

Seeking Resiliency in the Development of Sustainable Communities

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Abstract

Achieving community sustainability requires understanding connected economic, social, and environmental consequences of actions that support informed choices allowing people to lead healthy, productive, and enjoyable lives, now and in the future. Designing successful sustainable development strategies reveals a tight connection between resilience, diversity, and long-lasting stability of social-ecological systems. Dauphin Island (AL) wanted to secure a resilient and sustainable future after experiencing destruction from two hurricanes. During 10 months of a transparent, all-inclusive public consultation process, culminating in a community initiated, driven, and concluded strategic plan, stakeholders designed a program of consensus-building and policy-making toward a more sustainable community with a resilient future. Facilitated stakeholder groups used the Community Capitals Framework to evaluate how various issues historically played important roles in community development. A "spiraling capital assets" model was employed to define points of decline and potential strategic improvement milestones. Resulting plans included shifting the tax base from reliance on expensive rental home lodging and property taxes to growing a more diverse, small business community emphasizing cultural heritage. As an outcome of the planning processes stakeholders examined all community assets (environmental, cultural, historic, etc.) they possessed to determine leverage points for reversing rural economic leakage patterns and promoting new local forms of value-added economic development that protected environmental resources.

Keywords: sustainable community development, resiliency, Gulf Coast communities, community capital, public participation, spiraling assets analysis

Introduction

The imperative for communities to take action toward sustainability is tied to challenges represented by global climate change, sea level rise, the end of the era of cheap energy, natural disasters, and resource depletion. The need for

adaptation, as well as prevention of further damage, is clear and is moving many communities to begin looking at strategic planning activities in new ways, offering opportunities for development that will promote resiliency. In short, small and large communities are seeking to achieve goals for community-based natural resource management, community awareness and capacity building, strategic planning, and sustainable economic development through an interdisciplinary focus on the successful integration of the "triple bottom line."

Communities face enormous challenges, however, as their social, economic, and environmental resources are damaged or depleted (Holling 2001). Because these elements are interconnected, there are no simple solutions to the challenges. For example, consider the story of those who survived the great American dust bowl (Egan 2006). Humans populated the high plains of mid-North America and transformed millions of acres of productive grassland into a desert in less than 50 years. The contributing dynamics to this degradation were many, but they were all connected back to the actions of humans on the landscape. And yet American society has not seemed to learn from our mistakes on the land leading to the great dust bowl era. Our lack of concern for many issues of sustainability we face today is similarly and equally interconnected back to humans! What economic, social, and political choices can we still make, so we don't continually repeat the mistakes of the past? And more importantly, how do we integrate these choices across sectors to be most effective in solving present problems?

Dauphin Island (AL) along the U.S. Gulf of Mexico coastline (Figure 1) is a community that desires to take charge of its own destiny toward designing the means to secure a resilient and sustainable future. In 2007 the Town of Dauphin Island began a strategic planning project. They recruited the facilitation assistance of *Five E's Unlimited* (<http://www.eeee.net>) from Seattle (WA) to draw together all interested stakeholders eager to broaden their collective wisdom and evaluate best strategies for ensuring economic viability and social integrity through means that were environmentally responsible. The project design encouraged people to visualize how sustainability provides a multi-dimensional way to achieve multi-faceted goals and improve the quality of life for everyone. This project sought recommendations and



Figure 1. Map of the Gulf of Mexico coastline of the USA. Insert shows the location of Dauphin Island on the Alabama coast.

rationale for action strategies over the short- and long-term that would identify, among other things, steps for (a) decreasing greenhouse gas emissions (GHGs), (b) promoting sound economic strategies to support community financial viability, (c) encouraging strategies of low-impact development (LID), (d) identifying additional conservation-based development strategies, (e) defining steps to preserve the community's historic culture, and (f) developing other socio-economic tactics that could address community core values.

Dauphin Island project background

The Town of Dauphin Island is located on a barrier island that forms the western boundary of the channel entrance to Mobile Bay (Figure 1). The island is connected to the Alabama mainland by a three mile high-rise bridge and the Fort Morgan peninsula, accessible by ferry. The Town has approximately 2,400 property owners including 1,400 permanent resident owners. Many of the part-time residents use their homes a portion of the year as rental properties, especially those higher-priced homes on the western, beach end of the island.

Following two successive hurricanes, Ivan in 2004 and Katrina in 2005, that were extremely destructive to the Town and its people, Dauphin Island showed a willingness to develop a strategic approach for sustaining its economic livelihood and environmental relevance. Leaders recognized the importance of natural resources and ecologic systems in supporting both economic development and societal well-being, as represented by maintenance and improvement in quality of life and preservation of cultural integrity. Likewise, the community showed a deep concern for environmental responsibility as it related to the social and economic capacity concerns of people. Accordingly the Town expressed fear for potential uncontrolled growth that might degrade resources and the community's quality of life following hurricane destructive impacts. These potential changes on the island landscape caused anxiety about community well-being, prompting the community to pose a number of questions it felt needed to be answered during a community-wide strategic planning process (Table 1). Discussions around this project also motivated the community's articulation of needed emphasis on "sustainable" development for effectively influencing the direction and momentum of the change affecting resource

Table 1. Questions to Focus Dauphin Island Strategic Planning

- How can the Dauphin Island Community come together to develop a common vision for the community of what the island should be in 30 years?
- How can Dauphin Island plan for and develop improvements to Island infrastructure that are environmentally sensitive and hurricane resistant?
- How can Dauphin Island engage in economic revitalization and expansion of money-making opportunities including tourism and business growth in a way that capitalizes on its community assets?
- Can Dauphin Island manage growth to sustain the unique environmental quality of the island, including the beaches, dunes, maritime forest, wetlands, and marshes that make the island a special place?
- How can Dauphin Island maintain and improve housing diversity so that work force and other affordable housing for island commercial/retail establishment workers will be available?
- How can Dauphin Island improve/expand its arts/community/recreational facilities and opportunities and access to the water?
- How can Dauphin Island improve provision for social/community services on the island?
- Composition of the island is such that we have various governing entities. How can we work both independently and interdependently as a community to better coordinate governing activities, financing activities and organizational capacity of the current entities?

(source: from Dauphin Island Request for Proposals, 2006)

management, land-use, and community growth over the next several decades in a way that would promote resiliency. Wanting to be in control of their own destiny the community inspired stakeholders to engage in strategic planning and build consensus on sustainable development programs that would collectively improve the well-being of all residents.

In mounting its campaign to reinvent itself and develop strategies of resiliency and sustainability, Dauphin Island leaders considered three important requirements:

1. promote the community's deep and extensive science-based understanding of ecological, economic, and social sustainability, in all of its temporal, spatial and systemic dimensions, communicated effectively to participants and stakeholders in a way that inspires vision and action;

2. design a thoroughly community-based and community-driven process of deliberation and decision making, engaging all stakeholders in the identity of weaknesses and threats as well as community assets, and capable of guiding the making of difficult trade-offs while creating cohesive win-win solutions; and

3. express outcomes in a solid, comprehensive, implementable strategic plan fulfilling all best-practice planning and statutory requirements, which would identify the necessary resources to overcome challenges and take advantage of opportunities, and would be a model for change management that effectively guides the Town toward a successful, resiliently enduring future.

Sustainability in the context of this project

The totality of the human economy is measured by throughput. It is calculated as the total number of people multiplied by their consumption and waste. Thus, there is consistently a dependence of economic activity on human and natural resources. There is evidence with regards to freshwater, forests, fisheries for example, indicating the use of natural resources by many parts of our economy is nearing the regenerative and absorptive capacity of the environment (Dietz et al. 2009), as suggested in the simple graphs in Figure 2. These suggestions cause real concern about future human sustainability. The Natural Step framework (Cook 2004) suggests society is close to “hitting the walls of the funnel,” but recommends with significant adaptations and alternative directions society can adjust trajectories before the funnel walls close, or the curves cross in Figure 2, and we are beyond a threshold of return. The problem of climate change and global warming are commonly reported examples. The state of many ocean fisheries is another genuine example of our world's limitations.

Robust and generally acceptable answers to the question “what is sustainability” have remained elusive, however, because all the issues it touches are entrenched in socio-economic and ecological systems that are chaotic and complex, and which often represent issues in opposition requiring reconciliation. We can try to understand how these systems operate but, because of significant scientific uncertainty, we can never be sure how they are going to behave as conditions change (Flint 2006) — leading to much debate about the

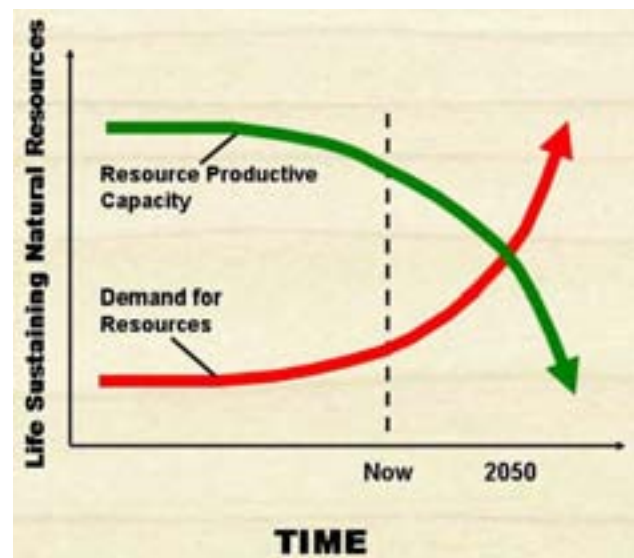


Figure 2. Patterns of natural resource demand by society and productive capacity of these resources in nature.

meaning and implications of sustainability and criticism of the actions of institutions claiming devotion to it. For example, it is believed that sustainability concerns include population, climate, economic prosperity, energy, natural resource use, waste management, our homes, our children, our jobs, biodiversity, watershed protection, technology, agriculture, safe water supplies, the air we breathe, the food we eat, international security, politics, green building, sustainable cities, smart development, community/family relations, human values, etc. (Flint 2004a). All these “pieces” are parts of the sustainable society puzzle, because they are the basic ingredients of everyday life. Therefore, sustainability must fully consider economic, social, and environmental dynamics concurrently in a system context and acknowledge space-time relationships when making decisions (Norton 2005). These interdependencies require new ways of thinking and taking action (Gibson 2006a) that will truly create a sustainable future where society and nature coexist with mutual benefit, and where the suffering caused by poverty and natural resource abuse is eliminated.

In its simplest form sustainable development recognizes the extent of human well-being cannot grow beyond the environmental capacity of our world — achieving human well-being without exceeding the Earth’s twin capacities for natural resource regeneration and waste absorption — improving human quality of life without damaging or undermining society or the environment in the future. But at the same time it promotes the equitable fulfillment of basic human needs now, such as food, shelter, clothing, and the economic means to achieve these. Therefore, our economic desires become accountable to an ecological imperative to protect the biosphere, and a social equity imperative to create equal access to resources and maximize human well-being through a process that acknowledges the “directionality of sustainability” (Figure 3: Flint 2004b). The community quest for societal and economic improvements to alleviate poverty, protect material resources, and achieve national security, while taking charge of their own destinies (Gibson 2002), is a call for “sustainable development,” reversing the path of the two graphs shown in Figure 2.

Sustainability is best characterized by a program of action emerging from people’s basic values, from concerns about the consequences of past development, and from scientific understanding (sustainability science) for the long-term detriments from degraded environmental and social capital (Heintz 2004). If we can begin to judge proposed actions and policies for their economic value, as well as for their ecological and evolutionary affects, we will be following a model of sustainable development by associating different human values (those wanting a strong economy and those valuing the natural environment) with the multiple dynamics of natural

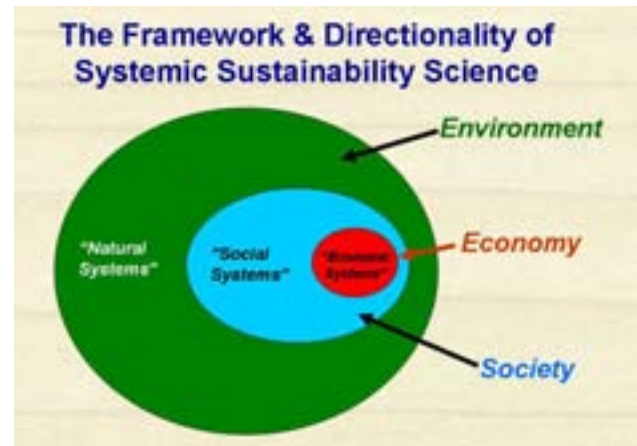


Figure 3. The directional (hierarchical) relationships of the different elements that comprise approaches to sustainable development.

systems. But threats to societal and ecological well-being are woven together in mutually reinforcing ways (Gibson 2006b). Therefore, corrective actions must also be woven together to have positive outcomes for multiple objectives and informative feedback for needed changes to stay on-track, in contrast to the carrying out of policy that is based solely on short-term economic benefits. Through the actions of sustainable development, a new win-win scenario can be born.

A community like Dauphin Island can move towards sustainability when it understands the *connected* economic, social, and environmental *consequences* of its actions and makes deliberate, informed *choices* (the 3 Cs of sustainability) that allow all people to lead healthy, productive, and enjoyable lives in the community, now and in the future, without experiencing unintended consequences. Living sustainably is maintaining the important mix of options and opportunities while creating no new and onerous constraints (Norton 2005). Living unsustainably is losing them, narrowing the range of options that other forms of life we share Earth with, people elsewhere, and subsequent generations can choose among in their attempt to adapt, survive, and prosper.

Key to community resiliency

The goal of sustainable development is to create and maintain thriving social, economic, and ecological systems that are intimately linked: humanity depends on services of ecosystems for its wealth and security. Moreover, humans can transform ecosystems into more or less desirable conditions (Gibson et al. 2005). Humanity receives many ecosystem services (*i.e.*, clean water and air, food production, fuel, and others). Yet human action can render ecosystems unable to provide these services, with consequences for human

livelihoods, vulnerability, and security (Folke et al. 2002). Such declines in ecosystem services can thus negatively impact the resiliency of a community. While evidence suggests the essential role of resilience for prosperous development of communities (Kates and Clark 1996), studies have also revealed the tight connection between resilience, diversity, and sustainability of social-ecological systems.

The idea of resilience was introduced by Holling (1973) as: “a measure of the ability of systems to absorb change... and still persist.” In an ecological context, resilience is generally described as the long-term capacity of an ecosystem to cope with and adapt to change and perturbation, such as storms, fire, and pollution. In the societal structure of communities, resilience is the capacity of a system to deal with change and continue to develop (Walker and Salt 2006); it is both about withstanding shocks or disturbances and regaining functions afterwards. In a human context this is closely linked to the ability to adapt to changing conditions through learning and innovation or even transformation. Hence, it is the capacity both to withstand pressures and to rebuild and renew itself if degraded.

Few community development programs have addressed the various interlinked and interdependent components of community resilience. As suggested by Pearson (2008) and others, development of human management strategies to promote community sustainability requires direct consideration of both resilience and risk factors. And since these are indirectly related to the uncertainty of environment and natural resources, in order to operationalize sustainable, healthy ecosystems with multiple societal benefits three major sets of community characteristics need to be recognized:

- human communities are able to plan and act in concert with natural systems;
- ecosystems are used for multiple community benefits; and
- those with ideas on differing uses of the ecosystems seek common ground.

Therefore, the reality of successful community improvement is that communities should be seeking to develop methods of local resiliency management in order to ultimately become more sustainable. In strictly human applications achieving resiliency is often affected by conscious intent, frequently in isolation from responses of nature which directly affects risk factors. Methods for local resilience management emphasizing social-ecological resilience on the other hand, can increase the robustness of a town, city, or community to a range of shocks, crises, and disasters (Walker and Salt 2006). For example, from an ecological perspective, that has correlates and is indirectly related to social and economic systems, loss of resilience tends to lead to more vulnerable systems, and possible system shifts to undesired states

(Walker and Salt 2006) that provide fewer goods (*i.e.*, fish and crops) and services (*i.e.*, flood control and water purification) in a natural resource context. Clear lakes can suddenly turn into murky, oxygen-depleted pools, grasslands into shrub-deserts (*e.g.*, the great American dust bowl), and coral reefs into algae-covered rubble. It is often caused by gradual loss of diversity making the system progressively more susceptible to disturbances like hurricanes or pollution.

Understanding the concepts of resiliency requires the combined consideration of the following (Pearson 2008): (1) Persistence: the capacity of a system to maintain structure and function when faced with shocks and change (*e.g.*, for a forest to withstand a storm); (2) Adaptability: the collective capacity of people to learn and adapt to changing conditions in order to stay within a desired state (*e.g.*, the ability to safeguard current water supplies under climate change); and (3) Transformability: the capacity of people to innovate and transform in periods of crisis in order to create a new system when ecological, social, or economic conditions make the existing system untenable (*e.g.*, turning the current global financial crisis into an opportunity to transform the local economy). Management can destroy or build resilience, depending on how the social-ecological system organizes itself according to the above principles (Folke et al. 2002). As noted above, resilience is often associated with diversity — of species, of human opportunity, and of economic options — that maintains and encourages both adaptation and learning. While diversity is arguably a key factor in affecting resiliency outcomes, Walker and Salt (2006) suggest a truly resilient world would also consider issues like ecological variability, modularity, tight feedbacks, social capital, innovation, and ecosystem services. They also note that resilience derives from slowly restored controlling variables, such as reservoirs of soil nutrients, heterogeneity of ecosystems on a landscape, multiplicity of businesses types, or variety of genotypes and species.

Social-ecological systems are constantly changing and difficult to control or channel. Additionally, one often assumes that ecosystems respond to gradual change in a smooth way, but sometimes there are drastic shifts, such as weather-related disasters (Folke et al. 2002). Paradoxically, management that uses rigid control mechanisms to harden the condition of social-ecological systems can only erode resilience and promote collapse. In contrast, management that builds resilience can sustain social-ecological systems in the face of surprise, unpredictability, and complexity. Resilience-building decision-making is flexible and open to learning. It attends to slowly-changing, fundamental variables that create memory, legacy, diversity, and the capacity to innovate in both social and ecological components of the system (Pearson 2008). It also conserves and nurtures the diverse elements that are necessary to reorganize and adapt to novel, unex-

pected, and transformative circumstances. Thus, it increases the range of surprises with which a socio-economic system can cope.

The Dauphin Island community recognized that building social-ecological resilience requires understanding of ecological and socio-economic systems that incorporates the knowledge of local users. The outdated perception of humanity as decoupled from, and in control of nature is an underlying cause of society's vulnerability. Technological developments and economic activities based on this perception further contribute to the erosion of resilience. Dauphin Island leaders believed these vulnerabilities could be counteracted by understanding the complex connections between people and nature, which create opportunity for technological innovations and economic policies aimed at building resilience. Two useful tools for resilience-building in social-ecological systems are structured scenarios and active adaptive management (Folke et al. 2002). Dauphin Island stakeholders engaged in scenarios to envision alternative futures and the pathways by which they might be reached. By envisioning multiple alternative futures and actions that might attain or avoid particular outcomes, they could identify and choose resilience-building policies. They also identified active adaptive management as a policy-setting framework that used sets of experiments designed to reveal processes that build or sustain resilience.

Application of the community capitals framework

Two distinct approaches to economic development in rural communities have evolved over recent times in the United States: industrial recruitment and self-development (Flora 2004a). The traditional approach to community reinvention or improvement has been industrial recruitment. Because studies show governments seldom gain back their investments in terms of public revenue generated (Summers and Branch, 1984), self-development, including supporting local entrepreneurship, is a community economic development (CED) strategy of increasing interest to a variety of technical assistance providers and rural communities (Blakely and Bradshaw 2002). This approach also embraces participatory advances that focus on civic engagement to mobilize multiple resources for widespread social and economic benefits; an asset-based approach with a focus on local capacity building. This perspective was presented to and embraced by the Dauphin Island community.

Assuming that the concept of resiliency can provide some conceptual understanding toward the self-development of communities, there needs to be a means of evaluating resiliency in the context of the environmental, social, and economic systems that form the foundation of communities. The

currency of such a methodology might be the consideration of community capital. Capital is a property that results from the characteristics (flows, reservoirs, and sinks) of subsystems, components, structure, and interactions (Heintz 2004). This is one way to operationalize the general concept of sustainability from the Brundtland Commission, "meeting current needs without compromising the opportunities to meet the needs of future generations" (WCED 1987). Capital is an economic term that has been extended by some into the natural and social realms to refer to terms like resources, capacities, conditions, stocks, assets, or endowments. Capital is a measure of the resources invested to create new resources over a long time horizon, the capacity to produce a flow of value over an extended time, and thus differs from the traditional comparison of capital and currency to money. Capital is an appropriate measure because environmental, social, and economic systems all contain capital and produce flows (or in other words a currency) of services, experiences, or goods over time. Self-development toward a goal of sustainability can be assessed using criteria and indicators of environmental, social and economic capital (Flora 2003).

Flora and Flora (2008a) define seven forms of capital in development of community capacity building strategies that form the idea of the Community Capitals Framework. These include:

- Natural Capital (Jansson et al. 1994) — Provides possibilities and limits to human actions: influences and is influenced by human actions (*e.g.*, air quality, wind and sun, water — quantity and quality, soil and minerals, biodiversity — wildlife and plants, landscape).
- Cultural Capital (Bourdieu 1986) — Determines how we see the world, what we take for granted, what we value, and what things we think possible to change (*e.g.*, spirituality, sense of place, ways of knowing, language-history, ways of acting, definition of what is problematic).
- Human Capital (Becker 1975) — Characteristics and potential of individuals that are determined by the intersection of nature (genetics) and nurture (social interactions and the environment) (*e.g.*, education, skills, health, self-esteem, self-efficacy).
- Social Capital (Coleman 1988) — Interactions among individuals that occur with a degree of frequency and comfort (*e.g.*, mutual trust, reciprocity, collective identity, sense of shared future, working together).
- Political Capital (Turner 1999) — The ability of a group to influence standards, regulations, and enforcement of those regulations that determine the distribution of resources and the ways they are used: increased voice and influence of people (*e.g.*, organization, connections, voice, power).

- Financial Capital (Eisinger 1988) — Financial capital is often dominant because it is easy to measure and there is a tendency to put other capitals into financial capital terms: can result in an appropriately diverse and healthy economy if distributed fairly (*e.g.*, savings, debt capital, investment capital, subsidies, tax revenue, tax abatements, grants, philanthropy).
- Built Capital (Chicoine 1986) — Human-constructed infrastructure used as tools for production of other capitals (*e.g.*, sewers and water systems, plants, machinery, transportation, electronic communication, soccer fields, housing).

For Dauphin Island to be successful in improving community livelihood through healthy sustainable CED they recognized the need to pay attention to the seven types of capital because community livelihood improvement is not limited to improving the ways people make a living, but rather to the ways people live in all their expression (Aigner et al. 1999). The community capitals framework is explained in a number of publications addressing rural development (*e.g.*, Emery and Flora 2006; Flora 2004b; Flora 2008). Beyond identifying the capitals and their role in economic development, their approach using community capitals also focused on the interaction among these seven capitals and how they build upon one another. Multiple capitals are the accumulated wealth of communities, the product of invested energy from which they create the ways and means to satisfy their fundamental needs (Reid and Flora 2004). Using this framework, the community traced how an investment in human capital, for example leadership training, might impact financial capital as leaders use their skills to acquire new funds and better manage existing funds (Flora et al. 2007). Social capital may then be impacted as members of the leadership program develop new bonds among themselves and new bridges among the groups with whom they interact. By measuring investment in the different capitals and the changes resulting from that investment, the framework provided a means by which the community could begin to understand the impact of CED on rural people and places; the impact on reducing poverty, creating wealth, supporting family self-sufficiency, and expanding local leadership (Flora and Flora 2008b).

Community consultation process

The community participated in a wide range of public consultation processes (*i.e.*, visioning, goal setting, SWOT analysis, futuring, etc.) in order to guarantee public participation would be transparent, consensual, and inclusive through the application of private, non-judgmental, non-coercive *transformative facilitation*. The concept of transformative facilitation aims at empowering the individual while en-

gendering a collective experience of resolving shared problems according to the group's self-defined values (Maser 1997). With common ground established, issues are more readily resolved and change more easily organized and implemented through a transformative style of public consultation. Transformative facilitation promotes a sense of accomplishment and belonging through shared learning and dialogue in a process of growing self-realization, self-definition, and self-determination. Through appropriately facilitated communication the many individual perceptions are then coordinated and integrated into a collective vision.

This project allowed for validation of effective community-based resource evaluation processes through a strategic public consultation process designed to meet the specific needs of the community in order for them to more readily engage. Public participation processes were developed to:

- identify the stakeholders, constituencies and special interests;
- draw-out people's attitudes, perceptions and values;
- engage stakeholders in a facilitated, consensus-building process;
- evaluate common goals and commonly-developed alternatives; and
- promote effective advocacy.

To assist all stakeholders in the identification of causes to their decline in community resiliency and the issues they needed to address in new sustainable approaches to development, the process of Pattern Mapping was employed. Pattern mapping is a form of group brainstorming, identifying key issue drivers and impacts or outcomes. It is a conceptual (diagrammatic) tool for creating a climate of collaboration among stakeholders, generating a common reference point of shared perspectives, validating all points of view (each person's reality), enabling a full appreciation for the complexity of issues, and working toward a shared solution or common vision of a possible future. The process offers methods to identify a solution to a specific problem, assets supporting a particular topic, or a preferred future for a particular issue of concern. Because of its intent to draw-out interconnections, pattern mapping is also a good process to engage in early-on in any solution or vision seeking process. In brief, the practice encourages the systemic analysis of things affecting an issue of concern. The product of collective discussion provides the initial means for conceptually identifying forces and trends acting on a focus area, their relationship to one another, as well as the chaos and complexity involved in the issue of concern. The diagrammatic result of discussion provides the substance for examining a probable outcome or future if no intervention is taken. This then can lead to brainstorming by on how certain leverage point actions can potentially produce solutions to the problem of concern and/or a

vision for a preferred future. The outcome in using this tool is the elaboration of a “system” that identifies potential opportunities for change through collective thinking to achieve a more sound solution to a particular problem impeding sustainability.

Most of us are concerned about the same issues and want to live in the same kind of world. That in no way diminishes the degree to which we disagree about how to get there. Pattern mapping brings stakeholders together to chart a common view of how past events led us here, what “here” looks like, and how an ideal future might differ from the one that looks probable. As a result, participants have a shared vision. It also breaks through old assumptions about how other stakeholders feel and think about these issues, allowing them to feel a shared responsibility for the present and the future rather than blaming one another for how things are and feeling that, the future is “out of their control.” Thus, they are able to pool their collective resources to bring about real change.

The outcome of community-wide discussions directed towards identifying specific points affecting the overall decline in community resiliency and brainstorming assets the community possessed, or could obtain from outside assistance, led to a Dauphin Island strategic planning process targeting increased community resiliency that would lead to sustainability (Five E’s Unlimited 2007a). Strategic planning looks for synergy (*i.e.*, co-action, harmony) among actions that cause major changes in the community in order to achieve a shared vision. Stakeholders (1) identified problems they perceived on the Town’s landscape or in the regional context, (2) turned those negative aspects of community life into a positive view of what the future could hold if everything were to work right, (3) identified the assets the community possesses to support moving in the defined direction of positive change (the vision), as well as identifying the “landmines” that may exist as challenges, and (4) then after defining these boundaries to perceived hopes for the future, the community worked at physically “designing” the different parts of the community that when changed would move them closer to their shared vision. One of the more important overall requirements of the strategic planning process was that it be “community-driven” rather than designed and presented by facilitating consultants.

An all-inclusive, fully transparent, and consensual public consultation process was conducted with the entire Dauphin Island community during 10 months of 2007. This consultation process involved more than 600 stakeholders from the Town’s permanent population of 1,400 over the course of the project. Their primary motivation for participation was to evaluate the issues most important to them in promoting resiliency toward achieving sustainability goals in their future development.

Evaluation of Dauphin Island community resiliency

The consultation process included stakeholders engaging in the community capitals framework (Flora and Thioumery 2006) and its “spiraling capital assets” model (Flora and Flora 2008a) to guide how the community could trace its points of decline and plot its strategic improvement milestones to reach a more sustainable and resilient future. The framework directed deliberations by stakeholders on how they could best work with the different kinds of assets the community possessed. Pattern mapping facilitated discussion and brainstorming by stakeholders on what caused community decline over time (spiraling down) and then what needed to be considered in the use of available assets to lead the community towards improvement (spiraling up) that was resilient and sustainable.

Tracing points of community decline:

Shoreline Changes to Dauphin Island — As Figure 4 shows, the first (in a temporal context) perceived long-standing cause of potential decline of Dauphin Island was believed to be related to dredging of the Mobile Bay Channel that connected Mobile Bay to the Gulf of Mexico (Figure 1). The navigation channel dredging in Mobile Bay began with enactment of the River and Harbor Act of 1826 (U.S. Army Corps of Engineers 2005). Over subsequent years Mobile Bay dredging was expanded. Section 104 of the River and Harbor Act of 1954 (House Document 74, 83rd Congress, First Session, as amended, and previous acts) authorized a 12.5 m deep channel. The current dimensions of the navigation channel are 17.8 m deep by 187.5 m wide across Mobile Bay into the Gulf of Mexico. These depths are in contrast to



Figure 4. The spiraling capital assets model of Flora and Flora (2008a) was used to demonstrate how the Dauphin Island community perceived decline in its quality over time

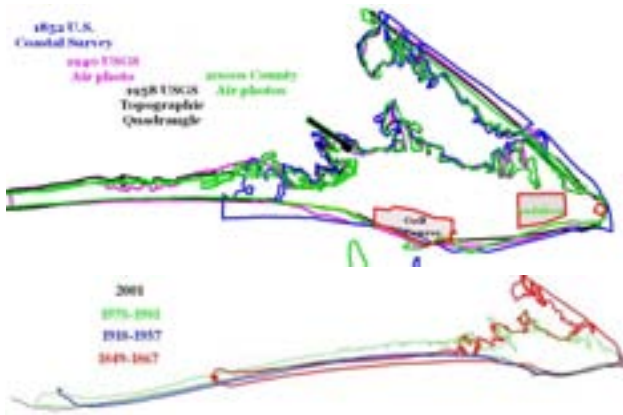


Figure 5. Shoreline changes of Dauphin Island, as interpreted from early drawings of the Island and more recent imagery from airplane over flights (from G. Martin, Department of Geography, University of Washington, Seattle, WA - 2007).

surrounding Gulf bottom depths of usually less than 6.25 m. This creates an extensive trench through Gulf near-shore shallow waters that can potentially interrupt the long-shore movement of sands along this portion of Gulf coast. Through time this disruption of long-shore sand movement has been pointed to as a factor in the changing and eroding of the Dauphin Island shoreline because of disruption of normal, continuous sand supply to the Island beaches that would be consistent with typical beach dynamics along marine coastlines. As illustrated in Figure 5, the shoreline has changed considerably in the last century and a half, thought to be related to the continued Mobile Channel dredging (Kelley et al. 2004).

Air photos, beach profiles, visual wave observations, and historical coastal engineering archives during the early 1990s (Douglass 1994) also demonstrate the history of Dauphin Island sand movement. Shoreline recession was measured at rates up to 15 m/yr. Based on beach profile surveys, these observed changes were consistent with the changes that had occurred during the last 10 years. Maximum recession rates of 6 m/yr were found over the longer term. The beach depth/reach pattern of the Island appears to be a response to changes in the position of the Mobile Channel and related ephemeral islands immediately offshore (Work et al 2004). Coastal engineering works which have modified the natural coastal processes of the littoral system include coastal structures at the east end of the Island and the removal of sand from the littoral system by dredging (Houston 1995).

The Dauphin Island public consultation process indicated many participants believed the channel dredging of Mobile Bay had a significant impact on the changing Island shoreline and the continual decline in both beach area and dune development. Sand dunes are an important obstacle to continued beach erosion. The Federal Emergency Manage-

ment Agency built an engineered sand berm on the Dauphin Island beaches in 2007 in an effort to lessen risks to beach structures that was completely destroyed by the fall of 2008, after two more hurricanes in the Gulf of Mexico (Katherine Sayre, Staff Reporter, Mobile Press-Register, December 4, 2008). The combination of lack of sand supply and storm events have left the Island at risk to further development as well as improvements to exiting infrastructure from erosion and sea level rise.

Hurricane Fredric and the New Bridge — In 1979 Hurricane Frederic destroyed the only bridge from Dauphin Island to the mainland of Alabama. A new, much improved bridge was re-built from the mainland and opened in 1982. With this new state-federal funded bridge recreational opportunities and natural amenities of the Island attracted many new visitors and residents, wanting to take advantage of their tax dollars spent on building the bridge. Dauphin Island was now much more accessible to the City of Mobile as its backyard playground. The result, as suggested in Figure 4, was that many new expensive homes were built on the west-end beaches, owned by wealthy, mostly part-time residents. The building of these expensive homes and for many their part-time use as rental property, significantly increased the Town's annual revenue through the collection of *ad valorem* property taxes and a lodging tax. Over time this income became a sizeable financial base, affecting revenue diversity that can offer long-term stability to small towns.

The new base of residents in the 1980s and 1990s, attracted by the more expensive real estate, caused a decline in local businesses because of the transient nature of these part-time residents. They chose to shop on the mainland rather than support local Island businesses. In addition, the increased wealth of the part-time residents was affecting issues of diversity and equity in the local population. In particular, people were concerned about retaining the cultural heritage of a small fishing village with an active waterfront, which is what Dauphin Island had historically been. With the closing of local businesses and concern over loss of the Island culture, economic benefits from tourism also became a major concern. Business decline and increased cost of living forced many long-time residents of the Island to leave, causing an increase in population loss even with the increases in wealthier, transient residents.

These fluctuations in population and significantly enhanced lifestyles also placed addition pressure on the Island's natural resources. For example, Dauphin Island is served for its only source of freshwater by a "sole source aquifer" (SSA) which limits the water supply to the community. An SSA is an underground water supply designated by the Environmental Protection Agency (EPA) as the "sole or principal" source of drinking water for an area (U.S. EPA 2008). New popula-

tion growth with very different lifestyles was believed by longstanding residents to put this supply of freshwater at risk without sufficient consideration for conservation-based development strategies.

Hurricanes Ivan and Katrina — The impact of Hurricane Ivan in the summer of 2004 and Hurricane Katrina in the summer of 2005 caused significant infrastructural damage (built capital) to Dauphin Island, whose economy was already at risk due to its lack of diversity from some of the social, political, human, and financial capital impacts discussed above. For example, there was major decline in Town revenue from the destruction of many expensive rental properties, closure of some of the remaining businesses in the community, damage to Island services infrastructure, and an overall decline in economy of the Town (Figure 4). Diminished community hope and pride was also suggested as a major issue in the spiraling down of the community's assets. The destruction of resources, including a break in the west-end of the Island that created a channel between the Gulf and inside bay, represented the prime stimulus for the community to decide that it needed to reinvent itself in order to survive.

Plotting strategic improvement milestones:

Through the clearly articulated points of decline in the Dauphin Island community by the stakeholder consultation process (Figure 4), it was then possible for participants to begin to plot benchmarks for improving the Island and the Town. The community capitals framework was again used to illustrate through the spiraling capital assets model (Figure 6) how stakeholders identified and planned to work with the dif-

ferent kinds of assets they possessed and that they targeted during the public consultation process toward the design of strategies that would prove to be sustainable.

Networking Internal and External Social Capacities — Stakeholders indicated they believed there needed to be a bridging of the community's social capital, where outside expertise on strategic sustainable development for small communities could be brought in and integrated with the internal wisdom of the community in order to build upon successes of the past and maintain the Town's cultural integrity. As Flora et al. (2007) articulated in their analysis of internal and external capital investments on community development outcomes, when there is a balance of investments from the inside and the outside, community actors engage in progressive participation, allowing different points of view to be heard and enhancing the chances of success in mobilizing internal and external investments in support of multiple community capital improvement. The acceptance of this direction in Dauphin Island community deliberations was promising in contrast to other potential outcomes that Flora had predicted including individualism, the development of strong boundaries among town sectors, or clientelism where decisions and action are made based upon what outsiders promote.

Identifying Community Core Values — The consultation process proceeded to identify the core values the community possessed. They then came to agreement on what issues were most important from a cultural perspective for moving forward with their process of reinvention. The delineation of these values provided the opportunity for stakeholders to agree upon a shared community vision for their future, what goals they wanted to achieve as part of this vision, and a deeper understanding of the problems that were defined as the gap between what is and what should be (Five E's Unlimited 2007b). Their shared vision was as follows:

On behalf of the people of Dauphin Island, the Town will lead this small island community through the 21st century by preserving the island's history, culture, and environmental assets, while planning for a future that capitalizes on its natural resources to promote economic well-being.

The goals the community stated to guide actions toward this vision included (1) improving the Central Downtown Village Environment, (2) developing Effective Governance, (3) identifying New Sources of Revenue (beyond lodging and property taxes), (4) maintaining Sustainable Beaches & Dunes, (5) promoting Eco-Tourism, (6) maintaining Healthy Ecosystems, and (7) developing a Sustainable Small Town Community.

Recognizing Need for Environmental Responsibility — Dauphin Island stakeholders acknowledged that many of



Figure 6. The spiraling capital assets model of Flora and Flora (2008a) was used to illustrate how stakeholders identified and planned to use the different kinds of assets Dauphin Island possessed that could lead to community improvement and sustainability. Capital reference to each action shown in parentheses.

their goals for improvement were dependent upon protecting their environment and natural resources in order to sustain their eventual revitalized, transformed economy. The community explored ways in which it could capitalize on the region's ecological infrastructure, complementing conventional approaches to such issues as flood control, stormwater management, drinking water supply, wastewater treatment, residential development, public parks, and other recreational design with approaches that targeted protection of the services provided by a healthy natural ecosystem. They identified areas for further consideration that through forms of low-impact development (LID) would sustain their natural environment and protect their future.

Promote New Forms of Sustainable Development — Through the different stakeholder discussions and assessment of alternatives to previous development strategies, they began to seriously evaluate the local assets they possessed to target in terms of future development that would be environmentally sensitive. (detail around some of these assets can be found in the Dauphin Island Strategic Planning Final Report — p. 16ff; http://www.eeeee.net/dauphin_island/di_final_report10-07.pdf). For example, stakeholders

- investigated opportunities for fishery harvest businesses that could be used as an anchor and magnet for rebuilding their local waterfront;
- researched many different transportation systems in order to identify alternatives to automobile access to the entire Island that would offer added protection to their pristine environments;
- studied different examples from other places that provided means of establishing living family wage strategies for the advantages of residents and the local economy (e.g., <http://www.smartcommunities.ncat.org/greendev/codes.shtml>);
- leaned about case histories from other places regarding efforts to leverage local assets and value-added options for decreasing economic leakage from the community;
- evaluated alternative development options for the Island's west end area targeting the recreational, beach-going attractiveness of this Island area which had historically been a place of high valued private residential real estate at high risk to storms and sea level rise;
- assessed a number of different low-impact development strategies such as increased green space, recycling waste waters, and less impervious surfaces all to hold freshwater on the Island (., <http://www.smartcommunities.ncat.org/greendev/codes.shtml>); and
- examined status of environmental protection and land-use risk for existing bird habitats on the Island in order to maintain and enhance the value of these

places to support eco-tourism business activities.

The public consultation processes resulted in stakeholder appreciation for the need to attract new developers and investors to the community. In order to achieve this objective, stakeholders believed the Town should be more creative with its zoning and land-use regulations in order to improve infrastructure and enhance economic development in an environmentally sound manner (Figure 6). The major economic problem facing Dauphin Island was the typical rural economic leakage that occurs in small towns across America. To reverse this potential for continued economic decline it was believed that opportunities should be discovered to add value to assets Dauphin Island possesses, to keep more money in the local economy and less flowing out to the larger regional economy of the County of Mobile and southern Alabama. Stakeholders suggested that economic activity be diversified; the degree of local ownership balance outside interests and the Town have the capacity to change with a changing market place by expanding to new markets and/or adding value to existing assets in order to achieve more economic security. Likewise, they stated that policies be developed to promote fair and affordable access to housing and cooperatively (internal and external) developed programs put in place to promote the affordability of goods and services to residents and employees (even in contrast to tourists) in order to keep money circulating in the community as a further guard against economic leakage, as well as to enhance social equity.

The idea of a “dual economy” was one of the alternative strategies discussed by stakeholders to make living on the Island more affordable to longtime residents and the workforce. This strategy consists of local goods and services provided to residents at different (less) costs than to visitors and tourists, requiring some form of computerized infrastructure. A metaphor for this strategy would be the membership card you use in your local chain-grocery store such as Safeway or QFC.

Conclusions and discussion

Following successive natural disasters, Dauphin Island (AL) leaders decided to reinvent their community in a sustainable way. Through a public consultation process strategic actions were identified that would allow the community to become more sustainable and resilient than it had been in the past. Emphasis of this strategic effort was placed upon shifting their economy from one dominated by expensive rental home lodging and property taxes to a more diverse small business community. In addition, the community conducted an intensive examination into its internal assets (environmental, cultural, historic, etc.) in order to reverse their significant

rural economic leakage patterns and to regain their sense of community around the environment of a small fishing village, which had been their history.

The Dauphin Island public consultation process employed the community capitals framework of Flora and Flora (2008a) to their strategic planning process in order to develop a path of action that could prove resilient and sustainable because it addressed four areas the community felt extremely dedicated to for its future. First, they were committed to partnering for the community's success, which included creating a shared vision, strategizing to achieve that vision, and assuming full community responsibility. Second, they firmly believed in protecting their future through community-based conservation development and environmentally sound infrastructure expansion. Third, they articulated that in order to build a vibrant community they would have to develop a "sense of community," preserve their cultural integrity, and consider how best to meet the needs of a local workforce with strategies for affordability and adequate access to health care and education. Finally, the public consultation process identified means they could pursue to enrich the community experience through conservation-based economic systems, sound land-use and urban design, and appropriate access and transportation mobility that would be sensitive to the pristine natural environment of the Island.

As an indication that this facilitated stakeholder consultation process to chart a new direction for Dauphin Island toward resiliency and sustainability would not take the path of many community planning activities and just "sit on a shelf," the Mayor of Dauphin Island, Jeff Collier, recently communicated the following (Sept. 2008; e-mail: jwcollier4@hotmail.com). "Things are going well on Dauphin Island. We purchased property on Bienville Blvd and will be opening a new public beach there on June 20. The same day we will open our new 'green park' which will be a pedestrian park with picnic tables and a gazebo for people to bird watch, have lunch, or read a book. The century year old oaks now can be readily seen and enjoyed by all. We are also poised to purchase properties on Aloe Bay as part of our 'downtown business district & working waterfront' effort. We are nearly finished with our new building at Billy Goat Hole. All we have to do now is keep the hurricanes away and the Island should regroup in a short while. We have several new businesses that have opened in the past 3-4 months including two restaurants, a kayak rental and a florist/gift shop."

The community capitals framework has been criticized as a methodology that actually distracts from taking a sustainable approach to policy-setting and decision-making in community development. It is believed this framework causes communities to look at the different forms of capital it identifies in a piecemeal fashion. The approach of address-

ing one issue at a time is always a risk in community development work intended to be sustainable. The community capitals framework was important to community development here because it demonstrated how to place many different kinds of community concerns on par with each other by suggesting comparisons and integration through the idea of a common currency, not in the idea of money, but rather in the "value" and investment that different capital assets of a community possess. With this understanding a community can find it much easier to have discussions about issues that cross boundaries of politics, culture, environment, and economy, for example. And eventually community stakeholders, often with very different ideas and views, can begin to acknowledge that improvements in all forms of capital are truly interconnected and require both internal investment as well as strategic investment in built capital and human capital from the outside. Figure 6 appropriately identifies this idea of integration; one form of capital providing the foundation (building blocks) for another by its indication of the different improvement steps the community planned identified along with the different types of capital being enhanced.

The need to account for resilience in a world of transformations was a perspective that became embedded in Dauphin Island strategies and policy of sustainable community development programming. Coupled systems of humans and nature are complex and uncertain, in terms of how they anticipate and respond to natural disasters. The community learned the capacity to deal with the types of uncertainty and surprises required novel approaches, creative combinations of strategies, and the ability to adapt in a changing environment. They recognized that resilience-building increased the capacity of a social-ecological system to cope with surprise. Accelerating learning and supporting novel approaches that limited vulnerability and expanded the community's understanding of the occurrence and impacts of natural disasters seemed to be critical components of building community resilience.

The Dauphin Island experience of desiring to achieve a more resilient and sustainable community from efforts to reinvent itself after two natural disasters serves as an excellent example of building community capacity through vision and leadership. Citizens were provided with the information and opportunities necessary to participate meaningfully in decision-making (citizen engagement), and all affected people were encouraged to participate in policy formulation and implementation (responsibility). As a result of the lens of sustainability they chose to look through in their exploration of possibilities, their decision-making considered the full environmental, economic, and social costs (full cost accounting) to ensure that all projects and programs proposed for both the short- and long-term contributed to the sustainabili-

ty vision for the community and provided them with increased economic security.

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Endnote

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