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Predicting Collaboration: Risk, Power, and Dependence in the Gulf of Maine

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PREDICTING COLLABORATION: RISK, POWER, AND DEPENDENCE IN THE GULF OF MAINE

A Thesis

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ABSTRACT

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Collaboration among natural resource organizations and users is touted by researchers as an effective approach to managing common pool resources. To understand how collaboration works, previous studies in organizational theory have identified three variables: power, dependence, and risk. Relationships between actors can be represented by these qualifications of resources or threats and may predict if those relationships are in conflict or asymmetric in power. In this study, the Gulf of Maine transboundary fishery management network relied upon a dyadic influenced survey to quantitatively capture the perception of communication ties between organizations. Four kinds of dependence and three types of risk were captured by respondent responses to be used in predictive and descriptive analysis. The patterns presented a network with low risk and high levels of dependence. Dependence and risk were able to significantly predict whether a relationship was in conflict or whether a relationship had feelings of power, with legitimacy and performance as higher rated indicators. The results suggest that policy makers and network designers should foster legitimacy and shun performance failures when evaluating the relationships among management networks.

DEDICATION

I would like to dedicate this to my wonderful family, who has been super supportive. Through the long hours, nights, weekends, and days they have been by my side either through video chat, a snack break or having an office dance party. Thanks for the stress relief, Eirik, April, Kelly, and my parents Jay & Colleen.

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CHAPTER I

INTRODUCTION & REVIEW OF LITERATURE

Collaboration networks as a governance type began to be identified in the public administration and organizational theory literature in the 1990s, with application in natural resource management (NRM) with Mark Imperial's landmark work in 2005 (Imperial, 2005). Studies describe networks as the emergent form in public administration where the public and private spheres interact on a substantive issue that involves multiple types of stakeholder groups (Kapucu, Hu, & Khosa, 2017; Scott & Ulibarri, 2019; Temby, Sandall, Cooksey, & Hickey, 2017). Complex and inter-organizational, network-as-governance exists where organizations and actors collaborate on various wicked problems due to the need for quick, flexible responses to uncertainty and the need for scattered hard-to-value resources (Powell, 1990).

Understanding dyadic network relations, either conflicted or collaborative, is a descriptive problem that can be mapped, which can translate into a diagnostic tool to identify issues between stakeholder groups, a key empirical and descriptive research need referenced in Lawrence O'Toole's "Treating Networks Seriously: Practical and Research Based Agendas in Public Administration" (O' Toole Jr, 1997). Those issues are broadly defined as the ability or inability of that organizational network to successfully collaborate and coordinate.

1.1 Organizational Relationships

Networks, as a structure, encourage various actors and groups to interact with one another by working outside of their main affiliated organization. These networks

find their strength by breaking down organizational barriers to communicate and coordinate with members of other organizations with the benefits of improving knowledge transfers and relationship trust (van Meerkerk & Edelenbos, 2018). Each organization or actor finds themselves, when working in a network setting, dependent on another actor or organization by various duties. Networks of dependence provides the structure by having resilient and redundant organizations manage environmental stress (Tompkins & Adger, 2004). Organization A and Organization B can be, as the literature terms it, interdependent on one another by the specialized resources delivered across organizations in a network (Thompson, 1974). Dependency is theorized to create relationships as one or many organizations complementary provide resources to others that they could not achieve on their own (Lincoln & McBride, 1985). For example, scientific data would be delivered by Organization A to Organization B, where Organization B has no means of creating this item with its available capacity. Dependence, therefore, can be an indicator of who does what in a network, and that describes the need for reaching network specific goals.

Of the importance of the dependent relationship, resource dependence theory (RDT) theorizes interdependence between networks, with certain environments of resource dependence and power asymmetry will predict relationship continuity or fracture (Hillman, Withers, & Collins, 2009; Ryu, Arslan, & Aydin, 2007). If power asymmetry is high, the organization in the powerful position will seek to maintain the current situation, while the organization in the dependent position will seek substitutes to negotiate for a more favorable institutional alignment (Furnari, 2016). As a measure, power and resource dependence levels can shape whether a relationship is predicted to be stable or fragmenting. Examining these relationship levels within a specific network

can explain the actions of public managers and boundary spanners for acting in the network space based on their organizational affiliation (Malatesta & Smith, 2014).

Natural resource management network research has trended to define networks as power sharing arrangements as public authority is contracted out to organizations, a co-management perspective (Carlsson & Berkes, 2005). From this framework of co-management, natural resource managers ally themselves with government agencies as ecological and economic duties are shared among the actors in a governance structure. As common pool resources, like fish stocks, become contested through competing interests, relationship power forms the governance structure of networks (Bodin & Crona, 2009). Present in the NRM literature is the ideal desire for power to be more equally shared among network members with the caveat, that disempowered stakeholders are the reality (Fabinyi, Evans, & Foale, 2014; Ho, Ross, & Coutts, 2015). Power imbalances become a point of contention due to "steering," which may not be amenable to specific members of the network and disrupt the collaborative process (Cvitanovic et al., 2019). As unequal power is distributed amongst natural resources governance networks, the network positions held by stakeholders can lead to conflict as the actors vie to shift their control of the governance rules and the target resource itself (Ratner, Meinzen-Dick, May, & Haglund, 2013).

In addition to power as a point of network fragmentation, risk has a part to play in whether strategic alliance or network relations form or continue to work. To overcome risk, dependence levels would need to create value where an organization would not develop the resource internally (Delerue, 2005). Risk is defined as the "fear" present in what each relationship could become, and has become a factor in whether, if or how organizations or firms make decisions (Das & Teng, 1998; March & Shapira, 1987). Of the focus of this study, external relational risks were the target of our

research as networks, and relationships our object of study. External relationship risks enter the decision-making calculus as organizations make linkages within a network as potential partners enter into agreements to accomplish the interests of those organizations, a key consideration for collaboration (Stern, Martin, Predmore, & Morse, 2014). The decision making of an organizational actor would perceive risk through future hazards or past failures, whether past performance or future collaboration could have negative impacts upon the organization's goals. Perception of relational, performance and a third type, sanction, risks underlie the creation of dyadic network relationships, where in the continual assessment of a relationship or in the initial establishment, the potential for failure outweighs or demands collaboration.

From this perspective, stability can be sought by reducing conflict events if the constellation of power, risk and dependence align in a formation throughout the network and the collection of organizations as actors. Managing networks, therefore, requires a diagnosis of those forces at work so that collaboration can flourish and conflicts can be smoothed (Savage, Nix, Whitehead, & Blair, 2011). "Ties," as the signature element of a social relationship, can become a tool to evaluate network structure (Clegg, Josserand, Mehra, & Pitsis, 2016). Dyadic ties, as a relationship quantification, have the potential to indicate balance between actors (Cartwright & Harary, 1956). As indicators of balance, the three variables studied herein have the potential to expand network relations beyond a superficial positive or negative characterization and quantify them further to test mediating factors among them. The objective of this research is to empirically identify imbalances by creating a novel system to determine if dependence, power, or risk will predict those imbalances

1.2 Case Study – The Gulf of Maine Fishery

Bordering two Canadian provinces and three US states, the Gulf of Maine encompasses 36,000 square miles of the Atlantic Ocean rich in marine life. This ecosystem and its marine resources have been utilized since the arrival of European colonists in the 17th century. Scientists rang the alarm in the 1970s as fish stocks of cod, yellowtail flounder and haddock were observed to be declining (Butler, Steele, & Robertson, 2001). In order to address this issue and issues like it, a fishery management plan (FMP) was formulated by the New England Fishery Management Council (NEFMC) as directed by the Magnuson Act (1976) to conserve fish stocks in the region with quotas, foreign vessel restrictions, and mesh size regulations (Wang & Rosenberg, 1997). At the center of fishery management, regional councils like the NEFMC bring a variety of stakeholders to formulate each management plan on the US side. In addition to the NEFMC, the transboundary Gulf of Maine Council on the Marine Environment (GOMC) works like the NEFMC, as Canadian and US federal agencies, like NOAA, Fisheries and Oceans Canada, and Environment Canada, provide support to other organizations to steer coordination (Hildebrand, Pebbles, & Fraser, 2002). The Gulf of Maine fishery management network entered existence as policy directed council members to work cooperatively to develop conservation and sustainable plans.

The Gulf of Maine governance network has existed for forty-odd years with the enactment of the Magnuson Act. As a mature NRM network, the Gulf of Maine was selected to test an instrument that conflict or its inverse, collaboration, can be predicted by identifying patterns between organizations. Patterns will vary across those organizations who fill specific roles within the Gulf of Maine e.g. researchers, fishers or government actors (van der Hulst, 2009). Documented conflicts in the Gulf of Maine like the legitimacy of researcher data or litigious power levelling have the effect to shift

the network's actions and further individual organizational goals (Layzer, 2002). Conflict derails collaboration, yet it has the effect of initiating change (Buckles & Rusnak, 1999). Our research, as a policy diagnostic tool, has the potential to identify whether conflicts are simmering beneath the surface, and if so, whether certain actions like trust building (Cooksey et al., 2017), legitimacy building (Human & Provan, 2000) or power sharing (Cristofoli, Markovic, & Meneguzzo, 2014) would assist in creating cooperation or managing conflicts in a network. In this article's conclusion section, topics will integrate the findings with the literature of policy tools related to managing networks and relationships.

1.3 Research Aims

To determine the network forces in the Gulf of Maine fishery management network, the goal of this paper is to quantify organizational relationships as descriptive units. Three forces can theoretically be applied in determining network structure—dependence, risk, and power. The questions asked:

- What organizations exist in the Gulf of Maine, and can a map be created to indicate stakeholder groups?
- What could be the theoretical empirical forces that describe the relationship between organizations?
- Are there specific patterns which emerge from organization-actor types quantified by those forces?
- Can relationship forces predict whether external efficacy or goal conflict are present between specific organizational groups within a network?

CHAPTER II

MATERIALS AND METHODS

For this research, a survey instrument was employed to operationalize the three variables. After operationalization, a survey was constructed with demographic and employment information. The survey asks if the respondent communicates with a network organization. Then, for those which are selected, the respondent asks questions about the target organization for those operationalized variables creating dyads. To measure the validity of the concepts, exploratory factor analysis was run to determine if the operationalizations were valid constructs.

2.1 Dependence, Risk Perception & External Efficacy Scales

Each of the three variables were developed with the 5-point Likert scale (strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree), and asked of the organization with whom the respondents communicated. Respondents were asked to answer the level of agreement with statements detailing their perception of their organizational relationships. As a pilot study, 16 questions were developed or adapted to quantify different relationship qualities.

2.1.1 Dependence

To determine which organization provides which resource (or a collection of resources), nine questions were developed from the network and NRM literature that would be relevant to a natural resources network. Resources in a public-private network, such as the Gulf of Maine, were hypothesized to be contain four different

types: 1) legitimacy, 2) epistemic, 3) financial, and 4) regulatory.

Legitimacy has the potential to increase other resources, and hence, survival (Meyer & Rowan, 1977). In NRM networks, the ability to incorporate various stakeholder groups in deliberations functions to legitimate the decision-making process (Lockwood, Davidson, Curtis, Stratford, & Griffith, 2010). If an organization has legitimacy, then it can be argued that their input in the network's direction is valued. Without it, an organization could fail to maintain or establish relationships, as their goals conflict with others in the network. Conflict has been said to be smoothed with the participation of groups who would oppose the collective decisions of the network (Birnbaum, Bodin, & Sandström, 2015).

Knowledge, or epistemic, dependence, arguably, is the most crucial component of a firm and networks, where organizations specialize their knowledge in different directions from other partners, such as scientists, local resource users, or bureaucrats (Bouwen & Taillieu, 2004; Eisenhardt & Santos, 2012; Grant & Baden-Fuller, 2004). Investigating and gathering actionable intelligence on the socio-ecological environment facilitates how the network develops of plans and how the network navigates the bureaucratic environment. With knowledge transfers, the organizations involved choose a collaborative governance structure, where relationships among boundaries exist (Heiman & Nickerson, 2002). As a variable relation, power mismatched groups find their knowledge devalued compared to dominant groups (Ahlborg & Nightingale, 2012).

Finances are crucial to natural resources networks, whether they bring their catch to market, apply for grants, or have the necessary personnel or equipment. Without the means to access finances, an organization may struggle to continue to

operate and survive. In a common-pool resource community, a lack of integration into the economic market may be an effect that an organization has failed to network well with financiers and funding (Bodin & Crona, 2008).

Regulations are the most common tool used in NRM to compel others to follow policy decisions. An organization may depend on another to enforce the agreed upon action like a no-catch. Enforcement and policy creation provide to the network the ability to take collaborative or commanded decisions to control behavior with enforcement mechanisms. Traditional regulatory actions have the effect of "encouraging" stakeholders to come to the collaborative network's negotiating table (Holley & Gunningham, 2011)

For the SEM on dependence, Exploratory Factor Analysis (EFA) applying standard varimax rotation with Kaiser assumptions was used. Analysis revealed three categories, with each category representing Eigenvalues exceeding 1. Regulation and legitimacy dependence remained consistent, yet, financial & epistemic dependence loaded together. Termed "capital dependence," this new factor combines information and funding. To explain this combination, organizations, in this high knowledge environment, funding and knowledge can be readily exchanged for one another to create value. This further supports the idea of "intellectual capital," where knowledge resources are valuable like financial resources (Martín-de-Castro, Delgado-Verde, López-Sáez, & Navas-López, 2011). Regulation explained 40% of the variance, resource dependence for 13% and legitimacy for 11%.

	Table 1 – Dependence Components	1	2	3
REGD1	Our organization depends on this organization to enforce, enact, comply, or design regulations and policy.	0.887	0.062	0.183
REGD2	Without this organization's authority to make collectively binding decisions, it would be difficult for us to meet our objectives.	0.866	0.170	0.152
CAPD1	This organization provides us important funding.	0.096	0.798	-0.138
CAPD2	I get information from this organization that I would not have known to ask for.	0.194	0.551	0.152
LEGD1	Working with this organization is expected as part of an inclusive fisheries management process.	0.289	0.100	0.815
LEGD2	Working with this organization prevents management problems from arising down the road.	0.124	0.127	0.870

Table 1: Dependence Components based on Varimax Rotation Matrix

2.1.2 Risk Perception

Perceiving risks in a partnership, in the organizational theory literature stream, has focused on the works of Das and Teng (Das & Teng, 1996, 2000, 2001a). The authors categorize risk into two types relational risk—failed cooperation or opportunistic behavior—and performance risk—incompetence, changing demands or poor knowledge transfers (Das & Teng, 2001c). A third type, regulatory and sanction risk, was discovered as a separate and distinct type (Anderson, Christ, & Sedatole, 2014). From these two sources, five questions were adapted to a public-private partnership network.

Like with dependence, Exploratory Factor Analysis (EFA) applying standard varimax rotation with Kaiser assumptions was used to verify the validity of the

constructs. Eigenvalues over 1 were chosen. One question was removed. Perception of performance risk accounts for 34% and perception of sanction risk accounts for 23% of the variance, respectively. PR1, SR1 and SR2 were negatively coded.

	Table 2 - Risk Components	1	2
PR2	The outcome is usually positive when I deal with this organization.	0.786	-0.235
PR1	I question this organization's competence.	0.753	0.131
SR1	A decision made by this organization can significantly impact my organization.	-0.032	0.749
SR2	The actions of this organization may expose my organization to regulatory sanctions if relevant rules are not followed.	0.181	0.787

Table 2: Risk Components based on Varimax Rotation Matrix

Surprisingly, relational risk split between performance and sanction risk. Due to the dyadic nature of the questions, if a relationship is existent, the reason for its collapse may not be full known to the respondent. Das and Teng's risk scheme is determinate upon *outcomes* (Das & Teng, 2001b). As the relationship has not become total, any negative scoring of their relationship may only be upon what the respondent knows. Participants may be able to identify specific causes more readily, like poor performance or risk of a future sanction. Culture or free riding (attributes of relational risk) may not be known if a relationship is still functioning. For future studies, questions should specifically ask about specific relational risks.

In the survey, we attempted to capture an "avoidance" relationship network, as an inverse of the communicative network. The hope was to demonstrate the proposition that if risks are higher than dependencies, a relationship would likely be avoided. Unfortunately, participation was limited. Social desirability bias can explain why the survey responses were low for identifying avoidance. If collaboration and inclusion is

the dominant social demand for a (primarily) public network, those who identify potential problematic collaborators would expose the respondent to exclusion.

2.1.3 External Efficacy

Power is the third variable for this study, for which external efficacy was a proxy measure. As defined, "efficacy is citizens' perceptions of powerfulness (or powerlessness) in the political realm" (Morrell, 2003). In an NRM network, collaboration is an "inherently political" process where groups have the potential to monopolize on the network's goals and plans (Walker & Hurley, 2004). To gauge this politicized arena, all members were considered citizens to a process operated, partly, by others. Collaboration can be explained principally by power relations, and its success or failure depends on understanding power in an NRM arena (Brisbois & de Loë, 2016). The power to choose the direction within a particular situation, the agency or efficacy of an actor, can be considered a component as a social factor determining the resilience of a socio-ecological system (Cinner & Barnes, 2019).

To determine how powerful a participant feels, their ability to exercise power, externally or internally, was scaled. For the methods of the survey, the revised efficacy scales of Craig, Niemi & Silver 1990 were used to adapt 3 questions (Craig, Niemi, & Silver, 1990). As a dyad, each organization the participant communicated was rated about how the respondent felt about their ability to interact with that organization. Internal efficacy was integrated to control for the respondents' own belief about their power.

	Table 3 - Efficacy Components
EE1	This organization accepts input from my organization into how it functions.
EE2	Generally speaking, this organization has lost touch with my organization.
IE	I feel that I have a good understanding of the important issues facing fisheries in the Gulf of Maine.

Table 3: Efficacy Components

2.2 Stakeholder-Based Evaluation

Stakeholder analysis identifies stakeholders who operate within a social ecosystem like a network. Identification happens in three stages: 1) identification of stakeholders by local experts, 2) new stakeholders are added by referencing that initial group, and 3) classification of the stakeholders into roles and goals (Paletto, Hamunen, & De Meo, 2015). The hypothetical classification takes stakeholder-based analysis into account to be as inclusive as possible to differentiate how each type perceives their collaborators in relation to their riskiness, reliance, and utility. Stakeholders were classified according to their jurisdictional level and their function within the network. Using this approach, our goal to attempt a hybrid methodological approach to classifying the relations between various organizational actors within any network setting, mentioned as a further research need for natural resource management (Grimble & Wellard, 1997). Then, we would treat these organizations as occupying a similar network "role," where our variables could identify patterns: for example, the relationship between researcher and regional organizations in aggregate.

The range for this group categorization included nine types of organizations: 1) regional, 2) US federal, 3) Canadian federal 4) US state, 5) CA provincial, 6) indigenous tribes, 7) research institutions, 8) environmental NGOs, and 9) fisher groups. **Figure 1** details the distribution among respondents. The boundary spanning

organization, the Gulf of Maine Council on the Marine Environment, provided the starting point for snowballing the inclusive organizational list, for use as a transboundary council. 49 organizations were curated from online "who we work with" listings, news articles and informant feedback. Such organizations include NOAA, the New England Fishery Management Council, Fisheries and Oceans Canada, the Gulf of Maine Research Institute, and a range of others. A full list with the organization type is included in the supplemental material (**Appendix S.1**). As interactions between individuals and alliance members are paramount in network and stakeholder analyses, care was taken for inclusion and depth. The list eventually became refined to those actively working in "fishery management" by two informers who assisted in clarifying relevance. Although the preliminary classification list included a wide berth of organizations involved in the Gulf of Maine, a "complete" list of organizations operating within the Gulf of Maine would be impossible to detail due to survey brevity.

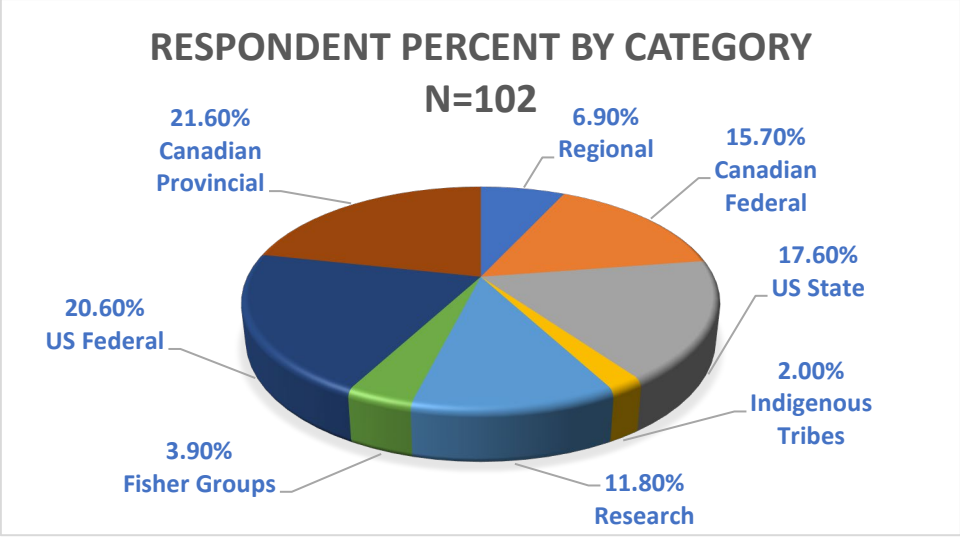


Figure 1: Respondent Percent by Category

2.3 Data Collection

Data was collected from a web-based survey instrument (Qualtrics) administered from August to October 2019. The survey was distributed throughout the binational

Gulf of Maine fishery management network from the 49 organizations mentioned previously. The focus was to identify a wide array of fishers, bureaucrats, researchers, environmentalists, and policy makers who worked within the organizations. The survey's demographic questions helped to identify each respondent based on their role and years of service. Role types are graphically represented in **Figure 2** below.

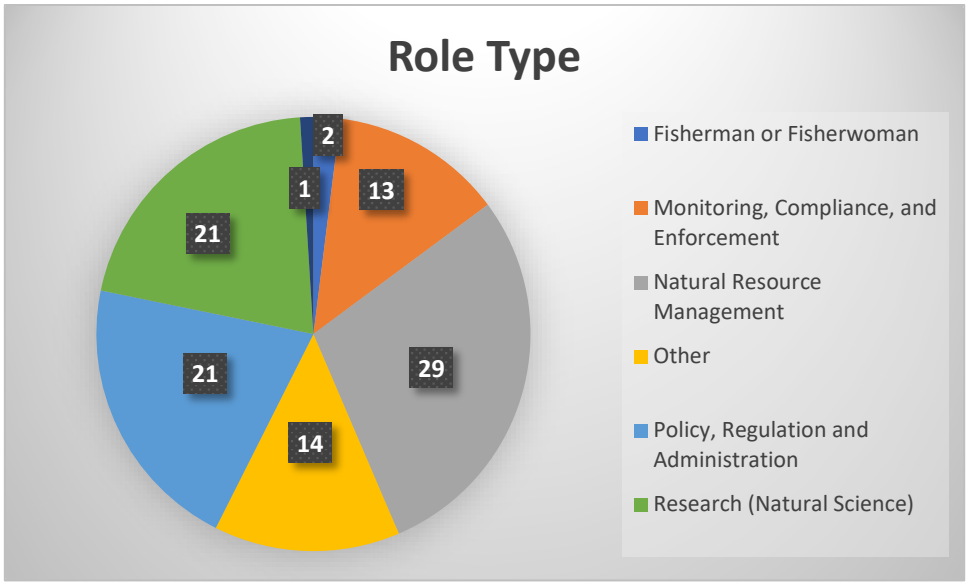


Figure 2: Respondent Role Type

From the organizational list of 49, individuals and their email addresses were collected from member and staff directory websites that were freely available, as well as reaching out via phone and email to decision makers who could volunteer to share a survey link to those members not available online. 2460 potential respondents were amassed from those lists, with completed surveys totaling 102. Due to the dyadic nature of the questionnaire, 880 dyads (communicative links) were collected, of which each of the 16 dyadic questions were answered. Emails were generated that explained the scope and provided a link to the Qualtrics survey platform. All responses were anonymous with no identifying personal information included in the data set.

CHAPTER III

ANALYSES AND RESULTS

3.1 Techniques

The analysis utilized was both descriptive and predictive. Describing the network was the first step to visualize each organization in relation to others in the network. Each organization occupied a node in the visualization, and each response about another organization generated an edge or tie between organizations. These "ties" were then quantified into specific relationship perceptions. To analyze and describe the relationship qualities (i.e. risk, external efficacy, and dependence), organizational categories were identified to classify the respondent and target organizations by jurisdiction or task. In addition, descriptors of the tie scores were generated to determine if those forces exhibited a pattern in the organizational categories and within the network. The communicative relationship scores then were analyzed to determine if those risk and dependence variables would predict the dependent variables external efficacy and goal conflict.

3.2 Respondent Location & Organizational Network

As an ecosystem, the Gulf of Maine extends from Cape Cod, Massachusetts to Nova Scotia, with those working in the fishery management network as far away as New Jersey. The survey asked for the postal and zip codes that determined the respondent's location. The survey respondents were drawn primarily from the 5 Gulf of Maine bordering provincial and state jurisdictions, with concentrations major cities and

fishing ports. Cities Boston, Gloucester, Portland, Halifax, and St. Andrews had high numbers of respondents.

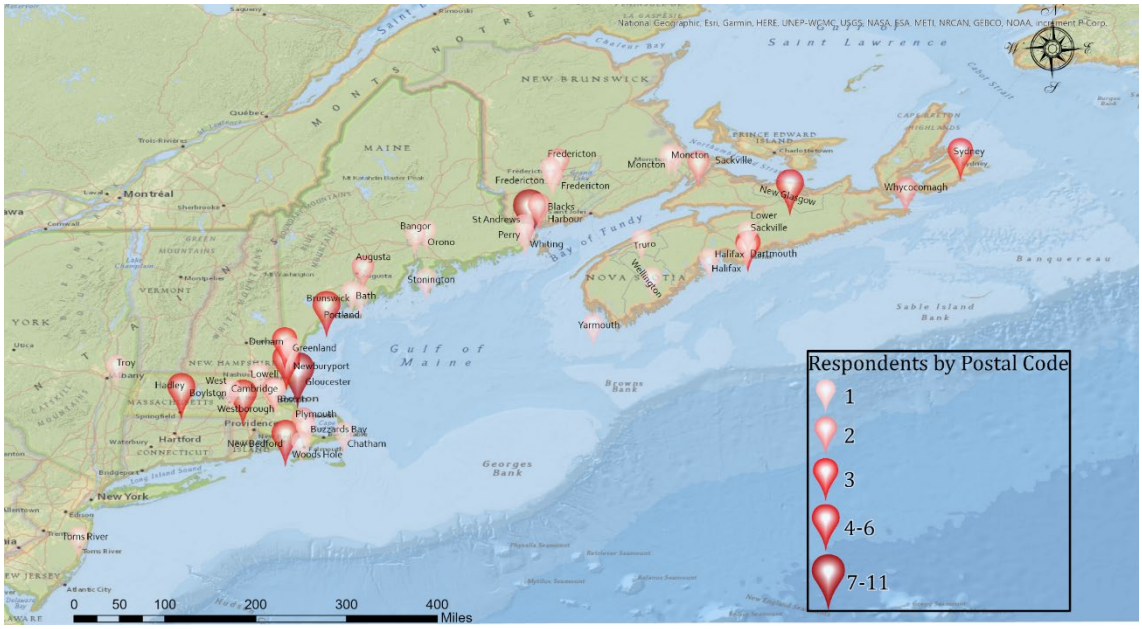


Figure 3: Respondent Geography by Zip Code.

Network mapping provided a diagram of where the relationships could be visually depicted along the various organizational nodes. As responses identified communication connections or ties, the 49 organizations yielded a contrast between those in the United States and those in Canada with the federal and regional organization types identified as the "boundary spanners." Occupying a central location in the map, these organizations serve as link between the national poles. Boundary spanners, actors who break their internal and external organizational boundaries, have been shown to improve trust and network performance (van Meerkerk & Edelenbos, 2014). For this study, describing where the organizational spanners lie in this relationship web was an important descriptive goal.

Different colors indicate the existence of clusters in **Figure 4.** Clusters develop in the network mapping analysis based on the frequency of communication among the

organizations. Green represents the Canadian section of the map, red, oranges and blues for the American side, and purple, yellow and that singular brown indicating the boundary spanning organizations.

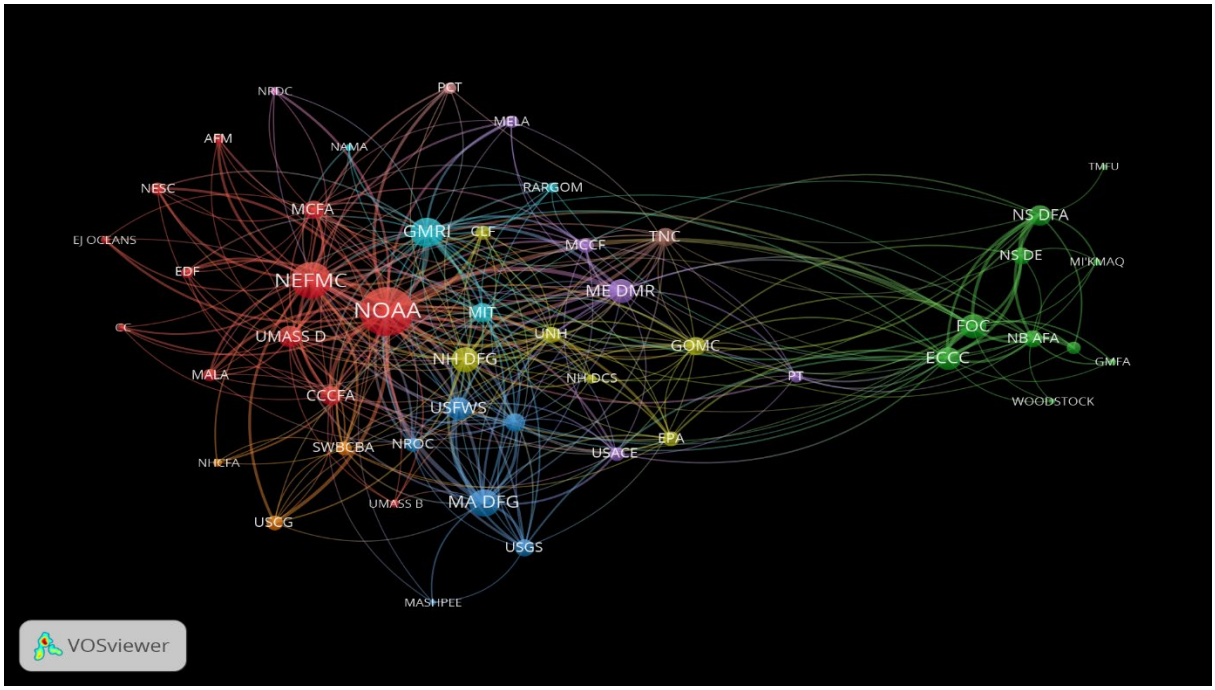


Figure 4: Network Communication Map

3.3 Descriptive Statistics for Risk Perception and Dependence Types

The tie forces (dependence, risk, external efficacy, and goal conflict) were calculated, empirically, from -1 to 1, based on a 5-point Likert-based scale i.e. strongly agree to strongly disagree. The questions were statements on whether the organization with which the organization communicated with fit the description. This process created dyadic outputs for each respondent-target labelled by their organization. The risk scales questions were reversed coded, except for one, as they were negatively worded. One of the external efficacy questions was reversed as well. In aggregate, the organizational categories were averaged by their ratings by the respondents to produce quantitative ratings of power, conflict, riskiness, and dependence.

Table 4 a-c demonstrate the dependency perception pattern of distribution between the groupings. Rows are labelled by respondent organizational affiliation, with columns indicating with whom the respondent communicates. The rows headings were limited due to the number of respondents in the types: fisher groups, NGOs, and indigenous tribes. A green to red scale was used to identify high to low levels of the three dependence types and are standardized for comparison. XXX's indicate lack of communication data from the respondents on those categories.

Each rating showed how the respondent perceived the organization with who they communicated, for example, a range of highly dependent to not at all dependent. Each organizational category and organization could then be scored based on the responses, and each could be described according to the perception of how the respondents viewed their communicative relationships. As an example, the United States federal respondents perceive researchers as having a high dependence among the three types.

Researchers and regional organizations provide capital and legitimacy to the network. Fishers, surprisingly, provide a regulatory check on the agencies with their decisions. US federal and CA federal perceptions on regulations, in addition, seem to come from the lower level jurisdictions and tasked groups, instead of what would be expected from regulations being top-down. Regional organizations rated all categories for high legitimacy dependence, with legitimacy dependence having high scores throughout.

Regulatory Dependence

	Regional	Canadian Federal	Canadian Provincial	US Federal	US State	Indigenous Tribes	Research	Fisher Groups
Regional	-0.350	-0.125	0.375	0.052	-0.021	XXX	0.246	0.500
Canadian Federal	0.000	0.389	0.544	0.281	-0.750	0.500	0.125	0.500

Canadian Provincial	-1.000	0.250	0.403	XXX	XXX	XXX	XXX	XXX
US Federal	0.273	0.431	0.375	0.346	0.360	-0.250	0.488	0.544
US State	0.330	0.125	0.250	0.265	0.092	0.250	0.148	0.688
Research	-0.366	-0.250	-0.500	-0.277	-0.554	XXX	-0.377	-0.500

Table 4a: Regulatory Dependence Perception between Organizational Categories

Capital Dependence

	Regional	Canadian Federal	Canadian Provincial	US Federal	US State	Indigenous Tribes	Research	Fisher Groups
Regional	-0.200	-0.250	0.063	-0.359	-0.240	XXX	-0.163	-0.167
Canadian Federal	-0.313	-0.167	-0.194	-0.250	-0.375	0.500	0.063	-1.000
Canadian Provincial	0.250	-0.278	-0.234	XXX	XXX	XXX	XXX	XXX
US Federal	-0.133	-0.278	-0.125	-0.296	0.085	-0.188	0.271	-0.183
US State	-0.402	-0.875	-0.500	-0.370	-0.423	-1.000	0.029	-0.188
Research	-0.464	-0.250	-0.375	-0.258	-0.338	XXX	-0.338	-0.433

Table 4b: Capital Dependence Perception between Organizational Categories

Legitimacy Dependence

	Regional	Canadian Federal	Canadian Provincial	US Federal	US State	Indigenous Tribes	Research	Fisher Groups
Regional	0.350	0.625	0.125	0.378	0.250	XXX	0.367	0.125
Canadian Federal	0.438	0.278	0.350	0.547	0.000	0.000	0.250	0.000
Canadian Provincial	0.500	0.278	0.269	XXX	XXX	XXX	XXX	XXX
US Federal	0.614	0.333	0.375	0.319	0.349	-1.000	0.592	0.194
US State	0.598	0.250	0.500	0.480	0.147	-1.000	0.594	0.375
Research	0.418	0.375	-0.250	0.296	-0.154	XXX	0.021	-0.150

Table 4c: Legitimacy Dependence Perception between Organizational Categories

As seen in **Figure 5**, legitimacy dependence was indicated to be the more present type of dependence. This figure averages the organizational target scores for six categories, where data was meaningful. Spikes in regulatory dependence for the US

state and CA provincial jurisdictions further confirm that regulatory responsibilities occur with those more locally involved in the fishery management network. Information and financial resources sharing appear to be less of a factor determining organizational relationships, with capital from research organizations a notable exception.

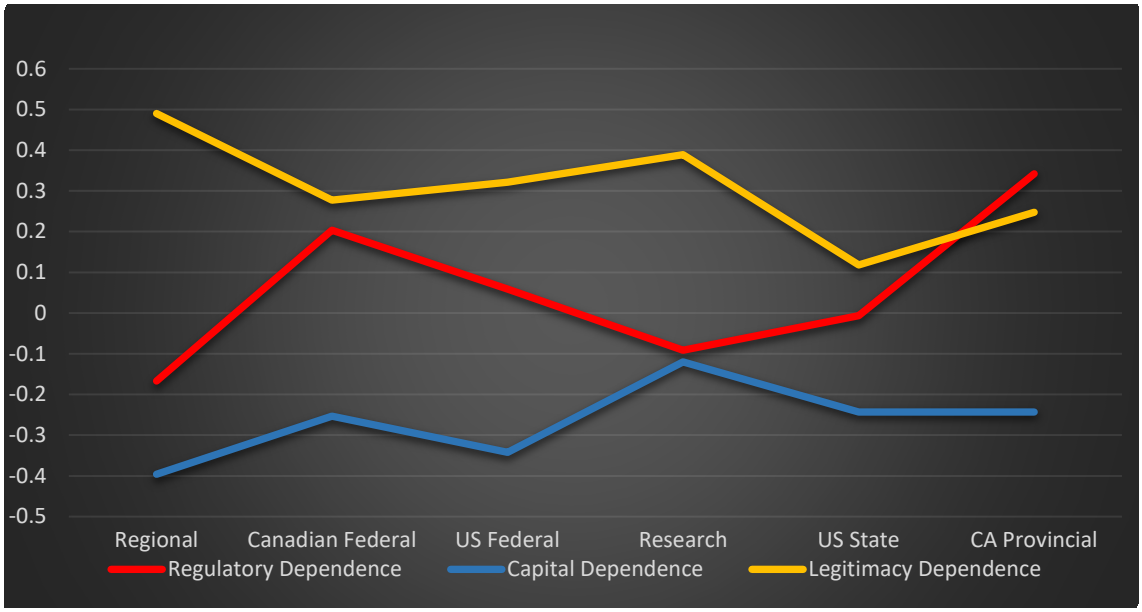


Figure 5: Dependence Levels by Respondent Category

For the risk variables, **Tables 6a** and **6b** were created to detail the Canadian and US poles of this network. Even with the two highest respondent counts, Canadian provinces and the US feds did not indicate communicating among one another. The five categories used were US Feds, Canadian Feds, Research, Regional and either US State or CA Provincial. Performance risk across organizational categories were negative overall, indicating a history of well performing organizations network-wide. Sanction risks, in comparison, are varied and relate to the role of the governmental level. As indicated from the CA Federal – CA Provincial and US Federal – US State

interactions, the higher the government level indicates a higher threat. Interestingly, the US Federal – CA Federal interaction shows a higher level of sanction from the US side.

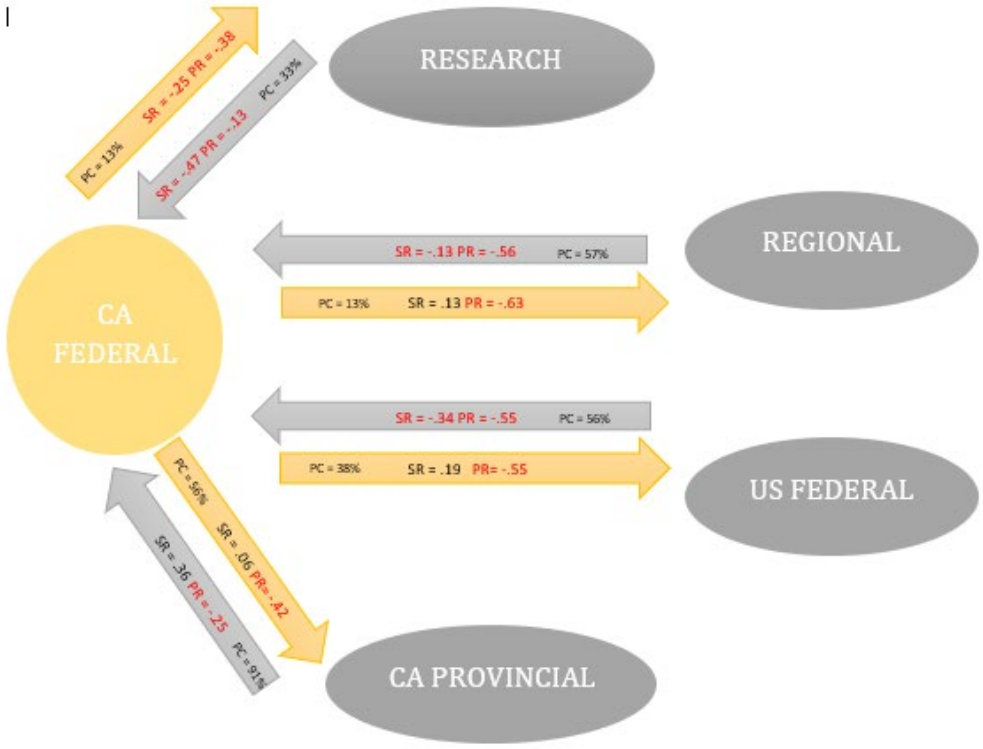


Figure 6a: Risk types with CA Federal hub. PC = Communication Percentage, SR = Sanction Risk and PR = Performance Risk

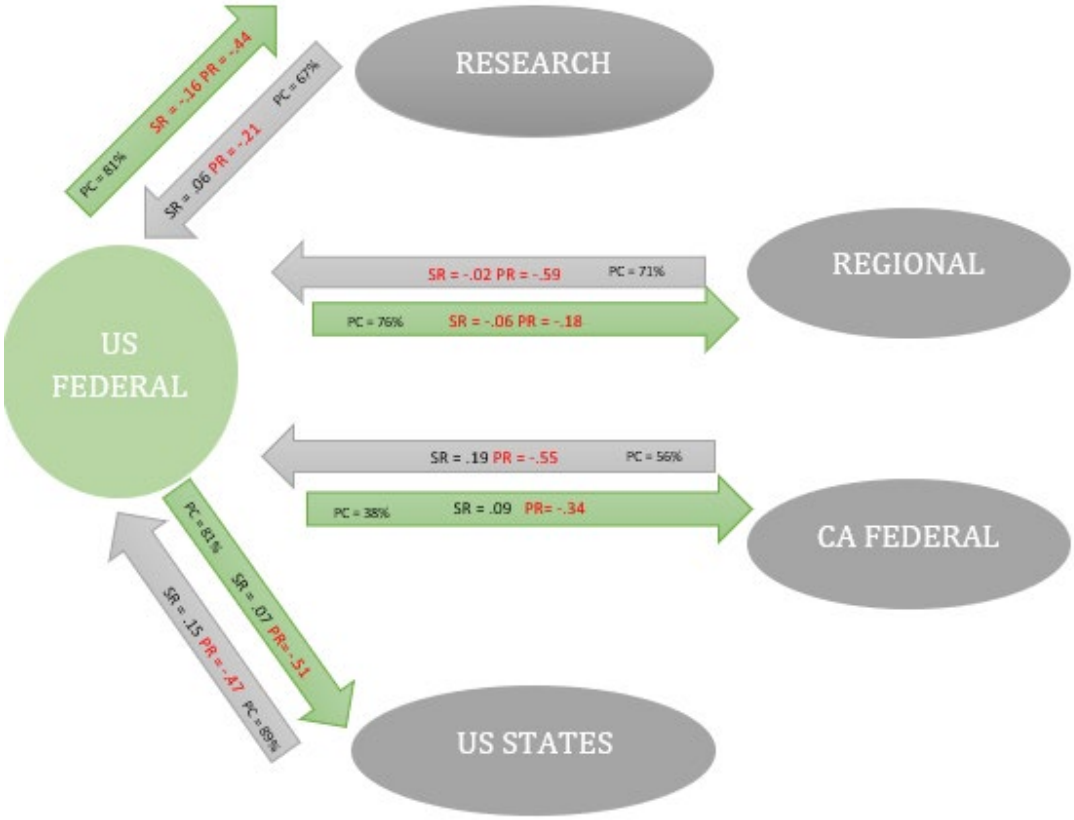


Figure 6b: Risk types with US Federal hub PC = Communication Percentage, SR = Sanction Risk and PR = Performance Risk

3.4 Predictive Hierarchical Regression

To measure the predictive value of the variables, on whether participants felt in conflict or had power with other organizations within the conditions of the network, hierarchical regression was used. This procedure was chosen to delineate the predictors, as their presence may correlate with each other (M. Lewis, 2007; Pedhazur, 1997). As with previous studies by this research team, hierarchical regression constructs predictor sets to determine the change in variance after input from the previous sets (Lima, Kim, Song, Hickey, & Temby, 2019; A. M. Song, Temby, Kim, Saavedra Cisneros, & Hickey, 2019; Temby et al., 2017). This analytic procedure places each set in a sequential order (see **Table 5**) to quantify the incremental change in the R^2 variance

not explained by the previous predictor sets. Two hierarchical regression models were created for the two dependent variables: 1) external efficacy and 2) goal conflict. Goal conflict also included the first dependent variable, external efficacy, as a predictor. Hierarchical regression's predictor sets are structured in three logic stages: 1) control variables, 2) independent variables, and 3) interactions. Interactions determine a predictive relationship upon a combination of variables, rather than one, which generate further determinates of variable x variable's effect on the dependent variable. Controls were fourfold in nature for these regressions: 1) respondent agency, 2) internal efficacy, 3) target agency and 4) criterion scaling. Target and respondent agencies were dummy coded by their 9 organizational categories. Internal efficacy entered as a control to differentiate between itself and external efficacy. Rather than the feeling of organizational power in a relationship, internal efficacy is a dispositional attribute of the respondent where the obstacles of the organization are not a factor (Ostrander, Lane, McClendon, Hayes, & Smith, 2017). External efficacy considers those organizational obstacles as the differentiating factor outside the disposition of the individual. Criterion-based scoring was utilized for the hierarchical regressions, as the dyadic property of the data could allow for efficiency. Rather than creating a dummy variable for each of the respondents, criterion-based scaling could be used due to "repeated measures designs" – i.e. the dyadic measures i.e. (A. Song, Temby, Krantzberg, & Hickey, 2017; Temby, Rastogi, Sandall, Cooksey, & Hickey, 2015).

	Table 5: Logic Ordering		
Predictor Sets in Order Entered	Logic for Ordering of Predictor Set	External Efficacy	Conflict
Participant Agency Jurisdiction (X dummy-coded variables)	Codes the most general way of classifying survey participants by jurisdiction of agency they work for, irrespective of target agency they relate to.	1	1
Internal Efficacy (IE) Q6_1	Scales the personal belief in the competence of oneself in a political context (Craig et al., 1990). Controls for agent disposition, rather than structural environment.	2	2
Criterion-scaled Participants predictor	Codes individual participants to control for individual differences in rating relationships with individual agencies.	3	3
Target Agency Jurisdiction (X dummy-coded variables)	Codes the jurisdiction of the specific agency that is a target for trust development and communications for an individual participant.	4	4
Legitimacy Dependence (LEGD) Q2_8, Q2_9	Assesses the function of an organization for inclusivity for multiple levels of stakeholders, which reinforces their position as participants (Barnaud & van Paassen, 2013).	5	5
Resource Dependence (CAPD) Q2_3, Q2_6	Identifies an organization who distributes knowledge, data, and financial resources to create specialized value for the network. An important function of public networks being the flexibility and speed to transmit that across organizational borders (Lockwood et al., 2010).	6	6
Regulatory Dependence (REGD) Q2_1, Q2_2	Identifies an organization's ability to enforce policies or legally binding constraints to behavior of agents in the network, which can be important to the management of common-pool resources (Nie, 2008)	7	7
Sanction Risk (SR) Q3_3, Q3_5	Assesses the level that an organization in a partnership perceives that the partner organization could cause sanctions to be put upon the respondent's organization (Anderson, Christ, Dekker, & Sedatole, 2015).	8	8
Performance Risk (PR) (PR2 is reverse coded), Q3_1, Q3_2 (3.2/PR2 is reverse coded)	Assesses the level of perceived risk for unsatisfactory performance in the selected organization (Das & Teng, 2001c).	9	9
Sanction Risk Interactions (SR*IE, SR*LEGD), SR*CAPD, SR*REGD)	2-way interactions between Sanction Risk and Internal Efficacy and dependence components, entered after the relevant main effects have been accounted for.	10	10
Performance Risk Interactions (PR*IE, PR*LEGD), PR*CAPD, PR*REGD)	2-way interactions between Performance Risk and Internal Efficacy and dependence components, entered after the relevant main effects have been accounted for.	11	11
External Efficacy Q3_6, Q3_7 (3.7 is reverse coded)	Assesses the belief that the participant has the meaningful power to express himself or herself in a politicized structure after accounting for internal efficacy, dependencies and risks (Morrell, 2003).	DV	12
Conflict Q3_4	Appraises if the goal of the respondent's organization aligns with the selected organization due to the risk, dependence, and efficacy forces.	--	DV

3.4.1 Risk and Dependence Predictors on External Efficacy and Goal Conflict

From the literature-drawn theoretical interactions in section 2.1, dependence and risk variables are theorized to effect conflict and power in relationships. Principally, that collaboration, either with positive external efficacy or negative conflict score, can be predicted by a resource level or by a threat level.

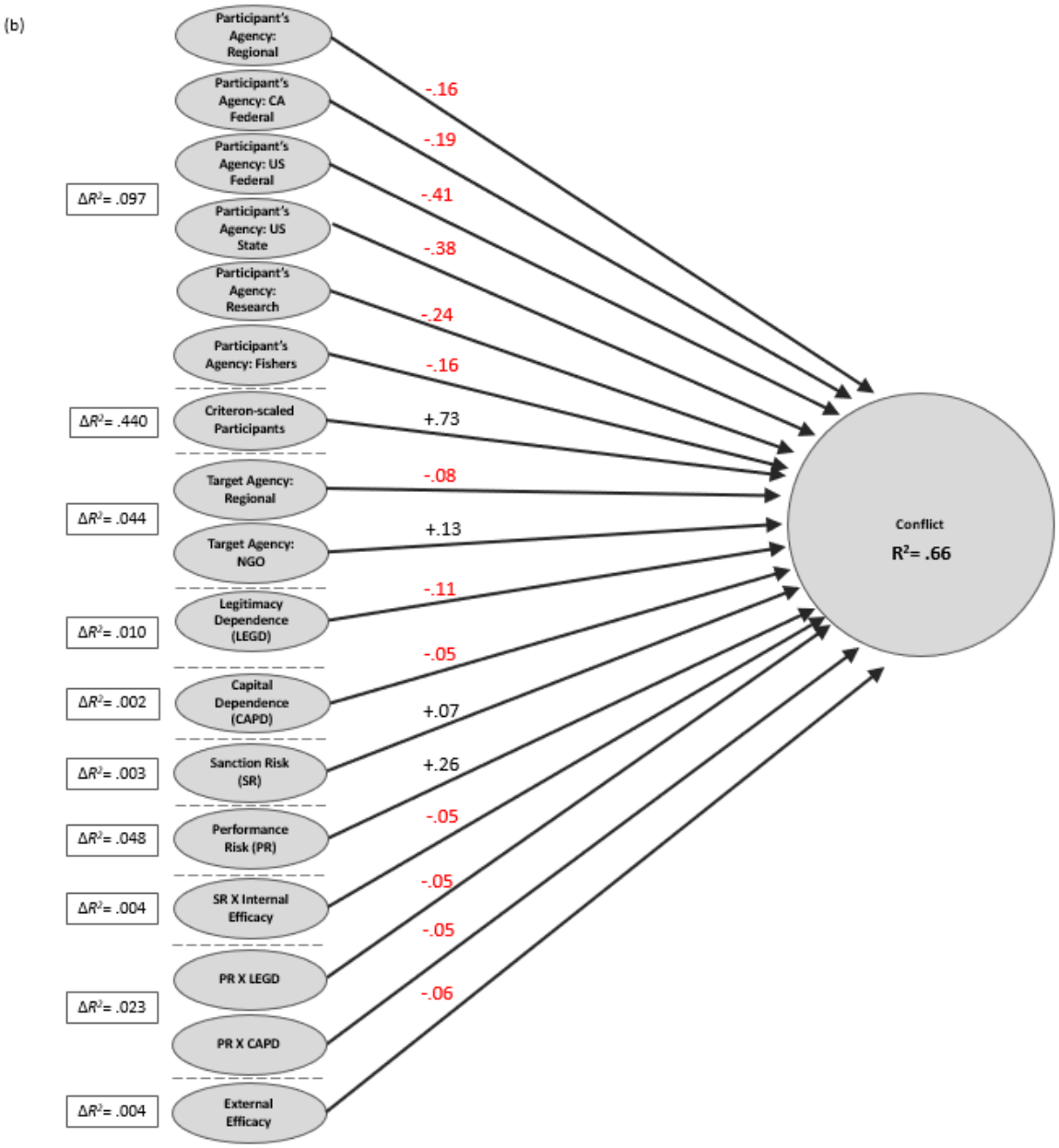
Figure 7a and **7b** present the hierarchical regression models: external efficacy and goal conflict, respectively. Each predictor set was only depicted if the alpha was significant at .05 or lower. As hierarchical regression is a cumulative process, the figures' R^2 values are represented as R^2 change. The number within the arrow represents the standardized beta coefficient with red indicating a negative coefficient value and **black** indicating a positive one. Total variance (R^2) predicted by the predictor sets was placed within the dependent variable box: external efficacy with .65 & conflict with .66. Criterion scaling, internal efficacy, target agency and participant agency were controlled before entering in the independent variable predictor sets. The full output is included in **Appendix S.2.**

Figure 7a details that all the independent variables included in the model predict external efficacy. Performance risk perception was highly negatively linked to external efficacy. In addition to the other kinds of dependence, legitimacy dependence had a three-fold predictive power for external efficacy. The weak relationship between sanction risk and external efficacy indicates that feeling that another organization can affect a respondent's organization through, potentially, regulatory sanctions, is associated with a feeling that the same organization is interested in and accepts inputs from the respondent's organization. In other words, it suggests a degree of reciprocal influence. The interaction between sanction risk and internal efficacy indicates that this effect is stronger among respondents reporting higher levels of internal

efficacy. The interaction of resource (capital) dependence and performance risk and sanction risk indicates that the effect of resource (capital) dependence on external efficacy is higher when the other forms of risk are elevated.

Figure 7b excludes regulatory dependence as a predictor for conflict. All the other independent variables, and the addition of external efficacy, predict conflict. Perceived risk, sanction & performance, raises conflict between organizations. In contrast, capital dependence, legitimacy dependence and external efficacy lower conflict. Sanction risk negatively interacts with internal efficacy to produce conflict. As internal efficacy increases, the effect of sanction risk on conflict lessens. Performance risk negatively interacts with legitimacy and capital dependence. As performance risk increases, the presence of these two types of dependence mitigates the effect of performance risk on conflict. External efficacy is negatively associated with conflict. People reporting high levels of external efficacy are more likely to report a consensus of goals, and less conflict, with partner organizations.


(a)
Participant's Agency: CA Federal
Participant's Agency: US Federal
Participant's Agency: US State
Participant's Agency: Indigenous
Criteron-scaled Participants
Target Agency: Regional
Target Agency: CA Federal
Target Agency: NGO
Target Agency: Fishers
Legitimacy Dependence
Capital Dependence
Regulatory Dependence
Sanction Risk
Performance Risk
SR X Internal Efficacy
SR X CAPD
PR X CAPD
ΔR²= .056
ΔR²= .461
ΔR²= .037
ΔR²= .032
ΔR²= .016
ΔR²= .007
ΔR²= .002
ΔR²= .030
ΔR²= .007
ΔR²= .004
+.15
+.13
+.13
-.11
+.72
+.08
-.07
-.13
-.14
+.21
+.14
+.11
+.05
-.21
+.06
+.05
+.06
External Efficacy
R²= .65


(b)
Participant's Agency: Regional
Participant's Agency: CA Federal
Participant's Agency: US Federal
Participant's Agency: US State
Participant's Agency: Research
Participant's Agency: Fishers
Criteron-scaled Participants
Target Agency: Regional
Target Agency: NGO
Legitimacy Dependence (LEGD)
Capital Dependence (CAPD)
Sanction Risk (SR)
Performance Risk (PR)
SR X Internal Efficacy
PR X LEGD
PR X CAPD
External Efficacy
ΔR²= .097
ΔR²= .440
ΔR²= .044
ΔR²= .010
ΔR²= .002
ΔR²= .003
ΔR²= .048
ΔR²= .004
ΔR²= .023
ΔR²= .004
-.16
-.19
-.41
-.38
-.24
-.16
+.73
-.08
+.13
-.11
-.05
+.07
+.26
-.05
-.05
-.05
-.06
Conflict
R²= .66

CHAPTER IV

DISCUSSION

As the case, the Gulf of Maine fishery management network was chosen due to its' functioning duration. For 50 odd years following the Magnuson Act, actors, organizations, and governments have divided duties to manage the Gulf of Maine fisheries. Maturity in organizational theory is an important benchmark as it indicates long-term organizational survival, the "survival of the fitting" (Mettler & Rohner, 2009). Due to its longevity, the Gulf of Maine provides an important testing ground for what makes organizations function, and how network actors collaborate. Stretching across international borders, the Gulf of Maine is a long-standing and healthy social system with well performing organizations.

As a snapshot of a network, the survey intended to understand how coherent or fragmented the Gulf of Maine case was. The organizational literature was reviewed to determine which objects would be the "mortar" for organizational relationships (Wondolleck & Yaffee, 2017). Employing a transdisciplinary approach, the findings pointed to risk and dependence as two poles that could deter or encourage relationships to form. From which, resource dependence theory could be used to infer a nexus of power and resources. The pattern was expected: high levels of dependence with low levels of power differentials. What was not expected was which kind of dependence was more influential and if those risk and dependence variables could predict power or conflict.

Performance risk is arguably the contributing factor to networks, and how they would fracture. Poor performance and incompetence lead to a waste of time and resources as mistakes

inhibit good work. As demonstrated by the risk levels and their predictive effects, conflict inhibits collaboration as various interests do not coalesce to foster accomplishments. Performance risk predicts conflict, and if networks are to remain cohesive, then organizations in networks and partnerships should control and be cognizant of poor performance and strategies to reconcile after failures (Marques, Ribeiro, & Scapens, 2011). In the case of the strongest and positive dependence variable, legitimacy, natural resource management and organizational theory has indicated its importance (Human & Provan, 2000; Ratner et al., 2013). As both a conflict reducer and enabler of empowerment, legitimacy by inclusion creates buy-in. This buy-in provides the network an important resource to provide various parties with agency to work toward a common goal, an important implication for co-management to distribute power throughout the network (Castro & Nielsen, 2001).

The independent variables were able to predict goal conflict and external efficacy. As discussed, legitimacy and performance risk were important, yet both dependence and risk variables indicated what was the forces would represent – coherence or fragmentation. Each dependence variable bonded the network together by fostering goal consensus (the inverse of goal conflict) and the feeling of empowerment in the social system (external efficacy). Descriptive analysis produced an interesting hierarchy of regulations and sanctions. Federal agencies rely on local actors, like fisher groups and state governments, to enforce regulations at the source. On the contrary, the network relies upon the feds to bring punishment against transgressors. As a weak predictor of collaboration, both sanction risk and regulatory dependence seem to indicate self-imposed rule-based design, an effective feature of common-pool resource management (Bodin & Crona, 2008).

For policy makers and network facilitators, stakeholder management is an important consideration when evaluating the collaboration potential of the system. Collaboration determines how well goals can be achieved, yet power determines whether that the collaboration is voluntary or coerced (Hardy & Phillips, 2008). Fostering organic empowerment requires legitimation amongst different roles and potential jurisdictional partners, as input across stakeholder groups can be incorporated from the lower levels to the top (Lockwood et al., 2010) . Externally, the positive efficacy of the agent predicts whether there would be goal consensus.

CHAPTER V

CONCLUSION

The Gulf of Maine fishery management network survey, herein, provides a starting point for continued research into fishery management strategies that would foster collaboration and empowerment, while minimizing conflict. The Gulf of Maine fishery management network lends to a mature case located between two developed countries with robust bureaucratic structures and actors. As discussed, the network performs well, shares capital and legitimizes other organizations. Applying these conditions to faltering or unstable networks may prove fruitful to identify missing network structural elements, then by applying lessons learned to alleviate poor capability, lack of empowerment, social learning, e.g. (Barnaud & van Paassen, 2013; Grant & Baden-Fuller, 2004; Weber & Khademian, 2014).

As an alternative methodological approach, embedded anthropology may provide further insight into additional causes of fragmentation (S. Lewis & Russell, 2011). A case may be chosen where collaboration is tenuous, and certain actors distrust others or waste their time in working together. Due to social desirability bias, a survey may fail to capture evidence of collaboration issues. Water cooler talk and off-the-record conversations would be ideal to understand grievances, if aired, may jeopardize status or reputation.

Further research should be determined by *how* network designers can foster the variables of dependence and external efficacy and discourage poor performance risks. To determine strategic recommendations, research into structural design best practices would be beneficial. Organizational theory offers insight into the differentiation between strategy and structure (Hill

& Birkinshaw, 2008). Public administrators would do well to foster collaboration with relationship evaluations and structural controls.

A long way from ideal, the Gulf of Maine ecosystem's cod population appears likely not recover. The lessons from the literature, and the Gulf of Maine fishery management network, would suggest that implementing good performance and democratizing involvement early could be effective to get decisions made. A key caveat would be that NRM network decisions, while existent and surviving in practice, may not correlate to sustainable decisions for the resource-base or ecosystem over time. A legitimated, high performing, and collaborative network make a poor decision. Limitations on collaboration have been limited by focusing upon process rather than the product (Conley & Moote, 2003). If collaboration works, then research should be invited to pursue whether collaboration produces a *good* decision.

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APPENDIX

Appendix S.1: Organization List

Regional

1. Gulf of Maine Council on the Marine Environment (GOMC)
2. New England Fishery Management Council
3. Northeast Regional Ocean Council (NROC)

CA Federal

4. Environment & Climate Change Canada
5. Fisheries and Oceans Canada

US Federal

6. National Marine Fisheries Service (NOAA Fisheries)
7. US Army Corps of Engineers
8. United States Environmental Protection Agency (EPA)
9. US Fish & Wildlife Service (USFWS)
10. US Geological Survey (USGS)
11. US Coast Guard

State

12. Maine Department of Marine Resources (Maine Coastal Program)
13. Massachusetts Department of Fish and Game
14. Massachusetts Office of Coastal Zone Management
15. New Hampshire Department of Coastal Services
16. New Hampshire Fish and Game Department

Provincial

17. Nova Scotia Department of Environment
18. New Brunswick Agriculture, Fisheries & Aquaculture
19. New Brunswick Department of Environment and Local Government

Wampanoag Mashpee Tribe

Mi'kmaq Rights Initiative

20. Passamaquoddy Tribe

Woodstock First Nation

21. Passamaquoddy Tribe
22. Woodstock First Nation

Environmental NGOs

25. Conservation Law Foundation (CLF)
26. Earth Justice (Oceans Program)
27. Environmental Defense Fund (New England Division)
28. Natural Resources Defense Council
29. Pew Charitable Trusts
30. The Nature Conservancy

Research Organizations

31. Gulf of Maine Research Institute
32. Maine Center for Coastal Fisheries
33. Massachusetts Marine Fisheries Institute (UMass Dartmouth)
34. MIT Sea Grant
35. Regional Association for Research on the Gulf of Maine (RARGOM)
36. University of New Hampshire Sea Grant
37. Urban Harbors Institute (UMASS Boston)

Fisher Groups

38. Associated Fisheries of Maine
39. Cape Cod Commercial Fishermen's Alliance
40. Choir Coalition
41. Grand Manan Fishermen's Association
42. Maine Coast Fishermen's Association
43. Maine Lobstermen's Association
44. Massachusetts Lobstermen's Association
45. NH Commercial Fishermen's Association
46. Northeast Seafood Coalition
47. Northwest Atlantic Marine Alliance (NAMA)
48. Stellwagen Bank Charter Boat Association
49. The Maritime Fishermen's Union

Appendix S.2

Table 1. Hierarchical Regression Analysis: **External Efficacy**

Hierarchical regression model summary [a]

		R^2 change statistics					
Model	Predictor set entered	Model R^2	R^2 Change	*df* predictors	*df* residual	F-test	P
1	Participant's Agency	0.0596	0.0596	7	882	**7.99**	**0.0000**
2	Internal Efficacy (IE)	0.0604	0.0008	8	881	**7.08**	**0.0000**
3	Criterion-scaled Participants	0.5216	0.4612	9	880	**106.59**	**0.0000**
4	Target Agency	0.5583	0.0367	17	872	**64.82**	**0.0000**
5	Legitimacy Dependence (LEGD)	0.5898	0.0315	18	871	**69.56**	**0.0000**
6	Resource Dependence (CAPD)	0.6058	0.0160	19	870	**70.37**	**0.0000**
7	Regulatory Dependence (REGD)	0.6124	0.0066	20	869	**68.65**	**0.0000**
8	Sanction Risk (SR)	0.6141	0.0017	21	868	**65.78**	**0.0000**
9	Performance Risk (PR)	0.6436	0.0295	22	867	**71.18**	**0.0000**
10	SR Interactions (SR×IE, SR×LEGD, SR×CAPD, and SR×REGD)	0.6505	0.0069	26	863	**61.78**	**0.0000**
11	PR Interactions (PR×IE, PR×LEGD, PR×CAPD, and PR×REGD)	0.6545	0.0040	30	859	**54.25**	**0.0000**

Model coefficients

		Unstandardized coefficients		Standardized coefficients	Correlations		F-test
Model	Individual predictor	β	Std. error	β	Part	sr^2	P
1	Participant's Agency: Regional	-0.0140	0.1044	-0.0068	-0.0044	0.0000	0.8931
	Participant's Agency: CA Federal	0.4468	0.1271	0.1483	0.1148	0.0132	**0.0005**
	Participant's Agency: US Federal	0.2237	0.0968	0.1314	0.0755	0.0057	**0.0210**
	Participant's Agency: State	0.2722	0.1069	0.1256	0.0831	0.0069	**0.0111**
	Participant's Agency: Provincial	-	-	-	-	-	-
	Participant's Agency: Indigenous	-1.0612	0.3187	-0.1124	-0.1087	0.0118	**0.0009**
	Participant's Agency: Research	0.1757	0.1059	0.0828	0.0542	0.0029	0.0974
	Participant's Agency: Fishers	-0.2194	0.1295	-0.0707	-0.0553	0.0031	0.0906
2	Internal Efficacy (IE)	-0.0291	0.0332	-0.0357	-0.0286	0.0008	0.3812
3	Criterion-scaled Participants	1.0000	0.0343	0.7222	0.6791	0.4611	**0.0000**
4	Target Agency: Regional	0.2316	0.1113	0.0775	0.0468	0.0022	**0.0378**
	Target Agency: CA Federal	-0.2108	0.1011	-0.0684	-0.0469	0.0022	**0.0375**
	Target Agency: US Federal	-0.0567	0.0987	-0.0285	-0.0129	0.0002	0.5659
	Target Agency: State	0.0074	0.1022	0.0035	0.0016	0.0000	0.9425
	Target Agency: Provincial	-	-	-	-	-	-
	Target Agency: Indigenous	-0.1507	0.1302	-0.0316	-0.0261	0.0007	0.2473
	Target Agency: NGO	-0.3096	0.1049	-0.1309	-0.0664	0.0044	**0.0033**
	Target Agency: Research	-0.1754	0.1028	-0.0809	-0.0384	0.0015	0.0884
	Target Agency: Fishers	-0.2857	0.1020	-0.1362	-0.0631	0.0040	**0.0052**
5	Legitimacy Dependence (LEGD)	0.1713	0.0209	0.2072	0.1775	0.0315	**0.0000**
6	Capital Dependence (CAPD)	0.1290	0.0217	0.1372	0.1266	0.0160	**0.0000**
7	Regulatory Dependence (REGD)	0.0662	0.0172	0.1058	0.0812	0.0066	**0.0001**
8	Sanction Risk (SR)	0.0459	0.0232	0.0531	0.0418	0.0017	**0.0480**
9	Performance Risk (PR)	-0.2005	0.0237	-0.2057	-0.1718	0.0295	**0.0000**
10	SR × IE	0.0509	0.0181	0.0607	0.0566	0.0032	**0.0051**
	SR × LEGD	0.0071	0.0211	0.0084	0.0068	0.0000	0.7350
	SR × CAPD	0.0439	0.0221	0.0479	0.0399	0.0016	**0.0478**
	SR × REGD	0.0154	0.0168	0.0237	0.0185	0.0003	0.3584
11	PR × IE	-0.0254	0.0235	-0.0248	-0.0216	0.0005	0.2808
	PR × LEGD	0.0265	0.0207	0.0310	0.0256	0.0007	0.2015
	PR × CAPD	0.0686	0.0266	0.0629	0.0518	0.0027	**0.0100**
	PR × REGD	-0.0409	0.0183	-0.0582	-0.0447	0.0020	0.0262

[a] Dependent variable: External efficacy. Note. Bold font gives us statistically significant predictors and values.

Table 2. Hierarchical Regression Analysis: **Conflict**

Hierarchical regression model summary [a]

		R^2 change statistics					
Model	Predictor set entered	Model R^2	R^2 Change	*df* predictors	*df* residual	F-test	P
1	Participant's Agency	0.0967	0.0967	7	882	13.49	**0.0000**
2	Internal Efficacy (IE)	0.0975	0.0008	8	881	11.90	**0.0000**
3	Criterion-scaled Participants	0.5377	0.4402	9	880	113.72	**0.0000**
4	Target Agency	0.5819	0.0442	17	872	71.38	**0.0000**
5	Legitimacy Dependence (LEGD)	0.5917	0.0098	18	871	70.11	**0.0000**
6	Resource Dependence (CAPD)	0.5941	0.0024	19	870	67.02	**0.0000**
7	Regulatory Dependence (REGD)	0.5943	0.0002	20	869	63.64	**0.0000**
8	Sanction Risk (SR)	0.5970	0.0027	21	868	61.23	**0.0000**
9	Performance Risk (PR)	0.6446	0.0476	22	867	71.49	**0.0000**
10	SR Interactions (SR×IE, SR×LEGD, SR×CAPD, and SR×REGD)	0.6487	0.0041	26	863	61.30	**0.0000**
11	PR Interactions (PR×IE, PR×LEGD, PR×CAPD, and PR×REGD)	0.6552	0.0065	30	859	54.41	**0.0000**
12	External Efficacy (EE)	0.6575	0.0023	31	858	53.14	**0.0000**

Model coefficients

		Unstandardized coefficients		Standardized coefficients	Correlations		F-test
Model	Individual predictor	β	Std. error	β	Part	sr^2	P
1	Participant's Agency: Regional	-0.3476	0.1100	-0.1575	-0.1012	0.0102	**0.0016**
	Participant's Agency: CA Federal	-0.6068	0.1339	-0.1874	-0.1450	0.0210	**0.0000**
	Participant's Agency: US Federal	-0.7484	0.1019	-0.4089	-0.2349	0.0552	**0.0000**
	Participant's Agency: State	-0.8833	0.1126	-0.3793	-0.2510	0.0630	**0.0000**
	Participant's Agency: Provincial	-	-	-	-	-	-
	Participant's Agency: Indigenous	0.3059	0.3357	0.0301	0.0292	0.0009	0.3624
	Participant's Agency: Research	-0.5393	0.1116	-0.2365	-0.1547	0.0239	**0.0000**
	Participant's Agency: Fishers	-0.5387	0.1364	-0.1614	-0.1264	0.0160	**0.0001**
2	Internal Efficacy (IE)	0.0317	0.0350	0.0362	0.0290	0.0008	0.3650
3	Criterion-scaled Participants	1.0000	0.0345	0.7333	0.6635	0.4402	**0.0000**
4	Target Agency: Regional	-0.2366	0.1165	-0.0736	-0.0445	0.0020	**0.0425**
	Target Agency: CA Federal	-0.0065	0.1059	-0.0019	-0.0013	0.0000	0.9514
	Target Agency: US Federal	-0.0942	0.1033	-0.0441	-0.0200	0.0004	0.3621
	Target Agency: State	-0.1503	0.1069	-0.0659	-0.0308	0.0009	0.1600
	Target Agency: Provincial	-	-	-	-	-	-
	Target Agency: Indigenous	0.1129	0.1363	0.0220	0.0181	0.0003	0.4075
	Target Agency: NGO	0.3371	0.1098	0.1326	0.0672	0.0045	**0.0022**
	Target Agency: Research	-0.0659	0.1075	-0.0283	-0.0134	0.0002	0.5399
	Participant's Agency: Fishers	0.2228	0.1066	0.0988	0.0458	0.0021	**0.0369**
5	Legitimacy Dependence (LEGD)	-0.0991	0.0217	-0.1115	-0.0989	0.0098	**0.0000**
6	Capital Dependence (CAPD)	-0.0541	0.0237	-0.0535	-0.0494	0.0024	**0.0225**
7	Regulatory Dependence (REGD)	-0.0118	0.0190	-0.0175	-0.0134	0.0002	0.5358
8	Sanction Risk (SR)	0.0637	0.0264	0.0685	0.0520	0.0027	**0.0159**
9	Performance Risk (PR)	0.2736	0.0254	0.2611	0.2183	0.0476	**0.0000**
10	SR × IE	-0.0422	0.0195	-0.0469	-0.0437	0.0019	**0.0305**
	SR × LEGD	-0.0373	0.0227	-0.0411	-0.0330	0.0011	0.1018
	SR × CAPD	0.0145	0.0239	0.0147	0.0122	0.0001	0.5440
	SR × REGD	-0.0163	0.0182	-0.0233	-0.0181	0.0003	0.3698
11	PR × IE	0.0299	0.0253	0.0272	0.0237	0.0006	0.2371
	PR × LEGD	-0.0477	0.0222	-0.0521	-0.0430	0.0018	**0.0321**
	PR × CAPD	-0.0659	0.0285	-0.0562	-0.0463	0.0021	**0.0211**
	PR × REGD	0.0059	0.0197	0.0078	0.0060	0.0000	0.7657
12	External Efficacy (EE)	-0.0646	0.0268	-0.0601	-0.0481	0.0023	**0.0162**

[a] Dependent variable: Conflict. Note. Bold font gives us statistically significant predictors and values.

BIOGRAPHICAL SKETCH

Derek Katznelson has earned a Master of Arts in Disaster Studies from the University of Texas Rio Grande Valley in August 2020. He works as the Regional Resiliency Coordinator at the Lower Rio Grande Valley Development Council with a focus on regional water and disaster issues for the three-county area. Before his master's studies, Derek worked in corporate finance and compliance roles. He completed his B.S. in Anthropology at Colgate University from 2007-2011. Derek is also a Boy Scouts of America Eagle Scout. He can be reached at dkatznelson@aol.com.