

Characterization of Brown Marsh Progression and/or Recovery Using Landsat 7 Satellite Imagery (2000-2001)

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Study Initiated: September 2001 **Anticipated Completion Date:** September 2002

Study Site Location(s): Brackish and Saline Marshes in the Coastal Zone of Louisiana

Keywords : Mapping, Remote sensing, Landsat 7 ETM+, Satellite Imagery

Project Type: Descriptive

Project Outline:

Specific Aims

- To assess the regional extent of the Louisiana Brown Marsh phenomenon.
- To determine the extent and amount of progression and/or recovery of the affected areas.

Methodology

- Based on analysis of Landsat 7 ETM+ Imagery
- Preprocessing of Imagery
 - Image geo-rectification (RMSE less than 1)
 - NDVI applied and layer-stacked with Landsat 7 bands 1-5, and 7
- Classification of Imagery
 - ISODATA unsupervised classification (used to provide insight into the varying Brown Marsh class signatures and develop ground control information)
 - Supervised Classification (based upon signatures developed through unsupervised classification, ground truthing and information from other Brown Marsh researchers)
- Postprocessing of Imagery
 - QA/QC of image classifications
 - Trend Analysis for 2000 and 2001
 - Change Detection Analysis for 2000 to 2001

Imagery Classification Scheme and Results (next page)

Publications, reports, or web-accessible materials

Landsat imagery and classifications can be found at: www.brownmarsh.net/data/I-2/I_2.htm

- Imagery Classification Scheme

Class	Definition
Healthy	Areas of healthy vegetation
Afflicted	Areas of marsh that are mildly stressed by Brown Marsh
Impacted	Areas of marsh that are noticeably stressed by Brown Marsh
Brown Marsh	Areas of marsh that are severely stressed by Brown Marsh
Brown Marsh Exposed	Areas of marsh where the vegetation has died, leaving stubble and/or exposed soil as a result of Brown Marsh
Water	Areas of open water bodies
No Data	Areas of the image that are masked by either clouds or cloud shadow preventing any interpretation of the obscured ground cover
Other	Areas inside the study area but were not part of the classification scheme; included but not limited to urban areas, bare soil, sand, mudflat, and burn scars

Results are broken down by time period and region.

	2000 Area (sq Km)	2001 Area (sq Km)	2000 Percent Area	2001 Percent Area	Area Change (sq Km)
Mississippi River Delta East					
Brown Marsh Exposed	0.0	0.0	0.0%	0.0%	0
Brown Marsh	0.3	58.9	0.0%	0.9%	58.6
Afflicted	351.5	361.8	5.3%	5.4%	10.2
Impacted	391.0	471.7	5.8%	7.0%	80.7
Healthy	657.9	405.3	9.8%	6.1%	-252.5
Other	54.5	42.1	0.8%	0.6%	-12.4
No Data	10.0	0.0	0.1%	0.0%	-10
Water	5,227.9	5,353.2	78.1%	80.0%	125.3
Subtotal	6,693.1	6,693.1	100.0%	100.0%	
Mississippi River Delta West					
Brown Marsh Exposed	11.7	20.7	0.2%	0.3%	8.9
Brown Marsh	41.5	401.2	0.7%	6.8%	359.7
Afflicted	1,039.7	689.0	17.5%	11.6%	-350.7
Impacted	498.0	572.9	8.4%	9.7%	74.9
Healthy	232.0	221.3	3.9%	3.7%	-10.7
Other	51.6	90.1	0.9%	1.5%	38.5
No Data	191.3	116.8	3.2%	2.0%	-74.5
Water	3,869.2	3,823.1	65.2%	64.4%	-46.1
Subtotal	5,935.0	5,935.0	100.0%	100.0%	
Chenier Plain					
Brown Marsh Exposed	60.3	38.5	3.5%	2.2%	-21.8
Brown Marsh	107.0	70.4	6.2%	4.1%	-36.6
Afflicted	143.3	274.1	8.3%	15.8%	130.8
Impacted	114.5	219.6	6.6%	12.7%	105.2
Healthy	316.2	176.4	18.2%	10.2%	-139.8
Other	267.0	273.6	15.4%	15.8%	6.6
No Data	21.7	4.9	1.3%	0.3%	-16.8
Water	702.5	675.0	40.5%	39.0%	-27.5
Subtotal	1,732.6	1,732.6	100.0%	100.0%	

Suggested citation: Georgia Coastal Research Council, 2004. Proceedings of the Marsh Dieback Workshop, held February 3-4, 2004, Savannah Georgia.