

**Elk  
Management Report  
of Survey-Inventory Activities  
1 July 2001–30 June 2003**

**Cathy Brown, Editor  
Alaska Department of Fish and Game  
Division of Wildlife Conservation**



**Photo by Riley Woodford, ADF&G**

**Funded through  
Federal Aid in Wildlife Restoration  
Grants W-27-5 and W-33-1, Project 13.0  
December 2004**

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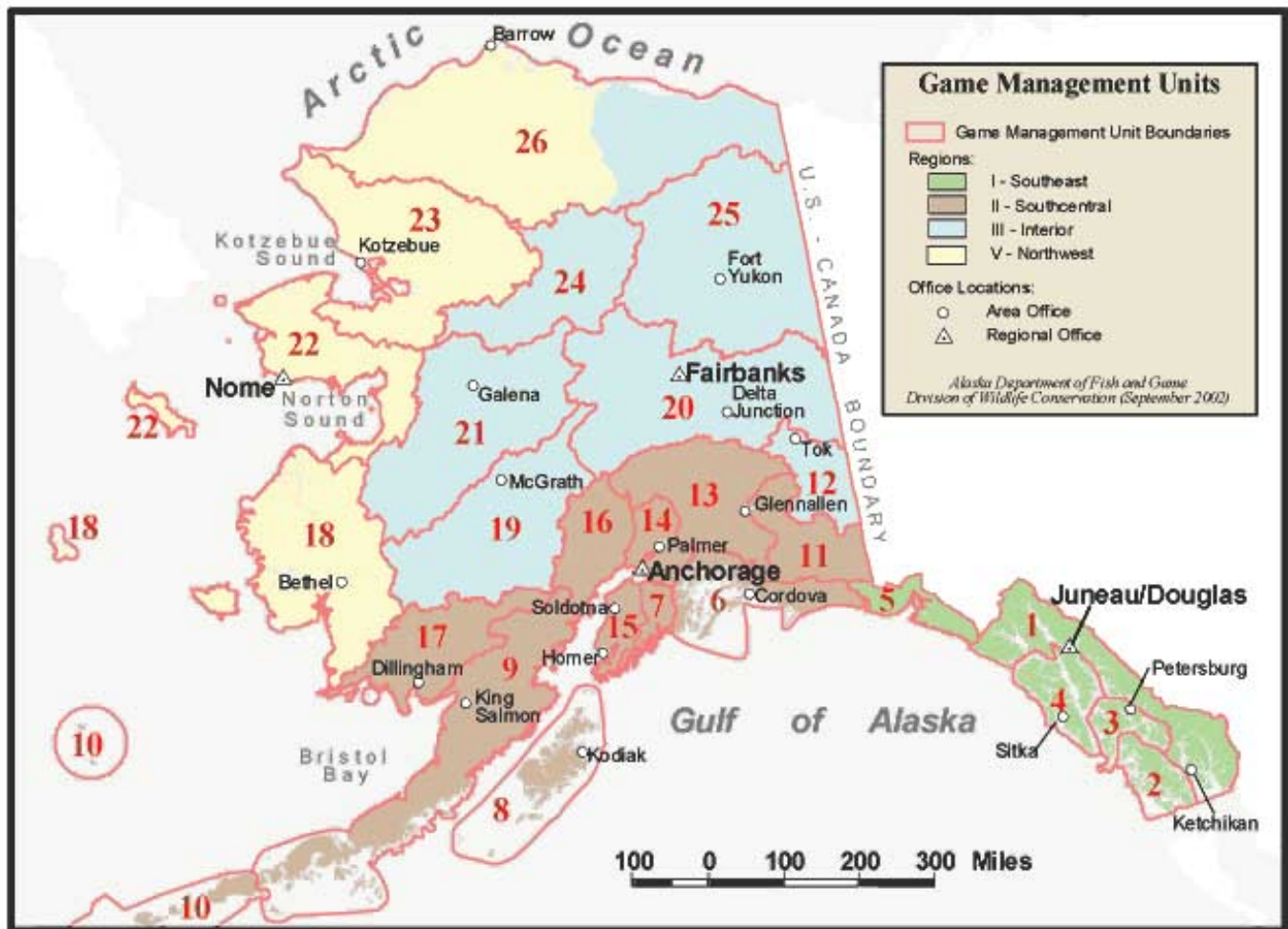
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# **ELK MANAGEMENT REPORT**

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## **ELK MANAGEMENT REPORT**

From: 1 July 2001

To: 30 June 2003

### **LOCATION**

**GAME MANAGEMENT UNIT:** 3 (3000 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Islands of the Petersburg, Kake, and Wrangell area.

### **BACKGROUND**

Elk (*Cervus elaphus*) are not endemic to Alaska but were successfully introduced onto Afognak Island in the Kodiak Archipelago in 1929. Prior to 1987 there were 6 unsuccessful attempts to introduce elk into Southeast Alaska (Burris and McKnight 1973). Lack of monitoring programs precluded our determining why previous attempts to introduce elk failed in Southeast Alaska.

In 1985 the Alaska Legislature passed a law that required the introduction of 50 elk to Etolin Island. In spring of 1987, 33 Roosevelt elk (*C. e. roosevelti*) from Jewell Meadows Wildlife Management Area and 17 Rocky Mountain elk (*C. e. nelsoni*) from the Elkhorn Wildlife Management Area in Oregon were translocated to Southeast Alaska. Roosevelt elk were released at Dewey Anchorage on the southwest side of Etolin Island and Rocky Mountain elk were released just north of Johnson Cove on the northwest shore of Etolin Island.

Initial losses were high, and about two-thirds of the elk died from predation, starvation, and accidents within 18 months of release. Following initial losses, the population stabilized, eventually began increasing, and today seems to be permanently established and thriving. In recent years the elk population has continued to increase and extend its range. A breeding population is now established on Zarembo Island, and elk observations have been reported from Mitkof, Wrangell, Prince of Wales, Deer, Bushy and Kupreanof islands and the Cleveland Peninsula. Elk numbers in Unit 3 on islands other than Etolin and Zarembo are believed to be low.

### **HUMAN USE HISTORY**

Unit 3 elk have been hunted for food and trophies since 1997. In fall 1996 the Board of Game (BOG) made a negative customary and traditional determination for the introduced elk, approved a Unit 3 elk season, and authorized up to 30 drawing permits for a 1–31 October, 1-bull season.

#### *Regulation History*

In 1993, in an effort to restrict the introduced elk to Etolin Island and prevent their dispersal to other islands, the BOG authorized an open season, either-sex elk hunt in Unit 3 off of Etolin Island. During the same board meeting this decision was reconsidered and reversed.

The ADF&G's 1987 Elk Management Plan called for a limited elk hunt when the population reached 250 elk and could sustain a harvest of 20 bulls. It was determined that the introduced elk

had reached such a population level by 1996. In October of 1996 the BOG established a bull-only elk season in Unit 3. The board authorized the department to issue up to 30 elk drawing permits for a 1–30 October season. The State Legislature passed House Bill 59, stating: “The department may donate 4 elk harvest permits each year for elk from the Etolin Island herd for competitive auctions or raffles. The donations may be made only to nonprofit corporations based in the state that are established to promote fish and game management of hunted species, translocation of species, and use of fish and game populations for hunting and fishing, subject to the terms of a memorandum of understanding developed by the department.”

In 1997, the first year of elk hunting in Southeast Alaska, ADF&G issued a total of 29 elk permits, including 27 drawing permits and 2 public raffle permits. In 1998 a total of 31 elk drawing permits were issued. One auction/raffle permit was issued in 1998. In 1999 one raffle permit was issued, and 2 were issued in 2000.

In fall 1998 the BOG authorized increasing the number of drawing permits from 30 to 70 and added a 2-week period (15–30 September) for archery only. An International Bowhunters Education Program (IBEP) certification card is required to participate in the archery-only season.

In fall 2000 the BOG increased the number of drawing permits from 70 to 120 and extended the archery only season by 2 weeks (1–30 September). To forestall the dispersal of elk and the establishment of elk herds off of Etolin and Zarembo islands, the BOG established boundaries for the Unit 3 permit hunt area and authorized an either-sex elk hunt from 1 August through 31 December, in Units 1, 2, and the remainder of Unit 3 outside of the drawing area.

#### *Historical harvest patterns*

Fall weather can influence elk movement patterns and hunter effort and success. Although harvest chronology varies somewhat from year to year, between 1997 and 2000 the largest percentage of the harvest occurred during the first and third weeks of October, respectively. Following the initial season opening, elk typically retreat to the more inaccessible portions of Etolin and Zarembo. Hunters are aided somewhat later in the season when the elk typically return to low elevation winter range along the coast.

#### *Historical harvest locations*

Between 1997 and 2000 a total of 159 hunters harvested 41 elk, including 33 from Etolin Island and 8 from Zarembo Island. Of the 33 elk harvested on Etolin Island, 8 were killed in Wildlife Analysis Area (WAA) 1901 on the north half of the island and 25 were killed in WAA 1910 on the south half of the island.

### **MANAGEMENT DIRECTION**

We have finalized a Region I elk management plan and have established management objectives for Unit 3 elk. We estimate that the Etolin Island winter carrying capacity ranges from 900 to 1300 elk (Dave Person, ADF&G, Elk Technical Committee oral presentation, 2000). We will attempt to maintain a postharvest ratio of 25–30 bulls per 100 cows.

### **METHODS**

We flew aerial surveys of Etolin Island to record tracks and visual sightings of individuals and groups of elk. We also recorded observations reported by other agency personnel and the public.

We conducted winter range elk and deer pellet counts periodically to assess relative density. Jawbones were collected from harvested elk and teeth were sent to the lab for aging. Successful hunters were asked to submit a photo of their elk's antlers. From 1999 to 2002 we provided hunters with blood sampling kits and asked that they voluntarily collect blood serum samples from harvested elk and submit them for disease analysis.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

#### *Population Size*

A precise population estimate is not available for Unit 3 elk. Annual differences in survey coverage, and uncertainties about the sightability of elk during aerial surveys, make it difficult to estimate abundance. Variables that influence survey results are numerous, and for the most part, unquantifiable. Our June 2003 population estimate is subjective, but based on all information available we estimate Unit 3 has 350–450 elk, with 75–100 on Zarembo and the balance on Etolin. The 2000 post-parturition modeling prediction for Etolin Island was approximately 350 elk; however, at the time our actual population was probably much lower because the estimate does not include factors such as predation, dispersal, competition with deer, etc. Based on these modeling predictions, we estimate that a reasonable upper limit for the elk population on Etolin and Zarembo combined was approximately 450 animals (D. Person, 2000).

#### *Population Composition*

No data are available to make meaningful elk population composition estimates for Etolin or Zarembo islands. Elk are usually found in small or large groups of mixed sex and age. Some calves are obviously surviving each year and are being recruited into the breeding population. Almost every large group of Roosevelt elk observed included large and small bulls, cows, and calves (in season). Zarembo Island was originally thought to support only Rocky Mountain elk; however, recently hunters have taken elk with antler characteristics indicative of both subspecies from the island.

#### *Distribution and Movements*

Roosevelt elk have dispersed from their release site but still incorporate this area within their range distribution. Most Roosevelt elk have remained within 10 miles of their release site. After remaining close to the release site for 18 months, Rocky Mountain elk have dispersed widely. It is now likely that Rocky Mountain elk have intermixed with Roosevelt elk, at least on Etolin. A breeding group is established on Zarembo Island, and elk have been reported on several islands in the area.

For both subspecies the area below 500 feet adjacent to the coast is preferred winter and spring habitat. Roosevelt elk move higher into the mountains in summer and have been observed above 3000 feet on Etolin Island.



## MORTALITY

### *Harvest*

<u>Season and bag limit</u>	<u>Resident and Nonresident hunters</u>
1 bull by bow and arrow only  or  1 bull	1 Sep–30 Sep (General hunt only)    1 Oct–31 Oct (General hunt only)

Unit 3, that portion bounded by a line beginning at the intersection of Sumner Strait and Clarence Strait, running southeast following the midline of Clarence Strait, down the midline of Snow Passage, then east of the Kashevarof Islands back to the midline of Clarence Strait down to its intersection with Ernest Sound, then northeast following the midline of Ernest Sound, excluding Niblack Islands, to its intersection with Zimovia Strait, then northwest following the western shoreline of Zimovia Strait to its intersection with Chichagof Passage, then west along the midline of Chichagof Passage to its intersection with Stikine Strait, then northerly along the midline of Stikine Strait, west of Vank Island, to its intersection with Sumner Strait, then northwest along the midline of Sumner Strait back to the point of beginning. One bull by drawing permit only as follows: up to 120 permits will be issued.

### Remainder of Unit 3

1 elk	1 Aug–31 Dec
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Board of Game Action and Emergency Orders. In November 2002 the BOG split the DE-320 elk drawing permit hunt into separate archery (DE-318) and rifle (DE-322) permit hunts and authorized the department to increase the combined number of permits up to 300.

Hunter Harvest. In 2001 we issued 120 drawing permits and 4 auction/raffle permit. Sixty-nine permittees hunted and harvested 19 elk (Table 1). During the 2002 season we issued 120 drawing permits and 2 auction/raffle permits. Eighty-eight permittees hunted and harvested 13 elk.

Despite the fall 2000 authorization of an either-sex elk hunt from 1 August through 31 December, in Units 1, 2, and the remainder of Unit 3, no elk harvest has yet been reported outside of the drawing permit boundaries.

Hunter Residency and Success. One nonresident received elk permits in both 2001 and 2002. Nonlocal residents represented the largest group of both successful and unsuccessful hunters in 2001. In 2002 nonlocal residents represented the largest group of unsuccessful hunters, while local residents represented the largest group of successful hunters (Table 2). The success rate for permit holders who actually hunted was 28% in 2001 and 15% in 2002. Most of the nonlocal hunters were from communities in Southeast Alaska, relatively close to the hunt area.

Harvest Chronology. In 2001 hunters had the best success during the first and third weeks of October when 42% and 37%, respectively, of the harvest occurred (Table 3). In 2002 the harvest was more evenly distributed with 31% of the harvest occurring in the first week, 23% occurring in each of the second and fourth weeks, and 15% occurring in the third week of October. In 2001 one bull was taken during the third week of the September archery-only season, and in 2002 one bull was also taken by an archer during the third week of September.

Harvest in Particular Areas (WAA's). In 2001 a total of 19 elk were killed in 2 Unit 3 WAA's. These include WAA numbers 1905 and 1910, with 37% and 63% of the harvest, respectively. In 2002 a total of 13 elk were harvested in 3 WAA's, with 1901, 1905, and 1910 representing 23%, 23% and 54% of the harvest, respectively.

Guided Hunter Harvest. No guides are currently offering guided elk hunts in the unit.

Transport Methods. In 2001, 68% of successful hunters used boats and 32% used airplanes to access their hunting areas. In 2002, 77% of successful hunters used boats and 23% used airplanes to access their hunting area (Table 4). Etolin Island has several lakes that are accessible by floatplane, and hunters flew into some of these lakes.

#### *Other Mortality*

Brown bears, black bears, and gray wolves occur on Etolin Island, and wolves and a relatively small number of black bears are found on Zarembo Island. The extent of predation on elk is not known, but fieldwork conducted by ADF&G staff indicates that wolves are a major predator. Some poaching of the introduced elk has been documented in the past.

### **HABITAT**

#### *Assessment*

Clearcut logging continues on Etolin and about 30,000 acres are scheduled to be cut by 2080 (U.S. Forest Service, unpublished data). This will reduce the island's elk carrying capacity. The Etolin Island winter carrying capacity is estimated to be 856 elk and consists of the following: clearcut, 2.0 mi<sup>2</sup>; second growth, 2.2 mi<sup>2</sup>; nonforest or noncommercial forest, 72.9 mi<sup>2</sup>; old growth forest, 124.4 mi<sup>2</sup> (ADF&G, 1985).

#### *Enhancement*

No habitat enhancement projects specifically intended to benefit elk have been attempted in the unit. Although primarily intended as a silvicultural practice, precommercial thinning and pruning has been performed in some young second-growth stands on Etolin and Zarembo islands. This effort provides a benefit to elk by improving and extending habitat suitability in the short term by reducing canopy cover, which permits sunlight to reach the forest floor and increases the production of understory forage plants. These benefits are relatively short-lived, approximately 20–25 years, after which time canopy closure again results in loss of understory vegetation. The long-term effects of clearcut logging will be detrimental to elk populations.

### **NONREGULATORY MANAGEMENT PROBLEMS/NEEDS**

The potential for disease and parasite transmission from exotics to endemic wildlife has long been a concern of wildlife biologists. Prior to transport to Alaska, transplanted elk were tested

for disease and treated for parasites. However, required quarantine periods and disease testing does not always detect infected animals.

During 2001, ADF&G provided elk hunters with sampling kits and asked that they voluntarily collect blood serum samples from harvested elk. We collected a total of 9 sera samples, which have yet to be submitted for disease testing.

ADF&G remains concerned about potential negative effect that an increasing elk population may have on native Sitka black-tailed deer. Elk may affect deer populations directly through physical displacement or indirectly by competition for food or by altered predator-prey dynamics. Research has shown the diets of deer and elk overlap to a high degree, suggesting potential for interspecific competition (Kirchhoff and Larsen 1998). Introduced elk have dispersed from Etolin to other islands and established a breeding population on at least one other island. Should elk become widely distributed throughout Southeast Alaska, a reduction in deer numbers is to be anticipated. Also, native moose populations have been increasing in Unit 3 over the past decade, with recent sightings on Zarembo Island. Our concerns regarding deer/elk conflicts may have a counterpart with this expansion in moose distribution.

### **CONCLUSIONS AND RECOMMENDATIONS**

Despite initial losses following introduction, the Unit 3 elk population is now increasing. Elk are dispersing and have established a breeding population on Zarembo Island. As elk disperse and the population increases, it will be important to continue monitoring their numbers and distribution. Research is needed to evaluate the extent of interspecific competition between introduced elk and native Sitka black-tailed deer.

In order to ensure that the elk population is kept below carrying capacity to minimize the likelihood of dispersal off of Etolin and Zarembo islands, accurate estimates need to be developed of both the carrying capacity and elk populations on these islands.

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Please cite any information taken from this section, and reference as:

Lowell, R.E. 2004. Unit 3 elk management report. Pages 1–8 *in* C. Brown, editor. Elk management report of survey and inventory activities 1 July 2001–30 June 2003. Alaska Department of Fish and Game. Project 13.0. Juneau, Alaska.

Table 1 Unit 3 elk harvest data by permit hunt, regulatory years 1997 through 2002

Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Harvest				Illegal	Total harvest
					Bulls (%)	Cows (%)	Unk (%)			
1997	29	14	68	32	8 (100)	0 (0)	0 (0)		0	8
1998	31	32	55	45	9 (100)	0 (0)	0 (0)		0	9
1999	71	17	72	28	16 (100)	0 (0)	0 (0)		0	16
2000	72	18	86	14	8 (100)	0 (0)	0 (0)		0	8
2001	123	43	72	28	19 (100)	0 (0)	0 (0)		0	19
2002	121	27	85	15	13 (100)	0 (0)	0 (0)		0	13

Table 2 Unit 3 elk hunter residency and success, regulatory years 1997 through 2002

Regulatory year	Unsuccessful				Successful				Total hunters
	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total (%)	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total (%)	
1997	7	10	0	17 (68)	3	5	0	8 (32)	25
1998	1	9	1	11 (55)	2	7	0	9 (45)	20
1999	8	34	0	42 (72)	7	9	0	16 (28)	58
2000	13	38	0	51 (86)	4	4	0	8 (14)	59
2001	18	31	1	50 (72)	4	15		19 (28)	69
2002	25	49	1	75 (85)	8	5	0	13 (15)	88

<sup>a</sup> Residents of Petersburg, Wrangell, and Kake.

Table 3 Unit 3 elk harvest chronology percent by harvest period, regulatory years 1997 through 2002

Regulatory year	Harvest period								<i>n</i>
	9/1–9/7	9/8–9/14	9/15–9/21	9/22–9/30	10/1–10/7	10/8–10/14	10/15–10/21	10/22–10/31	
1997	N/A	N/A	N/A	N/A	(38)	(0)	(24)	(38)	8
1998	N/A	N/A	N/A	N/A	(56)	(33)	(1)	(0)	9
1999	N/A	N/A	(0)	(0)	(43)	(12)	(26)	(19)	16
2000	N/A	N/A	(12)	(0)	(25)	(25)	(25)	(13)	8
2001	(0)	(0)	(5)	(0)	(42)	(16)	(37)	(0)	19
2002	(0)	(0)	(8)	(0)	(31)	(23)	(15)	(23)	13

Table 4 Unit 3 elk harvest percent by transport method, regulatory years 1997 through 2002

Regulatory year	Harvest percent by transport method								<i>n</i>
	Airplane	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unk	
1997	(13)	(67)	(0)	(0)	(0)	(0)	(0)	(0)	8
1998	(22)	(78)	(0)	(0)	(0)	(0)	(0)	(0)	9
1999	(0)	(100)	(0)	(0)	(0)	(0)	(0)	(0)	16
2000	(25)	(62)	(13)	(0)	(0)	(0)	(0)	(0)	8
2001	(32)	(68)	(0)	(0)	(0)	(0)	(0)	(0)	19
2002	(23)	(77)	(0)	(0)	(0)	(0)	(0)	(0)	13

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**ELK MANAGEMENT REPORT**

From: 1 July 2001

To: 30 June 2003

**LOCATION**

**GAME MANAGEMENT UNIT:** 8 (5097 mi<sup>2</sup>)

**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 by 1948, and the first hunt occurred in 1950. Hunting has been allowed annually since 1955. The population peaked at 1200–1500 by 1965, with 9 separate herds on Afognak Island and 1 herd on nearby Raspberry Island. A series of severe winters caused extensive mortality, reducing the population to an estimated 450 elk by 1972 (Burris and McKnight 1973). The herd recovered to near the previous high by the 1980s and remained relatively stable through the 1990s with minor fluctuations correlated with winter severity. Harsh winters in 1998–99 severely impacted ungulate populations on the archipelago, and elk herds on western Afognak and Raspberry Islands suffered declines. As a result of the winter mortality, overall populations declined under the management objective of 1000.

Relative accessibility of each elk herd to hunters strongly influenced management strategies. In the 1960s many herds were only lightly harvested, despite a 153-day season and a 2-elk bag limit. However, excessive harvest of the highly accessible Raspberry Island herd prompted managers to recommend closing that herd to hunting in 1968 (Alexander et al. 1968). Drawing permit hunts and registration permit hunts with harvest quotas regulated by emergency order closures characterized management strategies for the most accessible herds of southwestern Afognak Island and Raspberry Island from the mid 1970s to the late 1980s. Initiation of commercial logging in 1977 marked a new management era, with increased vulnerability of elk to hunting resulting from logging road access and loss of security cover. By the mid 1980s shorter seasons had to be imposed in east-central Afognak Island where logging was concentrated. Beginning with the 1993–94 season, the road-accessible eastern and central part of Afognak Island was incorporated with the southwestern Afognak areas into a single management area regulated by staggered drawing permit hunts, followed by a registration hunt. North Afognak was included in a registration hunt, while the elk on Raspberry Island were subject to staggered drawing hunts.

In 2003 Afognak Island was divided into 3 hunt areas. These areas were designed to address concerns associated with newly imposed access fees on private lands, decreased bull and calf percentages in the Malina/Afognak Lakes, and unclear boundaries from logging roads. Each area

will be open as drawing hunts from 25 September–22 October, and if harvest targets are not met for individual herds, portions of Afognak Island may be open as a registration hunt.

In 1999 ADF&G initiated a cooperative research project with the Rocky Mountain Elk Foundation, Washington Division of Wildlife, and Olympic National Park. This project was designed to investigate the degree of genetic diversity between the Unit 8 elk and the parent herd in western Washington. Investigation of herd fidelity on Afognak and Raspberry Islands was another aspect of the project. ADF&G is currently working with the Rocky Mountain Elk Foundation and the Afognak Native Corporation to identify critical wintering habitat and initiate habitat enhancement projects.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

The management objective is to maintain a population of at least 1000 elk distributed throughout suitable habitat on Afognak and Raspberry Islands.

### **METHODS**

Each year we attempt to use one observer in a Piper PA-18 (Super Cub) aircraft to conduct an aerial composition count of each herd between July and September. We also opportunistically conduct winter surveys to identify wintering areas and to refine population estimates of herds.

We used helicopter darting techniques to capture 13 female elk in June 2002. Conventional VHF radio collars were deployed on 11 elk and two elk received GPS/VHF collars.

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.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TRENDS**

#### *Population Size*

Aerial composition surveys indicated a stable to increasing elk population in 2002 (Table 1). The minimum population on Raspberry and Afognak Islands was estimated at 740 elk, well below the 892 elk minimum estimate in the previous 5 years. Among the 8 herds identified on Afognak Island, the Marka Lake, Duck Mountain herd and Malina Lake herds were increasing, while all others were stable. The elk herd on Raspberry Island was slowly increasing and is now estimated at 80 animals with a healthy bull:cow ratio. The Marka Lake herd has shown the greatest growth during this report period and is currently the largest herd on Afognak Island.

The Paramanof Peninsula herd, which declined precipitously after 1989 (Smith 1994), showed no sign of recovery, and we now assume that it has been incorporated into the Marka Lake herd. The Tonki Cape herd has shown little growth despite complete protection since 1993–94.

During the fall of 2002, a deer hunter reported 2 cow elk on the Kupreanof Peninsula and another pair near Termination Point on Kodiak Island. We were not able to verify either report, but the



frequency of such sightings suggests that small numbers of elk reside on Kodiak. There have been no recent reports of elk on Shuyak or Whale Islands.

### *Population Composition*

Obtaining bull:cow ratios continued to be problematic during this reporting period. Aerial composition data are often suspect due to the difficulty distinguishing spike bulls in velvet from cows. Overall calf percentages in the population were 22% in 2002–2003, up from the previous 5-year average (1997/98–2001/02) of 16.5% (Table 1). The Raspberry Island herd continued to have healthy percentages of bulls and calves, while the Malina Lake herd had the worst.

### *Distribution and Movement*

Elk herd distribution has been monitored by composition counts, hunter and logger reports, and by relocating radiocollared elk. There are at least 8 separate herds on Afognak Island and 1 herd on Raspberry Island. In June 2003, we had 22 active radio collars in the population, distributed among all of the herds.

Prior to 1998 the annual home ranges of most of the elk herds were relatively stable with little interchange between herds. Recent data suggest considerable mixing of herds and changes in traditional use areas during the winter and early spring. We suspect much of this change is due to significant alteration of winter ranges by commercial logging operations and/or increased severity of winter/early spring weather. Data recovered in 2000 from global positioning system (GPS) collars have helped in determining the extent of herd range, critical overwintering areas and rutting areas. With the help of Afognak Native Corporation we are overlaying relocation data with current habitat maps to better understand the relationships of elk movements to virgin, recently altered and regenerating habitats.

## **MORTALITY**

### *Harvest*

Seasons and Bag Limits: There was one open season for resident and nonresident hunters for Raspberry Island. During the 1–22 October season, the bag limit was 1 bull by drawing permit only, with up to 10 permits issued.

The open season for resident and nonresident hunters in that portion of Afognak Island west of Tonki Bay and west of a line from the head of Tonki Bay to Pillar Cape and south and east of a line from the head of Discoverer Bay to the head of Malina Bay and south of Malina Bay was 25 September–22 October; the bag limit was 1 elk by drawing permit, with up to 500 permits issued.

The open season for resident and nonresident hunters for the remainder of Unit 8 was 25 September–30 November; the bag limit was 1 elk by registration permit.

That portion of Afognak Island east of Tonki Bay and east of a line from the head of Tonki Bay to Pillar Cape was closed to elk hunting.

A federal subsistence elk hunt occurred from 15 September–30 November on Kodiak National Wildlife Refuge lands on northwestern Afognak.

Board of Game Actions and Emergency Orders: Prior to each hunting season, we analyzed survey results and estimated herd sizes to derive harvest limits for each herd. These limits were usually based on a 15% harvest rate, with modifications to accommodate population trends. We issued emergency orders closing the ranges of the herds when the individual harvest limits are reached.

In 2001 we issued 3 emergency orders. The first took effect 8 October, closing a portion of registration hunt RE754 between Paramanof and Malina Bays, which was occupied by the Marka Herd. The estimated population of the Marka herd included 150 elk, and the target harvest rate of 15–18% was accomplished a few days prior to the emergency order closure. On 22 October we issued the second emergency order, closing a portion of registration hunt RE753 west of a line from Malina Bay to Back Bay when a 15% harvest rate was reached for the Malina herd. The third emergency order took effect 15 November 2001, closing the remaining open areas to elk hunting within registration hunts RE753 and RE754.

In 2002 we issued 1 emergency order, which closed portions of registration hunt RE753 on 23 October west of a line from Malina Bay to Back Bay. The Malina and Afognak Lake herds experienced declines in recent years and prompted us to lower the harvest rate to 10% with no more than 10 bulls in the harvest. Harvest targets were reached by the time the emergency order took effect.

In March of 2003, the Board of Game adopted a proposal from the Kodiak Advisory Committee to divide Afognak into 3 separate drawing hunt areas. Some of the problems addressed were overcrowding of hunters due to access fees on private lands and unclear boundary lines that were not distinguishable from logging roads. In 2003 these areas will be open as drawing hunts from 25 September–22 October, and if harvest targets are not met, portions of Afognak Island may be open to a registration hunt. Due to concern of low bull and calf observations in the Malina and Afognak Lake elk herds, the either sex hunt for this area will be changed to a bull-only drawing hunt 25 September–9 October, followed by a cow-only hunt 8–22 October.

Hunter Harvest: The annual elk harvest decreased in the past 5 years from a high of 181 elk in 1998–99 to 62 elk in 2002–03 (Table 2). Recent annual harvests remained well below the peak of 206 elk killed in 1989–90. The percentage of bulls in the harvest increased to 66% in 2002–03 from a 52.6% average for the previous 5 years (Table 2). Smith (1996) noted the proportion of bulls in the harvest was in a declining trend prior to 1992–93, and Smith and Van Daele (1998) noted an increase in the bull proportion from 1992–93 to 1994–95. During this report period the Marka herd has surpassed the Malina herd in herd growth and harvest. The distribution of the elk harvest among the individual hunts varied considerably from one year to the next, reflecting the vagaries in weather, access options and elk distribution.

No elk were harvested during the federal subsistence hunts during this report period.

Permit Hunts: During this report period we retained the 10 bull-only drawing permits for Raspberry Island in response to the population decline on the island. The south and east Afognak Island elk hunts were reduced in 2002–03 from 500 permits to 275 permits in response to low

bull and calf observations in the Malina and Afognak Lake herds (Table 2). The number of registration permits, which were valid for both north Afognak and the late season in south and east Afognak, decreased to 366 in 2002–03 from an average of 433 in the previous 5 years.

Hunter Residency and Success: Average hunter success was 27% in 2001–02 and 19% in 2002–03 (Table 3). Residents of Unit 8 accounted for an average of 52% of the hunters afield from 1998–99 to 2002–03, and they consistently harvested more elk than other Alaska residents and nonresidents combined. The number of hunters in the field decreased to 316 in 2002–03 from an average of 429 in the previous 5 years.

Harvest Chronology: Lengthening the elk season to include the last week of September and first 10 days of October dramatically altered the harvest chronology patterns. Prior to 1997–98 harvest was highest in the last 2 weeks of October for all 3 areas in most years (Table 4). After the change, most of the elk were harvested in the first 20 days of the season.

Transportation Methods: Aircraft and boats are the predominant methods of transportation for elk hunters in Unit 8 (Table 5). Use of highway vehicles is dependent on the level of logging activity and the vehicle-use policies of the logging companies and the land owners.

#### *Other Mortality*

Three radiocollared female elk died, and 2 radios ceased functioning during this reporting period. A hunter killed 1 radiocollared elk, while the causes of death for the others were unknown. The decreasing trend in elk counts indicated that winter mortality was heavy in 1998–99, but moderated considerably from 1999–2000 through 2002–03.

Documenting mortality from sources other than hunting is seldom possible because of the remote setting of Afognak and Raspberry islands. Predation by brown bears undoubtedly occurs, but it is probably rare. It has been estimated that wounding loss and illegal harvest contribute additional mortality equivalent to 15% of the reported harvest.

## **HABITAT ASSESSMENT**

Commercial logging of Sitka spruce (*Picea sitchensis*) on Afognak Island slowed during this reporting period. Roads in much of eastern Afognak were closed and culverts were removed. There was some expanded timber harvesting in the Marka Creek drainage. ADF&G continued to review timber harvest plans that private timber owners are required to submit to the Alaska Department of Natural Resources. Current laws do not contain provisions for protecting terrestrial wildlife, so the reviews are strictly advisory.

Representatives from logging companies and Native land managers have expressed a desire to work with ADF&G to investigate the long-term effects of logging on elk habitat quality on Afognak Island, and develop cost-effective methods to improve elk habitat. Village Wildlife Conservation Cooperative, in association with Alaska Village Initiatives, has chosen Afognak Island as the site for an inaugural project that will emphasize cooperative wildlife management between ADF&G and Native land owners. We have been working closely with Afognak Native Corporation to identify areas suitable for habitat enhancement to benefit wildlife. We have also embarked on a cooperative research project with Rocky Mountain Elk Foundation, Kodiak

Brown Bear Trust, Afognak Native Corporation, and the Kodiak National Wildlife Refuge to deploy additional VHF and GPS radio collars on elk and brown bears (*Ursus arctos middendorffi*) and to refine our knowledge of critical habitats for these species on Afognak.

Kodiak Brown Bear Trust has been acting as a facilitator to acquire Native-owned lands on northern Afognak. Several nongovernment organizations have expressed a desire to purchase these lands and eventually turn them over to the State for management under the State Parks system. Negotiations are ongoing, but the proposal has potentially favorable impacts for elk and elk hunters.

#### **NONREGULATORY MANAGEMENT PROBLEMS/NEEDS**

Continued vulnerability of elk to hunting as the result of logging and road construction is still a management concern, although cooperation with landowners and logging operators has improved tremendously.

Fixed-winged aircraft seem to have little direct impact on the elk, but helicopters typically solicit flight responses from both individuals and groups. In April of 2002, a memorandum of agreement between the Alaska Department of Fish and Game and U.S. Fish and Wildlife Service and U.S. Coast Guard regarding flight operations over the Kodiak archipelago was finalized. This agreement has spurred further cooperation between the Coast Guard and ADF&G to minimize elk and other wildlife species disturbances from helicopter flight operations.

Genetic diversity has been a lingering concern for both hunters and managers of Unit 8 elk. Notably small, and often broken, antlers were cited as possible byproducts of inbreeding. Preliminary analysis of antler measurements seems to confirm that Unit 8 elk do have significantly smaller antlers than elk in the parent herd in western Washington. Preliminary analysis of genetic data, however, indicates that the Unit 8 elk are at least as genetically diverse as those sampled from the parent herd. In years following mild winters we have observed increased antler development and fewer cases of antler narrowing and breakage. This suggests that inbreeding may not be a serious concern, and that antler abnormalities may be caused by some other agent. We will continue to analyze these data and will publish the results as soon as possible. We will also consider investigating the role of nutrient and mineral availability in antler development on Raspberry and Afognak islands.

In 2003 ADF&G initiated an investigation into the status of Chronic Wasting Disease (CWD) in elk and deer on the Kodiak archipelago. There have been no reports of the disease in this area; however, widespread concerns about the rapid spread of CWD in areas of North America with commercial elk ranches prompted ADF&G to take action. Deer and elk hunters are asked to voluntarily submit the heads of harvested animals for analysis. We will also work closely with the one commercial elk rancher on Kodiak to assure that his animals do not have contact with wild animals.

## CONCLUSIONS AND RECOMMENDATIONS

Throughout most of the 1990s, the elk population in Unit 8 continued to increase to a minimum of 1400 elk. Winter mortality during 1997–98 and 1998–99 curtailed that increasing trend. Since then, the population has been relatively stable, but below the 1000 elk objective level. The Malina Lake and the Raspberry Island herds had the most dramatic declines, probably due to winter mortality. We have responded to the population decline by reducing harvest from 181 elk in 1998–99 to 62 elk in 2002–03. To accomplish this, emergency closures have been common. In 2003 Afognak was managed by drawing hunts and was divided into three hunt areas, which are easily discernible from current logging roads. These changes should distribute the harvest throughout the hunting season, reduce wounding loss and allow a higher quality experience for hunters.

In 2002 an additional logging company (White Stone Logging) started up operations and increased the number of people living and working on Afognak Island. Much of the current logging is occurring around Duck Mountain, the Marka River and east of the Kodiak National Wildlife Refuge boundary. The result of these changes, coupled with the imposition of land use fees on Native corporation-owned lands on southern and eastern Afognak, has shifted much of the hunting pressure away from the Duck Mountain and Portage Lake herds in recent years.

Management has been further complicated by the Federal Subsistence Board's action establishing elk as a customary and traditional resource for all residents of the Kodiak Archipelago. Federal seasons have changed several times since their inception, but there has yet to be an elk killed under a federal subsistence permit. There will be more effort associated with this hunt when all portions of Afognak Island are managed as drawing hunts in the fall of 2003.

To address these concerns and better manage the elk resource, we recommend the following:

- Manage the Raspberry Island elk herd to encourage growth of the herd to a maximum of 150 elk with a higher proportion of large bulls. In the past 40 years population data have shown 3 distinct peaks (1965, 1987 and 1997) in which the herd reached a maximum of 220 animals before suffering catastrophic declines. This suggests the island can support no more than 200 elk at a time;
- Manage Afognak Island elk hunting entirely by time-specific drawing permits, followed by registration permits if surplus elk are available;
- Work closely with Native and federal land managers to coordinate elk management objectives and harvest strategies;
- Foster and improve relationships and cooperative research agreements between the state and Kodiak National Wildlife Refuge and Native land owners;
- Work closely with Native land managers to devise methods of improving elk habitat while recognizing economic goals of the corporations;
- Maintain at least 3 active radio collars on each major elk herd ( $\geq 100$  animals) and 2 on each minor herd ( $< 100$  animals); and,
- Use radiotelemetry data from both GPS and VHF radio collars to refine our knowledge of elk habitat use patterns.

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Please cite any information taken from this section, and reference as:

Van Daele, L.J. and Crye, J.R. 2004. Unit 8 elk management report. Pages 9–22 in C. Brown, editor. Elk management report of survey and inventory activities 1 July 2001–30 June 2003. Alaska Department of Fish and Game. Project 13.0. Juneau, Alaska.

**Table 1. Unit 8 aerial elk composition counts and estimated population by herd, 1997/98–2002/03.**

<b>Herd</b>	<b>Regulatory Year</b>	<b>Bulls</b>	<b>Cows</b>	<b>Calves (%)</b>	<b>Bulls: 100 Cows</b>	<b>Calves: 100 Cows</b>	<b>Total Elk Observed</b>	<b>Estimated Population</b>
Raspberry Island	1997–98	22	96	44 (27)	23	46	162	210–220
	1998–99	17	87	-- --	20	--	104	210–220
	1999–2000	20	37	21 (27)	54	57	78	80–100
	2000–01	9	25	6 (15)	36	24	40	40–50
	2001–02	7	27	8 (19)	26	30	42	40–60
	2002–03	--	58	13 (18)	--	22	71	80
Seal Bay	1997–98	--	--	-- --	--	--	--	170–180
	1998–99	--	--	-- --	--	--	--	170–180
	1999–2000	--	34 <sup>a</sup>	3 (8)	--	--	37	90–110
	2000–01	--	--	-- --	--	--	--	60–80
	2001–02	--	38 <sup>a</sup>	-- --	--	--	38	60–80
	2002–03	--	--	-- --	--	--	--	70–80
Duck Mt.	1997–98	2	--	-- --	--	--	2	130–140
	1998–99	--	--	-- --	--	--	--	130–140
	1999–2000	--	--	-- --	--	--	42	90–110
	2000–01	--	48 <sup>a</sup>	-- --	--	--	48	90–110
	2001–02	--	97 <sup>a</sup>	-- --	--	--	97	90–110
	2002–03	--	35	12 26	--	34	47	110–140
Portage Lake	1997–98	--	--	-- --	--	--	--	75–85
	1998–99	--	--	-- --	--	--	--	75–85
	1999–2000	--	30 <sup>a</sup>	9 (23)	--	--	39	60–80
	2000–01	--	79 <sup>a</sup>	15 (19)	--	--	94	90–110
	2001–02	--	--	-- --	--	--	--	90–110
	2002–03	--	35 <sup>a</sup>	18 (35)	--	51	52	60
Marka Lake	1997–98	--	--	-- --	--	--	--	120–130
	1998–99	--	--	-- --	--	--	--	120–130
	1999–2000	--	93 <sup>a</sup>	6 (6)	--	--	99	120–130
	2000–01	5	68	19 (21)	7	28	92	150–200
	2001–02	--	95	24 (20)	--	25	119	130–150
	2002–03	--	102 <sup>a</sup>	54 (35)	--	--	156	180–220

**Table 1. Unit 8 aerial elk composition counts and estimated population by herd, 1997/98 – 2002/03 (continued).**

<b>Herd</b>	<b>Regulatory Year</b>	<b>Bulls</b>	<b>Cows</b>	<b>Calves (%)</b>	<b>Bulls: 100 Cows</b>	<b>Calves: 100 Cows</b>	<b>Total Elk Observed</b>	<b>Estimated Population</b>
Malina Lake	1997–98	12	221	65 (22)	5	29	298	335–345
	1998–99	--	--	-- (--)	--	--	--	335–345
	1999–2000	--	136 <sup>a</sup>	19 (12)	--	--	155	160–180
	2000–01	1	49	12 (19)	2	24	62	120–150
	2001–02	1	122	0 (0)	--	0	123	120–150
	2002–03	10	86	7 (7)	12	8	103	120–150
Afognak Lake	1997–98	4	--	-- (--)	--	--	4	125–135
	1998–99	--	--	-- (--)	--	--	--	125–135
	1999–2000	--	71 <sup>a</sup>	30 (30)	--	--	101	130–150
	2000–01	--	6 <sup>a</sup>	-- --	--	--	6	20–50
	2001–02	--	--	-- --	--	--	--	20–50
	2002–03	--	58	13 (18)	--	22	71	50–70
Waterfall Lake	1997–98	2	110	35 (22)	2	32	147	175–185
	1998–99	--	--	-- (--)	--	--	--	175–185
	1999–2000	--	64 <sup>a</sup>	22 (34)	--	--	86	130–170
	2000–01	--	39 <sup>a</sup>	-- --	--	--	39	40–60
	2001–02	--	39	9 (19)	--	23	48	40–60
	2002–03	6	30	4 (10)	20	13	40	40–60
Tonki Cape	1997–98	2	21	6 (21)	10	29	29	30–40
	1998–99	--	--	-- --	--	--	--	30–40
	1999–2000	--	--	-- --	--	--	--	20–30
	2000–01	--	--	-- --	--	--	--	20–30
	2001–02	--	--	-- --	--	--	--	20–30
	2002–03	10	3	-- (3.3)	--	--	--	20–30
Total all herds	1997–98	53	498	174 (24)	11	35	725	1300–1400
	1998–99	17	87	-- (--)	20	--	104	1300–1400
	1999–2000	--	485	110 (19)	--	--	595	880–1060
	2000–01	15	314	52 (14)	5	17	381	800–900
	2001–02	8	418	41 (9)	2	10	467	740–860
	2002–03	26	407	121 (22)	6	30	554	740–860

<sup>a</sup> Includes all adults, not differentiated by sex.



**Table 2. Unit 8 elk harvest data by permit hunt, 1998/99–2002/03.**

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. (Drawing Hunt No. 702-709)	1998–99	146	45	60	40	10 (39)	22 (61)	0	0	32
	1999–2000	146	73	80	20	5 (63)	3 (37)	0	0	8
	2000–01	10	50	60	40	2 (100)	0 --	0	0	2
	2001–02	10	70	67	33	1 (100)	0 --	0	0	1
	2002–03	10	50	60	40	2 (100)	0 --	0	0	2
South and East Afognak Is. (Drawing Hunt 712,714,716,718)	1998–99	500	54	69	31	28 (42)	39 (58)	0	0	67
	1999–2000	500	68	77	23	22 (59)	15 (41)	0	0	37
	2000–01	501	65	85	15	9 (35)	17 (65)	0	0	26
	2001–02	500	71	71	29	17 (40)	25 (60)	0	0	42
	2002–03	275	56	75	25	16 (67)	8 (33)	0	0	24
South and East Afognak Is. (Registration Hunt No. 753) <sup>a</sup>	1998–99	593	--	83	17	21 (58)	15 (42)	0	0	36
	1999–2000	466	57	69	31	18 (45)	21 (53)	1	0	40
	2000–01	431	40	83	17	6 (45)	10 (55)	0	0	16
	2001–02	312	41	79	21	10 (67)	5 (33)	0	0	15
	2002–03	366	42	82	18	7 (58)	5 (42)	0	0	12
North Afognak Is. (Registration Hunt No. 754) <sup>a</sup>	1998–99	593	--	62	38	36 (78)	10 (22)	0	0	46
	1999–2000	466	57	71	29	28 (74)	10 (26)	0	0	38
	2000–01	431	40	86	14	10 (50)	10 (50)	0	2	22
	2001–02	312	41	71	29	16 (50)	16 (50)	0	0	32
	2002–03	366	42	84	16	16 (67)	8 (33)	0	0	24
Total all hunts	1998–99	1239	47	77	23	95 (52)	86 (48)	0	0	181
	1999–2000	1112	54	73	27	73 (59)	49 (40)	1	0	123
	2000–01	942	54	84	16	27 (42)	37 (58)	0	2	66
	2001–02	822	59	73	27	40 (44)	50 (56)	0	0	90
	2002–03	651	47	81	19	41 (66)	21 (34)	0	0	62

<sup>a</sup> Permits were valid for both RE753 and RE 754.

**Table 3. Unit 8 elk hunter residency and success, 1998/99–2002/03.**

Regulatory Year	Successful					Unsuccessful					Total hunters <sup>b</sup>
	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total	(%)	Local <sup>a</sup> resident	Nonlocal resident	Nonresident	Total	(%)	
1998–99	97	78	6	181	(29)	204	218	19	441	(71)	622
1999–2000	61	57	5	123	(27)	178	149	11	338	(73)	461
2000–01	34	29	1	64	(15)	189	149	15	353	(85)	417
2001–02	53	35	2	90	(22)	131	101	9	241	(73)	331
2002–03	34	24	4	62	(20)	135	106	13	254	(80)	316

<sup>a</sup> Local means resident of GMU 8.

<sup>b</sup> Hunters participating in more than one permit hunt were tallied for each hunt

**Table 4. Unit 8 elk harvest chronology by 10-day period (percent in parentheses), 1998/99–2002/03.**

Area	Regulatory Year	Harvest periods (percent)							<u>n</u>
		21 – 30 Sep	1-10 Oct	11-20 Oct	21-31 Oct	1–10 Nov	11-20 Nov	21-30 Nov	
Raspberry Island	1998–99	--	8 (25)	2 (6)	3 (9)	7 (22)	7 (22)	5 (16)	32
	1999–2000	--	3 (38)	2 (25)	1 (13)	--	2 (25)	--	8
	2000–01	--	1 (50)	1 (50)	--	--	--	--	2
	2001–02	--	--	1 (100)	--	--	--	--	1
	2002–03	--	1 (50)	1 (50)	--	--	--	--	2
South & East	1998–99	14 (14)	35 (34)	16 (16)	13 (13)	14 (14)	3 (3)	8 (8)	103
	1999–2000	18 (24)	13 (17)	3 (39)	14 (18)	8 (11)	12 (16)	8 (11)	76
	2000–01	8 (19)	3 (7)	14 (33)	8 (19)	6 (14)	1 (2)	2 (5)	42
	2001–02	7 (12)	14 (25)	20 (35)	8 (14)	8 (14)	--	--	57
	2002–03	2 (6)	8 (22)	14 (39)	4 (11)	5 (14)	2 (5)	1 (3)	36
North Afognak Island	1998–99	18 (39)	17 (37)	7 (15)	2 (4)	--	2 (4)	--	46
	1999–2000	14 (37)	7 (18)	4 (11)	8 (21)	2 (5)	--	3 (8)	38
	2000–01	6 (30)	10 (50)	3 (15)	1 (5)	--	--	--	20
	2001–02	24 (75)	2 (6)	4 (13)	--	2 (6)	--	--	32
	2002–03	9 (38)	6 (25)	3 (12)	2 (8)	4 (17)	--	--	24

**Table 5. Unit 8 elk harvest by transport method (percent in parentheses), 1998/99–2002/03.**

<b>Regulatory Year</b>	<b>Airplane</b>	<b>Horse</b>	<b>Boat</b>	<b>ORV</b>	<b>Highway vehicle</b>	<b>Unknown</b>	<b>n</b>
1998–99	82 (45)	0	65 (36)	1 (1)	31 (17)	1 (1)	181
1999–2000	42 (34)	0	49 (40)	3 (2)	23 (19)	6 (5)	123
2000–01	30 (47)	0	14 (22)	2 (3)	16 (25)	2 (3)	64
2001–02	38 (42)	0	26 (29)	0 (–)	19 (21)	7 (8)	90
2002–03	20 (32)	0	11 (18)	0 (–)	12 (19)	19 (31)	62



The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sales of handguns, sporting rifles, shotguns, ammunition and archery equipment. The Federal Aid program allots funds back to states through a formula based on each state's geographic area and number of paid hunting license holders. Alaska receives a maximum 5% of revenues collected each year. The Alaska Department of Fish and Game uses federal aid funds to help restore, conserve and manage wild birds and mammals to benefit the public. These funds are also used to educate hunters to develop the skills, knowledge and attitudes for responsible hunting.



**Photo by Riley Woodford, ADF&G**