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EASTERN SLOPES GRIZZLY BEAR PROJECT:

A progress report for 2000

Prepared for the Eastern Slopes Grizzly Bear Steering Committee

This paper contains preliminary results of an on-going study and should not be cited without permission from the authors.

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GOALS AND OBJECTIVES

During 2000 our research focused on gathering basic reproductive and mortality data for analysis of demographic parameters. Another important research question we focused on is how do grizzly bear's spatial and temporal use patterns differ in areas of high human presence compared to areas with low human presence in a landscape, some of which is dominated by tourism activities? Our situation is unique in that no other grizzly bear study area in North America has both a high volume transcontinental highway and railway dissecting occupied grizzly bear habitat along with intensive tourism. Analysis has never been done on the effects of such levels of human presence on grizzly bears. One important question is the extent to which the Bow River Valley continues to function as a major movement corridor for bears providing connectivity between habitats.

The overall goal of ESGBP research is to understand how developments and human-induced mortality impact grizzly bears. Specific research objectives include:

1. Determine the basic demographic parameters for the grizzly bear population within the study area.
2. Detect spatial and temporal activity patterns of bears given various levels of human influences.
3. Determine how the distribution of humans affects a bear's ability to use the landscape.
4. Determine if population connectivity is being impeded by major transportation corridors.
5. Determine what adjustments to human activities would give bears better access to resources.
6. Suggest management alternatives for integrating land uses compatible with bear habitat and survival needs for the study area.

STUDY AREA

The area of interest remains unchanged from year 1 with the approximately 11,400 km² Bow River Watershed, from its headwaters to approximately where it meets the prairies, as the core study area. The greater study area defined by the movement of radio-collared bears is about 22,000 km² or roughly twice the size of the core study area. At the largest scale our research encompasses the 42,000 km²

Central Rockies Ecosystem (Komex International 1995).

METHODS

Methods for both the capture and monitoring of bears remain unchanged from the detailed description found in the year 1 progress report (Gibeau and Herrero 1995). Approximately 25 grizzly bears per year have active radio-collars. These bears are monitored from air and ground wherever they go and our budget permits. Aerial monitoring gives infrequent, but relatively unbiased data regarding location. This facilitates understanding of home range, movements and habitat use. Ground-based research allows intensive monitoring of grizzly bear activities related to development features such as towns, highways, campgrounds and trails. Mortality is monitored using both aerial and ground-based telemetry. The radio-telemetry monitoring area includes lands under several different jurisdictions. In the British Columbia portion of these lands, where some of our radio-collared grizzly bears are found, there is a Western Slopes Bear Research Project which provides complementary data and will allow a broader ecosystem versus provincial boundary-based understanding of grizzly bears in the Central Rockies Ecosystem.

RESULTS

WEBSITE

www.canadianrockies.net/grizzly Most of the ESGBP publications plus considerable other related material can be found here and is available for downloading.

POPULATION STUDIES

CAPTURE

There was no planned trapping effort in 2000 although 4 grizzly bears were captured during management actions (Table 1).

Table 1. Grizzly bear capture data in the Bow River Watershed, Alberta, 2000.

ID	Sex	Age Estimate	Weight (kg)	Area	Comments
33	F	25a*	n/a	Two Jack	recapture
68	M	5a	n/a	Two Jack	
69	F	3a	93	Nakiska	
70	F	3a	79	Nakiska	

* certainty code a= +/- 0 years, b= +/- 1-2 years, c= +/- 2-3 years

TELEMETRY DATA SET

Aerial and ground monitoring from early April until the first week of November produced 1641 point locations for the 2000 field season. Of these 439 (27 %) were from the air and 1202 (73%) from ground monitoring. Aerial locations were biased toward early morning hours. Ground locations were biased towards where observers could travel easily.

Since the project began in May 1994 a total of 61 individuals have been handled (Table 2). Of those, 15 have died, and 24 are currently radio collared. The sex/age breakdown of the current radio collared sample is as follows:

15 adult females	5 adult males
3 subadult females	1 subadult male

Table 2. Status of all grizzly bears captured in the Bow River Watershed, Alberta, as of November 2000.

ID	Sex	Age class ₁	Age at first capture ²	Months monitored	Fate	Cause ³	Most recent sighting ⁴
10	M	AD	13a	07/94 - 06/96 and 04/97 - 06/98	lost	drop collar	
11	M	SA	4b	05/94 - 03/96			
11		AD		03/96 - 07/97	lost	drop collar	
12	M	AD	13b	05/94 - 10/94	dead	self defense	
13	M	SA	5a	05/94 - 03/95			
13		AD		03/95 - 10/00	active		
14	M	AD	9a	05/95 - 05/97	lost	no signal - b	
15	M	AD	6a	05/94 - 10/00	active		
16	M	SA	5a	08/93 - 03/94			
16		AD		03/94 - 07/96	dead	removed to zoo	
17	F	AD	10a	06/94 - 07/96	lost	drop collar	10/99
18	F	AD	6a	05/94 - 10/00	active		
19	M	AD	6b	05/94 - 05/94	dead	accidental	
20	M	AD	11a	05/94 - 07/94	lost	drop collar	
21	M	SA	3a	05/94 - 07/95	dead	problem wildlife	
22	M	AD	14a	05/94 - 05/94	dead	legal hunting	
23	M	SA	3a	05/94 - 08/96	dead	problem wildlife	
24	F	SA	5a	05/94 - 03/95			
24		AD		03/95 - 10/00	active		
25	M	AD	6a	05/94 - 09/94	lost	drop collar	07/95
26	F	AD	18a	06/94 - 09/99	dead	self defense	
27	F	SA	2a	06/94 - 09/95	lost	no signal - b	06/99

28	F	AD	22a	06/94 - 08/96	dead	natural	
29	M	SA	2a	never collared			
30	F	AD	9a	09/94 - 10/00	active		
31	F	AD	7c	06/94 - 04/96	lost	drop collar	
32	F	AD	13b	06/94 - 10/97	lost	drop collar	
33	F	AD	19a	06/94 - 09/99 and 08/00 - 10/00	active		
34	M	AD	6a	05/95 - 11/96	lost	no signal - b	
35	F	SA	4a	05/96 - 09/97	dead	treaty Indian	
36	F	AD	8a	06/93 - 10/00	active		
37	F	AD	10a	06/94 - 10/00	active		
38	M	D	1a	never collared			
39	F	SA	3a	05/95 - 08/96	lost	no signal - b	
40	F	AD	15c	05/95 - 06/00	dead	natural	
41	F	AD	12a	05/95 - 10/00	active		
42	M	AD	7a	05/95 - 10/00	active		
43	M	SA	5a	05/96 - 10/96	dead	illegal	
44	M	SA	4a	06/95 - 08/96	dead	treaty Indian	

ID	Sex	Age class ¹	Age at first capture ²	Months monitored	Fate	Cause ³	Most recent sighting ⁴
45		AD		06/00 - 10/00	active		
46	F	AD	11a	06/95 - 10/00	active		
47	F	AD	9a	06/96 - 10/00	active		
48	F	D	2a	06/96 - 06/97			
48		SA		06/97 - 09/97	lost	no signal - c	
49	M	D	2a	06/96 - 06/97			
49		SA		06/97 - 06/98	lost	no signal - b	10/99
50	M	SA	4a	06/96 - 06/96	lost	no signal - a	
51	M	AD	8a	05/97 - 06/98	lost	drop collar	
52	M	AD	7b	05/97 - 10/00	active		
53	M	SA	3a	05/97 - 10/98	dead	illegal	
54	M	AD	15a	06/97 - 10/99	lost	no signal -c	
55	F	AD	6a	06/97 - 09/99	lost	drop collar	10/99
56	F	D	3a	05/97 - 06/98			
56		SA		06/98 - 03/00			
56		AD		03/00 - 10/00	active		
57	F	SA	5a	05/97 - 03/98			
57		AD		03/98 - 10/00	active		
58	M	AD	9a	06/97 - 09/97	dead	problem wildlife	
59	F	D	3a	05/97 - 06/98			
59		SA		06/98 - 03/00			
59		AD		03/00 - 10/00	active		
60	F	D	3a	05/97 - 06/98			
60		SA		06/98 - 03/00			
60		AD		03/00 - 08/00	dead	accidental	
61	F	AD	12a	06/97 - 08/99	lost	no signal -c or a	
62	F	AD	8a	06/97 - 10/00	active		
63	F	AD	7a	06/99 - 10/00	active		
64	F	AD	10a	06/99 - 10/00	active		
65	F	D	4a	05/98 - 06/99			

65		SA		06/99 - 03/00				
65		AD		03/00 - 08/00	lost	drop collar		
66	F	SA	4a	06/99 - 10/00	active			
67	M	SA	3a	06/99 - 10/99	lost	no signal - b		06/00
68	M	SA	5a	08/00 - 10/00	active			
69	F	SA	3a	09/00 - 10/00	active			
70	F	SA	3a	09/00 - 10/00	active			

¹ D = dependent, SA = subadult, AD = adult (>5 years old)

² certainty code from tooth analysis: a = +/- 0 years, b = +/- 1-2 years, c = +/- 2-3 years

³ (a) High probability that disappearance was related to death, (b) High probability that disappearance was unrelated to death, (c) No indication of which of the above 2 choices is more likely

⁴ sightings of animals who's collar has either failed or dropped off

POPULATION DEMOGRAPHICS

Observations from the research team as well as records from Banff National Park and Alberta Natural Resources Service established a minimum unduplicated count of females with cubs for the year (Table 3). Over time, a minimum count of sows with cubs (Table 4) can be established and used as a trend indicator (Knight et al. 1995).

Table 3. Unduplicated grizzly bear females with cubs of the year in the Bow River Watershed, Alberta, 1993 - 2000.

Family Identification	Most Cubs Observed	Location	# of Sightings
A - 1993	1	Bryant Creek	2
B - 1993	2	Fatigue Creek	1
C - 1993	2	Moraine Lake	1
D - 1993	2	Cascade River	1
E - 1993	2	Elbow R. / Nahahi Ridge	3
F - 1993	2	Kananaskis Lakes	4
A - 1994	2	Lower Cascade River	1
B - 1994	1	Moose Mtn. / Elbow R.	2
C - 1994	2	Mt. Indefatigable	4
D - 1994	1	Bryant Cr. / Mt. Nestor	2
Bear #28 1994	1	Upper Cascade River	2
Bear #30 1994	3	Baker Lake / Pipestone R.	5
Bear #36 1994	1	Upper Bow River	2
Bear #46 1994	2	Pipestone River	1
Bear #47 1994	2	Kananaskis Lakes	2

A - 1995	2	West Bragg Cr / Powderface	3
B - 1995	2	Skogan Pass / Wasootch	3
C - 1995	2	Upper Spray / Albert R.	3
Bear #17 1995	1	Cascade River	13
Bear #18 1995	3	Bryant Cr. / Assiniboine	10
Bear #26 1995	2	Nakiska / Evans Thomas	6
Bear #31 1995	2	Highwood River	3
Bear #32 1995	3	Forty Mile Cr. / Elk Lake	12
Bear #33 1995	3	Cascade River / Stoney Cr.	14
A - 1996	1	Cascade R. / Grassy Ridge	1
B - 1996	3	Mid Spray River	1
Bear #24 1996	2	Highwood Pass	25
Bear #36 1996	2	Upper Bow River	8
Bear #37 1996	2	Elbow / Sheep Rivers	3
A - 1997	2	Wind Valley	2
B - 1997	3	Elbow Lakes	2
Family Identification	Most Cubs Observed	Location	# of Sightings
A - 1998	1	West Bragg Creek	2
B - 1998	2	Palliser Range	2
C - 1998	1	Pipestone River	1
Bear # 33 1998	2	Cascade River	4
Bear # 41 1998	1	Simpson River	4
Bear # 47 1998	2	Kananaskis Lakes	3
Bear # 55 1998	1	Cascade River	9
Bear # 57 1998	2	Plateau Mtn	6
Bear # 18 1999	1	Bryant Creek	4
Bear # 26 1999	2	Nakiska	1
Bear # 36 1999	2	Upper Bow R	5
Bear # 56 2000	1	Lake Louise	10
Bear # 37 2000	2	Elbow River	3
A - 2000	2	Elpoca Cr.	2

Table 4. Number of unduplicated females with cubs of the year (COY), and 6 year running averages in the Bow River Watershed, Alberta, 1993 - 2000.

Year	Females w/COY	Total # COY	Mean litter size	6 year running averages		
				F w/COY	# cubs	Litter size
1993	6	11	1.8			

1994	9	15	1.6			
1995	9	20	2.2			
1996	5	10	2.0			
1997	2	5	2.5			
1998	8	12	1.5	6.5	12.2	1.9
1999	3	5	1.6	6.0	11.2	1.9
2000	3	5	1.6	5.0	9.5	1.9

Reproductive success of radio collared females was determined through year to year visual observations between 1994 and 2000 (Table 5). Year to year cub survivorship can be tracked by referring to the table and comparing the number of cubs observed in a given year to the previous years observations. Reproductive data from collared females is being used to construct an estimate of whether the sample population is increasing or decreasing.

Table 5. Reproductive status of known female grizzly bears in the Bow River Watershed, Alberta, 2000.

Female #	Location	Age at first capture	Cubs In						
			94	95	96	97	98	99	
17	Cascade River	10	0	1yoy	1	off air	2yoy	2	
18	Bryant Creek	6	0	3yoy	2	2	2*	1yoy	
24	Highwood Pass	5	0	0	2yoy	2	2*	0	
26	Nakisa	18	2*	2yoy	1	0	0	2yoy/died	
27	Cascade River	2	0	0/off air	-	-	2yoy	2	
28	Cascade River	22	1yoy	0	0/died				
30	Lake Louise	9	3yoy	3	3	3	3*	0	
31	Highwood River	7	0	2yoy	off air				
32	Cascade River	13	1*	3yoy	3	3*	off air		
33	Cascade River	19	2*	3yoy	2	2*	2yoy	2	
35	Evan Thomas	4		0	0	0/died			
36	Upper Bow River	8	1yoy	0	2yoy	1	0	2yoy	
37	Sheep River	10	1*	0	2yoy	1	0	0	2
39	Kananaskis River	3		0	0/off air				
40	Spray River	15		0	0	0	0	0	0/
41	Brewster Creek	12		0	0	0	1yoy	1	
46	Pipestone Creek	10	2yoy	2	2	2	2	2*	
47	Kananaskis Lakes	7	2yoy	2	2	2*	2yoy	2	
48	Kananaskis Lakes	2			0	0/off air			
55	Cascade River	6				0	1yoy	1/off air	
56	Lake Louise	3				0	0	0	1y

57	Cateract Creek	5	0	2yoy	2	
59	Lake Louise	3	0	0	0	
60	Lake Louise	3	0	0	0	0/
61	Spray River	12	0	0	0/died ?	
62	Cascade River	8	0	0	0	
63	Yoho R.	7			0	
64	Healy Creek	10			0	
65	Pipestone River	4		0	0	0/c
66	Cascade River	4			0	
69	Wind Valley	4				
70	Wind Valley	4				

* denotes cubs dispersed

There were 3 known mortalities within the study area in 2000 (Table 6). Adult female #40 died of natural causes in June after falling off a cliff. Adult female #60 was hit and killed by a train near Lake Louise in August. An unmarked subadult male was shot in self defense in Kananaskis Country in September.

Table 6. Summary of grizzly bear mortalities in the Bow River Watershed, Alberta, 1993 - 2000.

Bear Identification	Date	Location	Sex	Age	Kill Type
AFWS #21055 ^a	08/19/93	West Spray-408 ^b	M	3	PW ^c
Research #19	05/13/94	Kananaskis-648	M	6	AC
Research #22	05/28/94	Albert R.-B.C.	M	14	LH
AFWS #25161	09/29/94	Fortress Mt-408	M	subadult	IL
Research #12	10/04/94	Simpson R.-B.C.	M	13	SD
Research #21	07/26/95	Elkford B.C.	M	4	PW
AFWS #25722	08/20/95	Sarcee Reserve	M	unkn	TI
investigate	fall/95	3 Point Cr.-406	?	unkn	?
BNP L952104	09/25/95	Lake Louise	F&yly	adult	PW
C - 1995	10/12/95	Albert River	F	adult	PW
AFWS #34990	06/04/96	Morley	M	adult	TI
Research #44	08/23/96	Stoney Reserve	M	5	TI
Research #28	08/24/96	Cascade River	F	24	NA
Research #23	08/08/96	James River	M	5	PW
Research #43	10/10/96	Grease Creek	M	5	IL
BNP97-1567	fall 1996	Spray Lake	?	subadult	?
Research #35	09/20/97	Evan Thomas Cr.	F	5	TI
Research #58	09/23/97	James River	M	9	PW
BNP 1998	06/05/98	Bryant Cr.	?	subadult	NA

AFWS #36480	07/18/98	Kananaskis R	F	adult	AC
Research #53	10/20/98	Trap Cr.	M	4	IL
AFWS #	09/??/98	Pekisko Cr.	M	adult	PW
AFWS # 17883	09/??/99	Kananaskis R	M	subadult	AC
Research # 26	09/21/99	Nakiska	F	23	SD
AFWS # 42771	10/28/99	Highwood R	F	subadult	TI
Research # 40	06/03/00	Spray R	F	20	NA
Research # 60	08/17/00	Lake Louise	F	6	AC
AFWS # 47901	09/25/00	Elbow R	M	2	SD

^a Registration or file number

^b Wildlife Management Unit

^c PW=problem wildlife, AC=accidental, LH=legal hunter, SD=self defense, NA=natural, TI=treaty Indian, IL=Illegal

There was one grizzly bear translocation out of the study area in 2000. An adult female bear was removed to the Calgary Zoo after two separate aggressive encounters near Canmore. Since 1993, there have been 7 translocations from the Bow River Watershed (Table 7).

Table 7. Summary of grizzly bear translocations in the Bow River Watershed, Alberta, 1993 - 2000.

Bear Identification	Date	Translocation		Sex	Age
		From	To		
AFWS #407801 ^a	09/04/93	Canmore-410 ^b	Owl Crk-339	M	Subadult
Research #23	10/21/94	Sundre-318	Mitsue-350	M	3
B.C. GF75	09/26/95	Lake Louise	Kinbasket L	F	9 & 1yly
Research #50	06/17/96	Canmore-410	Highwood-404	M	4
Research #16	07/05/96	Banff	Calgary Zoo	M	8
AFWS	07/29/97	PLPP-648	White Goat-738	M	Subadult
AFWS	09/15/00	Nakiska-408	Calgary Zoo	F	18

^aRegistration or file number

^bWildlife Management Unit

The 34 grizzly bear deaths and removals in the Bow River Watershed between 1994 - 2000 are from a number of causes (Table 8). No one factor stands out. The diversity of mortality and removal causes means that it will continue to be challenging to maintain acceptable mortality / removal rates for subadult and adult female bears.

SCHEDULED CONCLUSION

The target of 8 years of data collection on about 25 grizzly bears per year will be met at the end of the field season in 2001. We appear to have sufficient data to complete all planned demographic and habitat analyses. An integrated final report will be published about one year after completion of field work in November 2001.

Table 8. Summary of known grizzly bear mortalities and removals by jurisdiction and activity in the Bow River Watershed, Alberta, 1993-2000.

Problem Wildlife			Illegal	Treaty Indian		Accident	Self D. (while hunting)	Natural	Legal H.	Unkno (suspe illegal)
griculture	Public Safety	Garbage Mgmt.		Hunting	Garbage Mgmt.					
3	2	3	3	3	2	3	2			1
	1	1					1		1	
	3					1		3		1
3	6	4	3	3	2	4	3	3	1	2

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