APPENDIX A

APPENDIX A1

U.S. FISH AND WILDLIFE SERVICE PLANNING AID INPUT

Completed by U.S. Fish and Wildlife Service, Lafayette, Louisiana

August 13, 2003

Louisiana Coastal Area Comprehensive Study
Fish and Wildlife Benefits Evaluation

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A team of scientists led by Dr. Robert Twilley of the University of Louisiana at Lafayette (LCA Modeling Team) is assisting the development and evaluation of restoration alternatives for the Louisiana Coastal Area Comprehensive Study (LCA). That team has developed a comprehensive modeling approach which utilizes numerical modeling and coarser-scale "desktop" modeling to forecast wetland conditions under future without-project (FWOP) and future with-project (FWP) scenarios. The numerical modeling includes the use of hydrodynamic, ecological, and water quality simulation models to predict hydroperiod, salinity, and sediment distribution. The desktop modeling has involved the development of a set of modules to convert numerical modeling results into landscape and ecological responses (e.g., acres of wetlands created). Outputs from the numerical models are utilized in the desktop models at different time intervals and space scales to predict habitat change, habitat loss, salinity, and a host of other pertinent variables. Desktop modules developed for this study include 1) Land-Building, 2) Habitat Switching, 3) Water Quality and 4) Habitat Use.

The Habitat Use module provides a methodology for estimating the impacts of restoration alternatives on fish and wildlife resources in the study area. That methodology is very similar to the Habitat Evaluation Procedures (HEP) developed by the U.S. Fish and Wildlife Service (Service). Twelve representative species/species groups of fish, shellfish, and wildlife were selected for evaluation, and include white shrimp, brown shrimp, American oyster, Gulf menhaden, spotted seatrout, Atlantic croaker, largemouth bass, American alligator, muskrat, mink, river otter, and dabbling ducks. The Service's published Habitat Suitability Index (HSI) models for the fish and shellfish species were modified to only include those variables for which output would be available from numerical or other desktop models. Important variables for those species included salinity, temperature, water depth, and percent wetland area. Models for the wildlife species were developed with methods similar to those used for the fish and shellfish models. All of the wildlife models utilized three variables, i.e., habitat type, percent wetland area, and water depth.

Originally, the Service intended to use the Habitat Use module outputs to determine impacts to fish and wildlife resources in the study area. Several inconsistencies and problems were noted, however, when comparing outputs among restoration alternatives and across the four coastal Subprovinces. Of particular concern is the projected increase in habitat values for most of the evaluation species under the No Action alternative and the inverse relationship between wetland dependent wildlife benefits and increases in their preferred habitats under some scenarios. Therefore, the Service decided to use an interim method to determine impacts to fish and wildlife until the LCA numerical and desktop models are further refined to more accurately project impacts to fish and wildlife resources. The Service fully intends to continue assisting the LCA

Modeling Team and the other involved agencies as part of an ongoing effort to refine model outputs. The Service fully recognizes that the plan selection process is ongoing, and that the estimates presented here reflect a set of wetland restoration measures that continues to be refined. Therefore, the benefit estimates presented in this evaluation should be viewed as interim values.

Evaluation Methodology

To determine impacts of the Preferred Plan on fish and wildlife resources, the Service used a modification of the HEP. Biologists with the USACE, Louisiana Department of Wildlife and Fisheries, and the Service selected 10 of the 12 evaluation species from the Habitat Use module. The species selected represent fish and wildlife resources which utilize the full range of coastal wetland habitats, from swamp to saline marsh. Estuarine-dependent species selected for evaluation include Atlantic croaker, spotted seatrout, Gulf menhaden, brown shrimp, and white shrimp. Wildlife species selected for evaluation include mink, river otter, muskrat, American alligator, and dabbling ducks. The largemouth bass was not selected as an evaluation species because its HSI model is primarily used for lacustrine and riverine habitats, not estuarine habitats. Therefore, it was difficult to draw inferences from the published HSI model and apply them to estuarine habitats, as was done for the other evaluation species. In addition, largemouth bass prefer low-salinity habitats such as fresh and intermediate marsh; thus, benefits to that species could be inferred from benefits to other low-salinity species (e.g., dabbling ducks and American alligator). In addition, the American oyster was not selected as an evaluation species because it is not impacted by the quality of emergent wetland habitat. Habitat suitability for each of the selected species is dependent on emergent wetland habitat conditions.

To determine impacts on each evaluation species, the Service incorporated habitat change and wetland acres projected by the LCA numerical and desktop models and an HSI for each species for each wetland type into the HEP methodology to determine impacts in terms of net Average Annual Habitat Units (AAHUs). To derive AAHUs, a species' HSI for a specific habitat type is multiplied by the acreage of that habitat type to obtain Habitat Units, which are annualized over the evaluation period (i.e., 50 years). Net AAHUs represents the difference in AAHUs between the Preferred Plan, and No Action conditions.

Because the models used to project future habitat types assigned a single average salinity value to a very large area or "salinity box", salinities are essentially averaged across those areas. In some cases, this has eliminated actual salinity gradients and caused unexpected shifts in projected salinities (those shifts appear at target year 10, the first future projection). Not having a better method for projecting future habitat type changes, the Service has used the existing habitat type data until the methodology can be improved.

HSI values for each wetland type were derived for the wildlife species using the wetland type-habitat suitability relationships found in the LCA Habitat Use module. For the estuarine-dependent species, HSI values were provided by the National Marine Fisheries Service utilizing the published salinity-habitat suitability relationships found in each species' HSI model. The HSI values for each evaluation species, by wetland type, are displayed in Table 1.

Table 1. HSI Values for each Evaluation Species by Wetland Type

Evaluation Species	Swamp	Fresh Marsh	Intermediate Marsh	Brackish Marsh	Saline Marsh
Atlantic Croaker	0	0.4	0.8	1.0	0.6
Spotted Seatrout	0	0.1	0.2	0.5	0.9
Gulf Menhaden	0	0.2	0.4	0.6	0.9
Brown Shrimp	0	0.1	0.3	0.8	1.0
White Shrimp	0	0.2	1.0	1.0	0.7
Mink	0.68	0.40	0.29	0.24	0
River Otter	0.68	0.39	0.67	1.0	0
Muskrat	0.04	0.21	0.11	1.0	0.43
American Alligator	0.26	0.55	1.0	0.55	0
Dabbling Ducks	0.66	1.0	0.69	0.66	0.08

Evaluation of the Preferred Plan

Subprovince 1

In this Subprovince, restoration features of the Preferred Plan are as follows: 1) a 5,000 cubic feet per second (cfs) diversion into the Maurepas Swamp at Convent/Blind River; 2) a 1,000 cfs diversion into the Maurepas Swamp at Hope Canal; 3) a 10,000 cfs diversion into the Breton Sound Basin at White's Ditch; 4) a 110,000 cfs diversion into the Breton Sound Basin at American/California Bay with sediment enrichment; 5) a 12,000 cfs diversion at Bayou Lamoque; 6) Seabrook salinity control structure; 7) optimize Caernarvon Freshwater Diversion Project to optimize marsh creation; 8) opportunistic use of the Bonnet Carre Spillway; 9) gap Amite River Diversion Canal spoil banks; 9) restore Labranche wetlands through sediment delivery; 10) rehabilitate and operate the Violet Siphon; 11) study the diversion of freshwater from the Mississippi River through the IHNC; and 12) nourish land bridge marshes.

Under the No Action Alternative, wetland loss continues with over 47,000 acres lost by year 50. Under the Preferred Plan, wetland acreage would increase through deltaic land-building resulting in a gain of over 118,000 acres by year 50. Compared to the No Action Alternative, the Preferred Plan would result in a gain of over 166,700 wetland acres (Table 2) at year 50. Freshwater diversion associated with the Preferred Plan would also increase fresh and

intermediate marsh acreages, compared to the No Action Alternative under which the acreage of all habitat types would decrease between years 10 and 50. The proposed diversions into brackish and/or saline marsh areas (White's Ditch, American/California Bay, and Bayou Lamoque) would result in greater amounts of fresh and intermediate marsh, at the expense of brackish and saline marsh, compared to No Action.

Table 2. Subprovince 1 wetland type distribution (acres) for the No Action and Preferred Plan Alternatives

Subprovince 1 - No Action Alternative

Wetland type	acres00	acres10	acres20	acres30	acres40	acres50
Fresh marsh	71,279	218,350	215,393	211,989	210,104	207,760
Intermediate marsh	160,752	101,797	101,113	99,948	99,045	98,156
Brackish marsh	180,441	151,820	150,303	148,071	146,116	142,972
Saline marsh	113,149	61,278	58,879	58,241	55,652	54,802
Swamp	353,904	336,154	333,897	331,680	329,497	327,350
Total wetlands	879,525	869,399	859,586	849,929	840,414	831,040

Subprovince 1 - Preferred Plan Alternative

Wetland type	acres00	acres10	acres20	acres30	acres40	acres50
Fresh marsh	71,279	231,822	245,951	263,623	282,554	300,482
Intermediate marsh	160,752	225,491	242,345	252,678	261,799	269,920
Brackish marsh	180,441	63,800	62,750	62,099	61,086	60,190
Saline marsh	113,149	56,738	55,297	54,485	52,360	51,558
Swamp	353,904	329,470	325,290	321,915	319,112	315,646
Total wetlands	879,525	907,320	931,632	954,801	976,912	997,796

Of the five wildlife species evaluated, four would benefit from the proposed restoration features associated with the Preferred Plan. Mink, which prefer swamp and fresh and intermediate marsh, would benefit from the projected increase in those wetland types. Overall, mink habitat value, in terms of AAHUs, would increase by 5.7 percent. The American alligator and dabbling ducks also prefer fresher environments and, thus, would benefit from the projected increase in fresh and intermediate marshes. Habitat value for the American alligator and dabbling ducks would increase by 22.2 percent and 11.7 percent, respectively. The river otter prefers brackish marsh, but swamp, fresh marsh, and intermediate marsh also provide desirable habitat for that species. Although brackish marsh would decline with the Preferred Plan, the projected increase in swamp and fresh and intermediate marshes would offset the predicted loss of the otter's preferred habitat, brackish marsh. Therefore, the HEP analysis indicates that the Preferred Plan would result in a 5.5 percent increase in AAHUs for the river otter. The muskrat is the only evaluation species, which would be negatively impacted by the Preferred Plan. Brackish marsh is considered its preferred habitat and has a much higher value for that species than fresh and intermediate marshes. Due to the anticipated decline in brackish marsh acreage, a net decrease in muskrat AAHUs of 19.7 percent is projected under FWP conditions. Table 3 displays AAHUs by wetland type for each of the evaluation species.

Table 3. Impacts (AAHUs) of the Preferred Plan Alternative on coastal wildlife in Subprovince 1

Wetland Type	Mink		Otter		Muskrat		Alligator		Dabbling Ducks	
	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan
Fresh	55,262	73,435	53,880	71,600	29,012	38,554	75,985	100,974	138,155	183,589
Intermediate	37,723	62,131	87,154	143,544	14,309	23,567	130,080	214,245	89,755	147,829
Brackish	38,899	29,164	162,081	121,518	162,081	121,518	89,145	66,835	106,974	80,202
Saline	0	0	0	0	59,407	26,495	0	0	11,052	4,929
Swamp	340,892	335,157	231,807	227,907	13,636	13,406	88,632	87,141	224,989	221,204
Total	**472,777**	**499,888**	**534,922**	**564,568**	**278,445**	**223,539**	**383,842**	**469,194**	**570,925**	**637,752**

Four of the five fish species evaluated would be adversely affected by the Preferred Plan Alternative (Table 4). Atlantic croaker, Gulf menhaden, and white shrimp typically utilize low-salinity habitats as juveniles and more brackish habitats as subadults and adults. Of those species, white shrimp would receive a minute positive effect under the Preferred Plan and Atlantic croaker would experience a minute negative impact. Gulf menhaden would experience a moderate decrease of 16.8 percent in AAHUs. In response to the loss of their preferred brackish habitats, spotted seatrout and brown shrimp would experience greater decreases in AAHUs of 27.6 percent and 24.7 percent, respectively.

Table 4. Impacts (AAHUs) of Preferred Plan Alternative on coastal fisheries in Subprovince 1

Wetland Type	Croaker		Menhaden		Spotted Seatrout		White Shrimp		Brown Shrimp	
	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan
Fresh	55,262	73,435	27,631	36,718	13,815	18,359	55,262	73,435	13,815	18,359
Intermediate	104,064	171,396	52,032	85,698	26,016	42,849	130,080	214,245	39,024	64,273
Brackish	162,081	121,518	97,249	72,911	81,041	60,759	162,081	121,518	129,665	97,214
Saline	82,893	36,969	124,339	55,454	124,339	55,454	110,524	49,293	138,155	61,616
Swamp	0	0	0	0	0	0	0	0	0	0
Total	**404,300**	**403,318**	**301,251**	**250,780**	**245,211**	**177,421**	**457,947**	**458,490**	**320,659**	**241,462**

Subprovince 2

Restoration features of the Preferred Plan include: 1) a 5,000 cfs diversions at Edgard with sediment enrichment; 2) a 5,000 cfs pulsed diversion at Myrtle Grove; 3) a 60,000 cfs diversion at Fort Jackson with sediment enrichment; 4) wetland creation; 5) barrier island restoration; 6) reauthorization of the Davis Pond Diversion at 5,000 cfs; 7) initiate the Mississippi River Delta Management Study; and 8) the Third Delta freshwater and sediment diversion.

Under the No Action Plan an additional 163,000 acres of wetlands would be lost over 50 years. Implementation of the Preferred Plan would reduce that loss to less than 58,000 acres. Over 50 years, the net effect of the Preferred Plan would be to save almost 106,000 wetland acres. The No Action alternative used for this analysis does not include the Davis Pond Freshwater Diversion Project. The Service believes that the current LCA modeling analysis for No Action, which included the Davis Pond Diversion, does not accurately project the likely distribution of wetland types in the Barataria Basin.

The Preferred Plan would cause a shift toward fresher conditions in Subprovince 2 compared to the No Action Alternative. The diversions at Myrtle Grove and Fort Jackson would result in greater amounts of fresh and intermediate marsh, at the expense of brackish marsh, compared to the No Action scenario. Those diversions, with the associated sediment enrichment, would also result in the restoration/creation of several thousand acres of wetlands. Habitat distribution with this alternative compared to the No Action alternative is shown in Table 5. However, the Service believes that the current LCA modeling analysis for the Preferred Plan, which indicates that no brackish and saline marsh would exist at year 10, is inaccurate. Refinement of model output is planned in the future.

Table 5. Subprovince 2 wetland type distribution (acres) for the No Action and Preferred Plan Alternatives

Subprovince 2 - No Action Alternative

Wetland type	acres00	acres10	acres20	acres30	acres40	acres50
Fresh marsh	180,876	306,490	290,379	275,368	260,297	244,994
Intermediate marsh	85,267	996	750	747	494	488
Brackish marsh	65,338	107,558	87,039	70,958	59,271	52,168
Saline marsh	117,809	0	0	0	0	0
Swamp	294,397	289,559	290,879	289,560	286,968	282,291
Total wetlands	743,687	704,602	669,046	636,633	607,030	579,940

Subprovince 2 - Preferred Plan Alternative

Wetland type	acres00	acres10	acres20	acres30	acres40	acres50
Fresh marsh	180,876	321,531	317,750	308,436	299,097	289,385
Intermediate marsh	85,267	152,727	150,297	141,436	131,829	122,469
Brackish marsh	65,338	0	0	0	0	0
Saline marsh	117,809	0	0	0	0	0
Swamp	294,397	283,288	281,021	277,855	274,526	274,018
Total wetlands	743,687	757,547	749,068	727,726	705,452	685,872

Except for muskrat, each of the wildlife species evaluated would benefit from the proposed restoration features associated with the Preferred Plan. The American alligator and dabbling ducks would benefit the most with 21.1 percent and 9.1 percent increases in AAHUs, respectively. Mink, which prefers swamp and fresh marsh, would also benefit from the projected increase in those wetland types. Overall, mink AAHUs would increase by 4.0 percent. The river otter prefers brackish marsh, but swamp, fresh marsh, and intermediate marsh also provide desirable habitat for that species. Although brackish marsh would decline with this alternative, the projected increase in swamp and fresh and intermediate marshes would offset the loss of the otter's preferred habitat. Our analysis indicates that the Preferred Plan would result in a 5.5 percent increase in AAHUs for the river otter. Brackish marsh is considered preferred muskrat habitat and has a much higher value for that species than fresh and intermediate marshes. The projected reduction in brackish marsh, compared to the No Action Alternative, results in a 10.0 percent decrease in AAHUs for the muskrat. Table 6 displays AAHUs by wetland type for each of the evaluation species.

Table 6. Impacts (AAHUs) of the Preferred Plan on coastal wildlife in Subprovince 2

Wetland Type	Mink		Otter		Muskrat		Alligator		Dabbling Ducks	
	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan
Fresh	84,918	93,618	82,795	91,278	44,582	49,150	116,762	128,725	212,294	234,046
Intermediate	12,680	30,014	29,296	69,342	4,810	11,385	43,725	103,496	30,170	71,412
Brackish	14,132	7,997	58,884	33,322	58,884	33,322	32,386	18,327	38,864	21,993
Saline	0	0	0	0	25,836	25,836	0	0	4,807	4,807
Swamp	288,465	284,411	196,156	193,400	11,539	11,376	75,001	73,947	190,387	187,711
Total	**400,195**	**416,041**	**367,131**	**387,342**	**145,650**	**131,068**	**267,874**	**324,495**	**476,521**	**519,969**

Of the five fish species evaluated, all but brown shrimp would benefit under the Preferred Plan (Table 7). Brown shrimp, which prefer brackish marshes, would experience a very slight decrease in AAHUs. Atlantic croaker, Gulf menhaden, and white shrimp, which typically utilize low-salinity habitats as juveniles and more-brackish habitats as subadults and adults, would receive the greatest benefits (AAHU increases of 14.4 percent, 8.7 percent, and 18.2 percent, respectively). Those benefits, derived largely from a substantial increase in marsh acreage through deltaic landbuilding, would more than offset the adverse affects of the conversion of brackish habitats to fresher habitats. For spotted seatrout, the negative effects of losing the brackish marsh under the Preferred Plan would be compensated for by the beneficial effects of substantial deltaic land building and increases in low-salinity habitat acreages.

Table 7. Impacts (AAHUs) of the Preferred Plan on coastal fisheries in Subprovince 2

Wetland Type	Croaker		Menhaden		Spotted Seatrout		White Shrimp		Brown Shrimp	
	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan
Fresh	84,918	93,618	42,459	46,809	21,229	23,405	84,918	93,618	21,229	23,405
Intermediate	34,980	82,797	17,490	41,398	8,745	20,699	43,725	103,496	13,117	31,049
Brackish	58,884	33,322	35,331	19,993	29,442	16,661	58,884	33,322	47,107	26,658
Saline	36,050	36,050	54,074	54,074	36,050	36,050	48,066	48,066	60,083	60,083
Swamp	0	0	0	0	0	0	0	0	0	0
Total	**214,831**	**245,787**	**149,354**	**162,275**	**95,466**	**96,814**	**235,593**	**278,502**	**141,537**	**141,194**

Subprovince 3

Features of the Preferred Plan are as follows: 1) a 1,000 cfs pump at Bayou Lafourche; 2) features to convey Atchafalaya River water to the eastern Terrebonne marshes; 3) freshwater introduction via Blue Hammock Bayou and south of Lake DeCade; 4) the Penchant Basin Restoration Plan; 5) relocation of the Atchafalaya River navigation channel to Shell Island Pass; 6) increased sediment transport down the Wax Lake Outlet; 7) modification of operation of the Old River Control structure; 8) multi-purpose operation of the Houma Navigation Canal Lock; 9) maintain north Cote Blanche Bay shore; 10) rebuild the Pointe Chevreuil reef; 11) restore the Isle Dernieres and Timbalier Islands; 12) restore and maintain the landbridge between Sister Lake and the Gulf; and 13) armor the Pointe au Fer Gulf shoreline.

At year 50, wetland loss under the No Action Plan (over 203,000 acres) would be greater in Subprovince 3 than in any other Subprovince. The Preferred Plan would reduce that loss to less than 84,000 acres. That loss would be the greatest Preferred Plan loss of any Subprovince. However, over 50 years, the Preferred Plan would save over 119,000 wetland acres in Subprovince 3, compared to the No Action Alternative.

According to model projections at year 50, the Preferred Plan would save substantially more fresh marsh than would the No Action alternative. Marsh-building processes on the Atchafalaya and Wax Lake Deltas would be made more efficient with relocation of the navigation channel and sediment enrichment of the Wax Lake Outlet. The Penchant Basin Restoration Plan would improve the health and productivity of flotant marsh in western Terrebonne and greater volumes of fresh water, sediments, and nutrients would be delivered to marshes south of the Penchant Basin. Conveyance of Atchafalaya River water to marshes in eastern Terrebonne would improve productivity and reduce marsh loss in areas where marine processes are advancing inland. Under the Preferred Plan, brackish marsh would decrease nearly 20 percent over 50 years, saline marsh would increase by over 200 percent, and swamp would decrease by nearly 4 percent. Habitat distribution for this alternative, compared to the No Action alternative, is shown in Table 8.

Table 8. Wetland type distribution (acres) at year 50 for Subprovince 3 for the No Action and the Preferred Plan Alternatives

Subprovince 3 - No Action Alternative

Wetland type	acres00	Acres10	acres20	acres30	acres40	acres50
Fresh marsh	341,733	39,008	38,143	37,981	36,677	33,294
Intermediate marsh	193,569	647,998	645,519	639,828	627,832	619,079
Brackish marsh	201,216	100,504	86,608	69,219	55,812	40,046
Saline marsh	113,513	61,496	41,509	25,620	12,985	5,355
Swamp	388,811	339,603	331,847	331,263	334,418	337,828
Total wetlands	1,238,841	1,188,609	1,143,626	1,103,911	1,067,724	1,035,601

Subprovince 3 - Preferred Plan Alternative

Wetland type	acres00	Acres10	acres20	acres30	acres40	acres50
Fresh marsh	341,733	221,320	214,225	203,142	188,130	175,592
Intermediate marsh	193,569	553,530	565,762	578,639	594,813	605,659
Brackish marsh	201,216	35,430	33,706	33,033	32,436	32,088
Saline marsh	113,513	74,540	54,970	37,977	23,936	16,490
Swamp	388,811	340,952	335,023	331,678	329,060	325,335
Total wetlands	1,238,841	1,225,772	1,203,685	1,184,469	1,168,376	1,155,164

Each of the five wildlife species evaluated would benefit from the proposed restoration features associated with the Preferred Plan Alternative. Muskrat, American alligator, and dabbling ducks would benefit the most, with 4.9 percent, 4.9 percent and 7.4 percent increases in AAHUs, respectively. Except for the muskrat, each of those species prefer fresher marshes, which would occur in substantially greater acreages with this alternative. Although the river otter and muskrat prefer brackish marsh, the projected increase in fresh and saline marshes would offset the relatively minor decrease in their preferred habitat. Table 9 displays AAHUs by wetland type for each of the evaluation species.

Table 9. Impacts (AAHUs) of the Preferred Plan Alternative on coastal wildlife in Subprovince 3

Wetland Type	Mink		Otter		Muskrat		Alligator		Dabbling Ducks	
	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan
Fresh	76,239	104,130	74,333	101,526	40,026	54,668	104,829	143,178	190,598	260,324
Intermediate	116,600	114,693	269,386	264,980	44,228	43,504	402,069	395,493	277,428	272,890
Brackish	29,338	28,402	122,243	118,343	122,243	118,343	67,233	65,089	80,680	78,107
Saline	0	0	0	0	26,022	28,368	0	0	4,841	5,278
Swamp	363,829	357,708	247,404	243,241	14,553	14,308	94,596	93,004	240,127	236,087
Total	**586,006**	**604,933**	**713,366**	**728,091**	**247,071**	**259,192**	**668,727**	**696,764**	**793,674**	**852,685**

The Preferred Plan would benefit all five fish species evaluated (Table 10). For species such as Atlantic croaker, Gulf menhaden, and white shrimp, which typically utilize low-salinity habitats as juveniles and more-brackish habitats as subadults and adults, those benefits are likely due to the substantial increase in fresh marsh acreage. Brackish marsh species such as brown shrimp and spotted seatrout would also benefit by increased acreage of fresh marsh habitat. Those increases, together with the increased acreage of saline marsh, would more than compensate for the small loss of preferred brackish marsh habitat, and would result in a small positive benefit for spotted seatrout (4.0 percent) and a slight increase for brown shrimp (2.5 percent) under the Preferred Plan.

Table 10. Impacts (AAHUs) of the Preferred Plan Alternative on Coastal Fisheries in Subprovince 3

Wetland Type	Croaker		Menhaden		Spotted Seatrout		White Shrimp		Brown Shrimp	
	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan
Fresh	76,239	104,130	38,120	52,065	19,060	26,032	76,239	104,130	19,060	26,032
Intermediate	321,655	316,394	160,828	158,197	80,414	79,099	402,069	395,493	120,621	118,648
Brackish	122,243	118,343	73,346	71,006	61,121	59,172	122,243	118,343	97,794	94,675
Saline	36,309	39,583	54,464	59,374	54,464	59,374	48,412	52,777	60,515	65,971
Swamp	0	0	0	0	0	0	0	0	0	0
Total	**556,446**	**578,450**	**326,757**	**340,642**	**215,059**	**223,677**	**648,963**	**670,743**	**297,990**	**305,326**

Subprovince 4

Preferred Plan restoration features are as follows: 1) salinity control at Oyster Bayou, Long Point Bayou, Black Lake Bayou, Alkali Ditch, Black Bayou, and the Highway 82 Causeway; 2) modification of the existing Cameron-Creole Watershed structures; 3) the East Sabine Hydrologic Restoration Project; 4) freshwater introduction at Pecan Island, Rollover Bayou, Highway 82, Little Pecan Bayou, and South Grand Chenier; 5) shoreline stabilization along the Gulf of Mexico; 6) beneficial use of dredged material along the Calcasieu Ship Channel; and 7) introduction of fresh water via the Sabine Irrigation Canal.

Under the Preferred Plan, wetland loss over 50 years would be limited to slightly more than 8,000 acres. However, under the No Action Alternative, the 50 year wetland loss would exceed 47,000 acres. Over the 50 year project life, the Preferred Plan Alternative would save over 39,000 wetland acres compared to the No Action Alternative.
The Preferred Plan Alternative, which utilizes perimeter structural salinity control and small freshwater diversions, would reduce the encroachment of marine processes and protect fresh and intermediate mashes throughout Subprovince 4. Consequently, under the Preferred Plan, the acreage of fresh and intermediate marshes would increase and brackish marsh acreage would

decrease, compared to the No Action Alternative. Habitat distribution for those alternatives is shown in Table 11.

Table 11. Wetland type distribution (acres) at year 50 for Subprovince 4 for the No Action and Preferred Plan Alternatives

Subprovince 4 - No Action Alternative

Wetland type	acres00	Acres10	acres20	acres30	acres40	acres50
Fresh marsh	346,923	327,770	329,149	322,709	317,432	312,800
Intermediate marsh	284,702	252,741	252,199	247,418	242,973	238,517
Brackish marsh	137,529	203,099	210,131	207,889	205,021	202,292
Saline marsh	30,307	0	0	0	0	0
Swamp	3,674	2,493	2,325	2,301	2,269	2,239
Total wetlands	803,134	786,103	793,804	780,317	767,695	755,848

Subprovince 4 - Preferred Plan Alternative

Wetland type	acres00	Acres10	acres20	acres30	acres40	acres50
Fresh marsh	346,923	329,535	335,420	331,951	328,759	326,685
Intermediate marsh	284,702	319,515	321,051	317,444	314,143	310,088
Brackish marsh	137,529	144,385	153,770	156,162	153,788	155,884
Saline marsh	30,307	0	0	0	0	0
Swamp	3,674	2,505	2,359	2,347	2,330	2,311
Total wetlands	803,134	795,940	812,599	807,903	799,020	794,968

Of the five wildlife species evaluated, all but muskrat would benefit from the proposed restoration features associated with the Preferred Plan Alternative. Mink, river otter, American alligator, and dabbling ducks would benefit with 3.0 percent, 0.7 percent, 4.9 percent, and 2.6 percent increases in AAHUs, respectively. Each of those species, except the river otter, prefers the fresher wetland types such as fresh and intermediate marsh, which would occur in substantially greater acreages with this alternative. Although the river otter prefers brackish marsh, the projected increase in fresh and intermediate marsh would offset the loss of its preferred habitat. The muskrat, however, would experience a 6.4 percent reduction in habitat value due to brackish marsh decreases under the Preferred Plan. Table 12 displays AAHUs by wetland type for each evaluation species.

Table 12. Impacts (AAHUs) of the Preferred Plan Alternative on coastal wildlife in Subprovince 4

Wetland Type	Mink		Otter		Muskrat		Alligator		Dabbling Ducks	
	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan
Fresh	132,081	134,802	128,779	131,432	69,343	70,771	181,611	185,353	330,202	337,006
Intermediate	76,001	86,171	175,588	199,084	28,828	32,685	262,071	297,141	180,829	205,027
Brackish	40,623	35,166	169,263	146,523	169,263	146,523	93,095	80,588	111,714	96,705
Saline	0	0	0	0	6,646	6,646	0	0	1,237	1,237
Swamp	2,970	3,006	2,020	2,044	119	120	772	782	1,961	1,984
Total	**251,675**	**259,145**	**475,650**	**479,084**	**274,199**	**256,747**	**537,550**	**563,864**	**625,942**	**641,959**

Compared to the No Action Alternative, Atlantic croaker, Gulf menhaden, and white shrimp, which utilize low salinity marshes as nursery habitat, would be benefited under the Preferred Plan Alternative. Those benefits are likely due to increases in fresh and intermediate marsh acreages under this alternative. Species such as spotted seatrout and brown shrimp would also benefit from gains in fresh and intermediate marsh. However, those benefits would not compensate for the substantial loss of preferred brackish marsh habitat. As a result, spotted seatrout and brown shrimp would experience small decreases in AAHUs of 2.0 percent and 2.7 percent, respectively.

Table 13. Impacts (AAHUs) of the Preferred Plan Alternative on coastal fisheries in Subprovince 4

Wetland Type	Croaker		Menhaden		Spotted Seatrout		White Shrimp		Brown Shrimp	
	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan	No Action	Preferred Plan
Fresh	132,081	134,802	66,040	67,401	33,020	33,701	132,081	134,802	33,020	33,701
Intermediate	209,657	237,713	104,829	118,856	52,414	59,428	262,071	297,141	78,621	89,142
Brackish	169,263	146,523	101,558	87,914	84,632	73,262	169,263	146,523	135,410	117,219
Saline	9,274	9,274	13,911	13,911	13,911	13,911	12,365	12,365	15,457	15,457
Swamp	0	0	0	0	0	0	0	0	0	0
Total	**520,275**	**528,312**	**286,338**	**288,082**	**183,977**	**180,301**	**575,781**	**590,832**	**262,509**	**255,518**

Coastwide Benefits Summary

The coastwide effects of the Preferred Plan Alternative for each Subprovince would include a substantial increase in fresh marsh, a moderate increase in intermediate marsh, a substantial reduction in brackish marsh, a small gain in saline marsh, and a slight decrease in swamp (Table 14). Thus, the Preferred Plan Alternative would result in a combined net increase of over 431,000 wetland acres at year 50, compared to the No Action scenario.

Table 14. Coastwide wetland type distribution (acres) at year 50 for the No Action and the Preferred Plan Alternatives

Coastwide wetland acreage - No Action Alternative

Wetland type	acres00	Acres10	acres20	acres30	acres40	acres50
Fresh marsh	940,811	891,618	873,064	848,047	824,509	798,847
Intermediate marsh	724,289	1,003,532	999,582	987,941	970,344	956,240
Brackish marsh	584,524	562,981	534,080	496,138	466,220	437,477
Saline marsh	374,778	122,774	100,388	83,861	68,637	60,157
Swamp	1,040,785	967,809	958,948	954,803	953,153	949,707
Total wetlands	3,665,188	3,548,713	3,466,062	3,370,791	3,282,862	3,202,429

Coastwide wetland acreage - Preferred Plan Alternative

Wetland type	acres00	Acres10	acres20	acres30	acres40	acres50
Fresh marsh	940,811	1,104,208	1,113,345	1,107,151	1,098,540	1,092,144
Intermediate marsh	724,289	1,251,263	1,279,454	1,290,197	1,302,585	1,308,136
Brackish marsh	584,524	243,615	250,226	251,294	247,311	248,162
Saline marsh	374,778	131,278	110,267	92,462	76,296	68,047
Swamp	1,040,785	956,215	943,694	933,795	925,028	917,310
Total wetlands	3,665,188	3,686,579	3,696,985	3,674,899	3,649,759	3,633,799

By year 50 under the No Action Alternative, loss of coastal wetlands would continue with nearly 463,000 acres being lost. However, under the Preferred Plan Alternative, those losses would be nearly eliminated with only 31,389 acres being lost under the Preferred Plan Alternative. Under the No Action Alternative, the acreage of all habitat types would decrease, except for intermediate marsh, which might increase. Saline marsh would experience the greatest decrease (60 percent) over 50 years. Because the drastic shifts in saline and intermediate marsh acreage are projected to occur by year 10, they may be unrealistic artifacts of the salinity projection methodology. Future refinement of the methodology may yield estimates depicting a more gradual change in habitat type acreages.

Coastwide effects on evaluated fish and wildlife species reflect the acreage changes of the various wetland types. Due to the large increase in their preferred fresh and intermediate habitats, dabbling ducks and the American alligator would be most benefited, with a 10.6 and 7.5 percent increases in AAHUs, respectively (Table 15). Other fish and wildlife that utilize low-salinity habitats, such as mink, Atlantic croaker, and white shrimp, would also benefit, but to a

lesser degree. However, Gulf menhaden, which utilize low-salinity habitats as juveniles, would experience a coastwide 2.1 percent decrease in AAHUs (due to the substantial impacts of the Preferred Plan in Subprovince 1). Consistent with the decrease in brackish marsh acreage, species which prefer brackish habitats (such as muskrat, spotted seatrout, and brown shrimp), would experience decreases in AAHUs of 7.9 percent, 8.3 percent, and 7.7 percent, respectively.

Table 15. Coastwide impacts (AAHUs) on fish and wildlife at year 50 for the No Action and the Preferred Plan Alternatives

Species	No Action Alternative	Preferred Plan Alternative	Difference	Percent Change
Mink	1,710,654	1,780,006	69,353	4.1
Otter	2,091,068	2,159,085	68,017	3.3
Muskrat	945,364	870,546	-74,818	-7.9
Alligator	1,857,992	2,054,316	196,324	10.6
Dabbling Ducks	2,467,062	2,652,365	185,303	7.5
Atlantic Croaker	1,695,852	1,755,867	60,015	3.5
Gulf Menhaden	1,063,699	1,041,780	-21,919	-2.1
Spotted Seatrout	739,713	678,213	-61,500	-8.3
White Shrimp	1,918,283	1,998,567	80,284	4.2
Brown Shrimp	1,022,695	943,500	-79,195	-7.7

APPENDIX A2

PEIS MAIL LIST

APPENDIX A2

PEIS MAIL LIST

Business (Dredging Construction Oil and Gas Companies)

Count: 55

Apache Louisiana Minerals, Inc. Mr. John Woodard / Houma
Apache Louisiana Minerals, Inc. Scott Rosteet / Cameron
Avoca Inc. Mr. Paul Hogan / President / New Orleans
Bernard Mcmenamy Cont Inc Dredging Mar & Gen Contractors / Florissant
Berry Brothers Gen Contractors Inc. Attn: Weldon Miller / Berwick
Bud Brodtmann Environmental Professional Ltd / Metairie
Carr Oil Company Inc / Franklin
Castex Laterre, Inc / Houma
CF Bean Corporation Mr. William J. Ashy / Lafayette
Circle, Inc. / Belle Chasse
Cl Jack Stelly & Associates Inc / Lafayette
CNG Producing Company / New Orleans
Cockrell Oil Corporation / Houston
Conrad Industries Mr. J. Parker Conrad / President / Morgan City
David, Saunders & Miller / Metairie
Diamond Services Corporation / Morgan City
Engineering Development Group Inc / Metairie
Ford Construction Company Co / Dyerburg
Geological Consultant Robert P Waldron Inc / Metairie
George Strain Continental Land and Fur Co. Suite 500 / Metairie
Glynn Haines CO-MAR Offshore Corporation / Morgan City
Grand Isle Material Co Inc / Grand Isle
Grand Isle Shipyard Inc Robert Pregeant / Raceland
Grasso Services Division / Galveston
Gulf Coast Pre-stress Co Inc / Pass Christian
Hank Smart Roy O Martin Lumber Co Inc / Alexandria
Hydro Consultants Inc Mr. Ernest Gammon / Baton Rouge
J H Menge & Co. Attn: Buren Jones / New Orleans
Je Jumonville Contractor Inc / Plaquemine
John Connolly Shinteaux Env Ser / Baton Rouge
Kaiser Aluminum & Chemical Corp. Chairman Env. Department / Arabi
Larry Doiron Inc General Contracting / Morgan City
Luhr Bros Inc / Columbia
Massaman Construction Company / St. Louis
Matzinger Petroleum Company / Houston
Mike Plaisance Plaisance Dragline & Dredging Co Inc / Golden Meadow
Mr. Jim Porter Mid-Continent Oil & Gas / Baton Rouge
P Hutchinson Construction / New Orleans
Pontchartrain Materials Corp / New Orleans
Port Aggregates, Inc. Timothy J. Guinn / Lake Charles
Potashnick-Harrison Construction Company / Cape Girardeau
Rebstock Drilling Co / Kenner
Richard B. Koen Martin Marietta Aggregates / St. Rose
St. Mary Land & Exploration Co. Ms. Linda Ditsworth Suite 1100 / Denver
Stanley Stockstill Inc / St. Martinville
Swiftships Inc Mr. Robert Ness / President / Morgan City
T Baker Smith & Son Inc. / Houma
Tennessee Gas Pipeline Sugar Mill Point / Houma
Texaco Inc. / New Orleans
Thompson Marine Transport Mr. Bob Thompson / Morgan City
Trigon Exploration Inc / Lafayette
Walk Haydel's Assoc Mr. Frank H. Walk Chairman / New Orleans
WHC Inc / Lafayette
Williams Inc Mr. Hugh C Brown, Jr. / Patterson
Williams-McWilliams Co Inc / Metairie

Business (Levee Boards)

Count: 28

Amite River Basin Comm. Exe. Director: Dietmar Rietschier / Baton Rouge
Atchafalaya Basin Levee District Director William Tyson / Port Allen
Board of Commissioners Lake Charles Harbor And Terminal District / Lake Charles
Board of Commissioners Southeast Arkansas Levee District / Rohwer
Bossier Levee District / Benton
Caddo Levee District Administrator : Sam Windham / Shreveport
Campti-Clarence Levee District / Natchitoches
Cane River Levee and Drainage District / Natchitoches
City Parish Department of Public Works Fred Raiford, Director / Baton Rouge
Fifth Louisiana Levee District Madison Parish Courthouse / Tallulah
Grand Isle Independent Levee District David Camardelle / Grand Isle
Lafourche Basin Levee District Administrative Manager: Randy Trosclair / Vacherie
Lake Borgne Basin Levee District Robert Turner / Violet
Mr. Ed Preau C / Water Res Design & Dev Div LA-DOTD / Baton Rouge
Natchitoches Levee And Drainage District / Natchitoches
Nineteenth Louisiana Levee District / Colfax
North Bossier Levee District / Benton
Orleans Levee District Executive Director: Max Hearn / New Orleans
Pontchartrain Levee District Executive Director: Stephen Cupit / Lutcher
Red River, Atchafalaya, & Bayou Boeuf Levee District Vice President: Jessie Lachney / Alexandria
Red River-Bayou Pierre Levee and Drainage District / Coushatta

South Lafourche Levee District Executive Director: Windell Curole / Galliano
South Louisiana Tidal Water Control Levee District / Galliano
Teche-Vermillion Fresh Water District Executive Director: Jason Dupuis / Lafayette
Tensas Basin Levee District Executive Director : John Stringer / Monroe
Terrebonne Levee & Conservation Dist. Executive Director: Jerome Zeringue / Chauvin
West Cal Port Harbor and Terminal District John Dixon - Director / Sulphur
West Jefferson Levee District Exe. Director: Gerald Spohrer / Marrero

Business (Local and Other)

Count: 20

Arkansas State Bank Department / Little Rock
B.W. Farrell Inc. / Paducah
C & M Contractors, Inc. Attn: Kenny Daigle / Lafitte
Camp, Carmouche, Barsh, Hunter, Gray & Hoffman 9th Floor - La Saving Bldg / Lake Charles
Entergy / Gretna
Entergy Land & R/W Manager / New Orleans
Gravity Drainage Dist No 4 of Calcasieu Parish Louisiana Ken Boudreaux / Lake Charles
JC Seafood / Arabi
John Price SSA Gulf Terminals / New Orleans
Kansas City Southern Railway Company / Kansas City
Kathy Pitre Lafourche Telephone Co Inc / La Rose
Marilyn Smith Digital Engineering and Imaging Inc / Kenner
New Orleans International Airport / New Orleans
O'Neil Malbrough Shaw Coastal, Inc. / Houma
South Central Planning and Development Mr. Craig Roussel / Gray
Southern Railway System / Atlanta
St Charles Grain Elevator Attn: Darryl G. Peltier / Ama
Vinson & Elkins-Attys Mr. Larry W Nettles / Houston
Wally "The Gator" Landry President Crucial, Inc. / New Orleans
William L Yeates Jr. Director of Public Works / Covington

Business (Port Commissions) Area Clearinghouse and Planning Commissions

Count: 25

Board of Commissioners Harbor and Terminal District of St. Bernard Port / Chalmette
Board of Commissioners Morgan City Harbor And Terminal District / Morgan City
Board of Commissioners Vinton Harbor District / Vinton
Caddo-Bossier Parishes Port Comm / Shreveport
Crescent River Port Pilots Assoc. Mike Buccola / Belle Chasse
Dept of Planning, Zoning and Codes Executive Director Mr. John Raines / Lafayette
Executive Director Mr. John Lebourgeois-RPC Amoco Building / New Orleans
Grayling Hadnott Acadiana Regional Dev. Distr. / Lafayette
Greater Krotz Springs Port Commission / Krotz Springs
Greater Ouachita Port Commission / Monroe
Lafayette Area Planning Commission Mr. Roger Hedrick, Director / Lafayette
Mr. Channing F. Hayden, Jr. Steamship Association of Louisiana World Trade Center - Suite 2217 / New Orleans
N Delta Reg Plng & Dev District Federal Programs Review Coord. Ms. Judy Milton / Monroe
Nw Regional Clearinghouse Federal Programs Review Coord. Ms. Helen Esparaza / Shreveport
Ouachita Council of Governments Mr. David Creed / Monroe
Ouachita Port Commission Mr. Saul A. Mintz / President F. Strauss & Son Inc. / Monroe
Plaquemines Parish Government Plaq Port Harbor & Term Dist Andrew MacInnis-CAM / Belle Chasse
Port Manchac South Tangipahoa Port Commission / Ponchatoula
Port of Greater Baton Rouge David Beck Director of Engineering / Port Allen
Port of New Orleans Board of Commissioners Chief Engineer / New Orleans
Regional Planning Commission Federal Programs Review Coord. Karen Kirkland / Baton Rouge
South Central Planning & Development Ms. Marie Fertitta / Gray
South LA Port Commission Suite. 100 - Drawer K / LaPlace
Ted M. Falgout Greater Lafourche Port Commission / Galliano
Terrebonne Parish Council Waterways & Permit Committee Paul Labat / Houma

Coastal Restoration Branch Master List

Count: 1566

A. J. Planche Friends of Jean Lafitte Park / Marrero
A.J. Gibbs Crescent River Port Pilots' Association / Belle Chasse
Aaron Viles Gulf States Field Director U.S. Public Interest Research Group / New Orleans
Acadiana Regional Clearinghouse Grayling Hadnot Dir of Planning / Lafayette
Adam Babich Associate Professor Tulane Law School / New Orleans
Addison Ellis Private Citizen / Covington
Albert Prater Calcasieu Parish Police Jury Gov. Access Channel / Lake Charles
Albert S. Enos / Belle Chasse
Albin Champagne, Jr. / LaRose
Alex Mccorquodale UNO- Lakfront Dept. of Environmental and Civil Engineering / New Orleans
Alex Plaisance Louisiana Landowners Assoc. & Restore / Golden Meadow
Alexis Duval Houma-Terrebonne Chamber Crcl-ror / Houma
Alfred Lippman Lippman, Mahjouz and Martin / Morgan City
Allen Dupont Shaw Environmental, Inc. / Baton Rouge
Allied Towing Service Inc. Attn: Mr Gary Sercovitch / Venice
Alton Farbe / Ponchatoula
Amanda Phillips LA. DNR CRD / Baton Rouge
American Commercial Barge Line Co. Attn: Bryan Christy / New Orleans
American Commercial Barge Line Co. Attn: Port Captain / Jeffersonville
American Commercial Barge Line Co. Mr. Dennis M. Hill/dir-fleet O / Jeffersonville
American Press Brenda Merchant / Lake Charles
Ancil Taylor Bean Stuyvesant / New Orleans
Andrew Adams Citizen / Cut Off
Andrew and Manitca Hyde Small Business Owner / New Orleans
Andrew J. Lewis Publisher-The Woodville Republican /

Woodville
Andy Nyman LSU School of Renewable Resources / Baton Rouge
Ann Ballard Johnson Controls / Baton Rouge
Anne Perry LED / Patterson
Ansythe Exploration Co. Inc. 1030 Oil & Gas Building / New Orleans
Ante Lepetie / Harvey
Anthony Cross The Environmental Management Society / Baton Rouge
Apex Oil Co Attn: Capt Terry Philips / Port Allen
Archie Chaisson / Thibodeaux
Army Times & Federal Times / Springfield
Art & Mary Courville / Carencro
Arthur Lemann IV Lemann and Associates / New Orleans
Assoc Federal Coast Pilots / Metairie
Associated Branch Pilots / Metairie
Att: Peter Spotts Christian Science Monitor / Boston
Attorney J. Tomas Anderson / Hammond
Audubon Society-Natl Chrmn Field Research Director / Taverier
AUX, LLC / Thibodaux
B & H Towing Inc Attn: W N Lay / Paducah
B. Scott Higginbotham City of Lake Charles / Lake Charles
Barbara Benson Providence Engr. Suite 100 / Baton Rouge
Barbara Keeler U.S. EPA Region 6 / Dallas
Barry Guidry Business owner / Lafayette
Barry Hunt Hunt Homes Inc / Johnson Bayou
Barry Wilson Louisiana Department of Wildlife & Fisheries / Grand Chenier
Bayou Black Elementary School Ms. Cindy Gaudet / Houma
Bayou State Bowhunters Association / Homer
Beau Tate LA. DNR CRD / Baton Rouge
Ben Taylor / Hammond
Bernard Chaillot Lafayette Daily Advertiser / Youngsville
Berwick Bay Oil Co Inc. / Morgan City
Berwick Duval CCA / Houma
Beth Lundy / Lake Charles
Beul Knapp UNO / Metairie
Beverly Ethridge EPA Water Quality Russell B Long Fed Bldg / Baton Rouge
BG Merdith W.B. Temple-Commander US Army Eng. Division, North Atlantic Fort Hamilton Military Community / Brooklyn
Bienville Press / Arcadia
Big River Industries Attn: Jack Moore 1150-C Hungry Neck Blvd / Mount Pleasant
Bill Bagley Univ of La. Monroe / Monroe
Bill Branch LSU Ag Center / Baton Rouge
Bill Bruce J.G. Gray Est / Lake Charles
Bill Busch UNO Lakefront Campus Dept of Geol and Geophy / New Orleans
Bill Herke Citizens For A Clean Environment / Baton Rouge
Bill Kappel UNO / New Orleans
Bill Scaife BP / Covington
Bill Streever BP-Environemtal Studies Leader / Anchorage
Billy Broussard / Kaplan
Billy Nungesser / Belle Chasse
Bloomburg News Attn: Mary Schlangenstein / Dallas
Bo Bolourchi DOTD / Baton Rouge
Bo Walters Fenstermaker Suite 260 / Houston
Bob Crain Department of Environmental Quality Capitol Regional Office / Baton Rouge
Bob Faulk / LaRose
Bob Jacobson URS Suite 601 / Baton Rouge
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Bobby Hession / Creole
Bobby Hession Louisiana Department of Health / Cameron
Bonnie Lewis Florida Parishes Social Science Research Center-SLU / Hammond
Bordelon Bros Towing Attn: Mitch Danos / Lockport
BP & Exploration & Production Attn: Mr.Keith Hayles Gulf of Mexico Logistics Manager / Houston
Brad Miller LA. DNR CRD / Baton Rouge
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Brent Duet HNTB Suite J / Baton Rouge
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Bret Acosta / Garyville
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Brian Crother Biology Graduate Student Organization / Hammond
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Bruce J. Richards N-Y Associates Inc. / Metairie
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Buddy Leach / Lake Charles
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C.l. Briggs / Lake Charles
Cablevision of Shreveport News Director / Shreveport
Caddo Citizen / Vivian
Calcasieu Parish Police Jury Attn: Grant Bush CZM Administrator / Lake Charles
Calcasieu Parish Police Jury Deparment of Planning & Development / Lake Charles
Calcasieu Parish Police Jury Mr. Algie Breaux / Bell City
Calcasieu Parish Police Jury Mr. Charles S. Mackey, D.D.S / Lake Charles
Cameron Gravity Drainage Dist 7 President Curtis L. Trahan / Cameron
Cameron Parish Police Jury / Hackberry
Canal Barge Company Attn: Capt Paul Barnes / Belle Chasse
Capt. C.E. Clayton - Preside Nobra Pilots / Jefferson
Capt. Gustave P. Cramond Jr. / Gretna
Capt. O. T. Melvin Jr. / La Rose
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Carol Parsons / Baton Rouge
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Carolyn Woosley / Lake Charles
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Carrie Schmidt-DelaFuente LA. DNR CRD / Baton Rouge
Catahoula News / Jonesville
Catherine Grouchy PMC - Coastal Restoration Branch USFWS / New Orleans
Cenac Towing Co Inc Attn: Ray P Sick / Houma
Central Gulf Lines Attn: Mr. William B. Rudolf Suite 103 / Metairie
Chad Bourgeois / Cutoff

Chad Calder, Reporter The Daily Comet / Thibodaux
Chad Courville Ducks Unlimited Suite 180 / Lafayette
Charles Fryling Baton Rouge Audubon / Baton Rouge
Charles Harris WEEKS MARINE / Covington
Charles Kaplan VPCAC / Kaplan
Charles Ledet / Mongtegut
Charles Reppel / Chalmette
Charles Roche' Acadiana Bay Association / Broussard
Charles Simenstad / Seattle
Charpentier Towing Co / Houma
Cheryl Brodnax NMFS, Habitat Conservation Division Louisiana State University / Baton Rouge
Cheryl Wells QRIUC Suite 106 / Baton Rouge
Chester C. Watson / Fort Collins
Chris Cretini Johnson Controls / USGS / Lafayette
Chris Doley NOAA Restoration Center / Silver Spring
Chris Knotts LA. DNR CRD / Baton Rouge
Chris Williams LA. DNR CRD / Baton Rouge
Christian Spies / Pequabuck
Christopher J. Areas / Lafitte
Christopher M. Swarzenski US Geological Survey LA Dist Office - Suite 120 / Baton Rouge
Cindy Brown The Nature Conservancy / Baton Rouge
CJ Kiff West Cameron Port Comm / Cameron
C-K Associates ATTN: Cheryl Booth / Baton Rouge
C-K Associates Dan Strecker / Baton Rouge
C-K Associates, Inc. Ioannis Georgiou / Baton Rouge
Clark Allen LA. DNR CRD / Baton Rouge
Clay T. Midkiff USDA/NRCS / Lake Charles
Cleve Thibodeaux / Erath
Cliff Seiber, Environmental Reporter Southwest Daily News / Sulphur
Cliff Smith T. Baker Smith and Son / Houma
Clint Mouser / Metairie
Clint Padgett USGS / New Orleans
Clyde J. Orgeron / Lockport
Coastal Zone Advisory Committee Mr. Henry Rodriguez, Jr. / St. Bernard
Colle Towing Co Inc Attn: Mr Charles Mcvea Jr / Pascagoula
Concerned Citizen Johnny Benoit / Gueydan
Councilman J. B. Breaux Suite 600 / Houma
Craig Vega Chamber / Galliano
Crescent River Port Pilots Assoc. Attn: Capt Mark Delesdernier Jr. / Belle Chasse
Cullen Curole Barataria Terrebonne Estuary Foundation / Thibodaux
Curtis Trahan Cameron Parish Police Jury / Cameron
Cynthia Duet Office of The Governor / Baton Rouge
Cyrus Theriot, Jr. President Harry Bourg Corp. / Dulac
D. Kandalepas Dept. of Biological Sciences SLU / Hammond
Daily Comet Katira A. Gandet / Thibodaux
Dale Palmer Acadiana Bay Association / Broussard
Dan Borne LA. Chemical Assoc. One American Place / Baton Rouge
Dan Collins / Baton Rouge
Dan Llewellyn LA. DNR / Baton Rouge
Dan Saucier CCA Lake Charles Chapter / Lake Charles
Dan W. Marrish / Jennings
Daniel Coluda Lake Borgne Levee Dist. / Vilolet
Daniel Jewell Jefferson Rod & Gun Club / Harahan
Daniel R Fontenot Sys / Lake Charles
Darrell Judice Iberia SWCD / New Iberia
Darryl Clark USFWS / Lafayette
Darryl Malek-Wiley Sierra Club / New Orleans
Dave Bourgeois, Jr. / Cut Off
David B. Gilhousen Meteorologist Data Systems Division National Data Buoy Center / Stennis Space Center
David Bourgeois LA. Cooperative Extension Service / Cut Off
David C. Thomas FEMA, DC Federal Center Plaza / Washington
David Champagne St. James Paish / Lutcher
David Cottingham DOC-NOAA-CE-EC Ecol/env Conserv / Washington
David Creed / Monroe
David Doss Representative Vitters Office / Metairie
David Guilbeau Microcomputer Systems Specialist Johnson Controls Inc. / Lafayette
David Laborde / Lutcher
David M. Richard Stream Property Mgmt. Inc. / Lake Charles
David Rabalais T. Baker Smith & Son Inc / Houma
David S. Williams CTE Suite 1900 / New Orleans
David W. Yeager Mobil Bay National Estuary Program / Mobile
David Walther US Fish & Wildlife Service Ecological Services - Suite 400 / Lafayette
Dawn Wesson Tulane University / New Orleans
Dean & Pam Manning / Sulphur
Dean McInnis Shaw Environmental, Inc. / Baton Rouge
Dean Roberts Gray Estate Stream Wetland Services / Lake Charles
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Del Vines Congressman Cookseys Office / Monroe
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News / Jennings
Nick Limberis McNeese Student - Cal. Pa. School Bd. / Lake Charles
Nicole Youngman Tulane University - Dept. of Sociology / New Orleans
No. Lafourche Con. Levee & Drainage Dist. / Raceland
NOAA Coastal Services Center Library / Charleston
NOBR Steamship Pilots / Jefferson
Noreen Clough-regional Director US Fish & Wildlife Service / Atlanta
NRCS Louisiana State Office Benny Landreneau / Alexandria
NRCS Office-LSU Campus Parker Coliseum / Baton Rouge
Ntl Wetlands Research Ctr Scott Wilson / Lafayette
O.J. Trosclair / Garyville
Office of Environmental Affairs Attn: Heather Szapary Orleans City Hall, Suite 8 E 0 6 / New Orleans
Office of Senator John Breaux Mr. Malcolm Myer Suite 802 / Baton Rouge
OFFSHORE MARINE SERVICE ASSOCIATION Robert J. Alario, President / Harahan
Olvice L. Greenwood Conoco Phillips / Sulphur
Oneil Malbrough Jefferson Parish / Westwego
Operations Division Port Allen Lock /
Orlando Adams Parsons-Brinckerhoff Suite 225 / New Orleans
Orleans Levee Board Attn: Stevan G Spencer Ste 202 / New Orleans
Oscar Vera Parson Brinckerhoff Suite 225 / New Orleans
Pam Pontiff / Morgan City

Pasadena Towing Service Inc. / Pasadena
Patricia Leander-ofc Of Economic & Budget Policy LA House of Representatives / Baton Rouge
Patrick Breaux LA DEQ Bayou Lafourche Regional Office / Raceland
Patrick Gordon Planning and Zoning Director / Houma
Patrick Williams NMFS - Habitat Conservation Division Louisiana State University / Baton Rouge
Paul Conners UNO Lakefront Campus Coastal Research Lab / New Orleans
Paul Cox / Lake Charles
Paul Gremilion LA. DNR CRD / Baton Rouge
Paul J. Leboeuf / Belle Chasse
Paul Looney Volkert Environemntal Group Inc. / Mobile
Paul Mack / Belle Chasse
Paul Perret / New Orleans
Paul Templet, Phd LSU - Inst. For Env. Studies / Baton Rouge
Peggy Choate Village of Saline / Saline
Perry Tamplain / Garyville
Personnel Officer, US Forest Svc. Kisatchie National Forest / Pineville
Peter Defur, Phd Environmental Defense Fund / Washington
Peter Gerica Lk Pontch Fishermen's Assoc / New Orleans
Peter Huyakorn Hydro-Geologic / Herndon
Peter M. Smith WS Nelson / New Orleans
Peter Vunovich Jr. Oyster Industry & (plaq C2m) / Port Sulphur
Phil Mccarty UNO Lakefront Campus Dept of Geol and Geophy / New Orleans
Plaquemines Parish Council Mr. Michael Mudge / Belle Chasse
Port Allen Lock Survey Field Off ED-SS Bulletin Board / Port Allen
Port Allen Survey Field Office / Port Allen
Port of New Orleans Board of Commissioners / New Orleans
Port of New Orleans J. Ron Brinson President / CEO / New Orleans
Port of New Orleans Jeff Plauche Permit Coordinator / New Orleans
Port of New Orleans Patrick J. Gallwey - Director
Port of New Orleans Paul Zimmerman / New Orleans
Port Ship Service Inc. / Arabi
Press / Mobile
Profess. Eng. Env. Consultants Inc. Attn: Mr Priyo Manjumdar / Marrero
Project Leader U.S. Fish and Wildlife Service Southeast La Refuges / Lacombe
Quay Dortch Lumcon / Chauvin
Quin Kinler USDA/NRCS / Baton Rouge
R. E. Turner LSU Coastal Ecology Institute Dept of Oceanography & Coastal Science / Baton Rouge
Ralph Broome Contract Specialist Natural Resource Conservation Service / Alexandria
Ralph Laukhuff La. Hydroelectric / Vidalia
Ralph Pausina Pausina Oyster Corporation / New Orleans
Ralph Rabalais President & BOD CCA Westbank Chapter / Terrytown
Randall Hood Windrush Industries / Lake Charles
Randy Gros Gulf States Marine Fisheries / Marrero
Randy Hanchey La Dept. of Natural Resource Coastal Restoration Division / Baton Rouge
Randy Moertle Coastal Environmental, Inc. / Lockport
Ray Champagne SWAP / Marrero
Ray Fremin / Belle Chasse
Ray J. Cheramie R.C. Cattle Co. / Lockport
Raymond W. Bianchini Comm. Fisherman / Gretna
Rebecca Howard USGS-NWRC / Lafayette
Rebecca Shirley Abbeville-Vermillion Chamber of Commerce / Abbeville
Reginald and Betty Oubre / New Orleans
Remy Amedee / Garyville
Republication / Woodville
Retif Oil & Fuel Attn: J F Thompson / New Orleans
Rex Moore, Assignments Editor KLFY-TV
Rhebb Rybiski / Raceland
Ricardo Johnson John Chance Land, Inc. / Lafayette
Rich Major Providence Engineering Suite 100 / Baton Rouge
Richard Armstrong / Diamondhead
Richard Aycock USDA/NRCS / Alexandria
Richard Campanella Center For Bio-Env. Research-Tulane U. / New Orleans
Richard Demay BTNEP Nicholls State University / Thibodaux
Richard Grillot Grillot Construction INC / Belle Chasse
Richard McCulloh LA. Geological Survey LSU Coast and Environment Bldg / Baton Rouge
Richard W. Fox Terrma, Co. / Covington
Rick Bryan Central LA Audubon Society / Pineville
Rick Smith Weeks Marine / Covington
River City Towing Service / Denham Springs
Riverbarge Excursion Lines Attn: Jeff Kindl / New Orleans
Robert Arceneaux / Meraux
Robert Becnel Farmer / Belle Chasse
Robert C. Esenwein C.E.P Vice President Turner Collie & Braden Inc. / Houston
Robert C. Mccad / Lake Charles
Robert Cashner Pontchartrain Inst. of Envir. Studies UNO - Lakefront Campus / New Orleans
Robert Day Indian River Lagoon National Estuary Program / Palm Bay
Robert Dolese-Director Parish Planning Commission / Baton Rouge
Robert Ensminger / DeRidder
Robert Hastings Southeastern Louisiana University / Hammond
Robert Heath Professional Eng. and Env. Consultants / Marerro
Robert Kelly Parsons Corp. Suite 100 / Norcross
Robert L. Allen Assistant Director, LSU CCEER 1002-T Energy, Coast and Env Bldg / Baton Rouge
Robert Lazor, CEWESEP-W US Army Engineer, Res & Dev Center / Vicksburg
Robert W. Sabate Subsurface Geologist / Metairie
Robin Knox Weston Solutions Suite 229 / New Orleans
Rogerest Romero Cameron Parish Police Jury / Cameron
Roland J. Chiasson 4-C's Land Corp. / Lockport
Ron Boustang USGS-NWRC / Lafayette
Ronald M. Madden Pine Bluff Sand & Gravel / Baton Rouge
Ronald Paille USFWS Suite 400 / Lafayette
Ronald Sanders Oases Offshore / Covington
Ronnie Barcak Coe/ Galveston / Galveston
Roy Keller Director, LA Technology Transfer Off. South Stadium Dr. LSU / Baton Rouge
Roy Walter USFWS -Sabine Refuge / Hackberry
RT Cerniglia / Kenner
Russ Wise News One / LaPlace
Russel Walters CH Fenstermaker and Assoc. / Lafayette
Russell G. Olivier Manager Safety, Security and Env. IMC Phosphates MP Inc. / Uncle Sam
Rusty Belsome Associated Federal Pilots / Metairie
Rusty Gaude' LSU Agcenter / Belle Chasse
Rusty Vincent Management Committee CCA / Sulphur
Sam Hamilton U.S. Fish and Wildlife Service / Atlanta
Sam Holder / River Ridge
Sammy Acordo Jr. / Garyville

Samuel P. Miano / Garyville
Sandra Thompson LA. DNR / Baton Rouge
Sauare Defelice Defelice Land Co. / Belle Chasse
Scott Privat Office of US Senator John Breaux Suite 1300 / Lafayette
Scott Romero USDA/NRCS / Jennings
Sean McMahon, Asst. Dir. Gov. Relation Ntl. Audubon Society Washington DC Policy Office / Washington
Senator Ken Hollis 9th Senatorial Dist / Metairie
Senator Lynn Dean / Braithwaite
Shea Penland Department of Geology / New Orleans
Shelly Beville LA. DNR / Baton Rouge
Shirley Laska Center For Hazards UNO Dept. of Sociology / New Orleans
Shreveport Area Office U.S. Army Corps of Engineers / Bossier City
Sidney Coffee Gov's Office of Coastal Activities / Baton Rouge
Sidney Coffee LA. DNR CRD / Baton Rouge
Sierra Club Delta Chapter / New Orleans
Skip Harris Valentine Paper Inc. / Lockport
South Lafourche Levee District Board Of Commissioners / Galliano
Southeastern La University Lab School Ms. Paulette Walkwitz
Southern Herald / Liberty
Southern University Lab School Mr. James Machen / Baton Rouge
Springhill Journal / Springhill
St Mary Parish Council Mr. Derhyl Hebert-dir Of
St. James Parish Government Mr. Dale Hymel / Convent
St. John the Baptist Parish Attn: Chris Guidry Chief Administrative Officer / LaPlace
St. Tammany News-Banner Scott Harrington, Mng. Ed. / Covington
Stapp Towing Company Inc. / Dickinson
State Rep. Ben Nevers Dist 75 / Bogalusa
Stefanie Regal, Reporter WWL-TV, Channel 4 / New Orleans
Stephen Stefanski Jr. Executive Assistant Representative Chris John / Lafayette
Steve Cochran Edf-116 Th Floor / New York
Steve Gauthreaux HESCO / Hammond
Steve Mathies CH2M / New Orleans
Steve Mire / Garyville
Steven A. Denham / Atlanta
Stu Scheer / Chauvin
Students Environmental Action Coalition / Baton Rouge
Sullivan Vullo / Port Sulphur
Susan King Legislative Analyst / Baton Rouge
Sweet Lake Land & Oil Co., Inc. Attn: Thomas G. Wright / Lake Charles
T Baker Smith & Son Inc Lou Schoher / Houma
T Baker Smith & Son Inc. Attn: Steven Smith / Houma
Tad Loupe LA DEQ / Raceland
Tangipahoa Parish Engineer Attn: Maurice Jordan / Amite
Tari Bradford US Courthouse Suite 2240 / Shreveport
Taylor Towing Co Inc Attn: Mr. Daniel S Taylor / Bayou La Batre
Ted Beaullieu Acadiana Bay Association / Broussard
Ted Kahn Port of Iberia / Jeanerette
Ted Mcmanus Daily Review / Morgan City
Teddy Babin DOTD / Lafayette
Teddy Leleux / New Iberia
Teri Goodmann Development Director National Rivers Hall of Fame / Debuque
Terrebonne Parish Attn: James Miller / Houma
Terrebonne Port Commission Attn: Ed Watson - Director / Houma
Terry Lejeune Big River Industries / Baton Rouge
Texaco Exploration & Production Attn: Daniel Ledet / Morgan City
Texas Gas Transmission, LLC / Lafayette
Theresa M.Jones / New Orleans
Theriot, Alex & Assoc Livingston Parish / Denham Springs
Tideland Barge Co Attn: Mr. Gene Drake / Metairie
Tiffany Crane UNO / New Orleans
Tim Allen / Houma
Tim Vincent National Audubon Society / Perry
Times / Shreveport
Times-Picayune Amy Ragsdale
Tina Sanchez Mobile Project Impact & Mobil NEP / Mobile
Tmr Exploration Inc Attn: Jack Lagrove / Bossier City
Tod Davison Director Mitigation Division FEMA Region IV / Atlanta
Todd Truax / Lake Charles
Tom Denes URS / Bethesda
Tom Gallagher Hydroqual Inc. / Mahwah
Tom Hess LA. Dept. Wildlife & Fisheries / Grand Chenier
Tom Holtzclaw Hatch Mott MacDonald Infrastructure and Environment / Monroe
Tom Wells WS Nelson / New Orleans
Tommy Milioto / La Place
Tommy Wright Sweet Lake Land & Oil Co. / Sulphur
Toni DeBosier Dept of Forestry and Ag. Suite F / Lafayette
Troy Pleblier / Lake Charles
Troy Rice Indian River Lagoon National Estuary Program / Palm Bay
Troy Voisin Seafood / Dulac
Tulane Environmental Law Clinic Karla Raettig / New Orleans
U. S. Coast Guard Marine Safety Office Attn: Port Operations Dept. / New Orleans
U.S. Army Corps of Engineers Area Engineer Lafayette Area Office / Lafayette
U.S. Coast Guard Commander (m) 8th District / New Orleans
U.S. Department of Housing & Urban Development Environmental Officer / New Orleans
U.S. Dept of Agriculture Nat'l Resource Conserv Ser / Alexandria
U.S. Dept of Agriculture NRCS Natl Env Coord/ecol Sci Div / Washington
U.S. Dept of Housing And Urban Development Hale Boggs Federal Bldg. / New Orleans
U.S. EPA Ofc of Fed Act (A-104) Rm
U.S. Fish and Wildlife Service Cameron Prairie National Wildlife Refuge / Bell City
U.S. Geological Survey Dr. Jeff Williams / Woods Hole
United Commercial Fisherman's / Chalmette
United Gas Pipe Line Company Marine Transportation Dept / Houma
University Lab School Dr. Glen Bowman Louisiana State University / Baton Rouge
US Department of Housing and Urban Development Attn: Terrance B. Course / New Orleans
USACE Inst. For Water Resources Attn: CEIWR-MD Ken Orth / Alexandria
USCG Marine Sfty Dtcmt Lake Charles Attn: Waterways Management / Lake Charles
USGS Attn: Charles Demas / Baton Rouge
Vann Fortier / Abbeville
Vernon Behrhorst National Rivers Hall of Fame / Lafayette
Vibhas Aravamuthan PhD Research Assocaite Oceanographer Louisiana State University / Baton Rouge
Viciki Ludden Gulf Restoration Network / New Orleans
Vicki Murillo Gulf Restoration Network / New Orleans
Vince Wilson LSU Environmental Graduate Org. Energy Coast and Environmental Bldg. / Baton Rouge

Virginia Burkett / Many
W. Dale Martin Blind River Properties / Maurepas
W.P. Edwards III Vermilion Corporation / Abbeville
Wade Matherne / Lockport
Wall Street Journal Renaissance Tower Attn:newsroom / Dallas
Walter R. Dunn / Des Allemands
WDSU-TV Jeff Hamburger / New Orleans
Webster Pierce, Jr. / Cut Off
Weeks Marine Inc / Covington
Western Gas Resources Inc Attn: Ttyrone C Ben / St. Bernard
WGNO-TV 26 (ABC) Kath Quinn (PD) / New Orleans
WGNO-TV 26 Ralph Mipro News Director / New Orleans
Whitney Baccigahopi / Grand Chenier
WILK - Amite Record / Gloster
Will Norman LA. DNR / Baton Rouge
William "Bud" Watson, III New Orleans - Baton Rouge Pilot Association / Jefferson
William Mitsch / Columbus
William Straw FEMA Region IV / Atlanta
Willie Cooper Stae Executive Director Consolidated farm Services Agency / Alexandria
Winn Parish Enterprise News Amer / Winnfield
WLPB-TV, Channel 27 (PBS) Beth George Courtney / Baton Rouge
WMIS / Natchez
WNAT / WQNZ / Natchez
WQBC / Vicksburg
WWL / New Orleans
WWL/WAJY / New Orleans
WYES-TV, Channel 12 (PBS) Beth Arroyo, Program Director / New Orleans
Yazoo River Towing / Vicksburg

Conservation Groups (GCCA, BASS, etc.)

Count: 6

Bonnet Carre' Rod & Gun Club Chairman Environmental Committee / Norco
CLIO Sportsman League / Metairie
Ducks Unlimited Director Ken Babcock / Ridgeland
Gulf Coast Conservation Assn. / Baton Rouge
Gulf States Marine Fisheries Commission Jeff Rester / Ocean Springs
President Mr. Wayne Allemond Association of Louisiana Bass Clubs / Marrero

Environmental Organizations (Audubon Society, Sierra Club, LWF, etc.)

Count: 16

Audubon Society- Baton Rouge Chapter Ms. Dorothy Prowell / Baton Rouge
Audubon Society, New Orleans Jennifer Coulson President / Metairie
Coalition of Coastal Parishes / Thibodaux
Coalition To Restore Coastal Louisiana Mr. Mark Davis / Exec Director / Baton Rouge
Donald Landry South La Environmental Council / Houma
Doug Daigle, Hypoxia Proj Mgr Mississippi River Basin Alliance / New Orleans
Environmental Defense Fund Mr. James T. B. Tripp / New York
La Nature Conservancy Mr. Keith Ouchley Director BBCC / Baton Rouge
Lake Pontchartrain Basin Foundation / Metairie
Louisiana Audubon Council Dr. Barry Kohl-Conserv Chr / New Orleans
Mr Carlton Dufrechou Lake Pontchartrain Basin Foundation / Metairie
National Audubon Society / New York
National Wildlife Federation / Washington
Natural Resources Defense Council Inc / New York
Randy Lanctot Louisiana Wildlife Federation / Baton Rouge
Sierra Club Russel Butz EPEC Organizer / Covington

Federal Agencies

Count: 17

Carl J. Brevelle USDA Forest Service / Pineville
CEMVD-PM-R US Army Corps of Engineers Attn: Chief / Vicksburg
Division Administrator Federal Highway Administration / Baton Rouge
Mark Schexnayder LSU Ag Center / Metairie
Mr Ron Brinkman US Minerals Management Service / New Orleans
Policy Review Branch US Army Corps of Engineers-HQ Cecw-ar / Washington
U.S. Advisory Council on Historic Preservation / Lakewood
U.S. Advisory Council on Historic Preservation-Executive Director Suite 809 / Washington
U.S. Army Corps of Engineers Mr. Ron Ventola CELMN-OD-S / New Orleans
U.S. Coast Guard 8th District Guy Tetreau Hale Boggs Federal Building / New Orleans
U.S. Dept of Agriculture Marine Advisory Agent LA Cooperative Extension Svc / Baton Rouge
U.S. Dept of Commerce - NOAA Ofc of Ecology & Conservation Rm 6117: Mr. William Archambault / Washington
U.S. Dept of Energy Office of Env Compliance Room 3g-092 Eh22 / Washington
U.S. Dept of The Interior Fish & Wildlife Service / Lacombe
U.S. Dept of The Interior Office of Env Policy & Compliance / Washington
U.S. EPA-Office Fed. Activities EIS Section Mail Code 2252-A / Washington
USEPA Region 6 Marine and Wetlands Section 6WQ-EM Attn: Troy Hill / Dallas

Individuals (Mr., Mrs., Boat Captains, etc.)

Count: 31

Armand Brinkhaus / Sunset
AUX LLC / Thibodaux
Barbara B. Kyle / Houston
Capt. K.C. Siverd / St. Bernard
Capt. O. T. Melvin Jr. / La Rose
Cecil Picard Suite 200 / Abbeville
Daniel Oakley / Sulphur
Dr. John C Moser / Pineville
Federal Aviation Administration/DOTD Joyce M. Porter / Fort Worth
Lafourche Parish Council James P. Ledet / Thibodaux
Linda Mathies U.S. Army Corps of Engineers OD-T / New Orleans
Montgomery Watson / Metairie
Mr. George Pivach Jr. / Belle Chasse
Mr. H. J. Broussard Jr. / New Iberia
Mr. Jay Vincent / Harvey
Mr. John E. Hine / Houston
Mr. John Edwin Kyle, Jr. / Houston

Mr. John Taliancich / Empire
Mr. Joseph V Frank III / Natchez
Mr. Jules A Toups Sr / Empire
Mr. Marvin J Buras / Empire
Mr. R W Collins, III Southdown Animal Hospital / Houma
Mr. Ray Gibbens / Venice
Mr. Robert D. Gorman / Thibodaux
Nolan Robicheaux Mike Hooks Inc / Lake Charles
Roy Kiesel & Tucker Mr. Victor L. Roy III / Baton Rouge
Tim Stine / Sulphur
Virginia H. Barber / Houston
Virginia Kyle Hine / Houston
W.a. Monteleone / New Orleans
Wildlife Photographer Mr. C. C. Lockwood Cactus Clyde Productions / Baton Rouge

Libraries and Museums (Public University, Parish, etc.)

Count: 65

Acadia Parish Library / Crowley
Allen Parish Library / Oberlin
Ascension Parish Library / Donaldsonville
Assumption Parish Library / Napoleonville
Avoyelles Parish Library / Marksville
Beauregard Parish Library / DeRidder
Bienville Parish Library / Arcadia
Bossier Parish Library / Bossier City
Calcasieu Public Library / Lake Charles
Cameron Parish Library / Cameron
Catahoula Parish Library Bushley Street / Harrisonburg
Claiborne Parish Library / Homer
Concordia Parish Library / Ferriday
Desoto Parish / Mansfield
Earl K. Long Library LA Collection, Sybil A. Boudreaux UNO - Lakefront Campus / New Orleans
East Baton Rouge Parish Library / Baton Rouge
East Carroll Parish Library / Lake Providence
Evangeline Parish Library / Ville Platte
Franklin Parish Library / Winnsboro
Grant Parish Library / Colfax
Iberville Parish Library / Plaquemine
Jackson Parish Library / Jonesboro
Jefferson Davis Parish Library / Jennings
Jefferson Parish Library / Metairie
Lafayette Natural History Museum & Planetarium / Lafayette
Lafayette Public Library / Lafayette
Lafourche Parish Library / Thibodaux
Lasalle Parish Library / Jena
Leslie Blanchard Iberia Parish Library / New Iberia
Library Louisiana State University Mrs. Roberta A. Scull / Baton Rouge
Lincoln Parish Library / Ruston
Livingston Parish Library / Livingston
Louisiana Collection Special Collections Tulane University Libraries / New Orleans
Madison Parish Library / Tallulah
Morehouse Parish Library / Bastrop
Natchitoches Parish Library / Natchitoches
New Orleans Public Library Mr. Colin Hamer / Louisiana
Opelousas-Eunice Public Library / Opelousas
Ouachita Parish / Monroe
Plaquemines Parish Library / Buras
Pointe Coupee Parish Library / New Roads
Rapides Parish Library / Alexandria
Red River Parish Library / Coushatta
Richland Parish Library / Rayville
Sabine Parish Library / Many
Shreve Memorial Library / Shreveport
St. Bernard Parish Library / Chalmette
St. Charles Parish Library / Luling
St. James Parish Library / Lutcher
St. John The Baptist Parish Library / LaPlace
St. Martin Parish Library / St. Martinville
St. Mary Parish Library / Franklin
St. Tammany Parish Library / Covington
State Library of Louisiana Louisiana Section / Baton Rouge
Tangipahoa Parish Library / Amite
Tensas Parish Library / St. Joseph
Terrebonne Parish Library / Houma
Union Parish Library / Farmerville
Vermilion Parish Library Jackie Choate / Abbeville
Vernon Parish Library / Leesville
Washington Parish Library / Franklinton
Webster Parish Library / Minden
West Baton Rouge Parish Library / Port Allen
West Carroll Library Highway 17 & Amp Marietta Street / Oak Grove
Winn Parish Library / Winnfield

Local Ports

Count: 7

Port of Iberia Executive Director: Roy Pontiff / New Iberia
Port of New Orleans Joseph G. Cochiara Jr. Sr. Manager For Mgt. Services / New Orleans
Port of New Orleans Sr. Manager For Operations Deborah Keller / New Orleans
Port of South Louisiana Globalplex Intermodal Terminal / LaPlace
Port of South Louisiana James Nelson Assistant Port Director / LaPlace
Port of South Louisiana Kay Jackson Director of Business Development / LaPlace
Port of South Louisiana Mitch Smith Operations Director / LaPlace

Locally Elected Officials (Mayors, Police Jurors, etc.)

Count: 567

"Barry" Verret District 8 - Iberia Councilman / New Iberia
"Bill" Wild District 12 - Jefferson Davis Police Juror / Welsh
"Bob" Manuel District 5 - Evangeline Police Juror / Ville Platte
"Buck" Richardson District 3 - East Feliciana Police Juror / Clinton
"Chris" Roberts District 1 - Jefferson Councilmember / Terrytown
"Chuck" Nassauer District 3 - Washington Council Member / Bogalusa
"Don" Davis District 10 - Jefferson Davis Police Juror / Iowa
"Donald" Woods District 1 - Jefferson Davis Police Juror / Lake Arthur
"Jay" Friedman District 7 - Plaquemines Member of Parish Council / Buras
"Jeff Big Daddy" Naquin District 2 - Assumption Police Juror / Labadieville
"Jeff Petit" Kershaw District 2 - West Baton Rouge Council Member / Port Allen
"Jerry" Binder District 12 - St. Tammany Council Member / Slidell
"Joe" Clark District 9 - Plaquemines Member of Parish Council / Venice
"Joe" Fuller District F - Rapides Police Juror / Alexandria
"Joe" Impastato District 7 - St. Tammany Council Member / Lacombe
"Johnny" Guinn District 5 - Jefferson Davis Police Juror / Jennings
"Ken" Burkhalter District 14 - St. Tammany Council Member / Slidell
"Ken" Wheat District 1 - Washington Council Member / Bogalusa
"Kenny" Alfred District 4 - St. Mary Councilman / Morgan City
"Kim" Elfert District 3 - Terrebonne Council Member / Houma
"Marty" Dean District 1 - St. Tammany Council Member / Covington
"Marty" Gould, Jr. District 5 - St. Tammany Council Member / Mandeville
"Mike" Mudge District 4 - Plaquemines Member of Parish Council / Belle Chasse
"Mike" Nothnagel District 4B - Beauregard Police Juror / Longville
"Pat" Miller District 3 - St. Landry Council Member / Opelousas
"Pete" Lambert District 9 - Terrebonne Council Member / Montegut
"Ram" Ramchandran District 3 - St. Charles Councilman / Destrehan
"Randy" Menard District 9 - Lafayette Member / Lafayette
"Ray" Fremin, Jr. District 3 - Iberia Councilman / New Iberia
"Ray" Pynes District 12 - Vernon Police Juror / Leesville
"Rick" Fremin District 2 - Plaquemines Member of Parish Council / Belle Chasse
"Rob" Stevenson District 8 - Lafayette Member / Lafayette
"Steve" Bordelon District B - Rapides Police Juror / Pineville
"Steve" Eastman District 7 - Jefferson Davis Police Juror / Jennings
"Steve" Lee District 7 - St. John the Baptist Councilman / LaPlace
"Steve" Stefancik District 11 - St. Tammany Council Member / Slidell
"Steve" Vaughn District 5 - Plaquemines Member of Parish Council / Belle Chasse
"Tommy" Lasseigne District 4 - Lafourche Council Member / Thibodaux
"Wayne" Ardoin District 9 - St. Landry Council Member / Opelousas
"Zeb" Simon District 12 - Iberia Councilman / Jeanerette
A. "Buddy" Mincey District 5 - Livingston Councilman / Denham Springs
A. J. "Fatty" Broussard District 2 - Acadia Police Juror / Crowley
A. J. "Jay" Credeur District 6 - Acadia Police Juror / Church Point
Adrian Thompson District 3 - Ascension Council Member / Gonzales
Albert "Dewey" Dukes District 7 - Pointe Coupee Police Juror / New Roads
Albert Foulcard District 2 - St. Mary Councilman / Franklin
Albert Hollier District 7 - St. Landry Council Member / Arnaudville
Allen J. St. Pierre District 2 - St. John the Baptist Councilman / Reserve
Allen Parish Police Jury / Oberlin
Alton Stevenson District 1 - Acadia Police Juror / Crowley
Alvin Tillman District 1 - Terrebonne Council Member / Houma
Alvin W. "Coach" Thomas, Jr. District 1 - Ascension Council Member / Donaldsonville
Amos Cormier, Jr. District 6 - Plaquemines Member of Parish Council / Port Sulphur
Andrew Hayes District 1 - Allen Police Juror / Oakdale
Anthony "Twine" Desselle District 5 - Avoyelles Police Juror / Marksville
April Black District 5 - St. Charles Councilman / St. Rose
Ascension Parish Police Jury / Donaldsonville
Barbara Gibson Village of Sun / Sun
Barbara J. Jacob St. Charles Parish Council Secretary / Destrehan
Barry Bagert District 9 - St. Tammany Council Member / Pearl River
Barry Minnich District 7 - St. Charles Councilman / Luling
Beauregard Parish Police Jury / DeRidder
Bernard E. Broussard District 6 - Iberia Councilman / New Iberia
Bert F. Babers, III District 6 - West Feliciana Police Juror / St. Francisville
Betty Nelson District 9 - West Baton Rouge Council Member / Port Allen
Billy D. Shoemake District 4 - West Feliciana Police Juror / Tunica
Bobby Badeaux District 1 - Lafayette Member / Scott
Bradley Eastman District 4 - Jefferson Davis Police Juror / Jennings
Brent Callais District 8 - Lafourche Council Member / Cut Off
Brian A. Fabre District 2 - St. Charles Councilman / Luling
Bruce Boudreaux District 1 - St. Landry Council Member / Opelousas
Bruce Conque District 6 - Lafayette Member / Lafayette
Buddy Farris District 2 - Allen Police Juror / Oakdale
Byrel H. Book District 4A - Beauregard Police Juror / Longville
Byron Lee District 3 - Jefferson Councilmember / Marrero
Byron Sharper Metro District 7 - East Baton Rouge Councilman / Baton Rouge
C. Ray Naquin City of New Orleans Mayor / New Orleans
Caesar Comeaux District 5 - Iberia Councilman / New

Iberia
Carl "Stan" Cain District 7 - Livingston Councilman / Walker
Carlo S. Bruno District 4 - Tangipahoa Councilman / Independence
Carlos Archield District 3A - Beauregard Police Juror / DeRidder
Carlos D. Notariano District 8 - Tangipahoa Councilman / Hammond
Cecelia S. Broussard District 4 - Acadia Police Juror / Crowley
Charles "I Spy" Ketchens District 5 - St. James Councilman / Vacherie
Charles A. "Chuck" Walters District 8 - St. Mary Councilman / Amelia
Charles Davis District 5 - St. Helena Police Juror / Amite
Charles Frank Haynes, Jr. District 5 - East Feliciana Police Juror / Clinton
Charles H. Reppel Special Asst. to the Parish President St. Bernard Parish Government / Chalmette
Charles Precht, III District 3 - Cameron Police Juror / Bell City
Charles R. Kelly Metro District 5 - East Baton Rouge Councilman / Baton Rouge
Cheryl K. Fontenot District 4 - Ascension Council Member / Gonzales
Christa M. Duplantis District 5 - Terrebonne Council Member / Houma
Christopher "Chris" Canulette District 8 - St. Tammany Council Member / Slidell
Christopher "Chris" Williams District 3 - Lafayette Member / Lafayette
City / Parish President Mr. Walter Comeaux / Lafayette
City of Abbeville Mark F. Piazza Mayor / Abbeville
City of Baker Leroy Davis Mayor / Baker
City of Bogalusa James "Mack" McGehee Mayor / Bogalusa
City of Breaux Bridge Jack Dale Delhomme Mayor / Breaux Bridge
City of Bunkie Gerard Moreau, Jr. Mayor / Bunkie
City of Carencro Glenn L. Brasseaux Mayor / Carencro
City of Convington Candace Watkins Mayor / Covington
City of Crowley Isabella L. Delahoussaye Mayor / Crowley
City of Denham Springs James E. Durbin Mayor / Denham Springs
City of Deridder Gerald Johnson Mayor / De Ridder
City of Donaldsonville Raymond "Ray" Jacobs Mayor / Donaldsonville
City of Eunice E. Lynn Lejeune Mayor / Eunice
City of Franklin Vincent J. St. Blanc, III Mayor / Franklin
City of Gonzales John A. "Johnny" Berthelot Mayor / Gonzales
City of Hammond Mayson H. Foster Mayor / Hammond
City of Harahan Paul D. Johnston Mayor / Harahan
City of Jennings Terry W. Duhon Mayor / Jennings
City of Kaplan Levi J. Schexnider Mayor / Kaplan
City of Kenner Philip L. "Phil" Capitano Mayor / Kenner
City of Lake Charles "Randy" Roach Mayor / Lake Charles
City of Leesville Jim Shapkoff Mayor / Leesville
City of Mandeville "Eddie" Price Mayor / Mandeville
City of Marksville Richard Michel Mayor / Marksville
City of Morgan City Tim Tregle Mayor / Morgan City
City of New Iberia Ruth Fontenot Mayor / New Iberia
City of New Roads Sylvester Muckelroy Mayor / New Roads
City of Oakdale Bobby Abrusley Mayor / Oakdale
City of Patterson J. L. "Jimmy" Bernauer Mayor / Patterson
City of Pineville Clarence Ray Fields Mayor / Pineville
City of Plaquemine Mark A. "Tony" Gulotta Mayor / Plaquemine
City of Ponchatoula Julian E. Dufreche Mayor / Ponchatoula
City of Port Allen Lynn B. Robertson Mayor / Port Allen
City of Rayne James J. "Jimbo" Petitjean Mayor / Rayne
City of Scott Hazel D. Myers Mayor / Scott
City of St. Gabriel George L. Grace Mayor / Sunshine
City of St. Martinville Eric Martin Mayor / St. Martinville
City of Sulphur Ron LeLeux Mayor / Sulphur
City of Thibodaux Charles Caillouet Mayor / Thibodaux
City of Ville Platte "Phil" Lemoine Mayor / Ville Platte
City of Westlake Dudley R. Dixon Mayor / Westlake
City of Westwego Robert E. Billiot Mayor / Westwego
City of Zachary Charlene M. Smith Mayor / Zachary
Clayton "Snookie" Faucheux St. Charles Parish Council Council Member At Large, Division B / Luling
Clayton J. Voisin District 7- Terrebonne Council Member / Dulac
Clement Guidroz District 4 - Pointe Coupee Police Juror / Jarreau
Clerk of Council Polly Boudreaux / Chalmette
Clifford "Ted" Nelson District 12 - Pointe Coupee Police Juror / Ventress
Clinton A. Miley, Sr. District 2 - Washington Council Member / Bogalusa
Council Member At Large Eastern Division Lynn B. Dean / Braithwaite
Council Member At Large Mr. Eddie L. Sapir Orleans Parish / New Orleans
Council Member At Large Oliver M. Thomas Orleans Parish / New Orleans
Council Member At Large Western Division "Joey" DiFatta / Chalmette
Council Member at Large, Division A John F. Young Jefferson Parish / Metairie
Council Member At Large, Division A Mr. Cleveland Farlough St. John the Baptist / Reserve
Council Member at Large, Division A Thomas J. "Tom" Capella Jefferson Parish / Metairie
Council Member At Large, Division B Joel S. McTopy St. John the Baptist / LaPlace
Craig Taffaro, Jr. District D - St. Bernard Councilman / Meraux
Curtis Anderson District 5 - West Baton Rouge Council Member / Port Allen
Curtis Clay District 10 - Vernon Police Juror / Leesville
Curtis J. Boudoin District 2 - Iberia Councilman / New Iberia
Cynthia Willard-Lewis District E - Orleans Councilmember / New Orleans
Dale Bourgeois District 2 - Lafayette Member / Carencro
Dale Laborde District 4 - Avoyelles Police Juror / Mansura
Daniel Lorraine District 9 - Lafourche Council Member / Golden Meadow
Danny Harrell District 3 - Livingston Councilman / Denham Springs
Dantin V. "Danny" LeBlanc District 4 - West Baton Rouge Council Member / Port Allen
Darrell P. Ourso Council Member, Metro District 9 / Baton Rouge
Darrell P. Ourso Metro District 9 - East Baton Rouge Councilman / Baton Rouge
Darryl Farque District 7 Police Juror / Lake Charles
Darwin Sharp District 7 - Washington Council Member / Franklinton
David Boneno Metro District 11 - East Baton Rouge Councilman / Baton Rouge
Davis Manuel District 1 - Evangeline Police Juror / Ville Platte
Debbie D. Edwards District 9 - Tangipahoa Councilman / Ponchatoula

Dempsey Lambert District 5 - Ascension Council Member / Prairieville
Derryl Wayne Walls District 4 - St. Charles Councilman / Des Allemands
Desmond J. Hilaire District 1 - St. Charles Councilman / Hahnville
Dewey A. Harrell District 6 - Livingston Councilman / Livingston
Dexter Q. Brown District 10 - St. Landry Council Member / Opelousas
Donald H. Wilmore District E - Rapides Police Juror / Boyce
Donald Ray Willson District 6 - St. Helena Police Juror / Kentwood
Douaine Conner District 4 - Cameron Police Juror / Creole
Douglas A. "Doug" Hillensbeck District 7 - Ascension Council Member / Prairieville
Douglas Ohmer District 3 - Assumption Police Juror / Labadieville
Douglas Wayne Sonnier District 5 - Allen Police Juror / Oberlin
Dudley "Dut" Jarreau District 10 - Pointe Coupee Police Juror / Livonia
Dwight Hill District 4B - East Feliciana Police Juror / Jackson
E. R. "Butch" Jones District 1 - West Feliciana Police Juror / St. Francisville
East Feliciana Parish Police Jury / Clinton
Eddie Wagner District 9 - Livingston Councilman / Albany
Edval Simon, Jr. District 8 - Vermilion Police Juror / Delcambre
Edwin M. Reeves, Jr. District 5- Iberville Council Member / Plaquemine
Elton Lagasse District 2 - Jefferson Councilmember / River Ridge
Elton M. Aubert District 6 - St. James Councilman / Vacherie
Elwyn Bocz District 1 - St. James Councilman / Gramercy
Elzie R. Bryant District 1 - Avoyelles Police Juror / Centerpoint
Ernal J. Broussard District 7 - Vermilion Police Juror / Abbeville
Eugene P. Stevens, Jr. District 8- Iberville Council Member / Plaquemine
Evangeline Parish Police Jury Courthouse Building / Ville Platte
Ezra Reed District C - Rapides Police Juror / Deville
Felton Moreau District 8 - Acadia Police Juror / Eunice
Floyd Younger West Feliciana Parish Police Jury / St. Francisville
Frank E. Johnson District 4 - St. Helena Police Juror / Pine Grove
Franklin Parish Police Jury Jenny Curtis, Parish Secretary / Winnsboro
Fred Mills, Jr. District 6 - St. Martin Council Member / St. Martinville
Gary D. Courville District 13 - St. Landry Council Member / Eunice
Gary Duhon District 11 - St. Mary Councilman / Morgan City
Gary T. Singletary District 6 - St. Tammany Council Member / Pearl River
Gaulman Gaspard District 10 - Vermilion Police Juror / Kaplan
George T. Gros District 7 - Iberia Councilman / New Iberia
George Valentine District 8 - Ascension Council Member / Geismar
Gerald M. "Mike" McLeod District 1 - Beauregard Police Juror / Singer
Geraldine "Gerry" Battley District 8 - Pointe Coupee Police Juror / New Roads
Glenn P. Romero District 9 - Iberia Councilman / New Iberia
Greg Nothnagel District 5 - Beauregard Police Juror / DeRidder
Guy Buckley District 1 - Tangipahoa Councilman / Kentwood
Guy Cormier District 1 - St. Martin Council Member / St. Martinville
H. G. "Buddy" Ridgel District 5 - Tangipahoa Councilman / Tickaw
H. G. "Buddy" Ridgel District 5 - Tangipahoa Councilman / Tickfaw
Harlan James Cashiola District 7 - West Baton Rouge Council Member / Port Allen
Harold F. Lapeyre District 6 - Terrebonne Council Member / Houma
Harry B. Levy District 6 - Jefferson Davis Police Juror / Jennings
Henry Billiot District 10 - St. Tammany Council Member / Mandeville
Henry Dupre District 7 - Assumption Police Juror / Belle Rose
Henry Hines District 8 - Avoyelles Police Juror / Bunkie
Hill Johnson District 4 - Evangeline Police Juror / Ville Platte
Houston Burns District 6 - Vernon Police Juror / Leesville
Howard "Pete" Dowden District 2 - Vernon Police Juror / Anacoco
Howard Oubre, Jr. District 7- Iberville Council Member / Plaquemine
Hubert Faulk District 2 - Vermilion Police Juror / Abbeville
Huet "Picheau" Dupre District 4 - St. Landry Council Member / Opelousas
Huey P. Brown District 6 - West Baton Rouge Council Member / Port Allen
Hurlin Dupre District 6 - St. Landry Council Member / Port Barre
Irma L. Cry St. Tammany Parish Council / Slidell
J. Michael Walker, Sr. Metro District 8 - East Baton Rouge Councilman / Baton Rouge
Jackie L. Grimes District 4 - Vernon Police Juror / Leesville
Jaclyn S. Hotard District 4 - St. John the Baptist Councilman / LaPlace
Jacquelyn Brechtel Clarkson District C - Orleans Councilmember / New Orleans
James "Jimmy" Brazan District 7 - St. James Councilman / Vacherie
James A. "Red" Thompson, II District 3 - St. Tammany Council Member / Folsom
James B. Tuck District 1 - Vernon Police Juror / Leesville
James Boswell District 3C - Beauregard Police Juror / Longville
James C. Eaglin District 2 - St. Landry Council Member / Opelousas
James Doxey District 6 - Cameron Police Juror / Cameron
James Francis Hunt, Sr. District 1A - East Feliciana Police Juror / Clinton
James Hebert District 8 - St. Martin Council Member / Breaux Bridge
James T. "Jim" Benham Metro District 12 - East Baton Rouge Councilman / Baton Rouge
Jared "Burger" Beiriger District 11 - Ascension Council Member / Gonzales
Jefferson Davis Parish Police Jury Courthouse / Jennings
Jefferson Parish Dr. Mary G. Curry / Harahan
Jefferson Parish Mrs. Marnie Winter Director Envir & Dev

Control Dept. / Jefferson
Jefferson Parish Police Jury Parish Council / Gretna
Jennifer Sneed District 5 - Jefferson Councilmember / Metairie
Jerome W. Fitch District 11 - Iberia Councilman / Jeanerette
Jerry Hodnett District 3 - Plaquemines Member of Parish Council / Belle Chasse
Jerry M. Kern District 3B - Beauregard Police Juror / DeRidder
Jerry McDonald Parish President Sabine Parish / Many
Jerry P. Savoy District 6 - Ascension Council Member / St. Amant
Jerry P. Wood District G - Rapides Police Juror / Alexandria
Jerry Shirley District 3E - Beauregard Police Juror / DeRidder
Jimmie McCoy District 2 - Livingston Councilman / Watson
Jimmie Pellerin District 5 - Acadia Police Juror / Rayne
Jimmy Bello District 5 - Pointe Coupee Police Juror / Ventress
Jimmy L. James District 5 - Vernon Police Juror / Pitkin
Joe "Coach" Thomas District 13 - St. Tammany Council Member / Slidell
John "Jay" Batt District A - Orleans Councilmember / New Orleans
John "Sassy" Pourciau District 2 - Pointe Coupee Police Juror / Batchelor
John Calvin James District 6 - Assumption Police Juror / Napoleonville
John Carroll Duhon District 1 - Vermilion Police Juror / Maurice
John Cobb District 3 - West Feliciana Police Juror / St. Francisville
John Hamilton District 11 - Vernon Police Juror / New Llano
John K. Roach District 5 - West Feliciana Police Juror / St. Francisville
John L. Barthelemy, Jr. District 1 - Plaquemines Member of Parish Council / Pointe-a-la-Hache
John M. Barnett District 1B - East Feliciana Police Juror / Ethel
John P. Marceaux District 2 - Jefferson Davis Police Juror / Lake Arthur
John R. Sexton District 11- Iberville Council Member / Rosedale
John W. Humble, Sr. District 3 - Acadia Police Juror / Morse
John W. Strother District 3 - Allen Police Juror / Oakdale
Joseph "Bozo" Bergeron District 11 - Pointe Coupee Police Juror / Fordoche
Joseph "Joe" Greco Metro District 4 - East Baton Rouge Councilman / Greenwell Springs
Joseph M. "Tooney" Davis, Jr. District 1 - St. Mary Councilman / Jeanerette
Judy Darby Hoffmeister District B - St. Bernard Councilman / Chalmette
Jule Charles Wascom District 1 - St. Helena Police Juror / Greensburg
Juliet Williams District 1 - Pointe Coupee Police Juror / Lettsworth
Julio C. Mayorga St. Bernard Parish Government Community Development / Chalmette
Karl "Bubba" Chaney District 6 - East Feliciana Police Juror / Clinton
Keith J. Leonard District 6 - St. Mary Councilman / Berwick
Keith K. Washington, Sr. District 3 - West Baton Rouge Council Member / Brusly
Keith O. Miller District 11 - St. Landry Council Member / Lawtell
Keith W. Lacombe District 9 - Avoyelles Police Juror / Simmesport
Keith Wade District 4 - Assumption Police Juror / Napoleonville
Kenneth W. "Kenny" Henderson District C - St. Bernard Councilman / Chalmette
Kent Fontenot District 7 - Allen Police Juror / Reeves
Kent Schexnaydre District 2 - Ascension Council Member / Gonzales
Kevin J. Voisin District 7 - St. Mary Councilman / Morgan City
Kirby Roy, III District 2 - Avoyelles Police Juror / Hessmer
L. Phillip Gouaux District 7 - Lafourche Council Member / Lockport
Lafayette Parish Police Jury Courthouse Building / Lafayette
Lance Marino St. Charles Parish Council Council Member At Large, Division A / Norco
Larry James Fontenot District 9 - Jefferson Davis Police Juror / Jennings
Larry L. Johnson District 8 - West Baton Rouge Council Member / Port Allen
Lenwood Broussard District 5 - Lafayette Member / Lafayette
Leonard "Buck" Jackson District 4- Iberville Council Member / Carville
Leroy A. Faul District 11 - Jefferson Davis Police Juror / Welsh
Lester Rainey, Jr. District 1 - St. John the Baptist Councilman / Edgard
Linda Calvert Mayor's Office of Env. Affairs NO City Hall / New Orleans
Lindel Toups District 6 - Lafourche Council Member / Gheens
Lionell Wells District 7 - Tangipahoa Councilman / Hammond
Lloyd "Red" Higginbotham District 5 - St. Martin Council Member / St. Martinville
Lloyd Brown District 4 - Iberia Councilman / New Iberia
Lorri Burgess Metro District 10 - East Baton Rouge Councilman / Baton Rouge
Louis "Pete" Kelley, Jr. District 10- Iberville Council Member / Plaquemine
Louis C. Benjamin, Jr. District 4 - Lafayette Member / Lafayette
Louis J. Congemi District 4 - Jefferson Councilmember / Kenner
Louis Kent District 7 - East Feliciana Police Juror / Clinton
Luther "Buster" Hardee, III District 14 - Vermilion Police Juror / Kaplan
Lynda Banta District 8 - Plaquemines Member of Parish Council / Buras
M. Larry Richard District 13 - Iberia Councilman / New Iberia
Maggie F. Daniels District 1 - Iberia Councilman / New Iberia
Magnus "Sonny" McGee District 1 - Cameron Police Juror / Cameron
Marc E. Guillory District 6 - Evangeline Police Juror / Ville Platte
Marc Mouton District 7 - Lafayette Member / Lafayette
Mark A. Borrel District 3 - Avoyelles Police Juror / Marksville
Mark Atzenhoffer District 5 - Lafourche Council Member / Bayou Blue
Mark Madary District A - St. Bernard Councilman / Arabi
Mark Poche District 6 - Vermilion Police Juror / Erath

Marlin N. Gusman District D - Orleans Councilmember / New Orleans
Marshall H. Harris District 4 - Livingston Councilman / Denham Springs
Martha Jane Tassin Metro District 6 - East Baton Rouge Councilman / Baton Rouge
Martin M. McConnell District 10 - Ascension Council Member / Gonzales
Martin S. Triche District 5 - Assumption Police Juror / Napoleonville
Marvin Thomas District 6 - Washington Council Member / Franklinton
Matthew H. Jewell District 12- Iberville Council Member / Maringouin
Matthew R. Hollins District 4 - Allen Police Juror / Mittie
Maxwell Chreene District 9 - Vermilion Police Juror / Abbeville
Mayor's Office of Env. Affairs Yarrow Etheredge City of New Orleans / New Orleans
McKinley "Pop" Keller District 6 - Avoyelles Police Juror / Bunkie
Melanie "Miss Mel" Bueche District 6 - Pointe Coupee Police Juror / Lakeland
Melton Alfred District 3 - Jefferson Davis Police Juror / Jennings
Melvin Haymon District 8 - Vernon Police Juror / New Llano
Merlin Price St. Mary Parish Council / Morgan City
Michael "Mike" Matherne District 3 - Lafourche Council Member / Thibodaux
Michael A. Petitto District 3 - Tangipahoa Councilman / Amite
Michael E. "Mike" Harper District 3D - Beauregard Police Juror / DeRidder
Michael F. Delatte District 2 - Lafourche Council Member / Thibodaux
Michael W. Domingue District 3 - St. Mary Councilman / Franklin
Mike Huval District 4 - St. Martin Council Member / Parks
Milton "Rocky" Ourso, Jr. District 2- Iberville Council Member / White Castle
Minos Broussard District 3 - Vermilion Police Juror / Erath
Mitchell "Mitch" Ardoin District 3 - Evangeline Police Juror / Mamou
Mix F. Vosburg District 9 - Pointe Coupee Police Juror / New Roads
Mr. Jess Curole Lafourche Parish CZM Administrator / Cut Off
Myron Matherne District 9 - Assumption Police Juror / Pierre Part
N. R. "Rusty" Williamson District 2 - Beauregard Police Juror / Merryville
Naray Hulin District 14 - Iberia Councilman / New Iberia
Nicholas P. Migliacio District 9- Iberville Council Member / Plaquemine
Odell Trahan District 3 - St. Martin Council Member / St. Martinville
Otis L. Wilson District 7 - West Feliciana Police Juror / St. Francisville
Parish President "Joey" Durel Layfayette Parish / Lafayette
Parish President Aaron F. Broussard Jefferson Parish / Kenner
Parish President Benny Rousselle Plaquemines Parish Government / Belle Chasse
Parish President Charlotte Angelette Randolph Lafourche Parish / Larose
Parish President Donald "Don" Menard St. Landry Parish / Cankton
Parish President Donald "Don" Schwab Terrebonne Parish / Houma
Parish President Henry "Junior" Rodriguez St. Bernard Parish / St. Bernard
Parish President M. E. "Toye" Taylor Washington Parish / Bogalusa
Parish President Michael "Mike" Grimmer Livingston Parish / Walker
Parish President Mr. Albert D. Laque St. Charles Parish / Boutte
Parish President Mr. Dale Hymel, Jr. St. James Parish / Lutcher
Parish President Mr. Gordon A. Burgess Tangipahoa Parish / Loranger
Parish President Mr. J. Mitchell Ourso, Jr. Iberville Parish / Plaquemine
Parish President Mr. Kevin C. Davis St. Tammany Parish / Slidell
Parish President Mr. Wilfred Langlinais Iberia Parish / New Iberia
Parish President Mr. William A. Cefalu St. Mary Parish / Morgan City
Parish President Nickie Monica St. John the Baptist Parish / LaPlace
Parish President Riley "Pee Wee" Berthelot West Baton Rouge Parish / Addis
Parish President Ronnie Hughes Ascension Parish / Gonzales
Parish President Suzanne D. Blanchard St. Martin Parish Parish / Martinville
Pat Cluse District 7 - St. Martin Council Member / Breaux Bridge
Pat Culbertson Metro District 3 - East Baton Rouge Councilman / Baton Rouge
Patricia "Pat" Brister District 4 - St. Tammany Council Member / Mandeville
Patrick Lawless District 1 - Assumption Police Juror / Belle Rose
Paul P. Naquin, Jr. District 9 - St. Mary Councilman / Baldwin
Peter Rhodes District 8 - Terrebonne Council Member / Houma
Peter Soprano District 10 - St. Mary Councilman / Garden City
Pierre J. Galley District 13 - Jefferson Davis Police Juror / Lacassine
Planning Department City of Kenner / Kenner
Plaquemine Parish Government / Port Sulphur
Plaquemines Parish Police Jury / Pointe-a-la-Hache
Pointe Coupee Parish Police Jury / New Roads
Police Jury St. Martin Parish / St. Martinville
President Metro Council, City of Baton Rouge Mr. Bobby R. Simpson / Baton Rouge
Public Works Superintedant Allen J. Benoit / Berwick
Purvis Abshire District 12 - Vermilion Police Juror / Kaplan
R. E. "Sonny" Weatherford District 6 - Allen Police Juror / Kinder
Ralph A. Patin, Jr. District 4 - St. James Councilman / Convent
Randal J. Mouch District 1 - West Baton Rouge Council Member / Addis
Randall L. Rushing District 1 - Livingston Councilman / Walker
Randy Stevens District 2 - West Feliciana Police Juror / Jackson
Ravis Menard District 11 - Vermilion Police Juror / Kaplan
Reid Weeks District 7 - Vernon Police Juror / Rosepine
Relton Sumrall District 5 - Washington Council Member / Franklinton
Renee Gill Pratt District B - Orleans Councilmember / New

Orleans
Richard "Blood" Thomas District 9 - Evangeline Police Juror / Ville Platte
Richard "Butch" Lindsay District A - Rapides Police Juror / Pineville
Richard "Dickie" Duhe District 6 - St. Charles Councilman / Norco
Richard Champagne Town of Lockport / Lockport
Richard Dale Wolfe District 3 - St. John the Baptist Councilman / Reserve
Richard Dudley District 4A - East Feliciana Police Juror / Jackson
Richard W. Billings District H - Rapides Police Juror / Forest Hill
Robert "Bob" Ray District 9 - St. Martin Council Member / Breaux Bridge
Robert J. Broussard District 8 - Jefferson Davis Police Juror / Jennings
Robert Johnson District 2 - East Feliciana Police Juror / Ethel
Rodney Brown District 4 - Washington Council Member / Bogalusa
Rodney Littleton, Acting Director City of New Orleans Env. Affairs Off. Orleans Parish / New Orleans
Roger D. Faust District 2 - Tangipahoa Councilman / Loranger
Roger Duncan District 10 - Iberia Councilman / New Iberia
Ronald "T" Doucet District 8 - Evangeline Police Juror / Ville Platte
Ronald Dugas District 8 - St. Landry Council Member / Sunset
Ronald E. Buschel District 5 - St. Landry Council Member / Washington
Ronald J. Darby District 4 - Vermilion Police Juror / Abbeville
Ronald L. Sharp District 8 - Livingston Councilman / Springfield
Ronnie Bankston District 6 - Tangipahoa Councilman / Hammond
Ronnie S. Smith District 6 - St. John the Baptist Councilman / LaPlace
Russell Fitzmorris District 2 - St. Tammany Council Member / Covington
Russell Young District 3 - Pointe Coupee Police Juror / New Roads
Salaris G. Butler District 6- Iberville Council Member / Plaquemine
Sam B. Fulton, Jr. District 9 - Vernon Police Juror / Leesville
Scott Perry, Jr. District I - Rapides Police Juror / Alexandria
Scott Trahan District 5 - Cameron Police Juror / Creole
Sean P. Roussel District 5 - St. John the Baptist Councilman / LaPlace
Sidney Fontenot District 2 - Evangeline Police Juror / Basile
St. Bernard Parish Police Jury Courthouse Annex St. Bernard / Chalmette
St. Charles Parish Police Jury St. Charles Parish Council / Hahnville
St. Helena Parish Police Jury St. Helena / Greensburg
St. James Parish Police Jury Convent Courthouse St. James / Convent
St. John The Baptist Parish Police Jury St. John the Baptist / Edgard
St. Landry Parish Police Jury St. Landry / Opelousas
St. Mary Parish Police Jury Courthouse St. Mary / Franklin
St. Tammany Parish Council St. Tammany / Covington
Steve F. Bierhorst District 5 - St. Mary Councilman / Patterson
Steve Trahan District 2 - Cameron Police Juror / Hackberry
T. J. Prejean, Jr. District 13 - Vermilion Police Juror / Abbeville
T.J. Smith, Jr. St. Tammany Parish Council St. Tammany / Covington
Tangipahoa Parish Police Jury Tangipahoa / Amite
Teri Chatagnier Cavalier District 4 - Terrebonne Council Member / Gray
Terrebonne Parish Police Jury Al Levron Terrebonne / Houma
Theodore Fountaine, Jr. District D - Rapides Police Juror / Alexandria
Thomas "Cade" Benoit District 7 - Acadia Police Juror / Church Point
Thomas E. Dominique, Sr. District 3- Iberville Council Member / White Castle
Thomas J. Wicker District 2 - St. Helena Police Juror / Greensburg
Thomas Nelson District 2 - St. Martin Council Member / St. Martinville
Timothy P. "Timmy" Roussel District 2 - St. James Councilman / Lutcher
Todd Foles District 8 - Assumption Police Juror / Pierre Part
Todd Lambert District 9 - Ascension Council Member / Gonzales
Tommy L. McMahon District 3 - Vernon Police Juror / Evans
Tony "Ricky" Melerine District E - St. Bernard Councilman / Violet
Town of Abita Springs Louis Fitzmorris Mayor / Abita Springs
Town of Addis Carroll P. Bourgeois Mayor / Addis
Town of Amite City Reggie Goldsby Mayor / Amite
Town of Arcadia Eugene Smith Mayor / Arcadia
Town of Arnaudville "Kathy" M. Richard Mayor / Arnaudville
Town of Baldwin Wayne J. Breaux Mayor / Baldwin
Town of Ball Roy Hebron Mayor / Pineville
Town of Basile Berline Boone Mayor / Basile
Town of Boyce Julius Patrick, Jr. Mayor / Boyce
Town of Brusly Joey Normand Mayor / Brusly
Town of Cheneyville Coral A. Johnson Mayor / Cheneyville
Town of Church Point Roger Boudreaux Mayor / Church Point
Town of Clinton H. Toler Hatcher Mayor / Clinton
Town of Cottonport Cleveland Carmouche Mayor / Cottonport
Town of Delcambre Carol Broussard Mayor / Delcambre
Town of Duson John E. Lagneaux Mayor / Duson
Town of Elizabeth Robert "Bob" Crafton Mayor / Elizabeth
Town of Elton "Cathy" Hollingsworth Mayor / Elton
Town of Evergreen Drew Robert Mayor / Evergreen
Town of Fordoche Justin K. Cox Mayor / Fordoche
Town of Franklinton Earle R. Brown, Sr. Mayor / Franklinton
Town of Glenmora Tyrone Doyle Mayor / Glenmora
Town of Golden Meadow Joey Bouziga Mayor / Golden Meadow
Town of Gramercy Terry Borne Mayor / Gramercy
Town of Grand Coteau Jean J. Coco Mayor / Grand Coteau
Town of Grand Isle David J. Camardelle Mayor / Grand Isle
Town of Greensburg "Ken" L. Carter Mayor / Greensburg
Town of Gueydan Chris Theriot Mayor / Gueydan
Town of Henderson Earl "To Bit" Patin Mayor / Henderson
Town of Hornbeck Clarence Beebe Mayor / Hornbeck
Town of Independence Phillip F. Domiano Mayor /

Independence
Town of Iota John D. Sittig Mayor / Iota
Town of Kentwood Harold J. Smith Mayor / Kentwood
Town of Killian Gillis Windham Mayor / Killian
Town of Kinder Fred A. Ashy Mayor / Kinder
Town of Krotz Springs Gary G. Soileau Mayor / Krotz Springs
Town of Lake Arthur E. R. "Red" Giles Mayor / Lake Arthur
Town of Lecompte Rosa S. Jones Mayor / Lecompte
Town of Leonville Joel Lanclos, Jr. Mayor / Leonville
Town of Livingston D. Derral Jones Mayor / Livingston
Town of Livonia Ronald "TB" Scallan Mayor / Livonia
Town of Lockport Richard Champagne Mayor / Lockport
Town of Lutcher Troas A. Poche Mayor / Lutcher
Town of Madisonville Peter Gitz, Jr. Mayor / Madisonville
Town of Mamou James S. Fontenot Mayor / Mamou
Town of Mansura Harold Quebedeaux Mayor / Mansura
Town of Maringouin John Fitzgerald Overton, Sr. Mayor / Maringouin
Town of Melville Willie "Butch" Haynes, III Mayor / Melville
Town of Merryville Foy W. Rhodes Mayor / Merryville
Town of New Llano Freddie Boswell Mayor / New Llano
Town of Oberlin "Phil" Beard Mayor / Oberlin
Town of Pearl River James Lavigne Mayor / Pearl River
Town of Port Barre John B. Fontenot Mayor / Port Barre
Town of Roseland Charles Bracey Mayor / Roseland
Town of Rosepine Keith Foshee Mayor / Rosepine
Town of Simmesport James "Boo" Fontenot Mayor / Simmesport
Town of Slaughter Bobbie Bourgeois Mayor / Slaughter
Town of Sorrento Camile J. Trabeau Mayor / Sorrento
Town of Springfield Charles E. "Charlie" Martin Mayor / Springfield
Town of St. Francisville William "Billy" D'Aquilla Mayor / St. Francisville
Town of Sunset Danny J. Louviere Mayor / Sunset
Town of Vinton David T. Riggins Mayor / Vinton
Town of Walker Travis Clark Mayor / Walker
Town of Washington Joseph "Joe" Pitre Mayor / Washington
Town of Welsh Jimmy Cormier Mayor / Welsh
Town of White Castle Maurice A. Brown Mayor / White Castle
Town of Woodworth David C. Butler, II Mayor / Woodworth
Town of Youngsville Wilson B. Viator, Jr. Mayor / Youngsville
Tyrone Brown Williams District 1 - Lafourche Council Member / Thibodaux
Tyrone Dufour District 7 - Avoyelles Police Juror / Plaucheville
Ulysses Z. Addison, Jr. Metro District 2 - East Baton Rouge Councilman / Baton Rouge
Vermilion Parish Police Jury / Abbeville
Vernon Parish Police Jury / Leesville
Village of Albany Thomas Allen Stewart Mayor / Albany
Village of Anacoco Leroy Cooley Mayor / Anacoco
Village of Angie John Dawsey Mayor / Angie
Village of Cankton Susan Menard Mayor / Cankton
Village of Chataignier Herman Malveaux Mayor / Ville Platte
Village of Estherwood Jeanelle F. Schexnider Mayor / Estherwood
Village of Fenton Frank D. Broxton Mayor / Fenton
Village of Folsom Marshell Brumfield Mayor / Folsom
Village of Forest Hill Marcia F. Young Mayor / Forest Hill
Village of French Settlement Clyde L. Wheat Mayor / French Settlement
Village of Grosse Tete Philip "Tunnie" Sarullo Mayor / Grosse Tete
Village of Hessmer Lynn Bordelon Mayor / Hessmer
Village of Loreauville Forbus J. Mestayer, Sr. Mayor / Loreauville
Village of Maurice Barbara L. Picard Mayor / Maurice
Village of Mcnary Don Parker, II Mayor / Glenmora
Village of Mermentau Myrtis A. Gautreaux Mayor / Mermentau
Village of Moreauville Lionel J. Bordelon Mayor / Moreauville
Village of Morganza Charles "Chuck" Landry Mayor / Morganza
Village of Morse Leon Clement Mayor / Morse
Village of Napoleonville Darrell Jupiter, Sr. Mayor / Napoleonville
Village of Norwood David C. Jett Mayor / Norwood
Village of Palmetto Earline H. Bihm Mayor / Palmetto
Village of Parks John Dugas Mayor / Parks
Village of Pine Prairie Terry L. Savant Mayor / Pine Prairie
Village of Plaucheville Terryl St. Romain Mayor / Plaucheville
Village of Port Vincent Mary T. Gourdon Mayor / Port Vincent
Village of Reeves Shelley Tyler Mayor / Reeves
Village of Rosedale Lawrence J. "Football" Badeaux Mayor / Rosedale
Village of Simpson Donnis Brinkley Mayor / Simpson
Village of Tangipahoa James Fultz Mayor / Tangipahoa
Village of Tickfaw Anthony "Tony" Lamonte Mayor / Tickfaw
Village of Turkey Creek Blaine Janet Mayor / Turkey Creek
Village of Wilson Bennie C. Jones, Jr. Mayor / Wilson
Warren Taylor District 1- Iberville Council Member / White Castle
Wayne "Spider" Carter Metro District 1 - East Baton Rouge Councilman / Zachary
Wayne J. Thibodeaux District 2 - Terrebonne Council Member / Gray
Wayne M. Roy District 13- Iberville Council Member / St. Gabriel
Wayne Touchet District 5 - Vermilion Police Juror / Abbeville
West Baton Rouge Parish Police Jury / Port Allen
William "Billy" Gil District 12 - St. Landry Council Member / Eunice
William A. "Bill" Guidry District 7 - Evangeline Police Juror / Ville Platte
Willie J. Morgan District 3 - St. Helena Police Juror / Greensburg
Wilson F. Malbrough, Jr. District 3 - St. James Councilman / Paulina

Louisiana District Conservationist

Count: 38

District Conservationist Acadia Parish Crowley Service Center / Crowley
District Conservationist Allen Parish Oberlin Service Center / Oberlin
District Conservationist Ascension Parish Donaldsonville Service Center / Donaldsonville
District Conservationist Assumption Parish Donaldsonville Service Center / Donaldsonville
District Conservationist Avoyelles Parish Marksville Service Center / Marksville
District Conservationist Beauregard Parish Deridder Service Center / DeRidder

District Conservationist Calcasieu Parish Lake Charles Service Center / Lake Charles
District Conservationist Cameron Parish Lake Charles Service Center / Lake Charles
District Conservationist East Baton Rouge Parish Denham Springs Service Center / Denham Springs
District Conservationist East Feliciana Parish Clinton Service Center / Clinton
District Conservationist Evangeline Parish Ville Platte Service Center / Ville Platte
District Conservationist Iberia Parish New Iberia Service Center / New Iberia
District Conservationist Iberville Parish Donaldsonville Service Center / Donaldsonville
District Conservationist Jefferson Davis Parish Jennings Service Center / Jennings
District Conservationist Jefferson Parish Boutte Service Center / Boutte
District Conservationist Lafayette Parish Lafayette Service Center / Lafayette
District Conservationist Lafourche Parish Thibodaux Service Center / Thibodaux
District Conservationist Livingston Parish Denham Springs Service Center / Denham Springs
District Conservationist Orleans Parish Boutte Service Center / Boutte
District Conservationist Plaquemines Parish Council Boutte Service Center / Boutte
District Conservationist Pointe Coupee Parish New Roads Service Center / New Roads
District Conservationist Rapides Parish Alexandria Service Center / Alexandria
District Conservationist St. Bernard Parish Boutte Service Center / Boutte
District Conservationist St. Charles Parish Boutte Service Center / Boutte
District Conservationist St. Helena Parish Amite Service Center / Amite
District Conservationist St. James Parish Donaldsonville Service Center / Donaldsonville
District Conservationist St. John The Baptist Parish Boutte Service Center / Boutte
District Conservationist St. Landry Parish Opelousas Service Center / Opelousas
District Conservationist St. Martin Parish Breaux Bridge Service Center / Breaux Bridge
District Conservationist St. Mary Parish Franklin Service Center / Franklin
District Conservationist St. Tammany Parish Franklinton Service Center / Franklinton
District Conservationist Tangipahoa Parish Amite Service Center / Amite
District Conservationist Terrebonne Parish Thibodaux Service Center / Thibodaux
District Conservationist Vermillion Parish Abbeville Service Center / Abbeville
District Conservationist Vernon Parish Leesville Service Center / Leesville
District Conservationist Washington Parish Franklinton Service Center / Franklinton
District Conservationist West Baton Rouge Parish Addis Service Center / Addis
District Conservationist West Feliciana Parish Clinton Service Center / Clinton

Louisiana Flood Plain Administrators

Count: 286

Permit Administrator Killian, Village of / Killian
Adrienne Labat Planning Coordinator St. John the Baptist Parish / LaPlace
Al Courouleau Building Inspector Ponchatoula, City of / Ponchatoula
Alan Dwyer Special Services Director West Feliciana Parish / St. Francisville
Ali Mustapha Assistant City Engineer Shreveport, City of / Shreveport
Alice Galland Town Clerk Plaucheville, Town of / Plaucheville
Amanda Castello Chief Bldg. Official Zachary, City of / Zachary
Amber Higginbotham Town Clerk Church Point, Town of / Church Point
Andre Bass Building Inspector Winnfield, City of / Winnfield
Angela Canady Permit Official Baker, City of / Baker
Arthur Israel Building Inspector Walker, Town of / Walker
Barbara E. Dupree*** Clerk Martin, Village of / Coushatta
Barry Brewer Administrator Port Allen, City of / Port Allen
Bea Guidry Permit Officer Kaplan, City of / Kaplan
Becky Blanchard City Clerk Breaux Bridge, City of / Breaux Bridge
Becky Culpepper FPA Westlake, City of / Westlake
Becky Garner Town Clerk Goldonna, Village of / Goldonna
Ben Adams Building Inspector Jonesville, Town of / Jonesville
Bernard Frances Code Enforcement Officer Donaldsonville, City of / Donaldsonville
Betsy Jordan Clerk Robeline, Village of / Robeline
Betty Jo Moberly Clerk Campti, Town of / Campti
Beverly Perry Clerk Merryville, Village of / Merryville
Bill Smith Parish Administrator DeSoto Parish / Mansfield
Bob Carpenter Mayor Calvin, Village of / Calvin
Bonnie Dugas Clerk Mermentau, Village of / Mermentau
Bonnie G. Price Clerk Carencro, City of / Carencro
Bonnie Sonnier Permit Official St. Martin Parish / St. Martinville
Brad Duhon Permit Official Scott, City of / Scott
Brandon Mellieon Building Inspector Plaquemine, City of / Plaquemine
Brenda Hilton Town Clerk Hornbeck, Town of / Hornbeck
Brenda Jones Secretary Red River Parish / Coushatta
Brent Cooley Building Inspector Minden, City of / Minden
Bruce Fleming Director of Planning West Monroe, City of / West Monroe
Bryan Harmon Dept. of Public Works East Baton Rouge Parish / Baton Rouge
Buddy Redmon City Superintendent Bunkie, Town of / Bunkie
Candance Thomas Municipal Clerk Tickfaw, Town of / Tickfaw
Carl Robichaux Parish Engineer Ascension Parish / Gonzales
Carla Richard Clerk Erath, Town of / Erath
Carmen Judice Permit Official Iberia Parish / New Iberia
Carol Martin Clerk Rodessa, Village of / Rodessa
Carolyn Davis-Goff Clerk Boyce, Town of / Boyce
Cathy Fitch Clerk Oak Ridge, Village of / Oak Ridge
Charlene E. Hill Clerk Parks, Village of / Parks
Charlene Picard/OfficeMgr Acadian Metrocode Lafayette Parish / Lafayette
Charlene Picard/OfficeMgr Acadian Metrocode Lafayette, City of / Lafayette
Charlene Smith Clerk Haughton, Town of / Haughton
Charles Dixon Clerk Greensburg, Town of / Greensburg
Charles Germany Clerk Rayville, Town of / Rayville
Charlie Driver Building Inspector New Llano, Town of / New Llano

Cheryl Thomas Clerk Glenmora, Town of / Glenmora
Christi Morgan Clerk Gonzales, City of / Gonzales
Christine Logarbo Clerk Morse, Village of / Morse
Chuck Vincent Building Inspector Denham Springs, City of / Denham Springs
Cinderella Miller Clerk Cankton, Village of / Cankton
Cindy Mallett Clerk Lake Arthur, Town of / Lake Arthur
Cindy Murry Planning & Zoning Clerk Abita Springs, Town of / Abita Springs
Clegg Chaumont Superintendent Oberlin, Town of / Oberlin
Collins Bonicard Building Inspector Tangipahoa Parish / Hammond
Connie McKeel Clerk Waterproof, Town of / Waterproof
Connie Treadway Permit Officer Plaquemines Parish / Port Sulphur
Corrine Jones Admin Asst for Parish Planning Natchitoches Parish / Natchitoches
Cynthia Taylor Clerk Arnaudville, Town of / Arnaudville
D. Michael Metcalf Gretna, City of / Gretna
Dale Kelly Building Inspector Leesville, City of / Leesville
Danette Cloud Clerk Pine Prairie, Village of / Pine Prairie
Danny Hebert Bldg. Inspector Crowley, City of / Crowley
Darla Duet Permit Officer Lafourche Parish / Thibodaux
Dave Lowery City Manager Patterson, City of / Patterson
David C. Butler, II Mayor Woodworth, Village of / Woodworth
David Dupont Building Inspector Iberville Parish / Plaquemine
David Sellers Building Inspector Kentwood, Town of / Kentwood
Dawn B. Stott Town Clerk Olla, Town of / Olla
Deborah Strickland Sec./Treasurer St. Helena Parish / Greensburg
Debra Blackledge Clerk Cottonport, Town of / Cottonport
DeeDee Wagner Permits & Address Admin. Livingston Parish / Livingston
Denise Frank Town Clerk Epps, Village of / Epps
Denise Moore Town Clerk Grand Coteau, Town of / Grand Coteau
Denise Mose Clerk Kinder, Town of / Kinder
Derhyl Hebert Dir. of Planning & Zoning Morgan City, City of / Morgan City
Diane Mataya Town Clerk Lockport, Town of / Lockport
Dolores Melancon Clerk Leonville, Town of / Leonville
Dolores Pousson Clerk Iota, Town of / Iota
Donald Simmons Building Inspector St. Francisville, Town of / St. Francisville
Donna Baudoin Permits Director Abbeville / Abbeville
Donna Bergeron Town Clerk Livonia, Town of / Livonia
Donna Tyler Clerk Colfax, Town of / Colfax
Donna Veillon City Treasurer Ville Platte, City of / Ville Platte
Donnie Ousse Bldg. Inspector Rayne, City of / Rayne
Doris McGee Clerk Palmetto, Village of / Palmetto
Doris Narron Town Clerk Benton, Town of / Benton
Dorothy Kropog Assistant Village Clerk Albany, Village of / Albany
Doug Burguieres FPA Lake Charles, City of / Lake Charles
E. A. Greer Secretary/Morehouse Par PJury Morehouse Parish / Bastrop
Earl Matherne Permit Officer St. Charles Parish / Hahnville
Elisha Matthews Secretary/Treasurer East Carroll Parish / Lake Providence
Elizabeth Allen Clerk Pearl River, Town of / Pearl River
Eloise Means Town Clerk Bonita, Village of / Bonita
Elton Pickering Director of Public Works Beauregard Parish / DeRidder
Emily Bentley Clerk Clinton, Town of / Clinton
Eva Taylor Asst. Secretary/Treasurer Madison Parish / Tallulah
Evelyn Sandidge Clerk Pioneer, Village of / Pioneer
Faye Boyd Permit Official Franklinton, Town of / Franklinton
Floodplain Administrator Bossier Parish / Benton
Floodplain Administrator Clerk Clarence, Village of / Clarence
Flora Hicks Clerk Collinston, Village of / Collinston
Frankie Crooks Code Enforcement Officer Pineville, City of / Pineville
Gary Beadle Director of Planning & Zoning Berwick, Town of / Berwick
Genevieve Ellis Permit Official Richmond, Village of / Tallulah
Genie Drouin Clerk Hessmer, Village of / Hessmer
Gerald Odom Clerk Tallulah, City of / Tallulah
Gilbert Pitre City Inspector Jennings, City of / Jennings
Glen Couvillion Floodplain Administrator Alexandria, City of / Alexandria
Glenda Thomas Clerk South Mansfield, Village of / South Mansfield
Gloria Dean King Clerk Delhi, Town of / Delhi
Grady Stephens Business Manager Vernon Parish / Leesville
Greg Prejean (Bubba) Floodplain Administrator Sulphur, City of / Sulphur
Guy Pucheu(pro. pea-shoe) Clerk Mamou, Town of / Mamou
Heuetta Benoit Clerk Gueydan, Town of / Gueydan
Holly Gilmore Clerk Jackson, Town of / Jackson
Irvin Richoux, Sr. Building Inspector Grand Isle, Town of / Grand Isle
James Boyd Fire Protection Chief Bastrop, City of / Bastrop
James Demouchet Permit Official Caddo Parish / Shreveport
James Hall Building Inspector Bogalusa, City of / Bogalusa
Jamie Liner Clerk Golden Meadow, Town of / Golden Meadow
Jana Klock Clerk Cheneyville, Town of / Cheneyville
Jason Benoit Senior Planner Houma, City of / Houma
Jason Benoit Senior Planner Terrebonne Parish / Houma
Jean Blackard Clerk Mer Rouge, Village of / Mer Rouge
Jeff L. James Mayor Rosepine, Town of / Rosepine
Jennifer Perkins Clerk Natchez, Village of / Natchez
Jenny Curtis Parish Secretary Franklin Parish / Winnsboro
Jerry DeWitt Code Enforcement Officer DeRidder, City of / DeRidder
JoAnn Basinger Town Clerk Ringgold, Town of / Ringgold
Jody Chenier Director of Operations St. James Parish / Convent
Joe Graves Clerk Wisner, Town of / Wisner
Joe Sontoyo Fire Chief Ferriday, Town of / Ferriday
John Boudreaux Floodplain Administrator Assumption Parish / Napoleonville
John Boudreaux Floodplain Administrator Napoleonville, Village of / Napoleonville
John Pinsonat Building Inspector New Roads, City of / New Roads
John Quebodeaux Permit Officer Acadia Parish / Crowley
Joy Fontenot Clerk DeQuincy, City of / DeQuincy
Joy S. Rhodes Clerk Plain Dealing, Town of / Plain Dealing
Joyce Core Clerk Folsom, Village of / Folsom
Juanita Fowler Director of Planning & Zoning Natchitoches, City of / Natchitoches
Judy Massey Clerk Ridgecrest, Town of / Ridgecrest
Judy Shelton Town Clerk Pollock, Town of / Pollock
Jules Lefeaux Town Clerk Brusly, Town of / Brusly
June Farmer Permit Administrator Port Vincent, Village of

/ Port Vincent
Karen Carlton Secretary/Treasurer Winn Parish / Winnfield
Karen Davis Clerk Springfield, Town of / Springfield
Kathy Dickens Clerk Vidalia, Town of / Vidalia
Kay Kleinpeter Clerk Grosse Tete, Village of / Grosse Tete
Kay Smith Secretary-Treasurer LaSalle Parish / Jena
Keith Chiro Permit Officer Kenner, City of / Kenner
Ken Amedee Clerk Rosedale, Village of / Rosedale
Laura Adams Floodplain Manager Catahoula Parish / Harrisonburg
Lee Butler Utilities Supervisor Maringouin, Village of / Maringouin
LeeAnn Clement Town Clerk Lake Providence, Town of / Lake Providence
Leslie Thibodeaux Clerk Fordoche, Village of / Fordoche
Linda Duhon Floodplain Administrator Vermilion Parish / Abbeville
Linda Gaspard Clerk Washington, Town of / Washington
Linda Lowery E-911 Admin/Floodplain Manager Caldwell Parish / Columbia
Linda S. LeBlanc Town Clerk Welsh, Town of / Welsh
Linda Sikes Sec./Treasurer Tensas Parish / St. Joseph
Lisa Richardson Building Permit Officer Ouachita Parish / Monroe
Lorraine M. Brummett Clerk Grand Cane, Village of / Grand Cane
Lorraine Thibodaux Clerk Baldwin, Town of / Baldwin
Louria* Jefferson Permit Official Arcadia, Town of / Arcadia
Lydia A. Boxie Clerk Sunset, Town of / Sunset
Lydia Z. Louque Permit Official Gramercy,Town of / Gramercy
Mack Thompson Parish Engineer Allen Parish / Oberlin
Margaret Doucet Code Enforcement Officer Opelousas, City of / Opelousas
Margie Holden Clerk McNary, Village of / McNary
Marie Beeson Clerk Elizabeth, Town of / Elizabeth
Marilyn Dilmore Clerk Sterlington, Town of / Sterlington
Marilyn Juneau Clerk Moreauville, Village of / Moreauville
Mark Hudson Civil Engineer Bossier City, City of / Bossier City
Mark Ramagos City Manager Morganza, Town of / Morganza
Mary Hebert Clerk Maurice, Town of / Maurice
Mary Hebert Tax Collector Jeanerette, City of / Jeanerette
Mary Lou Lacassin Clerk Krotz Springs, Town of / Krotz Springs
Mary Lou Lee Clerk Amite City, Town of / Amite City
Mary Pringle Clerk Forest Hill, Village of / Forest Hill
Mary Vice Clerk Vinton, Town of / Vinton
Maurice T. Bourgeois, Jr. City Clerk Westwego, City of / Westwego
Maxine Ard Assistant Clerk Montpelier, Village of / Montpelier
Maxine Buller Clerk Lecompte, Town of / Lecompte
Melissa Becker Rapides Parish / Alexandria
Melissa Blanco Permit Clerk St. Landry Parish / Opelousas
Mercedes Williams Clerk St. Joseph, Town of / St. Joseph
Merilyn Morris Tax Collector St. Gabriel, Town of / St. Gabriel
Michael Andrus Building Inspector Monroe, City of / Monroe
Michael Hunnicut Dir. of Comm. Development St. Bernard Parish / Chalmette
Michelle Jones Clerk Oakdale, City of / Oakdale
Mike Allen Supervisor of Public Works Farmerville, Town of / Farmerville
Mike Centineo Building Official Orleans Parish (New Orleans) / New Orleans
Mildred Johns Clerk Mangham, Town of / Mangham
Mindy Ezernick Town Clerk Zwolle, Town of / Zwolle
Minnie Hutchinson Clerk Tangipahoa, Village of / Tangipahoa
Mr. Carol J. Vinning Planning Director St. Mary Parish / Franklin
Mr. Chris Young Fire Chief Jonesboro, Town of / Jonesboro
Ms. Donny Duffy Clerk Livingston, Town of / Livingston
Ms. Eylene Bolling Secretary Claiborne Parish / Homer
Ms. Louise Jeansonne Asst. Administrator Marksville, Town of / Marksville
Ms. Lynn Hicks Clerk Cotton Valley, Town of / Cotton Valley
Ms. Paris Sumrall Mayor Varnado, Village of / Varnado
Ms. Willie Bishop Clerk Ball, Town of / Ball
Nancy Burney Clerk Cullen, Town of / Cullen
Nancy Robbins Town Clerk Gilbert, Village of / Gilbert
Neil Minor Planning & Zoning Director Franklin, City of / Franklin
Nell Tassin Town Clerk Mansura, Town of / Mansura
Pam Guidry Building Inspector Henderson, Town of / Breaux Bridge
Pam Mattingly Assistant Director of Planning Calcasieu Parish / Lake Charles
Pam Stokes Clerk Delta, Village of / Delta
Patricia Griffith Permit Clerk Evangeline Parish / Ville Platte
Patricia Lemoine Clerk Lutcher, Town of / Lutcher
Patti Vincent City Clerk Delcambre, Town of / Delcambre
Paulette St. Romain Permit Official Pointe Coupee Parish / New Roads
Peggy Robinson Permit Official West Carroll Parish / Oak Grove
Penny Fields Town Clerk Haynesville, Town of / Haynesville
Pete Panepinto Building Official Hammond, City of / Hammond
Phyllis Barnhill Clerk Many, Town of / Many
Phyllis Savoy Loreauville, Village of / Loreauville
Rachel Denison Town Clerk Columbia, Town of / Columbia
Ray Rozas (Shorty) Bldg. Inspector Eunice, City of / Eunice
Rebecca Langlinais Clerk Youngsville, Town of / Youngsville
Reggie Edmiston Building Inspector Ruston, City of / Ruston
Renee Dixon Clerk Melville, Town of / Melville
Rhonda King Clerk Newellton, Town of / Newellton
Richard Durrett Parish Engineer Lincoln Parish / Ruston
Robert Meeker Building Inspector Grant Parish / Colfax
Rodney Warren Permit Official Bienville Parish / Arcadia
Ron Keller Planning Director St. Tammany Parish / Mandeville
Rose Johnson Town Clerk Basile, Town of / Basile
Roxy Fletcher City Clerk Winnsboro, City of / Winnsboro
Ruby Maggio Building Permit Office Thibodaux, City of / Thibodaux
Russell Wagoner Secretary/Treasurer Concordia Parish / Vidalia
Sadie G. Jones Clerk Clayton, Town of / Clayton
Sallie Broadway Clerk Provencal, Village of / Provencal
Sandra Miller Town Clerk Oak Grove, Town of / Oak Grove
Sandra Turley Clerk Iowa, Town of / Iowa
Sandy S. Sarver Clerk Estherwood, Village of / Estherwood
Sarah Hebert Asst. Clerk Broussard, Town of / Broussard
Shannon Burke Covington, City of / Covington
Shannon Reeves Town Clerk Roseland, Town of /

Roseland
Sharon Eiland Clerk Doyline, Village of / Doyline
Sharon Johnson Permit Officer Union Parish / Farmerville
Sharon Keel Clerk Jena, Town of / Jena
Sharon Stewart Clerk Logansport, Town of / Logansport
Shedrick Berard Safety Director St. Martinville, City of / St. Martinville
Sheila McManus Clerk Montgomery, Town of / Montgomery
Sherry Boyd Town Clerk Sibley, Town of / Sibley
Sherwin LeFranc FPA Jefferson Davis Parish / Jennings
Shirley Byrd Sec./Treasurer Webster Parish / Minden
Sonia Marquette Floodplain Administrator West Baton Rouge Parish / Port Allen
Stacey Adler Clerk White Castle, Town of / White Castle
Stacey Swindle Clerk Florien, Village of / Florien
Stanley Polivick City Engineer Slidell, City of / Slidell
Steve Benton Floodplain Administrator Madisonville, Town of / Madisonville
Sue White Town Clerk/Permit Admin French Settlement, Village of / French Settlement
Susan E. Robinson Clerk Grayson, Village of / Grayson
Sybil Josey Clerk Mound, Village of / Mound
Sylvia Forbes Flood Administrator Washington Parish / Franklinton
Talona Hathcock Clerk Harrisonburg, Village of / Harrisonburg
Tara Albares Town Clerk Sorrento, Town of / Sorrento
Tekisha Guidry Town Clerk Duson, Town of / Duson
Terrence Green Permit Administrator Greenwood, Town of / Greenwood
Therese Wilcox Clerk Harahan, City of / Harahan
Tina Forrest Independence, Town of / Independence
Tina Horn Parish Administrator Cameron Parish / Cameron
Tina Lemoine OEP Assistant Avoyelles Parish / Marksville
Tom Rodrigue Jefferson Parish / Marrero
Tommy Burgess Floodplain Administrator Richland Parish / Rayville
Toria Comeaux Clerk Port Barre, Town of / Port Barre
Travis Beebee Building Inspector Homer, Town of / Homer
Trudy Boudreaux Clerk/Floodplain Administrator Baskin, Village of / Baskin
Vacant - Talk to Mayor Town Clerk Richwood, Town of / Richwood
Vera Lucas Clerk Addis, Town of / Addis
Verian Guillory Clerk Elton, Town of / Elton
Vernell S. Franklin Clerk Simmesport, Town of / Simmesport
Vicki Adkins Permit Officer Springhill, City of / Springhill
Wayne Berggren Bldg. Inspector Mandeville, City of / Mandeville
Wesley Dunn Clerk Mansfield, City of / Mansfield
Wilbur J. Rozas Clerk Chataignier, Village of / Chataignier
Willie B. Robinson Clerk Coushatta, Town of / Coushatta
Winston Copell Building Inspector New Iberia, City of / New Iberia
Yvette Crain Clerk Jean Lafitte, Town of / Lafitte

Media (Newspaper , TV, Radio)

Count: 197

Abbeville Meridional / Abbeville
Acadian Press / Mamou
Acadian Tribune / Rayne
American Press Attn: Hector San Miguel / Lake Charles
American Press Attn: Linda Young / Lake Charles
American Waterways Operators / Mandeville
Amite Tangi-Digest / Amite
Ascension Citizen / Gonzales
Avoyelles Journal / Marksville
Baton Rouge Business Report / Baton Rouge
Bill Capo WWL-TV, Channel 4 / New Orleans
Bob Breck Fox 8 Live WVUE-TV / New Orleans
Bobby Brennan Fox 8 Live WVUE-TV / New Orleans
Bunkie Record / Bunkie
Callais Cablevision Channel 5 / La Rose
Cameron Parish Pilot / Cameron
Carissa Mire The Daily Iberian / New Iberia
Carl Arredondo WWL-TV, Channel 4 / New Orleans
Catherine Carlock Simpson News Mgr LA Dept of Wildlife & Fisheries / Baton Rouge
Chief / Donaldsonville
Church Point News / Church Point
Citizen / Coushatta
Citizen / Welsh
City Business Deon Roberts / Metairie
City Business Editor: Terry O'Connor / Metairie
Courier / Daily Comet / Houma
Daily Comet Editor Jeffrey Zeringue / Thibodaux
Daily Comet Todd Siegrist / Thibodaux
Daily Shipping Guide Garry Naquin / New Orleans
Daily Star Lillian Mirando / Hammond
Daily World Exec Editor Harland Kirgan / Opelousas
David Bernard WWL-TV, Channel 4 / New Orleans
David Krapf Workboat Magazine / Mandeville
Denham Springs-Livingston News / Denham Springs
Dennis Woltering WWL-TV, Channel 4 / New Orleans
Dir - Advertising & Promotion LA Dept of Commerce & Industry / Baton Rouge
Don Hoffman Where Magazine / New Orleans
Eunice News / Eunice
Franklin Banner Tribune / Franklin
Galen H Rogers Gentilly Freak Productions / New Orleans
Gambit Weekly Michael Tisserand / New Orleans
Gazette / Ville Platte
Gonzales Weekly / Gonzales
Herald / Kaplan
Huey Stein - Editor The Enterprise / Vacherie
Jeanerette Enterprise / Jeanerette
Jeff Duhe-News Director Louisiana Public Broadcasting / Baton Rouge
John Gumm WWL-TV, Channel 4 / New Orleans
John Snell-Anchor Person WVUE-TV / New Orleans
KADN / Lafayette
KALB-TV / Alexandria
Kane - News Director / New Iberia
KAPB / KWLB / Marksville
KATC-TV / Lafayette
Katheline Gilbert The Courier Weekend Editor / Houma
KDBS / KRRV / Alexandria
Keith Magill The Courier Executive Editor / Houma
Ken Hocke Workboat Magazine / Mandeville
Kenner Star Candy Lovitt-Managing Editor / Kenner
Kent Prince, News Editor Associated Press / New Orleans
KEUN-AM / KJJB-AM / Eunice
KFNV-AM-FM / Ferriday
KGLA / Marrero
Kim Holden Fox 8 Live WVUE-TV / New Orleans
Kimberly Krupa The Courier / Houma
KJIN / KCIL / Houma
KLCL / KHLA / Lake Charles
KLFY-TV / Lafayette
KLLA / Leesville
KMRC-KFXY / Morgan City
KPEL AM FM / Lafayette
KPLC - TV Ch 7 Assignment Editor Sheletta Smith / Lake Charles
KPLC - TV Ch 7 Environmental Ed Teresa Schmidt / Lake Charles

KPLC - TV Ch 7 News Director Cynthia Victorian / Lake Charles
KPLC-TV / Lake Charles
KQKI / KDLP Ernst Polk / Morgan City
KSIG / Crowley
KSLO / KOGM / Opelousas
KSMB / Lafayette
KSYL / Alexandria
KTIB / Thibodaux
KVIP-AM-FM / Ville Platte
KVVP / Leesville
KWBJ Channel 39 / Morgan City
KWCL-AM-FM / Oak Grove
La Prensa Attn: Gina Cortez / Metairie
Lafayette Advertiser Attn: Charles Lenox / Lafayette
Lafayette Advertiser Attn: Ann Wakefield / Lafayette
Lafayette Advertiser Attn: Bill Decker / Lafayette
Lafourche Gazette Vicki Chaisson, ED / La Rose
Leader / Leesville
Ledger / Kentwood
Livingston Parish News / Denham Springs
L'Observateur Leonard Gray / LaPlace
Louisiana Network Inc Attn: Jeff Palermo / Baton Rouge
Louisiana Shipbuilding & Repairs Association / New Orleans
Marty Authement The Courier Features Editor / Houma
Matt Gresham The Courier / Houma
Mikel Schaefer WWL-TV, Channel 4 / New Orleans
Morgan City Daily Review / Morgan City
Ms Fran Marcus New York Times / New Orleans
Ms Janet Plume Journal of Commerce / New Orleans
New Orleans Port Record / New Orleans
News / Denham Springs
News / De Quincey
News Director KVPO Radio / Morgan City
News Examiner / Lutcher
News One State Capitol Station / Baton Rouge
Plaquemines Newspaper Publishing Inc / Belle Chasse
Pointe Coupee Banner / New Roads
Port of Lake Charles Harbor and Terminal District / Lake Charles
Port of New Orleans Gary Lagrange / New Orleans
Post Signal / Crowley
Rajun Cajun Radio Station / La Rose
Randy Decuir Avoyelles Journal / Marksville
River Parishes Guide / Boutte
Roger Hooper, Ed & Publisher Go Gulf Magazine / Baton Rouge
Scott Turick The Daily Iberian / New Iberia
Slidell Sentry News / Slidell
St Bernard News / Metairie
St Charles Herald Guide Daniel Moore / Boutte
St Helena Echo / Greensburg
St Mary Journal / Morgan City
St Tammany News Banner / Covington
Stanley R Dufrene - Public Affairs Union Carbide / Dow Chemical / Hahnville
Supervisor US Coast Guard (MSO) / Morgan City
Tangi-Talk / Amite
Teche News / St. Martinville
Terrebonne Press / Houma
Terry Westerfield WGNO TV Ch 26 / New Orleans
The Advocate Amy Wold / Baton Rouge
The Advocate Angela Simoneaux / Lafayette
The Advocate Ben Reed Asst. State Editor / Baton Rouge
The Advocate Bill Bankston / Baton Rouge
The Advocate Bobby Lamb Business Editor / Baton Rouge
The Advocate Carl Redman Managing Editor / Baton Rouge
The Advocate Chris Baughman City Desk / Baton Rouge
The Advocate Curt Eysink City Editor / Baton Rouge
The Advocate Emily Kern Westside Bureau / Port Allen
The Advocate Fred Kalmbach City Desk / Baton Rouge
The Advocate Joe Macaluso Outdoor Writer / Baton Rouge
The Advocate John LaPlante Capitol Bureau Chief / Baton Rouge
The Advocate John Mcmillan / Gonzales
The Advocate Johnny Brooks News / Baton Rouge
The Advocate Linda Lightfoot Executive Editor / Baton Rouge
The Advocate Madeleine Lamb People Editor / Baton Rouge
The Advocate Mike Dunne News / Baton Rouge
The Advocate Milford Fryer Surburban Editor / Baton Rouge
The Advocate Randy McLain News / Baton Rouge
The Advocate Roy Miller State Editor / Baton Rouge
The Advocate Tim Belehrad Newsfeatures Ed. / Baton Rouge
The Chamber Chris Laborde / New Orleans
The Currents Naval Support Activity, PAO / New Orleans
The Observer / Baker
The Rayne Independent / Rayne
The Times Picayune Attn: Sandra Barbier / Gretna
The Waterways Journal 666 Security Building / St. Louis
Times of Acadiana / Lafayette
Times Picayune / Metairie
Times Picayune Andrea Shaw / Gretna
Times Picayune Bob Marshall-Venture Editor / New Orleans
Times Picayune Charlie Crumpley - Money Section / New Orleans
Times Picayune Coleman Warner / New Orleans
Times Picayune Jed Horne, City Editor / New Orleans
Times Picayune Jefferson Bureau Drew E Broach / Metairie
Times Picayune Leslie Williams / New Orleans
Times Picayune St. Bernard Bureau Karen Turni / Chalmette
Times Picayune St. Tammany Bureau Ron Thibodeaux / Slidell
Times Picayune Terri Troncale / New Orleans
Times Picayune
Times-Picayune Mr. Mark Schleifstein / New Orleans
Town Talk / Alexandria
WABL / Amite
WBOK / New Orleans
WBRZ / Baton Rouge
WBYU / WSHO / New Orleans
WCKW-AM / Metairie
WDSU-TV / New Orleans
West Side Journal / Port Allen
WFCG / Franklinton
WFPR / WHMD / Hammond
WGGZ-FM / Baton Rouge
WGNO-TV 26 Paula Pendarvis News Director / New Orleans
WGSO Attn: Charles Travis / Metairie
White Castle Times / Plaquemine
WIBR / Baton Rouge
William A Evans Waterways Journal / Mandeville
WJBO / WFMF / Baton Rouge
WLPB-TV / Baton Rouge
WNOE-AM-FM / New Orleans
WQUE-FM / New Orleans
WSMB / New Orleans
WVUE-TV / New Orleans
WWL / WAJY / New Orleans
WWOZ / New Orleans
WYES-TV / New Orleans

WYNK Radio / Baton Rouge

Other Membership Organizations

Count: 8

American Rivers / Signal Mountain
Barbara Dodds League of Women Voters / Covington
Bicycle Awareness Committee of New Orleans Mr. Robin P. Robert / New Orleans
Concerned Citizens For Informed Choices / Slidell
LA League of Women Voters / Baton Rouge
La State Governors Advisory Committee On Bicycling Mr. Bill Keller - Chairman / New Orleans
Lake Pontchartrain Sanitary District / Baton Rouge
Ms. Jean Armstrong LA League of Women Voters / Baton Rouge

Standard Personal-Coordination Names for EA & EIS

Count: 11

David Bernhart NMFS - Protected Species Division / St. Petersburg
Donald Gohmert State Conservationist - NRCS / Alexandria
Field Supervisor U.S. Fish and Wildlife Service / Lafayette
Gary Zimmerer FEMA - Region VI, Federal Center / Denton
Gregory P. Ducote Interagency Affairs - LADNR CMD / Baton Rouge
Larry Wiesepape, Ph.D LA DEQ Permits Division / PER-REGC / Baton Rouge
Miles Croom NMFS - Habitat Conservation Division / St. Petersburg
Pam Breaux SHPO, Dept. of Culture Recreation and Tourism / Baton Rouge
Richard D. Hartman NMFS - Habitat Conservation Division Louisiana State University / Baton Rouge
Rob Lawrence EPA, Region VI - Off. of Planning and Coord. / Mail Code 6EN-XP / Metairie
Russell C. Watson Field Supervisor U.S. Fish and Wildlife Service / Lafayette

State Agencies

Count: 28

Cultural & Historical/ Research & Development Research Coord Melanie Marcotte / Charenton
Darin M. Lee Coastal Resources Scientist Supervisor LA DNR - CRD / Thibodaux
David Frugé, Administrator LA Dept. of Natural Resources Coastal Management Division / Baton Rouge
East Baton Rouge City-Parish Council / Baton Rouge
Edgar S. Bordes City of New Orleans Mosquito & Termite Control Board / New Orleans
Governors Office for Coastal Activities State Land & Nat Resources Bldg. / Baton Rouge
Katherine Vaughn Deputy Secretary of Louisiana DNR / Baton Rouge
LA Dept of Natural Resources Coastal Resources Program Consistency Coordinator / Baton Rouge
LA Dept of Natural Resources Office of Conservation Surface Mining Division / Baton Rouge
LA Dept of Natural Resources Title & Records Section Division of State Lands / Baton Rouge
LA Dept of Public Works / Baton Rouge
LA Dept of Transportation & Dev Asst Chief Engr Water Resources Office of Public Works / Baton Rouge
LA Dept of Wildlife & Fisheries Mr. Tim Morrison / Baton Rouge
LA Dept Wildlife & Fisheries Mr. Gary Lester-Nat Heritage Pgm / Baton Rouge
LA Dept Wildlife & Fisheries Mr. Maurice B. Watson / Baton Rouge
LA Dept Wildlife & Fisheries Secretary / Baton Rouge
LA Dept. of Agriculture & Forestry Mr. Matthew Keppinger Office of Ag & Environmntal Science / Baton Rouge
LA Dept. of Agriculture & Forestry Office of Forestry / Baton Rouge
LA Dept. of Culture Recreation & Tourism/office of State Parks Div. of Outdoor Recreation / Baton Rouge
LA Dept. of Environmental Quality Environmental Planning Division Ep-sip / Baton Rouge
LA Dept. of Health & Hospitals Office of Public Health Attn: Engineering/sewerage Unit / Baton Rouge
LA Dept. of Natural Resources Louisiana Geological Survey / Baton Rouge
LA Dept. of Transportation & Dev. Federal Projects Section Rm 207 - PO 94245 / Baton Rouge
LA Division of Administration State Land Office / Baton Rouge
LA Division of Administration State Planning Office / Baton Rouge
LA State Attorney Gen's Office Mr. William W. Goodell Jr/asst. A G State Lands & Natl. Res. Div. / Baton Rouge
LA State Board of Commerce & Industry Research Division / Baton Rouge
Lisa Miller LA DEQ MF-CG / Baton Rouge

State Elected Officials (Gov Lt.,Gov Sec.State, etc.)

Count: 4

Bob Odom LA Dept of Ag & Forestry / Baton Rouge
Governor of Louisiana Hon. Kathleen Babineaux Blanco State Capitol / Baton Rouge
Lieutenant Governor "Mitch" Landrieu / Baton Rouge
Secretary of State Honorable W. Fox Mckeithen / Baton Rouge

State Representatives

Count: 102

State Representative 45th Representative District / Lafayette
A. G. Crowe State Representative 76th Representative District / Pearl River
Alexander "Alex" Heaton State Representative 95th Representative District / New Orleans
Arthur A. Morrell State Representative 97th Representative District / New Orleans
Austin J. Badon, Jr. State Representative 100th Representative District / New Orleans
Avon R. Honey State Representative 63rd Representative District / Baton Rouge
Beverly Bruce State Representative 7th Representative District / Mansfield
Billy Montgomery State Representative 9th Representative District / Haughton
Brett Geymann State Representative 35th Representative District / Lake Charles
Bryant O. Hammett, Jr. State Representative 21st Representative District / Ferriday
Carl Crane State Representative 70th Representative District / Baton Rouge
Carla Blanchard Dartez State Representative 51st Representative District / Morgan City

Cedric Bradford Glover State Representative 4th Representative District / Shreveport
Cedric Richmond State Representative 101st Representative District / New Orleans
Charles D. Lancaster, Jr. State Representative 80th Representative District / Metairie
Charles I. "Chuck" Hudson State Representative 40th Representative District / Opelousas
Charles McDonald State Representative 14th Representative District / Fairbanks
Charles W. "Charlie" Dewitt State Representative 25th Representative District / Alexandria
Charmaine Marchand State Representative 99th Representative District / New Orleans
Cheryl Gray State Representative 98th Representative District / New Orleans
Clara Guilbeau Baudoin State Representative 39th Representative District / Carencro
Dale Erdey State Representative 71st Representative District / Livingston
Damon J. Baldone State Representative 53rd Representative District / Houma
Dan "Blade" Morrish State Representative 37th Representative District / Jennings
Dan Flavin State Representative 36th Representative District / Lake Charles
Daniel R. "Danny" Martiny State Representative 79th Representative District / Kenner
Derrick Shepherd State Representative 87th Representative District / Marrero
Diane Winston State Representative 77th Representative District / Covington
Don Trahan State Representative 31st Representative District / Lafayette
Donald "Don" Cazayoux, Jr. State Representative 18th Representative District / New Roads
Donald Ray Kennard State Representative 65th Representative District / Baton Rouge
Edwin R. "Ed" Murray State Representative 96th Representative District / New Orleans
Elcie Joseph Guillory State Representative 34th Representative District / Lake Charles
Emile "Peppi" Bruneau State Representative 94th Representative District / New Orleans
Eric Lafleur State Representative 38th Representative District / Ville Platte
Ernest Baylor, Jr. State Representative 3rd Representative District / Shreveport
Ernest D. Wooton State Representative 105th Representative District / Belle Chasse
Ernie Alexander State Representative 43rd Representative District / Lafayette
Errol "Romo" Romero State Representative 48th Representative District / New Iberia
Francis Thompson State Representative 19th Representative District / Delhi
Gary Beard State Representative 69th Representative District / Baton Rouge
Gary L. Smith, Jr. State Representative 56th Representative District / Norco
Gil Pinac State Representative 42nd Representative District / Crowley
Glenn Ansardi State Representative 92nd Representative District / Kenner
Gordon Dove State Representative 52nd Representative District / Houma
Harold L. Ritchie State Representative 75th Representative District / Franklinton
Herman Ray Hill State Representative 32nd Representative District / Dry Creek
Hollis Downs State Representative 12th Representative District / Ruston
Israel "Bo" Curtis State Representative 26th Representative District / Alexandria
Jack D. Smith State Representative 50th Representative District / Stephensville
Jalila Jefferson State Representative 91st Representative District / New Orleans
James R. "Jim" Fannin State Representative 13th Representative District / Jonesboro
James W. "Jim" Tucker State Representative 86th Representative District / New Orleans
Jane H. Smith State Representative 8th Representative District / Bossier City
Jean M. Doerge State Representative 10th Representative District / Minden
Jeffery "Jeff" Arnold State Representative 102nd Representative District / New Orleans
Joe R. Salter State Representative 24th Representative District / Florien
John A. Alario, Jr. State Representative 83rd Representative District / Westwego
John La Bruzzo State Representative 81st Representative District / Metairie
John Smith State Representative 30th Representative District / Leesville
Joseph F. Toomy State Representative 85th Representative District / Gretna
Karen Carter State Representative 93rd Representative District / New Orleans
Karen Gaudet St. Germain State Representative 60th Representative District / Pierre Part
Kay Kellogg Katz State Representative 16th Representative District / Monroe
Kenneth L. Odinet, Sr. State Representative 103rd Representative District / Arabi
Lelon Kenney State Representative 20th Representative District / Columbia
Loulan Pitre, Jr. State Representative 54th Representative District / Cut Off
M. J. "Mert" Smiley, Jr. State Representative 88th Representative District / St. Amant
Mack "Bodi" White State Representative 64th Representative District / Baker
Michael A. "Mike" Walsworth State Representative 15th Representative District / West Monroe
Michael G. "Mike" Strain State Representative 74th Representative District / Covington
Michael Jackson State Representative 61st Representative District / Baton Rouge
Mickey Frith State Representative 47th Representative District / Kaplan
Mickey J. Guillory State Representative 41st Representative District / Eunice
Mike Futrell State Representative 66th Representative District / Baton Rouge
Mike Powell State Representative 6th Representative District / Shreveport
Monica Walker State Representative 28th Representative District / Bunkie
N. J. Damico State Representative 84th Representative District / Marrero
Nita Rusich Hutter State Representative 104th Representative District / Chalmette
Pete Schneider State Representative 90th Representative District / Slidell.
Rick Gallot State Representative 11th Representative District / Ruston
Rick L. Farrar State Representative 27th Representative District / Pineville

Robby Carter State Representative 72nd Representative District / Greensburg
Robert R. "Bobby" Faucheux, Jr. State Representative 57th Representative District / Gramercy
Ronnie Johns State Representative 33rd Representative District / Sulphur
Roy "Hoppy" Hopkins State Representative 1st Representative District / Oil City
Roy Burrell State Representative 2nd Representative District / Shreveport
Roy Quezaire State Representative 58th Representative District / Donaldsonville
Sharon Weston Broome State Representative 29th Representative District / Baton Rouge
Shirley Bowler State Representative 78th Representative District / River Ridge
Stephen J. "Steve" Scalise State Representative 82nd Representative District / Jefferson
Sydnie Mae Maraist Durand State Representative 46th Representative District / St. Martinville
T. Taylor Townsend State Representative 23rd Representative District / Natchitoches
Thomas H. "Tom" McVea State Representative 62nd Representative District / St. Francisville
Tim Burns State Representative 89th Representative District / Mandeville
Tommy Wright State Representative 22nd Representative District / Jena
Troy Hebert State Representative 49th Representative District / Jeanerette
Warren Triche, Jr. State Representative 55th Representative District / Thibodaux
Wayne Waddell State Representative 5th Representative District / Shreveport
Wilfred Pierre State Representative 44th Representative District / Lafayette
William Daniel State Representative 68th Representative District / Baton Rouge
Willie Hunter, Jr. State Representative 17th Representative District / Monroe
Yvonne Dorsey Welch State Representative 67th Representative District / Baton Rouge

State Senators

Count: 39

"Butch" Gautreaux State Senator 21st Senatorial District / Morgan City
"Don" Hines State Senator 28th Senatorial District / Bunkie
"Joe" McPherson State Senator 29th Senatorial District / Woodworth
"Ken" Hollis State Senator 9th Senatorial District / Metairie
"Mike" Michot State Senator 23rd Senatorial District / Lafayette
"Nick" Gautreaux State Senator 26th Senatorial District / Abbeville
"Tom" Schedler State Senator 11th Senatorial District / Slidell
Ann Duplessis State Senator 2nd Senatorial District / New Orleans
Arthur "Art" Lentini State Senator 10th Senatorial District / Kenner
Ben Nevers State Senator 12th Senatorial District / Bogalusa
Charles D. Jones State Senator 34th Senatorial District / Monroe
Cleo Fields State Senator 14th Senatorial District / Baton Rouge
Craig Romero State Senator 22nd Senatorial District / New Iberia
Diana E. Bajoie State Senator 5th Senatorial District / New Orleans
Donald "Don" Cravins State Senator 24th Senatorial District / Arnaudville
Francis C. Heitmeier State Senator 7th Senatorial District / New Orleans
Gerald "Jerry" Theunissen State Senator 25th Senatorial District / Jennings
Heulette "Clo" Fontenot State Senator 13th Senatorial District / Livingston
J. Chris Ullo State Senator 8th Senatorial District / Marrero
James David Cain State Senator 30th Senatorial District / Dry Creek
Jay Dardenne State Senator 16th Senatorial District / Baton Rouge
Joel T. Chaisson, II State Senator 19th Senatorial District / Destrehan
John J. Hainkel, Jr. State Senator 6th Senatorial District / New Orleans
Kenneth M. "Mike" Smith State Senator 31st Senatorial District / Winnfield
Lambert C. Boissiere, Jr. State Senator 3rd Senatorial District / New Orleans
Lydia Patrice Jackson State Senator 39th Senatorial District / Shreveport
Max T. Malone State Senator 37th Senatorial District / Shreveport
Melvin L. "Kip" Holden State Senator 15th Senatorial District / Baton Rouge
Noble Ellington State Senator 32nd Senatorial District / Winnsboro
Paulette R. Irons State Senator 4th Senatorial District / New Orleans
Reggie P. Dupre, Jr. State Senator 20th Senatorial District / Bourg
Robert "Rob" Marionneaux, Jr. State Senator 17th Senatorial District / Grosse Tete
Robert Adley State Senator 36th Senatorial District / Benton
Robert J. Barham State Senator 33rd Senatorial District / Oak Ridge
Robert W. "Bob" Kostelka State Senator 35th Senatorial District / Monroe
Senator"Jody" Amedee State Senator 18th Senatorial District / Gonzales
Sherri Smith Cheek State Senator 38th Senatorial District / Shreveport
Walter J. Boasso State Senator 1st Senatorial District / Arabi
Willie Landry Mount State Senator 27th Senatorial District / Lake Charles

Tribes

Count: 5

Chitimacha Tribe Director of Cultural Affairs Kim Walden / Charenton
Chitimacha Tribe Mr. Alton D. Leblanc Jr. Chairman / Charenton
Coushatta Tribe Mr. Lovelin Poncho Chairman / Elton
Cultural & Historic Preservation Tunica-Biloxi Indians of La Chairman Earl Barbry Sr. / Marksville
Jena Band Choctaw Beverly C. Smith, Chairperson / Jena

United States District Conservationist

Count: 2

Allen Bolotte Dist. Cons. U.S. - NRCS / Boutte
Michael Jordon Avoyelles Parish-Dist. Conservationist / Marksville

Universities, University Affiliated Persons (Professors)

Count: 7

Craig A. Johnson - Director Louisiana Geographic Information Cent. Louisiana State University / Baton Rouge
Dr. Jack Van Lopik Executive Director Office of Sea Grant Development-LSU / Baton Rouge
Louisiana State University Curator of Anthropology Department of Geography / Baton Rouge
Louisiana State University Sea Grant Legal Program / Baton Rouge
Melanie Reed Tulane Environmental Law Clinic / New Orleans
Tulane University Army ROTC / New Orleans
Tulane University Dr. Oliver Houck Tulane Law School / New Orleans

US Representatives

Count: 7

Hon. "Chris" John U. S. Representative 7th Congressional District / Crowley
Hon. Billy Tauzin U. S. Representative 3rd Congressional District / Washington
Hon. David Vitter U. S. Representative 1st Congressional District / Metairie
Hon. Jim Mccrery U. S. Representative 4th Congressional District / Shreveport
Hon. Richard Baker U. S. Representative 6th Congressional District / Baton Rouge
Hon. Rodney Alexander U. S. Representative 5th Congressional District / Quitman
Hon. William Jefferson U. S. Representative 2nd Congressional District / New Orleans

US Senators

Count: 2

Honorable John B. Breaux U.S. Senate Hale Boggs Federal Bldg / New Orleans
Honorable Mary Landrieu U.S. Senate / New Orleans

Scoping Meeting - April 2004

Count: 94

Mr. Chris Liner
Mr. Darryl Chauvin, Atchafalaya River Coalition
Mr. Dustin Walker
Mr. E.J. Blaize
Mr. Forrest Forbes, OMI, Inc.
Mr. Jeff Evans
Mr. Jeff Stanford, DMJM & Harris, Inc.
Mr. Ken Savastano
Mr. Mike Landers
Mr. Terry O'Connor, The People
Mr. Tony Fazzio
Mr. Troy Clautier, MidSouth Bank
Ms. Charmaine Cacciopi
Ms. Jane Arnette, SCIA
Ms. Jeanne Fritsche, GSE Associates
Ms. Lynn Hadhy, Cajun Cultural Coalition
Ms. Sandy Kain, Congressman Billy Tauzin's Office
Ms. Shirley Laska, CHART, UNO
CF Bean LLC
Mr. Alex Kaplun
Mr. Ralph Lugvihuff, LA Hydroelectric
Mr. Rob Hamilton, Rob Hamilton Construction, Inc.
Mr. Robert C. Esenwein, TurnerCollie @ Braden, Inc.
Mr. Robert Graveolet, Plaquemines Parish Assessor
Mr. Andrew MacInnes, Plaquemines Parish
Mr. Daniel J. Babin, Gulf Fish Inc.
Mr. Jenneke Visser
Mr. Aaron Meredith, Outdoor Action with Aaron
Mr. Al Levron, Terrebonne Parish Government
Mr. Allen Dupont, SHAW Environmental, Inc.
Mr. Andy Jurkowski, Madison Dearborn Partners
Mr. Barry Blackwell, Terrebonne Parish Consolidated
Mr. Ben Bienvenu, LCPA-West
Mr. Bill New , New Offshore, Inc.
Mr. Bruce L. Badon, Burk-Kleinpeter, Inc.
Mr. Burt Marmande
Mr. Charles J. Starkovich, USDA-NRCS
Mr. Charles R. Caillouet, Jr., Vision Unlimited
Mr. Dan Arceneaux, CZM - St. Bernard
Mr. Daniel Bolinger, DMJM & Harris, Inc.
Mr. Daniel C. McCool, Political Science Department
Mr. Danny McKearan, Bean/Stuveysant Dredging
Mr. Cullen Curole, Lafourche Parish
Mr. David S. Williams, CTE Engineers
Mr. Denis de la Houssaye, Iberia Parish Coastal
Mr. Dennis Lambert, Moffatt Nichol
Mr. Don Samples
Mr. Doug Daigle, Mississippi River Basin Alliance
Mr. Ed Landgraf, Shell/Terrebonne CZM
Mr. Ed Nugent, Coalition to Close the MRGO
Mr. Freddie Castello III
Mr. Gene Simon, Bertucci Contracting
Mr. George Rey
Mr. Harold Schoeffler, Sierra Club
Mr. Hugh Babylon
Mr. Jay Lobrano, Lobrano & Lobrano
Mr. Jerry Bostic, Port of Morgan City
Mr. Jerry Lee Mayeaux
Mr. Jim Rausch, Dredging Contractors of America
Mr. Jim Hufft
Mr. John Higgins , Business Publishers Inc.
Mr. John Arms
Mr. John P. Laguens
Mr. John Woodard
Mr. Kenny Smith, Terrebonne Chamber of Commerce
Mr. Louis Walker
Mr. Mart Black , TPCG Cultural Res. & Eco. Dev.
Mr. Michael Scurto, Terrebonne Levee
Mr. Paul Medus
Mr. Paul Yakupzach, Terrebonne Coastal Mgt.
Mr. Percy J. Rodriguez
Mr. R. George Rey, Pres., COTS Technology,
Mr. Ryan Richard, Richard's Restaurant Supply
Mr. Sal Maiorana
Mr. Sam Hotard, Guarantz Broadcasting
Mr. Scott Rogers, American Press
Mr. Shane Bagala, Acadiana Bay Association
Mr. Sid Sundbery, Houma-Terrebonne Chamber of
Mr. Steve Peyronnin, Coalition to Restore Coastal
Mr. Stu Scheer, LA Charter Boat Association
Mr. Tom Hess, LDWF Rockefeller Refuge
Mr. W. Alex Ostheimer
Ms. Andi Stohler, TEC Icon
Ms. Barbara Coman
Ms. Carolyn Woosley, CRCL, SWLA Team Green
Ms. Christian Walker

Ms. Cindy Brown, The Nature Conservancy
Ms. Jennifer Armand, Restore or Retreat
Ms. Kelly Krenz
Ms. Kim M. Sylve, Grand Bayou Families United
Ms. Linda M Walker, League of Women Voters of
Ms. Margaret Sullivan, Coastal Environments, Inc.
Ms. Ruth Laney , Time Magazine
Ms. Sharon Alford, Houma Area CVB

APPENDIX B1

PROGRAMMATIC BIOLOGICAL ASSESSMENT

LOUISIANA COASTAL AREA (LCA)
ECOSYSTEM RESTORATION STUDY

APPENDIX B1

PROGRAMMATIC BIOLOGICAL ASSESSMENT

LOUISIANA COASTAL AREA ECOSYSTEM RESTORATION STUDY

1.0 PURPOSE

The purpose of this programmatic biological assessment (PBA) is to determine the potential impacts of the LCA Restoration Plan described in the Louisiana Coastal Area Ecosystem Restoration Study Draft Report (LCA Draft Report) and draft Programmatic Environmental Impact Statement (Draft PEIS) on Federally-listed threatened and endangered species, and their critical habitat, that occur within the proposed action area. This review evaluates the LCA Restoration Plan and provides information on potential impacts of this programmatic plan to Federally-listed threatened and endangered species and their critical habitat to decision makers to make determinations on whether to proceed with the plan.

2.0 PROPOSED ACTION

The proposed action is implementation of the draft LCA Ecosystem Restoration Plan, which is to develop, evaluate, and apply subprovince and coast-wide ecosystem restoration opportunities. Restoration would be achieved by combining a series of measures that would be expected to achieve one or more of the following objectives: minimize and/or control salinity changes, provide continuous re-introduction of fresh water, mimic historic hydrology, maximize Atchafalaya River inflow, build land through delta development, and maximize geomorphic features. Conceptual restoration measures include constructing river and/or sediment-delivery diversions, maintaining land bridges, restoring barrier islands, , installing water control structures, creating marsh, and achieving beneficial use of dredged material.

Detailed description of the LCA Restoration Plan can be found in chapter 2 of the draft PEIS; historic, existing, and future without conditions are discussed in chapter 3 of the draft PEIS, and direct, indirect, and cumulative impacts of the plan are discussed in chapter 4 of the draft PEIS. Because the outputs of the LCA Plan are conceptual and at a program-level, site-specific locations of each recommended measure have not been identified.

3.0 LOCATION AND GENERAL DESCRIPTION OF THE PROPOSED ACTION AREA

For the purposes of coastwide ecosystem planning, the Louisiana coastal study area is divided into four subprovinces. Subprovince 1 encompasses the coastal portion of the Pontchartrain

Basin, Breton Sound basin, and the eastern half of the Mississippi River Delta. Subprovince 2 encompasses the deltaic plain between the Mississippi River and Bayou Lafourche, including the Barataria Basin and the western half of the Mississippi River Delta. Subprovince 3 encompasses the deltaic complex between Bayou Lafourche and Freshwater Bayou Canal, including the Terrebonne, Atchafalaya, and Teche-Vermilion basins. Subprovince 4 encompasses the Chenier Plain between Freshwater Bayou Canal and the Louisiana-Texas border, including the Mermentau and Calcasieu-Sabine basins. Detailed descriptions of the sub-provinces can be found in Chapter 1 of the draft PEIS.

4.0 SPECIES DESCRIPTIONS

Seventeen endangered or threatened species have been identified which may occur within the boundaries of the proposed action area. However, the proposed activities would not be located within suitable habitat for five of those species: the gopher tortoise (*Gopherus polyphemus*), inflated heelsplitter mussel (*Potamilus inflatus*), Louisiana quillwort (*Isoetes louisianensis*), red-cockaded woodpecker (RCW, *Picoides borealis*), and ringed sawback turtle (*Graptemys oculifera*). Any suitable habitats for those species would be located outside the region of influence for the proposed action. Therefore, detailed species descriptions for those species are not included in this PBA. Descriptions of the remaining twelve species are given below.

A total of 28 cetaceans have been reported in the Gulf of Mexico waters (Davis et al., 2002). Of these, five Mysticeti [i.e., baleen whales including the blue whale (*Balaneoptera musculus*), finback whale (*Balaenoptera physalus*), and sei (*Balaenoptera borealis*); and Odontoceiti (i.e., toothed whales including the humpback (*Megaptera novaeangliae*) and sperm whale (*Physeter macrocephalus*)] have been reported in the Gulf of Mexico and all are listed as endangered species. Generally, infrequent historical sightings and strandings in the study area of these endangered cetaceans suggest that most of these species are rare, accidental, or uncommon. All whales are principally marine deepwater species and would not likely be impacted by the proposed action. Strandings of whales have occurred throughout the gulf coast.

4.1 BIRDS

4.1.1 **Bald Eagle** (*Haliaeetus leucocephalus*)

Status

The bald eagle was initially considered to have two distinct subspecies when the southern bald eagle was listed as an endangered species on March 11, 1967. Following the enactment of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), the entire species was listed as endangered in 43 of the conterminous 48 states and threatened in the remaining five states (Michigan, Minnesota, Oregon, Washington, and Wisconsin) on February 14, 1978. On August 11, 1995, the bald eagle was officially down-listed from endangered to threatened in the lower 48 states. There is no critical habitat currently designated for the bald eagle.

Species and Habitat Description

The bald eagle is a large bird of prey with white head and tail feathers, dark body feathers, yellow beak and black talons. The bald eagle is one of eight sea and fish eagles in the genus *Haliaeetus*, and is the only species of sea eagle native to North America. Male bald eagles generally measure almost 3 feet from head to tail, weigh 8 to 10 pounds, and have a wingspan of about 6.5 feet. Females are larger, reaching 42 inches in length, weigh up to 14 pounds, and have a wingspan as wide as 8 feet. Juvenile bald eagles are a mixture of brown and white with a black bill, and do not develop the characteristic white head and tail feathers until they are sexually mature. Bald eagles are believed to live as long as 30 years in the wild. Bald eagles are predominantly piscivorous, but they are also opportunistic and will supplement their diets with birds, small mammals, reptiles, amphibians, and carrion. Humans are thought to be the adult eagle's only significant predator (USFWS 1989c).

Bald eagles may range for long distances, but will return to within 100 miles of where they were raised to build a large nest. Each pair of birds can have several nests, reusing them several times.

Nesting rarely occurs farther than 2 miles from water. Most eagles select nest sites that include a dominant tree or stand of trees and prefer tall mature trees in an open stand with a clear flight path to water, usually associated with riparian habitat along coasts, rivers, and lakes. Most nests are located in the upper 30 feet of the tree with canopy cover above and a clear view of open water. The cone-shaped nest may be 6 feet in diameter and 6 to 8 feet in height, and may be lined with Spanish moss, cornhusks, or grasses. In the southeastern United States, nesting activities generally begin in early September with egg laying beginning as early as late October and peaking in the latter part of December (USFWS 1989c). In southeastern Louisiana, nests are often built in large bald cypress trees that are located near fresh to intermediate marshes or open water, and infrequently in large pine trees near large lakes in central and northern Louisiana.

Bald eagles reach sexual maturity between 4 and 5 years of age. Bald eagles pair with the same mate until one dies, at which time the survivor will accept a new mate. Once each year bald eagles lay one to three eggs, which hatch after 33 to 35 days of incubation. Although both males and females participate in incubating the eggs, the female does most of the incubating. Fledglings will take their first flights in about 3 months, but may not leave the nest for several more months. Final fledging occurs between 12 to16 weeks after hatching. Both parents participate in parental care, which may extend 4 to 6 weeks after fledging. As is typical for raptors, young eagles are fully developed at the time of fledging. Fledging generally occurs from March to April. It is estimated that only about 50 percent of fledglings survive to adulthood.

Range and Population Dynamics

Historically, the bald eagle ranged throughout North America, except extreme northern Alaska and Canada and central and southern Mexico. Nesting occurred along major lakes and rivers on both coasts of the United States, coastal plains of the Southeast, as well as the East Coast from the Chesapeake Bay to the Florida Keys, and north along the west coast of Florida to the Panhandle. The nesting range also appears to have been continuous along the entire Mississippi and other major rivers, through Louisiana and into eastern Texas, with a low density along the

Gulf coast. The bald eagle currently ranges throughout much of North America, nesting on both coasts from Florida to Baja California, Mexico in the south, and from Labrador to the western Aleutian Islands, Alaska, in the north (USFWS 1999a).

An estimated quarter to a half million bald eagles lived on the North American continent prior to the arrival of the first Europeans (Gerrard and Bortolotti 1988). The first major decline in the bald eagle population probably began in the mid- to late 1800s. Widespread shooting for feathers and trophies led to extirpation of eagles in some areas. Shooting also reduced part of the bald eagle's prey base. Big game animals like bison, which were essentially important to eagles as carrion, were decimated. Waterfowl, shorebirds, and small mammals were also reduced in numbers. Carrion treated with poisons was used as bait to kill livestock predators and ultimately killed many eagles as well. These were the major factors, in addition to the loss of habitat from forest clearing and development, which contributed to a reduction in bald eagles numbers through the 1940s.

Following World War II in the late 1940s, organochlorine pesticides such as dichloro-diphenyl-trichloroethane (DDT) were initially used to control mosquitoes but also became popular as general crop pesticides. In the late 1960s and early 1970s, bald eagle numbers had decreased due to the use of such pesticides, which were linked to the thinning of eggshells and resulted in reproductive failure (USFWS 1999a). In response to that decline, the bald eagle was listed as endangered south of the 40th parallel on March 11, 1967, under the Endangered Species Preservation Act of 1966. Nationwide bald eagle surveys conducted in 1973 and 1974 revealed that the eagle population throughout the lower 48 states was declining. At the species' lowest numbers in the Southeast, the breeding range had been reduced to remnant populations in South Carolina, Louisiana, and east Texas, with apparently secure nesting only in Florida.

In 1963, the National Audubon Society surveyed the lower 48 states and located 417 active bald eagle nests. By 1994, 4,452 occupied bald eagle territories were identified (an occupied territory is an area occupied by a pair of adult bald eagles, and the pair may or may not be engaging in nesting or breeding behavior). In Louisiana there were 36 occupied breeding areas during the 1987-1988 nesting season, and 226 occupied breeding areas during the 2002-2003 nesting season. Several factors have contributed to the resurgence of the bald eagle, including the ratification of the Bald Eagle Protection Act in 1940, the species' listing as endangered under the Endangered Species Preservation Act of 1966 and the ESA of 1973, the Migratory Bird Treaty Act, the Lacy Act, and the prohibition of DDT in 1972.

Management and Protection

The bald eagle adapts poorly to radical changes in its environment, and has a relatively low reproductive rate with deferred maturity and a small clutch size (i.e., 1 to 3 eggs). Consequently, the bald eagle may always require monitoring and management. Protective measures for the species consist mainly of legal and regulatory procedures, and habitat protection and improvement. The bald eagle is currently protected by Federal and State laws, which are enforced by the U.S. Fish and Wildlife Service (USFWS) and the Louisiana Department of Wildlife and Fisheries (LDWF), respectively. Nest sites are also protected under management programs on Federal lands (i.e., National Wildlife Refuges [NWR] and National Forests).

To facilitate recovery of the bald eagle and ecosystems upon which it depends, the lower 48 States were divided into 5 recovery regions, and recovery within those regions has been successful (USFWS 1999a). An expanding population requires the successful production of young, and reproduction has generally met or exceeded target levels established by recovery teams across the nation since 1990. Certain geographically restricted areas still have contamination threats, but with a national average of more than one fledgling per occupied breeding area since 1990, the eagle population continues to increase in overall size and maintains a healthy reproductive rate.

The USFWS proposal to delist the bald eagle was published in the Federal Register on July 6, 1999. Should the USFWS remove the bald eagle from the threatened and endangered species list, protection for the bird would continue under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests except when specifically authorized by the Department of the Interior. The BGEPA, the successor to the Bald Eagle Protection Act, prohibits, except under certain specified conditions, the taking, possession, transportation, export or import, barter, or offer to sell, purchase or barter a bald or golden eagle, alive or dead, or any part, nest, or eagle egg. If the bald eagle would be delisted, the USFWS would also work with state wildlife agencies to monitor the status of the species for a minimum of five years, as required by the ESA. If at any time it becomes evident that the bald eagle again needs protection under the ESA, the USFWS would relist the species (USFWS 1999a).

4.1.2 Brown Pelican (*Pelecanus occidentalis*)

Status

The brown pelican was originally listed as endangered throughout its range on October 13, 1970. The species was delisted in Alabama, Florida, Georgia, North Carolina, South Carolina, and points northward along the Atlantic coast on February 4, 1985. The brown pelican remains endangered throughout the remainder of its range, which includes Louisiana, Mississippi, Texas, California, Mexico, Central and South America, and the West Indies. No critical habitat is designated for the brown pelican within Louisiana.

Species and Habitat Description

The brown pelican is a large water bird that can be found year around along the Gulf of Mexico coastal waters from Texas to Florida and is one of two species of pelican in North America, the other being the white pelican (*Pelecanus erythrorhynchos*). Adult brown pelicans are dark gray-brown with white about the head and neck. Immature brown pelicans are gray-brown on their head and neck with white underparts. The brown pelican weighs up to 8 pounds and larger individuals have wingspans of more than 7 feet. They spend their entire life cycle in or near marine and estuarine waters, seldom venturing more than 20 miles out to sea. Brown pelicans feed mainly on fish, including menhaden, mullet, sardines, and pinfish, which they capture by plunge diving (USFWS 1989a).

Preferred nesting sites are small coastal islands, which provide protection from mammalian predators (mainly raccoons), and have sufficient elevation to prevent widespread flooding of nests. The nests are usually built in available vegetation (e.g., black mangrove trees), but ground nesting may also occur. Ground nests vary from practically nothing to well built nests of sticks, reeds, straw, palmetto leaves, and grasses. Tree nests are made of similar materials, only they are more firmly constructed. Sand spits and offshore sand bars are used extensively as daily loafing and nocturnal roost areas.

Brown pelican breeding activity in Louisiana can vary from as early as February to as late as September. They nest in colonies on small coastal islands in salt and brackish waters. Nesting islands are often chosen near channels where shipping and shrimping operations make fish easily available to nesting pairs. Normal clutch size is three eggs, and both parents share incubation and rearing of the young. The species is considered to be long-lived; one pelican captured in Edgewater, Florida, in November 1964 was banded in September 1933.

Range and Population Dynamics

In the United States, the brown pelican is found along the California coast, and from North Carolina to Texas. It is also found in Mexico, the West Indies and many Caribbean Islands, and as far south as Guyana and Venezuela in South America (USFWS 1995a). Brown pelicans were extirpated from the Louisiana coast during the 1960s, but were reintroduced from Florida in 1968. Extensive use of pesticides, which were ultimately ingested by brown pelicans, has been noted as the primary cause of decline of the species (USFWS 1989a). This threat has been essentially eliminated, resulting in delisting of the species in Alabama and Florida, and stable populations in Louisiana, Mississippi, and Texas coastal regions.

Historically, brown pelicans used the Shell Keys NWR in south-central Louisiana (Emmons 1990). Refuge Staff at the Delta NWR, located in Plaquemines Parish, Louisiana, have noted that brown pelicans tend to use the refuge more during the winter months and the coastal barrier islands during the spring. They suspect that the majority of the pelicans that use that refuge are immature and non-breeding birds (Wigginton 1990). Brown pelicans use the area around Breton NWR in St. Bernard and Plaquemines Parishes, Louisiana, as loafing, feeding, and nesting areas. Flocks typically containing 50 to 100 birds are routinely observed by refuge staff on or near all islands in the Breton and Chandeleur Sounds (Wigginton 1990, Guidry 1994).

The Louisiana population numbered as many as 50,000 birds in the 1930s. By 1963, brown pelicans had completely disappeared from Louisiana. The LDWF and Florida Game and Fresh Water Fish Commission jointly implemented a restoration project from 1968 to 1980, and a total of 1,276 pelicans were reintroduced at three release sites in southeastern Louisiana. Restored nesting populations were established at North Island in the Chandeleur Island chain and at Queen Bess/Camp Island in Barataria Bay. North Island production was 909 fledglings between 1974 and 1979, and first nested successfully when the birds were 2 years of age. Reintroduced birds at the Queen Bess/Camp Island site first nested successfully at 3 years of age (McNease and Joanen 1984). The 13-year reintroduction project suffered a setback in 1975 when approximately 40 percent of the population was killed by a pesticide incident, but the subsequent trend in numbers

of nesting pairs continued a generally upward trend. In 1983, the estimated number of nesting pairs in Louisiana was 602. In 1997, the LDWF estimated that there were approximately 10,000 pelican nests with 25,000 adults nesting in Louisiana, primarily on the Chandeleur Islands (Larry McNeese, LDWF personal communication 1997, Elizabeth Souheaver, USFWS, Southeast Louisiana Refuges, personal communication 1997). During the 2000 nesting season, a substantial portion of the Chandeleur Island nesting population relocated to an island created by dredge material at the mouth of Baptiste Collette Pass, but the birds returned to the Chandeleur Islands for the 2001 nesting season (Tom Hess, LDWF, Rockefeller Refuge, personal communication 2002). The LDWF estimates that there were approximately 16,400 pelican nests in Louisiana during the 2001 breeding season (Hess 2001). Other nesting areas in Louisiana are Raccoon and Wine Islands in the Isles Dernieres barrier island system, Queen Bess Island in Barataria Bay, West Breton Island in Breton Sound, and most recently, Rabbit Island in Calcasieu Lake. Current population estimates for Louisiana are estimated to be near 50,000 birds.

Management and Protection

The brown pelican is extremely susceptible to disturbance and habitat alteration in key nesting areas. It is, therefore, important to prevent disturbance to nesting colonies (e.g., by low-flying aircraft, noise disturbance from project-related activities, etc.) that could cause nest desertion and egg losses, as well as the control of pesticide use and other types of environmental pollution. Consequently, regular surveying occurs in Louisiana. Protective measures for the species consist mainly of legal and regulatory procedures, and habitat protection and improvement. The brown pelican is currently protected by Federal and State laws, which are enforced by the USFWS and the LDWF, respectively. Nest sites are also protected under management programs on Federal lands (i.e., NWRs).

4.1.3 Piping Plover (*Charadrius melodus*)

Status

On January 10, 1986, the piping plover was Federally listed as endangered in the Great Lakes watershed, and as threatened elsewhere in its range. Critical habitat for the wintering population was designated in 2001; that designation included 142 areas along the coast of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas, to provide sufficient wintering habitat to support the piping plover at the population level and geographic distribution necessary for recovery of the species. Critical habitat for breeding populations in the Great Lakes and Great plains was designated in 2001 and 2002, respectively.

Species and Habitat Description

The piping plover, named for its melodious mating call, is a small North American shorebird approximately 8 inches long with a wingspread of about 15 inches (Palmer 1967). Its light sand-colored plumage blends in well with beaches and sand flats, part of its primary habitat. During the breeding season, the legs are bright orange, and the short bill is orange with a black tip. There are two single dark bands, one around the neck and one across the forehead between the

eyes. The black breast band and brow bar are generally more pronounced in breeding males than females (Wilcox 1959). Breeding birds have white underparts, a light beige back and crown, a white rump, and a black upper tail with a white edge. In flight, each wing shows a single, white wing stripe with black highlights at the wrist joints and along the trailing edges. In winter, the bill turns black, the legs remain orange but pale, and the black plumage bands are lost on the head and neck. Chicks have speckled gray, buff, and brown down, a black beak, orange legs, and a white collar around the neck. Juveniles resemble wintering adults and obtain their adult plumage the spring after they fledge (Prater *et al*., 1977).

The primary constituent elements for piping plover critical habitat (wintering) are found in geologically dynamic coastal areas that contain intertidal beaches and flats (between annual low tide and annual high tide), associated dune systems, and flats above annual high tide. Primary constituent elements of intertidal flats include sand and/or mud flats with no or very sparse emergent vegetation. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important for roosting plovers (USFWS 2002).

Northward migration to the breeding grounds occurs during late February, March and early April (Patterson 1988, MacIvor 1990). Plovers will breed at 1 year of age (MacIvor 1990, Strauss 1990, Haig 1992) and are monogamous, but usually shift mates between years (Wilcox 1959, Haig and Oring 1988, MacIvor 1990).

Southward migration to the wintering grounds along the southern Atlantic coast and Gulf of Mexico shoreline extends from late July through September. Individuals can be found on their wintering grounds throughout the year but sightings are rare in May, June, and early July (USFWS 2001b). In general, wintering piping plovers feed extensively on intertidal beaches, mudflats, sand flats, algal flats, and wash-over passes with no or very sparse emergent vegetation; they also require unvegetated or sparsely vegetated areas for roosting. Roosting areas may have debris, detritus, or micro-topographic relief offering refuge to plovers from high winds and cold weather. In most areas, wintering piping plovers are dependant on a mosaic of sites distributed through the landscape, as the suitability of a particular site for foraging or roosting is dependent on local weather and tidal conditions. Plovers move among sites as environmental conditions change.

The following units are designated critical habitat in Louisiana: (1) Texas/Louisiana border to Cheniere au Tigre in Cameron and Vermilion Parishes; (2) Atchafalaya River Delta in St. Mary Parish; (3) Point Au Fer Island in Terrebonne Parish; (4) Isles Dernieres in Terrebonne Parish; (5) Timbalier Island to East Grand Terre Island in Terrebonne, Lafourche, Jefferson, and Plaquemines Parishes; (6) Mississippi River Delta in Plaquemines Parish, and (7) Breton Islands and Chandeleur Island Chain in Plaquemines and St. Bernard Parishes (see 50 CFR Part 17, pages 36127 to 36131, or http://plover.fws.gov/#maps, for detailed descriptions and/or maps).

Range and Population Dynamics

Piping plovers breed only in North America within three geographic regions encompassing three distinct breeding populations: the Northern Great Plains, the Great Lakes, and the Atlantic Coast. The piping plover's primary winter range is along the Atlantic and Gulf coasts from North

Carolina to Mexico and into the Bahamas and West Indies (USFWS 1988, 1989a, 1989b, 1996, 2002).

Loss and degradation of habitat due to development and shoreline stabilization have been major contributors to the species' decline. Recreational activity, coastal development, and dune stabilization have resulted in loss of suitable sandy beaches and other littoral habitats. Breeding success continues to be affected by human disturbance (foot and vehicular traffic), which destroys nests and young (USFWS 1989b, 1996). Since piping plovers spend 55 to 80 percent of their annual cycle associated with wintering areas, factors that affect their well being on the wintering grounds can substantially affect their survival and recovery (USFWS 1996).

Between 1986 and 1987, there were an estimated 1,258 to 1,326 breeding pairs of piping plovers in the Northern Great Plains breeding population. The 1991 International Piping Plover Census estimated that there were 1,486 breeding pairs in the Northern Great Plains. The 1996 census for that population indicated that it numbered about 3,284 adults, which would be the largest of the three breeding populations (i.e., Northern Great Plains, Great Lakes, and Atlantic Coast).

Russell (1983) reviewed historic records and estimated pre-settlement Great Lakes piping plover populations at 492 to 682 breeding pairs; those totals may be high, but there are no other estimates of pre-settlement population. Coinciding with major industrial development, piping plovers were extirpated from most of the Great Lakes beaches in the late 1970s and early 1980s. In 1977, the Great Lakes population was estimated at 31 nesting pairs (Lambert and Ratcliff 1979), but declined to 17 pairs by 1985 (USFWS 1985). Since 1986, nests have been recorded at 30 breeding sites with populations ranging from 12 to 25 breeding pairs.

Historical trends for the Atlantic Coast piping plover population have been gathered from largely qualitative records. In the nineteenth century, piping plovers were a common summer resident along the Atlantic Coast; by the twentieth century, uncontrolled hunting and egg collecting greatly reduced their populations. Following the passage of the Migratory Bird Treaty Act in 1918, piping plover numbers recovered to some extent. Raithel (1984) showed that Rhode Island piping plover numbers reached a twentieth century peak following a 1938 hurricane, which flattened sand dunes and shoreline developments. After World War II, populations declined due to dune stabilization efforts and construction of summer homes. The population partially recovered following another severe hurricane in 1954, but then began a decline that continued through the early 1980s. Recent population estimates indicate that, since the late 1980s, piping plover populations have increased steadily along the Atlantic Coast from 790 adults in 1986 to 1,349 adults in 1995 (USFWS 1996) and 2,581 adults in 1996 (USFWS 1999b).

Management and Protection

Habitat alterations such as marina construction, erosion control measures, and residential development affect the dynamic nature of the beach ecosystem by altering sediment patterns and hydrology, and inhibiting dune formation. Those actions may degrade or destroy habitat for a variety of marine plants and animals (USFWS 1996, 1997; Cuthbert *et al.,* 1998). Off-road vehicles and high levels of foot traffic may erode sand dunes and result in direct mortality by trampling (Bowles *et al.*, 1990, USFWS 1997).

The piping plover is currently protected by Federal and State laws, which are enforced by the USFWS and the LDWF, respectively. Critical habitat is also protected under management programs on Federal lands (i.e., NWRs).

4.2 FISH

4.2.1 Gulf Sturgeon (*Acipenser oxyrhynchus desotoi*)

Status

On September 30, 1991, the Gulf sturgeon was listed as a threatened species under the ESA, and the USFWS designated critical habitat for this species throughout its range on February 28, 2003. In Louisiana, Gulf sturgeon critical habitat includes the Pearl River System in Washington and St. Tammany Parishes, the Bogue Chitto River, as well as Lake Pontchartrain, Lake Borgne, Lake Catherine, and the Rigolets.

Species and Habitat Description

The Gulf sturgeon, also known as the Gulf of Mexico sturgeon, is an anadromous fish (breeds in fresh water after migrating up rivers from marine and estuarine environments). The Gulf sturgeon inhabits coastal rivers from Louisiana to Florida during spring and summer, and the estuaries, bays, and marine environments of the Gulf of Mexico during fall and winter. It is a nearly cylindrical, primitive fish embedded with bony plates or scutes. The head ends in a hard, extended snout; the mouth is inferior and protrusible and is preceded by four conspicuous barbels. The tail (caudal fin) is distinctly asymmetrical; the upper lobe is longer than the lower lobe (heterocercal). Adults range from 4 to 8 feet (ft)] [1.2 to 2.4 meters (m)] in length, with adult females larger than adult males.

Gulf sturgeon are long-lived, with some individuals reaching at least 42 years of age (Huff 1975). Age at sexual maturity for females ranges from 8 to 17 years, and for males from 7 to 21 years (Huff 1975). In the spring (from late February to mid-April) when the river surface temperatures are 63 to 70 degrees Fahrenheit (^{o}F) [17 to 21 degrees Celsius (^{o}C)], sexually mature, ripe males and females migrate into the rivers (Carr, Tatman, and Chapman 1996) to spawn. It is believed that Gulf sturgeon exhibit a spawning periodicity similar to Atlantic sturgeon, which have a long inter-spawning period, with females spawning at intervals ranging from every 3 to 5 years, and males every 1 to 5 years (Smith 1985).

Gulf sturgeon eggs are demersal (they sink to the bottom), adhesive, and vary in color from gray to brown to black (Vladykov and Greeley 1963, Huff 1975, Parauka *et al.* 1991). During their early life history stages, sturgeon require hard substrates for eggs to adhere to, and for shelter for developing larvae (Sulak and Clugston 1998). Egg collection sites have consisted of limestone bluffs and outcroppings, cobble, limestone bedrock covered with gravel, and small cobble, gravel, and sand (Marchant and Shutters 1996, Sulak and Clugston 1999, Heise *et al.* 1999a, Fox *et al.* 2000, Craft *et al.* 2001). Water depths at egg collection sites have ranged from 4.6 to 26 ft (1.4 to 7.9 m), with temperatures ranging from 64.8 to 75.0 ^{o}F (18.2 to 23.9 ^{o}C) (Fox *et al.* 2000,

Ross *et al.* 2000, Craft *et al.* 2001). Laboratory experiments indicate that optimal water temperature for survival of Gulf sturgeon larvae is between 59 and 68°F (15 and 20°C), with low tolerance to temperatures above 77°F (25°C) (Chapman and Carr 1995). Young-of-the-year Gulf sturgeon appear to disperse widely, using extensive portions of the river as nursery habitat. They are typically found on sandbars and sand shoals over rippled bottom and in shallow, relatively open, unstructured areas.

Gulf sturgeon feeding habits in fresh water vary depending on the fish's life history stage. Young-of-the-year Gulf sturgeon remain in fresh water feeding on aquatic invertebrates and detritus approximately 10 to 12 months after spawning occurs (Mason and Clugston 1993, Sulak and Clugston 1999). Juveniles less than 11 lbs (5 kg) are believed to forage extensively and exploit scarce food resources throughout the river, including aquatic insects (e.g., mayflies and caddis flies), worms (oligochaetes), and bivalve mollusks (Huff 1975, Mason and Clugston 1993). Subadults (age 6 to sexual maturity) and adults (sexually mature) only feed in marine and estuarine habitats and are thought to forage opportunistically (Huff 1975) on primarily benthic (bottom dwelling) invertebrates. Gut content analyses have indicated that the Gulf sturgeon's diet is predominantly amphipods, lancelets, polychaetes, gastropods, shrimp, isopods, mollusks, and crustaceans (Huff 1975, Mason and Clugston 1993, Carr *et al.* 1996b, Fox *et al.* 2000, Fox *et al.* 2002).

When river temperatures drop in the fall to about 63 to 72 ° F (17 to 22° C), Gulf sturgeon return to the coastal shelf areas of the Gulf of Mexico (Carr, Tatman, and Chapman 1996). Most subadult and adult Gulf sturgeon spend the cooler months (October or November through March or April) in estuarine areas, bays, or the Gulf of Mexico (Odenkirk 1989, Foster 1993, Clugston *et al.* 1995, Fox *et al.* 2002) feeding. Winter habitats used by Gulf sturgeon coincide with the habitats of their prey. Along the Mississippi Sound barrier islands, Gulf sturgeon habitat typically consists of sandy substrates with an average depth of 6.2 to 19.4 ft (1.9 to 5.9 m). Gulf of Mexico near shore [less than 1 mi (1.6 km)] unconsolidated, fine-medium grain sand habitats, including natural inlets and passes from the Gulf to estuaries, support crustaceans such as mole crabs, sand fleas, various amphipod species, and lancelets (Menzel 1971, Abele and Kim 1986, American Fisheries Society 1989, Brim personal communication 2002) where Gulf sturgeon are found. Estuary and bay unvegetated habitats have a preponderance of sandy substrates that support burrowing crustaceans, such as ghost shrimp, small crabs, various polychaete worms, and small bivalve mollusks (Menzel 1971, Abele and Kim 1986, American Fisheries Society 1989, Brim personal communication 2002) which are prey for Gulf sturgeon.

Range and Population Dynamics

Historically, the Gulf sturgeon occurred from the Mississippi River east to Tampa Bay. Its present range extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi, east to the Suwannee River in Florida, with infrequent sightings occurring west of the Mississippi River. In the late 19th century and early 20th century, the Gulf sturgeon supported an important commercial fishery, providing eggs for caviar, flesh for smoked fish, and swim bladders for isinglass, a gelatin used in food products and glues (Huff 1975, Carr 1983). Gulf sturgeon numbers declined due to over fishing throughout most of the 20th century. The decline was exacerbated by habitat loss associated with the construction of water control

structures, such as dams and sills (submerged ridges or vertical walls of relatively shallow depth separating two bodies of water), mostly after 1950. In several rivers throughout the species' range, dams have severely restricted sturgeon access to historic migration routes and spawning areas (Boschung 1976, Wooley and Crateau 1985, McDowall 1988).

The majority of recent Gulf sturgeon sightings in the Pearl River drainage have occurred downstream of the Pools Bluff Sill on the Pearl River, near Bogalusa, Louisiana, and downstream of the Bogue Chitto Sill on the Bogue Chitto River in St. Tammany Parish, Louisiana. Between 1992 and 1996, 257 Gulf sturgeon were captured from the Pearl River system (West Middle River, Bogue Chitto River, East Pearl River, and West Pearl River). The subpopulation in that system was estimated at 292 fish, of which only 2 to 3 percent were adults (Morrow *et al.* 1998b). The annual mortality rate was calculated to be 25 percent.

Preliminary results from captures between 1992 and 2001 suggest a stable subpopulation of 430 fish, with approximately 300 adults (Rogillio *et al.* 2002). Morrow *et al.* (1999) suggested that the Pearl River Gulf sturgeon population would be self-sustaining if the number of adults was at least 100, recruitment was satisfactory, and annual mortality was less than about 15 percent. Based on those criteria and from data gathered during 2000 and 2001, it appears that the population is at least self-sustaining and may even be recovering. There may be as many as 300 adults. While mortality estimates may be somewhat biased, the rate is probably about half of the 15 percent deemed to be a minimum acceptable benchmark.

Management and Protection

Life history characteristics of Gulf sturgeon may complicate and protract recovery efforts. Gulf sturgeon cannot establish a breeding population rapidly because of the amount of time it takes them to reach sexual maturity. Further, Gulf sturgeon appear to be river-specific spawners, although immature Gulf sturgeon occasionally exhibit plasticity in movement from one river to another. Therefore, natural repopulation by Gulf sturgeon migrating from other rivers may be non-existent or very low.

The take of Gulf sturgeon is prohibited in the state waters of Louisiana, Mississippi, Alabama, and Florida. Section 6(a) of the ESA provides for extended cooperation with states for the purpose of conserving threatened and endangered species. Under that provision, the Departments of the Interior and Commerce may enter into cooperative agreements with a state, provided that state has an established program for the conservation of a listed species. The agreements authorize the states to implement the authorities and actions of the ESA relative to the listed species recovery. Specifically, the states are authorized: 1) to conduct investigations to determine the status and requirements for survival of resident species of fish and wildlife (this may include candidate species for listing), and 2) to establish programs, including acquisition of land or aquatic habitat or interests for the conservation of fish and wildlife. Federal funding is also provided to states under those agreements to implement the approved programs. All four of the above mentioned states have entered into Section 6 agreements with the USFWS.

4.2.2 **Pallid Sturgeon** (*Scaphirhynchus albus*)

Status

The pallid sturgeon was listed as endangered on October 9, 1990. The reasons for listing were habitat modification, apparent lack of natural reproduction, commercial harvest, and hybridization in parts of its range. Critical habitat has not been proposed or designated for the pallid sturgeon.

Species and Habitat Description

Pallid sturgeon evolved from an ancient group of bony fishes, the subclass Paleopterygii. Most species in this subclass became extinct sometime in the Mesozoic Era. The living descendants of this group in North America include paddlefish and eight species of sturgeon.

The pallid sturgeon grows to lengths of over 6 feet, can weigh in excess of 80 pounds, and has a flattened, shovel-shaped snout, a long, slender, and completely armored caudal peduncle, and lacking a spiracle (Smith 1979). As with other sturgeon, the mouth is toothless, protrusible, and ventrally positioned under the snout. The skeletal structure is primarily cartilaginous (Gilbraith *et al.* 1988).

Forbes and Richardson (1905), Schmulbach *et al.* (1975), Kallemeyn (1983), and Gilbraith *et al.* (1988) describe the pallid sturgeon as being well adapted to life on the bottom in swift water of large, turbid, free-flowing rivers. Pallid sturgeon evolved in the diverse environments of the Missouri and Mississippi Rivers. Floodplains, backwaters, chutes, sloughs, islands, sandbars, and main channel waters formed the large-river ecosystem that provided macrohabitat requirements for pallid sturgeon and other native large-river fish, such as paddlefish and other sturgeon. Those habitats were historically in a constant state of change. Mayden and Kuhajda (1997) describe the natural habitat conditions to which pallid sturgeon are adapted as: braided channels, irregular flow patterns, flooding of terrestrial habitats, extensive microhabitat diversity and turbid waters. Those habitat conditions and much of the once naturally functioning ecosystem have been changed by human activities.

Bramblett (1996) noted important aspects of pallid sturgeon habitat use and movements. He also noted that the pallid sturgeon is specific and restrictive in use of macrohabitat selection. According to Bramblett's (1996) study, pallid sturgeon were found most often in sinuous channels with islands or alluvial bars present. Straight channels, and channels with irregular patterns or irregular meanders were only rarely used by pallid sturgeon. The seral stage of islands or bars near pallid sturgeon occurrences was most often subclimax (Bramblett 1996). Bramblett (1996) found macrohabitats used by pallid sturgeon were diverse and dynamic. For example, pallid sturgeon used river reaches with sinuous channel patterns and islands and alluvial bars; those river reaches generally have more diverse depths, current velocities, and substrates than do relatively straight channels without islands or alluvial bars, as well as a high diversity of channel features such as backwaters and side channels. The subclimax riparian vegetational seres in those areas are indicative of a dynamic river channel and riparian zone (Johnson 1993).

In telemetry studies of pallid sturgeon on the middle Mississippi River, Sheehan *et al.* (1998) found a positive selection for main channel border and downstream islands tips, depositional areas between wing dams, and deep holes off wing dam tips. Sheehan *et al.* (1998) speculated that areas between wing dams and downstream island tips may be used as velocity refugia and/or feeding stations. Sturgeon were found most often in main channel habitat; however, they exhibited selection against that habitat type. Their occurrence in such habitat was not surprising, considering main channel habitat comprised approximately 65 percent of the available habitat in the study reach (Sheehan *et al*. 1998).

Constant *et al*. (1997) reported on radio-tracked sturgeon, and stated that sturgeon were most frequently found in low-slope areas and that such areas were used in proportion to their availability. No sturgeon were observed on extremely steep slopes. Constant *et al.* (1997) found that sand made up over 80 percent of the substrate in low-slope areas where over 90 percent of pallid sturgeon were located. Those authors stated that the preference for sand substrates in low-slope areas suggests that pallid sturgeon use such areas as current refugia. Sand substrates were found to have lower invertebrate densities than substrates of silt-clay, which were generally located on steep-slope areas that were exposed by swift currents. As such, it would have been energetically costly for pallid sturgeon to remain near those steep-slope areas for extended periods of time. Telemetry observations, however, showed that 55 percent of sturgeon locations occurred within 33 feet of steep slopes, suggesting that pallid sturgeon remained near areas of high food abundance (Constant *et al.* 1997). Reed and Ewing (1993) found sturgeon occurring in the man-made riprap lined outfall channels of the Old River Control Structure Complex (ORCSC) in Louisiana. Bramblett (1996) found that pallid sturgeon preferred sandy substrates, particularly sand dunes, and avoided substrates of gravel and cobble. Pallid sturgeon have adhesive eggs. Thus, spawning is thought to occur over hard substrates of gravel or cobble with moderate flow (USFWS 2000).

Caution must be used in interpreting the results of habitat preference studies conducted in today's highly altered river environments. The results of studies conducted by Bramblett (1996) under fairly unaltered riverine conditions, however, provide additional information on habitat conditions preferred by this species. Characteristics of microhabitat used by pallid sturgeon have recently been described. Much of the microhabitat research to date has been conducted in significantly altered environments. That research does not necessarily indicate preferred or required habitats; instead it may only indicate which habitats of those presently available the pallid sturgeon uses. Also, capture locations may have conditions representing seasonal habitat preferences. Hurley (1996) found that pallid sturgeon were selecting downstream island tips although the island tips were not abundant within the study area.
Constant *et al*. (1997) found pallid sturgeon in the Atchafalaya and Mississippi Rivers at mean depths of 49.9 feet and observed pallid sturgeon at depths of 23.0 and 68.9 feet with greater frequency than such areas were available. The range of depth used by pallid sturgeon is likely related to the available habitat within the river segment (USFWS 2000).

Pallid sturgeon spawning occurs from March through July depending on location (Forbes and Richardson 1905, Gilbraith *et al.* 1988). Keenlyne and Jenkins (1993) estimate that spawning probably begins in March in the lower Mississippi and Atchafalaya Rivers; in late April or early

May in the lower Missouri and middle Mississippi Rivers; and in late May or early June in the upper Missouri River.

All sturgeon species spawn in the spring or early summer, are multiple spawners, and release their eggs at intervals. In the wild, the adhesive eggs are released in deep channels or rapids and are left unattended (Gilbraith *et al.* 1988). The larvae of Acipenserids are generally pelagic, becoming buoyant or active immediately after hatching (Moyle and Cech 1982). Although the behavior of young pallid sturgeon is poorly understood, work by Kynard *et al.* (1998) indicates that a downstream migration period for larval pallid sturgeon begins at hatching and continues up to day 13. With this information it has been possible to use water velocities to roughly estimate that larval pallid sturgeon may drift in the water column for a distance of 40 to over 400 miles (USFWS 2000).

Although benthic macroinvertebrates, characteristic of river habitats, are important pallid sturgeon dietary components (Modde and Schmulbach 1977, Carlson *et al.* 1985), the occurrence of lake and terrestrial invertebrates in sturgeon stomachs suggest that drifting invertebrates may also be important forage organisms (Modde and Schmulbach 1977, Constant *et al.* 1997). Aquatic invertebrates (principally the immature stages of insects) compose most of the diet of shovelnose sturgeon, while adult pallid sturgeon and hybrids consume a greater proportion of fish (mostly cyprinids). Other researchers also reported a higher incidence of fish in the diet of adult pallid sturgeon than in the diet of shovelnose sturgeon (Cross 1967, Held 1969).

Range and Population Dynamics

The pallid sturgeon is endemic to the Yellowstone, Missouri, Middle and Lower Mississippi Rivers, and the lower reaches of their major tributaries. Within Louisiana, the pallid sturgeon is found in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the ORCSC); it is possibly found in the Red River as well. The historic range of pallid sturgeon as described by Bailey and Cross (1954) encompassed the middle and lower Mississippi River, the Missouri River, and the lower reaches of the Platte, Kansas, and Yellowstone Rivers. Duffy *et al.* (1996) stated that the historic range of pallid sturgeon once included the Mississippi River upstream to Keokuk, Iowa, before the river was converted into a series of locks and dams for commercial navigation (Coker 1930).

The pallid sturgeon appears nearly extirpated from large segments of its former range. In 1991, pallid sturgeon were discovered in the Atchafalaya River in Louisiana (Constant *et al.* 1997). Today, they are only occasionally found in a few selected areas. Since 1980, reports of most frequent occurrence are from the Missouri River, the Mississippi River, and the Atchafalaya River at the ORCSC (USFWS 1993). Of 872 pallid sturgeon records prior to 1998, 70 percent were reported from the Missouri River. Nine percent of the total records came from the Yellowstone River, 5 percent from the Mississippi River, 14 percent from the Atchafalaya River, and less than 2 percent from the St. Francis, Platte, Ohio, Kansas, and Big Sunflower Rivers (USFWS 2000). Keenlyne (1989) updated previously published and unpublished information on distribution and abundance of pallid sturgeon.

The Missouri River has been modified significantly, with approximately 36 percent of the riverine habitat inundated by reservoirs, 40 percent channelized, and the remaining 24 percent altered due to dam operations (USFWS 1993). Most of the major tributaries of the Missouri and Mississippi Rivers have also been altered to various degrees by dams, water depletions, channelization and riparian corridor modifications.

Levee construction on the lower Mississippi River from the Ohio River to near the Gulf of Mexico has eliminated the river's major natural floodway and reduced the area of the floodplain connected to the river by more than 90 percent (Fremling *et al.* 1989). Fremling *et al.* (1989) also reported that levee construction isolated many floodplain lakes and raised riverbanks. Destruction and alteration of big-river ecologic functions and habitat once provided by the Missouri and Mississippi Rivers is believed to be the primary cause of declines in reproduction, growth, and survival of pallid sturgeon (USFWS 1993). In spite of efforts to constrict and control the Missouri and Mississippi Rivers with reservoirs, stabilized banks, jetties, dikes, levees and revetments, remnant reaches of the Missouri River and Mississippi River from the Missouri River confluence to the Gulf of Mexico still provide habitat usable by pallid sturgeon for certain life stages.

Since 1988, pallid sturgeon researchers have collaborated on studies to gather information about the species (Keenlyne 1995). Tag and recapture data indicate that 50 to 100 pallid sturgeon remain in the Missouri River above Fort Peck Dam in Montana, and between 200 and 300 pallid sturgeon remain between the Garrison Dam in North Dakota and Fort Peck Dam, including the lower Yellowstone River (USFWS 2000). One to five pallid sturgeon sightings per year have been recorded between the headwaters of Oahe Reservoir in South Dakota to the Garrison Dam and from the riverine reach in the Missouri River above Gavins Dam to Fort Randall Dam, suggesting that perhaps as many as 25 to 50 pallid sturgeon may remain in each of these areas. A small population also exists between Oahe Dam and Big Bend Dam on the Missouri River in South Dakota with perhaps 50 to 100 individuals remaining in that riverine section. There is no evidence that the upper Missouri River system populations are successfully reproducing (Keenlyne 1989, Duffy *et al.* 1996).

Glen Constant, while conducting research at Louisiana State University, estimated the pallid sturgeon population in the Atchafalaya River to range from 2,750 to 4,100 fish. A high rate of hybridization is occurring in the Atchafalaya and Mississippi Rivers (Keenlyne *et al.* 1994); that makes estimation of the number of pure pallid sturgeon in those river systems difficult (Duffy *et al.* 1996).

In recent years, pallid sturgeon populations have been augmented by release of hatchery reared fish. In 1994, the Missouri Department of Conservation (MDC) released approximately 7,000 fingerlings in the Missouri and Mississippi Rivers, and an additional 3,000 fingerlings were stocked in 1997 (Graham 1997, 1999). Since stocking in 1994, approximately 86 pallid sturgeon returns have been reported, mostly in the Mississippi River downstream of St. Louis (Graham 1999). Thirty-five 12- to 14-inch pallid sturgeon raised at Natchitoches NFH were stocked in the lower Mississippi River in 1998 (Kilpatrick 1999). Also in 1998, 745 hatchery-reared yearling pallid sturgeon were released at three sites in the Missouri River above Fort Peck Reservoir

(Gardner 1999) and another 750 yearling sturgeon were released near the confluence of the Yellowstone and Missouri Rivers (USFWS 2000).

Evidence of successful pallid sturgeon reproduction is rare throughout the range of the species. Recent work in the Atchafalaya River has revealed pallid sturgeon of several age groups, suggesting that some reproduction and recruitment may also occur in the Atchafalaya River. The only physical evidence of reproduction, however, were three gravid females reported by Constant *et al.* (1997). According to their data, pallid sturgeon collected in the Atchafalaya River and other areas of the Mississippi River have averaged less than 6.6 pounds and length-at-age estimates calculated according to Fogle (1963) indicated that even the smallest fish were over age 6, with the oldest perhaps over age 14. The age of fish in their study indicates the most recent recruitment of pallid sturgeon to be from the 1988 year class (Constant *et al.* 1997).

Management and Protection

Habitat destruction and alteration is believed to be the primary cause of declines in pallid sturgeon reproduction, growth, and survival. It is unlikely that successfully reproducing pallid sturgeon populations can be recovered without restoring the habitat elements (morphology, hydrology, temperature regime, cover, and sediment/organic matter transport) of the Missouri and Mississippi Rivers necessary for the species' continued survival (USFWS 1993). In spite of efforts to control the Missouri and Mississippi Rivers with reservoirs, stabilized banks, jetties, dikes, levees, and revetments, remnant reaches of the Missouri and Mississippi Rivers still provide habitat believed to be usable by the pallid sturgeon. Those habitat remnants are priority areas for implementation of recovery actions (USFWS 1993).

Mortality of pallid sturgeon occurs from both sport and commercial fishing activities. The states of North Dakota, South Dakota, and Louisiana require the release of all sturgeon whether taken commercially or for sport. Neither Montana nor Kansas allow commercial harvest of sturgeon. Sturgeon continued to be harvested as a bycatch of commercial fishing operations in Nebraska, Iowa, Missouri, Illinois, Kentucky, Tennessee, Arkansas, and Mississippi (USFWS 1993).

Pollution is also a likely threat to the pallid sturgeon over much of its range. Further investigations are needed to identify sources of contaminants in the Missouri and Mississippi Rivers, and to assess the role of contaminants in the decline of pallid sturgeon populations (USFWS 1993).

The pallid sturgeon is known to hybridize with the shovelnose sturgeon (Carlson *et al.* 1985). Keenlyne *et al.* (1992) concluded that hybridization might be occurring in half of the river reaches within the pallid sturgeon's range. Hybridization may be related to environmental degradation. Presumably, the loss of habitat diversity caused by human-induced environmental changes inhibits the reproductive isolating mechanisms that naturally occur among fish species. Also, the loss of available spawning habitat forces sharing of suitable habitat areas by similar species, with resultant increased hybridization (USFWS 1993).

4.3 MAMMALS

4.3.1 **Louisiana Black Bear** (*Ursus americanus luteolus*)

Status

The Louisiana black bear was listed as threatened on January 7, 1992, due to the population decline resulting from extensive habitat loss (USFWS 1995b). Simultaneously, other free-living black bears within the historic range of the Louisiana black bear were listed as threatened due to their similarity of appearance to the Louisiana black bear. The USFWS proposed to designate critical habitat for the Louisiana black bear in December 2, 1993, but no final rule has been issued. Proposed critical habitat included forested habitat within the Tensas River Basin, the Atchafalaya River Basin, and the Lower Iberia-St. Mary Parish area.

Species and Habitat Description

The Louisiana black bear is one of 16 subspecies of the American black bear. The black bear is a large, bulky mammal with long black hair and a short, well-haired tail. The facial profile is blunt, the eyes are small and the nose pad is broad with large nostrils. The muzzle is yellowish brown with a white patch sometimes present on the lower throat and chest. Although weight varies considerably throughout their range, adult males weigh more than 600 pounds; adult females generally weigh less than 300 pounds.

Though classified as a carnivore by taxonomists, black bears are not active predators and only prey on vertebrates when the opportunity arises. Most meat eaten by black bears is carrion. Bears are best described as opportunistic feeders, as they eat almost anything that is available; thus, they are typically omnivorous. Their diet varies seasonally, and includes primarily succulent vegetation during spring, fruits and grains in summer, and hard mast such as acorns and pecans during fall. Bears utilize all levels of forest for feeding; they can gather foods from treetops and vines, but also grub in fallen logs for insects. The growth rate, maximum size, breeding age, litter size, and cub survival of black bears are all correlated with nutrition.

Bear activity revolves mainly around the search for food, water, cover, and mates during the breeding season. Home ranges of bears, particularly females, appear to be closely linked to forest cover (Marchinton 1995). Beausoleil (1999) estimated maximum home range for Deltic bears in the Tensas River Basin to be 1,729 and 1,038 acres for males and females, respectively. Maximum home range estimates for Tensas River NWR bears were 81,396 and 13,072 acres for males and females, respectively (Weaver 1999). Home range estimates for male bears in the inland Atchafalaya River Basin subpopulation may be as high as 80,000 acres, while female home ranges are approximately 8,000 acres (Wagner 1995). Home range estimates for female and male bears in the coastal subpopulation are estimated to be 3,706 and 10,378 acres, respectively (Wagner 1995). Wagner (1995) speculated that the smaller home ranges of coastal bears as compared to inland bears were due to superior habitat quality in the coastal area.

Female black bears become sexually mature at 3 to 5 years of age. Breeding occurs in summer and the gestation period for black bears is 7 to 8 months. Cubs are born in winter dens at the end

of January or the beginning of February. Estimated litter sizes for the three Louisiana subpopulations ranges from 1.73 to 2.43. The normal litter size is two, although litter sizes of three to four cubs do occur. Cubs stay with the sow through summer and fall and den with them the second winter. The young disperse in spring or summer, prior to the female's period of estrus (Pelton 1982).

Louisiana black bears use a variety of den types, including ground nests, hollow trees, and brush piles. Generally, adult males and sub-adults use ground dens with greater frequencies than adult females. Black bears do not truly hibernate, but go through a dormancy period termed "carnivorian lethargy", a period of torpor, which helps them survive food shortages and severe weather during the winter. In warmer climates, such as in Louisiana, bears can remain active all winter (Taylor 1971). Bears may enter dens between October and early January depending on latitude, available food, sex and age, and local weather conditions (Pelton 1982). Adult females generally enter the den first, followed by sub-adults and adult males. Females with cubs generally are the last to leave the den.

The key habitat requirements of black bears are food, water, cover, and denning sites, which are spatially arranged across sufficiently large, relatively remote blocks of land. The remaining populations of Louisiana black bears typically inhabit bottomland hardwood communities; other habitat types may be utilized, including marsh, upland forested areas, forested spoil areas, and agricultural fields. Throughout its range, prime black bear habitat is characterized by relatively inaccessible terrain, thick understory vegetation, and abundant sources of food (Pelton 1982). Other important features of prime black bear habitat include dispersal corridors, protection from human-related disturbances, water, and denning sites. Corridors providing cover may facilitate the movement of bears through agricultural lands, particularly when bears reside in fragmented tracts of forest as observed by Weaver *et al.* (1992) in the Tensas Basin. According to Marchinton (1995), telemetry locations and visual observations indicated that wooded drainages were important travel corridors for movements among forested tracts.

Bear mortality has been attributed to natural and human causes. Natural causes include disease, cannibalism, drowning, poor maternal care, and climbing accidents. Human-induced mortality includes hunting, trapping, poaching, vehicle collisions, electrocution, depredation/nuisance kills, disturbance (causing den abandonment), and accidents associated with research activity. Road access can increase the chances of people or dogs disturbing maternal dens in winter (Rogers and Allen 1987). Cubs are dependent on the sow for warmth and food; human disturbance of denning females has resulted in cub mortality from abandonment (Elowe and Dodge 1989).

Pace *et al.* (2000) evaluated known black bear mortality in Louisiana between 1992 and 2000. Vehicular collisions were the most common cause of mortality, accounting for 45 percent of verified losses. Poaching was the second most common cause of death, with at least 12 bears illegally shot. Sixty-five percent of known mortalities occurred in the coastal subpopulation (the majority of which were adult females), 24 percent from Tensas River Basin subpopulation (the majority of which were males) and 11 percent from inland Atchafalaya River Basin subpopulation. Pace *et al.* (2000) concluded that anthropogenic causes of mortality are taking a relatively large toll on the coastal subpopulation in terms of absolute numbers and because adult

females represent a high proportion of the take. Similarly, female losses in the inland Atchafalaya River Basin are high, relative to estimated population size.

Range and Population Dynamics

The Tensas River Basin subpopulation is 110 miles north of the inland Atchafalaya River Basin subpopulation. Some of the Tensas bears are located on Tensas River NWR and Big Lake Wildlife Management Area (WMA), which are protected from development and managed for bears and other wildlife. The refuge and adjacent WMA provide approximately 130 square miles of forested habitat (Weaver 1999). The nearby Deltic tracts support one of the highest densities of black bears reported for the southeastern coastal plain and the surrounding agriculture is probably the reason for that high density (Beausoleil 1999). Anderson (1997) reported that agricultural crops constituted 49 percent of the diet of Deltic bears; if crops grown on the surrounding lands change from corn and wheat (which are used by bears) to cotton, which is not, the sub-subpopulation would lose a food resource that it prefers. Also, bear density is not distributed evenly among tracts. Beausoleil (1999) reported 8 of 12 females studied had home ranges exclusively within the Bluecat tract, and 2 additional females had home ranges that overlapped the Bluecat tract and smaller adjacent forested areas to the south. The Deltic tracts are in private ownership, and are thus not under management protection and are potentially subject to development pressure. The presence of 4-lane highways and extensive agricultural lands limit bear movements from this subpopulation to Tensas River NWR.

The inland Atchafalaya River Basin subpopulation occupies 175 square miles of predominately private forestland interspersed with agriculture, and is located within and adjacent to the Morganza Floodway and adjoining the Atchafalaya Basin Floodway. The Morganza Floodway and adjoining Atchafalaya Basin Floodway together comprise approximately 1,039 square miles, although much of the land in the middle and lower Atchafalaya Floodway is believed to be currently unsuitable for bear occupancy due to extreme flooding. Through time, however, the swamp and forest floor of the Atchafalaya Basin are expected to rise with each succeeding flood and subsequent deposition of sediment. Those changes will eventually convert most of the basin forests to bottomland hardwoods, with some cypress/tupelo swamps remaining in former aquatic areas (especially in the southeastern portion of the basin). Those changes could expand the suitable habitat for the inland Atchafalaya River Basin and coastal subpopulations, and improve linkage of those populations.

The coastal subpopulation is located approximately 70 miles south of the inland Atchafalaya River Basin subpopulation, in southern Iberia and St. Mary Parishes, Louisiana. Habitat evaluation is underway to determine if suitable linkages between those two subpopulations can be identified. The coastal subpopulation occupies private lands, totaling approximately 218 square miles, and the recently established Bayou Teche NWR (currently 9,040 acres). Bear range expansion in the coastal area is limited by development along U.S. Highway 90 to the north, and by the surrounding coastal marsh, which is believed to be unsuitable for sustaining bear populations. Large blocks of public and private forest land exist to the north of the coastal subpopulation within the Atchafalaya Floodway, but are believed to be uninhabited by bears, and may be unsuitable for bear occupancy due to extent of flooding. Development of the majority of the occupied area is believed to be unlikely because most of the area remains flooded during

most of the year, but some development pressure is expected on the eastern and western limits of the subpopulation. The densest portion of the coastal subpopulation is believed to be on the natural salt domes of Jefferson, Weeks, Avery, and Cote Blanche Islands (USFWS 2001a). Development that increases the number of roads, human presence, or reduces the amount of forest, especially the oak dominated habitat, could severely impact this population. Throughout the coastal subpopulation area, small forest patches on the edges of agriculture fields and developed areas may be at the greatest risk. These patches are protected from flooding by levees constructed to facilitate drainage and most are bottomland hardwood stands with a high proportion of oaks. Future changes to existing drainage systems could also alter coastal bear habitats.

Management and Protection

Black bears have relatively low reproductive potential; therefore, changes that influence reproduction can significantly impact population dynamics, an important management consideration. The most important natural factor regulating black bear populations appears to be variation in food supply and its effect on physiological status and reproduction (Rogers 1976).

Louisiana black bear habitat is believed to be stable to increasing overall as a result of regulatory programs (including Swampbuster and Section 404 of the Clean Water Act), and concerted efforts by Federal, state and private entities that are currently targeting reforestation projects in bear habitat. Since 1992, approximately 150,000 acres of habitat have been reforested/protected through USDA's Wetland Reserve Program, and more than 50,000 acres of this restoration and protection have directly benefited bears. Nearly all of this effort has occurred in the upper Atchafalaya and Tensas River basins. Additional reforestation has occurred on NWRs, State-owned lands, and other Federal lands in areas where black bears will be benefited. In addition, the USFWS has acquired bear habitat in the coastal area for establishment of Bayou Teche NWR. The USACE has purchased about 50,000 acres in fee title, and is securing easements on 338,000 acres, in the Atchafalaya Basin. There is little opportunity for the establishment of conservation easements in the coastal area, however, due to the current profitability of sugarcane farming.

4.3.2 West Indian Manatee (*Trichechus manatus*)

Status

The West Indian manatee was listed as endangered throughout its range for both the Florida and Antillean subspecies in 1967, and received Federal protection with the passage of the ESA in 1973. Critical habitat was designated in 1976, 1994, 1998, 2002, and 2003 for the Florida subspecies.

Species and Habitat Description

The West Indian manatee is a large gray or brown aquatic mammal. Adults average approximately 10 feet in length and weigh up to 2,200 pounds. They have no hind limbs, and their forelimbs are modified as flippers. Manatee tails are flattened horizontally and rounded.

Their body is covered with sparse hairs and their muzzles with stiff whiskers (USFWS 2001c). The nostrils, located on the upper snout, open and close by means of muscular valves as the animal surfaces and dives (Husar 1977, Hartman 1979). Manatees will consume any aquatic vegetation (i.e., submerged, floating, and emergent) available to them and sometimes even shoreline vegetation. Although primarily herbivorous, they will occasionally feed on fish. Manatees may spend about 5 hours a day feeding, and may consume 4 to 9 percent of their body weight per day.

Observations of mating herds indicate that females mate with a number of males during their 2- to 4-week estrus period, and then they go through a pregnancy estimated to last 12 to 14 months (O'Shea et al. 1992). Births occur during all months of the year with a slight drop during winter months. Manatee cows usually bear a single calf, but 1.5 percent of births are twins. Calves reach sexual maturity at 3 to 6 years of age. Mature females may give birth every 2 to 5 years (USFWS 2001c).

Manatees inhabit both salt and freshwater of sufficient depth (5 feet to usually less than 20 feet) throughout their range. Shallow grassbeds with ready access to deep channels are preferred feeding areas in coastal and riverine habitats (USFWS 2001c). They may also be encountered in canals, rivers, estuarine habitats, saltwater bays, and have been observed as much as 3.7 miles off the Florida Gulf Coast. Between October and April, Florida manatees concentrate in areas of warmer water. Severe cold fronts have been known to kill manatees when the animals did not have access to warm water refuges. During warmer months they appear to choose areas based on an adequate food supply, water depth, and proximity to fresh water. Manatees may not need fresh water, but they are frequently observed drinking water from hoses, sewage outfalls, and culverts.

Range and Population Dynamics

During winter months, the United States' manatee population confines itself to the coastal waters of the southern half of peninsular Florida and to springs and warm water outfalls as far north as southeast Georgia. Power plant and paper mill outfalls create most of the artificial warm water refuges utilized by manatees. During summer months, they migrate as far north as coastal Virginia on the east coast and the Louisiana coast in the Gulf of Mexico.

During summer months, manatees disperse from winter aggregation areas, and are commonly found almost anywhere in Florida where water depths and access channels are greater than 3.3 to 6.6 feet (O'Shea 1988). In the warmer months, manatees usually occur alone or in pairs, although interacting groups of 5 to 10 animals are not unusual (USFWS 2001c). A few individuals have been known to stray as far north as the northern Georgia coast and as far west as the coastal waters of Louisiana.

In the early 1980s, scientists tried to develop procedures for estimating the overall manatee population in the southeastern United States (USFWS 2001c). The best estimate throughout the State of Florida was 1,200 manatees (Reynolds and Wilcox 1987). In the early 1990s, the State of Florida initiated a statewide aerial survey in potential winter habitats during periods of severe

cold weather (Ackerman 1995), and the highest count of 3,276 manatees was recorded in January 2001.

Management and Protection

The most significant problem faced by manatees in Florida is death or injury from boat strikes (USFWS 2001c). Minimum flows and levels for warm water refuges need to be established to ensure their long-term availability for manatees. Their survival will depend on maintaining the ecosystems and habitat sufficient to support a viable manatee population (USFWS 2001c). The focus of recovery is on implementing, monitoring, and addressing the effectiveness of conservation measures to reduce or remove threats that will lead to a healthy and self-sustaining population (USFWS 2001c).

The West Indian manatee is also protected under the Marine Mammal Protection Act (MMPA) of 1972. The MMPA establishes a national policy for the maintenance of health and stability of marine ecosystems and for obtaining and maintaining optimum sustainable populations of marine mammals. It includes a moratorium on the taking of marine mammals. The recovery planning under the ESA includes conservation planning under the MMPA (USFWS 2001c).

4.4 REPTILES

4.4.1 Green Sea Turtle (*Chelonia mydas*)

Status

The green sea turtle was listed as endangered/threatened on July 28, 1978. The breeding populations off Florida and the Pacific coast of Mexico are listed as endangered while all others are threatened (USFWS 1991, NMFS www.nmfs.noaa.gov/). This species' current status in Louisiana is unknown (USFWS 1990b).

Species and Habitat Description

Although green sea turtles are found worldwide in oceans and gulfs with water temperatures greater than 68°F (20°C), their distribution can be correlated to grassbed distribution, location of nesting beaches, and associated ocean currents (Hirth 1971). Long migrations are often made between feeding and nesting grounds (Carr and Hirth 1962). Within Louisiana waters, these turtles probably occur all along the coast and may nest on the Chandeleur Islands (Dundee and Rossman 1989). Population decline has been attributed to heavy fishing pressure and human nest predation (Dundee and Rossman 1989). Historically, green sea turtles were fished off the Louisiana coast (Rebel 1974); exploitation and incidental drowning in shrimp trawls has contributed to the decline of this species and its eventual listing (King 1981). During their first year of life, green sea turtles are primarily carnivorous, feeding mainly on invertebrates. As adults they feed almost exclusively on seagrasses growing in shallow water flats (Fritts *et al.* 1983), but also feed on invertebrates and carrion (Dundee and Rossman 1989).

Green sea turtles feed in shallow water areas with abundant seagrasses or algae. The turtles migrate from nesting areas to feeding grounds, which are sometimes several thousand miles away. Most turtles migrate along the coasts, but some populations are known to migrate across the ocean from nesting area to feeding grounds. The major nesting beaches are always found in places where the seawater temperature is greater than 77°F (25°C). As a species that migrates long distances, these turtles face special problems associated with differing attitudes toward conservation in different countries.

Range and Population Dynamics

In the southeastern United States, green sea turtles are found around the U.S. Virgin Islands, Puerto Rico, and the continental U.S. from Texas to Massachusetts. Important feeding grounds in Florida include Indian River Lagoon, the Florida Keys, Florida Bay, Homosassa, Crystal River and Cedar Key. The primary nesting sites in U.S. Atlantic waters are along the east coast of Florida, with additional sites in the U.S. Virgin Islands and Puerto Rico.

Green sea turtles are also found throughout the North Pacific, ranging as far north as Eliza Harbor, Admiralty Island, Alaska, and Ucluelet, British Columbia. In the eastern North Pacific, green sea turtles have been sighted from Baja California to southern Alaska. In the central Pacific, green sea turtles can be found at most tropical islands. In U.S. Hawaiian waters, green sea turtles are found around most of the islands in the Hawaiian Archipelago. The primary nesting site is at French Frigate Shoals (http://www.nmfs.noaa.gov/prot_res/species/turtles/green.html).

Females deposit up to 7 clutches, and the number of nests has been estimated to be between 350 to 2,300 nests annually. Green sea turtles nest at 2-, 3-, or 4-year intervals. This nesting activity indicates a population of less than 1,000 females in the breeding population of Florida and Mexico.

Management and Protection

Recovery plan objectives consider the delisting of green sea turtles if, over a period of 25 years, the following conditions are met: 1) the level of nesting in Florida has increased to an average of 5,000 nests per year for at least 6 years (nesting data must be based on standardized surveys), 2) at least 25 percent (105 km) of all available nesting beaches (420 km) is in public ownership and encompasses at least 50 percent of the nesting activity, and 3) a reduction in age class mortality is reflected in higher counts of individuals on foraging grounds. The 1995 Biological Assessment (BA) lists degradation of foraging grounds as one of the impediments to population recovery. There is evidence that supports foraging site as well as nesting site fidelity by green sea turtles (Renaud 1995). The recovery plans include prevention of marine pollution of green sea turtle habitat and protection of the nesting sites.

4.4.2 Hawksbill Sea Turtle (*Eretmochelys imbricata*)

Status

The hawksbill was listed as an endangered species in June 1970 (USFWS 1991) and its current status in Louisiana is unknown (USFWS 1990).

Species and Habitat Description

Only one record of a hawksbill in Louisiana has been reported (Fuller and Tappen 1986). This species is an omnivore, feeding primarily on invertebrates and marine vegetation (Dundee and Rossman 1989). Hawksbill turtles are observed regularly in Florida and Texas. Florida is considered foraging habitat for those turtles, and Texas may be foraging habitat for hatchlings and juveniles (77 observations of small turtles were reported between 1972 and 1984) from the nesting sites in Mexico (NMFS and USFWS 1993).

Range and Population Dynamics

The hawksbill occurs in tropical and subtropical seas of the Atlantic, Pacific and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean, with representatives of at least some life history stages regularly occurring in southern Florida and the northern Gulf of Mexico (especially Texas); in the Greater and Lesser Antilles; and along the Central American mainland south to Brazil. Within the United States, hawksbills are most common in Puerto Rico and its associated islands, and in the U.S. Virgin Islands. In the continental U.S., the species is recorded from all the Gulf states and from along the eastern seaboard as far north as Massachusetts, but sightings north of Florida are rare.

Hawksbills are observed in Florida with some regularity on the reefs off Palm Beach County and in the Florida Keys. Texas is the only other state where hawksbills are sighted with any regularity. Most sightings involve post hatchlings and juveniles, which are believed to originate from nesting beaches in Mexico.

Nesting within the southeastern United States occurs principally in Puerto Rico and the U.S. Virgin Islands. Within the continental United States, nesting is restricted to the southeast coast of Florida and the Florida Keys.

Hawksbill turtles nest at low densities in aggregations of 1 to 100 adults; in contrast, other sea turtles have concentrated nesting sites and aggregations of thousands of adults. The Yucatan Peninsula of Mexico is the most concentrated nesting site, where approximately 178 to 222 adult females nest each year (NMFS and USFWS 1993). Most of the countries in the Caribbean report less than 100 females nesting annually; less than two nests annually have been observed in Florida (NMFS and USFWS 1993) and Texas (Saver 2001).

Management and Protection

Recovery criteria are directed at nesting beaches with U.S. jurisdiction in the Caribbean Sea, including Mona Island, Puerto Rico, and the Virgin Islands. The hawksbill turtle can be delisted if the adult female population has an increasing trend over 25 years, as evidenced by increases in annual number of nests at five index beaches, including Mona Island. Numbers of turtles of all classes must show an increasing trend on at least five key foraging areas within Puerto Rico, the U.S. Virgin Islands, and Florida to meet recovery criteria. Actions needed to achieve recovery include long-term protection of foraging habitat and nesting beaches, and reduction of illegal exploitation (NMFS and USFWS 1993).

4.4.3 Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)

Status

On December 2, 1970 the Kemp's ridley sea turtle was designated as endangered across its entire range (USFWS 1991) and has continued to decline in Louisiana (USFWS 1990).

Species and Habitat Description

This small sea turtle is believed to be the most frequently encountered (Dundee and Rossman 1989), if not the most abundant sea turtle, off the Louisiana coast (Gumer 1981, Viosca 1961). Predation on eggs by humans, other mammals, birds, and crabs, in addition to the capture of diurnal nesting females has contributed to the decline of the Kemp's ridley. Recent causes of mortality are fishing activities and accidental capture in shrimp trawls (Fuller 1978, Pritchard and Marquez 1973). These sea turtles are commonly captured by shrimpers off the Texas coast, as well as in heavily trawled areas off the coasts and in the bays of Louisiana and Alabama (Dundee and Rossman 1989, Carr 1980, Pritchard and Marquez 1973). Inshore areas of the Gulf of Mexico appear to be important habitat for Kemp's ridleys, as they tend to concentrate around the mouths of major rivers (Frazier 1980). Members of this genus are characteristically found in waters of low salinity and high turbidity and organic content, where shrimp are abundant (Hughes 1972 as cited in Frazier 1980, Zwinenberg 1977). Kemp's ridleys have been collected in Louisiana from Lake Borgne, Barataria and Terrebonne Bays, and near Calcasieu Pass (Dundee and Rossman 1989). Occurrence of these sea turtles in bays and estuaries along the Louisiana coast would not be unexpected, as many of their primary food items occur there. Stomach analyses of specimens collected in shrimp trawls off Louisiana revealed crabs, gastropods, and clams (Dobie *et al.* 1961). Although Kemp's ridleys are considered primarily carnivorous benthic feeders (Ernst and Barbour 1972), jellyfish as well as by-catch from shrimp trawlers have been reported as part of their diet (Landry 1986).

Trends in Kemp's ridley sea turtle populations in the Gulf of Mexico are identified through monitoring of their most accessible life stages on the nesting beaches, where hatchling production and the status of adult females can be directly measured. Most Kemp's ridley nesting occurs on a single beach at Rancho Nuevo, Mexico, about 30 kilometers south of the Rio Grande, with sporadic nesting along the Texas coast. Protection and monitoring by Mexico and the United States has occurred on that nesting beach since 1978. Nest production plummeted to

only 742 nests in 1985, but has been steadily increasing since that time. Over 1,500 nests were observed during the 1994 nesting season. The latest data available show that the number of nests increased during 1994 through 2000; in 2000, 5,751 nests were observed. The possibility of Kemp's ridley nesting on the Louisiana coast has been suggested (Viosca 1961), but no documentation exists.

Range and Population Dynamics

The known range of this species includes the Gulf of Mexico and the Atlantic Ocean. The current range for Kemp's ridley in the United States includes marine habitat of the following coastal states: Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas.

Management and Protection

The Recovery Plan for the Kemp's ridley sea turtle (NMFS and USFWS 1992) identified a recovery criterion of 10,000 nesting females in one season as a prerequisite for downlisting to threatened status. Considering that 58 percent of all adult females appear to nest in any 1 year, and each female lays an estimated 2.7 nests, the 5,751 nests documented in the year 2000 represent approximately 3,700 adult female Kemp's ridleys in the entire population; that is about one third of the amount included in the downlisting criteria identified in the Recovery Plan. Continued protection of all life stages of the Kemp's ridley is necessary to increase recruitment to the reproducing population and insure recovery of the species.

4.4.4 Leatherback Sea Turtle (*Dermochelys coriacea*)

Status

The leatherback sea turtle was listed as an endangered species throughout its range in June 1970 (USFWS 199l).

Species and Habitat Description

The leatherback is the largest living turtle, and is so distinctive as to be placed in a separate taxonomic family, *Dermochelyidae*. The carapace is distinguished by a rubber-like texture, about 1.5 in (4 cm) thick, and made primarily of tough, oil-saturated connective tissue. No sharp angle is formed between the carapace and the plastron, resulting in the animal being somewhat barrel-shaped. The average curved carapace length for adult turtles is 5 ft (155 cm) and weight ranges from 440 to 1,543 lbs (200 to 700 kg). Hatchlings are dorsally mostly black and are covered with tiny scales; the flippers are margined in white, and rows of white scales appear as stripes along the length of the back. Hatchlings average 2.4 in (61.3 mm) long and 0.1 lbs (45.8 g) in weight. In the adult, the skin is black and scaleless. The undersurface is mottled pinkish-white and black. The front flippers are proportionally longer than in any other sea turtle, and may span 8.9 ft (270 cm) in an adult. In both adults and hatchlings, the upper jaw bears two tooth-like projections at the premaxillary-maxillary sutures. Age at sexual maturity is unknown (http://www.nmfs.noaa.gov/prot_res/species/turtles/leatherback.html).

The leatherback sea turtle occurs mostly in continental shelf waters, but will occasionally enter shallow waters and estuaries. Adults are highly migratory, and are believed to be the most pelagic of all sea turtles (NMFS and USFWS 1992). Habitat requirements for juvenile and post-hatchling leatherbacks are unknown.

Leatherback turtles are omnivorous but feed primarily on jellyfish and other cnidarians, and have been associated with large schools of cabbage head jellyfish *(Stomolophus meleagris)*. Fritts *et al.* (1983) reported that these turtles also ingest plastic, apparently mistaking it for food.

Range and Population Dynamics

The leatherback is found throughout the tropical waters of the Atlantic, Pacific, and Indian Oceans (Ernst and Barbour 1972), the Gulf of Mexico, and the Caribbean (Carr 1952). Critical habitat for the leatherback includes the waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands, up to and inclusive of the waters from the hundred fathom curve shoreward to the level of mean high tide with boundaries at 17°42'12" N and 64°50'00" W. This turtle exhibits seasonal fluctuations in distribution in response to the Gulf Stream and other warm water features (Fritts *et al.* 1983, Hirth 1980, Pritchard 1971). During the summer, leatherbacks tend to be found along the east coast of the U.S. from the Gulf of Maine south to mid-Florida.

Nesting occurs from February through July at sites located from Georgia to the U.S. Virgin Islands. Nesting leatherbacks occur along beaches in Florida, Nicaragua, and islands in the West Indies; however, no nesting has been reported in Louisiana (Gunter 1981, Dundee and Rossman 1989). In Louisiana, leatherbacks are believed to occur offshore in deep waters; however, they have been collected from or sighted in Cameron Parish, Atchafalaya Bay, Timbalier Bay, and Chandeleur Sound (Dundee and Rossman 1989).

Leatherbacks are seriously declining at all major nesting beaches throughout the Pacific. The decline is dramatic along the Pacific coasts of Mexico, Costa Rica and Malaysia. Nesting along the Pacific coast of Mexico declined at an annual rate of 22 percent over the last 12 years, and the Malaysian population represents 1 percent of the levels recorded in the 1950s. The collapse of those nesting populations was precipitated by a tremendous over-harvest of eggs, direct harvest of adults, and incidental mortality from fishing. In the Atlantic and Caribbean, the largest nesting assemblages are found in the U.S. Virgin Islands, Puerto Rico, and Florida. Nesting data for these locations have been collected since the early 1980s and indicate that the annual number of nests is likely stable; however, information regarding the status of the entire leatherback population in the Atlantic is lacking. Nesting activity has also declined in French Guiana due to erosion of nesting beaches. The population appears to have shifted to Surinam, where annual numbers of nests rose from less than 100 in 1967 to 5,565 in 1977 and 9,816 in 1987. Current estimates are that 20,000 to 30,000 female leatherbacks exist worldwide.

Management and Protection

Habitat destruction, incidental catch in commercial fisheries, and the harvest of eggs and flesh are the greatest threats to the survival of the leatherback. Recovery plans are directed at all leatherbacks in the U.S. portion of Caribbean, Atlantic, and Gulf of Mexico waters, whether they

are nesting within this area or elsewhere. Stranding data for the United States shores indicate that stranded turtles are adult or near adult size, suggesting that leatherback turtles utilize the United States' coastal waters for foraging as well as nesting (NMFS and USFWS 1992). Leatherbacks begin nesting in February or March; other sea turtles begin nesting in May. Leatherback strandings are highest (84 percent) from October to April. Beach patrols are in place in May in most areas; however, few strandings (16 percent) occur from May to September. Aerial surveys indicate the presence of leatherback turtles in the southeastern U.S. in the winter months (NMFS and USFWS 1992). The recovery plan for the leatherback sea turtle concludes that nesting trends in the United States appear stable, but that the population faces significant threats from incidental take as a result of commercial fishing and marine pollution.

4.4.5 Loggerhead Sea Turtle (*Caretta caretta*)

Status

The loggerhead sea turtle was listed as a threatened species in July 1978 (USFWS 1991) and has continued to decline in Louisiana (USFWS 1990).

Species and Habitat Description

Loggerheads are capable of living in a variety of environments, such as in brackish waters of coastal lagoons and river mouths. During the winter, they may remain dormant, buried in the mud at the bottom of sounds, bays, and estuaries. The major nesting beaches are located in the southeastern United States, primarily along the Atlantic coast of Florida, North Carolina, South Carolina, and Georgia. Only minor and solitary nesting has been recorded along the coasts of the Gulf of Mexico.

The largest of the hard-shell sea turtles, the loggerhead is distributed worldwide in temperate and tropical bays and open oceans. Loggerheads probably range all along the Louisiana coast; however, Dundee and Rossman (1989) reported specimens only from Chandeleur Sound, Barataria Bay, and Cameron Parish. The population decline of loggerheads can be attributed to egg and nestling predation by mammals and birds (Dundee and Rossman 1989).

Nesting on the Gulf Coast occurs between the months of April and August, with 90 percent of the nesting effort occurring on the south-central Gulf Coast of Florida (Hildebrand 1981). Although loggerheads have been documented as nesting on the Chandeleurs in 1962 and Grand Isle in the 1930s, it is doubtful whether this species currently successfully nests on the Louisiana coast (Hildebrand 1981, Dundee and Rossman 1989). The loggerhead's diet includes marine invertebrates such as mollusks, shrimp, crabs, sponges, jellyfish, squid, sea urchins, and basket stars (Caldwell *et al.* 1955, Hendrickson 1980, Nelson 1986). Landry (1986) suggested that these turtles may also feed on discarded by-catch from shrimp trawling. Adult loggerheads feed in waters less than 50 meters deep, while the primary foraging areas for juveniles appears to be in estuaries and bays (Nelson 1986, Rabalais and Rabalais 1980).

Nesting in the U.S. accounts for about one third of the Federally listed threatened loggerhead worldwide population. Ninety-one percent of nesting occurs in Florida, particularly within the

Archie Carr NWR; the remaining U.S. nesting includes 6.5 percent in South Carolina, 1.5 percent in Georgia, and 1 percent in North Carolina. Nests are constructed from May through September in the United States. According to Gosselink, Coleman, and Stewart (http://biology.usgs.gov/s+t/SNT/noframe/cg138.htm), the only loggerhead turtle nesting sites observed in Louisiana were on the Chandeleur Islands. Because of storm processes, the Chandeleur Islands may no longer contain high beach and dune surfaces, i.e., beach structure suitable for nesting. Recent surveys by USFWS Refuge personnel have found no loggerhead nests in the area (James Harris, Southeast Louisiana Refuges, personal communication).

Range and Population Dynamics

Loggerheads are circumglobal, inhabiting continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters. In the Atlantic, the loggerhead turtle's range extends from Newfoundland to as far south as Argentina. During the summer, nesting occurs in the lower latitudes. The primary Atlantic nesting sites are along the east coast of Florida, with additional sites in Georgia, and the Carolinas; some nesting also occurs on the Gulf Coast of Florida. In the eastern Pacific, loggerheads are reported as far north as Alaska, and as far south as Chile. Occasional sightings are also reported from the coast of Washington, but most records are of juveniles off the coast of California. Southern Japan is the only known breeding area in the North Pacific(NMFS http://www.nmfs.noaa.gov/prot_res/species/turtles/loggerhead.html).

Management and Protection

The Recovery Plan is currently being revised, but its recovery criteria for delisting loggerhead sea turtles in the U.S. population include: 1) return to pre-listing nesting levels for North Carolina, South Carolina, and Georgia, and 2) demonstration of an increase in the adult female population of Florida (NMFS and USFWS 1993). Nesting trends are stable in Florida, but appear to be declining in Georgia and South Carolina; current trends in North Carolina have not been identified. Recent aerial survey data indicate a current population of 14,150 adult females. Female turtles deposit a mean of 4.1 nests per year, which would be approximately 58,000 nests in the southeastern U.S. That figure is supported by aerial and ground surveys that estimated between 50,000 and 70,000 nests annually in the southeastern U.S. Increasing the hatch success will necessitate improvement of nesting habitat and minimizing mortality from commercial fisheries.

5.0 POTENTIAL EFFECTS OF THE LCA ECOSYSTEM RESTORATION PLAN

Because the LCA Restoration Plan is programmatic and conceptual, the specific locations and design of features of the individual restoration measures have not been determined, and/or are subject to change. Hence, the following analyses are also expressed in conceptual terms for each of the major types of restoration measures recommended (e.g., river diversions, dredging, sediment delivery, barrier island restoration, and marsh creation). More specific and in-depth analyses will be completed during individual project-level consultations, once site-specific locations and designs have been developed.

5.1 BIRDS

5.1.1 Bald Eagle

There is suitable bald eagle habitat throughout much of the action area. Potential impacts to bald eagles may occur from construction activities that would disturb nest trees and/or cause noise-related disturbance to mating pairs during the nesting season. Impacts to nest trees can be avoided by circumventing the nest tree and other potential nest trees in the area. Noise disturbance to mating pairs can be avoided by conducting any work activities outside the nesting season and preventing those activities from encroaching within 1,500 feet of a nest during the nesting season (USFWS 1989c). Use of equipment that minimizes such disturbances may also help to minimize impacts to that species.

Bald eagles may also be impacted from contaminants introduced into their food source through water and sediments diverted from the Mississippi River into areas containing foraging and/or nest sites. The Davis Pond Freshwater Diversion Project is similar to diversion projects proposed in the final plan. The USFWS' 1984 Biological Opinion (BO) on the originally proposed Davis Pond project concluded the project was not likely to adversely affect eagles, but did propose implementation of a long-term contaminant sampling plan to monitor the health and population of bald eagles (including potential bald eagle prey items) within the project's ponding area. A study is currently being conducted on the effects of contaminants contained in water diverted from the Mississippi River on the bald eagle as a result of the implementation and operation of the Davis Pond Freshwater Diversion Structure. The USACE has begun implementation of that plan and is currently preparing a report on the result of those contaminant analyses. Furthermore, Mississippi River water quality used for diversions has improved measurably in the last ten years based on comparisons of data from the Caernarvon (Conzelmann *et al.* 1996) and Davis Pond (Jenkins and Jeske 2003) diversion studies.

Based on what is currently known, any proposed river or sediment delivery diversions would be similar to past projects and any proposed activities would be conducted according to bald eagle management guidelines. Therefore, the proposed action is not likely to adversely affect the bald eagle. In addition, habitat restoration that may occur due to the proposed action may also benefit bald eagles.

5.1.2 Brown Pelican

Suitable brown pelican feeding and/or nesting habitat occurs along the barrier islands, sand spits, and mud lumps along the Louisiana Gulf coast. Pelican nest sites [i.e., Rabbit Island in Calcasieu Lake, Raccoon Point on Isles Dernieres, Queen Bess Island, Plover Island (Baptiste Collette), Wine Island, and islands in the Chandeleur chain] and the birds themselves may be impacted by barrier island restoration activities or noise disturbance from work activities. Impacts to nesting brown pelicans can be avoided by preventing any work activities from encroaching within 2,000 feet of a nesting area during the nesting season. Furthermore, none of the barrier island restoration activities are expected to permanently affect suitable pelican nesting habitat, and are likely to create more nesting habitat and prolong the life of existing nesting habitat.

Noise disturbance to pelicans would be temporary and would be minimized by appropriate construction activity windows during the non-breeding season. Changes or impacts in coastal open water habitats providing suitable feeding and/or loafing areas would be temporary, and there is an abundance of suitable habitat should the birds be temporarily displaced. Changes in hydrology by measures to preserve existing marsh, create additional wetlands, and restore barrier islands would potentially enhance suitable feeding and/or loafing habitat for pelicans by enhancing the stability of those areas and the aquatic life upon which pelicans feed.

5.1.3 Piping Plover

Wintering piping plovers arrive from the breeding grounds as early as late July. Piping plovers are dependent on a mosaic of habitat patches, and move among these patches depending on local weather and tidal conditions. Wintering plovers in Louisiana depart for the breeding grounds during late March and early April. By May, most birds have left the wintering grounds. Potential impacts to piping plovers would be temporary displacement due to construction activities during barrier island restoration projects. To avoid disturbance to piping plovers, projects could be scheduled to occur outside the wintering season, or potentially disturbing activities could be phased to occur along the mainland side of the island.

Potential impacts to piping plover critical habitat may occur during barrier island restoration or enhancement activities, or as a result of activities that change the hydrology and/or dynamics of the barrier island system. The proposed action is expected to enhance and prolong the life of existing barrier islands, as well as create new barriers or structures that would function to protect the barrier islands. Any impacts that would occur to existing designated critical habitat would be temporary, and would only impact a small amount of habitat relative to the available critical habitat along the Gulf coast. No permanent impacts to critical habitat that would change the ecological processes that maintain it are expected as a result of the proposed action.

5.2 FISH

5.2.1 Gulf Sturgeon

Potential impacts to the Gulf sturgeon may result from river and/or sediment delivery diversions from the Mississippi River into the Labranche wetlands (located at the southwest corner of Lake Pontchartrain) and the "Golden Triangle" wetlands (located at the intersection of the Mississippi River Gulf Outlet and the Intracoastal Waterway in Orleans and St. Bernard Parishes). Those wetland complexes would receive fresh water from the river, and the affected brackish marshes could convert to intermediate marsh as a result. The Gulf sturgeon is an anadromous fish and should not be adversely impacted by an increase in intermediate marsh or a decrease in brackish marsh. Gulf sturgeon spawn in freshwater areas before returning to estuarine and marine environments. Because the above-referenced habitat changes would only slightly alter the proportion of intermediate to brackish marsh in those areas, no impacts to Gulf sturgeon critical habitat are expected.

5.2.2 Pallid Sturgeon

Potential impacts to the pallid sturgeon may occur due to proposed river diversions of or modifications to the Mississippi River and Atchafalaya River flows. Impacts associated with those proposed activities include but are not limited to increased turbidity, re-suspension of contaminants, and physical disturbance associated with dredging or other project construction. A greater impact may result from the long-term habitat changes associated with construction of such projects. However, sturgeon are able to withstand habitat changes, provided that the affected aquatic habitat remains riverine (Gilbraith *et al.* 1988). The proposed action is not expected to change the hydrology or capacity of either the Mississippi or Atchafalaya Rivers since the diversions would mainly occur during high water levels.

The Corps has consulted with the USFWS on prior dredging activities conducted in 1991, 1992, 1993, 1994, and 1996, along the Mississippi River, and received concurrence that those activities were not likely to adversely affect the pallid sturgeon. Those proposed features involving dredging of sediment from the Mississippi River would be similar to projects conducted in the past. Pallid sturgeon, as well as their prey species, should be able to actively avoid dredging sites. The size and extent of the proposed action are minor in relation to the size of the river system, and many areas of refuge are available to the fish if needed. Currents in the area would quickly disperse suspended dredged material, returning turbidities to ambient levels. Benthic organisms capable of withstanding main channel conditions would quickly re-colonize the area (Johnson 1976). Any re-suspended contaminants would quickly be dispersed and diluted. Habitat loss in the Mississippi River would be almost negligible because of the minimal area affected. Therefore, no adverse impacts to the pallid sturgeon are expected from dredging activities.

Biological Assessments (BA) were prepared on March 14, 1991, and June 5, 1992, to address the impacts of river engineering works in the Mississippi and Atchafalaya Rivers, respectively, on Gulf and pallid sturgeon. A Corps-funded study addressing the habitat, movement, and reproduction status of pallid sturgeon in the Mississippi and Atchafalaya Rivers was completed in January 1997. Pallid sturgeon are bottom dwellers and are not likely to be pulled into freshwater diversion structures, which draw water from the upper portion of the water column. Based on the findings of the BA, the 1997 study, and review of recent sightings data, the proposed action is not expected to impact the pallid sturgeon or its habitat.

5.3 MAMMALS

5.3.1 Louisiana Black Bear

Portions of the Atchafalaya River Basin and coastal St. Mary and Iberia Parishes are occupied (i.e., inhabited by denning females) by the Louisiana black bear. Potential impacts to black bears may include destruction of den trees from construction activities (e.g., disposal of dredged material, construction of new channels, or diversions) within occupied black bear habitat and disturbance to pregnant females during the denning season. Impacts to den trees could be avoided by preventing the removal of candidate or actual den trees, which are protected under the ESA. Candidate den trees include bald cypress or tupelo gum with visible cavities, having a

diameter-at-breast height of 36 inches or greater, and occurring in or along rivers, lakes, streams, bayous, sloughs, or other water bodies. Within occupied bear habitat, impacts to pregnant females and/or females with cubs could be avoided by preventing construction activities during the denning season.

Bears may also be encountered outside the denning season when construction activities occur within occupied bear habitat. Bears will typically avoid humans; however, sightings of bears may occur with activities that encroach upon occupied habitat. Outside the denning season, disturbance by construction activities would only temporarily displace bears, and there is an abundance of suitable foraging habitat in surrounding areas. Because bears can become attracted and accustomed to human food, keeping work areas clean and providing personnel with appropriate bear-proof trash receptacles would help to minimize the risk of disturbance and/or confrontations. Based on the available information, activities associated with the proposed action are not expected to adversely affect black bears.

5.3.2 West Indian Manatee

Sightings of the West Indian manatee in Louisiana have occurred in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of Louisiana; however, there is no known population thriving in the State. Should any manatees be encountered during the proposed activities, an on-board observer would notify the proper personnel, and harmful activities (e.g., dredging) would be temporarily suspended until the animal(s) moves to safety. Furthermore, the disturbance to that species would only be temporary during project construction, and would result in temporary displacement. The manatees would likely move to another area for foraging or resting purposes, and there would be an abundance of available areas to which the animals may relocate.

5.4 REPTILES

5.4.1 Green Sea Turtle

Due to the lack of extensive seagrass beds in coastal Louisiana and the low incidence of sightings and strandings, impacts to the green sea turtle population as a result of any potential impacts from the proposed action are not expected.

5.4.2 Hawksbill Sea Turtle

The effects of any proposed action to hawksbill populations are likely to be negligible due to its rarity along the Louisiana coast.

5.4.3 Kemp's Ridley Sea Turtle

Potential impacts are not likely to include adverse effects on Kemp's ridley sea turtle populations. The proposed marsh creation features could provide more suitable inshore habitat (characterized by low salinity, and high turbidity and organic content, where shrimp and blue crabs are abundant) utilized by this species when foraging.

5.4.4 Leatherback Sea Turtle

Any potential project impact would have no effect on populations of the leatherback sea turtle. This species largely occupies oceanic water more than 50 meters in depth.

5.4.5 Loggerhead Sea Turtle

The restoration of the Terrebonne and Grand Isle barrier island chains would occur in Subprovinces 2 and 3 with the proposed action. Nesting loggerhead sea turtles have historically used barrier islands; however, it is doubtful that loggerhead sea turtles nest anywhere on the Louisiana coast. The restoration of barrier islands may or may not provide suitable nesting habitat, but suitable nesting habitat is nearly nonexistent due to the current degraded state of those islands. The proposed plans, therefore, would not negatively affect loggerheads, and may provide some benefit to the species by restoring nesting habitat.

6.0 SUMMARY OF DETERMINATIONS

The proposed LCA Restoration Plan would not be located within suitable habitat for the gopher tortoise, the inflated heelsplitter mussel, the Louisiana quillwort, the RCW, or the ringed sawback turtle, nor will it indirectly affect areas inhabited by those species. Hence, the proposed plan, would have no effect on those species.

6.1 BIRDS

Site-specific plans and construction activities could be designed to avoid potential impacts to bald eagles throughout the action area. By adhering to the primary activity exclusion zone and timing restrictions outlined in the Bald Eagle Recovery Plan (USFWS 1989), the USACE can avoid impacts to nest trees and breeding behaviors. Although data is not available at this time regarding effects on bald eagles from contaminants that may be associated with river and sediment diversions, the USACE would reinitiate consultation with the USFWS, if necessary, once those data are made available. Therefore, the proposed action is not likely to adversely affect the bald eagle.

Brown pelicans nest on barrier islands and feed in shallow estuarine waters, using sand pits and offshore sand bars as rest and roost areas. Any pelicans foraging or loafing within the proposed action area during project construction could easily relocate to other foraging areas in the vicinity. Potential impacts to nesting brown pelicans could be avoided by conducting activities outside the nesting season. Should the proposed activities occur during the nesting season, those activities could avoid impacting nesting pelicans by remaining outside 2,000 feet of nesting areas. Therefore, the proposed action is not likely to adversely affect the brown pelican.

Potential impacts to piping plovers could be avoided by conducting proposed construction activities outside the wintering season. If any proposed projects cannot be scheduled to take place outside the wintering season, piping plovers would be able to avoid areas of temporary disturbance as long as there are feeding and/or roosting areas available along the coast. Because any plovers remaining in the action area during construction would be temporarily displaced to

other suitable habitats in the vicinity, the proposed action is not likely to adversely affect the piping plover.

Potential impacts on piping plover critical habitat would be minimal and temporary during projects associated with barrier island enhancement or restoration. Although the proposed action may impact a barrier island designated as critical habitat, only a relatively small amount of habitat will be affected when compared to the amount of critical habitat available. In addition, most of the proposed barrier island restoration projects may possibly create new potentially suitable habitat (beach) for the piping plover on the Gulf side of the islands and prevent/reduce erosion of existing habitat in the vicinity. Therefore, the proposed action is not likely to adversely modify critical habitat for wintering piping plovers.

6.2 FISH

The Gulf sturgeon is an anadromous fish that spawns in fresh water and migrates to estuarine and marine waters. Potential impacts to the Gulf sturgeon would involve relatively slight changes in marsh habitats along the southwestern edge of Lake Pontchartrain and the western edge of Lake Borgne. Those changes would involve creation of more intermediate marsh and a reduction in brackish marsh; however, there is an abundance of brackish marsh in surrounding areas. Therefore, the proposed action is not likely to adversely affect the Gulf sturgeon, its spawning behavior, or its critical habitat.

There are ways, through timing and use of different types of dredges, to minimize impacts to the pallid sturgeon caused by dredging activities. The pallid sturgeon is not likely be affected by construction or operation of freshwater diversion structures along the Mississippi or Atchafalaya Rivers; the species is a bottom dweller and is not likely to be entrained into diversion structures. Furthermore, the Mississippi and Atchafalaya Rivers are large enough to provide an abundance of refuge areas for the fish during construction activities or operation of any proposed diversion structures. Therefore, the proposed action is not likely to adversely affect the pallid sturgeon.

6.3 MAMMALS

Several proposed activities could potentially occur within occupied bear habitat along the coast of Iberia and St. Mary Parishes; however, developing project plans and construction activities that avoid or minimize work in occupied habitat during the black bear denning season would avoid disturbing pregnant females and/or females with cubs. Outside the denning season, bear sightings may still occur when working in occupied habitat, but maintaining clean work sites and providing bear-proof trash receptacles for construction crews could minimize the risk of bear disturbance and conflicts. If sightings do occur, bears are likely to avoid humans, and would only be temporarily displaced by disturbance from construction activities. Habitat loss should be minimal, if any. Therefore, the proposed action is not likely to adversely affect the Louisiana black bear.

The West Indian manatee is known to occur periodically in the coastal waters of Louisiana. If a manatee were to stray into the project areas, it may be attracted to noise from any proposed activities. Consequently, an on-board observer would be present to alert the proper personnel,

and harmful activities (e.g., dredging) would be temporarily suspended until the animal can move to safety. Should a manatee be sighted within any work areas, the USFWS's Lafayette, Louisiana, Field Office would be contacted immediately. Therefore, the proposed action is not likely to adversely affect the West Indian manatee.

6.4 REPTILES

The proposed action would not disturb sea turtles, and is not likely to adversely affect green, hawksbill, Kemp's ridley, leatherback, or loggerhead sea turtle populations. Most of those species are either rare along the Louisiana Gulf coast or feed in nearby waters.

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APPENDIX B2

U.S. FISH AND WILDLIFE COORDINATION LETTER FOR THREATENED AND ENDANGERED SPECIES ACT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506
September 26, 2003

Colonel Peter J. Rowan
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Rowan:

The Corps of Engineers (Corps), in partnership with various other State, local, and Federal agencies and entities, is preparing a Programmatic Environmental Impact Statement (PEIS) on the Louisiana Coastal Area Comprehensive Coastwide Ecosystem Restoration Study (LCA). In response to a September 23, 2003, request from Mr. Bill Klein of your staff, the U.S. Fish and Wildlife Service (Service) is pleased to provide the following information regarding Federally listed threatened and endangered species, their critical habitat, and migratory birds that may be found in or near the LCA study area. This information will facilitate programmatic Section 7 consultation under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). In addition, we have also included information to facilitate compliance with the Migratory Bird Treaty Act (MBTA; 40 Stat. 755, as amended; 16 U.S.C. 703 et seq.).

ESA Information
Seventeen threatened or endangered species, including the Louisiana black bear, West Indian manatee, bald eagle, brown pelican, piping plover, red-cockaded woodpecker, gopher tortoise, ringed map turtle, 5 species of marine turtles, pallid sturgeon, Gulf sturgeon, inflated heelsplitter, and Louisiana quillwort, occur within the four subprovinces comprising the LCA study area. In addition, the Service has designated critical habitat for the piping plover and the Gulf sturgeon.

Following the conclusion of programmatic consultation on the LCA PEIS, the Service will continue to assist the Corps and other Federal agencies responsible for funding or implementing selected LCA projects and/or plans to ensure they will not jeopardize the continued existence of threatened and endangered species, or adversely modify their designated critical habitat. The required consultations will be accomplished on a project-by-project basis, and will build upon the programmatic consultation.

Louisiana Black Bear
The threatened Louisiana black bear (*Ursus americanus luteolus*) is primarily associated with forested wetlands; however, it utilizes a variety of habitat types, including marsh, spoil banks, and upland forests. Within forested wetlands, black bear habitat requirements include soft and hard mast for food, thick vegetation for escape cover, vegetated corridors for dispersal, large trees for den sites, and isolated areas for refuge from human disturbance. Remaining Louisiana

black bear populations occur in the Tensas River Basin, the Upper Atchafalaya River Basin, and coastal St. Mary and Iberia Parishes. The primary threats to that species are continued loss of bottomland hardwoods, fragmentation of remaining forested tracts, and human-caused mortality (e.g., illegal killing and accidental collisions with motor vehicles).

Louisiana black bears, particularly pregnant females, normally den from December through April. To further protect denning bears, the Service (through the final listing rule published on January 7, 1992, in Volume 57, No. 4 of the Federal Register) has extended legal protection to candidate or actual den trees. These are defined in the final listing rule as bald cypress (*Taxodium distichum*) and tupelo gum (*Nyssa* sp.) with visible cavities, having a diameter at breast height of 36 inches or greater, and occurring in or along rivers, lakes, streams, bayous, sloughs, or other water bodies. (Please note that additional information can be found at http://endangered.fws.gov.)

West Indian Manatee

Federally listed as endangered, West Indian manatees (*Trichechus manatus*) occasionally enter Lake Pontchartrain, Lake Maurepas, and their associated coastal waters and streams during the summer months (i.e., June through September). Manatees have also been reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of Louisiana. Should the proposed project involve activities in those areas during summer months, further consultation with this office will be necessary. Manatees have also been occasionally observed elsewhere along the Louisiana Gulf coast. They have declined in numbers due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution. Cold weather and outbreaks of red tide may also adversely affect these animals.

Bald Eagle

Federally listed as threatened, bald eagles (*Haliaeetus leucocephalus*) nest in Louisiana from October through mid-May. Eagles typically nest in bald cypress trees near fresh to intermediate marshes or open water in the southeastern Parishes. Areas with high numbers of nests include the Lake Verret Basin south to Houma, the southern marshes/ridge from Houma to Bayou Vista, the north shore of Lake Pontchartrain, and the Lake Salvador area. Eagles also winter and infrequently nest near large lakes in central and northern Louisiana. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (i.e., organochlorine pesticides and lead).

Brown Pelican

Federally listed as endangered, brown pelicans (*Pelecanus occidentalis*) are currently known to nest on Rabbit Island in Calcasieu Lake, Raccoon Point on Isles Dernieres, as well as Queen Bess Island, Plover Island (Baptiste Collette), Wine Island, and islands in the Chandeleur chain. Pelicans change nesting sites as habitat changes occur. Thus, pelicans may also be found nesting on mud lumps at the mouth of South Pass (Mississippi River Delta) and on small islands in St. Bernard Parish. In winter, spring, and summer, nests are built in mangrove trees or other shrubby vegetation, although occasional ground nesting may occur. Brown pelicans feed along the Louisiana coast in shallow estuarine waters, using sand spits and offshore sand bars as rest and roost areas. Major threats to this species include chemical pollutants, colony site erosion, disease, and human disturbance.

Piping Plover

Federally listed as threatened, the piping plover (*Charadrius melodus*), as well as its designated critical habitat, occur along the Louisiana coast. Piping plovers winter in Louisiana, and may be present for 8 to 10 months, arriving from the breeding grounds as early as late July and remaining until late March or April. Piping plovers feed extensively on intertidal beaches, mudflats, sand flats, algal flats, and wash-over passes with no, or very sparse, emergent vegetation; they also require unvegetated or sparsely vegetated areas for roosting. Roosting areas may have debris, detritus, or micro-topographic relief offering refuge to plovers from high winds and cold weather. In most areas, wintering piping plovers are dependant on a mosaic of sites distributed throughout the landscape, as the suitability of a particular site for foraging or roosting is dependent on local weather and tidal conditions. Plovers move among sites as environmental conditions change. Their designated critical habitat identifies specific areas that are essential to the conservation of the species. The primary constituent elements for piping plover wintering habitat are those habitat components that support foraging, roosting, and sheltering, and the physical features necessary for maintaining the natural processes that support those habitat components. Constituent elements are found in geologically dynamic coastal areas that contain intertidal beaches and flats (between annual low tide and annual high tide), and associated dune systems and flats above annual high tide. Important components (or primary constituent elements) of intertidal flats include sand and/or mud flats with no or very sparse emergent vegetation. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting plovers. Major threats to this species include the loss and degradation of habitat due to development, disturbance by humans and pets, and predation.

Red-cockaded Woodpecker

The endangered red-cockaded woodpecker (RCW, *Picoides borealis*) inhabits open, park-like stands of mature (i.e., greater than 60 years of age) pine trees containing little hardwood understory or midstory. RCWs can tolerate small numbers of overstory hardwoods or large midstory hardwoods at low densities found naturally in many southern pine forests, but they are not tolerant of dense hardwood midstories resulting from fire suppression. RCWs excavate roost and nest cavities in large living pines (i.e., 10 inches or greater in diameter at breast height). The cavity trees and the foraging area within 200 feet of those trees are known as a cluster. Foraging habitat is defined as pine and pine-hardwood (i.e., 50 percent or more of the dominant trees are pine trees) stands over 30 years of age that are located within one-half mile of the cluster.

Gopher Tortoise

The threatened gopher tortoise (*Gopherus polyphemus*) is associated with areas that have well-drained, sand or gravel soils appropriate for burrow establishment, ample sunlight for nesting, and understory vegetation suitable for foraging (i.e., grasses and forbs). Gopher tortoises prefer "open" longleaf pine-scrub oak communities that are thinned and burned every few years. They also inhabit existing maintained transmission rights-of-way within Washington, Tangipahoa, and St. Tammany Parishes. The gopher tortoise is the only native tortoise found in the southeastern United States. Habitat degradation (lack of thinning or burning on pine plantations) and conversion to agriculture or urbanization have contributed to the decline of that species. That

habitat decline has concentrated remaining gopher tortoise populations along pipeline and powerline rights-of-way within their range.

Ringed Map Turtle

The threatened ringed map (= sawback) turtle (*Graptemys oculifera*) is endemic to the Pearl River system. In Louisiana, it occurs in the Bogue Chitto River south of Franklinton, and the Pearl River north of Louisiana Highway 190 in St. Tammany and Washington Parishes. It is found in riverine habitats with moderate currents, channels wide enough to permit sunlight penetration for several hours each day, numerous logs for basking, and large, sandy banks, that are used for nesting. Habitat loss (loss of exposed sand bars, basking areas) and water quality degradation (which decreases food supply) have contributed to the decline of this species.

Sea Turtles

Five species of threatened (T) and endangered (E) sea turtles, including the Kemp's ridley sea turtle (*Lepidochelys kempii*; E), green sea turtle (*Chelonia mydas*; T), hawksbill sea turtle (*Eretmochelys imbricata*; E), leatherback sea turtle (*Dermochelys coriacea*; E), and loggerhead sea turtle (*Caretta caretta*; T), forage in the near-shore waters, bays and sounds of Louisiana. Of those species, the two most commonly encountered are the loggerhead and Kemp's ridley sea turtles. The National Marine Fisheries Service is responsible for aquatic marine threatened or endangered species. Eric Hawk (727/570-5312) in St. Petersburg, Florida, should be contacted for additional information concerning those species.

Pallid Sturgeon

The pallid sturgeon (*Scaphirhynchus albus*) is an endangered fish found in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the Old River Control Structure Complex); it is possibly found in the Red River as well. The pallid sturgeon is adapted to large, free-flowing, turbid rivers with a diverse assemblage of physical habitats that are in a constant state of change. Detailed habitat requirements of this fish are not known, but it is believed to spawn in Louisiana. Habitat loss through river channelization and dams has adversely affected this species throughout its range.

Gulf Sturgeon

The threatened Gulf sturgeon (*Acipenser oxyrhynchus desotoi*) is an anadromous fish that occurs in many rivers, streams, and estuarine waters along the northern Gulf Coast between the Atchafalaya River and the Suwannee River, Florida. In Louisiana, Gulf sturgeon have been reported at Rigolets Pass, the Amite River, rivers and lakes of the Lake Pontchartrain basin, and adjacent estuarine areas. Spawning occurs in coastal rivers between late winter and early spring (i.e., March to May). Adults and sub-adults may be found in those rivers and streams until November, and in estuarine or marine waters during the remainder of the year. Sturgeon less than two years old appear to remain in riverine habitats and estuarine areas throughout the year, rather than migrate to marine waters. Habitat alterations caused by water control structures that limit and prevent spawning, poor water quality, and over-fishing have negatively affected this species.

On March 19, 2003, the Fish and Wildlife Service and the National Marine Fisheries Service published a final rule in the Federal Register (Volume 68, No. 53) designating critical habitat for

the Gulf sturgeon in Louisiana, Mississippi, Alabama, and Florida. Portions of the Pearl River system, Lake Pontchartrain east of the Lake Pontchartrain Causeway, all of Little Lake, The Rigolets, Lake St. Catherine, and Lake Borgne within Louisiana were included in that designation. The primary constituent elements essential for the conservation of Gulf sturgeon are those habitat components that support feeding, resting, sheltering, reproduction, migration, and physical features necessary for maintaining the natural processes that support those habitat components; those elements should be considered when determining potential project impacts. The primary constituent elements for Gulf sturgeon critical habitat include:

- abundant prey items within riverine habitats for larval and juvenile life stages, and within estuarine and marine habitats for juvenile, subadult, and adult life stages;
- riverine spawning sites with suitable substrates for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone, or hard clay;
- riverine aggregation areas, also referred to as resting, holding and staging areas, used by adult, subadult, and/or juveniles, generally, but not always, located in holes below normal riverbed depths, believed necessary for minimizing energy expenditures during freshwater residency and possibly for osmoregulatory functions;
- a flow regime (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg fertilization, resting, and staging; and necessary for maintaining spawning sites in suitable condition for egg attachment, eggs sheltering, resting, and larvae staging;
- water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages;
- sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and
- safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g., a river unobstructed by a permanent structure, or a dammed river that still allows for passage).

Please be aware that the Fish and Wildlife Service is responsible for ESA consultations regarding the Gulf sturgeon and its critical habitat for activities in riverine units. The National Marine Fisheries Service is responsible for ESA consultation regarding the Gulf sturgeon and its critical habitat for Corps activities within estuarine units, and is responsible for all ESA consultations regarding Gulf sturgeon and its critical habitat for activities in marine units.

Inflated Heelsplitter

Federally listed as threatened, the inflated heelsplitter mussel (*Potamilis inflatus*) occurs in the Amite River (Louisiana [with one report in the Pearl River]) and the Tombigbee and Black Warrior Rivers (Alabama). In Louisiana, the mussel occurs between Louisiana Highway 37 and Louisiana Highway 42, with the highest concentrations between Grangeville and Port Vincent. This freshwater mussel is typically found in soft, stable substrates such as sand, mud, silt, and sandy gravel, in slow to moderate currents. Heelsplitter mussels are usually found in depositional pools below sand point bars, and in shallow pools between sandbars and river banks. Major threats to this species in the Amite River are the loss of habitat resulting from sand and gravel dredging, and channel modifications for flood control.

Louisiana Quillwort

Federally listed as an endangered plant species, the Louisiana quillwort (*Isoetes louisianensis*) grows on sand and gravel bars on the accreting sides of streams and moist overflow channels within riparian forest communities in Washington and St. Tammany Parishes, Louisiana. The Louisiana quillwort is a small, semi-aquatic, facultative evergreen plant with spirally arranged leaves (sporophylls) arising from a globose, two-lobed corm. The hollow leaves are transversely septate, and measure approximately 0.12 inch wide and up to 16 inches long. Major threats to this species are habitat loss through hydrologic modifications of stream habitat, and land use practices that significantly alter stream quality and hydrology. Apparently, it is dependent on a special hydrologic regime resulting from the presence of small springs scattered at the bases of banks or bluffs.

MBTA Information

Colonial nesting waterbirds are protected under the MBTA. Colonies that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries may also be present. That database is updated primarily by monitoring the colony sites that were previously surveyed during the 1980s. Until a new, comprehensive coast-wide survey is conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect individual proposed project areas for the presence of undocumented nesting colonies during the nesting season. To minimize disturbance to colonial nesting birds, the following restrictions on individual proposed projects should be observed:

1. For colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 feet of a rookery should be restricted to the non-nesting period (i.e., September 1 through February 15, depending on species present).

2. For colonies containing nesting gulls, terns, and/or black skimmers, all activity occurring within 650 feet of a rookery should be restricted to the non-nesting period (i.e., September 16 through April 1, depending on species present).

In addition, we recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and avoid impacting them during the breeding season.

We appreciate the Corps' continued cooperation in the conservation of threatened and endangered species and migratory birds. If your staff have any questions or need further information, please have them contact Brigette Firmin (337/291-3108) of this office.

Sincerely,

Russell C. Watson
Acting Supervisor
Louisiana Field Office

cc: NOAA Fisheries, St. Petersburg, FL
LDWF, Natural Heritage Program, Baton Rouge, LA

APPENDIX B3

NATIONAL MARINE FISHERIES SERVICE COORDINATION LETTERS FOR THREATENED AND ENDANGERED SPECIES ACT

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Dr. N.
St. Petersburg, FL 33702
(727) 570-5312, FAX 570-5517
http://caldera.sero.nmfs.gov

SEP 18 2003

F/SER3:EGH

Mr. William P. Klein, Jr., Ed.D.
U.S. Army Corps of Engineers
P.O. Box 60267, New Orleans, LA 70160-0267

Dear Dr. Klein:

This responds to your request for comments on the draft threatened and endangered species section for the Louisiana Coastal Assessment (LCA) Preliminary Environmental Impact Statement (PEIS) and the Programmatic Biological Assessment (PBA). On March 14, 2003, NOAA Fisheries' Protected Resources Division (PRD) staff biologist Katie Moore provided initial comments and information for the draft programmatic supplemental EIS for the LCA Comprehensive Coastwide Ecosytem Restoration Feasibility Study (PRD consultation number I/SER/2003/00060). The study objectives were to identify restoration projects that would result in sustaining a coastal ecosystem that supports and protects the environment, economy and culture of southern Louisiana. In e-mail correspondence on August 15, 2003, with David Bernhart of the PRD staff, you requested review of portions of the PBA, specifically, chapters 3 and 5, to ensure that the document clearly states what will be done by the LCA team to meet requirements of the Endangered Species Act (ESA).

NOAA Fisheries PRD concurs with the PAB's assessment that wetlands habitat restoration in coastal Louisiana will ultimately benefit listed species under NOAA Fisheries' purview. The restoration actions/alternatives proposed include combining a series of measures, ultimately aimed at habitat restoration, that would be expected to achieve one or more of the following objectives: minimize and/or control salinity changes, provide continuous re-introduction of fresh water, mimic historic hydrology, maximize Atchafalaya River inflow, build land through delta development, and maximize geomorphic features. Those measures would include projects such as, but not limited to, constructing river and/or sediment delivery diversions, maintaining land bridges, restoring barrier islands, rebuilding historic reefs, installing water control structures, creating marsh, and achieving beneficial use of dredged material. Detailed descriptions of the plan that best meets the objectives (PMBO) and its alternatives are found in Chapters 3 of the PBA (incorporated herein by reference); however, the site-specific locations of each recommended measure have not been identified.

The BA does a good job of discussing the ESA-listed species under NOAA Fisheries' purview that may be present in the action area. The PEIS notes that sea turtles would likely benefit from increases in available coastal wetland habitats, especially barrier island/shoreline habitats, and that Louisiana coastwide restoration would help moderate impacts to this species felt nationwide. The PEIS notes that general direct, indirect, and cumulative impacts would be further developed on a project-by-project basis. The PBA notes that sea turtles may be found in Louisiana coastal shorelines as well as in various coastal water and that the COE has a long history of dredging and dealing with and avoiding adverse impacts to sea turtles during dredging operations. In addition,

the PBA notes that the COE would maintain close coordination with NOAA Fisheries to avoid potential impacts to sea turtles during dredging operations.

Hopper dredging effects on sea turtles are currently considered, and takes authorized, in a 1995 Regional Biological Opinion (RBO) to the New Orleans (and Galveston) COE districts. The 1995 RBO will soon be superseded by a Gulf-wide RBO. The new RBO will consider the effects of hopper dredging and hopper-dredged material disposal on 1) sea turtles and 2) Gulf sturgeon; however, dredging/disposal effects on Gulf sturgeon critical habitat are not part of the RBO.

The COE should look closely at the potential effects to Gulf sturgeon and Gulf sturgeon critical habitat of the restoration projects when submitting them individually to PRD for review pursuant to section 7 of the ESA, particularly if dredging if involved. Dredging (hydraulic, hopper, clam shell, sidecast, etc.) may adversely affect Gulf sturgeon and Gulf sturgeon critical habitat. Dredging and/or disposal of dredged materials in Gulf sturgeon critical habitat, may require formal consultation with PRD. PRD notes that Subprovince 1 of the PBMO encompasses the coastal portion of the Pontchartarain Basin, Breton Sound basin, and the eastern half of the Mississippi River Delta; the eastern portion of Lake Pontchartrain is designated Gulf sturgeon critical habitat, and Gulf sturegon may occur as well in Subprovince 2 encompassing the deltaic plain between the Mississippi River and Bayour Lafourche, including the Bataria Basin and the western half of the Mississippi River Delta.

We note for the record that the Gulf sturgeon is jointly listed by both the U.S. Fish and Wildlife Service; its critical habitat is also jointly designated by both agencies (see page 9 of PBA).

While the PEIS generally considers all restoration projects it proposes as ultimately beneficial to ESA-listed species, and concludes that the actions if implemented are not likely to adversely affect listed species under NOAA Fisheries' purview, the PEIS does not grant approval for the implementation of any particular project at any specific site. Furthermore, PRD cannot evaluate site-specific actions for effects to threatened and endangered species and conclude section 7 consultation on them without knowing where, when, and how the actions will take place. However, since the final restoration projects selected are subject to New Orleans District Corps of Engineers (COE) permitting requirements before being implemented, section 7 consultation between the COE and NOAA Fisheries will be conducted at the time the project is presented to PRD for review.

We look forward to continued cooperation with the COE in conserving our endangered and threatened resources. If you have any questions regarding this ESA consultation, please contact Mr. David Bernhart, fishery biologist, at (727) 570-5779, or by e-mail at David.Bernhart@noaa.gov.

Sincerely,

Gerogia Cranmore.
Assistant Regional Administrator
for Protected Resources

Ref: I\SER\2003\00060; File: 1514-22 f.1. NOD; O:\section 7\informal\LCA-PEIS

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, FL 33702
(727) 570-5312, FAX 570-5517
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MAR 14 2003

F/SER3:KPB

Joy Merino
Coastal Ecologist
NOAA Fisheries
646 Cajundome Boulevard
Lafayette, LA 70506

Dear Ms. Merino:

We have received the draft documents for the Louisiana Coastal Area Comprehensive Coastwide Ecosystem Restoration Feasibility Study in development by the Army Corps of Engineers (COE) and Louisiana Department of Natural Resources (LA DNR) transmitted electronically on January 28, 2003. You have requested comments on any threatened and endangered species information while the restoration plan is being developed. Please refer to consultation number I/SER/2003/00060 in future correspondence on this project.

A list of federally-protected species under the jurisdiction of NOAA Fisheries for the state of Louisiana and guidelines for preparing a biological assessment are enclosed. Biological information on federally protected sea turtles, marine mammals, fishes, and other listed species can be found at the following website addresses:

- NOAA Fisheries Southeast Regional Office (http://caldera.sero.nmfs.gov/protect/protect.htm);
- NOAA Fisheries Office of Protected Resources (http://www.nmfs.noaa.gov/prot_res/prot_res.html);
- U.S. Fish and Wildlife Service (http://noflorida.fws.gov/SeaTurtles/seaturtle-info.htm);
- the Ocean Conservancy (http://www.cmc-ocean.org/main.php3);
- the Caribbean Conservation Corporation (http://www.cccturtle.org);
- Florida Fish and Wildlife Conservation Commission (http://floridaconservation.org/psm/turtles/turtle.htm);
- http://www.turtles.org; http://alabama.fws.gov/gs/; and
- http://obis.env.duke.edu/data/sp_profiles.php.

In addition, we request that you review the potential for your project to affect candidate species. Candidate species are species that are being considered for possible addition to the threatened and

endangered species list. Candidate species currently have no legal protection. The list of candidate species' listings is also enclosed.

Incidental takes of marine mammals are not authorized through the ESA section 7 process. If you believe that bottlenose dolphins may be present in the action area of the proposed project and injury or harassment may result, an incidental take authorization under Marine Mammal Protection Act (MMPA) Section 101 (a)(5) may be necessary. Species descriptions for bottlenose dolphins and any other cetaceans found in the action area of the proposed ecosystem restoration plan should be included in your species description and analysis of effects of the restoration activities on those species.

The action agency is also reminded that, in addition to its protected species/critical habitat consultation requirements with NOAA Fisheries pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NOAA Fisheries' Habitat Conservation Division (HCD) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act's requirements for essential fish habitat (EFH) consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NOAA Fisheries letterhead from HCD regarding their concerns and/or finalizing EFH consultation. Consultation is not complete until EFH and ESA concerns have been addressed to NOAA Fisheries' satisfaction.

If you have any questions about EFH consultation for this project, please contact Mr. Richard Hartman, at (225) 389-0508. We look forward to our continuing cooperation. If you have any questions regarding this letter, please contact Kyle Baker, fishery biologist, at the number above or via e-mail at Kyle.Baker@noaa.gov.

Sincerely,

Georgia Cranmore
Assistant Regional Administrator
for Protected Resources

cc: F/SER44 - Richard Hartman
COE - New Orleans District
File: 1514.22.F.1 LA
No. I/SER/2003/00060
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Louisiana List of Species Under the Jurisdiction of NOAA Fisheries

Listed Species	Scientific Name	Status	Date Listed
Marine Mammals			
blue whale	*Balaenoptera musculus*	Endangered	12/02/70
finback whale	*Balaenoptera physalus*	Endangered	12/02/70
humpback whale	*Megaptera novaeangliae*	Endangered	12/02/70
sei whale	*Balaenoptera borealis*	Endangered	12/02/70
sperm whale	*Physeter macrocephalus*	Endangered	12/02/70
Turtles			
green sea turtle	*Chelonia mydas*	Threatened(1)	07/28/78
hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	06/02/70
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered	12/02/70
leatherback sea turtle	*Dermochelys coriacea*	Endangered	06/02/70
loggerhead sea turtle	*Caretta caretta*	Threatened	07/28/78
Fish			
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened	09/30/91

Species Proposed for Listing
None

Designated Critical Habitat
None

Proposed Critical Habitat
Gulf Sturgeon (67 FR 39106)

Candidate Species(2) (64 FR 33466)	Scientific Name
dusky shark	*Carcharhinus obscurus*
sand tiger shark	*Odontaspis taurus*
night shark	*Carcharinus signatus*
speckled hind	*Epinephelus drummondhayi*
saltmarsh topminnow	*Fundulus jenkensi*
Jewfish	*Epinephelus itajara*
Warsaw grouper	*Epinephelus nigritus*

1. Green turtles are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

2. Candidate species are not protected under the Endangered Species Act, but concerns about their status indicate that they may warrant listing in the future.
Federal agencies and the public are encouraged to consider these species during project planning so that future listings may be avoided.

NOAA Fisheries
Recommendations for the Contents of
Biological Assessments and Biological Evaluations

When preparing a Biological Assessment (BA) or Biological Evaluation (BE), keep in mind that the people who read or review this document may not be familiar with the project area or what is proposed by the project. Therefore your BA or BE should present a clear line of reasoning that explains the proposed project and how you determined the effects of the project on each threatened or endangered species in the project area. Try to avoid technical jargon not readily understandable to people outside your agency or area of expertise. Remember, this is a **public document**. Some things to consider and, if appropriate, to include in your BA or BE follow.

1. What is the difference between a Biological Evaluation and a Biological Assessment?

By regulation, a Biological Assessment is prepared for "major construction activities" considered to be Federal actions significantly affecting the quality of the human environment as referred to in the National Environmental Policy Act of 1969 (NEPA) [(42 U.S.C. 4332(2)(C)]. A BA is required if listed species or critical habitat may be present in the action area. A BA also may be recommended for other activities to ensure the agency's early involvement and increase the chances for resolution during informal consultation. Recommended contents for a BA are described in 50 CFR §402.12(f).

Biological Evaluation is a generic term for all other types of analyses. Although agencies are not required to prepare a Biological Assessment for non-construction activities, if a listed species or critical habitat is likely to be affected, the agency must provide the Service with an evaluation on the likely effects of the action. Often this information is referred to as a BE. The Service uses this documentation along with any other available information to decide if concurrence with the agency's determination is warranted. Recommended contents are the same as for a BA, as referenced above.

The BAs and BEs should not be confused with Environmental Assessments (EA) or Environmental Impact Statements (EIS) which may be required for NEPA projects. These EAs and EISs are designed to provide an analysis of multiple possible alternative actions on a variety of environmental, cultural, and social resources, and often use different definitions or standards.

2. What are you proposing to do?

- Describe the project. A project description will vary, depending on the complexity of the project. For example, describing the placement and construction of a new microwave tower may be relatively simple, but describing an alternative for improving range management likely would be more detailed and complex. Include sketches if they will help others understand your proposed action and its relationship with the species' habitat.

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- How are you (or the project proponent) planning on carrying out the project? What tools or methods may be used? How will the site be accessed?

- Describe the project area. Always include a map (topographic maps are particularly helpful). Provide photographs including aerials, if available. Describe the project area (i.e., topography, vegetation, condition/trend).

- Describe current management or activities relevant to the project area. How will your project change the area?

- Supporting documents are very helpful. If you have a mining plan, research proposal, NEPA or other planning document or any other documents regarding the project, attach them to the BA or BE.

3. What threatened or endangered species may occur in the project area?

A request for a species list may be submitted to the Service, or the Federal action agency or its designated representative may develop the list. If you have information to develop your own lists, the Service should be contacted periodically to ensure that changes in species' status or additions/deletions to the list are included. Sources of information include, but are not limited to, the Forest Service or Bureau of Land Management, this office for marine species, members of the public or academic community, and books and various informational booklets. Due to budget constraints and staff shortages, we are only able to provide general, state-wide, or country-wide (territory-wide) species lists.

Use your familiarity with the project area when you develop your species lists. Sometimes a species may occur in the larger regional area near your project, but the habitat necessary to support the species is not in the project area (including areas that may be beyond the immediate project boundaries, but within the area of influence of the project). If, for example, you know that the specific habitat type used by a species does not occur in the project area, it does not need to appear on the species list for the project. However, documentation of your reasoning is helpful for Service biologists or anyone else that may review the document.

4. Have you surveyed for species that are known to occur or have potential habitat in the proposed project area?

The "not known to occur here" approach is a common flaw in many BA/BEs. The operative word here is "known." Unless adequate surveys have been conducted or adequate information sources have been referenced, this statement is difficult to interpret. It begs the questions "Have you looked?" and "How have you looked?" Always reference your information sources.

Include a clear description of your survey methods so the reader can have confidence in your results. Answer such questions as:

- How intensive was the survey? Did you look for suitable habitat or did you look for individuals? Did the survey cover the entire project area or only part of it? Include maps of areas surveyed if appropriate.

- Who did the surveys and when? Was the survey done during the time of year/day when the plant is growing or when the animal can be found (its active period)? Did the survey follow accepted protocols?

- If you are not sure how to do a good survey for the species, the Service recommends contacting species experts. Specialized training is required before you can obtain a permit to survey for some species.

- *Remember that your evaluation of potential impacts from a project does not end if the species is/are not found in the project area. You must still evaluate what effects would be expected to the habitat, even if it is not known to be occupied.*

5. Provide background information on the threatened or endangered species in the project area.

Describe the species in terms of overall range and population status. How many populations are known? How many occur in the project area? What part of the population will be affected by this project? Will the population's viability be affected? What is the current habitat condition and population size and status? Describe related items of past management for the species, such as stocking programs, habitat improvements, or loss of habitat or individuals caused by previous projects.

6. How will the project affect the threatened or endangered species or critical habitat that occurs in the project area?

- If you believe the project will not affect the species, explain why.

- If you think the project may affect the species, explain what the effects might be. The Endangered Species Act requires you consider <u>all</u> effects when determining if an action funded, permitted, or carried out by a Federal agency may affect listed species. Effects you must consider include direct, indirect, and cumulative effects. Effects include those caused by interrelated and interdependent actions, not just the proposed action. Direct effects are those caused by the action and occur at the same time and place as the action. Indirect effects are caused by the action and are later in time but are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no significant independent utility apart from the action under consideration. Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal actions

subject to consultation.

- Describe measures taken to avoid, reduce, or eliminate adverse effects or enhance beneficial effects to the species. Refer to conversations you had with species experts to achieve these results.

- Consider recovery potential if the project area contains historic range for a species.

- Evaluate designated critical habitat areas by reviewing the physical or biological features essential to the conservation of the species. *Even if no critical habitat has been designated for a species, the evaluation of the project effects must include effects to the habitat, not just the species.*

7. What is your decision? The Federal action agency must make a determination of effect.

Quite frequently, effect determinations are not necessarily *wrong;* they simply are not justified in the assessment. The assessment should lead the reviewer through a discussion of effects to a logical, well-supported conclusion. Do not assume that the Service biologist is familiar with the project and/or its location and that there is no need to fully explain the impact the project may have on listed species. If there is little or no connection or rationale provided to lead the reader from the project description to the effect determination, we cannot assume conditions that are not presented in the assessment. Decisions must be justified biologically. The responsibility for making the determination of effect falls on the Federal action agency; however, the Service may ask the agency to revisit its decision or provide more data if the conclusion is not adequately supported by biological information.

You have three choices for each listed species or area of critical habitat:

1. "No effect" means there are absolutely no effects of the project, positive or negative. "No effect" does not include a *small* effect or an effect that is *unlikely* to occur. If effects are insignificant (in size) or discountable (extremely unlikely), a "may affect, but not likely to adversely affect" determination is appropriate.

2. "May affect - is not likely to adversely affect" means that all effects are beneficial, insignificant, or discountable. Beneficial effects have concurrent positive effects without any adverse effects to the species or habitat (i.e., there can not be "balancing," wherein the benefits of the project would be expected to outweigh the adverse effects - see #3 below). Insignificant effects relate to the size of the impact (and should not reach the scale where take occurs). Discountable effects are those extremely unlikely to occur. These determinations require **written** concurrence from the Service. Based on best judgement, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

3. "May affect - is likely to adversely affect" means that all adverse effects can not be avoided. A combination of beneficial and adverse effects is still "likely to adversely affect," even if the net effect is neutral or positive. Adverse effects do not qualify as discountable simply because we are not certain they will occur. The probability of occurrence must be extremely small to achieve discountability. Likewise, adverse effects do not meet the definition of insignificant because they are less than major. If the adverse effect can be detected in any way or if it can be meaningfully articulated in a discussion of the results, then it is not insignificant, it is likely to adversely affect. This requires formal consultation with the Service.

A fourth finding is possible for proposed species or proposed critical habitat:

4. "Is likely to jeopardize/adversely modify proposed species/critical habitat" is the appropriate conclusion when the action agency identifies situations in which the proposed action is likely to jeopardize the proposed species, or destroy or adversely modify the proposed critical habitat. If this conclusion is reached, conference is required.

List the species experts you contacted when preparing the BE or BA but avoid statements that place the responsibility for the decision of "may affect" or "no effect" on the shoulders of the species experts. Remember, this decision is made by the Federal action agency.

Provide supporting documentation, especially any agency reports or data that may not be available to the Service. Include a list of literature cited.

Prepared by:
U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
January 1997

Revised by:
U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuña NE
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(505) 761-4525
April 1997

Revised by:
National Marine Fisheries Service
Southeast Regional Office
Protected Resources Division
9721 Executive Center Dr. N.
St. Petersburg, FL 33702

(727) 570-5312
November 1998

OUTLINE EXAMPLE
FOR A
BIOLOGICAL ASSESSMENT OR BIOLOGICAL EVALUATION

A. Cover Letter - **VERY IMPORTANT** - Include purpose of consultation, project title, and consultation number (if available). A determination needs to be made for each species. You have three options: 1) a "no effect" determination; 2) requesting concurrence with an "is not likely to adversely affect" determination; 3) a "may affect, is likely to adversely affect" determination, and a request for formal consultation. If proposed species or critical habitat are included, state whether the project is likely to result in jeopardy to proposed species, or the destruction or adverse modification of proposed critical habitat.

B. Project Description - Describe the proposed action and the project area. Be specific and quantify whenever possible.

C. For Each Species
1. Description of affected environment (quantify whenever possible)
2. Description of species biology
3. Describe current conditions for each species
   a. Rangewide
   b. In project area
   c. Cumulative effects of State and private actions in project area
   d. Other consultations of Federal action agency in area to date
4. Describe critical habitat (if applicable)
5. Describe effects of proposed action on each species and/or critical habitat.
   a. Direct
   b. Indirect
   c. Interrelated and interdependent actions
   d. Incidental take

D. Conservation Measures (protective measures to minimize effects for each species)

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APPENDIX B4

U.S. FISH AND WILDLIFE COORDINATION ACT REPORT

LCA Comprehensive Study

LOUISIANA COASTAL AREA
LOUISIANA - COMPREHENSIVE COASTWIDE ECOSYSTEM RESTORATION STUDY

DRAFT
FISH AND WILDLIFE COORDINATION ACT REPORT

SUBMITTED TO
NEW ORLEANS DISTRICT
CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY
RONNY PAILLE, SENIOR FIELD BIOLOGIST

U.S. FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES

LAFAYETTE, LOUISIANA

SEPTEMBER 2003

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DRAFT
FISH AND WILDLIFE COORDINATION ACT REPORT

PROVIDED TO
NEW ORLEANS DISTRICT
U.S. ARMY, CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY
RONNY PAILLE, SENIOR FIELD BIOLOGIST
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ECOLOGICAL SERVICES
LAFAYETTE, LOUISIANA

SEPTEMBER 2003

EXECUTIVE SUMMARY

The U.S. Fish and Wildlife Service (Service) has prepared the following Draft Fish and Wildlife Coordination Act Report on the alternative plans evaluated in the Draft Louisiana Coastal Area (LCA) Comprehensive Coastwide Ecosystem Restoration Study Report. The purpose of that study is to ". . . to determine the feasibility of sustaining a coastal ecosystem that supports and protects the environment, economy and culture of southern Louisiana and that contributes greatly to the economy and well being of the nation." The LCA Comprehensive Study is a critically important component of the cooperative Federal-State effort to address the loss of Louisiana's coastal wetlands.

The study area includes all of Louisiana's coastal wetlands and supports nationally important fish and wildlife resources. Those wetlands are currently being lost at an average rate of approximately 24 square miles per year due to a variety of causes. Through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), the Corps, the Service, and other Federal and State agencies have worked together to develop and evaluate plans to protect and restore Louisiana's rapidly disappearing coastal wetlands. This study is a further development of the Coast 2050 Plan (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority 1998) developed by the above-mentioned agencies to identify comprehensive strategies for addressing the State's coastal wetland loss problems.

Within each of Louisiana's four coastal subprovinces, restoration projects were grouped into alternatives that would achieve varying levels of benefits, from reducing the rate of wetland loss to producing net wetland gains. Of the many initial alternatives, seven coastwide plans were selected for additional study. Each of those plans consist of numerous projects, including the introduction of flows from the Mississippi River and, to a lesser extent, the Atchafalaya River.

Under the No Action Plan, approximately 463,000 acres of Louisiana's coastal wetlands would be lost during the 50-year evaluation period. According to current estimates developed for the LCA study, the implementation of Plan 7002 would yield a net wetland gain of more than 114,000 acres during the same 50-year period. Plan 5610 would essentially achieve no net wetland loss. The remaining action plan alternatives would reduce future wetland losses and, by year 50, would save roughly 365,000 to 430,000 acres, compared to the No Action Plan.

It must be noted that the analyses and findings in the Service's report are of an interim nature, due to current technical limitations in various habitat models and salinity calculations. The Service will continue working closely with the LCA Modeling Team to further refine those models and reduce the current degree of risk and uncertainty associated with their outputs.

Interim benefits for each of the alternatives were determined for the 10 coastal fish and wildlife species and expressed in average annual habitat units (AAHU). Species which utilize fresh or intermediate marshes during all or part of their lives generally would benefit from implementation of the action plan alternatives compared to the No Action Plan. The American alligator and dabbling ducks would receive the greatest benefits. Habitat quality for mink, river otter, Atlantic croaker, and white shrimp would increase under all the action plan alternatives.

Habitat quality for species which utilize brackish marsh would decrease by varying amounts. For muskrat, Gulf menhaden, and spotted seatrout, habitat values would decrease under all action plan alternatives, except under Plan 7002, where those species would also experience AAHU increases. For brown shrimp, all action plans would result in a net coastwide reduction in habitat quality, with the least impact occurring under Plan 7002.

Many other species of fish and wildlife which utilize Louisiana's coastal wetlands would benefit from the restoration actions proposed under the action plan alternatives. The Service believes that implementation of any of the proposed action plan alternatives would result in major benefits to nationally significant fish and wildlife resources which are threatened by the continuing, severe loss of the Louisiana coastal wetlands. Consequently, the Service would support implementation of any of the proposed action plans.

According to the present interim evaluation results, however, only Plan 7002 would reverse the severe loss of Louisiana's coastal wetlands. It would also provide the greatest level of benefits to Louisiana's nationally significant fish and wildlife resources. Consequently, we currently favor implementation of that plan. However, Plan 7002 includes very expensive and highly complex projects, such as the large-scale diversion of Mississippi River water into the Barataria and Terrebonne Basins known as the "Third Delta;" hence, the benefits associated with that plan may not ultimately be achievable and/or affordable. As Plan 5610 is presently the second-most beneficial plan, we would favor its implementation in lieu of Plan 7002 if the latter is found to be infeasible.

Regardless of the alternative that is ultimately identified for implementation, should the "Third Delta" diversion project not be included, the Service recommends that the Subprovince 3 benefits lost through elimination of that project be replaced to the greatest extent possible through the comprehensive implementation of features and projects designed to maximize Atchafalaya River flows/influence in the Atchafalaya and Terrebonne Basins. The proposed restoration of the reefs extending from Point au Fer Island to the southern end of the Point Chevreuil reef would greatly enhance land-building in the Atchafalaya Delta and increase riverine influences in western Terrebonne Basin marshes. Because that reef restoration project is believed to be one of the most beneficial features of that strategy, the Service recommends that it be made part of any preferred implementation alternative that may be designated in the future. Similarly, the Service recommends the following modifications be incorporated in any plan ultimately selected for implementation:

1. Install a new Calcasieu Lock and use of the old lock for improved management of water levels in the Lakes Subbasin, and for moderating salinity levels in the Calcasieu Basin.

2. Delete the proposed Gulf Intracoastal Lock at the Alkali Ditch, as many of the wetlands intended to be benefitted by that feature have already been lost and others are now protected by other means.

3. Sufficient funding should be provided for full Service participation throughout post-authorization engineering and design studies, and to facilitate fulfillment of

its responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act.

4. The Corps should obtain a right-of-way from the Service prior to conducting any work on a National Wildlife Refuge, in conformance with Section 29.21-1, Title 50, Right-of-way Regulations. Issuance of a right-of-way will be contingent on a determination by the Service's Regional Director that the proposed work will be compatible with the purposes for which the Refuge was established.

To ensure that optimum fish and wildlife resource benefits are achieved, the Service plans to remain actively involved throughout the plan implementation process. Our findings and recommendations on the design and operation of projects approved for implementation will be provided under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). This report is provided in accordance with, but does not entirely fulfill the requirements of, Section 2 (b) of that Act.

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INTRODUCTION

The Louisiana Coastal Area, Louisiana - Comprehensive Coastwide Ecosystem Restoration Study Draft Report (DLCAR) has been prepared by the New Orleans District Corps of Engineers, Louisiana Department of Natural Resources, and other State and Federal natural resource agencies, with the assistance of scientists from several institutions. The DLCAR is envisioned as the vehicle for building a comprehensive array of projects to implement the most effective coastal wetland restoration and conservation strategies that were identified in the Coast 2050 Plan, which was prepared by the Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetland Conservation and Restoration Authority. The Louisiana Coastal Area (LCA) study was authorized by Resolutions adopted by the U.S. House of Representatives and Senate Committees on Public Works, on October 19, 1967, and April 19, 1967, respectively, seeking to improve existing hurricane protection features and the ". . . prevention of saltwater intrusion, preservation of fish and wildlife, prevention of erosion, and related water resource purposes."

Louisiana's 3.67 million acres of coastal wetlands and their associated waters are of national importance to fish and wildlife resources. Coastal Louisiana contains an estimated 45 percent of the tidal marshes in the conterminous United States. Those wetlands and associated shallow waters provide essential habitat to a diverse and abundant assemblage of fish and wildlife.

The coastal wetlands of Louisiana produce the largest commercial fish and shellfish harvest in the lower 48 States. More than 1.1 billion pounds of fish and shellfish (including shrimp, crabs, crawfish, and oysters) are harvested annually in coastal Louisiana. That harvest is nearly twice as much as in any other state and was valued at more than $400 million in 2000 (Louisiana Coastal Wetlands Conservation and Restoration Task Force 2001).

Recreational saltwater anglers spend approximately $245 million annually to fish for spotted seatrout, red drum, snapper, tuna and other species (Louisiana Coastal Wetlands Conservation and Restoration Task Force 2001). Fresh and low-salinity coastal wetlands also provide important habitat for numerous freshwater sport fishes, the pursuit of which is also an important recreational activity in the coastal areas.

Louisiana's coastal marshes provide winter habitat for more than 50 percent of the duck population of the Mississippi Flyway, an estimated 20 percent of North America's puddle duck population, and large concentrations of diving ducks. Those wetlands are vitally important to the habitat mission of the Gulf Coast Joint Venture, which was established to help achieve the goals of the North American Waterfowl Management Plan. Fresh and intermediate marshes support the greatest concentrations of wintering waterfowl in coastal Louisiana.

Louisiana's coastal marshes, swamps, and associated habitats also support many other migratory birds, such as rails, gallinules, shorebirds, seabirds, wading birds, and numerous songbirds. More than 196 nesting colonies of wading birds, shorebirds, and seabirds (representing 27 species and more than 430,000 nesting pairs) were observed in coastal Louisiana during a 1990 survey conducted by the Louisiana Department of Wildlife and Fisheries. The cheniers and

natural levee forests of coastal Louisiana provide essential stop-over habitat to numerous neotropical migratory passerine birds.

Coastal Louisiana has long been a leading fur-producing area in North America. Common fur-bearers in that area include nutria, mink, muskrat, raccoon, and river otter. Those coastal marshes and swamps also support game animals such as white-tailed deer and swamp rabbit. That area also supports 1.5 million alligators, and closely regulated sport and commercial hunting for that species.

DESCRIPTION OF THE STUDY AREA

The study area encompasses all of Louisiana's coastal wetlands, which include cypress-tupelo swamp, natural levee forest, fresh marsh, intermediate marsh, brackish marsh, saline marsh, and barrier islands. The study area is divided into four subprovinces, each of which include one or more coastal watersheds having similar hydrologic characteristics. The LCA Subprovinces are very similar to those identified under the Coast 2050 Plan, except that the boundary between Subprovinces 1 and 2 has been relocated from the Mississippi River-Gulf Outlet to the Mississippi River under the LCA.

Subprovince 1 consists of all coastal wetlands east of the Mississippi River (and South Pass) and includes the Pontchartrain and Breton Sound Basins. Subprovince 2 consists of the coastal wetlands located between the Mississippi River and Bayou Lafourche (i.e., the Barataria Basin). Subprovince 3 extends from Bayou Lafourche westward to the Freshwater Bayou Channel and includes the Terrebonne, Atchafalaya, and Teche/Vermilion Basins. Subprovince 4 extends from the Freshwater Bayou Channel westward to the Louisiana State line (i.e., the Sabine River/Sabine Lake) and includes the Mermentau and Calcasieu/Sabine Basins.

FISH AND WILDLIFE CONCERNS IN THE STUDY AREA

The foremost study-area concern is the rapid deterioration and loss of coastal wetlands. During the 1900s, coastal Louisiana lost approximately 1.2 million acres of its coastal wetlands. Coastwide loss rates were approximately 44 square miles per year during the 1956 to 1978 period, and averaged nearly 24 square miles per year between 1990 and 2000. Large areas of fresh marsh and swamp have either converted to open water or to more brackish wetland types.

To address this serious problem, a number of coastal wetland restoration projects have been constructed and/or authorized for construction throughout coastal Louisiana. Those projects are being funded via the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), and two large freshwater introduction projects (Davis Pond and Caernarvon) have been implemented by the Corps of Engineers under other authorities. Those efforts, though, will address less than one third of the 448,000-acre wetland loss projected to occur by the year 2050. That continuing loss of coastal wetlands and associated habitats threatens the nationally significant fish and wildlife resources that depend on them.

EVALUATION METHODOLOGY

A team of scientists led by Dr. Robert Twilley of the University of Louisiana at Lafayette (i.e., the LCA Modeling Team) is assisting in the development and evaluation of restoration alternatives for the LCA. That team has developed a comprehensive modeling approach which utilizes numerical modeling and coarser-scale "desktop" modeling to forecast wetland conditions under future without-project (FWOP) and alternative future with-project (FWP) scenarios. Their approach includes the use of hydrodynamic, ecological, and water quality simulation models to predict hydroperiod, salinity, and sediment distribution. The desktop modeling involves the development of a set of modules to convert numerical modeling results into landscape and ecological responses (e.g., acres of wetlands created). Outputs from the numerical models are utilized in the desktop models at different time intervals and spatial scales to predict habitat change, habitat loss, salinity, and a host of other pertinent variables. Desktop modules developed for this study include 1) Land-Building, 2) Habitat Switching, 3) Water Quality, and 4) Habitat Use.

The Habitat Use module provides a methodology for estimating the impacts of restoration alternatives on fish and wildlife resources. That methodology is very similar to the Habitat Evaluation Procedures (HEP) developed by the Service. The LCA Modeling Team selected 12 representative species/species groups of fish, shellfish, and wildlife for evaluation. Those species/species groups include white shrimp, brown shrimp, American oyster, Gulf menhaden, spotted seatrout, Atlantic croaker, largemouth bass, American alligator, muskrat, mink, river otter, and dabbling ducks. The LCA Modeling Team modified the Service's published Habitat Suitability Index (HSI) models for the fish and shellfish species to include only those variables for which output would be available from numerical or other desktop models. Variables retained for those species included salinity, temperature, water depth, and percent wetland area. Models for the wildlife species were developed with methods similar to those used for the fish and shellfish models. All of the wildlife models utilized three variables, i.e., habitat type, percent wetland area, and water depth.

Originally, the Service intended to use the Habitat Use module outputs (see the LCA draft Report, Appendix A) to determine project-related impacts to fish and wildlife resources in the study area. Several inconsistencies and problems were noted, however, when comparing outputs among the proposed restoration alternatives and across the four coastal Subprovinces. Of particular concern were the projected increases in habitat values for most of the evaluation species under the No Action Plan, and the inverse relationship between wetland-dependent wildlife benefits and increases in their preferred habitats under some scenarios. The Service, therefore, decided to use an interim assessment methodology, until the LCA numerical and desktop models are further refined to more accurately project impacts to fish and wildlife resources. The Service fully intends to continue assisting the LCA Modeling Team and the other involved agencies in the ongoing effort to refine model outputs.

To determine impacts of the FWOP and FWP alternative plans on fish and wildlife resources, the Service used a modification of the HEP. Biologists with the Corps, LDWF, NMFS, and the Service selected 10 of the 12 evaluation species utilized in the Habitat Use module. The species

selected represent fish and wildlife resources which utilize coastal wetland habitats, from swamp to saline marsh. Estuarine-dependent species selected for evaluation include Atlantic croaker, spotted seatrout, Gulf menhaden, brown shrimp, and white shrimp. Wildlife species selected for evaluation include mink, river otter, muskrat, American alligator, and dabbling ducks. The

largemouth bass was not selected as an evaluation species because its HSI model is primarily used for lacustrine and riverine habitats, rather than estuarine habitats. In addition, largemouth bass prefer low-salinity habitats such as fresh and intermediate marsh; thus, impacts to that species could be inferred from impacts to other low-salinity species (e.g., dabbling ducks and American alligator). The American oyster was not selected as an evaluation species because it is not impacted by the quality of emergent wetland habitat. Habitat suitability for each of the selected species is dependent on habitat conditions.

To determine impacts on each evaluation species/species group, the Service incorporated changes in habitat types and wetland acreage projected by the LCA numerical and desktop models; we also incorporated an HSI into the HEP methodology for each species/species group within each wetland type to determine impacts in terms of net Average Annual Habitat Units (AAHUs). To derive AAHUs, a species' HSI for a specific habitat type is multiplied by the acreage of that habitat type to obtain Habitat Units, which are annualized over the evaluation period (i.e., 50 years). Net AAHUs represent the difference in AAHUs between the action plan alternative (i.e., FWP conditions) and the No Action Plan (i.e., FWOP conditions).

Because the models used to project future habitat types assigned a single average salinity value to a very large area or "salinity box," salinities are essentially averaged across those areas. In some cases, this has eliminated actual salinity gradients and caused unrealistic shifts in projected salinities (those shifts appear at target year 10, the first projection). Lacking a better method for projecting future habitat-type changes, however, the Service has decided to use the existing habitat type data until the methodology can be improved. Because the plan evaluation and selection process is continuing, the preliminary benefit estimates presented in this evaluation should therefore be viewed as interim values, subject to a considerable degree of risk, uncertainty, and future refinement.

HSI values for each wetland type were derived for the selected wildlife species using the wetland type-habitat suitability relationships found in the LCA Habitat Use module. For the estuarine-dependent fish and shellfish species, HSI values by wetland type, were provided by the National Marine Fisheries Service, utilizing the published salinity-habitat suitability relationships found in each species' HSI model. Those HSI values for each evaluation species, by wetland type, are displayed in Table 1.

Table 1. HSI values for each evaluation species by wetland type

Evaluation Species	Swamp	Fresh Marsh	Intermediate Marsh	Brackish Marsh	Saline Marsh
Atlantic Croaker	0.00	0.40	0.80	1.00	0.60
Spotted Seatrout	0.00	0.10	0.20	0.50	0.90
Gulf Menhaden	0.00	0.20	0.40	0.60	0.90
Brown Shrimp	0.00	0.10	0.30	0.80	1.00
White Shrimp	0.00	0.20	1.00	1.00	0.70
Mink	0.68	0.40	0.29	0.24	0.00
River Otter	0.68	0.39	0.67	1.00	0.00
Muskrat	0.04	0.21	0.11	1.00	0.43
American Alligator	0.26	0.55	1.00	0.55	0.00
Dabbling Ducks	0.66	1.00	0.69	0.66	0.08

EXISTING FISH AND WILDLIFE RESOURCES

Description of Habitats

Forested Wetlands - Forested wetlands in the study area were divided into two major types; i.e., bottomland hardwood forests and cypress-tupelo swamps. Bottomland hardwood forests found in coastal portions of the project area occur primarily on the natural levees of distributary channels. Dominant vegetation may include sugarberry, water oak, live oak, bitter pecan, black willow, American elm, Drummond red maple, Chinese tallow-tree, boxelder, green ash, baldcypress, and elderberry. Cypress-tupelo swamps are located along the flanks of larger distributary ridges as a transition zone between bottomland hardwoods and lower-elevation marsh or scrub-shrub habitats. Cypress-tupelo swamps exist where there is little or no salinity and usually minimal daily tidal action.

Scrub-Shrub - Scrub-shrub habitat is often found along the flanks of distributary ridges. Typically it is bordered by marsh at lower elevations and by developed areas, cypress-tupelo swamp, or bottomland hardwoods at higher elevations. Typical scrub-shrub vegetation includes elderberry, wax myrtle, buttonbush, black willow, Drummond red maple, Chinese tallow-tree, and groundselbush.

Fresh Marsh - Fresh marshes occur at the upper ends of interdistributary basins and are often characterized by floating or semi-floating organic soils. Most fresh marshes exhibit minimal daily tidal action; however, fresh marshes in the Atchafalaya River delta and adjacent to Atchafalaya Bay are the exceptions. Vegetation may include maidencane, bulltongue, cattail, California bulrush, pennywort, giant cutgrass, American cupscale, spikerushes, bacopa, and alligatorweed. Associated open water habitats may often support extensive beds of floating-

leafed and submerged aquatic vegetation including water hyacinth, Salvinia, duckweeds, American lotus, white water lily, water lettuce, coontail, Eurasian milfoil, hydrilla, pondweeds, naiads, fanwort, wild celery, water stargrass, elodea, and others.

Intermediate Marsh - Intermediate marshes are a transitional zone between fresh and brackish marshes and are often characterized by organic, semi-floating soils. Typically, intermediate marshes experience low levels of daily tidal action. Salinities are negligible or low throughout much of the year, with salinity peaks occurring during late summer and fall. Vegetation includes saltmeadow cordgrass, deer pea, three-cornered grass, cattail, bulltongue, California bulrush, seashore paspalum, wild millet, fall panicum, and bacopa. Ponds and lakes within the intermediate marsh zone often support extensive submerged aquatic vegetation including southern naiad, Eurasian milfoil, and wigeongrass.

Brackish Marsh - Brackish marshes are characterized by low to moderate daily tidal energy and by soils ranging from firm mineral soils to organic semi-floating soils. Freshwater conditions may prevail for several months during early spring; however, low to moderate salinities occur during much of the year, with peak salinities in the late summer or fall. Vegetation is usually dominated by saltmeadow cordgrass, but also includes saltgrass, three-cornered grass, leafy three-square, and deer pea. Shallow brackish marsh ponds occasionally support abundant beds of wigeongrass.

Saline Marsh - Saline marshes occur along the southern fringe of the coastal wetlands. Those marshes usually exhibit fairly firm mineral soils and experience moderate to high daily tidal energy. Vegetation is dominated by saltmarsh cordgrass but may also include saltgrass, saltmeadow cordgrass, black needlerush, and leafy three-square. Submerged aquatic vegetation is rare. Within the study area, intertidal mud flats are most common in saline marshes.

Ponds and Lakes - Natural marsh ponds and lakes, interspersed throughout the coastal wetlands, are typically shallow, ranging in depth from 6 inches to more than 2 feet. Typically, the smaller ponds are shallow and the larger lakes are deeper. In fresh and low-salinity areas, ponds and lakes may support varying amounts of submerged and/or floating-leaved aquatic vegetation. Brackish and, much less frequently, saline marsh ponds and lakes may support wigeongrass beds.

Canals and Bayous - Canals and larger bayous typically range in depth from 4 or 5 feet, to more than 15 feet. Strong tidal flows may occur at times through those waterways, especially where they provide hydrologic connections to other large waterbodies. Such canals and bayous may have mud or clay bottoms that range from soft to firm. Dead-end canals and small bayous are typically shallow and their bottoms may be filled in to varying degrees with semi-fluid organic material. Erosion due to wave action and boat wakes, together with shading from overhanging woody vegetation, tends to retard the amount of intertidal marsh vegetation growing along the edges of those waterways.

Developed Areas - Most developed areas are located on higher elevations of former distributary channels and are typically well drained. They include agricultural lands, and commercial and residential developments.

Fishery Resources

Wetlands throughout the study area abound with small resident fishes and shellfishes such as least killifish, rainwater killifish, sheepshead minnow, mosquitofish, sailfin molly, grass shrimp, and others. Those species are typically found along marsh edges or among submerged aquatic vegetation, and provide forage for a variety of fish and wildlife. Fresh and low-salinity marshes provide habitat for commercially and recreationally important resident freshwater fishes such as largemouth bass, yellow bass, black crappie, bluegill, redear sunfish, warmouth, blue catfish, channel catfish, buffalo, freshwater drum, bowfin, and gar. Freshwater fishes may also utilize low-salinity areas (intermediate marsh zone), provided they have access to fresher areas during periods of high salinity.

The coastal marshes also provide nursery habitat for many estuarine-dependent commercial and recreational fishes and shellfishes. Because of the protection and abundant food afforded by those wetlands, they are critical to the growth and production of species such as blue crab, white shrimp, brown shrimp, Gulf menhaden, Atlantic croaker, red drum, spotted seatrout, black drum, sand seatrout, spot, southern flounder, striped mullet, and others. Those species are generally most abundant in the brackish and saline marshes; however, blue crab, Gulf menhaden, and Atlantic croaker and several other species also utilize fresh and low-salinity marshes.

Because tidal marshes provide essential nursery habitat, commercial shrimp harvests are positively correlated with the area of tidal emergent wetlands, not open water area (Turner 1977 and 1982). Future commercial harvests of shrimp and other fishes and shellfishes could be adversely impacted by the high rates of marsh loss throughout the study area (Turner 1982).

The American oyster occurs throughout much of the brackish and saline marsh zones within the study area. Oyster harvesting constitutes a valuable fishery in the northern portions of that zone, where salinities range from 10 to 15 parts per thousand (ppt).

Essential Fish Habitat

The generic amendment to Gulf of Mexico Fishery Management Plan identifies Essential Fish Habitat in the project area to be intertidal emergent wetlands, submerged aquatic vegetation, estuarine waters, and mud, sand, and shell water bottoms. Habitat Areas of Particular Concern have not been identified for the project area. Under the Magnuson-Stevens Fishery Conservation and Management Act, the Gulf of Mexico Fishery Management Council has determined that project-area habitats are utilized by Federally managed species such as brown shrimp, white shrimp, and red drum. Although those species utilize the project area primarily as nursery habitat, all life stages may occur therein. When they move to offshore waters, blue crabs and other species of fishes and shellfishes which utilize project-area habitats may also provide forage for Federally managed marine fishes such as groupers, snappers, and mackerel.

Wildlife Resources

Numerous species of birds utilize study-area marshes, including large numbers of migratory waterfowl which winter there. Project-area fresh and intermediate marshes provide excellent wintering habitat for migratory waterfowl, especially puddle (dabbling) ducks. Brackish marshes having abundant submerged aquatic vegetation may also support large numbers of puddle ducks. Puddle ducks that occur in the study area include mallard, gadwall, northern pintail, blue-winged teal, green-winged teal, American widgeon, wood duck, and northern shoveler. The resident mottled duck also utilizes project-area coastal marshes for nesting, feeding, and brood-rearing. Diving ducks prefer larger ponds, lakes, and open water areas. Common diving duck species include lesser scaup, ruddy duck, canvasback, redhead, ring-necked duck, red-breasted merganser, and hooded merganser. The lesser snow goose and the white-fronted goose also utilize coastal marshes. Other migratory game birds found in coastal marshes include the king rail, clapper rail, Virginia rail, sora, American coot, common moorhen, and common snipe.

Marshes and associated shallow, open-water areas provide habitat for a number of wading birds, shorebirds, seabirds, and other nongame birds. Common wading birds include the little blue heron, great blue heron, green-backed heron, yellow-crowned night heron, black-crowned night heron, great egret, snowy egret, cattle egret, reddish egret, white-faced ibis, white ibis, and roseate spoonbill. Shorebirds include the killdeer, American avocet, black-necked stilt, common snipe, and various species of plovers and sandpipers. Seabirds include white pelican, brown pelican, black skimmer, herring gull, laughing gull, and several species of terns. More than 190 wading and seabird nesting colonies have been identified within coastal Louisiana during surveys conducted in 1983, 1990, and 2001 (Michot et al. 2003). Other nongame birds such as boat-tailed grackle, red-winged blackbird, seaside sparrow, olivaceous cormorant, northern harrier, belted kingfisher, and sedge wren also utilize coastal-area habitats.

Common mammals occurring in the coastal marshes include nutria, muskrat, mink, river otter, raccoon, swamp rabbit, white-tailed deer, and coyote. Muskrat and river otter prefer brackish marsh. Nutria, mink, swamp rabbit, and white-tailed deer prefer fresh marsh and low salinity habitats. Saline marsh provides very poor habitat for the above listed species. For muskrat, however, saline marsh may provide fair to poor habitat quality.

Reptiles are most abundant in fresh and low-salinity coastal wetlands. Common species include the American alligator, western cottonmouth, water snakes, mud snake, speckled kingsnake, ribbon snakes, rat snakes, red-eared turtle, common snapping turtle, alligator snapping turtle, mud turtles, and softshell turtles. Amphibians commonly found in those areas include the bullfrog, pig frog, bronze frog, leopard frog, cricket frogs, tree frogs, chorus frogs, three-toed amphiuma, sirens, and several species of toads. In brackish and saline marshes, reptiles are limited primarily to the American alligator and the diamond-backed terrapin, respectively.

Forested wetlands and scrub-shrub areas provide habitats for songbirds such as the mockingbird, yellow-billed cuckoo, northern parula, yellow-rumped warbler, prothonotary warbler, white-eyed vireo, Carolina chickadee, and tufted titmouse. Additionally, these areas also provide important resting and feeding areas for songbirds migrating across the Gulf of Mexico. Other avian species found in forested wetlands include the American woodcock, common flicker, brown thrasher, white-eyed vireo, belted kingfisher, loggerhead shrike, pileated woodpecker, red-headed

woodpecker, downy woodpecker, common grackle, common crow, and mockingbird. Numerous other bird species use forested wetlands throughout the study area.

Forested habitats and associated waterbodies also support raptors such as the red-tailed hawk, red-shouldered hawk, osprey, American kestrel, Mississippi kite, northern harrier, screech owl, great horned owl, and barred owl. Wading bird colonies typically occur in cypress swamp and scrub-shrub habitat. Species found in those nesting colonies include anhinga, great egret, great blue heron, black-crowned night heron, tricolored heron, little blue heron, cattle egret, snowy egret, white-faced and glossy ibises, and reddish egret. Waterfowl species found in forested wetlands and adjacent waterbodies in the project area include, but are not limited to, wood duck, mallard, green-winged teal, gadwall, and hooded merganser.

Game mammals associated with forested wetlands include eastern cottontail, swamp rabbit, gray and fox squirrels, and white-tailed deer. Commercially important fur bearers include river otter, muskrat, nutria, mink, and raccoon. Other mammals found in forested wetlands include striped skunk, coyote, Virginia opossum, bobcat, armadillo, gray fox, and red bat. Smaller mammal species serve as forage for both mammalian and avian carnivores and include the cotton rat, marsh rice rat, white-footed mouse, eastern wood rat, harvest mouse, least shrew, and southern flying squirrel.

Reptiles which utilize study area bottomland hardwoods, cypress swamps, and associated shallow waters include the American alligator, ground skink, five-lined skink, broadbanded skink, green anole, Gulf coast ribbon snake, yellow-bellied water snake, speckled kingsnake, southern copperhead, western cottonmouth, pygmy rattlesnake, broad-banded water snake, diamond-backed water snake, spiny softshell turtle, red-eared turtle, southern painted turtle, Mississippi mud turtle, stinkpot, and common and alligator snapping turtle, in addition to numerous other species.

Representative amphibians in study-area forested wetlands include dwarf salamander, three-toed amphiuma, lesser western siren, central newt, Gulf coast toad, eastern narrow-mouthed toad, green treefrog, squirrel treefrog, pigfrog, bullfrog, southern leopard frog, bronze frog, upland chorus frog, southern cricket frog, and spring peeper.

Most developed areas provide low-quality wildlife habitat. Sites developed for agricultural purposes are usually located at elevations slightly higher than the wetlands, or they may have improved drainage. In agricultural areas, wildlife habitat is primarily provided by unmaintained ditch banks and field edges, fallow fields, pasture lands, and/or occasionally flooded fields. Cultivated crops, especially soybeans, provide forage for some wildlife species. Game species that utilize agricultural lands include the white-tailed deer, mourning dove, bobwhite quail, eastern cottontail, and common snipe. Seasonally flooded cropland and fallow fields may also provide important feeding habitat for wintering waterfowl, wading birds, and other waterbirds.

Threatened and Endangered Species

Federally listed threatened and endangered species occurring in coastal Louisiana wetlands and associated habitats include in the Louisiana black bear (threatened), West Indian manatee

(endangered), bald eagle (threatened), brown pelican (endangered), piping plover (threatened), several species of sea turtles, Gulf sturgeon (threatened), and the pallid sturgeon (endangered).

The Louisiana black bear is primarily associated with forested wetlands; however, it also utilizes a variety of other habitat types, including marsh, spoil banks, and upland forests. Louisiana black bear populations occur in the Tensas River Basin, the Upper Atchafalaya River Basin, and coastal St. Mary and Iberia Parishes.

The West Indian manatee occasionally enters Lakes Pontchartrain and Maurepas, and associated coastal waters and streams, during the summer months. Manatees have been reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of Louisiana. They have also been occasionally observed elsewhere along the Louisiana coast.

Bald eagles nest in Louisiana from October through mid-May. Eagles typically nest in baldcypress trees near fresh to intermediate marshes or open water in the southeastern parishes. Areas with high numbers of nests include the Lake Verret Basin, the marshes/swamp interface from Houma to Bayou Vista, the north shore of Lake Pontchartrain, and the Lake Salvador area. Brown pelicans are currently known to nest on Rabbit Island (in Calcasieu Lake), Raccoon Point (Isles Dernieres), Queen Bess Island, Plover Island (Baptiste Collette), and islands in the Chandeleur chain. Pelicans change nesting sites as habitat changes occur; thus, they may also be found nesting on mud lumps at the mouth of South Pass (Mississippi River Delta) and on small islands in St. Bernard Parish. In winter, spring, and summer, nests are built in mangrove trees or other shrubby vegetation, although occasional ground nesting may occur. Brown pelicans feed in shallow estuarine waters, using sand pits and offshore sand bars as rest and roost areas.

The piping plover winters in Louisiana from late July to March or April. Piping plovers feed extensively on intertidal beaches, mudflats, sandflats, algal flats, and wash-over passes with no or very sparse emergent vegetation; they also require unvegetated or sparsely vegetated areas for roosting. Critical habitat (i.e., specific areas that are essential to the conservation of the species) has been designated within coastal Louisiana, and consists of intertidal beaches and flats (between annual low tide and annual high tide) with no, or very sparse, emergent vegetation, and associated dune systems and flats above annual high tide. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting plovers. Those elements should be considered when determining potential project impacts.

Endangered and threatened sea turtles forage in the nearshore waters, bays and sounds of Louisiana. The National Marine Fisheries Service is responsible for aquatic marine threatened or endangered species. Eric Hawk (727/570-5312) in St. Petersburg, Florida, should be contacted for further information, and consultation regarding those species.

> The endangered Kemp's ridley sea turtle occurs mainly in the coastal areas of the Gulf of Mexico and northwestern Atlantic. Juveniles and sub-adults occupy shallow, coastal regions and are commonly associated with crab-laden, sandy or muddy water bottoms. Small turtles are generally found nearshore from May through October. Adults may be abundant near the mouth of the Mississippi River in spring and summer. Adults and juveniles move offshore to deeper, warmer water during the winter. Between the East Gulf Coast of Texas and the Mississippi River Delta, Kemp's ridleys use nearshore

waters, ocean sides of jetties, small boat passageways through jetties, and dredged and natural channels. They have been observed within both Sabine and Calcasieu Lakes.

Threatened loggerhead sea turtles nest within the continental United States from Louisiana to Virginia, with major nesting concentrations occurring on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida. In Louisiana, loggerheads are known to nest on the Chandeleur Islands. Nesting and hatching dates for the loggerhead in the northern Gulf of Mexico are from May 1 through November 30.

The Gulf sturgeon is an anadromous fish that occurs in many coastal rivers, streams, and estuarine waters from the Atchafalaya River to the Suwanee River, Florida. Adults and sub-adults spend 8 to 9 months in rivers and streams, and 3 to 4 of the cooler months in estuarine or marine waters. Spawning occurs in coastal rivers between late winter and early spring. Sturgeon less than 2 years old appear to remain in riverine habitats and estuarine areas throughout the year, rather than migrate to marine waters. In Louisiana, Gulf sturgeon have been reported at Rigolets Pass, rivers and lakes of the Lake Pontchartrain basin, and adjacent estuarine areas.

Critical habitat for the Gulf sturgeon has been designated in Louisiana, Mississippi, Alabama, and Florida. Portions of the Pearl River system, Lake Pontchartrain east of the Lake Pontchartrain Causeway, all of Little Lake, The Rigolets, Lake St. Catherine, and Lake Borgne within Louisiana were included in that designation. The primary constituent elements essential for the conservation of Gulf sturgeon are those habitat components that support feeding, resting, sheltering, reproduction, migration, and physical features necessary for maintaining the natural processes that support those habitat components; those elements should be considered when determining potential project impacts.

The pallid sturgeon is found in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the Old River Control Structure Complex); it may occur in the Red River as well. The pallid sturgeon is adapted to riverine conditions that can be described as large, free-flowing, turbid water with a diverse assemblage of physical habitats that are in a constant state of change. Detailed habitat requirements of this fish are not known, but it is believed to spawn in Louisiana.

Refuges and Wildlife Management Areas

The Service administers 10 National Wildlife Refuges (NWR) encompassing more than 301,700 acres in coastal Louisiana. Those refuges include Sabine, Cameron Prairie, Lacassine, Shell Keys, Bayou Teche, Delta, Breton, Bayou Sauvage, Big Branch Marsh, and Mandalay. The Louisiana Department of Wildlife and Fisheries operates 17 refuges, preserves, and wildlife management areas in coastal Louisiana, comprising more than 572,000 acres. Coastal wetlands make up the vast majority of those Federal and State wildlife areas.

FUTURE WITHOUT-PROJECT FISH AND WILDLIFE RESOURCES

Under the No Action Plan, more than 462,000 additional wetland acres would be lost by year 50 (Table 2). Habitat distribution would continue shifting toward more brackish and saline wetlands and open water as more salt-sensitive freshwater vegetation is lost. Because of the current degree of risk and uncertainty associated with the salinity/habitat type projection methodologies, however, the data in Table 2 do not reflect this anticipated trend. Associated with the projected wetland losses, corresponding decreases in habitat values for fish and wildlife that use those wetlands would also occur.

ALTERNATIVE PLAN DESCRIPTIONS

Within in each Subprovince, individual restoration projects were grouped to provide varying levels of wetland loss reduction. *Reduce* alternatives were developed to reduce existing loss rates by 50 percent. *Maintain* alternatives were developed to achieve no net wetland loss, and *Enhance* alternatives were developed to produce net wetland gains equal to half the annual net wetland loss. Subprovince alternatives were grouped into the coastwide alternative action plans shown in Table 3.

Subprovince 1

Restoration features of the Maintain 2 (M2) Alternative are as follows: 1) install a 5,000 cubic foot per second (cfs) diversion into the Maurepas Swamp at Convent/Blind River; 2) install a 1,000 cfs diversion into the Maurepas Swamp at Hope Canal; 3) install a 10,000 cfs diversion into the Breton Sound Basin at White's Ditch; 4) install a 110,000 cfs diversion with sediment enrichment into the Breton Sound Basin at American/California Bay; 5) install a 12,000 cfs diversion at Bayou Lamoque; and, 6) install the Seabrook salinity control structure.

Restoration features of the Modified Maintain 2 (M2 modified) Alternative are as follows: 1) install a 5,000 cubic foot per second (cfs) diversion into the Maurepas Swamp at Convent/Blind River; 2) install a 1,000 cfs diversion into the Maurepas Swamp at Hope Canal; 3) install a 10,000 cfs diversion into the Breton Sound Basin at White's Ditch; 4) install a 110,000 cfs diversion with sediment enrichment into the Breton Sound Basin at American/California Bay; 5) install a 12,000 cfs diversion at Bayou Lamoque; 6) install the Seabrook salinity control structure; 7) optimize operation of the Caernarvon Freshwater Diversion Project to optimize marsh creation; 8) opportunistically use the Bonnet Carre Spillway to introduce additional Mississippi River flows into the Pontchartrain Basin; 9) gap the Amite River Diversion Canal spoil banks; 9) restore the Labranche wetlands through delivery of Mississippi River sediment; 10) rehabilitate and operate the Violet Siphon; 11) evaluate the potential diversion of fresh water from the Mississippi River through the Inner Harbor Navigation Canal into St. Bernard Parish wetlands; and, 12) nourish the Lake Pontchartrain land bridge marshes.

Table 2. Wetland type acreages, under the No Action Planby Subprovince and coastwide

Subprovince 1					Subprovince 2			
Wetland Type	TY0 (acres)	TY50 (acres)	Acreage change	Percent change	TY0 (acres)	TY50 (acres)	Acreage change	Percent change
Swamp	353,904	327,350	-26,554	-7.5	294,397	282,291	-12,106	-4.1
Fresh marsh	71,279	207,760	136,481	191.5	180,876	244,994	64,117	35.4
Intermediate marsh	160,752	98,156	-62,596	-38.9	85,267	488	-84,779	-99.4
Brackish marsh	180,441	142,972	-37,469	-20.8	65,338	52,168	-13,170	-20.2
Saline marsh	113,149	54,802	-58,348	-51.6	117,809	0	-117,809	-100.0
Total wetlands	879,525	831,040	-48,486	-5.5	743,687	579,940	-163,747	-22.0

Subprovince 3					Subprovince 4			
Wetland Type	TY0 (acres)	TY50 (acres)	Acreage change	Percent change	TY0 (acres)	TY50 (acres)	Acreage change	Percent change
Swamp	388,811	337,828	-50,983	-13.1	3,674	2,239	-1,435	-39.1
Fresh marsh	341,733	33,294	-308,439	-90.3	346,923	312,800	-34,123	-9.8
Intermediate marsh	193,569	619,079	425,510	219.8	284,702	238,517	-46,184	-16.2
Brackish marsh	201,216	40,046	-161,170	-80.1	137,529	202,292	64,763	47.1
Saline marsh	113,513	5,355	-108,158	-95.3	30,307	0	-30,307	-100.0
Total wetlands	1,238,841	1,035,601	-203,240	-16.4	803,134	755,848	-47,286	-5.9

Coastwide				
Wetland Type	TY0 (acres	TY50 (acres	Acreage change	Percent change
Swamp	1,040,785	949,707	-91,078	-8.8
Fresh marsh	940,811	798,847	-141,964	-15.1
Intermediate marsh	724,289	956,240	231,951	32.0
Brackish marsh	584,524	437,477	-147,046	-25.2
Saline marsh	374,778	60,157	-314,622	-83.9
Total wetlands	3,665,188	3,202,429	-462,759	-12.6

Restoration features of the Enhance 1 (E1) Alternative are as follows: 1) install a 5,000 cubic foot per second (cfs) diversion into the Maurepas Swamp at Convent/Blind River; 2) install a 10,000 cfs diversion into Lake Pontchartrain at the Bonnet Carre Spillway; 3) re-create marshes near the junction of the the Mississippi River Gulf Outlet and the GIWW through delivery of Mississippi River sediment; 4) re-create marsh in the Labranche wetlands through delivery of Mississippi River sediment; 5) re-create marsh adjacent to the Mississippi River Gulf Outlet near Violet Canal through delivery of Mississippi River sediment; 6) install a 10,000 cfs diversion into the Breton Sound Basin at White's Ditch; 7) re-create marsh in the Breton Sound Basin at American/California Bay through delivery of Mississippi River sediment; 8) rebuild marsh in the Quarantine Bay area through delivery of Mississippi River sediment; 9) rebuild marsh in the Fort St. Phillip area through delivery of Mississippi River sediment; 10) install a 15,000 cfs diversion into the Breton Sound Basin at American/California Bayou; and, 11) install a 15,000 cfs diversion into the Breton Sound Basin at Fort St. Phillip.

Table 3. Combinations of Subprovince alternatives for the coastwide alternative action plans

Subprovince Alternatives	Coastwide Alternative Action Plans						
	5110	**5610**	**5410**	**7610**	**7410**	**7002**	**10130**
Subprovince 1							
Maintain 2	**X**	**X**	**X**				
Enhance 1				**X**	**X**	**X**	
Modified Maintain 2							**X**
Subprovince 2							
Reduce 1	**X**						
Maintain 1			**X**		**X**		
Maintain 3		**X**		**X**			
Enhance 3						**X**	
Modified Reduce 1							**X**
Subprovince 3							
Reduce 1	**X**	**X**	**X**	**X**	**X**		
Maintain 1						**X**	
Modified Reduce 1							**X**
Subprovince 4							
Enhance 2	**X**	**X**	**X**	**X**	**X**	**X**	
Modified Enhance 2							**X**

Subprovince 2

Restoration features of the Reduce 1 (R1) Alternative include: 1) install a 5,000 cfs sediment diversion with sediment enrichment at Edgard; 2) install a 5,000 cfs pulsed diversion at Myrtle Grove; 3) install a 60,000 cfs diversion at Fort Jackson; 4) use dredged material to create wetlands near Bayou L'Ours and the area north of Fourchon; and, 5) rebuild the barrier islands to a 3,000-foot-width using material dredged offshore.

Restoration features of the Modified Reduce 1 (R1 modified) Alternative include: 1) install a 1,000 cfs diversion at Des Allemands; 2) install a 1,000 cfs diversion at Donaldsonville; 3) install a 1,000 cfs diversion at Pikes Peak; 4) install a 1,000 cfs diversion at Edgard; 5) install a 5,000 cfs diversion at Myrtle Grove with sediment enrichment; 6) install a 60,000 cfs diversion at Boothville with sediment enrichment; 7) rebuild the barrier islands to a 3,000-foot-width using material dredged offshore; 8) re-authorize Davis Pond Freshwater Diversion Project operation to flow at 5,000 cfs and build marsh; and, 9) use dredged material to create wetlands near Bayou L'Ours and the area north of Fourchon.

Restoration features of the Maintain 1 (M1) Alternative include: 1) install a 5,000 cfs diversion at Des Allemands with sediment enrichment; 2) rebuild Myrtle Grove area marshes through delivery of Mississippi River sediment; 3) install a 5,000 cfs diversion at Myrtle Grove; 4) rebuild the barrier islands to a 3,000-foot-width using material dredged offshore; 5) install a 60,000 cfs diversion at Fort Jackson; 6) build marsh near Empire through delivery of Mississippi River sediment; 7) build marsh near Bastion Bay through delivery of Mississippi River sediment; 8) build marsh near Head of Passes through delivery of Mississippi River sediment; and, 9) use dredged material to re-create wetlands near Bayou L'Ours and the area north of Fourchon.

Restoration features of the Maintain 3 (M3) Alternative include: 1) install a 1,000 cfs diversion at Des Allemands; 2) install a 1,000 cfs diversion at Donaldsonville; 3) install a 1,000 cfs diversion at Pikes Peak; 4) install a 1,000 cfs diversion at Edgard; 5) install a 75,000 cfs pulsed diversion at Myrtle Grove with sediment enrichment; 6) install a 60,000 cfs diversion at Fort Jackson; and, 7) rebuild the barrier islands to a 3,000-foot-width using material dredged offshore.

Restoration features of the Enhance 3 (E3) Alternative include: 1) install a 5,000 cfs diversion at Des Allemands with sediment enrichment; 2) use dredged material to rebuild wetlands near Bayou L'Ours and the area north of Fourchon; 3) install a 120,000 cfs diversion at Bayou Lafourche (Mississippi River Third Delta); 4) install a 90,000 cfs diversion at Fort Jackson with sediment enrichment; 5) relocate the Deep Draft Navigation Channel from Southwest Pass; and, 6) rebuild the barrier islands to a 3,000-foot-width using material dredged offshore.

Subprovince 3

Features of the Reduce1 (R1) Alternative are as follows: 1) install a 1,000 cfs pump at Bayou Lafourche to deliver additional Mississippi River inflows; 2) implement features to convey additional Atchafalaya River water to the eastern Terrebonne Basin marshes; 3) increase Atchafalaya River inflows into tidal marshes via Blue Hammock Bayou; 4) increase freshwater flows to marshes south of Lake DeCade; 5) implement the Penchant Basin Hydrologic Restoration Plan; 6) relocate the Atchafalaya Bay navigation channel to Shell Island Pass; 7) increase sediment transport down the Wax Lake Outlet for delta-building purposes; 8) modify the Old River Control Structure operational scheme to increase downstream sediment transport for improved building and maintenance of coastal wetlands; 9) implement multi-purpose operation of the Houma Navigation Canal Lock to better distribute freshwater inflows; 10) rebuild the historic reef from Pointe au Fer Island to Eugene Island; and, 11) maintain the landbridge between Bayou Dularge and Bayou Grand Caillou.

Features of the Modified Reduce 1 (R1 modified) Alternative include: 1) install a 1,000 cfs pump at Bayou Lafourche to deliver additional Mississippi River inflows; 2) implement features to convey additional Atchafalaya River water to the eastern Terrebonne Basin marshes; 3) increase Atchafalaya River inflows into tidal marshes via Blue Hammock Bayou; 4) implement the Penchant Basin Hydrologic Restoration Plan; 5) relocate the Atchafalaya Bay navigation channel to Shell Island Pass; 6) increase sediment transport down the Wax Lake Outlet for delta-building purposes; 7) modify the Old River Control Structure operational scheme to increase downstream sediment transport for improved building and maintenance of coastal wetlands; 8) implement multi-purpose operation of the Houma Navigation Canal Lock to better distribute freshwater

inflows; 9) maintain the northern shoreline of East Cote Blanche Bay; 10) restore the Pointe Chevreuil reef; 11) restore the Isle Dernieres-Timbalier Island complex; 12) restore and maintain the landbridge between Caillou Lake and the Gulf; 13) armor the Gulf shoreline at Pointe au Fer Island; and, 14) maintain the landbridge between Bayou Dularge and Bayou Grand Caillou.

Features of the Maintain 1 (M1) Alternative are as follows: 1) implement the Mississippi River Third Delta (120,000 cfs diversion); 2) install a 1,000 cfs pump at Bayou Lafourche to deliver additional Mississippi River inflows; 3) implement features to convey additional Atchafalaya River water to the eastern Terrebonne Basin marshes; 4) increase Atchafalaya River inflows into tidal marshes via Blue Hammock Bayou; 5) implement the Penchant Basin Hydrologic Restoration Plan; 6) relocate the Atchafalaya Bay navigation channel to Shell Island Pass; 7) increase sediment transport down the Wax Lake Outlet for delta-building purposes; 8) modify the Old River Control Structure operational scheme to increase downstream sediment transport for improved building and maintenance of coastal wetlands; 9) implement a multi-purpose operation of the Houma Navigation Canal Lock to better distribute freshwater inflows; 10) maintain the northern shoreline of East Cote Blanche Bay; 11) restore the Pointe Chevreuil reef; 12) restore the Isle Dernieres-Timbalier Island complex; 13) restore and maintain the landbridge between Caillou Lake and the Gulf; 14) armor the Gulf shoreline at Pointe au Fer Island; 15) maintain the landbridge between Bayou Dularge and Bayou Grand Caillou; 16) rebuild the historic reef from Pointe au Fer Island to Eugene Island; 17) construct a segmented reef/breakwater from Eugene Island to Marsh Island; 18) increase Atchafalaya River inflows into marshes south of Lake DeCade; 19) stabilize the banks of Southwest Pass; 20) rehabilitate the northern shorelines of Terrebonne/Timbalier Bays; 21) backfill pipeline canals south of Catfish Lake; and, 22) maintain the Timbalier land bridge in the upper salt marsh zone.

Subprovince 4

Features of the Enhance 2 (E2) Alternative include: 1) install salinity control structures at Oyster Bayou, Long Point Bayou, Black Lake Bayou, Alkali Ditch, Black Bayou, and the Highway 82 Causeway; 2) modify the existing Cameron-Creole Watershed Project structures to improve water-level and salinity management; 3) implement the East Sabine Lake Hydrologic Restoration Project; 4) introduce fresh water from the Lakes Subbasin at Pecan Island, Rollover Bayou, Highway 82, Little Pecan Bayou, and South Grand Chenier; 5) install shoreline stabilization measures along the Gulf at Rockefeller Refuge; 6) beneficially use dredged material along the Calcasieu Ship Channel; 7) install a new lock in the GIWW east of the Alkali Ditch; and, 8) conduct dedicated dredging for marsh restoration.

Features of the Modified Enhance 2 (E2 modified) Alternative include: 1) install salinity control structures at Oyster Bayou, Long Point Bayou, Black Lake Bayou, Alkali Ditch, Black Bayou, and the Highway 82 Causeway; 2) modify the existing Cameron-Creole Watershed Project structures to improve water-level and salinity management; 3) implement the East Sabine Lake Hydrologic Restoration Project; 4) introduce fresh water from the Lakes Subbasin at Pecan Island, Rollover Bayou, Highway 82, Little Pecan Bayou, and South Grand Chenier; 5) install shoreline stabilization measures along the Gulf shoreline at Rockefeller Refuge; 6) beneficially use dredged material along the Calcasieu Ship Channel; and, 7) implement the Black Bayou Bypass Culverts Project.

Subprovince 1

Under the No Action Plan, wetland loss in Subprovince 1 would continue, with more than -48,000 acres being lost by year 50 (Table 2). Compared to the present total wetland acreage (879,525 acres), each of the alternative action plans would produce net wetland acreage gains throughout the 50-year evaluation period (Table 4). Compared to the No Action Plan, Plan 10130 would result in the greatest wetland gain, i.e., nearly 167,000 acres over 50 years. The least gain (75,000 acres) would occur under Plans 7002, 7410, and 7610. Plans 5110, 5410, and 5610, would result in gains of 102,000 acres over 50 years when compared to the No Action Plan. Freshwater diversions (i.e., introduction of Mississippi River water) associated with each action alternative would increase fresh and intermediate marsh acreages, compared to the No Action Plan under which the acreage of all habitat types would decrease between years 10 and 50. The proposed river diversions into brackish and/or saline marsh areas (at White's Ditch, American/California Bay, and Bayou Lamoque) would result in greater amounts of fresh and intermediate marsh at the expense of brackish and saline marsh, compared to the No Action Plan.

The above-referenced habitat type acreage projections will likely change as the locations, designs, and operation of project features are refined during the post-authorization planning and design process. Projected habitat acreages may also change as current habitat-change methodologies (and their associated the levels of risk and uncertainty) are refined in the future.

Table 4. Wetland acres at year 50, by type, for alternative plans in Subprovince 1

Wetland Type	No Action (acres)	Plan 5110 (acres)	Plan 5410 (acres)	Plan 5610 (acres)	Plan 7002 (acres)	Plan 7410 (acres)	Plan 7610 (acres)	Plan 10130 (acres)
Swamp	327,350	329,188	329,188	329,188	334,919	334,919	334,919	315,646
Fresh marsh	207,760	261,793	261,793	261,793	239,772	239,772	239,772	300,482
Intermediate marsh	98,156	225,541	225,541	225,541	117,269	117,269	117,269	269,920
Brackish marsh	142,972	62,772	62,772	62,772	104,187	104,187	104,187	60,190
Saline marsh	54,802	53,770	53,770	53,770	110,133	110,133	110,133	51,558
Total wetlands	**831,040**	**933,064**	**933,064**	**933,064**	**906,280**	**906,280**	**906,280**	**997,796**

Table 5. Wetland type difference (percent) at year 50, between the No Action Plan and alternative action plans in Subprovince 1

Wetland Type	No Action (% diff)	Plan 5110 (% diff)	Plan 5410 (% diff)	Plan 5610 (% diff)	Plan 7002 (% diff)	Plan 7410 (% diff)	Plan 7610 (% diff)	Plan 10130 (% diff)
Swamp	0.0	0.6	0.6	0.6	2.3	2.3	2.3	-3.6
Fresh marsh	0.0	26.0	26.0	26.0	15.4	15.4	15.4	44.6
Intermediate marsh	0.0	129.8	129.8	129.8	19.5	19.5	19.5	175.0
Brackish marsh	0.0	-56.1	-56.1	-56.1	-27.1	-27.1	-27.1	-57.9
Saline marsh	0.0	-1.9	-1.9	-1.9	101.0	101.0	101.0	-5.9
Total wetlands	**0.0**	**12.3**	**12.3**	**12.3**	**9.1**	**9.1**	**9.1**	**20.1**

Of the five wildlife species evaluated, mink, American alligator, and dabbling ducks would benefit from each of the proposed action alternatives (Table 6). Benefits to American alligator and dabbling ducks, which prefer fresh and intermediate marsh habitats, would be greatest under Plan 10130 (with 22.2 and 11.7 percent AAHU increases, respectively). Mink, which prefer swamp, fresh marsh and intermediate marsh, would receive benefits ranging from a 1.7 to 5.7 percent AAHU increase, depending on the action plan implemented. The river otter prefers brackish marsh, but swamp, fresh marsh, and intermediate marsh also provide desirable habitat for that species. The negative effects of the projected decreases in brackish marsh acreage under all the action plans would, in some cases, be offset by projected increases in swamp, fresh, and intermediate marshes. Consequently, habitat value for river otters would increase 2.5 percent for Plans 5110, 5410, and 5610, and 5.5 percent for Plan 10130; however, river otter habitat value would be slightly reduced (-0.8 percent) under Plans 7002, 7410, and 7610. Brackish marsh is considered the muskrat's preferred habitat and has a much higher habitat value for that species than do fresh and intermediate marshes. Due to the anticipated decline in brackish marsh acreage, a net decrease in muskrat AAHUs ranging from -12.6 to -21.3 percent is projected under FWP conditions, depending on the alternative.

Over the 50-year analysis period, all five fish and shellfish species evaluated would be adversely affected by every action plan (Table 6), except for a slight white shrimp habitat value increase (0.1 percent) under Plan 10130. Atlantic croaker and white shrimp, which typically utilize low-salinity habitats as juveniles and more brackish habitats as subadults and adults, would experience the least impacts to habitat value under the action plans (-0.2 to -9.1 percent). Gulf menhaden also utilize low-salinity habitats, but they would experience a moderate habitat value (AAHU) decrease ranging from -15.8 to -20.3 percent, compared to the No Action Plan. In response to the reduced acreage of their preferred brackish habitats under the FWP alternatives, spotted seatrout and brown shrimp would experience habitat value decreases ranging from -18.3 to -29.5 percent, over the 50 year period.

Table 6. Comparison of year 50 net AAHU differences (percent) between the No Action Plan and action alternatives for selected fish and wildlife species in Subprovince 1

Evaluation Species	Plan 5110	Plan 5410	Plan 5610	Plan 7002	Plan 7410	Plan 7610	Plan 10130
Mink	4.3	4.3	4.3	1.7	1.7	1.7	5.7
Otter	2.5	2.5	2.5	-0.8	-0.8	-0.8	5.5
Muskrat	-21.3	-21.3	-21.3	-12.6	-12.6	-12.6	-19.7
Alligator	14.5	14.5	14.5	2.2	2.2	2.2	22.2
Ducks	6.7	6.7	6.7	1.4	1.4	1.4	11.7
Croaker	-5.9	-5.9	-5.9	-8.4	-8.4	-8.4	-0.2
Menhaden	-20.3	-20.3	-20.3	-15.8	-15.8	-15.8	-16.8
Spotted seatrout	-29.5	-29.5	-29.5	-20.0	-20.0	-20.0	-27.6
White shrimp	-5.8	-5.8	-5.8	-9.1	-9.1	-9.1	0.1
Brown shrimp	-26.7	-26.7	-26.7	-18.3	-18.3	-18.3	-24.7

Subprovince 2

Under the No Action Plan, more than -163,000 acres of wetlands would be lost in Subprovince 2 over the 50-year planning horizon (Table 2). Action Plans 5610, 7002, and 7610 would result in more total wetland acres, after 50 years, than the present Subprovince 2 total of 743,687 acres (Table 7). Compared to the present wetland acreage, Plan 7002 would produce the greatest net wetland gain, i.e., nearly 44,000 acres (over 50 years). Similarly, Plans 5410 and 7410 would reduce the future wetland losses to approximately -13,000 acres over 50 years, and Plans 5110 and 10130 would reduce future wetland losses to -59,000 acres at the end of the 50-year evaluation period. At year 50, the action plan alternatives would produce net wetland increases ranging from 104,000 to 207,000 acres when compared to the No Action Plan.

The No Action Plan used for this analysis does not include the Davis Pond Freshwater Diversion Project, which is now being operated in an interim manner following construction completion in early 2002. The Service believes that the current LCA modeling analysis for the No Action Plan, which included the Davis Pond Diversion, does not currently project the likely distribution of wetland types in Subprovince 2 under No Action conditions with a reasonable degree of accuracy or confidence.

Proposed action plan features to introduce fresh water from the Mississippi River would shift habitat types toward lower-salinity conditions in Subprovince 2, compared to the No Action Plan. River diversions at Myrtle Grove and Fort Jackson would produce greater amounts of fresh and intermediate marsh, at the expense of brackish marsh and open water acreage. Those diversions, with their associated sediment enrichment, would also restore/establish several thousand acres of wetlands. The Service is not confident that the current habitat change projections, which indicate that brackish and saline marsh would not exist beyond year 10 under some action plans, are accurate. Future refinement of the habitat change model and associated methodologies will likely result in revisions to those habitat acreage projections.

Table 7. Wetland acres at year 50, by type, for alternative plans in Subprovince 2

Wetland Type	No Action (acres)	Plan 5110 (acres)	Plan 5410 (acres)	Plan 5610 (acres)	Plan 7002 (acres)	Plan 7410 (acres)	Plan 7610 (acres)	Plan 10130 (acres)
Swamp	282,291	270,386	265,991	249,174	231,943	265,991	249,174	270,386
Fresh marsh	244,994	352,130	396,585	513,345	487,736	396,585	513,345	352,130
Intermediate marsh	488	61,949	68,156	19,283	67,973	68,156	19,283	61,949
Brackish marsh	52,168	0	0	0	0	0	0	0
Saline marsh	0	0	0	0	0	0	0	0
Total wetlands	**579,940**	**684,465**	**730,732**	**781,801**	**787,652**	**730,732**	**781,801**	**684,465**

Table 8. Wetland type difference (percent) at year 50, between the No Action Plan and alternative action plans in Subprovince 2

Wetland Type	No Action (% diff)	Plan 5110 (% diff)	Plan 5410 (% diff)	Plan 5610 (% diff)	Plan 7002 (% diff)	Plan 7410 (% diff)	Plan 7610 (% diff)	Plan 10130 (% diff)
Swamp	0.0	-4.2	-5.8	-11.7	-17.8	-5.8	-11.7	-4.2
Fresh marsh	0.0	43.7	61.9	109.5	99.1	61.9	109.5	43.7
Intermediate marsh	0.0	12,606.2	13,879.3	3,855.0	13,841.8	13,879.3	3,855.0	12,606.2
Brackish marsh	0.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0
Saline marsh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All wetlands	**0.0**	**18.0**	**26.0**	**34.8**	**35.8**	**26.0**	**34.8**	**18.0**

Except for muskrat, each of the wildlife species evaluated would benefit from implementation of the proposed plans (Table 9). Because of large increases in their preferred fresh and intermediate marsh habitats, the American alligator and dabbling ducks would benefit the most, with over 20 percent increases in habitat value (AAHUs) under several of the proposed plans. Mink, which prefer swamp and fresh marsh, would also benefit from the projected increase in those wetland types, experiencing a 4.4 to 8.2 percent increase in habitat value. The river otter prefers brackish marsh, but swamp, fresh marsh, and intermediate marsh also provide desirable habitat for that species. Although brackish marsh habitats are projected to be lost under the action alternatives, the projected increase in swamp and fresh and intermediate marshes would offset the decline of the otter's preferred habitat. Brackish marsh is preferred muskrat habitat and has a much higher value for that species than do fresh and intermediate marshes. The projected loss of brackish marsh under the action alternatives, compared to the No Action Plan, would result in a -7.9 percent decrease in muskrat habitat value under Plans 5110 and 10130, and a -4.6 percent decrease under Plans 5410 and 7410. Plans 5610, 7002, and 7610 would provide small increases in muskrat habitat value over the 50-year period.

The proposed action plans would generally increase habitat value for the fish and shellfish species evaluated (Table 9). However, brown shrimp, which prefer brackish marshes, would experience small AAHU decreases of -2.2 to -4.4 percent under the various action plans. Spotted seatrout, which also prefer more saline habitats, would experience slight habitat value decreases under Plans 5110 and 10130. Atlantic croaker, Gulf menhaden, and white shrimp, which typically utilize low-salinity habitats as juveniles and more-brackish habitats as subadults and adults, would receive the greatest benefits (AAHU increases of 22.6 percent, 14.5 percent, and 23.4 percent, respectively) under Plan 7002.

Table 9. Comparison of year 50 net AAHU differences (percent) between the No Action Plan and action alternatives for selected fish and wildlife species in Subprovince 2

Evaluation Species	Plan 5110	Plan 5410	Plan 5610	Plan 7002	Plan 7410	Plan 7610	Plan 10130
Mink	4.4	6.3	8.2	6.6	6.3	8.2	4.4
Otter	3.0	5.5	5.7	7.1	5.5	5.7	3.0
Muskrat	-7.9	-4.6	1.7	1.4	-4.6	1.7	-7.9
Alligator	16.2	21.6	23.6	29.1	21.6	23.6	16.2
Ducks	11.0	15.7	23.1	22.8	15.7	23.1	11.0
Croaker	9.1	14.3	16.0	22.6	14.3	16.0	9.1
Menhaden	4.8	8.6	9.8	14.5	8.6	9.8	4.8
Spotted seatrout	-1.6	1.3	2.3	6.0	1.3	2.3	-1.6
White shrimp	10.8	15.8	15.4	23.4	15.8	15.4	10.8
Brown shrimp	-4.4	-2.2	-3.2	1.0	-2.2	-3.2	-4.4

Subprovince 3

At year 50, wetland losses under the No Action Plan (more than -203,000 acres) would be greater in Subprovince 3 than in any other Subprovince (Table 2). Of the proposed action plans, only Plan 7002 would reverse wetland loss in that Subprovince and provide a net wetland gain (compared to current wetland acreage) of nearly 52,000 acres (Table 10). The remaining plans would reduce future wetland losses to approximately -84,000 acres over the 50-year analysis period, and compared to the year 50 total wetland acreage under the No Action Plan, they would save more than 119,000 wetland acres.

According to model projections, the action plans would save substantially more fresh marsh than would the No Action Plan. This would be achieved through enhancing marsh-building processes in the Atchafalaya and Wax Lake Deltas by relocation of the navigation channel and by sediment enrichment of the Wax Lake Outlet. The Penchant Basin Restoration Plan would improve the health and productivity of floating freshwater marshes in the western Terrebonne Basin, and would deliver greater volumes of fresh water, sediments, and nutrients to the marshes south of the Penchant Basin. Increased conveyance of Atchafalaya River flows to the eastern Terrebonne Basin would improve productivity and reduce marsh loss in areas where marine processes are advancing inland. Compared to the No Action Plan at year 50, all the action plans, except Plan 7002, would result in nearly a 20 percent reduction in brackish marsh acreage; however, Plan 7002 would result in nearly a 400 percent increase in brackish marsh. Similarly, saline marsh would be increased by more than 200 percent (except under Plan 7002 in which all saline marsh would be converted to other habitat types), and swamp would decrease by nearly -4 percent (Table 11).

Table 10. Wetland acres at year 50, by type, for alternative plans in Subprovince 3

Wetland Type	No Action (acres)	Plan 5110 (acres)	Plan 5410 (acres)	Plan 5610 (acres)	Plan 7002 (acres)	Plan 7410 (acres)	Plan 7610 (acres)	Plan 10130 (acres)
Swamp	337,828	325,335	325,335	325,335	321,614	325,335	325,335	325,335
Fresh marsh	33,294	175,592	175,592	175,592	240,836	175,592	175,592	175,592
Intermediate marsh	619,079	605,659	605,659	605,659	531,250	605,659	605,659	605,659
Brackish marsh	40,046	32,088	32,088	32,088	197,028	32,088	32,088	32,088
Saline marsh	5,355	16,490	16,490	16,490	0	16,490	16,490	16,490
Total wetlands	**1,035,601**	**1,155,164**	**1,155,164**	**1,155,164**	**1,290,729**	**1,155,164**	**1,155,164**	**1,155,164**

Table 11. Wetland type difference (percent) at year 50, between the No Action Plan and alternative action plans in Subprovince 3

Wetland Type	No Action (% diff)	Plan 5110 (% diff)	Plan 5410 (% diff)	Plan 5610 (% diff)	Plan 7002 (% diff)	Plan 7410 (% diff)	Plan 7610 (% diff)	Plan 10130 (% diff)
Swamp	0.0	-3.7	-3.7	-3.7	-4.8	-3.7	-3.7	-3.7
Fresh marsh	0.0	427.4	427.4	427.4	623.4	427.4	427.4	427.4
Intermediate marsh	0.0	-2.2	-2.2	-2.2	-14.2	-2.2	-2.2	-2.2
Brackish marsh	0.0	-19.9	-19.9	-19.9	392.0	-19.9	-19.9	-19.9
Saline marsh	0.0	207.9	207.9	207.9	-100.0	207.9	207.9	207.9
Total wetlands	**0.0**	**11.5**	**11.5**	**11.5**	**24.6**	**11.5**	**11.5**	**11.5**

Each of the five wildlife species evaluated would benefit from implementation of the proposed action plans (Table 12). Benefits to wildlife species evaluated are identical across all action plans, except Plan 7002. Compared to the No Action Plan, Plan 7002 would provide the greatest habitat value increases for all evaluation species than would the other action plans. Among all five plans, otter would be benefitted the least and American alligator and dabbling ducks would be benefitted the most.

Each of the five fish/shellfish species evaluated would benefit from implementation of the proposed action plans (Table 12). Benefits to the fish/shellfish species evaluated are identical across all action plans, except for Plan 7002. As with the evaluated wildlife species, Plan 7002 would also provide much greater habitat value increases among the fisheries species than would the other action plans. Spotted seatrout, white shrimp, and brown shrimp, would benefit the most under Plan 7002, with 17.5 percent, 17.5 percent, and 18.9 percent AAHU increases, respectively.

Table 12. Comparison of year 50 net AAHU differences (percent) between the No Action Plan and action alternatives for selected fish and wildlife species in Subprovince 3

Evalution Species	Plan 5110	Plan 5410	Plan 5610	Plan 7002	Plan 7410	Plan 7610	Plan 10130
Mink	3.2	3.2	3.2	6.6	3.2	3.2	3.2
Otter	2.1	2.1	2.1	11.5	2.1	2.1	2.1
Muskrat	4.9	4.9	4.9	37.3	4.9	4.9	4.9
Alligator	4.9	4.9	4.9	37.3	4.9	4.9	4.9
Ducks	7.4	7.4	7.4	14.8	7.4	7.4	7.4
Croaker	4.0	4.0	4.0	14.7	4.0	4.0	4.0
Menhaden	4.2	4.2	4.2	14.4	4.2	4.2	4.2
Spotted seatrout	4.0	4.0	4.0	17.5	4.0	4.0	4.0
White shrimp	4.0	4.0	4.0	17.5	4.0	4.0	4.0
Brown shrimp	2.5	2.5	2.5	18.9	2.5	2.5	2.5

Subprovince 4

Under the No Action Plan, Subprovince 4 would lose more than -47,000 acres over the 50-year evaluation period (Table 2). Each of the action plans would produce the same result, reducing those future losses to slightly more than -8,000 acres, and at year 50, and they would save more than 39,000 acres compared to the No Action Plan (Table 13).

The action plans, which utilize perimeter (structural) salinity control and small freshwater introduction measures, would reduce the encroachment of marine processes and protect fresh and intermediate mashes throughout Subprovince 4. Under those plans, fresh and intermediate marsh acreage would experience a net increase, while brackish marsh would decrease (Table 14).

Table 13. Wetland acres at year 50, by type, for alternative plans in Subprovince 4

Wetland Type	No Action (acres)	Plan 5110 (acres)	Plan 5410 (acres)	Plan 5610 (acres)	Plan 7002 (acres)	Plan 7410 (acres)	Plan 7610 (acres)	Plan 10130 (acres)
Swamp	2,239	2,311	2,311	2,311	2,311	2,311	2,311	2,311
Fresh marsh	312,800	326,685	326,685	326,685	326,685	326,685	326,685	326,685
Intermediate marsh	238,517	310,088	310,088	310,088	310,088	310,088	310,088	310,088
Brackish marsh	202,292	155,884	155,884	155,884	155,884	155,884	155,884	155,884
Saline marsh	0	0	0	0	0	0	0	0
Total wetlands	**755,848**	**794,968**	**794,968**	**794,968**	**794,968**	**794,968**	**794,968**	**794,968**

Table 14. Wetland type difference (percent) at year 50, between the No Action Plan and alternative action plans in Subprovince 4

Wetland Type	No Action (% diff)	Plan 5110 (% diff)	Plan 5410 (% diff)	Plan 5610 (% diff)	Plan 7002 (% diff)	Plan 7410 (% diff)	Plan 7610 (% diff)	Plan 10130 (% diff)
Swamp	0.0	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Fresh marsh	0.0	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Intermediate marsh	0.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Brackish marsh	0.0	-22.9	-22.9	-22.9	-22.9	-22.9	-22.9	-22.9
Saline marsh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Total wetlands	**0.0**	**5.2**	**5.2**	**5.2**	**5.2**	**5.2**	**5.2**	**5.2**

Compared to the No Action Plan, each of the action plans would produce the same results in terms of impacts to evaluated wildlife species. Mink and American alligator would receive the greatest benefits, experiencing AAHU increases of 3.0 percent, and 4.9 percent, respectively (Table 15). River otter would receive only a 0.7 percent AAHU increase compared to the No Action Plan. Because of anticipated plan-induced decreases in its preferred brackish marsh habitat, muskrat would experience a -6.4 percent AAHU decrease.

Each action plan would have the same effect on the evaluated fishery species (Table 15). Gulf menhaden would receive the negligible benefit of a 0.6 percent AAHU increase under the action plans. Of the evaluated species, Atlantic croaker and white shrimp would receive the greatest benefits, with AAHU increases of 1.5 percent and 2.6 percent, respectively (Table 15). Those benefits are largely attributable to increases in fresh and intermediate marsh under this alternative. Gains in fresh and intermediate marsh would not compensate for the loss of preferred brackish marsh habitat used by species such as spotted seatrout and brown shrimp; thus, those species would experience small decreases in AAHUs of -2.0 percent and -2.7 percent, respectively, over the 50-year analysis period.

Table 15. Comparison of year 50 net AAHU differences (percent) between the No Action Plan and action alternatives for selected fish and wildlife species in Subprovince 4

Evaluation Species	Plan 5110	Plan 5410	Plan 5610	Plan 7002	Plan 7410	Plan 7610	Plan 10130
Mink	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Otter	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Muskrat	-6.4	-6.4	-6.4	-6.4	-6.4	-6.4	-6.4
Alligator	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Ducks	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Croaker	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Menhaden	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Spotted seatrout	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
White shrimp	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Brown shrimp	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7	-2.7

Coastwide Benefits Summary

Under the No Action Plan, a net loss of -463,000 acres would occur by year 50, even with projected gains in the Atchafalaya River Delta (Table 2). When the alternative action plans are compared against the No Action Plan at year 50, they would provide a net wetlands saving ranging from 365,000 acres under Plan 5110, to over 577,000 acres under Plan 7002 (Table 16). Compared to the today's coastwide wetland acreage of 3,665,188, however, only Plan 7002 would produce a net wetland gain, and Plan 5610 would roughly maintain the present wetland acreage over the 50-year evaluation period. Compared to the No Action Plan, the action plans

would, over 50 years, also result in a substantial percentage increase in fresh marsh, a moderate increase in intermediate marsh, a substantial reduction in brackish marsh, a small gain in saline marsh, and a slight decrease in swamp (Table 17).

Table 16. Coastwide wetland acreage at year 50, by type, for alternative plans

Wetland Type	No Action (acres)	Plan 5110 (acres)	Plan 5410 (acres)	Plan 5610 (acres)	Plan 7002 (acres)	Plan 7410 (acres)	Plan 7610 (acres)	Plan 10130 (acres)
Swamp	949,707	927,220	922,826	906,008	890,787	928,557	911,739	913,678
Fresh marsh	798,847	1,116,200	1,160,655	1,277,415	1,295,029	1,138,634	1,255,393	1,154,889
Intermediate marsh	956,240	1,203,237	1,209,444	1,160,571	1,026,580	1,101,172	1,052,299	1,247,616
Brackish marsh	437,477	250,744	250,744	250,744	457,099	292,159	292,159	368,413
Saline marsh	60,157	70,259	70,259	70,259	110,133	126,623	126,623	68,047
Total wetlands	**3,202,429**	**3,567,661**	**3,613,928**	**3,664,997**	**3,779,628**	**3,600,099**	**3,638,213**	**3,632,392**

Table 17. Coastwide wetland type difference (percent) at year 50, between the No Action Plan and alternative action plans

Wetland Type	No Action (% diff)	Plan 5110 (% diff)	Plan 5410 (% diff)	Plan 5610 (% diff)	Plan 7002 (% diff)	Plan 7410 (% diff)	Plan 7610 (% diff)	Plan 10130 (% diff)
Swamp	0	-2	-3	-5	-6	-2	-4	-4
Fresh marsh	0	40	45	60	62	43	57	45
Intermediate marsh	0	26	26	21	7	15	10	30
Brackish marsh	0	-43	-43	-43	4	-33	-33	-16
Saline marsh	0	17	17	17	83	110	110	13
Total wetlands	**0**	**11**	**13**	**14**	**18**	**12**	**14**	**13**

The above habitat type projections are interim values (subject to a considerable degree of risk and uncertainty) and likely will be modified with future improvements in the salinity and/or habitat modeling methodologies. They will likely also be changed to reflect the anticipated phased implementation of the various action plan features over a long period of time.

Coastwide effects on the fish and wildlife evaluation species reflect the acreage changes for the various wetland types. Due to the large increase in their preferred fresh and intermediate marsh habitats, the American alligator and dabbling ducks would be most benefitted (Table 18). Other fish and wildlife species that utilize low-salinity habitats, such as white shrimp, Atlantic croaker, and mink, would also benefit, but to a lesser degree. Gulf menhaden, which utilize low-salinity habitats as juveniles, are projected to experience a coastwide reduction in habitat quality due to the substantial impacts of the alternative action plans on that species in Subprovince 1. Consistent with the projected decreases in brackish marsh acreage, species which prefer brackish habitats (such as brown shrimp, spotted seatrout, and muskrat), would experience coastwide habitat value decreases.

Table 18. Coastwide comparison of year 50 AAHU differences (percent) between the No Action Plan and alternative action plans for selected wildlife and fish species

Evaluation Species	Plan 5110	Plan 5410	Plan 5610	Plan 7002	Plan 7410	Plan 7610	Plan 10130
Mink	14.9	16.8	18.7	17.9	14.2	16.1	16.3
Otter	8.3	10.8	11.0	18.6	7.5	7.7	11.3
Muskrat	-30.6	-27.3	-21.0	19.7	-18.6	-12.4	-29.1
Alligator	40.5	45.9	47.9	73.5	33.6	35.6	48.2
Ducks	27.7	32.4	39.8	41.6	27.2	34.5	32.7
Croaker	8.7	13.8	15.6	30.4	11.4	13.1	14.4
Menhaden	-10.7	-6.9	-5.7	13.7	-2.4	-1.1	-7.1
Spotted seatrout	-29.1	-26.2	-25.2	1.5	-16.7	-15.7	-27.2
White shrimp	11.6	16.6	16.2	34.4	13.4	12.9	17.5
Brown shrimp	-31.3	-29.0	-30.1	-1.1	-20.7	-21.7	-29.3

Plan 7002 is the only action plan alternative of those evaluated that would produce net wetland gains (relative to present baseline wetland acreage); it would also produce the greatest fish and wildlife benefits (in AAHUs), and it would avoid project-related adverse impacts to species of fish and wildlife that prefer brackish marsh. Based solely on fish and wildlife considerations, it is obviously the most beneficial of the evaluated action alternatives. All the action alternatives would, however, to varying degrees restore marsh-building and marsh-maintenance processes through freshwater and sediment inputs, and would substantially reduce or nearly halt (Plan 5610) coastal wetland loss. Hence, implementing any of the proposed action plans would be preferable to the continued loss and degradation of coastal wetlands under the No Action Plan.

Current projections suggest that fish and wildlife species which prefer brackish and saline marsh habitats might be negatively impacted by the freshwater/sediment diversion features included in the proposed action plan alternatives. However, given the rapid loss and likely future collapse of brackish and salt marshes systems under the No Action Plan, we believe that, over the long term, the action plan alternatives would provide a substantial net benefit to those species. Additionally, the Service anticipates that refinements in model-based habitat and salinity projections will ultimately reveal that projected impacts to those brackish marsh fish and wildlife species will be substantially less than presently estimated. Additionally, the Service will recommend, through involvement in subsequent planning and design, that design and operational measures be incorporated into project features to increase their benefits to wetland-associated fish and wildlife and to minimize adverse effects on those resources.

Because of the interim nature (i.e., their current degree of risk and uncertainty) of some habitat change estimates, and because many details regarding the design, operation, and associated effects of the action plans are not yet available, nor has a preferred plan yet been identified, we cannot complete our evaluation of the preferred plan's effects on fish and wildlife resources, nor can we entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. Therefore, extensive additional Service involvement during subsequent detailed planning, engineering, and design of specific project measures, along with more-

definitive project information that will be available during that plan implementation phase, will be required so that we can fulfill our responsibilities under that Act.

The National Wildlife Refuge System Improvement Act of 1997 mandates that no new or expanded use of a NWR may be allowed unless it is first determined to be compatible with the objectives for which that NWR was established and managed. A compatibility determination is a written determination, indicating that a proposed or existing use of a NWR is, or is not, a compatible use. Compatible uses are defined as proposed or existing wildlife-dependent recreational uses or any other uses of a NWR that, based on sound professional judgement, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the NWR. A compatibility determination is only required when the Service has jurisdiction over the use. Prior to initiating implementation of a project that would affect any NWR, the Corps of Engineers should contact the Refuge Manager to determine if the proposed project constitutes a "refuge use" subject to a compatibility determination. To determine the anticipated impacts of any proposed use, the Corps may be required to provide sufficient data and information sources to document any short-term, long-term, direct, indirect or cumulative impacts on refuge resources. Compatibility determinations will include a public review and comment period before issuance of a final decision by the appropriate Refuge Manager.

FUTURE SERVICE INVOLVEMENT

Because of the LCA's large scope, complexity, and programmatic nature, extensive funding will be required by the Service for full participation throughout future detailed planning and post-authorization engineering and design studies, and to facilitate fulfillment of our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. Accordingly, the Service plans to work closely with the Corps and the State of Louisiana to formulate detailed funding estimates to support our continuing and extensive involvement in the LCA.

Under provisions of Section 7 of the Endangered Species Act of 1973, as amended, the Service will also assist the Corps and any other Federal agencies responsible for funding or implementing selected projects and/or plans to ensure that they will not jeopardize the continued existence of threatened and endangered species, or adversely modify any designated critical habitat. The required consultations will be accomplished on a project-by-project basis, and will build upon the programmatic consultation contained in the Programmatic Environmental Impact Statement for the LCA study.

SUMMARY AND SERVICE POSITION

The Service has actively participated in the formulation and evaluation of the seven action plan alternatives. Given the severe future impacts to coastal wetlands and their associated fish and wildlife resources under the No Action Plan, we would support implementation of any one of the proposed action plans. According to the present interim evaluation results, however, only Plan 7002 would reverse the severe loss of Louisiana's coastal wetlands. It would also provide the

greatest level of benefits to Louisiana's nationally significant fish and wildlife resources. Consequently, we currently favor implementation of that plan. However, Plan 7002 includes very expensive and highly complex projects, such as the large-scale diversion of Mississippi River water into the Barataria and Terrebonne Basins known as the "Third Delta;" hence, the benefits associated with that plan may not ultimately be achievable and/or affordable. As Plan 5610 is presently the second-most beneficial plan, we would favor its implementation in lieu of Plan 7002 if the latter is found to be infeasible.

Regardless of the alternative that is ultimately identified for implementation, should the "Third Delta" diversion project not be included, the Service recommends that the Subprovince 3 benefits lost through elimination of that project be replaced to the greatest extent possible through the comprehensive implementation of features and projects designed to maximize Atchafalaya River flows/influence in the Atchafalaya and Terrebonne Basins. The proposed restoration of the reefs extending from Point au Fer Island to the southern end of the Point Chevreuil reef would greatly enhance land-building in the Atchafalaya Delta and increase riverine influences in western Terrebonne Basin marshes. Because that reef restoration project is believed to be one of the most beneficial features of that strategy, the Service recommends that it be made part of any preferred implementation alternative that may be designated in the future. Similarly, the Service recommends the following modifications be incorporated in any plan ultimately selected for implementation:

1. Install a new Calcasieu Lock and use of the old lock for improved management of water levels in the Lakes Subbasin, and for moderating salinity levels in the Calcasieu Basin.
2. Delete the proposed Gulf Intracoastal Lock at the Alkali Ditch, as many of the wetlands intended to be benefitted by that feature have already been lost and others are now protected by other means.
3. Sufficient funding should be provided for full Service participation throughout post-authorization engineering and design studies, and to facilitate fulfillment of its responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act.
4. The Corps should obtain a right-of-way from the Service prior to conducting any work on a National Wildlife Refuge, in conformance with Section 29.21-1, Title 50, Right-of-way Regulations. Issuance of a right-of-way will be contingent on a determination by the Service's Regional Director that the proposed work will be compatible with the purposes for which the Refuge was established.

To ensure that optimum fish and wildlife resource benefits are achieved, the Service plans to remain actively involved throughout the plan implementation process. Our findings and recommendations on the design and operation of projects approved for implementation will be provided under the authority of the Fish and Wildlife Coordination Act.

LITERATURE CITED

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APPENDIX B5

U.S. FISH AND WILDLIFE COORDINATION ACT REPORT

LCA Near-Term Plan

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

May 28, 2004

Colonel Peter J. Rowan
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Rowan:

Enclosed is the Draft Fish and Wildlife Coordination Act Report on the Near-Term Ecosystem Restoration Plan for the Louisiana Coastal Area, Louisiana Coastwide Ecosystem Restoration Feasibility Study. Copies of that revised draft report have been provided to the National Oceanographic and Atmospheric Administration - Fisheries and the Louisiana Department of Wildlife and Fisheries for their review. Their comments will be forwarded to you upon receipt, and will be fully addressed in our final report for the study. The enclosed document does not constitute the final report of the Secretary of the Interior, as required by Section 2(b) Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

Should your staff have any questions regarding the enclosed report, please have them contact Ms. Catherine Grouchy (504/862-2689) of this office.

Sincerely,

Russell Watson
Supervisor
Louisiana Field Office

cc: LA Dept. of Wildlife and Fisheries, Baton Rouge, LA
LA Dept. of Natural Resources (CRD & CMD), Baton Rouge, LA
National Oceanographic and Atmospheric Adm. - Fisheries, Baton Rouge, LA
Fish and Wildlife Service, Atlanta, GA (AES)
Environmental Protection Agency, Baton Rouge, LA
Natural Resources Conservation Service, Alexandria, LA

NEAR-TERM ECOSYSTEM RESTORATION PLAN FOR THE LOUISIANA COASTAL AREA

FISH AND WILDLIFE COORDINATION ACT REPORT

U.S. FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES

LAFAYETTE, LOUISIANA

MAY 2004

NEAR-TERM ECOSYSTEM RESTORATION PLAN FOR THE LOUISIANA COASTAL AREA

FISH AND WILDLIFE COORDINATION ACT REPORT

PROVIDED TO
NEW ORLEANS DISTRICT
U.S. ARMY CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY
CATHERINE GROUCHY, FISH AND WILDLIFE BIOLOGIST
AND
RONNY PAILLE, SENIOR FIELD BIOLOGIST

U.S. FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
LAFAYETTE, LOUISIANA

MAY 2004

EXECUTIVE SUMMARY

The U.S. Fish and Wildlife Service (Service) has prepared the following Fish and Wildlife Coordination Act Report for inclusion in the forthcoming draft Near-term Ecosystem Restoration Plan (NTP) for the Louisiana Coastal Area (LCA), Louisiana Coastwide Ecosystem Restoration Feasibility Study. The purpose of that study is " . . . to determine the feasibility of sustaining a coastal ecosystem that supports and protects the environment, economy and culture of southern Louisiana and that contributes greatly to the economy and well being of the nation." Although the NTP is largely programmatic, it is a critically important component of the continuing cooperative Federal-State effort to address the loss of Louisiana's coastal wetlands. The NTP, together with its supporting documentation (including this report), will be the basis upon which the Corps will request further authorization and funding from Congress to address that issue.

The study area includes all of Louisiana's coastal wetlands. Those wetlands, which support nationally important fish and wildlife resources, are being lost at an average rate of approximately 24 square miles per year due to a variety of causes. The NTP, developed by the Corps, the State of Louisiana, and the other cooperating Federal agencies, identifies the first 10-year increment of highly effective restoration features targeting critical ecological need areas—those areas of the coast plagued by the greatest ecosystem degradation, and those with the greatest potential for ecosystem recovery and infrastructure protection, as well as large-scale, long-term restoration features.

Each of the three major NTP action alternatives would, to varying degrees, reduce coastal wetland loss. Hence, implementing any of the proposed action plans would be preferable to the continued loss and degradation of coastal wetlands under the no-action scenario. The Tentatively Selected Plan (TSP) encompasses a variety of restoration strategies such as freshwater and sediment diversions, interior shoreline protection, barrier island and barrier headland protection, and dredged material/marsh restoration. The Service believes that the TSP, which focuses on preventing future land loss, restoring deltaic processes, restoring critical geomorphic structures, and protecting vital socio-economic resources, would provide the greatest fish and wildlife benefits, and would best achieve long-term sustainability of Louisiana’s coastal wetland ecosystem.

Coastwide, the TSP would restore marsh-building and marsh-maintenance processes through freshwater and sediment inputs. The TSP would increase coastal wetland acreage compared to taking no action; thus, it would have a major positive impact on most, if not all, of the fish and wildlife resources that utilize those wetlands. The project-related conversion of some brackish and saline marshes to fresh and low-salinity marshes would displace brown shrimp, spotted seatrout, and other fishes and shellfishes which prefer more saline habitats. Those displacement impacts would be partially compensated for by project-induced increases in the productivity of remaining high salinity habitats, and by the improved sustainability of those habitats, compared to taking no action. Additionally, the abundance and productivity of white shrimp, Gulf menhaden, and other fishes and shellfishes which utilize low-salinity habitats would likely be increased under the preferred plan. Given the continued rapid loss and likely future collapse of brackish

and salt marsh systems with no action, the TSP may also provide a long-term net benefit to species utilizing those areas. Accordingly, the Service recommends that, during future planning iterations, design and operational measures be incorporated into project features to minimize adverse effects on those resources and to increase benefits to other fish and wildlife species, to the greatest extent practical.

Because of the uncertainties regarding some of the currently proposed habitat prediction methodologies, and because many details regarding the design, operation, and associated effects of the TSP are not yet available at the current programmatic level of planning, we cannot complete our evaluation of the TSP's effects on fish and wildlife resources, nor can we entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Therefore, extensive additional Service involvement during subsequent detailed planning, engineering, design, and construction of specific project measures, along with more-definitive project information that will be available during those planning phases, will be required so that we can fulfill our responsibilities under that Act. Additionally, improvements in the hydrologic and desktop models will be needed to predict environmental impacts and benefits of plan features, as indicated in our previous draft Fish and Wildlife Coordination Act Report (Paille, R. and K. Roy, September 2003b) for the LCA Comprehensive Study.

The Service has actively participated throughout the formulation and evaluation of the LCA coastwide alternatives and the selection of near-term restoration features, as well as the large-scale studies and the demonstration projects that comprise the NTP. Given the substantial adverse future impacts to coastal wetlands and their associated fish and wildlife resources under future without-project conditions, we strongly support authorization and implementation of the near-term TSP for the NTP, as it would provide the greatest level of benefits to Louisiana's nationally significant fish and wildlife resources. Accordingly, the Service also provides the following procedural recommendations for future authorization and implementation of the NTP:

1. In accordance with the January 2003 Partnership Agreement for Water Resources and Fish and Wildlife between the Service and the Corps, sufficient continuous funding should be provided to the Service to fulfill our responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act throughout post-authorization engineering and design studies (for demonstration projects and NTP projects) and the long-term project feasibility studies.

2. The Corps should obtain a right-of-way from the Service prior to conducting any work on a National Wildlife Refuge, in conformance with Section 29.21-1, Title 50, Right-of-way Regulations. Issuance of a right-of-way will be contingent on a determination by the Service's Regional Director that the proposed work will be compatible with the purposes for which the refuge was established.

To ensure that optimum fish and wildlife resource benefits are achieved, the Service plans to remain actively involved throughout the plan implementation process. Our findings and recommendations for each of the projects ultimately approved for implementation will be provided as supplements to this report under the authority of the Fish and Wildlife Coordination Act.

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INTRODUCTION

The Near-term Ecosystem Restoration Plan (NTP) for the Louisiana Coastal Area (LCA), Louisiana Coastwide Ecosystem Restoration Feasibility Study has been prepared by the New Orleans District Corps of Engineers (Corps), Louisiana Department of Natural Resources, and other State and Federal natural resource agencies, with the assistance of scientists from several institutions. The LCA study was originally authorized by Resolutions adopted by the U.S. House of Representatives and Senate Committees on Public Works, on October 19, 1967, and April 19, 1967, respectively. Those resolutions sought to improve existing hurricane protection features and the ". . . prevention of saltwater intrusion, preservation of fish and wildlife, prevention of erosion, and related water resource purposes."

As currently formulated, the LCA is envisioned as the mechanism for developing and implementing a program to achieve system-wide sustainable restoration of Louisiana's coastal wetlands. That program would maximize use of restoration strategies that promote the reintroduction of riverine fresh water, nutrients, and sediments, and that would maintain the structural integrity of the estuarine basins. The program's near-term component would also include a process to develop better techniques for meeting the critical needs of the ecosystem and to advance our understanding of the coastal ecosystem. To put the scope and significance of the LCA in proper perspective, it is important to understand the magnitude of the problems to which it will respond, as well as the unprecedented level of coordinated efforts that have already been undertaken to address those problems.

In 1990, passage of the Coastal Wetlands Planning, Protection and Restoration Act, (PL-101-646, Title III, CWPPRA), provided authorization and funding for the Louisiana Coastal Wetlands Conservation and Restoration Task Force to begin actions to curtail the annual loss of approximately 24 square miles per year Louisiana's coastal wetlands. In 1998, after extensive studies and construction of a number of coastal restoration projects had been accomplished under CWPPRA, the State of Louisiana and the Federal agencies charged with restoring and protecting the remainder of Louisiana's valuable coastal wetlands developed the "Coast 2050: Toward a Sustainable Coastal Louisiana" report, popularly known as the *Coast 2050 Plan*. In recognition of the national significance of Louisiana's coastal wetlands, that plan proposes ecosystem restoration strategies and efforts larger in scale than any previously implemented, including restoration of the natural processes that built and maintained coastal Louisiana.

In 2000, the Corps used the *Coast 2050 Plan* as the basis for a section 905(b) reconnaissance report intended to gain approval for a coastwide feasibility study, the purpose of which would be to obtain Water Resources Development Act authorization of, and funding for, a comprehensive coastal wetlands restoration plan to include projects larger in scope than those implemented under CWPPRA. In 2000, it was envisioned that a series of feasibility reports would be prepared over a 10-year period. The first of those feasibility efforts focused on the Barataria Basin and involved marsh creation and barrier shoreline restoration.

By Fiscal Year (FY) 2002, however, it had become widely recognized that, despite the excellent progress of other programs, a much more comprehensive approach - one that could be submitted to Congress as a blueprint for future restoration efforts - would be needed to effectively address Louisiana's coastal wetland loss. As a result, the Corps and the State of Louisiana initiated the LCA Comprehensive Coastwide Ecosystem Restoration Study (LCA Comprehensive Study), an interagency planning effort to develop a comprehensive plan to restore Louisiana's coastal ecosystem. Although they were not publically released, a preliminary Draft LCA Comprehensive Study Report and preliminary Draft Programmatic Environmental Impact Statement (PEIS) were subsequently prepared. Associated with those documents, the Service provided a Draft Fish and Wildlife Coordination Act Report (Paille, R. and K. Roy, August 2003a). Immediately thereafter, the Corps and the local sponsor revised those documents to describe seven action alternatives, although a preferred alternative was not identified. Subsequently, the Service prepared a revised Draft Fish and Wildlife Coordination Act Report (Paille, R. and K. Roy, September 2003b). Following review by the Office of Management and Budget and the Council on Environmental Quality, public release of that draft LCA Comprehensive Study Report was deferred pending revisions to satisfy FY 2005 administrative budget guidance. Key elements of that guidance included requirements to: 1) identify the most critical ecological needs of the coastal area, 2) identify projects to address these needs that provide a very high return in net benefits (non-monetary and monetary) per dollar of cost, 3) present and evaluate alternatives for meeting those needs, 4) identify the key long-term scientific uncertainties and engineering challenges facing the effort to protect and restore the ecosystem, and 5) propose a strategy for resolving the identified challenges.

In a coordinated response to that guidance, the Corps, the State of Louisiana, and the other cooperating Federal agencies (including the Service), re-focused the larger comprehensive ecosystem restoration plan into the current NTP. The NTP identifies the first 10-year increment of highly effective restoration features targeting critical ecological need areas—those areas of the coast plagued by the greatest ecosystem degradation, and those with the greatest potential for ecosystem recovery and infrastructure protection, as well as large-scale, long-term restoration features. The balance of this report documents the Service's programmatic assessment of the NTP and provides our recommendations for future planning and implementation of the NTP and its features.

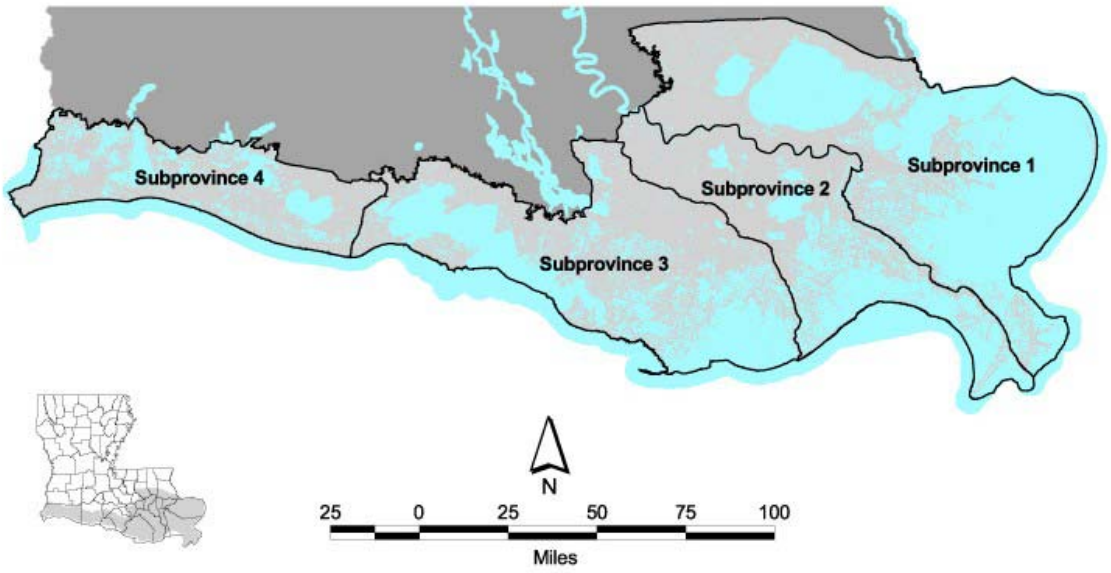
DESCRIPTION OF THE STUDY AREA

The study area encompasses all of Louisiana's coastal wetlands, which include natural levee forest, swamp, fresh marsh, intermediate marsh, brackish marsh, saline marsh, and barrier islands. The study area is divided into four subprovinces (Figure 1), each of which includes one or more coastal watersheds. The LCA subprovinces are very similar to those identified under the Coast 2050 Plan (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority

1998), except that the boundary between Subprovinces 1 and 2 has been relocated from the Mississippi River-Gulf Outlet to the Mississippi River under the LCA.

Subprovince 1 consists of all coastal wetlands east of the Mississippi River (and South Pass) and includes the Pontchartrain and Breton Sound Basins. Subprovince 2 consists of the coastal wetlands between the Mississippi River and Bayou Lafourche (i.e., the Barataria Basin). Subprovince 3 extends from Bayou Lafourche westward to the Freshwater Bayou Canal and includes the Terrebonne, Atchafalaya, and Teche/Vermilion Basins. Subprovince 4 extends from the Freshwater Bayou Canal westward to the Louisiana State line (i.e. the Sabine River/Sabine Lake) and includes the Mermentau and Calcasieu/Sabine Basins.

Figure 1. LCA Near-Term Ecosystem Recreation Plan Study Area.



EXISTING FISH AND WILDLIFE RESOURCES

Description of Habitats

Forested Wetlands - Forested wetlands in the study area consist primarily of bottomland hardwood forests and cypress-tupelo swamps. Bottomland hardwood forests found in coastal portions of the project area occur primarily on the natural levees of distributary channels. Dominant vegetation may include sugarberry, water oak, live oak, bitter pecan, black willow, American elm, Drummond red maple, Chinese tallow-tree, boxelder, green ash, baldcypress, and elderberry. Cypress-tupelo swamps are located along the flanks of larger distributary ridges as a transition zone between bottomland hardwoods and lower-elevation marsh or scrub-shrub habitats. Cypress-tupelo swamps exist where there is little or no salinity and (usually) minimal daily tidal action.

Scrub-Shrub - Scrub-shrub habitat is often found along the flanks of distributary ridges. Typically, it is bordered by marsh at lower elevations and by developed areas, cypress-tupelo swamp, or bottomland hardwoods at higher elevations. Typical scrub-shrub vegetation includes elderberry, wax myrtle, buttonbush, black willow, Drummond red maple, Chinese tallow-tree, and groundselbush.

Fresh Marsh - Fresh marshes occur at the upper ends of interdistributary basins and are often characterized by floating or semi-floating organic soils. Most fresh marshes exhibit minimal daily tidal action; however, fresh marshes in the Atchafalaya River delta and adjacent to Atchafalaya Bay are the exceptions. Vegetation may include maidencane, bulltongue, cattail, California bulrush, pennywort, giant cutgrass, American cupscale, spikerushes, bacopa, and alligatorweed. Associated open-water habitats may often support extensive beds of floating-leaved and submerged aquatic vegetation including water hyacinth, Salvinia, duckweeds, American lotus, white water lily, water lettuce, coontail, Eurasian milfoil, hydrilla, pondweeds, naiads, fanwort, wild celery, water stargrass, elodea, and others.

Intermediate Marsh - Intermediate marshes are a transitional zone between fresh and brackish marshes, and are often characterized by organic, semi-floating soils. Typically, intermediate marshes experience low levels of daily tidal action. Salinities are negligible or low throughout much of the year, with salinity peaks occurring during late summer and fall. Vegetation includes saltmeadow cordgrass, deer pea, three-cornered grass, cattail, bulltongue, California bulrush, seashore paspalum, wild millet, fall panicum, and bacopa. Ponds and lakes within the intermediate marsh zone often support extensive submerged aquatic vegetation including southern naiad, Eurasian milfoil, and wigeongrass.

Brackish Marsh - Brackish marshes are characterized by low-to-moderate daily tidal energy and by soils ranging from firm mineral soils to organic semi-floating soils. Freshwater conditions may prevail for several months during early spring; however, low-to-moderate salinities occur during much of the year, with peak salinities in the late summer to fall. Vegetation is usually dominated by saltmeadow cordgrass, but also includes saltgrass, three-cornered grass, leafy three-square, and deer pea. Shallow brackish marsh ponds occasionally support abundant beds of wigeongrass.

Saline Marsh - Saline marshes occur along the southern fringe of the coastal wetlands. Those marshes usually exhibit fairly firm mineral soils and experience moderate to high daily tidal energy. Vegetation is dominated by saltmarsh cordgrass, but may also include saltgrass, saltmeadow cordgrass, black needlerush, and leafy three-square. Submerged aquatic vegetation is rare. Within the study area, intertidal mud flats are most common in saline marshes.

Ponds and Lakes - Natural marsh ponds and lakes, interspersed throughout the coastal wetlands, are typically shallow, ranging in depth from 6 inches to more than 2 feet. The smaller ponds are typically shallow and the larger lakes are deeper. In fresh and low-salinity areas, ponds and lakes may support varying amounts of submerged and/or

floating-leaved aquatic vegetation. Brackish and, much less frequently, saline marsh ponds and lakes may support wigeongrass beds.

Canals and Bayous - Canals and larger bayous typically range in depth from 4 or 5 feet, to more than 15 feet. Strong tidal flows may occur at times through those waterways, especially where they provide hydrologic connections to other large waterbodies. Such canals and bayous may have mud or clay bottoms that range from soft to firm. Dead-end canals and small bayous are typically shallow and their bottoms may be filled to varying degrees with semi-fluid organic material. Erosion, due to wave action and boat wakes, together with shading from overhanging woody vegetation, may retard the amount of intertidal marsh vegetation growing along the edges of those waterways.

Navigation Channels - A number of large (300 feet wide or wider) navigation channels have been dredged across the coastal zone. Such channels include the Sabine-Neches Waterway, the Calcasieu Ship Channel, the Freshwater Bayou Channel, the Houma Navigation Canal, the Barataria Waterway, and the Mississippi River Gulf Outlet. Such channels may range in depth from 15 feet to over 40 feet, and often cut through natural distributary ridges and disrupted local hydrology by increasing tidal exchange, saltwater intrusion, and freshwater discharge rates. The Gulf Intracoastal Waterway traverses the coastal zone from east to west and has also caused hydrologic disruptions. Boat wakes and water displacement surges from the passage of large vessels has also resulted in severe erosion of adjoining marshes in some locations.

Developed Areas - Most developed areas are located on higher elevations of former distributary channels and are typically well drained. They include agricultural lands, and commercial and residential developments.

Fishery Resources

Wetlands throughout the study area abound with small resident fishes and shellfishes such as least killifish, rainwater killifish, sheepshead minnow, mosquitofish, sailfin molly, grass shrimp, and others. Those species are typically found along marsh edges or among submerged aquatic vegetation, and provide forage for a variety of fish and wildlife. Fresh and low-salinity marshes provide habitat for commercially and recreationally important resident freshwater fishes such as largemouth bass, yellow bass, black crappie, bluegill, redear sunfish, warmouth, blue catfish, channel catfish, buffalo, freshwater drum, bowfin, and gar. Freshwater fishes may also utilize low-salinity areas (intermediate marsh zone), provided they have access to fresher areas during periods of high salinity.

Louisiana's coastal marshes also provide nursery habitat for many estuarine-dependent commercial and recreational fishes and shellfishes. Because of the protection and abundant food afforded by those wetlands, they are critical to the growth and production of species such as blue crab, white shrimp, brown shrimp, Gulf menhaden, Atlantic croaker, red drum, spotted seatrout, black drum, sand seatrout, spot, southern flounder, striped mullet, and others. Those species are generally most abundant in the brackish and

saline marshes; however, blue crab, Gulf menhaden, Atlantic croaker, and several other species also utilize fresh and low-salinity marshes.

Because tidal marshes provide essential nursery habitat, commercial shrimp harvests are positively correlated with the area of tidal emergent wetlands, but not open-water areas (Turner 1977 and 1982). Future commercial harvests of shrimp and other fishes and shellfishes could be adversely impacted by the high rates of marsh loss throughout the study area (Turner 1982).

The American oyster also occurs throughout much of the brackish and saline marsh zones within the study area. Oyster harvesting constitutes a valuable fishery in the northern portions of that zone, where salinities range from 10 to 15 parts per thousand (ppt).

Essential Fish Habitat

The generic amendment to Gulf of Mexico Fishery Management Plan identifies Essential Fish Habitat in the project area to be intertidal emergent wetlands, submerged aquatic vegetation, estuarine waters, and mud, sand, and shell water bottoms. Habitat Areas of Particular Concern have not been identified for the project area. Under the Magnuson-Stevens Fishery Conservation and Management Act, the Gulf of Mexico Fishery Management Council has determined that project-area habitats are utilized by federally managed species such as brown shrimp, white shrimp, and red drum. Although those species utilize the project area primarily as nursery habitat, all life stages may occur therein. When they move to offshore waters, blue crabs and other species of fishes and shellfishes that utilize project-area estuarine habitats may also provide forage for Federally managed marine fishes such as groupers, snappers, and mackerel.

Wildlife Resources

Numerous species of birds utilize the study-area marshes, including large numbers of migratory waterfowl. Project-area fresh and intermediate marshes provide excellent wintering habitat for migratory waterfowl, especially puddle (dabbling) ducks. Brackish marshes with abundant submerged aquatic vegetation may also support large numbers of puddle ducks. Puddle ducks that commonly migrate to, or through, the study area include mallard, gadwall, northern pintail, blue-winged teal, green-winged teal, American wigeon, wood duck, and northern shoveler. The resident mottled duck and wood duck also utilize project-area coastal marshes for nesting, feeding, and brood-rearing. Diving ducks prefer larger ponds, lakes, and open-water areas. Common diving duck species include lesser scaup, ruddy duck, canvasback, redhead, ringnecked duck, red-breasted merganser, and hooded merganser. The lesser snow goose and the white-fronted goose also utilize coastal marshes as wintering habitat. Other migratory game birds found in Louisiana's coastal marshes include the king rail, clapper rail, Virginia rail, sora, American coot, common moorhen, and common snipe.

Marshes and associated shallow, open-water areas also provide habitat for a number of wading birds, shorebirds, seabirds, and other nongame birds. Common wading birds

include the little blue heron, great blue heron, green-backed heron, yellow-crowned night heron, black-crowned night heron, great egret, snowy egret, cattle egret, reddish egret, white-faced ibis, white ibis, and roseate spoonbill. Shorebirds include the killdeer, American avocet, black-necked stilt, common snipe, and various species of plovers and sandpipers. Seabirds include white pelican, endangered brown pelican, black skimmer, herring gull, laughing gull, and several species of terns. More than 190 wading and seabird nesting colonies have been identified within coastal Louisiana during surveys conducted in 1983, 1990, and 2001 (Michot et al. 2003). Other nongame birds, such as boat-tailed grackle, red-winged blackbird, seaside sparrow, olivaceous cormorant, northern harrier, belted kingfisher, and sedge wren, also utilize coastal-area habitats.

Common mammals occurring in the coastal marshes include nutria, muskrat, mink, river otter, raccoon, swamp rabbit, white-tailed deer, and coyote. Muskrat and river otter prefer brackish marsh. Nutria, mink, swamp rabbit, and white-tailed deer prefer fresh marsh and low salinity habitats. Saline marsh provides very poor habitat for the above listed species. For muskrat, however, saline marsh may provide fair-to-poor habitat quality.

Reptiles are most abundant in fresh and low-salinity coastal wetlands. Common species include the American alligator, western cottonmouth, water snakes, mud snake, speckled kingsnake, ribbon snakes, rat snakes, red-eared turtle, common snapping turtle, alligator snapping turtle, mud turtles, and softshell turtles. Amphibians commonly found in those areas include the bullfrog, pig frog, bronze frog, leopard frog, cricket frogs, tree frogs, chorus frogs, three-toed amphiuma, sirens, and several species of toads. In brackish and saline marshes, reptiles are limited primarily to the American alligator and the diamond-backed terrapin, respectively.

Coastal forested and scrub-shrub wetlands provide key habitats for songbirds such as the mockingbird, yellow-billed cuckoo, northern parula, yellow-rumped warbler, prothonotary warbler, white-eyed vireo, Carolina chickadee, and tufted titmouse. Those areas also provide vitally important resting and feeding areas for songbirds migrating across the Gulf of Mexico. Other avian species found in forested wetlands include the American woodcock, common flicker, brown thrasher, white-eyed vireo, belted kingfisher, loggerhead shrike, pileated woodpecker, red-headed woodpecker, downy woodpecker, common grackle, common crow, and mockingbird.

Forested habitats and associated waterbodies also support raptors such as the red-tailed hawk, red-shouldered hawk, osprey, American kestrel, Mississippi kite, northern harrier, screech owl, great horned owl, and barred owl. Wading bird colonies typically occur in cypress swamp and scrub-shrub habitats. Species found in those nesting colonies include anhinga, great egret, great blue heron, black-crowned night heron, tricolored heron, little blue heron, cattle egret, snowy egret, white-faced and glossy ibises, and reddish egret. Resident and migratory waterfowl species found in forested wetlands and adjacent waterbodies in the project area include, but are not limited to, wood duck, mallard, green-winged teal, gadwall, and hooded merganser.

Game mammals associated with coastal forested wetlands include eastern cottontail, swamp rabbit, gray and fox squirrels, and white-tailed deer. Commercially important furbearers include river otter, muskrat, nutria, mink, and raccoon. Other mammals found in forested wetlands include striped skunk, coyote, Virginia opossum, bobcat, armadillo, gray fox, and red bat. Smaller mammal species serve as forage for both mammalian and avian carnivores and include the cotton rat, marsh rice rat, white-footed mouse, eastern wood rat, harvest mouse, least shrew, and southern flying squirrel.

Reptiles, which utilize study area bottomland hardwoods, cypress swamps, and associated shallow waters, include the American alligator, ground skink, five-lined skink, broadbanded skink, green anole, Gulf coast ribbon snake, yellow-bellied water snake, speckled kingsnake, southern copperhead, western cottonmouth, pygmy rattlesnake, broad-banded water snake, diamond-backed water snake, spiny softshell turtle, red-eared turtle, southern painted turtle, Mississippi mud turtle, stinkpot, and common and alligator snapping turtle, in addition to numerous other species.

Representative amphibians in study-area forested wetlands include dwarf salamander, three-toed amphiuma, lesser western siren, central newt, Gulf coast toad, eastern narrow-mouthed toad, green treefrog, squirrel treefrog, pigfrog, bullfrog, southern leopard frog, bronze frog, upland chorus frog, southern cricket frog, and spring peeper.

Most developed areas provide low-quality wildlife habitat. Sites developed for agricultural purposes are usually located at elevations slightly higher than the wetlands, or they may have improved drainage. In agricultural areas, wildlife habitat is primarily provided by unmaintained ditch banks and field edges, fallow fields, pasture lands, and/or occasionally flooded fields. Cultivated crops, especially soybeans, provide forage for some wildlife species. Game species that utilize agricultural lands include the white-tailed deer, mourning dove, bobwhite quail, eastern cottontail, and common snipe. Seasonally flooded cropland and fallow fields may also provide important feeding habitat for wintering waterfowl, wading birds, and other waterbirds.

Threatened and Endangered Species

As a cooperating agency, the Service provided a September 26, 2003, letter to the Corps detailing Federally listed threatened and endangered species, their critical habitat, and migratory birds that may be found in or near the study area for the draft LCA Comprehensive Study (Appendix A). That information, and the draft Biological Assessment which Service staff also helped to prepare, remain applicable to the NTP alternatives, and should be used to facilitate programmatic Section 7 consultation under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and compliance with the Migratory Bird Treaty Act (MBTA; 40 Stat. 755, as amended; 16 U.S.C. 703 et seq.). In keeping with the consultation requirements of the ESA, informal and formal (if needed) consultation must be completed before the Record of Decision for the NTP and PEIS can be signed. Accordingly, the Service will continue to work closely with the Corps through the consultation period.

Fish and Wildlife Summary

Coastal Louisiana contains an estimated 45 percent of the tidal marshes in the conterminous United States. Louisiana's 3.67 million acres of coastal wetlands and their associated waters support nationally important fish and wildlife resources, and sustain the largest commercial fish and shellfish harvest in the lower 48 States. More than 1.1 billion pounds of fish and shellfish (including shrimp, crabs, crawfish, and oysters) are harvested annually in coastal Louisiana. That harvest is nearly twice that of any other State, and was valued at more than $400 million in 2000 (Louisiana Coastal Wetlands Conservation and Restoration Task Force 2001).

Recreational saltwater anglers spend approximately $245 million annually to fish for spotted seatrout, red drum, snapper, tuna and other species (Louisiana Coastal Wetlands Conservation and Restoration Task Force 2001). Fresh and low-salinity coastal wetlands also provide important habitat for numerous freshwater sport fishes, the pursuit of which is also an important recreational activity in those coastal areas.

Louisiana's coastal marshes provide winter habitat for more than 50 percent of the duck population of the Mississippi Flyway. Fresh and intermediate marshes support the greatest concentrations of wintering waterfowl in coastal Louisiana. Those wetlands are vitally important to the mission of the Gulf Coast Joint Venture, which was established to help achieve the goals of the North American Waterfowl Management Plan.

Louisiana's coastal marshes, swamps, and associated habitats also support many other migratory birds, such as rails, gallinules, shorebirds, seabirds, wading birds, and numerous songbirds. One hundred ninety-seven colonies of wading birds and seabirds (representing 215,249 pairs of nesting birds) were observed in coastal Louisiana during a 2001 survey (Michot 2003). The cheniers and natural levee forests of coastal Louisiana provide essential stopover habitat to numerous neotropical migratory passerine birds.

Coastal Louisiana has long been a leading fur-producing area in North America. Common furbearers include nutria, mink, muskrat, raccoon, and river otter. Those coastal marshes and swamps also support game animals such as the white-tailed deer and swamp rabbit. The area also supports 1.5 million alligators for which sport and commercial hunting is closely regulated.

Refuges and Wildlife Management Areas

The Service administers 10 National Wildlife Refuges (NWR) encompassing more than 301,700 acres in coastal Louisiana. They include Sabine, Cameron Prairie, Lacassine, Shell Keys, Bayou Teche, Delta, Breton, Bayou Sauvage, Big Branch Marsh, and Mandalay NWRs. The Louisiana Department of Wildlife and Fisheries operates 17 refuges, preserves, and wildlife management areas in coastal Louisiana, comprising more than 572,000 acres. Coastal wetlands make up the vast majority of those Federal and State wildlife areas.

FISH AND WILDLIFE CONCERNS IN THE STUDY AREA

The foremost study-area concern, particularly from a fish and wildlife resource standpoint, is the rapid deterioration and loss of coastal wetlands. During the 1900s, Louisiana lost approximately 1.2 million acres of its coastal wetlands. Coastwide loss rates peaked at approximately 42 square miles per year during 1950s and 1960s. Currently, Louisiana's coastal wetland loss rate is approximately 24 square miles per year. Additionally, large areas of fresh marsh and low-salinity wetlands have converted to deteriorated brackish and saline marshes, or open water.

To address this serious problem, a number of coastal wetland restoration projects have been constructed and/or authorized for construction throughout coastal Louisiana. More than 140 projects are funded and authorized via the CWPPRA of 1990. Two large freshwater introduction projects (Davis Pond and Caernarvon) have been implemented by the Corps under other authorities. Despite their success, those efforts will, together, address less than one third of the 448,000-acre wetland loss projected to occur by the year 2050 in Louisiana. The continuing loss of coastal wetlands and their associated habitat values are the principal threats to the nationally significant fish and wildlife resources that depend on them.

PLAN FORMULATION AND EVALUATION METHODOLOGY

Individual restoration projects previously identified during development of the October 2003 Draft LCA Comprehensive Study Report were evaluated for inclusion in the NTP by applying 3 "sorting" criteria and 4 "critical need" criteria to each project identified. Sorting criteria were used to classify individual features into the major NTP components (i.e., Near-term restoration features, Large-scale studies, and Demonstration projects). The four critical need criteria (preventing future land loss, restoring fundamentally impaired deltaic processes, restoring critical geomorphic structures, and protecting vital socio-economic resources) were developed to assess the potential for project features to address critical needs. Those sorting and critical needs criteria include:

Sorting Criterion #1 - Engineering and design completed, and construction started within 10 years.

This criterion would require the completion of feasibility studies including further modeling to optimize expected environmental outcome, full analysis of National Economic Development (NED) benefits, real estate acquisition, etc. in time to initiate construction in 10 years or less. It also includes completion of necessary NEPA documentation, pre-construction engineering & design, and receipt of construction authorization and commencement of construction during that period. A candidate restoration feature not deemed to meet this criterion would not be included in the NTP; however, it might be a candidate for the large-scale, long-range study component of the NTP.

Sorting Criterion #2 - Based upon sufficient scientific and engineering understanding of processes.

To satisfy this criterion, individual project features must have a sound basis in science, technology, and the engineering principles specific to those features must have been applied within coastal Louisiana to successfully achieve the desired ecosystem response. Individual features that do not meet this criterion were not included as potential near-term projects. The scientific and/or engineering uncertainties associated with those restoration features may, however, provide a basis for potential demonstration projects, and for review and analysis through the Science and Technology component of the NTP.

Sorting Criterion #3 - Construction is independent of, and does not eliminate, other near-term opportunities; construction is not dependent on the completion of another project and/or restoration feature.

If a feature is dependent on one or more other restoration features, that feature may be combined and reassessed to determine if the composite meets the other sorting criteria. If so, the composite project is then classified appropriately. If the evaluated individual feature might preclude the later implementation of another restoration feature, then it is not included in the NTP, but might become a candidate for long-range study.

Individual features that met all of the above sorting criteria were then evaluated against the below listed "critical need" criteria to determine if they should be included in the NTP. When the criteria were applied, the reasoning for the subsequent decisions was recorded so that the study team could make relative comparisons and refine the overall application of the "critical needs" criteria. Those criteria are as follows:

Critical Need Criterion #1 - Prevent future land loss where predicted to occur, and restore past land loss.

Future ecosystem condition should be based upon future patterns of land and water. According to the U.S. Geological Survey open file report 03-334 "Historical and Predicted Coastal Louisiana Land Changes: 1978-2050," proposed restoration features should prevent or reduce future predicted land loss or cypress swamp degradation in areas with existing fragmented marsh or degraded cypress swamp.

Critical Need Criterion #2 - (Sustainability) Restore fundamentally impaired deltaic processes through river reintroductions, or mimic deltaic processes.

This criterion refers to features that would restore or mimic natural connections between the river and the basins (or estuaries) and includes river diversions, crevasses, and over-bank flows. Mechanical marsh creation with river sediment

is also viewed as mimicking the deltaic function of sediment introduction, if supported by sustainable freshwater and nutrient reintroduction.

Critical Need Criterion #3 - (Sustainability) Restore endangered or critical geomorphic structure.

This criterion pertains to project features that would restore or maintain natural geomorphic features such as barrier islands, distributary ridges, cheniers, land bridges, and beach and lake rims that are essential to maintaining the integrity of coastal ecosystems.

Critical Need Criterion #4 - Protect vital local, regional, and national socio-economic resources.

This criterion would be met by project features which protect key local, regional, and national resources of social, economic, and cultural significance, such as cultural features and points of interest, communities, infrastructure, and businesses and industries.

Modeling to quantify wetland changes and associated impacts/benefits to fish and wildlife resources of the selected NTP features was not conducted, due to the short time frame to complete the NTP and because that plan is of a highly programmatic nature at present. Instead, the results of modeling conducted during the earlier LCA Comprehensive Study were used as a basis for estimating benefits to fish and wildlife resources, despite the known problems and uncertainties associated with those assessment methods. Beyond this programmatic level evaluation, when individual project features are undergoing further engineering and design, more rigorous assessments will be required to quantify fish and wildlife benefits and impacts, complete NEPA documentation, meet various water development planning policies, and to enable the Service to fulfill its Fish and Wildlife Coordination Act mandates.

FUTURE WITHOUT-PROJECT FISH AND WILDLIFE RESOURCES

Within coastal Louisiana under future with no action conditions, more than 462,000 additional wetland acres would be lost by year 50 (Table 1). Habitat types would continue shifting toward more brackish and saline wetlands, and open water, with the continual loss of more salt-sensitive freshwater vegetation. Because of the current degree of risk and uncertainty associated with the salinity/habitat type projection methodologies, however, the data in Table 1 do not reflect this anticipated trend. Nonetheless, corresponding decreases in habitat values for fish and wildlife that use those wetlands would also occur in association with the projected wetland losses.

Table 1. Coastwide wetland type acreages under the No Action Plan

Wetland Type	TY0 (acres)	TY50 (acres)	Acreage change	Percent change
Swamp	1,040,785	949,707	-91,078	-8.8
Fresh marsh	940,811	798,847	-141,964	-15.1
Intermediate Marsh	724,289	956,240	231,951	32.0
Brackish marsh	584,524	437,477	-147,046	-25.2
Saline marsh	374,778	60,157	-314,622	-83.9
Total wetlands	3,665,188	3,202,429	-462,759	-12.6

RESTORATION OPPORTUNITY DESCRIPTIONS

As detailed above, application of the sorting criteria and critical needs criteria were the basis for selecting the NTP restoration features, large-scale studies, and candidate science and technology demonstration projects. The following paragraphs describe those restoration opportunities in greater detail.

Near-Term Restoration Features

Of the 78 features that the sorting criteria were applied to, those features that met all three sorting criteria were considered as possible NTP features. Alternative combinations of those features were developed by applying each of the critical needs criteria individually or in various combinations. Application of the critical needs criteria yielded 15 possible alternatives. While that analysis indicated some similarity between alternatives, distinct alternatives were identified that were focused on critical needs criterion #2 only (Restoration Opportunity 1), critical needs criterion #3 only (Restoration Opportunity 2), and all four critical needs criteria combined (the Tentatively Selected Plan or TSP).

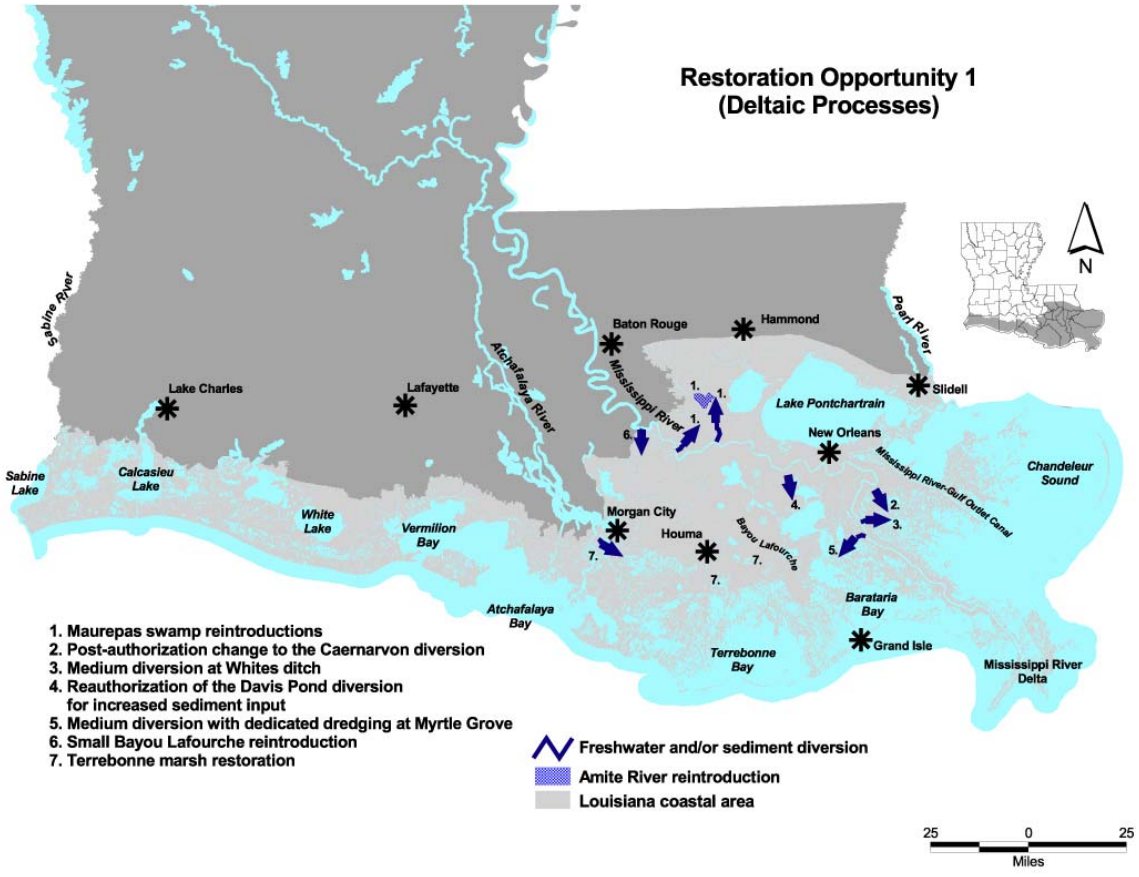
Restoration Opportunity 1 focuses on restoration of deltaic processes and includes seven near-term restoration features (Figure 2). Those features and their respective subprovinces (SP) are as follows:

1) Maurepas Swamp Reintroductions (SP 1)
    a. Small Diversion at Hope Canal (CWPPRA River Reintroduction to Maurepas Swamp)
    b. Small Diversion at Convent/Blind River
    c. Increase Amite River Influence by Gapping Spoil Banks
2) Post-authorization Change to the Caernarvon Diversion (SP1)
3) Medium Diversion at Whites Ditch (SP1)

4) Reauthorization of the Davis Pond Diversion for Increased Sediment Input (SP2)
5) Medium Diversion with Dedicated Dredging at Myrtle Grove (SP 2)
6) Small Bayou Lafourche Reintroduction (SP 3);
7) Terrebonne Marsh Restoration Opportunities (SP 3)
    a. Multi-purpose Operation of Houma Navigation Canal (HNC) Lock
    b. Convey Atchafalaya River Water to Terrebonne Marshes via a Small Diversion in the Avoca Island Levee, Repair Eroding Banks of the GIWW, Enlarge Constrictions in the GIWW below Gibson and in Houma, and Construct/Enlarge Lake Boudreaux and Grand Bayou Conveyance Channel.

Diversion features range from 1,000 cfs to 5,000 cfs for small diversions, 5,001 cfs to 15,000 cfs for medium diversions, and greater than 15,000 cfs for large diversions.

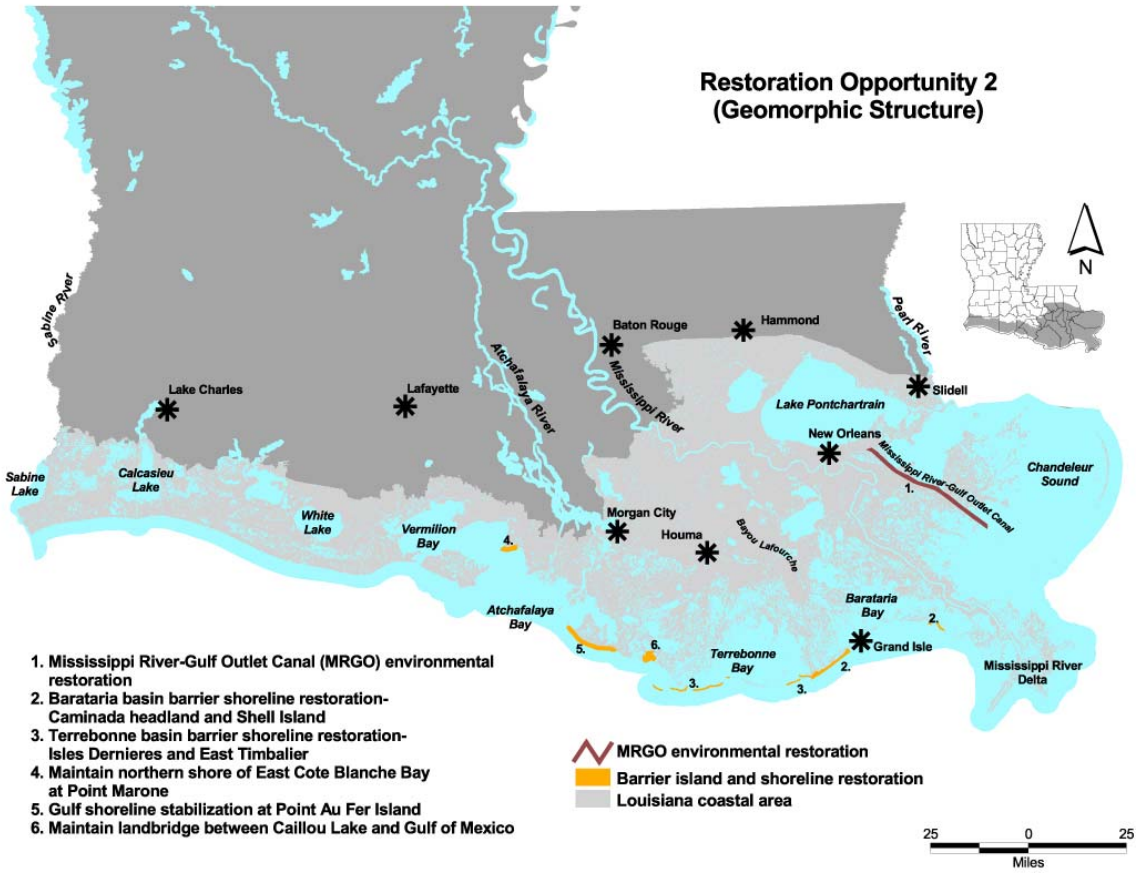
Figure 2. LCA Near-Term Ecosystem Restoration Plan Restoration Opportunity 1 - Restoration of Deltaic Processes.



Restoration Opportunity 2 is the alternative that focuses on restoration of geomorphic structure. It consists of six restoration opportunities which include shoreline protection, barrier island restoration, and marsh-creation features (Figure 3). The restoration features of this alternative and their respective subprovinces (SP) are as follows:

1) Mississippi River Gulf Outlet Environmental Restoration (SP 1)
2) Barataria Basin Barrier Shoreline Restoration-Caminada Headland and Shell Island (SP 2)
3) Terrebonne Basin Barrier Shoreline Restoration-Isles Dernieres and East Timbalier (SP3)
4) Maintain Northern Shore of East Cote Blanche Bay at Point Marone (SP3)
5) Gulf Shoreline Stabilization at Pt. Au Fer Island (SP 3)
6) Maintain Land Bridge Between Caillou Lake and Gulf of Mexico (SP3)

Figure 3. LCA Near-Term Ecosystem Restoration Plan Restoration Opportunity 2 - Restoration of Geomorphic Structure.



The third alternative restoration opportunity, or the TSP, encompasses all four critical needs criteria, and includes 12 potential restoration features including freshwater and sediment diversions, interior shoreline protection, barrier island and barrier headland protection, and dredged material/marsh creation (Figure 4). The restoration features of this alternative and their respective subprovinces (SP) are as follows:

1) Maurepas Swamp Reintroductions (SP 1)
    a. Small Diversion at Hope Canal (CWPPRA River Reintroduction into Maurepas Swamp)
    b. Small Diversion at Convent/Blind River

    c. Increase Amite River Influence by Gapping Spoil Banks
2) MRGO Environmental Restoration (SP 1)
3) Post-authorization Change to the Caernarvon Diversion (SP1)
4) Medium Diversion at Whites Ditch (SP1)
5) Reauthorization of the Davis Pond Diversion for Increased Sediment Input (SP2)
6) Medium Diversion with Dedicated Dredging at Myrtle Grove (SP 2)
7) Barataria Basin Barrier Shoreline Restoration-Caminada Headland and Shell Island (SP 2)
8) Terrebonne Basin Barrier Shoreline Restoration-Isles Dernieres and East Timbalier (SP3)
9) Small Bayou Lafourche Reintroduction (SP 3)
10) Gulf Shoreline Stabilization at Point Au Fer Island (SP 3)
11) Terrebonne Marsh Restoration Opportunities (SP 3)
    a. Multi-purpose Operation of Houma Navigation Canal (HNC) Lock
    b. Convey Atchafalaya River Water to Terrebonne Marshes via a Small Diversion in the Avoca Island Levee, Repair Eroding Banks of the GIWW, Enlarge Constrictions in the GIWW below Gibson and in Houma, and Construct/Enlarge Lake Boudreaux and Grand Bayou Conveyance Channel
12) Maintain Land Bridge between Caillou Lake and Gulf of Mexico (SP 3)

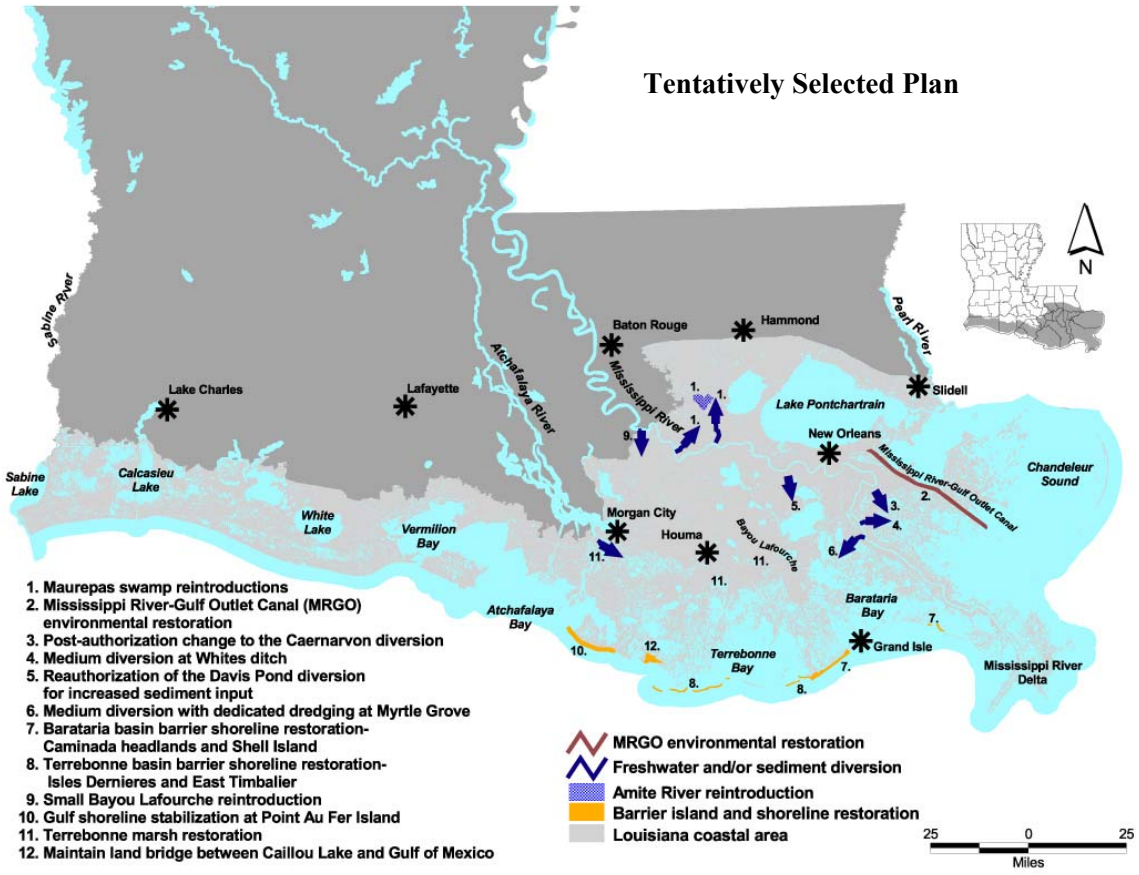
More detailed descriptions of the above-listed features are found in Appendix B.

Large-scale Studies

The NTP also recommends five feasibility studies of large-scale restoration concepts which have a high level of complexity and/or uncertainty associated with them. Those conceptual projects would affect (both positively and negatively) significant ecological and economic resources, but could potentially contribute to a more sustainable coastal Louisiana. However, the feasibility of undertaking those large-scale restoration concepts is not, at this time, fully known. In addition, it is unlikely that the requisite detailed investigations and the resolution of issues (e.g., land acquisition) associated with implementation could be completed in time to begin construction within the next 10 years. The large-scale, long-term initiatives selected for detailed study (and their respective subprovinces) are as follows:

1. Mississippi River Hydrodynamic Study
    a. Mississippi River Delta Management Study (SP 1 and 2)
    b. Third Delta (SP 2 and 3)
2. Post-authorization Change for Diversion of Water Through Inner-Harbor Navigation Canal (IHNC) Lock (SP 1)
3. Upper Atchafalaya Basin Study including Evaluation of Modified Operational Scheme of Old River Control Structure Conducted under Mississippi River and Tributaries (SP 3)
4. Point Chevreuil Reef Restoration (SP3)
5. Chenier Plain Freshwater Management and Allocation Reassessment (SP 4).

Figure 4. LCA Near-Term Ecosystem Restoration Plan - Tentatively Selected Plan



The Mississippi River Delta Management Study would require extensive investigations to maximize the use of riverine freshwater and sediments for wetland restoration without adversely impacting navigation. Sediments, nutrients, and freshwater would be re-directed to restore the quality and sustainability of the Mississippi River Deltaic Plain, its coastal wetland complex, and the Gulf of Mexico. The study would investigate potential modifications to existing navigation channel alignments and associated maintenance procedures and requirements.

The Third Delta feature consists of a control structure in the vicinity of Donaldsonville that would divert approximately 240,000 cfs at maximum river stage. Flows would be diverted into a newly constructed conveyance channel (parallel to Bayou Lafourche) extending approximately 55 miles from the initial point of diversion to the eventual point of discharge. The diverted flow would be divided equally at a point north of the GIWW to enable the creation of a delta lobe within the Terrebonne and Barataria Basins. Sediment enrichment of this diversion, using a 30-inch dredge for three months yielding 6,293, 000 yd^3 each year, would also be considered. Significant feasibility-level

investigation would be required to determine its effects on flood control, drainage, navigation, and environmental impacts.

Post-authorization change for diversion of water through IHNC Lock calls for a post-authorization modification of the Inner Harbor Navigation Canal Lock. Modifications would incorporate culverts and controls to divert freshwater through the IHNC to the wetlands downstream of that structure. The proposed modifications would reduce salinities and increase nutrient supply to the affected intermediate and brackish marshes.

Upper Atchafalaya Basin Study, including evaluation of modified operational scheme of Old River Control Structure (ORCS) would alter that structure's operational plan to increase the sediment load transported down the Atchafalaya River. Detailed studies would determine impacts (beneficial and adverse) to the interior of the Atchafalaya Basin, the distribution of the additional flow and sediment, and the increased costs of maintaining the flood control, navigation, and environmental features along the Lower Mississippi, Red, and Atchafalaya Rivers.

The Point Chevreuil Reef Restoration Study provides for rebuilding the historic shell reefs that were removed by shell dredging at the historic Point Chevreuil Reef (which formerly extended toward Marsh Island) and rehabilitating the Bayou Sale natural levee between Point Chevreuil and the Gulf of Mexico. The natural levee would be rebuilt in the form of a shallow sub-aqueous platform, small islands, and/or reefs. This feature would be designed to restore a semblance of the historic hydrologic conditions in the Teche/Vermilion Basin.

The Chenier Plain Freshwater Management and Allocation Reassessment would require detailed investigations involving water allocation needs and trade-off analyses in the eastern Chenier Plain, including the Teche/Vermillion Basin, to provide for wetland restoration, and support continued agriculture and navigation in the region. A series of navigation and salinity control structures are currently authorized and operated in the eastern portion of the Chenier Plain. Those structures maintain a freshwater source for agricultural applications and prevent salinity intrusion in the area. Tidal stages often exceed stages within the managed area, creating an inundation problem for the fresh and intermediate marshes in the area. In addition, the natural ridges that define this area continue to be impacted by erosion, which threatened to reduce continued management and sustainability of the interior marshes. That study must address water management and allocation issues including salinity control, drainage, and fisheries accessibility.

Science and Technology Plan

Although the NTP is based upon the best available science and takes advantage of over 25 years of experience gained through previous Louisiana coastal wetland restoration efforts via CWPPRA and other programs, there remain substantial scientific and engineering uncertainties associated with some of the proposed LCA restoration features.

Accordingly, the Corps and the State of Louisiana propose to develop and implement a Science and Technology Plan to ensure the LCA restoration effort continues to be supported by the best available science, and to resolve scientific and engineering uncertainties associated with the ecological processes of the ecosystem and their response(s) to restoration projects. Potential methods for resolving scientific and engineering uncertainties include the development and implementation of demonstration projects and adaptive management and monitoring.

Demonstration Projects

An integral component of the LCA Science and Technology Plan is the development and implementation of demonstration projects that will further develop engineering techniques, improve understanding of the ecological processes within coastal Louisiana, and provide insights on ecosystem responses associated with proposed restoration projects and features. Proposed demonstration projects are intended to: 1) reduce scientific and engineering uncertainties regarding the effectiveness of particular restoration techniques; 2) test new, innovative technologies and engineering techniques; and, 3) test ecosystem responses to engineering techniques and operational schedules. The proposed demonstration projects include: 1) a small marsh creation project to evaluate the application of saltwater sediments to support long-term sustainable marsh; 2) barrier island restoration to evaluate the effects of different wave environments, and optimize different island dimensions and shoreline protection measures; 3) pipeline conveyance of sediments to maintain land bridges; 4) chenier unit marsh creation; and, 5) Gulf shoreline stabilization near Rockefeller Refuge.

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Beneficial-Use of Dredged Material Program

In addition to the above-listed features, the NTP would also seek from Congress programmatic authority and increased funding for the Corps' Beneficial-use of Dredged Material Program. The New Orleans District Corps annually dredges approximately 71,000,000 cubic yards (yd^3) of material from key navigation channels and waterways in coastal Louisiana. Approximately 42 percent of those dredged sediments, or approximately 30,000,000 yd^3, are used to restore, protect, and/or create aquatic and wetland habitats. Funding limits on that program, however, preclude using the remaining dredged material for ecosystem restoration. By obtaining Congressional authorization and funding for a comprehensive beneficial use of dredged material program under the NTP, a significant increase in the quantity of dredged sediments could be made available for use in coastal restoration efforts.

EVALUATION OF THE TENTATIVELY SELECTED PLAN

Under no action conditions, a net coastal wetland loss of nearly 463,000 acres would occur by year 50, even with projected gains in the Atchafalaya River Delta (Table 1). Each of the NTP action alternatives would, to varying degrees, reduce that acreage of coastal wetland loss, if implemented. Hence, implementing any of the proposed

alternative plans would be preferable to the continued loss and degradation of coastal wetlands under the no-action scenario. Restoration Opportunity 2 (which focuses on restoring geomorphic structures) would have little, if any, effect on habitat type distribution, compared to the No-action Alternative. The river diversion features included in the other two restoration opportunities would likely result in greater amounts of fresh and intermediate marsh, compared to the No-action Alternative. The Service believes that, while both of the Restoration Opportunities 1 (which focuses on restoring deltaic processes) and 2 would have significant environmental benefits, the TSP (which focuses on preventing future land loss, restoring deltaic processes, restoring critical geomorphic structures, and protecting vital socio-economic resources) would provide the greatest fish and wildlife benefits. The TSP would likely best achieve long-term coastal wetland sustainability, because the restored geomorphic structures would help to protect and enhance the diversion feature influence areas from erosive coastal wave action and storm surge. Because sediment diversions are connected to the river resource and continually nourish receiving areas with sediments and nutrients, those features would more effectively achieve a sustainable ecosystem. Based solely on fish and wildlife considerations, those measures would likely be the most beneficial of the three evaluated alternative restoration plans currently under consideration in the NTP.

Proposed TSP features to introduce fresh water from the Mississippi River into the Maurepas Swamp, Upper Breton Sound, and the Mid-Barataria Basin would shift habitat types toward lower-salinity conditions in Subprovinces 1 and 2, compared to taking no action. Those diversions, along with marsh creation, beneficial use of dredged material, and barrier island restoration, would also restore/establish several thousands of acres of wetlands.

At year 50, wetland losses under the No-action Alternative (more than 203,000 acres) would be greater in Subprovince 3 than in any other Subprovince (Table 1). The TSP includes projects to address losses in that area. Gulf shoreline stabilization at Point Au Fer Island and increased conveyance of Atchafalaya River flows to central and eastern portions of the Terrebonne Basin would improve wetland productivity and reduce marsh loss in those areas where marine processes are advancing inland.

The TSP would have a positive effect on wildlife resources by increasing riverine and sediment inputs from the Mississippi River within Subprovinces 1 through 3, in concert with marsh creation in key areas. In combination, those features would help sustain and rejuvenate existing wetland habitats, promote significant landbuilding, and restore fresh and low salinity habitats. Marshes and swamps would be more productive and would provide improved habitat conditions for several species of wildlife.

Coastwide, the TSP would restore marsh-building and marsh-maintenance processes through freshwater and sediment inputs. The TSP would increase coastal wetland acreage compared to taking no action; thus, it would have a major positive impact on most, if not all, of the fish and wildlife resources that utilize those wetlands. The project-related conversion of brackish and saline marshes to fresh and low-salinity marshes would displace brown shrimp, spotted seatrout, and other fishes and shellfishes which

prefer more saline habitats. Those displacement impacts would be partially compensated for by project-induced increases in the productivity of remaining high salinity habitats, and by the improved sustainability of those habitats, compared to the No-action Alternative. Additionally, the abundance and productivity of white shrimp, Gulf menhaden, and other fishes and shellfishes which utilize low-salinity habitats may be increased under the preferred plan. Given the continued rapid loss and likely future collapse of brackish and salt marsh systems with no action, however, the TSP may also provide a long-term net benefit to species utilizing those areas. The Service will later recommend specific design and operational measures for incorporation into project features to minimize adverse effects on those resources and increase benefits to other fish and wildlife species, to the greatest extent practical.

Because of the uncertainties regarding some of the currently proposed habitat prediction methodologies, and because many details regarding the design, operation, and associated effects of the TSP are not yet available at the current programmatic level of planning, we cannot complete our evaluation of the TSP's effects on fish and wildlife resources, nor can we entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. Therefore, extensive additional Service involvement during subsequent detailed planning, engineering, design, and construction of specific project measures, along with more-definitive project information that will be available during those planning implementation phases, will be required so that we can fulfill our responsibilities under that Act. Additionally, improvements in the hydrologic and desktop models will be needed to predict environmental impacts and benefits of plan features, as indicated in our previous draft Fish and Wildlife Coordination Act Report (Paille, R. and K. Roy, September 2003b) for the LCA Comprehensive Study.

FUTURE SERVICE INVOLVEMENT

Because of the LCA's large scope, complexity, and programmatic nature, extensive and continuing funding will be required by the Service to enable our full participation throughout future detailed planning and post-authorization engineering and design studies, and to facilitate fulfillment of our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. Accordingly, the Service plans to work closely with the Corps and the State of Louisiana to formulate detailed funding estimates to support our future involvement in the LCA, as provided for in the January 2003 Partnership Agreement for Water Resources and Fish and Wildlife between the Corps and the Service. Given its scope, duration, and significance, the Service will, in cooperation with the New Orleans Corps District, draft and execute an LCA-specific set of operating guidelines for negotiating transfer funds (similar to those used for the Comprehensive Everglades Restoration Plan) to facilitate and expedite our future involvement.

Under provisions of Section 7 of the ESA of 1973, as amended, the Service will also assist the Corps and any other Federal agencies responsible for funding or implementing selected projects and/or plans to ensure that they will neither jeopardize the continued

existence of threatened and endangered species, nor adversely modify any designated critical habitat. The required consultations will be accomplished on a project-by-project basis, and will tier from the current programmatic consultation, details of which will be contained in the Programmatic Environmental Impact Statement (PEIS) for the NTP. In keeping with the consultation requirements of the ESA, informal and formal (if needed) consultation must be completed before the Record of Decision for the NTP and PEIS can be signed. Accordingly, the Service will continue to work closely with the Corps through the consultation period.

The National Wildlife Refuge System Improvement Act of 1997 mandates that no new or expanded use of a NWR may be allowed unless it is first determined to be compatible with the objectives for which that NWR was established. A compatibility determination is a written determination, indicating that a proposed or existing use of a NWR is, or is not, a compatible use. Compatible uses are defined as proposed or existing wildlife-dependent recreational uses or any other uses of a NWR that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the NWR. A compatibility determination is only required when the Service has jurisdiction over the use. Prior to initiating implementation of an LCA project that would affect any NWR, the Corps should, therefore, contact the appropriate Refuge Manager to determine if the proposed project constitutes a "refuge use" subject to a compatibility determination. To determine the anticipated impacts of any proposed use, the Corps may be required to provide sufficient data and information to document any short-term, long-term, direct, indirect or cumulative impacts on refuge resources. Compatibility determinations will include a public review and comment period before issuance of a final decision by the appropriate Refuge Manager. To facilitate such contacts, the Louisiana Field Office may be contacted at (337) 291-3100.

SUMMARY AND SERVICE POSITION

The Service has actively participated throughout the formulation and evaluation of the LCA coastwide alternatives and the selection of near-term restoration features, the large-scale studies, and the potential demonstration projects that comprise the NTP. Service involvement and input includes the preparation of two previous Draft Fish and Wildlife Coordination Act Reports (Paille, R., and K. Roy, 2003a and 2003b), a letter listing threatened and endangered species within coastal parishes (Appendix A), Service assistance in preparation of the draft Biological Assessment for Comprehensive Plan effects on threatened and endangered species, and a (May 11, 2004) letter affirming our continued participation as a Cooperating Agency in accordance with the implementing regulations of the National Environmental Policy Act of 1969. Those documents are incorporated herein by reference, and should be considered as integral components of the administrative record for the forthcoming PEIS and NTP Report.

Given the substantial adverse future impacts to coastal wetlands and their associated fish and wildlife resources that are expected to occur under future without-project conditions,

we strongly support authorization and implementation of the near-term TSP for the NTP, as it would provide the greatest level of sustainable benefits to Louisiana's nationally significant coastal fish and wildlife resources. Accordingly, the Service provides the following procedural recommendations for authorization and implementation of the NTP:

1. In accordance with the January 2003 Partnership Agreement for Water Resources and Fish and Wildlife between the Service and the Corps, sufficient continuous funding should be provided to the Service to fulfill our responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. Funding should cover Service participation in post-authorization engineering and design studies (for demonstration projects and NTP projects) and in the long-term project feasibility studies.

2. The Corps should obtain a right-of-way from the Service prior to conducting any work on a National Wildlife Refuge, in conformance with Section 29.21-1, Title 50, Right-of-way Regulations. Issuance of a right-of-way will be contingent on a determination by the Service's Regional Director that the proposed work will be compatible with the purposes for which the refuge was established.

To ensure that optimum fish and wildlife resource benefits are achieved, the Service plans to remain actively involved throughout the plan implementation process. Our findings and recommendations for each of the projects ultimately approved for implementation will be provided as supplements to this report under the authority of the Fish and Wildlife Coordination Act.

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APPENDIX A

September 26, 20003, U.S. Fish and Wildlife Service letter identifying Federally listed threatened and endangered species within coastal parishes of Louisiana

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506
September 26, 2003

Colonel Peter J. Rowan
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Rowan:

The Corps of Engineers (Corps), in partnership with various other State, local, and Federal agencies and entities, is preparing a Programmatic Environmental Impact Statement (PEIS) on the Louisiana Coastal Area Comprehensive Coastwide Ecosystem Restoration Study (LCA). In response to a September 23, 2003, request from Mr. Bill Klein of your staff, the U.S. Fish and Wildlife Service (Service) is pleased to provide the following information regarding Federally listed threatened and endangered species, their critical habitat, and migratory birds that may be found in or near the LCA study area. This information will facilitate programmatic Section 7 consultation under the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). In addition, we have also included information to facilitate compliance with the Migratory Bird Treaty Act (MBTA; 40 Stat. 755, as amended; 16 U.S.C. 703 et seq.).

ESA Information
Seventeen threatened or endangered species, including the Louisiana black bear, West Indian manatee, bald eagle, brown pelican, piping plover, red-cockaded woodpecker, gopher tortoise, ringed map turtle, 5 species of marine turtles, pallid sturgeon, Gulf sturgeon, inflated heelsplitter, and Louisiana quillwort, occur within the four subprovinces comprising the LCA study area. In addition, the Service has designated critical habitat for the piping plover and the Gulf sturgeon.

Following the conclusion of programmatic consultation on the LCA PEIS, the Service will continue to assist the Corps and other Federal agencies responsible for funding or implementing selected LCA projects and/or plans to ensure they will not jeopardize the continued existence of threatened and endangered species, or adversely modify their designated critical habitat. The required consultations will be accomplished on a project-by-project basis, and will build upon the programmatic consultation.

Louisiana Black Bear
The threatened Louisiana black bear (*Ursus americanus luteolus*) is primarily associated with forested wetlands; however, it utilizes a variety of habitat types, including marsh, spoil banks, and upland forests. Within forested wetlands, black bear habitat requirements include soft and hard mast for food, thick vegetation for escape cover, vegetated corridors for dispersal, large trees for den sites, and isolated areas for refuge from human disturbance. Remaining Louisiana

black bear populations occur in the Tensas River Basin, the Upper Atchafalaya River Basin, and coastal St. Mary and Iberia Parishes. The primary threats to that species are continued loss of bottomland hardwoods, fragmentation of remaining forested tracts, and human-caused mortality (e.g., illegal killing and accidental collisions with motor vehicles).

Louisiana black bears, particularly pregnant females, normally den from December through April. To further protect denning bears, the Service (through the final listing rule published on January 7, 1992, in Volume 57, No. 4 of the Federal Register) has extended legal protection to candidate or actual den trees. These are defined in the final listing rule as bald cypress (*Taxodium distichum*) and tupelo gum (*Nyssa* sp.) with visible cavities, having a diameter at breast height of 36 inches or greater, and occurring in or along rivers, lakes, streams, bayous, sloughs, or other water bodies. (Please note that additional information can be found at http://endangered.fws.gov.)

West Indian Manatee

Federally listed as endangered, West Indian manatees (*Trichechus manatus*) occasionally enter Lake Pontchartrain, Lake Maurepas, and their associated coastal waters and streams during the summer months (i.e., June through September). Manatees have also been reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of Louisiana. Should the proposed project involve activities in those areas during summer months, further consultation with this office will be necessary. Manatees have also been occasionally observed elsewhere along the Louisiana Gulf coast. They have declined in numbers due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution. Cold weather and outbreaks of red tide may also adversely affect these animals.

Bald Eagle

Federally listed as threatened, bald eagles (*Haliaeetus leucocephalus*) nest in Louisiana from October through mid-May. Eagles typically nest in bald cypress trees near fresh to intermediate marshes or open water in the southeastern Parishes. Areas with high numbers of nests include the Lake Verret Basin south to Houma, the southern marshes/ridge from Houma to Bayou Vista, the north shore of Lake Pontchartrain, and the Lake Salvador area. Eagles also winter and infrequently nest near large lakes in central and northern Louisiana. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (i.e., organochlorine pesticides and lead).

Brown Pelican

Federally listed as endangered, brown pelicans (*Pelecanus occidentalis*) are currently known to nest on Rabbit Island in Calcasieu Lake, Raccoon Point on Isles Dernieres, as well as Queen Bess Island, Plover Island (Baptiste Collette), Wine Island, and islands in the Chandeleur chain. Pelicans change nesting sites as habitat changes occur. Thus, pelicans may also be found nesting on mud lumps at the mouth of South Pass (Mississippi River Delta) and on small islands in St. Bernard Parish. In winter, spring, and summer, nests are built in mangrove trees or other shrubby vegetation, although occasional ground nesting may occur. Brown pelicans feed along the Louisiana coast in shallow estuarine waters, using sand spits and offshore sand bars as rest and roost areas. Major threats to this species include chemical pollutants, colony site erosion, disease, and human disturbance.

Piping Plover

Federally listed as threatened, the piping plover (*Charadrius melodus*), as well as its designated critical habitat, occur along the Louisiana coast. Piping plovers winter in Louisiana, and may be present for 8 to 10 months, arriving from the breeding grounds as early as late July and remaining until late March or April. Piping plovers feed extensively on intertidal beaches, mudflats, sand flats, algal flats, and wash-over passes with no, or very sparse, emergent vegetation; they also require unvegetated or sparsely vegetated areas for roosting. Roosting areas may have debris, detritus, or micro-topographic relief offering refuge to plovers from high winds and cold weather. In most areas, wintering piping plovers are dependant on a mosaic of sites distributed throughout the landscape, as the suitability of a particular site for foraging or roosting is dependent on local weather and tidal conditions. Plovers move among sites as environmental conditions change. Their designated critical habitat identifies specific areas that are essential to the conservation of the species. The primary constituent elements for piping plover wintering habitat are those habitat components that support foraging, roosting, and sheltering, and the physical features necessary for maintaining the natural processes that support those habitat components. Constituent elements are found in geologically dynamic coastal areas that contain intertidal beaches and flats (between annual low tide and annual high tide), and associated dune systems and flats above annual high tide. Important components (or primary constituent elements) of intertidal flats include sand and/or mud flats with no or very sparse emergent vegetation. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting plovers. Major threats to this species include the loss and degradation of habitat due to development, disturbance by humans and pets, and predation.

Red-cockaded Woodpecker

The endangered red-cockaded woodpecker (RCW, *Picoides borealis*) inhabits open, park-like stands of mature (i.e., greater than 60 years of age) pine trees containing little hardwood understory or midstory. RCWs can tolerate small numbers of overstory hardwoods or large midstory hardwoods at low densities found naturally in many southern pine forests, but they are not tolerant of dense hardwood midstories resulting from fire suppression. RCWs excavate roost and nest cavities in large living pines (i.e., 10 inches or greater in diameter at breast height). The cavity trees and the foraging area within 200 feet of those trees are known as a cluster. Foraging habitat is defined as pine and pine-hardwood (i.e., 50 percent or more of the dominant trees are pine trees) stands over 30 years of age that are located within one-half mile of the cluster.

Gopher Tortoise

The threatened gopher tortoise (*Gopherus polyphemus*) is associated with areas that have well-drained, sand or gravel soils appropriate for burrow establishment, ample sunlight for nesting, and understory vegetation suitable for foraging (i.e., grasses and forbs). Gopher tortoises prefer "open" longleaf pine-scrub oak communities that are thinned and burned every few years. They also inhabit existing maintained transmission rights-of-way within Washington, Tangipahoa, and St. Tammany Parishes. The gopher tortoise is the only native tortoise found in the southeastern United States. Habitat degradation (lack of thinning or burning on pine plantations) and conversion to agriculture or urbanization have contributed to the decline of that species. That

habitat decline has concentrated remaining gopher tortoise populations along pipeline and powerline rights-of-way within their range.

Ringed Map Turtle

The threatened ringed map (= sawback) turtle (*Graptemys oculifera*) is endemic to the Pearl River system. In Louisiana, it occurs in the Bogue Chitto River south of Franklinton, and the Pearl River north of Louisiana Highway 190 in St. Tammany and Washington Parishes. It is found in riverine habitats with moderate currents, channels wide enough to permit sunlight penetration for several hours each day, numerous logs for basking, and large, sandy banks, that are used for nesting. Habitat loss (loss of exposed sand bars, basking areas) and water quality degradation (which decreases food supply) have contributed to the decline of this species.

Sea Turtles

Five species of threatened (T) and endangered (E) sea turtles, including the Kemp's ridley sea turtle (*Lepidochelys kempii*; E), green sea turtle (*Chelonia mydas*; T), hawksbill sea turtle (*Eretmochelys imbricata*; E), leatherback sea turtle (*Dermochelys coriacea*; E), and loggerhead sea turtle (*Caretta caretta*; T), forage in the near-shore waters, bays and sounds of Louisiana. Of those species, the two most commonly encountered are the loggerhead and Kemp's ridley sea turtles. The National Marine Fisheries Service is responsible for aquatic marine threatened or endangered species. Eric Hawk (727/570-5312) in St. Petersburg, Florida, should be contacted for additional information concerning those species.

Pallid Sturgeon

The pallid sturgeon (*Scaphirhynchus albus*) is an endangered fish found in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the Old River Control Structure Complex); it is possibly found in the Red River as well. The pallid sturgeon is adapted to large, free-flowing, turbid rivers with a diverse assemblage of physical habitats that are in a constant state of change. Detailed habitat requirements of this fish are not known, but it is believed to spawn in Louisiana. Habitat loss through river channelization and dams has adversely affected this species throughout its range.

Gulf Sturgeon

The threatened Gulf sturgeon (*Acipenser oxyrhynchus desotoi*) is an anadromous fish that occurs in many rivers, streams, and estuarine waters along the northern Gulf Coast between the Atchafalaya River and the Suwannee River, Florida. In Louisiana, Gulf sturgeon have been reported at Rigolets Pass, the Amite River, rivers and lakes of the Lake Pontchartrain basin, and adjacent estuarine areas. Spawning occurs in coastal rivers between late winter and early spring (i.e., March to May). Adults and sub-adults may be found in those rivers and streams until November, and in estuarine or marine waters during the remainder of the year. Sturgeon less than two years old appear to remain in riverine habitats and estuarine areas throughout the year, rather than migrate to marine waters. Habitat alterations caused by water control structures that limit and prevent spawning, poor water quality, and over-fishing have negatively affected this species.

On March 19, 2003, the Fish and Wildlife Service and the National Marine Fisheries Service published a final rule in the Federal Register (Volume 68, No. 53) designating critical habitat for

the Gulf sturgeon in Louisiana, Mississippi, Alabama, and Florida. Portions of the Pearl River system, Lake Pontchartrain east of the Lake Pontchartrain Causeway, all of Little Lake, The Rigolets, Lake St. Catherine, and Lake Borgne within Louisiana were included in that designation. The primary constituent elements essential for the conservation of Gulf sturgeon are those habitat components that support feeding, resting, sheltering, reproduction, migration, and physical features necessary for maintaining the natural processes that support those habitat components; those elements should be considered when determining potential project impacts. The primary constituent elements for Gulf sturgeon critical habitat include:

- abundant prey items within riverine habitats for larval and juvenile life stages, and within estuarine and marine habitats for juvenile, subadult, and adult life stages;

- riverine spawning sites with suitable substrates for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone, or hard clay;

- riverine aggregation areas, also referred to as resting, holding and staging areas, used by adult, subadult, and/or juveniles, generally, but not always, located in holes below normal riverbed depths, believed necessary for minimizing energy expenditures during freshwater residency and possibly for osmoregulatory functions;

- a flow regime (i.e., the magnitude, frequency, duration, seasonality, and rate-of-change of freshwater discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg fertilization, resting, and staging; and necessary for maintaining spawning sites in suitable condition for egg attachment, eggs sheltering, resting, and larvae staging;

- water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages;

- sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and

- safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g., a river unobstructed by a permanent structure, or a dammed river that still allows for passage).

Please be aware that the Fish and Wildlife Service is responsible for ESA consultations regarding the Gulf sturgeon and its critical habitat for activities in riverine units. The National Marine Fisheries Service is responsible for ESA consultation regarding the Gulf sturgeon and its critical habitat for Corps activities within estuarine units, and is responsible for all ESA consultations regarding Gulf sturgeon and its critical habitat for activities in marine units.

Inflated Heelsplitter

Federally listed as threatened, the inflated heelsplitter mussel (*Potamilis inflatus*) occurs in the Amite River (Louisiana [with one report in the Pearl River]) and the Tombigbee and Black Warrior Rivers (Alabama). In Louisiana, the mussel occurs between Louisiana Highway 37 and Louisiana Highway 42, with the highest concentrations between Grangeville and Port Vincent. This freshwater mussel is typically found in soft, stable substrates such as sand, mud, silt, and sandy gravel, in slow to moderate currents. Heelsplitter mussels are usually found in depositional pools below sand point bars, and in shallow pools between sandbars and river banks. Major threats to this species in the Amite River are the loss of habitat resulting from sand and gravel dredging, and channel modifications for flood control.

Louisiana Quillwort

Federally listed as an endangered plant species, the Louisiana quillwort (*Isoetes louisianensis*) grows on sand and gravel bars on the accreting sides of streams and moist overflow channels within riparian forest communities in Washington and St. Tammany Parishes, Louisiana. The Louisiana quillwort is a small, semi-aquatic, facultative evergreen plant with spirally arranged leaves (sporophylls) arising from a globose, two-lobed corm. The hollow leaves are transversely septate, and measure approximately 0.12 inch wide and up to 16 inches long. Major threats to this species are habitat loss through hydrologic modifications of stream habitat, and land use practices that significantly alter stream quality and hydrology. Apparently, it is dependent on a special hydrologic regime resulting from the presence of small springs scattered at the bases of banks or bluffs.

MBTA Information

Colonial nesting waterbirds are protected under the MBTA. Colonies that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries may also be present. That database is updated primarily by monitoring the colony sites that were previously surveyed during the 1980s. Until a new, comprehensive coast-wide survey is conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect individual proposed project areas for the presence of undocumented nesting colonies during the nesting season. To minimize disturbance to colonial nesting birds, the following restrictions on individual proposed projects should be observed:

1. For colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 feet of a rookery should be restricted to the non-nesting period (i.e., September 1 through February 15, depending on species present).

2. For colonies containing nesting gulls, terns, and/or black skimmers, all activity occurring within 650 feet of a rookery should be restricted to the non-nesting period (i.e., September 16 through April 1, depending on species present).

In addition, we recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and avoid impacting them during the breeding season.

We appreciate the Corps' continued cooperation in the conservation of threatened and endangered species and migratory birds. If your staff have any questions or need further information, please have them contact Brigette Firmin (337/291-3108) of this office.

Sincerely,

Russell C. Watson
Acting Supervisor
Louisiana Field Office

cc: NOAA Fisheries, St. Petersburg, FL
LDWF, Natural Heritage Program, Baton Rouge, LA

APPENDIX B

Descriptions of the Near-Term Restoration Project Concepts

Small Diversion at Hope Canal consists of a small freshwater diversion through a newly constructed control structure at Hope Canal. The objective is to introduce sediments and nutrients into Maurepas Swamp south of Lake Maurepas. The introduction of additional freshwater via the proposed diversion would facilitate organic deposition, improve biological productivity, and prevent further deterioration of the swamp.

Small Diversion at Convent/Blind River consists of a small freshwater diversion into Blind River through a new control structure. The objective of this feature is to introduce sediments and nutrients into the southeast portion of Maurepas Swamp. This feature would operate in conjunction with the Hope Canal freshwater diversion to facilitate organic deposition in the swamp, improve biological productivity, and prevent further swamp deterioration.

Increase Amite River Influence by Gapping Spoil Banks consists of gapping the existing spoil banks of the Amite River Diversion Canal. The objective of this project is to introduce additional nutrients and sediment into western Maurepas Swamp primarily during flood events and localized rainfall events. This feature would provide nutrients and sediment to facilitate organic deposition in the swamp, improve biological productivity, and prevent further swamp deterioration.

MRGO Environmental Restoration involves the implementation of the environmental restoration features under consideration by the MRGO Environmental Restoration Study. In response to public concerns, past environmental effects, and national economic development considerations, an ongoing study is re-evaluating the viability of operation and maintenance of this feature. Since the construction of the MRGO, saltwater intrusion has degraded large expanses of freshwater marshes and accelerated habitat switching from freshwater marshes to brackish and intermediate marshes in the Biloxi marshes, the Central Wetlands, and the Golden Triangle wetlands. This study will evaluate the stabilization of the MRGO banks and various environmental restoration projects that would reduce saltwater intrusion into Lake Pontchartrain, the Biloxi marshes, the Central Wetlands, and the Golden Triangle marshes. Implementation should result in hydrologic restoration via implementation of environmental mitigations recommended in the Mississippi River Gulf Outlet (MRGO) Study.

The Caernarvon Diversion, constructed in 1992 near the Breton Sound marshes, has been operated to manage salinities in the central Breton Sound estuary through the introduction of freshwater at rates ranging between 1,000 cubic feet per second (cfs) and 8,000 cfs. This restoration project would seek a post-authorization change to the original project purpose to include wetland creation and restoration via increasing freshwater introduction rates, up to perhaps 5,000 cfs on average, to provide greater wetland-building function. The introduction of additional freshwater would facilitate organic and sediment deposition, improve biological productivity, and prevent further deterioration of the marshes.

Medium Diversion at Whites Ditch, located at White's Ditch downstream of the Caernarvon diversion structure, would implement a medium diversion into central River aux Chene area through the construction and operation of a new water control structure. The objective of this project is to provide additional freshwater, nutrients, and fine sediments to the area between the

Mississippi River and River aux Chene ridge which is currently isolated from the beneficial effects of the Caernarvon freshwater diversion. The introduction of additional freshwater would facilitate organic sediment deposition, improve biological productivity, and prevent further deterioration of the marshes.

Reauthorization of the Davis Pond Diversion for increased sediment input. The Davis Pond Freshwater Diversion structure, constructed in 2002 in the upper Barataria Basin, has been operated as to control central basin salinities through freshwater introductions ranging between 1,000 cfs to 10,000 cfs. This restoration feature would seek a re-authorization of the original project purpose to include wetland creation. To achieve this goal, the freshwater introduction rate would be increased up to perhaps 5,000 cfs on average, to accelerate wetland-building functions. The introduction of additional freshwater would facilitate organic and sediment deposition, improve biological productivity, and prevent further deterioration of the marshes.

Medium Diversion with Dedicated Dredging at Myrtle Grove consists of a medium freshwater diversion near Myrtle Grove through a new control structure. The diversion would provide additional sediment and nutrients to nourish highly degraded existing fresh to brackish wetlands and shallow, open-water areas. This would ensure the long-term sustainability of these marshes by increasing vegetative productivity and preventing future loss. The introduction of sediment to this area would also promote the infilling of shallow, open-water areas through both deposition and marsh expansion. This diversion would be complimented by dedicated dredging of sediment mined from the Mississippi River. The objective of the component is to create 1,500 acres of additional wetlands by placing dredged sediments in the shallow, open-waters within the fragmented marsh.

Barataria Basin Barrier Shoreline Restoration-Caminada Headland and Shell Island consists of mining offshore sediments to re-create eroded barrier islands. Based on designs developed in the LCA Barrier Island Restoration Study, a 3,000-foot-wide island footprint would be restored.

Terrebonne Basin Barrier Shoreline Restoration-Isles Derniere and East Timbalier consists of restoring some of the Timbalier and Dernieres barrier island chains. This restoration would simulate historical conditions by reducing the current number of breaches, and enlarging the width and dune crest of the Isles Dernieres (East Island, Trinity Island, and Whiskey Island) and East Timbalier Island.

Small Bayou Lafourche Reintroduction would reintroduce flow from the Mississippi River into Bayou Lafourche. The proposed year-round flows would provide water supply benefits and reduce marsh-loss rates for the wetlands south of the GIWW, between Bayous Lafourche and Terrebonne.

Gulf Shoreline Stabilization at Point au Fer Island would stabilize the Gulf shoreline of Point au Fer Island to prevent direct connections from forming between the Gulf and interior water bodies as that shoreline erodes. In addition to Gulf shoreline protection, this feature would reduce marine influence on fresher Atchafalaya Bay water, protecting the adjacent wetland habitats from saltwater impacts.

Multi-purpose Operation of Houma Navigation Canal (HNC) Lock consists of operation of the proposed Houma Navigation Canal Lock located at the southern end of the HNC, for multiple purposes, rather than for navigation only. The Corps' Morganza to the Gulf Hurricane Protection Study includes construction of the lock, but does not include the multi-purpose operation of the lock. This restoration feature would reduce saltwater intrusion, modify water circulation in the HNC to increase the distribution of Atchafalaya River water within Terrebonne Basin wetlands, especially within the Lake Boudreaux area wetlands to the north; the Lake Decade wetlands to the west; and the Grand Bayou wetlands to the east.

Convey Atchafalaya River Water to Terrebonne marshes includes a number of features to improve the distribution and supply of freshwater to deteriorated Terrebonne Basin marshes via the Gulf Intracoastal Waterway (GIWW). Construction of new channels and enlargement of existing channels would increase seasonal flows of Atchafalaya River water to central (Lake Boudreaux) and eastern (Grand Bayou) Terrebonne marshes. All channel alternatives would include a gated control structure to restrict saltwater intrusion during low river stages. Project features to increase the supply of Atchafalaya River within the GIWW include repairing banks along the GIWW, enlarging constrictions in the GIWW, and diverting additional freshwater from Bayou Shaffer into Avoca Island Lake. Those conveyance features would increase suspended sediment supply to Bayou Penchant and other wetlands receiving the Atchafalaya River water via the GIWW.

Maintain Land Bridge between Caillou Lake and Gulf of Mexico by installing shore protection along deteriorated portions of Grand Bayou DuLarge to prevent establishment of a major new hydrologic connection between the Gulf and Sister Lake. Some shore armoring would likely be needed to protect these features from erosion on the Gulf shoreline. A more systemic and comprehensive solution would involve a much greater amount of Gulf shoreline armoring, especially toward the west where shoreline retreat and loss of shoreline oyster reefs has allowed for increased water exchange between the Gulf and the interior waterbodies (i.e., between Bay Junop and Caillou Lake). Some of the newly opened channels would be closed to restore the historic cross-sections of exchange points. By reducing marine influences in these interior areas, these features might also allow increased riverine influences from Four League Bay to benefit area marshes.