APPENDIX A

Environmental

Appendix A-1. Southwest Pass NEPA Documentaion

SW Pass NEPA DOCUMENTATION	FONSI	PUBLIC NOTICE	WATER QUALITY CERTIFICATION		404 Evaluation
FEIS 40-Foot Channel	19-Jul -74	18-Oct -74		13-Dec-78	5 Jan 82
FEIS Supplement I	19-Mar-76				
FEIS Supplement II	1-Mar-85	14-Jun-84	840629-09	9-Aug-84	Oct 84
SIR #14 40-Foot Channel Advance Maint & Allow Overdepth	10-Dec-85				
FEIS Deep Draft Channel	2-Jul-82	31-May-84	840504-09	4-Jun-84	19 Oct 84 27 Jan 86
SIR #9 Deep Draft Channel Advance Maint & Allow Overdepth					19 Oct 84
EA #62	21-Apr-87	17-Sep-87	WQC 870917-06	24-Nov-87	19 Feb 87
EA #267 Dustpan Dredge	22-Apr-97	2-Dec-96	WQC 840629-09*	12-Mar-97	3 Apr 97
EA #268 Management HDDA Pass-á-Loutre	17-Apr-97	13-Nov-96	WQC 840504-09*	13-Nov-96	9 Mar 97
EA #268A Pass-a-Loutre Hopper Disposal Area Modification	4-Jun-02				27 Mar 02
EA #268B Pass-a-Loutre Hopper Disposal Area Additional Disposal Area	3-Oct-08	13-Nov-07	WQC 070620-04 AI 101235 CER 20070007	30-Aug-07	28 may 08
FEIS West Bay Sediment Diversion	18-Mar-02		WQC 900620-12 WQC 900620-12*	10-Aug-90 28-Jun-02	26 Oct 05
Dustpan Dredge Demonstration		15-May-96			
EA #393 Burrwood Bayou Flow Control Features	8-Dec-03	10-Apr-03 4-Sep-03	TR 030404-01 AI 101235 CER20030001	5-May-03 4-Nov-03*	1 Dec 03
EA #393-A Burrwood Bayou Flow Control Structure Repairs	28-Apr-05	10-Dec-04	WQC JP041201-01 AI126035 CER20040001	7-Mar-05	14 Jan 05
EA #393-B Burrwood Bayou Flow Control Structure			WW 080107-01/AI 101235/CER 20080001	11 Mar 08	4 Mar 08
EA #517 Additional Disposal Areas for Southwest Pass	22 Nov 13	12 Sep 12	WQC 121003-02/AI 101235/CER 20120007	1 Nov 12	8 Dec 12
		12 Jun 12	WQC 120521-03/AI 101235/CER 20120003	21 Jun 12	25 Jun 13

*WQC Revisions

Appendix A-2. 1996-2015 Dredging totals for CEMVN.

Mississippi River Maintenance Dredging in New Orleans District

Fiscal Year	SDX Cubic Yards	DDX Cubic Yards	NO Harbor Cubic Yards	SWP Cubic Yards
2015	566,580	16,762,344	482,195	19,245,648
2014	0	11,199,110	883,373	13,798,960
2013	375,000	15,842,357	778,389	15,783,302
2012	1,926,194	24,523,153	669,469	17,672,605
2011	814,478	21,822,885	675,266	14,580,247
2010	348,180	22,994,560	1,106,763	23,065,397
2009	579,040	26,270,682	1,003,474	18,229,009
2008	325,695	28,123,851	731,611	13,348,156
2007	623,878	11,762,086	1,228,325	10,886,560
2006	441,035	9,953,606	858,673	6,427,429
2005	824,628	19,368,940	1,088,234	13,911,798
2004	452,464	8,656,512	884,503	12,233,284
2003	623,692	13,104,433	1,346,418	9,382,331
2002	489,182	14,130,524	940,843	18,068,221
2001	628,451	10,694,759	1,313,108	13,509,054
2000	0	5,918,539	385,500	3,847,413
1999	0	12,914,990	1,183,133	19,530,236
1998	1,153,179	19,104,278	1,790,892	15,554,911
1997	1,105,121	23,098,962	1,581,881	25,575,406
1996	3,636,800	11,819,079	1,753,542	17,178,571
Totals	**14,913,597**	**328,065,650**	**20,685,592**	**301,828,538**
Averages	**745,680**	**16,403,283**	**1,034,280**	**15,091,427**

SDX = shallow draft crossings
DDX = deep draft crossings
NO = New Orleans
SWP = Southwest Pass
SP = South Pass
HDDA = hopper dredge disposal area (located at Head of Passes)
FY = Fiscal Year

SP Cubic Yards	HDDA Cubic Yards	Total Miss River Cubic Yards	Total FY Contract Cost
0	9,646,404	46,703,171	
0	0	25,881,443	$89,718,364
0	7,235,381	40,014,429	$78,187,640
0	787,274	45,578,695	$107,023,588
0	1,805,022	39,697,898	$84,004,278
0	6,527,685	54,042,585	$130,672,533
0	0	46,082,205	$89,352,236
0	4,013,912	46,543,225	$98,288,840
4,488,377	4,266,078	33,255,304	$67,023,572
0	0	17,680,743	$33,294,675
0	0	35,193,600	$50,704,830
0	4,124,598	26,351,361	$38,900,768
0	0	24,456,874	$33,242,566
0	0	33,628,770	$47,672,109
0	0	26,145,372	$31,441,137
0	0	10,151,452	$12,040,486
6,126,300	0	39,754,659	$45,235,217
0	1,051,661	38,654,921	$45,210,572
0	0	51,361,370	$55,225,438
0	0	34,387,992	$33,690,368
10,614,677	**39,458,015**	**715,566,069**	**$1,170,929,217**
530,734	**1,972,901**	**35,778,303**	**$61,627,854**

Appendix A-3. NEPA documentation for ship channnel dimensions.

PROJECT		AUTHORIZED DIMENSIONS (Depth x Width)	ADVANCE MAINTENANCE	ALLOWABLE OVERDEPTH	NEPA COMPLIANCE DOCUMENT
Mississippi River	**Baton Rouge to New Orleans (Deep Draft Crossings)**	-55’ (-45’) **LWRP** x 500’	**2’**	**2’**	Miss River Deep Draft FEIS 1982 (55’ channel) EA # 68 Adv. Maint. & Overdepth (17 Dec 87)
	New Orleans to Mile 12 AHP (Southwest Pass)	-55’ (-45’) **LWRP** x 750’	**2’**	**2’**	Miss River Deep Draft FEIS 1982 (55’ channel) SIR #9 Deep Draft Adv. Maint. & Overdepth (23 Aug 85)
	Mile 12 AHP to Mile 18 BHP (Southwest Pass)	-55’ (-48’) **MLLW** x 750’	**6’**	**2’**	Miss River Deep Draft FEIS 1982 (55’ channel) SIR #9 Deep Draft Adv. Maint. & Overdepth (23 Aug 85) NEPA Categorical Exclusion SWP Adv. Maint. (13 Jan 16)

	Mile 18 BHP to Mile 22 BHP (Southwest Pass)		-55’ (-48’) **MLLW** x 600’	**6’**	**2’**	Miss River Deep Draft FEIS 1982 (55’ channel) SIR #9 Deep Draft Adv. Maint. & Overdepth (23 Aug 85) NEPA Categorical Exclusion SWP Adv. Maint. (13 Jan 16)
	South Pass	**Inland**	-30’(-17’) **MLLW** x 450’ (300’)	-	-	Miss River Baton Rouge to Gulf FEIS 1974 (40’ channel) (Adv. Maint. & Overdepth not covered in any existing NEPA document)
		Bar	-30’(-17’) **MLLW** x 600’ (300’)	-	-	
Mississippi River						
	New Orleans Harbor		-40’ (-15’ to -35’) **LWRP** x 500’	**2’**	**2’**	Miss River Deep Draft FEIS 1982 (55’ channel) EA #68 (17 Dec 87)

Appendix A-4. History of deep draft crossing dredging (1980-2015)

Fiscal Year	Alhambra	Belmont	Smoke Bend	Medora	Red Eye	Baton Rouge Front	Missouri Bend	Sardine Point	Philadelphia Point	Bayou Goula	Granada	81 Mile Point	Rich Bend	Fairview	Unknown		Total Cost
2015	1,462,302	3,031,803	253,740	1,729,408	5,529,321	971,116	0	685,694	0	1,015,955	2,083,005	0	0	0	0	**16,762,344**	
2014					2,065,000			1,653,920									
2014	764,030	1,720,110	330,120	368,506	1,352,769	1,494,797	294,074	997,678	259,140	205,533	293,133						
2014	764,030	1,720,110	330,120	368,506	3,417,769	1,494,797	294,074	2,651,898	259,140	205,533	293,133	0	0	0	0	**11,199,110**	**$22,366,968**
2013	964,860	2,755,000			1,124,073					288,620	106,900	377,026					
2013	1,381,383	151,000	782,420	653,478	2,886,549	470,263	287,489	1,083,656	289,144	688,195	1,552,301						
2013	2,346,243	2,906,000	782,420	653,478	4,010,622	470,263	287,489	1,083,656	577,764	795,095	1,929,327	0	0	0	0	**15,842,357**	**$16,252,162**
2012					1,474,743												
2012	1,829,880	1,589,050	489,600	899,620	477,195	1,748,144		1,448,116									
2012	2,565,039	158,088	266,045	1,792,265	3,365,894	2,863,034	477,196	1,207,490	238,436	873,253	647,175		112,890				
2012	4,394,919	1,747,138	755,645	2,691,885	5,317,832	4,611,178	477,196	2,655,606	238,436	873,253	647,175	0	112,890	0	0	**24,523,153**	**$30,000,401**
2011		293,668															
2011		481,120															
2011		177,715															
2011	3,356,680	1,374,522	598,040					2,002,605		1,147,363							
2011	235,051	796,377	182,932	1,360,873	5,992,014	1,485,331		198,333	572,510	410,984	1,156,767						
2011	3,591,731	3,123,402	780,972	1,360,873	5,992,014	1,485,331	0	2,200,938	572,510	1,558,347	1,156,767	0	0	0	0	**21,822,885**	**$31,162,072**
2010		1,796,658									1,218,951						
2010		995,879	477,095	1,182,938	1,368,260						225,290						
2010	2,839,155	392,049	949,291	794,089	5,247,949	2,390,678	577,308	620,065		621,614	1,297,291						
2010	2,839,155	3,184,586	1,426,386	1,977,027	6,616,209	2,390,678	577,308	620,065	0	621,614	2,741,532	0	0	0	0	**22,994,560**	**$27,224,419**
2009	882,645	1,362,580	1,151,743	860,648	7,492,725	4,094,395	96,467	448,794	571,176	893,004	454,794		127,763				
2009	2,861,971	156,541		524,809				1,095,205		301,316	976,444						
2009		704,328		274,272						939,063							
2009	3,744,616	2,223,449	1,151,743	1,659,728	7,492,725	4,094,395	96,467	1,543,999	571,176	2,133,383	1,431,238	0	127,763	0	0	**26,270,682**	**$31,105,536**
2008	2,862,616	1,750,716	432,795	447,366	3,117,293	2,695,046	414,709	596,074	867,248	214,793	320,297						
2008	2,516,019	229,932	711,662	579,265	3,359,384			1,132,462		1,950,574	1,238,552						
2008		874,328															
2008		693,639		496,305						102,006	117,747						
2008		349,604		53,419													
2008	5,378,635	3,898,219	1,144,457	1,576,355	6,476,677	2,695,046	414,709	1,728,536	867,248	2,267,373	1,676,596	0	0	0	0	**28,123,851**	**$38,593,166**
2007	1,144,748	976,862	187,730		3,804,170	222,703	1,060,694	950,476	104,859	249,846	392,768	588,755					
2007	784,096	901,885								392,494							
2007	1,928,844	1,878,747	187,730	0	3,804,170	222,703	1,060,694	950,476	104,859	642,340	392,768	588,755	0	0	0	**11,762,886**	**$13,856,488**
2006	1,349,945	655,931	191,918		355,195	1,212,909		1,131,372		407,667	542,390						
2006		739,782	197,733		1,441,994	296,773				184,899							
2006	1,349,945	1,395,713	389,651	1,245,098	1,797,189	1,509,682	0	1,131,372	0	592,566	542,390	0	0	0	0	**9,953,606**	**$14,499,783**
2005	1,547,799	1,371,671	210,434	1,680,784	5,156,586	2,791,086		637,173		1,659,015	746,114						
2005	962,687	1,130,864	206,066	330,612	517,576	265,903					154,570						
2005	2,510,486	2,502,535	416,500	2,011,396	5,674,162	3,056,989	0	637,173	0	1,659,015	900,684	0	0	0	0	**19,368,940**	**$17,057,588**
2004	759,375	609,517	42,889	590,039	1,426,494	1,168,591		698,241		322,983	630,547						
2004					1,404,112	1,003,724											
2004	759,375	609,517	42,889	590,039	2,830,606	2,172,315	0	698,241	0	322,983	630,547	0	0	0	0	**8,656,512**	**$13,246,796**
2003	1,286,452	792,433	62,144	759,914	1,064,350	1,445,393		483,605		371,777	904,933						
2003	976,969	612,098	87,248	302,654	2,367,533			482,098		555,802	465,422						
2003										83,608							
2003	2,263,421	1,404,531	149,392	1,062,568	3,431,883	1,445,393	0	965,703	0	1,011,187	1,370,355	0	0	0	0	**13,104,433**	**$12,550,195**
2002	1,152,876	1,325,671	410,537	380,340	203,973	210,414		994,873	165,728	316,631	1,466,208						
2002	1,179,907	190,616		371,620	1,867,064	1,331,221		360,184	297,287	369,205							
2002				80,033	517,774			144,148		678,757	115,457						
2002	2,332,783	1,516,287	410,537	831,993	2,588,811	1,541,635	0	1,499,205	463,015	1,364,593	1,581,665	0	0	0	0	**14,130,524**	**$13,620,052**
2001	356,623	362,920	79,994	161,724	1,764,615	493,897		161,334		513,441	308,641						
2001	1,168,865	641,713			1,567,964	46,133		517,803		410,316	805,790						
2001	483,445	342,967									506,624						
2001	2,008,933	1,347,600	79,994	161,724	3,332,579	540,030	0	679,137	0	923,757	1,621,065	0	0	0	0	**10,694,809**	**$8,527,904**
2000	1,445,296		246,206		996,229	410,212		224,822	370,500	253,941	315,119						
2000		293,008			68,822	690,835					272,399						
2000		331,150															
2000	1,445,296	624,158	246,206		1,065,051	1,101,047	0	224,822	370,500	253,941	587,518	0	0	0	0	**5,918,539**	**$5,360,000**
1999	1,182,992	748,001		417,366	2,939,777	496,999		228,525	75,765	151,025	456,799						
1999	864,656	702,315		73,986	2,957,375	197,703				174,670	481,362						
1999		82,088		137,084						342,999							
1999		203,593															
1999	2,047,648	1,735,997	0	628,436	5,897,152	694,702	0	228,525	75,765	668,694	938,161	0	0	0	0	**12,915,080**	**$9,919,902**
1998		2,140,748			398,730												
1998	1,393,855	1,218,601	1,085,595	2,264,693	726,810			410,902		638,495	1,376,178						
1998				119,907	4,922,703	1,145,227		506,189	226,950		528,695						
1998	1,393,855	3,359,349	1,085,595	2,384,600	6,048,243	1,145,227	0	917,091	226,950	638,495	1,904,873	0	0	0	0	**19,104,278**	
1997	3,842,318	727,767	429,772	726,070	3,207,051	1,846,031			218,967		1,145,961			196,445			
1997	502,833	1,229,665		921,239	1,965,344	114,152				2,058,733	601,922						
1997		712,065	440,759														
1997		373,700	217,442	134,812													
1997								477,076	218,066	509,885			234,473	46,414			
1997	4,345,151	3,043,197	1,087,973	1,782,121	5,172,395	1,960,183	0	477,076	437,033	2,568,618	1,747,883	0	234,473	242,859	0	**23,098,962**	
1996				378,619						1,075,012							
1996		256,879									209,414						
1996	1,064,381	643,286	309,263	447,932	1,120,990	926,756		752,348			571,724			260,544			
1996	811,799				2,759,761						230,371						
1996	1,876,180	900,165	309,263	826,551	3,880,751	926,756	0	752,348	0	1,075,012	1,011,509	0	0	260,544	0	**11,819,079**	
1995	3,132,359	357,739		496,417		1,557,954				620,608			165,492				
1995	1,828,487																
1995						**1,289,678**		**700,154**	**343,556**								
1995		1,340,033		565,581	3,337,181			1,135,522			1,855,452						
1995				546,530													
1995	4,960,846	1,697,772	0	1,608,528	3,337,181	2,847,632	0	1,835,676	343,556	620,608	1,855,452	0	165,492	0	0	**19,272,743**	
1994	967,830	4,048,338	723,043			766,118		638,943		1,208,459	831,821						
1994	1,097,393			979,010	7,433,797								107,911				
1994				1,150,661		388,186								446,501			
1994				866,311	203,683					504,381	566,693						
1994				**1,787,396**	**2,403,203**				**302,851**	**469,743**	**808,399**						
1994	2,065,223	4,048,338	723,043	4,783,378	10,040,683	1,154,304	0	638,943	302,851	2,182,583	2,206,913	0	107,911	446,501	0	**28,700,671**	
1993	819,556	384,883		716,461	5,484,789									180,638			
1993		2,432,109								737,697	436,685						
1993	819,556	2,816,992	0	716,461	5,484,789	0	0	0	0	737,697	436,685	0	0	180,638	0	**11,192,818**	
1992															82,478		
1992															485,195		
1992	611,811	1,099,332		667,851	3,220,068			672,482		294,259							
1992	1,188,260			774,064	2,543,042			399,777			224,498						
1992	1,800,071	1,099,332	0	1,441,915	5,763,110	0	0	1,072,259	0	294,259	224,498	0	0	0	567,673	**12,263,117**	
1991															1,343,196		
1991															1,034,151		
1991		1,293,568															
1991	757,881	1,126,164	248,760	1,132,573	6,438,378	2,696,569		720,271		496,223	450,333						
1991	1,582,143	2,615,569			2,620,229												
1991	2,340,024	5,035,301	248,760	1,132,573	9,058,607	2,696,569	0	720,271	0	496,223	450,333	0	0	0	2,377,347	**24,556,008**	
1990	770,536	606,926		603,814	7,512,477	1,325,980					243,315						
1990	968,818	3,005,967	415,886	324,490						1,057,609							
1990	1,739,354	3,612,893	415,886	928,304	7,512,477	1,325,980	0	0	0	1,057,609	243,315	0	0	0	0	**16,835,818**	
1989	1,091,334	1,948,656	188,222	729,830	3,198,502	853,278		737,592		666,038	249,277						
1989		1,936,225	360,557		1,260,960												
1989	1,091,334	3,884,881	548,779	729,830	4,459,462	853,278	0	737,592	0	666,038	249,277	0	0	0	0	**13,220,471**	
1988	956,168			415,202	1,648,500	48,356				462,388							
1988															376,492		WHEELER: Belmont, Sardine Point, Baton Rouge Front, Granada
1988	956,168	0	0	415,202	1,648,500	48,356	0	0	0	462,388	0	0	0	0	376,492	**3,907,106**	
1987	610,407	0	0		3,629,483	0	0	0	0	360,370	532,518	0	0	0	0	**5,132,778**	
1986	1,346,300	1,901,646		2,309,791	3,268,881						891,487						
1986	1,132,074				1,012,666					240,721							
1986	2,478,374	1,901,646	0	2,309,791	4,281,547	0	0	0	0	240,721	891,487	0	0	0	0	**12,103,566**	
1985					1,018,112												
1985	805,346	1,641,535	543,589	914,665	5,407,139					203,049	200,260						
1985	805,346	1,641,535	543,589	914,665	6,425,251	0	0	0	0	203,049	200,260	0	0	0	0	**10,733,695**	
1984														631,000			
1984				578,303	957,234	59,432			196,000	238,500							
1984	240,000																
1984															716,816		
1984		248,945		185,910	136,902												84-C-0085: Red Eve, Medora, and Alhambra
1984	316,750			643,073	844,237												
1984	2,219,552	1,221,134	111,871	1,515,509	2,053,476				141,555	858,084	419,221						
1984	2,776,302	1,470,079	0	2,922,795	3,991,849	59,432	0	0	337,555	1,096,584	419,221	0	0	631,000	716,816	**14,421,633**	
1983				343,052	624,830												
1983	773,628	692,429	192,371	695,075	2,779,158	458,630			150,630	174,482	273,648						
1983	773,628	692,429	192,371	1,038,127	3,403,988	458,630	0	0	150,630	174,482	273,648	0	0	0	0	**7,157,933**	
1982	436,848																
1982	196,091								73,147								
1982	634,927	383,315		1,245,609	2,661,835					822,165	481,445						
1982	1,267,866	383,315	0	1,245,609	2,661,835	0	0	0	73,147	822,165	481,445	0	0	0	0	**6,935,382**	
1981				503,094	623,777						379,945						
1981	287,831																
1981	287,831	0	0	503,094	623,777	0	0	0	0	0	379,945	0	0	0	0	**1,794,647**	
1980	67,644	126,351			748,992												
1980		285,909		483,777	2,842,376					361,797	308,270						
1980	67,644	412,260	0	483,777	3,591,368	0	0	0	0	361,797	308,270	0	0	0	0	**5,225,116**	
Sum Total	73,623,522	70,849,276	15,658,865	44,715,835	166,290,068	43,973,647	3,207,937	26,736,302	5,972,135	30,968,327	34,760,669	588,755	748,529	1,761,542	4,038,328	521,519,292	
Annual Average	**2,045,098**	**1,968,035**	**434,968**	**1,242,107**	**4,619,169**	**1,221,490**	**89,109**	**742,675**	**165,893**	**860,231**	**965,574**	**16,354**	**20,792**	**48,931**	**112,176**	**14,486,647**	

Appendix A-5. Southwest Pass Beneficial Use Acreages from 2009-2015.

Year	BU Site	BU Type	Year 0 Acres	Year 1 Acres	Year 2 Acres	Year 3 Acres	Year 4 Acres	Year 5 Acres	Year 6 Acres	Total Acres Lost	% Land Lost
2009	12.7R BHP	WD	24	20	19	14	14	14	13	11	46
	10.2R BHP	WD	33	15	7	7	7	7	7	26	79
	7.9R BHP	WD	6	0.5	0	0	0	0	0	6	100
	6.5R BHP	WD	37	12	12	12	12	12	12	25	68
2010	15.5R BHP	WD	8	2	1	1	1	0.5		7.5	94
	14.3R BHP	WD	12	6	5	5	3	2		10	83
	13.0R BHP	WD	14	10	8	7	7	8		6	43
	11.2L BHP	WD	33	23	15	17	18	19		14	42
2011	2.0R BHP	WD	10	10	10	10	9			1	10
	3.4R BHP	BS	15	15	15	15	15			0	0
	5.3R BHP	BS	93	92.5	92.5	92	91			2	2
	6.2L BHP	BS	0.3	0.3	0.3	0.3	0.3			0	0
	6.5L BHP	BS	4	4	4	4	4			0	0
	8.2L BHP	BS	4	4	4	4	4			0	0
	9.9L BHP	BS	9	9	9	9	9			0	0
	11.2L BHP	BS	13	13	13	13	13			0	0
	11.8L BHP	BS	20	20	20	19.5	19			1	5
	14.2L BHP	BS	7	7	6.5	6.5	6.5			0.5	7
	14.6L BHP	BS	5	5	5	5	5			0	0
	16.5L BHP	BS	18	18	18	18	17.5			0.5	3
	17.6L BHP	BS	0.4	0	0	0	0			0.4	100
2012	17.3R BHP	WD	114	114	105	101				13	11
	14.3R BHP	WD	273	255	255	252				21	8
	10.7L BHP	WD	70	70	68	67				3	4
	10.5R BHP	WD	65	65	65	62				3	5
	4.1R AHP	WD	26	18	21	17				9	35
	2.9R AHP	WD	67	67	66	61				6	9
2013	8.0R BHP	BS	2	2	2					0	0
	8.0R BHP	WD	16	14	11					5	31
	10.8R BHP	WD	185	185	147					38	21
	12.0R BHP	WD	78	78	76					2	3
	14.1R BHP	WD	305	301	298					7	2
	16.6R BHP	WD	20	20	11					9	45
	17.1R BHP	WD	4	4	2					2	50
	17.5L BHP	BN	2	2	2					0	0

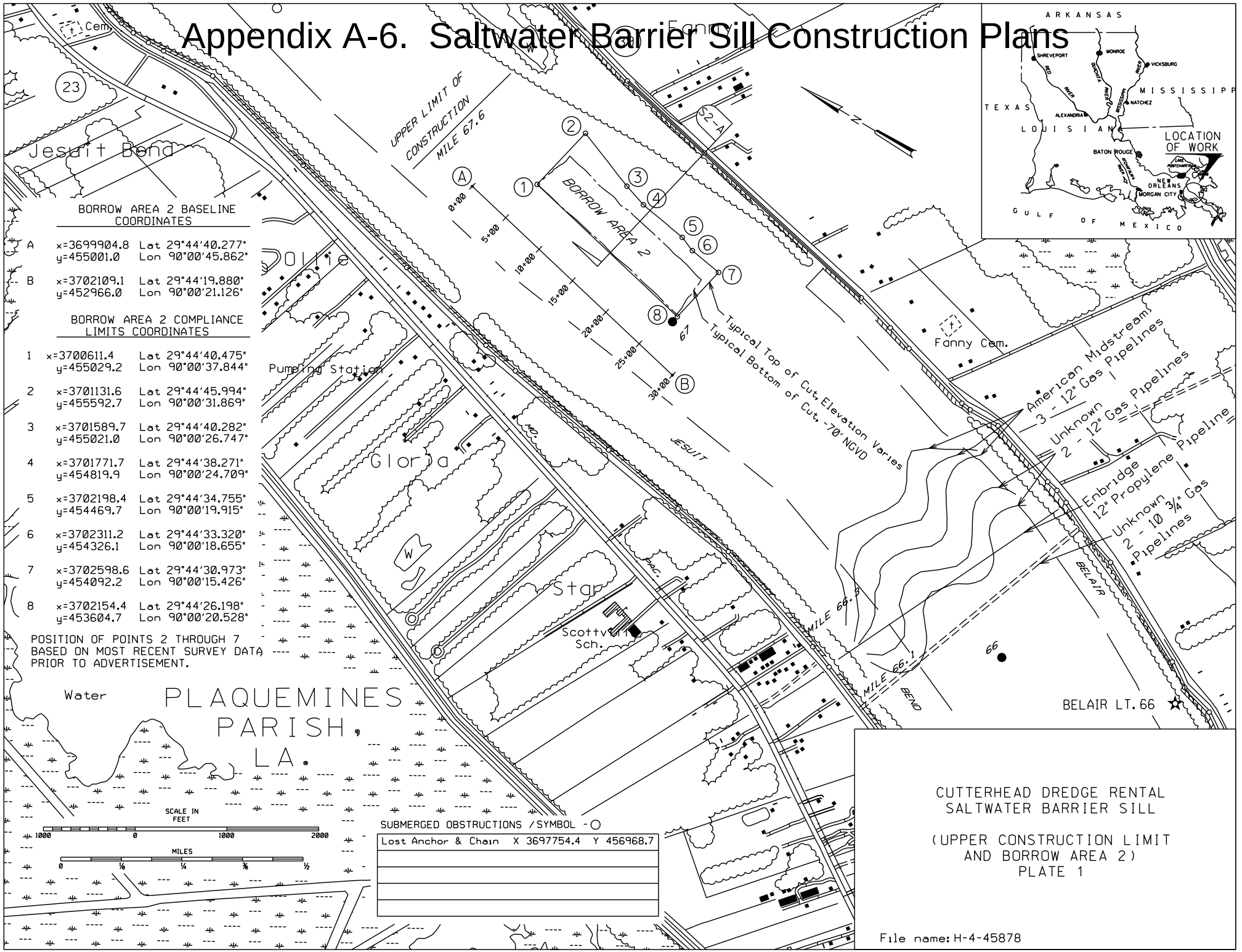
2014	17.8L BHP	WD	21	3						18	18
	15.7L BHP	WD	5	2						3	3
	14.0L BHP	WD	103	86						17	17
	12.6L BHP	WD	68	63						5	5
	11.1L BHP	WD/BN	129	123						6	6
	10.2R BHP	WD	61	19						42	42
	8.2L BHP	WD	116	97						19	19
	5.3R BHP	WD	69	53						16	16
2015	17.3R BHP	WD	49								
	12.7R BHP	WD	35								
	9.0L BHP	WD	17								
	8.04R BHP	WD	0								
	7.19R BHP	WD	9								
	3.8R BHP	WD	4								
	1.5R BHP	WD	73								
	4.0R AHP	WD	100								
	2.9R AHP	WD	45								
	1.5R AHP	WD	371								

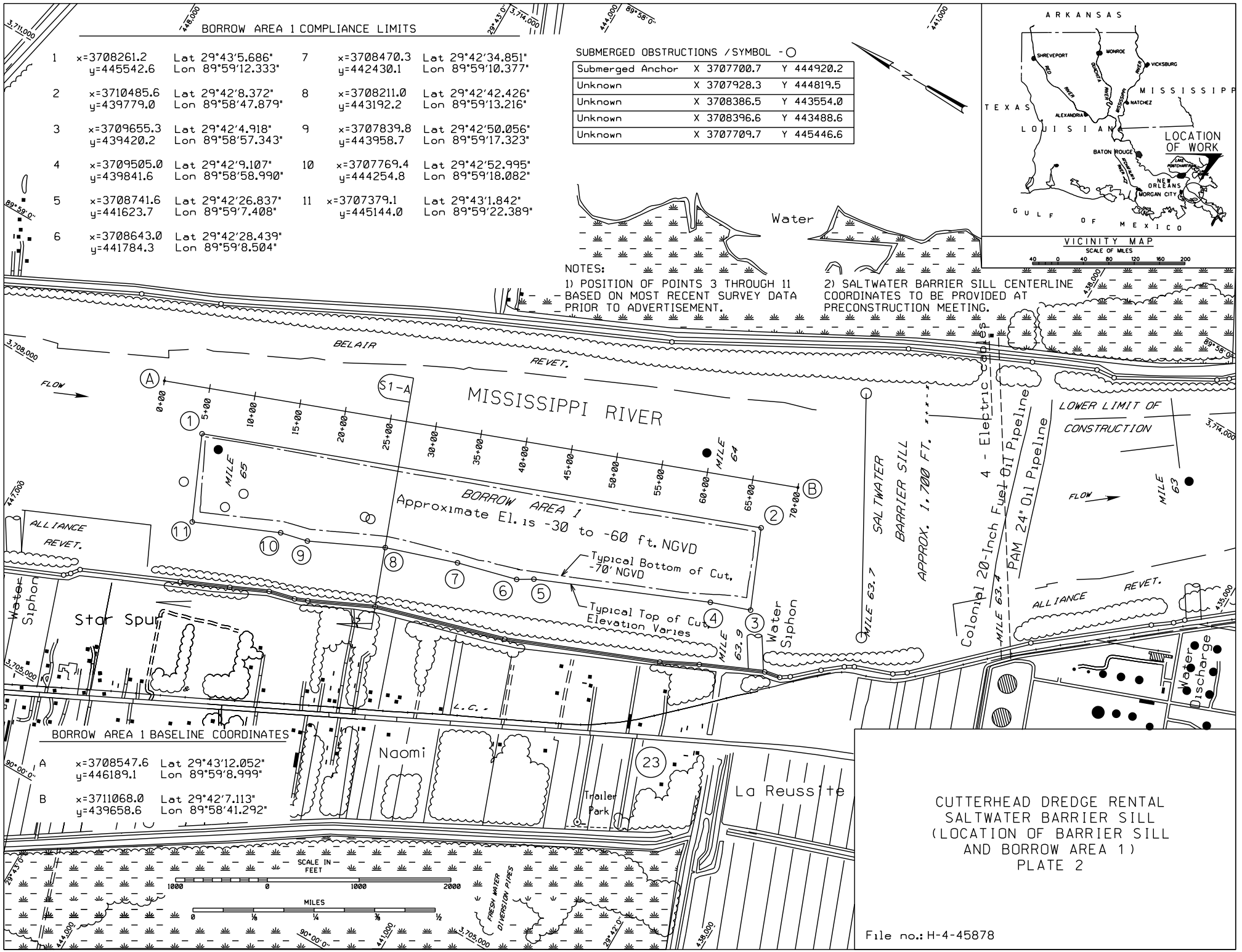
WD = Wetlands Development

BS = Bank Stabilization

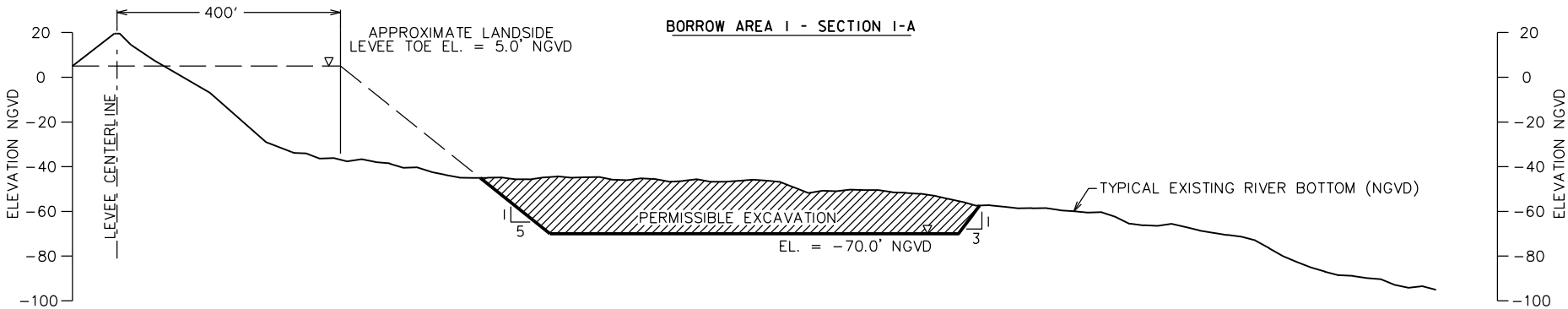
BN = Beach Nourishment

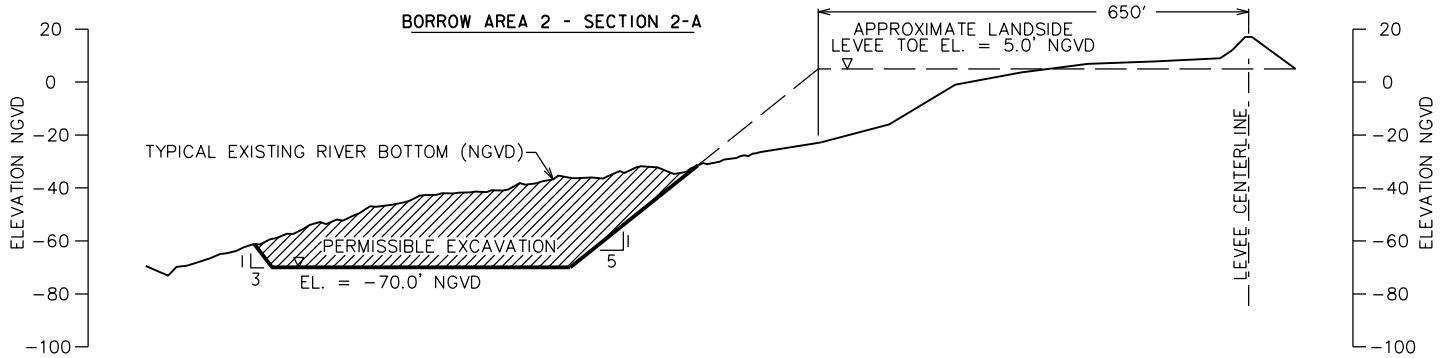
Appendix A-6. Saltwater Barrier Sill Construction Plans





SECTION 35 20 23.23 16 ATTACHMENT

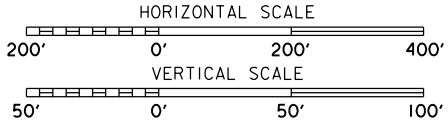




NOTES:

1. The gauge is in Alliance, La. and its location is LAT 29-41-04.36, LONG 89-58-11.64 on upstream end of coke dock of Alliance Refinery, right bank at Mile 62.5 (1962 survey) (Sta. 0139004.). The gauge is automatic wire weight and set at 0.0 Gage Datum and shall be used in lieu of benchmarks. 2011 datum relationships are as follows:
0.00' Gage = -0.14' NAVD88 (2004.65) = 0.52' NGVD29

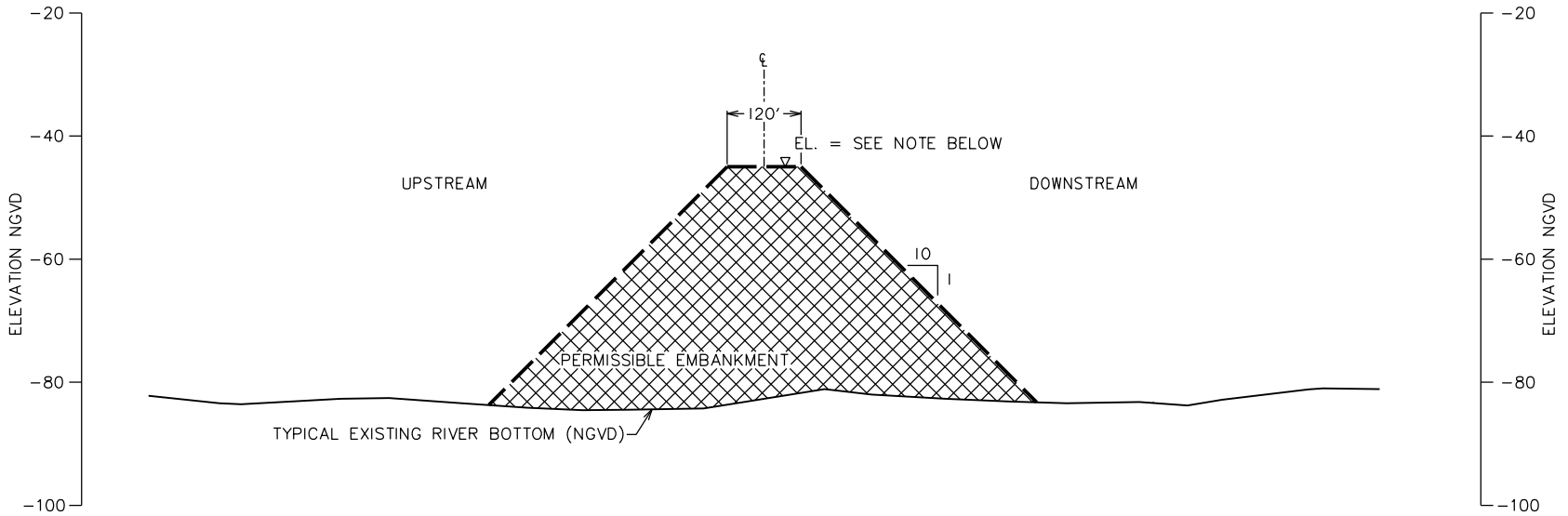
2. All elevations are in N.G.V.D.



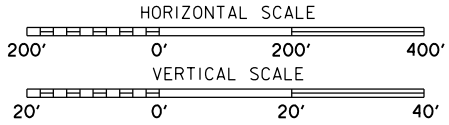
CUTTERHEAD DREDGE RENTAL
SALTWATER BARRIER SILL

(TYPICAL SECTIONS
FOR BORROW AREAS)
PLATE 3

File name: H-4-45878



NOTE:
Saltwater Barrier Sill height will range between −45.0' to −50.0' NGVD.
Final height of sill will be determined in the field by the Contracting Officer.



CUTTERHEAD DREDGE RENTAL
SALTWATER BARRIER SILL

(TYPICAL SECTION FOR
SALTWATER BARRIER SILL)
PLATE 4

File name: H-4-45878

Appendix 7. Marsh Creation Value Assessment.

WETLAND VALUE ASSESSMENT COMMUNITY MODEL V2.4

Fresh/Intermediate Marsh

Project: Area A-Delta

AAHUs = 190.10

FWOP

Project Area (ac)	365	365	365	365	365	365	365					
% Fresh	100	100	100	100	100	100	100					
% Intermediate												
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	0	0	0	0	0	0					
V2: % Aquatic	25	25	25	25	25	25	8					
V3: Interspersion Class 1	0	0	0	0	0	0	0					
V3: Interspersion Class 2	0	0	0	0	0	0	0					
V3: Interspersion Class 3	30	30	30	30	30	35	40					
V3: Interspersion Class 4	70	70	70	70	70	65	60					
V3: Interspersion Class 5	0	0	0	0	0	0	0					
V4: %OW <= 1.5ft	19	19	19	19	19	19	19					
V5: Salinty (ppt) - Fresh	1.16	1.16	1.16	1.16	1.16	1.16	1.16					
V5: Salinty (ppt) - INT												
V6: Fish Access - Fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT												

FWP

Project Area (ac)	365	37	93	375	377	405	431					
% Fresh	100	100	100	100	100	100	100					
% Intermediate	0											
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	10	25	100	100	100	100					
V2: % Aquatic	25	0	0	25	29	29	13					
V3: Interspersion Class 1	0	0	0	50	100	0	0					
V3: Interspersion Class 2	0	0	0	0	0	100	0					
V3: Interspersion Class 3	30	0	100	50	0	0	100					
V3: Interspersion Class 4	70	0	0	0	0	0	0					
V3: Interspersion Class 5	0	100	0	0	0	0	0					
V4: %OW <= 1.5ft	19	100	100	100	100	100	83					
V5: Salinty (ppt) - Fresh	1	1.16	1.16	1.16	1.16	1.16	1.16					
V5: Salinty (ppt) - INT	0											
V6: Fish Access - Fresh	1.00	0.00	0.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT	0.00											

Computed SIs - do not enter data here !

FWOP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.10	0.10	0.10	0.10	0.10	0.10					
% Aquatic	0.33	0.33	0.33	0.33	0.33	0.33	0.17					
Interspersion												
Class 1	0.26	0.26	0.26	0.26	0.26	0.27	0.28					
Class 2												
Class 3												
Class 4												
Class 5												
%OW <= 1.5ft	0.31	0.31	0.31	0.31	0.31	0.31	0.31					
Salinity (ppt)												
fresh	0.87	0.87	0.87	0.87	0.87	0.87	0.87					
intermediate												
Access Value												
fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
intermediate												
Emergent Marsh HSI =	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**					
Open Water HSI =	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.32**					

FWP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.19	0.33	1.00	1.00	1.00	1.00					
% Aquatic	0.33	0.10	0.10	0.33	0.36	0.36	0.21					
Interspersion												
Class 1	0.26	0.10	0.40	0.70	1.00	0.60	0.40					
Class 2												
Class 3												
Class 4												
Class 5												
%OW <= 1.5ft	0.31	0.60	0.60	0.60	0.60	0.60	1.00					
Salinity (ppt)												
fresh	0.87	0.87	0.87	0.87	0.87	0.87	0.87					
intermediate												
Access Value												
fresh	1.00	0.30	0.30	1.00	1.00	1.00	1.00					
intermediate												
Emergent Marsh HSI =	**0.24**	**0.27**	**0.39**	**0.95**	**0.99**	**0.94**	**0.92**					
Open Water HSI =	**0.44**	**0.22**	**0.24**	**0.50**	**0.55**	**0.52**	**0.41**					

AAHU CALCULATION - EMERGENT MARSH

Project: Area A-Delta

	FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
1	365	0	0	0.24	0.00	
2	365	1	0	0.24	0.00	0.00
3	365	3	0	0.24	0.00	0.00
4	365	5	0	0.24	0.00	0.00
5	365	6	0	0.24	0.00	0.00
6	365	25	0	0.24	0.00	0.00
7	365	50	0	0.24	0.00	0.00
8						
9						
10						
11						
12						
		Max=	50		AAHUs =	0.00

FWP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
365	0	0	0.24	0.00	
37	1	3.7	0.27	0.99	0.48
93	3	23.25	0.39	9.08	9.26
375	5	375	0.95	357.00	300.22
377	6	377	0.99	371.47	364.22
405	25	405	0.94	381.06	7152.98
431	50	431	0.92	395.95	9714.97
	Max=	50		AAHUs	350.84

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Emergent Marsh AAHUs =	350.84
B. Future Without Project Emergent Marsh AAHUs =	0.00
Net Change (FWP - FWOP) =	**350.84**

AAHU CALCULATION - OPEN WATER

Project: **Area A-Delta**

FWOP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
365	0	365	0.44	161.18	
365	1	365	0.44	161.18	161.18
365	3	365	0.44	161.18	322.36
365	5	365	0.44	161.18	322.36
365	6	365	0.44	161.18	161.18
365	25	365	0.44	161.45	3064.95
365	50	365	0.32	115.34	3459.89
	Max=	50		AAHUs =	149.84

FWP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
365	0	365	0.44	161.18	
37	1	33.3	0.22	7.28	71.90
93	3	69.75	0.24	16.79	23.80
375	5	0	0.50	0.00	22.71
377	6	0	0.55	0.00	0.00
405	25	0	0.52	0.00	0.00
431	50	0	0.41	0.00	0.00
	Max=	50		AAHUs	2.37

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Open Water AAHUs =	2.37
B. Future Without Project Open Water AAHUs =	149.84
Net Change (FWP - FWOP) =	**-147.47**

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	350.84
B. Open Water Habitat Net AAHUs =	-147.47
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1	**190.10**

WETLAND VALUE ASSESSMENT COMMUNITY MODEL V2.4

Fresh/Intermediate Marsh

Project: Area A-Delta With Maintenance

AAHUs = 1549.67

FWOP

Project Area (ac)	130	130	130	130	130	130	130					
% Fresh	100	100	100	100	100	100	100					
% Intermediate												
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	0	0	0	0	0	0					
V2: % Aquatic	25	25	25	25	25	25	8					
V3: Interspersion Class 1	0	0	0	0	0	0	0					
V3: Interspersion Class 2	0	0	0	0	0	0	0					
V3: Interspersion Class 3	30	30	30	30	30	35	40					
V3: Interspersion Class 4	70	70	70	70	70	65	60					
V3: Interspersion Class 5	0	0	0	0	0	0	0					
V4: %OW <= 1.5ft	19	19	19	19	19	19	19					
V5: Salinty (ppt) - Fresh	1.16	1.16	1.16	1.16	1.16	1.16	1.16					
V5: Salinty (ppt) - INT												
V6: Fish Access - Fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT												

FWP

Project Area (ac)	130	13	165	265	398	2916	6226					
% Fresh	100	100	100	100	100	100	100					
% Intermediate	0											
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	10	42	40	50	88	94					
V2: % Aquatic	25	0	0	25	29	29	13					
V3: Interspersion Class 1	0	0	0	50	100	0	0					
V3: Interspersion Class 2	0	0	0	0	0	100	0					
V3: Interspersion Class 3	30	0	100	50	0	0	100					
V3: Interspersion Class 4	70	0	0	0	0	0	0					
V3: Interspersion Class 5	0	100	0	0	0	0	0					
V4: %OW <= 1.5ft	19	100	100	100	100	100	83					
V5: Salinty (ppt) - Fresh	1	1.16	1.16	1.16	1.16	1.16	1.16					
V5: Salinty (ppt) - INT	0											
V6: Fish Access - Fresh	1.00	0.00	0.00	0.38	0.48	0.87	0.94					
V6: Fish Access - INT	0.00											

Computed SIs - do not enter data here !

FWOP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.10	0.10	0.10	0.10	0.10	0.10					
% Aquatic	0.33	0.33	0.33	0.33	0.33	0.33	0.17					
Interspersion												
Class 1	0.26	0.26	0.26	0.26	0.26	0.27	0.28					
Class 2												
Class 3												
Class 4												
Class 5												
%OW <= 1.5ft	0.31	0.31	0.31	0.31	0.31	0.31	0.31					
Salinity (ppt)												
fresh	0.87	0.87	0.87	0.87	0.87	0.87	0.87					
intermediate												
Access Value												
fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
intermediate												
Emergent Marsh HSI =	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**					
Open Water HSI =	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.32**					

FWP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.19	0.48	0.46	0.55	0.89	0.95					
% Aquatic	0.33	0.10	0.10	0.33	0.36	0.36	0.21					
Interspersion												
Class 1	0.26	0.10	0.40	0.70	1.00	0.60	0.40					
Class 2												
Class 3												
Class 4												
Class 5												
%OW <= 1.5ft	0.31	0.60	0.60	0.60	0.60	0.60	1.00					
Salinity (ppt)												
fresh	0.87	0.87	0.87	0.87	0.87	0.87	0.87					
intermediate												
Access Value												
fresh	1.00	0.30	0.30	0.57	0.64	0.91	0.96					
intermediate												
Emergent Marsh HSI =	**0.24**	**0.27**	**0.48**	**0.54**	**0.65**	**0.86**	**0.88**					
Open Water HSI =	**0.44**	**0.22**	**0.24**	**0.45**	**0.51**	**0.51**	**0.41**					

AAHU CALCULATION - EMERGENT MARSH

Project: Area A-Delta With Maintenance

	FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
1	130	0	0	0.24	0.00	
2	130	1	0	0.24	0.00	0.00
3	130	3	0	0.24	0.00	0.00
4	130	5	0	0.24	0.00	0.00
5	130	6	0	0.24	0.00	0.00
6	130	25	0	0.24	0.00	0.00
7	130	50	0	0.24	0.00	0.00
8						
9						
10						
11						
12						
		Max=	50		AAHUs =	0.00

FWP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
130	0	0	0.24	0.00	
13	1	1.3	0.27	0.35	0.17
165	3	69.3	0.48	33.60	29.01
265	5	106	0.54	57.73	90.60
398	6	199	0.65	128.52	91.55
2916	25	2566.08	0.86	2204.46	#######
6226	50	5852.44	0.88	5139.70	#######
	Max=	50		AAHUs	2246.32

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Emergent Marsh AAHUs =	2246.32
B. Future Without Project Emergent Marsh AAHUs =	0.00
Net Change (FWP - FWOP) =	2246.32

AAHU CALCULATION - OPEN WATER

Project: **Area A-Delta With Maintenance**

FWOP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
130	0	130	0.44	57.41	
130	1	130	0.44	57.41	57.41
130	3	130	0.44	57.41	114.81
130	5	130	0.44	57.41	114.81
130	6	130	0.44	57.41	57.41
130	25	130	0.44	57.50	1091.62
130	50	130	0.32	41.08	1232.29
	Max=	50		AAHUs =	53.37

FWP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
130	0	130	0.44	57.41	
13	1	11.7	0.22	2.56	25.58
165	3	95.7	0.24	23.04	24.97
265	5	159	0.45	71.71	90.31
398	6	199	0.51	100.75	85.86
2916	25	349.92	0.51	177.37	2641.86
6226	50	373.56	0.41	152.72	4135.79
	Max=	50		AAHUs	140.09

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Open Water AAHUs =	140.09
B. Future Without Project Open Water AAHUs =	53.37
Net Change (FWP - FWOP) =	**86.72**

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	2246.32
B. Open Water Habitat Net AAHUs =	86.72
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1	**1549.67**

WETLAND VALUE ASSESSMENT COMMUNITY MODEL V2.4

Fresh/Intermediate Marsh

Project: Area B-PAL

AAHUs = 99.30

FWOP

Project Area (ac)	365	365	365	365	365	365	365					
% Fresh	100	100	100	100	100	100	100					
% Intermediate												
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	0	0	0	0	0	0					
V2: % Aquatic	25	25	25	25	25	25	8					
V3: Interspersion Class 1	0	0	0	0	0	0	0					
V3: Interspersion Class 2	0	0	0	0	0	0	0					
V3: Interspersion Class 3	30	30	30	30	30	35	40					
V3: Interspersion Class 4	70	70	70	70	70	65	60					
V3: Interspersion Class 5	0	0	0	0	0	0	0					
V4: %OW <= 1.5ft	19	19	19	19	19	19	19					
V5: Salinty (ppt) - Fresh	1.03	1.03	1.03	1.03	1.03	1.03	1.03					
V5: Salinty (ppt) - INT												
V6: Fish Access - Fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT												

FWP

Project Area (ac)	365	36	90	358	356	320	229					
% Fresh	100	100	100	100	100	100	100					
% Intermediate	0											
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	10	25	98	98	88	63					
V2: % Aquatic	25	0	0	25	29	29	13					
V3: Interspersion Class 1	0	0	0	50	100	0	0					
V3: Interspersion Class 2	0	0	0	0	0	100	0					
V3: Interspersion Class 3	30	0	100	50	0	0	100					
V3: Interspersion Class 4	70	0	0	0	0	0	0					
V3: Interspersion Class 5	0	100	0	0	0	0	0					
V4: %OW <= 1.5ft	19	100	100	100	100	100	83					
V5: Salinty (ppt) - Fresh	1	1.03	1.03	1.03	1.03	1.03	1.03					
V5: Salinty (ppt) - INT	0											
V6: Fish Access - Fresh	1.00	0.00	0.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT	0.00											

Computed SIs - do not enter data here !

FWOP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.10	0.10	0.10	0.10	0.10	0.10					
% Aquatic	0.33	0.33	0.33	0.33	0.33	0.33	0.17					
Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	0.26	0.26	0.26	0.26	0.26	0.27	0.28					
%OW <= 1.5ft	0.31	0.31	0.31	0.31	0.31	0.31	0.31					
Salinity (ppt) fresh intermediate	0.89	0.89	0.89	0.89	0.89	0.89	0.89					
Access Value fresh intermediate	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
Emergent Marsh HSI =	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**					
Open Water HSI =	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.32**					

FWP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.19	0.33	0.98	0.98	0.89	0.67					
% Aquatic	0.33	0.10	0.10	0.33	0.36	0.36	0.21					
Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	0.26	0.10	0.40	0.70	1.00	0.60	0.40					
%OW <= 1.5ft	0.31	0.60	0.60	0.60	0.60	0.60	1.00					
Salinity (ppt) fresh intermediate	0.89	0.89	0.89	0.89	0.89	0.89	0.89					
Access Value fresh intermediate	1.00	0.30	0.30	1.00	1.00	1.00	1.00					
Emergent Marsh HSI =	**0.24**	**0.27**	**0.39**	**0.94**	**0.98**	**0.87**	**0.70**					
Open Water HSI =	**0.44**	**0.22**	**0.24**	**0.50**	**0.55**	**0.52**	**0.41**					

AAHU CALCULATION - EMERGENT MARSH

Project: Area B-PAL

	FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
1	365	0	0	0.24	0.00	
2	365	1	0	0.24	0.00	0.00
3	365	3	0	0.24	0.00	0.00
4	365	5	0	0.24	0.00	0.00
5	365	6	0	0.24	0.00	0.00
6	365	25	0	0.24	0.00	0.00
7	365	50	0	0.24	0.00	0.00
8						
9						
10						
11						
12						
		Max=	50		AAHUs =	0.00

FWP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
365	0	0	0.24	0.00	
36	1	3.6	0.27	0.97	0.47
90	3	22.5	0.39	8.85	9.04
358	5	350.84	0.94	330.91	279.57
356	6	348.88	0.98	340.69	335.82
320	25	281.6	0.87	245.87	5550.33
229	50	144.27	0.70	100.81	4233.78
	Max=	50		AAHUs	208.18

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Emergent Marsh AAHUs =	208.18
B. Future Without Project Emergent Marsh AAHUs =	0.00
Net Change (FWP - FWOP) =	**208.18**

AAHU CALCULATION - OPEN WATER

Project: Area B-PAL

FWOP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
365	0	365	0.44	161.88	
365	1	365	0.44	161.88	161.88
365	3	365	0.44	161.88	323.76
365	5	365	0.44	161.88	323.76
365	6	365	0.44	161.88	161.88
365	25	365	0.44	162.15	3078.30
365	50	365	0.32	116.05	3477.47
	Max=	50		AAHUs =	150.54

FWP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
365	0	365	0.44	161.88	
36	1	32.4	0.22	7.14	72.15
90	3	67.5	0.24	16.38	23.26
358	5	7.16	0.50	3.56	25.06
356	6	7.12	0.55	3.89	3.73
320	25	38.4	0.52	19.87	228.66
229	50	84.73	0.41	35.02	706.19
	Max=	50		AAHUs	21.18

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Open Water AAHUs =	21.18
B. Future Without Project Open Water AAHUs =	150.54
Net Change (FWP - FWOP) =	**-129.36**

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	208.18
B. Open Water Habitat Net AAHUs =	-129.36
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1	**99.30**

WETLAND VALUE ASSESSMENT COMMUNITY MODEL V2.4

Fresh/Intermediate Marsh

Project: Area B-PAL With Maintenance

AAHUs = 1525.81

FWOP

Project Area (ac)	130	130	130	130	130	130	130					
% Fresh	100	100	100	100	100	100	100					
% Intermediate												
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	0	0	0	0	0	0					
V2: % Aquatic	25	25	25	25	25	25	8					
V3: Interspersion Class 1	0	0	0	0	0	0	0					
V3: Interspersion Class 2	0	0	0	0	0	0	0					
V3: Interspersion Class 3	30	30	30	30	30	35	40					
V3: Interspersion Class 4	70	70	70	70	70	65	60					
V3: Interspersion Class 5	0	0	0	0	0	0	0					
V4: %OW <= 1.5ft	19	19	19	19	19	19	19					
V5: Salinty (ppt) - Fresh	1.03	1.03	1.03	1.03	1.03	1.03	1.03					
V5: Salinty (ppt) - INT												
V6: Fish Access - Fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT												

FWP

Project Area (ac)	130	13	164	259	390	2886	6154					
% Fresh	100	100	100	100	100	100	100					
% Intermediate	0											
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	10	42	39	50	88	93					
V2: % Aquatic	25	0	0	25	29	29	13					
V3: Interspersion Class 1	0	0	0	50	100	0	0					
V3: Interspersion Class 2	0	0	0	0	0	100	0					
V3: Interspersion Class 3	30	0	100	50	0	0	100					
V3: Interspersion Class 4	70	0	0	0	0	0	0					
V3: Interspersion Class 5	0	100	0	0	0	0	0					
V4: %OW <= 1.5ft	19	100	100	100	100	100	83					
V5: Salinty (ppt) - Fresh	1	1.03	1.03	1.03	1.03	1.03	1.03					
V5: Salinty (ppt) - INT	0											
V6: Fish Access - Fresh	1.00	0.00	0.00	0.38	0.48	0.87	0.94					
V6: Fish Access - INT	0.00											

Computed SIs - do not enter data here !

FWOP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.10	0.10	0.10	0.10	0.10	0.10					
% Aquatic	0.33	0.33	0.33	0.33	0.33	0.33	0.17					
Interspersion												
Class 1	0.26	0.26	0.26	0.26	0.26	0.27	0.28					
Class 2												
Class 3												
Class 4												
Class 5												
%OW <= 1.5ft	0.31	0.31	0.31	0.31	0.31	0.31	0.31					
Salinity (ppt)												
fresh	0.89	0.89	0.89	0.89	0.89	0.89	0.89					
intermediate												
Access Value												
fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
intermediate												
Emergent Marsh HSI =	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**					
Open Water HSI =	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.32**					

FWP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.19	0.48	0.45	0.55	0.89	0.94					
% Aquatic	0.33	0.10	0.10	0.33	0.36	0.36	0.21					
Interspersion												
Class 1	0.26	0.10	0.40	0.70	1.00	0.60	0.40					
Class 2												
Class 3												
Class 4												
Class 5												
%OW <= 1.5ft	0.31	0.60	0.60	0.60	0.60	0.60	1.00					
Salinity (ppt)												
fresh	0.89	0.89	0.89	0.89	0.89	0.89	0.89					
intermediate												
Access Value												
fresh	1.00	0.30	0.30	0.57	0.64	0.91	0.96					
intermediate												
Emergent Marsh HSI =	**0.24**	**0.27**	**0.49**	**0.54**	**0.65**	**0.86**	**0.88**					
Open Water HSI =	**0.44**	**0.22**	**0.24**	**0.45**	**0.51**	**0.51**	**0.41**					

AAHU CALCULATION - EMERGENT MARSH

Project: Area B-PAL With Maintenance

	FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
1	130	0	0	0.24	0.00	
2	130	1	0	0.24	0.00	0.00
3	130	3	0	0.24	0.00	0.00
4	130	5	0	0.24	0.00	0.00
5	130	6	0	0.24	0.00	0.00
6	130	25	0	0.24	0.00	0.00
7	130	50	0	0.24	0.00	0.00
8						
9						
10						
11						
12						
		Max=	50		AAHUs =	0.00

FWP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
130	0	0	0.24	0.00	
13	1	1.3	0.27	0.35	0.17
164	3	68.88	0.49	33.60	29.04
259	5	101.01	0.54	54.69	87.71
390	6	195	0.65	126.50	88.91
2886	25	2539.68	0.86	2189.11	#######
6154	50	5723.22	0.88	5009.26	#######
	Max=	50		AAHUs	2208.48

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Emergent Marsh AAHUs =	2208.48
B. Future Without Project Emergent Marsh AAHUs =	0.00
Net Change (FWP - FWOP) =	**2208.48**

AAHU CALCULATION - OPEN WATER

Project: **Area B-PAL With Maintenance**

FWOP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
130	0	130	0.44	57.66	
130	1	130	0.44	57.66	57.66
130	3	130	0.44	57.66	115.31
130	5	130	0.44	57.66	115.31
130	6	130	0.44	57.66	57.66
130	25	130	0.44	57.75	1096.38
130	50	130	0.32	41.33	1238.55
	Max=	50		AAHUs =	53.62

FWP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
130	0	130	0.44	57.66	
13	1	11.7	0.22	2.58	25.72
164	3	95.12	0.24	23.08	25.04
259	5	157.99	0.45	71.55	90.23
390	6	195	0.51	99.10	84.99
2886	25	346.32	0.51	176.21	2615.19
6154	50	430.78	0.41	176.95	4448.95
	Max=	50		AAHUs	145.80

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Open Water AAHUs =	145.80
B. Future Without Project Open Water AAHUs =	53.62
Net Change (FWP - FWOP) =	**92.19**

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	2208.48
B. Open Water Habitat Net AAHUs =	92.19
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1	**1525.81**

WETLAND VALUE ASSESSMENT COMMUNITY MODEL V2.4

Fresh/Intermediate Marsh

Project: Area C-SWP

AAHUs = 180.35

FWOP

Project Area (ac)	365	365	365	365	365	365	365					
% Fresh	100	100	100	100	100	100	100					
% Intermediate												
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	0	0	0	0	0	0					
V2: % Aquatic	8	8	8	8	8	8	2					
V3: Interspersion Class 1	0	0	0	0	0	0	0					
V3: Interspersion Class 2	0	0	0	0	0	0	0					
V3: Interspersion Class 3	100	100	100	100	100	50	0					
V3: Interspersion Class 4	0	0	0	0	0	50	100					
V3: Interspersion Class 5	0	0	0	0	0	0	0					
V4: %OW <= 1.5ft	15	15	15	15	15	15	10					
V5: Salinty (ppt) - Fresh	1.27	1.27	1.27	1.27	1.27	1.27	1.27					
V5: Salinty (ppt) - INT												
V6: Fish Access - Fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT												

FWP

Project Area (ac)	365	37	92	368	369	371	364					
% Fresh	100	100	100	100	100	100	100					
% Intermediate	0											
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	10	25	100	100	100	99					
V2: % Aquatic	8	0	0	8	9	9	4					
V3: Interspersion Class 1	0	0	0	50	100	0	0					
V3: Interspersion Class 2	0	0	0	0	0	100	0					
V3: Interspersion Class 3	100	0	100	50	0	0	100					
V3: Interspersion Class 4	0	0	0	0	0	0	0					
V3: Interspersion Class 5	0	100	0	0	0	0	0					
V4: %OW <= 1.5ft	15	100	100	100	100	100	83					
V5: Salinty (ppt) - Fresh	1	1.27	1.27	1.27	1.27	1.27	1.27					
V5: Salinty (ppt) - INT	0											
V6: Fish Access - Fresh	1.00	0.00	0.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT	0.00											

Computed SIs - do not enter data here !

FWOP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.10	0.10	0.10	0.10	0.10	0.10					
% Aquatic	0.17	0.17	0.17	0.17	0.17	0.17	0.12					
Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	0.40	0.40	0.40	0.40	0.40	0.30	0.20					
%OW <= 1.5ft	0.27	0.27	0.27	0.27	0.27	0.27	0.21					
Salinity (ppt) fresh intermediate	0.85	0.85	0.85	0.85	0.85	0.85	0.85					
Access Value fresh intermediate	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
Emergent Marsh HSI =	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.24**	**0.23**					
Open Water HSI =	**0.32**	**0.32**	**0.32**	**0.32**	**0.32**	**0.31**	**0.25**					

FWP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.19	0.33	1.00	1.00	1.00	0.99					
% Aquatic	0.17	0.10	0.10	0.17	0.18	0.18	0.14					
Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	0.40	0.10	0.40	0.70	1.00	0.60	0.40					
%OW <= 1.5ft	0.27	0.60	0.60	0.60	0.60	0.60	1.00					
Salinity (ppt) fresh intermediate	0.85	0.85	0.85	0.85	0.85	0.85	0.85					
Access Value fresh intermediate	1.00	0.30	0.30	1.00	1.00	1.00	1.00					
Emergent Marsh HSI =	**0.25**	**0.26**	**0.39**	**0.95**	**0.98**	**0.94**	**0.91**					
Open Water HSI =	**0.32**	**0.22**	**0.24**	**0.37**	**0.40**	**0.37**	**0.34**					

AAHU CALCULATION - EMERGENT MARSH

Project: Area C-SWP

	FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
1	365	0	0	0.25	0.00	
2	365	1	0	0.25	0.00	0.00
3	365	3	0	0.25	0.00	0.00
4	365	5	0	0.25	0.00	0.00
5	365	6	0	0.25	0.00	0.00
6	365	25	0	0.24	0.00	0.00
7	365	50	0	0.23	0.00	0.00
8						
9						
10						
11						
12						
		Max=	50		AAHUs =	0.00

FWP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
365	0	0	0.25	0.00	
37	1	3.7	0.26	0.98	0.48
92	3	23	0.39	8.92	9.11
368	5	368	0.95	349.44	293.77
369	6	369	0.98	362.69	356.06
371	25	371	0.94	348.16	6753.35
364	50	360.36	0.91	328.07	8451.62
	Max=	50		AAHUs	317.29

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Emergent Marsh AAHUs =	317.29
B. Future Without Project Emergent Marsh AAHUs =	0.00
Net Change (FWP - FWOP) =	317.29

AAHU CALCULATION - OPEN WATER

Project: Area C-SWP

FWOP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
365	0	365	0.32	116.78	
365	1	365	0.32	116.78	116.78
365	3	365	0.32	116.78	233.55
365	5	365	0.32	116.78	233.55
365	6	365	0.32	116.78	116.78
365	25	365	0.31	114.07	2193.06
365	50	365	0.25	92.48	2581.97
	Max=	50		AAHUs =	109.51

FWP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
365	0	365	0.32	116.78	
37	1	33.3	0.22	7.22	56.30
92	3	69	0.24	16.50	23.46
368	5	0	0.37	0.00	19.43
369	6	0	0.40	0.00	0.00
371	25	0	0.37	0.00	0.00
364	50	3.64	0.34	1.24	15.90
	Max=	50		AAHUs	2.30

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Open Water AAHUs =	2.30
B. Future Without Project Open Water AAHUs =	109.51
Net Change (FWP - FWOP) =	**-107.21**

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	317.29
B. Open Water Habitat Net AAHUs =	-107.21
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1	**180.35**

WETLAND VALUE ASSESSMENT COMMUNITY MODEL V2.4

Fresh/Intermediate Marsh

Project: Area C-SWP With Maintenance

AAHUs = 1532.43

FWOP

Project Area (ac)	130	130	130	130	130	130	130					
% Fresh	100	100	100	100	100	100	100					
% Intermediate												
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	0	0	0	0	0	0					
V2: % Aquatic	8	8	8	8	8	8	2					
V3: Interspersion Class 1	0	0	0	0	0	0	0					
V3: Interspersion Class 2	0	0	0	0	0	0	0					
V3: Interspersion Class 3	30	30	30	30	30	35	40					
V3: Interspersion Class 4	70	70	70	70	70	65	60					
V3: Interspersion Class 5	0	0	0	0	0	0	0					
V4: %OW <= 1.5ft	19	19	19	19	19	19	19					
V5: Salinty (ppt) - Fresh	1.27	1.27	1.27	1.27	1.27	1.27	1.27					
V5: Salinty (ppt) - INT												
V6: Fish Access - Fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT												

FWP

Project Area (ac)	130	13	165	263	395	2904	6202					
% Fresh	100	100	100	100	100	100	100					
% Intermediate	0											
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	10	42	40	50	88	94					
V2: % Aquatic	8	0	0	8	9	9	4					
V3: Interspersion Class 1	0	0	0	50	100	0	0					
V3: Interspersion Class 2	0	0	0	0	0	100	0					
V3: Interspersion Class 3	30	0	100	50	0	0	100					
V3: Interspersion Class 4	70	0	0	0	0	0	0					
V3: Interspersion Class 5	0	100	0	0	0	0	0					
V4: %OW <= 1.5ft	19	100	100	100	100	100	83					
V5: Salinty (ppt) - Fresh	1	1.27	1.27	1.27	1.27	1.27	1.27					
V5: Salinty (ppt) - INT	0											
V6: Fish Access - Fresh	1.00	0.00	0.00	0.38	0.48	0.87	0.94					
V6: Fish Access - INT	0.00											

Computed SIs - do not enter data here !

FWOP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.10	0.10	0.10	0.10	0.10	0.10					
% Aquatic	0.17	0.17	0.17	0.17	0.17	0.17	0.12					
Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	0.26	0.26	0.26	0.26	0.26	0.27	0.28					
%OW <= 1.5ft	0.31	0.31	0.31	0.31	0.31	0.31	0.31					
Salinity (ppt) fresh intermediate	0.85	0.85	0.85	0.85	0.85	0.85	0.85					
Access Value fresh intermediate	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
Emergent Marsh HSI =	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**	**0.24**					
Open Water HSI =	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.31**	**0.27**					

FWP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.19	0.48	0.46	0.55	0.89	0.95					
% Aquatic	0.17	0.10	0.10	0.17	0.18	0.18	0.14					
Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	0.26	0.10	0.40	0.70	1.00	0.60	0.40					
%OW <= 1.5ft	0.31	0.60	0.60	0.60	0.60	0.60	1.00					
Salinity (ppt) fresh intermediate	0.85	0.85	0.85	0.85	0.85	0.85	0.85					
Access Value fresh intermediate	1.00	0.30	0.30	0.57	0.64	0.91	0.96					
Emergent Marsh HSI =	**0.24**	**0.26**	**0.48**	**0.54**	**0.64**	**0.86**	**0.88**					
Open Water HSI =	**0.31**	**0.22**	**0.24**	**0.34**	**0.37**	**0.36**	**0.34**					

AAHU CALCULATION - EMERGENT MARSH

Project: Area C-SWP With Maintenance

	FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
1	130	0	0	0.24	0.00	
2	130	1	0	0.24	0.00	0.00
3	130	3	0	0.24	0.00	0.00
4	130	5	0	0.24	0.00	0.00
5	130	6	0	0.24	0.00	0.00
6	130	25	0	0.24	0.00	0.00
7	130	50	0	0.24	0.00	0.00
8						
9						
10						
11						
12						
		Max=	50		AAHUs =	0.00

FWP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
130	0	0	0.24	0.00	
13	1	1.3	0.26	0.34	0.17
165	3	69.3	0.48	33.43	28.84
263	5	105.2	0.54	57.03	89.75
395	6	197.5	0.64	127.07	90.49
2904	25	2555.52	0.86	2189.14	#######
6202	50	5829.88	0.88	5105.63	#######
	Max=	50		AAHUs	2230.89

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Emergent Marsh AAHUs =	2230.89
B. Future Without Project Emergent Marsh AAHUs =	0.00
Net Change (FWP - FWOP) =	**2230.89**

AAHU CALCULATION - OPEN WATER

Project: **Area C-SWP With Maintenance**

FWOP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
130	0	130	0.31	40.68	
130	1	130	0.31	40.68	40.68
130	3	130	0.31	40.68	81.35
130	5	130	0.31	40.68	81.35
130	6	130	0.31	40.68	40.68
130	25	130	0.31	40.77	773.77
130	50	130	0.27	34.69	943.23
	Max=	50		AAHUs =	39.22

FWP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
130	0	130	0.31	40.68	
13	1	11.7	0.22	2.54	19.71
165	3	95.7	0.24	22.88	24.80
263	5	157.8	0.34	53.52	74.33
395	6	197.5	0.37	73.85	63.45
2904	25	348.48	0.36	126.25	1906.56
6202	50	372.12	0.34	126.04	3155.95
	Max=	50		AAHUs	104.90

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Open Water AAHUs =	104.90
B. Future Without Project Open Water AAHUs =	39.22
Net Change (FWP - FWOP) =	**65.67**

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	2230.89
B. Open Water Habitat Net AAHUs =	65.67
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1	**1532.43**

WETLAND VALUE ASSESSMENT COMMUNITY MODEL V2.4

Fresh/Intermediate Marsh

Project: Area D-West Bay

AAHUs = 106.78

FWOP

Project Area (ac)	365	365	365	365								
% Fresh	100	100	100	100								
% Intermediate												
Target Year (TY)	**0**	**10**	**20**	**50**								
V1: % Emergent	2	5	21	21								
V2: % Aquatic	32	32	34	34								
V3: Interspersion Class 1	0	0	0	0								
V3: Interspersion Class 2	0	0	50	50								
V3: Interspersion Class 3	0	50	50	50								
V3: Interspersion Class 4	100	50	0	0								
V3: Interspersion Class 5	0	0	0	0								
V4: %OW <= 1.5ft	10	15	25	25								
V5: Salinty (ppt) - Fresh	0.75	0.75	0.75	0.75								
V5: Salinty (ppt) - INT												
V6: Fish Access - Fresh	1.00	1.00	1.00	1.00								
V6: Fish Access - INT												

FWP

Project Area (ac)	365	36	91	362	361	340	286					
% Fresh	100	100	100	100	100	100	100					
% Intermediate	0											
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	2	10	25	99	99	93	78					
V2: % Aquatic	32	0	0	32	37	37	16					
V3: Interspersion Class 1	0	0	0	50	100	0	0					
V3: Interspersion Class 2	0	0	0	0	0	100	0					
V3: Interspersion Class 3	0	0	100	50	0	0	100					
V3: Interspersion Class 4	100	0	0	0	0	0	0					
V3: Interspersion Class 5	0	100	0	0	0	0	0					
V4: %OW <= 1.5ft	10	100	100	100	100	100	83					
V5: Salinty (ppt) - Fresh	1	0.75	0.75	0.75	0.75	0.75	0.75					
V5: Salinty (ppt) - INT	0											
V6: Fish Access - Fresh	1.00	0.00	0.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT	0.00											

Computed SIs - do not enter data here !

FWOP SIs

Target Year (TY)	0	10	20	50								
% Emergent	0.12	0.15	0.29	0.29								
% Aquatic	0.39	0.39	0.41	0.41								
Interspersion												
Class 1	0.20	0.30	0.50	0.50								
Class 2												
Class 3												
Class 4												
Class 5												
%OW <= 1.5ft	0.21	0.27	0.38	0.38								
Salinity (ppt)												
fresh	0.95	0.95	0.95	0.95								
intermediate												
Access Value												
fresh	1.00	1.00	1.00	1.00								
intermediate												
Emergent Marsh HSI =	**0.26**	**0.29**	**0.44**	**0.44**								
Open Water HSI =	**0.48**	**0.49**	**0.53**	**0.53**								

FWP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.12	0.19	0.33	0.99	0.99	0.94	0.80					
% Aquatic	0.39	0.10	0.10	0.39	0.43	0.43	0.24					
Interspersion												
Class 1	0.20	0.10	0.40	0.70	1.00	0.60	0.40					
Class 2												
Class 3												
Class 4												
Class 5												
%OW <= 1.5ft	0.21	0.60	0.60	0.60	0.60	0.60	1.00					
Salinity (ppt)												
fresh	0.95	0.95	0.95	0.95	0.95	0.95	0.95					
intermediate												
Access Value												
fresh	1.00	0.30	0.30	1.00	1.00	1.00	1.00					
intermediate												
Emergent Marsh HSI =	**0.26**	**0.28**	**0.40**	**0.96**	**0.99**	**0.91**	**0.80**					
Open Water HSI =	**0.48**	**0.22**	**0.25**	**0.55**	**0.60**	**0.57**	**0.44**					

AAHU CALCULATION - EMERGENT MARSH

Project: Area D-West Bay

	FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
1	365	0	7.3	0.26	1.89	
2	365	10	18.25	0.29	5.37	35.67
3	365	20	76.65	0.44	33.54	180.64
4	365	50	76.65	0.44	33.54	1006.15
5						
6						
7						
8						
9						
10						
11						
12						
		Max=	50		AAHUs =	24.45

FWP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
365	0	7.3	0.26	1.89	
36	1	3.6	0.28	0.99	1.45
91	3	22.75	0.40	9.09	9.29
362	5	358.38	0.96	342.35	289.25
361	6	357.39	0.99	353.32	347.84
340	25	316.2	0.91	287.41	6076.52
286	50	223.08	0.80	177.83	5772.07
	Max=	50		AAHUs	249.93

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Emergent Marsh AAHUs =	249.93
B. Future Without Project Emergent Marsh AAHUs =	24.45
Net Change (FWP - FWOP) =	225.48

AAHU CALCULATION - OPEN WATER

Project: Area D-West Bay

FWOP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
365	0	357.7	0.48	172.87	
365	10	346.75	0.49	171.59	1722.55
365	20	288.35	0.53	153.18	1627.43
365	50	288.35	0.53	153.18	4595.51
	Max=	50		AAHUs =	158.91

FWP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
365	0	357.7	0.48	172.87	
36	1	32.4	0.22	7.28	76.05
91	3	68.25	0.25	16.84	23.86
362	5	3.62	0.55	1.99	25.34
361	6	3.61	0.60	2.18	2.08
340	25	23.8	0.57	13.67	152.49
286	50	62.92	0.44	27.94	541.42
	Max=	50		AAHUs	16.42

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Open Water AAHUs =	16.42
B. Future Without Project Open Water AAHUs =	158.91
Net Change (FWP - FWOP) =	**-142.49**

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	225.48
B. Open Water Habitat Net AAHUs =	-142.49
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1	**106.78**

WETLAND VALUE ASSESSMENT COMMUNITY MODEL V2.4

Fresh/Intermediate Marsh

Project: Area D-WB With Maintenance

AAHUs = 1553.42

FWOP

Project Area (ac)	131	131	131	131	131	131	131					
% Fresh	100	100	100	100	100	100	100					
% Intermediate												
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	0	0	0	0	0	0					
V2: % Aquatic	25	25	25	25	25	25	8					
V3: Interspersion Class 1	0	0	0	0	0	0	0					
V3: Interspersion Class 2	0	0	0	0	0	0	0					
V3: Interspersion Class 3	30	30	30	30	30	35	40					
V3: Interspersion Class 4	70	70	70	70	70	65	60					
V3: Interspersion Class 5	0	0	0	0	0	0	0					
V4: %OW <= 1.5ft	19	19	19	19	19	19	19					
V5: Salinty (ppt) - Fresh	0.75	0.75	0.75	0.75	0.75	0.75	0.75					
V5: Salinty (ppt) - INT												
V6: Fish Access - Fresh	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
V6: Fish Access - INT												

FWP

Project Area (ac)	131	13	165	262	394	2894	6174					
% Fresh	100	100	100	100	100	100	100					
% Intermediate	0											
Target Year (TY)	**0**	**1**	**3**	**5**	**6**	**25**	**50**					
V1: % Emergent	0	10	42	40	50	88	94					
V2: % Aquatic	25	0	0	25	29	29	13					
V3: Interspersion Class 1	0	0	0	50	100	0	0					
V3: Interspersion Class 2	0	0	0	0	0	100	0					
V3: Interspersion Class 3	30	0	100	50	0	0	100					
V3: Interspersion Class 4	70	0	0	0	0	0	0					
V3: Interspersion Class 5	0	100	0	0	0	0	0					
V4: %OW <= 1.5ft	19	100	100	100	100	100	83					
V5: Salinty (ppt) - Fresh	1	0.75	0.75	0.75	0.75	0.75	0.75					
V5: Salinty (ppt) - INT	0											
V6: Fish Access - Fresh	1.00	0.00	0.00	0.38	0.48	0.87	0.94					
V6: Fish Access - INT	0.00											

Computed SIs - do not enter data here !

FWOP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.10	0.10	0.10	0.10	0.10	0.10					
% Aquatic	0.33	0.33	0.33	0.33	0.33	0.33	0.17					
Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	0.26	0.26	0.26	0.26	0.26	0.27	0.28					
%OW <= 1.5ft	0.31	0.31	0.31	0.31	0.31	0.31	0.31					
Salinity (ppt) fresh intermediate	0.95	0.95	0.95	0.95	0.95	0.95	0.95					
Access Value fresh intermediate	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
Emergent Marsh HSI =	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**					
Open Water HSI =	**0.45**	**0.45**	**0.45**	**0.45**	**0.45**	**0.45**	**0.32**					

FWP SIs

Target Year (TY)	0	1	3	5	6	25	50					
% Emergent	0.10	0.19	0.48	0.46	0.55	0.89	0.95					
% Aquatic	0.33	0.10	0.10	0.33	0.36	0.36	0.21					
Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	0.26	0.10	0.40	0.70	1.00	0.60	0.40					
%OW <= 1.5ft	0.31	0.60	0.60	0.60	0.60	0.60	1.00					
Salinity (ppt) fresh intermediate	0.95	0.95	0.95	0.95	0.95	0.95	0.95					
Access Value fresh intermediate	1.00	0.30	0.30	0.57	0.64	0.91	0.96					
Emergent Marsh HSI =	**0.25**	**0.28**	**0.49**	**0.55**	**0.65**	**0.87**	**0.89**					
Open Water HSI =	**0.45**	**0.22**	**0.25**	**0.46**	**0.51**	**0.51**	**0.41**					

AAHU CALCULATION - EMERGENT MARSH

Project: Area D-WB With Maintenance

	FWOP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
1	131	0	0	0.25	0.00	
2	131	1	0	0.25	0.00	0.00
3	131	3	0	0.25	0.00	0.00
4	131	5	0	0.25	0.00	0.00
5	131	6	0	0.25	0.00	0.00
6	131	25	0	0.25	0.00	0.00
7	131	50	0	0.25	0.00	0.00
8						
9						
10						
11						
12						
		Max=	50		AAHUs =	0.00

FWP Project Area (ac)	TY	Marsh Acres	x HSI	Total HUs	Cum. HUs
131	0	0	0.25	0.00	
13	1	1.3	0.28	0.36	0.17
165	3	69.3	0.49	34.24	29.66
262	5	104.8	0.55	58.03	91.56
394	6	197	0.65	129.02	91.97
2894	25	2546.72	0.87	2211.03	#######
6174	50	5803.56	0.89	5149.64	#######
	Max=	50		AAHUs	2252.11

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Emergent Marsh AAHUs =	2252.11
B. Future Without Project Emergent Marsh AAHUs =	0.00
Net Change (FWP - FWOP) =	2252.11

AAHU CALCULATION - OPEN WATER

Project: Area D-WB With Maintenance

FWOP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
131	0	131	0.45	58.64	
131	1	131	0.45	58.64	58.64
131	3	131	0.45	58.64	117.29
131	5	131	0.45	58.64	117.29
131	6	131	0.45	58.64	58.64
131	25	131	0.45	58.74	1115.14
131	50	131	0.32	42.19	1261.66
	Max=	50		AAHUs =	54.57

FWP Project Area (ac)	TY	Water Acres	x HSI	Total HUs	Cum. HUs
131	0	131	0.45	58.64	
13	1	11.7	0.22	2.63	26.20
165	3	95.7	0.25	23.62	25.63
262	5	157.2	0.46	71.85	91.16
394	6	197	0.51	100.94	86.03
2894	25	347.28	0.51	178.14	2650.94
6174	50	370.44	0.41	153.70	4157.42
	Max=	50		AAHUs	140.75

NET CHANGE IN AAHUs DUE TO PROJECT

A. Future With Project Open Water AAHUs =	140.75
B. Future Without Project Open Water AAHUs =	54.57
Net Change (FWP - FWOP) =	**86.17**

TOTAL BENEFITS IN AAHUs DUE TO PROJECT

A. Emergent Marsh Habitat Net AAHUs =	2252.11
B. Open Water Habitat Net AAHUs =	86.17
Net Benefits=(2.1xEMAAHUs+OWAAHUs)/3.1	**1553.42**

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506
November 8, 2016

Colonel Michael N. Clancy
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Clancy:

Please reference the Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana Project. The U.S. Fish and Wildlife Service (Service) provided recommendations on the above proposed plan to the Corps of Engineers, New Orleans District (Corps) in an October 11, 2016, Fish and Wildlife Coordination Act (FWCA) Report. The Louisiana Department of Wildlife and Fisheries (LDWF) and National Marine Fisheries Service (NMFS) have provided their comments to the Service for inclusion in the FWCA Report. Therefore, this report supplements the October 2016 report by including those comments and is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (FWCA; 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). This supplemental draft report contains a description of the fish and wildlife resources of the project area, identifies fish and wildlife-related impacts of the proposed project, and provides recommendations for the Tentatively Selected Plan (TSP) to help conserve those resources. This report does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act (FWCA, 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

We appreciate the cooperation of your staff on this study. Should your staff have any questions regarding the enclosed report, please have them contact Ms. Catherine Breaux (504/862-2689) of this office.

Sincerely,

Joe Ranson
Supervisor
Louisiana Field Office

Attachment

cc: FWS, SE LA Refuges, Lacombe, LA

EPA, Dallas, TX
NMFS, Baton Rouge, LA
CPRA, Baton Rouge, LA
LDWF, Baton Rouge, LA
LDWF, Natural Heritage Program, Baton Rouge, LA

MISSISSIPPI RIVER SHIP CHANNEL, GULF TO BATON ROUGE, LOUISIANA

DRAFT
FISH AND WILDLIFE COORDINATION ACT REPORT

U.S. FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES

LAFAYETTE, LOUISIANA

NOVEMBER 2016

MISSISSIPPI RIVER SHIP CHANNEL, GULF TO BATON ROUGE, LOUISIANA

DRAFT
FISH AND WILDLIFE COORDINATION ACT REPORT

SUBMITTED TO

NEW ORLEANS DISTRICT

U.S. ARMY CORPS OF ENGINEERS

NEW ORLEANS, LOUISIANA

PREPARED BY

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U.S. FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES

LAFAYETTE, LOUISIANA

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EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (Corps), Mississippi River Valley Division, Regional Planning and Environment Division South, is preparing a General Reevaluation Report (GRR) and Supplemental Environmental Impact Statement (SEIS) for the New Orleans District (MVN) for The Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana, Project (MR Deepening Project). The 1981 Feasibility Study entitled "Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana" recommended deepening the Mississippi River's navigation channel to a 55-foot depth from Baton Rouge to the Gulf of Mexico. The 1981 project was authorized for construction by Section 101 of the 1985 Supplemental Appropriations Act (Public Law 99-88). Phase I and Phase II deepened the Mississippi navigation channel to 45 feet from Baton Rouge to the Gulf of Mexico. Construction was completed in December 1994. The current MR Deepening Project will evaluate the depth that creates the greatest net benefits up to a depth of 50 feet in order to implement the deepening of the Mississippi River channel from the current depth of 45 feet.

MVN proposes to designate additional disposal areas for the beneficial use-placement of dredged material removed during construction and maintenance of the Southwest Pass portion of the MR Deepening Project to 50 feet.

In concert with the early above mentioned feasibility and construction efforts to deepen the River to 45 feet, The Fish and Wildlife Service (Service) prepared a May 07, 1978 Planning Aid Report (PAR), a June 1981 Final Fish and Wildlife Coordination Act Report (FWCAR), an October 1984 Supplemental FWCAR, and an October 2016 Draft FWCAR addressing the impacts on fish and wildlife resources from implementation of the Selected Plan, and also providing recommendations to mitigate adverse impacts on those resources (herein incorporated by reference).

This supplemental report, which compliments the GRR and SEIS, incorporates and supplements our May 1978 PAL and June 1981, October 1984, and October 2016 FWCARs. This report contains descriptions of the existing fish and wildlife resources of the project area, discusses future with- and without-project habitat conditions, identifies fish and wildlife-related impacts of the proposed project, and provides recommendations for the TSP including mitigation requirements for adverse impacts to those resources. This document does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). This report has been provided to the National Marine Fisheries Service (NMFS) and the Louisiana Department of Wildlife and Fisheries (LDWF) and their comments have been incorporated into this Supplemental Draft report.

Overall, there would be positive net benefits to wetland resources in the project area, with the creation of emergent wetland habitat of higher value to fish and wildlife resources than the existing open water. Construction of the Mississippi River Deepening would result in

approximately 12,323 Average Annual Habitat Units (AAHUs) and 24,291 acres of fresh-intermediate marsh habitat over the 50 year project life (See Appendix A for WVA Project Information and Assumptions). The Service supports the beneficial use of dredged material obtained from constructing and maintaining the MR Deepening Project, provided the following fish and wildlife conservation recommendations are implemented concurrently with project implementation:

1. The Service recommends that to the extent feasible all dredged material should be used beneficially to restore coastal habitats that are in decline.

2. The Service and NMFS recommend the Corps evaluate options to enhance the sediment loads of proposed diversion projects or existing breaches in the vicinity of Mardi Gras Pass and Fort St. Phillip if dredging south of New Orleans is proposed in the future.

3. The Service and NMFS recommend the Corps expand the beneficial use areas to include areas near Spanish Pass.

4. The Service recommends avoiding and/or minimizing impacts to wetlands, including submerged aquatic vegetation in the study area.

5. The Service recommends avoiding and/or minimizing impacts to coastal restoration efforts in the study area and continued coordination with those efforts to avoid or minimize impacts to their effectiveness.

6. The Service recommends avoiding impacts to endangered or threatened species and their habitats, migratory birds, and colonial wading birds within and upstream of the study area as specified in this Fish and Wildlife Coordination Act Report. The service also recommends the Corps investigate the possibility of using dredged material to restore/create habitat for threatened or endangered species.

7. The Service recommends the Corps coordinate with the Service and other natural resource agencies in the planning of disposal areas and techniques and assessment of impacts and mitigation.

8. The created wetlands should be monitored over the project life to help evaluate the effectiveness of these features and to document both the elevation and acreage of wetland areas created.

9. The Service and other resource agencies shall be provided an opportunity to review and submit recommendations on future detailed planning reports (e.g., Design Document Report, Engineering Document Report, etc.) and the draft plans and specifications on the Mississippi River Deepening Project addressed in this report.

10. The Service recommends Special Use Permits be requested of the Delta National Wildlife Refuge (NWR) for any expected or proposed work on the Delta NWR. Close coordination by both the Corps and its contractor must be maintained with the Refuge Manager to ensure that construction and maintenance activities are carried out in accordance with provisions of any Special Use Permit issued by NWR. The Refuge Manager for the Delta NWR is Ms. Shelly Stiaes, (Shelly_Stiaes@fws.gov or 337-882-2000).

11. Louisiana Department of Wildlife and Fisheries (LDWF) and the Service recommend contacting theLDWF office, Mr. Shane Granier (504-284-5264), for further information regarding any additional permits or coordination that may be required to perform work on the Pass a Loutre Wildlife Management Area (WMA).

12. If the proposed project has not been constructed within 1 year or if changes are made to the proposed project, the Corps should re-initiate Endangered Species Act consultation with the Service.

Provided that the above recommendations are included in the feasibility report and related authorizing documents, the Service will support further planning and implementation of the TSP.

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INTRODUCTION

The U.S. Army Corps of Engineers (Corps), Mississippi River Valley Division, Regional Planning and Environment Division South, is preparing a General Reevaluation Report (GRR) and Supplemental Environmental Impact Statement (SEIS) for the New Orleans District (MVN) for The Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana, Project (MR Deepening Project). The 1981 Feasibility Study entitled "Deep-Draft Access to the Ports of New Orleans and Baton rouge, Louisiana" recommended deepening the Mississippi River's navigation channel to a 55-foot depth from Baton Rouge to the Gulf of Mexico. The 1981 project was authorized for construction by Section 101 of the 1985 Supplemental Appropriations Act (Public Law 99-88). Phase I and Phase II deepened the Mississippi navigation channel to 45 feet from Baton Rouge to the Gulf of Mexico. Construction was completed in December 1994. The current MR Deepening Project will evaluate the depth that creates the greatest net benefits up to a depth of 50 feet in order to implement the deepening of the Mississippi River channel from the current depth of 45 feet.

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DESCRIPTION OF STUDY AREA

The study area is located in southeastern Louisiana and consists of the Mississippi River below Baton Rouge and its major outlet to the Gulf of Mexico, Southwest Pass. The area includes the 45 foot channel of the Mississippi River. The Mississippi River, Gulf of Mexico to Baton

Rouge Louisiana project authorized the construction of the channel to a depth of 55 feet. The project has been constructed and maintained to dimensions of 45 feet x 750 feet from New Orleans to Mile 18 below head of passes (BHP) and 45 feet x 600 feet from Mile 18 BHP to Gulf of Mexico allowing for transfer of over 400,000,000 tons of cargo each year. See Figure 1.

Figure 1. The Project Area for the Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana Project.

Surrounding Southwest Pass on either side of the channel is the location of additional disposal areas for the placement and beneficial use of dredged material removed during construction and maintenance of deepening the Mississippi River and Southwest Pass to 50 feet. The proposed disposal areas are located in Plaquemines Parish in southeastern Louisiana in the active delta of the Mississippi River (See Figure 2). The dredged material would be placed within the boundaries designated in Figure 2 and adjacent to the Southwest Pass navigation channels, with-in the Pass a Loutre Wildlife Management Area (Pass a Loutre WMA), and within the Delta National Wildlife Refuge (Delta NWR) located north of Pass a Loutre. It is anticipated the disposal areas will naturally vegetate through colonization of species from adjacent vegetated areas, consistent with experience at other beneficial use-disposal areas in the Mississippi River Delta.

Figure 2. The potential disposal area for dredged material resulting from the Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana Project.

FISH AND WILDLIFE RESOURCES

The primary area of project impacts on fish and wildlife resources is the sparsely populated active delta of the Mississippi River, located generally south of Venice, Louisiana. The Mississippi River splits into three main channels within the delta region: Pass a Loutre, South Pass, and Southwest Pass. The active delta of the Mississippi includes the lower Mississippi River and its distributaries; subsiding natural levees along these water courses; dredged spoil disposal areas; large expanses of fresh and intermediate marsh and associated shallow ponds and lakes; and large open water bodies. Land elevations range from sea level along the Gulf coast, to approximately +10 feet above sea level along the natural levee ridges.

The marshes and natural levees of the project area were formed by river borne sediments deposited in shallow open water. Engineering works in the delta, coupled with upstream diversions, reservoirs, and bank stabilization work, have resulted in a greatly reduced quantity

of sediments reaching the marshes and shallow open waters of the delta. Consequently, sediment deposition has not kept pace with subsidence and erosion and a surprisingly rapid rate of marsh loss is occurring in the area. However numerous crevasses constructed by the Service and LDWF and several crevasses as well as the West Bay diversion were constructed under Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) along with the Louisiana Coastal Area (LCA) Beneficial Use of Dredged Material Program (BUDMAT) are helping to combat marsh loss in parts of the delta.

The proposed disposal areas encompass a total of approximately 163,492 acres (Table 1) of mainly open water with some eroded freshwater and intermediate marsh. The 2016 USGS data shows that the total acreage of marsh in the project area has lost between 100ac to 200acs a year from 1984 to 2016 however there have been land gains in Areas A due to ongoing beneficial use of dredged material and Service, LDWF, and CWPPRA crevasse projects.

Table 1. 2016 Acres of land and water (acres and %) by area for the Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana Project. Refer to Figure 2 for Area A-D. 1984 through 2016 data provided by USGS.

	Land Acres (acres)	Water (acres)	Total (acres)	% Land	% Water
Area A	10,987	16,656	27,643	39.7%	60.3%
Area B	16,986	55,631	72,617	23.4%	76.6%
Area C	11,337	25,831	37,168	30.5%	69.5%
Area D	2,670	23,394	26,064	10.2%	89.8%
TOTAL	41,980	121,512	163,492	25.7%	74.3%

Description of Habitats

The major habitat types within the project area include natural levee forest, fresh and intermediate marsh, scrub/shrub, river, and estuarine water bodies.

Natural Levee Forest - These forested wetlands are located on subsiding natural levees along Tiger, Grand, and Raphael Passes and along the west bank of the Mississippi River between Venice and Head of Passes. Typical vegetation includes black willow (*Salix nigra*), green ash (*Fraxinus pennsylvanica*), persimmon (*Diospyros* spp.), red maple (*Acer rubrum*), and scattered bald cypress (T*axodium distichum*).

Fresh and Intermediate Marsh - Marsh in the project area is dominated by fresh marsh and receives continuous riverine input, with areas of intermediate marsh near the gulfward open water areas of West Bay, East Bay, and portions of the Delta NWR. The marshes in the project area are strongly influenced by freshwater discharges from the Mississippi River and associated distributary outlets. Salinity in areas of the project areas have an average annual growing season salinity of 0.75-1.27 parts per thousand (ppt) based on CRMS stations CRMS2634, CRMS0154, CRMS0159, and CRMS2608 for time periods from 2007 to 2016 (Louisiana Office of Coastal Protection and Restoration, 2013). Emergent plant species include: smooth cordgrass (*Spartina alterniflora*), Walter's millet (*Echinochloa walteri*), *Schoenoplectus pungens*, and *Nelumbo lutea*. Submerged aquatic vegetation, such *as Myriophyllum spicatum*, *Heteranthera dubia*, *Ceratophyllum demersum*, *Najas guadalupensis*, and *Potamogeton nodosus* are also common in the lower elevation intertidal and shallow subtidal portions of the project area. The two

major soil types in the project area are commonly found together and are classified as Balize and Larose soils (BA). Both soil types are level and very poorly drained. They are flooded by Mississippi River water most of the time and support freshwater marshes.

Scrub/Shrub - This habitat type is synonymous with dredged spoil disposal areas in the project area. This dredged material consists of silt, clay, and sand taken from the Mississippi River and its distributary channels. These areas are typically, but not exclusively, limited to elevations above 2.0 feet North American Vertical Datum 1988 (NAVD88). Though spoil areas are initially barren, they are eventually colonized with a scrub/shrub complex of vegetation including rattlebox (*Crotalaria* spp.), goldenrod (*Solidago* spp), Bermuda grass (*Cynodon dactylon*), black willow, and eastern baccharis (*Baccharis halimifolia*).

River - This freshwater habitat type includes that portion of the Mississippi River and Southwest Pass which lies between the foreshore dikes and the existing bank.

Estuarine Water Bodies - This habitat type includes marsh ponds and lakes, estuarine bays and lakes, and aquatic beds characterized by stands of Eurasian watermilfoil (*Myriophyllum spicatum*), coontail (*Ceratophyllum demersum*), and fanwort (*Cabomba caroliniana*); and estuarine aquatic beds characterized by stands of widgeongrass (*Ruppia maritime*) and Eurasian watermilfoil (*Myriophyllum spicatum*). Water levels fluctuate from six to twelve inches or more in the vegetated areas and five to six feet in open water areas.

Fisheries Resources

Freshwater species occur in the Mississippi River and its distributaries, in petroleum industry access canals, and in the ponds and lakes within the fresh and intermediate marshes. Primary freshwater sportfishes include largemouth bass (*Micropterus salmoides*), yellow bass (*Morone mississippiensis*), black and white crappie (*Pomoxis* ssp.), bluegill (*Lepomis macrochirus*), freshwater drum (*Aplodinotus grunniens*), warmouth (*Lepomis gulosus*), channel catfish (*Ictalurus punctatus*), and blue catfish (*Ictalurus furcatus*). The commercial freshwater fishery is also important in the project area. Primary species harvested are alligator gar (*Atractosteus spatula*), blue catfish, and channel catfish.

The diverse sport and commercial estuarine and marine fisheries of the study area are of great importance. The nutrient-rich water in the Mississippi River in conjunction with the tidal marshes, aquatic vegetation beds, and shallow estuarine waters provide productive habitat to a variety of crustaceans and finfishes.

The importance of coastal marshes to estuarine-dependent fisheries production cannot be over-emphasized. Estuaries are among the most productive habitats in the world because they support high primary and fisheries production (Whittaker and Likens 1973; Walme 1972). These marshes produce vast amounts of organic detritus which are transported into adjacent estuarine waters. This detritus is extremely important in the maintenance of fish and shellfish productivity (Odum et al. 1973). Most of the economically important saltwater fishes and crustaceans harvested in Louisiana spawn offshore and then use estuarine areas for nursery habitat (Herke 1995). Marshes and associated shallow waters are also extremely important as

nursery habitat for many estuarine-dependent species such as for Atlantic croaker (*Micropogonias undulatus*), spot (*Leiostomus xanthurus*) (Rogers 1979), gulf menhaden (*Brevoortia patronus*) (Simoneaux 1979), for immature white (*Litopeneaus setiferus*) and brown shrimp (*Farfantepenaeus aztecus*) (brown and white), as habitat for blue crabs (*Callinectes sapidus*) (More 1969), and as prime habitat for shrimp, gulf menhaden, Atlantic croaker, sand seatrout (*Cynoscion nebulosus*) and southern flounder (*Paralichthys lethostigma*) (Conner and Truesdale 1973).

There is growing evidence that the acreage of marsh is the most important factor influencing the production of estuarine-dependent fishes of sport and commercial importance. Turner (1979) reported that the Louisiana commercial inshore shrimp catch is directly proportional to the area of intertidal wetlands and that the area of estuarine water does not seem to be directly linked to shrimp yields.

Essential Fish Habitat

The project is located within an area identified as Essential Fish Habitat (EFH) by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, Magnuson-Stevens Act; P.L. 104-297). The updated and revised 2006 generic amendment of the Fishery Management Plans for the Gulf of Mexico, prepared by the Gulf of Mexico Fishery Management Council, identifies EFH in the project area to be estuarine emergent wetlands, submerged aquatic vegetation, mud, sand, shell, and rock substrates, and estuarine water column. Under the MSFCMA, wetlands and associated estuarine waters in the project area are identified as EFH for various Federally managed species including larvae/postlarvae and juvenile brown and white shrimp; eggs, larvae/postlarvae, and juvenile Gulf stone crab (*Menippe adina*); larvae/postlarvae, juvenile, and adult red drum; larvae and juvenile lane snapper (*Lutjanus synagris*); and juvenile dog snapper (*Lutjanus novemfasciatus*).

In addition to being designated as EFH for these species, water bodies and wetlands in the project area provide nursery and foraging habitats supportive of a variety of economically important marine fishery species, such as striped mullet (*Mugil cephalus*), Atlantic croaker, gulf menhaden, spotted seatrout (*Cynoscion nebulosus*), sand seatrout, southern flounder, black drum (*Pogonias cromis*), and blue crab. Some of these species also serve as prey for other fish species managed under the Magnuson-Stevens Act by the GMFMC (e.g., mackerels, snappers, and groupers) and highly migratory species managed by NMFS (e.g., billfishes and sharks) (http://www.gulfcouncil.org).

Wildlife Resources

The marshes and estuarine bays provide excellent nesting, foraging, breeding and nursery habitats, as well as, wintering and stopover habitat for wildlife species. The Mississippi River Delta provides important nesting and brooding habitat for mottled ducks, wading birds, and shore birds. Migratory and resident waterfowl are also abundant in the area. The National Audubon Society designated the Mississippi River Delta an Important Bird Area. The active delta provides habitat for wintering waterfowl, wading birds, marsh birds, and shore birds. The higher elevations of shrub-dominated spoil banks and willow-dominated uplands provide important stopover habitat for numerous Neotropical migratory songbird species which breed in North America and spend the winter in Mexico, the Caribbean, and Central or South America. Neotropical migrants expected in

the project area include warblers, vireos, wrens, flycatchers, and many other species. Resident species include the blue jay (*Cyanocitta cristata*), cardinal (*Cardinalis cardinalis*), and mourning dove (*Zenaida macroura*). Woodpeckers, such as red-headed woodpecker (*Melanerpes erythrocephalus*), red-bellied woodpecker (*Melanerpes carolinus*), and yellow-bellied sapsucker (*Sphyrapicus varius*), are also typical in the project area forested habitat. Seabirds using the adjacent openwater areas may include laughing gull (*Leucophaeus atricilla*) and several species of terns.

Small game mammals that may be present in the project area include fox squirrel (*Sciurus niger*), eastern cottontail (*Sylvilagus floridanus*), and raccoon (*Procyon lotor*); and common furbearers include the raccoon, mink, nutria, and muskrat. Nongame mammals that occur in the study area include Virginia opossum (*Didelphis virginiana*), nine-banded armadillo (*Dasypus novemcinctus*), and several species of bats, rodents and insectivores. Reptiles include the common snapping turtle (*Chelydra serpentina*), red-eared turtle (*Trachemys scripta elegans*), various water snakes, five-lined skink (*Plestiodon inexpectatus*), and green anole (*Anolis carolinensis*). Representative amphibians include the green treefrog (*Hyla cinerea*), southern leopard frog (*Rana sphenocephala*), and northern spring peeper (*Pseudacris crucifer*).

Threatened and Endangered Species

Below is a list of federally-listed threatened and endangered species that could potentially be affected by the Corps' proposed channel deepening. In addition, a brief description of basic information regarding those species is provided along with means to reduce the likelihood of any potential impact to those species. Should the proposed action directly or indirectly affect any of the listed species further consultation with this office will be necessary.

West Indian Manatee

The endangered West Indian manatee (*Trichechus manatus*) is known to regularly occur in Lakes Pontchartrain and Maurepas and their associated coastal waters and streams. It also can be found less regularly in other Louisiana coastal areas, most likely while the average water temperature is warm. Based on data maintained by the Louisiana Natural Heritage Program (LNHP), over 80 percent of reported manatee sightings (1999-2011) in Louisiana have occurred from the months of June through December. Manatee occurrences in Louisiana appear to be increasing and they have been infrequently observed in the Mississippi River. Cold weather and outbreaks of red tide may adversely affect these animals. However, human activity is the primary cause for declines in species number due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution.

During in-water work in areas that potentially support manatees all personnel associated with the project should be instructed about the potential presence of manatees, manatee speed zones, and the need to avoid collisions with and injury to manatees. All personnel should be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Additionally, personnel should be instructed not to attempt to feed or otherwise interact with the animal, although passively taking pictures or video would be acceptable.

- All on-site personnel are responsible for observing water-related activities for the presence of manatee(s). We recommend the following to minimize potential impacts to manatees in areas of their potential presence:

- All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot radius (buffer zone) of the active work area. Once the manatee has left the buffer zone on its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings of manatee(s) in the buffer zone, in-water work can resume under careful observation for manatee(s).

- If a manatee(s) is sighted in or near the project area, all vessels associated with the project should operate at "no wake/idle" speeds within the construction area and at all times while in waters where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.

- If used, siltation or turbidity barriers should be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.

- Temporary signs concerning manatees should be posted prior to and during all in-water project activities and removed upon completion. Each vessel involved in construction activities should display at the vessel control station or in a prominent location, visible to all employees operating the vessel, a temporary sign at least 8½ " X 11" reading language similar to the following: "CAUTION BOATERS: MANATEE AREA/ IDLE SPEED IS REQUIRED IN CONSRUCTION AREA AND WHERE THERE IS LESS THAN FOUR FOOT BOTTOM CLEARANCE WHEN MANATEE IS PRESENT". A second temporary sign measuring 8½ " X 11" should be posted at a location prominently visible to all personnel engaged in water-related activities and should read language similar to the following: "CAUTION: MANATEE AREA/ EQUIPMENT MUST BE SHUTDOWN IMMEDIATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION".

- Collisions with, injury to, or sightings of manatees should be immediately reported to the Service's Louisiana Ecological Services Office (337/291-3100) and the Louisiana Department of Wildlife and Fisheries, Natural Heritage Program (225/765-2821). Please provide the nature of the call (i.e., report of an incident, manatee sighting, etc.); time of incident/sighting; and the approximate location, including the latitude and longitude coordinates, if possible.

Pallid Sturgeon

The pallid sturgeon (*Scaphirhynchus albus*) is an endangered, bottom-oriented, fish that inhabits large river systems from Montana to Louisiana. Within this range, pallid sturgeon tend to select main channel habitats in the Mississippi River and main channel areas with islands or sand bars in the upper Missouri River. In Louisiana it occurs in the Mississippi River. The pallid sturgeon is adapted to large, free-flowing, turbid rivers with a diverse

assemblage of physical characteristics that are in a constant state of change. Many life history details and subsequent habitat requirements of this fish are not known. However, the pallid sturgeon is believed to utilize Louisiana riverine habitat during reproductive stages of its life cycle. Habitat loss through river channelization and dams has adversely affected this species throughout its range.

Entrainment issues associated with dredging operations in the Mississippi River is a potential effect that should be addressed in analyzing current proposed project effects. We recommend the following to minimize potential impacts to pallid sturgeon associated with dredging to ensure protection of the pallid sturgeon: (1) the cutterhead should remain completely buried in the bottom material during dredging operations. If pumping water through the cutterhead is necessary to dislodge material or to clean the pumps or cutterhead, etc., the pumping rate should be reduced to the lowest rate possible until the cutterhead is at mid-depth, where the pumping rate can then be increased; (2) during dredging, the pumping rates should be reduced to the slowest speed feasible while the cutterhead is descending to the channel bottom.

Red Knot

The red knot (*Calidris canutus rufa*), federally listed as a threatened species, is a medium-sized shorebird about 9 to 11 inches (23 to 28 centimeters) in length with a proportionately small head, small eyes, short neck, and short legs. The black bill tapers steadily from a relatively thick base to a relatively fine tip; bill length is not much longer than head length. Legs are typically dark gray to black, but sometimes greenish in juveniles or older birds in non-breeding plumage. Non-breeding plumage is dusky gray above and whitish below. The red knot breeds in the central Canadian arctic but is found in Louisiana during spring and fall migrations and the winter months (generally September through March).

During migration and on their wintering grounds, red knots forage along sandy beaches, tidal mudflats, salt marshes, and peat banks. Observations along the Texas coast indicate that red knots forage on beaches, oyster reefs, and exposed bay bottoms, and they roost on high sand flats, reefs, and other sites protected from high tides. In wintering and migration habitats, red knots commonly forage on bivalves, gastropods, and crustaceans. Coquina clams (*Donax variabilis*), a frequent and often important food resource for red knots, are common along many gulf beaches. Major threats to this species along the Gulf of Mexico include the loss and degradation of habitat due to erosion, shoreline stabilization, and development; disturbance by humans and pets; and predation.

Because red knots are known to utilize the Mississippi River Delta we recommend that the Corps investigate the feasibility of creating foraging and roosting areas for red knots in association with dredged material disposal operations. Such habitat restoration/creation could be incorporated into an ESA Section 7(a)(1) Conservation Program that could aid the Service in recovery efforts for that species.

The Corps Mississippi Valley Division (MVD) finalized a July 23, 2013, Conservation Plan for the Interior Least Tern, Pallid Sturgeon, and Fat Pocketbook Mussel in the Lower Mississippi River (Endangered Species Act, Section 7(a)(1)) that addressed conservation of those species via features of the Channel Improvement Program (CIP). The Service's assessment and

recommendations for the CIP in the Lower Mississippi River (LMR) was provided to the Corps in our December 12, 2013 Biological Opinion (USFWS 2013). In that opinion we recommended that dredging activities avoid and/or minimize impacts on gravel bars, tributary mouths, backwater habitats, and affected species life cycle timing; those habitat features are not found in the project area.

Migratory Birds

Please be advised that the project area is located in habitats which are commonly inhabited by colonial nesting waterbirds and/or seabirds may be present; these species are protected by the Migratory Bird Treaty Act of 1918 (as amended).

Colonies may be present that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries. That database is updated primarily by (1) monitoring previously known colony sites and (2) augmenting point-to-point surveys with flyovers of adjacent suitable habitat. Although several comprehensive coast-wide surveys have been recently conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds, the following restrictions on activity should be observed:

1. For colonies containing nesting brown pelicans, all activity occurring within 2,000 feet of a rookery should be restricted to the non-nesting period (i.e., September 15 through March 31). Nesting periods vary considerably among Louisiana's brown pelican colonies, however, so it is possible that this activity window could be altered based upon the dynamics of the individual colony. Brown pelicans are known to nest on barrier islands and other coastal islands in St. Bernard, Plaquemines, and Jefferson, parishes.
2. 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, exact dates may vary within this window depending on species present).
3. 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, exact dates may vary within this window depending on species present).

In addition, we recommend that on-site contract personnel be trained to identify colonial nesting birds and their nests, and avoid affecting them during the breeding season (i.e., the time period outside the activity window).

Areas of Special concern

Public Lands - NWR and WMA

The Service's 49,000 acre Delta National Wildlife Refuge (NWR) is within the study area and currently material dredged from routine maintenance of the Mississippi River is disposed beneficially on that NWR. All construction or maintenance activities (e.g., surveys, land clearing, etc.) on a NWR will require the Corps to obtain a Special Use Permit from the Refuge Manager. Therefore, we recommend that the Corps request issuance of a Special Use Permit well in advance of conducting any work on the refuge. Please contact the Refuge Manager for further information on and for assistance in obtaining a Special Use Permit. Close coordination by both the Corps and its contractor must be maintained with the Refuge Manager to ensure that construction and maintenance activities are carried out in accordance with provisions of any Special Use Permit. The Refuge Manager for the Delta NWR is Ms. Shelly Stiaes, (Shelly_Stiaes@fws.gov or 337.882.2000).

Louisiana Department of Wildlife and Fisheries' (LDWF) Pass a Loutre Wildlife Management Area (WMA) encompasses approximately 115,000 acres and is located within the Mississippi River Delta. Please contact Shane Granier at the LDWF Office (504-284-5264) for further information regarding any additional permits or coordination that may be required to perform work on that WMA.

Both of these public lands could be impacted by any reduced flows of sediment laden water currently being delivered by adjacent distributaries. During planning the Service was concerned that a reduction of the water surface elevation via deepening of the channel could potentially result in decreased water flows down distributaries and an increase in erosion of these areas. However, modeling done by the Corps has shown that there will not be reduced flows or sediment from the river, thus not impacting the Delta NWR and Pass a Loutre WMA.

Coastal Restoration Efforts

The State of Louisiana and the Corps conducted modeling of the Mississippi River for the Louisiana Coastal Area, Mississippi River Hydrodynamic Study, Main Channel of the Mississippi River. That study is attempting to identify the best potential coastal restoration measures that can be developed using the Mississippi River. Restoration alternatives focus on sediment diversions from the Mississippi River. In addition the Coastal Wetlands Planning, Protection and Restoration program, (CWPPRA) has funded restoration projects that involve dredging sediments from shoals in the river to restore eroded coastal marshes. Other restoration activities in the project area include Coastal Wetlands Planning, Protection and Restoration Act projects such as crevasses and the West Bay diversion. According to modeling done by the Corps lowering of the river bed due to dredging will not have an effect on river stages or the quantity and duration of flows. However coordination of these projects should continue to insure there are no other potential impacts to those coastal restoration efforts.

EVALUATION METHODOLOGY

The WVA operates under the assumption that optimal conditions for general fish and wildlife

habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of 1) a list of variables that are considered important in characterizing fish and wildlife habitat, 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values, and 3) a mathematical formula that combines Suitability Index for each variable into a single value for wetland habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI.

The WVA model for marsh habitat attempts to assess the suitability of each habitat type for providing resting, foraging, breeding, and nursery habitat to a diverse assemblage of fish and wildlife species. While the model does not specifically assess other wetland functions and values such as storm-surge protection, floodwater storage, water quality improvement, nutrient import/export, and aesthetics, it can be generally assumed that these functions and values are positively correlated with fish and wildlife habitat quality.

The procedure for evaluating project benefits on fish and wildlife habitats, the WVA model, uses a series of variables that are intended to capture the most important conditions and functional values of a particular habitat. Values for these variables are derived for existing conditions and are estimated for conditions projected into the future if no project efforts are applied (i.e., future-without-project), and for conditions projected into the future if the proposed project is implemented (i.e., future-with-project), providing an index of quality or habitat suitability of the habitat for the given time period. The HSI is combined with the acres of habitat to get a number that is referred to as "habitat units".

Expected project benefits are estimated as the difference in habitat units between the future-with- project (FWP) and future-without project (FWOP). To allow comparison of WVA benefits to costs for overall project evaluation, total benefits are averaged over a 50-year period, with the result reported as Average Annual Habitat Units (AAHUs).

The change (increase or decrease) in AAHUs for FWP scenario, compared to FWOP conditions, provides a measure of anticipated impacts. A net gain in AAHUs indicates that the project is beneficial to the habitat being evaluated; a net loss of AAHUs indicates that the project is damaging to that habitat type.

DESCRIPTION OF TENTATIVELY SELECTED PLAN

The alternatives evaluated for this project include Alternatives 1, 2, and 3. Alternative 1 is the no action/base condition. It consist of a 45 foot (ft) deep Mississippi River channel at river crossings (there are 12 crossings in total within the project area) and the channel lowering to 48 ft in Lower Mississippi River. Alternative 2 would maintain a 48 ft depth at both the crossings and the lower river. The Tentatively Selected Plan (TSP) consists of Alternative 3, constructing and maintaining the river channel and its crossings at 50ft.

Existing maintenance on the Mississippi River channel includes the beneficial use of dredged material in disposal areas adjacent to the lower river; there is no feasible beneficial use sites for material dredged at the crossings. Alternative 3 includes an approximately 16% expansion of the existing disposal area. This expansion was in anticipation of the need for additional capacity associated with construction, and at the time of alternative development, an assumed/expected increase in annual operation and maintenance (O&M) (Figure 2).

Total Expansion of Disposal Areas in lower river = 24,053 acres
Previously Cleared Disposal Areas in lower river= 142,858 acres

PROJECT IMPACTS

During construction, the beneficial use of dredged material into open water habitat will initially result in approximately 1,462 acres of fresh marsh (with a final target elevation of 2 feet or less). These will be evenly distributed among the four areas seen in Figure 2. Therefore, the WVA evaluated an initial construction of 365 acres of marsh creation in Areas A, B, C, and D (Figure 2).

The annual beneficial use of dredged material in open water during river maintenance will result in approximately 528 acres of marsh distributed evenly across all four areas. The WVA evaluated an annual 132 acres in each Area for 50 years.

Using the WVA methodology, impact assessments were conducted by the Service based on data from the CWPPRA Pass a Loutre Restoration Candidate Project, the LCA West Bay project, DELFT 3D hydrologic model runs, the BUDMAT project, and knowledge of the area and experience with similar projects. The WVA results are listed in Table 2. Appendix A contains the WVA Project Information Sheet.

Approximately 12,323 Average Annual Habitat Units (AAHUs) and 24,291 acres of fresh marsh habitat are anticipated to be remaining via construction and maintenance through beneficial use over the 50 year project life (Table 2).

Table 2. Wetland Value Assessment Results for the Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana Project.

	Construction AAHUs (year 50 fwp-fwop)	Maintenance AAHUs (year 50 fwp-fwop)	Construction Net Marsh Acres (year 50 fwp-fwop)	Maintenance Net Marsh Acres (year 50 fwp-fwop)
Area A	190.1	1549.7	431.0	5852.4
Area B	99.3	1525.8	144.3	5723.2
Area C	180.4	1532.4	360.4	5829.9
Area D	106.8	1553.4	146.4	5803.6
TOTAL	6161.3	6161.3	1082.1	23209.1

With implementation of the proposed action there would be some minimal and insignificant impacts to wetland resources. A small, undetermined amount of wetland habitat would be temporarily impacted during the excavation of channels to provide equipment access to the proposed disposal areas. The resulting loss of wetland function would be temporary, as these areas would be backfilled to pre-project marsh elevations and eventually revegetated (naturally) and restored upon completion of the project. Direct placement of dredged material on existing marsh would be avoided. With implementation of the proposed action, there would be mainly positive impacts to wetlands in the project area. During construction, the beneficial use of dredged material into open water habitat will result in approximately 1,462 acres of intermediate marsh (with a final target elevation of 2 feet or less). The beneficial use of dredged material into open water during river maintenance will result in approximately 528 acres of marsh annually.

Wildlife Resources

Wildlife species, if present, would be only temporarily displaced from the project area during placement of dredged material. The placement of dredge material for beneficial use would reduce some shallow open water habitat by converting it to marsh, thereby reducing available foraging habitat for some avian species. However, the reduction in the amount of shallow open water is negligible compared to that remaining in the project area. Some positive indirect impacts to wildlife in the project area are anticipated with the proposed action. At the end of 50 years there would be 24,291 more acres of productive fresh and intermediate marsh than would be present without the project. Submerged and emergent vegetation potentially colonizing these areas would provide valuable and diverse habitat for foraging, refuge, breeding, nesting, nursery, and loafing of terrestrial wildlife, migratory waterfowl, and other avian species. Thus, it is anticipated that wildlife in and near the project area will ultimately benefit from the proposed activities.

Fisheries Resources

It is anticipated that fishery species would avoid proposed areas of disposal activities during the project period, thereby minimizing direct and indirect impacts to those species. Sessile organisms may be buried during deposition for marsh creation. The expansive emergent wetland vegetation expected to colonize this area would enhance primary and secondary productivity in the area and provide substantial fisheries benefits resulting from valuable foraging, refuge, breeding, and nursery habitat for finfish and shellfish. Creation of new marsh would provide highly productive fisheries habitat, increase detrital food material, and likely contribute to overall increased fisheries productivity in the project area. Benefits to both commercial and recreational fisheries are expected.

Essential Fish Habitat

With implementation of the proposed action, initially some EFH for brown shrimp, white shrimp, and red drum would be directly impacted in the project area during the beneficial use of dredged material for wetlands development in the shallow open waters of the proposed disposal areas. Approximately 1,462 acres resulting from construction and 528 acres annually for maintenance of shallow open water bottom and associated EFH habitat (e.g., mud/sand substrates, SAV) would be potentially impacted by the placement of dredged material in the proposed disposal areas; however, these areas would be converted to generally more productive categories of EFH (e.g., estuarine emergent marsh, marsh edge, inner marsh, marsh/water interface) as they eventually become colonized by emergent vegetation. Thus, the proposed action would provide mainly positive

indirect impacts to EFH in the project area, and any direct or temporary adverse impacts would be sufficiently offset by the net benefits from creating marsh, new shallow open water habitat, and associated EFH.

Additional, short term EFH impacts would include a temporary and localized increase in estuarine water column turbidity during the placement of dredged material in shallow open water areas; however, the project area is a naturally turbid environment and increased turbidity is not expected to significantly affect EFH needs within the project area.

Threatened and Endangered species

The Corps is responsible for determining whether the selected alternative is likely (or not likely) to adversely affect any listed species and/or critical habitat, and for requesting the Service's concurrence with that determination. If the Corps determines, and the Service concurs, that the selected alternative is likely to adversely affect listed species and/or critical habitat, a request for formal consultation in accordance with Section 7 of the Endangered Species Act should be submitted to the Service. That request should also include the Corps rationale supporting their determination.

SERVICE POSITION AND RECOMMENDATIONS

Overall, there would be positive net benefits to wetland resources in the project area, with the creation of emergent wetland habitat of higher value to fish and wildlife resources than the existing open water. Construction of the Mississippi River Deepening would result in approximately 12,323 Average Annual Habitat Units (AAHUs) and 24,291 acres of fresh-intermediate marsh habitat over the 50 year project life (See Appendix A for WVA Project Information and Assumptions). The Service supports the beneficial use of dredged material obtained from constructing and maintaining the MR Deepening project, provided the following fish and wildlife conservation recommendations are implemented concurrently with project implementation:

1. The Service recommends that to the extent feasible all dredged material should be used beneficially to restore coastal habitats that are in decline.

2. The Service and NMFS recommend the Corps evaluate options to enhance the sediment loads of proposed diversion projects or existing breaches in the vicinity of Mardi Gras Pass and Fort St. Phillip if dredging south of New Orleans is proposed in the future.

3. The Service and NMFS recommend the Corps expand the beneficial use areas to include areas near Spanish Pass. The Service recommends avoiding and/or minimizing impacts to wetlands, including submerged aquatic vegetation in the study area.

4. The Service recommends avoiding and/or minimizing impacts to coastal restoration efforts in the study area and continued coordination with those efforts to avoid or minimize impacts to their effectiveness.

5. The Service recommends avoiding impacts to endangered or threatened species and their habitats, migratory birds, and colonial wading birds within and upstream of the study area as specified in this Fish and Wildlife Coordination Act Report. Investigate the possibility of using dredged material to restore/create habitat for threatened or endangered species.

6. The Service recommends coordinate with the Service and other natural resource agencies in the planning of disposal areas and techniques and assessment of impacts and mitigation.

7. The created wetlands should be monitored over the project life to help evaluate the effectiveness of these features and to document both the elevation and acreage of wetland areas created.

8. The Service and other resource agencies shall be provided an opportunity to review and submit recommendations on future detailed planning reports (e.g., Design Document Report, Engineering Document Report, etc.) and the draft plans and specifications on the Mississippi River Deepening Project addressed in this report.

9. The Service recommends Special Use Permits be requested of the Delta National Wildlife Refuge (NWR) for any expected or proposed work on the Delta NWR. Close coordination by both the Corps and its contractor must be maintained with the Refuge Manager to ensure that construction and maintenance activities are carried out in accordance with provisions of any Special Use Permit issued by NWR. The Refuge Manager for the Delta NWR is Ms. Shelly Stiaes, (Shelly_Stiaes@fws.gov or 337-882-2000).

10. Louisiana Department of Wildlife and Fisheries' (LDWF) and the Service recommend contacting the LDWF office, Mr. Shane Granier (504-284-5264), for further information regarding any additional permits or coordination that may be required to perform work on the Pass a Loutre Wildlife Management Area (WMA).

11. If the proposed project has not been constructed within 1 year or if changes are made to the proposed project, the Corps should re-initiate Endangered Species Act consultation with the Service.

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APPENDIX A

WETLAND VALUE ASSESSMENTS PROJECT INFORMATION SHEET

FOR

MISSISSIPPI RIVER SHIP CHANNEL, GULF TO BATON ROUGE, LOUISIANA

Wetland Value Assessment Project Information Sheet

September 26, 2016

Prepared for:
Mississippi River Deepening PDT

Prepared by
U.S. Fish and Wildlife Service

Project Name: Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana Project

Project Type(s): Marsh Creation

Project Area: Plaquemines Parish, Louisiana (Figure 1).

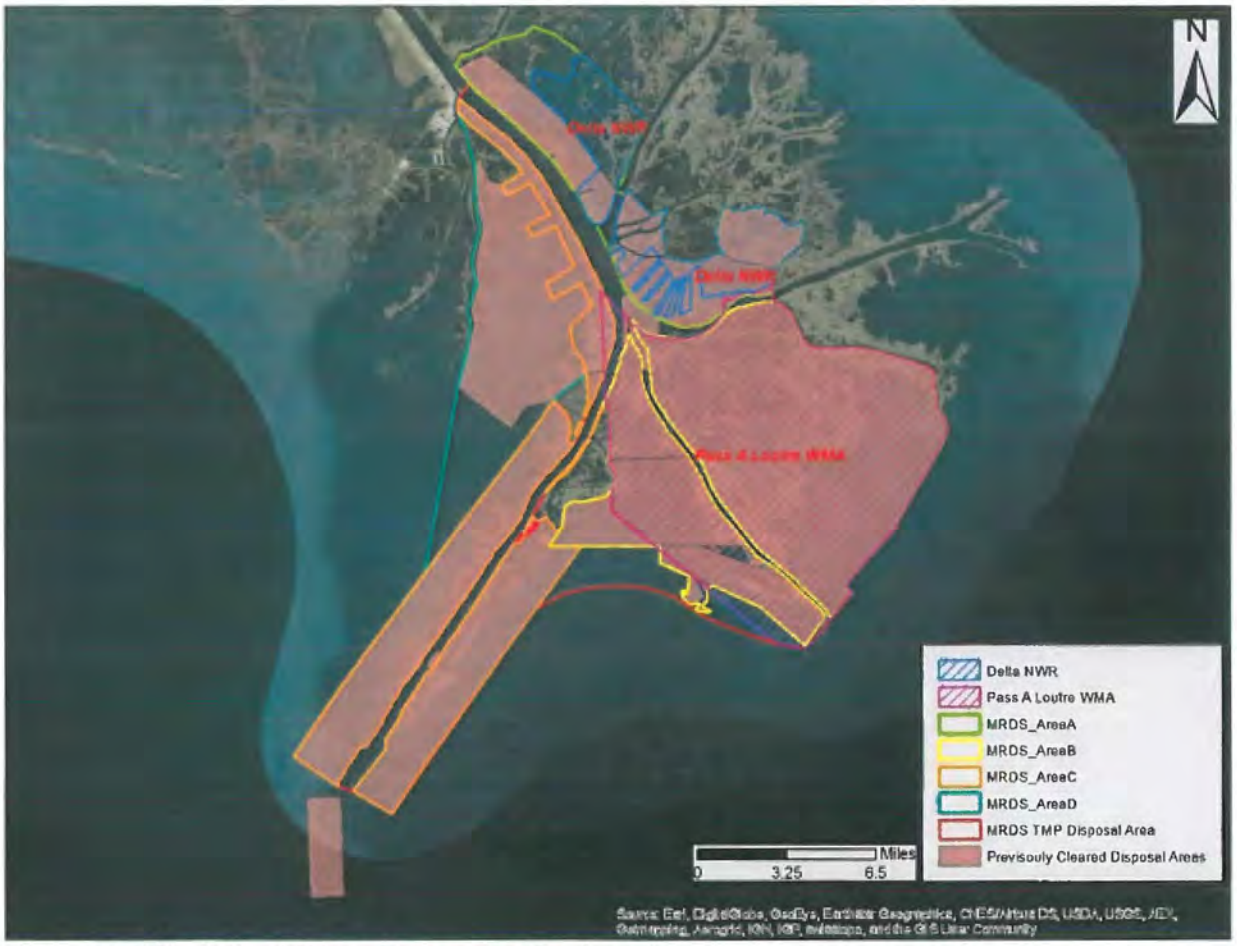


Figure 1. Mississippi River Deepening Project Area.

Project Goal:
This Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana Project is intended deepen the Mississippi River Ship Channel up to a 50 foot depth from Baton Rouge to the Gulf of Mexico and to create tidal freshwater marsh in the Mississippi River Delta with material dredged during construction and annual maintenance. Existing survey data shows that the proposed marsh creation sites in the delta have existing bottom elevations of approximately -2.5 feet NAVD88. The initial target elevation for dredge fill is between +4.0 and +4.5 feet NAVD88 which is expected to settle to an elevation between +2.5 and +3.0 feet NAVD88. Existing average marsh elevation, in the immediate vicinity is approximately +1.85 feet NAVD88.

Habitat Assessment Method
The WVA operates under the assumption that optimal conditions for general fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of 1) a list of variables that are considered important in characterizing fish and wildlife habitat, 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values, and 3) a mathematical formula that combines Suitability Index for each variable into a single value for wetland habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI.

The WVA model for marsh habitat attempts to assess the suitability of each habitat type for providing resting, foraging, breeding, and nursery habitat to a diverse assemblage of fish and wildlife species. While the model does not specifically assess other wetland functions and values such as storm-surge protection, floodwater storage, water quality improvement, nutrient import/export, and aesthetics, it can be generally assumed that these functions and values are positively correlated with fish and wildlife habitat quality.

The procedure for evaluating project benefits on fish and wildlife habitats, the WVA model, uses a series of variables that are intended to capture the most important conditions and functional values of a particular habitat. Values for these variables are derived for existing conditions and are estimated for conditions projected into the future if no project efforts are applied (i.e., future-without-project), and for conditions projected into the future if the proposed project is implemented (i.e., future-with-project), providing an index of quality or habitat suitability of the habitat for the given time period. The habitat suitability index (HSI) is combined with the acres of habitat to get a number that is referred to as "habitat units".

Expected project benefits are estimated as the difference in habitat units between the future-with- project (FWP) and future-without project (FWOP). To allow comparison of WVA benefits to costs for overall project evaluation, total benefits are averaged over a 50-year period, with the result reported as Average Annual Habitat Units (AAHUs).

Existing – The project area is the open water and surrounding fresh marsh of the Lower Mississippi River Delta. The vegetation is classified as fresh marsh and receives continuous riverine input. Emergent plant species include: smooth cordgrass (*Spartina alterniflora*), Walter's millet (*Echinochloa walteri*), *Schoenoplectus pungens*, *Nelumbo lutea*. Submerged aquatic vegetation, such *as Myriophyllum spicatum*, *Heteranthera dubia*,

Ceratophyllum demersum, *Najas guadalupensis*, and *Potamogeton nodosus* are also common in the lower elevation intertidal and shallow subtidal portions of the project area. The two major soil types in the project area are commonly found together and are classified as Balize and Larose soils (BA). Both soil types are level and very poorly drained. They are flooded by Mississippi River water most of the time and support freshwater marshes.

Land Loss/Gain*

- USGS calculated a historical loss rate for the disposal polygons (Figure 2) using a hyper-temporal analysis for the period 1984 to 2016. That analysis utilized TM satellite scenes and OLI imagery. The Fish and Wildlife Service calculated land loss rate using the same USGS Land/Water data, but with a different regression (land acres: time). That rate was used to calculate land/water values over the life of the project.

Area A-Delta NWR Disposal Area (Delta)

- FWOP gain rate: 0.54 %
- FWP loss rate: 0.54% (Gain rate is assumed to stay the same as FWOP for the life of the project).

Area B-Pass a Loutre WMA Disposal Area (PAL)

Area B subunits (B1 and B2) were combined for the land loss analysis and the WVA.

- FWOP loss rate: -0.78 %
- FWP loss rate: -0.39% (resumes to background loss rate at TY27).

Area C-Southwest Pass Disposal Area (SWP)

Area C subunits (C1, C2, and C3) were combined for the land loss analysis and the WVA.

- FWOP gain rate: 0.17 %
- FWP gain rate: 0.17% (Gain rate is assumed to stay the same as FWOP for the life of the project).

Area D-West Bay Disposal Area (West Bay)

- FWOP loss rate: -0.35 %
- FWP loss rate: -0.175% (resumes to background loss rate at TY27).

All Areas

For FWP we used the standard Civil Works WVA assumption of a 50% loss rate reduction for created marsh (but rate reverts back to FWOP rate when accretion equals 10 inches). Land loss rates were adjusted by the projected effects of three Relative Sea Level Rise (RSLR) scenarios. The medium RSLR scenario was chosen for these analyses. Additionally, FWP with Maintenance (FWPWM) accounts for an additional 132 acres added to each disposal site annually throughout the project life with respective loss/gain rates applied.

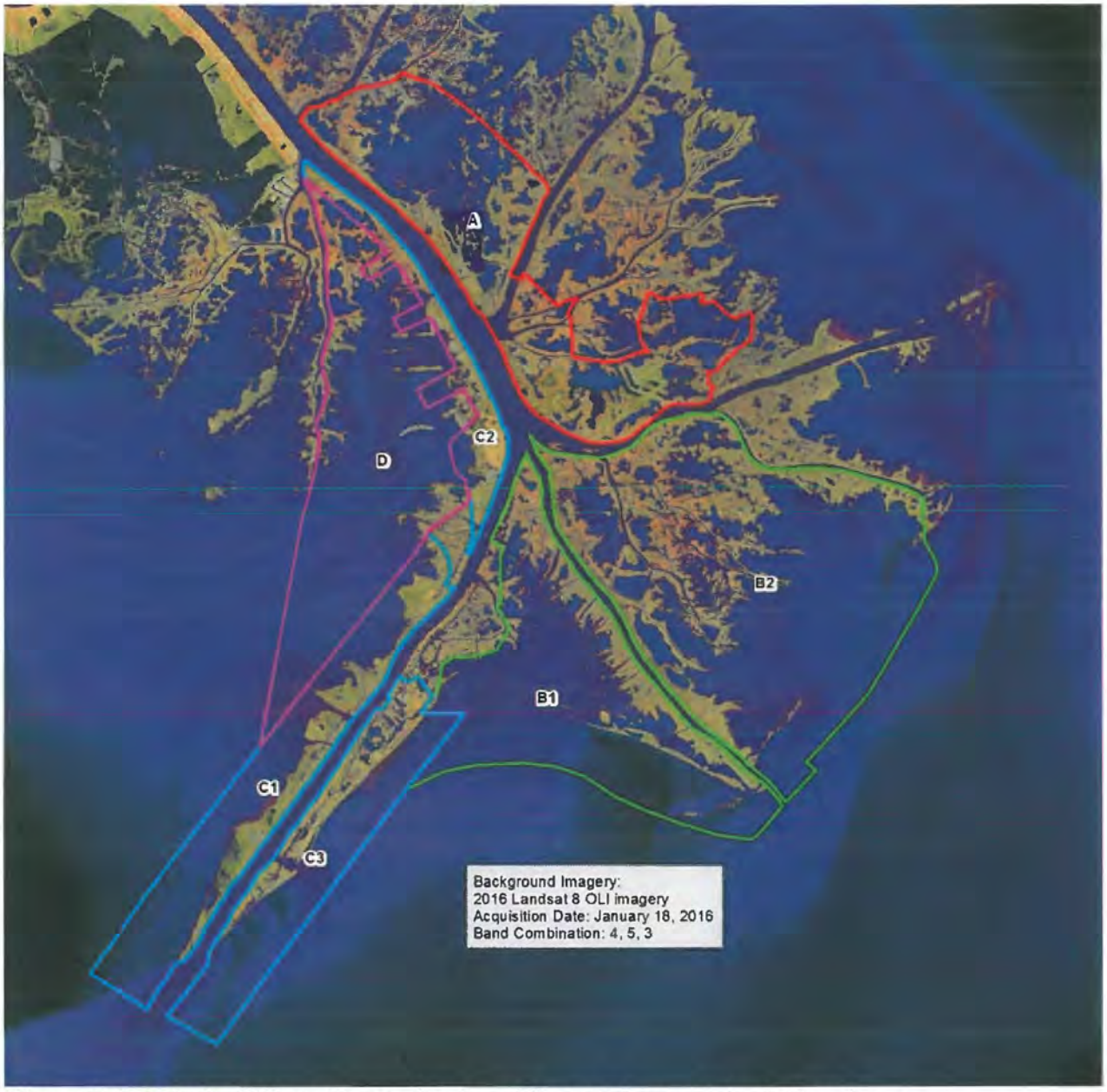


Figure 2. Mississippi River Deepening Land Loss Polygon Calculation Areas.

Sea Level Rise Effects*

Land loss rates estimated by the Service were adjusted by the projected effects of the medium relative sea level rise (RSLR) scenario for these analyses. The nearest water level gauge to the project area that is listed for use with the sea-level change curve calculator on the corpsclimate.us website is the one at Grand Isle. Therefore, we assumed the subsidence rate from Pahl et. al 2015: subsidence in Miss Delta = 5 feet/100 years. (1,524 millimeters/100 years) or about 15 mm/yr. Shinkle and Dokka (2004) estimated a subsidence rate of about 24 mm/yr, but recent CORS measurements at Boothville from 2002 to 2007 are much lower at about 3.5 mm/year (Morton &Bernier 2010). We used the earlier subsidence estimate from Britsch 2007 because the newer estimates were calculated from a comparatively limited period of time. Eustatic sea level rise was assumed to be 1.7 mm/yr.

(*) Subsequent to the Service's initial analyses, hydraulic modelling was conducted by The Water Institute of the Gulf (TWI) to determine the potential effects of the 4 mid-bay marsh creation alternatives. The analysis predicted substantial sediment infilling of West Bay during the 20 year period beginning at TY0 with each alternative and in the absence of any added land forms (FWOP). TWI used 19 mm/year as the subsidence rate and assumed an intermediate sea level rise scenario. Based upon estimates of substrate elevations at which marsh and submerged aquatic vegetation (SAV) are expected to grow (between 0.0 and +1.85 feet NAVD88 for SAV and between +1.85 and +4.5 feet NAVD88 for emergent marsh) the expected acreages of each were predicted after 20 years. The four (two from the environmental team and two proposed by TWIG during modelling) proposed mid-bay marsh creation alternatives had differential effects on the amount of sediment expected to build up within West Bay over 20 years. The DELFT 3D model results only extended to target year 20. Because of the uncertainty of diversion functioning or its potential purposeful closure, the resulting effects on perpetuating emergent marsh were not projected past TY20. Considering the potential increase in land loss that could occur versus. the positive effects of the diversion, we held the TY 20 values constant to TY50. This assumption was used for the West Bay (Area D) FWOP portion of the WVA analyses.

Variable V_1 - Percent of wetland area covered by emergent vegetation

FWOP–West Bay disposal area analysis considers the whole range (18,850 acres) of the hydrologic model as the project area. The remaining 3 disposal sites only consider project footprint and assumed that marsh creation polygons would be open water habitat.

Area A (Delta)	
	% Emergent
TY0	0
TY1	0
TY3	0
TY5	0
TY6	0
TY25	0
TY50	0

Area B (PAL)	
	% Emergent
TY0	0
TY1	0
TY3	0
TY5	0
TY6	0
TY25	0
TY50	0

Area C (SWP)	
	% Emergent
TY0	0
TY1	0
TY3	0
TY5	0
TY6	0
TY25	0
TY50	0

Area D (West Bay)	
	% Emergent
TY0	2
TY10	5
TY20	21
TY50	25

FWP –Created marsh platform has limited marsh function until material settlement, flooding and channel development. The assumption document suggests 0%, 15%, 50%, and 100% for TY years 1, 3, 5, and 6 respectively for unplanted marsh. Because this area is in close proximity to the freshwater and nutrients of the Mississippi River Delta, we adjusted the assumptions to10%, 25%, 100%, and 100% for TY years 1, 3, 5, and 6 respectively to reflect a more rapid vegetative response.

Area A (Delta)			
		acres	%
TY0	Constr	0	0

Area B (PAL)			
		acres	%
TY0	Constr	0	0

Area C (SWP)			
		acres	%
TY0	Constr	0	0

Area D (West Bay)			
		acres	%
TY0	Constr	0	0

	Maint.	0	0
TY1	Constr.	37	10
	Maint.	13	10
TY3	Constr.	93	25
	Maint.	165	42
TY5	Constr.	375	103
	Maint.	265	40
TY6	Constr.	377	103
	Maint.	398	50
TY25	Constr.	405	111
	Maint.	2916	88
TY50	Constr.	431	118
	Maint.	6226	94

	Maint.	0	0
TY1	Constr.	36	10
	Maint.	13	10
TY3	Constr.	90	25
	Maint.	164	42
TY5	Constr.	358	98
	Maint.	259	39
TY6	Constr.	356	98
	Maint.	390	50
TY25	Constr.	320	88
	Maint.	2886	88
TY50	Constr.	229	63
	Maint.	6154	93

	Maint.	0	0
TY1	Constr.	37	10
	Maint.	13	10
TY3	Constr.	92	25
	Maint.	165	42
TY5	Constr.	368	101
	Maint.	263	40
TY6	Constr.	369	101
	Maint.	395	50
TY25	Constr.	371	102
	Maint.	2904	88
TY50	Constr.	364	99
	Maint.	6202	94

	Maint.	0	0
TY1	Constr.	36	10
	Maint.	13	10
TY3	Constr.	91	25
	Maint.	165	42
TY5	Constr.	362	99
	Maint.	262	40
TY6	Constr.	361	99
	Maint.	394	50
TY25	Constr.	340	93
	Maint.	2894	88
TY50	Constr.	286	78
	Maint.	6174	94

Variable V_2 - Percent of open water covered by aquatic vegetation

Existing Conditions –SAV coverage estimation was determined for West Bay by optical area estimation and transect rake sampling for presence or absence conducted on September 26, 2014 by USFWS, NOAA, Arcadis, and Corps personnel. For PAL and Delta, SAV coverage information was derived from the Pass a Loutre Restoration CWPPRA PPL18 Candidate WVA analysis. The Southwest Pass disposal area SAV coverage was estimated by LDWF and Corps personnel.

Area A & B: SAV coverage was derived from the CWPPRA Pass a Loutre Restoration Candidate Project WVA.

Area C: Jeff Corbino, NOD Corps of Engineers biologist, and Shane Granier, LDWF Biologist and Pass a Loutre WMA Manager, provided the SAV data for the Southwest Pass disposal area.

Area D: SAV coverage was taken from the West Bay LCA BUDMAT project which was collected by field reconnaissance in September of 2014.

FWOP

According to the DELFT 3D hydrologic model run for Area D, SAV coverage is expected to increase as sediment from the West Bay diversion increases water bottom elevation and creates conditions conducive to SAV colonization. Standard Civil Works WVA assumptions applied to the other disposal sites with a 30% reduction in baseline SAV coverage at TY50.

Area A (Delta)	
	% SAV
TY0	25
TY1	25

Area B (PAL)	
	% SAV
TY0	25
TY1	25

Area C (SWP)	
	% SAV
TY0	8
TY1	8

Area D (West Bay)	
	% SAV
TY0	32
TY10	32

TY3	25
TY5	25
TY6	25
TY25	25
TY50	8

TY3	25
TY5	25
TY6	25
TY25	25
TY50	8

TY3	8
TY5	8
TY6	8
TY25	8
TY50	2

TY20	34
TY50	34

FWP & FWPWM

When the marsh land platform is constructed, all existing SAV will be buried. Until the created marsh platform settles to marsh elevation it is assumed that very little open water exists to support SAV growth. Only the disposal area footprint is considered in FWP for all disposal sites.

Area A (Delta)	
	% SAV
TY0	25
TY1	0
TY3	0
TY5	25
TY6	29
TY25	29
TY50	12.5

Area B (PAL)	
	% SAV
TY0	25
TY1	0
TY3	0
TY5	25
TY6	29
TY25	29
TY50	12.5

Area C (SWP)	
	% SAV
TY0	8
TY1	0
TY3	0
TY5	8
TY6	9
TY25	9
TY50	4

Area D (West Bay)	
	% SAV
TY0	32
TY1	0
TY3	0
TY5	32
TY6	37
TY25	37
TY50	16

Variable V_3 - Marsh edge and interspersion

Existing Conditions – Interspersion classes varied between areas and were determined utilizing aerial imagery and ArcMap GIS 10.3.1 software.

FWOP

Marsh growth predicted by the DELFT 3D model at TY20 was used to interpret interspersion. TYs before and after TY20 were interpolated or extrapolated using the hydrologic model results and the existing conditions.

Area A (Delta)		
	Class	%
TY0	3	30
	4	70
TY1	3	30
	4	70
TY3	3	30
	4	70
TY5	3	30
	4	70

Area B (PAL)		
	Class	%
TY0	3	30
	4	70
TY1	3	30
	4	70
TY3	3	30
	4	70
TY5	3	30
	4	70

Area C (SWP)		
	Class	%
TY0	3	100
TY1	3	100
TY3	3	100
TY5	3	100
TY6	3	100
TY25	3	50
	4	50
TY50	4	100

Area D (West Bay)		
	Class	%
TY0	4	100
TY10	3	50
	4	50
TY20	2	50
	3	50
TY50	2	50
	3	50

TY6	3	30
	4	70
TY25	3	35
	4	65
TY50	3	40
	4	60

TY6	3	30
	4	70
TY25	3	35
	4	65
TY50	3	40
	4	60

FWP & FWPWM

Baseline conditions were applied at TY0 for all areas. Standard Civil Works assumptions were applied for TY1–TY50.

Area A (Delta)		
	Class	%
TY0	3	30
	4	70
TY1	5	100
TY3	3	100
TY5	1	50
	3	50
TY6	1	100
TY25	2	100
TY50	3	100

Area B (PAL)		
	Class	%
TY0	3	30
	4	70
TY1	5	100
TY3	3	100
TY5	1	50
	3	50
TY6	1	100
TY25	2	100
TY50	3	100

Area C (SWP)		
	Class	%
TY0	3	100
TY1	5	100
TY3	3	100
TY5	1	50
	3	50
TY6	1	100
TY25	2	100
TY50	3	100

Area D (West Bay)		
	Class	%
TY0	4	100
TY1	5	100
TY3	3	100
TY5	1	50
	3	50
TY6	1	100
TY25	2	100
TY50	3	100

<u>Variable V_4 - Percent of open water area <=1.5 feet deep in relation to marsh surface</u>

Existing Conditions–

Area A & B: Water depths from field reconnaissance were collected by CWPPRA personnel for the Pass a Loutre Restoration Candidate Project. These data were gleaned from the CWPPRA WVA and utilized for both Areas A and B as the analysis incorporated both the Pass a Loutre WMA and the Delta NWR.

Area C: Water depths were taken from bathymetry data, provided by the Corps, collected by the Great Lakes Dredge and Dock Company in 2012.

Area D: Water depths were taken from the West Bay LCA BUDMAT project which was collected by field reconnaissance in September of 2014.

FWOP

Future estimates for Area D-West Bay were based on the results of the DELFT 3D hydrologic model utilized in the West Bay LCA BUDMAT analysis. The model included factors such as RSLR and the effects of sedimentation and land building due to the West Bay Diversion. The assumed range of water bottom level for SAV existence was 0 to 1.85 feet NAVD88. A subset (approximately +0.5 feet to 1.85 feet NAVD88) of that range was used as a guide to estimate shallow water areas using best professional judgment based on the 3D model 20 year results and the existing conditions for the TY10-TY50 values. The TY20 value was carried over for TY50 because the model was only run for a 20 year interval. Assumptions after that time are very difficult and depend on many unknowns, including the functionality of the diversion at that time in the future.

Area A (Delta)	
	Water ≤ 1.5ft (%)
TY0	19
TY1	19
TY3	19
TY5	19
TY6	19
TY25	19
TY50	19

Area B (PAL)	
	Water ≤ 1.5ft (%)
TY0	19
TY1	19
TY3	19
TY5	19
TY6	19
TY25	19
TY50	19

Area C (SWP)	
	Water ≤ 1.5ft (%)
TY0	15
TY1	15
TY3	15
TY5	15
TY6	15
TY25	15
TY50	10

Area D (West Bay)	
	Water ≤ 1.5ft (%)
TY0	10
TY1	15
TY3	25
TY5	25

FWP & FWPWM

Marsh that is lost is not assumed to become shallow open water <= 1.5 feet deep until TY50. According to the Civil Works standard assumptions applied for marsh creation, 1/6 of the SOW would become non-shallow.

Area A (Delta)	
	Water ≤ 1.5ft (%)
TY0	19
TY1	100
TY3	100
TY5	100
TY6	100
TY25	100
TY50	83

Area B (PAL)	
	Water ≤ 1.5ft (%)
TY0	19
TY1	100
TY3	100
TY5	100
TY6	100
TY25	100
TY50	83

Area C (SWP)	
	Water ≤ 1.5ft (%)
TY0	15
TY1	100
TY3	100
TY5	100
TY6	100
TY25	100
TY50	83

Area D (West Bay)	
	Water ≤ 1.5ft (%)
TY0	10
TY1	100
TY3	100
TY5	100
TY6	100
TY25	100
TY50	83

Variable V_5 - Salinity

Existing conditions – Salinity values represent mean growing season salinity (March 1–November 30).

Area A: Salinity was derived from data recorded at the CRMS2634 for the period of February 2008 to June 2016.

Area B: Salinity was derived from data recorded at the CRMS0154, 0157, and 0159 for the period of June 2007 to June 2016. The annual salinities were averaged and used for analysis.

Area C: Salinity was derived from data recorded at the CRMS0159 for the period of June 2007 to June 2016.

Area D: Salinity was derived from data recorded at the CRMS2608 for the period of July 2009 to June 2016.

FWOP, FWP, & FWPWM

Area A (Delta)	
	Salinity (ppt)
TY0-TY50	1.16

Area B (PAL)	
	Salinity (ppt)
TY0-TY50	1.03

Area C (SWP)	
	Salinity (ppt)
TY0-TY50	1.27

Area D (West Bay)	
	Salinity (ppt)
TY0-TY50	0.75

Variable V_6 – Aquatic organism access

Existing conditions – The four proposed marsh creation areas are not currently impounded or hydrologically controlled by any structures. Access to all parts of project area is assumed to be equal and existing conditions are expected to persist.

FWOP

All Areas	
TY0-TY50	1.00

FWP

The marsh creation area is considered to have no access at TY1 due to the elevation of the marsh platform and containment dikes. Based on Standard Civil Works assumptions, at TY5 the marsh creation area receives an access value of 1.0 due to settling of the marsh platform, formation of tidal channels, and gapping of the containment dikes.

All Areas	
TY0	1.00
TY1	0
TY3	0
TY5	1.00
TY6	1.00
TY25	1.00
TY50	1.00

FWPWM

The marsh creation area receives an additional 132 acres of maintenance annually. Based on Standard Civil Works assumptions full access is given at TY5 however, with annual maintenance full credit is never attained.

All Areas		
TY0	1.00	
TY1	0	
TY3	0	
TY5	0.38	(~260 acres of credit/685 acres built)
TY6	0.48	(~390 acres of credit/817 acres built)
TY25	0.87	(~2890 acres of credit/3325 acres built)
TY50	0.94	(~6200 acres of credit/6625 acres built)

Literature Cited

Pahl, James, Barb Kleiss, and Gary Brown 2015. Proposal for Addressing Relative Sea Level Rise in the LCA Mississippi River Hydrodynamic and Delta Management Feasibility Study. Figure 2 developed by Britsch. Pg 5.

Morton, R.A. and Bernier, J.C., 2010. Recent subsidence-rate reductions in the Mississippi Delta and their geological implications. Journal of Coastal Research, 26(3), 555–561. West Palm Beach (Florida), ISSN 0749-0208.

Shinkle, K.D. and R.K. Dokka. 2004. Rate of Vertical Displacement at Benchmarks in the Lower Mississippi Valley and the Northern Gulf Coast. NOAA TECHNICAL REPORT NOS/NGS 50.

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO ATTENTION OF

Regional Planning and Environment Division South
Environmental Planning Branch

Appendix A-9. Draft 404 Public Notice

PUBLIC NOTICE

Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana Project, Phase III

DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (EIS-15)

Introduction. This Public Notice is issued in accordance with provisions of Title 33 CFR Parts 336.1(b)(1) and 337.1, which establish policy, practices, and procedures to be followed concerning federal actions involving the disposal of dredged or fill material into waters of the United States.

This notice addresses project-related impacts to waters of the United States for the next phase of construction in deepening the Mississippi River Ship Channel to a depth of 50 feet (Mean Lower Low Water, i.e., MLLW) in the lower Mississippi from river mile 10 Above Head of Passes to river mile 22 below head of passes, and to deepen the three crossings, (Richbend, Belmont, and Fairview) located within the Port of South Louisiana to a depth of 50 feet at the low water reference plane.

The 30-day public review of this notice will run concurrently with the review period for the associated Supplemental Environmental Impact Assessment #15-1 that addresses…

Project Authority. A feasibility report entitled “Deep-Draft Access to the Ports of New Orleans and Baton Rouge, Louisiana” was prepared in 1981 recommending deepening the Mississippi River navigation channel to a 55 ft depth from Baton Rouge to the Gulf of Mexico. The final Chief’s Report for the project was signed in 1983. The project was authorized for construction by the 1985 Supplemental Appropriations Act, and the Water Resources and Development Act of 1986 (PL 99-662) and the Water Resource Reform and Development Act of 2014 (H.R. 3080) provided additional authorization by formalizing the cost-sharing provisions of the project for both construction and operations.

During the pre-construction planning, a construction sequence was developed that would implement the authorized project in three construction phases, to obtain the fully authorized project. Construction of Phase I was completed in December of 1987 and

provided a depth of 45 ft from Donaldsonville, LA (River Mile 181.0) to the Gulf of Mexico. Construction of Phase II was completed in December 1994 and involved deepening of the MRSC to a depth of 45 ft between Donaldsonville, LA (River Mile 181.0) to Baton Rouge and included dredging eight river crossings to an equivalent depth.

Phase III, which has not been constructed as of publication of this report, was originally defined as deepening of the MRSC from the Gulf to Baton Rouge from a depth of 45 ft to a depth of 55 ft.

To proceed with the evaluation of alternatives for the next phase of construction, this study was initiated with the issuance of Federal funds to initiate a GRR, following execution of the Feasibility and Cost Sharing Agreement (FCSA), signed on the 2nd of April 2015.

Location. Construction activities would occur at three crossings in the vicinity of the Port of South Louisiana, in St. James and St. Charles Parishes. Construction would also occur in the lower river and Southwest Pass in Plaquemines Parishes Parish, Louisiana **(Figures 1-3)**.

Project Description. This plan would deepen portions of the Mississippi River (RM 22 BHP to RM 60 AHP) including deepening and maintaining 3 river crossings (Rich Bend (Mile 160-155), Belmont (Mile 156-151), Fairview (Mile 117-111)) from 45 feet to 50 feet. This would also include deepening and maintain the lower river (RM 13.4 AHP to RM 22 BHP) to the Gulf of Mexico (via Southwest Pass) from 48 feet to 50 feet**.**

Material dredged during construction (sand/silt/clay loam) at the 3 crossings would occur via dustpan, hopper dredges, and occasionally cutterhead would total approximately 616,600 cubic yards, and would be placed in areas adjacent and downstream, as is current maintenance practice. The material dredged during construction of the lower river would be via cutterhead dredge, would total 19,900,000 cubic yards, and would be placed in open water habitat to create approximately 1462.5 acres of coastal marsh habitat.

Material dredged by hopper and dustpan dredges (sand/silt/clay loam) during the O&M of the 3 crossings would total approximately 5,087,000 cubic yards and would be placed in areas adjacent and downstream, as is current practice. In emergency situations cutterhead dredges may also be utilized for crossings. Maintenance of the lower river/Southwest Pass is not anticipated to increase from current practice and would include a combination of cutterhead, hopper and dustpan dredges. Approximately 38 percent of the suitable/available material dredged in the lower river/Southwest Pass under the O&M program (approximately 22,250,000 annually) will be used beneficially, equating to approximately 528 acres of intermediate marsh annually. It is anticipated the disposal

areas will naturally vegetate through colonization of species from adjacent vegetated areas, consistent with experience at other MVN beneficial use-disposal areas in the Mississippi River Delta. The remainder of the material will be disposed of in the Hopper Dredge Disposal Area at the Head of Pass or in the Ocean Dredge Material Disposal Site west of the Bar Channel (RM 19-22 BHP).

Placement sites are expected to become vegetated by colonization from adjacent vegetated areas, consistent with experience at other MVN beneficial use-disposal areas in the Mississippi River Delta.

Flotation access dredging may be required to allow construction equipment and pipeline to reach discharge sites within the disposal area. Flotation access channel material would be placed on adjacent shallow open water bottom to a maximum initial height of about +4.5 feet MLG or be used to backfill the flotation access channels when disposal operations have been completed. Flotation access channels would be limited to a maximum bottom width of about 80 feet and a maximum depth of about -8.0 feet MLG.

Access corridors across existing marsh and upland areas e may be required to allow construction equipment and pipeline to reach discharge sites within the disposal area. Adverse impacts to areas of existing emergent marsh would be avoided to the maximum extent practicable. Such access corridors would be limited to a maximum width of about 150 feet. These access corridors may be backfilled with dredged material to a maximum elevation of about 3 feet above existing, adjacent marsh upon completion of dredging and disposal activities to restore these degraded corridors to pre-project marsh elevations. Access to the site would be via previously-cleared (i.e., NEPA-cleared) disposal areas.

Discharge of dredged material into the proposed disposal area would be performed by a hydraulic dredge. Excavation and discharge of flotation access channel material, of access corridor material would be performed by a mechanical dredge.

Status of Draft Supplemental Environmental Impact Statement (SEIS) and Other Environmental Documents. Environmental compliance for the proposed action would be achieved upon: coordination of the Draft SEIS 15-1 with appropriate agencies, organizations, and individuals for their review and comments; public review of the Section 404(b)(1) Public Notice; signing of the Section 404(b)(1) Evaluation; receipt and acceptance or resolution of all U.S. Fish and Wildlife Service Fish and Wildlife Coordination Act recommendations; Louisiana Department of Natural Resources concurrence with the determination that the proposed action is consistent with the Louisiana Coastal Zone program, and that there are no direct or indirect impacts to resources within the coastal zone; and receipt and acceptance or resolution of all Louisiana Department of Environmental Quality comments on the air and water quality impact analysis documented in the SEA. The Record of Decision will not

be signed until the proposed action achieves environmental compliance with applicable laws and regulations, as described above.

Coordination. The following is a partial list of agencies to which a copy of this notice is being sent: U.S. Environmental Protection Agency, Region VI

U.S. Fish and Wildlife Service
National Marine Fisheries Service
U.S. Coast Guard, Eighth District
Louisiana Department of Environmental Quality
Louisiana Department of Natural Resources
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Transportation and Development
Louisiana State Historic Preservation Officer

This notice is being distributed to these and other appropriate Congressional, Federal, Tribal, state, and local interests, environmental organizations, and other interested parties.

Evaluation Factors. Evaluation includes application of the Section 404(b)(1) guidelines promulgated by the Administrator of the USEPA, through 40 CFR 230.

Public Involvement. Interested parties may express their views on the disposal of material associated with the proposed action or suggest modifications. All comments postmarked on or before the expiration of the comment period for this notice will be considered. Any person who has an interest that may be affected by deposition of excavated or dredged material may request a public hearing. The request must be submitted in writing to the District Engineer within the comment period of this notice and must clearly set forth the interest that may be affected and the manner in which the interest may be affected by the proposed action. You are requested to communicate the information contained in this notice to any parties who may have an interest in the proposed action. For further information regarding the proposed action, please contact Mr. Steve Roberts at (504) 862-2517; FAX number (504) 862-1892 and E-mail address steve.w.roberts@usace.army.mil.

Sandra Stiles
Acting Chief, Environmental Planning

Branch

COMMENT PERIOD FOR THIS PUBLIC NOTICE EXPIRES: _____

Figure 1.

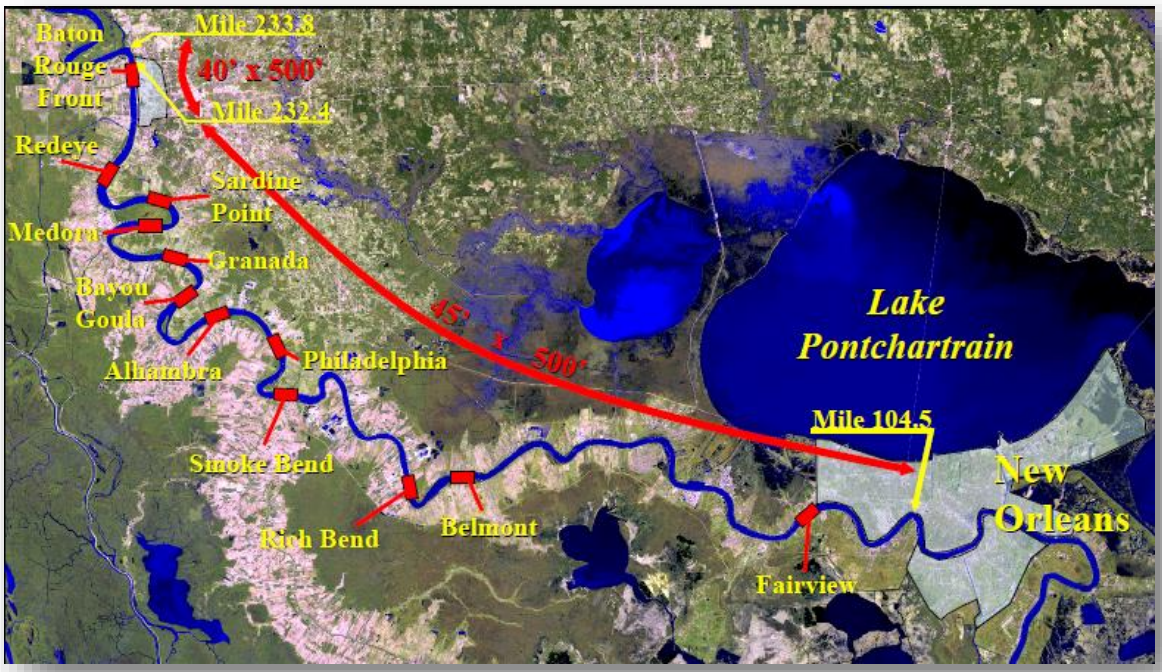

Baton Rouge Front
Mile 233.8
40' x 500'
Mile 232.4
Redeye
Sardine Point
Medora
Granada
Bayou Gould
Alhambra
Philadelphia
45' x 500'
Lake Pontchartrain
Mile 104.5
New Orleans
Smoke Bend
Rich Bend
Belmont
Fairview

Figure 2.

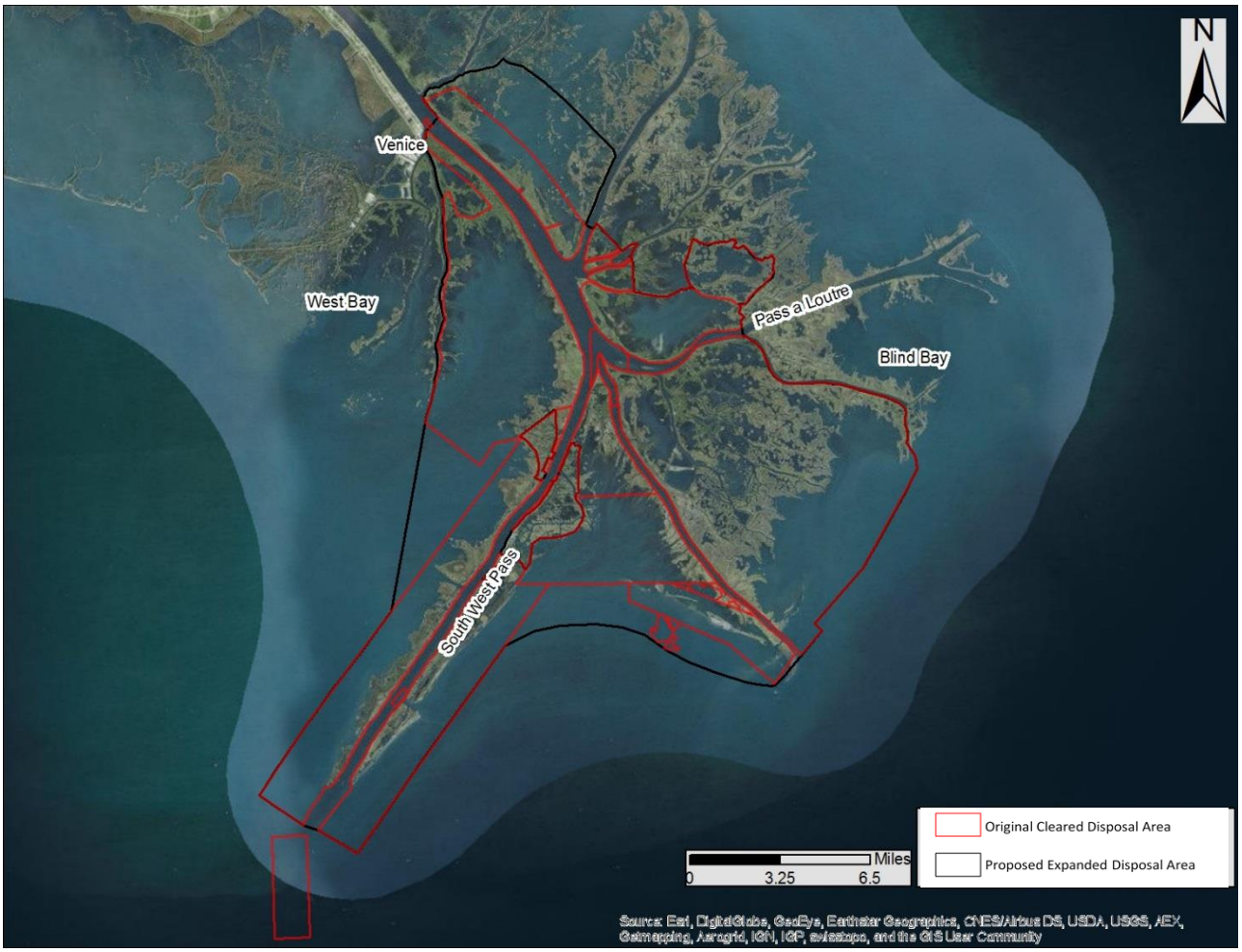


Figure 3 Disposal area long term plan

Appendix A-10. Draft 404(b)(1) evaluation.

SECTION 404(b)(1) EVALUATION

The following short form 404(b)(1) evaluation follows the format designed by the Office of the Chief of Engineers. As a measure to avoid unnecessary paperwork and to streamline regulation procedures while fulfilling the spirit and intent of environmental statutes, the New Orleans District is using this format for all proposed project elements requiring 404 evaluation, but involving no significant adverse impacts.

PROJECT TITLE. Supplemental EIS 15-1 "Mississippi River Ship Channel, Gulf to Baton Rouge, Louisiana Project, Phase III."

PROJECT DESCRIPTION.

The proposed action would require construction and maintenance of three river crossings to 50 ft (LWRP) and the lower river (RM 13.4 AHP – RM 22 BHP) to a depth of 50 feet (MLLW). Construction and O&M quantities for the proposed work are exhibited in Table 4-1. Construction activities would occur at three crossings in the vicinity of the Port of South Louisiana, in St. James and St. Charles Parishes. Construction would also occur in the lower river and Southwest Pass in Plaquemines Parishes Parish, Louisiana

	Crossings Construction	**Lower River Construction**	**Annual O&M Crossings**	**Annual O&M Lower River**	**Acres created**
Proposed action	616,600	19,900,000	5,087,000	0	1462.5

Table 1.

Depending on need and availability, both construction and Operations and maintenance activities would utilize dustpan, hopper and cutterhead dredges to maintain the crossings and the lower river under. It is anticipated that construction and maintenance would occur across 3 crossings specifically Rich Bend crossing (Mile 160-155), Belmont crossing (Mile 156-151), and Fairview crossing (Mile 117-111). Material dredged during both construction and maintenance of crossings would be placed immediately downstream, (via agitation dredging from dustpan, direct deposit from hoppers, or pumping via cutterhead), in areas greater than 50 ft MLLW. Deepening this subset of crossings would allow for deep draft access up to the Port of South Louisiana.

Construction of the lower river would occur at various shoals from RM 13.4 AHP to RM 19 BHP with cutterhead dredges over 4 years and that material would be used beneficially. It is anticipated that construction from RM 13.4 to RM 19 BHPB would result in 1462.5 acres of fresh marsh habitat over the 4-year construction period. It is also anticipated that construction of the bar channel would occur at shoals from RM 19 BHP to RM 22 BHPB with hopper

dredges utilizing the Ocean Dredge Material Disposal Site (ODMDS) over 4 years. One dimensional sedimentation modeling concludes that shoaling in the lower river are not anticipated to increase as a result of deepening from 48 ft to 50 ft (Appendix C of the associated SEIS). As such, maintenance of the lower river is not anticipated to increase.

During the early stages of alternative development, a need for additional beneficial use capacity for construction and O&M over 50 years was anticipated. As such, the previously cleared beneficial use disposal areas (142,858 acres) were expanded by 24,054 acres to 166,911 acres at early stages of alternative development (Figure 4-1) for Alternative 3. An ancillary benefit of the additional capacity would also allow for beneficial use in some future circumstances (vs. open water disposal) under the federal standard.

The proposed actions consist of measures to minimize the adverse effects of storm water erosion and thus require no separate measures or controls for compliance with CWA Section 402(p) and LAC 33:IX.2341.B.14.j.

1. Review of Compliance (∋230.10 (a)-(d)).	Preliminary[1]		Final[2]	
A review of this project indicates that:				
a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and information gathered for environmental assessment alternative);	YES	NO*	YES	NO
b. The activity does not appear to: (1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act; (2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and (3) violate requirements of any Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies);	YES	NO*	YES	NO
c. The activity will not cause or contribute to significant degradation of waters of the United States including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, esthetic, and economic values (if no, see section 2);	YES	NO*	YES	NO
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5).	YES	NO*	YES	NO

2. Technical Evaluation Factors (Subparts C-F).

	N/A	Not Significant	Significant*
a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C).			
(1) Substrate impacts.			x
(2) Suspended particulates/turbidity impacts.		x	
(3) Water column impacts.		x	
(4) Alteration of current patterns and water circulation.			x
(5) Alteration of normal water fluctuations/ hydro period.		x	
(6) Alteration of salinity gradients.			x
b. Biological Characteristics of the Aquatic Ecosystem (Subpart D).			
(1) Effect on threatened/endangered species		x	
(2) Effect on the aquatic food web.		x	
(3) Effect on other wildlife (mammals, birds, reptiles, and amphibians).		x	
c. Special Aquatic Sites (Subpart E).			
(1) Sanctuaries and refuges.		x	
(2) Wetlands.		x	
(3) Mud flats.	x		
(4) Vegetated shallows.		x	
(5) Coral reefs.	x		
(6) Riffle and pool complexes.	x		
d. Human Use Characteristics (Subpart F).			
(1) Effects on municipal and private water supplies.		x	
(2) Recreational and commercial fisheries impacts.		x	
(3) Effects on water-related recreation.		x	
(4) Esthetic impacts.		x	
(5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves.		x	

Remarks. Where a check is placed under the significant category, preparer has attached explanation.

2.a.(1), (4), and (6). This action is not expected to contribute to the toxicity of benthic organisms in the beneficial use disposal area. The project will convert open water to fresh marsh habitat. The conversion will change water circulation, depth, and current patterns along with benthic communities by converting shallow open water to intermediate marsh. This alteration is intended to create/replace marsh that has degraded over time is not expected to negatively impact the area. The creation of fresh marsh using dredged material is expected to alter the substrate elevation, which would result in changes in water circulation and current pattern. As a result, changes in: location, structure, and dynamics of aquatic communities; substrate erosion and deposition rates; the deposition of suspended particulates; and the rate and extent of mixing of dissolved and suspended components of the water body are expected. These alterations are desired, and are considered to be beneficial effects of wetland restoration. At this time, 3D hydraulic (salinity) modeling is ongoing. However, Since the construction of Phase I, the frequency of construction of the sill has not changes. The frequency of enacting the sill is still on a 10 yr. basis. Further, impacts to salinity below the sill by deepening to a depth of 50 ft (MLLW) is expected to be less than dredging to the authorized depth of 55 ft. Further, compromising drinking water supplies by deepening the river from 48.5 (MLLW) to 50 ft (MLLW) is not anticipated due to prior success with the saltwater sill mitigation feature. Only upon confirmation of such findings by the results of the 3D model, this document and the Record of Decision will be signed.

3. Evaluation of Dredged or Fill Material (Subpart G).[3]

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material.

(1) Physical characteristics	x
(2) Hydrography in relation to known or anticipated sources of contaminants	x
(3) Results from previous testing of the material or similar material in the vicinity of the project	
(4) Known, significant sources of persistent pesticides from land runoff or percolation	
(5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances	x
(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources	x
(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	
(8) Other sources (specify)	x

Remarks: Dredge slurry was collected directly from the discharge lines of dustpan dredges performing maintenance on 11 Deep Draft Crossings during Fiscal Year 2016. The solid and liquid fractions of the slurry were analyzed individually for the presence of EPA priority pollutants including metals, pesticides, PCBs, and semi-volatile organic compounds. Metals were common to both fractions, and were detected at or below background levels in the Mississippi River. Chlordane pesticides and hydrocarbon exhaust products were detected infrequently in the solid samples, but at levels generally at or below 1 part per billion. All contaminant detects in dredge slurry were below regulatory water quality criteria and ecological screening values, and dredging of the crossings is not expected to have a negative impact on human health or the environment. Other sources included conversations and email communications from USACE staff members from 9/29/2016 to 11/11/2016, including Joseph Musso, Jeff Corbino, and Danny Wiegand.

Appropriate references:

1. Environmental Regulatory Code, Part IX. Water Quality Regulation, Louisiana Department of Environmental Quality, 1994, 3rrd Edition.

2. State of Louisiana Water Quality Management Plan, Volume 5, Part B – Water Quality Inventory, Louisiana Department of Environmental Quality, Office of Water Resources, 1994.

3. Louisiana DEQ, Chapter 11 Surface Water Quality Standards, May 2007: http://www.deq.louisiana.gov/portal/LinkClick.aspx?link=planning%2fregs%2ftitle33%2f33v09.pdf&tabid=1674

4. Louisiana Department of Environmental Quality. 2015. *2014 Louisiana Water Quality Inventory: Integrated Report*. http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityStandardsAssessment/WaterQualityInventorySection305b/2014IntegratedReport.aspx. Last accessed on August 7, 2015

5. NOAA, Screening Quick Reference Tables, November 2006: http://response.restoration.noaa.gov/

6. US Coast Guard, National Response Center: www.nrc.uscg.mil/index.htm

7. US EPA, CERCLIS Database of Hazardous Waste Sites: www.epa.gov/superfund/sites/cursites/index.htm

8. US EPA, EnviroMapper StoreFront: http://www.epa.gov/enviro/html/em/index.html

9. US EPA, National Recommended Water Quality Criteria, 2006: http://epa.gov/waterscience/criteria/wqcriteria.html

10. US EPA, Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material,

3. Evaluation of Dredged or Fill Material (Subpart G).[3]

July 2004: http://www.epa.gov/owow/wetlands/pdf/40cfrPart230.pdf

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or the material meets the testing exclusion criteria.

YES	NO

4. Disposal (Fill) Site Delineation (ə230.11(f)).

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

(1) Depth of water at disposal site	x
(2) Current velocity, direction, and variability at disposal site	x
(3) Degree of turbulence	x
(4) Water column stratification	x
(5) Discharge vessel speed and direction	x
(6) Rate of discharge	x
(7) Dredged material characteristics (constituents, amount, and type of material, settling velocities)	x
(8) Number of discharges per unit of time	x
(9) Other factors affecting rates and patterns of mixing (specify)	

Appropriate references:

Same as 3(a)

b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable.

YES	NO*

5. Actions to Minimize Adverse Effects (Subpart H).

All appropriate and practicable steps have been taken, through application of the recommendations of ∋230.70-230.77 to ensure minimal adverse effects of the proposed discharge.

YES NO*

Actions taken: All material will be placed in a manner conducive to wetlands creation or will be placed in a manner so as not to cause unnecessary suspension of sediments (gapping of spoil banks and disposal of gap material would occur by bucketed equipment). Available data shows material not to be a carrier of contaminants.

6. Factual Determination (∋230.11).

A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term (adverse) environmental effects of the proposed discharge as related to:

a. Physical substrate at the disposal site (review sections 2a, 3, 4, and 5 above).	YES	NO*
b. Water circulation, fluctuation and salinity (review sections 2a, 3, 4, and 5).	YES	NO*
c. Suspended particulates/turbidity (review sections 2a, 3, 4, and 5)	YES	NO*
d. Contaminant availability (review sections 2a, 3, and 4).	YES	NO*
e. Aquatic ecosystem structure and function (review sections 2b and c, 3, and 5).	YES	NO*
f. Disposal site (review sections 2, 4, and 5).	YES	NO*
g. Cumulative impact on the aquatic ecosystem.	YES	NO*
h. Secondary impacts on the aquatic ecosystem.	YES	NO*

*A negative, significant, or unknown response indicates that the proposed project may not be in compliance with the Section 404(b)(1) Guidelines.

[1]Negative responses to three or more of the compliance criteria at this stage indicates that the proposed project may not be evaluated using this "short form procedure". Care should be used in assessing pertinent portions of the technical information of items 2a-d, before completing the final review of compliance.

[2]Negative responses to one of the compliance criteria at this stage indicates that the proposed project does not comply with the guidelines. If the economics of navigation and anchorage of Section 404(b)(2) are to be evaluated in the decision-making process, the "short form" evaluation process is inappropriate.

[3]If the dredged or fill material cannot be excluded from individual testing, the "short form" evaluation process is inappropriate.

7. Evaluation Responsibility.

Evaluation prepared by: Steve Roberts, Environmental Manager

Position: Senior Biologist

Date: 11/21/2016

8. Findings.

a. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines X

b. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines with the inclusion of the following conditions ..... _____

c. The proposed disposal site for discharge of dredged or fill material does not comply with the Section 404(b)(1) guidelines for the following reason(s):

(1) There is a less damaging practicable alternative ..... _____
(2) The proposed discharge will result in significant degradation of the aquatic ecosystem ..... _____
(3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem ..... _____

_____
Date

_____
Sandra Stiles
Acting Chief, Environmental Planning Branch

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

(33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires October 1996

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States, the discharge of dredged of fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: Information provided on this form will be used in evaluating the application or a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	***2. FIELD OFFICE CODE***	***3. DATE RECEIVED***	***4. DATE APPLICATION COMPLETED***

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	*8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)*
US Army Corps of Engineers, New Orleans District	Same as Applicant
6. APPLICANT'S ADDRESS	***9. AGENT'S ADDRESS***
Regional Planning and Environment Division South; Env Compliance Branch CEMVN-PDC-CEC P.O. Box 60267 New Orleans, LA 70160-0267 ATTN:	*Same as Applicant*
7. APPLICANT'S PHONE NOS. W/AREA CODE	*10. AGENT'S PHONE NOS. W/AREA CODE*
a. Residence ***b. Business*** (504) 862-2517	*a. Residence* *b. Business Same as Applicant*

11. STATEMENT OF AUTHORIZATION

_____

APPLICANT'S SIGNATURE *DATE*

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

Mississippi River Ship Channel, Gulf to Baton Rouge, LA, Phase III. This is a request to amend WQC 840504-09.

13. NAME OF WATERBODY, IF KNOWN (if applicable)	*14. PROJECT STREET ADDRESS (if applicable)*
Mississippi River, from Baton Rouge to the Gulf of Mexico via Southwest Pass	*N/A*
15. LOCATION OF PROJECT *COUNTY* *STATE* St. James,, St. Charles, and Plaquemines Parishes	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN, (see instructions)

17. DIRECTIONS TO THE SITE

Mississippi River from River Mile 160, Above Head of Passes (AHP), to RM 22, Below Head of Passes (BHP), via the Southwest Pass and Bar Channel

18. NATURE OF ACTIVITY (Description of project, include all features.)

This plan would deepen portions of the Mississippi River (RM 22 BHP to RM 60 AHP) in St. James,, St. Charles, and Plaquemines Parishes. This would include deepening and maintaining 3 river crossings (Rich Bend (Mile 160-155), Belmont (Mile 156-151), Fairview (Mile 117-111)) from 45 feet to 50 feet . This would also include deepening and maintain the lower river (RM 13.4 AHP to RM 22 BHP) to the Gulf of Mexico (via Southwest Pass).

19. PROJECT PURPOSE (Describe the reason or purpose of the project, (see instruction.)
The purpose of the proposed action is to improve the navigational capacity of the Mississippi River and reduce transportation costs within the ship channel.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. REASON(S) FOR DISCHARGE
Improvements to navigational capacity of the Mississippi River.

21. TYPE(S) OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS.

Material dredged during construction (sand/silt/clay loam) at the 3 crossings would occur via dustpan, cutterhead,and hopper dredges, would total approximately 616,600 cubic yards, and would be placed in areas adjacent and downstream, as is current maintenance practice. The material dredged during construction of the lower river would be via cutterhead dredge, would total 19,900,000 cubic yards, and would be placed in open water habitat to create approximately 1462.5 acres of coastal marsh habitat.

Material dredged by hopper, dustpan, and cutterhead (sand/silt/clay loam) during O&M of the 3 crossings would total approximately 5,087,000 cubic yards and would be placed in areas adjacent and downstream, as is current practice. In emergency situations cutterhead dredges may also be utilized for crossings. Maintenance of the lower river/Southwest Pass could occur with dustpan, cutterhead and hopper dredges and is not anticipated to increase from current practice. Approximately 38 percent of the suitable/available material dredged in the lower river/Southwest Pass under the O&M program (approximately 22,250,000 annually) will be used beneficially, equating to approximately 528 acres of intermediate marsh annually. The remainder of the material will be disposed of in the Hopper Dredge Disposal Area at the Head of Pass or in the Ocean Dredge Material Disposal Site west of the Bar Channel (RM 19-22 BHP).

22. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED (see instructions)
Material dredged from the crossings will be released downstream in open water. Approximately 1462.5 acres of water bottoms would be utilized to create coastal marsh habitat during construction. Approximately 528 acres of water bottoms would be utilized to create coastal marsh habitat during annual O&M, as is current practice, with 38 percent of the material dredged in the lower river. The remaining 62 percent of material will be placed in designated open water disposal areas.

23. IS ANY PORTION OF THE WORK ALREADY COMPLETE? Yes _____ No _X____ IF YES, DESCRIBE THE COMPLETED WORK

24. ADDRESSES OF ADJOINING PROPERTY OWNERS, LESSEES, ETC., WHOSE PROPERTY ADJOINS THE WATERBODY (If more than can be entered here, please attach a supplemental list.)
Crossings occur within the open water of the Mississippi River and within the flood protection levees. See attached for landowners in the vicinity of the beneficial use plan.

25. LIST OF OTHER CERTIFICATIONS OR APPROVALS/DENIALS RECEIVED FROM OTHER FEDERAL, STATE OR LOCAL AGENCIES FOR WORK DESCRIBED IN THIS APPLICATION.

AGENCY	*TYPE APPROVAL*	*IDENTIFICATION NO.*	*DATE APPLIED*	*DATE APPROVED*	*DATE DENIED*
USFWS	*ESA Sec 7*	*N/A*	*pending*		
LDNR	*CZ Consistency Determination*	*N/A*	*pending*		
SHPO	*106/NHPA*	*N/A*	*pending*		

To the best of my knowledge the proposed activity described in my permit application complies with and will be conducted in a manner that is consistent with the LA Coastal management Program.
**Would include but is not restricted to zoning, building and flood plain permits.*

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

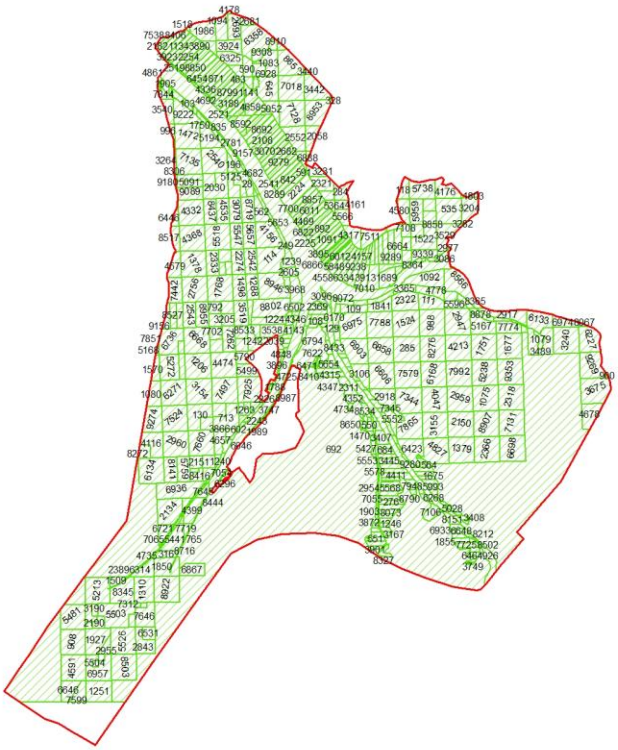
_____ _____ _____ _____
SIGNATURE OF APPLICANT *DATE* *SIGNATURE OF AGENT* *DATE*

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency The United States knowingly and willfully falsifies, conceals, or covers up

by any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than five years, or both.

**U.S. :1994-520-478/82018*



GRANTEE_NA	TRACT_ID
Eugene De Armas et al	8406
Grand Prairie Levee District	1134
Grand Prairie Levee District	3923
Grand Prairie Levee District	2519
U.S.A.	8910
Grand Prairie Levee District	3924
Grand Prairie Levee District	2254
Eugene De Armas et al	1053
Grand Prairie Levee District	2846
Grand Prairie Levee District	2693
Eugene De Armas et al	1094
Eugene De Armas et al	1986
Eugene DeArmas et al	1518
Eugene DeArmas et al	5256
Eugene De Armas et al	8850
Grand Prairie Levee District	3890
Grand Prairie Levee District	2681
Grand Prairie Levee District	5322
Grand Prairie Levee District	7538
Eugene De Armas et al	2182
Grand Prairie Levee District	7537

Grand Prairie Levee District	3431
Eugene De Armas et al	1202
Grand Prairie Levee District	4692
Louisiana Fruit Co.	7844
Grand Prairie Levee District	2280
Mark Delesdernier	9157
Steve DAsaro	8582
Mark Delesdernier et al	2109
Mark Delesdernier et al	2847
Mark Delesdernier et al	2782
Emma Bego	3244
U.S.A.	4290
Buras Levee Dist.	2540
Louisiana Fruit Co.	7135
Cattle Farms Inc.	3264
U.S.A.	9279
Buras Levee Dist.	196
U.S.A.	2682
U.S.A.	3231
U.S.A.	6888
U.S.A.	4091
U.S.A.	2541
U.S.A.	8289
Mark Delesdernier et al	1926
U.S.A.	842
U.S.A.	591
Buras Levee Dist.	28
Buras Levee Dist.	4682
Kate W. Duff et al	5125
Kate W. Duff et al	2030
K.W. Duff et al Int. Wm. A. Wenck Int.	1882
Barbara Leavy undiv.	8306
Kate W. Duff et al	9180
Paul Delesderneir etal	1739
U.S.A.	2224
U.S.A.	284
U.S.A.	2321
Jas. G. Timolat	9355
U.S.A.	1803
U.S.A.	5738
U.S.A.	4176
Cattle Farms Inc.	9089
Buras Levee Dist.	8532
U.S.A.	8516
U.S.A.	7700
U.S.A.	4767
U.S.A.	8857

Mark Deledernier	562
Buras Levee Dist.	8719
J.F. Keeland	3079
Hilda O. Erwin et al	4535
Cattle Farms Inc. J.S. Abercrombie et al	8437
Cattle Farms Inc.	4332
Cattle Farms Inc.	6446
Ira L. Delesdernier et al	6011
Ira L. Delesdernier et al	7899
U.S.A.	8782
U.S.A.	115
Herbert Behrend et al John Behrend	5959
J.G. Timolat	2747
U.S.A.	3204
U.S.A.	535
U.S.A.	4489
U.S.A.	5364
Mark Delesdernier et al	5653
Jas. G. Timolat Est.	5566
U.S.A.	6822
U.S.A.	8972
U.S.A.	892
Delesdernier Est. Inc.	2225
Geo. Delesdernier et al	4156
Buras Levee Dist.	5657
J.F. Keeland	5547
Buras Levee Dist.	4368
Cattle Farms Inc.	8517
Delesdernier Est. Inc.	1091
U.S.A.	6132
Delesdernier Est. Inc.	3895
U.S.A.	4317
J.G. Timolat Est.	7511
Mark Delesdernier et al	249
John Behrend	7108
U.S.A.	1522
U.S.A.	3529
U.S.A.	3282
U.S.A.	8789
U.S.A.	6664
U.S.A.	9289
U.S.A.	7278
Anna Buckingham	5297
Delesdernier Est. Inc.	8877
Delesdernier Est. Inc.	9359
Delesdernier Est. Inc.	6866
Delesdernier Est. Inc.	3755

J.G. Timolat et al	3773
Cemetery	8553
C.W. Wright	4122
U.S.A.	2299
U.S.A.	5831
Paul Delesdernier et al	1260
Delta Development Co Inc	2977
U.S.A.	5517
Geo. Kain et al Patenter	4581
Delesdernier Est. Inc.	6012
Buras Levee Dist.	114
Buras Levee Dist.	2542
Delesdernier Est. Inc.	6334
J.F. Keeland	2274
K.W. Duff et al	8307
J.E. Duff et al	2333
Cattle Farms Inc.	1378
Cattle Farms Inc.	4579
Delesdernier Est. Inc.	4558
U.S.A.	9238
Delesdernier Est. Inc.	4157
J.G. Timolat et al	8364
U.S.A.	9339
School Land	3086
U.S.A.	3230
Thaddeus Wenthworth Wright et al	1239
J.F. Keeland	238
Barbara Leavy Int.	1125
Steve DAsaro	113
Steve DAsaro	5502
U.S.A.	7010
Steve DAsaro	3913
Mark Delesdernier et al	8526
Emerson P. Loga et al	2605
Steve DAsaro	5073
Steve DAsaro	1689
Geo. Delesdernier et al	8946
Buras Levee Dist.	1288
J.F. Keelan	1498
Cattle Farms Inc.	1768
Cattle Farms Inc.	2756
Kate W. Duff et al	5518
Mark Delesdernier	8566
U.S.A.	1092
Lloyd N. Whyte	3968
Eunice L. Le Blanc	8275
Unknown	3096

U.S.A.	3365
U.S.A.	6720
U.S.A.	4778
U.S.A.	9310
U.S.A.	2322
U.S.A.	111
U.S.A.	8365
Geo. Delesdernier et al	8802
J. Isabelle Mc Caughan	8469
Buras Levee Dist.	2572
Cattle Farms Inc.	3260
Buras Levee Dist.	792
Buras Levee Dist.	8955
Robt. White Hrs.	2543
Mark Deledernier etal	1841
Buras Levee Dist.	8527
Mark Deledernier etal	8072
Cattle Farms Inc.	9156
Dr. M.F. Bonzano Hrs.	1696
U.S.A.	3827
J. Isabelle Mc Coughan	6502
State	5596
U.S.A.	5074
U.S.A.	1123
U.S.A.	109
U.S.A.	8067
U.S.A.	6974
State	2369
U.S.A.	2917
Buras Levee Dist.	3205
Cattle Farms Inc.	4015
Jas. Eads Hrs	2978
U.S.A. Geo. Delesdernier et al	1110
J.S. Abercrombie et al	5396
State	988
State	2947
State	1524
U.S.A.	8878
State	7788
State	6975
U.S.A.	6170
U.S.A.	1988
State	5167
Jas. Eads Hrs	9352
U.S.A.	4346
Geo. T. Armstrong & H. Howcott et al	1224
U.S.A.	108

Chas. F. Lafeaux	2219
Geo. T. Armstrong H. Howcott et al	3538
Buras Levee Dist.	3434
Buras Levee Dist.	1242
J.G. Timolet et al	8533
Cattle Farms Inc.	7262
Kate W. Duff et al Int.	7702
U.S.A.	129
Cattle Farms Inc.	6736
Also Claimed by Ed Duff USA	4143
Kate W. Duff et al	7851
U.S.A.	6151
Lenmark Lands Inc.	2744
State	7774
U.S.A.	4467
U.S.A.	6794
U.S.A.	8995
U.S.A.	6000
U.S.A.	563
U.S.A.	7428
U.S.A.	5212
U.S.A.	9127
U.S.A.	6227
U.S.A.	3240
U.S.A.	3489
Geo. T. Armstrong Gladys Monrose et al	2039
Cattle Farms Inc.	3033
Buras Levee Dist.	2077
Buras Levee Dist.	1370
Cattle Farms Inc.	7442
U.S.A.	6133
Buras Levee Dist.	5168
U.S.A.	3661
State	1751
State	1677
State	8276
State	4213
State	285
State	6858
State	6903
Charles F. Lateour	7848
J.G. Timolet Jr. et al	8326
U.S.A.	8433
U.S.A.	610
U.S.A.	6167
U.S.A.	7775
Geo. Delesdernier et al	9194

Geo. T. Armstrong Gladys Monrose et al	5397
Buras Levee Dist.	5790
J.G. Timolat Jr. et al	4474
Buras Levee Dist.	1206
Buras Levee Dist.	4828
Kate W. Duff et al	5272
J.G. Timolat Jr. et al	1570
Mrs. C. Rutledge	1866
Geo. T. Armstrong	4848
U.S.A.	5355
U.S.A.	7622
A. Dunbar	3715
U.S.A.	8135
Geo. T. Armstrong	3896
Geo. Delesdernier et al	7388
Balsin Materne etal	7592
U.S.A.	6153
Balsin Materne et al Patentee	1262
U.S.A.	900
U.S.A.	9269
Cattle Farms Inc.	5499
U.S.A.	8410
U.S.A.	6471
State	9353
State	7992
State	5238
State	7579
State	6168
State	6606
U.S.A.	9148
State	3106
Dr. H. L. Ballowe	4725
U.S.A.	5838
U.S.A.	5654
Wallace T. Armstrong	1788
U.S.A.	4315
Cattle Farms Inc. J.S. Abercrombie et al	6329
Buras Levee Dist.	7925
J.G. Timolat Jr. et al	7497
U.S.A.	1079
Buras Levee Dist.	3154
Buras Levee Dist.	6271
Buras Levee Dist.	1080
U.S.A.	4347
U.S.A.	5655
School Land	8649
Unknown	127

U.S.A.	2311
U.S.A.	3675
Howard Collette Est.	7343
Unknown	4830
State	4047
State	2959
State	2918
State	7344
State	1075
State	3107
U.S.A.	7571
Steve D. Asaro	8987
U.S.A.	4352
Cattle Farms Inc.	713
H.J. Harvey Cattle Farms Inc	1263
Kate W. Duff et al Int.	5191
Buras Levee Dist.	2226
Buras Levee Dist.	1459
J.G. Timolat Jr. et al	130
J.G. Timolat Jr. et al	7524
Geo T. Armstrong etal	2243
U.S.A.	4726
Josiah Marshall N. Paten	6633
U.S.A.	4734
U.S.A.	8534
Unknown	3747
U.S.A.	7345
Lorotta OBrien	8773
State	5552
U.S.A.	128
U.S.A.	4678
Cattle Farms Inc.	3866
Buras Levee Dist.	3131
U.S.A.	5342
Lorotta OBrien	1989
State	7865
State	3155
State	2150
State	7131
State	8907
U.S.A.	550
H. Howland E.A. & A.P. Cheron Int.	4523
U.S.A.	8650
U.S.A.	1990
U.S.A.	8923
Buras Levee Dist.	602
H.J. Harvey Cattle Farms Inc	4657

H.J. Harvey Cattle Farms Inc	7660
Cattle Farms Inc.	2960
Buras Levee Dist.	4116
Loretta OBrien	5163
U.S.A.	1470
Arthur H. Simonin	3407
Emile Collette	6046
U.S.A.	743
U.S.A.	6896
Kate W. Duff etal	8272
State	4827
State	1379
U.S.A.	8519
State	6423
State	2366
U.S.A.	5427
U.S.A.	8359
U.S.A.	7850
U.S.A.	684
Buras Levee Dist.	1942
Calif Harvey	1240
Kate W. Duff et al Int. W.A. Wenck	2151
U.S.A.	5923
H.J. Harvey Cattle Farms Inc	5759
Buras Levee Dist.	6134
U.S.A.	5553
U.S.A.	1298
U.S.A.	3614
U.S.A.	1977
U.S.A.	6855
U.S.A.	830
U.S.A.	2040
Henry Lawrence	3642
U.S.A.	603
Buras Levee Dist.	7054
H.J. Harvey Cattle Farms Inc	8416
U.S.A.	564
U.S.A.	5578
Unknown	5428
Unknown	7721
U.S.A.	1675
U.S.A.	9280
U.S.A.	5527
U.S.A.	4411
U.S.A.	2718
Unknown	6296
Wm. Alsey High Patentee	8205

Plaquemines Oil & Dev Co	6936
Hazel Jones et al	7645
U.S.A.	7816
U.S.A.	2462
U.S.A.	5079
Plaquemines Oil & Dev Co	774
U.S.A.	7948
U.S.A.	7825
U.S.A.	1471
U.S.A.	5993
U.S.A.	9073
U.S.A.	1309
U.S.A.	8206
A. Galbrance et al	5162
U.S.A.	6228
U.S.A.	5701
U.S.A.	2954
U.S.A.	4663
U.S.A.	5568
U.S.A.	1992
U.S.A.	6268
U.S.A.	5080
U.S.A.	7055
U.S.A.	4399
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Plaquemines Oil & Dev Co	2134
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U.S.A.	276
Jeremiah Weatherly et al Patentee	6135
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U.S.A.	8073
Joseph P. Sendkar et al	7507
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U.S.A.	691
Caroline Brenan Patentee	619
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Mary Louise Brenan Patentee	765
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U.S.A.	7933
U.S.A.	7146
Jos. P. Sendker et al	7231
U.S.A.	4400
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Gladys Swietzer et al	8716
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U.S.A.	8212
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U.S.A.	7725
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Steve D Asaro	1740
U.S.A.	5618
U.S.A.	5751
Chas. Krenlon etal	4964
Steve D Asaro	7311

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U.S.A.	3749
Jos. P. Sendker Jos. Lombard Pat.	3303
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Delta Development Co	1509
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Government Entity	692
Grand Prairie Levee District	9308
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U.S.A.	3440
Eugene De Armas et al	1331
Alma Hingle et al	4859
Grand Prairie Levee District	5083
U.S.A.	590
Grand Prairie Levee District	6454

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Eugene De Armas et al	4336
Alma Hingle et al	6111
A.S. Abercrombie	3510
George W. Delesdernier et al	1905
James G. Timolet	2295
James G. Timolet	645
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U.S.A.	3442
Mark Deleedennrer	8777
James G. Timolet	1294
James G. Timolet	1619
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La. Fruit Co.	3684
Eugene De Armas et al	8799
Grand Prairie Levee District	2995
Jas. Timolat Jr. et al	4114
Eugene De Armas et al	3188
Eugene DeArmas et al	4766
Mark Delesdernier et al	5607
James G. Timolet	8800
Willis C. Mc Donald et al	6621
Grand Prairie Levee District	1302
Eugene DeArmas et al	7424
Grand Prairie Levee District	1720
Grand Prairie Levee District	2284
J. Geiser et al	4793
Grand Prairie Levee District	7926
New Orleans Female Dominican Academy	6312
Dan Moriarty Est.	5572
Grand Prairie Levee District	7637
U.S.A.	4826
Steve DAsara	1119
Grand Prairie Levee District	6387
Eugene De Armas et al	2521
School	711
Grand Prairie Levee District	5580
Mark Delesdernier	2740
Louisiana Fruit Co.	9222
Louisiana Fruit Co.	3540
Alma A. Hingle et al	4658
Mark Delesdernier et al	6131
James G. Timolat	5052
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U.S.A.	6445
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U.S.A.	8953

Frank Wagner	163
Ruth Dauterive	8731
Grand Prairie Levee District	5991
Alma A. Hingle et al	806
James G. Timolet	6928
Grand Prairie Levee District	8046
Grand Prairie Levee District	871
U.S.A.	463
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New Orleans Female Dominican Academy	2781
Graham C. Pembroke et al	5244
Narcisse Guedry Pat.	5545
Graham C. Pembroke et al	1750
Grand Prairie Levee District	1894
Mark Delesdernier et al	3512
Grand Prairie Levee District	8592
Mark Delesdernier et al	8692
State	3161
Mark Delesdernier et al	2108
Mathias Strickert	835
Buras Levee Dist.	5194
Louisiana Fruit Co.	1472
Louisiana Fruit Co.	996
Eugene De Armar	3070
Abnigo Adams et al Patentee	5581
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U.S.A.	118
U.S.A.	4161
J.G. Timolat Est.	4580
Rhoda M. Meier Miner John Behrend	8858
U.S.A.	5848
U.S.A.	6321
J.F. keeland	3519
K.W. Duff et al	4345
Lenmark Lands Inc.	6927
U.S.A.	8343
J.G. Timolet Jr. et al	6668
U.S.A.	7824
Cattle Farms Inc.	3241
State	2318
Nelson W. Hill Pat.	2624

Buras Levee Dist.	9274
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State	6698
Geo. Armstrong	3748
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Edith Kranebell	1939
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U.S.A.	168
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Grand Prairie Levee District	9223
Jean B. Planche Jr. Patentee	7438
U.S.A.	2058

Figure 1.

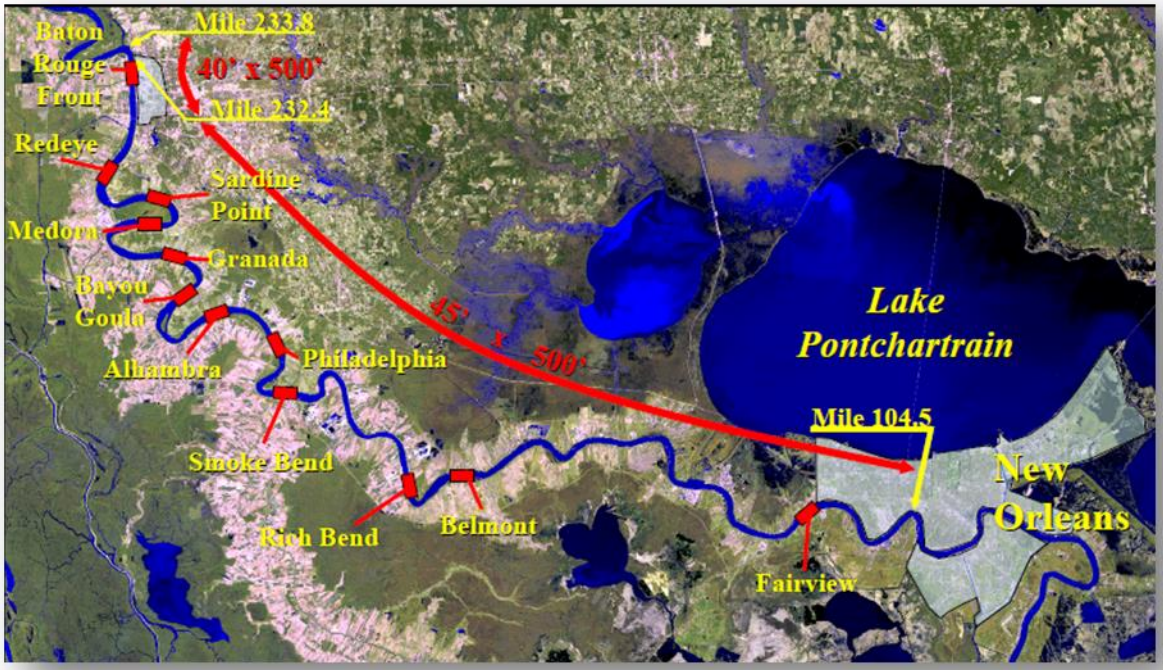


Figure 2.

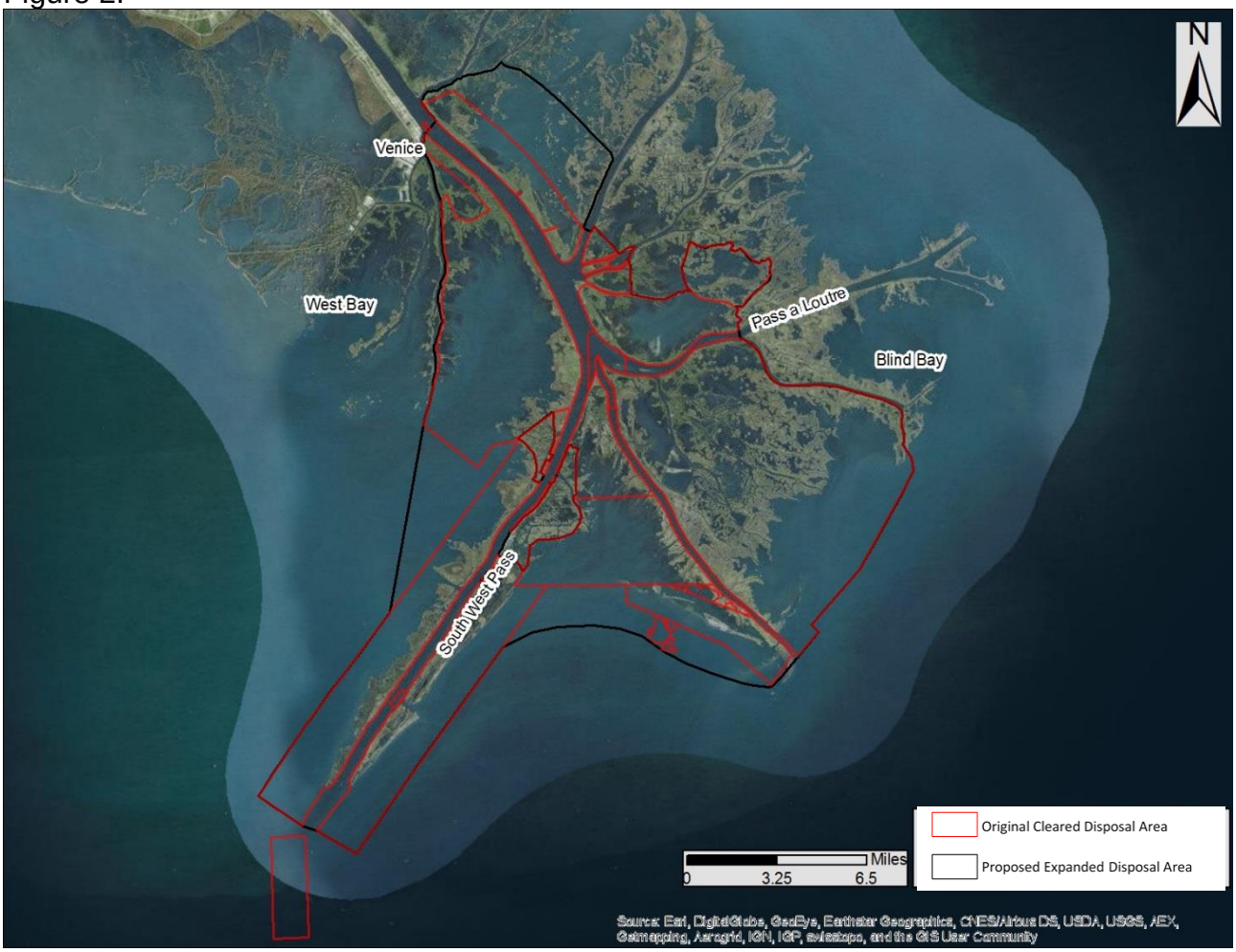


Figure 3. Disposal area long term plan

Appendix A-12. Best Management Practices

Best Management Practices and Avoidance Procedures

MIGRATORY BIRD TREATY ACT and
BALD AND GOLDEN EAGLE PROTECTION ACT
BEST MANAGEMENT PRACTICES

Colonial nesting wading birds (including but not limited to, herons, egrets, and Ibis), seabirds/water-birds (including, but not limited to terns, gulls, Black Skimmers, and Brown Pelicans) and bald eagles are known to roost, forage, and nest in the project area. The birds and their nests are protected by the Migratory Bird Treaty Act (MBTA) and must not be disturbed or destroyed. As such, in areas near known rookeries, nesting prevention measures may be necessary in order to insure the success of the nesting season. These measures would be developed by the U.S. Army Corps of Engineers New Orleans District (CEMVN) in coordination with the U.S. Fish and Wildlife Service (USFWS) and Louisiana Department of Wildlife and Fisheries (LDWF) and would be implemented by a trained biologist. The nesting activity period extends from 15 February through 1 September for colonial nesting wading and seabirds/water birds, and September to May for bald eagles. Therefore, the nesting prevention measures should begin well before February.

CEMVN and USFWS biologists will conduct surveys prior to construction to determine the presence and/or location of any eagle's nests, colonial nesting wading/water birds and/or rookeries and if nesting prevention measures would be necessary. Nest prevention measures shall be intended to deter birds from nesting within applicable the designated buffer zone of construction areas without physically harming birds or disturbing any existing nests. Nest prevention measures may be used in combination and/or adjusted to be most effective. At minimum, nest prevention measures shall include, but not be limited to the following:

- Flagging/Streamers
- Vehicular/Pedestrian Traffic
- Clapping and Yelling
- Horn Blowing

Once work has commenced, the presence of nesting eagles, wading birds and/or seabirds/water-birds within the minimum distances from the work area, as specified in paragraph entitled "No Work Distances", shall be immediately reported to the Environmental Technical Manager, Ms. Tammy Gilmore, of the U.S. Army Corps of Engineers at (504) 862-1002 email address tammy.h.gilmore@usace.army.mil

No Work Distances

No-work distance restrictions are as follows:

o Terns, Gulls, and Black Skimmers -1,300 feet;
o Colonial nesting wading birds -1,000 feet;
o Brown Pelicans -2,000 feet; and,
o Bald Eagles -660 feet.

Coordination by CEMVN personnel with the USFWS may result in a reduction or relaxing of these no-work distances depending on the species of birds found nesting at the work site and specific site conditions.

MANATEE PROTECTION MEASURES COORDINATED WITH USFWS:

All contract personnel associated with the project would be informed of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel would be responsible for observing water-related activities for the presence of manatees. Temporary signs would be posted prior to and during all construction/dredging activities to remind personnel to be observant for manatees during active construction/dredging operations or within vessel movement zones (i.e., the work area), and at least one sign would be placed where it is visible to the vessel operator. Siltation barriers, if used, would be made of material in which manatees could not become entangled and would be properly secured and monitored. If a manatee

is sighted within 100 yards of the active work zone, special operating conditions would be implemented, including: moving equipment would not operate within 50 ft of a manatee; all vessels would operate at no wake/idle speeds within 100 yards of the work area; and siltation barriers, if used, would be re-secured and monitored. Once the manatee has left the 100-yard buffer zone around the work area of its own accord, special operating conditions would no longer be necessary, but careful observations would be resumed. Any manatee sighting would be immediately reported to the USFWS (337/291-3100) and the LDWF, Natural Heritage Program (225/765-2821).

SEA TURTLE PROTECTION MEASURES

1. Hopper dredging is being conducted under the "Gulf of Mexico Regional Biological Opinion" (RBO) which can be viewed at the following link: http://el.erdc.usace.army.mil/seaturtles/refs-bo.cfm.

It should be noted that incidental takes of sea turtle and gulf sturgeon are authorized on a Fiscal Year (FY) (October 1 – September 30) basis to be metered out by the Division Commander, South Atlantic Division, U.S. Army Corps of Engineers for the southeastern United States for Federal, military, and permitted projects. If care is not taken, the take limits could be reached by any of these parties and hopper dredging would cease for the remainder of that FY. The Permittee understands and agrees that, even where it is in full compliance with the terms and conditions of the RBO, incidental take by the Permittee may require suspension of the permit by the Corps of Engineers. The amount of incidental take that will trigger suspension, and the need for any such suspensions, shall be determined at the time in the sole discretion of the Corps of Engineers. The Permittee understands and agrees on behalf of itself, its agents, contractors, and other representatives, that no claim, legal action in equity or for damages, adjustment, or other entitlement against the Corps of Engineers shall arise as a result of such suspension or related action.

2. Prior to the commencement of hopper dredging, and throughout the dredging operations, a Corps of Engineers-approved Inspector shall inspect specific sea turtle protection requirements. The list of inspections the Inspector will perform is identified on a sea turtle inspection checklist entitled "USACE Sea Turtle Inspection Checklist for Hopper Dredges" that can be found at the following link: http://el.erdc.usace.army.mil/seaturtles/index.cfm. All identified deficiencies shall be corrected prior to the commencement of hopper dredging activities. An inspection shall also be performed following each sea turtle incidental take. Results of inspections shall be provided to Mr. Edward Creef (Edward.D.Creef@usace.army.mil) as soon as they are completed.

3. No dredging shall be performed by a hopper dredge without the inclusion of a rigid sea turtle deflector device. The Permittee shall electronically submit drawings showing the proposed device and its attachment to Mr. Edward Creef at Edward.D.Creef@usace.army.mil. Mr. Creef can be contacted by phone at (504) 862-2521. These drawings shall include the approach angle for any and all depths to be dredged during the dredging. A copy of the approved drawings and calculations shall be available on the vessel during the dredging. No dredging work shall be allowed to commence until approval of the turtle deflector device has been granted by the New Orleans District U.S. Army Corps of Engineers. Sample turtle deflector design details may be viewed at the web site indicated in condition number 1.

The leading v-shaped portion of the deflector shall have an included angle of less than 90 degrees. Internal reinforcement shall be installed in the deflector to prevent structural failure of the device. The leading edge of the deflector shall be designed to have a plowing effect of at least 6" depth when the draghead is being operated. Appropriate instrumentation or indicator shall be used and kept in proper calibration to ensure the critical "approach angle" (Information only note: The design "approach angle" or the angle of lower draghead pipe relative to the average sediment plane is very important to the proper operation of the deflector. If the lower draghead pipe angle in actual dredging conditions varies tremendously from the design angle of approach used in the development of the deflector, the 6" plowing effect does not occur. Therefore, every effort should be made to insure this design "approach angle" is maintained with the lower drag pipe.).

If adjustable depth deflectors are installed, they shall be rigidly attached to the draghead using either a hinged aft attachment point or an aft trunnion attachment point in association with an adjustable pin front attachment point or cable front attachment point with a stop set to obtain the 6" plowing effect. This arrangement allows fine-tuning the 6" plowing effect for varying depths. After the deflector is properly adjusted there shall be NO openings between the deflector and draghead that are more than 4" X 4".

4. The Permittee shall install baskets or screening over the hopper inflow(s) with no greater than 4" X 4" openings. The method selected shall depend on the construction of the dredge used and shall be approved by the Corps of Engineers-approved Inspector prior to commencement of dredging. The screening shall provide 100% screening of the hopper inflow(s). The screens and/or baskets shall remain in place throughout the performance of the work. The turtle deflector device and inflow screens shall be maintained in operational condition for the entire dredging operation.

5. When initiating dredging, suction through the dragheads shall be allowed just long enough to prime the pumps, and then the dragheads must be placed firmly on the bottom. When lifting the dragheads from the bottom, suction through the dragheads shall be allowed just long enough to clear the lines, and then must cease. Pumping water through the dragheads shall cease while maneuvering or during travel to / from the disposal area (Information Only Note: optimal suction pipe densities and velocities occur when the deflector is operated properly. If the required dredging section includes compacted fine sands or stiff clays, a properly configured arrangement of teeth may enhance dredge efficiency, which reduces total dredging hours, and potential for "turtle takes". The operation of a draghead with teeth must be monitored for each dredged section to insure that excessive material is not forced into the suction line. When excess high-density material enters the suction line, suction velocities drop to extremely low levels causing conditions for plugging of the suction pipe. Dredge operators should configure and operate their equipment to eliminate all low-level suction velocities. Pipe plugging in the past was easily corrected, when low suction velocities occurred, by raising the draghead off the bottom until the suction velocities increased to an appropriate level. Pipe plugging cannot be corrected by raising the draghead off the bottom. Arrangements of teeth and / or the reconfiguration of teeth should be made during the dredging process to optimize suction velocities.

6. Raising the draghead off the bottom to increase suction velocities is not acceptable. The primary adjustment for providing additional mixing water to the suction line should be through water ports. To insure suction velocities do not drop below appropriate levels, production meters shall be monitored throughout the job and adjustments primarily made to the number and opening sizes of water ports. Water port openings on top of the draghead or on raised standpipes above the draghead shall be screened before they are utilized on the dredging project. If a dredge section includes sandy shoals on one end of a tract line and mud sediments on the other end of the tract line, the equipment shall be adjusted to eliminate draghead pick-ups to clear the suction line.

7. During turning operations, the pumps must either be shut off or reduced in speed to the point where no suction velocity or vacuum exists. These operational procedures are intended to stress the importance of balancing the suction pipe densities and velocities in order to keep from taking sea turtles.

8. All hopper dredges shall be equipped with the National Dredging Quality Management Program (DQM) system, formerly known as Silent Inspector, for hopper dredge monitoring. The DQM system must have been certified by the Engineer Research and Development Center (ERDC) within the last year. Questions regarding certification should be addressed to the DQM support team at 877-840-8024. The DQM is an automated dredge monitoring system comprised of both hardware and software developed by the U.S. Army Corps of Engineers (Corps). The Corps developed the DQM as a low cost, repeatable, impartial system for automated dredge monitoring. The DQM consists of three major components: The Dredge Specific System (DSS), the Ship Server, and the Shore Server. The DSS collects and displays various dredge sensor data for the dredge crew to monitor dredge progress and quality control. The other major task of the DSS is to send data to the Ship Server. Most dredging contractors already have a computer system and sensors onboard for control or positioning that can be used as the DSS. The dredging contractor supplies and owns the DSS and all associated

sensors. The Ship Server acts as the dredged-based data archive and report creation center by storing the data from the DSS and performing automated review of the data. The Ship Server can produce many different reports including dredge location history, volume history, and an operational status. Additional information about DQM can be found at: http://dqm.usace.army.mil/. The data collected by the DQM system shall, upon request, be made available to the Operations Division Technical Support Branch of the New Orleans District U.S. Army Corps of Engineers.

All hopper dredge(s) shall be equipped with recording devices for each draghead that capture real time draghead elevation, slurry density, and at least two of the following: Pump(s) slurry velocity measured at the output side, pump(s) vacuum, and / or pump(s) RPM. The Permittee shall record continuous real time positioning of the dredge, by plot or electronic means, during the entire dredging cycle including dredging area and disposal area. Dredge location accuracy shall meet the requirements of the latest version of EM 1110-1-1003. A copy of the EM can be downloaded from the following website: http://www.hnd.usace.army.mil/techinfo/engpubs.htm.The recording system shall be capable of capturing data at variable intervals but with a frequency of not less than every 60 seconds. All data shall be time correlated to a 24-hour clock and the recording system shall include a method of daily evaluation of the data collected. This data shall be made available at the request of the New Orleans District U.S. Army Corps of Engineers.

The practice of dropping an empty dredge bucket can be taken as a precaution during construction to avoid impacts to sea turtles. A bucket (or similar equipment) will be dropped into the water and retrieved empty one time. After the bucket has been dropped and retrieved, a one-minute no work period must be observed. During this no work period, personnel would carefully observe the work area in an effort to visually detect listed species. If listed species are sighted, no bucket dredging would be initiated until the listed species have left the work area. If the water turbidity makes such visual sighting impossible, work would proceed after the one-minute no work period has elapsed. If more than fifteen minutes elapses with no work, then the empty bucket drop/retrieval process would be performed again prior to work commencing.

9. **Dredging operations shall cease immediately upon the first incidental take, and thereafter as directed by the Corps, until the District Engineer, or his designee, notifies the Permittee to resume dredging.** The Permittee shall immediately notify Mr. Edward Creef by phone (504-862-2521) and e-mail (Edward.D.Creef@usace.army.mil) that an incidental take has occurred. The Sea Turtle Mortality Report, available on the web site indicated in condition number 1, will be filled out by the National Marine Fisheries (NMFS)-Approved Protected Species Observer immediately (within 6 hours) and sent to Edward Creef electronically at the e-mail address listed above.

10. During dredging operations, NMFS-Approved Protected Species Observers shall be aboard to monitor for the presence of sea turtles, sturgeon, and whales. Observer coverage shall be 100% (24 hr/day) and shall be conducted year round. During transit to and from the disposal area, the Observer shall monitor from the bridge during daylight hours for the presence of endangered species. During dredging operations, while dragheads are submerged, the Observer shall continuously monitor the inflow and / or outflow screening for turtles and / or turtle parts. Upon completion of each load cycle, dragheads should be monitored as the draghead is lifted from the sea surface and is placed on the saddle in order to assure that sea turtles that may be impinged within the draghead are not lost and unaccounted for. Observers shall physically inspect dragheads and inflow and overflow screening / boxes for threatened and endangered species takes.

11. Monitoring Reports: The results of the monitoring shall be recorded on the appropriate observation sheets. There is a sheet for each load, a daily summary sheet, and a weekly summary sheet. In addition, there will be a post dredging summary sheet. Observation sheets will be completed regardless of whether any takes of sturgeon, whales, or sea turtles occur. In the event of any sea turtle or sturgeon takes by the dredge, appropriate incident reporting forms shall be completed. Additionally, all specimens shall be photographed with a digital camera. These photographs shall be attached to the respective reports for documentation. Dredging of subsequent loads shall not commence until all appropriate reports are completed from the previous dredging load to ensure completeness and thoroughness of documentation associated with the incidental take. Reports

shall be submitted to the Corps within 24-hours of the take. Copies of the form shall be legible. Observer forms may be accessed on the web site indicated in condition number 1.

a. NMFS-Approved Protected Species Observers: A list of protected species observer-biologists that have been NMFS-approved to monitor threatened / endangered species takes by hopper dredges can be obtained by contacting NOAA Fisheries Northeast Region, Protected Resources Division. The main contact is Ms, Julie Crocker; she can be reached at Julie.Crocker@noaa.gov or 978-281-9300 ext. 6530. A current list of NMFS-Approved Protected Species Observer companies is provided at the end of this document.

b. The Contractor shall provide a digital camera, with an image resolution capability of at least 300 dpi, in order to photographically report incidental takes, without regard to species, during dredging operations. Immediately following the incidental take of any threatened or endangered species, images shall be provided via e-mail, CD, or DVD to Mr. Edward Creef electronically at Edward.D.Creef@usace.army.mil in a .JPG or .TIF format and shall accompany incidental take forms. The nature of findings shall be fully described in the incidental take forms including references to photographs.

12. Manatee, Sea Turtle, and Whale Sighting Reports.

Any take concerning a manatee, sea turtle, sturgeon, or whale; or sightings of any injured or incapacitated manatees, sea turtles, or whales shall be reported immediately to the Corps Regulatory Section Chief, Martin Mayer electronically at martin.s.mayer@usace.army.mil, and to Mr. Edward Creef electronically at Edward.D.Creef@usace.army.mil.

13. Disposition of Sea Turtles or Turtle Parts

a. Turtle taken by hopper dredge

(1) Dead turtles – upon removal of sea turtle and / or parts from the draghead or screening, Observers shall take photographs as to sufficiently document major characteristics of the turtle or turtle parts including but not limited to dorsal, ventral, anterior, and posterior views. For all photographs taken, a backdrop shall be prepared to document the dredge name, observer company name, contract title, time, date, species, load number, location of dredging, and specific location taken (draghead, screening, etc.). Carcass / turtle parts shall also be scanned for flipper and Passive Integrated Transponder (PIT) tags. Any identified tags shall be recorded on the "Sea Turtle Incidental Take Form" that is included in the "Endangered Species Observer Program Forms" located on the web site indicated in condition number 1. Turtle parts which cannot be positively identified to species on board the dredge or barge(s) shall be preserved by the observer(s) for later identification. A tissue sample shall be collected from any lethally taken sea turtle and submitted under the process stated in the "Protocol for Collecting Tissue Samples from Turtles for Genetic Analysis" on the web site indicated in condition number 1. After all data collection is complete, the sea turtle / parts should be marked (spray paint works well), weighted down and disposed of in direction of the contracting officer.

(2) Live Turtles - Observer(s) shall measure, weigh, scan for PIT tags, tag (Inconel flipper and PIT tags - if PIT tag is not located during scan and only if observer is qualified to tag using PIT tags), and photograph any live turtle(s) incidentally taken by the dredge. Observer(s), or their authorized representative, shall coordinate with the contracting officer's representative and environmental branch staff to transport as soon as possible the live turtle(s) taken by the dredge to an approved rehabilitation facility such as the Aquarium of the Americas in New Orleans, Louisiana.

14. Relocation Trawling of Sea Turtles

Sea turtle relocation trawling efforts to aid in the prevention of sea turtle takes during dredging operations would be performed by the Permittee as deemed necessary. An initial sea turtle relocation trawling effort would be performed 2 to 3 days prior to the start of hopper dredging activities to determine if sea turtles are present at the dredging site. Based on the results of this trawling effort, the Permittee may be required to implement sea turtle relocation trawling either at the start of hopper dredging activities, or following the first sea turtle take by the hopper dredge. Captured sea turtles either would be relocated approximately 5 miles away from the dredging site, or, if injured, transported to the Aquarium of the Americas located in New Orleans, Louisiana. A NMFS-Approved Protected Species Observer shall supervise the relocation trawling efforts. If relocation trawling in Louisiana territorial waters occurs outside of the shrimping season, the approved sea turtle relocation trawling supervisor must possess a Scientific Collecting Permit from the Louisiana Department of Wildlife and Fisheries (point of contact is Ms. Karen Foote at 225-765-2384).

Trawling operations shall be performed in front of the working hopper dredge, with trawlers operating a safe distance from the hopper dredge. Trawling efforts shall be performed with and against the tidal flow at a speed not to exceed 3.5 knots using repetitive trawls in the dredging area with each trawling effort not to exceed 42 minutes duration.

Methods and equipment shall be standardized including data sheets, nets, trawling direction to tide, length of station, length of tow, and number of tows per station. Data on each tow shall be recorded using the Sea Turtle Trawling Report found at the website (http://el.erdc.usace.army.mil/seaturtles/docs/trawlingforms.pdf). The trawler shall be equipped with 60-foot nets constructed from 8-inch mesh (stretch) fitted with mud rollers and flats as specified in the Turtle Trawl Nets Specifications appended to the end of this Section. Paired net tows shall be made for 24 hours per day. The tows shall be performed in shifts, and the trawler shall be available for operation 24 hours a day. Positions at the beginning and end of each tow shall be determined from GPS Positioning equipment.

At least one crewmember who is a NMFS-Approved Protected Species Observer shall be on board the trawler during the trawl. The Observer shall be responsible for handling of captured sea turtles. Each captured turtle shall be identified, scanned for PIT tags, measured, tagged, tissue sampled and released, and data recorded on the Sea Turtle Tagging and Relocation Report, which can be found at the following website: (http://el.erdc.usace.army.mil/seaturtles/docs/taggingforms.pdf). Presence of PIT tags shall be scanned for by using a multi-frequency scanner capable of reading multiple frequencies (including 125-, 128-, 134-, and 400-kHz tags) and reading tags deeply embedded in muscle tissue. Turtle measurements shall be recorded and shall include, at a minimum, weight, straight-line length, straight-line width, and tail length. Turtles shall be tagged with NMFS #681 Inconel tags in each of the front flippers according to NMFS protocol. Aseptic conditions shall be maintained for tags and tag attachment. The Contractor shall be responsible for obtaining any and all permits related to trawling from the appropriate state and Federal agencies. All aspects of the trawling shall be coordinated with Mr. Edward Creef (504-862-2521).

Anyone handling sea turtles infected with fibropapilloma tumors shall either: 1) clean all equipment that comes in contact with the turtle with mild bleach solution between the processing of each turtle, or 2) maintain a separate set of sampling equipment for handling turtles displaying fibropapilloma tumors or lesions.

Water temperature measurements shall be taken at the water surface each day using a laboratory thermometer. Weather conditions shall be recorded from visual observations and instruments on the trawler. Weather conditions, air temperature, wind velocity and direction, sea state-wave height, and precipitation shall be recorded on the Sea Turtle Trawling Report. High and low tides shall be recorded.

a. Repair and Replacement of Damaged Trawl Nets

The Contractor, at the time of mobilization, shall provide trawl nets that meet the requirements specified in the Turtle Trawl Net Specifications at the end of this section. Tools, supplies and materials for repairing nets shall be kept aboard the trawler. In the event of damage to trawl nets, one hour will be allowed to either repair or replace them. The Contractor shall have at least one set of

replacement nets immediately available at all times, to insure that the dredging work is not adversely delayed due to trawler down-time for replacing damaged nets. It is recommended that a second set of replacement nets be available aboard the trawler.

b. Suspension of Dredging and Relocation Trawling
Should there be a tearing of nets, or breakdown of other equipment that would cause the trawler to leave the area where dredging is underway during any period of time where relocation trawling is required, the dredge may continue to operate for up to 48 hours, as long as no turtles are taken. Should there be dangerously high seas that would cause the trawler to leave the dredging area when relocation trawling is required the dredge may continue to operate, as long as no turtles are taken.

c. Turtle Excluder Devices
Approval for trawling for sea turtles without Turtle Excluder Devices (TEDs) must be obtained from NMFS (contact Eric Hawk at 727-551-5773). Any necessary State or Federal clearances for the capture and relocation of sea turtles must also be obtained. Approvals must be submitted to Mr. Edward Creef electronically at Edward.D.Creef@usace.army.mil prior to trawling.

d. Reporting
Immediately after completing each day of relocation trawling, if possible, the Contractor shall notify Mr. Edward Creef by telephone (504-862-2521) or email (Edward.D.Creef@usace.army.mil) conveying the results of the trawl. The results of each trawl shall be recorded on the Sea Turtle Trawling Report. The Sea Turtle Trawling Report also shall be furnished by the Contractor to Mr. Edward Creef within 24 hours after completing the relocation trawl. Following completion of the project, a copy of the Contractor's log regarding sea turtles shall be forwarded to Mr. Edward Creef within 10 working days.

15. Report Submission.

The Contractor shall maintain a log detailing all incidents, including sightings, collisions with, injuries, or killing of manatees, sea turtles, sturgeon, or whales occurring during the contract period. The data shall be recorded on forms provided at the web site indicated in condition number 1. All data in the original form shall be forwarded directly within 10 days of collection to Mr. Edward Creef at the address provided below. Following project completion, a report summarizing the above incidents and sightings shall be submitted to:

USACE - New Orleans District
Operations Division - Technical Support Branch
Attn Edward Creef
P.O. Box 60267
New Orleans, Louisiana, 70160-0267

Partial List of NMFS-Approved Protected Species Observer Companies

Dr. L. M. Ehrhart Dept. of Biological Science University of Central Florida P.O. Box 25000 Orlando, FL 32816 407-823-2970 Fax: 407-283-5769 lehrhart@pegasus.cc.ucf.edu	A.I.S. Inc. (P.O.C. Arv Poshkus) 19 Camden Street P.O. Box 421 Stoughton, MA 02072-0421 800-230-8032 Fax: 781-297-7669 ARVIDAS1@juno.com	Mary Jo Barkaszi ECOES, Inc. 7341 Glenwood Road Cocoa, FL 32927 321-635-8477 Fax: 321-635-8449 maryjo@ecoes.com www.ecoes.com

Jane Provancha Dynamac Corporation DYN-2 Kennedy Space Ctr., FL 32899 321-759-0935 Fax: 321-730-3455 jprovancha@dynamac.com	R. Eric Martin Ecological Associates, Inc. P.O. Box 405 Jensen Beach, FL 34958 772-334-3729 Fax: 772-334-4925 erikmartin@bellsouth.net	Roxanne Carter REMSA, Inc. * 124 W Queens Way Hampton, VA 23669 757-722-0113 ext. 25 Fax: 757-722-0638 roxy@remsameso.com
Christopher Slay, President ** Coastwise Consulting (Environmental Consultants - Land, Sea, Air) 173 Virginia Avenue Athens, GA 30601 706-543-6859 904-261-8518 Fax/Tel cslay@att.net	Richard Alboth Tiny's Marine Environmental Services 7 Rogers Street Randolph, MA 02368 781-963-6308 Cellular: 321-863-6561 tinysvc@aol.com	Andrea Balla-Holden, Marine & Marine Life Consulting 5988 SE Kelsey Court Port Orchard, WA 98367 360-769-5934: Office 360-769-4195: Fax MarineMarineLife@aol.com
Trish Bargo, ** East Coast Observers, Inc. P.O. Box 6192 Norfolk, VA 23508 757-227-5779 757-965-6766 Fax 757-880-7636 Cell tbargo@eastcoastobservers.com		Robert K. Metzger ** Relocation Trawling Biologist 1327 N. Wheaton Dr. St. Charles, MO 63301-0881 636-946-6464 Tel/Fax 314-265-4806: Cell metzgerr@swbell.net

* Contractors that also provide sea turtle trawling and relocation services.

Turtle Trawl Net Specifications

DESIGN: 4 Seam, 4 Legged, 2 Bridal Trawl Net

WEBBING: 4 inch bar, 8 inch stretch
Top – 36 Gauge Twisted Nylon Dipped
Side – 36 Gauge Twisted Nylon Dipped
Bottom – 84 Gauge Braided Nylon Dipped

NET LENGTH: 60 ft from cork line to cod end

BODY TAPER: 2 to 1

WING END HEIGHT: 6 feet

CENTER HEIGHT: Dependent on depth of trawl – 14 to 18 ft

COD END: Length 50 meshes x 4 in equals 16.7 ft
Webbing 2 in bar, 4 in stretch, 84 gauge braid nylon
Dipped, 80 meshes around, 40 rigged meshes with ¼ x 2 in choker rings, 1 each ½ x 4 in at end
Cod End Cover – none
Chaffing Gear – none

HEAD ROPE: 60 ft ½ in combination rope (braid nylon with stainless cable center)

FOOT ROPE: 65 ft ½ in combination rope

LEG LINE: Top – 6 ft, Bottom – 6 ft

FLOATS: Size – Tuna Floats (football style), Diameter – 7in;
Length – 9 in; number 12 each;
Spacing – center of top net 2 in apart

MUD ROLLERS: Size – 5 in Diameter, 5.5 in length
Number – 22 each; spacing – 3 ft attached with 3/8 in
Polypropylene rope (replaced with snap on roller when broken)

TICKLER CHAINS: NONE (Discontinued – but previously used ¼ in x 74 ft galvanized chain)

WEIGHT: 20 ft of ¼ in galvanized chain on each wing, 40 ft per net looped and tied

DOOR SIZE: 7 ft x 40 in (or 8 ft x 40 in); Shoe – 1 in
X 6 in: bridles – 3/8 in high test chain

CABLE LENGTH: (Bridle Length, Total): 7/16 in x 240-300 ft varies with bottom conditions

FLOAT BALL: NONE

LAZY LINES: 1 in nylon

PICKUP LINES: 3/8 in polypropylene

WHIP LINES: 1 in nylon

SEA TURTLE/GULF STURGEON OBSERVER SPECIFICATIONS

As a result of consultation under Section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers has agreed to report any sea turtle/gulf sturgeon activity to the National Marine Fisheries Service (NMFS). The points of contact (listed below) should be notified of any sightings, collisions with, injuries or killing of sea turtles/gulf sturgeons by telephone within 12 hours of the action. The notification should include the number and species of turtles (if known) impacted and the time the activity occurred.

New Orleans District, Operations Division,
Marine Management Section, Dredge Wheeler
Ms. Bethany Walker
(504) 862-2699 and fax (504) 862-1912
After hours number: 504-905-4573 (cell)

New Orleans District, Operations Division,
Operations Technical Support Branch,
Mr. Ed Creef
(504) 862-2521 and fax (504) 862-2317
After hours number: 504-818-0034 (home)

Observers will continuously monitor all of the hopper inflow and/or over-flow screens 24 hours per day during dredging mode, to detect turtles/sturgeons or turtle/sturgeon parts. Screen monitoring shall be conducted as required to effectively watch these screens, based on the design, configuration, and position thereof. The observers will be provided access and use of a facsimile and telephone 24 hours per day to insure, in the event of a take, the observers will be able to fulfill the requirements of the paragraph entitled "Sea Turtle/Gulf Sturgeon Reporting".

In addition to monitoring 24 hours per day during dredging mode, the observers will be responsible for assuring that:

1) temperatures in the waterway are taken, in degrees Fahrenheit, at the surface and at the mid-depth from the surface to the water bottom. The readings shall be made each eight hours for the duration of each dredging assignment. The waterway mileage and latitude/longitude shall be recorded corresponding to each temperature reading.

2) during transit of the dredge to/from the disposal site(s), after dredging has ceased, the screen observer shall assure that the hopper screens are cleaned of debris and correctly re-installed on the dredge for return to dredging mode. The observer shall report damage of the screens to the Dredge Wheeler representative immediately upon detection of such damage, and the screens shall be repaired or replaced before dredging is resumed.

3) complete turtle/sturgeon data reporting is made, as required in paragraph entitled "Sea Turtle/Gulf Sturgeon Reporting".

4) positively identified turtle/sturgeon parts are disposed of at the dredge material disposal site(s). Turtle/sturgeon parts which cannot be positively identified on board the dredge shall be color photographed by the observer(s) using instant developing film or a digital camera. The photos shall be attached to respective reports for documentation and later identification. Observer(s) shall measure, weigh, tag, and release any uninjured turtles incidentally taken by the dredge. Turtle/sturgeon handling and tagging methods shall be performed in accordance with NMFS-approved procedures. Injured turtles shall be transported to a rehabilitation facility, the Aquarium of the Americas at New Orleans, Louisiana. Observer(s) or their authorized representative shall provide NMFS-approved containers for turtle/sturgeon transport.

5) Sea Turtle/Gulf Sturgeon Reporting

The observers shall maintain a log detailing all incidents, including sightings, collisions with, injuries, or killing of sea turtles/sturgeons occurring during the contract period. The results of the monitoring shall be recorded on copies of the observation sheets attached, entitled "Endangered Species Observer Program" or similar forms. For each load, screen watch data shall be consolidated on a single sheet prior to beginning a new sheet for the next load. An observation sheet shall be completed for each load whether or not turtles are sighted in the waterway or turtle/sturgeon parts are detected on the screens. Dredging shall not commence until the consolidated report is completed from the previous dredging load. The observer(s) should notify the District points of contact (listed above) of any sightings, collisions with, injuries or killing of sea turtles by telephone and facsimile within 12 hours of the action. The notification should include the number and species of turtles impacted and the time the activity occurred. Upon completion of the dredging project, all consolidated and completed data reports shall be forwarded to the District points of contact (listed above).

The various endangered species observer program data forms are provided below.

ENDANGERED SPECIES OBSERVER PROGRAM

LOAD DATA FORM

USACE DISTRICT: _____

CONTRACT #: _____ **Maintenance**____**/New Work** _____ **PROJECT start date** _____

PROJECT NAME: _____ **DREDGE NAME:** _____

DREDGE FIRM: _____

LOAD #: _____ **LOAD start date:** _____ **Times (24hrs): Start** _____ **End** _____

Condition of screening : **Port**_____ **Starboard** _____ **Overflow** _____

Number of dragheads in use: _____ **Type of dragheads used:** _____**Size of dragheads:** _____

Draghead deflector? YES ____ **NO** ____ **Condition of deflector:** _____

Type of material dredged: _____

Weather conditions: _____

_____

Tidal stage (CIRCLE ONE): Slack Rising High Falling Low Unknown

Beaufort Sea States (Winds/Wave Height) (CIRCLE ONE)

0 = <1 knot/ 0 ft	**3** = 7-10 knot/ 2 ft	**6** = 22-27 knot/10 ft	**9** = 41-47 knot/23 ft	**12** = >63 knot/45
1 = 1- 3 knot/ 0.25 ft	**4** = 11-16 knot/ 4 ft	**7** = 28-33 knot/14 ft	**10** = 48-55 knot/29 ft	
2 = 4- 6 knot/ 0.5 ft	**5** = 17-21 knot/ 6 ft	**8** = 34-40 knot/18 ft	**11** = 56-63 knot/37 ft	

Waves: _____ **ft** **Wind (speed & direction):** _____

AIR TEMP: _____ **°C/° F** (°F = 9/5 (°C) + 32; °C = 5/9 (°F - 32))

WATER TEMP: Surface _____ **°C /° F** **Column (mid-depth)** _____ **°C /° F** **Bottom** _____ **°C /° F**

SCREEN TYPE

_____**Inflow screening:**	**None**	**25%**	**50%**	**75%**	**100%**	
_____**Overflow screening:**	**None**	**25%**	**50%**	**75%**	**100%**	
_____**Other screening:**	**None**	**25%**	**50%**	**75%**	**100%**	

PORT SCREEN CONTENTS: _____

_____

_____

STARBOARD SCREEN CONTENTS: _____

_____

_____

Estimate number entrained on this load for the following:

Sturgeon (any species) _____

Shark (any species) _____

Horseshoe crab _____

Blue crab _____

TURTLE OR TURTLE PARTS PRESENT THIS LOAD: YES _____ **NO** _____

SPECIES OF TURTLE TAKE: Unknown Loggerhead Green Kemp's ridley Hawksbill Leatherback

Comments: _____

_____

Number observers used/24hrs: _____ **% Monitoring/24 hrs: None 25% 50% 75% 100%**

Observer's name: _____ **Observer firm**_____

Observer signature _____

ENDANGERED SPECIES OBSERVER PROGRAM

DAILY REPORT

USACE DISTRICT: _____

PROJECT NAME: _____ **DREDGE NAME:** _____

Date: _____ **Load #s:** _____ **Areas dredge worked:** _____

Beaufort Sea State: 0 1 2 3 4 5 6 7 8 9 10 11 12

AIR TEMP: _____ °C/° F (°F = 9/5 (°C) + 32; °C = 5/9 (°F - 32))

WATER TEMP: Surface _____ °C /° F **Column (mid-depth)** _____ °C /° F **Bottom** _____ °C /° F

Condition of deflector:_____ **Condition of screening:** _____

Were there incidents involving endangered or protected species? YES ____ NO ____

Which species? (complete incident form(s))_____

Comments (type of material, biological specimens, unusual circumstances, etc): _____

BRIDGE WATCH SUMMARY

Time	Species	# Sightings/# Animals	Location/Comments
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	
		/	

Observer name _____

USACE Sea Turtle/Dredging Database – Post Hopper Dredging Project Checklist follows.

USACE Sea Turtle/Dredging Database
Post-Hopper Dredging Project Checklist

(1)_____PROJECT SUMMARY

District name_____ District POC _____
Contract # _____ Maintenance ___ New Work____ Federal ____Regulatory ____

Project name _____ Dates of project _____

Dredge name _____ Dredge firm _____ Dates worked _____
Dredge name _____ Dredge firm _____ Dates worked _____
Dredge name _____ Dredge firm _____ Dates worked _____
Dredge name _____ Dredge firm _____ Dates worked _____

For total project:
 # days dredged: _____ # hours dredged:_____ # loads dredged: _____Total CY dredged_____

For dredge vessel_____
 # days dredged: _____ # hours dredged:_____ # loads dredged: _____Total CY dredged_____
For dredge vessel_____
 # days dredged: _____ # hours dredged:_____ # loads dredged: _____Total CY dredged_____
For dredge vessel_____
 # days dredged: _____ # hours dredged:_____ # loads dredged: _____Total CY dredged_____
For dredge vessel_____
 # days dredged: _____ # hours dredged:_____ # loads dredged: _____Total CY dredged_____

General project description/Disposal method(s):_____
_____
_____

Type of material dredged: (circle) silt clay sand mud shell rock other
Type of draghead(s): _____ Silent inspector: YES _____ NO _____
Mitigation measures:
- **Dredging within designated environmental window YES _____ NO _____ N/A _____**
- **Draghead deflectors installed YES _____ NO _____ N/A _____**
- **Relocation trawling conducted YES _____ NO _____ N/A _____**
- **Pre-dredge assessment trawling conducted YES _____ NO _____ N/A _____**

Monitoring measures:
- **Screening type(s) : _____ % material screened: None 25% 50% 75% 100%**
- **# observers/24hrs: _____ % monitoring/24 hrs: None 25% 50% 75% 100%**

For total project:
 # Incidental sea turtle takes Loggerhead _____ Green _____ Kemp's ridley _____ Other _____ Unknown _____
 # Incidental sturgeon takes Shortnose _____ Gulf _____ Other _____ Unknown _____
Description of other endangered/sensitive species incidents: _____
_____

(2)_____ Dredge summary logs associated with dates of incidental takes

(3)_____ Endangered Species Observer Final Report(s)
(Each incidental take reported should include: Incidental Take Form, Load Data Form, Dredge Load Log, Copies of photos)

(4)_____ Relocation and/or assessment trawling Final Report(s)
(Report should include: total #/species of turtles relocated during project; total #/species of turtles relocated on date of dredging incidental take, total #/species of sturgeon collected.)

(5)_____ Reports/descriptions of other related research/studies being done during/related to project.

Endangered Species Observer Program – Sturgeon Incidental Take Data Form

ENDANGERED SPECIES OBSERVER PROGRAM

STURGEON INCIDENTAL TAKE DATA FORM

USACE DISTRICT: _____
PROJECT NAME: _____ **DREDGE NAME:** _____

DATE: _____ **Time sturgeon take recovered (24hr):** _____ **Sturgeon # for project:** _____

LOAD #: _____ **Times (24hrs): Start** _____ **End** _____ **Load start date** _____

SPECIES OF STURGEON TAKE: Shortnose _____ **Gulf** _____ **Other** _____ **Unknown** _____

Channel location of take: Latitude _____ **Longitude** _____
Other location / Channel description (e.g. buoy markers, landmarks): _____
_____

Location take recovered on dredge: _____

Number of dragheads in use at time of incident: _____ **Draghead deflector? YES** ____ **NO** ____
Condition of deflector: _____ **Condition of screening:** _____

Beaufort Sea State: 0 1 2 3 4 5 6 7 8 9 10 11 12

AIR TEMP: _____ **°C/° F** (°F = 9/5 (°C) + 32; °C = 5/9 (°F - 32))
WATER TEMP: Surface _____ **°C /° F Column (mid-depth)** _____ **°C /° F Bottom** _____ **°C /° F**

Condition of specimen: _____
_____
_____
0 = Alive; 1 = Fresh dead; 2 = Moderately decomposed; 3 = Severely decomposed; 4 = skeleton/old bone; 5 = undetermined

Measurements/description of specimen: _____
_____
_____

Genetic samples taken: YES ____ **NO** ____ **Photos taken: YES** ____ **NO** ____
Sample frozen/preserved: YES ____ **NO** ____
Final disposition of specimen: _____

Comments: _____
_____
_____
_____

Load data form attached: YES ____**NO** ____ **Dredge load log attached: YES** ____**NO** ____

Observer's name _____

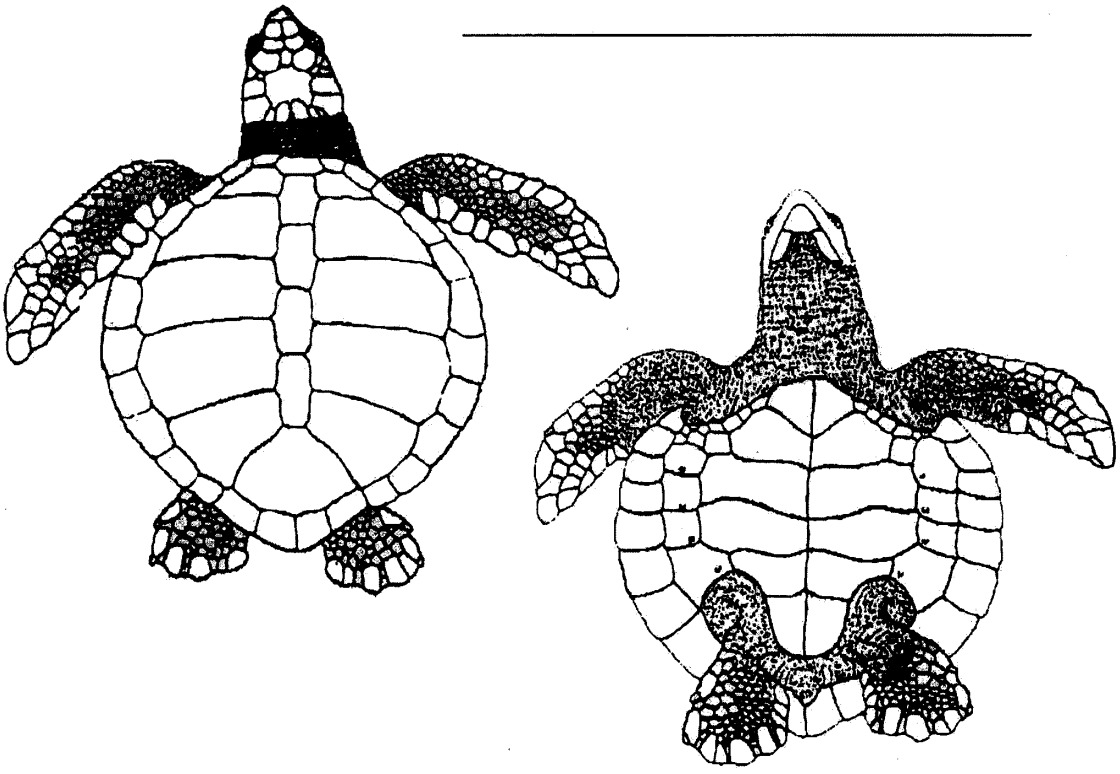
Use diagram below to illustrate specimen/part recovered:

Endangered Species Observer Program Sea Turtle Take Form - Kemp's Ridley follows

Kemp's Ridley (*Lepidochelys kempii)*

Shade areas of turtle that are missing; sketch cracks and lacerations

Comments: _____

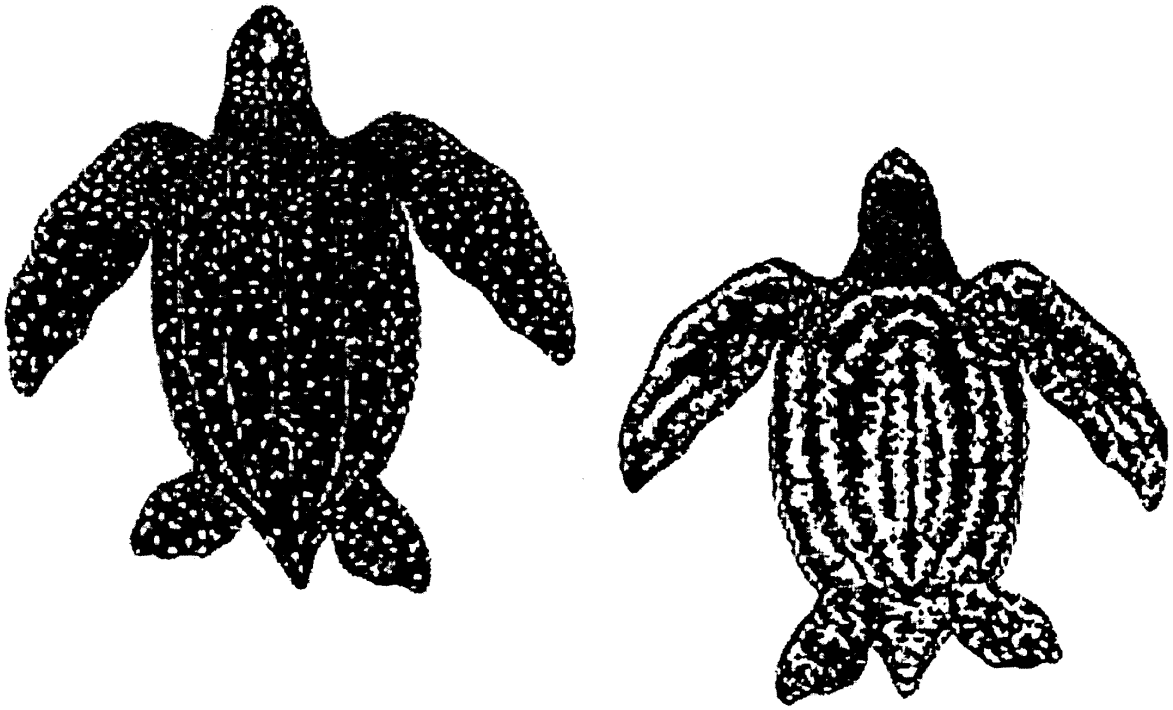


Diagrams by Tom McFarland

Leatherback (*Dermochelys coriacea)*

Shade areas of turtle that are missing; sketch cracks and lacerations

Comments: _____

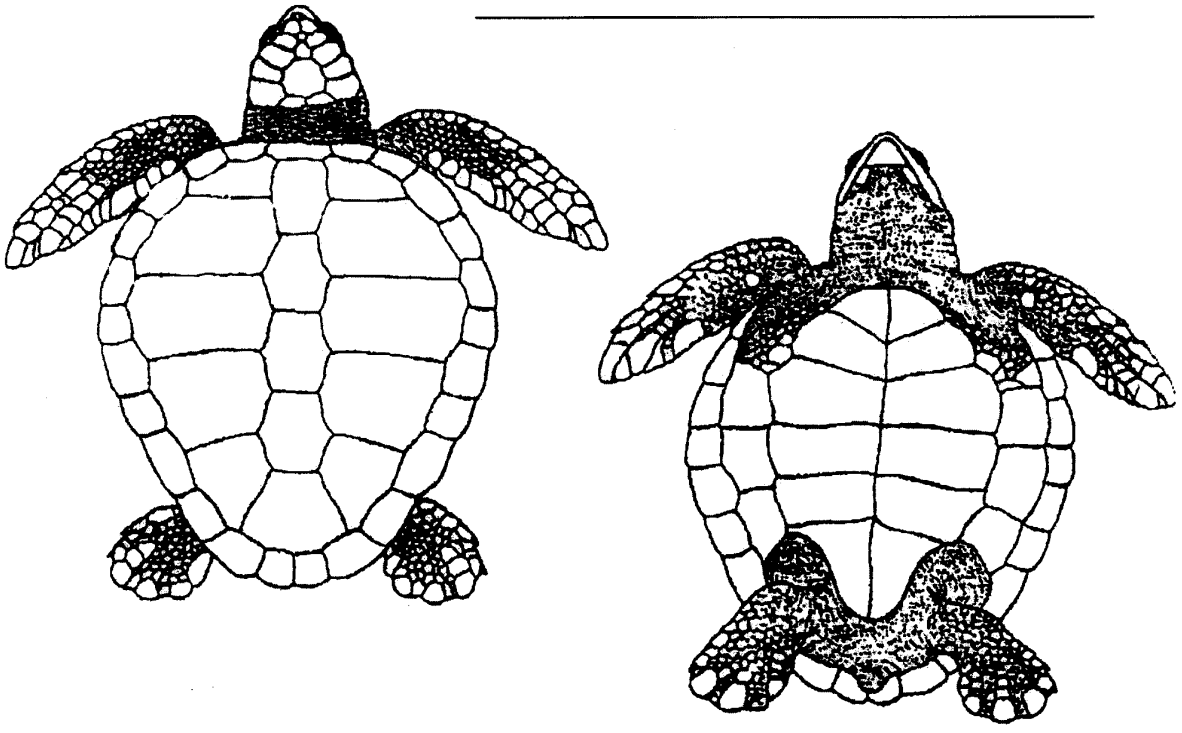


Diagrams by Tom McFarland

Loggerhead (*Caretta caretta)*

Shade areas of turtle that are missing; sketch cracks and lacerations

Comments: _____

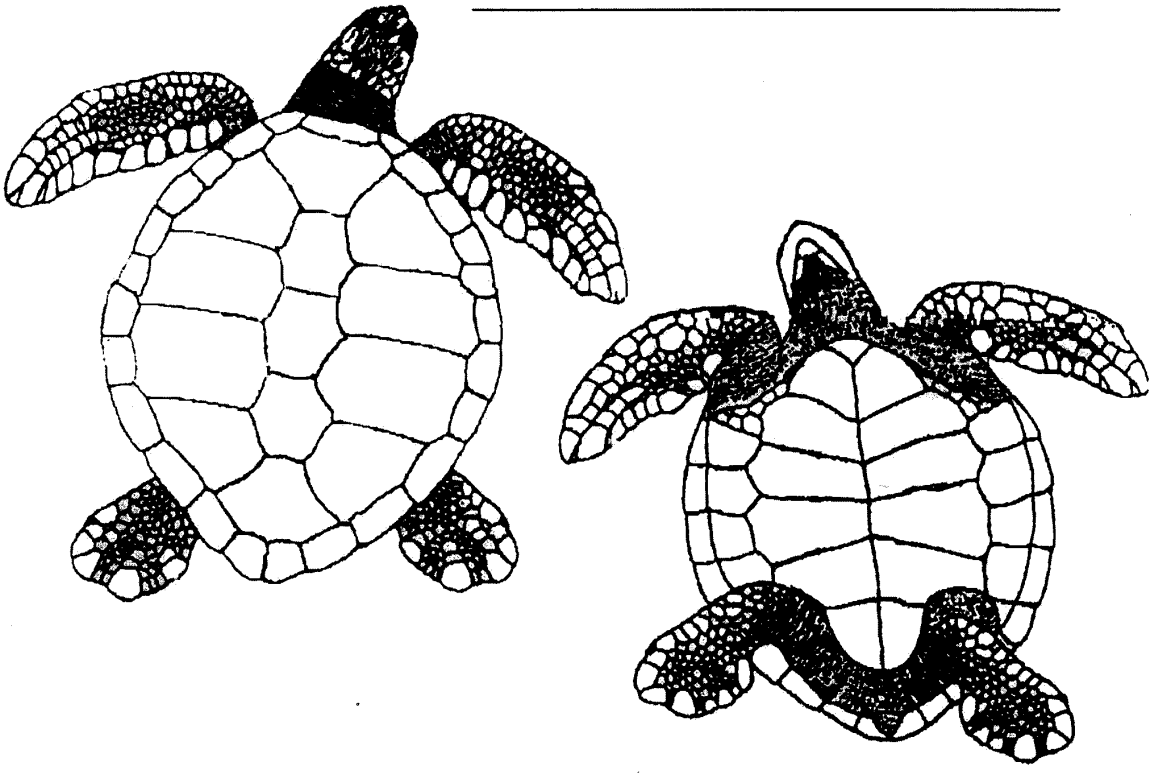


Diagrams by Tom McFarland

Green turtle (*Chelonia mydas)*

Shade areas of turtle that are missing; sketch cracks and lacerations

Comments: _____



Diagrams by Tom McFarland

Endangered Species Protection for Sea Turtles & Gulf Sturgeon

I. Sea Turtle Trawling and Relocation

Sea Turtle Trawling and Relocation, as specified herein, will be at the option and in the discretion of the Government to aid in preventing the taking of sea turtles during dredging operations with the approved turtle deflector in place. Within 72 hours after receiving written directions from the Contracting Officer, the Contractor shall begin trawling for turtles to relocate them from the dredging project area. Relocation trawling shall be performed so as to not interfere with dredging operations in progress.

e. Approved Sea Turtle Trawling and Relocation Supervisor

A NMFS-Approved Protected Species Observer (supervisor) shall conduct sea turtle trawling. A letter of approval from NMFS shall be provided to the Contracting Officer or his/her authorized representative prior to commencement of trawling. If trawling in Louisiana territorial waters outside of the shrimping season, the approved sea turtle trawling and relocation supervisor must also possess a Scientific Collecting Permit from the Louisiana Department of Wildlife and Fisheries (point of contact is Ms. Karen Foote at 225-765-2384).

f. Sea Turtle Trawling Procedures

Any captured sea turtles either shall be transported to the Institute for Marine Mammal Studies located in Gulfport, Mississippi, or released into waters minimally impacted by presence of oil/dispersants (to be determined by the relocation trawling supervisor in coordination with Edward Creef and Dena Dickerson (601-831-0687). Any captured gulf sturgeons shall be released immediately after capture and handling for measurements away from the dredging site in waters minimally impacted by presence of oil/dispersants (to be determined at the time of capture by the trawling supervisor in coordination with Edward Creef and Dena Dickerson). Methods and equipment shall be standardized including data sheets, nets, trawling direction to tide, length of station, length of tow, and number of tows per station. Data on each tow shall be recorded using the Sea Turtle Trawling Report found at the website (http://el.erdc.usace.army.mil/seaturtles/docs/trawlingforms.pdf). The trawler shall be equipped with 60-foot nets constructed from 8-inch mesh (stretch) fitted with mud rollers and flats as specified in the Turtle Trawl Nets Specifications appended to the end of this Section. Paired net tows shall be made for 24 hours per day, as directed by the Contracting Officer or his/her authorized representative. The tows shall be performed in shifts, to be determined by the Contracting Officer or his/her authorized representative, and the trawler shall be available for operation 24 hours a day. Positions at the beginning and end of each tow shall be determined from GPS Positioning equipment. Refer to EM 1110-1-1003 "Navstar global positioning system surveying", paragraph 5.3 and Table 5-1, for acceptable GPS criteria.

g. Trawling Requirements

Trawling operations shall be conducted in the vicinity of dredge operations, but shall maintain a safe distance from that dredge. **NOTE: ALL TRAWLING ACTIVITIES, VESSELS AND EQUIPMENT SHALL COMPLY WITH THE CONTRACTOR'S ACCIDENT PREVENTION PLAN AND THE REQUIREMENTS OF EM 385-1-1, U.S. ARMY CORPS OF ENGINEERS SAFETY AND HEALTH REQUIREMENTS MANUAL**. Trawling shall be conducted with and against the tidal flow at a speed not to exceed 3.5 knots using repetitive trawls in the channel or other work area not to exceed 42-minutes (total time). Trawls shall be made in the center, green, and red sides of the channel such that the total width of the channel bottom is trawled.

h. Sea Turtle/Gulf Sturgeon Handling and Measurements

At least one crewmember who is a NMFS-Approved Protected Species Observer shall be on board the trawler during the trawl. The observer shall be responsible for handling of captured sea turtles and Gulf sturgeons.

Each captured turtle or gulf sturgeon shall be identified, scanned for PIT tags, measured, tagged, tissue sampled and released, and data recorded on the Sea Turtle Tagging and Relocation Report, which can be found at the following website: (http://el.erdc.usace.army.mil/seaturtles/docs/taggingforms.pdf). Presence of PIT tags shall be scanned for by using a multi-frequency scanner capable of reading multiple frequencies (including 125-, 128-, 134-, and 400-kHz tags) and reading tags deeply embedded in muscle tissue. Any captured sea turtles shall be transported to the Institute for Marine Mammal Studies located in Gulfport, Mississippi. Turtle measurements shall be recorded and shall include, at a minimum, weight, straight-line length, straight-line width, and tail length. Gulf sturgeon measurements shall be recorded and shall include, at a minimum, weight, total length, and fork length. Turtles shall be tagged with NMFS #681 Inconel tags in each of the front flippers according to NMFS protocol. Aseptic conditions shall be maintained for tags and tag attachment. The Contractor shall be responsible for obtaining any and all permits related to trawling from the appropriate state and Federal agencies. All aspects of the trawling shall be coordinated with Edward Creef (504-862-2521) and Dena Dickerson (601-831-0687).

i. Handling Fibropapillomatose Turtles

Anyone handling sea turtles infected with fibropapilloma tumors shall either: 1) clean all equipment that comes in contact with the turtle with mild bleach solution between the processing of each turtle, or 2) maintain a separate set of sampling equipment for handling turtles displaying fibropapilloma tumors or lesions.

j. Water Quality and Physical Measurements

Water temperature measurements shall be taken at the water surface each day using a laboratory thermometer. Weather conditions shall be recorded from visual observations and instruments on the trawler. Weather conditions, air temperature, wind velocity and direction, sea state-wave height, and precipitation shall be recorded on the Sea Turtle Trawling Report. High and low tides shall be recorded.

k. Repair and Replacement of Damaged Trawl Nets

The Contractor, at the time of mobilization, shall provide trawl nets that meet the requirements specified in the Turtle Trawl Net Specifications at the end of this section. Tools, supplies and materials for repairing nets shall be kept aboard the trawler. In the event of damage to trawl nets, one hour will be allowed to either repair or replace them. The Contractor shall have at least one set of replacement nets immediately available at all times, to insure that the dredging work is not adversely delayed due to trawler down-time for replacing damaged nets. It is recommended that a second set of replacement nets be available aboard the trawler.

l. Suspension of Dredging and Relocation Trawling

Should there be a tearing of nets, or breakdown of other equipment that would cause the trawler to leave the area where dredging is underway during any period of time where relocation trawling is required, the dredge may continue to operate for up to 48 hours, as long as no turtles are taken, and subject to the discretion of the Contracting Officer. Should there be dangerously high seas that would cause the trawler to leave the dredging area when relocation trawling is required, the dredge may continue to operate, as long as no turtles are taken and subject to the discretion of the Contracting Officer.

m. Turtle Excluder Devices

Approval for trawling for sea turtles without Turtle Excluder Devices (TEDs) must be obtained from NMFS (contact Eric Hawk at 727-551-5773). Any necessary State or Federal clearances for the capture and relocation of sea turtles must also be obtained. Approvals must be submitted to the Contracting Officer or his/her authorized representative prior to trawling.

n. Reporting

Immediately after completing each day of relocation trawling, if possible, the Contractor shall notify Dena Dickerson by telephone conveying the results of the trawl. The results of each trawl shall be recorded on the Sea Turtle Trawling Report. The Sea Turtle Trawling Report also shall be furnished by the Contractor to Mr. Edward Creef, U.S. Army Corps of Engineers, New Orleans District, within 24 hours after completing the relocation trawl (fax number 504-862-2317; email: edward.d.creef.@usace.army.mil). Following completion of the project, a copy of the Contractor's log regarding sea turtles shall be forwarded to Mr. Edward Creef within 10 working days.

Turtle Trawl Net Specifications

DESIGN:	4 Seam, 4 Legged, 2 Bridal Trawl Net
WEBBING:	4 in bar, 8 in stretch Top – 36 Gauge Twisted Nylon Dipped Side – 36 Gauge Twisted Nylon Dipped Bottom – 84 Gauge Braided Nylon Dipped
NET LENGTH:	60 ft from cork line to cod end
BODY TAPER:	2 to 1
WING END HEIGHT:	6 ft
CENTER HEIGHT:	Dependent on depth of trawl – 14 to 18 ft
COD END:	Length 50 meshes x 4 in equals 16.7 ft Webbing 2 in bar, 4 in stretch, 84 gauge braid nylon Dipped, 80 meshes around, 40 rigged meshes with ¼ x 2 in choker rings, 1 each ½ x 4 in at end Cod End Cover – none Chaffing Gear – none
HEAD ROPE:	60 ft ½ in combination rope (braid nylon with stainless cable center)
FOOT ROPE:	65 ft ½ in combination rope
LEG LINE:	Top – 6 ft, Bottom – 6 ft
FLOATS:	Size – Tuna Floats (football style), Diameter – 7 In; Length – 9 in; number 12 each; Spacing – center of top net 2 in apart
MUD ROLLERS:	Size – 5 in Diameter, 5.5 in length Number – 22 each; spacing – 3 ft attached with 3/8 in Polypropylene rope (replaced with snap on roller when broken)
TICKLER CHAINS:	NONE (Discontinued – but previously used ¼ in x 74 ft galvanized chain)
WEIGHT:	20 ft of ¼ in galvanized chain on each wing, 40 ft per net looped and tied
DOOR SIZE:	7 ft x 40 in (or 8 ft x 40 in); Shoe – 1 in X 6 in: bridles – 3/8 in high test chain
CABLE LENGTH:	(Bridle Length, Total): 7/16 in x 240-300 ft varies with bottom conditions
FLOAT BALL:	NONE
LAZY LINES:	1 in nylon
PICKUP LINES:	3/8 in polypropylene
WHIP LINES:	1 in nylon