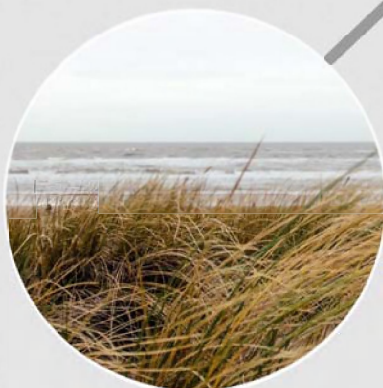




Prepared Expressly For:



Technical Memorandum

Review of Exposure of Coastal Wetlands to Deepwater Horizon Oil

Mengni Zhang; Jacob Oehrig; Shahrokh Rouhani

September 4, 2015

A large, full-width background image of the ocean with a dark blue, textured surface, showing the aftermath of the Deepwater Horizon oil spill.

• Deepwater Horizon Oil Spill •

NewFields LLC, 1349 West Peachtree St NW #2000, Atlanta, GA 30309

TECHNICAL MEMORANDUM

SUBJECT: Review of Exposure of Coastal Wetlands to Deepwater Horizon Oil

DATE September 4, 2015

TO: Mary Baker, NOAA; Marla Steinhoff, NOAA

FROM: Mengni Zhang, NewFields; Jacob Oehrig, NewFields; Shahrokh Rouhani, NewFields

In April 2010, an explosion aboard the Deepwater Horizon, an offshore, Macondo prospect (MC252) oil rig in the northern Gulf of Mexico (GOM), resulted in the largest oil spill in United States history. As part of the natural resource damage assessment (NRDA), numerous studies were completed and large datasets were compiled to assess oil exposure pathways. In the summer of 2010, shoreline/vegetation NRDA pre-assessment (PA) team collected vegetation and oiling data at 2,779 locations along the coastline of the northern GOM (NOAA, 2010). The data provided a base to evaluate PA plant oiling as the ratio of the oiled portion of plant stems to the average plant stem height. PA plant oiling was categorized into five classes: 0-0% (or reference), 0-10% (or trace), 10-50%, 50-90%, and 90-100% for developing subsequent coast wetland vegetation (CWV) sampling plans. In the fall of 2010, a statistically-balanced, stratified random CWV sampling plan was developed for Louisiana, which was later expanded to Mississippi and Alabama (NOAA, 2011a; NOAA, 2011b). In total, 188 CWV sites were selected and repeatedly surveyed across the region, as listed in Table 1 and depicted in Figure 1.

A transect was established at each CWV site, with one to three fixed locations representing edge and interior exposure zones. The center of the edge (or Zone 1) was located 1.5 meters (m) inland from the shoreline, the center of Zone 2 was located inland of the shoreline at 50% of the transect length, and the center of Zone 3 was located inland of the shoreline at 80% of the transect length, with a minimum of a 1 m buffer maintained between zones. The initial transect length for the oiled Louisiana herbaceous marsh sites (mainland and back barrier) was set as the maximum observed extent of oil penetration into the vegetation at each site. These penetration depths varied from 2.9 to 30.0 m. The summary statistics of transect lengths in oiled Louisianan herbaceous salt marsh sites are shown in Table 2.

CWV soil chemistry results were used to quantitatively evaluate MC252 oil presence in the northern GOM nearshore environment. The primary exposure data summarized here are total polycyclic aromatic hydrocarbon (tPAH) surrogate corrected concentrations, which were calculated using the toxPAH50 formula available in DIVER (<https://dwhdiver.orr.noaa.gov>).

CWV soil forensic results indicated wide-spread presence of MC252 oil along the affected shorelines of the northern GOM, as displayed in Figure 2 (Emsbo-Mattingly and Martin, 2015). The forensic results were also utilized to identify *ambient representative* samples. Ambient representative samples were those samples that had been forensically identified as code D, while being at least 100 m from any MC252 oil manifestation. This included oiled segments or sites observed by various survey teams, MC252 confirmed oil, tar ball, sheen, soil, sediment, or tissue samples. The 100 m buffer was included in order to minimize the chances of having diluted MC252 oil in ambient representative samples. Analysis of the data indicated

that state and habitat had statistically significant influence on reported ambient concentrations, as listed in Table 3. In these calculations, zone was not a statistically significant factor. The highest ambient tPAH concentrations were from the Mississippi River Delta and the lowest values occurred along barrier islands.

tPAH concentrations in the soils of affected coastal wetlands in Louisiana were orders-of-magnitude higher than ambient concentrations, especially in locations along the seaward edge of the marsh, as shown by their summary statistics in Tables 4 and 5. P-values corresponding to significances of two-sample *t*-tests between oiled groups and their corresponding reference values were also calculated, when sample sizes exceeded 4. The computed significances and standard errors were corrected for finite populations (Cochran, 1977). A plant oiling group was considered as having significantly higher tPAH concentrations if its average exceeded the corresponding reference value (flag = 1) with a p-value less than or equal to 0.05. The significant cases with p-value 0.05 is highlighted in yellow. All summary statistics and hypothesis tests were performed using R package *survey* (R version 3.2.0) and verified by SPSS *Complex Samples* (IBM SPSS version 23). The pattern of tPAH concentrations were consistent with observed shoreline and plant oiling conditions. tPAH concentrations along oiled shorelines have generally declined since the fall of 2010. However, along the heavier persistent oiling shorelines of Louisiana tPAH concentrations have remained elevated through the fall of 2013, as displayed on Figure 3.

Reference

- Cochran, W.G. Sampling Techniques, 3rd ed.; John Wiley & Sons: New York, NY, 1977.
- Emsbo-Mattingly, S.; Martin, C. 2015. Distribution and Weathering of Macondo oil in Nearshore Soils, Sediments, and Tissues Collected between Spring 2010 to Spring 2012 Based on Chemical Fingerprinting Methods. NOAA.
- Deepwater Horizon/MC252/BP Shoreline/Vegetation NRDA Pre-assessment Data Collection Plan, July 12, 2010; NOAA: 2010; <http://www.gulfspillrestoration.noaa.gov/oil-spill/gulf-spill-data/>
- Sampling and Monitoring Plan for the Assessment of MC252 Oil Impacts to Coastal Wetland Vegetation in the Gulf of Mexico, August 4, 2011; NOAA: 2011a; <http://www.gulfspillrestoration.noaa.gov/oil-spill/gulf-spill-data/>.
- Addendum to Sampling and Monitoring Plan for the Assessment of MC252 Oil Impacts to Coastal Wetland Vegetation in the Gulf of Mexico, November 30, 2011; NOAA: 2011b; <http://www.gulfspillrestoration.noaa.gov/oil-spill/gulf-spill-data/>.

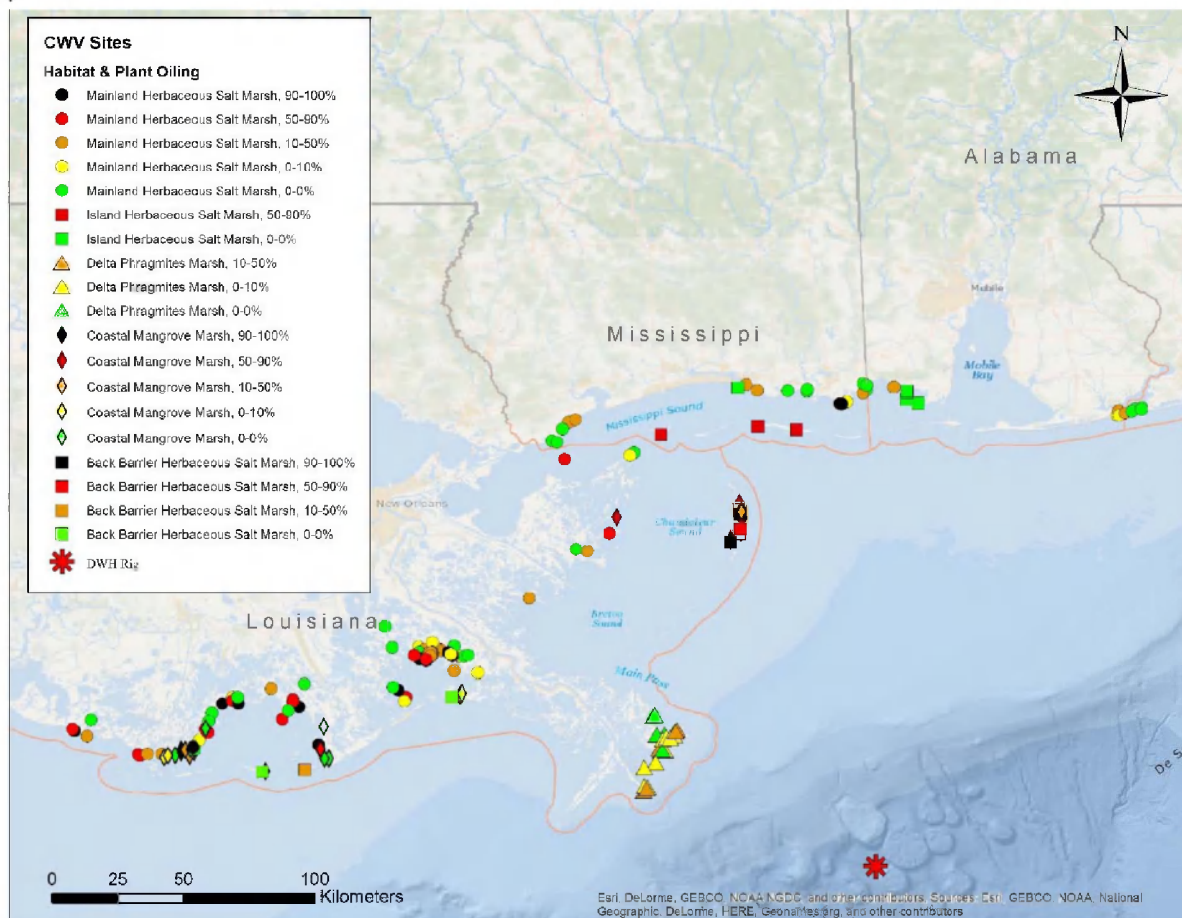


Figure 1. Distribution of CWV sites by habitats and PA plant oiling classes.

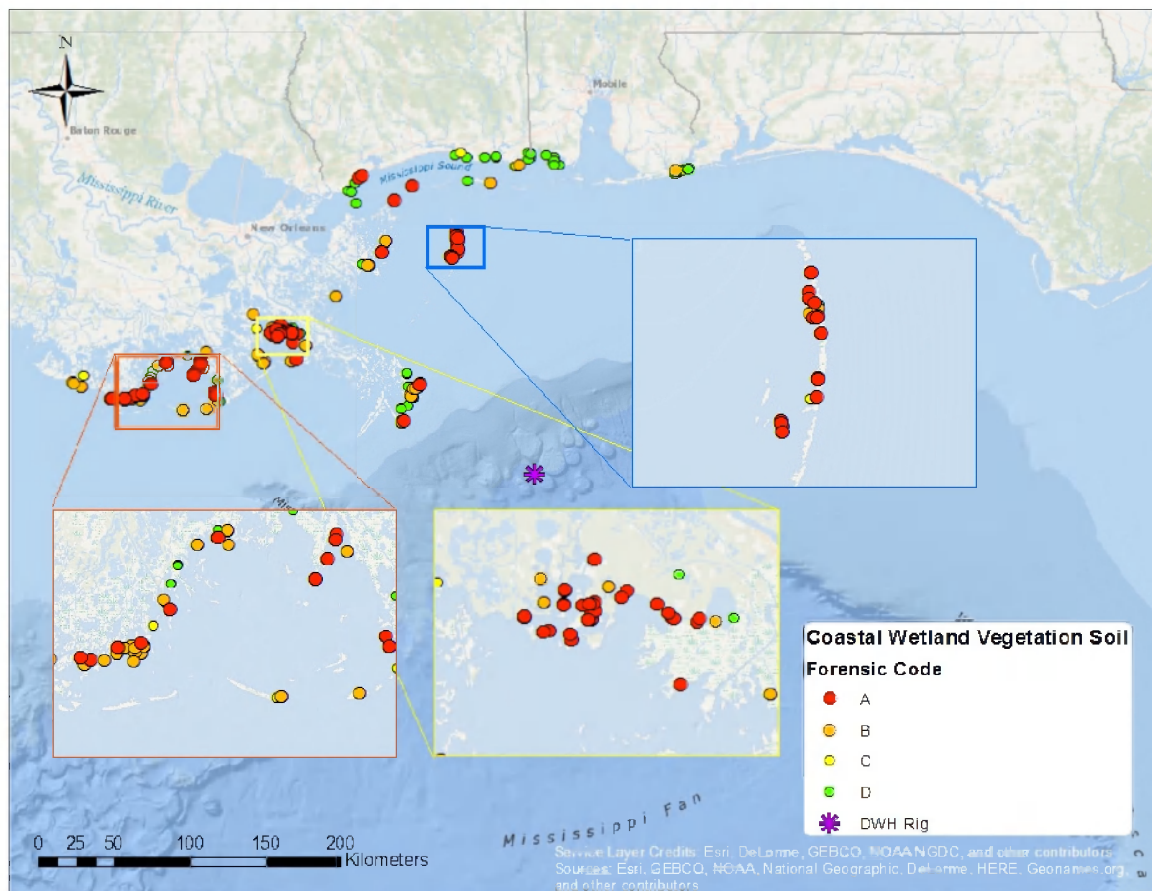


Figure 2. Coastal wetland vegetation soil forensic results

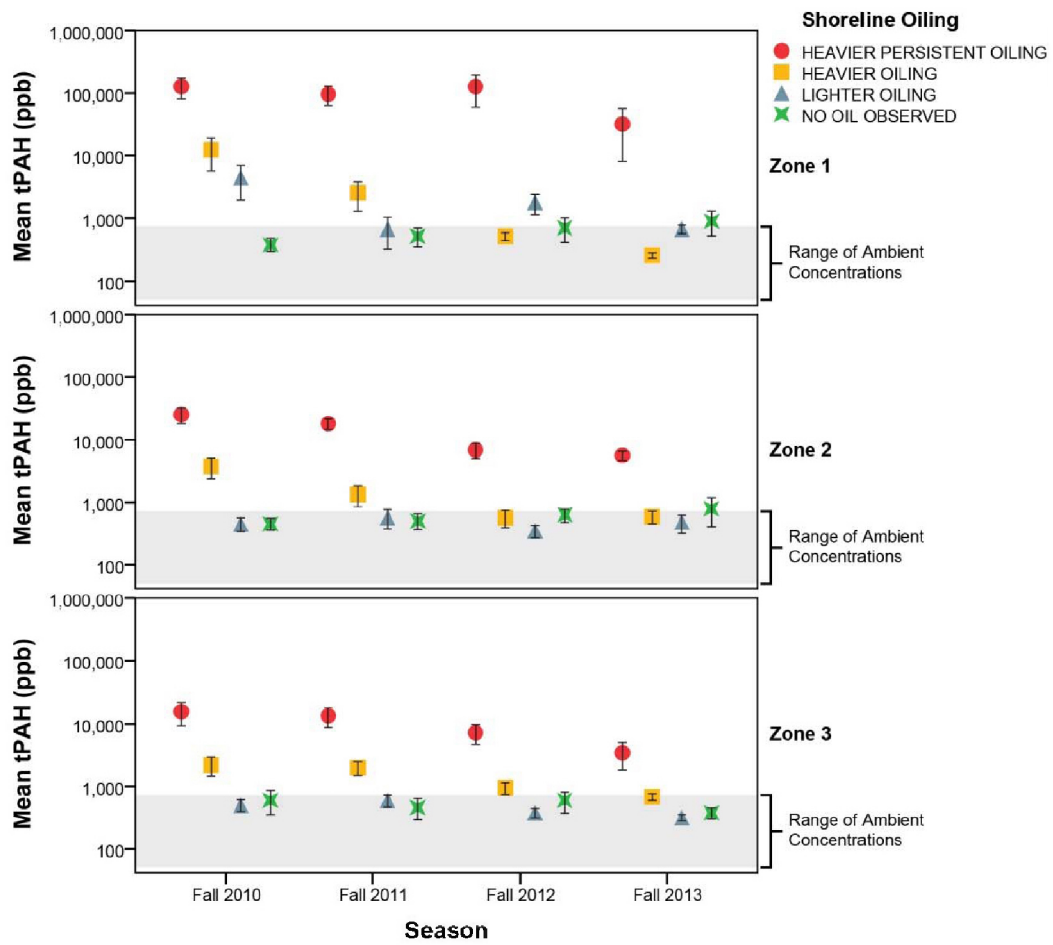


Figure 3. Time series plots of soil tPAH concentrations in Louisiana mainland herbaceous salt marsh.

Table 1. Coastal wetland vegetation surveys and dates.

Survey Season	Start	Finish	Extent of Survey	Investigated Sites
Fall 2010	9/16/2010	1/7/2011	All Louisiana Sites	150
Spring 2011	4/9/2011	6/8/2011	All Louisiana, Mississippi and Alabama Sites	188
Fall 2011	9/17/2011	11/2/2011	All Louisiana, Mississippi and Alabama Sites	188
Fall 2012	9/10/2012	12/9/2012	All Louisiana, Mississippi and Alabama Sites	188
Fall 2013	9/23/2013	12/13/2013	Louisiana (Mainland + Mangrove) Sites + Mississippi and Alabama Sites	152

Table 2. Transect lengths in Louisiana herbaceous salt marsh.

Habitat	PA Plant Oiling	Count	Average	Standard Deviation	Min	Max
Mainland Herbaceous Salt Marsh	90-100%	15	17.2	8.6	4.5	30.0
	50-90%	16	11.5	7.0	2.9	20.0
	10-50%	18	13.1	9.6	3.0	30.0
	0-10%	13	8.7	6.6	3.0	24.4
Back Barrier Herbaceous Salt Marsh	90-100%	2	14.1	1.3	13.2	15.0
	50-90%	2	6.2	1.7	5.0	7.4
	10-50%	7	7.7	6.0	3.0	20.0

Table 3. "Unweighted" ambient tPAH concentrations.

State/Region	Habitat	Count	Average	Standard Deviation	Min	Max
Louisiana	Mainland Herbaceous Salt Marsh	24	278	169	51	737
	Back Barrier Herbaceous Salt Marsh	6	26	20	2	46
	Coastal Mangrove Marsh	20	244	238	0	766
	Delta Phragmites Marsh	18	4,278	5,918	1,211	24,448
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	30	254	225	19	953
	Island Herbaceous Salt Marsh	12	130	108	7	358
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	9	210	278	3	679

Table 4. Soil tPAH concentrations (ppb) by PA plant oiling with finite population correction in all states, habitats and seasons.

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	0-0%	1	14	974	486	110	7,203	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	0-0%	2	14	482	113	122	1,707	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	0-0%	3	14	569	154	90	2,343	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	0-10%	1	12	3,353	1,340	19	15,296	0.054	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	0-10%	2	8	5,494	4,399	42	40,275	0.134	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	0-10%	3	7	1,206	672	68	5,711	0.184	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	10-50%	1	18	55,099	26,607	32	497,807	0.025	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	10-50%	2	14	14,785	6,047	92	79,241	0.013	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	10-50%	3	11	8,316	5,490	110	67,583	0.086	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	50-90%	1	16	14,109	7,807	36	143,873	0.052	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	50-90%	2	12	1,475	344	5	4,684	0.006	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	50-90%	3	9	5,397	1,579	138	14,465	0.003	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	90-100%	1	12	65,335	30,802	148	463,129	0.024	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	90-100%	2	14	7,416	2,255	131	30,595	0.002	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	90-100%	3	13	6,050	2,242	120	35,152	0.011	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	0-0%	1	13	568	110	51	1,361	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	0-0%	2	13	417	80	106	1,151	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	0-0%	3	14	505	120	69	1,569	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	0-10%	1	11	6,361	2,364	151	21,840	0.011	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	0-10%	2	8	2,294	950	129	8,438	0.032	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	0-10%	3	7	1,228	596	29	5,076	0.124	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	10-50%	1	17	53,865	23,459	43	325,325	0.015	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	10-50%	2	13	13,147	5,268	89	59,772	0.012	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	10-50%	3	11	6,413	2,763	113	32,815	0.022	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	50-90%	1	14	5,094	2,773	19	45,985	0.058	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	50-90%	2	10	1,982	513	41	5,093	0.003	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	50-90%	3	9	2,434	769	219	7,486	0.011	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	90-100%	1	11	79,635	32,343	220	#####	0.012	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	90-100%	2	14	6,416	2,594	213	40,592	0.015	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	90-100%	3	13	2,311	554	258	7,298	0.002	1

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	0-0%	1	13	457	94	36	1,159	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	0-0%	2	14	428	80	86	1,322	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	0-0%	3	13	550	120	136	1,510	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	0-10%	1	11	4,382	2,302	163	26,765	0.051	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	0-10%	2	9	1,660	771	31	7,498	0.063	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	0-10%	3	7	1,052	433	39	3,399	0.139	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	10-50%	1	15	39,754	21,042	44	305,886	0.037	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	10-50%	2	14	9,462	3,370	56	33,817	0.006	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	10-50%	3	11	8,360	4,331	80	53,741	0.043	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	50-90%	1	13	693	140	59	1,997	0.087	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	50-90%	2	11	1,901	534	42	5,870	0.006	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	50-90%	3	9	2,847	944	156	8,885	0.013	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	90-100%	1	9	66,746	30,266	176	275,001	0.020	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	90-100%	2	13	8,266	3,267	257	52,297	0.012	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	90-100%	3	13	4,451	1,499	140	20,477	0.008	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	0-0%	1	6	579	185	148	1,415	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	0-0%	2	13	406	86	104	1,180	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	0-0%	3	13	473	108	104	1,556	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	0-10%	1	8	1,107	504	138	4,843	0.173	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	0-10%	2	8	673	208	186	1,895	0.125	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	0-10%	3	7	792	308	109	2,776	0.171	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	10-50%	1	8	81,397	52,546	626	470,180	0.075	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	10-50%	2	12	3,810	1,607	117	19,611	0.023	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	10-50%	3	10	5,240	2,503	139	28,074	0.035	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	50-90%	1	5	1,675	976	214	6,201	0.149	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	50-90%	2	10	1,517	476	26	5,695	0.016	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	50-90%	3	8	1,281	373	74	3,217	0.026	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	90-100%	1	4	6,776	4,214	136	22,279	IDA	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	90-100%	2	10	1,719	657	226	7,497	0.030	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	90-100%	3	10	1,416	454	159	4,843	0.028	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	0-0%	1	6	745	227	153	1,760	NA	NA

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	0-0%	2	12	542	182	131	2,490	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	0-0%	3	13	452	71	172	1,135	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	0-10%	1	9	670	218	209	2,578	0.408	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	0-10%	2	7	372	62	204	719	0.195	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	0-10%	3	6	423	154	168	1,285	0.433	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	10-50%	1	4	24,146	21,398	419	93,873	IDA	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	10-50%	2	12	3,352	1,109	52	10,779	0.010	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	10-50%	3	10	2,600	1,478	124	16,738	0.081	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	50-90%	1	2	1,169	249	879	1,460	IDA	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	50-90%	2	8	1,722	475	11	4,600	0.016	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	50-90%	3	8	726	145	140	1,348	0.053	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	90-100%	1	2	4,500	3,286	402	8,599	IDA	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	90-100%	2	9	1,611	693	280	7,923	0.076	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	90-100%	3	9	745	168	208	1,712	0.062	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	0-0%	1	4	40	16	2	82	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	0-0%	2	4	125	53	28	335	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	0-0%	3	4	50	14	2	90	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	10-50%	1	6	4,408	3,443	7	25,487	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	10-50%	2	2	87	8	77	97	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	50-90%	1	2	507	305	75	938	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	50-90%	2	1	79	NA	79	79	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	90-100%	1	1	134	NA	134	134	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	90-100%	2	1	5,686	NA	5,686	5,686	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	90-100%	3	1	5,453	NA	5,453	5,453	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	0-0%	1	4	37	6	16	56	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	0-0%	2	4	46	6	26	59	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	0-0%	3	4	49	3	41	58	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	10-50%	1	6	1,371	923	20	7,011	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	10-50%	2	2	87	26	56	119	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	50-90%	1	2	270	167	34	506	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	50-90%	2	1	48	NA	48	48	IDA	1

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	90-100%	1	2	68,745	55,953	217	137,273	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	90-100%	2	1	2,204	NA	2,204	2,204	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	90-100%	3	1	2,990	NA	2,990	2,990	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	0-0%	1	4	83	30	2	196	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	0-0%	2	3	104	20	75	158	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	0-0%	3	4	57	7	34	73	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	10-50%	1	6	235	75	33	627	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	10-50%	2	2	131	52	67	194	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	50-90%	1	2	67	10	52	82	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	50-90%	2	1	29	NA	29	29	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	90-100%	1	2	1,425	749	508	2,342	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	90-100%	2	1	879	NA	879	879	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	90-100%	3	1	1,239	NA	1,239	1,239	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	0-0%	1	1	57	NA	57	57	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	0-0%	2	4	83	27	5	180	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	0-0%	3	4	35	5	22	54	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	10-50%	1	6	172	87	4	684	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	10-50%	2	2	13	7	4	22	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	50-90%	1	1	38	NA	38	38	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	50-90%	2	1	6	NA	6	6	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	90-100%	1	1	975	NA	975	975	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	90-100%	2	1	225	NA	225	225	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	90-100%	3	1	216	NA	216	216	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	0-0%	1	7	197	101	7	788	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2010	0-0%	2	7	256	95	0	606	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2010	0-0%	3	7	194	89	0	698	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2010	0-10%	1	5	207	18	139	259	0.461	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	0-10%	2	5	318	72	124	657	0.307	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	0-10%	3	5	625	164	223	1,235	0.022	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	10-50%	1	9	1,645	760	3	7,627	0.040	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	10-50%	2	11	2,254	1,330	0	17,272	0.077	1

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Louisiana	Coastal Mangrove Marsh	Fall 2010	10-50%	3	11	1,359	889	0	11,759	0.105	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	50-90%	1	8	661	191	20	1,962	0.026	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	50-90%	2	8	1,374	671	2	8,176	0.061	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	50-90%	3	8	1,796	749	4	7,308	0.027	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	90-100%	1	4	741	255	85	1,475	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	90-100%	2	4	1,808	935	47	5,377	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	90-100%	3	4	777	292	144	1,797	IDA	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	0-0%	1	7	274	100	34	795	NA	NA
Louisiana	Coastal Mangrove Marsh	Spring 2011	0-0%	2	7	315	101	6	766	NA	NA
Louisiana	Coastal Mangrove Marsh	Spring 2011	0-0%	3	7	208	67	16	520	NA	NA
Louisiana	Coastal Mangrove Marsh	Spring 2011	0-10%	1	5	340	23	273	426	0.268	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	0-10%	2	5	469	121	149	1,035	0.177	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	0-10%	3	4	642	141	360	1,105	IDA	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	10-50%	1	11	652	273	1	3,147	0.106	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	10-50%	2	11	1,035	351	6	3,393	0.033	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	10-50%	3	11	1,594	1,182	6	15,463	0.129	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	50-90%	1	8	185	27	70	370	0.203	0
Louisiana	Coastal Mangrove Marsh	Spring 2011	50-90%	2	8	970	453	5	5,571	0.091	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	50-90%	3	8	1,069	380	7	4,295	0.022	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	90-100%	1	4	381	132	100	826	IDA	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	90-100%	2	4	823	301	29	1,889	IDA	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	90-100%	3	4	576	219	93	1,396	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	0-0%	1	7	246	78	12	650	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2011	0-0%	2	7	273	91	9	679	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2011	0-0%	3	7	273	98	11	766	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2011	0-10%	1	5	363	103	103	841	0.192	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	0-10%	2	5	483	59	306	676	0.041	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	0-10%	3	5	344	71	158	655	0.285	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	10-50%	1	11	349	129	10	1,623	0.251	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	10-50%	2	11	880	434	2	5,761	0.095	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	10-50%	3	11	396	143	3	1,932	0.245	1

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Louisiana	Coastal Mangrove Marsh	Fall 2011	50-90%	1	7	220	52	1	533	0.395	0
Louisiana	Coastal Mangrove Marsh	Fall 2011	50-90%	2	7	445	125	5	1,275	0.144	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	50-90%	3	7	391	130	4	1,252	0.241	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	90-100%	1	3	276	44	211	389	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	90-100%	2	4	2,194	816	92	4,961	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	90-100%	3	4	405	98	104	720	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	0-0%	1	6	296	116	49	887	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2012	0-0%	2	6	608	229	44	1,684	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2012	0-0%	3	6	295	108	123	850	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2012	0-10%	1	3	301	96	112	521	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	0-10%	2	5	818	253	263	1,821	0.277	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	0-10%	3	5	459	148	151	1,162	0.197	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	10-50%	1	4	1,124	885	14	4,242	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	10-50%	2	8	457	163	34	1,724	0.300	0
Louisiana	Coastal Mangrove Marsh	Fall 2012	10-50%	3	7	415	143	93	1,327	0.258	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	50-90%	1	3	96	28	51	179	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2012	50-90%	2	6	460	185	16	1,785	0.313	0
Louisiana	Coastal Mangrove Marsh	Fall 2012	50-90%	3	5	613	160	109	1,212	0.067	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	90-100%	1	3	90	44	10	201	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2012	90-100%	2	4	426	191	16	1,132	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2012	90-100%	3	3	290	94	90	507	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	0-0%	1	2	209	154	48	371	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2013	0-0%	2	6	740	300	81	2,033	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2013	0-0%	3	6	359	110	102	902	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2013	0-10%	2	5	375	30	272	483	0.129	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	0-10%	3	5	301	75	123	628	0.336	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	10-50%	1	3	841	652	71	2,372	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2013	10-50%	2	8	552	177	121	1,893	0.300	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	10-50%	3	7	392	78	112	732	0.405	1
Louisiana	Coastal Mangrove Marsh	Fall 2013	50-90%	1	1	70	NA	70	70	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2013	50-90%	2	5	525	114	90	941	0.260	0

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Louisiana	Coastal Mangrove Marsh	Fall 2013	50-90%	3	5	609	208	49	1,719	0.158	1
Louisiana	Coastal Mangrove Marsh	Fall 2013	90-100%	1	2	49	36	2	96	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	90-100%	2	4	271	78	3	484	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	90-100%	3	3	402	137	193	753	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2010	0-0%	1	5	2,475	459	1,145	4,152	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2010	0-0%	2	6	3,289	1,091	942	8,907	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2010	0-0%	3	4	2,016	242	1,528	2,771	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2010	0-10%	1	9	1,964	394	548	5,112	0.207	0
Louisiana	Delta Phragmites Marsh	Fall 2010	0-10%	2	8	2,408	993	895	10,855	0.281	0
Louisiana	Delta Phragmites Marsh	Fall 2010	0-10%	3	6	2,792	678	609	6,234	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2010	10-50%	1	5	586	152	281	1,038	0.002	0
Louisiana	Delta Phragmites Marsh	Fall 2010	10-50%	2	4	1,634	875	85	4,328	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2010	10-50%	3	4	4,718	4,044	36	17,552	IDA	1
Louisiana	Delta Phragmites Marsh	Spring 2011	0-0%	1	3	6,269	3,922	1,338	14,855	NA	NA
Louisiana	Delta Phragmites Marsh	Spring 2011	0-0%	2	6	6,281	3,335	1,220	24,448	NA	NA
Louisiana	Delta Phragmites Marsh	Spring 2011	0-0%	3	4	4,522	1,921	1,211	10,583	NA	NA
Louisiana	Delta Phragmites Marsh	Spring 2011	0-10%	1	8	1,947	451	217	4,426	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	0-10%	2	7	1,634	245	1,090	3,179	0.096	0
Louisiana	Delta Phragmites Marsh	Spring 2011	0-10%	3	5	1,363	226	1,034	2,465	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	10-50%	1	4	681	275	123	1,401	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	10-50%	2	4	1,387	778	21	3,759	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	10-50%	3	4	2,249	1,645	64	7,453	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	0-0%	1	5	2,103	662	33	4,442	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2011	0-0%	2	6	4,329	892	1,456	7,634	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2011	0-0%	3	4	2,126	487	1,361	3,674	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2011	0-10%	1	9	1,135	154	160	2,342	0.090	0
Louisiana	Delta Phragmites Marsh	Fall 2011	0-10%	2	8	1,764	296	438	3,212	0.009	0
Louisiana	Delta Phragmites Marsh	Fall 2011	0-10%	3	6	1,431	229	938	2,687	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	10-50%	1	5	870	279	287	1,661	0.062	0
Louisiana	Delta Phragmites Marsh	Fall 2011	10-50%	2	4	1,002	283	110	1,384	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	10-50%	3	4	1,028	661	69	3,105	IDA	0

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Louisiana	Delta Phragmites Marsh	Fall 2012	0-0%	1	4	5,954	3,903	1,340	18,804	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2012	0-0%	2	5	5,215	2,174	1,254	14,386	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2012	0-0%	3	3	2,903	1,333	1,273	5,825	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2012	0-10%	1	6	1,821	320	995	3,473	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	0-10%	2	5	1,818	417	951	3,734	0.082	0
Louisiana	Delta Phragmites Marsh	Fall 2012	0-10%	3	4	1,600	430	759	3,137	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	10-50%	1	4	1,044	490	48	2,499	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	10-50%	2	4	1,013	556	61	2,660	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	10-50%	3	4	1,065	399	126	2,092	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	0-0%	1	10	215	57	19	645	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	0-0%	2	10	280	65	27	735	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	0-0%	3	10	265	76	44	953	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	0-10%	1	1	622	NA	622	622	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	0-10%	2	1	352	NA	352	352	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	10-50%	1	5	319	NA	59	646	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	10-50%	2	6	597	NA	73	1,417	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	10-50%	3	6	371	NA	150	581	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	90-100%	1	2	103	NA	78	128	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	90-100%	2	2	289	NA	8	569	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	90-100%	3	1	277	NA	277	277	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	0-0%	1	9	254	63	18	647	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	0-0%	2	10	314	74	4	755	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	0-0%	3	10	294	57	32	577	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	0-10%	1	1	401	NA	401	401	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	0-10%	2	1	1,004	NA	1,004	1,004	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	10-50%	1	5	406	NA	81	1,194	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	10-50%	2	6	255	NA	10	563	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	10-50%	3	6	339	NA	103	732	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	90-100%	1	2	97	NA	76	118	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	90-100%	2	2	86	NA	11	160	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	90-100%	3	1	248	NA	248	248	IDA	0

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	0-0%	1	7	257	79	26	733	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	0-0%	2	10	397	89	22	1,025	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	0-0%	3	10	285	64	24	789	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	0-10%	2	1	68	NA	68	68	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	10-50%	1	4	330	NA	2	851	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	10-50%	2	6	198	NA	108	350	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	10-50%	3	6	565	NA	50	1,642	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	90-100%	1	1	174	NA	174	174	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	90-100%	2	2	104	NA	16	191	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	90-100%	3	1	298	NA	298	298	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	0-0%	1	4	109	37	37	227	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	0-0%	2	10	417	108	16	1,099	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	0-0%	3	10	313	73	25	873	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	0-10%	2	1	365	NA	365	365	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	10-50%	1	2	289	NA	154	425	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	10-50%	2	6	513	NA	79	1,513	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	10-50%	3	6	324	NA	121	630	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	90-100%	1	1	57	NA	57	57	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	90-100%	2	2	79	NA	14	145	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	90-100%	3	1	190	NA	190	190	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	0-0%	1	5	69	20	7	150	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	0-0%	2	5	122	47	10	297	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	0-0%	3	5	143	53	33	358	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	0-10%	1	1	104	NA	104	104	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	0-10%	2	1	84	NA	84	84	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	0-10%	3	1	44	NA	44	44	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	10-50%	1	2	52	31	8	96	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	10-50%	2	2	29	20	1	56	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	10-50%	3	2	53	18	28	78	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	50-90%	1	3	301	NA	11	863	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	50-90%	2	3	204	NA	1	573	IDA	1

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Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	50-90%	3	3	151	NA	1	376	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	0-0%	1	5	132	45	60	331	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	0-0%	2	5	245	53	53	406	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	0-0%	3	5	271	59	85	441	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	0-10%	1	1	97	NA	97	97	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	0-10%	2	1	123	NA	123	123	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	0-10%	3	1	89	NA	89	89	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	10-50%	1	2	68	30	26	111	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	10-50%	2	2	31	19	4	57	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	10-50%	3	2	203	83	86	320	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	50-90%	1	3	278	NA	4	794	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	50-90%	2	3	204	NA	7	591	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	50-90%	3	3	207	NA	3	607	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	0-0%	1	1	93	NA	93	93	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	0-0%	2	4	213	90	49	497	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	0-0%	3	5	141	57	20	374	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	0-10%	2	1	41	NA	41	41	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	0-10%	3	1	8	NA	8	8	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	10-50%	2	2	6	1	5	8	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	10-50%	3	2	13	9	0	27	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	50-90%	1	2	369	NA	8	730	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	50-90%	2	3	125	NA	1	374	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	50-90%	3	3	99	NA	1	289	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	0-0%	2	4	320	159	46	816	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	0-0%	3	5	153	58	14	376	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	0-10%	2	1	38	NA	38	38	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	0-10%	3	1	78	NA	78	78	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	10-50%	2	2	21	14	1	40	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	10-50%	3	2	31	1	30	32	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	50-90%	1	2	392	NA	1	782	IDA	IDA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	50-90%	2	3	167	NA	1	498	IDA	0

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	50-90%	3	2	7	NA	1	13	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	0-0%	1	4	177	152	3	679	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	0-0%	2	3	168	101	4	380	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	0-0%	3	2	340	262	52	628	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	0-10%	1	2	75	32	21	130	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	0-10%	2	1	96	NA	96	96	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	10-50%	1	2	40	30	2	78	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	10-50%	2	1	2,890	NA	2,890	2,890	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	10-50%	3	1	9,002	NA	9,002	9,002	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	0-0%	1	4	109	95	2	422	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	0-0%	2	3	212	125	6	473	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	0-0%	3	2	242	172	52	431	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	0-10%	1	2	14	5	5	22	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	0-10%	2	1	182	NA	182	182	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	10-50%	1	2	1,358	1,049	4	2,713	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	10-50%	2	1	1,758	NA	1,758	1,758	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	10-50%	3	1	2,714	NA	2,714	2,714	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	0-0%	1	4	319	248	2	1,132	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	0-0%	2	3	130	68	16	272	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	0-0%	3	2	331	259	46	617	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	0-10%	1	2	27	14	2	52	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	0-10%	2	1	225	NA	225	225	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	10-50%	1	2	235	182	1	470	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	10-50%	2	1	12,769	NA	#####	12,769	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	10-50%	3	1	4,203	NA	4,203	4,203	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	0-0%	1	4	310	225	1	1,044	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	0-0%	2	3	197	128	41	478	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	0-0%	3	2	289	246	18	560	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	0-10%	1	2	227	128	6	448	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	0-10%	2	1	288	NA	288	288	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	10-50%	1	2	226	173	3	450	IDA	0

State/Region	Habitat	Season	PA Plant Oiling	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to Reference	Flag Indicating Oiled Mean Higher than Ref Mean
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	10-50%	2	1	1,948	NA	1,948	1,948	IDA	1

Note:

NA = Not applicable

IDA = Insufficient Data Available (e.g. sample size ≤ 4)

Table 5. Weighted summary statistics of soil tPAH concentrations (ppb) by shoreline oiling in all states, habitats and seasons.

State/Region	Habitat	Season	Shoreline Oiling Exposure	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to NOO	Flag Indicating Oiled Mean Higher than NOO Mean
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	HEAVIER PERSISTENT OILING	1	13	127,558	46,433	1,332	497,807	0.007	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	HEAVIER PERSISTENT OILING	2	14	25,250	7,120	1,834	79,241	0.001	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	HEAVIER PERSISTENT OILING	3	13	15,712	6,348	2,927	67,583	0.017	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	HEAVIER OILING	1	17	12,398	6,684	59	104,451	0.043	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	HEAVIER OILING	2	14	3,761	1,379	131	30,595	0.014	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	HEAVIER OILING	3	10	2,198	745	293	13,019	0.030	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	LIGHTER OILING	1	23	4,477	2,538	19	143,873	0.059	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	LIGHTER OILING	2	17	450	110	5	4,684	0.483	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	LIGHTER OILING	3	15	503	107	68	4,782	0.352	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	NO OIL OBSERVED	1	14	394	94	32	4,093	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	NO OIL OBSERVED	2	12	456	98	53	871	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	NO OIL OBSERVED	3	12	610	256	90	2,343	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	NOT SURVEYED	1	5	2,614	1,130	273	15,296	0.035	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	NOT SURVEYED	2	5	345	92	154	746	0.215	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2010	NOT SURVEYED	3	4	351	84	190	494	IDA	0
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	HEAVIER PERSISTENT OILING	1	13	130,351	35,078	619	325,325	0.001	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	HEAVIER PERSISTENT OILING	2	14	21,848	5,279	836	59,772	0.000	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	HEAVIER PERSISTENT OILING	3	13	9,148	2,855	1,510	32,815	0.003	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	1	14	4,875	3,050	56	44,858	0.088	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	2	13	867	212	149	5,093	0.111	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	3	10	2,109	544	295	7,486	0.007	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	1	22	2,707	1,095	19	45,985	0.024	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	2	17	704	241	41	8,438	0.269	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	3	15	473	136	29	5,076	0.427	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	1	11	556	162	43	1,060	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	2	9	526	164	89	1,151	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	3	11	516	181	69	1,569	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	1	5	1,577	869	151	13,509	0.126	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	2	5	450	98	129	1,758	0.344	1
Louisiana	Mainland Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	3	5	410	98	148	654	0.309	0

State/Region	Habitat	Season	Shoreline Oiling Exposure	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to NOO	Flag Indicating Oiled Mean Higher than NOO Mean
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	HEAVIER PERSISTENT OILING	1	12	95,842	32,125	411	305,886	0.005	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	HEAVIER PERSISTENT OILING	2	14	18,131	3,515	1,496	52,297	0.000	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	HEAVIER PERSISTENT OILING	3	13	13,487	4,683	769	53,741	0.007	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	1	14	2,552	1,255	44	16,444	0.061	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	2	13	1,332	487	159	5,870	0.062	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	3	10	1,984	499	156	8,885	0.006	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	1	19	681	354	59	15,179	0.348	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	2	17	571	198	31	7,498	0.405	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	3	15	602	134	39	3,399	0.273	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	1	10	527	172	36	1,466	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	2	11	511	147	56	1,322	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	3	10	466	172	80	1,324	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	1	6	992	331	355	5,216	0.057	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	2	6	435	81	220	824	0.330	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	3	5	371	69	191	505	0.313	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	HEAVIER PERSISTENT OILING	1	7	126,834	68,075	892	470,180	0.055	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	HEAVIER PERSISTENT OILING	2	11	6,881	1,863	881	19,611	0.002	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	HEAVIER PERSISTENT OILING	3	12	7,226	2,527	522	28,074	0.009	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	1	5	520	74	256	751	0.292	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	2	12	567	176	127	1,986	0.404	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	3	8	946	196	139	2,480	0.145	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	1	8	1,785	644	136	6,201	0.084	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	2	16	348	78	26	1,895	0.061	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	3	15	378	67	74	945	0.185	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	1	5	711	295	138	1,415	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	2	8	625	150	104	1,180	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	3	8	595	221	108	1,556	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	1	6	1,040	605	224	10,292	0.203	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	2	6	327	68	150	476	0.052	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	3	5	279	66	104	401	0.104	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	HEAVIER PERSISTENT OILING	1	4	31,920	23,856	586	93,873	IDA	1

State/Region	Habitat	Season	Shoreline Oiling Exposure	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to NOO	Flag Indicating Oiled Mean Higher than NOO Mean
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	HEAVIER PERSISTENT OILING	2	11	5,647	974	289	10,779	0.000	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	HEAVIER PERSISTENT OILING	3	12	3,456	1,611	410	16,738	0.042	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	HEAVIER OILING	1	3	260	24	209	316	IDA	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	HEAVIER OILING	2	12	588	134	52	2,753	0.316	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	HEAVIER OILING	3	7	682	87	124	1,267	0.017	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	LIGHTER OILING	1	6	674	101	402	1,460	IDA	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	LIGHTER OILING	2	13	470	151	11	4,600	0.229	1
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	LIGHTER OILING	3	14	318	36	168	1,131	0.243	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	1	4	918	388	153	1,760	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	2	6	792	386	131	2,490	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	3	8	379	76	140	623	NA	NA
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	NOT SURVEYED	1	6	624	116	248	1,706	IDA	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	NOT SURVEYED	2	6	430	90	206	625	0.197	0
Louisiana	Mainland Herbaceous Salt Marsh	Fall 2013	NOT SURVEYED	3	5	601	183	204	1,135	0.148	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	HEAVIER OILING	1	3	8,695	6,132	181	25,487	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	LIGHTER OILING	1	2	43	24	4	82	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	LIGHTER OILING	2	2	182	93	28	335	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	LIGHTER OILING	3	2	55	5	46	63	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	NO OIL OBSERVED	1	2	33	14	2	55	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	NO OIL OBSERVED	2	2	73	15	42	97	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	NO OIL OBSERVED	3	1	2	NA	2	2	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	NOT SURVEYED	1	6	230	91	7	938	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	NOT SURVEYED	2	4	1,723	475	77	5,686	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2010	NOT SURVEYED	3	2	3,155	979	90	5,453	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	1	4	36,285	22,614	397	137,273	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	1	2	26	6	16	36	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	2	2	50	5	42	57	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	3	2	49	5	41	58	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	1	2	41	1	39	41	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	2	2	79	25	26	119	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	3	1	46	NA	46	46	NA	NA

State/Region	Habitat	Season	Shoreline Oiling Exposure	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to NOO	Flag Indicating Oiled Mean Higher than NOO Mean
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	1	6	184	58	20	506	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	2	4	684	182	48	2,204	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	3	2	1,731	536	53	2,990	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	1	4	884	333	220	2,342	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	1	2	37	22	2	73	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	2	1	158	NA	158	158	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	3	2	60	6	50	69	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	1	2	59	NA	59	60	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	2	2	144	31	78	194	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	3	1	34	NA	34	34	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	1	6	178	58	33	508	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	2	4	299	66	29	879	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	3	2	739	213	73	1,239	IDA	0
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	1	4	486	110	98	975	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	2	2	93	53	5	180	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	3	2	25	1	22	27	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	1	1	15	NA	15	15	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	2	2	47	16	22	80	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	3	1	36	NA	36	36	NA	NA
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	1	4	34	8	4	57	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	2	4	83	19	4	225	IDA	1
Louisiana	Back Barrier Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	3	2	147	30	54	216	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2010	HEAVIER PERSISTENT OILING	1	2	1,065	333	603	1,962	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	HEAVIER PERSISTENT OILING	2	2	14,177	2,229	8,176	17,272	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	HEAVIER PERSISTENT OILING	3	2	9,895	1,342	6,282	11,759	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	HEAVIER OILING	1	6	966	455	3	4,525	0.354	0
Louisiana	Coastal Mangrove Marsh	Fall 2010	HEAVIER OILING	2	6	1,122	503	311	4,986	0.073	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	HEAVIER OILING	3	6	346	89	142	879	0.435	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	LIGHTER OILING	1	8	311	151	20	1,811	0.211	0
Louisiana	Coastal Mangrove Marsh	Fall 2010	LIGHTER OILING	2	8	222	90	2	1,001	0.153	0
Louisiana	Coastal Mangrove Marsh	Fall 2010	LIGHTER OILING	3	8	394	151	44	1,235	0.349	1

State/Region	Habitat	Season	Shoreline Oiling Exposure	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to NOO	Flag Indicating Oiled Mean Higher than NOO Mean
Louisiana	Coastal Mangrove Marsh	Fall 2010	NO OIL OBSERVED	1	9	711	451	45	7,627	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2010	NO OIL OBSERVED	2	10	331	73	0	538	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2010	NO OIL OBSERVED	3	10	323	104	0	698	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2010	NOT SURVEYED	1	8	277	151	7	1,626	0.219	0
Louisiana	Coastal Mangrove Marsh	Fall 2010	NOT SURVEYED	2	9	461	279	0	5,377	0.325	1
Louisiana	Coastal Mangrove Marsh	Fall 2010	NOT SURVEYED	3	9	466	274	0	7,308	0.312	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	HEAVIER PERSISTENT OILING	1	2	1,623	497	285	2,313	IDA	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	HEAVIER PERSISTENT OILING	2	2	3,935	608	3,092	5,571	IDA	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	HEAVIER PERSISTENT OILING	3	2	11,664	2,737	4,295	15,463	IDA	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	HEAVIER OILING	1	6	658	313	43	3,147	0.188	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	HEAVIER OILING	2	6	1,141	437	193	3,393	0.053	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	HEAVIER OILING	3	6	300	67	101	888	0.378	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	LIGHTER OILING	1	8	337	40	140	826	0.480	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	LIGHTER OILING	2	8	457	64	5	1,035	0.244	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	LIGHTER OILING	3	8	420	62	95	1,105	0.079	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	NO OIL OBSERVED	1	10	343	119	1	795	NA	NA
Louisiana	Coastal Mangrove Marsh	Spring 2011	NO OIL OBSERVED	2	10	367	104	6	766	NA	NA
Louisiana	Coastal Mangrove Marsh	Spring 2011	NO OIL OBSERVED	3	9	267	76	6	520	NA	NA
Louisiana	Coastal Mangrove Marsh	Spring 2011	NOT SURVEYED	1	9	78	24	18	469	0.024	0
Louisiana	Coastal Mangrove Marsh	Spring 2011	NOT SURVEYED	2	9	205	103	6	1,889	0.137	1
Louisiana	Coastal Mangrove Marsh	Spring 2011	NOT SURVEYED	3	9	248	123	7	2,674	0.446	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	HEAVIER PERSISTENT OILING	1	2	353	67	261	533	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	HEAVIER PERSISTENT OILING	2	2	4,106	1,192	895	5,761	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	HEAVIER PERSISTENT OILING	3	2	1,602	238	962	1,932	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	HEAVIER OILING	1	5	555	169	56	1,623	0.070	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	HEAVIER OILING	2	5	568	149	146	1,637	0.158	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	HEAVIER OILING	3	5	271	74	96	772	0.281	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	LIGHTER OILING	1	7	304	56	1	841	0.345	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	LIGHTER OILING	2	8	358	85	5	1,146	0.443	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	LIGHTER OILING	3	8	356	36	4	655	0.482	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	NO OIL OBSERVED	1	10	270	58	12	986	NA	NA

State/Region	Habitat	Season	Shoreline Oiling Exposure	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to NOO	Flag Indicating Oiled Mean Higher than NOO Mean
Louisiana	Coastal Mangrove Marsh	Fall 2011	NO OIL OBSERVED	2	10	376	96	2	867	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2011	NO OIL OBSERVED	3	10	350	110	18	766	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2011	NOT SURVEYED	1	9	102	30	10	389	0.013	0
Louisiana	Coastal Mangrove Marsh	Fall 2011	NOT SURVEYED	2	9	545	277	9	4,961	0.278	1
Louisiana	Coastal Mangrove Marsh	Fall 2011	NOT SURVEYED	3	9	147	61	3	1,252	0.057	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	HEAVIER PERSISTENT OILING	2	2	308	27	237	345	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2012	HEAVIER PERSISTENT OILING	3	2	700	190	436	1,212	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	HEAVIER OILING	1	6	682	490	14	4,242	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	HEAVIER OILING	2	6	435	166	34	1,724	0.400	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	HEAVIER OILING	3	6	238	51	93	605	0.112	0
Louisiana	Coastal Mangrove Marsh	Fall 2012	LIGHTER OILING	1	5	594	158	51	887	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	LIGHTER OILING	2	7	1,097	284	16	1,821	0.033	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	LIGHTER OILING	3	5	378	136	154	1,162	0.383	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	NO OIL OBSERVED	1	4	200	9	179	213	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2012	NO OIL OBSERVED	2	9	485	93	223	833	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2012	NO OIL OBSERVED	3	9	442	146	123	1,327	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2012	NOT SURVEYED	1	4	65	20	10	201	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2012	NOT SURVEYED	2	5	338	201	16	1,785	0.256	1
Louisiana	Coastal Mangrove Marsh	Fall 2012	NOT SURVEYED	3	4	192	33	90	459	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	HEAVIER PERSISTENT OILING	2	2	196	8	176	207	IDA	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	HEAVIER PERSISTENT OILING	3	2	796	343	320	1,719	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2013	HEAVIER OILING	1	3	841	652	71	2,372	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2013	HEAVIER OILING	2	6	912	237	90	1,893	0.024	1
Louisiana	Coastal Mangrove Marsh	Fall 2013	HEAVIER OILING	3	6	295	52	49	577	0.106	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	LIGHTER OILING	1	1	70	NA	70	70	IDA	1
Louisiana	Coastal Mangrove Marsh	Fall 2013	LIGHTER OILING	2	6	1,078	435	157	2,033	0.066	1
Louisiana	Coastal Mangrove Marsh	Fall 2013	LIGHTER OILING	3	5	293	50	165	628	0.102	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	NO OIL OBSERVED	1	1	371	NA	371	371	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2013	NO OIL OBSERVED	2	9	411	52	206	848	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2013	NO OIL OBSERVED	3	9	479	125	123	902	NA	NA
Louisiana	Coastal Mangrove Marsh	Fall 2013	NOT SURVEYED	1	3	48	11	2	96	IDA	0

State/Region	Habitat	Season	Shoreline Oiling Exposure	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to NOO	Flag Indicating Oiled Mean Higher than NOO Mean
Louisiana	Coastal Mangrove Marsh	Fall 2013	NOT SURVEYED	2	5	226	96	3	941	0.079	0
Louisiana	Coastal Mangrove Marsh	Fall 2013	NOT SURVEYED	3	4	217	90	102	753	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2010	HEAVIER PERSISTENT OILING	1	1	281	NA	281	281	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2010	HEAVIER PERSISTENT OILING	2	1	4,328	NA	4,328	4,328	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2010	HEAVIER PERSISTENT OILING	3	1	17,552	NA	17,552	17,552	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2010	HEAVIER OILING	1	3	1,128	520	334	2,320	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2010	HEAVIER OILING	2	3	3,639	2,016	1,045	8,907	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2010	HEAVIER OILING	3	2	739	401	239	1,528	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2010	LIGHTER OILING	1	4	1,350	507	366	5,112	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2010	LIGHTER OILING	2	4	834	301	85	2,174	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2010	LIGHTER OILING	3	4	1,048	384	36	2,605	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2010	NO OIL OBSERVED	1	9	1,763	402	548	4,152	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2010	NO OIL OBSERVED	2	8	2,739	783	895	10,855	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2010	NO OIL OBSERVED	3	6	2,575	609	609	6,234	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2010	NOT SURVEYED	1	2	2,581	229	2,030	2,864	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2010	NOT SURVEYED	2	2	1,798	337	987	2,215	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2010	NOT SURVEYED	3	1	2,771	NA	2,771	2,771	IDA	1
Louisiana	Delta Phragmites Marsh	Spring 2011	HEAVIER PERSISTENT OILING	1	1	896	NA	896	896	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	HEAVIER PERSISTENT OILING	2	1	3,759	NA	3,759	3,759	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	HEAVIER PERSISTENT OILING	3	1	7,453	NA	7,453	7,453	IDA	1
Louisiana	Delta Phragmites Marsh	Spring 2011	HEAVIER OILING	1	3	1,233	604	306	2,613	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	HEAVIER OILING	2	3	1,779	851	602	3,919	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	HEAVIER OILING	3	2	4,506	3,092	653	10,583	IDA	1
Louisiana	Delta Phragmites Marsh	Spring 2011	LIGHTER OILING	1	3	1,229	813	123	4,426	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	LIGHTER OILING	2	4	1,446	578	21	3,244	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	LIGHTER OILING	3	4	1,032	388	64	2,465	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	NO OIL OBSERVED	1	8	3,690	1,957	217	14,855	NA	NA
Louisiana	Delta Phragmites Marsh	Spring 2011	NO OIL OBSERVED	2	7	6,392	3,698	1,090	24,448	NA	NA
Louisiana	Delta Phragmites Marsh	Spring 2011	NO OIL OBSERVED	3	5	2,088	629	1,034	4,147	NA	NA
Louisiana	Delta Phragmites Marsh	Spring 2011	NOT SURVEYED	2	2	1,195	20	1,147	1,220	IDA	0
Louisiana	Delta Phragmites Marsh	Spring 2011	NOT SURVEYED	3	1	1,211	NA	1,211	1,211	IDA	0

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Louisiana	Delta Phragmites Marsh	Fall 2011	HEAVIER PERSISTENT OILING	1	1	529	NA	529	529	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	HEAVIER PERSISTENT OILING	2	1	1,384	NA	1,384	1,384	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	HEAVIER PERSISTENT OILING	3	1	3,105	NA	3,105	3,105	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2011	HEAVIER OILING	1	3	377	169	33	1,323	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	HEAVIER OILING	2	3	1,817	305	1,322	3,212	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	HEAVIER OILING	3	2	1,634	1,038	341	3,674	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2011	LIGHTER OILING	1	5	1,223	346	160	2,342	0.102	0
Louisiana	Delta Phragmites Marsh	Fall 2011	LIGHTER OILING	2	4	1,408	620	110	3,851	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	LIGHTER OILING	3	4	779	322	69	1,999	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	NO OIL OBSERVED	1	8	2,004	374	925	4,442	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2011	NO OIL OBSERVED	2	8	4,116	655	438	7,634	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2011	NO OIL OBSERVED	3	6	1,484	193	938	2,687	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2011	NOT SURVEYED	1	2	1,295	42	1,195	1,347	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	NOT SURVEYED	2	2	1,481	20	1,456	1,531	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2011	NOT SURVEYED	3	1	1,361	NA	1,361	1,361	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	HEAVIER PERSISTENT OILING	1	1	48	NA	48	48	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	HEAVIER PERSISTENT OILING	2	1	274	NA	274	274	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	HEAVIER PERSISTENT OILING	3	1	1,337	NA	1,337	1,337	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	HEAVIER OILING	1	1	913	NA	913	913	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	HEAVIER OILING	2	2	3,193	428	2,660	4,033	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	HEAVIER OILING	3	2	3,541	1,162	2,092	5,825	IDA	1
Louisiana	Delta Phragmites Marsh	Fall 2012	LIGHTER OILING	1	3	1,415	437	717	3,473	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	LIGHTER OILING	2	3	825	362	61	1,663	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	LIGHTER OILING	3	3	703	287	126	1,611	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	NO OIL OBSERVED	1	7	4,991	2,529	995	18,804	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2012	NO OIL OBSERVED	2	6	5,705	2,066	951	14,386	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2012	NO OIL OBSERVED	3	4	1,600	430	759	3,137	NA	NA
Louisiana	Delta Phragmites Marsh	Fall 2012	NOT SURVEYED	1	2	1,330	8	1,310	1,340	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	NOT SURVEYED	2	2	1,261	5	1,254	1,273	IDA	0
Louisiana	Delta Phragmites Marsh	Fall 2012	NOT SURVEYED	3	1	1,273	NA	1,273	1,273	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	1	2	362	NA	78	646	IDA	1

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Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	2	2	588	NA	8	1,167	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	3	1	549	NA	549	549	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	1	6	283	NA	59	622	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	2	7	476	NA	73	1,417	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	3	6	325	NA	150	581	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	1	7	202	70	19	645	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	2	7	253	83	27	735	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	3	7	254	105	44	953	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	1	3	246	93	81	476	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	2	3	341	86	211	560	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	3	3	289	54	190	421	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	1	2	89	NA	76	102	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	2	2	287	NA	11	563	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	3	1	203	NA	203	203	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	1	6	408	NA	81	1,194	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	2	7	305	NA	10	1,004	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	3	6	347	NA	103	732	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	1	6	277	88	18	647	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	2	7	259	86	4	755	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	3	7	274	73	32	577	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	1	3	207	57	95	344	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	2	3	441	118	254	739	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	3	3	342	79	209	539	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	1	1	851	NA	851	851	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	2	2	139	NA	16	262	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	3	1	1,131	NA	1,131	1,131	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	1	4	161	NA	2	311	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	2	7	169	NA	68	350	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	3	6	426	NA	50	1,642	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	1	5	258	111	26	733	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	2	7	334	88	22	779	NA	NA

State/Region	Habitat	Season	Shoreline Oiling Exposure	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to NOO	Flag Indicating Oiled Mean Higher than NOO Mean
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	3	7	263	88	24	789	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	1	2	253	25	218	288	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	2	3	544	190	243	1,025	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	3	3	335	50	254	462	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	HEAVIER OILING	2	2	363	NA	14	713	IDA	0
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	HEAVIER OILING	3	1	566	NA	566	566	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	LIGHTER OILING	1	3	212	NA	57	425	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	LIGHTER OILING	2	7	411	NA	79	1,513	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	LIGHTER OILING	3	6	262	NA	121	630	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	1	2	57	15	37	77	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	2	7	395	141	16	1,099	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	3	7	257	66	25	602	NA	NA
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	NOT SURVEYED	1	2	162	48	97	227	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	NOT SURVEYED	2	3	468	146	248	839	IDA	1
Mississippi/Alabama - Mississippi Sound	Mainland Herbaceous Salt Marsh	Fall 2013	NOT SURVEYED	3	3	443	169	182	873	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	HEAVIER PERSISTENT OILING	1	2	446	NA	29	863	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	HEAVIER PERSISTENT OILING	2	2	306	NA	38	573	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	HEAVIER PERSISTENT OILING	3	2	227	NA	77	376	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	1	1	11	NA	11	11	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	2	1	1	NA	1	1	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	HEAVIER OILING	3	1	1	NA	1	1	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	1	7	71	20	7	150	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	2	7	71	25	1	174	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	3	7	80	21	28	168	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	1	1	59	NA	59	59	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	2	1	297	NA	297	297	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Spring 2011	NOT SURVEYED	3	1	358	NA	358	358	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	HEAVIER PERSISTENT OILING	1	2	415	NA	35	794	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	HEAVIER PERSISTENT OILING	2	2	303	NA	15	591	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	HEAVIER PERSISTENT OILING	3	2	305	NA	3	607	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	1	1	4	NA	4	4	IDA	0

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Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	2	1	7	NA	7	7	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	HEAVIER OILING	3	1	10	NA	10	10	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	1	7	130	42	26	331	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	2	7	188	49	4	406	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	3	7	214	45	85	400	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	1	1	79	NA	79	79	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	2	1	318	NA	318	318	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2011	NOT SURVEYED	3	1	441	NA	441	441	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	HEAVIER PERSISTENT OILING	1	1	730	NA	730	730	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	HEAVIER PERSISTENT OILING	2	2	188	NA	2	374	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	HEAVIER PERSISTENT OILING	3	2	145	NA	1	289	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	1	1	8	NA	8	8	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	2	1	1	NA	1	1	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	HEAVIER OILING	3	1	8	NA	8	8	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	2	6	157	87	5	497	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	3	7	66	22	0	142	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	1	1	93	NA	93	93	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	2	1	215	NA	215	215	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2012	NOT SURVEYED	3	1	374	NA	374	374	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	HEAVIER PERSISTENT OILING	1	1	782	NA	782	782	IDA	IDA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	HEAVIER PERSISTENT OILING	2	2	250	NA	2	498	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	HEAVIER PERSISTENT OILING	3	1	13	NA	13	13	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	HEAVIER OILING	1	1	1	NA	1	1	IDA	IDA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	HEAVIER OILING	2	1	1	NA	1	1	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	HEAVIER OILING	3	1	1	NA	1	1	IDA	0
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	2	6	232	152	1	816	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	3	7	85	29	14	194	NA	NA
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	NOT SURVEYED	2	1	336	NA	336	336	IDA	1
Mississippi/Alabama - Mississippi Sound	Island Herbaceous Salt Marsh	Fall 2013	NOT SURVEYED	3	1	376	NA	376	376	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	1	4	53	22	2	130	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	2	2	1,842	NA	96	2,890	IDA	1

State/Region	Habitat	Season	Shoreline Oiling Exposure	Zone	Sample Size	Average	Standard Error	Min	Max	One-tailed p-value Relative to NOO	Flag Indicating Oiled Mean Higher than NOO Mean
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	LIGHTER OILING	3	1	9,002	NA	9,002	9,002	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	1	4	177	152	3	679	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	2	3	168	101	4	380	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Spring 2011	NO OIL OBSERVED	3	2	340	262	52	628	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	1	4	854	656	4	2,713	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	2	2	1,167	NA	182	1,758	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	LIGHTER OILING	3	1	2,714	NA	2,714	2,714	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	1	4	109	95	2	422	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	2	3	212	125	6	473	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2011	NO OIL OBSERVED	3	2	242	172	52	431	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	1	4	157	114	1	470	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	2	2	8,065	NA	225	12,769	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	LIGHTER OILING	3	1	4,203	NA	4,203	4,203	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	1	4	319	248	2	1,132	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	2	3	130	68	16	272	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2012	NO OIL OBSERVED	3	2	331	259	46	617	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	LIGHTER OILING	1	4	227	118	3	450	IDA	0
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	LIGHTER OILING	2	2	1,326	NA	288	1,948	IDA	1
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	1	4	310	225	1	1,044	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	2	3	197	128	41	478	NA	NA
Alabama - Perdido Bay	Mainland Herbaceous Salt Marsh	Fall 2013	NO OIL OBSERVED	3	2	289	246	18	560	NA	NA

Note:

NOO = NO OIL OBSERVED

NA = Not applicable

IDA = Insufficient Data Available (e.g. sample size ≤ 4)