Subsidence in Terrebonne Parish May be Slowing Down

James M. Sothern, MS

Adjunct Instructor of Geology

Fletcher Technical Community College Houma, LA

Introduction

- Natural subsidence across the gulf coast is brought about mainly by regional synclinal down warping, sediment compaction, and faulting.

- The rate of this type of subsidence may be on the order of inches over hundreds of years.

- Recently the rate of subsidence in coastal Louisiana has escalated to inches over decades rather than hundreds of years.

Introduction, continued

- It is widely accepted by many geologists and environmental scientists that this accelerated subsidence in South Louisiana over the last several decades is due, at least in part, to the withdrawal of hydrocarbons and connate water from the subsurface.

(Chan and Zoback, 2007; Holzer and Galloway, 2005).

Methods

- The methods and concepts used in this presentation were fairly simple.

- Crude oil and natural gas production data were compared to bench mark elevations over the same time span up to the present.

Methods, continued

- The starting point for this investigation was the elevation bench mark data presented in the U.S Army Chief of Engineers Houma Quadrangle Bulletin (1942).

- Elevations from the mid to late 1930's to the early 1940's represent relatively stable conditions that existed prior to the accelerated surface subsidence.

Methods, continued

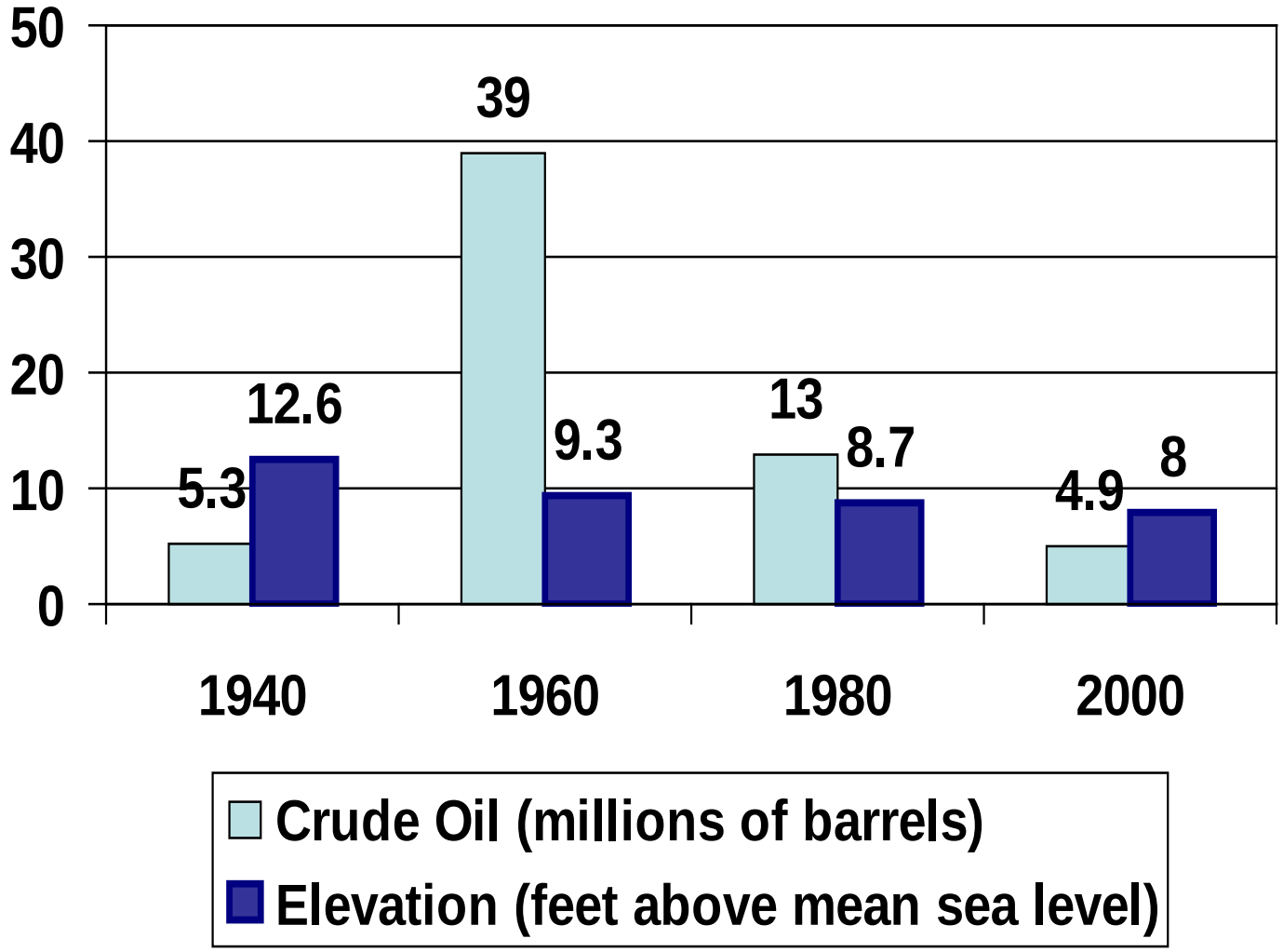
- Crude oil and natural gas production data were obtained from the LA Department of Natural Resources (1940- 2008) and compared to bench mark elevations over the same time span up to the present (Rembert, 1950-2006).

- Condensate and casinghead gas and ground water withdrawal data were unavailable at the time of this investigation.

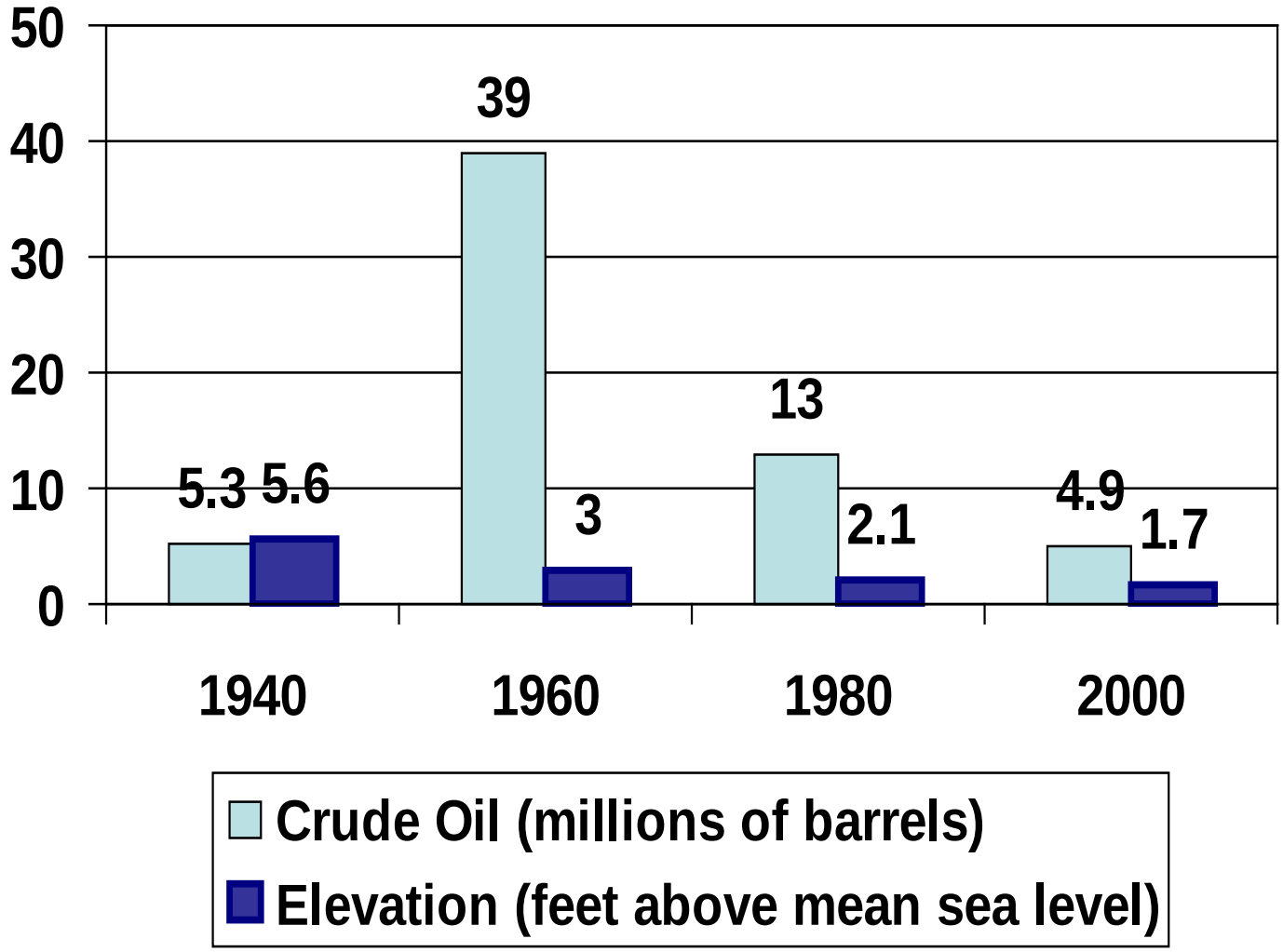
Results

- When plotted and displayed by bar graphs, the results clearly show an interaction indicating accelerated subsidence during peak production years, and a decrease in surface subsidence coinciding with diminishing hydrocarbon production.

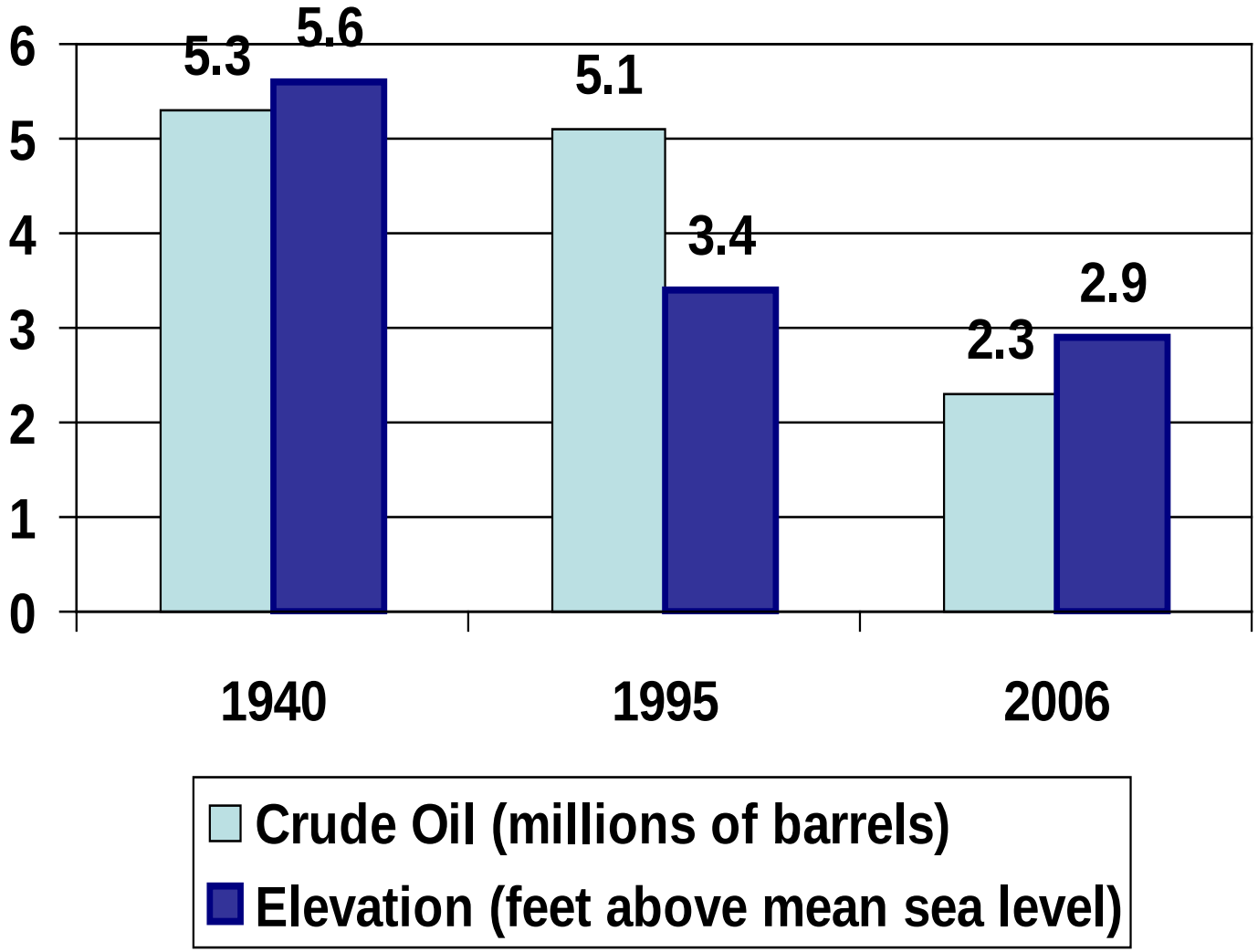
Results: Land Elevation of Houma, LA and Crude Oil Production



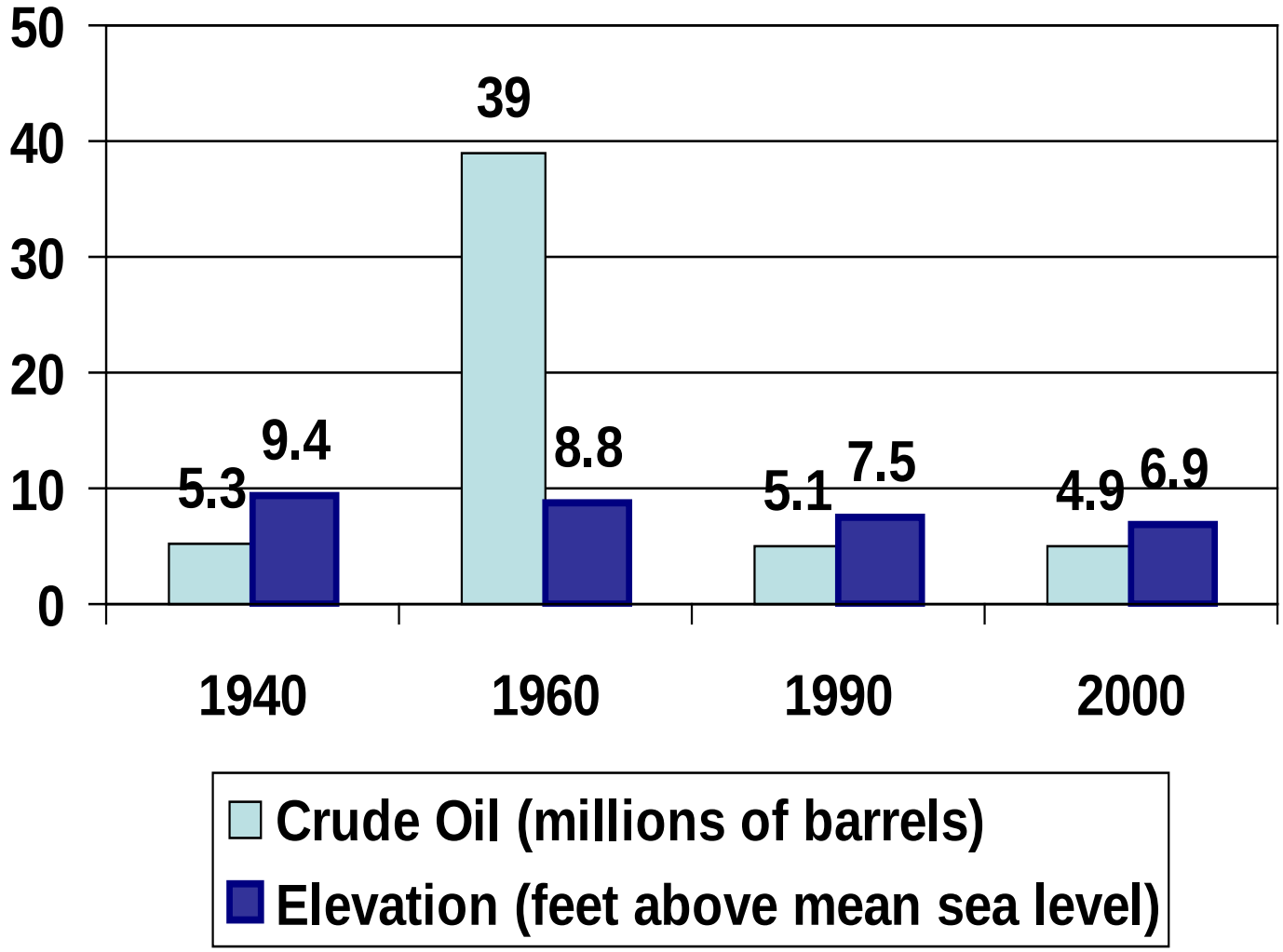
Results: Land Elevation of Chauvin, LA and Crude Oil Production



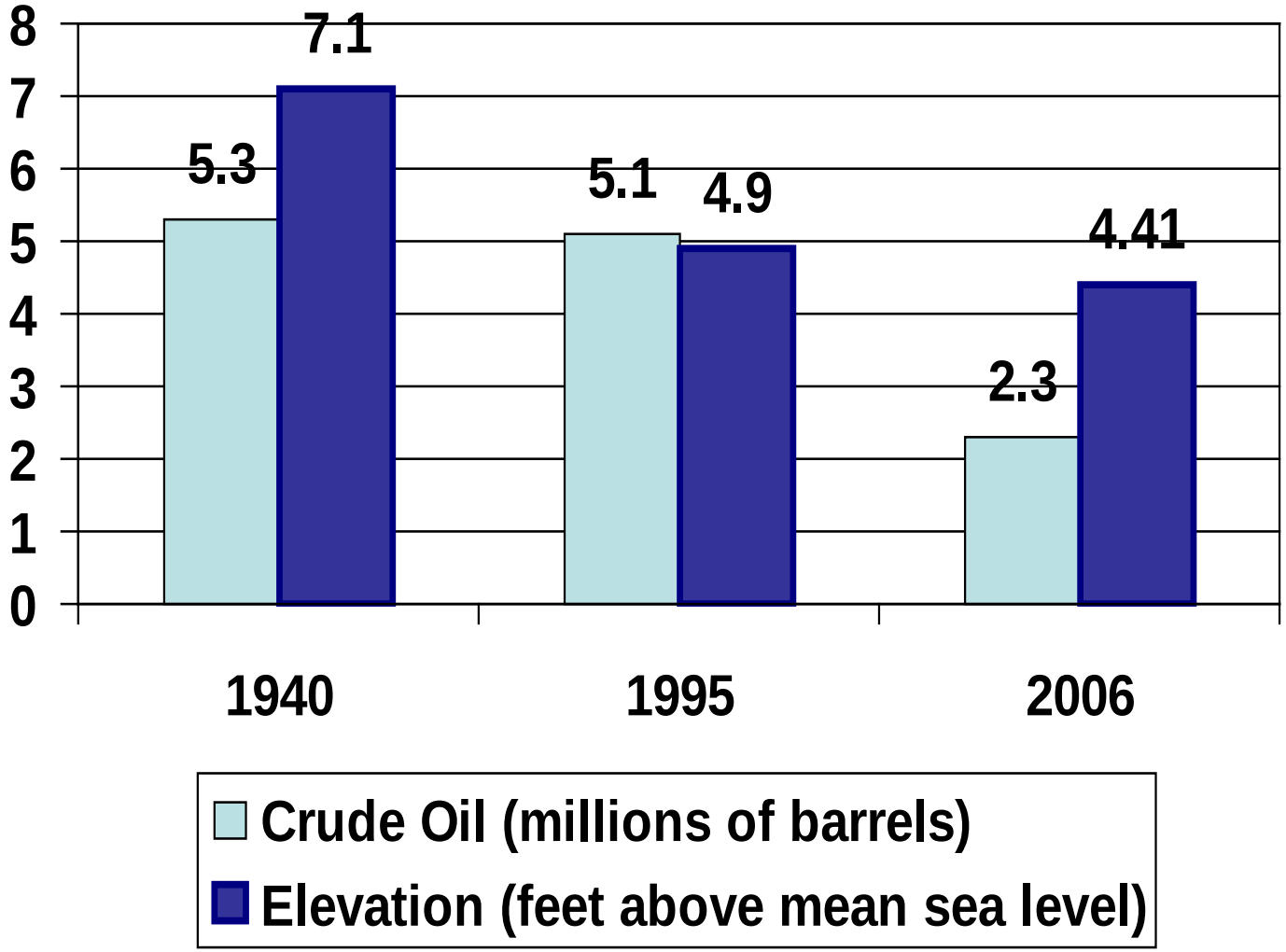
Results: Land Elevation of Grand Caillou, LA and Crude Oil Production



Results: Land Elevation of Savoie (Bayou Blue) LA and Crude Oil Production



Results: Land Elevation of Bourg LA and Crude Oil Production



Results, continued

- The subsidence induced by hydrocarbon and groundwater withdrawal appears to be approximately 3 feet (0.914 meters) over the past 60 years in Terrebonne Parish

- When compared with pre-existing and present elevations over this same period, there appears to be a reduction in the rate of subsidence that correlates with the diminishing rate of crude oil and natural gas production in Terrebonne Parish.

Results - Summary

- This preliminary investigation suggests that land subsidence in Terrebonne Parish may be inversely related to oil and natural gas production.

- More data is needed to determine whether this is a statistically significant relationship.

Conclusion

- Land subsidence in Terrebonne Parish over the past decade appears to be slowing down.

- These events give impetus for funding and implementation for coastal and wetlands restoration.

Acknowledgements

- Robert R. Wright, retired Civil Engineer and Land Surveyor, U.S. Army Engineers 1942 Bulletin

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