

Application of Plan Integration for Resilience Scorecard: Lessons Learned from the City of Norfolk, VA

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This case study reviews the City of Norfolk's experience in application of the Plan Integration for Resilience Scorecard. Norfolk was the first demonstration community to apply the Scorecard. Objectives of the study include: 1) to evaluate the effectiveness of the organizational and technical elements of the Scorecard application process from the perspective of city staff; 2) to identify how information produced by the Scorecard influenced changes and innovations in plans, regulations and infrastructure investments; and 3) to determine what aspects of the process worked and areas that need to be improved. The information generated reveals practical applications of the Scorecard, and to provide guidance for updating the *Plan Integration for Resilience Scorecard Guidebook* and the plan evaluation software tool.

Data for the case study were derived from several sources. Notes were taken during an on-site training session and monthly teleconference meetings that dealt with queries raised by city staff as they completed the phases of the Scorecard application process between December 2016 and September 2017. Notes were supplemented with responses to interviews of staff participants 18-months after the process (interviews conducted, March 1, 2019). Interview questions were designed to assess staff experience in applying the scorecard and identify actions taken by the city, civic groups and the private sector due to information generated by the Scorecard.

I. Background

The City of Norfolk, Virginia, estimated population of 244,707 in 2017, was selected as the first pilot community to test the validity of the *Plan Integration for Resilience Scorecard Guidebook*. Norfolk was a good fit to serve as a demonstration community due to several factors:





Figure 1: Motorists drive through so-called nuisance flooding in Norfolk, Virginia

©Will Parson, Chesapeake Bay Program, 2015.

- More frequent exposure to coastal flooding and sea-level rise. Norfolk floods not just in heavy rains or during hurricanes. Flooding occurs during good weather, at high tide, or when the winds come from the right direction. The seas are rising at twice the global average, due to ocean currents and subsidence geology. The Union of Concerned Scientists determined that with sea level rise predicted at 1.4 feet over the next 20 to 50 years, the low-lying areas of the city, including the world's largest Naval base, would flood about 280 times each year, and under water about 10 percent of the time.¹

- Longstanding leadership to be a “model community on resilience.” The city was selected to be a participant in the Rockefeller Foundation’s 100 Resilient Cities program and adopted a resilience city strategy in 2015. In 2016, Norfolk prepared a forward-looking Vision 2100, which responds to sea level rise and includes principles to guide the development of a new comprehensive plan during 2019-2020.
- City staff and elected officials indicated commitment to partnering with Texas A&M staff in testing the validity of the Scorecard and associated training materials. Local officials agreed to initiate networking and communication activities among multiple local government agencies with decision making responsibilities that influence land use in hazard areas throughout the Scorecard application process.

Scorecard Team Members and Roles

To facilitate application of the Scorecard, the City of Norfolk created a team of six members—the planning director, two planning staff within the department of city planning, one emergency manager, their chief resilience officer (from the 100 Resilient Cities initiative), and a GIS analyst. The main points of contact included one senior planner and the GIS analyst. All members participated in collecting and evaluating Norfolk’s network of plans.

What Worked for the Team?

The size of the team charged with actually doing the work was about right. The team needed to be of sufficient size to assure that core members represented those local agencies most involved in resilience planning, and making day-to-day administrative decisions about development in hazard areas. Members also felt that a larger team would be too cumbersome requiring additional time and effort to train plan evaluators and coordinate work assignments.

Inclusion of a core team member with GIS expertise was crucial. Mapping of a broad range of spatially data is an essential activity in all phases of application of the Scorecard. Team members were also clear that a GIS expert should be included early-on in the process. A critical first-step is the need for accurate delineation of geographic areas that represent the values, resources and challenges of different districts (e.g., residential neighborhoods, downtowns), as well as assessing how well plan policies are responsive to the unique conditions in each district.

1. Union of Concerned Scientists. July 2016, <https://www.ucsusa.org/sites/default/files/attach/2016/07/front-lines-of-rising-seas-naval-station-norfolk.pdf>

What Needs Improvement in Organizing the Team?

City staff indicated during interviews that they were satisfied with the organization and roles of the team, and did not have recommendations for making improvements.

II. Technical Assistance Activities

Technical assistance services were provided by Texas A&M throughout the Scorecard application process. Core activities included a kickoff webinar, a 2-day on-site training visit (November 2016), and monthly tele-conference meetings (between December 2016 and September 2017) to respond to queries by city's team members. Team members were also provided copies of the *Plan Integration for Resilience Scorecard Guidebook* and a software tool for tracking evaluation results of networks of plans.

What Activities Worked?

Norfolk team members reported that the monthly tele-conference calls were very effective. They maintained that checking in on a regular basis helped keep the evaluation team on track. Guidance by Texas A&M staff was particularly important because Norfolk was the first community that applied the Scorecard. Team members had a good grasp of the overarching problem of poorly integrated plans and how the concepts underlying the Scorecard could help the city address the problem. The team was clear that while many issues were raised, they were successfully addressed because on the monthly tele-conference consultation process.

What Activities Need Improvement?

At various points in the Scorecard evaluation process team members did not fully comprehend how the specific tasks fit together. They had difficulty in seeing the trees from the forest. One Norfolk team member stated “it would be helpful to explain how the tasks of each phase achieve the goals, and continually repeat how the tasks fit into the overall process to make sure where we are, where we are going, and what is the end game.” They made several recommendations:

- More attention to details should be given at the start of the process. Specifically, the introductory webinar lecture and initial on-site training session should place greater emphasis on explaining “in detail” the tasks required and how they fit together.
- During teleconference calls the Texas A&M staff needed to more frequently describe the overall process, and then discuss how each set of tasks about to be undertaken is part of the process.
- At the start of each the major section of the *Guidebook* explain how the tasks in the section build tasks that were completed and tasks that were to be undertaken in the next phases of the Scorecard evaluation process.

III. Phases of the Scorecard Method

The Scorecard was tested in three phases in Norfolk: 1) delineating district hazard zones; 2) selecting plans; and 3) identifying and scoring policies in plans.

Phase 1. Delineating District Hazard Zones. Norfolk created District Hazard Zones that served as the basic unit of analysis for scoring the degree of integration among plans that reduce (or increase) vulnerability in different parts of a community. The team delineated the zones according to a three-step process. The first step was to identify the hazard zones—the parts of the city subject to flooding in a 100-year event and those predicted to flood in a future sea level rise scenario.

The second step involved identifying the city’s planning districts. Similar to most local planning efforts, Norfolk focuses on certain delineated areas in attempting to coordinate plan policies to achieve development goals that are responsive to the unique environmental, social, and economic characteristics of different districts in the city. The Norfolk team wanted to create a manageable number of planning districts that represented distinct geographic areas. Political and technical considerations played a role. The team was concerned about the appearance of bias when presenting the scorecard results to city decision-makers, and thus wanted to use districts that were more ‘objective’ than the official neighborhoods (which are closely linked to city council districts). In the end, they chose to use the 80 U.S. Census Tracts located entirely or partially in the hazard areas to serve as the planning districts. Smaller-scale units of analysis (e.g., Census Block Groups) would offer a more fine-gained analysis of policy coordination, but the time and effort required to evaluate policies in a significantly greater number of policy districts was beyond available time and staff resources that could be devoted to Norfolk’s PIRS evaluation.

The third step was to intersect the hazard zones with the locally defined planning districts (80 Census tracts). Figure 2 shows the resulting district hazard zones (and composite plan policy scores from all plans) for the City of Norfolk PIRS analysis.

What Worked in the Delineation of Districts?
 The Norfolk team was successful in establishing criteria for delineating districts that are tailored to staff capabilities, representation of distinct geographic areas of the city, and adherence to technical objectiveness. Using these criteria staff crafted a balanced solution by creating a manageable number of districts that did not exceed staff resources, preserving the common interests of small geographic areas, and establishing the technical objectivity in boundary delineation.

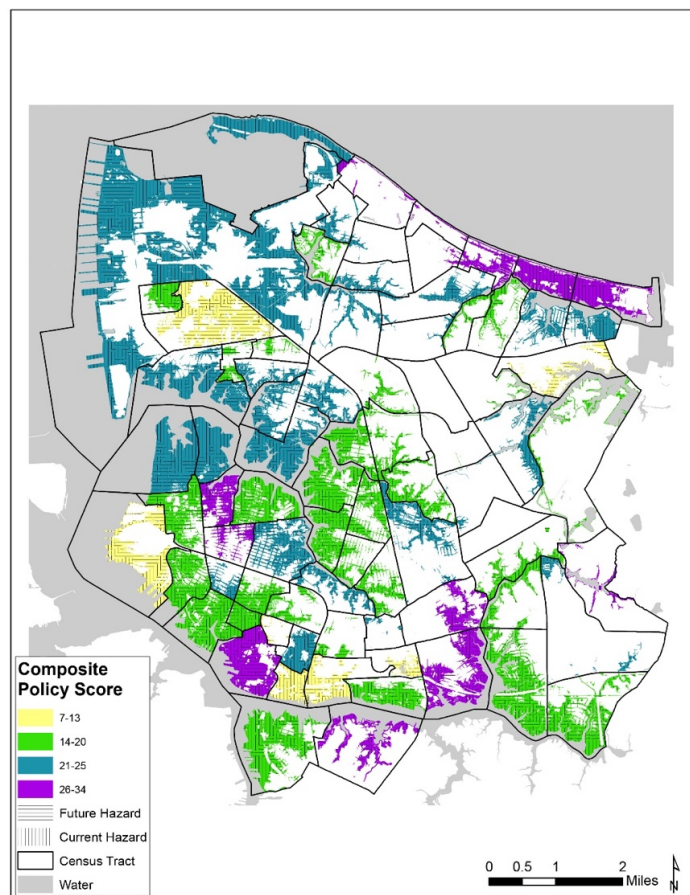


Figure 2: District Hazard Zones and Composite Plan Policy Scores

What Needs Improvement in the Delineation of Districts?

Norfolk staff felt that mapping instructions for hazard zone district boundary delineation provided by Texas A&M staff needed more clarity. The definitions and tradeoffs for using different types of criteria for identifying these geographic areas need to be more clearly specified. The Guidebook needs to be revised to reveal the insightful Norfolk experience on how one city made the choices.

Phase 2. Selecting Plans. Norfolk has adopted a diverse “network of plans” that have a guiding influence on land use and development decisions in areas exposed to coastal flooding and sea level rise. Among the 17 official plans adopted by the City, the local team identified six plans to be included in the study as they were considered to have the most significant influence on development decisions in the city (Table 1). Plans excluded from the study did not intersect with the hazard zones, were out of date, or were already integrated in the city’s comprehensive plan, which incorporates as chapters several of the stand-alone small area and functional plans. Each of these plans are independently prepared by distinct government agencies and interest groups. The city staff felt that the combined impact of the selected plans has a strong effect on vulnerability to community hazards.

Table 1: Selected Norfolk Plans

Comprehensive Plan: Norfolk 2030: The General Plan for the City of Norfolk (2013)
Hazard Mitigation Plan: Hampton Roads Hazard Mitigation Plan (2016)
Shoreline Plan: Sand Management Plan Guidance Document (2016)
Resilience Plan: Norfolk Vision 2100 (2016); selected by the 100 Resilience Cities program.
Small Area Plan I: Downtown Arts and Design District Plan Revitalization Strategy (2013)
Small Area Plan II: Military Circle/Military Highway Urban Development Area: A Vision for the Future (2017)

What Worked in Selecting Plans?

The Norfolk team learned a great deal about what plans are most influential in guiding land use and development in hazard areas and should be included in the Scorecard evaluation process. The process of selection required that they have cross agency staff discussions about the influences of different plans. Urban planning staff, for example, were unaware about the role of the city’s hazard mitigation plan in reducing vulnerability of the built and social environments. The city’s emergency management department lead the preparation of this plan, but communication across agencies was limited. The Norfolk team thus included the mitigation plan in the evaluation when it might otherwise have been excluded.

The Norfolk team maintained that several types of plans should always be included in the Scorecard evaluation process. Of the multiple plans that local governments in the United States prepare, the comprehensive plan represents the predominant form of general governmental planning and is widely considered to have a prominent role in further reducing community vulnerability to hazards. Further, the hazard mitigation plan is one of the most ubiquitous special-purpose plans adopted by local governments in the United States.

What Needs Improvement in Selecting Plans?

The criteria for selecting plans should be more clearly specified. In hindsight, the team learned that the two small area plans (see Table 1) should not have been included in the analysis since these plans had already been built into the comprehensive plan.

Phase 3. Identifying and Scoring Policies in Plans. Norfolk ‘skewed positive’ in deriving plan integration scores by district and plan. That is, policies were often scored according to what the Norfolk team viewed as a likely future scenario in which flood control measures (e.g. seawall) are strongly reinforced, rather than scoring each policy ‘on its own merits’ and based on present circumstances. Thus, if a seawall is to be installed in the near future the score for a policy that increases commercial or residential development density behind the proposed seawall received a 0 (or neutral) score, but not a -1 (increasing vulnerability) score.

Norfolk often referenced place-specific term within policies was “shoreline.” The city did not create a separate layer or special map for this geography, because it was easily recognizable. Place-specific terms that might need mapping could include, repetitive loss structures, critical facilities, public housing, etc.

What Worked in Scoring Plans?

Overall, the composite index score for all plans for different geographic areas made sense according to the Norfolk team.

- The mapped scores had a broad range of significant impacts in revising plans, development regulations and infrastructure investment decisions.
- The scoring method was flexible and enabled the city to adapt the method to meet local context.

What Needs Improvement in Scoring Plans?

The scoring method is not always a straightforward increasing vulnerability (+1) or decreasing vulnerability (-1). The Norfolk team supported the flexibility of the scoring method but thought there should be more explanation of the alternative approaches to scoring. The Norfolk team offers some insight to its approach – scoring based on expected future and not current situation. Future case studies should yield additional rationales for choices that communities might make regarding scoring plan policies.

IV. Advancing Knowledge, Plans & Policy Tools, and Vulnerability Outcomes

Advancing Knowledge. Following are observations from the Norfolk team regarding the impacts of the Scorecard process changed knowledge and awareness of hazard risks and policies among city officials:

- “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 Vision 2100 document specifically designates areas of flood protection and retreat.”

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- “We were surprised the Larchmont community (districts 23 and 24) next to Old Dominion University had such high scores despite the fact that they are so highly vulnerable. This area is a high-income community with more political power in the community. It makes us think about spreading our policies around in support of all communities.”
 - “I really like this because it is an unbiased and impartial look at policies and plans. It helps reveal how we need to spread our energy to other areas of the community.”
 - Planning staff recognized that Hampton Blvd., a key connection across the city, would be the only connection for a “new island” revealed with sea level rise hazard zone maps. The planning staff had a conversation about the need to discuss further with stakeholders to elevate the roadway.

Advancing Better Integrated Plans and Development Policy Tools. City of Norfolk staff indicated that they had not taken such a comprehensive approach to integrating policies and plans before, that the evaluation process allowed them to see policies spatially and have conversations about the impacts of specific policies. The City of Norfolk planning commission conducted a public hearing and the city council approved several policy amendments across multiple plans:

- George Homewood (FAICP, CFM, Planning Director, City of Norfolk, January 2018) stated that the “Resilience Scorecard was a great tool to allow us to evaluate our existing plans and policies...Following our participation in scoring Norfolk’s plan, we undertook a major plan amendment to more fully incorporate our Hazard Mitigation Plan as a key element in our comprehensive plan.”
- Norfolk staff concluded that many plans and policy implementation tools lacked specificity. For example, the hazard mitigation plan did not specify “appropriate strategies to mitigate the impact of flooding to existing flood-prone structures.”
- The Scorecard results revealed weaknesses and inconsistencies throughout plans. For example, the location criteria for community facilities was amended in the comprehensive plan, since it did not factor in resiliency metrics, but instead only focused on accessibility to populations and other public uses.
- Norfolk planning staff had not previously reviewed or evaluated the hazard mitigation plan in the planning process and the scorecard provided a methodical tool. The public hearing document specifies a variety of “text amendments to better incorporate the actions aimed at mitigation and resilience as outlined” in the hazard mitigation plan across other planning documents.
- A team member observed that the Scorecard results revealed the need to create a new zoning ordinance to account for the variations in the “geography of resilience.” The new ordinance assigns specific land use location standards (setbacks, limitations of permitted uses in hazard areas), and building standards.
- Team members from the city planning department are stated that the scorecard results will be used to inform the preparation of a major new citywide comprehensive plan during 2019-20.

Advancing Reduction in Vulnerability Outcomes. Several actual changes in reducing vulnerability in Norfolk can be traced to results derived from application of the scorecard. Change in vulnerability can be linked to the built environment, socially marginalized people, and natural environmental systems. Specifically, Scorecard results provided an important component in the fact base for developing two successful proposals in 2018 that target two poor neighborhoods that received low scores from the Scorecard evaluation:

- The city received a \$112 million award from the National Disaster Resilience Competition. The funds will focus on the Ohio Creek watershed (figure 3), known as Chesterfield Heights area. Design work will be measured against several goals, such as creating coastal resilience, improving economic vitality, and strengthening vulnerable neighborhoods.



Figure 3: Norfolk Resilience Park as part of Ohio Creek Watershed Initiative

- The city received a \$30 million award from the Department of Housing and Urban Development under the Choice Neighborhood Implementation Grant program. The funds will be used by the city to redevelop and reduce social and physical vulnerability in the St. Paul neighborhood. The St. Paul's Area is more than 200 acres which contains three public housing communities and is subject to extensive flooding.

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