

U.S. Department of the Interior U.S. Geological Survey

Land Area Change in Coastal Louisiana: A Multidecadal Perspective (from 1956 to 2006)

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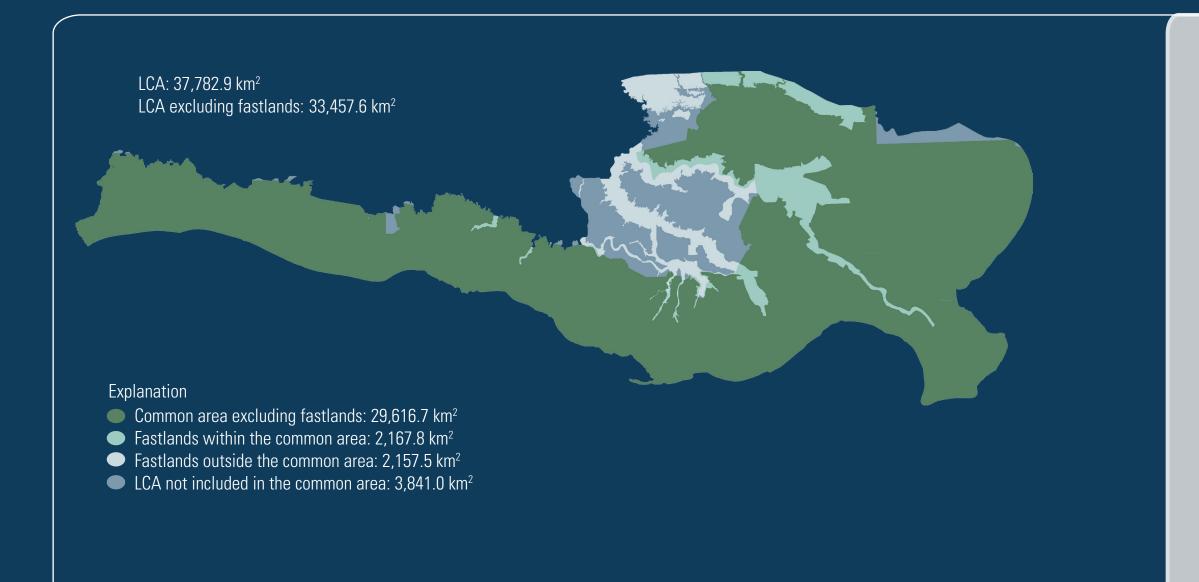


Figure 1. Map of common study area composed of overlapping data coverage in the 1956 and 1978 land and water data sets and those of the 2000 Landsat Thematic Mapper data set used in the Louisiana Coastal Area (LCA) Study (Barras and others, 2003). Also shown are fastlands, which are excluded from calculations of net changes in land area.

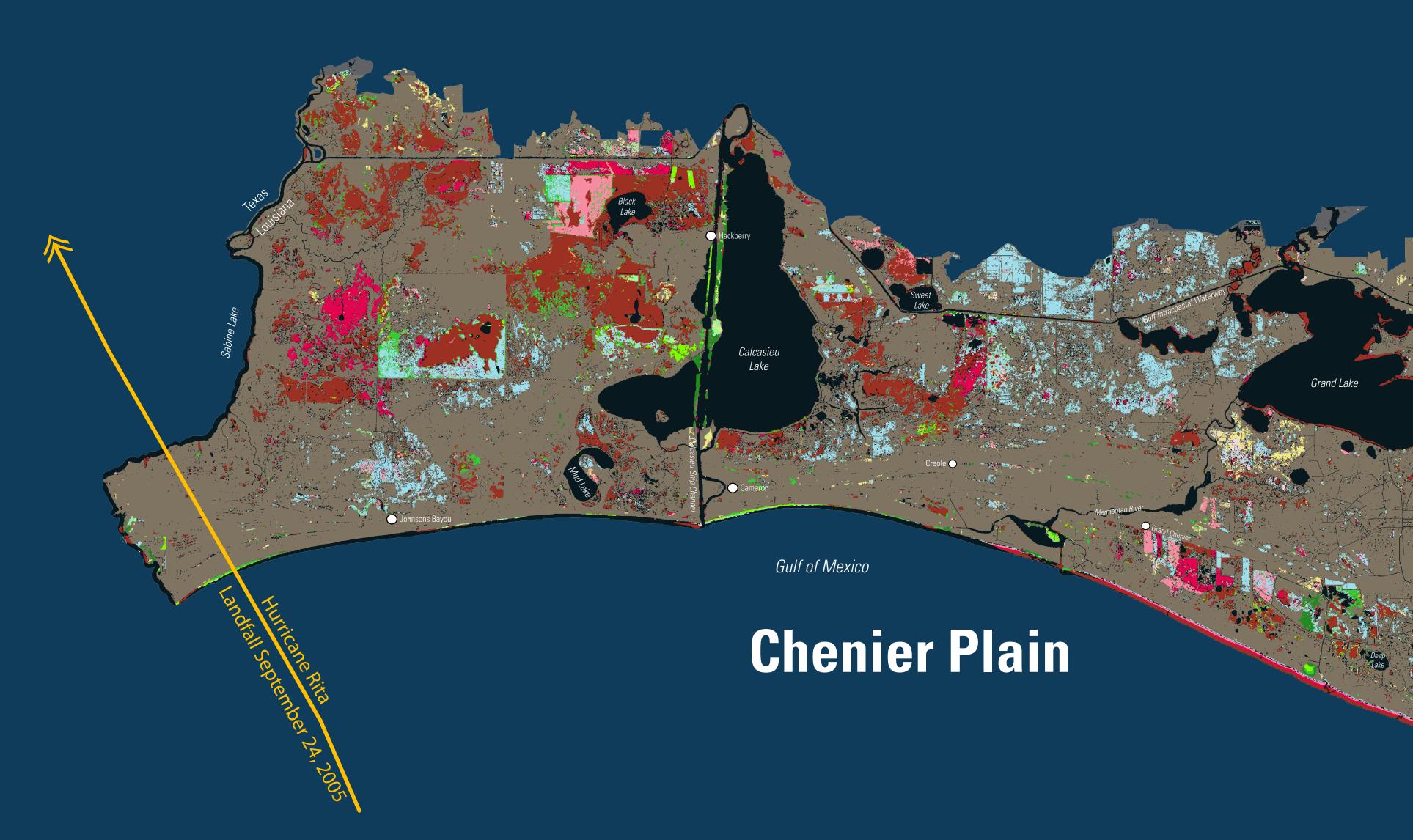


 Table 1. Land and water areas in coastal Louisiana by physiographic province, 1956–2006.
 [Area measurements provided in km²; habitat, National Wetlands Inventory Habitat Data; TM, Landsat Thematic Mapper classified imagery; LCA TM, Louisiana Coastal Area 2000 Landsat Thematic Mapper classified mosaic

Data Set Information		Deltaic Plain		Marginal Deltaic Plain			Chenier Plain			Coastal Louisiana				
Date ¹	Julian Date	Data Source	Land	Water	Total	Land	Water	Total	Land	Water	Total	Land	Water	Total
10/1/56	1956.8	habitat	8,951.0	11,600.7	20,551.7	1,844.1	1,916.6	3,760.7	4,359.0	945.3	5,304.3	15,154.1	14,462.6	29,616.7
10/1/78	1978.8	habitat	7,378.9	13,172.8	20,551.7	1,761.2	1,999.5	3,760.7	3,776.2	1,528.1	5,304.3	12,916.3	16,700.4	29,616.7
1/19/85	1985.1	TM	7,288.3	13,263.4	20,551.7	1,761.2	1,999.5	3,760.7	3,540.5	1,763.8	5,304.3	12,590.0	17,026.7	29,616.7
1/26/88	1988.1	TM	7,490.3	13,061.4	20,551.7	1,800.1	1,960.6	3,760.7	3,600.1	1,704.2	5,304.3	12,890.4	16,726.3	29,616.7
10/1/88	1988.8	habitat	7,249.4	13,302.3	20,551.7	1,805.2	1,955.5	3,760.7	3,618.2	1,686.1	5,304.3	12,672.9	16,943.8	29,616.7
11/1/90	1990.8	TM	7,031.9	13,519.8	20,551.7	1,766.4	1,994.3	3,760.7	3,789.2	1,515.1	5,304.3	12,587.4	17,029.3	29,616.7
2/24/98	1998.2	TM	6,860.9	13,690.8	20,551.7	1,719.8	2,040.9	3,760.7	3,354.1	1,950.2	5,304.3	11,934.7	17,682.0	29,616.7
11/18/99	1999.9	TM	6,721.1	13,830.6	20,551.7	1,862.2	1,898.5	3,760.7	3,768.5	1,535.8	5,304.3	12,351.7	17,265.0	29,616.7
10/1/00	2000.8	LCA TM	6,581.2	13,970.5	20,551.7	1,807.8	1,952.9	3,760.7	3,649.3	1,655.0	5,304.3	12,038.3	17,578.4	29,616.7
10/30/01	2001.8	TM	6,700.3	13,851.4	20,551.7	1,807.8	1,952.9	3,760.7	3,714.1	1,590.2	5,304.3	12,222.2	17,394.5	29,616.7
2/27/02	2002.2	TM	6,822.1	13,729.6	20,551.7	1,805.2	1,955.5	3,760.7	3,576.8	1,727.5	5,304.3	12,204.1	17,412.6	29,616.7
11/7/04	2004.9	TM	6,617.5	13,934.2	20,551.7	1,807.8	1,952.9	3,760.7	3,747.7	1,556.6	5,304.3	12,173.0	17,443.7	29,616.7
10/25/05	2005.8	TM	6,311.8	14,239.9	20,551.7	1,769.0	1,991.7	3,760.7	3,525.0	1,779.3	5,304.3	11,605.8	18,010.9	29,616.7
10/28/06	2006.8	TM	6,399.9	14,151.8	20,551.7	1,800.1	1,960.6	3,760.7	3,460.2	1,844.1	5,304.3	11,660.2	17,956.5	29,616.7

¹Represents the acquisition date for Landsat Worldwide Reference System, Path 22 and Rows 39-40 only, and provides a general date of reference for other scenes comprising each coastal land-water data set.

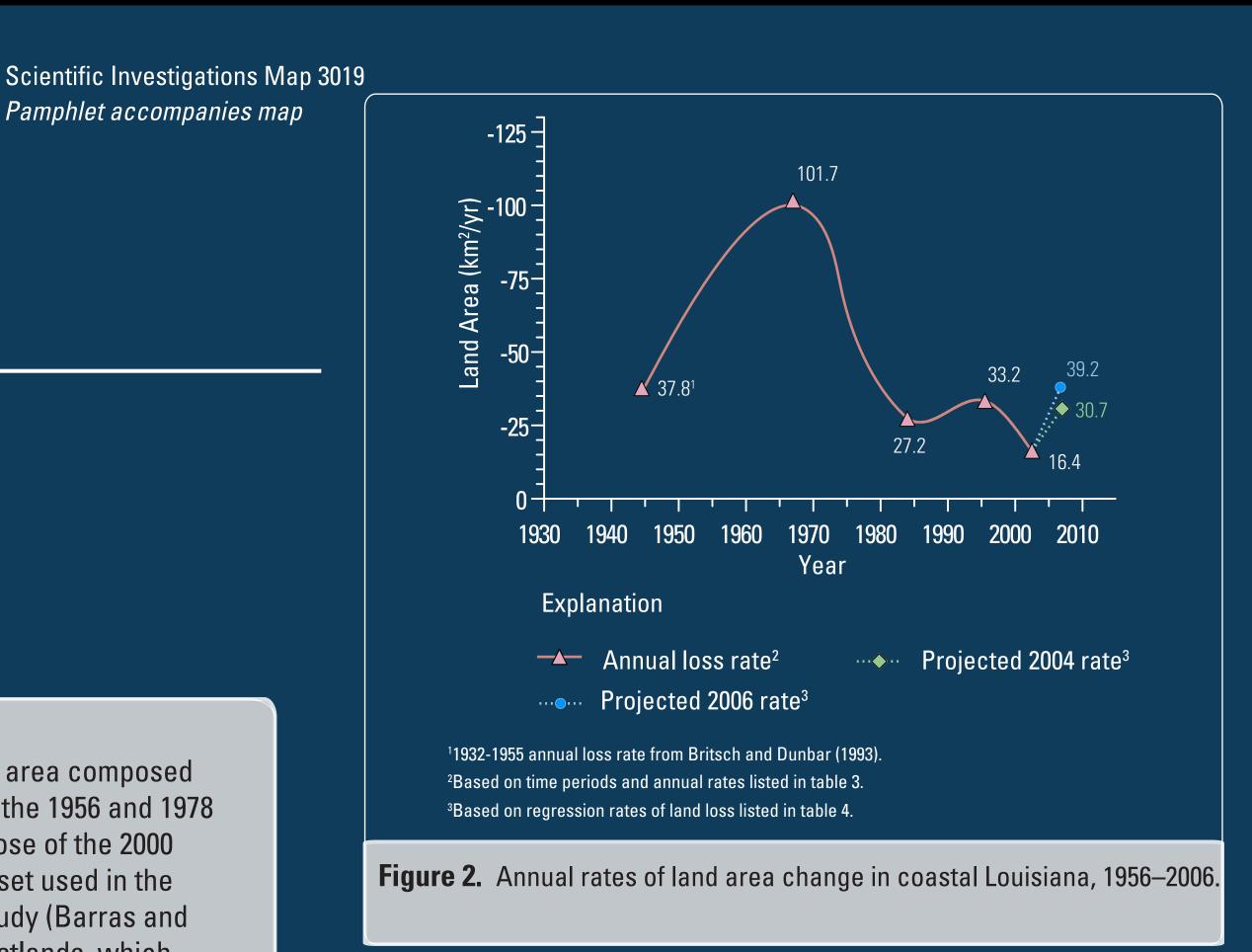
Table 2. Changes in land area and rates of land loss in coastal Louisiana by period

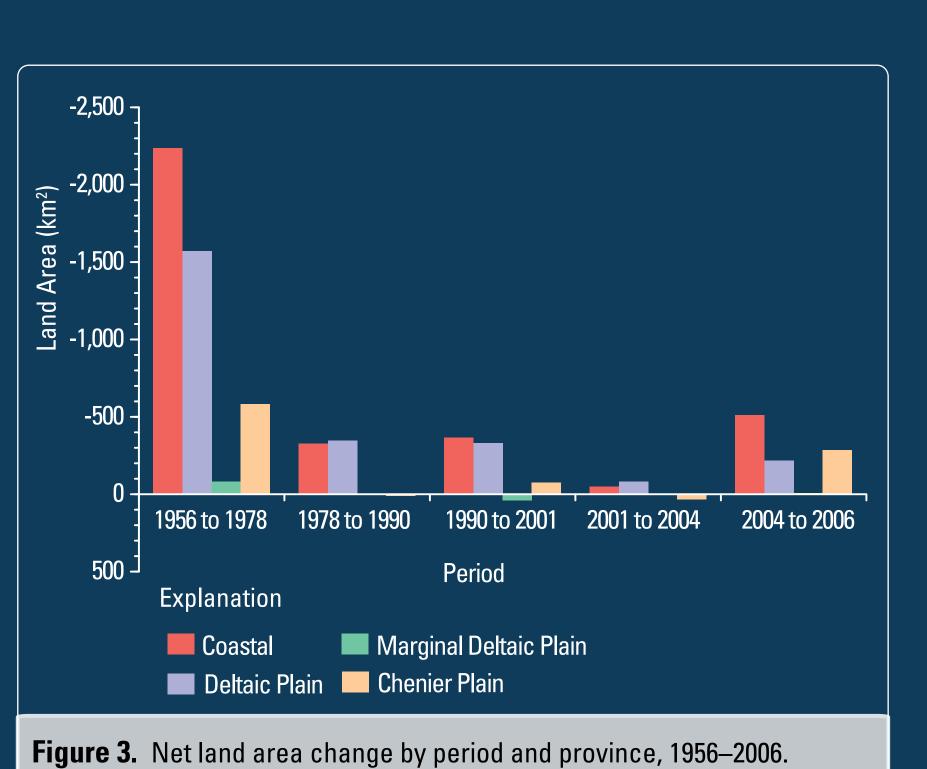
 and physiographic province, 1956–2006.

[Area change measurements provided in km² (negative measurements indicate land loss, while positive ones indicate land gain); percent area change equals area change per period divided by total area change from 1956 to 2006]

Period	Period Years	Delta	ic Plain	Marginal	Deltaic Plain	Chenie	er Plain	Coastal Louisiana	
I onou		Area Change	Percent Area Change	Area Change	Percent Area Change	Area Change	Percent Area Change	Area Change	Percent Area Change
1956 to 1978	22.0	-1,572.1	-61.6	-82.9	-188.4	-582.8	-64.8	-2,237.8	-64.0
1978 to 1990	12.1	-347.0	-13.6	5.2	11.8	13.0	1.4	-328.8	-9.4
1990 to 2001	11.0	-331.6	-13.0	41.4	94.1	-75.1	-8.3	-365.3	-10.5
2001 to 2004	3.0	-82.8	-3.3	0.0	0.0	33.6	3.7	-49.2	-1.4
2004 to 2006 ¹	2.0	-217.6	-8.5	-7.7	-17.5	-287.5	-32.0	-512.8	-14.7
1956 to 2006	50.1	-2,551.1	100.0	-44.0	100.0	-898.8	100.0	-3,493.9	100.0

¹The changes in this period reflect an estimate of conditions 1 year after the 2005 hurricane season as compared to the analysis conducted by Barras (2006) immediately after Hurricanes Katrina (Aug. 29) and Rita (Sept. 24) in 2005. The current analysis provides a refined estimate of loss likely caused by those two closely-timed events.





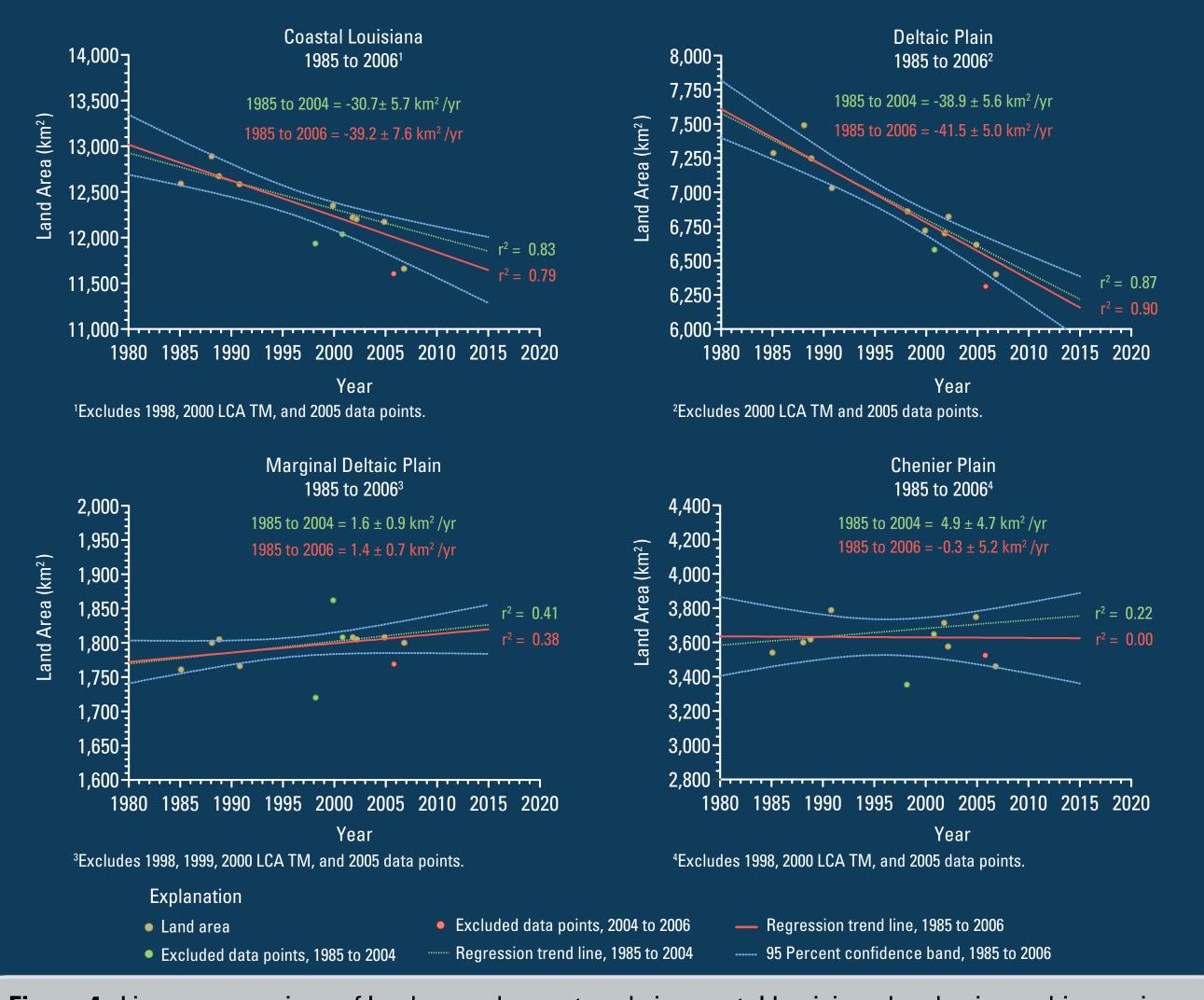


Figure 4. Linear regressions of land area change trends in coastal Louisiana by physiographic province, 1985–2006. (Negative measurements indicate land loss, while positive measurements indicate land gain.)

Marginal Deltaic Plain

Table 3. Annual rates of land area change in coastal Louisiana by period and physiographic province, 1956–2006.

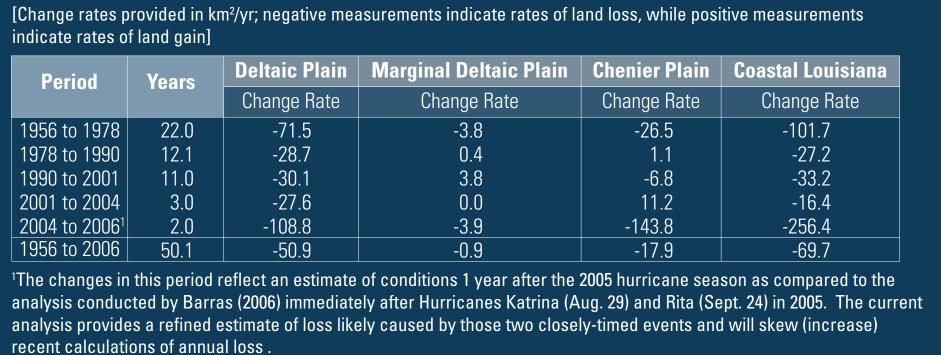


Table 4. Rates of land area change in coastal Louisiana, derived from linear regressions of change rates versus time, by physiographic province, 1985–2006. [Change of area slope (rate) provided in km²; SD, standard deviation; slope SD provided in km²; confidence intervals of slope are provided in km² at 95 percent confidence; Sy.x, the standard deviation of the vertical distances of the data points from the regression line and is

Area	Period	Change of Area Slope (Rate)	SD of Area Slope	Confidence Intervals of Slope	Sy.>
Coastal ¹	1985-2004	-30.7	± 5.7	-44.7 to -16.8	117.0
υσασται	1985-2006	-39.2	± 7.6	-57.2 to -21.2	177.0
Deltaic Plain ²	1985-2004	-38.9	± 5.6	-52.3 to -25.6	116.8
	1985-2006	-41.5	± 5.0	-53.0 to -29.9	116.6
Marginal	1985-2004	1.6	± 0.9	-0.6 to 3.9	17.3
Deltaic Plain ³	1985-2006	1.4	± 0.7	-0.4 to 3.1	16.4
Chenier Plain ¹	1985-2004	4.9	± 4.7	-7.2 to 17.0	93.9
	1985-2006	-0.3	± 5.2	-13.1 to 12.5	120.3

³Excludes the 1998, 1999, 2000 LCA TM, and the 2005 data sets.

Explanation

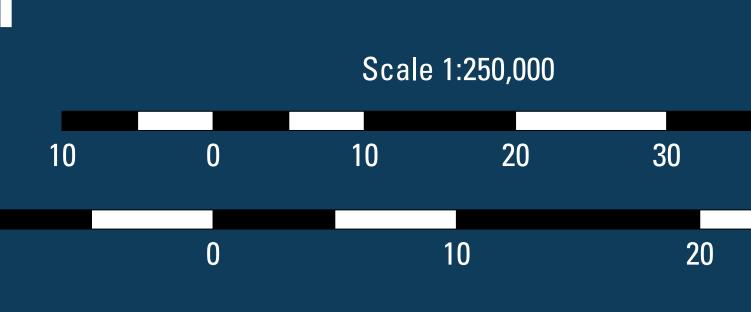


r ²	Data Points
0.83	8
0.79	9
0.87	9
0.90	10
0.41	7
0.38	8
0.22	8
0.00	9

Gulf of Mexico

Deltaic Plain

Lake Maurepa



- **1956** to 1978 land loss¹
- 1978 to 1990 land loss¹
- 1990 to 2001 land loss²
- 2001 to 2004 land loss²
- 2004 to 2006 new water areas²
- 1956 to 1978 land gain¹

Lake Pontchartrain

- 2004 to 2006 new land areas²
- **2005** land
- 2005 water
- Fastlands: Agricultural, developed, and upland areas that are generally considered
- nonwetlands (Barras, 2006) and that are excluded from calculations of net land area change.
- Portions of the Louisiana Coastal Area (LCA) Study not included in the 1956 boundary of data coverage
- 2005 Hurricane tracks
- -- Physiographic province boundary: These boundaries include the shared area between the physiographic provinces, the historical habitat data sets, and the boundary of the LCA Study (Barras, 2006).
- ¹Data were filtered to depict areas of loss and gain greater than 1.4 ha in size to remove noise and increase the confidence of the depicted trends. ²Data were filtered to depict areas of loss and gain greater than 1.3 ha in size to remove noise and increase confidence in the depicted trends.



Image Source: Landsat 5 Thematic Mapper satellite imagery is provided by the USGS Center for Earth Resources Observation and Science (EROS).

The background land-water image depicts data from October 28, November 20, and December 13, 2006, and January 25, 2007, that is classified by types of land and

Suggested citation:

Barras, J.A., Bernier, J.C., and Morton, R.A., 2008, Land area change in coastal Louisiana–A multidecadal perspective (from 1956 to 2006): U.S. Geological Survey Scientific Investigations Map 3019, scale 1:250,000, 14 p. pamphlet.

See pamphlet for references cited.

