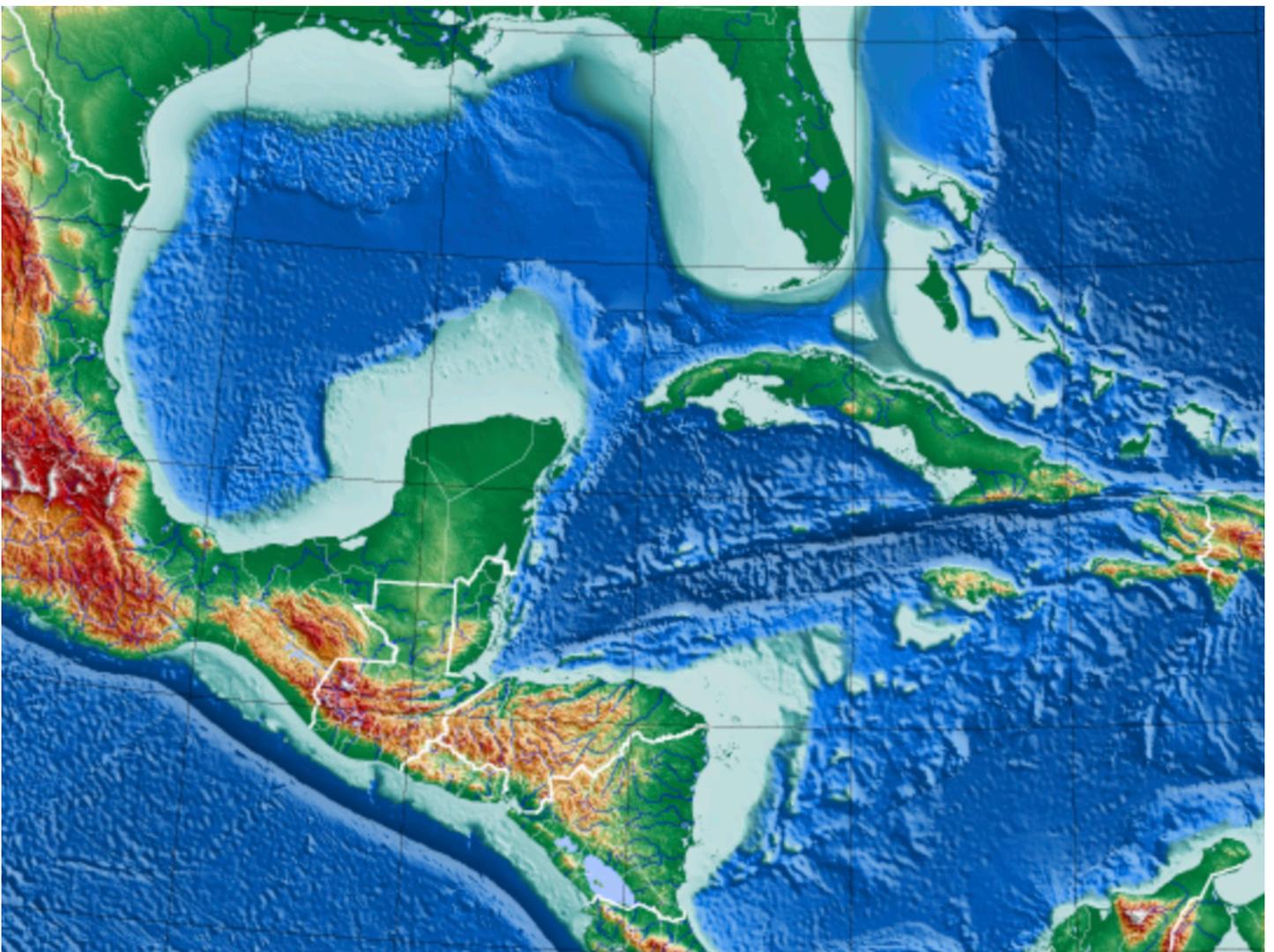


Proceedings Outline for
**Gulf of Mexico International
Ocean Acidification Summit**

Oct. 18-19, 2022, Merida, Mexico



Background

The Gulf of Mexico is home to highly diverse marine, coastal, and estuarine environments including ecosystems that contribute significantly to the Gulf of Mexico blue economy of all three nations surrounding the Gulf. These systems contain several habitats and species including shellfish, coral reefs, carbonate seafloor environments, and economically important fisheries that are vulnerable to ocean and coastal acidification.

Ocean acidification poses an economic threat to the Gulf's blue economy, which is estimated to have a combined value of \$2.04 trillion per year across Cuba, Mexico, and the U.S. (Shepard et al. 2013). However, socioeconomic risks from acidification impacts to fisheries species are largely unknown.

In addition to elevated carbon dioxide (CO₂) in the atmosphere, acidification in the region is influenced by a complex interplay of processes and multiple stressors such as increasing water temperature, ocean circulation, runoff of both river water and excess nutrients, as well as low oxygen conditions, harmful algal blooms (HABs), storms, and oil seeps and spills.

Gulf of Mexico seawater chemistry is highly complex but remains relatively understudied with respect to acidification. Critical knowledge, research, and monitoring gaps limit

our current understanding of environmental, ecological, and socioeconomic impacts needed to improve models for predicting acidification and its consequences.

The diversity of habitats over multiple climate zones and connections between bordering nations' ocean and coastal resources through ocean circulation makes international collaboration critical to understanding the influence of acidification, its causes, and impacts in the Gulf of Mexico.

A shared, multi-national vision of *“a Gulf of Mexico Region that is prepared to respond and adapt to ocean acidification”* united an international team of scientists from the United States, Cuba, and Mexico to organize and conduct the Gulf of Mexico's first International Ocean Acidification Summit.



Meeting Proceedings

Thirty-one participants from the United States, Cuba, and Mexico met in Merida, Yucatan, Mexico from Oct. 18-19, 2022, for the first Gulf of Mexico International Ocean Acidification Summit. The meeting was sponsored by the Furgason Fellowship of the Harte Research Institute for Gulf of Mexico Studies (HRI) at Texas A&M University-Corpus Christi and co-hosted by the Gulf of Mexico Coastal Ocean Observing System (GCOOS, a regional association of the U.S. Integrated Ocean Observing System). Organizing institutions included:

- Harte Research Institute for Gulf of Mexico Studies, Texas A&M University-Corpus Christi
- GCOOS Gulf of Mexico Coastal Acidification Network (GCAN)
- United States Geological Survey, St. Petersburg Coastal and Marine Science Center (USGS-SPCMSC)
- Centro de Investigaciones Marinas, Universidad de La Habana (CIM-UH)
- Centro de Estudios Ambientales de Cienfuegos (CEAC)
- UMDI-Sisal, Facultad de Ciencias, Universidad Nacional Autónoma de México (UNAM)
- Instituto de Investigaciones Oceanológicas, Universidad Autónoma de Baja California (IIO-UABC)
- Kalanbio A.C. - Mexico

Meeting participants included representatives from government agencies, universities, research institutes, non-governmental organizations, and students (see participant list).

Primary meeting objectives included:

- Fostering communication among international colleagues;
- Sharing information on ocean acidification science, gaps, research and monitoring needs; and
- Exploring approaches and opportunities for collaboration.

Prior to this in-person meeting, participants provided summaries of their information needs related to ocean acidification to the organizing committee. GCAN hosted virtual group activities on September 7, 2022 to prioritize topics of discussion for the Merida meeting based on common needs across the nations; and this information was used to develop the in-person meeting agenda. Highest priority communication needs identified by the participant group included exchanging experiences with colleagues related to science and working with stakeholders, learning different perspectives related to the impacts of ocean acidification, and development of a tri-national network to facilitate multi-national collaboration on ocean acidification research and monitoring.

The meeting in Merida, Mexico began with introductory presentations from the sponsors and representatives from each of the three countries on meeting goals, potential outcomes, and brief overviews of the state of the science, gaps, and challenges from each country. These presentations were followed by topic-specific breakout sessions and group discussions on gaps, challenges, common regional issues, scientific and geographic priorities related to:

- Exposure to ocean acidification exposure and region-specific special considerations effecting exposure;
- Biological response to ocean acidification including species, habitat, and ecosystem response;
- Known and potential socioeconomic vulnerabilities.

The final group discussion focused on approaches for developing a tri-national network for ocean acidification and acknowledging their shared commitment to working toward this goal. The group agreed upon short-term actions to begin facilitating development of this network including establishing pathways and platforms to facilitate group communication, increasing awareness of this tri-national effort, and building on existing collaborative efforts and networks such as GCAN.

Additionally, the group identified shared priorities for observational, biological, and socioeconomic research including environmental justice needs; outreach and communications; priority geographic locations for study; and longer-term actions needed to facilitate multi-national collaboration such as:

- Identification or development of shared data and information platforms;
- Standardization of chemical and biological methods;
- Joint training activities for research and monitoring practices and procedures;
- Coordinated interaction and communication with regulatory agencies and resource managers for guidance to science; and
- Coordination of monitoring activities, collaborative research experiments, and tri-national comparison of results.



Anticipated Outcomes

In addition to working toward development of a tri-national network to foster collaboration among the three nations on ocean acidification research and monitoring, other anticipated outcomes from this meeting include:

- Co-development of a white paper report by the participant group describing meeting topics and discussion in more detail;
- Development of a multi-national Gulf of Mexico regional gap analysis to assist with identifying nation-specific and shared research and monitoring gaps;
- Development of a multi-national Gulf of Mexico socioeconomic risk and vulnerability assessment/report; and
- Development of special topical work groups to facilitate international collaborative research activities, training opportunities, and funding needs.



Participants

First Name	Last Name	Organization/Affiliation	Country
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Mark	Besonen	Harte Research Institute for Gulf of Mexico Studies	US
Matt	Bethel	Sea Grant LSU	US
Jorge	Brenner	GCOOS	US
Emily	Hall	Mote Marine Laboratory/SOCAN	US
Xinping	Hu	Harte Research Institute for Gulf of Mexico Studies	US
Claire	McGuire	University of Southern Mississippi	US
Alejandra	Navarrete	The Ocean Foundation	US
Jennifer	Vreeland	GCOOS	US
Kim	Yates	USGS	US
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