

Aerial Survey Descriptions

Survey 1, 16 June 2000.—Survey weather conditions were good, with clear skies, winds at 3.1 to 4.6 meters per second (mps) from the northeast (70° to 100°), and temperature 13 to 15°C between 1030 and 1400 Alaska Daylight Savings Time (ADST; ASCC 2001). Areas of patchy snow cover (30% to 40%) and flooded tundra were noted in the study area. Indices of parasitic insect activity indicated conditions were not suitable for mosquito or oestrid activity on 16 June (Fig. 3, Table B-1). Small groups (mean = 5.5 ± 2.04 caribou) of cows and calves were in the study area, with a total density of 0.40 caribou/km² (0.12 calves/km², Figures 2 and A-1, Tables 1 and A-1). Calf production appeared low (44 calves:100 cows). Eighty-eight percent of caribou (including 90% of cow-calf pairs) were west of the Point Hopson transect (transect 59) and more than 12 km south of the coastline (Fig. A-1, Table 2). For caribou sightings with behavior and habitat noted, most caribou were feeding or resting on moist or dry tundra (Table 3). Other mammals recorded during the survey included muskoxen, grizzly bear, and arctic fox (Fig. A-1; Tables 1 and A-2).

Survey 2, 28 June 2000.—Survey weather conditions were good, with skies overcast at 2,000 ft, winds at 4.6 to 7.2 mps primarily from the northwest (290° to 300°), and temperature 6 to 7°C between 1230 and 1630 ADST (ASCC 2001). No snow cover remained. Indices of parasitic insect activity indicated conditions were not favorable for mosquito or oestrid activity on 28 June (Fig. 3, Table B-1). The largest number of caribou during 2000 surveys were recorded on this date, with 2.87 caribou/km² (0.77 calves/km²; Fig. A-2, Tables 1 and A-1). Mean group size increased from 5.5 ± 2.04 caribou/group on 16 June to 13.8 ± 2.64 caribou/group on 28 June. The composition of classified caribou was 4% bulls, 60% cows, and 36% calves. Most caribou (95%) were between 9 and 20 km inland from the coast (Fig. A-2, Table 2). Most caribou groups were resting or feeding on wet and moist tundra habitats (Table 3). Other mammals recorded during the survey included 3 groups of muskoxen near the Staines/Canning rivers, and an arctic fox 8.5 km south of Point Hopson (Fig. A-2, Tables 1 and A-2).

Survey 3, 6 July 2000.—Survey weather conditions were good with 20,000 ft broken ceiling, winds at 4.6 to 7.7 mps from the east (80° to 90°), and temperature 10 to 12°C between 1100 and 1430 ADST (ASCC 2001). Indices of parasitic insect activity indicated conditions were not favorable for mosquito or oestrid activity on 6 July (Fig. 3, Table B-1). Caribou density within the study area decreased from 2.87 caribou/km² on 28 June to 0.83 caribou/km² (0.13 calves/km²) on 6 July, while mean group size continued to increase from 13.8 ± 2.64 caribou/group on 28 June to 34.0 ± 28.90 caribou/group on 6 July (Fig. A-3, Tables 1 and A-1). Fewer than half of the caribou seen during this survey were classified according to sex/age class. Forty-two percent of caribou were within approximately 3.5 km of Bullen Point and 56% were along the

Staines/Canning rivers (Fig. A-3). Most caribou were feeding on wet or moist tundra or traveling (primarily eastward; Table 2). Two arctic foxes were seen: 1 near the Staines River, and 1 at a den in the southwest corner of the study area (Fig. A-3, Table A-2).

Survey 4, 20 July 2000.—Survey weather conditions were good, with 21,000 ft overcast and 2,100 broken to scattered ceiling, winds at 4.6 to 6.1 mps from the east-northeast (60° to 80°), and temperature 6 to 8°C between 1630 and 2030 ADST (ASCC 2001). Indices of parasitic insect activity indicated conditions were not favorable for mosquito or oestrid activity on 20 July (Fig. 3, Table B-1). Few caribou were within the study area (0.02 caribou/km²; Fig. A-4, Tables 1 and A-1). Caribou groups were clustered in small groups (2.6 ± 1.84 caribou/group) from 1 to 5 km and 12 to 16 km from the coast (Table 2). Most groups were feeding on wet or moist tundra (Table 3). Other mammals recorded included a grizzly bear sow with 3 cubs, an arctic fox with 4 kits at a den, and muskoxen (Fig. A-4, Tables 1 and A-2).

Survey 5, 24 July 2000.—Survey weather conditions were fair, with overcast skies, some light rain and haze, winds at 4.1 to 5.1 mps from the east (70° to 100°), and temperature 6 to 7°C between 1020 and 1400 ADST (ASCC 2001). Indices of parasitic insect activity indicated conditions were not favorable for mosquito or oestrid activity on 24 July (Fig. 3, Table B-1). Few caribou (0.04 caribou/km²) remained in the study area, and mean group size remained small with 2.8 ± 2.57 caribou/group (Fig. A-5, Tables 1 and A-1). Most caribou were near the Staines/Canning rivers (Fig. A-5), where they fed or stood on tundra that ranged from wet to dry (Table 3). Other mammals seen were grizzly bear and muskoxen (Fig. A-5, Tables 1 and A-2).

GENERAL CARIBOU DISTRIBUTIONS AND ABUNDANCE: MULTI-YEAR COMPARISONS

Calving Period

The total number of caribou seen during the 6 calving period surveys over the multi-year Bullen Point to Staines River study area between 1993 and 2000 ranged from 355 (0.41 caribou/km²) in 2000 to 2,496 (2.89 caribou/km²) in 1998. Calf production by survey ranged from 44 calves:100 cows in 2000 to 70 calves:100 cows in 1997. Across study years, mean cow density was 1.16 ± 0.72 cows/km², mean calf density was 0.67 ± 0.42 calves/km², and mean total caribou density was 1.89 ± 1.15 caribou/km².

The distribution of calves within the multi-year study area varied somewhat within and among survey years. However, 2 trends were consistent: (1) very few cow/calf pairs used the northeast corner of the study area, and (2) during 5 of 6 years, most cow/calf pairs used the 4 townships in the southwest corner of the study area (1993 = 84%, 1997 = 86%, 12 June 1998 = 88%, 19 June 1998 = 2%, 1999 = 85%, and 2000 = 96%; Fig. 4). These patterns are illustrated by the contours generated from an inverse distance weighting interpolation of the multi-year

data. Nearly 70% of the contour area with >5 calves/km² was located in the 4 southwest corner townships, which represent 39% of the study area (Fig. 5).

Post-calving Period

The total number of caribou seen during the 21 post-calving period surveys (excluding 1995 surveys) of the multi-year Bullen Point to Staines River study area conducted between 1993 and 2000 ranged from 3 (<0.01 caribou/km²) to 5,730 (6.65 caribou/km²; each in 1993). By year, mean post-calving caribou densities ranged from 0.87 ± 2.12 caribou/km² in 2000 ($n = 4$ surveys) to 1.89 ± 5.07 caribou/km² in 1993 ($n = 4$ surveys). Across study years, the mean density of caribou was 1.37 ± 0.72 caribou/km².

To identify areas along the coast where caribou concentrated during the post-calving period, we plotted the locations of all caribou groups observed within 2 km of the coast across study years (Fig. 6). Caribou were recorded within that 2-km buffer during 17 of 23 surveys (including 1995 surveys). More than half of the 5038 total caribou recorded within 2 km of the coast were within 4 km of Bullen Point (32%) or 4 km of Point Thomson (24%; Fig. 6). These concentrations were reflected in the contouring generated from inverse distance weighting interpolation of the data (Fig. 6).

CARIBOU IN THE BULLEN POINT TO STAINES RIVER AND BADAMI STUDY AREAS

Fewer caribou were present within the Bullen Point to Staines River study area (0.40 caribou/km²) than the Badami study area (0.68 caribou/km²) during the calving period in 2000 (Fig. 7, Noel and Olson 2001). This may be due in part to the 30% to 40% snow cover that remained in the Bullen Point to Staines River study area, while the Badami study area was primarily snow free. The Badami calf:cow ratio was slightly higher (47 calves:100 cows) than the Bullen Point to Staines River ratio (44 calves:100 cows). Calving caribou abundance was similar between 1999 (915 caribou) and 2000 (1,149 caribou) in the Badami study area (Noel and King 2000a, Noel and Olson 2001). Calving caribou abundance was lower in 1999 (Table 1) than in 2000 (2,252 caribou) in the Bullen Point to Staines River study area (Noel and King 2000b). Both study areas were snow free during calving-period surveys in 1999.

Except on 28 June 2000, far fewer caribou occurred in the Bullen Point to Staines River study area than in the Badami study area (Fig. 7, Noel and Olson 2001). The number of caribou within combined study areas for paired post-calving period surveys ranged from 2,675 on 24-25 July to 6,915 on 6-7 July 2000. Mean post-calving caribou density during 4 paired surveys in 2000 was 0.94 ± 2.133 caribou/km² in the Bullen Point to Staines River study area, and 4.44 ± 4.206 caribou/km² in the Badami study area (Noel and Olson 2001). Mean difference in caribou

density between the 2 study areas was -3.51 ± 5.760 caribou/km². Except for 28-29 June surveys, caribou density was consistently higher in the Badami study area (Fig. 7).

Few bulls were observed within the Bullen Point to Staines River study area. Post-calving composition for classified caribou was 7% bulls, compared to 36% bulls within the Badami study area (Fig. 7, Noel and Olson 2001). There were large numbers of unclassified caribou recorded for both study areas, however.

DISCUSSION

The area between Bullen Point and the Canning River has been used consistently by calving caribou in most years since 1969 (Pollard et al. 1992). The distribution of animals observed during calving surveys may reflect survey timing within the calving period (early or late June) and/or spring snow and flood patterns (Gavin 1983, Whitten and Cameron 1985). Calving period distributions in the Bullen Point to Staines River study area across the study years of 1993, 1997, and 1998-2000 have consistently shown: (1) few cow-calf pairs used the northeast portion of the study area, and (2) concentration within the southwest 4 townships in the study area, with the exception of 1 late calving period survey conducted on 19 June 1998 (Figures 4 and 5).

The most recent population size count for the CAH in 2000 is 27,128 animals, with 12,833 animals east of the west bank of the Sagavanirktok River (E. Lenart, ADFG, pers. comm.). Caribou calving between Bullen Point and the Canning River were considered the eastern segment of the CAH (Cameron and Whitten 1978, Lawhead and Curatolo 1984, Whitten and Cameron 1985, Cameron et al. 1989). But there are probably movements between these eastern and western segments of the CAH (Cronin et al 1998, 2000). Based on the 2000 herd size, about 3% of CAH east of the Sagavanirktok River (1% of the CAH) used the Bullen Point to Staines River study area during calving. The calf:cow ratio recorded for our 2000 calving period survey (44:100 on 16 June) was significantly lower than the 70:100 reported for CAH calving transects flown by ADFG on 15, 16, and 17 June 2000 (E. Lenart ADFG, pers. comm.). ADFG's calving period transects extend further into the foothills to lat 69°45'N and group composition is more comprehensive than our surveys; however, in previous years our reported calf:cow ratios have been comparable. It is possible that cows with calves remained further inland than our survey area due to the late snow cover; while cows that either did not calve or lost calves early continued to the coastal plain. Our calf:cow ratio on 28 June was 61:100, and was intermediate between ADFG's late June (70:100) and fall (56.5:100) ratios (E. Lenart ADFG, pers. comm.).

During the post-calving period, weather-moderated insect activity probably influences caribou distribution, movements, and behavior more than any other environmental factor (White et al. 1975, Roby 1978, Dau 1986, Johnson and Lawhead 1989). In the Prudhoe Bay and Kuparuk oilfields, caribou were reported to move to coastal areas to ameliorate insect harassment

(Roby 1978, Dau 1986, Johnson and Lawhead 1989, Pollard et al. 1996a,b). Caribou were observed to drift inland and feed during periods of low temperatures and/or high wind velocities, which suppress mosquito activity (White et al. 1975, Curatolo et al. 1982, Dau 1986, Pollard et al. 1996b). During the post-calving period in 2000, the percentage of the CAH east of the west channel of the Sagavanirktok River, which used the Bullen Point to Staines River study area, ranged from less than 1% to 20% (<1% to 10% of the CAH). An interpolation of coastal post-calving caribou distributions across study years shows that caribou concentrated primarily along coastlines and spits near Bullen Point, Point Gordon, Point Sweeney, east of Point Thomson, and near North Staines River #1 (Fig. 6).

The composition of the CAH in November 2000 was 56.5 calves:100 cows and 83.8 bulls:100 cows (E. Lenart, ADFG, pers. comm.). The pooled calf:cow and bull:cow ratios for our 4 post-calving surveys in 2000 (61 calves:100 cows, 13 bulls:100 cows) indicate that the proportion of calves in the study area was representative of the herd, but that the proportion of bulls was substantially lower within the Bullen Point to Staines River study area. The 86 bull:100 cow ratio for post-calving surveys in the Badami study area, however, was more similar to the fall CAH composition (Noel and Olson 2001).

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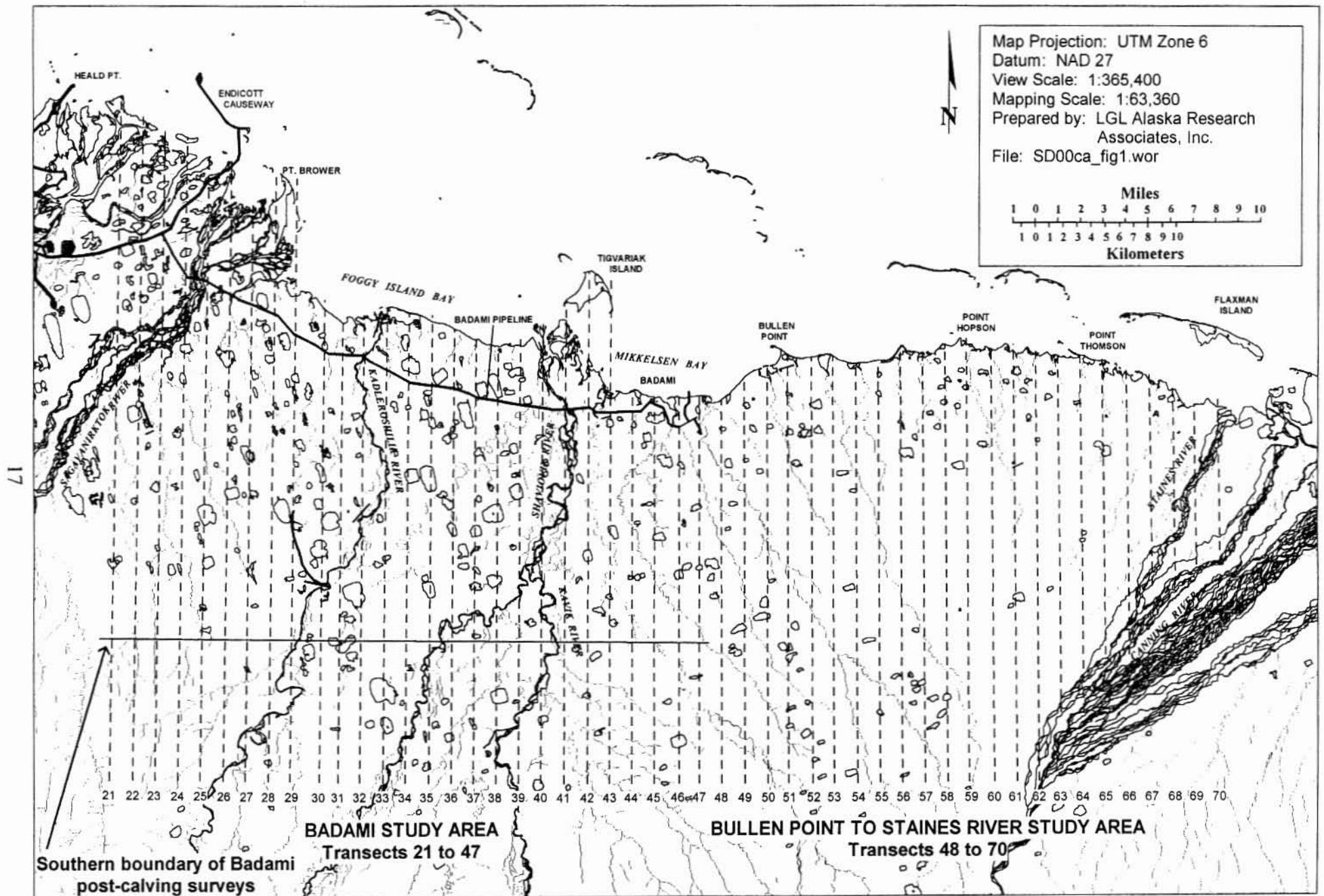
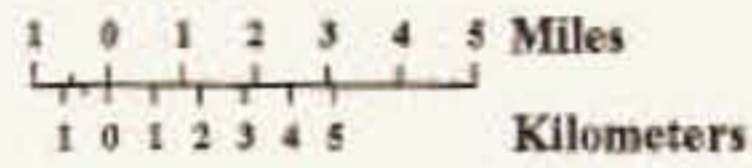


Figure 1. Survey transects in the Bullen Point to Staines River and Badami study areas, Alaska, summer 2000. This report presents data for transects 48-70 in the Bullen Point to Staines River study area, summer 2000.

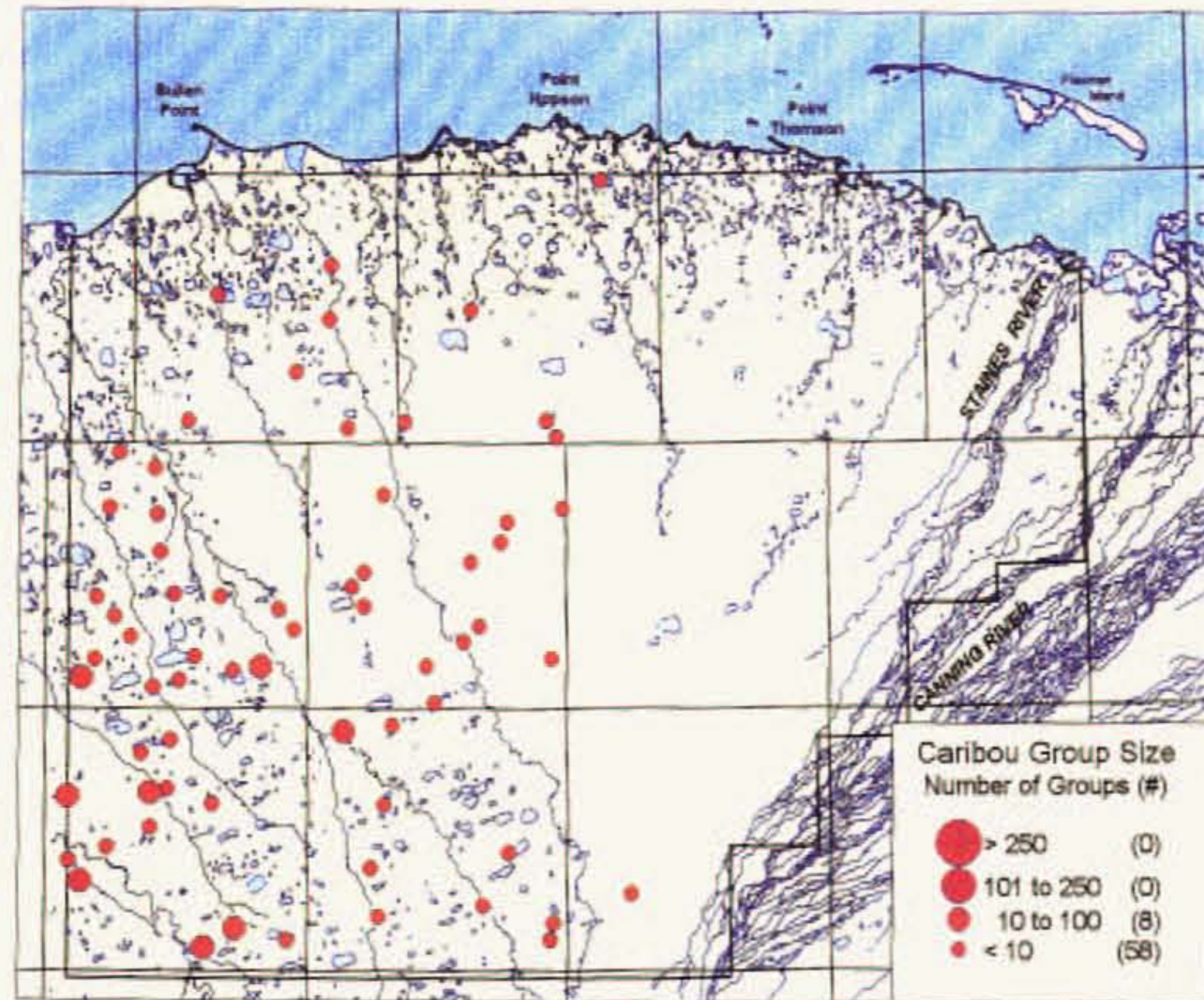
Figure 2

Distribution of caribou in the Bullen Point to Staines River study area, Alaska, during aerial surveys conducted summer 2000.

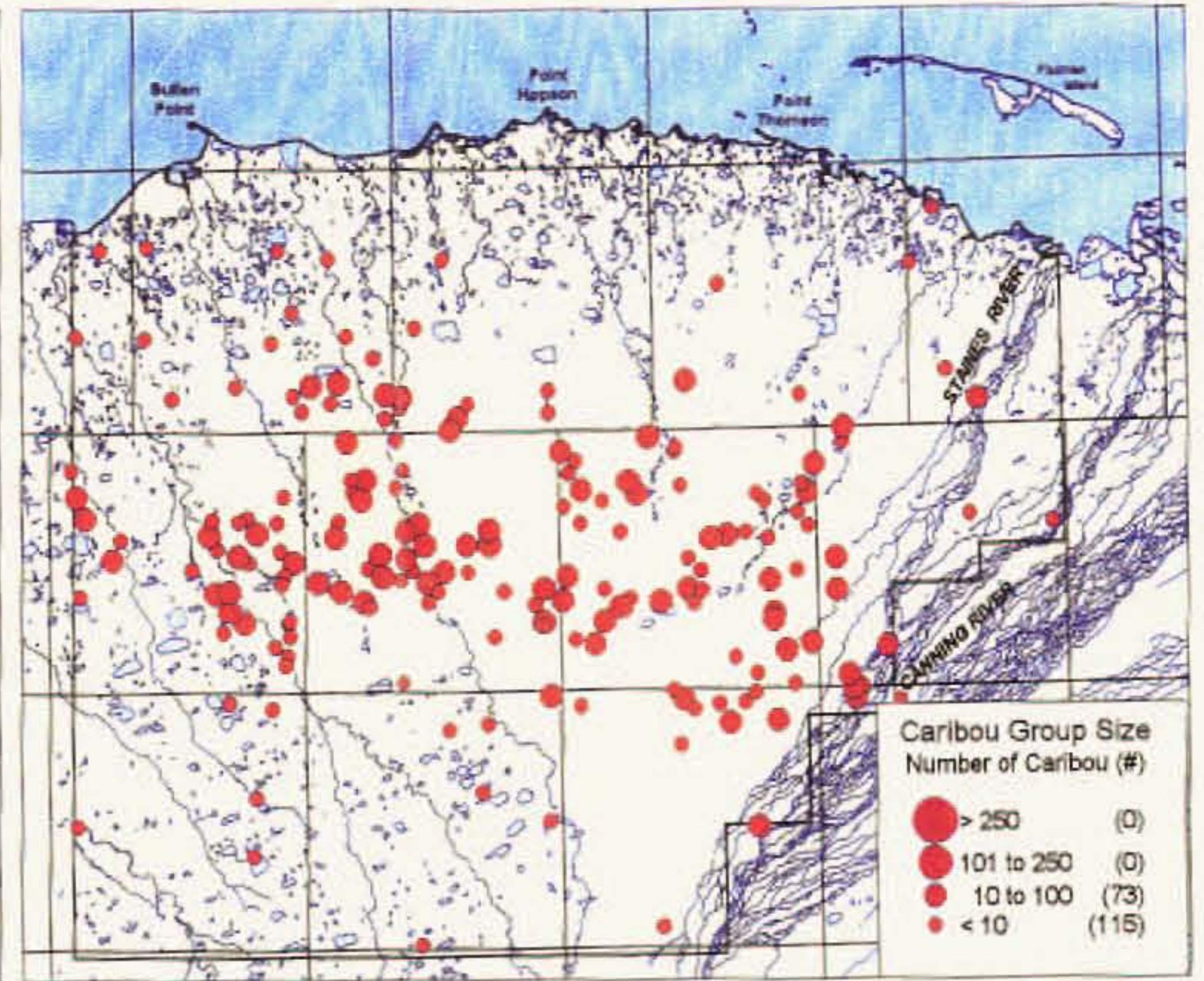
— Study Area Boundary



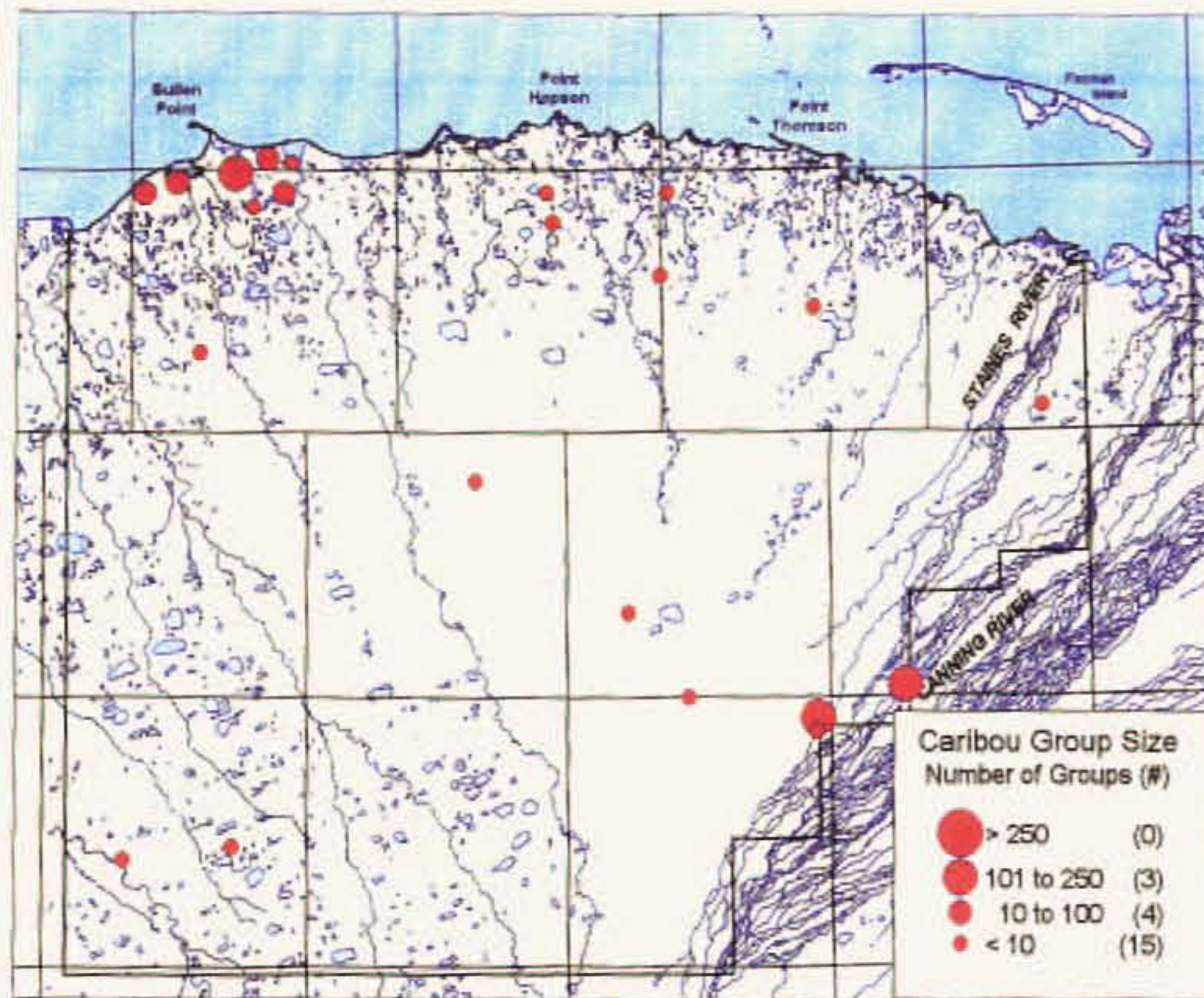
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Datum: NAD 27
View Scale 1:335,000
Mapping Scale: 1:63,360
File: SD00ca_fig2.wor



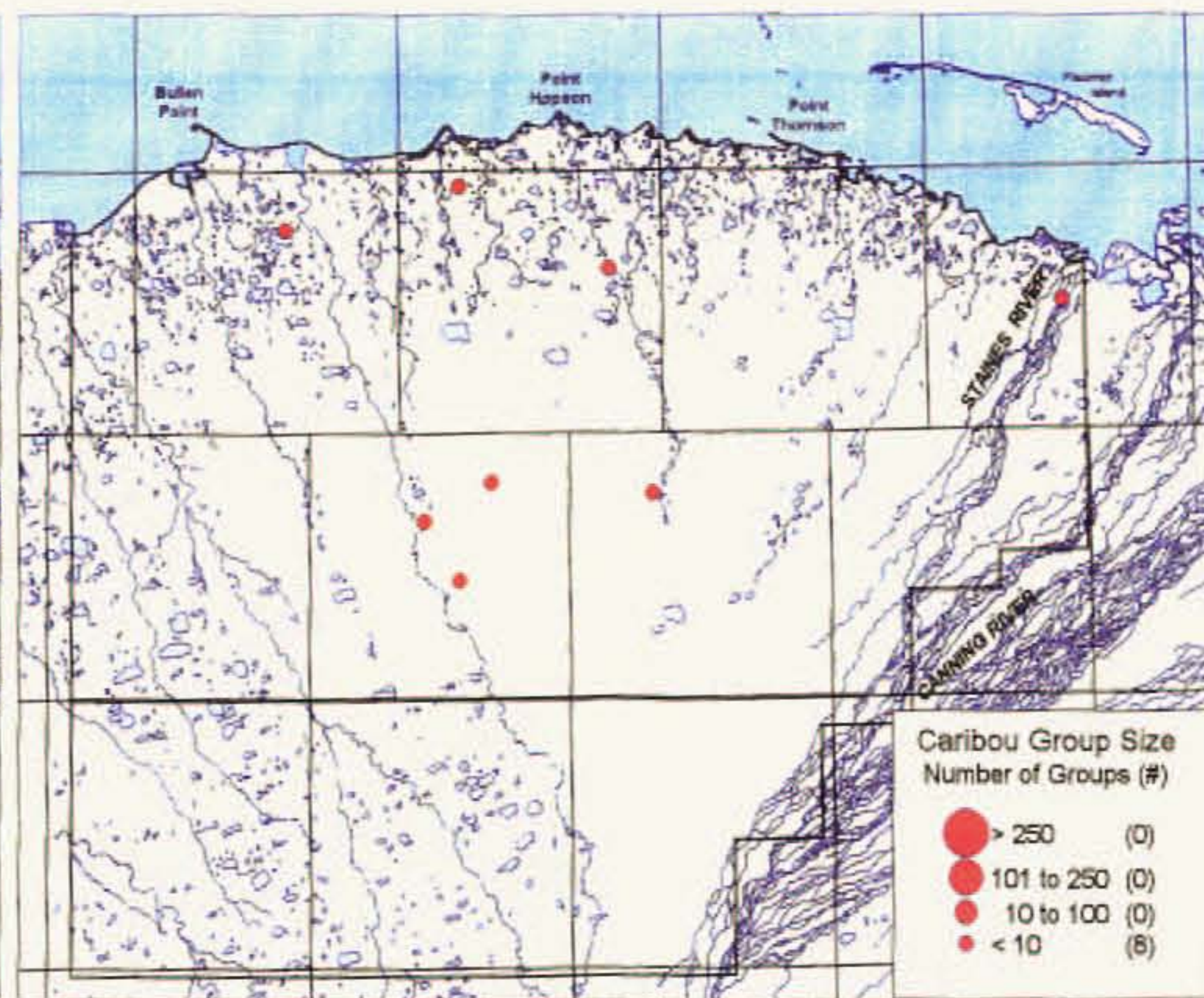
Survey 1: 16 June 2000



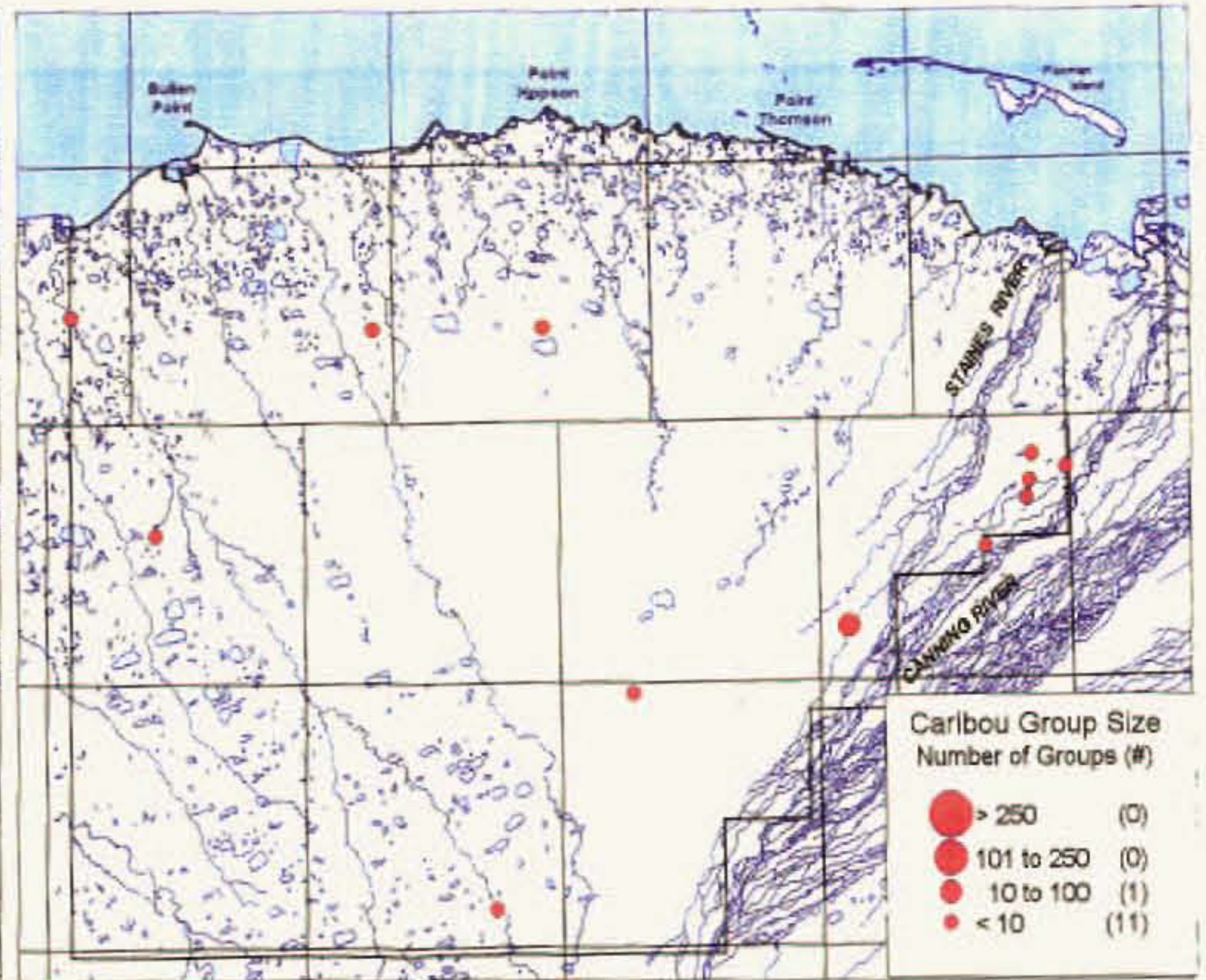
Survey 2: 28 June 2000



Survey 3: 6 July 2000



Survey 4: 20 July 2000



Survey 5: 24 July 2000

Indices of Parasitic Insect Activity

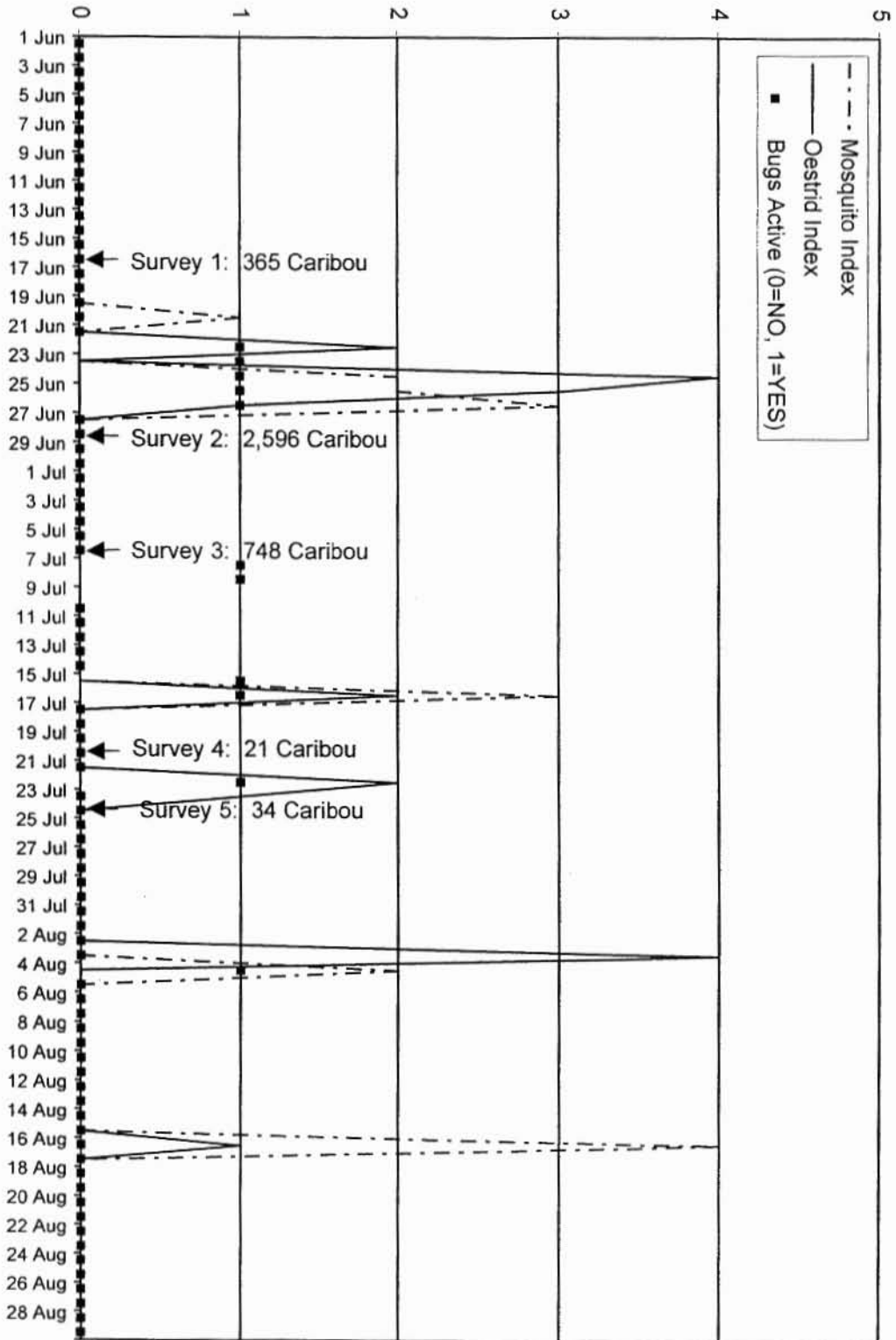


Figure 3. Daily mosquito and oestrid activity indices based on hourly weather data collected at the Deadhorse Weather Station (ASCC 2001), and aerial survey caribou counts, Bullen Point to Staines River study area, Alaska, summer 2000. Bugs active based on mean daily temperature $\geq 13^{\circ}\text{C}$ and mean daily wind speed < 6 mps (Walsh et al. 1992).