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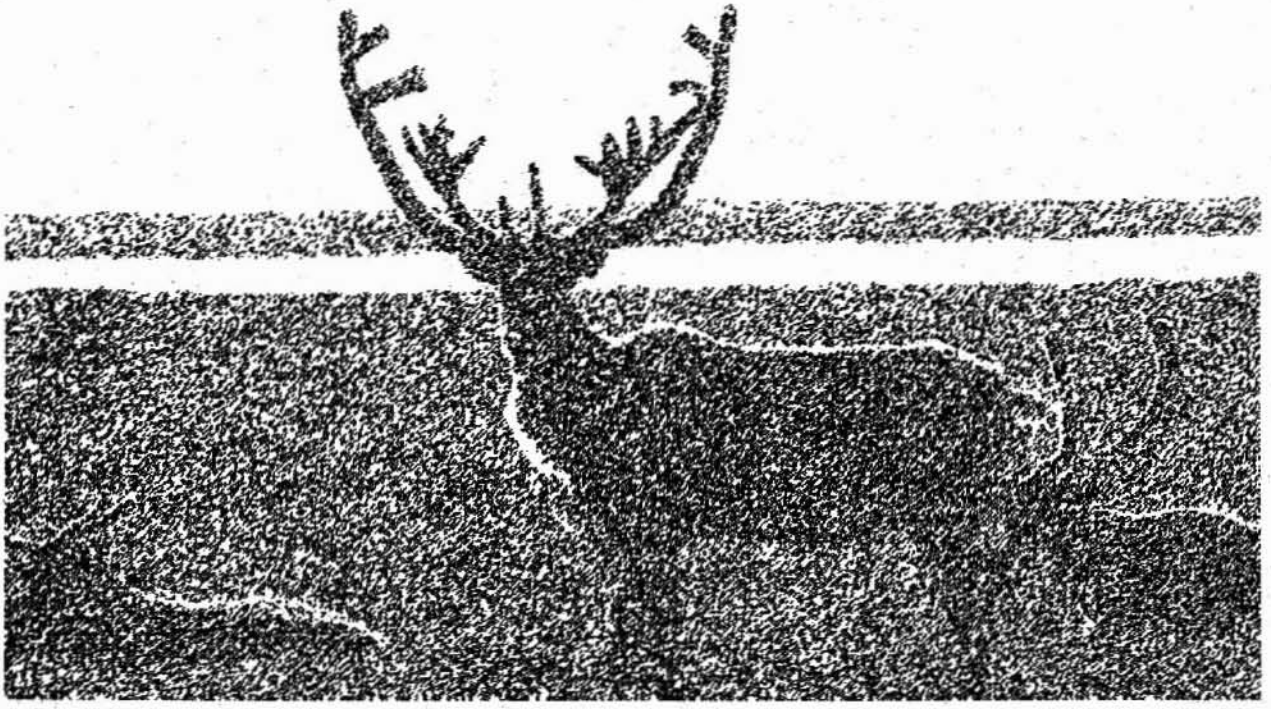
ARCTIC COASTAL PLAIN CARIBOU DISTRIBUTION, SUMMER 2001



Prepared for

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ARCTIC COASTAL PLAIN CARIBOU DISTRIBUTION, SUMMER 2001

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Jensen, P.G., and L.E. Noel. 2002. Caribou distribution in the northeast National Petroleum Reserve-Alaska, summer 2001. Chapter 3 *in* M.A. Cronin (ed.) Arctic Coastal Plain caribou distribution, summer 2001. Unpublished report for BP Exploration (Alaska) Inc. by LGL Alaska Research Associates, Inc., Anchorage, Alaska. Pages 3- 1–101.

Noel, L.E., M.J. Nemeth and B. Streever. 2002. Caribou movement in riparian areas crossed by the Badami pipeline, Arctic Coastal Plain, Alaska, summer 2001. Chapter 4 *in* M.A. Cronin (ed.) Arctic Coastal Plain caribou distribution, summer 2001. Unpublished report for BP Exploration (Alaska) Inc. by LGL Alaska Research Associates, Inc., Anchorage, Alaska. Pages 4- 1–54.

Cronin, M.A., and J.C. Patton. 2002. Caribou and reindeer (*Rangifer tarandus*) genetic variation and herd structure in northern Alaska. Chapter 5 *in* M.A. Cronin (ed.) Arctic Coastal Plain caribou distribution, summer 2001. Unpublished report for BP Exploration (Alaska) Inc. by LGL Alaska Research Associates, Inc., Anchorage, Alaska. Pages 5- 1–77.

CHAPTER 1:

Caribou Distribution on the Arctic Coastal Plain of Alaska, 2001

Introduction

by

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Introduction

Summer 2001 Caribou Studies

This introduction provides background information regarding issues and potential impacts of oilfield development on barren ground caribou (*Rangifer tarandus granti*) in arctic Alaska (Figure 1). This report summarizes the results of all 2001 caribou studies on the North Slope sponsored by BP Exploration (Alaska) Inc. and the Point Thomson Unit Owners. These studies included monitoring the distribution with aerial surveys and studies designed to answer specific questions about caribou in oilfields. These included systematic aerial distribution surveys in the Milne Point Unit (MPU), Prudhoe Bay oilfield (PBOF), Badami, and Bullen Point to Staines River (Bullen-Staines) study areas (Chapter 2A; Figure 2), road-based distribution surveys in the Kuparuk, Milne Point, and Prudhoe Bay study areas (Chapter 2B), systematic aerial distribution surveys in the NPR-A study area (Chapter 3; Figure 2), remote video monitoring of caribou movements in riparian habitats crossed by the Badami pipeline (Chapter 4), and quantification of genetic differentiation of caribou herds and assessment of inter-herd exchange and range overlap for the arctic Alaska herds (Chapter 5). Each of these chapters can be read as a stand-alone report, but reading the report as a whole offers a better understanding of the issues surrounding caribou in North Slope oilfields.

Arctic Caribou Herds

Four caribou herds occur in arctic Alaska (Figure 1). From west to east, these herds are the Western Arctic Herd (WAH), the Teshekpuk Caribou Herd (TCH), the Central Arctic Herd (CAH), and the Porcupine Caribou Herd (PCH). Herd identification is based on repeated use of geographically distinct calving grounds (Skoog 1968). Cows have high fidelity to calving areas, although overlap as movement between herds on fall, winter, and calving ranges may occur (see Chapter 5 of this report). Because herds are the units of management, quantification of the independence of herds is needed for meaningful impact assessment and clear identification of management objectives.

Western Arctic Herd

The annual range of the WAH covers approximately 363,000 km^2 of northwestern Alaska (Dau 1999). The calving range is generally located within the southwest corner of the National Petroleum Reserve-Alaska (NPR-A), in the Utukok uplands in the foothills of the Brooks Range (Davis and Valkenburg 1979; Kelleyhouse 2001). The WAH was estimated to be about 75,000 caribou in 1976 (Davis and Valkenburg 1979) and increased to about 463,000 in 1996 (Cronin et al. 1998a; Dau 1999). The WAH decreased to approximately 430,000 by 1999 (P. Valkenburg, Alaska Department of Fish and Game (ADFG), pers. comm.). Currently, the WAH is the largest herd in Alaska and one of the largest in the world.

An estimated 20,000 WAH caribou are harvested each year by subsistence hunters from numerous villages across northwestern Alaska, and 3000 WAH caribou are harvested annually by sport hunters (Bente 1997). Industrial developments within the WAH annual range include the Red Dog Mine (a lead-zinc mine) with an 85-km access road to Kotzebue Sound, and portions of the Kuparuk and Alpine oilfields.

Teshekpuk Caribou Herd

The TCH was recognized as distinct from the WAH and CAH in the mid-1970s (Davis and Valkenburg 1978). The overall range of the TCH extends from northwestern Alaska, east to the Colville River and south to Galena (Kelleyhouse 2001). The annual range varies from 3772 km^2 to 219,214 km^2

(Philo et al. 1993) and is typically within the northern portion of NPR-A (Kelleyhouse 2001). The calving area is near Teshekpuk Lake, including the eastern, southern, southeastern, and northeastern shorelines (Davis and Valkenburg 1979; Carroll 1992; Philo et al. 1993; Kelleyhouse 2001).

The TCH was estimated to be approximately 3000 to 4000 caribou in 1978 (Davis and Valkenburg 1979), and increased to approximately 28,000 by 1993 (Carroll 1995; Cronin et al. 1998a). The most recent photocensus was conducted in 1999, and 28,627 caribou were counted (Carroll 2001).

Most subsistence harvest of the TCH occurs between July and October (Carroll 1999) by residents of Anaktuvuk Pass, Atqasuk, Barrow, Nuiqsut, Point Hope, and Wainwright. Subsistence harvest of the TCH was estimated between 800 to 3000 caribou each year (Carroll 1995). In 1999–2000, the estimated caribou harvest was 2503 (Carroll 2001). Large numbers of TCH caribou have died during periods of extremely cold, windy weather (winters of 1989-1990 and 1992-1993; Carroll 1992, 1995). Sport hunter harvest from the TCH is generally low and from the Colville River drainage (Carroll 2001). Industrial developments within the TCH annual range include the Red Dog Mine with an 85-km access road to Kotzebue Sound, and portions of the Kuparuk and Alpine oilfields.

Central Arctic Herd

The annual range of the CAH extends roughly from the Colville River, east to the Canning River and south to the Brooks Range (Cameron and Whitten 1979). The overall range of the CAH also includes small areas west of the Colville River, east of the Canning River, and in the southern foothills of the Brooks Range. The calving areas are located between the Colville and Canning rivers within 160-km of the Beaufort Sea (Cameron and Whitten 1979; Wolfe 2000). The CAH was estimated at approximately 5000 caribou in 1978 and increased to approximately 23,000 in 1992 (Whitten and Cameron 1983; Ballard et al. 2000; Cronin et al. 2000). The CAH declined to approximately 18,000 in 1995, and increased to approximately 27,000 in 2000 (Cronin et al. 2000, 2001).

Between 200 and 600 CAH caribou are harvested each year, primarily through subsistence hunts by Nuiqsut and Kaktovik residents (Murphy and Lawhead 2000). Industrial developments within the CAH annual range include numerous developments associated with the Trans-Alaska Pipeline System and the Prudhoe Bay area oilfields.

Porcupine Caribou Herd

The annual range of the PCH extends from the Arctic National Wildlife Refuge (ANWR) in northeastern Alaska to the north-central Yukon Territory in Canada (Russell et al. 1993). The calving area is located in the ANWR and the Yukon Territory (Russell et al. 1993). The PCH was estimated to be 105,000 in 1977 (Bente and Roseneau 1978), and increased about 4.5% per year to 178,000 by 1989 (Whitten 1992). The PCH has been declining since 1989 and currently is approximately 123,000 (Cronin et al. 1998a; P. Valkenburg, ADFG, pers. comm.).

Many villages across northeastern Alaska and the Yukon Territory, Canada harvest caribou from the PCH. Estimates of annual subsistence harvest from 1984 to 1995 have ranged from 100 to 2100 and 500 to 4000 caribou in Alaska and Canada, respectively (Whitten 1997).

Caribou and North Slope Oilfields

The primary concerns regarding caribou and oilfields are: (1) displacement of calving caribou from areas of intensive development and activity, (2) decreased nutritional status and reproductive productivity of females, (3) blockage and delay of caribou movements by oilfield infrastructure between inland

foraging and coastal insect-relief habitats (Cameron et al. 1995), and (4) cumulative effects that could eventually lead to population declines.

Ballard and Cronin (1995), Cronin et al. (1998a, 2000, 2001), Ballard et al. (2000), and Murphy and Lawhead (2000) provided detailed reviews of caribou/oilfield relationships. Data presented in these papers show that while impacts to individual caribou from oilfield development have occurred, population-level impacts on the CAH have not occurred. For example, the number of CAH caribou in the western area of their range including oilfields increased from 6327 in 1995 to 14,295 in 2000 (Cronin et al. 2000, 2001). Nevertheless, Wolfe (2000) found that between 1980 and 1995, the most concentrated calving grounds of the western segment of the CAH exposed to oilfield development shifted southwest away from the oilfields (south of the Kuparuk oilfield). Additionally, Lawhead and Prichard (2002) summarized caribou survey data from 1993 and 1995–2001 and reported that the highest densities of caribou during the calving period occurred south of the Kuparuk oilfield. While it has been hypothesized that potential nutritional and reproductive consequences (and hence a numerical population response) could result from such changes in distribution (Dau and Cameron 1986; Cameron et al. 1992a; Nellemann and Cameron 1996, 1998; Wolfe 2000; Cameron et al. 2002), existing data do not support this hypothesis.

Further evidence that impacts on caribou have been limited have been documented with aerial surveys conducted during the post-calving period over multiple years within the North Slope oilfields (Pollard et al. 1996b; Cronin et al 1998b; Noel et al. 1998). These surveys have documented several characteristics of caribou use of oilfield habitats, including: (1) regular use of riparian and coastal insect-relief habitats, (2) continued use of foraging habitats within oilfields, (3) movements between these habitats and habitats outside the oilfields, (4) the occurrence of caribou close to oilfield infrastructure, and (5) use of oilfield structures (e.g., gravel roads and pads) as insect-relief habitat (Pollard et al. 1996a, Noel et al. 1998).

While some of the older portions of the Prudhoe Bay oilfield with low ground-clearance pipelines (<1.5 m) and complex infrastructure have blocked some movements of caribou across the oilfield (Cameron 1983), mitigation techniques implemented by the petroleum industry at newer developments have been successful at addressing issues of caribou movements under pipelines (Curatolo and Murphy 1986; Lawhead et al. 1993; Cronin et al. 1994).

Business Rationale

Caribou are an important part of arctic ecosystems and an important wildlife resource for native communities, sport hunters, and the general public. Maintaining caribou populations while developing oil and gas reserves are management objectives of the State of Alaska and an integral part of land-use decisions in the Arctic.

Despite more than two decades of studies, speculation remains regarding impacts to caribou resulting from development of oilfields. During early development, speculation centered around the potential to have dramatic adverse effects on caribou populations, but when these impacts failed to materialize, speculation shifted to the possibility of subtler impacts that could eventually have negative impacts on caribou (Cameron et al. 2002). A workshop organized by the Alaska Oil and Gas Association in January 2002, confirmed the persistence of concerns, including those of native communities. In keeping with broad BP policies regarding environmental stewardship and social responsibilities, continued study of caribou is warranted. In addition, aerial surveys were undertaken to provide data for environmental reports that would contribute to Environmental Assessments, Environmental Impact Statements, and other documents that may be required prior to development of the Point Thomson Unit and the National

Petroleum Reserve-Alaska (NPRA)[1]. Road surveys were undertaken to gain more detailed knowledge about avoidance of roads by caribou during the calving and post-calving periods to supplement work conducted by Cameron et al. (1992b) suggesting that caribou with calves avoid roads by 1–4 km. Work that details caribou crossings under the Badami pipeline was required by government agencies (Appendix A in Coltrane and Lanctot 2001) after pipeline vibration dampers reduced pipeline height below minimum allowable heights. Finally, genetic work was undertaken to address the degree to which individual caribou herds are unique from one another, which could be an important component in the protection of biodiversity on the North Slope.

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[1] Work was initiated in the NPR-A when BP still anticipated development of its NPR-A leases. Subsequently, BP has ceased exploration and development plans for these leases.

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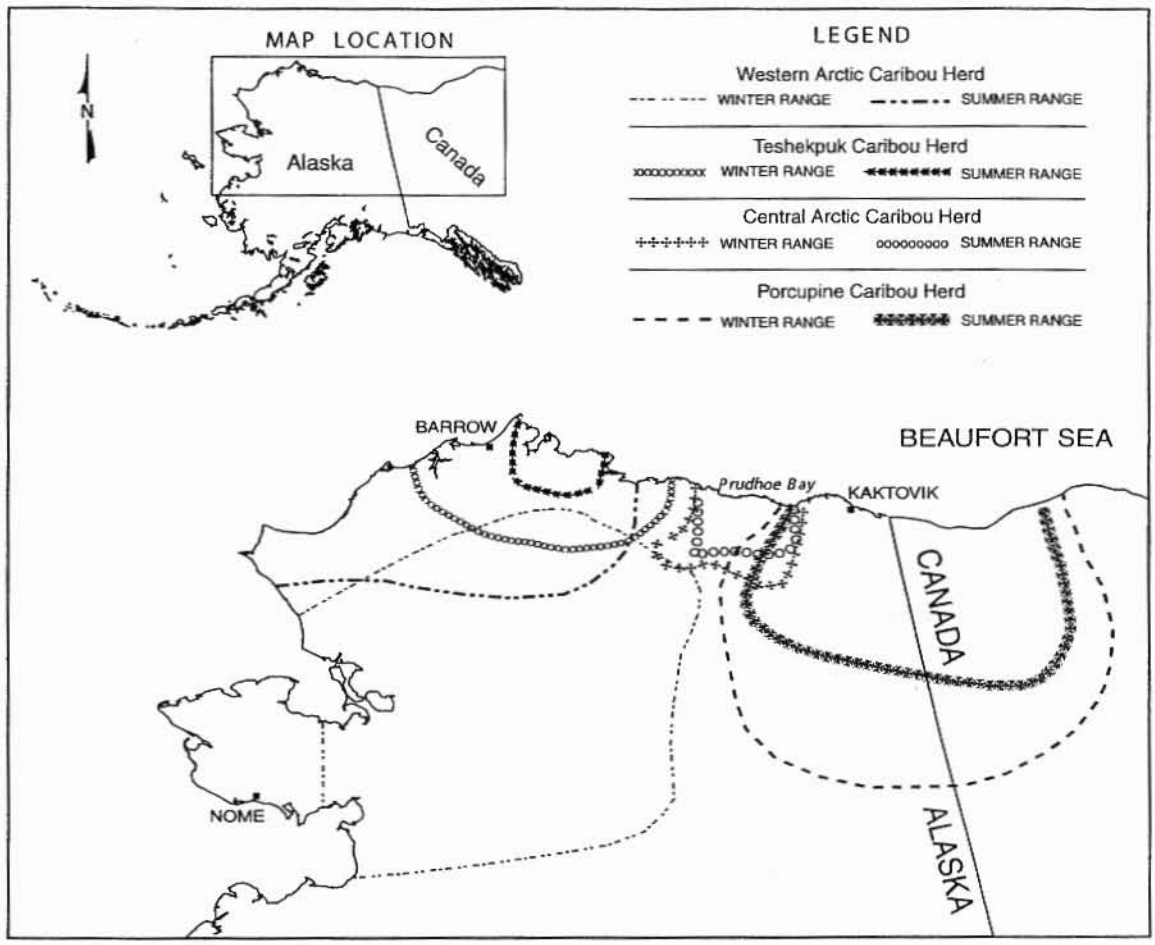

Figure 1. Summer and winter ranges of the Western Arctic (WAH), Teshekpuk (TCH), Central Arctic (CAH), and Porcupine (PCH) caribou herds, Alaska.

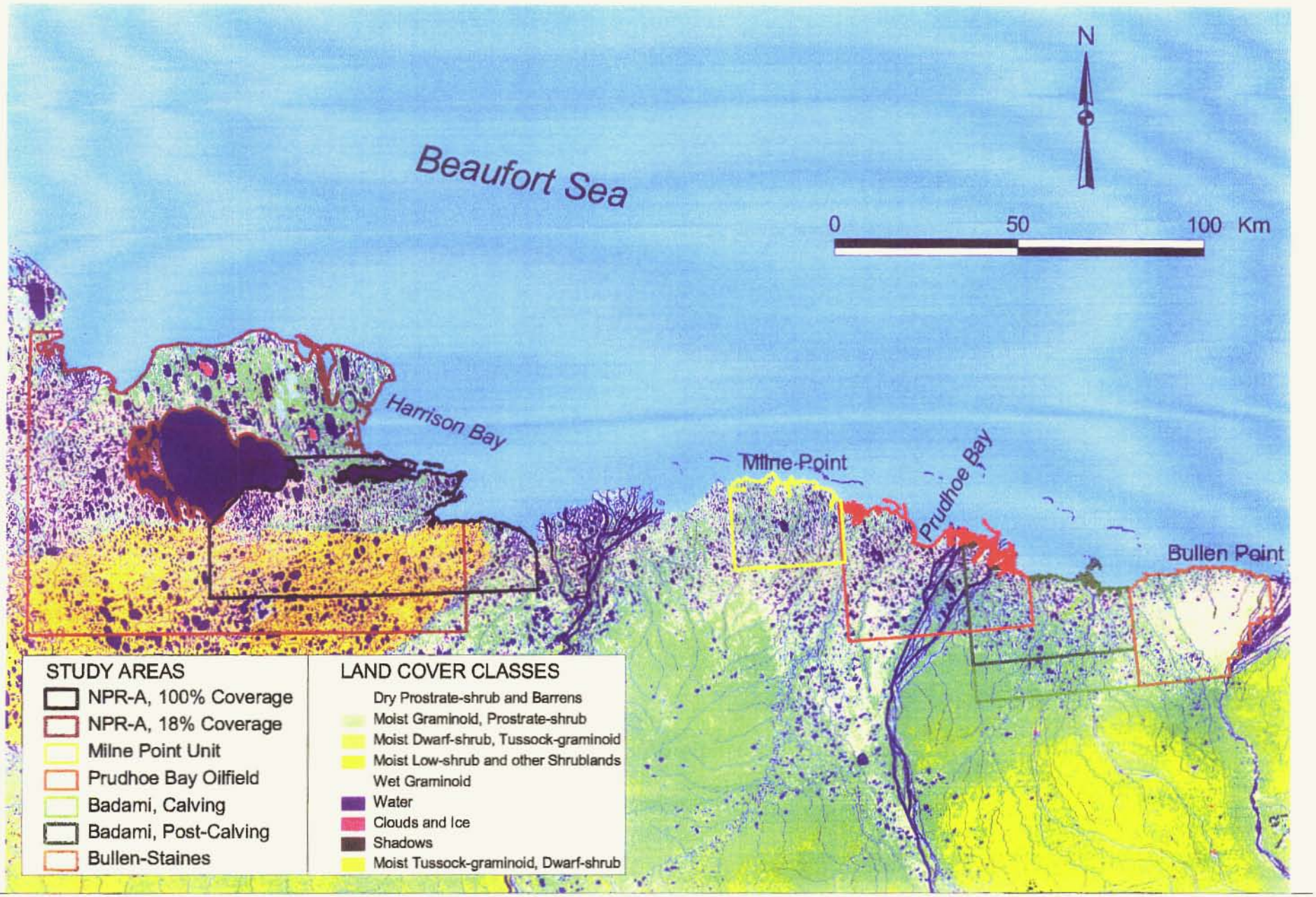

Figure 2. Study areas for aerial surveys of caribou and other large mammals, Arctic Coastal Plain, Alaska, summer 2001. Background is a land cover classification from Muller et al. (1999).

CHAPTER 2:

Caribou Distribution in the Range of the Central Arctic Herd

Part A. Aerial Surveys in the Milne Point Unit, Prudhoe Bay Oilfield, Badami, and Bullen Point to Staines River Study Areas, Summer 2001

by

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