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ARCTIC NECKBANDING
AND CONTINENTAL MONITORING OF GEESE
PROGRESS REPORT, 1992-93

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INTRODUCTION

The 1992-93 season is the third year of focus on neckbanding and monitoring of Midcontinent White-fronted Geese and Short Grass Prairie (SGP) and Tall Grass Prairie (TGP) Small Canada Geese under the Arctic Goose Joint Venture. It also marks the sixth year since this international cooperative program on arctic-nesting geese began with Snow Geese of the Western Canadian Arctic in 1987. A completion report on results from Snow and Ross' Geese will be distributed separately this spring. Here we present a summary of results, with special emphasis on observations of marked Whitefronts and Small Canadas from all areas for fall 1991 to spring 1992, and from Prairie Canada for fall 1992.

ARCTIC NECKBANDING

A late spring with delayed snow melt in 1992 led to a near failure of goose production in the Eastern Arctic and to reduced production in the Central Arctic. Due to an especially poor outlook for Inglis River and Southampton Island, neckbanding on those areas was cancelled. Marking proceeded on Baffin Island, the Central and Western Arctic, and Alaska - at the Selawik, Koyukuk, Kanuti and Innoko National Wildlife Refuges, and the Colville River Delta (Fig. 1). In 1992, 3,651 Whitefronts and 4,726 Small Canadas were neckbanded, bringing the totals marked since 1990 to over 10,000 for each species (Table 1, Fig. 2).

Marking of Snow and Ross' Geese in 1992 was limited to 360 Ross' Geese neckbanded in the Central Arctic and 96 Snow Geese marked with radio transmitters on Wrangel Island.

MONITORING RESULTS

The direct observation rates (Table 1, Fig. 2) for 1991-92 were similar to those of 1990-91 for both Whitefronts (35% and 36%, respectively) and Canadas (34% and 33%, respectively). Increasing the annual rates to over 50% is highly desirable for analyses of survival and other population parameters. This year we expect that, due to increased observation efforts and inflow of data from all areas, direct rates of over 50% will be achieved for most subpopulations. From Prairie Canada in fall 1992 the direct resighting rates for Central Arctic, Western Arctic and Alaska subpopulations have already matched or exceeded the previous annual continental rates (Table 1, Fig. 2). The volume of field observations on Whitefronts and Canadas received so far this winter from the Central and Mississippi Flyways also has increased greatly over the previous two years.

The numbers and distribution of marked Whitefronts and Small Canadas recorded in 1991-92 are summarized in Tables 2 to 4 and Figures 3 to 6. Table 4 gives a seasonal summary by state/province.

Over the next few months we will be working with Jim Hines and others to calculate survival rates of Midcontinent Whitefronts and SGP and TGP Small Canada Geese from the 1990-1993 observation data. Also, we will be analyzing the field data on marked to unmarked ratios (Table 5) to extrapolate total continental populations.

WHITE-FRONTED GEESE

The continental distribution pattern of marked Whitefronts in 1991-92 was similar to that of 1990-91. Distinct differences between Western and Eastern components of Midcontinent Whitefronts are not evident. The "Western" birds with red collars, from Alaska (Fig. 3a) and the Western Arctic (Fig. 3b) overlapped with each other and with the "Eastern" birds with blue collars, from the Central Arctic West (Fig. 3c), Central Arctic East (Fig. 3d) and Inglis River (Fig. 4).

The increased observation rate noted above for fall 1992 was also reflected by increased total unique codes read. The fall 1992 total was higher than that of fall 1991 by 69% in Alberta and by 147% in Saskatchewan (Table 4).

Most marked birds recorded in the agricultural area of northwest Alberta in autumn in both 1991 and 1992 were from Alaska, with some from the Western Arctic.

The Inglis River birds neckbanded in 1991 showed a more eastern continental distribution (Fig. 4) than other Whitefront subpopulations. Of 47 Inglis River birds seen in Canada in fall 1991 35 were in eastern Saskatchewan and 12 in western Saskatchewan. However, in fall 1992, of 60 Inglis River birds seen, only 2 were in eastern Saskatchewan, with 58 in western Saskatchewan. That may have been due to the late spring and delayed snow melt in the Inglis River area, which induced the geese from there to moult in the Central Arctic (E). Then they would have migrated with the Central Arctic (E) geese.

As in 1990-91, the only Midcontinent birds recorded in the Pacific Flyway were 3 from Innoko NWR in Alaska.

In north central Mexico, Alaska birds were recorded in Chihuahua (1) and Durango (6). All were from Innoko NWR except one from Kanuti NWR. In January 1993 D.J. Nieman made the first observations of neckbanded birds to be received from the Gulf Coast of eastern Mexico. In the area north of Tampico to approximately 100 km (60 mi) south of the US border he recorded 48 marked Whitefronts. They represented all breeding regions, with 17 from the Central Arctic(W), 13 from the Central Arctic (E) and Inglis River, 12 from Alaska and 6 from the Western Arctic. Nieman (pers. comm.) found substantial numbers of geese in that area with excellent viewing opportunities in certain places, and he plans to work with cooperators there again next winter.

On the Gulf Coast wintering grounds the majority of Whitefronts from Alaska were in Texas, while the majority from the Central Arctic and Inglis River were in Louisiana. The Western Arctic birds were evenly divided between the two states (Figs. 3 and 4, Table 2). During the two winters 1990-91 and 1991-92 we have records of eight individuals which moved from Texas to Louisiana and one which moved from Louisiana to Texas.

SMALL CANADA GEESE

In 1991 three new neckbanding areas (Western Arctic, Inglis River, and Southampton Island) were added to those of 1990. The observation effort, particularly in the USA, also increased in 1991-92 over 1990-91. The observations from 1991-92 (Fig. 5 and 6, Table 3) have thereby given a more complete view of continental distribution than that of 1990-91.

The component groups of the SGP and TGP populations tend to show a regional trend in distribution patterns, from the most western nesting region (Western Arctic) having the most western distribution (Fig. 5a) to the most eastern nesting region (Baffin Island) having the most eastern distribution Fig. 6b).

The Western Arctic Canadas appear to have the most distinct pattern, with least overlap with other SGP/TGP subgroups. In autumn 1991 all of the Western Arctic marked birds (68) seen in Canada were recorded in northwest Alberta. In autumn 1992 Western Arctic birds again were recorded almost entirely in northwest Alberta (345 birds) with only 4 in eastern Alberta and western Saskatchewan.

Total unique marked birds recorded in autumn 1992 increased by 200% in Alberta and by 118% in Saskatchewan, over the totals of autumn 1991 (Table 4).

This winter (1992-93) we have received reports of increased numbers of Western Arctic Canada Geese in northwest Texas and from Maxwell NWR in northern New Mexico. These records add significant information, previously lacking, on the wintering range of this subpopulation.

Small Canadas wintering on the Gulf Coast of Louisiana and Texas are almost entirely from the TGP group, especially Baffin Island (Figs. 5 and 6, Table 3).

SNOW AND ROSS' GEESE

We are working with Jim Hines, Bruce Turner and Sam Barry to produce a completion report on 1987-92 continental results from the international marking and monitoring of Snow and Ross' Geese. That report will be distributed to cooperators this spring. We hope that it will lead to additional detailed regional reports and publications which will make further use of the data bank here.

Meanwhile, we continue to receive and file field observations on Snow and Ross' Geese. Since autumn 1991 the field monitoring effort has concentrated on White-fronted and Small Canada geese in Canada and the Central and Mississippi Flyways. Also, the number of marked white geese has declined, as few have been neckbanded since 1990. Nevertheless, substantial numbers of observations were received for 1991-92 (Table 6). Those data will be particularly useful for keeping track of some birds whose histories now go back for several years.

CONCLUDING REMARKS

Arctic neckbanding of Midcontinent Whitefronts and TGP/SGP Canadas is to continue for two more years under the Arctic Goose Joint Venture. The monitoring effort on those birds in Canada and the Central and Mississippi Flyways has improved significantly this year. Commitments should be made to maintain or increase that level of effort for the next three to four years.

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Table 1. Number of Midcontinent White-fronted Geese and SGP/TGP Small Canada Geese neckbanded in 1990, 1991, and 1992, by nesting region, with subsequent direct observations (number of unique codes per region).

| Species | Region | 1990 | —1990-1991— | | 1991 | —1991-1992— | | 1992 | Fall 1992 (Canada) | |
|------------------------|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------|-------------|
| | | Neckbanded | Uniques | %obs'd | Neckbanded | Uniques | %obs'd | Neckbanded | Uniques | %obs'd |
| White-fronted Geese | Alaska | 1362 | 476 | 35% | 599 | 204 | 34% | 809 | 294 | 36% |
| | Western Arctic | 688 | 263 | 38% | 1264 | 447 | 35% | 1130 | 389 | 34% |
| | Central Arctic(W) | 664 | 222 | 33% | 662 | 244 | 37% | 702 | 273 | 39% |
| | Central Arctic(E) | 698 | 260 | 37% | 407 | 125 | 31% | 1010 | 455 | 45% |
| | Inglis River | - | - | - | 321 | 129 | 40% | - | - | - |
| | West Hudson Bay | 5 | 2 | 40% | - | - | - | - | - | - |
| | Subtotal | | 3417 | 1223 | 36% | 3253 | 1149 | 35% | 3651 | 1411 |
| Small Canada Geese | Western Arctic | - | - | - | 367 | 110 | 30% | 1086 | 296 | 27% |
| | Central Arctic(W) | 296 | 92 | 31% | 675 | 317 | 47% | 695 | 329 | 47% |
| | Central Arctic(E) | 838 | 301 | 36% | 335 | 141 | 42% | 800 | 361 | 45% |
| | Inglis River | - | - | - | 168 | 55 | 33% | - | - | - |
| | West Hudson Bay | 260 | 39 | 15% | 875 | 212 | 24% | 849 | 15 | 2% |
| | Southampton Island | - | - | - | 163 | 29 | 18% | - | - | - |
| | Baffin Island | 885 | 328 | 37% | 571 | 205 | 36% | 1296 | 11 | 1% |
| Subtotal | | 2279 | 760 | 33% | 3154 | 1069 | 34% | 4726 | 1012 | 21% |
| Total | | 5696 | 1983 | 35% | 6407 | 2218 | 35% | 8377 | 2423 | 29% |

Table 2. White-fronted Geese marked in Alaska (1990,91), Western Arctic (1990,91), Central Arctic: West (1987-1991), East (1990,91), and Inglis River (1991); number of neckbanded birds observed August 1991 to July 1992.

| State/Province of observations | ---Alaska--- | | ---Western Arctic--- | | ---Central Arctic (W)--- | | ---Central Arctic (E)--- | | ---Inglis River--- | |
|-----------------------------------|--------------|------------|----------------------|------------|--------------------------|------------|--------------------------|------------|--------------------|------------|
| | Unique | Avg | Unique | Avg | Unique | Avg | Unique | Avg | Unique | Avg |
| CANADA | | | | | | | | | | |
| N.W.Territories | - | - | - | - | - | - | 1 | 1.0 | 1 | 1.0 |
| Alberta | 218 | 1.3 | 128 | 1.2 | 64 | 1.2 | 24 | 1.2 | - | - |
| Saskatchewan | 182 | 1.3 | 305 | 1.3 | 313 | 1.3 | 138 | 1.3 | 53 | 1.2 |
| PACIFIC FLYWAY | | | | | | | | | | |
| Oregon | 2 | 2.0 | - | - | 1 | 1.0 | - | - | - | - |
| California | 1 | 2.0 | - | - | 2 | 1.0 | - | - | - | - |
| CENTRAL FLYWAY | | | | | | | | | | |
| North Dakota | 11 | 1.3 | 16 | 1.1 | 8 | 1.0 | 7 | 1.0 | 1 | 1.0 |
| South Dakota | 8 | 1.1 | 10 | 1.0 | 7 | 1.0 | 10 | 1.1 | 5 | 1.0 |
| Nebraska | 132 | 1.2 | 57 | 1.3 | 40 | 1.3 | 23 | 1.1 | 2 | 1.0 |
| Kansas | - | - | 6 | 1.2 | 5 | 1.2 | - | - | - | - |
| Oklahoma | 10 | 1.3 | 9 | 1.6 | 6 | 2.2 | 7 | 1.1 | - | - |
| Texas | 42 | 1.3 | 117 | 1.2 | 46 | 1.1 | 17 | 1.1 | 6 | 1.0 |
| MISSISSIPPI FLYWAY | | | | | | | | | | |
| Iowa | - | - | 1 | 1.0 | - | - | - | - | - | - |
| Missouri | - | - | 7 | 1.9 | 2 | 2.5 | 2 | 2.5 | - | - |
| Arkansas | 1 | 1.0 | 1 | 1.0 | - | - | 1 | 1.0 | 2 | 1.0 |
| Louisiana | 14 | 1.7 | 95 | 1.8 | 50 | 1.4 | 82 | 1.7 | 77 | 2.4 |
| Minnesota | - | - | - | - | - | - | 1 | 2.0 | - | - |
| MEXICO | | | | | | | | | | |
| Chihuahua | 1 | 1.0 | - | - | - | - | - | - | - | - |
| Durango | 6 | 1.2 | 1 | 1.0 | - | - | - | - | - | - |
| Total | 513 | 1.6 | 634 | 1.5 | 476 | 1.5 | 278 | 1.5 | 129 | 2.0 |

Unique = Number of neckband codes unique within state/province.

Avg = Mean number of observations per unique code.

Table 3. Small Canada Geese marked in Western Arctic (1991), Central Arctic: West (1990,91), East (1990,91), Inglis River (1991), West Hudson Bay (1987-91), Southampton Island (1991) and Baffin Island (1989-91); number of neckbanded birds observed August 1991 to July 1992.

| | Western ---Arctic--- | | Central ---Arctic (W)--- | | Central ---Arctic (E)--- | | Inglis ---River--- | | West ---Hudson Bay--- | | Southampton ---Island--- | | Baffin ---Island--- | |
|---------------------------|-------------------------|------------|-----------------------------|------------|-----------------------------|------------|-----------------------|------------|--------------------------|------------|-----------------------------|------------|------------------------|------------|
| | Unique | Avg | Unique | Avg | Unique | Avg | Unique | Avg | Unique | Avg | Unique | Avg | Unique | Avg |
| CANADA | | | | | | | | | | | | | | |
| Alberta | 68 | 1.3 | 89 | 1.3 | 35 | 1.1 | - | - | 4 | 1.0 | - | - | 2 | 1.0 |
| Saskatchewan | - | - | 215 | 1.6 | 198 | 1.5 | 16 | 1.5 | 22 | 1.2 | 2 | 1.0 | 25 | 1.1 |
| Manitoba | - | - | - | - | - | - | - | - | 24 | 1.8 | 5 | 1.8 | 7 | 1.3 |
| PACIFIC FLYWAY | | | | | | | | | | | | | | |
| Montana | 8 | 1.0 | 1 | 1.0 | - | - | - | - | - | - | - | - | - | - |
| Nevada | 15 | 1.1 | - | - | - | - | - | - | - | - | - | - | - | - |
| CENTRAL FLYWAY | | | | | | | | | | | | | | |
| North Dakota | - | - | 3 | 1.0 | - | - | - | - | 46 | 1.4 | 1 | 1.0 | 8 | 1.0 |
| South Dakota | - | - | 1 | 1.0 | 4 | 1.0 | 9 | 1.6 | 23 | 1.1 | 2 | 2.5 | 15 | 1.1 |
| Nebraska | 8 | 1.9 | 106 | 1.6 | 94 | 1.5 | 24 | 2.1 | 107 | 2.6 | 9 | 1.8 | 32 | 1.4 |
| Colorado | 29 | 1.1 | 13 | 1.0 | 13 | 1.0 | - | - | 1 | 1.0 | - | - | - | - |
| Kansas | 2 | 2.0 | 2 | 1.0 | - | - | - | - | 11 | 1.9 | - | - | 23 | 1.6 |
| Oklahoma | - | - | 20 | 1.3 | 25 | 1.2 | 11 | 1.3 | 103 | 1.3 | 6 | 1.2 | 19 | 1.2 |
| Texas | 1 | 4.0 | 33 | 1.3 | 18 | 1.1 | 4 | 2.0 | 22 | 1.7 | 3 | 1.0 | 80 | 1.2 |
| MISSISSIPPI FLYWAY | | | | | | | | | | | | | | |
| Minnesota | - | - | - | - | - | - | - | - | 10 | 1.1 | - | - | 8 | 3.6 |
| Wisconsin | - | - | 1 | 1.0 | - | - | - | - | 1 | 1.0 | - | - | 7 | 2.9 |
| Michigan | - | - | - | - | - | - | - | - | 1 | 1.0 | - | - | 7 | 2.4 |
| Iowa | - | - | - | - | - | - | - | - | - | - | - | - | 6 | 1.2 |
| Missouri | - | - | - | - | 1 | 1.0 | - | - | 34 | 1.3 | 1 | 1.0 | 352 | 2.0 |
| Illinois | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 1.0 |
| Ohio | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1.0 |
| Kentucky | - | - | - | - | - | - | - | - | - | - | - | - | 6 | 2.2 |
| Tennessee | - | - | - | - | - | - | - | - | 2 | 1.5 | - | - | 1 | 1.0 |
| Arkansas | - | - | - | - | - | - | - | - | 3 | 2.0 | - | - | 1 | 1.0 |
| Louisiana | - | - | - | - | - | - | - | - | 6 | 1.0 | 1 | 3.0 | 100 | 2.0 |
| Total | 110 | 1.5 | 380 | 1.9 | 329 | 1.7 | 55 | 2.0 | 372 | 1.9 | 29 | 1.6 | 610 | 2.0 |

Unique = Number of neckband codes unique within state/province.

Avg = Mean number of observations per unique code.

Table 4. Observations of neckbanded White-fronted and Small Canada geese from all banding areas by season*, fall 1991 to fall 1992.

| | Whitefronts | | | | Small Canadas | | | |
|--------------------|-------------|-----------|--------|-----------|---------------|-----------|--------|-----------|
| | Fall 91 | Win 91-92 | Spg 92 | Fall 92** | Fall 91 | Win 91-92 | Spg 92 | Fall 92** |
| CANADA | | | | | | | | |
| N.W. Territories | - | - | 1 | - | - | - | - | - |
| Alberta | 245 | - | 178 | 413 | 142 | - | 63 | 429 |
| Saskatchewan | 1007 | - | 101 | 2483 | 422 | - | 60 | 918 |
| Manitoba | - | - | - | - | 34 | - | 2 | 40 |
| PACIFIC FLYWAY | | | | | | | | |
| Montana | - | - | - | - | 6 | 3 | - | - |
| Oregon | - | 3 | - | - | - | - | - | - |
| Nevada | - | - | - | - | - | 15 | - | - |
| California | - | 2 | 1 | - | - | - | - | - |
| CENTRAL FLYWAY | | | | | | | | |
| North Dakota | - | - | 43 | - | 33 | - | 27 | - |
| South Dakota | 2 | - | 38 | - | 30 | 7 | 21 | - |
| Nebraska | 2 | 40 | 215 | - | 19 | 318 | 57 | - |
| Colorado | - | - | - | - | 2 | 54 | - | - |
| Kansas | 2 | 7 | 4 | - | 3 | 35 | 3 | - |
| Oklahoma | 22 | 13 | - | - | 68 | 124 | - | - |
| Texas | 34 | 189 | 14 | - | 19 | 136 | 1 | - |
| MISSISSIPPI FLYWAY | | | | | | | | |
| Minnesota | - | - | 1 | - | 18 | - | - | - |
| Wisconsin | - | - | - | - | 19 | - | - | - |
| Michigan | - | - | - | - | 6 | 3 | - | - |
| Iowa | - | - | 1 | - | 6 | - | - | - |
| Missouri | - | 11 | - | - | 371 | 21 | - | - |
| Illinois | - | - | - | - | - | 3 | - | - |
| Ohio | - | - | - | - | - | 1 | - | - |
| Kentucky | - | - | - | - | 2 | 6 | - | - |
| Tennessee | - | - | - | - | - | 3 | - | - |
| Arkansas | - | 5 | - | - | - | 4 | - | - |
| Louisiana | 47 | 280 | 16 | - | 3 | 107 | - | - |
| MEXICO | | | | | | | | |
| Chihuahua | - | 1 | - | - | - | - | - | - |
| Durango | - | 7 | - | - | - | - | - | - |

* Fall = Fall, Aug - Oct

Win = Winter, Nov - Feb

Spg = Spring, Mar - May

** Fall 92 data from Canada only.

Table 5. Marked:unmarked ratios in White-fronted and Small Canada Geese, fall 1990 to spring 1992 (with fall 1992 Canada)*.

| Season | Prov./ State | Whitefronts | | | Small Canadas | | |
|-----------|-----------------|-----------------------|-----------------------------|--------|-----------------------|--------------------------------|----------|
| | | No. necks examined | No. necks/neckband Red** | Blue** | No. necks examined | No. necks/neckband Yellow** | Orange** |
| Fall 90 | Alberta | 6416 | 157 | 494 | 8710 | 2903 | - |
| Fall 91 | Alberta | 5473 | 148 | 912 | 32025 | 395 | - |
| Fall 92 | Alberta | 19625 | 153 | 258 | 44623 | 154 | - |
| Fall 90 | Saskatchewan | 69558 | 638 | 663 | 53521 | 1010 | - |
| Fall 91 | Saskatchewan | 41828 | 530 | 536 | 104044 | 788 | 4729 |
| Fall 92 | Saskatchewan | 60897 | 265 | 246 | 75598 | 158 | 15120 |
| Fall 91 | Manitoba | - | - | - | 2278 | 456 | 109 |
| Fall 90 | Kansas | 3583 | 326 | 1792 | 1141 | - | 571 |
| Fall 90 | Oklahoma | 2097 | 300 | 2097 | 4143 | 414 | 691 |
| Fall 91 | Oklahoma | 1778 | 593 | 356 | 10953 | 1095 | 391 |
| Fall 90 | Louisiana | 4101 | 456 | 228 | - | - | - |
| Win 90-91 | Arkansas | 1242 | - | 621 | 1454 | - | 54 |
| Win 90-91 | Oklahoma | - | - | - | 5979 | 1993 | 544 |
| Win 91-92 | Oklahoma | - | - | - | 17211 | 956 | 307 |
| Win 91-92 | Colorado | - | - | - | 4500 | 900 | - |
| Win 91-92 | Nebraska | 6807 | 189 | 2269 | 38715 | 403 | 596 |
| Win 91-92 | Texas | - | - | - | 89172 | 956 | 307 |
| Win 90-91 | Louisiana | 42560 | 2027 | 709 | 6321 | - | 154 |
| Win 91-92 | Louisiana | - | - | - | 34820 | - | 94 |
| Win 91-92 | Durango | 1086 | 272 | - | - | - | - |
| Spg 91 | Nebraska | 11280 | 2256 | 2256 | 6666 | 1333 | 1111 |
| Spg 92 | Nebraska | 16344 | 131 | 334 | - | - | - |
| Spg 92 | North Dakota | 5910 | 394 | 657 | - | - | - |
| Spg 91 | Alberta | 11969 | 499 | 855 | 6407 | 6407 | - |
| Spg 92 | Alberta | 12596 | 332 | 741 | 15461 | 469 | 15461 |
| Spg 91 | Saskatchewan | - | - | - | 3601 | 1801 | 1801 |
| Spg 92 | Saskatchewan | - | - | - | 11228 | 2246 | 1021 |

* Samples of <1000 necks examined per province/state or season not included here.

The neckband data bank of the Wisconsin Wildlife Co-op Unit may have additional samples.

** Red = Western Midcontinent Population (Alaska and Western Arctic).

Blue = Eastern Midcontinent Population (Central Arctic (W&E), Inglis River).

Yellow = Shortgrass Prairie Population (Western Arctic, Central Arctic (W&E), Inglis River).

Orange = Tallgrass Prairie Population (West Hudson Bay, Southampton Island, Baffin Island).

Table 6. Snow and Ross' Geese marked in Arctic Canada, Alaska and Wrangel Island;
observed August 1991 to July 1992.

| | No. of Unique Codes Observed | | | | |
|---------------------------|------------------------------|---------------------|-------------------------|-------------------------|-------------------------|
| | Snow Geese | | | | Ross' Geese |
| | Wrangel Is. 1988,89,91 | Alaska 1980-1991 | W. Arctic 1987,88,89 | C. Arctic 1989,90,91 | C. Arctic 1989,90,91 |
| CANADA | | | | | |
| N.W. Territories | - | - | - | 1 | 3 |
| British Columbia | 131 | - | - | - | - |
| Alberta | 11 | 34 | 62 | 7 | 49 |
| Saskatchewan | 2 | 11 | 43 | 55 | 84 |
| Manitoba | - | - | - | 1 | - |
| PACIFIC FLYWAY | | | | | |
| Montana | 57 | 59 | 125 | 4 | 76 |
| Idaho | 2 | - | 7 | 1 | 2 |
| N. Washington | 64 | - | - | - | - |
| N. Oregon | 6 | - | - | - | - |
| S. Oregon | 6 | 1 | 6 | - | 59 |
| Nevada | 1 | 3 | 3 | - | - |
| Utah | 1 | 2 | 23 | 1 | 7 |
| N. & C. California | 122 | 134 | 226 | 5 | 355 |
| S. California | - | - | 7 | 1 | 25 |
| CENTRAL FLYWAY | | | | | |
| North Dakota | - | - | - | 6 | - |
| South Dakota | - | - | - | 18 | - |
| Nebraska | - | - | - | 3 | - |
| Colorado | - | 2 | 1 | 5 | 1 |
| Kansas | - | - | - | 7 | - |
| Oklahoma | - | - | - | 4 | - |
| New Mexico | - | 3 | 5 | 16 | 14 |
| Texas | - | - | - | 72 | 2 |
| MISSISSIPPI FLYWAY | | | | | |
| Iowa | - | - | - | 3 | - |
| Missouri | - | - | - | 8 | - |
| Arkansas | - | - | - | 1 | - |
| Louisiana | - | - | - | 16 | - |
| MEXICO | | | | | |
| Chihuahua | - | - | 1 | 1 | - |
| Total | 292 | 188 | 367 | 220 | 539 |

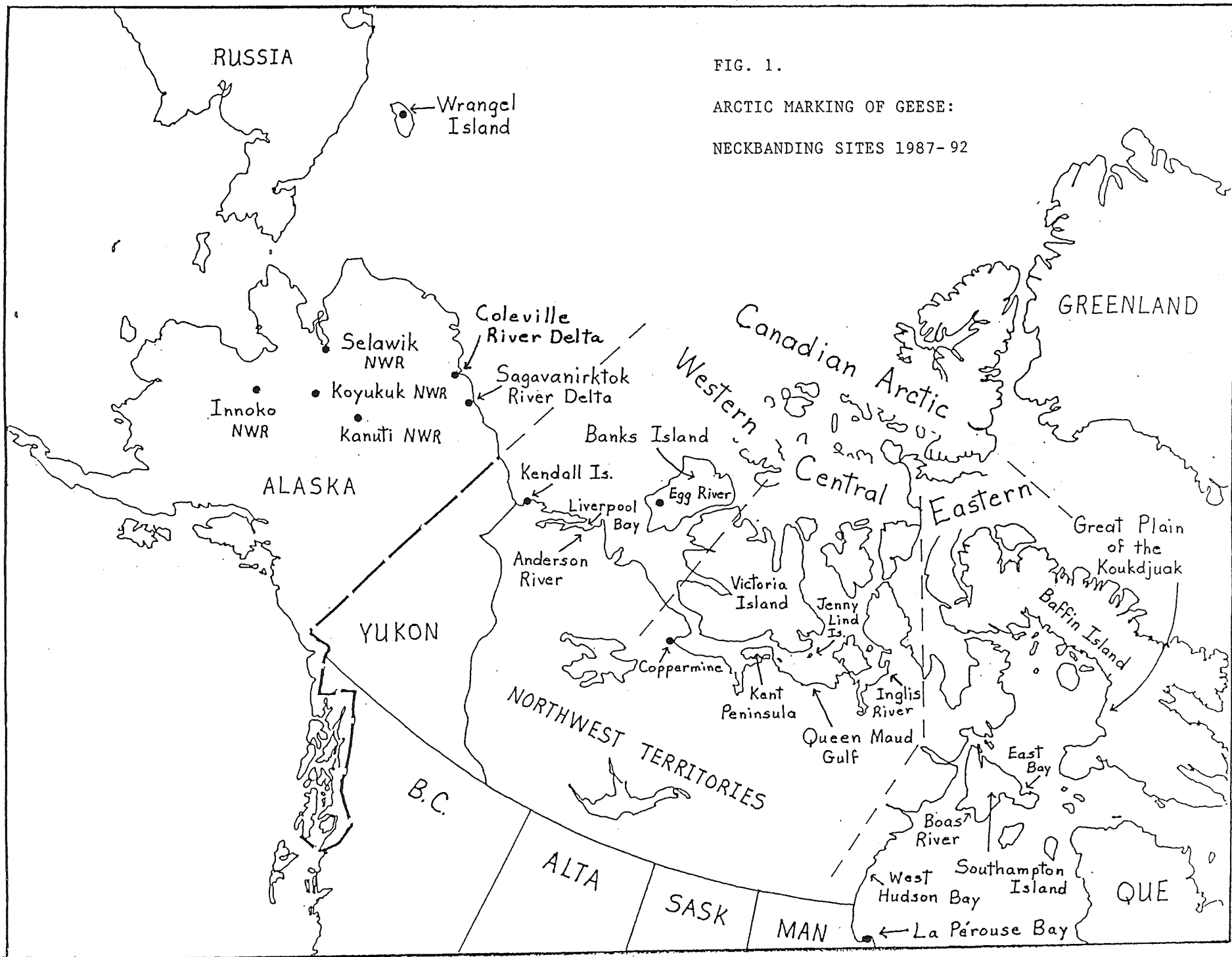


FIG. 1.

ARCTIC MARKING OF GEESE:

NECKBANDING SITES 1987-92

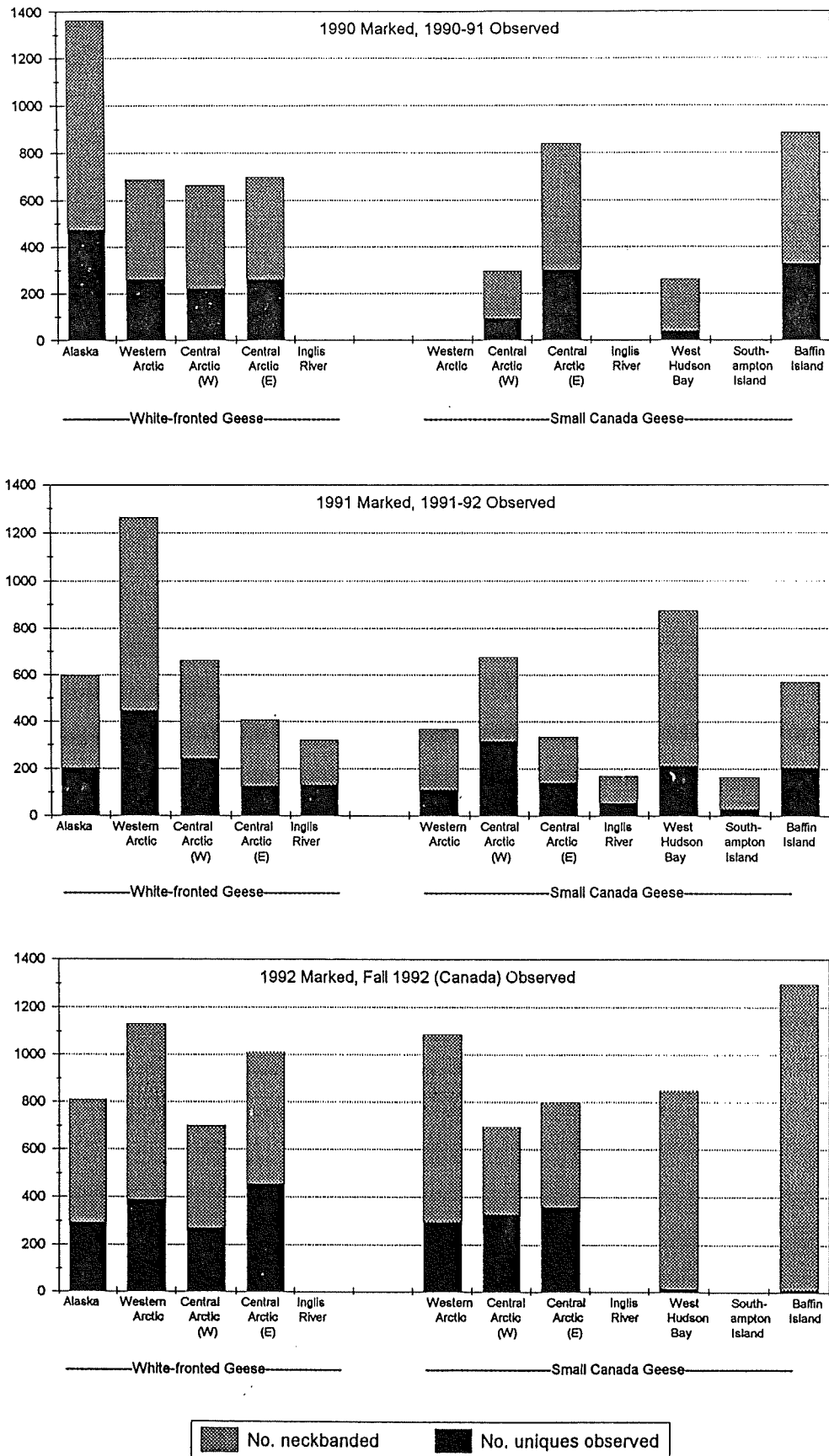


Figure 2. Number of Midcontinent White-fronted and SGP/TGP Small Canada Geese neckbanded in 1990, 1991 and 1992, by nesting region, with subsequent direct observations.

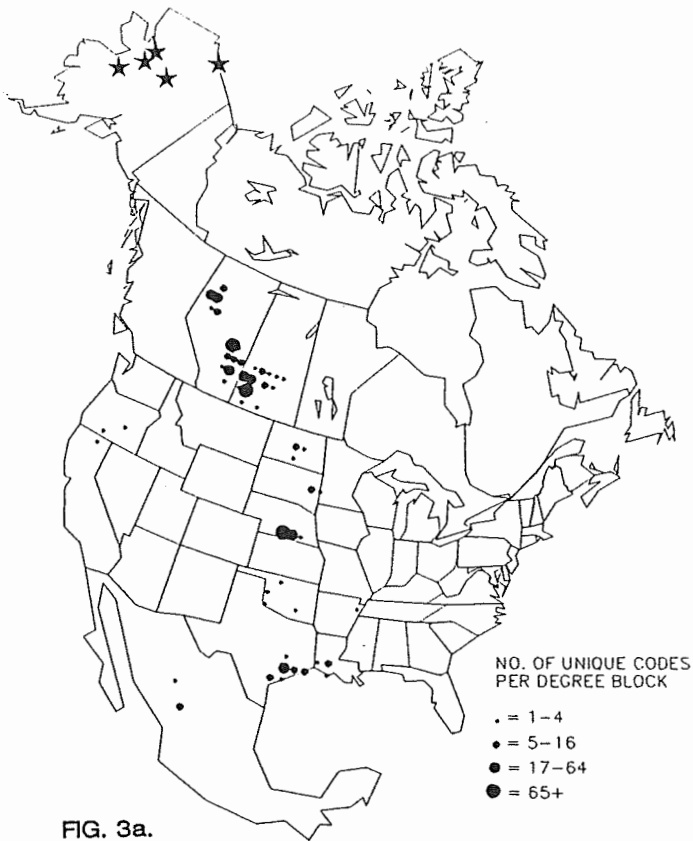


FIG. 3a.

WHITE-FRONTED GEESE NECKBANDED IN ALASKA ★ 1990-91
OBSERVED AUGUST 1991 TO JULY 1992

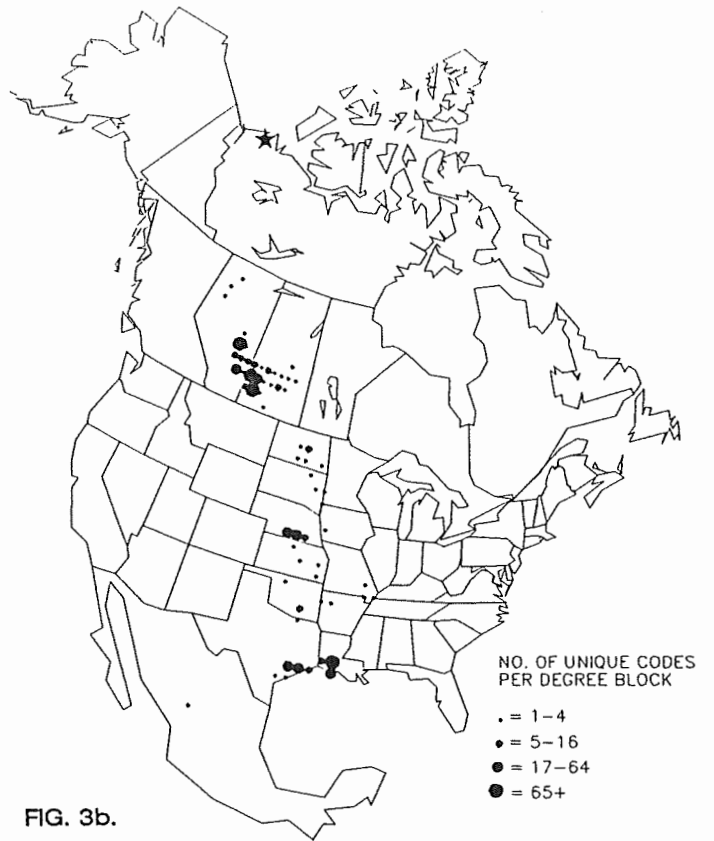


FIG. 3b.

WHITE-FRONTED GEESE NECKBANDED IN WESTERN ARCTIC ★ 1990-91
OBSERVED AUGUST 1991 TO JULY 1992

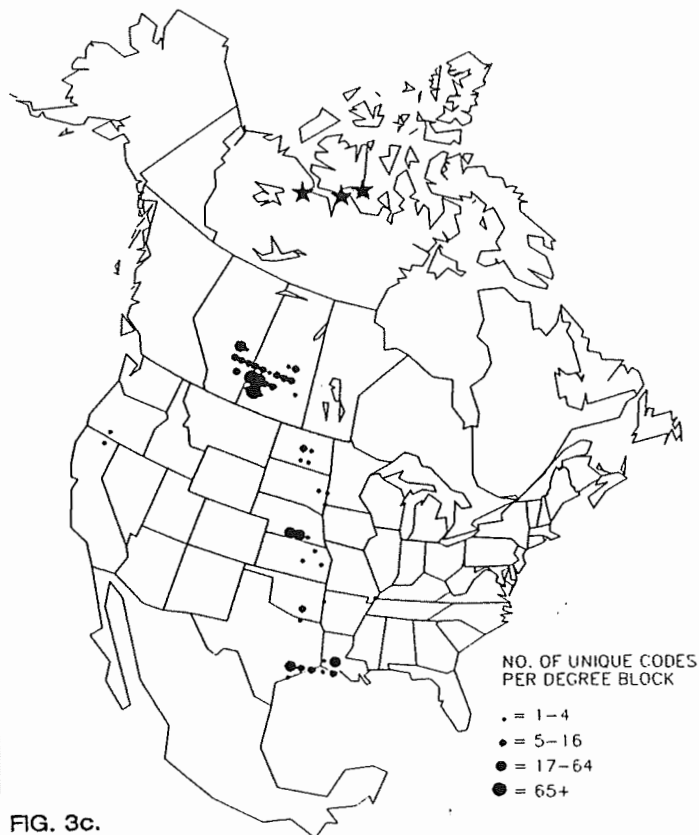


FIG. 3c.

WHITE-FRONTED GEESE NECKBANDED IN CENTRAL ARCTIC(W) ★ 1987-91
OBSERVED AUGUST 1991 TO JULY 1992

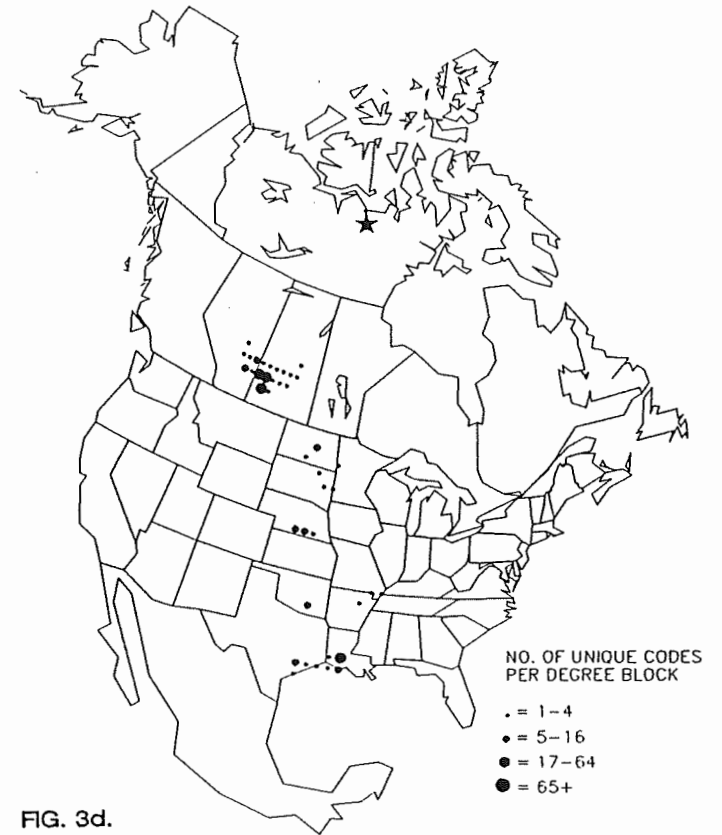


FIG. 3d.

WHITE-FRONTED GEESE NECKBANDED IN CENTRAL ARCTIC(E) ★ 1990-91
OBSERVED AUGUST 1991 TO JULY 1992

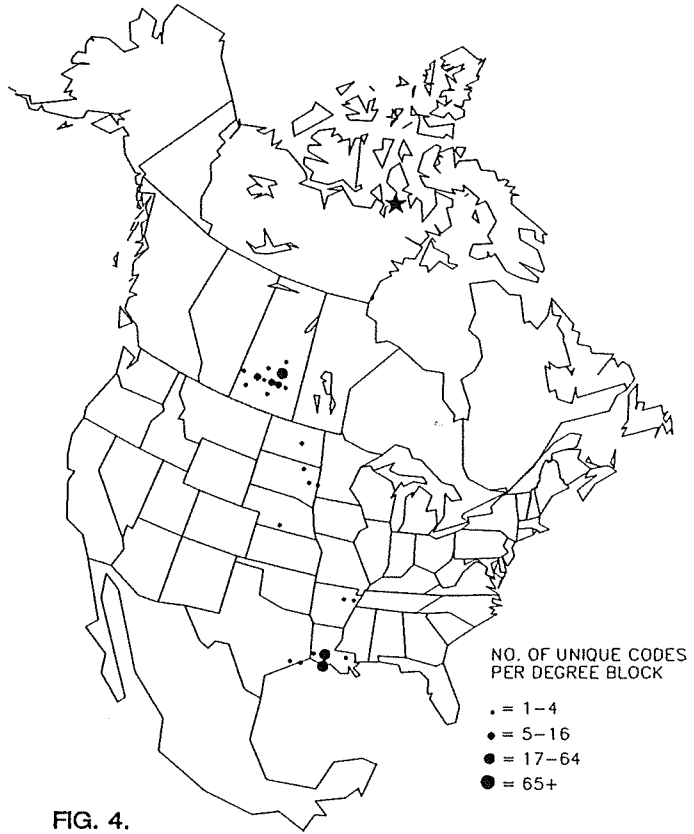


FIG. 4.

WHITE-FRONTED GESE NECKBANDED AT INGLIS RIVER ★ 1991
OBSERVED AUGUST 1991 TO JULY 1992

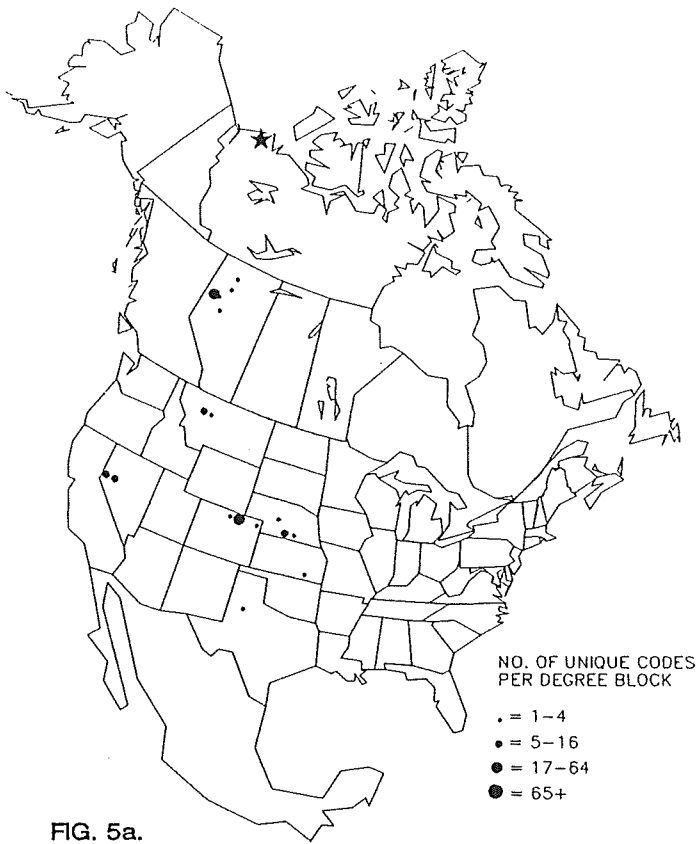


FIG. 5a.

SMALL CANADA GEESE NECKBANDED IN WESTERN ARCTIC ★ 1991
OBSERVED AUGUST 1991 TO JULY 1992

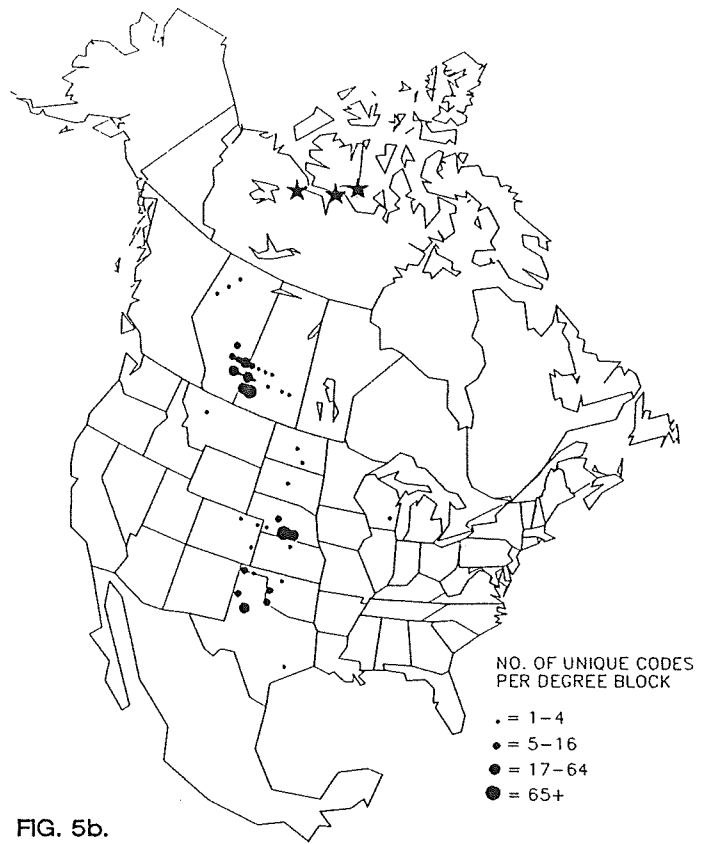


FIG. 5b.

SMALL CANADA GEESE NECKBANDED IN CENTRAL ARCTIC (W) ★ 1990-91
OBSERVED AUGUST 1991 TO JULY 1992

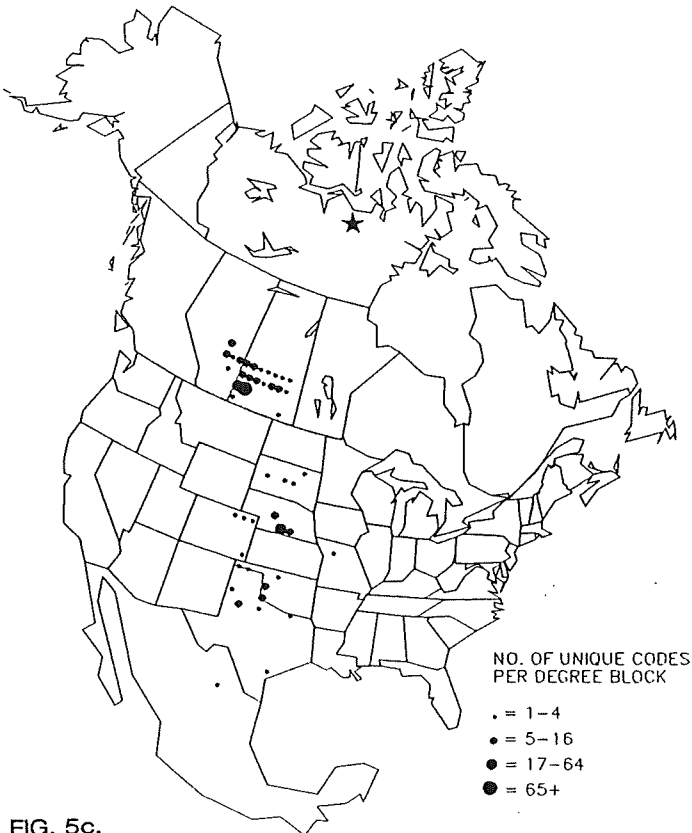


FIG. 5c.

SMALL CANADA GEESE NECKBANDED IN CENTRAL ARCTIC (E) ★ 1990-91
OBSERVED AUGUST 1991 TO JULY 1992

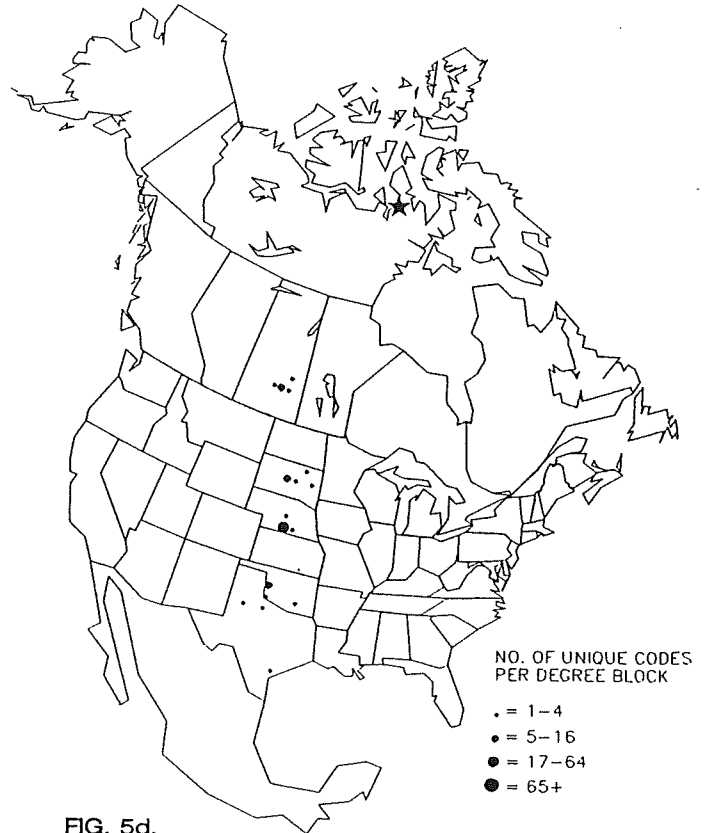


FIG. 5d.

SMALL CANADA GEESE NECKBANDED AT INGLIS RIVER ★ 1991
OBSERVED AUGUST 1991 TO JULY 1992

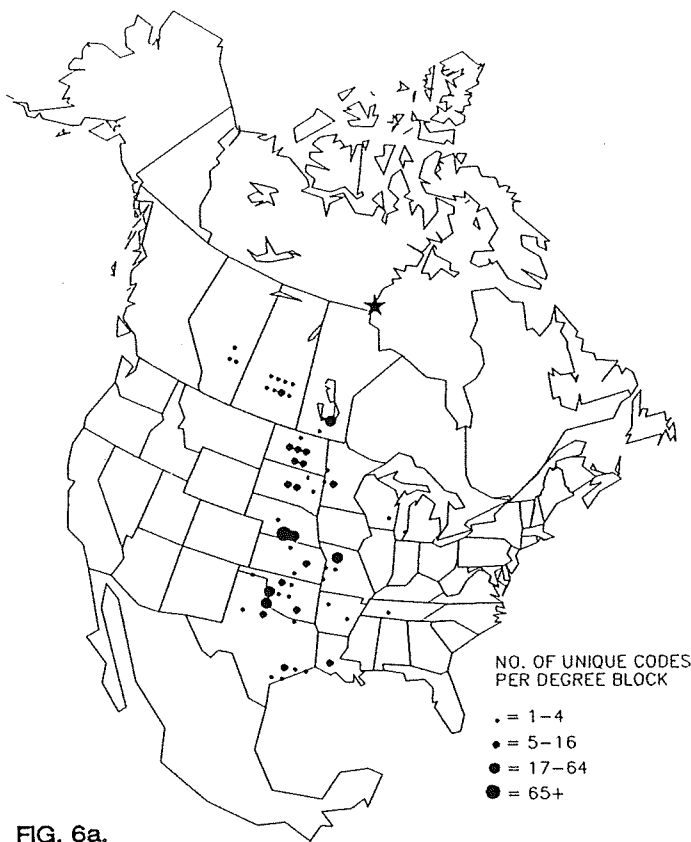


FIG. 6a.

SMALL CANADA GEESE NECKBANDED ON WEST HUDSON BAY ★ 1987-91
OBSERVED AUGUST 1991 TO JULY 1992

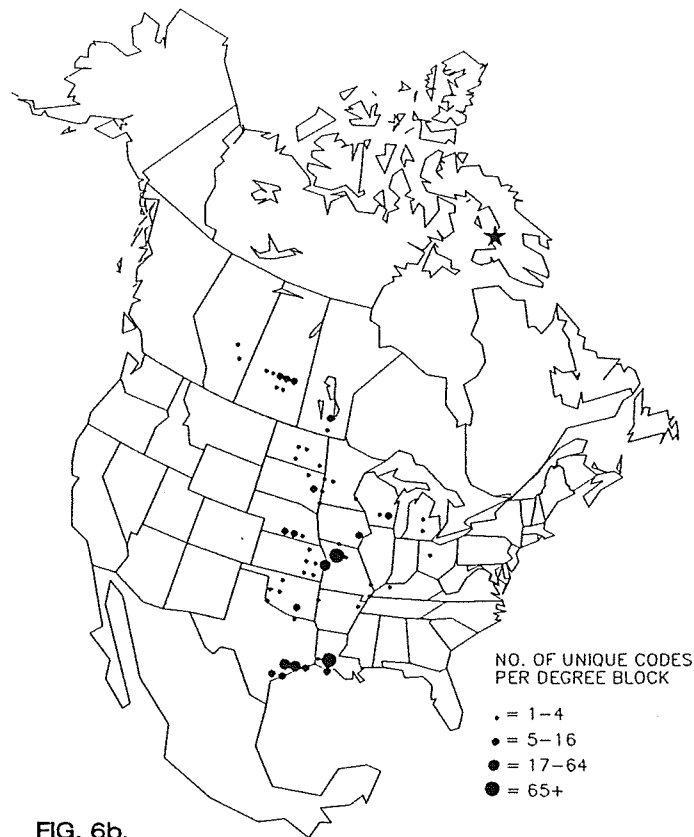


FIG. 6b.

SMALL CANADA GEESE NECKBANDED ON BAFFIN ISLAND ★ 1989-91
OBSERVED AUGUST 1991 TO JULY 1992

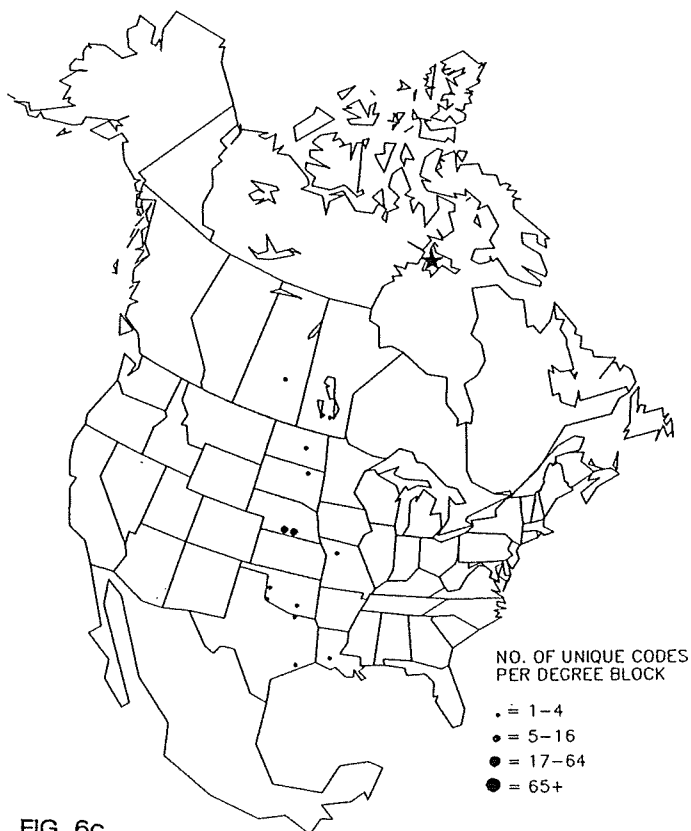


FIG. 6c.

SMALL CANADA GEESE NECKBANDED ON SOUTHAMPTON ISLAND ★ 1991
OBSERVED AUGUST 1991 TO JULY 1992