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OF THE GULF™

SCENARIO BUILDING WORKSHOPS

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SCENARIO BUILDING WORKSHOPS

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INTRODUCTION

Louisiana's Comprehensive Master Plan for a Sustainable Coast (Coastal Protection and Restoration Authority [CPRA], 2012) offers a range of procedures to offset coastal land loss, to restore portions of the littoral landscape, and to preserve the culture, economy, and heritage of this threatened region. Government personnel, external experts, and stakeholders collaborated in its development. Since the final 2012 document appeared, reaction has been mixed to some of the proposed restoration projects. Communities have recognized some projects as vitally important and highly desirable, while questioning or opposing some projects.

The Institute has been exploring the "human dimensions" of the Louisiana coast through the Community Resilience and Adaptation component of the 2012 Science and Engineering Plan (the Institute, 2012).

In an effort to gather information and to engage with multiple stakeholders Institute staff carried out a series of public workshops as pilot projects at the community level. The workshops draw on techniques developed by the U.S. Department of the Interior (USDoI) and published in Science (Machlis & McNutt, 2010). During the spring of 2014, Institute personnel conducted scenario-building workshops with informed community members who could provide usable information to decision makers. Through the scenario-building process, representatives of coastal communities were able to identify potential cascading consequences that could be part of futures with a particular project or without that project. The

workshops were designed as a pilot project with the intent that they might be refined after initial trials, modified in geographic scope, carried out sequentially over time, or replicated in other locations. Ultimately, the purpose of these workshops is to follow sound social science public participation methods to gather information that can be conveyed to decision makers. Additionally, key findings will be included in an adaptation toolkit under development by Institute staff and are central to that effort.

This report reviews the background behind scenario-building workshops as tools for collecting information for environmental decision making, the methods used to recruit stakeholders and conduct the workshops, and the information gathered during the process. The findings will be relayed to officials at CPRA and other appropriate agencies, made available to workshop participants and the public, used in the development of the Institute's Louisiana Coastal Adaptation Toolkit, and assessed in terms of further use of the procedure. 💧

¹ Craig Colten, the author of this report, participated in two workshops on scenario building and a follow-up meeting to develop a strategic science group within the USDoI (Machlis, 2010).

BACKGROUND

In 2010, in the midst of the Deepwater Horizon oil release into the Gulf of Mexico, USDoI scientists convened a panel of experts¹ to develop a rigorous method for providing a “rapid scientific assessment of potential consequences of the spill that could provide usable knowledge to decision-makers” (Machlis & McNutt, 2010, p. 1018). The swiftly assembled Strategic Science Working Group endeavored to develop a method to deploy sound science in the midst of a crisis and to provide decision makers with intervention points for actions to aid in recovery, both short- and long-term (Machlis & McNutt, 2011). The scenarios were not intended to serve as a scientific analysis, but as a process to assemble critical information, derived from experts, that could assist in real-time prioritization of response and recovery steps and decision making about additional scientific research.

The working group’s decision to employ scenarios follows well-established methodologies. We use scenarios here to refer to the possible chain of consequences within a human/natural system that follow or accompany environmental change. A host of scientific endeavors have used scenarios, some with distinct objectives and methods. The Intergovernmental Panel on Climate Change (IPCC) has incorporated scenarios in its ongoing efforts to assess the impacts of changing climates (Carter, 2001). In that case scenarios reflect unknown but plausible future conditions that then

drive climate change outcomes. Socio-economic scenarios often provide a means to consider a range of adaptation options (Dessai et al., 2005; van Vuuren et al., 2011; Kriegler et al., 2012). The USDoI Strategic Sciences Working Group developed a scenario framework that allows for the consideration of human-environment stress during and after a disruptive event or crisis (Machlis, 2010). A central value of the application of this scenario framework is its ability to accommodate the uncertainties associated with environmental change and identify socio-economic adaptation strategies. The USDoI Strategic Sciences Working Group used its scenario methodology to address relatively short-term crisis situations. Through the course of two sessions, the working group demonstrated the viability of the method to identify scenarios to show important consequences of an ongoing crisis that could provide decision makers with new insights (Machlis, 2010).

Participatory social science has become a prominent component in the human-environment research and resource management toolkits. The methods enable researchers to consider a wide range of values, knowledge, and perspectives and incorporate them into collaborative problem solving (Pain, 2004; Newing et al., 2011; von Korff et al., 2012; & Schensul et al., 2014). Planners, engineers, and scientists working on complex environmental problems also employ structured participatory methods (U.S. Army Corps of Engineers

[USACE], 2014). As with the USDoI scenario-building process, these methods allow experts to identify key issues in managing environmental change. Our efforts following these systematic research methods, drew on individuals with local expertise, albeit not necessarily with science-based training and methods.

CPRA has characterized the state's coastal situation as a "land loss crisis" (CPRA, 2012). While it is a slower process than a hurricane or oil spill, the scale of the response required and the broad range of potential impacts mean that crisis planning is, in many ways, suited to the task. The agency has declared that in the absence of effective restoration projects, land loss will continue and will increase "flood risk with disastrous effects" (CPRA, 2012). Given the risk and the lack of consensus among coastal residents attending the workshops, there is a need to identify consequences that may accompany coastal restoration and protection and make them available to state officials. The relationship of Louisiana's coastal society to unknown futures and the need to consider options for its continuation follows the basic intent of USDoI's scenario workshops carried out during the Deepwater Horizon oil spill and in its aftermath. The USDoI scenarios that the workshop participants developed were able to provide decision makers with key intervention points where they could focus attention and reduce the negative impacts of an unfolding event (Machlis & McNutt, 2010). For example, in the midst of the 2010 oil release, one scenario identified economic adjustment as a possible consequence. Interventions might focus on economic diversification, safety regulations in the oil industry, or a shift toward long-term stimulus from emergency relief (Machlis, 2010). This longer-term perspective is often missing in the midst of a crisis. In the case of Louisiana coastal land loss and flood risk, local experts, rather than scientists, provided possible intervention points for refining coastal management plans and offers a perspective sometimes unseen in the midst of crisis.

Louisiana's coastal Master Plan follows a structure that compares the state of the coast with and without restoration and protection projects. At a fundamental level, this approach offers a pair of contrasting situations, but at a very different scale and with greater emphasis on biophysical processes and outcomes than the social side of the issue. Given this existing framework, the USDoI scenario-building approach seems to offer a complementary method in which local experts from selected coastal areas could consider the socio-economic future both with and without specific projects. The scenario-building method used here tapped local expertise and focused on socio-economic activities within a human/environmental system, thereby augmenting the Master Plan scenarios. An indirect benefit of the workshop-produced scenarios is that in discussing the potential consequences, stakeholder uncertainty about the Master Plan can be reduced or misunderstandings identified. The major adjustment in our application of the method was the substitution of local stakeholders, experts in various elements of resource-based economies and society residing on Louisiana's coast, for scientific experts. Rather than scientific expertise, knowledge was sought from everyday life, a valuable source of information that is sometimes overlooked in major environmental management projects (Ludwig, 1993). 

METHODS

Institute staff employed three key steps to carry out the scenario building workshops: (1) identifying and recruiting appropriate and knowledgeable stakeholders (Becker et al., 2003; Glucker et al., 2013) (2) organizing and carrying out the workshops, and (3) summarizing the results.

An underlying objective of the scenario workshops was to interact with a disparate group of knowledgeable local stakeholders, both to tap a range of expertise and to open the forum to the most diverse viewpoints possible. Experience with scenario workshops has shown that 10-15 participants allows for an adequate range of expertise while keeping the number small enough to allow for all participants to participate comfortably (Machlis, 2010). Thus, we sought to include between 12 and 15 participants. Working with members of the Institute's Non-Government Organizations (NGOs) Liaison's Group (<http://thewaterinstitute.org/who-we-are/liaison-groups/>), we identified individuals with experience in various coastal economic activities: commercial fishing, shipping, natural resource management, sport hunting and fishing, and oil and gas. We also sought individuals from local government, local NGOs, and faith-based organizations, representatives of minority/vulnerable populations, the local business community, and land owners. Our staff worked with partner organizations such as the National Wildlife Federation (NWF) and the Coalition to Restore Coastal Louisiana (CRCL) to expand our contacts among communities and local organizations. Following a snowball method, we parleyed initial contacts into a larger list of potential participants.

We prepared an information sheet for potential participants (see Appendix). The sheet offered a brief description of the workshop aims, why it was important, and who we sought to include, along with contact information for Institute personnel. Staff visited the communities and met with local groups and individuals to explain our purpose, to distribute fliers, and ultimately to recruit willing participants. We followed up with phone or email communication, as appropriate, with potential participants. In the course of our outreach, we inquired about suitable meeting dates, times, and days of the week that would enable maximum participation.

While we were seeking participants, we also sought suitable meeting locations. Our initial plans called for three meetings to include participants from Terrebonne and Lafourche parishes, St. Bernard and Plaquemines parishes, and Cameron and Vermilion parishes. We sought meeting sites that were near the population centers of the two-parish territories that could accommodate the group seated around a set of tables, enable us to use a digital projector visible to all participants, and permit us to serve refreshments and lunch. We also sought a neutral site that no participants, particularly those representing marginalized populations, would not regard as "off limits." The Lafourche Parish Library in Cutoff offered use its meeting room for the initial meeting and Woodland Plantation, a commercial lodging and dining establishment in Plaquemines Parish, provided its large multipurpose room for the second meeting. The second meeting place was not geographically central, but was well known to residents and was relatively accessible.

Although three workshops were originally planned, it was not possible to complete arrangements for the Vermilion/Cameron Parish event before the opening of the summer shrimp fishing season. In order to gather information for use in developing the related adaptation toolkit during the summer of 2014—another part of the Science and Engineering Plan—we carried out only two workshops.

With locations selected and based, in part, on feasible dates provided by the participants, we announced meeting dates and times that did not conflict with major fishing seasons: Lafourche-Terrebonne, April 4, and Plaquemines-St. Bernard, April 21.

To prepare for the meetings we researched the basic social and economic patterns of the communities and we prepared a series of large reference maps that indicated the main communities, key habitats, and also the areas that would be influenced by the proposed Master Plan projects (CPRA 2012) for the communities.

We finalized our participant rosters, after which we developed an agenda and circulated it to the participants in advance of the meeting (see Appendix).

The two workshops were planned as full-day meetings with sufficient time to introduce the scenario process and to work through several actual scenarios. Participants who agreed to attend represented a diverse array of populations and interests and brought sound local expertise to the workshop (Tables 1 and 2). Of utmost importance was representation from those engaged in natural resource economic pursuits such as fishing and oyster gathering. We had participants in both meetings from minority communities, local government, local NGOs, and business/industry. There were unfortunate gaps, and several participants were unable to take part for the full-day meeting due to last-minute schedule conflicts. Nonetheless, there was satisfactory cross-sectional representation at both workshops.

Table 1: Plaquemines/St. Bernard Parish participants

Name	Organization/Affiliation
Rosina Phillippe	Grand Bayou native
Rev. Tyrone Edwards	Zion Traveler’s Cooperative Center
Albertine Kimble	Plaquemines Parish Coastal Program
Byron Marinovich	Plaquemines Parish Council - District 8
Foster Creppel	Woodlands Plantation owner
Terry Shelley	Terry’s Oysters
Earl Armstrong	Land owner and rancher
Twyla Herrington	Louisiana Sea Grant

Table 2: Lafourche/Terrebonne Parish participants

Name	Organization/Affiliation
Natalie Bergeron	Project Learn La-Terre
Michael Greene	La. Dept. Wildlife and Fisheries
Wendel Curole	South Lafourche Levee District
Paul Chiquet	Lafourche Parish Library
Joni Tuck	Greater Lafourche Port Commission
Jeff Leuenberger	Lafourche Parish Planning Office
Simone Maloz	Restore or Retreat
Betsy Billiot <i>(rep. for Thomas DarDar)</i>	United Houma Nation
Patty Whitney	Bayou Interfaith Shared Community Organization (BISCO)
Sarah Voisin	Oyster Task Force for the Louisiana Seafood Promotion Board

Each session began with a round of introductions of both the Institute staff and the participants. Craig Colten facilitated the meetings and Taylor Marshall, who had made advance arrangements, served as “scribe” and recorded the discussion in the software package SmartDraw. Of central importance in the introduction was conveying that we sought to tap their expertise and that the information they provided was valuable. In addition, we emphasized that we were not employees of state government, but we represented a research institute that would report to state government. Also, we stressed that the principal focus would be on social-economic consequences.

In order to introduce the scenario process, Institute staff used an illustrated presentation to acquaint the participants with the idea of scenarios and to explain how the group would proceed to assemble these scenarios. First, we explained that for any event in a human/environment system, many possible consequences could result. Each consequence could trigger additional possible consequences. We provided simple examples and then displayed them in the software we would be using (Figure 1). Next, we introduced the probability factor (Figure 1). Since not all consequences were as likely as the next, the process allows participants to assign each consequence a probability (Table 3), ranging from certain (5) to not possible (0). The participants would decide on the probability based on the group consensus. Deciding on an acceptable probability enabled the group to discuss the possibilities of a consequence, avoid debates over stark “yes” or “no” possibilities, and acknowledge the uncertainty of a particular consequence. Assigning probabilities also enables the procedure to include a wide range of possible consequences, regardless of how certain their occurrence. By assigning a low probability, unlikely outcomes could be included, but not receive undue weight. Also by assigning probabilities, the graphic record captures what the participants considered unlikely social

Figure 1: Example of scenario consequences with probabilities

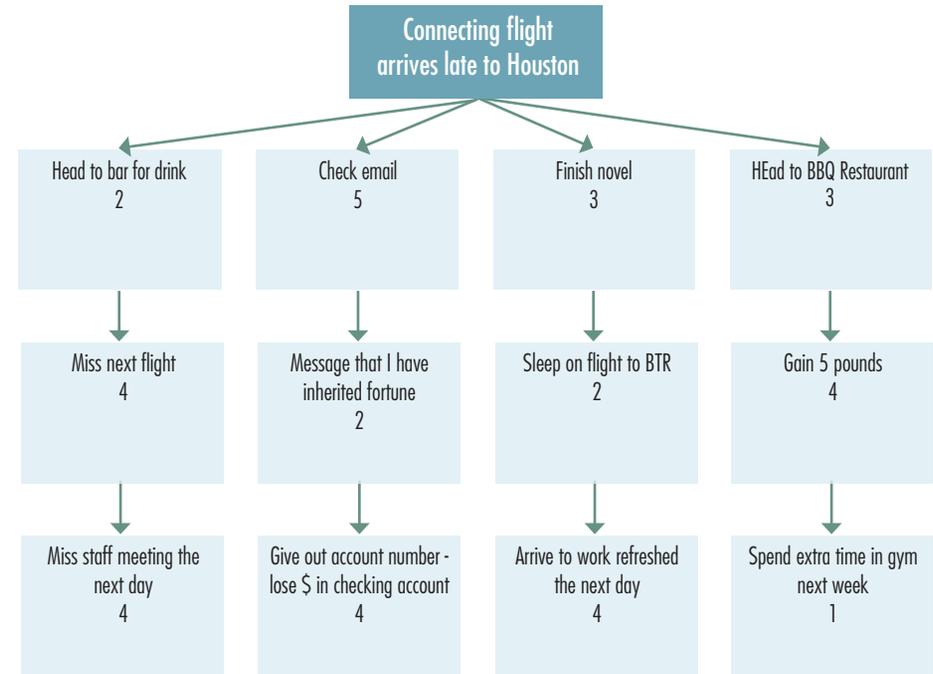


Table 3: Probabilities

Levels of Certainty
5 - certain
4 - reasonably certain
3 - probably
2 - plausible
1 - unlikely
0 - not possible
nk - not known

Based on probabilities developed by USDol Strategic Science Working Group (Machlis, 2010).

consequences, thereby exposing potential weaknesses or strengths of a particular scenario. Furthermore, in the event of some low probability consequences, subsequent consequences may indicate very high probability. Using probabilities allows these potential sequences to be recognized.

Following the discussion of the probability measure, we introduced the group to the parameters component. For each scenario it is essential to consider the particular situation, the geographic and temporal scales, and the size of the project (Table 4). The situation was fairly well defined as “with” or “without” a particular Master Plan action. We had selected several Master Plan projects for the localities (CPRA, 2012) and presented basic information taken from the Master Plan project descriptions (see Figure 2) to the group. From the Master Plan project descriptions, we could delimit the geographic and temporal scales and the relative size of the project. The Master Plan, for consistency’s sake, provided the parameters for each scenario.

A final aspect we sought to emphasize in these workshops was the human dimension. Since there has been excellent science that deals with the related topics of coastal land loss, coastal restoration, and flood risk, we were seeking to complement those findings with input on the social and economic aspects of the Master Plan projects. To sharpen the focus of the group on the human dimension, we introduced a list of social/cultural considerations (Table 5) and asked the group to direct their comments to, and be aware of, the full range of these elements of coupled human-environmental systems (Machlis, 2005).

Table 4: Matrix of parameters

Situation	Geographic Scale	Time Horizon	Size of Action
with action	local/community	1 year	small
without action	immediate region	20 years	medium
	coastwide	50 years	large

Table 5: Social/cultural elements of coupled human-environment system

Social Institutions	Social Order	Social Hierarchy
health/medical	gender	education/schools
shelter/housing	class	recreation/leisure
food/sustenance	family	government/politics
justice/law	beliefs	public safety (law enforcement, military, security)
religion	age	wealth
business/industry		power
		knowledge
		status
		territory

After introducing the process, we selected one Master Plan project, identified the parameters, and began considering the potential “ripple effects” or consequences that would follow initiation of that project. Since there is no predetermined end point, we allowed the discussion to move through several realms of social and economic effects. The moderator’s roll was to allow participants to drive the deliberations while keeping the discussion focused on the social/economic consequences. The groups discussed each scenario until it appeared that the principal concerns had been recorded or that interest was waning on the particular project. We attempted to cover several scenarios at each site. We took regular breaks to allow participants to refresh themselves. No scenario was able to explore all the potential cascading consequences. Consequently, each scenario in the pilot project is representative rather than exhaustive.

Problems emerged along the way. Recording the discussion using the SmartDraw software sometimes failed to keep pace with the group’s mental processes and working to condense concerns in phrases to fit the format was less than ideal. Despite preworkshop training and “dress rehearsals,” working with SmartDraw proved difficult and, at the second workshop, our laptop computer was sluggish and complicated the process unnecessarily. We shifted to recording some comments in a word processing program and then converting those observations to SmartDraw. Nonetheless, the visual presentation afforded by SmartDraw was superior in terms of visual organization to simple text displays.

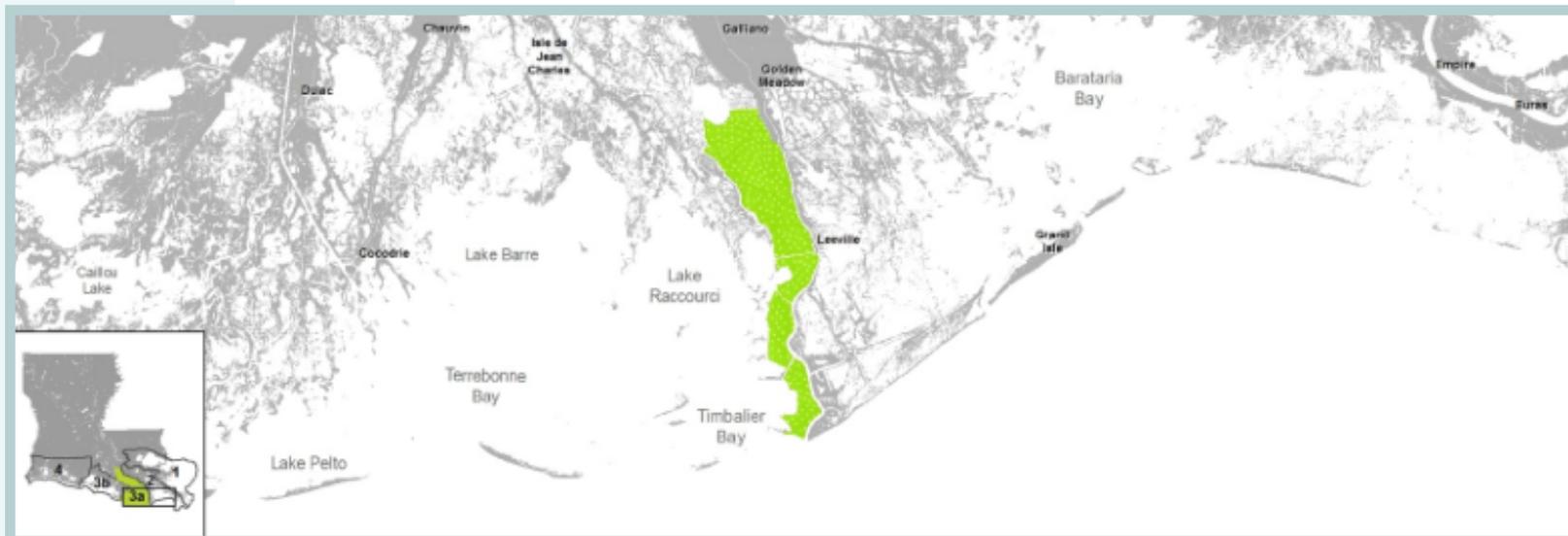
In addition, keeping the discussion on scenarios, rather than personal criticisms, proved challenging. Indeed, at both workshops, extended personal narratives about local issues consumed large blocks of time. These personal accounts illustrate a firm commitment on the part of the participants to preserving local social and economic institutions and deep-set frustration with what the participants apparently viewed as an inadequate opportunity for citizen input into the Master Plan process. The purpose of the workshops was not to document citizen participation in previous hearings and public meetings. Whether or not participants took advantage of previous opportunities did not alter the fact that frustration with access to the decision-making process was a common refrain

At the Plaquemines/St. Bernard workshop, participants desired to terminate the scenario for life without the Master Plan project, preferring instead to focus on assessing additional projects. One participant made the argument that carrying out this scenario would merely give state officials further justification for the project, suggesting the scenario process played into the hands of the state. They also recommended that we deviate from the scenario framework and consider alternate projects. After working through two scenarios, we followed their recommendation, but the alternative scenarios did not have clearly defined parameters. Nonetheless, they do offer further insight into local concerns and reveal a desire for local inclusion in defining the list of options to be considered. 💧

TERREBONNE-LAFOURCHE SCENARIOS

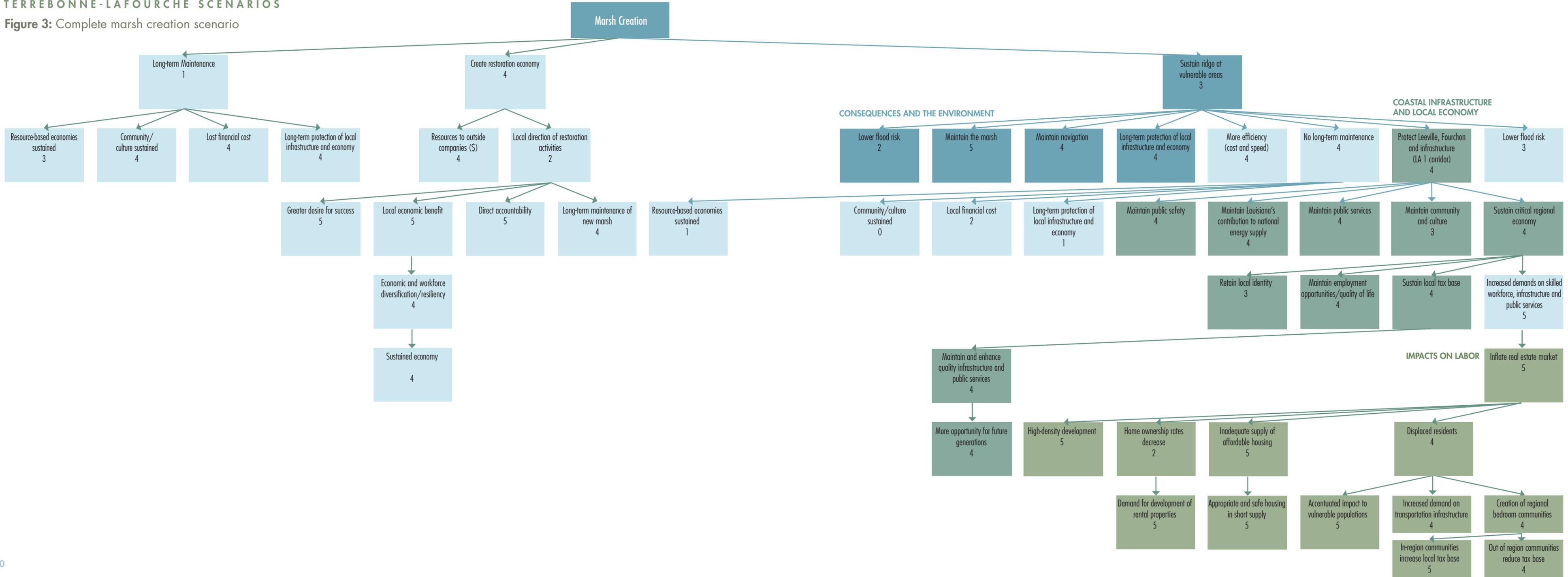
The initial scenario considered by the Terrebonne-Lafourche workshop was the Belle Pass-Golden Meadow Marsh Creation Project (03a.MC.07; Figure 2 and 3). According to the Master Plan, this project is intended to establish some 14,400 acres of marsh in order to create new wetland habitat, restore degraded marsh, and to reduce wave erosion in an area west of Bayou Lafourche from near the community of Golden Meadow to near Port Fourchon (CPRA, 2012). The geographic parameter was defined by the Master Plan project description, and the group discussed the project's first increment from 2012 to 2031 (Master Plan Appendix A2, C-9 - 10).

Figure 2: Belle Pass - Lafourche marsh creation project



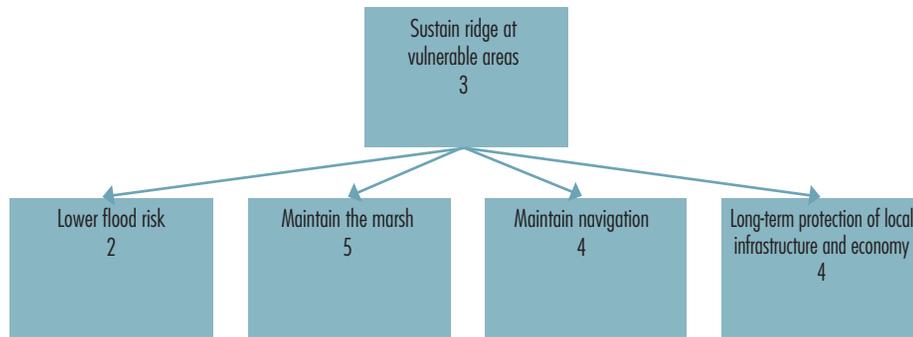
Source: CPRA, 2012.

Figure 3: Complete marsh creation scenario



TERREBONNE-LAFOURCHE SCENARIOS

Figure 4: Marsh creation scenario - consequences and the environment

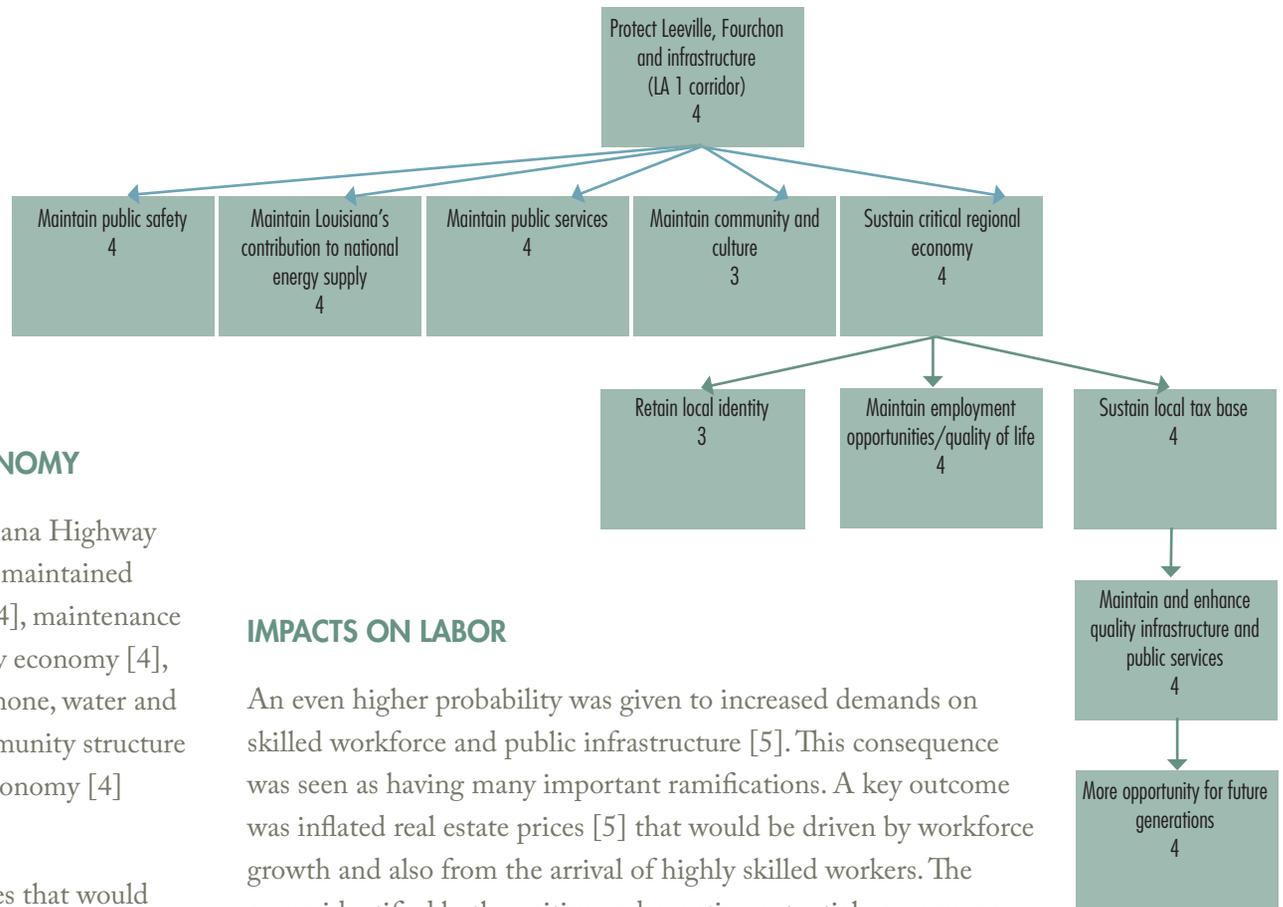


CONSEQUENCES AND THE ENVIRONMENT

Local participants made the point that in order for marsh creation to succeed the initial step would be to sustain “ridges” at vulnerable locations, thereby protecting the new marsh. Participants saw ridges (or containment dikes) as critical to the viability of any subsequent marsh creation. However, they only thought there was a probability of 3 that they would be included. Participants expressed the view that without ridges to contain and protect the new marsh, erosion and dispersal of sediment would destroy restoration efforts. Ridges are not prominent natural features of Louisiana’s deltaic marshes close to the coast. Sustaining the proposed ridges according to the scenarios would lead to: protection of Leeville, Port Fourchon, and LA 1 [4]², lower flood risks [3], maintenance of navigation [4], maintenance of marsh [5], and greater efficiencies in the entire long-term marsh creation project [4] (Figure 3 and 4). Such concerns underscore the local desire to achieve a sustainable coast and avoid huge investments that are not perpetuated over the long-term.

² Probabilities assigned by the group appear in brackets after each possible consequence in the body of this document.

Figure 5: Marsh creation scenario - coastal infrastructure and local economy



COASTAL INFRASTRUCTURE AND LOCAL ECONOMY

By protecting Port Fourchon, Leeville, and Louisiana Highway 1, participants foresaw the ensuing consequences: maintained public safety (police, fire, and ambulance access) [4], maintenance of Louisiana's contribution to the country's energy economy [4], maintenance of public services (utilities such as phone, water and sewerage, etc.) [4], and maintenance of local community structure and culture [3], and sustaining the critical local economy [4] (Figure 5).

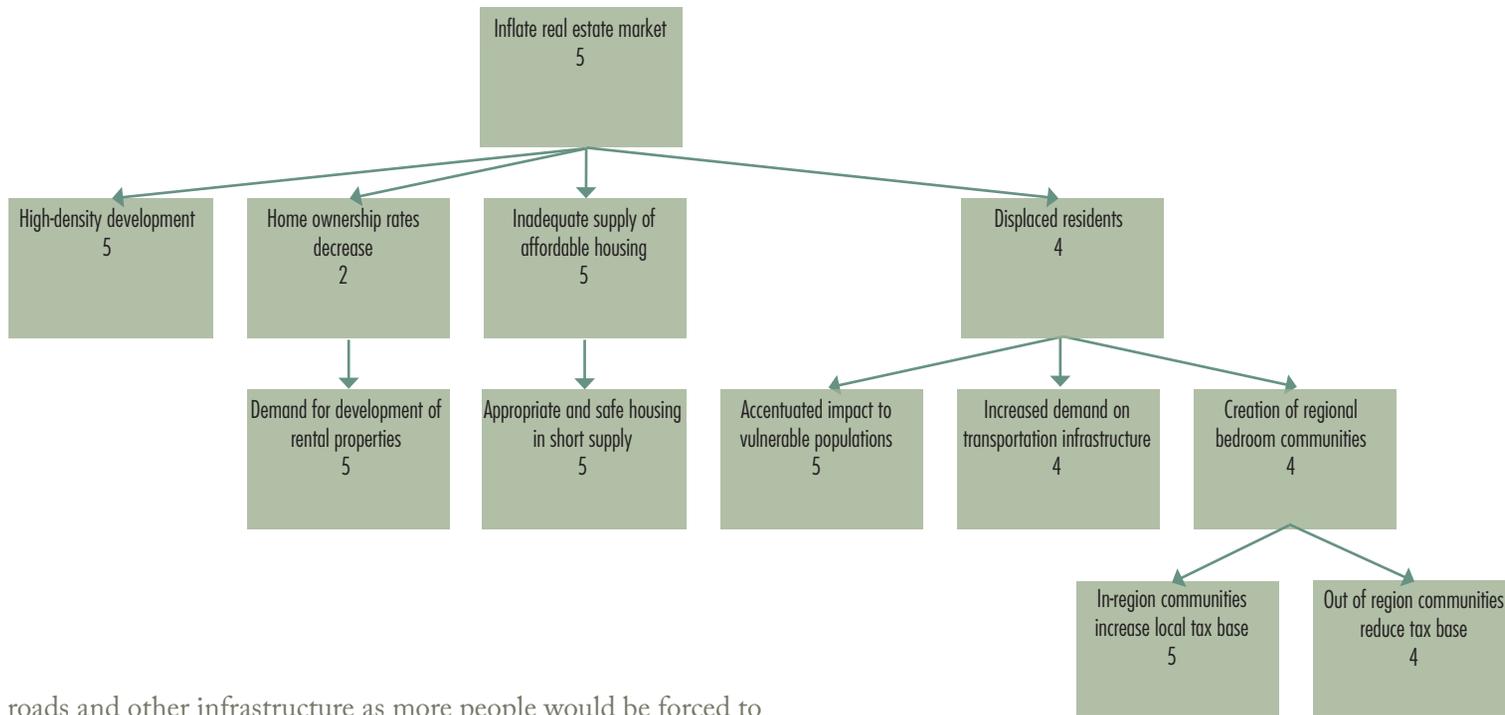
An extended discussion of additional consequences that would flow from the protection of the lower bayou communities and infrastructure covered important social and economic issues. In particular, the group wanted to explore in greater detail the consequences that could result from sustaining the critical local economy. Two consequences that the group decided had high probabilities were maintenance of employment and quality of life [4] and maintenance of the local tax base [4] that would contribute to maintaining infrastructure and related public services [4] that could contribute to opportunities for future generations [4] (Figure 5).

IMPACTS ON LABOR

An even higher probability was given to increased demands on skilled workforce and public infrastructure [5]. This consequence was seen as having many important ramifications. A key outcome was inflated real estate prices [5] that would be driven by workforce growth and also from the arrival of highly skilled workers. The group identified both positive and negative potential consequences that would follow. On a positive note, the group decided that high density development would be likely [5]. Given the limited amount of viable land for development in the coastal region, this process was presented as a positive trend. Less desirable, however, would be an inadequate supply of affordable housing [5] and the displacement of residents who were unable to afford housing [4]. The group noted that displacement would be accentuated among vulnerable populations [5] and that it would place increased demand on

TERREBONNE-LAFOURCHE SCENARIOS

Figure 6: Marsh creation scenario - impacts on labor



roads and other infrastructure as more people would be forced to commute longer distances [4]. Displacement could also contribute to the creation of bedroom communities outside the two-parish region [4] and thus deny the parish tax revenue [4].³

Sustaining local identity [3] is one of the intangibles that was included under sustaining the critical local economy (Figure 5). Identification with a location or group can be a powerful force when a person is deciding to remain in a precarious situation or elects to leave (Burley, 2010). It has no easily assigned monetary value, but it is fundamentally important at the local level. Nevertheless, sustaining local identity through protection of communities and infrastructure only received a probability of 3. The moderate probability suggests local identity is not seen as thoroughly intertwined with economic and infrastructure maintenance, and reflects the notion that it operates, to a degree, independently of

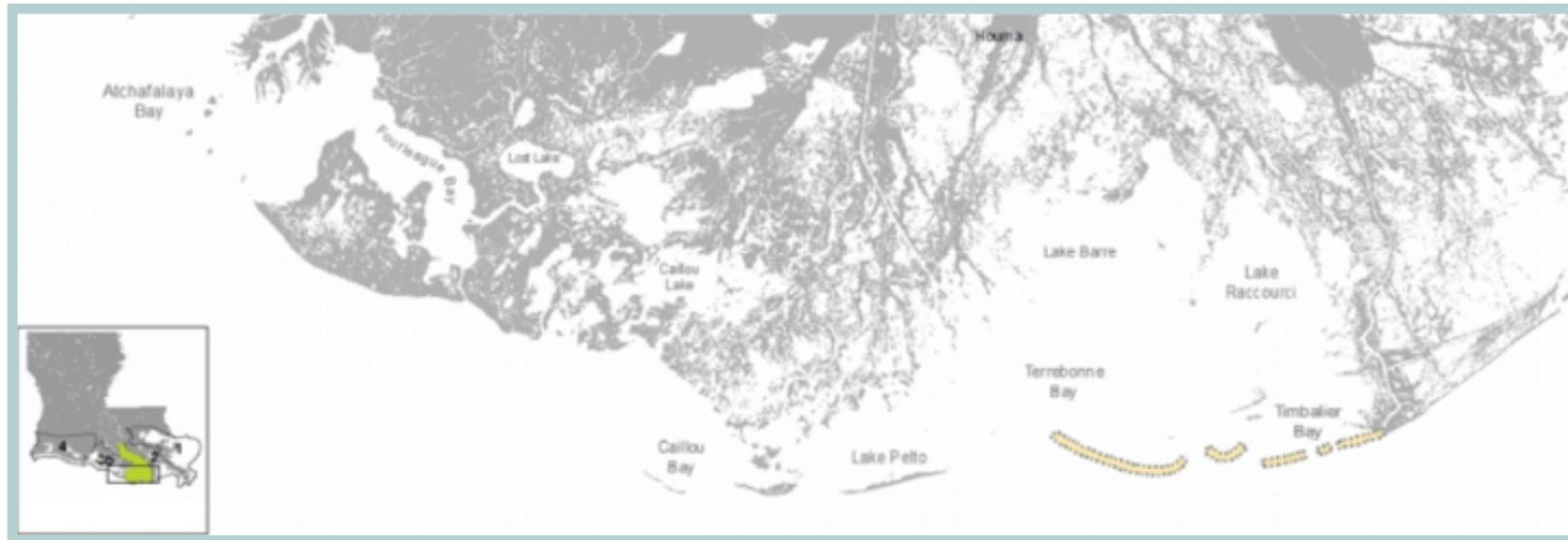
these factors. Another possibility is that maintaining a critical local economy will not sustain local identity and culture.

An additional observation was that long-term maintenance of the marsh was essential. In terms of social and economic aspects of coastal restoration, long-term maintenance demands an on-going commitment to preserving the investments in coastal projects beyond the terms of elected officials and the careers of current agency personnel. In addition, it requires the dedication of funds for maintenance that may not be included in the Master Plan budget projections. The cascading consequences of long-term maintenance were: (1) sustained local resource-based economy and culture, (2) protection of infrastructure, and (3) no loss of the investment in the original project.

³ The Data Center (2014) reports that long-distance commuting is already a prominent characteristic of the coastal work force.

The second scenario carried out with the Terrebonne-Lafourche group focused on barrier islands. The stakeholders worked with the Timbalier Islands project (03a.BH.04; [Figure 7 and 8]), which, according to the Master Plan, is to provide dune, beach, and back barrier island habitat and provide storm surge and wave attenuation (CPRA, 2012).

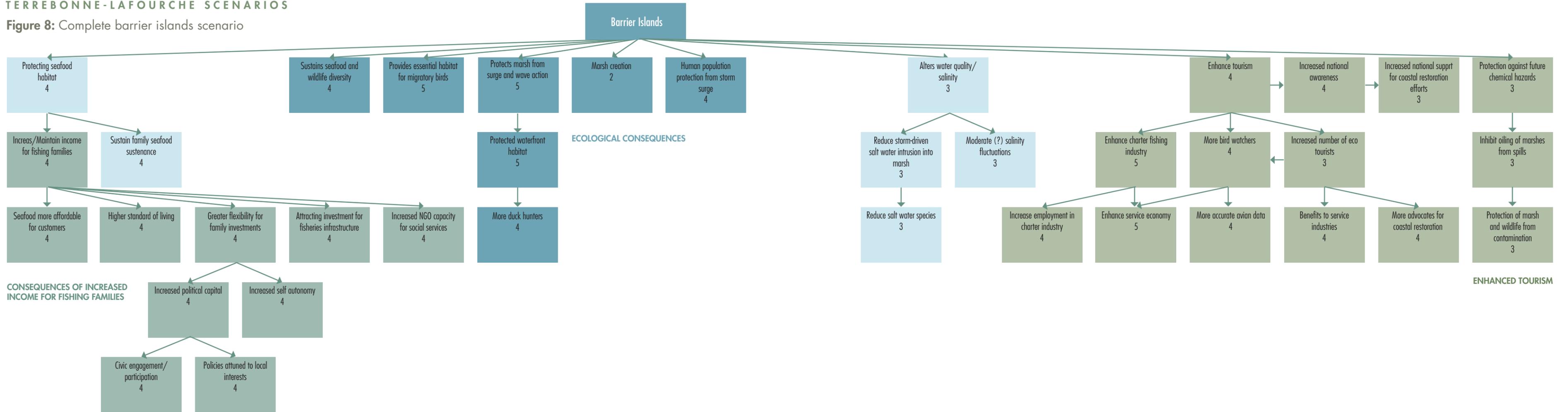
Figure 7: Barrier islands – Timbalier Islands project



Source: CPRA, 2012.

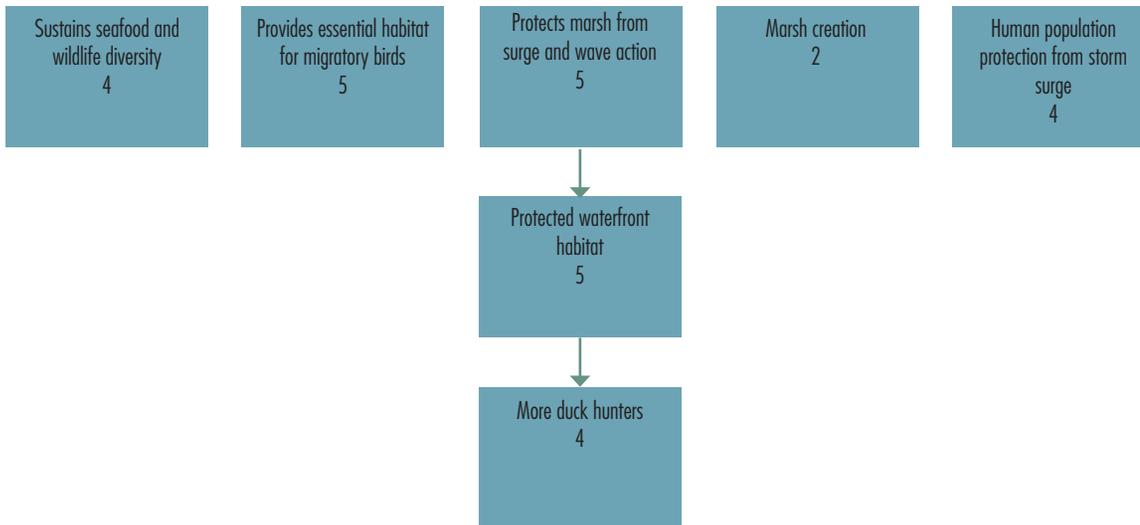
TERREBONNE-LAFOURCHE SCENARIOS

Figure 8: Complete barrier islands scenario



TERREBONNE-LAFOURCHE SCENARIOS

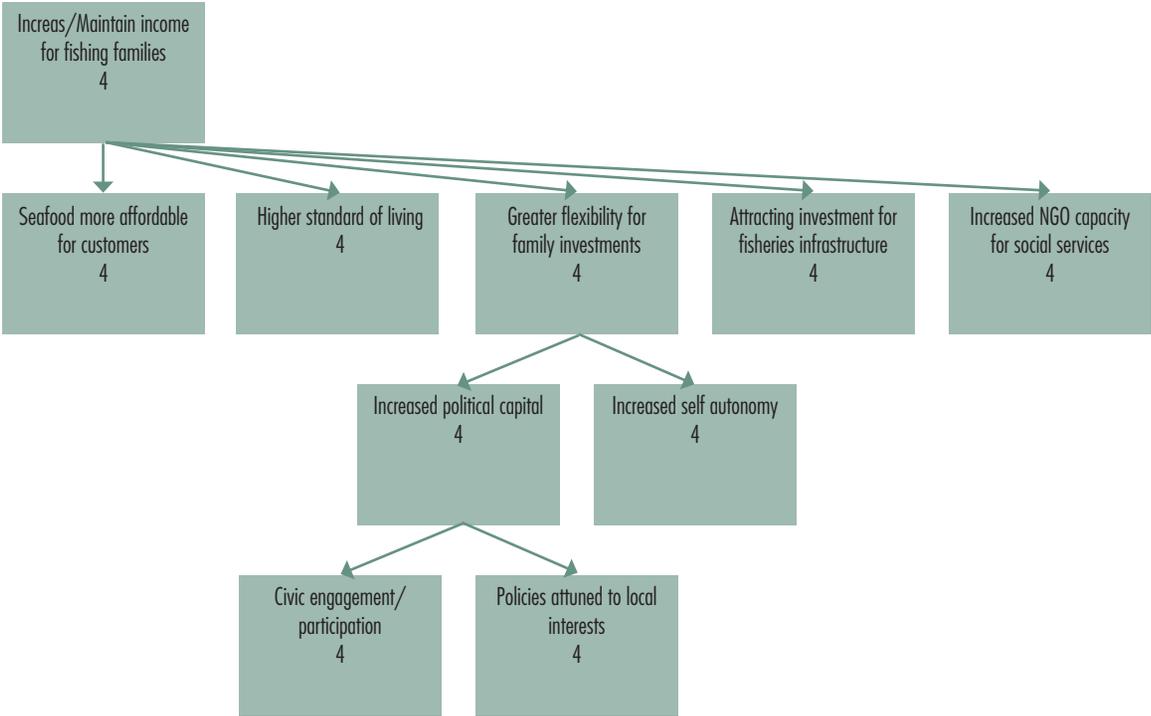
Figure 9: Barrier islands scenario - ecological consequences



ECOLOGICAL CONSEQUENCES

In this scenario, the group identified numerous ecological benefits that would likely follow completion of the barrier islands (Figure 9). Among them were: habitat for migratory waterfowl [5], new marsh creation [2], sustaining diverse seafood and wildlife populations [4], and protecting seafood habitat [4].

Figure 10: Barrier islands scenario - consequences of increased income for fishing families



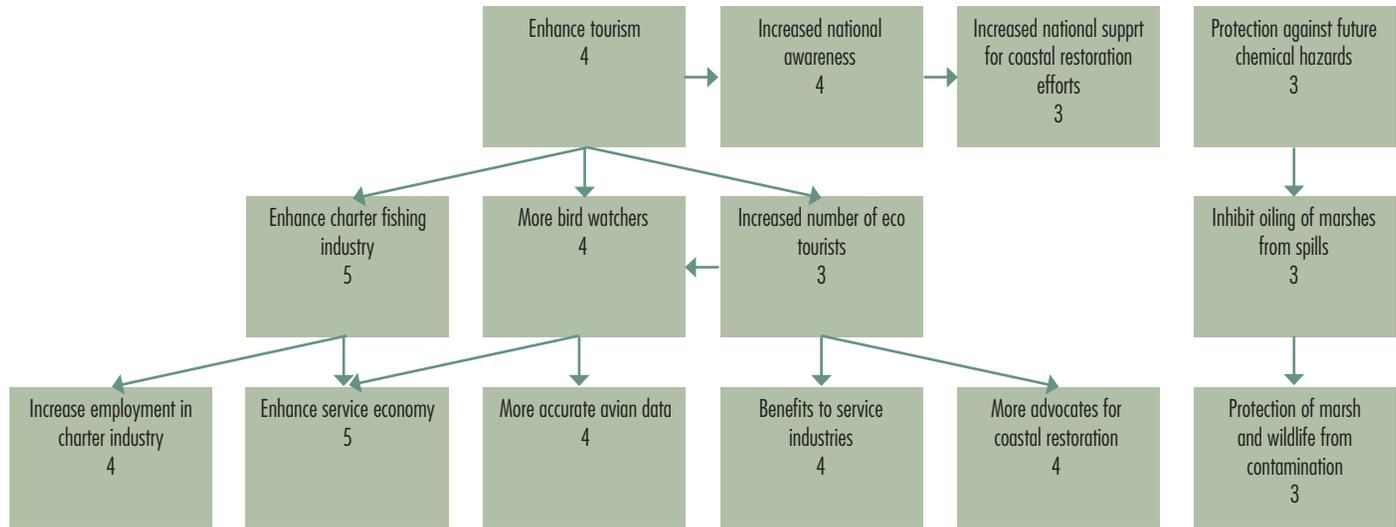
CONSEQUENCES OF INCREASED INCOME FOR FISHING FAMILIES

Underscoring local concern with local economies, a likely consequence from the protection of seafood habitat would be maintenance of fishing family incomes [4]. This one aspect of the coastal economy (Figure 10) was seen as a means to make seafood more affordable to consumers [4], enable local fishing families to have a higher standard of living [4], enable fishing families to have greater flexibility in personal investments [4], leverage more funds

for the fisheries infrastructure [4], and increase the capacity of NGOs to provide social services. Families with greater flexibility in personal investments would have increased political capital [4] and increased self-autonomy [4]. With greater political capital, residents would be more likely to be engaged citizens [4] and be able to secure policies attuned to local interests. Obviously maintaining the commercial fishing economy is seen as linked to many direct social and economic outcomes that the participants viewed in a positive light.

TERREBONNE-LAFOURCHE SCENARIOS

Figure 11: Barrier islands scenario - enhanced tourism



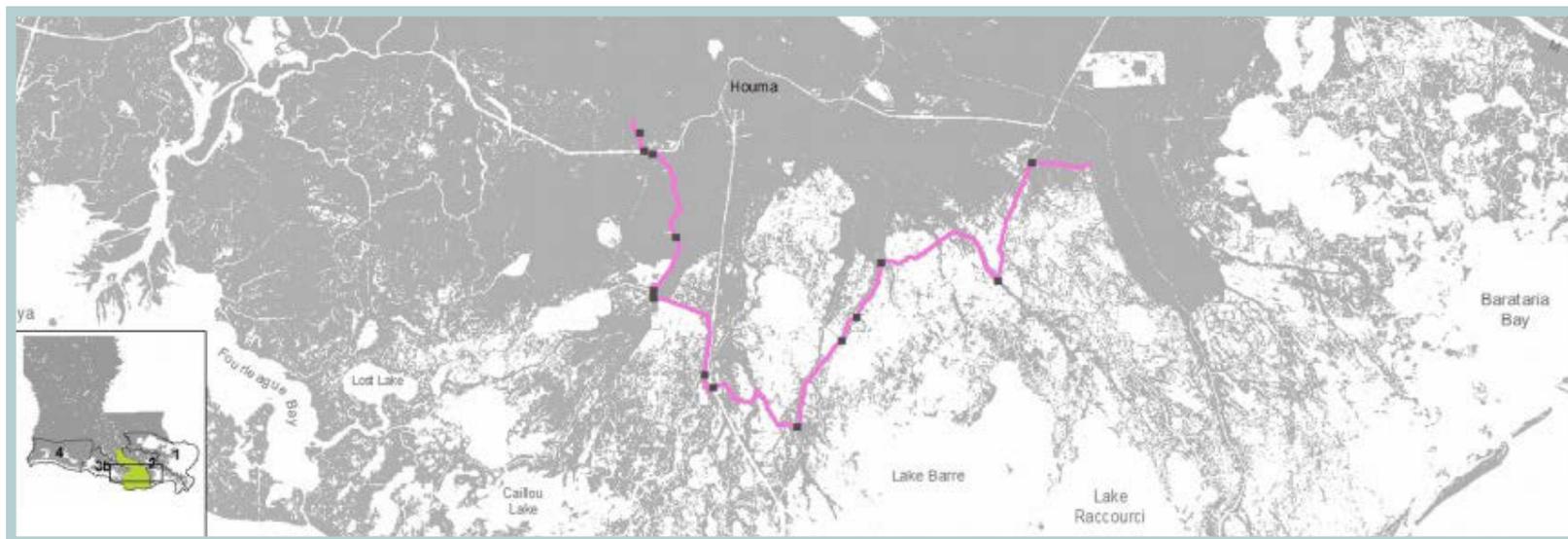
ENHANCED TOURISM

The barrier island scenario also revealed local concern with outside attention to the plight of the Louisiana coast. By restoring the barrier islands, participants commented that there would be enhanced tourism [4], which would stimulate greater national awareness of the coastal situation [4], and this could lead to increased national support for restoration efforts [3]. Increased tourism would also contribute to positive economic consequences: enhanced fishing charter business [5], more bird watchers [4], and more ecotourists [3] (Figure 11).

TERREBONNE-LAFOURCHE SCENARIOS

The group also elected to work on the Morganza-to-the-Gulf project (03.a.HP.02b; [Figure 12 and 13]). This project proposes to build approximately 65 miles of levees and a concrete T-wall around the Houma and Terrebonne ridge (natural levee) communities for storm surge risk reduction. There is strong support in Terrebonne Parish for this project.

Figure 12: Morganza-to-the-Gulf project



Source: CPRA, 2012.

TERREBONNE-LAFOURCHE SCENARIOS

Figure 13: Complete Morganza-to-the-Gulf scenario

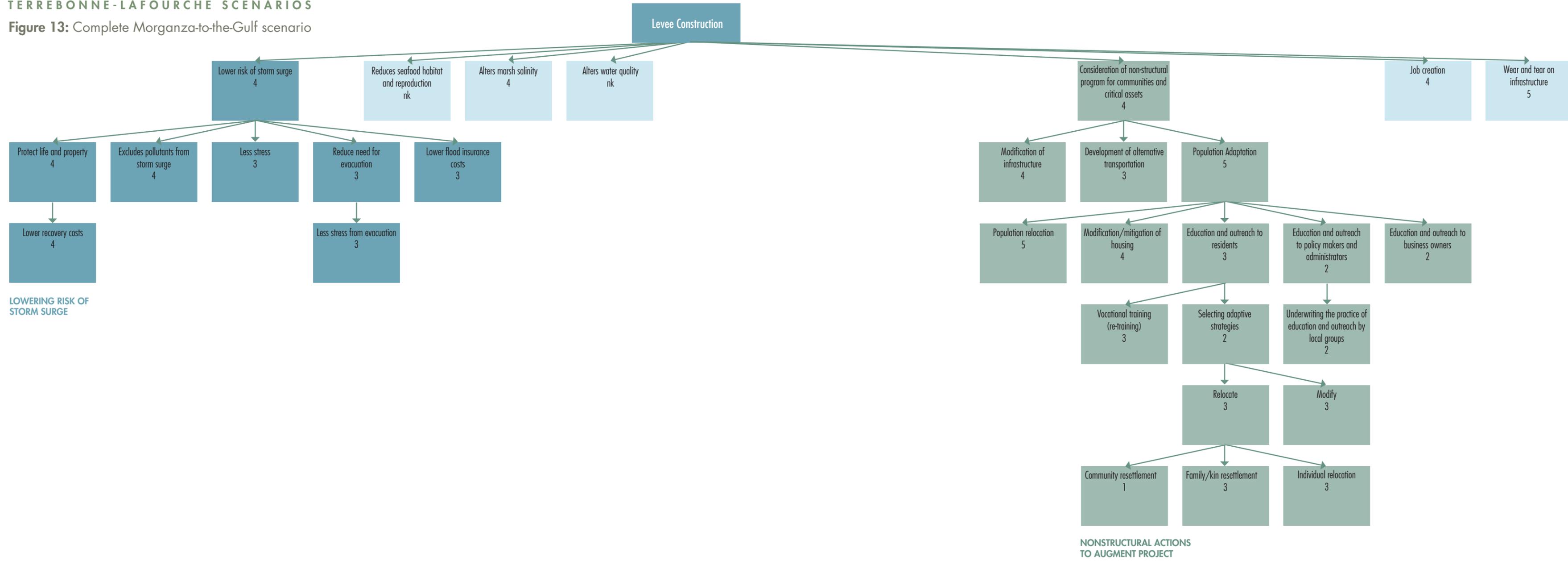
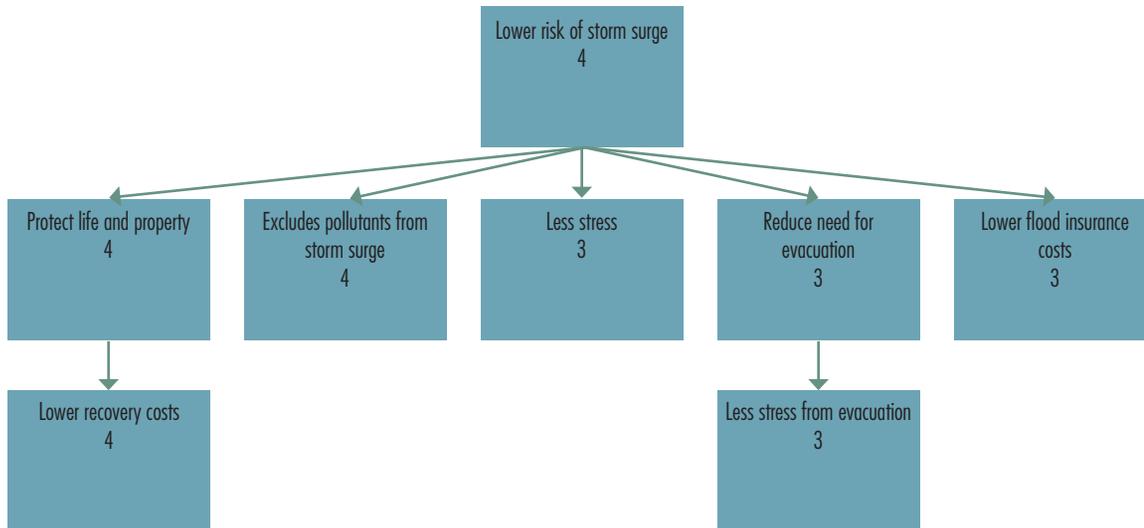


Figure 14: Morganza-to-the-Gulf scenario - lowering risk of storm surge

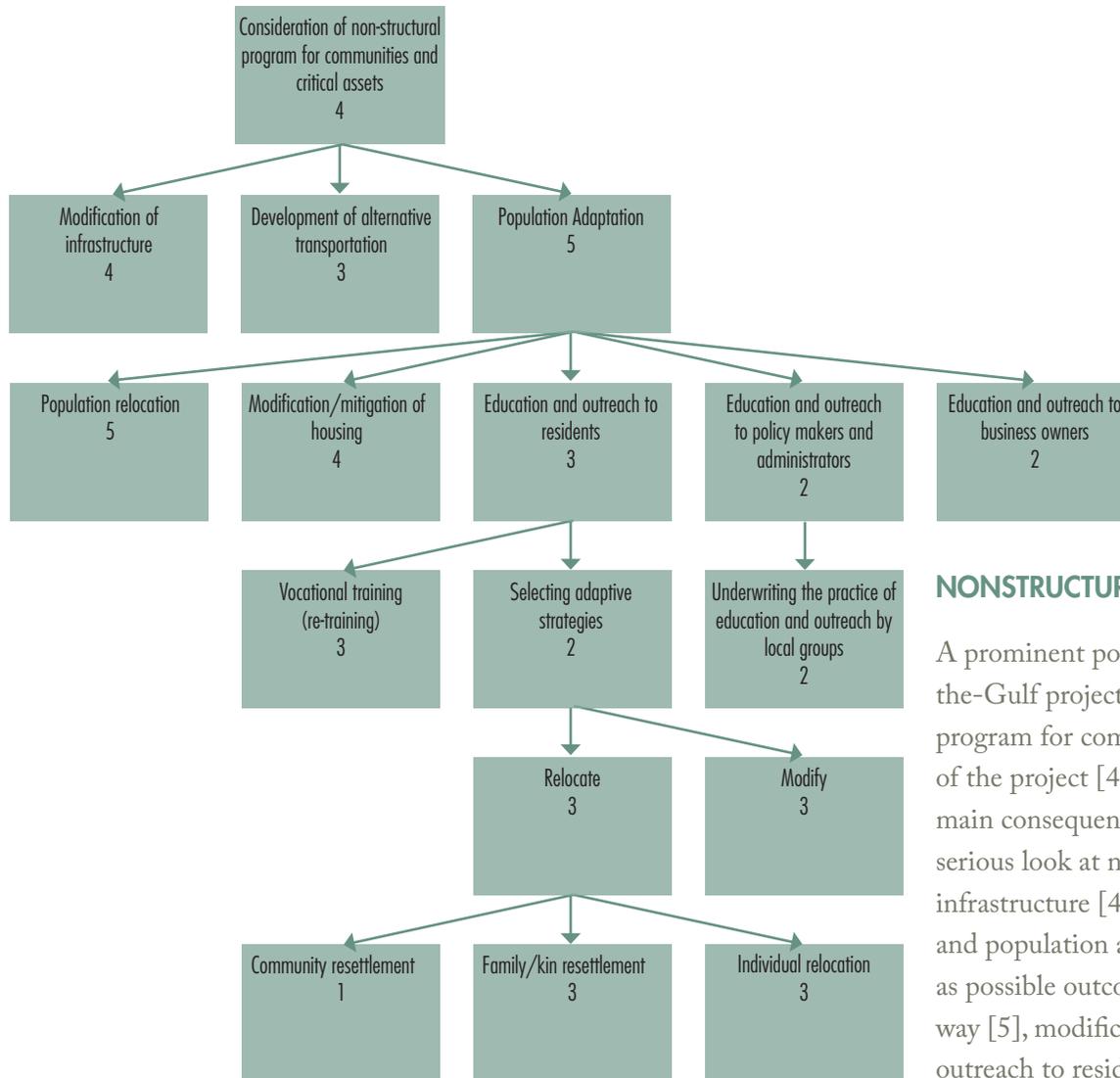


LOWERING RISK OF STORM SURGE

The participants decided there was a significant probability that it would provide surge protection [4], and that this would protect life and property [4], lower stress for inhabitants [4,] reduce the need for evacuation [4], and lower flood insurance rates [3] (Figure 14).

TERREBONNE-LAFOURCHE SCENARIOS

Figure 15: Morganza-to-the-Gulf scenario - nonstructural actions to augment project



NONSTRUCTURAL ACTIONS TO AUGMENT PROJECT

A prominent portion of the discussion on the Morganza-to-the-Gulf project centered on consideration of a nonstructural program for communities and critical assets, which is not part of the project [4] (Figure 15). The participants identified three main consequences that would follow local governments taking a serious look at nonstructural coastal protection: modification of infrastructure [4], development of alternative transportation [3], and population adaptation [5]. The adaptations the group foresaw as possible outcomes included population relocation out of harm's way [5], modification of housing (e.g., elevated) [4], education and outreach to residents [3], education and outreach to policy makers and administrators [2], and education and outreach to business owners [2]. Despite the relatively modest expenditures required for education and outreach options compared to structural components, the group indicated a fairly low probability of this occurring. Among the outcomes of outreach to residents, the group envisioned

they would be involved in selecting adaptive strategies [2] that might include relocation [3]. Among the options for relocation, the group indicated there could be three different scenarios: community resettlement [1], family/kin resettlement [3], and individual relocation [3]. From the probabilities assigned, they indicated that there was a stronger probability that some form of support for family/kin group resettlement than wholesale community resettlement.

The Terrebonne-Lafourche group worked through several scenarios, but the number of participants dwindled before we were able to revisit any of the completed scenarios to consider them without the Master Plan project as proposed. This was the result of inappropriate time management on the part of the facilitator. The completed scenarios, nonetheless, offer valuable insights into local understanding and concerns.

Several priorities came to light in the course of this workshop. This group considered coastal protection as central to the economic and social vitality of the two parishes. They desired local input into the process and expected protection of local natural resource-based economies. They expressed concern not only with preservation of the local economy, but with sustaining the intangible “identity” of the coastal communities. Coastal protection/restoration is seen in the light of more than just economic measures. Economic stability is seen as a pathway to greater personal and local autonomy and greater civic involvement. The participants also noted that economic stability provided the resources to sustain public services, particularly educational facilities at the local level. Safety, while a topic of concern, was largely secondary to economic vitality. 💧



PARISHES OF FOCUS

Terrebonne

Lafourche

St. Bernard

Plaquemines

ST. BERNARD-PLAQUEMINES SCENARIOS

The St. Bernard-Plaquemines workshop group had participants with direct involvement in natural resource related activities as fishermen, oystermen, seafood distributors, and operation of tourist facilities that depended on sport hunters and fishermen. The group was exceptionally knowledgeable in local wetlands geography and ecology. The first scenario considered the consequences of the Mid-Barataria diversion. This project (022.DI.03; Figure 16) is envisioned to divert

Mississippi River sediment into Barataria Bay where land loss has occurred and where large areas of oyster leases and shrimp habitat exist. Its purpose is to build and maintain land. The first implementation period in the Master Plan is to occur between 2012 and 2031. Participants were aware of this project and it has been the topic of vigorous public discussions in the months prior to the workshop.

Figure 16: Mid-Barataria Diversion



Source: CPRA, 2012, Appendix A2.

Figure 17: Mid-Barataria Diversion scenario

The discussion centered on biophysical impacts and possible political ripple effects (Figure 17). The initial consequence, which the group foresaw contributing to several related outcomes, was lowering salinity with the arrival of fresh water from the river [5]. The participants identified two direct outcomes: saltwater marsh die off [5] and oyster die off [5]. With an oyster die off, they projected that the oyster fishery would be disrupted [5]. Flowing from this outcome would be several possible consequences: a related disruption of marine fisheries [5], oyster men would move/rebuild reefs [1], and there would be community pressure on the state [5]. This final possible outcome reflects a long-standing tradition among the oyster fishermen to push back against actions that diminish the habitat and productivity of their leases. The group indicated that pressure would lead to policy adjustments [5]. Among the possibilities that the group identified were: the state would buy out the fishermen [3], the state would listen and respond to the fishermen [4], and the oil and gas industry would be excluded from leasing oyster beds [1]. Exclusion of oil and gas interests from leasing oyster beds was deemed unlikely.

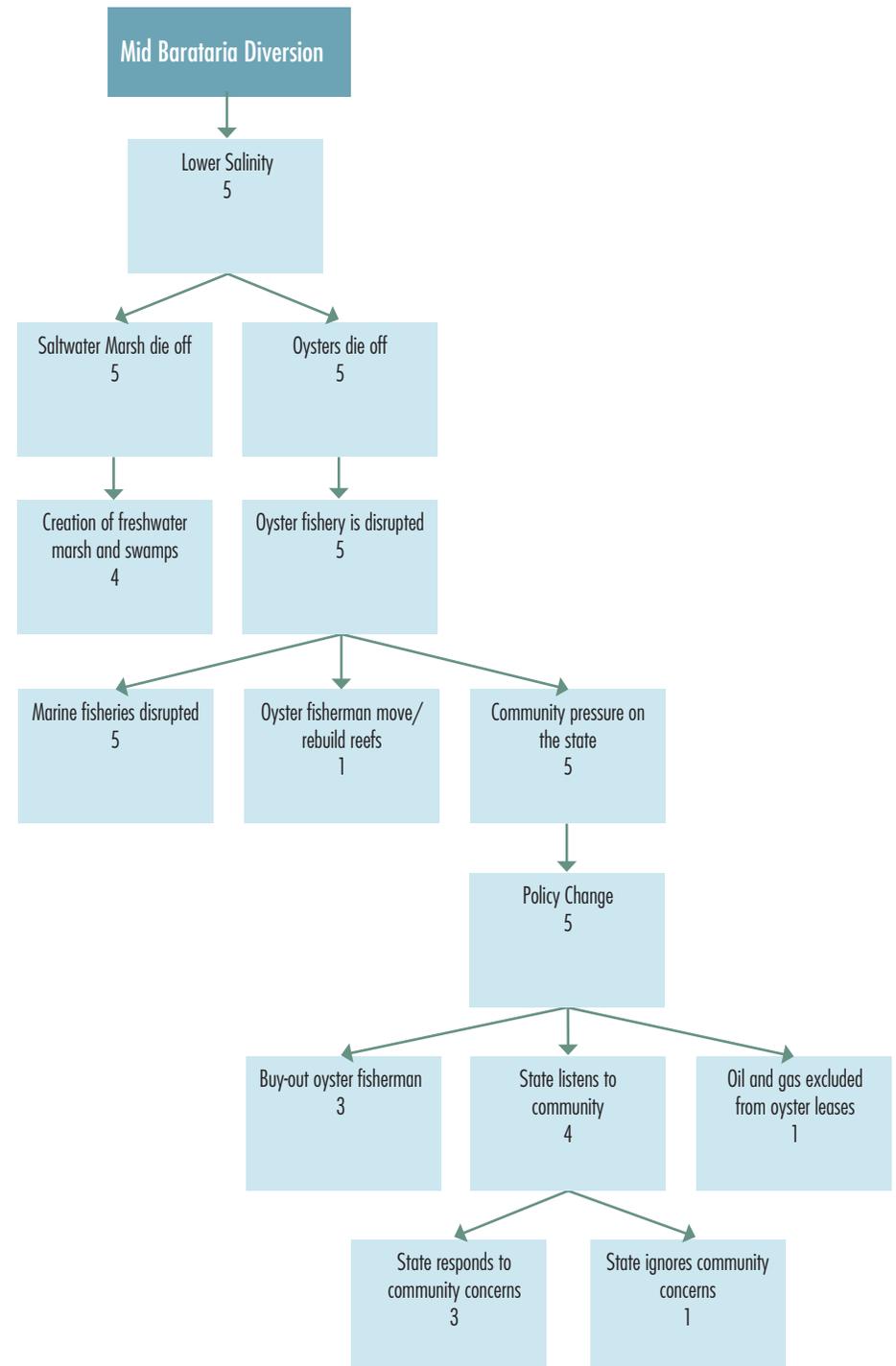
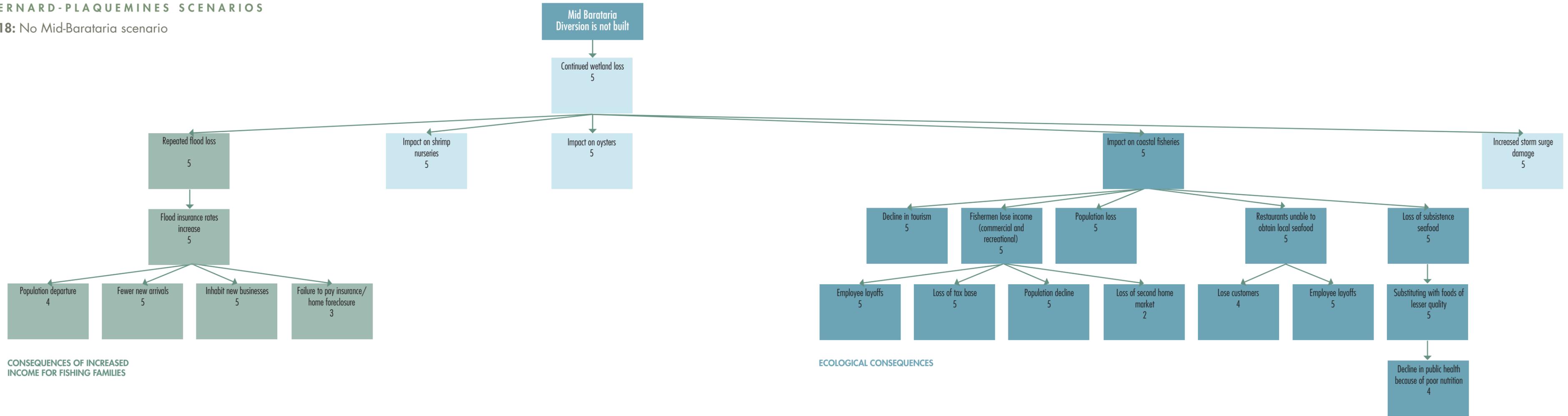


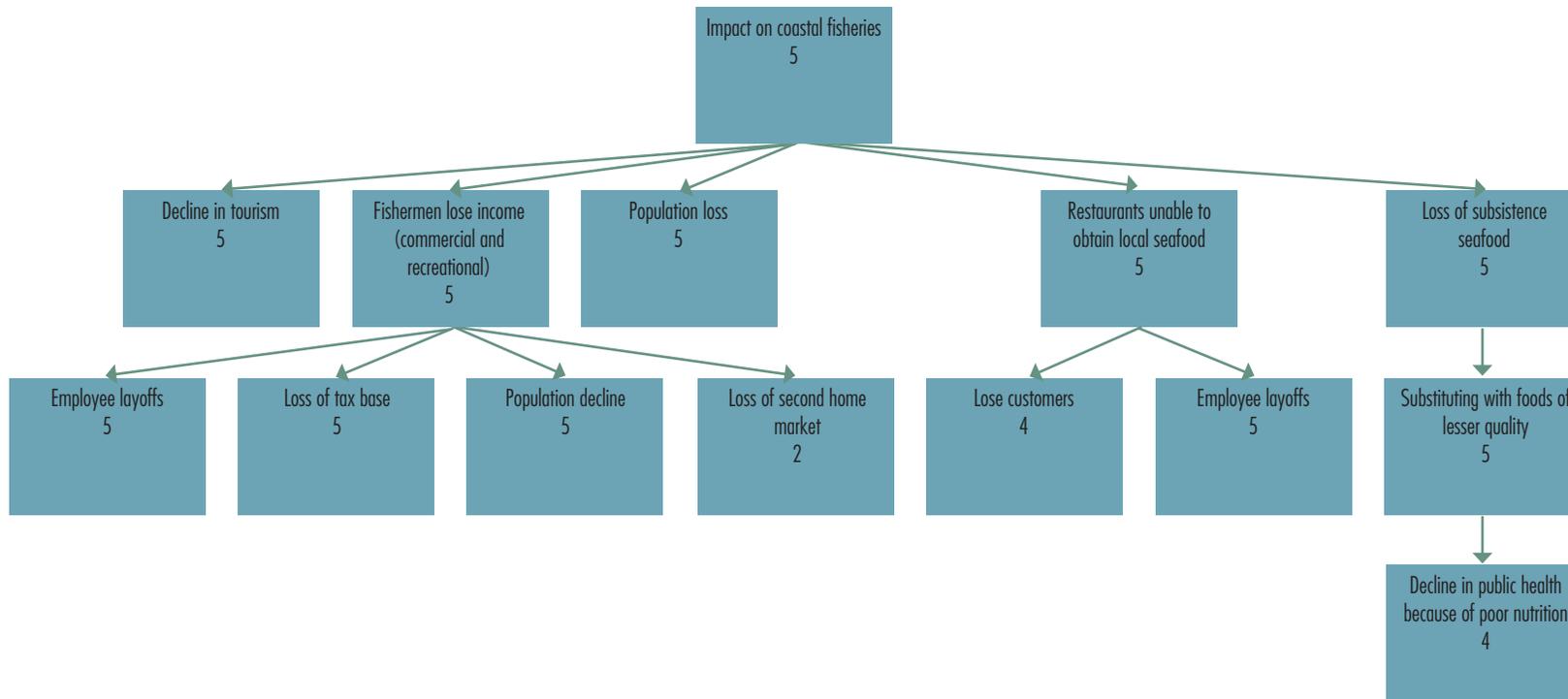
Figure 18: No Mid-Barataria scenario



CONSEQUENCES OF INCREASED INCOME FOR FISHING FAMILIES

ECOLOGICAL CONSEQUENCES

Figure 19: No Mid-Barataria scenario - consequences following impacts to local fisheries

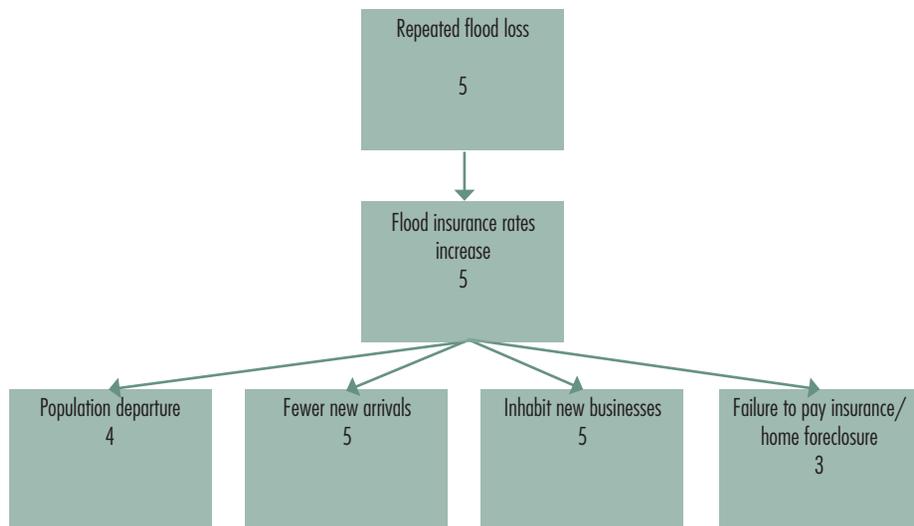


CONSEQUENCES FOLLOWING IMPACTS TO LOCAL FISHERIES

When the group considered the situation without the Mid-Barataria diversion, they focused initially on the biophysical impacts that would impact local natural resource-based economies (Figure 18 and 19). They noted that there would be continued wetland loss [5]. The loss of wetland could lead to: repeated flood losses [5], impact on oysters [5], impacts on shrimp nurseries [5], impact on coastal fisheries [5], and increased storm surge damage

[5]. The group followed up on the impact on coastal fisheries by considering the potential economic consequences. They foresaw a decline in tourism [5], loss of income by commercial and recreational fishing operations [5], population loss due to loss of employment opportunities [5], restaurants unable to provide local seafood to diners [5], and loss of subsistence seafood [5]. The loss of subsistence seafood could lead to substitution of foods of lesser quality into daily diets [5] and decline in public health due to poor nutrition [4].

Figure 20: No Mid-Barataria scenario - flooding consequences



FLOODING CONSEQUENCES

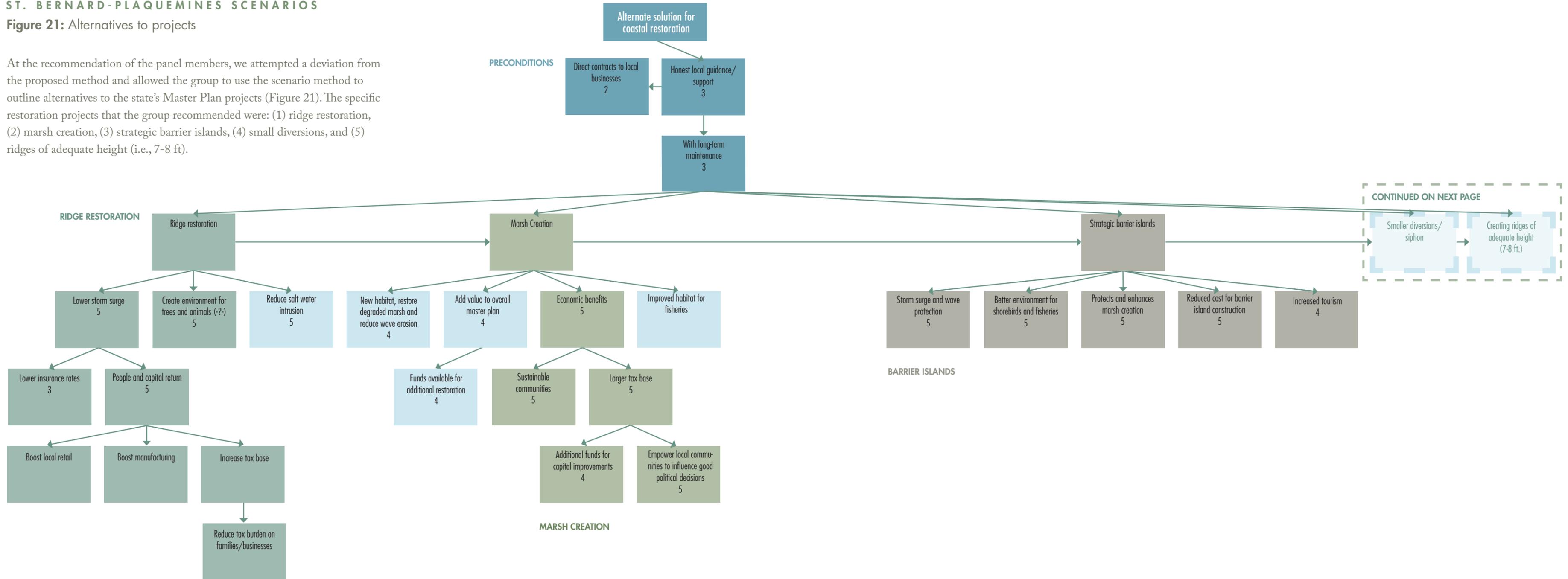
As a consequence of increased flood losses, the group projected an increase in flood insurance rates [5] that could be followed by population departure [4], decline in new arrivals to the parishes [5], discouraging new businesses in parishes [5], and increased number of foreclosures due to inability of homeowners to pay premiums [3] (Figure 20).

Following the brief discussion of possible negative outcomes, the group asked to terminate the “without action” scenario. A member of the group indicated that this scenario played into the hands of state officials who sought to move forward with the diversion. At a very basic level it reveals that residents are cognizant of the many undesirable consequences of a future without restoration, and also a fundamental lack of confidence in state officials to listen to residents.

ST. BERNARD-PLAQUEMINES SCENARIOS

Figure 21: Alternatives to projects

At the recommendation of the panel members, we attempted a deviation from the proposed method and allowed the group to use the scenario method to outline alternatives to the state’s Master Plan projects (Figure 21). The specific restoration projects that the group recommended were: (1) ridge restoration, (2) marsh creation, (3) strategic barrier islands, (4) small diversions, and (5) ridges of adequate height (i.e., 7-8 ft.).



ST. BERNARD-PLAQUEMINES SCENARIOS

Figure 21: Alternatives to projects (continued)

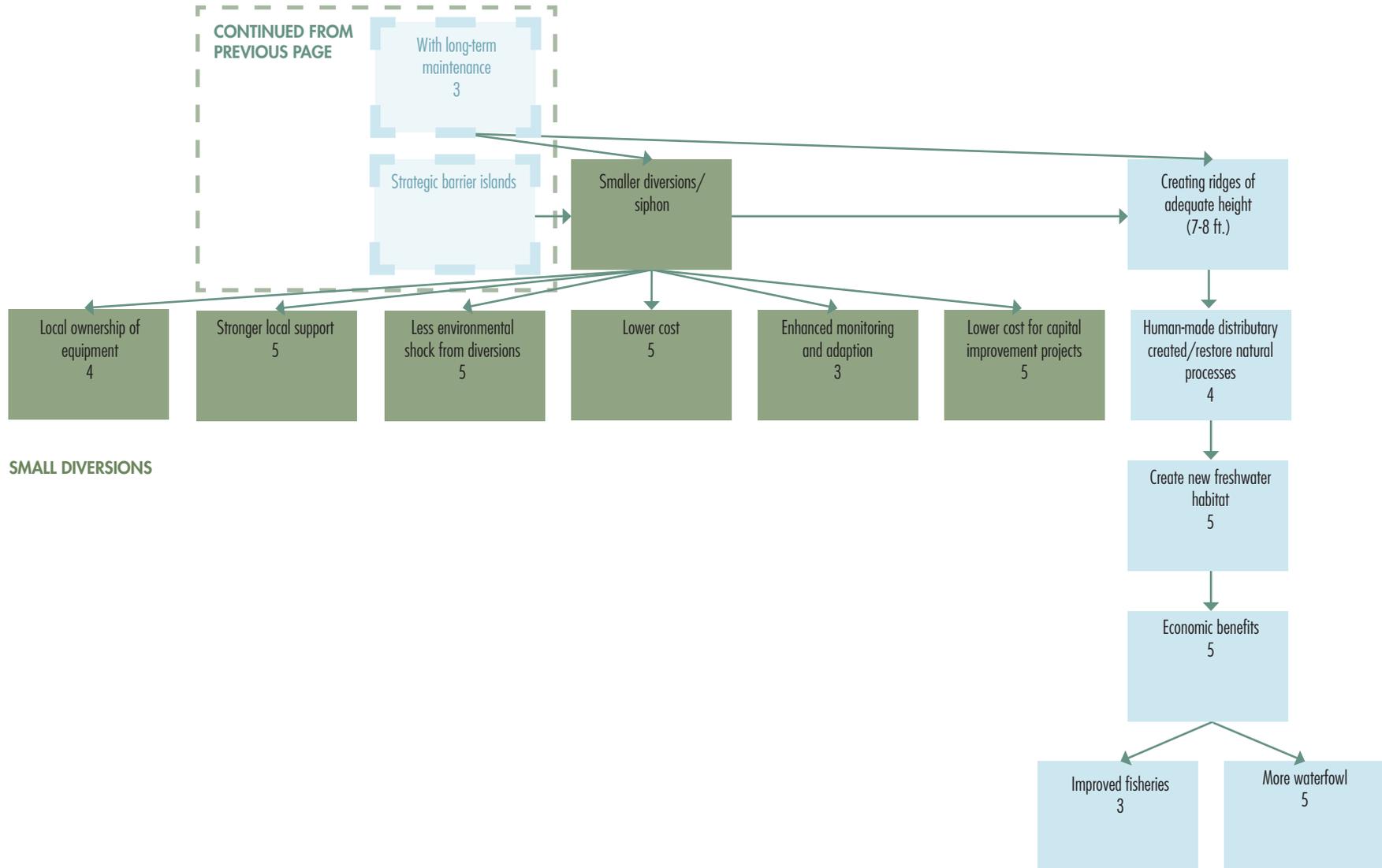
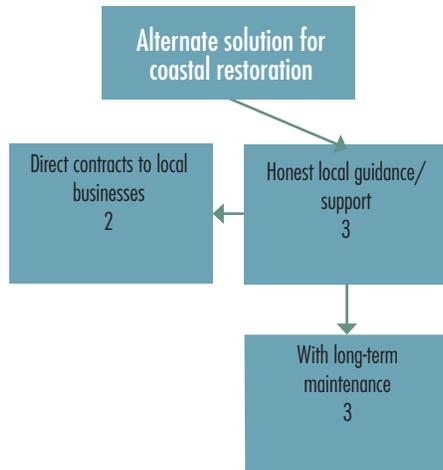


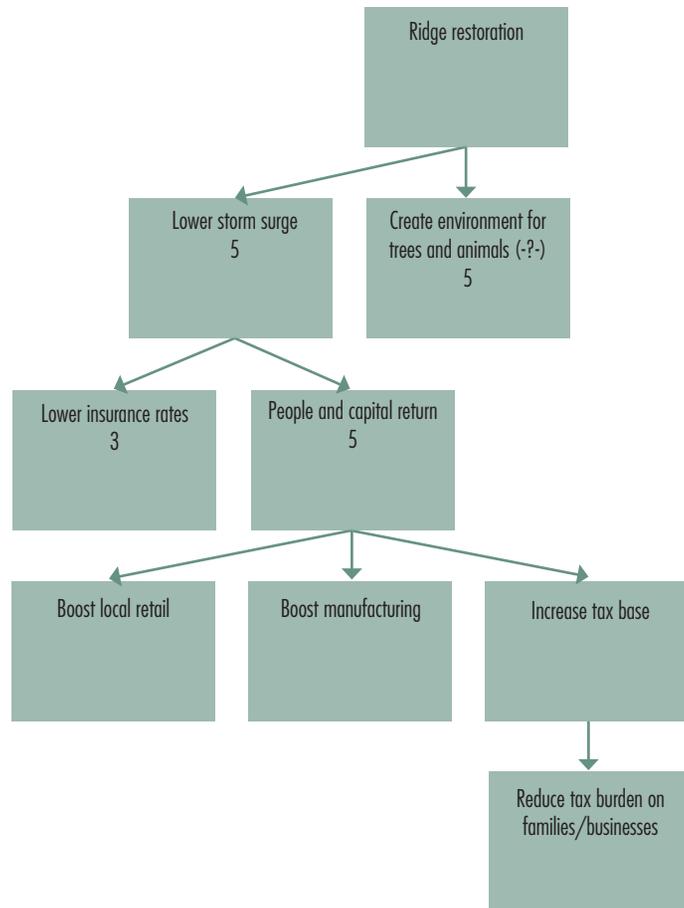
Figure 22: Alternatives to projects scenario - preconditions



PRECONDITIONS

As a precondition to these possible consequences, the group underscored the need for both honest local government [3] and long-term maintenance of the projects [3]. The modest probability and insertion of these as preconditions illustrates misgivings with local government officials and with the long-term commitment to projects (Figure 22).

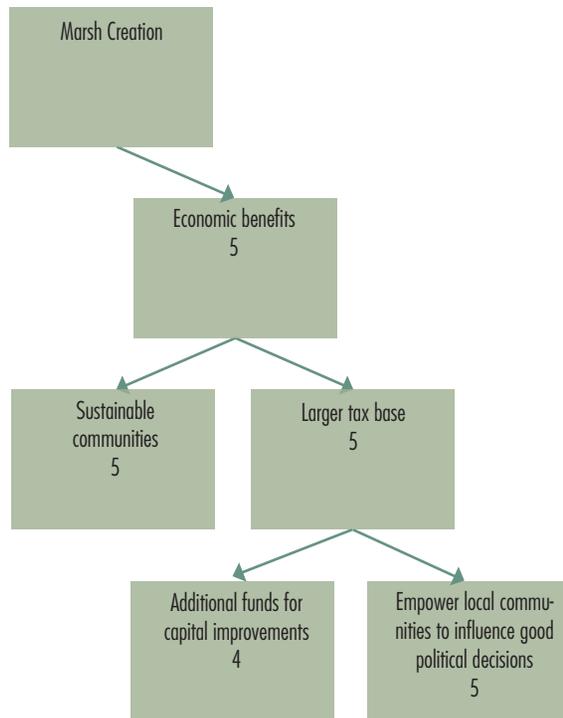
Figure 23: Alternatives to projects scenario - ridge restoration



RIDGE RESTORATION

Consequences that could result from ridge restoration were: lower storm surge [5], creation of habitat for trees and animals [5], and reduced salt water intrusion [5]. With lower storm surge, the group thought that population and capital would return [5] and that insurance rates would decline [3] (Figure 23). The lower probability for insurance rate decreases reflects their awareness of the ongoing federal discussion about the National Flood Insurance Program which could have a direct relationship to particular projects on the Louisiana coast. With the return of people and financial resources [5], local retail would improve, there would be a boost in manufacturing, and the local tax base; no probabilities were recorded for these items.

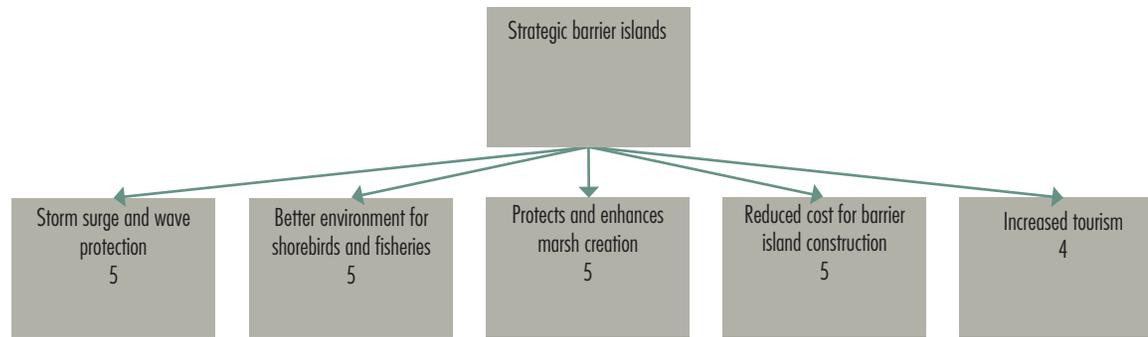
Figure 24: Alternatives to projects scenario - marsh creation



MARSH CREATION

In the event of marsh creation, the group envisioned a ripple effect on other Master Plan projects [4] by virtue of the fact that this could release funds for additional projects [4]. The group projected economic benefits that would lead to more sustainable communities [5] with a stronger local tax base [5] (Figure 24).

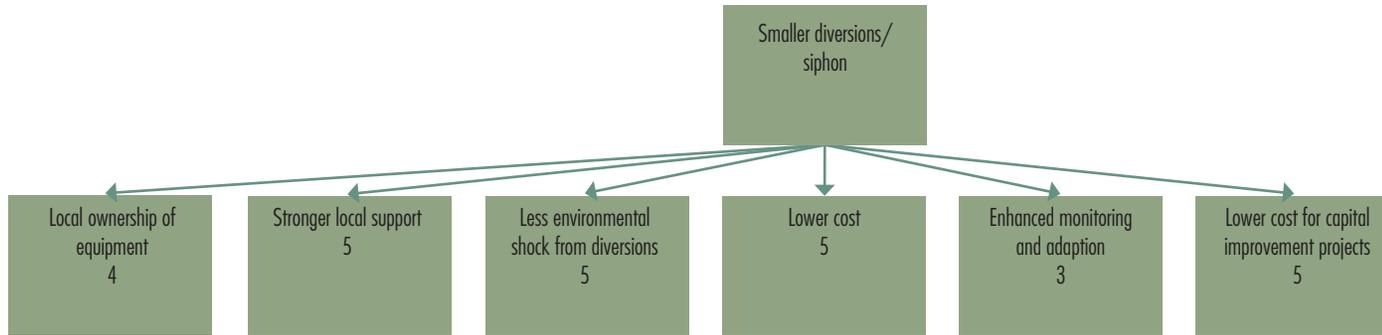
Figure 25: Alternatives to projects scenario - barrier islands



BARRIER ISLANDS

The group also proposed an alternative to the existing barrier island projects in the Master Plan. They suggested smaller, more strategically placed barrier islands. They foresaw benefits if restoration efforts included islands set closer to the wetlands, rather than at the mouths of bays, where they could suppress waves and with their proximity to the wetlands, prevent fetch across the bays from producing potentially damaging waves on the shore side of barrier islands. They indicated the smaller islands, in shallower water, would require less sand and cost less to build. The consequences of these barrier islands would be: storm and wave protection [5], habitat for waterfowl [5], enhanced wetland creation and protection [5], reduced cost of island construction [5], and enhanced tourism [4] (Figure 25).

Figure 26: Alternatives to projects scenario - smaller diversions



SMALLER DIVERSIONS

Another component of the group’s alternatives was the creation of small diversions/siphons rather than large-scale projects such as the Mid-Barataria project. They reasoned that small projects would cost less [5], would produce smaller environmental shocks [5], would encounter stronger local support [5], and also enable local contractors who own equipment to participate [4]. By virtue of a smaller scale, the diversions they recommend would enable more effective monitoring and adaptive management [3] (Figure 26). 💧



OBSERVATIONS

What became apparent to the facilitator during the course of the pilot project workshops is the rich diversity of knowledge, based on extensive experiences living and working in coastal parishes, among the various stakeholders. This local expertise should not be a surprise, but it is a basic component that is infrequently recognized and appreciated. Not all stakeholders vigorously oppose Master Plan projects and not all endorse them. In fact, most stakeholders are fully aware of the risks posed by coastal land loss, and desire effective solutions to this slow-moving crisis. Nonetheless, they often held differing ideas about how to achieve a sustainable working coast. Sometimes their ideas conflict with the Master Plan and sometimes there are contrasting ideas among local stakeholders. Within the range of views on coastal restoration and protection, the state can find important insights that might be used to fine tune Master Plan projects. Other organizations have found community input valuable in large-scale environmental management undertakings. We encourage further and more formal information gathering efforts that involve community organizations, as recommended in the social impact assessment report and the Diversion Panel report (Colten & Hemmerling, 2014; Expert Panel, 2014).

The scenario workshops allowed for a lively exchange of ideas and participants appeared to offer input with enthusiasm. The content of each scenario merely hints at the full range of ideas and is not exhaustive. There is potential for greater insight with additional and more focused workshops. Also, the scenario workshops help identify misunderstandings on the part of participants and this reveals needs in terms of public outreach and education to remedy any misconceptions.

Diverse local opinion lends itself to the current Master Plan which is not built on a single, one-size-fits-all restoration and protection approaches. Information collected in a systematic and tested method, such as scenario building workshops, can provide vital insights to decision makers. The scenario workshops revealed a strong desire on the part of stakeholders to engage with coastal restoration planners, and a wealth of knowledge they were willing to share.

PRIORITIES

Priorities, noted by the facilitator, that emerged from the scenario workshop included:

1. Population mobility - There is a great concern that restoration projects may initiate population out-migration that would lead to loss of tax revenue, lower property values, and a general decline in local capacities. A related—but unvoiced—issue would be the loss of inherent resilience capacity as those familiar with local environments and risks depart the area, local capacity to cope with disruptions would decline. Participants acknowledged that without successful Master Plan projects, residents could also depart due to increased flood risk (and insurance rates), loss of property value, and loss of local government services. Long-distance commuting is already enabling workers to live outside the parishes where they work (Hobor & Plyer, 2014).

2. Communication with government bodies - Great frustration with government bodies, at all levels, exists among local stakeholders. This attitude, exacerbated in part by current national political discussions, undermines trust and exposes a “democratic deficit” (Vanclay, 2012).

3. Sustaining local economies - Stakeholders, as mentioned above, were keenly aware of the potential disruptions to ecological systems that could impact fishing and other natural resource-based economic activities. They desire opportunities to provide input on modifications/adjustments to Master Plan projects to minimize damage to habitats and loss of shrimp, oyster, crab, and other aquatic species that local workers depend on for their livelihoods. Implementing small-scale projects is one way that they see to minimize the geographic and temporal impact of projects, particularly diversions.

4. Building consensus - Stakeholders expressed an interest in acquiring tools to enhance community input into the master planning process and also to build community consensus. They indicated that they felt better informed community members could reach a more unified view, and therefore be prepared to effectively provide input to the process.

5. Avoiding corrosive community outcomes - Participants indicated they seek to avoid becoming “corrosive communities,” a term used to describe intracommunity tensions following a disruptive event. Participants in the workshops indicated a desire to obtain tools to help them avoid internal disputes at the local level and to work toward common solutions. Both the possibility of, and the potential adverse outcome of, Master Plan projects are inflection points where tools could be introduced to minimize in-fighting.

6. Local management of projects - To the greatest possible extent, participants consistently voiced a desire to see greater local management of restoration and protection projects. This position reflected a view that local expertise would add value to the projects and minimize damage to local economies and society. Participants acknowledged that complete local management might not be possible, but that tools to enable more direct links between local leadership and project developers, and between local leadership and state and federal government officials, would be desirable.

7. Involvement of local workers/businesses - A common issue noted by participants was the belief that Master Plan projects would give an advantage to out-of-town/state contractors to do the work. Local participants were consistent in calling for issuing contracts that would require local workers/businesses. There were two fundamental reasons for this: (1) if huge sums of money were being spent on coastal restoration and protection, a portion of that should find its way to those impacted by the activity and who had a direct stake in a favorable outcome, and (2) by employing local workers

and businesses, the project might provide a financial bridge to those who faced potential disruption to resource-based livelihoods.

8. Scale of projects - Two overlapping issues emerged in terms of the scale of projects. First, based on local knowledge, participants viewed larger scale projects as more likely to disrupt local ecologies and therefore natural resource-based economies. The bigger the project, the thinking went, the more extensive and the longer lasting the impacts would be. Second, smaller scale projects would be more likely to hire local firms, with local environmental expertise, and would thus benefit the local economy and also be sensitive to local concerns. And the impacts would not be as disruptive or damaging, while the benefits, their thinking went, would be comparable to large projects

9. Impacts on units of local governance - In the event of further land loss or population loss, stakeholders expressed concern with the implications for units of local governance. Migrating households could swell neighboring parishes and strain infrastructure, while depleting the tax base of an impacted parish. This concern raised the issue of resizing parishes to fit new population and business geographies. In the past, parishes have been reduced in size as populations grew and, more recently, congressional districts have been realigned to match new demographics. Consideration of how to right-size territorial boundaries needs to begin in association with project development.

10. Adaptation planning - Participants recognized the near-term need to foster adaptation planning for infrastructure and other public services (e.g., public safety and education) to new coastal realities. Population mobility and changing tax revenue streams will alter current capacity to fund and maintain transportation, public utilities, and other social infrastructure. In addition, building codes and other policies related to coastal living will require adjustments to conform to either scenario, with or without particular projects.

11. Long-term financing - Participants voiced a strong desire to see long-term fiscal support for any projects that are built. There is grave concern that in the decades it takes to implement projects, the commitment to their maintenance may wane and they may deteriorate through inadequate maintenance. Sustained funding is a priority, as is a long-term commitment to the perpetuation of the project.

Key among the priorities at the local level was the desire that the Master Plan projects minimally disrupt local resource-based economies and that the restoration and protection projects contribute to local economies. Among the notions advanced by participants was the consideration of small-scale projects (especially diversions) in lieu of major works. The basic opinion was that smaller projects would be less disruptive to the coastal ecology; in some cases (e.g., the near-shore barrier islands) they would cost less, and by virtue of their scale they could involve more local contractors and residents. Participants advanced the notion of small-scale projects in several scenarios and saw it as inextricably linked to local economic development. Also, safety was generally secondary to economic vitality. For those living in communities that have coped with hurricanes and flooding, risk was a fundamental part of local existence. Without a healthy society and economy, participants indicated there would be little need for expensive projects that would improve safety.

These scenarios represent an attempt to gather basic information to help inform decision makers. The various consequences projected by the participants were not the result of scientific analysis, but rather derived from personal experience on the part of the individuals stakeholders. The process did not seek to validate local knowledge. This pilot exercise was conducted to complement on-going scientific analysis, not replace it. 💧

ASSESSMENT

Scenario-building workshops offer one tool for assembling information from community members about their understanding of the coastal crisis and restoration projects included in the Master Plan. Observations of the facilitator about its viability for continued use are:

1. The discussion format presented challenges. Enthusiastic participants sought to give extended personal accounts that did not fit the scenario format. While this consumed time, it exposed a passion for the coast where they lived and a sincere desire to sustain the communities and economies there.
2. Participants, in some instances, did not have a thorough or accurate understanding of the biophysical process or the restoration projects. This was inevitable, particularly given brief descriptions of the projects. This situation suggests a need to expand the public outreach and educational efforts prior to subsequent workshops.
3. The software, while not ideal for after-the-fact reporting, is a viable format for collecting information and directing the conversation during the workshops. The graphic format clearly isolates individual consequences and highlights the relationship among sequential events. It also provides an immediate digital record that is superior to tracking the conversation on a white board or poster-size post-its.
4. The two pilot project workshops merely scratched the surface in terms of assembling information. A series of workshops in additional pairs of parishes could systematically assemble additional useful information.
5. Direct discussion of the “intervention points” could greatly enhance the process. This could provide participants with a sense of helping refine Master Plan projects and also deliver direct input on that component. 💧

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APPENDIX

Sample agenda and handout for
prospective participants

Sample Workshop Agenda

SCENARIO BUILDING WORKSHOP
THE WATER INSTITUTE OF THE GULF
CUT OFF, LOUISIANA
APRIL 4, 2014

AGENDA

- | | |
|-------------|---------------------------------------|
| 9:00-9:30 | Introductions |
| 9:30-10:30 | 1st scenario |
| 10:30-10:45 | break |
| 10:45-12:00 | continue 1st scenario |
| Noon-1:00 | Lunch |
| 1:00-2:30 | 2nd scenario |
| 2:30-2:45 | break |
| 2:45-4:00 | 3rd scenario |
| 4:00-4:30 | Prioritize ripple effects and wrap up |
-

Staff: Craig Colten, Director of Human Dimensions
Taylor Marshall, Research Associate

COASTAL SCENARIO WORKSHOP LAFOURCHE & TERREBONNE

FRIDAY, APRIL 4 2014
9AM-4PM (lunch provided)
LAFOURCHE PARISH LIBRARY - CUT OFF, LOUISIANA

WHAT?

This workshop will provide an opportunity for participants to volunteer their expertise as representatives of coastal communities. The workshop will examine two scenarios: 1) conditions with and 2) conditions without Master Plan projects.

A moderator will work with community members to identify what they perceive as potential “ripple effects” that will follow either scenario. Once these ripple effects are identified, the moderator will work with the participants to prioritize their concerns and propose potential solutions.

WHY?

- **To reveal local understanding, concerns, and priorities** for life on the Louisiana coast
- **To identify local concerns and recommend solutions to decision makers**
- **To reduce uncertainties about the 2012 Coastal Master Plan** by improving, supporting, and including community perspectives and local decision-making
- **To assemble critical information** to construct a tool kit to enhance community resilience and build adaptive capacities

WHO?

We are inviting 12-15 local participants representing the variety of coastal community members and stakeholder groups including:

- Elected municipal officials, police jury, community leaders
- Resource managers, coastal zone managers, and/or floodplain managers
- Land owners
- NGO and faith-based organizations
- Local business communities
- Resource-based businesses (oystermen/fishermen/boat operators, etc.)
- Representatives or citizens of minority/vulnerable populations (African American, Hispanic, Native American, Vietnamese, etc.)



THE WATER INSTITUTE
OF THE GULF

HOW?

- Participants will be asked to consider the changing environmental conditions with and without the Master Plan
- Based on projected environmental conditions, participants will identify potential “ripple effects” and estimate their probability
- After each scenario, participants will review consequences and prioritize those that are of greatest concern locally and offer suggestions to address priorities

GOALS?

- The Water Institute will incorporate community priorities into a coastal adaptation tool kit to share with other coastal communities
- Water Institute staff will present their findings to the Coastal Protection and Restoration Authority (CPRA) of Louisiana to help inform Master Plan project implementation
- These workshops will foster an important dialogue and on-going relationships within coastal communities

If you are interested in participating in a workshop, or would like to recommend participants please contact Taylor Marshall at 225.227.2723 or tmarshall@thewaterinstitute.org

For more information about The Water Institute, please visit www.thewaterinstitute.org

Sample Handout



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