INTEGRATING SCIENTIFIC KNOWLEDGE AND LOCAL ECOLOGICAL KNOWLEDGE (LEK) ABOUT COMMON EIDERS (Somateria mollissima) IN SOUTHERN LABRADOR

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Integrating Scientific Knowledge and Local Ecological Knowledge (LEK) about Common Eiders (*Somateria mollissima*) in Southern Labrador

By

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ABSTRACT

There has been little research on the history and status of Common Eiders in Labrador. In this thesis I explored how varying degrees of human exploitation over time on the south coast of Labrador specifically in St. Peter's Bay have influenced Common Eider populations. To do this, I collected Local Ecological Knowledge (LEK) from hunters, and compared this information to data generated through scientific surveys and experiments.

Population estimates of nesting pairs of eiders in St. Peter's Bay during 2001 obtained from direct nest counts and from boat surveys of breeding males were within 10 % of each other, 651 nests and 713 males, respectively. This finding suggests that invasive nest counts could at times be substituted with less invasive breeding male counts carried out from boats. From LEK and from comparisons of nesting population data collected in this thesis with previous data, it was determined that the nesting population of *S.m. dresseri* in St. Peter's Bay and Henley Harbour is increasing. From LEK it was found that there have been changes in nesting locations as eiders move out of high use areas (e.g .Mary's Harbour) and into areas of lower human activity (e.g. Henley Harbour).

The range of two subspecies of Common Eider, a northern subspecies (*Somateria mollissima borealis*) and a southern subspecies (*S.m. dresseri*), overlaps in southern Labrador. *S.m. dresseri* breeds in southern Labrador, where *S.m. borealis* are the more common subspecies during winter. Visual assessments of eiders in St. Peter's Bay

indicated that 99 % of the eiders nesting there were *S.m. dresseri*. Head collections of eiders obtained from hunters showed that 72 % of the eiders wintering near St. Peter's Bay were *S.m. borealis*. Changes to hunting and egging practices combined with stricter enforcement has resulted in hunting pressure shifting from *S.m. dresseri* to *S.m. borealis*. Changes in both nesting distribution and nesting populations appear to result from a shift from much spring and summer hunting and disturbance to winter hunting and minimal spring and summer disturbance. Interviews with hunters confirm that they are concerned about ongoing poaching and egging, and feel that more wildlife officers are required on the south Labrador coast, especially during eider nesting seasons. The possibility that St. Peter's Bay should be reinstated as a Migratory Bird Sanctuary, is also apparently gaining greater approval among hunters.

Key Words: Common Eider, *Somateria mollissima*, subspecies, Labrador, Newfoundland, hunters, harvesting, interviews, Local Ecological Knowledge, LEK, sanctuary.

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CHAPTER 1: INTRODUCTION

1.1 LOCAL ECOLOGICAL KNOWLEDGE (LEK)

The Local Ecological Knowledge (LEK) referred to in this thesis relates to the knowledge of local hunters. When they hunt in the same areas for years, and sometimes generations, hunters often acquire detailed knowledge of their environments, including the distribution of local resources, as well as local hunting practices. Compared to most scientific knowledge, this knowledge has a relatively long temporal scale and a small spatial scale (Fischer 2000).

Obtaining reliable LEK to combine with scientific data depends largely on the systematic collection of qualitative data from a large sample of experienced or "expert" hunters. Because most existing scientific data tends to be collected at larger spatial scales and shorter time scales than those that inform LEK, it is useful to combine LEK with linked scientific research. When scientific research is linked to what hunters know and have experience about, scientists and hunters can share their expertise more effectively. This sharing of information can lead to the generation of testable hypotheses, the development of more comprehensive research designs, potentially improved data collection, and can contribute to a better understanding of natural processes and human interactions with nature. When studies of integrating science and LEK produce results where the two match, there is more confidence in the findings. Where they mismatch there is a need for more study, and/or a re-examination of LEK, and therefore a need to

generate a scientific hypothesis. In a study on the harvesting of lobsters, Gendron et al. (2000) concluded that the incorporation of fishers' information enhanced the credibility of the scientific conclusions concerning the harvesting of lobster populations.

Other research has used LEK on seabirds such as *Seabird harvest and the importance of education in seabird management on the North Shore of the Gulf of St. Lawrence* (Blanchard 1984). On the Belcher Islands, Nunavut, Nakashima (1991) collected Traditional Ecological Knowledge (TEK) of the Inuit specifically on Common Eiders for his Ph.D thesis. Nakashima concluded that Western scientists and Qikirtamiut exhibit comparable intellectual application and ability and exhibited pursuit of objective knowledge. Gilchrist and Robertson (2000) focused on wintering habitat of Common Eiders in the Belcher Islands, Nunavut and used semi directive interviews to gather TEK as were used in this thesis. They then used TEK to help interpret field observations (Gilchrist and Robertson 2000). Information about wildlife distribution and abundance has been provided by TEK/LEK in many other studies as well (Ferguson and Messier 1997, Ferguson et al. 1998, Huntington et al. 1999, Kean 1999, Mymrin et al. 1999, Neis et al. 1999, Neis and Morris 2001).

In this study, I integrate LEK about Common Eiders from hunters in southern Labrador and scientific research to examine:

1. Decadal level changes in spatial distributions and abundance of two subspecies of Common Eider
2. Seasonal distributions of these two subspecies
3. Perceived changes in human impacts on eiders

4. Conservation and management possibilities

5. Strengths and weaknesses of hunter LEK and its capacity to combine with science.

1.2 THE COMMON EIDER

The Common Eider *Somateria mollissima* has been traditionally used as a local source of meat, eggs and feathers by coastal Labradorians, both aboriginal and immigrant. Two primary subspecies of Common Eider occur in Labrador - the 'Southern' or 'American' eider (subspecies *dresseri*) that breeds mostly in southern Labrador, Quebec, Newfoundland, the Maritime Provinces and Maine, and the 'northern' eider (subspecies *borealis*) that breeds in northern Labrador and Arctic Canada and over-winters in southern Labrador and Newfoundland (Mendall 1986, Goudie et al. 2000, Palmer 1976).

These two subspecies are very similar in appearance. A primary distinguishing feature is the shape of their bills. Head shape, size and plumage color are more difficult to distinguish, though the southern eider usually has a slightly larger head and greenish plumage under the eye (Figure 1.1).

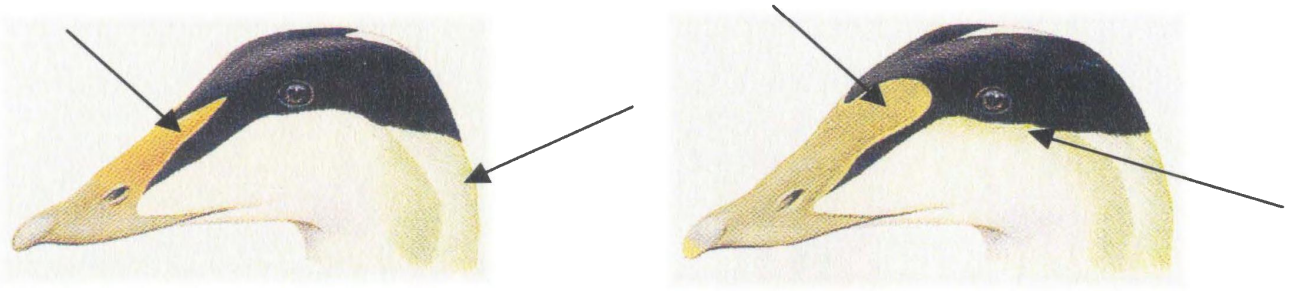

Figure 1.1. Male *S.m. borealis* (northern eider, left) and *S.m. dresseri* (southern eider, right) (After Gooders 1998).

1.3 COASTS UNDER STRESS

This project was carried out as part of a national, interdisciplinary research program, Coasts Under Stress (CUS). CUS is a 5-year Major Collaborative Research Initiative, funded by SSHRC (Social Sciences and Humanities Research Council) and NSERC (Natural Science and Engineering Research Council). CUS study areas occur in coastal communities in Newfoundland and Labrador, and also in British Columbia. The main goal of CUS is to assess interactions between environmental restructuring and social restructuring on the west and east coasts of Canada. In order to do this, CUS is attempting to reconstruct how ecosystems may have changed, and by identifying how these changes have affected human, community, and environmental health. There are five "Arms" or research categories in CUS, each with its own specific questions and goals.

This project is in Arm 2 of CUS. Research in Arm 2 is focused on combining local, traditional and scientific knowledge in order to reconstruct ecosystem change in coastal environments surrounding collaborating communities (CUS Progress Report,

2001). The overarching question of research in Arm 2 is, "how can local ecological and scientific knowledge help us to understand changes in environmental, community, and individual health in ways that will help develop better strategies for future ecological recovery?"

In this project, Local Ecological Knowledge (LEK) about the history of Common Eider duck populations and distributions and about eider hunting practices on the south Labrador coast was collected and combined with information obtained using natural science methods. This research approach is a novel synthesis of LEK and scientific knowledge. Integrating both types of knowledge may provide a more complete understanding of Common Eider populations and human interactions with them, particularly over longer time periods.

1.4 ST. PETER'S BAY, LABRADOR

This research was carried out on the southern Labrador coast with an emphasis on St. Peter's Bay (Figure 1.2). This area was established as a Federal Migratory Bird Reserve/Sanctuary in 1949 at the request of the Newfoundland government. The purpose of the reserve was to protect eiders that were breeding there. However, according to records obtained from the Battle Harbour Regional Development Association, Dr. Les Tuck visited the area in June 1950 and reported very few nesting eiders. In 1959, after no increase in colony size had been reported by local sources, Tuck suggested the sanctuary status be cancelled. This cancellation, however, was deferred for several years because

St. Peter's Bay was the only federal migratory bird reserve in Newfoundland and Labrador at that time. In 1980, after an assessment by the Canadian Wildlife Service that found fewer than 40 nests during an incomplete survey, the decision to cancel the reserve status was implemented.

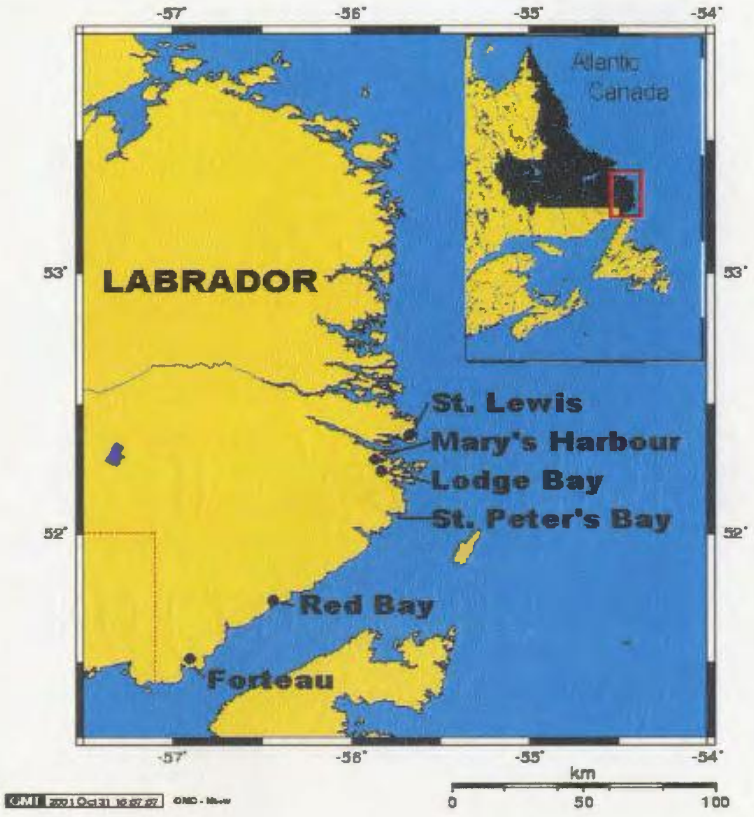

Figure 1.2. Study area on the south coast of Labrador

1.5 THESIS OBJECTIVES

In the following chapters, LEK is the primary source of information and many quotations are reported. In three chapters, LEK is combined with scientific knowledge to give a more complete understanding of the topic in question. Each chapter addresses a

main objective of the thesis. Each chapter consists of an Introduction, Methods, Results and Discussion section. Results often include and summarize major points that hunters commented on regarding a particular subject. The Discussion section overviews and synthesizes the results focusing on the changes that have occurred and their possible causes. In many places in the results and discussion of this thesis, the exact percentages of hunters that have a particular view are given. In other places the adjectives, "some", "many" or "most" are used to give a general idea of the number of hunters that had similar responses to a particular question; "some" meaning 10-20%, many meaning 25-50% and most meaning 55-95% of the 20 hunters interviewed. When information is extracted from an interview it is cited by interview and page number. For example (10:2) refers to interview 10 page 2. This reference can then be used to find the exact location of the reference in the transcripts from these interviews; some of which are deposited in the Folklore Archive at Memorial University of Newfoundland.

Chapter 2 explores how populations, distributions and migration patterns of eiders in St. Peter's Bay and the surrounding area have changed over time. It also assessses the reliability of boat surveys for breeding males, compared to more invasive nest counts that are typically used to estimate breeding populations. Chapter 3 assesses the ratio of two subspecies hunted during winter near several communities on the south Labrador coast. This ratio is compared with the composition of eider subspecies that nest there in spring and summer. In Chapter 4, the events that have caused eider-hunting practices to change, as well as how these changes appear to have affected the *borealis* and *dresseri* populations are considered. The opinions of hunters regarding eider conservation and

management are captured in Chapter 5. The significance of St. Peter's Bay for eider populations and the possibility of it being re-designated as a protected area is evaluated. To conclude, Chapter 6 consolidates the main questions addressed in the previous chapters. This chapter overviews the advantages and limitations of integrating LEK and scientific knowledge and identifies issues for future research.

CHAPTER 2: CHANGES REPORTED IN DISTRIBUTION, MIGRATION PATTERNS AND POPULATIONS OF COMMON EIDERS IN THE ST. PETER'S BAY AREA

2.1 INTRODUCTION

Many sources of information should be sought out and evaluated when studying wildlife as little is known about many wildlife species. This project involved the documentation of Local Ecological Knowledge (LEK) from local residents. Many other studies on wildlife have successfully taken this approach (Blanchard 1984, Nakashima 1991, Gilchrist and Robertson 2000, Ferguson and Messier 1997, Ferguson et al. 1998, Huntington et al. 1999, Kean 1999, Mymrin et al. 1999, Neis et al. 1999, Neis and Morris 2001) however it is recognized that LEK may have limitations that may be hard to qualify. Much scientific knowledge is not known about Common Eiders in Labrador although there is considerable LEK from hunters. Throughout this chapter distributions, migration patterns and eider populations in St. Peter's Bay and the surrounding area are studied based on LEK and scientific knowledge.

Systematic aerial counts and nest counts of breeding populations of eiders in some areas of Labrador and Newfoundland were conducted periodically through the late 1900s, by the Canadian Wildlife Service (CWS) (K. Chaulk and S. Gilliland pers. comm.). Other information on eider populations and distribution in Newfoundland and Labrador consist of recorded sightings from hunters, local residents and researchers

dating back to the mid 1700s to the present time (Lock 1986, W.A Montevecchi, unpublished data files). By collecting and analyzing LEK from eider hunters, this project provides important baseline data for St. Peter's Bay and the surrounding area. Information obtained from hunters about distributions, migration patterns and populations of *borealis* and *dresseri* subspecies on the south Labrador coast is also presented.

2.1.1 Eider Distribution and Abundance: Literature Review

Some Common Eider populations migrate thousands of kilometers during fall and spring while others are sedentary (Goudie et al. 2000). Each fall and spring the coasts of Labrador and Newfoundland are migratory pathways for *dresseri* and *borealis* (Bellrose 1976, Palmer 1976, Godfrey 1986, Nakashima 1986, Reed, A. 1986, Gilchrist and Robertson 2001).

Spring migration of Common Eiders occurs rapidly between March and June depending on overwintering location, subspecies, weather and ice conditions (Goudie et al. 2000). During this time, eiders fly in large flocks along the coast, at times flying over land such as isthmuses and peninsulas (Erskine and Smith 1986, Nakashima 1986, Goudie et al. 2000).

Populations of *dresseri* migrate from Maine, the Maritime Provinces, and the Gulf of St. Lawrence, to Newfoundland's Northern Peninsula and to the south Labrador coast approximately as far north as Hamilton Inlet (Beetz 1916, Gillespie and Learning 1974, Mendal 1980). *S.m. borealis* has a large breeding area (Palmer 1976). They migrate

from wintering grounds around Newfoundland and Labrador's coasts northward as far as Baffin Island and Greenland (Palmer 1976, Mendal 1980).

After breeding, male eiders migrate to molting sites (Palmer 1976). This migration is usually rapid, and males often leave breeding areas in late June and early July (Palmer 1976). *S.m. borealis* that nest along the northern Labrador coast are thought to migrate around the tip of the Labrador Peninsula to the east shore of Ungava Bay to molt (Nakashima 1986). During molting there is a 3-4 week period when eiders are unable to fly (Goudie 1996). *S.m. dresseri* and intergradations of *S.m. dresseri* and *S.m. borealis* that breed on the south and south central Labrador coast molt offshore, near nesting colonies (Goudie et al. 1994).

While attending broods, adult females begin to molt (Cooch 1965), usually in late August and September (Goudie et al. 2000). After molting, adult females and broods may start flying at the same time. If the young are not ready to fly, however, they may be left behind for the winter (Nakashima 1986).

Fall migration of Common Eiders generally begins in October with males and subadults of both sexes, being the first to leave molting areas (Cooch 1965, Nakashima 1986). Migration lasts throughout November, and migrants usually reach wintering areas in late November and early December (Goudie et al. 2000).

In fall, *dresseri* will migrate back to overwintering areas, mostly in Maine (Palmer 1976). *S.m. borealis* from the Arctic migrate south to overwintering areas on the southwest coast of Greenland, the southeast coast of Baffin Island, along the Labrador coast (Goudie et al. 2000), the south and southeast coasts of Newfoundland, the Maritime

coasts, and the eastern Gulf of Maine (Palmer 1976). In Labrador and Newfoundland, *borealis* replaces *dresseri* during winter (Palmer 1976, Goudie et al. 2000) and in the Maritimes and the Gulf of Maine they cohabitate with *dresseri* (Figure 2.1).

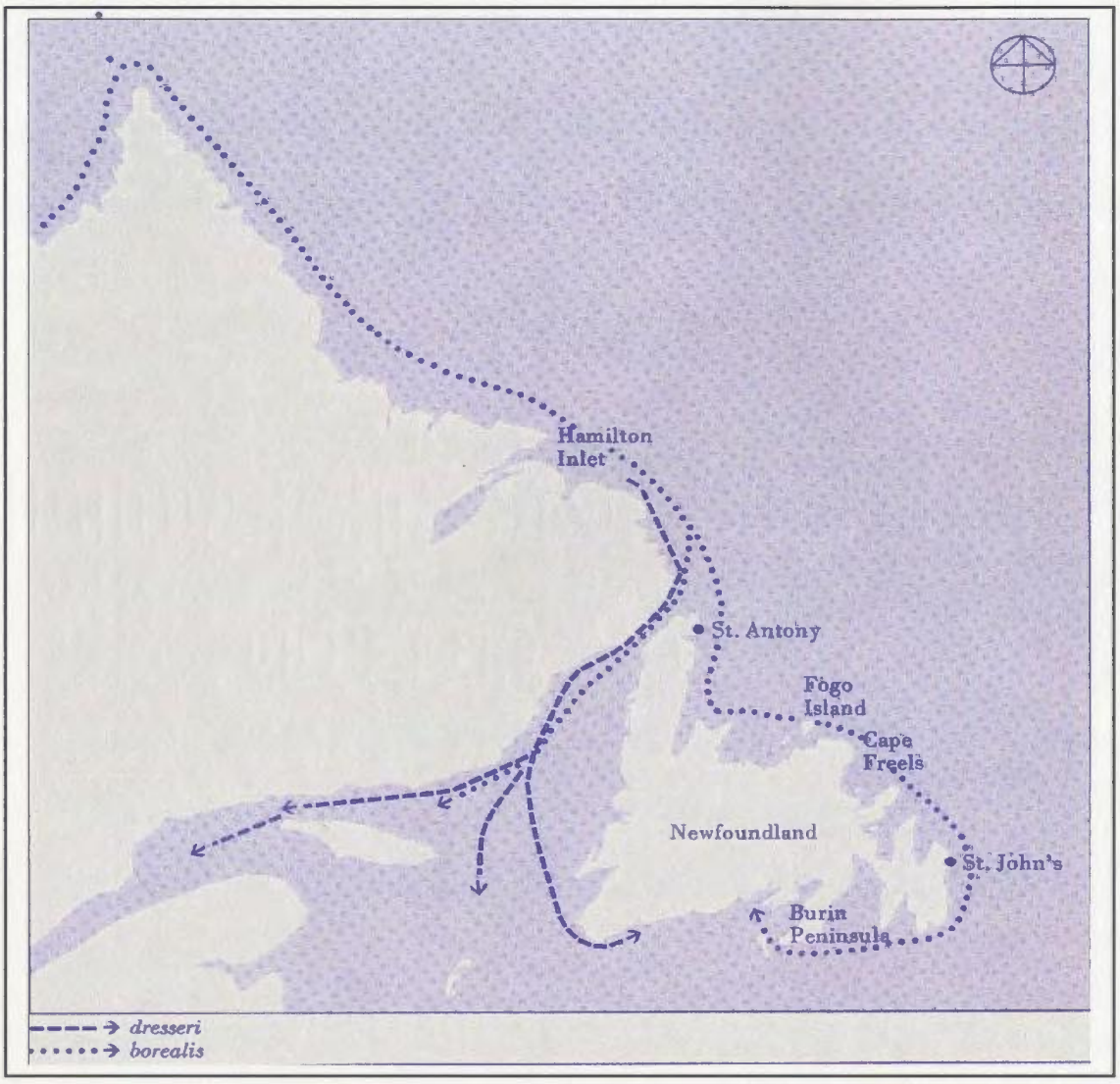

Figure 2.1. Fall migration routes of *S.m. dresseri* and *S.m. borealis* (After Gillespie and Learning 1974).

2.1.2 Population History

Aboriginal peoples, early explorers and European settlers of Newfoundland and Labrador described eiders as very plentiful (Goudie 1986, Montevecchi and Tuck 1987). Captain Cartwright, in his Labrador journals, notes killing 1500 eiders during migration from the middle of April to May 1770 (Cartwright 1792). By the late 19th and early 20th centuries, however, the Common Eider had been nearly extirpated from the northeastern seaboard of North America (Goudie 2000, Goudie 1986). This extreme population decline is thought to have been due primarily to heavy exploitation by humans (Goudie 2000). After enactment of the Migratory Bird Convention Act in 1917 strategies for Common Eider enhancement were developed in some important areas for Common Eider on the northeastern seaboard of North America (Goudie 1986). No form of Common Eider enhancement in Labrador was initiated until 1989, when a nest box project was started in Table Bay (informal interview with a hunter from Cartwright). Funding for this project ceased in 1998, and with it, eider enhancement in Labrador.

In June and July 1980, an estimated 14,000 – 15,000 pairs of Common Eiders were counted during an aerial count along the Labrador coast (Lock 1986). On Newfoundland's Northern Peninsula, Hare Bay and the Grey Islands were surveyed from 1985-1989, and in 1992, 1993 and 1996 (S. Gilliland pers. comm.). Hare Bay was also surveyed in 2000 and 2001. St. John Bay and Sacred Bay were surveyed in 1993, 1996 and 2001. On the Southwest coast, the Ramea and Burgeo area was surveyed in 1999.

Currently, populations of *dresseri* appear to be stable in the Maritimes and increasing in Newfoundland and in the Gulf of St. Lawrence. Wintering populations of *borealis* in Newfoundland and Labrador may be in decline (Goudie et al. 2000).

2.2 METHODS

2.2.1 INTERVIEW DESIGN AND SELECTION OF INTERVIEWEES

In order to collect LEK systematically, a protocol has to be followed. The main tool used to collect LEK in this study was a semi-directive, in depth interview schedule with a mapping component (Nakashima 1991, Neis et al. 1999, St. Martin 2000). The semi-directive interview schedule provided hunters with a chance to elaborate on questions and introduce information if they desired. In this way, the interview was guided by the interviewer but gave the interviewee freedom to answer the questions being asked as well as to add information they considered relevant and important. Before the research began, the interview protocol involving the consent form describing the risks and benefits of being interviewed, the semi-directive interview schedule, and an archival deposit form for the tapes, transcripts and maps was approved by the Interdisciplinary Committee on Ethics in Human Research (ICEHR) at Memorial University of Newfoundland. Then the process of selecting interviewees began (Appendix 1 and 2).

The first interviews were conducted in December 2000 in Mary's Harbour, St. Lewis, Port Hope Simpson, Charlottetown and Cartwright (Figure 2.2). These

background interviews were conducted to support several CUS projects. Information on local terms for various birds and fish and information on local observations of these different species, as well as local uses for them were collected. These interviews helped to design the interview schedule, to ensure that appropriate local names were used in interviews, and to identify hunters in these communities. The people selected for this first set of interviews were all retired fishermen.

A second set of interviews concentrating on hunters, was conducted from May through August 2001 in Forteau, Red Bay, Lodge Bay, Mary's Harbour and St. Lewis (Figure 2.2). A method called snowball sampling was used to select experienced hunters who had hunted in the St. Peter's Bay area. Neis et al. (1999) used snowball sampling to identify local fisher "experts". Snowball sampling identifies people who have the most knowledge of the topic under consideration. Using this sampling method, local leaders in the community were asked to identify experienced hunters in the area and then these experienced hunters were in turn asked to provide additional names of others they thought would be appropriate to interview. Thus, those interviewed were among the most experienced eider hunters in their communities with the best knowledge of the history of hunting and eiders in the St. Peter's Bay area.

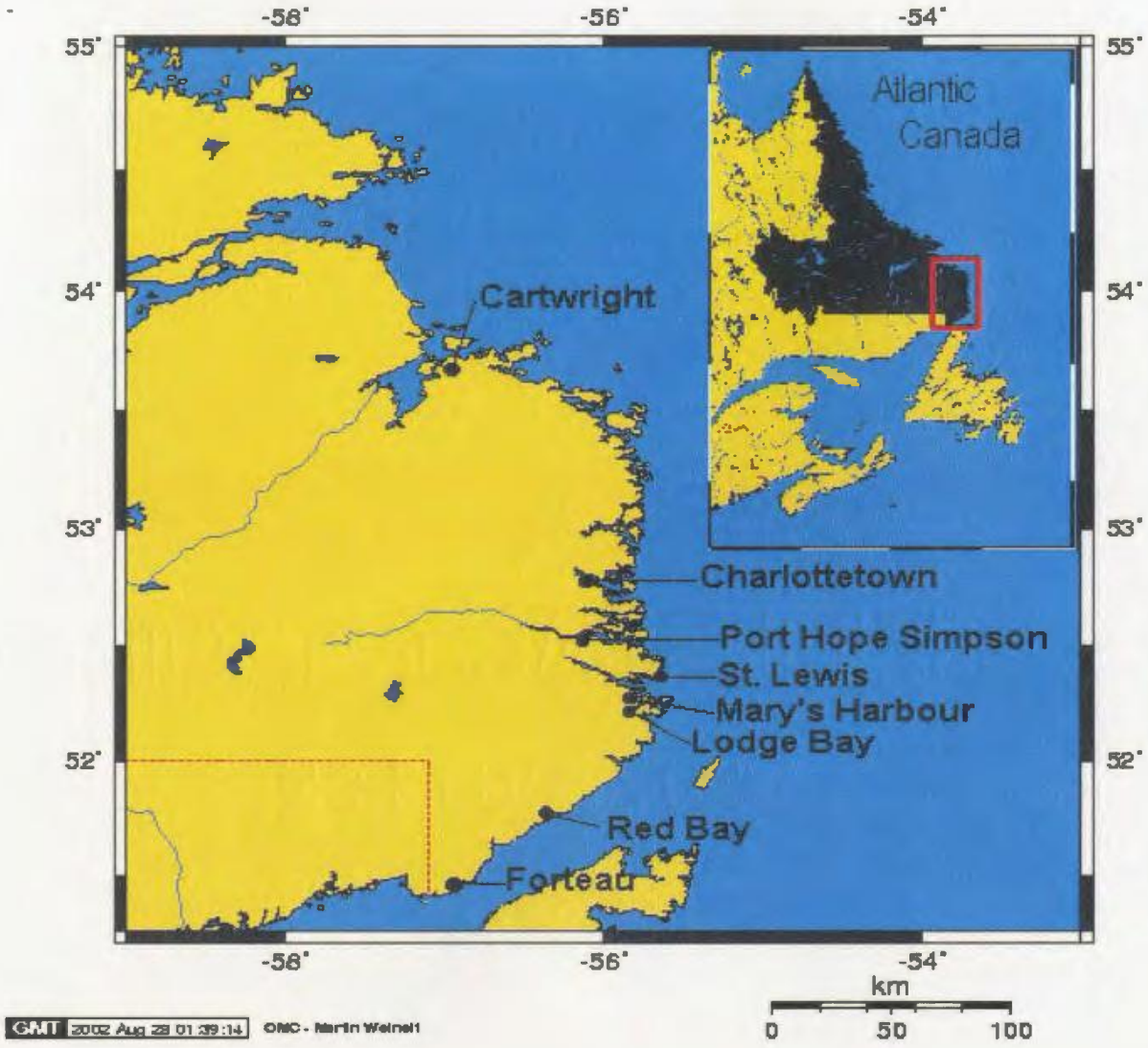

Figure 2.2. Communities where interviews were conducted in 2000 and 2001.

Twenty-two male fish harvesters were interviewed in the initial set of taxonomic background interviews during December 2000. All fish harvesters were or had been hunters. Interviewees' ages ranged between men in their 40s and 80s; most were retired from active commercial fishing. In the detailed species-specific interviews during May

through August 2001 an additional 20 male hunters whose ages ranged between 27 and 84 were interviewed (Figure 2.3). All had been hunting for at least 12 years in the St. Peter's Bay area (Battle Harbour to Henley Harbour); 50% of them had hunted for 30 years or more in this area. All had been hunting since they were about 14 years old. A majority of the hunters made or had made their living from fishing; 28% of them were current fish harvesters; 39% were former fish harvesters.

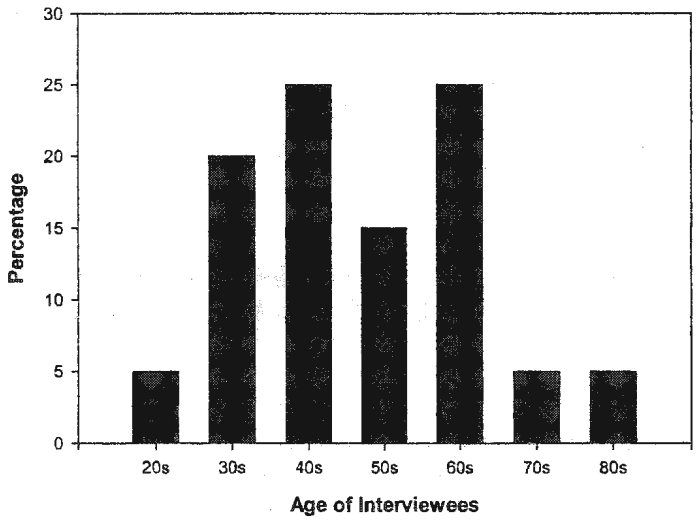

Figure 2.3. Age distribution of 20 interviewees.

2.2.2 INTERVIEW PROCESS

At the outset of an interview, hunters signed a consent form they had read or that was read to them. They also filled out an archival deposit form that enabled them to decide what they wanted to be done with the transcripts, maps and cassette tapes that were used to record the information in their interview. Interviewees were given a choice

as to whether or not have the interview recorded on audiotape. They also had the option to decline to answer a question or stop the interview at any time. Each interview included approximately 100 questions and lasted an average of 1.5 hours. The subject areas discussed included asking hunters for information on the abundance of eiders in St. Peter's Bay, the location of breeding areas, over-wintering distributions and migration patterns. Hunter awareness of eider subspecies' morphological differences and behavioural differences was also determined. They were asked to describe changes in their hunting practices over time and if changes in hunting practices could have affected the breeding and over-wintering populations of eiders. Hunters' opinions about hunting regulations, conservation and about the establishment, disestablishment and possible reestablishment of a federal migratory bird sanctuary in St. Peter's Bay were sought.

Information that could be mapped, such as the hunters' boat routes when hunting, the most popular hunting locations, eider migration routes, nesting locations, brood rearing areas and wintering distributions were recorded on a 1:60,000 (L/C 5030) nautical chart that covered the area from Battle Harbour south to Green Bay (Figure 2.4). Hunters used different colors to map different things on the chart. Green was used for the boat route while hunting, brown for the best hunting areas, red for migration routes of the eiders, blue for nesting areas, orange for eider brood rearing (or crèching) areas, and purple for wintering locations.

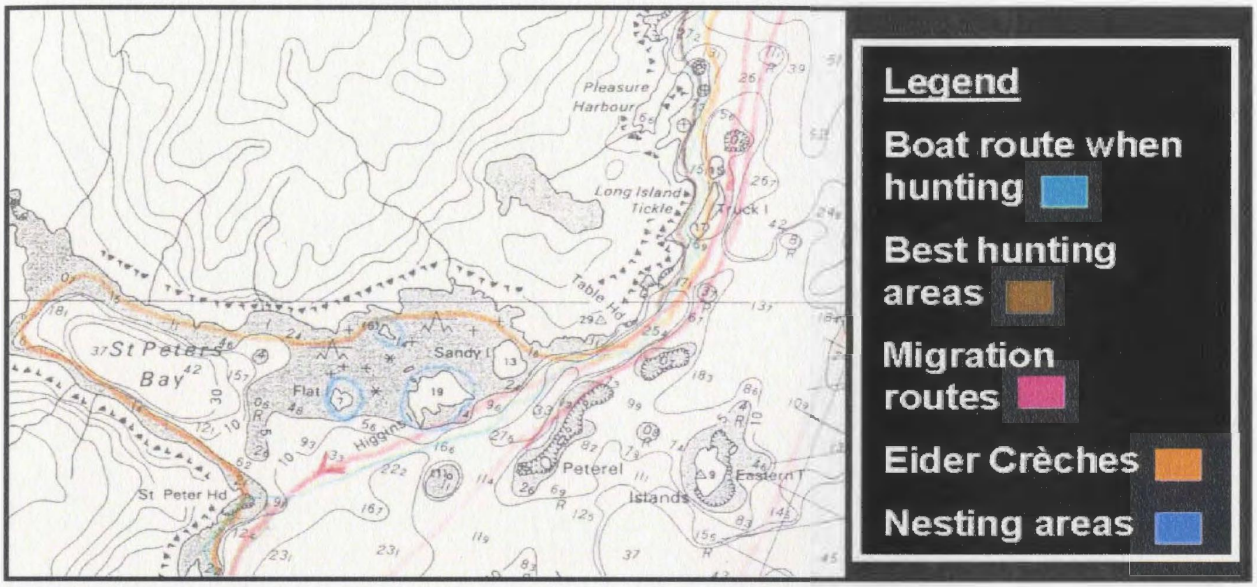

Figure 2.4. Chart used to record hunters' local ecological knowledge

To demonstrate differences between the shapes of bills of the southern and northern subspecies of Common Eider that breed and over-winter in Labrador and Newfoundland, hunters were shown pictures and mounted heads of the two subspecies.

2.2.3 Analysis of Interviews

Interviews were transcribed for detailed analysis. Summaries of each interview with major themes highlighted provided a means with which to compare interview data. Data tables were produced describing all information that was recorded on the maps used during interviews. Each map was scanned and the information on it was digitized in Map

Info©. Composite maps were then produced using Map Info© in order to combine information on specific topics from all hunters and to document changes over time.

2.2.4 SURVEYS FOR COMMON EIDERS

2.2.4.1. Male surveys from boat

Estimates of the 2001 and 2002 nesting population of Common Eider in St. Peter's Bay (52°04'N, 55°46' W), Labrador, were made on the basis of systematic surveys of eiders swimming near islands beginning on 29 May 2001 and 25 May 2002. Prior to this, pack ice prevented boats from traveling along the coast and into St. Peter's Bay.

Surveys were divided into two time periods in 2001 and 2002. For 2001, 29 May to 12 June (pre-hatch) and 19 July to 4 August (post-hatch). For 2002, 25 to 28 May and 7 to 12 June (pre-hatch). Each survey was conducted from a 6.1 m, open boat that completely circumnavigated the islands in St. Peter's Bay. The inside islands, Harbour, Higgins, Black and Goose Islands, were surveyed sequentially (Figure 2.5). On clear days when the wind was less than 36 km/hr (29 May, 11, 12 June 2001 and 25, 27, 28 May, 7, 9 ,10, 12 June 2002), the survey continued to the outside islands, Double, Western, Eastern, Rock in the Run and Peterel Islands, which were also surveyed sequentially. All islands were surveyed within 18 to 20 m of the shore at a speed of about 10 km/hr. When the tide was low, the survey was carried out farther from the

shore, the furthest distance being about 30 m, and at a slower speed of 3-5 km/hr. This distance was still close enough to count birds on the water around the islands.

St. Peter's Bay has many shoals and weather conditions had to be very good in order to complete a survey around all islands in a single day. When winds increased to about 36 km/hr surveys were discontinued. St. Peter's Bay is also a very foggy place. On some days, the fog lifted by late morning and on other days, the Bay was blanketed in thick fog for the entire day. On these latter days it was impossible to conduct research.

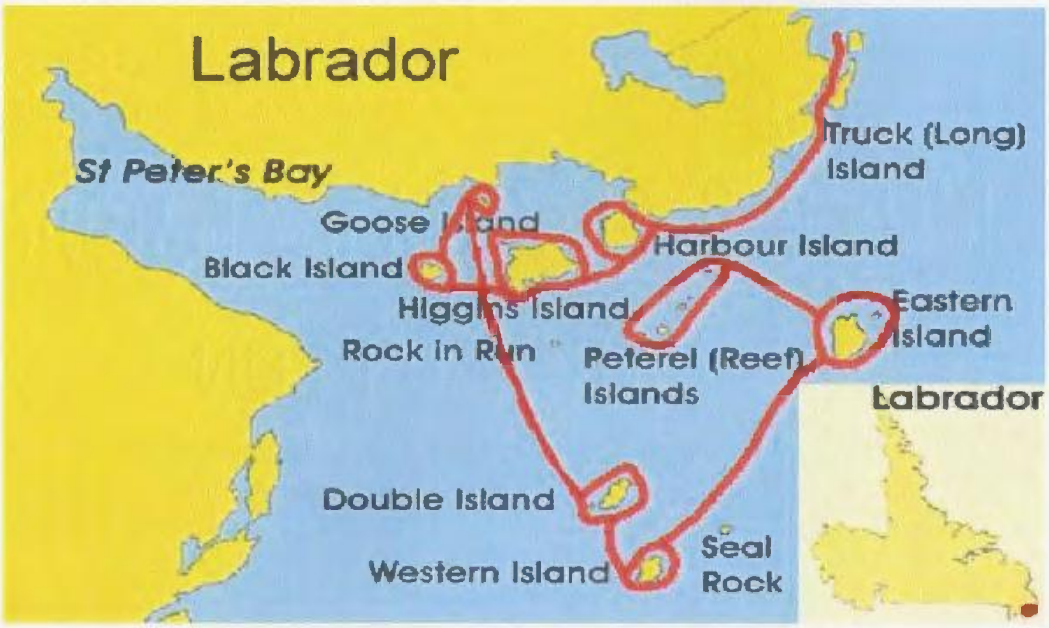

Figure 2.5. Survey route around islands in St. Peter's Bay.

Pre-Hatch Boat Surveys

The objective of the initial observations in St. Peter's Bay was to survey breeding male eiders in order to estimate the breeding population in St. Peter's Bay. Thirteen

breeding male surveys were conducted on 29, 30 May, 5, 11 and 12 June 2001, 25, 26, 27, 28 May and 7, 9, 10, 12 June 2002. Data collected during the surveys included species, number of males and if possible subspecies identification, number of birds, females, juveniles, pairs, activity, locations, wind direction and speed, and time. Survey data from 30 May 2001 was not used in the final estimate of breeding male population size because results were affected by fog.

Post-Hatch Boat Surveys

Twelve surveys were conducted around the islands and along the shoreline of St. Peter's Bay between mid-July and early August 2001, to; (1) determine how much of the breeding population were still present, (2) determine how many broods were still present, (3) and to determine how eider broods occupy different areas and habitats. Survey routes in St. Peter's Bay were the same as those carried out in May and June. Four of these surveys included the coastline between St. Peter's Bay and Henley Harbour (Figure 2.6). Surveys took place from 19 July to 4 August 2001. Data collected included: total number of birds, number of broods, brood sizes, ratio of ducklings/adult females, species (subspecies if possible), sex, activity, time of day and weather. The locations of broods were mapped and the sizes of ducklings relative to the adult hens that were with them were estimated.

Figure 2.6. Eider brood survey route, July 2001.

2.2.4.2. Nest surveys on foot

Pre-Hatch Nest Counts

To complement breeding male survey data and nest counts that were collected in St. Peter's Bay during June, 1999 (K. Chaulk, Canadian Wildlife Service, unpubl. data), nest surveys were conducted on 11, 12 June 2001 on Long (Small), Long (Big), Higgins, Goose (Small) and Goose (Big) Islands and on all islands in St. Peter's Bay in 2002. The number of eider nests on each island and the number of eggs in each nest were counted. The survey was conducted by a crew of four people who were evenly spaced along a survey line that ranged in length from 50 – 300 m. Surveyors zigzagged back and forth, ensuring all suitable nesting areas were inspected. Surveys were continued until the entire island was covered.

Islands were surveyed efficiently and quickly so that hens were flushed from nests for the minimum time possible. Campbell (1975) found that eider hens in a colony came back to nests within 10 min after having been disturbed by humans. During the present nest counts, some hens began walking back toward nests within 5 min of being flushed. Some islands are so level and small that the surveyors could be seen from any other point on the island and this delayed their return to nests. These islands did not take longer than 1 hr to census. Larger, hillier islands took up to 4 hr to survey but also allowed eiders to return to nests sooner. Surveys were not conducted in wet weather to avoid egg chilling after the hens had flushed. Eider hens cover their eggs with down when they leave nests

voluntarily (Campbell, 1975). However, when an eider hen is flushed because of human disturbance, she may not cover eggs leaving them partially or completely exposed (Dwernychuk and Boag 1972). During the present nest counts the surveyor closest to each nest carefully covered the eggs with down that were in the nest if the eider had not already done so. This presumably helps to maintain heat and lessen egg predation.

Using a "candling" technique, the ages of the embryos in 1-2 eggs in some nests were assessed (Resource Inventory Committee 1997). The age of the embryo was estimated by holding the egg up to the sun and looking through a cardboard tube against the eggshell. When the relative ages of eggs in a nest were assessed, hatching dates were estimated. Hatching dates from 2001 candling data were used to estimate the appropriate time to conduct nest counts in 2002. Nest counts were scheduled to be completed one week before the eggs began to hatch.

Post-Hatch Nest Counts

A post-hatch nest survey that could not be conducted in June was completed on Black Island on 21 July 2001. The procedure was the same as with the nest surveys described above.

2.3 RESULTS

2.3.1 SOURCES OF BIAS

There were sometimes differences in hunters' observations. One reason for these differences was the different spatial and temporal scales of the hunters' observations. Figure 2.7 shows where the hunters grew up and were they are currently living, and figure 2.8 shows when all hunters started hunting. Five of the hunters interviewed had stopped hunting; (two in the 1980s and three in the 1990s).

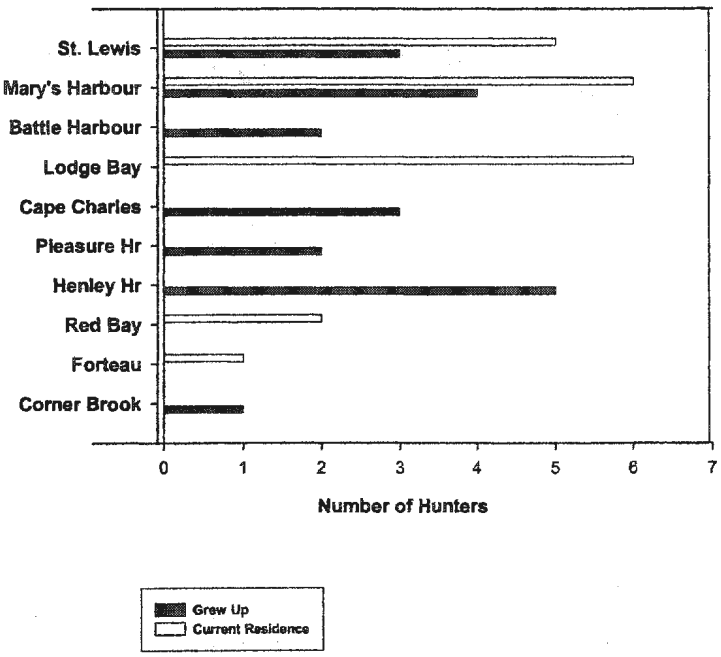

Figure 2.7. Hunters' current and past places of residence.

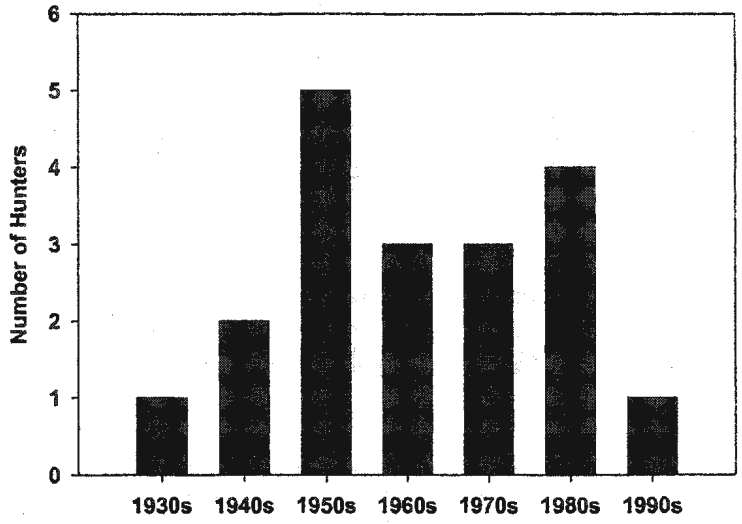

Figure 2.8. Decade when interviewees began hunting.

2.3.2 Spring Migration of Eiders

2.3.2.1. LEK About Spring Eider Migration

Hunters reported that during spring migration, eiders fly north to the coast of Labrador from the Gulf of St. Lawrence and also from the northeast coast of Newfoundland. While flying north through the Strait of Belle Isle, eiders follow the coastline (10:36). At times they follow the ice edge if it is within a few kilometres of shore (8:43). Eiders fly in a straight line avoiding bays unless it is foggy (9:20). Interviewee 4 noted that after flying past Battle Harbour, the eiders would begin to fly further off the land (4:20). This could be because the coast runs westward north of Battle

Harbour and because the eiders do not follow the coastline and may only fly past prominent headlands along the coast, eg. Battle Harbour, Black Tickle and Smokey. Interviewee 7 speculated that the spring migrants that flew past Mary's Harbour continuing to the north may go as far as Nain, Labrador or even Greenland to nest.

Hunters noted that during spring migration, most eiders fly north during the first three weeks of May (16:29). An occasional "company" (a flock of greater than two ducks) of eiders is seen flying north toward the end of May, throughout June and sometimes in July (13:3). However, it remains unknown whether the companies seen in June and July are molting males and non-breeding females. Some interviewees said that they sometimes see companies of eiders flying both north and south in spring, but the majority fly north (17:48; 18:29).

A few hunters said that most of the eiders they see flying north in the spring are males (14:7). Other hunters said that the first few companies of eiders to fly north in the spring consist entirely of adult males. After this initial "bunch" of males are observed migrating north, which usually only lasts for the first and second day of spring migration, males and females are seen flying together. Hunters find that most of the eiders that fly north in the spring are "older birds", the breeding eiders. This is a common observation among hunters as they find the "young" birds stay year round for a couple of years until they are adults. Hunters say the "older" birds are the ones that leave in the fall and return in the spring. They distinguish old from young by the color of their plumage, shape of their bill, time of year seen and their activity, and the taste and texture of their meat. It is

easier for hunters to distinguish the difference between young and old male eiders than female eiders when based on visual characteristics of the eider.

According to hunters, weather can affect spring north migration in several ways. Wind direction affects flight patterns. If the wind is blowing off the land, the eiders will fly away from the land as they migrate. However, if the wind is blowing on the land the eiders fly along the shore (15:32; 11:26; 17:46). If there is much ice in the bays along the coast, the birds will "hang up" and will wait until the ice moves offshore before continuing their migration. During fog and rain, more eiders will be seen "stopping over" during migration than when the weather is clear. Interviewee 2 noted:

> Lots of times when they start migrating they come so far and there's ice. If they're in no rush to go they'll hang up, or if the weather gets wet they'll hang up. … I've seen lots of times in May month if you got, … 2 or 3 foggy days and rain … there's birds everywhere in the water (2:25).

If eiders are seen flying in fog they are likely to be flying close to or "trimming" the land on their way north (3:19). Eiders sometimes seem to be disoriented in the fog, and may not fly straight. Most hunters drew two or more spring migration route lines representing the eiders' route during fine weather and during fog (Figure 2.9).

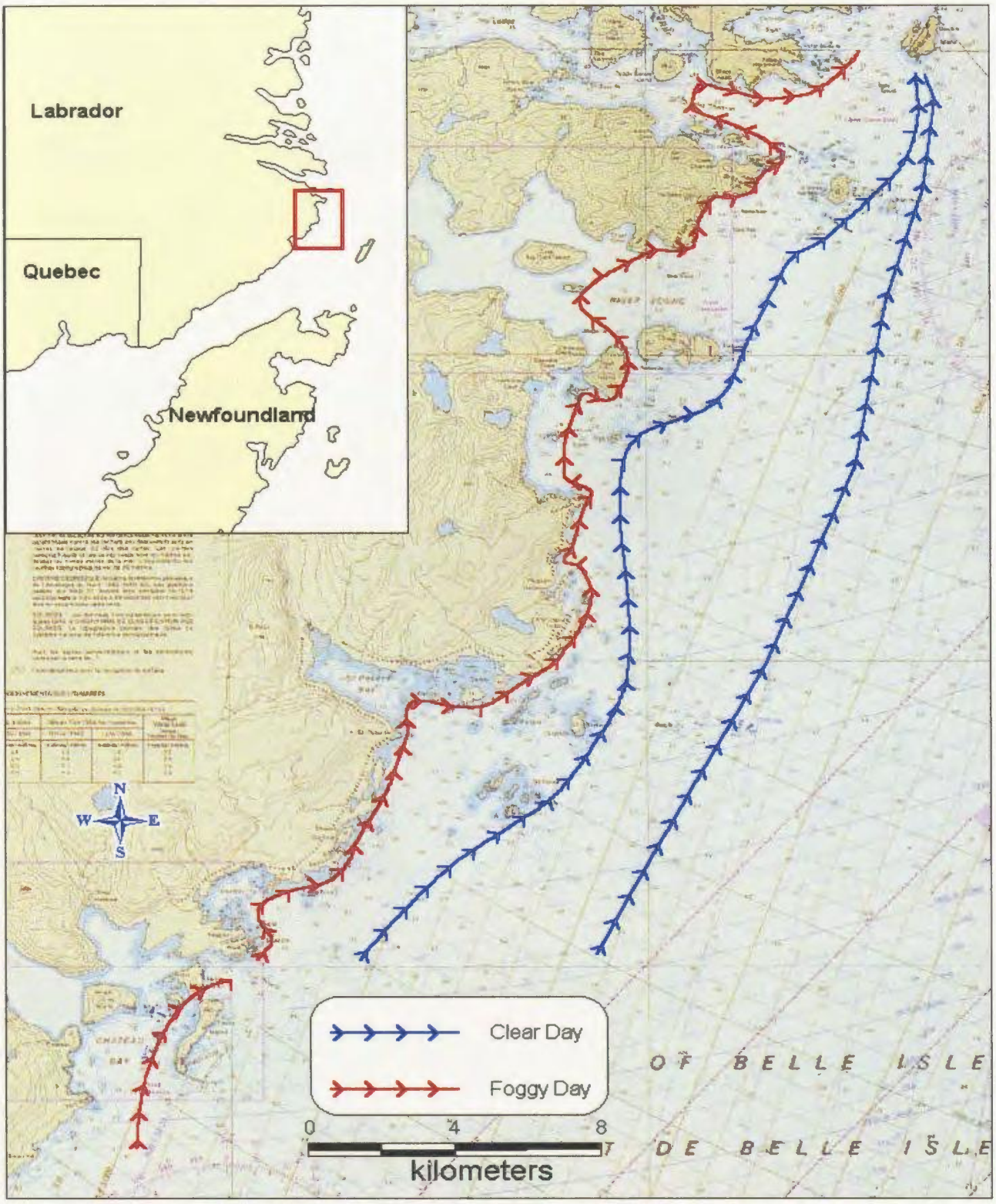

Figure 2.9. Northern spring migration of Common Eider on clear and foggy days on south Labrador coast.

Near St. Lewis, interviewee 6 observed that during spring migration, if fog and ice are close to the land, the eiders will try to fly "inside" the ice and will sometimes fly over land or even houses.

Hunters noted that most eiders flying north during spring are thin and do not seem to stop and feed. They speculate that feeding must occur when the eiders arrive at their destination. In spring, however, hunters noted that eiders do stop over at night and continue flying north early in the morning. Some of the places hunters have seen eiders stop over are St. Peter's Bay, The Ribs – a shoal area just below Battle Harbour, and Fish Rock, an island ~5 km east of Cape Charles (9:20).

2.3.2.2. Changes in Spring Migration

During the 1940s, 1950s and 1960s, between 1 and 20 May, hunters sometimes saw as many as 100 flocks per day flying north (10:48) (16:25). The majority of eiders reported continue to fly north during this period, however hunters report that spring and fall migrants now fly further from land (14:24). However, hunters are reportedly spending less time out on the headlands in spring since the commercial cod fishery ended in 1992. Interviewee 12 observed that both the numbers of flocks and eiders within focus during the spring has not changed since the early 1970s.

2.3.3 BREEDING EIDERS *(DRESSERI)*: COLONY LOCATIONS AND POPULATIONS

2.3.3.1. LEK

Colony Locations on the South Coast of Labrador

Hunters mapped the locations of nesting eiders between Henley Harbour and Cape St. Lewis. They also gave information about the changes in nesting locations, preferred nesting habitat and nesting populations on some islands.

Hunters considered nesting location and habitat in St. Peter's Bay ideal for Common Eiders. It has become a very quiet place with less boat traffic passing through than before the road opened between Red Bay and Mary's Harbour in 2000 (12:36) (7:11). Also, the grassy islands with some patches of "withy beds" (small shrubs) provide good nesting habitat for eiders. There is also a shoal near St. Peter's Bay, allowing eiders to access mussels (7:11).

All hunters recognized St. Peter's Bay as the largest breeding colony for eiders on the south Labrador coast. During the beginning of the breeding season in early spring, hunters have observed eiders all along the coast but the greatest concentration occurs in St. Peter's Bay (3:17). Some hunters said that eiders nested on all islands in St. Peter's Bay, whereas others said that only some of the islands have nesting eiders (Figure 2.10). Most hunters said that Black, Higgins, Double and Western Islands have nests on them. Interviewee 10 mentioned that during nesting time there were always just as many eiders

around the outside islands as the inside islands in St. Peter's Bay (10:29). Based on nest counts in St. Peter's Bay during spring, 2001 and 2002, Goose Island, Black Island, Higgins Island, the largest Reef Island, Double Island, Western Island and Eastern Island all had nests. The islands that had the greatest average number of nests (>100) over the two years surveyed were Black Island, Higgins Island, Double Island and Eastern Island as reported by most hunters.

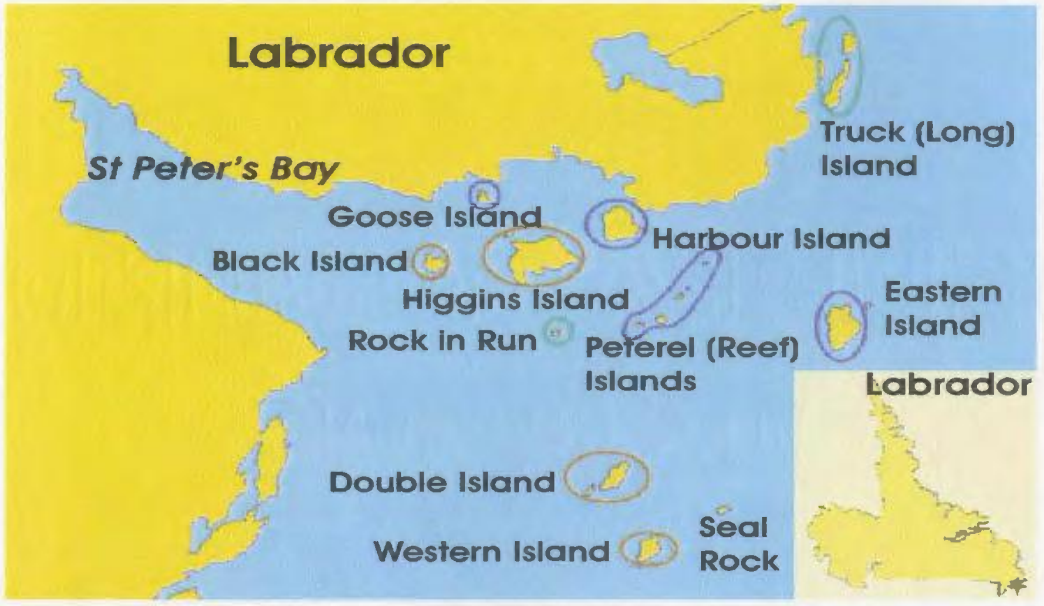

Figure 2.10. Information from hunters' interviews about eider nesting islands in St. Peter's Bay.

According to hunters, eiders nest in every bay between Henley Harbour and Cape St. Lewis, and a few eiders nest on almost all low islands along the coast. Figure 2.11 is a composite map that combines each interviewees' knowledge of old and new eider nesting areas between Henley Harbour and Battle Harbour. Some hunters also observed that eiders prefer low lying islands, and therefore will likely not be found nesting on the high islands along the coast.

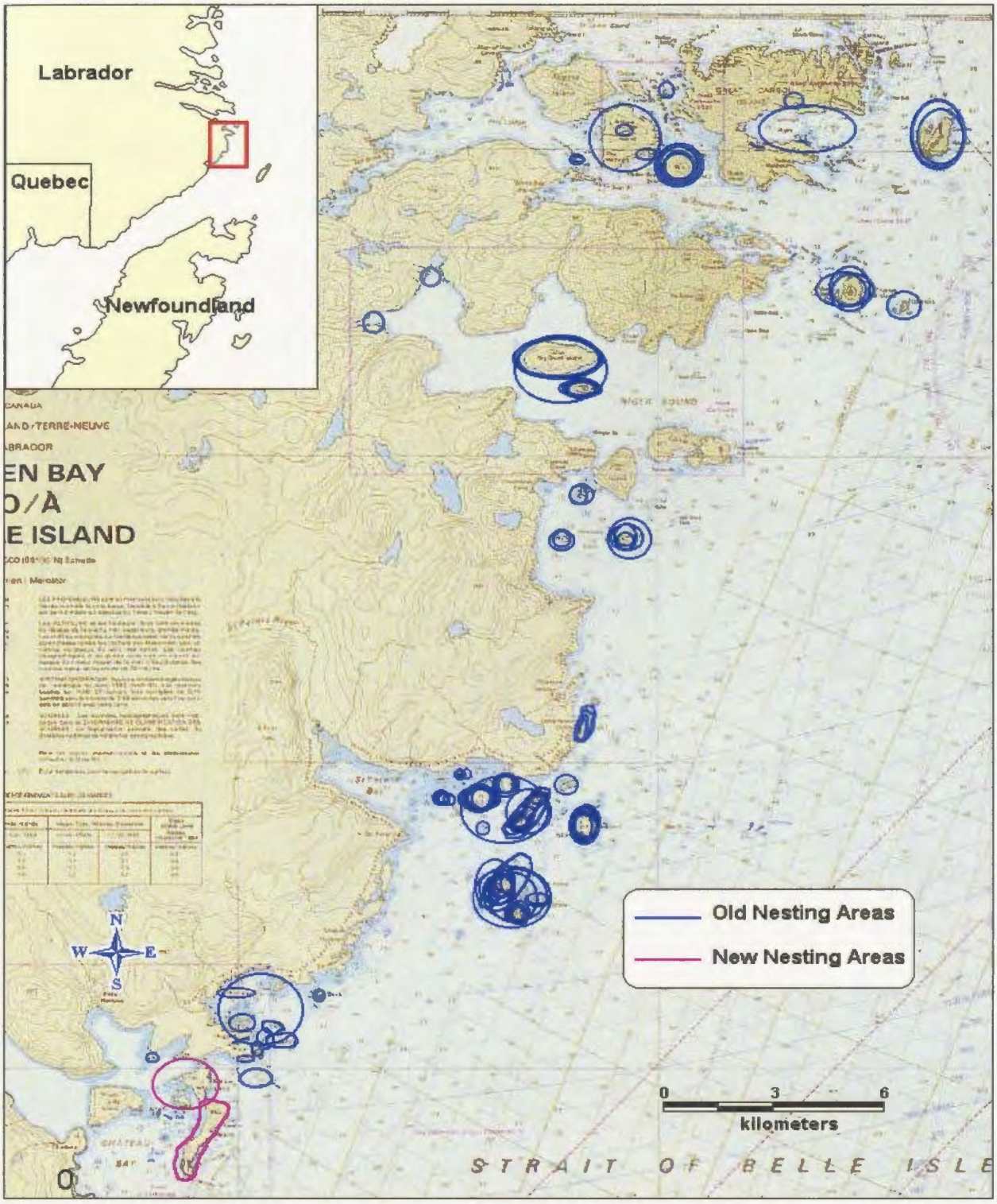

Figure 2.11. Composite map of "old" and "new" (late 1990s) Common Eider nesting areas, based on LEK, on the south Labrador coast.

Breeding Population in St. Peter's Bay

Five out of six hunters that commented on the size of the breeding population in St. Peter's Bay said that there are more eiders now in the spring and summer than there were when they started hunting; that is from the early 1930s to the early 1970s. Interviewee 9 said that it seemed like there were more eiders in St. Peter's Bay when he hunted there at times during the 1970s and 1980s, however, he couldn't say if he thought the population was declining or if there are just more eiders nesting there some years than others (9:14). Interviewee 3 said that in the 1920s, there were more breeding eiders around. When talking about the St. Peter's Bay area interviewee 11 said:

> Well these last few years there's more around there (during breeding) than there used to be ... (11:4).

Interviewee 4 said:

> I really think that they're increasing now because people don't go to islands any more to take eggs like they used to, so there's so many more left. And, there's not so much hunting goin' on. I think there's more ducks, laying birds, in that area than what there was (in the 1960s) (4:15).
> (Hunting and egging are discussed further in Chapter 3).

When asked to estimate the number of breeding pairs in St. Peter's Bay hunters gave answers from 200 to 2000 pairs. Only 40% of hunters felt they could answer this question. Out of those hunters, 75% said there were between 500 and 1000 pairs. Three of the hunters who had lived closest to St. Peter's Bay when growing up estimated

between 500 and 700 pairs. The ground estimate produced from the 2001 and 2002 nest counts was between 600 and 700 pairs.

2.3.3.2. 2001 and 2002 surveys

In 2001, the mean number of male eiders (680) counted during boat surveys was lower than the estimated number of nests (502) because nest counts could only be conducted on the four inside islands in St. Peter's Bay. In 2002, male counts in May were considerably different than those in June. In May the numbers of male breeders were low, possibly because the breeding eiders had not all arrived. In June however, the numbers increased, all breeders would have nested and possibly some non-breeders would have been present. The mean of the June breeding male eider count was used to compare with the June nest count. The results of these breeding male counts indicate that the best time to conduct breeding male eider counts in St. Peter's Bay is in early June (Figure 2.12).

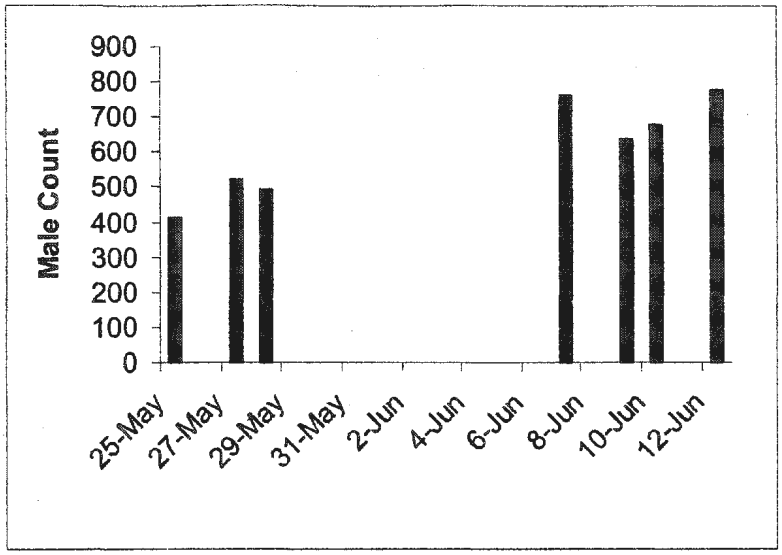

Figure 2.12. Breeding male eider counts, in May and June 2002 in St. Peter's Bay.

The mean number of male eiders counted during boat surveys in June 2002 was 713 (SD = 67, n = 4), and the total number of nests on all islands in St. Peter's Bay was 591. Spring came late however, on the south Labrador coast in 2002. This resulted in low nest counts because the eiders were late nesting and many pairs that were seen swimming near the islands in early June had not produced eggs. The 2002 field season ended on June 12, though interviewee 15 found that more eiders had nested on Black Island in St. Peter's Bay by July 11. At least 60 new nests were counted. Most of these nests had 3 or 4 unhatched eggs. Hatched ducklings about 2 or 3 weeks old were seen swimming at the same time (pers. obs.). These 60 new nests were added to the previous total of nests for 2002. Therefore there were at least 651 nests with eggs in St. Peter's Bay during spring and summer, 2002. The total nest count (651) and mean number of breeding males estimated (713) in St. Peter's Bay in June 2002 was similar. This

indicates that conducting breeding male eider surveys could be a reliable method to estimate numbers of breeding eiders and could also provide a way of quickly assessing nesting distribution in a non-invasive manner (Figure 2.13).

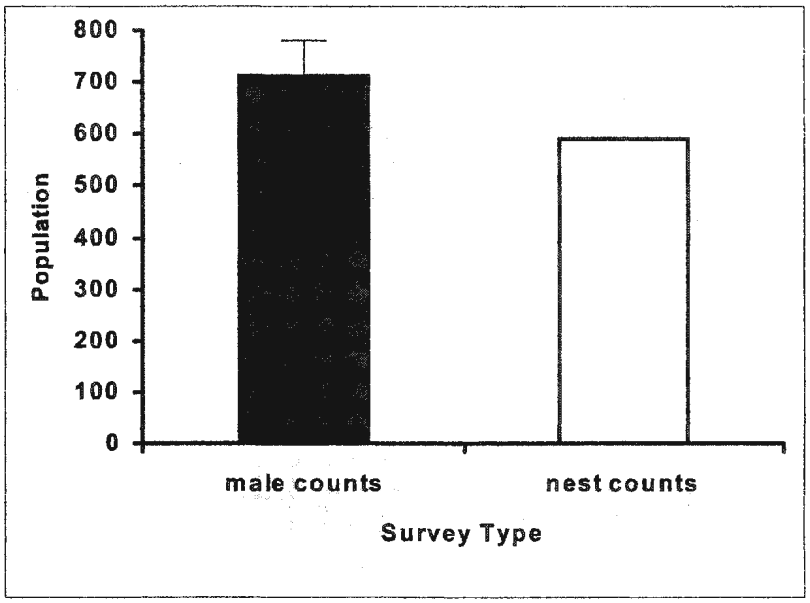

Figure 2.13. Number of nest counts and male counts on islands in St. Peter's Bay, June 2002.

In 1999 Keith Chaulk of the Canadian Wildlife Service (CWS) surveyed ten islands in St. Peter's Bay. Five islands that were surveyed in 1999 were re-surveyed in 2001. In 2002, all 12 islands in St. Peter's Bay were surveyed. Two of these islands had no nests in either year. As not all islands were surveyed in 1999 or in 2001, and more nests were found after the nest count in 2002, the total amount of nests in each year could not be estimated. Three of the islands however were surveyed each year. From these three islands it can be seen that the numbers of nests on each island vary from one year to the next from 3 to 341 % (Figure 2.14).

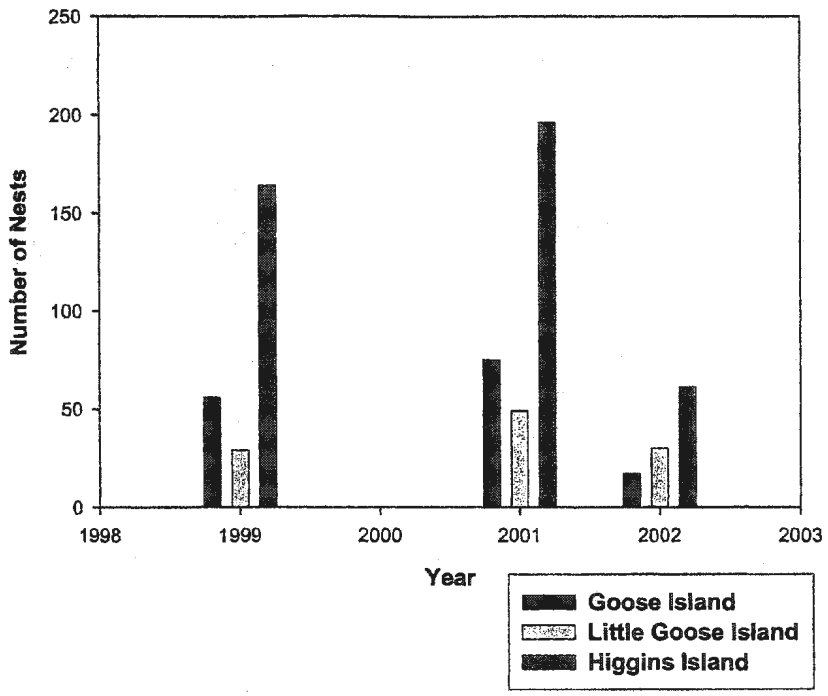

Figure 2.14. Number of nests counted on three islands over three years in St. Peter's Bay.

2.3.3.3. Reported changes in populations, colony locations and habitat

In general, hunters say that there are more nesting eiders now than in the 1970s and 1980s, and that the numbers seem to be increasing every year (12:6). Interviewee 11 said: "I know'd there is a lot more laid around this year (2001) than there was last year (2000)." Eider colony size can increase greatly over a few years if they are protected from hunting and egging (Goudie 1986). For example, in the St. Lawrence Estuary, the number of nests changed from around 200 in the early 1900s to more than 20,000 in 1986 (Chapdelaine et al. 1986). This change is similar to what is happening in St. Peter's Bay,

where the population in 1950 (month unknown) was reported by Les Tuck as, "very few nesting eiders", then 36 nests were counted on 13-14 July, 1978, and more than 651 nests were counted in July 2002. The 1978 counts excluded Eastern and Western Islands, but included nests where ducklings had already hatched, and therefore should provide a reasonable estimate of the nesting population on the surveyed islands.

In the area between Bad Bay and Henley Harbour, hunters originally from Henley Harbour noted that during the late 1990s, an increase in nests on some islands and new nesting sites on other islands were established where they had not been observed previously. Pigeon Island is one of these sites. Before the late 1990s, it used to have 10 to 12 nests but in 2001, 25 to 35 nests were found on it (11:20). Eiders are also currently nesting on Henley Harbour Island and Castle Island where, the hunters report, they had never nested when people lived there before the late 1970s (12:22) (Figure 2.11).

Breeding eiders have also "moved away" from some islands where they previously nested. For example, Interviewees 7 and 16 said that in the 1950s, 1960s and 1970s, there used to be many more eiders nesting on islands near Mary's Harbour and St. Lewis than are nesting there now. One reason some eiders may have abandoned this area is much more boat traffic in St. Lewis Bay relative to the 1950s, 1960s and 1970s. Interviewee 16 explains:

> I doubt there's going to be very many breeding in those areas like Lewis's Bay area where there used to be a lot of birds one time. I can remember when we used to live out on Battle Harbour and we used to have to come up here and cut our firewood during the winter months and in the spring of the year we'd boat out, like motorboat. And we would only go up as far as, I don't know if you're familiar with the Bay there, Hibb's Harbour what they call that – Ball's Cove, it's about probably 7 or 8 miles up from here. And there used to be say hundreds

> and hundreds of pairs of breeding birds up around the islands. Up here, like Pigeon Island they call it, and Daddy's Island there, and there's Ship's Harbour Island. But I mean you don't see that there now because there is too much traffic on the go. ... I mean people would only go up there and bring out their firewood and that would be it for the year, then. You know they wouldn't go up there and they wouldn't take too long to go up there, because there wasn't too many people livin' around, very few people livin' in Mary's Harbour. All the people then used to live in Mini Cove and Trap Cove and Matthew's Cove and Battle Harbour and Cape Town (16:42-43).

Interviewee 7 commented that if there was less disturbance from boats in the St. Lewis Sound area, perhaps the small colonies on the islands there would grow (7:21).

In St. Peter's Bay, Interviewee 12 remarked that a few eiders used to nest on Harbour Island (12:21). From the nest count, no eiders nested there in 2001 and only one pair nested there in 2002. This shows that eider nesting locations can change from year to year. Interviewee 2 observed that there used to be more short trees ("tuckamore") on Higgins Island, and that the small area of woods would be full of eider nests. Since 1994 many trees have died (2:23). Other changes to nesting habitat have been noticed since the 1960s, such as eiders nesting under shrubs rather than rocks and grass (3:18). Also, hunters had never seen any nests on top of islands in the past (3:18) but because of limited nesting areas in 2002, some eiders were on top of the islands.

2.3.4 BROODING EIDERS

2.3.4.1. LEK

Brood and crèche areas

Eider ducklings are regularly seen along the coast from St. Lewis to Henley Harbour (16:24). Hunters reported that ducklings occur in coves along the coastline during June, rather than close to the islands where they were hatched (1:1; 3:22). Interviewee 3 noticed that it is during late June to early July when most ducklings are seen around the inside islands of St. Peter's Bay. After that time they move away from the area. Some broods move further south and up into the bays (3:04; 11:21). Interviewee 11 said that the boats "drive" (scare) the eider hens and their broods and speculated that this would cause them to go up into the bays where there is not much movement (11:21). When talking about St. Peter's Bay, Interviewee 4 said:

> If they (ducklings) were born in the bay … usually they move out around the outside islands, on the shoals, …they spreads around the edge of the coast too, like so far off from the coast, and up in this area in Bad Bay … (4:15).

Interviewee 13 noticed that in the fall, the young ducks that hatched during the previous summer would be found around the outside islands of St. Peter's Bay (13:11).

Many hunters mentioned that they pick bakeapples (*Rubus chamaemorus*) around St. Peter's Bay in early August. It is during this time that most hunters see eider ducklings (10:41). This is an example of how seasonal activities could influence LEK.

Usually in July, August and September, eider hens and broods are in the bottom of St. Peter's Bay (11:21). They have also been seen along the coastline from St. Peter's Bay to Henley Harbour (as found in the 2001 brood survey) during the second week in September (18:12).

Hunters found it difficult to answer where ducklings spend most of their time feeding, because they find the ducklings in many areas and they conclude that they move perhaps in response to boat disturbance (11:22). Interviewee 10 noticed that in locations where people were fishing or living, eider hens and broods would not be seen and that they appear to avoid people (10:35).

Brood and crèche sizes

Interviewee 1 reported usually seeing 20-30 ducklings with one mother. These large "groups" (crèches) of ducklings are usually seen during June and July. In September, the crèches are smaller. As interviewee 2 states:

> Usually in September, … you might find a little bunch of birds somewhere but you won't find big bunches like … when you see the ducklings … you might come across hundreds in one place. You might come across 6 or 7 broods all together … but when September comes you might see 5 or 6 (ducklings), … whether it's because that's all that's left of them, for some reason or another, or they just separate … When the frost comes, starts getting frosty, you might see [them] bunchin' together …

Ducklings have been seen in crèches of up to 200 ducklings with 40-50 hens (11:22). Many other studies have documented brood/crèche sizes to have between 1 and 60 ducklings and 1 and 17 hens with the average of around 7-12 ducklings and 2 hens

(Bédard and Munro 1976, Munro and Bédard 1977a, Munro and Bédard, 1977b, Bustnes and Erikstad 1990, Ost 1999).

Gull predation on ducklings

Most hunters had seen gulls prey on ducklings. Because there is not as much discard and offal, from fishing, in the ocean and around processing plants, many gulls have been food stressed and may have increased their intake of other birds and their young (See also: Regehr and Montevecchi 1997, Stenhouse and Montevecchi 1999). Hunters have seen Black-backed Gulls and Herring Gulls preying on eider ducklings (9:19).

2.3.4.2. 2001 Brood/Crèche survey

Many broods/crèches were recorded on the coast between St. Peter's Bay and Henley Harbour during the 4-day brood survey, 20, 28, 29, 30 July 2001 (Figure 2.15). More broods/crèches were seen 20 and 28 July than 29 and 30 July. The number of adult females and ducklings in a crèche were variable each day with an average ratio of 1:4 adult females to ducklings (SD = 0.311, n = 65). The number of ducklings in a crèche however, seemed to be lower on the last two days of the survey. The sizes of the ducklings compared to adult females were also variable (Table 2.1). Broods/crèches appeared to move southward and decreased in abundance as the survey progressed during

the end of July. Hunters' observations were corroborated in that some of the adult females, broods and crèches moved to Pitts Harbour where there is very little boating activity.

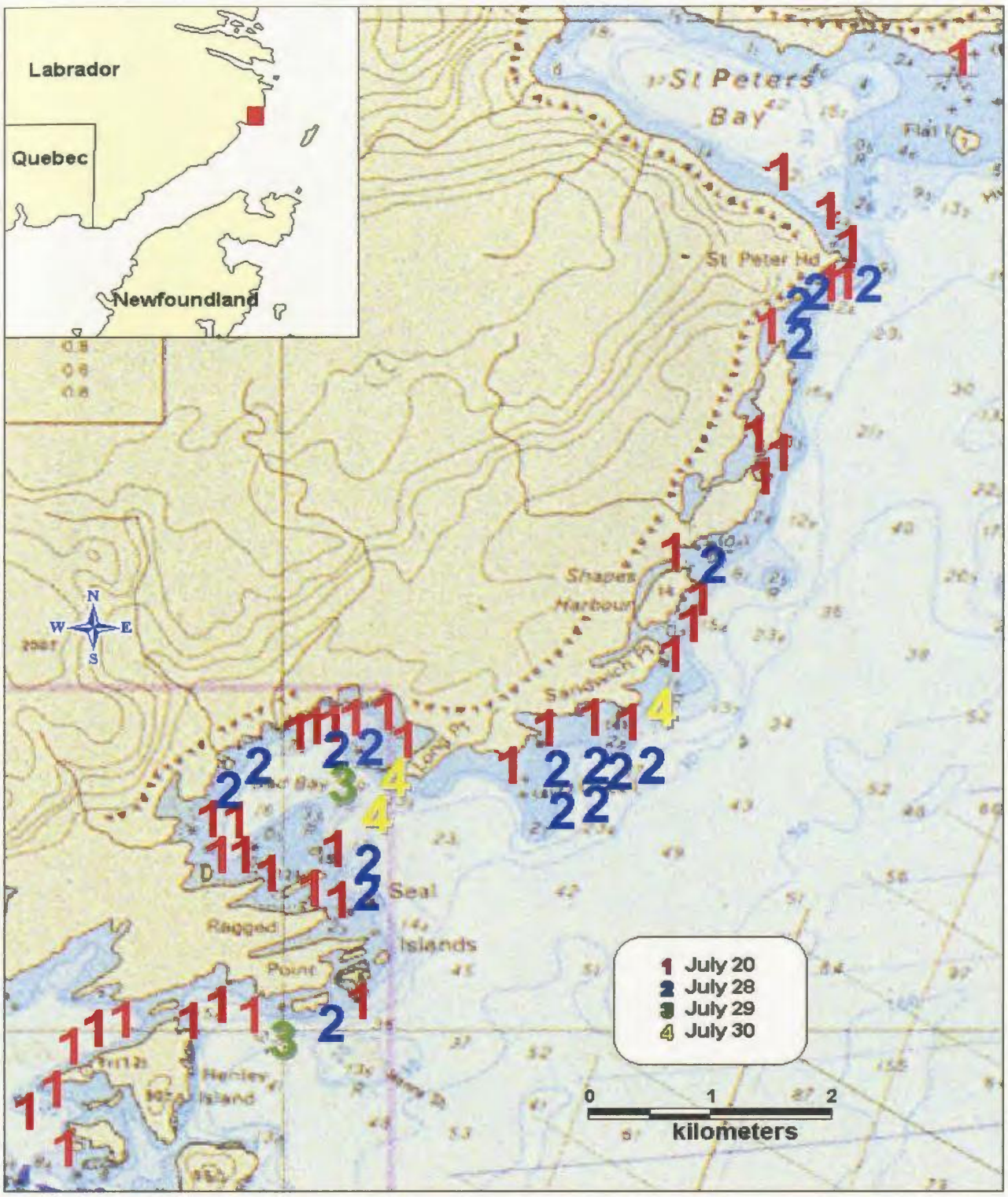

Figure 2.15. Locations of broods/crèches during a four-day survey in July 2001.

Table 2.1. Number of hens and ducklings and size of the ducklings compared to the hen on four 17 km surveys, 20, 28, 29, 30 July 2001

Date	Number of Broods/ Crèches	Mean # of adult females/ ducklings	Range of #'s of adult females in crèches	Range of #'s of ducklings in crèches	Size of ducklings compared to adult female
20 July	41	3:9	1-20	1-27	1/4 – 1/2
28 July	12	2:14	1-3	2-35	1/4 – 1/2
29 July	2	3:13	1-4	10-16	1/3 – 3/4
30 July	3	2:5	1-2	4-7	1/2

2.3.4.3. Changes in brood areas

Interviewee 11 had noticed a change in eider hen and brood areas in Pitts Harbour near Henley Harbour.

> The last few years, even up here in Pitt's Harbour, we've seen a lot of young birds and we never used to see none up around there (11:21).

Interviewee 3 noticed a decrease in the time that hens and broods stayed near the islands in St. Peter's Bay after hatching. He thought that in the past few years the hens and their broods have been moving to the outside islands and up into the bays more rapidly than before (3:4-5).

2.3.5 MOLTING AREAS

In Labrador, molting male eiders are called "bedlamer drakes". "Bedlamer drakes" are usually seen during late July and early August. Hunters have seen hundreds around the outside islands in St. Peter's Bay. During a boat survey on 20 July 2001, an estimated 300 molting male eiders were seen in the tickle of Double Island, St. Peter's Bay. On 23 July 2001, an estimated 200 molting male eiders were seen near Western Island, St. Peter's Bay although these were most likely the same flock of eiders. Molting males are not killed for food because hunters cannot legally kill ducks at that time of year (12:36). Hunters did not remember ever seeing or knowing when female eiders were molting.

2.3.6 FALL MIGRATION

2.3.6.1. LEK

While mapping movement patterns (Figure 2.16), hunters noted that most eiders flew south in November. They said that Battle Harbour was the last point of land adult eiders are seen during their fall migration south.

Figure 2.16. A hunter sharing his knowledge of eider migration

As during the spring migration, the route in fall depends on weather (2:28). However, eiders do not fly as close to the land as they do in spring (2:31; 3:59-60; 10:37). After passing Battle Harbour, eider flocks fly south even further offshore (3:21; 4:20; 6:50; 11:28) (Figures 2.17, 2.18).

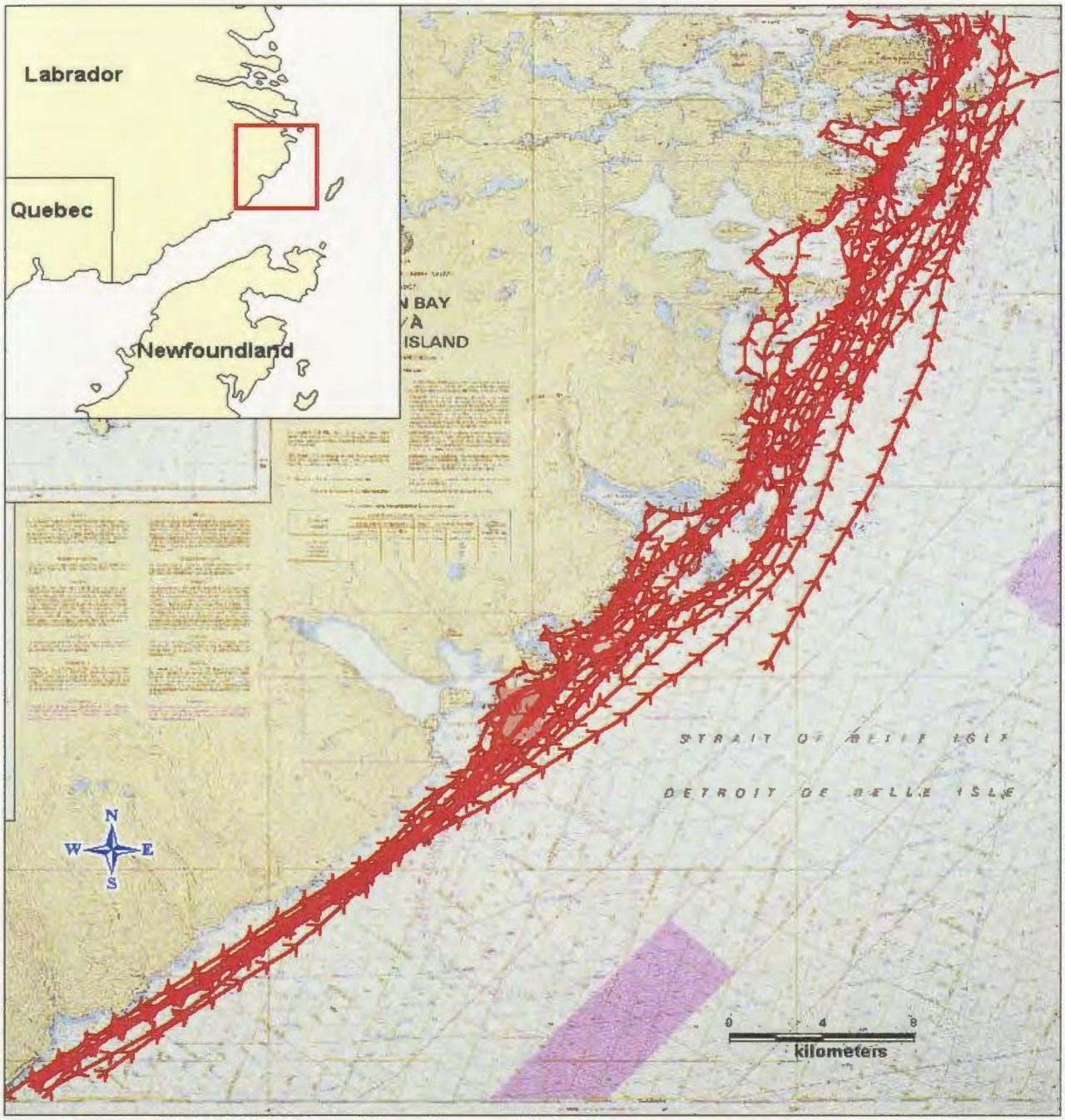

Figure 2.17. LEK information about spring migration routes of Common Eider on south Labrador coast.

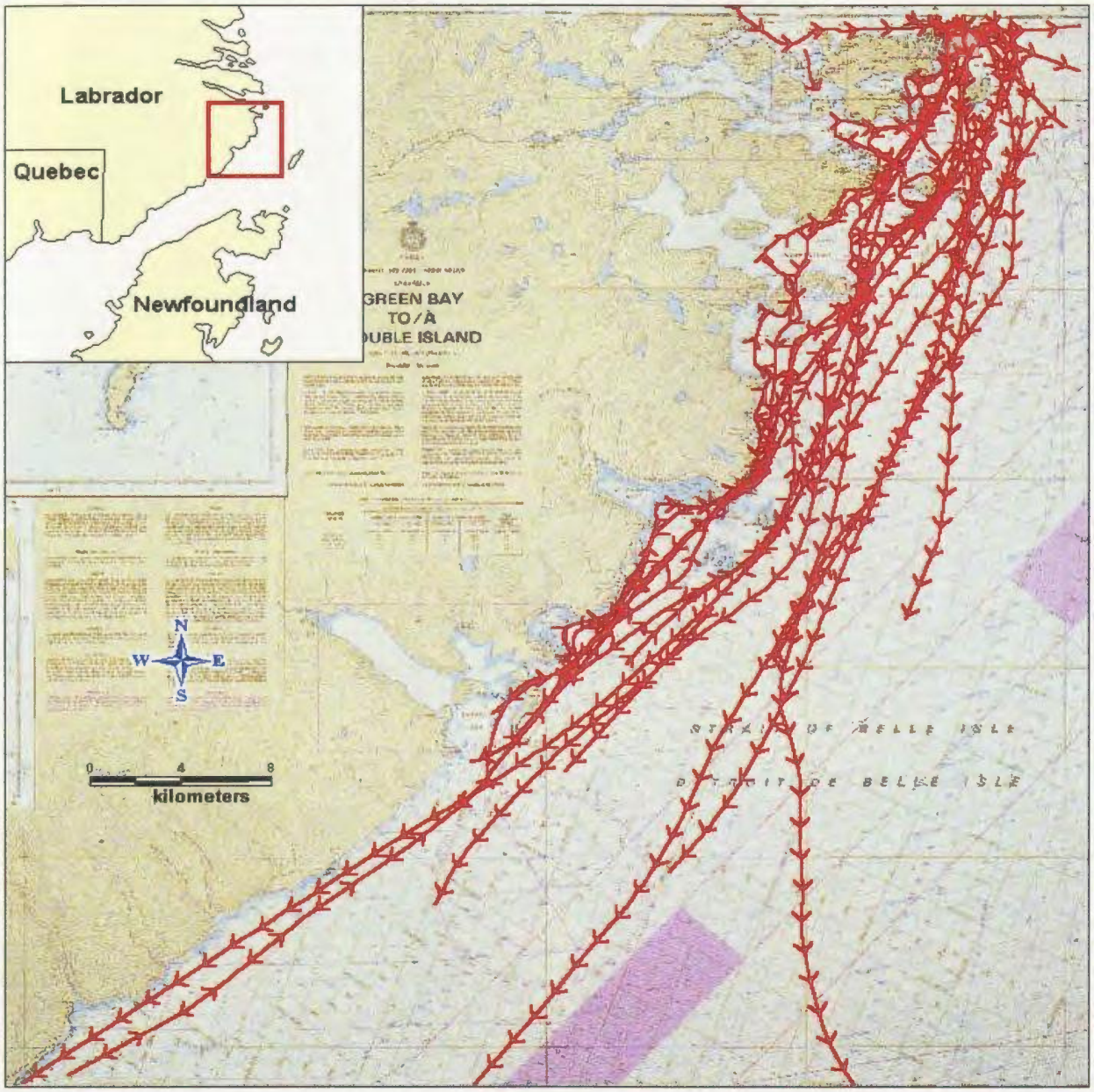

Figure 2.18. LEK information about fall migration routes of Common Eider on south Labrador coast.

Interviewee 4 remarked:

> They don't follow the coastline only on the headland, Battle Harbour is the main place they'll strike coming back [flying south in fall] (4:21). ...they come close to Battle Harbour, ... and then they'll...leave land after they [pass] Battle Harbour, they'll go right ... off ... the land. They'll come inside of Double Island. A lot of them will go outside Double but it's all [according] if it's a foggy day or which way the wind blows ... (4:20-21).

One hunter said, however, that he would see eiders flying past Camp Islands in the fall. Camp islands are about 15 km south of Battle Harbour (5:60).

Hunters who used to live in Henley Harbour never saw eiders migrating in the fall (3:21; 11:28; 10:38) unless weather was bad. In this case, the migrating eiders would 'hang up' and stay not far off the headlands until the weather cleared (3:21). Hunters speculate that the eiders flying south through the Labrador Straits in the fall "fly further from land than the eye can see" (16-24 km) (12:30). They also speculate that many eiders fly around the east side of Belle Isle and fly south in fall along the east side of the Northern Peninsula of Newfoundland, to their overwintering grounds on the north east coast of the island (3:21; 4:21).

There are reported differences in the timing of migration based upon age and sex. Males fly first and then a few days or even weeks later the females fly south (16:18). "Young" ducks may fly back and forth along the coast between the months of September to December; in contrast to most adults. The "young" eiders tend to stay all winter (15:32).

2.3.6.2. Changes in fall migration

According to Interviewee 16, the timing of fall migration has changed (16:16). Since the 1990s, the eiders seem to be migrating later in the fall, at one time starting in September but now starting in October (16:16).

2.3.7 FALL AND OVERWINTERING DISTRIBUTION AND POPULATIONS

2.3.7.1. LEK

Distribution

Common Eiders are present along the south Labrador coast in fall and winter. According to Interviewee 12, the largest concentration of eiders on the south coast during autumn is between Henley Harbour and St. Peter's Bay (12:28). Interviewee 16 explained that during September and October, he would see mostly "immature" males with just a few white feathers (these could have been males that had just molted). After mid-October, he would see "old ones" with the green feathers on their heads. (These could have been the eiders he thought were immature, however that were just molting and now had breeding plumage again). In late October/early November, there were a few males still left but most of the eiders were "young" eiders and females (16:35). Some adults stay around for the winter (16:18; 19:1; 20:1; 13:14), but most of the eiders that are

seen from November to March are "young" ducks (13:14-15; 14:7; 19:1; 20:1; 7:13; 16:18) between 6 months and 3 years old (1:1; 2:46; 7:20). Some hunters speculate that eiders will not fly south in the fall with the rest of the breeding eiders until they are three years old (2:46; 3:20). Interviewee 2 commented this way:

> ***Interviewee***: For the most part, they're mostly young birds that stay around here wintertime.
>
> ***Researcher***: And those are the ones that were born there, well hatched there?
>
> ***Interviewee***: ... well hatched somewhere ... on the coast ... when they are a year or 2 old, it don't seem like they migrate like the rest of them. ... You'll find some few old birds a scattered time wintertime. I'm not sayin you don't see none (2:46).

One hunter said that the "young" ducks keep "handier" (closer) to the land, and that the "old" ducks stay further offshore in winter (6:9). Interviewee 7 (the youngest hunter) said that it is difficult to tell whether the "young" eiders around in the winter hatched in that area the previous summer, whether they came from the north or south or whether they are this year's, last year's or older ducks (7:21).

In the late fall and winter, flocks of eiders can be seen flying north or south along the coast or far offshore (1:1; 6:49; 7:20). Hunters say that on some days during the hunting season as many as 15 flocks may be seen, and other days none are observed (2:35). Interviewee 4 described the distribution of overwintering eiders in the area where he usually hunts:

> There's no big concentrations up here winter, only like the scattered company, like say we used to kill from the land. There might be a flock of ducks around Cape Charles, one bunch up there and there might be a bunch down off Battle Harbour that just pitches there for food

> wintertime, and next day they might be 20 miles from that. They just hunting around more or less for food. But no big, big lot (4:33).

He also explained that, generally, eiders are seen swimming not far from headlands of the coast in winter (10:24). They are not seen in the frozen bays (4:18; 10:36). Some winters, however, the bays do not freeze over. During these times, eiders are seen closer to land in winter, although this does not seem to be the norm (3:24) (Figure 2.19).

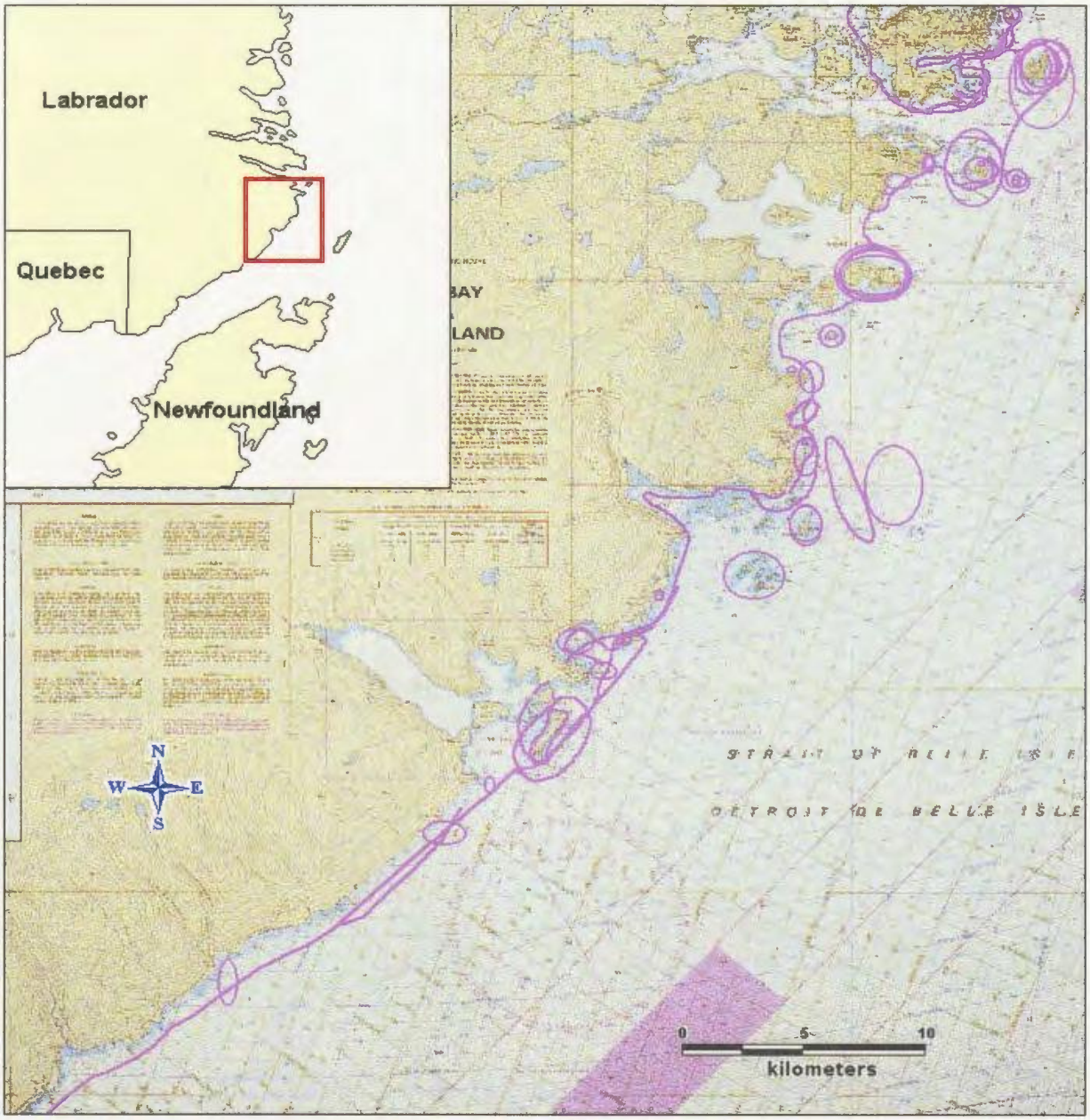

Figure 2.19. LEK information about overwintering areas of Common Eider on south Labrador coast.

Winter weather can affect eider distribution. For example, when there is no wind and "slob ice" forms, or if the wind has been blowing on land for a long period and the pack ice moves in (11:34, 15:10), eiders have no water to land in or feed in and will move elsewhere (6:9; 15:11). Some hunters suggest that when there is too much ice, the eiders fly further south.

There are not nearly as many eiders in St. Peter's Bay during late fall and winter as there are in spring and summer (18:42), although the area is rarely visited in winter due to bad weather and the cost of traveling that distance (18:42).

Populations

Both Interviewees 15 and 17 found that in St. Lewis Sound, the overwintering population has fluctuated since they started hunting in the late 1950s and 1960s (15:10; 17:68). Interviewee 17 observed that the population of eiders cycles like those of ptarmigan (*Lagopus lagopus*) or "rabbits" (*Lepus americanus*) (8:17). There are not only between-year fluctuations in overwintering eider populations, but also within-year fluctuations. Fluctuations of population size in the same winter were noted by Interviewee 3 to be most likely because of the ice. In some years, ducks would arrive after ice break-up in spring. During December and January there are most often some eiders around (9:14). In the months of February and March they get "driven" offshore or further south because the ice comes in the bays and around the headlands (18:15). Such patterns could make it seem that there are not as many eiders.

2.3.7.2. Changes in overwintering distribution and populations

Interviewee 11 said eiders occurred near Henley Harbour in winter until March. Now, however, eiders occur there in December and January but there numbers decline in February and March (11:4).

More eiders used to be seen closer inshore in winter (16:18). Interviewee 14 said that for 20 years, he has noticed that not as many eiders come in around the bay and those that do, come less often (14:5). Some reasons according to hunters are noise from boats or planes and the fact that eiders are being chased and shot from "speed boats" (boats with outboard motors) (17:8). In addition fiberglass boats can now safely penetrate thin ice and this has extended the time that hunters are out in the bay when compared to the 1970s (14:5). Interviewee 16 thought that the wintering population of eiders started to decrease after people began using "speedboats" in the 1950s and 1960s.

Interviewee 15 observed that the overwintering population decreased since the mid 1970s. Six hunters who commented on the overwintering population had very similar responses. Interviewee 16 said that the size of the eider population during winter is no more than 20% of what it was in the 1940s, 1950s and 1960s (16:38). However, in recent years, the population seems to be increasing (15:11-12; 17:8). Even though the overwintering population of eiders on the south coast of Labrador is lower than hunters can remember when they first started hunting, it seems to be higher than the breeding population of eiders (1:1; 11:4; 11:5). This suggests that some or all of these birds originate from more northern breeding populations.

Interviewee 8 said that the overwintering population is increasing near the Mary's Harbour area in the past few years, because the eiders are habituating to the boats and they "know" how fast to fly to get away from the boat and how far from the points of land to fly to stay out of gun shot range. He said:

> And I think ducks are smart because ... they know that people shot at them on this point last year and ... when they pass this point this year they gotta stay off two gun shots away, I think. Honest to god, they know. If you chased a bird in a boat, the bird flies a little bit faster than your boat do, so if you got a boat that does 50 knots, or if you got a boat that does 70 knots, that duck is going to be a little bit faster than your boat, so you're not going to catch it (8:8).

Interviewee 11 observed that near Henley Harbour, there were many more ducks in the winter in the 1960s and 1970s than now. He found that the wintering population started to decrease more in the past five or six years, going from thousands to hundreds (11:5). Another hunter, originally from Henley Harbour, said that the winter population has been decreasing for the past 10 years (12:11). He supported his observation by saying that when he used to hunt during January and February, he would see five or six companies of eiders flying in to land near one particular spot. However, in the past few years he has spent many hours at the same spot during the same time of year and did not see even one company of eiders (12:26).

2.4 DISCUSSION

I gathered LEK from hunters in Labrador regarding the migration, distribution and population size of Common Eiders on the south Labrador coast. The following

discussion highlights key findings in how migration, distribution and population have changed over time.

2.4.1 Spring Migration

Hunters noted that many changes in spring migration had taken place. One of the major changes was the difference in the number of flocks (these could be both *dresseri* and *borealis*) flying north. This is difficult to interpret because fewer hunters live on the headlands as they once did and this greatly lowers their opportunities for observing eiders migrating north. However, several also commented that when they are out in their boats during spring, they see the eiders flying further offshore.

When people lived on the headlands, they would see eiders flying by during all kinds of weather. Now that most hunters do not live on the headlands or spend much time there during the spring, they only see eiders migrating when they are out in their boats. Hunters will usually only be out in boat on clear days when winds are < 30 km/h. During warm, calm conditions eiders may fly further offshore. Hunters who still live on the headlands may not be watching for eiders during the times of day when most eiders would normally be seen migrating, early morning or late evening (10:48). Most hunters are no longer out hunting on points of land during these peak migration times because the hunting season is not open at that time. The closed season and the fact that hunters do not depend on hunting as they did in years past deter hunting during spring migration. These factors could explain why some hunters see fewer eiders during spring while

others have noticed no change, and illustrates how LEK information can be wrongly interpreted in the absence of information on changes to human activities over time. These differences in hunter observation also indicate that more local discussion and scientific research is required before conclusions can be made about the numbers of spring eider migrants and how they have changed over time.

Much of the LEK recorded about spring migration was consistent among interviews. Generally hunters found that most Common Eiders flew north in the first three weeks of May with flocks of male eiders being the first to migrate and flocks of both males and females continuing days after. Hunters reported that eiders migrated closer to land during fog and/or onshore winds, and further offshore on clear days and/or with offshore winds (3:21; 3:19; 6:48; 15:32; 11:26; 17:46). Common Eiders also reportedly would pause/stop their migration during periods of bad weather or dense pack ice. During a study on spring migration of King (*Somateria spectabilis*) and Common Eiders at Holman, Northwest Territories, Byers and Dickson (2001) found that "the largest King Eider flocks and the highest 2-hour counts occurred in fog, with visibility of less than 1 km".

During mapping, the migration lines drawn by hunters reflected where they originated or currently lived. A line showing a migration route usually became increasingly detailed as the hunter drew it near his place of residence. This suggests that knowledge is influenced by the travel and geographic distribution of human hunting practices in this study. Each hunter has a different perspective and level of expertise, and

this is partly influenced by their experience in a specific area. Aggregating interviews resulted in a broader geographic understanding of eider migration.

2.4.2 LOCATIONS AND POPULATIONS OF EIDER COLONIES

In the late 1990s new Common Eider nesting areas (*S.m.dresseri*) were found, by hunters, on Castle and Henley Islands in Henley Harbour. Nesting areas near Mary's Harbour were abandoned. These changes in colony locations seem to be directly related to human activity in the areas, with eiders moving out of areas that are increasingly busy and into areas such as Henley Harbour, an abandoned community that now has very little human activity.

The mean number of male eiders counted in 2001 (680) and 2002 (713) were similar, suggesting that less than 1000 pairs (*dresseri*) nested in St. Peter's Bay during both seasons. These estimates of nesting population are in the same order of magnitude as those reported by hunters (500-1000). The similarity in the nest count for all islands in St. Peter's Bay during 2002 (651) and the mean number of males counted (713) shows that boat surveys to count male eiders could be a reliable way to estimate population size (Figure 2.13). Boat surveys of males cause less disturbance to eiders than nest counts on islands because most hens will not leave their nest if a boat passes but will if a person is walking by. In some eider colonies nest counts have been conducted every summer. If after more study of conducting boat surveys to estimate breeding eider population size it is found to be a very reliable method, years of conducting nest counts could be

interspersed with three or four years of conducting male population surveys, helping to minimize disturbance on nesting eiders.

Suitable nesting areas on islands was limited in 2002, because of the late spring and the time it took for snow and ice to melt on the islands. Some, mostly grassy areas, that had many nests in 2001 had no nests in 2002. Therefore nesting areas on individual islands can change from year to year (Mehlum 1991a, Bjørn and Erikstad 1994).

In addition, nesting was late for Common Eiders on the south coast of Labrador in 2002 due to heavy pack-ice conditions. Ice maps obtained from Environment Canada, Canadian Ice Services, show that throughout May 2001, loose, scattered ice was moving on and off the coast and did not move to shore after 28 May. In 2002, there was more ice on the south Labrador coast during May and June than in 2001 (Figure 2.20). In May 2002, ice lined the coast, being densely packed on some days and more open on others. On 27 May 2002, ice moved offshore, but scattered ice hugged the shores again on 20 June 2002. The greater extent and density of ice during May 2002 restricted eiders from nesting, causing them to breed later than 2001.

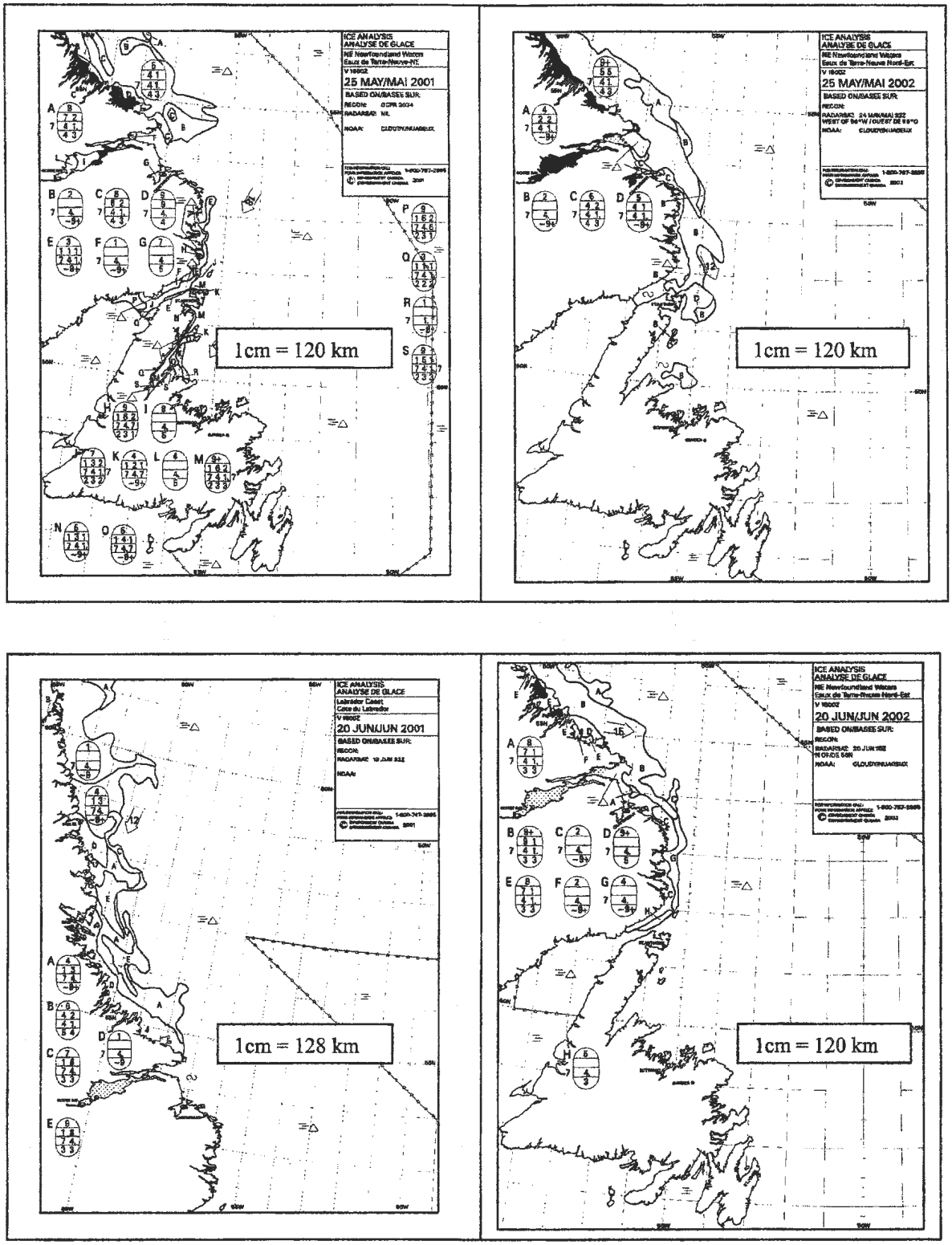

Figure 2.20. Ice distribution on 25 May and 20 June 2001 and 2002 (Canadian Ice Service of Environment Canada 2002).

In general, the breeding population of St. Peter's Bay seems to have been increasing during the past 60 years. Eighty-five percent of the hunters who commented specifically on the breeding population there said that there are more eiders nesting there now than when they first started hunting in the 1930s and up. Old records from the Canadian Wildlife Service also indicate that there were few breeding eiders in St. Peter's Bay in the late 1940s. In contrast, I found that there are between 600-700 pairs of eiders that breed in St. Peter's Bay. These estimates of nesting population size are similar to those reported by hunters (500-1000 pairs).

2.4.3 CRECHE/BROOD NUMBERS AND AREAS

As observed during the 2001 brood survey, as ducklings get older crèches seem to disperse and decrease in size. The range of adult female and brood/crèche areas (*dresseri*) seems to be expanding along the south Labrador coast as some were seen in Pitts Harbour where they had not been seen before. The new brooding areas could reflect an expansion of nesting areas or be a response of eiders to avoid increased boating activity during July and August when people travel by boat to pick bakeapples. This later possibility speculation is supported by the comments of hunters that broods/crèches do not stay near islands as long as they once did before because they are being "drove" by boats. Keller (1991) showed that human disturbance affected the behaviour of eider crèches for extended periods. Human disturbance not only delays ducklings from

foraging and other daily activities, but can also increase the rate of gull encounters and predation on ducklings by 200-300 times (Åhlund and Götmark 1989).

Another hunter's observation of broods/crèches suggests that there are now more young ducks in August and September. This is supported by other observations by hunters that there are more breeding eiders in St. Peter's Bay and more nesting areas on the south Labrador coast than when they began hunting, mostly in the 1950s.

2.4.4 Fall Migration

The later onset of fall migration of both *dresseri* and *borealis* in the past few years according to Interviewee 16, may be due to warmer falls and later winters. This assumption can be supported by the fact that Interviewee 17 noticed that ponds near St. Lewis that used to be frozen by 5 November are now not frozen until mid-December or later (17:5). Because only one hunter reported a later onset of fall migration more local discussion and scientific study should be carried out before progress in this area of research can be made.

2.4.5 Fall and Overwintering Distribution

There was considerable uncertainty regarding the over-wintering population trend of eiders. Most hunters felt there had been a decrease in the overwintering population of eiders (*borealis*) since they began hunting. For example the second oldest hunter

interviewed observed that there have been "less and less" eiders on the coast in winter since the early 1930s, whereas a few avid hunters in the St. Lewis' Bay area reported that eiders have increased in the past few years. Differences in reporting could simply reflect that hunters were describing real changes in eider numbers (declined from the past; increased recently) but over different time scales. This indicates the importance of controlling for time in studies of LEK.

The current absence of eider companies near Henley Harbour in early winter could be a result of more ice there lately. Perhaps the eiders moved elsewhere to overwinter. Interviewee 15, a hunter from the St. Lewis area, noticed more eiders overwintering near that area in the past four or five years, and this observation could suggest that some eiders are staying further north in winter recently. Perhaps eiders are responding with annual variation in ice extent in the winter. The observed small numbers of eiders during winter could also mean that eiders are not staying in the area as a result of the hunting and many boats that drive them away. They could be staying further north, going further south or, as some hunters suggested, staying offshore out of hunters' immediate view (12:7). (However, they would only be able to stay offshore if there were shoals were they could feed). Interviewee 12 attributed the low number of overwintering ducks near Henley Harbour and Red Bay to hunters from Lodge Bay, Mary's Harbour and St. Lewis who for the past 8-10 years have hunted from boat all winter long (12:11). The effects of boats on the eiders are discussed more in Chapter 4.

Some hunters observed that gulls prey on young ducks that have hatched during the summer when they are not full-grown. This has been recorded many times elsewhere

(Munro and Bedard 1977, Swennen 1988, Åhlund and Götmark 1989). Also, in the fall hunters kill a lot of "young" ducks. They say this contributes to the decrease in overwintering eiders in the Henley Harbour area because these "young" eiders are the main source of the overwintering population (12:8). A few hunters also mentioned oil pollution as a problem (12:35). Interviewee 3 had actually picked up oiled eiders on the beach (12:36).

Even though a population decline is suspected some hunters conclude that there are still a lot of eiders present in winter and feel that there is little cause for concern. However, several hunters would like to see some hunting regulations changed and some form of protection for breeding eiders in St. Peter's Bay (7:19). These ideas will be discussed in Chapter 5.

As Interviewee 7 mentioned, it is difficult to determine exactly the age of "young" overwintering eiders, however all hunters reported that most of the Common Eiders on the south Labrador coast in winter are hatch-year young. In the next chapter, I analyze the age and composition of subspecies that occur along the south Labrador coast throughout the year.

CHAPTER 3: YEAR ROUND DISTRIBUTIONS OF *S.M. DRESSERI* AND *S.M. BOREALIS* ON THE SOUTH LABRADOR COAST

3.1 INTRODUCTION

Detailed information regarding the subspecies of Common Eiders in Labrador is lacking. This requires that all available information, both local knowledge and scientific should be sought out and evaluated. In this chapter, I will review; what is known about the classification of the two subspecies of Common Eider that occur on the south Labrador coast, gather new information about the subspecies from local hunters, refine classification techniques based on a new statistical analysis and discuss seasonal distribution of the two subspecies based upon findings derived from LEK interviews and analysis of carcasses sampled from the harvest.

3.1.1 HUNTER KNOWLEDGE OF COMMON EIDER SUBSPECIES

When studying traditional ecological knowledge among people of the southeastern Hudson Bay Inuit, Nakashima (1991) found that, "Qikirtamiut classification of the natural world (and specifically the Common Eider) does not, of course, abruptly end at the level of the 'species'." The knowledge of the eider hunters of southern Labrador similarly extends beyond the species level. Hunters assess the occurrence of Common Eiders in their local area throughout the year. In this section of chapter 3

hunters' knowledge of local names, bill shapes, plumage differences and behaviours associated with these are documented. Detailed information on subspecies occurrence in Labrador is lacking. In this study, recording and using temporal and spatial Local Ecological Knowledge (LEK) about Common Eiders achieved a more complete understanding of subspecies ecology. LEK also helped to interpret visual observations of subspecies and results from an analysis of a Common Eider head collection.

3.1.2 Discrimination Of Subspecies

Both *Somateria mollissima dresseri* (the American or southern Common Eider) and *S.m. borealis* (the northern Common Eider) breed and overwinter in Labrador and Newfoundland. The two subspecies geographically overlap throughout the year. Because differences in body size of these two subspecies of eider are very small and color of plumage varies greatly by age, season, and region, the most reliable method found for classifying subspecies is based on bill morphology; particularly bill measurements and the shapes of the frontal lobes (Mendal 1986). The shapes of the frontal lobes of the bills of the two subspecies are quite distinct (Figure 3.1). However, owing to overlap in subspecies range, they have the potential to interbreed, producing intergrades of the subspecies. Morphological intergradation makes the clear distinction identification of the two subspecies more difficult, particularly in intergrade zones like Labrador. Identification of these subspecies can be made at times by observing a bird in the wild or more precisely by measuring bill dimensions directly.

Figure 3.1. The northern eider (*S. m. borealis*, left) has a bill that elongates into a narrow point at its base and the southern eider (S. *m. dresseri*, right) has a bill that is more rounded at the base (After Peters and Burleigh, 1951).

When observing Common Eiders in the wild, the shape of the bill and also coloration of plumage are factors used to visually classify subspecies. Male *dresseri* has olive green feathers under the eye that extends to the back of the neck. Male of *borealis* has green feathers but only at the back of the neck (Godfrey 1966, Palmer 1976). An intergrade male has less green feathering under the eye than male *dresseri*. *S.m. borealis* males and females are slightly smaller than *dresseri* (Palmer 1976, Goudie et al. 2000). *S.m. borealis* females are also paler than the darker *dresseri* females (Palmer 1976).

A dichotomous key can be used to differentiate subspecies (Mendall 1986) but the key is cumbersome and time consuming to apply and most importantly, requires that birds be directly measured in the hand. This study was designed to develop a more efficient and precise way to classify Common Eider subspecies using discriminant functions. A more accurate and efficient method of differentiating subspecies could assist hunters in assessing their kill rates of each subspecies, and in this way be important for conservation.

3.2 METHODS

3.2.1 INTERVIEWS

In order to collect LEK about Common Eider subspecies, 20 hunters were asked various questions pertaining to the morphological and behavioural differences of *dresseri* and *borealis*. Taxidermied heads of *dresseri* and *borealis* were used during discussions of the two subspecies, to ensure that both hunter and interviewee knew which Common Eider subspecies was being talked about. The semi-directive interview procedure followed, interviewee characteristics and how the interviews were analyzed are explained more fully in Chapter 2.

Hunters did not use scientific names or local names to differentiate subspecies. However, they used certain words or phrases that described each subspecies separately. In this chapter, scientific names are used when it could be determined which subspecies hunters were talking about.

3.2.2 VISUAL SUBSPECIES DISCRIMINATION

To help determine the ratio of southern to northern Common Eider subspecies during the breeding season in St. Peter's Bay, observations to determine subspecies were carried out. On 5 June 2001, a 2-hour observation based on visual discrimination between subspecies was conducted on Higgins Island. When eiders came within 80 m of

land or while swimming, the shape of their bill could be discriminated and birds could be identified to subspecies. On 10-12 June 2001, observations to discriminate subspecies were conducted during boat surveys when eiders flew within 5 to 10 m of the boat.

In 2002, eiders were visually observed and classified to subspecies on 26-28 May and 5,10,11 June. These observations were conducted from various points on the mainland and on islands. The length of time spent observing each day ranged from 10 minutes to 1 hour. Observations were conducted from left to right or vice versa so that individual eiders would not be reclassified.

3.2.3 Discrimination of Subspecies Based on Bill Measurements

Before hunting season opened in fall of 2001 and 2002, hunters in various communities along the south coast of Labrador (Figure 3.2) were telephoned and asked if they would save heads from the eiders they killed for their own use. Most hunters were glad to assist in the project. Hunters sent the heads via Air Labrador to St. John's where they were retrieved for analysis.

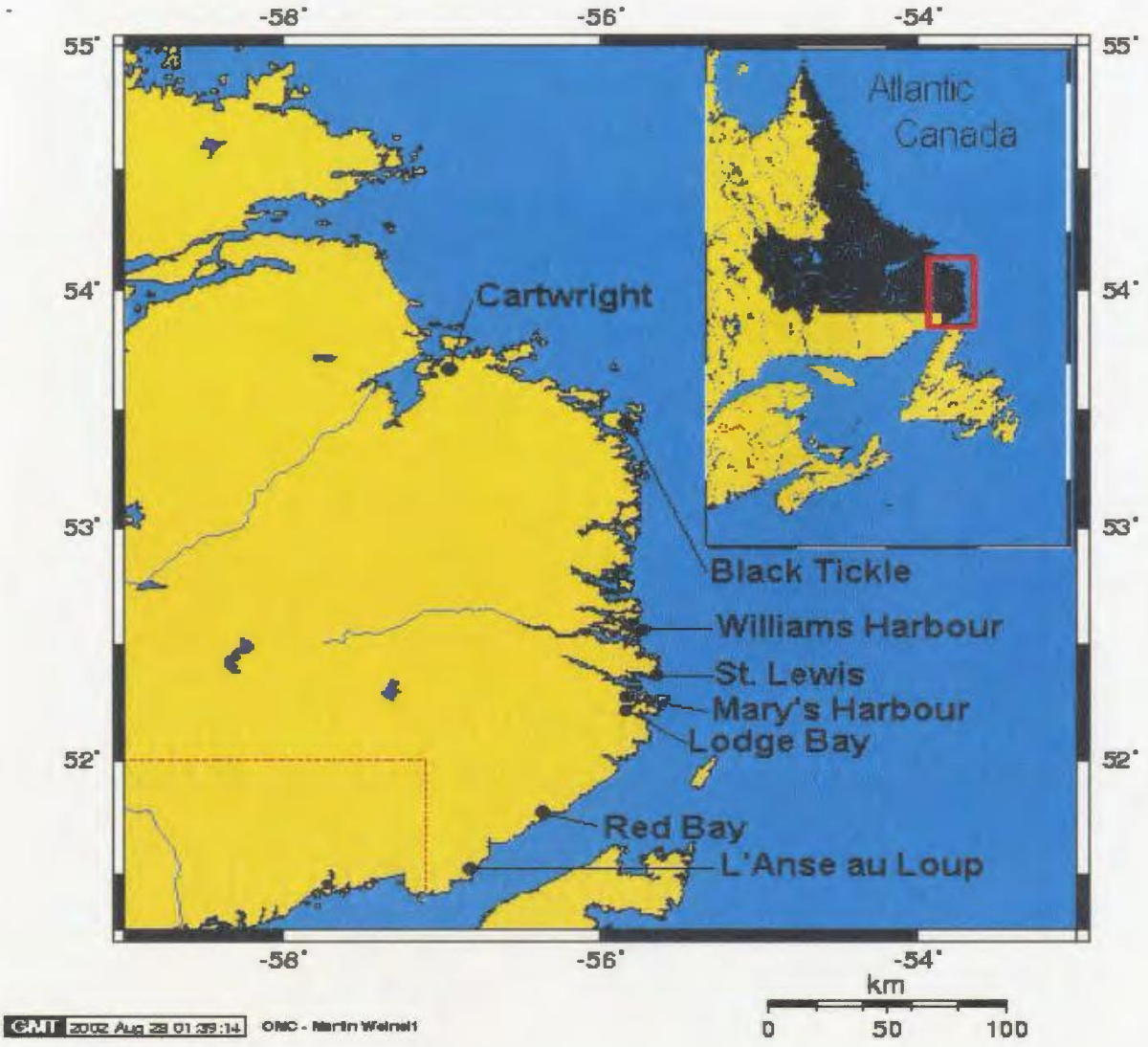

Figure 3.2. Communities where hunters collected eider heads.

Discriminant analysis of bill measurements was used to determine the ratio of southern to northern subspecies hunted during winter near several communities. On each head four bill measurements were made, to the nearest 0.1 mm with Vernier calipers. The four bill measurements were culmen midline, exposed culmen, nostril extension and frontal extension (Figure 3.3). Discriminant analysis was performed on these measurements.

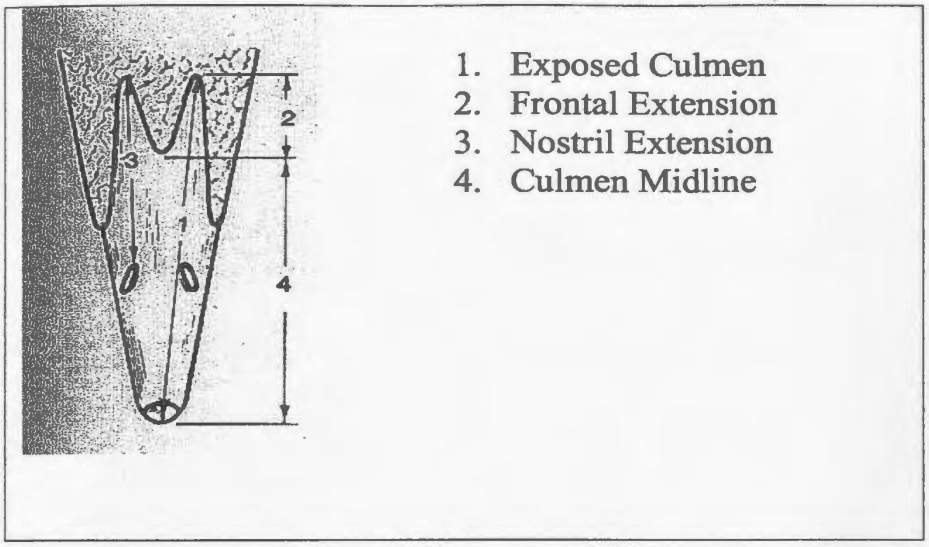

Figure 3.3. Measurements of an eider bill (After Mendall 1986).

Prior to classifying all heads collected to subspecies, a data set of known subspecies composition was used to develop discriminant functions. These came from 60 male and 60 female Common Eiders previously classified by an experienced biologist using visual identification characteristics from the whole bird and a dichotomous key based on bill measurements (Mendal 1986). These eiders were collected in the area ranging from Virginia and the New England states in the south to Hopedale, Labrador in the north. For each sex, 20 eiders had been classified as *S. m. borealis*, 20 as *S. m. dresseri* and 20 as intergrades. There are multiple traits to classify Common Eiders into subspecies (Mendal 1986, Goudie et al. 2001). Culmen midline, exposed culmen, nostril extension, and frontal extension provided accurate classification of known specimens into subspecies. These measurements were entered into the statistical software package, SPSS, a discriminant analysis was performed and discriminant functions produced.

Bill measurements of two-hundred-and-fifty-eight unclassified Common Eider heads were then processed through the discriminant functions, which distinguish between the *borealis* and *dresseri* subspecies and intergrades. Discriminant analysis was partitioned by sex, location and date shot. An eider's bill stops growing at fledging (I. Goudie, pers comm). Therefore, age difference does not affect discriminant analysis. A ratio of each subspecies to number shot in an area at a particular date was then determined.

3.3 RESULTS

3.3.1 HUNTER RECOGNITION OF SUBSPECIES

3.3.1.1. Local Naming

Interviewee 16 noticed 2 "kinds" of eiders. He called one the "American Eider" (this is actually the common name for this subspecies) (*dresseri*) and the other the "Common Eider" (*borealis*) (16:30). Interviewee 5 also remembers his father calling Common Eiders "American ducks". However he did not know if his father was referring to a particular "kind" of Common Eider (*borealis* or *dresseri*) (5:8).

Interviewees 3, 11 and 16 used the name "shoreyers" for Common Eiders, and interviewee 10 mentioned that the "old people" used to call eiders "shore ducks". These names were used extensively in Newfoundland as well (Montevecchi and Tuck 1987).

All other hunters used the term eider ducks and used the terms "duck" and "drake" for the females and males respectively. Interviewee 7 referred to the *borealis* and *dresseri* males as "old drake" and "king drake" respectively ("king drake" being different from the King Eider which he recognized as a different seaduck). During the interview some hunters, however, used the term "female" and "duck" interchangeably when talking about adult female eiders. This probably occured because the interviewer used the term female when referring to a Common Eider female.

3.3.1.2. Recognizing Bill Shape

When hunters were shown heads of the two different subspecies of Common Eider, *dresseri* (southern) and *borealis* (northern), 47% of hunters that commented on eider bill shape remembered seeing eiders with different shaped bills, but did not realize they were two different subspecies (18:35). Some hunters who had noticed differences in sizes and shapes of the bills thought these differences were due to age (4:35; 8:49; 10:44), and this is incorrect. They thought that *borealis*, with the smaller more pointed bill process, was a young eider, and that *dresseri*, with the larger more rounded bill process, was an old eider. Interviewee 7 recalled that *dresseri* also has "more of a hook on the tip of the bill." When talking about female eiders, Interviewee 5 mentioned that females do not have as much "bill" (frontal extensions are not as thick) and it is not "rose as high" as the bill of a "drake" (5:10). However, neither hunter noticed differences in shapes of bills between females. Nine of 17 hunters who commented on differences in bill shapes

said they had not noticed any (6:1; 18:35; 14:24; 15:36; 12:15; 2:47; 3:25; 11:35; 17:36). When talking about male Common Eiders Interviewee 14 said:

> I never really paid much attention to it … you just called it a drake, and I just figured they was all the same (14:25).

Some hunters who had not noticed the differences in eider bill shape said that they would look for it the next time they went hunting.

3.3.1.3. Recognizing Plumage Differences

More hunters recognized the differences in colors of the subspecies than the differences in bill shape. In general, hunters noticed that some males have more green under the eye and on the back of the neck than others (6:1; 18:35; 15:36; 11:13) and that some females are darker than others (11:13; 12:17; 15:37). Interviewee 3 said he never noticed the differences in bill shapes or feather colors of eiders before, but when shown heads of the two different subspecies, he then realized that he had seen both "kinds" before.

> Ya, I can see the difference there. I never noticed huntin' them, but I know I've seen both kinds (3:26).

Interviewee 17 also had never noticed a difference in bill shape or color but recognized the green feathers on the head of *dresseri* and recalled it being the drake that he sees in the spring. He said:

> I can identify the green with the birds … in the spring of the year we would see them (17:37).

Interviewee 10 said that he thought *dresseri* was an older eider because it has "the real ol' green on it" (10:44). He recalled seeing them mostly in spring (10:44). Interviewee 5 had noticed different "kinds" of Common Eiders. He said:

> They are all much alike, but some (drakes) got more of this green, some got it heavier than others. Some's right heavy, there's a heavy stripe ... and it goes up toward the head further. ... One's a light green, the other is a deeper green. ... So I mean they must, them is two different birds. Well this one could be younger (*borealis* head that was being observed) just the same but there is two different kinds of them. Like I said, one kind has ... the heavier ... stripe than the other (5:6).

He had also observed that the eider with the thicker green stripe that extends under the eye (*dresseri*) has more white on its back than the other "kind" of eider.

Most hunters recognized *dresseri* to be the eider that they would see during the breeding season in spring and summer (3:27; 5:7; 11:28; 17:37). Interviewee 11 noticed that in spring the "ole shoreyers" (*dresseri*) were different than eiders that were around in the winter. He said:

> ... in ... spring ... we used to call them ol' shoreyers ... That's like April, May when they starts flying down because they're different colour then altogether ... The ol' drake, is got green on him, and she's (the adult female) a different bird altogether than what is around wintertime. ... darker (11:13).

Interviewee 3 said:

> Ol' shoreyers (*dresseri*) we call them. We get them in spring ... they all got that green on them (3:27).

When talking about *dresseri* Interviewee 5 said:

> Most of the time ..., when went duck hunting ... spring ... May, we used ... to kill them kind of ducks (5:7).

Interviewee 9, however, recalled seeing the "two types" of "ducks" in spring (9:11). He noticed that some have green under the eye and some do not (9:12). He did not believe these differences were due to age. He recognized them as "two types."

Interviewee 5 mentioned 2 different colors of female eiders but did not associate this distinction with 2 different "kinds" of eiders. He and other hunters mentioned that the females that are "darker brown" or "rusty color" are "old ducks" and the "younger birds" are not as brown (5:10; 15:37). Interviewees 10, 11 and 12 mentioned that the "old duck", which is seen in spring flying back (north), is "browner," "darker brown" and "deeper brown" respectively (10:43; 11:13; 12:17). Interviewee 12 said:

> … what we call the old ducks, they are always a deeper brown (12:17).

Interviewee 10 said:

> … in … spring … when they flies back, there could be a company, and they are more browner (10:43).

Interviewee 5 said that as they get older they get "browner" and it takes them about three years to get to what he said people call "a real old brown duck" (10:43). Interviewee 13 reported one duck he thought must have been very old because she was gray in color (13:15). Interviewee 18 said he knows when a duck is very old because she is "dark brown, almost red" and they are harder to "pick" (pluck) and tougher to eat (18:37).

Many hunters said that the overwintering ducks that are "younger" are lighter in color (10:43; 12:17). However some dark ones are mixed with the lighter ones in winter (12:17). Interviewee 13 said that the older ducks in the summer are brown. He also said

that in winter younger ducks are almost black (13:15). He did not say, however, if these "younger ducks" were males or females.

Many interviewees pointed out that they see both "kinds" of male and female ducks in winter (3:27; 7:4; 10:45; 11:13; 15:37; 18:36); males that have green under the eye and those that do not, and females that are darker brown and those that are lighter. Most of them, however, are the latter of the two and only a "scattered one" is of the former (10:45; 11:13; 3:27; 18:36). Interviewee 11 recalled:

> ... there would be a scattered one (*dresseri*) mixed with them in the wintertime but not that many. Very odd one you would see with them (11:13).

Most hunters noted that *borealis* were the eiders they would see mostly during winter. After having being shown a head of *borealis* one hunter said,

> Usually this is the one you would see mostly staying around in the winter time.

3.3.2 Visual Discrimination

During observations of subspecies differentiation in St. Peter's Bay in June 2001 only one possible *borealis* was observed out of 90 Common Eiders visually identified to subspecies. The other 89 were *dresseri*. This procedure was repeated in May and June 2002, and all 75 Common Eiders carefully observed were *dresseri*. A majority of *dresseri* nesting in this area is consistent with records in previous scientific documents.

3.3.3 Discriminant Analysis

3.3.3.1. Using Eider Heads Previously Classified to Subspecies to Develop Discriminant Functions

The discriminant analysis for both males and females produced two functions (axes) to discriminate three groups. For males, the first function (1) explained 93.1% of the variance and the second (2) explained 6.9% of the variance. For females, the first function (1) explained 92.3% of the variance and the second (2) explained 7.7%. This indicates that there was high variability between groups and low variability within them for both males and females. Discriminant functions 1 and 2 are statistically significant for both males and females (Table 3.1).

Table 3.1. Percentage of variance explained and p-value of each discriminant function for male and female Common Eiders.

Sex	Axis	% Variance Explained	p
Male	1	93.1	0.0001
	2	6.9	0.012
Female	1	92.3	0.0001
	2	7.7	0.012

The amount of information each variable (bill measurement) from the male Common Eider heads contributed to each function was assessed by examining the standardized canonical discriminant function coefficients. The larger the coefficient, the more information each measurement contributes. In function 1, nostril extention and

frontal extension contributed the most information to the axis, whereas function 2 was primarily an exposed culmen axis, because it contributed much more information to the axis and had the only negative sign relative to the other bill measurements (Table 3.2). This interpretation of the contribution of variables to the axis was used to describe the axis of the canonical discriminant functions graph for male eiders.

For female heads exposed culmen contributed the most information to the axis in function 1. Frontal extension contributed the next most amount of information to the axis. As in function 1, exposed culmen contributed most information to the axis in function 2. Frontal extension contributed the next most amount of information to the axis (Table 3.2). This interpretation of the contribution of variables to the axis is used to describe the axis of the canonical discriminant functions graph for female eiders.

Table 3.2. Standardized canonical discriminant function coefficients showing information each variable (bill measurement) contributed to each function for male and female Common Eiders.

Sex	Axis	Culmen Midline	Exposed Culmen	Nostril Extension	Frontal Extension
Male	1	0.368	-0.547	0.936	0.747
	2	1.742	-3.064	1.345	0.906
Female	1	0.048	0.583	0.181	0.491
	2	0.978	-1.940	0.364	1.560

Unstandardized canonical discriminant function coefficients (Table 3.3) were used to write the identification equations for discriminant functions 1 and 2 for both male and female Common Eiders.

Table 3.3. Unstandardized canonical discriminant function coefficients for male and female Common Eiders used to write the equations for discriminant functions 1 and 2.

Sex	Axis	Culmen Midline	Exposed Culmen	Nostril Extension	Frontal Extension
Male	1	0.110	-0.174	0.357	0.302
	2	0.520	-0.977	0.513	0.366
Female	1	0.021	0.229	0.065	0.216
	2	0.435	-0.763	0.131	0.803

The bill measurements of an unclassified eider were entered into discriminant functions in order to derive discriminant scores (Table 3.4).

Table 3.4. Discriminant functions (DF) used to calculate discriminant scores for male and female Common Eiders.

Sex	Discriminant Function
Male	Df1 = -12.801 + 0.110 (culmen midline) – 0.174 (exposed culmen) + 0.357 (nostril extension) + 0.302 (frontal extension).
	Df2 = +17.350 + 0.520 (culmen midline) – 0.977 (exposed culmen) + 0.513 (nostril extension) + 0.366 (frontal extension).
Female	Df1 = -23.248 + 0.021 (culmen midline) – 0.229 (exposed culmen) + 0.065 (nostril extension) + 0.216 (frontal extension).
	Df2 = +10.660 + 0.435 (culmen midline) – 0.763 (exposed culmen) + 0.131 (nostril extension) + 0.803 (frontal extension).

These discriminant scores were then used to classify male and female eiders into groups *borealis*, *dresseri* or intergrades.

Key for classifying male and female Common Eiders from discriminant scores

When a discriminant score for DF 1 is < 0 and the discriminant score for DF 2 is > 0, the male or female Common Eider is classified as *borealis*. When the discriminant

score for DF 1 and DF 2 is > 0, the Common Eider was classified as *dresseri*. When the discriminant score for DF 2 is < 0, the Common Eider is classified as an intergrade. Using these identification equations, researchers can classify Common Eiders into subspecies with little individual bias.

The table of functions at group centroids (Table 3.5) and the discrimanant scores graphs (Figures 3.4 and 3.5) show how distinct the three groups are for both males and females. *S.m. borealis* and *S.m. dresseri* separated distinctly without overlap. Intergrades overlapped with *borealis* and *dresseri* equally.

Table 3.5. Functions at group centroids, showing how discriminant scores are used to classify male and female Common Eiders into groups.

Sex	**Subspecies Group**	**Function**	
		1	2
Male	*borealis*	-2.004	0.335
	dresseri	2.066	0.306
	intergrade	0.0624	-0.641
Female	*borealis*	-1.993	0.183
	dresseri	1.546	0.407
	intergrade	0.446	-0.590

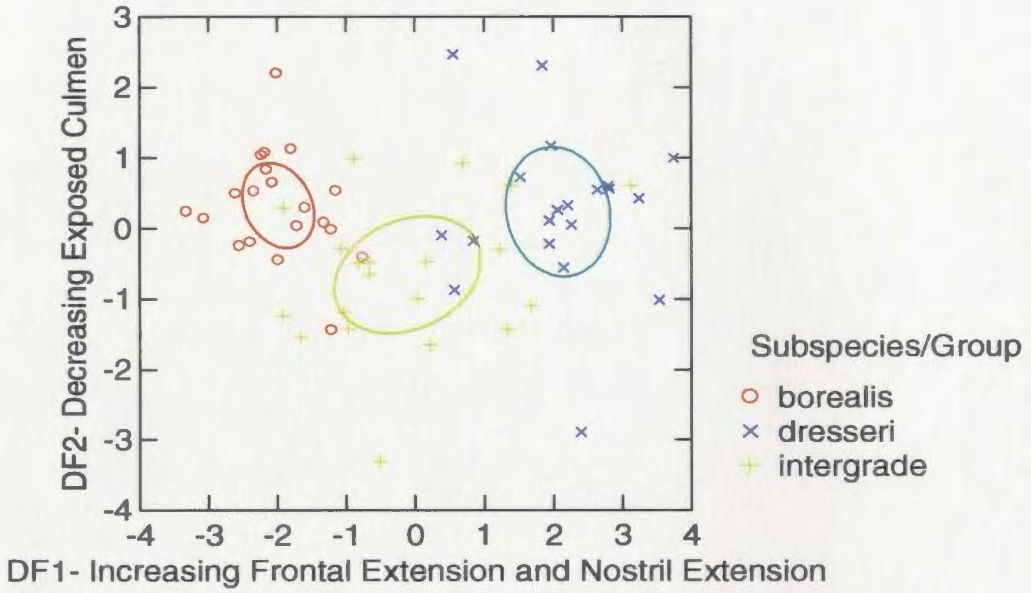

Figure 3.4. Discriminant scores of functions 1 and 2 plotted for each male eider and its respective group.

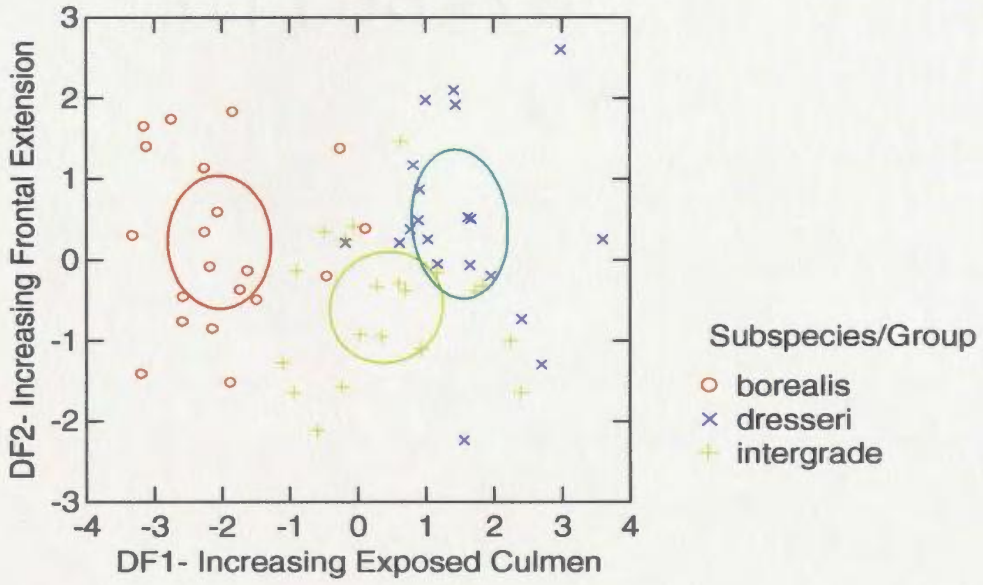

Figure 3.5. Discriminant scores of function 1 and 2 plotted for each female eider and its respective group.

For males and females, the percentages of eiders that were correctly classified as *borealis* or *dresseri* was higher than the percent of eiders that were correctly classified as intergrades (Tables 3.6 and 3.7). This result was expected because the "intergrades" are hybrids between *borealis* and *dresseri*.

Table 3.6. Classification results, conveying the percentage of male Common Eiders that were correctly classified as *borealis*, *dresseri* and intergrades.

	Subspecies Group	**Predicted Group Membership**			**Totals**
		borealis	*dresseri*	intergrade	
Count	*borealis*	18	0	2	20
	dresseri	0	17	3	20
	intergrade	4	5	11	20
%	*borealis*	90	0	10	100
	dresseri	0	85	15	100
	intergrade	20	25	55	100

Table 3.7. Classification results table, conveying the percentage of female Common Eiders that were correctly classified as *borealis*, *dresseri* and intergrades.

	Subspecies Group	**Predicted Group Membership**			**Total**
		borealis	*dresseri*	intergrade	
Count	*borealis*	18	0	2	20
	dresseri	0	16	4	20
	intergrade	2	5	13	20
%	*borealis*	90	0	10	100
	dresseri	0	80	20	100
	intergrade	10	25	65	100

Application of discriminant functions to unknown specimens collected from Labrador hunters

Seventy three percent of the Common Eider heads returned from hunters between L'Anse au Loup and Black Tickle on the south coast of Labrador between late December and late February were *S.m. borealis*, 25% were intergrades and 2% were *S.m. dresseri*. The percentage of males and females in each group is very similar to the overall percentage among all groups collected. There was no significant difference in the number of *borealis* killed near each community during this time (G-test: p= 0.68). Some eider heads that were sent from one of the most northern communities were killed in May and June, 2002. In this collection of 33 heads, 49% were *borealis*, 30% were *dresseri*, and 21% were intergrades. The only heads that were collected in October were from this same northern community. In this collection of 8 heads, 50% were *borealis* and 50% were *dresseri*.

3.4 DISCUSSION

3.4.1 RECOGNIZING *S.M. BOREALIS* AND *S.M. DRESSERI*

Most hunters distinguish eiders on the basis of colour more than on bill shape. Those who do use bill shape to distinguish eiders also use colour. Both the presence of green feathers beneath the eye rather than just on the nape of the neck, and the large

rounded bill process rather than a small pointed process are indicators of older eiders to hunters. To some hunters, these differences are indicators of two different "kinds" of Common Eider. Few hunters noticed the slight morphological bill differences that occur among the eider subspecies. Those that did, wrongly concluded that these represented age differences. However, hunters did notice and report plumage differences, particularly of male eiders.

During winter, hunters told of male eiders with less green on their heads and napes than was typical of the males they see in spring. The bill processes of the males in the winter were also smaller than those of the Common Eider males that would be seen migrating north in spring. These are characteristics of male *borealis*. Thus, based upon the observations of hunters, borealis overwinter on the south coast of Labrador rather than the *dresseri* subspecies. This complements current scientific literature that indicates that *borealis* is the subspecies of Common Eider that migrates to winter on the Labrador coast (Goudie et al. 2000). Hunters described breeding male Common Eiders as "older" males, with more green under the eye and large bill processes. They described these males as slightly larger than overwintering male Common Eiders. This description is that of the male Common Eider, subspecies *S.m. dresseri* which has been documented to breed from the south central Labrador coast, south to Massachusetts (Goudie et al. 2000).

Hunters described overwintering female Common Eiders as lighter than the ones seen flying north during spring migration. According to Palmer (1976), basic plumages of female *borealis* tend to be pale and grayish. The breeding females described by

hunters, is dark brown. According to Palmer (1976), *dresseri* females are "dark and richly colored".

Hunters also said that they saw both subspecies together. They saw some *dresseri* overwintering with *borealis* on the south Labrador coast and see small numbers of *borealis* with *dresseri* during breeding in spring and summer. Populations of *dresseri* and *borealis* overwinter together in the Gulf of St. Lawrence and on the south coast of Newfoundland (B. Turner pers. Comm.), with some inference that *borealis* breeds as far south as northern Newfoundland (Goudie et al. 2001). During breeding season there is a greater ratio of *dresseri* to *borealis* from north to south on the Newfoundland coast (L. Tuck unpubl. Data).

The morphological differences hunters observed were due to subspecies variation rather than age as most hunters had speculated. There are morphological differences due to age, however, what hunters classified as "older" and "younger" eiders were adult, *dresseri* and *borealis* respectively. Therefore hunters did observe morphological differences and did link age as being a factor in those differences but did not consider subspeciation as a reason for differences in plumage.

Knowing that the differences hunters noted in eiders were related to subspecies based upon science, and combining the observations of hunters, gives convincing evidence of seasonal differences of the presence of the two races along coasts in Labrador. *S.m. borealis* move in from the north in fall to over-winter and *S.m. dresseri* are present in summer but most move south in winter. This finding has important

management implications, because *borealis* are the eiders most heavily hunted in winter and also because any birds shot in summer are likely breeding *dresseri*.

3.4.2 Discriminant Analysis of Common Eider Bill Measurements

Hunters' observations that mostly *borealis* overwinters on the south Labrador coast are supported by scientific data collected in this study, which show that 73% of the 198 heads collected from hunters between December and February 2002 were *borealis*. Hunter observations that mostly *dresseri* nests on the south Labrador coast are also supported by the visual observation of subspecies that was conducted in St. Peter's Bay during June 2001 and May – June 2002: 99% were observed to be *dresseri*.

The collection of heads in May and June 2002 from one of the most northern communities in this study shows a much higher percentage (48.5%) of *borealis* breeding there than in St. Peter's Bay (1%) at this time. The furthest south *borealis* has been documented to breed is Groswater Bay Labrador; however Goudie et al. (2000) state that this subspecies possibly breeds as far south as northern Newfoundland. This study documents *borealis* breeding in high concentrations as far south as Black Tickle Labrador. This subspecies may have always bred there, or their breeding area could be moving or expanding further south.

3.4.3 HUNTING *S.M. DRESSERI* AND *S.M. BOREALIS* ON THE SOUTH LABRADOR COAST

The current Common Eider hunting season lasts from the fourth Saturday in November to the last day of February on the south Labrador coast, and from the last Saturday in October to the last Saturday in November and from the first Saturday in January to the last day of February on the south central Labrador coast (Migratory Birds Hunting Regulations, 2001).

Based on the results of the head collection in this project, most of the Common Eider killed during the hunting season in this region between November and February are *borealis*. Supporting this statement, Interviewee 15 observed that the eiders that he kills during the hunting season have come from the north. He states:

> We don't kill a lot of ... older birds ... The older ducks and drakes ... don't stick around very much. ... Well around this area what we kill in the winter is flying from the north to us. ... And ... around ... St. Lewis Bay, St. Peter's Bay, ... we don't get any of those at all. Cause they're flying. Before the season opens they're gone south. ... So we're getting the ducks that fly from the north (15:41).

In Black Tickle, where the season opens in October, there are some *dresseri* being killed. In October 2000, 50% of the heads collected from Black Tickle were *dresseri*. Also, on the south and south central Labrador coast some hunters continue to hunt out of season. When out-of-season hunting occurs, the Common Eiders killed are most likely *dresseri*. One interviewee said that most of the ducks he kills have green on their nape that extends up under the eye. These *dresseri* were most likely hunted in spring. Chapter 4 explores how hunting practices have changed over time and examines how these changes appear to have affected populations of *dresseri* and *borealis*.

CHAPTER 4: CHANGES IN HUNTING OF COMMON EIDERS ON THE SOUTH LABRADOR COAST

4.1 INTRODUCTION

4.1.1 PAST HUNTING PRACTICES

The Norsk noted Common Eiders to nest abundantly on the island of Newfoundland around 1000 AD (Montevecchi and Tuck 1987). From 1770-1786, Captain George Cartwright's journals provide rich detail of wildlife on the south Labrador coast (Townsend 1911). Hunting has been a way of life in the area since the first aboriginals settled there. Cartwright developed his journal of 16 years living on the south Labrador coast of into a large 3-volume work (Montevecchi and Tuck 1987). In his diaries, Cartwright briefly mentions eider-hunting experiences and provides observations of eiders. He records killing four eiders on the islands of St. Peter's Bay in July 1770 and killing a pair of eiders near Camp Islands in October 1770. He also shot four eiders in Henley Tickle (Henley Harbour) in May 1771.

Cartwright notes the spring migration of eiders in 1771, when on 27 April he observed thousands flying north near St. Peter's Bay. In 1783 he noted that the first flock of eiders to fly south in the fall was on 8 October.

During the early 1900s, Common Eider (*S.m. dresseri*) drastically decreased in numbers around the coasts of Newfoundland and came to the verge of disappearance

along the Maine coast (Norton 1907, Montevecchi and Tuck 1987, Goudie et al. 2000). Much of this was considered to be due to egging by fishermen (Gross 1944).

Until 1950, British laws of hunting regulations for Common Eiders in Newfoundland and Labrador were in effect. Hunting regulations, based on the Migratory Birds Convention Treaty between Canada and the United States, were applied to Newfoundland and Labrador following Confederation with Canada in 1949 (Montevecchi and Tuck 1987). At this time, the Common Eider season in Labrador was from October 2 to December 26. The bag limit for Labrador was 25 ducks per day, and hunters were allowed to harvest 150 ducks per season. Regulations were not specific to species and applied to all ducks.

Regulations on weapons were stricter than they are today. Legislation prohibited: "the use of an automatic gun; a pump or repeating shotgun with a magazine that could carry more than two cartridges; a swivel gun; a machine gun; a battery; any gun larger than number 10 gauge; any weapon other than a gun or bow and arrow; the use of live birds as decoys; the use of any aeroplane, power-boat, sailboat, sneak boat, or night light" (The Newfoundland Journal of Commerce 1950). Further, no person could "shoot migratory birds from a motor vehicle or wheeled vehicle or from a vehicle to which a draught animal is attached; have with him for his own use more than one shotgun at any one time while hunting migratory birds; hunt migratory birds by the use or aid of baiting with grain or other materials that may attract migratory game birds; shoot migratory birds earlier than one-half hour before sunrise or later than one-half hour after sunset" (The Newfoundland Journal of Commerce 1950 p.41). Anyone who violated these regulations

could be fined an amount no greater than $300 and no less than $10 or face imprisonment up to 6 months. They could also be both fined and imprisoned (The Newfoundland Journal of Commerce 1950).

4.1.2 Current Hunting Practices

Even though hunting regulations have been in place since the 1950s, they were not enforced until around 1986 (K. Tucker, Federal Wildlife Conservation Officer pers. comm.) Sometime before or during the 1980s, bag limits and seasons were changed (6:4) so that the season started on the fourth Saturday in November and ended on 10 March. Hunters were allowed to shoot 12 ducks per day and have 24 in their possession. During the late 1980s, hunting regulations began to be more effectively enforced (K. Tucker pers. comm.). In 1994, hunting regulations were revised for Labrador and Newfoundland and are still in effect today. In southern Labrador, the season extends from the fourth Saturday in November to the last day of February. Before the first Monday in February, hunters are currently allowed a bag of six eiders a day with a possession limit of 12. After this time, the bag limit is three per day with a possession limit of six (Migratory Bird Hunting Regulations 2001).

Even though hunters cannot shoot as many eiders a day as they could in the 1950s, many hunting regulations seem much more lenient now then they were then. For example, hunters are now allowed to use pump and semiautomatic shot guns and can use

power boats as long as they are not illegally "pursuing" the eiders in boat and the boat is not moving while shooting (K. Tucker pers. comm.).

4.1.3 Changes in Hunting Practices

Throughout the 20th Century, many changes took place in Labrador society including resettlement, advances in technology, general improvements in the standard of living, and decline in the commercial fisheries of cod and salmon. These changes have influenced hunting of Common Eiders. Changes in hunting practices have, in turn, contributed to changes in hunting pressure on the two subspecies of Common Eider (*dresseri* and *borealis*) that occur on the south coast of Labrador. Here I report on the accounts of hunters who discuss hunting practices and how they may have contributed to changes in Common Eider behaviour, population size and distribution. A summary of these results is compiled in Table 4.1 at the end of the results section of this chapter.

4.2 METHODS

Local Ecological Knowledge (LEK) was collected during interviews with 20 hunters living in Forteau, Red Bay, Lodge Bay, Mary's Harbour and St. Lewis on the south Labrador coast in June, July and August 2001. Effects of resettlement, changes in the cod and salmon fishery and technological changes on hunting practices were explored. The semi-directive interview procedure is explained in Chapter 2, which also

describes the interviewees, their hunting periods and locations, and how the interview data were analyzed.

4.3 RESULTS AND DISCUSSION

4.3.1 PURPOSE OF THE EIDER HUNT

4.3.1.1. Hunters' Diets

Eider duck is a traditional meal for some Labradorians (8:3). In the 1950s-1970s, it was tradition for everyone to have eiders for Sunday dinner (17:21), although is no longer true for most people today. Hunters who continue to hunt eiders do so because of tradition, love of the sport, and/or the taste of eider or all of these things (8:3; 10:43). Some hunters said they do not like the taste of eiders in summer and some do not like the taste of eiders from May to November (2:4; 12:9; 6:10), and could partly explain why eiders are rarely shot in summer. Interviewee 12 said,

> That's (summer) just a certain time of the year that I wouldn't kill duck because I don't think it's any good to eat anyway. … A duck from the last of May until … the first of November is, to me, is not good to eat (12:9).

When an eider was brought home to eat (1930s-1970s), nothing was wasted (20:1). Many older hunters explained that they used to eat (some still do) the whole eider, including the feet and head (1:1; 17:18). Some hunters mentioned the good taste of

duck head, neck and "paw" (feet) soup. However, today, these parts are usually discarded with the feathers (11:36; 17:18).

One hunter who no longer hunts as much as he used to said he really misses eating duck (4:11). Interviewee 6 said that he cooks a "duck" (eider) every second Sunday (6:26). Eating eider is a treat for some people, just like lobster or salmon would be a treat for others (8:55). Some hunters said that they liked the taste and texture of younger eiders more than older eiders, that young eiders are not as tough and are easier to pick (pluck) (18:37), and that adult females are also considered to be more tender than adult males and are the preferred adult to eat (15:9).

4.3.1.2. Subsistence Hunting

Interviewee 1 said that in the 1930s, he hunted because of necessity (1:1). Everyone in the community back in the 1930s-1960s needed to hunt for food (16:36; 17:63), and the eider was a "main source of meat"(16:2). Interviewee 14 who grew up in the 1950s and 1960s was part of a family with 14 children and said that his family would depend on eiders for food and would consume between 300 and 400 a year (14:10). Interviewee 2 recalled,

> There was times when … anything (food) else was pretty scarce. … So … you used what you could get (2:15).

In the 1960s, hunters hunted when the meat was needed (12:4; 14:6). Many told of times when they put themselves in very dangerous situations in order to shoot eiders

(12:23). This shows how important eiders were for subsistence. This dependence on eiders changed somewhat when several newly settled communities (under the resettlement plan of Premier Smallwood) on the south Labrador coast got electricity in the early 1970s (16:13) and people were able to buy meat at the store.

Some hunters who had started hunting in the 1980s said that they would only go hunting today when needed (6:7). Many hunters mentioned that hunting eiders is at present not a necessity for most people; however, people still like to supplement their diet with eider meat because they enjoy it and it is part of a traditional meal (16:36; 8:3).

If hunters killed more than enough eiders for their own family, they would sometimes share their kill with others in the community who failed to obtain eiders but needed food (1:1; 2:13; 17:2,20). Other times, if someone did not have eiders, he would simply go and ask a hunter who had some if they could have one (17:21). If a hunter could not give a whole eider to a family, he would instead give the family the insides of the eider(s) he had shot (17:18) Interviewee 3 said,

> If anybody never had any there were always like I say, 3 or 4 people went out and got a few birds they'd come in and they be shared with people that didn't get out you know. ... Some people couldn't go ... illness ... busy or some other thing and couldn't go. ... You always shared what you got, that was the policy then. That was it then. It's not so today (3:9).

Most hunters who were between their late 50s and mid-80s (oldest hunter) told of times when they would share their kill. This does not seem to happen as often now. Most hunters who are between their late 20s and early 50s said they hunt for their own (or own families') use (6:13; 11:9). Some of these hunters started hunting in the 1970s, some in the 1980s. Two of these younger hunters did talk of sharing their kill of eiders.

In 1941, interviewee 1 sometimes sold eiders for 50 cents (1:1). Interviewee 6 said that in the 1970s and 1980s, his family would sell eiders or trade them with people (6:14). He said, however, that he would not do that now, as it is illegal (6:14).

4.3.1.3. Hunting for Sport

Interviewee 2 said that in the past few years much of the hunting he does is for sport (2:12). Other hunters also mentioned that the purpose of eider hunting has changed from subsistence hunting to hunting for recreation and sport (7:13; 16:63; 19:1). Interviewee 7 thought, "...it's become more of a recreational thing than what it is a survival thing" (7:13). "People have so much money allotted for so many things ... and usually recreation is one of their priorities. ...It is very expensive to go huntin', ... people don't go so often as they did but there are more people going" (7:14). Interviewee 12 shares this view (12:5). Interviewee 18, who started hunting in the mid-1980s, only hunts for sport. He does not eat anything he kills. He said,

> I don't eat anything I kill. I'm a sportsman. That's it, you know. Other people eats my birds (18:19).

Because the cost of hunting is so high, not many hunters said they could afford to hunt just for sport. Interviewee 18 said,

> ... it is so expensive there's only probably ... 2 or 3 crews in this harbour (St. Lewis) that still ... hunts... all winter, when the season is open. The rest will trot out and get a few birds and that's it for them, they won't go no more. It's so expensive. And it's no trouble to tell like a plant worker down there more or less can't go burning gas huntin' birds, but someone say, [who is a] crab fisherman ...., you

> know making a nice bit of money fishing there in the season can (18:20).

4.3.2 EGGING AND DOWN COLLECTING

Interviewees recalled that most local people egged from the 1950s-1970s (9:7; 11:9). Four of 14 hunters who commented on egging said that they had taken eggs; others said they had never egged. Only one hunter who had egged said that he liked the taste of eider eggs. However, he only had two or three meals of them in his life (6:15). Another hunter who had egged had not done so in 25 years (12:10). Six of 14 hunters said they had tasted eider eggs (some said they had tasted eider eggs but had never taken any from a nest) and did not like them (4:6; 9:7; 10:14; 12:9; 15:15). Gulls eggs were more popular (4:6; 9:7; 11:9; 12:10; 17:33). When asked if he ever took eider eggs, interviewee 3 said,

> No. Some people did, but we never, ever you know. Didn't like the taste. When I was growing up, a young man, always after gulls' eggs. ... We used to eat a lot of gulls' eggs one time, everyone did; they thought they were wonderful, good. Women used to use them for baking. They were a lot better than a hens' egg for baking (3:10).

Other hunters never took eider eggs because they thought it was a waste; many eggs would not be good to eat and would have to be thrown away (16:37). Interviewee 16 said that he didn't think there was ever a need for anyone to take eider eggs (16:37). Interviewee 8 said that a lot of locals still take some eggs every spring. However, virtually all of these hunters take gulls eggs and not eider eggs (8:10). Interviewee 2 said,

"I'd rather have the duck in the fall than the egg now." Interviewee 11 said that not many people he knew egged because they knew it "destroyed" eiders (11:10).

Not many eiders nest in St. Lewis Bay and it was always easier to get gulls' eggs because they were closer to the community (6:16; 14:12). There was also not much eider egg collecting by the residents of Battle Harbour during the 1950s and 1960s, because people had to go over 3 km in a rowboat or trap skiff to islands in the open sea to find eider nests (13:15; 16:14).

Interviewee 18 said that there was a lot of egging during the fishery before the cod moratorium in 1992 (18:18). He said that Newfoundlanders and Labradorians would go home with buckets full of eggs (18:18). Two hunters commented on the fact that in the 1960s everyone took eider eggs from nests and St. Peter's Bay was a popular place for doing so (5:21; 1:1). Interviewee 3 recalled,

> Oh yes, yes, everyone. Even the fishing schooners. They'd gather them (eider and gull eggs) up in the spring of the year. Some would go ashore on St. Peter's Islands on the way along, people years ago went up northern fishing, Labrador, salt 'em in. They'd put 'em in salt and they'd keep for a long while. Have 'em all summer in fact (3:10).

Interviewee 2 also recalls many fishing boats passing through St. Peter's Bay during the fishery. They were disturbing the eiders and could have been taking eggs as well. However, since the ground fisheries closure ("moratorium") in 1992 he has noticed more nests (*S.m. dresseri*). Interviewee 2,

> Well, as things are go'in now, unless things change, ... those birds that's in that bay (St. Peter's Bay) now were never no more on their own than they are now at this time. Cause when the fishery was going on you had people ... in Henley Harbour, and boats go'in and come'n, and long liners come'n and go'in every other day all down through here

> (between Red Bay and Henley Harbour). Sure I bet you there's weeks up there (now) there's not a boat going along there, only out here like the bigger boats but, ... you don't see nothing in here now, not like you did. ... The longliner boats from the Straits, they used to fish here sometimes; they fished here (Cape Charles) along side of us. They'd have 8 or 10 boats. I mean they'd go home every couple of days. They was back and forth here all the time. ... That was their run. [The] people [who] fished in Henley Harbour, outboard and everything, they used to come down, ... there (Cape Charles) and pick up supplies and stuff. ... That's all a thing of the past now. ... There's not one tenth so many boats goes back and forth through there now as what it used to be. Sure they're not being disturbed nearly so much and I knows I'm almost sure of it, that there's more nests there (St. Peter's Bay) than [there] ever was. The last couple of times I've been up there in the last 2 or 3 years in June and there was a lot of nests (2:42).

Interviewee 1 said that some people would not only take the eggs, but would also hunt the eider hens that were sitting on nests (1:1). This may explain the local decline of nesting eiders in the 1960s and 1970s that are now on the slight increase.

Interviewee 5 believed that egging reduced the size of the nesting population (*S.m. dresseri*) in St. Peter's Bay but said that he doesn't know anyone who eggs any more (5:20). None of the hunters said that they still egg. Hunters said that the regulations concerning egging have been enforced more since the 1980s, and not nearly as many people egg now. People also do not have as great a need to egg as they once did. Interviewees 7 and 8 said that they knew of people who egg. These people are hunters who may take about a dozen eggs (8:18). Some of these hunters are young people who do not need eggs but just do so for sport. He said that the older people in the community do not take eggs anymore (7:9). Interviewee 19 said that some eggs are still taken in St. Peter's Bay, but not many. Not many people go to St. Peter's Bay in spring and summer until bakeapple picking during August, after the eggs are hatched (19:1).

Much of the egging stopped in the 1970s, when stores started carrying chicken eggs (17:34) and those who could afford to buy these eggs did so (17:35). Also, since the moratorium, much more egging has stopped, as most people do not go back to their summer homes on the coast. Therefore, they cannot egg and egging has become a "thing of the past" (18:18). This decrease in egging seems to have contributed to an increase in nesting populations of the southern eider (*S.m. dresseri*) in recent years on the south coast of Labrador (see chapter 2).

A test used by many eggers to determine if an eider egg was good to eat (not spoiled) was to put it in water. If it sank it was good to eat, and if it floated it was not (1:1). People that egg today use this same test (pers. comm. with a hunter that was not interviewed).

Eggers would collect eggs once or twice in spring to get the eggs they would use through the summer. Before electricity in the 1970s, people would put all the eider eggs collected in barrels that were filled with salt and sometimes sawdust too (4:7; 6:16; 8:9; 18:18). They would then put these barrels down in the "stage" (a small building where fish and fishing equipment were kept) where they used to keep their fish, directly over the water. This would keep them cool and would preserve them for weeks in the summer, sometimes until August (1:1; 2:18).

No hunters collected down from eider nests on a regular basis or used eider down. Some interviewees said they had taken a few handfuls in the past but did not use it for anything (1:1; 3:11). All hunters knew of people who had used eider duck feathers and down picked from the body of killed birds. Interviewee 3 said, "the old people would

never throw away a feather. All the feathers were saved and dried" (3:11). They would use these feathers for pillows and mattresses (11:11; 12:10). Some of the hunters interviewed had also done this (4:8; 12:10; 14:13; 15:18; 16:15; 17:18; 20:1).

No one saves feathers for this purpose now. Interviewee 15 said that this practice stopped around 30 years ago (14:13; 15:18).

4.3.3 Use, Preservation and Preparation of Common Eider Meat

Men and women had different roles in preparing the eiders to eat. Men always hunted the eiders but when they brought them home, Interviewee 17 said,

> The women took over the pickin' (plucking). Most time that was the womens' job. It was our job to basically ... go and get the birds and bring them home, and then we would have to go and harness the dogs and get a barrel of water 'cause the women wants lots hot water for picking the birds (17:18).

Interviewee 3 told of how, in his grandfather's time (early 1900s), if during an eider hunt in late fall people killed more than they could use at once, they would put the extra eiders in a pond and let them freeze in the ice. Later in the fall and winter, they would chop out an eider when needed (3:9). During the mid-1900s, before communities on the south coast of Labrador received electricity (~ early 1970s), people would freeze Common Eiders, skinned, in apple barrels that were filled with salt water (1:1; 10:13; 19:1). They would leave this frozen barrel containing eiders in salt ice in their stage and would obtain them when needed (1:1). They would also sometimes freeze eiders in winter by simply hanging them outside in their "store" [shed], or by putting them in the

snow (10:13; 15:14; 16:12; 17:2; 20:1). In spring, the eiders were frozen in tubs that contained salt and iceberg ice or snow (3:9; 5:29). Interviewee 3's wife said they are a lot tastier frozen this way than frozen in an electric freezer. Interviewee 11 mentioned that he never froze any before electric freezers; he just bottled them (11:9). In spring and summer (1930s-1970s), many eiders were bottled for summer to last until the fall hunt (1:1; 5:8; 12:9; 15:14; 20:1). For some families, bottled duck was the back up meal in summer, when they could not afford something at the store (5:71). In fall, some eiders were also bottled because the weather would not be cold enough to freeze them (16:12) (2:14). People used whatever bottles they had, but sometimes bottles were scarce (5:29).

Most hunters had bottled eiders in the past, and some still bottle them (6:15; 7:8; 8:55; 10:12; 15:14). However, some hunters now freeze their eiders (15:14). Interviewee 11 said that he does not get enough eiders to bottle now (11:9).

4.3.4 Timing of Hunt (and Egging)

4.3.4.1. Past and Present Eider Hunting Times

Sixteen of the 20 hunters interviewed still practice hunting. All hunt during winter from November to February when the hunting season is open and also when fiberglass speedboats (boats with outboard motors) make it possible to hunt even in the ice (15:9). Fifteen of the 20 hunters interviewed had hunted in spring (March to May). Eleven of 20 hunters had hunted in September and October.

Some hunters said that before hunting regulations were enforced, they would hunt anytime they needed or wanted, except in the summer (8:11,12; 10:7; 13:6,13; 17:10). Between the 1940s and the1980s, people hunted from September to the end of April or early May (10:8). Interviewee 8 said that there was no hunting in summer (July and August) because it was considered wrong, as the eiders were trying to nest and people were too busy fishing anyway (8:13; 10:8). Interviewee 17 said that most fishers were too busy to hunt much after February 1, because they had to go in the woods to get logs to build up their fishing premises for the upcoming fishing season (17:6).

Eiders killed in March and May were breeding males and females that were migrating north to nest (12:5). Eiders killed in October and November were usually fall migrants flying south. Interviewee 16 said that the best time to hunt was during October and November (16:8).

Interviewee 5, who began eider hunting in the 1950s, said that people lived off of ducks and seals in the spring, and hunters could go hunting every morning if they wanted (5:7). He found that May was the best month for hunting eiders. He would then wait until the "young ones" were big enough to fly and would hunt them at the end of September after which he would stop hunting again until around Christmas, another good time to hunt eiders (5:28).

Only one hunter admitted to currently hunting out of season, in the fall and spring (8:11). Others said that after hunting regulations were enforced more during the late 1980s and the 1990s, they have hunted only during the hunting seasons (3:3; 4:10; 6:5; 9:2). In the 1980s, before hunting regulations were enforced, more people hunted in

spring but now more people hunt in fall (19:1). Interviewee 13 said there were 10 times as many eiders killed in spring during the 1960s, than are now killed in spring (13:17). Some hunters said that this was one of the major changes in hunting for them (4:9). The two youngest hunters said they had never hunted out of season because when they began hunting in the 1980s and 1990s regulations were being enforced (7:4; 18:19). There has been no change in the time of their hunt (7:4). Interviewee 5 said that on the Quebec North Shore many eiders are still hunted in spring even though it is illegal (5:13). Interviewee 7 said that in early May 2002, he witnessed some hunters on the Quebec North Shore bringing in 100-140 eiders in a boat (7:14).

When talking about current hunting practices near Mary's Harbour Interviewee 7 said,

> ...people around here usually do not hunt birds out of season, especially in the spring (7:14).

Interviewee 5 said,

> There is no ducks killed in the spring of the year now like they used to be [because] they are not allowed... and nobody don't want to get caught... (5:73).

4.3.4.2. Hunting While Fishing

When hunters were asked if they had ever hunted while they fished commercially for cod and salmon, only two of the 10 who responded to this question said that they had. One of these hunters said that hunting at this time, however, was infrequent because the gun was not always "handy" during fishing (1:1). The gun would be in the boat but he

would not always be prepared to shoot when he saw a flock of eiders. The other hunter said, "...hunting was ... whenever you got the opportunity ... whenever you needed the fresh (meat). That's what people used to call it, 'the fresh.' They live on it" (8:11). However, this hunter said that he did not hunt in mid-summer (8:12,13). Other hunters explained that they did not take a gun in the boat when they were fishing, because they did not have time for hunting when fishing (5:23; 6:12; 10:15; 12:9; 14:13; 17:13). Most hunters explained that one of the main reasons they did not take their gun fishing was that the older people they had fished with would never allow it. Some hunters observed, however, that some people used to take their gun when they went fishing (5:37). Interviewee 14 said,

> ...Ya had to make a living, you had to get what fish you could so you wouldn't stop from fishing to go huntin. ... But you know, soon as ya got a break in fishing, you know you go and get some kind a meal [of] birds. If it wasn't ducks it might be turrs (murres) or whatever was on the go at the time (14:13).

Interviewee 17 said that he never hunted eiders when he was cod fishing from mid June to late October (17:2) but would hunt sometimes when he was hunting for seals around mid May (17:13). Interviewee 4 said,

> We didn't do any hunting when we were fishing. ... [we had] no guns summer time. ... My father wouldn't let me take a gun when we went sealing (in spring) ... and there was thousands of ducks. ... I think that was on account of the time of the year. It was when it was icy in the boat and [we were] afraid somebody would have an accident with the gun or something (4:3).

Interviewee 5 thought that the "little bit of hunting" done when people were fishing did not affect the eider population (5:38).

4.3.4.3. Effects of the 1992 Cod Moratorium on the Timing of Hunting

Some hunters mentioned that since the moratorium they are no longer living on the headlands for five or six months of the year (8:52). In the past, people usually left their winter homes in late April or early May to go to their summer homes and would not go back to their winter homes until early September or October (9:2). This matches the description of seasonal life by Kennedy (1995). Today, some families only return to their old homes on the headlands for weekends during summer, others do not even go that often. For example, Interviewee 5 used to live in Cape Charles from April to September and now lives in Lodge Bay all year (5:24). As a result, local people do not see as many eiders migrating north during spring. It is probable that hunters do not hunt as many eiders, because the change from seasonal lifestyle means that they rarely have the opportunity (4:11; 7:28). However no hunter actually said that he does not hunt as many eiders illegally in the spring now because he does not have the opportunity to do so. Interviewee 5 said that he did not think that the cod moratorium had an impact on when people hunted eiders, because by the 1990s most people only hunted during the hunting season (5:37). Some others also saw no impact of the moratorium on Common Eiders (13:17).

As a result of resettlement, the cod moratorium, changes in hunting regulations and new technology there seems to have been a shift in primary hunting times during the 20th Century. This change contributed to increased hunting of northern eiders (*Somateria mollissima borealis*) near shore in late fall and winter, and to decreased hunting of

southern eiders (*Somateria mollissima dresseri*) during spring and summer. This pattern likely facilitates an increase in the nesting of the southern subspecies. This is discussed in greater detail in Chapter 2.

4.3.5 TRANSPORTATION AND HUNTING

4.3.5.1. Hunting from Land

Until the late 1960s and early 1970s, hunters either walked or used dog team when eider hunting. Sometimes they used a rowboat to retrieve shot eiders (11:12; 13:17). As Interviewee 4 stated,

> Years ago we used to kill ducks from the land; we wouldn't even go in [the] boat until they were killed. You launched the boat to pick them up. We had no speedboats (4:4).

Hunters never had to go very far from home to hunt eiders before the 1970s (4:1; 13:3). Interviewee 1 said that in the winter he would wait until the ice was frozen hard enough (5:15) to travel safely and then he would walk about 2 miles (3.2 km) from his community (Indian Cove) to hunt eiders (1:1). Interviewees 2, 3, 5 and 10 said that they used dogs in the 1950s and 1960s until they got snowmobiles (2:31; 3:7; 5:15; 10:11,41). At that time people who had dog teams could travel much further than those on foot (15:21). For example, Interviewee 3 said that when he would hunt on foot he would only go about 1 mile (1.6 km) from home (Henley Harbour). With a dog team and later

snowmobile (~1970), however, he and others would go as far as St. Peter's Bay (10 km from Henley Harbour) (3:23) (12:4).

Interviewee 8 said that the ocean starts to freeze in November. By December, some people go out on the ice with their snowmobiles and a boat in tow and launch their boat when they get to the ice edge (8:13,54). Some hunters also hunt from land when there is too much ice and/or wind to go by boat (2:11). They walk or go by snowmobile then leave their snowmobiles and walk to the shoreline of the points and coves, so as not to scare the eiders they have spotted (7:6; 9:5). If the eiders have not come in to shore, the hunters build a "gaze" (blind) (15:16) or hide behind a rock (8:13) and wait (3:7; 14:6). Sometimes hunters pull a small "flat boat" or "dory" behind their snowmobile, in case they need it to get eiders they have shot that cannot be reached from shore (2:11; 7:7; 8:42; 10:41). Some hunters use a cone shaped piece of wood that has many hooks on it and about 20-50 m (10-25 fathoms) of fishing line (4:4; 5:16,19; 3:7) that they throw out in the water to retrieve eiders they have shot. This device has many local names: "wooden dog" (2:11; 5:16), "hook dog" (3:7; 7:7; 11:41), "floating jigger" (15:17; 17:4), "duck jigger" (15:17), "bobber", (4:4; 5:16) "hook bobber" (3:7) or "grab all" (11:42). A wooden dog was especially used when the wind was blowing on land and there was no need for a boat to retrieve the eiders (10:42).

After the first of March, it was much more difficult to hunt from land, because the eiders seemed "more wild" (17:6). In addition, many hunters said that it is more difficult to hunt from land now than it used to be (11:33; 13:18), because eiders are now usually further from shore and are "more skittish". Therefore, it takes much longer to hunt them

(9:9). Also, speedboats sometimes scare eiders before hunters can get close enough on land to shoot them (5:31; 6:25; 17:7). For these reasons, some hunters do not bother to hunt eiders from the land in fall and winter anymore (4:33; 9:9; 17:12). Interviewee 13 said,

> I know one thing; they stay off the points of the land, for they don't go up in the coves like they did before. Speedboats kill them. I mean they are just, the poor things is afraid to feed because there are too many boats going around. And that's a problem (13:27).

Interviewee 4 said,

> ... we used to go out and wait for ducks to swim along by us ... Might just get there and a speed boat come and drives them away, so, not worth goin' out, cause the coldest time in the winter here, there's somebody out in boat (4:33).

A similar situation occurred when conducting field observations in November 2001. After observers waited a few hours for eiders to come to land, a speedboat came by and frightened a flock away. The hunters in the boat took the opportunity to shoot at the flock of eiders (it is unknown whether they were successful). The hunters on land had spent several hours waiting to shoot. It is very frustrating for hunters to lose a chance of shooting at a flock of eiders, which they have traveled to and waited for, due to other hunters pursuing the ducks in a speedboat.

Some hunters, even those who no longer hunt, prefer hunting from land because the eiders do not get harassed (7:7; 8:9; 17:6; 15:41). These hunters do not like to hunt by boat and would prefer to hunt from land but ultimately do go by boat to get birds. Some hunters suggested that hunting regulations should be changed so that no one is

allowed to hunt by boat, making it easier for those hunting from land, thereby helping to protect duck populations. Interviewee 15 speculated that if people hunted only by land, the eiders would come closer to shore and further into the bays as they did before hunters began using speedboats in the 1970s (15:20).

4.3.5.2. Hunting from Boat

Hunters interviewed who had hunted in the 1950s, 1960s and 1970s, before motorboat use, used rowboats (punts) during spring to hunt eiders (5:15; 16:3; 17:47). Before people had boats with outboard motors they had boats with inboard motors called "trap skiffs" (3:14). These boats were relatively slow (~ 10 km/hr) and the engine sound created a constant rhythm (3:14). Eiders are not as frightened by these boats as by those with outboard motors (10:20). Many hunters would turn off the motor of trap skiffs when they approached eiders and would row. As Interviewee 3 stated,

> ... One time you [were] going around ... in the motor boat, ... the old make-and-break engines, you rowed up in shot of them ... sort of quiet. But after they got the speedboats, 2 or 3 years going around, the birds seemed to be going to wing ... You wouldn't get at them ... Unless you got them cornered or barred in a sort of cove somewhere I guess. That's the biggest difference I've seen in the change of the bird[s] after that. Same thing after the skidoos [came]. Getting around on the snowmobiles in the wintertime kept them routed all the time ... And ... more on the go too, more traffic, just speedboats, they go quicker and faster. Much more ... on the go everywhere.

Changes in transportation methods during hunting, from walking and using rowboats and dog teams to using snowmobiles and fiberglass boats has influenced the behaviour of Common Eiders on the south Labrador coast. The biggest change in

hunting seen by some interviewees occurred when people started getting outboard motors ("speedboats") in the late 1960s and 1970s and no longer used their "trap skiffs" and rowboats while hunting in September, October and November (1:1; 2:20; 3:12; 4:9; 5:17; 9:8-9; 15:19; 16:7; 20:1). Some hunters found using speedboats an easy way to hunt eiders (14:8; 15:21) while others found it more difficult than when everyone was hunting from land (13:17). Speedboats enabled hunters to go faster (up to 45 – 70 km/hr), cover more area (9:11), "chase eiders" (8:9), "round them up" in coves (10:21), and generally hunt more efficiently (4:9) killing more eiders in a shorter amount of time. After people began using speedboats, they would "drive" eiders away (4:9; 10:20; 15:20). Some hunters also noticed a big difference in the number of eiders that would remain near the community and shore (15:20). Hunters had to go further to find eiders (4:9; 16:44); before speedboats, only the slob ice could drive eiders away (15:20).

Interviewee 16, who had been hunting for about 15 years from a rowboat before he got a speedboat, said that three or four years after people started using speedboats, he noticed a decrease in the number of eiders in winter (16:11).

Interviewee 3 noted, however, that when eiders are pursued by a speedboat they sometimes "seize up" and "can't get away." He said, "you could run down any of them" (3:14).

Some hunters said the biggest change in hunting was when people began using fiberglass boats in place of wooden boats in the mid-1980s (2:19; 6:9). Most hunters now use fiberglass speedboats (9:11; 15:16). Fiberglass boats are reported to have made winter hunting a common practice (4:30; 15:9) because it is easier than in the past for

hunters to go out in icy water (15:9) without doing any damage to the boat. Interviewee 2 said,

> ... if you was ... in the ice you cut your [wooden] boat up, winter time you kill from the land, and ... you hook 'em or you got some ... little boat to just throw overboard to pick 'em up ... but when the fiberglass speed boats come, about 16, 17 years ago, for 2 or 3 years ... I'm go'na tell ya there was ... a lot'a pressure put on ...birds. ... you could go anytime ... Four or 5 inches of ice, you could go through it. Solid ice. That was the big change (2:20).

Interviewee 5 said,

> ... the fellers got those fiberglass boats ... even the ice don't make no difference to them now... they gets in the ice and ... goes on through ... (5:18).

4.3.6 WEAPONRY

Some of the hunters who had begun hunting in the 1930s, 1940s and 1950s had used muzzleloaders (10:11). Most hunters said that the caliber of their guns (12 gauge) has not changed but the type of gun has (2:10; 14:7; 15:8). Before the early 1980s, all hunters used a single-shot shotgun, such as a break action (3:7; 12:8; 14:7). Now however, they use pump action or a semiautomatic shotguns (2:10; 15:8; 18:12). Ninety percent of the hunters interviewed now use a pump action; 10% use a semi-automatic.

Shotguns now hold more cartridges that can be more quickly discharged than they did in the past (20:1). The number of eiders that can be shot in one period of time, however, seems to depend more on hunting strategies than the type of weapon used (14:8). Interviewee 14 said you could shoot just as many eiders with a single-shot

shotgun in the 1960s, than you can with a repeating shotgun today, because of how they were hunted (14:8). Interviewee 1 told of his greatest eider hunting success in 1958 when he killed 311 eiders at one time by trapping them in a small cove and then shooting whatever he wanted (1:1). Interviewee 4 also reported that because there were more eiders during winter in the 1950s, 1960s and 1970s and they were less weary and didn't stay as far from shore as they do now, hunters were able to shoot just as many eiders at one time with a single-shot shotgun, as they can now with a pump or automatic shotgun. He said, "that gun (single-shot gun) was good enough at that time" (4:3). Interviewee 7 said that he had heard stories from years ago (~1950s) when people hunted from land using muskets and muzzleloaders and would kill hundreds of birds during a hunting trip (8:54).

A break action shotgun allows the hunter to fire one shot at a time, with a new cartridge loaded after each shot. A pump action shotgun allows a hunter to load as many as five cartridges into the magazine at once (hunting regulations state that hunters are only allowed to load three at once) and after a shot is fired it takes less than a second to "pump" (load) a new cartridge into the chamber where it stays until fired. Some of the younger hunters have used the same kind of gun since they started hunting. For example, Interviewees 7, 8 and 9, who were 27, 34 and 43 years old respectively, had always used a pump action shot gun (7:6).

4.3.7 HUNTING PRESSURE

Since the early 1900s hunting pressure on Common Eiders on the south coast of Labrador seems to have always been high. From the early 1900s up until the 1970s, most people depended on eiders for food, and almost every household hunted eiders. Some hunters thought that more people did more hunting during the hunting season after the cod moratorium because they had more time (2:14; 3:15-16; 10:21; 11:33). Interviewee 2 however said that this increase in hunting only lasted during the first 2 or 3 years after the moratorium and in the last five or six years, there have been fewer hunters than ever (2:14). Interviewee 8 has also noticed less hunting recently (8:55).

> ... for the first 2 or 3 years after the cod fishery shut down no doubt there **probably** was a little more pressure put on it (hunting of the eider population). But the last 5 or 6 years, I don't think, there's ... so much pressure put on (hunting) eider ducks as ... there used to be. Sure there's only 2 or 3 people in the community (Lodge Bay) now who goes huntin', the rest won't even go, one time everyone was at it (8:14).

Interviewee 7 from Mary's Harbour said, "there is more people **probably** ... [hunting eiders] now than there was when ... we started (~1991) ..." (7:13). He also observed that those who hunt are not going as often as they used to.

Interviewee 12 thought that the cod moratorium affected eider duck hunting in certain areas and mostly in the northern communities, like Black Tickle. His reasoning was that when they were fishing that was all they did, but after the moratorium, they had much more time to hunt because there was little else to do (12:12).

Interviewee 2 said he does not hunt as much as he once did, because his wife and children do not like eider meat (2:17); they eat a lot of "store bought" meats. Interviewee 11, currently living in Red Bay, said that he used to go hunting twice in the fall and twice in the winter, but now he only goes one or two times throughout fall and winter (11:8). This is mainly because it is so expensive to go back to his old hunting spot now, because it is in Henley Harbour, >50 km away.

Interviewee 6 mentioned that he does not like hunting now, because there are so many hunters in boats out hunting at the same time, and he does not like hunting when there are a lot of people around (6:9). Some hunters said that on a "good day" during the hunting season, you might see 2-8 boats out hunting at the same time (15:20; 19:1). Interviewee 15 did not think, however, that there had been a change in the number of people hunting eiders. He said,

> ... a lot of the older people don't hunt anymore, and ... some families don't hunt at all anymore.... From our community in St. Lewis, probably you might get 7 or 8 boats ... going from the whole community, so that's not a lot. They don't go everyday, they'll go till they get probably enough for ... their quota or whatever they can take, and that's it (15:21).

Interviewee 18 said that in the 1980s, all the men in St. Lewis hunted eiders, but now "there's hardly anybody" (18:25) probably only "2 or 3 crews in the harbour" (18:20). He also remarked,

> It's not like it used to be ... More and more people is getting away from going out in the boat, putting up with the cold, ... somewhere when we was out it was 25 below zero. ... You can't hardly breathe, you won't take off your mitts. ... And [with] regard to this (my) putting up with that too, my time is going to come when I won't want to do it anymore either ... It's cold and you're (I'm) getting older ... It happens to

> everybody. ... The younger generation here ... is not having nothing to do with guns ... To me (my observation) they're not ... You see a lot of young people around now. When I was their age ... I was at Gunning Point (a popular place for hunting) (18:41).

The number of hunters per capita has decreased since the early 1900s. The number of hunters overall, however, may be the same, due to increases in population. There are differences in opinion on the number of people that now hunt compared to in the past. This is influenced by age as most older hunters say there are fewer people hunting than before, although most younger hunters consider that there are more people hunting. They contend that younger people are not hunting as often as the older people did and are hunting for sport rather than for subsistence. The younger generation, teens to mid-20 year olds, do not seem to have much interest in hunting.

4.3.8 AREAS HUNTED

When hunting areas of all interviewees are combined the area covered is from Smokey (Hamilton Inlet) in the north (18:23) to Red Bay in the south, and some hunters also occasionally go out to Belle Isle (8:39). Many hunters said that when they go hunting they go into all bays and coves along their route to make sure every possible place is covered (9:15) (Figure 4.1). Hunters said that before they started using speedboats they would only hunt within a 1-mile radius (1.6 km) of their community (3:8; 16:20) (Figure 4.2). Each community had its own eider hunting area (15:42)

(16:44). After they acquired speedboats (1970s), they could go many kilometers farther (Figure 4.3). Interviewee 13 from St. Lewis said,

> Back in the 60s, well you only had row boats and you just rowed out and you waited and the ducks come to you and like going to St. Peter's Bay was like on the other side of the world, like taking a trip over to England somewhere, right? ...You never went there. ... The people in the Cape (Cape Charles), ... hunted off the Cape, and the people in Battle Harbour, hunted off Battle Harbour, and the people in Fox Harbour hunted off Fox Harbour; now, sometimes in the fall of the year I might go up to St. Peter's Bay ... (13:16).

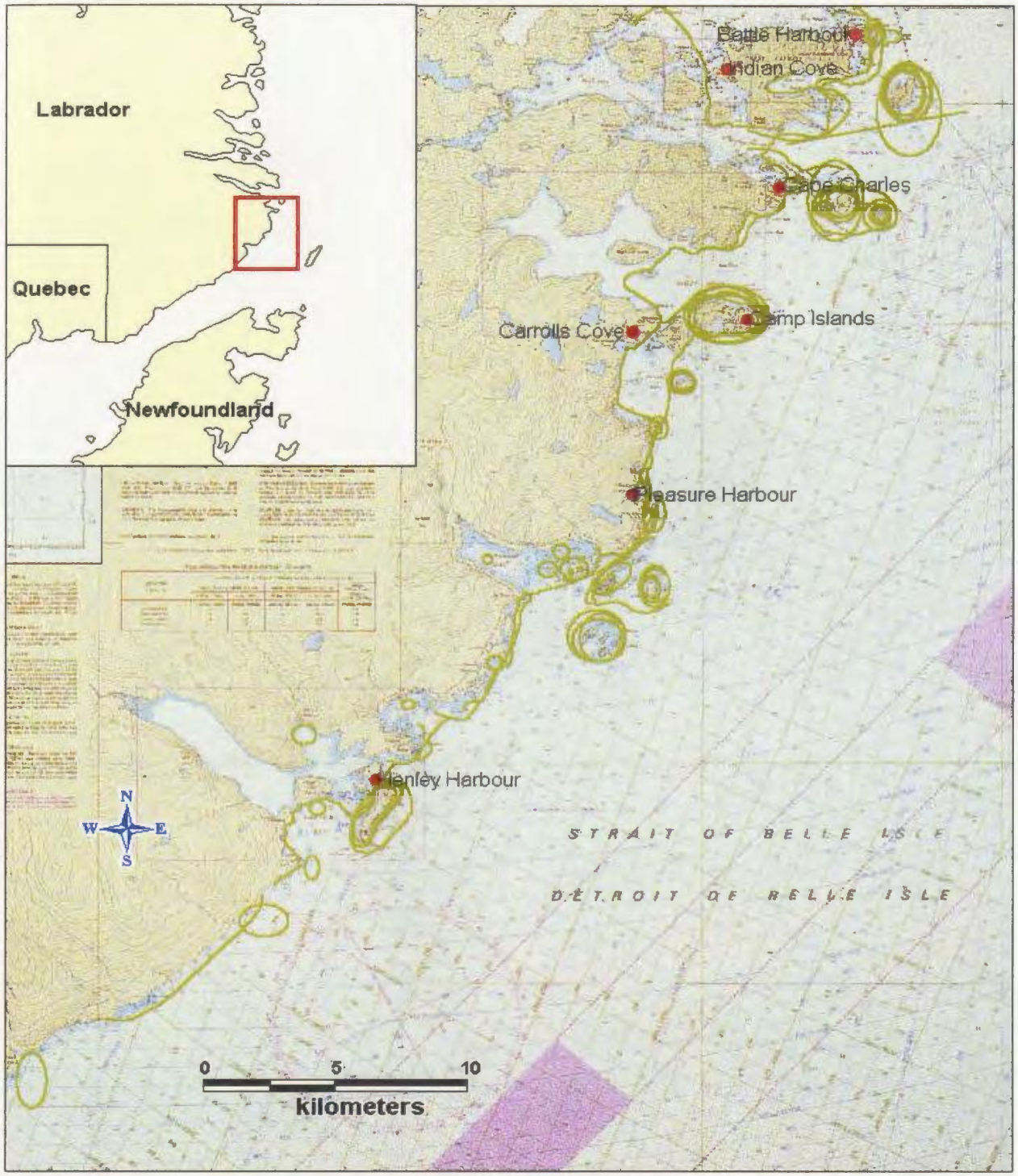

Figure 4.1. Current hunting areas from Battle Harbour to Green Bay, Labrador.

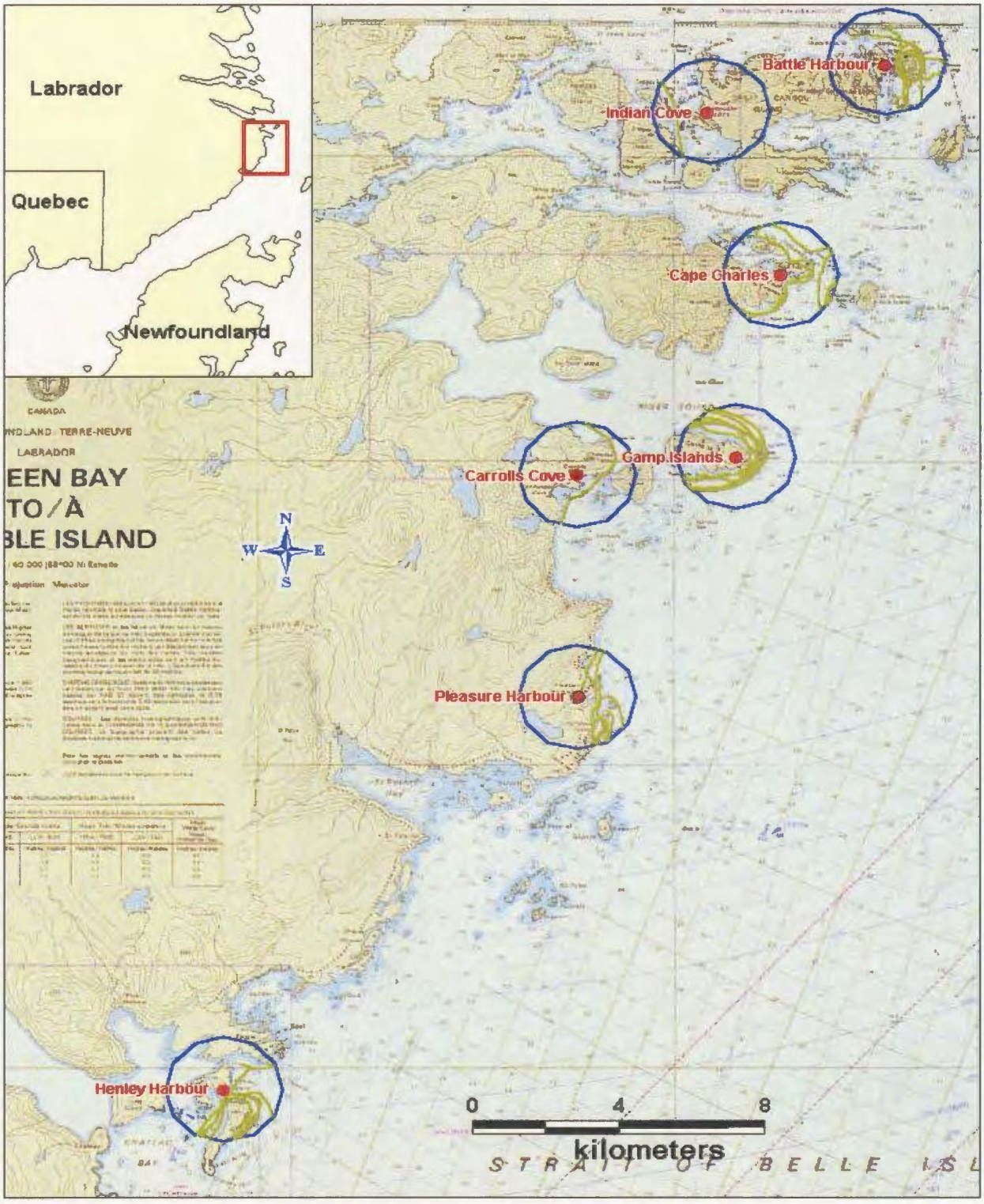

Figure 4.2. Hunting routes, using rowboat, within a 1-mile (1.6 km) radius of old fishing communities.

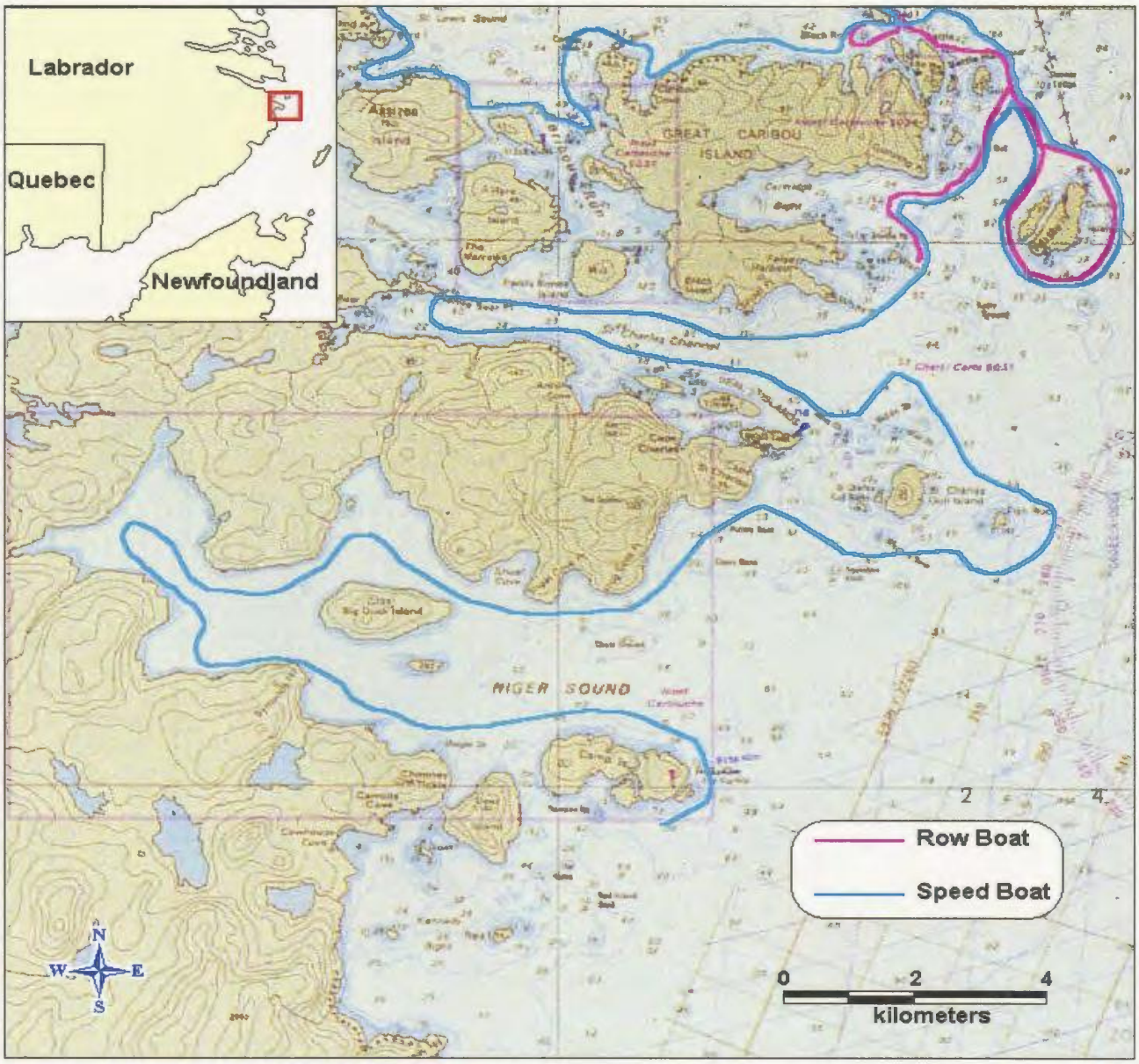

Figure 4.3. Hunter's account of rowboat versus speedboat coverage during a hunting trip.

When more people hunted by land in the 1960s and 1970s, sometimes many hunters from the same community would show up in the same area to hunt the same flock of eiders they had been following (14:9; 17:12). Now, people from all communities can go many kilometers from home to hunt. This apparently makes a difference in the distribution of eiders and the time that eiders stay near the communities (15:42). Currently, many people from several communities will sometimes end up in the same hunting area (15:42). For example, Gunning Point, next to Battle Harbour, was always a very popular place for the people of Battle Harbour to hunt eiders (16:6). People from all communities in the area now hunt there (18:31).

One of the biggest changes interviewee 4 found was that hunters have to go further from the community to hunt, because the speedboats have the eiders "drove" away (disturbed) (4:9). Interviewee 7 also said that he is going further to hunt in the past few years, because there have been more people hunting (7:4). Currently many hunters from Lodge Bay hunt from St. Lewis Sound to the north to Chateau Bay in the south (4:29). Interviewee 6 said that he would only go past Henley Harbour (which is approximately 4 km north of Chateau Bay) if he were going to Red Bay. That had only happened two or three times (6:38). The most common eider hunting grounds for the people of St. Lewis is from Cape St. Lewis in the south to Spear Point 10 km to the north (18:22). However hunters from St. Lewis have hunted eiders on the Labrador coast as far north as Smokey (Hamilton Inlet) and as far south as Red Bay. For example, one interviewee, who covers the greatest distance when hunting, hunts from Smokey (Hamilton Inlet) to Red Bay and also hunts in Newfoundland. He brings his boat to

Newfoundland by truck rather than leaving from his community and going to the hunting area in speedboat, as he does with his hunting grounds in Labrador.

Some of the hunting areas have always been hunted. However, the way people get there, who goes there (people from different communities) and the number of people going there (more people traveling to other places and greater distances to hunt) have changed (17:7).

4.3.9 Hunting Strategies

Hunting strategies vary seasonally. During spring, eider hunters wait on a pan of ice or point of land and shoot eiders as they fly past (1:1; 8:3). In the fall, eider hunters hunt around coves, shoals and points of land. Eiders seen during fall are more likely to be in the water feeding or resting rather than migrating (1:1). Most fall hunting is now done by boat (2:30; 11:6; 12:4). Experienced hunters use the wind directions and location of ice (if there is any) to determine where eiders are (1:1; 2:30). Based on these two factors, hunters choose where they will wait for eiders or their boat route to particular areas (3:8).

Hunters know that when eiders are "trapped" in a hole of water surrounded by ice or when they "heave up" (crowd together when coming into shore) under the "ballicatter," (ice formed by the action in winter of spray and waves along the shoreline, making a fringe or band on the landward side; Story et al. 1990) in the evening, they stay there all night and will not "go to wing" until dawn (17:53). This is a very valuable

occurrence for hunters who hunt from land. If hunters have seen that a flock of eiders has gone close to shore in a cove just before dark, they will arrive there just before dawn the next day in an attempt to shoot them (1:1; 12:27; 17:53). At other times, eiders would "heave to" (crowd together when going offshore) in the evening (71:51). This was reported to happen when the wind was northerly or northwesterly. Many eiders would flock together tightly and drift offshore with the wind (17:51). Hunters would wait for them in places where they knew the eiders would go to feed in order to get a chance to shoot them (17:51). Many hunters told of the practice of throwing rocks around the eiders in the water to "drive" them together in winter so that they could be shot more effectively (13:27; 14:8; 15:13). This would only work in winter when it was very cold and if the hunters were quiet and quick (15:13). If this strategy were tried after the end of February, when the air was beginning to get warmer, then the eiders would "go to wing" (17:6).

Hunters also say that eiders have a tendency to be on the side of a point of land in fall (12:19). When eiders are around these points, hunters can get very close to them before the eiders are aware, and sometimes the eiders can even be trapped, into a narrow cove for example, with no way out when they eventually see the hunters (12:19).

When hunting from boat, hunters will often "wing" eiders. This means hunters will shoot at the eiders as they fly over them. When shot this way eiders fall into the water and the hunter will retrieve them with a dip net (15:17). Since people started using speedboats, hunters report that they attempt to be first out hunting in the morning in order to have the best chance at shooting eiders (15:20).

In the 1950s and 1960s, during spring eider migration, Interviewee 5 would go hunting around 4:00 am. He said this would be when most of the eiders, "thousands of them," would be flying. Hunters could choose the flock of eiders they would shoot in the span of an hour. However, "over the past few winters," hours will pass and they do not see any eiders (12:26). Some hunters said that hunting is more difficult now, whether from land or by boat, because, when the hunting season is open, the eiders are just not as plentiful as previously (12:12; 11:4; 12:6). These are very dramatic observations and suggest a massive decline in *S.m. borealis* since the 1960's and 1970's.

4.3.10 Duration of Hunt

The length of time a hunter spends hunting varies depending on how long it takes him to acquire the number of eiders he needs or wants (1:1; 18:16). It also depends on the weather (20:1) and if the hunter gets tired cold or hungry (3:8). Most hunters said that before snowmobiles and boats with outboard motors, the time they spent hunting during the 1930s to 1970s varied from 2 hours to no more than one entire day (1:1; 3:8; 4:4; 9:5; 10:12; 15:7; 17:63; 18:16). Sometimes they would go out a couple times a day if they did not get anything the first time (14:8).

Currently, the amount of time hunters spend on hunting trips ranges from 2 hours to several days (9:5; 14:9; 18:17,37). Some hunters will still only go for a few hours, some for no more than one night (7:7), others a week (2:13) or up to 10 days (18:23). Some of the hunters currently living in Red Bay, Mary's Harbour and St. Lewis said that

if they go hunting in Henley Harbour, Pleasure Harbour, St. Peter's Bay or Smokey (Hamilton Inlet) they will usually stay overnight because it is a long way to go (14:9; 18:37).

This change in the amount of time hunters spend hunting is a result of people having more free time with the increased conveniences of living and of the difficulty of hunting from land, which requires more time to get eiders than in the past. It is also as a result of eiders having become scarcer during the winter and hunters having to go further from home to hunt. The further from home hunters travel, the longer it takes them and the more supplies they have to take. Therefore people have begun to stay longer, making each hunting trip worth the initial expenses of traveling. However, some people currently only go hunting for a few hours. Interviewee 8 believes the reason is that people like to get home to watch cable TV and rented movies in recent times. He says people are becoming "couch potatoes" and many do not go hunting and or fishing as much as they used to (8:15).

4.3.11 Numbers of Eiders Killed

When people could shoot as many ducks as they wanted during one hunting trip, they could save money, because they either walked and spent no money on transportation or the money spent in gas for a snowmobile or boat would be less than the amount of money it would take to buy the same amount of meat from a store. Interviewee 19 said that he would kill 40-50 eiders on a hunting trip in the 1980s, but now will only kill 15-

20 (19:1). Now, hunters spend money on expensive fuel to go out in their boats, but are not allowed to shoot as many eiders on a trip. Therefore, depending on the hunter's particular situation, it is sometimes very costly and a "big investment" to go eider hunting (5:71; 19:1). Some hunters suggested that the cost of hunting keeps many hunters from hunting in boat as often as they did in the 1970s and 1980s (6:9; 16:40; 17:6; 18:20). Interviewee 2 said, "I don't know if it makes much sense economically, to even go hunting." (8:21). Interviewee 8 said:

> There's probably only 20, 25 people in Mary's Harbour, Fox Harbour, and Lodge Bay area that (who) hunt because it is just too expensive. Like a few years ago when fuel was cheap, we used to go hunting twice a week. ...I always had 14 ducks in my fridge. Always had my limit of ducks in the fridge and now I might have 2 or 3 down there from the winter (8:4).

Other costs include the expense of purchasing shotgun cartridges, obtaining a firearms acquisition certificate, and registering a gun. People were not required to do these things years ago (8:5). Because the cost of hunting is high, many hunters prefer to get the number of eiders they need for a year in one trip (18:39). Hunters, however, can only legally shoot six eiders each per day, and are only allowed to have 12 in their possession at a time and thus have to spend extra money and take extra time to hunt the eiders they want (18:39; 13:22). Hunters in Lodge Bay, in particular find it expensive, because they have to travel further by boat to get out to the headlands. They do not have the same access to the eiders as people on the "outside" of the bay (6:6; 8:52). Interviewees 6 and 18 thought that, overall, there are not as many eiders killed in Lodge Bay and St. Lewis respectively per year now when compared to the 1970s and 1980s

because of greater enforcement, stiffer penalties if caught hunting illegally, less hunting by older, experienced hunters, and lack of interest by the younger generation in hunting (18:40). Interviewee 6 did say, however, that he knew of two or three people in his community who had killed, "a lot of birds (eiders)", over their bag limit during winter of 2001 (6:29).

Interviewee 2 said he only kills enough for his own family to use (2:14). He said that he used to kill at least 52 in a year, but now, because he and his family do not eat them as much as before, 25 eiders are enough for a year (2:13). Interviewee 3 also said he only ever killed what he needed and that amount had not changed over time (3:15). Interviewees reported killing 50-300 eiders per year in the 1950s to 1980s (5:28; 15:15; 16:13; 18:17). At present, however, most people report killing in the range of 10-60 per year (3:8; 9:6; 15:15).

Since 1974, there has been a National Harvest Survey (NHS) for waterfowl in Canada. This survey was primarily designed for inland waterfowl. Hunters are chosen randomly to participate in the survey. They are asked to send in the wings of the birds they kill. In this way, the species and sometimes sex of bird can be determined. Not many eider hunters, however, get chosen, because they are only in localized areas on the coasts of Canada. Also, the deadline to submit wings for the survey is before the eider-hunting season closes. Therefore, the estimate of eiders killed by hunters on the coast of Newfoundland and Labrador based on the NHS is not as accurate as for other waterfowl. The estimate does, however, show a trend in the number of eiders taken over time. Based on the NHS data for eiders on the coast of Labrador from 1974 to 2001, the number of

hunter-killed eiders began to decrease in the mid 1980s (Figure 4.4). This trend is consistent with the information recorded from hunters interviewed in this study.

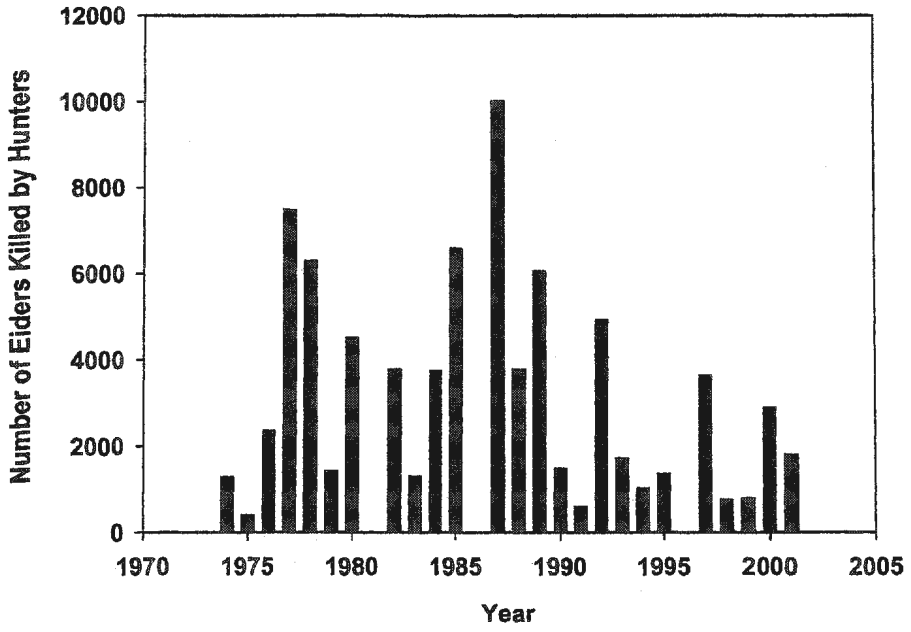

Figure 4.4. Number of eiders taken by hunters on the coast of Labrador 1974-2001 (Canadian Wildlife Service, NHS data).

Before electricity (early 1970s) interviewees said they would shoot fewer eiders on a typical hunting trip in spring (10:12; 12:9; 15:13; 16:13) than in other seasons, because they had no way to preserve eiders in spring other than by bottling. People would hunt between 1 and 15 eiders each on a trip at that time (10:12; 12:9; 15:13; 16:13).

When talking about hunting in the 1990s, Interviewee 6 said that he and three or four hunting partners would normally kill 25-30 eiders between them (6:12). He said that sometimes when they shot at a flock of eiders they would kill more than their bag limit.

It is often hard to tell how many birds will actually be hit when shooting into an eider flock; therefore it is easy to exceed the bag limit. If they kill over their bag limit, they will not let the extra eiders float away. It is for this reason that they sometimes go home with more than their bag limit (6:12).

Because of hunting strategies, such as throwing rocks to aggregate eiders, some hunters thought that when everyone was hunting from land more eiders were killed. Using these successful strategies, many eiders were killed at one time. Interviewee 14 said that four or five people sometimes killed 300 eiders from land when they waited for the right time to shoot (14:8).

Some hunters thought there was an increase in the number of eiders killed after electricity came and people purchased freezers (3:16). Interviewee 13 said that people became "pack rats" when they got "deep freezers," and killed too many eiders (13,16). When describing how many eiders he would get on a typical hunting trip in the late 1950s and 1960s compared to what people get now, Interviewee 3 said,

> ... if you were lucky you may get ½ a dozen (on one hunting trip). Probably one time you may get a dozen. Because ... if you got a dozen, that was it then you had enough. No way to keep them or preserve them at that time ... Like now, I know people today I suppose they kill a hundred. We'd just go when we needed. When I started ... hunting, my father, he'd go if we needed meats or anything, he went huntin', duck hunting or caribou hunting or whatever. Or rabbit hunting, you'd go and get a few meals you needed and that was it, till they were all gone, then you'd go again if you needed it. It was more or less a necessity and you had to have ... your meat (3:8).

Other hunters had a different opinion and suggested that not as many eiders are killed since electricity came, because people have been able to buy different frozen meats at the

store (14:11). Because of these differences of opinion, the influence electricity has had on the number of eiders killed is not clear. It seems that some hunters hunted more, while some less and the effect of having electricity may have changed over time. Overall there may not have been a significant change in the number of eiders that were shot between the 1970s and mid 1980s.

Due to greater enforcement of hunting regulations in the late 1980s, the increasing costs associated with hunting, and the fact that hunters do not "need" eider meat like they did previously, the number of eiders killed per family per year has decreased.

Table 4.1. Changes in eider hunting during the 20th century over time on the south coast of Labrador from interview responses

Subject	Early 1900s	1940s-1960s	1970s	1980s	1990-present
Shotgun	Muzzle loader	Break action	Break action	Bolt and pump action	Semiautomatic
Main hunting transportation	Walking	Walking/ dog team	Boat/ snowmobile	Boat/ snowmobile	Boat/ snowmobile
Boat	Rowboat	Trap skiff with inboard motor	Wooden with outboard motor (speedboat)	Fiberglass with outboard motor (speedboat)	Fiberglass with larger outboard motor (speedboat)
Timing of most hunting	Fall and spring	Fall and spring	Fall and spring	Late fall and winter	Late fall and winter
Egging incidence	High	High	High	Moderate	Low
# People hunting /capita	High	High	High-moderate	Moderate	Moderate
Frequency of hunting	High	High	High	High	High
# Eiders/hunting family/year	?	50-400	50-300	50-300	10-60
Area hunted by 1 hunter	Small (~2km^2)	Small (~2km^2)	Moderate (~5-10km^2)	Large (~10-20km^2)	Large (~10-40km^2)
Average hunting trip duration	1 hr – 1 day	1 hr – 1 day	1 hr – 1 day	1 hr – 1 week	1 hr – 1 week
Purpose of hunt (in order of importance)	Subsistence	Subsistence	Subsistence/ Tradition	Tradition/ Subsistence/ Sport	Sport/ Tradition/ Subsistence
Cost of hunting	Low	Low	Moderate	Moderate	High

Note: In the interviews, outboard motors were usually referred to as "speedboats"

Table 4.2. Changes in human disturbance to eiders over time on the south coast of Labrador from the impressions of interviewees

Timing of Hunting	Early 1900s	1940s-1960s	1970s	1980s	1990-present
Spring	High	High	Moderate	Moderate	Low
Summer	?	Moderate	Moderate	Moderate	Moderate
Fall	Low	Low	Low	Moderate	High
Winter	Low	Low	Moderate	High	High

CHAPTER 5: CURRENT MANAGEMENT AND FUTURE CONSERVATION OF COMMON EIDERS ON THE SOUTH COAST OF LABRADOR

5.1 INTRODUCTION

5.1.1 HISTORICAL AND EXISTING CONSERVATION EFFORTS

Blanchard (1994) explained three reasons why management of seabird populations on the North Shore of the Gulf of St. Lawrence failed between 1955 and 1978. First, people in the coastal communities did not accept the regulations that were being enforced. Second, caretakers of the seabird colonies were no longer employed and as a result habitat protection no longer existed. Third, there was no education on seabird conservation because of the high cost of implementing such programs (Blanchard 1994). The same factors may be causing a lack of effective management of seabirds on the south Labrador coast.

Hunting regulations are the most common form of Common Eider management throughout their northern range (Circumpolar Seabird Working Group 1997). Additional management and conservation efforts have been applied in Labrador and Newfoundland. These include the "Co-operative Waterfowl Management Plan for Newfoundland and Labrador" [Ducks Unlimited 1998 and the provincial government] and the "Newfoundland and Labrador Waterfowl Management Plan" [Atlantic Region of the

Canadian Wildlife Service (CWS) and the Newfoundland and Labrador Wildlife Division] (Newfoundland and Labrador Eider Management Plan 1990).

Projects that were initiated through these plans included nest box installation on islands, intended to increase annual reproductive success. In addition, eiders were raised in captivity and released near Hare Bay Newfoundland in the late 1980s'. Also, an "Adopt a Duck Program" organized by the White Bay Central Development Association encouraged school children to become involved in eider rehabilitation (Byrne 1992). There was also a nest box program in Table Bay, Labrador, initiated in the early 1990s by the Newfoundland and Labrador Wildlife Division, and supported by Ducks Unlimited.

These projects have all ended due to funding cuts. There is currently very little involvement of hunters in organized Common Eider conservation efforts.

In September 2002, Ducks Unlimited launched an eider duck project that will be carried out in Atlantic Canada, including Newfoundland and Labrador. Plans for this project include supporting educational awareness about eiders, and community involvement in field research activities. One of the main objectives of the project is to obtain information on migration by implanting satellite transmitters into eiders from Newfoundland and Labrador (W. Bartlet, pers. comm. Ducks Unlimited, Newfoundland and Labrador). The Eastern Habitat Joint Venture (EHJV) has also promoted awareness of eiders and other birds on the south coast of Labrador. Stewardship agreements that would include conservation of eiders could be finalized with Mary's Harbour, Labrador.

As mentioned in Chapter 1, St. Peter's Bay was a Federal Migratory Bird Sanctuary, although this formal status was revoked in 1980. A Migratory Bird Sanctuary,

1) supports birds which are concentrated for any part of the year and/or are restricted to a specific geographical area and 2) that are exposed to regional threats and/or human disturbance. In addition a Migratory Bird Sanctuary usually supports at least 1 % of the national population of a species and/or subspecies and sometimes, has high potential for educational purposes. In a Migratory Bird Sanctuary, no person is permitted to hunt, disturb, destroy or take the nest of a migratory bird or have in his/her possession a live, carcass, skin, nest or egg of, a migratory bird. Firearms or any other hunting appliance are not permitted in a migratory bird sanctuary, except as otherwise provided in the regulations. Dogs and cats are also not permitted to roam free (Department of Justice, Canada). The area that was covered by the St. Peter's Bay sanctuary is described in the "Order in Council P.C. 4046, dated August 17, 1949, which authorized the establishment of the St. Peter's Bay Bird Sanctuary in the Province of Newfoundland". It included "all the islands off and within St. Peter's Bay and the foreshore to a depth of one quarter mile inland, from Table Islands to one mile southward of St. Peter's Point and seaward to a distance of 3 miles" (Figure 5.1).

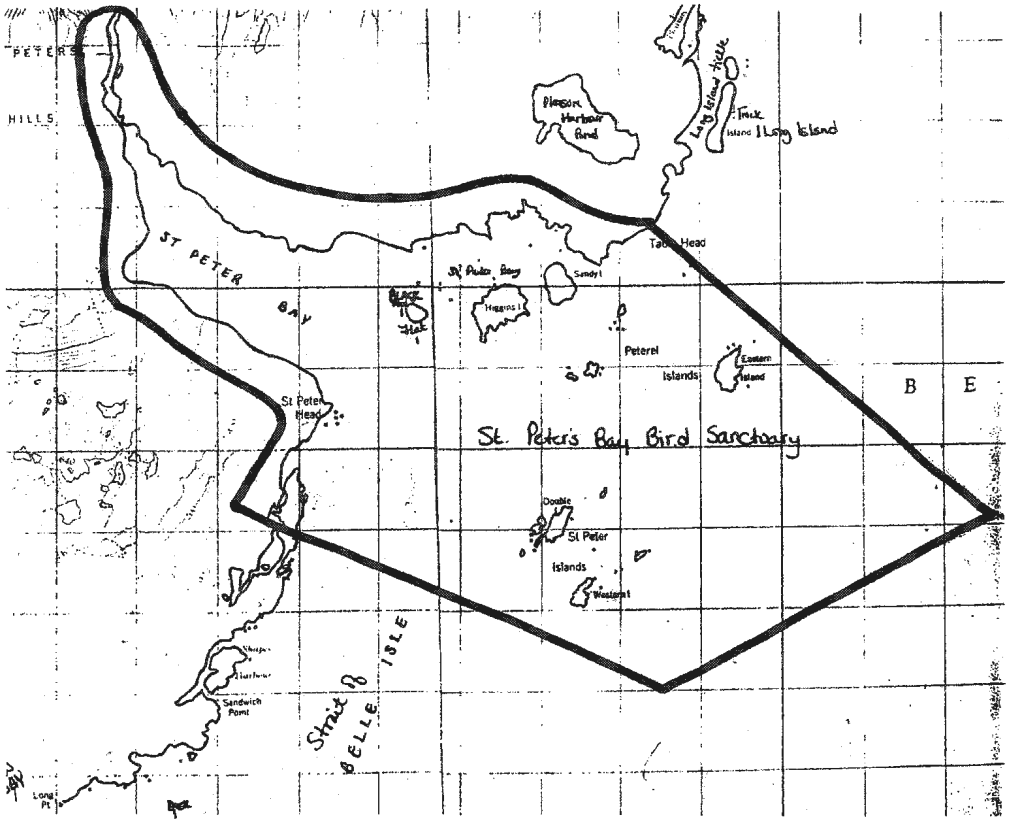

Figure 5.1. St. Peter's Bay Sanctuary Boundaries (1949).

During the period that St. Peter's Bay was a sanctuary it was seldom patrolled. According to hunters interviewed, hunters/fisherman regularly took eggs of both eiders and gulls. Insufficient resources were available to the CWS to effectively patrol the area to control poaching. Nest and bird counts were incomplete, and in 1978, Bruce Johnson of the CWS recommended the cancellation of the sanctuary as the only reasonable approach to the situation (CWS memorandum 23 November, 1978). This exact situation occurred in the Foxe Islands sanctuary near Cape Dorset, Nunavut, after eider colonies were extirpated there despite being given sanctuary status (G. Gilchrist, pers. comm.).

In 1998, the Battle Harbour Regional Development Association (BHRDA) considered applying to re-instate the St. Peter's Bay bird sanctuary. They sent out a newsletter and a response form to everyone in the Battle Harbour region (Lodge Bay to Fox Harbour). This newsletter explained the history of St. Peter's Bay, what they were proposing to do, the regulations that would have to be followed when in the sanctuary, and a map of the original sanctuary boundaries, and they encouraged people to reply with their comments. However, only a small percentage of the people replied. Of those that did reply the majority did not support the sanctuary, and the BHRDA did not apply to the CWS to re-instate it. This response may reflect that aspects of the original newsletter were poorly explained. As a result, local residents had many unanswered questions about proposed regulations of the sanctuary (7:17,18).

This chapter compares the responses of hunters to the 1998 survey to the responses of 20 hunters interviewed for this thesis in 2001. This chapter also presents the opinions of hunters regarding current hunting regulations. I also report on the opinions of hunters regarding future goals of Common Eider conservation and enhancement in St. Peter's Bay and the surrounding area (from St. Lewis to Red Bay).

5.2 METHODS

I conducted interviews with 20 hunters using the semi-directive interview procedure explained in Chapter 2.

5.3 RESULTS

5.3.1 OPINIONS REGARDING CURRENT HUNTING REGULATIONS

Most hunters recalled that hunting seasons and bag limits were not enforced until about 10-15 years ago, in the late 1980s and early 1990s (9:2; 11:32; 14:6; 19:1). Before then, most hunters shot the number of eiders they wanted whenever they wanted (10:8). Apparently some hunters did not realize that there were times when hunting was not permitted and that there were limits on the number of eiders that could be legally shot per day (1:1). As a result of enforcement, awareness of seasonal hunting periods and daily bag limits grew (2:51; 2:19). Currently, hunters reported that there is less illegal hunting than there used to be. They conclude that this reflects that fines and penalties for poaching are high (3:31; 4:44). Individuals who are caught poaching may have their boat and gun confiscated and also be required to pay a fine (8:16). Interviewee 12 said,

> There is always the thought that if you go hunting and kill more than you are supposed to have, ... you'll meet the wildlife officer on the way home! (12:32).

There were indications in interviews that some hunters continue to break the law, hunting out of season and exceeding the bag limit. Some hunters said that they sometimes take more than the bag limit. One hunter said,

> Bag limit in the wintertime don't mean a whole lot to me. I'm not going to go day after day and kill x number of ducks. But if I gets the chance to kill so many birds, I'll kill'em. And if that's all I need, that's all I need, that's all I'll take.

Some hunters indicated an interest in having regulations enforced more (2:38; 8:26; 10:47). At the time of the interviews, there were only two provincial wildlife officers in Red Bay and interviewees felt that they do not patrol very often (10:46; 12:32; 13:23; 15:38). For example, Interviewee 9 said that he rarely sees the wildlife officers and has never been checked by them (9:6). Interviewee 8 has only seen wildlife officers twice in 18 years (8:27), while some hunters have never seen them (17:31). Some hunters think that more wildlife officers should be hired (17:31,32) and because of the lack of wildlife officers, conclude that the locals themselves carry out most management and enforcement of regulations. They take only their bag limits and hunt within the hunting season (7:15).

A past problem with enforcing the law in small communities was that wildlife officers would not charge their relatives (2:39). However, everyone including relatives are beginning to receive equal treatment under the law (4:44).

Several hunters suggested changes to hunting regulations, however none of them felt that the season should be shortened or the bag limit for eiders be reduced (5:67; 4:45). Some thought current regulations were fine, and others thought that the season length should be extended and/or bag limit should be increased. Interviewee 6, for example, said that the season should extend until 10 March as it used to be, instead of closing in February (6:24). Some interviewees thought that the season could be open until April (4:45; 8:8). Interviewee 4 said that the breeding birds do not start to come back until the first of May, and therefore eiders hunted in March and April would still be the overwintering population that had been around all winter (4:45). Interviewee 8's reason for suggesting the season could be open until the last of April was that "it

wouldn't make any difference to the population," as, he said [wrongly], "there are millions" (8:8). Interviewee 5 stated that he would like to be able to shoot eiders while they are migrating north in spring (during May). His reasoning was that "the majority of those eiders will not nest anyway" and that "people always used to shoot them in the spring". He concluded that spring harvest did not affect the population (5:67). He said, however, that he does not agree with killing breeding birds (5:67).

Some hunters also thought that the season could open earlier in the fall (5:68). Interviewee 5 said that the season should open in October. November is too late for him to travel in boat because the water gets rougher and it is much colder then. Also, by October, the young eiders are fully grown and are fine to kill and eat (5:68). Interviewee 15 thought that the hunting season should not open earlier because if it did hunters, would be killing the older, breeding birds (15:41).

Six of 20 hunters agreed that bag limits are currently fair and should not be increased or decreased (10:47; 12:34; 14:27; 15:39; 16:40; 18:40). Four of 20 hunters reported that some illegal hunting continues and bag limits need to be enforced (5:70; 11:30; 14:27; 16:38). Other hunters suggested that the bag limits per trip should be increased. They felt that this is justified because the current bag limit does not warrant the time and money spent on the activity (6:26; 8:26; 13:22). Interviewee 8 believed the bag limit should be 50, so that hunters would only have to make 1 or 2 trips out per season to meet their needs, and that this would save money (8:26).

Only one hunter thought that there should be a quota or a bag limit for the entire season instead of a daily bag limit. He thought people should be able to hunt when

needed, except during the breeding season. Hunters would get a specific number of tags that they would have to use for each eider killed based on the quota. This hunter believed that it is people's right to hunt when they want, as long as they are responsible hunters. He said that because people are given only limited time to hunt, they "panic" and do not use their knowledge of hunting to decide what, when and where would be best for them to hunt. They react by getting whatever they can whenever they can, not a good or efficient hunting practice (17:65).

5.3.2 St. Peter's Bay – Its History and Current Status

People have hunted in St. Peter's Bay in spring, summer, fall and winter. In the past, some only hunted there in spring (1:1), others only hunted there in fall (11:19), and very few hunted eiders there in summer. Now, most hunters hunt in St. Peter's Bay in early fall (6:10). Only a few hunters have hunted there in winter (8:8). Hunters often hunt near their communities rather than traveling great distances to hunt. Because St. Peter's Bay is ~ 40 km from the nearest community, it is not a frequently visited hunting location (16:5; 18:22). Any hunting there now, is usually in the fall for geese or divers (scoters). As interviewee 18 said, "there's nobody who hunts eiders much in St. Peter's Bay" (18:22). Some hunting and egging has always occurred there even when it was a sanctuary (8:25; 10:19; 12:35; 18:22). One hunter who hunted in the 1950s said that he never did much hunting in St. Peter's Bay because he said, "it was reserve ground and we wasn't allowed to be there very much. … You had to watch what you was doing if you

did go there" (5:55). In summer, families would sometimes go to St. Peter's Bay on Sundays when they were not fishing to see the ducklings (4:33) or to pick bakeapples (15:45). Before the early 1970s, people who went to St. Peter's Bay went to kill seals or to pass by during cod fishing. Because people did not have fast boats, nobody went there in rowboat or trap skiff only in order to hunt eiders (15:43).

Many hunters mentioned that there was a man named Ben Comby who lived with his family in Sandy Tickle in St. Peter's Bay for one year in the early 1950s when St. Peter's Bay first became a federal migratory bird sanctuary (1:1; 4:41; 5:34; 10:45-46; 19:1; 20:1). Even though he was hired to protect the sanctuary from poachers his presence there did not make a difference to the amount of hunting and egging that occurred, they thought, because he did not even have a boat (1:1). Due to a lack of funds, Comby could only stay there for a year and no one else was ever hired to work there (8:24). Many hunters said that St. Peter's Bay was never monitored very closely (3:28; 5:33) and no one ever saw a wildlife officer there (4:43).

A few of the hunters interviewed had been a part of the BHRDA and had helped to write the proposal to re-instate St. Peter's Bay as a bird sanctuary (7:16; 16:41; 4:40). Interviewee 7 expressed that the issue was not clearly explained and there were mistakes in the questionnaire asking for feedback on the sanctuary re-instatement. People misunderstood several aspects of the questionnaire and rejected re-instatement without giving the proposal a chance or trying to reconcile the parts that were wrong (7:16). Hunters had to fill out a response form indicating whether they agreed or disagreed with the designation of St. Peter's Bay as a migratory bird sanctuary. Fifty-two percent (25)

of the 48 people who sent back a response did not support the sanctuary (Table 5.1). Interviewee 7 thinks that opinions are now changing because more people have been asking questions and there seems to be more of an understanding between those who proposed the re-establishment of the sanctuary in 1998 (some of whom currently hunt in and around St. Peter's Bay) and those hunters who initially rejected the idea (7:18).

Forty percent of the hunters interviewed in 2001 stated they do not think the bird sanctuary in St. Peter's Bay needs to be or should be re-instated (Table 5.1). Most of the hunters who expressed this opinion currently hunt in St. Peter's Bay (8:19). Their reasons include that there are fewer disturbances in that particular area in the summer now than previously.

Table 5.1. Number of hunters that agreed/disagreed that St. Peter's Bay should be a migratory bird sanctuary.

	1998 Survey	**2001 Interviews**
Agreed	23 (48 %)	12 (60 %)
Disagreed	25 (52 %)	8 (40 %)
Total Responded	48	20

Hunters say that eiders are distributed along the coast in the winter and do not use St. Peter's Bay specifically as a place to feed or rest, and that in fact there are not many eiders around St. Peter's Bay in winter (15:44). Interviewee 15 recalled,

> I never seen a lot of ducks around St. Peter's, in (winter), ... sometimes you'd see 'em around Eastern Island, Double Island, and Western Island... sometimes, not a lot, not very often. Mostly Eastern Island if you're gonna see any. And even if you do see 'em there, you won't get any. Not in the winter. You won't get close; before you even get off to the islands, the ducks are usually gone... 'cause you got so much space between the land and the ducks (15:44).

Others say there is simply no need for a sanctuary (1:1; 12:35; 13:20). Some hunters think that they should be able to hunt eiders there just as they hunt them else where along the coast in the winter. Interviewees 17 and 18 said that there is no abuse in St. Peter's Bay (17:2; 18:23) and that only "good responsible hunters" go there (17:2; 18:23).

Some of the hunters mistakenly thought the BHRDA's proposal meant they would not be able to go through the sanctuary with a gun in their boat even if it was necessary to pass through there to get to their destination. They thought that if they had a gun in their boat they would have to go offshore in dangerous waters in order to pass St. Peter's Bay (2:38). Some hunters also thought that they would not even be able to go through the sanctuary and would have to go far offshore whether there was a gun in their boat or not (6:22). This was a misconception. Another part of the proposal many hunters did not agree with was that the 10-mile radius for the sanctuary included 1 mile (1.6 km) inland along the shore. People who do a lot of rabbit catching and partridge hunting there did not like this idea, and stated that they did not understand how they would be disturbing the ducks by being onshore hunting other animals (7:16). Many people who hunt geese and other waterfowl also did not like the idea of re-instating St. Peter's Bay as a sanctuary, because they say it is the best place for hunting Canada Geese (*Branta Canadensis*) on the south Labrador coast (4:42; 5:36; 13:19; 15:44). Interviewee 17 recalled,

> This last - I don't know - 7 or 8 years or longer, 10 years probably, people go up in the St. Peter's Bay area and ... hunt geese ... Apparently it's a very good place for the geese to gather ... in the fall. ... If they close that now, then the people from this area basically is not able to go out and get a goose to eat. There's no other place around here that they go, basically. But I guess now the latter few years they

> found out that this is where ... a lot of them pitches ... when they're migrating and so you know get a scatter[ed] meal of birds (17:1).

When asked if he thought St. Peter's Bay should be a bird sanctuary interviewee 15 said,

> No. For only one reason. The goose hunting. You got no other place to hunt geese, and nobody goes there at that time of the year to hunt ducks anyway. We don't get those ducks like I told you earlier, when the duck season opens. The ducks around St. Peter's area is gone south. Or most of 'em anyway, 90%. There might be some later ducks that couldn't fly really, or something. That's about it (15:44).

For one hunter's family, goose is a traditional Christmas meal (13:27). Some of the goose hunters believe that St. Peter's Bay will eventually be closed to hunting (13:19; 6:20). One goose hunter, who had disagreed with St. Peter's Bay being designated as a sanctuary in 1998 when the questionnaire was sent out by the BHRDA, has now changed his mind. He stated,

> Right now, maybe, it might be a good idea because I know this has been talked about for a long time ... now and people, some people have been trying to get a reserve there. I didn't agree with it then but maybe now it might be all right because there's other places to go where you can hunt geese. With the road through you know, because before when you go there in boat that's the only place you get to hunt geese where you know you could get to a place where geese normally lands to feed and that, so you could hunt geese there. But now, with the road through, I guess there's other places you can get to now ... some pretty good places in around the ponds where you can go (14:26).

Interviewee 16 said,

> People that hunt geese wouldn't have that area to hunt in because that's probably one of the best areas around this area for hunting geese. But then again, I mean if we don't have some place, some bay, some area set aside for breeding eider duck, I mean what's going to happen? I don't know (16:42).

Some hunters suggested that St. Peter's Bay could be protected as a seasonal sanctuary in the spring and summer, and not protected in fall and winter (6:23; 5:36,38; 13:20). The adult eiders and hatch-year young are gone by late July or August (5:38; 16:43). Therefore, some hunters suggested St. Peter's Bay be protected from the first of May until the end of August (6:23; 5:36). By the time goose hunting season opens on the second Saturday in September, adult males and females and hatch year young have usually left St. Peter's Bay (16:43; 19:1). Interviewee 16 said,

> It wouldn't be so bad after [eider breeding time] ... because ... once the season ... opens they're usually ... big enough ... [and] they usually leave the bay anyhow ... (16:43).

Interviewee 18, who is a devoted sport hunter, and who disagreed with St. Peter's Bay being designated as a sanctuary, said it would be better if there was a wildlife officer there during breeding and the hunting season to make sure people are not hunting illegally (18:24). He remarked,

> If they turn it into a reserve and ... there is no hunting at all, then that means that they got to get somebody to look after it. ... Because fellers like me is going to be up there anyway. What I am up there for is geese. So one alternative to this is just to have someone up there during the hunter and breeding season anyway. ...Why do you ... have [to] bar (ban) [geese] hunters out of it, ... just because of the eider ducks? ... I'd tell on anybody up there killing, if I thought it would help my cause (18:24).

> I don't know where else we are going to go, if this is taken away, for good hunting (18:37).

When Interviewee 7, who was in support of a sanctuary in St. Peter's Bay, was asked whether he thought a "seasonal sanctuary" was a good idea he said,

> If you starts letting one thing by or starts letting something else by ... [and don't] end up with whatever you put forth in the first place it's no

> benefit at all. If you start letting people in there in the fall of the year to hunt geese, well okay, you got a lot of young ducks there, you got a lot of Belmar (molting) drakes there, and before you know it, if it's not being monitored every day, on a regular basis, 12 or 14 hours a day, ducks is getting killed, birds is getting killed – it's not only geese, there's other species getting killed. …And you know you're still disturbing the habitat that the birds is in and you know just 'cuz the nesting is over and the juveniles is starting to [be]come young birds. …There still needs to be in a good environment (7:20).

Interviewee 7 also made the point that because we (humans) kill eiders, and have taken their down and eggs, we have the responsibility for protecting them and setting aside a safe place for them, where they will not be harmed by us (7:29).

Sixty percent of hunters interviewed for this study would like St. Peter's Bay to be a sanctuary again. When asked whether he thought St. Peter's Bay should be a migratory bird sanctuary Interviewee 3 said,

> I think [it] should be. You see we talked about that for the past 15, 20 years, it should be put on the reserve, you know, on again because there is, it is a bird sanctuary. Or it's supposed to be. St. Peter's Bay always was you know. It was always respected as that you know years ago. … And the more I think, there's too much, they're disturbed too much. … many people travelling around and people being there. That's why I think it should be brought back again. It is a breeding ground, always was a breeding ground for eiders. … A lot of people feel the same, you know, we talked about it. … Some people don't. That's the sad part about it I guess. … But you would want to be [there] for a short while … during the breeding season, like say from May up to August or September. Because when the bird season opens there is going to be people around, regardless. … You'd have to be there at all times. You know, to patrol it I guess. … Well years ago people didn't know Peter's Bay existed with regards to you know hunting or anything like that, well I mean I knows the people like Henley Harbour now or Cape Charles, the nearby communities. But now if they can, they comes from all over, like I just said, the whole coast. Especially the goose season opens in St. Peter's Bay. And they all knows where St. Peter's Bay is at now, and … I don't think it should be opened at all times … there should be some restrictions put on St. Peter's Bay (3:28-29).

Unlike some other areas where eiders breed on the south coast of Labrador, people do not regularly use St. Peter's Bay. This is a strong advantage to having a bird sanctuary there. Interviewee 16 said,

> We do need some areas, like I mean there's not much you can do with places like Lewis's Bay here now … over around Bay Harbour and Long Harbour or over across the bay here. There used to be a lot of birds used to nest over around there but there's not much you can do about those areas because I mean the people use it on a daily basis. … St. Peter's Bay up there is remote. … It's a remote area and I think it could be set aside for you know one place for the birds to … breed and that …(16:41).

> I think we are going to have to set aside some areas as breeding areas because if not … I don't see any way that they can survive. Not around this area, I don't know if there is the same pressure on other areas. [There are] speedboats, a lot of speedboats on the go now (16:46).

Other reasons hunters support St. Peter's Bay as a sanctuary are that it has ideal habitat for nesting eiders (7:19) and that is the only place in the area from Red Bay to St. Lewis where many eiders nest (9:14). The next best nesting location is Table Bay, which is 200 km north of St. Peter's Bay (7:19). Other hunters, who support the sanctuary, explained that it would "keep" eiders in the area, provide a safe place for them to nest (11:31) and that if eiders are declining, the sanctuary could help the population increase again (4:39; 10:47). Interviewee 8 thought that there should be more research conducted there:

> I think there should be somebody up there…. seasonal. In the summer, there should be a shack up there. There should be people, like university students up there doing whatever, their thesis, their honours thesis or whatever up there in the summer time, doing counts, doing nesting boxes, should be, I think there should be people up there. … Just finding out what's happening up there. If they did, you know. … Then if people up here, see that there is someone up there watching it, they won't go out there with a shotgun. Or they won't go up collecting eggs, or they won't, you know? (8:27).

Other hunters mentioned that St. Peter's Bay should be a sanctuary, not only because of the eiders, but also because of the other waterfowl that nest there and the gray seals that breed there (19,1). It was also suggested that if there were a sanctuary, there should have to be someone there year round to protect it (19:1). Clearly, hunters felt that enforcement was a fundamental and essential component of eider conservation.

5.3.3 Potential Effects of The Trans-Labrador Highway on Conservation

Some interviewees said that most people do not have a need to travel in boat past St. Peter's Bay in summer now, because they can travel on the road much easier and more efficiently (2:38; 6:20). For example, Interviewee 6 used to go to Red Bay in speedboat in the spring to get his boat for crab fishing, but since the highway from Red Bay to Lodge Bay was opened in 2000 it is much quicker to drive to Red Bay to get the boat (6:11). In the fall, more non-residents may visit St. Peter's Bay to goose hunt because of the road (6:20). People who could never afford to fly to Labrador just to goose hunt can now drive; often bringing their own boats.

Some interviewees noticed that wildlife officers are traveling on the road between Red Bay and Lodge Bay a lot since it has been opened, and that they have been stopping people on the road and checking to see if they are carrying guns in their vehicles (6:29; 8:26). Interviewee 6 noticed that no one he knows who previously hunted geese in the spring did so in spring 2001, because spring goose hunting is illegal and the chance of seeing a wildlife officer was too great (6:29). Wildlife officers never make a "special"

trip to St. Peter's Bay. They will only go there if they have to pass it on their way to somewhere else (8:27).

Even though there may be less boat disturbance in St. Peter's Bay as a result of the new road, one hunter suggested that in other areas where the road nears some nesting islands in St. Lewis' Bay, the eiders will be disturbed by noise from traffic (16:39).

5.3.4 HUNTERS' CONCERNS FOR COMMON EIDERS

Some hunters are concerned that if St. Peter's Bay is re-instated as a bird sanctuary, tourists may come and disturb the eiders more than they are being disturbed now (2:41; 15:45). Interviewee 2 said,

> To me there's no need, there's no need for the sanctuary. ...If it's a sanctuary and it's not promoted as a tourism thing, probably, then there's no different than what it is now. But if you're gonna put it there and promote it for tourism and stuff like that... If you puts a sanctuary on that the tourists is gonna want to go in there. [It's as] plain and simple as that. ... How close can you go to a nest without drivin' the duck off to take a picture of the eggs, I mean... I'll tell you another thing I've seen. ... I've went up there and, you knows what the old ducks does when you goes along there. You drives 'em away. ... I've seen the gulls stealing those little ones. They'll come down they'll attack 'em. So if every tourist there, that happens, there won't be n'ar (any) duck left there at all. I am a bit concerned about the tourist crowd (2:41).

Interviewee 15 said,

> People want to go to look at the ducks. Some people were saying they could take people up there to watch the birds, and I think that would be even worse. Especially when the ducks is laying. [They've] got their eggs, and they're hatching and ... one thing and another. ... And when they leave the nest the gulls probably take their eggs, or they take their

> young soon as they hatch. I think that they probably just wait until they get their chance. The gulls. … But see by the time we get up bakeapple picking, … all the hatchlings were out anyway, and gone, ...so didn't, still don't bother the ducks I don't think (15:45).

When eiders are frightened off their nests there is a great chance that gulls could predate their eggs. Interviewee 16 suggested culling the gull population because he believes the gulls are destroying eggs (16:47).

Many hunters mentioned that they do not believe eiders should be killed for sport (3:3). Interviewee 17 called hunting eiders for sport abuse (17:64). Interviewee 6 said,

> I know some people, I'm not mentioning no names or nothing like that, [who] killed … birds … the winter. But I mean he wasn't throwing them away, I mean he was giving them away and trading them for gas and that kind of stuff, but I'm not mentioning no names or nothing. But … there's no need of that. They're just killing them, basically for sport. … I mean the ducks were getting consumed by other people but… I don't believe in that, there's no need of it, as far as I'm concerned. You go out and you kill your birds, whatever you needs for yourself and that's it. My thoughts of it anyway (6:28).

Interviewee 3 also does not agree with hunting eiders for sport,

> Never went for sport or anything like that. That wasn't, just when you wanted meat you went hunting and killed what you wanted and that was it, just enough until next time when you needed it again. Not like it is today. Where they see how many they can slaughter. Sport, what they calls sport. I don't know (3:3).

Many hunters are concerned about general disturbance to eiders. Interviewee 6 mentioned that many eiders used to feed near Camp Islands but no longer do. He believes they are frightened by the loud continuous foghorn on Camp Islands (6:43). Some hunters were also concerned about the disturbance from boats with outboard motors that may disrupt them from feeding and resting close to shore (13:27).

Some hunters are concerned that eider meat and other wild meat is now sometimes wasted. People are more wasteful now than they used to be. When talking about frozen eiders that people have killed Interviewee 14 said,

> I've seen 'em throw away in later years. ... I dunno they spoiled or what happened to 'em but you see ducks sometimes get thrown away. ... Not a big lot ... just once in awhile I think, somebody has some that I guess [it] gets freezer burn (14:12).

Interviewee 13 gave the example of hunters on TV even cutting the breast meat off of a goose and then throwing the rest away (13:26). He didn't think that was right and said that his family eats every part of the goose.

5.3.5 Hunters' Ideas For Conservation and Enhancement in and around St. Peter's Bay

Some hunters suggested that community awareness and education are very important to establish long term local conservation practices. Interviewee 1 suggested that there could be community meetings where local residents could discuss what they would like to do to help conserve the Common Eider (1:1). Interviewee 8, who would like St. Peter's Bay to be a sanctuary, said that there were community meetings in 1989 to discuss the possibilities of re-instating St. Peter's Bay as a sanctuary, but very few people showed up (8:19).

Hunters reported that a good conservation and/or enhancement program for the St. Peter's Bay area would work if people from the nearby communities support it. First however, they commented that, people need to understand the importance of protecting

eiders. The people who are initiating the conservation plan also have to understand the concerns of hunters, take their considerations into account, and need to be able to explain clearly, and in person what is happening. Interviewee 8 remarked,

> I think if there were people around here holding ... public meetings and ... going around talking to people making them aware of their impact ... I think they would understand more of it. People don't ... even your presence here is going to make a big impact ... a lot of people talk now about ...those girls, ... going up to St. Peter's Bay. ... They think you're here to designate it again as a bird sanctuary. And I said no they are just doing a study. ... The Battle Harbour Regional Development Association ... sent a questionnaire out to all the households. ... I filled out my questionnaire and she only got like a dozen filled out and sent back to her office out of the hundreds, 800 that she sent out ... It would be different if she went around and asked the questions to people because you got a lot of people around here who can't read and write. ... And they are just intimidated by people who come in ... or letters ... I am more comfortable answering questions with you girls than just sitting down with this thick questionnaire and filling it out. Because you don't understand what [they're] asking, half of it right? ... Like (what) you ... are doing instead of just putting the questionnaire in the mailbox, ... a 20 page questionnaire and most people look at that, and say, ... You could light the fire with that! And that's what they do. They put a match to it and light their fire with it (8:27,29).

One hunter had been involved in a program organized by the Quebec Labrador Foundation (QLF), in which they took children on islands in St. Peter's Bay to show them the eider habitat, eider ducklings that were just hatching, icebergs, whales, porpoises and whatever else they could see (8:23). Interviewee 17 commented that teaching school children about conservation and how to be responsible hunters is important. He remarked,

> I think our young people ... they're going to have to be responsible hunters say like me ... because ... I've seen the old ways and I've seen the change. ... And in order to bring back a little bit of the old ways our younger people are going to have to put ... traditional learning in the schools and [we'll have to] learn (teach) our younger people to be

> responsible hunters, responsible fishermen and [have] conservation in mind at all times. And when you go out and kill something and you think it's good even though you think it's a sport, and you enjoy it, always remember that you got brothers and sisters and other generations that's coming after you (17:66).

Some hunters do not agree with hunting from boats (17:12) and suggested that a great way to help conserve eiders is to ban this practice. Hunters should only be allowed to hunt from land for eiders, and use a boat only when retrieving them (6:25; 15:40). Interviewee 12 said,

> You are not allowed to hunt from a boat, but … they do! Not so much here, but north of here they do it all the time. … I mean you take for instance say a boat leaves Battle Harbour and I mean they might be tracing the one company of ducks from Battle Harbour to Red Bay. … But don't get a chance, when the birds are chased like that don't stay, they are gone. That's the reason I think we don't see so many now as we did one time. … The company of ducks go to wing, they probably fly, oh I don't know, maybe 8 or 10 miles, pitch again. Ten minutes after that the boat is there, they are gone away again, they fly another 8 or 10 mile and pitch, and so on and so on (12:33).

Interviewee 15 said,

> … if the ducks was down or declining …, it would be a good idea to get them boats off the water (15:41). … I'd just as sooner hunt from land. I think you'd see more ducks anyway. The ducks would stay in the area more. … I used to always hunt from land so ... a lot of people hunted from land. … I told many people that; they didn't like that very good (much) though (15:40).

Hunters also suggested that there needs to be more protection for eiders (14:27) and wildlife officers should currently patrol all eider nesting grounds and eider hunting grounds more often (6:28; 10:47; 11:30; 16:40; 17:31). Patrol should especially occur in fall, as people tend to take a "bigger chance" than they do in spring to hunt illegally (9:10; 11:30). Interviewee 11 said,

> The young birds, October, November, they['ve] got no protection at all. As soon as they gets big enough to fly, someone kills them (11:30).

Interviewee 17 suggested that wildlife officers be stationed in St. Peter's Bay, during breeding and chick rearing, until all the broods have left (approximately from May to August) (17:1). Interviewee 8 and 16 suggested that nest boxes be put on the islands in St. Peter's Bay (8:18; 16:41).

Only one hunter interviewed thought St. Peter's Bay should be a sanctuary for the purpose of enhancing tourism. He believed that people would probably "get more from it" if it was a sanctuary than if they just hunted there because they could make money from tourism (8:21). Other hunters were aware that some people felt this way and they gave this as their reason that they would not support St. Peter's Bay as a sanctuary.

During fall migration, there are certain points of land that eiders will always fly past. These places are usually named "gunning point." In Battle Harbour there is a Gunning Point where hundreds of eiders are killed each fall. Most hunting practiced there is illegal, before the eider hunting season actually opens in November. One hunter said that Gunning Point in Battle Harbour should be closed for hunting throughout the year and needs to be patrolled during fall. He said,

> I've been here twice out of season early in the fall. And all that is getting killed there is breeding birds. ...And I've seen hundreds, knocked down there. ... Coming south, the wind pushes them in[to] the bay. And they get land locked and they got no other choice only to pass in over this point. And you get 12 or 14 or 15 guns lined across that point. That would be the only place I'd close in a hurry. I've done it (hunted from there) twice. And I said never again will set foot on that point. ... Because it's, my opinion, it's destroying birds. ... Like that's hunting, it's hunting out of season, it's hunting the breeding birds because the young ones are not left down north yet, right. The breeding birds always return before the young birds. They must be left on their

> own or something right? And you'll see hundreds and hundreds and hundreds. You could be over there for the day and probably 50 lots will pass by that point in one day. That's how, you know, it's guaranteed you can't miss (18:31).

Two hunters thought that eiders do not need to be protected (17:67; 18:25). Their reasons were that eiders are not hunted nearly as much now as they have been in the past (18:25) and that their population seems to be increasing (17:67).

Table 5.2. Summary of hunter opinions and ideas about "management" of eiders, where they suggested changes that should and should not be made.

Topic	Opinion
Hunting Transportation	- Ban use of boats to hunt (to be used only to retrieve eiders)
Bag Limits	- Retain as is - Have one bag limit for entire season (e.g. 50 eiders) - Have a tag system for use on each eider killed (as there is with salmon)
Season	- Retain as is - Open earlier (October) - Extend later (March/April/May)
Enforcement	- More wildlife officers are required - More patrolling of officers to enforce current bag limits and seasons - Officer stationed in St. Peter's Bay is required, May-August or year round
St. Peter's Bay	- No sanctuary with more patrolling - Sanctuary with more patrolling - Place for students to study wildlife - Tourist attraction (only one hunter favored this)
Education	- School children should be taught hunting and conservation practices
Other conservation ideas/concerns	- Gunning Point at Battle Harbour should be closed entirely to hunting eiders - Community meetings are required to provide information and identify areas of interest for eider conservation - Hunting eiders for sport is wrong - Eider meat should not be wasted

5.4 DISCUSSION

The opinions and ideas of each hunter were based primarily on their own hunting experiences. However, they often discussed the actions of others. Age and home community do not seem to have much influence on the hunters' ideas about hunting transportation, bag limits, seasons, enforcement or conservation. Things that do seem to affect hunters' opinions and ideas about these issues are if they have hunted for other waterfowl besides eiders, particularly Canada geese, their views on conservation, whether they believe eiders need protection, and their views on ecotourism. In this discussion these central themes and ideas for future management changes and eider enhancement are discussed. It is recognized that caution has to be taken when using LEK for management purposes. If LEK used for management purposes is wrong the consequences could be grave.

5.4.1 HUNTING ACCESS

If hunting regulations were changed so that hunters could no longer hunt from a boat, hunters could only hunt from coastlines. This might be easy or very difficult depending on how well hunters can hunt by land and whether they want to make the change or not. In many parts of Newfoundland, hunters hunt from the land. For example, in Ramea on the south coast and near Lewisporte on the northeast coast, hunters hunt from the mainland or from small islands. Hunters wait on points and use decoys to

attract eiders. In this way, hunters feel they are not disturbing the eiders, because the eiders do not even know they are there until they are shot at, and only a few eiders come to the decoys at a time. Hunters are not shooting at large flocks, and are therefore less likely to wound eiders. Also, when hunting this way, a hunter can control the number of eiders (two or three) killed and can be selective about which eiders are killed (K. Tucker pers. comm.). Hunters interviewed on the south coast of Labrador never mentioned trying to hunt eiders this way. If it was tried it might be an effective way to hunt and an effective alternative to hunting from boat.

5.4.2 Bag Limits

Increasing bag limits would be much more economical for those hunters who have to spend a lot of money on gas to get to their hunting grounds (e.g. hunters from Lodge Bay). Some hunters might kill only the amount they need, as they have in previous years; however other hunters may kill many more eiders in a season just because they have the opportunity to do so.

It is unrealistic to have a quota system in Labrador because all migratory bird hunting in North America is based on daily bags and a possession limit (double of daily bag) (G. Robertson pers. comm.). There is potential for abuse if hunters had to tag the eiders they shoot. Given a limited number of tags, some hunters might not attach tags on the eiders unless they see a wildlife officer nearby. This illegal approach would allow them to shoot more eiders than their tags would permit.

5.4.3 SEASONS

Opening the season earlier would mean that more adult and juvenile southern eiders (*S.m. dresseri*) would be killed. They would be shot in their breeding habitat as well as during their migration to their staging and in their overwintering areas in the Gulf of St. Lawrence, Newfoundland, St. Pierre and Miquelon, Nova Scotia, Maine and Massachusetts. If seasons were extended into March and April, hunters constrained by severe weather in winter could compensate for this by hunting in spring. This, however, puts increased pressure on the northern eiders (*S.m. borealis*), as the hunting season would be open for four to five months instead of three. Extending the eider-hunting season in Labrador would be improbable as hunting beyond 10 March is illegal in North America, without special exemptions. Also, there is a 109-day open season limit for all waterfowl that would unlikely be changed (G. Robertson pers. comm.). One hunter said that responsible hunters should have the freedom to make their own decisions about when to hunt but he also acknowledged that not everyone is a responsible hunter and that some people would abuse an extended hunting season. This could be detrimental to the *S. m. borealis* population, which is also hunted in Nunavut before the migration to the coast of Labrador during fall (Gilchrist and Robertson 2001). Most hunters interviewed were comfortable with the timing and length of the hunting season; so it appears that maintaining the current season is appropriate.

5.4.4 Enforcement

Most hunters concur that current hunting regulations need better enforcement and that self-regulation will not work. There are only two wildlife officers in Red Bay who serve the coast of Labrador between Red Bay and St. Lewis. The hunters reported that they have a very limited presence along the ~ 100 km of coast between these communities. The majority of hunters would like to see more wildlife officers on patrol because they do not like to see others hunting out of season and taking more eiders than they are entitled to. If St. Peter's Bay were reinstated as a bird sanctuary, they emphasized that there would also have to be regular patrols. Several suggested that patrols could occur three times a week on different days and at different times each week to keep poachers off guard. If this did not reduce illegal activity, an additional officer could be stationed in St. Peter's Bay. This would be costly but necessary, especially during the first few years after reinstating a sanctuary.

5.4.5 St. Peter's Bay as a Migratory Bird Sanctuary

The main reason for disagreement on reinstating St. Peter's Bay as a migratory bird sanctuary was that some hunters who hunt geese there in fall would not be able to do so. From the 20 hunters interviewed, five out of eight who disagreed with the sanctuary did so because of conflicts with goose hunting.

The main reason why the 12 other hunters agreed to the sanctuary was to enhance eider reproduction and survival. These hunters believe there should be a place, at least during nesting, where eiders are protected from hunting and boat disturbance. The islands of St. Peter's Bay support more than 600 pairs of eiders, (see Chapter 2). In order for sanctuary status at St. Peter's Bay to be effective in protecting nesting eiders and other wildlife there, the communities closest to it would have to support it.

5.4.6 EDUCATION

Education of youth and adults can strongly influence the harvest practices of marine birds by people. As one hunter suggested, school children should be taught hunting and conservation practices. Blanchard (1994) found that 7 years of educational programmes that promoted the conservation of seabirds on the Quebec Lower North Shore "helped change the social norm away from approval of widespread seabird harvest" and "reinforced the basic cultural ethic that favored conservation."

In most communities where hunting has been a tradition for decades, most people feel that it is wrong to kill more birds than one needs (Blanchard 1994). The need for eiders has decreased considerably because people have been able to store meat in freezers and buy meat in stores. People have also had access to more stores because of new roads connecting communities. Blanchard (1994), however, found a conflict between peoples' traditional views and their actual behaviour. People still seemed to be killing just as many seabirds after their need for them had decreased. The educational programs helped

local people to realize the change that had taken place; they did not need to depend on seabirds and continue hunting them as much as in the past (Blanchard 1994).

There are many similarities between seabird harvest on the south Labrador coast and seabird harvest on the north shore of Quebec. In Labrador, more people are now hunting for sport and none of the hunters interviewed said that they currently hunt because they need eiders for subsistence purposes (see Chapter 4). Yet, there has been a lack of education programs focused on seabird conservation on the south Labrador coast.

In interviews conducted for this thesis, hunters provided some traditional and new views. Examples (Table 5.2) include, that eider meat should not be wasted, hunting eiders for sport is wrong, and that locations where hunters can cause much destruction to flocks of eiders, such as Gunning Point Battle Harbour, should be closed to hunting. However there remains considerable disagreement between hunters over several of these issues. As one hunter suggested, a good way to begin to resolve these issues, or even to come to a common understanding about them, would be to hold community meetings. There, these issues could be discussed and perhaps common areas of interest from all hunters could be identified. Once these common areas of interest are found, ideas, plans and activities for current and future conservation and management for the Common Eider on the south Labrador coast could progress.

CHAPTER 6: CONCLUSIONS

6.1 INTEGRATING LEK AND SCIENTIFIC RESEARCH TO STUDY EIDERS

In Chapters 2 and 3 several examples are given in which LEK coincides with results of scientific study. Each type of knowledge can sometimes support, refute, verify and strengthen the other. For example, in Chapter 2, hunters' knowledge of the breeding population size in St. Peter's Bay was shown to match the estimate produced from the boat surveys of breeding male eiders and nest counts. In Chapter 3 there is an example of LEK and science working together to augment information that was presented in Chapter 2. In Chapter 2 hunters reported that most of the eiders that are seen in winter are young males and females and adult females that stay near shore. In Chapter 3, LEK and science confirmed that the majority of eiders that were killed by hunters who participated in this project along the south Labrador coast during the winter were females (age undetermined) and juvenile males *S.m. borealis*. In Chapter 4 LEK indicated the same downward trend in numbers of eiders harvested over time, as did the National Harvest Survey. Both demonstrated that the number of eiders harvested on the south coast of Labrador has decreased since around the mid-1980s to early 1990s. This shows that LEK can support scientific research and in some situations, help explain results, particularly those pertaining to changes in human hunting practices.

Chapter 3 described that hunters did observe morphological differences in the two subspecies of eider. Hunters wrongly interpreted observed morphological differences

were due to age and not subspeciation. While hunters' interpretations of their own observations may not always be correct, the same applies to scientific observations. In a study where both LEK and science are used to obtain results, the reliability of LEK can be assessed by comparing within and across interviews and by comparing with scientific data (Fischer 2000). Using both may reduce the risk of errors of interpretation.

Without the documentation of LEK in this thesis, an historical reconstruction of hunting practices and their effects on two subspecies of Common Eider would not have been possible. LEK may contribute qualitative historical information often along temporal scales of decades (Fischer 2000), and provides years of local observations where scientific observations may not exist. However, LEK cannot be verified independently and there are several instances where differences of opinion existed. In these cases clear interpretations are difficult. Changing human activity patterns also clearly influence people's observations and hence interpretations of natural phenomena.

When combining LEK and scientific study matches and mismatches often occur. These occurrences likely are indicative of issues involving environmental uncertainty.

In chapter 3 hunters wrongly interpreted that differences in color and bill morphology of eiders was a function of age, rather than characteristics from two races. However, when their observations were integrated with scientific knowledge of these race characteristics, I was able to construct the timing at which the two races occurred along the Labrador coast. In this case, if scientific data had not been available we would not have realized that the hunters were describing two different subspecies. The two

subspecies of Common Eider on the south Labrador coast would have been treated as one population.

It is also important to recognize that LEK can be inconsistent and misinformed. Thus, as when using scientific information, the use of LEK also requires that precautionary approaches be favored in the face of uncertainty (Ludwig et al. 1993). Combining LEK and scientific information could go a long way in helping to improve understanding and helping to reduce environmental uncertainty.

Chapter 5 illustrates the disagreement among hunters over whether a sanctuary is warranted, but most are in agreement that more enforcement is required to protect eiders from over-harvest and disturbance. They feel that self-regulation of harvesting practices is not working. They are convinced that intensive enforcement involving conservation officers is necessary for the effective protection of eiders.

A positive and indirect benefit of LEK is that the process of conducting interviews among hunters greatly enhances communication between agencies and scientists and the hunters themselves. As well as generating shared information that can contribute to better management decisions (LEK), the process of LEK and community involvement can enhance the likelihood that the regulations are actually adopted.

Science provides quantitative data for a specific time and location. Together scientific knowledge and LEK has provided a greater understanding of Common Eiders on the south Labrador coast. Combining hunters' knowledge with the scientific results about breeding populations in St. Peter's Bay, brood distribution, and winter subspecies ratios greatly enhanced the overall picture of Common Eider subspecies distribution,

population, migration patterns and their changes over time in southern Labrador. By recording changes in hunting practices over time (LEK), it was possible to infer ways those changes could have influenced eider populations, distributions and migration patterns.

6.2 PARTICIPATION AND ENHANCED COMMUNICATION

Interactions with hunters throughout the project encouraged their interest in the project and of eider ducks in general. They looked forward to receiving research summaries. Some hunters not only showed interest in the project but also interest in finding out more about all birds in their communities. This made for great conversation and improved documentation of their everyday observations. The more times hunters were approached about the project, the more comfortable they seemed to feel with the researcher(s). This rapport was enhanced as they became confident that their identity would be kept confidential. The researcher(s) also became more comfortable with the hunters and learned how to ask questions most effectively.

This thesis will be sent back to some individuals in order to get more feedback about the overall project. Some feedback has already been given to locals in the communities where research for this project has taken place. After preliminary results were analyzed, I returned November 2001 to Mary's Harbour and St. Lewis. I participated in the local eider duck hunt with hunters from the communities. During this time, school presentations to grades kindergarten to 12 were made in the St. Lewis

School. The research was presented and there were discussions about the research and the involvement of the community. Other different species of birds in the area were talked about. The students and teachers enjoyed the experience, told of their own observations and asked many questions. During this trip I also gave each person interviewed a thank-you letter and a small version of a colorful informational poster that described the research that had been completed. Local assistants were presented with bird guides. Community leaders were also provided with a letter and a small poster describing the research that was being conducted in the communities.

Because LEK gathered as part of this thesis was confidential, I had to be careful not to reveal too much information about a particular community or individual in order to conceal their identities. This can create difficulty in trying to make certain points about a location or record and describe information precisely. Researchers not only have to watch their wording but also what maps or portions of maps they show that have individual hunter's hunting areas on them. When combining LEK and scientific study, there has to be a balance between being accurate and maintaining anonymity.

There are also language barriers. Because of accents, local terms and phrases, it was sometimes difficult to understand what an informant was saying. Similar problems might prevent the informant from understanding the researcher's questions. Some local participants are not relaxed and therefore may not give as much pertinent information as they would if they had been. Some hunters may also not completely trust the researcher(s)' word that the information will be kept confidential and as a result may not be totally truthful because they do not want others to know their answers to certain

questions. For example the question, "Have you ever collected eggs?" possibly worried some hunters as they thought they might get in trouble because of their illegal activities. As a result, some hunters may not have been honest with the researcher, and this may have introduced intentional bias into the results. There are, however, many ways to overcome these limitations in collecting LEK and combining it with scientific study. Some of which will be addressed shortly.

6.3 SUMMARY

Combining hunters' knowledge with scientific knowledge proved to be very useful and all research objectives were realized. Collecting hunters' LEK about the southern (*S.m. dresseri*) and northern (*S.m. borealis*) Common Eiders on the south coast of Labrador and combining it with scientific knowledge of the two subspecies helped to provide a more complete understanding of their population size, migration patterns and distribution. Important changes have apparently taken place over the past 10 to 60 years, although the reasons for them remain uncertain.

Chapter 2 explored how migration patterns, population sizes and distributions of eiders in St. Peter's Bay and the surrounding area changed over time. The main changes in migration patterns that were noticed by hunters were, smaller numbers of eiders were flying north in flocks each year, and that they were further offshore during spring. These 'observed' changes could be influenced by hunters not living on the headlands anymore and thus not being in the right place at the right time to see flocks of ducks flying north in

the spring. Also when hunters do see eiders now it is when they go out in their boat on clear days, and on clear days eiders may fly further from shore. Therefore during their northern migration, southern eiders may have always flown further offshore on certain (clear) days. This shows that it is important to know the nature of the hunter's observation, and how changes to human activity patterns can complicate interpretation of LEK.

There have been shifts in nesting locations as new southern eider nesting areas in Henley Harbour have been observed and fewer nesting areas have been observed in locations near Mary's Harbour. The breeding population in St. Peter's Bay has increased substantially since the late 1970s and may be stabilizing, as breeding male surveys revealed averages of 680 and 713 in 2001 and 2002, respectively. Male surveys conducted by boat may be a reliable way to estimate breeding eider populations as the nest count was 651 and the mean number of males counted was 713 in 2002. Boat surveys are less intrusive than are nest surveys for incubating hens. Hunters also reported more breeding eiders in St. Peter's Bay and more nesting areas on the south Labrador coast since about the 1950s, perhaps in response to fewer sources of disturbance.

There has been an overall decrease in overwintering eiders since the 1940s, though in the past few years some hunters have noticed an increase. All hunters observed that most of the eiders that are around in the winter and that they hunt are hatch-year young (as indicated in chapters 2 and 3). This suggests that many of the young northern eiders that migrate to the south coast of Labrador in October and November are susceptible to the winter harvest there.

Chapter 3 assessed the percentages of two subspecies of Common Eider hunted during winter on the south coast of Labrador. Seventy-three percent of the heads collected from the winter hunt on the south coast of Labrador were identifiable as *S.m. borealis* and only 2% were identifiable as *S.m. dresseri*. When these percentages were compared with the composition of subspecies that breed in the area, it was found that 49% of the eiders nesting in the northernmost part of southern Labrador near Black Tickle were *S.m. borealis* and only 1% of the eiders breeding 160 km south in St. Peter's Bay Labrador were *S.m. borealis* as almost all were *S.m. dresseri*. Some hunters noticed morphological differences at the subspecies level and classified them as two different "kinds" or ages of eiders. *S.m. dresseri* was wrongly thought to be an older eider than *S.m. borealis*.

In Chapter 4, changes in hunting practices and the effects these changes have had on the northern (*S.m. borealis*) and southern (*S.m. dresseri*) Common Eider population were assessed. Methods of transportation and the types of shotguns used when hunting eiders have gotten much faster and efficient. Before hunters began to get speedboats (outboard motors) in the 1970s, they hunted primarily from land. Because of the loudness of speedboats and the tendency of hunters to chase eiders in the boat, eiders have become very skittish. If hunters did not have the rapid-fire shotguns they have today it would be much more difficult to kill them in large numbers.

Due to current hunting seasons and the capability of fiberglass boats to go though moderately scattered ice, most hunting is now carried out in late fall and winter. In contrast, until the early 1980s, most hunting occurred in early-mid fall and spring. There

is also very little egging now compared to before the 1980s. Hunting pressure has either remained constant or slightly decreased even though hunting costs are high and there appears to be fewer people hunting than in the past. This suggests that hunting pressure has shifted from the breeding southern Eiders to the overwintering adult and hatch-year young northern (*S.m. borealis*) Common Eiders. The total number of eiders killed in a year, however, seems to be decreasing. This is beneficial for the population of northern Eiders, which may be in decline (Goudie et al. 2000).

Even though the number of eiders killed per year (or season) appears to be declining, the area covered by each hunter has been very large since the early 1980s. Hunters are also going for longer hunting trips and their main reason for hunting has changed from subsistence purposes to hunting because of tradition and for sport.

In chapter 5, the opinions and attitudes of hunters toward conservation and management were discussed. Many hunters suggested banning the use of speedboats when hunting eiders, although there was not consensus. Hunters had very different views on the current bag limits and season lengths. Some thought they are fine as they are, while others expressed interest in larger bag limits and longer seasons. The latter two options, however, do not seem prudent if trying to develop a conservation plan for eiders on the south coast of Labrador. There was also disagreement between hunters on whether St. Peter's Bay should be a migratory bird sanctuary. Sixty percent of hunters interviewed believed St. Peter's Bay should be a sanctuary. Most hunters (whether they agreed or not with a sanctuary in St. Peter's Bay) felt strongly that there should be more wildlife patrols in St. Peter's Bay and other eider nesting areas during spring and early

summer. Other conservation ideas expressed by hunters included educating children about conservation and closing areas where there is a lot of illegal fall hunting. Some hunters also feel that hunting for sport and wasting eider meat are wrong.

6.4 RECOMMENDATIONS AND CONSIDERATIONS FOR FUTURE RESEARCH AND CONSERVATION

Based on experience gained from this thesis research, I offer the following recommendations for collecting LEK efficiently and effectively. Following these points will not only speed up the interview but will greatly enhance the efficiency of analyzing the data once interviews are completed.

When preparing for a semi-directive interview, leave adequate space on the questionnaire to write answers to some short answer questions that relate to major themes of the project. Use a new sheet for answers from each interview. This will save time when analyzing the interviews.

When consent forms are long and difficult to understand, they are inhibiting and can make interviewees nervous. Therefore, the consent forms should consist of a short paragraph written in layman's terms.

At the beginning of an interview, the interviewer should get the interviewee's consent to do the interview knowing that things will be kept confidential. The interviewer should mention that the interviewee would be provided with the opportunity to decide where and how the information is used at the end of the interview. Consent

forms have to be signed at the beginning of an interview however, the interviewee should not be presented with the archival deposit forms that they can sign until the end of the interview. This gives the interviewee a chance to become comfortable with the interviewer and after having gone through the interview, the interviewee will know exactly the kind of information the researcher was looking for. Waiting until the end of the interview will give the interviewee time to think about where he or she would like the information to go when the interview is finished. This procedure would make reading, filling out, and signing the archival deposit form easier.

When conducting semi-directive interviews, it can be difficult to remain focused on the interview questions, and the interviewees should not be interrupted the moment they "seem" to be digressing. They may actually be explaining something related to the researcher's interests that the researcher did not consider. Listening to what the interviewee is saying is often "the answer that is needed" and one that could lead to an important finding.

Interviewers should ensure that interviewees are asked the reasons why or how they know or think something. Also when hunters are talking about the past the interviewee should regularly ask the hunter to estimate the date they are talking about. The interviewer could also ask time-lined questions such as, "was this after or before fiberglass boats were used?" This will help them remember and make the analysis of the data much easier, and may make the interview more accurate.

When recording information on maps during interviews, each object drawn on the map should be numbered. If the interview is being taped, that number should be spoken

into the tape recorder. If the interview is being transcribed by hand, the object number should be written next to the description of the object in the interview notes. This will save much time during analysis of the map data, as the information corresponding to each map object number will be easily found.

There are many possibilities for more eider research to be carried out in southern Labrador. The following are ideas for the future of St. Peter's Bay, and other projects on population size, distribution, and migration patterns of Common Eiders along the Labrador coast.

If St. Peter's Bay were to become a tourist attraction, tourists would have to follow the same regulations as the local people. Strict regulations would limit when tourists could enter the sanctuary, and the distance they would have to stay from nesting islands. Presumably tourists would not be permitted on islands with nesting eiders due to their sensitivity. Flushing eiders from nests can be detrimental to the survival of the ducklings and the hen (Quinlan and Lehnhausen 1982, Åhlund and Götmark 1989, Mehlum1991). Researchers would also have to follow strict guidelines and should only be allowed to go into the bay to conduct research during chosen times. Researchers should also have to follow guidelines when they are in the bay related to the type of boat and motor used, the speed traveled, proximity to the islands when not landing on them, how to approach and walk on the islands, colours to wear when on the islands and the time spent on each island to minimize disturbance to the nesting eiders. The number of days a person is allowed to spend consecutively in the bay would also have to be assessed and monitored. Good observational points on the main land in St. Peter's Bay could be

chosen where researchers could use high-powered telescopes to watch the behaviour of the eiders or to do counts. This was an effective means of observation for this thesis and caused minimal disturbance to breeding eiders.

Table Bay Labrador has the largest nesting population of eiders in Labrador, but no population estimates for this area currently exist. Nest counts every 2 or 3 years alternating with boat surveys for breeding males may be a reasonable way to obtain reliable estimates of population change. As in this study, visual subspecies identification could also be carried out during the nesting season.

As indicated in this thesis, increased technology has apparently dramatically changed the over-wintering behaviour of eider ducks, the effects of which are not known. This warrants further study to determine the effects of changes in eider over-wintering behaviour on the life cycle of individual eiders as well as the population as a whole.

In St. Peter's Bay, the effects of ice distribution throughout April, May and June, on timing of nest initiation and distribution of nesting eiders over the outer and inner islands could be studied. This would help biologists predict nest initiation based on the ice distribution in subsequent years. Based on estimated hatching dates, survival rate could be assessed each year.

A study on timing of migration each year and the effects of weather and climate change (air and water temperature, precipitation, fog) should be conducted to determine changes over time. Points of land that eiders are known to visit during spring and fall migration could be used as study sites.

A study of gull predation on eider eggs and ducklings in St. Peter's Bay and other areas of Labrador would also be informative. These predation rates could be compared with Common Eider nesting areas elsewhere. The effects of oil on eiders near Labrador should also be assessed more carefully. These studies would help to strengthen the valuable information gathered from both science and LEK on the south Labrador coast thus far.

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APPENDIX 1

Sub-component of MCRI Sub-Project: "Combining Local Ecological Knowledge (LEK) of the Occurrence and Use of Two Subspecies of Common Eider With Scientific Knowledge of Subspecies Distribution On the South Coast of Labrador

CONSENT FORM FOR INTERVIEWEES

This research involves collecting the knowledge that individuals such as you have and combining it with scientific research in order to improve our understanding about trends over time in the distribution and abundance of Common Eiders in this area. We are also interested in your knowledge about the behaviour of these ducks. In addition, we are interested in your observations concerning the ways hunting has changed over time, as well as any explanations you might have for the changes you have observed.

This research is part of a larger study called "Coasts Under Stress" that is studying the interactions between social and environmental change experienced by coastal resource-dependent communities in Newfoundland and Labrador and in British Columbia. This particular part of the project includes several smaller, local projects where the knowledge of local experts such as yourself will be combined with scientific research to improve our knowledge about the health of the environment and people in this region. The interviews I am doing will be used in my masters dissertation and in related publications.

The list of people interviewed for this part of the research will be shared only with a small number of other researchers in the Coasts Under Stress project with an interest in resource users' ecological knowledge. You are free to participate or not participate, you may decline to answer any question put to you, and you are under no obligation to explain or justify any such choice. You understand that the interview is being tape-recorded, and that you may ask that the tape recorder be turned off at any time over the course of the interview.

Your anonymity and the confidentiality of your comments will be maintained to the best of our ability. We will do this by assigning each interview a number (eider01) and storing the list of names and contact information for the people we are interviewing separately from the interviews, charts, and typed versions of those interviews. The list will be stored in a locked cabinet .

We think the risk to you of participating in the project are minimal but you should be aware that a local person or someone who knows you well might suspect that you provided a particular piece of information discussed in feedback meetings with the community or in a publication. Another risk could be that hunters from elsewhere will travel to the areas that you talk about to harvest birds. The potential benefits to you are also limited. You will have the opportunity to influence scientific knowledge regarding Common eiders in this area.

We would be very grateful if you would participate by describing your observations and presenting any information you think is relevant to this study. You are aware of the potential risks and benefits associated with your participation in this interview, and you have been given the opportunity to ask questions about and to offer opinions about those risks and benefits.

I hereby agree to participate in a recorded interview with the researcher named below, subject to the conditions listed above.

Name

Signature_____ Date

Researcher's Name

Signature_____ Date

(See over for Third Party Witness form)

If you have any questions/concerns about this project, please feel free to contact Dr. Anne Storey, Director, Biopsychology Program, Memorial University, St. John's, Newfoundland A1B 3X9. Her phone number is: 709-737-7665.

CONSENT FORM (cont.)

Third Party Witness (where necessary)

I have witnessed the researcher named above explain the research project and the contents of this Consent Form to the interviewee, and I am satisfied that the interviewee understands the Consent Form and is aware of his/her rights with respect to participation in this interview. I have no direct involvement in the research being conducted, and no direct interest in its outcome.

Name

Signature_____ Date

Researcher's Name

ARCHIVAL DEPOSIT/ACCESS FORM

What happens to the recorded interview once our research project is complete is up to you. However, at the very minimum, tapes, transcripts and maps or copies of these will need to be retained by the researchers in a secure location for at least 10 years. In addition, if you are a member of the Labrador Metis Nation and you give your permission, the original tapes and maps can be deposited with the LMN at the completion of the project. The information you have provided in the recorded interview for our research project on resource users' knowledge and science is also potentially a very valuable resource for other, future researchers. If you are willing to have a copy of these archived at the Folklore Archive at Memorial University for use by students and other bona fide researchers for approved research purposes, please indicate this below. Should you choose to have you tape deposited at the Folklore Archives, a copy of the master list of names which our research team has compiled, whose function has been explained to you, will be deposited with the head archivist who will keep it confidential subject to the conditions listed below.

In keeping with the conditions on the Consent Form, no one accessing the interview through the Folklore Archive or through the Labrador Metis Nation would be permitted to use your real name in any published document, public presentation, or other publicly accessible channel without your prior permission. You can also request that future researchers only have access to the interview with your written permission. If you are not comfortable with any of the above options, you can ask to have the interview tapes, transcripts and maps retained only by the research team or even destroyed after the completion of the project and the data analysis. Finally, you may wish to receive a copy of the interview tapes for your own personal files and family records. Please check the option(s) you would prefer below.

I hereby authorize:

OPTION 1: _____ Placement of original tape and maps with the Labrador Metis Nation.

OPTION 2: _____Placement of tape, transcript and maps in the Folklore Archive, Memorial University.

OPTION 3: _____Placement of transcript only with the Labrador Metis Nation.

OPTION 4: _____Placement of transcript only with the Folklore Archive, Memorial University.

For those selecting Options 1-4: Access to the deposited interview materials should be:

a) at the discretion of the organizational representative with responsibility for these materials ____.
b) only with my written permission_____.
c) only after _____ years from the date of this interview.

OPTION 5: _____Retention of tapes, transcripts and maps only by the research team.

OPTION 6: _____Destruction of tapes and maps after completion of the research.

OPTION 7: _____ In addition to the options I have checked above, I wish to have a copy of the tape sent to me.

Name _____ Signature_____ Date

(See over for Third Party Witness Form)

ARCHIVAL DEPOSIT/ACCESS FORM (cont.)

Third Party Witness (where necessary)

I have witnessed the researcher named below explain the contents of this Archival Deposit/Access Form to the interviewee, and I am satisfied that the interviewee understands the contents of the form and the various options open to him/her with respect to use of and access to the taped interview. I have no direct involvement in the research being conducted, and no direct interest in its outcome.

Name

Signature_____ Date

Researcher's Name

Signature_____ Date

APPENDIX 2

List of Questions for Interviewees

(ALL INTERVIEWEES SHOULD HAVE HUNTED IN ST. PETER'S BAY. A 1:60000 NAUTICAL CHART OF GREEN BAY TO DOUBLE ISLND WILL BE USED FOR ALL INTERVIEWS)

Hunter ID #: (Ex. Eider01)
Chart #:
Date:
Location:
Interviewers:

To interpret your answers to the following questions better, we need some background information. The following information will be kept strictly confidential and will not be associated with your name.

Basic Demographic Information:

1. Age (In what year were you born):
2. Gender:
3. Where born:
4. Where currently living:
5. Marital status
6. Your occupation:
7. Spouses occupation:
8: What was the last year of schooling that you received:

Fishing

9. (If person is/was a fisherperson) where were/are your fishing grounds?

The Common Eider

10. Have you ever seen this bird?
11. What do people around here call it?

Hunting

When 1st started hunting: (How do these things compare to when you first started hunting?)
12. Have you ever hunted for eider ducks?
13. When did you start hunting? (age)
14. What areas have you hunted?
15. Do you still hunt? If not, when did you stop hunting for eiders and why?

16. When you started hunting for eiders: During what times of the year did you hunt?
17. For each time: Where did you hunt?
18. Why would you hunt there?
19. Can you give me an estimate of the population of eider ducks in those places at those times? (Most importantly in St. Peter's Bay at different times of the year)
20.a) Would you (hunters) kill mainly male or female eiders?
20.b) Would you (hunters) kill mainly young eiders or mature eiders?
21. When you would go hunting in rowboat, about how far would you go away from your home?
22. What did you hunt with (weapon)?
23. How did you get to the place where you hunted?
24. How long would a typical hunting trip last?
25. On average, how many eiders would you (others in the community) get on a typical hunting trip? How does that compare to now?
26. On average, how many eiders would you (others in the community) get during a typical year? How does that compare to now?
27. What would you do with these eiders (Eat them immediately, bottle or freeze, share with family/friends)?
28.When you were young, did you/others in the community gather eider eggs? How does that compare to now? When did the most gathering of eggs occur?
29. Roughly how many eggs would you/others in the community gather per trip?
30. Roughly how many eggs would your family/ others in the community consume in a year?
31. Did you/others in the community gather eider down? If yes, what did you use the down for?
32. Did you/ others in the community combine hunting for eiders with other activities (fishing, hunting for other types of waterfowl?) How does that compare to now?
33. What is the first major change, if any, that you can remember in your eider hunting? (I.e. change in hunting technology, season when hunted, eider abundance, eider egging…? – go through each one.)
34. Has there been a change in the size of the eider population? When did this happen?
35. Can you describe the change or changes?
36. How did they affect your hunting behavior?
37. Do you have any reflections on why the changes occurred?

****(Next major change(s)? Work up through career until the interviewee describes what it was like when he/she last hunted for eiders. Go through questions changing them to fit the time of their hunting career they are talking about.)

38. Do you think the closure of the cod fishery had an impact on the hunting for eiders? Salmon fishery?
39.a) in your past opinion, has hunting for eiders become easier/ more efficient or harder/ less efficient than in the past? How much? When did the change occur? Any thoughts on why?

b) Are there more or less people hunting than there used to be?
c) Do you believe eiders are important to you and your community?
d) Consider the way things are today in this town. Dos your family need eiders? (Today/10 years ago/ 5-10 years from now)
e) About what percent of the families in this town have been taking eiders and eggs in the past few years?
f) (Now think about 10 years ago) How does the number of people taking eiders and eggs today compare to that of 10 years ago?
g) How does the number of eider eggs taken today compare to that of 10 years ago?
h) What do you think is the most common reason for people to take eggs and birds today? (Food/sport/tradition/other)
i) Forget about the laws now. How right or wrong do you think it is to do each of the following?
i) Taking birds and eggs for family needs (1=very wrong-5=very right)
ii) Taking birds and eggs for sport

Predators
40. What predators do eiders have?
41. Which predator is the worst one? Why?
42. Did you ever see a predator attack n eider adult, duckling, or egg?
43. Is this a rare or common sight?
44. (In St. Peter's Bay are there more predators around certain islands? Which predators and which islands?)

Location/Distribution (Chart Work)

Starting with **spring**, then do **summer, fall, winter:**
Where do you usually see eiders (Specifically St. Peter's Bat)?
45. When are they in this location?
46. What are they doing at this time?
47. How long do these eiders stay?
48. Do you know of other places where they are located?
49. During what months of the year are eiders here?
50. Has the timing of their arrival/departure changed over time?

Nesting
51. Where do eiders nest in this area?
52. Has this changed over time? I.e. are some nesting areas now non-existent?
53. Roughly how many eiders nest in this area?
54. During what periods would they nest and for how long?
55. Has this changed over time?
56. What makes you think the numbers have changed/ not changed?
57. How much change has occurred?

Evaluation
58. Around how many eggs do you usually see in an adult's nest (range)? Has this changed over time?
59. Have you or others (that you know of) ever taken eiders off their nest?
60. Do you believe an eider will come back to her nest if she is disturbed? If yes- if eggs are lost repeatedly how many times do you believe they will lay again that season?

Brooding
61. Where do you see broody eiders (eider hens and their ducklings)? Where do they feed? Where do they rest?
62. How many ducklings do you see together in a group (brood/crèche)? How many adult female hens are usually with them?

Feeding
63. Where do eiders (male and female) feed in this area?
64. What season would that be?
65. How many eiders would feed in this area?
66. Has this changed over time?
67. What makes you think the numbers have change/ have not changed?
68. How much change has occurred?

Population
69. What are the sizes of the populations of the eiders in the places you have mentioned?
70. Where is the biggest population of eiders?
71. Why do you think the eiders are distributed that way? (I.e. more in one particular place than in another.).
72. Would you consider these to be common, uncommon or rare?
73. How has this changed over history? (Again, use map)
74. In 2 years time, do you think the number of eiders will increase, decrease, or remain the same? In 10 years?
75. Are there more or less eiders than there were 10 years ago? What about 2 years ago?

Migration patterns (chart work)
76. Are there eiders here all year round?
77. Where do the eiders that breed and nest here in the spring and summer come from? (Always here? Migrate from the south? North? From up in the inlets? From offshore? All or some of the above?)
78. Where do they go when they leave in the spring?
79. Do eiders stage here?
80. Do eiders molt here?
81. How has this changed over history? (Again, use map)

Subspecies (chart work)
82. Have you noticed any differences in the appearance of the eiders in the area?

83. This is a picture of two different subspecies of eiders.
84. These eiders have somewhat different beaks. Have you ever noticed this difference in the eiders that you have hunted? If so, which one of these have you seen? Have you seen both? When? Where?

NOTE: Most hunters do not distinguish between S.m. borealis and S.m. dresseri. Most only distinguish between Common and King Eiders.

Attitudes
85. How are eiders currently managed in this area?
86. How has the management of eiders changed over time?
87. What are the current bag limits?
88. How have the bag limits changed?
89. Have you ever provided input or advice into the management process?
90. What do you like about the current management system? Dislike? Why?
91. What do the local wildlife officers do to enforce management of the eiders?
92. Are there things that they do that you think should be done differently?
93. How concerned are you about the future numbers of eiders along this coast?

Use Management
94.a) should people be allowed to take eiders?
   b) How many per person?
   c) In what seasons?
95.a) should people be allowed to take Eider eggs?
   b) How many per person?
   c) What restrictions should there be?
96. Do you have suggestion on any of the following?
   a) Sanctuaries
   b) Wardens
   c) Laws
   d) Fines
97. Are you aware that St. Peter's Bay was once a migratory bird reserve?
98. Do you know when that was? (When it started and ended?)
99. What impact, if any, do you think the reserve had on local hunting?
100. Did you support the introduction of the reserve? It's elimination?
101. Do you think St. Peter's Bay should be a federal migratory bird reserve once again? Do you think eiders need to be protected?
102. Is there anything else you would like to tell me that you think is really important that we might not have talked about? (How management of Eiders has changed over the years).
103. We are interested in interviewing other local experts on eider hunting. Do you know anyone else who is knowledgeable about eiders?
104. Would you be willing to provide their name or call them, describe the project and ask if they would be willing to be contacted by us?