Coastal Change in Mississippi: A Review of 1850 to 1999 data

Pascagoula – SMA
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Selected Aspects of Coastal Change

• Shoreline Change – Historic
  – NOS T-Sheets & Aerial Photos
    • 1850 - 1986 Mainland along exposed shoreline
    • 1850 - 1986 Barrier Islands

• Marsh Change 1950-1992
  – U.S. Fish & Wildlife & Office of Geology data
    • Based on aerial photographs

• Shoreline Change – Recent
  – GPS Shoreline surveys (after 1986)
    • Marsh loss 1986 to 1999
    • Island change – Ship Island
    • Spoil Island change – Singing River Is.
Shoreline Change 1850-1986

Data from NOS T-Sheets and aerial photography

Only areas south of US 90 analyzed (wave influenced)
1850-1986 Mainland Shoreline Change – Hancock

Net Change = -1,026 acres
**1850-1986 Mainland Shoreline Change – Harrison**

<table>
<thead>
<tr>
<th>Change Type</th>
<th>1850 to 1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>man loss</td>
<td>-45</td>
</tr>
<tr>
<td>man gain</td>
<td>612</td>
</tr>
<tr>
<td>natural loss</td>
<td>-288</td>
</tr>
<tr>
<td>natural gain</td>
<td>16</td>
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</tbody>
</table>

**Net Change = +295 acres**

<table>
<thead>
<tr>
<th>from to</th>
<th>1850 1917 1950 1986 1850 1917 1950 1986</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total loss</td>
<td>-351 -125 -229 -333</td>
</tr>
<tr>
<td>Total gain</td>
<td>194 682 117 628</td>
</tr>
</tbody>
</table>
1850-1986 Mainland Shoreline Change – Jackson

Net Change = -466 acres
1850-1986 Shoreline Change – Islands

<table>
<thead>
<tr>
<th>Island Totals</th>
<th>Gain</th>
<th>Loss</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2601</td>
<td>-5296</td>
<td>-2695</td>
</tr>
</tbody>
</table>
1850-1986 Coastal Shoreline Change - Totals

Mainland Shoreline Change

<table>
<thead>
<tr>
<th>Hancock</th>
<th>Harrison</th>
<th>Jackson</th>
</tr>
</thead>
<tbody>
<tr>
<td>-934</td>
<td>-272</td>
<td>-1610</td>
</tr>
<tr>
<td>-93</td>
<td>567</td>
<td>1145</td>
</tr>
<tr>
<td>-1027</td>
<td>295</td>
<td>-465</td>
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</tbody>
</table>

Total Coast Changes

<table>
<thead>
<tr>
<th>net natural change</th>
<th>net man-made change</th>
<th>Net change</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5561</td>
<td>1669</td>
<td>-3892</td>
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</table>

Mainland Totals

<table>
<thead>
<tr>
<th>net natural change</th>
<th>net man-made change</th>
<th>Net change</th>
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</thead>
<tbody>
<tr>
<td>-2816</td>
<td>1619</td>
<td>-1197</td>
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</table>

Islands

<table>
<thead>
<tr>
<th>net natural change</th>
<th>net man-made change</th>
<th>Net change</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2745</td>
<td>50</td>
<td>-2695</td>
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</tbody>
</table>

Net change

-2000  -1500  -1000  -500  0  500  1000  1500  2000

Acres
Marsh Change 1950-1992

- Less than 15 ft elevation
- Emphasis on tidal marsh
- Some non-tidal

Mainly wetlands south of I-10 considered
1950’s = 23,825 acres  
1990’s = 21,186 acres  
Total Marsh Loss = 2,639 acres
1950’s = 7,168 acres
1990’s = 5,836 acres
Total Marsh loss = 1,333 acres
1950’s = 36,005 acres
1990’s = 31,390 acres
Total marsh loss = 4,615 acres
Marsh Loss Accounting

<table>
<thead>
<tr>
<th></th>
<th>Hancock Co.</th>
<th>Harrison Co.</th>
<th>Jackson Co.</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Marsh Loss</td>
<td>2640</td>
<td>1333</td>
<td>4615</td>
<td>8588</td>
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<tr>
<td>Marsh to Development</td>
<td>1441</td>
<td>624</td>
<td>1362</td>
<td>3427</td>
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<tr>
<td>Marsh to Water</td>
<td>1014</td>
<td>444</td>
<td>812</td>
<td>2270</td>
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</tbody>
</table>

1950’s = 67,000 acres  
1990’s = 58,500 acres
MDEQ - Mississippi Office of Geology

Marsh Shorelines – Recent

86-99 loss = 86 acres

86-99 loss = 133 acres

Hancock Marsh: Yearly Change

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>-5.9</td>
<td>-7.4</td>
<td>-6.6</td>
<td>-7.4</td>
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</tbody>
</table>

Grand Bay

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>-7.6</td>
<td>-13.3</td>
<td>-10.2</td>
<td>-10.0</td>
<td></td>
</tr>
</tbody>
</table>
Ship Island Area Change 1850-1999

- Dredging Begun Across Ship Island Bar (1948)
- Camille
- Georges

Year:
1840 1860 1880 1900 1920 1940 1960 1980 2000 2020 2040

Acres:
200 400 600 800 1000 1200 1400 1600 1800

Ship Is.: 1850
Ship Is.: 1899
Ship Is.: 1917
Ship Is.: 1966
Ship Is.: 1999

N
S
W
E
2 0 2 4 6 Kilometers
Ship Island – Future Predictions

- Calculated 2017 area from cross island transects (1986-1997) = 611 acres
- Calculated 2017 area from long term area change (graph of 1850-1999) = 600 acres
Total lost = 120 acres
Conclusions – Totals

• **A net of about 4000** acres of coastal Mississippi south of US 90 has been lost since **1850**
  – Total natural change = **-5600** acres
  – Total man-made change = **+1700** acres.

• **9000+** acres of marsh south of I-10 (below 15 ft elevation) has been lost since **1950**, or about **15%** of total marsh in the area analyzed.
  – About **2700** acres to water.
  – About **3500** acres to development.

• Loss of coastal habitat continues today at rates similar to historic trends.

• Present rate of sea level rise will maintain coastal habitat loss trend, expected increases in sea level rise will heighten coastal loss.