

# Regional Climate Change Adaptation Policy Network in Southeast Florida

Timothy Kirby<sup>1</sup>, Adam Henry<sup>2</sup>, Michael Sukop<sup>1</sup>, Jessica Bolson<sup>1</sup>, Nancy Schneider<sup>3</sup>, and Lauren Ordway<sup>4</sup>

<sup>1</sup>Florida International University

<sup>2</sup>University of Arizona

<sup>3</sup>Southeast Florida Regional Climate Change Compact

<sup>4</sup>Institute for Sustainable Communities

November 24, 2022

## Abstract

Climate change poses uncertain, complex, and emerging risks to local governments across the country, particularly in regions prone to flood and storm hazards. While local governments recognize the importance of finding innovative approaches to climate change adaptation, it remains a challenge for many reasons, including the high cost of policy experimentation, lack of organizational capacity, and uncertainty about the efficacy of potential adaptation strategies. These are not merely challenges of technological innovation, but also of social and policy innovation. It is increasingly recognized that collaboration is required to meet these challenges. Collaborations of various types—referred to broadly as policy networks—give organizations access to information, ideas, and other resources that may be used to adapt to climate change. Certain types of networks are hypothesized to be effective for these purposes, particularly networks that span fragmented communities and integrate different knowledge systems and resources. These types of networks tend to reduce information asymmetries and maximize the diversity of information and resources available to network actors, thus increasing capacity to manage uncertain, emerging, and complex problems. In this paper we characterize the policy network surrounding climate change adaptation in Southeast Florida that includes municipal actors as well as a diverse array of stakeholders in the public, private, and nonprofit sectors. Data are gathered using a survey of organizational representatives in the region, identified through systematic searches of organizational websites as well as nominations by other climate change professionals. Overall this study shows a complex web of collaborations where over 300 diverse actors are exchanging information about climate change and sharing resources to address adaptation. Findings demonstrate that county governments and regional nonprofit organizations, such as the Southeast Florida Regional Climate Change Compact, play a crucial role in linking disparate resources and knowledge systems in the region. These organizations help to stabilize network ties within a complex and rapidly shifting political landscape, making them instrumental for the delivery of climate adaptation services.



# Regional Climate Change Adaptation Policy Network in Southeast Florida



Timothy Kirby<sup>1</sup>, Dr. Michael Sukop<sup>1</sup>, Dr. Jessica Bolson<sup>1</sup>, Dr. Adam Henry<sup>2</sup>,  
Nancy Schneider<sup>3</sup>, Lauren Ordway<sup>4</sup>

<sup>1</sup> Florida International University, <sup>2</sup> University of Arizona, <sup>3</sup> Southeast Florida Regional Climate Change Compact, <sup>4</sup> Institute for Sustainable Communities

## Motivations and Objectives

- **Social Network Analysis (SNA)** offers new leverage for answering standard social and behavioral science research questions by giving precise formal definition to aspects of the political, economic, or social structural environment (Wasserman & Faust, 1994)
- Focuses on relationships among social entities, and on the patterns and implications of those relationships (Wasserman & Faust, 1994)
- Actors and their actions are viewed as interdependent rather than independent, autonomous units
- Relational ties (linkages) between actors are channels for transfer or “flow” of resources (either material or nonmaterial)
- Network models focusing on individuals view the network structural environment as providing opportunities for or constraints on individual action
- Network models conceptualize structure (social, economic, political, etc.) as lasting patterns of relations among actors
- In this research, we use SNA to study the professional activities of organizations and individuals who work on education, advocacy, and the scientific and/or policy dimensions of climate change—e.g. sea level rise in South Florida—to understand how these organizations and their representatives collaborate with one another
- Together with the Southeast Florida Regional Climate Change Compact, we seek to identify points of centrality among these organizations and professionals
- The results of this investigation are intended to inform policy and support activities to enhance and extend collaboration between local climate-engaged organizations.

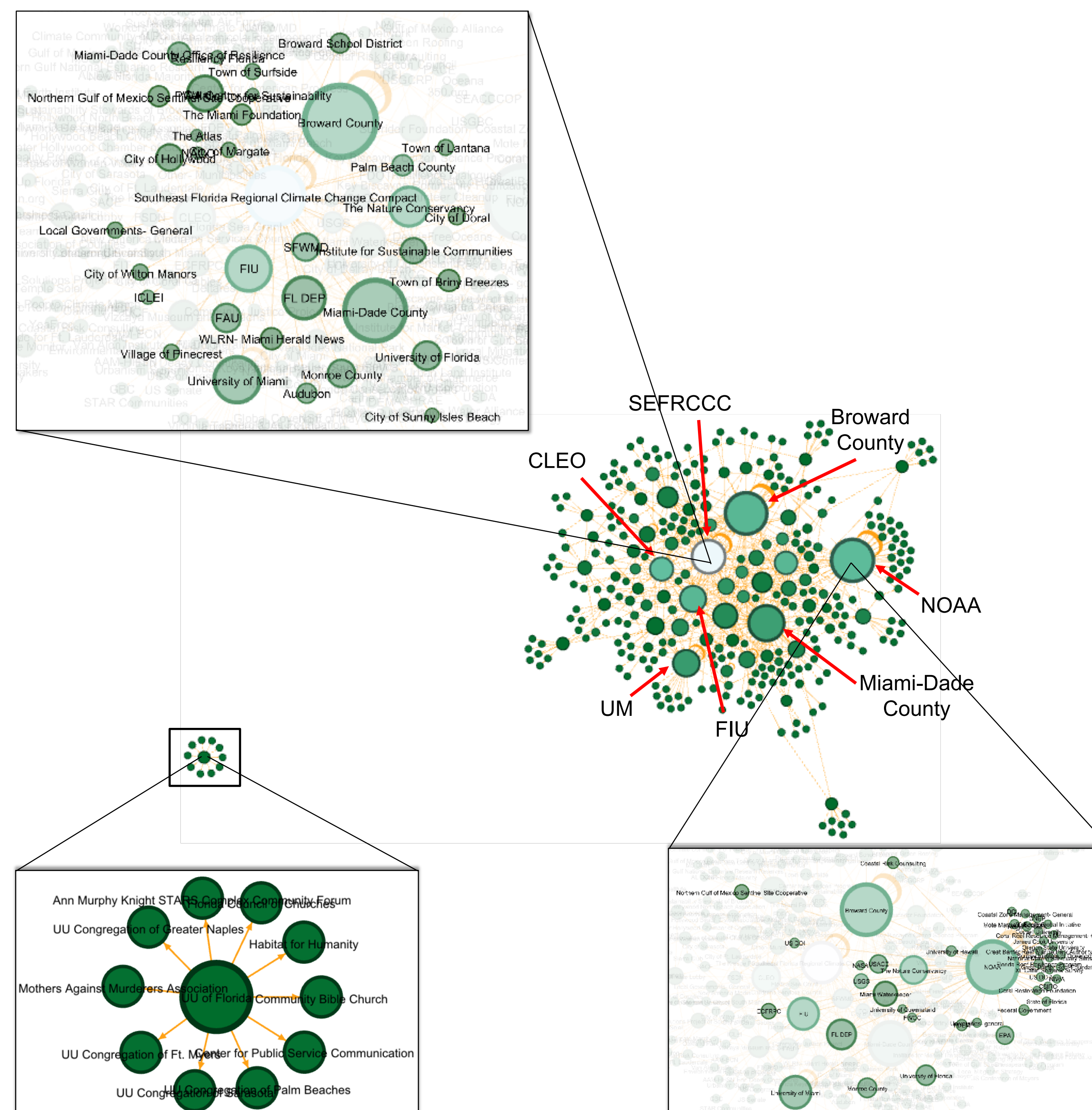
## Approach/Methods

- Potential Respondents for the web-based survey (Qualtrics) were generated through the Southeast Florida Regional Climate Change Compact's immediate list of collaborators
- Survey was created using Dr. Adam Henry's previous Risk Professionals and Organizations survey as a template
- After sending out our initial seed, each respondent was asked to nominate max ten people/organizations from their collaborator list for us to send the survey
- Nominations from each of the respondents were sorted into seeds based on time initial e-mail was sent
- Data was imported from Qualtrics and sorted for analysis in Excel by creating separate Node and Edge .csv files

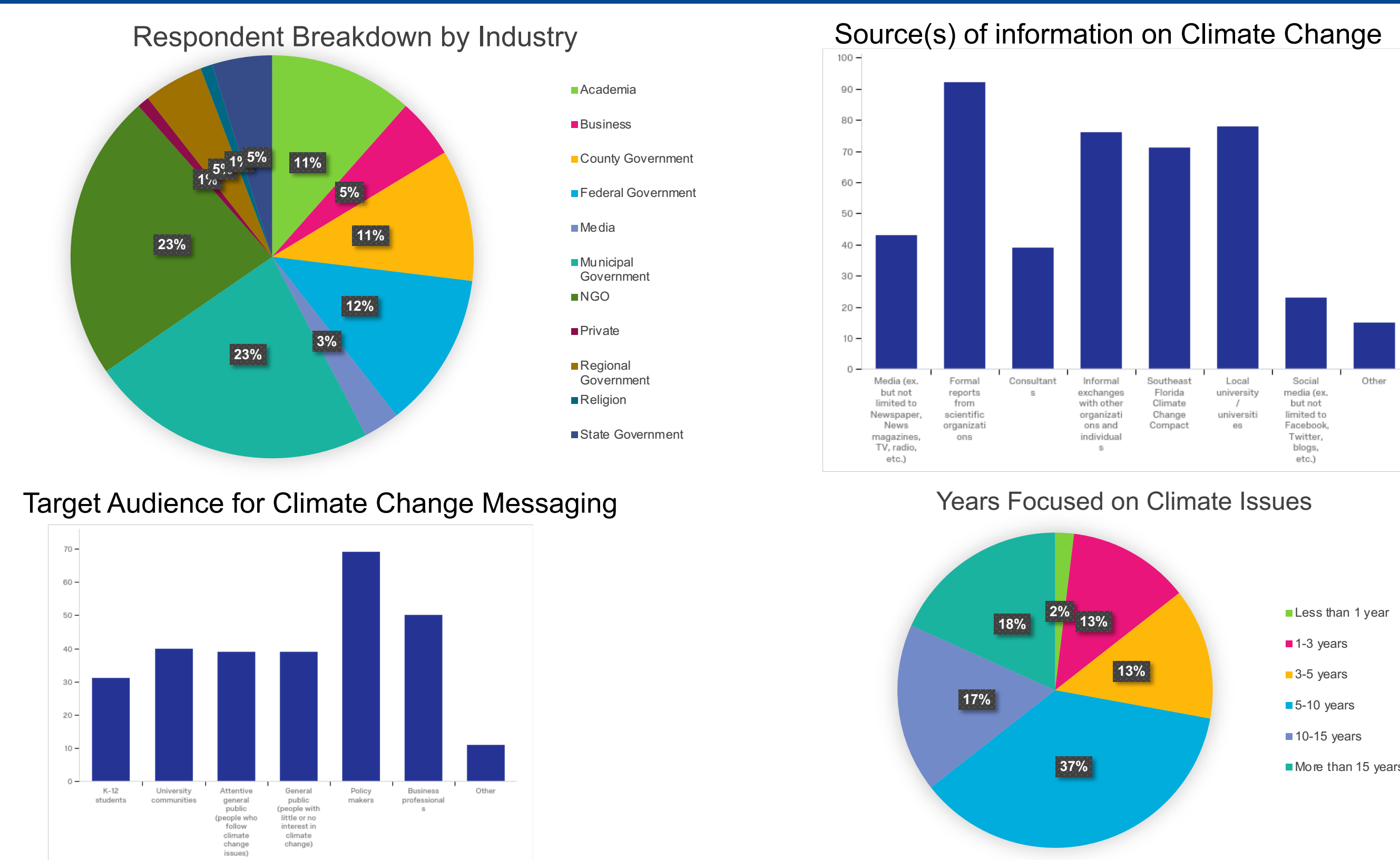
### Data Analysis

- For visualizing and analyzing the large network graphs, open-source software Gephi
- Imported Node and Edge .csv files into Gephi and sorted data according to software specifications
- Node Sizes were generated proportional to their degree (# of connections)
- Graph Spatialization was created using **Fruchterman Reingold** (with decided area of 4000) and **Force Atlas 2** (with 10 scaling) algorithms
- Final rendering and centrality measures were created by calculating the Average Weighted Degree of the Nodes and using that value to rank the nodes
- Labeled nodes and finalized graphs according to personal visual specifications
- Graphs for other survey data were generated using Qualtrics Data Visualization tool

## Results



## Data



## Discussion

### Strategic Challenges in Stakeholder Networks: A Case for Climate Change Adaptation Collaboration

- Zdziarski and Boutillier (2016) argues that a three-way integration of resource dependence theory (RDT), social network analysis, and stakeholder theory offer important insights for options of maneuvering networks and addressing strategic challenges in gaining access to resources controlled by stakeholders
- Resource Dependence Theory
  - dependence on “critical” and important resources influences the actions of organizations and that decision and actions can be explained depending on the particular situation (Nienhüser, 2008)
- Stakeholder Theory
  - the decision and actions of organizations are dependent on external and internal social actors—i.e. stakeholders—that have a stake in the actions of the organizations (Freeman, 1984)
  - by either being affected or being able to affect the actions of organizations, certain stakeholders are able to control resource access (Freeman, 1984)
- Social Network Analysis
  - while identifying resources is important, successful governance requires identifying the organizational capacity of the policy network to deploy and exploit its resources (Amit & Schoemaker, 1993; Hill & Jones, 1992; Makadok, 2001; Teece, Pisano, & Shuen, 1997)

## Conclusions/Further Research Initiatives

- Original dialogue around survey was to figure the Compact's role in Climate Change issues in South Florida
- Though development and subsequent discussions of the survey diverged from this focus, preliminary analysis note that the Compact plays a central role in climate change issues in South Florida
- Preliminary analysis positions the Compact as having Global Centrality within the network and correlates with Qualtrics data on engagement with the Compact
- Preliminary Network Analysis of NOAA, FIU, UM, Broward and Miami-Dade Counties, and CLEO correlate with survey data on Sources of Information and Target Audience survey questions, bolstering assumptions of local centrality

### Further Research:

- Betweenness Centrality
- Further Analysis of Survey Data
- Further analysis of Local Centralities

## References and Acknowledgements

- Amit, R., & Schoemaker, P. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, 14(1), 33–46.
- Freeman, R. E. (1984). *Strategic management: A stakeholder perspective*. Boston: Pitman, 13.
- Hill, C. W. L., & Jones, G. R. (1992). *Strategic management theory: An integrated approach*. Boston: Houghton Mifflin.
- Makadok, R. (2001). Toward a synthesis of the resource-based and dynamic-capability views of rent creation. *Strategic Management Journal*, 22(5), 387–401.
- Nienhüser, W. (2008). Resource dependence theory—How well does it explain behavior of organizations? *management revue*, 9-32.
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications* (Vol. 8). Cambridge university press.
- Zdziarski, M., & Boutillier, R. G. (2016). Strategic Challenges in Stakeholder Networks. *Problemy Zarządzania*, 14(4 (64)), 1. 2 Teoria sieci społecznych w naukach o zarządzaniu), 62-79.
- This work was funded by NSF Sustainability Research Network (SRN) Cooperative Agreement 1444758
- We are also indebted to the Southeast Florida Regional Climate Change Compact and Institute for Sustainable Communities for their time and support