State of Alaska
Department of Fish and Game
Nomination for Waters
Important to Anadromous Species

1992
Year of Revision

Approved

Name of Waterway LITTLE MUD RIVER

AWC# of Waterway 334-30-11000-2532-3551-4

AWC Volume & Number Interior

USGS Quad OPHIR D-4 D-5 NULATO A-5 A-4

Addition X A-2 Correction _____
Deletion _____ Change _____

Change to _____ Atlas
_____ Catalog
X Both

[signature] 12-19-91
Regional Supervisor Date

[signature] 93 002 12/16/92

[signature] 12/18/92
Drafted

Species	Date(s) Observed	Spawning	Rearing	Migration
Coho salmon	Aug 91		X	
Chinook salmon	Sept & Oct 91			X
Chum salmon	8-9-91, Sept & Oct 91	X		

Comments: Provide any clarifying information, including number of fish observed, location of fish survey data, etc.

See attached information from report by J. Morsell, Northern Ecological Services, to North Pacific Mining Corporation
coho juveniles were also observed by P. Weber Scannell in July 1991.

Attach a copy of a map showing location of mouth and upper points of each species, specific stream reaches identified for spawning or rearing, locations of barriers, such as falls. Attach a copy of the fish survey data, if available.

Name of Observer (please print) John Morsell

Date: _____ Signature: [signature]

Address: Northern Ecological Services

ALASKA DEPT. OF
FISH & GAME

DEC 24 1991

REGION II
HABITAT DIVISION

TERRA NORD
NATURAL RESOURCES CONSULTING
8640 ROUND TREE DRIVE
ANCHORAGE, ALASKA 99516
(907) 346-2551

December 12, 1991

Phyllis:

Enclosed are two copies of the report *Aquatic resources assessment study, Illinois Creek gold project* for your files.

It is obvious that Illinois Creek should be a candidate for inclusion in the *Anadromous fish stream catalog*.

Sincerely,

Mike

Mike Smith

FINAL REPORT

AQUATIC RESOURCES ASSESSMENT STUDY
ILLINOIS CREEK GOLD PROJECT

Prepared for

North Pacific Mining Corporation
Anchorage, Alaska

FINAL REPORT

AQUATIC RESOURCES ASSESSMENT STUDY
ILLINOIS CREEK GOLD PROJECT

by

John W. Morsell
Northern Ecological Services
Anchorage, Alaska

Prepared for

North Pacific Mining Corporation
Anchorage, Alaska

December, 1991

INTRODUCTION

The North Pacific Mining Corporation is examining the feasibility of developing a hard rock gold prospect located about 30 miles southeast of Kaltag and 60 miles southwest of Galena (Figure 1). The topographic setting of the Illinois Creek Gold Project is in hilly terrain at the southern fringe of the Kaiyuh Mountains. The primary drainage within the project area is Illinois Creek, a small tributary to the Little Mud River in the Innoko River drainage system (Figure 2).

Reconnaissance level biological information was collected with regard to aquatic resources within those streams that could be potentially affected by the project. Such information was intended to provide the basis for an initial evaluation of potential impacts and provide input to project planning relative to impact minimization. Hydrological studies were also initiated in 1991 and will be continuing, thus providing additional information regarding the physical aspects of streams in the project area.

DESCRIPTION OF THE STUDY AREA

Background Information

No previous studies have looked at aquatic resources in Illinois Creek or the Little Mud River drainage and few studies have examined the Innoko River, in spite of its size and significance. Alt (1983) surveyed portions of the Innoko River and some of its major tributaries and found the full array of fish species that would be expected in a major tributary of the Yukon River including sheefish, northern pike, Arctic grayling, Arctic char, several species of whitefish, as well as chum, coho and chinook salmon. The closest sampling to the project area was a gill net set at the mouth of the Mud River resulting in a catch of

several northern pike (Alt 1983). The Mud River and its tributaries (including the Little Mud River and Illinois Creek) are not currently listed as anadromous fish streams (ADF&G 1990).

Stream Descriptions

An aerial reconnaissance of the Illinois Creek Gold Project area indicated that the only stream within the potential project impact area is Illinois Creek (Figure 2). California Creek, a larger tributary to the Little Mud River, is located east of the area but will not be impacted by the project. The USGS topographic map shows another small unnamed stream immediately west of Illinois Creek; however, no stream actually exists at this location, rather the drainage consists of a swale with occasional wet spots.

Illinois Creek is 4-5 miles long (not including meanders) originating at an elevation of about 500 ft. and ending at the Little Mud River at an elevation of less than 200 ft. The stream originates primarily from a fan-shaped series of springs that flow out of the hill sides. The upper portion of the stream is 3-10 ft. wide and 0.5-2.5 ft. deep while the lower stream is 15-30 ft. wide. At the time of the survey the stream had been unaffected by man's activities except for a low-water crossing (ford) at the exploration roadway crossing at the upper end and a log bridge at a trail crossing on the middle reaches of the stream (Figure 2).

SURVEY METHODS

A visual reconnaissance of the project area was conducted on June 30, 1991. The project area and surrounding terrain were observed from the air and selected portions of Illinois Creek were observed from the ground. The reconnaissance trip was followed by a two day field investigation on August 9 and 10, 1991.

Methods used during the field investigation included visual observations of selected stream portions with emphasis on observations of adult salmon and potential spawning and rearing habitat. The reaches observed on foot are indicated on Figure 2. In addition, standard 1/8 inch wire mesh minnow traps were baited with preserved salmon eggs (inside a perforated plastic container) and placed at selected locations in the stream. The traps were fished for varying lengths of time up to 3 hours per location. Fish caught in the traps were identified to species and most were measured (fork length to the nearest mm). In some cases species were simply enumerated without measurement. All trapped fish were returned to the stream alive at the point of capture.

Additional information was obtained by interviewing the mining camp caretaker and other camp residents relative to fish presence.

RESULTS

Fish Presence

Minnow trap catches are presented in Table 1. All minnow traps caught juvenile coho salmon with catches ranging from 4 to 33 fish per trap-hour. The highest catch in an individual trap was 85 fish. Visual observations indicated that juvenile coho salmon were present in all portions of the stream that were observed, but were more abundant in the vicinity of the mine road crossing and above. Minnow trap catches confirmed this impression. Length/frequency analysis for the coho salmon (Figure 3) suggests the presence of 2 and, possibly, 3 year classes. The smaller cohort probably consisted of fish that hatched in the spring of 1991 (0+) and the larger cohort probably consisted of fish that hatched in the previous year (1+). A third cohort (2+) may also have been present.

On August 9, 8 adult chum salmon carcasses were observed in

Illinois Creek along with one live chum salmon. Of these fish, 6 were observed above the mine road crossing and 3 were observed in the surveyed area below the crossing. According to camp personnel, chum salmon were first noted at the road crossing in late July. Spawning, if it occurred, had obviously been completed by the time of the field survey. A second run of chum salmon was noted by camp personnel starting in late September (first seen September 26) and continuing into mid-October. Up to 30 chum salmon were seen by camp personnel in Illinois Creek between the road crossing and the upper springs. The observer also reported seeing one chinook salmon in the same area.

Arctic grayling, ranging in size from 6 to 12 inches were observed in upper Illinois Creek during both the June and August field observations. Grayling appeared to be most abundant above the upper mine road crossing; on June 30, 11 grayling were observed in this stretch. Grayling were also observed below the road crossing but in lesser numbers. No grayling were seen in the surveyed portion of lower Illinois Creek on August 10.

Habitat Suitability

Illinois Creek is a clear water stream with very constant flow as indicated by moss and grass growing on the tops of boulders in midstream that were only a few inches above stream level. Groundwater apparently is the major water source. Of particular interest is the fact that a warm spring (66 degrees F.) located immediately upstream from the mine road crossing increases flow in the stream by 10-20 percent and undoubtedly affects downstream water temperature with the greatest relative effect expected to occur in the winter. Water temperature at headwaters springs was in the low 40's which would also provide a moderating influence in winter.

The lower 2/3 of Illinois Creek is characterized by a

primarily sandy bottom with much overhanging vegetation and woody debris. Intermittent stretches of gravel and cobble separated by sand bottom reaches are present starting about 3/4 mile below the upper mine road crossing and continuing up to the crossing. Immediately above the road crossing, cobble and boulder substrates are dominant with some patches of gravel. About 800 ft. above the crossing is an area formerly impacted by beavers consisting of drained silt-bottomed ponds and remnants of beaver dams. Groundwater input is very evident in the beaver impoundment area as evidenced both by springs entering the stream from the hillsides and water bubbling up through the silt of the pond bottoms.

Spawning habitat for salmonid fish is limited by the shortage of gravel areas. The stable temperature and flow regime resulting from groundwater input likely enhances the value of the potential spawning areas that do exist.

Abundant caddis fly larvae and algae suggest that the creek is unusually productive relative to other headwaters stream areas in interior Alaska. This productivity combined with the high number of juvenile coho salmon would imply that Illinois Creek provides high quality rearing habitat for the salmon. The creek also provides feeding habitat for adult and sub-adult Arctic grayling. No small grayling were observed possibly due to competition from the aggressive juvenile salmon. The downstream areas of the creek would probably be less productive of fish food organisms because of the relatively sterile sand bottom. However, the abundance of woody debris may act to offset the unproductive substrate.

DISCUSSION AND CONCLUSIONS

Illinois Creek, while small, is an unusual body of water and provides high quality rearing habitat for coho salmon throughout its length and at least some spawning habitat for chum salmon at

the upper end of the stream.

Estimates of absolute density of juvenile coho salmon were not conducted for this study; however, the minnow trap catch-per-unit-effort is very high when compared to other studies done in productive salmon streams (Environmental Research and Technology 1984; Wadman and Delaney 1979). Growth rate of 0+ and 1+ coho salmon appears to be somewhat faster than occurs in the Little Susitna River in southcentral Alaska (Wadman and Delaney 1979).

The number of chum salmon spawning in Illinois Creek in 1991 was small and the scarcity of suitable spawning habitat probably limits the value of the creek to spawning salmon. The abundance of juvenile cohos in the upper stream suggests that coho salmon may also spawn in Illinois Creek. Such spawning, if it occurs, would probably be in October or November as is typical of coho salmon in the Yukon drainage (U.S. Dept. of Interior 1987).

The groundwater origin of Illinois Creek very likely contributes to its value because of the constant flow, moderate temperature, and possibly mineral rich water.

Illinois Creek (and, by implication, Little Mud River and Mud River) should be nominated for anadromous stream status. There is no question that Illinois Creek provides significant habitat for anadromous salmon.

REFERENCES

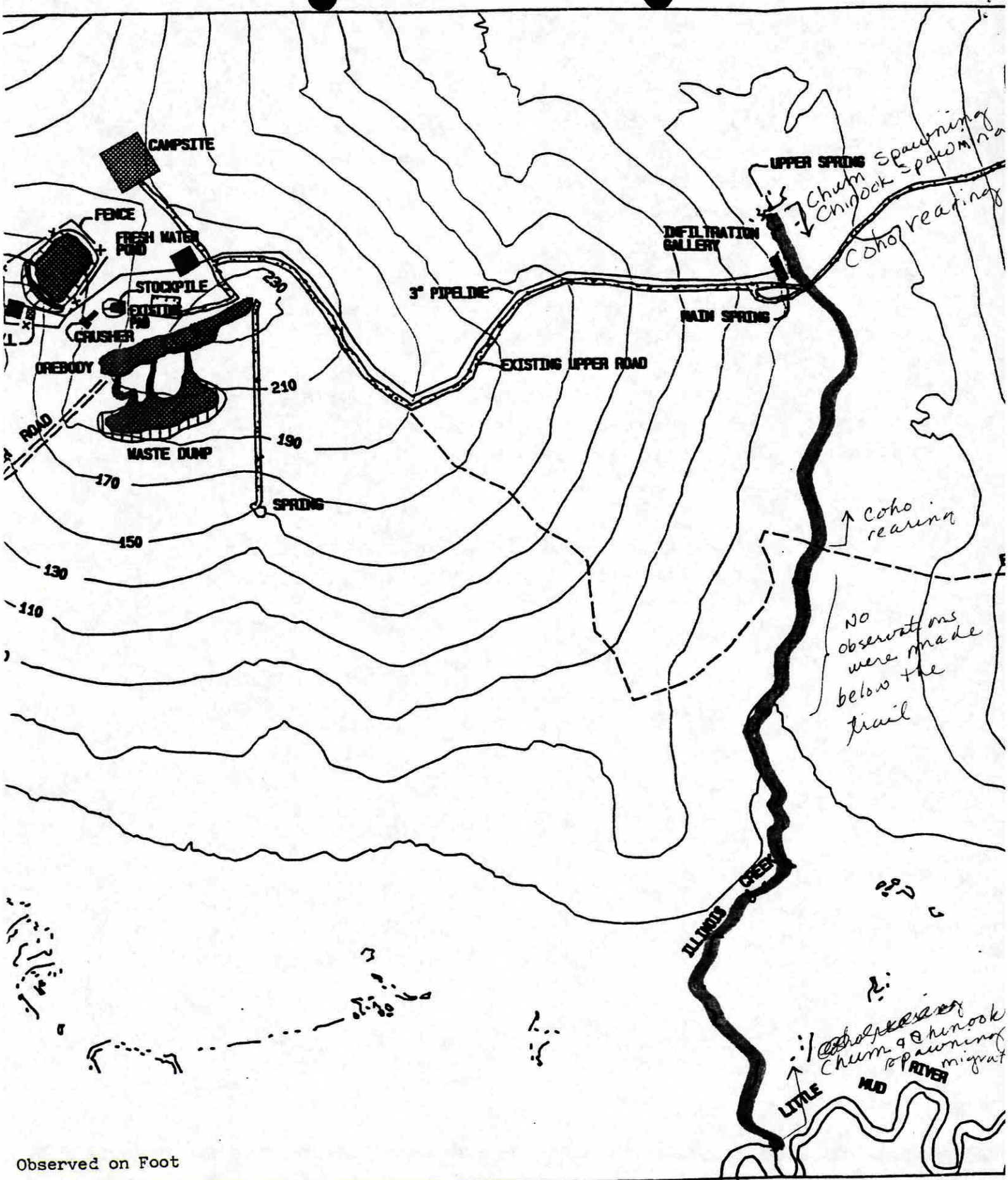
Alaska Dept. of Fish & Game, 1990. Catalog of waters important for spawning, rearing or migration of anadromous fishes. ADF&G Habitat Division, Juneau, Ak.

Alt, Kenneth, 1983. Inventory and cataloging of sport fish and sport fish waters of western Alaska. Alaska Dept. of Fish & Game, Federal Aid in Fish Restoration Research Project Completion Report, Vol. 24.

Environmental Research and Technology, Inc., 1984. Aquatic biology baseline studies project, Vol. I. Prepared for Diamond Shamrock-Chuitna Joint Venture, Anchorage, AK.

U.S. Dept. of the Interior, 1987. Innoko National Wildlife Refuge comprehensive conservation plan, environmental impact statement, and wilderness review. U.S. Fish and Wildlife Service, Region 7, Anchorage, Ak.

Wadman, Roger and Kevin Delaney, 1979. Little Susitna River. juvenile chinook and coho study, 1978. Alaska Dept. of Fish & Game, Division of Sport Fish.



Observed on Foot

Figure 2. Illinois Creel

TABLE 1. MINNOW TRAP CATCH RECORDS ON ILLINOIS CREEK

DATE	STREAM SECT.	TRAP NO.	TIME SET	SPECIES	CATCH	CATCH/HR.
8/9/91	ABOVE RD. XING	1	1:45	COHO SALMON	56	32
		2	2:15	COHO SALMON	28	12
		3	2:20	COHO SALMON	12	5
		4	2:25	COHO SALMON	50	21
8/10/91	BELOW RD. XING	1	2:35	COHO SALMON	85	33
				SCULPIN	1	0.4
		2	2:40	COHO SALMON	11	4
		3	2:37	COHO SALMON	33	13
		4	2:35	COHO SALMON	11	4
8/9/91	LOWER TRAIL XING	1	1:00	COHO SALMON	14	14
		2	1:10	COHO SALMON	19	16

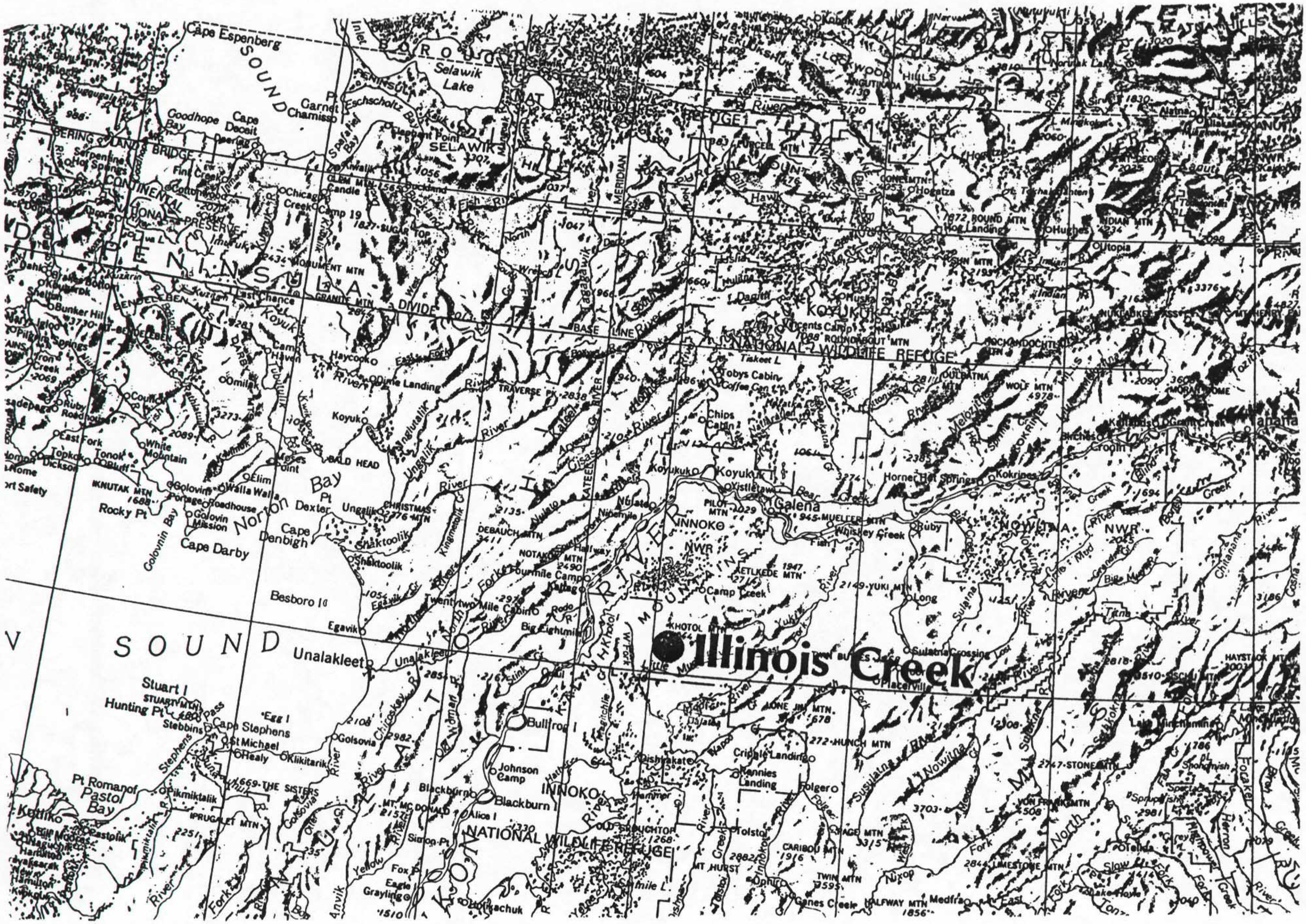
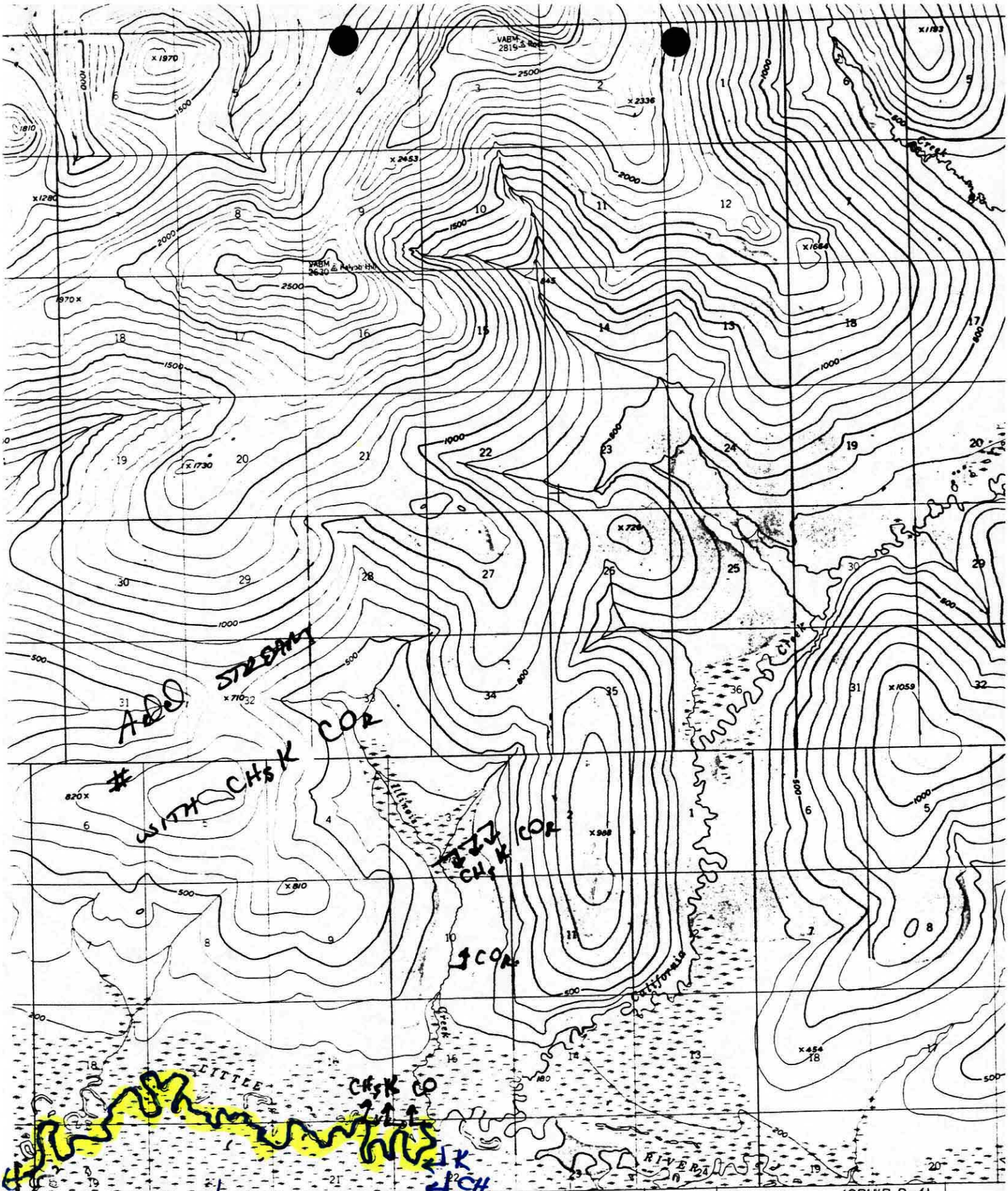


Figure 1. Location of Illinois Creek Project



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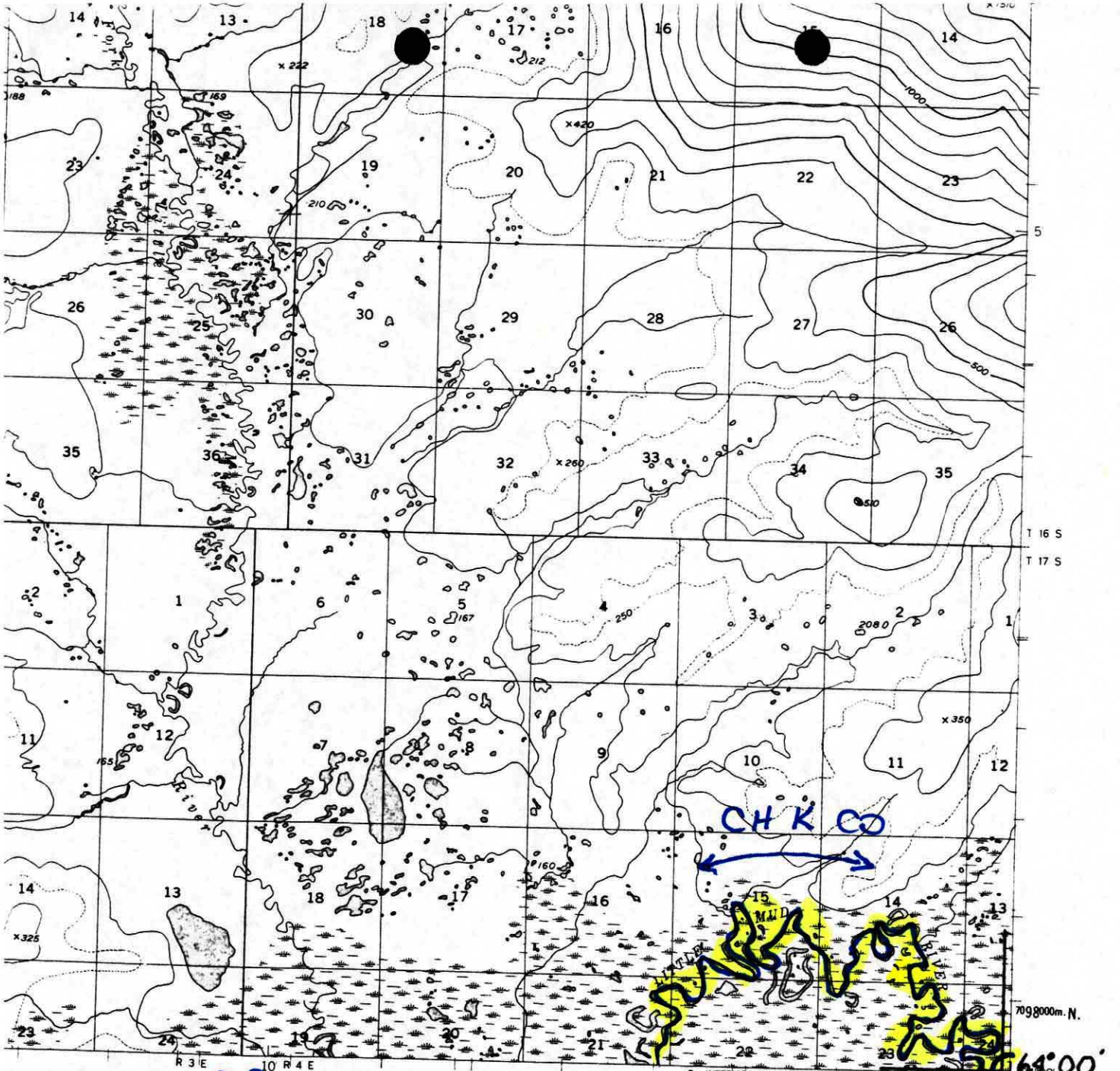
field annotated 1953. Map not field checked
nsverse Mercator projection, 1927 North American datum



ADD stream 334-30-11000-2532-3551-4101

w/ CO K CH

QUADRANGLE LOCATION

NULATO (A-5), ALASKA

N6400—W15800/15X30

1952

MINOR REVISIONS 1973

WATERS CATALOG

ED PURSUANT TO AS 16.05.870 (a)

STATE OF ALASKA

BY	DATE
BB	3/1/03

Add stream

334-30-11000-2532-3551-4101

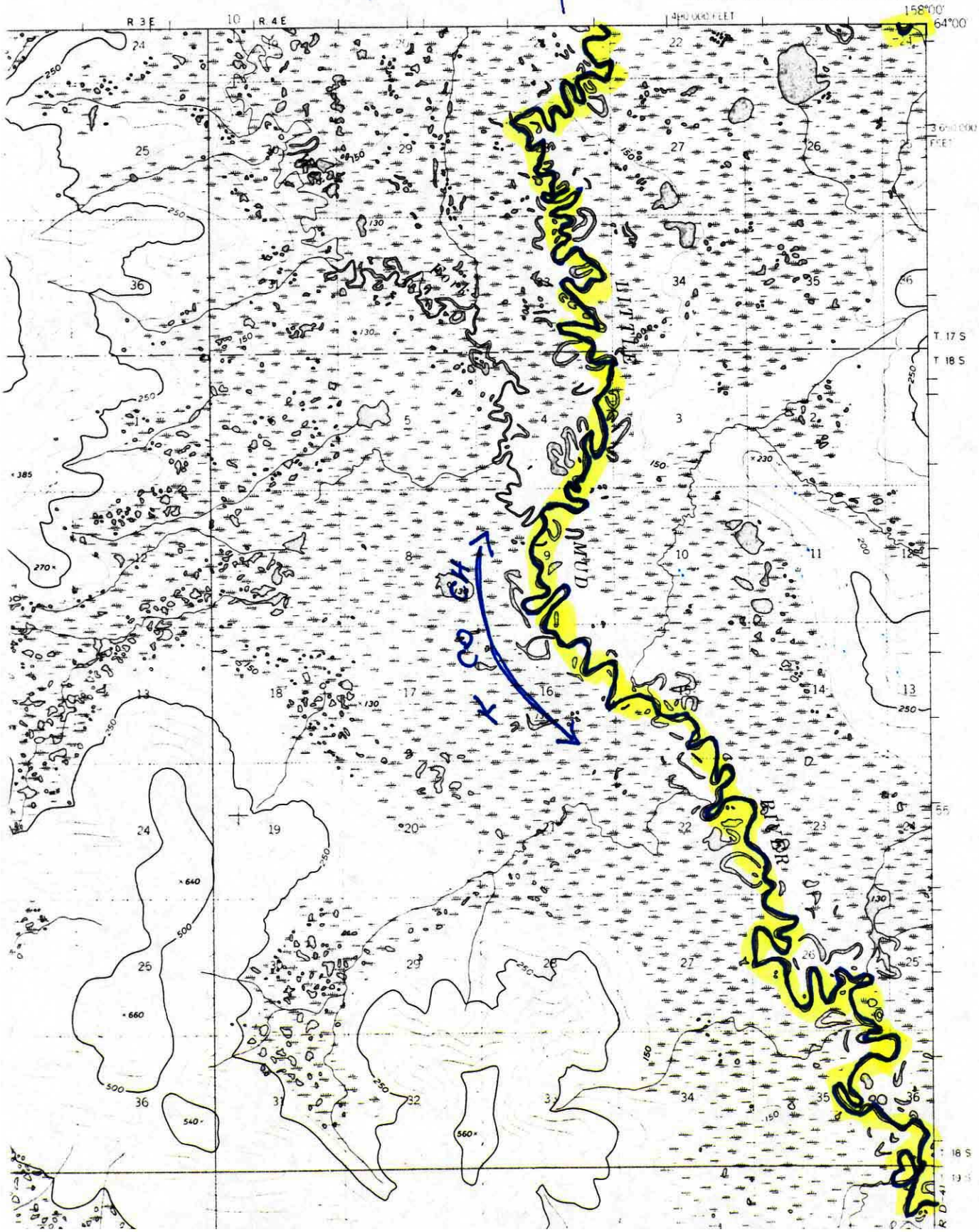
w/ CO K CH

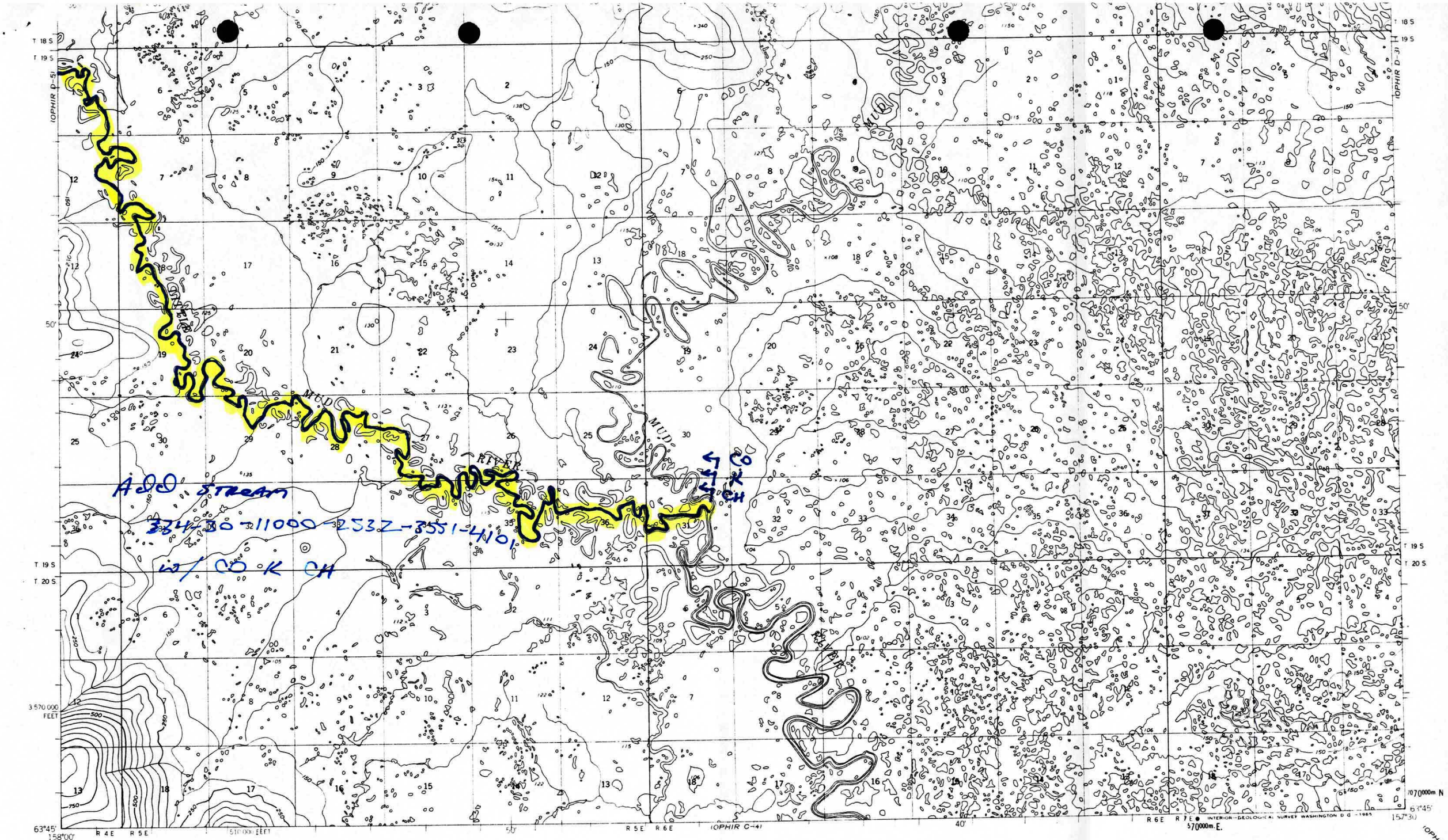
OPHIR (D-5) QUADRANGLE

ALASKA

1:63 360 SERIES (TOPOGRAPHIC)

INULATO A-4





Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1953. Field annotated 1954. Map not field checked

Universal Transverse Mercator projection. 1927 North American datum
10 000 foot grid based on Alaska coordinate system, zone 6
1000 meter Universal Transverse Mercator grid ticks, zone 4, shown in blue

Land lines represent uncurveyed and unmapped locations

TRUE NORTH
MAGNETIC NORTH
22°
APPROXIMATE MEAN

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

ROAD CLASSIFICATION

No roads or trails in this area

OPHIR (D-4), ALASKA