CHAPTER 1. Introduction

The «Porcupine Caribou Herd» was first named in the early 1950s, after a few years of cooperative surveys by the U. S. Department of Agriculture and the Canadian Wildlife Service. Until then the large number of observations of caribou concentrations in north eastern Alaska, northern Yukon and northwestern Northwest Territories (NWT), were attributed to the existence of either a number of seemingly discrete herds or parts of a large amorphous caribou population that inhabited all of Alaska and Yukon with various centres of habitation. Murie (1935) recognized the somewhat discrete nature of caribou in the region. After noting the obvious «centres of abundance» of caribou he concluded that:

. . . there is free communication among the caribou, a connected distribution, all the way from the headwaters of the Porcupine and Peel rivers in the Yukon to the Brooks range in Alaska, including the Chandalar animals.

We are relatively certain that the herd has acted as an entity for several thousand years. Archaeological work at Old Crow has uncovered evidence of caribou crossings on the Porcupine River as much as 27,000 years B.P. These crossing sites coincide with present crossing sites of the herd. The entire home range of the herd is approximately 250,000 sq km, encompassing three jurisdictions (Fig. 1.1). Although the herd can be found anywhere north of Dawson in a given year, the wintering concentrations in Canada normally occur south of the Porcupine River in the west and from the headwaters of the Peel River to the Beaufort Sea in the eastern portion of the Yukon (Russell *et al.* 1992b). Most of the herd arrive on the winter range by mid-November and move little until March. Pregnant females begin to group up in early March and move north, generally along two migration routes (Fig. 1.1); the Richardson Route along the western flank of the Richardson Mountains and the Old Crow route, through the Ogilvie basins, Whitestone, Fishing Branch and Miner rivers, along the Keele Range and across the Porcupine River. The two routes tend to converge in the Old Crow Pediments north and east of the Old Crow Flats. Movement then proceeds through the valleys of the Babbage River and the British Mountains, joining any Alaskan wintering groups near the lower reaches of the Firth and Malcolm rivers. Arrival on the calving grounds can occur from early May to early June with the peak of calving during the first week of June. There are two areas where animals have concentrated during the calving period over the last two decades – in the foothills of the British Mountains near the Yukon/Alaska border and in the uplands of the Jago River in Alaska (Garner and Reynolds 1986, Russell *et al.* 1992b).

After calving, movement tends to follow the receding snowline north. At this time, the non-productive segment of the population (nonpregnant cows, bulls and juveniles), have moved from their wintering areas, generally along the same routes as the cows but three weeks later. During the peak of calving, this segment can be found in a crescent south and east of the calving locations. After calving, these animals move west along the foothills and coastal plain of the Yukon to join the nursery groups on the coastal plain of Alaska.

By early July, larger and larger aggregations begin to form and move in response to insect harassment. Movement can be south through the Brooks Range or southeast, through the British Mountains, eventually arriving in the Richardson Mountain region by the latter part of July (Russell *et al.* 1992b). After

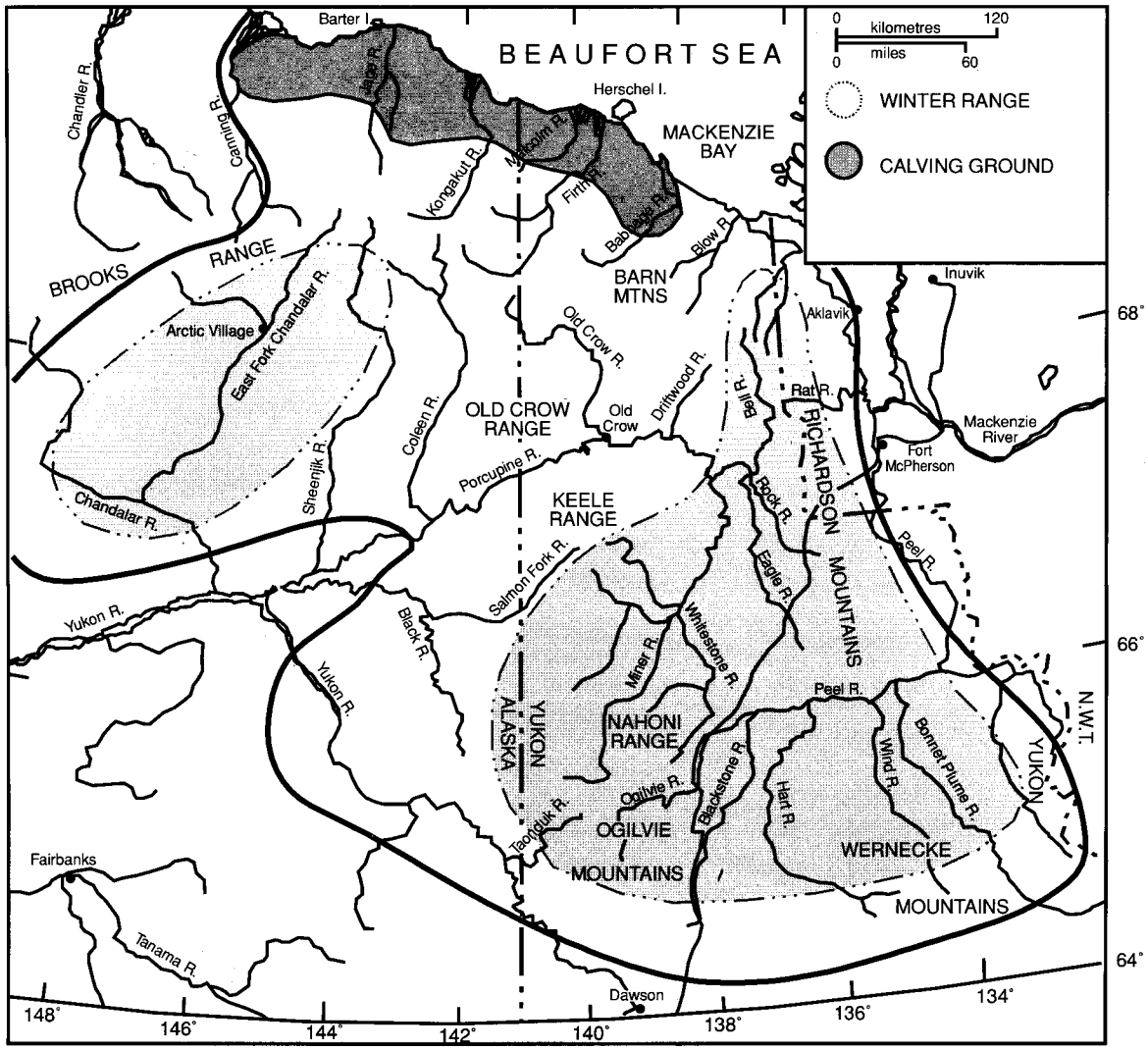

Figure 1.1. Home range of the Porcupine Caribou Herd.

insects become less of a nuisance, the large groups tend to fracture and smaller bands, generally of less than 100 animals, move continuously in August and early September. Movement of animals that arrived in the Richardsons in mid to late July is primarily east to the Canoe Lake area of NWT or to the west along the north end of the Old Crow Flats and into the southern flank of the Brooks Range in Alaska. In early September, most animals return to the Yukon retracing the August movement along the north part of the Old Crow Flats. The herd can remain north of treeline well into October if snow storms are late and mild weather prevails. However, by mid-September, snow storms will result in rapid southerly movements of the herd, south of treeline and across the Porcupine River. As in spring, this fall migration movement can funnel into two migration routes – the Old Crow route and the Richardson Mountain route. Rutting occurs in mid-October, wherever the herd happens to be at the time. By November, the herd has greatly reduced its movement and can be considered to be on winter range again.

We have divided the annual cycle of the herd into 15 periods that reflect changes in the environmental conditions that influence the behaviour and energetics of the individual (Table 1.1). We identified

Table 1.1. The 15 periods in the annual life cycle of the Porcupine Caribou Herd.

Season	Dates	Characteristics
Chapter 2. Winter[1]		
Rut	8 - 31 October	snow but melting
Late fall	1 - 30 November	beginning of winter snow cover
Early winter	1 December - 10 January	snow-cover shallow; shortest daylength very cold
Mid Winter	11 January - 20 February	snow-cover increasing; very cold
Late winter	21 February - 31 March	snow-cover peaking; longer daylength
Spring	1 - 30 April	snow-cover decreasing
Chapter 3. Late spring		
Spring migration	1 - 19 May	80 - 100% snow-cover; snow rotting; animals move north of treeline
Pre - calving	20 - 31 May	10 - 50% snow-cover, disappearing rapidly; cottongrass in bud
Calving	1 - 10 June	0 - 10% snow-cover; cottongrass in full flower; willow leaves in bud
Post - calving	11 - 20 June	cottongrass past flowering; willow leaves unfolding
Movement	21 - 30 June	willow in leaf; biomass increasing rapidly
Chapter 3. Summer		
Early summer	1 - 15 July	biomass peaking; mosquitoes peaking
Mid summer	16 July - 8 August	biomass at peak; mosquitoes past peak; oestrid flies peaking
Chapter 4. Energetic implications		
Late summer	9 August - 7 September	vascular forage quality declining
Fall migration	8 September - 7 October	early snow storms

1: chapters in this report that present data for included periods.

five late fall/winter periods influenced by changing snow conditions and daylength. Spring migration was recognized as a separate period. The most dynamic time of year (late May to the end of June) was divided into four periods reflecting the rapidly changing nutrient dynamics. Summer was divided into three periods, tracking the changing insect populations. The final two periods were fall migration and rut.

The overall strategy for these range studies was a response by the government agencies to the increasing number of potential and real industrial developments within the range of the herd with requirement to gain a better insight into the range relations of these large migratory caribou populations (Klein and White 1978).

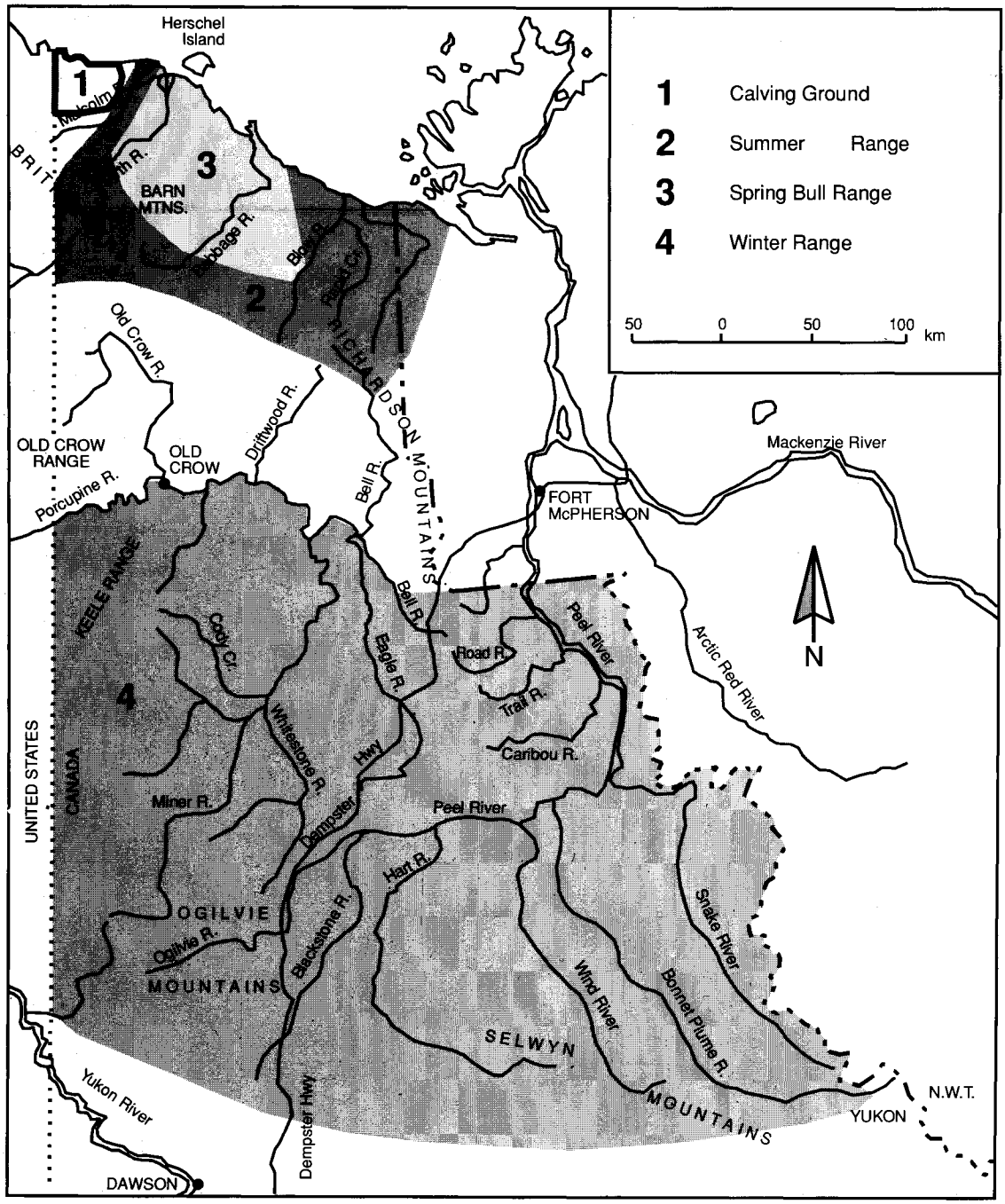

Figure 1.2. Study areas for the three range studies, 1979–86.

The format of the report roughly parallels three specific field projects conducted between 1979 and 1986 (Fig.1.2). Chapter 1, based on work conducted between 1979–82 documents the winter ecology of the herd. The presence of the Dempster Highway, initiated in 1958 and completed in 1979, resulted in a significant amount of concern about the potential impacts of the road to wintering Porcupine caribou. The road bisected the winter range and it was felt that significant harassment could cause the herd to abandon wintering areas south and east of the highway.

Concurrent with this work, we conducted a three year study on the use and characteristics of the core calving grounds in the Yukon (1979–81). Caribou biologists have long identified the core calving grounds of large migratory caribou as the most critical component of their annual range. This study focuses on the components that make up the core calving grounds in Yukon, how they are used by the herd and how the herd responds to changing environmental variables within a year and between years.

From 1984–86, we conducted an intensive study on the use of northern Yukon during the insect season. A formal review of potential hydrocarbon development on Yukon's north slope identified a need to document the range relations of the herd during the critical insect season and to assess the potential negative impacts of various development scenarios on the well being of the herd (Beaufort Environmental Assessment Review Panel 1983). In the summer study, we address the regional resources in the area, how the herd responds to these resources and examine the behaviourial and energetic response of individuals and groups to insect harassment (Chapter 3).

In Chapter 4, we bring together much of the information presented and examine the energetic implications of our findings in terms of weight changes of reproductive females and the birth and weight gain in the calves utilizing a computer simulation model.