

BERKE, TAMU
DHS Coastal Resilience Center

Research Project:

Annual Project Performance Report

Covers reporting period July 1, 2016 – June 30, 2017

1. Project Title:

Local Planning Networks and Neighborhood Vulnerability Indicators

2. Principal Investigator / Institution:

Philip Berke/Texas A&M

Galen Newman, Assistant Professor, Texas A&M; Supervise digital mapping, visualization.

Walter Peacock, Professor, Texas A&M; Develop indicators, analysis of indicator data,

report research; Texas Target Communities (engagement coordinator), Texas A&M

University; lead and supervise all end user engagement activities.

3. Other Research Participants/Partners:

Jaimie Masterson, Texas Target Communities at Texas A&M

4. Short Project Description (“elevator speech”):

We develop a *plan integration for resilience scorecard* and user guidelines to assist local planners and emergency managers to integrate disaster risk into planning in all relevant sectors of urban development. Failure to coordinate networks of plans can significantly increase risks to disaster events. We apply the *scorecard* in nine coastal cities to evaluate the level of integration (and conflict) of local plans and the degree to which the network of plans targets areas most vulnerable to hazards.

5. Abstract:

Problem. Fragmentation of mitigation among the diverse range of sectors of planning has led to siloes in which mitigation planning is isolated from other planning. When plans do not consistently integrate mitigation they can actually increase the vulnerability of people and the built environment to hazards and climate change. Failure to coordinate integration of multiple planning activities that govern land use in hazard areas has become a national policy concern. This was acknowledged by the Federal Emergency Management Agency director Craig Fugate’s call for more integration of hazard mitigation efforts into all types of local planning and more cooperation between emergency managers and planners (see, Fugate, W. C. 2010 “Integrating Hazards into Local Planning,” Foreword to Hazard Mitigation: Integrating Best Practices into Planning, James Schwab, editor, Planning Advisory Service Report 560, American Planning Association, Chicago, IL, 2010: iii-iv).

Methods. We will initially review the literature in hazard mitigation planning to identify how mitigation can be supported through different types of local planning activities (economic development, land use, capital improvement programs, environment) that influence land use and development patterns in hazard areas. We then develop a conceptual framework to guide

the creation of a *plan integration for resilience scorecard* (PIRS) that consists of two sets of indicators that measure the spatial variation of a community's social vulnerability and physical vulnerability, and how well a local network of plans are aimed at vulnerability reduction. Next, we apply the scorecard to a set of nine demonstration coastal communities to test the applicability of the scorecard in determining how well the network of local plans support mitigation, and how well they are spatially correlated with variation in local vulnerability to coastal floods and projected sea level rise.

Deliverables

- A guidebook on application of the *plan integration for resilience scorecard* for local mitigation practitioners.
- Publications in peer reviewed journals.
- Research summary (2-3 pages) for each publication to be targeted to broad audience of end users.
- Conference presentations and webinars.
- Update of mitigationguide.org website supported by DHS to include the scorecard guidebook, and best practice examples of application of the tool in local jurisdictions.

6. End users:

We are engaging end-users through creation of a National Advisory Committee, direct contact with FEMA and NIST officials, and involvement of local government staff in the demonstration communities.

We have recruited and convened a National Advisory Committee to strengthen partnerships and collaborations with the practice community and to ensure the applicability of the scorecard for mitigation practitioners. Members include key leaders in the practice community:

- Chad Berginnis, Director, Association of State Floodplain Managers
- Nat'l Coordinator for Community Recovery Planning & Branch Chief
for Community Planning and Capacity Building of the Interagency Coord. Div., FEMA
- Jennifer Ellison, Community Development Coordinator, City of Urbandale, Iowa
- Allison Hardin, Urban Planner, City of Myrtle Beach, SC
- Barry Hokanson, Director, Hazard Mitigation and Disaster Recovery Division of the
American Planning Association & Mitigation Planner, PLN Associates
- Darrin Punchard, Mitigation Planner, Hawksley Consulting
- Gavin Smith, Exec. Director, Coastal Resilience Center, University North Carolina
- Michele Steinberg, National Fire Protection Association, Wildfire Division Manager
- Rich Roths- URS Corporation, Principal Planner

The Committee meets about once every 4-months via teleconference with project investigators. To date the Committee has met five times. Committee members offer guidance to the development of the *plan integration for resilience scorecard* and guidebook for local mitigation practitioners, assist with dissemination of project results, and provide oversight and strategic advice to the research and translational activities. The Committee also

serves to enhance communication between the project researchers and the practice community.

FEMA is the primary end user for this project. Our point of contacts are in the FEMA Risk Analysis Division, Assessment and Planning Branch, Mitigation Planning Program and FEMA Community Planning and Capacity Building Recovery Support Function informed them of our progress during the Hazard Mitigation and Disaster Recovery Division meeting at the American Planning Association Conference in May 2017. In addition, the Risk Analysis Division stakeholder serves on our National Advisory Committee. We keep in regular communication with our OUP Program Manager about progress of this study through emails, conference calls, and preparation of a brief research summary report.

We are conducting engagement efforts with three of the nine demonstration communities in League City, Texas (Key contact: Marc Linenschmidt, Planning and Development Department); Norfolk, Virginia (Key contacts: Paula Shea, Principal Planner; George Homewood, Director of Planning & Community Development); and San Luis Obispo, CA (Key contact: Michael Codron, Director of Community Development). It is the local community where all aspects of planning that influences land use and development come together. We engage local agency staff and in some cases non-governmental actors charged with responsibilities for planning. Local entities include, for example, emergency management, land use planning, housing, utilities, transportation, economic development, and environmental conservation. These end users are typically charged with preparing, updating and reviewing the diversity of local plans that influence land use and development in hazardous areas.

Finally, we have started the process of institutionalizing the plan integration scorecard. This fall-2017 we will initiate a fourth demonstration community – a collaborative project with NIST in Annapolis, MD, a HUD entitlement community, which we hope can be sustained in the long-term. We will work with NIST in combing NIST's *Resilience Planning Guidebook* and the Texas A&M *plan integration for resilience scorecard*. NIST is committed to our scorecard as part of its major program aimed at facilitating local government action in support of hazard mitigation. Presentation of the emerging partnership between NIST and Texas A&M investigators will be discussed on a panel this July at the Hazards Workshop in Broomfield, CO). If our project is extended, we will seek to strengthen our partnership with NIST based on additional community demonstration projects. We will also aim to build similar partnerships with other federal agencies, notably HUD's CDBG-Disaster Recovery program and FEMA's CRS program.

7. Unanticipated Problems:

No unanticipated major problems.

8. Project Impact:

We are working on two sets of impacts that focus on working with the demonstration communities and institutionalizing application of the scorecard at the national, state and local levels.

Demonstration Communities

Use of the plan integration scorecard by the three demonstration communities aims to improve planning for hazards by allowing planners from multiple community agencies to identify conflicts between plans and missed opportunities to mainstream mitigation into multiple sectors of planning, and assess whether plans target areas that are most vulnerable.

In our work in applying the scorecard in the three demonstration communities we are tracking four types of impacts likely to occur at different stages of the plan review and implementation process (see Figure 1):

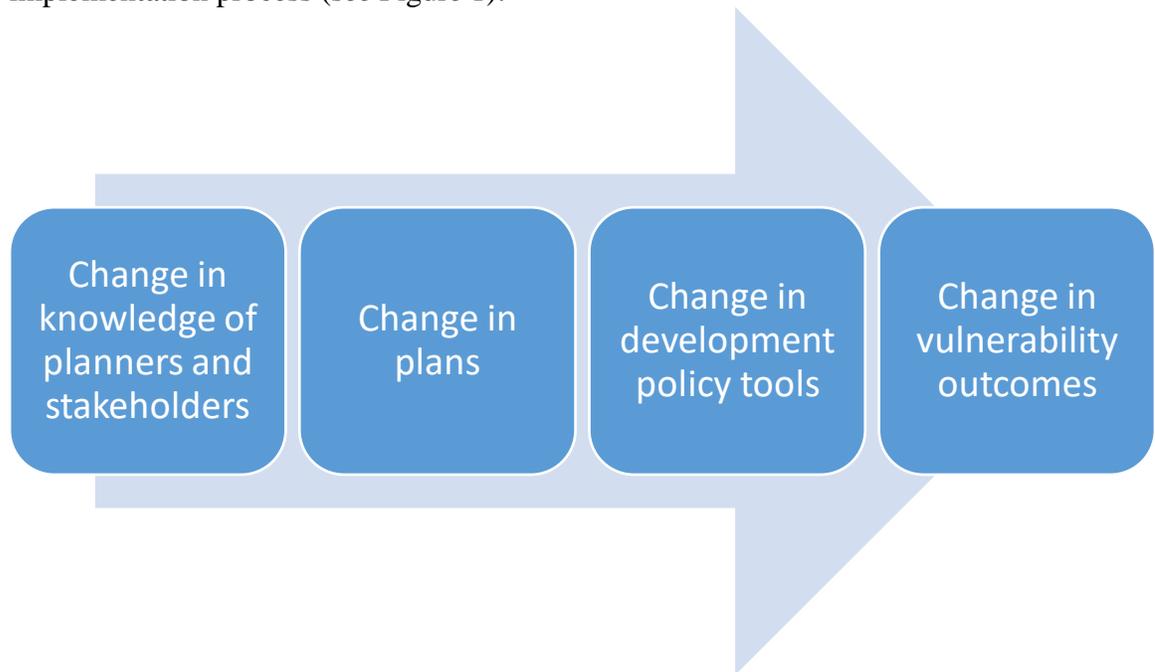


Figure 1 Impacts of PIRS

Impact #1: Changes in knowledge by urban planners, emergency managers and stakeholders about roles of alternative plans and how they can be better integrated to increase support for mitigation, reduce duplication of effort, and more efficiently use limited resources.

Impact #2: Revision and better integration of vulnerability reduction into a community's general plan, hazard mitigation plan, and other local plans.

Impact #3: Revision of a range of development policy tools that influence land use and development in hazard areas to be consistent with the revisions of plans. Examples of policies include development regulations (e.g., zoning and subdivision ordinances), incentives (density bonuses, property tax breaks), land acquisition strategies, and design and location of capital improvement projects (transportation, water, sewer).

Impact #4: Changes in vulnerability outcomes that limit or prevent new development (and population) in hazard areas, or reduce vulnerability of existing development (and population) in hazard areas in different geographic areas.

Impact #1 (change in knowledge of planners and stakeholders) begins soon after (1-3 months) a community starts to apply the scorecard. This impact indicates that plan review is not just about the scores. Based on our work with the demonstration communities to date, we are finding that a valuable contribution resulting from application of the scorecard is a collaborative process that yields information about how specific policies that influence public and private land use and investments within a plan and the network of plans. Application of the scorecard provides a deeper understanding and comprehensive assessment of how multiple plans, that may not directly address hazard mitigation, are conclusively linked to mitigation and disaster loss. Examples of comments by local officials in the demonstration communities indicate the high value they place in gaining a better understanding of their networks of plans through application of the scorecard:

- “We wanted to see the effect of all our policies on flood resilience because we had never taken such a comprehensive look our policies before. It was also an opportunity to see how different plans stacked up, particularly because we had not previously evaluated the hazard mitigation plan side by side with other community plans.” –City of Norfolk;
- “We were very intrigued by the spatiality of our policies and hadn’t thought about our policies spatially before. This was important to us because our Vision2100 document specifically designates areas of flood protection and retreat.” –City of Norfolk;
- “We utilized this to update our comprehensive plan and zoning ordinances” –League City;
- “It is important for practice that you are tracing back to the policy.” –League City

Impact #2 (change in plans) and **Impact #3** (change in regulatory and investment policies) will likely occur in the mid-term (3-12 months) after completion of our engagement efforts in the demonstration communities this fall 2017. We will document these changes during the fall 2017, and continue to track changes if funding for this project is extended. To date, change in plans and policies have included amendments to several components of planning documents of the City of Norfolk. Staff planners indicate that applying the scorecard produced several benefits: a) the most comprehensive examination (but not time consuming) of the level of integration among different plans they had ever undertaken; b) allowed them to evaluate the degree to which policies from multiple plans decrease (or actually increased) vulnerability in different geographic areas of the city; and c) the new information supported deeper and more inclusive conversations about different stakeholder interests regarding the impacts of specific policies.

Action by the City of Norfolk was recently taken based largely on results of the scorecard evaluation process. On June 22, 2017 the planning staff presented a document to the Norfolk

Planning Commission Public Hearing that details policy amendments across various plans. Following are examples of needed actions under two broad headings that are included in the public hearing document (see attached Planning Commission Public Hearing document):

- I. The scorecard tool revealed weaknesses and inconsistencies throughout plans. Examples of improving plan integration include:
 - a. Pg. 1: Land use, transportation, and facility location elements in the comprehensive plan (plaNorfolk 2030) need to be amended to incorporate resilience plan proposals (Vision 2100).
 - b. Pg. 2: Amend comprehensive plan (plaNorfolk 2030) to incorporate specific design criteria for public facilities in the resilience plan (Vision 2100).
 - c. Pg. 4: Revise land sales and acquisition policies in the affordable housing plan to be consistent with resilience plan (Vision 2100).
 - d. Pg. 4: Update zoning regulations to be consistent with resilience plan land use strategies that vary across different geographic areas (red, yellow, green and purple districts, see pp. 10-11).
 - e. Pg. 5: Location criteria for community facilities within the comprehensive plan did not account for resilience policies and metrics discussed in the resilience plan.
 - f. Pg. 5: Incorporate resilience policies in Vision 2100 into the capital improvement projects to determine major roadway improvements, rail, ferries, etc. (p. 5)
 - g. Pg. 5: Use Vision 2100 as a guide when reviewing development proposals and budgets for capital improvements.

- II. Norfolk planning staff indicates they had not previously reviewed or evaluated the hazard mitigation plan. They have not consulted the hazard mitigation plan in the preparation of all other plans adopted by the city. They indicate that the scorecard provided a methodological tool to guide integration of the mitigation plan across other plans, and to make the mitigation plan better. Examples of integration of the mitigation plan identified on the attached Planning Commission Public Hearing document include:
 - a. Pg. 2: Amend the comprehensive plan (plaNorfolk 2030) to incorporate actions in the hazard mitigation plan (Hampton Roads Mitigation Plan).
 - b. Pg. 5: Integrate the mitigation plan and resilience plan (Vision 2100) guides to evaluate options to future development proposals.
 - c. Pg. 7: Hazard mitigation plan contains policy actions that should more clearly specify “appropriate strategies to mitigate the impact of flooding to existing flood-prone structures.” The resilience plan could be used to improve the mitigation plan, for example, since the resilience plan includes flood maps of locations of such structures, which can provide the basis for formulating more spatially specific policies in the mitigation plan.

Impact #4 (change in vulnerability outcomes) will likely be evident in the long-term (>2 years), but we will track any change outcomes during the duration of this study.

Institutionalizing the Plan Integration for Resilience Scorecard

The following activities will be initiated fall-2017 that are focused on disseminating and institutionalizing our *plan integration for resilience scorecard*, and thus increase multiple impacts related to our work:

-- As noted above, we anticipate that our new partnership with NIST will generate multiple outcomes. The NIST Community Resilience Planning Guide is a detailed guidebook for communities, which discusses the importance of plan integration, but does not give a tool or mechanism to do it. NIST guidance and scorecard are a natural fit and have spurred a panel discussion at the annual Natural Hazards Workshop in Broomfield, CO (July 2017). As noted, we have agreed to partner with NIST in Annapolis. NIST is also working to institutionalize their guidance and is committed to marketing and expanding use of its guidebook. We anticipate that our scorecard will be part of NIST's effort.

-- We are connecting with CRS as to embed the tool into their guidance and activities. We have reached out to Bill Lesser to set up a meeting to discuss the scorecard more. He has also suggested we reach out to Sam Brody and Wes Highfield at Texas A&M because of their work with CRS.

-- We have received invitations from Louisiana Sea Grant and Texas Sea Grant to collaborate. They are interested in a train-the-trainer program for their extension agents, coastal specialists, and coastal planners. Their network of agents would allow communities across the gulf coast to embed the tool into what they are already doing with communities. Louisiana Sea Grant (Robert Twilley, Director) and Texas Sea Grant (Heather Wade, Director) have agreed to support travel and accommodations.

-- Based on FEMA's suggestions we are uncovering an opportunity to work with the CPCB Recovery Support Function and their communities in Louisiana to apply the scorecard for a more informed recovery. Additionally there is an opportunity to work with jurisdictions already a part of FEMA's Statewide Hazard Mitigation Pilot Program. They are working in four counties.

-- We will conduct webinars for the Association of State Floodplain Managers and the American Planning Association. We are working with Chad Berginis and Barry Hokanson to coordinate these. We will explore for other opportunities to host webinars for boarder reach.

9. Research Activity and Milestone Progress:

Research Activities and Milestones: Progress to Date

Reporting Period 7/1/2016 – 6/30/2017			
Research Activity	Proposed Completion Date	% Complete	Explanation of why activity / milestone was not reached, and when completion is expected
Complete data analysis to determine how well a network of plans support mitigation, and how well they are spatially correlated with variation of social and physical vulnerability.	8/30/16	100%	
Research Milestone			
Produce draft manuscript for presentation at research conference (Association of Collegiate Schools of Planning, or some other national or international conference) to obtain feedback.	10/30/2016	100%	

10. Transition Activity and Milestone Progress:

Transition Activities and Milestones: Progress to Date

Reporting Period 7/1/2016 – 6/30/2017			
Transition Activity	Proposed Completion Date	% Complete	Explanation of why activity / milestone was not reached, and when completion is expected
Analyze plans and work with local agency staff of demonstration communities in developing a draft plan integration assessment tool (<i>Plan Integration for Resilience Scorecard</i>) and accompanying draft of user guidelines for mitigation planning practice.	8/30/2016	75%	We are still working with the demonstration communities. Most of the work is completed, but we are dependent on the schedules of the teams of local government staff. We plan to complete this work in fall 2017.
Transition Milestone			
“Draft “of plan integration assessment tool and user guidelines.	9/30/2016	100%	

11. Interactions with education projects:

We offered our availability to participate, but have not been able to make arrangements to participate.

12. Publications:

Berke, P, Lee, J., Newman, G., Combs, T. Kolosna, C., Salvesen, D. 2015. Evaluation of Networks of Plans and Vulnerability to Hazards and Climate Change: A Resilience Scorecard, *Journal of the American Planning Association* 81(4): 287-302.

- **2016 Best Article Award, American Planning Association.**

Berke, P., Malecha, M., Yu, S. and Masterson, J. 2017. Plan integration for resilience scorecard: Evaluating networks of plans in six coastal cities. *Journal of Environmental Planning and Management* (under review).

Malecha, M.L., Brand, A.D., & Berke, P.R. Spatially Evaluating a Network of Plans and Flood Vulnerability Using a Plan Integration for Resilience Scorecard: A Case Study in Feijenoord District, Rotterdam, the Netherlands. *Land Use Policy*. (under review).

-This paper applies the scorecard developed by our DHS project. The lead author is a doctoral student. The Rotterdam case study is supported by NSF.

13. Tables

Table 1: Documenting CRC Research Project Product Delivery

<u>Product Name</u>	<u>Product Type</u>	<u>Approx. Delivery Date</u>	<u>Recipient or Anticipated End Users</u>
Plan Integration Scorecard Guidebook: How to Spatially Evaluate Networks of Plans to Reduce Hazard Vulnerability	Guidelines for integrating mitigation into local planning practice	Fall 2017	--National Institute of Science and Technology (to integrate with NIST resiliency planning guidelines) -FEMA (agreed to place guidebook on FEMA’s website as a resource for local hazard mitigation planners) -Hazard Mitigation and Disaster Recovery Division of the American Planning Association -Association of State Floodplain Managers -Louisiana and Texas Sea Grant programs

Table 2: Documenting External Funding and Leveraged Support

<u>External Funding</u>			
<u>Title</u>	<u>PI</u>	<u>Total Amount</u>	<u>Source</u>
NSF PIRE- Coastal Flood Risk Reduction Program: Integrated, Multi-scale Approaches for Understanding How to Reduce Vulnerability to Damaging Events, Sam Brody Lead at TAMU-Galveston, National Science Foundation, \$250,000 sub-award to TAMU-College Station. (September 2016-20).	Berke	\$250,000	NSF
<u>Leveraged Support</u>			
<u>Description</u>			<u>Estimated Annual Value</u>
Portion of university indirect returned to project			About \$20,000

14. Metrics

<u>Metric</u>	<u>Year 1</u> (1/1/16 – 6/30/16)	<u>Year 2</u> (7/1/16 – 6/30/17)
HS-related internships (number)	0	0
Undergraduates provided tuition/fee support (number)	0	0
Undergraduate students provided stipends (number)	0	0
Graduate students provided tuition/fee support (number)	2	2
Graduate students provided stipends (number)	3	3
Undergraduates who received HS-related degrees (number)	0	0
Graduate students who received HS-related degrees (number)	0	
Graduates who obtained HS-related employment (number)	0	
SUMREX program students hosted (number)	0	0
Lectures/presentations/seminars at Center partners (number)	0	3
DHS MSI Summer Research Teams hosted (number)	0	0
Journal articles submitted (number)	0	2
Journal articles published (number)	0	0
Conference presentations made (number)	3	5
Other presentations, interviews, etc. (number)	1	6
Patent applications filed (number)	0	0
Patents awarded (number)	0	0
Trademarks/copyrights filed (number)	0	0
Requests for assistance/advice from DHS agencies (number)	0	1
Requests for assistance/advice from other agencies or governments (number)	0	9
Total milestones for reporting period (number)	2	2
Accomplished fully (number)	2	1
Accomplished partially (number)		1
Not accomplished (number)		