KHUTZEYMATEEN VALLEY GRIZZLY BEAR STUDY

by

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A cooperative project of
the Ministry of Environment, Lands and Parks and the Ministry of Forests

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TABLE OF CONTENTS

APPENDICES

TABLES

FIGURES

6 LITERATURE CITED

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APPENDIX 1: Grizzly bear capture data for the Khutzeymateen study area, 1989–1991

Bear	Captured			Age[a]	Cap. type[b]	Tooth wear	Vulva condition	Evidence of nursing	Pelage colour	Hind foot		Front foot		Baculum length (cm)
	Day	Mon.	Yr.							Length (cm)	Width (cm)	Length (cm)	Width (cm)	
Females														
GF18	16	5	89	13	CS	moderate	slightly swollen	lactating	brown	18.2	12.7	7.7	14.0	N/A
GF24	18	5	89	4	CS	moderate	swollen	normal	brown	16.4	13.2	7.0	15.0	N/A
GF26	19	5	89	13	TS	heavy	slightly swollen	lactating	brown	20.0	13.5	8.0	14.0	N/A
GF26[d]	2	6	90	14	CS	—	—	—	—	—	—	—	—	—
GF27	19	5	89	4	TS	minimal	normal	normal	brown	16.0	12.0	6.0	12.0	N/A
GF34	25	9	89	6	TS	moderate	—	lactating	brown	—	—	—	—	—
GF40	1	6	90	17	TS	heavy	swollen	lactating	brown	19.5	14.0	7.5	14.5	N/A
GF41	5	6	90	15	TS	moderate	normal	rubbed	brown	19.0	14.5	8.0	14.0	N/A
GF43	5	6	90	24	TS	heavy	slightly swollen	normal	brown	18.0	13.5	8.5	15.0	N/A
GF54	30	5	91	13	CS	moderate	normal	rubbed	brown	22.9	13.7	9.0	15.0	N/A
GF56	30	5	91	12	TS	moderate	normal	lactating	brown	21.9	12.4	6.5	13.6	N/A
Males														
GM02	4	5	89	3	CS	minimal	N/A	N/A	brown	19.0	14.0	—	—	9.5
GM02[d]	28	5	90	4	TS	moderate	N/A	N/A	lt. brown	19.0	14.0	7.5	15.0	15.0
GM04	5	5	89	14	CS	heavy	N/A	N/A	brown	21.0	16.5	10.0	18.0	14.0
GM06	7	5	89	6	CS	minimal	N/A	N/A	brown	18.0	15.0	7.5	16.0	15.0
GM08	9	5	89	9	TS	mod.–heavy	N/A	N/A	brown	20.5	16.8	9.5	19.7	18.5
GM09	10	5	89	14	CS	heavy	N/A	N/A	brown	23.0	16.0	8.0	18.0	19.0
GM11	12	5	89	12	CS	heavy	N/A	N/A	dk. brown	28.0	17.5	11.0	18.0	17.0
GM13	13	5	89	4	TS	minimal	N/A	N/A	lt. brown	—	—	—	—	—
GM17	15	5	89	3	TS	minimal	N/A	N/A	lt. brown	19.0	13.0	7.0	13.0	9.0
GM22	17	5	89	3	CS	minimal	N/A	N/A	lt. brown	19.4	13.7	6.5	13.5	12.0
GM22[d]	26	5	90	4	TS	minimal	N/A	N/A	lt. brown	20.0	14.0	7.0	14.0	13.0
GM25	19	5	89	3	TS	moderate	N/A	N/A	lt. brown	20.0	15.5	7.5	16.5	13.0
GM32	26	5	89	14	TS	heavy	N/A	N/A	dk. brown	22.0	17.0	9.5	19.0	—
GM36	27	5	90	3	CS	minimal	N/A	N/A	brown	18.0	13.5	5.5	14.0	13.0
GM36[d]	1	6	91	4	TS	minimal	N/A	N/A	brown	23.8	15.2	6.0	14.5	13.5
GM38	31	5	90	3	TS	moderate	N/A	N/A	md. brown	17.0	12.5	6.0	13.0	14.5
GM45	5	6	90	11	CS	moderate	N/A	N/A	dk. brown	22.0	15.0	10.0	18.0	—
GM80	1	6	90	19	CS	heavy	N/A	N/A	dk. brown	20.0	17.5	8.0	16.5	—
GM47	25	5	91	8	CS	moderate	N/A	N/A	lt. brown	21.0	16.0	8.0	18.5	14.0
GM58	2	6	91	2	TS	minimal	N/A	N/A	brown	14.5	13.0	5.4	11.5	7.4
GM59	7	6	91	14	CS	moderate	N/A	N/A	brown	21.5	17.3	9.2	18.3	19.5

[a] Age at time of capture.

[b] Capture type: TS=trail set; CS=cubby set.

[c] Zygo=zygomatic.

[d] Recapture.

APPENDIX 1: (Continued)

Bear	Testes length (cm)	Nipple length (cm)	Body weight (kg)	Zygo[c] width (cm)	Skull length (cm)	Total length (cm)	Tail length (cm)	Shoulder height (cm)	Neck girth (cm)	Heart girth (cm)	Abdominal girth (cm)	Canine		
												Length (cm)	Width (cm)	Span (cm)
Females														
GF18	N/A	1.3	115.0	20.5	33.7	180.5	14.0	116.0	60.0	105.5	116.5	3.10	1.84	6.66
GF24	N/A	1.0	115.0	20.2	35.6	178.0	15.0	108.0	55.0	96.0	110.0	3.04	1.83	5.54
GF26	N/A	1.0	—	21.4	38.0	194.0	14.0	112.0	66.0	115.5	128.5	3.55	2.06	6.57
GF26[d]	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF27	N/A	0.5	85.0	16.2	33.3	159.0	13.0	90.0	50.0	87.5	96.5	2.75	1.68	5.13
GF34	—	—	—	—	—	—	—	—	—	—	—	—	—	—
GF40	N/A	2.2	145.0	22.5	36.0	185.0	12.5	104.0	67.0	112.0	116.0	3.25	2.52	7.05
GF41	N/A	1.4	151.0	22.0	35.5	184.0	15.0	99.0	71.0	114.0	112.0	2.84	1.64	6.15
GF43	N/A	0.8	150.0	21.5	39.0	143.0	8.0	103.0	75.0	129.0	131.0	3.20	1.90	6.50
GF54	N/A	1.90	115.0	20.3	34.6	172.0	13.7	105.0	61.4	107.9	102.1	3.25	1.83	5.75
GF56	N/A	1.84	112.0	21.0	35.0	182.0	14.8	85.0	59.6	99.5	94.7	3.57	1.96	5.97
Males														
GM02	7.0	N/A	75.0	18.4	36.8	166.5	14.0	108.7	63.0	103.0	105.5	3.43	1.85	6.52
GM02[d]	7.5	N/A	145.0	21.0	38.5	188.0	20.0	109.0	71.0	113.0	126.0	3.32	1.82	6.65
GM04	7.5	N/A	—	25.7	41.8	200.0	12.0	125.0	97.0	147.5	147.0	3.27	2.10	7.09
GM06	8.0	N/A	145.0	20.8	41.7	200.0	15.0	107.5	70.0	112.0	115.0	4.15	2.32	6.32
GM08	9.0	N/A	—	26.6	41.1	225.0	14.0	133.0	101.0	148.0	168.0	4.07	2.28	7.65
GM09	12.0	N/A	200.0	25.8	41.6	237.0	17.0	125.0	92.0	155.0	145.0	3.54	2.04	7.03
GM11	8.5	N/A	260.0	27.0	44.4	221.0	16.0	126.0	99.0	146.0	172.0	4.31	2.51	8.53
GM13	—	N/A	—	—	—	—	—	—	—	—	—	—	—	—
GM17	—	N/A	—	17.9	34.5	—	—	106.0	—	—	—	3.30	2.18	5.88
GM22	7.5	N/A	100.0	18.2	35.1	180.0	14.0	107.0	53.0	97.0	104.0	3.12	1.64	6.29
GM22[d]	—	N/A	135.0	20.5	31.5	198.0	17.0	100.0	65.4	123.0	123.5	3.17	1.79	—
GM25	6.0	N/A	130.0	19.0	36.6	183.0	14.0	95.0	60.0	100.0	113.0	3.71	1.89	6.61
GM32	—	N/A	—	25.5	41.8	—	—	—	99.0	—	—	—	—	—
GM36	6.5	N/A	126.0	18.5	36.5	191.0	24.0	106.0	57.5	110.0	117.0	3.52	2.65	6.85
GM36[d]	7.54	N/A	145.0	19.6	35.7	193.0	23.4	105.5	70.0	107.0	114.0	3.48	2.12	6.19
GM38	6.5	N/A	135.0	18.3	36.0	183.0	20.0	107.0	61.5	103.5	116.0	3.31	2.07	6.12
GM45	—	N/A	—	—	42.0	—	17.5	—	—	—	—	—	—	—
GM80	—	N/A	—	36.0	40.1	—	—	115.0	—	—	—	2.72	2.35	7.26
GM47	7.50	N/A	190.0	23.4	36.6	204.0	16.0	113.0	77.8	126.5	130.0	2.21	2.00	7.22
GM58	2.69	N/A	57.0	15.8	29.5	161.0	11.5	81.5	49.5	80.0	83.5	3.18	1.87	6.34
GM59	11.40	N/A	275.0	26.5	39.4	217.0	19.5	122.0	99.5	145.0	162.0	4.04	2.18	8.47

[a] Age at time of capture.

[b] Capture type: TS=trail set; CS=cubby set.

[c] Zygo=zygomatic.

[d] Recapture.

APPENDIX 2: Black bear and wolf capture data for the Khutzeymateen study area, 1989–1991

Bear	Captured			Age[a]	Cap. type[b]	Tooth wear	Vulva condition	Evidence of nursing	Pelage colour	Hind foot		Front foot		Baculum length (cm)
	Day	Mon.	Yr.							Length (cm)	Width (cm)	Length (cm)	Width (cm)	
Black bear females														
BF46	25	5	91	12	TS	moderate	normal	normal	black	11.0	8.5	5.0	9.0	N/A
Black bear males														
BM01	4	5	89	7	TS	moderate	N/A	N/A	black	15.5	11.5	6.3	12.8	18.0
BM03	5	5	89	8	CS	moderate	N/A	N/A	black	16.5	12.0	6.4	13.0	17.8
BM03[d]	27	5	90	9	TS	moderate	N/A	N/A	black	14.0	11.5	6.0	12.0	15.0
BM05	6	5	89	7	CS	minimal	N/A	N/A	black	16.3	9.7	6.2	12.2	14.0
BM07	7	5	89	14	TS	mod.–heavy	N/A	N/A	black	16.5	12.0	6.3	12.5	18.8
BM10	12	5	89	14	TS	minimal	N/A	N/A	black	15.0	11.0	6.5	12.5	17.0
BM12	13	5	89	8	CS	minimal	N/A	N/A	black	14.5	11.0	6.0	11.5	15.0
BM12[d]	4	6	90	9	TS	moderate	N/A	N/A	black	14.5	10.5	6.0	11.5	16.0
BM14	14	5	89	12	CS	moderate	N/A	N/A	black	17.0	11.0	6.5	11.5	20.0
BM15	14	5	89	12	CS	moderate	N/A	N/A	black	15.0	12.0	6.5	13.0	19.0
BM16	15	5	89	9	TS	minimal	N/A	N/A	black	14.0	10.8	6.0	11.0	14.5
BM19	16	5	89	9	TS	minimal	N/A	N/A	black	15.0	11.5	7.0	12.0	19.0
BM20	16	5	89	12	CS	moderate	N/A	N/A	brown	17.0	13.0	8.0	14.0	16.0
BM21	17	5	89	9	CS	moderate	N/A	N/A	dk. brown	14.8	11.5	6.4	12.3	18.0
BM23	18	5	89	3	CS	minimal	N/A	N/A	brown	12.0	9.0	6.0	9.0	11.0
BM28	19	5	89	8	TS	moderate	N/A	N/A	black	15.8	10.5	6.5	12.0	18.0
BM30	21	5	89	12	TS	heavy	N/A	N/A	black	14.0	10.0	5.3	11.4	17.0
BM31	21	5	89	10	CS	moderate	N/A	N/A	black	15.0	12.0	7.0	12.5	17.0
BM33	27	5	89	7	TS	moderate	N/A	N/A	black	15.0	10.0	6.0	12.0	15.0
BM35	24	5	90	9	CS	moderate	N/A	N/A	black	15.0	10.0	6.0	10.5	17.5
BM37	29	5	90	18	CS	heavy	N/A	N/A	black	14.0	9.5	5.0	11.0	17.5
BM48	25	5	91	16	CS	heavy	N/A	N/A	black	15.0	11.5	5.5	11.0	18.0
BM49	26	5	91	12	TS	moderate	N/A	N/A	black	13.7	9.8	5.0	9.6	18.0
BM50	27	5	91	9	CS	moderate	N/A	N/A	black	14.5	11.0	5.0	8.0	16.5
BM51	28	5	91	11	CS	moderate	N/A	N/A	black	14.5	10.5	7.5	13.0	16.5
BM52	28	5	91	5	TS	minimal	N/A	N/A	black	12.2	10.0	6.0	10.5	15.0
BM53	28	5	91	11	CS	moderate	N/A	N/A	black	14.0	10.5	6.0	11.0	17.0
BM55	30	5	91	12	CS	moderate	N/A	N/A	black	19.1	9.9	6.2	9.7	17.8
BM57	31	5	91	5	CS	minimal	N/A	N/A	black	14.8	10.0	6.0	11.5	15.0
Wolf female														
WF01	3	6	91	ad	TS	moderate	normal	lactating	grey	4.0	4.8	4.4	5.3	N/A

[a] Age at time of capture.

[b] Capture type: TS=trail set; CS=cubby set.

[c] Zygo=zygomatic.

[d] Recapture.

APPENDIX 2: (Continued)

Bear	Testes length (cm)	Nipple length (cm)	Body weight (kg)	Zygo[c] width (cm)	Skull length (cm)	Total length (cm)	Tail length (cm)	Shoulder height (cm)	Neck girth (cm)	Heart girth (cm)	Abdominal girth (cm)	Canine		
												Length (cm)	Width (cm)	Span (cm)
Black bear females														
BF46	N/A	1.1	40.0	14.8	22.2	136.5	9.0	69.0	42.2	76.6	75.5	2.77	1.35	4.73
Black bear males														
BM01	10.0	N/A	125.0	19.3	33.0	166.0	12.0	94.0	64.0	120.0	123.0	2.89	1.76	5.42
BM03	7.0	N/A	62.0	18.5	28.5	160.0	7.0	89.0	61.0	87.0	96.5	2.92	1.68	5.29
BM03[d]	9.0	N/A	100.0	19.5	25.5	157.0	8.0	89.0	71.0	95.5	104.0	2.85	1.68	—
BM05	8.0	N/A	65.0	16.6	31.5	158.0	6.5	91.5	20.0	85.0	89.0	2.32	1.40	5.24
BM07	8.2	N/A	70.0	18.6	31.5	172.0	6.0	106.0	60.0	97.0	106.0	3.63	1.80	5.76
BM10	7.5	N/A	95.0	18.5	22.6	162.0	10.0	89.0	56.0	92.0	96.0	2.81	1.72	5.38
BM12	4.0	N/A	90.0	18.1	31.4	160.0	9.0	86.0	61.0	97.0	99.0	3.20	1.76	5.52
BM12[d]	8.0	N/A	110.0	19.0	29.0	163.0	5.0	90.0	66.0	102.0	98.0	2.98	1.75	5.86
BM14	8.0	N/A	135.0	18.6	31.5	174.0	8.5	107.5	63.5	108.0	113.0	3.46	1.65	5.32
BM15	8.0	N/A		19.1	29.0	166.0	11.0	93.0	61.0	95.0	105.0	2.59	1.66	5.93
BM16	8.0	N/A	90.0	18.5	32.5	168.5	11.5	102.0	54.5	93.0	102.5	2.68	1.45	5.02
BM19	6.0	N/A	85.0	18.0	30.1	160.5	8.0	85.0	60.0	86.5	97.0	2.86	1.60	5.36
BM20	7.0	N/A	N/A	19.5	32.8	179.0	9.0	95.0	69.0	108.0	118.0	3.17	1.92	5.66
BM21	7.0	N/A	100.0	19.0	30.3	166.0	10.0	94.0	62.0	98.0	104.0	3.02	1.76	5.80
BM23	6.0	N/A	35.0	13.3	25.9	123.0	9.0	73.0	38.0	65.0	72.5	2.62	1.36	4.54
BM28	8.0	N/A	85.0	17.2	32.2	164.0	12.0	91.0	58.0	89.0	93.0	3.05	1.63	5.28
BM30	6.5	N/A	95.0	18.8	27.9	163.0	11.0	84.0	61.0	98.0	103.0	2.85	1.59	5.22
BM31	8.0	N/A	100.0	19.6	31.2	169.0	10.0	94.0	65.0	112.0	120.0	2.75	1.98	5.51
BM33	7.5	N/A	75.0	17.4	31.4	160.0	13.0	91.0	54.0	82.0	97.0	3.22	1.83	5.42
BM35	—	N/A	73.0	17.5	25.0	160.0	9.0	89.0	51.0	87.0	101.0	2.80	1.80	—
BM37	7.0	N/A	65.0	19.0	29.5	158.0	9.0	87.0	45.0	82.0	95.0	2.40	1.85	5.98
BM48	7.00	N/A	85.0	18.7	28.2	155.0	8.5	88.0	51.0	94.5	84.5	2.68	1.76	5.43
BM49	6.16	N/A	60.0	17.9	27.3	151.0	9.0	74.0	46.2	77.5	71.7	2.56	1.60	5.11
BM50	7.50	N/A	74.0	17.5	46.8	146.0	12.0	76.5	55.7	80.8	77.0	2.86	1.67	5.30
BM51	7.02	N/A	95.0	19.0	27.4	156.0	11.5	79.0	61.4	94.5	99.0	2.70	1.55	5.53
BM52	6.20	N/A	83.0	15.9	27.3	152.0	14.0	75.0	51.5	74.0	77.5	2.87	1.55	5.35
BM53	7.00	N/A	89.0	17.7	26.0	161.0	12.0	73.0	56.2	93.5	87.5	2.68	1.65	5.72
BM55	7.35	N/A	100.0	19.2	28.3	157.5	12.9	83.0	69.6	100.9	96.7	2.38	1.90	5.81
BM57	6.74	N/A	47.5	14.7	25.8	144.0	13.0	78.0	43.5	81.0	76.0	2.54	1.35	4.68
Wolf female														
WF01	N/A	1.83	29.0	13.5	24.5	152.0	39.0	74.0	37.7	61.3	51.8	2.12	1.37	4.84

[a] Age at time of capture.

[b] Capture type: TS=trail set; CS=cubby set.

[c] Zygo=zygomatic.

[d] Recapture.

APPENDIX 3: Summary of all photos (except test photos) taken at remote camera sites in the Khutzeymateen watershed, 31 July–29 September 1991

	Camera 1		Camera 2		Camera 3		Camera 4		Camera 5		Camera 6		Camera 7		Camera 8a		Camera 8b		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n
Grizzly bear	5	12.5	14	16.7	2	1.8	36	14.6	10	7.1	7	15.2	13	24.5	1	14.3	26	53.1	114
Black bear			7	8.3	9	8.0	17	6.9	24	17.0	4	8.7	1	1.9					62
Unidentified bear			1	1.2									2	3.8	1	14.3	2	4.1	5
Marten	5	12.5	10	11.9	26	23.2	59	23.9	37	26.2	6	13.0	18	34.0	5	71.4	5	10.2	167
Porcupine	11	27.5	8	9.5	18	16.1	32	13.0	8	5.7	1	2.2					2	4.1	85
Squirrel	8	20.0			4	3.6	1	0.4	4	2.8			9	17.0					26
Wolf			2	2.4			1	0.4											3
Other wildlife (unidentified)			1	1.2	2	1.8													3
Weak battery			33	39.3	27	24.1	33	13.4	20	14.2									113
Flash did not go off			2	2.4	1	0.9	3	1.2			1	2.2							7
Environmental factors[a]	7	17.5			9	8.0	54	21.9	25	17.7	20	43.5	2	3.8			11	22.4	128
Unknown	4	10.0	6	7.1	14	12.5	11	4.5	13	9.2	7	15.2	8	15.1			3	6.1	66
Total	40		84		112		247		141		46		53		7		49		779
Camera-days[b]	18.0		56.0		50.0		48.0		49.0		40.0		47.5		33.5		12.0		354.0

[a] For example, sun, wind, rain.

[b] One camera-day equals 24 hours of operation.

APPENDIX 4: Summary of grizzly bear detections at the remote camera sites in the Khutzeymateen watershed, 31 July–29 September 1991

	Camera 1	Camera 2	Camera 3	Camera 4	Camera 5	Camera 6	Camera 7	Camera 8a	Camera 8b	Overall
All bears together:										
Number of detections	5	7	1	23	5	7	11	1	19	79
Number radio-collared	0	0	0	3	2	2	4	0	0	11
Number unmarked	5	7	1	19	3	4	4	1	18	62
Unknown	0	0	0	1	0	1	3	0	1	6
Camera-days per detection	3.6	8.0	50.0	2.1	9.8	5.7	4.3	33.5	0.6	4.5
Lone bears only:										
Number of detections	5	3	1	13	3	3	10	1	16	55
Number radio-collared	0	0	0	0	0	0	3	0	0	3
Number unmarked	5	3	1	12	3	3	4	1	15	47
Unknown	0	0	0	1	0	0	3	0	1	5
Camera-days per detection	3.6	18.7	50.0	3.7	16.3	13.3	4.7	33.5	0.7	6.4
Family groups only:										
Number of detections	0	4	0	10	2	4	1	0	3	24
Number radio-collared	n/a	0	n/a	3	2	2	1	n/a	0	8
Number unmarked	n/a	4	n/a	7	0	1	0	n/a	3	15
Unknown	n/a	0	n/a	0	0	1	0	n/a	0	1
Camera-days per detection	n/a	14.0	n/a	4.8	24.5	10.0	47.5	n/a	4.0	14.75

APPENDIX 5. Descriptions of known or suspected grizzly bear mortalities, 1989–1991

Bear GF41 was accompanied by two yearlings when captured on the Khutzeymateen estuary in 1990. However, it is believed that she had three COY in 1989. The remains of a yearling grizzly bear were found on the north side of the estuary in mid-June 1990 near GF41's area of spring activity. It is possible that it was one of her young. Cause of death is unknown, although the carcass was found at the bedding site of a radio-collared subadult male. Bear GF41 was observed several times in spring 1991 in the company of a single 2-year-old. No evidence was found to indicate what had happened to the other cub. Bear GF54 apparently lost one of her three cubs. A female thought to be this bear was observed with three COY in 1990. Subsequent to her spring 1991 capture, she was seen several times with only two yearlings. Bear GF26 was first observed in May 1991 with three COY. However, two sightings of the family in July, and evidence collected at site investigations throughout the year, indicate that she lost one cub.

Bear GF34 had three COY when she was first captured in fall 1989. However, she was accompanied by only two yearlings in spring 1990. Remains of the third cub were found during an investigation of her den site. Cause of death is unknown. Bear GF34 and her two yearlings were active near the Mouse Creek estuary throughout early spring 1990. They were regularly observed feeding undisturbed until mid-May when a large lone grizzly bear, likely an adult male, appeared on the Mouse Creek estuary. It was observed there periodically over the next 10 days. Telemetry locations of GF34 suggested that she did not venture close to the estuary during this time. She was active on slopes north of Mouse Creek and along Khutzeymateen Inlet northeast of Mouse Creek during the rest of May and early June. The family was observed feeding along the shore just northeast of Mouse Creek on 13 June. Bear GF34 was limping badly although the reason was not apparent. Four days later she was aerially located near the mouth of Mouse Creek. Two subsequent aerial surveys indicated that she was in the same general area. The site was visited on 28 June and her body found. Evidence suggests GF34 was killed by another grizzly bear. A complete description of this incident is in MacHutchon and Himmer (1992). There was no sign of her yearlings for the rest of 1990. However, a subadult female grizzly bear believed to have been one of her young was seen several times near Mouse Creek and the Khutzeymateen estuary in 1991 (C. Russell, pers. comm.; this study). Bear GF34's 1989/90 den site was revisited in 1991 but there was no indication that her yearlings reused it in 1990/91.

An uncollared female with three COY was observed in the area of the Carm Creek and Khutzeymateen River junction in 1989. One cub had a distinctive large white ''V'' on its chest. In 1990, an uncollared female was observed in the same area on two occasions, accompanied by two yearlings, one with a large white chest ''V''. It is probable that they were the same family group and that one of the cubs died between 1989 and 1990. This family was also apparently observed several times in 1991 with both cubs still present. In 1989, GM17, a subadult male (estimated as 2–3 years old), was killed by another bear while in a snare. A female grizzly bear with three young (probably GF26 before her capture) was observed at the trap site where this bear was killed on the same day it was killed. It is possible she killed him while defending the bait at the trap site. A full description of this incident is in Nagy and MacHutchon (1991).

APPENDIX 6. Specific movement patterns and home ranges of radio-collared grizzly bears, 1989–1991

Adult Females

Bear GF18 was first captured near the junction of the Khutzeymateen and Kateen rivers in May 1989. She primarily used areas of lower Carm Creek and the Khutzeymateen River below Carm Creek in 1989. However, she made extended movements to the Khutzeymateen River and Larch Creek estuaries and to the upper Khutzeymateen River during the spring and early summer. She denned in the upper Khutzeymateen area. Her 1989 home range was 65.2 km^2 (Figure A6.1). Bear GF18 left her den between 10 and 23 April 1990 and remained in the vicinity of the den until she dropped her collar in early May.

Bear GF24 was captured along the Kateen River in May 1989. She was located only in the Kateen River drainage in 1989. Until 20 July, she was active in the headwaters of the Kateen River, with one brief foray to the lower Kateen. After 20 July, she concentrated her activities along the lower Kateen River. Her 1989 home range was 37.8 km^2 (Figure A6.1). Bear GF24's radio-collar was found on a southeast-facing slope on the lower Kateen River in the spring of 1990. It is suspected that she dropped her radio collar just before denning.

Bear GF26, accompanied by three 3-year-old young, was first captured near Carm Lake in May 1989. She then moved down to the lower Khutzeymateen River and estuary (5 June to 9 July). At the end of season 1, she began to move up the Khutzeymateen River and spent most of her time in wetlands below the Kateen River junction. She returned to the Carm Creek area near the end of season 2 and was observed twice in Carm Creek, accompanied by two young. She dropped her collar around 30 August. Her 1989 home range was 22.8 km^2 (Figure A6.2). Bear GF26 was recaptured alone in June 1990, between the Kateen River and Carm Creek. She spent most of season 1 in the Carm Creek and the mid-Khutzeymateen River area before moving into the Exchamsiks River drainage at the end of season 1. She spent most of season 2 in the mid- and lower Exchamsiks River drainage. During season 3, she was most active along lower Carm Creek, occasionally moving into the mid-Khutzeymateen River area. She denned above the junction of the Khutzeymateen and Kateen rivers. Her 1990 home range was 115.5 km^2 (Figure A6.2). Bear GF26 emerged from her den between 17 and 23 April 1990 with three COY. They remained in steep, rocky terrain above the den until 29 May, then moved to a mid-slope area on the opposite side of the valley until 18 June. They spent the rest of season 1 on or near the floodplain of Khutzeymateen River and lower Carm Creek. During seasons 2 and 3, the family remained in mid- and lower Carm Creek and nearby Khutzeymateen River areas. She denned in the vicinity of the previous year's den. Her 1991 home range was 22.5 km^2 (Figure A6.2).

Bear GF34, accompanied by three COY, was captured on the north shore of Khutzeymateen Inlet near the estuary in September 1989. She was observed on six separate days from 9 to 21 September along the shore of Khutzeymateen Inlet between the Mouse Creek and Khutzeymateen River estuaries before her capture. She remained in the area of the estuary and lower reaches of the Khutzeymateen River after capture. She denned in Mouse Creek. Her 1989 late summer and fall home range was 21.3 km^2 (Figure A6.3). In 1990, GF34 emerged from her den between 10 April and 23 April, accompanied by two yearlings. She was active along Khutzeymateen Inlet north and south of Mouse Creek and around the mouth of Mouse Creek before her death in mid-June. Her 1990 spring home range was 7.5 km^2 (Figure A6.3).

Bear GF40 was first captured in lower Carm Creek in June 1990. She spent season 1 in the upper Carm Creek area and most of season 2 moving back and forth between the mid- and upper Exchamsiks River and Carm Creek. She was active in the Khutzeymateen River braids or lower Carm Creek during season 3. She denned above the junction of Tony and Carm creeks. Her 1990 home range was 42.7 km^2 (Figure A6.4). In 1991, GF40 emerged from her den between 23 and 25 April. She spent the early part of season 1 between 300 and 800 m elevation above Carm Lake and within the Tony Creek drainage, then moved across the valley to another mid-slope area until 3 June. She moved into the upper Exchamsiks River drainage towards the end of

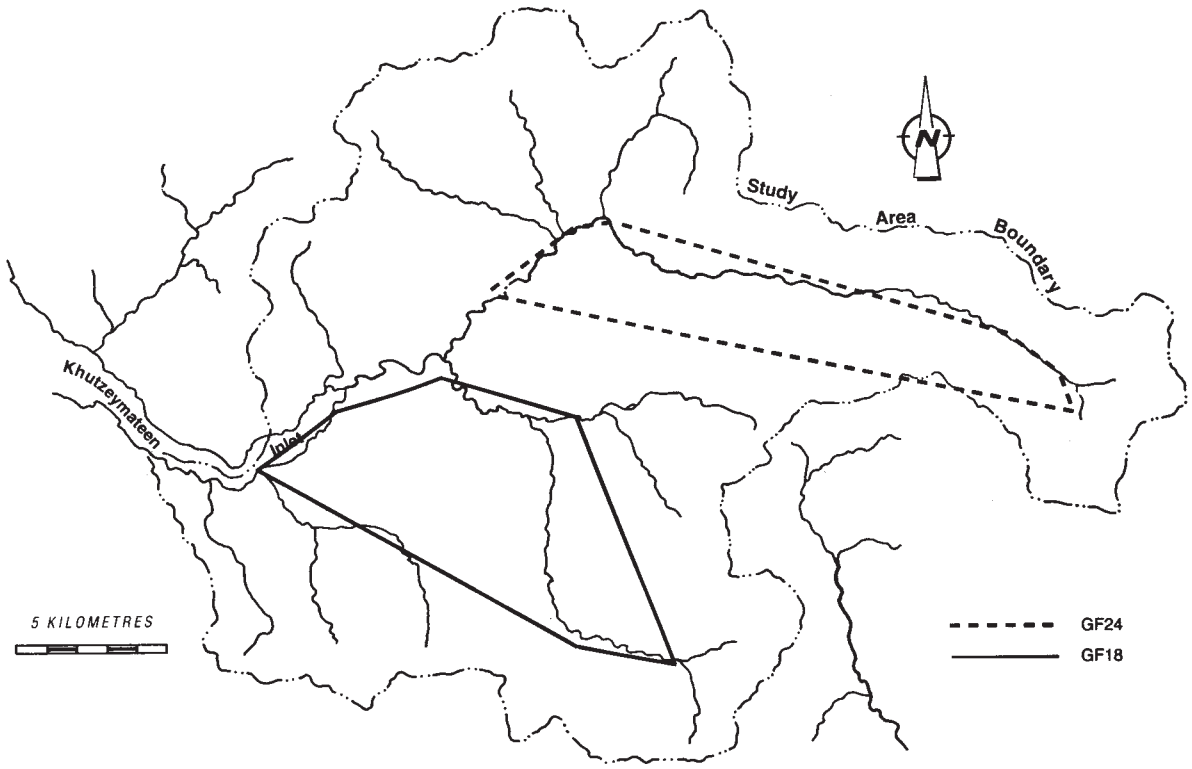

FIGURE A6.1. Minimum annual (1989) home range polygons for adult females GF18 and GF24.

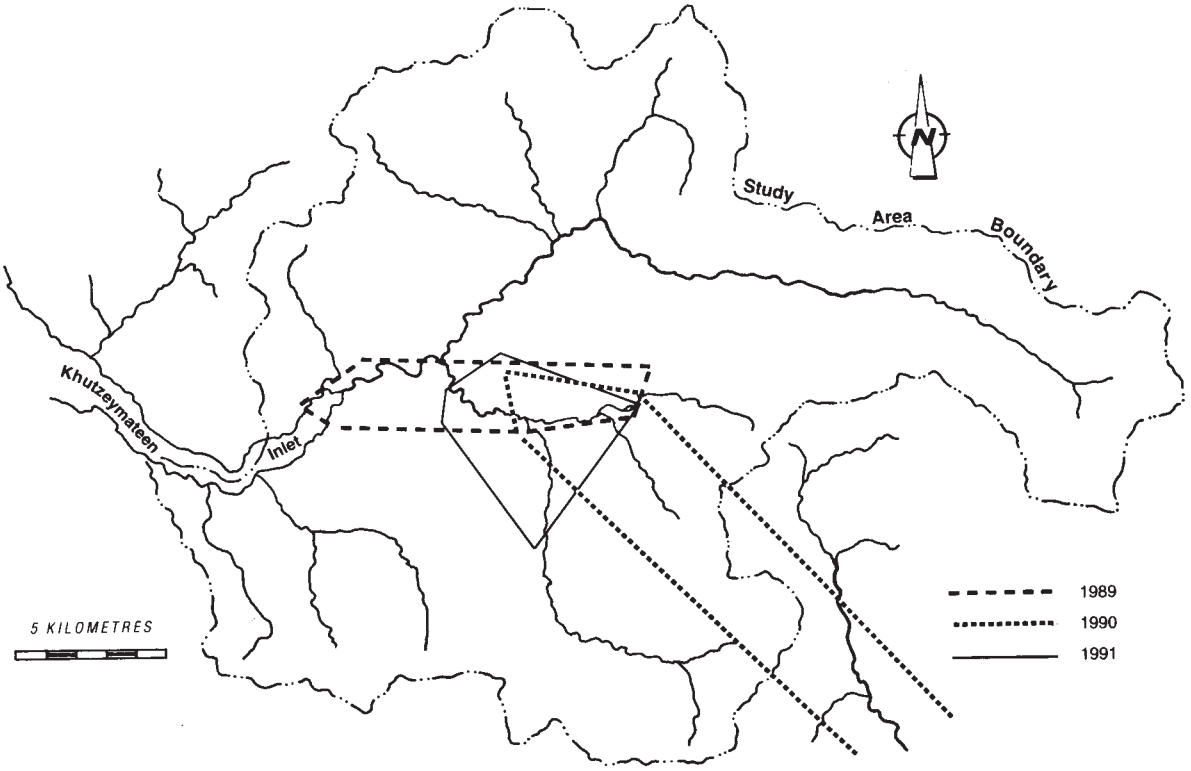

FIGURE A6.2. Minimum annual home range polygons for adult female GF26.

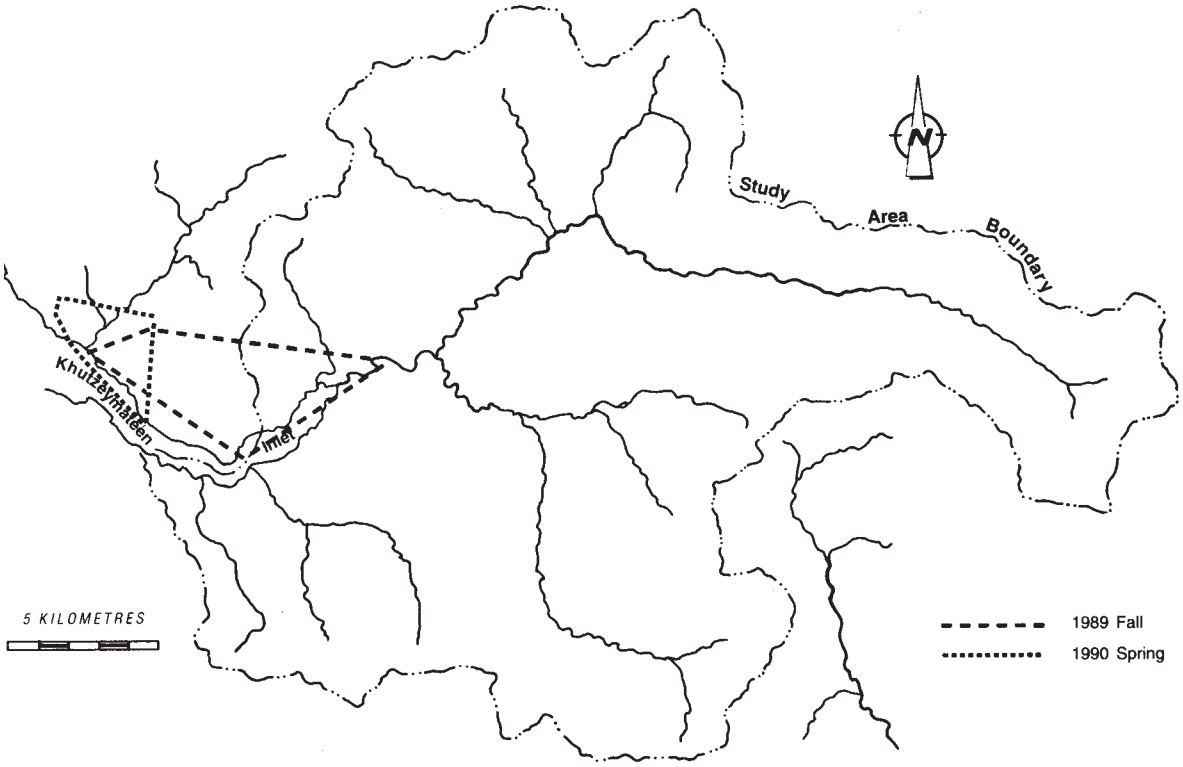

FIGURE A6.3. Seasonal home range polygons for adult female GF34.

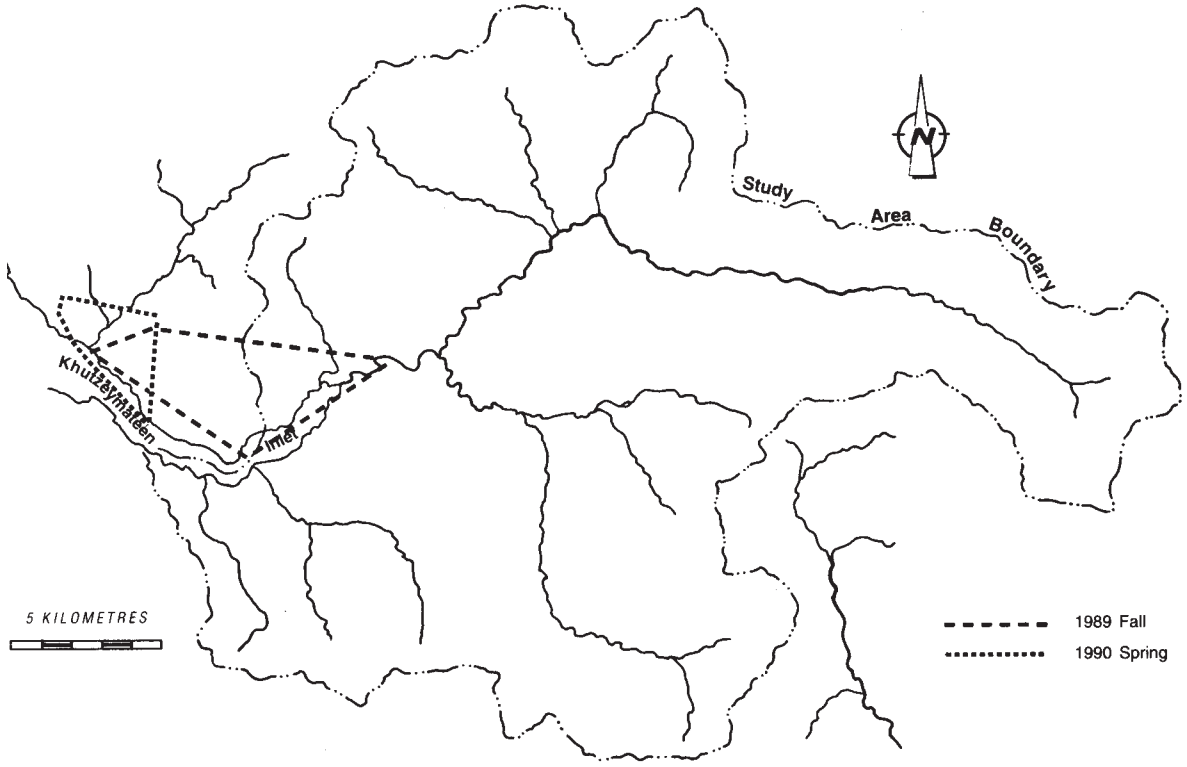

FIGURE A6.4. Minimum annual home range polygons for adult female GF40.

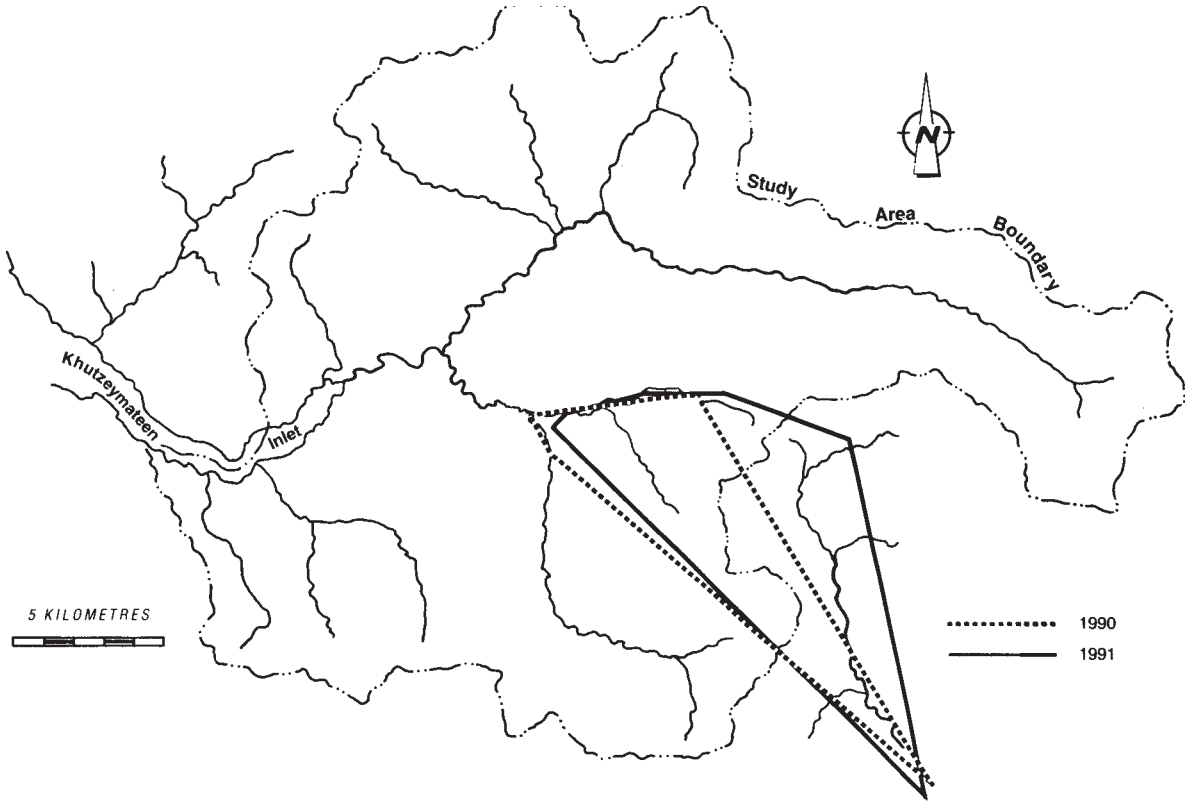

FIGURE A6.5. Minimum annual home range polygons for adult females GF41 and GF43.

season 1 and remained there until she returned to Carm Creek at the end of season 2. She spent season 3 in the lower Carm Creek area. She denned in the Carm Creek Valley. Her 1991 home range was 67.2 km (Figure A6.4).

Bear GF41, accompanied by two yearlings, was captured on the Khutzeymateen estuary in June 1990. She spent part of season 1 on or near the Khutzeymateen estuary before moving to a tributary of Mouse Creek. She spent most of season 2 in helicopter-logged and adjacent forested areas of Mouse Creek and Khutzeymateen Inlet. She was active along the lower Kateen River and lower Khutzeymateen River during season 3. She denned in the Mouse Creek watershed. Her 1990 home range was 83.9 km^2 (Figure A6.5). 1991, GF41 left her den between 16 and 23 April accompanied by one 2-year-old. After spending time near an unnamed creek west of Mouse Creek, they were at the Khutzeymateen estuary by 11 May. During the rest of season 1, she was active on the estuary and along the lower Khutzeymateen River before she moved to helicopter-logged slope west of Mouse Creek. She returned to the lower Khutzeymateen River and estuary most of season 2, then moved back to helicopter-logged and adjacent forested areas near the mouth of Mouse Creek at the end of season 2. She returned to the lower Khutzeymateen River area in mid-season 3. She denned in Mouse Creek watershed again. Her 1991 home range was 68.4 km^2 (Figure A6.5).

Bear GF43 was captured at Carm Lake in June 1990. She spent season 1 in the upper Carm Creek area and then moved into the upper Exchamsiks River watershed where she spent several weeks of season 2 before returning to Carm Creek for the remainder of the season. Bear GF43 was active in the mid- and upper Carm Creek area during season 3. She denned in the Carm Creek area. Her 1990 home range was 44.3 km^2 (Figure A6.5). In 1991, GF43 left her den between 16 and 23 April and spent the early part of season 1 in the Carm Creek and mid-Khutzeymateen River area before moving to the lower Khutzeymateen River and estuary. the end of season 1, she moved into the upper Exchamsiks River watershed and remained there for 1 month,

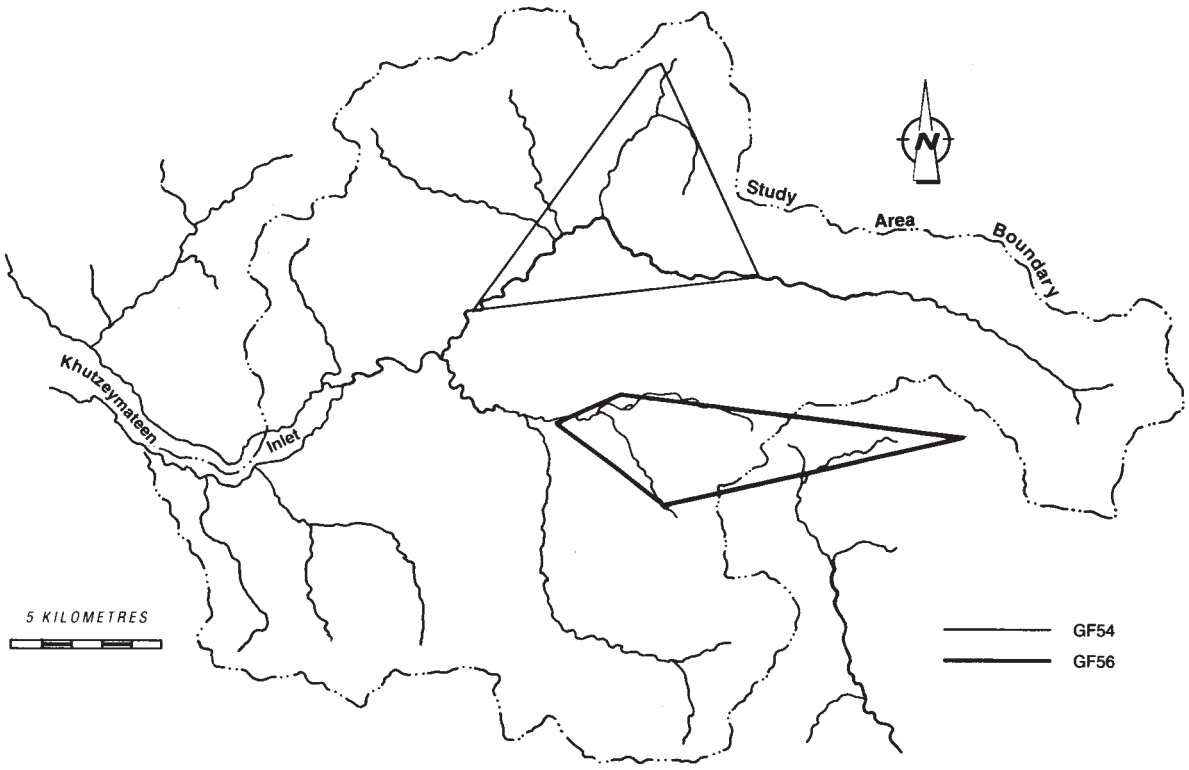

Figure A6.6. Minimum annual (1991) home range polygons for adult females GF54 and GF56.

then spent the remainder of season 2 and all of season 3 in the lower Carm Creek area. She denned near Carm Creek again. Her 1991 home range was 40.4 km^2 (Figure A6.5).

Bear GF54 was first captured on the mid-Kateen River in May 1991, but was seen on avalanche chutes in the Grant Creek area and on the Kateen River between Colleen and Tracey creeks in the 2 years before her capture. Following capture, she and her two yearlings moved back into the Grant Creek area and were located several times on the same avalanche slopes. They remained in this area until the end of season 1. At the beginning of season 2, she was active between the lower Kateen River and upper Grant Creek. She spent the end of season 2 and most of season 3 along the lower Kateen River to within 2 km of the Khutzeymateen River. She denned above the junction of Grant Creek and the Kateen River. Her 1991 home range was 37.0 km^2 (Figure A6.6).

Bear GF56, accompanied by two 2-year-olds, was captured at Carm Lake in May 1991. They spent season 1 moving between Carm Creek, Tony Creek, and the upper Exchamsiks River. In the Exchamsiks River watershed, they were located at 915 m elevation, above the headwaters glacier. One month later they were located in a similar area, 250 m to the southwest. At the beginning of season 2, GF56 moved from upper Exchamsiks River watershed back to the mid- and lower Carm Creek area for most of season 2 and of season 3. She denned above the junction of Tony and Carm creeks. Her 1991 home range was 26.2 km (Figure A6.6).

Adult Males

Bear GM04 was captured near the Khutzeymateen River estuary in May 1989. He was located with two females (GF18 and probably GF54) during season 1. He left the watershed in late May and was not located again until 5 September, along the upper Exchamsiks River. By the following week (11 September) he had

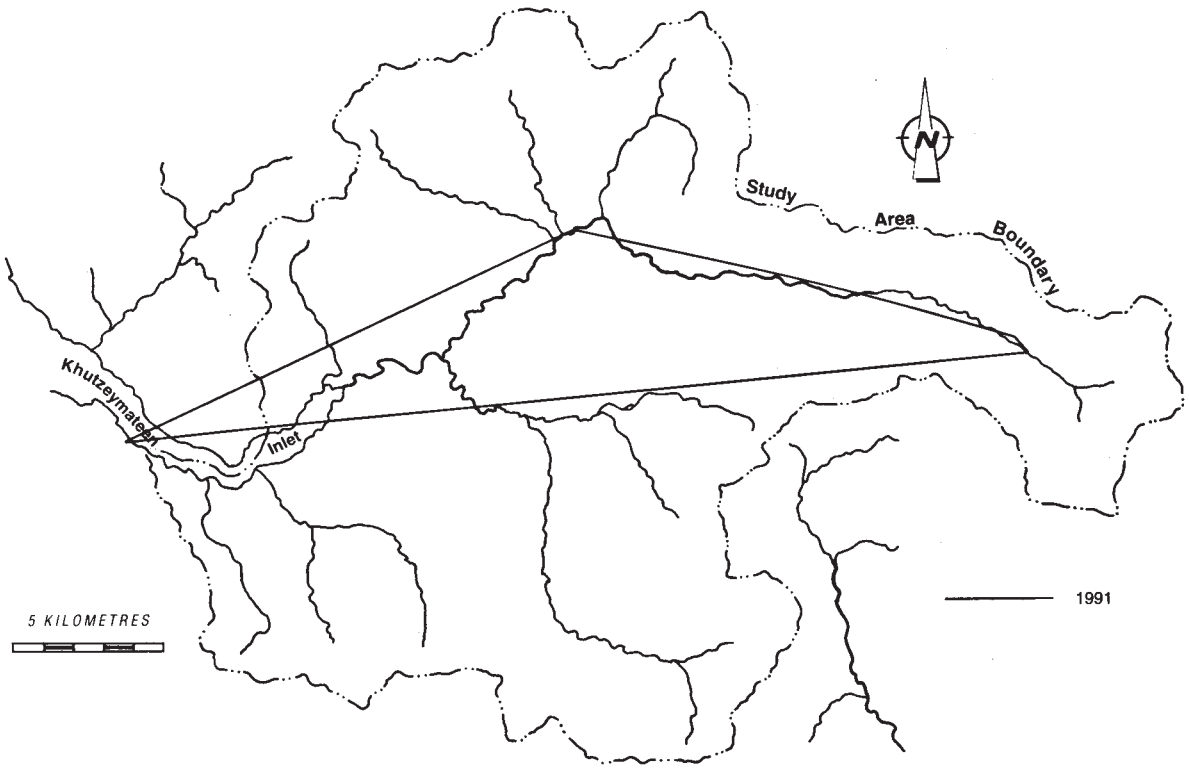

Figure A6.7. Spring and early summer home range polygon for adult male GM47.

dropped his collar in a small tributary of the lower Exchamsiks. His minimum 1989 home range estimate was 220.1 km^2. His actual home range was undoubtedly much larger as the first six locations were all between and 20 May.

Bear GM08 was captured near the Khutzeymateen River estuary in May 1989. He was subsequently observed with an adult female (GF54) in Grant Creek. He dropped his collar in lower Grant Creek between May and 7 June. He was not monitored long enough to get a good measure of his home range size.

Bear GM11 was first captured on the Kateen River in May 1989. He left the study area after his second capture in June, and reappeared in the Khutzeymateen watershed temporarily when he was located once along the lower Khutzeymateen River (24 July 1989). He was not located again, but on 5 September his radio-collar was found near the headwaters of the Kwinamass River. His minimum 1989 home range estimate was 56.9 km^2. His actual home range was undoubtedly much larger.

Bear GM47 was captured on the Kateen River near the mouth of Grant Creek in May 1991. He spent season 1 moving between the upper and lower Kateen River. He was seen with two different females in the upper Kateen Valley during this period. He moved from the mid-Kateen River to the south shore Khutzeymateen Inlet near Cedar Creek at the beginning of season 2 and was not located again after 30 July His 1991 spring and early summer home range was 88.9 km^2 (Figure A6.7).

Bear GM59 was captured at the mouth of Cedar Creek in June 1991. He was located six times during season 1, along the south shore of Khutzeymateen Inlet, in the upper Ensheshese River area, and near Tsamspanaknok Bay of Khutzeymateen Inlet. He was not located between 3 July and 5 August. On 6 and August he was located along the mid-Ensheshese River and on 1 October at the mouth of the Toon River. denned in the upper Ensheshese Valley. His minimum 1991 home range estimate was 134.5 km^2. His actual home range was undoubtedly larger.

Three adult males dropped their radio collars shortly after capture: GM32 was captured at Cedar Creek estuary in May 1989, GM45 was captured along the lower Kateen River in June 1990, and GM80 was captured along the mid Khutzeymateen River in June 1990. Only two to three post-capture locations were obtained for these bears.

Subadult Males

Bear GM02 was first captured in May 1989 along the mid-Khutzeymateen River. He was not radio-collared but it is believed he spent much of season 1 (1989) with his brother (GM22) on or near Khutzeymateen estuary. Bear GM02 was captured near the estuary twice in 1990, at which time he was radio-collared. In 1990, he spent the majority of season 1 on or near the estuary with his brother GM22. The two brothers split up and GM02 spent most of season 2 along the lower Khutzeymateen River, making occasional foray toward Carm Creek or up the Kateen River. During season 3 he spent all his time moving and down the lower Khutzeymateen and lower Kateen rivers. He denned above the mouth of Mouse Creek. His 1990 home range was 86.4 km^2 (Figure A6.8). He dropped his collar either shortly before or shortly after denning. He remained recognizable because of distinct physical features and behaviour, and was frequently observed in season 1, 1991. At this time he was active along the shores of Khutzeymateen Inlet, on the Khutzeymateen estuary, and on the estuaries of Cedar and Larch creeks. Occasionally, he was observed with his brother on the Khutzeymateen estuary. After 11 July he was only seen three times (twice on Khutzeymateen estuary and once on the lower Kateen River). His 1991 home range, based on incidental observations only, was 32.2 km^2. His actual home range was undoubtedly much larger.

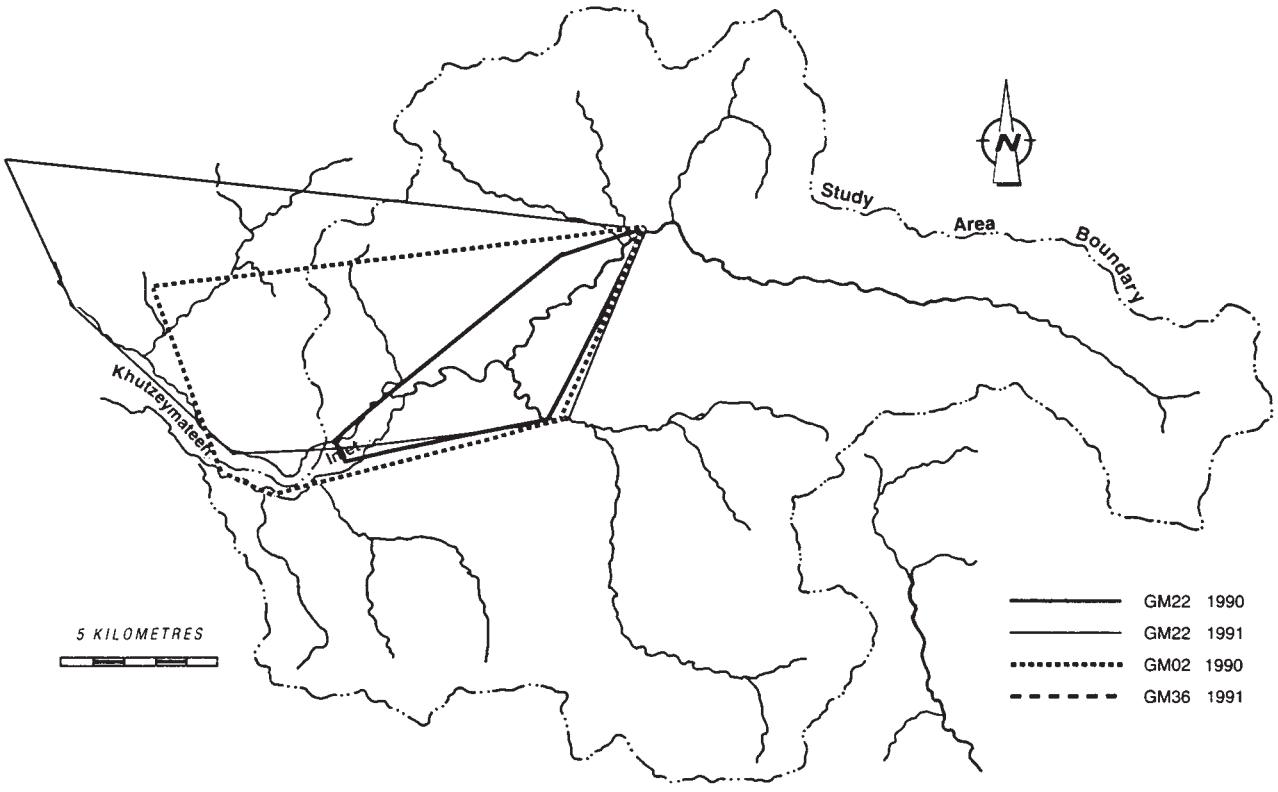

FIGURE A6.8. Minimum annual home range polygons for subadult males GM02, GM22, and GM36.

Bear GM22 was first captured near the mouth of Carm Creek in May 1989. He was not radio-collared but was observed with his brother (GM02) as described above. He was captured near the estuary twice in 1990, at which time he was radio-collared. In 1990, GM22's season 1 activities closely parallelled his brother's. He spent most of season 2 along the lower Kateen, making occasional forays to the lower and mid-Khutzeymateen River. He moved up and down the lower Kateen and occasionally the lower Khutzeymateen during season 3. He denned in the lower Kateen Valley. His 1990 home range was 28.8 km^2 (Figure A6.8). In 1991, GM22 emerged from his den between 16 and 23 April and spent season 1 moving from his den to the lower Khutzeymateen River and estuary where, again, he was observed with his brother. He made two brief forays down Khutzeymateen Inlet before returning to the lower Khutzeymateen and Kateen rivers at the beginning of season 2. He was active along these rivers until he dropped his radio collar in August. His 1991 spring to midsummer home range was 124.3 km^2 (Figure A6.8).

Bear GM36 was first captured along the lower Khutzeymateen River in May 1990, but was not radio-collared until his recapture near the estuary in June 1991. He spent the early part of season 1, 1991 on or near the Khutzeymateen estuary. For the rest of season 1, he was active along the lower and mid-Khutzeymateen River, with one foray into the lower Kateen River valley. Season 3 was spent in the lower Carm Creek area and the braided section of the mid-Khutzeymateen River. His collar was found along the lower Khutzeymateen River in early March 1992, probably lost sometime during the previous fall. His 1991 home range was 20.9 km^2 (Figure A6.8).

APPENDIX 7: Seasonal breakdown by ecosystem unit for aerial and ground locations of radio-collared grizzly bears in the Khutzeymateen study area, 1989–1991. Den locations are not included.

Subzone[a]	Ecosystem unit	Seral assoc.[b]	Succ. stage[c]	Season 1		Season 2		Season 3		Total	%
				n	%	n	%	n	%		
vm,wm	AV		2	10	3.6	1	0.7	0	0.0	11	1.7
vm,wm	AV		3	33	11.8	5	3.6	0	0.0	38	5.9
vm,wm	DC		2	0	0.0	0	0.0	0	0.0	0	0.0
vm,wm	DC		3	1	0.4	2	1.4	2	0.9	5	0.8
vm,wm	DC		4	1	0.4	1	0.7	1	0.4	3	0.5
vm,wm	DC		5	11	3.9	2	1.4	4	1.8	17	2.6
vm,wm	DC		6	8	2.9	3	2.2	2	0.9	13	2.0
vm,wm	DC		7	14	5.0	11	8.0	20	8.8	45	7.0
vm,wm	SC		1	0	0.0	0	0.0	0	0.0	0	0.0
vm,wm	SC		2	1	0.4	1	0.7	2	0.9	4	0.6
vm,wm	SC		3	0	0.0	0	0.0	2	0.9	2	0.3
vm,wm	SC		4	1	0.4	2	1.4	3	1.3	6	0.9
vm,wm	SC		5	5	1.8	6	4.3	4	1.8	15	2.3
vm,wm	SC		6	2	0.7	5	3.6	8	3.5	15	2.3
vm,wm	SC		7	4	1.4	3	2.2	7	3.1	14	2.2
vm	ES			54	19.4	7	5.1	3	1.3	64	10.0
vm,wm	NW		2	30	10.8	4	2.9	1	0.4	35	5.4
vm,wm	NW		3	8	2.9	3	2.2	1	0.4	12	1.9
vm,wm	OW			0	0.0	1	0.7	4	1.8	5	0.8
vm,wm	FD		1	0	0.0	0	0.0	1	0.4	1	0.2
vm,wm	FD	1	1	0	0.0	8	5.8	40	17.7	48	7.5
vm,wm	FD	1	2	0	0.0	1	0.7	0	0.0	1	0.2
vm,wm	FD	1	3	0	0.0	1	0.7	1	0.4	2	0.3
vm,wm	FD	2	3	1	0.4	1	0.7	2	0.9	4	0.6
vm,wm	FD	2	4	6	2.2	4	2.9	14	6.2	24	3.7
vm,wm	FD	2	5	3	1.1	2	1.4	4	1.8	9	1.4
vm,wm	FD	3	3	1	0.4	3	2.2	0	0.0	4	0.6
vm,wm	FD	3	5	0	0.0	0	0.0	3	1.3	3	0.5
vm,wm	FD		4	0	0.0	0	0.0	1	0.4	1	0.2
vm,wm	FD		5	0	0.0	1	0.7	2	0.9	3	0.5
vm,wm	FD	5	3	1	0.4	9	6.5	1	0.4	11	1.7
vm,wm	FD	5	4	0	0.0	0	0.0	1	0.4	1	0.2
vm,wm	FD	5	5	1	0.4	0	0.0	1	0.4	2	0.3
vm,wm	FD	5	6	0	0.0	2	1.4	9	4.0	11	1.7
vm,wm	FD	5	7	0	0.0	0	0.0	3	1.3	3	0.5
vm,wm	FD	6	4	0	0.0	0	0.0	1	0.4	1	0.2
vm,wm	FD	6	5	3	1.1	4	2.9	6	2.7	13	2.0
vm,wm	FD	6	6	1	0.4	3	2.2	0	0.0	4	0.6
vm,wm	FD	6	5	1	0.4	0	0.0	0	0.0	1	0.2
vm,wm	FD	6	6	1	0.4	0	0.0	0	0.0	1	0.2
vm,wm	FD		7	9	3.2	15	10.9	19	8.4	43	6.7
vm,wm	FD	8	3	0	0.0	2	1.4	0	0.0	2	0.3
vm,wm	FD	8	5	1	0.4	1	0.7	1	0.4	3	0.5
vm,wm	FD	8	6	1	0.4	3	2.2	5	2.2	9	1.4
vm,wm	FD	8	7	1	0.4	2	1.4	8	3.5	11	1.7

[a] Subzone: vm=very wet maritime; wm=wet maritime; mm=moist maritime; mmp=moist maritime parkland; AT=Alpine Tundra zone (no subzone).

[b] Seral associations: refer to Table 1.

[c] Successional stages: 1=Non-vegetated; 2=Herb; 3=Shrub; 4=Pole-sapling; 5=Young forest; 6=Mature forest; 7=Old growth.

APPENDIX 7: (Continued)

Subzone[a]	Ecosystem unit	Seral assoc.[b]	Succ. stage[c]	Season 1		Season 2		Season 3		Total	%
				n	%	n	%	n	%		
vm,wm	FD	9	3	4	1.4	3	2.2	6	2.7	13	2.0
vm,wm	FD	9	4	0	0.0	2	1.4	0	0.0	2	0.3
vm,wm	FD	9	6	0	0.0	2	1.4	0	0.0	2	0.3
vm,wm	FD	9	7	0	0.0	1	0.7	0	0.0	1	0.2
vm,wm	BM		2	0	0.0	0	0.0	0	0.0	0	0.0
vm,wm	BM		3	0	0.0	0	0.0	1	0.4	1	0.2
vm,wm	BM		4	0	0.0	0	0.0	1	0.4	1	0.2
vm,wm	BM		5	0	0.0	0	0.0	0	0.0	0	0.0
vm,wm	BM		6	2	0.7	0	0.0	2	0.9	4	0.6
vm,wm	BM		7	31	11.1	6	4.3	17	7.5	54	8.4
vm,wm	FF		2	0	0.0	0	0.0	0	0.0	0	0.0
vm,wm	FF		3	0	0.0	0	0.0	0	0.0	0	0.0
vm,wm	FF		4	0	0.0	0	0.0	0	0.0	0	0.0
vm,wm	FF		5	2	0.7	0	0.0	0	0.0	2	0.3
vm,wm	FF		6	1	0.4	1	0.7	3	1.3	5	0.8
vm,wm	FF		7	1	0.4	2	1.4	3	1.3	6	0.9
vm	CM		6	1	0.4	1	0.7	0	0.0	2	0.3
vm	CM		7	1	0.4	0	0.0	0	0.0	1	0.2
wm	HM		4	0	0.0	0	0.0	0	0.0	0	0.0
wm	HM		5	0	0.0	0	0.0	0	0.0	0	0.0
wm	HM		6	0	0.0	0	0.0	0	0.0	0	0.0
wm	HM		7	2	0.7	0	0.0	0	0.0	2	0.3
vm,wm	RO			0	0.0	0	0.0	0	0.0	0	0.0
mm	AV		2	2	0.7	0	0.0	1	0.4	3	0.5
mm	AV		3	10	3.6	0	0.0	0	0.0	10	1.6
mm	HF		2	2	0.7	0	0.0	0	0.0	2	0.3
mm	HF		3	1	0.4	0	0.0	0	0.0	1	0.2
mm	HF		6	0	0.0	0	0.0	0	0.0	0	0.0
mm	HF		7	0	0.0	0	0.0	0	0.0	0	0.0
mm	MM		3	0	0.0	0	0.0	0	0.0	0	0.0
mm	MM		4	0	0.0	0	0.0	0	0.0	0	0.0
mm	MM		5	0	0.0	0	0.0	0	0.0	0	0.0
mm	MM		6	0	0.0	0	0.0	0	0.0	0	0.0
mm	MM		7	5	1.8	0	0.0	1	0.4	6	0.9
mm	SS		3	0	0.0	0	0.0	0	0.0	0	0.0
mm	SS		4	0	0.0	0	0.0	0	0.0	0	0.0
mm	SS		6	0	0.0	0	0.0	0	0.0	0	0.0
mm	SS		7	1	0.4	0	0.0	2	0.9	3	0.5
mm	FW		7	0	0.0	0	0.0	0	0.0	0	0.0
mm	NW		2	0	0.0	0	0.0	0	0.0	0	0.0
mm	OW			0	0.0	0	0.0	0	0.0	0	0.0
mm	RO			0	0.0	0	0.0	0	0.0	0	0.0
mmp	PA			0	0.0	1	0.7	2	0.9	3	0.5
AT	AT			0	0.0	0	0.0	0	0.0	0	0.0
AT	OW			0	0.0	0	0.0	0	0.0	0	0.0
Total				279	100.0	138	100.0	226	100.0	643	100.0

[a] Subzone: vm=very wet maritime; wm=wet maritime; mm=moist maritime; mmp=moist maritime parkland; AT=Alpine Tundra zone (no subzone).

[b] Seral associations: refer to Table 1.

[c] Successional stages: 1=Non-vegetated; 2=Herb; 3=Shrub; 4=Pole-sapling; 5=Young forest; 6=Mature forest; 7=Old growth.

APPENDIX 8: Frequency of use of Bear Habitat Units (BHUs) by radio-collared grizzly bears in the Khutzeymateen study area, 1989–1991

	GF18		GF24		GF26		GF34		GF40		GF41		GF43		GF54		GF56		GM02		GM22		GM36		GM47	
BHU	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
AVA	3	8.8	9	37.5	5	4.5	0	0.0	4	6.9	0	0.0	2	3.3	10	32.3	0	0.0	1	1.6	1	0.8	0	0.0	8	47.1
BMY	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	4.9	0	0.0	0	0.0	0	0.0	1	1.6	1	0.8	0	0.0	0	0.0
BMO	9	26.5	3	12.5	12	10.9	2	14.3	6	10.3	5	12.2	8	13.1	2	6.5	0	0.0	6	9.7	12	10.2	0	0.0	3	17.6
DCS	0	0.0	3	12.5	0	0.0	0	0.0	1	1.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	5.9
DCY	0	0.0	0	0.0	6	5.5	0	0.0	1	1.7	3	7.3	2	3.3	3	9.7	0	0.0	1	1.6	3	2.5	0	0.0	1	5.9
DCO	2	5.9	1	4.2	8	7.3	2	14.3	2	3.4	6	14.6	8	13.1	2	6.5	5	23.8	7	11.3	10	8.5	2	5.3	0	0.0
CMO	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	2.5	0	0.0	0	0.0
HMO	0	0.0	0	0.0	2	1.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SCY	0	0.0	0	0.0	6	5.5	1	7.1	3	5.2	3	7.3	7	11.5	2	6.5	1	4.8	1	1.6	1	0.8	2	5.3	0	0.0
SCO	0	0.0	0	0.0	9	8.2	0	0.0	3	5.2	6	14.6	1	1.6	0	0.0	2	9.5	2	3.2	1	0.8	4	10.5	0	0.0
FDS	3	8.8	0	0.0	10	9.1	1	7.1	3	5.2	1	2.4	3	4.9	1	3.2	0	0.0	6	9.7	4	3.4	4	10.5	0	0.0
FDY	7	20.6	5	20.8	7	6.4	1	7.1	7	12.1	3	7.3	5	8.2	3	9.7	3	14.3	5	8.1	9	7.6	6	15.8	0	0.0
FDM	3	8.8	0	0.0	4	3.6	0	0.0	4	6.9	1	2.4	5	8.2	1	3.2	1	4.8	3	4.8	3	2.5	2	5.3	0	0.0
FDO	1	2.9	2	8.3	11	10.0	0	0.0	11	19.0	2	4.9	9	14.8	1	3.2	3	14.3	3	4.8	5	4.2	6	15.8	2	11.8
EST	2	5.9	0	0.0	2	1.8	3	21.4	0	0.0	5	12.2	1	1.6	0	0.0	0	0.0	7	11.3	44	37.3	0	0.0	0	0.0
RIB	0	0.0	0	0.0	3	2.7	4	28.6	3	5.2	1	2.4	2	3.3	4	12.9	1	4.8	18	29.0	14	11.9	0	0.0	0	0.0
NFW	2	5.9	0	0.0	17	15.5	0	0.0	3	5.2	3	7.3	4	6.6	0	0.0	2	9.5	0	0.0	5	4.2	11	28.9	0	0.0
OWA	0	0.0	0	0.0	0	0.0	0	0.0	2	3.4	0	0.0	1	1.6	0	0.0	0	0.0	1	1.6	0	0.0	1	2.6	0	0.0
ROC	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AVM	1	2.9	0	0.0	1	0.9	0	0.0	4	6.9	0	0.0	0	0.0	1	3.2	3	14.3	0	0.0	1	0.8	0	0.0	2	11.8
MHY	0	0.0	0	0.0	3	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
MHO	1	2.9	0	0.0	3	2.7	0	0.0	1	1.7	0	0.0	1	1.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
FWE	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SSC	0	0.0	0	0.0	1	0.9	0	0.0	0	0.0	0	0.0	1	1.6	0	0.0	0	0.0	0	0.0	1	0.8	0	0.0	0	0.0
RCM	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
OWM	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
NFM	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
PAR	0	0.0	1	4.2	0	0.0	0	0.0	0	0.0	0	0.0	1	1.6	1	3.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
ALP	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AOW	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	34		24		110		14		58		41		61		31		21		62		118		38		17	

APPENDIX 9: Measurements of dens visited during the Khutzeymateen Grizzly Bear Study

	Entrance		Tunnel			Chamber		
Bear	Height (cm)	Width (cm)	Height (cm)	Width (cm)	Length (cm)	Height (cm)	Width (cm)	Length (cm)
GF18	41.8	20.5	41.5	19.5	102.5	50.5	292.0	255.0
GF34	67.0	44.0	52.0	59.0	104.0	122.0	174.0	243.0
GF40	100.0	99.0	87.0	109.0	210.0	124.0	240.0	156.0
GF41	79.0	97.6	0.0	0.0	0.0	127.7	188.4	185.6
GF43	86.0	107.0	75.0	92.0	150.0	125.0	194.0	139.0
Mean	74.8	73.6	63.9	69.9	141.6	109.8	217.7	195.7

APPENDIX 10: Birds identified in the Khutzeymateen study area and Khutzeymateen Inlet, 1989–1991 (B=courtship, nesting, or young observed; S=present throughout summer, suspected breeder; M=non-breeding migrant; U=unknown)

U Common Loon
U Western Grebe
U Red-necked Grebe
M Great Blue Heron
U Trumpeter Swan
B Canada Goose
U American Widgeon
M Oldsquaw
B Mallard
M Northern Pintail
M Green-winged Teal
M Blue-winged Teal
M Cinnamon Teal
U Lesser Scaup
U Greater Scaup
U Northern Shoveler
U Ring-necked Duck
U Barrow's Goldeneye
U Common Goldeneye
U Bufflehead
B Harlequin Duck
U White-winged Scoter
U Surf Scoter
S Hooded Merganser
B Common Merganser
S Red-breasted Merganser
U Sharp-shinned Hawk
U Cooper's Hawk
U Northern Goshawk
U Red-tailed Hawk
U Golden Eagle
B Bald Eagle
U Northern Harrier
U Osprey
U Peregrine Falcon
S Merlin
S Blue Grouse
U Rock Ptarmigan
U Short-billed Dowitcher
U Common Snipe
S Solitary Sandpiper
B Spotted Sandpiper
U Greater Yellowlegs
U Lesser Yellowlegs
U Least Sandpiper
U Killdeer
M Glaucus-winged Gull
M Herring Gull
M California Gull
M Mew Gull
M Thayer's Gull
M Ring-billed Gull
M Bonaparte's Gull
M Black-legged Kittiwake
S Marbled Murrelet
S Northern Pygmy Owl
S Barred Owl
U Black Swift
S Vaux's Swift
S Rufous Hummingbird
B Belted Kingfisher
S Northern Flicker
S Red-breasted Sapsucker
B Hairy Woodpecker
U Western Wood-Peewee
S Dusky Flycatcher
S Western Flycatcher
U Alder Flycatcher
U Hammond's Flycatcher
B Tree Swallow
S Violet-green Swallow
S Barn Swallow
S Cliff Swallow
S Steller's Jay
S Gray Jay
S Common Raven
S Northwestern Crow
S Boreal Chickadee
S Chestnut-backed Chickadee
S Red-breasted Nuthatch
S Brown Creeper
S American Dipper
U Cedar Waxwing
S Winter Wren
S Amerian Robin
S Varied Thrush
S Swainson's Thrush
S Hermit Thrush
S Townsend's Solitaire
S Golden-crowned Kinglet
S Ruby-crowned Kinglet
U Water Pipit
S Red-eyed Vireo
S Warbling Vireo
B Yellow Warbler
S Yellow-rumped Warbler
S Townsend's Warbler
S Northern Waterthrush
B Common Yellowthroat
S Blackpoll Warbler
S MacGillvary's Warbler
S Wilson's Warbler
U American Redstart
S Red-winged Blackbird
S Rusty Blackbird
U Evening Grosbeak
U Pine Grosbeak
U Rosy Finch
S Pine Siskin
U Red Crossbill
U Savannah Sparrow
S Dark-eyed Junco
S Golden-crowned Sparrow
B Fox Sparrow
B Song Sparrow

APPENDIX 11: Mammal species or their sign identified in the Khutzeymateen study area and Khutzeymateen Inlet, 1989–1991

Common name	Scientific name	Sightings[a]
Hoary Marmot	*Marmota caligata*	Uncommon
Red Squirrel	*Tamiasciurus hudsonicus*	Common
Beaver	*Castor canadensis*	Common
Deer Mouse	*Peromyscus maniculatus*	Common
Long-tailed Vole	*Microtus longicaudus*	Uncommon
Porcupine	*Erethizon dorsatum*	Common
Killer Whale	*Orcinus orca*	Uncommon
Gray Whale	*Eschrichtius robustus*	Rare migrant
Humpback Whale	*Megaptera novaeangliae*	Rare migrant
Gray Wolf	*Canis lupus*	Occasional
Black Bear	*Ursus americanus*	Common
Grizzly Bear	*Ursus arctos*	Common
Marten	*Martes americana*	Common
Fisher	*Martes pennanti*	Introduced
Mink	*Mustela vison*	Occasional
Wolverine	*Gulo gulo*	Uncommon
River Otter	*Lutra canadensis*	Common
Harbour Seal	*Phoca vitulina*	Common
Sitka Deer	*Odocoileus hemionus*	Rare
Moose	*Alces alces*	Rare
Mountain Goat	*Oreamnos americanus*	Common

[a] Common=>30; occasional=<10; uncommon=<5; rare=1.