# An International Network-to-Network approach to generating new scientific community collaborations in the Gulf of Mexico and surrounding region – A case study

## NSF Project #1809245 - No-Cost Extension Project Summary September through November 2020

Dr. Zenon Medina-Cetina: N2N-GOM Project Extension Lead: Associate Professor, Zachary Department of Civil & Environmental Engineering, Texas A&M University

Dr. Jack Baldauf: Senior Associate Vice President for Research, Texas A&M University

Dr. Khalil Dirani: Associate Professor, Educational Administration and Human Resource Development, Texas A&M University

Dr. Sharon Herzka: Research Professor, Ensenada's Center for Scientific Research and Higher Education (CICESE)

Dr. Luis Alberto Muñoz Ubando: Chief Innovation Officer, Grupo Plenum

Miguel Fernando Ortiz Cahun: Graduate Student in the Civil and Environmental Engineering Department, Texas A&M University

Dr. Kateryna Wowk: Senior Research Scientist, Harte Research Institute for Gulf of Mexico Studies (HRI), Texas A&M University at Corpus Christi

1. **Introduction:** The Network to Network Gulf of Mexico (N2N-GoM) organization is created to bring together networks across market sectors, academia, and government to build a new community of communities based on shared priorities for solutions to climate change forcing in the GoM region. Building a new community from existing networks and stakeholders allows new collaborations towards finding solutions to complex climate-related risks that affect the social, economic, and environmental elements within the GoM region and beyond. Development of the N2N-GoM continued after the N2N-GoM Merida Workshop as part of the approved no-cost extension creating a foundation to further seek implementation of research and professional development strategies. Key elements include the following:

    - Continued coordination of the participating networks and members following the N2N-GoM Yucatan Workshop.
    - N2N-GoM Merida Workshop: Identification and Prioritization of Risk-Based Decision Making Factors
    - N2N-GoM Merida Workshop: Risk-Based Decision-Making Framework for the Development of a Decadal Research and Development Agenda for the Gulf of Mexico
    - Production of two manuscripts, one focused on the workshop outcomes and the other focused on establishing the model framework.

    In addition to the items identified above the N2N-GoM team continued development of a Data-Lake System for data integration and modeling. It is envisioned that this Data-Lake System will be a technological catalysis and integrator for leveraging N2N-GoM network capacity **(Note that this effort compliments and is an important element of the N2N-GOM network, but is an independently funded effort supported by the Yucatan Imitative Project and members of Texas A&M University).**

2. **Continued coordination of the participating networks and members following the N2N-GoM Yucatan Workshop:** The continued network development centers on enhancing relationships of the current networks and institutions who initially participated in the N2N-GoM Workshop, as well as strategic new members that leverage the N2N-GoM goals in terms of scientific development and overall network strength. Appendix A presents individuals and networks currently engaged in this effort. The Steering Committee (SC), led by Dr. Zenon Medina-Cetina during this extension period, held weekly coordination meetings from March 27, 2020 to November 30, 2020. In total there have been 27 meetings to date that have provided the framework for both N2N-GoM member meetings, as well as continuing the positive momentum established during the Merida Workshop.

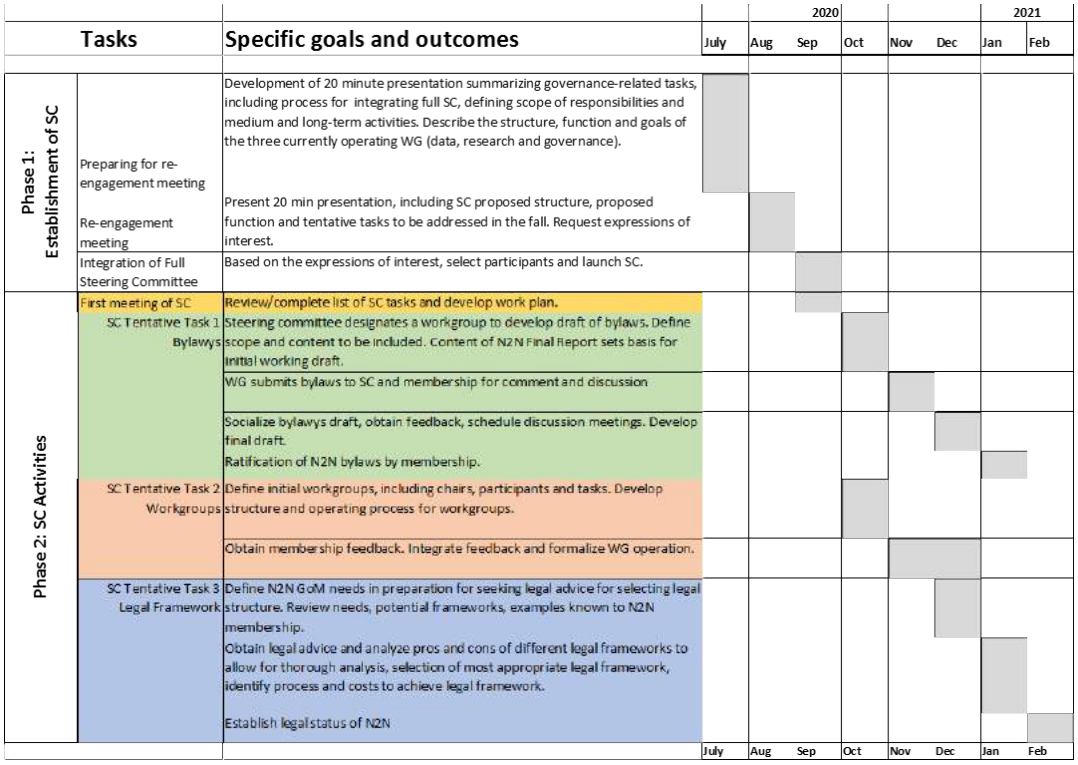
    To advance N2N-GoM the Steering Committee (i) established three Working Groups (WG): Governance, Research, and Data Science and (ii) targeted two N2N-GoM membership meetings: 28 August (member Informational meeting and re-engagement) and 6 November 2020 (N2N-GoM kick-off meeting).

2.1. **Working Groups.** Members of the three established WG's met regularly through the summer and continue to meet through the fall 2020. Current WG outcomes are summarized below:

2.1.1. **Research:** Specific goals were identified (i) Establish Integrated Research Teams; (ii) Reconfirm research priorities (i.e. Extreme Events, Economic Resilience, Coastal Resilience, etc.), (iii) Establish a strategy to develop a N2N-GoM decadal agenda, (iv) Identify possible funding opportunities, and (v) Establish strategies for connectivity.

2.1.2. **Governance:** The N2N-GoM Governance WG identified specific goals and outcomes that will create the organizational bylaws. The initial step is charging a committee to draft the bylaws and to establish the legal status of N2N pertaining to network and international agreements. A task description with the targeted timeline is showed in Figure 1.

**Figure 1. Governance Working Group Agenda**




**2.1.3. Data Science:** The N2N-GoM Data Science WG identified the critical needs related to data (i.e. Identification, sampling strategies, integration and collection of data for its organization and use within the Data-Lake System, data application for models, among others). The Data Science WG includes: (i) Draft N2N-GoM Data Governance, (ii) Define Data-Lake System opportunities,

and (iii) Investigate, select, validate and approve a set of the Data Science Methods and resources.

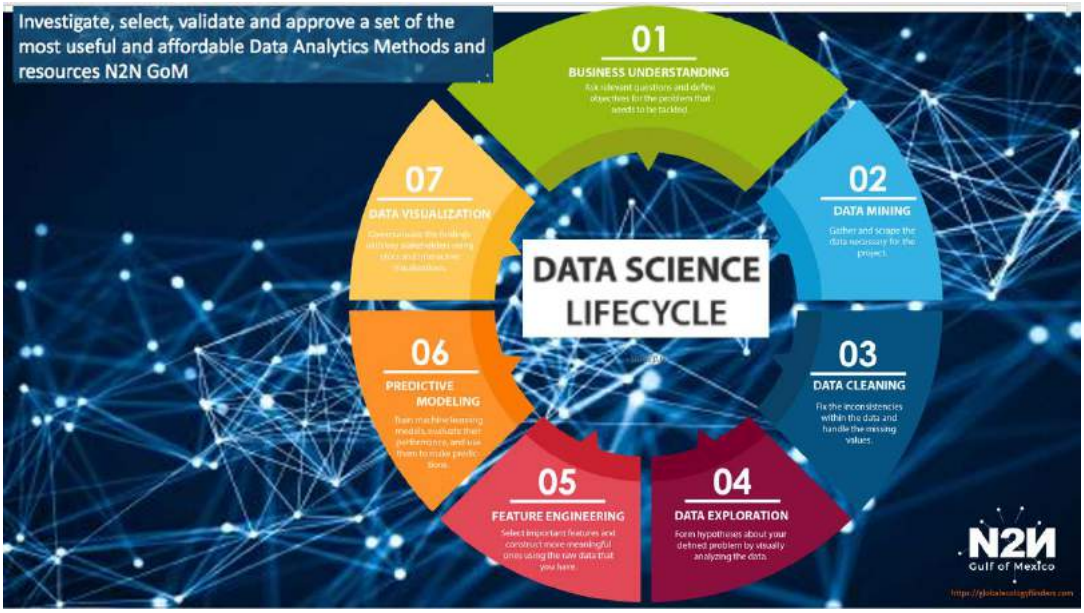



**Figure 2.Data Science Lifecycle**

2.2. **N2N-GOM Community Engagement.** Two community engagement efforts occurred during the extension period.

2.2.1 **Informational Overview Meeting:** The meeting was held on 28 August 28, 2020. The key aspects covered during the informational were: (i) Highlights of the Merida Workshop, (ii) Progress since the workshop, (iii), Strategy going forward, and (iv) WG updates.

The specific outcomes was to actively engage Merida Workshop participants in the development of the N2N-GoM. Invitations were extended to the 45 participants from the Merida Workshop, plus some other new interested participants. The number of final participants in the informational session was 29 (including steering committee members and support staff). The slides with the information presented during this session are included in Appendix B.

2.2.2 **Kick-off meeting Overview: The meeting** took place 6 November 2020. The discussion addressed the proposed organizational structure and the current strategies developed by the three working groups. The Workshop Invitations were extended to the participants from the August meeting. There was a total of 33 participants (including steering committee members and support staff). The slides with the information presented during this session are included in Appendix C.

**2.2.2.1. Research:** The N2N-GoM Research WG circulated a survey to the 46 participants from the Merida Workshop to obtain additional post workshop information to aid in the development of the Research strategy. A total of 19 responses were received from participants resulting in a response rate of 41 percent. Noteworthy is that 90 percent of the members responding to the survey agreed to engage in one or more of the IRTs with several individuals expressing interest in leading a specific IRT. The survey responses were presented at the N2N-GOM kickoff meeting (Figure 3) resulting in a proposal to establish the initial IRTs (Figure 4). Also presented were the current capacities identified across existing N2N-GoM members (Figure 5).

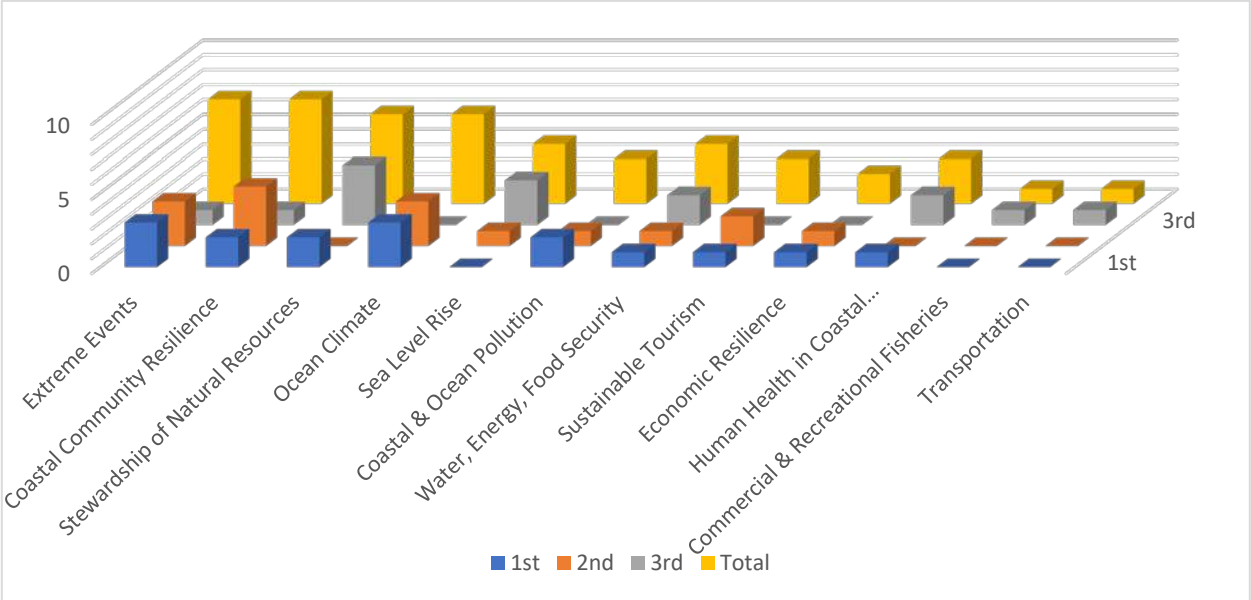



**Figure 3. IRTs Survey Responses.**


**Figure 4. Research WG Proposed IRTs.**


**Figure 5. IRTs Potential capacities from members. Specifics remain to be defined.**

**2.2.2.2. Governance:** The Governance WG presented the initial N2N-GoM organizational structure for discussion (Figure 6). The discussion also focused on the roles and responsibilities of the Governance WG. Examples of issues to be addressed by the Governance WG include at present: Bylaws (i.e. membership, governance, policies and procedures, Committee composition, functions,, communication guidelines, bylaw amendments, Conflict of interest, NDAs, legal framework, data governance, etc.

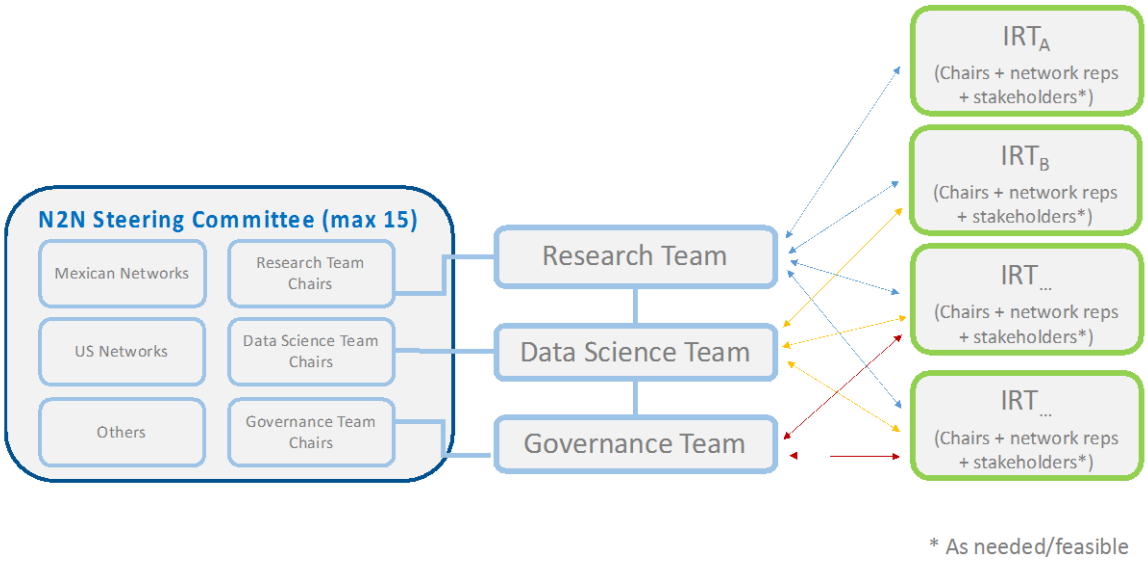



**Figure 6. N2N-GoM Governance Structure**

**2.2.2.3. Data Science:** The Data Science WG presented the following task items to advance the ability for data exchange and use among networks:

**2.2.2.3.1.** Collect Data Governance related recommendations from Council members.

**2.2.2.3.2.** Resolve data related issues when conflicts arise.

**2.2.2.3.3.** Makes decisions about data definitions, data quality, and data timeliness with knowledge of impact on their domain.

**2.2.2.3.4.** Consider, approve and promote University-wide data management policies, standards, guidelines, and operating procedures related to the University's institutional data assets.

**2.2.2.3.5.** Assess University-wide applications as it relates to storing and strategically using data.

**2.2.2.3.6.** Evaluate and prioritize potential University-wide and institutional data systems projects.

**2.2.2.3.7.** Advise on University-wide strategic plans for data management including sourcing, distribution, maintenance, and quality of University/institutional data assets.

**2.2.2.3.8.** Advise on University/Research Lab-wide data management practices for decision making including data warehousing, business intelligence, master data management, and metadata management.

**2.2.2.3.9.** Recommend plans and methods for assessing data management value and risk.

**2.2.2.3.10.** Ensure institutional data has consistent definitions and responsible classifications according to best practice data management standards and guidelines.

In addition, the Data Science group has set their input into the Risk Model with a flow chart presented in Figure 7. The flow chart explains the interaction between the Data-Lake System and the Bayesian Network risk model.

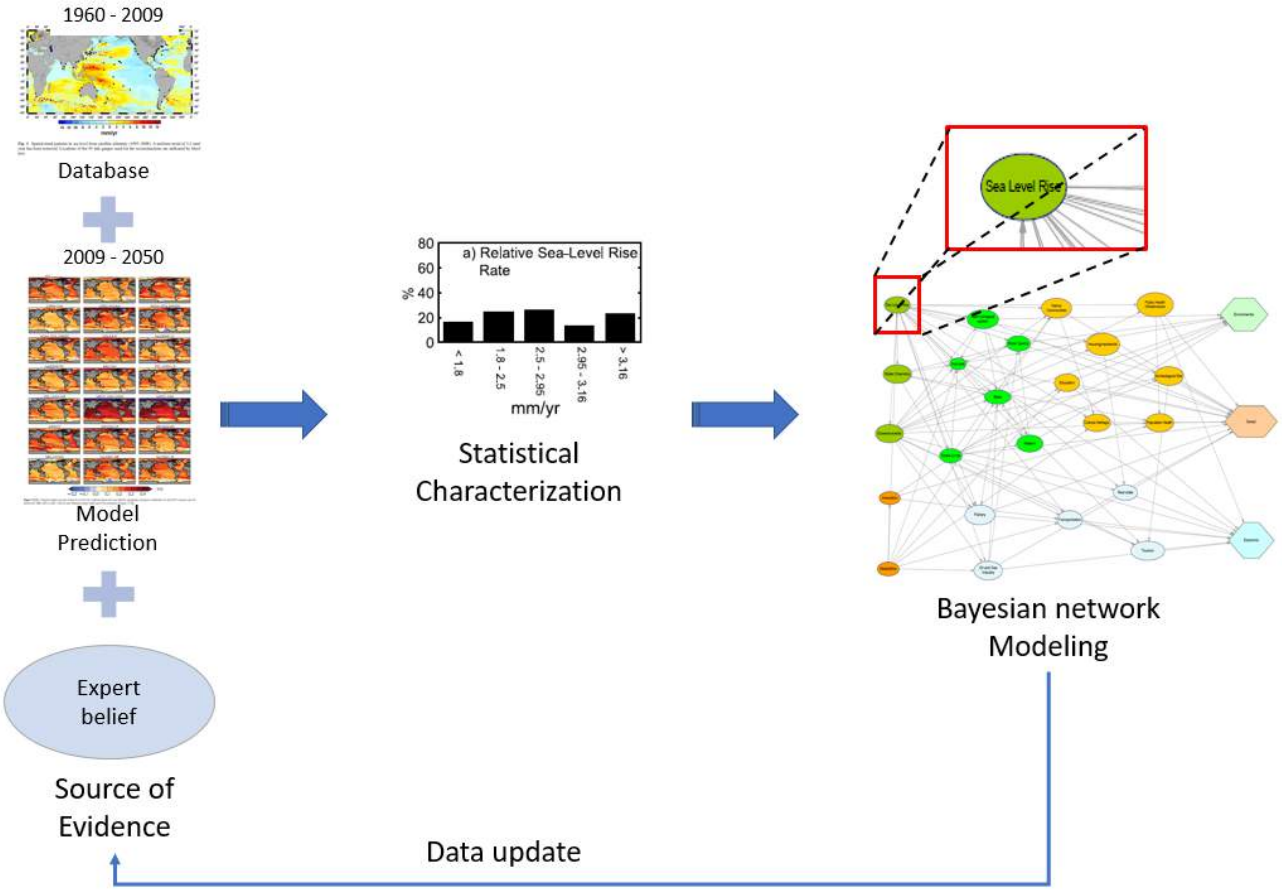



**Figure 7. Data Feed on the Bayesian Risk Mode.**

As part of ensuring security in data sharing, the Data Science WG introduced the Data Ethics Canvas (Figure 9). The sets of issues to be addressed by the Data Science WG and the Governance WG are to ensure a correct use and within the legal framework of the data shared though this network.


***Figure 8. Data Science Governance.***

3. **N2N-GoM Merida Workshop: Identification and Prioritization of Risk-Based Decision Making Factors:** The Network to Network Gulf of Mexico (N2N-GoM) organization is created to bring together networks across market sectors, academia, and government officials to build a new community of communities based on shared priorities for solutions to climate change forcing in the GoM region. Building a new community from existing networks and stakeholders allows new collaborations towards finding solutions to complex climate-related risks that affect the social, economic, and environmental elements within the GoM region. This network-to-network approach provides the opportunity to capitalize on new insights and perspectives for breakthroughs that accelerate transformation and leverage existing and new resources to attain solutions. Also, it is important to remark that international collaboration from both countries (US and Mexico) through their networks bring a new level of leverage for assessing the GoM risks related to climate change and bring solutions to those risks. The internationality that N2N-GoM brings to these networks will expedite data sharing and characterization of variables and processes related to climate forcing in the GoM region. The N2N-GoM is aimed to help decision making using scientific data to validate and create priorities of impacts and the solutions for those impacts. Post Merida Workshop efforts continued the characterization of the threats, vulnerable systems, and impacts of those threats

over the vulnerable systems. To do so, requires resource managers, scientists, and market sector experts.

One element of the N2N-GoM Merida Workshop was to identify and characterize the natural and anthropogenic threat variables, vulnerable systems to these threats, and the metrics used to assess the social, economic, and/or environmental losses derived from the damage to the systems/vulnerabilities withstanding the given threats. To improve the decision making the workshop was organized using a risk methodology by means of risk theory inspired by the United Nations Disaster Relief Office (UNDRO, 1980). This theory introduces the concept of Risk Assessment as a state for a given spatial and time domain.

Risk = Hazard x Vulnerability x Consequences (eq. 1) where Risk = P(T)x P(C/T)x u(C) (eq.2)

In equation 2, P(T) is the Hazard or probability of a given threat intensity (T), P(C|T) is the Vulnerability or conditional probability of experimenting with a consequence or damage level (C) given likely threat intensities (T).

An outcome from the Merida workshop was the identification of five priority threats: Sea level rise, water chemistry, weather extreme events, innovation (or lack of innovation), and geo-politics based on workshop participants. Systems vulnerable to these threats were classified into three groups: environmental, social, and economic (Figures 9 and 10).

**Figure 9. Vulnerable systems identified in the N2N-GoM workshop**

| Vulnerable Systems | | |
|---|---|---|
| Environmental | Social | Economic |
| Water quality | Population health | Oil and gas industry |
| Wetlands | Native communities | Tourism industry |
| Geo-hydrological systems | Public health infrastructure | Transportation system |
| Shorelines | Housing/residential | Real state |
| Biota | Education | Fishery |
| | Cultural heritage | |
| | Archeological sites | |

It is important to mention, sea-level rise, water chemistry, and extreme events are a consequence in some research works (Agraz, 2015; Duarte et al., 2013; Gutierrez, Plant, & Robert Thieler, 2011). However, damage to the environment is irreparable at some point and their impacts assessments are a priority for international, national, and institutional organizations. USGCRP (2018) recognizes five adaptations stages, awareness, assessment, planning, implementation, and monitoring, and evaluation. Adaptation entails a continuous risk management process which includes considering probable permanent climate changes, and the actions to reduce their risks over time. Resiliency and adaptation are processes where time is the key factor. In a complex system such as the GoM, resiliency and adaptation requires the engagement of varied disciplines, stakeholders, policies, and the

community in other to achieve an equilibrium. Following a risk methodology approach can lead to create a foundation to implement strategies on top priority threats to create resiliency and adaptation on the GoM region.

Establishment of N2N-GoM continues to focus on alignment of existing networks, developing synergies through appropriate conduits, as well as the identification of common scientific and technological priorities. This is a critical step in the development of a successful 'Network of Networks', however, further advances can be attained through the development of a strategic roadmap that integrates common priorities and leverages resources to advance research on how climate variability will impact the GoM region. Two key elements are required to advance N2N-GoM. The first is continued development of the network connectivity. The second element is continued advancement in advancing the science.

**Figure 10. Risk-based processes/variables list identified in the N2N-GoM Merida workshop**

| Identified Variables N2N GoM Merida Workshop | | | | | | | |
|---|---|---|---|---|---|---|---|
| Threats | | Vulnerable Systems | | | Impact Metrics | | |
| Natural | Anthropogenic | Environmental | Social | Economic | Environmental | Social | Economic |
| Sea Level Rise | Innovation | Water quality | Population health | Oil and gas industry | Water availability | Life expectancy | Fishery production |
| Water Chemistry | Geo-politics | Wetlands | Native communities | Tourism industry | Water quality | Social Cohesion | Insurance cost/availability |
| Extreme Weather Events | Infectious Diseases | Geo-hydrological systems | Public health infrastructure | Transportation system | Biodiversity damage | Utilities availability | Oil/gas production |
| | Oil Spills | Shorelines | Housing / Residential | Real state | Mortality | Wellness | Housing cost |
| | Micro-Plastics | Biota | Education | Fishery | Shoreline change rate | Housing Displacement | Tourism revenue |
| | Invasive Species | Habitats | Cultural heritage | | Habitat displacement | Mortality | Unemployment |
| | | | Archeological sites | | | | |

The purpose of this effort work is to continue the revision of the list of threats, vulnerabilities, and consequences from the N2N-GoM workshop. The definition of the variables consists of the revision of the literature, the characterization of the processes and variables related to the variable, collecting evidence related to the variable, and defining the variables existing evidence overlaps and gaps. A Bayesian Network is implemented for the Risk Assessment in the GoM as an environmental, social, and economic system. Finally, to develop a risk-based decal agenda for the GoM region.

The effort completed during the extension was to improve the N2N-GoM Merida Workshop: Identification and Prioritization of Risk-Based Decision Making Factors through a literature review.

To analyze the most relevant keywords related to the GOM, a set of bibliometric analyses of the literature published over the past 40 years was completed. Fifteen keyword combinations using the GoM and risk-related language. The Web of Science database (Analytics, 2018) was selected since it contains 171 million records, 34 thousand journals registered, 1.89 billion cited references, and 119 years of back-files (as of November 2020) . This procedure entails fifteen experiments keywords searches in the database, collecting a list of papers titles, abstracts, keywords, and cited references from the time period of 1960 – 2020. This time period was selected to provide an adequate temporal range to identify research trend areas. Fifteen author-keywords were selected, one search for the GoM alone, six for GoM and words related to the risk framework, three more for a combination of GoM, a system, and the word risk, and to conclude five more combinations of the GoM and the top priority threats identified at the N2N-GoM workshop. Figure 11 illustrates the fifteen author-keyword combinations used in this search and categorize them as previously stated.

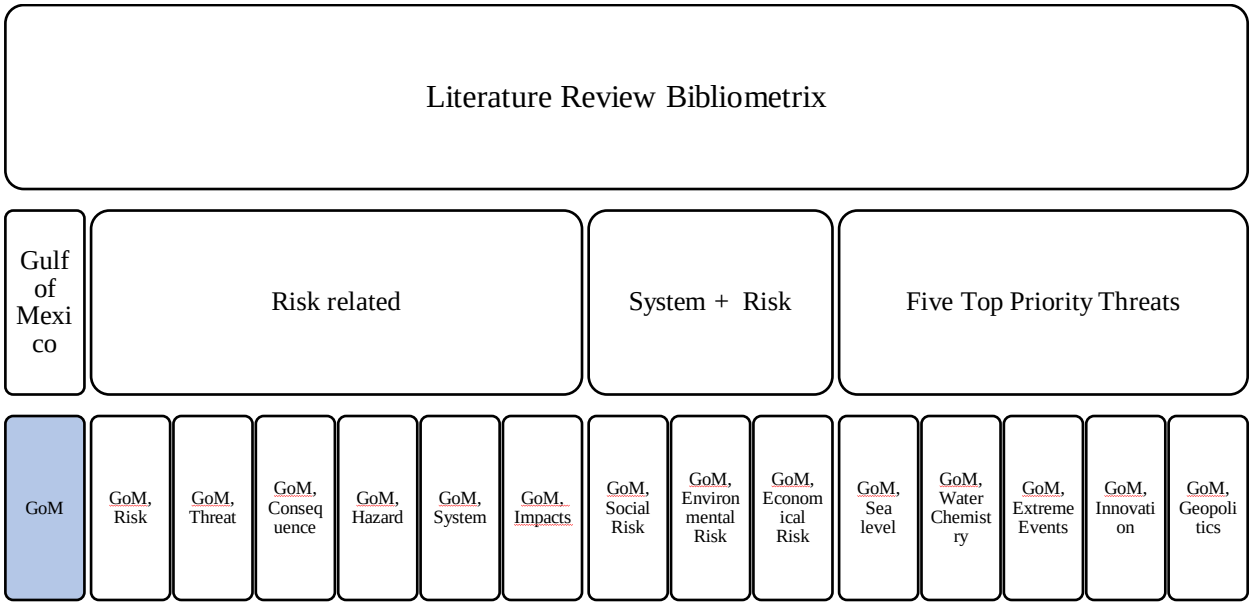
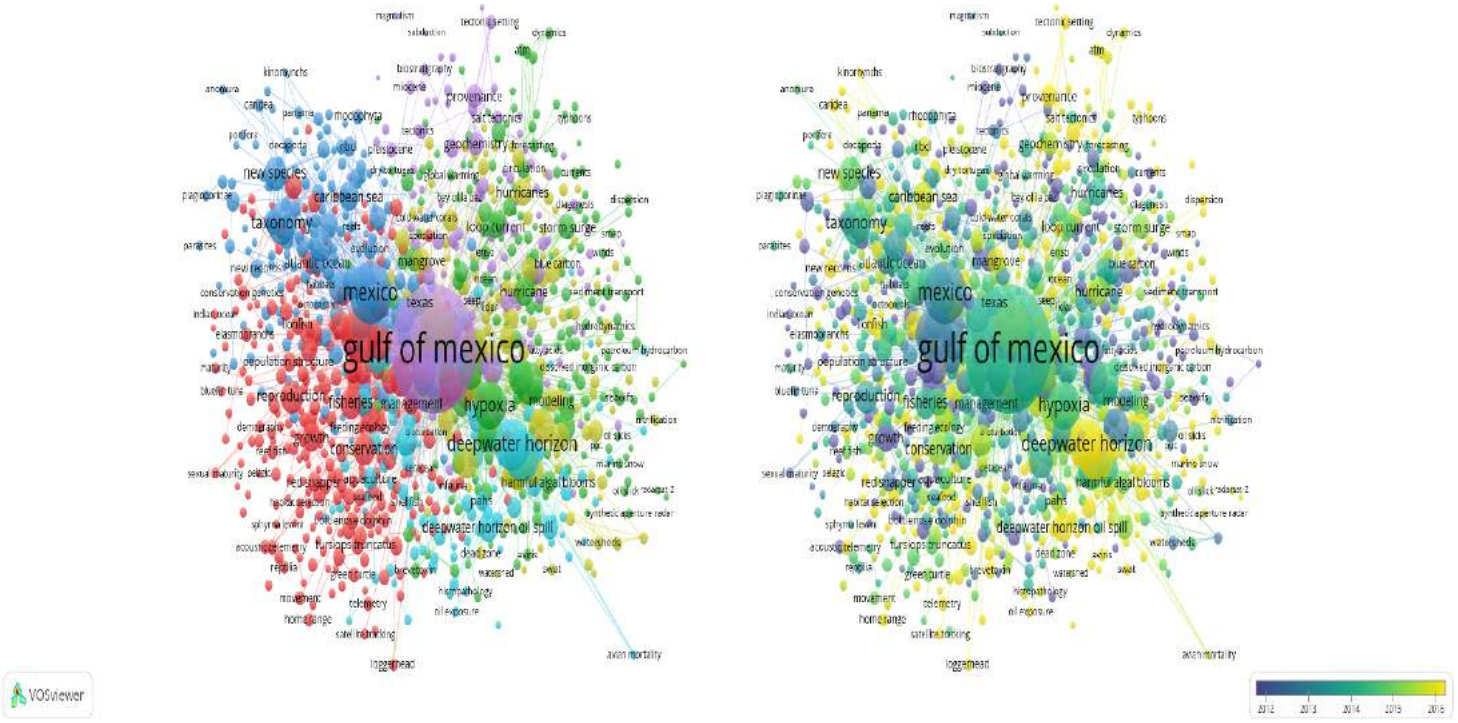



**Figure 11. Literature review systematic keyword search**.

The bibliometric maps represent with nodes the keywords and their sizes represent the occurrences of each keyword in the database is presented in Figure 12. The key words sorting based on publications, publications per classification, organization, and county are shown in Figures 13 through 16.

**Figure 12. Network map Keywords: GoM. Clusters (left) and time-period overlay (right).**



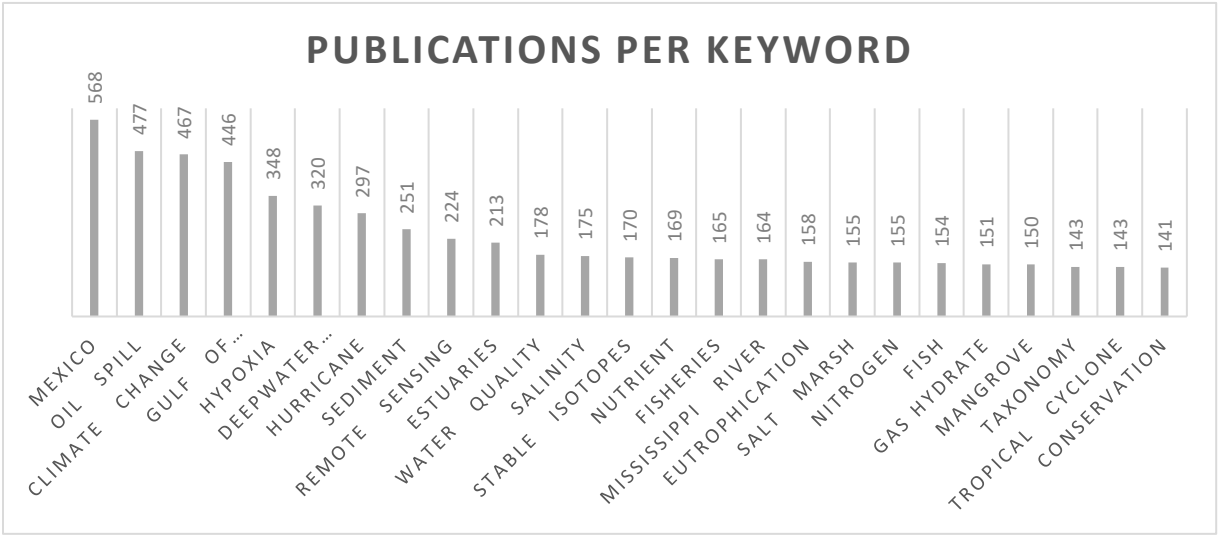




**Figure 13. Twenty-five keywords with more occurrences in the fifteen databases**

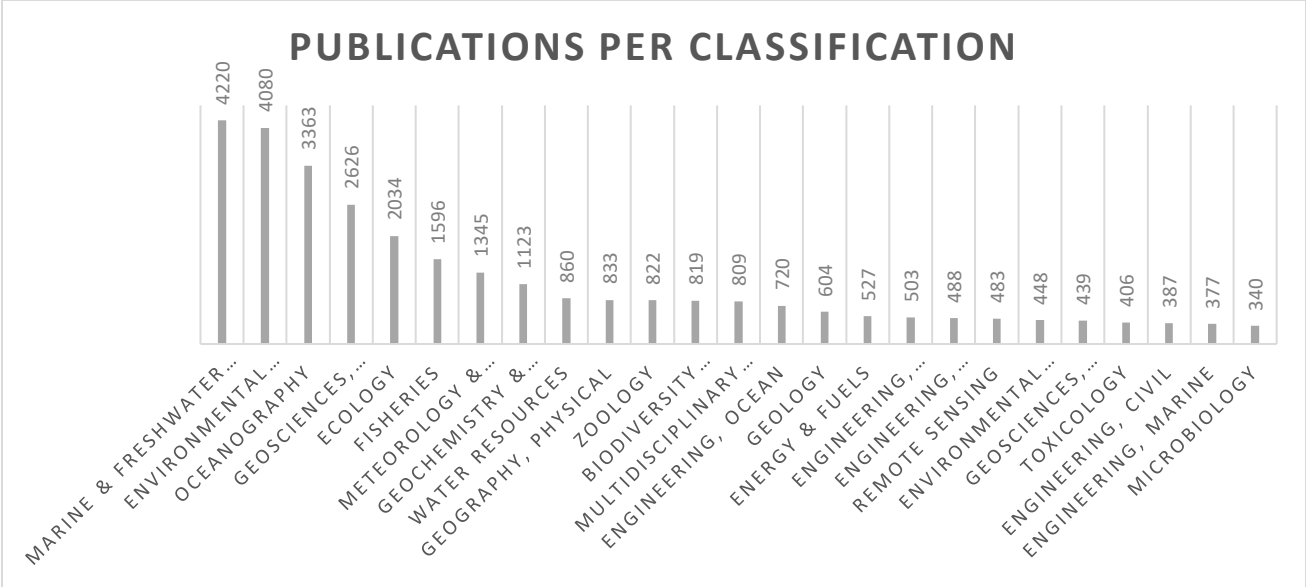



**Figure 14.Twenty-five classification areas with more occurrences in the fifteen databases**

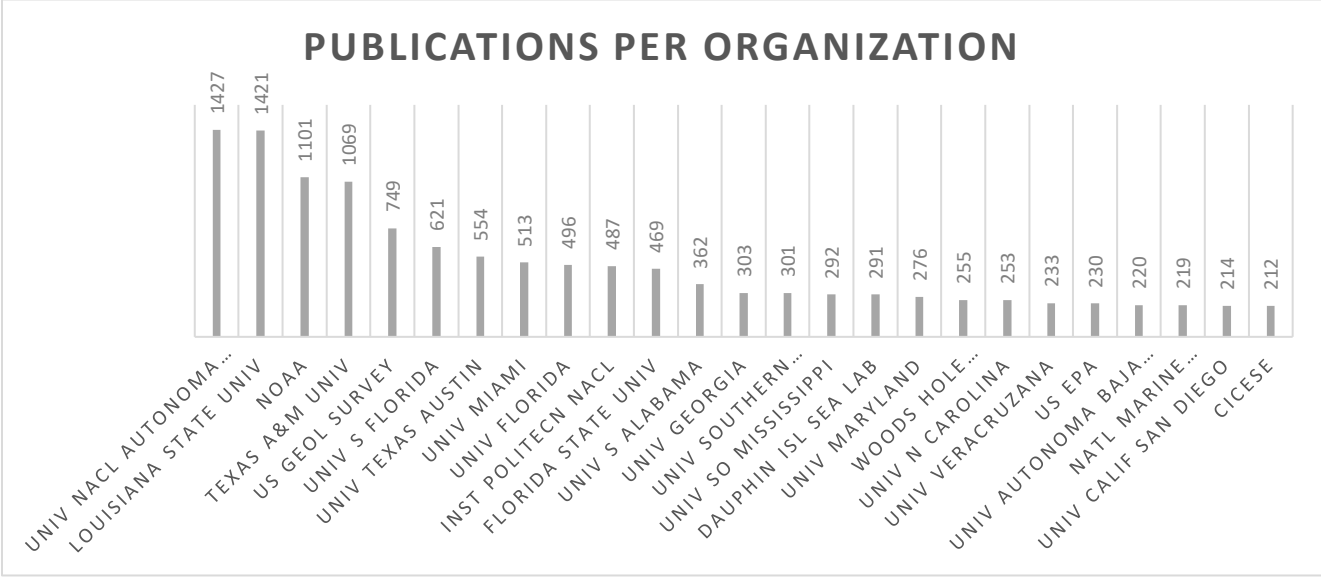



**Figure 15. Twenty-five organizations with more contributions to the fifteen databases**

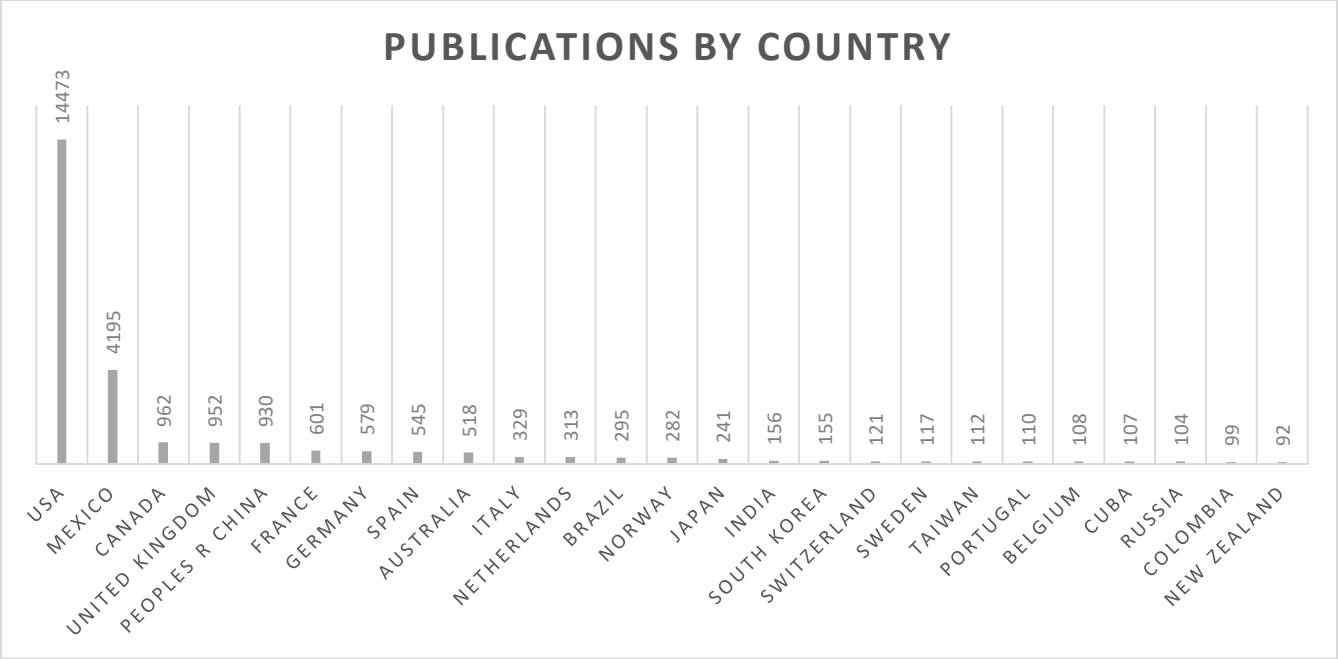



**Figure 16. Twenty-five countries with more contributions to the fifteen data bases**

The top 5 study classification areas concur with the keywords' topics, being marine sciences, environmental sciences, ocean sciences, geosciences, and ecology the areas with more documentation related to the GoM and a risk framework. A histogram of the organizations with more contributions to the databases is presented in Figure 15. Figure 16 enlist the twenty-five countries with more publications within the fifteen databases. The top five institutions are amongst universities (Universidad Nacional Autonoma de Mexico (UNAM), Louisiana State University, and Texas A&M University) and two federal organizations (NOAA and US Geological Survey).

The bibliometric maps of the 15 experiments (Figure 13) represents one mode analysis of the keywords among the databases. A one mode analysis illustrates the keyword occurrences and their strength of union depends on the number of citations of the keywords and their respective publications and documentations. This analysis helps us to identify the research clusters and main priorities related to the GoM.

## 4. N2N-GoM Risk-Based Decision-Making Framework for the Development of a Decadal Research and Development Agenda for the Gulf of Mexico

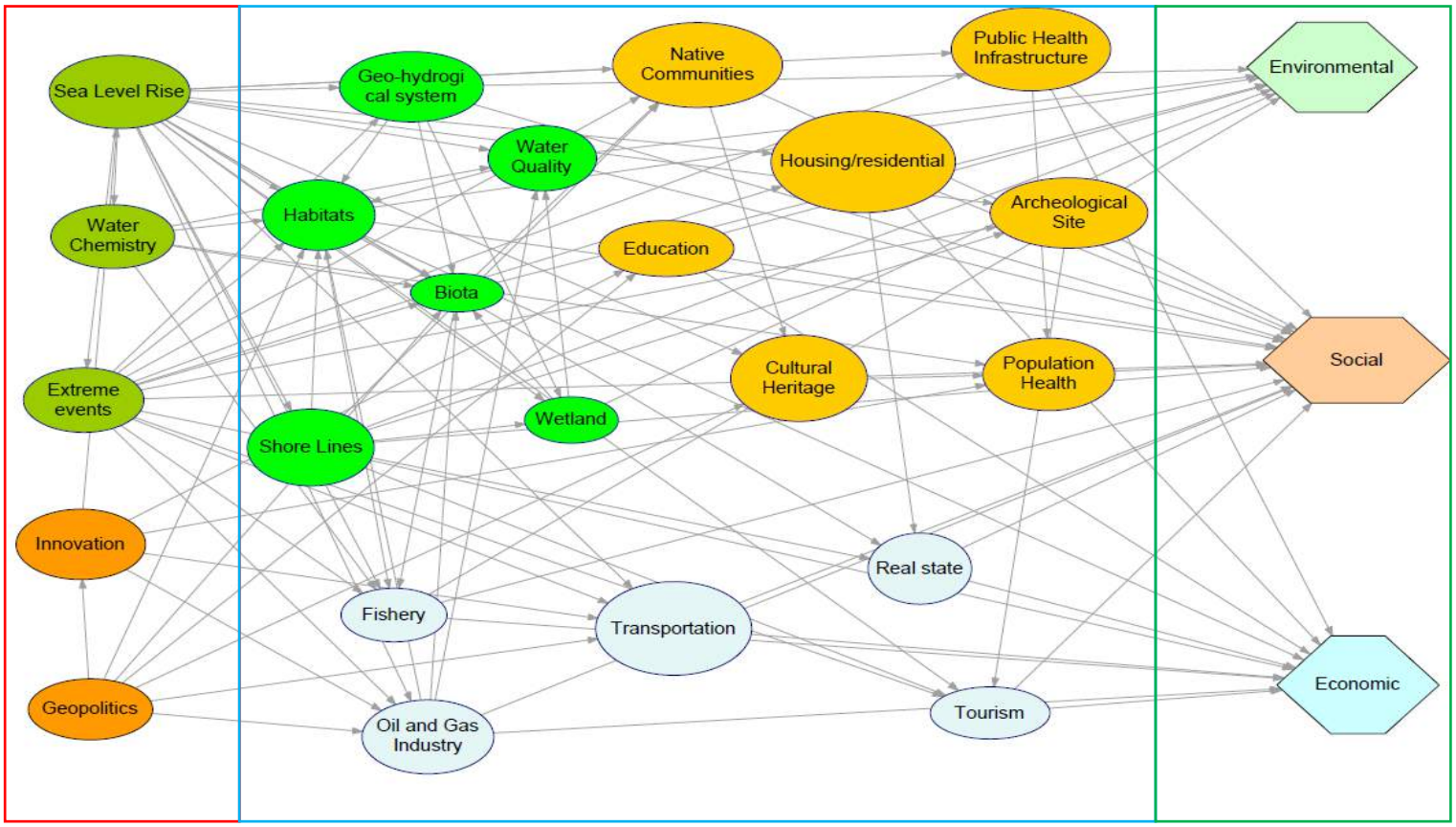
Each variable was classified during the N2N-GoM workshop in three categories, threat, vulnerable system, and impact metric. The next step is to characterize each variable by the identification of the evidences. To characterize the variable, we created a database with each variable definition, and listed each variable source of evidence which can be a dataset, a model prediction or an expert belief. (Figure 17). The variable characterization is going to

be used later in the variable statistical characterization that will feed the Bayesian Network model (Figure 18) in the risk assessment of the GoM.

**Figure 17. Variables data base content.**

| **Threat** | | **Vulnerable systems** | | **Impact metric** | |
|---|---|---|---|---|---|
| Definition | | Definition | | Definition | |
| References | | References | | References | |
| Evidence | Dataset (field and/or lab observation) | Evidence | Dataset (field and/or lab observation) | Evidence | Dataset (field and/or lab observation) |
| | Model Prediction | | Model Prediction | | Model Prediction |
| | Expert knowledge | | Expert knowledge | | Expert knowledge |

**Figure 18. Bayesian Network for representing the variables influencing on the Gulf of Mexico. Red box = threats; Blue box=vulnerable systems, Green box = state of risk**



The Bayesian network model shown in Figure 19 contains the variables identified in the N2N-GoM workshop. This model only includes the top five priority threats, the vulnerable systems these impact to, and their corresponding social, economic and environmental States of Risk. The color code for variables is: green colors represent an environmental variable in threat, vulnerabilities, and state of risk system; orange color represents anthropogenic threats and social variables in the vulnerable and state of risk levels; and finally, the blue color represents an economic variable. This color code was carried out in the entire document.

Interdependencies were built using the expert criteria constructed during the N2N-GoM workshop and complemented using the variable characterization. Innovation and geopolitics were the variables with less information related to their effects on the Gulf of Mexico. Therefore, their dependencies were recognized mainly by the expert criteria from the workshop. The model represents a simplification of the entire GoM system, nevertheless, due to time and evidence availability in this project, we revised the variables and processes recognized in the N2N-GoM workshop recognized as top priorities.

Three variables were presented, one with identification of every type of evidence (physical data, model predictions and expert beliefs), and two variables with two types of evidence. Expert's beliefs refers information related on how or what is the expert options about parameters and ways to measure a process. For example, Horton et al. (2014) utilized the same methodology by Church (2013); they provided a probabilistic assessment related to sea level rise.

**Figure 19. Data-base Variable Characterization**

| | | Evidence | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **Definition** | **Type of evidence** | **Data type** | **Data source** | **Data extension** | **Time-period** | **Methods** | **Link** | **References** |
| **Sea level rise** | Relative sea level rise computed from long term observations from tidal-gauge observations, alongshore between stations and satellite measurements calculating sea level from center of the earth. | Physical data | [1] spatial data, [3] spatio-temporal, [4] spatio-temporal, [6] Point, spatio-temporal | [1] U.S. Geological Survey, [3] NASA, [4] different sources, [6] NOAA | [1] U. S Atlantic Ocean coast line, [3] Global, [4] global, [6] US. States | [1] 2011, [3] 1870 - present, [4] 1993 - 2003 [6] 2015 - present | [3] satellite, tidal gauge, [4] tidal gauge, [6] tidal gauge | [1] https://pubs.usgs.gov/ds/601/ProbSLC_AtlanticData.html , [3] https://climate.nasa.gov/vital-signs/sea-level/, [6] https://coast.noaa.gov/arcgis/rest/services/dc_slr/ [7] https://oceanografia.semar.gob.mx/estaciones.html | [1](Gutierrez, Plant, & Robert Thieler, 2011), [2] (Carbajal-Dominguez, 2011), [3] NASA, [4] (Meyssignac, Becker, Llovel, & Cazenave, 2012), [5] (Beckley, Callahan, Hancock III, Mitchum, & Ray, 2017), [6] (NOAA), [7] SEMAR |
| | | Model predictions | [1,2] Spatio - Temporal | [1] NOAA [2] IPPC | [1] USA [2] Global | [1,2] 1950 -2100 | [1,2] Probabilistic | | [1] (Sweet et al., 2017) [2] (Church, 2013) |
| | | Expert beliefs | [1] Longitudinal | | [1] Global | [1] 2000 - 2300 | [1] Probabilistic | | [1] (Horton, Rahmstorf, Engelhart, & Kemp, 2014) |
| | | Evidence | | | | | | | |
| **Variable** | **Definition** | **Type of evidence** | **Data type** | **Data source** | **Data extension** | **Time-period** | **Methods** | **Link** | **References** |
| **Geo-politics** | Policies and politics generally regarding international relations influenced by geographical factors | Physical data | [1] Point<br>[2] Longitudinal | [1] IBERMAR network [2] Board of Governors of the Federal Reserve System | [1] Mexico [2] Global | [2] 1985 – 2018 | [1] Decalog Methodology [2] Historical Indexing | | [1] (Spejel-Carbajal et al., 2020), [2] (Caldara & Matteo, 2018), |
| | | Model predictions | | | | | | | |
| | | Expert beliefs | | | [1] Global | 1985 - 2018 | | | [1] (Wade & Lauro, 2019) |

**4.1 N2N-GoM Supporting Staff**

As part of the N2N-GoM development, one member was hired as support staff. The member staff has helped to expedite coordination and information sharing among the Steering committee, working groups and new/potential members on the N2N-GoM. The support staff has help with these items:

4.2.1. Lead coordination of the implementation 'the four commitments from N2N-GoM Yucatan Workshop.

4.2.2. Coordination and technical support on the 27 (March 27, 2020 – November 30th, 2020) Steering committee meetings scheduled weekly on Fridays from 9:00 – 10: 00 am.

4.2.3. Coordination and technical support on the two N2N-GoM Workshops including Members' contact information data-base construction

4.2.3. Updates on the N2N-GoM website.

5. **Publications:** Two papers (one abstract and one manuscript) were produced following the N2N-GoM Merida workshop. The abstract titled: Using Action Learning Model for International Network-to-Network Collaborations was accepted for presentation at the 2020 International Network for the Science of Team Science Conference. The manuscript titled: Learning Organization as a Framework for Networks' Collaboration and Knowledge Sharing was accepted with revisions to the Learning Organization Journal.

   Two additional manuscripts are in development. Paper 1: N2N-GoM Merida Workshop: Identification and Prioritization of Risk-Based Decision-Making Factors – (target submission January, 2021) and Paper 2: N2N-GoM Risk-Based Decision-Making Framework for the Development of a Decadal Research and Development Agenda for the Gulf of Mexico targeted submission (March, 2021). The journal, description, impact factor and Link for those journals being considered for submission are presented below.

**Paper 1**

| Journal name | Description | Impact Factor | Link |
|---|---|---|---|
| Climate Risk Management | Climate Risk Management publishes original scientific contributions, state-of-the-art reviews and reports of practical experience on the use of knowledge and information regarding the consequences of climate variability and climate change in decision and policy making on climate change responses from the near- to long-term. | 4.904 | https://www.journals.elsevier.com/climate-risk-management |

| | | | |
|---|---|---|---|
| Climatic Change | Climatic Change is dedicated to the totality of the problem of climatic variability and change - its descriptions, causes, implications and interactions among these. The purpose of the journal is to provide a means of exchange among those working in different disciplines on problems related to climatic variations. | 4.134 | https://www.springer.com/journal/10584 |

**Paper 2:**

| **Journal name** | **Description** | **Impact Factor** | **Link** |
|---|---|---|---|
| Nature Climate Change | Understanding the Earth's changing climate, and its consequences, is a scientific challenge of enormous importance to society. Nature Climate Change is a monthly journal dedicated to publishing the most significant and cutting-edge research on the nature, underlying causes or impacts of global climate change and its implications for the economy, policy and the world at large. | 21.722 | https://www.nature.com/nclimate/ |
| Global Environmental Climate Change | Global Environmental Change is a peer-reviewed international journal publishing high quality, theoretically and empirically rigorous articles, which advance knowledge about the human and policy dimensions of global environmental change. The journal interprets global environmental change to mean the outcome of processes that are manifest in localities, but with consequences at multiple spatial, temporal and socio-political scales. | 10.466 | https://www.journals.elsevier.com/global-environmental-change |

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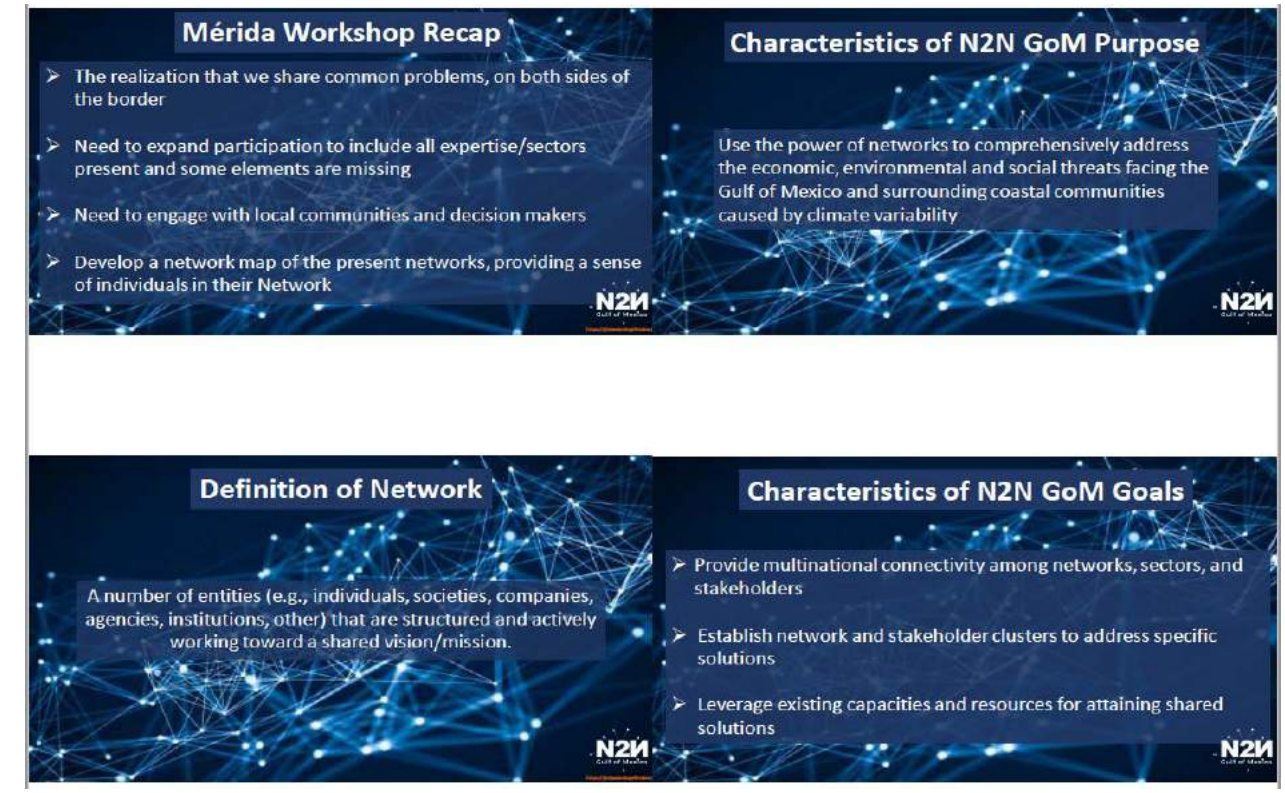
# Appendix A: Individuals and Networks engaged in N2N-GoM.

| Name | | Network/Stakeholder | Title | Email |
|---|---|---|---|---|
| Becky | Allee | Gulf of Mexico Large Marine Ecosystems | Senior Scientist | beck.allee@noaa.gov. |
| John | Allen | Subsea Systems Institute | Advisor | John.o.allen1@comcast.net |
| Elisa Guillen | Arguelles | | Dr. | eguillen@itcancun.ed.mx |
| Jack | Baldauf | N2N-GoM | Dr. | jbaldauf@tamu.edu |
| Daniel | Benet | MFA | | Dbenetsn@gmail.com |
| Michael | Beyerlein | Human Resource Development | Dr. | beyerlein@tamu.edu |
| Khalil | Dirani | N2N-GoM | Governance WG | dirani@tamu.edu |
| Elva | Escobar | UNAM ICML | Professor | escobr@cmarl.unam.mx |
| Ernesto | Garcia | Harmful Algal Bloom Network | Coordinator | ergarcia@cicese.mx |
| Elisa | Guillen | Instituto Tecnologico de Cancun | | elisa.ga@cancun.tecnm.mx |
| Victor | Gutierrez | N2N-GoM | Data Analytics WG | vgutierrez@grupoplenum.com |
| Jessica | Henkel | RESTORE | Science Advisor | jessica.henkel@restorethegulf.gov |
| Juan Carlos | Herguera | CIGOM | PI | herguera@cicese.mx |
| Vanessa | Herrera | N2N-GoM | Data Analytics | vherrera@grupoplemun.com |
| Sharon | Herzka | N2N-GoM | Governance WG | sherzka@cicese.mx |
| Xinping | Hu | HRI Chair for ecosystem science and modeling | | xinpinghu@tamucc.edu |
| Barbara | Kilpatrick | GECOOS | Executive Director | Barb.Kilpatrick@gcoos.org |
| Maria Eugenia | Lbarraran | REDCAM | Dr. | mariaeugina.ibarraran@iberopuebla.mx |
| Erwin | Marti | INECC | Coordinator | erwin.marti@inecc.gob.mx |
| Zenon | Medina-Cetina | N2N-GoM | Co-PI | zmedina@civil.tamu.edu |
| Gregory | Miller | Center for Responsible Travel (CREST) | Executive Director | gmiller@responsibletravel.org |
| Lynette | Millett | Forum on Cyber Resilience at The National Academies | Director | LMillett@nas.edu |
| Alberto | Muñoz | N2N-GoM | Data Analytics WG | luisalbertomunozubando@gmail.com |
| Alicia | Navarrete | SIIES | Representative | anavarrete.siies@gmail.com |
| Kennedy | Obomobo | Center for Responsible Travel (CREST) | affiliate | magiobom@yahoo.com |

| | | | | |
|---|---|---|---|---|
| Miguel | Ortiz | | PhD Student | miguelortica@tamu.edu |
| Daniel | Pech | Cima Red Pinc | Coordinator | dpech@ecosur.com |
| Pamela | Plotkins | Texas Sea Grant | Director | plotkins@tamu.edu |
| Antonio | Rodriguez | Thematic Network for sustainable energy, environment and society | Executive Board | redsumas@gmail.com |
| Katie | Thompson | The Ocean Foundation | Program Manger | kthompson@oceanfdn.org |
| Jamie | Urrutia | Mexican geophysics Unicion | Secretary for international affairs | jus@geofisca.unam.mx |
| Victor | Vidal | Southeast interinsitutional Network for Climate Change | Coordinator | vvvidal@cinvestav.mx |
| Carol | Welsh | REDESCLIM | Coordinator | cwelsh@uv.mx |
| Katya | Wowk | N2N-GoM | Research WG | Katya.wowk@tamucc.edu |

# Appendix B. Slide deck of Spring N2N-GoM Meeting

## Characteristics of N2N GoM Goals

- Obtain new resources for attaining shared solutions
- Develop and implement a multinational, cross sectoral, decadal agenda for the GoM and surrounding region
- Engage / inform decision makers in finding solutions to reduce risk

N2N Gulf of Mexico Leveraging the Power of Network Collaborations

Meeting Agenda

9:00am – 9:10am: Introductions
9:10am – 9:20am: N2N-GoM Merida Workshop Outcomes
9:20am – 9:30am: N2N-GoM After Merida's Workshop
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10:35am – 10:45am: Discussion of N2N-GoM Governance Working Group
10:45am – 11:00am: Summary of Discussions and Next Steps


## N2N-GoM After Merida's Workshop

- Transition of leadership in the Planning Committee
- Integration of three Working Groups:
  - Research
  - Data Analytics
  - Governance
- Definition of a Transitioning Budget from Phase I to Phase II
  - NSF-NCE($25k) + SIIES-NCE($15k) + TAMU ($15k) =$55k
  - Coordination of Planning Committee
    - ✓ Research: Merida Papers + Proposals -> Transition Plan
    - ✓ Data Analytics: Data-Lake -> Transition Plan
    - ✓ Governance: MTP + NGO -> Transition Plan

## N2N-GoM After Merida's Workshop

- Research Preliminary Results: Summary of Merida's Workshop

Risk = Hazard x Vulnerability x Consequences

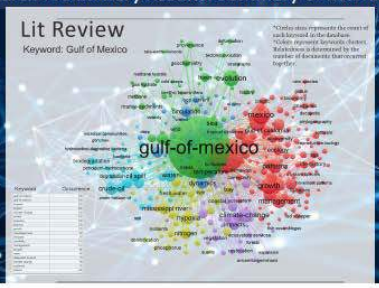
R = P[T] x P[C | T] x u(C)

Threat → Consequence → Risk

T = Threat Intensity
C = Value of Consequences
R = State of Risk

## N2N-GoM After Merida's Workshop

- Research Preliminary Results: Summary of Merida's Workshop




## N2N-GoM After Merida's Workshop

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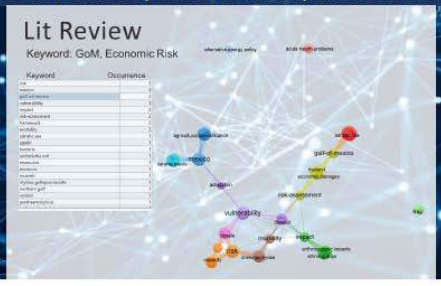


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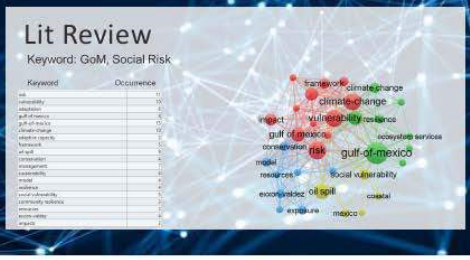
- Research Preliminary Results: Summary of Merida's Workshop



## N2N-GoM After Merida's Workshop

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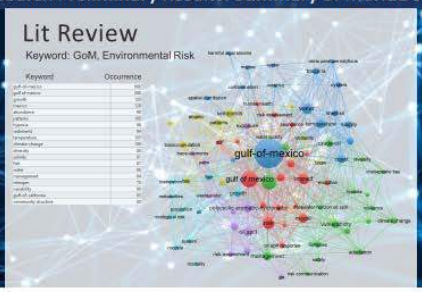


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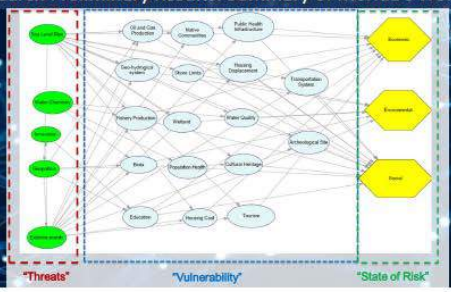
- Research Preliminary Results: Summary of Merida's Workshop




N2И Gulf of Mexico — Leveraging the Power of Network Collaborations

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## Research Agenda - Proposed Outcomes

- Establish a N2N - GoM Research Framework
- Establish Integrated Research Teams
- Establish a strategy to develop a N2N-GoM decadal agenda
- Identify possible funding opportunities
- Establish pathways for connectivity
- Other

## N2N GoM Research Framework

- Reconfirm Research Priorities *(must focus on <u>complex, cross sectoral, societal challenges</u>)*
  - ✓ Sea-level Rise
  - ✓ Extreme events
  - ✓ Innovation
  - ✓ Governance
  - ✓ Technology & innovations (capacity /gaps)
  - ✓ Data
  - ✓ Other

## N2N GoM Research Framework

- Reconfirm Research Priorities *(must focus on <u>complex, **cross sectorial**, societal challenges</u>)*
  - ✓ **Other**
    - Sustainable Communities
    - Health
    - Vulnerable populations
    - Economies
    - Sustainable Coastlines
    - Education……

## Establish Integrated Research Teams (IRT)

- **<u>Establish initial research working groups</u>**
  - ✓ Define purpose of groups
    - Provide connectivity to leverage within and across sectors
    - Identify potential collaborators/funding opportunities
    - Bring existing and new knowledge/data/technology and innovation to deliver solutions
    - Define barriers & gaps
    - Identify possible solutions
    - Integrate data and models as appropriate
    - IRT suggests agendas and outcomes for each group

## Establish Integrated Research Teams

- **Establish initial research working groups**
  - ✓ Define composition / leadership
    - Participants may join more than one team, but must be committed
    - ***Committed = joining IRT meetings every other week, participating in discussion, answering questions and developing a research agenda around the issue area***

## Establish Integrated Research Teams

- ✓ **Engagement strategy Questionnaire**
  - Objective: Distribute online questionnaire to N2N participants
  - Questionnaire will request deeper information on network
    - Priorities (working group)
    - Capacity to address priorities (data, models, experts)
    - Challenges

Results used both to inform development of Research Integration Teams and as building blocks toward a decadal research agenda

## N2N GoM Decadal Research Agenda

- **Develop decadal strategy**
  - ✓ Define purpose
  - ✓ Define specific outcomes
  - ✓ Determine Stakeholders
  - ✓ Identify Contributors
- Build from N2N GoM IRT issues / solutions
- Logistics
  - ✓ Timeframe

## Funding Opportunities

- Identify teams that are poised to respond to funding opportunities
- Current effort (examples)
  - ✓ Accelerating Research through International Network-to-Network Collaborations (AccelNet)
    - Letter of support
  - ✓ Major Research Instrumentation Program
  - ✓ Others (need to be defined)

## Funding Opportunities

- **Network Letter of Support**
  - Value of N2N-GoM to your Network
  - N2N – GoM potential Impact
  - What your network brings to N2N-GoM

## Connectivity

- Research Engagement
  - ✓ Identification of issues & solutions
  - ✓ Define resource opportunities
    - Knowledge, data, other
- Research Opportunities
  - ✓ Collaboration
  - ✓ Internships
- Pathways
  - ✓ Leadership Team
- Timelines
- Other

## Timeline

**Research Team Participation** *Due 11 Sept.*

- In priority order, rank the Top 3 research teams in which you'd like to participate
- For each team, identify which role(s) you are willing to serve

**Letter of Support** *Due 18 Sept.*

Letter of Support from your network (may be submitted in Spanish) to include three points:
1) Value you see of N2N for your network
2) Positive impact N2N could have on your network
3) Value your network brings to N2N

**Network Questionnaire** *Due 2 Oct.*

Completed questionnaire, with your network's input, on network priorities, capacity, etc. to address specific research areas

Separate Research Integration Team Meetings (*Sept.-Oct.*), followed by Full Research Integration Team Meeting (*Nov.*)

## Action Items

- Establish a N2N - GoM Research Framework
  - Your input on Research priorities
- Establish Integrated Research Teams
  - Your input concerning your commitment concerning Priority research teams
- Establish a strategy to development of a N2N-GoM decadal agenda
  - Finalize development strategy
- Identify possible funding opportunities
  - Provide Letter of Support

## Contact Information

Katya Wowk, Ph.D.
Director, Texas OneGulf Center of Excellence
Harte Research Institute for Gulf of Mexico Studies
Office: 361.825.2030
Katya.Wowk@tamucc.edu

Jack Baldauf
Senior Associate Vice President for Research
Division of Research
Professor of Oceanography
Texas A&M University
Office: 979 8585
jbaldauf@tamu.edu

## N2N Gulf of Mexico — Leveraging the Power of Network Collaborations

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## Discussion of N2N-GoM Research Working Group -> Transition Plan

N2N Gulf of Mexico — Leveraging the Power of Network Collaborations

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## Presentation of N2N-GoM Data Analytics Working Group -> Transition Plan

## DATA ANALYTICS N2N GOM

Objective :

The main objective of the DATA ANALYTICS integration component involves (1) the definition and (2) coordination with the various sectors for the (3) identification, (4) sampling strategies, (5) integration and (6)collection of data for its organization and use within the datalake.
Equally important is the integration of (7) methods and (8) solutions development to their approval for the application of (9) forecasting models.

## Organizational Structure for DATA ANALYTICS N2N GOM

Organizational structure would consist of:

- Data Analytics Comittee
- Data-oriented gathering working groups
- Data procurement representatives
- Data Stakeholders

## Main Challenges DATA ANALYTICS N2N (from the report) (I/III)

1. Identify existing data baselines and the critical variables needed to measure climate impacts on physical, chemical, biological and social systems, including spatial and temporal engagement gaps.
2. A case study incorporates random or purposive sampling, and includes quantitative and qualitative data
3. Data collection strategies and facilities
4. What data already exists to assist? (data can be social, environmental and economic data, including observed data and models)
5. Where are the overall gaps? (e.g., across data, people, funding, technology, policy, regulations, etc.).

## MVP Tourism under COVID 19


- ✔ Front DataLake
- ✔ Data sources definition
- ✔ Design of datalake
- ✔ Definition of 2 algorithm
- ✔ Definition of 3 Reports
- ✔ API extraction & API ingestion

## DATA ANALYTICS Timeline

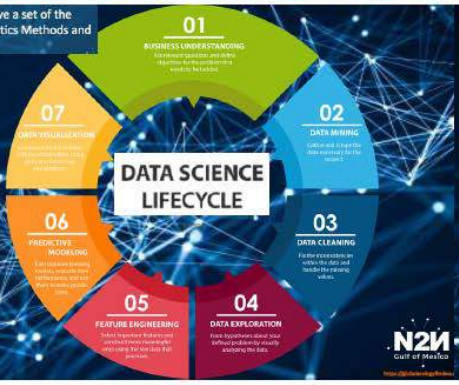
- Letter of Support. Due 11 sept.
- Kick Off meeting. Due 18 sept. Monthly Meetings
- Follow up. Due 16 oct
- Follow up. Due 13 nov

## DATA ANALYTICS Upcoming Tasks

- Draft N2N-GoM Data Governance
- Define Datalake opportunities
- Investigate, select, validate and approve a set of the most useful and affordable Data Analytics Methods and resources N2N GoM

## Draft N2N-GoM Data Governance


## Investigate, select, validate and approve a set of the most useful and affordable Data Analytics Methods and resources N2N GoM




## Contact Information

Alberto Muñoz, Ph.D.
Chief Innovation Officer
Plenumsoft
amunoz@grupoplenum.com

Víctor Gutiérrez
CEO
Plenumsoft
vgutierrez@grupoplenum.com

## N2N Gulf of Mexico Leveraging the Power of Network Collaborations

**Meeting Agenda**

9:00am – 9:10am: Introductions
9:10am – 9:20am: N2N-GoM Merida Workshop Outcomes
9:20am – 9:30am: N2N-GoM After Merida's Workshop
9:30am – 9:45am: Presentation of N2N-GoM Research Working Group
9:45am – 9:55am: Discussion of N2N-GoM Research Working Group
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10:45am – 11:00am: Summary of Discussions and Next Steps

## Discussion of N2N-GoM Data Analytics Working Group -> Transition Plan

N2N Leveraging the Power of Network Collaborations
Gulf of Mexico

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## Organizational Structure for N2N-GoM Governance

This will consist of:

- Steering Committee (SC)
- Working groups (WG)
- Network representatives
- Stakeholders

***Steering Committee*:** Responsible for building trust, credibility, effective communication, coordination, and facilitating engagement of member networks and stakeholders

- Aprox. 15 individuals (8 planning committee members + 7 additional members) - *membership will determine remaining positions*
- Includes an Executive Committee (operates within SC)
- Composition should be balanced across countries, sectors and gender, if possible
- Quarterly meetings

## Steering Committee Upcoming Tasks

- Develop work plan
- Amend and ratify N2N-GoM bylaws (to be subsequently ratified by N2N GoM members) for N2N operation, as well as SC and workgroup function
- Define and ratify initial workgroups
- Investigate, select, approve and implement an appropriate legal framework for N2N GoM

Multisector ***Working Groups*** (WGs): will be established to focus on developing solutions to specific threats, vulnerabilities and consequences, and to increase resilience and adaptation

- Currently operating:
  - Research group
  - Governance group
  - Data Analytics Group
- Can change through time based on N2N GoM activities and goals

***Network representatives:*** Each network member has a single representative in N2N GoM

- Initial membership derived from Merida 2019 workshop
- Additional network members to be recruited

***Stakeholders representatives:*** Each stakeholder member has a single representative in N2N GoM

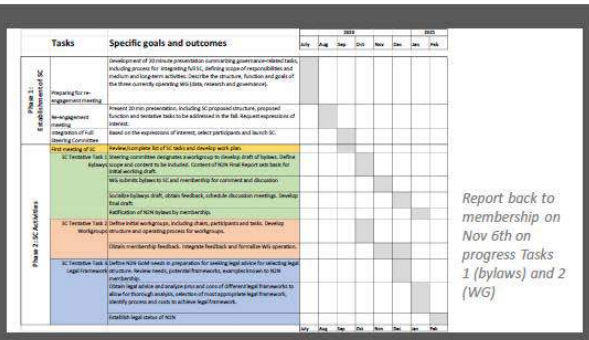
## N2N GoM Bylaws and articles of operation

- Main governing document
- Bylaws cover an organization's operating procedures
- Will guide the SC's operation and procedures
- Needed to prevent conflicts
- Can be tailored to address:
  - *SC structure and function, roles of different groups within the organization, terms of service, membership/ appointment of network representatives, process for engagement with stakeholders, conflicts of interest, etc.*

## Examples of N2N GoM Bylaws to be defined by SC

- *SC operation (tentative):*
  - Chair and members of the SC will rotate every three years. Terms will be staggered to ensure continuity.
  - Co-Chair will be selected from the member of the SC and will replace the chair when the chair rotation is completed.
  - The SC will receive the support of an office manager/executive director as soon as funding permits.
- *WG operation (tentative):*
  - Each WG will be commissioned and decommissioned by the SC
  - WGs will be populated by N2N-GoM members base on a formal expression of interest to the SC
  - Each working group will have a chair and co-chair.
  - Need to define selection process and member participation in WG. WG members will select the Chair.

From N2N Merida Workshop Final Report




*Report back to membership on Nov 6th on progress Tasks 1 (bylaws) and 2 (WG)*

***Expressions of interest for SC or WG participation requested***

## Contact Information


Dr. Sharon Herzka
Research Professor
Department of Biological Oceanography
Center for Scientific Research and Higher Education of Ensenada (CICESE)
Consortium for Gulf of Mexico (CIGOM)
Baja California, México
Office: +52 646 175-0500 ext 24259
sherzka@cicese.mx

Khalil Dirani
Associate Professor
Educational Administration and Human Resource Development
511 Harrington Office Building
4226
Office: (979) 845-2716
dirani@tamu.edu


N2N Gulf of Mexico

N2N Gulf of Mexico Leveraging the Power of Network Collaborations

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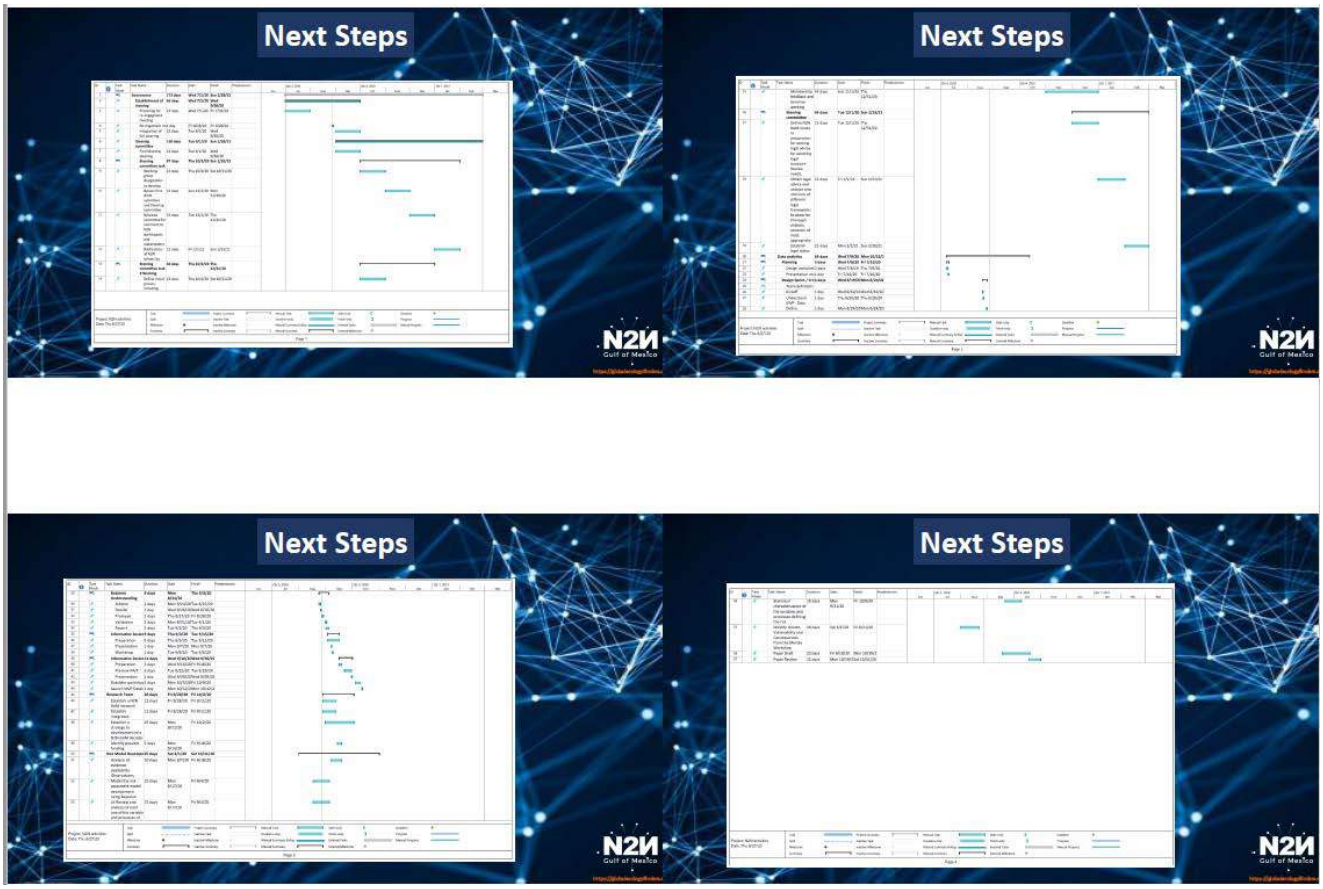
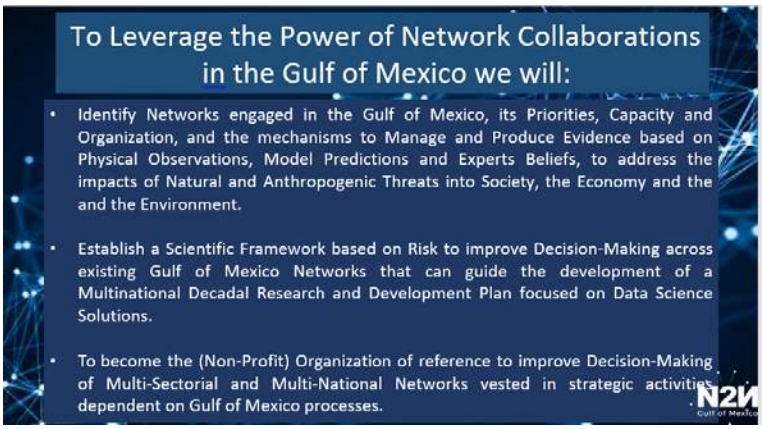
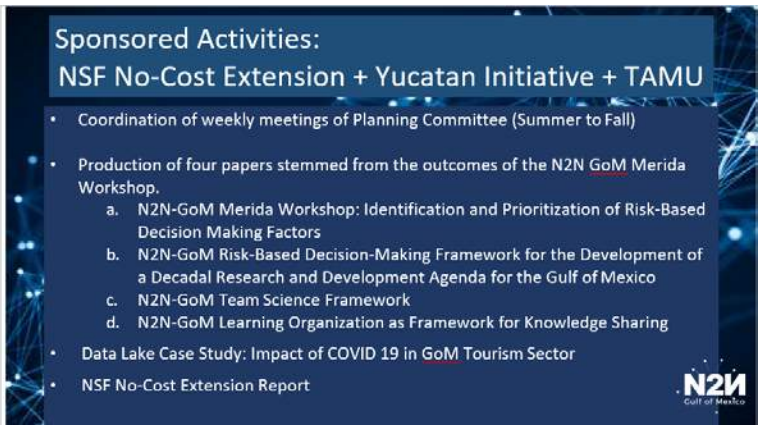

Next Steps
Next Steps
Next Steps
Next Steps

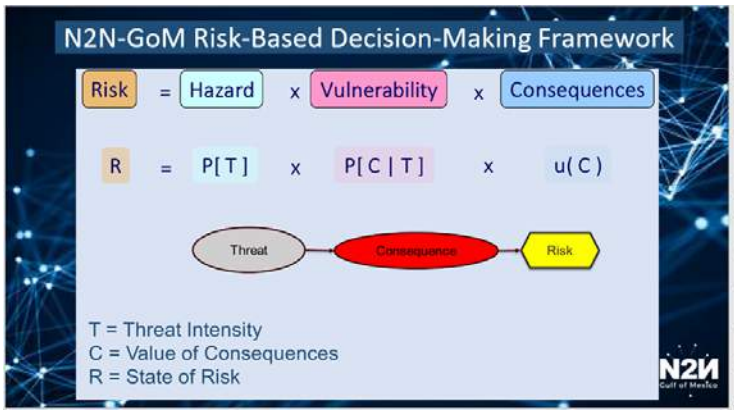

N2И
Gulf of Mexico
Leveraging the Power of Network Collaborations
Thank you for your participation!
zenon@tamu.edu
NSF
Yucatán
SIIES
TEXAS A&M UNIVERSITY
SUIT - US
YUCATAN INITIATIVE

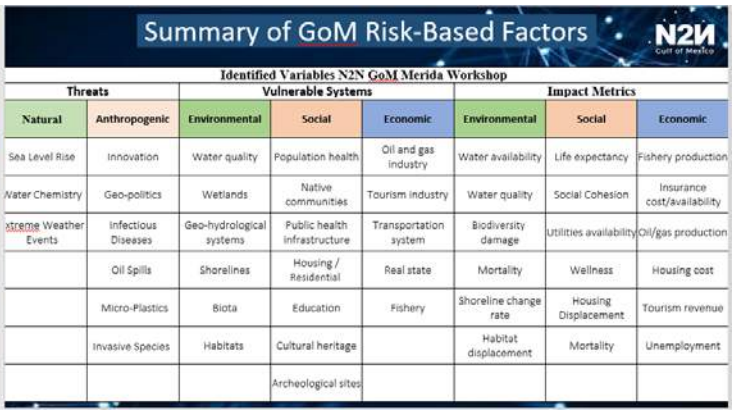
**Appendix C:** Slide deck of Fall N2N-GoM Meeting





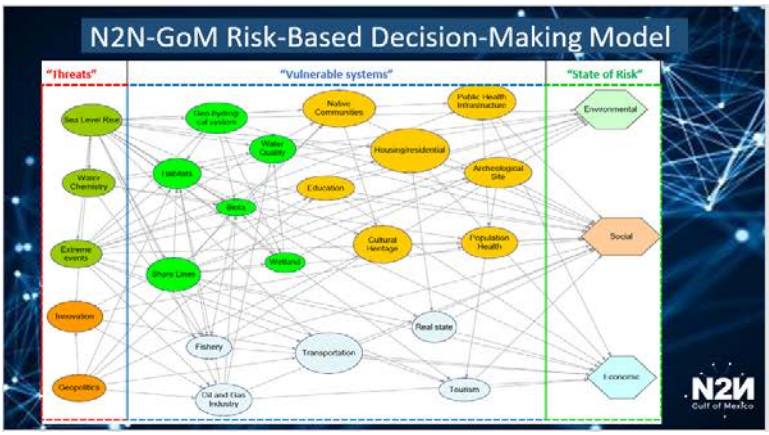



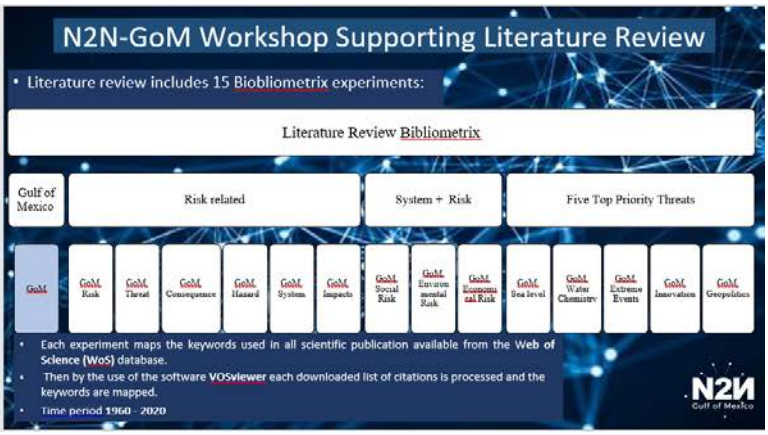



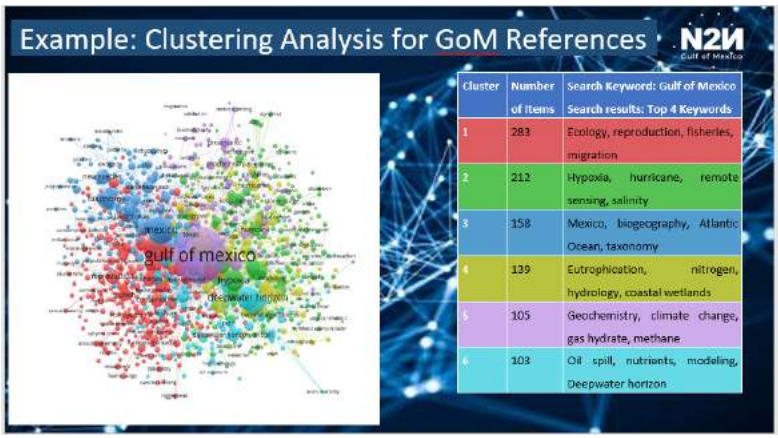




Identified Variables N2N GoM Merida Workshop

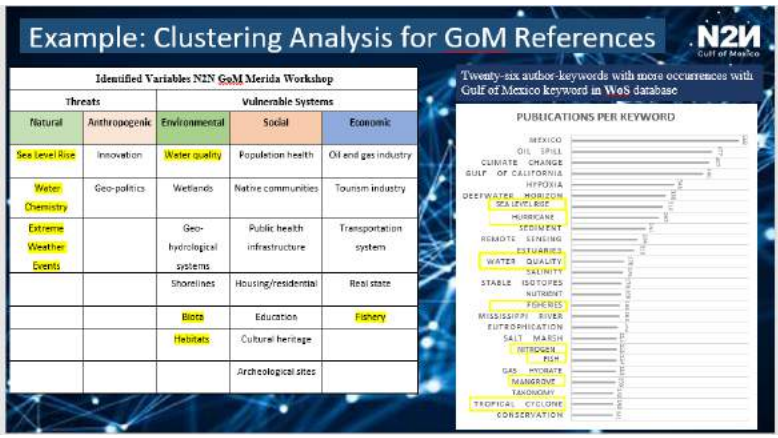
| Threats | | Vulnerable Systems | | | Impact Metrics | | |
|---|---|---|---|---|---|---|---|
| Natural | Anthropogenic | Environmental | Social | Economic | Environmental | Social | Economic |
| Sea Level Rise | Innovation | Water quality | Population health | Oil and gas industry | Water availability | Life expectancy | Fishery production |
| Water Chemistry | Geo-politics | Wetlands | Native communities | Tourism industry | Water quality | Social Cohesion | Insurance cost/availability |
| Extreme Weather Events | Infectious Diseases | Geo-hydrological systems | Public health infrastructure | Transportation system | Biodiversity damage | Utilities availability | Oil/gas production |
| | Oil Spills | Shorelines | Housing / Residential | Real state | Mortality | Wellness | Housing cost |
| | Micro-Plastics | Biota | Education | Fishery | Shoreline change rate | Housing Displacement | Tourism revenue |
| | Invasive Species | Habitats | Cultural heritage | | Habitat displacement | Mortality | Unemployment |
| | | | Archeological sites | | | | |




| Cluster | Number of items | Search Keyword: Gulf of Mexico Search results: Top 4 Keywords |
|---|---|---|
| 1 | 283 | Ecology, reproduction, fisheries, migration |
| 2 | 212 | Hypoxia, hurricane, remote sensing, salinity |
| 3 | 158 | Mexico, biogeography, Atlantic Ocean, taxonomy |
| 4 | 139 | Eutrophication, nitrogen, hydrology, coastal wetlands |
| 5 | 105 | Geochemistry, climate change, gas hydrate, methane |
| 6 | 103 | Oil spill, nutrients, modeling, Deepwater horizon |




| Identified Variables N2N GoM Merida Workshop | | | | |
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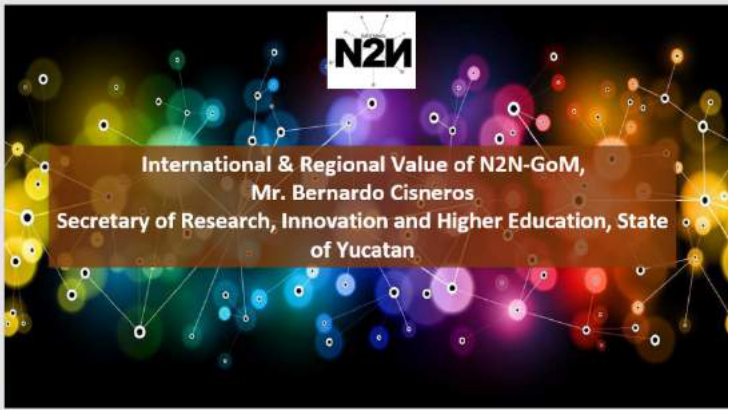


N2N
Leveraging the Power of Network Collaborations
Gulf of Mexico
Meeting Agenda
9:00am – 9:05am: Welcome & Summary of Past Activities, Dr. Medina Cetina
9:05am – 9:10am: International & Regional Value of N2N-GoM, Mr. Bernardo Cisneros
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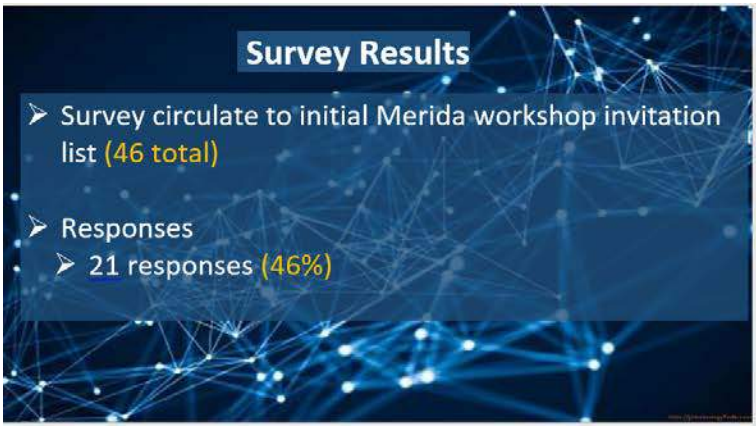
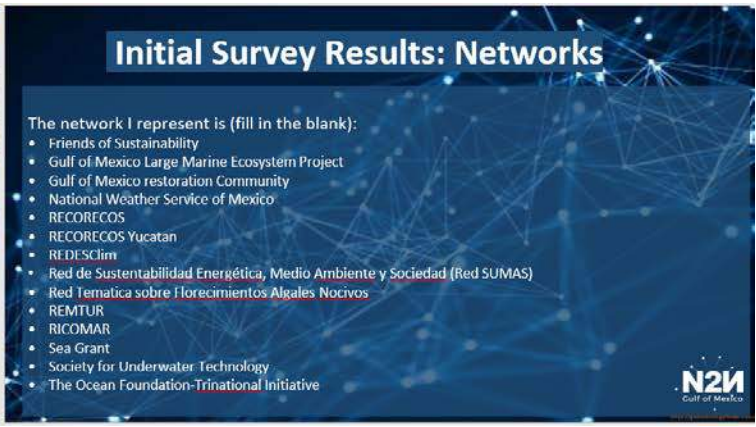
N2N
Presentation of N2N-GoM
Research Working Group Strategy
-> Becoming the 'N2N-GoM Research Team'


Survey Results
Survey circulate to initial Merida workshop invitation list (46 total)
Responses
21 responses (46%)


Initial Survey Results: Networks
The network I represent is (fill in the blank):
Friends of Sustainability
Gulf of Mexico Large Marine Ecosystem Project
Gulf of Mexico restoration Community
National Weather Service of Mexico
RECORECOS
RECORECOS Yucatan
REDESClim
Red de Sustentabilidad Energética, Medio Ambiente y Sociedad (Red SUMAS)
Red Tematica sobre Florecimientos Algales Nocivos
REMTUR
RICOMAR
Sea Grant
Society for Underwater Technology
The Ocean Foundation-Trinational Initiative
N2N
Gulf of Mexico


N2N-GoM Research Agenda
Establish a N2N GoM Research Framework
Establish Integrated Research Teams (IRT)
Establish a strategy for development of a GoM decadal agenda
Identify possible funding opportunities
Establish pathways for connectivity
N2N
Gulf of Mexico


Establish Integrated Research Teams (IRT)
Establish initial research working groups
Define purpose of groups
Provide connectivity to leverage within and across sectors
Identify potential collaborators/funding opportunities
Bring existing and new knowledge/data/technology to deliver solutions
Identify critical issues
Define barriers & gaps
Identify possible solutions
Integrate data and models as appropriate
N2N
Gulf of Mexico

## Initial Survey Results: Joining IRTs

2. N2N Integrated Research Teams (IRTs) are being formed to strengthen collaboration and capacity to address complex issues for the Gulf. Members will be expected to join IRT meetings (~2/month), participate in discussion, and provide input (information & data) on developing a research agenda. Are you willing to join one or more IRTs?

**Yes: 19 (90%)**

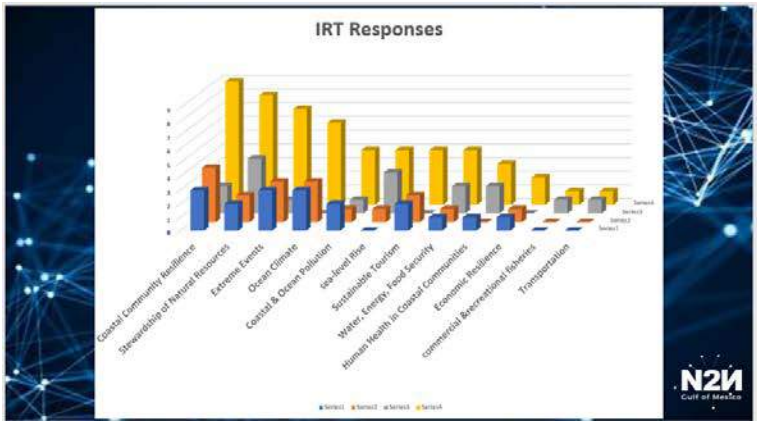
**No: 1 (5%)**

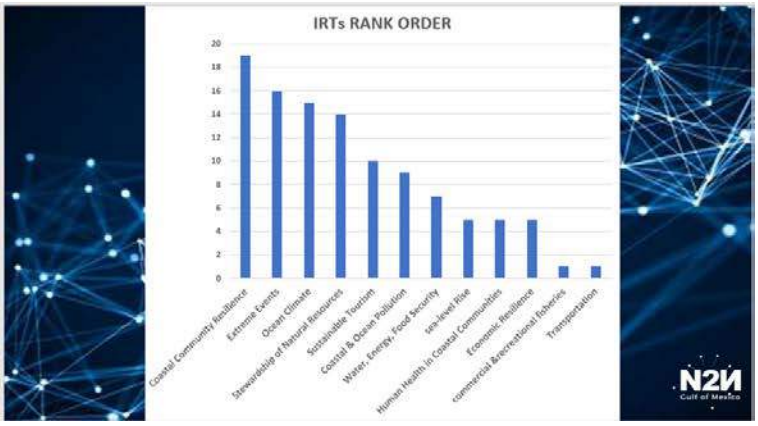
**Maybe: 1 (5%)**

## Potential IRT Themes

**Rank (Score)**

Extreme Events
Ocean Climate
Coastal Community Resilience
Stewardship of Natural Resources
Coastal & Ocean Pollution
Sustainable Tourism
Water, Energy, Food Security
Economic Resilience
Sea Level Rise
Human Health in Coastal Communities
Transportation
Commercial & Recreational Fisheries

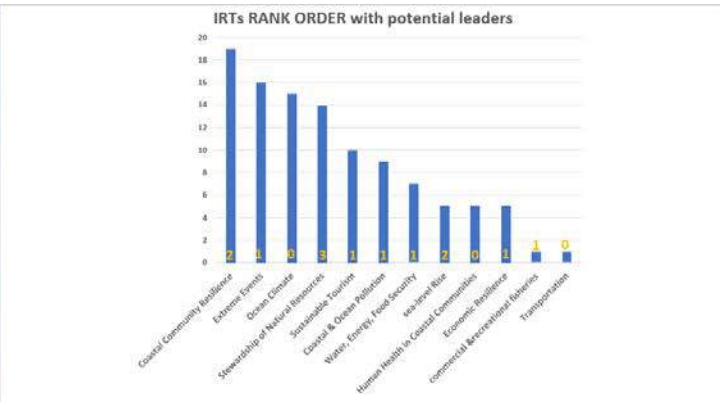



## Initial Survey Results: Themes (Others)

**IRT - Others**

- Integrated coastal zone management (method)
- Community Involvement (method)
- Numerical modelling (method)
- Vulnerability of marine resources (stewardship)
- Deep Sea biological diversity
- Climate change adaptation strategies in the tourism sector (tourism)



## Proposed IRTs

**Rank**

1 Extreme Events + 2 Coastal Community Resilience
3 Ocean Climate
4 Stewardship of Natural Resources
5 Sustainable Tourism
6 Coastal & Ocean Pollution
7 Water, Energy, Food Security + 8 Economic Resilience
8 Sea Level Rise
8 Human Health in Coastal Communities
10 Transportation
11 Commercial & Recreational Fisheries

**Note: Click on the Zoom Chat to provide your name and the IRT name(s) that you are interested in participating in!**

## Potential Capacity

- Capacity building
- Data
- Decision maker access
- Engagement (Cuba)
- Forecasts (extreme events)
- Laboratories
- Literacy (ocean)
- Models
- Outreach
- Subject matter experts: coastal, ecology, energy, environmental, fisheries, ocean, renewable energy, management, sea-level, water
- Tools
- Training

## Initial IRT meetings

1. Establish connectivity among team members
2. Establish IRT operating parameters
3. Define critical issue(s)
   a) Current baseline (knowledge)
   b) Knowledge and technological gaps
   c) Current expert(s) on issue
   d) Additional members / networks
   e) Available capacity
   f) Other

## IRT Next Steps

4. Identify potential contributors and other networks
   a) develop and circulate survey
5. Frame the research agenda specific to each issue
6. Identify potential funding opportunities
7. Other

## Survey Example

**I. Network Demographic Information**

1- What do you consider your geographic scope?
- local Do we need to define (does this include rural?
- city
- county - Not sure if Mexico uses county. Maybe Municipalities?
- state
- regional (please specify) ----------
- national
- international

2- What is your network's framework? Please select all that apply
- Non-profit
- For profit
- Government
- Academic
- Private
- Corporate
- Charity
- Other (please specify) ----------

3- What is the number of member institutions in your network?
- 1-5
- 6-10
- 11-30
- More than 30
- Does not apply to this network

**II. Network Collaboration**

4- What are your network's top three challenges related to collaboration on (IRT issue area) in the Gulf: 1-
2- _____
3- _____

5- Please identify other networks that also address or are concerned with (IRT issue area) in the Gulf of Mexico that should be included in this initiative.

**III. IRT Issue Area Capacity Assessment**

*Expertise, Data, Tools, Models & Gaps*

## Next Research Meeting

**Date: Targeting about** 1 March 2021
**Proposed outcomes (draft):**
IRT Reports
- Issues to resolve
- Capacity Building
- Data
- Funding Opportunities
- Research Priorities

GOM decadal agenda
Other

## Contact Information

Katya Wowk, Ph.D.
Director, Texas OneGulf Center of Excellence
Harte Research Institute for Gulf of Mexico Studies
Office: 361.825.2030
Katya.Wowk@tamucc.edu

Jack Baldauf
Senior Associate Vice President for Research
Division of Research
Professor of Oceanography
Texas A&M University
Office: 979 8585
jbaldauf@tamu.edu

N2N Gulf of Mexico — Leveraging the Power of Network Collaborations

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N2N

**Discussion of N2N-GoM Research Working Group**

N2N Gulf of Mexico — Leveraging the Power of Network Collaborations

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N2N Gulf of Mexico

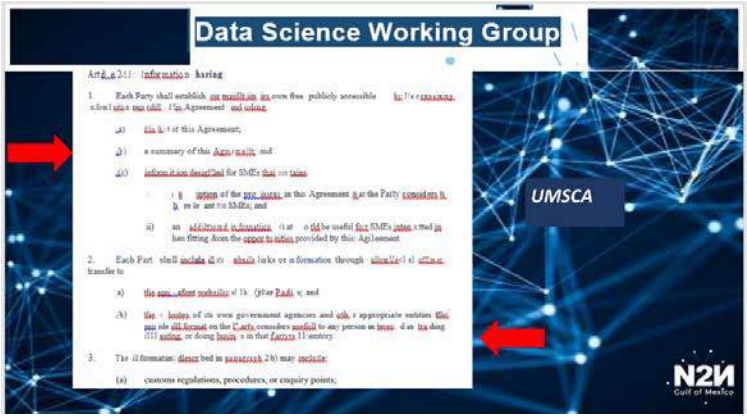
**Presentation of N2N-GoM Data Science Working Group Strategy -> Becoming 'N2N-GoM Data Science Team'**

## Data Science Working Group

### The ExO Formula


N2N Gulf of Mexico

## Data Science Working Group




## Data Science Working Group

- Collect Data Governance related recommendations from Council members.
- Resolve data related issues when conflicts arise.
- Makes decisions about data definitions, data quality, and data timeliness with knowledge of impact on their domain.
- Consider, approve and promote University-wide data management policies, standards, guidelines, and operating procedures related to the University's institutional data assets.

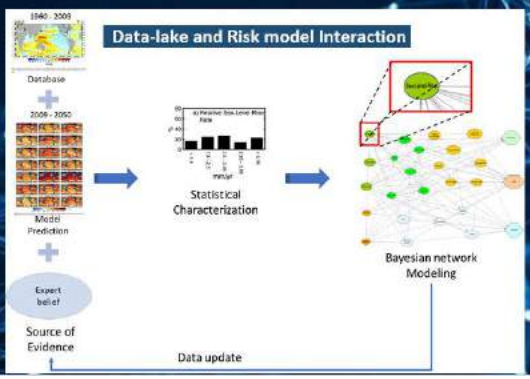
## Data Science Working Group

- Assess University-wide applications as it relates to storing and strategically using data.
- Evaluate and prioritize potential University-wide and institutional data systems projects.
- Advise on University-wide strategic plans for data management including sourcing, distribution, maintenance, and quality of University/institutional data assets.

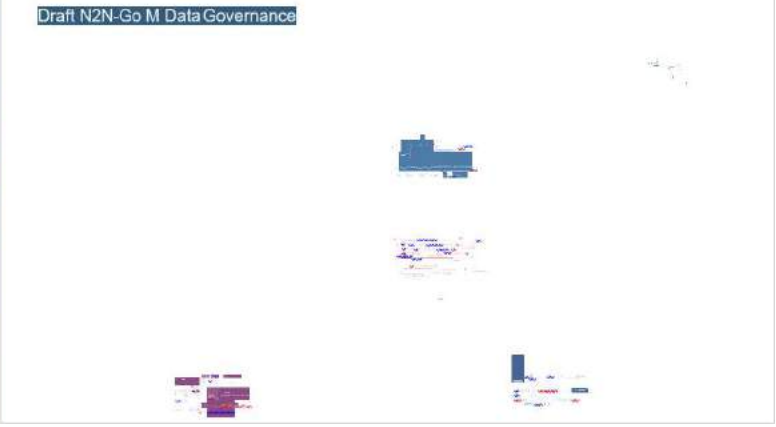
## Data Science Working Group

- Recommend plans and methods for assessing data management value and risk.
- Ensure institutional data has consistent definitions and responsible classifications according to best practice data management standards and guidelines.

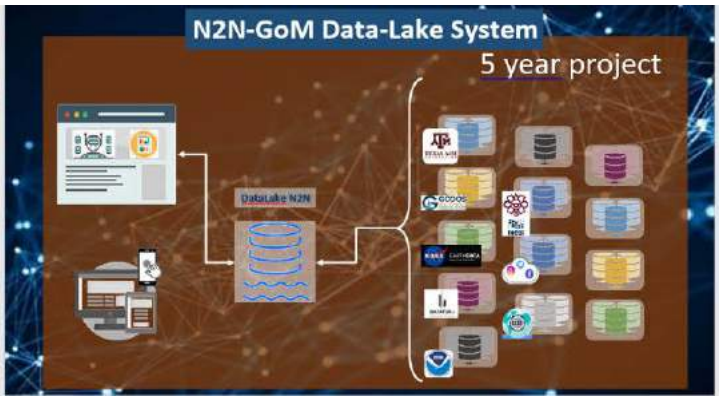
## Data Science Working Group

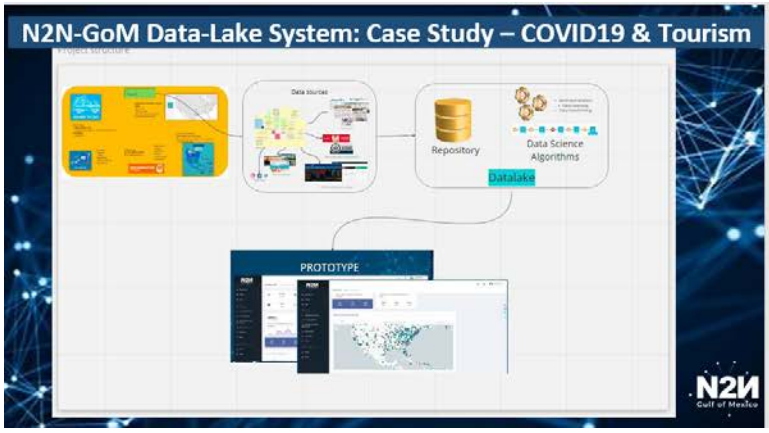


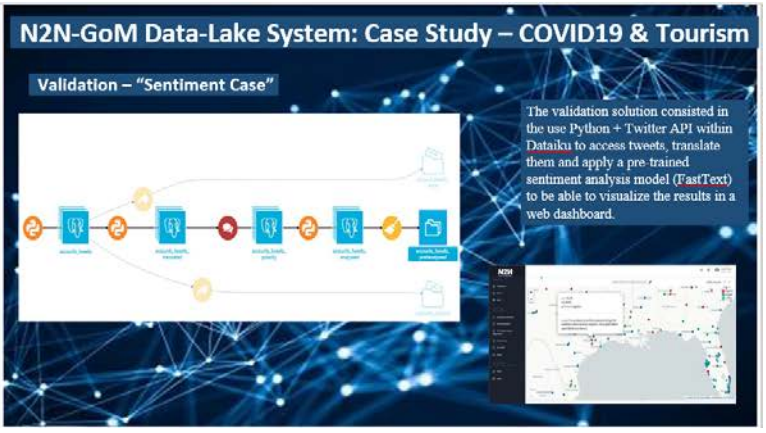

Draft N2N-Go M Data Governance




Data Ethics Canvas


N2N-GoM Data-Lake System
5 year project
DataLake N2N


N2N-GoM Data-Lake System: Case Study – COVID19 & Tourism
Repository
Data Science Algorithms
Datalake
PROTOTYPE


N2N-GoM Data-Lake System: Case Study – COVID19 & Tourism
Validation – "Sentiment Case"
The validation solution consisted in the use Python + Twitter API within Dataiku to access tweets, translate them and apply a pre-trained sentiment analysis model (FastText) to be able to visualize the results in a web dashboard.


Contact Information
Alberto Muñoz, Ph.D.
Chief Innovation Officer
Plenumsoft
amunoz@grupoplenum.com
Víctor Gutiérrez
CEO
Plenumsoft
vgutierrez@grupoplenum.com


Leveraging the Power of Network Collaborations
Gulf of Mexico
Meeting Agenda
9:00am – 9:05am: Welcome & Summary of Past Activities Dr. Medina Cetina
9:10am – 9:30am: Presentation of N2N-GoM Research Working Group Strategy
9:30am – 9:40am: Discussion
10:00am – 10:10am: Discussion
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N2N
Gulf of Mexico
Discussion of N2N-GoM
Data Science Working Group


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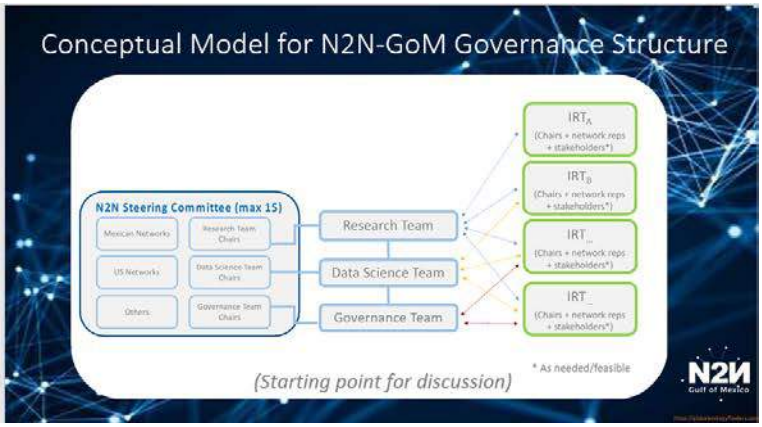
N2N
Gulf of Mexico
Presentation of N2N-GoM Governance Working Group Strategy
-> Becoming 'N2N-GoM Governance Team'


GOVERNANCE
Board
nonprofit
N2N GoM
Governance Working Group
Goal: provide the operating framework that facilitates LEVERAGING THE POWER OF NETWORKS
How: Defining governance structure, drafting bylaws and defining legal status of N2N
Outcome of Nov 6: consolidate Governance Team
N2N


Governance Working Group
N2N
Responsible for advising SC on all aspects regarding the governance of N2N, including bylaws and legal framework
Initial draft of bylaws will be submitted to SC by Governance Team with feedback from membership
Issues to be addressed in bylaws:
1. Purpose of N2N
2. Membership
3. Governance structure
4. Steering Committee composition, function and operation
5. Team and IRT composition, function and operation
6. Communication guidelines
7. Bylaw amendment process
8. Conflicts of interest
9. Guidelines for data sharing
BYLAWS


Conceptual Model for N2N-GoM Governance Structure
N2N Steering Committee (max 15)
Mexican Networks
US Networks
Others
Research Team Chairs
Data Science Team Chairs
Governance Team Chairs
Research Team
Data Science Team
Governance Team
IRT_A
IRT_B
IRT_...
IRT_...
(Chairs + network reps + stakeholders*)
* As needed/feasible
(Starting point for discussion)
N2N

## N2N-GoM Membership

- Initial membership derived from Merida 2019 workshop
- Additional network reps will be actively recruited to achieve
  - balanced representation between countries and sectors
  - IRT goals

*Success of N2N depends on member participation*

## Network participation in N2N-GoM

- ***Issues to be discussed within context of bylaws:***
  - Network representation (1 person per network)
  - Conditions of membership (eligibility, permanence)
  - Meeting frequency (6 -12 mo) and mechanics (online/in person)
  - Ratification of new members (by SC based on expression of interest)
  - Additional members participation in IRTs (based on expertise)

*(Starting points for discussion)*

## N2N-GoM Steering Committee

- Responsible for building trust, credibility, effective communication, coordination, and facilitating engagement of member networks and stakeholders
- *Tasks:*
  - Develop N2N work plan
  - Ratify N2N-GoM bylaws
  - Commission and decommission Teams
  - Define how funding opportunities will be pursued
  - Ratify initial IRTs proposed by Research Team
  - Implement an appropriate legal framework for N2N GoM
  - Develop communication guidelines

## N2N-GoM Steering Committee

- ***Issues to be discussed within context of bylaws:***
  - Election/selection process
  - Definition of leadership roles (chairs, secretaries, etc)
  - Meeting periodicity (quarterly)
  - Terms of service (rotate every three years, staggered turnover)
  - Inclusion of an Executive Committee (3-4 people)
  - Possibility of including office manager/executive director, as funding permits.

*(Starting points for discussion)*

## N2N-GoM Research Team

- Responsible for advising SC on all aspects regarding research and funding of N2N, and coordinating IRTs
- ***Issues to be discussed within context of bylaws:***
  - Representation in Steering Committee (two representatives)
  - Integration of Research Team (additional member volunteers or recruits)
  - Mechanism for creation of IRTs (confirmation by Steering Committee)
  - Communication strategy (research initiatives, funding opportunities, IRT outcomes)

*(Starting points for discussion)*

## N2N-GoM Data Science Team

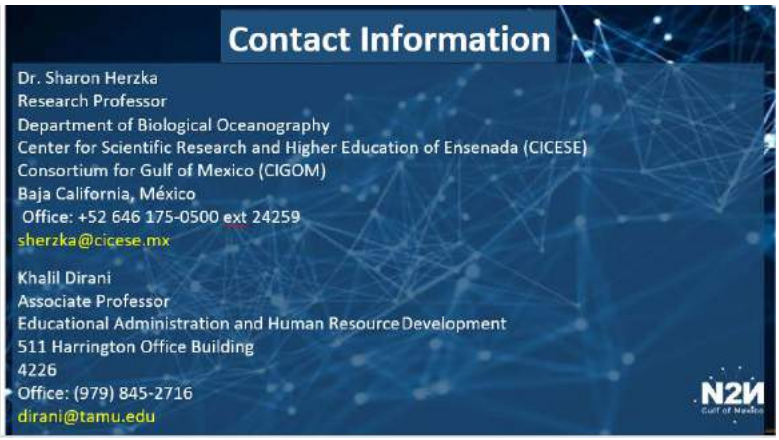
- Responsible for advising SC and IRTs on all aspects regarding data science and data sharing
- ***Issues to be discussed within context of bylaws:***
  - Participation of reps in SC (two representatives)
  - Integration of Data Science Team
  - Framework for data sharing that is consistent with the Data Ethics Canvas
  - Mechanisms for working with IRTs

*(Starting points for discussion)*


N2N-GoM Integrated Research Teams
N2N
Gulf of Mexico
Responsibilities of IRTs: THIS NEEDS TO BE DEVELOPED
Issues to be discussed within context of bylaws:
Participation in IRTs (expression of interest through various mechanisms)
Selection of leads for IRT (chairs or co-chairs)
Nomination of member representative (could be based on expertise)
Process for interaction with Research Team
Process for striving for adequate representation
Informing about progress and outcomes
Commissioning and decommissioning of IRTs
(Starting points for discussion)


N2N-GoM Stakeholders
N2N
Gulf of Mexico
Represent sectors or government entities involved in decision making
Issues to be discussed within context of bylaws:
Invitation of stakeholders (SC)
Stakeholder participation guidelines
Number of stakeholder reps to N2N
Mechanisms of participation
(Starting points for discussion)


Current Governance Team
Sharon Herzka, CIGOM/CICESE (Planning Committee)
Khalil Dirani, Texas A&M University (Planning Committee)
Jan van Smirren Ocean Sierra, Group on Environmental Forces
Evelia Rivera Arriaga, Red Internacional de Costas y Mares (RICOMAR) – CONACYT Network
Alfredo Ortega Rubio, Red Temática de investigación sobre Áreas Naturales Protegidas (RENANP) - CONACYT Network
Kennedy Obombo Magio, Center for Responsible Travel (CREST)
Please send expressions of interest to Sharon and Khalil


Contact Information
Dr. Sharon Herzka
Research Professor
Department of Biological Oceanography
Center for Scientific Research and Higher Education of Ensenada (CICESE)
Consortium for Gulf of Mexico (CIGOM)
Baja California, México
Office: +52 646 175-0500 ext 24259
sherzka@cicese.mx
Khalil Dirani
Associate Professor
Educational Administration and Human Resource Development
511 Harrington Office Building
4226
Office: (979) 845-2716
dirani@tamu.edu
N2N
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