

# Social Network Analysis of Incorporation of Land Use Approaches into Local Hazard Mitigation Plans

## Author

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Effective planning to reduce long-term risks from natural hazards, termed hazard mitigation, requires involvement of stakeholders with diverse expertise and resources. If and how mitigation stakeholders are linked together in networks that facilitate information sharing and collaboration may play a critical role in creating and implementing better mitigation plans. This study uses Social Network Analysis (SNA) concepts and techniques to examine the influence of involvement of local planners in mitigation planning processes on inclusion of land use approaches in Disaster Mitigation Act of 2000-compliant mitigation plans. DMA-compliant local hazard mitigation plans are developed through participatory processes that are typically led by emergency managers.

## Research Questions

- (1) Does inclusion of local planners in more central positions in stakeholder networks lead to greater use of land use approaches in mitigation efforts?
- (2) Do stronger connections between emergency managers and local planners in stakeholder networks lead to greater use of land use approaches in mitigation efforts?
- (3) Do structures of stakeholder networks that support collaboration lead to greater use of land use approaches in mitigation efforts?

## Methodology

*Case Selection:* Four in-depth case studies were conducted of four counties' (populations >100,000) mitigation planning efforts conducted in 2009 and 2010. The cases varied in the basic characteristics of the counties' mitigation stakeholder networks. The case counties were in two states with different priorities for local mitigation: Florida (rigid and project-oriented) and North Carolina (flexible and comprehensive).

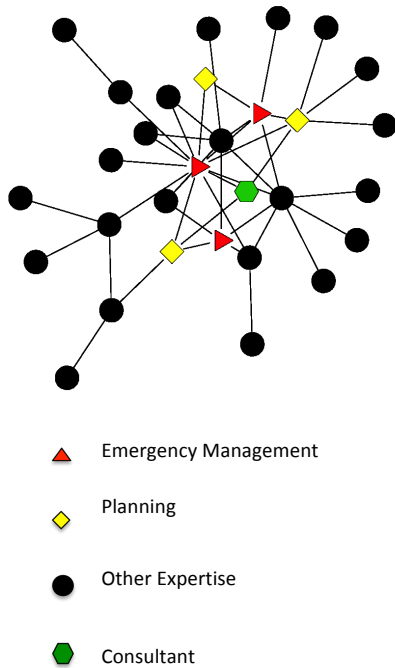
*Data Collection:* Web-based surveys of mitigation planning committee members conducted in 2011 (n=58), with response rates between 62.5% and 77.8%, were used to generate network structure diagrams. Semi-structured interviews with more than 20 key stakeholders were conducted in person or over the phone and were transcribed and analyzed for core themes related to networks, planning outputs, and planning processes. Hazard mitigation plans and related components of comprehensive plans were reviewed and in-person site visits were conducted.

*Cross-Case Analysis:* analytical methods included explanation building of linkages between network characteristics and planning outputs within individual cases and pattern matching of trends across the four cases.

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## Individual Case Findings – North Carolina

### MAKING THE CONNECTIONS IN NEW HANOVER COUNTY

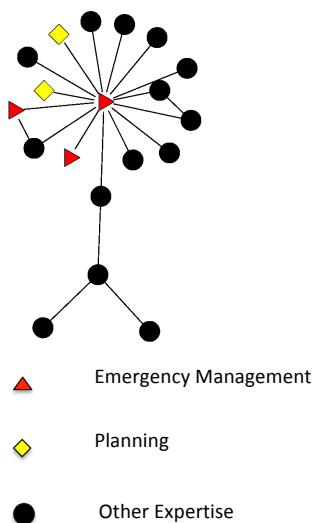


The New Hanover County network diagram (generated from survey responses and shown at left) shows a network with features supportive of collaboration across expertise boundaries. It had a core group of stakeholders highly inter-connected to each other (the red triangles, yellow diamonds, black circles and green hexagon in the middle), surrounded by peripheral stakeholders with fewer connections. Within the network core, both emergency managers and planners were in central positions. In interviews, county emergency managers and planners indicated that they have strong ties to each other, including co-leading mitigation planning dating back to participation in FEMA’s Project Impact in the late 1990s.

The network features, particularly the strong emergency manager-planner ties, have facilitated the integration of land use approaches throughout the mitigation plan. The land use approaches include multiple innovative policies, such as density limits in hazardous areas. Additionally, ongoing collaboration supports solid progress in implementation of land use approaches to hazard mitigation that are linked to open space preservation, sustainable development, and other community goals.

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### TENUOUS TIES IN ONSLOW COUNTY



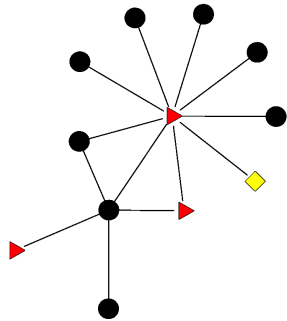
The Onslow County network diagram (generated from survey responses and shown at left) shows a network with features that limit collaboration across expertise boundaries. Almost all connections in the network were centered on the county emergency management agency (red triangle in middle). Planning agencies were in peripheral positions and peripheral stakeholders had few interconnections. Additionally, interviews identified weak ties between county planners and emergency managers due in part to high turnover in leadership positions in recent years.

The network features have constrained success in using land use approaches to reduce hazard risks. While land use approaches were integrated throughout mitigation plan, they were disorganized and consisted of business-as-usual continuation of permissive regulations. Staff turnover and weak connections between emergency managers and planners have encumbered efforts to systematically integrate land use approaches into mitigation planning and advance more stringent land use approaches.

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## Individual Case Findings - Florida

### STRONG BUT STOVE-PIPED IN MARTIN COUNTY



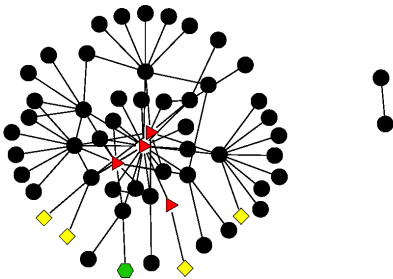
- ▲ Emergency Management
- ◆ Planning
- Other Expertise

The Martin County network diagram (generated from survey responses and shown at left) also shows a network with features that limit collaboration across expertise boundaries. Almost all connections in the network were centered on the county emergency management agency (red triangle in middle) and the only planning agency was in a peripheral position. Interviews identified weak ties between county emergency managers and county planners. The weak ties were due in part to local officials viewing hazard mitigation planning as an agency-by-agency process of prioritizing discrete capital projects eligible for federal disaster grants. These views reflect the State of Florida’s rigid, project-oriented approach for local mitigation.

Martin County has a strong land use planning tradition, but network weaknesses constrained opportunities to deeply integrate it with hazard mitigation planning. The local political climate has been resistant to high-density development and planners have enforced stringent land use policies. Yet, land use enforcement has taken place in isolation from the mitigation efforts of emergency managers and mitigation benefits from the land use policies have been largely incidental. Weak ties have limited opportunities to identify how existing land use approaches could be strengthened as part of comprehensive, future-oriented mitigation strategy.

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### MORE IS LESS IN BREVARD COUNTY



- ▲ Emergency Management
- ◆ Planning
- Other Expertise
- ◆ Consultant

The Brevard County network diagram (generated from survey responses and shown at left) illustrates the largest and most hierarchical network of the four cases. A core of group of county, state and federal emergency management agencies (red triangles in the middle) are surrounded by a tier of stakeholders that function as bridges (black circles around the emergency management agencies) to a tier of peripheral stakeholders (the fan-shaped sets of stakeholders along the edges of the diagram.) Notably, planning agencies are located only in peripheral positions. Interviews indicated weak ties between county emergency managers and planners, due in part to substantial cuts to the planning department.

The large, hierarchical network structure with limited planner involvement contributed to limited integration of land use approaches into mitigation efforts by limiting opportunities for collaboration and consideration of land use approaches. The county’s mitigation plan is exceedingly long, at 1,822 pages, is disjointed, and includes very limited integration of land use approaches. Instead of a comprehensive mitigation strategy, it focuses instead on long wish lists of discrete projects eligible for federal funding, in line with the approach promoted by the State of Florida. Further, the county struggles to enforce existing land use regulations in the face of a pro-development political climate.

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## Cross-Case Findings

***Central involvement of local planners and strong ties to emergency managers can have a positive influence:*** More central involvement of local planners and stronger ties to emergency managers can contribute to greater integration of land use approaches into hazard mitigation plans and more implementation of land use approaches.

***Network structures supportive of collaboration can have a positive influence:*** A balance of strong connections between core stakeholders and bridging connections to peripheral stakeholders can support opportunities for information sharing and collaboration across expertise boundaries. This balance appears to be important for crafting comprehensive mitigation strategies, including land use approaches.

***A flexible state policy approach for coordinating local hazard mitigation planning can positively influence attention to land use approaches.*** Florida's rigid, project-oriented approach to coordinating local hazard mitigation planning has focused attention on securing post-disaster federal funding. This approach is reactive and de-emphasizes integrating land use approaches into hazard mitigation plans and ongoing implementation. North Carolina's more flexible approach encourages pursuit of a more comprehensive array of mitigation approaches, including land use policies.

## Implications for Practice

Based on these findings, the following recommendations are offered:

- **Federal and state mitigation officials need to be more proactive in building local capacity and commitment.** Efforts to implement FEMA's new network-oriented 'Whole Communities' initiative (<http://www.fema.gov/whole-community>) need to pay particular attention to involving local planners in mitigation stakeholder networks.
- **Local emergency managers should increase efforts to involve local planners for all participating jurisdictions.** Local planners should in turn reciprocate through active participation.
- **Mitigation officials at all levels need to be highly cognizant of the state policies that increase inclusion of land use policies in mitigation plans.** Federal and state officials need to assess existing state policy approaches to coordinating local hazard mitigation planning. They need to consider how to better target efforts to build local commitment and capacity.
- **Federal officials need to shift their efforts to implement the Disaster Mitigation Act more towards a pro-active approach.** FEMA guidance and review processes need to place more emphasis on local communities developing comprehensive mitigation strategies including land use approaches, rather than narrow lists of federally-fundable post-disaster projects.

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## Additional Information

The full version of this publication and research summaries for other publications are available at: <http://hazardscenter.unc.edu/mitigation-planning/> and at <http://www.ie.unc.edu/cscd/projects/dma.cfm>.

More about the Coastal Hazards Center and its work can be found at <http://hazardscenter.unc.edu>. More about the Institute for the Environment and its work can be found at [www.ie.unc.edu](http://www.ie.unc.edu).

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