

RESOURCE USE AREAS IN THE ANIAK
AND OSKAWALIK RIVER DRAINAGES

by
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Abstract

The Department of Natural Resources has proposed to include three remote parcels in the central Kuskokwim area in the State Land Disposal Program. Two are located on the Oskawalik River; one is located on the Aniak River. The land disposal sites are located in and near areas used by the residents of Aniak, Chuathbaluk, Crooked Creek and Sleetmute for subsistence activities.

These villages were visited between 5 July and 6 August 1982 in order to document subsistence use areas. Land use areas along the Aniak and Oskawalik river drainages were mapped during interviews with residents. Resources procured from these areas and times of year at which they are harvested were recorded. Use areas for hunting, trapping, fishing and gathering within the Aniak and Oskawalik river drainages have been compiled and mapped in relation to the land disposal sites. Potential impacts of the land disposals on subsistence users and resources are discussed.

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Introduction

This study was initiated in response to state land disposals west of the Alaska Range proposed by the Department of Natural Resources. State lands have been nominated for disposal along the Aniak and Oskawalik rivers in the central Kuskokwim River area. Three remote parcels have been proposed for these drainages. The Aniak River remote includes 25 five-acre parcels. Twenty parcels of up to 30 acres each may be made available in the Canoe remote. The Henderson Mountain remote would open 1,000 acres of land in lots of up to 40 acres each. These remote parcels are scheduled for disposal in fiscal year 1984.

A hearing on the proposed land disposals was held in Aniak on 2 June 1982. Local residents strongly opposed the plan stating that they would not benefit from it and that it might have a negative impact on their communities. The Aniak and Oskawalik rivers are used by residents of Aniak, Chuathbaluk, Crooked Creek and Sleetzute for subsistence pursuits. Preliminary data suggest that a subsistence-based economy predominates in these middle Kuskokwim villages where there is a low cash flow and limited access to commercially produced goods (Stickney 1981). The Aniak and Oskawalik river drainages reportedly are rich in fish and game resources and valued as areas for harvest by local people. The Department of Natural Resources has received little information from local residents and agencies on this aspect of land use in the central Kuskokwim.

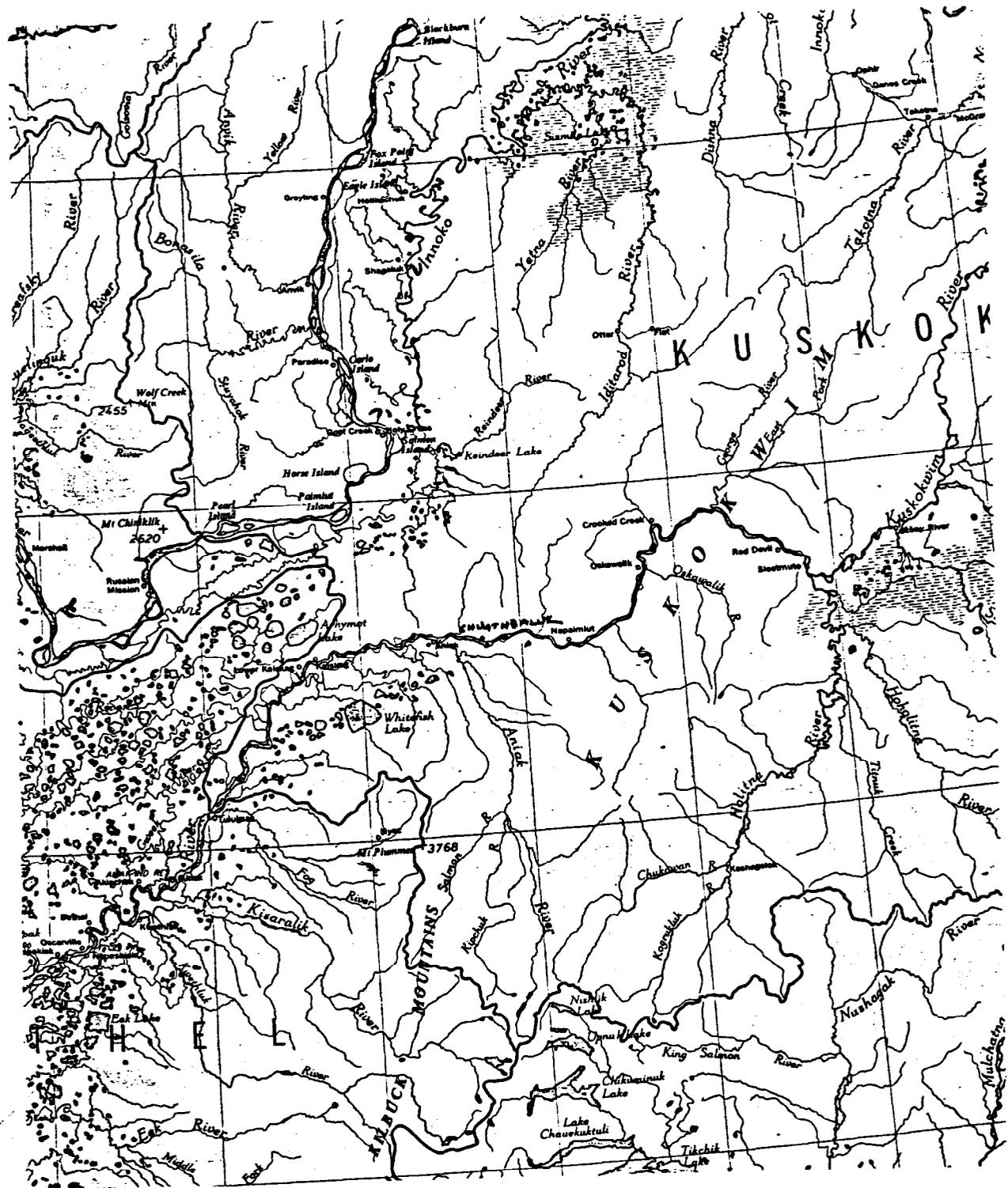


Figure 1. The Central Kuskokwim River Region

Purpose

The purpose of this report is to document use of the Aniak and Oskawalik river drainages by residents of Aniak, Chuathbaluk, Crooked Creek and Sleetmute. Places where people go for fishing, hunting, trapping, and berry-picking activities are depicted on accompanying maps. The potential impacts of state land disposals along these rivers, as indicated from mapped land use patterns and information provided by local residents, are discussed.

Methodology

The field work for this study was conducted by two researchers from the Division of Subsistence, Alaska Department of Fish and Game -- Susan Charnley, Resource Specialist II and Raymond Peterson, Technician III. This work was done in conjunction with an ongoing, long-term research project on resource use activities in Chuathbaluk and Sleetmute. Mapping sessions and informal interviews took place in Aniak, Chuathbaluk, Crooked Creek and Sleetmute between 6 July and 5 August 1982.

A total of 60 individuals were interviewed from the four villages. This sample size represents the following percentages of households for each village: Aniak - 13.9; Chuathbaluk - 76.9; Crooked Creek - 60.0; Sleetmute - 16.7. Individual interviewees

were selected who were identified by community members as being from households that rely heavily on local fish and game resources in the areas of concern. With the exception of Aniak, the mapped data are thought to be fairly representative of land use patterns along the Aniak and Oskawalik river drainages for members of the villages involved in this study. An analysis of sample size is provided later.

Male heads of households were interviewed in each village and asked to respond to the four questions described below. Male heads of households were chosen because they were identified as being major participants in fishing, hunting and trapping activities. During interviews, household heads were questioned concerning the extent to which other members of their households utilized these river drainages. Other members of the household were interviewed if their land use areas appeared to differ from those of the household head. An attempt was made to interview the head of every household in each village, unless the individual and his household were identified as not using the Aniak or Oskawalik river drainages for resource use purposes. Residents of Aniak and Chuathbaluk were asked to describe the use of fish, game, and plant resources along the Aniak River. Residents of Chuathbaluk, Crooked Creek and Sleetmute were asked to describe resource use along the Oskawalik River.

The mapping methodology followed was that used in the Inuit Land Use and Occupancy Project (Freeman 1975) as modified by the Division of Subsistence (Wolfe 1982). Resource use areas were

mapped for individuals using U.S. Geological Survey 1:63,360 topographic maps with mylar overlays. Several individuals mapped onto one overlay. Composite maps showing fishing, hunting, trapping, and berry-picking areas by village were drawn up from the individual maps and transferred to xerox reductions of USGS 1:250,000 topographic maps. General areas where people go to hunt, trap, fish, and berry-pick were mapped, as opposed to mapping discrete locations where a resource was procured by an individual at a specific time.

The following research questions were asked of village residents:

1. What fish, game, or plant resources do you obtain from the Aniak or Oskawalik River systems?
2. At what times of year do you travel there to obtain these resources?
3. Where have you carried out resource use activities in the affected areas, both recently and in your lifetime? (map these)
4. How important is this area to you for subsistence purposes?

Use areas were mapped for six resource categories: moose, black and brown bear, caribou, furbearers (including beaver, red fox, lynx, marten, mink, land otter, wolf, and wolverine), non-salmon fish species (including several species of whitefish, sheefish, Dolly Varden, grayling, rainbow trout and pike), and berries (including salmon, blue and black berries, and high and low bush cranberries). Other resources are obtained along the Aniak

and Oskawalik rivers in addition to these, including waterfowl, ptarmigan, grouse, porcupine, hare, squirrel, muskrat and salmon species. Due to time constraints, the places where people go to obtain these resources were not mapped.

The resource use areas on each map represent current use patterns of uncertain time depth. The original intention was to distinguish between areas where people had gone to conduct resource use activities during the past five years and areas where they went prior to that. However, this time distinction proved to be arbitrary and non-meaningful to respondents. It became apparent during interviews that individuals were using similar areas during the past five years as they had before that. Portions of each area may not be visited every year by a particular user, but areas are used over the span of several years. In summary, the maps represent current and past land use patterns combined, with an as yet undetermined time depth.

Sample Size

The sample size of persons and households interviewed are shown in Table 1. Village population estimates derive from the 1980 United States Federal Census. Estimated number of households are derived from listings provided by the Itinerant Nurse program of the U.S. Public Health Service, Bethel, and modified by key respondents familiar with village residents.

The village of Aniak is composed of approximately 122

Table 1
Sample Interviewed

	1980 Population	Estimated Number of Households	Persons Interviewed	Households Interviewed
Aniak	341	122	17 (5.0)	17 (13.9)
Chuathbaluk	106	26	22 (20.7)	20 (76.9)
Crooked Creek	108	20	14 (13.0)	12 (60.0)
Sleetmute	107	24	7 (6.5)	4 (16.7)

households, with an average household size of 2.8. Only 17 heads of household were interviewed at Aniak. Had all of the active subsistence users from Aniak been interviewed, a much more complete map showing land use areas would have been drawn. The data presented here show minimum land use areas for the residents of Aniak.

There are 26 households in Chuathbaluk, with an average household size of 4.1. Twenty-two persons were interviewed here, representing 20 households. Of these, 13 persons made use of the Oskawalik River, 17 made use of the Aniak River, with 8 persons using both river systems for resource harvest purposes. Individuals not interviewed were out of the village during the mapping period. The data presented here are based on a 76.9 percent sample of households. Of the four communities, these maps may show the most complete picture of land use along the Aniak and Oskawalik river drainages by residents of a village.

Crooked Creek is composed of 20 households, with an average of 5.4 persons per household. Fourteen persons were interviewed, representing 12 households. The 60 percent household sample size is believed to be fairly representative of the land use patterns of Crooked Creek residents along the Oskawalik river.

There are 24 households in Sleetmute, with an average household size of 4.5. Seven persons, representing 4 households, were found to have used the Oskawalik River for harvesting resources. According to key respondents at Sleetmute, most residents apparently use the Holitna and Hoholitna river drainages when

conducting resource harvest activities.

Qualifiers

It is important to note that fishing, hunting, trapping and gathering for domestic use along the Aniak and Oskawalik rivers are not limited to residents of Aniak, Chuathbaluk, Crooked Creek and Sleetmute. Residents of Lower Kalskag and Upper Kalskag make use of the Aniak River system. People from the lower Kuskokwim villages and Bethel also use the Aniak and Oskawalik river systems for obtaining resources, most notably for purposes of moose hunting. Due to time constraints, information for this report was gathered only from those villages nearest to the Aniak and Oskawalik rivers, and which as a consequence may be more heavily impacted by possible land disposals. Therefore, the data here represent minimum land use areas and intensity of use information.

It should also be noted that areas where the residents of Aniak, Chuathbaluk, Crooked Creek and Sleetmute fish, hunt, trap and gather are not limited to the Aniak and Oskawalik river drainages. Only those land use areas with the closest proximity to the land disposal sites were documented.

Findings

A variety of fish and wildlife are harvested along both the Aniak and Oskawalik rivers. Because of ecological similarities

between these river systems, similar resources occur within both drainages. The list of resources and time of year at which they are harvested in both areas is presented in Figure 2.

The maps which follow present land use areas for each river drainage by resource category and by village. Four categories of resources are separately mapped: (1) trapping areas; (2) moose hunting areas; (3) bear and caribou hunting areas; (4) fishing and berry-picking areas. On the maps which show caribou and bear hunting areas, black bear and brown bear areas are combined. The land disposal sites on each river are outlined with a heavy black line to show their locations in relationship to areas where people hunt, trap, fish, and pick berries. The Aniak River is shown on two separate pages, due to its length and the desire to present the data on maps at a meaningful scale.

Map 1 is a composite of use areas of individual interviewed residents of Aniak, Chuathbaluk, Crooked Creek and Sleetmute at a scale of 1:2,000,000. It provides a general summary of use areas within the Aniak and Oskawalik river drainages presented in Maps 2 to 28. It should be noted that on the base maps Chuathbaluk is called Little Russian Mission.

The use areas within the Aniak River drainage of residents of Aniak are shown in Maps 2 to 8. Chuathbaluk residents' use areas along the Aniak River are depicted in Maps 9 to 16, and within the Oskawalik River drainage vicinity in maps 17 to 20. The use areas within the Oskawalik River drainage vicinity of residents of Crooked Creek are shown in Maps 21 to 24. Sleetmute residents' use areas within the Oskawalik River drainage vicinity are depicted in Maps 25 to 28.

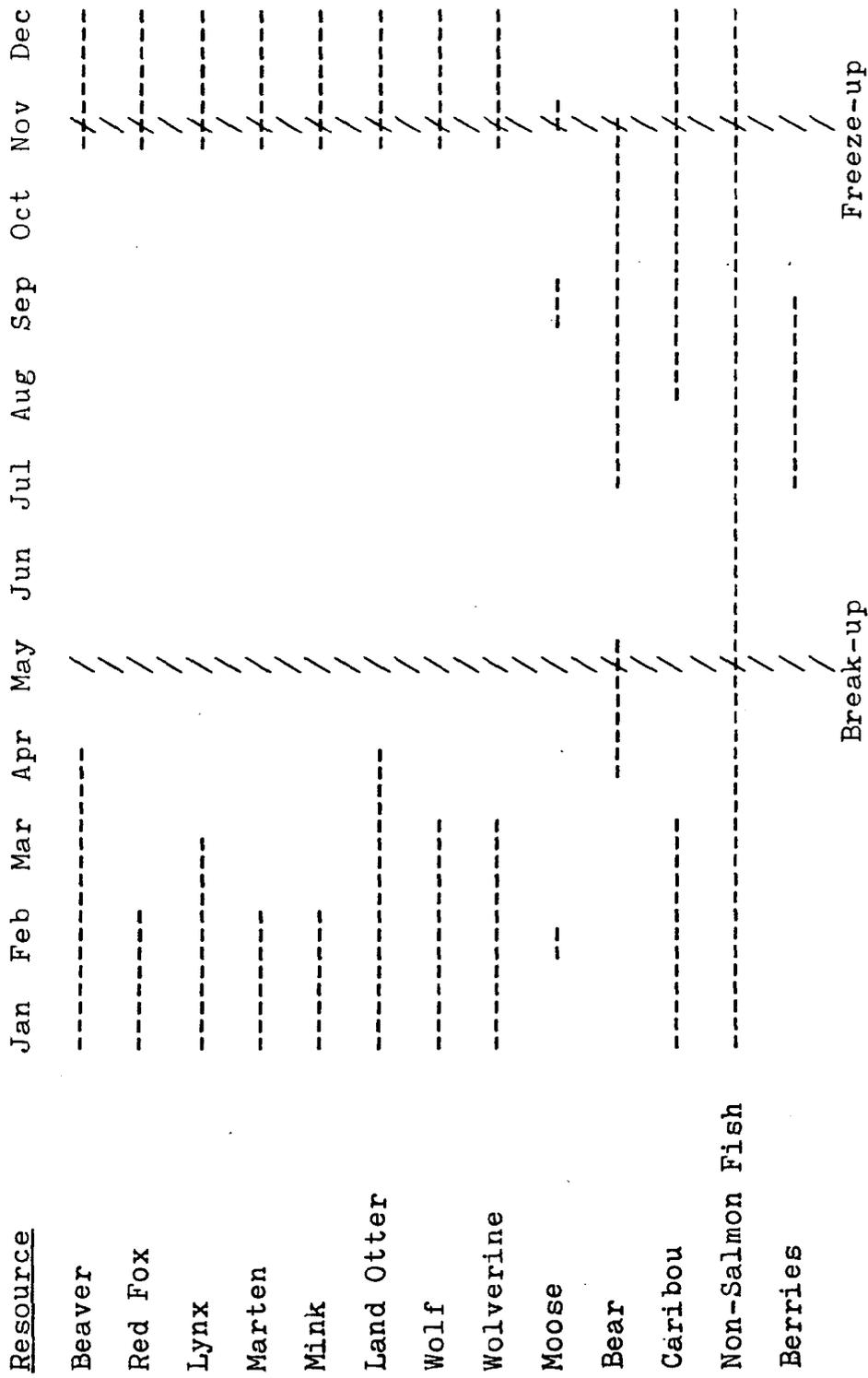
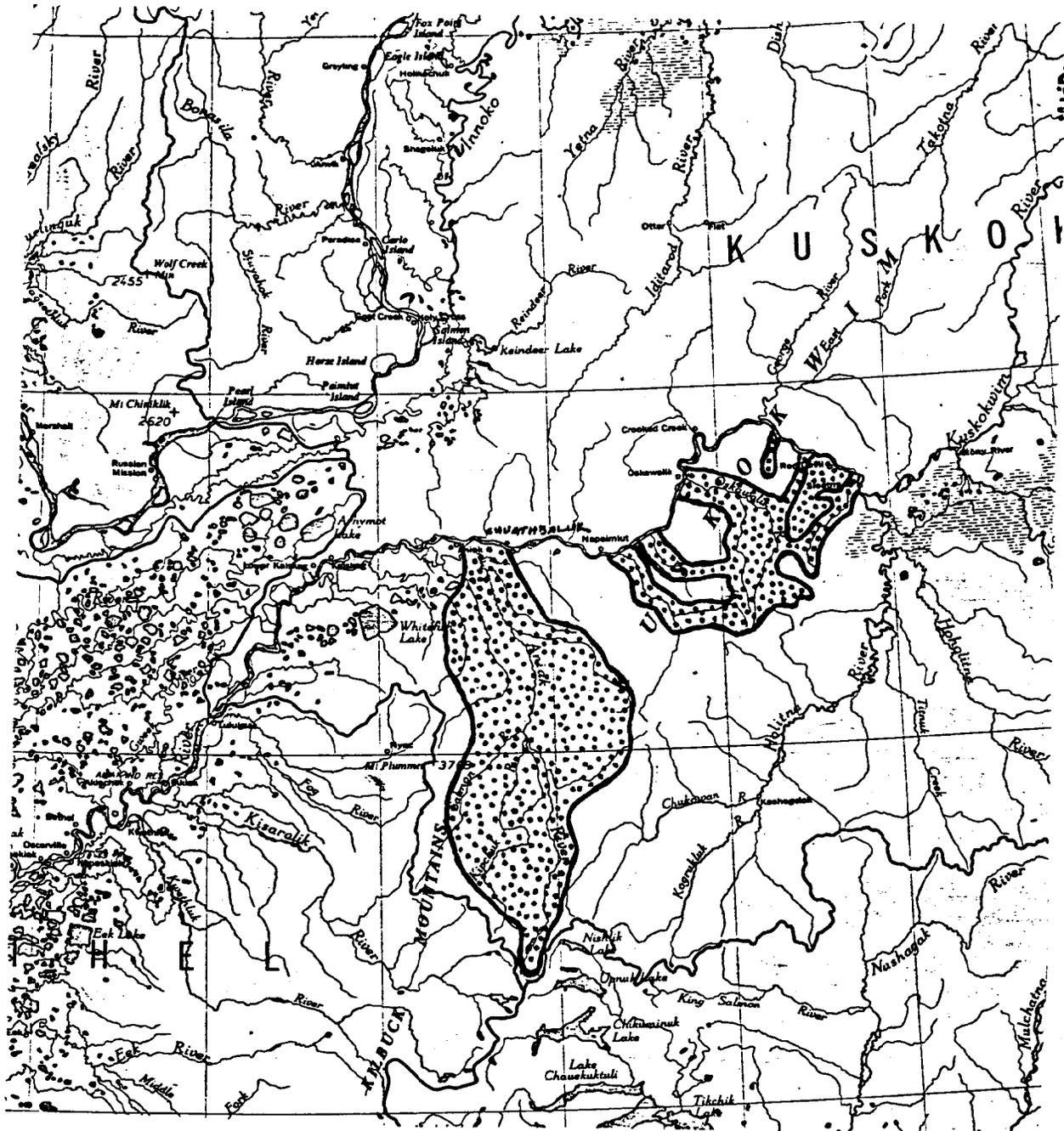


Figure 2. Resources Harvested within the Aniak and Oskawalik River Drainages, by Time of Year



Map 1. Composite of Resource Use Areas within the Aniak and Oskawalik River Drainages of Residents of Aniak, Chuathbaluk, Crooked Creek, and Sleetmute (n=60). See text for explanation.



-- Resource Use Areas

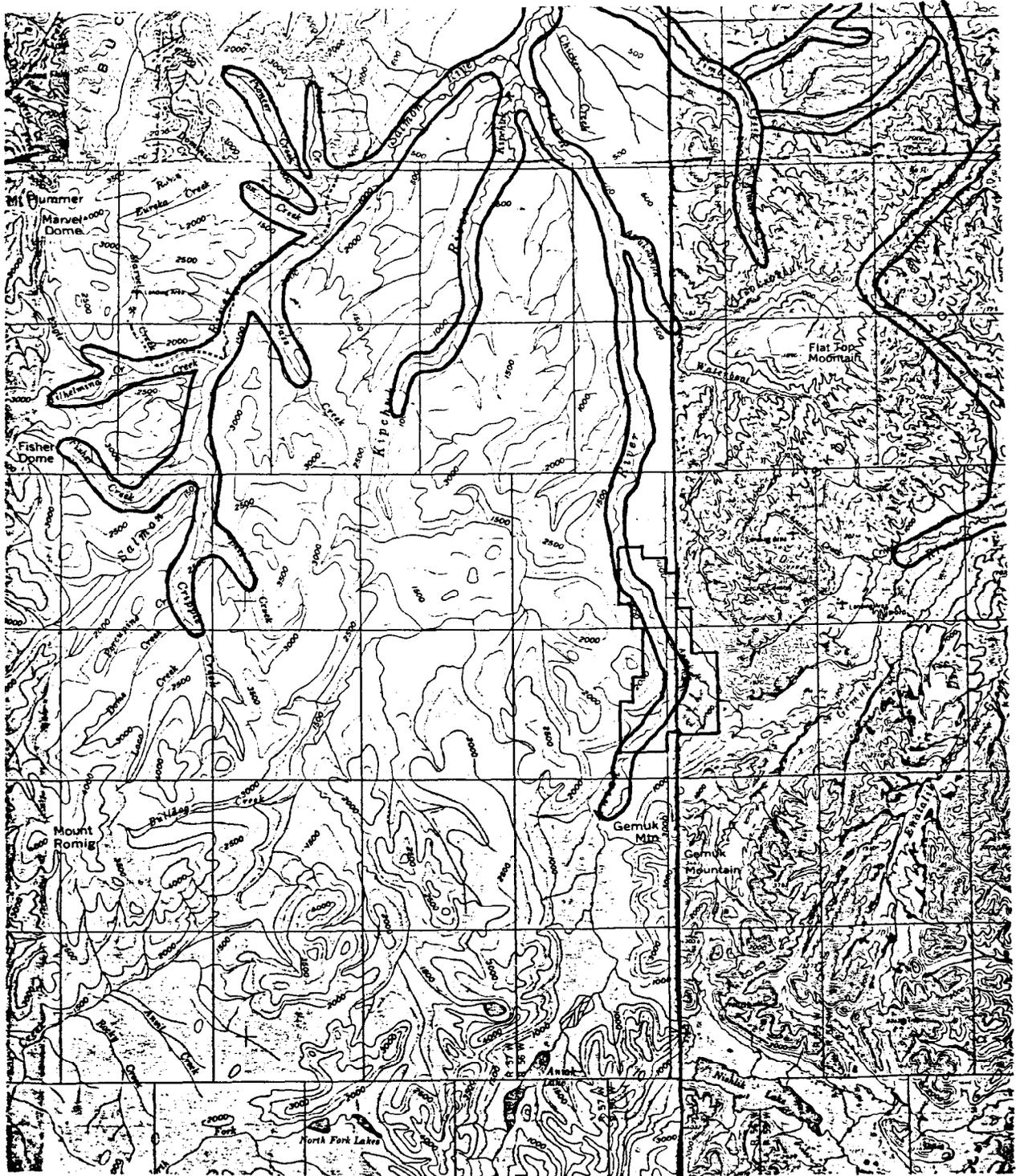
Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



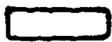
Map 2. Furbearer Harvest Areas within the Aniak River Drainage of Residents of Aniak (n=17)

— Furbearer Harvest Areas

Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



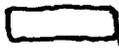
Map 3. Furbearer Harvest Areas within the Aniak River Drainage of Residents of Aniak (n=17)

 -- Furbearer Harvest Areas

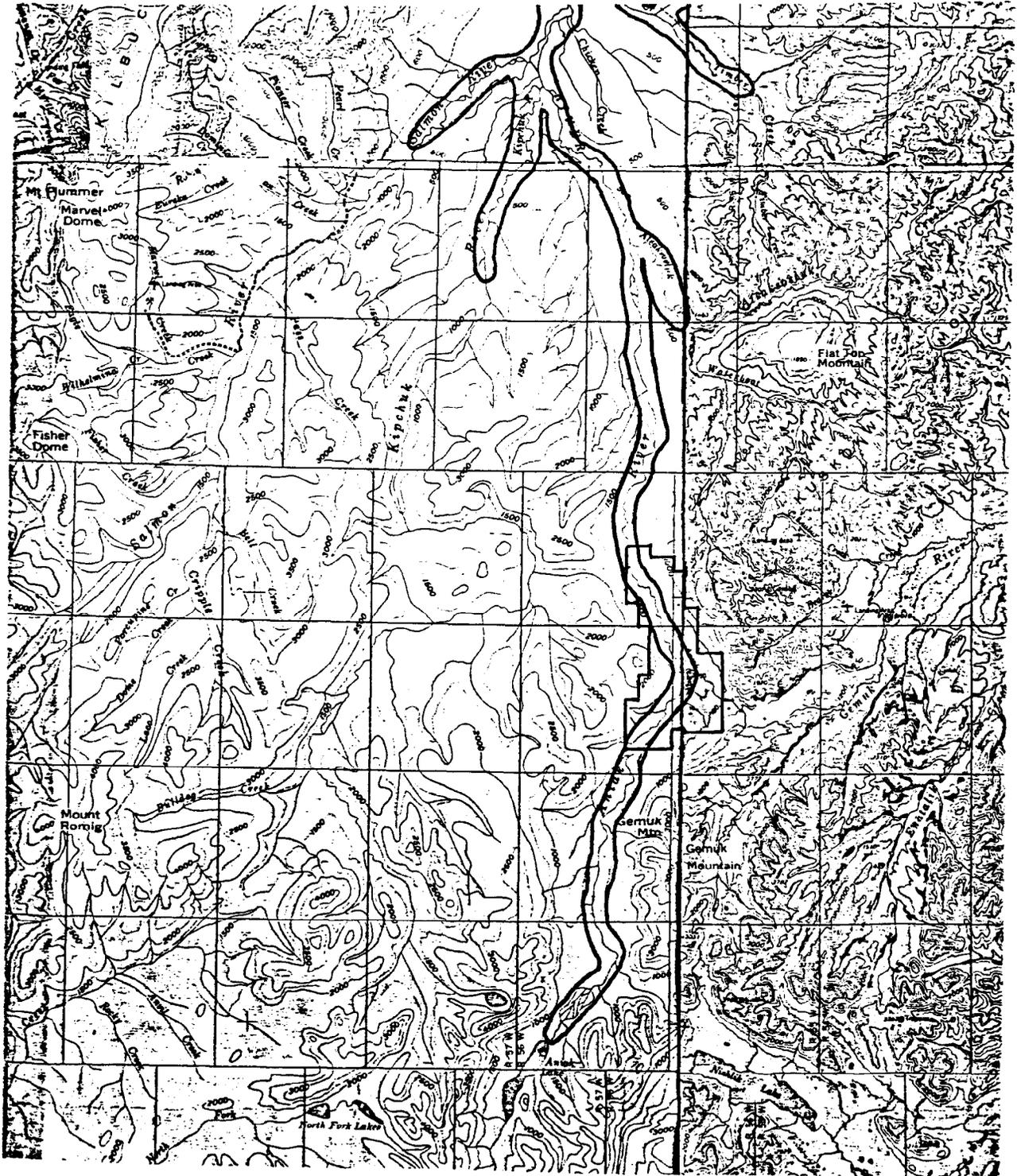
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Map 4. Moose Hunting Areas within the Aniak River Drainage of Residents of Aniak (n=17)

 -- Moose Hunting Areas

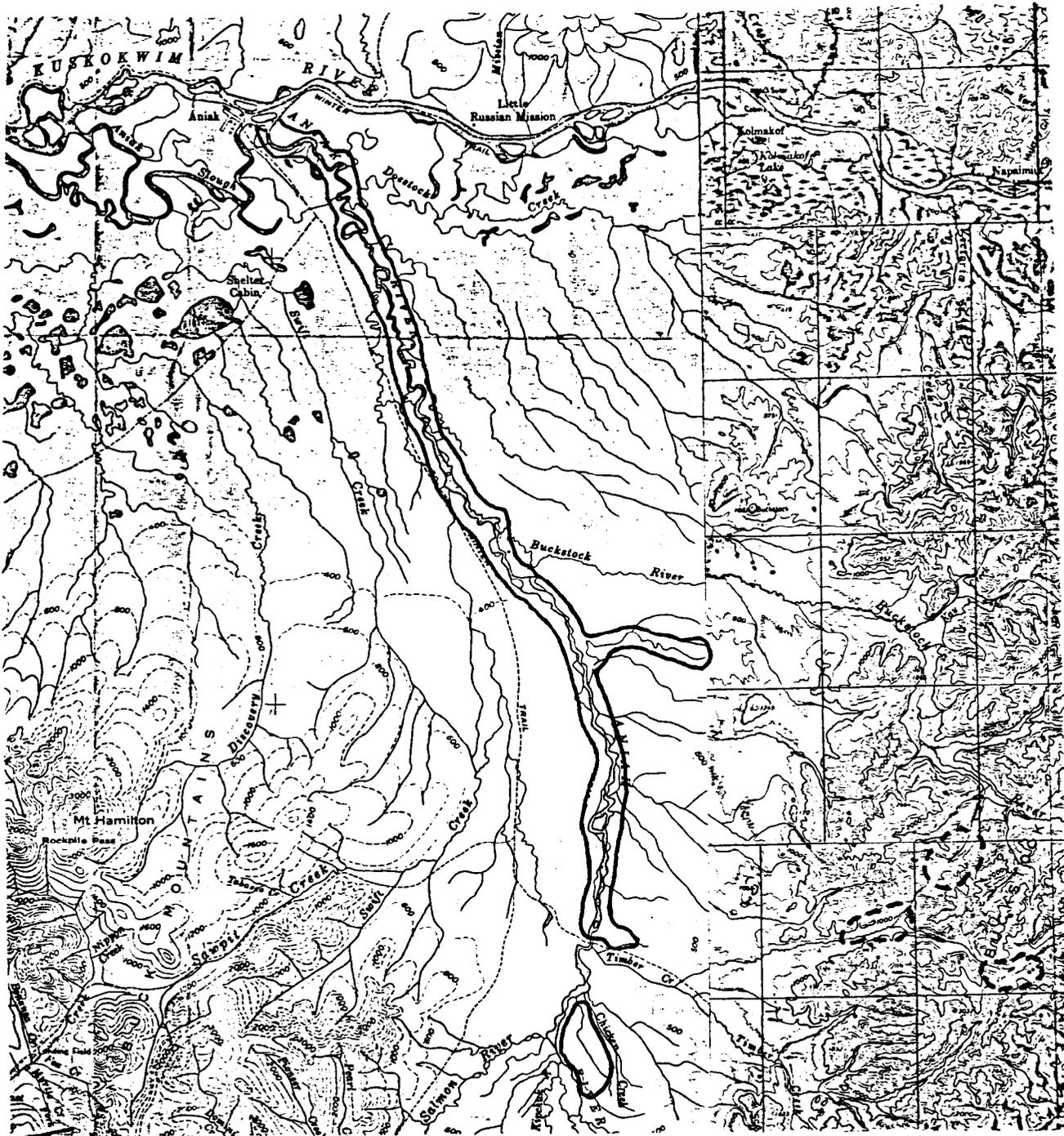
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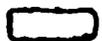
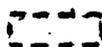
Map 5. Moose Hunting Areas within the Aniak River Drainage of Residents of Aniak (n=17)

 -- Moose Hunting Areas

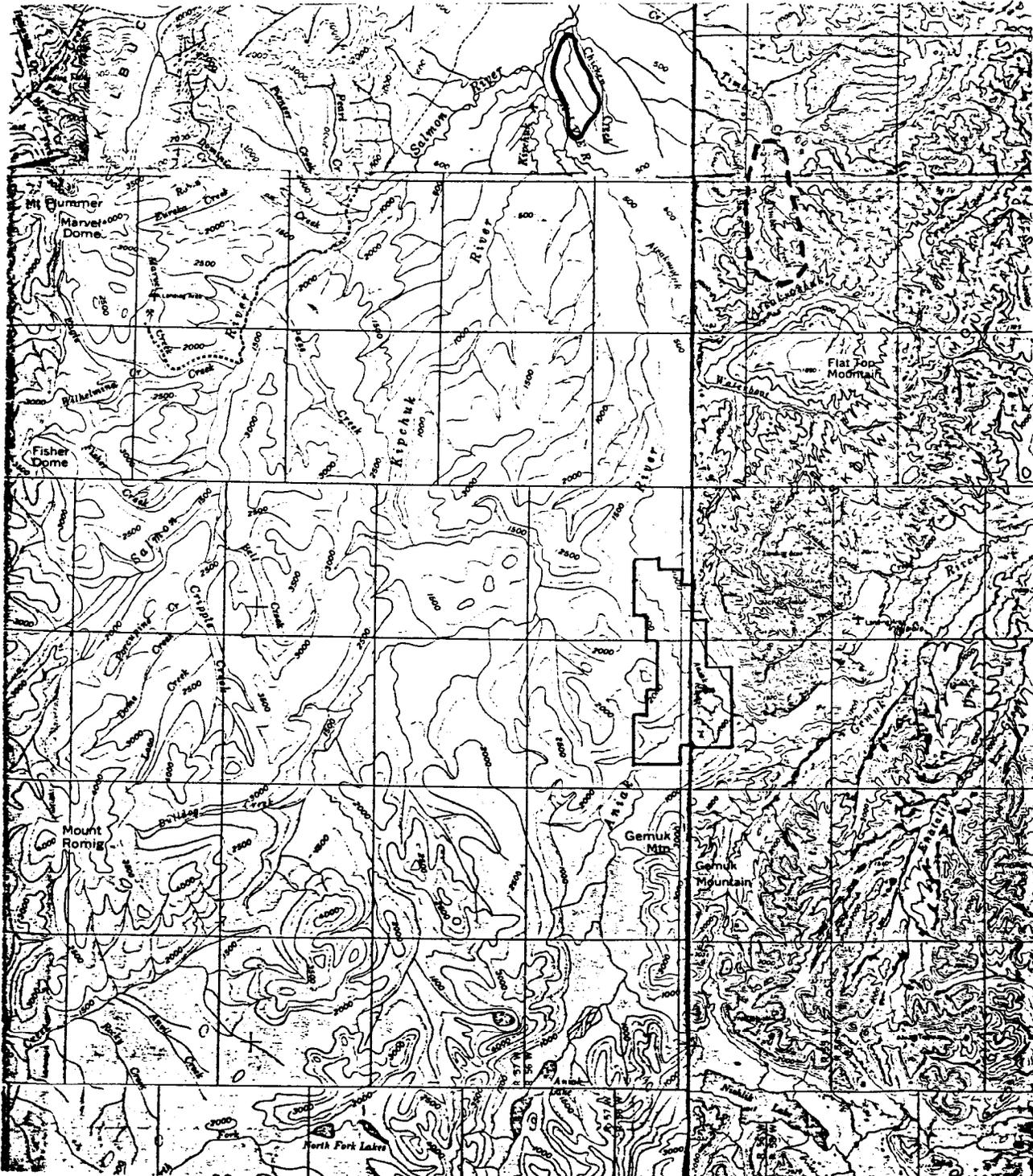
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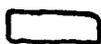
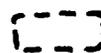
Map 6. Bear and Caribou Hunting Areas within the Aniak River Drainage of Residents of Aniak (n=17)

-  -- Bear Hunting Areas
-  -- Caribou Hunting Areas

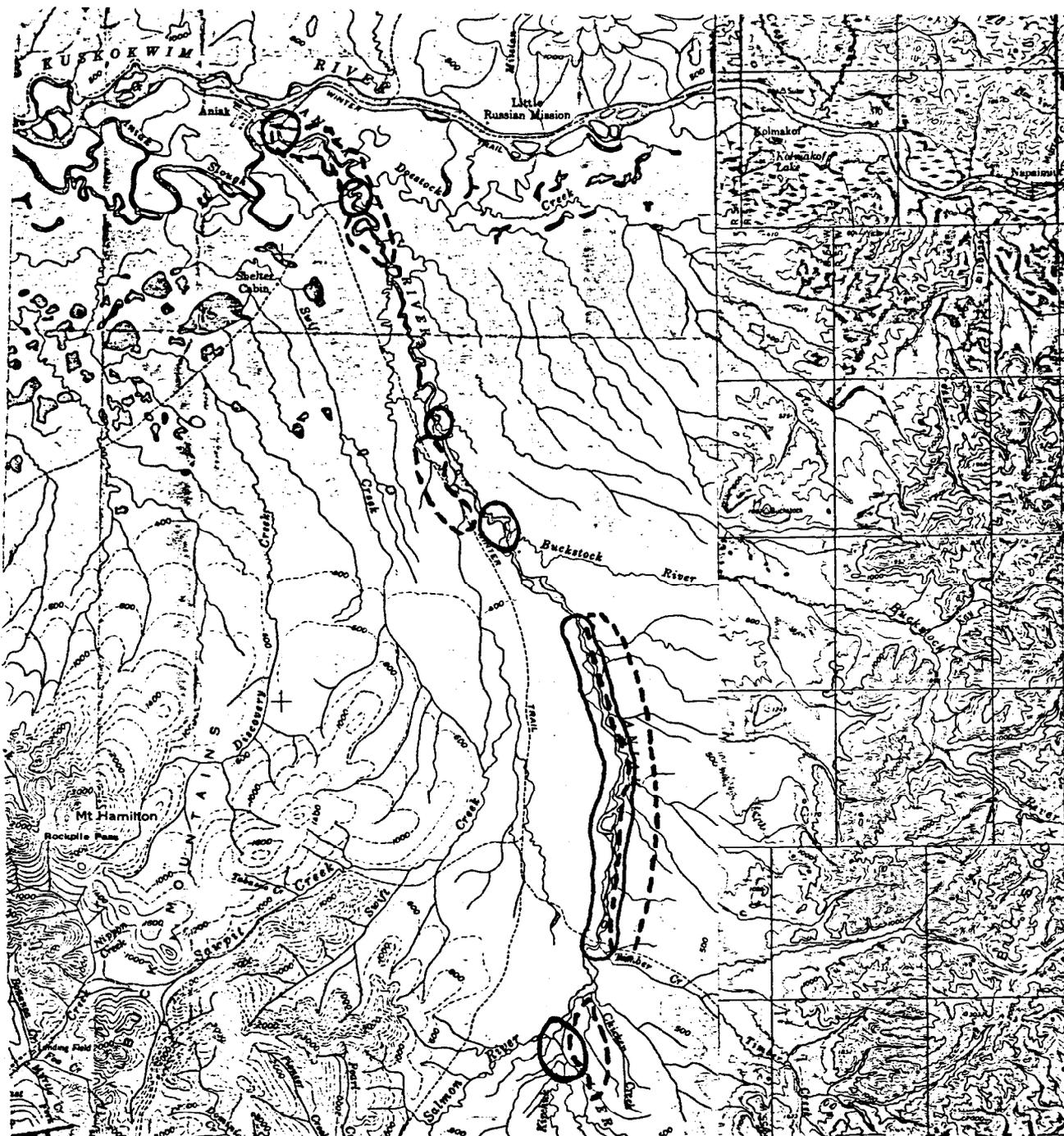
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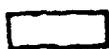
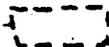
Map 7. Bear and Caribou Hunting Areas Within the Aniak River Drainage of Residents of Aniak (n=17)

-  -- Bear Hunting Areas
-  -- Caribou Hunting Areas

Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



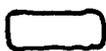
Map 8. Fishing and Berry Picking Areas within the Aniak River Drainage of Residents of Aniak (n=17)

-  -- Fishing Areas
-  -- Berry Picking Areas

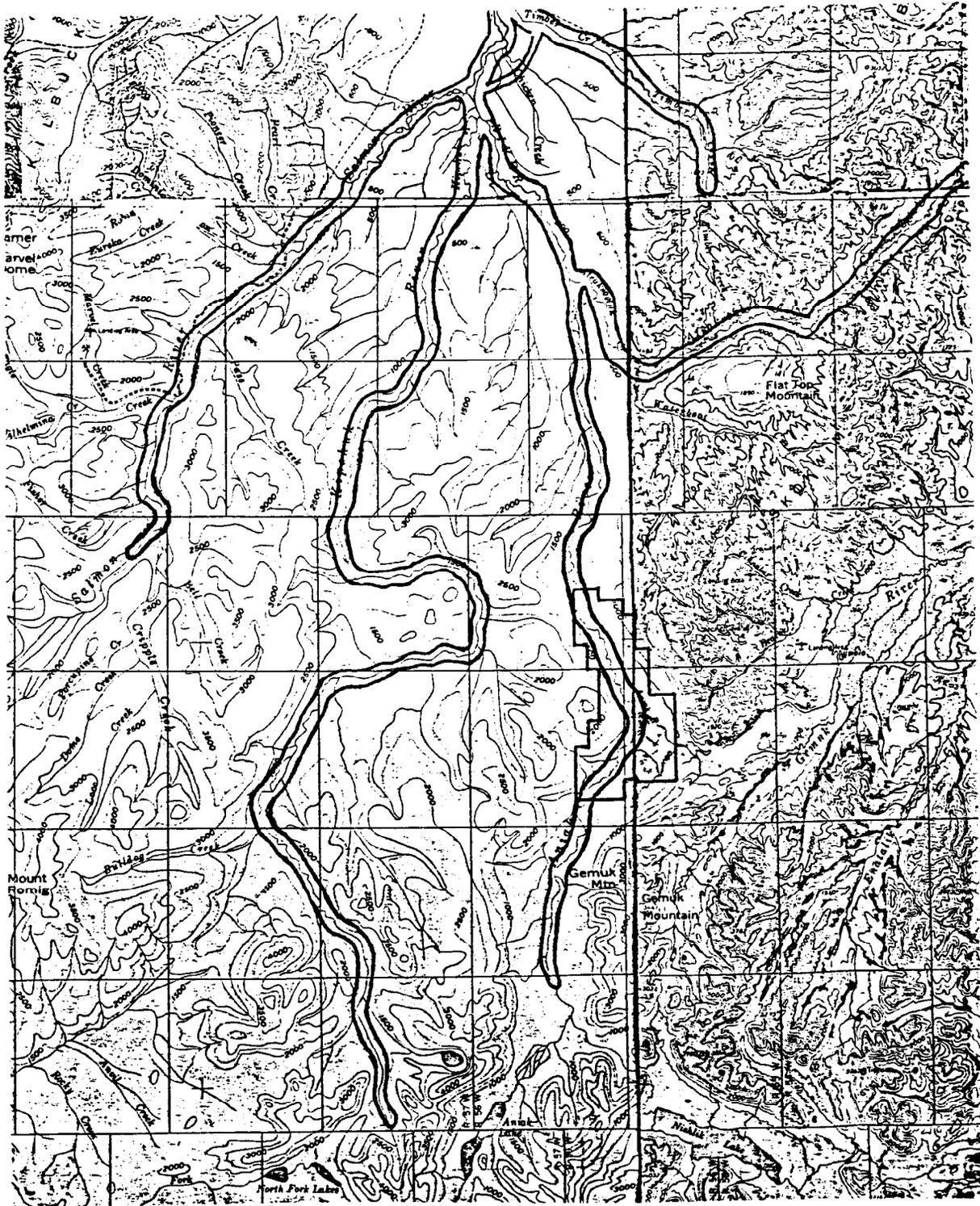
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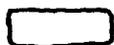
Map 9. Furbearer Harvest Areas within the Aniak River Drainage of Residents of Chuathbaluk (n=22)

 -- Furbearer Harvest Areas

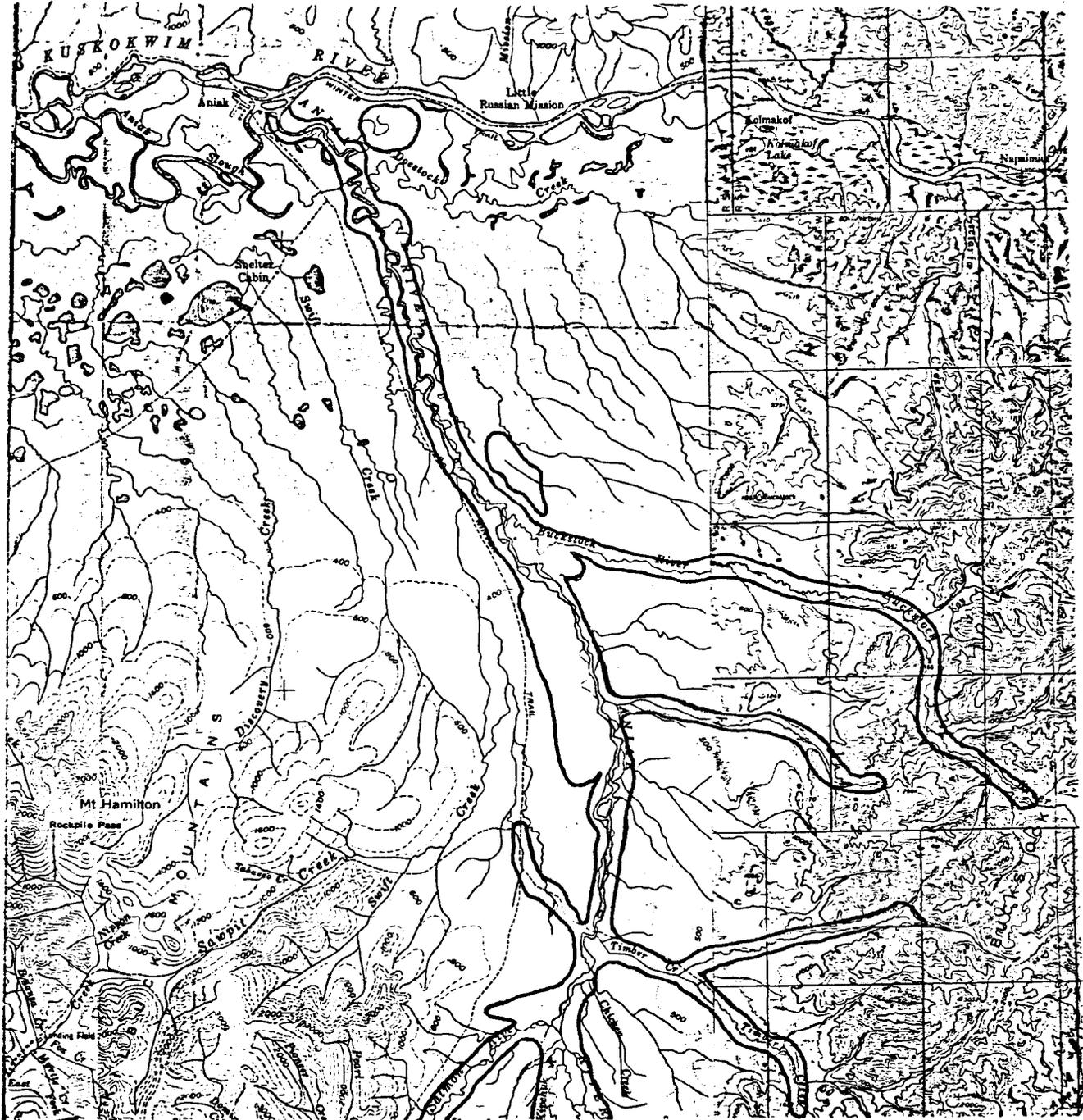
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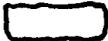
Map 10. Furbearer Harvest Areas within the Aniak River Drainage of Residents of Chuathbaluk (n=22)

 -- Furbearer Harvest Areas

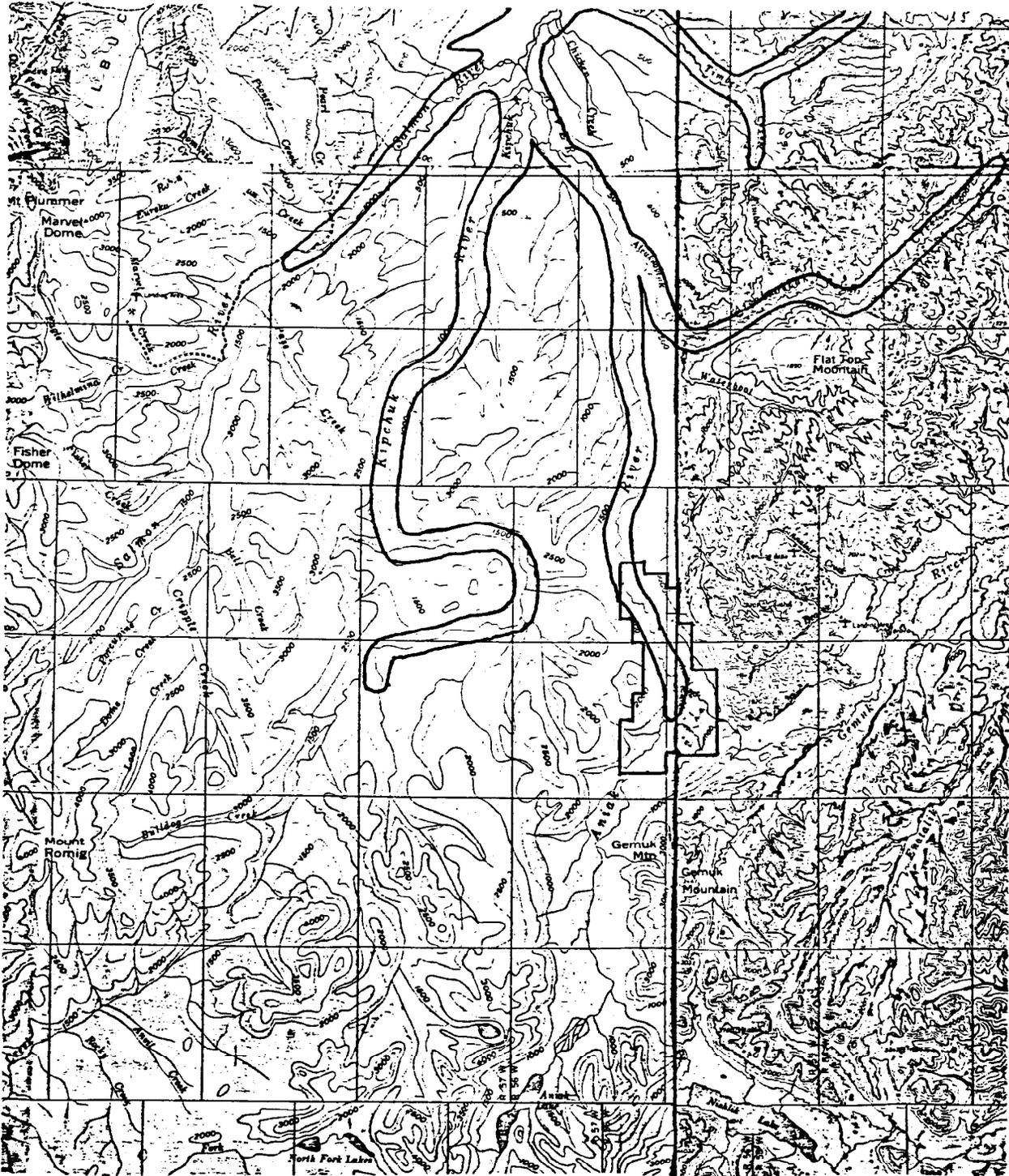
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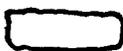
Map 11. Moose Hunting Areas within the Aniak River Drainage of Residents of Chuathbaluk (n=22)

 -- Moose Hunting Areas

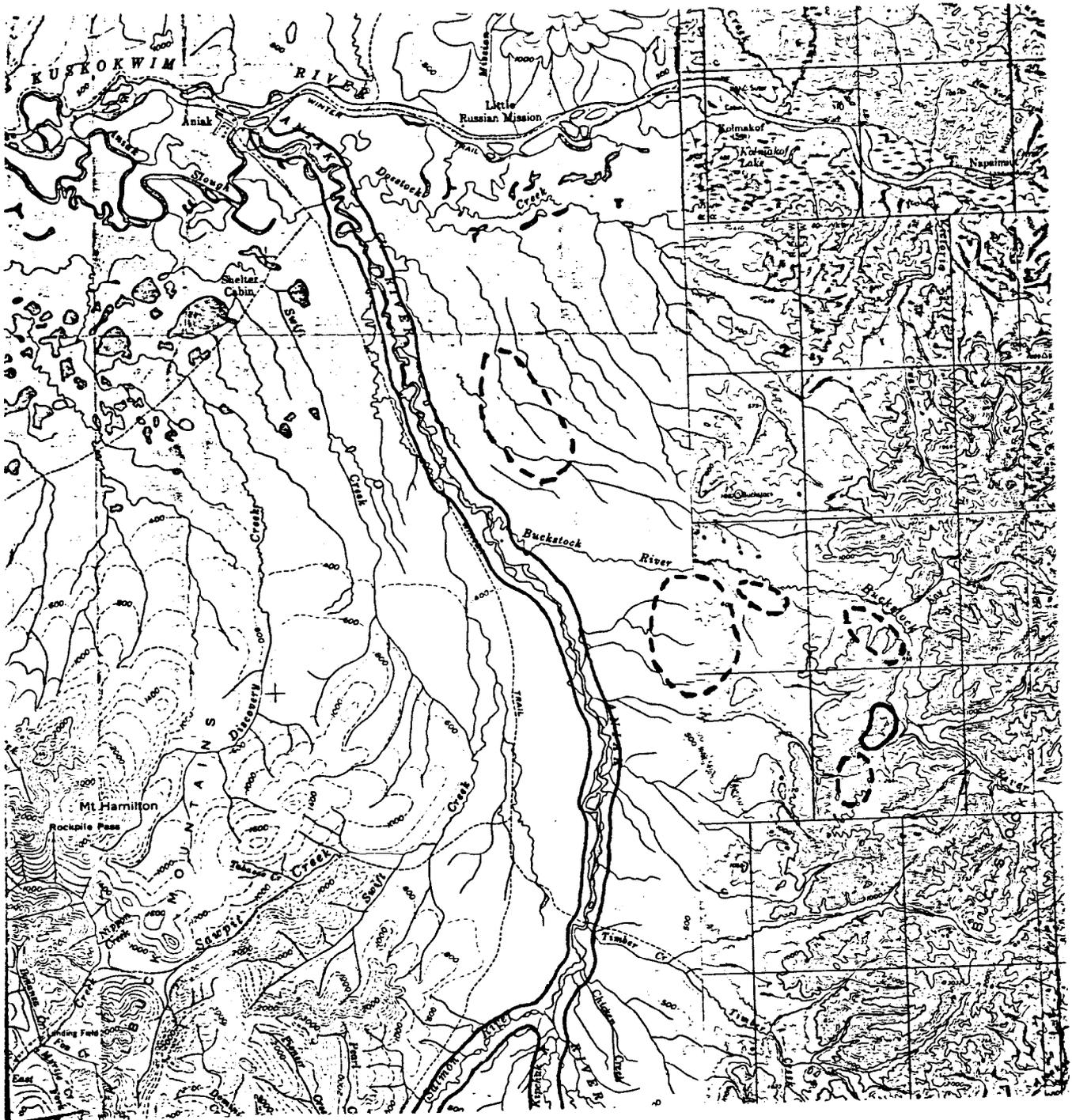
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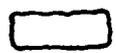
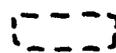
Map 12. Moose Hunting Areas within the Aniak River Drainage of Residents of Chuathbaluk (n=22)

 -- Moose Hunting Areas

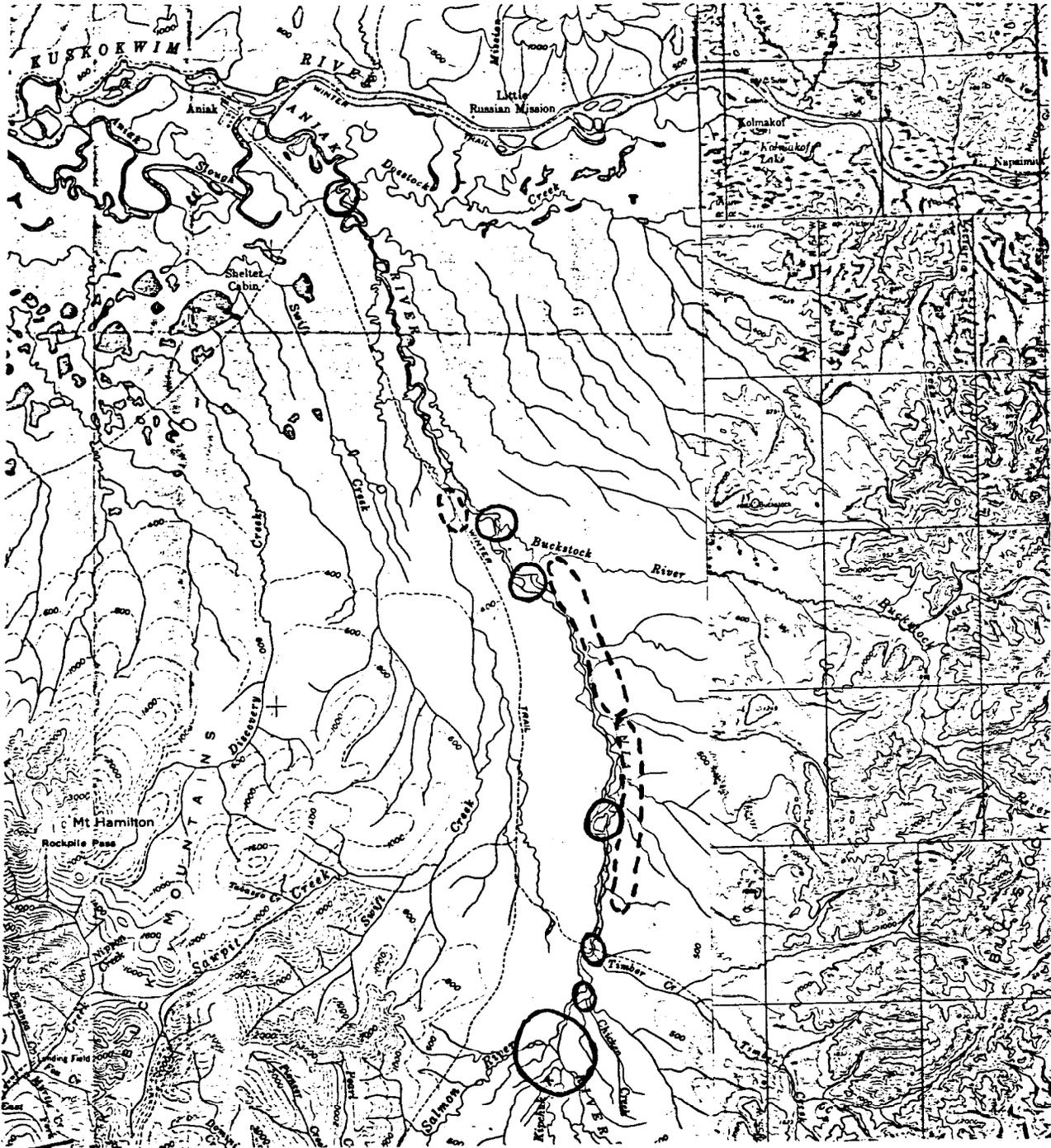
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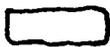
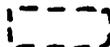
Map 13. Bear and Caribou Hunting Areas within the Aniak River Drainage of Residents of Chuathbaluk (n=22)

-  -- Bear Hunting Areas
-  -- Caribou Hunting Areas

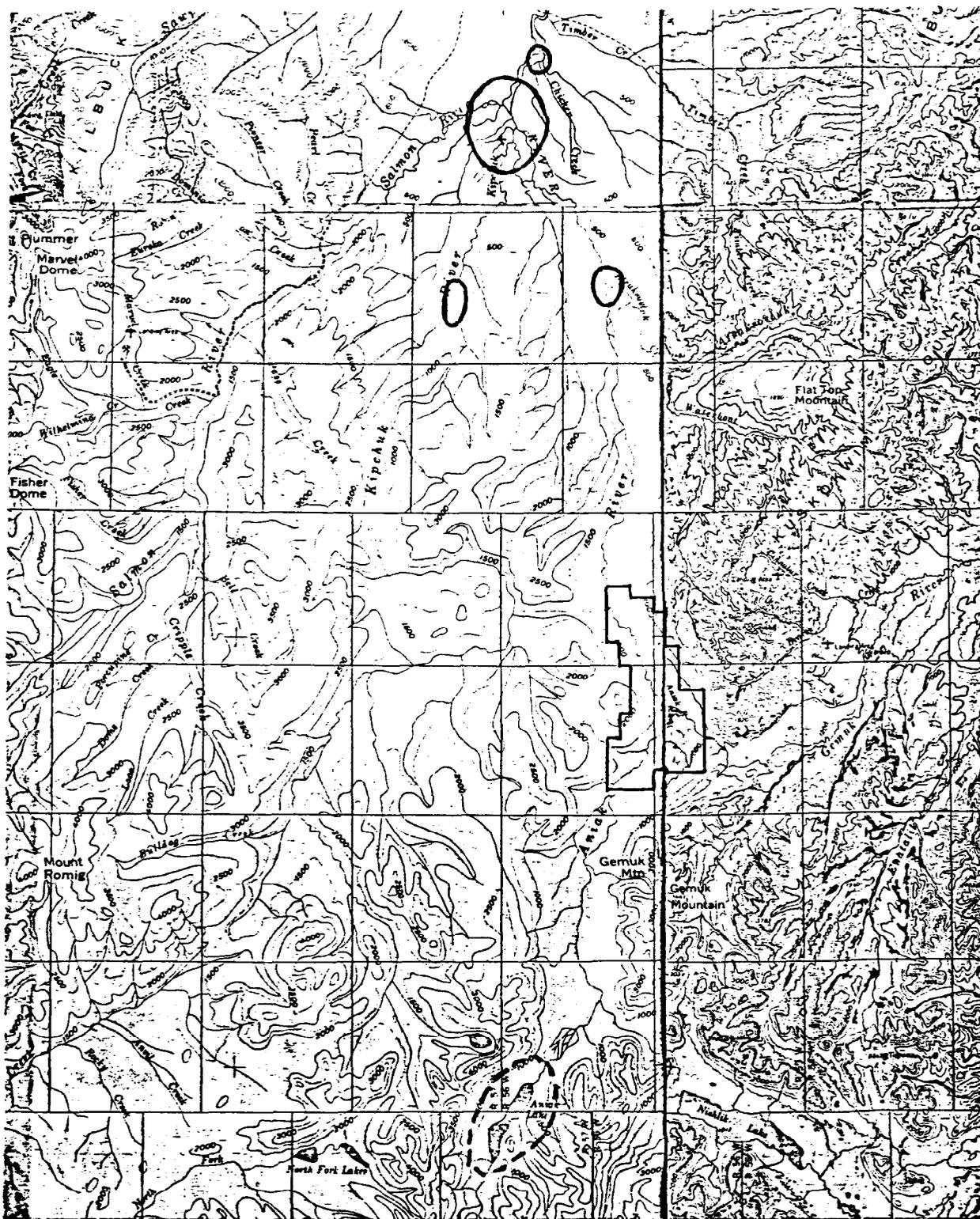
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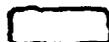
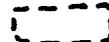
Map 15. Fishing and Berry Picking Areas within the Aniak River Drainage of Residents of Chuathbaluk (n=22)

-  -- Fishing Areas
-  -- Berry Picking Areas

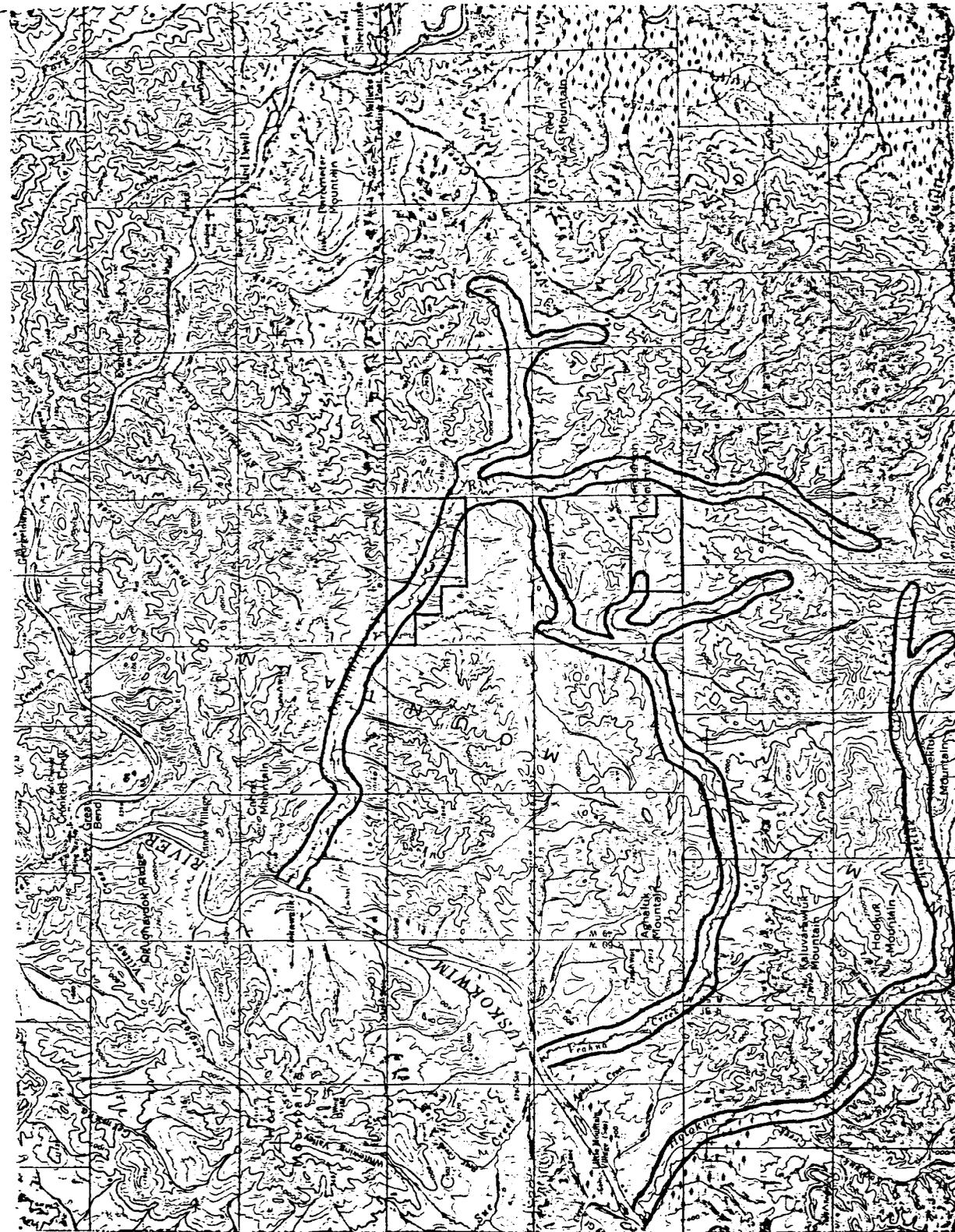
Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



Map 16. Fishing and Berry Picking Areas within the Aniak River Drainage of Residents of Chuathbaluk (n=22)

-  -- Fishing Areas
-  -- Berry Picking Areas

Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



Map 17. Furbearer Harvest Areas within the Oskwalik River Drainage Vicinity of Residents of Chuathbaluk (n=22)

--- Furbearer Harvest Areas

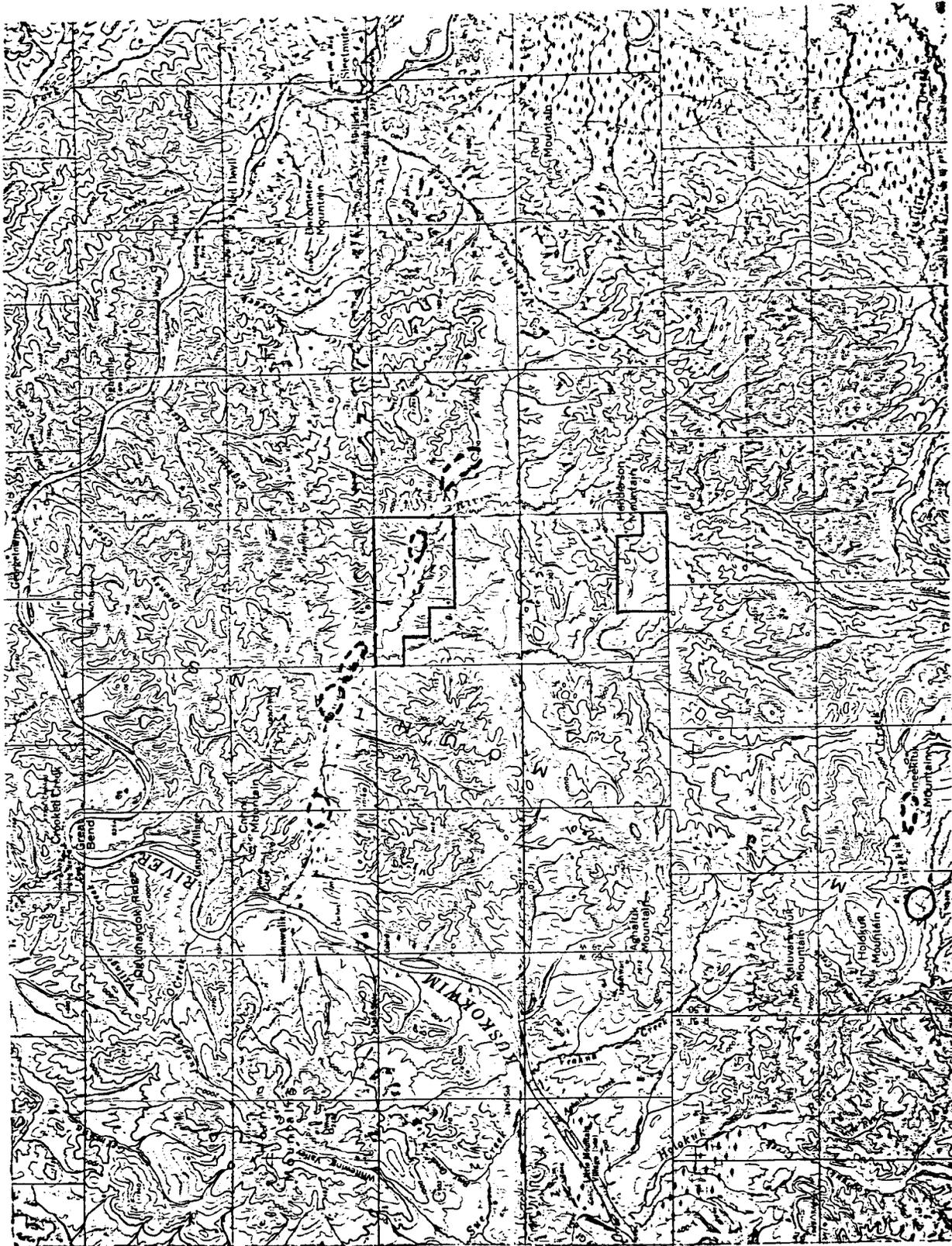
Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



Map 19. Bear and Caribou Hunting Areas within the Oskawalik River Drainage Vicinity of Residents of Chuathbaluk (n=22)

-  -- Bear Hunting Areas
-  -- Caribou Hunting Areas

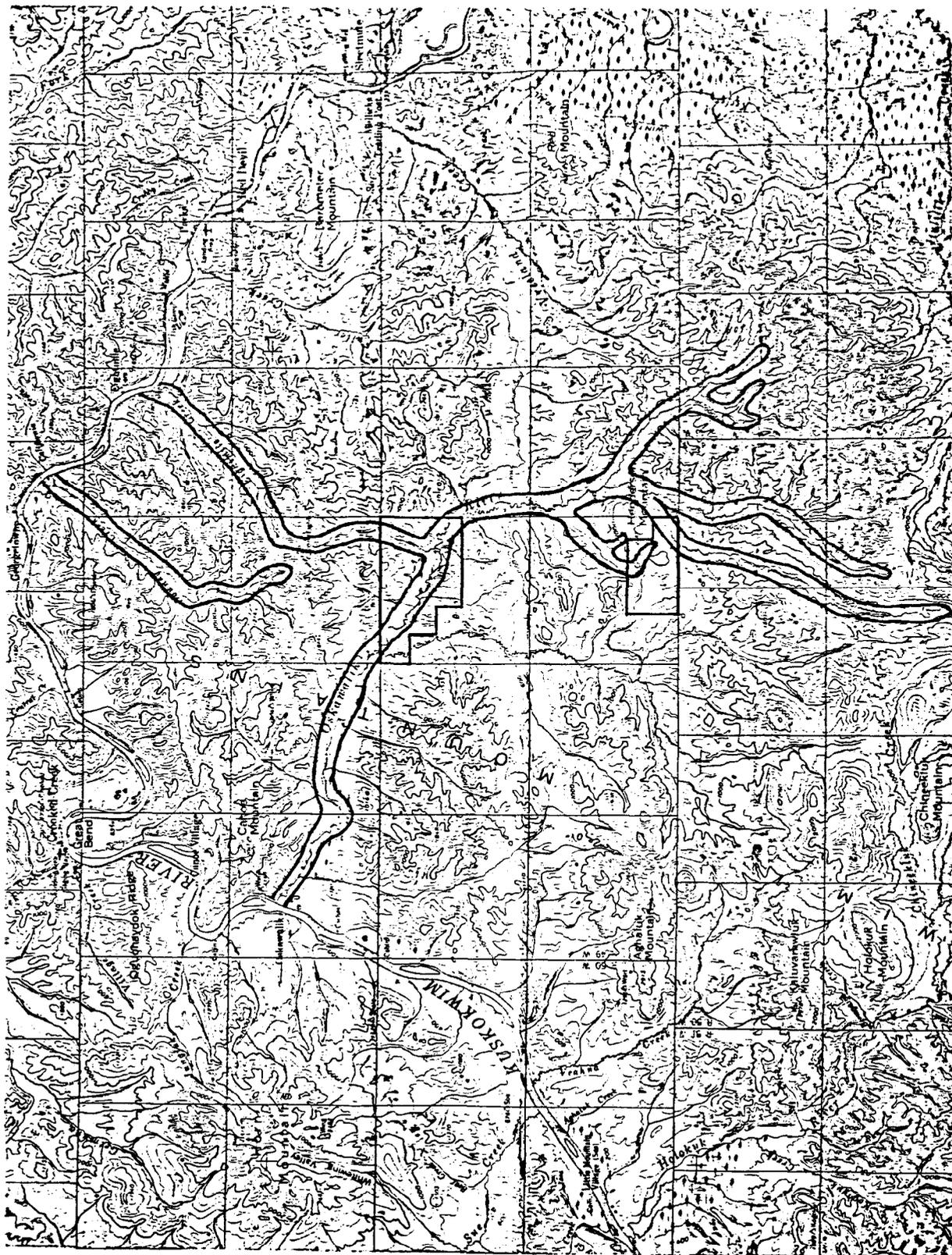
Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



Map 20. Fishing and Berry Picking Areas within the Oskawalik River Drainage Vicinity of Residents of Chuathbaluk (n=22)

-  -- Fishing Areas
-  -- Berry Picking Areas

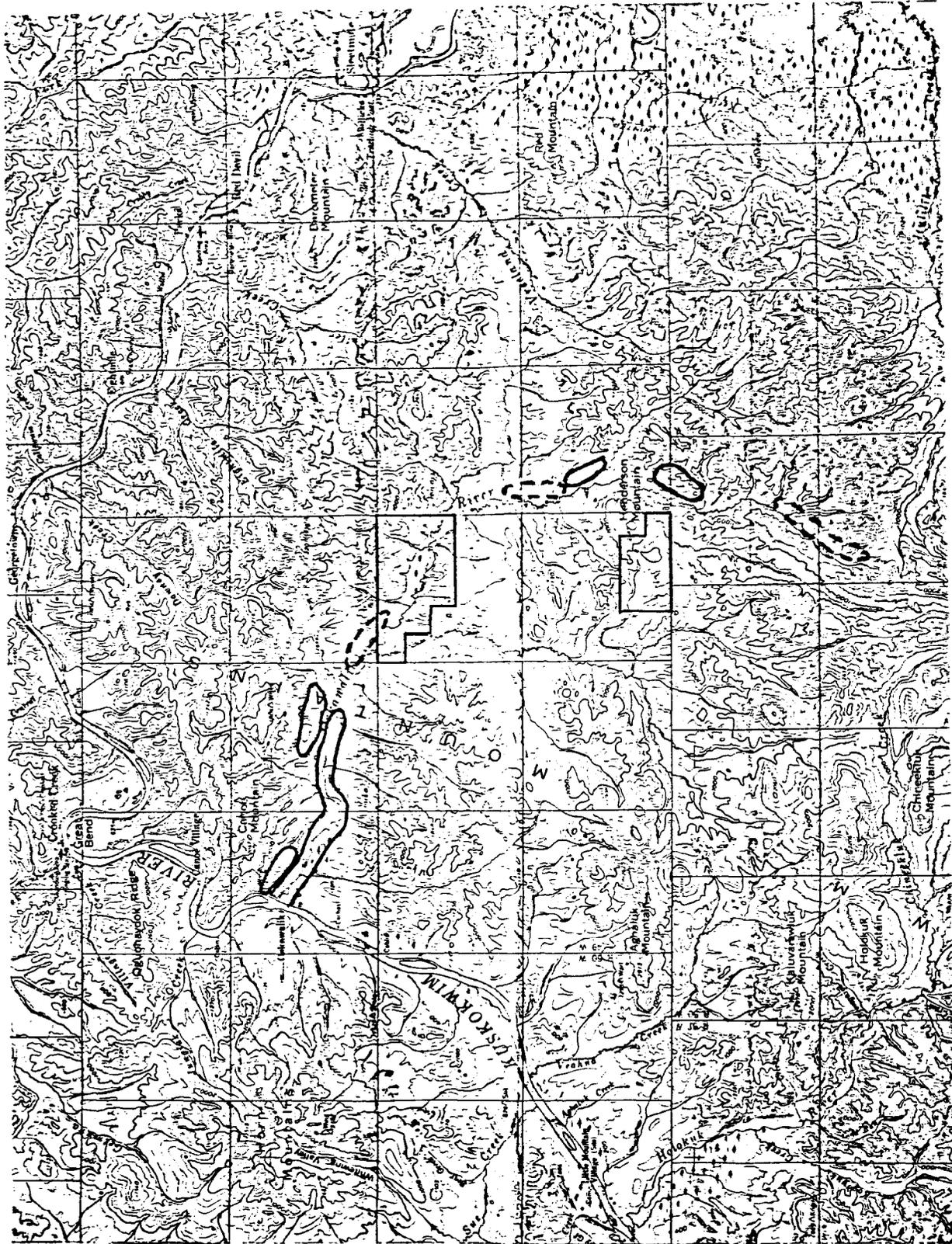
Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



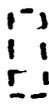
Map 21. Furbearer Harvest Areas within the Oskawalik River Drainage Vicinity of Residents of Crooked Creek (n=14)

Furbearer Harvest Areas
 - - - Residents of Crooked Creek (n=14)

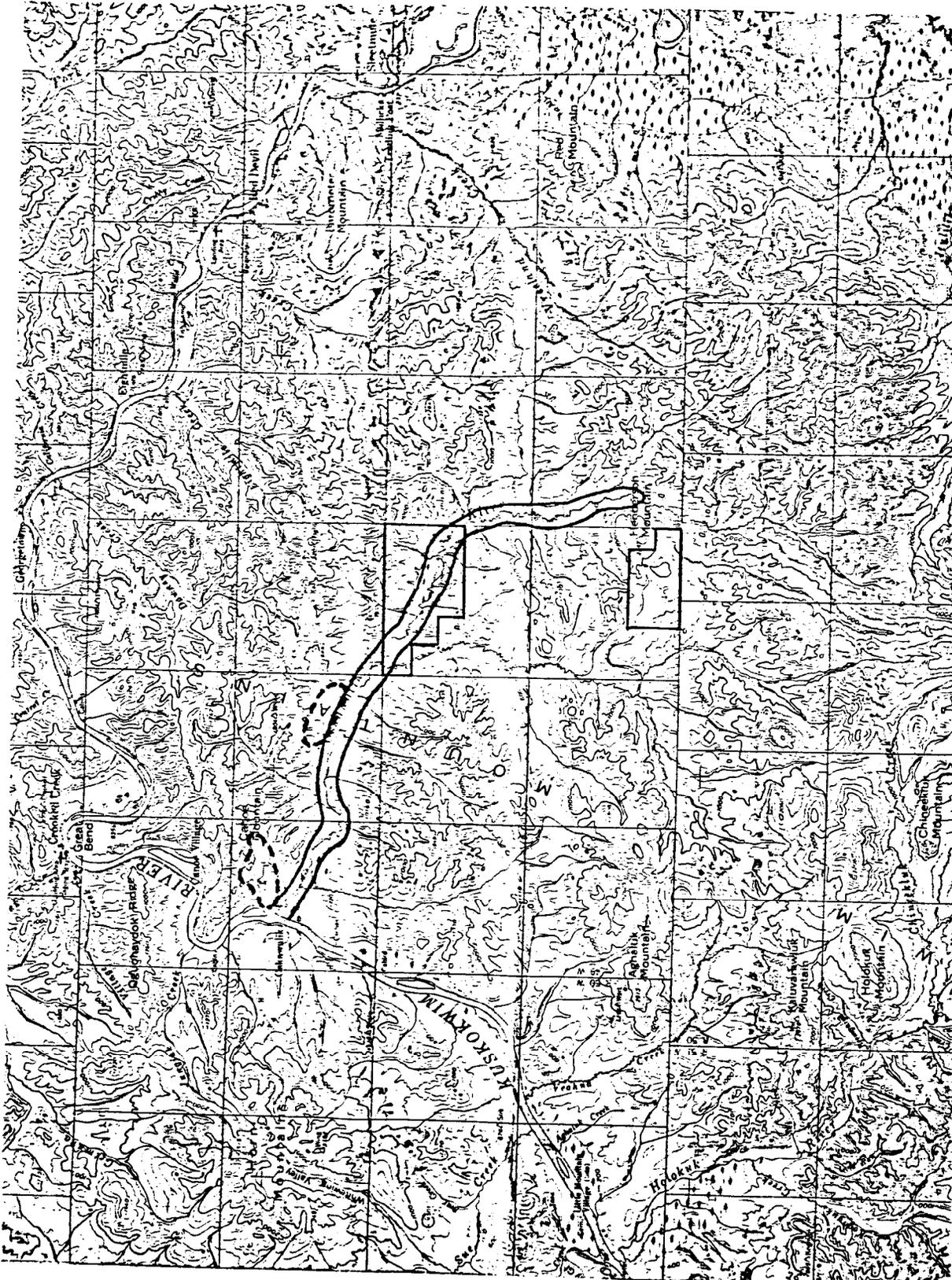
Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



Map 23. Bear and Caribou Hunting Areas within the Oskawalik River Drainage
Vicinity of Residents of Crooked Creek (n=14)

-  -- Bear Hunting Areas
-  -- Caribou Hunting Areas

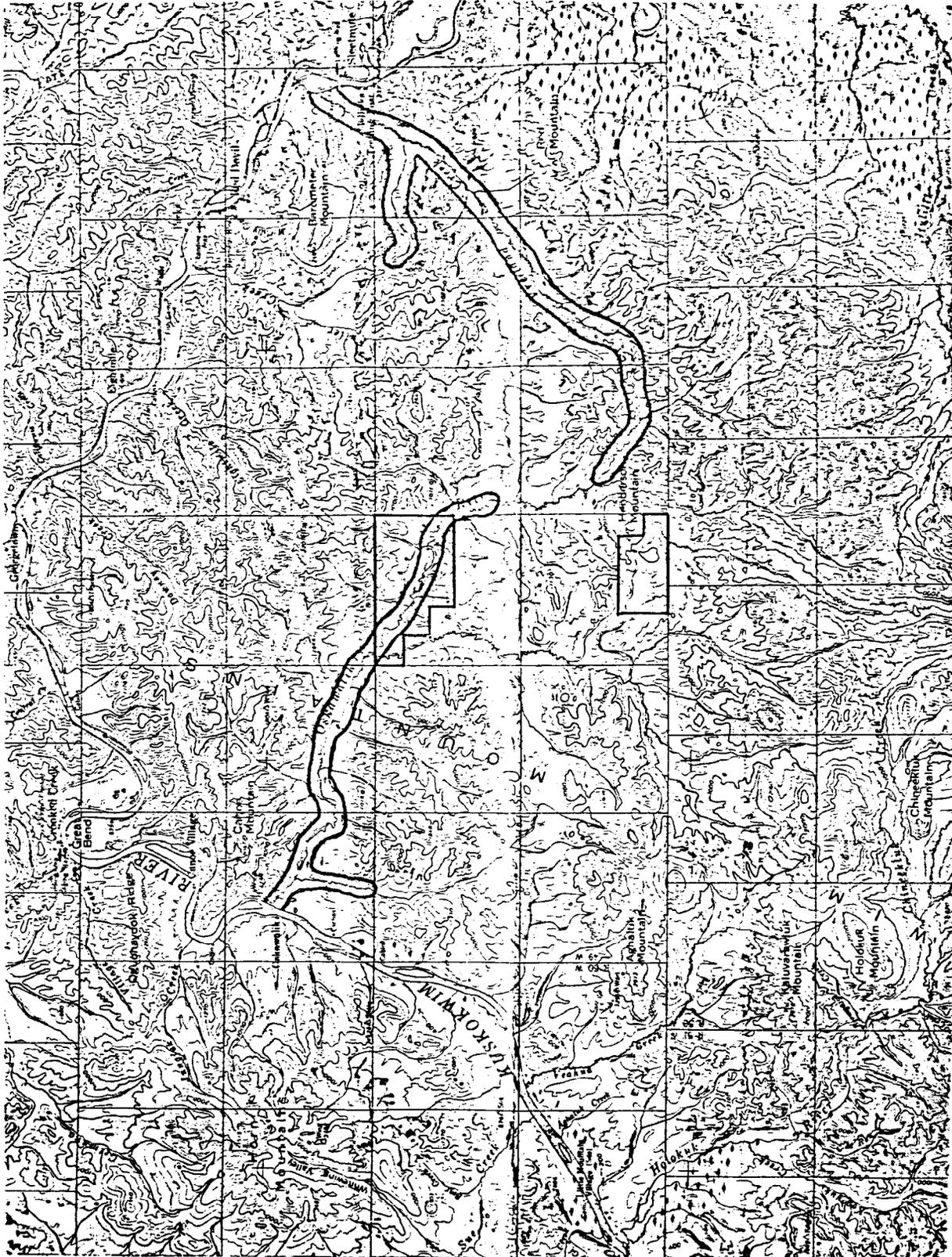
Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



Map 24. Fishing and Berry Picking Areas within the Oskawalik River Drainage for Residents of Crooked Creek (n=14)

-  -- Fishing Areas
-  -- Berry Picking Areas

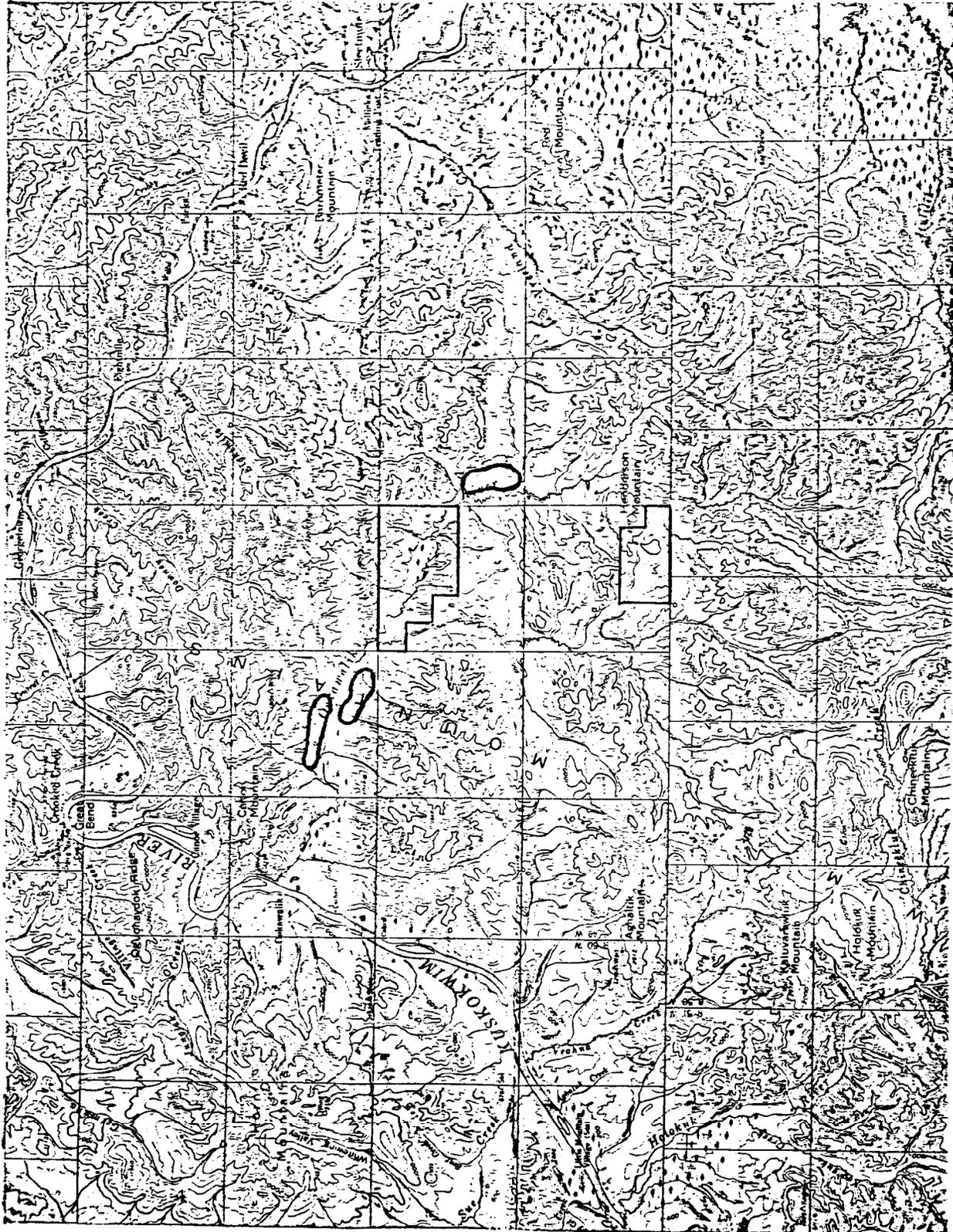
Note: This map was compiled during 1990 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



Map 26. Moose Hunting Areas within the Oskawalik River Drainage Vicinity of Residents of Sleetmute (n=7)

-- Moose hunting Areas

Note: This map was compiled during 1982 from a sample of community residents, so it may be a partial representation of areas used by community members for fishing, hunting, trapping and gathering. Use areas change through time and are not fixed entities. Land outside use areas should not be assumed to be of relative less importance to community members.



Map 27. Bear Hunting Areas within the Oskowalik River Drainage Vicinity of Residents of Sleetmute (n=7)

--- Bear Hunting Afeas

Discussion

It is apparent from the maps that the rivers and creeks of the Aniak and Oskawalik river drainages are used for fishing, hunting, trapping, and gathering by residents of the Middle Kuskokwim. Most resource use activities appear to occur along the edges of the region's waterways. The typical form of transportation in summer is by a 16 to 20 foot wooden or aluminum boat powered by a 15 to 35 horsepower outboard motor. A jet unit may be required to get to upper river areas when the water is low; however, most households only own prop units. In winter, travel is by dog team or snowmachine. Winter trails, as indicated on the maps, serve as routes for travel and areas for hunting and trapping. Airplanes are rarely used for harvesting locally available resources.

Harvest methods along these rivers vary. During summer, non-salmon fish species and salmon primarily are taken using rod and reel in the Aniak and Oskawalik rivers. In winter, non-salmon fish species are taken by jigging with hook and line through ice holes.

The central Kuskokwim is an area in which no one resource is abundant. Typically, household diets are composed of small amounts of a variety of resources. Salmon and moose comprise the largest volume of food, but other resources including whitefish, sheefish, grayling, rainbow trout, pike, Dolly Varden, bear, caribou, waterfowl, upland game birds, some furbearers and

other small game species form significant components of the local diet (Stickney 1981). It is doubtful that the natural resource base of this region can support a large human population, although there are no data that show the carrying capacity of the central Kuskokwim region for human populations. If it is the case that the natural resource base is relatively low, it is conceivable that any human population increase in the area could potentially exert significant pressures on local resources. Already there is pressure on the moose resource due to non-local hunters who enter the region during the hunting season and compete with local residents for moose.

The resource use maps show that Aniak, Chuathbaluk, Crooked Creek and Sleetmute residents use land near and including the land disposal sites for subsistence fishing, trapping, hunting and gathering. Many local people commented that the land disposal sites are located in relatively "rich" resource areas. The Canoe remote falls in the center of a major travel corridor for those who use the Oskawalik River. It also receives heavy use by local people, and has been noted as an area especially critical for moose hunting. The Henderson Mountain remote is located in an area rich in furbearers, an important area for local trappers. The Aniak River remote is located in a relatively narrow corridor along the Aniak River. This corridor is reportedly used by big game species such as moose and bear as a travel route. Were a land disposal to occur here, it might have a detrimental effect on these species' patterns of movement from upriver to downriver

hunting areas.

Two points might be brought out here. It is possible that pressure on a resource base increases and competition arises when the land use areas of individuals overlap extensively. Should the land disposals take place in their present locations, it is clear from the maps that this situation might arise. In addition to this, even if land disposal sites were located in areas not specifically used by local residents, they still could impact the harvest of local resources. This might happen in at least two ways. The first is the mobility of fish and game resources mentioned previously. The movement of resources from one area to another suggests that activities taking place at one locale may affect the abundance of resources in another, thus affecting resource use in the second location. Second, people do not stay in one place. If individuals acquire land in a remote parcel, they will not necessarily remain on that piece of land. It is assumed that the type of person who would seek to acquire land in a remote parcel might be interested in conducting hunting, fishing, trapping and berry-picking activities. In order to do this, they would probably spread out into the surrounding countryside, and in this way possibly hunt, fish, and trap within traditional use areas, competing for the area's resources.

A commonly expressed fear by local residents concerns the possibility that a land disposal might lead to the establishment of hunting and fishing lodges on the Aniak or Oskawalik rivers. In this case, the increases in hunting and fishing pressure on

fish and game species might be large. As has been previously mentioned, competition from downriver and non-local moose hunters are already a source of tension in the area.

Preliminary data suggest that trapping is an important economic activity in the central Kuskokwim area. While there are no systematic data as yet available which describe the role of trapping in the local economy, several factors suggest that it may be significant. Few jobs are available in the villages. What wage employment there is tends to be of a seasonal nature and occurs mostly during summer. Fur trapping is one of the few local activities that provide a source of cash income during winter. The region is fairly rich in fur resources. The mapped data indicate that many individuals make extensive use of the Aniak and Oskawalik river drainages for fur trapping.

Wolfe (1981) determined the mean income per household from commercial fur sales for six Yukon Delta communities combined during the 1980-1981 season. The mean income from a sample of 88 households was \$1,101, with a range from 0 - \$9,308. The cash income resulting from fur sales comprised an average of 5.7 percent of the total monetary income for these households with a range from 0 to 43.9 percent. Commercial fishing provided the households with 41.5 percent of their total cash income. In the central Kuskokwim area, earnings from commercial fishing are substantially less, and most households do not participate in commercial fishing. This suggests that the role of fur trapping as an economic activity may have a greater significance in providing

monetary income to this region.

Land disposals in and near areas used by fur trappers could exert negative economic impacts on these individuals. This could be caused by disturbing the resource base and by creating competition for the fur resource. Furbearers are particularly sensitive to over-trapping. If a specific area is repeatedly trapped year after year, the furbearer population does not have a chance to build itself up and may become depleted.

Residents of Sleetmute stated that they currently depend more heavily on the Holitna and Hoholitna river drainages than on the Oskawalik River drainage for hunting, fishing, trapping and berry-picking activities. However, several village residents noted that the community elders had made greater use of the Oskawalik River than the younger generations. It is conceivable that land use patterns are cyclic. Former use areas may be used again, if there is reason to shift from current use patterns. An increased number of Sleetmute residents might use the Oskawalik River drainage if their current options became limited. There are presently two issues which could have a major effect on the local resource use patterns of the people of Sleetmute: a potential State oil and gas lease sale in the Holitna Basin, scheduled for 1985, and three State land disposal sites being considered for disposal in FY 1984. These sites are located on the Holitna and Hoholitna river drainages and include the Cinabar, Forks, and Antilo remote parcels. The option to shift land use areas to the Oskawalik River system, should either of

these development issues affect local users on the Holitna, would be curtailed if land disposals were to take place there.

During a mapping session, one Sleetmute resident made the following statement: "Oskawalik country belongs to the people of Crooked Creek; we don't go up there, that's their land; we have ours -- the Holitna." This statement suggests that local systems of customary law exist by which people respect the land use areas of others. A State land disposal on the Oskawalik should be mindful of these customary rules of land use. Underlying the geographic patterns depicted in the maps are traditional and customary social patterns organizing the lives and activities of the region's communities.

Land disposals on the Aniak and Oskawalik rivers might open up these rivers significantly as travel corridors. Were communities to be established in the proposed remote areas, they would need some kind of support system for commodities and services. People possibly would go to Aniak, the regional center, for these services. This would increase travel up and down the Aniak and Oskawalik rivers, and might lead to environmental disruption.

A final point to make in regards to interpreting the mapped data in relation to sample size has to do with the phenomenon of food sharing. Food sharing among kin and non-kin relations is a common occurrence in the central Kuskokwim villages (Stickney 1981). Often households who do not procure wild resources themselves gain access to these resources through ties of kinship and friendship. For example, if 60 percent of the households in

Crooked Creek have hunters and gatherers who obtain resources from the Oskawalik River drainage, it is possible that 80 percent of the households in Crooked Creek might be supported by these resources through food sharing. The importance of a resource base to villagers exceeds that which is indicated by the size of the household group that obtains the resource. Because food sharing is so important, there is an even greater incentive for a hunter or fisherman to be successful. Greater competition for the resource base further increases pressure to produce on the local hunter or fisherman.

The effects of a land disposal on communities in the central Kuskokwim region could be understood more fully were additional data available. Biological data on resource abundance and mobility would provide the means by which to better assess the impacts of increasing the population of the region in a specific geographic locale on fish, wildlife and plant populations. Research on place names would help in identifying resource areas that are considered important to local people. These areas might receive a greater amount of use than others. Historical data showing cyclic shifts in geographic areas used for resource harvest by local residents would indicate resource areas important in the past, and suggest possible future land use patterns. A description of customary law as it relates to land use areas and the way in which it defines access to those areas would be useful. Data from other Kuskokwim villages showing the extent to which they use the Aniak and Oskawalik

rivers, and data from these four villages showing the extent to which they use other resource areas, would be of use in determining the effects of these particular land disposals. Broader-based data concerning the role of resource harvest and use in local sociocultural and economic systems would provide a basis by which to predict the deeper impacts of disrupting a subsistence pattern of a local community.

Conclusions

Residents of Aniak, Chuathbaluk, Crooked Creek and Sleetmute use the Aniak and Oskawalik rivers for hunting, fishing, trapping and berry picking activities. Their land use areas are in close proximity to and include the remote parcel sites proposed for disposal by the Department of Natural Resources. Subsistence use of these river drainages is not limited to use by the residents of the four villages involved in this study. Also, land use areas by residents of these four villages are not limited to those located on the Aniak and Oskawalik rivers. Mapped data showing land use represent minimum usage patterns for each village, as only a percentage of the users in each village were interviewed.

Land disposals on the Aniak and Oskawalik rivers may impact local resource users in several ways. The nature of the resource base in the central Kuskokwim area, in which no one resource is abundant, makes it susceptible to population pressure when higher demands are placed upon it. Additional people moving into the area

are likely to exert pressure on this resource base. By moving into areas already used by local people, greater competition for the resource base may arise. The moose resource is already perceived by local residents to be under such pressure. Competition for the fur resource could have a negative economic impact on local trappers. A system of customary law by which people respect the land use areas of others exists in the central Kuskokwim. State land disposals in the area should consider traditional rules of land use. The role of food sharing in villages through kin and non-kin relations implies that a greater number of households depend on resources from a given area than is apparent by looking only at the number of households with active hunters or fishermen.

Additional data would be useful in order to better assess the impact of a land disposal in the central Kuskokwim area. Topics for further research include the biological nature of the resource base, place names, customary law, historic land use patterns, additional land use patterns by these and other villages in the region, and the role of resource harvest in local economic and sociocultural systems.

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