Alaska Department of Fish and Game
Division of Wildlife Conservation

Federal Aid in Wildlife Restoration
Survey-Inventory Management Report
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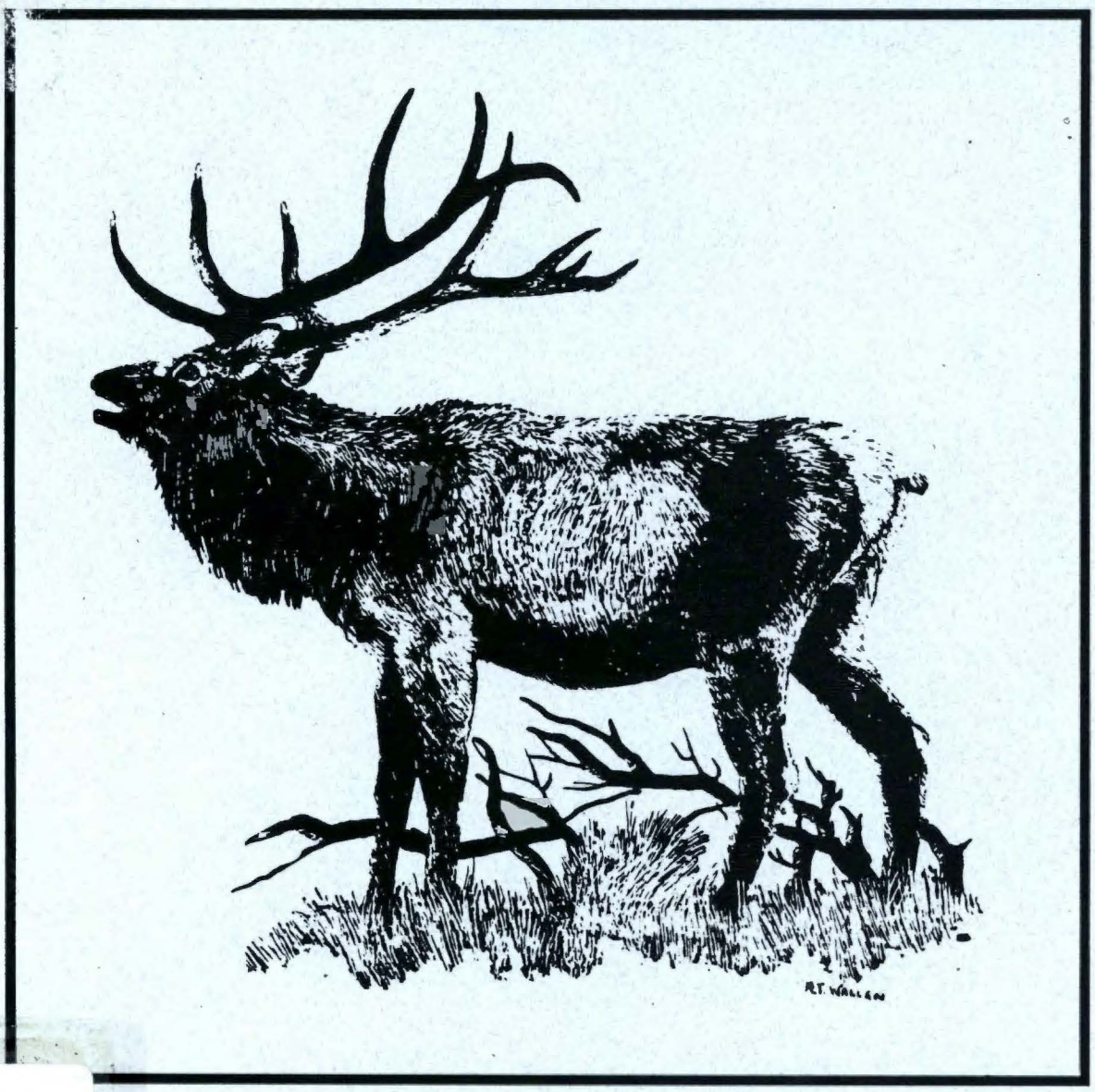
ELK

Susan M. Abbott, Editor



Projects W-23-3 and W-23-4
Study 13.0
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LOCATION

Game Management Unit: Unit 3 (3,000 mi^2)

Geographical Description: Islands of the Petersburg, Wrangell, and Kake areas.

BACKGROUND

Elk (*Cervus elaphus*) are not endemic to Alaska but were successfully introduced into Afognak Island in the Kodiak Archipelago in 1929. There have been several unsuccessful attempts to introduce elk into Southeast Alaska. All previous introductions failed, but lack of monitoring precluded determining the cause of failure.

In 1927 six Roosevelt elk calves (*C. e. roosevelti*) were released on Kruzof Island near Sitka. One calf died and the remaining five were returned to Sitka and held over the winter. In April they were returned to Kruzof Island where one female was later mistaken for a deer and shot. Burris and McKnight (1973) reported, "From the very first these animals have shown a tendency to wander, and to break up into small groups until it is impossible to secure an accurate check on them."

In June 1962, the U.S. Forest Service (USFS) and the Alaska Department of Fish and Game (ADF&G) cooperatively attempted to introduce elk onto Gravina Island near Ketchikan. Eleven calves were captured on Afognak and Raspberry Islands and moved to Gravina, where the elk were penned. Eight survivors were released after three months of captivity. These hand-reared calves were subsequently shot by a homesteader for repeated damage to his garden (Burris and McKnight 1973).

In 1985 the Alaska Legislature passed a bill directing ADF&G to transplant not less than 30 nor more than 150 Roosevelt elk onto Zarembo Island or another suitable location in Southeast Alaska. A companion bill appropriated $50,000 for this project (Alaska Dept. of Fish and Game 1985). An Environmental Assessment (EA) was required because all potential release sites were located in the Tongass National Forest. The EA process required public hearings which were held in several communities in Southeast Alaska during 1985. An interagency task force consisting of ADF&G and USFS biologists assessed the project's biological implications. Etolin Island was chosen as the release site after careful consideration of nine evaluation criteria (Young 1986).

Because the bill specifically excluded Alaska elk as a source for the transplant, other sources were sought. The Oregon Dept. of Fish and Wildlife (ODF&W) offered to trade elk for mountain goats (*Oreamnos americanus*). An agreement with Oregon was made to trade 15 mountain goats for 30 Roosevelt elk. After this trade was completed additional elk were made available by Oregon in a complex trade arrangement involving other states.

Starting in January 1987, 50 elk were moved from Oregon to Etolin Island and released. The elk were transported in three shipments with the last release completed 15 March 1987. A total of 33 Roosevelt elk in two shipments from the Jewel Meadows Elk Refuge were released on southern Etolin Island at Dewey Anchorage. This fulfilled the requirements of the state law. Each animal was fitted with a wide, yellow visual collar that had a black identifying number or letter code; 15 of these animals were also fitted with a radio collar.

Seventeen Rocky Mountain elk (*C. e. nelsoni*) were moved from eastern Oregon and released at a site on northwest Etolin Island. Rocky Mountain elk were used as additional Roosevelt elk were not available. The release site was just north of Johnson Cove and inside Marsh Island. Thirteen of these were fitted with radio collars, and all had blue visual collars with contrasting yellow number or letter codes to provide individual identification.

Radio transmitters in both groups were equipped with a sensor that changed the transmission rate from approximately 75 to 140 pulses per minute if the radio did not move for six or more hours. This normally means the animal is dead.

Aerial radio-telemetry surveys were flown to determine individual elk locations, monitor individual and group movements, and locate dead animals. Fifty-two aerial surveys were flown in fixed-wing aircraft from 22 January 1987 to 30 June 1988. Precise locations were made for elk transmitting radio signals in the "mortality mode." A thorough, on the ground investigation of each death was made when possible. A cooperative ADF&G and USFS field project was conducted during June 1987 to determine the feasibility of using ground surveillance to assess sex and age composition.

The elk population declined until May 1988. Less than half the transplanted animals survived until June 1988. Although the mortality rate declined after August 1987, there was still a net loss, in that fewer elk appeared surviving in June 1988 than the number released.

The June 1988 ground survey located nine adult Roosevelt elk and three yearlings. Two additional adult bulls were subsequently observed . As of June 1988 at least 11 introduced elk and three young born on the island in 1987 were surviving. Animals seen without collars were recorded as born on the island since their size and body conformation indicated they were yearlings.

Of the 17 Rocky Mountain elk released only six were located in the June 1988 survey. No unidentified elk were seen. Four of the 17 radio-collared elk were alive at that time.

As of June 1988 the minimum combined elk population was 20 of which 17 were from the original introduction. This means that at least 34% of the Oregon animals survived the first 18 months after the introduction.

The June 1988 ground survey of the Roosevelt elk herd located two adult males, two yearling males, six adult females, and one yearling female. Another adult female was located by radio but not seen on the southeast side of Etolin Island. A private pilot photographed this cow with two adult bulls in late June 1988, and all three had collars indicating they were from the introduction. It is highly improbable that the two adult males were from the group of eight adults seen on the West side of Etolin one week earlier. This radio-collared female moved from the release site shortly after the release and has since been located in the vicinity where photographed. No known elk mortality has been documented for those animals fitted with radio collars since May 1988.

MANAGEMENT DIRECTION

No Federal Aid objectives for elk exist in Unit 3. However, the Etolin Island winter carrying capacity has been estimated at 900 elk (Alaska Dept. of Fish and Game, 1985). Clearcut logging continues and 27,450 acres are scheduled to be cut between 1980 and 2080 (USFS, unpubl. data). This is expected to reduce carrying capacity. As several decades may be required for the elk population to reach carrying capacity, the division's current plan is to provide total protection for maximum population growth. A bulls-only season would be initiated when the population reached approximately 250 animals and a post-harvest ratio of 25-30 bulls per 100 cows would be maintained (Alaska Dept. of Fish and Game, 1985).

METHODS

Radio telemetry was used to locate individuals and groups. When possible, we checked elk visually. Reports from fishermen, loggers, and other members of the public were recorded. In July 1989, personnel from ADF&G and the USFS conducted an on-the-ground survey to monitor calf production and survival. USFS personnel also surveyed 2 areas of elk winter range.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size: No natural mortality was noted this report period. The last known natural mortality occurred in May 1988. Based on radio telemetry flights and reports from the public the elk population is now apparently increasing. One observer reported 23 elk at McHenry Anchorage and only two had identification collars. As all elk released were fitted with collars this suggests that 21 of the 23 had been born on the island. Ten of the original 28 animals fitted with radio collars were still alive when last checked.

Rocky Mountain elk have established themselves on Zarembo Island. Two cows with radio collars were located repeatedly on the island. Visual sightings of these animals were made during this report period. These two cows were seen with a calf each during summer 1989 and a bull having small, branched antlers was seen with them. A group of two calves, two cows, and a bull were also seen in 1991.

Based on current information, we now estimate that the elk population exceeds 50 animals. Reports from the public, primarily pilots and commercial fishermen, indicate continued calf production and survival.

Population Composition: No data are available to make a meaningful population composition estimate. Reports from the public mention elk with collars and others without collars but the sporadic nature of the sightings and the low numbers seen are insufficient for drawing any conclusions. Continued calf production indicates the presence of bulls.

Distribution and Movements: Roosevelt elk have dispersed somewhat from the release site but still use the release area in their range. Some elk were located above 1,500 feet during this report period. No specific seasonal movements were noted. One cow that moved East to Brownson Island returned to Etolin and joined with a large (>20) group.

After remaining near the release site the first 18 months, the Rocky Mountain elk have dispersed widely. One group of five was seen regularly at the fish hatchery located on the east shore of Burnett Inlet, about 10 air miles east of the release site. Two cows with at least one bull moved from Etolin to Zarembo Island. This involved swimming across 2 or more miles of saltwater.

For both sub-species the area below 500 feet and adjacent to the shore is the preferred habitat in spring and early summer. Some elk are now moving higher into the mountains in summer but apparently prefer lowlands close to the release sites during winter.

Mortality

Harvest:

Season and Bag Limit. No open season

Other Mortality: No natural mortality was recorded this report period. The last known natural death occurred in May 1988. Brown bears, black bears, and grey wolves occur on Etolin Island and wolves are found on Zarembo Island but the extent of predation on elk is not known.

Habitat

The winter carrying capacity of Etolin Island for elk has been estimated at 900 where elk winter range consists of the following: Clearcut - 2 mi^2; Second growth - 2.2 mi^2; Non-forest or non-commercial forest - 72.9 mi^2; Old growth forest - 124.4 mi^2 (Alaska Dept. of Fish and Game, 1985). The spring survey of the two wintering areas indicated no habitat deterioration associated with three years of elk use.

CONCLUSIONS AND RECOMMENDATIONS

The elk population in Unit 3 is apparently increasing after its initial losses. The survival of all radio-equipped animals during this period is encouraging. Continued monitoring, both by radio and on the ground, is essential.

LITERATURE CITED

Alaska Department of Fish and Game. 1985. Biological Feasibility of Transplanting Elk in Southeast Alaska. Juneau. 19pp.

Burris, O. E. and D. E. McKnight. 1973. Game Transplants in Alaska. Alaska Dep. of Fish and Game. Fed. Aid in Wildl. Rest. Game Tech. Bull. No. 4. Proj. W-17 R. Juneau. 57pp.

Land, C. R. and D. James. 1989. Unit 3 elk survey-inventory progress report. Pages 1-10 in S. Morgan, ed. Annual report of survey-inventory activities. Vol. XIX, Part III, Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-23-1, Study 13.0. Juneau. 22pp.

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LOCATION

Game Management Unit: 8 (5,097 mi^2)

Geographical Description: Kodiak and adjacent islands

BACKGROUND

The Roosevelt elk population in Unit 8 originated from a release of 8 animals near Litnik Bay on Afognak Island in 1929 (Batchelor 1965). The population was estimated at more than 200 elk in 1948, and the first hunt occurred in 1950. Hunts have been held annually since 1955. By 1965 the population reached an estimated peak of 1,200-1,500 elk, with 9 herds on Afognak Island and 1 herd on nearby Raspberry Island. A series of severe winters resulting in extensive mortality reduced the population to an estimated 450 elk by 1972 (Burris and McKnight 1973). Improved winter conditions and conservative harvests resulted in a recovery to over 1,000 elk by the early 1980s.

Accessibility of elk herds to hunters was the most important consideration in managing harvest this past decade. The Raspberry Island herd and the southwestern Afognak Island herd, which were most accessible, were regulated with drawing and registration permit hunts. Season closures by emergency order were used frequently to enforce annual harvest quotas.

Access to other Afognak Island herds was relatively limited until 1975 when commercial logging activities began. Increased elk harvest near logging roads in central and eastern Afognak Island correlated with a decline in those herds by the mid-1980s. In 1986 the Board of Game imposed a shorter hunting season for eastern Afognak Island where extensive logging road access was available.

Hunting pressure was stable, averaging 636 hunters afield (range=498-718) from 1986-90. Average annual harvest during that period was 163 elk (range 120-206).

MANAGEMENT DIRECTION

Management Objective

The management objective is to maintain a population of at least 1,000 elk for use by all user groups.

METHODS

Aerial composition counts were done annually in July-September using a Piper PA-18 aircraft with 1 observer. Supplemental counts of herds larger than 50 animals were made from color slides taken during aerial surveys.

Using helicopter darting techniques in 1986 and 1989, we captured 18 elk and equipped them with radiocollars. Each year we made 6-8 flights with fixed-wing aircraft to relocate collared animals.

We collected data on harvest and hunting effort from mandatory hunting reports, from field check stations, and periodic monitoring of hunting activity by boat and aircraft. Lower jaws were collected for aging.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size: The estimated size of the elk population ranged from 1,175-1,580 animals between 1986 and 1990 (Table 1). At least 8 separate herds existed on Afognak Island, while all the Raspberry Island elk tended to group in 1 herd. The Raspberry Island herd declined sharply from 200-230 elk in 1988 to 150-160 elk in 1989. Emigration to nearby Afognak Island was suspected based on an unconfirmed report that a herd of elk was observed swimming from Raspberry Island to Afognak Island in late 1988. The single herd on southwestern Afognak Island increased with a peak population estimate in 1989 of 475-550 elk. Although annual composition count sample sizes were small, the 4 herds on eastern Afognak Island were believed to be increasing, with an estimated 300-425 elk in 1990. A stable to slightly declining population trend was indicated for the 3 herds on northwestern Afognak Island, with an estimated 300-425 elk in 1990. A decline in the total 1990 composition count may indicate an overall population decline.

Population Composition: A declining trend in bull:cow ratios was apparent by 1990 when the lowest annual ratios were recorded in 3 of the 4 management areas (Table 1). Calf:cow ratios ranged from 26 calves:100 cows in 1988 and 1989, to 42 calves:100 cows in 1990. Because spike bulls were difficult to distinguish in aerial surveys, both bull:cow ratios and calf:cow ratios were probably biased.

A decline in the percent of bulls in the 1990 harvest (Table 2) further validates the declining bull:cow ratio noted in composition counts. Continued hunter selectivity for bulls and winter mortality may explain this trend. Survey conditions varied considerably each year. Although we tried to do surveys in early morning and late afternoon to

correspond with expected peak elk activity, aircraft were often unavailable when survey weather was suitable.

Distribution and Movements: Distribution of 6 of the 8 Afognak Island elk herds was monitored by relocating radiocollared elk beginning in July 1986. We collected 429 point locations for 18 captured elk since 1986 (Table 3). We delineated home ranges for the 6 herds represented by the radiocollared elk (Fig. 1). Alexander (1973) also identified 8 elk herds on Afognak Island during a 1970-1972 telemetry study, but distribution of the herds was not identical. We found only a remnant herd of < 25 animals on the Tonki Cape Peninsula compared to Alexander's findings that the largest elk herd, estimated at 120 elk, occupied that area in the early 1970s. We found a large herd (>100 elk) ranging in the adjacent Seal Bay-Izhut Bay drainages, an area which was not delineated as elk range by Alexander. Alexander's study was done when the population was relatively low, < 500 elk, whereas the population exceeded 1,000 elk during the present study.

Mortality

Harvest:

Season and Bag Limit. The open season for resident and non-resident hunters for Raspberry Island was 1 October-15 November; the bag limit was 1 elk by drawing permit only. Up to 300 permits were issued in 1989/90 and up to 60 permits were issued in 1990/91.

The open season for resident and nonresident hunters in that portion of Afognak Island south and west of a line from the head of Malina Bay to the head of Back Bay was 1 September-10 October; the bag limit was 1 elk by drawing permit only, with up to 400 permits issued in 1989/90 and up to 210 permits issued in 1990/91. A second open season for resident and nonresident hunters was held 15 October-15 December with a 1 elk bag limit by registration permit only.

The open season for resident and nonresident hunters in that portion of Afognak Island east of a line from the head of the northwest arm of Kazakof Bay to Delphin Point in Perenosa Bay was 1 September-15 November, and the bag limit was 1 elk by registration permit only.

The open season for resident and nonresident hunters in the remainder of Unit 8 was 1 September-15 December with a 1 elk bag limit registration permit only.

Board of Game Actions and Emergency Orders. In 1986 the Board of Game replaced the Raspberry Island registration permit hunt with a drawing permit hunt. That action was taken after high hunter density and a rapid harvest rate required an emergency closure after only 3 days in 1985. Hunters were dissatisfied with the crowded hunting conditions

under the registration permit hunt, and the rapid harvest rate made it difficult to keep the harvest within allowable limits.

Hunting in the southwestern Afognak Island area was regulated with a registration permit hunt through the 1986 season. An emergency order was issued that season when it was discovered that 44 elk had died in an accidental fall from a cliff near Malina Bay. It was suspected that hunters accidentally stampeded the elk off the cliff. The Board of Game subsequently adopted a departmental recommendation for a series of drawing permit hunts to reduce both hunter density and harvest.

The drawing permit hunt curtailed the 1987 and 1988 harvests more severely than we predicted, and the elk population increased above estimated carrying capacity. The Board adopted the department's recommendation that a registration permit hunt be held following the drawing permit hunt to assure adequate harvest in 1989. Local residents supported establishing a registration hunt, because they felt that a drawing hunt did not provide adequate opportunity to participate. Using two types of permit hunts effectively achieved harvest objectives in 1989 and 1990.

The effects of an expanding logging road system east of Kazakof Bay on harvest rates became apparent in 1984 and 1985 when emergency order closures were required. The Board of Game adopted the department's recommendation to implement a shorter season for 1986 in eastern Afognak Island where logging roads now provide excellent access.

Hunter Harvest. The annual harvest ranged from a low of 121 elk in 1987 to a high of 206 elk in 1989 (Table 2). We noted a slightly increasing trend in harvest in both the eastern and northwestern Afognak Island areas. Harvest from Raspberry Island declined proportionally to reductions in permits. Harvest in the southwestern Afognak Island area increased in 1989 and 1990 when a registration permit hunt was added after the drawing hunt. A declining trend in the proportion of bulls and an increasing trend in the proportion of cows in the harvest was noted in all hunting areas. Those trends were mirrored in the declining bull:cow ratios in aerial composition surveys.

Permit Hunts. The change from a registration to a drawing permit hunt for southwestern Afognak Island was more effective in reducing harvest than expected in 1987 and 1988 because of relatively low hunter participation (Table 2). Adding a registration hunt resulted in the desired increase in harvest, with the harvest evenly divided between the drawing and registration permit hunts. Hunter success was higher, and the frequency of bulls in the harvest was higher in the drawing hunt than in the registration hunt.

The number of hunters afield was lowest in 1987 and 1988, when the southwest Afognak Island area was regulated by a drawing permit hunt (Table 2). That area was easily accessible and highly popular among hunters residing in Unit 8. Hunters numbers increased again when registration hunts were reinstated in 1989 and 1990.

Hunter Residency and Success. Hunter success ranged from 25% in 1988 to 32% in 1990 (Table 4). Successful hunters were primarily residents of Unit 8, followed by other Alaska residents, and nonresident hunters.

Harvest Chronology. Table 5 shows the annual harvest chronology. Seasonal weather patterns largely determine harvest chronology in Unit 8. When aircraft and boat transportation are restricted by weather, conditions are usually poor for hunters in the field. A comparatively high harvest in December 1990 followed a heavy snowfall which made elk vulnerable to hunters along a new logging road west of Kazakof Bay.

Transport Methods. Aircraft predominated, followed by boats and highway vehicles, as the most often used forms of transportation by hunters (Table 6). Increased highway vehicle use corresponded with increased logging activity and construction of a new logging road system west of Kazakof Bay in 1989. Two logging camps employing an estimated 200 workers were active in Kazakof Bay during 1989 and 1990. The logging roads provided potential access to 6 of the 8 elk herds on Afognak Island. As more roads are built, hunting regulations will undoubtedly have to become more restrictive.

Other Mortality: Increases in natural mortality may be inferred from trends in composition counts, though losses of individual animals usually go undetected. During the 1990-91 winter 4 of 13 radio-collared cow elk died of natural causes. A decline in the bull:cow ratio also suggested that winter mortality was a factor in regulating the population.

Smith (1987) previously noted the deaths of 44 elk in a fall from a cliff during the 1986 hunting season. No witnesses to the accident were found, but based on reports of hunters who observed an elk herd near the accident site it was suspected the elk were stampeded by hunters. The dead elk included 15 males, 22 females, and 7 elk of unknown sex, with ages ranging from < 1 year - > 4 years.

Habitat Assessment

The elk population was estimated at 1,200-1,500 in 1990, comparable to the 1,200 elk estimated in 1963 by Batchelor (1965). Based on that population estimate, elk density was 1.5 - 1.9 elk/mi^2 in 1990. Batchelor stated that willow (*Salix* spp.) and elderberry (*Sambucus racemosa*) were the principal winter browse species, and he considered those species excessively browsed on winter range in the Afognak Lake area in the early 1960s. The elk population subsequently declined to an estimated 450 elk after the severe winters of 1970-71 and 1971-72 (Alexander 1973). The estimated density based on that population low was 0.6 elk/mi^2.

Optimum carrying capacity for elk is probably within the range between the lowest (0.6 elk/mi^2) and the highest (1.9 elk/mi^2) densities estimated within the past 2 decades.

Carrying capacities of the ranges of individual elk herds undoubtedly vary with differences in plant composition, timber stand density, topography, and aspect.

Rapid conversion of the privately-owned Sitka spruce (*Picea sitchensis*) forest by clearcut logging further complicates the assessment of carrying capacity. Since 1975 several thousand acres of mature coastal forest within the ranges of 6 Afognak Island elk herds have been removed. Gross examination of the clearcuts indicates that grass (*Calamagrostis* sp.), forbs and shrubs, including salmonberry (*Rubus spectabilis*), alder (*Alnus sinuata*) and blueberry (*Vaccinium ovalifolium*) are the predominant plants of this successional stage. Previous work on plant succession in small clearcuts logged in the 1940s, indicated that regrowth of Sitka spruce was retarded by excessive competition with grass and shrubs (Harris 1972). Although forage quantity apparently increased in clearcuts, the loss of forest cover may offset those benefits. At current harvesting rates, most of the commercial timber will probably be removed within the next 25 years. If large areas support second-growth stands with closed canopies, a serious decline in elk carrying capacity may occur.

The department periodically reviews timber harvest plans which private landowners are required to submit to the Department of Natural Resources. Current State laws regulating timber harvest on private land do not specifically provide for protecting terrestrial wildlife habitat, so that logging practice reviews are only advisory. One major timber management firm, KONCOR, signed a cooperative agreement with the department in 1988 to promote information exchange and encourage voluntary compliance with departmental recommendations on timber harvest. The department recently provided KONCOR with timber harvest guidelines for protecting habitat for elk, brown bear and Sitka black-tailed deer.

Nonregulatory Management Problems/Needs

Logging roads are rapidly improving hunters' access to elk in previously remote drainages. The potential for excessive harvest of individual herds is enhanced by hunters' increased mobility. Efficacy of the annual aerial composition counts varies, and accuracy of aerial counts in heavily forested areas is often poor. Deploying radiocollars on elk improves our ability to locate major herds, but sometimes population size must be estimated from incomplete counts. Moreover, accurately distinguishing cows from yearling bulls is extremely difficult from aerial surveys. With the increased harvest efficiency provided by roads, more precise annual composition counts are needed, and the ranges of each elk herd must be known. Maintaining radio-collared elk in each herd and increasing the intensity of aerial surveys should fill those needs to a large extent. Although labor-intensive, composition counts from the ground may be necessary to gain accuracy for herds most susceptible to excessive harvest.

Management of the elk herds on Raspberry Island and southwestern Afognak Island has continued to be controversial, particularly with Unit 8 residents. Relatively few local

residents harvest elk when these hunts are managed by drawing permit, whereas locals have a decided advantage over nonlocals with a registration permit hunt. This has led to Board proposals to allocate the harvestable surplus from 2 herds to local residents under provisions of the State's subsistence preference law. A segment of the public, mostly nonlocals, who would like management oriented toward producing more trophy bulls.

CONCLUSIONS AND RECOMMENDATIONS

Elk numbers were near historic peak levels until 1990 when declines in bull:cow ratios and composition count sample size occurred. High natural mortality among radio-collared elk during the 1990-91 winter suggested that poor overwinter survival influenced the decline. Elk carrying capacity was estimated at 0.6 - 1.9 elk/mi^2, the range in estimated elk density since the mid-1960s.

Annual ranges of 6 of the elk herds in Unit 8 have been documented by monitoring the movements of 18 radio-collared elk since 1986. Proliferating logging roads have rapidly improved access for hunters and increased the vulnerability of previously remote and lightly harvested elk herds. Privately-owned, mature Sitka spruce forest of central and eastern Afognak Island was rapidly converted to a seral grass/brush community by clearcut logging. Although forage production improved in clearcuts, the loss of forest cover, the effects of disturbance, and the development of second-growth stands may affect overall elk carrying capacity.

Elk are more vulnerable to hunting because of an expanding system of logging roads. This requires that each herd be managed individually. I recommend continuing and expanding the telemetry study to document the distribution of all Unit 8 elk herds. Improving the accuracy of composition counts is another priority which may require more intensive aerial surveys and counts from the ground. A technique for assessing winter mortality would be useful in interpreting the survey composition counts. Ground composition counts in late spring should be explored as a possible technique. Management objectives should be developed for each herd. This information will be used to develop herd specific management objectives and integrate those elk management objectives with forest management objectives.

The lack of objective data on the effects of logging on elk habitat on Afognak Island limits our effectiveness in influencing logging practices. We need quantitative data on elk food habits, plant succession, and habitat carrying capacity. High hunter selectivity for bull elk with either sex hunts has contributed to low bull:cow ratios. Alternative harvest regimes such as specified sex permits and post-rut hunting seasons should be explored to increase recruitment of mature bulls and to assess affects on population recruitment.

LITERATURE CITED

Alexander, J. E. 1973. Seasonal movements of elk. Alaska Dep. Fish and Game, Fed. Aid in Wildl. Rest. Final Research Report. Proj. W-17-3 and W-17-4, Job 13.1 R. Juneau, 37 pp.

Batchelor, R. F. 1965. The Roosevelt elk in Alaska--it ecology and management. Alaska Dep. Fish and Game, Fed. Aid in Wildl. Rest. Proj. Rep. Vol. V: Proj. W-6-R-S, Work Plan D. Juneau. 37 pp.

Burris, O. E. and D. E. McKnight. 1973. Game transplants in Alaska. Alaska Dep. Fish and Game. Game Tech. Bull. No. 4. Juneau. 57 pp.

Harris, A. S. 1972. Natural reforestation after logging on Afognak Island. USDA Forest Serv. Res. Pap. PNW-176, 11 pp. Pacific Northwest Forest and Range Exp. St., Portland, Oregon.

Smith, R. B. 1987. Elk survey-inventory progress report. S. O. Morgan, ed. Annual report of survey-inventory activities. Vol. XVIII, Para III Alaska Dep. Fish and Game, Fed. Aid in Wild. Rest. Prog. Rep. Proj. W-22-6. Job 13.0, Juneau. 4 pp.

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Figure 1. Home range polygons for six Afognak Island elk herds, 1986-1990.

A.	Tonki Peninsular herd	D.	Duck Mountain herd
B.	Seal Bay-Saposa Bay herd	E.	Waterfall Lake herd
C.	Portage Lake herd	F.	Marka Lake herd

Table 1. Unit 8 summer aerial elk composition counts and estimated population size, 1986-91.

Area	Regulatory year	Bulls: 100 Cows	Calves: 100 Cows	Calves (%)	Adults	Total elk observed	Estimated population size
Raspberry Island (Hunt No. 702-707)	1986/87	18	39	52 (25)	159	211	220-230
	1987/88	11	24	38 (18)	177	215	220-230
	1988/89	6	20	26 (16)	138	164	200-230
	1989/90	12	40	27 (26)	76	103	150-160
	1990/91	3	56	54 (35)	100	154	155-175
Southwestern Afognak Island (Hunt No. 708-710, 751)	1986/87	28	44	83 (26)	239	322	350-375
	1987/88	37	28	48 (17)	235	283	300-325
	1988/89	11	30	96 (21)	356	452	450-550
	1989/90	10	28	88 (20)	346	434	475-550
	1990/91	6	16	14 (8)	94	108[a]	400-425
Eastern Afognak (Hunt No. 750)	1986/87	15	42	25 (27)	69	94	190-230
	1987/88	7	43	64 (43)	160	224	230-260
	1988/89	7	34	35 (24)	111	146	250-300
	1989/90	6	22	4 (17)	19	23	200-300
	1990/91	--	--	-- --	--	[b]	300-425
Northwestern Afognak (Hunt No. 752)	1986/87	4	30	105 (23)	361	466	475-500
	1987/88	7	16	33 (13)	218	251	425-600
	1988/89	8	17	71 (17)	350	421	450-550
	1989/90	12	21	66 (16)	347	413	450-500
	1990/91	13	48	69 (30)	162	231	350-475

Table 1. Con't.)

Area	Regulatory year	Bulls: 100 Cows	Calves: 100 Cows	Calves (%)	Adults	Total elk observed	Estimated population size
Total all areas	1986/87	14	36	265 (24)	828	1,093	1,235-1,335
	1987/88	16	27	183 (19)	790	973	1,175-1,415
	1988/89	17	26	228 (19)	955	1,183	1,375-1,580
	1989/90	11	26	185 (19)	788	973	1,275-1,510
	1990/91	8	42	137 (28)	256	493	1,205-1,500

[a] An additional herd of 179 unclassified adults and 71 calves was observed.
[b] A herd of 167 unclassified adults and 49 calves was observed.

Table 2. Unit 8 elk harvest data by permit hunt, 1986-91.

Hunt Area/No.	Regulatory Year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Bulls (%)	Cows (%)	Unk.	Illegal/ unreported	Total harvest
Raspberry Is.	1986-87	300	62	50	50	30 (55)	25 (45)	0	--[a]	55
(Drawing Hunt	1987-88	200	55	62	38	19 (58)	14 (42)	0	0	33
No. 702-707)	1988-89	230	51	72	28	17 (57)	13 (43)	0	0	30
	1989-90	200	66	66	34	8 (36)	14 (64)	0	0	22
	1990-91	60	62	50	50	4 (36)	7 (64)	0	0	11
Southwestern	1986-87	1,013	--[b]	62	38	47 (92)	4 (8)	6	--[a]	57[e]
Afognak Is.	1987-88	225	82	62	38	12 (80)	3 (20)	0	0	15
(Drawing Hunt	1988-89	300	65	66	34	30 (91)	3 (9)	1	3	37
No. 708-710)	1989-90[c]	300	71	51	49	31 (76)	10 (24)	1	0	42
	1990-91	210	67	34	66	25 (56)	20 (44)	0	0	45
Southwestern	1989-90[c]	1,045	--[b]	66	34	36 (54)	31 (46)	1	0	68
Afognak Island	1990-91[c]	1,065	--[b]	64	36	11 (28)	29 (72)	0	0	40
(Registration Hunt No. 751)										
Northwestern	1986-87	1,013	--[b]	80	20	31 (63)	18 (37)	3	--a	52
Afognak Island	1987-88	717	--[b]	69	31	30 (55)	25 (45)	5	0	60
(Registration	1988-89	737	--[b]	77	23	23 (62)	14 (38)	4	0	41
Hunt No. 752)	1989-90	1,045	--[b]	70	30	28 (68)	13 (31)	6	0	47
	1990-91	1,065	--[b]	73	27	28 (38)	45 (62)	1	0	74
Eastern	1986-87	1,013	--[b]	96	4	2 (67)	1 (33)	1	--a	4
Afognak Island	1987-88	717	--[b]	88	12	8 (73)	3 (27)	1	1	13
(Registration	1988-89	737	--[b]	82	18	15 (79)	4 (21)	0	2	21
Hunt No. 750)	1989-90	1,045	--[b]	83	17	13 (68)	6 (32)	7	0	26
	1990-91	1,065	--[b]	83	17	15 (54)	13 (46)	1	0	29

Table 2. (Con't.)

Hunt Area/No.	Regulatory Year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Bulls (%)	Cows (%)	Unk.	Illegal/ unreported	Total harvest
Total all areas	1986-87	1,313	47	74	26	111 (70)	48 (30)	10	2	171
	1987-88	1,210	63	71	29	69 (61)	45 (39)	6	1	121
	1988-89	1,267	56	74	26	85 (71)	34 (29)	5	5	129
	1989-90	1,545	56	69	31	116 (61)	74 (39)	16	0	206
	1990-91	1,335	52	67	33	84 (42)	115[d] (58)	2	0	201

[a] Illegal kill not available by geographic hunt area in 1986/87; no illegal kill documented in 1989 or 1990.
[b] Registration permit hunts valid for multiple hunts so % of permittees not hunting in a specific area not a valid statistic.
[c] Both drawing permits and registration permits valid in this area in 1989, 1990.
[d] Includes 1 cow taken by registration permit but area unreported.
[e] An estimated 44 elk were killed in an accident during the hunting season.

Table 3. Summary of elk capture and status of radio-collared elk, 1987-91.

Herd	I.D. No.	Sex	Estimated age	Capture date	Ear tag no. (L/R)	No. re-locations	Period monitored	Comments
Portage Lake	86-1	F	8-10	7-7-86	355/356	40	7-86 to 12-90	Found dead by logger 4-91; winter mortality
	86-3	F	4	7-9-86	351/10939	36	7-86 to 10-90	Shot by hunter 10-29-90
	89-5	F	6	7-6-89	383/382	15	7-89 to 5-91	Winter mortality by 5-23-91
Duck Mountain	86-4	F	5	7-9-86	369/370	2	--	Capture mortality
	86-8	F	10+	7-9-86	384/385	36	7-86 to 5-91	Winter mortality by 5-19-91
	89-3	F	2	7-2-89	362/361	18	7-89 to present	
	89-6	F	6	7-6-89	377/386	21	7-89 to present	
	89-8	F	8+	7-6-89	391/379	18	7-89 to present	
Seal Bay	86-2	F	5+	7-7-86	372/374	39	7-86 to 5-91	Winter mortality by 5-19-91
Saposa Bay	86-5	F	5+	7-9-86	363/364	41	7-86 to 11-91	Hunter kill 11-13-91
	86-6	F	5+	7-9-86	367/368,10975	39	7-86 to present	
	89-1	F	5+	6-30-89	366/394	22	6-89 to present	
	89-4	F	8+	7-2-89	376/395	20	7-89 to present	
Tonki	86-7	F	5+	7-9-86	374/373	34	7-86 to present	
Peninsula	89-2	F	-	6-30-89	387/388	8	6-89 to 4-90	Winter mortality by 4-26-90
Marka Lake	89-9	M	2	7-6-89	358/357	6	7-89 to 10-89	Hunter kill 10-7-89
	89-10	F	10+	7-7-89	359/360	14	7-89 to 10-90	Hunter kill 10-4-90
Waterfall Lake	89-7	F	4	7-6-89	389/390	20	7-89 to present	

Table 4. Unit 8 elk hunter residency and success, 1986-91.

Regulatory year	Successful				Unsuccessful				Total[b] hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total(%)	Local[a] resident	Nonlocal resident	Nonresident	Total (%)	
1986/87	108	54	7	169 (27)	201	229	29	459 (73)	628
1987/88	64	49	7	120 (29)	122	159	16	297 (71)	417
1988/89	62	54	8	124 (25)	149	202	18	369 (75)	493[c]
1989/90	113	87	6	206 (31)	162	275	18	456 (69)	662
1990/91	106	91	4	201 (32)	196	214	22	432 (68)	633[d]

[a] Local means resident of Unit 8.
[b] Hunters participating in more than one permit hunt were tallied for each hunt.
[c] Does not include 6 unsuccessful hunters whose residency is unknown.
[d] Does not include 1 unsuccessful hunter with residence unknown.

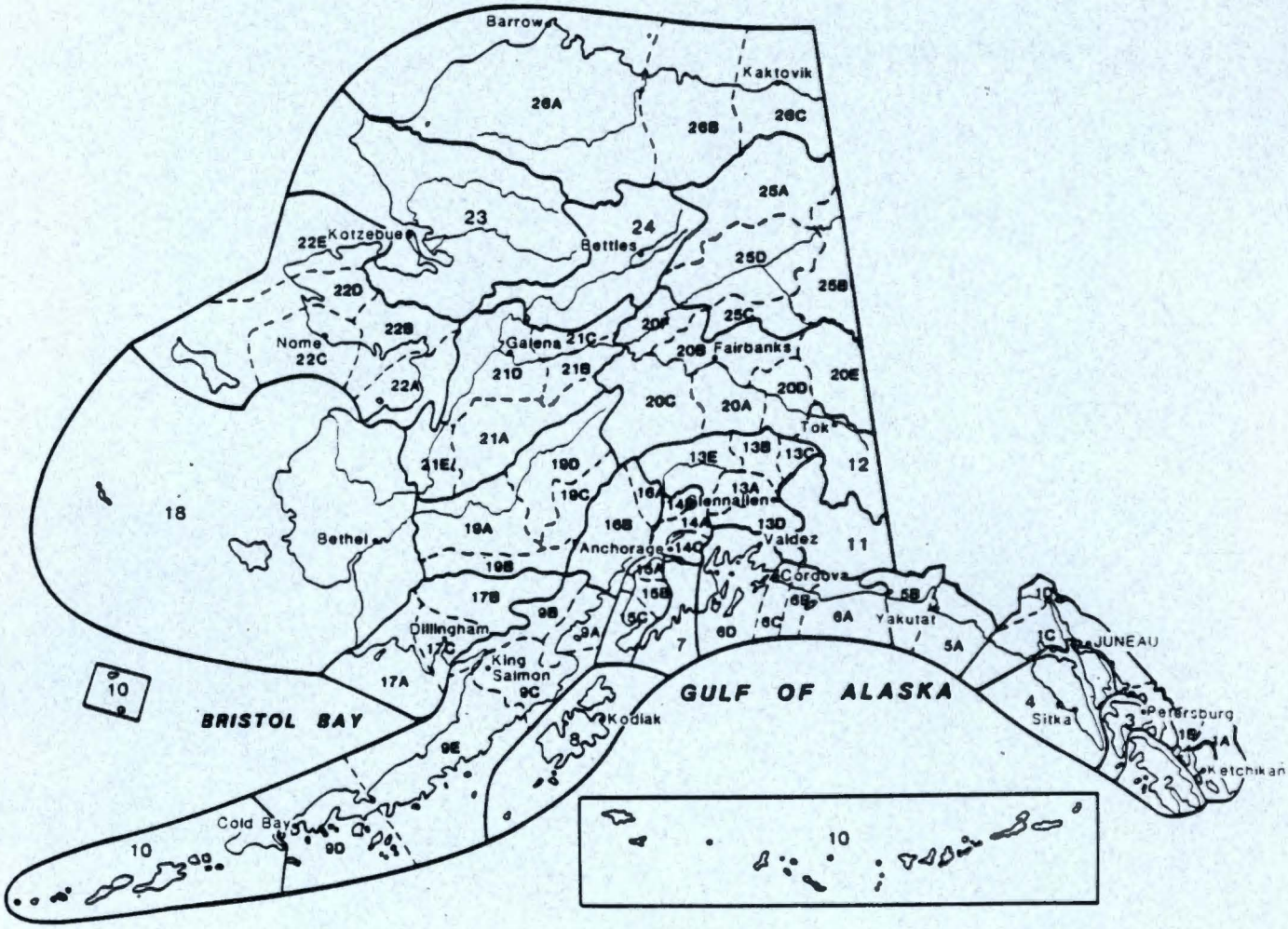
Table 5. Unit 8 elk harvest chronology percent by 15-day period, 1987-91.

Area	Regulatory year	Harvest periods by percents							n
		9/1-15	9/16-30	10/1-15	10/16-31	11/1-15	11/16-30	12/1-15	
Raspberry Is.	1986/87	--	--	--	--	--	--	--	55
	1987/88	--	--	--	--	--	--	--	33
	1988/89	--	--	--	--	--	--	--	30
	1989/90	--	--	--	--	--	--	--	22
	1990/91	--	--	9 (82)	2 (18)	0	--	--	11
Southwestern	1986/87	--	--	--	--	--	--	--	57
Afognak Is.	1987/88	--	--	--	--	--	--	--	15
	1988/89	--	--	10 (29)	20 (59)	4 (12)	--	--	34
	1989/90	11 (10)	24 (22)	8 (7)	26 (23)	6 (5)	19 (17)	17 (15)	111
	1990/91	12 (14)	26 (30)	13 (15)	35 (41)	--	--	--	86
Northwestern	1986/87	--	--	--	--	--	--	--	52
Afognak Is.	1987/88	8 (13)	7 (12)	15 (25)	5 (8)	15 (25)	4 (7)	6 (10)	60
	1988/89	3 (7)	7 (17)	5 (12)	8 (20)	2 (5)	13 (32)	3 (7)	41
	1989/90	3 (6)	17 (36)	5 (11)	4 (9)	1 (2)	5 (11)	12 (26)	47
	1990/91	2 (3)	22 (30)	6 (8)	4 (5)	4 (5)	7 (9)	29 (39)	74
Eastern	1986-87	--	--	--	--	--	--	--	4
Afognak Is.	1987/88	1 (8)	0	7 (58)	4 (33)				12
	1988/89	--	1 (5)	7 (37)	11 (58)	--	--	--	19
	1989/90	1 (4)	0	4 (15)	7 (27)	13 (50)	--	--	26
	1990/91	2 (7)	1 (3)	6 (21)	9 (31)	9 (31)	--	--	29

Table 6. Unit 8 elk harvest percent by transport method, 1986-91.

Regulatory year	Percent of harvest						n
	Airplane	Horse	Boat	ORV	Highway vehicle	Unknown	
1986/87	56 (33)	0	91 (54)	0 (0)	1 (1)	21 (12)	169
1987/88	65 (54)	0	46 (38)	2 (2)	2 (2)	5 (4)	120
1988/89	65 (52)	0	46 (37)	1 (1)	2 (2)	10 (8)	124
1989/90	94 (46)	0	77 (37)	0 (0)	12 (6)	23 (11)	206
1990/91	86 (43)	0	69 (34)	1 (T)	15 (7)	30 (15)	201

Alaska's Game Management Units



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