

**A Qualitative Assessment of the Environmental Stewardship Value of Salt Hay
Harvesting Practices in Nova Scotia**

by

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Submitted in partial fulfillment of the requirements
for the degree of Master of Arts in Atlantic Canada Studies

Saint Mary's University

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Abstract

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April 08, 2004

Since European colonization salt marshes have been utilized for agricultural purposes, and have played a prominent role in the development of Nova Scotia's social, cultural, economic, and environmental history. While dykeland agriculture has received much attention in Atlantic Canada's historiography, popular culture representations, and agricultural development planning, the agricultural practices associated with tidally unrestricted marshlands have remained largely unacknowledged. Local and oral histories reveal a long tradition of Nova Scotian farmers who harvested the indigenous flora of salt marshes, and utilized it in a variety of ways within their farming operations. Research indicates that systems of natural resource management, wherein communities maintain long-term utilization of a natural resource, have environmental stewardship value. Employing qualitative research methods, this paper presents the expertise of men and women who utilized these salt marsh resources in their farming operations, and assesses the environmental stewardship value of salt hay harvesting in Nova Scotia.

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CHAPTER 1

INTRODUCTION

“The narrative continuity of a place is formed of both ecological and cultural histories; the two cannot be easily or appropriately separated” (Higgs, 2003, p.153).

I am standing on the highway bridge of ‘the 215’ where it crosses the Cogmagun River in Hants County, Nova Scotia, just a short distance walk from my home. Looking eastward, I have an unobstructed view of the river’s winding channel and grassy flood plain. Long ago the Mi’kmaq, the First Nations people of Nova Scotia, gave the Cogmagun its fitting name meaning “crooked river” to describe its twisting, turning course (Ferguson, 1967, p. 139). At present the tide is out. The river’s channel is deep, cutting through the thick, reddish-brown, mud that typifies this coastal region of the province. A steady stream of crystal-clear, headland water flows westward, cascading over rocks and sandbars. The out-flowing freshwater is a stark contrast to the surge of turbid seawater, which will engulf the river’s channel in several hours time, filling and possibly spilling over its banks, depending on the phase of the moon.

On each side of the river, meadows of salt marsh flank the muddy shoreline. It is mid-summer. The marsh is cloaked in a vernal blanket of wiry, cord grass. Cloud-filtered sunlight dances shifting shades of green, burgundy, and tawny hues across the seemingly flat, floodplain. The air is redolent with the salty tang of low tide and the ripe pungency of rank growing vegetation. At the marsh’s periphery my eyes follow the incline up forested banks of bayberry, witch hazel, alder, maple, spruce, and fir; their sylvan presence delimiting the ecological zone of terra firma. Salt marshes, on the other hand, occupy a special niche. They are an ecological interface that melds the meeting of land and sea. Along the north-eastern coast of North America “the ribbon of green marshes,

part solid land, part mobile water, has a definite but elusive border, now hidden, now exposed, as the tides of the Atlantic fluctuate” (Teal & Teal, 1969, p.3).

While the day-to-day dynamics of a salt marsh are governed by a coastal region’s particular tide cycle, periodically more dramatic events occur, such as when a storm surge slams ashore, or a marsh surface becomes littered with behemoth bergs of mud-rippled ice, marooned in the wake of a springtime melt. The geomorphology of a salt marsh results directly from these tidal rhythms and turbulent episodes. Salt marshes are depositional environments. Both vertical and horizontal growth results from sediment accretion. “The tidal waters flooding salt marshes are normally turbid. As the tide floods the marsh, the vegetation acts as a baffle allowing the sediment to settle out” (Adam, 1990, p. 20). In the coastal region of the Minas Basin, in the Upper Bay of Fundy, where marsh levels keep pace with rising sea levels (Chmura, Helmer, Beecher, & Sunderland, 2001), and the tidal amplitude can reach fifty feet (fifteen meters), the depth of salt marsh soils is exceptional (Bleakney, 2004). The extraordinary depth of the Cogmagun River’s channel gives evidence to this fact.

If I turn now and face the westerly flow of the Cogmagun’s out-going current, in my mind’s eye, I can follow the salt marsh along the twisting contours of the river to where it reaches its tributary conclusion by converging with the Avon River. From there, the Cogmagun’s headland waters flow north to mingle with the Minas Basin, eventually reaching the Bay of Fundy. This hydrological trajectory will reverse itself in roughly six hours time when, with the turning of the tide, an in pouring of turbid seawater will extend far in land, following the Cogmagun’s serpentine channel.

From my current perspective, the muddy-banked Cogmagun, with its salt marsh meadows and semi-diurnal inflow and outflow of Fundy's voluminous tides, seems incidental to the many houses, out-buildings, and power-poles lining the road that intersects it. At a glance, the marshland appears to be untouched by humans. However, on closer examination I see what appear to be the bleached remnants of weatherworn fence posts. These posts are not arranged in the typical, linear fashion that I am accustomed to seeing along roadsides, or farmers' fields. Instead, the posts or what remain of them stand, clumped together in square-like configurations. On the westward side of the highway bridge several clusters of these silver-grey, ragged-topped posts mark the marshland. Their situation appears at once purposeful, but decidedly out of time.

These posts are part of a story. Their presence gives testimony to a time when the people who lived in the vicinity of the Cogmagun were intimately connected with the rhythm of this river, the seasonal variations of its salt marshes, and the guiding cycle of the moon. These few remnants are what remain of the hundreds of wooden platforms that were at one time used by local farmers to stack their annual harvests of salt hay on, all along the Cogmagun and the other tidal rivers in this region of Nova Scotia. Known locally as *straddles* or *staddles* (Bleakney, 2004; Scott, 2003), and in other parts of the province as *échafaud* or *carré* (Crowell & Saulnier, 1998), the remnants of these wooden platforms are artifacts from a material culture that has, on the North American continent, spanned nearly four centuries. They are signatures to a social and ecological linkage (Berkes & Folke, 1998) that gave rise to Nova Scotia's agricultural heritage, and contributed to the development of rural communities along much of the province's coastline.

In North-western Europe, wetland agriculture had been practiced prior to the Middle Ages, and was a key component in Atlantic Europe's economic growth and socio-political environment (Butzer, 2002; Hatvany, 2003). Historical evidence indicates that the transfer of European wetland knowledge and technology to the shores of Nova Scotia began with such historically notable men as Samuel de Champlain, Marc Lescarbot, and Jean de Pourtincourt (Butzer, 2002). Lescarbot's journals, written in the dawning years of the seventeenth century, portray a man whose "deep interest in farming and plant husbandry" (Clark, 1968, p. 85), led him to consider the agricultural potential of the New World's tidal marshes, in particular, as an inexhaustible source of livestock fodder:

There was found in the meadows three-foot deep of earth, not earth but grass or herbs mingled with mud, which have heaped themselves yearly one upon another from the beginning of the world, not having been moved. Nevertheless the green thereof serveth for pasture to the élans, which we have many times seen in our meadows of those parts....Not far off from our fort, at a place where Monsieur de Monts having caused the grass to be mowed two years before, it was grown again the fairest of the world. (Lescarbot, 1606, p. 97)

Like Lescarbot, Samuel de Champlain was also interested in the agricultural potential of salt marshland and is known to have conducted experiments with growing crops on the marshland soils near the fortified compound of Port Royal. Champlain's journal entries provide one of the earliest accounts of salt marsh reclamation in a North American context:

Even as the French compound was being built, Champlain was making 'gardens' in the adjacent marshland. Three or four rectilinear fields are schematically shown

on his map, the border aligned with minor watercourses....One of these he also surrounded with ditches full of water, which he stocked with trout. Further, there [he] made a small sluice against the seashore to drain off the water when [he] wished. (Butzer, 2002, p. 454)

Since the time of Lescarbot and Champlain, salt marshes have continued to influence the economic, cultural, and social development of Nova Scotia.

In agro-economic terms, Nova Scotia has been characterized as being “an ungenerous place, with proportionately no more agriculturally usable soil than British Columbia, with all its mountain ranges” (Gwyn, 1998, p. 3; Also, see Bittermann, 1988; and Troughton, 1988).

Geomorphologists have classified the area of the three maritime provinces of Canada, east of the New Brunswick highlands and Gaspé’s rugged Shickshock mountains as the “Acadian” landform region....There are two major types of terrain. The first is that underlain by crystalline rocks, which have been comparatively resistant to erosion and usually have substantially greater elevations. The soil of these areas generally has not been useful for agriculture. The second has a surface eroded to lower levels in softer sandstones, shales, and limestones and characteristically covered by better soils on which most of the limited agricultural activity in the area has taken place during the last two centuries. (Clark, 1968, pp.11-12)

The geological nature of Nova Scotia’s uplands and its soil types were, and have remained, a limiting factor in the agricultural development of the province (Dumanski & Stewart, 1981; Troughton, 1988). Most of the early efforts to establish farm settlements

were thus directed towards coastal regions where salt marshes—with their high vegetative productivity and seemingly inexhaustible fertility—could be found. “Salt marshes were outstanding contributors to the nature of land use and occupation in the Acadian period. The tidal flats around the Bay of Fundy offered both an opportunity to make farms with the spade rather than the axe, and soils of fertility greatly exceeding that of most of the dry land areas”(Clark, 1968, p. 55). From the mid-seventeenth century until their deportation a little more than a hundred years later, Acadian farmers, particularly those who established their settlements in the salt marsh regions of the Inner Bay of Fundy, excelled in their farming endeavours. Early Acadian farms produced a wide range of food crops that included wheat, rye, oats, barley, field peas, potatoes, carrots, turnips, cabbages, field peas, and beans. Raising livestock, including beef and dairy cattle, sheep, and pigs, was also an important part of the Acadians’ farm management practices. Food from these small, but agriculturally diverse farms, was produced for the consumption of the farm family, as well as for export to the New England colonies and to Fort Louisbourg (Clark, 1968). While salt marsh dyking occurred during this period, we may deduce from the large number of cattle and other livestock raised (Clark, 1968) that the naturally occurring vegetation from undyked salt marshes provided a large portion of the required forage, and was thus a crucial component of the farm management practices of these early agrarians.

Following the expulsion of the Acadians by British forces in mid-eighteenth century, efforts were made to re-populate the Acadians’ expropriated farmlands with settlers more aligned to the British colonialist agenda. The promise of cleared or already productive farmland (Patterson, 1994) compelled many settlers from the colonies of

southern New England to leave behind kith and kin and venture north to start a new life in the British colony of Nova Scotia . Many of these New England Planters, as they came to be called, chose to settle in regions of Nova Scotia where salt marshes could be found (Whitelaw, 1997; MacNeil, 1993; Duncanson, 1985). Documentation showing how land was granted to the new settlers indicates that access to those natural resources was deemed to be necessary to a farm family's survival (Whitelaw, 1997). In granting land, it appears that salt marshes were considered to be as important as woodlots to farm viability and communal integrity (MacNeil, 1990). Records from the founding of Newport Township in 1760 indicate that each family, along with churches and schools, were allotted a portion of salt marshland (Duncanson, 1985). The availability of salt marshland remained just as important for the United Empire Loyalists when selecting settlement sites along the Northumberland Strait in 1782 (Brown, 1973). For many of these early Nova Scotians, whose subsistence depended on the generosity of the soil, salt marshes were considered some of the most valuable agricultural land of a farm. Salt marshes were frequently the only source of hay or pasture for years after land was granted or property rights were secured. In Nova Scotia, as in nearby Prince Edward Island, farmers who owned or had use rights to salt marshes, with their fertile soils, and abundant and free supply of livestock forage, would have had a competitive advantage over their inland neighbours (Hatvany, 2001). The high value placed on salt marsh resources, and their limited availability would have been a factor in the "differentiating process" (Bittermann, 1988, p.34) of settlement in Nova Scotia. In this way, since the earliest days of European colonization, salt marshes have been an important factor in

structuring settlement patterns and shaping Nova Scotia's cultural landscape (Jobb, 1988; Boucher, 1980; Campbell, 1979; Labelle, 1995).

Scholarly accounts have depicted agriculture in Nova Scotia as being characteristically retarded during the late eighteenth and early nineteenth centuries; a critical time, argues Anthony Winson (1985) who identifies this as the era in which the success or failure of regional agriculture was determined in Canada. Julian Gwyn (1998) speaks of this time in Nova Scotia's agricultural history as having resulted from the tragic flaw in British colonialist policy of deporting the region's most accomplished farmers—namely the Acadians. Even “contemporary commentators were critical of the way in which the [New England] settlers farmed their lands in the late eighteenth and early nineteenth centuries. According to many accounts, ‘English’ use of the marshlands compared unfavourably with that of the Acadians” (Wynn, 1979, p. 81). Even though evidence indicates many of the New England settlers were familiar with salt marsh agricultural methods, and brought with them their own social mechanisms for managing this natural resource base (Conrad, 1988; Whitelaw, 1997), the prevailing assumption, which has become part of the mythology of Nova Scotia's settlement history, is that the New England settlers, and those who followed them, lacked the skills and knowledge needed to properly manage salt marshes in order to realize their full agricultural potential – namely reclaiming the marshlands from the sea (Milligan, 1987; Wynn, 1979). The ideas put forth by the nineteenth century agricultural improver John Young (1822) were intended to remedy this perceived problem by motivating farmers to shift their attitudes, and their methods for utilizing the region's salt marsh resources:

There is no employment of capital, which would yield so great a return to the

public, and to the individuals, as the dyking of these Marshes: and no pains should be spared to unite in such schemes the adjoining proprietors who have a common interest. The ignorance of some, the backwardness of others, and the poverty of all—which last is the child of laziness—are powerful obstacles in the way of success; but such is the paramount utility of these undertakings, that the wellwishers of the Province, and the patrons of Agriculture, should persuade, soothe, flatter, and cajole them into one system of zealous and active cooperation. We have thousands of acres capable of being reclaimed from the ocean, chiefly on the Bay of Fundy, its creeks, and inlets, which, if dyked and cultivated would bring great accession to our internal prosperity, as well as to the private emolument of the undertakers. (Young, 1822, p. 119)

Young was not alone with his notion that dyking and draining salt marshes would improve agricultural productivity, and create a stronger regional economy. Historians Kim Sebold (1992 & 1998) and Matthew Hatvany (2003) have both shown that during the nineteenth century pressure was being applied to farmers, all along the coastal regions of the United States, as well as along the shores of the St. Lawrence River, to dyke the expansive salt marshes that were endogenous to their respective regions. In Nova Scotia, the edict to transform salt marshes into dykelands reached its zenith in the late 1940s when the Federal government passed the Maritime Marshland Rehabilitation Act (MMRA). By this point in time, managing Nova Scotia's salt marsh resources, particularly those of the Upper Bay of Fundy, had "transition[ed] from individual, localized, approaches to highly centralized administration relying on provincial and federal funding" (Summerby-Murray, 2003, p. 185). By 1970, under the auspices of the

MMRA, 33,275 acres of salt marshland had been converted into dykeland in the three Maritime Provinces, with most of the transformation occurring in Nova Scotia (Milligan, 1987). It is significant to note, as Buckley and Tihanyi (1967) have, that “despite employment in construction the [MMRA] project failed to add to productive farmland or to stem the movement out of farming” (Troughton, 1988, p. 40). While the nation building politics of agricultural policy-making (Skogstad, 1987) have most certainly played a hand in determining what some have interpreted as the rise and fall of agriculture in Nova Scotia (Troughton, 1988), I would also suggest that much about Nova Scotia’s natural capacity for agriculture, and historically proven farm production methods have been overlooked, or dismissed, for not fitting in with the more general trend in agriculture thinking in North America, that viewed small, diversified farming practices as being anti-modern. What John Young (1822) and many agricultural improvers and analysts that followed him appear to have failed to understand is that sustained agricultural production does not emanate from an objective focused solely on maximizing production, but rather through employing risk avoidance mechanisms to ensure long-term survival—a strategy well-known to most traditional agrarian societies (Butler Flora, 1990). Balancing the input costs of production with farm output is a finely tuned art (Hecht, 1987), a factor in sustainable production methods Butler Flora (1990) refers to as “low capital use and dependence avoidance” (p. 29). In this light, Nova Scotian farmers who utilized their allotted marshland holdings in their natural state rather than investing time, energy and financial resources into dyking may not have been lazy or lacking in agricultural innovation as much as they were prudent and conserving.

Prior to the advent of fossil-fuelled machinery, erecting and maintaining dykes, in addition to clearing the densely forested upland in order to cultivate field crops, grains, and domestic grasses, would have been an arduous and costly venture (MacNeil, 1993; Hatvany, 2001). A case in point is the financial burden assumed by local farmers in the construction of the Wellington Dyke near Starr's Point, Kings County, in 1825. Marjory Whitelaw (1997) informs us that completing the dyke—the largest to that point in Nova Scotia's history—meant that many of the original proprietors were forced to mortgage or sell their farms to pay for the costs. While at the same time many of the Wellington Dyke farmers were losing their hold on their farmland, other, perhaps more cautionary, farmers were busy utilizing the natural resources they could procure from the tidally unrestricted salt marshes—despite having a knowledge of dyking technology (Brown, 1973; Campbell, 1979; Labelle, 1995; Whitelaw, 1997). However, within the historical representation of Nova Scotia's agricultural development, the value of these marshland resources to practicing agriculturalists has either been ignored or considered an indication of backwardness.

While agriculture in Maritime Canada has been largely characterized as having been afflicted with continuous failure, particularly when compared to the rest of the country (Winson, 1985; Troughton, 1988), Daniel Samson (1994) has pointed out that, “part of the problem social historians have had with older emphases in agricultural history is their failure to go beyond measures of agricultural performance, the growth of markets and technological change” (p.1). According to Samson (1994), by highlighting Maritime farmers' failure to modernize, or transform to fit the needs of “an advanced capitalist social agenda” (Winson, 1985, p. 434), many scholars have “by-passed the

complexities of rural life” (Samson, 1994, p.6). Another way of stating this is that much has been overlooked in our scrutiny of why and how Nova Scotia’s farmers utilized the natural resources available to them, and how they negotiated a rapidly changing political economy. It is in this regard that I suggest that the historiographic emphasis on failure or underdevelopment has not only obscured our awareness of the full contribution salt marshes have made to farm viability and community resilience over time, this preoccupation with failure has served to advance a paradigmatic view, which has relegated local knowledge systems to the sidelines of what may be relevant information for current environmental management concerns. The resulting narrative, which has come to dominate the historical representation of marshland agriculture, has effectively narrowed our focus onto the social, cultural, and economic significance of dyked marshlands in Nova Scotia’s agricultural history (Ganong, 1903; Clark, 1968; Gwyn, 1998), and obscured our ability to perceive any other possibilities.

Challenging this assumption is further hindered by “the long neglect of research on the modern history of Canada’s Maritime Provinces, [allowing] myths and stereotypes to dominate both popular and academic images of that region” (Forbes, 1989, p. 7). The result of the limited scholarly attention given to developing a post-Confederation, Maritime historiography, according to Forbes (1989), is “that we really know very little about the Maritimes in the post-Confederation period” (Forbes, 1989, p. 64). Over time, as myths and stereotypes became popularized, our perspective of the past has become increasingly skewed, often in favour of the very people and institutions transmitting and/or receiving the myths and stereotypes (Forbes, 1989). As a region’s history becomes increasingly simplified, voices are silenced, events disappear, and meaning is lost. We

are left with an inability to develop a genuine appreciation of the Maritime region. A case in point is Timothy Lewis' (2005) study that demonstrates how the scholarly treatment of the early 20th century United Farmers movement in the Province of New Brunswick has overlooked the central role that the provincial Liberal government played in undermining the potential of farmer-lead co-operative movements (Lewis, 2005). Fortunately historians such as Lewis (2005, 2001) have re-invigorated the region's rural historiography, and have revealed the complexity of rural history (Lewis, 2001).

Our perception of what constitutes salt marsh agriculture has not escaped the effects of the limited historical analysis of agriculture in a post-Confederation Maritime region. Our collective imagination has been impressed with the popularization of early Acadian communalism and agrarian innovation, giving rise to the notion that today's dykelands represent the manifest destiny of Acadian social organization and material culture (Cameron, Bowron, Butler, & Graham, 2000). That today's "dykes are bigger and more effective...than they could have been during the Acadian occupation" (Lavoie, 2003) and that present-day, dykeland agriculture bears little resemblance to Acadian marshland farming is generally overlooked. Moreover, government sponsored publications such as D.W. Milligan's (1987) historical portrayal, *Maritime Dykelands*, have bolstered the notion that dykelands represent a triumph of human ingenuity over nature. This aggrandizement of Nova Scotia's dykeland agriculture has resulted in little attention being paid to the contributions that tidally unrestricted salt marshes made towards Nova Scotia's agricultural and social history. However, local and oral histories indicate that many Nova Scotian farmers did value undyked salt marshes —often times as much as their upland holdings (Bourque, 2004; Brown, 1973; Clairmont, 1980; Crowell

& Saulnier, 1998; Labelle, 1995; Scott, 2003). These historical sources reveal a long tradition of farmers, from many regions of Nova Scotia, who harvested the indigenous, halophytic flora of salt marshes, and utilized it in a variety of ways within their farming operations. Given that the dominant historical discourse has narrowed our conceptualization of marshland agriculture and obscured our awareness of traditions for using undyked marsh resources, expanding the historical framework to account for how this natural resource contributed to the viability of farming in Nova Scotia is long over due.

The notion that dyking, or ‘reclaiming’ salt marsh land from the sea enhanced a region’s economic and social conditions is not exclusive to Nova Scotia’s historical representation of marshland agriculture. All along North America’s Atlantic coastline the perception that dyked marshland was an improvement over naturally occurring salt marshes had become widespread by the nineteenth century (Cassagrande, n.d.). New England’s agricultural improvers stressed the point that “draining the marshes was an economic endeavour that would increase profits and make useless land operational” (Sebold, 1992, p. 21). In Canada, historical-geographer Matthew Hatvany (2003) chronicles a similar pattern of economic modernization and environmental change in the community of Kamarouska, on the shore of the Gulf of St. Lawrence. Taken together, these regional responses speak to a much larger issue concerning how humans have come to conceptualize nature, and what they consider to be the best practices for extracting and making use of environmental goods and services.

Over the course of the past few centuries the economic objectives that emerged out of the utilitarian Western worldview (Berkes & Folke, 1998), and the rise of positivist

science (Hecht, 1987) have given rise to methods of resource management that on a global scale “have treated the environment as discrete boxes of resources, the yields from which could be individually maximized (Berkes & Folke, 1998, p. 1). Within this unabashedly, anthropocentric paradigm, the transformation of salt marshes into dry land through draining and dyking has been lauded as an efficient use of this natural resource. Indeed, the “reclamation [of salt marshes] for agricultural land has resulted in the creation of some of the most valuable productive farmland in the world” (Adam, 1990, p. 372; Also see Boorman, 2003; Onaindia & Amezaga, 1999). However this practice has also resulted in the global-scale loss of salt marsh ecosystem functions and productivity. Particularly troubling is the fact that, outside of North America and a few European countries, salt marsh alteration has remained unreported since very little effort has been made to document wetland loss on a systematic basis (Scott, 1993).

While it can be said that no ecosystem type—marine, forest, savannah or wetland—has escaped the destructive impact of the ‘growth and prosperity’ economics of global industrialization, tidal marshes have been particularly vulnerable to capricious development. In their naturally occurring state, salt marshes have been viewed as undeveloped, “desolate wastelands with monotonous vegetation and topography, repugnant smells, too much mud and too many bugs” (Daiber, 1986, p. 7). Salt marshes, along with other wetlands “have traditionally been regarded as having very little, or even negative, value” (Turner, van den Bergh, & Brouwer, 2003, p.6). Because “many of the real values of salt marshes are not recognized, or accrue some distance from the marsh itself” (Gosselink, Odum, & Pope, 1973, p.2), most anthropogenic activities directed towards their alteration have not been analysed and held to account for the total costs of

their impact. When one considers that in addition to being dyked and drained for agricultural usage, salt marshes have been made into garbage dumps, mined for their underlying sand and gravel, or in-filled for construction projects, the costs of their destruction becomes even more troubling (Daiber, 1986). The National Wetlands Working Group (1988) estimates that since European settlement, about sixty-five per cent of Canada's Atlantic tidal and salt marshes have been lost or degraded. In the Bay of Fundy alone, the past three hundred years have seen "as much as 85% of the original area of tidal marshes diked and drained"(Connor, Chmura, & Beecher, 2001, p. 944). Given this disturbing trend it seems somewhat paradoxical to discover that costly initiatives are well underway in some countries to protect salt marshes and other wetland ecosystems from the deleterious effects of economic development, and to restore those marshes that have been degraded (The Wildlife Trusts n.d.; Onaindia & Amezaga, 1999; Commission for Environmental Cooperation, n.d.).

Since the 1950s, international interest in salt marsh ecology has been on the rise (Redfield, 1958; Kabler, 1959). This shift in interest was further advanced by the emergence of an ecological worldview in the 1960s (Cassagrande, n.d.), and the move towards academic interdisciplinary research methods (Redfield, 1958). Interdisciplinary approaches to scientific research have increased our understanding of the ecological processes and functions of salt marsh ecosystems, resulting in an ever-expanding body of knowledge the goods and services salt marshes provide:

By definition, ecosystem goods and services represent the benefits that humans derive from naturally functioning ecological systems....Ecosystem goods and services occur at multiple scales, from climate regulation and carbon

sequestration at the global scale, to flood protection, soil formation, and nutrient cycling at the local and regional scales. (Wilson, Troy, & Costanza, 2004, pp. 69 - 72)

The list of benefits salt marshes provide to human social well-being is extensive (Turner et al., 2003; Daiber, 1986). Some have ascribed the concept of keystone' ecosystem to salt marshes, as a means of emphasizing the significance this ecological system has within the global ecosystem structure: "There are many examples of keystone ecosystems that provide limiting resources in their particular landscape context, including *Spartina* salt marsh ecosystems embedded in an estuary landscape/seascape offering nursery habitat and primary production" (deMaynadier & Hunter Jr., 1997, p. 71).

The goods and services derived from salt marshes can be valued through various qualitative and quantitative valuation methods and techniques (Turner et al., 2003). Some of the identified goods and services salt marshes provide are: carbon sequestration, nursery habitat for certain fish species, macro and micro-climate stabilization, the absorption of heavy metals, preventing saline intrusion, and storm protection and windbreak (Gosselink et al., 1973; Daiber, 1986; Adam, 1990; Gordon & Cranford, 1994; Chmura, Anisfeld, Cahoon, & Lynch, 2003; Turner et al., 2003). However, there are serious problems associated with trying to apply monetary values when evaluating salt marshes. Daiber (1986) has noted that "markets for ecological services of natural environments fail to exist or do not function according to certain economic criteria. Thus the observed market prices for tidal wetland will not reflect the total value of the services they provide"(p.266). Furthermore, a goods and services approach to ecosystem valuation and the design of management practices is limiting in that "goods and

services' are human constructs [and only attribute value] in terms of our own need" (Franklin, 1997, p. 31). Nevertheless, while the true value of the world's salt marshes is difficult, if not impossible to calculate, it has been estimated that the global value of goods and services salt marshes and their associated estuaries provide to human society is in the range of four billion dollars per year (MacKinnon & Scott, 1984; Costanza, 1997).

The increase in awareness of the linkage between ecological functions and the economic values of salt marshes has prompted initiatives in many countries to protect these wetland systems from further destruction. The perception that salt marshes are undeveloped wastelands is progressively giving way to the realization that salt marshes and their associated estuaries are integral to the functioning of the earth's life support systems and essential to sustaining human societies.

The global community has responded in a multi-faceted way to the increase in awareness that salt marshes are both valuable to human society, and in danger because of it. One approach has been to try and restore salt marsh ecosystems that have been degraded because of human activities. In this manner, "conservation is...driven by the desire to restore natural areas to a previous condition characterized as fitting within the 'natural range of variability' or 'indigenous nature of a system (Foster et al., 2003).

In coastal regions around the world, the past two decades have seen a proliferation of scientific and community-based projects intended to restore salt marshes, or in some cases create new marshland to compensate for previous losses (Sinicrope & Hine, 1990; Boesch & Josselyn, 1994; Boorman, 2000; Mitsch & Wilson, 1996; Streever 1997; Lee & Nishijima, 1998; Bedford, 1999; Cassagrande, n.d.). Some of the indicators used to monitor the success of salt marsh restoration are increased tidal flooding, increased

sediment deposition, the re-establishment of salt marsh vegetation, and the presence of certain fish species (Bowron & Hynes, 2005).

A central problem facing all ecological restorationists, whether their goal is to restore salt marshes, forests, or montane ecosystems, is determining a point in history where the ecological integrity of a particular site is best represented (Higgs, 2003). This is tricky business on two fronts. Not only do restorationists need to account for the dynamic, and thus ever changing nature of ecological systems, they also need to be mindful that history, or the representation of history, is culturally constructed. Beliefs about what constitutes a natural landscape differ temporally and spatially. For example, European approaches to ecological restoration, in which “historical conditions may incorporate rather than exclude human participation (Higgs, 2003, p. 72) are often at variance with the typical North American idealization of pristine wilderness, wherein achieving ecological integrity is thought possible only when humans are excluded from natural spaces. However, what most North Americans have come to idealize as wilderness is itself a cultural construct that reflects societal prerogatives and human intervention. (Schama, 1996; Cronon, 1995). Moreover, many of the efforts to exclude humans from natural spaces have been driven by political and economic objectives that further disadvantage already disenfranchised or marginalized groups, such as indigenous populations, farmers, or the working poor. In some instances the landscapes that are left in the wake of the evacuation of one group of human occupants are re-packaged and sold to another—as in the case of Canada’s National Park system (Brookes, 1988; MacEachern, 2001)—or set aside as natural preserves that no longer contribute to local economies (Higgs, 2003). Such responses to the real dilemma of global ecological

degradation and the loss of natural habitat give the impression that human societies are, by default, an anathema to ecological sustainability. This delineation between social and natural systems, which has been reinforced by conventional ecology and social sciences (Berkes & Folke, 1998), leaves one wondering whether there is any room for humans in nature.

While the evidence pointing to the overwhelmingly destructive impact of humans on global ecosystems may lead one to consider the wisdom of barring humans from natural spaces, ecologists such as Edward Grumbie (1994) suggest that we need to be thinking and moving in the opposite direction if we are to attain ecological integrity. Instead of precluding human utilization of natural resources within an economic framework, Grumbie (1994) advocates changing our thinking on the natural environment, by prescribing a shift from resourceism towards stewardship. Within this new paradigm, “protecting ecological integrity becomes the ultimate test of whether people will learn to fit in with nature” (Grumbie, 1994, p. 34). Some proponents of this approach to environmental management utilize the concept of ‘working agricultural landscapes’ as a means of marrying economic objectives with environmental preservation by establishing market values for ecological goods and services. For example, in the United States, The Institute for Agriculture and Trade Policy is currently advocating a green-tag system for applying market values for environmental benefits accrued through environmentally sustainable farming practices, a practice that is similar to Tradable Renewable Resources for renewable energy (Institute for Agricultural Trade Policy, n.d.). Similar practices are being considered and implemented in Europe (Bignal & McCracken, 2000). In Canada, geographer Gail Chmura (personal communication, 2005. Public lecture, *Sea level rise*,

salt marshes, sediments and sheep, January 20, 2005 at Dalhousie University, Halifax) has raised the question of whether there “is room for this type of agriculture on the Bay of Fundy”. Chmura et al. (2003), whose own research has related the rates of sediment accretion to levels of carbon sequestration in the Inner Bay of Fundy, looks to European practices of grazing livestock on salt marshlands as a means for realizing both economic and environmental values. She has gone so far as to suggest that by re-flooding tidally restricted marshlands and restoring their ecosystem functions, the possibility exists for “getting our ecosystem services and agricultural returns”(personal communication, 2005).

The concept of humans living within the means of their natural surroundings is not, however, only the prerogative of present-day scientists, policy makers, and natural resource managers. Evidence from every corner of the planet indicates that throughout history human societies and the natural environment have “mutually modified one another over a period of time, and that local knowledge systems and [social] institutions became attuned to the resources used” (Berkes & Folke, 1998, p. 21). These localized knowledge systems are the “cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment” (Berkes & Folke, 1998, p. 5). Traditionally, farmers learned to capture the agricultural potential in biological and social systems through a process of trial and error, selection, and cultural learning. Such local ecological knowledge systems have been shown to be the basic building blocks of historically continuous communities (Altieri, 1987). In light of this, the question arises: Does the practice of harvesting salt hay in Nova Scotia represent such a

model of local expertise? Previous research into the agricultural usage of salt marsh resources along North America's north eastern coast indicates that the environmental impact from pasturing livestock and salt hay harvesting, while having some deleterious effects on marshland and estuarine ecology, was slight compared to other activities, such as dyking or infilling (Hatvany, 2003).

The purpose of this study was to document the technical aspects of salt hay harvesting in Nova Scotia, chronicle expressions of environmental stewardship particular to this practice, identify points of linkage between social and ecological systems, and ascertain what impact a capitalist oriented political-economy had on farming and rural communities where salt hay harvesting occurred. To accomplish this task I have interviewed a number of Nova Scotian farmers who, at some point in their career, harvested salt hay as a component of their farming operations. Interview questions were structured to build an understanding of the extent to which Nova Scotian farmers considered salt hay to be a renewable resource; whether the resource was managed in a conservative or exploitative manner; and how the utilization of this resource influenced people's understanding of the nature of salt marshes, and shaped their perceptions of human society's place within that environment.

This thesis is organized into five chapters. Chapter one provides an overview of the history of salt marsh agriculture in Nova Scotia, and introduces the idea that historical representation can be politically and economically driven which, in turn, can result in a limited understanding of the range of possibilities for social and ecological linkages. The research questions that have been raised in this chapter seek to understand whether, or not, the relatively uncelebrated practice of harvesting the indigenous grasses from tidally

unrestricted salt marshes is an example of an environmentally sustainable resource practice. Chapter two details the methods by which research data were collected, analysed, and interpreted. Chapter three introduces the reader to the farmer-participants of this study through a case study approach. Chapter four interprets the data generated from the farmer-participant interviews through qualitative research methods, in corroboration with the historiography of Nova Scotia's agricultural development, and literature pertaining to traditional ecological knowledge and other practices of environmental conservation and stewardship. A synthesis of the research findings and final conclusion can be found in chapter five.

CHAPTER 2

METHODOLOGY

A necessary part of our intelligence is on the line as the oral tradition becomes less and less important. There was a time throughout our land when it was common for stories to be told and retold, a most valuable exercise, for the story retold is the story re-examined over and over again at different levels of intellectual and emotional growth ...But news as displayed on television appears once only, unlike the story in the oral tradition with its many levels of meaning (Wes Jackson, 1994, p. 89)

In this study I seek to understand the role that salt hay—the harvesting and utilization of the indigenous grass-like flora of salt marshes—played in the social, economic, and cultural development of agriculture and rural communities in Nova Scotia, and to identify environmental stewardship values expressed through this farming practice. Historical records indicate that harvesting salt hay has nearly a four hundred year old history in Nova Scotia, and in certain coastal regions it has been continuously practiced for many generations. Systems of natural resource management that have historical longevity within the community or geographical locale they are employed have been shown to have an inherently high environmental and social sustainability value (Gliessman, 1990; Hill, 1992; Berkes & Folke, 1998; Kimmerer 2000).

The literature review for this study integrated natural and social scientific research findings. An interdisciplinary approach to salt marsh research is indicated as being crucial for avoiding information failure (Redfield, 1958; Turner et al., 2003) and invaluable for understanding how social and ecological linkages are formed and maintained over time (Berkes & Folke 1998). In chapter one, an overview of the history of marshland agriculture in Nova Scotia is provided, making evident the longevity of marshland resource management practices in this part of the world. I discuss how our

awareness of the full range of marshland agricultural practices has been obscured by a grand narrative (McKay, 2000) that has represented farming, for the most part, as failing within the economic and social development of Nova Scotia, and the emergence of the pervasive notion that dykeland agriculture represents the totality of marshland agricultural practices. Countering the paradigm of agricultural failure, and filling in the gap in awareness of existent variability in management practices of salt marsh resources is my impetus for undertaking this current study on salt hay harvesting.

In this chapter I present the methods of inquiry used for building an understanding of the environmental stewardship value of salt hay harvesting in Nova Scotia, and identifying the social, economic, and cultural contexts in which this practice occurred. The research questions identified in chapter one are responsive to ecological and agroecological theories, which point to a utilitarian and exploitative worldview, ‘production for profit’ economics, and the prioritization of Western scientific ways of knowing over local, ecological knowledge, as key factors in the mismanagement and subsequent depletion of natural resources (Holling, Berkes, & Folke, 1998; Grumbine 1993; Altieri, 1987). In formulating a theoretical framework to manage this inquiry, I have drawn upon insights gained through anthropological and ethnoecological research (Becker & Ghimire, 2003; Nazarea, 1999), which demonstrate the epistemological legitimacy and environmental sustainability value of traditional ecological knowledge, as my basis for seeking alternative narratives of salt marsh resource utilization. To this end, I employ narrative, qualitative research methods to generate primary data for analysis.

At the centre of this study are the stories, observations, and insights of those men and women who have first-hand knowledge of, or expertise in, salt hay harvesting. The

value of employing a qualitative approach is the inherent ability to transcend the abstract, albeit measurable, variables of quantitative data such as census records, and reflect a world where “phenomena are complex and their meanings are not easily fathomed or taken for granted” (Strauss & Corbin, 1998, p. 6). Data generated through narrative, qualitative research methods opens up opportunities in research for the interpretation of what people did and what they thought. Utilizing these methods enabled me to gain insight into the lived experiences of the farmers I interviewed, and advance my understanding of what meaning these farmers attached to salt hay harvesting, and the values they assigned to the salt marshes of their region (Yow, 1994). Choosing a narrative, qualitative approach also grew out of my own life-long experience of being a farmer, and being closely associated with members of Nova Scotia’s agricultural community. Experience has taught me that the answers farmers provide to most inquiries, from seed planting times to the intricacies of lambing, are almost always couched within a story. It seemed appropriate to incorporate, within the design of my research methods for this study, this seemingly natural tendency for farmers to teach or exchange information through a narrative process.

In employing oral history or narrative research methods, I have remained conscious of the fact that individual recollections, while offering invaluable insights particularly into the minutia of day-to-day and localized events, are not immune to the vagaries of selected memory or self-interpretation. This should not be viewed as a weakness in the research method, but as a reflection that ‘tradition’ itself is not a static construct, but rather a dynamic ongoing process of interpretation and reconstruction of the past. Stories about the past are always viewed from the present, and are not

necessarily an absolutely factual account of the way things were. Rather, the story is filtered through the imagination of the teller and influenced by what has happened in the intervening years and the current situation of the storyteller (Mullen, 1992). Thus, while not absolutely empirical these representations, by providing recollections and interpretations of daily, lived, experience and individual perception, can help to build a more complex understanding of what was meaningful to those farmers who traditionally harvested salt hay as part of their ongoing farm management practices. Because oral histories are intimately connected with individual experience they can provide unique insights into social variability, often times by their ability to express exceptions to the official view (Yow, 1994).

While it is necessary to scrutinize the responses of interview participants for their intrinsic subjectivity, it is equally necessary to recognize my own biases and idealizations of traditional farming techniques, and stories of the past. The temptation is great to turn a nostalgic glance towards a longed-for golden age of agricultural and social coherence; a past where a presumed simplicity meant humans lived nobly with each other, and harmoniously with nature. “But nostalgia ignores much of the difficulty of times past, and countervailing historical accounts are necessary for balance” (Higgs, 2003, p.143). For instance, both Bittermann (1988) and Hatvany (2001) have made apparent the processes and impacts of social differentiation in some of the farming communities of Canada’s Maritime region. Furthermore, while studies indicate that in a substantial number of cases, traditional knowledge has been responsible for maintaining high levels of human health and sustaining natural resources, in certain situations traditional management practices have been shown to be ecologically maladaptive (Becker &

Ghimire, 2003). Having made this qualification, I, along with Eric Higgs (2003), remain convinced that nostalgia has more than just an emotional appeal, but “that the past offers a wide array of alternative models of ecological integrity (some would argue *better* models)” (Higgs, 2003, p. 145).

The data presented in this study was generated through utilizing field research techniques that allowed me to become “personally engaged in an interpretive focus on the...field of activity, with the goal of generating holistic and realistic descriptions and/or explanations” (Miller & Crabtree, 1999, p.5). The data emerges from dialogues between researcher as learner, and the interview participants as the locus of expertise—an evolutionary or dialectical process that begins with my own limited understanding and questions, which are progressively challenged or confirmed by the participants’ recollections of their own first-hand experiences with salt hay harvesting. In this way, both researcher and participant are mutually engaged in building a body of information. A summation of these narrative exchanges is profiled in chapter three, in a case-study format.

Interview participants were sought for the three major marsh-type regions of Nova Scotia: the Inner Bay of Fundy marshes, the Atlantic marshes, and the Northumberland Strait marshes (Hatcher & Patriquin, 1981). My intention was to explore whether regional differences in marshland geomorphology impacted harvesting practices and resource utilization. These three marshland regions have also been shown to have significant variability in agricultural opportunity and farm viability due to variation in soil types, climatic conditions, and access to markets (Hilchey, Cann, & Macdougall, 1960; Troughton, 1988; MacKinnon, 1991). With these regional variations

in mind, I endeavour to draw out participant perceptions of their own farms' productive capacity in relation to other farms in their home community, as well as other regions of Nova Scotia.

Following approval from the Saint Mary's University Research Ethics Board, I interviewed sixteen individuals between the spring and fall of 2005. Participants' home locations were in Yarmouth, West Hants, Colchester and Cumberland Counties. A variety of methods were used to identify and recruit participants for this study. Several participants responded to advertisements that I had placed in two agriculturally focused and regionally produced publications: *The Farm Focus* and *Rural Delivery*. I also produced posters (see Appendix 1) that advertised the objectives of this study and requested interview participants. These I placed in several community museums. However, to my knowledge no one responded to these poster-advertisements. Many of the interview participants from the Acadian communities in Argyle Township, Yarmouth County responded to the posters that I distributed by hand, following a community event called "La festival de la barge". This festival is an annual event, which celebrates the salt hay harvesting heritage of the Acadian communities in that region of the Province, through the re-enactment of a traditional salt hay harvest. The year prior to this study I attended the festival as an observer and quasi-participant. As a result, many of the individuals who agreed to participate in this study were familiar with who I was, and knew about my interest in researching salt hay. Other interview participants from the Argyle region came to me through word of mouth—or snowball effect. In my own home community of Centre Burlington and the Hants Shore region, several of the interview participants were known to me prior to the study and agreed to participate out

of neighbourliness, and likely curiosity in the research I was conducting. Mildred Burrows, from Beaver Brook in Colchester County, volunteered to participate as the result of my having been an acquaintance of her son. The two participants from the Wallace Bay region were identified after I contacted the director of the museum in Wallace Bay. In all cases I traveled to the participants' home communities in order to conduct the interviews, most times meeting with the participants in their homes. In one case I met with a participant at a local museum. I expected and found that most of the participants were elderly. Maximum variation sampling was not an option for this study given the limited number of available respondents. The majority of the participants are men, although female participants were sought out, and included whenever possible.

Interviews were scheduled to be approximately an hour and a half in length. The interviews were semi-structured, consisting of a series of open-ended questions (see Appendix 2), and a conversational style of engagement. The interviews were audio taped, with the participant's consent, and later transcribed. Additional notes were taken during or subsequent to the interviews to ensure information was not lost. In one case it became apparent at the outset of the interview that the participant would not be able to answer many of the questions I had prepared. This participant self-identified as not having much hands-on experience with harvesting salt hay. However, I continued with the interview, switching to an informal, conversational style, since it was apparent this participant had plenty of information relevant to this study, as she had lived in her community for over eighty years and was well aware of the importance of salt hay to her neighbours.

Methodologically, the time period represented by the majority of individuals interviewed for this study provides an opportunity to hear directly from people who have first-hand knowledge and/or experience in harvesting salt hay during a period of radical transformation in Nova Scotia's agricultural history. Throughout the Maritimes, "subsistence production remained a major part of farm life at least as late as the Second World War....An indicator of the marginal commercial orientation of most farms before 1950 is the limited degree of mechanization" (Sinclair, 1984, p.279). Following the war years, an increase in the specialization of farm production practices, the consolidation of farm holdings, and an increase in expenditures on inputs such as fertilizers and pesticides, and capital intensive machinery are indicative of the modernization of agriculture that occurred in Nova Scotia, which was marked by the decline of small-hold, independent producers, and the rise of corporate agri-business (Sinclair, 1984; MacKinnon, 1991).

While most of the interview participants had long retired from farming at the time these interviews were conducted, and referred to their experiences of utilizing salt marshes resources in the past, two participants from the Hants Shore region currently operate farms, and presently harvest salt hay or utilize the marshland for grazing purposes. These participants represent a younger age cohort, and offer a sense of a time continuum from the era of the Second World War up until the present. Taken as a whole, the interviews in this study represent roughly a seventy-year period of Nova Scotia's agricultural history.

Thirteen coastal communities in Nova Scotia are represented in this study. Seven interviews were conducted in the predominantly Acadian communities of Amiraaults Hill, Hubbards Point, Surrettes Island, and Abrams River in the Township of Argyle,

Yarmouth County. One interview was conducted in the predominantly English speaking community of Pleasant Lake, Yarmouth County. Five interviews are from the English speaking communities of Centre Burlington, Upper Burlington, Scotch Village, MacKay Section, and Belmont in the Municipality of West Hants, formerly known as Newport Township. One interview is from the community of Beaver Brook, near Truro. And two interviews are from the English speaking communities of Wallace and Wallace Bay, along the Northumberland Strait. All interviews were conducted in English. In the case of Lawrence Doucette, at his request, his son-in-law Hayden Landry (also an interview participant) sat in on his interview to act as translator, and at times memory prompt. While the information obtained from the sixteen interviews provides a temporal and spatial snapshot of farm-life from various regions of Nova Scotia, because of the small sample size we cannot assume the interviews are representative of all farmers' experiences from a particular region or a specific time period.

Analysis and interpretation of the research findings occurred throughout the research process, with each interview helping to further shape my understanding of the subject of salt hay harvesting. In this way, "the interpretation of the resulting textual data is a subjective/objective iterative dance towards contextual truth" (Miller & Crabtree, 1999, p. 14). However, the formal process of data analysis began once all the interviews had been completed and transcribed. At this point I set about the task of intentional analysis by a process that involved organizing the data through the identification of themes. To accomplish this task I made notes in the margins of the transcriptions. For example, when an interviewee spoke about what they considered to be the optimal time of the year for mowing the marshes or what methods they used for storing the hay, I

would mark this as being a technical aspect of harvesting salt hay. Whereas, if an interviewee spoke of how the marshland resources were crucial to the survival of their livestock over the winter months, and thus the well being of the farm family, I would utilize category of ‘evaluating the resource’ to mark the excerpt. This method of organizing the data most closely resembles what Miller and Crabtree (1999) have termed “the editing organizing style” of interpretation. In this method, the researcher/interpreter “enters the text much like an editor searching for meaningful segments, cutting, pasting, and rearranging until the reduced summary reveals a helpful interpretation” (Miller & Crabtree, 1999, p. 23). This method of data analysis led to the emergence of five themes, which provide an organized and descriptive account based on substantive research findings. The first theme, which I have entitled ‘Who we were: the human landscape’ emerged from the participants’ recollections of their personal living conditions and the broader socio-economy during the early 1930s to the late 1950s. This thirty-year period encompasses the tail end of the historical era wherein salt hay was harvested for agricultural purposes, by a relatively large number of people, who lived in the communities represented in this study. The second theme, ‘Where we lived: The natural landscape’, focuses on the participants’ observations and perceptions of the nature of salt marsh ecosystems. The third theme, ‘How we managed’ explores the interface of human cognition and salt marsh ecology by identifying the techniques and skills used for exploiting and managing the marshlands as a resource base; the organization and application of labour in the practice of salt hay harvesting; and the participants’ perceptions of human impact on the marsh environment. The fourth theme, ‘Why we made it work: Evaluating the resource’ focuses on the benefits, as well as limitations or

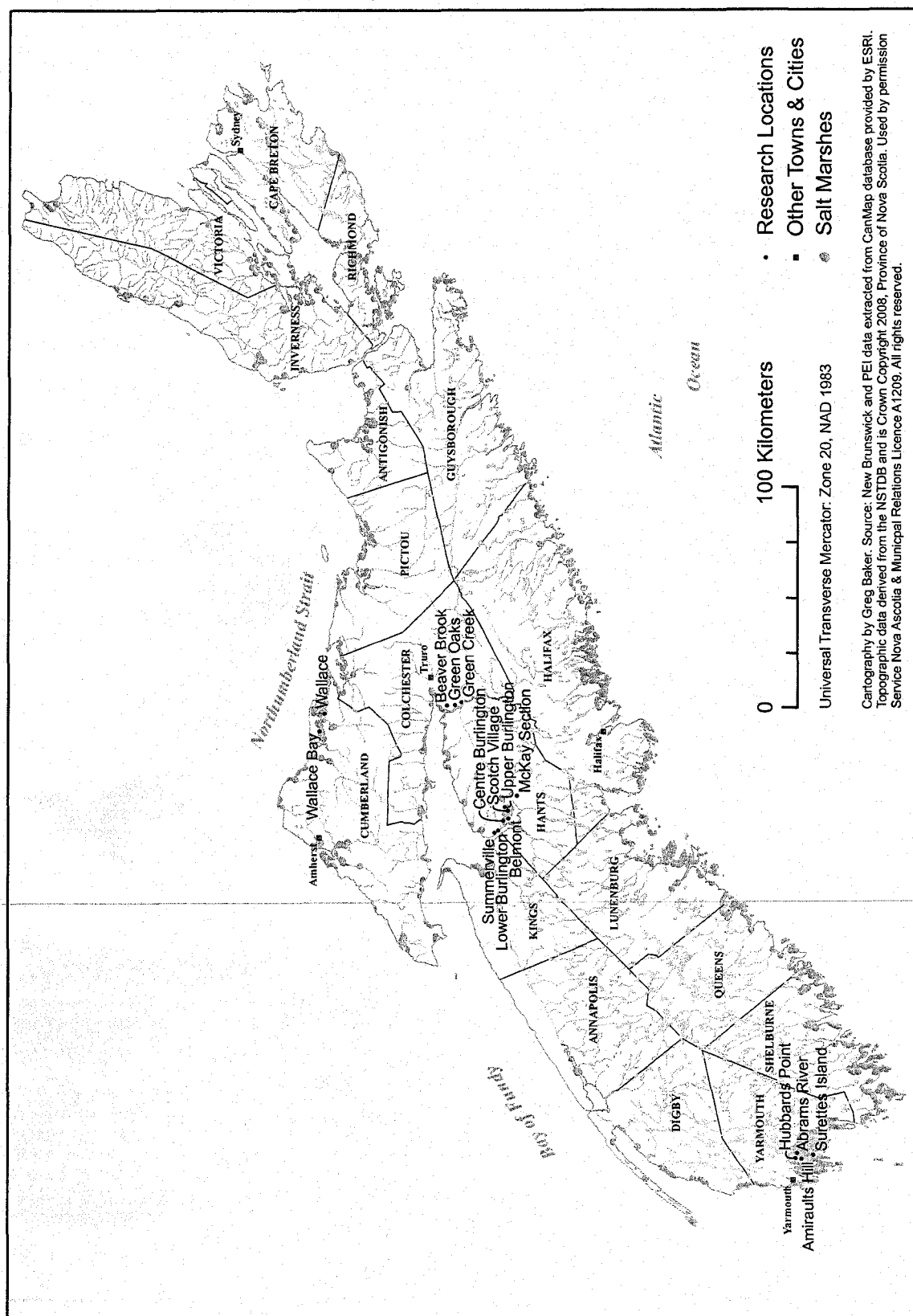
costs associated with the utilization of salt marsh resources for agricultural purposes. The fifth theme ‘The times, they are a’ changing’ explores the participants’ assessments of when and why salt hay harvesting declined as an agricultural practice in their home communities, and seeks to understand the connection between the social, cultural, and economic conditions driving the relationships people currently have with salt marshes.

With an eye to conceptualizing the environmental stewardship value of salt hay harvesting practices, I filtered my research findings through an adopted set of guidelines for appropriate goals for environmental sustainability, established by Stewart B. Hill (1992). In this instance, environmental sustainability implies:

- 1) Meeting the basic needs of all people, and giving this priority over meeting the greeds of a few.
- 2) Keeping population densities, if possible below the carrying capacity of the region.
- 3) Adjusting consumption patterns and the design and management of systems to permit the renewal of renewable resources.
- 4) Conserving, recycling, and establishing priorities for the use of non-renewable resources.
- 5) Keeping environmental impact below the level required to allow the systems affected to recover and continue to evolve. (Hill, 1992, p.1)

These guidelines are supported by the research findings of Folke, Berkes and Colding (1998), and detailed in their extensive list of “social-ecological practices and mechanisms for resilience and sustainability” (p. 418). The substantive content of the five themes that

resulted from my own field research, along with interpretation comprises the fourth chapter of this paper.



Geographical zones of Nova Scotia's salt marshes and the locations of the participant communities referred to in this study.

CHAPTER 3

PARTICIPANT CASE STUDIES

This chapter is comprised of eight case studies or participant profiles, selected from the sixteen interviews conducted for the field research component of this study. The eight interviews not profiled in this chapter are included in Appendix 3. The participant profiles presented in this chapter were chosen to reflect the range of variability in farming conditions and opportunities based on access to salt marshland in Nova Scotia's three salt marsh regions. These profiles were also selected to cover the time continuum from the early twentieth century to the present, and thus reflect changes in farming methods that occurred over the past seventy plus years of Nova Scotia's agricultural history. Of course these profiles are merely snapshots of complex lives.

Profile one:

Lawrence Doucette was born, the youngest of fourteen children, in the community of Hubbards Point in 1912. The farm he grew up on is also his current home and has been in his family's possession since the mid-1800s. Up until Lawrence was in his late twenties his family ran a mixed-farm operation that included livestock, vegetables, and soft fruit production. The farm supplied Lawrence's family with most of their food requirements, as well as producing a surplus of potatoes, strawberries, and butter, which were sold locally. Periodically the family shipped strawberries to Boston.

The Doucettes' farm consists of thirty-eight acres, not all of which was cleared or arable, but did include several upland fields, which provided their cattle with pasture during the summer, and 'sweet' or fresh hay in the winter. Also included in their farmland holdings were several small acreages—between two and three acres each—of

salt marsh. A small section of salt marsh was contiguous to the farmstead, and the Doucettes would sometimes pasture their cattle here during the summer. Lawrence recalled that the milk and butter produced from cows pastured on salt marsh grass would acquire an undesirable marshy taste after several days. Most of the Doucettes' marshland, which they used for making salt hay, was located about a quarter of a mile from their farmstead. These marshland holdings were a part of the expansive salt marsh known locally as *la vieux parc*, or *the old field*. This large salt marsh, which Lawrence estimated to be over a hundred acres, is associated with the Tusket River. The salt marsh flanks both sides of the main road, which joins the communities of Hubbards Point, Amiraults Hill, Sluice Point, and Surrettes Island.

Prior to the Second World War, Lawrence recalled having seen hundreds of the large salt hay stacks on *la vieux parc* at harvest time. Most families from Hubbards Point to Surrettes Island kept at least one cow and an ox, and would raise a pig for their winter supply of meat. The salt marshes provided many families in that region with their winter hay requirements. Lawrence remembered that harvesting salt hay was an activity where men, women and children participated. Men would mow the grass with scythes, while women and the younger children would rake the hay by hand, forming windrows and haycocks. The haycocks were then placed on two large poles, and like a medical stretcher, two men or older boys transported the hay to the large salt-hay stacks, or 'la barge'. Lawrence remembered various times during the war years when his father would hire a labourer to assist with the salt hay harvest.

Lawrence described the local economy as having been very depressed during the time between his childhood and young adult life. While their farm was one of the largest

and most productive in the community, the Doucettes were not able to meet all of their household's financial needs through farming, and Lawrence's father had to take off-farm work to make ends meet. Lawrence described how his father walked twelve miles each day to and from the community of Raynardton in order to work on a road crew. Prior to WWII there were few local employment opportunities and many of the men from Hubbards Point and Amiraults Hill joined fishing fleets based out of the United States. As a result, many younger, able-bodied men from the community were absent for prolonged periods during the year.

Lawrence was fourteen years old when he began farming full-time with his father. At the onset of the Second World War, on the condition that would not seek employment off the farm, Lawrence was officially excused from active duty in the army so that he could continue to farm with his father. However, in 1942, Lawrence began working as a cook on the railway, and gave up farming, never to return.

Each year, during the fifteen years that Lawrence farmed with his father, they made twelve to fourteen stacks of salt hay. The salt hay, in addition to the fresh hay or upland hay they harvested, maintained the family's six or seven head of cattle. The Doucettes harvested salt hay during the months of June, July, and August. They mowed their hay with scythes until they acquired an ox-drawn mowing machine. The mowing machine lessened the time and effort required to cut the salt hay, however the heavy machinery made accessing the soft marshland far more difficult.

Salt hay was an important component of the Doucette family's farm economy. It allowed them to maintain far more cattle than they would have been able to otherwise. Having access to this free, winter fodder meant they did not have to sell their cattle in the

fall when prices would generally be deflated. However, while salt hay was essential to the farm's economic viability, Lawrence did not believe that salt hay was a very nutritional feed for their cattle.

Lawrence identified the period of the Second World War as bringing tremendous, economic change to the Township of Argyle. Many of the region's young people left to serve in the military, leaving a shortage of farm labour. As well, there was an increase in local, off-farm, employment opportunities. Lawrence cited the construction of the Yarmouth airport as an example of the increased employment opportunities in the region. While an increase in available jobs and rising income levels marked a decline in the number of people farming in the region, and a decline in the number of farms, Lawrence felt that life improved for the people of Hubbards Point and the surrounding communities from that time forward.

Profile two:

Edward Warner was born in 1929, in the community of Abrams River. He was one of eighteen children. The Warner family made their living off their mixed-farm by maintaining about fourteen head of cattle, three of which were milking cows. Edward's father also raised oxen, keeping a pair for use on the farm, and raising one to sell. The Warners also kept chickens, raised several pigs, and grew a large vegetable garden of potatoes, carrots and turnips, all of which would tide them over the winter. With a well-stocked cellar, Edward remembers his parents only having to buy sugar, flour, and kerosene to get the family through the winter. The Warner family supplemented their farm-based diet by fishing locally for eels, smelt, and herring, some of which they would

salt for winter consumption. Edward recalls that his family always had plenty of food for the winter.

The Warners had very little upland associated with their farm, however they owned a large section of salt marsh, which Edward estimated to be around ten acres. Each year the family mowed enough salt marsh hay to produce between ten and twelve large haystacks, about half the amount of hay required to maintain their livestock over the winter. The remainder of their winterfeed was obtained by mowing other people's upland hay fields from as far away as Tusket. Because of the Warners' limited access to upland pasture and hay, Edward's father partitioned off half of their salt marshland for grazing purposes. While Edward did not consider salt hay to be as nutritious as upland hay, he held to the belief that if you "fed salt hay to your animals they'll never be sick". In addition to its value as livestock feed, the Warner family also used salt hay for banking their house in the winter, and mulching their strawberry plants in the fall.

Harvesting salt hay required the labour input of the entire family, including Edward's mother. As a child, Edward helped by raking the salt hay into windrows after his father mowed the hay with a scythe. The Warner family usually cut their salt hay in September, after they had finished harvesting their upland hay. Edward recalls that they cut everything they possibly could from the marsh, right down to the water's edge. Eventually the Warners acquired an ox-powered mowing machine. Edward continued to farm with his father until he was thirty years old, at which time he married and moved to his current home in Abrams River. Edward attributes the viability of his parents' farm to the fact that the whole family worked well together, and to the availability of the renewable salt marsh resources.

Profile three:

Rudolph Muise was born in 1932 in the community of Surrettes Island. There were nine people in his family. He described his family's farm as a "one cow operation" that also included an ox, and a pig or two, which his family raised for their winter meat supply. The Muise family depended on the milk produced by their one cow for their household consumption, and for the production of small quantities of butter, which they traded with their neighbours for other locally produced commodities. Similarly, Rudolph's father often worked in exchange for such locally produced goods as turnips. While money was in short supply for most people of Surrettes Island, Rudolph recalls that his family always had plenty of food. In addition to the food the Muises produced on their small farm, hunting ducks, and fishing for eels also supplied a good portion of the family's food.

Rudolph did not consider the inhabitants of Surrettes Island to be farmers, but fishermen. Farming on Surrettes Island was done "on the side" to provide food for the family. Rudolph's father fished commercially for lobster. After his father brought his lobster pots ashore for the season he would go to the country store on Surrettes Island and buy a hundred pound bag of beans, two cases of canned milk to use until the cow freshened, tea, and other provision to last them over the winter. The timing of the lobster season meant that many of Surrettes Island's men were unemployed during the summer and fall. During this time they would be occupied with making hay, tending their potato patches, and trying to find local work, both paid and barter.

On Surrettes Island, a family's marshland holdings were often adjacent to their woodlot. While his own family owned enough upland to graze their small number of

livestock during the summer months, Rudolph recalled that some island residents, who had no access to upland fields, used the salt marshes for grazing their cattle. While Rudolph did not consider this practice to be beneficial to the salt marsh environment, as the cattle would often trample the soft marsh soils, he believed that mowing the salt marsh for hay was beneficial for ensuring a consistent re-growth of the preferred marsh grasses. Mowing the marsh was considered a way to keep the marsh 'clean'.

The Muisers cut their salt hay by scythe in July and August. They made between four and six large haystacks each season. Like their neighbours, the Muise family stacked their salt hay on the marsh and retrieved it by oxen and sled as needed during the winter months. During the winter they fed their livestock a ration that was comprised of about seventy-five per cent salt hay, and twenty-five per cent fresh hay.

Rudolph cited the Second World War as being the turning point in the local economy. When people went to war and were able to get paid employment they stopped making hay and keeping cattle. After this point, Rudolph remembered that only the odd person stayed and had cattle. As a young man, in the early 1950s Rudolph joined the out-migration from Surrettes Island and went to Goose Bay, Labrador to seek seasonal employment where he worked for seven years doing various jobs on the American and Canadian military bases. Each spring Rudolph returned to Surrettes Island where he was able to draw unemployment until the fall when work would resume. Rudolph attributed the decline in household production and small livestock operations on Surrette's Island to increased employment opportunities, and the commercial availability of farm products such as milk.

Profile four:

Gordon Knowles was born in 1917 in the community of Newport (Avondale), Hants County. He was one of three children. The farm Gordon grew up on has been in his family since the 1760's. Presently the Knowles farm consists of about two hundred acres. During the time that Gordon was involved in farming, approximately half of this area was cleared for pasture and hay land, and included about fifty acres of dyked marshland. While Gordon remembered making salt hay with his father, he said that it was not nearly as important to the overall economy of his family's farm as dykeland hay. What salt hay the Knowles family did harvest was from salt marshes associated with the Avon River and St. Croix River, on the seaward side of their dyked marshland. Gordon recounted how neighbouring farmers valued the undyked marshes because sediments deposited by the incoming tides were continuously renewing the nutrient base. Gordon remembered how some of the local farmers even used marsh mud as a soil conditioner for their upland fields.

Over the course of his life Gordon witnessed many changes in farm technology and agricultural practices. The farm of Gordon's childhood, like many other farms in the area, was a mixed operation, geared foremost towards the self-sufficiency of the farm family. The farm was also a commercial enterprise, and comprised the mainstay of the family's income. Gordon remembered when he was a child that the cream produced from the family's dozen or so dual-purpose cows was made into butter, which was sold directly to customers in Windsor. Later on, the Knowles' shipped their cream to a dairy in Halifax. In addition to the dairying component of the Knowles' farm, sheep, hogs, and beef were raised for meat or for finishing, and wool was sold. Farming practices

remained pretty much unchanged up until the late 1930s, at which time the availability of tractors—a technological event that Gordon described as a “mini industrial revolution”—changed everything. When the Second World War commenced Gordon enlisted. After the war ended, and he returned to civilian life, Gordon became a full-time dairy farmer with his brother. At the time of their retirement in the 1970s, the Knowles brothers were milking about forty cows. Presently, Gordon’s nephew maintains a beef herd on this farmland.

Gordon remembered harvesting salt hay from the 1920s, up until the mid-1930s. Salt hay was used primarily to supplement the upland hay during the winter. Gordon does not consider salt hay to be an ideal feed for dairy production, although he credited it with containing “minerals and things that animals needed during the winter.” While upland-hay was reserved for the higher production requirements of the dairy cows, salt hay was mostly fed out to the young cattle. Gordon also recalled his father grazing their cattle on the salt marshes.

The Knowles family harvested their salt hay later in the summer, the timing of the harvest being dependent on the tide cycle. Gordon remembered farmers in his community making use of a tide book that was published by the federal government. Harvesting salt hay required a great deal of manual labour. While the farm family supplied most of the farm’s labour requirements, when certain tasks required the assistance of outside help, Gordon recalled that money was rarely exchanged, but rather, labour was exchanged for labour.

For the most part, the Knowles family mowed their salt marshes with scythes since the marshes along the Avon and St Croix Rivers were too soft for heavy machinery.

When it was possible to take a team of horses and a mowing machine on the marsh, the horses were often required to wear special clog-like shoes in order to keep them from sinking into the mud. Gordon also remembered seeing some of the raised, wooden platforms that he referred to as “straddles” on some of the marshes in the area.

Profile five:

James Card was born in 1925, in the community of Centre Burlington, Hants County. He was one of two children. James grew up on the farm that had been purchased by his grandfather in the late 1800s. The farm was a mixed livestock operation with approximately twenty-seven cattle, including fourteen milking cows, and about fifty sheep. It was the primary source of Card family’s income. During James’ childhood the farm’s land base, which was about fifty acres, was not sufficient to maintain all their livestock. Additional hay for winter-feed was obtained from neighbouring land that was not being utilized, as well as from salt marshes. Like many of their neighbours, the Card family owned salt marshes in several locations. Most of these marsh holdings were small—three acres or less. Contiguous to the Card farmsteads’ upland were sixteen acres of dyked marshland, plus about three acres of salt marshes on the seaward side of these same dykes. These marshes were associated with the Kennetcook River. Both the dyked and undyked marshes were cut for hay. Salt marsh hay took longer to cure than either upland or dykeland hay.

James began helping his father harvest salt hay when he was about eight years old. When James was a child he remembers that salt hay was mowed with a scythe. Making salt hay was very labour intensive, and James’ father usually hired three labourers to help get their crop of salt hay harvested. In later years the Cards used horse-

powered machinery, which was replaced by tractors when that technology became available. After the hay was cut and cured it was stacked on a wooden platform, called a *straddle*, which was raised about four feet high so that it would be up clear of the tide and the torrents of water from the spring run-off. James recalled there being quite a knack to making a salt hay stack, and certain individuals were noted for their ability to build a stack that would shed the water.

The Cards harvested their salt hay in the later summer, after their upland hay, which was considered more valuable, had been harvested. James remembered farmers trying to get their salt hay harvested before a series of big tides, which deposited mud on the hay, making it far more dusty to handle, and also less valuable as a livestock feed. Because of the constraints imposed by the tidal cycles, the local farmers were often found mowing their marshes at the same time. With everyone on the marsh, James recalled there being an element of sociability to the event.

Salt hay was an important component in the economic viability of the Card family's farm. It was highly valued as a renewable crop that required no inputs other than the labour required to harvest it. In addition, salt hay was considered a good source of essential trace minerals not available in the upland hay. While James did not recall salt hay being reserved for feeding out to any particular animals, he maintains that the pregnant animals and young animals likely benefited the most from it. James also noted that the manure produced from livestock that were fed salt hay was also very valuable to the farm as a soil conditioner. The Cards also valued, and used salt hay for its insulating properties in out buildings, pump houses and farrowing pens. While the Cards mostly utilized their salt marshes as a source of livestock feed, certain plants were gathered for

human consumption. James still gathers a type of marsh plant, which he referred to as ‘marsh greens’ or ‘goose tongue greens’.

Salt marshes that were mowed on a yearly basis were favoured over those cut less frequently. If a marsh was cut regularly it produced “nicer, greener hay.” In addition to regularly mowing the marshes to maintain their productivity, ditching was done in areas where fresh water ran down the hillsides onto the marshes. Because ditching was all done by hand and was extremely labour intensive, given the dense tangle of roots formed by the marshland flora, farmers would try and utilize a creek already present on the marsh as part of the ditching network. James remembered his father periodically grazing cattle on the marshes, however James did not consider this to be a good practice for the over-all health of the marsh. Because cattle graze “all the parts of the marsh, no matter whether it was hard or soft, high or low”, the marshland sod would be trampled and often destroyed.

By the late 1950s, salt hay was no longer commonly harvested in the farming region along the Hants Shore. James attributed this decline to several factors, including the increased availability of commercial fertilizers and tractors. The soft marshland soils were not suitable for the application of the new, and much heavier farm machinery. James also expressed the belief that there was a direct correlation between the increased ability to clear upland for cultivation—made possible with the newly available farm machinery—and the decline in utilization of salt marsh resources in agriculture. With relatively inexpensive fossil fuel, compared with the cost of labour, harvesting salt hay became uneconomical in the new age of mechanized farming.

Profile six:

Philip Nunn was born in 1947 in the community of Summerville, Hants County. Philip's father owned salt marshland on the Cogmagun River, approximately eight kilometres away from the farmstead, where the Nunn family made their salt hay. Philip started helping with harvesting salt hay when he was about nine years old on his cousin's farm in Burlington, Hants County. Currently, Philip operates a mixed farm in MacKay Section, Hants County. It is this farm that was the focus of discussion in the interview conducted for this study.

Philip's farm is a dairy and beef cow operation, with young stock being raised both as replacement animals, and for sale. In addition, there are a number of horses on the farm, which are kept for breeding purposes and for woods work. The main part of the farm's income is generated through the dairying operation, with secondary income from beef production. Between twenty to thirty per cent of the farm's income is generated from the woodlot operation. Like Philip's childhood farm, his farm in MacKay Section does not have and salt marshland associated with it. Philip owns, or has use rights for salt marshland in Lower Burlington, Upper Burlington, and Mantua, on the Cogmagun River, Kennetcook River and St. Croix River respectively. These marshes vary in size from three acres to about twelve acres.

Because salt hay comprises only a small fraction of his farm's livestock feed requirements, Philip considers it to be a minor contributor in the economic viability of his farm. However, he considers salt hay to be an important component in maintaining his farm's viability since, unlike upland hay, salt hay has relatively low production costs. In addition to being a relatively low cost feed, Philip also believes that salt hay provides

many important health benefits to his livestock, due to the presence of essential trace elements in the hay. He has observed that livestock fed salt hay tend to drink more water in the winter, which he believes helps to maintain proper an animal's body regularity and thus increases the efficiency feed. Philip has also noted that his horses have a lower parasite load when they are fed salt hay. Along with ensuring that his horses receive salt hay as part of their feeding regime, Philip usually portions out salt hay to his young stock. His method for rationing the limited amount of available salt hay is based on the premise that the younger, still maturing cattle benefit the most from the mineral component of the salt hay, as their bones are still developing.

Philip harvests salt hay at the end of July or early August, after he has finished harvesting his upland silage and forage, which he considers to have a higher economic importance to the farm. Unlike the commercial varieties of upland hay, which deteriorate "relatively quickly towards the first part of July", salt hay has the tendency to reach maturity much later in the season. This characteristic makes salt hay a good fit in the overall management of the farm's annual cycle of forage harvesting.

The salt marshes Philip referred to have a tendency to be wetter closer to upland or shore, as well as near the outer tidal region where salt water covers the marsh on a daily basis. Philip prefers to mow the middle marsh, which is higher and drier. For obvious reasons a drier, firmer marsh is more conducive to the mechanized harvesting methods, which dominate the modern farming practices of Philip's farm operation. Incidentally, these drier areas of the marsh are associated with the species of grasses Philip prefers for making salt hay. He has also observed that keeping a marsh regularly mowed tends to promote the growth of the grass species he prefers for salt hay. However, he notes there is

significant variability in both the quantity and quality of the marshland flora from year to year. Both species composition and yield vary depending on the tide cycle and weather. A major factor that determines the productivity of a marsh is ice, which can gouge a marsh's surface, or melt and leave large deposits of mud. Another limiting factor Philip mentioned, which determines the economic feasibility of harvesting salt hay, is the amount of garbage floating in the rivers, including plastic and trees, which becomes deposited on the marsh when the tides recede. Such garbage impedes the efficiency of the harvesting machinery. Philip has observed that grazing livestock and using heavy equipment on a marsh can have adverse effects on the marshland, due to the soft conditions of most marsh soils. He notes that when the marsh sod is broken and water cannot drain, more of the weedier and less preferred species of marsh flora tend to predominate. He believes that it is possible to graze minimal numbers of livestock on high marshes without any significant damage.

While Philip considers salt hay to be an important component in the over-all operation of his farm, he expressed a general concern for the economic feasibility of farming. Philip contends that the high costs of fuel and other input costs such as baler twine, along with the ongoing effects of the Bovine spongiform encephalopathy (BSE) crisis for cattle farmers, is having a negative impact on the economic viability of farming in Nova Scotia.

Profile seven:

Graham Brown was born in 1924, into the community of Wallace Bay, in Cumberland County. Graham and his sister Betty currently live on the farmstead they grew up, in the house their father built. Their farm is located on the shore of Wallace

River, and has been in the Brown family for the past three generations. The farm consists of approximately three hundred acres, half of which is in woodland, while the remainder is cleared for pasture and hay land, and includes the portion of shoreline where Graham used to make, what he referred to as shore hay.

Graham drew a distinction between the hay he cut along the shore, and that which he referred to as true salt hay. What Graham referred to as salt hay were those marsh grasses that grew further out from shore and were subject to regular tidal submergence. These grasses tend to be finer in texture than the types of grasses growing closer to shore. During Graham's farming career he never harvested the finely textured salt hay that grew on the outer, wetter, marsh zone. The practice of making salt hay on the marshes around Wallace Bay had ended long before Graham took over the family farm. However he remembered his father telling him about the way salt hay was made, and who in the community made it. Graham also remembered seeing the remnants of the old wooden stack bottoms that had once been used by farmers to store their hay on. During the twenty odd years he farmed, Graham regularly cut the grass that grew along the shore, which he referred to as shore hay or broadleaf. This region of the marsh is also subject to tidal inundation, and for purposes of this study will be considered salt hay. Graham described shore hay as being a heavier grass than upland hay, and considered it to be an inferior livestock feed when compared to the domestic grass varieties.

Between 1952 and 1974 Graham operated a mixed livestock farm. He raised both dairy and beef cattle, and kept a flock of about forty Oxford ewes, which were raised for meat and breeding stock. His dairy herd was comprised of about ten Jersey cows, with milk and cream being produced for commercial sale. The remainder of the cattle herd

was made up of mixed breeds that were raised either for replacement dairy stock, beef, or sold as young stock. Graham left full-time farming in 1974 because he was not able to make a living in agriculture. He took employment as the janitor at the local school, where he worked until he retired.

Graham only mowed the area of the shoreline from the high tide mark out as far as the ground was firm enough to carry a team of horses and a mowing machine. After he cut the hay, he raked it onto the highland, above where the tide could not reach it. Graham cut the shore hay in September after the upland hay was harvested. The timing of harvesting shore hay, within the seasonal cropping schedule, was primarily a reflection of its relative value—upland hay being the more highly valued crop. The broadleaf grasses that comprised shore hay matured much later in the season than the species of grasses that grew on the uplands, making it both convenient and economically feasible to harvest shore hay later in the season.

The economic importance of the shore hay to Graham's farming operation was not great. When asked why he went to the trouble of cutting this hay when it was often difficult to get, Graham laughed and said, "It was hay". However, in a good year he reported that shore hay could comprise a significant portion of his overall hay harvest. Graham never applied any soil amendments to that area of the shore where he made salt hay, but depended upon the tide to replenish the soil nutrients.

Just as his father before him had done, Graham fed marsh hay to the young stock during the winter. The milking cows were not fed the shore hay because he did not consider it to be sufficient in nutrients to maintain milk production. While no specific reason was given, Graham said he never fed the shore hay to the sheep. Marshland hay

had been far more important to the economic viability of the farm during Graham's father's tenure. Graham's recollections of stories his father told him indicate that in his father's day, the young stock essentially survived the winter months on marsh or shore hay. Access to marshland resources made it possible for Graham, and his father before him, to stretch their supply of upland hay over the winter months, enabling them to maintain a larger herd than would have been otherwise possible with only the upland hay resources that were available to them.

In the years when there was an extra heavy crop of upland hay Graham recalls that the local farmers would not bother harvesting the shore hay. If, however, the shore hay was not cut in a given season, farmers would burn the old grass off the following spring to ensure a good crop of marsh hay that coming harvest season.

Profile eight:

Elmer Mills was born in 1936. When Elmer was eleven years old he was adopted by two older people who had no children of their own, and came to live on a farm in the community of Wallace, in Cumberland County. For the six years prior to moving to his new home on the shore of the Northumberland Strait, Elmer had lived at the Halifax Protestant Orphanage. Elmer currently resides in the same farmhouse where he spent most of his life. During the time he was growing up, the farm, which is situated on the south shore of Wallace Bay, had approximately seventy-five acres. Like the neighbouring properties, Elmer's farm was a long, narrow, strip of land, stretching back about a mile from the coastal road, which connects communities from Pugwash to Pictou. Many of the property lines of these neighbouring farms extend beyond the high tide mark, onto the salt marshes located on the coastal side of the road.

The farm of Elmer's childhood was a mixed operation, with about thirty-five head of cattle, eight of these being milking cows. The farm produced cream, which was sold to the creamery in Tatamagouche where it was made into butter. Elmer recalled that selling cream was a good source of income in those days. In addition to the cattle, a pig was usually raised each year and butchered in the fall for the family's own use. The farm also maintained thirty-five laying hens whose eggs were sold at the local store in Wallace. Nearly all of the grain required for livestock feed, which included oats and barley, was produced on the farm. Elmer recalls his adopted mother preserving many of the fruits and vegetables they grew in their garden, including strawberries and tomatoes. In general the farm's resources were managed so that the family was highly self-sufficient. Provisions that were required, but surpassed the farm's natural capacity, such as flour and certain livestock feed supplements, were routinely purchased off the creamery truck that came from Tatamagouche on a weekly basis.

By the time Elmer first arrived at the Wallace farm in 1947, harvesting what was considered to be true salt marsh hay had become a tradition of the past. Over the years Elmer learned from listening to his adopted parents and others in the community how salt hay had been harvested. Salt hay was mowed by hand using a scythe. Once cured, the hay was piled on wooden platforms that were built on the marsh. Farmers would retrieve the salt hay in the winter when the marsh was frozen and could withstand the weight of horses or oxen. By the time Elmer came to live on the farm in Wallace, the farmers in that region were only harvesting what was known as shore hay, which grew on the marsh zone, adjacent to the upland. Because shore hay grew on firmer marshland than salt hay, it was possible to harvest shore hay with a team of horses and a mowing machine. Shore

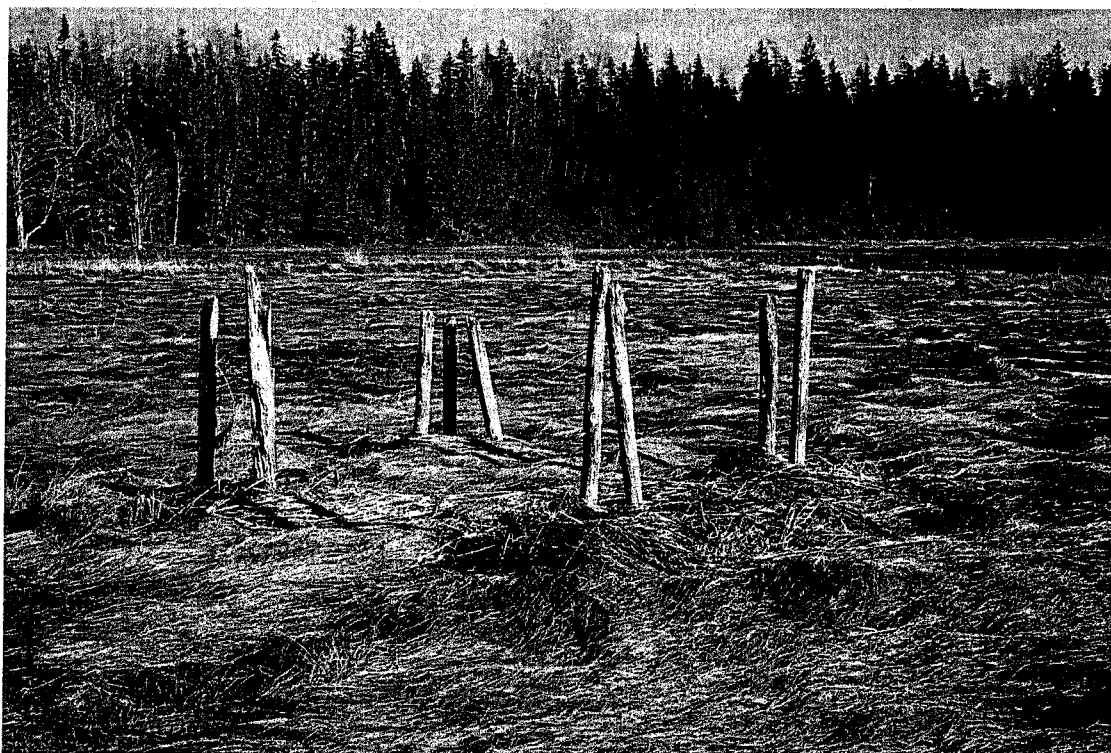
hay was cut after the upland hay was harvested; often it was not cut until late August or September. Elmer recalls that the shore hay did not require the same amount of curing time as the upland hay.

After the shore hay was cut, in order to avoid losing it to the incoming tides, it would be raked up to higher ground, off the edge of the marsh, using a horse-drawn dump rake. Once fully cured, the hay was transported to the barn where it was stored for winter-feed. Compared with the amount of upland hay the farm produced, shore hay constituted a small fraction of the total feed needed to carry the farm's livestock through a winter. Elmer estimated that the area of marsh cut for shore-hay would be approximately half an acre.

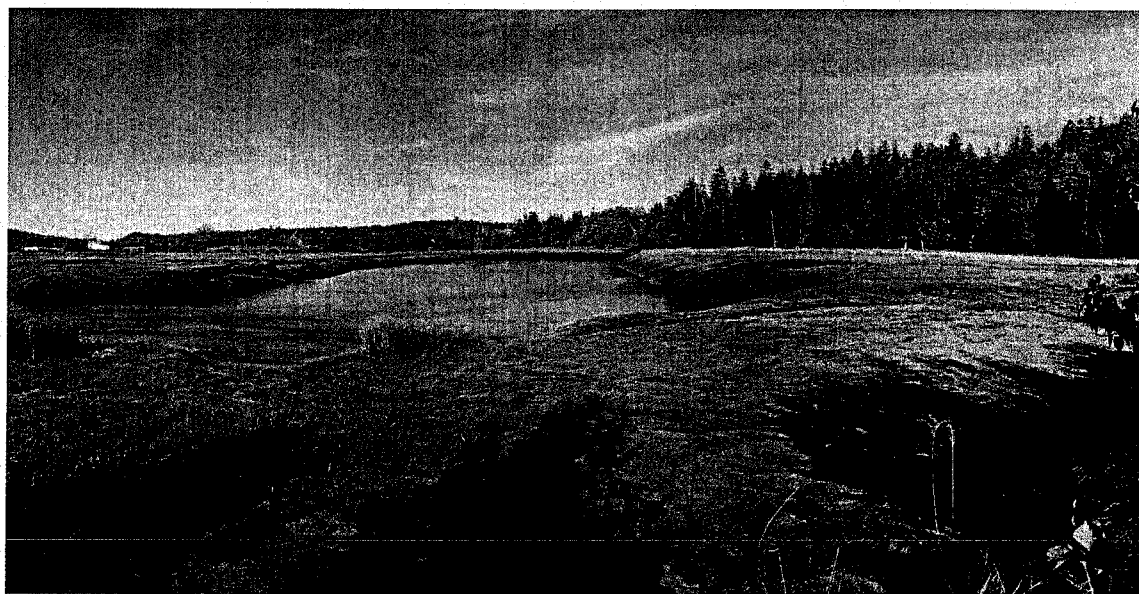
Shore hay was valued because it was considered to have important nutritional properties that benefited the livestock. On Elmer's farm, shore hay was reserved for those cows bred to calve in the spring of the year. It was believed feeding shore hay to the pregnant animals made them drink more water, which was considered beneficial to their overall health.

For about ten years after Elmer arrived on the farm, his adopted father continued to harvest shore hay on an annual basis. After the old people died Elmer continued in farming by specializing in dairy production. At this time he discontinued the practice of harvesting shore hay. Elmer gave up farming after a short period and went to work in the salt mine in Malagash, where he was employed for about six or seven years. Eventually Elmer sold his farmland, but remained living in the old house he grew up in. At present time the farmland is not be utilized for agriculture. Elmer attributed the overall decline in farming in this region of Nova Scotia to an increase in opportunities for off-farm

employment that had higher remunerative value than farm work, and the arrival of the automobile, which gave people more mobility.



Salt hay staddles. Salt marsh, upper Cogmagun River, West Hants, NS early spring 2004



Lower Cogmagun River, looking eastward and upstream, Centre Burlington, NS late spring 2004



**Author with salt hay staddles on salt marsh,
upper Cogmagun River, West Hants, NS May 2003.**



**Fishing boat at low tide. Tributary, lower
Cogmagun River, West Hants, NS Summer 2003.**



Marsh Grass, lower Cogmagun River, West Hants, NS Summer 2004



"Festival de la barge." Building a traditional salt hay stack at Amiraults Hill, Yarmouth Co., NS August 2004



Dyked agricultural land. Making English hay, Kennetcook River, Upper Burlington, NS September 2003

CHAPTER 4

INTERPRETING THE INTERVIEW TRANSCRIPTS AND DISCUSSION

“One thing that can be learned is that everything is connected with everything else, not only in its consequences but also in its causes” (Jane Jacobs, 2004, p. 22).

Harvesting salt hay is an agricultural practice that each of the sixteen interview participants in this study indicated they had some direct involvement in, in by-gone years. At the time the interviews were conducted in 2005, only two participants—Philip Nunn and Lois Brown of Hants County—were still utilizing salt marshes for agricultural purposes, either for grazing livestock or for making salt hay. The other participants had not farmed for decades. Melvin Landry and Hayden Landry from Argyle Township, who are both involved in organizing La Festival de la barge, an annual event where people from the community of Amiraults Hill and neighbouring villages congregate to build a traditional-style salt haystack (Crowell and Saulnier, 1998), offered insight into the heritage value salt hay has recently assumed within their home communities. The input of Philip Nunn, Lois Brown, Hayden Landry, and Melvin Landry provides a bridge from the past to the present, and sheds light on how the values assigned to natural landscapes and natural resources shift over time.

Analysis of the sixteen interview transcripts, (see Chapter two for methods of analysis) led to the emergence of five themes. These themes, which I have entitled: 1) ‘Who we were: the human landscape’, 2) ‘Where we lived: The natural landscape’, 3) ‘How we managed’, 4) ‘Why we made it work: Evaluating the resource’ and 5) ‘The times, they are a’ changing’, are detailed in Chapter two. In this present chapter, these five themes provide the structure for making a comparative analysis of salt hay harvesting practices of the three coastal regions of Nova Scotia (Hatcher & Patriquin,

1981), and for building an understanding of the social, economic, cultural, and environmental changes that have occurred in the communities represented in this study.

THEME ONE: WHO WE WERE—THE HUMAN LANDSCAPE

1.1 Argyle Township Accounts:

In telling their account of salt hay harvesting, most of the participants from Argyle Township situated themselves and their story within a familial context. In these accounts, the family encompasses a range of manifestations that include the nuclear family, comprised of one or two elders and their children; the extended family, which could include two or three generations of relations; as well as several examples of familial arrangements that extended even further into the community, as we hear from Leonard Surrette: “[My parents] were just married...and this [old] couple, that’s what they were doing then, they would take a younger couple, so they’ll stay with them, then they’ll die and then they’ll keep the house.” Whatever form it took, the family provided security to both young and old, served as the primary source of labour in its own maintenance, and thus appears to have occupied a central position in the economic viability of rural communities scattered along the coastline of Argyle Township.

Harvesting salt hay was a collective endeavour. Only rarely was it a solitary task. As we hear from Edward Warner: “The whole family would go on the marsh even my mother,” and Rudolph Muise: “The whole family was always included, including women. It would include the whole family on these little farms.” In addition to the labour supplied by family members, two of the interviewees also mentioned that harvesting salt hay required the hiring of additional labourers.

Many of the Argyle Township participants recounted how they began to work on the marsh at an early age. James Hatfield recounted: "I started farming when I was a kid....They gave me the job of cooking the dinner up in the woods. And that was my big job before I got big enough to carry heavy stuff." Hayden Landry remembers being "thirteen or fourteen when I was helping my father out. Because I was young they wouldn't let me use the scythe." Within this intergenerational labour pool, tasks appear to have been divided along the lines of gender and age. Those tasks that were considered to require special skills or competence conferred a degree of status on the individuals who possessed them (For a similar analysis on the division of labour within the productive household from an earlier period of Maritime history, see Steven Maynard 1994). For example, someone would be remembered for having been particularly skilful at constructing the large haystacks—*la barge*—or for maintaining the myriad of ditches that were necessary to drain the marshes and promote their agricultural productiveness. Lawrence Doucette remembers, "there was two brothers, they used to go there with a spade. We used to watch them make ditches. They could do the job. They were smart, they were smart." Other community members were remembered for their outstanding endurance at mowing the marsh grasses or maintaining a finely sharpened scythe. James Hatfield remarked admirably of his father: "He wasn't very strong, but he was a terrific mower. He was awfully good at keeping his scythe sharp."

Having experienced 'hard-times' appears to have been a common social condition among the Argyle participants interviewed for this study. All the interviewees mentioned being poor or having grown-up in a community that was largely economically impoverished. This impression, that basic survival or subsistence was the order of the

day is reinforced by the research findings of Neil Boucher (1980) who, in 1973, interviewed eighty people from the community of Surrettes Island to determine the level of education achieved by the inhabitants. Boucher found that:

Money had been a problem in establishing a school on Surrettes Island, and the lack of it continued to prevent students from receiving an education. If money was scarce within the family, all members had to work together to obtain what was necessary for its maintenance. There were animals to care for, planting to be done, fish to be caught, and wood to be cut, just to name a few....Most of the females left to help their mothers care for the younger children, while a good majority of the males left school to help their father fish and/or farm. (Boucher, 1980, p.57)

In this present study, lack of financial resources was cited by several participants as the reason their family harvested salt hay, as we hear from Lawrence Doucette, “[My family] didn’t have money enough to buy stuff for the cows, like feed, like bran. So that’s why we were making so much salt hay. They couldn’t afford to buy stuff from the stores.” Salt marshes were cited as having been an important source of local, abundant, and free livestock feed, and the marshes were considered to have been a key factor in the survival of people living in this coastal region during a time of extreme economic hardship. Hayden Landry considers “salt marshes [to have been] very important for supporting the people, at least in my area in the winter-time, otherwise I don’t know what would have happened.” Rudolph Muise describes similar conditions for residents of Surrettes Island, “We had to have salt hay on small places like Surrettes Island and all these small villages because there wasn’t enough big fields to make hay.”

In this socio-economic context, a family's life-chances were particularly vulnerable to the loss of a parent, whether through death or sickness. Leonard Surette speaks of the hardship he and his family faced after his father became ill with tuberculosis: "We didn't have money enough to buy feed or nothing. That's all [the cow] would be eating would be salt hay and water." The limited availability of social assistance was cited by several interviewees as the impetus for having to farm and harvest salt hay. Rudolph Muise remembers, "there was no unemployment in them days. [They were] doing their little farming just for food for the winter." It is important to keep in mind that it was not until 1956 that the Nova Scotia government repealed the Poor Relief Act, replacing it with the Social Assistance Act. Even then, until 1958 poverty stricken families could still find themselves at the mercy of the county poor house (Guildford, 2005).

While the Argyle Township interviews indicate that many people living in this region of the province shared the socio-economic condition of poverty, the interviews also provide evidence of a significant variability in access to agriculturally suitable land, and show that some families were better situated for growing food than others. Even a cursory examination of the *Soil Survey of Yarmouth County* (Hilchey et al., 1960) reveals the uneven distribution or pocketed nature of soils suitable for agriculture in this region of Nova Scotia. This impression is reinforced by Hayden Landry who informs us that farms were not equal in terms of quantity or quality of agriculturally suitable land: "My grandfather was lucky in this sense that he had two or three fields of sweet hay, so the cattle would have a fairly good winter, as opposed to some people who didn't have the luxury of any sweet hay at all, so they just fed them salt hay which apparently didn't have

too many vitamins.” Lawrence Doucette of Hubbards Point reinforces this point, recalling that his family had “quite a bit of land. With everything, it wasn’t all cleared, but there was thirty-eight acres altogether....but all the others, there was no ground at all. They didn’t have no fields or nothing. From the store going down there’s no big fields.” In contrast to Hayden Landry’s and Lawrence Doucette’s recollections of farming conditions, Rudolph Muise’s recollection of the limited availability of agriculturally suitable land on Surrettes Island highlights the difficulty residents living there would have faced in maintaining livestock, and why salt hay was such an important crop: “We did not have any big fields. We had to make salt hay....There was all kinds of marshes but no big fields....The little field we did own we farmed a vegetable garden.” The significant variability in natural capital meant that while some farms in the region were able to maintain a relatively large number of livestock: “We had animals, somewhere around fourteen head” (Edward Warner); “We had enough area of salt marsh land to make about forty stacks of salt marsh hay....We used to have sixteen head, and one winter we had twenty-two head”(James Hatfield); other farm families just a short distance away could only support “a cow and an ox, that’s all we could keep” (Leonard Surette), and struggled for subsistence.

The Argyle Township participants expressed a variety of interpretations as to how use-rights to salt marshland were determined. Several participants stated that use-rights were ensured through ownership or deeded title. Others had the impression that marshland was not legally owned, and that use-rights were conferred through habitual or traditional usage of a particular section of marshland. One participant stated that a salt marsh could be claimed if it abutted one’s upland holdings, while Leonard Surette

indicated that use-rights to salt marsh resources were not restricted to residency in a community that was geographically associated with salt marshes: “they were even coming from Wedgeport to make hay here [on Surrettes Island].” Several of the interview participants spoke of how use-rights to the large expanse of marshland extending between the villages of Amiraults Hill and Hubbards Point—known locally as “*la vieux parc*”—did not depend on deeded title (although several participants acknowledged that deeds for salt marsh holdings did exist) as much as on “knowing one’s place” (Anna Bourque). Lawrence Doucette, whose family ‘owned’ two sections on *la vieux parc* explains, “Oh we know that next guy would cut. There was like a line, you know and we would cut as far as the other guys that owned on the other side. We would come together and we would know exactly where our marsh was.” These lines were the many ditches that criss-crossed the marshlands that provided drainage while also marking a family’s marshland holdings. In this way, ‘knowing one’s place’ was confirmed through a material culture that emerged out of the needs of the local community, and was in turn maintained by members of that same community. Most of the participants indicated that while they could remember having seen those ditches being repaired or re-dug, they could not recall ever having seen any being dug for the first time, implying that this material culture was an inheritance from previous generations of salt marsh users.

Only one participant cited an example where traditional use-rights were contravened:

Everybody they had a certain spot on the marsh, you know, it was divided. There was a ditch here. My father would own on this side, people own on the other side. But I don’t believe there was ever a deed or something, because I don’t think he paid tax on that....One night this man he wanted a few more haycocks. And one

night [my father saw] the lantern on the marsh and he went over. [This man] was taking, oh [my father] said six feet or more of my father's land. [This man] was making a new ditch. And with all the mud he was taking out he was filling the other ditch with that mud. Yeah, that's what he was doing. He wanted a few more haycocks to make an even haystack (Edward Warner).

Although much about the interviewees' recollections of farm life in Argyle Township, from the early to middle years of the 20th century, paints a picture of hardship and austerity, these accounts also speak to many positive qualities of the social reality during this period of time. The interviewees all expressed admiration for the adaptive capacity and resiliency of their parents and grandparents who made a life for themselves and their families within the bounds of the natural and human resources at hand. A family's self-reliance was a point of pride in the telling of each participant's story. Collectively, these accounts depict a rural reality deeply entrenched in the principles of resourcefulness, as we hear in the words of Edward Warner:

We had plenty for winter. Everything! Everything was in the basement, turnips, carrots, everything. All they had to buy in the wintertime was flour to make bread, and sugar, and kerosene. Everything was in the basement. Now if somebody lived like that they would be a millionaire today. People live on the store mostly now, canned food and stuff.

Even those participants who identified as having lived through extreme economic deprivation, countered the notion that this time period was merely bleak and depressed, by highlighting positive attributes of their family life, and the high quality of food their families had access to. For example, Rudolph Muise, believes that the dairy products his

family “one cow operation” produced during that time was of much higher quality than what the present generation can purchase from Cook’s Dairy, located in Chebogue: “Now they have the sign of the side of the trucks ‘You can beat our cream but you can’t beat our milk’. But I think then we could beat their milk. Yeah....Mom would milk the cow and they would drink a glass of it coming right out of the cow you know. It was the real thing!”

In this social reality, the concept of conservancy was not imposed from outside the household, but emerged from the day-to-day existence of people who practiced, albeit out of necessity, methods of resource management that were infused with an ethics of sustainability and ensured not a single blade of grass was wasted.

1.2 Hants/Colchester Accounts:

Like the Argyle Township interviewees, the Hants/Colchester participants indicated that from the early to middle years of the 20th century, salt marshland and salt hay was highly valued by the farmers of their region. Gordon Knowles of Avonport, recounted that in his “younger days quite a few people harvested salt hay.” James Card also reflected on how he and his neighbours valued the salt marshes: “I can’t put a dollar and cent value on it, but we valued it quite highly. And we hayed little strips all over everywhere. Lower Burlington, on the Cogmagun. Far up and low down. And other farmers did the same. Everyone was scrounging around it get it, so it must have been considered of some value.” John Barkhouse spoke of the relative value of salt marshland by comparing it to upland holdings: “The old fellers, the homesteaders they valued their marshes as much as they did their upland. Oh yes, it was very important to them....There wasn’t an inch that wasn’t harvested years ago. Everybody! Anybody had a piece of salt

marsh had a valuable piece of land.” Mildred Burrows’ account indicates that salt hay harvesting was a common practice in the region of Colchester County where her farm was situated: “Most farms were getting salt hay. And some I know when my husband came here, his younger brother eventually took over their farm, it was just a small farm and he bought a marsh so he would have some marsh hay. So everybody seemed to want to have the marsh hay.”

In common with the Argyle Township farmers, the use of marshland resources in Hants/Colchester, during the early to middle years of the 20th century, appears to have been driven by the limited availability of upland with which farmers could make enough hay to carry their livestock through the long winter months. However, the interviews conducted for this study indicate a major difference in the natural capital, and the socio-economic realities between these two regions. Unlike the Argyle Township farms represented in this study, the Hants/Colchester participants all indicated that their farms held a reserve of natural capital, in the form of ‘undeveloped’ or forested upland that had high agricultural potential. This impression of agricultural potential is supported by the *Soil Survey of Hants County* (Cann, Hilchey, & Smith, 1954), which indicates that most of the land in this region of the province has agricultural capacity. Robert A. MacKinnon (1991) also notes that the physiography, climate and soil conditions endemic to Hants and Colchester Counties are cause to include both counties in the ‘farming zone’ of Nova Scotia. Over time, this reserve of natural capital enabled many of the participants from Hants/Colchester to enlarge their farm operations, and in some instances specialize in more financially lucrative agricultural pursuits, such as commercial dairy production. Whether considering acreage or number of livestock, the farm descriptions provided by

the Hants/Colchester participants suggest that even the smallest of farms was on par with the largest farms represented in the Argyle Township interviews.

The disparity in natural capacity between Hants/Colchester farms and the Argyle Township farms is perhaps most apparent in the assessment of what is deemed to be an average sized farm. Gordon Knowles remembers the farm he grew up on in Avondale, Hants County to as “an average farm. We’d have probably a dozen cows....There’d be probably twenty or thirty sheep, and that brought in a little income with the sale of the lambs and the wool....We always had probably three or four, or half a dozen hogs to look after the skim milk.” Similarly, James Card, who grew up on a farm that maintained “twenty-seven head of cattle, and fifty sheep”, considers his farm not to have been “a very big operation in those days.” As with the Argyle Township farms, well into the 20th century, the Hants/Colchester farms were clearly utilizing farm management practices that emphasised diversification over specialization. However, these accounts indicate that there was a significant difference in agricultural capacity between the Hants/Colchester farms and the Argyle Township farms. What is considered an ‘average’ farm in Nova Scotia is clearly a relative and regionally specific concept.

In 1945 Mildred and Clifford Burrows began dairy farming in Beaver Brook, Colchester County, with fifteen to twenty milking cows—a similar herd size to that of Edward Warner’s family from Abrams River, Yarmouth County. Like the Warner family, the Burrows’ upland resources were initially quite limited. Mildred remembers “the woods went right back of the house.” However, over the course of their farming career the Burrows family cleared hundreds of acres of upland, enabling them to substantially increase the size of their dairy herd.

In addition to the significant difference in upland resources, another difference between the natural capacity of the Hants/Colchester farms and the Argyle Township farms was due to the availability of dykeland. While marshland dyking had occurred in many coastal regions of the province over the course of the past four centuries (Clark, 1968) the Inner Bay of Fundy salt marshes received, by far, the most consistent and intensive attention (Milligan, 1987). All six of Hants/Colchester participants mentioned that dyked marshes were or had been associated with their farms. With its desalinated and highly fertile soil, dykeland is considered to be prime agricultural land. Dykeland has a high capacity for producing domestic forage crops such as timothy and clover that comprise, what several Hants/Colchester participants called, 'English hay'. Compared to salt hay or "French Hay" (Philip Nunn), English hay was considered to be far superior in its nutrient value and palatability for livestock feed. Moreover, dyked marshland was valued over tidally unrestricted salt marsh land, because farmers no longer had to contend with incoming tides or residual flooding when making hay. As we hear from Gordon Knowles, having access to dyked marshlands greatly increased the natural capital of his family's farm: "This farm would run around two hundred acres, more or less....About probably a third of it would be, or maybe half of it would be cleared. Half of that would be dyked lands. And we depended a lot on the dykelands for our hay." Likewise, Mildred Burrows remembered that when the marshes that were owned by her family were dyked by the government, under the auspices of the Maritime Marshland Rehabilitation Act (see Milligan, 1987):

We didn't have to worry then about when the tide came. It never came up. That made a great change. And we could go onto the marsh whenever we wanted to,

whenever the weather was good. That was the biggest change. And then the fact that it certainly changed the grass that grew. Those were big changes....It was very good feed, and it was still worth getting, very much worth getting. I don't think they regretted the passing of the marsh grass that much (Mildred Burrows).

In addition to having greater access to natural capital, the Hants/Colchester interviews suggest that access to domestic markets was greater in this region, than in Argyle Township, as well as most other counties in the province. MacKinnon (1991) notes that by the middle of the 19th century, "with a direct rail connection to the city of Halifax" (MacKinnon 1991, p. 158) shipping fluid milk became the mainstay for many farm families from Colchester and Hants County. Urban centres such as Truro and Windsor served as additional market outlets for shipping agricultural products (MacKinnon, 1991). The uneven development of road infrastructure in the province, determined by political partisanship as much as demographic necessity, also meant that farmers in certain counties had greater market advantages than others (Brown, 1998). Unlike the Argyle Township participants, all of the participants interviewed from Hants/Colchester indicated that farming had been the main source of their family's income. For instance, James Card remembers that his "father earned his living on that farm. And increased the size of it, and built it up over the years. And he didn't spend much money off of the farm. But he spent a lot of money on the farm." Gordon Knowles' family "sold cream to a dairy in Halifax. And just before that, when I was a small child, we made our own butter and we had customers in the town of Windsor. My father used to take the butter to Windsor on the ferryboat that ran, and that was subject to the tides." However, while the Hants/Colchester farms were able to produce surplus to

sell to local markets, the interviews indicate that first and foremost farm production in Hants/County during the early to middle years of the 20th century, as it was in Argyle Township, was oriented towards self-sufficiency of the household:

In my younger days, as with all the local farms it was what you'd call a mixed farm. Everybody had a few sheep, and a few pigs, and a few cows. And it was much different than now. It's more specialist thing. If you're in dairying that's the main occupation. In those days they were more self-sufficient, they raised their own food and that's why we had hens and pigs and sheep. (Gordon Knowles)

It was mixed farming. At today's standards it would be an organic farm. Dad never bought anything off of the farm. He used his own manure, very, very little fertilizer....He used to have a sawmill to supplement the farm here. Raised some colts, and pigs and...always had two pigs for the winter. And raised five pigs. Three would go to market, two for the home. (John Barkhouse)

While the above accounts show that greater natural capital and more market opportunities gave the Hants/Colchester farmers a clear advantage over their Argyle Township counterparts, the following excerpts indicate that in both regions of the province, from the early to middle years of the 20th century, harvesting salt hay was physically demanding work that required the labour input of the whole family, sometimes in combination with off-farm labour:

And it was a terrible amount of work. We just worked and worked to get that stuff....Like my Dad and five girls. That's all he had working for him was five girls....My Mom was there, but she had about all she could handle in the house

trying to take care of...she sewed our coats, clothes, and she made everything we wore sort of thing. (Lois Brown)

It was quite an undertaking, very interesting you know. Today they would say that you'd have child slavery. But them days everybody was expected to work....It felt great. You know, we felt guilty if we couldn't do it. You know, we wanted to work. That was the way things were. If you didn't work you weren't worth much. That's the way we felt. (John Barkhouse)

Well my husband he usually tried to hire either one his younger brothers, or an uncle used to help us hay sometimes. And I would go out too, and although I would cook a lunch, I usually made a stew or something for dinner at noon, and I would help with whatever was going on that I could help with. And often I would be the one that built the load. (Mildred Burrows)

The Hants/Colchester participants correlated the intense labour required to harvest salt hay with the technology that was available to them during that era, and to the limitations imposed by the marsh environment. Gordon Knowles recounts that "there was a great deal of manual labour. When machines, even mowing machines weren't suitable for mowing on the marsh it had to be done with hand scythe mostly." Similarly, James Card spoke of the effort involved in harvesting hay on the salt marshes near to his home farm:

I only wish I had photographs of some of the old days when we used to hay on the marsh. I can remember when I would stand on the second Cogmagun bridge, and look up and down the river, and you could see fifty or sixty men and boys, and

women running all over the salt marsh with hand tools and horses and pitching hay onto stacks and building them on the marsh. (James Card)

The degree to which salt hay can be interpreted as being highly valued by the Hants/Colchester farmers is indicated by the considerable effort these farmers expended in harvesting this resource from marshland holdings that were mostly small acreages, scattered in different locations, and not always geographically connected to the farmstead: “Most of them only owned three acres, or five acres or something like that. Very often they were in small strips. Not all in one piece. But a lot of the farmers through Riverside and Cognagun, and Lower Burlington, would have two acres here, and an acre and a half there. And they would harvest that” (James Card). And as we hear from a couple of the participants, procuring a winter’s supply of salt hay not only entailed the laborious work involved in mowing, raking, and stacking the hay, but in some instances it also involved a tremendous amount of time and effort to haul it back to the farmstead: “My Dad’s farm [was] down in Summerville. But the family owned property right directly opposite the river from the Red Bank farm [in Lower Burlington]. And the hay and stuff was made at that property and then hauled down to Summerville where we had the actual livestock” (Philip Nunn). Likewise, Lois Brown remembers having to go out on the marshes “through the winter. You went out there and you shovelled and you had your sled behind your horses. And you shovelled and you dug, and you shovelled and you dug ‘til you got a way out there. And then you got your salt hay. You put it on your sled and you brought it home to where you needed it” (Lois Brown).

As with the Argyle Township accounts, the Hants/Colchester participants indicated that farm viability was closely linked to a conserving ethic wherein farmers

utilized natural resources to their best advantage, and were not wasteful. As Lois Brown tells us:

We made do with what land was cleared the first few years. We had a small flock of sheep at the time and we had some young cattle and we mostly just made our living there.... There were five children in the family, everything you had you made it there on that farm. It was very fertile land.... But we had to use every last little bit of land that we could in the best way we knew how in order to make it work.

Circumstances were similar on Mildred Burrows' Colchester County farm:

Well we would cut every bit of it. We'd cut it all. All that we had. And we cut every bit of it that we owned, unless once in a while there might be a marsh spot, or a low spot that was wet when we were getting it. And you'd cut around that so you wouldn't get mired with you machinery. But we cut the whole thing as I recall.

Analysis of the Hants/Colchester transcripts, indicates a similar degree of variation to that of the Argyle Township accounts, in how use-rights to marshland resources were conceptualized. While several of the Hants/Colchester participants stated that entitlement to marshland resources was through deeded ownership, as we hear from Gordon Knowles: "A lot of the deeds went to a certain level of high water, on the tide at a certain time. It wouldn't be the highest tide, and it wouldn't be the lowest. That's most of the deeds would include that in the farm," other participants suggested that use-rights were based as much on tradition and neighbourly arrangements as they were on legal formalities:

I don't think it was deeded with anyone. Any of them! I don't think it is today, deeded with anyone's farm....The farmers, if they wanted it, they just took what butted on their land....It was an understanding I guess between the old farmers that, they never wrote anything down, they just said 'well that would be mine, that will be yours, and so forth' (Lois Brown).

Such variation in the conceptualization of use-rights suggest that while more formal and legally sanctioned arrangements were in place, neighbourly and informal agreements were perhaps as important, if not more so, in the day-to-day functioning of Hants/Colchester farms.

These interviews indicate that the role and value of salt marshes in Hants/Colchester farming practices changed a great deal over the course of the 20th century. In the early to middle years of the 20th century, James Card tells us that salt marshes played an integral role in maintaining a greater number of livestock on his family's farm than could have been otherwise: "At that time my father only had a fifty acre farm. But it wasn't sufficient to support the livestock population of the farm and that was exceeded by renting small areas of land that other people were not using. And in a lot of cases they were salt marshes." John Barkhouse has similar things to say about the farm he grew up on in Upper Burlington: "My grandfather and father bought the farm June of 1921. The farm was a mixed farm. There wasn't too much land cleared here at that time. I think they said seven acres, they've now got about fifty acres cleared, but at the time they depended very heavily on the marsh for their winter feed for their cattle." However, as the 20th century unfolded and technology made it possible to increase the production of domestic hay and grain crops, the need to rely on the indigenous forages of

the salt marsh decreased. Moreover, on Mildred Burrows' farm, which had specialized in dairy production by the last quarter of the 20th century, changes in agricultural technology and livestock breeding rendered salt hay obsolete as a livestock feed: "It's such a difference in the system now that they probably wouldn't have much use for the salt hay. And probably the cows are so sophisticated they probably wouldn't eat it if you offered it to them....The cows their appetites have changed. A tremendous change in technology."

The transition from the mixed-farm operations, typical of the early to middle years of the 20th century, to the specialized farm operations that had emerged by the second half of the century, is reflected in the change in values assigned to salt hay in this region of the province. Philip Nunn, who presently harvests salt hay to feed his beef cattle and horses, speaks about the relative importance of salt hay in his farming practice:

In terms of the salt marshes contributing to the economic stability of the farm, I guess they probably are a very minor part at this time in the operation. We keep roughly a hundred and fifty head of cattle and horses combined here at the farm. Each one of those animals consumes somewhere in the vicinity of two to two and a quarter tons of forage per year. And we probably only harvest maybe twelve to fifteen ton of salt grass. So that portion would be, I guess, related to the overall operation, or you could look at that in the percentage wise.

Philip Nunn along with Lois Brown continue to utilize salt marsh resources within their livestock husbandry practices, but do so mostly to help control internal parasites in their livestock, and as a supplemental feed, which both farmers value for the mineral content they believe is present in salt hay.

1.3 Wallace/Wallace Bay Accounts:

Only two farmer-participants from Wallace and Wallace Bay, on Nova Scotia's Northumberland Shore contributed to this study. Neither had farmed for over three decades. Both Elmer Mills and Graham Brown grew up on farms that were comparable in size and management practices to the farms represented in this study, from the Hants/Colchester region. MacKinnon (1991) has noted that by the beginning of the 20th century, farms such as the ones that Elmer Mills and Graham Brown grew up on, were located "along the edges of the central dairy belt...averaged slightly more cleared land than in the developing fruit and dairy belts; but smaller amounts of land were devoted to field crops" (MacKinnon, 1991, p. 162). Considered to be part of the 'mixed farming belt', farms in this region of the province tended to be more diversified in their commercial orientation than those in the dairy belt (MacKinnon, 1991). Like the Hants/Colchester farms represented in this study, during the early to middle years of the 20th century, the Wallace/Wallace Bay farms were oriented towards household self-sufficiency and commercial production. Elmer Mills, who was born in 1936 and came to Wallace after spending his first eleven years in a Halifax orphanage, tells us that:

The old fella that brought me up he had no family, him and his wife. And he farmed. He had about seventy-five acres of land. He raised cattle and milked cows, stuff like that. Well the most head of cattle that we kept was maybe thirty-five head....But the old fella, we milked, oh we milked about seven or eight cows I guess. And he separated the milk. They had what you call a separator. And he shipped cream. And they made butter. That's the way his income was in the summer time. And then the cattle, he would keep them for maybe two and half

years and fatten them up, and sell them as beef.... We always had about thirty-five hens. Always.... And we always kept one pig for ourselves. We'd butcher that in December in the cold weather. And we had that for our own use.... They had strawberry patches. We had all our own vegetables. Carrots, potatoes, turnips. All this stuff.

Gordon Brown, who was born in 1924, in the farming community of Wallace Bay described his childhood farm as being, "more or less mixed. It was classified as a mixed farm. Well, there was mixed cattle. That'd be cattle that you could milk and shipping cream and raise young stock up, either to make more cattle, more cows or to make beef."

Elmer Mills recounted how farmers in the Wallace/Wallace Bay region had access to local markets where they could sell their products, and also obtain through trade or purchase most of their household and farm supplies:

[In] Tatamagouche they had a creamery down there, they made butter. And we shipped the cream down there. Let me see now, it was once a week.... And I forget what we got now, but it was a good income for the cream. You got pretty good money.... The eggs we took down to the store in Wallace on a Saturday. The old fella always went down. That where Grant's store they called it, and sold the eggs, and bought all the groceries you needed, and you still had a little money left over.... And flour, you bought the flour from the creamery where you shipped your cream.... Yeah, you could buy your flour off of the cream truck. He'd come around once a week. And you could buy the flour, great big hundred pound bags in them days. And you could buy certain kinds of feed.... And I forget what else you could buy. I can't remember now. Oh yeah, we were pretty well you know.

While both participants indicated that farming was economically significant for people living in the Wallace/Wallace Bay region during the early to middle years of the 20th century, occupational pluralism was also a part of the economic and social reality for many farmers living in that region:

[Farming] that's pretty well all that a lot of the people did around here. But then there was fishermen and lumbermen. You know. There's always the fishermen. ...I fished oysters and quahogs. That's about the only fish I fished....I raked oysters for...well in the fall of the year it would be slack, and you would go out and rake oysters. Pretty good money in that. And in summer you picked quahogs. But then they got things regulated, you know, and its different then what it used to be. (Elmer Mills)

Unlike the participants from Argyle Township and Hants/Colchester, both Graham Brown and Elmer Mills had no personal experience or even memories of harvesting, what they considered to be real salt hay. By the time they were children, the farmers in their communities had long abandoned harvesting salt hay (Brown, 1973). All that remained of this agricultural practice were the stories they had been told by their parents, and a few remnants of a material culture still visible on the marshland:

Of course I can remember the old stack bottoms out there. For years and years they used to be there. They'd build these stack bottoms and they gradually disappeared because they'd fall down and the tide would take them out, and so on. But that's about all I can remember of it. But I do remember that they'd say that there's places out here...there's areas out here that belong to people on the Gulf, and they'd come over here in the spring of the year, just

before the ice went out and bring a bunch of teams over and spend all day out there loading the sleds and haul it home, because there was ice over it. (Graham Brown)

However, both participants spoke of having hands-on experience in harvesting what they called 'shore hay'. Elmer Miles remembers, "I was eleven years old when I come here....Oh we cut that grass on the shore for, I would say eight or ten years....Oh yeah, oh yeah it was into the fifties. See I come here in forty-seven." Shore hay was made from the grass, which grew in the salt marsh zone directly adjacent to the upland, or the 'high' marsh. Graham Brown tells us that:

From low tide to high tide, there's a piece along the shore that was, when the tide wasn't over it, it was growing hay. Growing grass. And we'd get out there and mow that with the team. But I never worked out on the marsh itself. I never made salt hay. I don't know if you would call it salt hay or not. But anyhow, it wasn't really what I would consider as salt hay. We'd cut along the shore there with the...as far as you'd go...where it was hard enough to carry horses or machinery.

Both participants indicated that farming practices and farm structure underwent substantial changes during their lifetimes. While these changes saw some farms in the region getting bigger and more specialized in their production methods, others went out of business. Neither Graham Brown nor Elmer Mills remained in farming beyond the early 1970s. The interviews suggest both men gave up farming because there was little financial incentive to remain in it. Elmer Mills was one of those farmers who ended up selling most of his land. At present the land that was once a part of his farm holdings is no longer being utilized for agricultural production: "It's all growing up in bushes, most

of it. Part of it they used sometimes. They were using it for pasture but they don't even pasture it now." Meanwhile, Graham Brown who continues to reside in the farmhouse he grew up in, and still owns the farmland he inherited from his parents, reports that his upland fields are now being rented to a neighbouring beef producer for hay production.

1.4 Discussion:

The above, first-person accounts of farming and salt hay harvesting reflect many of the findings by historians, geographers, and economists, who have written extensively on agricultural trends in Canada's Maritime provinces. For instance, Peter Sinclair's assertion that the social organization of Maritime farming underwent a radical transformation "from a predominantly peasant structure to an industrial-capitalist one" (Sinclair, 1984, p. 325), certainly matches the descriptions of agricultural change that occurred over the span of time represented in the sixteen interviews of this study. Indeed, the participants' stories from all three coastal regions indicate that household oriented or "subsistence production [had been] a major part of farm life at least as late as the Second World War" (Sinclair, 1984, p. 279). Likewise, Anthony Winson's (1985) investigation of post-Confederation agricultural development indicates that as late as 1930, farm production in Canada's Maritime Provinces remained primarily oriented towards household subsistence, and relatively primitive in its practices. Winson (1985) instructs us that while "the mechanization of Canadian farming accelerated at an historically unprecedented rate" (Winson, 1985, p. 425) during and immediately after the Second World War, Maritimes farmers remained in a state of technological stagnation, and as a result continued to grapple with "retarded commercial development of a substantial proportion of farms in this region" (Winson, 1985, p. 422). The theme of

agricultural failure, retardation, and decline is again picked up and advanced by geographer Michael J. Troughton (1988) who, in charting the course of agricultural expansion and contraction in the Maritimes, leaves us to wonder whether anything innovative or positive was happening on the farmsteads of Canada's Maritime provinces during the 20th century. However, as Daniel Samson (1994) makes us aware, rural life in Atlantic Canada was far more complex than most historical representations have depicted. While the allegation that "subsistence orientation and technological backwardness of the Maritime farmer, created a rural society characterized by its 'cultural isolation' and 'primitive' condition" (Samson, 1994, p. 14) appears to be supported by the refrain of "hard times" expressed by many of the participants of this study, Samson (1994) reminds us that methods of analysis, which remain single-minded in representing the history of Maritime rurality as "the simple movement to modernity" (p. 262) miss the mark in locating the essence of social dynamism that infused rural households (Samson, 1994). I would suggest that it is the nature of this social dynamism, when in concert with the natural dynamics of the salt marsh ecosystem that has much to contribute to:

Improving conventional resource management, by providing: insights for designing adaptive resource management systems that flow with nature; novel approaches to...agriculture...lessons for developing systems of social sanctions and successful implementation and enforcement of sustainable practices; means to avoid surprises caused by conventional resource management; experiences in managing fluctuations and disturbance, and to build resilience for sustainability. (Folke, Berkes, & Colding, 1998, p. 434)

This is not to suggest that we reinvent “‘the folk’ [by] turning rural dwellers into a variety of ‘primitive’ pre-capitalist peasants (Samson, 1985, p. 263). The above stories provide stark examples of a rural reality that was neither simple, quaint, nor in the end resistant to the forces of modernity and the industrialization of farming. However, what these stories do provide are vivid portraits of the social and environmental locations of households that, by and large, succeeded in an era of extreme hardship, through their own resourcefulness.

THEME TWO: WHERE WE LIVED—THE NATURAL LANDSCAPE

2.1 Argyle Township

To the uninitiated, one salt marsh can appear to be similar to the next. But as the participants from Argyle Township make clear, a great amount of variation exists among the marshes that pocket the coastline region of Yarmouth County. The interviews also make clear that a high degree of morphological variation can exist within a single marsh body. In Abrams River, Edward Warner noted that on the marsh where his family made their salt hay: “there was half of it, more this way it was softer then on the north side it was harder.” In Pleasant River, James Hatfield recalled that “there’s certain areas ...on the marsh, there’s every here and there, but its generally quite a ways a part, it can be, you’ll find places where there’s soft holes and stuff like that where you can’t make [salt hay]. You can’t even mow it.”

Different species of flora inhabited the different marshland zones. The Argyle participants indicated that certain species of marsh grasses were preferred for making salt hay. For the most part, the more preferred species were associated with the higher and

thus drier regions of the marsh. On one section of salt marsh that Lawrence Doucette's family utilized:

[It] was just like fresh hay. It was just as good as the hay we were making in the field here. It was on top of an island. There's two little islands, we call them 'les islets'. But we had four, or five or maybe six [where] it was right salty. You know, they were right in the salt water. But where it was there, the ones it was more fresh water when it was raining.

Rudolph Muise recalled that on Surrettes Island the marsh his family utilized for making salt hay, the "better hay was closer to the island....Closer to the wooded area, the hay is better." Most of the farmers interviewed preferred what was known locally as 'black grass' for making salt hay.

The species of salt marsh vegetation a farmer had access to could greatly impact the amount of labour required for making salt hay. Edward Warner recalled that the grasses on their marsh, which they used for salt hay, only grew six or seven inches tall:

So you had to mow down quite a bit to have a stack....Now you take down in Amiraults Hill, those places, my, the grass there comes over a foot tall or more. And its black grass. And that's very good hay....So down in Amiraults Hill you only mow half of the size we mow down here for a stack. Yup. Because it's heavy, heavy, a lot of hay.

Hayden Landry remembers that the type of marshland vegetation referred to by the locals as *la pause Pierre* was not preferred because "when they cut this grass they had to sharpen their scythe maybe three or four times more often than [when] they used to when they were cutting the other type." However, some locals relished *la pause Pierre* as an

edible marsh green. Another species of flora referred to by several participants as *la messotte* was considered to make very poor quality salt hay. Edward Warner remembers that “you couldn’t cut that. If it was damp you could cut it, but just as soon as the sun come out, your scythe would...even if she was very sharp you would just go right over it, just like wire, that’s what it was.” Closer to the water’s edge *sedge* grew, which was normally utilized for strawberry cover rather than livestock feed because cattle found it to be unpalatable. While some farmers had access to enough marshland that they could pick and choose between the areas they harvested, thus utilizing only the preferred grasses to make their hay, others spoke of having to utilize whatever was available to them.

Several of the Argyle Township participants recalled there having been little variation in the marshlands’ vegetative productiveness from year to year. Others remembered noticing significant variation in the quality and quantity of the salt hay from one year to the next. Environmental factors were attributed to any noted variability, as we hear from Rudolph Muise:

Some summers hay was better than others. And I would believe, this is just my belief, if you did not have too much of a bad winter, why the marshes would cover with ice cakes and everything, that was worse for the hay.... When the ice cakes would melt and float out in the spring, it would break some of the hay and take some with it.

The tides, and what the tides brought in with them, also contributed to the quality of salt hay in a given season. Leonard Surette recalled that “if the eel [grass] would come and cover [the marsh] you had to go and clean it out before the [marsh] grass would start growing. You would make sure there was nothing; because eelgrass would float you

know and come on top of the [marsh] grass....If you let that eelgrass...I mean, you couldn't cut it." If the tides were blamed for importing all manner of jetsam and flotsam that could impede the harvest of salt hay, they were also credited with bringing in new fertility and renewing marshland productivity.

The marsh was considered by the participants to have been highly responsive to anthropogenic activities. Several participants observed that cutting the marsh grasses did not seem to deplete the marshland environment, but actually improved the quality and quantity of the vegetation:

We're getting more. It seems like it's getting thicker. Of course when they had left it...ok the last time it was [cut] was what, 1954?...If you don't burn it, and you leave it there it's hard even to cut. We had a hard time to cut it that first year. But now there's nothing underneath. It cuts easy. And when the water comes over the marshes I would imagine it brings in some kind of fertilizer from the sea or good stuff....Its getting way better, its been getting better every year. There's more hay. Basically I see is we're getting more hay. (Melvin Landry)

Lawrence Doucette had similar things to say about the impact mowing had on the marshland environment:

Oh yeah, I guess I can notice. I guess I can. Cause when you look at the marsh and see everything like now, it not like when we used to be on the marsh and cut hay. You can tell it's not the same marsh. It's the same marsh but it's different. It's not growing anymore. Look where they're building the stacks (reference to the stacks that have recently been built for La festival de la barge). Its getting better and better every year. More grass. But when they started the first stack [the

grass] was about that high. Now it's about that high. So its getting better and better. After they cut the grass you can go there, its right green when it grows again. But it's getting better. So where we used to make hay there's nothing growing there now.

Whereas mowing the marshland was considered to enhance vegetative regeneration, utilizing the marshland for grazing purposes was not considered to benefit the marsh environment. Rudolph Muise notes that grazing livestock on the marsh "would trample down the grass and this and that, because its soft, it's not like a field....I've seen the cow and the ox up to here in the mud and the side of the river....I don't think it helped the marshland as far as I'm concerned."

The Argyle Township participants' observations indicate that there was an abundance of wildlife—both marine and terrestrial - associated with the salt marshes. Animals mentioned include eel, smelt, herring, mink, muskrat, deer, and various species of waterfowl. For many of the participants, wild food provided a large part of their diet. Black ducks were noted as having been particularly abundant during the era in which salt hay was being harvested. The decline in the duck population was noted by several of the participants. One participant suggested this decline might be due to the fact that the marshes were no longer being cut for salt hay:

I can remember when doing the salt hay with my father you would find the ducks, the smaller ducks, the ducklings in those little creeks that they had, you know just swimming around. And they'd hide in the tall grass and stuff like that....Now, I don't know if its because the marshes have been abandoned that you see less and less ducks around this area. And if you talk to duck hunters they'll tell you that

basically there's a lot fewer ducks than there were.... One thing we've noticed, just across the river here is there's no grass at all. Its just black mud. Some say it's a disease that gets in there and every once in a while kills the grass. And the eel grass which is where the ducks feed basically.... So that could be a reason why there's fewer ducks. But I still think that the fact the marshes have been sort of abandoned. (Hayden Landry)

Several participants also mentioned that over the course of their lifetime they had observed, what they considered to be, a significant decline in marine species such as herring, smelt, and eels.

Environmental and climatic conditions were identified as major limiting factors in the making of salt hay. The tide determined when salt hay could be harvested. Attending to the moon's cycle was the way most people kept track of the tides:

You have to wait till the tides are low. You can't go down on the marsh. You can, but you won't make no hay, because the tide comes right over the marsh when the tides are high. But if you go on a low course of tides, which you've got to do if you want to make hay. And you generally get maybe five or six days, hopefully six to mow the hay down. (James Hatfield)

Storms and tidal surges could have a devastating impact on a salt hay harvest:

One time there was a big storm and we went there and there was... we had four stack and they were gone. We went along side of an island.... some of them were in the river. Oh, some of them lost a lot of hay. It was a big storm, a big tide.

(Lawrence Doucette)

Because they had depended so heavily on the salt marshes for their survival, the participants were familiar with the intricacies of this ecological system in a way that exceeded simple observations. A keen ecological awareness was born out of their own subjective experience, and their relationship to the salt marsh was nothing short of intimate. In this way, the salt marsh was fundamentally a cultural landscape—“everybody was on the marsh”(Lawrence Doucette). While a salt marsh at harvest time undoubtedly reflected back the message of basic, back-breaking survival to those individuals who laboured with primitive tools, the salt marshes also invoked other sentiments. As we hear from Lawrence Doucette, people saw this natural environment as being exceptionally beautiful: “There must have been all together five hundred stacks on that marsh, on both sides of the road. Boy it was pretty. At night when there was moonlight and the tide was on the marsh you could see...well it was some pretty. Yeah. Everybody was making salt hay.”

2.2 Hants/Colchester County Accounts:

In defining salt hay, the Hants/Colchester participants were quick to differentiate between the indigenous vegetation that grew on marshes exposed to tidal inundation, from the vegetation that grew on dyked marshland— the first being considered true salt hay. According to Philip Nunn, salt hay “by its definition or name is actually the grass that grows on the outside or the lower lining areas of the rivers that are periodically flooded by the high rising tides.” Gordon Knowles also notes that “salt hay would be the wild vegetation that grows on the seaward side of the dykelands here.”

As with the participants from Argyle Township, the Hants/Colchester participants were cognizant of the diversity of vegetation that grew on the salt marshes, and were

highly specific in their preferences for which of the marsh flora they used when making salt hay:

We didn't cut what was on the other side of the running dykes so much, because it was [what] we called flat grass. It was very big, very tough. It sort of had a purple stem, almost to a wood stem. But we got the very short stuff that was on the other side. Used to sort of a little purple bloom on it, some of it. And that's what we used. But it was generally no higher than maybe a foot, foot and a half high. It was very small grass. It took you a long time to gather up enough. (Lois Brown)

John Barkhouse also recounted the different species of grasses growing on the marshes his family utilized: "You have real salt hay. Then you have your black grass, then you have what they call duck grass. And then there's, we used to call them Indian wild oats, but gosh knows what they're really called." As the following excerpts indicate, the value assigned to a particular plant species was directly related to its usefulness as livestock feed: "There was another kind of a grass that they used to call flat grass that grew in close to the shore, and that was of very little use for livestock feed. We didn't cut that" (James Card). Likewise Philip Nunn had his preferences for certain species of marshland vegetation:

We have certain grasses that we prefer to make the hay out of....There are a lot of different vegetations out there ...broad leaf annual vegetation that will grow if the grass isn't growing in competition with them. And these do not make a good quality hay. [...] My preference is the actual marsh, or the brown-top marsh grass

that is there. Secondly is what the old people used to refer to as blackgrass that grows in some of the wetter areas. And the least preferable is couch grass.

Like their Argyle Township counterparts, the Hants/Colchester participants noted that there was a great deal of morphological variability between marshes in this region, as well as within a single marsh body:

[Our neighbours] marsh was so soft; the cows wouldn't even go out on it. They'd sink right to their knees.... We got a high spot on one end of the farm, and high spot on the other. But in the middle there's a low spot.... There's the upper marsh we call it, and then middle marsh, and lower marsh. And we always start in the upper marsh because it was the hardest. (John Barkhouse)

In some places you could go out pretty well to the edge, but others... the worst of it was, a lot of the marshes, the softest ground would be in close to the upland.

And that was the problem to get out across that area to the other. It was always higher out next to the water.... Well that caused a drainage problem you know.

You had to have a deeper ditch out next to the river than you would have in here.

(Gordon Knowles)

Likewise, Philip Nunn noted that "usually as a rule it is in the middle, drier portions of the marshes. The marshes have a tendency to be wetter towards the high tide side of them as a rule, or the dyke side.... They also have a tendency to be wetter down on the lower side of it." In general, the farmers in this study tended to prefer to make their salt hay from the grasses that grew in the middle to higher regions of a marsh.

Opinions varied on whether or not the quality and quantity of the salt marsh grasses changed from year to year. James Card recalled that, "there wasn't that much

difference in them. Now the upland hay would vary a lot from year to year. Some years you'd have a much bigger crop than others. But salt hay, very similar from year to year. Not a big difference." In contrast, Philip Nunn noted that "depending on how the tides coincide with our weather that we're getting, the vegetation is not always the same year after year." Other factors that were identified as being detrimental to the marshland were overstocking when grazing livestock, and the use of heavy equipment, which could leave ruts in the softer, wetter marsh zones. A significant difference in the flora composition was noted between marshes that were regularly cut for salt hay, and those that were not. Throughout the years that Philip Nunn has been cutting salt marsh hay he has observed that, "a marsh that is regularly harvested has a tendency to predominately be the finer grasses that you would see as opposed to some that are unharvested where some of the couch grass and some of these other areas have a tendency to predominate over the brown top grasses that you're looking for." While farmers preferred to make salt hay on marshes that were regularly cut, sometimes, as in years of drought when upland hay would be in short supply, they needed to utilize marshes that had not been mowed for several years. At such times, farmers could be faced with a litany of obstacles impeding the efficiency of a harvest:

Any marshes that were easy to handle, and easy to cut, and readily accessible, they were cut regularly. Whereas places that tended to be too soft, or fresh water ran down them excessively, or they were all split up with runs and reels, they were not very easily harvested. So they were just left. So in a year when you wanted to cut extra acres you cut the good acres and then you would have to keep going on to poorer and poorer stands, and cut in the areas that had not been cut in previous

years perhaps.... There would have been a lot of trash in them, and they would have ice deposits of mud. Of the ice cakes would deposit a great big clot of mud on the marsh and you would have to mow around that. (James Card)

The Hants/Colchester participants spoke of the marshes in their region of the province as being highly dynamic ecosystems. The environmental factor, or natural process that was considered to be the main driver of the dynamic nature this region's marshlands were the extremely high tides associated with the Inner Bay of Fundy: "Some of the marshes, which we harvest, will cover with the seawater when the tides are basically rising around twenty-three feet. Other ones are higher and drier marshes that may take a twenty-six to a twenty-seven foot tide to cover" (Philip Nunn). The tides were seen as having both a positive and negative impact on the marsh environment. James Card credited the tide with "constantly depositing, fresh fertility from the sea. And it's free." However, Philip Nunn noted that the tides could also bring with them a fair amount of garbage that impeded the efficiency of harvest:

The good years are when we get what I call a clean marsh. These high running tides when they come up the tides will deposit whatever is floating in the river in terms of garbage, and trees, and sticks. If you ever look along the edge of the rivers you'll see what I call the tide mark with some old seaweeds and unfortunately a lot of times some garbage, cans, milk jugs, lots of the plastics. And in some years...we may get one of those tide marks every four or five feet as it goes off of the marsh, because the tide, as you're well aware probably, its not like one day there is a big high tide and its over the marsh, and the next day doesn't go over the marsh. It is receding, progressional system whereby usually

the tide drops two or three feet in height down. So there'll be a tidemark and then there may be four or five feet and another tide mark. When you get the marsh covered with a lot of that, I call it junk and debris every four or five feet it certainly cuts down on the harvesting, because we can't cut a machine through that stuff. And it also just becomes uneconomic to try and get off of a tractor each time and move this old junk of driftwood and this type of thing. So what we call our bad years are usually when we have a lot of tide marks on there in conjunction with a lot of driftwood and garbage I guess, for want of a better word. Because it is a lot of times plastics and garbage.

Ice was also identified as a factor that could impede agricultural productivity on the marshes:

The type of ice I call ice damage or vegetation damage that we get, whether we get the ice washing out the river on the high tides after, or whether the ice stays up on the marsh and melts and stays there. But we do get some very damaging years from ice on these marsh vegetations....It its usually the most damaging we get is with high winds and storms when the ice is floating around on the marshes. Sort of just gouge in and digging and going out. We don't get too much damage if ice just goes up there and lays and melts away, other than if it's a cold wet spring coinciding with that and there's still ice laying on there when the grass should be starting to grow. (Philip Nunn)

All the participants indicated their awareness that marshland formation resulted from the dynamic relationship between the tides and the ubiquitous silt in the waters of the Inner Bay of Fundy. While some salt marshes referenced in these interviews were

considered by the participants to have formed naturally through a progressive accretion of silt, other marshes were identified as having formed in direct response to anthropogenic activities, such as dyking, the building of bridges and other transportation infrastructure.

Philip Nunn believes that:

The St. Croix River marsh was probably influenced some in the last few years by the addition of a new bridge at Mantua. I'm in close proximity to the Mantua Bridge, where it used to be a single-lane, old bridge over there, and they actually did some modifications in the channel flow when they were putting in the new two-lane bridge. I've talked to Mr. Sanford who is now well into his eighties, and he informed me that the marsh actually formed in his lifetime in there. Prior to that, when he was working with his father on that property there was no marsh out there.

Meanwhile, Gordon Knowles points to what he considers to be the negative impact of anthropogenic forces on his farm's marshland holdings:

There would have been a narrow band where we harvested the salt hay. There's not much left now. They built a causeway on the Avon River at Windsor, and you notice a large belt of new marsh building up there. Well, to get that marsh it came off of our land. Ours is getting narrower and narrower all the time. That's just an observation. The mud had to come from somewhere.

Several participants noted that salt marshes that had at one time been dyked but, because of a breach, were no longer tidally restricted, tended to have similar characteristics to naturally occurring high marsh zones. Such marshes were valued for their firm land base, and were better suited for withstanding heavy harvesting equipment.

By the middle of the 20th century, with the increase in farm mechanization, only those marshes or marsh zones that were high, and thus dry and firm, where farmers could use tractors and other machinery when making their hay, maintained their agricultural value: “[On the Cogmagun river] That’s the latest that I can remember of people that were harvesting salt hay. They could use machinery there, it was quite firm” (Gordon Knowles). Likewise, Philip Nunn noted when a marsh is:

Very dry and you can bring large loads of hay off of there with not disturbing any soils or leaving any ruts. And the particular year that I’m thinking of, like I said, ten, twelve years ago, the marsh was actually so dry we used half ton trucks out there to bring the loads of hay in, very simply and easily. And I didn’t have to trans-load any of the salt hay on to trucks or anything.

Among the Hants/Colchester participants there was a greater range in opinion on whether or not salt marshes were important wildlife habitat, than had been indicated in the Argyle Township interviews. Gordon Knowles recalled seeing “ducks during the migration period” whereas, Lois Brown remembers that while having seen a number of different bird species on the marshes “wildlife don’t live around the marshes very much I don’t think.” Philip Nunn, on the other hand, spoke of the marshes as having:

A fairly healthy wildlife population on them. On the Cogmagun, certainly waterfowl are probably the most predominate that we see when we’re there. Migratory ducks there. There are a lot of, in recent years, a lot of birds of prey have a tendency to really congregate at the marsh areas when we’re working because there’s a lot of moles, mice and rodents exposed as we start to work on,

so we often see red-tail hawk in close proximity to where we're harvesting. And quite a few eagles of late.

2.3 Wallace/Wallace Bay Accounts:

What the Wallace/Wallace Bay participants referred to as 'the shore' was the marsh zone that was immediately adjacent to the upland on their farms. Tidal amplitude in this part of the province is not very high, averaging around six feet (Bleakney, 2004). Thus, while the shore was subject to periodic tidal inundation, and the vegetation that grew in this high marsh zone was halophytic, because this region of the marsh was only infrequently covered with salt water, it was much drier and firmer than the lower marsh zones, making feasible the application of horse-drawn farm equipment for harvesting hay:

Along the shore, from the low tide to the high tide there's a piece along the shore that was, when the tide wasn't over it, it was growing hay; growing grass. And we'd get out there with the team. But I never worked out on the marsh itself. I never made salt hay. I don't know if you would call that salt hay or not. But anyhow it wasn't really what I would consider as salt hay. We'd cut along the shore there ...where it was hard enough to carry the horses or machinery.

(Graham Brown)

However, if one ventured further out on the marsh, away from shore, the marsh became much wetter and softer. Elmer Mills, remembers the marsh that was part of his family's farmland holdings, which extended out to Wallace Bay, was "pretty soft. And then there's a big creek. There's a creek runs up through here. And there's a lot of holes. Salt

ponds they call them. And you had to be careful of that you know. That's why it was cut with a scythe."

Neither participant expressed being especially familiar with the characteristic flora that grew on the lower marsh zones, further away from the shore. Elmer Mills recalled there being a cranberry bog on an outlying section of his farm's marshes. However, both participants noted that the marsh grasses, which comprised shore hay, were different from the vegetation that grew in the wetter areas of the marsh, as well as from the domestic grasses that grew on the upland. Graham Brown described shore hay as a kind of broad-leaf grass. While Elmer Mills recalled that 'shore hay "wasn't as tall as the upland hay. You know, a different kind of stuff. And it was quite smooth like. I don't know. I can't tell you very much about it, it was quite a few years ago. But it was good feed for the cattle.'" Both participants held the opinion that the marshes were important habitat for wildlife:

Oh, well, there's lots of ducks. There was always lots of ducks, cause there's lots of salt ponds see. Lot's of ducks....Well there's muskrats out there. Muskrat houses out there. They build them every year yet. There's rabbits out here, and here. Deer go out here. And now and again you might see the odd fox. Foxes are getting scarce. But other than that, I don't know. (Elmer Mills)

Graham Brown also spoke of having observed a decline in certain species of wildlife he remembered frequenting the marsh environment when he was a boy: "Oh, ducks. Ducks of course. There's not as many ducks as there used to be. And of course we used to always see seals out there on the banks there. We haven't seen them for years. But outside of that I don't know."

2.4 Discussion:

As indicated in the above accounts, Nova Scotia's salt marshes are "highly dynamic ecosystems. [Exhibiting] complex patterns of zonation with respect to plants and animals that reflect the daily and seasonal changes in water depth, salinity and temperature" (Dalton & Mouland, 2002, p. 9). These interviews show there to be many ecological similarities between the three marshland regions in the province. They also confirm the finding that:

A distinctive feature of salt marshes is their regional character. The secondary (animal) production in marshes, the nutrient and material exchanges with the adjacent estuarine and coastal waters, the soil types, the vegetation and so on, vary according to the regional climatic and physiographic regimes (Hatcher & Patriquin, 1981, p. 1).

The participants in this study verified this distinctive variability when telling their stories on salt hay harvesting. It should be noted that the vernacular plant names that participants provided were not identified as part of the research methods for their corresponding scientific species names. Therefore, it is quite possible that the common name given for a plant in one region of the province could refer to a completely different species in another part of the province. What is significant about these accounts is that the participants were cognizant, within the context of their own natural and social environment, of the degree of natural variability that comprised the marshlands of their home regions. This variation in the endemic plant species of the different marsh zones, and between the three coastal regions meant that the quality and quantity of salt hay could vary significantly from one farm to the next. For example, farmers residing along

coastal waters of the Inner Bay of Fundy, whose landholding included a ‘high’ marsh zone—the marsh zone subject to infrequent tidal submergence—likely harvested salt hay comprised mainly of *spartina patens*, whereas those farmers along the Atlantic coast who had use-rights to a ‘high’ marsh would likely find the dominant plant species *carex paleacea*. Farmers, whose marshland holdings were poorly drained, or largely limited to the intertidal marsh, could be limited to harvesting less preferred species of marshland flora (Hatcher & Patriquin, 1981).

Given the historical and geographical prevalence of salt hay utilization by Nova Scotia’s coastal farmers, it is surprising to discover there is little in the way of available literature on the feed values of these different plant species; the only available literature being published in 1898 at the Massachusetts Agricultural College (Linsay & Jones, 1989). Research from the Massachusetts Agricultural College comparing the various species of marshland vegetation—such as black grass (*juncus gerardi*), fox grass (*spartina patens*), branch grass (*distichlis spicata*), and sedge (*spartina stircta martima*)—indicates significant variation between the various plant species in their palatability and digestibility in livestock feeding regimes (Lindsay & Jones, 1898). Such findings support the accounts of the participants in this study, and offer some explanation as to why certain farmers believed that salt hay had considerable nutritional value as livestock feed, while others expressed the opinion that salt hay was only useful in providing bulk roughage.

While salt marshes were primarily valued by the participants of this study as a source of abundant and free livestock fodder, many of the participants indicated that they also valued the marshes for the abundance of marine and terrestrial animals that lived

there. From an ecological perspective, salt marshes are known to be crucial to the viability of many marine species—detritus decomposition originating from salt marshes forms the basic building block of a food chain that directly leads to the consumption by humans of certain preferred fish and bird species (Odum, 1961; Hatcher & Patriquin, 1981; Daiber, 1986; Adam, 1990). While Nova Scotia's estuarine systems have a much lower number of fish species than southern Atlantic salt marsh-estuarine systems, "flounder, eel, and striped bass obtain the major part of their food within [Nova Scotia's] estuarine system. Striped bass populations, once large, are now small and are not exploited commercially in the Maritimes" (Hatcher & Patriquin, 1981, p. 17). The documented decline of once plentiful marine species in the Bay of Fundy's estuarine system has been attributed to "multiple human influences [that] have altered abundance and composition of every trophic level in the food web and reduced upper trophic levels by at least one order of magnitude" (Loetz & Milewski, 2004, p. 1428). This decline has been largely attributed to loss of habitat. It has been estimated that over the course of the past four centuries anthropogenic activities—including dyking, infilling, and draining of salt marshes—have resulted in the destruction and loss of more than 65 percent of the original salt marshes in Nova Scotia's Bay of Fundy (Dalton & Moulant, 2002). While loss of habitat, due to anthropogenic influences, has been indicated as a major factor in the decline of biodiversity (Grumbie, 1994), the loss of biodiversity has been shown to have adverse effects on ecosystem functioning (Hooper et al., 2005).

THEME THREE: HOW WE MANAGED

3.1 Argyle Township:

Analysis of the Argyle Township interviews shows that the production of salt hay was remarkably consistent across the different communities represented in this study, and socio-economic circumstances of the participants. These first-person accounts suggest that the method for making salt hay had remained pretty much unchanged until the point in time when fossil-fuelled mechanization came to dominate farming practices. Up until this time, traditional knowledge had been disseminated intergenerationally, by way of doing. On farms in Argyle Township, learning started early, extended over the life of an individual, and was situated in the context of the whole community.

These interviews suggest that the management of salt marsh resources was oriented more towards maximizing the efficiency of human labour than for ensuring that the marsh was not overexploited. Edward Warner expresses the generally held assumption that you could not over utilize the marsh through harvesting salt hay: “Every year we go on the marsh just about the same time of the year and we mowed everything down and the next year it was back to the same thing. You know it comes right back. It didn’t hurt nothing.”

In Argyle Township salt hay was harvested anytime between June and September. The timing of a harvest depended on the weather and tides, the availability of labour,—this was particularly true for those farmers who also fished offshore—and the prioritizing of other farm management concerns. Those who owned or had access to upland fields usually cut their upland hay before harvesting salt hay, since upland or ‘fresh’ hay was considered to be more nutritional and palatable for the cattle.

Salt hay took about twice as long to make as upland hay, because the marsh grasses needed more time to cure. To make salt hay, the marsh grass was cut, dried for three or four days, and stacked on the large wooden platforms before the next course of high tides covered the marsh and ruined or carried out to sea any hay that had not been gathered up. Because the production of salt hay was extremely labour intensive, often the volume of salt hay required by a farmer could not be made in the time span of a single course of low tides. Several participants mentioned that their families would make one or two stacks one month, and return to the marsh the following month to make more.

The intergenerational nature of the labour force led to a division of tasks during a salt hay harvest. In general, men mowed with the scythes or other mowing equipment, while women and children raked the hay into windrows and the small piles or haystacks, which they then carried or poled to the large wooden platforms where the hay would be carefully stacked until it was needed later in the winter. The changes in farming technology, marked by a movement from the use of hand tools, to animal powered mowing machines, to fossil-fuel driven machinery, greatly changed the way farm work was conducted as well as farm productivity. Lawrence Doucette remembered the time when he and his family “used to go with scythes you know. But I didn’t mow much. I couldn’t mow much myself, but my father could....Then when we had an ox we used to go there with a mower. I had a mower and I’d go on the marsh with the mower. It was easy with the ox you know.” James Hatfield spoke of the increase in farm productivity his family realized after they acquired their first tractor:

To make forty stacks, you know it means a terrible amount of mowing by the scythe. And that’s hard work. Terrible. I mowed a few, or helped to. But after the

last Great War we got a little tractor. And it was what they called a 'Farm All Cub'.... You could take the wheel weights off and put it right on the marsh and mow on the marsh with it. So you didn't have to mow with a scythe anymore.

And boy I'm telling you; we could make some hay then.

While the change in technology was generally considered to have improved farm productivity, it was also noted by several participants that the heavier equipment was not always applicable to the marshland environment. Edward Warner remembers the ox-drawn mowing machine he acquired as a young man was not applicable to "places [on the marsh where] it was quite soft. We couldn't cut it....Where it was too soft my father and them would go and mow it down [with a scythe]."

The management practice of ditching the marshes was considered by the Argyle Township participants to have 'improved' the agricultural productivity of the marsh environment. Lawrence Doucette explained that:

If there wasn't no ditch at all there, if it wasn't spade like they used to say, the water would stand on the marsh and it would kill the grass. Well them ditches, the water would go in the ditches and right in the creek. So that's why it was good, that's why they had ditches on the marsh. Some places didn't have ditches and the grass was about that high.

Ditching the heavy, waterlogged marsh soil would have been extremely labour intensive. For that reason, ditches were usually dug to take advantage of natural watercourses, such as small creeks. A well-drained marsh was considered cleaner than one with clogged ditches and standing water. The installation of drainage ditches had the effect of replicating the growing conditions of a higher marsh zone where more preferable grass

species for making salt hay grew. Ditched marshes also gave farmers access to their marshland holdings more quickly after the tide receded, thus increasing the efficiency of managing this natural resource.

Participants observed that mowing the marsh each year also kept it clean and more agriculturally productive. Edward Warner cautioned that “if you don’t mow it every year, the next year all that old grass, like we say, it was still on the marsh. And it’s hard to cut. Because that old grass is dead and this new grass takes over. But the old grass is just laying there, so it was very hard to mow.” This notion that a mowed marsh was a ‘clean’ marsh, and far more productive than one left uncut, served to benefit those farmers who had limited use-rights to marshland resources. Rudolph Muise remembers that if an owner of a marsh was:

Away or somewhere they never used the piece of marshland. So they would let these people cut the hay and keep it clean huh! Like any other field now. Some people don’t use it. They let some other people. Marshland was the same thing then. Marshes had to be cut so they would grow the next winter. Now it’s no more. It just grows and dies and that. The only thing that it’s good for now is the wild minks and muskrats and this and that.

In general, the Argyle Township participants indicated that harvesting salt hay had been positive for the human community as well as the marsh environment. However, there was the acknowledgement that the marshes could be negatively affected by certain agricultural practices. In most situations, grazing livestock was not considered to be a good management practice, since the weight of the cattle on the soft marsh soils punched holes in the surface where water could not drain. Heavy farm equipment, such as wagons

and tractors also could leave ruts in the soft marsh soil that filled with water and stagnated. The participants noted, however, that salt marshes are highly resilient environments. Over time, with each high tide, deposits of incoming silt repaired the negative impacts of these anthropogenic changes in the marsh environment.

The Argyle Township accounts suggest that an ethic of conservation, similar to that practiced at the household level, was extended to marshland resource management. An applied ethic of “not wasting” meant that everything that could be used on the marsh was used. Edward Warner remembers that his family cut the grasses on their marshes “right to the edge. Right down. Yup. Sometimes we had to reach down and cut everything we could. Then before the tide comes up we had to rake it up and bring it up on higher ground so the tide wouldn’t get it.”

The Argyle Township interviewees agreed that making salt hay was more than merely a methodical or technical exercise to procure a necessary resource. A great deal of care was employed, from mowing the grass to the precision in stacking the hay. As we hear from Edward Warner, there was absolutely no room for sloppy workmanship: “When you make the haystack if she’s well made it will never leak. When you go get it, its just as dry and nice as can be....But if its not made right ...if there’s a little hole in it like, then the water goes in there and it ruins it.”

The Argyle Township interviews indicate that there was a fair degree of variation in how salt hay was fed out to livestock in this region of the province. Leonard Surette, whose family did not own any upland hay fields, recalls that salt hay comprised the entire winter diet of their cow and ox. Meanwhile, farmers who had access to upland hay, tended to utilize salt hay to supplement or stretch out their better quality hay. Some

farmers fed salt hay to their cattle because it made them drink more water during the winter months, which was considered beneficial to the animals' health.

3.2 Hants/Colchester Accounts:

The Hants/Colchester participants spoke of how the salt marshes were integral to the management practices on many of the region's farms, from the early to middle years of the 20th century. By and large, the grass-like flora of the salt marshes was seen as a resource for the taking. A conserving ethic was expressed in terms of using everything that was available—of not being wasteful. Mildred Burrows expresses this ethic when she states “We’d cut it all. All that we had. And ours went ...the creek was on one side of it, and the steep hill was on the other. It went very abruptly into upland. So there was no change in the level of the marsh at all. And we cut every bit of it that we owned.” John Barkhouse’s family managed their marshland resources in a conserving way by grazing their livestock on the marshes after they had mowed everything they possibly could:

After you cut the hay off, well then there was a lot of hay you couldn’t get; soft spots and black grass and whatnot along the dyke. [We] couldn’t get in there with the mower, so Dad would take the cows in the morning and drive them over there....[We] never wasted anything, and the horses and cattle would go over there and they would eat what we didn’t mow.

In the Hants/Colchester County region, salt hay was harvested anywhere between the middle of July to the beginning of September. As with the Argyle Township accounts, the Hants/Colchester participants indicate that the timing of the harvest was driven more by economics than concern over the marshland environment. James Card recalls that most farmers harvested their salt hay “after they had put up their upland hay.

And they had to do it between the tides....Upland hay was considered to be a lot more valuable. And you wanted to get it at its zenith, when it was best. We didn't pay much attention to the maturity. It didn't seem to be as important as with the upland grasses." The tendency to consider the feed value of salt hay as secondary to the value of upland hay or silage continues to hold true for present-day farmers such as Philip Nunn:

We harvest our forage in progression to where its economic importance to the farm. So in mid-June I'm doing silage and forage for the dairy herd, which I definitely have to get done. We then start into what I call the dry hay forage, which is our upland hay that is going to deteriorate relatively quickly a long towards the first part of July. If we have good weather and we're through harvesting the upland hay, say by the middle of July, then we're looking at dykes and trying to figure out when the tide is going to be over them.

From the early to middle years of the 20th century, labour—a significant input cost in salt hay production—also needed to be factored into the decision-making mix of how farm work was prioritized. At one time labour costs were mitigated by the fact that the farm family mostly comprised the workforce. While the advent of tractors and other mechanized harvesting equipment has changed that, farmers like Philip Nunn and Lois Brown must now factor in the costs of operating heavy machinery when considering the economic feasibility of harvesting salt hay.

However, while economics played a major role in ordering the annual cycle of farm work, environmental factors could not be ignored. The imperative of a successful salt hay harvest meant that a farmer had to be attuned to the rhythms of the natural environment, as well as cognizant of their meaning. James Card tells a story of some

modern-day farmers whose lack of regard for traditional ecological knowledge resulted in the loss of their entire harvest:

Depending on the moon when you could salt hay. And then the tide wouldn't come and take it away over night. Here a couple of years ago, some fellas got the idea that they would cut some salt hay to supplement their English hay, English hay just means cultivated hay. So they went out and cut a whole big acreage of salt hay, and that night the tide took it all out to sea....They learned their lesson. The next year they cut it at the proper time and it didn't go out to sea.

A high tide was not only capable of carrying an entire season's harvest out to sea, or rendering a dry marsh impassable, a high tide at the wrong time was also thought to reduce the feed-quality of the hay, and the extra mud damaged harvesting equipment. Mildred Burrows remarked on the importance of watching "your tides, to know when was the best time. Because once it came in...[the marsh grass] was covered with silt, and the cows didn't like it nearly as much as if you could get it before the high tides in July." For similar reasons James Card spoke of need to be precise when making salt hay:

That's another thing that set the time of harvest. You harvest it after the upland hay was finished, and you had to harvest it between the high and low tides, and you also tried to harvest before or ahead of a big series of high tides, because that deposited all this mud on the hay. And it made it extremely dusty to handle. And probably put more salt mud inside of the animals then they really needed. And the farmers didn't like to handle it when there was great clouds of dust flying off of it.

While farmers aimed to time their harvest so that it would coincide with a course of low tides, they also needed to keep an eye on weather conditions. The skill required to juggle these assorted environmental factors is evident in the following excerpt from Philip Nunn's interview:

When the hay is harvested you have to basically work with two or three elements as you are doing it. One...the tides have to be coming at the right heights....The tides are influenced, not only by the moon and the cycle of the times, but also weather conditions....We would prefer that after the high running tide has flooded the salt hay that we have a good rain or two in between before start harvesting to wash some of the silt off of the grass, both from the aspect of making the quality hay and from the aspect of we don't want to abrade a lot of our equipment.

Farmers' expressions of ecological knowledge were not limited to responsive behaviours such as watching the tides and weather, but were also indicated in the active engagement of shaping the natural environment to make it more productive for human needs. The construction and maintenance of the many ditches that drained the marshland exemplifies this social-ecological linkage:

Well, they had to ditch. They had to make ditches in them as a rule, so as to drain the [marsh], especially where the fresh water ran down the hillsides onto the marshes. There had to be a ditch there to drain that away. There were usually runs on the marsh, you followed them so as you didn't have to dig too deep. You followed the run, where the water naturally flowed off, and made a ditch there. And you dug the ditches with a spade. A digging spade, or marsh spade....Once you made a ditch it lasted for years....And for that reason it's common to make

one main ditch from the sea into the upland and then drain other ditches into that one. Rather than making all the ditches full depth clear out to the sea. (James Card).

As with the Argyle Township participants, the Hants/Colchester interviews suggest that making salt hay demanded a high degree of skill. A well-constructed haystack was emblematic of the care, precision, and pride associated with farming well during the pre-industrial era. James Card recalled there being:

Certain individuals [who] were noted for their ability to build a stack that would shed the water. Ah, Will Reynolds was one of the fellas that was noted for doing that. Even Raymond Sanford used to go and get him to go and do his stacking for him. For one thing he was too lazy to do the hard work on the ground, but he could stand on top of the stack and push the hay around and make stacking. He did a great job that way. Well, it was sort of a specialist thing I guess.

Overall, salt hay harvesting was considered by the Hants/Colchester participants to have had a beneficial effect on the marsh environment. James Card noted that marshes that were not cut for “several years [were] a lot tougher to cut, and had a lot of old dead stuff in it from previous years. Held a lot more mud. So if it was cut every year you got a lot nicer, greener hay.” Similarly, Philip Nunn found that “a marsh that is regularly harvested has a tendency to predominately be the finer grasses that you would see as opposed to some that are unharvested where some of the couch grass and some of these other areas have a tendency to predominate over the brown top grasses that you’re looking for.” Lois Brown asserts “it’s better to cut them and graze them than it is to leave them, I would say. They will come up in all flat grass after a while, or this coarse

old stuff that's really, really bad, and no good for nothing. And then it will all fall down and then it will just be big clumps of old dead, like dead hay or straw there."

While grazing livestock on the marshes was considered by some of the participants to have been economically prudent, opinions varied as to the negative impact grazing had on the salt marsh environment. For example, James Card believes that:

It was good for the animals to graze the marsh because they could graze all the parts of the marsh, no matter whether it was hard or soft, or high or low. Or what kind of weeds grew there, they could munch on them. And they never got poisoned ever. And I guess it did them good. It didn't do the marsh good. Their hoof prints destroyed the sod on the marsh. The marsh simply cannot stand to being pastured.

Philip Nunn expressed the opinion that the extent of damage from grazing livestock depended upon variables such as stocking rates and the physiography of the marsh:

I think personally I believe we get some damage from livestock grazing on the marshes....I think is directly proportional to how intense those marshes are grazed....I don't believe it's very detrimental to the marshes if it's done with minimal numbers. I think usually it's a combination of over-grazing and soft conditions that have a tendency to do some damage to the vegetation....When the sod is broken for whatever the reason on these marshes there has a tendency for weedier or couch grass or something to vegetate into those areas.

Meanwhile, Lois Brown asserts that grazing livestock on the salt marshes associated with her farm has had beneficial effects on the marsh's productivity:

But our own marsh here, I noticed since we came here, it hadn't been pastured for years before we came here, and I find now that the cattle have been walking on it and eating everything off of it, that its...the hay or grass that comes up on it now is much nicer. There's no old, dead stuff down at the bottom. The cattle walk on it and when the tide comes in it washes the old stuff all out, and its quite nice, even looking grass comes in it now. I think working it, or the cattle walking on it lets the air into it. Because the mud...the soil I should call it is quite baked or packed like sort of thing. Its very fine soil.

The divergence of opinion expressed in these interviews may be attributed, in part, to the high variability in the physiographic characteristics of the marshes in the Hants/Colchester region—softer marshes being far more susceptible to damage from trampling than higher and drier marshes. While there was general agreement amongst the participants that marsh ecology is highly responsive to anthropogenic influences, they also observed that salt marshes are highly resilient ecosystems:

I had the cattle out there, then I stopped for a few years, and the cows had punched some of it. And I went back about four years later and you would never know that there was any animal out on that marsh because the mud comes in on the tide and lies in the holes and fills the place up. And I've made tracks out there with the tractor and then I stayed off it for a couple of years, and I was looking the other day...ah, a month ago, and you'd never know a tractor was on that marsh. It fills in, the mud you see.... There's some places the grass hasn't come back yet, but it will eventually if you leave it. (John Barkhouse)

3.3 Wallace/Wallace Bay Accounts:

Shore hay was cut later in the season than upland hay. Because the shore was still subject to tidal inundation, precautions were taken during a harvest to ensure the hay did not get wet or carried away by the tide:

The old fella cut it with the mowing machine and the horses. And then he had an old one-horse rake. It was made out of all wood, except the teeth, they were steel. It had a handle on it. And that's the way we used to hay when I first come there. And the rake, you could go so far and then you'd lift the handle up, and then you'd put it back down and rake some more. And then you took the hand fork and you piled it up on the upland. (Elmer Mills)

And it was on that shore where we made the hay. We had to rake it all up on the top of the highland. We'd stook it there, and let it dry out. It always had to be raked in. We couldn't go on and rake it, you had to rake it up...go out and rake it in, rake it in. Which is what we did. We took the horse rakes and raked it in. And you went out and picked it up and brought in and go back out and get another rake full and bring it back in and bring it in. So it was...when it was all done it was all up on the highland on top the shore above the tide. [We] made stooks out of it and let it dry. Stook it up, and let it dry. It might be out there for two or three weeks. Then it would be dry and you'd haul it off and store it in the barn. (Graham Brown)

Both participants indicated that shore hay played a specific role in their farms' respective management practices. It is of interest to note that these two farms managed

their marshland resources very differently when it came to feeding practices. On Elmer Mills' farm, his adopted father:

Would start feeding [shore hay] to the cattle around about, we'll say December, or coming on. He always had the cows so they would freshen in the spring. He had them bred. They would feed too much of this salt hay to the cattle, just a little bit. They still had the other hay, the upland hay. And he also fed them turnips. He figured the salt hay was to make them drink goodBut he saved that till, like I say, a month or two before the cows started to have their calves.

In contrast, Graham Brown recalled that his father “usually fed [shore hay] to the young stock; maybe one feed a day or something like that. We didn't plan on feeding it to the heavy milking cows or anything like that, but young stock would eat it....Well, it would keep them alive until spring.”

3.4 Discussion:

A comparison of the management practices utilized by the farmer-participants in this study reveals many similarities in the technicalities of harvesting salt hay in the three marshland regions. Up until the time the use of fossil-fuelled machinery became more commonplace on Nova Scotian farms, the material culture and methods utilized in the production of salt hay varied little across the province. These accounts also indicate the importance of having a working knowledge of salt marsh ecology, which appears to have been subject to the intergenerational transference of traditional ecological knowledge. Wendell Berry (1983) speaks to the value of intergenerational knowledge in farming when he says “to live fully in its own possibility...may take hundreds of years” (Berry,

1983, p.71). “Length of memory” asserts Berry is key to remembering “previous mistakes, failures, and successes. [So that] the land would not have to pay the cost of trial-and-error education for every new owner” (Berry, 1983, p. 78). In the context of salt hay harvesting, having a long memory was a matter of economical efficiency. The price for neglecting to remember “previous mistakes, failures, and successes” is clearly evident in James Card’s story of the farmers who cut their hay during a course of high tides and lost the entire crop to the incoming tides. The Wallace/Wallace Bay accounts also make us aware of what can be lost with a gap in just one generation of knowledge transference. Both Elmer Mills and Graham Brown were limited in their ecological awareness at the most basic level—knowing the names of the plants on the marsh. Ironically, Graham Brown’s father, Harry R. Brown (1973) not only provides one of the most detailed descriptions of harvesting salt hay in his book *The Valley of the Remsheg: A history of Wallace Bay and a genealogical record of the descendants of the six founding families*, he also identifies the names of plant species comprising the marshland environment he knew so well. All this would seem to support the notion that traditional ecological knowledge and its associated values are inevitably lost to the processes of modernization and the technological changes of industrialized agriculture. However there is also evidence in these accounts showing that modernization does not necessarily preclude the valuation and application of traditional ecological knowledge in natural resource management practices. Philip Nunn is clearly one example of a farmer who makes a point of straddling the divide between the traditional ecological knowledge handed down from the old-time farmers, and the scientific knowledge required to participate in today’s agricultural sector.

THEME FOUR: WHY WE MADE IT WORK—EVALUATING THE RESOURCE

4.1 Argyle Township Accounts:

All the Argyle Township participants spoke of the salt marshes as having been highly valued by farmers during the early to middle years of 20th century. Many of the people living in these small, coastal communities kept cattle during this time, and “if it hadn’t been for the salt marshes it would have been extremely difficult and sometimes impossible to keep your cattle in the winter” (Hayden Landry). In this region, agriculturally suitable land is very scarce, whereas “there [is] a lot of marsh, a lot!” (Anna Bourque). The value of the salt marshes were in providing an abundant source of free livestock feed to a segment of the province’s rural population that was, by and large, agriculturally disadvantaged and economically depressed.

While several participants felt that salt hay was not very palatable for their livestock, and that its value was in keeping their animals alive through the winter; other participants observed that their cattle liked salt hay, and did well on this feed. Several participants speculated that salt hay was a source of minerals for their cattle, and that in the absence of commercial salt licks and mineral supplements, salt hay provided necessary dietary components that were otherwise unavailable. It was believed by some that if you fed your cattle salt hay they would not get sick.

While salt hay was primarily valued as a livestock feed, several other uses were identified including: mulch or cover for strawberries, banking one’s house for insulation in the winter, bedding for livestock, and as a soil enhancer when applied as compost in combination with rockweed.

4.2 Hants/Colchester Accounts:

Several Hants/Colchester participants made the point of saying that salt hay was 'free', or at the very least it was considered an inexpensive feed to produce. Salt hay production did not require the input costs of cultivation and fertilization associated with domestic hay production. The only costs incurred in salt hay production were labour, and in later years the operating expenses associated with mechanization, such as fossil fuel and machinery repairs. In this way, utilizing salt marsh resources as part of the livestock-feeding regime reduced a farm's overall expenditures: "The income from the farm wasn't enough to buy much feed, but if you got free salt hay, that helped quite a bit. And in those days you didn't go to the store and buy salt blocks or commercial mineral mixes. You just used salt hay, and the animals got it for themselves" (James Card).

Several participants noted that salt marsh flora matures much later than domestic grass species, making it economically feasible to harvest salt hay later in the farm season than upland hay. Philip Nunn observed that "salt hay has a tendency never to go to the end of maturity in terms if you were comparing it to upland hay, because of the fact it gets flooded and set back so often....From that aspect it doesn't go beyond its maturity as quickly as say for instance timothy grass would." John Barkhouse had this to say about the keeping properties of salt hay: "Salt hay will keep...you can put it up greener than upland hay because upland hay will mould. Salt hay won't mould because it's got salt in it. It will keep. You've got to have salt hay pretty wet before it won't keep." In addition to the keeping properties of the later maturing salt marsh flora, the hydrological properties of salt marshes made them especially valuable to farmers during droughts: "One thing about the marsh, if you have a very dry year, well part of the marsh, every

fourteen days the tide comes over it, replenishes it, makes it wet. And the upper marsh every twenty-eight days. So if you had a dry summer, your marsh...it saved you, see” (John Barkhouse).

Several of the Hants/Colchester participants asserted that salt hay had important nutrient and medicinal properties that were not present in the upland hay but, in the absence of commercial mineral supplements and anthelmintics, were necessary to the health of their livestock. For example, James Card believed that salt hay gave his livestock “access to the minerals and salt that they didn’t get the upland hay....It just increased their over all health.” In addition to the minerals that were considered to be present in salt hay, Philip Nunn observed that feeding salt hay “keeps cattle drinking enough water in the winter cold conditions to maintain the proper body regularity.... Sometimes when cattle have a tendency to be chilled, or in colder conditions where their body heat is being conserved, they tend not to consume enough water to utilize the feed that is going through them.” Both Philip Nunn and Lois Brown also remarked that salt hay assists in maintaining a low parasite load in their livestock:

I’ll tell you the reason first, the reason we done it and it was so important. It was mostly for the purpose of de-worming your animals, that’s what Dad always claimed it was for. And that was what we used it for mostly....I can’t remember my dad ever de-worming the cattle. You didn’t have your Ivomec you have today, and Tremisol and whatever else you use for your sheep. I can’t remember, I don’t think until I was maybe a grown up girl, of him ever getting wormer. And that’s when he didn’t use salt hay anymore. He started to get wormer for his sheep. But I think it must have served the purpose, we always had nice big fat

animals. And never had to go to the vet or anywhere and buy the stuff. (Lois Brown)

These perceived nutrient and medicinal properties meant that in many cases salt hay was not fed out as the mainstay of an animal's diet, but was rationed as a supplement feed, or only fed to specific animals. As with the Argyle Township accounts, opinions varied between the Hants/Colchester participants as to which livestock benefited the most from salt hay. While James Card believed that "pregnant animals probably benefited by it more than others," Philip Nunn reported that:

Very seldom do we use salt hay intentionally for adult animals, mainly because we just don't have enough. I use it predominantly in the smaller cattle in that it goes a lot further. As an animal matures it eats more tonnage of feed....And if my theory is correct that we are getting some benefits from the mineral content and this type of thing, its probably more essential in growing animals than it is mature animals.

The Hants/Colchester participants also mentioned that salt hay was useful in insulating outbuildings, and enriching animal manures, thereby adding nutrients to a farm's upland soils when applied as fertilizer. Having a supply of salt hay also meant that some farmers were able to sell a portion of their upland hay as surplus, and generate additional farm income.

There were very few negative attributes associated with salt hay. John Barkhouse identified the issue of salty tasting or marsh-tainted milk, while Gordon Knowles believed that salt hay was not nutritionally sufficient as a feed for dairy production. One participant pointed out that the dust in salt hay was detrimental to the

health of horses. Another participant was adamant that salt hay was not good bedding for livestock. While the costs associated with salt hay production were considered by all the participants to be relatively low when compared to upland hay production, harvesting salt hay was considered to be hard on farm equipment. John Barkhouse found that he “could cut fifty ton of upland hay and still use the blades. [Whereas] you cut five ton of that stuff down there and its just like hay wire. You’ve got to replace your blades. Oh yes, it’s hard on equipment.”

4.3 Wallace/Wallace Bay Accounts:

The Wallace/Wallace Bay accounts also indicate that there was variability in perception of salt hay’s value to the farmers in that region of the province. Elmer Mills recalled that his adopted father used shore hay as a conditioning feed for pregnant cattle. He observed that feeding the marsh hay to cattle not only made them drink more water, which was considered beneficial especially during the colder months of the year, it was also considered to have “quite a bit of nourishment” for the cattle. By contrast, Graham Brown asserted that shore hay was of little value for high producing animals such as dairy cattle. On the Brown farm shore hay was used to stretch out their upland hay supply, and was only fed to the young stock to keep them alive during the winter months. As Graham Brown recalls, it does not appear the young stock fared all that well on shore hay, suggesting its nutritional value was not very high:

I can remember my Dad saying that the young stock you’d have to help them to their feet in the spring of the year until they got to pasture, because they just didn’t have enough strength to get up.... Well they didn’t have enough quality,

yeah, because they practically lived on the stuff all the year round. Whereas, of course, the milking cows they wouldn't live on that year or day round. (Graham Brown)

Aside from its use as livestock feed, neither participant mentioned any other use for the shore hay.

4.4 DISCUSSION:

Salt marshes were valued for their natural ability to regenerate without the aid of fertilizers or the input costs associated with cultivation. This 'free' source of livestock fodder enabled many of the participants in this study to maintain far more cattle than would have otherwise been possible, given the limited capacity and uneven distribution of agriculturally suitable land in Nova Scotia (Troughton, 1988). Moreover, salt marshes made it possible for farming households and rural communities to survive, and in some instances thrive, during an historical era in which Nova Scotia's social welfare system was woefully inadequate to respond to rural poverty (Guildford, 2005). In this way, salt hay harvesting fits within the general patterns and principles of ecologically sustainable resource management practices that are adaptive to both social and environmental uncertainty and surprise (Folk et al., 1998). The inter-regional and intra-regional variability that was expressed by the participants in this study, regarding the perceived nutrient value of salt hay, and livestock feeding practices may be partially explained by the differences in salt marsh flora that was available to each farmer. In addition, research has shown significant variability in the productive levels of various breeds of livestock fed a diet largely comprised of salt marsh forage (Whyte, n.d).

THEME FIVE: THE TIMES THEY ARE A' CHANGING

5.1 Argyle Township Accounts:

The Argyle Township participants pointed to the Second World War as the time when demographic and economic changes brought about the decline of farming in that region of the province. Hayden Landry noted that when “all the younger people joined the army...it didn’t leave that many able bodied young people on the so-called farms to do the salt hay. And so a lot of the older ones who stayed at home eventually either got rid of their cattle or just fed them sweet hay.” The Second World War was also cited as bringing about new employment opportunities that, according to Lawrence Doucette, improved the lives of the people: “The money was coming in when the war started. Yeah, in thirty-nine, when the war started, cause they were making the airport and there was work, you know what I mean. Just this time it started, it was getting better then.”

Increased employment opportunities also contributed to the shortage farm labourers; a situation that did not reverse once the war ended, when the youth and able-bodied of these small, rural communities did not return to farming, but immersed themselves in the new opportunities that emerged from of a strong waged-based economy (Connor et al., 1965). As we hear from Rudolph Muise, some of the new job opportunities continued to entice people far away from the region:

When I was old enough, like forty and fifty years ago, that’s when work was started in Goose Bay, Labrador. That’s where I ended up, you know what I mean. In my early twenties then. Everybody was going, why not me?... But everybody was heading there. That’s why everybody left these little farms. [They] wanted a little more money.

The war years also coincided with dramatic changes in technology, which in turn impacted how work was conducted on farms. The advent of the pneumatic tire is a case in point: "When the pneumatic tire came into use, instead of having the very narrow wheels, they replaced them with the rubber tires, which enabled them to go on the marsh right when they cut the hay. So instead of piling it up on the marsh they'd haul it by the barns" (Hayden Landry). As tractors and other farm machinery became more available to farmers, farm productivity increased and the need for labour decreased. The large labour pool once required to accomplish most farm work, was replaced by individually operated machinery and relatively inexpensive fuel. Ironically the convergence of a decreased need for agricultural labourers and an actual labour shortage did not stem the tide in the decline of farms in this region of the province. Rather, the amount of improved farmland continued to decline both in absolute and relative terms (MacKinnon, 1991). Both MacKinnon (1991) and Boucher (1974) point to global economics and technological changes in the fisheries as cause for the absolute decline in farming in this region:

In a rapidly changing world, the Acadian fisherman with his wooden sailing ship was no competition for the iron and steam vessels used by the American. The fish markets, like many others, were now under control of large corporations, which favoured the most efficient way of obtaining large quantities of fish. This could be called the beginning of the end for the Acadian fishermen, for by 1940s, few if any were still fishing off the New England coast as their fathers had done (Boucher, 1974, p. 69).

Since fishing and farming had traditionally been complimentary occupations for a large number of Argyle Township's rural population (MacKinnon, 1991), a contraction in the

fisheries would have most certainly impacted the life-chances of farm families and been at least one factor that compelled the youth and whole families of that region of Nova Scotia to emigrate to the United States, where secure or at least better paying employment opportunities could be found (Boucher, 1980). By 1954, when Hurricane Edna struck the coastal region of Argyle, salt hay harvesting and farming had all but come to an end. Melvin Landry tells us that:

In 1954 there wasn't a thousand haystacks there. Maybe there was just eight, ten haystacks. It had been decline hey.... There was a lot of cattle in the twenties, thirties, and forties. A lot of cattle. Everybody had one or two or more. You had to have the hay. But it started to go down. And in 1954 I believe, I don't know how many they lost, but they only lost maybe eight, ten haystacks. So it had been declining for a long time before that.

While the shift from semi-subsistence farming and household-based economies to a globally integrated, waged-based economy was generally viewed by the participants in this study as benefiting the people of their communities, these accounts also suggest that something fundamental to the social and cultural fabric of these small, coastal communities was lost in the process. Participants' comments suggest that farming had not only been a means by which people made their living, it had also been a source of cultural identity and community cohesion. As we hear from Anna Bourque, the decline in farming marked a shift in how rurality was constructed: "Now it doesn't feel like country....nobody plants now, just a few here and there that plant a little garden in the summer. Yup, before every house had a big garden." Even more than the structural changes that came about in the wake of the Second World War, it was the perceived loss

of values and community capacity that were particularly troubling to the participants.

While Anna Bourque laments that “now a days, the young kids of today wouldn’t know how to make a garden or nothing,” Rudolph Muise derides the modern-day, sportsmanship hunters who “come from everywhere and...scare all the birds away and they don’t come back.” Meanwhile, Leonard Surrette notes a change in behaviour of some community members that could never have existed at a time when households depended for their survival on sustaining a healthy salt marsh environment: “The three-wheelers or four-wheelers, Jesus, they’ve ruined everything. I mean [the marsh] its all full of holes and now them holes there got no bottoms huh. Oh Jesus, I mean, it’s a good thing that we didn’t have the four-wheelers then because we would never have been able to get the hay from the marsh.” Several participants also made a point of mentioning that much of the marshland of that region is now owned by Duck’s Unlimited rather than by local residents. In sum, there was a high degree of ambivalence about whether the social and cultural changes that had occurred since the middle of the 20th century, and that were marked by the decline in salt hay harvesting and other agricultural practices, were more good than bad for the communities of that region. At present, salt hay has taken on a new cultural value within several of the Acadian communities of Argyle Township. Through historical re-enactment and celebration, the organizers of the annual Festival de la Barge have set the goal of “keeping our heritage” (Melvin Landry) as their main objective. According to Melvin Landry, a video made at the first Festival de la barge in 1998 has been presented in all the French-speaking schools in Nova Scotia and New Brunswick. It is in this manner that the traditional knowledge and practice of salt hay harvesting is being passed on to yet another generation.

5.2 Hants/Colchester Accounts:

The Hants/Colchester participants indicated that over the course of the 20th century, the methods and objectives of farming changed dramatically in their region of the province. While agriculture continues to the present day to play a role in the economic, social, and cultural realities of this region, these interviews indicate that, over all, farming is in a state of decline. The reasons cited by the participants for the decline in agricultural viability ranged from recent events, such as the devastating impact that Bovine spongiform encephalopathy (BSE) has had on livestock producers: “I got out about six months before the price dropped. And the people who are in it now, you’ll see a lot of them, they’ll wait till the price goes up a little more, and they’ll go out of it and they’ll never go back into it again. You’ve got to be big or you’re out. Go big or go home” (John Barkhouse), to a more encompassing view of the social, political, and economic events that marked the 20th century, which saw a precipitous decline in farming in all regions of the province:

By 1951 there were only 23,515 working farms in Nova Scotia. This total was 25 per cent below that of 1851, and there was 20 per cent less improved land than 100 years before. In 1951 perhaps half of all Nova Scotia’s farms were part-time or semi-subsistence operations....In 1971, there were approximately 6,000 farms remaining in Nova Scotia, just 25 per cent of those enumerated two decades earlier (MacKinnon, 1991, p. 246).

While MacKinnon (1991) notes that specialty dairy farms, which comprised more than forty per cent of Nova Scotia’s farms by the middle of the 20th century, helped to

make agriculture a more viable option in the province's farming regions "scale changes in production and marketing had undermined the viability of small, family-run farms and externally-owned agribusiness corporations had consolidated large tracts of farmland in the province's best farming districts (MacKinnon, 1991, p. 261). The trend of commodity production is continuous expansion. In the case of dairy farming, a farmer's ability to expand was not only tied to the limitations imposed by available land resources, but also to the financial means to buy production quota. On farms too small to justify expansion, many farmers turned to off-farm employment as a means to keep operating. Sinclair (1984) notes that "by 1976, those farmers with substantial off-farm employment...amounted to about 25 percent in all [Maritime] provinces" (p. 284). Gordon Knowles' family's farm appears to fall into this trend:

[After the War] my brother and I were in partnership. We were completely in a dairying business then. I farmed with him until we both retired about the same time, that would be probably sometime in the 1970's probably.... My nephew is running the farm now....He's got rid of the dairy and went into the beef. And to supplement his income he's a heavy equipment operator in the gypsum quarries here. So he's really just a part-time farmer now.

Meanwhile farmers like Philip Nunn, who continue to try and make a go of full-time farming through a combination of commodity production and diversification are feeling evermore squeezed out of agriculture as rising production costs outweigh the low returns for their effort. In this context, even the relatively low-expense production of salt hay is in question:

Farming in the last 28 years I guess in general hasn't been too viable....Input costs in general in this 2005-year have probably been up twenty-five to thirty percent for the farm. And with the post-BSE crisis in the livestock industry, probably our returns are down another thirty percent. So if you take a thirty per cent reduction on one side and add a twenty-five or thirty per cent increase on the other side, it makes a fairly significant adjustment in the financial end of it. So this particular 2005 has been a bad year in terms of the economic aspect of doing salt hay. (Philip Nunn)

In addition to the ever increasing expenses associated with commercial-oriented farm production, many of the farmer participants in this study noted that the methods of mechanization associated with industrialized farming practices did not lend themselves to the environmental conditions of most salt marshes: "Heavy machinery was not applicable to the salt marsh to any extent. You couldn't go out and use balers on the salt marsh much. I've been stuck a good many times on the salt marsh trying to use baler on it." (James Card). Changes in farm practices were gradual at first, as early models of farm machinery were often found to be less efficient than more traditional harvesting methods:

In later years we had an old Ford tractor it was like fifty some...it was in the fifties, that tractor was a fifty-two or something like that. A little, small, wee, Ford tractor but it couldn't...like you done a lot of shovelling with that. And in later years he got chains on it, before [my father] started to get enough money ahead that he could get a better tractor. But the first tractor we had was a wee, little, tiny, Ford tractor. It was so tiny the wheels were about the size of truck

wheels. It was really not very good. The horses done better out on the salt marshes. (Lois Brown)

Eventually though, machinery prevailed and harvesting salt hay was considered to be less and less economically viable on most farms.

Fossil-fuelled machinery also had a tremendous impact on the extent of marshland dyking that occurred in the farming regions associated with the Inner Bay of Fundy. By the middle of the 20th century, the convergence of technological capacity, political will, and government funding saw many salt marshes in the Inner Bay of Fundy converted into tidally restricted holdings (Milligan, 1987) Mildred Burrows remarks that exchanging the productive capacity of marshland for dykeland was a positive move for her farm:

Well certainly there was the one when the 'bateau' went in, because we didn't have to worry then about when the tide came, it never come up. That made a great change. And we could go onto whenever we wanted to, whenever the weather was good. That was the biggest thing. And then the fact that it certainly changed the grass that grew. Those were the big change. [...] I don't think they regretted the passing of the marsh grass that much. I don't think that it was any particular benefit. Except that the cows did enjoy it. But it was good mainly because it meant that you could get your marsh whenever you wanted....I think it would be, well sometime maybe in the 1950's (Mildred Burrows).

These interviews suggest that farm mechanization's greatest impact was on upland farming methods, rather than directly on the marshes themselves. A couple of participants could well remember when much of their family's farmland was still

wooded. To clear fifty-acres would have taken many years of human or animal powered labour. Fossil-fuel mechanization changed this, making it possible to clear hundreds of acres in a very short time period. Farmers who had access to cultivatable upland could now grow larger rotations of protein-rich grain and the higher valued English hay then had been possible previously. In addition, these farmers no longer had to contend with incoming tides when harvesting hay, or the continuous repairs of dykes:

We didn't have an awful lot of acreage, and that was true of most of the farms.

Now a days when Lorne has those big machines, he can go in...well Jim in fact one year, he cleared about fifty acres in the spring—it was trees—and by August he had grain planted. But when you had to do it tree by tree and get the roots out it took a long time to get more upland free. And so there was the marsh, and the trees never grew on it, and it was just there. (Mildred Burrows)

James Card noted that as the natural advantages of utilizing the salt marshes became increasingly overshadowed by the newly released potential of deforested upland, salt hay harvesting, for the most part, became a thing of the past: “[Salt hay] sort of gave people a chance to get over the time when there was a shortage of upland to cultivate. As they brought more upland under cultivation, bulldozers and rooters came in, and they cleared quite considerable tracts of upland. And people had more to work with.”

In the end, the Hants/Colchester interviews indicate that salt hay harvesting has little economic advantage in today's industrial agricultural practices: “I don't believe in my lifetime I would ever see it economically driven again, or approaching the fact that people will be keeping livestock to the extent that they would actually want to get salt hay” (Philip Nunn).

5.3 Wallace/Wallace Bay Accounts:

As indicated in the interviews with Graham Brown and Elmer Mills, tremendous social, cultural, and economic changes occurred in agriculture in the Wallace/Wallace Bay region over the course of the 20th century. In general, this change can be described as a movement away from dependence on agriculture production, which was geared towards meeting the needs of the farming household, to an increased dependence on off-farm, wage-labour employment. The impact this change had on cultural values is expressed by Elmer Mills:

If you went out and got a job somewhere...seems as though you had more money. And then if you got more money, you're going to spend more money. And you know, you've got to keep up with the Joneses and have your driveway looking pretty good, and your house. One time it was no disgrace to have a bare floor. But today if you haven't got a foot carpet on it.

Elmer Mills also credited the car, and the increase in people's mobility, with the many social and cultural changes he witnessed during his lifetime.

The technological evolution, from hand-tools to animal-powered machinery to fossil fuel machinery, impacted the way farmers interacted with the salt marshes. The change in relationship between farmers and the salt marsh environment appears to have begun earlier in the Wallace/Wallace Bay region of the province than the other two regions in this study, since neither Graham Brown or Elmer Mills, both older than many of the participants from the other two study regions, had witnessed salt hay being harvested from the lower marsh zones: "But I can't remember them cutting it. It had to be

cut with a scythe because the ground was too soft for the horses to go out, away from the upland. And that was why it had to be cut with a scythe, and they piled it on these... But those stakes are all gone today. Washed away with time” (Elmer Mills).

Harvesting the shore hay was the last vestige of salt hay harvesting in this region of the province, and even this practice had become obsolete over the course of Elmer Mills’ and Graham Brown’s farming careers:

We didn’t get all that much hay off the shore; I don’t know how many loads. We might have got three, four loads of hay. That was just the shore. But the marsh was never cut when I come there. I come there in 1947 and it never was cut. [The old man] he didn’t bother. But he did cut it years ago. He was getting older and didn’t ... a lot of the farmers didn’t bother cutting it.... Well I never bothered with it. And at the last end of the old fellas life, he didn’t bother with it. Because you know, I guess I was doing the farming then. (Elmer Mills)

By the early 1970s both participants were no longer farming.

5.4 Discussion:

By 1941, farms in Wallace/Wallace Bay—a part of the region of the province identified by MacKinnon (1991) as the “mixed farming belt”—were noted for being more diverse in their production than farms from the dairy belt of Hants County, and far more productive than the “fishing zone” of Yarmouth County (MacKinnon, 1991). As indicated by the Wallace/Wallace Bay participants, local markets for products such as eggs and butter, as well as external markets for hay contributed to farm viability in this region of the province. Even so, neither markets nor diverse farming practices were

adequate to maintain overall farm viability much past the mid-point of the 20th century. As with the other two coastal regions represented in this study, the Wallace/Wallace Bay farms were part of a trend that saw, by 1951, farm production levels in Nova Scotia—both field crops and livestock—plummet to nearly the same levels they had been a hundred years earlier (MacKinnon, 1991).

CONCLUSION

A comparison of the farming practices in three salt marsh regions of Nova Scotia show many similarities in terms of the methods utilized for harvesting salt hay, during the early to middle decades of the 20th century. Well into the third decade of the 20th century, the common use of hand-tools such as scythes, rakes, and wooden poles indicate that farming practices had not changed all that much since the arrival of Europeans more than three centuries before. Rapid change occurred around the mid-point of the century when fossil-fuelled mechanization enabled farmers to increase production. Salt marshes, which had been highly valued by coastal farmers early on in the 20th century, as a source of low-cost, mineral rich, livestock fodder, lost their agricultural value when fossil-fuelled mechanization meant dyking hundreds of acres of marshland and clearing as much woodland took a matter of months instead of years or decades. However, change was not just structural in nature, but as the above accounts indicate, this period marked a watershed point in Nova Scotia's agricultural history, as the exchange relations of rural dwellers "transition[ed] from production for use to production for exchange" (Samson, 1994, p. 28). The impact of this transition was profoundly cultural, as the participants' stories indicate. Furthermore, these accounts show that Nova Scotia's agricultural history

did not unfold in an historical or political vacuum. At the same time the modernizing forces of technology were releasing farmers from the constraints imposed by their natural environment, the emerging political economy, marked by an increase in globally integrated markets, imposed new restrictions on Maritime farmers, which were, for the most part, beyond the ability of individual farmers to contend with (Murphy, 1990).

CHAPTER 5

A SYNTHESIS: ASSESSING THE ENVIRONMENTAL STEWARDSHIP VALUE OF SALT HAY

“Our relation to the natural world takes place in a place, and it must be grounded in information and experience” (Snyder, 1990, p. 39).

In this chapter I utilize the five criteria of environmental sustainability, as determined by Stewart B. Hill (1992) and outlined in Chapter two of this study, to provide a systematic way of assessing the environmental stewardship value of salt hay harvesting practices in Nova Scotia. In making a claim that salt hay harvesting has environmental stewardship value, it is important to keep in mind that this specific agricultural practice did not take place in a disconnected manner from all the other day-to-day, and seasonal tasks that routinely occupied farmers' lives. Thus, any value assessment of salt hay harvesting must be contextualized within the milieu of agricultural management practices that occurred in conjunction with it, and the social framework in which agriculture itself is embedded.

1) Meeting the basic needs of all people, and giving this priority over meeting the greeds of a few.

Participants from all three coastal regions indicated that, from the early to middle decades of the 20th century, salt marshes, which were a local source of free and abundant livestock forage, had been a valued resource for their own farms' production systems, as well as that of many of their neighbours. The participants' accounts indicate that salt hay harvesting retained its functionality and value, primarily, within the context of household or 'subsistence-plus' (Sebold, 1992) economies, wherein family-operated farms were

diversified in their production methods, and utilized “multiple ecological zones in the landscape” (Folke et al, 1998, p. 420). The rationale behind this agrarian strategy for managing human and natural resources “is the guarantee of an uninterrupted flow of goods, materials, and energy from [both] natural and transformed environments” (Toledo, 1990, p.55). The exceptions to this trend were the accounts of Philip Nunn and Lois Brown, both of whom currently operate livestock farms, and produce agricultural goods and services primarily in response to the dictates of a commodity-driven, market, economy. For the most part, however, the participant accounts in this study reflect a time in Nova Scotia’s agricultural history when farming was oriented towards providing sustenance to the farming household, and that a farm’s labour demands were largely filled by the very people who stood to benefit most from their own input. Samson (1994) reminds us that it is this form of relationship between labour and production that:

Marked life for country people—and defined it as ‘rural life—was their ability to exploit land or the sea, to produce for themselves a major part of their subsistence either directly (as food, shelter, and clothing) or indirectly through exchange, and their ability to obtain some measure of independence—derived either from their own resources or resources from which access was not restricted in this way—at least not deferring full dependence on waged labour. (p. 26)

This is not to say that this was an era in which Nova Scotia’s “rural residents enjoyed rough equality of condition” (Bittermann, 1988, p. 33). Despite the evidence that indicates salt marshes were highly valued by those farm families who settled many of Nova Scotia’s coastal regions, and that in some locales social mechanisms were in place to distribute use-rights to salt marsh resources throughout a community (Duncanson,

1985; Whitelaw, 1997), it is apparent, from the data collected in this study, that access to salt marsh resources was not evenly distributed among coastal farmers by the early decades of the 20th century. For example, in the Argyle Township accounts we learned that while farmers on Surrettes Island had to make do with marshland holdings that were adequate for producing three or four salt haystacks, another farmer in a nearby community owned enough marshland to make forty haystacks. In a similar fashion, the natural capacity for agriculture between the three salt marsh regions (MacKinnon, 1991) varied greatly. This discrepancy in access to land resources meant that some farms were able to maintain larger livestock herds than others, engage in commercial production and trade, and in some cases expand their production capacity. Meanwhile, other farm families, just a short distance away, struggled for their subsistence.

Just as significant in the evolution of Nova Scotia's rural reality is the disparity in equality of social conditions that occurred when industrialized farm technology and methods became more prevalent. Troughton (1982) has identified:

Four main processes at the heart of industrializing agriculture. The first was the tendency towards an increasing size of the production unit. The second process was an intensification of capital inputs such as energy, machines and chemicals. The third process was specialization of production, both crop and animal production. The fourth main process making up industrializing agriculture was the integration of farm production with other parts of the 'total food system'. (cited in Paterson, 1998, p. 119)

While it was noted by several participants that the use of tractors and other fossil-fuelled machinery increased their farm's production capacity, mechanization also

rendered other small-hold farms, with their diverse production methods, economically unsustainable. In these latter cases, instead of being able to direct their labour “to produce for themselves a major part of their subsistence....and obtain some measure of independence,” (Samson, 1994, p. 26), these one-time farmers were obliged to sell their labour, and in turn, purchase many of the same food items they or their family had once produced. And while several of the interview participants, particularly those from the more impoverished regions of Nova Scotia, asserted that the opportunities for waged-employment improved the lives of rural people, others noted a decline in many of the values and patterns of behaviour that had previously ensured generations of community continuity.

The sixteen participant accounts also draw our attention to the tremendous impact that fossil-fuelled mechanization had on the ecosystem functions and processes of Nova Scotia's salt marshes and their associated estuaries. Under the auspices of the Maritime Marshland Rehabilitation Act, “the advent of machines and government aid” (Milligan, 1987, p. 58) saw the dyking and drainage of thousands of acres of salt marshland, which radically degraded the integrity of this ‘keystone’ ecosystem (Cameron et al., 2000; deMaynadier & Hunter, 1997). Given that scientific inquiry into the complex nature of salt marsh ecology and functions has shown that “many of the real values accrue some distance from the marsh itself” (Gosselink et al, 1973, p.2), any benefits from this massive ecological perturbation cannot be said to have been distributed equitably, particularly if one considers the divergent interests of human communities and the biotic rights of extrahuman communities (Barrett & Grizzle, 1999). In this light, such radical anthropogenic changes to salt marsh ecosystems have not been held to account for the

total costs of their impact on the natural environment or the human communities that rely on the ecological goods and services tidally unrestricted salt marshes provide.

Furthermore, when the management of a region's natural resources transitions from localized or community-based approaches, to top-down management strategies (Berkes & Folke, 1998), studies indicate that the efficacy for protecting "diminishing species and disappearing or degraded ecosystems" (Zantell, 2001, p. 279) becomes questionable. The struggle between local strategies for managing natural resources and centralized management approaches is one in which the:

Central challenge for sustainable societies is [to] balance the individual use of shared natural resources with sustaining the "public goods" inherent in resources....Traditional knowledge...acquired through the accumulation of experiences and informal experiments, and through an intimate understanding of the environment in a given cultural context...can be an information base for a society, facilitating communication and decision making, and serving as a foundation for local institutions. (Becker and Ghimire, 2003, p. 1)

It is important to note that while Becker and Ghimire (2003) extoll the virtues of most traditional knowledge systems for their effective management of natural resources in the interest of the greater public good, they do not rule out the value of applying western scientific approaches to natural resource management.

2) Keeping population densities, if possible, below the carrying capacity of the region.

Managing salt marshes for ecological resilience and the sustainable production of amenities was of utmost importance to the farmer-participants in this study. Ecological

resilience refers to an ecosystem's ability to recover its full complement of processes and functions following a disturbance, while "sustainability is generally taken to mean that yield of goods and services from an ecosystem will not decline over time" (Haney & Boyce, 1997, p.2). Several of the participants noted that the intensive labour demands that came from using the primitive tools, which in many instances were all that was available to them up until the middle of the 20th century, in combination with the environmental restraints imposed by tide cycles and weather patterns, limited their production capacity, and by default, the anthropogenic impact that salt hay harvesting had on the marsh ecology. As Lawrence Doucette so poignantly remarked, when asked if he could recall there ever having been any dispute with someone else cutting hay on another person's marshland: "No, no, no. It was enough doing our own hay without going to the other guy's." It is not, however, the intention of this paper to suggest that ecologically sustainable farming practices can only be realized through the use of hand-tools and the sweat of one's brow. Wendell Berry (1983) reminds us that:

We would be wrong...to say that anyone who farms with a tractor is a bad farmer. That is not true. What we must say, however, is that once a tractor is introduced into the pattern of a farm, certain necessary restraints and practices, once implicit in technology, must now reside in the character and consciousness of the farmer—at the same time that the economic pressure to cast off restraint and good practice has been greatly increased. (p. 75)

What we can say with certainty, based on the participant accounts of this study, is that tractors and other forms of mechanization made it possible for some Nova Scotian farmers to increase their salt hay production and decrease their reliance on labour; and

that tractors and other heavy farm machinery could damage a salt marsh's soil substrate far more quickly and severely than humans, walking on a marsh with scythes, rakes, and wooden poles, would ever be able to. Given these two certainties, along with an awareness that Nova Scotia's agriculturalists have, by and large, followed the same economic imperative to 'get big or get out' as farmers and policy makers have from most other agricultural regions in North America, we can conclude that while tractors and other machinery had some applicability in salt hay harvesting, salt hay harvesting had very limited applicability in the capitalist driven, industrialized agriculture that typified the middle to later decades of the 20th century. While some of the participants spoke of using tractors, balers, and other machinery on the marshes, more often, the increase in farmers' reliance on mechanization appears to have resulted in the decreased use of tidally unrestricted marshes, and thus a decrease in the density of human populations on the carrying capacity of some salt marshes in Nova Scotia. However, in order to balance this ecological-economic equation we must also acknowledge the impact that mechanization had on wildlife habitat, and increasing the density of human populations on the carrying capacity of the upland holdings of many of the farms represented in this study. Moreover, fossil-fuelled mechanization in concert with the top-down policies and highly centralized administration of the MMRA (Summerby-Murray, 2003), can be said to have affected the ecological devastation of a large portion of Nova Scotia's salt marshes, and thus, over-all, caused an increase in the anthropogenic impact on the carrying capacity of Nova Scotia's salt marshes.

Several of the participants in this study indicated they regulated livestock densities when utilizing a marsh for grazing purposes. While grazing livestock on salt

marshes was considered by these participants to be an indication of a conserving ethic—of not wasting resources—other participants expressed strong opposition to this practice, as they had observed the damage livestock grazing could cause to a marsh's soil substrate, and the impediments this damage could have on marsh resiliency. Scientific research has shown that grazing livestock on salt marshes:

Is a major factor controlling the diversity in flora and vegetation between sites....The nature of grazing stock, stocking rates, and timing of grazing periods are all likely to have impacts on the vegetation...To the direct effects of grazing must be added the impact of trampling—both through damage to the plants and from the effects on the substrate....The response of flora to trampling damage depends, in part, upon the zone affected. (Adam, 1990, pp. 357-358)

In keeping with these science-based observations, some of the participants expressed the opinion that livestock grazing was ecologically sustainable as long as stocking rates remained low. Others stated that the physiography of a particular marsh or marsh zone dictated the feasibility of this practice. It is of interest to note that by impacting growth rates and species composition of marshland vegetation, and enhancing irregular rough surfaces on the marsh, livestock grazing has been shown to have a positive effect on “maintaining high [avian] species diversity on salt marsh meadows (Daiber, 1986, p. 35). However, it is also important to acknowledge that both grazing and hay harvesting have been shown to have deleterious affects on the fledgling rates of the endangered Nelson's sharp-tailed sparrow, who nest directly on salt marshes. However, delaying hay harvesting until later in the season was indicated as having a positive correlation with increased fledgling rates (Nocera, Parsons, Milton, & Fredeen, 2005).

In all cases, using the resources from tidally unrestricted salt marshes, whether for making salt hay or for grazing livestock, made it possible for the farmers in this study to exceed the natural capacity of their upland resources. The participants noted that this was very important to their farms' viability prior to the time when supplemental feeds and other commercially prepared livestock nutrients were available. In this way, these farmers effectively utilized a pathway for exporting a salt marsh's primary production to meet the sustenance needs of the local population, and in some instances generate income from local markets (Adam, 1990). Holmgren (2002) refers to this strategy as "catching and storing energy" (p.27).

3) Adjusting consumption patterns and the design and management of systems to permit the renewal of renewable resources.

Folke, Berkes, and Colding (1998) have specified that "monitoring the state of resources [is] a common practice among resource users" (p. 417) whose management practices are based on ecological knowledge. As noted above, the participants in this study were highly cognizant of the impact their activities had on the marsh environment, and in most cases adjusted their farming practices according to the carrying capacity of a particular marsh environment.

Managing for the sustained delivery of a marsh's amenities was also achieved through the use of nature's own rhythms and cycles. The participants all noted the value of the tides as the source for renewing a salt marsh's soil fertility. Unlike farming dykeland, where the marshland soil's initial fertility is being continuously extracted, and only replenished through the application of fertilizers, the principle behind salt hay

harvesting was to achieve sustained renewal of the resource base through natural processes. In this manner, the farmers in this study demonstrated their cognizance of attending to nature's feedback, and the requisite for self-regulation in accordance with this feedback (Holmgren, 2002). By thinking as a salt hay harvester, these accounts make apparent the variability in environmental impacts that different anthropogenic activities—from grazing livestock, to building causeways and other impoundments, to ATV use—could have on a salt marsh.

4) Conserving, recycling, and establishing priorities for the use of non-renewable resources.

Harvesting salt hay was a means by which many of Nova Scotia's coastal farmers captured and stored the photosynthetic capacity of salt marsh vegetation, and thus effectively harnessed an energy source that was renewable, in so long as salt marshes retained their ecological integrity. But, while the complex of plants that colonize a farm's land base—whether salt marshland or upland—are renewable, land itself is a non-renewable resource. Throughout my life, farmers have reminded me that 'they ain't making no more land', and Troughton (1988) has made it clear that, in Nova Scotia, agriculturally suitable land is scarce to begin with. In this light, one would think that maintaining the integrity of this non-renewable resource would be of utmost importance to agriculturalists. However, the conversion of land to agricultural production has, in many instances, resulted in a decline in biodiversity, which has led to the loss of ecosystem properties and functions, and the depreciation of this non-renewable resource (Altieri, 1999; Heywood, Watson, & United Nations Environment Programme, 1995;

Hooper et al., 2005; Perrings, 2003; Scott 2002). From a global perspective, the importance of conserving biologically diverse farmland is considered to be of critical concern. In 2005, the United Nations published *The Millennium Ecosystem Assessment Synthesis Report*, wherein it was noted that, “humans have changed ecosystems more rapidly and extensively in the last 50 years than in any other period... More land was converted to agriculture since 1945 than in the 18th and 19th centuries combined...this resulted in a substantial and largely irreversible loss in diversity of life on Earth” (cited in Land Institute, 2005, para 37). The impact of this biotic change on complex ecosystem processes and functions has been the focus of organizations like *The Land Institute*, which have shown that:

When humans convert natural ecosystems that feature diverse perennial plant communities to agricultural crops, primarily annuals grown in monoculture, we fundamentally change the way the ecosystem functions. Annual crops capture the sun's energy just as perennial plants do, so why does this change so dramatically cut into the diversity of Earth's life? Photosynthesis is not the only function of plants. For an ecosystem to remain productive and provide habitat to wildlife over the long term, it must support many other complex processes that support a plant. For example, it must manage water and nutrients and conserve soil. (Land Institute, 2005, para. 38)

Because all “agricultural systems are complex interactions between external and internal social, biological, and environmental processes” (Hecht, 1987, p. 6), no matter whether the system is considered traditional, neo-traditional or fully industrialized:

Every farmer must manipulate the physical and biological resources of the farm for production. Depending on the degree of technological modification, these activities affect four major ecological responses: energetic, hydrological, biogeochemical and biotic regulation processes. Each can be evaluated in terms of inputs, outputs, storages and transformations. (Altieri, 1987, p. 33)

Without question, the practice of salt hay harvesting modified the salt marsh environment. Ditching altered the hydrological processes of a marsh, effectively changing the physiographic characteristics of low-lying or poorly drained marsh zones to high marsh zones; mowing the marsh promoted the “growth form, species composition, number of species, and the physical size and amount of production” (Daiber, 1986, p. 29) of desired marsh vegetation; and the annual removal of biomass certainly had an impact on the energetic processes of the marsh and estuarine ecosystem complex. However, when all told, the participant accounts suggest that salt hay harvesting had a limited impact on changing the over-all nature of salt marsh vegetation, and that wildlife habitat remained relatively functional. This cannot be said to be true of a salt marsh that has been dyked or impounded. At that point, marine biota is impeded from access to former habitat, normal hydrological and edaphic patterns are altered, and foreign species of vegetation are introduced. In some areas where tidal flow has been restricted, rates of erosion have increased, causing further loss of salt marshland (Adam, 1990; Boorman, 2003; Daiber, 1986). Furthermore, the industrialization of farming, that has gone hand-in-hand with modern-day dyking schemes, has been achieved through the substitution of solar energy and human labour for mechanization, the chemical inputs derived from large

amounts of fossil fuels, and the mining of non-renewable resources such as phosphorous (Brown, 2003).

Because “the environmental impact of industrial agriculture can be categorized generally as impacts that deplete non-renewable natural capital, and impacts that deplete or degrade renewable natural capital” (Cleveland, 1994, p. 189), such agricultural practices are deemed, by many, to be unsustainable. Economic trends, which indicate a steep increase in the consumption of fossil fuels per unit of food produced, confirm this concern to be a valid one. “On average it now takes 1.2 barrels of oil to produce a ton grain, twice the amount used in 1960. Since 1950, agricultures’ use of fossil fuels has increased sevenfold, the number of tractors has quadrupled, irrigated area has tripled, and fertilizer use has risen tenfold” (Miller Jr. 1990, p.276). Industrial agriculture’s dependency on the use of fertilizers produced largely from natural gas has also increased dramatically. “Between 1950 and 1989, world fertilizer use increased from 14 million tons to 146 million tons (Chiras et al. 2002, p. 106). In recognizing that the world’s supply of oil and natural gas is decreasing, and that price of fossil fuel products is continuously increasing, industrialized food production can only be seen as unsustainable.

In contrast, farmers who harvested salt hay managed salt marsh resources so that they maintained a high degree of ecological integrity and resiliency. Moreover, by utilizing salt hay in their livestock feeding regimes these farmers were also effective in enhancing their upland resources by increasing the soil’s fertility. The edict to “produce no waste” (Holmgren, 2002, p. 111), which is basic to agroecological production systems, and realized through such mechanisms as “nutrient cycling” (Hecht, 1987, p.

13), is evident in both the culture and economics of traditional salt hay harvesting practices. Unlike industrial agricultural practices, traditional salt hay harvesting practices produced no by-products that were not valued and utilized by the farm, thereby mitigating the need to internalize any external production costs, such as pollution created by burning fossil fuels to operate farm machinery.

5) Keeping environmental impact below the level required to allow the systems affected to recover and continue to evolve.

In exploring the comparative values of traditional, neo-traditional, and conventional or western scientific approaches to natural resource management, Folke, Berkes, and Colding (1998) have drawn attention to the fact that:

Conventional resource management is predisposed to block out disturbance, which may be 'efficient' in a limited sense in the short term. But since disturbance is endogenous to the cyclic processes of ecosystem renewal, conventional resource management tends to increase the potential for larger-scale disturbances and even less predictable and less manageable feedbacks from environment. These feedbacks, or surprises, can have devastating effects on ecosystems and on societies that depend on the resources and services that ecosystems generate...As resilience or the buffering capacity of the system gradually declines, flexibility is lost, and the linked social-ecological system becomes more vulnerable to surprise and crisis. (p. 415)

By maintaining the over-all morphological and biological integrity of a natural salt marsh/estuarine system, the practice of salt hay harvesting has inherent capacity for "responding to and managing disturbances and surprises" (Folke et al, 1998, p. 421; Also

see Bright, 2000). This is particularly significant given the concern over the anticipated impact climate change will have on rising sea levels, and the future of coastal communities around the world (Charbonneau, 2004; Chmura & Hung, 2004; Orson, 1996; Smith, 2007).

CONCLUSION

Within the past century, agricultural production practices have changed dramatically in Nova Scotia. Technological changes, coupled with top-down, governmental policies ushered out small-scale, diversified farming systems, while ushering in an agricultural sector that is characterized by consolidated landholdings, specialization in production, and driven by the market-oriented commodification of food. Salt hay harvesting, which remained functional primarily within the context of family operated farms, where production was geared foremost towards meeting the sustenance of the household, lost its economic value and applicability within this process of modernization.

Along with the social transformation of Nova Scotia's rural, farm-based communities, the 20th century was also witness to the increased capacity—through mechanization and publicly funded dyking schemes—for altering the ecology of a large percentage of Nova Scotia's salt marshes. The environmental impact of this massive anthropogenic change has prompted recent efforts to restore salt marsh ecosystems in order to ensure the delivery of ecological goods and services to future generations (Cameron et al, 2000; Casagrande, n.d.). However, this study has also demonstrated the environmental stewardship value of salt hay harvesting practices, and indicated that there is merit in considering the renewed applicability of this traditional farming practice in

agroecological production systems. Of course, any proposal for the agricultural usage of salt marsh resources should be carefully considered within the context of known and anticipated ecological functions of the “marsh-estuary shelf complex” (Hatcher & Patriquin, 1981, p. 22), which indicates that the exchange of nutrients from intertidal regions to nearshore waters comprises an important element in the food chain of certain marine biota. However, while the theory that “nearshore waters can be enhanced by...‘outwelling’ of nutrients, organic matter and organisms from fertile estuaries” (Odum, 2000, p. 3), research has also shown that the rate of this exchange is variable and is “related to the level of productivity and extent of marsh cover within the estuary, the tidal amplitude and the geomorphology of the estuarine landscape” (Odum, 2000, p. 7). Given this uncertainty, more research is required to assess specific salt marshes and marsh regions for their suitability for harvesting salt hay and/or grazing livestock in this larger ecological context. In a similar fashion, natural resource management decisions must concern themselves with the design of the whole farm, if the ecological integrity of Nova Scotia’s salt marshes is to be restored. For example, the environmental impact of deforesting upland to make way for expanding the production of crops such as corn and soybeans, no doubt, has altered hydrological patterns and nutrient loading of adjacent salt marsh systems.

While this study’s data indicate the ecological merits of traditional salt hay harvesting practices, implementing such a practice is a whole other story. Given that the economic, social, and cultural contexts, in which salt hay harvesting was traditionally practiced, have changed over time, it becomes imperative that we develop a full understanding of the historical course agriculture has followed in this province over the

past half century. That we are lacking such a comprehensive historical analysis means that our perceptions of what has taken place and our scope of options may be debilitatingly myopic. While Ernest Forbes (1989) reminds us that, “history does not teach specific lessons nor does it dictate courses of action” (Forbes, 1989, p. 12), he is quick to point out that:

Without an understanding of the past, individuals, communities and institutions are in no position to identify, much less defend, their true interests. The more their perspective on the past is distorted by myth and stereotype, the less able they are to cope intelligently with the stream of decisions and judgements which a complex society sends their way. (Forbes, 1989, p. 12)

A comprehensive historical analysis of the past half century of agriculture in Nova Scotia would go a long way in shedding light on the complex and ever changing relationship between the productive farm and the consuming public. To date, the most comprehensive discussion regarding present-day producer/consumer relationships in Canada is emerging from farmer and consumer driven organizations such as *The Canadian Organic Growers Association*. One consumer driven model, which is currently achieving some ascendancy in the mainstream discourse, by extolling the virtues of ‘eating local’, is the 100 mile diet (Smith & Mackinnon, 2007; Also see Kingsolver, Kingsolver, & Hopp, 2007). Such a model makes good sense for farms that are geared not so much towards volume production, as they are the sustained production of high quality food, and the ecological integrity of a farm’s resource base. In light of this, we might well conclude that salt hay harvesting could feasibly play a central role in a multifunctional approach for sustainably managing Nova Scotia’s salt marsh

ecosystems (Boody et al., 2005), wherein many ecological conservation objectives could be met through agricultural practices. However, such an approach will only be truly feasible when farmers are adequately remunerated for the “goods they produce and for the services they render to conservation” (Berry, 2002, p. 54)

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Appendix 1**Advertisement soliciting for interview participants****Nova Scotia Salt Hay Study**

My name is Ruth Lapp. I am a graduate student at Saint Mary's University in Halifax. I am interested in learning more about the traditional practice of salt hay harvesting in Nova Scotia. This summer I will be interviewing farmers and members from Nova Scotia's rural and coastal communities who have memories and stories to tell about salt hay harvesting.

If you have experiences or memories of harvesting salt hay I would be very interested in interviewing you for this project. An interview would be approximately an hour long. The interview may take place either in your home or at location in your community that is convenient to you.

If you are interested in participating in an interview please indicate with your signature.

Signature: _____

Please Print your name: _____

Date: _____

Telephone number: _____

Address:

For more information contact:
Ruth Lapp
138 Red Bank Rd.
Centre Burlington, Nova Scotia
B0N 1E0
(902) 757-0326

You may return this form to Ruth Lapp at the above address.
Thank you for your interest

Appendix 2

Interview Questions

1. Could you please describe your farm, as if you were describing it for someone who cannot see or visit it? Probe for detailed description of whole farm.

Location—county, geographically. Location of salt marsh to rest of farm. Is it adjacent? How long farm in family (# of generations).
2. What about this farm made it productive or viable for you? Probe: What makes it a good farm? Appreciative questioning. Probe: Was the land farmed commercially (details of when, and what was grown commercially), or for self-sufficiency?
3. Can you describe for someone not familiar with a salt hay harvest what it is exactly?
4. Can you describe in detail a salt hay harvest that you remember as being a particularly good harvest? Describe a poor harvest?
5. What made the salt marshes to your farming operation? Probe for descriptive details defining what is important to different farming scenarios (e.g. beef cattle vs. milk, cattle vs. sheep) throughout Nova Scotia.
6. Have you made any modifications to the salt marshes make them more valuable or productive to your farming operation? (E.g. ditching, fencing, dyking, draining, planting of domestic crops etc.)
7. Which of the salt marsh grasses are preferred/useful to your farming methods?

Probe: Were certain grasses preferred for haying, and others for grazing? Were there other salt marsh plants that were important for farm family i.e./ harvesting

marsh greens as part of family diet? What are the names/types of grasses/sedges that you know of that grow on the marshes?

8. What region of the marsh did you crop for salt hay (upper, middle, lower)
9. Did you use marsh hay for any other purposes besides feeding of livestock?
10. What time of the year would the salt hay be harvested? What time of year did you traditionally harvest the upland hay on your farm? Probe: What were the qualities of the grass/state of maturity for hay or grazing that you tried to obtain? Ideal condition of grass. E.g. at what stage of seed head production? What would be the optimum harvesting conditions?
11. If you used the marsh for grazing, what time of the year did you usually try and have your cattle/sheep out on the marshes? Why? How long did you graze your animals on the marsh?
12. What were the benefits of feeding salt hay to your livestock? Probe for details about health advantages, palatability, increased production—milk, weight gain, economic benefits. Probe for indicators such as noted responses from livestock to salt hay, or access to marshland grazing.
13. Was the salt hay reserved for certain animals? E.g. age class of livestock, species, etc.
14. What would cause you not to harvest salt hay in a given season? Or, Why might a farmer choose not to utilize a marsh in a given year?
15. Do you own the marshes that you harvested hay from? Or, What arrangement of use-rights or tenure do you have with the salt marsh that you harvested hay from?

16. How important was salt hay to the over-all economy of your farming operation, compared with upland hay, or other crops/commodities produced on your farm?
17. Have you noticed any changes to the physical well-being or health of the marsh over the time that you have farmed it?
18. What wildlife have you noticed using the marshes? Before harvesting/after harvest? Have there been changes in the # of wildlife over the years? If so, can you describe these changes?
19. What challenges do the marshes present that haying the upland does not? Probe: were there risks in utilizing marshland for agricultural purposes? E.g. getting stuck in mud, ruins equipment, accessibility.
20. What considerations or methods did you use to ensure that the marsh was not over harvested/grazed and destroyed?
21. Did you notice any differences in the marshes that were cut for hay or grazed compared to adjacent marshes that were not? E.g. species composition ruts from machinery, trampling.

Appendix 3

Participant Case Studies

Profile nine:

Anna Bourque was born in 1920, into the community of Amiraults Hill in Yarmouth County. She has lived in Amiraults Hill all of her life. When Anna's father was forty-six years old he drowned while working on a fishing fleet in the United States. The death of her father brought tremendous hardship for Anna's mother, who was left to raise ten children on her own. Anna described her family situation as financially impoverished. Her mother died when she was sixty-six years old. Anna herself was forced to leave school after grade ten because of not being able to afford to buy the books that were necessary for her to attend. She began working as a maid in Yarmouth when she was fourteen years old.

During the time that Anna was growing up, the Bourque family, like most families in Amiraults Hill, grew much of their own food. They maintained a milking cow, raised a pig each year to butcher in the fall, and grew a garden. Although Anna's father had owned a piece of marshland, she only remembers her mother buying the salt hay they required for their livestock. Anna said that while she never participated directly in a salt hay harvest, she has clear memories of seeing the salt hay being made on the marshes of Amiraults Hill. She remembers seeing at least fifty of the large stacks on the marshes that stretch between the communities of Amiraults Hill and Hubbards Point.

Anna recalled that salt hay was used as a supplemental livestock feed; rationed out with the more valued upland hay, which was a very limited resource for the farmers of Amiraults Hill, given the limited availability of agriculturally suitable land in this

region. The time for making salt hay depended upon the tides. Anna remembers June and July as being the months when people generally cut their salt hay. The entire harvest was done manually, and included the use of scythes, wooden rakes, and poles.

After Anna married in 1942, she and her husband did not make any salt hay because they did not keep any livestock. Anna's husband worked in the textile mill in Yarmouth. She recalls that by this time that few people were making salt hay in Amiraults Hill or the surrounding communities.

Profile ten:

James Hatfield was born in 1929 into the community of Pleasant Lake, Yarmouth County. He was the youngest of three children. James grew up on the farm where he currently resides with his wife Marie. They own a hundred and thirty acres of upland, thirty of which is cleared for fields, pasture, and gardens. The remainder is woodland. The exact amount of salt marshland the Hatfields own was not specified in the interview, but James reported they had enough marshland to make about forty stacks of salt hay each year, although they did not always make that amount. The Hatfields' salt marshes are located less than a mile from their farmstead.

James, who identified as having been a farmer all of his life, remembered working on the marsh at a very young age to help his father and two older brothers make salt hay. As a youngster, one of his earliest jobs was to cook the noon meal for the harvesters. When he became older he participated in mowing, raking, poling, and stacking the hay. Unlike some of the other farmers in his region, who harvested their salt hay in monthly intervals over the course of the summer and fall, James' family generally harvested all of their salt hay at one time. Salt hay was harvested during the later part of the summer or

early fall, once the upland hay had been made. James recalled that during his childhood harvesting their annual supply of salt hay would require at least a week to complete. Mowing salt hay commenced during the period of lowest tides in the monthly tide cycle. James explained “you generally get maybe five or six days, hopefully six to mow the hay down. You used to have to mow it down with scythes. And then in a day or so you rake it up with a hand rake”. The loose hay was raked into small haycocks and then transported, using two long poles, to a large wooden platform that was situated on the marsh. A large haystack would be carefully constructed on this platform, and remain on the marsh until winter. Once the marsh was frozen the hay could be retrieved and brought up to the barn to be used as winter-feed for the livestock.

During the time James’ father operated the farm, harvesting salt hay was a very labour intensive operation. James spoke with pride about how his father, though not a very strong man due to having contracted tuberculosis while in the army, was a terrific mower. Given the labour requirements and the time constraints of a salt marsh harvest, James’ father hired additional, off-farm labourers to meet the labour demands of the harvest. Many of the men who worked as labourers on the Hatfield farm returned year after year to assist with harvesting salt hay.

James noted that there was little variability in the quality or quantity of the marsh grass from year to year. Weather and the availability of adequate labour would determine a good or bad harvest of salt hay. There was always the risk of losing a harvest if high tides struck before the hay was adequately cured and stacked on the wooden platforms.

Following the Second World War, the Hatfields bought their first small tractor. While the use of tractors and other farm machinery greatly increased the amount of hay

that could be harvested at one time, and decreased the amount of manual labour, James noted that the heavy machinery was not always useful on areas of the marsh that were wet or soft. He also noted that the capital required to purchase farm machinery has increased over time, making the economic feasibility of farming questionable. During the time that James was growing up, salt hay was crucial in the overall economy of the Hatfields' farming operation. Throughout James' lifetime, this farm has always been a commercial operation. The Hatfields have raised beef cattle and dairy cattle. At the peak of their cattle production their herd numbered twenty-two animals, however on average they maintained about eighteen head of cattle. James attributes the availability of salt hay with their ability to keep as many cattle as they did. Salt hay was used as a winter feed, and even at times as bedding. James considered all the flora that grew naturally on their salt marsh to be suitable for livestock feed. Moreover, he observed that the cattle appeared to like salt hay as a feed. The Hatfields did not use their salt marshes for pasturing their livestock.

In addition to selling their cattle for beef, the Hatfields made butter for commercial sale and sold the occasional quart of milk. They also grew strawberries commercially, and relied on salt hay to cover their strawberry plants in the winter. As mulch, salt hay was highly valued because it could be sourced locally (it is important to remember that very little grain and straw were produced in this part of Nova Scotia). In addition, using salt hay as mulch did not introduce weed seeds into the strawberry patch. Later in his farming career James sold a lot of salt hay to a large strawberry producer. He noted that this was a good source of income for a few years, until the strawberry grower

found an alternative mulch. The Hatfields also used salt hay as insulation to bank their house in the winter.

Profile eleven:

John C. Barkhouse was born in 1933, into the community of Upper Burlington, Hants County. He was one of fourteen children. In 1921, John's grandfather and father bought the three hundred acre farm where John spent his childhood, and which is now his current home. When his father and grandfather first purchased the farm, there was little cleared upland. The farm included approximately forty-two acres of marshland that was associated with the Kennetcook River. Prior to the arrival of the Barkhouse family these marshes had been dyked. However, in 1920 the dykes were breached, allowing the incoming tides to flood the marsh. The marshes have remained out to tide during John's lifetime and tenure of the farm.

During John's childhood, his family's farm was a mixed operation that included dairy and beef cattle, pigs, grain and hay production, as well as a garden. Farming provided food for the family as well as a portion of the family's income. The farm also had a large woodlot, and John's father and grandfather had a sawmill, which they used to cut pulpwood. Salt hay was an important component in the Barkhouse family's annual harvest of winter livestock feed. The family generally put up about twenty-five to thirty tons of salt hay a year. It was a highly valued crop, and John emphasised that a tremendous amount of consideration was taken to ensure that the salt hay was the highest quality possible.

The Barkhouses generally harvested their salt hay by the middle of July, after they had put up their upland hay. They utilized the entire marsh for making hay, harvesting

the marsh in succession from the upper marsh, or that closest to the upland, then moving to the middle or the “flats”, and lastly to the lower marsh, which was nearest to the river. There was significant variation in the grass-like flora that grew on these different marsh zones. John valued the upper marsh and flats the most for the type of salt hay they produced. These marsh regions produced the finer textured marsh hay the cattle preferred.

Making salt hay was labour intensive, and required the participation of the whole family and often the help of an additional hired hand. Once the salt hay was mowed, it was left to dry or cure on the marsh for about four or five days. After this time the hay was raked into windrows, using a horse-powered drag rake, and pitched onto wagons. The hay was then transported to a higher region of the marsh and stacked on wooden platforms where it remained until it was needed for feed. The haystacks John’s father built would be about fourteen to fifteen feet high from the square base. The hay was piled in a manner so that it shed rain. John remembers there being “quite a knack” to building a proper haystack.

In the winter salt hay was fed out to the cattle and horses, although the horses were generally given upland hay since salt hay was considered to be too dusty. Salt hay was valued for its perceived nutrient content, and was utilized within the livestock-feeding regime as a mineral supplement. Salt hay was not used for any other purpose besides livestock feed, and was rarely sold.

The Barkhouses also pastured their cattle on sections of salt marshland that were too soft for harvesting hay, as well as on those sections of marsh that had been previously harvested. John considered this practice to be an indication of a conserving

ethic his family practiced, where none of the resources available to them were wasted. John observed that the cattle would often prefer to graze on the salt marsh over the upland pasture, even though the upland pasture was comprised of clover and was considered to be superior forage. However, John recalled the milk from cows grazed on salt marsh was not desirable since it would taste marshy. To avoid having their marshes “punched full of holes,” the Barkhouse family did not let their cattle graze the marsh when it was flooded.

John considered their salt marshes to be very important to the over-all economy of the farm. He did not recall a single year when his grandfather or father would not get their annual harvest of salt hay. Each year the salt marshes produced a crop of ‘free’ hay, without having to clear any land or apply any inputs. Other than putting up fences to keep their cattle away from the haystacks, the Barkhouses did not modify their marshes in any manner.

In 1974, after many years of living and working away from the farm, John and his wife Joan returned and began raising beef cattle. John’s father gave up managing the farm around 1980. Until 2004, John and Joan maintained about a hundred head of cattle. John continued to utilize the salt marshes as a source of feed for his cattle, and used his upland for pasture. He purchased additional upland hay from another local farmer. After John stopped raising beef cattle he continued cutting the salt hay on his farm, which he now sells to a neighbouring farmer. Instead of using a horse-powered mower John now uses a tractor. While mechanization has increased production, John admitted that the heavier machinery damages the marshes.

Profile twelve:

Mildred Pulsifer was married to Clifford Burrows in 1945. Shortly after their marriage, the couple bought a farm in Beaver Brook, Colchester County. Included in the purchase of the Beaver Brook farmstead was a section of farmland in the neighbouring community of Green Oak, and a ten acre salt marsh located in the community of Green Creek, about six miles from the Burrow's farmstead. This salt marsh is associated with a small tributary of the Shubenacadie River. In total the Burrows' farmland included approximately three hundred acres of land, of which only a small portion was cleared in 1945.

At the outset of their marriage, Mildred and Clifford Burrows went into dairy farming. In the beginning their dairy herd was comprised of about a dozen cows, mostly Guernsey, with a few Ayrshire, Jersey and Brown Swiss. All the milking was done by hand. Gradually the Burrows introduced Holsteins into their herd in order to increase the volume of milk produced. Like many other farms in that region of Colchester County, when the Mildred and Clifford began their dairy operation, salt hay was an important crop, and marshland was highly valued. For the Burrows family, salt hay was an important supplement to their upland hay and the other crops that were used as winter-feed for their livestock.

The Burrows' marsh was subject to flooding at every tide. Mildred recalled that the marsh grass they harvested for salt hay was characteristically shorter than the cultivated or upland grass species, which she referred to as "English Hay". The Burrows harvested their salt hay in the early part of July, prior to the high tides that were associated with the later summer months. Once covered by silt from the incoming

tides, salt hay could still be harvested, but Mildred recalled, “ the cows did not like [it] nearly as much.”

In the early years of their farm operation, the Burrows family cut their marsh hay using horses and a mowing machine. Harvesting salt hay demanded a time and labour commitment that set it apart from the farm’s other crops. Because of the distance the salt marshes were from their farmstead, Clifford would set up a camp and stay with the horses until the salt hay was harvested. In addition to the labour supplied by Clifford, Mildred and their three sons, extra hands were routinely hired for the salt hay harvest. For the first few years the Burrows stacked their salt hay on the marsh, returning with their horses and wagons in January or February, when the marshes were frozen.

Mildred considered the salt marsh to have been extremely important to the economic viability of her family’s farm during the early years of farming. She recalled getting quite a bit of hay from their salt marsh. The continuous, natural productivity of the salt marsh meant that the application of fertilizer was not required as it was with upland hay fields. Mildred recalled that the cattle also liked salt hay, and seemed to do well on it. She did not recall salt hay ever being sold to any great extent.

Over the course of their farming career the Burrows experienced several technological and governmental policy changes that caused a tremendous shift in how agriculture was practiced in Nova Scotia. Shortly after the Second World War, Clifford Burrows purchased the first tractor in his farming community. With this new equipment the Burrows were able to harvest salt hay and their other crops far more quickly than they could with horses. No longer dependent on horsepower, the Burrows did away with their marsh camp. Salt hay could now be mowed, raked, and loaded onto the wagons and

brought home to the farmstead where it was baled. In this way, tractors greatly transformed farming practices and the seasonal patterns of work. The advent of fossil-fuel driven machinery also made it possible to dyke far more marshland than had been previously possible with dyking spades and horse-drawn drags. After the federal government passed the Maritime Marshland Rehabilitation Act in 1948, for about a twenty-year period many farmers across Nova Scotia had their holdings of salt marshland converted into high production dykeland. Mildred considered the conversion of their salt marsh to dykeland as being a positive change for their farm's economic viability. However, after a time the upkeep costs of all these dykelands became prohibitive and the government stopped maintaining some of the smaller dykelands. The Burrows' dykeland eventually reverted back to salt marsh, but by that time many technological changes had occurred in dairying, and salt hay was no longer a part of the livestock's feeding regime.

Profile thirteen:

Lois Brown (nee Chapman) was born in 1942. When Lois was twelve years old she, along with her mother, father, and four sisters, moved from Quebec to a three hundred acre farm in Upper Burlington, Hants County. Previous to that time, Lois' father had served in the army during the Second World War. As a war veteran, Lois' father had been eligible for re-settlement assistance under the Veterans' Land Act, introduced in 1942, for soldiers returning to civilian life. Starting with twenty-five Ayrshire cows, the Chapmans went into dairy farming. They also kept a small flock of sheep. The Chapmans made their living through farming and selling wood from their woodlot. Lois recalls those years of her childhood as being a time when thriftiness was crucial to the survival of her family.

While the Chapman family's farmland was very fertile and well situated for productivity, Lois noted that they "had to use every last little bit of land that we could, in the best way we knew how in order to make it work." When the Chapmans began farming, much of their farmland was not cleared. However during the course of their tenure, they cleared about a hundred acres of upland. The farm property also included two separate parcels of salt marshland. The section of marshland that was contiguous to the upland on the farmstead was not utilized for salt hay, but Lois remembers her father grazing both cattle and sheep on this marsh. The Chapmans also owned about twenty acres of salt marsh on the Kennetcook River, near the town of Brooklyn. It was on this parcel that they made their annual harvest of salt hay. Most of the salt marshland along this section of the Kennetcook River had been dyked by the time the Chapmans commenced their farming operation in Upper Burlington. However, some sections of the dykes had been breached, and were out to tide when the Chapmans gained tenure of the land. These marshes were considered to be 'high' marshes, in that the highest tides, which came about once a month, were the only tidal submergence the marsh was subject to.

Lois recalled several, distinct types of grass-like flora that grew on these marshes. The grass they preferred for salt hay was a fine, short grass that had a little purple bloom. Because the marsh the Chapmans used to make their salt hay was subject to periodic, tidal submergence, they stacked their salt hay in the traditional way - on a wooden platform. Lois, her father and four sisters supplied the labour necessary for making the salt hay, which they harvested in the later summer months, after their upland hay was in.

Lois remembered that making salt hay that was not only labour intensive and time consuming, there was a craft to it as well.

In the early years, the Chapmans employed a horse drawn mower to cut their marsh hay. In the winter they would retrieve their hay from the frozen marshes, hauling it back to their livestock barn with horse and sled. In later years the family acquired a small tractor, which replaced the use of horses on the farm. Lois noted that the efficiency of that first tractor, when compared with the horse-powered equipment, was questionable.

Salt hay was used specifically as a vermifuge on the Chapman farm. As such, Lois' father only fed the livestock small amounts of salt hay, about once every month. Lois cannot remember her father ever having to de-worm their livestock. She considers salt hay to have been very important to the economic viability of the farm.

In the 1960s, under the Maritime Marshland Rehabilitation Act, the salt marsh across the road from the Chapmans' farmstead was dyked in order to protect the 'Shore Road', which cut through the Chapmans' property. Once dyked, Lois remembered that the marsh dried up quickly, making it possible to grow domestic varieties grass and legume species. However, the Chapmans' continued to harvest their annual supply of salt hay off of their other marshland property. Lois' father operated the dairy farm in Upper Burlington until 1966, at which time the barn burned and he sold the farm.

Currently Lois resides in Scotch Village, Hants County, on a mixed livestock farm that includes beef cattle and sheep. On this farm, salt marshes associated with the Kennetcook River are contiguous with the upland pasture and hay fields. Lois and her partner utilize these marshes, which are periodically covered by the highest incoming tides, for livestock grazing. Lois continues to be convinced that giving their livestock

access to the salt marsh grass reduces their parasite load. She does not consider grazing livestock on the marsh to cause any damage, and has observed that the cattle and sheep will avoid the marsh if it is too soft. Grazing livestock, according to Lois, also improves the grass production of the marsh itself.

Profile fourteen:

Hayden Landry grew up in the village of Amiraults Hill. He is the eldest of twelve children. He currently resides in the community of Hubbards Point, which is adjacent to Amiraults Hill. Hayden is not a farmer. His memories of harvesting salt hay are from the late 1940s and early 1950s when, as a teenager, he helped his maternal grandfather harvest his hay. More recently, Hayden became interested in salt hay for its heritage value to his community. This interest led him to become actively involved in helping organize the annual Festival de la barge, a community event where people gather on the local salt marsh to re-enact the building of a traditional salt haystack.

The salt marshes that are the focus of Hayden's childhood memories, as well as his current interest in local history, stretch between the two communities of Amiraults Hill and Hubbards Point. Locally these marshes are known as *la vieux parc* or *the old field*. At one of the early planning meetings for La Festival de la barge, Hayden recalled one elderly man from the community speaking about the time when there would have been a thousand large haystacks on the marshes from Tusket to Sluice Point.

Hayden remembered, as a child, helping his grandfather and father make salt hay during the months of July and August. Farmers would go to the marsh early in the morning, while there was still dew on the foliage, and cut the marsh grass. Hayden's job was to rake the hay. He remembered not being allowed to use the scythe, because it was

considered too dangerous. In the later years when Hayden helped his grandfather harvest salt hay he recalled that there was often a shortage of farm labourers. He attributed this labour shortage to the fact that after the start of the Second World War, many of the younger men from the community joined the army leaving few able-bodied people to work on the home farms. This labour shortage meant that “women, children, everyone pitched in” to get the harvest in. Throughout the interview, Hayden emphasised that making salt hay was very hard work. He also considered that making salt hay was a kin to a science. Farmers had to be in tune with nature’s rhythms and cycles, as well as knowing the locations of the various marshland flora that were preferred for salt hay.

During the time of Hayden’s childhood, his father worked as a fisherman and was often away from home for long stretches of time. Hayden, his mother, and his other siblings lived with his maternal grandparents on their small farm. His grandfather owned several parcels of salt marsh land. Mostly these parcels were small, and as Hayden put it “scattered hither and thither”. Hayden has seen deeds to both his father and grandfather’s marshland holdings.

The livestock on Hayden’s grandparents’ farm consisted of three to four head of cattle, a few pigs, and some chickens. Hayden recalled that most people from Amiraults Hill were fishermen. Farming was really a sideline to provide fresh meat and vegetables in the winter, and was primarily intended to meet the food requirements of the household. Hayden did not remember there being much in the way of commercial farming in Amiraults Hill. Some people may have sold a few pounds of butter, but most food produced on these small farms was sold within the community, or traded for other locally produced goods. Hayden recalled that when he was growing up, most people in

Amiraults Hill were very poor, therefore anything that could be produced either by farming or harvesting from the wild was crucial in supporting the household economy.

Hayden considered his grandparent's farm to have been large and prosperous relative to many other farms in Amiraults Hill and the surrounding communities. In addition to owning several small parcels of salt marsh land—each about two acres in size—Hayden's grandfather also owned two or three fields of upland on which he was able to make fresh or sweet hay. In the winter his grandfather fed the cattle a mix of sweet hay and salt hay. Hayden did not believe that salt hay was very nutritional, but it did keep the cattle alive over the winter. Hayden considered the salt marshes to have been integral to the viability of his grandparent's farm and most of the small farms in Amiraults Hill and the surrounding communities.

Hayden identified the advent of the pneumatic tire, which came into common use around the time of the Second World War, as being a key technological change that impacted farm work patterns, and the cultural landscape of his community. Unlike the narrow, old-fashioned, iron, wagon wheels, which sank into the soft marsh mud, the new pneumatic tires enabled farmers to access the marshes far earlier in the season, making it possible to transport their salt hay off the marsh immediately after it was cured. As a result, salt hay was less frequently stacked on the large wooden platforms on the marshes, and the panorama of *la vieux parc* changed forever. However, by this time, there were few people still farming in Amiraults Hill.

Since the 1950s, when salt hay was last harvested to any extent in Amiraults Hill, Hayden has observed some significant changes to the physical nature of the marsh. Many large shallow ponds and muddy patches have formed on the marshes. Hayden

attributes this change to the declining maintenance of the many ditches that used to criss-cross the marshes, and served to drain the incoming tidal water. Hayden described the marshes as being much ‘cleaner’ when he was a boy, than they are now. Over the course of his life, Hayden has also observed a decline in the number of ducks that nest on the marsh, or use the it for feeding or staging purposes. He speculated that this decline might be due to the fact that the marshes are no longer being farmed—or in his words the “marshes have been sort of abandoned.”

Profile fifteen:

Leonard Surrette was born in 1931 into the community of Surrettes Island, Yarmouth County. He was one of five children. During his childhood, Leonard’s family kept one cow and an ox. The Surrettes also planted a large garden to get them through the winter, growing potatoes, carrots and turnips. The family owned enough upland for pasturing their animals during the spring and summer, but not enough to make hay. Leonard remembers money being very scarce, and his family could not afford to purchase any supplemental feed for their animals. During the winter they depended entirely on their harvest of salt hay for their livestock’s’ survival. While Leonard recalled this as a challenging time for his family, because they were so poor, he also reported they never went hungry. Along with raising a lot of their own meat on the farm, the Surrettes also fished for herring and eels, which they also salted for the winter

When Leonard was eighteen his father contracted tuberculosis and was initially confined for twenty-two months in the Shelburne sanatorium. At the time of his father’s illness, the responsibility of making the years supply of salt hay fell to Leonard and his brother, who was sixteen months younger. As they had done before with their father, the

two young men, with scythes in hand, harvested their salt hay in July. They made four stacks in total, utilizing two different marsh areas to meet the winter-feed requirements for their livestock.

Leonard recalls that the marshes were very valuable to the people of Surrettes Island. "Everything was cut. They were even coming from Wedgeport to make hay here. Yeah, I guess so, it was a big thing. You had to do it if you wanted to keep alive". In addition to taking on many of the farming responsibilities when his father took sick, Leonard and his brother also continued to fish commercially for lobster, in order to maintain this source of their family's income. Leonard continued to fish for lobster for his whole working life. In 1953, after he married and his father came home from the hospital, the Surrettes' got rid of their cow and discontinued their salt hay harvesting.

Profile sixteen:

Melvin Landry was born in 1944, into the community of Amiraults Hill, Yarmouth County. Melvin is not a farmer. His interest and involvement in salt hay harvesting is for its heritage value to his community and the Acadian people. For the past nine years Melvin has organized and participated in the annual "Festival de la barge". Melvin and other committee members of the festival consulted many older people from the communities of Amiraults Hill, Hubbards Point, Abrams River, and Surrettes Island to gather information on marshland farming traditions. Melvin's experience in interviewing these people led him to appreciate the many technical details that needed to be attended to in order to ensure a successful salt hay harvest.

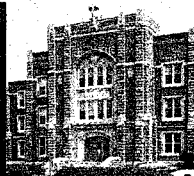
Melvin also learned from talking to the elders of his community, that prior to the Second World War, salt hay had been considered to be crucial to the survival of many

people living in Amiraults Hill, and the surrounding communities. “Everybody had a few cattle, so the need for hay was great.” Melvin recalled that when he was a child, everybody owned some marshland. At this time marshland and the resource of salt hay were highly valued. Melvin remembered the many ditches on the marsh, and the role they played in drainage and delineating ownership of the specific marshland sections, however he was not able to remember anyone ever digging these ditches. Likewise, he could remember seeing the wooden platforms upon which the salt hay was stacked. Many of these platforms had been in use for more than a single generation of farmers.

Melvin’s memories of helping his grandfather harvest salt hay gave him insights into the cultural and social changes that occurred during the era of the late 1940s and early 1950s. Melvin noted that while many locals blame hurricane Edna, of 1954, for causing the end of salt hay harvesting in Amiraults Hill, he stated that farming had already been in decline, and that there were not the “thousand haystacks, but maybe only eight or nine.” According to Melvin, the storm’s destruction only clinched the demise of farming in this region of Nova Scotia.

For the past eight years Melvin’s involvement in La festival de la barge has allowed him to observe the impact on the marsh ecology when the same section of salt marsh is mowed year after year. He noted that the quality and quantity of salt marsh grass in this section of marsh has actually improved—now growing taller and thicker than it had previously. Melvin attributed the marsh’s vegetative productiveness to the high fertility of the marshland soils, which are renewed with each high tide. He also thought that mowing the grass caused it to grow back more vigorously. Melvin noted that because the community is no longer utilizing the whole marsh, many of the ditches

that used to drain the marsh had become clogged over the years. Because many sections of the marsh no longer drain as quickly, the grass in these sections does not grow as well as it used to.



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24 April, 2008

Ruth Lapp
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