PARAMETERS OF CARIBOU POPULATION ECOLOGY IN ALASKA

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SYNOPSIS OF THE SYMPOSIUM

I. Introduction

1. History and Current Status of Alaska Caribou Herds

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From his exhaustive review of historical information, Skoog (1968) surmised that throughout the past 5,000 years caribou have had essentially the same habitat (i.e. range) available to them in Alaska and adjoining Yukon Territory. Furthermore, caribou have had ample opportunity to occupy all suitable habitat. Skoog also postulated that because intermingling (hence gene flow) has apparently occurred between all caribou herds in Alaska and adjoining Yukon Territory, there is only one caribou population in Alaska. Further, he stressed that this population consists of various subpopulations or herds which inhabit six main "caribou regions" (Figure 1).

Although historical records have provided a fairly good picture of caribou distribution in Alaska, the records do not present a clear picture of fluctuations in numbers that have occurred. However, the records do show that there were periods of abundance and of scarcity in various locations, and Skoog's (1968) "centers of habitation" were the approximate focal points of caribou distribution.

There is fairly good evidence of population highs in the 1860's and the 1920's and lows in the 1890's and 1940's (Skoog 1968). More recently we can add a presumed high (or at least a normal level) in the 1960's and a low in the 1970's. Although considerable fluctuation in total numbers within all subpopulations or herds has occurred, it is much more difficult to say how much the total Alaska population changed during historic "highs" and "lows." Most observations prior to 1935 suggest a much larger caribou population than has occurred since; however, accurate estimates are not available. Much of the available data pertain to the 1910's and 1920's when a large caribou population inhabited east central Alaska. Much of Alaska's human population also lived there, so records are more plentiful. No comparable volume of observations exists for earlier times; therefore, the size of the population prior to 1910 remains unknown.

O. J. Murie (1935) was the first field biologist who had any data from systematic surveys by which to estimate Alaska's caribou population. He estimated the total for Alaska and adjacent Yukon to be one to two million. Undoubtedly a major factor in the above estimate was Murie's estimate of the huge sub-population (i.e. the Steese-Fortymile herd) in Skoog's east central region at the time. Murie used a systematic procedure to estimate the herd's size and derived an estimate of 568,000 animals. Although he did use a systematic procedure, he actually counted only 13,200 animals and extrapolated from that. Nonetheless, Murie's estimate is supported by later observations of Alaska Game Commission personnel who estimated that 500,000 to 700,000 animals migrated near the Delta River (Skoog 1968). Unfortunately no basis for this estimate was given.

Skoog (1968) speculated about probable maximum historical numbers by calculating that 400,000 square miles represents a valid estimate of the potential habitat that has been available to caribou and that the total population never exceeded a density of five caribou per square mile. Therefore, total numbers have likely never exceeded two million. He elaborated that it is more likely that the population has remained far below this number, and that the total habitat never has been fully occupied.

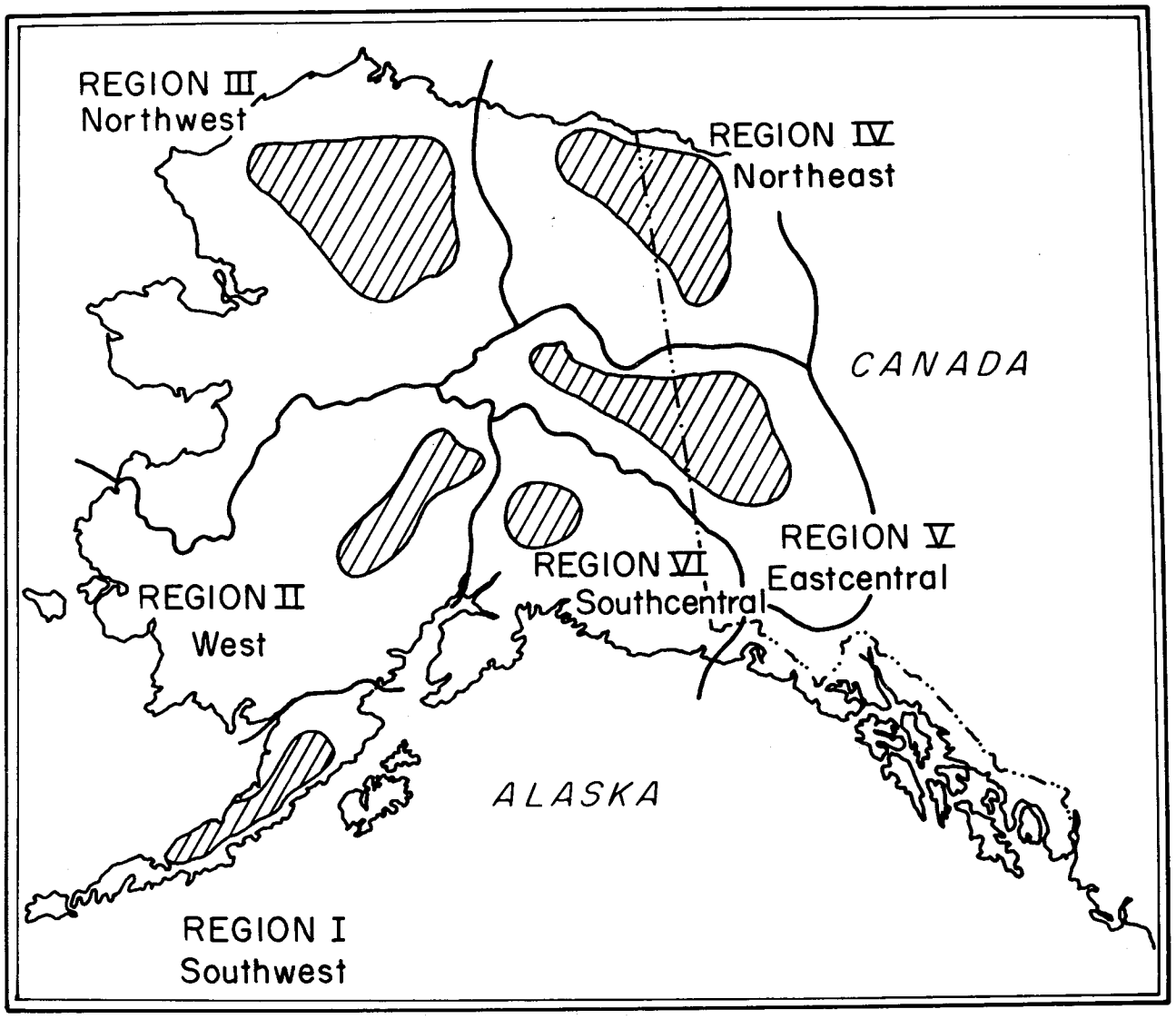

FIGURE 1. Skoog's six caribou regions of Alaska and adjacent Canada, and their "centers of habitation" shown as cross hatching (modified from Skoog 1968).

The first statewide population estimate based on extensive aerial reconnaissance was Scott's 1949 estimate of 160,450 (Scott et al. 1950). Skoog (1968) recognized the many biases and inaccuracies involved in Scott's method of estimation, and utilized subsequent knowledge (i.e. Watson and Scott 1956) to revise Scott's 1949 estimate to 325,000. Skoog's revision seems warranted.

In June 1964 Skoog estimated Alaska's total caribou population at 600,000 (excluding calves) based on a combination of some systematic censuses and some aerial reconnaissance. Skoog concluded that the 600,000 estimate (excluding calves) approximates a near "normal" population size -- both past and present. By considering 600,000 as a near "normal" level, Skoog implied that during the low in the 1890's there were substantially fewer animals as was the case during the low in the 1940's (see Skoog's and Scott's 1949 estimates above). Also, the highs in the 1860's and 1920's imply that during these periods numbers should have been considerably greater than Skoog's "normal," 600,000, level.

Hemming (1971) estimated that the total caribou population in 1970 exceeded 600,000. His individual herd estimates for 1970 are shown in Table 1. Because the total indicated is only 537,309, Hemming apparently surmised that many herds had grown since last censused. The 600,000 estimate may also have included additional animals not in the 13 identified herds or some adjustment (e.g. for calves); however, no discussion or elaboration was given.

Investigation of Alaska's caribou since 1972 has resulted in the identification of several new herds based upon Skoog's herd definition. Formal acknowledgment of these new herds is warranted to be consistent in herd definition and for practical management considerations. Recognized Alaska caribou herds in 1977 are delineated and listed in Figure 2.

Individual herd sizes in 1977 are listed in Table 1. From inspection of the table, estimates of present numbers compared to estimates for 1970 show a substantial decline in several herds as well as a substantial statewide population decline. A straight comparison between 1970 and 1977 numbers reveals an alarming statewide population decline of 55% from about 537,000 to about 240,000. However, as in Skoog's (1968) revision of Scott's 1949 estimate, it appears that, based upon acquisition of subsequent information, the 1970 statewide estimate should be revised to 415,000 (column 2, Table 1). Even considering this revision, there has been a statewide decline of 42% during the 1970's. There are some encouraging signs that the deline may have been halted in 1976 and some increase may be occurring.

Skoog (1968) and Hemming (1971) described the range and characteristics of the "original" 11 and 13 Alaskan herds, respectively. A brief narrative for each of the new herds follows. It should be noted that the recent increase in the number of herds extant is more likely the result of refined knowledge about seasonal distributions and delineation of calving areas rather than actual creation of new calving areas.

Andreafsky Herd. An obscure population of caribou/wild reindeer inhabits the area around Norton Sound. Estimates of numbers since 1970 have ranged from 1,500 to 5,000. The herd may have originated from a group of feral reindeer, but the Western Arctic Herd (WAH) intermittently ranges this far south and could have given rise to the herd, or contributed to its growth.

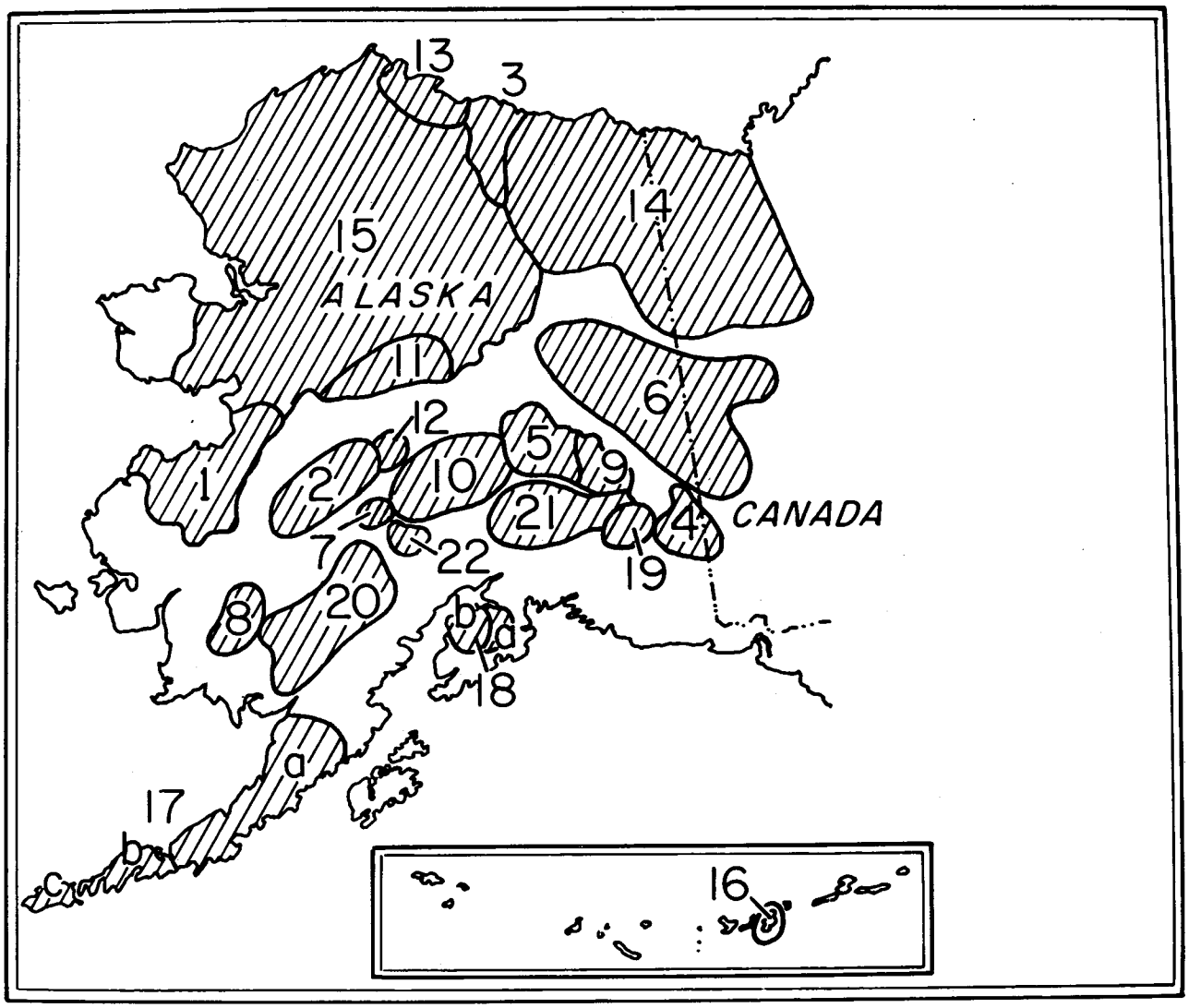

FIGURE 2. Approximate ranges of caribou herds in Alaska (1977).

Interior-Arctic Herds
1. Andreafsky
2. Beaver
3. Central Arctic
4. Chisana
5. Delta
6. Fortymile
7. Granite Mountains
8. Kilbuck Mountains
9. Macomb
10. McKinley
11. Ray Mountains
12. Sunshine-Cloudy Mountains
13. Teshekpuk Lake
14. Porcupine
15. Western Arctic

South Central Herds
16. Adak
17. Alaska Peninsula (a) (b) (c)
18. Kenai (a) (b)
19. Mentasta
20. Mulchatna
21. Nelchina
22. Rainy Pass/Farewell

TABLE 1. Size of Alaskan caribou herds in 1970 and 1977 with revised 1970 estimates and apparent population trends.

Herd	Estimated Herd Size[1] Hemming[2] 1970	Revised[3] 1970	1977	Population Trend Revised 1970 to 1977
Adak	189		250	Stable
Alaska Peninsula	14,000+		18,000[4]	Increased
(a) N of Port Moller			10,400	
(b) S of Port Moller			2,600	
(c) Unimak			5,000	
Andreafsky			1,500-5,000	---
Beaver[5]	3,000	2,000		Stable
Central Arctic			5,000	---
Chisana	3,000	1,500	1,000-1,500	Stable
Delta	5,000		2,500	Decreased
Fortymile	50,000	10,000	4,000	Decreased
Granite Mountains			100	---
Kenai	120		365	Increased
(a) Kenai Mountains		300		
(b) Kenai Lowlands			65-80	
Kilbuck Mountains			1,000	---
Macomb			800-1,000	---
McKinley	10,000	4,500	1,000	Decreased
Mentasta	5,000	2,500	2,500	Stable
Mulchatna	5,000	8,000	10,000	Increased
Nelchina	60,000	25,000	14,000	Decreased
Rainy Pass/Farewell			3,000	---
Ray Mountains			200	---
Sunshine-Cloudy Mountains			500-1,000	---
Teshekpuk			500	---
Porcupine	140,000	100,000	100,000	Stable
Western Arctic	242,000		75,000	Decreased
TOTAL	537,309 (540,000)	415,809 (415,000)	238,915-243,630 (240,000)	

[1]Herd size estimates are inconsistent as to time of year they represent. Some calves are included in all estimates. Most estimates are of July 1-15 or fall populations.

[2]These estimates are ones stated or implied in Hemming (1971) or if status unknown the last available estimate was used.

[3]These revisions are based on printed more current estimates than were available in 1970 or adjusted by author based on knowledge acquired since 1970.

[4]These are 1975 estimates from Irvine (1976) and a revised 1976 estimate for Unimak.

[5]The Beaver herd is considered stable because in 1977 the 500-1,000 animals in the Sunshine-Cloudy Mountains herd must be added to the Beaver herd to make 1970 and 1977 comparisons valid.

Central Arctic Herd. This is the largest new herd and is estimated to contain about 5,000 animals. Cameron and Whitten (1976) discussed the history, identity and status of this herd. For the most part these caribou are thought to be annual residents of the Arctic Slope (north of the Brooks Range) between the Canning River on the east and the Itkillik and Colville Rivers on the west.

Skoog (1968) presented evidence of two separate herds of caribou in the central and eastern Arctic during the 1920's and 1930's; one herd occupied areas now used by the Porcupine herd and the other occupied a portion of the present Central Arctic herd's range. Although this herd was generally believed to have disappeared during the 1950's, Cameron and Whitten (1976) state that Gavin (1971, 1972 and 1975) provided evidence for its continued existence as a separate subpopulation although he did not recognize it as such and identified these animals as "offshoots from both the Arctic and Porcupine herds."

Granite Mountain Herd. A minimum of 100 animals reside year-round in this small block of upland habitat southwest of McGrath (P. E. K. Shepherd pers. comm.).

Kilbuck Mountain Herd. There are probably over 1,000 caribou in several "groups" residing in the upland areas of the Kilbuck Mountains between the Beaver herd and the head of the Aniak River (Alaska Department of Fish and Game 1977).

Macomb Herd. This herd ranges the north slopes of the Alaska Mountain Range between the Richardson and Glenn Highways. Although Skoog (1968) included this herd in the range of the Delta herd and Hemming (1971) included it in the range of the Mentasta herd, it is probable that it existed as a separate herd during this period but surveys were not intensive enough at the time to allow its identification. Hemming stated that it was possible that several relict herds existed in the Mentasta-Wrangell Mountains area (i.e. the Mentasta herd range) and also reported that local bush pilots had observed some calving on the Macomb Plateau. Larry Jennings (pers. comm.) quoted Tanacross pilot Mr. Warbelow (now deceased) as seeing calving in the area annually throughout the 1960's. Approximately 800 to 1,000 caribou occupy this area with wintering concentrations exceeding 500, frequently seen on the Macomb Plateau.

Rainy Pass-Farewell Herd. This is a poorly understood "group" of caribou that consists of several small groups of animals which possibly were formerly part of the McKinley herd. These caribou can annually be found near Rainy Pass, along Post River, and in scattered groups along the northwest side of the Alaska Range from McKinley Park to Telequana Lake where they contact the Mulchatna herd. The subpopulation numbers about 3,000 (ADF&G 1977).

Ray Mountains. Little is known of these caribou. Wintering animals from the Western Arctic herd have intermittently used this area, which has confounded interpreting incidental observations of caribou in the area. No reliable estimate of herd size is available, but there are likely only a few hundred. A partial survey in 1977 located fewer than 200.

Sunshine-Cloudy Mountains Herd. For many years the caribou in this area were considered part of the Beaver herd. Although frequent interchange with the Beaver herd is likely, the herd can appropriately be considered discrete because distinct calving and wintering areas exist, and from a management standpoint they differ in vulnerability to hunting.

Teshekpuk Herd. This apparently discrete subpopulation resides in the northern part of the Western Arctic herd's range. Caribou can be found year-round from east of Barrow to the Colville River Delta. Calving has been noted in this area for many years (H. Helmericks pers. comm.). Cursory surveys by ADF&G in 1976 and 1977 documented calving in the area and suggested herd estimates of 500-4,000. Because caribou from the Western Arctic herd and perhaps the Central Arctic herd are seasonally present in this herd's range, estimating herd numbers is significantly confounded.

Alaska Peninsula Herd. Although Skoog and/or Hemming discussed the subpopulations on the Alaska and Kenai Peninsulas, acquisition of recent data warrant elaboration on each.

Skoog (1968) discussed the Alaska Peninsula herd in three parts: a "main caribou population north of Port Moller that calved primarily between the Bear and Meshik Rivers, animals southwest of Port Moller on the mainland that probably calve in the Black Hills near Cape Leontovitch, and animals on Unimak Island that probably calve around Urilia Bay." Skoog considered the Unimak groups and the adjacent mainland group as temporary offshoots of the main herd.

Hemming (1971) discussed the herd as consisting of three segments: one north of Port Moller; one south of Port Moller; and one ephemeral population on Unimak Island. Hemming found the segment north of Port Moller to calve on the coastal plains between Bear River and Port Heiden Bay and occasionally between Port Heiden and Cinder River. South of Port Moller, the calving area is located on the slopes of Trader Mountain at the head of Caribou River. No regular calving area was identified on Unimak Island.

Irvine (1976) recently censused the Alaska Peninsula herd and again identified the herd as actually consisting of three herds with separate calving areas. The herd north of Port Moller was estimated to number 10,342 in November 1975; the mainland herd south of Port Moller numbered 2,627 in July 1975; and the Unimak Island herd was estimated to contain at least 3,334 (revised in 1976 to 5,000).

Based on the above and the fact that the three "segments" of the herd will be managed as separate entities in the future (Jim Faro, ADF&G Area Biologist, pers. comm.), it seems warranted to recognize the three "segments" as discrete herds.

Kenai Herd. Caribou occurred on the Kenai Peninsula until the early 1900's and became extinct about 1913 (Spencer and Hakala 1964). In May 1965, 15 caribou were released near the Chickaloon River and in April 1966, 29 more were released at Watson Lake (Glenn 1967, cited in Hemming 1971). Since then two discrete herds have formed: a Kenai Mountains herd and a Kenai Lowlands herd. The Kenai Mountains herd grew rapidly after the introductions and numbered 336 in fall of 1974. Regulated harvesting has maintained the post-hunting population at about 300 animals. The year-round range is the mountainous area of the northeastern Kenai Peninsula. The Lowland herd presently numbers 65-80 (ADF&G 1977). The muskeg areas in the vicinity of the Kenai municipal airport are used for calving and summer range and the Moose River Flats as winter range.

Insular Feral Reindeer Herd. Feral reindeer inhabiting islands where there is no private ownership of animals are subject to regulation by the Alaska Department of Fish and Game. Such feral populations exist on Atka and Umnak Islands in the Aleutian Chain but no current population data are available (ADF&G 1977). Kodiak Island also has about 300 feral reindeer at present. They have declined

from about 600-700 in the early 1960's (Roger Smith pers. comm.).

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