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In memory of Virginia Dale Baker and Robert Caven Ronald, my mother and father
I would like to thank those professors working on my committee for their continued support, especially my major professor Dr. Vandra Masemann and Dr. Steven Klees who took positions at other universities before my work was complete. I would also like to thank Dr. Karen Monkman, who stepped in to support me in their physical absence. In addition, I would like to thank my two daughters, Seneca Dale and Katharine Marguerite, for their patience as I pursued this dream. Perhaps most important in this process were those “professors” who will go unnamed, the members of the clam farming community who welcomed me into their lives. Without their participation, this study would not have been possible.
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<td>FDA</td>
<td>Federal Drug Administration</td>
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<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
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<td>(Florida) Marine Fisheries Commission</td>
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ABSTRACT

This dissertation examines the process of informal situated learning and conscientization in a Florida coastal community that faced rapid environmental change from 1989 to 2003. By examining this poorly understood process of learning in the face of sudden and sporadic (lurching) change, and transformational change, I clarify those conditions and characteristics that fostered learning and the process of individual and collective conscientization. The study period encompassed the closure of local oyster harvesting areas, the decline of the oyster industry, the Florida net ban and decline of commercial net fishing, the collapse of wild clam harvesting in the state, and the emergence of clam farming. Two theories, panarchy developed by the Resilience Alliance (1999) and Gunderson and Holling (2002) and communities of practice developed by Lave and Wenger (1991), provided a conceptual framework for the study. I used an ethnographic approach, conducted life-learning interviews, and shared transcriptions with participants to foster conscientization. Direct and participant observations were made, and documents were collected. I used the constant comparative method to analyze data, mapped social ties and stakeholder characteristics. Data were plotted spatially and temporally to determine conditions and characteristics affecting learning and conscientization. Interaction, communication and collaboration increased during the adaptive phase of reorganization, fostering intense learning and innovation. Individuals – primarily women – denied ready access to resources by cultural structures and/or environmental events were involved in conscientization first. The participation of greater numbers of women and outsiders in clam farming during the adaptive phase of reorganization modified cultural structures and patterns of interaction with the social and biophysical environment. Women (many former oysterers) and outsiders were able to play an influential role in collective conscientization through the retelling of their personal experiences. As the community of practice moved into the adaptive phase of utilization, cultural structures and patterns rigidified and learning slowed. Decreased access to resources due to steeper hierarchical structures perpetuated the process of conscientization. A series of crises accelerated the process. I found that individual conscientization occurred when individuals perceived action was in their best interest. I also confirmed that individual conscientization is a prerequisite for collective conscientization.
CHAPTER 1
INTRODUCTION

Problem

This ethnographic study focuses on situated informal and incidental learning processes and conscientization\(^1\) in a Florida coastal island community that confronted rapid environmental change. The study examined how a community of practice\(^2\) learned that certain environmental conditions were more or less propitious to its survival and worked towards producing those conditions, the process of conscientization (Foley, 1999; Freire, 1970b). Against a theoretical and epistemological backdrop of social constructivism, ecofeminism and socialist feminism, I have integrated aspects of the theoretical framework of panarchy\(^3\) [developed by Gunderson and Holling (2002) and the Resilience Alliance (1999)] with the theoretical model of communities of practice [developed by Lave and Wenger (1991)] to better explain how situated, informal and incidental learning and conscientization occurred. As a result, I have also shed light on how a community of practice changed as learning and conscientization occurred.

How human groups or systems deal with transformative change, both cultural and biophysical is a poorly understood process, but it is clear that learning is pivotal. Learning, however, is not just a means of coping with change. Learning also produces change, for as people learn, the way they look at the world and interact with the world changes. The processes of learning and environmental transformation are circular events; new ways of interacting with the world produce environmental change and environmental change results in additional learning.

This ethnographic study was centered in a small coastal community along the Gulf Coast of Florida in the southeastern section of the United States. At the turn of the 20\(^{th}\) century, with the end of World War II and the closing of one of the community’s largest employers, the inhabitants of Oyster Isles\(^4\) began to depend heavily upon fisheries. By 1953, the community was considered one of nine major fishing areas in the state.

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\(^1\) *Conscientization* refers to an awareness of social, political, and economic contradictions based upon critical learning and reflection that results in action (Freire, 1970b). João Freire also defines it as a methodology that facilitates a person’s increased awareness of a situation that can lead him or her to action (1970b, 73).

\(^2\) *Community of practice*, a concept developed by Jean Lave and Etienne Wenger (1991), refers to groups that are working together to pursue similar goals. These groups may be geographic or virtual.

\(^3\) I will be focusing on the adaptive cycle and the effects of potential, connectedness, and resilience on this cycle.

\(^4\) *Oyster Isles* is a pseudonym.
(Florida Fisheries Outlook, 1953). Fisheries practices that had been relied upon for
generations had become the lynchpin of the local economy. Service industries and a
limited tourist trade supplemented incomes gained from fisheries.

From 1953 until the early 1980s, the federal and state government supported
commercial fishing in the United States. In 1969, the federal government allocated more
than $1.5 million dollars to the Gulf and South Atlantic states for commercial fisheries
research (Whiteleather, 1969). During the oil crisis of 1973, commercial fishermen, who
were seen to be vital to the food producing industry, were assured access to fuel (Captain
Tom Hamblen, personal communication, 1975). In 1976, the U.S. fishing boundary was
extended from 12 to 200 miles.

During this period of political and financial support, local fishermen\(^5\),
oystermen, crabbers, wholesalers and retailers found themselves increasingly regulated
by the Florida Marine Fisheries Commission (MFC). State and federal resource
management agencies argued that the regulations were the result of over harvesting.
Many commercial fishermen argued that the regulations were enacted to placate the
multimillion-dollar sports fishing industry (informants, personal communications, 2001-2002).

Oystermen faced an additional threat, water pollution. As waters became
polluted, areas previously open to shellfish harvest would be closed, forcing oystermen to
centralize their efforts on a smaller area. Increased pressure on the resource further
deprecated stocks, despite the State’s sponsorship of oyster replanting efforts\(^6\).

Until 1989, changes in the fisheries industry were incremental and learning
from and for change was incremental. In late 1989, early 1990, a sequence of
transformative change began that would, over the next decade, transform the quiet fishing
village into the number one producer of farmed clams in the state (informants, personal
communications, 2002-2003). These changes included the closure of oyster flats resulting
in the unemployment and underemployment of oystermen, increases in property
valuations and taxes and an influx of wealthy newcomers, the Florida net ban\(^7\) resulting
in the unemployment of commercial fishermen, and the introduction of shellfish
aquaculture.

The shift from a hunting-and-gathering based economy to an agricultural one
has been the focus of substantial anthropological research. This research has indicated
that such change is accompanied by significant worldview\(^8\) changes as cultural and
environmental patterns shift (Coe, 1968; Maisels, 1990; Palerm & Wolf, 1972). In

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\(^5\) The term fishermen has been used rather loosely in much literature to refer to individuals who make their
living by harvesting live wild natural from the water (i.e., clams, crabs, fish, oysters, shrimp, sponges, etc.).
In this paper, the term is used more specifically to refer to those individuals who were involved in the
capture of fish. The terms fisherman, oysterman, or crabber refer to both men and women who were
involved in these livelihoods.

\(^6\) Oyster replanting was an activity organized by the state of Florida where oystermen and their families are
paid to relocate young oysters from restricted areas to waters that are classified as open. Here they mature
and are available in later seasons for harvest.

\(^7\) The Florida net ban “prohibited all gill nets, monofilament material, nets over 500 square feet, more than
two nets from a vessel, and possession of mullet and a gill net on the same vessel…” (Salz, 1998, 3). This
ban took effect on July 1, 1995 and “resulted in a major reallocation of the state’s near-shore fisheries in
favor of recreational “hook and line” anglers” (Salz, 1998, 3).

\(^8\) Worldviews are paradigms held by groups and individuals that determine how people perceive their
Oyster Isles, albeit a wild harvest community immersed in the modern world, this transition from hunting and gathering to farming occurred in less than a decade and was accompanied by a population shift. The population prior to 1989 primarily was made up of families who had lived in the area for generations. This was a homogeneous, white community. By 2002, the existing community had been augmented by a mix of retirees, second-home owners who wintered in the Southeast of the United States, academics, former wild clam harvesters, and fishermen from other areas.

The cultural and biophysical factors that created this transformative change were obvious, as was the community’s success. How the community had learned to deal with this rapid environmental change was not. Rapid environmental transformations have destroyed communities and cultures that were not able to learn. What factors had enabled this community to avoid this fate?

Some think that human adaptation to changing biophysical and social conditions is primarily a process of situated informal and incidental learning (Foley, 1999; Marsick & Watkins, 1990). Lave and Wenger (1991) in their work on communities of practice, define learning as “an integral and inseparable aspect of social practice” (31). It is a combination of adapting to biological and physical forces and a process of adapting socially – enculturation. Such enculturation appears to involve the restructuring or modification of cultural structures of legitimation, domination, and signification (Giddens, 1979, 1984, 1990, 1995).

Informal learning, the result of the transmission of tacit and practical knowledge, procedures, and skills, appears to promote the resilience of social and natural systems (Berkes & Folke, 2000a, 2000b; Holling, Carpenter, Brock & Gunderson, 2002a). Resilience is required within systems if they are to survive transformative change.

While an understanding of incremental, linear learning (single- and double-loop learning) may suffice when dealing with incremental or lurching change, Foley (1999) and Freire (1970b), among others, argue that critical reflection and action (conscientization or transformative learning) are key to adaptive learning for transformative change (Argyris & Schon, 1978, 1996; Holling et al., 2002a; Mezirow, 1990, 2000; O’Sullivan, 1999; Senge, 1990). Understanding how this adaptive learning occurs, then, is key to understanding how communities and communities of practice can best deal with transformative change.

Prior to the intense period of change from about 1989 to 1995, most Oyster Isles’ residents were able to trace their roots back for generations. Most residents regarded

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9 Resilience refers to the ability of a system to withstand the strains of disturbance “without the system flipping into another state or stability domain” (Holling et al., 2002a, 399).

10 The definition of sustainability varies according to the definer. The Cambridge Advanced Learner’s Dictionary defines sustainable development as “causing little or no damage to the environment and therefore able to continue for a long time” (n.d.) Maximum sustained yield is an idea that focuses on resources as commodities (Ekins & Newby, 1998). In contrast, another definition includes the consideration of living within our ecological means, meeting basic material needs, and meeting the basic social and cultural needs of future generations (Bruntland, 1987). This concept is discussed in greater depth in chapter two.

11 Adaptive learning is that which sustains a community, community of practice, and their environs by increasing choices or alternatives as opposed to maladaptive learning that decreases options (Berkes & Folke, 2000a, 2000b).
fishing, oystering, and/or crabbing as their heritage. The traditional fishing community shared a traditional knowledge base. Warren (1991) and Roberts (1964) describe such communities as places where knowledge systems are gendered. Warren says different groups are assigned specific production and management responsibilities and therefore hold specific knowledge. Roberts says knowledge is not equally distributed; some people have access to resources (i.e., learning, etc.) that others do not.

After the closure of the oyster flats and again after the commercial net ban, the state offered job retraining to unemployed and underemployed residents. Most were former oystermen and fishermen. The non-formal classes focused on shellfish aquaculture. Those individuals who completed the courses and continued farming clams were joined by others who were interested in aquaculture. The latter relocated to the community as word of Oyster Isles’ success grew. This group formed the core of the incipient clam farming community of practice. As the community of practice emerged, its cultural structures of legitimation, domination, and signification and patterns of interaction with the social and biophysical world were modified by learning and conscientization.

Berkes (1998, 2002) documents the merging of traditional and academic knowledge bases as the knowledge systems of resource managers and commercial fishermen merge. He terms the results of such learning neotraditional knowledge. Shiva (1989, 1993a) argues that some worldviews are so mutually exclusive that they prohibit the partnership between different knowledge bases. The economic success of the clam industry in Oyster Isles is an indication that neotraditional knowledge developed.

In 2002, farmed clams brought more than $15 million to the island’s economy, accounting for more than half of the state’s total clam landings (informants, personal communications, 2002). This apparent success may be attributed to a number of other factors including: geography, timing, non-formal education programs and the provision of submerged offshore leases, start-up seed and equipment, and the modification of cultural structures and patterns of interaction with the social and biophysical environment.

Much of the learning and resulting changes in cultural structures and patterns of interaction appear to have been the result of a changed production system – the move from wild harvest to agriculture. A number of theorists say that as production (technology) systems change, relations within the natural and social environments change (Mead, 1953; Thomas-Slayter, Esser & Shields, 1993; White, 1949). Others disagree; they say technology alone explains nothing (Boserup, 1965; Maisels, 1990). Maisels (1990) says that any explanation of change “must be in terms of the social needs that existing and improved technologies serve” (32). Boserup (1965) adds that natural population pressure drives this process of change. While this study sheds light on factors that appear to have prompted change, it is the implications of change on the process of informal learning and conscientization that is the primary focus. These implications include: 1) the possibilities for different actors to become involved in new roles; 2) the expansion and/or contraction of social groups; changes in cultural structures and patterns of interaction with the social and biophysical environment; 3) the existence of different

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12 Aquaculture is the farming of plants and animals in fresh or salt water.
types of relationships, i.e., weak/strong and vertical/horizontal ties\textsuperscript{13}, etc.; 4) the creation and/or disappearance of common spaces; and, 5) the sense of place that develops as the community of practice constructs the character of its environment (Altman & Zube, 1989; Berry, 2000; Flora & Flora, 1993; Granovetter, 1973; Jiggins, 1986a; Oldenburg, 1989; Putnam, 1993; Thomas-Slayter et al., 1993; Schensul, LeCompte with Trotter, Cromley & Singer, 1999; Swanson, 1992).

The decline of the oystering and the Florida net ban were two factors that prompted the community to turn from wild harvest to aquaculture. The success of aquaculture in Oyster Isles resulted in still more change. The number of raceways (land-based nurseries for clam seed), processing operations, and boats increased. Property values, taxes, and insurance rates continue to rise, and increasing numbers of long-time residents were forced to move inland or to leave the area altogether. In addition, despite the construction of two sewage plants, restrictions on developments in some island and mainland wetland areas, storm water runoff projects and the closing of all island septic tanks, the threat of pollution from increased development inland and upstream became a major concern. The sale of approximately 90 mainland, coastal lots adjacent to the many of the island’s clam leases threatened water quality and prompted a growing realization that it had to be protected. Clam farmers and concerned community members collaborated to protect this resource. In early 2003, when the Florida governor suggested the elimination of the Division of Aquaculture\textsuperscript{14} as a cost-cutting measure, these groups came together again and representatives testified in both the Florida House and Senate to preserve the Division (Colavecchio-Van Sickler, 2003).

The exponential pressures on and changes in Oyster Isles over the last decade exemplify problems occurring in rural and coastal areas worldwide. Some of these include increasing coastal populations, development, pollution, increasing taxes and insurance on coastal property, increased property values, changes in livelihoods, out-migration and immigration, and the transition from commercial fishing to other livelihoods.

Internationally, governments are grappling to manage fisheries and marine resources while contending with coastal growth (Constanza, Culliton, 1997; D’Arge, deGroot, Farber, Grasso, Hannon, Limberg, Naeem, O’Neill, Parvelo, Raskin, Sutton & van den Belt, 1997; McEvoy, 1986; United States Environmental Protection Agency [USEPA], 1994a, 1994b, 1994c, 1996). Coastal development and increased populations have reduced public access to the water and augmented negative impacts on the natural resource base (Lime, 1983; Pitt, 1989). Construction has destroyed wetland and marine habitats and increased pollution (Blobaum, 1981). Wetlands and estuaries, nursery areas for many marine species, have deteriorated and are being destroyed, negatively impacting available stocks. Meanwhile, the worldwide appetite for seafood has soared in the past

\textsuperscript{13} Granovetter (1973) describes weak ties as those contacts between individuals that are infrequent and strong ties as those more regular contacts between individuals. Thomas-Slayter et al., (1993) describe vertical ties as those between the same class or economic group and horizontal ties as those between different classes or economic groups. This concept is discussed in more detail in Chapter Two.

\textsuperscript{14} The elimination of the Division of Aquaculture, part of the Florida Department of Agriculture (DOA), would have meant the virtual cessation of water quality testing required by the Federal Drug Administration (FDA) for the sale of shellfish (informants, personal communication, April, 2002).
quarter century, and fishing pressure\textsuperscript{15} has grown (National Marine Fisheries Service, 2003).

For those community members of Oyster Isles who lost their livelihoods as a result of the oyster flat closures and the Florida net ban and continue to feel threatened by the rapid changes caused by social and natural factors out of their control, anxiety is palpable. This study looks at the members of a community of practicing fishermen and oystermen who, to varying degrees, merged with incoming individuals to produce a new community of practice, shellfish farmers. How this occurred and how individuals within this community learned is the focus of this study.

**Purpose**

“…[S]low variables and the prospect of large, unique disturbances – key features of ecological systems (Carpenter & Turner, 2000) – help set the stage for collapse of ecological-socioeconomic systems” under normal conditions (best use of scientific information and good management) according to Carpenter, Brock, and Ludwig (2002, 187). Escalating forces of globalization\textsuperscript{16} exacerbate collapses and periods of potential renewal. Many feel that learning is how individuals and social groups cope with collapse and build and maintain resilience and sustainability (Gunderson & Holling, 2002; Carpenter et al., 2002; Scheffer, Westley, Brock & Holmgren, 2002).

Holling, Gunderson and Peterson (2002b) hypothesize about cycles of change and conditions that promote adaptive learning and sustainability as opposed to those which promote poverty and increased volatility: potential\textsuperscript{17}, connectedness\textsuperscript{18}, and resilience. Understanding the learning processes and characteristics of learners that correspond to adaptability and sustainability is critical, as the frequency of adaptive cycles\textsuperscript{19} appears to be increasing with the pressures of globalization. A better understanding of the transformative learning process may allow communities and those who work with communities to create conditions where such learning can flourish.

As the realization of the increased potential for collapse and renewal has grown, conversations among educators and community developers have reflected that individuals will no longer be able to rely on having a single career for a lifetime. This concern has translated into a need to create life-long learners and build learning communities and collegial groups. Most of these conversations have taken place within the field of formal

\begin{itemize}
\item \textit{Fishing pressure} is defined as the amount of competition by harvesters (commercial and sport) for fisheries resources (crabs, oysters, fish, etc.).
\item \textit{Globalization} is a term that describes the increasing connectivity and interdependence of world markets, (i.e. the increased mobility of goods, services, labor, technology, and capital).
\item “Social and or cultural potential can be represented by the character of human relationships – friendships, mutual respect, and trust among people and between people and institutions of governance,” (Holling et al., 2002, 398). “In ecosystems, potential can be measured, in part, by production of biomass or nutrients accumulated as a consequence of ecosystem successional dynamics (Carpenter, Ludwig & Brock in Holling et al., 2002a, 398).
\item \textit{Connectedness} represents the strength of internal connections that mediate and regulate the influences between inside processes and the outside world. (It is) essentially the degree of control that a system can exert over exogenous variability (Holling et al., 2002a, 398).
\item Adaptive cycles – reorganization, exploitation, conservation, and release – are discussed in Chapter Two.
\end{itemize}
education. If, however, most learning occurs informally, then an understanding of how this situated informal and incidental learning occurs, what the characteristics of learners are, and what conditions promote successful learning become increasingly important.

Many suggest that as communities of practice negotiate meaning and come to a shared understanding of the environment, they also construct the character of that environment (Scribner & Cole, 1973; D'Andrade, 1981; Lave & Wenger, 1991; Wenger, 1998). Others argue that over time learning in practice may generate the most powerful type of knowledge; the ability to preserve valued environmental resources (Foley, 1999; Lave & Wenger, 1991; Resnick, 1986; Wenger, 1998). The study sheds light on this environmental learning, as well as the role conscientization plays as individuals and groups define environmental sustainability and work towards it, building greater resilience into natural and social systems.

Carpenter, Brock and Ludwig (2002) conclude, “For the foreseeable future, important responses to environmental uncertainties will include creation and conservation of social mechanisms that promote flexible, adaptive response to novel and emerging issues” (187). This study identifies and examines a number of these mechanisms.

Another reason to pursue this study is the fact that an overwhelming amount of research examining the effects of environmental change has been geared to technology, overlooking and ignoring social consequences (Friedland, 1978). This is particularly true in the area of agriculture (aquaculture) and agribusiness (aquabusiness). For example, in the area of fisheries and aquaculture, research to date has consisted mainly of resource biology, stock assessment and gear development. Only a smattering of social science research has been conducted, and when funded by “hard” scientists it is frequently considered “nuts and berries” research. Friedland (1978, 258) says “the fact that so little is known about the social consequences of technological innovation in agriculture is not accidental.” He claims it is the result of deliberate investment policies. In 1990, the U.S. Department of Agriculture (USDA) mandated research and education programs on alternative agriculture systems. Despite this mandate, funding allocated to social science research lags far behind that of natural science (Bird & Ikerd, 1993). This study is meant to contribute to that gap for it is in these places, over sustained periods of time, that people learn to conform their artifacts and attitudes “to the local landscape, local circumstances, and local needs creating the possibility of sustainability” (Berry, 2000, 141).

**Rationale**

Foley (1999, 84) writes that during this time of increased globalization, “the most significant economic reorganization since the advent of mass production and consumption, and ‘scientific’ management,” an understanding of how successful informal environmental learning occurs is essential. This study provides an understanding of how some members of the Oyster Isles community of practice came to understand that an understanding of the relationship between the social and biophysical community was required for increased sustainability.
Carpenter, Brock and Ludwig (2002, 190) note that “increasingly narrow management programs, when combined with increasingly fragile ecosystems and growing social dependency, set the stage for gridlock, crisis, and collapse.” The estuarine system of Oyster Isles is one of ten such systems in Florida analyzed as part of a Florida Sea Grant study in 1996. Of these, it was the most pristine but was facing significant wetland loss that was deemed a “great concern” (Kleppel & The Estuarine Theme Panel, 1996a, 31). The waters within this estuary were some of the less than 15 percent of Florida’s coastal waters that were classified as suitable for shellfish aquaculture. Even here, however, five inches of rain in a 24-hour period created runoff problems that closed the waters to clam harvesting until water quality tests deemed they met high enough standards to reopen (informant, personal communication, April, 2002). Because of the fragility of such ecosystems, the informal learning that occurs under conditions of rapid environmental change and the social and natural consequences of economic and social reorganization that result from such change need to be better understood.

In addition, few studies have focused on marginalized groups in first world countries. This community of practice, rural entrepreneurs that in Drabenstott’s words “tilt against the wind, pursuing their fortune in new endeavors,” appears to be an excellent example of a marginalized subculture confronting the tremendous pressures of globalization (1999, 12). The town lacks a doctor, dentists, movie theatre, and a pharmacy, yet is located within thirty miles of the largest (as measured by sales) Wal-Mart Supercenter in the Southeast (personal conversation with the Wal-Mart manager, May, 2002). As class structure in the United States continues to crystallize, an understanding of how this marginalized group learned and began to act upon its learning to protect the social and biophysical environment sheds light on the need to preserve or create those social mechanisms or individual characteristics necessary to promote resilience and sustainability.

Research Questions

The central research question that this investigation answers is: “How does a Florida coastal community of practice learn to respond to rapidly changing environmental conditions?” Three principal sub-questions derive from this question. They are:

1. What conditions influence the learning process?
2. What characteristics of social and environmental interaction influence the learning process? and,
3. What characteristics of actors involved in these interactions affect the learning process?

The term conditions in sub-question (1) refers to those effects external to the knower or knowers. These include the cultural structures of legitimation, domination, and signification. Giddens (1979, 1984, 1990, 1995) discusses these. He says signification includes worldview; legitimation includes norms and values; and, domination includes
patterns of status and hierarchy. This last concept explains how access to resources (multiple forms of capital) is allotted.

The term characteristics in sub-question (2) refers to how individuals and groups interact with the social and biophysical environment. Giddens (1979, 1984, 1990, 1995) refers to these as patterns of interaction.

The term characteristics in sub-question (3) refers to the types of interactions between individuals and/or groups and the traits of individuals and groups that support or weaken these interactions. These include the notions of dense and weak ties, vertical and horizontal ties, bridging and bonding (Granovetter, 1973, 1974; Flora & Flora, 1993, 1997; Shields, Dale, Flora, Thomas-Slayter & Buenavista, 1996; Thomas-Slayter, Wangari & Rocheleau, 1993). Many of these characteristics are the result of cultural structures. These characteristics are important when talking about the potential and connectedness that ultimately affect a system’s resilience. These concepts will be discussed in greater depth in Chapter Two.

**Approach**

An informal pilot study was conducted during the summer and fall of 2000. During this exploratory period, I was able to determine the problem and purpose of the research through observations and casual discussions. In subsequent investigations, the purpose and rationale for the study gelled. At first I had thought to focus on women’s roles and learning in the transformation from wild harvest to agriculture. As a clearer picture of events emerged and the situation in Oyster Isles continued to evolve, I came to believe that a narrow focus on women would not be sufficient to understand the reorganization of the clam farming community nor the process of learning and conscientization. Informal, incidental learning occurs in social interaction and interaction with the natural environment. Such learning is a process of enculturation. Neither social interaction nor enculturation can be well understood without looking at the entire community of practice – men and women – and the larger community**20** (Wilkinson, 1991).

The transition from wild harvest to agriculture that occurred in Oyster Isles required an ethnographic approach. First, according to Bogdan and Taylor (1975), this method does not impose reified constructs on the researcher and therefore allows him or her to see the world through the eyes of members of the culture so that “grounded categories” can emerge from the data (Glaser & Strauss, 1967). Spradley (1980, 45) suggests that this methodology is unique as it allows for “the existence of alternative realities” to be documented and described on their own terms.” The ethnographic approach also treats those members of the community as experts. In this way, informants can become active participants in the research. This was particularly important because I felt that if I made the study more participatory, the participants would be given a voice and the process of critical reflection and action (conscientization) could be invigorated (Bogdan & Taylor, 1975; Freire, 1970b).

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20 Wilkinson (1971) defines community as a process of local social interaction.
Because a great deal of environmental learning had occurred prior to the onset of the research, I thought that modified life-history approach focusing on learning in the context of fisheries was also required. Dominice’s (2000) use of educational biographies with adults prompted me to develop a semi-structured interview that focused on how adults in Oyster Isles thought they had learned. His research and that of others indicates that as learners talk about their learning they begin to reflect. In addition, I thought that if I provided members of the community of practice with an opportunity to talk, reflect and later read (in interview transcriptions) about their learning and the social and biological changes that had prompted this learning, the process of critical reflection and conscientization that appears necessary for the generative process of developing resilience and sustainability might be furthered (Foley, 1999; Freire, 1970b; Gunderson & Holling, 2002; Lave & Wenger, 1991).

The ethnographic work involved document collection, direct and participant observation, and semi-structured and structured interviews. Selected sampling was employed, and the transcriptions from the first semi-structured interviews were shared with participants to further the process of conscientization. Some members of the community of practice were more accessible than others. As a result, I choreographed the research over an eight to ten month period hoping to be able to make the study as inclusive as possible. At first, women were more willing to become involved; the first six interviews were with women. This included women who were directly involved in clam farming, women who were peripherally involved, and women who had very little involvement in clam farming – members of the larger community. As the community became more accustomed to my presence and began to understand my purpose, men became more accessible. Because the pilot study had enabled me to understand the diversity of the community, I was able to select members from different segments of the community. These included former fishermen, former oystermen, crabbcrs, lease owners, hired help, investors, marketers, equipment suppliers, state and government officials, and varied members of the community from hotel managers and business owners to artists to service sector workers.

The study of the complex process of informal environmental learning and conscientization in an era of globalization required the lenses of sociopolitical ecology. This approach blended a number of theoretical frameworks. It combined feminism with constructivism, critical theory, political ecology, self-referential systems theory and panarchy (Abbott & Ryan, 1999; Bohm, 1983; Bohm & Hiley, 1993; Freire, 1970a, 1970b; Gramsci, 1971; Gunderson & Holling, 2002; Lave & Wenger, 1991; Maturana & Varela, 1980; Mayo, 1999; Mies & Shiva, 1993; Moser, 1993; Thomas-Slayter et al., 1993; Wenger, 1998; Whitaker, 2000). This blended framework will be discussed in more detail in Chapter Two.

The constant comparative method coming from grounded theory and some limited content analysis provided the means for analyzing memos, transcriptions, and documents (Berelstom, 1952). Social interactions were mapped and analyzed using Inspiration© and Microsoft Excel©. Information (i.e., characteristics, access to resources) was first gleaned from documents, interviews, and observations and placed into an Excel© spreadsheet. This enabled me to determine whether one category (i.e.,

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21 Inspiration© is a visual thinking and organization software program marketed by Inspiration Software, Inc.
gender, level of formal education, family) was linked to particular characteristics or access to resources. This information was then transferred into a graphic organizer by participant, to determine social interaction patterns. Detailed satellite maps of the area also were acquired from the local water management agency. These tools provided a means to better understand people’s interaction with and access to the social and natural world.

**Organization of the Study**

The organization of this study is a result of the theoretical framework and the reorganization of events that unfolded from 1989 forward. In Chapter Two, the author’s positionality and the two major theoretical frameworks that are being linked to better examine the processes of incidental, situated learning and conscientization are discussed and superimposed on an epistemological backdrop of social constructivism and socialist feminism. Chapter Three is a presentation of the methodological approach. Chapter Four presents a temporal and spatial contextualization of Oyster Isles and a brief overview of some marine and coastal issues, aquaculture, and the clam farming practice. This chapter provides the reader with a foundation for understanding how learning and conscientization took place as the clam farming community of practice emerged and developed. Chapter Five provides the reader with an understanding of those conditions that existed that produced rapid change and participant’s initial reactions to such change. Chapter Six provides the reader with an understanding of the cultural structures and patterns of interaction that existed before the reorganization of clam farming. These structures and patterns are the result of community learning over time in space and constrained and promoted learning as individuals and communities of practice merged into the clam farming community of practice. Chapter Seven focuses on the learning that occurred as the clam farming community first emerged and then entered a period of greater organization and conservation. This chapter discusses those external conditions, characteristics of biophysical and social interaction, and the characteristics of actors that affected the learning process by focusing on major events as different stakeholder groups experienced them. Their stories of the multiple ways of coming to know (learning) are told in their voices. These voices tell the story of risk taking, innovation, failure, success, reflection, and changing worldview. Chapter Eight focuses on the process of critical reflection, transformative thinking and conscientization, and examines those conditions and characteristics that fostered both individual and collective conscientization. Chapter Nine concludes the study. Here the research findings are overviewed and implications for further research and future policy and practice are discussed.

The study sheds light on how communities of practice respond to rapidly changing environmental conditions. Through the examination of those conditions and characteristics that fostered individual and collective conscientization, it also sheds light on how the process of critical reflection and conscientization might be enhanced or slowed. It is important to note, however, that in the community of practice, each learner is like an instrument in an orchestra – the entire symphony – the totality of learning and conscientization – is never heard. In its entirety and complexity, it is unknowable.
CHAPTER 2
THE RESEARCHER AND HER LENSES

Introduction

Chapter Two is an examination of the literature pertinent to this interdisciplinary research and a positioning or locating of the author. A theoretical framework is like a set of optical lenses ground and polished from worldview. Coupled with the author’s positionality, it determines what can be seen, how it is seen, and how it is organized and presented (Hartsock, 1998).

A great deal of learning and conscientization is done in response to environmental change. My research focuses on incidental, situated learning and conscientization in response to environmental change and links aspects of the theoretical model of panarchy with the theoretical model of communities of practice (Gunderson & Holling, 2002; Lave & Wenger, 1991; Resilience Alliance, 1999). These two models, used against an epistemological and theoretical backdrop of socialist feminism and ecofeminism and social constructivism, provide an integrated tool for the examination of the process of learning and conscientization.

Lave and Wenger (1991) focus on learning within communities. Brock, Carpenter, Gunderson, Holling (2002), and others (Resilience Alliance, 1999) focus on how complex systems undergo change. The use of the metaphor of adaptive cycles and the theory of panarchy adds to an understanding of the role that learning and conscientization play in the transformation of human and natural systems and the role that the transformation of these systems has on the process of learning and conscientization. This integrated model may provide a tool for future studies that examine learning and conscientization in communities facing rapid change.

This chapter is divided into three sections. In part one, I introduce myself to readers and discuss the epistemological and theoretical background supplied by social constructivism and socialist feminism and ecofeminism. In part two, I overview learning theory; present an in-depth discussion of incidental, situated learning within communities of practice; and examine the process of conscientization. In part three, I discuss aspects of the theoretical model of panarchy, specifically the four-phase adaptive cycle metaphor and three factors that impact this cycle – potential, connectedness, and resilience. Because panarchical theory is a distillation of social ecology, feminist political ecology and self-referential systems theory, these theoretical frameworks are briefly discussed.

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22 An individual’s perspective or standpoint, their location in life influences how they see and interpret the world (Hartsock, 1998).
Part 1: Positionality and Theoretical Background

Positionality

The day I was born, my father, an officer in the U.S. Marine Corps, left to fight in the Korean War. Three years later he returned, but the demands of his military career left my mother the primary responsibility for raising five children. By the time I was 18, we had moved 12 times and I had attended nine different schools. Uprooting and adapting to new and diverse situations had become my way of life. In high school in Hawaii, I found myself was one of a very few “haoles” or white people in my classes. Upon graduation, I left home to attend university in the highlands of Mexico. After my first year in college, my family emigrated from the United States to Brazil. For the next eight years, before returning to the United States, I traveled between Mexico and Brazil, studying anthropology and working in a variety of areas – from archaeology to agriculture. Upon my return to the United States, I became involved in commercial fishing and acquired my captain’s license. This opportunity built on my love of the water and led to a serious interest in water quality, marine and coastal issues. I became involved in a number of environmental efforts in South Florida where I worked for state, national government, and non-governmental agencies. Disenchanted with enforcement as a means of handling with environmental issues, I decided to explore other means of dealing with environmental problems. I enrolled at Ohio State University to study environmental journalism. During my time at the university, I worked with the Ohio Sea Grant program and decided to marry. Shortly after I acquired my M.A., my husband and I moved to the Northeast. There I was able to combine journalism, anthropology, and my interest in water quality and fisheries with writing and editing. Seven years later, I divorced and returned to Florida with two young daughters. Faced with raising children as a single parent, I decided to teach; teaching allowed me to have vacations and summer with my girls. For the next 15 years, I taught Spanish, English to second language learners, writing, and anthropology, and had the opportunity to work with children and adults in a variety of settings, from kindergarten to university. Finally in 1995, I decided to pursue a doctorate in international intercultural development education. This enabled me to combine my interests in anthropology, the environment, and education.

When I was young, my family had spent a great deal of time traveling and camping. I remember constantly being outside and consistently being encouraged to be independent. Perhaps it was my nature or perhaps it was a result of my upbringing as the older sibling to three brothers and a sister, but I rarely felt constricted by my gender. I motorcycled through the backcountry of California, traveled independently through South America and the Caribbean, and felt quite at home on the docks in Miami. As I raised my own children, I tried to reinforce this same love of the outdoors and the sense of freedom and independence that I had been given. I am sure that these same factors have influenced not only what I study and how I approach it, but also how I come to understand it.
Social Constructivism

Social constructivism comes from the postmodern school of thought. This epistemology holds that much of what we see as reality and progress is socially constructed, not founded in truth or objectivity. This thinking assumes that the knower’s view, or way of knowing the external world (outside the knower or knowers), is molded by the filters of language, reason, the senses, and emotions (Bates, 1997; Berger & Luckmann, 1966; Freire, 1970b; Masemann, 1990; Maturana & Varela, 1980). Those coming from this way of thinking understand that learning is “the historical production, transformation, and change of persons” (Abbott & Ryan, 1999; Lave & Wenger, 1991, 51).

Socialist Feminism

Braidotti, Charkiewicz, Hausler, and Wieringa (1995) provide an excellent analysis of the streams of feminism in their book Women, the Environment and Sustainable Development: Towards a Theoretical Synthesis. In it they examine perspectives of various researchers to illuminate their work and the future directions of the field. These include humanism, essentialism, gynocentric essentialism, deconstructive feminism, socialist feminism, Marxist feminism, ecofeminism, etc.

Socialist feminism, one of the many strands of feminism, emerged as a major paradigm within feminist thought in the 1970’s (Philipson & Hansen, 1990). Central to this paradigm is the thought that “women must simultaneously liberate themselves from the isolation of the home and exploitation of the capitalist workplace” (5). Phelps (1975), in her article Patriarchy and Capitalism, summarizes the dual systems theory of socialist feminism. She says that patriarchy is a term, which describes the system of interaction, which arises from that basic sexist relationship in which males have authority over females much like the capitalist system in which the capitalist has authority over workers. She writes that these relationships (male over female, capitalist over worker) “are two markedly different ways that human beings have interacted with each other and have built social, political, and economic institutions” (Phelps, 1975, 39). Mitchell (1974) expands upon this writing, “Men enter into the class-dominated structures of history while women (as women, whatever their actual work in production) remain defined by the kinship patterns of organization” (406). Along similar lines, Rubin sees the subordination of women as a product of relationships by which sex and gender are organized and produced (in Philipson & Hansen, 1990, 20).

Ecofeminism

Ecofeminism, another stream of feminist thought, places greater responsibility for nature in the hands of women. Its proponents say women are closer to nature in a spiritual sense and in their reproductive (biological) roles (Rocheleau, Thomas-Slayter & Edmunds, 1995; Shiva, 1989). Shiva (1989) states that ecofeminism provides a holistic understanding of the natural world. This perspective has been highly influential as a theme within the debates over women, environment and development (WED) as concerns
about over-population and natural resource destruction are seen as part of male
domination over women and nature (Braidotti et al., 1995; Mies & Shiva, 1993).

Since cultural structures and human patterns of interaction with the social and
biophysical world inherent within communities of practice are, as a result, different for
men and women, the effects of gender on learning are explored in part two. In addition, a
gender analysis of data was conducted as a part of the research.

**Part 2: The Process of Learning and Conscientization**

The disciplines of education and psychology, and more recently management,
sociology, and biology, provide a large body of literature addressing individual and
organizational learning. This research focuses on incidental, situated learning that occurs
in communities of practice as they work toward a common goal. Before discussing this
concept in-depth, I am presenting a brief overview of learning theory.

**The Learning Process**

Learning is a complex, continuous, human activity. As humans interact with their
social and biophysical environment, they draw upon past experience, reflect upon
existing knowledge, communicate with others, and in the process attempt to make sense
of their world, attributing meaning to what they have experienced and constructing a new
reality (Argyris & Schon, 1978; Bates, 1997; Checkland, 1999; Foley, 1999; Gee, in
Marsick and Watkins (1990) define learning as “the way in which individuals or groups
acquire, interpret, reorganize, change or assimilate a related cluster of information, skills
and feelings.” They think it is “primary to the way in which people construct meaning in
their personal and shared organization lives” (4).

Change results from learning, and learning is essentially a result of change. Through learning, identity is constructed and behavior is changed (Eisner, 1985; Lave &
Wenger, 1991). These changes in behavior, the result of changes in structure of
signification (worldview), transform patterns of interaction with the social and
biophysical environment and create change anew (Bates, 1997; Dewey, 1938; 1958;

A number of theorists describe the actual learning process as a circular or cyclical
one (Argyris & Schon, 1978; Checkland, 1999; Kolb, 1984). People identify a problem;
they experiment with solutions, and monitor and reflect on their findings before using
their new knowledge to reformulate the problem.

Bates (1997) writes about learning and states that individuals or systems (i.e.,
communities of practice) must be able to do the following in order to learn. They must be
able to store perceptions in temporal sequences and remember spatial patterns (109).
They have to see patterns and regularity so “that when phenomena are encountered that
are alike in sensory characteristics to objects or events previously encountered, they
should be remembered as similar occurrences of the same phenomenon” (110). This, he
explains, enables them “to build a structural model of phenomena, constructing artificial
mental images of things outside the mind…and thereby recognize external phenomena
and represent them by artificial symbols” (110). They have to perceive the world
selectively, be able to anticipate the consequences of their actions, and build up a record
of their experiences in order to predict their relationship with the perceived world and
control their own behavior (111-113). All the above are encapsulated in discussions of
Argyris and Schon on single-loop learning23.

Bates adds that systems or individuals have to pay attention to the effects of their
behavior on their environment, notice and predict changes, and if necessary change their
behavior (113). This is related to discussions of Argyris and Schon of double-loop
learning, discussions of Foley and Freire on critical learning and conscientization, and
discussions of Mezirow and O’Sullivan on transformative learning.

Formal, Non-formal, and Informal Learning

Most general discussions of education and learning talk about formal, non-formal,
and informal learning. Formal learning, the result of formal education, is seen as the most
efficient way to produce human capital (Bowles & Gintis, 1976). Formal learning occurs
in a bureaucratic, ritualized setting and is accompanied by proof of mastery (i.e.,
certificate, diploma). It is the result of direct instruction mediated by teacher, parent,
sibling or other caregivers who select and organize the world of stimuli for the learner
(Feuerstein, 1980).

Advocates of formal education assume that learning is separate from doing, and
that learning processes can be intensified by making the content explicit and specific
(Lave, 1988, 1993; Freire, 1970b). These advocates assume that culture is an
accumulation of actual knowledge (e.g. D’Andrade, 1981; Romney, Weller &
Batchelder, 1986). They further assume that cognitive benefits will result only when
learning is formalized and removed from where it is to be applied (Lave, 1988; Marsick

In Western culture, formal education, which has become a commodity, is seen as
a means of educating more intelligent students (Sternberg & Caruso; 1985, 143). It has
been criticized as taking the responsibility for learning away from the home and
community, and placing it in institutions, effectively undermining the community and

Non-formal learning is the result of non-formal education. Non-formal learning
occurs in less bureaucratic settings than formal learning does. It is the result of direct and
tacit instruction; learners are told how something is done, then the task is modeled and
learners are expected to practice it (Marsick & Watkins, 1990).

Non-formal education is seen as more appropriate either for learners who may not
be capable of or interested in handling higher theoretical concepts or for those individuals
whose learning needs are immediate (Sternberg & Caruso, 1985, 143; Marsick &
Watkins, 1990). It also is seen as an effective means of providing learning experiences to

23 According to Argyris and Schon (1978, 1996), single-loop learning is the result of an individual or a
system using feedback from various sources about how to improve. This type of learning focuses on
behavior change and skills training.
adults. As a result, it “became a recognized force in development activities in the 1970’s” (Marsick & Watkins, 1990, 32)

La Belle (1987) talks about two innovative and one traditional form of non-formal education. “The traditional human capital approach places emphasis on small-scale agrarian or industrial production (involving a combination of private property and social cooperation) and uses technical, financial and commercial assistance from above” (206). He writes that this traditional approach complements “the existing social and economic system” and that the “economic and political results of such an approach have often produced inequalities in the distribution of wealth and income, a polarization of rural and urban workers and a perpetuation of a cycle of low food costs, cheap labor, a highly skewed income distribution, and upper-class luxury consumption” (206).

In the United States, land grant institutions^24 were designated by Congress to promote this type of non-formal learning in rural areas. About 40 years ago, sea grant institutions^25 were legislated to play a similar role in coastal areas. The educators, usually cooperative extension agents, offer workshops and seminars. Cooperative extension agents have been criticized for their gender-biased instruction (Hobbs, 1993; Mead in Manning, 1977). These agents, typically men, worked almost exclusively with men and ignored women. When working with women, they did so in ways that separated men from women, emphasizing the domestic sciences (Hobbs, 1993; Mead in Manning, 1977).

The two more innovative forms of non-formal education that LaBelle (1987) writes about include consciousness raising and popular education. He states that these forms of education are seen as appropriate for economically and politically subjugated adults. He says consciousness-raising education is sometimes linked to “literacy programs and skill-transmission programs” but “typically does not represent a fixed curriculum, nor does it aim to integrate the individual into the present society.” Popular education, on the other hand, is more focused on skill transmission. Proponents of popular education say that it utilizes “self help, political agitation, rotating capital, and community cooperation to execute flexibly projects that emphasize equality but that still compete effectively in the marketplace” (206).

Informal learning, the focus of this study, may be the most important and interesting means of learning (Foley, 1999; Sternberg & Caruso, 1985). It is certainly the most important part of adult learning (Dominice, 2000, 4). Freire (1970b) talks about such learning saying that it is a process that “human beings pursue in the world, with the world, and with each other” (53). Foley (1999) says that because learning is a social practice, it should be grounded in theories of social practice.

It occurs as a result of observation; experience; communication; repetition and practice; trial and error; invention and construction (Ortner, 1984; Resnick, 1986). A great deal of it is practical learning (skills) but much it is abstract and theoretical, learned

^24 Land grant institutions were created by several congressional acts that resulted in three interrelated units: colleges of agriculture, state agricultural experiment stations, and state cooperative extension service (Friedland, 1978, 260).

^25 In 1966, sea grant institutions were established by the U.S. Congress. These institutions partner with NOAA and universities. They operate programs dedicated to initiating and supporting research and education into the development of marine resources (What is Sea Grant?, n.d.).
as a result of story, jokes, songs, etc. (Marsick & Watkins, 1990; Sternberg & Caruso, 1985).

Many researchers say informal learning is observational and experiential (Bandura, 1977, 1986; Kolb, 1984; Lave & Wenger, 1991). It is the result of observing, imitating, listening, participating, asking, trial and error, and real-life performance of context-specific skills (Bandura, 1986, Harris, 1984; Lave & Wenger, 1991).

Lave and Wenger say informal learning does not occur as the result of fixed curriculum or planned pedagogical activities (1988, 1991, 1998). Instead, learning is determined by “which of several problems lurking in a situation need to be solved” (Jonassen, Peck & Wilson, 1999; Lave, 1988, 317). Cambourne (2001) adds that “as society is forced to deal with problems, events, issues, and dangers that threaten its survival” this type of learning takes place (758). Informal learning, however, can be planned or intentional (Marsick & Watkins, 1990, 6-7). Most agree, though, that it must relate directly to the learner; the learner must understand it in the course of his or her activity – practice (Lave, 1988; Ortner, 1984).

Incidental, Situated Learning

Incidental learning\(^{26}\) is a subcategory of informal learning. This type of learning is not intentional. It occurs as a byproduct of some other activity, such as task accomplishment, interpersonal interaction, sensing the organizational culture, or trial-and-error experimentation (Marsick & Watkins, 1990; Sternberg & Caruso, 1985).

Marsick and Watkins (1990) state that informal and incidental learning are intuitive and active and require far less abstract conceptualization than do either formal or non-formal learning (8). While this may be true, conscientization based on informal learning, frequently involves abstract conceptualization.

Marsick and Watkins (1990) say that creativity is an important condition for learning as “it helps a learner break out of preconceived patterns that do not allow him or her to frame the situation differently, or even to see a situation as in need of reframing” (30). The perception of change induces informal and incidental learning. “Whenever humans encounter something they do not know but need to understand, their natural inclination is to attempt to reconcile it with what they know in order to determine what it means” (Jonassen et al., 1999, 190).

A number of authors document environmental learning as part of the incidental learning process (Boserup, 1965; Nazarea, 1999a, 1999b; Thomas-Slayter, et al., 1993). Some insist that environmental learning promotes transformative learning (Maturana & Varela, 1980; Whitaker, 2000). Environmental crises (i.e., the Dust Bowl in the United States in the 1930’s; the closure of waters to oyster harvesting in 1989 in Oyster Isles; and the 1995 Florida net ban that forced many commercial fishermen to give up a way of life) prompt individuals to critically reflect and begin questioning their political and economic systems (Cranton, 1994).

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\(^{26}\) Foley (1999) calls *incidental learning* practical learning, but I think the nuance of the word “practical” negates a wide-range of other learning, which occurs as a result of being involved in other activities, incidentally.
Learning in Social Interaction

Community

Almost all incidental and informal learning is situated temporally and spatially within autopoietic systems\(^{27}\) (Argyris & Schon, 1978, 1996; Danbom, 1995; Hammer, 1993; Hobbs, 1993; Senge, 1990; Wenger, 1998; Wilkinson, 1991). Individuals interacting within these systems create places, reshape their biophysical environment and social environments. In the process of creating places and institutions (i.e., communities of practice), they develop a sense of belonging to the biophysical and social environment.

Wilkinson (1991), a rural sociologist, states that the interactions of people within an area define a territory and this territory becomes the community\(^{28}\). He adds, “…community emerges in the local society when the latent bond of common interest in the place – the shared investment in the common field of existential experience – draws people together and enables them to express common sentiments through joint action” (1991, 7). Bowles and Gintis (2000), educational economists, say community consists of “a group of people who interact directly, frequently, and in multifaceted ways” (3).

His use of the word *common* provides a segue into a discussion of the interaction between the community and the commons. Originally this term was associated with people or community but as time passed it was extended in a wider sense to those things that these people held together (i.e., rights, daily meals, geographic areas, and resources) (Oxford English Dictionary Online, 1989). This included open-access resources, like the oceans. A more in-depth discussion of open-access resources and private property occurs in part three of this chapter when the concept of potential is explored.

The Role of Space – A Place for Interaction

Places provide space for interaction, communication, and the negotiation of meaning (learning), where people can construct their realities, either maintaining or challenging existing worldview (Schneekloth & Shibley, 1995, 13). In the process of naming, people give meaning to places, people and things, and decide who the players are, what the boundaries for action are, and what rules govern interaction (Shields, 1997). By creating “place” humans transform the areas where they live (Schneekloth & Shibley, 1995, 1). They landscape, construct buildings, and establish organizations from family to government. Sometimes their actions are almost invisible. Other times they are dramatic. Sometimes these actions are done with the support of others. Other times they are done in defiance of others (1).

These spaces (actual geographic locations or social structures) that create and preserve social order are the result of learning and action and provide opportunities for future learning and action (Brill, 1989; Oldenburg, 1989; Shields, 1997). Those who

\(^{27}\) *Autopoietic systems* are self-referential systems existing within the biophysical environment (Maturana & Varela, 1980). Communities, communities of practice, social networks and kinship networks are self-referential systems. Self-referential systems theory is briefly discussed in part three of this chapter.

\(^{28}\) Wilkinson (1991) does talk about virtual and special-interest communities that do not occupy a fixed space but these are not the focus here.

\(^{25}\) The term *family* refers to a group of persons of common ancestry. This includes extended family groups as well as nuclear families.
study the concept of public space compare these geographic locations to good classrooms (Oldenburg, 1989). Here a variety of people – young and old, insiders and outsiders 30 -- can come to share ideas on a variety of topics in an egalitarian setting, meet new people, or meet friends (Brill, 1989; Oldenburg, 1989). These informal public gathering places “profoundly affect public life” (Brill, 1989). Sometimes they serve as offices where transactions take place as they provide neutral ground whether no party has an advantage over another (Oldenburg, 1989, xxv).

The Role of Time — Community as Memory

Many find that meaning or knowledge is accumulated over time through various modalities and linked to and stored in the environment – in the organization or community of practice, in materials that are used in practice, and in the biophysical surroundings (Argyris & Schon, 1978, 1996; Gee in Cambourne, 2001). One example of this is the meaning and/or knowledge inherent in a tool, like a clam boat or a clam tumbler31. “...[B]ecause tools and the way they are used reflect the particular accumulated insights of communities, it is not possible to use a tool appropriately without understanding the community or culture in which it is used” (Brown, Collins & Duguid, 1989, 33).

Esteva and Prakash talk of community as a collective remembering. They say as people remember and share their living memories with neighbors, friends, and relatives these memories cease to be private collections and begin to constitute a commons – a part of the community (Esteva, 1998b, 71).

Communities of Practice

Lave and Wenger (1991, 98), who popularized the term community of practice, define it as “a set of relations among persons, activity, and the world, over time and in relation to other tangential and overlapping communities of practice”. Essentially a community of practice is a group of interacting members involved in the same sort of work.

Those who study communities of practice assume that: learning is situated; learning takes place in activity; and learning is a characteristic of social practice (Lave & Wenger, 1991, 33-34). Those who think about learning in terms of participation focus on how learning involves “evolving, continuously renewed set of relations” and how learning “emphasizes the relational interdependency of agent and world, activity, meaning, cognition, learning, and knowing” (Lave & Wenger, 1991, 50).

In many ways communities of practice are similar to beehives. Like hives, they are reproductive and productive systems (Lave & Wenger, 1991, 115). Unlike hives, communities of practice are a bit amorphous; they have ever-changing members and the participants in them “can never be fully internalized or externalized” (54). Participants who are involved in production reproduce a set of cultural norms, values, and knowledge through their learning. Those participants at the center of the community hold greater

30 The concept of insiders and outsiders is discussed in-depth in Chapter Five.
31 A clam tumbler is a machine used to rinse and clean clams. Clams are poured down a chute where they are tumbled and sprayed with waster. In the process, dead clams are removed.
levels of knowledge of the practice. Those on the outside, whom Lave and Wenger called “legitimate peripheral participants,” have less. This social structure of a community of practice, “its power relations and its conditions of legitimacy, define possibilities for learning…”(Lave & Wenger, 1991, 98).

Lave and Wenger (1991) feel that newcomers move toward full participation in the practice by having 1) access to all areas of the work; 2) time to practice and intensify their efforts; and, 3) opportunities to do more difficult and riskier tasks (110-111). newcomers also move toward full participation by gaining a significantly increased sense of identity as a master practitioner, engaging “with the technologies of everyday practice,” and participating “in the social relations, production processes, and other activities of communities of practice” (101).

Communities of practice, like communities, have complex cultural structures that determine patterns of interaction with the social and biophysical environment. By living in and becoming a member of a place over time, individuals come understand these structures and come “to know their place” (Giddens, 1979, 1984, 1990, 1995; Scheffer et al., 2002; Shields, 1997). In the process, they become a part of the commons, “attached to each other by duties and obligations” (Lummis, 1996 in Esteva & Prakash, 1998b, 159).

Cultural Structures

Cultural structures, inherent in communities of practice and other self-referential systems, underlie individual and group patterns of interaction with the social and biophysical world (Flora, 1998; Giddens, 1976, 1979, 1982, 1984; Granovetter, 1985; Lave & Wenger, 1991; Portes & Sensenbrenner, 1993). These structures are in a constant state of modification, constantly being produced and reproduced.

The power relations, conditions of legitimacy, and ways of seeing the world embedded in a community’s cultural structures determine patterns of interaction with the social and biophysical environment and define the possibilities for learning (Giddens, 1976, 1979, 1982, 1984). Ways of seeing the world, what Giddens refers to as structures of signification, are “the interpretations or meanings that individuals use to make sense of their experience” (Scheffer et al., 2002, 229). These worldviews are embedded within a cultural groups power relations and conditions of legitimacy. Power relations are what Giddens calls structures of domination, “allocative and authoritative resources that are distributed among social actors to facilitate goal-oriented action” (Scheffer et al., 2002, 229). Conditions of legitimacy are those rules and norms that govern the behavior, values, and roles of members of a community of practice. Giddens defines these as structures of legitimation.

These embedded structures that determine behavior, interaction with the social and biophysical world, and learning are gender bound (Escobar, 1998; Jiggins, 1986b; Thomas-Slayter et al., 1996). Gender is a social, cultural, and historical construction embedded in the beliefs and socio-political structures of cultures (Bourque & Warren, 1981). It is crucial in determining identity, role, status, and therefore knowledge construction, and therefore gendered learning is a result of gendered space, access to resources, problem solving approaches, different skills, and discourse styles (Escobar, 1998; Jiggins, 1986a, 1986b; Thomas-Slayter et al., 1996). Gender “shapes the opportunities and constraints women and men face in securing safe environments, viable
livelihoods, and strong communities across cultural, political, economic, and ecological settings” (Thomas-Slayter et al., 1996, 305). It also shapes how individuals look at the world.

**Structures of Signification**

Structures of signification are those interpretations or meanings that individuals use to make sense of their experiences. While each individual may have a distinctive learning style, learning processes (and even learning styles) are culturally determined by the societal worldviews (Atran, 1999; Geertz, 1964; Kuhn, 1970; Nazarea, 1999a, 1999b). Redfield (1952) writes that worldviews are the pictures that members of a society see themselves in relation to all else” (30). The sum of an individual’s or a group’s past learning, its knowledge base, is interpreted within the framework of the worldview.

Worldviews determine how a society values and makes decisions about its environment (Ekins & Newby, 1998). For instance, “it is likely…that a secular, anthropocentric world view will permit more environmental destruction than an ecocentric world view which perceives the earth and all life within it as sacred” (866). These authors conclude that if the environment is viewed primarily as an economic resource, then techniques of environmental economic valuation will be perceived as the most important inputs in the decision-making process. If the environment is seen as sacred, sustaining it and fostering social integration and cohesion becomes essential to the preservation of life.

Some postulate that women’s work, which is characterized by greater interaction with material substances, by constant change, and by its requirement of emotional investment in the form of caring, promotes the development of different knowledge (Feldstein & Poats, 1990; Fernandez, 1992; Maurial, 1999; Price, 1997). Many authors agree that because of the social relations of gender women play fundamental roles in natural resource management and emerging environmental grassroots activism (Arizpe, Paolisso, Lycette, Velazquez, Paz, 1994; Harcourt, 1994a, 1994b; Jiggins, 1986a, 1986b; Thomas-Slayter et al., 1996). Arizpe et al., (1994, 18) find that women actively take “steps to increase their own understanding of environmental and sustainable development issues, which they see as a prerequisite to educating their children and other family and community members”. They also pay pivotal roles in environmental advocacy (19). “Women are the backbone of virtually all environmental organizations in the United States” (Seager, 1996, 271).

**Environmentalism**

Environmental paradigms range from extremely anthropocentric to deeply biocentric. Anthropocentric thinking has dominated modern people’s mindsets for the past 500 years. It is the product of Judeo-Christian theology that proposes the assumption either that “nature is an unlimited repository of resources to be exploited for man’s benefit” or that nature should “be conserved or managed for man’s future uses” (Metzner, 1993, 166). In the United States, a sense of plenty coupled with a belief in unlimited economic and technological progress has promoted the former perception (Hawken, Lovins & Hunter-Lovins, 1999; Holling et al., 1998). This paradigm places few limits on
regional or political carrying capacity; it promotes the belief that “trade can relieve politically significant limited factors” (Rees, 1997, 346).

More biocentric thinking – that nature should “be conserved or managed for man’s future uses” – is more likely to focus on ways in which “site-specific ecological and livelihood systems are linked into national and global environmental, economic, and political systems” shaping, enabling, and limiting the opportunities and constraints occurring at the local level (Thomas-Slayter et al., 1996, 296).

Deep biocentric or ecocentric thought teaches that humans are a part of nature, not over or against it (Metzner, 1993, 166). These deep ecologists call for a new relation with nature (Devall & Sessions, 1985, 87; Naess, 1984; Sessions, 1985). They claim that “the worldview and associated attitudes and values of the industrial age have permitted and driven us to pursue exploitative, destructive, and wasteful applications of technology” (Metzner, 1993, 163-164). A variety of paradigms, sometimes mixes of contradictory perspectives, are found in between extreme anthropocentric and extreme ecocentric thought.

The Environmental Movement in the United States

Many have traced environmental thinking in the United States in order to shed light of the environmental movement. (Sessions, 1985; Whisenhunt, 1974). Looking back on the country’s first century and a half, some found that many along the frontier appeared to have little concern for resource or environmental protection; many farmers moved westward and cleared virgin forest land when their crop yields dropped (Berry, 2000; Whisenhunt, 1974).

This lack of concern continued through the 1950’s. Many industrialists realized that mass production required a dependable source of raw materials (natural resources and human capital) but instead of prompting conservation for the sake of the natural world it created a philosophy of maximum sustained yield; the sense that the ecosystem should be maintained in its current condition to continue to produce goods and services (Adams, 1995; Ekins & Newby, 1998; Whisenhunt, 1974, 54). The production of goods and services was paramount to the ecosystems current condition as was evidenced by the continued use of DDT (dichlorodiphenyltrichloroethane), aldrin, and a host of other chlorinated organic chemicals which enabled the United States to become the breadbasket of the world but decimated natural wildlife populations and endangered human health Carson (1951). Despite a growing awareness of the damage of the policy and the establishment of land grant universities in the late 1800’s, these practices continue until today.

After World War II, social meliorists concerned with human welfare prompted the greening of America (Schainberg, 1985). In 1969, the National Environmental Policy Act was passed. It was followed a year later by the Clean Air Act and two years later by the founding of the USEPA. These actions may have been fueled by publications like Rachel Carson’s Silent Spring (1962); Barry Commoner’s Science and Survival (1966), Paul Ehrlich’s The Population Bomb (1968), and Alvin Toffler’s Future Shock (1970).
Sustainability

Around 1972, the concept of sustainability was introduced at the United Nations Conference on the Human Environment. This concept arose out of concern for the natural environment that had arisen as a result of the Third World’s recognition of gluttonous, destructive policies resulting from the capitalist lifestyle of First World countries. Ten years later, with the release of *Our Common Future* (Bruntland, 1987), a firm definition of sustainability was proposed that said, “sustainable global development requires that those who are more affluent adopt lifestyles within the planet’s ecology means.” This was contested immediately by the United States who boycotted the conference.

Leaders of the developed world began reframing the definition of sustainability in terms they felt comfortable with. Instead of stating that biodiversity and other capitals should be sustained to meet the needs of future generations, they said that human-made capital could be substituted for natural capital. Instead of agreeing that the ecology sets limits on develop, they proposed that there were tradeoffs between the economy and the ecology. These leaders placed the Earth’s system in terms of a cost benefit analysis and weakened the concept of sustainability proposed by the World Commission on Environment and Development (WCED) (Bruntland, 1987).

Several years later the “energy crisis” diminished American’s concern for the environment. Some individuals began to worry more about economic growth, and corporate and industrial groups began organizing and litigating against federal environmental policies. These individuals, on the anthropocentric end of the environmental scale, defined sustainability in terms of “maximum sustained yield” or “optimal sustainable yield” (Berkes & Folke, 2000a, 2000b; Kidd, 1992; Larkin, 1977; Ludwig, 1993; McEvoy, 1982, 1986; Palsson, 1998). This thinking is based on a technocentrist standpoint, which involves “technocratic management, regulation and ‘rational utilization’ of the environment,” a form of dominant industrialist and modernist ideologies (Adams, 1995, 89-90). Conservation and the resulting re-defining of sustainability applies only to resources in short supply, not to those that seem to be available in great abundance (Whisenhunt, 1974, 55).

As the public began to digest the works of Hardin (*The Tragedy of the Commons*, 1968) and Devall and Sessions (*Deep Ecology*, 1985) in the late 1980’s, the concept of sustainability underwent a transformation. Radical environmentalists began to claim that environmental sustainability was not compatible with either developmentalism or capitalism – sustained economic growth (Adams, 1995; Bookchin, 1979). Many believed there could be “no solution to environmental problems without political change” (Adams, 1995, 94). Women working in development (WID) were some of the growing number of individuals who questioned whether gross national product (GNP) was a reliable gauge of a nation’s wealth. They claimed it did not take into account the social and environmental impacts of development (Daly, 1992; Soderbaum, 1992).

By the 1990’s, the term was increasingly accepted as meaning “to meet the needs of the present without compromising the ability of future generations to meet their own needs (Bruntland, 1987). By this time the term sustainable development was commonplace. Shiva (1992) and others claim it is an oxymoron. Others disagree, claiming that because “sustainability is the capacity to create, test, and maintain adaptive

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32 An individual with a technocentrist standpoint would rely on technology as a panacea.
capability” and “development is the process of creating, testing, and maintaining opportunity” the two concepts combine to form a “logical partnership” (Holling et al., 2002b, 76).

Structures of Legitimation

Structures of legitimation regulate social interaction with sets of norms (rules) and values. A society’s norms and values determine much of an individual’s behavior, characteristics, and roles. It is important to note that these are the result of seeing the world a certain way (structures of signification) and allocative authority (structures of domination).

An individual’s behavior, characteristics, and their involvement in different roles result in different skills, knowledges, and problem solving approaches. Many of these are gender determined (Goodnow, 1990, 264). The characteristics and behavior of individuals and groups determine the roles they will play, how they will play a particular role, and how they will interact with the social and natural environment.

Moser (1989) suggests that women are more flexible than men because of the many different roles that society expects them to play (reproductive, productive, and community services). Several authors state that the freedom to play different roles, frequently observe others while being involved in a full range of meaningful activities, and the ability to practice these basic and high level skills can increase learning (Gee in Cambourne, 2001; Lave & Wenger, 1991). Whether or not women’s flexibility and diverse role demands allow time for frequent observation and practice is questioned by Moser (1989).

Structures of Domination

Structures of domination regulate social interaction by allocating authority to some and not to others. These structures control access to resources. Patterns of interaction with the social and biophysical environment are a product of allocative resources. These patterns relate to the concept of connectedness, which is discussed in part three of this chapter.

A number of researchers say that it is access to and control over resources that appears crucial in the learning process (Best, 1999; Nazarea, 1996; Ruddle, 1996; Shiva, 1989). This access can be determined by a number of factors including age, birth order in family, wealth, status, educational background, and gender.

Ruddle (1996) says social stratification with respect to wealth and authority can impede or facilitate the adoption and sustainment of innovation, depending on local circumstances. Where a high degree of social stratification exists, less well-endowed persons may regard themselves as social inferiors, an attitude that may discourage the adoption of innovation. Further, since elites tend to be more articulate, better educated, and more familiar with technical subjects, they tend to dominate decision-making in communal projects, thereby inhibiting communication and egalitarian participation (Ruddle, 1996, 224). He adds that in some cases the more homogenous a community, the more likely it is that an innovation will be widely adopted.
Women’s status and social position also affects learning (Arizpe, et al., 1994; Moser, 1989; Tannen, 1994). Moser (1989) explains that women have practical gender needs, those “which are formulated from the concrete conditions women experience in their engendered position within the sexual division of labor, and strategic gender needs “which are formulated from the analysis of women’s subordination to men (1803). Tannen (1994) also talks about conversational style as a skill that affects “who gets heard, who gets credit, and what gets done at work” (30).

Women’s access to a variety of resources is different than men’s. Women in traditional societies have had less access to information such as extension services and to formal schooling. As a result, much of the information they receive about conservation techniques, agricultural methods, and strategies for maintaining healthy and hygienic communities comes to them secondhand. Mead (in Manning, 1977) brings up this issue as a concern with the dissemination of information by U.S. cooperative extension agents.

In addition, when changes in agriculture (aquaculture) occur, like increased emphasis on cash crops, mechanized equipment, etc., women are frequently denied access to resources. These resources include land, tools, information, other individuals, and seed. This results in a decreased ability to learn and transmit learning to children and peers (Dixon, 1982; Mead in Manning, 1977). Frequently these changes result in increased gendered division of labor. This fragments the learning process, denying one gender group access to information.

Increased demands on specialization and labor times can also result in changing family structure; the number of nuclear families may increase while the number of extended families decreases (Barron, 1986). Changes in family structure may decrease access to kin. Not having access to extended family may decrease access to men. Neis and Williams (1996) researched women’s roles in Newfoundland fisheries. “For generations, women’s access to fishery work and wealth has depended upon their relationships with men and more recently, with corporate employers” (Neis & Williams, 1996, 67).

The Effect of Change on Learning

A number of authors find that incremental change where learners can build on past knowledge and experience is far easier than lurching or transformative change (Foley, 1999; Freire, 1971; Gunderson & Holling, 2002; Holling et al., 2002a; Mezirow, 2000). Occasional events that provide teachable moments are examples of incremental change that can prompt learning. When these events occur one after another – lurching change, learners have more difficulty. Gee (in Cambourne, 2001) found that learners needed to be pushed to perform at constantly higher levels. Occasional events or lurching change can provide such impetus.

Crises that deeply affect individuals and groups are examples of transformative change. Several researchers find that learners need to receive positive and negative feedback (tacit instruction) and rewards regularly, (Gee in Cambourne, 2001; Stewart, 2002b) say “Major transformations are rare and extreme because a unique combination of separate developments has to conspire together simultaneously” (90). They mention the agricultural and industrial revolutions.
Activities involving low risk but high rewards may enable learners to cope with lurching and transformative change. These two researchers also find that learning is correlated to learner motivation. High motivation also may enable learners to cope with lurching and transformative change.

Conscientization

Many individuals facing such situations begin talking about their critical reflections and learning as a result of questioning existing paradigmatic frameworks and choose to become involved in informal learning. Freire (1971) and Mezirow (1990) think that these actions are a vital component of adult learning. “…[S]ome of the most powerful learning occurs as people struggle against oppression, as they struggle to make sense of what is happening to them and to work out ways of doing something about it” (Foley, 1999, 1-2). When individuals or groups begin to critically reflect on learning and worldview and realize that their learning has been determined by hegemonic ideologies, they become involved in what Foley and Freire (1970, 1972) call emancipatory learning. Active involvement in emancipatory learning results in social action (Foley, 1999; Freire, 1970b, 1972; Mezirow, 2000, 167). Such action is the engine of practice that drives social movements (Foley, 1999). And it is within social movements that identity is recreated and a great deal of incidental learning, “practical learning,” takes place (4).

Conscientization is a result of emancipatory learning. As a result of this learning, people perceive social, political and or economic contradictions, take action against these perceived oppressive elements of reality (Freire, 1970b, 100), and create new paradigms that sometimes threaten existing power structures. Freire stated that awareness alone does not imply conscientization. Conscientization involves both recognizing the situation of oppression and its causes, realizing that the situation can be changed, and subsequently working to create a new situation (31).

One of the largest obstacles standing in the way of conscientization is that the “oppressive reality absorbs those within it and thereby acts to submerge human beings’ consciousness” (Freire, 1970b, 33). This submersion creates “contradictory, divided beings” where one group or individual exploits or hinders another (37). Because of these two factors, individuals and groups need opportunities to critically reflect upon their reality. “…The oppressed must confront reality critically, simultaneously objectifying and acting upon that reality” in order to transform it (34). Mezirow (1985, 25) defines critical reflectivity as “the bringing of one’s assumptions, premises, criteria, and schemata into consciousness and vigorously critiquing them”.

Freire talks about a “pedagogy for the oppressed” and states that systematic education projects must take place. When Freire talks about education projects, he is referring to non-formal education efforts like the literacy efforts he was involved with first in Sao Paulo, Brazil and later in the Northeast of the country. Foley (1999) and Flora and Flora (2002) write about education projects in more informal terms, i.e., town meetings, informal conversations between individuals and groups, etc. These projects allow for “a process of engaging with hegemonic and oppositional ideologies and discourses” (Foley, 1999, 9) whereby the oppressed are able to unveil the world of oppression and through praxis “commit themselves to its transformation” (Freire, 1970b,
The concepts of reflective practice and reflection in action have had major influence on continuing professional education (Schon, 1987). Critical reflection or critical thinking focuses on the process by which individuals question and reframe previously accepted assumptions and form alternative perspectives. It is a practice that continually attempts to surface taken for granted mental models, values and beliefs (Brookfield, 1987). Critical reflection is seen as a requirement for conscious transformational change.

Social conscientization involves the perception of gender, socioeconomic class, religious, and/or racial bias. Political conscientization involves the perception of oppressive power structures. Social and political conscientization could involve an awareness in historical terms that lead to a change in present action. An example of this is when people perceive that past resource management strategies are biased against and oppress a particular group (i.e., minorities, future generations) and begin to work for policy change.

Collective Conscientization

Freire (1970b) says when individuals “discover within themselves the yearning to be free from social or political oppression), they perceive that this yearning can be transformed into reality only when the same yearning is aroused in their comrades.” (29).

When the conscientization of one individual spreads to others, collective conscientization or a social movement can result. Molyneux (1998) states that whether or not these movements develop depends upon “five main factors: prevailing cultural configurations, family forms, political formations, the forms and degree of female solidarity, and more generally…, the character of civil society in the regional and national context” (221). Other social movement theorists look at the concept of cultural politics as a factor (Alvarez, Dagnino & Escobar, 1998; Escobar, 1998). Escobar (1998) states, “Cultural politics is the process enacted when sets of social actors shaped by, and embodying, different cultural meanings and practices come into conflict with each other” (68). He adds that such groups could come together in this fashion to protect their territory, their continued survival as a social, cultural, and political group, and their livelihoods.

This conscientization can lead to an environmental movement. “In many parts of the world, women are becoming involved in collective struggles to address problems of resources, the environment, and economic survival, most often in women’s organization or those dominated by women, and sometimes jointly with men, whether as equals, members of women’s groups within men’s organizations, or as informal affiliates” (Thomas-Slayter et al., 1996, 294).

Part 3: Panarchy

The theory of panarchy was created as a tool to better understand and explain interaction and change in complex environmental systems (Holling & Gunderson, 2002). By integrating interdisciplinary thinking, it provides a valuable means of looking at the transformations of human and natural systems. This theoretical framework is distilled
from sociopolitical ecology, a combination of self-referential systems theory and feminist political ecology.

Self-referential Systems Theory

Self-referential systems are seen as self-contained, bounded, somewhat closed entities that are in control of their own behavior (Bates, 1997; Luhmann, 1986; Maturana & Varela, 1987). The term self-referential implies that these systems relate to their external environment, through internal action, thus creating their own environments (Bates, 1997; Checkland & Scholes, 1990). “Systems may respond to events outside themselves by ‘fitting’ their behavior into an immediately occurring set of events or environmental conditions by selecting, from within themselves, a response which they, themselves, define as fitting into a self-defined set of circumstances” (95). Individuals, groups of individuals involved in social interaction, communities of practice, communities, etc., can all be envisioned as self-referential systems (Schensul et al., 1999; Wenger, 1998; Wilkinson, 1991).

Political Feminist Ecology

Political ecology is a means of explaining relationships between political and economic processes (Bates, 1997; 233-235). When it is combined with socialist feminism and ecofeminism, a more critical perception of economic and political power results (Braidotti et al., 1995; Geertz, 1973; Gramsci in Mayo, 1999; Giroux, 1988).

Thomas-Slayter et al., (1996) say this perspective “emphasizes the complexity and interconnectedness of ecological, economic, and cultural dimensions of environmental change (289). It recognizes the relationship among global, national, and regional policies and local processes and practice”.

Sociopolitical Ecology

When feminist political ecology and environmentalism are combined with the theory of self-referential systems, the result is sociopolitical ecology (Bates, 1997; Bohm, 1983; Bohm & Hiley, 1993). This approach enables the researcher to critique the process of modernization while taking into the account the complex and interrelated dimensions of culture, politics, the economy, and the biophysical environment. It also facilitates recognition of “relationships among global, national, and regional policies and local processes and practices” (Thomas-Slayter et al., 1996, 289). By recognizing these, the researcher can “consider the making and remaking of geographical and historical agents and the forms of their agency in relation to movement, interaction, and shifting, competing claims about community, culture, and scale,” better conceptualizing the process of globalization (Tsing, 2000, 30). One distillation of sociopolitical ecology is a theory called panarchy developed by the Resilience Network (Gunderson & Holling, 2002, xxiii).
Panarchy

The theory of panarchy\(^{34}\) was developed to begin looking at both the top-down and the bottom-up nature of change that occurs in sets of self-referential systems nested one within another. This theory integrates “the dynamics of change across space from local to regional to global and over time from months to millennia” and diverse “disciplines to better understand systems of linked ecological, economic, and institutional processes” (Holling et al., 2002, 21). (See Figure 1.)

\[\text{Figure 1. Stylized representation of the four-phase adaptive cycle.}\]

In this paper exploitation is referred to as utilization and release is referred to as decline and/or collapse. “The cycle reflects changes in two properties: (1) Y axis – the potential that is inherent in the accumulated resources…; (2) X axis – the degree of connectedness among controlling variables. The exit from the cycle indicated at the left of the figure suggests, in a stylized way, the stage where the potential can leak away and where a flip into a less productive and organized system is most likely” (Holling & Gunderson, 2002, 34).

Two features distinguish panarchy theory from traditional hierarchical theory (Holling & Gunderson, 2002). The first is the four-phase adaptive cycle. The second is the nesting of adaptive cycles and the connections between levels.

“The original concept of the adaptive cycle…emerged from experience with productive ecosystems that exist in temperate regions of the world…” but was expanded

\(^{34}\) Holling et al., (2002b) discuss hierarchical theories of change. These frameworks were abandoned because the term hierarchy implies that change is solely the result of top-down authority (72-74).
to large human organizations – bureaucratic and industrial organizations” (Holling & Gunderson, 2002, 33). It shows systems flowing from exploitation to conservation to release to reorganization within three dimensions of potential, connectedness, and resilience. (See Figure 2.)

Figure 2. Stylized panarchy. “A panarchy is a cross-scale, nested set of adaptive cycles…” (Holling et al., 2002b, 74). This figure illustrates how systems in a panarchy are operating at different scales (time and space).

The terms exploitation, conservation, release, and reorganization were chosen to describe change within an ecological system. Exploitation refers to a period of “rapid colonization of recently disturbed areas” (Holling & Gunderson, 33). Conservation refers to a period of “slow accumulation and storage of energy and material” (33). Release refers to a period of “creative destruction” 35, a period when tightly bound accumulations of biomass and nutrients become increasingly fragile and are suddenly released. Reorganization refers to the period “in which [for example] soil processes minimize nutrient loss and reorganize nutrients so that they become available for the next phase of exploitation” (34-35). The terms developed by Holling and Gunderson and the Resilience Network have negative connotations in the area of education and community development. I have therefore renamed exploitation, utilization, and release, decline and or collapse.

When such a model is applied to a cultural system like a community of practice the various stages can be understood in the following way. During the utilization phase, a

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35 Holling & Gunderson (2002) state that the term creative destruction was borrowed from the economist Schumpeter (1950) (34).
community of practice is rapidly learning about its environment and developing the skills to be able to extract and process resources. In the conservation phase, a knowledge base of individuals and the community is in place and still growing and some limited innovation may still be occurring, however, for the most part, skills have been perfected and a set of fixed practices is being shared. During the decline phase, the group, for whatever reasons, is dispersing; the resource base that the community has depended upon may have changed or disappeared. The knowledge base is being lost and transmission of learning is incomplete. During the reorganization phase, steps have been taken to refashion the community; perhaps a new practice is beginning. Members with some knowledge base are coming together to engage in a new practice.

The four-phase adaptive cycle represented in Figure 2 is affected by low or high levels of potential, low (loose) or high (tight) connectedness, and more or less resilience. “These three properties shape a dynamic of change” (Holling et al., 2002, 399).

Potential

The interdisciplinary mix of authors brought together in Gunderson and Holling’s book Panarchy (2002) define potential as the sum of accumulated capital. In ecological terms, they say it “can be measured, in part by production of biomass or nutrients accumulated as a consequence of ecosystem dynamics” (Carpenter, Ludwig & Brock, 1999 in Holling & Gunderson, 2002, 34). In social and cultural terms, they define it as friendship, mutual responsibility, and trust, what others have defined as social capital (Berkes & Folke, 2002).

The Commons

Social constructivists would look at potential as a perceived social reality. Discussions of the commons, what many define as open-access resources, shed light on this facet of potential. Malinowski (1926) says that common resources would “be overused because of the higher value of present benefits compared to potential future costs of unrestricted use, especially when each individual user bears only a fraction of those costs but gains the entirety of present benefits” (21).

Gordon (1954) who has worked in areas of open-access resources, points out that widespread overcapitalization is a consequence of open access to resources and such overcapitalization has resulted in access restrictions to the commons, like the Florida net ban. Others disagree, saying that individuals act in the interests of the collective good rather than with narrow self interest (Rapport, 1984).

Hardin (1968), in his article The Tragedy of the Commons, examines this issue in light of what he perceived was an environmental crisis. He defines it as a resource that could be freely accessed by a population as a whole, i.e., pastureland, a national park, the oceans. Selfishness underlies his analysis of the commons. He argues that “man is locked into a system that compels him to increase his herd without limit in a world that is limited.” He adds that “those who restrain their use of a common pool resource lose out economically in comparison to those who continue unrestrained use and against those who restrained their own harvesting” (1968, 1244). Hardin thinks that as populations
increased, the commons could no longer be areas of free access; the solution was mutually agreed upon coercion.

Dietz, Dolsak, Ostrom & Stern (2002) approach the concept from a slightly different slant. They define the commons as a public good and said “one person’s use of the resource does not necessarily diminish the potential for use by another” (4-5). They add that the problem was that in a large group “an individual will enjoy the benefits of the public good whether or not he or she contributes to producing it” (5). They think people will follow the “dictates of narrow self-interest,” enjoying the benefits of the resource without paying for them.” Dietz et al., conclude that “if everyone follows this logic the public good will not be supplied, or will be supplied in less quantity or quality than is ideal” (5).

Several researchers point out problems with how Americans treat private property as compared to public property and the commons. Kunstler (1993) writes that the sacred nature of individual property ownership in America degrades the notion that the private individual has a responsibility to care for public land. Kemmis (1990, 1998) points out that not only are Americans preoccupied with their individual wellbeing, the current political climate of the country does not empower individuals to make decisions about how public land is managed. As a result, public property and common resources are not given a high level of care or attention (Kemmis, 1990).

**Cultural Capital**

Cultural capital refers to the accumulated knowledge of a system. Such knowledge may be the result of formal, non-formal, and/or informal learning. Many authors talk about that local knowledge that is transferred from one generation to another (Berkes, 2000; Holling, Berkes & Folke, 2000). Others talk about sense of place (i.e., Berry, 1997; Kemmis, 1998).

Traditional ecological knowledge refers to “a cumulative body of knowledge and beliefs, evolving by adaptive process and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment (Berkes, 1999 in Berkes & Folke, 2000b, 123; Berkes, Folke, & Gadgil, 1995).

Sense of place is defined as the relationship that develops between an individual, the land, and the community in which he or she lives (Berry, 1995; Berry, 1996; Kemmis, 1998). It “is rooted in four aspects: an understanding of the ecological and social processes, an awareness of the embeddedness of one’s identity in a place, a disposition to feel a sense of belonging, and the skills required to deepen one’s understanding, awareness, and disposition” (Mueller, Abrams, Fletcher & Schram, 2001, 1).

Sense of connectedness grows over time as a result of informal learning (Dunaway, 1997; Nazarea, 1996; Price, 1997; Robertson, R., 1997). Berry (2000) says, “Living and working the place day by day, one is continuously revising one’s knowledge of it, continuously being surprised by it and in error about it (138). And even if the place stayed the same, one would be getting older and growing in memory and experience and would need for that reason alone to work from revision to revision” (138). Danbom (1995) adds that long life spans favor high levels of informal transmission of knowledge through family and community networks. Elder and Pellerin (1998) find that generational
membership or class was important but “less influential on beliefs or behavior” than shared historical location and relation experiences (267).

Berry equates sense of place to local knowledge. An individual is both mind and body, and it is the combination of an individual’s interaction with the world, a locale, and a community over time that produces a “whole heritage of culture, language, memory, tools, and skills” (2000, 48-49). He adds, “[T]he longer the mind of an individual or a community is at home the better it may become” (49). This “better” equals an enhanced sense of place, the essence of local knowledge. Schneekloth and Shibley (1995) qualify this knowledge saying that it “is often unstructured, informal and hesitant” (5).

Edward Wilson (1998) notes that sense of place (local knowledge) can continue to expand as it passes from one generation to another (236). Others find that in the modern world, knowledge is being lost locally, especially in rural areas (Berry, 2000; Ladislau & Kincheloe, 1999). Those who study indigenous and local knowledge issues say that the loss of this knowledge underlies a serious land-use problem (Berry, 2000; Ladislau & Kincheloe, 1999; Wilson, 1998). “One of the most significant costs of the economic destruction of farm populations is the loss of local memory, local history, and local names,” a loss of local knowledge (Wilson, 1998, 138).

Berry (2000) looks at this loss and reflects that “Modern humans typically have been using places whose nature they have never known and whose history they have forgotten: thus ignorant, they almost necessarily abuse what they use” (91).

Many think that a strong attachment to place and/or people results in a sense of reciprocity (Beckely, Stedman, Ambard & Wallace, 2002; Berry, 2000; Bourdieu, 1987; Coleman, 1990; Wilson, 1998). Berry (2000) writes, “The world does not exist simply for our consumption (137). Writing about physical places, Berry (2000) says they “offer themselves to us in a special relationship, and as a form of reciprocity our recognition is expected” (37). He continues, “Without our attention, our places are endangered. And when our places are endangered…we are at risk” (18). That same thing can be said of social relationships and institutions. Attachment to place (sense of place) and an attachment to others (sense of community) are built upon shared values and norms.

Relationships to place and to others require reciprocity. A number of researchers hypothesize that sense of place may facilitate environmentally responsible behavior (Berry, 2000; Orr, 1992; Smith & Brown, 1996; Smith, 1992). Berry (2000) says, “…[P]eople exploit what they have merely concluded to be of value, but they defend what they love” (41). Others write that social interactions lead to strengthened collective identity, mutual trust, and collaboration (Bourdieu, 1977, 1986; Flora & Flora, 2002; Portes & Landolt, 1996; Putnam, 1993; Wilkinson, 1991).

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36 Berry is alluding to what Holling et al., (2002) define as resilience.
37 Values are ideas people hold about what is socially defined as good or desirable (Webrref.org, 2002).
38 A norm is a rather specific rule of the group that the members share and that serves to guide their conduct. Norms are standards of behavior, rules for conduct, what the group expects its members to do (Webrref.org, 2002).
Current discussions of social interaction, norms, values, trust and reciprocity increasingly allude to the notion of social capital. Social capital is closely related to social exchange theory, what Adam Smith and other 19th century classical economists thought enabled group collaboration. This theory was based on the premise that the exchange of social and material resources is a fundamental form of human interaction and that exchanges over time that are reciprocated build trust between individuals (Blau, 1975; Mauss, 1979; Redfield, 1952).

Social capital is said to be a resource that lies in networks of social relationships and can be accumulated, stored, and used by individuals and groups (Bourdieu & Coleman, 1991; Fountain, 1988; Granovetter, 1979; Putnam, 1993). Many think social capital is composed of three distinct elements: form, norms of obligation and reciprocity, and resources. Form includes structural aspects of social ties and relations, the breadth of the network, depth or intensity of the relations, existence of structural holes, and the nature of the relations (weak/strong ties, vertical/horizontal ties, etc.) (Bourdieu, 1977, 1986; Burt, 1992, 2000; Granovetter, 1979; Portes & Landolt, 1996; Scheffer et al., 2002). Norms of obligation result from feelings of obligation and norms of reciprocity result from feelings of trust. Resources include access to additional social interactions, relationships, information, language, money, physical goods, etc.

Most think that this “capital” exists in relationships between people but some, like Putnam (1993), think it is a group resource that can facilitate the coordination and cooperation at the macro-level (institutional) for the benefit of society, while others like Portes (1998) feel it is problematic to consider social capital this way. Portes says this does not take into consideration those resources that individuals benefit from as a result of relationships, nor does it take into consideration that all individuals may not benefit equally from these resources as a result of group membership.

Portes and Sensenbrenner (1993) discuss four definitions of social capital in light of four theoretical schools of thought: Durkheims’ non-contractual aspects of contractual solidarity; Simmel’s “reciprocity transactions” or obligations between individuals based on self interest; Marx’ “bounded” class solidarity; and, Weber’s concept of substantive rationality. Social capital theorists appear to align with two schools of thought neoclassical economics or collectivist (Astone, Nathanson, Schoen & Kim, 1995). The former are more inclined to link the use of social capital to eventual economic gain while the latter are more inclined to think that people build social capital because humans are basically social animals – relations assure a sense of security and inclusiveness (Levi Strauss, 1963; Simmel, 1921).

A number of other authors refer to localized (individual, family, local community) and generalized (group, larger community, or institutional) social capital (Putnam, 1995), social capital held at the micro and macro levels (Granovetter, 1985; La Jolla Institute, 1997; Woolcock, 1998) or vertical (between individuals, households, groups of different social standing) social capital (Shields et al., 160, 1996).

Looking at the emerging theory of social capital, Granovetter (1974) attempts to integrate social capital at different levels with the development of the concept of “embeddedness” (social relationships and networks that underlie the transfer, accumulation, or diminishment of other symbolic capitals. He thinks that social
relationships and networks exist at both levels and that ties that form from micro to macro levels may result in greater social benefits.

Social capital, like economic, human, and natural capital accumulates when used productively (Fountain, 1988). It is preserved by carefully selecting individuals and groups with which to form alliances and strictly sanctioning inappropriate behaviors like mistrust (Fountain, 1988; Putnam, 1993). And, it is through networks of social relationships that are imbued with high levels of social capital that knowledge is effectively transmitted, both informally and formally (Coleman, 1990; Flora & Flora, 2002; Scheffer et al., 2002; Warner, Hinrichs, Schneyer & Joyce, 1997).

If the potential of a group is high, then it will have a greater ability to reorganize and exploit the resource base. If it is low, the members may disperse altogether and the entire knowledge base may be lost (Holling & Gunderson, 2002).

**Connectedness**

Connectedness is represented by:

the strength of internal connections that mediate and regulate the influences between inside processes and the outside world – essentially, the degree of control that a system can exert over exogenous variability. An organism, ecosystem, organization, or economic sector with high connectedness is little influenced by external variability; its operation and fate are determined by internal regulatory processes that mediate or control variability. …[I]t could be measured by the intensity of control by direct human activity (Carpenter, Brock, and Hansen, 1999 in Holling et al., 2002, 398-399).

Familiarity with local public spaces and the relationships that people form with others and institutions enable individuals to form attachments to place (Firey, 1945; Watson, Battistich & Solomon, 1997). “Attachment to place involves the development of roots, connections that stabilize (networks) and creates a feeling of comfort and security” (Shumaker & Taylor, 1983, 13).

Those who are dependent on natural resources and local economies are very aware of the connectedness of their livelihoods to both the local human and non-human communities (Mueller et al., 2001).

Social interaction “gives structure and direction to collective action” and “is the source of community identity (Wilkinson, 1991, 11). Flora sees that social behavior governing interaction is embedded in social structure. Granovetter (1985) sees that economic behavior governing interaction is embedded in relations both within and among organizations39. Several rural sociologists look at the concept of embeddedness more deeply and hypothesize that social infrastructure involves social organization and cultural characteristics (Swanson, 1992).

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39 Granovetter claims that distinctions between social and economic behavior are not useful.
Woolcock (1998) notes that it is important to look at both integration\(^{40}\) (intracommunity ties) and linkage (extra-community networks). Effective social ties\(^{41}\) can link resources, ideas and people together, promoting communication and collaboration and ensuring community access to systems in the larger ecological field that can bring in resources and new ideas (Warner et al., 1997). Holling (1995) says, “The development of a sense of involvement, ownership, and belonging by the people at a regional scale was important to the generation of sustainable policies in the Chesapeake Bay and Great Lakes” (34).

Several researchers state that if resources are to be mobilized effectively, there should be a number of diverse, internally homogenous social networks\(^{42}\) within the community and links tying these networks to outside groups (Flora & Flora, 2002). Flora and Flora (2002) refer to the linkages within social networks as bonds and the ties linking internal social networks to those outside as bridges.

A number of researchers talk about these bonds and bridges (Granovetter, 1973; Flora & Flora, 1998; Scheffer et al., 2002). Horizontal links are those between groups of similar status, economic or otherwise. Flora and Flora (1998, 2002) state that these links enable communication and collaboration. Vertical links, on the other hand, are between groups of differing socioeconomic groups. These can ensure broader political and economic change. Granovetter (1973) describes weak ties as those contacts between individuals that are infrequent and strong ties as those indicating more regular contacts between individuals (1973). Strong ties usually exist where individuals or networks have known each other for a long time and have maintained frequent contact. Granovetter (1973) says that these ties are not particularly valuable for accessing new information or resources but have values of other types, i.e., sense of belonging to a group. Weak ties are those indicated by infrequent contact or shorter length of time. While these may not add to one’s sense of wellbeing, they are important for innovation (Granovetter, 1973). Granovetter referred to this as the strength of weak ties.

Flora and Flora (1993) expand on the issue of connectedness and talk about the legitimacy of alternatives. This concept deals with how inclusive a group is, whether it accepts controversy, depersonalizes politics, and focuses on process. They say that controversies can increase the flow of information and lead to more considered decisions or can turn to conflict that creates permanent rifts between different groups in the community. These rifts can impede the flow of information and decrease learning. Flora (1998) also writes, if community politics are personalized, community members may find themselves reluctant to speak out because of risk to their reputations or livelihoods (492). This can also decrease information sharing and learning.

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\(^{40}\) Integration is defined by Granovetter (1973) as encompassing strong rather than weak ties, by Weber (1968) as substantive, not formal, rationality; by Tonnies (trans., 1987) as Gemeinschaft (fixed and stable communities), not Gesellschaft (society); by Durkheim (trans., 1984) as mechanical solidarity not organic; and Habermas (1990) as value-oriented, not interest-based, action.

\(^{41}\) Social ties are the links between actors involved in social interaction.

\(^{42}\) Social networks are the relationships and flows between people, groups, and organizations. It is important to note that social networks, like communities of practice, can change structure as individuals move in and out of relationships (Lave & Wenger, 1991).
Several researchers find that as rural communities grow increasingly diverse, relationships between farmers and fishermen and those used to more urban settings can become a source of friction (Beckley et al., 2002; Stedman, 2002). “When participants share and agree upon basic rules and rituals of engagement, interactions are relatively straightforward. However, when parties from radically different social systems meet and attempt to engage new rules of legitimation, domination, and signification must be renegotiated” (Scheffer et al., 2002, 229). Others find that the existence of these diverse relationships and individuals can provide links that provide access to different perspectives and new resources (Granovetter, 1973; Warner, 1997).

**Resilience**

Resilience is central to adapting to changing conditions. It has three defining characteristics. Resilience is a measure of: 1) the amount of change a system can undergo and still retain the same controls on function and structure; 2) the degree to which a system is capable of self-organization; and, 3) the ability to build and increase the capacity for learning and adaptation (Resilience Alliance, 2001 in Berkes, 2002, 313).

Scheffer et al., (2002) make two points that are extremely pertinent to understanding this model. First they state that “human activity imposes a continuously increasing stress on most ecosystems. That stress causes ecosystems to change. The change can be smooth, but some ecosystems collapse unexpectedly at a certain critical stress level and are difficult to restore” (238). Communities of practice can impose increasing stress on the environmental systems they occupy. This stress, coupled with the three dimensions of change – potential, connectedness, and resilience, affects how communities will adapt and transform.

Scheffer et al., (2002) mention that “usually only a subgroup of society benefits from the activities that cause the strongest stress to the ecosystems, whereas the costs of environmental degradation are largely on the account of other groups, or society as a whole…” (238). They add, “…a problem (degradation of an ecosystem) will first be noticed by a few perceptive individuals (often scientists or directly affected persons). These individuals may try to stop or reverse the degradation, investing their kinetic social and other capital into advocacy or change groups. If they have a clear and convincing story (signification) and good social links with fellow stakeholders, they will be able to mobilize a large interest group. However, other interest groups may mobilize in reaction” (238).

These authors identify “…four key ingredients for a resilient sustainable human-nature interaction.” These include:

1. a clear and widely shared insight into ecosystem-dynamic responses to human use;
2. a broad and widely shared inventory of ecosystem utilities – short and long term, local and global;
3. avoidance of bias due to differences in the organizational power of different groups of stakeholders; and
4. social network structures that bridge gaps between interest groups and hierarchic levels (Scheffer et al., 2002, 239).

Gallopin (2002) hypothesizes that “cumulative loads on Earth’s biogeochemical cycles and ecosystems could well exceed natural assimilative capacities,” and “heightened pressure on natural resources could lead to economic and social disruptions or even conflicts” (375).

Conclusion

The lenses of feminist political ecology and panarchy, which have been discussed above, provide a solid theoretical framework for the placing the processes of situated, informal learning and conscientization in communities of practice into context.

Although social scientists who argue that social action is predicated on a hierarchy of cultural structures – i.e., that worldviews, structures of signification are the most slowly developed, that structures of legitimation (rules and norms) are developed more quickly, and that structures of domination that allocate access to resources to individuals and groups are the first to develop – these can also be looked at in a panarchical sense. For example, circumstances like globalization and accompanying human migration, can bring together individuals from different cultural systems. Shortages in a labor force may enable individuals to take on new roles. Crises or the advent of technological innovation can quickly overturn patterns of resource allocations. All these can prompt conscientization and changes in structures of signification. When such conscientization is seen as valuable to a group’s survival, structures of signification may quickly change, modifying structures of legitimation and domination.

Holling et al., (2002a) write about incremental, lurching, and transformative change and resultant learning. They state that incremental environmental change fosters incremental learning and allows learners to build on existing knowledge. Such learning is easily integrated into underlying paradigmatic thought. Lurching change forces individuals to make large learning jumps and sometimes they jump before having all the necessary knowledge to make the jump successfully. Occasional lurching change can usually be handled successfully and resulting knowledge can be integrated into the existing worldview. Continuous lurching change and transformational change, however, are much more difficult. Such changes can force transformational learning but individuals may attempt to resist this process because of anxiety or fear of change (Mezirow, 1981; Brookfield, 1987). Transformative learning may not ever occur in systems with low levels of potential, connectedness and resilience, but when sufficient levels of these three components are available within a system, such learning will occur (Gunderson & Holling, 2002; Gallopin, 2002).

A number of researchers have explored this process. Light et al., (1990) write that when “deep learning necessary during periods of profound change” does occur, it “originates on the periphery not within existing institutions” (158). One author writes that during the early stages of transformative change, a great deal of learning and innovation
takes place (Maisels, 1999). Dominice (2000) says “local role changes in family, work, and community have been found to trigger a heightened readiness to learn” (6).

The nature of a community – levels of potential, connectedness, and resilience – may determine the nature of the learning that occurs (Gallopin, 2002). Holling (1995) adds that institutions and societies learn as they progress through the cycles of growth (exploitation), production (conservation), release, and renewal (reorganization). He adds that when there are extreme mismatches among the scales at which ecosystems, institutions, and societies function, understanding and learning can create extraordinary conflict. “If the scale of all three (ecosystems, institutions, and societies) becomes more congruent, it is likely that the inevitable bursts of human learning can proceed with less conflict and more creativity” (31).

Together the adaptive cycle metaphor, the theory of panarchy, and communities of practice theory provide a means of understanding and explaining the characteristics and conditions that foster adaptive learning and conscientization. Communities of practice are self-referential systems with complex, panarchically related cultural structures. These structures largely determine the interactions of individuals and groups with others and the natural environment. Over time in space, these interactions produce, reproduce, and modify these cultural structures. Considered together with the concepts of potential and interaction they enable the researcher to more clearly investigate the process of learning and conscientization.

Communities of practice are nested within larger social and natural systems and encompass smaller social and natural systems. Frequently communities of practice overlap. Sometimes they merge. Panarchical theory leads to a better understanding of the synergistic interactions between systems, which leads to a better understanding of the process of learning and conscientization.

How incidental, situated environmental learning and conscientization within the clam farming community of practice are affected by these changes (incremental, lurching, and transformative) is the concern of the next three chapters. Chapter Four contextualizes temporally and spatially the larger community of Oyster Isles, the clam farming community of practice, and a number of smaller communities of practice, several of which existed prior to clam farming. This contextualization not only provides the reader with an understanding of place over time, but insight into some of the challenges facing areas like Oyster Isles in an era of increasing globalization. It also provides the reader with a sense of the adaptive cycles of the larger community and smaller communities of practice. This understanding enables the reader to understand panarchical relationships between the larger community, the clam farming community of practice, and the state described later in this paper.
CHAPTER 3
METHODOLOGICAL APPROACH

Introduction

This chapter discusses the research methodology selected and used in this study. After a brief introduction of the ethnographic method, the three basic research stages – pre-field work, fieldwork, and analysis – are presented followed by a discussion of generalizability, validity and reliability (Bogdan, 1972). Reflections on philosophical ethical, and political issues are interspersed when they are relevant.

This ethnographic case study examines informal environmental learning among clam farmers in a Florida coastal community. Ethnographies by nature are phenomenological in that they present an account that is the result of researching the views of the people in the community that are studied. As discussed in Chapter Two, however, ethnographic data and findings can be tied in with other theoretical approaches that generally are considered less subjective. This study is particularly phenomenological as modified learning history interviews were utilized (Dominice, 2000). This research approach allowed for this paper to represent the voices of the practicing clam farmers in Oyster Isles and others who live and work with this population. This interview method inspired a dialogue that promoted critical reflection and action (Freire, 1970b, 35-48). This approach assumed that the interviewer and the interviewee shared “the same reality, a set of understandings sustained in and through the shared assumptions of interaction and recurrently sustained in processes of typification” (Gubrium & Holstein, 2000, 489-490). Such an assumption can be dangerous; shared reality must be worked at through intensive dialogue in the field on a number of levels.

Ethnographic research is an evolving process. When I first went into the field, I had no clear focus or research design. The informal pilot study enabled me to focus the research and develop a suitable design (Light et al., 1990; Maxwell, 1996). As the actual formal fieldwork progressed, I encountered the pattern of repeating expansion and reduction of research concerns noted by a number of other researchers (Spradley, 1980). For instance, when I realized that many participants were unwilling to share the names of those they worked with or communicated with regularly, I found I had to abandon planned social network analysis. Towards the end of the first series of interviews, I realized that I had enough information about these interactions to develop general

\[43\] Phenomenological studies enable the subjective point of view of informants, “the world of social (and natural) reality” to inform the research results, not the “fictional non-existing world constructed by the scientific observer” (Schutz, 1964, 8).
concept maps using Inspiration©, a visual learning software. These maps illustrated characteristics of social interaction, but because informants did not freely offer names of those they worked closely with, I did not have the required level of detail necessary to conduct a social network analysis (Schensul et al., 1999; Scott, 1988).

This study took place over a two- to three-year period, from 1999-2002. The time span focused upon in the memories of the interviewees, however, was a 15-year period from the late 1980’s until late 2002. Approximately eight months, at intervals, were spent in the field. The informal pilot study was undertaken from late 1999 to early 2000. The formal study began in late 2000 and continued through mid-2003. It turned out this was an opportune time to observe change. In early 2001, about 200 acres of marshland were placed on the market. In two weekends, in a total of four days, approximately 90 lots were sold as residential sites that once developed might have septic tanks. This development created a controversy that continued through late 2002. The development, the events of September 11, 2001, and a number of other events that prompted learning became focal points that augmented my understanding of members of the community’s interactions with their social and natural environment.

Pre-Fieldwork

Designing a study and selecting a relevant site for research was problematic because my interests and experience are broad. To narrow the area of research, I took the advice of J. Maxwell (1996); I reflected on why I had enrolled in a doctoral program and decided I should research a topic that I not only enjoyed but one that moved me deeply. These topics included indigenous knowledge, culture change in light of environmental impacts, and informal learning processes resulting in critical reflection and conscientization. Combining these three into one study was challenging. I then took the advice of a former professor, Dr. George Papagiannis (Fall Semester, 1998). He told me to find a place where I would like to be. He said if I were unable to find something and somewhere that fascinated me, I would become bored and never finish. This piece of advice proved to be the one of most important I received. When I found an issue of interest and coupled it with a location, I reflected on that advice. If I felt at all uncomfortable I kept looking. That search led me to Oyster Isles.

Before my first visit, I had heard about the town’s success with clam farming. Upon my first visit, I was told that a small group of women initiated this effort. I was intrigued. My research into indigenous environmental knowledge had pointed to interesting correlations with women’s strategic, productive and reproductive issues. Furthermore, I was somewhat familiar with Oyster Isles. I had visited a number of times in the past, once about 25 years ago and subsequently about 10 years ago.

I decided to conduct an informal pilot study. Light et al., (1990) advocate such studies as a means of clarifying research design. Maxwell (1996) states that such studies provide a means of understanding the meaning that “phenomena and events have for the actors who are involved in them” (45). This informal study allowed me to: develop a clear study focus and design; grapple with philosophical, ethical and political issues
After a kayaking trip in the area, I found the focus narrowing. Oyster Isles sits along the Gulf coast surrounded by tidal marsh and shallow Gulf waters. During that visit, my daughter, two friends and I skinned across the shallow Gulf waters, jumping from island to island. The first day we were able to see the sea grasses and bottom in the shallows. The next day out, however, the water was turbid. I learned that water clarity depended on the tides; on incoming tides the water was clearer and as the tide flowed out, drawing the nutrient-rich waters from the rivers, it became cloudier. I was then told that during the first few years of clam farming floodwaters from upstream had killed large number of young and harvestable clams. Water quality and quantity appeared to be problems.

Another morning bicycling, I noticed a fishing boat covered with a tarp in a yard. It was being modified; the stern had been cut off and in the center a hole had been cut and enclosed for a motor. Clam farming apparently required a different technology than fishing had. Learning was prompting innovation.

Walking around town, I was intrigued by several monuments. One was for commercial fishermen who had lost their livelihoods when the Florida net ban was enacted. Another was a plaque commemorating the life of a woman who had worked to build the community. As I continued talking informally to individuals in stores and on the street, I again was told that women were responsible for the town’s successful move to clam farming. I realized the study needed to focus on gender roles and their effect on learning as the community made the transition from wild harvest to agriculture (Burton & White, 1982).

A bit later it became clear that the community was experiencing a great deal of turmoil as change continued. I learned that the shift from fishing to farming was only a piece of the change. The demographics and economic base of the island and the surrounding watershed were changing. The effects of these changes were complex and made me realize that understanding learning in the midst of such complexity required a study that would encompass the larger community while focusing on the clam farming community of practice.

Once I began to feel confident of the research topic, I began thinking seriously about its design. The pilot study clarified this approach. As I wandered the island and listened to community members I heard a number of interesting remarks: “Campbell’s Soup will probably run all us mom and pop people out of the business in five years;” “Those people have to wade over mountains of money to get to their boats;” and, “You can’t find many places on the water to put a raceway anymore – not that anyone from here can afford.” As I contemplated these and other remarks in my growing field notes and memos, I realized that many remarks appeared to reflect a concern for sustainability. Were individuals critically aware of this concern or as Freire (1970b) writes, were they apprehending their reality in fragments and not perceiving that these fragments were interacting constituent elements of a whole? If this was the case, I asked myself, would they be able to work toward sustainability?

Freire (1970b) talks about the use of a methodology of conscientization. Such a methodology entails the apprehension and understanding of themes embodied in people’s perceptions, aspirations and motives. In the process of decoding and externalizing these
themes, participants are made aware of their “real consciousness” of the world so that they begin achieve an awareness of their reality (Freire, 1970b, 96). After reading Dominice’s (2000) book Learning from our Lives, I realized that as a researcher I could become a tool for developing and extending participants’ consciousness. I could do this by both by eliciting participants’ learning experiences and dialoguing with them, and by later making transcripts of these narratives available to them. By reading and reflecting on these transcribed narrative-like interviews, participants could develop a critical understanding of their reality. Rapport (2000) discusses such narratives saying that they “represent a primary engagement of our understanding of the world, of experience, and ultimately of ourselves” (75-76). He adds, by creating narratives, people transform the “inchoate sense of form” in their experience and “transform the temporal and spatial fragmentariness” of their lives.

On a number of levels, this type of approach appeared attractive. First, participatory research is seen as empowering and democratic; it might enable me to avoid treating participants as objects of investigation (Freire, 1970b, 88). Second, as a researcher I realized I shared an environmental agenda with some clam farmers, a concern for sustained water quality and quantity. As the immediate area and the land in the upstream watershed continued to develop, aquaculture could prove as impossible here as it had for water farmers in other areas of Florida (personal communication, informant, June 2002). Oyster Isles clam farmers might need to be better able to work toward water quality, and this research could provide a partial means of promoting such action (Rappaport, 1979).

On other levels, this approach appeared disconcerting. First, I was not sure how participatory even the best-designed study would end up being. Would individuals feel participation was a waste of their time? Would I be able to involve participants sufficiently? Would they bother to read and reflect on the transcribed interviews? Second, I wondered whether my participation in the study was even proper. Hammersely (in Stavenhagen, 1971) states “that to engage in ethnography in pursuit of any other goal than the production of knowledge is unethical” (347). After serious reflection, I realized that by questioning individuals about their environmental learning I would promote critical reflection even if promoting such reflection were not my intention. I as researcher would end up affecting the reality whether or not that had been my intent. I also knew from the informal pilot study that a number of other individuals were talking about the issue of water quality and had been working with local organizations to ensure sustained water quality.

The next hurdle was finding a place where I could stay. Not only did I need a place for an extended period of time, I also needed one where I could occasionally come for weekends, meetings, or other events. The town had become somewhat of a tourist area, with restaurants and motels priced above what I as a graduate student could afford. The alternative was camping but I didn’t feel would provide the necessary security or air conditioning. Florida summers can be rainy and hot.

Maxwell (1996) talks about the difficulty of living arrangement during one of his studies of an Inuit community. He says the ways in which this arrangement was negotiated made it difficult for him to develop working relationships with those families with whom he did not live. I realized in the small community of Oyster Isles where there were only a few distinct family groups this could be a problem. I was extremely
fortunate. One day while I was asking at the hardware store about the possibility of renting a room in someone’s home, a former university professor approached me. This contact led to many others and a verbal agreement for a small, furnished apartment. The owners, relative newcomers to town, were respected for their contributions to and care for the community. Their status provided me with a relatively bias-free location.

The pilot study also revealed that within the clam farming community of practice there were former fishermen, former oystermen, former crabbers, and combinations of these, as well as a number of individuals who came from other backgrounds and other communities. The latter group included individuals who had prior fishing experience, experience with wild or domestic clams, and some who had no former experience on the water besides recreation. Some of these individuals appeared to have linked into existing social groups. Others formed new social groups as a result of their professional interests.

Once I decided that learning interviews were essential, I began reflecting on additional research methods that could be combined in order to produce a meaningful understanding of the participants’ reality for outsiders. Since communities of practice are organizational systems, I decided to take the advice of Bogdan (1972) who writes about the value of participant observation in such settings. He advocated observation over a prolonged period of intense social interaction during which time field notes are unobtrusively and systematically collected (3). During the course of fieldwork and analysis I would begin to employ other tools to clarify my understanding of the learning process and create “thicker” data (Geertz, 1994). These included document analysis, use of maps, some limited direct participation, concept maps, Microsoft Excel® spreadsheets, and timelines.

Fieldwork

The Research Site

Oyster Isles is a small town located along Florida’s Gulf Coast. It has a full-time population of about 800, a history of European settlement that dates back to the mid-1700’s, and an economic base that has recently changed from primary dependence on wild harvest (fishing, oystering and crabbing) to shellfish farming. The site is more completely described in Chapter Four.

The Role of the Researcher

I planned – as Bogdan (1972) advocates – to blend unobtrusively into the research scene. However, I realized that my role as researcher had to be clear. I determined to introduce myself and explain my role in the community. I said I was a doctoral student from Florida State University conducting research for my dissertation. When asked about the topic, I answered as directly as possible, saying that I was trying to understand how people learned about their environment and attempting to ascertain whether people were acting differently towards their environment as a result of their new livelihood,
aquaculture. I also wore a hat or shirt with the university logo until people in the community were familiar with me.

During the period of data collection, I lived in Tallahassee, Florida, the state capital, and traveled to and from Oyster Isles for extended weekends, vacations, and an eight-week period in the summer and early fall of 2001. In addition, I traveled frequently to the area for relevant meetings and conferences. The total amount of time spend in the community was about eight months. During this time, I observed members of the larger community and clam farming community of practice and conducted more than 160 interviews.

Over the course of the study, I established a number of relationships with different individuals within the larger community and clam farming community of practice. Many of the participants helped provide materials for me during the course of fieldwork (maps, documents, photographs, etc.). And, while I am fully responsible for the data that are presented here, many of the participants read their transcripts and assisted informally with an analysis of the data. In doing so, many directly and indirectly helped answer some of the research questions and reached conclusions about their learning processes. Their feedback not only gave me a greater perspective and understanding of the data, but also allowed them to think more critically about their situation.

Establishing and Maintaining a Working Relationship

During the first week, I visited shops, clam farming establishments, research facilities, and spent time walking the town and talking informally to those I met. As a subtle eavesdropper, I closely listened to, watched and recorded daily events in field notes and memos. I drove through surrounding areas and occasionally took a motorboat or kayak into the surrounding waters. During this time, I established rapport and became aware of the local culture, and themes of importance in conversations, at least as they presented themselves to the observer.

Maxwell (1996) states that “the researcher is the instrument of the research, and the research relationship is the means by which the research gets done” (66). Bogdan (1972) says it is sometimes necessary to establish one strong relationship first (24). Early on I was fortunate to establish several relationships that anchored much of my research. These relationships allowed me to understand some of the cultural expectations and worldviews of the area, something that became crucial to the sequencing, timing, and locating of interviews (choreography). These relationships were with four women. Two were islanders and two were relative newcomers to the area. Over the course of the field study, they shared much of their lives with me and assisted with field research when they could. They supplied documents, sometimes helped arrange interview sessions, and frequently offered the use of their homes and/or offices. I am indebted to these women, especially those who continued a relationship with me via email.

Through candid conversations with these women, I found that the former fishing and oystering communities of practice, the newer clam farming community of practice, and the greater community were divided along gender lines, the former two with more clear-cut divisions, and the latter with more fluid ones. This understanding enabled me to tread carefully from the beginning, so as not to alienate different members of the community.
I also realized early into the study that I was inextricably part of the phenomena I was studying, something Hammersley and Atkinson (1983) term *reflexivity*. This understanding was brought home on Mother’s Day when I decided to purchase two pieces of coastal wetland property on sale as part of a new development. It was a tempting opportunity. The real estate (at least in the dry season) was beautiful. The developer’s slick brochure was enticing. Residents would have waterfront views, share beach access, and be protected by certain development restrictions. Most importantly, the price was within my budget. I looked at two side-by-side lots, signed a contract, and for the next two days was beset by doubts about how ethical my actions had been. I understood that coastal development in wetland areas, especially those developments with septic tanks, were eventually detrimental to estuarine water quality. By buying the property, even without the anticipation of building, I had placed myself in a position where residents could question my research motives and the very integrity of my research results. Several days later, I returned to the developer and asked that I be released from the contract, and he agreed to my request. That vivid experience placed all my dealings with community members in a new light. Bogdan (1972) says, “Ideally, the researcher is perceived as a neutral figure, having no special alliances with any subject in the situation and having no relationship outside the situation, which might hurt the subjects” (21). I was able to ensure the latter did not occur but the former was more difficult. Over the course of the research, I developed several friendships. Maxwell’s comment about these relationships being complex and changing proved very true. The demands of my job combined with analysis and writing have made it all but impossible to maintain these relationships the way I would like to have done.

Data Collection

I used a variety of methods to acquire data. These included use of documents, maps, interviews, participatory observation, some limited direct participation, and the writing of field notes and reflective memos. A number of university libraries, private collections, and local museums provided a great deal of background information. The Institute of Food and Agricultural Sciences (IFAS) and the sea grant office at the University of Florida provided me with survey information and valuable publications. In addition, I met briefly with the local cooperative extension agent and a number of state employees in the Division of Aquaculture of the Florida Department of Agriculture.

Sampling

Because of the nature of the investigation, I selected my group of interviewees purposefully. My first interviewees volunteered because of their interest in the study. They shared names of other individuals who once interviewed shared names of others. As I became aware of the balance I needed in my sample group, I began looking for specific types of individuals and called upon them directly. Not only was the clam farming community of practice divided along gender lines, there were individuals who previously had been members of other communities of practice (fishing, oystering, crabbing, wild clam harvesting, etc.), and there were insiders (native islanders) and outsiders (newcomers to the area).
The informal pilot study revealed that there were a number of diverse social groups that comprised the Oyster Isles clam farming community of practice. I expected that interaction within and between these groups and their links to other groups and individuals in the community fuelled the informal environmental learning process (Checkland & Scholes, 1990; Wenger, 1998).

Here again, the informal pilot study had been helpful for early on I had learned that there individuals in Oyster Isles are involved in a wide variety of roles within the clam farming community of practice, from bag makers to marketers of the final one-inch or 7/8-inch product. I also had realized that the community of practice and the larger community had a synergistic affect on one another. These conclusions led me to include a wide variety of individuals in the sample. These included local developers, storeowners, former clam farmers, wives of clam farmers who were involved in peripheral activities, hoteliers, scientists working with environmental management issues, as well as those involved in the variety of specialties in the clam farming community of practice.

I had originally anticipated interviewing only about 40 individuals; however I found that in order to saturate categories, detail a theory though the use of open coding, and develop as complete an understanding of social interaction, I had to interview more. The total sample size ended up at 71⁴⁴, but I spoke with and learned of many other individuals during my time on the island.

To ensure that I had a sample that reflected the diversity of the community, I first looked to include equal numbers of insiders and outsiders, men and women. The insider/outsider issue was key to understanding the process of legitimate peripheral participation (Lave & Wenger, 1991). Interviewing equal numbers of men and women was important if I was to understand how different household and community responsibilities, labor obligations, rights of access to and control over specific resources and products, knowledge and decision making authority played into the learning process (Rocheleau, Thomas-Slayter & Edmunds, 1996, 63-64). It seemed obvious that if knowledge were gendered, the learning process would be as well (Nazarea, 1999a, 1999b).

As I discovered that social interaction patterns differed between those who had previously worked as fishermen or oystermen and those who worked in different specialty areas, I worked to insure that I interviewed equal numbers of each group. These different sub-groups appeared to have varying levels of involvement in clam farming and played different roles in the community. Because “members of organizations…tend to see the world in a particular way...(and) to attribute at least partially shared meanings of their world,” ensuring that I interviewed these would probably give me insights into how different roles, rights, responsibilities affect learning and how social interactions affects such learning (Checkland & Scholes, 1990, 2). It also ensured that I captured the heterogeneity of the population and illuminated differences between individuals and social groups (Guba & Lincoln, 1994; Maxwell, 1996; Miles & Huberman, 1994).

⁴⁴ Of these 71 individuals, only 47 participated in the initial, semi-structured interview. The remainder were involved in minor interviews which provided background information and triangulation.
Interviewing

I planned to interview about 40 individuals in person twice. Face-to-face interviews allow the interviewer to establish better rapport with the interviewee, allow the interviewer to observe the interviewee, and allow more complex questions to be asked (Patton, 1987). In three cases, I was forced to conduct phone interviews. The first round of interviews would be semi-structured lasting between one and a half and two hours. The first interview would provide a means for discovering how people felt they had learned during the time they had been involved in fisheries. It would also provide a time for participants to reflect. It had a series of pre-established questions that allowed for variation. All questions were basically open-ended so as to elicit stories and personal experiences (Patton, 1987). A copy of the interview is in Appendix A. The questions were asked in the order they were written in order to increase the comparability of responses. The order of the questions was determined by the natural flow of dialogue and meant to encourage participation.

The initial one-and-a-half to two-hour semi-structured interview took the form of a modified life history, a genre developed by ethnographers in the early 1900’s to illuminate cultural, historical, and social facts (Dunaway & Baum, 1996). “Life history is any retrospective account by the individual of his life in whole or part, in written or oral form, that has been elicited or prompted by another person” (Watson & Watson-Franke, 1995, 2). Oleson found that life history interviews “exposed a close interrelation between professional learning and personal development…” (Olesen, 2000, 1). I felt this narrative history would give me a sense of how participants saw events occurring over time.

These learning history interviews were modified life history biographies. Epistemologically, they were a good match for the informal learning process as they are based on the sociological tradition of symbolic interactionism where meaning is viewed as a social creation achieved through human interactions mediated by language or symbols (Blumer, 1969). As an interview progressed, I was able to probe as to what meaning or significance individuals placed on an event. This is what Wenger (1998) refers to as reification.

These learning narratives allowed “social actors (to) retell their life (learning) experiences…(Coffey & Atkinson, 1996, 55). These stories provided “insight into the characters, events, and happening(s) central to those experiences” and provided “information about the perspectives of the individual in relation to the wider social grouping or cultural setting to which that individual belonged” (Coffey & Atkinson, 1996, 77). The interviews also opened an understanding of ‘voice,’ which is a product of local structures and traditions (Marcus, 1998, 66). They were “based on a fundamental assumption of cognitive psychology: that to understand how people put to use what they know in what they do, one must first of all seek to understand what they know” (Atran, 1999, 192).

When I made arrangements for an interview, I introduced myself as a researcher and explained the purpose of my study. In the case of a participatory study, I thought that having the intent on the table was the only ethical approach. Most individuals approached agreed to both interviews, though some were taken aback by the amount of time the first might take. Some individuals were very hesitant about being included in the study, but by the time I had finished about 30 interviews, I found almost everyone offering to help. No
participant complained about the amount of time after the interview process was underway and some interviews lasted three hours. Many times an interview involved the semi-structured format and ended with the participant showing me his or her clam farming operation. On several occasions, an interview was extended to another time and I was asked to go out to the lease site, the raceway, or come back to the office for additional information. Interviews began in the late spring and summer of 2002 and continued intermittently through mid-2003.

Before beginning an interview, each participant was informed: of the purpose of my research; of how I planned to use the findings; and that I was going to return the transcript of the first interview to them and follow up at a later time with additional questions if necessary. I also had them sign a consent form provided by the university and assured that that their identity would be kept confidential. (See Appendix C.)

By the time I began interviewing, I had choreographed interview sequences. I had decided to meet with women first and then men. I also had decided before interviewing that I would begin with insiders first and then start to meet with outsiders. I felt that if I, as an unattached woman, were to start interviewing men first, I would not be trusted by women, and if I began with outsiders, I might never develop trusting relationships with insiders. I also decided that I could interview women in the apartment I had rented but that it would be unseemly to meet alone with any of the men in that same way. Early on, I had found that there were several places where I could interview outside or in a restaurant setting where there was an electrical outlet for my tape recorder. Unfortunately, many of these interviews had annoying background noise and were difficult to transcribe. At other times, situations dictated that I interview individuals at their workplace. This worked fairly well except for one recording where the wind made conversation almost too difficult to transcribe.

Occasionally, I was able to interview more than one individual at once. In retrospect, these were some of the most valuable interviews. When I realized this, I began searching out opportunities to meet with more than one person at once, even if I could not tape record the session. These interviews allowed for dialogue where many times I realized participants were negotiating meaning of past events or critically reflecting on the how’s and why’s of a situation. (Meeting with husbands and wives together, however, frequently proved not as valuable; sometimes one voice and perspective colored the interview.)

Community leaders, scientists, and government employees were the last stakeholders interviewed. I felt that if they were interviewed earlier their perspectives might bias the research.

Early in the interview process, I found that a number of the questions that shed light on learning events had been saturated but several other issues were appearing as a result of memoing. I modified the interview, omitting some questions and adding others. Those that were added dealt with how one group or social network appeared to look at another or how this or that group appeared to perceive and treat the biological, physical and social environment differently than another. Miles and Huberman (1994) state that complex social phenomena require “highly inductive, loosely designed studies” (17). Learning is one of these complex social phenomena.

45 When data become saturated, no new information that adds to the researcher’s understanding is emerging (Creswell, 1997).
After the first interview with a participant had been completed, I transcribed it. This process was extremely tedious. I listened to the tape completely first and then began typing it, starting a new line every time a speaker paused or a new speaker began to talk. Different voices were indicated by different type styles, bold, italic, normal, and underlined. By transcribing every tape in this manner, I began to develop a sense of the rhythm of the language and common word use. While I have not conducted a discourse analysis, this more general analysis enabled me to clearly see differences between some insider and outsider groups and some family groups. In addition, “how social actors retell their life experiences as stories can provide insight into the characters, events, and happening central to those experiences” and how the chronicle is told and how narratives are structured can “provide information about the perspectives of the individual in relation to the wider social grouping or cultural setting to which that individual belongs” (Coffey & Atkinson, 1996, 68). It is important to remember that oral narratives are a form of performance and as such they are “situationally and institutionally contextualized” providing and understanding of the local (77).

When the transcript was complete, it was returned to the participant. “As adult learners improve their critical thinking, they are better able to recognize assumptions and beliefs, make sense of the complexities in their lives, and understand major societal influences” (Candy, 1991; Jackson & Caffarella, 1994, Merriam, 1993, Merriam & Brockett, 1997 in Dominice, 2000, 5). I hoped that these transcripts would allow adult learners to do this and to critically reflect on their reality and be more apt to take action. Every participant handled this process differently. Some quickly skimmed through the transcript. Some felt that it was not necessary to bother reading it. Others read them very carefully, checked them for errors while still others began to feel very uncomfortable with some of the personal information they had shared. There was a fear others would recognize who they were by what they had said and might treat them differently. If this information were not handled very carefully, I felt their fears would be realized. I had assured them that I would guard their anonymity.

The second follow-up interview took place after the first interview had been transcribed and returned to the participant. It was much shorter than the first and fulfilled two purposes. The first was to fill information gaps encountered in an analysis of the first interview. The second was to further discuss the last three questions of the interview which elicited thinking about whether or not individuals felt or acted differently toward the natural environment, the community or themselves as a result of their learning about the social and biophysical world. (See Appendix A.) During this interview, I shared general results from my initial analysis with informants and reiterated the purpose of the study. I felt this discussion might further promote critical reflection and action. During the course of the study, critical reflection and conscientization did occur. Whether or not this was as a result of my interviewing and interaction or a larger part of the learning process is not known.

Corrections in the transcription or concerns about the interviews were also addressed. Sometimes these interviews were very brief; a participant felt it unnecessary and had no time. Sometimes there were no gaps in the first interview and the participant had no corrections or problems with the transcript of the first interview. At other times multiple follow-up interviews took place. The subsequent interviews were transcribed but
were not shared with participants. Not only were these interviews quite short, interviewees did not seem to feel that they had the time to review them.

One inherent problem with such interviews is the uncertainty of memory. Informants readily admitted they were not sure of dates. It also appeared that negative events were given less importance and positive ones took precedence. Becker (1991) points out that these life histories can give the impression that life, and in this case learning, is linear while this is not the case. The narratives that resulted from such interviews have to be understood as human attempts to organize experience and make sense of life (Rapport, 2000).

There were many advantages of such interviews. I was able to build a great deal of rapport and learn about things I should more closely observe. In addition, many individuals were made aware of their learning. Frequently a participant would remark that they didn’t know they had learned so much. Some conclusions that resulted from reflection included: “Diversification would be a good idea,” and “Maybe I shouldn’t plant so many clams at once.” These conclusions will be discussed in much more depth in Chapter Five.

Approximately 70 people were interviewed for the study. About half of these were individuals who had resided in the area for more than ten years and about half were women. Of the 70 interviews, about 17 were with individuals who had previously been involved in the fishing community of practice, 17 were with individuals who had previously been involved in the oystering community of practice, about four were with individuals previously involved in wild clam harvesting, above three were involved in crabbing, about the remainder were either individuals from other miscellaneous communities of practice who had become clam farmers or worked at the regional or state level in policy positions or academia.

Taking Field Notes and Memoing

Throughout the research period (informal pilot study and formal research period), field notes of daily observations were made and typed for later analysis. These provided details of daily observations and experiences. Reflective memos were also kept. Memoing was begun during the informal pilot study as I attempted to understand how learning might be occurring so as to best design my study. Memos kept during the actual fieldwork period provided reflective information and opinions that served as a form of interim analysis (Creswell, 1998). I found that these memos frequently allowed me to fine-tune interview questions. Early on, I realized that a number of interview questions were not yielding any information. I began to change these and added others. The ongoing memoing also shed light on the changing paradigmatic frameworks of shellfish farmers and their neighbors in the larger community.

Observing

Bogdan said participant observation was “research characterized by a prolonged period of intense social interaction between the researcher and the subjects, in the milieu of the latter” (1972, 3). This interaction and observation would allow the researcher to begin to see the world as they conceived it (Bogdan, 1972). These observations began
during the informal pilot study and continued throughout the period of analysis whenever I returned to the field site. Many observations did not appear valuable at the time, but without the notes and memos that had been kept, I feel I would have lost a valuable means of furthering my understanding of community learning.

Some limited direct observation was employed. For about one year, I attended town meetings and occasional county commissioner meetings. I also was fortunate to be involved on a limited basis with raceway operations\textsuperscript{46}, clam harvesting, planting, cleaning and packaging.

Data Analysis

The process of analysis began when the research was first being considered and continued throughout the organization and writing of the results. As Martin and Turner (1986) state, analysis is a process of open-ended exploration followed by continuous verification and fine tuning. As information continued to be gathered, validated and analyzed, sometimes simultaneously, new hypotheses and additional areas from which data should be gathered continued to arise.

Coding Data

Analysis of field notes, memos, interview transcripts, meeting notes, and newspaper articles, and policy documents was done using the constant comparative method advocated by Martin and Turner (1986). This method is based in grounded theory (Glaser & Strauss, 1967). All materials were entered into an Atlas Ti© database. Within this database, I was able to use open coding and write memos that focused on these codes. Because of my lack of experience with Atlas Ti©, I eventually resorted to printing all memos and related data pieces that were related by code. These were broken into finer categories and another set of memos was written. Having hard copies of all data chunks that corresponded to a large concept at my fingertips, enabled me to begin comparing and sub-categorizing related data. It was at this point meaningful coding occurred. Sometimes I found a chunk would fall into two or even three categories or concepts. I re-labeled these categories, gave them numbers, and then started placing these numbers by chunks of data that seemed to fit each category. Then I began to think the categories through in more memos, constantly referring back to the collated piles of data chunks. Definitions of concepts took shape and the nuances of how the concepts fit together and were evolving became apparent. This time-consuming task provided a “rich picture” of how different people in the community and the clam farming community of practice perceived their surroundings, negotiated meaning making sense of their learning, and took action as a result of such learning. It enabled me “to make explanatory connections between this micro activity and broader cultural, political and economic processes” (Foley, 1999, 12).

Such methodology was necessary because of the multiple realities, perspectives, and worldviews that became visible and underwent a transformation over time.

\textsuperscript{46} Raceways are above ground trough-like containers shaded from the sun used to raise small clam seed to nursery-bag size. Often these troughs are lined with plastic or fiberglass. Small clam seed are placed in these troughs and saltwater is pumped through them. Periodically the seeds are cleaned to remove build up of algae or other foreign particles.
This study involved a detailed stakeholder analysis that included gender. To facilitate this I developed spreadsheets using Microsoft Excel©. The various stakeholder groups were disaggregated for analysis, by gender, by status and insider/outsider, by previous profession, by academic background, generally by socioeconomic class, by social interaction patterns, age, role(s) within the community of practice, and access to diverse resources. This information was then transferred into a graphic organizers (one for each stakeholder) using Inspiration©. The analysis was necessary to determine an individual’s patterns of interaction with the social and natural world (Thomas-Slayter et al., 1996, 300). Because this software program uses a variety of shapes and colors, it proved indispensable in an understanding of those conditions and characteristics that played a role in successful environmental learning and conscientization.

I had initially determined to do a detailed social network analysis. This proved impossible. Participants were not willing to share the details of their social networks to the extent needed. However, over time through numerous observations and conversations I was able to construct a general picture of social interaction. These maps took the form of individual matrices for variable analysis of stakeholders (Scott, 1988, 39). When they were filled in, information gaps became apparent, and I was able to follow up for additional information. These matrices do not appear in the appendices. I felt the information contained within them too easily identified participants.

Additional Forms of Analysis

A number of additional forms of analysis were conducted to enable me to better understand the data. First I constructed a timeline of general events since the mid 1700’s. This timeline became very detailed from the period stretching from 1985 to 2002. This timeline enabled me to understand the adaptive cycles of the larger community over time, identify correspondence in the adaptive cycles of different communities of practice, and place an individual’s learning temporally. This timeline was correlated with maps of the island and surrounding lease sites. Conditions at different lease sites vary substantially (water depth, bottom, salinity levels, etc.). Conditions at individual lease sites also vary seasonally. Having these maps enabled me to better understand what participants were talking about in their modified learning histories and to whom they were working in close proximity.

Finally aerial maps of the area enabled me to develop a greater understanding of social and biophysical interaction. Because learning is a result of such interaction, it was important to develop an understanding of these patterns.

Generalizability

This case study was not undertaken just to understand the process of informal environment learning and conscientization in a particular clam farming community. It is hoped that as an instrumental case study, it may provided insight into some of the conditions (biophysical and social) and characteristics (individual) that promote informal environmental learning (Stake, 2000, 437). If a substantial number of case studies are
gathered which look at a similar phenomenon having somewhat similar characteristics and under somewhat similar conditions, and analyses of these reveals common patterns, these case studies may prove valuable in advancing the theory of panarchy developed by the Resilience Network (Gunderson & Holling, 2002).

Validity and Reliability

Qualitative studies, which rely on the researcher as the primary tool are essentially subjective (Wolcott, 1975) A study of learning is essentially phenomenological. Such studies rely on how informants in interaction with others and with the world construct reality. It is this construction of social reality that further complicates the issue of researcher subjectivity. For this reason, a narrative, action research approach was chosen. This approach allowed participants’ voices to emerge as they discussed their learning experiences and dialogued with the researcher. This essentially determined the content of the analysis.

Truth should not appear to be an issue in a study of this type. However, as the relationship of the researcher with informants’ changes, “truth” may change. By keeping track of field notes and memos by date throughout the project, some differing information emerged. I credit this to changing relationships.

Triangulation, the process of using multiple perceptions (sources) to clarify meaning, verifying the repeatability of an observation, were important in the study interpretation (Stake, 2000, 443). This procedure helped in acquiring a more complete understanding of the roles actors played, putting the informal environmental learning issue in perspective and thereby improving the quality of the data.

As previously mentioned, participants who were recalling the past as they talked about how they felt they had learned, were not always sure of precise dates. As a result, I have triangulated dates from a variety of sources to place events in a sequential order. Memories are recalled for reasons that are important to someone – the speaker, the interviewer – in large part because of present contextual definitions of what constitutes identity, society, and culture. “The challenge to us as researchers it to ensure that individuals are not the objects of our discourses, but rather the agents of complex, partial, and contradictory identities that help transform the worlds they and we inhabit” (Tierney, 2000, 545).

After the study had been written, it was shared with various interviewees who provided a member check.

Transferability

Validity, reliability and generalizability are positivist terms that developed during the reign of modern science. Social scientists felt compelled to fit the messiness of the human situation within parameters developed in the laboratory. As we moved away from dualistic, objectivist thinking to a realization that findings were subjective and co-created by the viewer and the viewed, the inquirer and the inquiree, instrumental case studies
became valued for the insights they could provide. Guba and Lincoln (1989, 2000) discuss the concept of trustworthiness. They say this concept provides a parallel criteria to validity and reliability. Trustworthiness has four dimensions: credibility, transferability, dependability, and confirmability or authenticity. Transferability is the rough parallel to generalizability. If a study provides thick description with both data and context, these authors think readers who are intimately familiar with another situation may determine that the findings of the study can be transferred. When the reader determines, upon critical reflection, that a described situation is congruent with his or her experience, he or she is led to a new practical knowledge that enables action in practice or policy or further research.

Conclusion

This chapter introduced the reader to the research setting and the study design. The pilot study which occurred during the pre-fieldwork period, was particularly valuable. It enabled me define my research questions and decide on the most efficient way of conducting the study. It also prompted me to do further reading and discuss issues with colleagues and professors. This process clarified the research process. As I began the formal study, I felt more secure in the role of ethnographer. This was particularly valuable. The focus of ethnographic research changes slightly each day. Sometimes it becomes blurry and at other times more clear. The definition acquired during the pilot study gave consistency to the work despite the occasional detours that inevitably were placed in my way.

The participatory process was difficult. Ensuring that the sample reflected the diversity of the community made me aware of the below-the-surface conflicts, resentments, hopes, and aspirations of the participants. In this chapter, I discussed some of the philosophical, ethical and political issues that I faced. These continued through the process of analysis and writing, and remain today.

While day-to-day memoing and reflection was a relatively easy process, analyzing the massive amounts of data that resulted from document collection, mapping, interviews and meetings was particularly difficult. This material was all transcribed and placed in a database. Analysis was time consuming; I spent hours focused on the database, and hours more reflecting on the emerging results while involved in other tasks. The positivist concepts of generalizability, validity, and reliability were bothersome. Coming from the standpoint of natural science, I felt insecure with the idea of applying a conclusion from one study to another. On a deeper level, I had an innate understanding that we, as humans, do this daily – some of us with more success than others. I began noticing how successful inquirers applied their personal results from “case studies” to their next life task. Lincoln and Guba’s (2000) time-line like discussions increased my intellectual comfort level with this process. The next five chapters are written to provide the readers/inquirers with thick, authentic data and context with the hope that they can extend and reflect on their personal, congruent experiences and knowing and come to a greater understanding of the situations that they are researching, practicing in, or developing policy for.
CHAPTER 4
OYSTER ISLES IN SPACE AND TIME

Introduction

In this chapter, I present a contextualization of the research site in space and time. This contextualization provides background for a short discussion of aquaculture, clam farming practice, and some of the challenges facing the area. By situating the larger community of Oyster Isles, the four small communities of practice that existed prior to clam farming, and the clam farming community of practice both spatially and temporally, I have linked the metaphor of the four-phase adaptive cycle to community of practice theory.

The theory of panarchy developed by the Resilience Network and Holling et al., (2002a, 2002b) facilitates the understanding of transformations of human and natural systems. Its advocates integrate systems theory, talk about adaptive cycling, and explain conditions that affect these cycles (potential, connectedness, and resilience). Lave and Wenger (1991) see communities of practice as systems and look at these systems temporally and spatially. However, they do not seriously consider scale nor do they focus on the impact that one system can have upon another. Holling et al., (2002a, 2002b) and others (Allen & Starr, 1982; O’Neill, DeAngelis, Waide & Allen, 1986) see systems as existing in hierarchies, “transitory structures maintained by the interaction of changing process across scale” (75). Holling et al., (2002b) explain that these hierarchies are not understood as rigid, top-down-only systems but as systems nested one within another that affect one other from the bottom up and from the top down. They explain, “when a level (a system nested within another system) in the panarchy enters its…phase of creative destruction and experiences a collapse [decline], that collapse can cascade up to the next larger and slower level by triggering a crisis…” (75). By looking at learning within communities of practice using Lave and Wenger’s descriptions of these systems and combining their descriptions with the panarchical model, conditions and characteristics of social and environmental interaction that influence learning can be better understood. (See Figure 3.)

\[\text{Scale}\] refers to the rate of speed of an adaptive cycle. For example a geological system operates at a much slower rate than a human system (Holling et al., 2002b).
This spatial and temporal contextualization is presented from an etic and an emic perspective, using documents, observations, and the voices of participants. Because Holling et al., (2002b) explain that systems nested within other systems affect each other from the bottom up and top down, and because many natives of Oyster Isles consider Oyster Isles the “real world,” I organize the chapter considering Oyster Isles the core and not the periphery.

The chapter is organized into two sections. The first section is a spatial contextualization of the area. It situates the research site and provides the reader with a sense of geography and a general understanding of some of the challenges facing the area as a result of globalization. The focus is on the larger community of Oyster Isles, but other communities are briefly described to enable the reader to understand connections with other systems that are operating at different scales (i.e., communities of practice, larger community, county, watershed, state, nation).

The second section is a temporal contextualization of the area from the 1850’s until 2002. The larger community is reviewed first. This discussion is followed by overviews of four communities of practice that existed and declined prior to the clam farming community of practice and emerged and organized as the clam farming community of practice. The clam farming community of practice is considered last. Within this section of the chapter there is a brief overview of aquaculture and the practice of clam farming.

This spatial and temporal contextualization provides readers with a sense of the patterns of adaptive cycles – periods of reorganization, organization, conservation, and decline. Readers will find that a number of systems overlapped and that some were
embedded, one within another. This is particularly true of communities of practice nested within the larger community. These communities and communities of practice were constantly in a state of flux. They expanded and diminished in size as varying social and environmental systems affected them. They also cycled through the four phases at varying rates as the result of their interaction with the environment. For example, as stocks of oysters diminished, some oystermen began relying more heavily on mullet fishing, placing more pressure on this stock. As a result, the oystering community of practice shrunk while the fishing community of practice grew.

How connectedness in the area has increased and decreased over time affecting the resiliency of different systems is also discussed. Holling et al., (2002b) give a biological example of resiliency. They explain that if connectedness is low, an organism or system may be more resilient. An example of system with low connectedness would be that of a vegetarian-based system (organism) that could survive by relying on other plant sources after one of the plants in its diet becomes extinct. An example of a system with high connectedness and lower resilience would be a vegetarian-based system that became extinct after the only plant in its diet disappears. Lower levels of connectedness (less dependence on other systems and broader bases of social networks) may provide a key to understanding why systems collapse.

Spatial Contextualization

Oyster Isles

The keys or islands of Oyster Isles lie along the northern Gulf Coast of Florida in an estuary formed by the outflow of several rivers. The islands are surrounded by marsh, tidal inlets and flats, and oyster outcroppings subject to two full high and full low tides per day (Fernald & Purdum, 1998). Several thousand acres of publicly controlled land surround the islands. Limited acreage, including some smaller keys and surrounding coastal land, is held privately.

The Estuarine Area

The estuary where the islands are located is situated on the edge of a large water management area. The largest river in that area, fed by hundreds of freshwater springs and numerous smaller rivers, deposits an average of 11,000 cubic feet per second into the Gulf of Mexico. The river has its headwaters in a large swamp to the northeast (Fernald & Purdum, 1998).

Estuaries are some of world’s most diverse and productive ecosystems (NOAA, 1990; Odum, W., Odum, E. & Odum, H., 1995; Weber, Townsend & Bierce, 1992). The ability of estuaries to function as nursery grounds depends upon the quantity, timing, and location of freshwater inflows. Estuarine ecosystems can be adversely affected by humans, primarily via upstream withdrawals of water for agricultural, industrial, and

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48Resiliency, the result of high levels of potential and mid to low levels of connectedness, is discussed in-depth in Chapter Two.
domestic purposes, and contamination by industrial and sewage discharges and agricultural runoff carrying pesticides and herbicides; eutrophication\textsuperscript{49} caused by excessive nutrient inputs from a variety of non-point (i.e., agricultural drainage, faulty septic systems) and point sources (i.e., sewage treatment and manufacturing plants); and habitat alteration (i.e., construction and dredge and fill operations). Common effects of human use of estuaries include degraded natural habitats declining plant and animal populations, diminishing fish and shellfish harvests, and impaired water quality. (USEPA, 1994a).

In some areas, estuaries are unable to safely assimilate the pollutants caused by increased population being added to the system and become adversely affected (USEPA, 1999, 5-6). “Altered freshwater inflow indirectly affects the metabolism, reproduction, and migration of fish and shellfish as well as other organisms that inhabit estuaries” (13). “When sediments, sewage, or fertilizers are introduced into an estuary, the concentration of available nutrients can increase beyond natural background levels, resulting in a condition known as eutrophication” (16). Increased nutrient concentrations can result in red tides\textsuperscript{50}.

The Watershed

The water management district where Oyster Isles is located covers approximately 7,500 square miles of some of the least populated and poorest sections of north central Florida (Fernald and Purdum, 1998). According to these authors, growth in the past decade came in the following forms: development of homes and land by retirees and second-home buyers and an increased number of dairy, chicken, and row crop farms. The southern sections of the area have high concentrations of center-pivot irrigation systems that tap the Floridan aquifer\textsuperscript{51}. Much of the coastal lowlands is held by timber companies and was planted with pines (Fernald & Purdum, 1998). There are several major urban centers in the area.

The Gulf of Mexico

The waters from the entire water management district feed into the Gulf of Mexico. The Gulf is a diverse, productive, and extremely valuable marine resource utilized and managed internationally. Marine shipping, fisheries\textsuperscript{52}, tourism, and oil and gas production are worth tens of billions of dollars a year. As growth increases along its rim which stretches from the Yucatan Peninsula north and around to the Florida Keys, so

\textsuperscript{49}Eutrophication is “the process by which a body of water becomes enriched in dissolved nutrients (as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen (The Merriam Webster On-Line Dictionary, 2003).

\textsuperscript{50}Red tide is the common name for a phenomenon marked by very fast growths of phytoplankton in ocean waters. In Florida, red tides are “caused by blooms of dinoflagellates that produce potent neurotoxins. These neurotoxins cause extensive fish kills, contaminate shellfish and create severe respiratory irritation to humans along the shore” (The Harmful Algae Page, n.d.).

\textsuperscript{51}The Floridan aquifer is one of the several underground rivers supplying water to Florida’s residents (Fernald & Purdum, 1998).

\textsuperscript{52}In Oyster Isles, fisheries industries have included fishing, oystering, sponging, crabbing, turtling, shrimping, and sponging.
do the anthropogenic impacts on the Gulf’s ecosystems. The populations of coastal counties along the United States section of the Gulf grew by more than 30 percent between 1970 and 1980, and another 16 percent between 1980 and 1990. According to projections by the U.S. Department of Commerce, the Gulf’s total coastal population will increase by 144 percent between 1960 and 2010, to almost 18 million people (USEPA, 1999). A growing population requires land and that expansion leads to the conversion of wildlife habitat and agricultural areas to urban areas. Expanding impervious surfaces associated with urbanization (parking lots, roads, etc.) will put pressure on the receiving waters that have to assimilate additional storm water runoff. A growing population also generates more wastewater and solid waste. These require disposal and increase the emission air pollutants. These pollutants are deposited on surface areas and can enter receiving waters via storm water runoff. As growth increases, so do anthropogenic impacts on the Gulf’s ecosystems.

Oyster Isles is located in one of the most pristine remaining estuaries in the state of Florida. It provides a nursery area for hundreds of marine species. The watershed surrounding it is one of the least developed in the state but is facing unprecedented development pressure in the years ahead as the state continues to be one of the fastest growing areas in the United States. This growth presages unprecedented transformation of both human and natural systems in the years ahead. An understanding of how human populations successfully learn could benefit planners, policy makers, and developers as they work to increase the resilience of area communities.

**Temporal Contextualization – 1850 to 2002**

The Larger Community

Along the shallow near-shore waters of the Gulf in Oyster Isles, far from the closest city, you are in a different world, one where much of life and work is governed by the tides and the weather. One older woman born and raised on the island said, “Three generations ago people came in with horse and buggy. They would ford the water at the...bridge...and if you wanted to go back out you waited for low tide.” Men talked about setting their nets across a cove and waiting for the tide to fall. Some recounted how sometimes in the middle of a storm, with a wind shift, they’d leave the house to take care of a boat. It is a place where people depend closely on one another for their survival.

Many residents trace their ancestors in the area back five, six, and even seven generations, to the time the area was first settled by Europeans. Some island structures that are still standing were built with material from the shell middens of Tocobaga and later Timucua Indians who inhabited the coastline as far back as 15,000 years (Bullen, 1900, 317-318). Fishermen launch their boats from eroding shell mounds and some islands retain their Indian names.

European settlements may have existed in the island area as early as 1750; but by the early 1840’s, Florida was part of the United States, and Oyster Isles had a post office and a lighthouse funded by the U.S. Congress. Until 1860, most connections with the
outside world were the result of boat traffic that either sailed in and out of the island port or traveled down river.

There are widespread stereotypes of isolated rural communities separated from urban centers, but “rural extractive industries (mining, logging, and commercial export agriculture) have long connected rural communities and major urban centers” (Thomas-Slayter et al., 1996, 293-294). In the early 1860’s, the growing trade in timber, turpentine, beef, salt, fish, oysters and cotton prompted the construction of a railroad. The railroad prompted additional investment and contact with the outside world. Through Oyster Isles, the region became a supplier for Southern troops during the Civil War. In a skirmish with Yankee soldiers, numerous vessels and the town’s wharves were destroyed. Despite this and a cholera epidemic, Oyster Isles became one of the busiest ports in the State of Florida. Sailing vessels and steamers connected the islands to Cuba, Tampa, and New Orleans. Trains ran regularly to the East Coast. The downtown boasted wooden sidewalks, a bustling wharf, and a 200-room hotel. The noted naturalist John Muir was drawn to the area and stayed a while as he made his way north from Cuba.

By the end of the century, with the destruction and disappearance of virgin stands of cypress, pine, live oak and cedar, exports slowed. As a result of the devastation of a massive hurricane and storm surge that destroyed many homes and local businesses, coupled with a yellow fever epidemic, the larger community began to decline. For the next twenty years, the diversity of the area’s population and its economy continued; but by the early 1920’s, as the world reeled from the effects of World War I, Oyster Isles’ economy was faltering despite a new factory. Racial tensions ignited; an African American community not far away was destroyed and many of its citizens killed. Ten years later, railroad activity ended. Oyster Isles was isolated briefly from the mainland except for boat traffic.

In the 1930’s amid the Great Depression, the state and federal governments built a road and a series of bridges to connect the island community to the mainland. This era marks the beginning of the adaptive cycle of reorganization. Additional funds from the federal government paid for the construction of a city dock and fishing pier. A bit later, an airport was installed. By the 1940’s, area fishermen came to hold a status like that of farmers; they were recognized as feeding troops fighting abroad and helping to feed a nation at war (Florida Fisheries Outlook, 1953). During the mid to late 1940’s, tourists began returning in greater numbers to the island and a new hotel was built, but over the next 50 years, fishing oystering, and crabbing provided the economic mainstays of the area.

Dependence on fisheries and other natural resources has fluctuated over the years. When one resource was plentiful and had a market, more individuals were involved in its extraction and when a resource diminished, people turned to other ways of making a living. One island fisherman reflected on the community’s past and said, “Used to this town was only fishing. Now of course over the years, the centuries, you had different things, like the…factory. But fishing has been there the whole time, fishing and oystering. And when all these other big businesses, you know, kind of went away,  

53 Hurricanes hit the Oyster Isles area every three to five years (Fernald & Perdum, 1998).
54 The Great Depression was a severe economic downturn that began in the United States in 1929 and lasted for approximately a decade.
because the manpower wasn’t here and the resource wasn’t here, 1940’s, about the time the war started, fishing held true, especially in the 50’s. It was a booming business.”

In early times, most islanders had depended upon rainwater gathered in cisterns for drinking water. Wells were usually brackish or smelled of hydrogen sulfide. Over time the situation worsened. When running water was installed it came from shallow island wells. In the mid-1960’s, an emergency report commissioned by the town found that private shallow wells on the island were in danger of contamination from the large number of septic tanks on the island. The report also mentioned that several businesses flushed their raw sewage directly into the Gulf.

The situation in Oyster Isles was similar to that occurring globally in the late 1970’s and early 1980’s. Growing coastal populations were reducing public access to the water and were increasing negative effects on the natural resource base (Lime, 1983; Pitt, 1989). Construction was also destroying wetland and marine habitats, and increasing pollution (Blobaum, 1981). As wetlands and estuaries, nursery areas for many marine species, were deteriorating and being destroyed, fisheries stocks were negatively affected (NOAA, 1990). All these processes were occurring as the worldwide appetite for seafood soared and fishing pressure increased (National Marine Fisheries Service, 2003).

In the late 1960’s, as the population of outsiders slowly increased, a comprehensive plan was written and the infrastructure of the town was upgraded. These upgrades marked another adaptive cycle of reorganization. Despite another hurricane that hit the island and destroyed area business in the mid 1980’s, a few of the outsiders who had been moving to the area in increasing numbers began investing in area development. In the next few years a three-story building was approved in the downtown area, the sewage treatment facility was expanded, and a developer received conditional approval to subdivide an offshore island and build approximately 40 boat slips (personal communications, informants, 2002). This latter action drew the opposition of a group of environmentalists and members of the Audubon Society led by a relative newcomer to the island. The group worked to save the island from development, the state opted not to run a causeway to it and instead designated it a conservation or preservation area, and the water management district purchased the island. That same year another comprehensive plan was adopted and a moratorium was placed on construction that would add septic tanks and increase storm water runoff into estuary waters (personal communications, informants, 2002). When plans were made to control storm water runoff, the water management district provided a grant.

Area development and improvements were accompanied by increases in the property appraisal rates and taxes. These increases began to force islanders, many of whom were making minimum wage, to reassess whether they could afford to continue paying taxes to live on the island. They were also tempted to sell by the large amounts that outsiders were willing to pay for their property.

One newcomer to the area, a motel owner, talked about the changes in property value. “I bought my place down here for $50,000 dollars with waterfront and…two structures on it. Now that was in 1988.” She explained that she had applied for a $40,000 mortgage and had gone to the local bank and they had asked, “Is any place in Oyster Isles worth $40,000?”

Another newcomer said, “When I came here, local people living in Oyster Isles (were) fishermen, clammers, crabbers.” She described the town saying, there were traps,
boats, and nets everywhere. “It was a typical fishing community. And that’s totally changed. Local people don’t live in Oyster Isles anymore. About the only way you can live in Oyster Isles is if you’re working with family property that’s been in your family for a long time.”

An islander reflected on the changes. “It’s not a retirement (town), but that’s what it’s turning into…a retirement city. And you know everybody that lives here, that grew up here; they’re not going to live here anymore. They’ll all move out of town.”

The next five or six years were a time of intense change for islanders as several small communities of practice nested within the larger community reached low points in their adaptive cycles of decline. Oyster harvesting was stopped because of pollution and shortly afterwards, commercial net fishermen were prevented from fishing by a voter referendum. As a result, two job-retraining programs were offered to these two groups, one from 1991 to 1993 and another from 1995 to 1997 (personal communication, informant, April 20, 2002). A more in-depth discussion of the above occurs in Chapter Five. During this period, many women took service jobs both on the island or in urban areas. Many of these jobs required that women drive long distances. As a result, many women ended up spending more time away from their families and community. At the same time, many men took odd jobs, from dock construction to engine repair, or began to work in other areas of fisheries, placing greater pressure on those resources bases still accessible to them. Many islanders who found themselves unemployed and financially stretched began selling property and moved inland, while newcomers and islanders with financial resources bought island land and built new homes or consolidated their holdings.

Meanwhile, work on closing down septic tanks and ensuring that storm water runoff did not flow directly into the estuary continued. Condominiums replaced abandoned fish houses and storage buildings. With the advent of clam harvests, the community stabilized financially. The reorganization of the clam farming community of practice marked the adaptive cycle of reorganization of the fisheries systems. People invested in new boats, trucks, and homes, many of these inland. They also began investing in small pieces of waterfront property to ensure access to the water.

When I arrived in the community in 1999, there was a population of around 900 residents comprising several diverse sub-communities. These residents spanned a wide range of social and economic backgrounds, from the unemployed to millionaires, from high school dropouts to retired university presidents.

Homes stretched from one end of the island to another. In the downtown area, there were fewer private homes and these were interspersed with businesses, motels, and city buildings. The eastern section of the island and areas north of town were more residential. Many of the homes belonged to year-round residents, islanders and newcomers. An almost equal number belonged to seasonal residents. The older homes in the historical district were wood frame, one- and two-story. Along some of the higher ground in the central section of the island there were concrete block homes, some of which provided subsidized housing. Most waterfront property was occupied by condominiums and newer homes, most on stilts to comply with newer, stiffer building codes.

The only businesses on the island that are chains were convenience stores. Other businesses were independently owned. There was one grocery store, one local newspaper
that produced both on-line and hard copy once weekly, a fluctuating number of clam processing houses, an automotive parts store, a hardware store, motels, restaurants, bars, one gas station, a marina with dry boat storage, a beauty shop, numerous real estate offices, gift shops, art galleries, and other small business. There was no doctor’s office, but there was a dentist’s office that was open several days a week. There was no movie theatre.

Other buildings on the island included some state offices for the departments of environmental protection and agriculture, an art center, two museums, a public library, city hall, fire station, a sewage treatment plant, the Lion’s Club, a woman’s club, a legion hall, and four churches. Approximately 300 children attended the local K-12 public school. Along a western point there was a small airport, and on higher land to the north a public cemetery. There is also a downtown public park and a county dock and marina.

There is a more public and a more private area of the community. Most tourists see only the more public areas of Oyster Isles. This includes the downtown area and sections along the highway coming into town. This area is where most of the businesses, including motels, restaurants, shops, city buildings, and public areas – the park, pier and marina, and a strip of beach where sunsets were viewed. The more private areas of the community include the residential/condominium area to the east and the historical and residential areas to the east and north.

Tourists are more likely to visit the island during the cooler months, especially during holiday periods. Summers are the slow season. However, it appears that residents feel tourism had been increasing – at least until after Sept. 11, 2001 crisis and subsequent increased economic downturn. On weekdays, the town is relatively quiet. Some clam farmers, charter boats and sports fishermen use the public marina. On weekends, however, the number of visitors increases. Recreational fishing traffic increases and the marina parking lot is be filled. Overflow vehicles park along all downtown streets.

Employment in town is limited to service industries, town and state positions (Department of Environmental Protection, Florida Marine Patrol, police, Department of Agriculture, and school teaching) and positions within clam operations. Most island residents are self-employed and many are retired.

One island woman said, “There’s not that many ways for women to make a living out here if you’re not an artist or a school teacher or somebody who can deal with the convenience store mentality.”

From 1850 to 2002, Oyster Isles has evolved through the adaptive cycles of reorganization (reorganization) to conservation many times. It is apparent that in the mid 1960’s, the larger community was beginning to re-emerge (reorganize) as several of the smaller communities of practice nested within it reached low points in their adaptive cycles of decline. It is interesting to note that the re-reorganization (reorganization) of the larger community predates the reorganization of the fisheries systems. The momentum to reorganize the larger community of practice appears to have positively influenced the reorganization of the fisheries community of practice as clam farmers.

Four Communities of Practice

This discussion focuses on four communities of practices. Two others – oystering and fishing – would partially collapse and reorganize or re-emerge as the clam farming
community of practice. The third is the crabbing community of practice. It is briefly discussed for three reasons: 1) crabbers periodically interacted with members of the oystering and fishing communities of practice; 2) crabbers appear to have been affected negatively by clam farming; and, 3) crabbers were beginning to join the clam farming community of practice toward the end of this study. The fourth community of practice discussed is that of wild clam harvesters. It is discussed because some members of this group, which had roots in the New York area, but more recently were working along the East Coast of Florida, joined the clam farming community of practice in Oyster Isles where they played influential roles.

As mentioned previously, communities of practice are always in a state of flux, expanding and diminishing in size as varying social and environmental systems influence them. When different communities of practice exist simultaneously, individuals may move in and out of a group and may be members in more than one system. (Structures of legitimation, signification, and domination, which will be discussed in Chapter Six, appear to have evolved to control membership in communities of practice and movement between and interaction within these systems.) Despite differences between these communities of practice, all those involved in fisheries were more similar to one another than they would have been to those working in land-based practices. Most participants agreed that their fisheries practices brought them together. Craig said, “The fishing heritage here; it seemed like we all had something in common.”

The Oystering Community of Practice

Oyster Isles oysters have been recognized as some of the best in the nation since the 1800’s (informant, personal communication, July 17, 2002). Oystermen (predominantly men) worked in small, shallow draft boats with wooden tongs and harvested oysters from flats. Before the advent of outboard motors in the late 1940’s, or early 1950’s, oystermen would pole or row out to the flats. Oysters were brought in by the bagful and either sold whole or shucked.

One former oysterman explained that there were two ways to harvest oysters. “One is with a pair of tongs. You stand on the side of the boat and put these tongs down and pick up oysters and put them in the boat. Or you can wait for a low, low tide and you can pick up oysters.”

Oyster beds were part of the commons, areas that were regarded as areas that could be accessed by anyone. “It was your oysters and my oysters and his oysters and his oysters, because they were in the gap and whoever combed them up first got them,” said one former oysterman.

During the early 1900’s and late 1890’s, oysters were the backbone of the area’s economy. In 1900, when a lumber operation on the island went out of business, it was converted to an oyster canning plant. In fewer than ten years, oysters were no longer available in the abundance required by the cannery and the cannery closed.

A few individuals attempted to re-seed the oyster beds. Their efforts as individuals resulted in the issuance of oyster bottom grants by the state. Subsequently, researchers at Florida State University had found that oysters could be farmed. Their findings did not result in commercial oyster farming probably because farming this crop was not deemed profitable. Wild harvest of oysters continued, principally in the form of
family-based operations where the husband would harvest oysters, while his wife would handle shucking, marketing, and bookkeeping. Perhaps, however, as a result of periodic shortages, the first seafood-related office in Florida was established in 1913 with the appointment of a shellfish commissioner. This individual was from Oyster Isles and his descendants still live and work that area’s waters (Florida Fisheries Outlook, 1953).

Since the early 1900’s, consumers in the United States have recognized that polluted shellfish could cause typhoid, hepatitis, diarrhea, and minor intestinal disorders. Public health initiatives in coastal and estuarine waters date back to the mid-1920’s (Rippey, 1994). In the 1960’s, after an outbreak of seafood poisoning blamed on oysters, the federal government began classifying waters for shellfish harvest. In 1966, the National Shellfish Register began reporting on water quality for purposes of shellfish harvest. The Shellfish Register classifies shellfish growing areas according to water quality. Classifications include: approved, conditionally approved, restricted, conditionally restricted, and prohibited (Florida Briefing Book, 1953). Shellfish growing in approved waters may be harvested at any time for direct marketing. Those growing in conditionally approved waters can be harvested when water quality standards set by the federal government are met. They are closed at other times. Shellfish growing in restricted waters cannot be harvested unless they are moved to approved waters or depurated before direct marketing. Shellfish growing in conditionally restricted waters may be harvested if shellfish are subjected to a suitable purification process. And shellfish growing in prohibited waters may not be harvested for marketing under any conditions (USEPA, 1999, 43).

Pollution can be caused by both anthropogenic and natural factors. Natural factors include changing salinity levels and red tides. Red tide is a term used to characterize natural blooms of toxic marine algae that color marine waters red, brown and green. Red tides regularly affect Texas and Florida and may be increasing because of numerous human populations in coastal areas. Mollusks ingest this toxin and when these mollusks are consumed by humans, serious illness or death can result. In 1996, the northern section of the Gulf of Mexico was closed to shellfish harvest from Mississippi to Mobile Bay (National Association of Conservation Districts, 1997).

Oyster harvests also are affected by salinity levels, which rise and fall as river effluents decrease and increase. Dramatic increases, usually due to heavy rainfall which creates inland flooding, flush high levels of nutrients and freshwater into estuarine areas. Oysters reproduce more quickly in less saline water and tend to flourish. In periods of drought, however, oyster production can slow.

Although the Gulf region contains the most classified shellfish-growing waters in the nation (6.3 million acres in estuaries in 1995), it also ranked first in total acres of prohibited shellfish-growing waters. From 1990 to 1995, the total acres of approved shellfish-growing waters decreased by 574,000 acres. The top three pollution sources affecting harvest limitation in 1995 were upstream sources, individual wastewater treatment, plants, and wildlife (USEPA, 1999, 43). Commercial landings of oysters decreased from 1985 to 1990 but have increased since 1990 (USEPA, 1999, 44).

Today, because of diminished harvests the state pays oysters to replant oysters from closed water to approved waters. The replanting or relay program is an additional way for oyster-dependent families to make money. For two weeks after the oyster season, in summer, they relay oysters from marshes and inshore waters to approved shallow
waters offshore. An oystermen’s association meets to determine where oysters will be planted.

In 1995, the area was one of the top producers of oysters in the state, but harvests were down significantly from 30 years previous. Instead, as supplies of oysters diminished, oystermen gathered together into associations and participated in the state sponsored oyster planting, where young oysters from prohibited areas were moved to approved areas after the oyster season was over. These relay efforts sustained the industry.

In 1987, the Florida Department of Natural Resources published a comprehensive shellfish harvesting area survey which recommended prohibiting and/or conditionally restricting the harvest of shellfish in the estuary surrounding Oyster Isles whenever there was a heavy rainfall in any seven-day period in excess of 1.29 inches (Chew, 1994; Dees & Dees, 1990).

One former oysterman remembered, “The oysters had pretty much run out (in the approved areas) and people were going into the closed areas.” Intermittent closures continued for several years. When areas were closed for harvest, families found other temporary ways of supplementing their incomes.

One former oysterman remembered the last, more permanent closure, “They [oystermen] would be getting oysters right beside the line [between conditionally approved and prohibited] and they knew they were crossing the line. So rather than have to deal with all that, they [federal officials with FDA] just shut it [harvesting] down.”

That closure occurred in the winter of 1990. Overnight, families that had depended on oysters, many of whom owned small oyster houses, were out of business. Men turned to net fishing and other odd jobs to make a living. Women, though, who had in many cases had kept the books or worked to market the catch, were forced to seek other employment. Many found themselves pushed into an overcrowded service industry and forced to drive long distances for work.

Shortly afterwards the water management district allocated $25,000 for a detailed feasibility study that addressed the town’s wastewater treatment needs (Sturmer, 1998). The water management group also helped local city and county offices obtain $9.7 million in federal grants and loans to finance the town’s new wastewater treatment system. When the oyster flats were opened some time later, the effort to treat point-source pollution was called a resounding success.

The Fishing Community of Practice

Commercial fishing is inextricably tied to personal and community identity and the state’s historical and cultural roots (Smith et al., 2000). One fisherman expressed the thoughts of many others, saying, “My family’s fished forever. It’s a heritage.” Many trace this heritage back to the early days of Oyster Isles.

In 1877, fish ranches were established in Florida to harvest mullet for trade with Cuba. By 1895, Florida had a well-established infrastructure available to the commercial net fishermen. One resident’s description of net fishermen in 2002 could be applied to the practice since it began. She said, “Net fishermen fished the outgoing tide. As the tide falls, fish are forced into the net.” Over the years, however, fishing technologies changed.
Pound nets were introduced from Europe. Monofilament replaced cotton, and motors replaced sails and oars. (informants, personal communications, 2002).

As early as 1902, commercial fishermen were beginning to be blamed for the demise of fish stocks primarily by sportsfishermen (Gregg, 1902 in Herbert & Herbert, 1979). The claims that fishing was not what it used to be because of the use of gill nets were countered by other claims that blamed declining fish stocks on pollutants and development. “Statisticians tell us that wild things decrease in direct proportion to an increase of humans in any community” (Merwin, 1919).

The controversy over the use of nets prompted the establishment in 1913 of the first seafood-related office in Florida, a shellfish commissioner. This commissioner, a native of Oyster Isles, enforced net size legislation that varied from county to county (Herbert & Herbert, 1979). Still, the controversy over the use of nets would continue up until 1994. Those opposing the use of nets said, nets had “been responsible for excessive and damaging harvesting of fish populations… and… the unnecessary deaths of other marine animals, such as turtles and dolphins” (Jones, 2000). Those claims would be countered by individuals who said the fisheries were not being overfished and the “deaths of turtles and dolphins” were not the result of gill nets (2000). Commercial fishermen and scientists pointed out that fishing was cyclical; the abundance of species changed as a result of problems with the weather. They added that the degradation of habitat and nursery beds was a major factor in downturns of fish stocks (Clark, 1967; Herbert & Herbert, 1979, 6).

In 1953, the Oyster Isles area was listed as one of the nine major fishing areas of Florida. One island fisherman recalled the technological changes that made this possible. He said, “That was the time you came out with the outboard motor; you didn't have to pole. You came out with monofilament instead of cotton.” Area fishermen were involved in both net fishing inshore and hook-and-line fishing offshore. Offshore fishing took place in relatively shallow waters, and the Gulf is no more than about 35 feet deep for miles offshore.

“You’re not in that deep a water,” said Bernard. “You’re just looking for rocks, potholes. That’s what we do over here, look for structure and look for fish.”

One woman stated, “Fishing was uncertain. It was not a predictable business.”

One fishermen turned clam farmer recalled, “We’ve had some good trips. It was good and it was bad. You had a lot of bad trips too; a lot of high fuel bills when you don’t bring anything back in.”

Over the next 40 years, as fishing landings statewide increased and a dependence on the revenue they brought to the state increased, so did the realization that fishing stocks needed protection. Herbert and Herbert (1979) look at the increasing legislation in Florida governing fisheries. They write that over 200 local marine fishing laws “have been passed by the Florida legislature since before the turn of the century and by early April 1979, another dozen had been proposed for consideration during the annual legislative session (1)” They note that commercial fishermen were affected by confusing and costly restrictions and sometimes were excluded from some of the most productive fishing grounds in the state year-round or at peak harvest seasons.

A review of legislative regulatory action from 1953 until the early 1980’s revealed the following:
**Table 1. List of Legislative Regulatory Actions from 1953 to Early 1980**

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
</tr>
</thead>
</table>
| 1953 | Ownership of all marine life vested in state.  
State regulates wholesale and retail dealers, purse seines, transportation of seafood products, crawfish, and shrimp. |
| 1965 | State regulates seafood processors. |
| 1973 | State regulates blue crab industry.  
State preempts local fisheries rules with state rules. |
| 1976 | Federal establishment of the 200-mile limit giving states control over the oceans and all fish therein for a distance of 200 miles out from the coastline. |
| 1981 | State establishment of Saltwater Fishing Study and Advisory Committee to develop options related to the management of marine resources. |

(Florida Fisheries Outlook, 1953, 53; Jones, 2000; Whiteleather, 1969, 39).

The state and federal governments were also taking other steps to conserve fisheries. In 1967, state patrol boats were stationed in the area of the Dry Tortugas offshore the southwest tip of Florida to protect fisheries stocks and nursery areas (Florida Fisheries Outlook, 1953). Later, the federal government granted almost $2 million to Gulf and Atlantic states for commercial fisheries research and development (1953). And in the early 1970’s during the oil crisis, the Florida governor and cabinet enabled state fishermen and farmers to obtain fuel more easily than other individuals, as they were involved in the production of food (1953).

In the mid-1980s under the administrations of presidents Reagan and Bush, assistance to the commercial fishing industry began to vanish (Florida Fisheries Outlook, 1953). A review of legislative regulatory action from then until 1995 revealed the following:
<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>First meeting of the Florida Marine Fisheries Commission (MFC).</td>
</tr>
<tr>
<td>1984</td>
<td>MFC establishes Biscayne Bay Lobster Sanctuary. MFC limits commercial catches of king mackerel.</td>
</tr>
<tr>
<td>1988</td>
<td>Gulf of Mexico Fisheries Management Council limits catches of red snapper, grouper and amberjack. State prohibits commercial fishermen from taking redfish.</td>
</tr>
<tr>
<td>1989</td>
<td>MFC tightens specifications on commercial fishing gear (primarily net-related) and prohibits the use of some gear.</td>
</tr>
<tr>
<td>1990</td>
<td>MFC again tightens specifications on commercial fishing gear (primarily net-related) and prohibits the use of other gear.</td>
</tr>
<tr>
<td>1991</td>
<td>MFC again tightens specifications on commercial fishing gear (primarily net-related) and prohibits the use of other gear. South Atlantic Fisheries Management Council bans drift gill nets.</td>
</tr>
<tr>
<td>1992</td>
<td>MFC tightens specifications on commercial fishing gear (primarily net-related) and prohibits use of other gear.</td>
</tr>
<tr>
<td>1993</td>
<td>MFC prohibits use of purse seines in Tampa Bay. State and federal governments outlaw shark finning in Florida waters (the catching of sharks for their fins).</td>
</tr>
<tr>
<td>1994</td>
<td>MFC tightens specifications on commercial fishing gear (primarily net-related) and prohibits the use of other gear. State voters approve a constitutional amendment that prohibits use of commercial entanglement nets – Florida net ban.</td>
</tr>
</tbody>
</table>

(Florida Fisheries Outlook, 1953, 53; Jones, 2000; Whiteleather, 1969, 39).

One island fisherman recalled that once legislation increased, fishing was not as profitable. He said, “The fishing part of Oyster Isles started slowly declining from that
time one and about in the early 90’s, you started seeing tourism be kind of more held above the fishing industry, which was the first time that had ever happened.” Still most fishermen continued pursuing their heritage.

In 1987, when another severe hurricane hit, some began looking for other livelihoods, especially those who were operating fish houses. It appeared that high overhead, coupled with the inability to buy flood insurance, forced some into other lines of work.

Prior to the net ban in approved by voters in 1994, 18,787,639 pounds of mullet were caught in Florida waters (Jones, 2000). Albert remembered that in Oyster Isles, he would see truckload after truckload carrying catches of mullet off the island. He said, “There was mullet in there, and this is no exaggeration, there was mullet in there so big that…. And I said [to the truck driver], ‘That’s really gonna feed a lot of people, you know, that fish.’ [and] He [the driver] says, ‘The weird thing about it is, them fish ain’t worth anything.’ He [driver] says, ‘We don’t use the fish. The fish go into a byproduct of maybe fertilizer, dog food, or cat food.’” Albert explained, “All they were interested in was the roe.”

In November 1994, Florida citizens voted to eliminate net fishing altogether and in July 1995, the net ban took effect. The ban “affected an estimated 1,500-2,000 fishermen and their families in coastal communities throughout the state, as well as seafood processors, restaurants, retailers and wholesalers, and other related industries” (Smith et al., 2000b, 1). This “was a traumatic event that permanently altered a ‘way of life’” for these traditional families and fishing dependent communities, and had unintended social and environmental consequences” (Smith et al., 2000b, 2).

While most fishermen felt robbed of their heritage as a result of the net ban, others like Sally said, “I thought they were harming the quantity of fish by netting everything. And I thought that was a problem down the line, years and years to come; there’d be more nets in the water and even less fish.” She reflected on the booms and busts on the island, “I watched the fishing community go down and I seen a lot of things. There’s a lot of poverty that all of a sudden happens in a short time.” She added, “You gotta be able to be prepared for that. That chance.”

The fisheries community of practice, which was comprised of a number of sub-communities of practice, began its adaptive cycle of reorganization with European settlement of the area. The adaptive cycle of exploitation had moved into that of conservation by the early 1900’s. Increased state and federal regulations of fisheries in mid 1990’s are indications that the adaptive cycle of this community of practice was moving from conservation into decline. The net ban was one of the strongest indicators of the community’s decline.

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55 I was informed that Oyster Isles had dropped out of the National Flood Plan. Towns have to be involved if their residents are to be able to purchase flood insurance (communication with informant, 2002).

56 Florida voters had been told that the net ban was necessary in order to preserve remaining fisheries (informants, personal communications, 2002).
The Crabbing Community of Practice

Blue crabbing has been practiced in the area for hundreds of years. Prior to about 1950, most crabs were not taken with traps but on lines. When traps became the preferred method of harvest, a number of problems arose (personal communication, informants, 2002). These included the entanglement of marine life in lines extending from the surface buoy to the trap, the capture of species other than blue crabs, and the abandonment or loss of traps that continue to trap marine life. Recognition of problems with the fishery marked the adaptive cycle of conservation. Increased regulation since the 1950’s and volatility of stocks leading to uncertain levels of income were indications of the adaptive cycle of decline.

By the 1999-2002 period, there were only a handful of individuals working as blue crabbers in the Oyster Isles area. Of these, only two were interviewed. Increasingly these individuals were becoming members of the clam farming community of practice.

The Wild Clam Harvesting Community of Practice

In 1919, a Ft. Pierce newspaper mentioned wild hard clams\(^{57}\) (*Mercenaria mercenaria*) in Florida waters, saying that periods of abundant clams were followed by periods of scarcity. In the early 1980’s, a large natural set of clams occurred in the Indian River Lagoon, and from 1984 to 1987 wild harvest was practiced (Holiman, Weldon, Thunberg, Adams & Spreen, 1995, 1). As news of this wild set arrived in markets in the Northeast of the United States, a number of Northeastern wild clam harvesters came South. Richard said, “There was an incredible set of clams discovered in Florida on the East Coast in the Indian River. So I packed up and drove down to find them.”

Traditionally large-scale harvest occurred in the Mid-Atlantic and North-Atlantic coastal regions (Manzi & Castagna, 1989).

One wild clam harvester remembered, “Where I grew up on Long Island was pretty much the traditional hotbed of hand harvesting clams. A pretty strong industry. Been there since the 1800’s.” He described the practice. “It consisted of long raking, which is working out of a boat with large baskets and rakes with teeth which rake the bottom. You work with a long handle that is a telescoping handle. You adjust it to roughly three times the depth [of the water] and you work with the tide and/or the wind. It pushes your boat…so you just go in and out with it…usually working in 6 to 12 foot of water.”

“Wild harvest declined in 1987 because of a combination of harvest pressure and changing environmental conditions (Holiman et al., 1995, 1). One former wild clam harvester said the die-out was “was due to over-development of the area. Water quality. Water quality dropped every time you got rain and as development increased and increased, there was so much more runoff.”

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\(^{57}\) Two species of hard clams are native to Florida: *Mercenaria mercenaria*, the northern hard clam, and *Mercenaria campechiensis*, the southern hard clam (Vaughan, Creswell & Pardee, 1988).
The Clam Farming Community of Practice

The clam farming community of practice, which began to emerge in Oyster Isles in the early 1990’s, was the result of the collapse of the oystering community of practice in the late 1980’s, the wild clam harvesting community of practice in the early 1990’s, and the fishing community of practice in the mid 1990’s. Members of these three groups merged to form a new community of practice, clam farmers. Unemployed oystermen were the first to become involved. As news of their success traveled, a number of wild harvesters were attracted to the area. In 1995, after the net ban, many former net fishermen became legitimate peripheral participants. As some failed at the business, lost interest, or just decided to sell their lease, others, many of whom had never taken classes, were invested in the new business. The temporal contextualization of the clam farming community of practice that follows provides a foundation for the discussion of structures of legitimation, signification, and domination in Chapter Five, and the more in-depth discussion of situated learning in Chapter Six.

The Adaptive Cycle of Reorganization

In the mid-1980’s landings of wild clams along Florida’s East Coast declined. To create an alternative supply to balance fluctuating wild harvest clam stocks, the farming of hard clams began (Bendle, 1995). Some of the farming was a byproduct of wild clam harvesting; clams that had been raked but were too small to sell were replanted. Other farming was more involved. “Techniques for producing seed clams had been developed in the 1950’s” and a Ft. Pierce firm had just developed early growout culture technologies (Philippakos, Adams, Hodges, Mulkey, Comer & Sturmer, 2001, 2).

Richard, who is now a clam farmer in Oyster Isles, remembered, “…for two or three year period over in the Indian River, there were aquaculturalist leases.”

During that same time, in the late 1980’s, a similar situation was occurring on Florida’s West Coast. A Florida State University professor was researching growth rates in the northwest Florida area and had developed farming techniques suitable for those waters (Chew, 1994). At the same time, oyster stocks were diminishing and offshore areas where oysters were harvested were being intermittently closed to oyster harvesting because of pollution. This prompted one woman, intrigued by the potential of aquaculture, to look into the possibility of growing clams. After talking to a number of people, she was approached by an East Coast firm that was interested in having her begin raising clam seed and then planting it offshore.

As time passed and pollution became more severe, one oysterman remembers the FDA changing the status of conditionally restricted waters to conditionally unapproved. Oyster harvest was virtually stopped. About this time, Linda, who had been visiting the capitol in Tallahassee on business, happened to pass by a room where the state was offering shellfish farming classes to underemployed oyster harvesters from another Florida community.

“There were probably 50, 75 Belhaven men there [at a meeting in the capitol building] saying they said they didn’t want this thing [job-retraining program] in their county,” said Linda, who had been at the capital at the time. “But I wanted it here,” she said. “And I said, ‘If they don't want it, we would love to have it in Oyster Isles.'”
Several women teamed up and traveled south to the East Coast for a three-day shellfish training. They returned convinced that clam farming could be a way for their men to remain on the water making a living. Shortly afterwards, they and others were able to convince the state to offer job retraining classes to displaced oystermen in their area where unemployment had reached about 35 percent (informant, personal communication, July 17, 2002).

The first job retraining classes began in 1991. Those involved were provided with information on production, market preparation, and business management. In 1993, graduates received diplomas certifying them as aquaculturists. They were also provided with seed clams, rudimentary equipment, and a four-acre submerged, 10-year lease. By that time many had a full crop of clams growing on the bottom and were beginning to harvest. About four years later, the clam harvest in the Oyster Isles area equaled 16 percent of the state’s total landings (informant, personal communication, July 22, 2002).

In 1995, when net fishermen were put out of business by the net ban, a second series of job retraining classes was offered. Those involved in this course also received seed, equipment, training, and access to a lease.

By 1997, the state reported that there were more than 300 hard clam growout operations on 950 acres of state-owned submerged lands in the Oyster Isles area with clam sales (farm gate value) estimated at $10 million. Clam leases generally are between two and four acres in size. They are located in a number of different areas, in different depths of water with different bottom types and different levels of salinity. Some leases are so deep they must be worked with a diving rig. Other leases are so shallow that clams are exposed during very low tides.

Aquaculture

While aquaculture, the farming of plants and/or animals in either fresh or salt water, is an ancient practice in many parts of the world, today, from a global perspective, is similar to agriculture in the early to mid-1900’s in the United States; the majority of operations are family run. Change is occurring rapidly, however. These “mom and pop” operations are being converted to aquabusinesses (agribusiness). While smaller operations are generally seen as more environmentally friendly, agribusiness extends the promise of increased yields. At the same time it is seen as a capital-intensive industry that exploits both workers and the environment (Hightower, 1978, 274-275).

Aquaculture is seen as a means of supplying the increasing demand for seafood in an era of diminishing stocks. It is “far more efficient than terrestrial agriculture at converting solar energy into animal protein” (Ophuls & Boyan, 1992, 54). Williams (1996) stated, internationally “marine and inland aquaculture production doubled between 1984 and 1993, reaching 16.3 million tons” but in the United States it accounted for less than nine percent of seafood production (1).

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58 Originally the classes had been aimed at training displaced oystermen in the culture of both oysters and clams. Because of the success of clams and the greater profitability, clam culture became the focus of classes.

59 Many are doubtful that global fisheries landings will recover to the levels of the 1940s through the 1980s (Rothschild, 1996; Williams, 1996). Williams says, “Over the next 35 years the challenge will be to maintain present or near-present levels of natural harvest while sustainably increasing aquaculture production” (Williams, 1996, 1).
Aquaculture requires high water quality. As demand for offshore aquaculture grows, so does the need for high water quality. Thus far, it appears that this demand has increased opposition to aquaculture. This opposition has arisen on the social, political and economic fronts according to a number of authors. “Agricultural, industrial and urban activities will compete vigorously for high-quality water, space, and other inputs such as feed, fertilizers, labor, and capital” (Williams, 1996, 2). “Some firms and industries see environmental standards as a threat to their international competitiveness. For others, nation-based environmental standards are a threat to liberalized, global free trade” (Clark, 1995, 229). In addition, urban areas worldwide are facing water shortages (Rand, 2003). As freshwater is removed for human consumption, agriculture, and industrial needs, river effluents may diminish resulting in higher salinity levels in estuary areas.

Aquaculture in Florida

In 1990, when shellfish farming in the state was in its infancy, The Florida Aquaculture Plan stated,

Florida, with its mild climate combined with thousands of miles of rivers, lakes, streams, and ocean and Gulf shorelines, is in a unique position to become a world leader in aquaculture production in a rapidly approaching age where increased food production is mandatory for much of mankind’s survival. The maintenance of our salt and fresh water resources and our fragile wetland ecosystem, coupled with our need to provide food for an ever expanding population, require that responsible and realistic decisions be made now in terms of fostering a climate of governmental cooperation, education our citizens, and creating a governing concept for the future growth management of our state (Conner, 1990, 2).

In the same year, a report from the Institute of Food and Agricultural Sciences at the University of Florida presented a “hypothetical hard clam aquaculture system.” This report was built on years of previous research and provided a foundation for the industry that took off in 1991 (Thunberg & Adams, 1990, 1). (See Table 3.)

Four years later, Florida was ranked fifth nationwide in aquaculture. A survey answered by clam farmers in 1995 revealed that between the summer of 1994 and 1995, the average shellfish aquaculturalist had planted 382,000 seed clams (68 percent survived the nursery phase) (Philippakos et al., 2001).

Four years later, Florida was ranked fifth nationwide in aquaculture. A survey answered by clam farmers in 1995 revealed that between the summer of 1994 and 1995, the average shellfish aquaculturalist had planted 382,000 seed clams (68 percent survived the nursery phase) (Philippakos et al., 2001).

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60 In Florida, aquaculture includes the production of ornamental fish and aquatic plants, alligator, gamefish (largemouth bass, striped bass and more recently sturgeon), catfish, tilapia, shellfish, and shrimp (Conner, 1990).
Table 3. Overview of Farm Gate Values of Hard Shell Clams Harvested in the Oyster Isles Area from 1993 to 2001

<table>
<thead>
<tr>
<th>Year</th>
<th>Farm Gate Value ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>3.7</td>
</tr>
<tr>
<td>1995</td>
<td>5.4</td>
</tr>
<tr>
<td>1997</td>
<td>12.7</td>
</tr>
<tr>
<td>1999</td>
<td>15.8</td>
</tr>
<tr>
<td>2001</td>
<td>18.3</td>
</tr>
</tbody>
</table>

(Florida Agricultural Statistics Service, 2002)

The Florida Aquaculture Plan of 2001-2002 stated, “within the next three decades aquaculture must supply five times as much seafood as it does today to meet projected demand.” By that time, Oyster Isles was the top producer nationally of farm-raised clams and responsibility for aquaculture, which had initially been placed with the Department of Natural Resources, had been transferred to the Department of Agriculture under the Division of Aquaculture.

The Adaptive Cycle of Utilization

A little after net fishermen began joining the community of practice, a large corporation came into town to set up a clam farming/processing/distributing business. While several groups had previously come into town and set up small operations to raise seed or process and distribute, this business was the largest.

One clam farmer said, “They were a nightmare. They started buying up all kinds of leases. They were dumping millions of dollars into the clam industry, bringing the prices down and flooding the market.”

In late 1997 and early 1998, after a series of hurricanes and tropical storms increased the freshwater outflow from several area rivers devastating crops, many family operations found themselves unable to continue in the business. Ocean Ventures, a large

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61 Holling and Gunderson (2002) refer to this adaptive phase as exploitation.
corporation that had moved to the area, suffered as well. The larger than normal rainfall was attributed to the El Niño\textsuperscript{62} effect. Increased salinity levels due to droughts or the input of more saline waters in areas of desalinization plants can adversely affect shellfish and other marine life. The flooding decreased salinity levels and killed millions of clams. These clams had to be removed from leases and disposed of.

Many believed the El Niño event had ended clam farming in Oyster Isles. Instead, two things occurred. First the event caused many who had lost what they had and had no capital to reinvest to pull out of the business and sell their leases. Second, the state stepped in with a crop insurance program. These events caused others. First, outsiders, new to the area, were able to buy leases and become involved and became involved as investors supporting those who needed capital to continue. Second, the industry gained stature as farming venture; individuals involved began to think of themselves more as farmers than fishermen. Third, those who remained in the business but had lost large numbers of clams may have become involved in theft. Fourth, insurance offered a stability never known in fishing or oystering. It is possible that the El Niño event strengthened the industry, weeding out individuals who were not fully committed. It certainly made those individuals involved begin to think of themselves more as farmers than fishermen.

The Adaptive Cycle of Utilization to Conservation

Over the next several years, there was a period of financial growth and stability rarely seen in Oyster Isles in recent years.

One clam farmer commented, “It was the best money in 25 years. Just a few years ago people that were living paycheck to paycheck were buying acres of land, new homes, new cars, new trucks.”

Along with the financial growth, there was expansion and people began to realize they increasingly needed waterfront access. Access to the water was important for two primary reasons. First, access assured a means of getting a boat into the water. As the town was beginning more developed and popular with tourists, the traditional areas to launch boats were becoming more crowded. Second, those who wanted to raise clams in land-based operations, needed access to the Gulf’s waters for their young seed. And at this point, many of those involved in clam farming had sold their island land and lived on the mainland.

In May, 2002, when an outside landowner decided to sell a section of property just offshore the island, there was a great deal of interest. In four days, approximately 90 lots sold. The landowner had previously offered the land to the state but the state had refused because of the price. The state had also told the landowner it would be difficult to sell the property. The sale of the property became a major concern. Clam harvests were routinely stopped (closed) after five inches of rain in a three-day period (informants, personal communications, 2002). As these lots were to have septic tanks, the state water quality management group said that three inches of rain would now close the leases. In

\textsuperscript{62} El Niño is a weak, warm ocean current that flows south off the coast of Ecuador in late December. In years when this current is stronger, the Southeastern United States can experience wetter than usual winters and heavy flooding. In estuarine areas this can result in lower salinity levels which threaten sedentary marine species (What is El Niño, n.d.).
fact, there were threats that clam harvests might stop altogether in some areas. The sale of this property and subsequent actions taken by clam farmers, community residents, and government officials became major learning events. These are elaborated on in Chapters Five and Six.

Some time later, on September 11, 2001, the World Trade Center in New York was destroyed by terrorists. This event grounded air traffic for several weeks, stopping the shipment of clams to markets in California, the Midwest, and the Northeast. It also exacerbated the recession. The local cooperative extension agent wrote, “Seafood suppliers and white-table cloth restaurants are in for a tough year. Americans aren’t eating out like they used to and sales of high-end seafood items are off by as much as 25 percent” (Sturmer, 2002). The terrorist event coupled with the recession slowed the sale of clams and decreased the wholesale price per clam (informants, personal communications, 2002).

In 2002, clam aquaculture continued as a primary source of income for many area residents, and Oyster Isles led the nation as the top producer of farm-raised clams. Despite this success, in late 2002 Governor Bush suggested greatly decreased water quality monitoring as a means of managing the state’s budget. Such a decrease would have made it legally impossible to harvest oysters or clams in Oyster Isles (informants, personal communications, 2002-2003).

The Practice of Clam Farming

Hard clam aquaculture consists of three phases: hatchery, nursery, and growout (Manzi & Castagna, 1989). The first two phases typically required controlled environments (Holliman et al., 1995, 3). The hatchery phase involves spawning selected clams to produce clam larvae. About eight to fourteen days later, the larvae develop a shell and lose the ability to swim. When it reaches about seven-ten mm in size it is ready for to be place in nursery bags in a nursery. Nursery can be located offshore or onshore. In Oyster Isles, nurseries generally take the form of raceways and either upwellers or downwellers63. Raceways are land-based structures with open trays. The seed is placed in the trays and seawater is pumped over it. Periodically the seed is cleaned. Upwellers or downwellers are basically containers in which seeds are placed. These can be placed on land or placed near shore along docks. Seawater is either allowed to flow through the top of the containers or up through the bottoms. When seeds, or young clams, are large enough they are placed in nursery bags along a belt of fabric offshore. Once they outgrow this bag, they are pulled up and transferred into a growout bag, and returned to the lease where they remain until harvest (7/10 inch or one inch) (Personal communications, informants, 2002). Once bags are placed offshore on leases, they are protected by a cover net from predators (a number of fish, rays, crabs, etc.). Bags are anchored to the bottom in a number of ways: metal stakes, PVC stakes, etc. Usually bags are laid or planted along the lease site in straight lines and maps are made to indicate their positions. On these maps farmers indicate the dates clam bags were planted and harvested.

Once clam farmer talked about the variety of methods used by different farmers. “I’m sure everybody’s got their method…particular ways. A lot are similar, but a lot are

63 Upwellers and downwellers are containers in which clam seed is placed. These containers sit in saltwater. Saltwater flows up through an upweller and down through a downweller.
different in subtle ways, such as the way they belt their clams, the way they plant them, what type of predator net they use, how long they leave their nursery clams down. Things like that, just little tiny differences. But generally we all use the same practices…developed by Ocean Ventures.”

Conclusion

In this chapter, I discussed various systems within a panarchy. These included: communities of practice, the larger community, the county, the watershed, the estuary, and the Gulf of Mexico. Obviously there are many more systems within this panarchy (i.e., rookeries, bays, marshes and the state of Florida, the United States, the global system). The communities of practice are encompassed within and encompass a myriad of biophysical systems. All systems within a panarchy operate simultaneously and at different scales. Individuals are frequently members of more than one system (their membership is more peripheral in some systems than others), and members of one system are connected to members within their own systems and to members of other systems (horizontal and vertical ties).

To review, I looked closely at the relationship between the larger community of Oyster Isles, three smaller communities of practice nested within it, and the relationship between the clam farming community of practice and four smaller communities of practice whose members became clam farmers.

I described how the larger community of Oyster Isles had been declining prior to the 1950’s and linked the decline of this larger community to the ongoing decline of three communities of practice nested within it (oystering, fishing, and crabbing). These three communities of practice had been in decline for a long period but the ecosystems they were dependent upon were operating at such a different scale that their declines were either ignored by members of the communities of practice or were imperceptible. There were indications that the oystering community of practice reached its peak in about 1900 and began collapsing as a result of harvesting pressure only a decade later. By the late 1980’s, with the FDA reclassification of shellfish harvesting areas from approved and conditionally approved to unapproved, the oystering community of practice essentially collapsed. The fishing community of practice also appears to have been in a slow decline for a long period, but again its decline may not have been recognized. In 1995 with the net ban, a sub-group of this community of practice collapsed. The crabbing community of practice more recently appears to be faltering. The decline of the larger community of Oyster Isles can, in part, be linked with the decline in these communities of practice.

By the early 1970’s, the larger community of practice was beginning to reorganize. When the oystering and fishing communities of practice collapsed and members of these communities turned to clam farming, the reorganization or emergence of the clam farming community of practice became an energizing factor in the

64 Because of the seasonal nature of oysters and their dependence on cyclical periods of rain occasional upswings in populations may have masked the overall decline of the resource.
65 Informants reported that in the 1950’s, some species of fish that are now sought after for food were routinely discarded.
reorganization of the larger community of practice. The reorganization of the larger community of practice also appeared to have energized the reorganization or emergence of clam farming. The “coincidental” collapse of the wild clam harvesting community of practice in South Florida and the migration of some of its members to the Oyster Isles area, also appeared to have energized the reorganization of the clam farming community of practice. The arrival of a large clam farming corporation, Ocean Ventures, to Oyster Isles was an indicator of the beginning of the adaptive cycle of utilization. Several years later, as Ocean Ventures faltered, smaller, more stable partnerships began flourishing. This was an indicator of the system’s adaptive cycle moving from utilization to conservation.

Holling et al., (2002a, 2002b) postulate that systems cycle through periods of reorganization, exploitation, conservation, and decline, and that as they reorganize the greatest amount of learning takes place. Chapters Five through Eight examine the process of learning and conscientization that took place as the four smaller communities of practice collapsed, and the clam farming community of practice emerged, organized, and moved from the adaptive cycle of reorganization to utilization to conservation.
CHAPTER 5
CULTURAL STRUCTURES AND PATTERNS OF INTERACTION:
PRE-CLAM FARMING

Introduction

Those who discuss human learning are forced to grapple with a chicken and egg-like conundrum: what came first? As individual systems interact with their environment learning (social and biological) occurs. When systems of individuals interact with their social and biological world, individual learning is shared and meaning is negotiated. Negotiated meanings become embedded in the minds of individuals and the institutional memories of systems as structures of signification – worldview. Structures of legitimation (norms) and domination (access to resources determined by patterns of hierarchy) then emerge (Giddens, 1976, 1979, 1982, 1984). These become part of the social structure. Their existence strongly influences the characteristics of actors, their worldviews, their interactions with the social and natural environment, and thus their learning. Human learning is, therefore, a circular process.

Change drives the process of learning and conscientization. Tacit learning – the reproduction of structures of legitimation, domination, and signification and patterns of interaction with the natural and social world – occurs daily. As a result of constant changes at multiple levels and on multiple scales, actors continually transform the cultural structures and patterns of interaction within their communities (Goffman, 1967, in Scheffer et al., 2002, 229; Holling et al., 2002a, 2002b).

This chapter looks at the cultural structures of legitimation, domination and signification and the patterns of interaction with the social and natural world that existed within the larger community of Oyster Isles and four smaller communities of practice that existed prior to the reorganization of the clam farming community of practice. This discussion provides the reader with an understanding of different systems’ cultural structures and the culturally determined characteristics of actors, and patterns of interaction that various actors held. These structures and patterns are the result of former learning and they impact new learning, conscientization, and the development of new structures and patterns as a system moves through the four-phase adaptive cycle. These cultural structures and patterns are illustrated with excerpts from field notes and participant interviews.

Norms and rules created expectations for the roles people played and the rights and responsibilities that accompanied these roles and they determined how people interacted. Because these norms and rules enforced conformity, by observing what people
did and said, I was able to understand these behavioral expectations. When I looked at idiosyncratic behavior, these norms and rules became even clearer.

I found that norms and rules governing roles, rights and responsibilities were entwined with structures of domination and signification. These structures essentially controlled access to resources – interactions with the social and natural environment – that facilitated goal-oriented actions and learning (Scheffer et al., 2002, 229). Structures of domination were looked at in two ways. Patterns of access to resources, controlled by hierarchical structures, existed between different groups in a community. Structures of signification – worldview – were the means of embedding structures of legitimation, domination and resultant patterns of interaction with the social and natural world into the minds and memories of individual actors and social systems. These structures and patterns were understood by analyzing interview transcripts using the constant comparative method (Martin & Turner, 1986).

This discussion of the larger community of Oyster Isles and four smaller communities of practices allows the reader a glimpse of some of the structures of legitimation, domination and signification that influenced patterns of interaction with the social and natural world and learning prior to the onset of clam farming. It also allows the reader to understand how actors were “programmed” to see the world, behave, interact, and learn as they reorganized into the clam farming community of practice.

The implicit cultural structures and patterns were not visible to most participants prior to the period of intense change that occurred between 1989 and 1995. They became visible to many as they began reflecting on their learning. For some, this reflection had occurred prior to research interviews. For others, the interviews prompted reflection and subsequent awareness. All information within this discussion was drawn from an analysis of documents and participants’ transcribed interviews.

**The Larger Community of Oyster Isles**

During the four decades prior to 1989, Oyster Isles had a fairly homogeneous, white, Christian population of about 700. Many individuals were related to one another and social networks were, to a large extent, family based. Those who were born and raised on the island had a strong sense of personal identity, a strong sense of place, and a strong sense of community.

When they were interviewed and when they spoke in town functions, they frequently referred to their heritage with statements like, “My family’s been in Oyster Isles for generations.” It became apparent that they felt this allusion to their island heritage would make those who were listening to them consider their remarks more

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66 Of the four smaller communities of practice, three were largely nested within the larger community of Oyster Isles, the fishing, oystering, and crabbing communities of practice. The fourth, the wild clam harvesting community of practice, existed outside the study area. While the first three communities of practice were long standing groups, the latter essentially existed from the early 1980’s until mid 1990.

67 During this time the fishing and oystering communities of practice collapsed, property prices, taxes, and insurance soared, a variety of newcomers began streaming into the island accompanied by development and further price increases, and shellfish aquaculture began.
seriously; they seemed to feel their deep roots gave them a greater stake in the island’s affairs and in its future.

Gail, a clam farmer’s wife, said, “My great granddaddy came up (to Oyster Isles) in horse and buggy from Gulf City after he was discharged from the English Army. That was on my mother’s side. We’re fifth generation.”

George, a former fisherman, started his interview saying, “I’m fourth generation. This house is more than a hundred years old. My granddaddy built it.”

Another islander said, “My mother’s name was Lillibridge, which is a family from Persimmon. My grandmother’s original name was Hornsby that is a big family still in Oyster Isles. It’s one of the bigger families that’s still living here. And my dad’s family. You could trace my dad’s family back…. We’re on the map down here in the museum building.”

The feeling among participants that Oyster Isles was a unique place was shared by all who were interviewed. One former fisherman said, “It’s always been a joke around here that this is the Garden of Eden because it’s between two rivers. Of course, the [one] ain’t much of a river. It’s a creek really. I don’t really believe that’s true. Sounds good though doesn’t it?”

Prior to the changes of the 1970’s and 1980’s, islanders shared a sense of ownership and responsibility for the social and natural commons. This resulted from patterns of intimate interaction with the social and natural world. Many remembered they had been free to wander the island as children, even walking home from kindergarten by themselves.

Dennis, a former oysterman, said, “When I was a kid we could go anywhere we wanted to on our bicycles. We could throw a castnet or we could fish out of anybody’s backyard or off their dock.”

Hugh, another former oysterman, remembered being able to throw a basketball off a bridge linking the island to the mainland and swimming and chasing after it with a group of other boys as the tide flooded out.

Bernard, a former fisherman, said, “You could pull your boat up most anywhere on the flats and leave it.”

Edward, a blue crabber, stared over the back bay at the piers and remembered that he had had a dock there for his boat for 50 years and never owned the property where the dock was built.

Arnold talked about “an old beach there that the locals know about” where you could hunt for arrowheads and old bottles. He and his wife also remembered traditional camping areas on offshore beaches that are now off limits to the public.

Norms and patterns of interaction with the social and natural world were inculcated in islanders as a result of worldview. These included a sense of competitiveness, secrecy, an inability to communicate well with others, independence, and self-reliance.

Men were typically involved in one or more of three communities of practice: fishing, oystering, or crabbing. Many were used to working alone.

One fisherman said, “I liked being on the water. I liked being my own boss. The independence. It all appealed to me.”

When men spoke about their fisheries experience, they frequently told stories of times they had been out fishing, oystering, or crabbing by themselves. A limited
discourse analysis revealed that men used the pronoun *I* in isolation more than 90 percent of the time when talking about something they did, while women used the word *I* in isolation less than 30 percent of the time when talking about things they did. Men would frequently make remarks like, “I did it all.”, and “I had to get into it. It was the only way I could stay on the water.” Women more often said things like, “When we were in the program, I did the same thing Carl did.”, “I helped….”, “I bought one of these for Bernard.”

Keeping one’s wealth a secret or at least not flaunting it – a small community norm that fosters peaceful relationships -- was evident in how people maintained their homes and communicated. The exterior of many homes was left in a state of disrepair (unpainted etc.) that belied their interiors. People with wealth did not talk about their holdings or bank accounts.

Linda said, “You don’t want everybody to know how much money you got in the bank. You’ve got it. It’s not anybody’s business.”

This norm became more apparent as the community began to change and became less homogenous. One story in particular highlights this norm. An islander who had left the island to work in South Florida had recently returned to the area to retire. She and her husband had bought waterfront property and were building a home. One day she came into the museum and complained to a friend of hers at the welcome desk that people were saying her home was too large. The man behind the desk looked at her and said, “It is huge.” She hastily explained that it was mostly porch, and added that her old friends were teasing her and accusing her of having left the island to make her money.

Thriftiness and a good work ethic were other values that many people agreed were important. Many people explained that there were two groups of people, those who worked hard and saved their money and those who worked enough to pay their bills and buy beer. Working just enough to get buy and spending money frivolously were frowned upon.

Steve said, “You got your groups…. Let’s see. How do you say it? You got groups that live differently than other groups.”

I asked, “Live different?”

He explained, “See this group goes home every night and he might drink two beers and he might drink a beer every now and then, and then you got groups that go home that drink beer all night. They just live different lifestyles.”

George said, “I can’t understand somebody that can’t even work enough to save enough to buy…some kind of boat.” He said, “I wanted to fish. So I made enough money and bought a skiff boat. I worked as a city policeman for a week and I quit when I made enough money to buy a skiff boat. And so then I bought me…a three-horse kicker, and then I bummed me up an old net and I went out. That’s how I made my living. That’s how I started mullet fishing.”

Gail recalled when she and her husband had begun their life together. Her husband had owned a little red boat with no motor. So he went to the bank and tried to borrow the money and they wouldn’t let him but the banker’s mother was walking out and she said him, ‘What were you just in there for?’ And he said, ‘I was trying to borrow some money and they wouldn’t loan it to me.’ And
she said, ‘How much do you need?’ And he said, ‘$50 dollars to get a motor.’ And she said, ‘You come by the house.’ And she gave him the money and we paid her back $10 a week and he [her husband] started oystering. Actually, we had our house paid for by the time the clamming began.

She added, “Carl fished along with oystering. He didn’t sit around and twiddle him thumbs.”

She and many others talked about the value of being flexible. “It’s like after a hurricane. Some people sit back and bellyache about, ‘The water’s closed. They can’t fish and they can’t oyster.’ But you can go fishing. You can find something to do.”

Gender Expectations

Roles, rights, and responsibilities of women and men varied from one community of practice to another. From the mid-1950 until the mid- to late-1980’s, roles, rights, responsibilities of women and men in Oyster Isles were fairly distinct. Men traditionally worked on the water interacting more with the natural environment, while women were involved in land-based occupations. Their roles intersected at the dock. Men brought in their catches, and women filleted fish, shucked oysters, and picked meat from the claws of boiled crabs.

Women cared for the community and families while men focused on providing a living for their families. Isabel said, “Women kept families and the town together…. Most worked outside the home and at home.

George said his wife “actually ran the hardware store most of the time. And I fished. It’s always been, ‘Honey. You keep me healthy and fed well and…I’ll do the work….”

Because women dominated the land-based occupations, working in restaurants, motels, shops, or as bookkeepers, schoolteachers, and housewives, many women saw Oyster Isles as a “woman’s town.”

Virginia said, “If it wasn’t for women nothing would ever get done.” She added, “It’s always been like that. I mean we kid around but look at who owns the businesses. Look at who does them. It’s women.”

Women’s multiple roles resulted in greater flexibility. For instance, Maria waited tables, raised children and foster children, substituted at the school, helped her husband with crabbing, and did bookkeeping. This flexibility extended a woman’s social network horizontally. It may have increased her ability to learn.

Victoria said, “Women are more chameleon like I think. They can change or can mediate. I was able to negotiate.” She added, “Men aren’t usually as able to change.”

Attitudes toward Community

A shared sense of belonging and heritage fostered a sense of ownership, security and commitment to the community. This sense of belonging and heritage – worldview – translated into set patterns of interaction with the social world.
Once an individual was no longer considered a child, he or she was expected to become involved in and care for the community, children, and the elderly. Wealthier men in fishing and oystering communities of practice, those at the top of the hierarchy in their respective groups, were frequently involved in politics, civic and athletic associations, and established strong networks of horizontal and vertical ties.

Gail remembered her father had “always been a civic-minded person. That whatever helped Oyster Isles or his country he would do it.” Then she talked about her husband who had been president of the Oystermen’s Association and “always spent a lot of time in the (school) gym with the kids; basketball. He likes to help it he can....”

A former city and county commissioner, who had also worked at the state level talked about this responsibility, “I’ve done my watch. It’s somebody else’s turn now.”

Many men, however, predominantly those in subordinate positions on the hierarchy “disdained authority and organized government outside of their own little...city government,” said Richard, a newcomer to the area. He added, “They sort of got a phobia of the rest of the world.”

Victoria talked about men in Oyster Isles and differentiated them from men not involved in fisheries. She said, “They just don’t believe they have to be part of the world and they don’t have to listen to anything and they’re just not ever going to function completely in the real world.” She added, “I don’t see many of these men doing stuff and when they do it, they get angry.” She explained that men involved in politics, civic organizations and state agencies “are not the same men we’re talking about here. There’s two kinds of men. The men that work in the wild have a different mentality than those guys. That’s the real world and not real world. They’re both real worlds, but these guys cannot function in the other guys’ world and the other guys are in control.”

Wives of wealthier fishermen or oystermen were more likely to be involved in local organizations with the community. Many women worked through the Women’s Club that had been started after a major hurricane to raise money for the scholarship fund at the school, for battered women, and for those requiring food and clothes as a result of emergencies. Some worked through the local churches, the garden club, the art society, the chamber of commerce, and/or the historical association to sponsor local events and better the community. Many worked as volunteers at the local school. Most also were involved with additional family responsibilities. These responsibilities created dense horizontal ties.

Linda said, “I was active. I was a free lobbyist for the oystermen’s association in Tallahassee. I was PTO [parent-teacher organization] president, very active in PTO. Very active in the booster club. I’ve been a Girl Scout Leader. Active in church. Just real community oriented.”

Frequently young adults would take responsibility for older adults and younger children. Virginia said, “I’ve been a caretaker for a lot of older people...that got left down here. I...get their meals or fix them special food.” She added, “If there’s a kid, especially at the lower end...special problems in town. I work with kids.”

Several women recalled, “When we were in school at a ball game...you weren’t free just because your parents left because 25 other parents ...were just as quick to grab you by the ear as your own...and pass judgment on you.”

It was not uncommon for boys of single mothers or mothers whose husbands were frequently away to be “adopted” by an older male, a family friend or neighbor, an uncle,
or a grandfather. This individual would take them fishing, oystering, or crabbing and teach them a trade. Hugh talked about his great uncle. “He’s…one of the ones that raised me on the water. Me and him used to go all over the state in a houseboat working all summer and hanging out together when I was 13, 14, 15, and 16. So he’s like a father, you know. He treated me like one of his own kids.”

As parents aged they usually became the responsibilities of daughters. Two women said that one of their primary responsibilities now was to take care of their parents. “We’re not just having to take care of them, the doctors and all that. We’re having to take care of their finances.”

Attitudes toward Education

When young people grew up, men usually stayed in town working in fisheries, a family tradition, while women were more apt to leave the community. Boys typically worked with fathers or uncles in fisheries. It wasn’t uncommon for boys of single mothers or mothers whose husbands were frequently away to be “adopted” by an older male, a family friend or neighbor, an uncle, or a grandfather. This individual would take them fishing, oystering, or crabbing and teach them the trade. By the time boys were 13 or 14 years old many had bought their own boats and were saving money. By the time they were in high school (if they opted to go on to high school) many were making a respectable living. This income may have been one factor that increased the local dropout rate. Early involvement in fisheries and a family tradition appears to have encouraged men to remain in the area.

Steve, an ex-fisherman, explained that men could do well without higher education. “Guys that I know that I grew up with that didn’t go to college, like guys I graduated with that maybe went to college for a year or went in the Air Force for two years. They come back and they’re making a nice living.”

Kate, the wife of an ex-fisherman, explained that perhaps because men lacked a higher education and loved to fish, they found it difficult to leave the island. “The men that are raised here…it seems like their whole life they’re working toward getting back, coming back. The women, it’s not quite the same. They seem to be able to leave.”

Perhaps women were more able to leave the island community because they had been encouraged to finish high school and continue their education. If a family could afford it, women were sent to college. A number of men and women talked about their sisters and mothers having attended college. One wife of a former fisherman remembered an aunt who had graduated from FSU [Florida State University] and her mother who graduated from business college and worked as a secretary before she got married.

Hugh said “Just about ever girl in (my sister’s) class was real smart and did really good in school and they’re going to college.”

The practice of sending girls to college appears to have been latent structure of legitimation that the fisheries communities of practice developed as a result of interaction with the natural environment. Like men’s involvement in alternative fisheries during lean times, it appeared to enable the community to continue in times of disruptive change.

Hugh said, “I think that’s good because what if something does happen here? What if El Niño does happen? …the women are sort of the security system. They go to school so they can be our backup.”
Interactions between Men and Women

This sense of partnership between men and women appeared to be institutionalized. A folk tale from the area encapsulates the role of husbands and wives involved in fisheries. It is a tale about a fisherman who lost his boat, his sole way of making a living and supporting his family. The fisherman was worried about what his wife would say when he told her. Her reaction was one of understanding; “her family, for generations, had lived by the sea and fished it, as had his, and loss of life as well as property – was part of their life.” She understood as he did that the Gulf gave, but it also took. She said she could get a job as a waitress and if times became too difficult they would try to sell their home.

Prior to clam farming, most individuals married at a young age but marriages were not always stable. Virginia said, “I mean everybody got married when they were 16.” Linda talked about she and a friend of hers. “We both got married. I got married at 17,” she said. “I think she was 19.” According to both men and women divorce was not uncommon, even historically on the island. Men hypothesized that perhaps the instability of life on the water and fluctuating incomes did not always promote stable marriages.

Several women who were new to the area shared that while women were treated in a more egalitarian manner in relatively Oyster Isles than they were on the mainland, women were treated differently by men in the South as compared to men from the North. Marjorie said, “We went into sign the papers for the insurance on our house we live in. The guy took the piece of paper and he said to Will, ‘Will you have the wife sign it?’ And I’m thinking to myself, ‘OK. What am I doing down here?’ I mean that part floors me. It still happens. I mean I was sitting right there.” She added, “It took me a long time to adjust, a long time.”

Victoria said, “When I moved here, when we were building the house and people would come over to help they would walk over to my husband and talk with him. It was a change for me being a Yankee, a girl from New York, and outgoing. My father raised me closer to him. I would walk up to guys and they wouldn’t talk to me. They would walk away and talk to him (my husband).”

Attitudes toward the Natural Environment

Perhaps because the natural world had always been seen as something to exploit, a winner-take-all attitude prevailed that resulted in very different patterns of interaction with the natural environment.

Victoria said, “America got taken by everything. The Indians got taken, the timber got taken, the mining got taken, coal…. Everything got raped.”

As resources became scarcer, interactions between individuals changed even more; the sharing of information about fishing holes or oyster beds decreased. This is discussed later in this chapter.

Prior to the late 1960’s when town well water was found to be polluted most people did not think about the potential of septic tanks and storm water runoff to pollute the water.

Steve said, “Back when I was a kid I can remember -- this might be a little bit gross -- but I can remember swimming in the canal behind my house, where my sister
lives now…and it wasn’t nothing to see a feces. I mean back then everything used to run right off into the canals.”

The Smaller Communities of Practice

Prior to the change to clam farming, the economy of the larger community of Oyster Isles was fisheries (fishing, crabbing, sponging, oystering, etc.) based. “The thing about Oyster Isles was the fishing heritage. It seemed like we all had something in common here,” said a town leader. As a result, somewhat similar structures of legitimation, domination, signification and patterns of social interaction pervaded all the communities of practice nested within it.

There were long-standing hierarchical differences both between and within the three communities of practice nested within the larger community of Oyster Isles. These hierarchical differences were linked primarily to economic and social differences. Where one stood in reference to others and what resources one could access significantly affected how one saw the world. The acquisition of economic capital influenced the acquisition of natural, human, cultural, technological and to a degree social capital. The acquisition of social capital influenced access to economic, natural, human, cultural, and technological capital. Within different hierarchical groups, there were different structures of legitimation and domination.

The fishing community of practice topped the hierarchy. It appeared that those who worked from their boats – the fishermen followed by the crabbers – and made more money topped the hierarchy, while those who at times might have had to get into the water and made less money were on the lower end. Social capital that facilitated access to other forms of capital played a secondary role in one’s status within the overall hierarchy.

One former oysterman recalled, “Fishermen think they’re better than the oystermen. They say, ‘I’m not going to go out there all day and grapple for 20 bushels of oysters at $20 dollars a bushel. I’m going to put my nets out and stand in a boat with my clean little khaki shirt and my white boots and winch my nets in.’”

Another recalled, “The oystermen. We were at the bottom.” Several former oystermen remembered fishermen saying, “Anyone with a canoe and bucket can be an oysterman.”

Within communities of practice there was also a hierarchy. The fishing community of practice appeared to have a steeper hierarchy than did the oystering community of practice. These hierarchical structures were relatively fixed but individuals’ status could fluctuate. Much of the status within communities of practice was tied to family’s wealth and holdings (primarily boats, businesses, and land, especially waterfront property). Several recent arrivals noted that about five families had controlled the island politically and economically for generations.

Among men in fisheries, status was also acquired as a result of experience and age. Younger men deferred to older men. Dennis said, “I was born and raised here, but I haven’t been on the water (for as long as these older men) and I don’t know near what a lot of these older men know that are 20 or 30 years older than me.”
Among all communities of practice there were those who worked hard and consistently and those who worked just enough to pay their bills. Those in the first group usually began working for themselves but saved to buy a fish or oyster house or restaurant or develop markets where their catches could be sold directly. Those in the second group were always supplying their catches to someone else who would market them. As a result a patron-client relationship developed. This relationship was more oppressive in the fishing community of practice than in the oystering one.

In the early 1970’s, several women were reported as working on the water but they appeared to be exceptions to the rule. Some of these women were newcomers to the area who did not share similar norms. Others came from island families where their participation on the water had been encouraged instead of discouraged because of the need for their labor and company. Those women predominantly came from those families involved in either crabbing or oystering.

The Fishing Community of Practice

Within the fishing community of practice there were different sub-communities of practice. These included those who commonly fished offshore with hook and line, those who more often net fished, and those who did both. In addition, some fishermen supplemented their incomes by trapping stone crabs. There were also individuals, nuclear family groups (sometimes just a man and wife), and at other times extended families that, over time, saved or consolidated their incomes and were able to acquire a fish house or restaurant.

Fishermen who owned a fish house or restaurant topped the hierarchy within the fishing community of practice. They were able to market their own catches and by buying the catches of others, were able to fix market prices. Those who owned fish houses or restaurants were usually able to continue fishing at least on a part-time basis (offshore or as net fishermen) as other family members, usually a wife or another female relative handled the land-based end of the business.

Those fishermen who frequently fished well offshore were next on the hierarchy. They owned larger boats that were more seaworthy under adverse conditions and their boats were equipped with larger, more reliable engines. In addition to a sizeable investment in gear, they had to be able to purchase fuel and ice in advance of a trip and be able to withstand several consecutive unsuccessful trips.

One former fisherman recalled, “In fishing, you go out, sometimes you can spend $500 and not make anything, the next trip you might make $4,000…. But you just never know.”

Those fishermen who most often netted their catch were next on the hierarchy. Their boats and motors did not have to be as seaworthy or as reliable as an offshore fishermen’s as these men usually worked shallower waters near shore. However, their nets were a sizeable investment. This was particularly true as regulations tightened; this forced fishermen to have a variety of net styles and sizes to be legal in different situations/seasons.

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68 Crabbing refers to the catching of blue crabbing. People also crabbed for stone crabs but this is specified as stone crabbing in this research.
Ownership or access to capital influenced an offshore fisherman’s or net fisherman’s status. An individual’s status was also influenced by his fishing ability, work ethic, age, and experience. Nuclear families of fishermen were usually not as large as the families of oystermen or crabbers. Extended families as a result were smaller. Many families of fishermen appeared to intentionally link themselves horizontally with other fishing families through marriage. Limited nuclear family size meant a fisherman did not have a large group to support financially. The extensive social network provided by extended family provided fishermen with a larger group to interact with and learn from. Smaller nuclear families appear to have been one way to increase or ensure continued high status. Those families with higher status usually had no more than two or three children, one or two of who were boys.

Members of the fishing community or practice worked to maintain their status within the hierarchy of communities of practice through marriage or by developing social ties to those sharing the same status. One woman talked about how a woman’s status was linked to her husband’s. She said, “I remember my momma saying to me, ‘Those just aren’t the kind of people that we date.’ And she said, ‘You know you marry the people that you date so it’s… it’s better not to even start dating those kinds of people [people with lower status].’”

Women in fishing families did not usually play a role in fisheries unless the family owned a restaurant or fish house. If the family owned a restaurant, many times a woman’s life was tied to it. Isabel said she and her husband were partners in one of the first restaurants in the area. She said she did everything there was to do: worked as a hostess, cooked, washed windows, etc. She and her husband worked 18 hours a day. If the family owned a restaurant, a woman might work as a bookkeeper or occasionally deliver fish.

Kate said, “Women do more bookkeeping.” She explained, “That’s always been the case with families that earn their living on the water. The women usually do the bookkeeping and… drive the (delivery) trucks.”

Wives of those fishermen who were just scraping by were usually working in service industries as waitresses and motel workers.

Laura said, “When I came here in the 1980’s, women were working in restaurants as waitresses to keep motors on their husband’s boats.”

Ownership of access to deep water for boat dockage through kinship ties or friends was linked to higher status and/or the ability to work toward higher status. Fishermen’s boats and engines could not be dragged ashore like an oysterman’s but required deeper water. If a fisherman did not have access to deep-water dockage through family or friends, he was forced to use dock space provided by the fish house. Keeping a boat at the fish house meant you were compelled to buy your gas and ice there and sell your catch there. This reinforced the patron-client relationship.

Raleigh remembered that fishermen would go out “and mullet fish all night…. Then he’d come back up to the fish house and the fish house owner would walk out there and say, ‘I’ll give you three and a half cents (a pound).’ And he would say, ‘I thought you were paying five yesterday?’” Raleigh concluded, “They were indentured servants because they had no control (over prices) and they had to take what was offered…."

A fisherman’s ability to work a variety of areas in different ways added to his economic status. Involvement in offshore fishing, occasional inshore netting, and stone...
crabbing was one means of stabilizing income. If a fisherman was limited because of equipment and ability/knowledge to work just one fishery, his income was tied to the availability of that one resource.

Fishermen and crabbers guarded information in the same way. Ron said, “Before if I went over here and I caught crabs, then you’d almost want to dribble and drabble them in so that nobody (found out where you had trapped them) cause all they had to do was follow you and they’d put their traps where you put your traps. Or if I caught fish in a certain area, you wouldn’t come in till you were sure if was dark and nobody could see which direction you came from.”

A former fisherman, said, “Commercial fishing you’re always afraid somebody’s going to hit that rock [fishing spot] before you get there. Or when you’re pompano fishing there’s going to be a bunch of tourists fishing on the bank where you hoped there’d be some pompano.”

He added, “I still have the commercial fishermen's mentality…if you don’t get it today – you better get it today – because it may not be here tomorrow.” He told a story to illustrate the point. “I had a nephew that went into commercial fishing. Well, he started blue crapping. And we were down off the mouth of the Blue River. And I mean they (blue crabs) were roaring. I mean it was ten pounds to the trap, you know. And we were making good money. We were all going crazy. Well, Bernard, he woke up one day and said, ‘I don’t feel like going today.’ And he didn’t go. And one day he went down there and they (his traps) were all empty, you know. Nothing…. He said, ‘What happened?’ We said, ‘They’re gone. They moved.’ ‘You mean it’s over?’ (he said). I said, ‘Yes. It’s over. You got to get it while it’s there, because it may not be here tomorrow.’”

The Crabbing Community of Practice

Crabbing was more labor intensive than either fishing or oystering and required more family involvement. Crab traps had to be built and maintained. A crabber required space to store traps when they were not in use. Bait had to be caught, traps baited, and checked regularly. Frequently the catch was boiled and meat picked from the claws. This was usually women’s work. If a family opted to become involved in marketing soft-shell crabs, labor was even more intensive, equipment costs were higher, and family involvement became even more necessary. Crabs had to be caught, kept in containers with flowing seawater, and watched carefully to catch them as their shells softened. Because of the nature of the work in inshore waters, hauling traps, extracting crabs, baiting traps, and resetting them, often a spouse, partner, son or daughter was taken along.

Because many fewer crabbers were interviewed, I do not have enough data to write about hierarchical patterns within this group. A map analysis coupled with property valuations indicated that several crabbers had been able to invest in waterfront property with access for their boats, some with the financial help of extended family. Crabbers who also fished were able to secure higher status. Several had been able to start restaurants and fish houses. Their boats and engines were often more substantial than the boats of many oystermen, some of whom could get by with a kicker (a very small outboard). Interviews revealed that some only trapped crabs but that several also net fished, and continued to do this on a limited basis after the net ban.
The Oystering Community of Practice

Oystering did not require the capital that fishing did. Linda said, “It didn’t take much money to start oystering. A small boat, a motor and a strong back and strong work ethic.”

Many men remembered how difficult the work had been. Dennis said, “I had two back surgeries by the time I was 20 years old.”

Men involved in the oystering community of practice poled flat boats or motored shallow draft boats. They commonly made their own tongs to pull oysters from the bars. Other equipment consisted of bags for the oysters and a cull board where harvested oysters were cleaned and inspected. Again there were individuals, nuclear family groups (sometimes just a man and wife), and at other times extended families that saved their money and were able to start an oyster house.

At times it was lucrative and at other times disappointing. When times were good, oystermen “could make $300 a day and be in by lunch,” many said. But during bad times “you could work all day long for $25 or $50 dollars.” Hugh said, “It kind of takes the pep out of your step.”

The hierarchy within the oystering community of practice was flatter than that of the fishing community of practice. The oystering community of practice consisted of two primary sub-communities. The first was comprised of those who ran an oyster house or marketed their individual catches outside the area. The second group was more likely to sell their catch to other those in the first group.

Many of the same characteristics – equipment (boat and motor), family size, networks, flexibility, background knowledge, and motivation – were factors that influenced the status of an oysterman and his family. A better boat with a faster engine allowed an oysterman a head start to the grounds, the ability to cover more territory quickly, and handle heavier weather more safely. Family size appeared important in much the same way that it was for fishing families. Frequently, however, the nuclear families of oystermen were larger, resulting in more children to support. Extended families, however, especially if they consisted of male relatives who also worked in oystering were a plus as these provided greater access to information on the location of mature oysters.

Some oystermen, like fishermen, would work only as much as was necessary to pay bills and would then stop. Others worked consciously at raising their status or retaining their status by becoming involved in multiple livelihoods. Many of those who were inclined this way “fished, crabbed or oystered, whatever was in season” or acquired a land-based job to supplement their fisheries income. They were the type of individuals who “didn’t sit back and bellyache” when times were difficult but went out and “found something to do,” said the wife of a former oysterman. Gail recalled Carl. “Carl fished along with oystering.” He didn’t sit around and twiddle his thumbs.” The two had, at one point, been involved in oystering and crabbing. She recalled working over a stainless steel sink endlessly, picking crabmeat.

By being flexible and motivated, families were able to start or expand their oyster houses. This placed them in a position of being able to buy from others and to a limited extent, control the price of oysters. Corbin remembered, “The man told them how many they could get and what he was going to pay them.”
Controlling the price of oysters was a bit more difficult than controlling the price of fish. First, there were more, small oyster houses than fish houses and as a result oystermen had a greater choice of where to sell their harvest. Second, since their boats were shallow draft and could be pulled ashore or docked in shallower areas, they were not committed to selling to a particular dealer.

Oystermen, unlike the fishermen who had a steeper hierarchy, were able to work cooperatively and had formed an oystermen’s association. One oysterman explained that people would meet to vote to determine how the state-sponsored oyster relay should take place. During the relay that occurred at the close of the oyster season, oysters would be moved from unapproved inshore waters and placed offshore in conditionally approved waters.

Dennis, who was involved in the oystermen’s association, recalled that everyone was working toward the same thing. “…[E]verybody that went to the meetings, everybody that voted on everything, depended on it for a livelihood. Therefore, a disagreement, whether it was a good disagreement or a bad one, was a valid one. And it was along the same lines. Everyone wanted the same thing.” He added, “While there was always arguments or turmoil about where to plant them [oysters] or where to get them from…you were able to agree (because) everybody wanted the same thing. Nobody was trying to capitalize on it… Basically everybody wanted the oysters moved, and they wanted them planted, and they wanted what would turn out the best because that was their livelihood.”

Besides the communication that took place as a result of social interaction in the oystermen’s association, oystermen relied on large nuclear and extended family networks for information. By the 1960’s, as pressure increased on marine resources, Oyster Islanders involved in fisheries no longer freely shared information regarding fishing, oystering or crabbing with those outside their families. Steve said, “…it was your oysters and my oysters and his oysters and his oysters, because they were in the gap and whoever combed them up first got them.

Carl who oystered for years remembered talking with his many brothers over the kitchen table. They’d all recount their day and plan where they’d go the next.

Communication between fellow oystermen who were not family was more a source of camaraderie than information, a former oysterman’s wife explained. She said, “In the old days, when they’d all go oystering, they’d all go to the (convenience) store. They’d have coffee and they’d talk about where they’d oystered out this hole and that. Then they’d say, ‘I think I’ll go to that hole.’ And then they’d tell you they were going here but they really wouldn’t go there. They didn’t want you to go there and get their stuff.”

Matt said, “I tried to keep it (information on good oystering spots) to myself. The more days I could work there without more boats showing up the better. The more money I could make.” Matt explained, “You had folks that didn’t look for oysters. They looked for people who knew where oysters were.”

Women in oystering families frequently worked in the family business, mostly on land but sometimes on the water. Roseanne, a daughter from an oystering family, said her mother oystered with her father for 30 years.

Gail explained that many families worked together to run small oyster houses. She said, “Husbands and wives ran their business together.” Recalling a typical day she
remembered getting her husband off oystering at daylight, preparing the oyster house, getting the kids off to school, cleaning house, and paying bills. “And then, by that time he could be in…. [A]nd we would start shucking oysters. I did some of that.” She held out her arms to me. “Got my scars.” She laughed. “The knife slips.” Then she added, “And of course, the phone would ring and there would be people placing orders, or there’d be people driving up.”

Frequently, generations of women worked together. Roseanne remembered working in the oyster house with her mother. She added that her mother still works with her at the oyster house she now runs. Roseanne said, “She still helps me. She’s going to shuck and do deliveries this year.

In some oystering families, particularly those with no sons, daughters were encouraged to work on the water. One wife of a former oysterman said, “The dads wanted a boy so bad, you know, that they just...took their little girls off and made them boys. Let them do it.”

Sally added, “You got to be raised, I guess, that way. I mean I was never told there was nothing I couldn’t do. If I wanted to do something, I went out and did it. I’ve crabbed. I’ve oystered. I’ve fished. I’ve done it all.”

Linda said she remembered her dad singing, “Anything boys can do girls can do better. So I had this whole mindset of first, not having been a boy, I had to prove myself. And I was daddy’s boy, so I had to prove it to myself probably more than anybody.”

Through different patterns of interaction with the natural world, these women accessed resources that had previously not been available to women. They also, however, were responsible for their role as a woman – daughter, sister, mother, etc. These women had extraordinary flexibility, developed a wide set of interests. Because dual roles require dual sets of patterns of interaction, these women had well-developed sets of vertical and horizontal ties and knowledge sets that others did not.

Interaction Patterns across Communities of Practice

People who moved between communities of practice, claiming legitimate peripheral membership in more than one group, were criticized by some and admired by others. It appears that this strategy was commended when it enabled individuals to “get by” or survive in lean time but criticized when it became a means of raising one’s status above that of others. Involvement in more than one community of practice enabled individuals to expand their social network and diversity their interaction with the natural world. This expanded interaction resulted in a more diverse knowledge base. Others turned to these men for advice and assistance. Their names we mentioned by others in almost every interview.

The Wild Clam Harvesting Community of Practice

The wild clam harvesting community of practice was not nested within the larger community of Oyster Isles, but existed in South Florida in the 1980’s and early 1990’s. Several members of this community of practice left that area and came to Oyster Isles as the clam farming community of practice began to emerge. The wild clam harvesting community of practice had its origins in the New York area, from Bellport to Long
Island. Clam harvesting has been a tradition in this area since Revolutionary times. Several wild clam harvesters remembered working with their fathers as boys and then going on to own their own boats.

Phil said, “I guess I started when I was about ten. I culled for my father on his boat and I culled for other baymen on their boats.”

Clam harvesting, like oyster harvesting, was backbreaking work. Clam harvesters worked out of a boat with a long rake that had a telescoping handle. The harvester adjusts the handle “to roughly three times the depth of the water” and works with the tide and or the wind, one former wild harvester explained. “It pushes your boat,” he said. “You’re not anchored…you just go in and out…in usually 6-12 feet (of water).”

Another wild clam harvester added, “It’s a tremendous amount of work.” Because of the nature of the work, few women were involved. Most wives, like the wives of fishermen, worked another job or career to supplement their husband’s income.

The interviews that were conducted with former wild clam harvesters shed little light on the cultural structures and patterns of interaction of wild clam harvesters prior to their arrival in the Oyster Isles area.

Conclusion

This chapter has looked at cultural structures and patterns of interaction with the social and natural world that existed before the reorganization and organization of the clam farming community of practice. This analysis has revealed that the smaller communities of practice nested within the larger community of Oyster Isles were structured hierarchically, with fishing over oystering. Further, within communities of practice, there were hierarchical structures that determined interactions. All of the fisheries communities of practice had patron-client structures although those structures appeared most pronounced in the fishing community of practice. Within this community of practice hierarchies were considerably steeper than in the more egalitarian oystering community of practice. Steeper hierarchies stifled cooperation and collaboration.

This analysis also revealed that men primarily worked on the water while women played land-based roles supporting men’s work, supporting the family (children and older adults), and supporting the community. Men at higher levels of the hierarchical structure developed both vertical and horizontal ties. Men at lower levels of the hierarchical structure more often developed horizontal ties. If they worked solely in one community of practice, these ties were limited to strong ties with others within that practice. If they crossed into multiple communities of practice, they had both strong horizontal ties within their primary community of practice and some weak and strong ties to other communities of practice.

Women, on the other hand, primarily developed horizontal ties within their family structures and with other females, older adults, and children within their community. Despite the fact that women were more likely to have received some higher education outside the community, few maintained strong vertical ties outside their immediate system except with those individuals who directly affected their family’s wellbeing.

Revolutionary times refers to the late 1700’s, preceding and following the U.S. Revolutionary War.
(doctors, dentists, etc.). Ties with men to whom they were not related or romantically involved were discouraged. These phenomena may have decreased opportunities for women to learn.

It became clear that attitudes toward the natural environment shaped patterns of interaction with both the natural environment and the social world. As resources within the commons became scarcer, social interaction with those outside ones extended family decreased; horizontal ties became stronger while vertical ties weakened or disappeared. This phenomenon may have also decreased opportunities for learning.
CHAPTER 6
ENDINGS AND BEGINNINGS: A PERIOD OF INTENSE CHANGE

Introduction

This chapter focuses on the intense period of change that marked the reorganization of the larger community and the collapse of the fishing and oystering communities of practice in Oyster Isles and the wild clam harvesting community of practice along the Southeast coast of Florida. As the phases of adaptive cycles of these various systems in the panarchy collapsed and reorganized, they fed off one another, top down, bottom up, and laterally. The organizing of the larger community of Oyster Isles appeared to have both positive and negative effects on the communities of practice nested within it. One major result of the changes occurring was increasing diversity and the reorganization of two groups – insiders and outsiders.

The Effects of the Larger Community on the Panarchy

By the early 1980’s with the organization of the larger community of Oyster Isles, people were beginning to relocating from outside areas. Some came to retire, others to buy second homes, and some came to pursue a new way of life. Many were searching for a community like Oyster Isles, one with a pristine environment and a safe, small-town feel. One woman said she moved here because of her son’s allergies. Another found an article about the island community in the Wall Street Journal and decided to take a look. She said, “When we drove into Oyster Isles we just knew this is what we wanted. We wanted it for our daughter and her life. A place for her to grow up riding her bike around town, going to the grocery store for mommy.”

Many of these early arrivals to the island had come from areas where the environment was not as pristine as in Oyster Isles. Some had come from South Florida where the reefs were dying and fisheries were being depleted. Others were from the Northeast where “the waters had been destroyed.” These people treasured what they found and began working with islanders to protect the waters around Oyster Isles. In the late 1980’s, action was taken to begin developing a comprehensive plan. Work then began to expand the sewage treatment plant and eliminate septic tanks. A bit later, the environmentally active group learned of a developer’s attempts to build on an offshore island. They were able to thwart his efforts.
Growth continued. With the decline of the fishing and oystering communities of practice, condominiums replaced fish houses and warehouses. Historical properties were refurbished and resold. Property appraisals and taxes rose. So did insurance premiums. Many members of the oystering and fishing communities of practice, who were now struggling to make a living, sold their island property and moved inland to the “sticks”.

Craig pointed at a map and said, “Some people had moved off the island to the mainland right out here.”

Barbara, one of those who had moved, reflected, “When I came here local people living in Oyster Isles (were) fishermen, oystermen, crabbers.” She said there were traps, boats, and nets everywhere. “It was a typical fishing community. And that’s totally changed. Local people don’t live in Oyster Isles anymore. About the only way you can live in Oyster Isles is if you’re working with family property that’s been in your family for a long time.” Otherwise, she explained, “…a lot of those people are finding themselves unable to afford the taxes, property taxes, and insurance.”

By this time the state had offered the first series of job retraining classes to former oystermen and they were farming clams – in the early 1990’s, the wild clam harvesting community of practice along the Southeast coast of Florida was collapsing. Members of this community learned about Oyster Isles when they marketed their clams.

One said that while he was on vacation in the Northeast visiting his brother who marketed clams, he saw Oyster Isles farm-raised clams for the first time. He said, “I asked my brother, ‘Hey!’ Where did those come from?’ ‘Oh. These came from Oyster Isles in Florida.’ ‘Oh, really!’ So, when Sara and I got back (to Florida) we took a trip over here.” He said that when they came they met people he had known as a boy growing up in New York, fellow wild clam harvesters. “It’s a small world. The clam world’s a small world,” he said.

Then fishermen who had been forced to stop net fishing were offered the state-sponsored aquacultural training began farming clams. The success of these former oystermen, fishermen, and wild clam harvesters and the continued organization of the larger community of Oyster Isles led to more growth. The number of outsiders and accompanying development increased.

One islander said, “The price of real estate here and property has just skyrocketed. When you talk to people that’s come in here and bought and they’ve built big houses, it’s like, ‘How can you buy this lot for $100,000 and now your property taxes are going to be $2-$3,000 a year?’ They tell you flat up, ‘We’ve been all over the state of Florida and this is the cheapest land and the cheapest tax.’ And another thing that’s kind of scary is they’re coming in and they’re building these really nice, fantastic houses. But not to live in. For resale. That’s scary.”

**Insiders and Outsiders**

Even before the net ban, as islanders and newcomers came into increasing contact with one another, the use of the terms *insider* and *outsider* became more frequent. By the time research was underway, the use of these terms was frequent.
Dave, the in-law of a native islander, was one of many who talked about the “insider-outsider thing.” He, like most other insiders and outsiders agreed that most of the differences between community members were “between insiders and outsiders.”

Those who were born and raised on the island were unlikely to refer to themselves as insiders. When they were interviewed and when they spoke in town functions, they frequently referred to their heritage with statements like, “My family’s been in Oyster Isles for generations.” It became apparent that they felt this allusion to their island heritage made those listening consider their remarks more seriously. They also seemed to feel their deep roots gave them a greater stake in the island’s affairs and in its future.

Gail, a clam farmer’s wife, said, “My great granddaddy came up [to Oyster Isles] in horse and buggy from Gulf City after he was discharged from the English army. That was on my mother’s side. We’re fifth generation.”

George, a former fisherman turned clam farmer, started his interview, “I’m fourth generation. This house is more than a hundred years old. My granddaddy built it.”

Hugh said, “My mother’s name was Lilibridge, which is a family from Persimmon. My grandmother’s original name was Hornsby; that is a big family still in Oyster Isles. It’s one of the bigger families that’s still living here. And my dad’s family, you could trace my dad’s family back…. We’re on the map down here in the museum building.”

Natives were quite clear about who outsiders were. Corbin, whose family goes back five or six generations, said, “We call them outsiders…new people (who) move in.” Donald, echoing a refrain heard from many outsiders, said, “If you weren’t born and raised here, you’ll always be an outsider.”

Most newcomers, especially men, no matter how long they had been on the island, seemed to understand that the term outsider implied a lack of acceptance. Many outsiders did not feel that what they said at town functions was taken as seriously as if they had been native islanders. Billie, a recent newcomer who worked as hired help, said, “They [insiders] don’t take too well to outsiders.”

Women from outside the island who had lived in the community and married island natives did not appear as concerned about insider-outsider issues as men did. It became apparent that they felt they shared in their husband’s insider status and as a result were part of the island family.

Kay, a woman with more than 20 years on the island, began her interview in islander fashion, pointing out her heritage. She said, “Actually, I’m not really related to anyone from here, other than through Hugh.” She then spoke about Hugh’s family and heritage on the island.

Another woman, Maria, who had recently bought a clam lease with her husband Jonathan said, “It seems like almost everyone is related somehow. That makes the town a family.” Her 20-some years on the island, her island-born children, and her steady community involvement may have contributed to this feeling.

A content analysis of vocabulary used by insiders and outsiders revealed that the use of the word they as opposed to we when referring to the natives on the island appeared to be an indication of outsider status. When native islanders were consistently referred to as they, it became apparent the speaker did not feel he or she was one of them. A retiree new to the island who had taken the job retraining classes in aquaculture said, “I was not a commercial fisherman [but] I lost my job like they did.” Another newcomer
and local businessman on the island described native clam farmers saying, “They would prefer to be called fishermen.”

As the concept was discussed by insiders and outsiders, it became clear that as the fishing and oystering community of practice declined and reorganized as the clam farming community of practice, those who had been regarded as outsiders by fishermen and oystermen began to regard themselves as insiders in the new community of practice – clam farming. Those insiders who had been fishermen and oystermen, however, still regarded outsiders as outsiders.

Several individuals exhibited this re-orientation in their speech patterns as they switched between they and we. Victoria, a former oysterman who now farms clams part-time, was one of these. She said, “That’s why the water’s screwed up. Because we have people who are testing and monitoring the water and there are people regulating the land and they don’t mesh. They [the state] regulate the land and it screws the water up.” Other times she said, “I wanted to see if they [the larger community of Oyster Isles] really wanted change. They did. But they didn’t want it at the cost of….”

Marjorie, another long-time clam farmer, also spoke this way. When I asked how people were learning she said, “We [the clam farming community of practice] all talk to each other. There’s no secrets.” However, when she talked about the former fishermen in the community she said, “These are the men that are oystermen. These are the men that used to fish before they banned the nets. That collective memory that they have is awesome.”

Switching between we and they also indicated more than belonging or not belonging to the community of practice. Some individuals, who were insiders within the clam farming community, perceived themselves as insiders in the larger community of Oyster Isles on some issues and as outsiders on others. For instance, some who married into the community and could trace their family’s island heritage through their spouse found that their perspectives on some issues were so different from those of islanders that in some ways they felt like outsiders.

Victoria, Marjorie, and a number of other women told similar stories of an alienating cultural difference. Victoria said, “I would walk up to guys and they wouldn’t talk to me. They would walk away and talk to my husband.”

Several stories told by different members of the clam farming community also indicated they felt there were degrees of insiderness and outsiderness. One member of the clam farming community who arrived about five years ago said, “We’re still outsiders here.” Another woman new to the community said, “Once you’ve made friends and become part of the community, I don’t think they consider you a Yankee any longer.” These statements encapsulated the feeling of many that one’s degree of insiderness or outsiderness could change.

The use of the terms insider and outsider was a recognition on the part of participants of the existence of different structures of legitimation, domination, and signification held by the two groups, those who were from the island and those who were new to the island. Those who could trace their roots back in the area generations and had remained in Oyster Isles during the community’s economic booms and busts appeared to have an insider-like status. Those people who had come and married into or had been “adopted” by island families, and had woven themselves into the fabric of island life by
having children or sharing common values also found themselves regarded more as insiders than outsiders.

“They didn’t come and buy a fancy house. They came to be part of the community,” said an island native about a family who came to the island from South Florida and now runs a business. “These people support local churches, participate in island club functions and many times send their children to island schools. They don’t come here to try to change it [the island] into where they came from,” said another islander.

Some native islanders who left, usually for short periods of time and then returned to make a living on the island, found it easier to become classified as insiders, especially if they had kept in close touch with extended family on the island and frequently visited. These people identified themselves as islanders (insiders). They identified closely with their extended island family, cousins, aunts, uncles, grandparents and great grandparents. During interviews, they shared photographs and/or discussed family heritage.

Some native islanders who moved away and spent most of their lives outside the community found that even once they returned they were never really insiders. One former island woman who had recently moved back with her husband to retire had bought a piece of bayfront property and built what islanders considered to be “a three-story mansion.” The two had installed a pool and then concealed their property with a high fence. This returned islander said people were complaining that her house was too big. “People are teasing us and accusing us of having left to make money,” she said, “but the house is mostly porch.”

Others realized that by leaving they had lost touch with their cohort. They said they knew people their own age (people with whom there were in the same class at school) who stayed on the island, but didn’t know their children and “didn’t share all that living” that occurred from the time they had left until they had returned.

Then there were those who were clearly considered outsiders. They readily admitted that they were Yankees. Edward, who have been involved in fisheries in Oyster Isles for more than 30 years, said, “If you’re from across the bridge, you’re a Yankee. You’re not welcome.”

Associated with the use of the terms were a number of stereotypes. Insiders were seen by outsiders as poor, lazy, uneducated, and out to take advantage of outsiders. Several participants shared a saying, “How can you leave Oyster Isles with a $100,000? Come with a million.” Outsiders were seen by insiders as wealthy, out to take advantage of islanders, dishonest and destructive. Peter, a clam farmer and former fisherman, said, “They [outsiders] have to climb over their piles of money just to get to their boats.”

Because outsiders were seen as threatening the island way of life and the island commons, initial contacts between strangers were frequently guided by these stereotypes. One particular event stands out as an example of this. Shortly after the net ban individuals, perhaps former fishermen, took roofing nails and scattered them around the marina parking lot. A charter fisherman said, “I think they [Oyster Isles fishermen] put them here to keep the sport fishermen out. According to several islanders, the roofnailers felt they were protecting a community resource for the community’s survival. Another example may have been the decision by town commissioners not to sponsor a July Fourth fireworks exhibition one year. Several islanders explained that the decision was probably done to keep unwanted visitors away. They said that crowds come from nearby towns,
“caused parking problems, drank excessively, and trashed up the island.” They pointed out that these individuals didn’t buy their supplies on the island either but instead brought them in coolers in the back of their trucks.

**Conclusion**

The reorganization of the larger community of practice attracted outsiders to the island community. The subsequent collapses of the fishing, oystering, and wild clam harvesting communities of practice and reorganization of the clam farming community of practice accelerated in migration and contact between members of diverse systems with different cultural structures and patterns of interaction. As the clam farming community of practice grew, these individuals began to interact more intensely with one another. This interaction prompted the sharing of different values, norms, and worldviews. It also prompted learning. This sharing and learning within the emerging clam farming community of practice and the interaction of this community of practice with larger systems (the larger community of Oyster Isles, the county, the watershed area, the state, etc.) and smaller systems (the remaining fishing, oystering, crabbing communities of practice, the wild clam harvesting community of practice in New England, etc.) resulted in a formation of new cultural structures and patterns of interaction with the social and natural world.
CHAPTER 7
LEARNING AND INNOVATION
IN THE CLAM FARMING COMMUNITY OF PRACTICE

Introduction

This chapter looks closely at the conditions and characteristics that affected the learning process in the clam farming community of practice. The adaptive phase of reorganization was marked by intense interaction, sharing and collaboration. This behavior resulted in a great deal of learning and innovation. As the community of practice moved from the adaptive phase reorganization-reorganization to utilization and then conservation, learning and innovation slowed. Those conditions and characteristics that affected the learning process during the adaptive phase of reorganization are discussed first. This discussion is followed by an examination of those conditions and characteristics that affected the learning process as the system moved into the adaptive phase of utilization and then conservation.

The Adaptive Phase of Reorganization

Increased interaction, sharing and collaboration were characteristics of the reorganization phase. These characteristics were primarily the result of six factors: less rigid cultural structures; patterns of more gender egalitarian interaction with the social and natural environment; the need for new knowledge and individuals with diverse experiences; the need for investment capital; the demand for an increased labor force; and a number of crises or learning events which provided teachable moments.

There was no clear division between the adaptive phase of decline/collapse and the adaptive phase of reorganization. Area oyster harvesting closed in late 1989, but clam farming did not begin to emerge as a practice until late 1992-1993 with the end of the first shellfish farming classes. From late 1989 until at least the first clam harvests sometime in late 1993, early 1994, individuals were working at whatever jobs they could find to make ends meet. It probably was not until sometime in 1996, when individuals had experienced a full cycle of farming – from raising small seed, to planting nursery seed on their leases, harvesting that nursery seed, planting these larger clams into growout bags, and then harvesting a crop – that a clearly recognizable clam farming community of practice could be said to exist. This system was the result of the...
coalescence of members from a number of collapsed communities of practice (oystering, net fishing, and wild clam harvesting).

During the adaptive phase of decline, members of the oystering and fishing communities of practice had begun to interact differently with the social and biophysical environment. When oystermen or fishermen found they were unable to rely on regular catches or harvests, they became more secretive about when and where they would fish or oyster, shared less information with others, and turned to other fisheries or part-time, land-based jobs. Wholesale and retail markets found themselves searching for other sources of seafood. Women in families who were strapped for income as a result of the continued decline of the adaptive cycle of fishing or oystering also began interacting differently with the social and biophysical environment. Some sold belongings and/or found additional or alternative jobs to bring in additional income. Some women were working two or more part-time jobs, while others traveled 50 miles or more in one direction for full-time jobs.

These different patterns of interaction affected the social and natural environment adversely. When men shared less information with their peers, they weakened those horizontal ties. If men worked in other fisheries, they placed additional pressure on other already stressed resource bases. When they were unable to supply buyers with product, their vertical ties with weakened or disappeared. And, if men found themselves spending time searching and competing for odd jobs, they further diminished horizontal ties with peers and sometimes found their ties with family members weakening. When women sold belongings to bring in needed income, the immediate result was to increase levels of connectedness within the nuclear and extended family. However, additional and/or alternative jobs far from home frequently weakened horizontal ties with family (both extended and nuclear) and community and the vertical ties they established were usually weak.

The initial result of weakened ties and diminished social networks was increased levels of connectedness and decreased levels of potential within both the fishing and oystering communities of practice. Increased levels of connectedness and decreased levels of potential decreased the overall resilience of these systems. There is some indication that it also decreased resilience within the larger community of Oyster Isles. A majority of the population of the larger community was also involved in the fishing and/or oystering communities of practice. It is certain that it decreased the cohesiveness of this larger community. The incomes of members of the declining fishing and oystering communities of practice, while previously lower than most of the incomes of retirees, businessmen, second-home owners, and commuters who had recently started to use Oyster Isles as a bedroom community, were now even more disparate. This forced many to sell their island property(ies) and move inland. Moving inland meant children who had traditionally been raised on the water, no longer freely interacted with it.

Levels of potential were decreased in a number of ways as well. Social capital diminished as social ties weakened and/or disappeared. Some existent technical capital (i.e., nets, boats, etc.) was no longer useful, at least without modification. Natural capital was decreased as men’s emergency patterns of interaction with the natural environment placed additional pressure on fisheries resources. As pressure on area resources increased, several offshore islands and additional coastal areas were deemed wildlife
sanctuaries, and camping and picnicking were prohibited. This decreased access to areas that had been considered the commons.

One islander talked about this change saying that in the late 1970’s and early 1980’s he had been one of the biggest opponents to the state’s purchase of lands in the Lower Suwannee River. “I had the attitude of, ‘It’s a damned ‘nother government agency buying property that’s going to fence it off so that we can’t go on it.” Traditional cultural capital, the experience and knowledge of fishermen and oystermen, was not deemed as necessary to survival as the communities of practice declined.

The Beginnings

The Search for Alternatives

As the oystering community of practice declined and collapsed, some individuals had begun to look for alternative ways of making a living on the water. Linda, a woman from a traditional oystering family, said, “I was just looking for something that I can do here, to keep my life here and still have children at home.” She explained that she began reading and talking. “I guess it kind of goes back to, I never got to go to college or do any higher learning, so I read, read, read. And I was just in one of my reading things and was reading about all the incredible things that they were doing with aquaculture, not just clams but like shrimp farming,” she said.

Her reading and talking with others piqued her interest in aquaculture much like her father’s had been piqued years before. At that time, her father had experimented with the farming of oysters and had acquired a ten-acre, offshore lease from the state. Though he had found that growing oysters was not profitable but had retained his lease. Linda’s access to this lease, her family’s ownership of waterfront property, and her husband’s involvement in the collapsing oystering community of practice were factors that prompted her to continue to talk and read about aquaculture. She said, “We even had one guy from Japan come over here and look to see if we were suitable for shrimp farming.”

Eventually Linda experimented with clam farming. She said, “Somehow I hooked up with Stuart. It might have been through Victoria. I don’t know. And I had this great waterfront property here and he’s [Stuart] thinking, ‘You ought to meet these people. They’re doing this [raising clams] down on the East Coast, the Southeast Coast. And they [the people from the Southeast Coast] came up and set up raceways, and basically rented them [from Linda]. They were paying me. They were paying me a weekly salary (to run raceways) and then we [she and her husband] also, as the seed got larger, we planted my dad’s lease.”

A bit further north, another woman was also looking for an alternative to oystering. When the oyster beds were closed to harvesters, she had been working with her husband in the family’s oystering business and realized how difficult it would be for her husband and sons and the other men in the community of practice to leave the area they loved. She said, “They have a lifestyle that is different…. They have a creed that is different…. They just don’t believe they have to be part of the world and they don’t have to listen to anything. They’re just not ever going to function completely in the real world. They couldn’t leave this place.”
She and Linda teamed up and visited a South Florida firm to investigate the possibility of raising clams. “Victoria and I went down south together, to Ocean Ventures, and we did a little three-day training thing,” said Linda. Victoria added, “I found out that aquaculture was going to be what we would have to do and clams would be…the smartest.”

Linda remembered being in Tallahassee at the capitol building some time later with one of her father’s old friends when she heard they [the state] were trying to start an aquacultural training program in Belhaven. She said, “They [the state] wanted to have this program at Belhaven and there were probably 50, 75 Belhaven men there, saying…they didn’t want this thing in their county.” Linda recalled that she stepped into the roomful of men and said, “If they don’t want it, we would love to have it in Oyster Isles.” That was how the job-training program began in Oyster Isles, she said.

Early Resistance to Clam Farming

At first, women found it difficult to convince men in the community of Oyster Isles to become involved. Linda spoke about the position she was hired for by the state. “I was the community liaison. I was the one who tried to keep people interested, make ’em believe it would be worthwhile,” she said. Part of the difficulty most women had convincing men was the result of a pre-existing norm that prevented men from really listening or talking to women to whom they were not related nor romantically involved. Here Linda played a particularly valuable role. As the youngest of four daughters, she had been raised as her father’s son. She had been encouraged to work on the water, oystering and fishing. As a result of playing two gender roles, Linda interacted differently with the social and natural world than most other men and women in the area. She had learned how to develop both horizontal and vertical ties with both men and women. She could run a boat and had a great deal of local environmental knowledge. This gender role flexibility enabled her to play an extremely valuable role as the clam farming community of practice emerged.

A number of other women – all outsiders who had been raised to speak and interact openly with men and had been allowed as young girls to be “tomboys” interacting more freely with the biophysical environment – also played instrumental roles in effecting change. Of this group, those women who had realized what the gender expectations of Oyster Isles were and had found ways to work around them without fully assimilating were most able to communicate effectively with men. Those women who found the area’s gender expectations too restrictive were able to communicate with men but were much less effective. Island women and men saw them as “abrasive” and “dominating.”

Marjorie told a story that illustrated what many of the women from the outside faced when they moved to the area. She said she and her husband went into the dealership after she had arranged to purchase the car over the phone. Once they arrived, the dealer couldn’t speak directly to her and instead asked her husband, “Can you have the wife sign this?” Marjorie said, “I still haven’t gotten over it and that’s eleven years ago. He couldn’t even look at me directly.” She added, “It took me a long time to adjust, a long time. And there are some rules that they expect women to do.”
There were two other reasons that men initially found it difficult to begin clam farming. First, clam farming meant they were abandoning their heritage. Second, men’s roles had traditionally lacked flexibility.

Craig said, “Clam farming doesn’t have the heritage. Fishing was a skill. You don’t have be real skilled to go out and throw clams in a bag and put them on the bottom.”

Victoria said, “Men don’t usually make those kind of changes and women usually do.” She added, “There’s this point in life where women are ready to make a change and men just get more solidified.”

Louise remembered her father didn’t want any part of clam farming. Mitchell said his mother talked his dad into it. She admitted that she had to drag her husband “along screaming and kicking. He thought it was just another one of my wild adventures.”

Victoria remembered how difficult it was to persuade the men in her county to become involved. “They were adamant against the very thing that was going to save their ass,” she said. She recalled how she and her husband began teaching children in a local organization how to raise clams. She said when the children started taking buckets of mature clams home that they had raised, their parents began to take notice.

The Florida Net Ban

In 1994, a petition for a state referendum on a commercial fishing net ban was circulated throughout the state. This action, coupled with other commercial fishing regulations, the increasing pressure on the fisheries resource base, prompted several fishermen’s wives to talk to those involved in the emerging clam farming industry. As a result, several decided they would attempt clam farming.

Kate said, “I watched Bernard [her husband] through this whole net ban fight and helped him. Went with him, you know, places wherever, whenever I could.” She added that when she realized they wouldn’t be able to afford to keep the fish house, she decided to get a clam lease and work summers to supplement the teaching income she was already bringing in to the family. She said, “So I went down to the fish house one day and I said, ‘I want a clam lease.’ And Bernard said, ‘What in the world do you want with a clam lease?’ And I said, ‘Well, I’m going to clam in the summertime.’” She said, “I’ve been on the water all my life. I’ve been in a boat. I always had a little boat of mine that I used to redfish in, mess around in…. So I said, ‘I’m going to clam in the summertime months and earn us some extra money.’” She added, “Cynthia, we both, the two of us planted – the first time – a hundred thousand clams.”

The Shellfish Farming Classes

Though several individuals had been experimenting with clam farming previous to 1992, the state-sponsored job-retraining classes were largely responsible for the rapid reorganization of the clam farming community of practice. Graduates of the first class primarily included underemployed men and women who had been members of the oystering community of practice while graduates of the second classes were largely underemployed men and women, members of the former fishing community of practice. Many individuals who had been classmates developed strong horizontal ties. However,
because the separate classes had largely involved members of separate communities of practice, strong horizontal ties between members of the two groups did not readily develop. This situation was not helped by the fact that leases sites for the two groups were, for the most part, in separate locations. As a result, knowledge sharing between the two groups was not as frequent, nor as in-depth as it might have been.\footnote{In mid-2003, a decision was made to open more leases in the area where former oystermen predominated and make them available to former fishermen who owned leases in another area. This move may increase interaction between members of these two former groups (informant, personal communication, October 12, 2003).}

Several farmers recalled the first job re-training program that started in 1992. “It was a year’s worth of a combination of classroom and field training. At the end of the time, you received a land lease and about 100,000 clam seeds.”

One former oysterman said, “Got the feeling most of what was done was just to fulfill a contract not to really teach anybody anything. We met, in a whole year, maybe once a week, sometimes not even then.”

Many of those in the first class disparaged the “scientific knowledge” of the instructors and said that they thought that they were looked down upon by the instructors. All agreed that the real value of the classes was the opportunity to talk and work with others.

Several recalled how they had learned to construct the belts that nursery bags were attached to before they were laid on the bottom. “The belt system was ridiculous. It was developed by people that were…thinkers, and they’re not hands-on. They didn’t want to get in the water with sea rays and sharks. But guess what, you have to get your butt in the water and you have to plant the clams. You can’t just run them off this magnificent boat with this magnificent belt system and say, ‘Aha.’” one said.

Another continued, “It was… a Ph.D. He’d thought up this belt system. He thought this was going to be this wonderful thing. Well, the damn thing didn’t work and he knew it before he even finished the book, but he had this investment in it and we had to learn how to tie the knots, and carry it, and drive it down the sand spit. And then all the while they were taking photos, like we were some poor Cubans playing dominoes. But the belt system was ridiculous. So we developed our own system.”

Several remembered that the business classes were the most valuable part of the classes, but even during these participants sometimes felt they were being disparaged.

One clam marketer said, “At one point it was so bad…. They were talking about taxes and the instructor made a statement, ‘Well, you deduct what you think you want to and then let the IRS [Internal Revenue Service] argue with you.’” She continued, “Well, even…fishermen knew better than this and everybody started laughing.”

A divide between outsiders who came into teach (any of whom were hired by the state) and students from the island area resulted. It was created by outsiders’ lack of appreciation for local knowledge. This decreased levels of interaction between the state and the islanders. At the same time, however, interaction between “students” increased as they were forced to work together and placed in situations where collaboration was necessary. In addition, because the state had opened the job-retraining classes to both women and men, these two groups began to interact with each other in new ways.

A number of women who said they had not been able to enroll in the classes became intrigued by the potential of clam farming. Two, one with no previous ties to
fisheries and another who had dabbled in net fishing and ecotourism, decided to become partners. Marjorie remembered one of the fish house owners ridiculing them. “He used to call my partner and I ‘women from hell’ because we would go out clamming by ourselves. He’d be throwing shit at us; throwing mullet at us when we were coming under the bridge.”

Resistance Conquered

It appeared that oystermen, who were more familiar with shellfish, were more able than fishermen to see the possibility of success in clam farming.

One former fisherman who refused to take classes said, “I thought they were crazy. You know, just being from a small town I guess you think things like that will never work.” He recalled making fun of those fishermen who did take the classes. “I remember Dale Baker and them coming through the bridge and we’d all be at the fish house laughing at them and throwing fish heads at them and stuff, you know. Just joking around but saying they were idiots,” he said.

Another former fisherman’s wife recalled her husband’s decision to take the classes. She said, “There were a lot of people who made fun of him and laughed at him because that was dumb and they couldn’t believe he was going to fall for that.”

It is important to note that many of those (primarily former oystermen) who graduated from the first job-retraining classes received leases in one area while those who graduated from the second series of classes (primarily former fishermen) received leases in another. This geographic segregation impeded interaction, sharing, and collaboration between these two former communities of practice.

Personal success or learning about the success of others was a major factor in decreasing resistance to clam farming.

One woman recalled a story that drove home how foreign the concept of raising clams was for fishermen. She said, “You know, the first time he came home with it [clam seed], it was in a bag. And it was $2,000 or $3,000 [worth]. And I could hold it like that.” She cupped her hands. “And it looked like a bag of sand. And I said, ‘They saw you coming. We’ve been taken. You have Jack’s Beans as far as I’m concerned. But he [her husband] took them out and put them in the raceway. And he stewed about them for two or three weeks ’cause – I’m talking about early, early on, when nobody was really doing this. And we’d gone all the way south to pick up this dirt. And came back with it and it looked just like sand. You couldn’t count it. There was no way. They counted it under a microscope before they gave it to us.” She recalled, “Probably about three weeks later he called me out and 10 of them would fit just on the ball of your finger but you could tell they were clams then. And within just a short period of time they had grown.” She said, “We had a really good survival rate on them…so the magic beans were worth it.”

Eventually women were able to convince their husbands, brothers, fathers, boyfriends, and male neighbors to become involved. One of the techniques that women used repeatedly to persuade men was to have them look at the profit margin. This recollection is representative of this method.

One fisherman turned clam farmer recalled, “There was a lady in town that pulled me aside and said, ‘You need to pay attention to this.’ She said, ‘You need to pay
attention. You need to start observing.’ So she gets out a piece of paper and starts telling me if I put this many dollars into it, the dollars I get out.”

Once a group of men had become convinced, they persuaded others. Craig said, “So I kinda tell dad, ‘Hey. I’m gonna make this much money…if I plant this many clams….’ And it just so happened that the total was…more than he made. And he said, ‘Well, I’m gonna be upset if you make more than me.’” Craig continued, “Well, before long, everybody was kind of picking this up saying, ‘Look here. We need to do this.’” Craig added that they had just been watching others do this and realizing that they needed a job and wanted to stay on the water. “They didn’t want to leave. They couldn’t leave the water really and truly.”

Those who had taken the first class pointed to the incentive to clam farm: a free lease, some equipment, and 100,000 clam seed.

Dennis said, “What convinced me that it was worth doing was the seed that they [the state] gave us during the class because I saw some of the other dealers come in from across the state, from the other coast, who bought up all the project clams and they paid us like 10 cents a clam.”

Most clam farmers pointed to other reasons for becoming involved in clam farming. One of the biggest was the “possibility of controlling your destiny.”

The wife of a former fisherman said, “You put a certain amount (of seed) down and you count on, you know, this percentage of them living and getting to be adults and marketable.”

A former fisherman said, “Now I got a place down there that I know there’s not going to be anybody else in before me.”

Oystermen who had once tried to prevent others from finding out where they were harvesting agreed. One said, “Now you’d be responsible for your own (harvest) instead of letting the whole community share.”

A New Way of Life

The initial success people experienced with clam farming meant a new way of life for many. People were able to trade in their old trucks and buy new ones, invest in new motors for their boats, and, though many found they could no longer afford homes on the island, they had enough money to buy property inland and build a house or buy a new mobile home. People also found that because of the need for knowledge, investment capital, and a larger labor force, they had to interact in new ways. Increased interaction and new patterns of interaction meant more learning.

An Increased Role for Women

The reorganization of clam farming provided women with an opportunity to interact differently with the social and biophysical environment. Several factors contributed to this. The first factor was the more egalitarian nature of the non-formal classes. Both underemployed men and women were encouraged to enroll in the job-retraining classes. Second, an existent norm encouraged women to support their husbands and families during crises. Third, women’s care-giving skills, what some women in the area referred to as kitchen gardening skills, were valued in this new practice. Fourth,
women provided another set of hands in an initially labor intensive practice. All four factors increased interaction and collaboration between men and women.

Women traditionally played important support roles during crises. Kate recalled that her mother-in-law had “sold the little house that they grew up in…and gave each one of the kids $20,000.” This action, and others like it, boosted the group’s potential but increased already high levels of connectedness. Some women continued in the full- and/or part-time positions they had acquired to support their families. Others, like Victoria, opted to take advantage of alternative job retraining. Still others enrolled in the clam farming classes. The gender egalitarian nature of the classes place men and women on somewhat equal footing; all students who completed the classes received a lease, seed, and some equipment. For the first time, women had a legal claim to interaction with the biophysical environment. Many women, whether or not they had taken the aquacultural classes, helped their husband or other male family members with clam farming in their free time. This increased their interaction both with men and the biophysical environment.

Kate, who continued teaching as the clam farming community of practice emerged, said, “I was helping him [her husband] on the weekends and after school and teaching kindergarten. It was physically exhausting. At that time we were just planting, just planting. So I took a year and a half off from teaching…and I clammed and drove the truck, and planted and graded. And everything else.”

Ruth, another wife of a fisherman said she became involved to help the family save money. “Everything he (my husband) did, I did, to save money instead of hiring help.” Ruth’s daughter remembered the whole family working together, “standing neck-deep on the lease planting clams.”

Linda reflected, “That whole aspect of male camaraderie was kind of sliced in half. Suddenly men were having to deal with wives they hadn’t seen in 10 or 15 years. They were always scrambling around working on their own.”

New Gender Roles Affect Cultural Structures

The new camaraderie between men and women resulted in the sharing of new perspectives. Many participants thought women kept most men informed about issues. Laura said, “I don’t think men in general are as aware of what’s going on as women are. I don’t think the men around here will read a newspaper or that type of thing as readily as a woman will either. So they’re not informed unless their wife or girlfriend tells them about it.” She added, “Of course, that’s not to say that there aren’t men around who keep informed.”

Several women talked about the differences between women and men. One said, “Men are hunters and gatherers and women were more into taking care of what’s right in front of them so it kind of flows into women’s ability to take... that’s part of your kitchen or your garden, you know. You have a better sense of control of what’s yours. Where men venture off and did their own thing while women pulled from what was around them. Made a home. They were more confined and stable.”

Several other participants added that men and women had different mindsets. They said men thought about immediate needs and women thought about long-term issues, children growing up and grandchildren. Frequently, women talked about the lives
that they hoped their children and grandchildren would have. Sally voiced a common concern. She said, “…my worst fear that I can think of, which probably won’t be in my lifetime, is my grandchildren have to grow up in a world…where they couldn’t become fishermen or farm clams, or oyster, or even swim in this water.” It appeared that over time, perhaps as a result of increased interaction, several men began speaking about these concerns. On one occasion during a town meeting, a commissioner said he hoped his children and grandchildren would have a chance to work as clam farmers if that is what they wanted to do.

Several women said that the additional communication and interaction increased women’s respect for men and men’s respect for women. Marjorie remembered that when men realized that the women were working and doing the same things that they were “they came to respect us and that opened a lot of communication, where we could go to them because they knew the waters so much better than we did.” Increased respect led to more meaningful communication and a sharing of different perspectives.

Women appeared to look at the environment differently and shared those perspectives with the men they worked with. This group appeared to feel that humans had a tremendous impact on the environment. Women and the men they worked with were more apt to speak about the fragility of the environment and its cyclical nature. It appeared that to this group there was an understanding of the detrimental impact humans could have upon nature. They appeared to look at long-term sustainability over short-term gain.

Sally said,

Everything has a purpose in this world. As far as anything out in that water, everything out in that water is very important. The crabs, they have their own thing that they do that keeps the dead critters off from harming the water, bacteria wise. The fish, the dainty fish, whenever they're grown up…each one of them has their own source of food that has something to do with the next sized fish. It goes on and on and on. I’ll give you a for instance,” she said. “I love redfishing…. Well, one time, they put a closed season on them and all that for they were fearing that the redfish was being eliminated. Well, that’s not true. That's not even not even beginning to be true for the simple reason that now that the redfish are so plentiful and they’re not being caught at the rate that they were -- you see they can’t even sell them in the restaurant. What’s happening is the redfish’s diet is crabs. Well, now the crabbers in this community are suffering because they can’t get any crabs. There’s none available. You know why? Because the redfish community has gotten so large that they’re eating all the crabs and it’s changed the whole thing out there. So one little thing…it’s all connected. So what happens if one person changes the natural environment. It’s, it’s like a ball that rolls downhill and it gets bigger and bigger and bigger. You see. One thing’s got to suffer because the other one’s decided to grow.

One man who had partnered with a woman clam farming said, “I noticed when we went clamming, we would pick up these clam bags. And there would be all of these
types of marine life in there. Not just clams. There were crabs and fish. And I wonder the impact that it’s having on the other species. When you take these bags out. Oh, the stone crabs! You have millions of stone crabs! It was like are they all attracted to that area? And then, not being anywhere else! Is it depleting their numbers?” Then he added, “It’s a breeding area there, I think. Pretty much a nursery area, so somehow we’re disrupting that whole thing.”

Men who did not interact professionally with women felt that humans had much less of an impact on nature. This group spoke more frequently about Mother Nature as more resilient and in control.

One former oysterman said, “Nothing lasts forever and sooner or later something will happen to knock it [clam farming] out.”

Another said, “Mother Nature. You couldn’t change that if you tried. Mother Nature’s going to put you out of business every once in a while and then she’s going to make you rich every once in a while.”

Another factor that influenced patterns of interaction and learning was the fact that women found themselves playing multiple roles while men were usually playing only one. Often women retained their full or part-time jobs, took care of the family, and helped their husband. Occasionally these roles resulted in a woman’s establishment of weak vertical ties with individuals off island who supplied seed or equipment or who could market the family’s harvest. Pre-existing norms that discouraged men and women who were not related from interacting with one another weakened women’s ability to form vertical ties. These same norms and the fact that women found themselves responsible for family and community enabled them to more effectively develop and maintain horizontal ties. However, as a result of the multiple roles women found themselves playing, they had less time to maintain social ties and less time to interact with the natural environment. Multiple roles then decreased women’s access to resources and as a result decreased opportunities for learning.

Men, on the other hand, with their focus on establishing a farm and business, found that they were forced to establish both horizontal and vertical ties. This was a new role for many men. One clam farmer’s wife said, “He rather be on the boat doing something on the water by himself but he has to call and buy seed because I don’t do that anymore. He has to order bags, bagging material and call up and decide who he’s going to sell to and how many they want and everything.”

Pre-existing norms that had prevented men from communicating with unrelated women, whether the relationship was horizontal or vertical, had also discouraged interaction between insiders and outsiders. These pre-existing norms worked against the establishment of effective vertical and horizontal ties and may have decreased some of the potential for learning as the clam farming community of practice emerged.

In this example, a former male oysterman, an insider, was unable to take the advice of the female cooperative extension agent, an outsider. A of the research participants interviewed said several male clam farmers had not believed the cooperative extension agent when she discouraged them from planting clam seed in the coldest months of winter.

One island woman said, “[He] didn’t believe her. He thought he could grow it [clam seed] and he found out she was right about growing it in the cold weather. He lost a lot of seed.”
Several men learned when to plant and when not to plant the hard way. One former fisherman talked about working with several other former fishermen and learning when not to plant seed. “We had a joke around here, guess it still is in a way. It’s been six years ago. We went out, Hamish, and Stewart, and JD and myself. Four of us working. We did (planted) seed in 40-degree weather and we killed it. We planted close to a million seed that day. We came in and Hamish was taking a shower. We were all taking showers. And Hamish came out of the shower and said, ‘My feet are plumb purple. That’s purple sticky toe weather.’” Well the next day they went back out to check on the seed “and it had all died.” The former fisherman concluded, “Purple sticky toe weather. We don’t mess with it when it gets that cold anymore.”

Women who farmed clams spoke about the cooperative extension more often than did men who farmed clams. Marjorie said, “She’s wonderful. Whenever you have a problem…. Whenever I have one, I just call. She’s a great channel of information. If we need anything, she’s there.”

An Increased Role for Outsiders

Because clam farming was a new venture in Oyster Isles, there was a need for new knowledge and people with diverse experiences became more valued. There was also a need for investment capital. Graduates of the retraining programs had been given a lease, some equipment, and some seed. Many graduates who continued to operate found it necessary to find additional funds to do so. Those who came into clam farming without taking the class found they had to purchase a lease from someone exiting clam farming. Initially leases were relatively inexpensive ($500 to $1,000). Since clam farming had been pioneered in South Florida, members of the Oyster Isles clam farming community of practice began developing vertical ties to individuals who had lived and worked there and had migrated to Oyster Isles, or individuals who were still living and working in South Florida. Before clam farming classes, Linda, a former oysterman, had partnered with a company along the Southeast coast and begun to experiment with clam farming. Later she and Victoria traveled to the South to take an aquaculture workshop. When the first job-retraining classes were offered in Oyster Isles, the state contracted with a company along the Southeast coast to help with training and to supply clam seed. This contract led to strong vertical ties with many Oyster Isles clam farmers. Some clam farmers continued to rely on that company and other companies along the Southeast coast for seed. In addition, several companies from the Southeast coast moved some of their operations to Oyster Isles. This provided employment opportunities for some members of the local clam farming community. These individuals and firms interacted with members of the Oyster Isles clam farming community of practice, sometimes collaborated with them, and began trusted sources of information for island clam farmers.

Christopher, a former fisherman, explained that when he began clam farming he was able to get information from the local cooperative extension agent and a company who was selling seed. This individual ended up working with him. Christopher said, “He came over [from the Southeast coast] and helped us out in the beginning because he had been in the farm-raised clam industry for probably 10-12 years on the East Coast and had a lot of knowledge. We learned a lot from him.”
A former wild clam harvester who had moved to Oyster Isles to establish a clam farm and wholesale business said he had “tested the waters in 1986 when it was still the dark ages of aquaculture.” He explained that many individuals who had grown up wild clam harvesting in the Northeast and had worked along the East Coast of Florida, came to Oyster Isles. They brought years of experience in the area of marketing and processing which area clam farmers were able to tap into.

Richard, another former wild clam harvester, talked about his business and said, “We’ve got a unique thing going and we’re setting an example for a lot of people. They see what they can do.” He continued, “Everybody is trying to emulate us.”

Sometimes outsiders formed partnerships with other outsiders. When they were able to team up with individuals who had farmed clams on the East Coast, they were particularly successful. Myra said that when she and her husband began they did everything slowly. “We started planting our clams and Angel’s Clams was here at the time…[and] Angel would go out with us and show us what not to do. We bought out seed from him and he went out on the boat with us and helped us clam. And he was just really, you know, nice. He was from the East Coast.”

Sometimes outsiders found it impossible to interact and acquire advice from insiders. When this occurred, many would observe insiders closely to learn how to better farm clams. One clam farmer noted that when she and her husband worked their clam lease they would frequently have a cull board\(^{71}\) on the deck of the boat. One outsider new to clam farming noted this and adopted the practice. The island clam farmer said, “The next time we saw them out there they had a cull board. Boy, did we laugh.”

**An Increased Need for Labor**

Despite pre-existing norms, the labor intensive nature of clam farming, forced many clam farmers and those involved in peripheral specialties (raceway and hatchery operators, bag makers, etc.) to broaden their social ties both horizontally across the former communities of practice to negotiate information and recruit partners and vertically to contact investors, seed suppliers and markets. Sometimes they extended their horizontal ties to outsiders.

Former fishermen and oystermen were used to working alone but the labor-intensive nature of clam farming almost necessitated having at least two individuals work together. In the beginning, this person was usually a family member or close friend, but some were forced to hire help or find a partner.

Small operations could usually rely on family. One peripheral business in town that produced equipment relied strictly on family. Steve explained that he and his brother-in-law have a clam business together. One clam farmer had his daughter working for him making belts while his son worked for him on the lease. In addition, he hired one or two people.

Larger operations, where multiple family members had acquired leases, required extended family collaboration. Beverly said, “…[A] lot of the Hornsby’s. They do it together. They have their leases close to each other and they help each other.”

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\(^{71}\) A **cull board** was a board typically placed on an oyster boat where oysters that had been harvested could be separated and cleans. Small or dead oysters would be culled from the harvest and returned to the flats.
Those relationships that were limited to family promoted stability and decreased perceived risk. For this reason they were conducive to learning. Craig, like many others, explained that his group was primarily family. “My group consists mostly of relatives.” Here learning was usually the result of shared experiences and commonly negotiated meanings.

Frequently individuals exchanged labor to farm more profitably. This occurred frequently between extended family but was also fairly common between friends. Laura explained that she worked on her ex-boyfriend’s lease as needed and he worked on hers. She said, “I traded days. The days that he helped me, I helped him those many days on his (lease), so that evened it out.”

When family was unavailable, people were forced to look in other directions. One newcomer to the island said, “I started helping Pierre just to clam out on the water because the people that were related to him, family members, were uncomfortable being on the water, in the water. So I started just helping out as a friend.”

Marjorie said, “I work with a partner. I can’t do this by myself. No one can. You can’t do it by yourself physically.”

Many talked about the difficulty of expanding their clam farming business because of a lack of economic capital. Barbara said, “There was no institutional financing of clams available. Nothing. And everything that people did as a result…. You hear about partners that had money or happened to be able to get money from the bank or…just bootstrapped themselves. She said, “I took the bootstrap [route].”

Christopher explained that he formed a partnership with someone from off the island. “He were always interested in this clamming industry that was just starting to take hold and I was also. I’m local, I knew what’s going on and I knew the waters. So he approached me about it, ‘Let’s get into the clam business.’ And I had this property next door here and I owned that property there. So we took my property and his finances and we got in the clam business.”

A former oysterman talked about one of his friends who had three acres. “He’s trying to plant four million [clam seed]. He has a backer which is his girlfriend.”

Other entrepreneurial types made deals with investors. Steve said that he and his brother-in-law worked for shares with an outsider. He explained that they “do a fifty-fifty deal. We raise his seed and we get to keep half and he gets to keep half because he doesn’t have enough space [and] he doesn’t have enough money. It works out pretty well.”

Resilience Increased

Interactions between insiders and outsiders, whether the result of a need for knowledge, diverse experience, or investment capital, decreased the level of connectedness and raised the level of potential within the community of practice. This increased resilience.

One group of outside clam farmers told an interesting story about how acquiring a market had led to a partnership with a group of islanders who farmed clams. Myra said, “That is the most bizarre story. Roger and I love Disney. Not the theme park thing about it but the hotels and the pools. So we went down there
and Roger and Dorothy were playing in the pools and I had on a bathing suit. We were staying at the beach and...yacht club and they had a Cape May Clam Bake. It’s called a Cape May Clam Bake. And so I went up to them and they have their clams out and I made fun of them I said, ‘Look at these puny little clams, you guys.’ And the guy said, ‘What are you talking about?’ ‘I’m just kidding around with you about these clams. I’m a clam farmer from Oyster Isles.’ And he said, ‘Don’t move.’ And I thought I was going to be in trouble for a minute, you know, but I was just being a smarty pants. But he didn’t… He brought out the head chef and the head chef said his name was Barry. And he said, ‘You. Are you really from Oyster Isles?’ And I said, ‘Yes.’ And he said, ‘We’ve been trying to get Oyster Isles clams for a year.’ Oh my goodness. Well, I started shaking inside. I was so excited. But I didn’t have clams myself. They weren’t ready then. So there I am, in my bathing suit and Roger comes out. ‘You’ve got to go in there and talk to these people. I just can’t do it.’ I just couldn’t do it. I was so nervous. So Roger comes in and...we ended up sitting there for an hour and a half and by the time we left we had an order for our first shipment of clams. So we came back and what we did is we contacted George because he was so good to us. And Christopher. And we said, ‘We’ve got this order for Disney, but we don’t have any clams. Would you like to go in partnerships with us and deliver clams to Disney?’ And they were just, ‘Yeah. Great.’ And that’s how it got started.”

Interactions with outsiders instilled in outsiders a greater sense and love of place. This led to more successful interactions with the natural environment and increased learning.

Richard said, “Sometimes I just go down to the lease and mess around. I carried a friend of mine down one time to the lease, one cold morning. You know how crisp and clear it is. It was beautiful. He told me, ‘You sure work in a beautiful office.’ I said, ‘Yeah.’ ”

Marjorie said that her boys learned how to run boats and navigate area waters from islanders. She said, “These men are amazing. [They] have been on the water since they were seven years old. Rick’s the one that taught [my oldest son] how to drive his boat. [He] taught him how to go out to the channel and back.”

Perhaps the most notable example however, was the link between one insider, a former fisherman, and an outsider, a recent high school graduate. The young man’s mother talked about his relationship with his mentor. She said that he had first worked for another clam farmer and become interested in clam farming but “he didn’t learn too much. Mostly just doing the bags and cleaning the raceway but nobody ever explained to him any of the background about it, like why you’re cleaning the clams off or what happens if you don’t clean the clams....” She continued, “He never got involved enough to really learn. And now with Carl he’s really learning.” The young man agreed and added that his mentor “really knows the waters. Sometimes we’re out there and he sees something and just starts telling me a story about it.”
Intense Learning and Innovation

Changing patterns of interaction and increased collaboration accelerated the learning process during the reorganization phase of the adaptive cycle.

“One guy…called it [clam farming] the never-ending experiment…cause we were always looking for something to make it easier to do and as we experimented we shared, shared with close friends and family,” said Caven.

Caven said, “Some people will ask us what we think about a good time to do planting and we discuss with them how you handle the seed when you have it out of the water.” He explained,

In the summertime, we actually chill it like fish in ice water and then drain ice water back off it. Put it in an insulated cooler. Put a couple ice bags on it. Keep it nice and cool. Wintertime, keep it in the cooler. Protect it from wind and don’t add any ice to them. In the summertime, if you’re going to hold them any amount of time, bunch them up in a sand bag or a 48-quart cooler. Let them sit there for few minutes. Run your hand down [until] you can feel the heat, even when [you] put ice water on it you can feel the heat if haven’t stirred it.

He said ice can hurt them so “don’t leave it on them. I stir them up in the cooler ‘till I don’t feel a hot pocket in there. Then, in a minute or so, drain the water off of them.” When asked how he learned that he said he and his partner had been talking and realized they had to find a solution to the seed losses. He said, “We knew heat was a problem.” So they tried a number of ways to keep the seed cool until they found this. “We did it. It worked. They do it down south now when they ship them [clam seed] to us.” He concluded, “The idea started here and went down there and back. Some of the students [in the clam farming classes] when they first saw us doing it, they’d freak out. But they’d seen right off the bat that it worked.”

Interactions between insiders and outsiders and the new patterns of interaction with the natural environment required innovation. Ruth said, “Everybody is experimenting. They’re just all trying from the time they spawn the clam to the time it’s growed to one and a half inch size. There’s lots of people out there right now that’s coming up with all kinds of great ideas.”

Matthew and Caven, two clam farmers talked about a series of interactions between insiders and outsiders that resulted in several inventions still in use today. Caven said,

When it [clam farming] first started, everything [the harvested clams] was hand counted for market sale. That was a really time consuming thing to do and somebody came up with the automatic grader And it counted it [the harvested clams] and cleaned them at the same time. I’m not really sure who did that first. They might have already had something on the market but it took us several months before it ever got to Oyster Isles. Anyway, we needed something to count large seed clams. They had come up with
this tumbler – I'm sure you seen them around town – for getting the trash out of the market clams – anyway I guess it’s been about two years ago and we were doing [cleaning] some large seed and we had a lot of shell in them. And Robert was telling us we need to come up with something [to process them automatically instead of having to process them by hand] and I was standing there and I thought, ‘Well, hell they used a tumbler for large clams. We just need to build a small one. So I went out and called Stuart. He’s passed away since. He was one of the people around town that was building different things. And I went out there and told him what I wanted and he put it together. And it was about half the size of the larger tumbler with a smaller gap in it and it worked great. And then I turned around and bought one for my seed business and Ocean Ventures sent that one [that he had made first] south.

Matt explained that Robert had also built a tumbler for Carl with a washing machine transmission or a lawn mower transmission on it. He said, “It had four speeds and a reverse and everything. He [Robert] was the Red Green of Oyster Isles. I mean he had on sign on a shed out there, something or other salvage [and] had it on a big old redfish over the door.” Then the two showed me a grader that they had made mounted a spring and Caven explained, “Well, I was down…at the hardware store getting some paint and watched the way the paint shaker moved. So we got some springs off an old paint shaker.” Then they pointed to the motor and Matt said, “That’s an old washing machine motor.” He then turned it on to show me how it worked and said “We used to sieve out a million clams and it’d take three or four of us all day by hand. Now we can do that in about an hour and a half with this.” He explained that when they had first made it and turned the motor on and loaded it with small clams, it ran backwards. They had tinkered with until he found that by spinning the motor in the opposite direction they could get the clams running down the grade. After rewiring it so it ran in the direction they needed it to, they had a real time saver.

Stories of other inventions to save time were frequently shared. Most, like the grader above, were the result of trial and error.

One woman said, “At first people were putting their belts on the bottom using plastic clothes hangers. They would bend them and stick them down in the ground.” She explained that waves and storms would wash them up. She continued,

Then they come up with the wires. You bend the wires in half and stick it in. It was a bit longer. Same problem. It washes up. And then they came up with PVC and just hook it on with a zip tie, stick it down. You can cut it any length you want, about a foot is what most people use and that doesn’t wash up. The one advantage of that is you zip tie that to the bags. See, then you recover it. You don’t lose it. You get it back or you can use it next year. PVC never rots away.

Those who appeared to be more successful said that experimenting had to be done gradually to keep risks low. One clam farmer said, “What we do is we do some things in small degrees till we see if they work, then they don’t hurt you that bad.” He explained
that he and his partners had come up “with a brilliant idea about building frames for nursery seed.” They had tried it but “thank goodness we didn’t build but two because it didn’t work worth two cents. It floated up and washed away….”

_Crises, Learning and Innovation_

About two years after the first job-retraining classes began, a serious incident prompted intense communication and collaboration. Farmers who returned to their leases found that their clams were being eaten but could not understand how, at first.

Laura, who that she had just planted clams on a friend’s lease, said, “I put down 60,000 clams. We put down some for [my friend] the next day and he checked my bags and we were surprised to find my clams had been eaten overnight.”

This crisis prompted everyone to begin investigating. Gail said they found that it was “a fish that gets in there and turns upside down with its tail wiggling up in the air. It makes a hole in the clam bag. They’re crunching and trying to get through the bag and suck the clams right out of the shell.”

I heard from almost everyone who had been clam farming at the time how he or she had discovered the problem and in cooperation with others found that a cover net would solve the problem.

Gail said, “It was something that came up after everybody was just getting their seed out there the second year. Jean’s husband had some old wire and he was out clamming and he said to Carl, ‘I’m putting some fence wire over mine to keep those fish out of there. They’re tearing me up. So Carl got to looking and he said it’d be cheaper to buy chicken wire….”

The use of cover net has since evolved and has become a controversial topic. Some have continued to use chicken wire and claim it is effective and safe. Others claim it is harmful to the environment and their product. Their awareness and critical reflection has resulted in action, conscientization. Many have begun to use plastic cover net. Use of the plastic cover net is also controversial. Some feel that many of those who use this cover net material do not dispose of it properly. Those who feel this way and have continued to use metal cover net have also critically reflected and acted. Conscientization is discussed in-depth in the next chapter.

A few years after the second job-retraining classes had been completed, an El Niño event occurred. A staff member with a local water management group recalled the heavy rains of the late winter and early spring that caused flood waters to pour into the estuary. Most clam farmers experienced major losses.

Hugh said, “I know when I had the El Niño, we lost 900 bags [of clams]. Had an 87 percent kill. Dead clams, just dead clams.

Ruth remembered that her clams had been ready to harvest. “When they died, they were big,” she said. “When they’re little, that’s one thing, but when they’re harvestable and you go out to harvest them and then you can see where they died just like yesterday.”

When farmers realized that their crop could be eliminated overnight, they asked that the state to transfer authority over aquaculture to the Department of Agriculture.
One clam farmer said, “We felt that we should be regulated by the Department of Agriculture because we were farmers, not wild harvesters. So we actually requested that change and got it.”

One result of this change was the offer of crop insurance to clam farmers. This is an example of a system at a lower level in a panarchy affecting an upper level, and an upper level remembering a lower level; learning took place at a number of levels within the panarchy.

**Characteristics that Enhanced Successful Learning and Innovation**

Individual’s personal characteristics were the result of cultural norms and values (structures of legitimation). Compliance with these norms was important to one’s continued interaction and therefore one’s ability to be in a position to learn from others and from the biophysical environment. Many of these structures existed in one or more of pre-existing communities of practice. Other had been intrinsic within numerous other communities of practice of which newcomers had been/or continued to be members. Several of these structures were shared across these communities of practice in the larger culture.

A number of these characteristics appeared to enhance an individual’s ability to learn. Characteristics that appeared to enhance learning were frequently characteristics that enabled one to develop and maintain successful patterns of interaction with the social and natural world. These characteristics included: male gender; strong sense and/or love of place; prior knowledge and experience; honesty, loyalty and conscientiousness; focus and commitment – a good work ethic; the ability to look ahead and plan; the ability to cooperate and reciprocate; access to resources; flexibility (the ability to multi-task or diversify one’s background or interests); and patience and organization.

**Gender**

The larger community of Oyster Isles, the clam farming community of practice, and members of the smaller communities of practice that declined and reorganized into the clam farming community of practice shared patriarchal values and norms. Men were hierarchically in positions of greater control within these systems. Women, who were credited with handling bookkeeping, rarely controlled the family’s income. They played the role of advisor. In addition, when people were asked who they would go to for information, rarely were women cited as a source of information. Women’s roles as knowledge bearers were rarely talked about unless participants were referring to school teachers. There were few exceptions. Men, then, were more valued as sources of information. Older men who had worked as fishermen, oystermen for a long time, or those clam farmers who had been in the business longer than others were even more highly regarded.

**Sense of Place**

Individuals who had a sense of place and/or love of place were valued. Many townspeople, former fishermen and oystermen made statements which emphasized this
characteristic. One clam farmer shared, “You have to have one requirement and that’s that you love Oyster Isles and you’re not here to spoil Oyster Isles. We’ve had some people down there do nothing but exploit Oyster Isles. I don’t care if you’re born here or if you move in here. If you love Oyster Isles and what you’re trying to do is good for Oyster Isles, then you’re okay.”

Another said, “You gotta protect or have an interest in what goes on in your city.” This characteristic of valuing place was similar to that of having local knowledge or having prior experience working with clams. When people, both insiders and outsiders, looked for someone to work with, they frequently sought out these individuals.

One clam farmer’s wife said that newcomers sought out her husband. She said, “They’d come over to the house everyday looking for information.”

Bernard, a former island fisherman, said that the first person he hired “didn't know anything about the clam business…but knew a lot about Oyster Isles, about the water.” Craig said the fishermen, crabbers and oystermen “already knew the exact spots that these leases were. We’d fished them. And these same channels that we take to go there, we’ve been running these channels since we could run a boat. So it’s the new people basically that have a harder time.”

Just how hard it was for some who lacked local knowledge to find their lease was made particularly clear one day when I was invited on a company boat to replant clams. The boat had been scheduled to leave around 9 a.m. At 10:10, the last two of five men who were scheduled to be on board arrived and we set out for the lease site where the day before they had dropped off a several bags of replants. When we arrived at the lease area, the crew and captain began arguing about where they had left the bags. There was no agreement. They wound their way here and there through a maze of PVC pipe markers for 45 minutes before finally dropping anchor. Then they all jumped overboard and started feeling around in the murky, waist-deep water with their feet and hands for the clam bags. About 30 minutes later, when two men claimed to have found the bags about a quarter mile away, the captain and one crew member came aboard the boat, pulled the anchor and moved south to recover the clams on a neighbor’s lease. Once the bags were aboard, they headed back north and replanted them properly. Some four hours later, they harvested several bags of mature clams. On the way back to the dock, one crew member joked that the captain didn’t know how to find the leases because he was new. Then he added, “Good thing no one saw us taking those bags from that lease. It would have looked like we was stealing.”

During this period, there were an increasing number of partnerships formed linking individuals with local knowledge or knowledge of the clam business with those who had another area of expertise. Frequently these partnerships linked insiders and outsiders. These relations resulted in valuable innovations: graders, nursery seed counters, and novel ways of planting and harvesting with cable systems and winches. Sometimes insiders with a strong fisheries background joined with committed outsiders who financed their operations yet worked closely with them on the water.

These partnerships were usually based on shared values and norms. One outsider who now clam farms said, “…I couldn’t have asked for anybody better than George and Christopher. They’re conscientious. Their places are spotless. He’s the one who showed...”

72 Replants are clams that have been harvested but deemed too small to sell. After the entire harvest is graded, these clams are set aside to be returned and replanted on a lease site.
me how to clean the clams: to make sure about broken ones, how important it is that your name is on that clam, that they really be beautiful when they leave [for the market].”

It also appeared that during this adaptive phase several connections within social networks of unrelated individuals that were not long standing were becoming quite strong. One woman talked about the relationship between a young man, an outsider, and an older man, an insider. This relationship was much like that between an apprentice and a master. She said, “Carl has taken him in. He’s been really, really good to him. The other day…one of the guys said, ‘Al is so lucky. He gets to work with Mr. Carl.’ And Al said, ‘Yeah, I am lucky. But I know Mr. Carl has had a lot of people work for him…and they couldn’t keep up. They didn’t want to stay working for him.’ That’s true. It’s not all luck, you know."

Honesty, Loyalty

Honesty and loyalty were two other valued traits. Craig told a story about a time he had been working out on his clam with his partners and they watched an outsider. “We saw someone in the water feeling around on a lease that wasn’t his. We knew him and knew whose lease it was so we didn’t approach him on the boat. We waited until he got in and we, all of us, went and saw him. Well that does two things. First of all it makes us know that the guy’s still all right – we won’t need to burn his house down. But the other thing is it also lets him know that everybody’s looking out for everybody.” He explained, “Now, he’s not a thief. That’s the reason we went and saw him. Because I know the guy but my dad didn’t know him and the other guys didn’t. But you know, if he was ever going to steal now he says, ‘Wait a minute. These guys are looking out for each other just like I’m looking out for the guys that I work with.’ ”

Most everyone agreed with Richard who said, “It’s important to work with somebody and learn from somebody. Clamming or fishing.” He added that “it took me 30 years to reach a point where I was making, when I really felt like that I was there. I mean you’re never there but that I was finally getting to be one of the old-timers I used to respect.”

Another local clam farmer shared another example of how important these two traits were. She said, “We’re now buying seed from Larry who is farming and doing his own seed…. He’s a very…moral man. He has replaced anything that has died. He has just been really conscientious. He comes over. He makes sure that everything is okay. He won’t even give them [clam seed] to me until I’m ready to plant.”

Several people talked about those individuals who processed their own clams and would set the grade on their processing equipment to allow some small clams to be packed into nylon onion bags and shipped out. They also shared stories about individuals who skimmed their harvest selling the best (largest) clams to one dealer and the rest to another. Individuals who consistently engaged in these practices were avoided, diminishing their social ties. Diminished social ties inevitably affected one’s ability to market clams. A decreased ability to market affected how often one interacted with the natural environment. Decreased patterns of interaction resulted in a decreased opportunity for learning.
Professional Work Ethic

The ability to focus on one thing and do it well and the ability to continue with something through adversity were also valued.

Several said that clam farming had to be done full-time. Barbara said, “I was trying to clam and do the bookstore and it didn’t work. You can’t do both.” Her following comment was echoed repeatedly by many in the clam farming community of practice, “A clam farm has to be a full time, seven-day-a-week job. And to be successful, you can’t let anything else interfere.” Those were involved part-time, as gentleman farmers or hobby farmers, or were involved in another principal means of employment were not seen as committed to the business.

Hired help were typically seen as lacking commitment. Small operators were quick to point out that this was why larger companies and those who investment-farmed were frequently not as successful as those who were hands-on. “These companies hire employees and most employees are just in it for a paycheck,” said one clam farmer. Interviews with hired help confirmed that most were involved only for the money. One who was repairing used clam bags with a glue gun under the shade of a lean-to said, “I spent yesterday patching bags and made enough for a bike payment.”

Most successful clam farmers said that learning required at least one full cycle, from planting to harvest. Richard said, “It usually takes a year or so to figure out if you did something wrong.” Ruth said, “You have to be diligent with it. You have to be patient. There’s always a risk involved so you can never sit back and say, ‘Well, I don’t worry about it.’ It’s always something you have to worry about. I worry about clams dying, the market stopping. It’s like you can’t just be a science to it. You can have a procedure working really well, and then something totally unexpected comes.”

Ruth, Hugh and others said that the ability to stick to things and hang on were characteristics that had enabled islanders to survive during times of crisis. “Like my seven uncles that have been here for years and years. They stuck it out. They realized that the value was going to be here years from now. They just stayed and didn’t sell out,” said Lamar, who along with others moved inland.

This ability to hang on enabled some clam farmers to remain on the island after the collapse of the fishing and oystering communities of practice and others to continue in the business after the El Niño event where hundreds found their clams dead overnight, a result of heavy rains in the state’s interior which pushed a flood of freshwater into the estuary.

Sally said, “People don’t give up around here. People like her uncle. That’s who inspire me and her. ‘Don’t get out of it,’ he said. ‘Stay with it.’” They recalled that they had sold all of their material and would have sold their sewing machines if they had been able to get rid of them. “We would have been completely out of it but her uncle talked us into redoing it and we went ahead and re-invested.” Today they operate one of the few businesses on the East Coast of the United States where clam farmers can buy their bags.

Focus was associated with consistency, hard work, and diligence. Together they were part of a good work ethic.

The same two bag makers remarked, “We’ve got a quality bag. We just try really hard to put out a very good product for a decent price. We’re very concerned. And we also tell them [our buyers] that if they find anything wrong with our bags, ‘Just bring it
back.’ We’ll give them another one. We inspect every bag that we make before it leaves this property here. It’s inspected for any kind of flaws or anything. We get the best thread that we possibly can. We do everything we can. We bought the best machines that we could buy.”

A number of clam farmers talked about how working hard led to success. One said, “We process all day, all day. The phone rings all day. The phone rings half the night.” He added that they even work when they are on the road.

Another said, “A person that works on the water, the man who puts his head down and goes to work is the man that makes the money.” He added, “He’s the guy that gets up and goes to work every day come hell or high water. Who doesn’t watch the Weather Channel. The man who watches the Weather Channel and says he can’t go to work, he’ll never make it ’cause if you watch the weather channel you’ll never go to work.”

Several others shared how important these values were to continued interaction. One farmer explained that he would stop dealing with someone who did not take the same care with his product that he had. He said, “We started loading on the truck and that truck driver throws those clams. We tell him it can crack shells. We tell him, ‘Hey! Wait a minute! Now I babied these things for years. Now you’re going to baby them in this truck.’ ”

On another occasion, a processor recalled when lack of attention had affected his business. “They [the company] bought these food processing machines that weighed fruit and put them in the bags and they tried to use them. The drop on them was about three foot and you just can’t drop a clam three foot. It’s like they were breaking stuff and he [the owner] was just sending them out broken. And nobody was really paying attention to what he was doing, I guess. And so customers started finding out real quick and stopped buying.”

Patience and orientation to detail were two other characteristics that many participants felt increased learning. Most agreed that these characteristics, like flexibility, were more common in women. Ruth said, “Men are not as patient as women. To get the seed from the weller out to the growout, they’re always impatient. They think if they [clam seed] don’t grow, if all of them don’t grow…then you throw them away because they’re no good.”

Christopher added, “There’s probably – I don’t know – as many different ways to plant and farm clams as there are farmers. But all of the ways will work, more or less. Really the common denominator is doing it well, paying attention to detail and being on the spot.”

Several individuals noted that when people were better off they paid less attention to detail and were less patient than when they had to make do with less. “It seems like when people start making more money, they don’t worry about the little, you know, the details. They get more careless with, ‘Oh! You wasted more seed here and some seed there, but no big deal…’”

Long-term Perspective, Flexibility, and the Ability to Cooperate

Planning ahead and having a long-term perspective were also valued characteristics. Ruth said, “Successful clam farmers put an investment into it and get a return.” She added, “during our first year we didn’t really see a profit…because we kept
putting it back into buying better equipment and the new boats. We bought bags, the cover nets and by the time a year came around, we had everything going at once. We had seed in the raceway, we had seed in the nursery and we had harvestable clams.”

Continued investment, consistency, and focus helped ensure that a farmer would have a continued cycle in place, lowering risk. Lower risk appeared to increase the ability to be innovative.

Many clam farmers said you had to “prepare for rainy days” and could not live “hand to mouth.” Preparing for rainy days meant budgeting, saving your money, and planning for your future and that of your children. Matt said, “I’m fixing to start planting them a few...to build a college fund for them [his children].” I’m hoping they’ll be educated. I keep pointing down the road to Michael. ‘Don’t be like that boy.’ And my son sees real quick that he doesn’t want that.” Preparing children for higher education was also a means of diversifying family roles, a form of flexibility.

Another valued characteristic was the ability to work together and cooperate. Many in the fisheries industries were seen as independent and unwilling to work together, but as farmers many insiders and outsiders began to realize the importance of working together. Successful farmers cooperated with others on the farm and within the industry. Many who were able to share raceway or lease space with one another made comments like Christopher’s. He said, “The good thing is that if you have bad conditions in one area, odds are pretty good that they won’t be bad in another, so if you spread your product out, there’s less change of getting hard hit.”

Marjorie said, “We’re going to have salinity drops because of the river. We know that. But we have pretty much figured out where we need to put out seed and I can move my seed from my raceway over to Dennis’ raceway. He’s on the other side. The salinity stays higher. When it drops to 10 [parts per million] on my side, his is still at 24 [parts per million]. Jack, he and Willis are really good friends. We help each other when we need to. You know, not everybody has that.”

Kate explained that sometimes farmers had to cooperate to be able to fill their orders. “We would plant all the time,” she said. “But simply because of economics, because we can’t afford to, we never have been able to afford enough seed to plant all the time. And sometimes... We’ve had times when we would run out of clams, were we wouldn’t have clams that were...marketable. Then we’ve had to buy clams from other clam farmers so we could fill out orders.”

Phil said, “Clam farmers got to understand, whatever you do affects your neighbor. It’s not just you.” He continued, “They [some clam farmers] don’t understand that if you sell dead clams... if you drive around in your pickup truck and they [the clams] go out dead, they’re not your clams anymore. They’re Oyster Isles clams.”

Flexibility was another characteristic of successful learners. It included the ability to diversify how one interacted with both the social and natural environment. Diversifying roles of individuals within families by sending some children on for higher education, raising daughters as sons, and the establishment of gender-based roles were some examples of flexibility. Being flexible enough to take on new roles when necessary was another example. Some men did this by engaging in multiple fisheries. Hal said, “I always had, all through my fishing career...something I could fall back on. I did everything, instead of...just pompano fishing, or just the stone crabbing, or just the mullet fishing, or just the oystering.” Women, however, agreed most participants were
the most flexible. They frequently engaged in multiple roles, wife, mother, daughter, community caretaker, clam farmer, bag and belt maker, as well as working full- and/or part-time jobs in other areas.

A number of individuals said women were more flexible than men. Sue said, “There’s this point in life where women are ready to make a change and men are just getting more solidified.”

Individual’s personal characteristics were the result of cultural norms and values, and compliance with these was important to one’s continued interaction and learning. Higher education, patience, and flexibility were three traits that were particularly desirable in women. It appears that in Oyster Isles these were traits associated with the ability of the families and the community to survive during times of crisis. Women provided a different perspective, valuable horizontal ties, and an ability to reflect critically on the family’s and the community’s finances.

Access to Resources

Being able to gain access to resources, whether this was to existing knowledge, interaction with others, clam seed, equipment, or a lease, was key to successful learning. While some of this has been discussed in earlier sections, it is important that the reader have a clear understanding of the importance of this issue. The more egalitarian structure that existed as the clam farming community of practice emerged, enabled individuals who had not previously interacted with others or the natural environment to begin doing so. During this period, women and men interacted more freely with one another and women, as a large result of this interaction, had increased access to the natural world.

Laura, who did not own a lease, was able to farm clams by placing them on her boyfriend’s lease. Many other women, despite having a lease in their name, had access to the lease through their husband or male relatives. In fact, in several cases, once access to a male relative was denied, access to a lease or a boat to get to and from the lease, decreased dramatically. One woman who had clam-farmed with her husband stopped directly farming clams and had access to her clam farming only through her husband’s male relatives. She explained, “And they had their own leases. They couldn’t devote everything to mine. So we have, you know, the time that they can give me.”

Another individual who was not able to work his own lease said that when he was forced to find someone new to work for him, he found that his direct knowledge of where seed was planted, what seed had died or been stolen, and what seed had been harvested was less certain. Lack of direct contact with the natural environment inhibited learning.

Role Specialization

Role specialization began shortly after the reorganization of the clam farming community of practice. In addition to working with a group (horizontal ties), individuals found they were forced to interact with those who supplied seed, equipment, and bought their harvested clams. Seed suppliers were already seen to be a valuable source of information. Equipment suppliers or refurbishers, especially those who supplied or refurbished (cleaned and repaired) equipment like bags that needed to be replacement or refurbishment regularly, and buyers were valuable sources of information.
Sally, an early clam farmer said, “When I first started harvesting clams there were only one or two people in town that bought them. And we didn’t like the price. Some of us got together and talked about it. We didn’t like the deal. And I said, ‘I’m going to get a license and sell my own product.’ And so I got a license. I got certified as a shellfish buyer and started selling my own product and that of others.”

As a marketer she found that “Everybody wants to know what everybody else is doing and this is a good spot to find out cause everybody tells me what they’re doing.” She explained, “I put a lot of people in contact with each other. I have people who come and say: ‘Do you know anybody that’s buying clams?: Do you know anybody that’s selling clams?: Do you know anybody that’s got a tumbler for sale?: You know anybody that’s got a boat for sale? And I tell them. I’ve even got a little board down there [and I say] put up your boat or whatever you want to. We’re kind of like a little bit of a clearing house for information.” Equipment suppliers were typically able to supply information about what materials others were using and how they were using them.

Buyers were another valuable source of information. They linked clam farmers with the world of restaurants and other retail markets but also could provide information on who was harvesting and how they were farming. Phil, a former wild clam harvester whose family has been in the business for years said he is constantly acquiring information from family members in the Northeast, friends along the East Coast of Florida, and customers all over the United States. “We’re very in touch,” he said. In turn, he shares this information with the clam farmers he buys from. “I let them know everything that is going on,” he said.

Those individuals who one works with are examples of horizontal ties. Suppliers and buyers and those you do not work with on a regular basis are examples of vertical ties. Both horizontal ties and vertical ties can provide an individual or group with additional social ties and information about the social and natural world. For most clam farmers, however, both insiders and outsiders, vertical ties were their most valuable source of information.

Another example of the formation of vertical ties were those created in mentoring situations where one individual had a great deal of local knowledge or expertise in some aspect of clam farming. A number of these relationships have been discussed.

Because clam farmers realized the value of these weak links, they sought them out. Several places on the island provided public meeting spots. Some clam farmers met and talked at the local convenience stores in the morning as they fueled their trucks and boats and grabbed a cup of coffee. Marjorie said if she needed information, “all you have to do is go to the convenience store. Just stand there and listen. That’s where all the fishermen are every morning at six o’clock.”

Others would meet for lunch or an early breakfast at local restaurants. One waitress said, “The boys, when they come in every morning, become fair game to learn from.”

Clam farmers also congregated at boat ramps as they were leaving and returning. Some would visit while in the lease area, pulling their boats alongside others or meeting on a barge anchored in the area. Kay said, “Actually the clammers come by the barge and talk the shit, bullshit, whatever.”

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73 Clam farmers were frequently referred to as fishermen. This indicated that those formerly involved in wild harvest had not made the transition mentally to clam farmers. This is a matter of worldview.
Frequently they met coming and going at suppliers, local bag makers, the hardware store, various processing houses, or downtown along the main road of town. Early in my research, I was advised to go to these spots to meet people and talk. Initially, role specialization resulted in increased access to information. Marketers, seed suppliers, etc., dealt with 40 or 50 different individuals on a regular basis. As time passed, people became more selective with those individuals they dealt with regularly. This selectivity resulted in less sharing of information.

The Adaptive Phase: Utilization to Conservation

Throughout the adaptive phase of reorganization, levels of connectedness had decreased and potential had increased. Levels of connectedness decreased as increased numbers of men, women, insiders, and outsiders interacted, shared information, and collaborated. Their interaction, based on shared norms and values, increased levels of trust. This increased social capital. Cultural capital increased as the knowledge base of the community of practice grew, a result of the sharing of different knowledge bases. Technical capital increased as innovations were developed and shared. Berkes and Folkes would look at the result as neotraditional knowledge. The increased levels of potential and decreased levels of connectedness increased levels of resilience. Holling and Gunderson (2002) state that as an ecosystem cycles slowly from the period of reorganization (organization) into utilization (exploitation) and conservation, “connectedness and stability increase” (35). Within the clam farming community of practice, it appears that once sufficient learning and innovation had provided a foundation for successful farming, cultural structures began to rigidify and patterns of interaction with the social and natural world became more fixed.

Lave and Wenger (1991) point out that communities of practice are fluid systems; members are constantly leaving and joining. As members leave, they take their individual knowledge with them, but a core of knowledge remains in the institutional memory of the community of practice. This is supplied by core members. As connectedness and stability increased, cultural structures rigidified. Core participants stopped interacting as freely with peripheral participants as they once had.

Interaction Decreases

Over time, those individuals who held those characteristics that fostered social interaction were able to amass a variety of capital and felt comfortable narrowing their social networks. This amassment of capital appeared to increase levels of connectedness. One clam farmer talked about the transition from reorganization to utilization and conservation. He said, “First of all we were all trying to survive, so everybody was sharing information with everybody. Now everybody drives by kinda’ mad at each other.” He explained, “You don’t want that person to know where you’re selling your product at. You don’t want him to know how much seed you got. You don’t want him to know where you’re getting your seed.”

Competition had decreased interaction, collaboration and sharing across social networks. “The conversations that happened five years ago you wouldn’t have today,” he
added. “And all of us are still friendly to each other. It’s just, we’re not so open.” Other clam farmers agreed.

Decreased social interaction was largely a result of focusing on those social ties that were of the most value. These ties were those with individuals sharing valued characteristics.

A former wild clam harvester added, “When I first got here, we were like the only game in town or the biggest game so a lot of the clam farmers – we had 40, 50 guys a day – coming through begging us for sales. We, we’ve weeded it down to about five or six regulars. It’s very comfortable. We’re dealing with guys that have got their act together. They’re professionals.”

Another buyer who had been accustomed to dealing with about 40 individuals began dealing with those who were following regulations more closely. That included clam farmers who covered their boat with a tarp, prevented their gasoline from coming into contact with their clams, kept pets off their boats and trucks, carried some sort of marine sanitation device on their boats, harvested only from open waters, and covered their baskets of clams to prevent them from overheating in the sun on the way from the dock to the market.

One clam farmer said, “I buy [seed] regularly from the same person and I’ve never had problems. Never. And that’s important. I don’t want nightmares in my clam business. Other clam farmers talked about deciding on equipment and seed suppliers. Many said their bag needs were satisfied locally at a good price. Others had found reliable sources of seed and stayed with them. know, you buy a 100,000 seed and they’re dead or they don’t grow or they’re stunted. The stores are awful. I don’t want that.”

Women’s roles on the water also began decreasing. Those women who had been working with their husbands and families when clam farming first emerged were able to focus more attention on their previous jobs, family and community as the practice became more routine and profitable.

One woman who had started into clam farming when it first started said, “I think a lot of women are pulling back from that [working on the water] once they have their feet on the ground financially.”

Most women admitted that the work on the leases was difficult. One woman said that as a result of clam farming, “I have a bad neck. I have a bad hip. And I don’t care what people say, women are not built the same, to carry the same load.”

Another woman who had been involved in a number of aspects of clam farming was selling her lease and specializing in marketing because the water-based work was too hard on her back.

Many men discouraged women from working on the water. One clam farmer who had formerly fished said, “That’s one thing my wife doesn’t do.”

“Why not?” I asked.

“I kind of learned her,” he said. “I carried her out there the first time we got overboard in the water chest deep and there was bait fish all around us and a big old jack went by us and scared her. Not a great first experience.”

“No,” I said.

“And I should have known better. I should have carried her down there on one of those low tides,” he said.

“Yeah,” I said.
“On a pretty morning. Eased her into it. But…,” he said.
Another young clam farmer new to the area said, “Let the guys do the guy thing and have the girls do the girl thing.”
“And what’s the girl thing?” I asked.
“The girl thing is, uh, making out tags, cutting the bags, getting the baskets ready to go…. Uhm, just organizing things for when we [guys] come back in [off the water],” he said.
“And the guy thing is?” I asked.
“Is lifting, and uh, shoving the clams down the tumbler to the grader and then transferring, you know, taking the clams and putting them in the truck and bagging them and stuff like that,” he said.
Another farmer said, “You’ll see their role to be at home. Not in the house but outside. Doing the clam belts and stuff like that. Working on the clam bags. So they’re more on the land-based side of the business. That’s what they seem to like. That way they can do their hobbies, like if they have a part-time store or a shop. Or if they’re a part-time elected official or a part-time school teacher.”
Few clam farmers outfitted their operations to make it easier for women, installing motorized winches or using smaller sized bags that could be picked up out of the water more easily than the bags designed for 100 pounds of mature clams.
Those clam farmers who had arrived from outside the area more recently were not aware of the important role women had played as the practice began. One said, “The only girls that really ever did it…they were very young and they live off the island and they’re generationals here.”

Access to Resources Decreased

As the adaptive phase of reorganization came to a close, access to resources became more limited. A fixed amount of waterfront property was available on the island. As prices had increased, many islanders had moved inland, selling waterfront property and with it their access for water to supply a raceway operation or boat dockage.
Craig said, “probably only about five percent of the clam farmers that live on the water tie their boats up to their house, which means three or four. Most of them have other docks in town.” Craig added, “People need access to water not just for their boats but their raceways. People like these raceways cause they can grow their clams small.” Growing clams from seed increased a clam farmer’s profit margin.
Many of those who moved inland and began to clam farm began to realize that water access was more important than ever to their livelihood as clam farmers.
Economic capital was only one means of acquiring access to the water. Social and cultural capital were others. Cultural capital also facilitated access to waterfront. Those who had been in positions of power and understood the in’s and out’s of city and county government took advantage of their knowledge base, their vertical ties outside the community, and their access to economic capital to begin buying small pieces of waterfront property, primarily small pieces that traditionally had allowed for common access.
Craig talked about the old subdivisions that had been platted long ago and extended out into the water. “What happens is you’ve got a lot every now and then, it
touches a piece of land. Well, you can buy that piece of property and put a power pole there and build a dock off that. Now you can’t build a house, but you can have a dock. ….all’s you need is the deed.” He added, “If they can just get a little piece [of land] on the water they are okay. Sometimes a group of men will get together and buy a piece of property or lease a piece of property and build a dock on it.”

Another farmer said, “You had these pieces of property that used to were worth a couple hundred dollars. Now they are worth $10,000 or $12,000.”

Sally talked about one relative who had built a raceway on “commons” and “was being squeezed out of an area.” She explained, “So now he’s got all his money invested; he invested everything he had done. And now he’s got to close. They’re going to close him down in January. They’re going to shut his raceways down and he’s looking for a piece of property.” She added, “A person like him, he doesn’t have a whole lot of money to invest in land and land is so expensive here, anywhere on this water. You cannot afford it. Nobody can afford it other than somebody that has retired.”

Several farmers who lived on the mainland talked about the difficulty and expense of running their boats back and forth to the island and searching for a place to park their truck and boat trailer after they had unloaded their boat. One said, “Having your boat already on the water saves time and fuel.” He added, “It’s harder to find a parking place now than it once was and when they put a gate on the Landing [a traditional launching spot], I don’t know if I’ll be able to use it.”

Another individual talked about the Landing. He said, “It’s way out there. It’s called the Landing. Out in the back there…. There’s a dirt ramp. Nobody knew that the city didn’t own that. Now it belongs to a private citizen.”

There had been discussion that this access point would be turned over to the city and designated for commercial use only.

Women’s changing roles, their greater emphasis on the land-based end of clam farming meant that they interacted less with the natural environment. Children of former fishermen and oystermen, many who now worked as clam farmers, had less access to the water environment as well.

Christopher remembered that as a boy he had played in and around the island, becoming familiar with the natural environment. Hugh said, “We’d get a basketball, jump off one of the bridges and swim to the nearest [convenience] store and get a drink and then walk home. That was the entertainment for the afternoon.” He reflected, “Nowadays they got Sega games and Super Nintendo and something to keep them in front of a TV and they don’t realize that there’s a world out there, you know. Stuff to be done. There's fish to be caught. Stuff like that.”

Decreased access to leases was also another impediment for many looking to join the clam farming community of practice. Submerged lease sites had been given to graduates of the shellfish job-retraining classes upon graduation. After a 10-year period, these leases were to be renewed. Many graduates found it impossible to continue clam farming for one reason or another. When they moved on to another livelihood, some sold their leases. By 1998, clam leases were selling for upwards of $25,000. Several years later, the price being asked for some was upwards of $35,000.
Worldview Change

Learning has continued during this adaptive phase but not at the rate occurred during the adaptive phase of reorganization.

One farmer said, “We're still going by ear, playing by ear. It seems to be if you have a cold winter, like this year and it freezes, it doesn’t matter because they’re [the clams] already used to being cold. It’s when they’re warm, we figured out…. We think that a clam dies when it changes real fast; when it goes from hot to cold, or hot salty water to hot fresh water. If it eases into it, it’s fine.”

Another said, “I guess every lease is different, every year is different. You’re constantly adjusting and constantly learning. About the time you think you learned something, after a year…. Well, it takes a year to find out if you were right or not.”

Much learning that accompanied the development of clam farming was single loop. Many of the innovations, however, were the result of double-loop learning. Double-loop learning changed how individuals looked at the world and how they interacted with it. It was during this adaptive phase that many people began to think more like farmers than fishermen. This way of thinking was essential to the community’s continued success. Evidence of a transition to this new way of thinking included: carefully tending seed in a raceway; removing dead clam bags from leases before they became covered with oysters; promptly returning small clams (replants) to the lease; resting the bottom; a realization that water quality must be protected and that there was not an unlimited natural food supply for clams.

Much of this learning has resulted in conscientization, the topic of the following chapter.

Conclusion

This chapter has talked about learning in the context of two adaptive phases – the adaptive phase of reorganization and the adaptive phase that moved from utilization to conservation. It was determined that the divisions between such phases are unclear. During the adaptive phase of reorganization, levels of connectedness decreased and levels of potential rose. This increased the resilience of the clam farming community of practice. Connectedness decreased because people were forced to interact more closely with one another and with individuals they had not been working with previously – a result of flattening hierarchies. Men began working with women in a different context and outsiders (some holding more “scientific” knowledge) and insiders (holding more local knowledge) began working together. Greater collaboration and sharing increased learning and innovation. Learning and innovations were readily shared.

Was the reorganization of different cultural structures of legitimation and patterns of interaction with the social and biophysical environment a traditional adaptation that fisheries communities of practice share? Do cultural systems allow for the abeyance of shared cultural structures of legitimation during times of crisis? These two questions are worthy of future study. Certainly, the fact that norms and values and patterns of interaction were laid aside, allowed for increased learning and the sharing of different worldviews. This process increased the resilience of the reorganizing system.
As the clam farming community of practice moved from reorganization to utilization and conservation, interaction and collaboration slowed. As a result, levels of learning plateaued. Learning and innovation continued, but at a much slower pace, and levels of diffusion from one small network to another slowed substantially. This process was a result of steepening hierarchies and greater role specialization. During this period norms, values, and some similar patterns of interaction with the social and natural environment emerged. Women were pushed out of full participation in the community of practice and were relegated roles on the periphery in land-based specializations. As stratification steepened and crystallized and as role specialization increased (a form of stratification), access to resource decreased. Access to resources also decreased as one system, the larger community of Oyster Isles, impacted the clam farming community of practice. Members of the larger community, many of whom possessed greater wealth than clam farmers, bought waterfront property needed by clam farmers for raceways and boat access.

Would a longer period of reorganization have fostered increased change in the cultural structures of legitimation and signification permitting women continued access to the natural environment and to men in working relationships? This is another question posed by research findings.

The job-retraining classes sponsored by the state increased interaction between those who took the classes. By opening the classes to both men and women, fishermen and oystermen, and to some outsiders, interaction between these groups resulted in increased learning and innovation. However, by granting leases to one class of graduates (primarily oystermen) in one area and graduates of another class (primarily fishermen) in another, interaction between these two groups was not stimulated. In addition, the somewhat negative attitudes that emerged between two groups, teachers with more scientific knowledge, and students with more local knowledge, did not stimulate the production of what Berkes refers to as neotraditional knowledge. Increased planning could have resulted in even lower levels of connectedness and higher levels of potential. Could better planning prior to the implementation of assistance programs better foster levels of resilience in systems?

The diversity provided by the residual fishing, oystering, and crabbing communities of practice decreased as financial success within the clam farming community of practice grew. This diversity had previously provided the system(s) encompassing these smaller communities lower levels of connectedness and therefore greater resilience. As clam farming intensified, the technological and knowledge capital bases were smaller than the combined knowledge bases of the former communities of practice. Pressure on a resource base also intensified. Following this line of logic and employing the perspective of panarchy, one can surmise that over time the resilience of the panarchical system may decrease as a result of the reorganization of the clam farming community of practice. A jolt to the estuarine system (water pollution, high level of freshwater inflow) could collapse the clam farming community of practice. This collapse could upset the economy of the county and the state. A decision by the county, the water management district, the state, or the nation to stop water quality management, place industrial point pollution sources in upstream areas or offshore, or permit non-point pollution could also collapse the clam farming community of practice.
As time passed, people became explicitly aware of those characteristics that enhanced interaction and learning. These included male gender, sense of place, honesty and loyalty, a professional work ethic, a long-term perspective, and an ability to work well with others. Because these characteristics enhanced learning, those individuals holding a greater number of these characteristics were able to better accumulate capital. It is notable that only one woman was able to do this successfully while a number of single men did. Most women who were successful were successful because of their access or linkage to men.

Clam farming required a different mentality and way of looking at the world. As the adaptive phase of the system moved from reorganization to conservation, former fishermen and oystermen began to think like farmers. They became caretakers of a crop and of the ambient this crop required to grow, the submerged bottoms and the water column above their crop. It is interesting to note that a continuing series of crises may have prolonged the adaptive phase of reorganization, prompting continued learning and innovation. The result of these crises and the growing awareness on the part of participants within both the clam farming community of practice and the larger community of Oyster Isles may have fostered conscientization, the topic to be discussed in the next chapter.
CHAPTER 8
TRANSFORMATIVE LEARNING AND CONSCIENTIZATION

Introduction

During the adaptive phase of reorganization of the clam farming community of practice, a great deal of learning and innovation occurred. As the system moved from reorganization to utilization and then conservation, learning and innovation slowed. Much of the learning that occurred as people turned from wild harvest to aquaculture was single-loop (Argyris & Schon, 1978, 1996). Some of the learning, however, and most of the innovations, were the result of the double-loop process (Argyris & Schon, 1978, 1996). When double-loop learning occurred, the way individuals and systems looked at the world was transformed (structures of signification) and individuals changed the way they interacted with the world (Argyris & Schon, 1978, 1996; Bates, 1997, 113; Mezirow, 1990). One example of transformative learning in the clam farming community of practice was that individuals began to think of themselves as farmers instead of wild harvesters. This worldview change is discussed in this chapter.

When individuals critically reflected on their learning and realized that existing paradigmatic frameworks were oppressive and could impede their survival, conscientization began to occur. Conscientization, however, not only required such realizations, but also corresponding actions (Foley, 1999; Freire, 1970b, 1972).

The conscientization that occurred among members of the clam farming community of practice was as a result of individuals identifying hegemonic ideologies and beginning to work against these. This occurred on a number of levels. For example, many women critically reflected on gender roles and the norms and values that dictated these roles. Some of the women who found these roles oppressive worked to change them. Other individuals began to realize that the capitalistic system that favored development over sustainability was oppressive. Some began working to modify it.

Initially, conscientization was an individual phenomenon. This conscientization – the critical reflection on learning, the identification of oppressive hegemonic ideologies, and action – was expressed in both negative and positive ways. As time passed, however, conscientization became more of a collective phenomenon. The process of conscientization is also discussed in this chapter.
Thinking Like Farmers

Former fishermen and oystermen, especially those who regarded their former livelihood as a heritage, practiced clam farming but did not think of themselves as farmers until they had been involved with aquaculture for several years.

The wife of a former fisherman said, “By the time we had been in for about a year, we had everything going. We had seed in the raceway. We had seed in the nursery and we had harvestable clams. It was like a cycle. It was like doing we were doing something on a seasonal basis.”

David, a former fisherman recalled one winter day when the north winds had blown out the tide and he could see his whole lease. He said, “I guess that was the first time that I thought of myself as a farmer.”

Record-keeping practices were another indication that former wild harvesters were beginning to think of themselves as farmers. Caven said, “We kept close track on it [conditions] daily: salinity, water temperature, air temperature. It showed a pattern. My partner said a couple years ago that he was predicting how things would grow and the way the cycle would run.” Caven remembered, “He figured these next three years would be good growing conditions and I think he’s right.”

As people accumulated knowledge their perspective resulted in comments like, “We may have started at the top. The best conditions and everything. It looks like when we went into it that it was at the best that it could be.”

Another added, “The first year we got into it, everything was just perfect. We couldn’t tell then because we didn’t know. But now that we look at the different seasons that we’ve had in the last six years we can see that the first year we grew clams everything was just perfect.”

Unlike fishermen or oystermen, clam farmers kept records of the seed they had bought, where they planted it, and when they harvested it. A former oysterman said, “We actually started a little chart. We drew out our lease and would draw where we had out bags and then we started harvesting and they would disappear so I decided to use tracing paper and put it over [the original map] and you could see where they actually were and you could flip it over and see where they were, when we had sole them or they’d been harvested.”

Some farmers kept their maps on plastic transparencies and recorded planting and harvestings with a grease pencil. Others bought computers.

“Actually, one reason I got the computer was I wanted to keep better records. I wanted to trace from the time we bought the seed, from the time we put it out and then when we harvested it and how much we would get for the harvest,” said another farmer. Several searched for software programs that would assist them with bookkeeping and mapping. Some who had had previous business experience began using Microsoft Excel.

Several clam farmers who had land-based farming experience started drawing comparisons between agriculture and aquaculture.

Another former fisherman, now a successful clam farmer, said, ““Farmers are looked at on a much higher perspective than commercial fishermen. It’s just the respect. You’re not looked upon as some guy out there that’s killing and destroying, raping and pillaging. I mean, you’re somebody that’s providing food for Florida. You know, fresh from Florida.”
Another former fisherman continued, “We’re not only pulling in clams, we’re providing habitat.” The creation of habitat became an issue of concern for many islanders.

Christopher who said, “There’s more predators now than there used to be.” Christopher added, “We're creating an ecosystem around here with all the food we’ve got planted.”

Kate added, “Now it’s [the lease sites] a smorgasbord for every predator.”

Most were unwelcome. Many fed upon clams. Others fed upon those animals drawn to the newly created feeding grounds. Richard listed the predators, “The red drum and the black drum. The stone crabs, blue claw crabs, horseshoe crabs, rays. Those are the big ones. Then there are all kinds of snails…conchs and whelks and the merk snails.”

Rays were a particular concern for they not only fed on clams but threatened the safety of clam farmers who were working in the water. One islander said, “There's always zillions of when you go to stirring up the bottom, like when you bring the clams bags up and wash ’em, they come to it. It’s an opportunity for them. And then you’ll be working and step on them or something. And then during mating season, the males challenge [each other]. They challenge big males.” He explained, “When you see one with his tail up out of the water like that [he motioned with his hands], held high, better stay out of his way. He’s challenging you and he will run at you and sting you.” He added, “There’ve been a lot of people this year got stingray stings. Lots of them.”

Sharks were another concern. One clam farmer talked about the increasing number of sharks. He said, “You’re down there in the water. You’ll get a cold spot and they say the sharks like the cold. The water out there’s hot right now. But you’ll be out there and hit a cold spot and you always hear that sharks like the cold spots so sometimes you’ll be working and in your head you’ll hear…[He hummed the tune from the movie Jaws]. You start getting paranoid and start freaking yourself out.”

By building on their knowledge and experience, clam farmers began to draw comparisons and hypothesize about which techniques and practices would lead to further success.

Over time most clam farmers realized, like Ruth, that “every lease out there is different. The bottom is different and so you gotta be different. You got to match your own conditions.

Several farmers began talking about the need to rest the bottom of their lease. One said, “You really need to rotate your bottom.” When asked why, farmers were not completely sure but they had noticed that when clams bags were planted back to back on the same bottomland, the second crop took longer than the first to mature. Some hypothesized that the silt layer needed to build up.

One speculated, “Maybe it’s the fecal count in the sand that those clams have been laying in for over year. It needs time to clean up. I like to leave mine at least six months.” He continued, “I don’t know what it is, but it’s kinda like when you grow watermelons, you know. You grow crops on land, you stagger their fields. They don’t plant back to back in the same field because of what it does to the soil. And we try to rote ours. Now depending on who you talk to you’ll get different stories. But most everybody agrees with that. But some people say, ‘Oh. You only need to leave it a month, you know. Some say you need to leave it a year, you know. It might be depending upon where their
lease is too. I’m sure it varies with where you go but I try to leave mine at least six months.”

Another clam farmer said he didn’t understand why you needed to rest the bottom. He said, “…I pulled clams and put replants right back down on the same bottom and it did not go as fast. They just were very slow [growing] so just letting it [the bottom] rest a while seems to make a difference.”

While many clam farmers compared clamming to land-based farming, they also pointed out the differences. One former fisherman’s wife said, “I think clamming is a combination because you can control it in a way by how many you plant and how you do it. But then, because of nature and it being on the water, you can’t control it as much. You know, you can’t see it. A farmer can go in his field and see…the crop coming up. A clammer can’t see it. So I think that’s a big difference.

Another former fisherman said, “…You can make money as a clam farmer but you can lose money too.” He explained, “Melon farmers can make or lose good money. The difference, though, is the water; you can’t change the circumstances like adding fertilizer. Like this winter – January to March it was cold – I had seen my clams literally starved to death.”

The transformative thinking that led many former fishermen and oystermen to begin regarding themselves as farmers was not conscientization. It led to conscientization when the actions that were seen to accompany the process led to increased success of the individual and the group. If, however, critical reflection indicated an action that was perceived as inhibiting the success of an individual member within the community of practice, conscientization did not occur.

**Conscientization**

Critical reflection on learning, the identification of oppressive hegemonic ideologies, and subsequent action occurred early and often as the oystering and fishing communities of practice declined. The following are two examples of conscientization that occurred during this adaptive phase. When oystermen were told they could no longer harvest in areas where mature oysters were located because of pollution, some stepped across the lines drawn by the FDA and continued to harvest. This is an example of conscientization. The state and federal governments were seen as oppressive. Many oystermen perceived that the closures were endangering their livelihoods. Some reflected that in order to survive they had to illegally cross into areas where pollution was deemed to One wife of a former fishermen explained that the net ban “really had absolutely nothing to do with conservation. It was organized by sportsfishermen, developers and real estate people. The bottom line is a lot of the commercial fishermen in Florida lived on prime waterfront property, prime real estate.” A fisherman said, “We never had a chance. I think it was the tremendous number of people who thought that had this vested interest in the sports industry. There was too much money there to pass up. You look at the money. We [commercial fishermen] spend $600,000. They [sportsfishermen] spent $3 or $4 million. Just think…fishing supplies and boats and motors and the weekend warrior thing.”
These two examples of conscientization may have been perceived, at least in the short term, as benefiting the individual and the group. However, because they were illegal acts, outside accepted norms, they were isolated and short-lived.

**Water Quality and Quantity**

Former oystermen critically reflected on the importance of water quality and quantity issues much earlier than fishermen. Oystermen understood that the abundance of oysters was tied to cyclical influxes of fresh water and they had long been concerned about pollution levels. The total closure of oyster harvesting areas in late 1989, early 1990 had driven the importance of clean water home to many who had been placed out of business. Immediately after the closure, a number of oystermen had begun to reflect critically on water quality. Several were women. They concentrated on learning about water quality issues, alternative livelihoods, and state policy.

When former oystermen began clam farming, and understanding of the need for high water quality was a given.

Former fishermen who turned to clam farming, however, did not have this same understanding. One former fisherman said, “We didn’t care a thing about water quality because that wasn’t the issue with fish. I mean we knew that we had good water quality. Just didn’t know how good a water quality.”

Another added, “I pompano fished for 30 years and when the water’s clear the pompano would hit the net a lot better than they would when it was murky colored…. And I cussed it [murky water] for 30 years, ‘Oh. You sorry water.’” He laughed and added, “And now that same murky algae in the water – which I didn’t know at the time – is now feeding me.”

As learning occurred in the adaptive phase of reorganization and the community of practice moved into the adaptive phase of utilization and conservation, former fishermen, former oystermen who had not been directly affected by the closure of 1989, former wild clam harvesters who had been put out of business along the East coast, and others who had become clam farmers began to critically reflect on the need for clean water and began to act differently.

**Factors Fostering Conscientization**

This growing conscientization was due to several factors. One was the ongoing effort to rid Oyster Isles of septic tanks and connect every household to the municipal sewage treatment plant. Another was continued sharing of the story of the oyster harvesting closures. The retelling of this story was prompted after every heavy rain event. A third was the sale of close to 90 coastal lots and their proposed development.

**The Move Toward Sewage Treatment**

After the oyster flats were closed to harvesting in late 1989, momentum to connect all island properties to the sewage treatment plant accelerated. In 2000, this effort was still ongoing. Several clam farmers talked about the ongoing septic tank survey. They said, “They’re [the town government] trying to get rid of septic tanks on the
coastline which is a very important thing for the environment now...because this is...one of the best areas to grow clams in Florida and if we can’t keep our water quality, well...."

A former oysterman who had moved to the area and bought property on the island said that the home she had bought, in the city limits, was still connected to a septic tank when she moved in. “Can you imagine that? So I run up to the county to find out where the tank was cause it kept getting stopped up.” She learned that it had been legally permitted and was located underneath the driveway. She explained that her house was located on the bay and the septic tank didn’t even have a drainfield. “Oh my God!” she said. She explained that she and her husband rectified the situation shortly afterwards.

A former fishermen who was now clamming said, “Well I don’t guess we ever thought about it even though we knew septic tanks were bad.”

Another former fisherman turned farmer added, “I now care about the septic tanks. Care about houseboats tied up dumping their sewage overboard. Cause I’ve talked to people up and down the coast. He remembered a conversation he had had while on vacation along the north Gulf coast with a university professor who had told him about dye being placed in coastal septic tanks to trace leakage into the bay. He said, “I would have never had that discussion prior to being a clam farmer. About septic tanks.” He continued, “If you go to build a house or if you go to develop a piece of property, you think if you’re putting septic tanks in. It takes a lot of water to clean a septic tank out. You know where it is going to go. So I think it [clam farming] has made everybody who never used to think about water quality to think. It makes them now realize, ‘Hey. You know. We got something unique here in the two senses. We got something unique in business and in an environment. Let’s try to keep it the way it is.’”

The Tale of the Oyster Bed Closures

Once clam farming was underway, harvesting would be closed periodically after heavy rain events. Each time this occurred, former oystermen would recount the tale of the oyster bed closures of 1989. This story became more formalized after each telling. Common elements were the conditional closures, followed by the total shutdown of the area industry, unemployment, and then the long-term solution that had been the abandonment of septic tanks and the construction of a sewage treatment plant. This solution had resulted in the reopening of the waters to shellfish harvest. At times I heard this story take as long as thirty minutes to tell. Other times it was encapsulated in two or three sentences.

In keeping with Rapport’s (2000) understanding of narratives, the story of the closure represented participants’ understanding of their world and their experience. In a condensed form, this story of personal experience transformed an event that had occurred years earlier into a moral and ethical tale designed to quickly communicate a lesson that the speaker felt the listener needed in order to create a yearning for sustainability in the listener that was similar to that of the speaker (Freire, 1970b). The story was a means of spreading conscientization.
Perhaps the third event was the most important to water quality conscientization. In May, 2001 an individual owning more than one thousand coastal acres on the mainland near Oyster Isles sold close to 90 lots adjoining the bay where clam leases are located. The sales occurred in a four-day period. Shortly after the sale of the property, a number of events occurred. All were examples of conscientization, some positive and some negative. Signs advertising the development located at its entrance were vandalized. Flyers calling for a meeting to discuss the impact of the proposed development were placed on doors and windows of Oyster Isles business establishments. These flyers warned of the potential impact this coastal development could have on the clam farming industry. The flyers stated that the “development of this property would definitely impact the two biggest lease areas,” said a clam farmer. He continued,

It would close them. It would take a year or so but as soon as the septic tanks started leaking into the water, well, every time it rained it would make it to where they’d (FDA) have to close them for a certain period of time and then reopen them and close them and reopen them. Well, that wouldn’t coincide with the amount of sales that was going on. There’s millions of dollars being made because of the clams and to interrupt that because of a few septic tanks, because some developer decides to build in a wetland isn’t going to fly.

Meetings were held for the next year and a half. Oyster Isles residents and members of the clam farming community of practice worked with the watershed management group, city, county, and state government to resolve the problem. These meetings were examples of positive conscientization. People realized that “development as usual” in sensitive wetland areas could destroy their livelihoods. Critically reflecting on this, they acted in a democratic fashion to change the process of “development as usual.”

Other individuals critically reflected on what they recognized as an oppressive reality, “a developer trying to get rich quick at our expense,” and placed roofing nails on the dirt roads throughout the proposed subdivision. Buyers driving through to survey or view their recently purchased property found themselves replacing the tires of their vehicles.

At one informational meeting a spokesperson with the Department of Environmental Protection stated that if the area were developed with septic tanks, the principal clam lease area would be closed to harvesting 30-40 percent of the time. Reaction to this statement was mixed. Some clam farmers who owned leases in this area had bought land in the proposed development.

Freire (1970) wrote that one of the largest obstacles standing in the way of conscientization is that the “oppressive reality absorbs those within it and thereby acts to submerge human beings’ consciousness (33)”. He continued saying that this submersion creates “contradictory, divided beings” where one group or individual exploits or hinders another (Freire, 1970b, 37). This was certainly the case here. Many of these clam farmers who had purchased this land were criticized. These farmers defended their actions saying
if they had not purchased the land someone else would have and “who knows how they would have developed it?” Whether this was the real motive behind these purchases, or whether the purchases were made in order to amass capital and rise within the hierarchical structure of the clam farming community of practice and the larger community is not clear. Many felt these farmers had “cut off their nose to spite their face” for their leases would be the first harmed by leakage from the septic tank of the proposed subdivision. Others, who owned clam leases in another area and had purchased land in the subdivision, said they did not think their leases (which were further away) would be affected by the potential pollution problem. These farmers were seen as selfish by others who owned clam leases closer to the proposed development and had not purchased lots in the development.

Eventually, as a result of continued interaction and conversation, most farmers realized that all clam farmers would be affected by the proposed subdivision and that any development would have to be done to ensure the least amount of damage to the industry. Ultimately a resolution was signed indicating the development would have a secondary waste management system installed instead of septic tanks.

The meetings and the ongoing conversations between the multiple stakeholders that took place over an extended period of time resulted in collective conscientization. Most area residents came to the conclusion that one clam farmer shared, “Coastal areas need waste management systems so they don’t hurt the environment. That’s what Oyster Isles has and that’s what everybody on the coastline should have.” Others began to support the construction and purchase of additional facilities that would handle the sewage waste of campers and mariners visiting the area. Some began talking about building a large sewage treatment plant on the mainland to cope with increased inland growth.

Some farmers started talking about other potential threats to water quality and quantity. Several mentioned the dangers of approving oilrigs offshore Florida in the Gulf. Others talked about pollutants entering the estuarine waters from upstream sources like dairy and chicken farms, and cement plants. Several mentioned their concerns about decreased water quantity as a result of withdrawal of freshwater from upstream sources (bottling plants at springs, etc.).

Comments like this one from a clam farmer new to the area were common. He said, “Normally [before] you didn’t dump out your oil when you were changing it in your truck or boat but you [might] think ,’If it spills out, who cares?’ but because of the clams now you think about it.”

Cover Net

Because water quality was a shared concern, it prompted collective conscientization. If after critical reflection, individuals came to the conclusion (implicitly) that a particular action to rectify the problem they had reflected upon would limit their short-term success – usually the amassment of economic capital, conscientization did not result. A key example of this was an issue that grew out of the use of cover net.

Cover net was used to protect clams from predators. Initially chicken wire was used. Over time, however, as some reflected about the effects of rusting chicken wire,
Some began to use plastic net cover. Some said they had found bits of rusted wire in harvested clams. Several individuals who reflected upon this and concluded that the long-term success (sustainability) of the industry was threatened by this or their health or the health of the ecosystem, opted to use plastic cover net. This cover net was usually used once and discarded.

One farmer said, “I personally don’t like the metal netting, the metal chicken wire. I don’t think it’s good for the environment. What happens is the metal starts deteriorating. I have harvested clams that have pieces of metal in them.”

Another farmer said, “A bad thing about chicken wire is if you try to pull it up before it deteriorates you might end up with lock jaw.”

Another farmer added, “The chicken wire would rust and you would come back in and you’d have punctures all over and little pieces of rusty wire which you had to pick out.” Others islanders even suspected that rusting chicken wire added arsenic to local waters.

Many farmers saw disadvantages with this material and argued for chicken wire and against plastic. One said, “The chicken wire disintegrates. There’s nothing left of it out there, plus it doesn’t float. Plastic floats and it washes your bags up. Chicken wire just goes away. It doesn’t pollute the water. It actually brings iron to the water.”

Another said, “If you put plastic in the water and it goes somewhere, it has one-inch square holes. You can imagine any critter that comes afoul of that.”

Several islanders and clam farmers talked about plastic cover net becoming an increasing problem. One said he frequently saw clam farmers “look around to see if somebody was looking and then dump a whole boat load of cover net…in the channel.” He added, “I see them doing that all the time to the bridge down here at low tide.”

Those who use plastic cover net because they see it as more environmentally friendly say they discard it in the landfill. It was apparent that there was no clear consensus about the effect of using one form of cover net or another. There did appear, however, to be a growing sense that if plastic cover net were to continue, people who used it would have to ensure it was discarded properly. Several clam farmers and members of the larger community were concerned about improperly discarded plastic cover net causing the deaths of sea mammals and birds, negatively affecting the image of clam farming. Until there is some consensus about the long-term effect of a particular cover net on the sustainability of the community of practice, I do not think collective conscientization will occur.

Another example of individual conscientization is the critical reflection that there is only so much food available to clams in the estuary and the accompanying decision to limit the number of clams farmers plant. Collective conscientization regarding this issue is stifled as talk about limiting the number of clams a farmer can plant has been met with resistance. It appears that some farmers think that talk of limiting the number of clams per lease is a means of limiting an individual’s income and his or her place in the hierarchy. Such conscientization may not be possible with the modern, individualistic mentality that prevails.
Tales of Conscientization

Victoria

Victoria was the wife of a former oysterman. For years she had worked in the family oyster business and occasionally accompanied her husband when he harvested. When oyster harvesting was shut down in 1989, she along with hundreds of others oystermen and their families were left unemployed. Victoria, along with a number of other women, played a key role in bringing clam farming to Oyster Isles.

When she was offered job retraining, she decided to enroll in college classes instead. Her decision to do so is an example of conscientization. She had reflected critically on her personal experience as a youngster in the Northeast, the collapse of the oystering community of practice, and conversations with others who were clam farming in South Florida before making her decision.

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“I’m actually from New York,” she said. “I was raised on the water though, always on the water. I’m a water person. I cannot live unless I can see the water and I saw water destroyed up there.” She explained that when oyster harvesting was closed, “I went out seeking answers. I took a course… to understand why the water was closed.”

While this woman’s decision to enroll in the college to pursue an alternative line of work was in line with existing community norms, her work to establish vertical ties that would benefit her community was usually a role delegated to men. She explained that her contacts with outsiders “helped me a lot.” She added, “Afterwards I went to state agencies and asked, ‘Why did you close it [the waters]?’”

When she found that regulations had been in place to protect the state’s waters, she said she began confronting people in state agencies asking, “Why didn’t you protect it [the water]?” Instead of being given a direct answer, she was told about the area water management group and she decided to attend their meeting. “I went to that meeting with oystermen and their kids. I came in with a bunch of them, some documents, and water quality papers that I had gathered from everywhere, and said, ‘Why are you guys not doing your job?’ I said, ‘You forgot about us. We’re at the end of the line where all this stuff is coming. What about river?’”

She continued, “I unlayered things. I found out that there was fecal coliform [in the water] and that people were responsible for it, and then they were animals too, dairies. And then there’s this little thing about sewage treatment plants.” This cycle of awareness, reflection, and action is the essence of conscientization.

Once Victoria had learned about the causes of the closure, she realized she had to become even more active. “I had to tell to these guys [the clam farmers] who wouldn’t come up to you and talk to you. And for some reason, in their desperation, I was able to bring big clout.” Working with former oystermen, the area water management board and other area leaders, she and others were able to convince the state that a sewage treatment should be built along the mouth of the river and that septic tanks should be closed.

Several years later, after septic tanks were abandoned and the new $12,000,000 dollar sewage treatment plant was online, the FDA opened the waters again to oyster harvesting, she said.

Victoria continued to work to protect area waters. After several years she concluded, “There is an alarming system out there that’s designed to grind us all into
nothing. This is a development state. This is not a state that cares about natural resources. That’s a reality. It is a state that is intent on development…tourism and industry.” This realization has prompted Victoria to continue acting to protect water quality and the area’s environment “for my children and grandchildren.”

Linda

Before the oystering community of practice collapsed, another woman had been experimenting raising clams in conjunction with a South Florida company. Her work heightened her awareness of water quality issues and led her to create an awareness of this issue in others as she worked with the state to bring clam farming to Oyster Isles.

Linda had reflected on the constraints of the cultural structures of domination, the patriarchal system that placed men over women, and the hierarchical pattern that placed fishermen over oystermen.

She said, “It’s too much the good old boys and everybody goes out drinking afterwards…. Too much the good old boys everywhere.”

The realization that “the women have always kinda…done the bookwork” and that men didn’t “respect them when they have a meeting” enabled her to begin working to ensure that women had the opportunity to take the job-retraining classes and acquire clam leases.

As the daughter of a former oysterman, and the youngest of four daughters, Linda had been “her father’s son” and had been encouraged to work on the water, fishing and oystering. She admitted that working on the water and proving herself able to do anything a man could had been detrimental to her physically. “I had this whole mindset of first not having been a boy I had to prove myself, and I was daddy’s boy,” she said. She continued, “It was real hard for me. It was like I had to prove that I could do anything they [men] could do. Prove it to myself probably more than anybody. But as a result, I have a bad neck. I have a bad hip. And I don’t care what people say, women are not built the same, to carry the same load.” Despite this realization, she and her husband decided against installing a winch on the boat. A winch would have made it easier to lift bags of mature clams at harvest time.

She said, “Now this is a funny thing. We…very rarely use a winch. We still muscle them up.” She explained that the reason for this was “My husband’s mentality for one thing and that we still have good strong backs.” She added that using a winch made harvesting take considerably longer.

Linda also recognized that the hierarchical patterns of fishermen over oystermen appeared to persist as former members of these communities moved into clam farming. She said that “…fishermen think they’re better than the oystermen ’cause they like… ‘I’m not going to go out there all day and grapple for 20 bushels of oysters at $20 a bushel. I’m going to put my nets out and stand in a boat with my clean little khaki shirt and my white boots and winch my nets in.” She explained that this affected interaction and learning among individuals in the clam farming community of practice.

By the time I had begun my research she said she thought that while clam farming was seen as a way to protect water quality, the pendulum was already moving against this environmental thought. “There’s a little bit of a backlash to that water quality movement already in that the tar that some of them are doing, the tar they're dipping the [clam] bags
in…to make them last longer is illegal. It’s even written in my lease agreement.” She explained that people used tar to make their clam bags last longer like they used to do with their fish nets.”

This woman, along with two others, played an important role in fostering collective conscientization. Her role as an activist, however, slowed as time passed as a result of a number of personal commitments and responsibilities.

Barbara

Another woman played an extremely important role in raising the community’s awareness of water quality issues and of the importance of establishing and maintaining vertical ties. She and her son had come to the island after having lived in a number of other places. She had a strong sense of environmental awareness. Several years before clam farming and the closure of the oyster industry, she had been involved in efforts to protect an offshore island from development. These efforts had been successful and the island was purchased to become a wildlife preserve.

This woman realized the importance of developing and maintaining strong vertical ties. She noted that establishing and maintaining ties with the state, by attending workshops and meetings, was extremely important.

Occasionally this woman found that her actions and discussion with others did not result in success. This resulted in feelings of despair. She talked about the independent nature of those in fisheries and reflected that people in fisheries, “who worked on the water, didn’t want to go to meetings or interact with people.” “They just don’t want to deal with the whole thing even though they have their personal feelings on it. And if you want them to sign a petition, you know, they’d be happy to do that, she said.”

At times, she noted that some progress was being made. At other times, she appeared so disillusioned with the lack of conscientization on the part of others that she talked about leaving the community. “How in the world can the state of Florida sell the commons” she asked, referring to springs upriver that had been bought by bottling companies like Coca Cola. “They’re just into money. Competition. Whoever lobbies, gets the money,” she said.

She concluded, “People in this country have become incredibly materialistic to the point where everybody in the world makes fun of the United States. Nobody really cares. Nobody really listens to anybody else. It’s all about more money. But life’s not about money.”

After the study ended, this woman left the country.

Craig

Craig, the son of a former fisherman, came from a family with deep roots in the area. He had been raised with a strong sense of community. As a town commissioner he was often forced into the position of critically reflecting and acting. Time and again it became apparent that he realized the value of creating and maintaining both vertical and horizontal ties. He realized that “the state was not always a willing partner” but continued to strengthen ties with the state and develop new ties. He did the same with county and
regional agencies as he worked with others to cope with the proposed coastal development that threatened the clam farming industry.

He said, “They’ve (the state) just changed the name of the area to the Beautiful Coast. We still say Swamp Coast because…you’re still Swamp Coast here. We’re the southern part of the Swamp Coast. But the whole thing’s the Beautiful Coast. That’s just a way of selling it, you know. That’s just one way to make us like the rest of the state and ruin us, like Gold Coast, Treasure Coast.”

He also said “We have the cleanest water quality in the nation, and that’s a constant fact. And that’s the reason I’m on the city council.” These critical reflections clarified his actions on behalf of his community.

The Clam Farmers’ Cooperative – Collective Conscientization

Before 2000, most efforts among clam farmers to work collaboratively were relatively unsuccessful. The number of individuals including the local cooperative extension agent had attempted to put together a clam farmer’s association but it had not been a small group. Several who had been active said they had not met regularly. Others said they had been contacted once, but had never attended a meeting. Some said they did not know that such a group existed. Former fishermen were more likely to feel that collaboration was impossible. When the fishing community of practice was vibrant, there had never been a cooperative group. Instead fishermen had been tied to a patron-client system. Former oystermen, on the other hand, had had the Oystermen’s Association, a group that met to decide on how to transfer young oysters from closed areas to approved or conditionally approved areas so they could be harvested during the next season. As a result, when the clam farming community of practice emerged, former fishermen were more likely to see it as more collaborative and former oystermen as less.

A former fisherman said, “Before we didn’t have enough people to fight. We didn’t have a cohesive group.” However, a former oysterman said, “It’s more individual [now]. Before everybody was Joe, Joe, Joe, Joe. Now it’s Joe’s, Bob’s, Nick’s and Terry’s and Harry’s and Sue’s and…because you all are out for yourself now. There’s less people working together on long term.” Over time, especially after the proposed coastal subdivision, there was a growing sense of collaboration, former fishermen and former oystermen saw the situation differently. In mid-2000, the clam farmer’s association incorporated.

One of the women behind the effort to organize it said, “Sometimes it’s like the ’30’s and ’40’s and sometimes it’s like the ’90’s. It’s like the ’30’s and ’40’s when you have to sell the man on the idea and make the idea their idea. It’s like the ’90’s because they [men] let you take charge.”

The organization of this group\textsuperscript{74}, an example of greater connectedness and stability, along with gelling structures of legitimation, domination, and signification resulted in increasing conscientization among townspeople and clam farmers. Many appeared to come to an awareness that the state’s policy was focused on development and the accumulation of capital and not on what might be best for the people of Oyster Isles. As a diverse group of individuals emerged as clam farmers and as those individuals who

\textsuperscript{74} By 2002, the organization had about 150 members and a regularly meeting board of directors that was keeping abreast of issues of concern to the industry.
had moved to Oyster Isles came together and realized that clean water was one of the reasons they had chosen the island as their new home, they began to perceive that water quality and quantity were not only pivotal to their industry but to their continued way of life. As individuals and in every more tightly connected groups, they reflected on the state’s policies, actions and inactions and became aware that these policies contradicted those that needed to be in place to ensure their survival. The state, they began to agree, was determined to accumulate capital and power at the expense of its citizens oppressive.

Conclusion

Social conscientization involves the perception of gender, socioeconomic class, religious, and/or racial bias. Political conscientization involves the perception of oppressive power structures. Social and political conscientization can involve an awareness in historical terms that leads to a change in present action. An example of this is when people perceive that past resource management strategies are biased against and oppress a particular group (i.e., minorities, future generations) and begin to work for policy change.

Conscientization, whether it is an individual or group phenomenon, appears to take a great deal of time. Many individuals became aware of inconsistencies and contradictions between their old realities and new realities during the adaptive cycle of organization. Several reflected on oppressive hegemonic ideologies during this period. Those individuals were primarily those who had a diverse background and fairly high level of formal education. This appeared to enable them to critically reflect and compare one reality to another more easily. Those individuals who began the process of conscientization during this period who were from the island, some of whom lacked higher levels of formal education and varied experience in other locations, had been brought up in an environment that allowed them to play multi-gender roles. All these individuals developed and maintained strong networks of vertical and horizontal ties. In addition, they had the capital assets that allowed them to engage in this process. They possessed sufficient economic capital to enable them to be relatively comfortable; they were not surviving “hand to mouth.” They possessed the necessary social capital to establish and maintain vertical and horizontal ties. It appears that in many cases this capital was transferable; individuals were able to assess the ties of others as they reflected critically and acted. It addition, they had local knowledge of the area and community, access to resources – boats, leases, clam seed, etc. Two other important components were a love of place, a strong sense of community, and available time.

Conscientization is a continuing process. One can be aware and can critically reflect but be unable or unwilling to act on that knowledge. Sometimes personal commitments and responsibilities pull individuals away from this process. Sometimes an individual lacks the dense social ties necessary to continue. If one lacks deeps roots in an area, a sense of commitment to the social and natural world one lives in, such conscientization may not continue. Continued conscientization on the part of several individuals appears to be necessary to coalesce a group of individuals towards
conscientization. And it is group conscientization that may be crucial to the transformation of worldview.
CHAPTER NINE
CONCLUSION

Introduction

This ethnographic case study was undertaken to understand better the process of informal, situated learning in a community facing rapid environmental change. How human groups or systems learn to deal with lurching (sudden stop and go) and transformational change is not well understood. Many studies have been done focusing on the general learning process but few focus on the double-loop learning process that can lead to transformative learning, spurts of innovation, and conscientization. Understanding how individuals and communities handle sudden, stop and go change, and transformational change is increasingly important. Growing populations and shrinking natural resource bases are placing increased pressure on individuals, families and communities. These pressures are resulting in decreased resilience; systems are more tightly connected and have lower levels of available capital (social, natural, human, cultural, economic, etc.). As a result, they are frequently less able to accomplish the learning required by external change.

Coastal communities worldwide find themselves facing rapid environmental change. They are threatened by increasing pollution from offshore sources (i.e., oil rigs, ships and boats, marinas), rising populations and accompanying development that can degrade coastal habitats and diminish access to water. In addition, fisheries dependent communities find that fisheries stocks are steadily decreasing as a result of years of unsustainable harvesting practices and habitat destruction.

Oyster Isles, a small coastal community along Florida’s Gulf Coast, was a place where such change was occurring. It provided an ideal research setting. The area’s population was increasing, development was encroaching upon the marine habitat, large numbers of individuals had lost their livelihoods as commercial fishermen and oystermen (wild harvesters) and had been forced to begin working as aquaculturalists (farmers) to continue living in the area and working on the water. In addition, this community is located downstream several rivers in an estuarine area and faces additional threats. These include pollution from upstream sources and decreased inflow of freshwater as a result of upstream withdrawals.

This study examined how individuals thought they had learned about the environment\textsuperscript{75} as they made the transition from wild harvest to aquaculture. In addition to the principal research question, “How does a Florida coastal community of practice learn

\textsuperscript{75} Environment was defined as the social and the biophysical world.
to respond to rapidly changing environmental conditions?”, I posed three sub-questions. These were:

1. What conditions influence the learning process?
2. What characteristics of social and environmental interaction influence the learning process? And,
3. What characteristics of actors involved in these interactions affect the learning process?

Because there were a number of communities involved and because these communities existed at different hierarchical levels and operated on different scales, I decided to integrate the theory of panarchy developed by the Resilience Alliance (1999) and Gunderson and Holling (2002), and the theory of communities of practice proposed by Lave and Wenger (1991). Panarchical theory was developed to aid in the understanding of transformations in human and natural systems. This theory talks about multiple systems operating at different scales and their effects upon one another, from the top down and from the bottom up. It also looks closely at the four phases that systems move through as they confront and cope with change. These consist of decline/collapse, reorganization, utilization, and conservation. The cycling of these adaptive phases is governed by levels of potential and connectedness, which determine a system’s (and a panarchy’s) resilience.

Community of practice theory provides a conceptual framework for thinking about learning as a process of social participation. It is based on four premises. First, learning is a social activity and human beings are social animals. Second, knowledge is a matter of competence with respect to valued practices. Third, knowing is a result of doing. And fourth, meaning is the product of learning. Together these two systems-based theories enabled me to discover and understand the characteristics and conditions that fostered environmental learning and conscientization as members of the clam farming community of practice in Oyster Isles coped with rapid change.

Research Findings

Conditions and Characteristics Affecting Learning

I found that change drove the process of learning, and learning drove change. As small fisheries-based systems declined and collapsed in the area, a new community of practice emerged, organized, and began to rigidify. During the adaptive cycle of reorganization, as individuals from different social systems met, engaged, and negotiated different cultural structures and patterns of social and environmental interaction, learning and the development of innovations flourished. This phase was marked by flattened hierarchical structures, intense social interaction, increased communication and collaboration, new patterns of social and environmental interaction, and expanded social networks. The need for new knowledge pushed insiders and outsiders, men and women, former fishermen, oystermen, and wild clam harvesters to interact and share more
information with one another than they had previously done. Intense labor needs accelerated this process.

Other systems in the panarchy affected the cycling of the adaptive phases in the clam farming community of practice and therefore affected the process of learning and conscientization. Those systems above the clam farming community of practice – the state, the larger community of Oyster Isles, the water management district, northern wholesale markets for clams, etc. – impacted the clam farming system. Systems nested within the clam farming community of practice also affected learning and change within the system. These included the various social networks of clam farmers, former fishermen, former oystermen, former wild clam harvesters, marketers, seed producers, etc. In addition, systems that were nested laterally around clam farming system – the remaining fishing and oystering communities of practice, the crabbing community of practice, etc. – affected it.

As a number of systems collapsed (the net fishing community of practice, the oystering community of practice, the wild clam harvesting community of practice), their members joined the growing clam farming community of practice. The remaining available capital from these systems and numerous others was funneled into the clam farming community of practice. As this capital (potential) was added to the system and various cultural structures and patterns of interaction were shared, the resilience of the clam farming community of practice grew. Expanded resilience enhanced the learning process. Numerous other systems within the panarchy affected the clam farming community of practice. These included the estuarine system, several river systems, the Gulf, various systems of diverse marine populations (rays, sharks, stone crabs, etc.). The effects of these systems on the clam farming community of practice were not explored.

Several other conditions fostered the development of the clam farming community of practice. The first important condition was the role women appeared to play traditionally in times of emergency; they concentrate their efforts on their husband’s success, and the survival of their community and family. The second was the success that early clam farmers enjoyed. The third was the increased access to resources (classes, leases, knowledge, men, etc.) that allowed many to enter the business, especially women.

Because of the increased role for women and for outsiders with diverse structures of signification, and the agricultural nature of the new livelihood, new patterns of interaction with the natural environment resulted. This change led to transformative thinking; thinking like farmers. Transformative thinking led to conscientization. This first occurred among a few individuals during the adaptive phase of reorganization, primarily in women. As the system entered the adaptive phases of utilization, more conscientization occurred. It was during this period that conscientization became collective. Clam farmers critically reflection on the importance of high water quality and sufficient flows of freshwater. They then realized that state and federal policy and policy implementation did not consistently support those conditions that ensured the survival and sustainability of their livelihood.

It became apparent as the adaptive cycle of reorganization moved toward utilization, a number of characteristics that had fostered higher levels of social interaction and learning were being recognized by the community as valuable. These included male gender; a strong sense and/or love of place; prior knowledge and experience; honesty loyalty, and conscientiousness; focus and commitment – a professional work ethic; the
ability to look ahead and plan; the ability to cooperate and reciprocate; patience and organization; and flexibility. Individuals, who held these characteristics or many of these, were able to develop and sustain social ties more easily. This enhanced their ability to learn.

Once the adaptive cycle of utilization began, rates of change and learning slowed. This was a result of rigidifying cultural structures, steepening hierarchies, and the development of a new core of knowledge. Access to resources decreased. Women’s access to the natural environment (and roles with greater potential remuneration) decreased. Women’s access to men, many of whom were working with the natural environment, also decreased. As a result, women found it more difficult to access men’s knowledge. Clam lease sites became more difficult to acquire; some sites that had been leased to the state sold upwards of $35,000 in 2003. Land with access to saltwater for a raceway operation or hatchery became more expensive and less available. Spots for dockage or for entering and exiting a boat from the water or park a truck and boat trailer became scarcer. Decreased access to resources meant decreased interaction with the social and biophysical environment. This process resulted in decreased learning.

As the system moved toward the adaptive cycle of conservation, cultural structures rigidified further (role specialization increased), hierarchical patterns became steeper, and access to resources even more difficult. These factors slowed the learning process even more.

Conditions and Characteristics Affecting Conscientization

In Chapter Eight, I discussed transformative thinking and conscientization. Transformative thinking was the result of new patterns of interaction with the social and biophysical environment and different cultural structures. In the case of Oyster Isles, transformative thinking involved worldview change: former fishermen and former oystermen (wild harvesters), and former wild clam harvesters began to think of themselves as farmers. Transformative learning involves reflection and action but does not involve critical reflection or the realization of oppressive forces. Conscientization does.

Conscientization, on the other hand, was the result of critical reflection and the realization that paradigmatic frameworks were felt to be oppressive and could impede their survival.

As different communities of practice declined and clam farming began, several women were involved in the process of conscientization. These women either held dual gender perspectives or shared different cultural structures and patterns of interaction. Some participants critically reflected on oppressive patterns of interaction that were the result of gender or hierarchical structures. Others focused on state and federal policies and the capitalistic paradigm.

For most, the process of conscientization did not occur until the clam farming community of practice was in the adaptive phase of utilization. At this point, greater numbers of individuals were being denied ready access to resources. The process of conscientization was accelerated by the sharing of personal experiences that illustrated the dangers of water pollution, excessive flows of freshwater, decreased flows of freshwater, and the threat of predators (rays, drum, and humans). These personal
experiences in narrative form were retold time and again as situations threatened the community of practice. These threats included the sale of coastal property for development with septic tanks.

Former oystermen were some of the first to become conscious of the need for high water quality and sufficient freshwater from upstream as a result of personal experience with oyster bed closures in 1989. They were able to transfer this knowledge to clam farming in story form to others. As other individuals in the clam farming community of practice critically reflected on state and federal policies and the implementation (or lack of implementation) of these policies, they began the process of conscientization. Many reflected that the state’s policies regarding water quality and quantity and realized that the government valued increased development over environmental protection. This paradigmatic position was directly opposed to the one they thought was compatible with sustained aquaculture.

This research made it apparent that conscientization is a long-term and sometimes convoluted process. One can be aware and can critically reflect but be unable or unwilling to act on critical reflections. The process may begin and may be thwarts as an individual may not have sufficient levels of capital to engage in action. In Oyster Isles, it became apparent that those individuals who had sufficient levels of capital (including time) were more apt to be involved in conscientization for the long term.

The research indicates that individual conscientization is a prerequisite for collective conscientization but does not ensure collective conscientization. Individual conscientization occurs when an individual realizes a benefit. Collective conscientization occurs when all individuals benefit. If one group of individuals realizes that conscientization is not in their best interest, they can thwart the process of collective conscientization.

It became obvious that the process of conscientization takes longer than the single-loop learning process or transformative learning (double-loop learning). It involves implicit consensus. As consensus grows, so does the conscientization of the larger group – collective conscientization. Continued interaction and communication among individuals led to the conscientization of others in Oyster Isles. When collective conscientization regarding water quality occurred, it was because almost all clam farmers saw high water quality as a necessity. It is important to note that conscientization regarding high water quality had occurred among groups within the larger community of Oyster Isles as that community began to reorganize. This process of conscientization affected and reinforced the process of conscientization within the emerging clam farming community of practice. Conscientization at other levels within the panarchy (the overall environmental movement within the United States) also affected and reinforced conscientization within the clam farming community. Likewise, the conscientization that occurred within the clam farming community affected and reinforced conscientization in groups at other levels in the panarchy.

This research suggests that neither legislation, proclamation, majority vote, nor the promotion of paradigms or models alone can force conscientization. Instead, there are certain conditions that prompt the questioning of existing paradigms and the renegotiation of cultural structures and patterns of interaction. This process can lead to deep cultural change. Critical reflection, however, does not always lead to conscientization. If upon critical reflection and the realization of oppression, actions are
identified that do not appear to serve the best interests of the individual, even though they may serve the best interests of the group, the process of conscientization may be subverted. When identified actions (i.e., the removal of a septic tank, the decision to use a particular type of cover net), serve the best interests of the individual, conscientization occurs. This research also suggests that individual conscientization is a prerequisite for collective conscientization. When sufficient numbers of individuals begin to act differently and continue communicating the need and rationale for these actions with others, and these individuals begin to understand the rationale for the action and see it in their best personal interest, they are able to join the process.

**Future Research Needs**

This research has answered three large questions and many small ones, but there are other questions that it has raised. In Chapter Six, I alluded to a number of related questions. These were not explicitly stated. They included:

1) When individuals are raised playing more than one gender role, are they better able to play a leading role in the process of learning and conscientization during times of intense cultural and/or environmental change?

2) Do cultural systems allow for individuals to be raised playing more than one gender role (i.e., girls being allowed to be tomboys) to ensure that the cultural system has members who can play leading roles in the process of learning and conscientization during times of intense cultural and/or environmental change?

3) What role can/does acculturation play in the process of learning and conscientization as systems collide/merge and confront intense cultural and/or environmental change?

In Chapter Eight, I raised additional questions:

1) Was the reorganization of different cultural structures and patterns of interaction with the social and biophysical environment the result of traditional adaptations that fisheries communities of practice share?

2) Do cultural systems allow for the abeyance of shared cultural structures of legitimation during times of crisis; i.e., are women’s typical roles suspended to deal with the crisis?

3) Would a longer period or reorganization have fostered increased change in cultural structures, permitting women continued access to the natural environment and to men in working relationships?

4) Can the length of adaptive phases be controlled?
5) What implications do the above have on the process of informal, situated learning and conscientization?

Additional research into those conditions and characteristics affecting the process of learning and conscientization in systems facing lurching and transformational change is needed. This study has scratched the surface. I was able to follow the clam farming community of practice from its emergence and organization to the incipient stage of conservation. Continued research as the system moves firmly into the adaptive phase of conservation would be invaluable. This would allow for an understanding of how levels of potential decline and levels of connectedness increase, lowering resilience and leading to potential decline and collapse. Further information regarding the length of adaptive phases could shed light on the process of learning and conscientization and the fluctuating memberships and patterns of communities of practice.

Research Implications

The Value of Pilot Studies

This study has made me extremely aware of the need for preliminary studies or pilot studies. These should not only be undertaken prior to dissertation research, but also the planning and implementation of development efforts (i.e., training programs, grant funding) and the development and implementation of policy.

My pilot study enabled me to pose the proper questions, find and understand those theoretical frameworks that could best shed light on these questions, and effectively design the research study. Shortly after the pilot study began, I realized that an ethnographic study would allow me best to answer the questions I was asking. After further research, I decided to use a modified life-history approach (life-learning histories).

Without having conducted a pilot study, I would not have been aware of the complexities of the panarchical situation, the fact that multiple communities nested within other communities and nesting other communities were affecting one another. An understanding of this complexity allowed me to design the research appropriately. As I began to realize that the various systems were operating at different scales and were in the midst of different adaptive phases, I was better able to discover and understand diverse cultural structures and patterns of interaction that were affecting the process of learning and conscientization. This understanding affected my sampling technique and the choreography of interviews.

The Need for Interdisciplinary Approaches

During the fieldwork process, I became keenly aware of the need for more interdisciplinary studies. Human and natural systems are complex and integrally linked. Without as complete an understanding of these as possible, policy and practice will not be as effective as they could be.
In initial interviews, I became aware of farmer’s concerns about the impact of clam farming on the environment. Many wondered how many clams could be sustained in the area in light of available nutrients and the production of waste without slowing growth substantially or causing disease. Some were particularly concerned about monoculture and the potential impact of a virus on their crop. Later, I became aware that some farmers were rotating the bottom to increase growth rates and that some farmers who were able would move their clams from site to site when salinity levels dropped quickly. It also became apparent that different farmers had critically reflected and begun to use different planting designs. If biological and social research had been implemented simultaneously and if results from such research were shared, the development of practice, future workshops and training programs, the implementation of local and state policy, and the research agendas of universities and government agencies would have benefited.

Cultural structures and patterns of interaction with the social and biophysical environment of various systems within the panarchy affected the development and learning and conscientization that occurred at all levels. Biological, chemical, and physical structures also affected learning and conscientization. Leases were given to graduates of the job-retraining program and then offered to others on a lottery basis. Some leases were in water where salinity levels were too low for success. Other leases were too deep and some were too shallow. Still others lacked the type of bottom that would ensure success. If an individual decided to leave the community of practice, he or she was able to sell the lease that rightfully belonged to the state. Sometimes an individual decided to stop clam farming and leases were abandoned. If there had been a clear understanding of the cultural structures and patterns that existed within the original fisheries communities, the training program, the distribution of leases (granting and re-granting), and the implementation of policy and practice to support better the clam farming community of practice could have resulted.

The Development of Neotraditional Knowledge

Perhaps the most important implication of this study was the need to promote the development of balanced connectedness, an increase of vertical social ties within the panarchy and a sustaining of horizontal ties. This could have resulted in a solid base of neotraditional knowledge. Social ties are conduits for learning and conscientization. The more developed and balanced a network of multidimensional social ties, the better the interaction and communication between systems. If those involved in policy and practice had developed ties between scientists and clam farmers through action research projects, these relationships might have resulted in the production of neotraditional knowledge, a mix of local, indigenous knowledge and “scientific” knowledge. Such knowledge could result in more cohesive policies that might be more consistently implemented.

As wild harvests decrease, aquaculture is increasingly seen by governments worldwide as means of supplying the rising demand for seafood. It is also seen as a means of employing unemployed and underemployed coastal populations. Aquaculture,

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76 Flora and Flora (2002) talk about bridging and bonding. This concept is similar to discussions by Gunderson and Holling (2002) of connectedness. Flora and Flora’s work in this area could provide a valuable tool for future research, policy development, and implementation.
however, demands sufficient high quality water, large amounts of food, and space. Frequently industry requirements are not compatible with coastal growth and development; increased coastal growth and development, both supported by government policy and practice, can diminish water quality, quantity, and marine habitats. Government policies need to be cohesive and should build, one upon another, in order to support resilient, sustainable systems. Such policies also need to be consistently enforced. The development of social ties between systems could enable greater cohesiveness, consistency and higher levels of resilience throughout the panarchy.

The Need to Create and Sustain Love of Place

Increasing property prices, insurance and property tax rates in coastal areas appear to discourage the development of strong aquacultural communities. Many of those involved in farming in Oyster Isles have had to move inland. As a result, they have lost access to saltwater for raceway operations, access to the water for their boats, and have to travel long distances to and from their homes to their sites of business. Those farmers and their families who no longer can afford waterfront or near waterfront property and have moved away from the larger community lose their sense of place. They are no longer able to vote in local elections and their sense of place is torn between the inland community and the waterfront community. In addition, their children are no longer raised with a sense of place. One generation is no longer capable of passing its local knowledge to the next. Berry said an individual is both mind and body, and it is the combination of an individual’s interaction with the world, a locale, and a community over time that produces a “whole heritage of culture, language, memory, tools, and skills” (2000, 48-49).

As I noted earlier in this paper, relationships to place and to others require reciprocity. Younger generations of clam farmers may not interact with the social and biophysical environment in the ways or to the extent necessary to develop this sense of reciprocity, which appears crucial to sustainability. Sense of place (physical place and community) facilitates reciprocity. The alienation of farmers and their families from the larger community – a geographical place and an institution – upon which they are dependent, may result in their exploiting the estuarine environment instead of loving it enough to defend it. Their interaction patterns may also lead to a disjointed sense of collective identity, and a lack of mutual trust and collaboration. If this process occurs, learning and conscientization may slow, levels of potential may fall, and connectedness will become unbalanced (more tightly connected), leading to a possible decline or collapse in the clam farming community of practice.

If populations are to work towards environmental sustainability, governments, communities, families, and individuals must have higher levels of potential and balanced connectedness. Those characteristics and conditions that foster learning and positive acts of conscientization should be worked towards and encouraged.
APPENDIX A
SEMI-STRUCTURE INTERVIEW QUESTIONS

Section I: The Individual

Tell me about yourself. (This should include personal and family background. If they are not from Oyster Isles, it should include information about how they arrived in Oyster Isles and whether they have extended family here. It is important here that key characteristics, age, gender, ethnicity, academic background, place of residence, former place of residence, place of business, etc. be identified so that stakeholder groups can later be analyzed. It may be difficult to get to economic status; this may end up being a bit of guesswork as a result of other questions.)

When and how did you get into clam farming? (This question should get at a chronology of their life as a clam farmer, the location of their lease(s), time of lease renewal, etc.)

What do you (did you) do as a clam farmer? (This question should elicit their role in the clam farming community of practice or the larger community – integral, peripheral, or otherwise. It can be changed to get them to talk about their activities from algae grower to wholesaler, to a member of the water and sewer district.)

Tell me about a typical workday, workweek, and year. (Activities of clam farmers may have a certain daily, weekly, and yearly pattern.)

What other activities are you involve in? (i.e., school PTO, county commission, water board, Sierra Club, women’s club, etc.)

What do you like to do for fun, relaxation?

Section II: Worldview

What do you like and dislike about living in Oyster Isles?
What is it like to be a clam farmer (here)?

What is it like as a woman (man) to live here? (Try to elicit how living here may be different for men and women.)

Do you think women see clam farming differently than men? (If the interviewee is a man, ask about women, if she is a woman, ask about men.)

Do women run their operations differently than men? (If the interviewee is a man, ask about women, if she is a woman, ask about men.)

Oyster Isles is said to be one of the best places to raise clams in Florida? Why do you think this is? (This question elicits environmental values. With probing, the interviewer should be able to ascertain the interviewee’s view of natural resource management.)

What factors could change this? (This question again elicits environmental values and natural resource management views.)

(This question does not need to be asked if the prior question elicited this information.)
What are the largest threats to/of clam farming? What would you say is the greatest threat? (Try to get informant to rank threats. This may elicit information about their critical reflection, or get them to start reflecting critically.)

What has this “success” meant to you? (This gets the informant talking about the term success. This again elicits environmental (social and natural) values, natural resource management views, and identifies specific characteristics of individuals in networks.)

Five years from now do you think you will still be farming clams? (Then change the question to:) Five years from now do you think clam farming will still be practiced in Oyster Isles? (Ask the question(s) again substituting fifteen for five. This question should get the informant thinking about sustainability.)

Do you encourage your children to learn the business? Why? Why not? (This question again should get the informant thinking about sustainability. If it appears from the answer that the informant is not thinking about sustainability, talk about this issue directly in light of the research I am doing.)

Section III: Learning

Do women and men do the same jobs as clam farmers? (Do not ask the follow-ups if they have already been answered.) Are women more likely to do one thing and men another? What things do men (or women) do better than women (or men)? (This question is geared to look at the informant’s conscientization of gendered roles.)
How did you start to learn about clam farming? (This question will get at whether the informant had any formal or non-formal training.)

What’s the best way you’ve found for you to learn? (This question will get them to reflect on their learning style. If an informant was involved in formal or non-formal training, it can be followed up with:) How useful did you find the classes you took? (This should get the informant critically reflecting on informal and more formal learning.)

How long did it take you to get comfortable with what you do? What was the hardest thing to learn, the easiest? (This question is just a means of continuing the learning dialogue.)

Who did/do you go to for information about: seed, planting, equipment, markets, water quality, etc.? (This question elicits information about the informant’s social network. If the individual is uneasy with giving names, have them indicate relationships instead.)

Do you get information in other ways – television, newspaper, trade magazines, computer, etc.? (This question is geared at getting to how the informant most comfortably learns.)

Who do you work with? (This question is geared at getting information on social networks. Apparently networks of four to eight intimate relationship are easily elicited, but this can vary across cultures and within different populations (Wellman, 1979).)

What are your goals? (This question looks at the issue of sustainability.)

What things have made it difficult or easy for you to learn? (This question is geared at getting to how the informant most comfortably learns.)

Who do you share information with? Where? (These questions look at the transmission of information within and between social networks, and between individuals. It is here information on ties and public space will emerge. The following question can be used to get them to continue to talk about this.) Are you more likely to share information with family, fellow clam farmers who are unrelated, the cooperative extension agent, etc.?

What are you still learning? (Additional information on learning style, transmission of information, social networks, ties, and public space may emerge here.)

Do you think women learn differently than men? Do you think men learn differently than women? (Ask this question both ways to elicit information on gendered learning.)

What things do men (or women) have a better understanding of than women (or men)? (Ask women about women, and ask men about men. This question should elicit information on gendered learning.)
(Notes: Make sure the following issues are covered: 1) is informant a member of the clam farmers cooperative; 2) is informant a member of an advisory board (water and sewer, water management district, environmental group, etc.).

**Final Questions:**

What things have you learned that have changed the way you think about the environment? (Let the informant answer this without specifying what environment means. When they finish, be specific – natural environment, social environment. This allows the informant’s view of the environment to appear and then allows specific information on all aspects of the environment to emerge.)

What things have you learned that have changed the way you think about yourself? Your family? Your community? Clam farming in general? (This gets at critical reflection and possible action on the part of the respondent. It may also begin the process of conscientization.)

What things have you learned about the above that have made you act differently about where you live, your family, what you do? (This further gets at critical reflection and possible action on the part of the respondent. It may also begin the process of conscientization.)
APPENDIX B
UNIVERSITY HUMAN SUBJECTS PERMISSION

Florida State University
Office of the Vice President
For Research
Tallahassee, Florida 32306-2763
(850) 644-5260 · FAX (850) 644-4392

Human Subjects Committee

RENEWAL NOTIFICATION

Date of Notice: 5/19/2003

Margaret Lynn Ronald
9265 Parkhill Rd
Tallahassee, FL 32311

From: Human Subjects Committee

Re: Renewal of Project Entitled: Worldview and Environmental Knowledge of Aquaculturalists: A Look at Learning and Practice in a Florida Clam Farming Community

This is to advise you that your approval for use of human subjects in the above-referenced research project will expire on 6/28/2003. No research involving human subjects may be conducted after that time unless an extension is granted by the Human Subjects Committee.

In order to be granted an extension and continue your research, you must complete and submit the attached Request for Renewal to the Committee by 5/17/2004. If you do not wish to continue your approval for this project, or if your study has been completed and continuation is not necessary, please indicate by underlining or circling below and return this form only to the Committee.

If no response is received to this notice by 7/8/2004 a formal termination will be issued to you, your major professor and/or department chair (whichever is applicable).

If you have any questions, please do not hesitate to contact Peggy Haire, Assistant to Human Subjects Committee at phaire@meller.fsu.edu.

: ph
Endorse
Cc: Dr. Vendra Masemann
Department: Education Foundation and Policy Studies
Category: Exempt
HSC No. 2002.400-R
No renewal is necessary.
APPENDIX C
INFORMED CONSENT FORM

Informed Consent Form

I freely and voluntarily and without element of force or coercion, consent to be a participant in the research project entitled “Worldview and Environmental Knowledge of Aquaculturists: A Look at Learning and Practice in a Florida Clam Farming Community”.

I understand that this research, being conducted by Margaret Ronald, will be used for a dissertation to fulfill doctoral degree requirements at Florida State University. The results of this study may also be disseminated at academic conferences and in professional research-oriented journals. I understand the purpose of her research is to better understand the knowledge of clam farmers, how they learn, and how they act upon that knowledge. I understand that if I participate in the study I will be asked questions about my life as a clam farmer, my understanding of the environment as it affects clam farming, how I have and continue to learn the environment, and how I act upon that knowledge. I also understand that I will be observed as I work.

I understand that the researcher would like to conduct a total of three interviews and that the time commitment for each interview will be between 60 and 90 minutes. If I participate in this study, I will have the opportunity to ask questions of the researcher, to review and comment on field notes and interview transcripts, and to read and comment on the final report.

I understand my participation is totally voluntary and I may stop participation at anytime. All information obtained during the course of the study will remain confidential to the extent allowed by law. My interview comments and my identity will be kept confidential; my name will not appear on any of the results. I understand that each interview will be recorded and that I may be photographed in the context of clam farming to aid with later analysis and interpretation of observations and interviews. The audio tapes and photographs will be stored in a locked filing cabinet until February 28, 2003 at which point they will be destroyed. With permission of participants, the photographs and/or audio tapes of study will be donated to the local historical society to document clam farming in the area.

I understand there is a possibility of a minimal level of risk involved if I agree to participate in this study.

I understand there are benefits for participating in this research project. First, my own awareness of different types of environmental knowledge and practices may be increased. Also, I will be providing information to other professionals that may provide valuable insights into the management of ecological systems.

I understand that this consent may be withdrawn at any time without prejudice, penalty or loss of benefits to which I am otherwise entitled. I have been given the right to ask and have answered any inquiry concerning the study. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Margaret Ronald at (850) 309-9938 or mhlolland@mailer.fsu.edu for answers to questions about this research or my rights as a participant.

I have read and understand this consent form.

Printed Name of Subject __________________________
Signature of Subject __________________________ Date __________________________


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BIOGRAPHICAL SKETCH

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EDUCATION

2003 Ph.D., International Intercultural Development Education
Education Foundations and Policy Studies
Florida State University, 1994-present
*Dissertation Defended Successfully: October 2003
   Advisor: Vandra Masemann. Dissertation Title: How a Florida Coastal
   Community Learned to Deal with Rapid Environmental Change. Emphasis:
   informal learning, the transformation of human and natural systems, consensus

1982 M.A., Journalism
The Ohio State University
Columbus, Ohio
   Emphases: environmental journalism, marine issues, community
   development and education (1980-1982).

BA Anthropology/Spanish, 1973
Universidad de las Americas
Puebla, Mexico
   Emphases: culture systems and culture change, environmental anthropology,
   language and the negotiation of meaning.

PROFESSIONAL CREDENTIALS AND CERTIFICATES

1978 U.S. Coast Guard charter license, (6-ton)

1990  ESOL Endorsement, Florida

LANGUAGES

Spanish: fluent
Portuguese: fluent

ACADEMIC EXPERIENCE

1972-3  Instructed 2A-3 in British School, Rio de Janeiro, Brazil.

1972-1973:  Adjunct Professor, Instituto Getulio Vargas, Rio de Janeiro, Brazil. Developed curricula and taught Introduction to Anthropology and Mesoamerican Archaeology.

1985-1986:  Adjunct Professor, University of Maine, Thomasville, Maine. Developed curriculum and taught business and technical writing.


1988-1991  Instructed K-6 Spanish, St. Edwards School, Vero Beach, Florida


1991-1993  Instructed business writing, public speaking, and English at Lake City Community College, Lake City, Florida.

1997-2002: Undergraduate Teaching Assistant, Florida State University. Every fall and spring. Taught *Introduction to Education* (teacher education foundations course). Developed curriculum and taught *Education in America* (an upper level policy course).

1995-2002: Consulted, developed curricula and taught ESOL to teachers and administrators in Leon, Wakulla and Gadsden counties.


PROFESSIONAL EXPERIENCE


1975-1978: Commercial fisherman and smokehouse manager. Coast Guard licensed from Lake Worth to Key West.

1976-1980: Worked with community-based organization fundraising and speaking to keep the Oleta River from being dammed. Today it remains the only undammed river in Miami-Dade County and part of a larger park system which resulted from the group’s actions.

1978-1980: Pollution Control Inspector, Department of Environmental Resources, Dade County, FL. Worked in North Miami Beach, Central Miami along the Miami River, and in the Everglades on loan to USGS. Monitored water and air quality, collected evidence, wrote reports, handled photography, and did general enforcement work for the county.

1980-1982: Communicator, Ohio Sea Grant, Ohio State University, Columbus, Ohio. Managed all publications for Ohio Sea Grant and the Center for Lake Erie Area Research. Worked as a liaison with university. Wrote press releases. Published three newsletters. Wrote and edited fact sheets, edited several books. Worked with more than 40 professors to develop and manage grants, disseminate findings, and edit publications. Developed slide shows and helped organize and host Sea Grant events statewide. Managed three people and worked closely with four cooperative extension agents.
1982-1986: Freelance environmental writer. Worked with National Fisherman, Down East, Fish Boat Magazine, Maine Audubon, Maine Sea Grant, etc.

1984-1987: Assistant Editor, Courier Gazette, Rockland, ME. As one of two assistant editors, was responsible for the publication of the area newspaper three times a week. Assigned articles, wrote features and hard news, edited copy, developed layout, wrote headlines. Awarded Maine Environmental Writer of the Year 1986.


2002-present: School Improvement Facilitator for the Florida School Improvement Policy Center. Work with administrators, teachers, and policy makers to improve student achievement, school advisory councils, effective practices, data analysis. Conduct site visits and school studies, deliver presentations and training, and provide research-based information regarding private, state, and federal education initiatives.

PUBLICATIONS


Currently: Co-authoring section on Indigenous Knowledge for UNESCO Encyclopedia with Dr. Peter Easton, Florida State University.
PRESENTATIONS

March 1997: “Two Rivers Run into the Sea: A Comparative Study of Environmental Education Programs in Curitiba, Brazil and Apalachicola, FL” at the annual meeting of the Comparative and International Education Society in Mexico, D.F.


April 1999: “Conscientization of Globalization among North Florida Women Educators” at the annual meeting of the Comparative and International Education Society in Toronto, CA.


March 2001: “Struggling for Sustainability: An Incipient Environmental Social Movement in West Coast, FL”. Presented at the annual conference on social movements at OISE, Toronto, CA.


SERVICE

1994-1995: Co-authored three successful grants at Florida State University School, FSU.


July 1996: Assisted Dr. David LaHart (Energy and Environmental Alliance, FSU) with education and translation for a group of Brazilian professors from University of Curitiba, Brazil visiting the Apalachicola Estuarine Reserve.

Summer 1996: Developed a four-week summer abroad program with a colleague at FSUS. Students would spend two weeks studying Spanish in the highlands of Guatemala and two weeks studying ecology in Honduras.

April 1996: Assisted Dr. Hansen (Center for the Study of Teaching and Learning, FSU) with education and translation for Brazilian professors from the University of Rio Grande do Sul visiting vocational educational facilities throughout Florida.

May 1996: Assisted Dr. Bob Walker (Geography, FSU) with translation for a group of Brazilian professors from the Amazon region studying GIS systems.

February 1997: Elected to chair a Florida state committee for innovative teaching in team settings.

Fall 1998: Assisted with facilitation of the “Participatory Research and Gender Analysis in Agriculture” conference held by CIAT (Centro de Agricultura Tropical) in Quito, Ecuador.

PROFESSIONAL ORGANIZATIONS

Comparative International Education Society
American Education Research Association
Rural Sociology
American Anthropological Association