

# Gulf of Mexico Shoreline Movement

## Mustang Island and North Padre Island, Texas

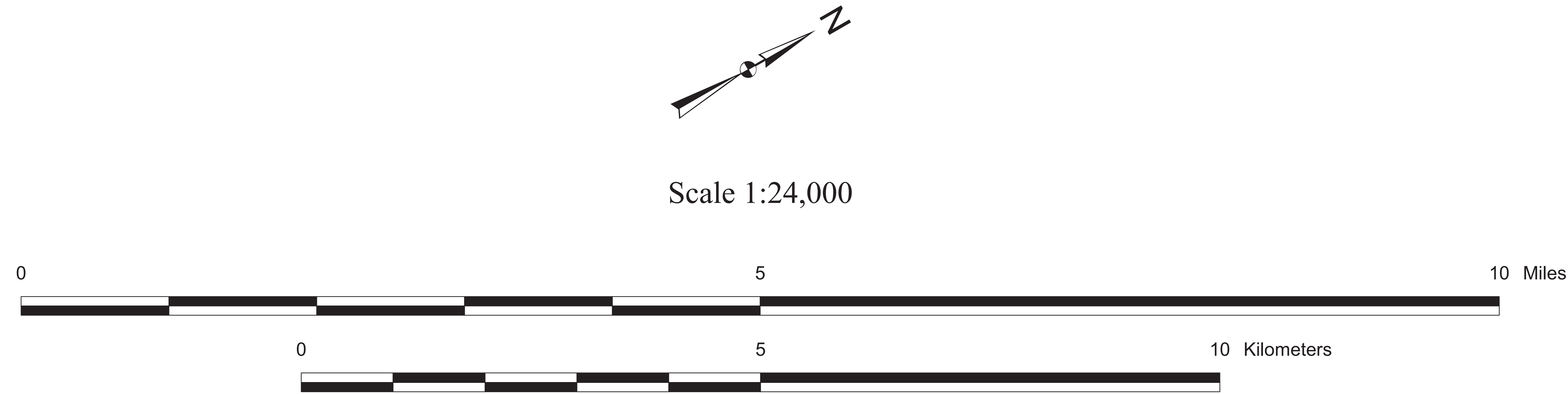
### Northern Padre Island to Aransas Pass



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Shoreline movement rates displayed on this poster were prepared under General Land Office of Texas contract nos. 16-201-000, "BEG Shoreline Update" and 20-039-000-B747 "Texas High School Coastal Monitoring Program." The shoreline movement update project was funded through the Coastal Erosion Planning and Response Act (CEPRA) project no. 1662. Poster creation was supported by the Texas Coastal Management Program grant pursuant to National Oceanic and Atmospheric Administration Award No. NA19NOS4190106 and by the State of Texas Advanced Resource Recovery Program (STARR).

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2021



SHORELINE MOVEMENT RATE	
feet/year	meters/year
> 14.8	> 4.5
11.5 – 14.8	3.5 – 4.5
8.2 – 11.5	2.5 – 3.5
4.9 – 8.2	1.5 – 2.5
1.6 – 4.9	0.5 – 1.5
-1.6 – 1.6	-0.5 – 0.5
-4.9 – -1.6	-1.5 – -0.5
-8.2 – -4.9	-2.5 – -1.5
-11.5 – -8.2	-3.5 – -2.5
-14.8 – -11.5	-4.5 – -3.5
< -14.8	< -4.5
Point Labels: feet/year	
— 1937 Shoreline	
— 1950's Shoreline	

## EXPLANATION

### Average Annual Rates of Shoreline Change

Long-term rates of Gulf shoreline movement (1930s to 2019) have been calculated as net (average) and linear-regression rates. Rates were calculated every 164 ft (50 m) alongshore within ArcGIS software using the Digital Shoreline Analysis System (DSAS) (Himmelstoss and others, 2018). For readability, this map shows every third data point at an alongshore interval of 492 ft (150 m). Net rates shown here are the simple average rate of movement, calculated by dividing the movement distance by elapsed time for the longest period available. Data point labels are feet per year. The following historical shorelines were used in the complete analysis of historical shoreline change discussed in Paine and others (2021): 1937, 1958, 1959, 1965, 1969, 1974, 1990, 1995, 2000, 2007, 2012, and 2019.

### 1937, 1958, and 1959 Shorelines

These shorelines were interpreted on vertical aerial photographs, transferred to a U.S. Geological Survey 7.5 – minute quadrangle map, and then digitized and georeferenced. The 1937 shoreline is the oldest shoreline used in determining the annual average rate of shoreline change.

### 2019 Shoreline

The shoreline movement markers coincide with the position of the shoreline extracted from airborne lidar survey data acquired in April thru June 2019.

### Aerial Photography

Shoreline-movement data are superimposed on 2020 digital ortho-rectified imagery from the United States Department of Agriculture's National Agriculture Imagery Program (NAIP).

### References

Paine, J. G., Caudle, T., and Andrews, J. R., 2021, Shoreline movement and beach and dune volumetrics along the Texas Gulf Coast, 1930s to 2019: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for the General Land Office under contract no. 16-201-000, 101 p.

Himmelstoss, E. A., Farris, A. S., Henderson, R. E., Kratzmann, M. G., Ergul, Ayhan, Zhang, Ouya, Zichichi, J. L., Thieler, E. R., 2018, Digital Shoreline Analysis System (version 5.0): U.S. Geological Survey software release, <https://code.usgs.gov/cch/dsas>.