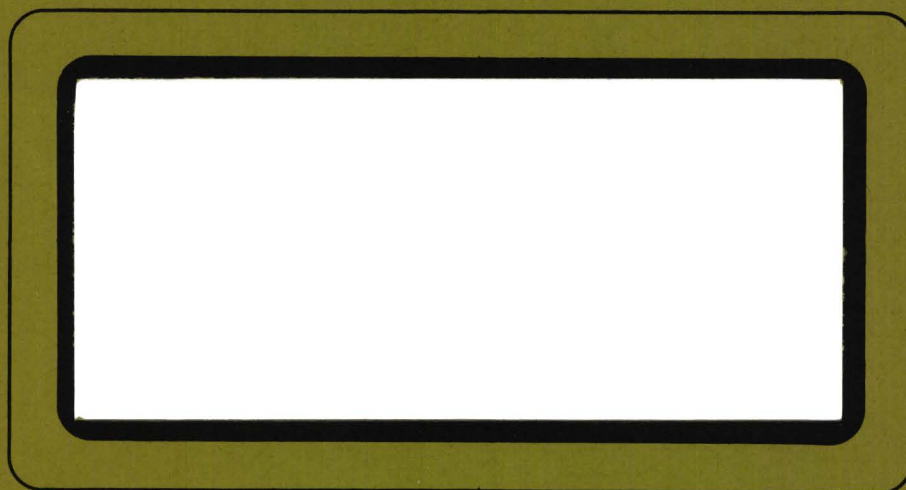


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**CHARACTERISTICS  
OF THE  
1986 FALL HUNTING EFFORT AND HARVEST  
IN THE  
SKAGIT RIVER WATERSHED**

**BY  
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**MINISTRY OF ENVIRONMENT AND PARKS  
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## 1.0 INTRODUCTION

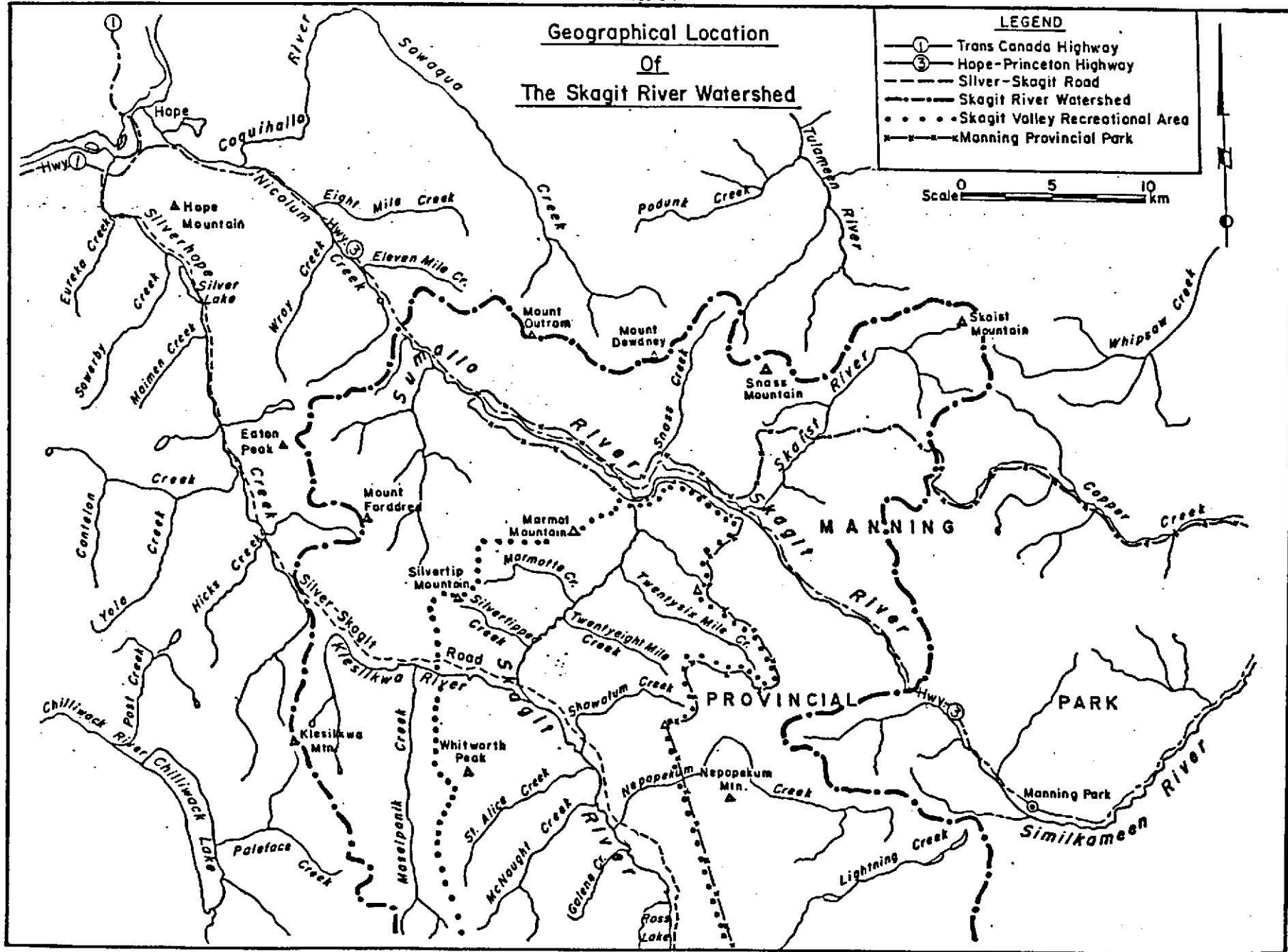
In January, 1986 the Skagit Endowment Commission approved funding of a proposal by the Fish & Wildlife Branch of the Ministry of Environment to conduct a series of wildlife studies in the Skagit River watershed. The primary objective of the studies was to update the data base for various wildlife species and related activities (Barnard, 1986). Among the studies subsequently undertaken was determination of fall hunting effort and harvest characteristics within the Skagit watershed. Hunting is a long-established landuse in the watershed. With increased leisure time, improved access, and a steadily increasing population in the adjacent Lower Fraser Valley, demand for hunting opportunity in the watershed is expected to increase. As a prelude to meeting that demand wildlife managers must first have access to wildlife oriented recreational baseline data (ie. how many hunters currently use the area, how much recreation do they derive from it, what game species are they seeking and what are the current levels of harvest). This study of the 1986 fall hunting season in the Skagit River watershed attempts to provide that baseline data.

## 2.0 STUDY AREA DESCRIPTION

The Skagit River watershed is located in southwestern British Columbia, approximately 150 km east of Vancouver (Fig.1). Straddling the International Boundary, the entire watershed encompasses approximately 8133 km<sup>2</sup> of which some 1036 km<sup>2</sup> are situated in British Columbia (Whately, 1979). The Canadian portion contains an array of physiographic features including the ecotone between coastal and interior forest types (Perry, 1981). This diversity is reflected in the six biogeoclimatic zones that occur within the watershed: 1) Alpine Tundra and Mountain Hemlock 2) Alpine Tundra and Englemann Spruce-Subalpine Fir 3) Mountain Hemlock 4) Englemann Spruce-Subalpine Fir 5) Coastal Western Hemlock and 6) Interior Douglas Fir (Barnard, 1986).

A diversity of land uses have occurred in the watershed. Since early times portions of the watershed have served as a travel corridor linking the Interior with the coast, first for native Indians and subsequently for fur traders and gold miners (Perry, 1981). Today that link continues in the form of the Hope-Princeton Highway (Hwy. 3). The discovery of gold in 1859 led to attempts at mining in the watershed. Since then sporadic attempts at mineral extraction have continued. In the late 1800's and early 1900's several attempts were made to establish ranching operations in the Lower Skagit Valley. However, by 1910 the last of these attempts had failed. In the late 1930's and early 1940's construction and subsequent modification of the Ross

Figure 1



Dam approximately 48 km below the International Boundary resulted in the creation of Ross Lake Reservoir. At full pool the reservoir inundates approximately 200 ha of the Lower Skagit Valley (Slaney, 1973). Between 1946 and 1954 most of the valley floor was clear-cut or selectively logged and has been followed by relatively slow regeneration.

Today, forest harvesting activities are the predominant form of land use, primarily in the Maselpalik, Klesilkwa, Cantelon, Yola and Sumallo drainages. No logging is permitted in that portion of the watershed within Manning Provincial Park. Additionally, future forest harvesting activities in the 32781 ha Skagit Valley Recreational Area (S.V.R.A.) will only be permitted if compatible with other resource users. This reflects recognition of the increasing role of recreation in the area generally, and in the southeast portion of the watershed in particular.

Finally, the study area is situated in Wildlife Administrative Region 2. Within that region the watershed occupies approximately the southern half of wildlife management unit (WMU) 2-2.

### 3.0 METHODS

A major source of data for this study was a game check station operated a total of seventeen days during the period September 6 thru December 14 inclusive. The days of operation were selected based on their likelihood to sample the largest number of hunters possible. The major periods of emphasis were the first two weekends of the deer season, the three-day Thanksgiving weekend, the Remembrance Day weekend (a four day holiday for many people) and the last three weekends of the deer season (Table 1). The check station was located on the Silver-Skagit Road approximately .6 km south of the highway turn-off (Fig. 2). The Silver-Skagit Road is approximately 60 km in length with the first 30 km bisecting the Silverhope Creek watershed. From Km 30 to its terminus at Ross Lake the road traverses the southern portion of the Skagit River watershed. Although road access does exist elsewhere in the study area most recreational activities, including hunting, are thought to occur in that portion serviced by the Silver-Skagit Road. Therefore, the check station is likely to have accounted for the bulk of the hunting activity in the study area on the days that it was operational (Keding - personal communication).

The daily station operating hours were from 0800 hrs. until one hour after sunset. Two large (.9 m x 1.8 m) painted signs requesting vehicles carrying firearms and/or wildlife to report to the check station were located on the road shoulder approximately 200 m and 50 m respectively prior to the station. Red





Figure 2. Check Station Location on the Silver-Skagit Road--1986.



Figure 3. Conservation Officers Carried Out Enforcement Activities at the Check Station During the Fall Hunting Season--1986.

traffic cones were used to direct traffic to the parking area. A flashlight, reflective safety vest and an automatic flashing caution light were used after sunset. Data collection was undertaken by one checker on eight of the seventeen days and by two checkers on the remainder. On seven of the check days members of the Conservation Officer Service (C.O.S.) also attended the check station in an enforcement capacity (Fig. 3).

The occupant(s) of each vehicle that stopped at the check station were asked if they were hunting. If the answer was affirmative the occupant(s) were asked a series of questions designed to complete the various data requirements of the road check form (Appendix 1). Particular emphasis was placed on determining what area the occupant(s) hunted so as to ensure that data obtained from those hunting outside the study area i.e. between the check station and Km 30, were recorded separately. All game birds and animals declared by hunters were examined and identified to species where possible.

Data derived wholly or in part from the game checks were then used as follows:

### 3.1 Hunter Area of Residence

All data was derived from the road checks. Area of residence was based on municipal boundaries wherever possible. In particular, those hunters who initially stated that "Vancouver" was their place of residence were further queried to ensure they resided within the City of Vancouver and not one of the satellite municipalities surrounding Vancouver City.

### 3.2 Total Estimated Hunter Use

This parameter is comprised of three components. The first was the actual number of hunters encountered during the game checks. These reflected hunter-use on selected weekends during the four month period. The second component was derived from the game check data. The average number of hunters per weekend day checked for each month was calculated and then extrapolated to the weekend days in that month that were not checked. The third component was derived from the field diaries of the Conservation Officer who regularly patrols the study area (Keding - personal communication). From these the average number of hunters encountered per weekday per month was determined for each of the four months. These data were then used to calculate, on a monthly basis, the estimated number of hunters using the Silver-Skagit Road to access the study area on weekdays. The total estimated number of hunters was derived by adding the sum of each component.

### 3.3 Total Estimated Hunter Effort

Hunter effort is measured in terms of hunter-days. A hunter-day was defined as a day, or any part of a day, spent hunting. For example, if two hunters spent a two-day weekend in the study area and hunted both days their total hunting effort was four hunter-days. The total estimated hunter effort was also comprised of three components. The first was derived from the number of hunters and hunter-days recorded on the weekends that the game check was operational. From these data the average number of hunter-days per hunter was calculated for each of the four months. To arrive at the second component these monthly averages were then multiplied by the respective monthly number of hunters estimated to have hunted on weekends when the check was not operational (Sec 3.2). The number of hunter-days resulting from these calculations are weighted to reflect variation in hunter effort with area of residence.

The third component was also derived from C.O.S. records - see 3.2. From these the average number of hunters encountered in the study area per weekday per month were calculated. These were then multiplied by the number of weekdays per month. For these calculations it was assumed that there was no variation in hunter effort with area of residence and therefore no weighting adjustment was necessary. The total estimated hunter effort was derived by adding the sum of each component.

### 3.4 Game Species Preferred by Hunters

All data was derived from the game checks. Each hunter was asked the question, "Are you primarily hunting deer, bear, grouse or other game?". In most instances a single preference was expressed. If a hunter was insistent that he/she was equally interested in more than one species of game his/her response was recorded accordingly.

### 3.5 Number and Species of Game Harvested

#### 3.5.1 Deer

The total estimated number of deer harvested during the hunting season (Sept. 6 thru Dec. 14 inclusive) was derived from three sources. The first was the actual number of deer tallied by game check staff as recorded on the road check form. The second source were those deer reported harvested but which did not pass through the check station. These data were obtained by asking all hunters passing through the check whether they, any members of their family, or their hunting partner(s) had shot a deer in the study area which had not been checked. The date, location of kill and number of tines per antler were recorded in each



instance. Where possible each animal reported in this manner was confirmed by checking the hunter's cancelled deer tag. The final source was simply an estimate of the number of deer that may have been harvested but not observed by, or subsequently reported to, check station staff. This estimate resulted from discussions with both wildlife management and C.O.S. staff and hunters familiar with the area.

### 3.5.2 Other

The numbers and species of game other than deer harvested in the study area were obtained solely from data collected at the check station. As such those data reflect only what was checked and are not total estimates for the fall hunting season. Each hunter was asked whether he/she had taken any such game and, if the answer was affirmative, these were inspected and the appropriate data noted.

### 3.6 Age Structure of Adult Male Deer

The lower jaw of each male deer bearing single spike antlers was examined at the game check to determine the animal's age. If the third pre-molar still had three cusps the animal was classed as a yearling ie. one and a half years old. Any deer in which the age could not be determined by this method had a primary incisor removed, after first obtaining the hunter's permission. After removal each tooth was sealed in a numbered envelope and placed in storage. After conclusion of the deer hunting season all stored teeth were forwarded to Mr. Gary Matson, Milltown, Montana, for tooth cementum age analysis. By this method the age of each animal at its last birthday was determined. In addition to age each tooth was assigned a reliability indicator as follows: A = result nearly certain; B = some error possible; C = error likely.

### 3.7 Regional and Economic Importance of Fall Hunting

Provincial Hunter Sample Survey statistics on the 1986 deer hunting harvest and effort in Region 2 were not available at time of writing. Therefore, to establish a comparative base for 1986 it was decided to assume that the actual figures would be similar to the average of the immediately preceding five year period. Harvest and effort statistics for the 15 management units comprising Region 2 during the period 1981 thru 1985 were obtained from the Wildlife Branch data bank and processed. Data extracted and averaged to an annual basis included: total animals killed, number of hunter-days and hunter-days per kill. From these, data pertaining to only those management units contiguous with the Lower Fraser Valley were subsequently isolated for separate analysis.

Three data components were utilized to determine the economic value of fall hunting in the study area. The first was the number of hunter-days spent hunting each of the individual species or species-groups as indicated by hunter preference recorded at the check station. This was obtained by multiplying the total estimated hunter-effort (Sec. 3.3) by the proportion of hunters seeking each of the game species, or game species groups, during the four month period.

The second component consisted of the estimates of daily expenditures by hunters seeking each of the same species or species-groups in the study area. Data for individual game species were obtained from a 1985 report prepared for the Fish and Wildlife Branch that documents the value and characteristics of resident hunting (Reid, 1985). All monetary values expressed in the Reid report were multiplied by a factor of 29 to update them from 1981 to 1986 dollars (Reid - personal communication). Data for species-groups were obtained by totalling the expenditures for each individual species in the group and then calculating a group average.

The third component was also obtained from the aforementioned report and consisted of the estimated daily economic values found for hunting each of the species. The economic value represents a measure of the amount of satisfaction or enjoyment that hunters derive from a day spent hunting, expressed in monetary units. This value is estimated by asking hunters to state the maximum amount they would be willing to pay, over and above their actual expenditures, for a day spent hunting a particular species (Reid 1985). The economic value for species groups was obtained by totalling the individual species values and then determining an average value. The daily monetary value of both expenditures and economic value for each of the species and species-groups was then totalled. These were then multiplied by the number of hunter-days spent hunting each of the species or species groups to obtain the respective monetary values. The total economic value of fall hunting in the study area was obtained by summing the individual values.

It should be noted that both the expenditures and economic values are considered the appropriate measures to employ in any economic assessment of wildlife related recreation such as would be found in a mitigation-compensation claim or a benefit-cost analysis (Reid, 1985).



## 4.0 RESULTS AND DISCUSSION

### 4.1 Hunter Numbers

Hunter numbers in this report refers to hunter occurrence in the study area. As it includes repeat visits it is not a measure of the number of individual hunters who used the study area during the 1986 fall hunting season. A total of 2060 hunters were estimated to have utilized the study area during the period September 6 thru December 14 inclusive (Table 1). Of these 698 were actually recorded by check station personnel. Another 689 hunters were estimated to have visited the study area on weekends when the check station was not operating. That estimate is derived from actual weekend daily hunter use data for the study area. The estimate of 676 hunters utilizing the study area on weekdays when the check station was not operating is felt to be somewhat conservative. This reflects variations in intensity and frequency of sampling which may underestimate the number of hunters actually using the area on weekdays (Keding - personal communication).

Use of the study area by hunters in the fall shows considerable monthly variation (Table 1). After an initial surge of interest on the opening weekend hunter-use during the balance of September and throughout October remains relatively low. This is thought to reflect a combination of factors including less than ideal weather conditions for deer hunting and the continuing presence of most buck deer on the difficult-to-access high elevation summer ranges (Forbes - personal communication). Extensive use of the study area between Km 30 and Ross Lake by campers, fishermen, mushroom pickers and hikers during the early fall may also discourage some hunting activity.

The peak month for hunting activity is November. With the onset of the rut in late October the adult males move down from the higher elevation in search of females. From then until the latter part of November the bucks are not only more accessible to hunters but are also less wary. In addition, the onset of colder weather may result in snowfall which, if heavy enough, can push the deer closer to the lower elevations frequented by most hunters. In 1986 hunter activity dropped off in December but was still substantially higher than that of either September or October. In years of low snowfall, such as 1986, this decline in activity probably reflects termination of the rut and the concomitant return of the bucks to less accessible, higher elevation habitat. However, in years of heavy snowfall deer are likely to remain at lower elevations. In those years it is probable that the high level of hunter activity in November continues on into December.

TABLE 1: TOTAL CALCULATED NUMBER OF HUNTERS AND HUNTER-DAYS OF RECREATION  
IN THE SKAGIT RIVER WATERSHED--SEPTEMBER 6 THRU DECEMBER 14, 1986.

STATUS	September		October		November		December		Total	
	No.		No.		No.		No.		No.	
	No. Hunters	Hunter-days	No. Hunters	Hunter-days	No. Hunters	Hunter-days	No. Hunters	Hunter-Days	No. Hunters	Hunter-Days
Weekends and Holidays-checked	143	177	70	109	309	413	176	209	698	908
Weekends-not checked	143	175	140	219	406	542	-	-	689	936
Weekdays-estimated	107	107	119	119	324	324	126	126	676	676
Totals:	393	459	329	447	1034	1279	304	335	2060	2520

#### 4.2 Hunter Effort

A total of 2520 hunter-days of recreation were estimated to have occurred in the study area in 1986 (Table 1). Of these 908 were accounted for by hunters passing through the check station. Based on that data another 936 hunter-days were estimated to have been spent in the study area on weekends when the check station was not operating. The remaining estimated 676 hunter-days occurred on weekdays and are thought to be conservative for two reasons. Firstly, they are derived from the estimated number of weekday hunters which may be underestimated (Sec. 4.1). Secondly, it was assumed that weekday hunters live close to the study area and therefore returned home each day. This resulted in the hunter-days per hunter equalling one. Undoubtedly some hunters other than locals do hunt in the study area during the week and do stay more than one day. However, no data was available to indicate how many hunter-days this may represent. Consequently, a hunting effort of one hunter-day per weekday hunter was used to ensure that any error was conservative in nature.

Previous estimates of hunter-day use in the study area are limited and not always directly comparable. During the one year period October, 1970 thru October, 1971 hunting was estimated to have provided 2200 days of recreation in the Lower Skagit Valley (I.J.C., 1971). Although that portion of the study area does probably account for a large proportion of the hunting effort undoubtedly some occurs elsewhere in the watershed. Therefore the figure should be considered a minimum at best. Bowden (1974) used Forest Service data to also estimate the level of hunting effort in the Lower Skagit Valley. In 1973 he estimated that hunting provided 2500 recreational days annually. He further extrapolated these data to estimate that hunter activity would peak at 4000 hunter-days in 1989 and would maintain that level to the end of the forecast period ie. the year 2015.

Based on these estimates it would appear that the number of hunter-days of recreation presently occurring in the Skagit River watershed have not kept pace with earlier projections. However, any comparisons must be made keeping in mind a number of differences between the studies. Both the I.J.C. and the Bowden studies were restricted to the Lower Skagit Valley whereas this study monitors both the Lower Skagit and the Klesilkwa Valleys. None of the studies completely monitor the entire watershed. Also, the present study only measures hunting activity occurring during the period September 6 thru December 14. As such it does not include most cougar (Felis concolor), black bear (Ursus americanus altifrontalis) and small predator hunting that occurs during the winter and early spring. The I.J.C. estimate of hunter-days, however, encompassed one full year's hunting activities. The period of annual hunting activity considered by Bowden is not known.

#### 4.3 Hunter Area of Residence

The 698 hunters reporting to the check station resided in 31 different communities within British Columbia (Table 2). Of these, 25 were located within the Lower Fraser Valley (L.F.V.). For purposes of discussion, the valley was divided into two areas by an imaginary line running north-south immediately west of Mission and Abbotsford. All hunters residing in communities west of that line were considered to be from the Western Lower Fraser Valley (W.L.F.V.). Hunters residing in communities east of that line were considered to be from the Eastern Lower Fraser Valley (E.L.F.V.). The remaining eight communities were located outside the L.F.V. and hunters residing in these were collectively classified as other-British Columbia (O-B.C.).

Hunters originating from the W.L.F.V. accounted for 63.8% (446) of those reporting to the check station (Table 3). They resided in a total of 13 different communities with almost 63% located in Vancouver (26.3%), Surrey (22.0%) and Langley (14.6%) (Table 2). During the months of September, October and November there was little change in the proportion of hunters who originated from the W.L.F.V. (Table 3). That, however, increased by approximately 13% during December. The proportion of those hunters originating in the W.L.F.V. who resided in Vancouver remained relatively constant throughout the four month period (Table 2). However, hunters residing in Surrey and, to a lesser extent, Langley demonstrated a greater temporal variation in utilizing the study area.

Two hundred and thirty eight (34.2%) of the hunters checked originated in the E.L.F.V. (Table 3). Over 46% of these resided in the communities of Chilliwack (23.1%), Abbotsford (12.2%) and Silver Creek (10.9%). The remainder lived in an additional nine communities within the E.L.F.V. Proportionately, the number of hunters from Chilliwack and Silver Creek decreased temporarily whereas those from Abbotsford increased. There was little variation in the proportion of hunters from the E.L.F.V. who utilized the study area in September, October and November. There was, however, a decline during December, the reasons for which are not apparent at this time.

Only 14 (2.0%) of the hunters checked in the study area originated from communities outside the L.F.V. (Table 3). This probably reflects both the travelling distance involved from the nearest population centres ie. Kamloops, the Okanagan and Vancouver Island, and the relatively poor hunter success rate.

TABLE 2: TEMPORAL VARIATION BY AREA OF RESIDENCE OF HUNTER NUMBERS AND EFFORT--SKAGIT RIVER WATERSHED, 1986.

	SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER				TOTAL		TOTAL	
	No. Hunters	%	No. Hunter- Days	%	No. Hunters	%	No. Hunter- Days	%	No. Hunters	%	No. Hunter- Days	%	No. Hunters	%	No. Hunter- Days	%	No. Hunters	%	No. Hunter- Days	%
<b>LOWER FRASER VALLEY--WEST</b>																				
Vancouver	25	(27.9)	29	(24.8)	11	(25.0)	20	(24.8)	45	(24.8)	67	(25.2)	36	(27.7)	45	(27.5)	117	(26.3)	161	(25.7)
Burnaby	7	(7.8)	11	(9.4)	1	(2.3)	1	(1.2)	21	(11.5)	34	(12.8)	16	(12.3)	20	(12.3)	45	(10.1)	66	(10.5)
Richmond	3	(3.3)	4	(3.4)	4	(9.1)	4	(4.8)	7	(3.8)	9	(3.4)	4	(3.1)	4	(2.5)	18	(4.0)	21	(3.4)
North Vancouver	3	(3.3)	4	(3.4)	4	(9.1)	11	(13.6)	5	(2.7)	8	(3.0)	3	(2.3)	5	(3.1)	15	(3.4)	28	(4.5)
Coquitlam	4	(4.4)	4	(3.4)	1	(2.3)	2	(2.5)	14	(7.7)	18	(6.8)	8	(6.2)	12	(7.4)	27	(6.1)	36	(5.8)
Port Coquitlam	5	(5.6)	6	(5.1)	2	(4.5)	4	(4.9)	-	-	-	-	1	(.8)	1	(.6)	8	(1.8)	11	(1.8)
Maple Ridge	3	(3.3)	5	(4.3)	2	(4.5)	6	(7.4)	6	(3.3)	11	(4.2)	8	(6.2)	10	(6.1)	19	(4.3)	32	(5.1)
Surrey	30	(33.3)	41	(35.1)	7	(16.0)	14	(17.3)	40	(22.0)	59	(22.3)	21	(16.2)	27	(16.6)	98	(22.0)	141	(22.5)
Delta	1	(1.1)	1	(.9)	-	-	-	-	6	(3.3)	9	(3.4)	7	(5.4)	9	(5.5)	14	(3.1)	19	(3.0)
Langley	8	(8.9)	10	(8.5)	7	(15.9)	7	(8.8)	26	(14.3)	34	(12.8)	24	(18.5)	28	(17.2)	65	(14.6)	79	(12.6)
New Westminster	1	(1.1)	2	(1.7)	3	(6.8)	6	(7.4)	10	(5.5)	10	(3.8)	1	(.8)	1	(.6)	15	(3.4)	19	(3.0)
Port Moody	-	-	-	-	-	-	-	-	2	(1.1)	6	(2.3)	1	(.8)	1	(.6)	3	(.7)	7	(1.1)
Pitt Meadows	-	-	-	-	2	(4.5)	6	(7.4)	-	-	-	-	-	-	-	-	2	(.2)	6	(1.0)
Totals	90	100.0	117	100.0	44	100.0	81	100.0	182	100.0	265	100.0	130	100.0	163	100.0	446	(100.0)	626	(100.0)
<b>LOWER FRASER VALLEY--EAST</b>																				
Abbotsford	1	(1.9)	1	(1.7)	2	(7.7)	2	(7.1)	16	(13.9)	20	(16.7)	10	(22.7)	10	(22.7)	29	(12.2)	33	(13.1)
Chilliwack	16	(30.2)	19	(31.6)	7	(26.9)	7	(25.0)	23	(20.0)	23	(19.7)	9	(20.5)	9	(20.5)	55	(23.1)	58	(23.0)
Agassiz-																				
Rosedale	4	(7.5)	4	(6.7)	2	(7.7)	2	(7.1)	8	(7.0)	8	(6.7)	3	(6.8)	3	(6.8)	17	(7.1)	17	(6.7)
Mission	3	(5.7)	3	(5.0)	1	(3.8)	3	(10.7)	-	-	-	-	-	-	-	-	4	(1.7)	6	(2.4)
Hope	13	(24.5)	14	(23.3)	8	(30.8)	8	(28.7)	34	(29.5)	35	(29.2)	19	(43.1)	19	(43.1)	74	(31.1)	76	(30.2)
Laidlaw	2	(3.8)	3	(5.0)	2	(7.7)	2	(7.1)	16	(13.9)	16	(13.3)	1	(2.3)	1	(2.3)	21	(8.8)	22	(8.7)
Silver Creek	12	(22.6)	12	(20.0)	4	(15.4)	4	(14.3)	10	(8.7)	10	(8.3)	-	-	-	-	26	(10.9)	26	(10.3)
Floods	2	(3.8)	4	(6.7)	-	-	-	-	1	(.9)	1	(.8)	-	-	-	-	3	(1.3)	5	(2.0)
Cultus Lake	-	-	-	-	-	-	-	-	2	(1.7)	2	(1.7)	1	(2.3)	1	(2.3)	3	(1.3)	3	(1.2)
Sardis	-	-	-	-	-	-	-	-	3	(2.6)	3	(2.5)	1	(2.3)	1	(2.3)	4	(1.7)	4	(1.6)
Ruskin	-	-	-	-	-	-	-	-	1	(.9)	1	(.8)	-	-	-	-	1	(.4)	1	(.4)
Yarrow	-	-	-	-	-	-	-	-	1	(.9)	1	(.8)	-	-	-	-	1	(.4)	1	(.4)
Totals:	53	(100.0)	60	(100.0)	26	(100.0)	28	(100.0)	115	(100.0)	120	(100.0)	44	(100.0)	44	(100.0)	238	(100.0)	252	(100.0)
<b>OTHER - BRITISH COLUMBIA</b>																				
Campbell River	-	-	-	-	-	-	-	-	1	(8.3)	1	(3.6)	2	(100.0)	2	(100.0)	3	(21.4)	3	(10.0)
Nanaimo	-	-	-	-	-	-	-	-	1	(8.3)	1	(3.6)	-	-	-	-	1	(7.1)	1	(3.3)
Kamloops	-	-	-	-	-	-	-	-	1	(8.3)	1	(3.6)	-	-	-	-	1	(7.1)	1	(3.3)
Penticton	-	-	-	-	-	-	-	-	1	(8.3)	1	(3.3)	-	-	-	-	1	(7.1)	1	(3.3)
Powell River	-	-	-	-	-	-	-	-	2	(16.8)	14	(50.0)	-	-	-	-	2	(14.3)	14	(46.8)
Kelowna	-	-	-	-	-	-	-	-	6	(10.0)	10	(35.6)	-	-	-	-	6	(43.0)	10	(33.3)
Totals	-	-	-	-	-	-	-	-	12	(100.0)	28	(100.0)	2	(100.0)	2	(100.0)	14	(100.0)	30	(100.0)



TABLE 3: TEMPORAL VARIATION IN HUNTER NUMBERS AND AREA OF ORIGIN  
 --SKAGIT RIVER WATERSHED, 1986

Area of Origin	September		October		November		December		Total	
	Total Hunters	%	Total Hunters	%	Total Hunters	%	Total Hunters	%	Hunters	%
Western Lower Fraser Valley	90	62.9	44	62.9	182	59.1	130	73.1	446	63.8
Eastern Lower Fraser Valley	53	37.1	26	37.1	115	37.0	44	25.8	238	34.2
Other - British Columbia	-		-		12	3.9	2	1.1	14	2.0
Totals:	143	100.0	70	100.0	309	100.0	176	100.0	698	100.0

#### 4.4 Game Species Preferred by Hunters

##### 4.4.1 Deer

Deer were selected as the primary objective by almost 85% (592) of the 648 hunters checked (Table 4). Temporally, deer were most widely sought by hunters during November (91.9%) and early December (88.7%). This probably reflects the perception of most deer hunters utilizing the study area that chances of success are greater during that period which encompasses both the rutting season and the likelihood of snowfall.

##### 4.4.2 Black Bear

Less than 1% of the hunters checked were primarily seeking black bear (Table 4). Most bear hunting in the study area apparently occurs in the spring and is often conducted with hounds (Keding - personal communication). None of the bear hunters checked were using hounds.

##### 4.4.3 Deer and Bear

Eighteen (2.6%) of 698 hunters checked said they were equally interested in deer and bear (Table 4). However, it should be noted that 17 of the 18 individuals expressed this preference during November and December. Hunter interest in deer was at a peak during that period, and the likelihood of encountering a bear was diminishing with the onset of hibernation. This suggests that, despite the hunters stated preference, deer were the primary reason for their hunting activities in the study area at that time.

##### 4.4.4 Grouse

Grouse were the primary quarry of 49 (7%) of the 698 hunters checked and ranked second to deer in terms of hunter preference (Table 4). Hunter interest in grouse was greatest in September and progressively diminished through the ensuing three months. This may reflect, in part, the availability of the birds. During September and early October grouse were commonly seen along the Silver-Skagit Road, particularly in the early morning and late evening. However, by November, at which time leaf drop should have made the birds even more visible, relatively few sightings of birds were being reported.

In part, this probably stemmed from the number of birds that had already been harvested. However, it has also been suggested that ruffed grouse, which are the predominant species encoun-

TABLE 4: TEMPORAL VARIATION IN HUNTER PREFERENCE FOR VARIOUS GAME SPECIES--SKAGIT RIVER WATERSHED, 1986.

Game Species Primarily Sought	SEPTEMBER				OCTOBER				NOVEMBER				DECEMBER				GRAND TOTAL HUNTERS			
	Total Hunters	%	No. Days Checked	Hunters Per Day	Total Hunters	%	No. Days Checked	Hunters Per Day	Total Hunters	%	No. Days Checked	Hunters Per Day	Total Hunters	%	No. Days Checked	Hunters Per Day	TOTAL HUNTERS	%	Total Days	Hunters Per Day
Deer	111	77.6	4	27.7	41	58.5	3	13.7	284	91.9	6	46.5	156	88.7	4	39.5	592	84.9	17	34.6
Bear	1	.7	4	.3	2	2.9	3	.7	1	.3	6	.2	1	.6	4	.3	5	.7	17	.3
Deer/Bear	1	.7	4	.3	-		3	-	9	2.9	6	1.5	8	4.5	4	2.0	18	2.6	17	1.1
Grouse	24	16.8	4	6.0	9	12.9	3	3.0	13	4.2	6	2.2	3	1.7	4	.8	49	7.0	17	2.9
Deer/Grouse	6	4.2	4	1.5	18	25.7	3	6.0	2	.7	6	.3	5	2.8	4	1.3	31	4.4	17	1.8
Cougar	-	-	4	-	-	-	3	-	-	-	6	-	3	1.7	4	.8	3	.4	17	.2
Total:	143	100.0	4	35.8	70	100.0	3	23.3	309	100.0	6	50.7	176	100.0	4	44.5	698	100.0	17	40.9



Figure 4. Mule Deer Buck Taken in the  
Km 30 Area in October  
--Skagit River Watershed, 1986

tered, undertake a late fall-early winter migration to higher elevations in the study area (Slaney, 1973). This would also contribute to the reduced likelihood of hunters encountering grouse along, and adjacent to, the valley-bottom roads as the season progressed.

#### 4.4.5 Deer and Grouse

Deer and grouse were equally the primary objective of 31 (4.4%) of the 698 hunters surveyed (Table 4). Temporally, October was the month in which greatest mutual interest was shown in these two species. One possible explanation for the October interest is that the number of grouse encountered along the road system in early fall had simply made hunters ostensibly hunting deer more aware of the opportunity to also bag a grouse.

#### 4.4.6 Cougar

The 1986-87 cougar hunting season in the study area did not commence until December 1, 1986. As the check station ceased operations on December 14, 1986, the level of interest in cougar hunting expressed in this study is obviously underestimated. Cougar hunting is a highly specialized activity practiced by a relatively small number of hunters. However, the dedication of these individuals to their sport may result in the generation of a considerable number of hunter-days of recreation in an area where cougar hunting is regularly practiced. The Lower Skagit Valley portion of the study area is recognized by some as the prime cougar hunting area in the Lower Fraser Valley (Stephens - personal communication). Therefore, if a complete picture of the recreation afforded by hunting in the study area is to be derived the contribution of cougar hunting needs to be fully documented.

### 4.5 Game Species Harvested

#### 4.5.1 Deer

A total of 21 male deer were recorded during the 17 days of check station operation in the study area (Table 5). Identification of these animals to species was primarily based on a tail characteristics method developed during an earlier study in the Lower Skagit Valley (Slaney, 1973). Using these data three deer were classified as mule deer (Odocoileus hemionus hemionus), five were identified as Columbian blacktails (Odocoileus hemionus columbianus) and six were described as intergrades between those two species (Figs. 4, 5 and 6). As the tail had been removed from the carcasses of the remaining seven deer, these were not classified. This situation occurred most often during the first four weeks of the deer season. Warm weather during that period often prompted hunters to remove the hide shortly after the kill in an



TABLE 5: NUMBERS AND TEMPORAL DISTRIBUTION OF GAME ANIMALS AND  
BIRDS RECORDED AT THE CHECK STATION  
--SKAGIT RIVER WATERSHED, 1986

<u>Game</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Total</u>
Deer	5	2	10	4	21
Black Bear	-	-	-	-	-
Grouse	60	36	3	1	100
Waterfowl	-	-	21	-	21
Snowshoe Hare	4	-	-	-	4
Cougar	-	-	-	-	-

TABLE 6: TOTAL CALCULATED DEER HARVEST  
--SKAGIT RIVER WATERSHED, 1986

<u>Status</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Total</u>
Checked	5	2	10	4	21
Confirmed but not checked	3	1	11	-	15
Estimated	<u>4</u>	<u>4</u>	<u>4</u>	<u>2</u>	<u>14</u>
Totals:	12	7	25	6	50



Figure 5. Blacktailed Deer Also Occurred in the Harvest--Skagit River Watershed, 1986.



Figure 6. Large Mule-Blacktail Hybrid from the Km 33 Area--Skagit River Watershed, 1986.

effort to cool the carcass as quickly as possible and thereby avoid spoilage of the meat.

The total calculated deer harvest for the study area in 1986 was 50 animals (Table 6). In addition to the 21 deer actually recorded another 15 were confirmed by questioning hunters passing through the check station. These were animals that had been taken in the study area by the hunter, his hunting partner(s) or a member of his family on days when the check station was not operating. If there were any doubts as to the reliability, or possible duplication, of kills reported in this manner they were discarded. The final component of the total calculated harvest were those animals that were neither observed at the game check nor confirmed by questioning hunters. A total of 24 such animals were subsequently estimated to have been taken (Table 6). This estimate was based on one deer per week for each week of the deer season and resulted from discussions with wildlife management staff. It is thought to be conservative, particularly with reference to the latter half of the season.

Based on the number of deer checked, and those confirmed but not checked, the bulk of the harvest in 1986 occurred in November (Table 6). This encompasses the period of greatest rutting activity in the study area (Keding - personal communication). During the rut males become less wary and tend to range widely in search of females (Forbes - personal communication). As a result they are more vulnerable to hunters and the harvest tends to rise accordingly.

Comparison of the 1986 total calculated harvest in the study area with data collected in previous seasons is difficult due to different sampling designs. Slaney (1973) calculated deer hunting success in and adjacent to the study area for the period 1965 thru 1972 (Table 7). However, none of the areas he monitored coincided with the area sampled in this study. Additionally, except for the 1971 data, he does not specify how many check days were involved and therefore what proportion of the deer hunting season his data reflects. Estimated total harvest figures for 1970, 1971 and 1972 are presented for the Lower Skagit Valley but the method of computation is not specified.

Using Slaney's method of calculating hunter success the 502 deer hunters checked in this study experienced a 3.5% success rate while harvesting 21 deer. If Slaney's data can be considered generally representative of the study area then the 1986 deer hunting success rate appears, with one exception, to be within the range established for the period 1965 thru 1972. The exception is 1968 for which there appears to be a calculation error. Current management practice is to calculate hunter success based on the number of hunter-days required to harvest a deer (Forbes - personal communication). According to actual field data for the period 1968 thru 1972 a total of 4853 hunter

TABLE 7: DEER HUNTING SUCCESS IN THE SILVER-HOPE VALLEY, KLESILKWA VALLEY AND SKAGIT VALLEY --1965-72.

<u>Year</u>	<u>Hunters Checked</u>	<u>Estimated Total Hunters</u>	<u>Hunter Days Checked</u>	<u>Estimated Total Hunter days</u>	<u>Deer Checked</u>	<u>Estimated Total Harvest</u>	<u>Deer per 100 Hunters</u>	<u>Deer per 100 Hunter Days</u>
1965	* 260	-	-	-	13	-	5.0	-
1966	* 692	-	-	-	18	-	2.6	-
1967	* 588	-	-	-	30	-	5.1	-
1968	** 974	-	1147	-	45	-	4.6	3.8
	* 43	-	50	-	16	-	23.2	20.0
1969	** 512	-	664	-	10	-	1.9	1.5
	+ 290	-	315	-	2	-	0.7	0.6
1970	** 1470	-	1780	-	20	30	1.3	0.9
	+ 925	-	1100	-	10	-	1.1	1.1
1971	** 606	1095	720	1169	13	24	2.2	1.8
1972	** 495	905	542	994	5	9	1.0	0.9

\* Silver-Hope, Klesilkwa and Skagit Valleys combined.

\*\* Skagit Valley Two Part Study Area.

+ Silver-Hope Valley and Klesilkwa Valley.

--modified from Slaney, 1973



days were required to harvest 93 deer in the Lower Skagit Valley (Table 7). Using the contemporary method of calculating success this indicated an expenditure of 52.18 hunter-days for each deer killed. In this study 771 deer hunters bagged 21 animals for a success rate of 36.71 hunter-days per kill. Again, if it is assumed that Slaney's data is representative of the larger area encompassed in this study, the success rate experienced by deer hunters in 1986 was significantly improved over that occurring during the period 1968 thru 1972.

Another source of harvest comparison are the B.C. Hunter Sample Surveys for the period 1980 thru 1985. By establishing what proportion of the deer reported as harvested in a given year in WMU 2-2 were from the study area it is then possible to calculate the annual estimated kill for that area (Table 8). By comparison, the 1986 total calculated harvest of 50 animals is slightly lower than the average annual estimate of 62 for the preceding six years. However, any comparison of harvest on a year-to-year basis can only be made if consideration of snow conditions during the deer season are taken into account. Accumulated snow depth is a major factor in moving deer to lower elevation winter ranges thereby increasing their vulnerability to hunting. Snowfall in the study area during the 1986 deer hunting season was well below average and was probably the primary cause of the reduced harvest.

#### 4.5.2 Grouse

A total of one hundred grouse were checked during the 17 days of game station operation (Table 5). Based on hunter road check data for 1970, 1971 and 1972 the estimated grouse harvest in those years for the entire season in the Lower Skagit Valley was 55, 80 and 20 respectively (Slaney, 1973). Even taking into account the larger area monitored in this study, relative to Slaney's, it would appear that grouse numbers in the study area in 1986, based on hunter bag, were considerably higher than in the period 1970-1972. Population fluctuations in all North American grouse are known to be cyclic (Leopold, 1933). Therefore, based on the comparison of current and past harvest data it would appear that grouse populations in the study area are currently on the higher end of the cyclic range.

Of the 100 grouse checked 47 were identified as ruffed grouse (Bonasa umbellus) and four as blue grouse (Dendragapus obscurus). The remaining 49 birds checked could not be identified to species as hunters had removed only the breast and discarded the rest of the bird. However, based on the proportion of identified birds that were ruffed grouse it is likely that this species constituted the bulk of those not classified. Slaney (1973) stated that, based on hunter checks, ruffed grouse appeared to provide most of the grouse hunting in the Lower Skagit Valley. The results of this study would appear to confirm that

TABLE 8: ESTIMATED DEER HARVEST IN THE SKAGIT RIVER WATERSHED  
BASED ON B.C. HUNTER SAMPLE SURVEY DATA--1976-85.

<u>YEAR</u>	<u>ESTIMATED HARVEST</u>
1980	45
1981	53
1982	85
1983	68
1984	58
1985	<u>61</u>
$\bar{X} = 62$	

TABLE 9: AGE STRUCTURE OF MALE DEER INSPECTED AT THE CHECK  
STATION--SKAGIT RIVER WATERSHED, 1986.

<u>DATE KILLED</u>	<u>LOCATION</u>	<u>ANTLER CONFIGURATION</u>		<u>AGE (Years)</u>
		<u>L.</u>	<u>R.</u>	
Sept. 6	Maselpanik Cr.	2	2	1
Sept. 6	Maselpanik Cr.	1	1	1
Sept. 7	Maselpanik Cr.	2	2	2
Sept. 13	Maselpanik Cr.	2	2	2
Sept. 14	Maselpanik Cr.	1	1	1
Oct. 12	Km 30	2	2	2
Oct. 12	Km 30	1	1	1
Nov. 4	Mt. Potter	4	4	6
Nov. 8	Silvertip Mtn.	3	4	5
Nov. 8	Km 54	2	2	2
Nov. 9	26 Mile Bridge	2	2	1
Nov. 9	Km 33	3	3	3
Nov. 14	Km 34	3	3	2
Nov. 18	Km 47	2	2	2
Nov. 22	Km 40-42	2	2	3
Nov. 24	Mt. Potter	3	3	8
Dec. 6	Km 45	4	4	3
Dec. 7	Km 49	1	1	1
Dec. 11	Km 54	4	4	5



observation for both the Lower Skagit Valley and other portions of the study area accessible from the Silver-Skagit Road. Temporally, 96% of the grouse bagged were harvested during the first five weeks of the 14 week open season. Of these 60% were harvested during the first two weekends. Based on comments solicited from hunters most of the grouse were shot on, or adjacent to, the Silver-Skagit Road. Possible reasons for the decline in grouse harvest as the season progresses are discussed in Sec. 4.4.4.

#### 4.5.3 Waterfowl

Twenty-one ducks were checked through the game station during its operation. Twenty were mallards (Anas platyrhynchos) and one was a pintail (Anas acuta). Waterfowl were not listed as a primary game objective by any of the hunters checked (Table 4). Those observed at the check station were taken by two hunters on Ross Lake in November incidental to deer hunting (Fig. 7). Slaney (1973) observed that as many as 2-300 ducks have been observed on Ross Lake during fall migration and that approximately 100 birds, primarily mallards, overwinter. Based on road check harvest data for 1970, 1971 and 1972 he estimated the total waterfowl harvested in those years for the Lower Skagit Valley at 140, 45 and 20 birds respectively. Most, if not all, of these birds are thought to have been taken on, or adjacent to, Ross Lake. These data would appear to confirm that waterfowl are not largely sought after in the study area.

#### 4.5.4 Snowshoe Hare

A total of four snowshoe hares (Lepus americanus) were harvested in the study area. All of these were taken on the first day of the fall hunting season by deer hunters. During the balance of the season very few of the hunters passing through the check station mentioned seeing hares.

#### 4.6 Age Structure of Adult Male Deer

A total of nineteen deer harvested in the study area were aged via dental characteristics (Table 9). Of these, five were yearling spike bucks whose age could be determined by game check personnel. The remaining 14 were aged in the laboratory by specialists using a tooth cementum age analysis. Twelve of the 19 deer were either one or two year old animals. The remainder ranged in age from three to eight years old. At first glance such a high proportion of relatively young animals would seem to indicate a vibrant and healthy population. However, there are several factors which may have resulted in the data presenting a distorted profile of the population. One of these is the small sample size. Another is variation in the seasonal distribution



FIGURE 7: Mixed Bag of Mallard and Pintail from  
Ross Lake--Skagit River Watershed, 1986.

of male deer which could result in certain age classes being harvested in greater proportion than their occurrence in the general population.

In the study area most of the hunting pressure and, consequently, most of the harvest, occurs in either the valley bottoms or at relatively low elevations on the valley sides. During the first two months of the deer season the bulk of the bucks at the lower elevations are primarily one and two year old animals (Forbes - personal communication). Consequently they bear the bulk of the harvest during that period. In the latter half of the season the older bucks move down from the higher elevation summer ranges in response to the rut and, in some years, increasing snow depths. At that time these animals also start to occur in the harvest. However, once the rut is over and if the weather remains mild, these older bucks tend to move back up the valley sides to avoid hunters. In harsher winters they remain closer to the valley floor and are harvested accordingly.

Therefore, in a mild fall there is a greater likelihood of a larger proportion of younger animals occurring in the deer harvest than would be the case if weather conditions were harsher. As the fall and winter of 1986 were particularly mild in the study area this may account for the preponderance of younger bucks in the harvest. Age structure based on data from such a harvest would therefore also tend to be weighted toward younger age classes.

#### 4.7 Regional and Economic Value of Fall Hunting

Based on hunter comments the Skagit Valley watershed is considered primarily a deer hunting area (Sec. 4.4.1). Of the 2520 hunter-days estimated to have occurred in the study area in 1986, 2140 (84.9%) were spent hunting deer exclusively (Table 12). In 1986, a total of 34,241 hunter-days were assumed to have been spent hunting deer in Region 2 (Table 10). Therefore, in a regional context, the study area supported 6.2% of the total 1986 deer hunting effort. In addition to WMU 2-2, in which the study area is located, there are five more management units contiguous with the Lower Fraser Valley (Fig. 8). They are, therefore, as equally available to deer hunters residing in the Lower Fraser Valley as is the study area. In 1986 these management units are assumed to have provided 15,632 hunter-days of deer hunting (Table 11). Ninety-seven percent or 2076 hunter-days of effort in the study area originated with deer hunters residing in the Lower Fraser Valley. For purposes of comparison it was assumed that the same proportion of the 15,632 hunter-days for the contiguous WMU's (ie. 15,163 hunter-days) also originated from hunters residing in the Lower Fraser Valley.

TABLE 10: DETERMINATION OF THE 1986 ASSUMED HUNTER HARVEST AND EFFORT STATISTICS BASED ON 1981 THRU 1985 MANAGEMENT UNIT DATA--WILDLIFE ADMINISTRATIVE REGION 2.

<u>M.U.</u>	<u>ANIMALS KILLED (1981-85)</u>	<u>HUNTER- DAYS (1981-85)</u>	<u>HUNTER-DAYS PER KILL</u>
201	25	402	16.08
202	758	15,224	20.08
203	588	22,252	37.84
204	181	7,672	42.39
205	4,386	54,792	12.49
206	90	3,798	42.20
207	144	5,918	41.10
208	556	2,504	18.69
209	295	6,879	23.32
210	584	10,882	18.63
211	887	12,743	14.37
212	444	11,678	26.30
213	163	1,770	10.86
214	23	434	18.87
215	<u>131</u>	<u>1,514</u>	<u>11.56</u>
Totals	9,255	171,207	18.50
1986 Assumed ( $\div 5$ )	1,851	34,241	18.50

**Figure 8**

**Management Units Contiguous With The Lower Fraser Valley**

—— Wildlife Administrative Region 2 ———

Scale 0 100 km

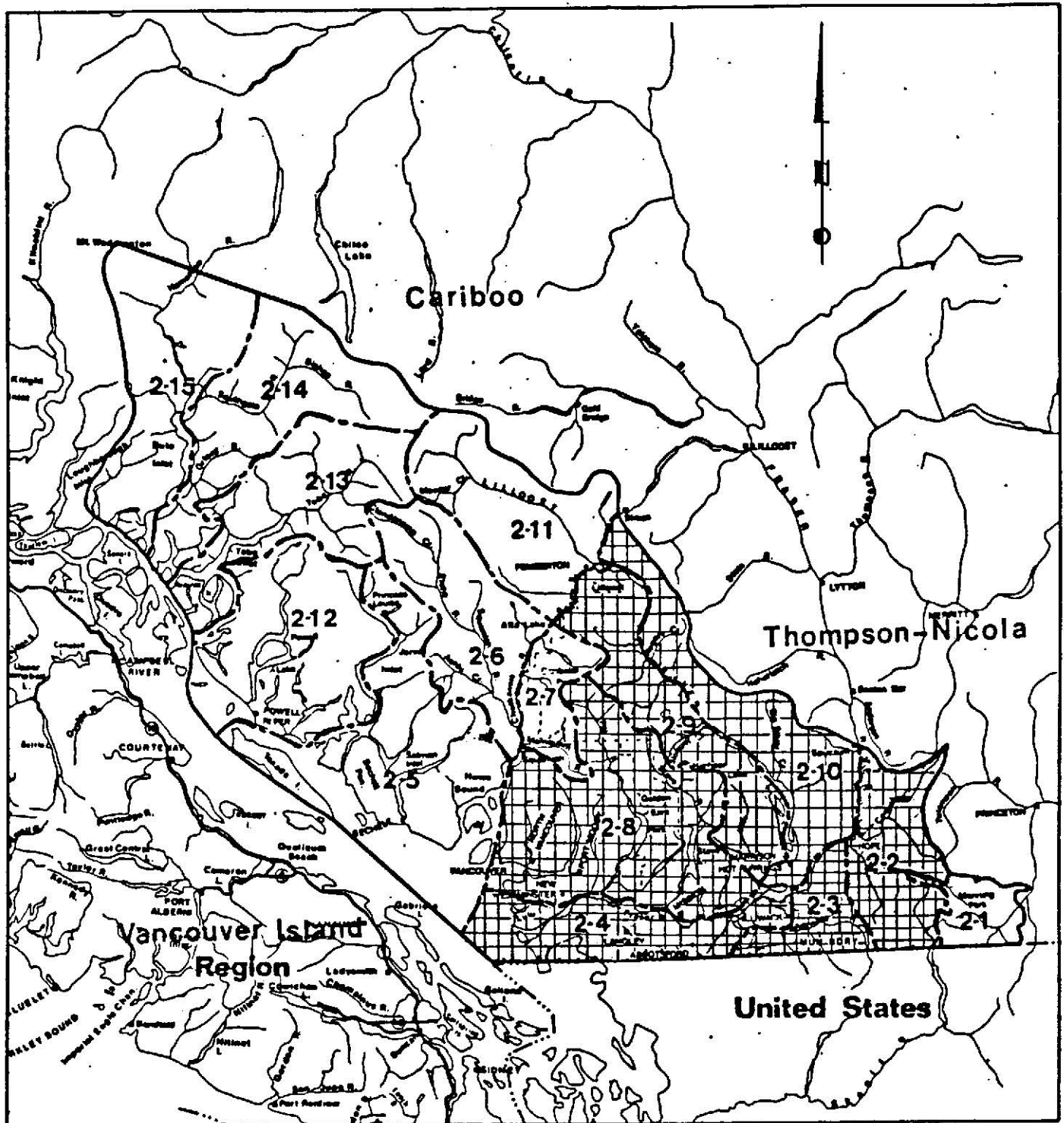




TABLE 11: DETERMINATION OF THE 1986 ASSUMED HUNTER HARVEST AND EFFORT STATISTICS BASED ON 1981 THRU 1985 DATA FOR MANAGEMENT UNITS CONTIGUOUS WITH THE LOWER FRASER VALLEY--WILDLIFE ADMINISTRATIVE REGION 2.

<u>M.U.</u>	ANIMALS KILLED (1981-85)	HUNTER- DAYS (1981-85)	HUNTER-DAYS PER KILL
202	758	15,224	20.08
203	588	22,252	37.84
204	181	7,672	42.39
208	556	15,249	18.69
209	295	6,879	23.32
210	<u>584</u>	<u>10,882</u>	<u>18.63</u>
Totals:	2,962	78,158	26.40
1986 Assumed (+5)	592	15,632	26.40

TABLE 12: ESTIMATED ECONOMIC VALUE OF THE 1986 FALL HUNTING SEASON--SKAGIT RIVER WATERSHED.

<u>GAME</u>	ESTIMATED AVERAGE DAILY EXPENDITURES ( <u>\$</u> )	ESTIMATED DAILY VALUE ( <u>\$</u> )	<u>TOTAL</u> ( <u>\$</u> )	EST. NO. HUNTER- DAYS	<u>TOTAL</u> VALUE ( <u>\$</u> )
Deer	41.28	32.25	73.53	2140	157,354.20
Black Bear	29.54	32.77	62.31	17	1,054.27
Deer/Bear	35.41	32.51	67.92	66	4,482.72
Grouse	19.35	16.90	36.25	176	6,379.82
Deer/Grouse	30.32	24.58	54.90	111	6,093.29
Cougar	95.46	44.12	183.70	<u>10</u>	<u>1,837.00</u>
				2520	177,201.30

--modified from Reid (1985)



Therefore, the study area supported 13.7% of the assumed 1986 deer-hunting effort that occurred in management units located adjacent to the population centres of the Lower Fraser Valley.

Economically the total estimated value of fall hunting in the study area in 1986 was \$177,201 in 1986 dollars (Table 12). Of this total \$157,354 was generated by deer hunting exclusively. This represents 6.2% of the \$2,517,740 that is estimated to have been spent in 1986 on deer hunting in Region 2.

## 5.0 CONCLUSIONS

Hunting appears to be a significant form of recreational use of the study area during the late summer and fall. After an initial flurry of activity in early September hunter use of the area remains at a relatively low level until November at which time it peaks. Almost 97% of the hunter-effort in the study area was derived from hunters who resided in the Lower Fraser Valley. Of that total 71% was generated by hunters living west of the Abbotsford-Mission area.

Deer are the major game species sought by hunters in the study area with grouse a distant second choice. Deer hunters appear to be most active in the last half of the fall season whereas the grouse effort decreases as the season progresses. Based on actual road check data, hunting success for deer in 1986 was low requiring 36.7 hunter-days per kill. By comparison 18.5 hunter-days per kill were expended regionally. Both blacktailed and mule deer were included in the estimated season take of 50 animals, as were hybrids of those two species. Based on a relatively small sample size of 10 animals the deer population in the study area appears relatively young. However, a larger sample size comprised of both male and female segments of the population is required before definitive statements regarding age structure of the population can be made.

From a regional standpoint the study area generated a relatively low proportion of the total deer hunting effort expended in 1986. When considered in light of deer hunting effort reported in those management units immediately adjacent to the Lower Fraser Valley the recreation provided by the study area appears more significant. Fall hunting in the study area also generates economic benefits, the bulk of which are thought to remain in the Lower Fraser Valley. Both recreational and economic benefits could be expected to increase proportionate to any further growth in hunter use. The two factors thought to be currently limiting hunter use is lack of road access and low hunter success.

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APPENDIX I: REGION 2 ROAD CHECK FORM

REGION 2

ROAD CHECK FORM

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Date:

[illegible]