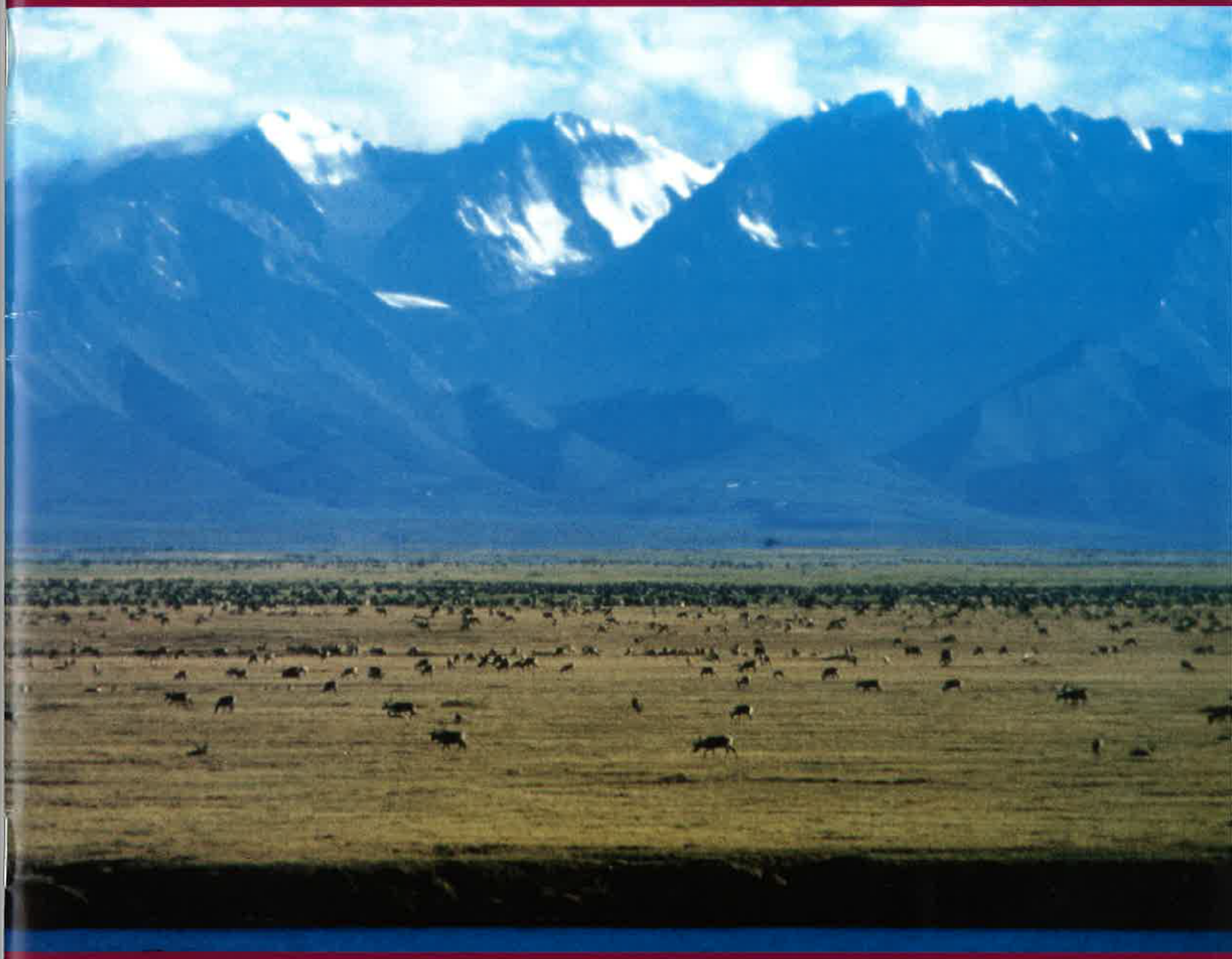
SENSITIVE HABITATS

OF THE PORCUPINE CARIBOU HERD



INTERNATIONAL PORCUPINE CARIBOU BOARD

Porcupine Caribou Board
International
USA Canada

SENSITIVE HABITATS
OF THE
PORCUPINE CARIBOU HERD

Report accepted by the International Porcupine Caribou Board
from the Porcupine Caribou Technical Committee
January 1993

ABSTRACT

At different times of the year, caribou need special places in order to stay healthy and raise their young. As the seasons change, the caribou travel from one special place or "habitat" to the next according to their needs for food, safety, escape from flies or shallower snow depths.

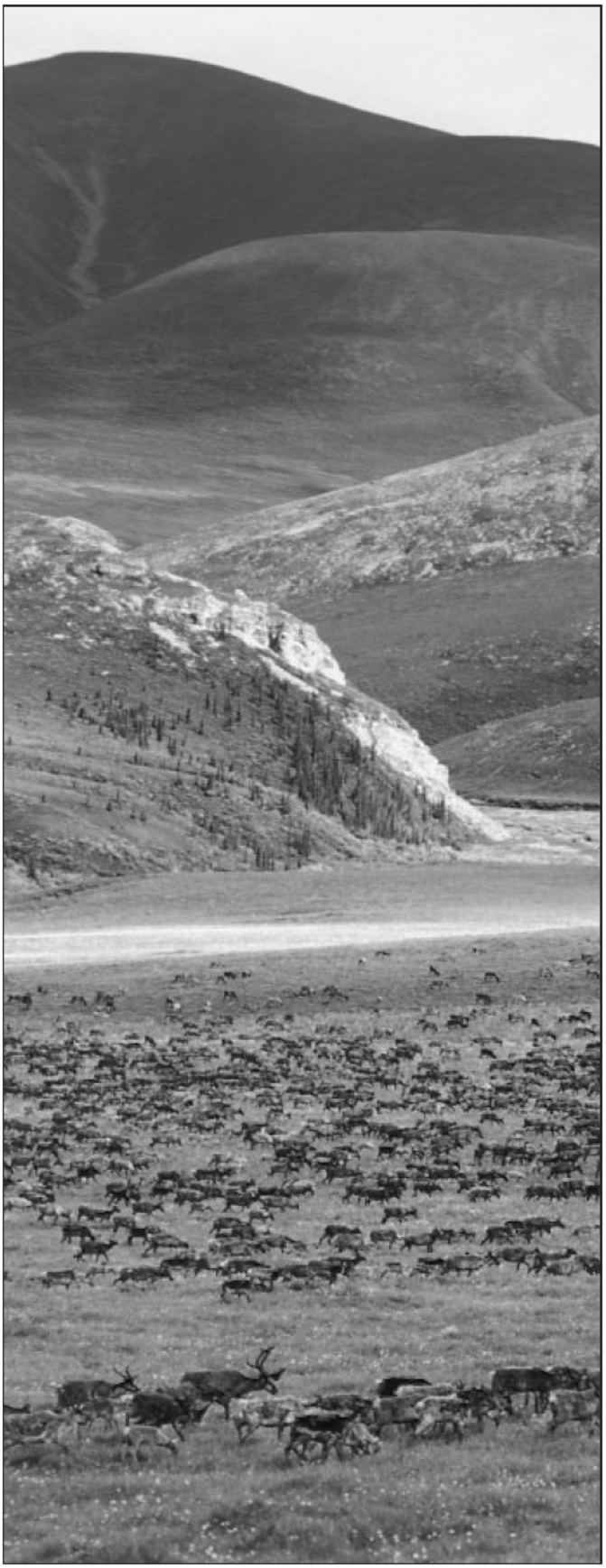
As it travels around, the Porcupine Caribou Herd uses a lot of different habitats every year and some of these are more important than others. In order to show how important each habitat is, biologists asked these questions:

- Do caribou use this place when they need energy the most?
- Is this place important for rutting or for raising healthy calves in a safe place?
- Is it a place where caribou can be easily bothered by disturbance?
- Is it a good place to go when the snow gets too deep or when there are too many bugs or to get away from predators?
- Is this place used almost every year or only from time to time?
- Does this place give something special to the caribou that no other place can?

By asking these questions about different places that the caribou use during the year, it was possible to show how important each kind of place is. If you look at Table 2 you can see that the most important places (number 1) are where caribou have their calves and where they go right after calving. Next in importance (number 2) are places used by the whole herd in early and mid-summer. The maps show where these special places are and use the same numbers so you can see how important each area is.

Because the Porcupine Caribou Herd travels to so many places in Alaska and Canada, there are 12 areas on the herd's range with different laws governing what people can do in those areas. Each of these 12 areas is described in this report.

This report comes from the International Porcupine Caribou Board. From now on every time some activity is proposed for a part of the herd's range, everybody will check this report to see what effects the activity will have on the caribou. This report will be used to protect the Porcupine Caribou Herd by helping people decide what kind of activities could be allowed in the herd's range without harming the caribou.



KET NINJIHGWUDHUT

Nugwutudhut gwizzit ndo thligwedha ji vutzui nihthluudun nun kug gwitetchyacho, Rsi gwehendui tsut viggyi dikiheda genjit. Nugwutudhut gwizzit ndo thligwetha ji chuttui nihkehao, nigin vizzi goli genjit. Rsi gwehendui tsut ssin he nijin ttshi gwintlo ya nigwehea kwa tchun kwut khui he nijin zokh gwintlo tinintchi kwa gwutso nuhao.

Nunh gwintshi gwitechyacho, Ji gwullut tshirsit tsut gwitechyacho genjit chutthui kuhanji ei biologist kut genjit tchugotahkut chitti rsit gwundo gwitukwitchyacho enjit.

- Chuttui vitekit gwullut rsit tsut vuttui gwehelya genjit gwutuchyacho?
- Ettelye vitekit gwullut chuttui nykhonkuhao tchun kwut viggyi rsi gwehendui tsut dikyiheda genjit kirsigwichyacho?
- Jih vutzui vitekit gwullut lye gihgwudhun va chuttsui nugwahattha?
- Zzoh tininchi tchun kwut ssin he dui tshi ha goli gehkhe tsut nyin tchi vitekit gwinzi goui lye gwitsehao?
- Jih vitekit nugwutudhut gwittukwinyancho chun kwut ndo nihlig he gwirzi lye gwituchyacho?
- Jih vutzui titekit chirsit tsut gwituchyacho gehkhe tsut tchutun vitekit lye gugwahaa kwa?

Jih vutzui nugwutudhut gwizzit titekit nihluudun nitso gwutuchyacho ketchutrotahkhut. Vitekit gwittugwinyancho tegwahtchi gwihile getrigwahatachya gogwudhun. Jih table 2 kug trigwunahin ji, nijin chirsit tsut vitekit gwihile trigwahunaia. Number 1, Nijin vutziu viggyi goli tchun kwut nijin vigoli tle gwitsehao. Ei tle tchirsid tsut gwihile goui number 2 vitekit etut notli tutthug ssin gwului gwudhuk tsut ssin tenjirh gwutso tutthug gwutuchyacho. Jih nun gwikit tehthudhut gwizzit gogwijiltshei tchirsit tsut vitekit gwihile, Ei tsut gehkhe tsut gwitehtichya gwikit ttrugwunahin ji tegwahtchi vitekit tutthug gwihile ttrugwuhunaia.

Jih vutzui nun kug gwinchi nahao, Alaska tsui tsut Canada ha. Nijin chutthui nahao gwizzit tutthug 12 area gwizzit gwuttut gwinyanchyo gwitchin tutthug ko tugwitie nihlinehtshi ttitichyo. Ei tutthug gwutsut ji tinehtle tratsi.

International Porcupine Caribou Board tsut jih tinehtle treltsei. Ei tsut choog gwutsut nijin kugwichyo tigwehetya ji chutthui nijin nahao vidive tutthug joo genjit gwitrit tegwain tutthug jih tinehtle ha hedundui, nitso ji vutzui vitive kugwichyo tigwidiin tthug gahtrehedundui genjit. Jih tinehtle chutthui kuhunahtya genjit ei tsut nijin nahao tutthug gwizzit kugwichyo tigwehedya gahgwehedundui. Gwikikhe chutthui ugwehedendul kwa genjit.

Translated by Roy Moses
Old Crow, Y.T.

KINIYUNAKTUAK ISUMIUGUUN

Tarrani, alagitni kavsiiksukuting taptumani ukiumi. Tutut nuutvikrakaaktukraurut inigiktuani itviksamingni sayakiknaktuami ahiin huli inugukviksani nugangisa. Tavrani tamana piviit alangukpaktuat. Tamatkua tutut iglauvaktuat inimingnin alanun itvikramingni tavra tuklia inaa pigivlugit nikiksating, kimaklugit kiktugiat makualu aputikipayamiklu.

Taina iklaukaming tapkua Porcupine–guum tutuit atuukpagat inugiaktuamik iniksangit inait ukuilimakman huli ilangit makua nuutvitatukpaguit alanin inimingnin, tamna tutkiklugu naluniaktut sauyuak inilangit tapkua (biologistkut kaunaksingit) makua apsutingit;

- Pivakpagit makua, tutut atuuklugit tapkua initing mana piviksangit suangatiksamiknik atulgaaktangit?
- Unaa inigiyat tamatkua. Nuliakvigivagaat inalu nutviat ini imalu nuutakaming huli inuuguksaklugit nugait tavrani anayanaitumi inimi?
- Tamna inaat tututlu piyuaktauvakpat tupingaphaklugitlu?
- Inigikpa nuunvigikamitku tamna apuun mayalikpainman imaluni kiktugianin inugiakpainmata kimaklutinglu anguniaktit suut?
- Unaa ini piluatuuva tutuunun inaa ukiulimakman imaluni kangalilaakman nuutakvingani?
- Uma inin kaitsivatigit tutut alani ininin pilatilanginin?

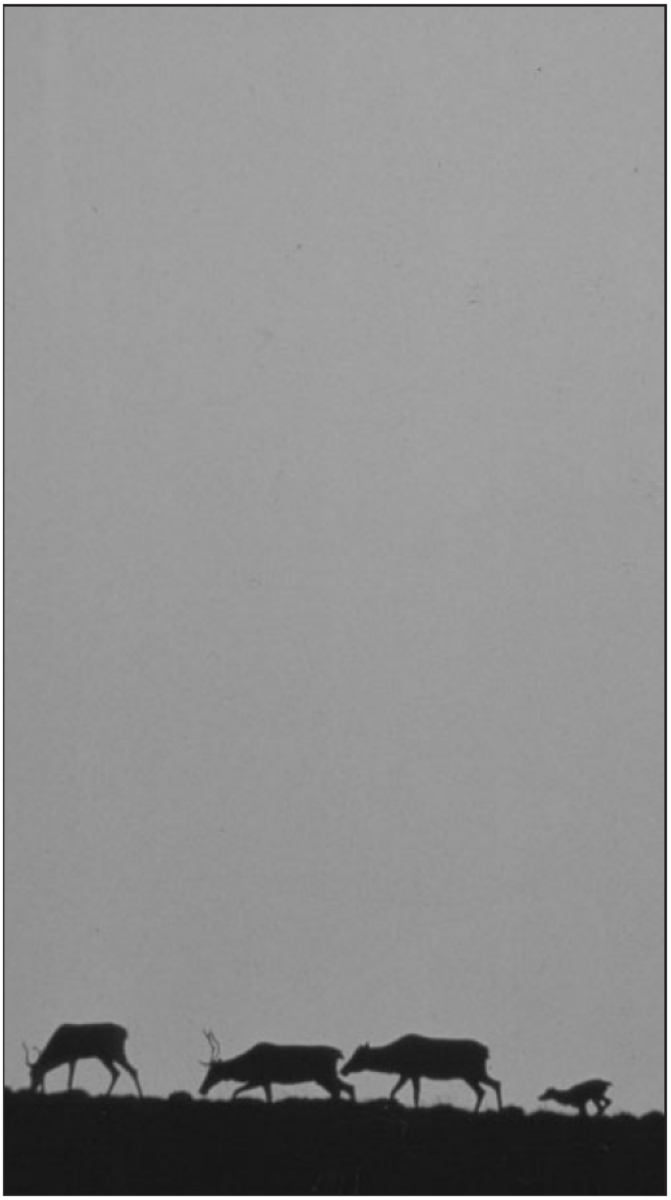
Inaa apigivlugit makua apiksuutit makununa alagiktiguun initiguun tamatkua tutut atuuktaitkiguun ukiumi inaa pilaaruk nalunaigait alaagit inilaat. Ilivit kinigurku tamna aklaak 2 ilivit tautukniagin tamatkua pivaaktait alaagihat inauyuat inaalu (titiga 1) tapkua tutut nugivaktuat huli, aulaakpaktuat nugianikaming. Tuklia piviat (titiga 2) init atuukpagait, ilukating tutugakyuit Hivuliitlu nuutvit huli upingam kitkani. Tamna nungurat nalunaikpagait makua atuvialuktait inigivaktait atuukpagait atiruat titigait kihiyutait ilivit pivialuktait tautukpigit kanuk pivaktait inilaguyuat taina.

Ami tapkua (Porcupine–guun tutugayungit – Porcupine Caribou Herd) iklauvaktuat inugiaktunun ininu nunanun Aklaslomilu Huli Canadamilu, ituat 12 inigiyat tarkua tutugukyuit inigiyait aulavitlu alagiinik pitkurakaaktuat atangupluting inuuit kanuk pilatilanginik tamatkunani inauyuani ilingila tapkua 12 inauyuat aklaaksimayuat umani kuliami.

Unaa kuliak kairuak ukunanga International Porcupine Caribou Boardnin. Tutut katimayinginin nuli tavrangani pivingani kanusikautait itkaniaktait ilanganin tamatkua tutukaakyuit itvianin.

Kisulikaa tapkua kenuk itilangit kiniklugit kanak tapkua aulataat piniakmakatta tamatkua tutut. Unaa kuliak atuuktauniakaat munagivlugit (Tapkua Porcupine Caribou Herd) Porcupine tutungit ikayuklugit inuuit Hivuniukpataa Kanusilimat–iguun kanuk piutainig tamani pipkalakangit tamatkua tutut kanuuklangilugitlu.

Translated by Ishmael Alunik
Inuvik, NWT



SIVUNIŊA

Qakugulirağimman ukiumi Tuttut kukiluguurut niqaukkaqtuamun suli piqatigivlugit nuğğatik. Siḷa allaṇ-ṇuğağimman uniłługu taamna allamun iglauraqtuq niqiligaamun anayanaitchuamunlu qimakłutiglu kiktu-ğianiñ mauyakipayaamunlu.

Iglillağmik Porcupine Caribou Herd iglausuurut sumulliqaa ukiutuağman, iḷaṇiasi nuimagiłhaaqługi allaniñ. Iḷisimatquvlugi qanutun nuimatilaaṇa niğiñi-ağvikaaṇat niğrusiqisirit apiqsruqtairaqtut ukuniṇa:

- Tuttut tavraniitchuuvat sayyaağiktuksraupiallikkamik?
- Tavraniitchuuvat nulliqamik naakka nuğğaiyaatik piḷ-gusitchiağuuvatigik anayanaitchuami tamaani?
- Ini nuyuağnaqpa tuttunun?
- Ini nakuuva mauyaṇṇuğmauṇ kiktuğiaqaqpaiñmauṇ, naagga tuttutuğuktuaniñ?
- Ullaguuvarruṇ ukiutuağmauṇ naakka qakugulillaam-man?
- Tavruṇaqamik nalunaigiramignik piqağuuvat allami paqitchuisamigñi?

Apiqsruqtaiqpakłutik allallaatigun ininik Tuttut ullaguuraṇiññik ukiumi, iḷitchuğiłhiñağaqtut qanutun nuimatilaaṇa inillaam. Qiñiğlugu Table 2 kaṇiqsiñiağiñ nuimanaqtauruaq ini (number 1) sumi tuttut iğñiuğuuti-laaṇat sumuguutilaaṇallu iğñianipqaurağamik. Tugliuruat nuimanaqtauruami (number 2) init ullaguuraṇit aqi-maruuvlutik upinğaapak. Nunaurat qiñiqtitkai tamatkua init sumiitilaaṇat number–tiguaqłutik.

Iglaulguvaiłłutik allagiiñun nunanun Alaska–milu Canada–milu, tainnamik qulit malğuut nuimaruat tuttut tikiumaraṇanni allagiiḷḷaanik pitquraqaqtut iñuit atugak-sraṇiññik. Taapkunani nunani agliumarut maqpiğarriami.

Una maqpiğarriaq qaisauruq International Porcupine Caribou Board–ṇiññiñ, tavraṇṇaaglaan sumik savakku-maalliqpata tuttut tikitqataqtaṇannun qimilğuullaaniağaat maqpiğarriaq qanuq aksiutauniağmagaan tuttunun. Unauvva maqpiğarriaq atuğniağaat anniqsuqsağlugich tuttut, ikayuğlugich iñuit sivunniikpata qanusiq savaaq inniaqtilaaṇa tuttut tikitqataqtaṇannun aksiutuyu-miñaiğlugu tuttunun.

Translated by Giana Harcharek, Point Barrow, Alaska

INTRODUCTION

The International Agreement on the Conservation of the Porcupine Caribou Herd contains a requirement for the International Board to make recommendations on items requiring international co-ordination. Among items to be included is "the identification of sensitive habitats deserving special consideration". To facilitate recommendations the International Board requested that the Porcupine Caribou Technical Committee (PCTC) prepare a report identifying sensitive habitats for the herd.

Don Russell (Canadian Wildlife Service) was the lead in the preparation of this report. Other PCTC contributors were Ken Whitten (Alaska Dept. of Fish and Game), Glenn Elison (U. S. Fish and Wildlife Service), and Dorothy Cooley (Yukon Fish and Wildlife Branch). Dr. Robert White and Dr. David Klein, (University of Alaska, Fairbanks) and Debbie van de Wetering (Canadian Wildlife Service) also participated in the drafting of this paper.

WHAT ARE SENSITIVE HABITATS?

The Technical Committee acknowledges that the Agreement did not specifically define sensitive habitats. Therefore, to address the sensitive habitat issue the Technical Committee:

- rationalizes which periods in the annual cycle are most important to the long term survival of the herd (ranked from 1 to 4).
- presents the known distributions of the herd during all periods (from Russell et al 1992[1]), and delineates the most consistently used habitats, and
- presents the management regimes that are present within the range of the herd.

[1]Russell, D. E., K. R. Whitten, R. Farnell, and D. van de Wetering. 1992. Movements and distribution of the Porcupine Caribou Herd, 1970-1990. Technical Report Series No. 138. Canadian Wildlife Service, Pacific and Yukon Region.

CRITERIA FOR RATING THE IMPORTANCE OF HABITATS

Six criteria were chosen to assess the importance of certain habitats based on the period in the annual life cycle of the herd.

1. **Energy balance:** Throughout the year the projected energy balance of a productive female can be determined. The habitat that sustains the animal, during that time of year when the animal is normally in a negative energy balance, is of concern.

   Rationale - Animals disrupted from normal activity or displaced from normal ranges are not able to compensate, energetically, on a daily basis if they are normally in an energy deficit for that time of year.

2. **Reproductive contribution:** Those habitats that are occupied during the time of year critical to the reproductive potential of the herd are of concern.

   Rationale - Although all periods contribute to the potential growth rate of the herd, some periods have a higher contribution, both in terms of birth and mortality rates. For example; the importance of late summer and fall to pregnancy and subsequent birth rate within a year, and the importance of calving habitat in early summer to the survival of calves.

3. **Tolerance to disturbance:** Areas occupied when animals are least tolerant to disturbance are of concern.

   Rationale - The potential for displacement to other ranges or disruption of normal activity patterns is greater during periods when the herd displays greatest reaction to human disturbance.

4. **Escape Requirements:** This criterion refers to the repeated use of areas primarily to avoid or escape from external factors. For the Porcupine Caribou Herd, predators and insects are the two most important elements caribou actively avoid. Areas repeatedly used to escape these external forces are of concern.

   Rationale - These habitats offer protection for the herd

TABLE 1
LIFE CYCLE PERIODS OF THE PORCUPINE CARIBOU HERD

SEASON	DATES	CHARACTERISTICS
Early, Mid and Late Winter	1 December - 31 March	snow cover; short day length; cold
Spring, Spring Migration and Pre-calving	1 April - 31 May	snow cover decreasing; animals move north beyond the treeline; cottongrass in bud
Calving	1 - 10 June	0 - 10% snow cover; cottongrass in full flower; willow leaves in bud
Post-calving and Movement	11 - 30 June	cottongrass past flowering; willow leaves emerge; biomass increasing rapidly
Early Summer	1 - 15 July	biomass peaking; mosquitoes peaking
Mid Summer	16 July - 7 August	biomass at peak; mosquitoes past peak; oestrid flies peaking
Late Summer and Fall Migration	8 August - 7 October	vascular forage quality declining; early snow storms
Rut and Late Fall	8 October - 30 November	snow, but can melt

during critical times in its life cycle and directly influence survival (predators) and growth (calves during insect season).

5. **Intensity of use:** Over the last 20 years, enough distributional data has been gathered to assess caribou use of specific areas throughout the year. Areas receiving the highest intensity use (caribou-days), for whatever reason, are important.

   Rationale - Many factors influence the distribution and abundance of animals in a certain region. This criterion simply says that those regions that consistently contain high densities of animals should be considered important.

6. **Alternatives available:** The movements and distribution of the PCH over the last two decades have revealed times of year when a particular area is utilized almost exclusively with no alternative habitats apparently selected.

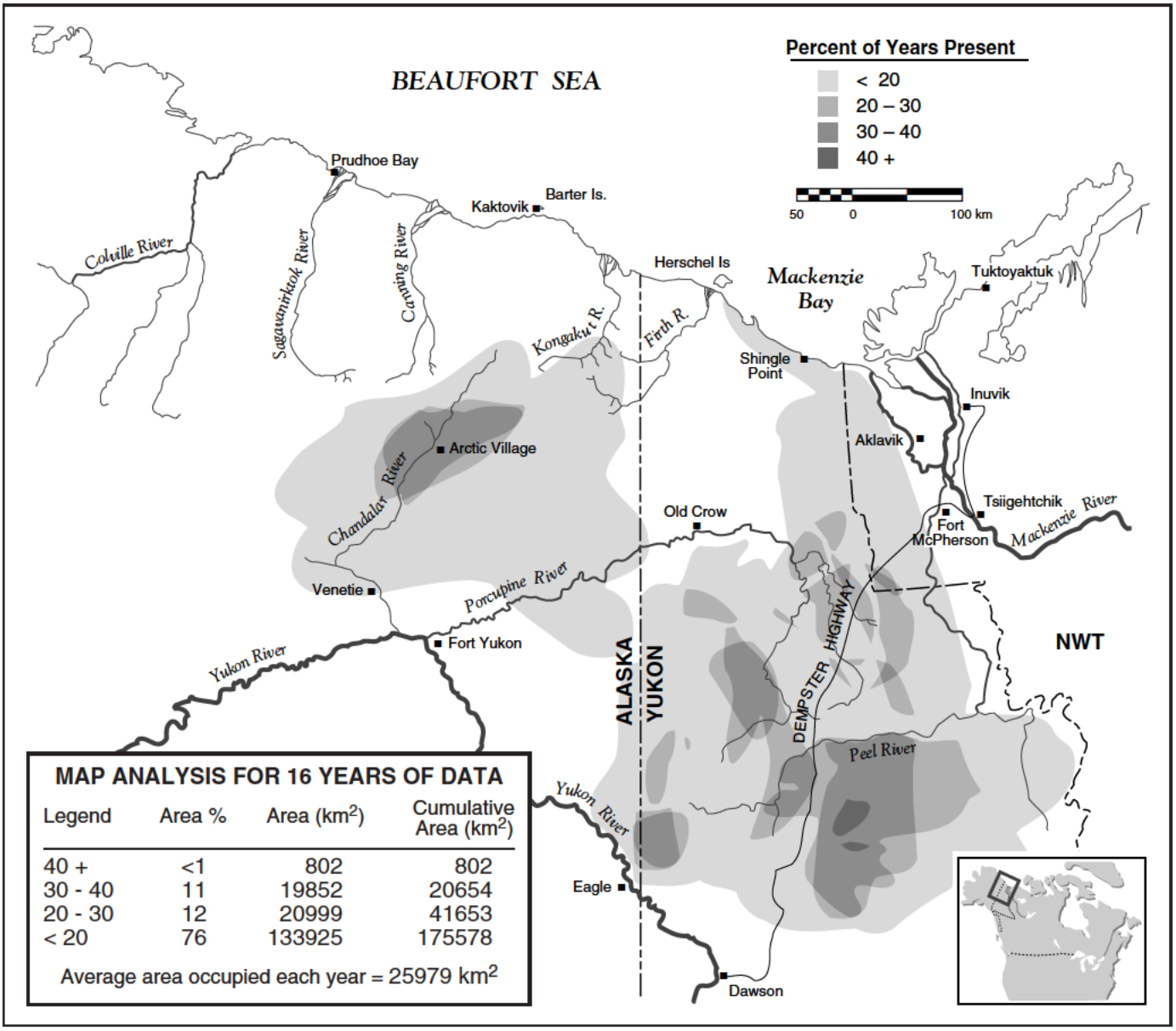
   Rationale - Survey data identify areas that receive continued use at specific times of the year with few if any alternative regions utilized. Displacement from, or disruption of access to these areas could have significant implications to the productivity of the herd.

TABLE 2

ASSESSMENT OF CRITERIA OF SEASONAL HABITATS

PERIOD	CRITERIA[1]						TOTAL[2]	IMPORT[3]
	energy balance	reproductive contribution	tolerance to disturbance	escape requirements	intensity of use	alternatives available		
Early, Mid and Late Winter 1 Dec. - 31 March	2	3	3	3	3	3	17	4
Spring, Spring Migration and Pre-calving 1 April - 31 May	1	2	3	3	3	2	14	3
Calving (cows) 1 - 10 June	1	1	1	1	1	1	6	1
Calving to Movement (bulls) 1 - 30 June	3	3	2	3	2	1	14	3
Post-calving and Movement (cows) 11 - 30 June	2	1	1	1	1	1	7	1
Early Summer 1 - 15 July	1	2	2	1	1	2	9	2
Mid Summer 16 July - 7 Aug	1	2	2	1	2	2	10	2
Late Summer and Fall Migration 8 Aug - 7 Oct	3	1	3	3	3	2	15	3
Rut and Late Fall 8 Oct - 30 Nov	3	3	3	3	3	3	18	4

[1] scores - based on a 1 - 2 - 3 rating (1 = highest concern)
[2] total of criteria ratings
[3] level of importance (1 = highest importance)



This map represents the distribution of the herd in late winter for all years with data. Early and mid-winter distributions tend to overlap with late winter distributions.

EARLY, MID, AND LATE WINTER

Time period: December 1 - March 31

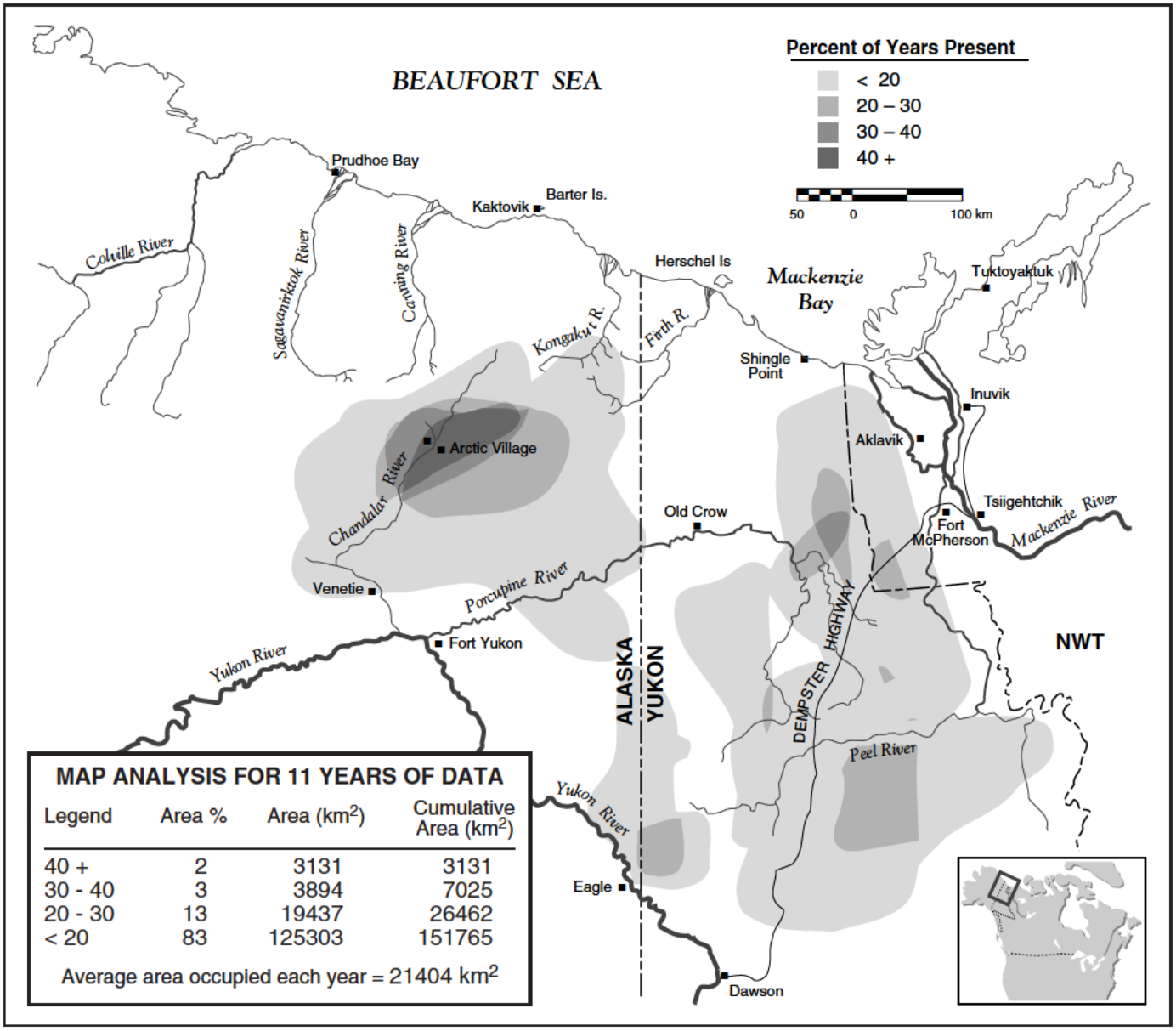
(total rating = 17 importance rank = 4)

Importance

The winter period is primarily influenced by snow depth and condition. Animals at this time of year are relatively tolerant to human activity. In shallow to normal snow years, animals can gain weight. Winter ranges are occupied at low densities.

Distribution

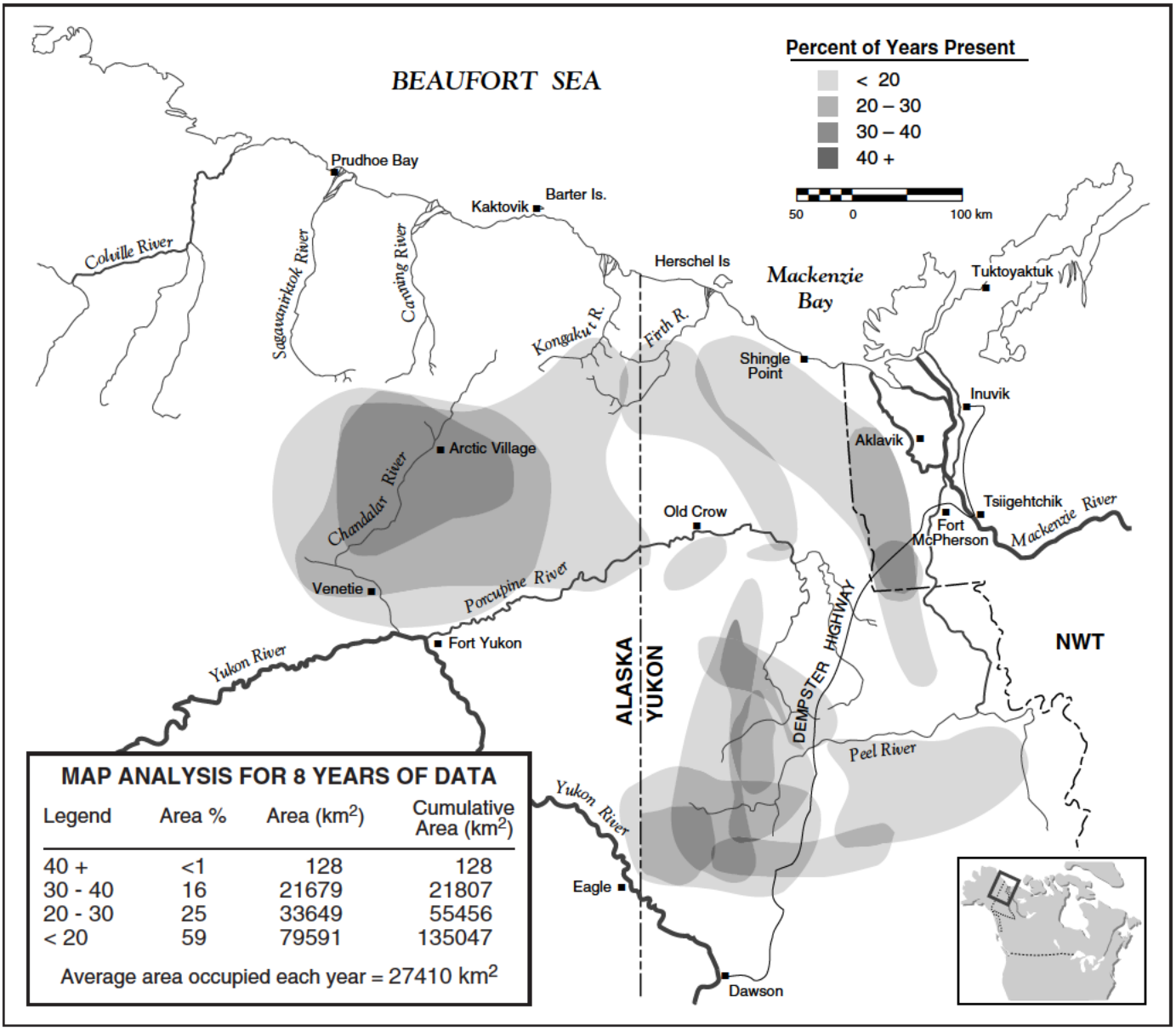
The Porcupine Caribou Herd occupies a vast area of northcentral Yukon and northeastern Alaska. In Canada, use of two regions occurs in normal to deep snow years, the Richardson Mountains and the Ogilvie-Hart basins. In shallow snow years the region with the most abundant lichen resources, the Whitestone River/Eagle Plains is used. The use of the range in Alaska is centred in the Chandalar River/Arctic Village area and use appears correlated with normal to deep snow years.



This map represents the distribution of the herd in late winter for years of above average snowdepth. Early and mid-winter distributions tend to overlap with late winter distributions.

Present Land Use Designation

Yukon winter ranges south of the Porcupine River are subject to Territorial Land Use Regulations. North of the Porcupine River, winter ranges are within the Order-in-Council withdrawal and are still subject to the above regulations. The majority of the Alaskan winter range is within ANWR.



Distribution of the Porcupine Caribou Herd during spring.

SPRING, SPRING MIGRATION AND PRE–CALVING

Time period: April 1 – May 31

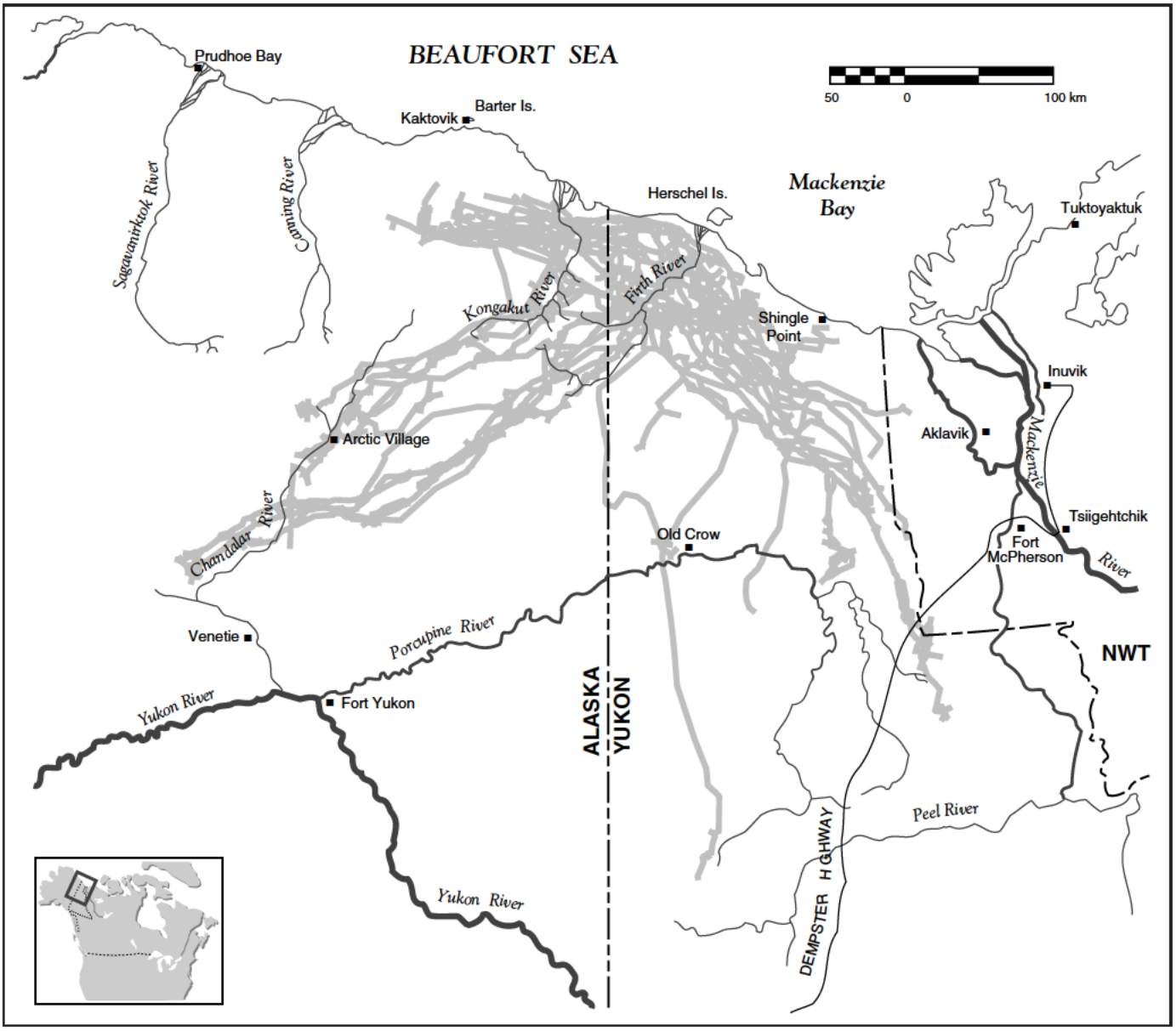
(total rating = 14 importance rank = 3)

Importance

Pregnant females are in almost constant energy deficit during this period, as they leave the lichen-rich boreal forest, often in advance of snowmelt to the calving grounds of the Yukon and Alaskan North Slope. There is strong evidence that female condition just prior to calving is related to newborn calf survival.

Distribution

Depending upon the progress of snow melt, cows can either remain on the wintering grounds during spring or initiate migration early. Routes chosen for spring migration are often affected by local snow conditions and can vary along a wide front during shallow snow years to confined trail systems along ridges in years of deep snow or late snowmelt. Using satellite tracking, certain valleys

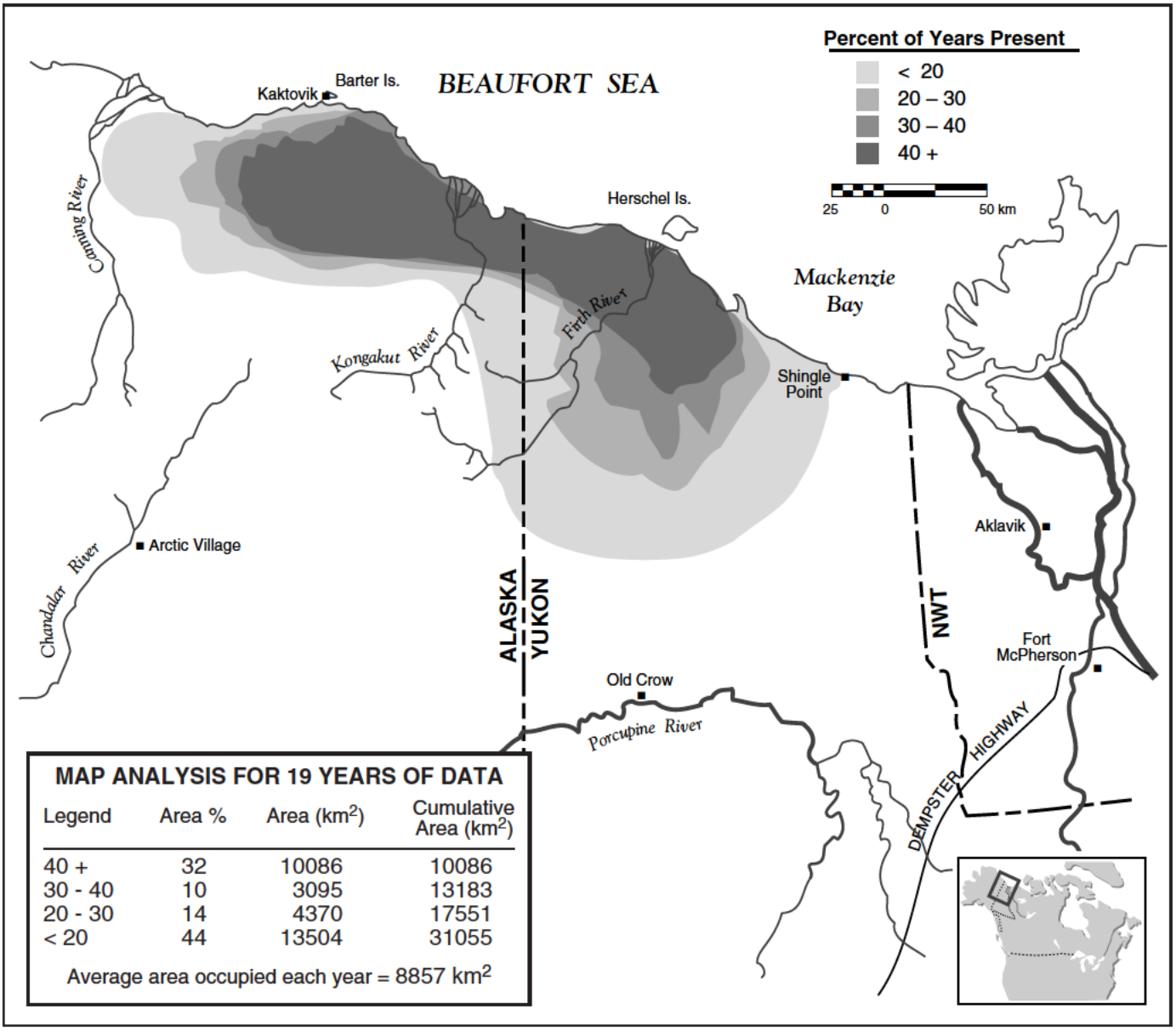


Cumulative movements of satellite radio-collared cows of the Porcupine Caribou Herd during spring migration 1985 – 1989.

or crossing sites become evident; however no well defined spring migration corridor can be delineated.

Present Land Use Designation

In Yukon, south of the Porcupine River, routes are covered either under Territorial Land Use Regulations or Area Development Regulations. North of the Porcupine River routes are all presently protected by the Order-in-Council Withdrawal as well as Land Claims provisions. All routes in Alaska are in ANWR.



General distribution of the Porcupine Caribou Herd during calving.

CALVING – (COWS)

Time period: June 1 – 10

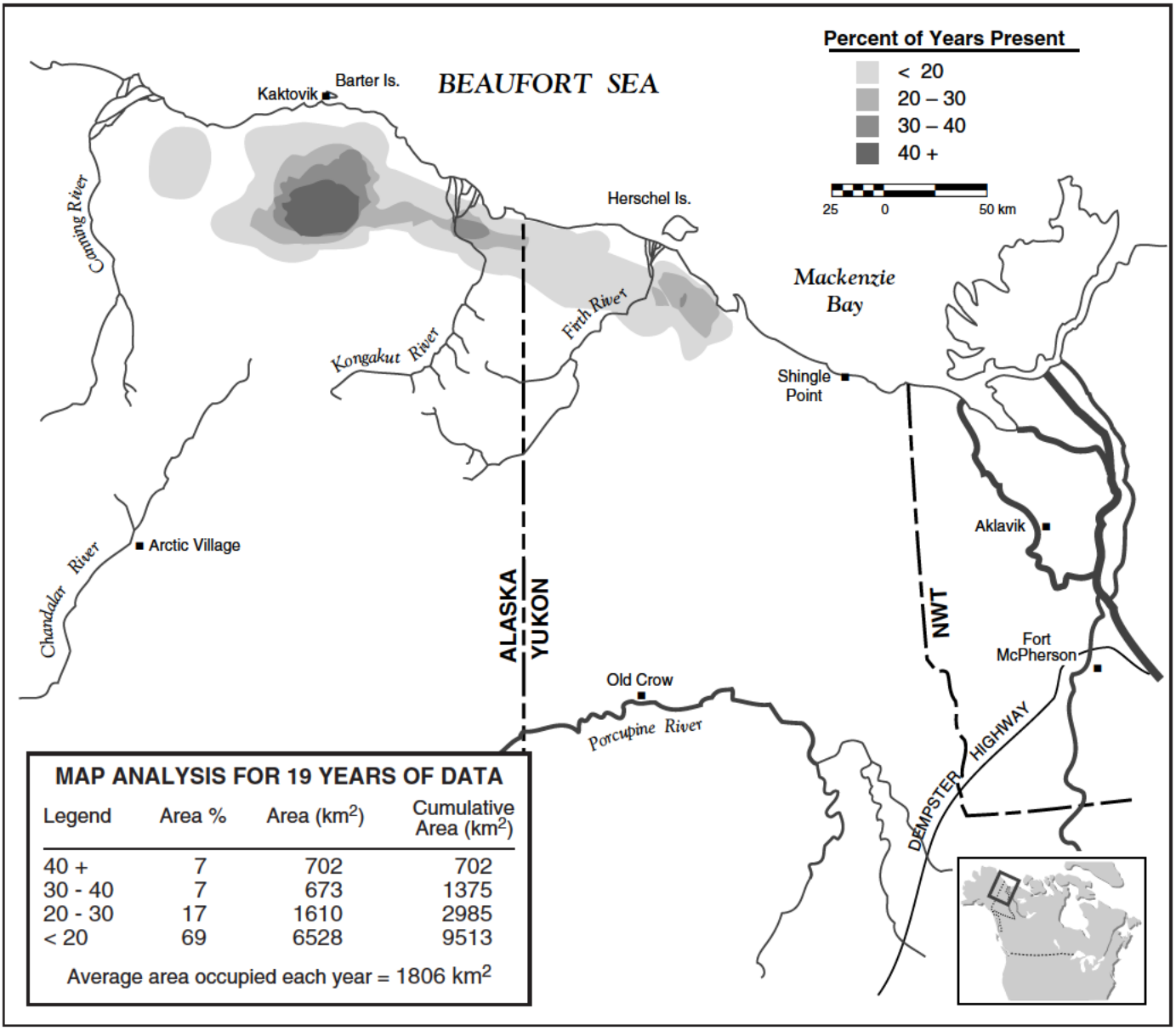
(total rating = 6 importance rank = 1)

Importance

The calving period received the highest ranking of all time periods. Adult females are at the lowest ebb of their physical condition, they have the largest energetic deficit, they are least tolerant to human disturbance, the time period is critical to the survival and development of calves (50% of first year mortality is in the first month), the region used appears to provide reduced predators and abundant forage soon after calving, and no alternative habitats are apparently available.

Distribution

The general calving distribution of the herd follows the coastal plain from the Hulahula River in the west to the Babbage River in the east. Areas of concentrated use are centred in the Jago Uplands and extend between the Hulahula and the Aichilik Rivers in Alaska.



MAP ANALYSIS FOR 19 YEARS OF DATA

Legend	Area %	Area (km^2)	Cumulative Area (km^2)
40 +	7	702	702
30 - 40	7	673	1375
20 - 30	17	1610	2985
< 20	69	6528	9513

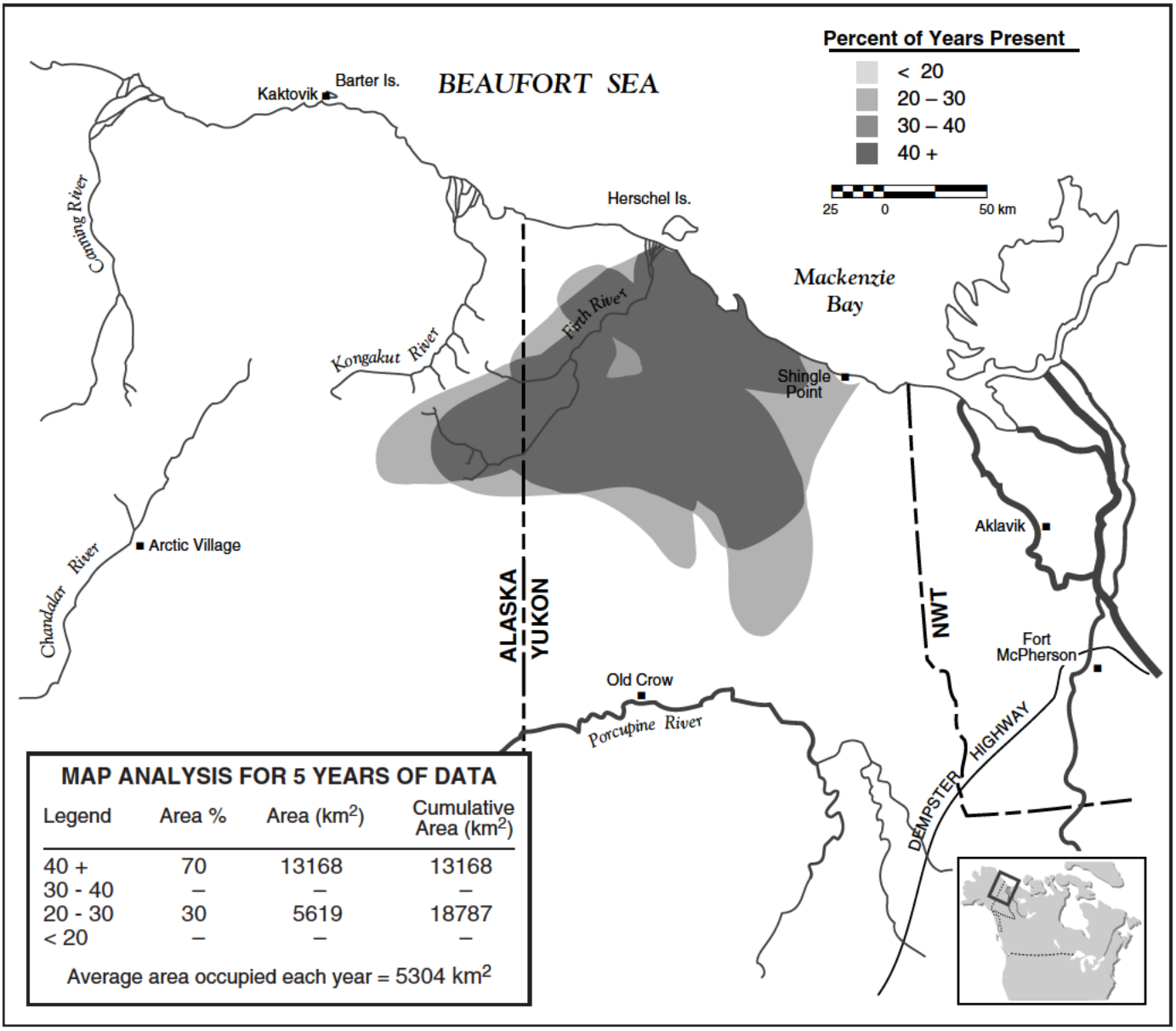
Average area occupied each year = 1806 km^2

Concentrated distribution of the Porcupine Caribou Herd during calving.

Present Land Use Designation

The majority of the primary concentration area, the Jago uplands, is within the 1002 area of ANWR. Areas in Yukon are within Ivvavik National Park.

Norman Barichello



Distribution of the majority of bulls, juveniles and non-productive cows of the Porcupine Caribou Herd during pre-calving, calving and post-calving.

CALVING TO MOVEMENT (BULLS)

Time period: June 1 – 30

(total rating = 14 importance rank = 3)

Importance

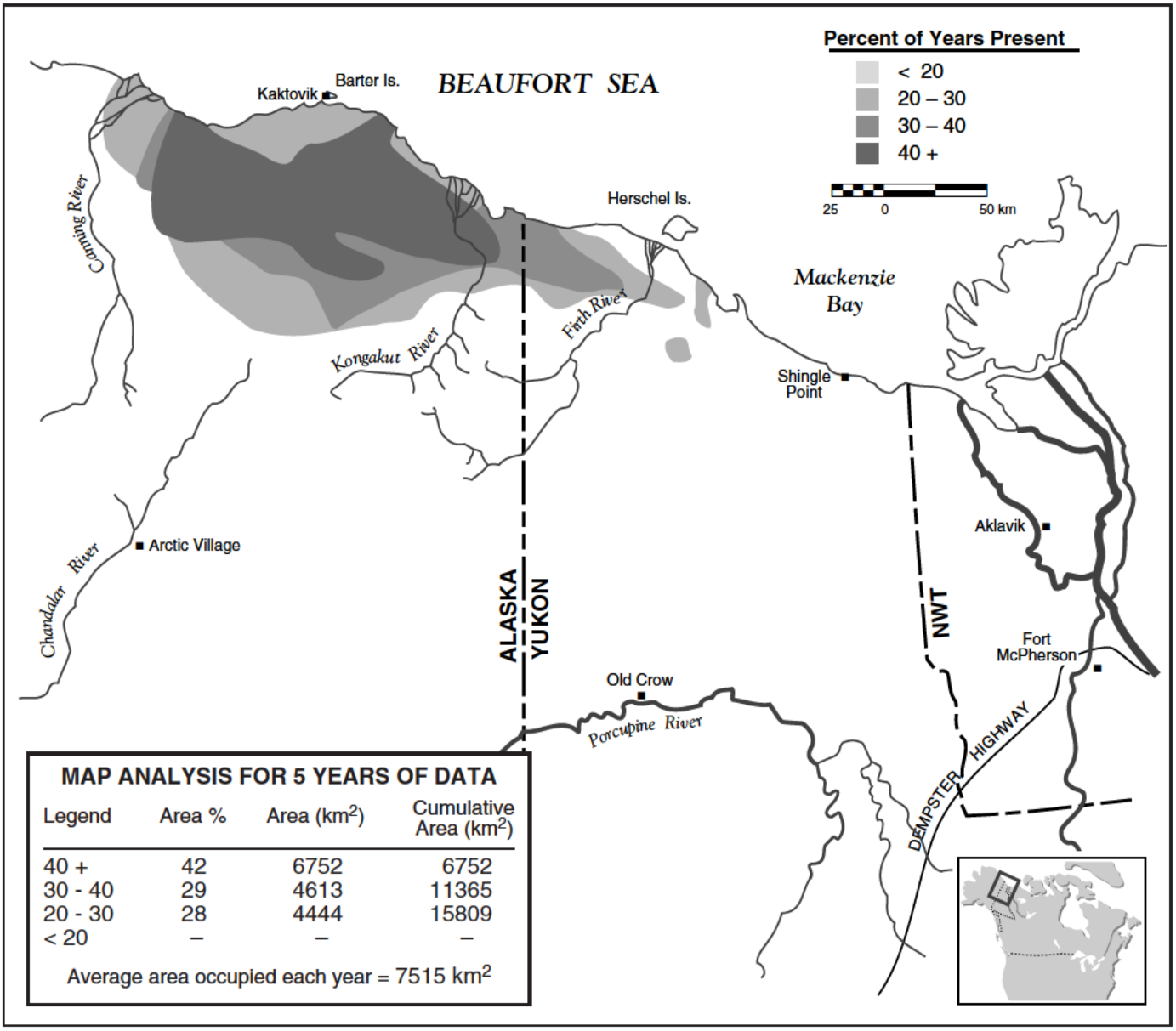
The bulls, non-pregnant females and juveniles leave the winter range later than pregnant cows. During this period they are quite mobile and track early phenological stages of plant species.

Distribution

The Old Crow Pediments and the Babbage River drainage has been consistently used by this segment of the herd during this time. No alternative habitat appears to be used. The region offers a rich diversity of habitat types. Snow melts first from the Old Crow Pediments, then from the northern foothills and coastal plain and finally from the intermountain regions and headwaters of rivers and streams.

Present Land Use Designation

Half of the region falls within Ivvavik National Park and the proposed extension while the other half falls in the Special Conservation Area set up under the Inuvialuit Final Agreement.



Distribution of cows and calves from the Porcupine Caribou Herd in post-calving and movement period. Distribution based on satellite relocations and represents the area covered by 80% of the points.

POSTCALVING AND MOVEMENT (COWS)

Time period: June 11 – 30

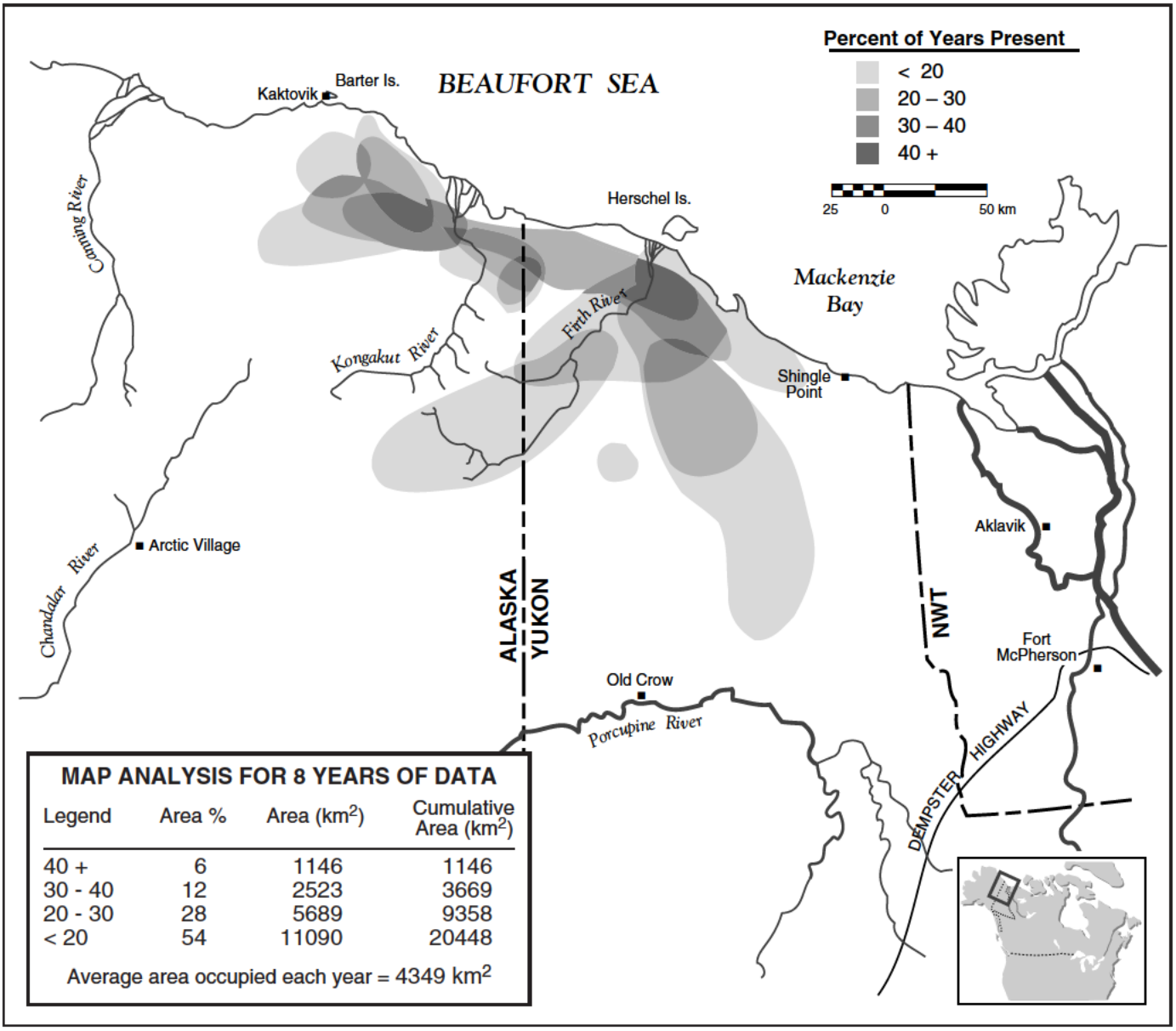
(total rating = 7 importance rank = 1)

Importance

The post-calving period is important to lactating females as this period marks the highest energetic demands, thus the requirement for highly nutritious forage. As group size increases, movement rates and band size increase. Free movement of these large groups is critical. Cow/calf groups are relatively intolerant to disturbance. Cows and calves appear to have a high fidelity to the Alaskan coastal plain between the Aichilik and the Hulahula Rivers.

Distribution

In the postcalving period the Porcupine Caribou Herd moves from calving areas, following retreating snow to take advantage of nutrient-rich vegetation. As well, cows that calved in Yukon tend to move west along the foothills into ANWR. Movement rate is very high at this



MAP ANALYSIS FOR 8 YEARS OF DATA

Legend	Area %	Area (km^2)	Cumulative Area (km^2)
40 +	6	1146	1146
30 - 40	12	2523	3669
20 - 30	28	5689	9358
< 20	54	11090	20448

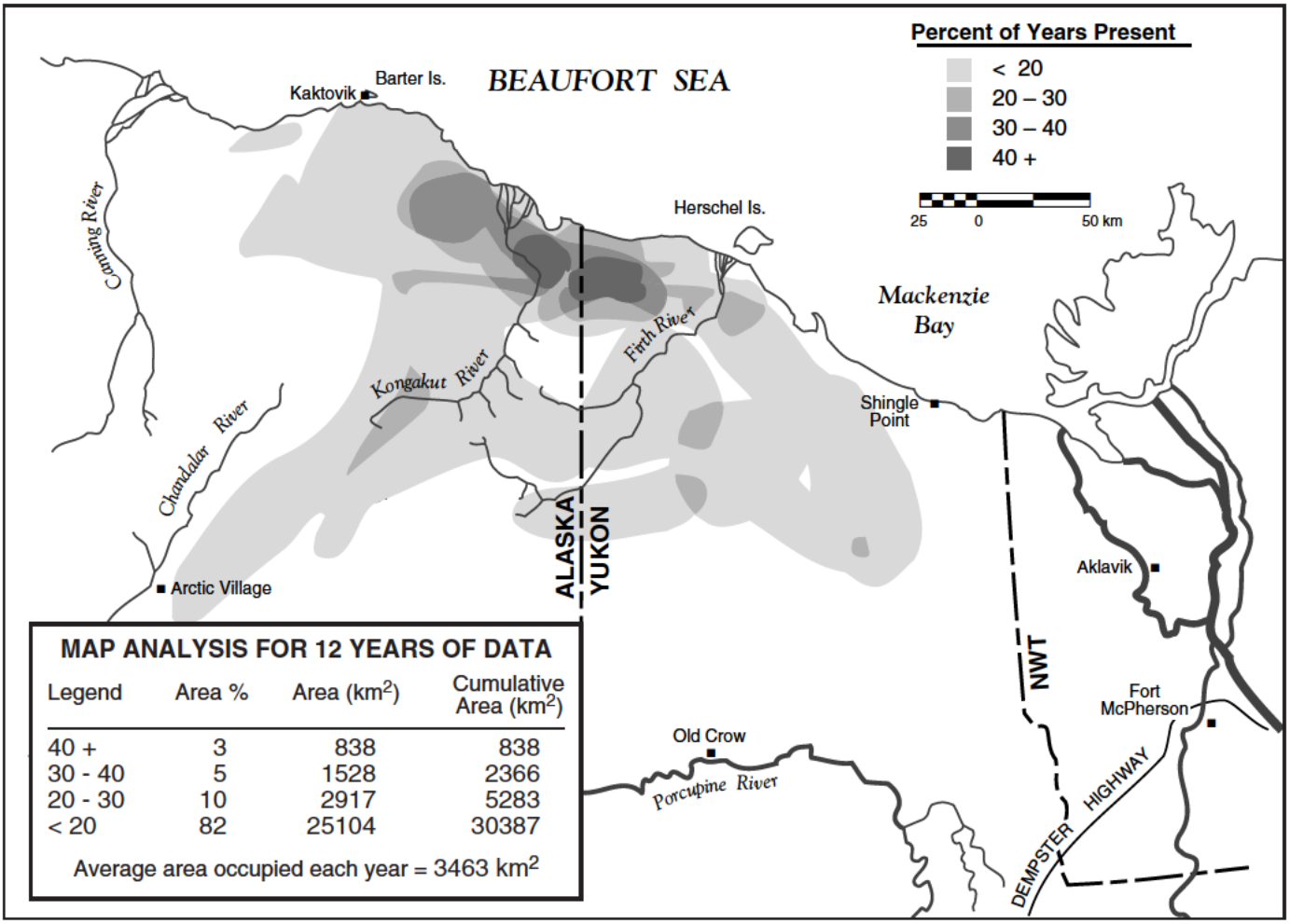
Average area occupied each year = 4349 km^2

Distribution of the Porcupine Caribou Herd during movement period. This figure is based on aerial relocations of all animals in the herd and, at best, reflects regional distribution.

time of year, however the entire female and calf portion of the herd occupy the coastal plain of Alaska from the foothills to the coast. Insect harassment, if conditions permit, can dictate distribution by the end of June.

Present Land Use Designation

The majority of the area lies within the 1002 area of ANWR. Outside of ANWR, groups comprised primarily of bulls and non-productive females, or productive females in years of late snowmelt, occupy Ivvavik National Park in Yukon.



MAP ANALYSIS FOR 12 YEARS OF DATA

Legend	Area %	Area (km^2)	Cumulative Area (km^2)
40 +	3	838	838
30 - 40	5	1528	2366
20 - 30	10	2917	5283
< 20	82	25104	30387

Average area occupied each year = 3463 km^2

Distribution of the Porcupine Caribou Herd during early summer. **Caution:** As movement rates are high and animals are normally in tight concentrations, this map, at best, reflects regional distribution.

EARLY SUMMER

Time period: July 1 – 15

(total rating = 9 importance rank = 2)

Importance

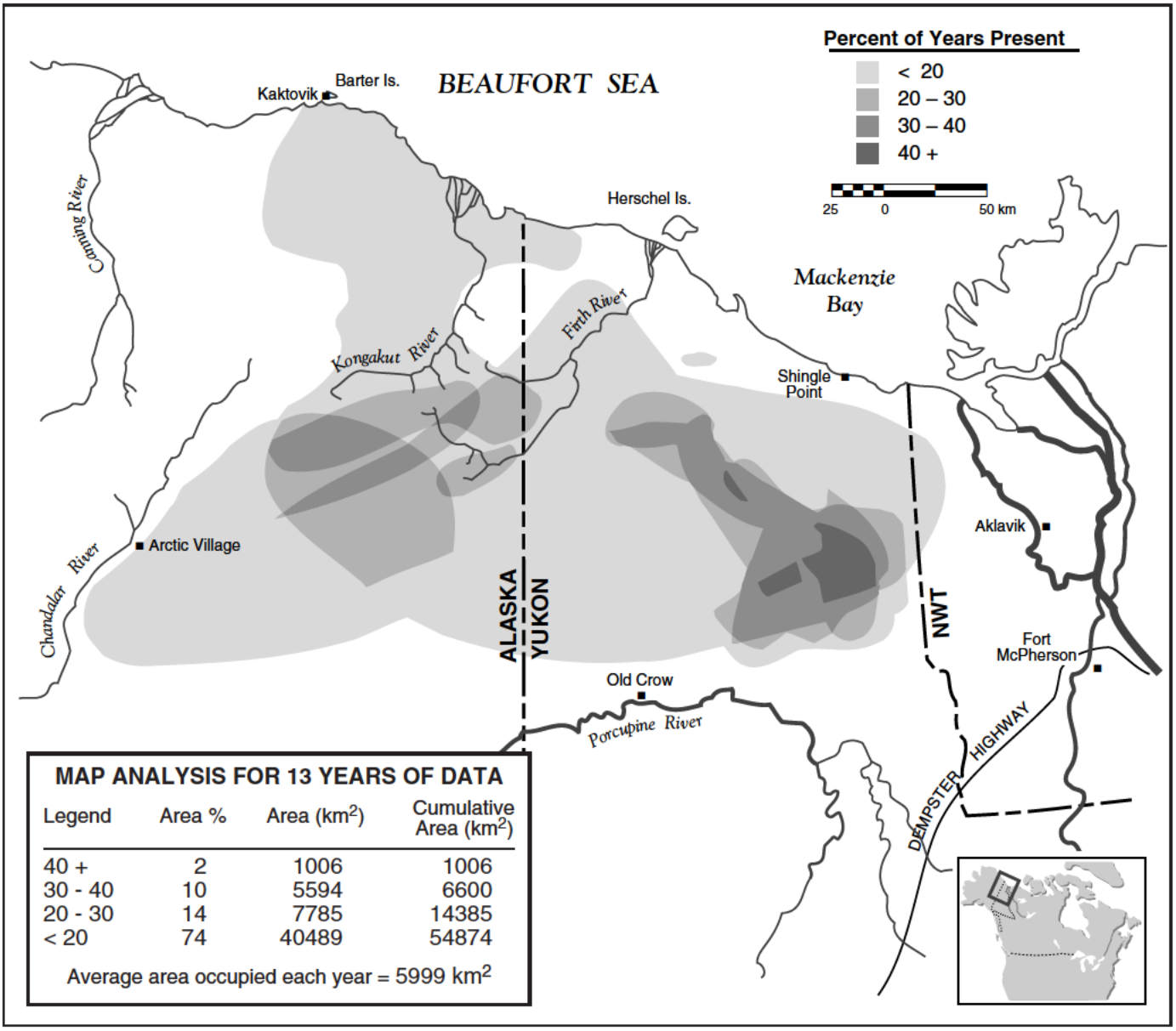
Cows require a high energy intake to produce milk for the rapidly growing calves at a time when mosquito and oestrid fly harassment limit their feeding time. Group size increases to the tens of thousands and movement rates can average 25 km per day. These dense groups move primarily in response to insect harassment. Key areas are those that offer relief from insects while still providing some food, most critical to the lactating females. The male component of the herd, if not mixed with the females, tends to be in the foothills and, in recent years, in the southern Brooks Range.

Distribution

In Alaska, the coastal plain adjacent to the Beaufort Sea offers primary insect relief for the female segment of the herd. For the male segment, having a lower energetic demand than the females and having tracked early phenological changes in the vegetation since early May, the relief offered by the Brooks Range is adequate, although poor in providing nutritious forage. Distribution in the Brooks Range is quite widespread. Animals that return to Canada often utilize the southern British Mountains by mid-July.

Present Land Use Designation

The coastal strip west of the Aichilik River is within the 1002 area of ANWR. Lands east of the Aichilik in Alaska and in the Brooks Range are within the designated wilderness in ANWR. Locations in the British Mountains are within Ivvavik National Park and Vuntut National Park.



Distribution of the Porcupine Caribou Herd during mid-summer.

Mid–Summer

Time period: July 16 – August 7

(total rating = 10 importance rank = 2)

Importance

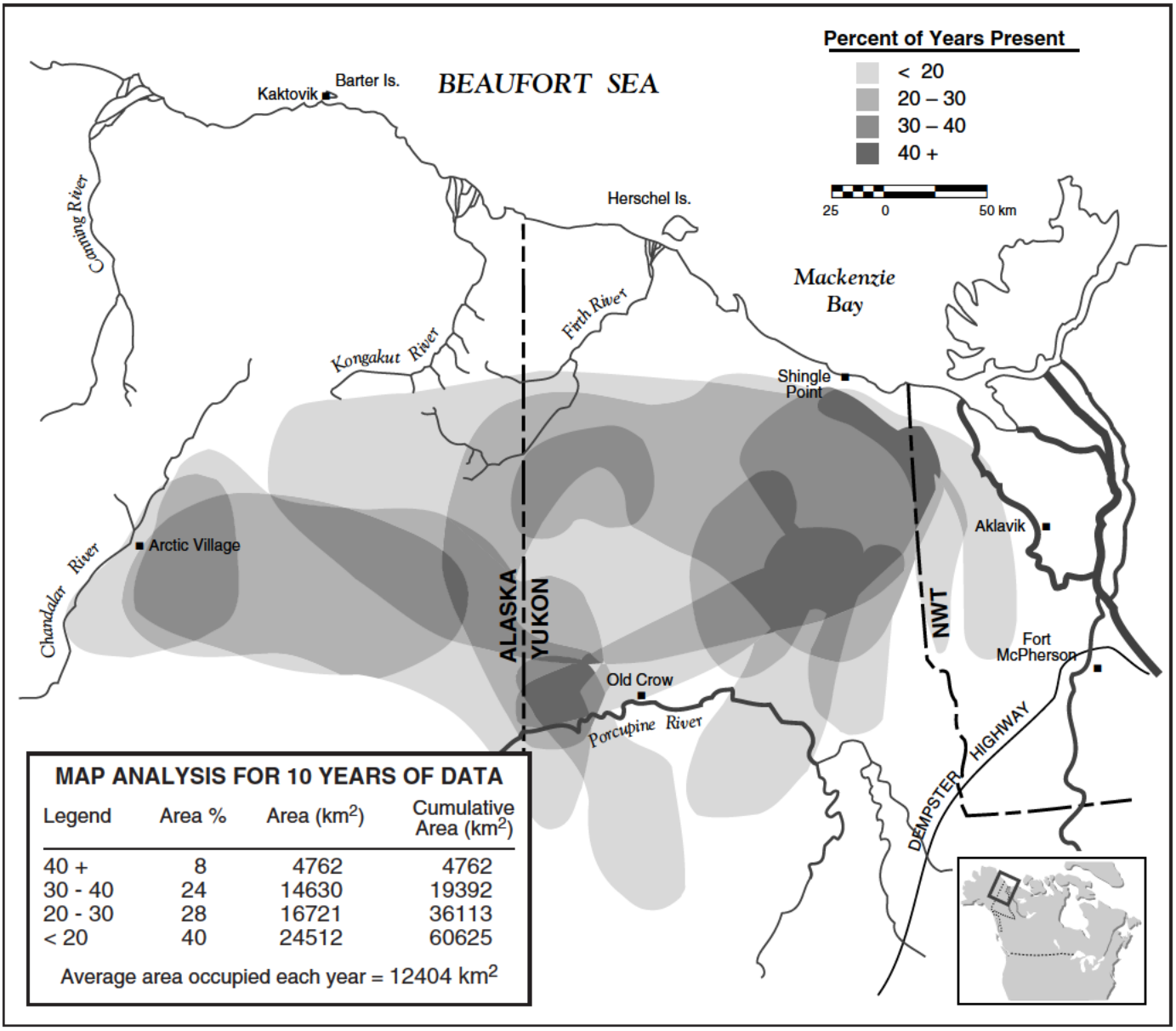
Mid-summer is a period of potentially high insect harassment particularly by oestrid flies. Lactation demands are still high for females and access to high quality insect relief areas is important. During harassment females may be in an energy deficit.

Distribution

Two areas appear to be consistently used for insect relief – the northern Richardson Mountains and the southern flanks of the Brooks Range. The Richardson Mountains provide high quality forage and cool humid conditions. The reasons for the use of the Brooks Range distribution are unknown but may be related to the absence of emerging oestrid flies.

Present Land Use Designation

The northern part of the Richardson distribution is managed under the Special Conservation Zone of the Inuvialuit Final Agreement. The southern portion of this distribution is presently under the Order-in-Council Withdrawal. The southern Brooks Range is primarily within the designated wilderness of ANWR.



Distribution of the Porcupine Caribou Herd during late summer.

LATE SUMMER AND FALL MIGRATION

Time period: 8 August – 7 October

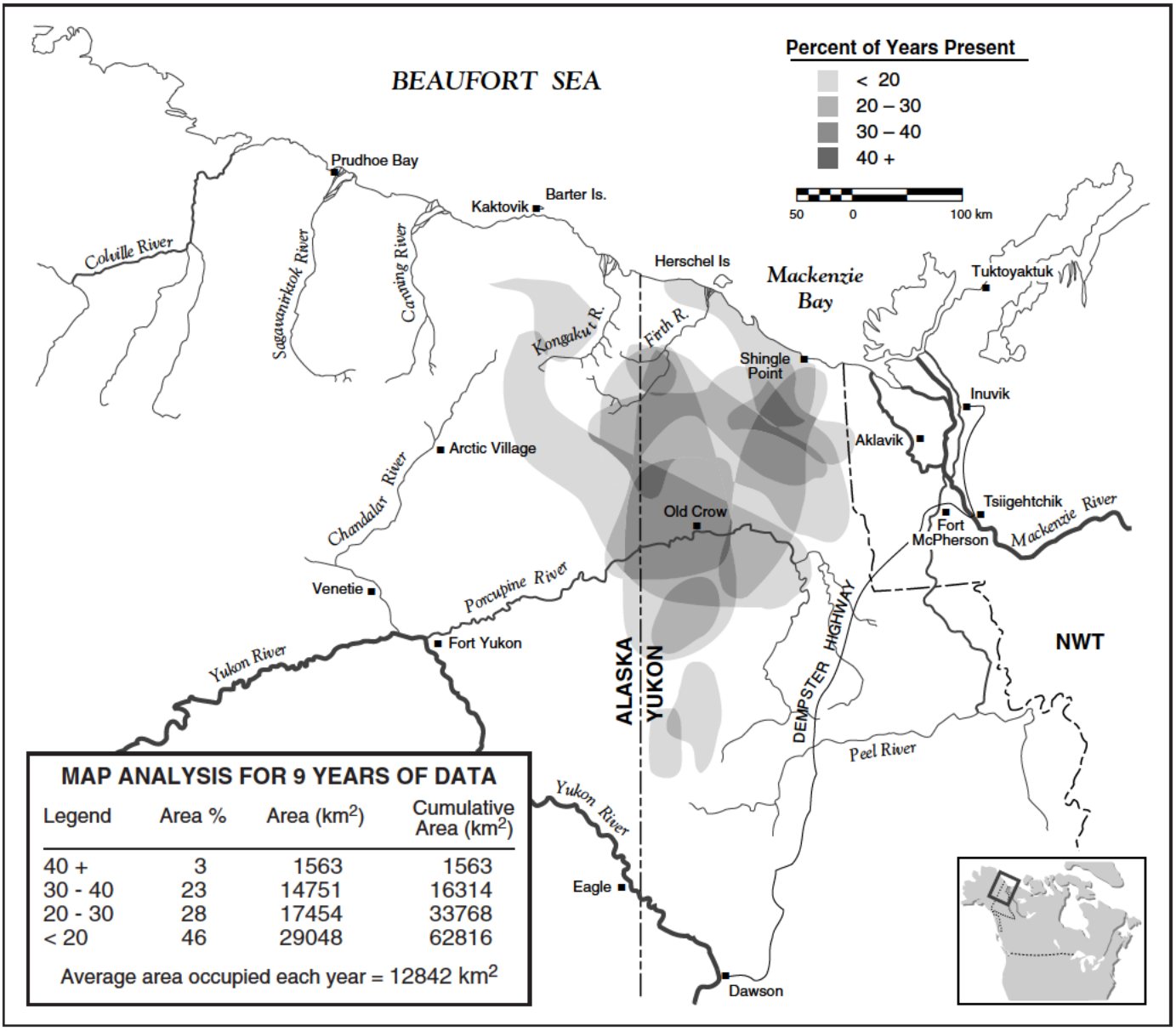
(total rating = 15 importance rank = 3)

Importance

After the insect activity declines, the herd disperses throughout the northern Yukon and Alaska, exhibiting high feeding rates and gaining fat reserves for the winter. The period is important for the females to gain fall condition in preparation for the rut. Body condition of females entering the rut dictates the pregnancy rate for that year.

Distribution

The small band sizes and dispersed nature of the animals in late summer result in an extensive distribution compared to the earlier summer period. Movement typically stays north of the treeline. Fall migration, south of the treeline follows certain terrain features, such as valleys and ridge systems, however in large part the movement routes are unpredictable from one year to the next.



MAP ANALYSIS FOR 9 YEARS OF DATA

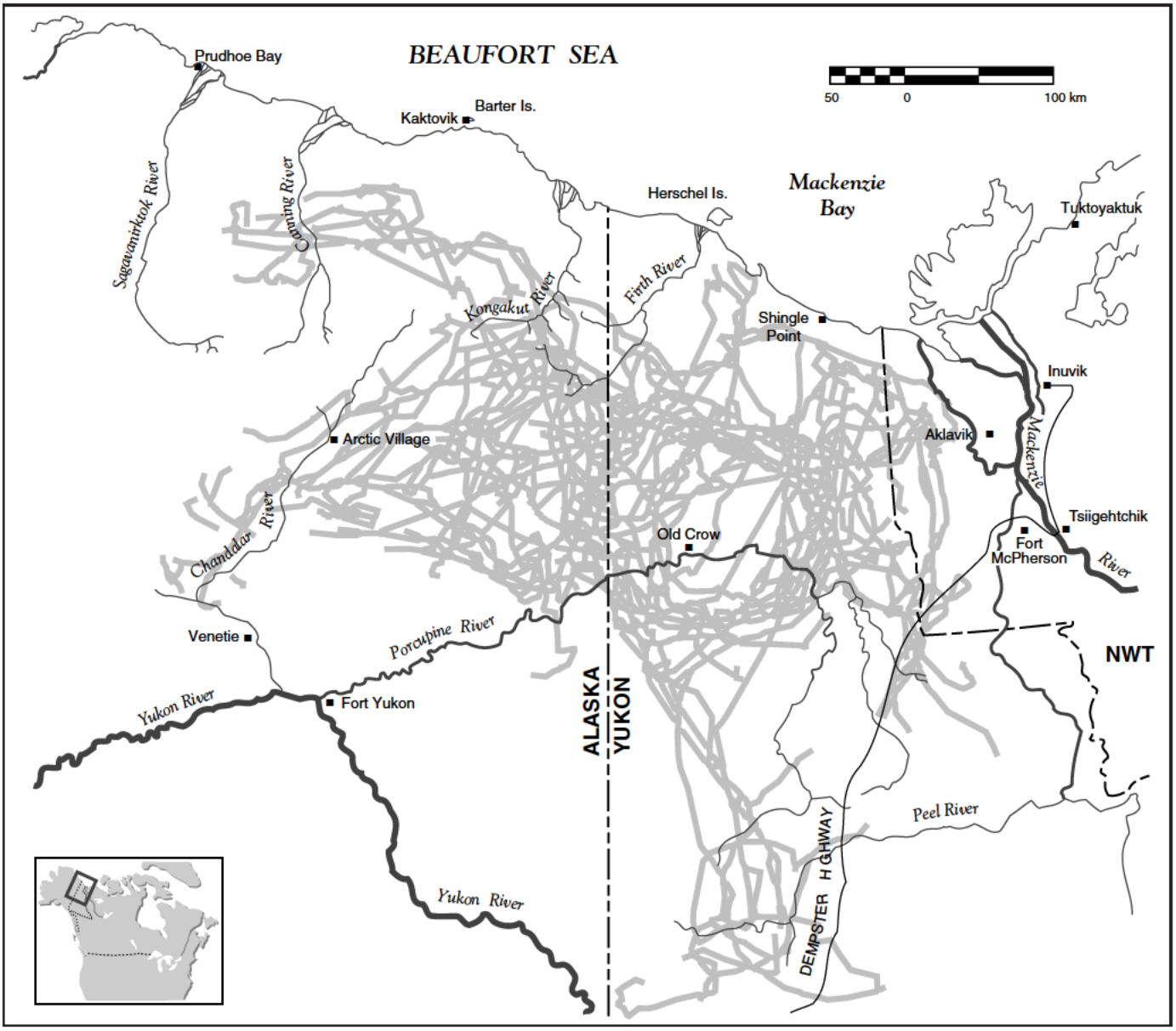
Legend	Area %	Area (km^2)	Cumulative Area (km^2)
40 +	3	1563	1563
30 - 40	23	14751	16314
20 - 30	28	17454	33768
< 20	46	29048	62816

Average area occupied each year = 12842 km^2

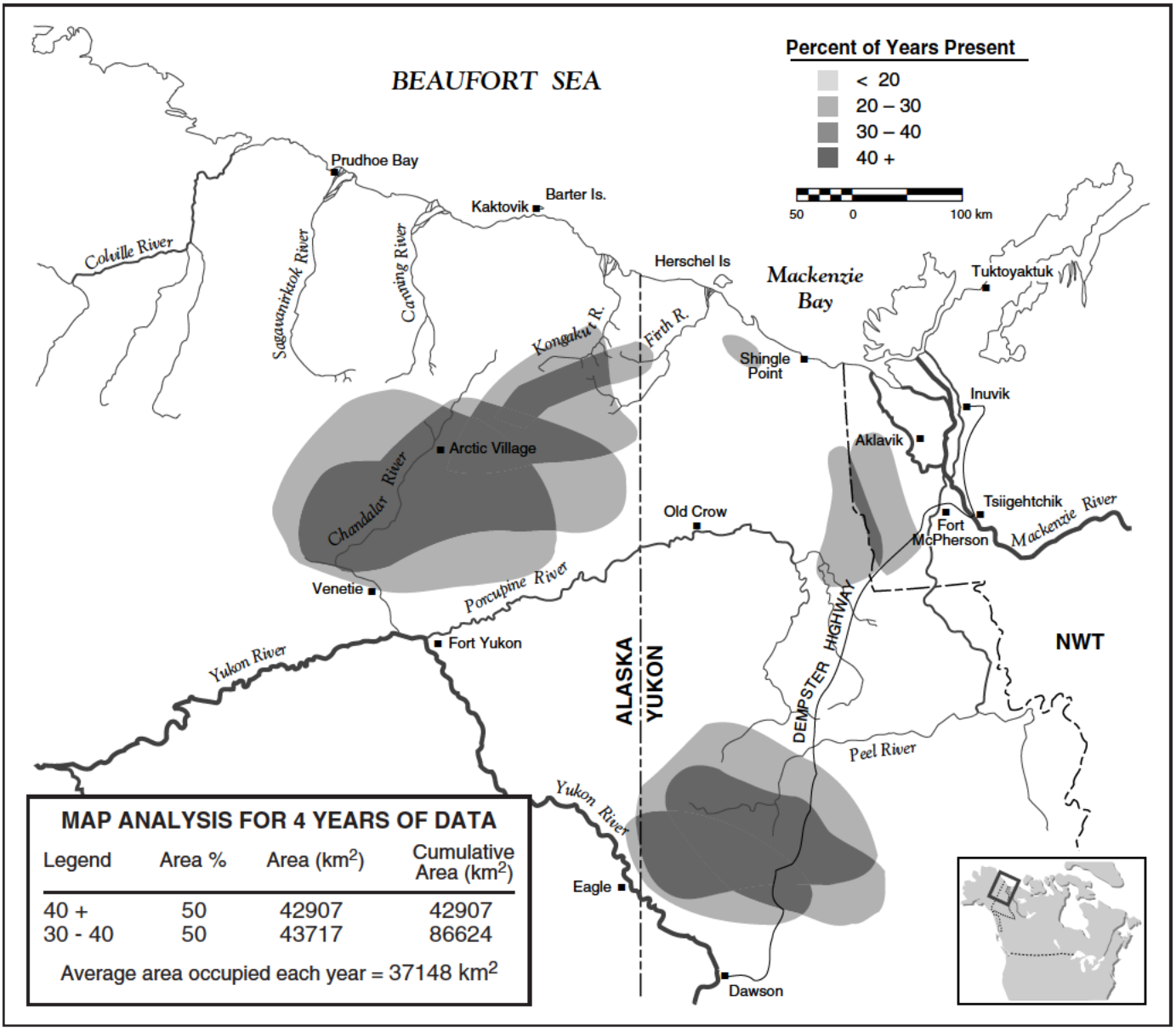
Distribution of the Porcupine Caribou Herd during fall migration.

Present Land Use Designation

All Yukon areas north of treeline are managed within the Special Conservation Zone of the Inuvialuit Final Agreement or Ivvavik and Vuntut National Parks. Areas south of the Porcupine River in Yukon are covered under Territorial Land Use Regulations or Area Development Regulations. The majority of the distribution in Alaska is within ANWR.



Cumulative movements of satellite radio-collared cows of the Porcupine Caribou Herd during fall migration 1985 – 1989.



Distribution of the Porcupine Caribou Herd during the rut.

RUT AND LATE FALL

Time period: October 8 – November 30

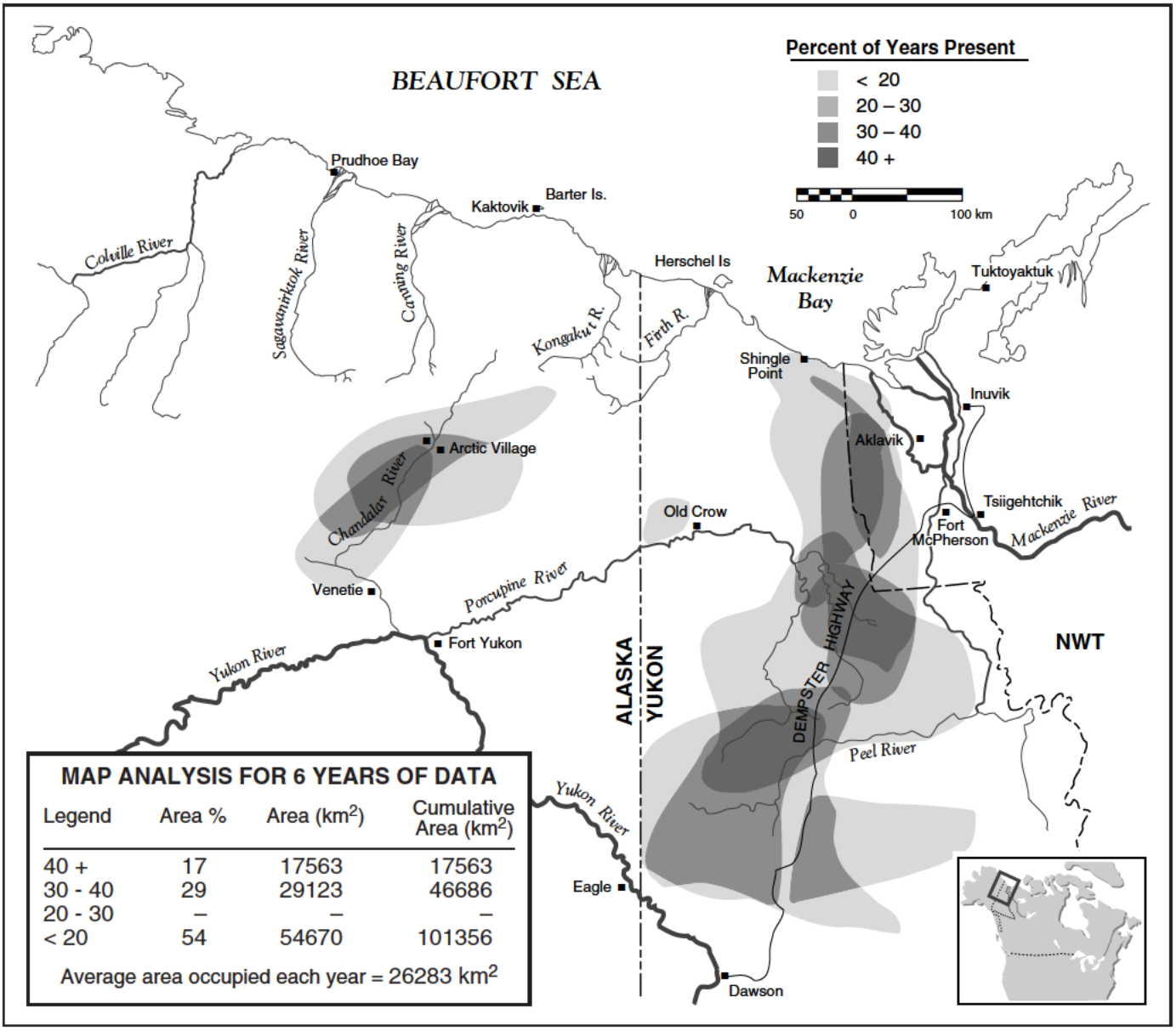
(total rating = 18 importance rank = 4)

Importance

This period was the lowest level of importance. Although this stage of the life cycle has importance for successful reproduction, the herd shows no affinity for a specific location, rather rut appears to occur wherever the herd happens to be along fall migration. Late fall distributions are equally variable.

Distribution

The region where rut occurs is largely dependent upon the timing of fall migration and the location of the winter range for that year. In Yukon, rut can occur from the southern Ogilvie Mountains to the northeastern Yukon in and adjacent to the Richardson Mountains. If animals are in Alaska, rut can occur in the Arctic Village and Chandalar River area. By late fall, distributions largely

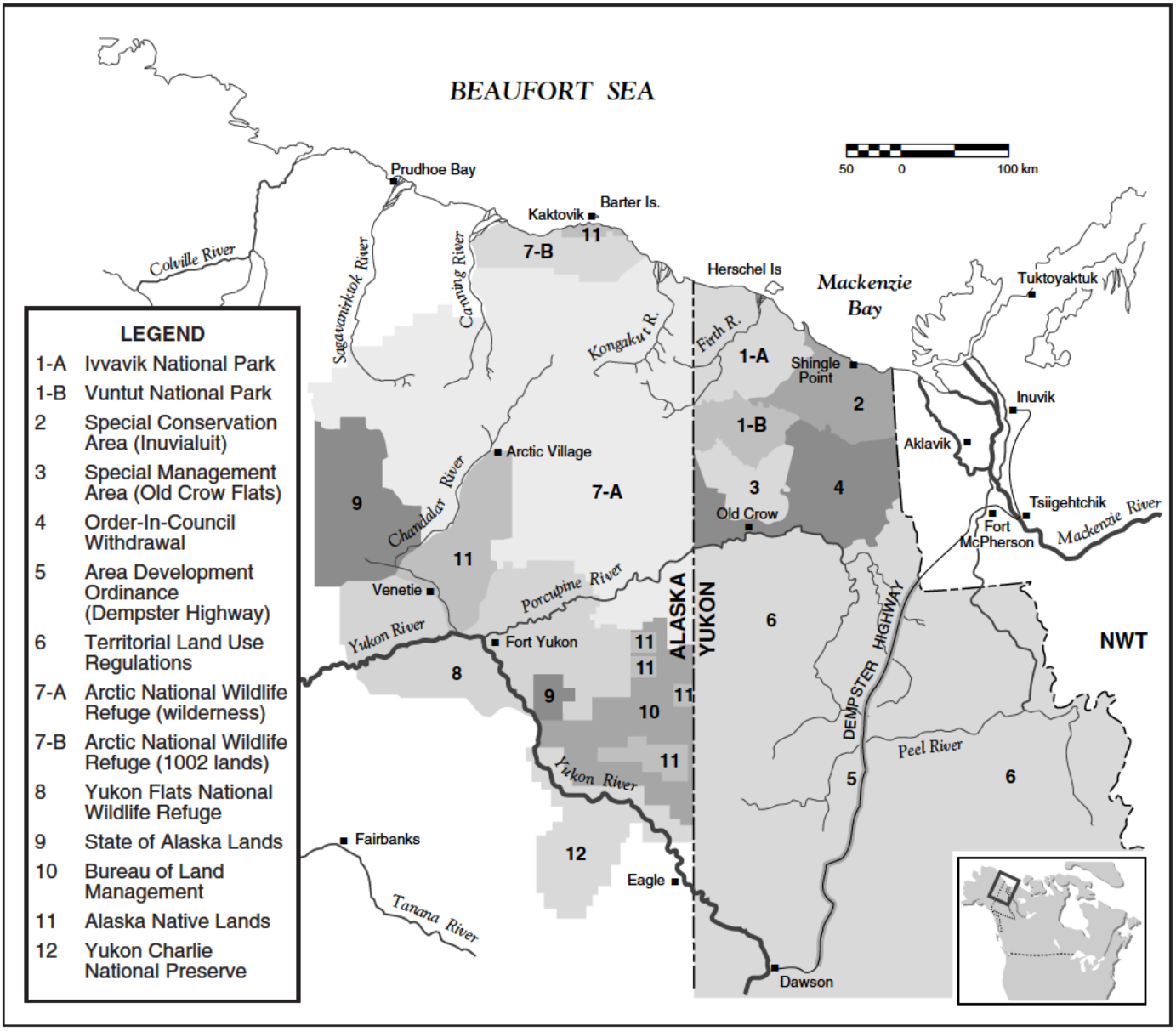


Distribution of the Porcupine Caribou Herd during late fall.

reflect that years winter distributions although more movements can occur.

Present Land Use Designation

In Alaska, the distribution is primarily in ANWR. In Yukon, south of the Porcupine River, routes are covered either under Territorial Land Use Regulations or Area Development Regulations. North of the Porcupine River, routes are all presently protected by the Order-in-Council Withdrawal and are subject to provisions in Land Claims.



Current management regimes within the range of the Porcupine Caribou Herd.

LAND MANAGEMENT WITHIN THE RANGE OF THE PCH

Land management regimes vary considerably within the range of the Porcupine Caribou Herd. This section briefly describes the management regime offered by each designation.

YUKON

National Parks (areas 1A, 1B)

Purpose

To protect for all time a representative natural area of Canadian significance.

Management regime

- protection of fish and wildlife habitat as a first priority. Ecosystems allowed to evolve naturally.
- maintenance of natural fish and wildlife population levels.
- recognition of aboriginal rights to harvest for subsistence; prohibition of mining and oil and gas development.

Special Conservation Area – Inuvialuit Final Agreement (area 2)

Purpose

To conserve wildlife, habitat and traditional native use.

Management regime

- all development proposals are screened to determine if there could be any significant negative impact on wildlife, habitat or native harvest.
- any proposal that will potentially impact the above is subject to the Inuvialuit Environmental Impact Review Board review process, and other environmental reviews by the appropriate regulatory authorities.

Special Management Area – Old Crow Flats (area 3)

Purpose

To protect fish and wildlife and their habitat and the natural evolution of the ecosystem as a priority while recognizing the traditional and continuing use of the area's resources by Vuntut Gwich'in.

Management regime

- maintain the integrity of the area as one ecological unit.
- recognize and protect the traditional and current use of the area by Vuntut Gwich'in.
- protect and conserve fish and wildlife and their habitats, in particular the Porcupine Caribou Herd and migratory birds.
- protect the full diversity of fish and wildlife populations and their habitats from activities which could reduce the land's capability to support them.

Order–In–Council Withdrawal (area 4)

Purpose

To protect the natural resources within lands north of the Porcupine River from exploration and development.

Management regime

- no new leases or permits for exploration or development have been issued since 1978.
- these measures considered interim until adequate protection of the area is achieved and a Management Plan (under the Council for Yukon Indians claim) is established.

Area Development Ordinance Dempster Highway (area 5)

Purpose

To provide for planning and zoning in areas undergoing development.

Management regime

- interpreted, for the Dempster Highway, to provide special restrictions to protect migrating and wintering caribou within 8 km of the highway.

Territorial Land Use Regulations (area 6)

Purpose

To control land use activities on federal crown land.

Management regime

- essentially, permit applicants are screened and either given a permit with restrictions, denied a permit or have their proposal referred to a higher review process.
- these regulations do not apply to mining operations under either the Yukon Quartz Mining Act or the Yukon Placer Mining Act.

ALASKA

National Wildlife Refuges – Arctic (area 7) & Yukon Flats (area 8)

Purpose

- To conserve fish and wildlife populations and habitats in their natural diversity.
- To fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats.
- To provide the opportunity for continued subsistence uses by local residents.
- To ensure water quality and necessary water quantity within the refuge.

Management regime

- manage to conserve fish, wildlife, and habitats in their natural diversity.
- human uses, which are compatible with the purposes of a national wildlife refuge, may be allowed.
- Arctic National Wildlife Refuge is closed to oil and gas leasing unless authorized by Congress (1002 area).
- oil leasing may be authorized on other Alaskan national wildlife refuges if it is in the national interest and compatible with purposes of the refuge.
- National Wildlife Refuges are closed to mining except for prior existing rights.

State of Alaska Lands (areas 9)

Purpose

To control land use on state owned land.

Management regime

- development is covered under existing State and Federal environmental laws and regulations.
- virtually all land has been offered or will be offered for oil and gas leasing.

Bureau of Land Management Lands (areas 10)

Purpose

To provide for the protection of lands in Federal ownership within the framework of a program of multiple use and sustained yield and for the maintenance of environmental quality.

Management regime

- management is designed to balance an array of sometimes competing uses.
- mining, petroleum and various recreational uses are permitted under multiple use management.

Alaska Native Lands (areas 11)

Native lands in Alaska include large village owned holdings and private small patches. Management of Native lands varies by owner. All Native lands are private lands. Some lands are covered under local, state and federal land use regulations while other land may be considered sovereign Tribal Lands and management control is either unclear or unsettled. Generally, Native lands are managed to perpetuate fish and wildlife while allowing economic development activities.

Yukon Charlie National Preserve (area 12)

Purpose

- To maintain the environmental integrity of the entire Charlie River basin, including streams, lakes and other natural features, in its undeveloped condition for public benefit and scientific study.
- To protect habitat for, and populations of, fish and wildlife.
- To protect and interpret historic sites and events associated with the gold rush on the Yukon River and geological and paleontological history and cultural prehistory of the area.

Management regime

- closed to mining and mineral leasing; subject to prior existing rights.
- hunting permitted.

TABLE 3

SUMMARY OF SENSITIVE HABITATS FOR THE PORCUPINE CARIBOU HERD

LEVEL OF IMPORTANCE[1]	TIME PERIOD	REGION	MANAGEMENT REGIME
1	Calving - (cows)	Jago concentration Firth concentration	ANWR[2] Ivvavik National Park
	Postcalving and Movement (cows)	Alaskan coastal plain	ANWR[2]; Ivvavik
2	Early Summer	ANWR coastal zone	ANWR[2]; Ivvavik
	Mid Summer	N. Richardsons S. Brooks Range	IFA ANWR
3	Spring, Spring Migration and Pre-calving	Yukon Alaska	Land Use Regs.;Withdrawal; ANWR
	Calving to Movement (bulls)	Babbage/Firth watershed	Ivvavik; IFA
	Late Summer and Fall Migration	northern Yukon Alaska	Withdrawal; Land Use Regs.; ANWR
4	Early, Mid and Late Winter	Richardson Mts. Ogilvie/Hart; Alaska	Withdrawal; ANWR
	Rut and Late Fall	northern Yukon Alaska	Withdrawal; Land Use Regs.; ANWR

[1] level of importance (1 = highest importance).
[2] the majority of this distribution is within the 1002 lands of ANWR.