Rising oceans, flooded towns: How Georgia coastline communities are readying to recover despite a changing climate

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Abstract

Climate change is posing a significant threat to the coastal counties of Georgia. The Georgia Department of Natural Resources and Hagerty Consulting have recognised this threat and are facilitating a nine-year project aimed at developing a disaster recovery and redevelopment plan for the state's coastal communities, and providing state-wide technical assistance. This paper provides an overview of this planning initiative and summarises the many insights into the pre-disaster recovery and resilience planning process gained from this project.

Keywords: planning, disaster recovery, disaster redevelopment, resilience, local recovery, sea level rise, climate change

INTRODUCTION

The State of Georgia, like all other communities in the USA, has a long history of disasters.[1] The 11 counties that sit along the eastern seaboard (as shown in Figure 1) are at a heightened risk, experiencing the brunt of initial impact from coastal hazards and witnessing firsthand the escalating severity of incidents through increased

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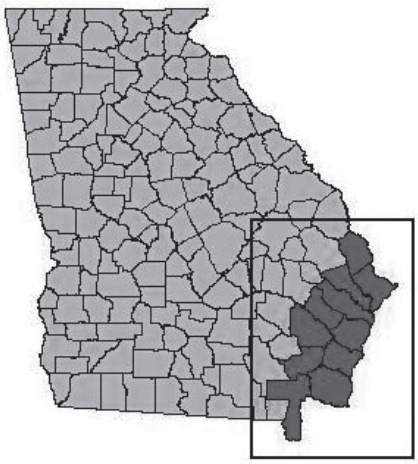

Figure 1 The 11 counties involved in the disaster recovery and redevelopment planning process

flooding and wind events, rising sea level and other devastating hazards. Climate change has exacerbated the frequency and severity of storms along the east coast, making impacts all the more dangerous and shortening the time and manpower available to recover from disasters.[2]

The Georgia Department of Natural Resources (DNR) recognised this increased risk and nearly a decade ago took action to support local planning through the initiation of coastal-specific disaster recovery and redevelopment plans (DRRPs) and a state-wide guidance document about disaster recovery and redevelopment planning. Cumulatively, these plans represent an essential component of the state's strategy to build local capacity in overcoming the obstacles that arise while rebuilding communities after a disaster.[3] DNR, in collaboration with Hagerty Consulting, is in the midst of conducting an inclusive and robust planning process that involves assessing each community's level of resilience, understanding its vulnerabilities and strengths, and leveraging this information to design local DRRPs and organisational constructs to use after an event.

The project, completed in three phases, began in 2010 when Georgia DNR received grant approval to develop a DRRP for two pilot communities, Chatham and Brantley counties. Shortly after these plans were underway, the justification for Georgia DNR's efforts were bolstered through the publication of the 2011 Federal Emergency Management Agency (FEMA)'s National Disaster Recovery Framework (NDRF), as well as the passage of a state-wide executive order in 2013[4] that formalised Georgia's support in recovery planning efforts. The executive order prompted Georgia DNR, in conjunction with the Georgia Emergency Management and Homeland Security Agency, to complete the pilot and develop state-wide guidance based on the pilot communities' experiences.

With state directed authority and federal guidance at hand, Georgia DNR continued its effort after the pilot programme concluded. In 2015, the Georgia Coastal Management Program identified the project as a high priority and utilised additional financial support from 309 Enhancement Funds, Project of Special Merit Funds and the Coastal Resilience Grant from the National Oceanic and Atmospheric Administration (NOAA) to see the project through to completion. These funds made it possible to complete the second phase of recovery planning and finish developing a DRRP in 2017 for Glynn County, which included the City of Brunswick and Jekyll Island.

Currently, the project is in phase three, utilising funding from Georgia DNR's Coastal Incentive Grant and the NOAA's Coastal Resilience Grant to support DRRP development for the counties of Charlton, Camden, Liberty, Bryan, Effingham, Long, McIntosh and Wayne. Additionally, the state-wide planning guidance document has been updated

to maintain continuity with emerging recovery practices and bodies of work.

It is challenging to measure the return on investment on planning generally, but especially for pre-disaster recovery planning. However, it is the working hypothesis of both Georgia DNR and Hagerty that planning effectively for recovery mitigates the impact of long-term recovery needs and associated costs. The following paper provides support to this hypothesis while discussing experiences and lessons learned from the local, state and federal stakeholders involved, and introducing best practices identified for other communities looking to undertake a similar process.

PLANNING PROCESS OVERVIEW

The State recognised that successful pre-disaster recovery planning should be owned and managed by local leaders — those who will be in charge of recovery operations in the event of a disaster. The local level is where the rubber meets the road in recovery and where the Georgia Coastal Management Program prioritised investments in DRRP development. Communities are more prepared when they are active in developing and implementing local recovery plans.[5,6] Therefore, Georgia DNR and Hagerty facilitated the DRRP planning process with local leaders in coastal Georgia counties to provide an opportunity for jurisdictions to own the planning for disasters and account for county-specific needs and priorities.

The planning process timeline varied from county to county, but typically lasts six to nine months for each jurisdiction. During this time, Georgia DNR and Hagerty work with community leaders, like county commissioners and emergency management directors, to conduct extensive stakeholder engagement and develop the DRRP. The purpose of stakeholder engagement is to validate planning concepts and build their capacity to lead recovery operations during the next disaster. Stakeholders include representatives from government agencies, local businesses and nonprofit and community organisations. Table 1 provides examples of the types of stakeholders that are involved in this project. Stakeholder engagement is critical to the completion of two processes that define the DRRP planning process: resilience assessments and capacity building.

Resilience assessments are conducted early in the planning process to evaluate a community's existing resources and capacity to inform disaster redevelopment in the natural, built and social environment. The assessment is organised into six categories, based on the approach identified by Atreya and Kunreuther[7], which details a framework to understand community resilience through the lens of six 'capital areas' (shown in Figure 2).

The jurisdiction's strength in each capital area is determined by an evaluation of several indicators of social, physical and organisational resilience in each category. These indicators were selected and informed by leading academic research and resilience assessment models. Assessment findings are presented to stakeholders for validation, so that the planning team can help them identify immediate, short and long-term goals that reflect community values and increase capacity in the community's areas for improvement. These assessments provide the basis for recovery and redevelopment recommendations that seek to strengthen a community's resilience before a disaster and identify critical considerations for recovery operations that address the community's unique needs.

The process of identifying recommendations and building out the plan, with close stakeholder engagement, facilitates capacity-building at the local level. Participation in planning helps stakeholders

Table 1: Potential stakeholders

Recovery Support Function	Stakeholder Group	Function/Contribution
Community Planning and Capacity Building	Municipalities (if jurisdiction is a county)	Inter-jurisdictional Participation
	Public Information Officer	Information dissemination/communications
	Public Safety/Emergency Management Department	Emergency operations and long-term recovery
	Finance/Legal/Administrative Department	Technical and administrative support
	GIS Department	Vulnerability and redevelopment mapping
	Planning or Community Development/Development Authorities	Land use and other comprehensive plan compatibility
Economic Development	Economic Development Organization/Chambers of Commerce	Economic recovery
	Tourism or Visitors' Bureau	Economic recovery
	Major Employers	Recovery and resilience of local businesses
	Banking Organizations	Economic recovery/resilience
Health and Social Services	School District and Higher Education Facilities	Transition from sheltering to schools opening, population return
	Health Department/Medical Organization	Hospital and medical recovery
	Human or Social Service Agencies	Special needs populations
	Animal Shelters	Pet sheltering needs
Housing	Building and/or Zoning Department	Building moratoria, permitting procedures
	Code Enforcement Department	Damage assessment/enforcement of redevelopment
	Neighborhood or Home Owner's Association	Community representation
	Planning Councils or Commissions	Jurisdictional coordination and oversight
Infrastructure Systems	Transportation Departments (Public and Private Organizations)	Regional transportation coordination/mitigation
	Aviation and Port Authorities	Regional transportation coordination/resumption of service
	Communications Companies	Private-sector engagement/communications
	Waste Management	Debris removal and public safety
Natural and Cultural Resources	Water Management/Riverkeeper	Flood mitigation/environmental protection
	Environmental Resources/Parks and Recreation Department	Land acquisition/environmental protection
	State of Georgia Department of Natural Resources	Environmental protection
	Forestry Commissions	Environmental protection
Volunteer Organizations Active in Disasters	American Red Cross/Salvation Army	Volunteer services/donations
	Local Houses of Worship	Volunteer services/donations

Source: Georgia Department of Natural Resources (2018) 'Post Disaster Recovery and Redevelopment Planning: A Guide for Georgia's Communities'

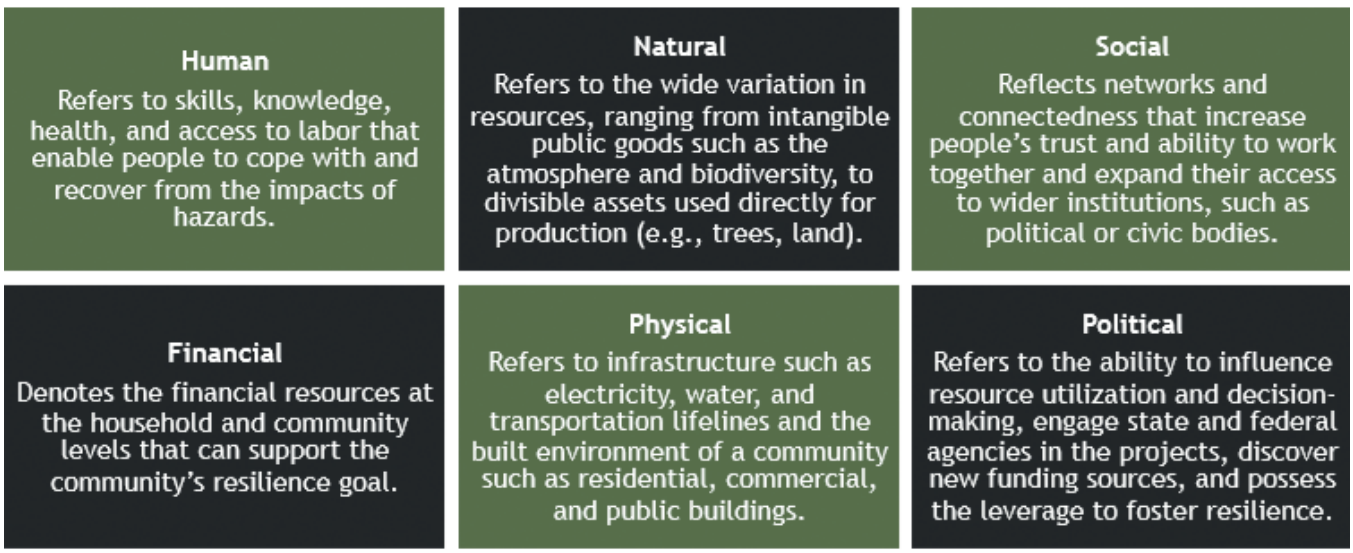

Figure 2 Resilience assessment capitals

Source: Definitions acquired from Atreya, A. and Kunreuther, H. (2016) 'Measuring Community Resilience: The Role of the Community Rating System (CRS)'

Figure 3 Stakeholders participating in DRRP development

build the skills and relationships necessary to implement the plan when it is complete. Empowering the community through the planning process gives the stakeholders a chance to be involved, to voice what is most important to them, and prompt discussion on future needs after a disaster. Georgia DNR and Hagerty facilitated capacity building and stakeholder engagement through workshops, discussion-based exercises and stakeholder meetings that allowed participants to share information and perspectives, and build relationships among key community leaders. The DRRPs also support capacity building in a post-disaster environment by offering the tools and resources needed to allow local leaders to implement recovery operations. The stakeholder engagement process was critical to plan development process and has evolved throughout the planning project.

Each planning process concludes with the finalisation and validation of the county DRRP from local stakeholders. The plan includes:

- Recovery and redevelopment recommendations (pre and post-disaster) to support resilience building at the local level;
- A community engagement and outreach strategy to engage the public and community members through the implementation of the plan and recovery efforts; and
- Recovery support function (RSF) appendices and tools that outline operational responsibilities for leading and supporting agencies involved in recovery.

Taken together, these outcomes support coastal Georgia communities in preparing for the next disaster and future impacts of climate change by:

- Identifying at-risk areas;
- Recommending projects that the City can undertake now to reduce impacts to climate change and future disasters in the future; and
- Outlining a recovery structure and clear responsibilities to support implementation of these projects.

STAKEHOLDER PERSPECTIVES

Measuring the return on investment of these plans is difficult because many jurisdictions have not had to use their plans to facilitate long-term recovery and redevelopment in response to a catastrophic event. However, this decade-long collaborative planning process has provided a rare opportunity for Georgia DNR and Hagerty to check back in with communities to reflect on the planning process and implementation of the DRRP principles in their communities. Via electronic survey, key local, state and federal stakeholders were asked to share perspectives on the planning process. Local stakeholders shared perspectives from their own jurisdictions, while state and federal stakeholders were surveyed on the benefits and lessons learned at the local, state and regional level.

Local perspectives

Feedback received from the local survey was overwhelmingly positive. Many local leaders recognised that the planning process helped their community prepare for future disasters in a myriad of ways, depending on priority and need. However, the planning process faced several challenges, especially in the early stages. Several counties emphasised the importance of the planning timeline and process, noting that long meetings and delayed schedules will cause burn-out and deter stakeholders from meaningful involvement. Similarly, local leaders recognised the need for stakeholder appreciation to ensure that stakeholders are aware of the critical role they play in the DRRP development. The planning process also revealed the importance of engaging a diverse group of stakeholders and organisations. Some localities' governments found it difficult to identify points of overlap between values, policies, infrastructure and markets that are required in order to create effective DRRP plans. The inclusion of a wide audience of stakeholders from various sectors addressed this shortcoming and allowed the county to think beyond traditional recovery services and operations.

While few communities involved in the project have experienced a major disaster since the adoption of the county DRRP, stakeholders already understand the advantage of having the plan developed pre-disaster. One stakeholder commented that though they had not yet needed to utilise the DRRP in recovery operations, their community has 'high hopes for when they do need it'. Local leaders have acknowledged the many benefits that the DRRP planning process has brought to their community, including the tools and resources they have identified through the planning process (eg regional, state and federal resources that can provide assistance; reference literature that can guide recovery operations).

The planning process itself has also prepared communities for recovery and redevelopment. Engagement with stakeholders through the planning process has also fostered relationships that can be utilised during recovery operations to provide inter-agency assistance and connect stakeholders with resources that support the restoration and redevelopment of buildings and infrastructure. Local leaders also understand the importance of community engagement during recovery operations and have recognised that the community engagement and outreach strategy serves as a beneficial tool in these efforts. Lastly, DRRPs provide a structure by which to organise recovery and clearly outline the roles and responsibilities of organisations and agencies involved in those efforts. Communities understand the value of having this information prepared prior to a disaster to address recovery and redevelopment needs more quickly and efficiently.

State and federal perspectives

Despite the perceived success at the local level, the planning process was not without challenges. For example, many coastal communities struggled to comprehend the likelihood of or severity of hurricanes or coastal storms due to their relative infrequency. To plan successfully for recovery and redevelopment, it was essential to prompt communities to honestly consider the potential impacts of a severe weather event. Unfortunately, the state was directly impacted by Hurricane Matthew in 2016, Hurricane Irma in 2017 and Hurricane Michael in 2018. These events have helped turn the tides by reinforcing the value of planning ahead for recovery and redevelopment.

Through the planning process, state and federal stakeholders began to see communities tackle future climate and disaster concerns. Communities are now addressing climate change and future

disasters by identifying risk and vulnerabilities in their plans, recommending actions that safeguard against climate change impacts, directing steady state infrastructure development away from high-hazard areas, and acknowledging the need for resilient practices in rebuild efforts after a disaster. While it is difficult to calculate the benefits that DRRPs have provided, state and federal stakeholders acknowledge the value of the DRRP planning process. The project has brought broader awareness of hazard risk and future impacts from climate change to coastal communities and throughout the state.

Lindy Betzhold of the NOAA Office for Coastal Management also acknowledged that, 'having these plans in place, allows counties to have a proactive plan for recovery that considers the specific needs, economic forces, and priorities of the county'. Overall, these plans are creating a more connected and resilient state.

KEY PLANNING TAKEAWAYS

While there is a consistency in planning structure and outcomes, the planning approach has been adapted throughout the course of nine years to (1) fit the unique needs of each community, (2) leverage lessons learned in past projects, and (3) incorporate emerging policies and trends in the areas of disaster recovery. The following takeaways provide insight into the evolution and successes of DRRP planning, as well as ways in which other communities can learn from this initiative.

Capacity building and engagement works best in a concentrated timeline

For the first planning initiatives, the timeline spanned from 12 to 18 months. While there were numerous meetings intended to integrate stakeholders into the process, the length of the engagement ultimately contributed to a gradual loss of engagement over time. Over the course of the planning effort, the planning process timeline has been reduced down to six to nine months, generating an effort within a community that is focused and optimised. Georgia DNR and Hagerty host a series of three to four in-person meetings with each plan. These meetings are held close together and hosted in-person to ensure full participation from stakeholders. With this strategy, stakeholders are engaged strategically, building knowledge in a relatively short period of time, avoiding common previous challenges (eg stakeholder turnover, building baseline knowledge of key concepts at each meeting).

Meet stakeholders where they are

Throughout the planning process, the planning team has learned that there are inherent challenges associated with planning in small, rural communities. For example, participation from small businesses is extremely limited because it requires business owners to step away from their shop, which equates to lost revenue potential. At the same time, small businesses are key stakeholders in economic recovery. To combat this challenge, Georgia DNR and Hagerty worked with state and local community partners to develop and disseminate a survey to gather small business input. The outcome was the production of a disaster recovery and redevelopment guidance document targeted at the small businesses of Georgia.

Create long-range plans that are useful in the near term

The project works with community leaders, many of whom wear multiple hats and question the relevance of planning for success 20–50 years in the future, as is the case with rising sea levels. While the plans and tools provided are relevant to those types of long-ranging all-hazards incidents,

they are also built to scale to address smaller incidents, using the resources the community already has in place.

Over time, the value of including scalable solutions in DRRPs was underscored by the events that occurred within the state. Though the DRRPs are flexible enough to scale up to catastrophic events, they are more regularly used for smaller events, reinforcing the usefulness of plan elements in disasters large and small. Georgia DNR and Hagerty have worked to establish a resilience assessment, a recovery framework and considerations for key issues in resilience that are relevant for communities of all sizes now, not just far in the future.

Leverage both data and real-life experience to promote planning

The Georgia DNR and Hagerty team leveraged the planning process by utilising real-life experience, as well as additional tools, data and resources, to prompt coastal jurisdictions to think critically to understand the risks of rising sea levels and climate change and associated recovery operations.

The Georgia coast has experienced more large-scale events in recent years than in the last several decades, including Hurricane Matthew, Hurricane Irma and Hurricane Michael. While these caused damage and devastation, the hurricanes also provided an opportunity to improve on recovery operations and make coastal counties more attuned to the importance of planning to be more resilient. In terms of augmenting the DRRP planning process, jurisdictions impacted by disasters became guest speakers for other communities planning kickoff meetings. By sharing their experience, impacted local leaders helped build knowledge of real-life needs and help underscore the importance of the planning process.

Data validation has additionally proven to be useful in the planning process. Again, during each kickoff meeting, each county is given maps where stakeholders are asked to validate and enhance information showing impact from hazards. Framing the planning process around experience and visual evidence helps facilitate consensus of need and buy-in to recovery concepts generated later in the planning process.

Host inclusive community engagement with all relevant agencies and organisations

Local communities involved in DRRP development have recognised the need to involve the whole community in planning process. FEMA promotes its whole community concept as a guiding principle to create robust planning processes that are inclusive and comprehensive.[8] It seems as though many emergency preparedness plans involve the same types of stakeholders — the same was true for the DRRP initiatives. However, planning for recovery and redevelopment is unique and requires non-traditional partners to be at the table, committed and engaged to successful community-wide recovery.

Georgia DNR and Hagerty now start each planning process by providing the county with a list of potential stakeholder types to invite to the planning process. Through the project and plan implementation, local leaders have recognised the importance of inviting stakeholders from a wide range of organisations, agencies and communities to ensure that plan development addresses all community priorities and needs.

Identify funding resources to pursue planning in steady state

Globally, there are limited programmes and opportunities that can support the funding of these planning processes. The DRRP project has utilised funding sources from a variety of programmes (as discussed)

and has been able to secure competitive grant funding to support plan development. Counties have recognised the need for funding sources to support both plan development, as well as identified recovery and redevelopment projects. Communities pursuing similar projects can similarly utilise the time available before a disaster to identify steady-state funding sources and/or allocate budgetary resources that may support planning processes and projects in the future.

CONCLUSION

The coastal Georgia Disaster Recovery and Redevelopment Plan process has now lasted nearly a decade, generating six coastal county pre-disaster recovery plans, two iterations of a state-wide recovery planning guidance document for local communities, and a small business guide for recovery and redevelopment.

While lessons continue to be learned, overall planning has bolstered resilience, enhancing recovery capability for the future as the impacts of climate change continue to worsen. As communities are considering undertaking this type of planning in their own jurisdictions, Hagerty and Georgia DNR suggest considering the following questions before beginning:

- *How do we pay for resilience?* Planning and implementing resilience activities should be a priority, but are often omitted from the typical budget cycle. Resilience-building should not wait for post-disaster cost recovery funds (the time after an incident where disaster-related funds are available). Implementing resilience should be considered and integrated during every step of blue-sky operations.
- *How do we make something so complicated and lengthy like recovering from a major disaster easier to navigate?* Communities cannot predict all elements needed for effective recovery, but they can put together a foundation that provides elements that lead communities through the recovery process with some semblance of order — it is essential that recovery plans be functional tools to enact thoughtful recovery practices.
- *How do we keep recovery planning and implementation relevant?* Recovery planning has come a long way since Georgia DNR and Hagerty first initiated this work. FEMA's NDRF has gone through two iterations. In practice, recovery operations at FEMA evolve with every major disaster. Professionals in emergency management are learning more every day and continuously adjusting their approach to pre-disaster recovery planning to integrate new strategies and techniques. Communities should continue to evaluate their resilience capacity and pre-disaster recovery plans to ensure they integrate lessons learned, innovative techniques and climate change impacts, and are as prepared as they can be to handle the next disaster.

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