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STUDY TITLE: Socioeconomic Responses to Coastal Land Loss and Hurricanes: Measuring Resilience among Outer Continental Shelf Related Coastal Communities in Louisiana

REPORT TITLE: Socioeconomic Responses to Coastal Land Loss and Hurricanes: Measuring Resilience among Outer Continental Shelf-Related Coastal Communities in Louisiana

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BACKGROUND: In the years since Hurricanes Katrina and Rita in 2005, scholars, policy makers, residents and other stakeholders have raised questions about the long-term survival of coastal communities in the face of increasingly intense storms, sea-level rise and other natural hazards. Several Outer Continental Shelf (OCS) management questions relate to the overall, long-term resilience of communities in coastal Louisiana and other states in the region with oil and gas industry activities and investments.

OBJECTIVES: This research addresses the following questions.

1) How can community resilience best be measured?
2) How resilient are OCS communities to threats posed by coastal land loss and hurricanes?
3) Are OCS communities more resilient to these natural threats than coastal communities less involved in OCS activities?

These topics are relevant to BOEM and to Louisiana, especially, given the high levels of OCS activity within the coastal areas of the State and the large-scale destruction to property, natural assets, and human life as a result of major hurricanes during the last few years.

DESCRIPTION: The study involves the application of concepts from the social-ecological resilience literature to coastal communities in Louisiana and the four other northern Gulf of Mexico states: Texas, Mississippi, Alabama and Florida. The research objectives are to: 1) develop quantitative indicators of community resilience to coastal land loss and to hurricanes; 2) compile these indicators into a "resilience index"; 3) create GIS-supported maps depicting vulnerability and resilience based on these indicators; and 4) make comparisons among communities of coastal Louisiana more and less involved with OCS activities. Specifically, we investigate whether communities with more of the workforce employed in oil and gas and supporting industries tend to be more resilient to natural disasters than coastal communities with less oil and gas industry activity. Computation of the resilience index provides useful baseline information concerning the hazards facing OCS communities, the extent to which they have been able to withstand and recover from natural disturbances, and whether OCS activities may tend to enhance the overall resilience of these communities.

SIGNIFICANT CONCLUSIONS: Does this study suggest that higher levels of employment within the oil and gas industry help make a community more resilient to disasters? To determine possible associations, we applied bi-variate correlation analyses between two measures of oil and gas industry activity (total employment of five NAICS categories and number of establishments within these five categories) and the resilience scores (calculated by two methods: Factor Analysis and Discriminant Analysis) for the coastal counties within the study area. The Pearson Correlation Analyses yielded no evidence of statistically significant associations between either of the calculated resilience scores and the measures of oil and gas industry activity within the counties and parishes.

However, even in light of these findings, the study is a first step in operationalizing key theoretical concepts from the social-ecological resilience literature that are relevant to considerations of how industry presence may influence the socioeconomic conditions of communities. We have aggregated a range of socioeconomic and environmental variables so that comparisons can be made among coastal communities, demonstrating a useful approach for the more systematic examination and comparison of exposure, vulnerability and capacity for resilience among these coastal areas.

STUDY RESULTS: The calculation of the resilience scores for the coastal counties and parishes yielded information about the relative socioeconomic conditions among coastal jurisdictions and the extent to which the coastal communities have held on to populations over time in light of exposure to storms and other large-scale disturbances.

The two methods employed, the Factor Analysis (FA) method and the Discriminant Analysis (DA) method produced slightly different rankings or scores for parishes and counties. For example, using the FA method to calculate the resilience scores resulted in Terrebonne Parish, Louisiana being placed in the third quartile of resilience among

the coastal counties and parishes, while the DA method placed it in the second quartile. Most of these counties are categorized differently by only one resilience group. For example, Cameron, Texas is placed in group 1, or the least resilient group via the FA method, but by the DA analysis method is placed in group 2, a slightly more resilient group. Nine counties had differences that are greater than a one-group difference. These counties are: Jefferson, Texas; Nueces, Texas; Kennedy, Texas; Jefferson, Louisiana; Mobile, Alabama; Pasco, Florida; Citrus, Florida; Hernando, Florida; and Pinellas, Florida. For each of these counties the difference between the resilience scores for the two methods were two group categories. Twenty-six counties in the Gulf of Mexico region have the same resilience categorization by both methods. For example, Willacy, Texas is in the least resilient category via both the FA and the DA methods while Okaloosa, Florida is estimated to be in the most resilient category by both methods.

The DA method may be considered a more refined approach in that it includes the exposure to hurricanes and other natural disturbances over time in the calculation of the resilience score. In that sense, it provides a method to compare areas that have been similarly affected by disturbances when evaluating their resilience or ability to maintain and increase their population over time.

STUDY PRODUCTS: Reams, M.A. and N.S.N. Lam. 2013. Socioeconomic responses to coastal land loss and hurricanes: Measuring resilience among Outer Continental Shelf-related coastal communities in Louisiana. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2013-0111. 52 p.

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