

TEPROR LAKE HYDROELECTRIC PROJECT

REPORT ON MOUNTAIN GOAT STUDIES, 1985

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ALASKA DEPARTMENT OF FISH AND GAME

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SUMMARY OF FINDINGS

Mountain goat investigations in the Terror Lake study area, Kodiak, Alaska, were initiated in 1982. This study continued in 1985 with aerial surveys conducted on 13 March; 12 and 19 June; and 26, 27 August; 6 September 1985. Winter distribution was similar to that observed during the winters of 1982, 1983 and 1984, with the northern drainages of Uqak Bay the major wintering area. Post-kidding surveys indicated the lowest kid:adult ratios recorded during this study for Uqak and Terror drainages. The number of goats observed in Kizhuyak and northern Uqak drainages during summer distribution surveys has remained stable throughout the study, although the distribution of these observations has varied widely. The number of goats observed during summer surveys in the Kizhuyak portion of the "primary impact area" increased from 1982-1984 and declined slightly in 1985. Thirty-one goats were harvested in the study area. Hunter access into the study area was again facilitated by project features. Continuation of existing research methods is recommended for 1986.

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INTRODUCTION

Studies to monitor the impacts on wildlife of construction and operation of the Terror Lake hydroelectric project were required by the Federal Energy Regulatory Commission as a condition for project licensing. The requirement for wildlife studies was intended to partially mitigate habitat lost due to project construction. The Alaska Department of Fish and Game (ADF&G) was contracted by the Alaska Power Authority to conduct the study on mountain goats (Oreamnos americanus) to delineate movement patterns and seasonal ranges and document any changes which may have been caused by project activities. The study began in 1982 and it is scheduled to continue through the project's construction phase (1982-1984) and two years into the operational stage (1985-1986).

Investigations of mountain goats in the Terror Lake hydroelectric project area during 1982 indicated that construction activities had no detectable effects on goat movements or distribution (Smith and Van Daele 1984). In 1983 winter and spring distribution was similar to that of previous years. The number of goats observed in the Terror River drainage during the summer survey was lower than noted in previous years. This decline was correlated with increased project activity at Terror Lake (Smith et al. 1985). Inclement weather in 1984 prevented a summer survey of Terror drainage. During each year from 1982-1984 the number of goats observed during summer surveys in the Kizhuyak section of the primary impact area increased (Smith and Van Daele 1986a). This report summarizes investigations conducted in 1985.

Acknowledgements

We are grateful to Ben Ballenger and Victor Barnes for their assistance with aerial surveys. Pilots B. Patterson, S. Carvalho, D. Henley and D. Wassick piloted survey aircraft. Karl Schneider secured approval for the project and contributed his editorial and supervisory skills. Susan Malutin typed several drafts of the report.

METHODS

Methods for data collection were similar to those described in Smith and Van Daele (1984).

STUDY AREA

A description of the study area (Fig. 1) and the Terror Lake hydroelectric project is contained in Smith and Van Daele (1984).

RESULTS AND DISCUSSION

Winter Distribution

A helicopter survey of the study area was conducted on 13 and 16 March 1985 to document winter distribution of goats. One hundred thirty-eight goats were counted during the 5.4 hour flight. Results of this survey are presented in Table 1 and Figure 2.

The number of goats observed during this survey was within the range seen in previous winter surveys (Table 2) and distribution was similar to previously observed patterns. Drainages into Ugak Bay continued to constitute the major wintering area (Smith and Van Daele 1985a). Goat

observations were at a mean elevation of 337 m (n=138; range = 183-549 m). This mean is lower than those noted in 1982 (446 m), 1983 (408 m) and 1984 (398m).

Post-kidding survey

A post-kidding survey was conducted by helicopter on 12 and 19 June 1985 (4.9 hr). Two-hundred fifteen goats were observed and classified, resulting in a ratio of 26 kids to 100 adults. Kid:adult ratios in Terror and Ugak drainages were lower than observed in previous years (Table 4). Data from this survey are presented in Table 3 and Figure 3.

Twenty-five goats were observed in the Kizhuyak drainage during this survey. This is the fewest goats seen during a post-kidding survey (Table 4) and may have been a result of goats staying on winter ranges during the unseasonably cool spring and early summer in 1985 (Smith and Van Daele 1986b). Two kids were seen in the vicinity of Falls Creek, again indicating that goat parturition occurred in close proximity to project features..

Summer distribution

Aerial surveys of mountain goat summer ranges throughout Kodiak Island were conducted on 26, 27 August and 6 September 1985 (13.6 hrs). Summer distribution within the study area is summarized in Table 5 and Figure 4.

The number of goats observed in northern Ugak and Kizhuyak drainages combined has remained stable throughout this study (1982-206 goats, 1983-210 goats, 1984-203 goats; 1985-211 goats). The number of goats observed annually in each drainage has varied widely (Table 6). The number of goats counted in the Kizhuyak section of the "primary impact area" (Spencer and Hensel 1980) increased each year during

the construction phase of the project (1982-1984) (Smith and Van Daele 1986a). Thirty-one goats were observed in that area in 1985, compared to 38 goats in 1984.

Seasonal Distribution, 1982-1985

The 1985 data supports the mountain goat seasonal distribution pattern described by Smith and Van Daele (1986a). Table 7 summarizes the goat distribution by season and drainage for 1982-1985.

Mortality

Thirty-one mountain goats (11 males, 20 females) were harvested by sport hunters in the study area in 1985. Several goat hunters used Terror Lake and Shotgun Creek reservoir for float-plane access. Others used the construction access road, from the Kizhuyak Bay or the Terror Lake end.

Recommendations for further study

Aerial surveys should be continued to monitor seasonal distribution and movements of mountain goats in the Terror Lake hydroelectric project area. Surveys to document winter distribution, post-kidding activities and late summer distribution should be repeated in 1986. Other incidental observations of goats in the study area should continue to be recorded and analyzed to supplement aerial survey information.

LITERATURE CITED

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Table 1. Results of an aerial survey of mountain goat distribution in the Terror Lake study area, Kodiak, Alaska on 13 and 16 March 1985.

<u>Observation Number</u>	<u>Number of adults</u>	<u>Number of kids</u>	<u>Total Number</u>	<u>Aspect</u>	<u>Elevation (meters)</u>	<u>Drainage</u>
1	9	0	9	SE	366	Kizhuyak
2	2	0	2	S	488	Hidden Basin
3	1	0	1	S	488	Hidden Basin
4	1	0	1	S	457	Hidden Basin
5	1	0	1	S	488	Hidden Basin
6	3	1	4	E	427	Hidden Basin
7	9	3	12	E	290	Hidden Basin
8	2	0	2	E	366	Hidden Basin
9	1	0	1	SE	549	Hidden Basin
10	3	1	4	SW	183	Hidden Basin
11	2	2	4	SE	183	Hidden Basin
12	1	1	2	W	244	Hidden Basin
13	1	0	1	SE	213	Hidden Basin
14	1	0	1	S	244	Hidden Basin
15	1	0	1	SW	305	Hidden Basin
16	3	1	4	SW	305	Hidden Basin
17	7	4	11	S	518	Hidden Basin
18	1	0	1	SW	244	Hidden Basin
19	1	0	1	E	198	Wild Creek
20	2	1	3	E	335	Wild Creek
21	1	1	2	E	366	Wild Creek
22	1	0	1	E	259	Wild Creek
23	1	1	2	E	274	Wild Creek
24	4	2	6	SE	213	Wild Creek
25	4	0	4	SE	213	Wild Creek
26	1	0	1	E	244	Wild Creek
27	3	0	3	NE	335	Wild Creek
28	7	2	9	E	427	Wild Creek
29	3	0	3	NE	396	Wild Creek
30	2	0	2	E	427	Wild Creek
31	5	0	5	SE	274	Wild Creek
32	5	4	9	SW	244	Wild Creek
33	5	0	5	SW	305	Wild Creek
34	6	1	7	SW	366	Wild Creek
35	3	1	4	SW	366	Wild Creek
36	7	2	9	SW	366	Wild Creek
TOTALS	110	28	138			

Summary:

<u>Drainage</u>	<u>Adults</u>	<u>Kids</u>	<u>Total</u>	<u>Mean elevation</u>	<u>Elevation ranges</u>
Kizhuyak	9	0	9	366m	366m
Terror/Uganik	0	0	0	---	---
Ugak	<u>101</u>	<u>28</u>	<u>129</u>	<u>335</u>	<u>183-549</u>
TOTAL	110	28	138	337	183-549

Table 2. Results of mountain goat winter distribution surveys in the Terror Lake study area, Kodiak Alaska, 1982-1985.

<u>Drainage</u>	<u>Adults</u>				<u>Kids</u>				<u>Total</u>			
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Kizhuyak	1	9	10	9	0	4	5	0	1	13	15	9
Terror/Uganik	0	1	11	0	0	1	2	0	0	2	13	0
Ugak	<u>59</u>	<u>51</u>	<u>88</u>	<u>101</u>	<u>19</u>	<u>19</u>	<u>34</u>	<u>28</u>	<u>78</u>	<u>70</u>	<u>122</u>	<u>129</u>
TOTAL	60	61	109	110	19	24	41	28	79	85	150	138

Table 3. Results of an aerial survey of mountain goat distribution in the Terror Lake study area, Alaska on 12 and 19 June 1985.

<u>Observation Number</u>	<u>Number of adults</u>	<u>Number of kids</u>	<u>Total Number</u>	<u>Aspect</u>	<u>Elevation (meters)</u>	<u>Drainage</u>
1	1	0	1	E	716	Kizhuyak
2	1	0	1	N	701	Kizhuyak
3	1	1	2	NE	579	Kizhuyak
4	5	0	5	S	411	Kizhuyak
5	4	1	5	S	640	Kizhuyak
6	1	0	1	N	701	Kizhuyak
7	1	1	2	S	564	Kizhuyak
8	1	0	1	SE	579	Kizhuyak
9	3	2	5	SE	686	Kizhuyak
10	1	1	2	SE	762	Kizhuyak
11	1	0	1	E	361	Hidden Basin
12	1	0	1	E	610	Hidden Basin
13	6	4	10	N	610	Hidden Basin
14	6	2	8	S	610	Hidden Basin
15	1	0	1	S	579	Hidden Basin
16	1	1	2	NE	640	Hidden Basin
17	5	2	7	SE	564	Hidden Basin
18	2	0	2	NE	533	Hidden Basin
19	2	1	3	E	579	Hidden Basin
20	2	1	3	NE	686	Hidden Basin
21	1	1	2	E	610	Hidden Basin
22	2	0	2	E	610	Hidden Basin
23	2	0	2	S	640	Hidden Basin
24	6	2	8	SE	610	Hidden Basin
25	1	1	2	SW	610	Hidden Basin
26	1	0	1	E	305	Hidden Basin
27	1	0	1	S	411	Hidden Basin
28	1	0	1	W	518	Hidden Basin
29	2	0	2	W	610	Hidden Basin
30	2	0	2	E	579	Wild Creek
31	1	0	1	E	610	Wild Creek
32	3	3	6	SE	457	Wild Creek
33	5	1	6	SE	579	Wild Creek
34	1	0	1	NE	488	Wild Creek
35	1	0	1	NE	427	Wild Creek
36	4	0	4	NE	549	Wild Creek
37	1	0	1	NE	518	Wild Creek
38	2	0	2	NE	396	Wild Creek
39	4	0	4	E	518	Wild Creek
40	1	0	1	S	457	Wild Creek
41	5	0	5	SE	488	Wild Creek
42	1	1	2	NE	579	Wild Creek
43	2	0	2	E	518	Wild Creek
44	4	0	4	E	518	Wild Creek
45	3	0	3	NE	427	Wild Creek
46	1	0	1	SE	457	Wild Creek

Table 3. (Continued). Results of an aerial survey of mountain goat distribution in the Terror Lake study area, Alaska on 12 and 19 June 1985.

<u>Observation Number</u>	<u>Number of adults</u>	<u>Number of kids</u>	<u>Total Number</u>	<u>Aspect</u>	<u>Elevation (meters)</u>	<u>Drainage</u>
47	1	0	1	E	762	Wild Creek
48	1	1	2	E	671	Wild Creek
49	3	0	3	SE	701	Wild Creek
50	1	1	2	E	716	Wild Creek
51	2	0	2	E	747	Wild Creek
52	1	1	2	NE	701	Wild Creek
53	1	1	2	E	792	Wild Creek
54	3	1	4	S	640	Wild Creek
55	7	2	9	S	488	Wild Creek
56	1	1	2	S	579	Wild Creek
57	1	0	1	S	610	Wild Creek
58	4	2	6	W	472	Wild Creek
59	4	1	5	S	503	Wild Creek
60	4	3	7	S	488	Wild Creek
61	5	0	5	S	853	Uganik
62	4	0	4	SW	884	Uganik
63	1	0	1	E	686	Uganik
64	4	1	5	S	884	Terror
65	12	4	16	S	732	Terror
66	<u>6</u>	<u>0</u>	<u>6</u>	NE	732	Terror
Total	170	45	215			

Summary

<u>Drainage</u>	<u>Adults</u>	<u>Kids</u>	<u>Total</u>	<u>Mean Elevation</u>	<u>Elevation ranges</u>
Kizhuyak	19	6	25	608 m	411-762 m
Terror/Uganik	32	5	37	784	686-884
Ugak	<u>119</u>	<u>34</u>	<u>153</u>	<u>561</u>	<u>305-884</u>
Total	170	45	215	605	305-884

Table 4. Results of mountain goat post-kidding surveys in the Terror Lake study area, Kodiak Alaska, 1982-1985.

Drainage	Adults				Kids				Kids: 100 Adults				Total			
	1982	1983	1984	1985	1982	1983	1984	1985	1982	1983	1984	1985	1982	1983	1984	1985
Kizhuyak	37	27	48	19	9	11	14	6	24	41	29	32	46	38	62	2
Terror/Uganik	16	24	30	32	5	6	11	5	31	25	37	16	21	30	41	3
Ugak	<u>89</u>	<u>118</u>	<u>115</u>	<u>153</u>	<u>21</u>	<u>48</u>	<u>35</u>	<u>34</u>	<u>24</u>	<u>41</u>	<u>30</u>	<u>22</u>	<u>110</u>	<u>166</u>	<u>150</u>	<u>15</u>
TOTAL	142	169	193	170	35	65	60	45	25	39	31	26	177	234	253	21

Table 5. Results of an aerial survey of mountain goat distribution in the Terror Lake study area, Alaska on 26 and 27 August and 6 September 1985.

<u>Observation Number</u>	<u>Number of adults</u>	<u>Number of kids</u>	<u>Total Number</u>	<u>Aspect</u>	<u>Elevation (meters)</u>	<u>Drainage</u>
1	1	0	1	S	945	Terror
2	1	0	1	S	1036	Terror
3	1	0	1	N	1036	Terror
4	22	6	28	N	823	Terror
5	1	0	1	N	884	Terror
6	1	0	1	N	671	Terror
7	1	0	1	SE	1036	Terror
8	3	0	3	SW	1097	Uqanik
9	1	0	1	S	975	Uqanik
10	1	0	1	S	975	Uqanik
11	3	0	3	SE	1097	Uqanik
12	2	2	4	E	1097	Uqanik
13	4	1	5	SW	701	Sharatin
14	1	1	2	E	762	Kizhuyak
15	5	0	5	N	930	Kizhuyak
16	3	1	4	N	945	Kizhuyak
17	12	8	20	E	823	Kizhuyak
18	1	1	2	W	671	Wild Creek
19	4	0	4	NW	914	Kizhuyak
20	14	1	15	SE	1006	Hidden Basin
21	12	2	14	S	975	Hidden Basin
22	2	0	2	NW	792	Hidden Basin
23	1	0	1	SE	732	Hidden Basin
24	18	7	25	SW	823	Wild Creek
25	11	5	16	SW	762	Wild Creek
26	32	7	39	SW	732	Wild Creek
27	1	0	1	F	869	Wild Creek
28	1	0	1	SW	732	Wild Creek
29	9	2	11	NE	701	Wild Creek
30	27	10	37	E	823	Wild Creek
31	1	0	1	SW	671	Hidden Basin
32	4	1	5	SW	792	Hidden Basin
33	2	0	2	NE	701	Hidden Basin
34	4	0	4	E	610	Hidden Basin
Total	207	55	262			

Summary

<u>Drainage</u>	<u>Adults</u>	<u>Kids</u>	<u>Total</u>	<u>Mean Elevation</u>	<u>Elevation ranges</u>
Sharatin	4	1	5	701 m	701 m
Kizhuyak	25	10	35	860	762-945
Terror/Uqanik	38	8	46	904	671-1097
Uqak	140	36	176	807	610-1006
Total	207	55	262	828	610-1097 m

Table 6. Results of mountain goat summer distribution surveys in the Terror Lake study area, Kodiak Alaska, 1982-1985.

<u>Drainage</u>	<u>Adults</u>				<u>Kids</u>				<u>Total</u>			
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Sharatin	0	0	0	4	0	0	0	1	0	0	0	5
Kizhuyak	57	17	39	25	18	9	10	10	75	26	49	35
Terror/Uganik	37	20	--- ^a	38	6	3	--- ^a	8	13	23	--- ^a	46
Ugak	<u>92</u>	<u>142</u>	<u>116</u>	<u>140</u>	<u>39</u>	<u>42</u>	<u>38</u>	<u>36</u>	<u>131</u>	<u>184</u>	<u>154</u>	<u>176</u>
TOTAL	186	179	155	207	63	54	48	55	249	233	203	262

a = no survey data for 1984.

Table 7. Seasonal distribution of mountain goats in the Terror Lake study area, Alaska, 1982-1985 combined.

<u>Drainage</u>	<u>Winter</u>	<u>Spring</u>	<u>Summer</u> ^a
Kizhuyak	38 (8%)	171 (19%)	136 (18%)
Terror/Uganik	15 (3%)	129 (15%)	112 (15%)
Ugak	<u>399</u> (88%)	<u>579</u> (66%)	<u>491</u> (66%)
TOTAL	452	879	739

a - Terror/Uganik drainages were not surveyed in summer 1984, therefore, no summer 1984 data are included in this summary.

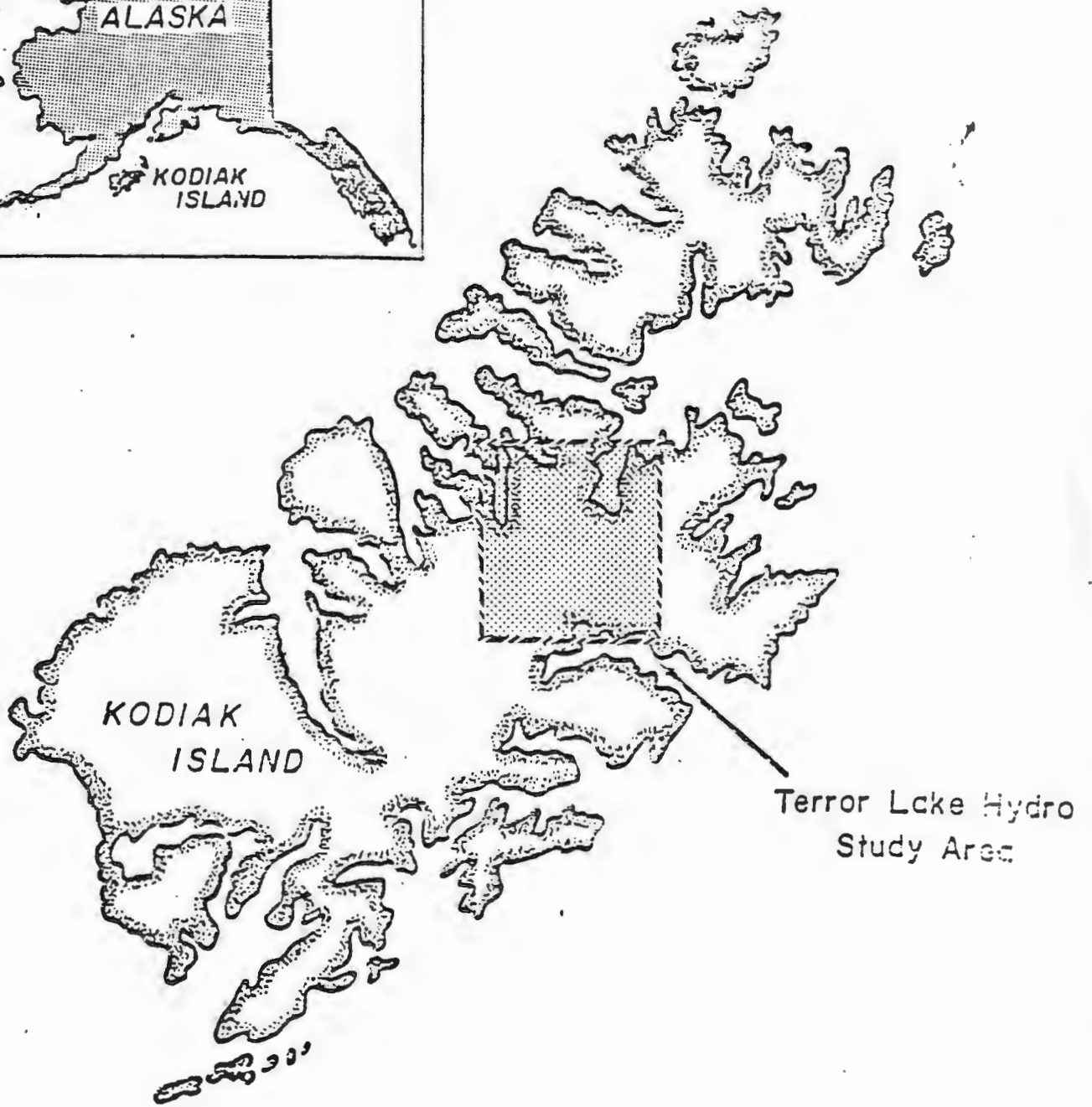
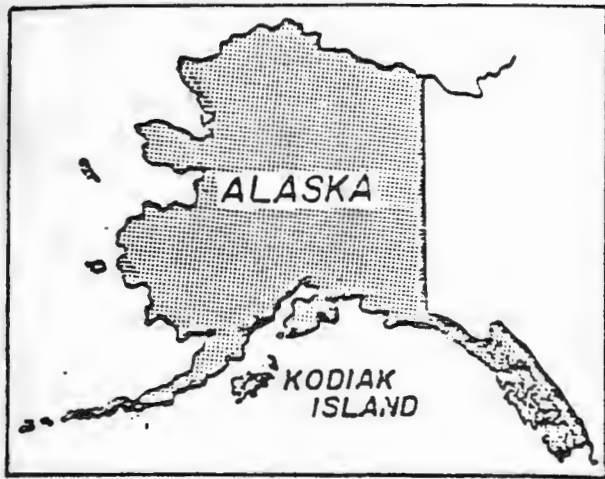


Figure 1. Location of the Terror Lake Hydroelectric Project study area, Kodiak, Alaska.

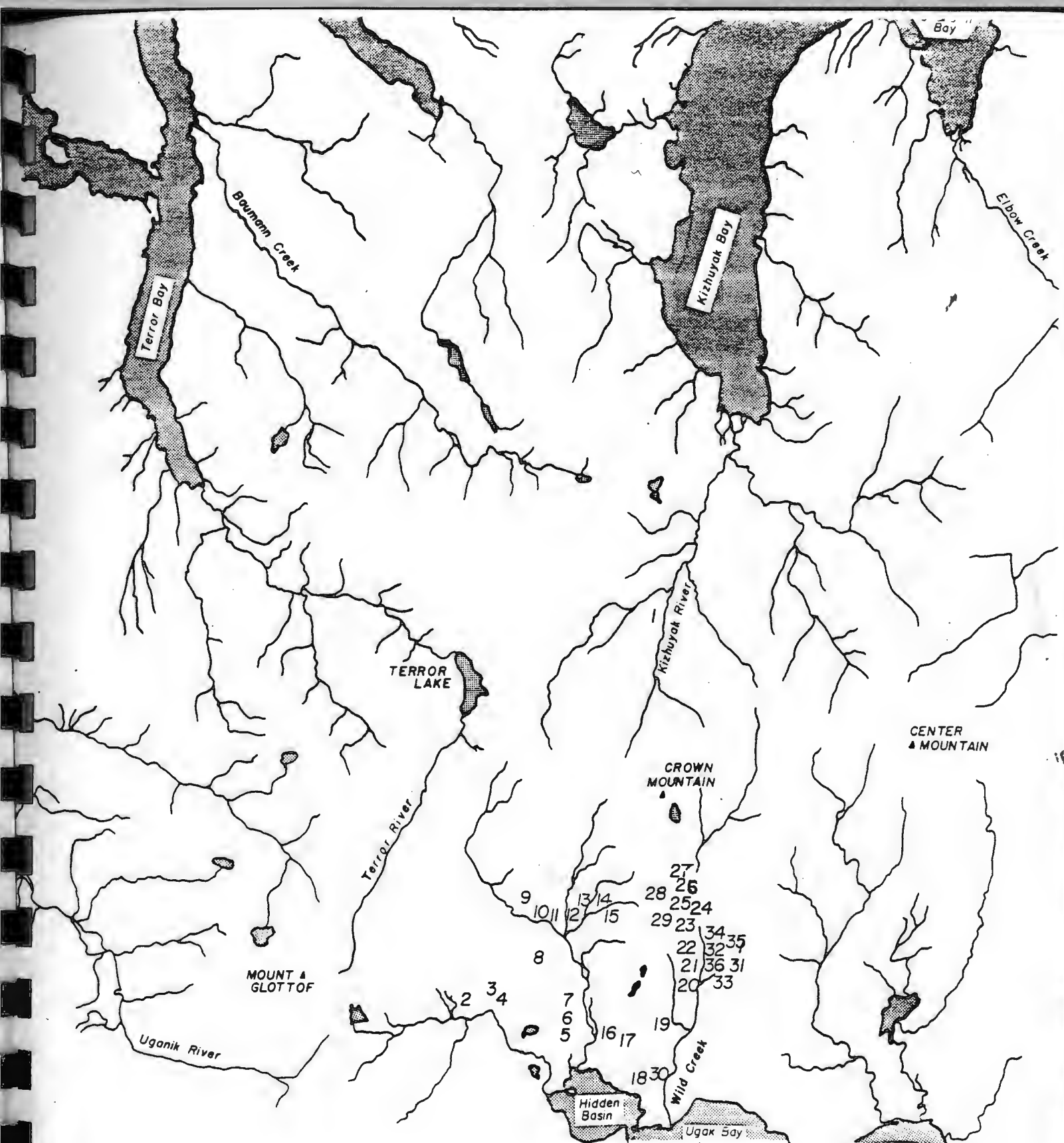


Fig. 2. Locations of mountain goat observations from an aerial survey of winter distribution in the Terror Lake study area, Kodiak, Alaska, on 13, 16 March 1985.

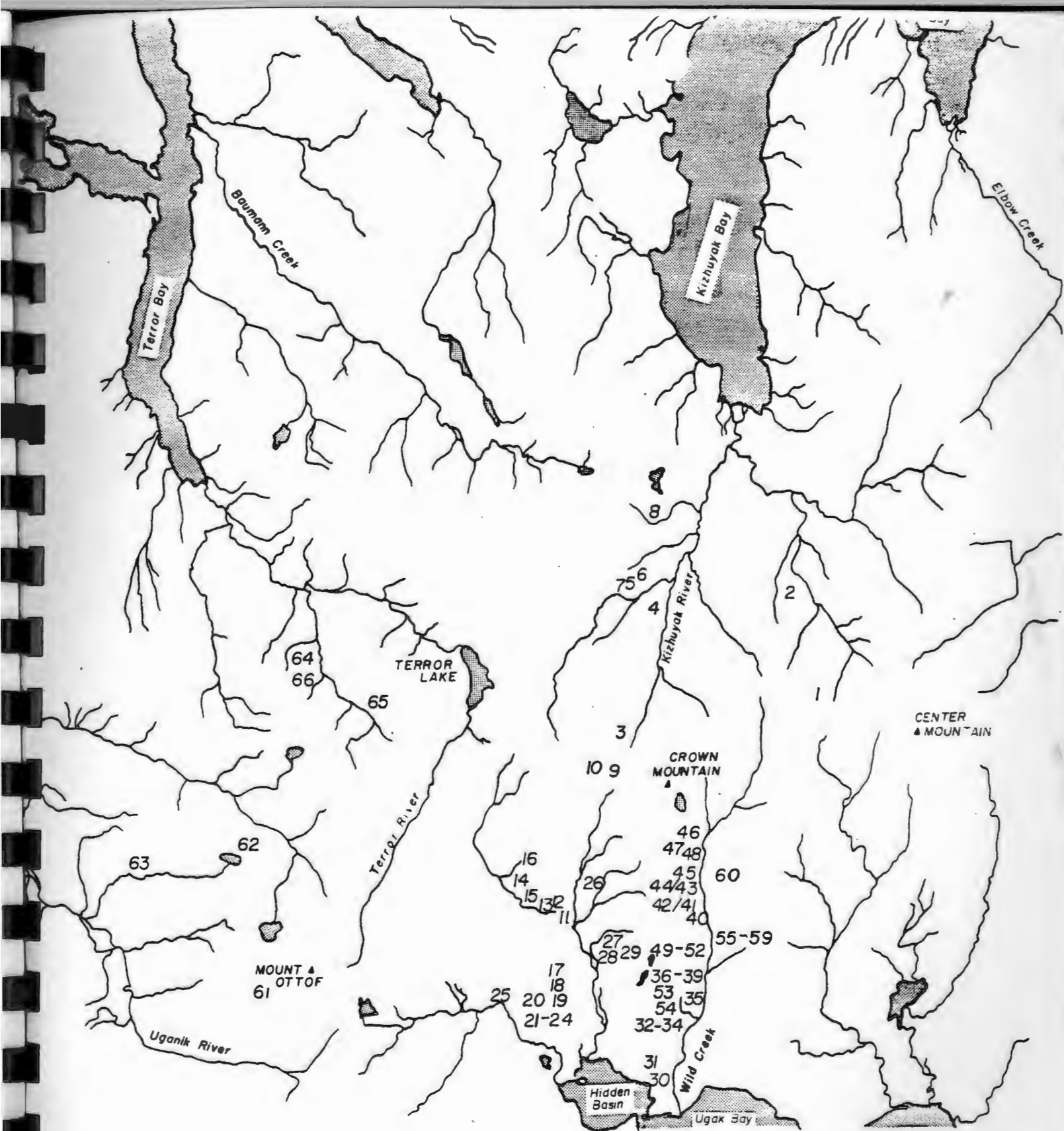


Fig. 3. Locations of mountain goat observations from an aerial survey of post-kidding distribution in the Terror Lake study area, Kodiak Alaska, on 12 and 19 June 1985.

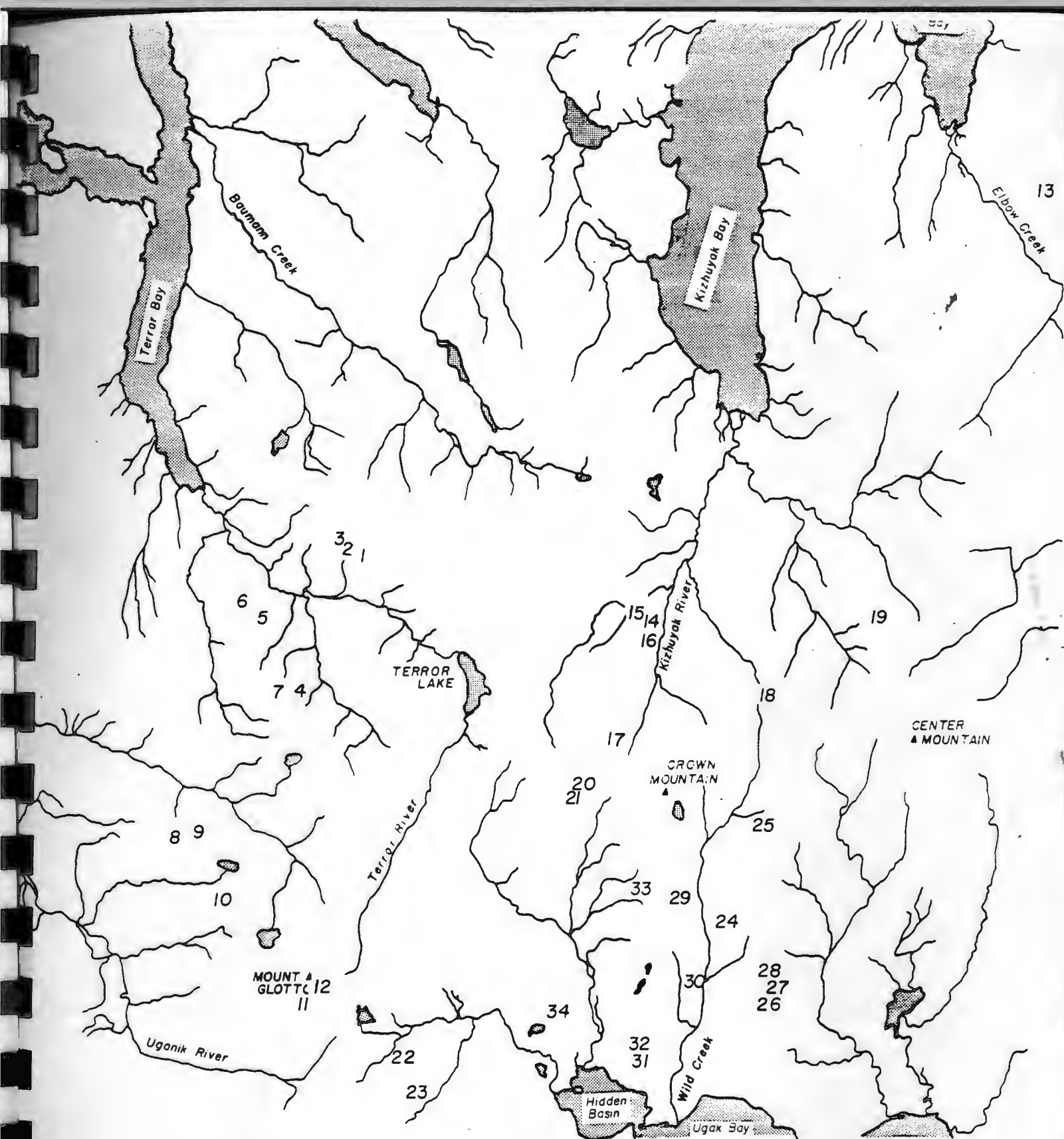


Fig. 4. Locations of mountain goat observations from an aerial survey of summer distribution in the Terror Lake study area, Kodiak, Alaska, on 26, 27 August and 6 September 1985.