On March 9-10, 2017, researchers from Mexico and the United States gathered in San Miguel de Allende, Mexico at the Hacienda Santa Clara for the Binational Perspectives on Gulf of Mexico Sustainability Workshop to discuss shared issues and research in environmental sustainability. This report is intended to create a history of the workshop. The report situates the scientific information presented at the workshop within the context of a greater communitarian need. Written from the perspective of a public historian, this report emphasizes the inclusion of local, traditional knowledge in discussion of environmental climate change adaptation. The field of public history developed during the 1970s as a way to make history more accessible and relevant to targeted audiences. The report seeks to reach key stakeholders within local communities so the information generated at the workshop can inform decisions that benefit the future of rural and urban communities. Public history fosters an environment that enables the public to participate and engage with local history. In this way, the public is better able to understand how issues from the past, and current trends in science and technology, may be relevant to sustain a viable community in the present.

Recent literature emphasizes the convergence of the fields of environmental and public history in an effort to disseminate information to a broader, more public audience about issues pertaining to the physical environment, including both the built and natural environments. Environmental public history creates an interdisciplinary discourse that focuses on the protection of both cultural and natural resources. The constructive merger of the two fields enables local communities to understand the tradeoffs involved in
natural and cultural changes to their community. The idea is to engender conversation concerning the impact of environmental climate change on individual communities, within the context of human’s social, cultural, and political interaction with nature. It is hoped that through efforts to localize, and in some ways personalize individual community’s relationship with nature, the scientific dialogue concerning climate change will also humanize and find voice in important adaptations and policy changes that will help the local community understand the gravity of climate change.

By focusing on the impact of sustainability on local rural and urban communities, this report will address three key themes that emerged from the discussions at the workshop in Mexico. The first theme is the recognition of a local community’s connection and emotional attachment to place and space. Place-based rural and urban histories encourage communities to create and maintain their own identity. The workshop stressed the proper integration of scientific inquiry with a respect for local knowledge of land use and resources. In other words, promoting productive exchanges between the scientific community and local economies. A powerful takeaway from the workshop was the participants’ conversations on the displacement of local groups through economic, social,
political and environmental means. Understanding the emotional power of place is crucial to developing decision-making strategies that involve individual communities.

The second theme is interpreting and transferring scientific data into information that is usable for communities. “We are drowning in an ocean of data,” said Dr. Jorge Vanegas, Dean of the College of Architecture at Texas A&M University. Pun intended, Vanegas emphasizes the idea that data must be shaped into relevant information. In order to do this, he stresses that researchers must converge knowledge with experience. This report outlines the different tools and strategies proposed by workshop participants that encourage the thoughtful use of data and information for informed decision-making processes. The third theme addresses the political reality of integrating governmental policies that adequately incorporate social, economic, and environmental concerns. This report also includes participants’ analyses of the current political sphere and how politics plays a role in shaping the climate change agenda.

**Overview of Workshop Agenda:**

The workshop was a two-day intensive event. Guests arrived at the Hacienda Santa Clara on the night of Wednesday, March 8th, 2017 for a casual, evening networking reception. There were over 50 international researchers present, along with six sponsored graduate students. The majority of the workshop was held on Thursday, with presentations immediately following a group breakfast. Dr. Jorge Vanegas, Dean of the College of Architecture at Texas A&M University; Dr. Luis Cifuentes, Vice President, Division of Research, Commercialization and Outreach at Texas A&M University-Corpus Christi; and Dr. Jon Mogford, Vice Chancellor for Research for the Texas A&M University System welcomed participants and provided the background and context for
the workshop. The three themes addressed in this report stem from broader discussions of core topics presented by panelists, and keynote speakers.

Core workshop Topics:

- **Water, Energy, Food Nexus:**
  - Impacts of environmental change on fundamental global resources
- **Utilizing Global Data Sources for Informed Decision Making and Sustainable Action:**
  - Predicting regional climate change, identifying sustainability metrics, and developing science-based policy and responses
- **Water Resourcing in Response to Climate Change:**
  - Securing societal water quantity and quality needs while meeting environmental water requirements in a changing climate
- **Meeting the Challenges of Climate Variability and Change:**
  - Impact of climate change on urban growth, human health and well-being

The three panels, titled “Water-Energy-Food Nexus: A Fundamental Resource Challenge in an Evolving World,” “Resilient and Sustainable Urban and Rural Society in the Face of Climate Change,” and “An Evolving GOM Influence on Our Binational Future: Metrics for Decision-Making” along with the two keynote speakers, Dr. Elva G. Escobar-Briones, Director of the Instituto de Ciencias de Mar y Limnologia, and Dr. Jerry Miller, Director of the Science and Technology for Sustainability Program, National Academy of Sciences, Engineering and Medicine, were spaced throughout the day on Thursday. Dr. Vanegas provided the group synthesis of the workshop at the conclusion of the day. The participants reconvened Friday morning to discuss global research collaboration strategies. Participants were then divided into three working groups to develop action items resulting from the workshop.

**Hacienda Santa Clara:**

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http://rcnce3sar.tamu.edu/Mexico%20Workshop/Presentations/Files/Day_1_Agenda.pdf
Upon arriving through the gated entrance to the Hacienda Santa Clara, participants and passengers happily were greeted by several families of goats, who were seen prancing and bounding through the grass in front of the bus. Guest’s eyes were then drawn down the winding dirt road towards the stunning architectural designs and sculpture gardens of the Hacienda. The location for the workshop could not have been in a more ideal place and space. From the faint aroma of growing lavender, to the shades of violet and red flowering vines scaling the chapel, to the large natural stone architecture
canopied by burnt orange terracotta roofs, and the renewable energy sources powering the buildings, the natural and cultural landscape of the Hacienda was a magical reminder of the power and beauty of our earth and the significance of the workshop’s mission “to develop international research partnerships that advance scientific understanding and inform stakeholders on the impacts of environmental change on essential resources that affect countries bordering the Gulf of Mexico.”

Directors Barbara and Pablo Marvin established the Hacienda Santa Clara “to be an incubator where universities, government, and the private sector collaborate to solve real-life problems.”

Situated as an international learning environment, the Hacienda promotes collaborative learning approaches that enable “students to form an intensive view of the reality represented by Mexico’s social, cultural, and economic landscape.” The overall goals for the Education Center are to expand the intellectual and cultural minds of students and to promote critical and creative thinking across multiple disciplines. Education at the Hacienda proposes a “twist to the STEM educational model, adding to it the important cultural variable to create a powerful new educational tool—STEAM—where the “A” is dedicated to the Arts.”

Pablo Marvin’s opening remarks on the first day of the workshop encouraged guests to take a few moments to walk around the grounds and observe the artwork on

2 Ibid.
4 Ibid.
5 Ibid.
display. The extensive art collection includes original paintings, outdoor sculptures, water fountains, architectural woodwork, and hand-carved furniture. The art collection is the product of the Marvin’s unique tastes, emphasizing a blend of cultural inspirations collected over the course of their marriage. The artwork is significant to the mission of the Hacienda because art inspires critical thinking. Pablo Marvin reiterated that he is always amazed at the way art triggers the brain to think in new and inventive ways. The artwork provides the stimuli for trained students and faculty to think outside the scope of their own fields. Incorporating multi-disciplinary perspectives was central to the workshop’s objectives. The workshop welcomed participants from varying academic backgrounds—the humanities, social sciences, natural sciences, public policy, and law. The inclusion of such a diverse network of fields facilitated productive discussions that stimulated participants to think and reflect about their own research within a broader context and learn to integrate new ideas by working from different standpoints.

The blending of diverse cultural influences is an important theme in San Miguel de Allende. The government of Mexico established San Miguel as a National Historic Monument in 1926 to preserve the town’s cobblestone streets and its architecture, which was constructed at the height of colonial-era Mexican Baroque style. The preserved buildings also exhibit the unique evolution of the Baroque style to the late 19th century Neo-Gothic and Neoclassical architecture. In 2008, UNESCO recognized San Miguel as a World Heritage site because the town “constitutes an exceptional example of the interchange of human values; due to its location and functions, the town acted as a melting pot where Spaniards, Creoles, and Amerindians exchanged cultural influences,
reflected in the tangible and intangible heritage.\textsuperscript{6} This theme of cultural engagement is mirrored at the Hacienda, specifically through the designation of the space as a safe platform for supporting international sensitivity through faculty-led study abroad programs.

Barbara Marvin explained the positive effects the Hacienda has had on the surrounding communities. When visitors see pictures or hear about San Miguel, the most common descriptions include the magnificent architecture and the lively arts community. The municipality of San Miguel de Allende extends beyond the confines of the city of San Miguel, including over 50 different small towns and communities. Uniquely situated, the location of the Hacienda Santa Clara connects urban and rural communities. Located approximately 45 minutes by car from the heart of the city, guests see several small communities on their drive to the Hacienda. The bus drive from the airport to the Hacienda is noteworthy because participants are able to see firsthand the challenges faced by rural and urban communities in terms of equal access to water, agricultural and energy resources. It is in these rural towns on the outskirts of the city where some individuals live in extreme poverty. Many of the homes and businesses in the local villages and towns appeared dilapidated and food and water resources seemed scarce.

The landscape reinforces the fact that any significant findings about the environment must address the needs of all humans to be able to live a valued life. The inclusiveness of the Hacienda, sheltering science and art under one roof, is significant because it is a living monument to what can be accomplished by learning to see the world

through a new and varied lens. The bus ride to the Hacienda gave participants a chance to see how their research could affect the welfare of locals who struggle each day to acquire even simple amenities like access to water, agricultural and energy resources.

Observation, particularly relating global approaches with local action, is a powerful tool for climate change adaptation, while also addressing challenges associated with equity.

Barbara Marvin described how the Hacienda’s connection to local communities has enabled young men and women in the community to see beyond poverty by embracing education. One area where there seems to be real change is in how young woman are beginning to see the merit of education. She specifically mentioned the importance of local young women’s exposure to strong educational role models in the arts, humanities, and sciences. It is important to the Hacienda’s mission to include and support local economies. The Hacienda uses locally sourced foods and also highlights local artisanal crafts. For example, at the foot of each of the guest’s beds there are brightly colored, hand-woven, heavyweight blankets. Mexican tin folk art that has been stamped and shaped into lanterns, mirrors, and ornaments hang in the gardens and in the interior of the buildings. The intricate details that exhibit local Mexican culture and traditions throughout the Hacienda encourage the exchange of student’s ideas and values. One detail, specific to Mexican culture, is exhibited on the church doorway. The doorway is designed with thousands of handmade Milagros charms. Milagros, which translates as “little miracles” in English, have been displayed in churches for centuries. The delicate tin charms offer miracle wishes for cherished loved ones. Barbara Marvin notes the vibrancy of Mexican culture is celebrated through these expressions from local artists.

**Theme One: Valuing Place and Culture for Sustainable Action**
This theme addressed collaboration at the local level for sustainable action. The panelists discussed framing and incorporating equity and environmental issues within economic growth. The proper integration of local ecological knowledge with scientific data is important for informed decision-making strategies. This concept involves engaging and identifying key stakeholders, including individuals in government circles, in the early stages of sustainable action development. Dr. Patricia Romero-Lankao, Senior Scientist, Lead of Urban Futures Initiative at the National Center for Atmospheric Research, and Dr. Gian Carlo Delgado, Senior Researcher at the National Autonomous University of Mexico, emphasized the understanding of equal access for all actors in the protection of threats resulting from climate change. The key to determining adequate climate change adaptation is getting involved with those voices that remain unheard. Many local families that have remained
Dr. George Allen Rasmussen, Vice-President of Research and Dean of Graduate Studies at Texas A&M University-Kingsville, shared one of his personal experiences that demonstrates the importance of combining local knowledge with science. Rasmussen was tasked with determining the proper reintegration of fire within a small community of herders in Africa. Rasmussen’s research focuses on prescribed burning and fire ecology. He said he was impressed with the knowledge of the older nomadic herders concerning their understanding of the use of fire to manage their environment. Rasmussen remembers crawling around on the ground with a couple of the local herders picking up and examining the length of new tillers of the grass. Considerations for the decision to burn or not to burn were whether the new grass tillers were present but less than three inches tall. These new tillers signaled that there was soil moisture available to ensure the grass would recover following the burn. If the tillers were greater than three inches tall they would not burn because it would then suppress the plants recovery. The herder told Rasmussen that the soil gives him the sign when to burn. Rasmussen was amazed that the same knowledge the herders were describing from their experiential knowledge was the same prescribed burn strategies that were recreated over the last 70 years in North America.

When it came time to write the report on his findings concerning fire strategy in the community, Rasmussen wrote that it was not his knowledge that was sought, it was the preservation of the local, wiser men and women in the community concerning their long practiced fire strategy. “Local knowledge is tremendously beneficial. We need to
begin to actively record it,” Rasmussen said. “Societies like the communities of herders in Africa I was studying with lived everyday in their environments. They knew the land, and they understood the importance of soil science.” Local knowledge base is frequently lost as humans change their environments. Rasmussen argued that strategies must be put into place that capture and preserve oral histories. It is important to note that one of the graduate students from Texas A&M University-Corpus Christi, Coral Lozada, will be spending a summer in Mexico working with local fishing communities in the Yucatan. Her research will involve interviews with the fishing communities, combining qualitative and quantitative data approaches.

Keynote speaker, Dr. Jerry Miller, described his own involvement working with native tribes and individual communities when he was developing the National Ocean Policy, under the Obama Administration. In some ways, Miller said, local community members are the first to recognize how their environment and climate is changing. “We have learned the value of taking advantage of indigenous knowledge. They have been living on the lands and coasts for eons, and have information embedded in their culture that is of value and can be used to inform science and resource management strategies,” Miller said. The fact that these individuals are utilizing ocean resources on a daily basis allows them to understand how the ocean has changed monthly and annually. The Ocean Policy explicitly recognizes native tribes and other indigenous communities that rely on marine resources as key stakeholders in discussing plans for resource management in the ocean. The Ocean Policy suggested nine different regions, where there are regional planning bodies. Miller emphasized the designation of regions in terms of their physical environment, or as part of larger marine ecosystems, rather than through conventional
political boundaries. Participants at the workshop echoed the importance of regional collaborative analyses of the Gulf of Mexico’s ecosystem for successful environmental policy implementation.

Miller mentioned one significant challenge in working with local communities is that they do not have a trusted, or long-term, relationship with local and national governments. He highlighted the commercial fishing communities, and how they are interpreting scientific research at NOAA for fishing regulations. Commercial fishing, he said, tends to be more mechanized. There are not generations of knowledge as with Native American communities. “As the fishing seasons come and go, the fishers see that there are sometimes more fish or less fish. It is part of the patchiness in the schools of fish at a given time. For them (commercial fisheries), it gets to be deceptive because there is an under sampling problem. They think that if I caught more fish this year than last year that must mean that the fish are healthier and then they begin to question the NOAA’s regulations,” Miller said. We see how NOAA and commercial fishing communities would benefit from a local and federal alliance that focuses primarily on regulations that locals have helped to create and administer. Of equal importance is a public record of regulations that locals have compiled. Effectively, this would be an accessible history of the regulations to demonstrate that federal and local policy is working for the good of the community.

The importance of local ecological knowledge comes from a deep cultural attachment to place and space. Individuals with a strong connection to their environment attach meaning and value to these lands. The most powerful claim one can make to the land is a claim of belonging. Often, individuals connect their identity with the meanings
they attach to the lands in which they work and live. Dr. Gabriela Munoz Melendez, Profesora Investigadora en Cambio Climatico, Energia y Calidad del Aire, expanded on this idea. Melendez described the importance of emotional attachment to place and space, and discussed ways to prepare communities for sudden displacement, either through political, environmental, or social reasons. In an interview, Melendez described one example of the successful relocation of a marginalized group in China. China attempted to mitigate the effects of the move for the community by including housing and employment opportunities in the preparedness strategy, but the plan failed to consider the emotional factors that underlie the community’s assembly. She explained that the Chinese engaged with community members and asked the community what they would miss about the town or village. The majority of responses sought to find a way to show their children or grandchildren where they had grown up. The Chinese created a museum that exhibited community donated artifacts, and displayed local oral histories. The museum enabled community members to show family members where they moved from, and transition to their new home.

Ana De Luca, a graduate student from Universidad Nacional Autonoma de Mexico, suggests that climate change adaption must take into consideration the connection between gender and the environment. De Luca mentioned that community based adaptation in Mexico has recently integrated a gender perspective and has been successful at considering the means by which women already adapt to climate change so that they can further enhance their knowledge on a wider scale. De Luca explained that the ways in which women and men contribute to and are affected by climate change are different. She said, “Gender roles play a major component towards how we are shaping
our natural environment. Gender allows us to understand how women and men have different responses to mitigation and adaptation efforts, how their everyday habits regarding gendered roles are contributing to greenhouse gas emissions.”

The gendered context of climate change is significant because as she states, “studies regarding natural disasters have shown that women tend to be more affected than men during the disaster and in the aftermath. Therefore, the gender and environment literature has indicated that the social dimension must be included in climate change efforts and that our efforts towards promoting sustainability require considerations of human rights and social justice. No effort to build sustainability will be successful unless it promotes gender equality as well, it makes for a more complex case, but it will bring about better results.”

Theme Two: Valuing and Supporting an International Sharing of Research and Data

The second theme that emerged from the workshop is collaborating on data repositories that enable successful global information exchange. The idea is the constructive union of international research. Panelists and participants stressed the creation of an inventory of available data repositories and links that contain effective descriptions of the data available throughout different countries. Keynote speaker, Dr. Elva Escobar Briones, described the strong relationship between local industries, non-governmental organizations and academies in Mexico. Open access data sharing among all actors is important to determine suitable sustainable action strategies. For example, the collaboration with local fisheries track where water temperature is suitable for fishing. This information is also included in the university network. In this way, the information
generated from various stakeholders is consolidated within one system. The importance is
to foster education about available technical information that is pertinent to the wellbeing
of a local community. Briones notes education fosters resilient civil societies that adapt to
global community needs. She said the best outlets for transferring data are local
universities, farmers and fishermen that use and track information from the Gulf of
Mexico.

Briones said, “The idea is to gather knowledge that promotes the health of
individuals and the environment. We try to collaborate with groups from the very start. If
one group does not have enough funds, we support that group. It is about balance.” The
goals of international collaboration include identifying where research is located
internationally, circulating research that is already available on a specific topic, and
targeting arenas where additional research needs to done. Successful partnerships at the
international level will create a knowledge base of individual experts and networks across
countries, specifically providing the necessary contact information for these individuals.
The inventory will be catalogued to include searchable descriptions of key experts’
research areas.

She also suggested placing more local coastal observatories in the Gulf of
Mexico. The observatories track ecological data such as water temperature, salinity, pH,
sea level, and dissolved oxygen concentration. Regional monitoring systems can be used
to promote sustainable fisheries. Ocean partnerships with marine biotechnology can track
the ocean’s relationship with public health concerns. Briones said, “We need to expand as
much as possible. To do this, we need international regulation between the waters of the
United States and Mexico. Define specific areas that need to be preserved, and
collaborate within the stakeholders of that region.” Dr. Rabi Mohtar, TEES Endowed Professor at Texas A&M University, also recommended creating models and platforms that define “hot spots” for action. Dr. Katya Wowk, Senior Associate for Strategic Planning and Policy at the Harte Research Institute for Gulf of Mexico Studies, emphasized the idea that resilience is place-based. It is important to understand that people filter information through their own values and traditions. She said that tools and metrics must be tailored to individual communities. She proposed building on current tools to organize and integrate health and environmental concerns. Dr. Luis Cifuentes added that funding for long-term data is required to make informed policy decisions. New strategies that seek funding from public and private sources need to be explored in order to make data easily available to a larger audience.

The collection, integration and sharing of knowledge at the local level was discussed in detail at the workshop. Vanegas described the successful implementation of the Texas A&M College of Architecture Colonias Program. The TAMU program works directly with the residents living in colonias to include local community members in developing sustainable solutions to the challenges faced in their community. Central to the mission of the colonias is creating necessary social programs for local residents that enhance their quality of life. Social programs range from education and job services to community development assistance. Vanegas said that the formula for the Colonias Program’s success is “ask, listen, deliver on what we hear, and continue working with the communities.”

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Academic outreach programs, such as the Colonias Program, that support relationships between the academic community and local groups is significant to climate change adaptation strategies. Observing best practices within the Extension Service in the United States, and CONAMP, a similar service that focuses on natural protection in Mexico, provides another outlet to establish relationships between the scientific community and local groups. Rasmussen described his experience working in agricultural extension. In rural agriculture programs, sea-grant programs, and other education networks, the key is garnering the support from the local community. It is the responsibility of the county agents to develop local credibility and trust. To establish credibility, the county agent must work closely with key local stakeholders first by conveying new technologies and research to the community along with their advantages and disadvantages. Second, they need to communicate with the research community the problems of the local community. Because at times the technology provided does not address the community’s problems. This gives the community a stake in the solution. This two-way communication provides the trust needed for a community to feel they are part of the solution and even the problem. In essence, the county agent’s responsibility is to interpret information in an accessible manner for local community members and the research community. It is important to remember that there are different levels of expertise and both research and indigenous knowledge have a place if we are going to be successful, Rasmussen said. He advised training county agents in conflict mediation, which involves constant communication, and negotiation. This is one way in which Extension Services in the United States have been able to gain the trust of local members of the community.
The debate concerning utilization of new technology for climate change adaptation varied between the disciplines. Melendez and Romero-Lankao cautioned against using technology as the main approach to climate change adaptation because technologies can be expensive and are not always adopted easily. The trick for successful integration is about mapping key actors and fostering consistent communication. Melendez suggested knowing the stakeholders and the community that is being engaged as an effective pathway toward solutions because socioeconomic plays a role in how and if technology is incorporated into local practices. Dr. Bruce McCarl, Distinguished Professor of Agricultural Economics at Texas A&M, added that an incentive program that lowers costs for farmers and agricultural stakeholders also encourages more successful collaboration among community stakeholders.

**Theme Three: Valuing and Managing Integrated Governmental Networks**

The third theme addresses the political reality of integrating international governmental policies that adequately incorporate social, economic, and environmental concerns. Participants discussed the role politics plays in shaping the climate change agenda. Mohtar highlighted the international policy and governance obstacles for climate change adaptation; particularly pushback from international governments on security issues in international waters. Domestic challenges are further complicated by politics. In describing his time at the White House during the Obama Administration, Miller discussed this reality. He said that science is only one of many considerations when a legislator proposes a new statute. Several factors such as health, economy in the districts, and the district’s local businesses come into play when determining whether to support a
piece of legislation. In many cases, politicians strategically tackle specific issues in ways that foster reelection.

Coordination of departments and offices in government also pose significant challenges for adequate policy adaptation. When creating the Ocean Policy, Miller said he was surprised to learn that there were 26 departments and offices that have some kind of statutory responsibility for the ocean. The challenge is facilitating and coordinating efforts from these different agencies for successful implementation. Similar problems in Mexico were expounded upon by Dr. Porfirio Alvarez, Secretario Ejecutivo the Consorcio de Instituciones de Investigacion Marina del Golfo de Mexico y del Caribe. Alvarez emphasized the difficulty in streamlining and understanding all of the laws, norms, agencies, and problems that make up the coastal and marine areas. He said that poor federal policy integration on coastal zones is a large barrier to coastal adaptation strategies. Alvarez advocated that to bridge the gap between the science community and decision-makers, a focus on regional and local research is essential to make climate change concerns relevant to policymakers.

A very real obstacle for current conversations surrounding environmental climate change is that some elites who influence community policies still profess that effects of climate change are a hoax. Miller, elaborated upon two reasons why people do not believe climate change is occurring. First, he says, that a fraction of the general public does not have much scientific exposure. “Perhaps, science was a struggle in grade school and some never really thought about science again,” Miller, said. In order to understand climate change, Miller argued that individuals must be familiar with the scientific method. When the public thinks about the scientific process, they equate the word theory
with “guess.” Individuals do not understand that the theory is based on rigorous experiments and research. Getting information in a positive and comprehensible way to local resource managers that can be disseminated to local citizens is an important first step to demystifying science and encouraging a real dialogue at the local level about sustainable environmental changes. It is not as if local citizens are not witnessing that summers are hotter, or weather is more violent. The key is to encourage grassroots action with relevant, yet accessible scientific information that helps the community make informed political decisions that are in the best interest of the community.

The workshop’s emphasis on Mexican and American perspectives is significant. With the transfer of power from the Obama Administration to the current Trump Administration, international perception of the relationship between the United States and Mexico has changed. The successful collaboration at the workshop proved that global information exchange is not only possible, but also a necessity in today’s political climate. Climate change transcends boundaries. Multi-disciplinary and global workshops such as the “Binational Perspectives on Gulf of Mexico Sustainability Workshop” help to break down barriers and build stronger networks to achieve a reasoned discourse for a sustainable environment.

**Conclusion:**

The workshop makes it evident that incorporating local communities and groups is critical to establishing the communication path between the academic community and local communities. Consistent and constructive communication between the academic community and local groups will help integrate appropriate solutions at the political levels. Communication, by definition, requires both the academic community and the
local communities to listen to one another. Specifically, the research community must actively work with the local communities to understand their concerns before addressing possible solutions. This will allow for the joint development of mechanisms that link research with comprehensive explanations to sustainable actions at the environmental and political level.