High Scenario – 80% to Upland Disposal				
	Wetland Restoration	Delta Restoration	Rehandling	Total
1-5 years	16 mcy 84 %	1 mcy 5 %	2 mcy 11%	19 mcy or 100%
5-15 years	28 mcy 74%	5 mcy 13%	5 mcy 13%	38 mcy
15-50 years	82 mcy 61%	20 mcy 15%	32 mcy 24%	134 mcy
Total	**126 mcy 66%**	**26 mcy 14%**	**39 mcy 20%**	**191 mcy**

Assumptions: Maximum Delta placement throughout
5-15 years assumes 4 wetland projects
15-50 years assumes wetland projects implemented every 3 years and a portion of total volume rehandled reuse in Delta

APPENDIX O

Air Quality

Assumptions Used in the LTMS Project Air Quality Analysis:

1. Volume dredged per year (averaged over the 50 year life of LTMS)= 237.2 mcy/50 = 4.74 mcy

2. 3.79 mcy of material would be dredged by 26 cy clamshell dredges; 0.95 mcy dredged by hopper dredge.

3. Hopper dredge would only be used for dredging, transport, and disposal to in-bay placement environment.

4. Clamshell dredge (26 cy) barge loading rate = 275 cy/hr.

5. Hopper dredge: loading rate = 360 cy/hr; capacity = 4,000 cy; speed = 8 knots.

6. One-way transport distances from dredging locations to in-bay and ocean placement environments estimated from the average of minimum and maximum transport distances used in EPA cost estimate. Otherwise, transport distances based on the average distance from the dredging centroid within the Bay to potential upland/wetland placement environments (Gahagan and Bryant 1994):
   In-Bay = (22 + 5)/2 = 13.5 nm
   Ocean = (80 + 62)/2 = 71 nm
   Habitat Restoration = 15 nm
   Levee Restoration = 40.3 nm
   Rehandling Facility = 19 nm.

7. Only one barge would be towed per tug.

8. Average tug speed = 6 knots.

9. One clamshell crane would be used for unloading during levee restoration.

10. One hydraulic booster pump would be used to unload sediment at a habitat restoration or rehandling facility site.

11. Clamshell crane (26 cy) unloading rate = 550 cy/hr.

12. Hydraulic booster pump unloading rate = 1,210 cy/hr.

13. Pumpout distance for hydraulic unloading estimated from the average of minimum and maximum distances used in EPA cost estimate = (26,000 + 4,000)/2 = 15,000 feet.

14. One booster pump (1,500 Hp) would be required for every 5,000 feet of hydraulic pipeline unloading beyond the first 5,000 feet. Therefore, two 1,500 Hp booster pumps would be needed for 15,000 feet of pipeline.

15. Barge capacity for ocean disposal (actual material) = 4,000 cy.

16. Barge capacity for disposal at all other placement environments (actual material) = 2,000 cy.

17. Transport truck average one-way haul distance from rehandling facility to landfill site = 12 miles.

18. Transport truck capacity (dry material) = 10 cy.

19. Transport truck average speed = 30 mph.

20. Dredging equipment would work 22 hrs/day, 360 days/yr, with 2 hrs/day downtime for maintenance.
21. Employee emissions from commuting are negligible in comparison to all other project emissions.

Distribution of Dredged Material Among Placement Environments and Alternatives (mcy)					
Alternative	*In-Bay*	*Ocean*	Upland/Wetland Reuse		
			Habitat Restoration	*Levee Restoration*	*Rehandling Facility*
No Action	3.32	0.71	0.40	0.31	0.0
Alternative 1	1.90	1.90	0.54	0.40	0.0
Alternative 2	1.90	0.95	1.19	0.40	0.30
Alternative 3	0.95	1.90	1.19	0.40	0.30
Low Volume Analysis	1.00	1.00	0.57	0.43	0.0
Medium Volume Analysis	2.40	2.40	1.51	0.52	0.38
High Volume Analysis	3.80	3.80	2.51	0.52	0.78

Table 1. Emission Source Data for No-Action Alternative.

Activity/Equipment Type/ Disposal Alternative	*HorsePower (Hp)*	*Load Factor*	*Number Active*	*Hp-Hours*	*Fuel Use (Gal/Hr)*	*Hours Per Day*	*Work Days*	*Total Fuel Usage*
Dredging								
Clamshell Dredge	5,000	0.75	2	7,500	420.0	22.0	313.2	2,894,182
Work Tug	400	0.50	2	400	22.4	22.0	313.2	154,356
Barge Equipment	95	0.50	2	95	5.3	22.0	313.2	36,660
Hopper Dredge	2,000	0.75	1	1,500	84.0	16.8	157.3	221,667
Support Boat	850	0.50	3	1,275	71.4	12.0	261.2	223,833
Ocean Site								
Transport/Disposal								
Tug Boat	2,300	0.75	3	5,175	289.8	22.0	63.9	407,229
Barge Equipment	95	0.50	3	143	8.0	22.0	63.9	11,214
In-Bay Site								
Transport/Disposal								
Tug Boat	1,050	0.75	2	1,575	88.2	22.0	123.4	239,518
Barge Equipment	95	0.50	2	95	5.3	22.0	123.4	14,447
Hopper Dredge	2,000	0.75	1	1,500	84.0	5.2	157.3	68,994
Habitat Restoration Site								
Transport								
Tug Boat	1,050	0.75	2	1,575	88.2	16.5	30.2	44,100
Barge Equipment	95	0.50	2	95	5.3	16.5	30.2	2,660
Disposal								
Tug Boat	1,050	0.20	2	420	23.5	5.5	30.2	3,888
Barge Equipment	95	0.50	2	95	5.3	5.5	30.2	879
Hydraulic Unloader	1,500	0.75	1	1,125	63.0	10.9	30.2	20,826
Booster Pump	1,500	0.75	2	2,250	126.0	10.9	30.2	41,653
Work Tug	400	0.50	1	200	11.2	10.9	30.2	3,702
Generator	69	0.50	1	35	1.9	10.9	30.2	639
Support Boat	250	0.50	1	125	7.0	10.9	30.2	2,314
Levee Site								
Transport								
Tug Boat	1,050	0.75	4	3,150	176.4	17.3	30.1	91,824
Barge Equipment	95	0.50	4	190	10.6	17.3	30.1	5,539
Disposal								
Tug Boat	1,050	0.20	4	840	47.0	4.7	30.1	6,628
Barge Equipment	95	0.50	4	190	10.6	4.7	30.1	1,499
Clamshell Crane	5,000	0.75	1	3,750	210.0	18.7	30.1	118,364
Grader	200	0.50	1	100	5.6	18.7	30.1	3,156
Scraper	330	0.50	1	165	9.2	18.7	30.1	5,208
Bulldozer	285	0.50	2	285	16.0	18.7	30.1	8,996