

Seeking Resiliency in the Development of Sustainable Communities

Dr. R. Warren Flint

Five E's Unlimited

1906 S. Bennett Dr.
Seattle WA 98108 USA
rwflint@eeee.net

Abstract

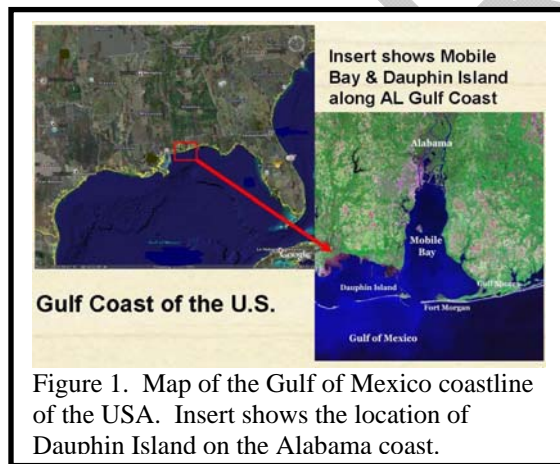
In beginning to embrace ideas of community sustainability society seeks to achieve improvement through an interdisciplinary focus on the successful integration of the “triple bottom line.” A willingness to engage in sustainable development encourages an understanding of socio-economic and ecological concerns representing issues often in opposition but requiring reconciliation. In reconciling differences, a community can move towards sustainability when it understands the connected economic, social, and environmental consequences of its actions and makes deliberate, informed choices that allow all people to lead healthy, productive, and enjoyable lives in the community, now and in the future, without experiencing unintended consequences. Additionally, new insights have been gained about the essential role of resilience for a prosperous development of society in general and communities in particular, revealing a tight connection between resilience, diversity, and sustainability of social-ecological systems. Dauphin Island (AL) along the U.S. Gulf of Mexico coastline is a community that desires to take charge of its own destiny toward designing the means to secure a resilient and sustainable future after experiencing two successive years of significant physical, economic, social, and environmental destruction from two hurricanes. During a 10 month strategic planning effort of transparent, all-inclusive public consultation, designed to culminate in a community initiated, driven, and concluded strategic plan, stakeholders sought to understand how communities function with regards to sustainable community economic development and build consensus and policy-making toward an improved, more sustainable community with a resilient future. They recognized the need to employ the Community Capitals Framework to guide their evaluation of how various issues played important roles in their development, demonstrating through their discussions how these capitals integrated and maintained one another. The “spiraling capital assets” model was employed to define how the community traced its points of decline and plotted its strategic improvement milestones. Major emphasis of the resulting strategic action plan emphasized shifting the Town’s tax base from one dominated by expensive rental home income taxes to focus on a more diverse small business community that emphasized the cultural heritage of the Town. 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 promote new local forms of economic development, while establishing means to protect their important environmental resources.

Keywords: sustainable community development, resiliency, sustainability, economic development, community development, Gulf Coast communities, community improvement, community capital, community assets, public participation, public consultation, 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 by acts of humanity (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). Although less than a century ago this story tells how 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, as suggested by our lack of concern for many issues of sustainability we face today that are equally interconnected back to humans! What economic, social, and political choices can we still make, so that 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 that recruited the facilitation assistance of *Five E's Unlimited* 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 focused upon helping people to visualize how sustainability provides a

multi-dimensional way to achieve multi-faceted goals and improve the quality of life for everyone. The anticipated outcome of this project was recommendations and rationale for improvement pointing to 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 along the Gulf of Mexico coast of the USA (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.

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. Dauphin Island 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 relates to the social and economic capacity concerns of people. Accordingly

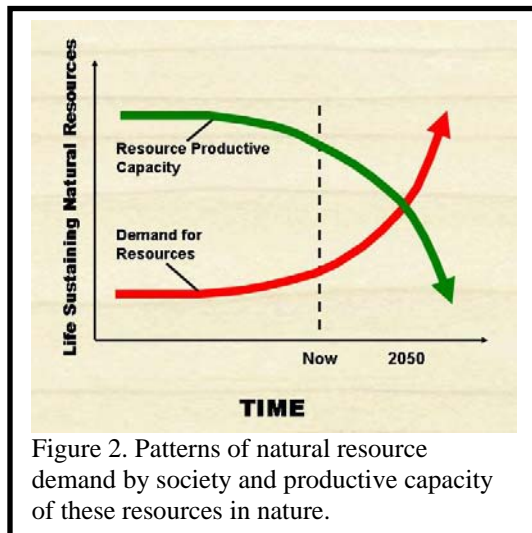
the Town expressed fear for potential uncontrolled growth that might degrade these resources and the community’s quality of life following the impacts of the recent destructive hurricanes. These potential changes on the Island landscaped caused anxiety about community well-being, prompting the community 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 Island community’s articulation of needed emphasis on “sustainable” development for effectively influencing the direction and momentum of the change affecting resource 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 was able to inspire stakeholders to engage in a strategic planning process and build consensus on sustainable development programs that would collectively improve the well-being of all residents.

Table 1	Questions to Focus Dauphin Island Strategic Planning
	<p>(source: from Dauphin Island Request for Proposals, 2006)</p> <ul style="list-style-type: none"> • 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?

In mounting its campaign to reinvent itself and develop strategies of resiliency and sustainability, Dauphin Island looked to promote (1) 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 inspired vision and action; in order to (2) inform 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; whose outcomes were expressed in (3) 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 guided the Town of Dauphin Island 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 considerable



evidence now, however, indicating the use of natural resources by many parts of our economy has already exceeded the regenerative and absorptive capacity of the environment (Dietz, et al., 2009), as suggested in the simple graphs in Figure 2, prompting concerns about human sustainability. The problem of climate change and global warming are commonly reported examples. These issues provide evidence that we have exceeded the capacity of the atmosphere to absorb our carbon dioxide, methane, and nitrogen oxide wastes. 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 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 be a strategy that fully considers

economic, social, and environmental dynamics concurrently in a system context and acknowledges space-time relationships when making decisions that ultimately impact a complex, dynamic system (Norton, 2005). These interdependencies require new ways of thinking about things 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 quest for societal and economic improvements so that communities can implement better programs to alleviate poverty, protect material resources, and achieve national security through more sound development, while taking charge of their own destinies (Gibson, 2002), is a call for “sustainable development.” In acting sustainably our economic desires/demands become accountable to an ecologic imperative to protect the ecosphere, and a societal imperative to create equal access to resources and minimize human suffering (Figure 3), reversing the path of the two graphs shown in Figure 2.

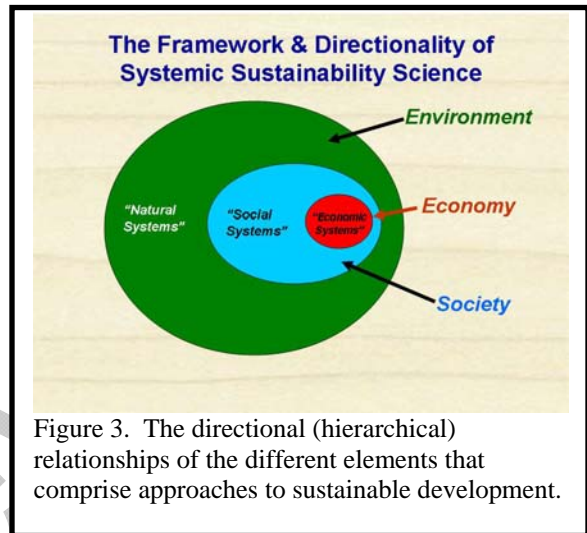


Figure 3. The directional (hierarchical) relationships of the different elements that comprise approaches to sustainable development.

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 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.

The Key to Community Resiliency

As detailed above, the goal of sustainable development is to create and maintain prosperous social, economic, and ecological systems. These systems 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 negative shifts represent loss of resilience. New insights have emerged concerning the essential role of resilience for prosperous development of society in general and communities in particular (Kates and Clark, 1996). A growing number of case studies have 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 both the capacity to withstand pressures and to rebuild and renew itself if degraded.

As suggested by Pearson (2008) and others, development of human management strategies to promote sustainability requires direct consideration of both resilience and risk factors. Most community development thinkers have already agreed that risk is the key to development, vulnerability is the key to risk, and community resilience is the key to vulnerability (Walker and Salt, 2006). “This leaves community resilience as the root of the spiral.” Although this suggestion seems logical, few community development programs have addressed the various interlinked and interdependent components of community resilience. And since all of these factors are indirectly related to 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 alternative uses of the ecosystems seek common ground.

Therefore, the reality of successful community development is that communities should be seeking to development methods of local resiliency management in order to ultimately become more sustainable. Methods for local resilience management will increase the robustness of a town, city, or community to a range of shocks, crises, and disasters including environmental

emergencies, industrial accidents, outbreaks of epidemics, economic shocks, natural disasters, terrorist attacks, and social conflict (Walker and Salt, 2006). Understanding the concepts of resiliency requires the combined consideration of the following three principles (Pearson, 2008): (1) Persistence: the capacity of a system to maintain structure and function when faced with shocks and change – the magnitude of shock that the system can absorb and remain within a given state (*e.g.*, for a forest to withstand a storm); (2) Adaptability: the collective capacity of people to adapt to changing conditions in order to stay within a desired state – the degree to which the system can build capacity for learning and adaptation (*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 – the degree to which the system is capable of self-organization (*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 in response to management actions (Folke, et al., 2002). Resilience is often associated with diversity – of species, of human opportunity, and of economic options – that maintains and encourages both adaptation and learning. In general, resilience derives from things that can be restored only slowly, such as reservoirs of soil nutrients, heterogeneity of ecosystems on a landscape, multiplicity of businesses types, or variety of genotypes and species.

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.

One approach to the ongoing modification of social-ecological systems has been the attempt to control or channel change. Social-ecological systems are constantly changing. 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. There are many examples of management that suppressed natural disturbance regimes or altered slowly-changing ecological variables, leading to disastrous changes in soils, waters, landscape configurations, or biodiversity that did not appear until long after the ecosystems were first managed. Similarly, governance can disrupt social memory or remove mechanisms for creative, adaptive response by people, in ways that lead to breakdown of social-ecological systems.

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, unexpected, 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 ecologic 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. In this way they felt it would be possible to facilitate a social-political structure with flexible and open institutions and multi-level governance systems that would allow for learning and increase adaptive capacity without foreclosing future development options.

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. While industrial recruitment still has a large following among local and state economic developers, despite studies that show that 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 approaches 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. When we say capital in this context we mean to include all of these. 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).

The Community Capitals Framework was employed to understand how the Dauphin Island community functions with regards to economic development. This framework is explained in a number of publications addressing rural development (*e.g.*, Emery and Flora, 2006; Flora, 2004b; Flora, 2008). In the desire of 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). 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 the Community Capitals 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). This proved to be an invaluable evaluation process in the Dauphin Island project.

Community Consultation Process

The Dauphin Island community participated in a wide range of the 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 engendering 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.

The conduct of the Dauphin Island project allowed for the 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. The 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. 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 of pattern mapping meets the needs of a corporation, organization, or community group in working to identify a solution to a specific problem, assets supporting a particular topic, or a preferred future for a particular issue of concern they might be grappling with. 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 the group's discussion provides the substance for discussing a probable outcome or future if no intervention is taken. This then can lead to brainstorming by the group 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.

The theory that underlies this method of public consultation includes the assumption that 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." As a result, 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 stated vision the community holds in common. 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. This requirement demanded experience and ingenuity to determine a number of different ways in which the public could be engaged.

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 the resiliency of communities attempting to achieve sustainability goals in their future development.

Evaluation of Dauphin Island Community Resiliency

The consultation process, which was designed to eventually lead to a community initiated, driven, and concluded strategic plan, began with stakeholders engaging in the community capitals framework (Flora and Thiboumery, 2006) and its “spiraling capital assets” model (Flora and Flora, 2008a) to define how the community was able to trace its points of decline and plot its strategic improvement milestones to reach a more sustainable and resilient future. The framework guided deliberations by stakeholders on how they could best work with the different kinds of assets the Dauphin Island community possessed. Pattern mapping facilitated discussion and brainstorming by stakeholders on what caused the decline of the Dauphin Island community over time (spiraling down) and then what needed to be considered in the use of available assets to direct 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

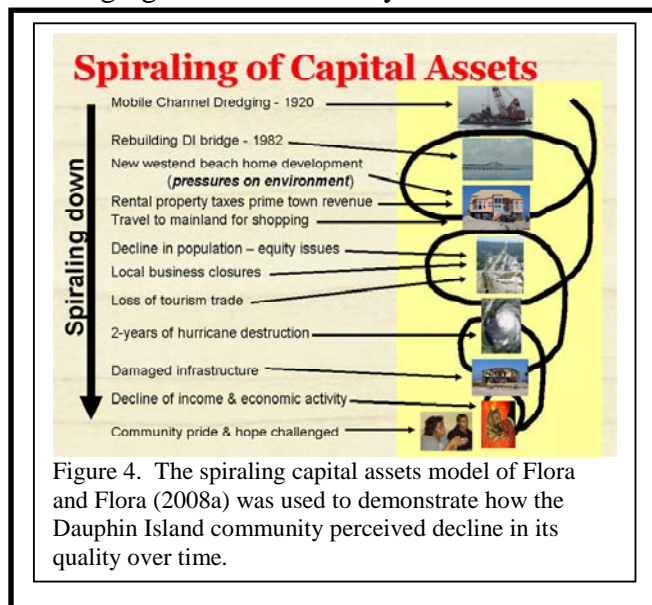


Figure 4. The spiraling capital assets model of Flora and Flora (2008a) was used to demonstrate how the Dauphin Island community perceived decline in its quality over time.

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, the federal project of Mobile Bay dredging was expanded to include adjoining channels within the bay and in the early 1900s was intensified and the channel significantly deepened. Section 104 of the River and Harbor Act of 1954 (House Document 74, 83rd Congress, First Session, as amended, and previous acts) authorized a 40-foot deep channel. The current dimensions of the navigation channel are 57 feet deep by 600 feet wide across Mobile Bar into the Gulf of Mexico. These depths are in contrast to surrounding

Gulf bottom depths of usually less than 20 feet. 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 major 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 of Dauphin Island has changed considerably in the last century and a half, thought to be related to the continued Mobile Channel dredging (Kelley, et al., 2004).

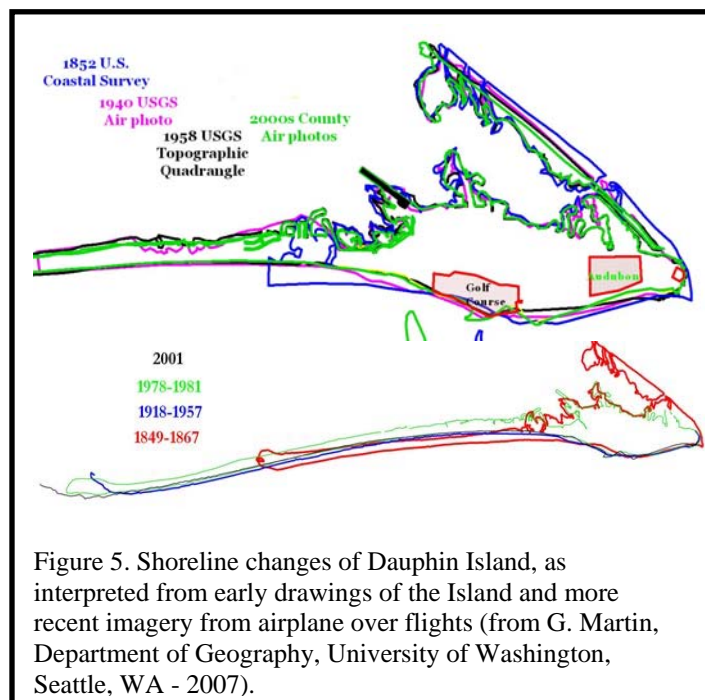


Figure 5. Shoreline changes of Dauphin Island, as interpreted from early drawings of the Island and more recent imagery from airplane over flights (from G. Martin, Department of Geography, University of Washington, Seattle, WA - 2007).

Further evidence of beach erosion and deposition along the Gulf of Mexico beaches of Dauphin Island (AL) was provided using air photos, beach profiles, visual wave observations, and historical coastal engineering archives during the early 1990s (Douglass, 1994). 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 previous 10 years along this coast. 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 demonstrated that many of the 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 Management Agency built an engineered sand berm on the Dauphin Island beaches in 2007 in an effort to less 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 to the Island and opened in 1982. The building of this bridge was supported with state and federal monies and as a result the 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 of the Island, owned by wealthy, mostly part-time residents, and many served as rental properties. The building of these homes significantly increased the Town of Dauphin Island's annual revenue through the collection of rental property taxes. Over time this income to the Town became a sizeable financial base and the predominate source of revenue, causing a lack of income diversity that normally offers 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 population 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 as a functioning town.

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

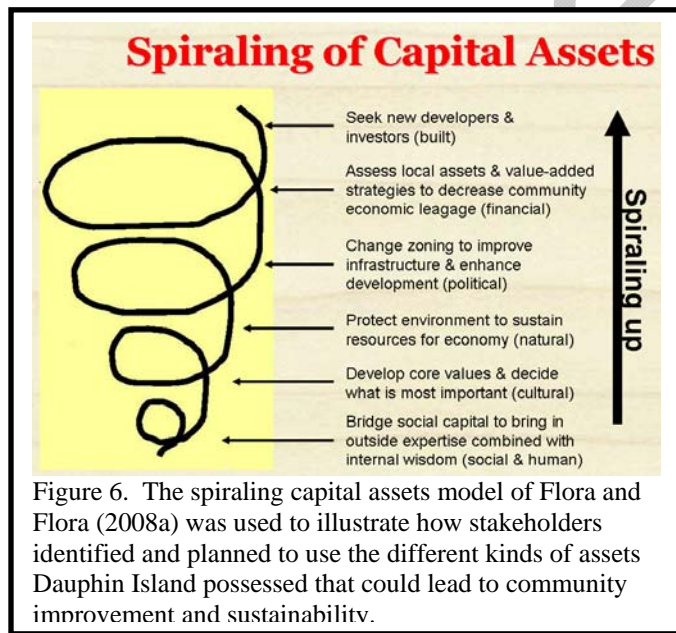


Figure 6. The spiraling capital assets model of Flora and Flora (2008a) was used to illustrate how stakeholders identified and planned to use the different kinds of assets Dauphin Island possessed that could lead to community improvement and sustainability.

again used to illustrate through the spiraling capital assets model (Figure 6) how stakeholders identified and planned to work with the different kinds of assets the Island 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

– During public consultation 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 Dauphin Island 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 rental 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 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. For example, Dauphin Island 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;
- 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 valuable freshwater on the Island; 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 and 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.

Conclusions & 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 tax base from one dominated by expensive rental home income 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 (September 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. A prime reason for this criticism is the belief that this framework causes communities to look at the different forms of capital it identifies in a piecemeal fashion, often in isolation from one another. The approach of addressing one issue at a time is always a risk in community development work intended to be sustainable. The community capitals framework is important to community development processes by the fact that it demonstrates 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 establish 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 natural capital, cultural capital, human capital, social capital, political capital, financial capital, and built 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 and one form of capital providing the foundation (building blocks) for another form of capital 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 the Dauphin Island strategies and policy of sustainable community development programming. The community learned that managing for resilience could enhance the likelihood of sustaining development in a changing world where surprise is likely. They recognized that resilience-building increased the capacity of a social-ecological system to cope with surprise. A

changing, uncertain world in transformation demands action to build the resilience of the social-ecological systems which embrace all of humanity.

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

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