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Using social network analysis to examine planner involvement in environmentally oriented planning processes led by non-planning professions

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Broad stakeholder involvement cannot be assumed in all environmental planning and management processes that have critical land use dimensions. This paper illustrates how concepts and techniques from social network analysis (SNA) can be used to examine and better understand the roles of one type of stakeholders, planners, in environmentally oriented planning and management processes led by other professions. Two cases of natural hazard mitigation planning led by emergency managers illustrate the usefulness of three SNA concepts of network structural characteristics in understanding how differences in planner involvement may influence incorporation of land use approaches in local natural hazard mitigation plans aimed at reducing long term risks from natural hazards.

Keywords: social network analysis; hazard mitigation; land use planning; planner involvement; stakeholder

1. Introduction

Recently, scholars have developed and applied network concepts such as stakeholder diversity, interdependence of stakeholder interests, and communities of practice to deepen the understanding of communication and collaboration in environmental planning and public policy processes (Booher and Innes 2002; Albrechts and Mandelbaum 2005; Goldstein and Butler 2010; Innes and Booher 2010; Margerum 2011). This literature has provided important insights into the roles of planners in shaping attention on, and coordinating action around, environmental and land use planning issues. To date, though, limited use has been made of the rich array of concepts, theories, and techniques offered by social network analysis (SNA) for systematically evaluating stakeholder networks and their influences on planning outcomes (Mandarano 2009; Dempwolf and Lyles 2012).

Along with the increasing attention to network oriented concepts, much of planning scholarship, training, and practice have shifted from a conception of planners as technical experts on the spatial arrangement of land uses to a view of planners as intermediaries in public processes. Under the process oriented view, planners manage interactions among networks of stakeholders involved in planning processes to support more widespread and meaningful communication and collaboration (Forester 1989, 1993; Berke, Godschalk and Kaiser 2006). Conceiving of planners as mediators, facilitators, consensus builders, conveners, and shapers of attention (Forester 1989 and 2006, Innes and Booher 1999a

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and 1999b; Innes 2004; Berke, Godschalk and Kaiser 2006) implies that more often than not planners have substantial involvement in – if not primary responsibility for – a planning process and engaging a network of stakeholders in the process.

Yet, what are the roles and influences of planners in planning domains with integral environmental and land use dimensions for which planners often have not had primary responsibility or even substantial involvement? A prominent example is natural hazard mitigation planning in the United States, for which emergency managers usually have primary responsibility (Schwab and Topping 2010). Emergency managers typically have expertise on the phases of the disaster cycle (preparedness, response, recovery, and mitigation) and deep awareness of community vulnerability, but frequently lack training and expertise related to land use planning and managing collaborative planning processes (Schwab and Topping 2010). Planners often have training and expertise in both these areas and can help identify linkages between emergency management issues and environmental and land use issues. The importance of inter-disciplinary coordination involving planners is reflected in US Federal Emergency Management Agency director Craig Fugate's recent call for more integration of hazard mitigation efforts and land use planning and more cooperation between emergency managers and planners (Fugate 2010).

My main purposes for this paper are threefold. First, I identify core concepts from the field of SNA which are useful for examining planning networks and the roles of planners in environmentally related domains led by other professions. Second, I demonstrate the utility of these SNA concepts, as well as SNA techniques, by presenting two illustrative case examples of planner involvement in natural hazard mitigation planning processes in the United States. Third, I identify implications for environment planners and managers and illuminate potential network oriented relationships for future empirical testing. Before addressing these purposes, however, I elaborate on why natural hazard mitigation in the United States is an appropriate planning domain for this work.

2. Natural hazard mitigation and the role of planners

Natural hazard mitigation consists of “advance action taken to reduce or eliminate the long term risk to human life and property from natural hazards”(Godschalk *et al.* 1999, 5) and meets the purposes of this paper for multiple reasons. It is a prime example of a planning domain with central environmental and land use dimensions that is typically the purview of a profession with limited training and expertise in land use and environmental planning and management, namely emergency management (Schwab and Topping 2010). Natural hazard mitigation planning in the United States has been used to test a wide array of public policy and planning theories (Berke *et al.* 1996; Burby and May 1997; Deyle and Smith 1998; Brody 2003). In 2000, the United States federal government passed a law – the Disaster Mitigation Act of 2000, or DMA – essentially mandating all local governments to perform natural hazard mitigation planning. The DMA provides a national level intergovernmental planning policy framework to study. Finally, dramatic growth in economic losses from hazard events like hurricanes and floods, and increasing confidence that existing climatic hazard risks are exacerbated by anthropogenic climate change (Mileti 1999; Pielke *et al.* 2008; Karl, Melillo, and Peterson 2009; Field 2012) means that hazard mitigation is a critical environment planning domain.

Key factors in the rising economic losses from natural hazard events have been property development in hazardous locations (e.g. floodplains) and degradation of natural ecosystems (e.g. wetlands) which provide hazard mitigation benefits (Burby *et al.* 1999;

Mileti 1999, National Research Council 2006; Berke and Smith 2009). Land use approaches (e.g. zoning ordinances and subdivision regulations) that direct people and property out of hazardous locations into safer areas and preserve ecosystem functions provide the best opportunities for reduction of long term hazard risks (Godschalk, Brower, and Beatley 1989; Godschalk *et al.* 1999; Burby *et al.* 1999; NRC 2006; Berke and Smith 2009). Land use approaches are usually inadequately integrated into hazard mitigation planning; however, planning for hazard mitigation in general is of moderate to weak quality (Berke and French 1994; Burby and Dalton 1994; Berke *et al.* 1996; Burby and May 1997; Brody 2003; Tang *et al.* 2008; Kang, Peacock and Hussein 2010; Olonilua and Ibitayo 2011). Multiple factors explain weak hazard mitigation planning and limited integration of land use approaches with hazards management, including elements of the state planning policy context, local community context, and the planning process (Berke and French 1994; Berke *et al.* 1996; Burby and May 1997, Prater and Lindell 2000; Brody 2003; Burby 2003; Norton 2005; Brody, Kang, and Bernhardt 2009).

In the late 1990s, prominent studies called attention to the United States' historically disaster driven and reactive approach to natural hazard mitigation and called instead for a more proactive, planning oriented, and sustainable approach that would better prioritize land use approaches to risk reduction (Burby *et al.* 1999; Godschalk *et al.* 1999; Mileti 1999). Soon thereafter, the DMA was adopted with requirements for all state and local governments to adopt hazard mitigation plans to be eligible for federal post-disaster Hazard Mitigation Grant Program and Pre-Disaster Mitigation funds. The DMA's prioritization of pre-event mitigation planning comprised an attempt to shift the nation toward a more proactive hazard mitigation policy framework. Under the DMA, local governments may work together on a multi-jurisdictional hazard mitigation plan (Federal Emergency Management Agency 2008). More than 26,000 local jurisdictions adopted mitigation plans in the first 12 years after the DMA's passage (Department of Homeland Security Office of the Inspector General 2012) likely making them the most widely adopted category of plans in the United States today. The DMA requires individual jurisdictions to have their own future-oriented actions or policies, but the jurisdictions have discretion whether to include land use policies. It also requires participatory planning processes (FEMA 2008), but there are no provisions that anyone with land use planning expertise be involved.

Local emergency managers most often have lead responsibility for managing hazard mitigation planning processes. The profession of emergency management grew out of a Cold War civil defense culture focused on preparing for and responding to military attacks and, over time, it came to have responsibility for natural hazards management as well (NEMA 2011.) Traditionally, environmental and land use planning has not been part of emergency managers' expertise or responsibility (Schwab and Topping 2010). Instead, local planners often have expertise using the toolkit of land use management approaches to influence the location, types, intensity, design, quality, and timing of development – a critical body of knowledge and skills for steering development to safer locations (Olshansky and Kartez 1998; Schwab and Topping 2010). Additionally, local planners trained to foster public involvement in planning processes are likely to have working relationships with developers, builders, environmental groups, and other prominent land use planning stakeholders, with whom emergency managers may have little or no contact (Berke, Godschalk, and Kaiser 2006, Chap. 2; Schwab and Topping 2010). Limited attention has been paid to the interdisciplinary collaboration between emergency managers and planners (Kartez and Faupel 1994) and to the roles of planners in hazard mitigation planning under the DMA (Lyles, Berke, and Smith 2014). However, evidence of the importance of planner involvement is seen in a recent finding that jurisdictions

represented by their own planner on a hazard mitigation planning committee have been found to include more land use policies in their DMA compliant hazard mitigation plans (Lyles, Berke, and Smith 2014). SNA offers valuable concepts and techniques to further explore the importance of planner involvement.

2.1 Applying social network analysis (SNA) to understanding planning stakeholders networks

SNA explores the attributes of individuals or organizations that are interrelated (Wasserman and Faust 1994; Knoke and Yang 2008). Wasserman and Faust (1994) distinguish among network composition, the attributes of individual stakeholders, network structure, and the patterns of relationships between stakeholders. Information on the individual stakeholders, or nodes, and their relationships, or ties between nodes, can be used to model the overall structure of the network (Wasserman and Faust 1994; Knoke and Yang 2008; Jackson 2008). Conceptualizing planning networks as (1) being composed of individuals (or organizations) with a diverse set of assets who (2) relate to each other through interdependent and structured patterns of relationships aligns with two conditions for building “network power” in collaborative planning, network diversity, and interdependence, respectively (Booher and Innes 2002, 225; Innes and Booher 2010). Network diversity consists of a “wide range of life experiences, interests, values, knowledge, and resources” that can be brought together in a planning process (Booher and Innes 2002, 227). In a similar vein, empirical SNA analysis of educational policy networks that exhibited positive relationships between network heterogeneity and mobilizing resources for policy-making (Sandström and Carlsson 2008). Meanwhile, self-interest and reciprocity associated with interdependence can support exchanges between stakeholders which evolve into long term patterns of cooperation (Booher and Innes 2002). Here, I focus on three structural characteristics particularly suited to planning processes (Table 1).

First, variations in overall network structure can lead to advantages (or disadvantages) for sharing information, engaging in joint problem solving, and other planning tasks (Watts and Strogatz 1998; Newman 2003; Berardo and Scholz 2010; Siegel 2010). Preferential attachment networks are characterized by a “rich-get-richer phenomenon” wherein a few stakeholders are highly connected and central to the network while most are minimally connected and peripheral (Barbarasi and Albert 1999). For example, a “star shaped” network provides highly efficient information consolidation and distribution because one central stakeholder can reach all the other stakeholders through just one connection (Figure 1) (Gould 1993; Berardo and Scholz 2010). However, it limits the ability of peripheral stakeholders to directly share information and interact face to face; it is vulnerable to the dominance of flows by the central stakeholder (Berardo and Scholz 2010); and the burden of maintaining connections can be overwhelming for the central stakeholder (Long, Cunningham, and Braithwaite 2013). In contrast, small world networks are characterized by strong connections within clusters of stakeholders and short average paths between stakeholders (Watts and Strogatz 1998). The properties of high clustering and short path lengths foster an attractive balance of numerous connections within stakeholders and maintenance of efficient overall connectivity (Watts and Strogatz 1998).

Siegel (2010) builds on preferential attachment, small world, and other network concepts to develop a typology of four network types (Figure 2(a)–(d)). Small world networks are like modern cities and dense suburbs “in which there are no exceptional

Table 1. Summary of network structure concepts.

Concept	Explanation	Relevant sources
Network type	<p>Typology of network structures (see Figures 2 (a)–(d))</p> <ul style="list-style-type: none"> • <i>Small world</i> networks with short path lengths and high clustering are like modern cities with no exceptional individuals with inordinate sway • <i>Village</i> networks are similar to small worlds but with higher clustering, which like a small town means all individuals know each other and exert equal influence • <i>Opinion leader</i> networks have a few elite stakeholders that monopolize most connections • <i>Hierarchical</i> networks have a few elite stakeholders that have power by virtue of being at the top of a series of levels of stakeholders 	Barbarasi and Albert (1999), Berardo and Scholz (2010), Gould (1993), Siegel (2010), and Watts and Strogatz (1998)
Centrality	<p>Refers to the prominence of individual stakeholders in the context of all connections in the network:</p> <ul style="list-style-type: none"> • <i>Degree centrality</i> measures the total number of other stakeholders to which a stakeholder is connected • <i>Betweenness centrality</i> measures whether a stakeholder is on the shortest path between other stakeholders in a network 	Freeman (1977), Jackson (2008), Knoke and Yang (2008), and Scholz, Berardo, and Kile (2008)
Boundaries	<p>If certain types of boundaries are not spanned by individuals or organizations (e.g. bridges or brokers) in public policy networks, then information sharing and cooperation problems can arise:</p> <ul style="list-style-type: none"> • <i>Horizontal</i> boundaries between adjacent jurisdictions • <i>Vertical</i> boundaries between lower and higher levels of government • <i>Ideological</i> boundaries between competing interest groups • <i>Expertise</i> boundaries between different disciplines 	Crona and Parker (2012), Long, Cunningham, and Braithwaite (2013), and Schneider <i>et al.</i> (2003)

citizens who hold an inordinate amount of sway over their peers” (131). Village networks are similar to small world networks but the stakeholders are more tightly clustered, such as one might expect in “small towns, villages, and cliques, in which everyone knows everyone else within the social unit, and all exert equal influence on each other” (131). Opinion leader networks include “star-shaped” networks and feature a few elite stakeholders gaining influence by monopolizing most of the connections. In “hierarchical” networks, the elite stakeholders gain power by virtue of being at the top of a series of levels of stakeholders. In small world and village networks, most stakeholders

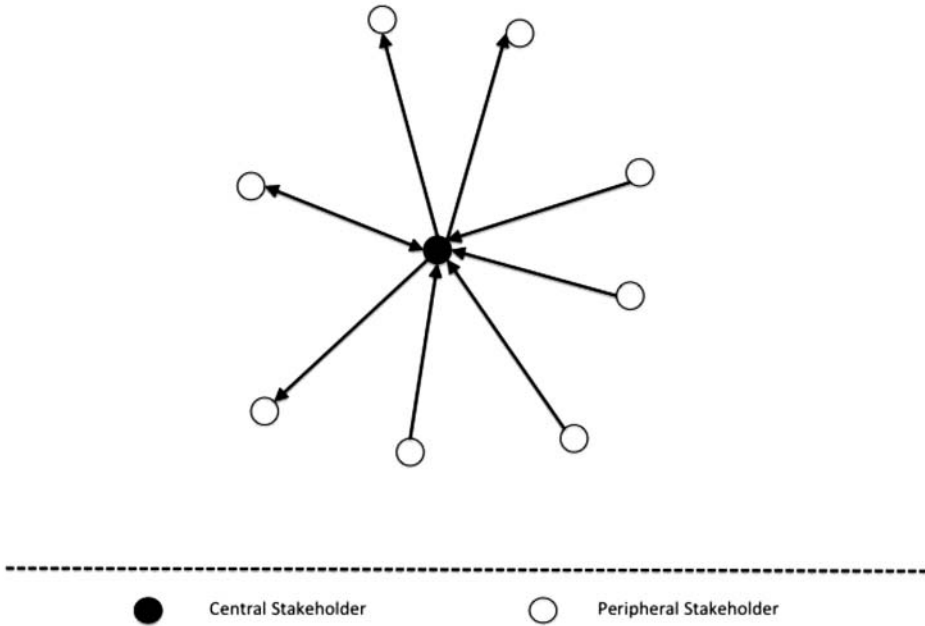


Figure 1. Network exhibiting preferential attachment.

have comparable numbers of connections and influence, while opinion leader and hierarchical networks have elite stakeholders with many more connections and influence.

The second network concept relates to the centrality of stakeholders in networks. Network centrality refers to the prominence of an individual stakeholder in the context of all the other connections between stakeholders in the network (Knoke and Yang 2008; Jackson 2008). Two concepts of centrality are relevant here. Degree centrality refers to a stakeholder's number of connections to other stakeholders. High degree centrality can provide access to a wide array of information and potential partners, but also can require considerable effort to maintain relationships (Scholz, Berardo, and Kile 2008). Degree can also be assessed based on the direction of the relationship, such as whether information flows from a stakeholder (out-degree) to a stakeholder (in-degree).

Betweenness centrality focuses on whether a stakeholder functions as an intermediary between other stakeholders and measures whether or not a stakeholder is on the shortest path between two other stakeholders in the network (Freeman 1977; Jackson 2008; Knoke and Yang 2008). High betweenness scores for a stakeholder can indicate that the stakeholder has the ability to exert considerable influence on the flow of information between other stakeholders in the network.

The third structural characteristic of interest is the strength of interdisciplinary connections that facilitate information sharing and collaboration. Four types of boundaries can be problematic in public policy contexts if they are not spanned: horizontal boundaries between adjacent governments, vertical boundaries between higher and lower levels of governments, expertise boundaries between professional disciplines, and ideological boundaries between competing interests (Schneider *et al.* 2003). Arguments for spanning these boundaries align with concerns expressed about traditional top-down hierarchical governance approaches being unable to result in widespread information sharing and dialogue (Susskind, McKernan, and Thomas-Larmer 1999;

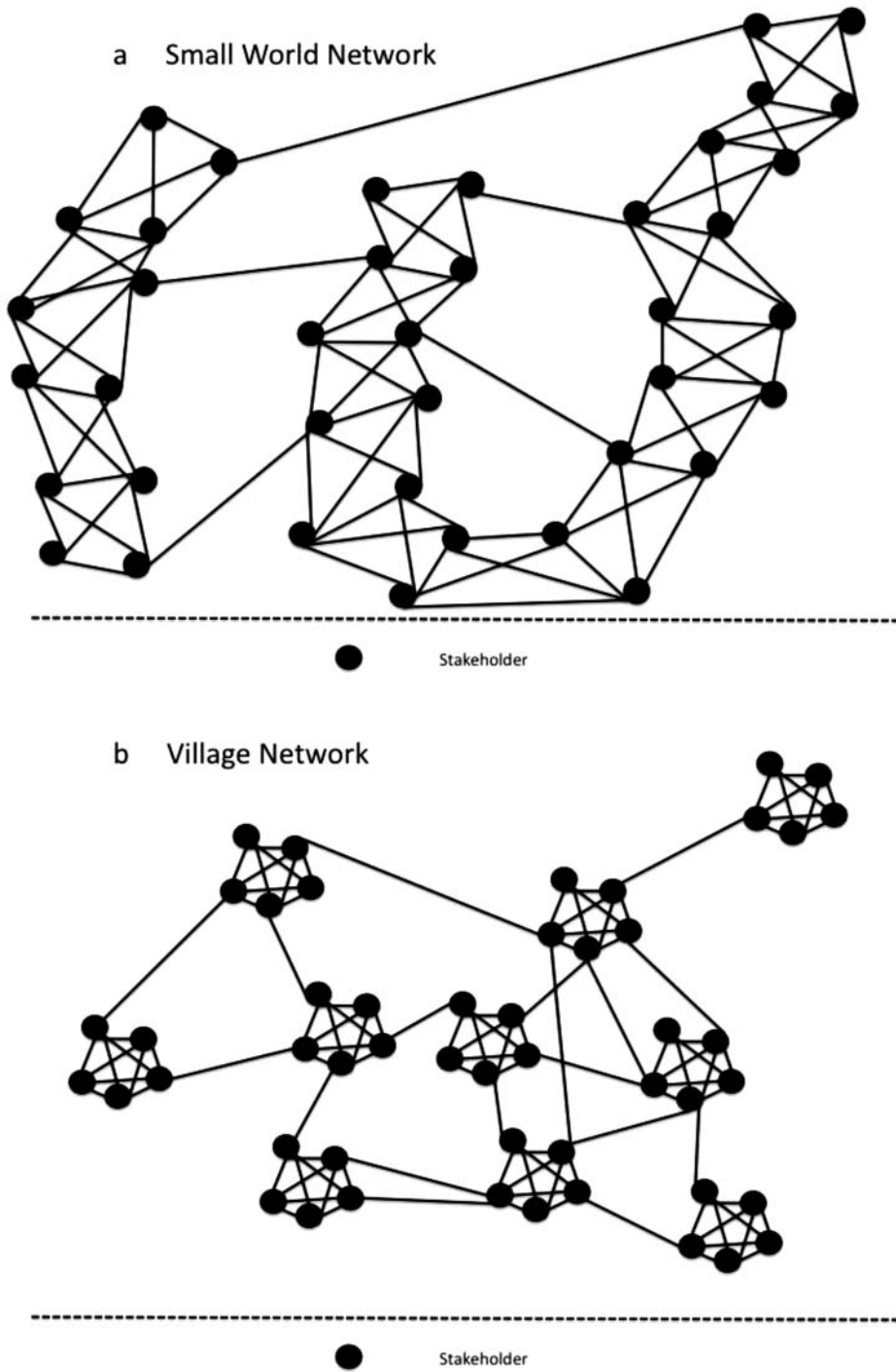


Figure 2. Network structures (modeled on Figure 2 in Siegel 2010). a) small world network, b) village network, c) opinion leader network, and d) hierarchical network.

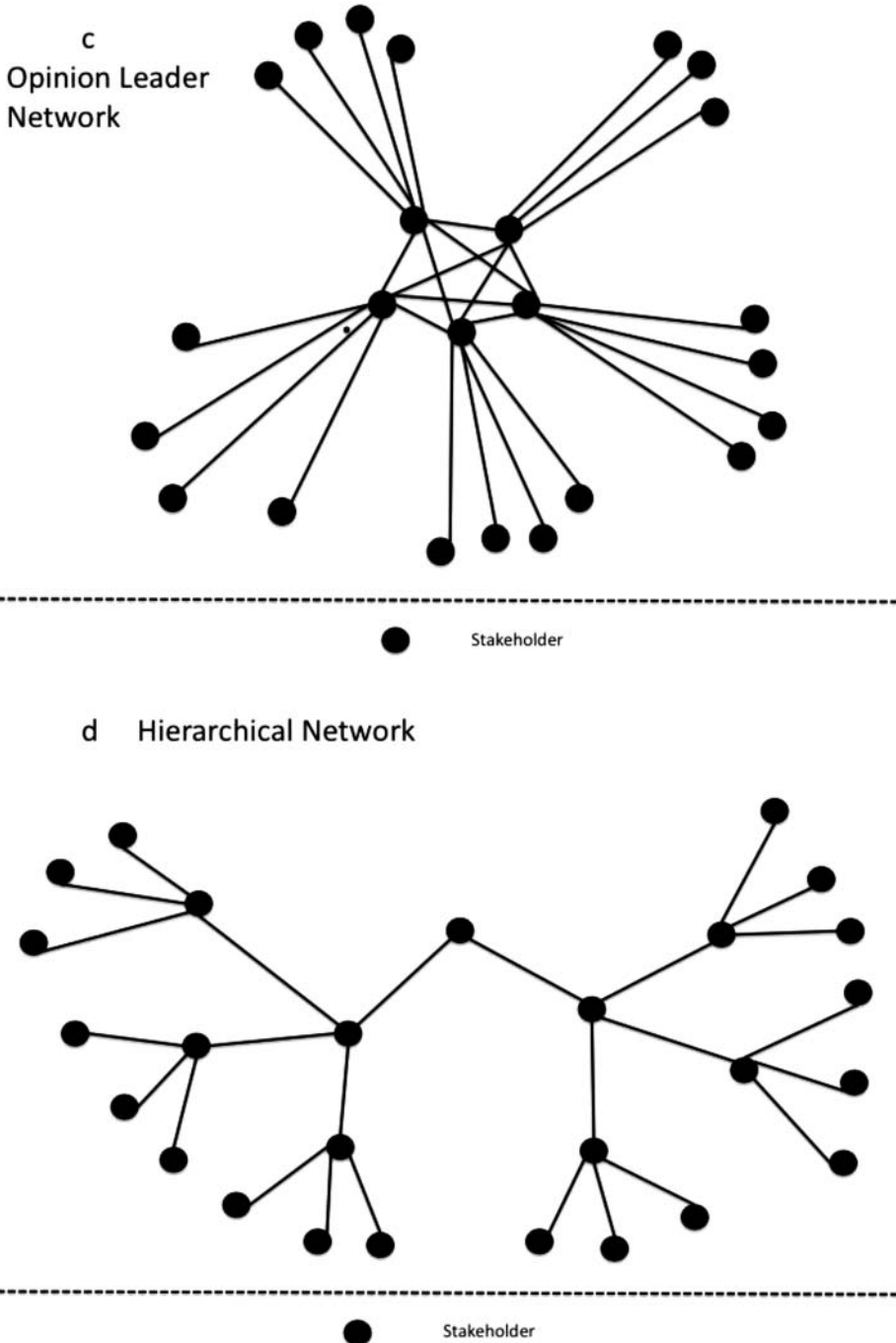


Figure 2. (Continued)

Ansell and Gash 2008; Innes and Booher 2010). Boundary spanning relationships can take many forms, including information and resources, mediating conflict, and informal and formal sharing of responsibility by stakeholders filling a variety of roles (e.g. bridges, brokers, coordinators, liaisons, etc.) (Long, Cunningham, and Braithwaite 2013). Particularly important is the ability of boundary spanners to build trust, facilitate information flows, and foster group learning (Crona and Parker 2012).

2.2 Applying SNA concepts to understand planner involvement in hazard mitigation networks

SNA concepts and tools have been underutilized to understand hazard mitigation and other hazard management networks (NAS 2009; Robins, Bates, and Pattison 2011). In the two cases that follow, I seek to answer research questions related to each of the three structural network characteristics just described. First, I examine the overall structure of the network. Incorporating land use policies into hazard mitigation efforts requires stakeholders to view mitigation planning as more than a process of individual agencies identifying and prioritizing projects that are consolidated into a master agenda or “to-do” list. Instead, stakeholders need opportunities to recognize how land use policies influence the exposure of people and property to hazard impacts and degrade the environmental systems that provide natural mitigation benefits (e.g. wetlands and dunes). Strengthening land use policies often requires broad based political support and coordination with infrastructure location and other agency decisions. Thus, are small world (and village) type networks associated with greater inclusion of land use policies in hazard mitigation plans than hierarchical (and opinion leader) type networks?

Second, I examine the relative centrality and in-degree and out-degree of local planners in hazard mitigation planning networks. Is more central involvement of planners in a hazard mitigation network associated with greater inclusion of land use policies in hazard mitigation plans? Third, I examine whether strong inter-agency connections bridge the expertise boundary between emergency managers and local planners because of the importance of incorporating land use planning approaches into hazard mitigation planning. Thus, are stronger relationships between emergency managers and land use planners – characterized by more frequent communication, greater information and resource sharing, and sharing responsibilities – associated with greater inclusion of land use policies in hazard mitigation plans?

3. Research design and methodology

3.1 Case selection

To illustrate the utility of SNA concepts and techniques for understanding environmental planning networks, I conducted two case studies. While the cases are primarily exploratory in nature, the patterns within and across the cases do point to answers to the three research questions posed above. The dependent variable of interest is the level of integration of land use policies into local hazard mitigation plans, which is one measure of local efforts to reduce natural hazard vulnerabilities, risks, and impacts by steering development out of hazardous areas (Lyles, Berke, and Smith 2014).¹ The independent variables of interest are the network-related characteristics described above – overall structure, centrality of planners, and bridging of the expertise boundary between emergency managers and planners. The cases were selected to account for as many contextual factors as possible.

Table 2. New Hanover County and Onslow County characteristics.

	New Hanover County	Onslow County
County population*	194,732 (first in NC coastal region)	165,435 (second in NC coastal region)
County population growth rate 2000–2010*	26.4%	18.2%
Major city*	Wilmington (population 101,350)	Jacksonville (population 80,542)
Smaller municipalities #	Town of Carolina Beach, Town of Kure Beach, Town of Wrightsville Beach	Town of Holly Ridge, Town of North Topsail Beach, Town of Richlands, Town of Swansboro
Top five hazards of concern #	Flooding, hurricane and coastal storm, wildfire, severe thunderstorm, storm surge	Hurricane and coastal storm, tsunami, tornado, flooding, wildfire
Timing of planning process #	Original Plan 2005 Plan Update 2009–2010	Original Plan 2004 Plan Update 2009

Source: *United States Census (2000, 2010), #New Hanover County (2010), and Onslow County (2009).

Both case counties were selected from the 20 coastal counties in North Carolina, which eliminates the possibility of differences in the cases due to state planning policy contexts. North Carolina was selected because of its long history of requiring coastal land use and hazards planning (Burby and May 1997; Norton 2005).² Of the 20 coastal North Carolina counties, New Hanover County and Onslow County (OC) were selected because they are similar on multiple contextual conditions, including population sizes, population growth rates, primary city sizes, exposure to nearly identical major hazards, and timing of their hazard mitigation planning processes (Table 2).³ These similarities allow the case comparison to account for a number of alternative explanations to the influence of network related characteristics. Contextual differences between the two counties include that New Hanover County (NHC) is a heavily urbanized county with a diversified economic base (New Hanover County 2010), while OC has more of a mixture of urban and rural areas and an economy heavily influenced by a major Marine Corps base (Onslow County Planning and Development Department 2014).

New Hanover County's 346-page hazard mitigation plan was first adopted in 2005 and was updated through a planning process in 2009 and 2010 (New Hanover County 2010). OC's 150-page mitigation plan was first adopted in 2004 and was updated in a planning process that took place in 2009 (Onslow County 2009). In terms of integration of land use approaches into the hazard mitigation plan, New Hanover County's mitigation plan includes six specifically worded, land use related policies (referred to as "Actions" in the plan, in line with FEMA nomenclature), five of which are also included in its 2006 land use plan (Table 3). Not only does New Hanover County have the second most land use policies in a national sample from which the cases were selected, but its policies are among the most innovative (Lyles, Berke, and Smith 2014). Only 10 other jurisdictions in the national sample included provisions related to regulating the density of land use in hazardous areas (Actions 23, 24, and 26) and only one other jurisdiction included a density trade-off or transfer provision (Action 24). Additionally, New Hanover County's policies

Table 3. Land use approaches included in future-oriented mitigation strategies.

County	Land use approaches included by county agencies in future oriented strategy sections of mitigation plans
New Hanover County, NC	<p>“Following a storm event, take advantage of opportunities to acquire or purchase land located in storm hazard areas which are rendered unbuildable or have sustained substantial damage. The property should satisfy objectives including, but not limited to, the conservation of open space and scenic areas and the provision of public water access” (New Hanover County 2010, 9:20)</p> <p>“Declare a moratorium on the acceptance of any request for rezoning in flood prone areas other than rezoning for a less intense use” (New Hanover County 2010, 9:21)</p> <p>“Declare a moratorium on the permitting of any new construction, new utility hookups, or redevelopment construction that would increase the intensity of land use existing in disaster prone areas” (New Hanover County 2010, 9:21).</p> <p>“Limit density to 2.5 units/acre or less in areas classified as conservation on the CAMA land use map (including areas in the 100 year, or 1% annual change floodplain). Develop a program for density tradeoffs to encourage development outside the floodplain” (New Hanover County 2010, 9:22).</p> <p>Implementation responsibility for all four is assigned to county Planning and Zoning.</p>
Onslow County, NC	<p>“Onslow County will rely on its existing ordinances and land use controls to regulate development within the floodplain. These documents will be periodically reviewed and updated” (Onslow County 2009, 25) with implementation responsibility assigned to the Community Development Coordinator.</p> <p>“Adopt a policy to prohibit development of critical public facilities in the 100-year floodplain where viable alternatives exist. Such a policy could be enforced through the County’s floodplain and subdivision ordinances and permit issuance process.” (Onslow County 2009, 26) with implementation responsibility assigned to the County Manager.</p>

are accompanied by specific information about the responsible agency, relevant hazards, potential funding sources, and priority status, although timeframes and estimated costs are only listed as TBD (i.e. to be determined) (New Hanover County 2010).

Onslow County’s plan includes two land use policies (referred to as “strategies” in the plan) (Table 3), which is twice the mean of a sample of hazard mitigation plans from 175 jurisdictions in a national policy evaluation study (Lyles, Berke, and Smith 2014). The policies refer to generic development management provisions and lack specificity about the “existing ordinance and land use controls” and what constitutes a “viable alternative” for critical public facilities. The plan also references the county’s land use plan and notes that “[W]hen reviewing development proposals, the County will work to reduce density in areas susceptible to flooding” and “encourage public purchase of land in the most hazardous areas” but lacks additional detail (Onslow County 2009, 36). Information about how the land use policies will be implemented is limited to identification of a responsible agency and a timeframe identified as ongoing.

To summarize, there is a clear difference in the dependent variable between the two counties. New Hanover County exhibits much stronger performance than OC on integration of land use policies into its hazard mitigation plan, both in terms of quantity

(six vs. two), quality (innovative and stringent vs. generic and weak), and provision of implementation information for the policies (detailed information vs. limited information). Nonetheless, OC's plan outperforms the average jurisdictions' plan from a national sample. In turn, the two cases enable comparison between a very high performing jurisdiction and a moderately well performing jurisdiction, rather than comparing the two extreme cases. The individual cases identify potential relationships among the network characteristics, local community contexts, and the incorporation of land use approaches, while the cross case analysis comparison identifies potential patterns in the network characteristics and relationships (Yin 2008).

3.2 *Data collection and analysis*

Primary data sources included web based surveys, interviews, and content analysis of plans. The primary data source for measuring overall network structure and centrality of planners was web based survey responses, while interview responses were used to measure expertise boundaries between emergency managers and planners and to supplement the descriptions of the planning processes described in the plan documents. In line with this distinction, the description of data collection and analysis is described in two parts. Content analysis consisted of systematic double coding of the land use policies included in the plans (see Lyles, Berke, and Smith 2014) and qualitative analysis of the description of the steering committee and the planning process.

3.3 *Overall network structure and centrality of planners*

To identify the boundary of the network, a positional approach based on a criterion of membership on the official hazard mitigation planning steering committee was used (Marsden 2005). As a result, the sampling frame consists of a census of the committee members, who were identified from official steering committee member lists in the plans. Committee members were surveyed following recommendations for collecting web survey data for network analyses (Marsden 1990 and 2005; Manfreda, Vehovar, and Hlebec 2004; Couper 2008; Dillman, Smyth, and Christia 2008; Vehovar *et al.* 2008). Following pretesting of the survey instrument in counties not included in the final data-set, the survey was administered from July to December 2012. Response rates of individuals still in the network were 62.5% in New Hanover County (20 of the 32 committee members) and 77.8% in OC (7 of the 9 committee members). Missing data due to non-response can be especially problematic for network analysis (Marsden 1990; Doreian and Woodard 1992; Kossinets 2006). Post-survey analysis of the non-respondents indicates that committee members considered essential for answering this study's research questions (e.g. emergency managers and planners) were not among the non-respondents. The network data are deemed suitable to visually represent the overall network structures and to calculate basic measures of centrality. Network statistics that are more sensitive to missing data were not calculated because of the non-responses (Kossinets 2006).

Survey questions to collect network data were modified from previously used surveys of stakeholder networks in the environmental management and policy arena (Lubell, Henry, and McCoy 2010 and Scholz, Berardo, and Kile 2008). Responses to the question "Who have you received information from related to mitigating natural hazards in your community?" were used to generate network diagrams (Appendix 1). Open ended name generator questions rely on respondents' memories to recall their sources of information. Recall approaches are subject to respondents' forgetfulness but tend to expose core

contacts, while targeted prompts can be an effective way to stimulate their memories beyond an open ended name generator (Brewer and Webster 1999; Brewer 2000; Marsden 1990, 2005). Thus, a set of follow-up prompt questions asked respondents to name anyone else that was a source of information within four broad categories of stakeholders organized by social clusters (local government representatives, state and federal government representatives, contractors, academics or other consultants who assisted in plan development, and non-profit and private sector representatives) (Brewer 2000; Marsden 2005) (see Appendix 1). The questionnaire form allowed up to 21 names to be entered, thereby reducing the possibility of artificially reducing the responses and thus biasing the network measurement (Vehovar *et al.* 2008).

To enable network analysis, adjacency matrices were constructed. Relational ties were recorded at the organizational level, including all steering committee organizations and other organizations named by the survey respondents. For organizations represented by multiple individuals, the ties were aggregated. Ties between stakeholders were treated as directed, but unweighted. Visualization of the networks using a Kamada–Kawai algorithm and measurement of degree and betweenness centrality were conducted using the *igraph* and *statnet* packages in the R statistical computing environment (Csardi and Nepusz 2006; Handcock *et al.* 2003).

3.4 Bridging the expertise boundary and planning process

Semi-structured interviews were conducted with key mitigation stakeholders to examine if and how the expertise boundary was bridged, and to obtain background information on the planning process and networks not included in the plans or obtained through the survey (Seidman 2006). Interviews were scheduled with emergency management officials and planning department officials, as well as representatives of other central organizations in the network as indicated by the web based survey data. The interviews were conducted with six individuals from four agencies in New Hanover County, NC, and eight individuals from five agencies in Onslow County, NC, in December 2011 and January 2012 (Table 4). Each of the agencies was on its county's steering committee, with the exception of the Onslow County Planning and Development. Representatives of Onslow County Planning and Development were interviewed to examine the relationship

Table 4. Agencies whose representatives were interviewed.

Jurisdiction	Agencies whose representatives were interviewed
New Hanover County, NC	New Hanover County Emergency Management and 911 Communications New Hanover County Health New Hanover County Planning and Inspections City of Wilmington Zoning Town of Carolina Beach Planning and Development
Onslow County, NC	Onslow County Emergency Services Onslow County Planning and Development Onslow County Geographic Information Systems City of Jacksonville Fire Department Town of North Topsail Beach Planning Department

between OC emergency managers and planners and why the agency was not on the list of official steering committee members included in the plan.⁴

Using a protocol with question prompts (Appendix 1), the semi-structured interviews ranged from less than an hour to two hours. Interview transcripts were digitally recorded, professionally transcribed, and systematically content-analyzed for seven core themes. Core themes relevant to the research questions investigated here included the integration of land use into the mitigation plan, network structure, network composition, bridging the expertise boundary, and local community characteristics. The coded themes were used to examine the bridging of the expertise boundary between emergency managers and planners, as well as corroborate the web based survey findings and supplement the plan description of the planning process. The interview responses reflect emergency manager and planners' perceptions of the network, which can be impacted by their level of participation and experience with the planning process (Mandarano and Paulsen 2011).

4. Findings

This section presents the findings organized by county. The planning process, overall network structure, centrality of planners, and bridging the expertise boundary are each described for New Hanover County. Then, the same is done for OC. Interpretation and comparison of the cases are provided in the discussion section, which follows.

4.1 *Making the Connections in New Hanover County*

The Planning Process

New Hanover County was hit by major hurricanes in the 1990s and participated as a pilot community in FEMA's Project Impact in the late 1990s and early 2000s, which provided funding for mitigation planning and projects (New Hanover County 2010). These experiences laid a strong foundation of capacity and commitment to hazard mitigation planning. After passage of the DMA, planning grant funding allowed the county and partnering municipalities to invest considerable time and resources in the process for developing the plan adopted in 2005, including hiring a national consulting firm to handle the technical analysis and coordination tasks (Interviews with NHC Emergency Management and 911 Communications and NHC Planning and Inspections officials, 2011). By the 2009–2010 update process, decreases in federal and state funding support and fading memories of the 1990s hurricanes had reduced participation by some stakeholders (Interviews with NHC Emergency Management and 911 Communications and NHC Planning and Inspections officials, 2011). Nonetheless, a core group of stakeholders were very active in the 2009–2010 process and local funding was secured to re-hire the consultants, albeit in a more limited role than in 2005 (Interviews with NHC Emergency Management and 911 Communications and NHC Planning and Inspections officials, 2011). The steering committee for the 2009–2010 planning process included 22 public, private, and non-profit entities representing a wide variety of responsibilities and expertise (New Hanover County 2010). Altogether, seven of the committee members were county planning staff or municipal zoning officials, providing expertise in land use approaches to mitigation. The NHC Planning and Inspections Department was represented by five different employees, including its director and long range planning manager, providing decision-making authority in addition to land use planning expertise. Additionally, the consultant firm's project manager for the 2009 update was a certified professional planner (New Hanover County 2010).

NHC overall network structure

Overall, the web based survey responses indicated that the New Hanover County mitigation stakeholder network for the 2009–2010 planning process was relatively large with a highly interconnected core of emergency management, planning, and other stakeholder agencies surrounded by peripheral stakeholder agencies (Figure 3(a)). As shown by the dashed circle, a dozen core stakeholder agencies have multiple ties to other stakeholders in the network, while most of the peripheral stakeholders outside the core have just one or two ties.⁵ The interlaced pattern of ties within the core and complementary ties to a diverse array of peripheral stakeholders aligns with village or small world network structures that support widespread information sharing and group discourse important for incorporating land use policies into hazard mitigation efforts. Further, assessing the direction of the ties in the network indicates that information flows in multiple directions within the core of the network. No one stakeholder is the primary recipient or source of hazard mitigation information. Instead, the pattern of directed ties exposes multiple channels through which information may move about the core of the network.

NHC planner centrality

The web based survey responses indicated that three planning agencies are included in the core of the stakeholder network. In terms of degree centrality, NHC Planning and Inspections (diamond labeled “A” on Figure 3(a)) and City of Wilmington Zoning (diamond labeled “B”) each have four or more connections to other stakeholders, while the Town of Carolina Beach Planning and Development (diamond labeled “C”) has two connections. All three planning agencies are connected to NHC Emergency Management and 911 Communications (triangle labeled “D”), which had connections to 14 of the 36 other organizations, the most of any stakeholder in the network. Additionally, the consultant (circle labeled “E”), which was represented by a certified planner, had connections to NHC Emergency Management and 911 Communications and NHC Planning and Inspections, as well as to City of Wilmington Zoning. The somewhat central positions of planning agencies offered opportunities to advance land use policies as important components of New Hanover County’s mitigation efforts. In terms of directional ties, NHC Emergency Management and 911 Communications’ in-degree (seven ties) and out-degree (eight ties) are balanced, suggesting that it facilitates the transfer of information within the network rather than serving simply as a consolidator of information. Meanwhile, NHC Planning and Inspections has a higher out-degree (four ties) than in-degree (one tie), suggesting that its role in distributing information in the network is somewhat limited. Betweenness centrality analysis indicates that NHC Emergency Management and 911 Communications has the highest betweenness centrality (84.5), followed by Wilmington Zoning (24.0) and NHC Planning and Inspections (17.0), with no other organizations having a score above 10.0.⁶ While the emergency managers are clearly the most central officials in the network, the Wilmington and New Hanover County planners have valuable positions for facilitating information flows.

NHC bridging the expertise boundary

In the semi-structured interviews, NHC Emergency Management and 911 Communications officials and NHC Planning and Inspections officials both indicated the existence of strong connections between the agencies dating back at least as far as the

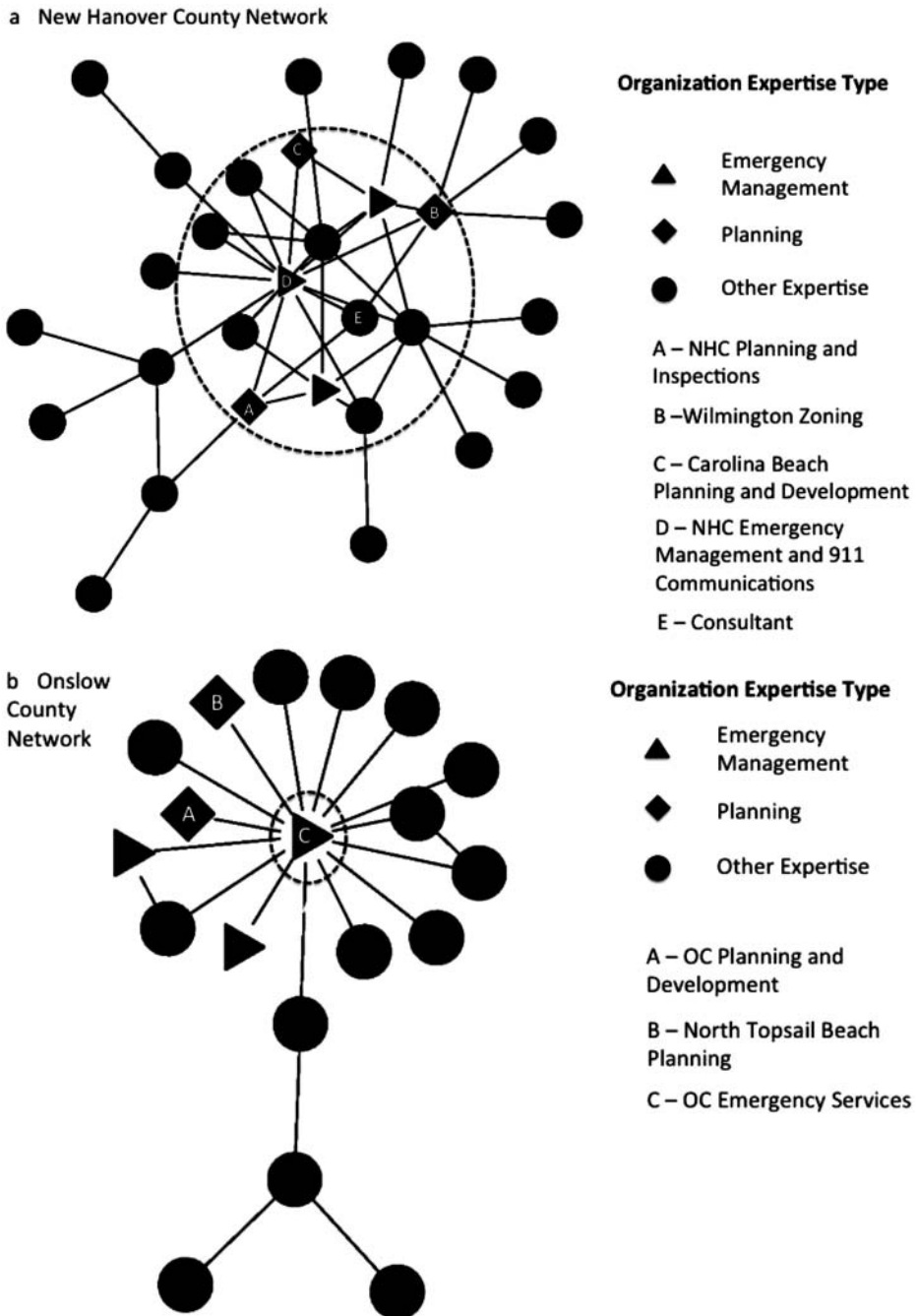


Figure 3. New Hanover County and Onslow County stakeholder networks (generated from survey responses; isolates not shown) a) New Hanover County Network and b) Onslow County Network.

hurricanes of the 1990s (Interviews with NHC Emergency Management and 911 Communications and NHC Planning and Inspections officials, 2011). The connections were strengthened during the Project Impact period and have been maintained since.

Notably, staff from the two agencies shared responsibility for leading the planning process. For emergency managers, local planners were “a critical piece of the puzzle” (Interview with NHC Emergency Management and 911 Communications officials, 2011). Likewise, county planners described emergency management staff as their closest partner on mitigation issues (Interview with NHC Planning and Inspections officials, 2011). Additionally, Wilmington and Carolina Beach zoning officials served as their municipalities’ point-people for mitigation planning, thereby establishing additional bridges across the emergency management – land use planning expertise boundary.

4.2 Tenuous ties in Onslow County

The planning process

As was the case in New Hanover County, the barrage of hurricanes that struck North Carolina in the 1990s increased attention to all types of emergency planning in OC (Onslow County 2009). However, unlike New Hanover County, OC was not part of Project Impact and mitigation planning did not begin until federal planning grant support was provided to develop its 2004 DMA compliant hazard mitigation plan (Interview with Onslow County Emergency Services officials, 2011). An independent consultant was contracted to assist with the development of the 2004 plan (Interview with Onslow County Emergency Services officials, 2011). However, Emergency Services agency staff were dissatisfied with the consultant because, as indicated in an interview, the plan “was not driven enough by the needs of the county” (Interview with Onslow County Emergency Services officials, 2011). For the 2009 plan update process, external planning grant funds were not available and the county chose to give a college intern lead responsibility for the plan. This decision economized the use of limited resources and built the agency’s capacity, as the intern was subsequently hired and rose to a management position (Interview with Onslow County Emergency Services officials, 2011). The intern, who did not have land use planning training, used the 2004 plan as the template for the 2009 plan. The steering committee for the 2009 planning process consisted of nine local government organizations, including those with responsibilities and expertise in emergency management, planning, Geographic Information Systems, and municipal administration (Onslow County 2009). A small municipality, the Town of North Topsail Beach, was represented by its land use planner. Clearly, in comparison to New Hanover County, land use planning expertise was much more limited on Onslow County’s mitigation committee.

OC overall network structure

Overall, the web based survey responses indicated that the OC mitigation stakeholder network involved in the 2009–2010 update process was relatively small, with almost all of the connections in the network concentrated on OC Emergency Services (Figure 3(b)). The only stakeholder agency in the core of the network is OC Emergency Services, while all other stakeholders are in peripheral positions. The concentration of almost all connections in the network with the county emergency management agency is emblematic of an opinion leader network characterized by preferential attachment. The direction of the ties indicates that there are very few opportunities for information flow in the network, except those provided through the OC Emergency Services agency. This structure can be quite effective for consolidating and distributing information, but it provides few opportunities for group discourse important for considering and promoting more aggressive and stringent land use policies to more effectively steer development out of hazardous areas.

OC planner centrality

The web based survey data indicate that two planning agencies are included in the OC mitigation stakeholder network. Onslow County Planning and Development (diamond labeled “A” on Figure 3(b)) and Town of North Topsail Beach Planning (diamond labeled “B”) each had just one connection, and in both cases it was as a source of information for OC Emergency Services (triangle labeled “C”). Neither agency had any other connections. By comparison, OC Emergency Services was directly connected to 15 of the 18 other organizations in the network. Its in-degree was 14 and its out-degree was 2, meaning that the agency functions much more as a consolidator of information than a facilitator of information flows between stakeholders. OC Emergency Services was the only organization in the network to have a non-zero betweenness score (25.0), which further confirms its central role in information consolidation and distribution in the network.⁷

OC bridging the expertise boundary

The expertise boundary between emergency managers and planners has been bridged in Onslow County, but the connections have been weak and unstable (Interviews with Onslow County Emergency Services and Onslow County Planning and Development officials 2011). In the late 2000s, there were three different emergency management agency directors and two planning agency directors (Interviews with Onslow County Emergency Services and Onslow County Planning and Development officials 2011). These transitions contributed to limited priority being placed on mitigation planning (Interview with Onslow County Emergency Services officials 2011). In terms of involvement of municipal planners, the North Topsail Beach planner provided a link to county emergency managers (Interviews with Onslow County Emergency Services and North Topsail Beach officials 2011). Interviews made it clear, though, that the Town, which is separated from Jacksonville and much of the rest of the county by the Marine Corps base, handles most of its hazard mitigation and land use planning in isolation from the county. The OC Planning and Development official who has the most involvement with hazard mitigation planning has a professional background in emergency management and worked more on code enforcement than on managing development patterns through land use planning (Interview with Onslow County Planning and Development officials 2012).

In discussing a recent reorganization of OC Emergency Services, one emergency management official expressed a view of mitigation planning primarily as a technical data gathering exercise rather than a collaborative discourse (Interview with Onslow County Emergency Services officials, 2011). The administrator stated that:

I don't know how any emergency management organization can really operate without a true planner . . . who can sit down with the document, close the door, shut the rest of the world out, read through it and find out the major parts that need to be pulled from and write. (Interview with Onslow County Emergency Services officials, 2011)

This supportive, but narrow and technocratic, conception of the process of planning and the role of a “true planner” by OC Emergency Services administrators is particularly important, because in an opinion leader network the views of the central stakeholder can easily dominate. From the perspective of advancing land use planning approaches to reduce natural hazard risks, another important view that OC Emergency Services officials

expressed was a reluctance to engage more land use oriented stakeholders in mitigation planning because of a concern that addressing, zoning, and other land use policies would introduce conflicts about balancing regulation for public welfare and property rights (Interview with Onslow County Emergency Services officials 2011). They wanted to ensure that hazard mitigation efforts could remain focused on traditional public safety issues (Interview with Onslow County Emergency Services officials 2011). In essence, OC Emergency Services officials viewed OC Planning and Development and its planning processes as buffers against the politicization of the county's mitigation efforts and the structure of the OC Emergency Services led hazard mitigation planning network reinforces this role for planners.

5. Discussion

The New Hanover County and OC cases demonstrate the value of SNA concepts and techniques for understanding the importance of planner involvement in planning networks led by other professions. New Hanover County's network is consistently stronger on the characteristics expected to be more conducive to incorporation of land use policies into mitigation efforts than OC's network. OC's smaller network is emblematic of an opinion leader structure that limits opportunities for the types of discourse and joint problem solving needed to engage the political and coordination issues fundamental to reducing hazard risks through more innovative and stringent land use policies (Innes and Booher 2010; Siegel 2010).

5.1 Implications: network structure

New Hanover County's larger network is much closer to a village or small world structure that provides just those types of opportunities (Siegel 2010). The emergency managers leading New Hanover County's network had more of a balance of in-degree and out-degree than OC, suggesting that New Hanover County emergency managers fill more of a facilitator role in the distribution of information while OC emergency managers fill more of a consolidation of information role (Berardo and Scholz 2010). The emergency management organization's role in New Hanover County network aligns more with the concept of a bridging organization that seeks to facilitate the flow of information and promote group learning among stakeholders (Crona and Parker 2012; Long, Cunningham, and Braithwaite 2013). The technocratic approach taken by the OC emergency management agency, coupled with using the planning agency as a buffer against politicization of mitigation planning, may be reactions to the costs of serving as the sole mitigation planning broker in the county network (Long, Cunningham, and Braithwaite 2013).

Planners should consider insights drawn from the network analysis and political science literatures on how different network structures can enable or constrain discourse and joint problem solving (e.g. Watts and Strogatz 1999; Newman 2003; Berardo and Scholz 2010; Siegel 2010). Practically speaking, relatively simple web based surveys and interviews like those used in this study can be employed to map out the networks. Then, planners can leverage their skills as mediators, facilitators, consensus builders, conveners, and shapers of attention to strengthen the overall structure of their networks. More research is needed to understand how planners and other officials responsible for planning processes can intentionally and effectively "weave" together stronger network structures in this manner (Krebs and Holley 2006; Dempwolf and Lyles 2012).

5.2 *Implications: bridging the expertise gap and centrality*

As evidenced in the shared responsibility for mitigation planning in New Hanover County, the leadership turnover in OC, and the comments made in interviews, New Hanover County's planners also had stronger and more stable connections to emergency managers than OC's planners. The strong, stable interdisciplinary connections between New Hanover County's planners and emergency managers have been crucial because even as participation of peripheral stakeholders waned over time, incorporation of land use policies into mitigation efforts remained strong. Finally, New Hanover County planners were in more central positions than the OC planning agency representative. Not only were New Hanover County planners more centrally involved, but there were multiple planning agency representatives in comparison to just one in OC. Moreover, the New Hanover County planners brought valuable land use expertise and decision-making authority, which was not the case in OC. Although the purposes of comparing these cases were exploratory and illustrative, rather than causally oriented, the fact that New Hanover County's comparative strong network structural characteristics align with its strong integration of land use policies in its hazard mitigation plan, while OC's network structural characteristics and integration of land use policies were weaker, suggests that the relationship between network structure and planning outputs merits further investigation.

Deeper understanding by planners and other officials of if and how individuals and agencies are in central positions, and bridge boundaries in the planning process can help ensure that key areas of expertise are not absent or marginalized in planning processes (Schneider *et al.* 2003). Expertise boundaries between emergency managers and planners have received limited attention in the literature to date (Kartez and Faupel 1994). The strong ties observed in New Hanover County are similar to those advocated for, and observed, in the recent case studies emphasizing the importance of linking expertise in emergency management and land use planning (Godschalk 2010; Schwab 2010). A key topic for exploration is what factors (e.g. individual stakeholder knowledge, attitudes, and competing responsibilities and organizational priorities and structures) contribute to the formation and strengthening of connections across professional disciplines.

5.3 *Additional implications: external support*

Local planners and environmental managers can leverage external funding to build their local network. In the New Hanover County case, Project Impact was an important catalyst for strengthening the mitigation network, which also fits with the previous research that found the federal National Estuary Program that has built local network capacity (Schneider *et al.* 2003; Mandarano 2009). Not only should local officials think of projects funded through external grants as opportunities to build networks, but so too should federal and state officials responsible for approving and distributing such grants. In the coming years, it will be interesting to see if FEMA's recent network oriented Whole Communities initiative can effectively induce and support local planning capacity and commitment building efforts similar to those that occurred in New Hanover County (FEMA 2011).

6. Conclusion

This research calls attention to the importance of land use planner involvement in planning processes led by non-planners who often lack expertise in, or responsibility for,

land use planning. It illustrates the importance of considering planner involvement in the context of stakeholder networks with diverse memberships and distinct structures. Three structural characteristics of networks drawn from the field of SNA have been used to illustrate how planner involvement in the networks can vary theoretically and in practice. The two cases described here, while exploratory in nature, support an argument that greater integration of planners in stronger networks can contribute to greater incorporation of land use planning approaches into planning domains led by other professions. In particular, New Hanover County's higher level of integration of land use planning approaches into its natural hazard mitigation planning efforts, as compared to neighboring OC, points to the importance of strong interdisciplinary connections across the planning emergency management expertise boundary.

This paper contributes to the body of collaborative planning literature that holds that involvement of a diversity of stakeholders with interdependent interests can generate network power that can be leveraged individually and collectively (Booher and Innes 2002; Innes and Booher 2010). It adds to the body of studies demonstrating the utility of SNA for deepening our understanding of environmentally oriented planning processes (Dempwolf and Lyles 2012). Substantively, these hazard mitigation related findings may also be relevant in transportation planning and other planning domains where planners need to work to bridge interdisciplinary expertise boundaries in networks for which they do not have lead responsibility. The findings may be especially relevant to climate change adaptation planning, wherein planners have uncertain roles, and environmental scientists who typically lead the planning processes are often disconnected from emergency managers who typically have responsibility for reducing the risk from disasters that climate change exacerbates (IPCC 2007).

A key challenge in future analyses will be generating network data that can be used in quantitative analyses, which will likely require complementing subjective measures of networks (i.e. measures from surveys and interviews) with objective measures of networks (i.e. documented communications, resources shared, and formal partnerships and agreements). Additionally, future research aimed at explaining the influence of planner involvement in stakeholder networks on planning outputs – such as the generation of social capital, the quality of local plans, and implementation of local plans – will need to address factors previously identified in the literature. In the context of natural hazards planning factors that must be addressed include the state planning policy context (Berke and French 1994; Burby and May 1997; Deyle and Smith 1998), local community characteristics (Berke *et al.* 1996; Burby and May 1997; Brody 2003), and characteristics of the planning process (Burby 2003; Brody, Kang, and Bernhardt 2009, Lyles, Berke, and Smith 2014).

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Notes

1. Numerous other measures of local land use planning efforts to reduce natural hazards vulnerability, risk, and damages could be used to further explore this topic, including implementation oriented measures such as enforcement effort dedicated to enforcing land use policies, permit compliance with land use plans, and actual changes in land use patterns due to development.
2. Since 1974, North Carolina's Coastal Area Management Act (CAMA) required 20 coastal counties and the municipalities therein to maintain local land use plans. The plans are reviewed for consistency with state guidelines (Burby and May 1997). Attention must be paid to hazard mitigation, emergency evacuation, and post-disaster recovery in the land use plans. In terms of mitigation planning, North Carolina has entrusted local officials with latitude to shape their plans' balance of projects (e.g. discrete structural or property protection actions), programs (e.g. wide reaching education and outreach initiatives), and regulations (e.g. policy oriented land use approaches) (Lyles, Berke, and Smith 2014).
3. The contextual information about counties and planning processes are provided as background for understanding the stakeholder network characteristics observed in the cases. This paper is not intended to explain the factors that led to the observed stakeholder network characteristics, although that is an important topic for further research.
4. Because the OC Planning and Development department was not listed as being represented on the plan steering committee (Onslow County 2009), none of its officials were requested to complete the web based survey used in generating the network diagrams. It is possible that responses from an OC Planning and Development official would have altered the network structure and centrality measures, as would be the case if any officials representing an organization not on the steering committee were surveyed.
5. Examples of peripheral stakeholder organizations include the New Hanover County Sheriff's Department, Wilmington Fire Department, and the University of North Carolina at Wilmington, as well as state and federal agencies such as North Carolina Public Health and the Centers for Disease Control.
6. Betweenness centrality scores are scaled relative to other nodes in the same network and thus cannot be compared across networks.
7. See note 6.

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Appendix 1: Survey and interview questions

Survey questions

"Who have you received information from related to mitigating natural hazards in your community? For each person, please type in the individual's first and last name and organization to the best of your ability. If you only remember a name or an organization, please enter what you can remember.

Nine open-ended response slots provided

"In ADDITION to the people you have just listed, did you receive any information related to mitigating natural hazards in your community from individuals representing any of the following categories? If so, please type in the individual's name and organization to the best of your ability."

Three open-ended response slots provided for each of the following prompts:

Local government (for example, departments, agencies, bureaus or offices)?

State and/or Federal government (for example, departments, agencies, bureaus or offices)?

Private contractors, academics, or other professionals who consulted on developing the plan?

Non-profit or private sector organizations?

Interview questions

Hazard mitigation stakeholder network questions

Can you begin by talking about who you work with most closely on hazard mitigation?

I'm curious about how you see yourself in the hazard mitigation network. Do you see yourself as being in a very central position or more on the edge or periphery?

Do you see yourself as serving as a bridge between different groups involved in hazard mitigation?

We've talked about your connections to other stakeholders and different positions in the network.

Next, I'd like you to please think a bit more broadly about the full network of people involved in hazard mitigation planning in [insert] county. Would you describe the network as large or small? Well connected or disconnected? Active or inactive?

How did the [insert] county hazard mitigation network develop in the first place? How has it evolved over time?

The last network question focuses on the hazard mitigation planning process. Could you briefly describe the roles of each of these groups in the hazard mitigation planning process: emergency managers, land use planners, consultants, elected officials? Are there any other groups that played major roles?

Implementation questions

What, if any, hazard mitigation actions are you currently working to implement?

Does your community use land use approaches to mitigate hazards? If so, can you please describe those efforts and your involvement?

Can you update me on the progress made on the following action included for your community in the [county] plan? Are they completed, in progress, not yet started, or eliminated? [insert list of actions from hazard mitigation plan, focusing on land use related actions and actions the subject is designated as being responsible for].