Alaska Department of Fish and Game
Division of Wildlife Conservation

Final Report

Matanuska Valley Ruffed Grouse Transplant
1988 - 1990

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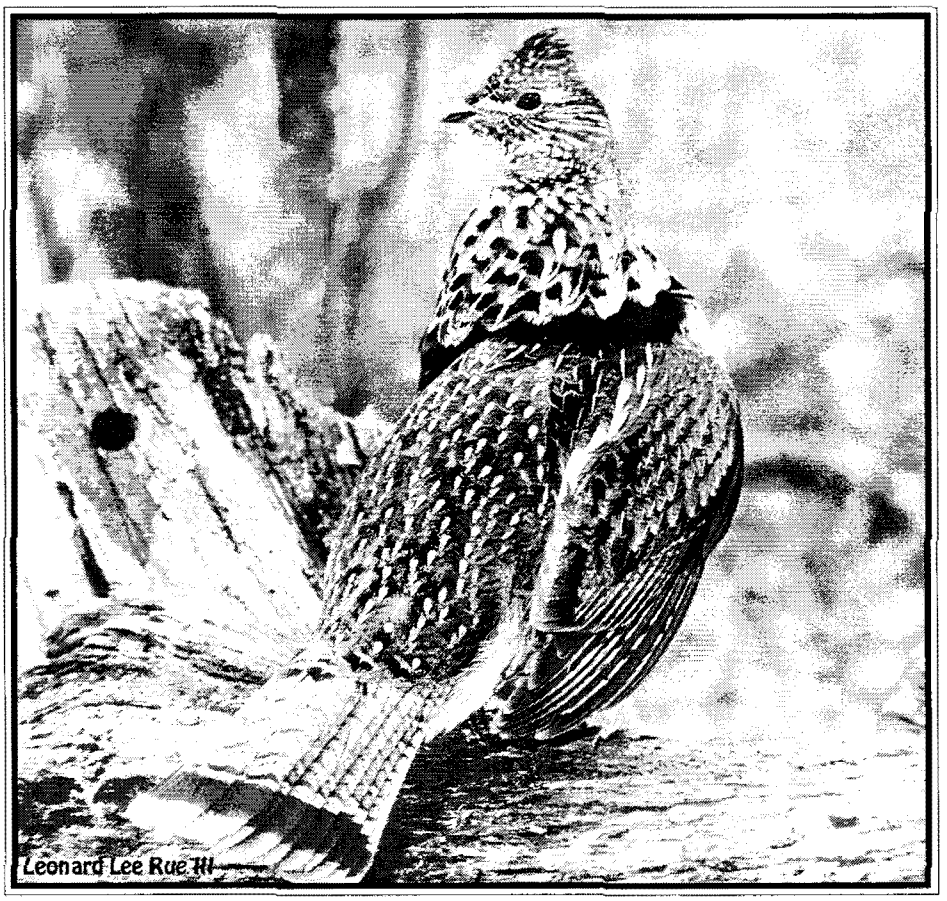

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SUMMARY

One hundred forty-three ruffed grouse (*Bonasa umbellus*) were captured north of the Alaska Range in 1988, 1989, and 1990, and 140 of these grouse were released at 4 sites in the Matanuska-Susitna valleys.

Nineteen of the birds released in 1989 and 12 of the grouse released in 1990 were fitted with radio transmitters for information on movements, mortality and reproduction. Grouse were radiotracked until April 1991.

Grouse dispersal varied among release sites, but movements of 5 to 10 miles were not unusual. One radiocollared bird moved 23 miles, while 2 grouse without radios moved in excess of 24 miles.

Mortality rates varied among release sites. The 8 radiocollared birds released at Willow in 1989 survived less than 8 months. Two (50%)of the radiocollared birds released at Big Lake in 1989, survived for 10 and 19 months, respectively. Three of the 7 radiocollared grouse released at Sutton in 1989 survived 7, 11 and 13 months, respectively. The radios may have influenced mortality.

Three nests containing eggs were located. The mean clutch size was 14.3 eggs (range = 12-16) which exceeded the "normal" clutch sizes of 10 eggs in Minnesota (Guillion 1984) and 11 to 12 eggs in the Midwest (Storm and Scott 1989). A brood of ruffed grouse was located adjacent to the Sutton release site in July 1989. Since that initial observation, 35 broods have been reported in a 100 mi^2 area.

Four dead grouse were recovered intact and necropsied. Three birds had extensive fat reserves. The fourth bird was in poor condition and may have expended its fat reserves in a snow roost following a gunshot wound.

Ruffed grouse dispersed into available habitat, located suitable forage and successfully reproduced. The introduction of grouse into the Matanuska-Susitna valleys was successful.

CONTENTS

BACKGROUND

Ruffed Grouse (Bonasa umbellus) are the most widely distributed upland game bird in the northern hemisphere and one of the most sought after species by upland bird hunters. In Alaska, ruffed grouse are indigenous north of the Alaska Range, from McGrath to Tok, and in some areas of southeastern Alaska. They provide extensive hunting and viewing enjoyment to residents and visitors. Expansion of ruffed grouse populations, south of the Alaska Range, would provide additional opportunities to enjoy this species.

A variety of early-succession forest types provide good ruffed grouse habitat (Gullion 1966, Rusch and Keith 1971). Ruffed grouse are primarily browsers, subsisting on the buds, twigs, leaves, and fruits of various herbs, shrubs and trees (Guillion 1984). Throughout the primary range, aspen is the most important plant contributing to their yearlong welfare. In regions where snow covers the ground for extended periods in the winter, the flower buds of the male aspen are the most important source of food for these grouse.

Ruffed grouse diets vary seasonally: fruits and seeds are of greater importance during the summer and fall, buds and catkins are a prime food in the early spring, and insects are important during the late spring and summer months, especially for young birds. In interior Alaska, quaking aspen *(Populus tremuloides)* and various species of willow *(Salix spp.)* are an important winter food

(McGowan 1973). Spruce-hardwood forests containing these species occur extensively throughout upper Cook Inlet.

In 1981, a proposal was developed to introduce ruffed grouse into the Matanuska Valley (Game Management Subunit 14A). In the autumn of 1987, the Alaska chapter of the Safari Club International provided a grant to the Alaska Department of Fish and Game (ADF&G) to fund the transplant. Grants to continue the project were contingent upon the success of the initial introduction and the need for additional stocking. The project was extended 2 additional years and comprehensive reports were prepared for each year.

OBJECTIVES

Management Goal

To establish huntable populations of ruffed grouse in the Matanuska and Susitna valleys.

Management Objectives

- To develop efficient capturing and handling techniques that cause the least stress and mortality to the birds.
- To evaluate potential release sites and determine those most suitable for the introduction of grouse.
- To capture and release a minimum of 100 grouse.
- To monitor translocated grouse and determine survival, dispersal and reproductive success.

STUDY AREA

Capture Site

The capture site was adjacent to the Parks Highway between mileposts 275 and 284, approximately 50 miles south of Fairbanks, Alaska. This area was on the north slope of the Alaska Range, elevation 550 to 700 ft ASL, drained by the Nenana River. A portion of the area was on Clear Air Force Site.

The capture site had a mosaic of variously aged trees and shrubs. The predominate species was quaking aspen (*Populus tremuloides*), 4 inches to 6 inches in diameter at breast height (DBH). The secondary deciduous forest type was birch (*Betula papyrifera*) with scattered balsam popular (*Populus balsamifera*). Interspersed within the deciduous forest were white spruce (*Picea glauca*) of various ages. The understory supported alder (*Alnus* spp.), highbush cranberry (*Viburnum edule*), leatherleaf (*Chamaedaphne calyculata*) and wild rose (*Rosa* spp.). Ground cover includes lowbush cranberry (*Vaccinium vitis-idaea*), crowberry (*Empetrum nigrum*) and a variety of small herbaceous plants.

Release Site

Extensive potential ruffed grouse habitat exists throughout the Matanuska Valley. Eight locations were evaluated as potential release sites (Steen, 1990). Records of the Department of Natural Resources, Division of Forestry, indicate there are 46,182 acres of aspen/birch stands in the Matanuska River drainage and 2886 acres of cottonwood stands. The adjacent Susitna River drainages support 1.2 million acres of birch/aspen forest (pers. commun. Bill Beebe, DNR, Div. of Forestry, Area Forester, Big Lake, Alaska). In addition, the Knik and Kashwitna River drainages contain an undetermined but substantial amount of suitable grouse habitat.

METHODS

Capture

We initially used a recording of a lost chick to capture grouse (Healy et al. 1980). Dave Holdermann, former Assistant Area Biologist, Homer, assisted in developing this technique in West Virginia. He described the call as attracting the hen with brood, making her oblivious to her surroundings. The family group could be captured by hand-held net or if the speaker was inside a trap, the family would enter, completing the capture. Edwards (1961) pioneered a technique similar to this using a captured chick placed inside a trap. However, he found the hens reluctant to enter traps until just before dark.

When the lost chick methods proved ineffective, we used lily pad traps with drift fences. This capture method was used and described by Backs et al. (1985) in Indiana. Each trap site consisted of 4 trap bodies and 2 drift fences that provided approximately 112 feet of barrier to intersect moving birds. When birds encountered the trap site, they moved along the fence until they encountered an opening, the trap entrance, and the birds were directed into the traps.

Trap bodies were covered with a layer of spruce boughs to protect captured birds from inclement weather and to provide some concealment from predators. We did not camouflage the drift fence. However, we attempted to block holes under the fence which might have provided an escape route. Straight alignment of fences was maintained as angles tended to direct the birds away from the fence and trap.

Handling

We sexed captured birds using rump spots and eye patches and aged them as adult or juvenile by size and the shape of the outer primary feathers (Brewer, 1980). We banded grouse with sequentially numbered, colored aluminum leg bands. Females received a red band on the left leg, while males were given a blue band on the right leg. Radio transmitters were attached to selected birds. Birds were placed in an 9 inch X 18 inch cardboard, carpet-floored pet carrier (Trico porta pet) divided into 2 compartments by a removable partition. We initially provided apple wedges for food and liquid but subsequently found cantaloupe or honey dew melon wedges more readily accepted.

Radiocollaring

We used 2 brands of radios in both 1989 and 1990. The transmitters were equipped with a mortality mode and had a 10 month battery life (Steen 1989). Telonics, Inc. transmitters weighed 14-15 grams, were rectangular in shape and were mounted on a vinyl bib. HoloHill Systems, Ltd. transmitters weighed 10.5-11.5 grams and were circular in shape with a round elastic band for attachment.

We used twice monthly tracking flights to determine survival and dispersal. Tracking was accomplished using a Piper PA-18, Super Cub, aircraft equipped with H-element antennas mounted on each wing strut. All locations were recorded on a 1:250,000-scale map. When a transmitter was determined to be on mortality mode, we attempted to locate the site from the ground and determine the cause of death.

RESULTS AND DISCUSSION

Capture and Handling

During the 3-year capture effort, we captured 143 ruffed grouse, including 25 adult males, 38 adult females, 34 immature males, 42 immature females and 4 of undetermined sex. We successfully moved 140 birds to release sites in the Matanuska Valley.

We captured 141 birds using lilly pad traps with drift fences in 1307 trap days. Predators killed an additional 8 birds in the traps. Trapping success of 9.2 trap days per bird was higher than the 16.1 days per bird reported by Backs et al. (1985) or the 33 trap days per bird reported by Wentworth et al. (1986). Two birds (a three-week-old chick and an adult female) were captured near Delta Junction in June 1988 using a chick distress call and long-handled nets (Steen 1988).

We began trapping grouse on 15 September in 1988 and birds were captured immediately. In 1989, in an attempt to increase the number of birds captured, we began trapping on 1 September. We captured the first bird on 5 September, and by 10 September we had only trapped 4 birds. We captured 10 birds between 10-16 September (Steen 1989). Due to limited early September success, trapping began on 15 September again in 1990. Trapping efforts for all 3 years continued until early October, when heavy snow terminated the capture effort.

Capture Mortality

We trapped 143 grouse and relocated 140 in the Matanuska-Susitna valleys. Two birds, a three-week-old chick and an immature male, died from capture-related stress. The third bird, an adult female, died of injuries sustained from striking a window after escaping inside a building. This mortality rate, 2.1%, was well below the 12% mortality rate in Indiana (Backs et al. 1985). Our lower mortality rate was attributed to several modifications in the capture and handling techniques developed in Indiana.

The isolation of birds in confining, shipping containers reduced competition among birds and reduced holding-related injuries. Feeding birds melon afforded the birds a high water and sugar diet, reducing stress-related problems. Substituting welded wire for chicken wire on trap tops eliminated injuries. The light gauge wire used in 2-inch poultry netting stripped feathers from the back of the necks, caused skin loss on the top of the head (scalping) on 2 birds, and a cut at the wing root on a third bird. Birds captured in traps with the heavier, welded wire tops were not injured.

Postrelease Mortality

Radiocollaring revealed high mortality of the 19 birds collared in 1989. Five birds survived beyond 8 months while only 1 survived to 20 months. Mortality of 6 birds was attributed to birds of prey, while accidents accounted for 3 deaths. The cause of death could not be determined for the remaining birds (Steen 1990). We did not obtain any information from the 1990 bird collaring. The radios we used were recovered from the 1989 release and did not function well because of poor batteries.

We observed different mortality rates among the birds equipped with different types of radios. Birds fitted with the heavier, bib-mounted radios were killed at a faster rate than grouse carrying lighter, elastic-strap mounted radios (Steen 1989). A statistical comparison indicated a significant difference between the 2 types of radios (Fisher's Exact Test, $P = 0.02$) (Steen 1990).

Grouse survival rates were probably influenced by the weight of the radio; i.e., the heavier the radio, the greater the influence on the activities of the bird. Radio weight influenced survival of hen pheasants (Warner and Etter 1983) and the same factors probably influenced survival of radiocollared ruffed grouse. The attachment mode or shape of the radio may also have caused some of the difficulties. Radioinduced mortality has been reported in ring-necked pheasants (*Phasianus colchicus*) (Warner and Etter 1983), gray patridge (*Perdix perdix*) (Carroll 1990), and sharp-tailed grouse (*Tympanuchus phasianellus*) (Marks and Marks 1987).

Movement

We fitted 19 birds translocated in 1989 with radio transmitters (Steen 1989). Data from those birds provided information on dispersal, mortality and reproduction. Data on movement varied, depending on the release site. Movements of 5-7 miles were recorded for 3 birds, 7-10 miles for 2 birds, and 23 miles for 1 bird. The remaining 13 birds stayed within 3 miles of their release site. Two grouse without radios moved 24 miles before being killed. These movements exceeded those of grouse released in Missouri (9 miles), Tennessee (2.5 miles), and Illinois (1.5 miles) (Kurzejeski and Root 1989). The significance of longer movements was unknown, but it showed the ability of ruffed grouse to expand their range into new habitat.

Nutritional Status

We recovered and examined 4 dead birds to ascertain their physical condition. Three had large fat reserves and full crops. The fourth bird died in a snow burrow, possibly from a gunshot wound. This bird did not have fat reserves or food in its crop or gizzard.

Productivity

Of 4 females fitted with radios, 3 were located on nests in the spring of 1990. The mean clutch size was 14.3 eggs (range = 12-16). This mean clutch size exceeded the mean of 11-12 eggs found in grouse studies in the Midwest (Rusch 1989).

Reproduction

On 31 July 1989, the first reported brood of ruffed grouse in the Matanuska Valley was observed 250 yards north of the Sutton release site. Since the initial observation, at least 35 grouse broods have been reported by the public. All individuals that reported a brood were closely questioned to determine the accuracy of their observations. We considered 35 broods were a minimum number because we combined reports that appeared to be duplicate sightings.

Twenty-four broods were observed in the vicinity of the Sutton release site. We received 7 reports of broods south and east of the Big Lake release site and 4 observations of grouse broods near Willow. These reports were particularly encouraging because the number of birds released per site was low: 64 birds at the Sutton site; 32 grouse at the Willow site; 16 birds at Big Lake site, and 28 grouse on Hayfield Road, 11 miles east of Big Lake.

Sightings of birds have been reported 3 to 5 miles either side of a line from Mile 100 of the Glenn Highway to Pt. McKenzie, a distance of about 100 miles. Additional reports have been received along the Parks Highway from Mile 69 to Mile 95, and an isolated report from the vicinity of Amber Lake, 20 miles west of the Parks and Talkeetna Highway Junction. In addition, spruce grouse hunters reported observing ruffed grouse at 4 locations on Ft. Richardson, near Anchorage in 1990, and again in 1991. These reports indicated widely scattered groups of birds have become established in a variety of habitat types throughout the area.

Costs

Because we used volunteers and donated services, the overall costs of the ruffed grouse relocation project were minimal. Expenditures totaled $2348 in 1988. In addition, $3830 in aircraft time was donated for a total of $6178, excluding salaries (Steen 1988).

The 1989 expenditures were $6345, of which $4200 was allocated for radios. An additional $3840 in aircraft time was donated for a total of $10,185, excluding salaries (Steen 1989).

Expenditures in 1990, the final year of the project, totaled $1731, with an additional $1800 of donated aircraft time for a total of $3531, excluding salaries.

The total cost of the relocation project was $10,424, with an additional $9470 in donated aircraft time.

CONCLUSIONS AND RECOMMENDATIONS

A 3-year program to introduce ruffed grouse into the Matanuska-Susitna valleys of Alaska began in 1988 and was completed in 1990. We captured 141 birds in 1307 trap days for an average of 9.2 trap days per bird, using a lily pad trapping method.

Trapping began on 15 September in 1988 and 1990, and on 1 September in 1989. In 1989, capture rates were very poor until the week of 10-16 September. This indicated the dispersal period for ruffed grouse in interior Alaska began the week of 10-16 September. Capture rates remained constant after mid-September until trapping was halted due to heavy snowfall in early October. No data were collected to determine the end of the dispersal period.

Capture mortality was kept to a minimum (2.1%) by modifying the capture and holding techniques described by Backs et al.(1985). The use of confining cardboard shipping boxes for long-term holding reduced attempted escapes and injuries from other birds. Melon wedges provided a high water and sugar diet, reducing problems of dehydration and stress. Using welded wire for trap covering eliminated physical damage to the birds such as scalping and cuts, providing a stronger, healthier bird for release.

Radiocollared birds provided an opportunity to determine movements, mortality and reproduction patterns. Although movements varied, most birds remained within 10 miles of a release site. One adult female moved 23+ miles before being killed. This unusual movement was supported by 2 nonradioed birds that moved 24+ miles before being killed. Necropsy of 3 radiocollared birds showed abundant fat reserves, including a fat layer covering the crop. A fourth bird died in a snow burrow of an apparent gunshot wound. This bird did not have any fat reserves. The nutritional condition of grouse and the large clutch sizes indicated grouse located suitable habitat in the Matanuska-Susitna valleys.

The capture and handling techniques used in this project proved very satisfactory. However, the shipping containers were top-opening, with 2 compartments. It was difficult to get birds into and out of the box, particularly when it was the second bird. A redesigned box with side openings is recommended for any future transplants.

The use of radio transmitters provided valuable data. However, they can influence mortality rates. The weight of the radio appears to be critical, the lighter the radio the better. If the data the radios provide are not critical to the success of the project, it is recommended birds not be telemetered.

Three methods of attaching the radios to the birds were used in the project: gluing, bib and elastic strap. Gluing was not successful. The bib was satisfactory but required 2 people to properly fit and attach. The elastic strap was the easiest, simplest to use and the least evident on the bird.

A monitoring program to access the size and distribution of the population needs to be developed. This program should include establishment of permanent drumming count sites, flushing of birds in specific habitat with the use of dogs, and possibly a banding project.

ACKNOWLEDGMENTS

This project was made possible through the combined efforts of numerous volunteers. Ms. Laurel Bennett conducted the majority of the field work in 1989 and 1990. Without her willingness and drive, the project would not have been as successful. Mike Peryam assisted in all phases of the program, from suggesting the Clear AFB as a capture site, to initial trap placement, to transporting birds from Clear AFB to Palmer and arranging transport with the Alaska Railroad. I would like to thank the Alaska Railroad for transporting birds from Clear AFB to Palmer and the Matanuska Telephone Company for moving birds and equipment. I am indebted to the personnel of Clear AFB for allowing us to use their facilities, for their support in keeping our equipment running, and for all the volunteer help during the 3 years of this project.

I would like to acknowledge and thank all those individuals that have provided encouragement and support for the project, by reporting sightings, collecting road-killed birds, reporting hunter-killed birds, and listening for drummers. Without their assistance we would not have this available information on ruffed grouse harvest and distribution.

My heartfelt thanks to the Anchorage Chapter of the Safari Club International and to the Alaska Waterfowl Association for the monies which made this project possible.

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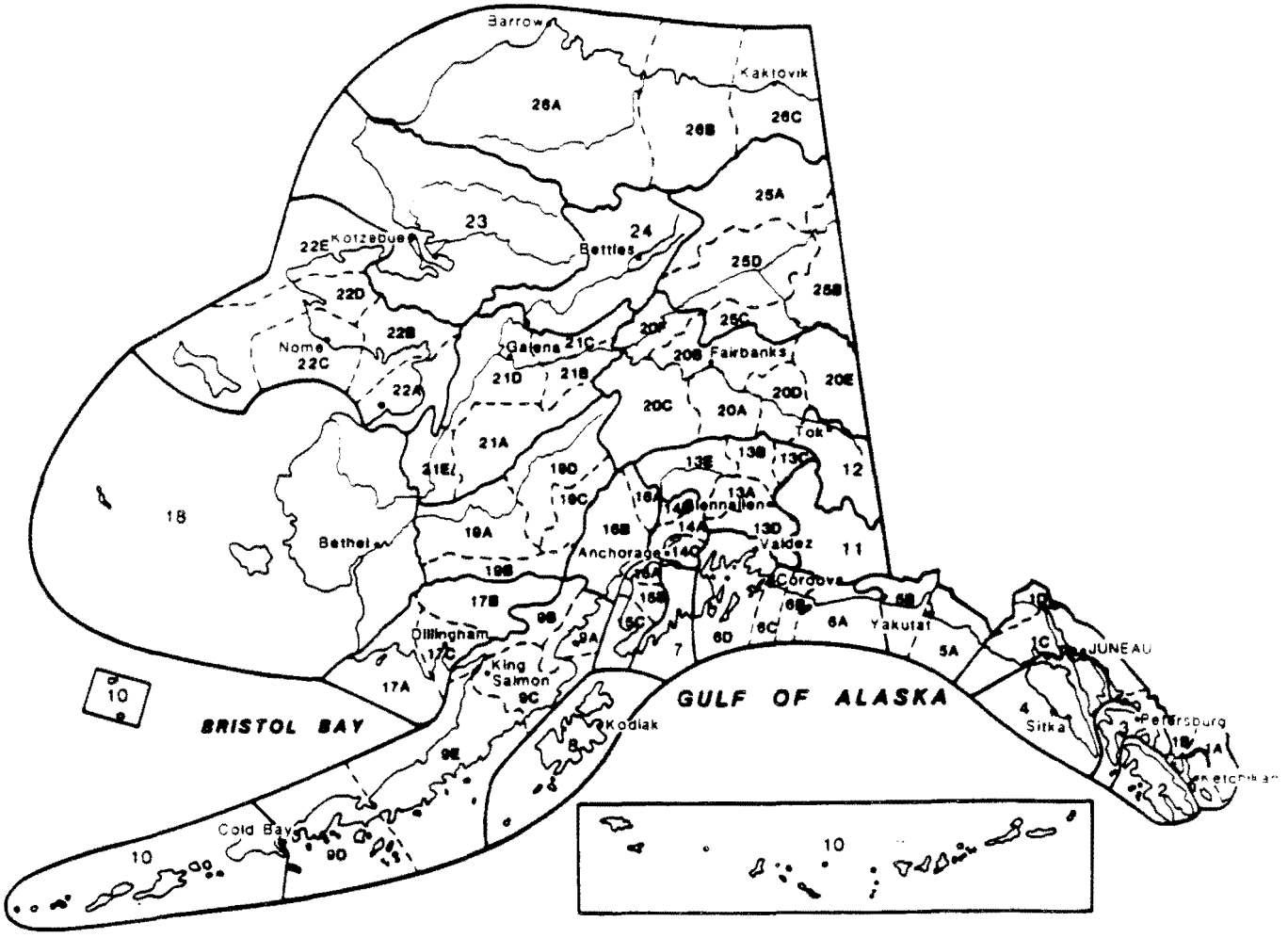

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