

NR 6/125.14/1986

C.1

COLORADO STATE PUBLICATIONS LIBRARY



3 1799 00123 9607

GREENBACK CUTTHROAT TROUT RECOVERY PROJECT
1986 PROGRESS REPORT

Thomas E. Chart
Scott Gillihan
Douglas A. Krieger

State of Colorado
Department of Natural Resources
Division of Wildlife
6060 Broadway
Denver, CO 80216

INTRODUCTION

The greenback cutthroat trout (Salmo clarki stomias) was one of two native salmonids present east of the Continental Divide in Colorado when European settlers arrived. The range of the greenback, along with that of the yellowfin cutthroat trout (S. clarki macdonaldi), gradually shrank as habitat loss and contamination from mining activities combined with the fishes inability to compete successfully against the introduced brook (salvelinus fontinalis), brown (Salmo trutta), rainbow (Salmo gairdneri), and lake trout (Salvelimis namaycush). The yellowfin was driven to extinction by the early 1900's. The greenback steadily lost ground and hybridized with introduced rainbow and cutthroats until only three genetically pure populations existed. Como Creek in Boulder County and the Little South Fork of the Cache la Poudre River in Larimer County, both part of the South Platte River drainage, and Cascade Creek in Huerfano County in the Arkansas River drainage.

In 1977 the Greenback Cutthroat Trout Recovery Team was organized. It is composed of personnel from the U.S. Fish and Wildlife Service, the U.S. Forest Service, U.S. Bureau of Land Management, U.S. National Park Service, and the Colorado Division of Wildlife. The goal of the team is the removal of the greenback from the USFWS threatened and Endangered Species List. To accomplish this 20 stable populations must be established within its historical range.

Efforts in 1986 toward achieving that goal in the DOW Northeast Region included surveying seven greenback populations, checking the success of the 1985 renovation of Pennock Creek, and stocking fry into Pennock Creek.

METHODS

Population Surveys

Greenback populations were surveyed by first attempting to locate the same section of stream surveyed by Culver and Bestgen (1985). A 100 m section was measured and a block net placed at the lower terminus to restrict movement of fish. Two passes were made through the section with a Coffelt backpack shocker, with equal effort on each pass. Lengths and weights of the collected fish were recorded. The Seber-Le Cren model was used to estimate population size.

In previous reports (Culver and Bestgen 1982, Davis and Culver 1984, Culver and Bestgen 1985) the Habitat Quality Index (HQI) (Binns and Eisermann 1979) was used to predict the quality and quantity of habitat within greenback recovery sites. The ratings for streams listed in the 1984 report are presently felt to be in error. The previous values may have been derived from field measurements which were recorded during periods that were logistically convenient but less than optimum (i.e., at low flow). In addition values for nitrates are seemingly too high. As such in this report standing crops on study streams were not compared with the predicted standing crops derived from the HQI. In 1987 the HQI evaluation will be repeated.

STATUS OF EXISTING POPULATIONS

Black Hollow Creek

This stream was poisoned in 1979 and was subsequently stocked with adult greenbacks transplanted from Como Creek in 1980. It was then stocked with 900 fry in 1983 and with 1100 fry and 75 fingerling (140 mm) fish in 1984. The downstream terminus of the lower sampling section was located approximately 20m upstream of the barrier. This section overlapped but did not duplicate Culver and Bestgen's (1985) site. The stream had a fairly high gradient and was heavily shaded. The substrate was cobble and boulder with gravel in the riffles. The lower terminus of the upper site was located approximately 100 m upstream of the edge of the large clearing shown on the topo map. The habitat was similar to the lower site, with the addition of 2 large pools.

For the combined sites, the standing crop estimates was 47.5 kg/ha (Table 1), a 32% increase over last year's value. The average length increased 11% and average weight increased 17% since 1985 (Table 2). None of the fingerlings planted in 1984, which were marked by clipping the adipose fin, were captured in 1985 or 1986.

Cornelius Creek

This creek was poisoned in 1982 and was stocked with 2200 fry in 1983, and 3600 fry and 310 fingerlings (140 mm) in 1984. None of the marked fingerlings were recovered in 1985 or 1986.

The lower terminus of the sample section was approximately 1 cm upstream from the confluence with George Creek. Habitat consisted of low gradient streambed of gravel and sand. Shallow, undercut banks were present, as well as, some shading from riparian willows.

The standing crop increased from 34.2 kg/ha in 1985 to 75.0 kg/ha in 1986. Average length increased by 26.7 mm and average weight increased 28.1 g. Brook trout, which were first found in Cornelius Creek in 1985, were still present in 1986 as evidenced by three specimens captured in this year's efforts. No young-of-the-year greenback were found in this section (Table 2).

George Creek

Non-native fishes were removed from the George Creek drainage (along with Cornelius Creek) in 1982. The following year 2200 fry were stocked, and in 1984 an additional 3600 fry and 200 marked fingerlings (140 mm) were released. In contrast to Cornelius Creek, seven marked fish were recovered in 1986. These fish averaged 215 mm in length (91 g) a gain of 15 mm since 1985.

The upper terminus of the sampling site was located approximately 150 m downstream of the road crossing. Substrate was mixed from silt to cobble. Some undercut banks were present.

The standing crop estimate of 92 kg/ha represents a 40% increase over 1985. The presence of young-of-the-year fish was also noted. Since no fish were stocked in 1985 these trout were a result of natural reproduction. They were found in a shallow backwater area.

Little South Fork of the Cache La Poudre River

This is an historical, pure population of greenback cutthroat trout which has received no stocking. The section sampled is located about 3 km southwest of the Pingree Park campus (above private land). The lower terminus was

Table 1. Greenback cutthroat trout population parameters, 1986.

STREAM	DATE	SITE LENGTH (m)	SITE AREA (M)	NO. CAPTURED	SITE POP. EST.	POP. DENSITY (#/ha)	AVG. LENGTH (mm)	LENGTH RANGE (mm)	AVG. WEIGHT (g)	WEIGHT RANGE (g)	STANDING CROP EST (kg/ha)
Black Hollow-lower	8/5	100	312	34	38	1218	153.1	61-247	43.6	3-145	47.5
Black Hollow-upper	8/18	100	317	36	36	1136	164.8	112-238	40.8	13-94	46.3
Black Hollow-comb.		200	629	70	74	1176	159.2	61-247	43.3	3-145	47.5
Cornelius	8/22	100	125	13	13	1040	190.1	153-225	72.1	30-123	75.0
George	8/22	100	193	29	29	1503	184.5	123-228	61.2	15-105	92.0
Little S. Fork Poudre	9/9	100	571	14	14	245	208.0	161-277	118.4	43-257	29.0
May	9/5	100	253	41	43	1700	149.5	109-202	38.2	12-92	61.9
Sheep-E. Fork	8/21	100	375	40	41	1093	152.5	117-189	35.5	15-68	37.8
Sheep-W. Fork	8/19	100	375	40	41	1093	170.9	144-210	49.4	26-83	52.6
Sheep-combined		200	750	80	82	1093	161.7	117-210	42.4	15-83	45.2
Williams Gulch lower	8/29	100	198	18	18	909	120.9	28-214	31.5	1-88	28.6
Williams Gulch middle	8/29	100	177	37	37	2090	138.5	99-197	28.2	10-69	58.9
Williams Gulch upper	9/3	100	149	50	55	3691	128.3	25-188	24.7	1-60	82.9
Williams Gulch combined		300	524	105	110	2099	130.6	25-214	27.1	1-88	54.3

approximately 50 m downstream of the tributary entering from the west. The gradient was low to moderate throughout and the substrate was sand-cobble. Within the sampling section were three log jams which created pool habitat.

The 1986 standing crop estimate was 29 kg/ha, the lowest of the seven streams sampled. It has been speculated that the unstable habitat (shifting log jams and pools) may be limiting to this population. Although this population has, obviously, sustained itself for quite some time it should be considered to be unstable as defined by Culver and Bestgen (1985). Establishment of a hatchery brood stock of Little Stock Fork Poudre greenbacks has been attempted for a number of years without much success, primarily because of the limited numbers of fish available.

May Creek

May Creek was barren when stocked in 1980 with 54 adult greenbacks from Como Creek. Subsequent stockings included, 2000 fry in 1982, 700 fry in 1983, and 1400 fry and 90 fingerlings in 1984.

The section sampled was located 1.5 km southwest of the end of the Crown Point Road at the Zimmerman Trail. The stream moderately shaded and had a moderate gradient through an area of mixed timber and clearings. Substrate was cobble and gravel. This section was also characterized by four large pools created by log jams, and shallow undercut banks. The standing crop estimate of 62 kg/ha exceeded the 1984 estimate (37 kg/ha) by 68%.

East and West Forks of Sheep Creek

Exotic trout species were removed from these two streams in 1981. Each tributary fork then received 3600 greenback fry in 1982, 1100 fry in 1983, and 900 fry and 150 fingerling in 1984. In 1985, 6500 fry were divided between the two forks.

The lower terminus for the East Fork was located 300 m above the meadow and beaver ponds. Habitat consisted of rubble to silt substrate with some pools. The lower terminus on the West Fork was located approximately 150 m past the point where the trail turns away from the creek. The substrate at that location was composed of large rubble, cobble and gravel. Several instream logs had produced two large plunge pools. There was little canopy cover, gradient was low to moderate, and about one-third of the stream bank was undercut.

The standing crop in the East Fork was found to be 38 kg/ha, and in the West Lake 53 kg/ha. The difference in these two areas can be attributed to habitat and preferred substrate in the West Fork. Current standing crop of greenback trout exceeded the 1984 estimates for the East and West Forks by 59% and 46%, respectively.

Williams Gulch

Williams Gulch, which was formerly barren, was stocked with 48 (127 mm) fish in 1981, 2000 fry in 1982, 400 fry in 1983, and 1400 fry and 230 marked fingerlings (140 mm) in 1984. Of the marked fingerlings, two were recovered in 1985 but none in 1986.

The lower termini of the three sites sampled were located 2.5, 2.8, and 3.5 km downstream from the point where the Green Ridge Trail and the four-wheel drive road cross the creek in the meadow. The lower site had a moderate gradient, slight to moderate shading, and a boulder, cobble, and sand substrate. There were no substantial pools and few undercut banks. The middle section received some shading from pines and willows. Gradient was low, resulting in a meandering stream configuration, undercut banks, and a substrate of gravel/sand. The upper sampling station meandered through an open meadow with a tributary entering from the south midway through the section. Habitat consisted of slow runs, short riffles, and pools, with a substrate of sand/gravel.

The standing crop of greenback cutthroat trout was highest at the upper section (83 kg/ha) and lowest at the lower station (29 kg/ha) with the middle station of intermediate biomass (59 kg/ha). The combined estimate for this stream was 54 kg/ha which is a 45% drop from 1985, the only stream sampled to show a reduction in trout biomass. In addition, the average length has not changed since 1985 and weight has only increased slightly. The reduction in biomass of greenback trout in this stream may be due to a couple of circumstances; overstocking in previous years, and/or habitat degradation.

Stocking rates for greenback streams have been less than exact since the beginning of recovery efforts. The primary concern was to establish populations and stocking "on the heavy side" was probably the rule. In addition, a working estimate of the area of potential habitat was not known before 1985. Therefore, a number of streams were unknowingly overstocked, Williams Gulch being one of those. Culver and Bestgen (1985) noted the abundance of fish with poor body condition which may have been caused by an average annual stocking rate since 1982 of 1139 fish/ac (2847/ha). Therefore, the population may have been maintained at artificially high levels, which "crashed" to the low population level of 1986.

The habitat in the Williams Gulch drainage has seemingly declined in quality during the past few seasons. Cattle grazing appeared to have decreased bank stability and riparian vegetation resulting in increased siltation and bank sloughing. Indeed, biologists of the Arapahoe-Roosevelt Forests have (independent of recovery efforts) been alarmed of the habitat condition in the upper part of the drainage. A solution to this problem is currently being pursued by the USFS.

Pennock Creek

Pennock Creek was selected for reintroduction of greenbacks because of the good quality habitat and relatively low fishing pressure on the stream. Brook and brown trout were removed above the gabion barrier in 1985 by the USFS and DOW. Before stocking greenbacks in 1986, the stream was checked for any non-native trout which may not have been eliminated. The main channel and tributaries were intensively sampled with backpack shockers to the upper limit of fish habitat (about 2,970 m). This effort resulted in the capture of one rainbow trout, found just above the barrier, and one brook trout about 1.5 km upstream. It was assumed that the rainbow was put into the stream by an amateur "fish biologist". Because of the intensive nature of the sampling it was felt that the one brook trout was probably a sole survivor and that species was essentially eliminated.

Greenback fry from the USFWS Fish Technology Center in Bozeman, Montana were trucked to Ft. Collins on September 24. The 5,000 fry for Pennock Creek were then transferred to a smaller tank, iced, and trucked to the site. Fish were divided into seven double-lined plastic bags filled with approximately 3 gallons of water. The bags were inflated with oxygen and sealed with castrator bands. The fry were released at seven pool areas along the main channel (Figure 1) after being tempered to stream water temperature.

OPENING STREAMS TO FISHING

This topic was considered as part of the 1985 progress report (see Culver and Bestgen 1985) and that critique is still applicable at this time. Since that time fishing was also considered for East and West Sheep Creek, and Williams Gulch.

Black Hollow Creek

As discussed in the 1985 report, Black Hollow should be considered for opening to flies and lures/catch and release fishing for the 1988-89 regulation period. The standing crop has increased 32% since 1985 and all age classes were present in 1986. The only qualifying situation to this would be the U.S. Forest Service Crown Point plans. Potential adverse affects on the stream should be considered and the situation resolved before the creek is opened to fishing.

East and West Forks of Sheep Creek

Standing crops in the East and West Forks have increased by 59% and 460%, respectively, since 1984. They, therefore, meet all of the criteria stated in the 1985 report except that of stability. At present, stability is unknown since stocking has occurred each year (except 1986) and the degree of natural reproduction is uncertain. Two more years of monitoring, without the stocking factor, should be considered before opening. In most cases catch and release fishing at low pressure would not affect parent stocks, however, this area is moderately accessible and holds some potential for poaching.

Williams Gulch

According to the 1985 criteria this stream has potential as a fish-for-fun area, except that stability was unknown at that time. Although it now appears that all age classes are represented the standing crop has declined by 45% since 1985. This was the only greenback stream to show such a decline in 1986. Degredation of habitat due to grazing may be increasing siltation and temperatures which could be detrimental to the greenback population. This matter should be resolved before opening to public fishing is considered.

George/Cornelius Exotic Contamination Situation

Brook trout were found in both George and Cornelius Creeks in 1985 and again in Cornelius Creek in 1986. A reconnaissance of the lower drainage was conducted during early summer to assess the potential to rectify the situation. Due to conditions the upper basin could not be reached, an area of many beaver ponds and heavy willow growth.

In the 1985 report a plan was proposed to remove greenbacks using sodium cyanide, rotenone the basin, and reintroduce greenbacks. Because of restrictions on the use of NaCN this plan would now be difficult to accomplish, and could be difficult even if NaCN were available for use.



Figure 1. Stocking locations for greenback fry on Pennock Creek in 1986.

Electrofishing or seining would also be ineffective in removing all greenbacks. The only way to proceed with such a plan would be to sacrifice what would be numerous greenbacks, a possibility tarnished by potential media, statute, and "philosophical" problems.

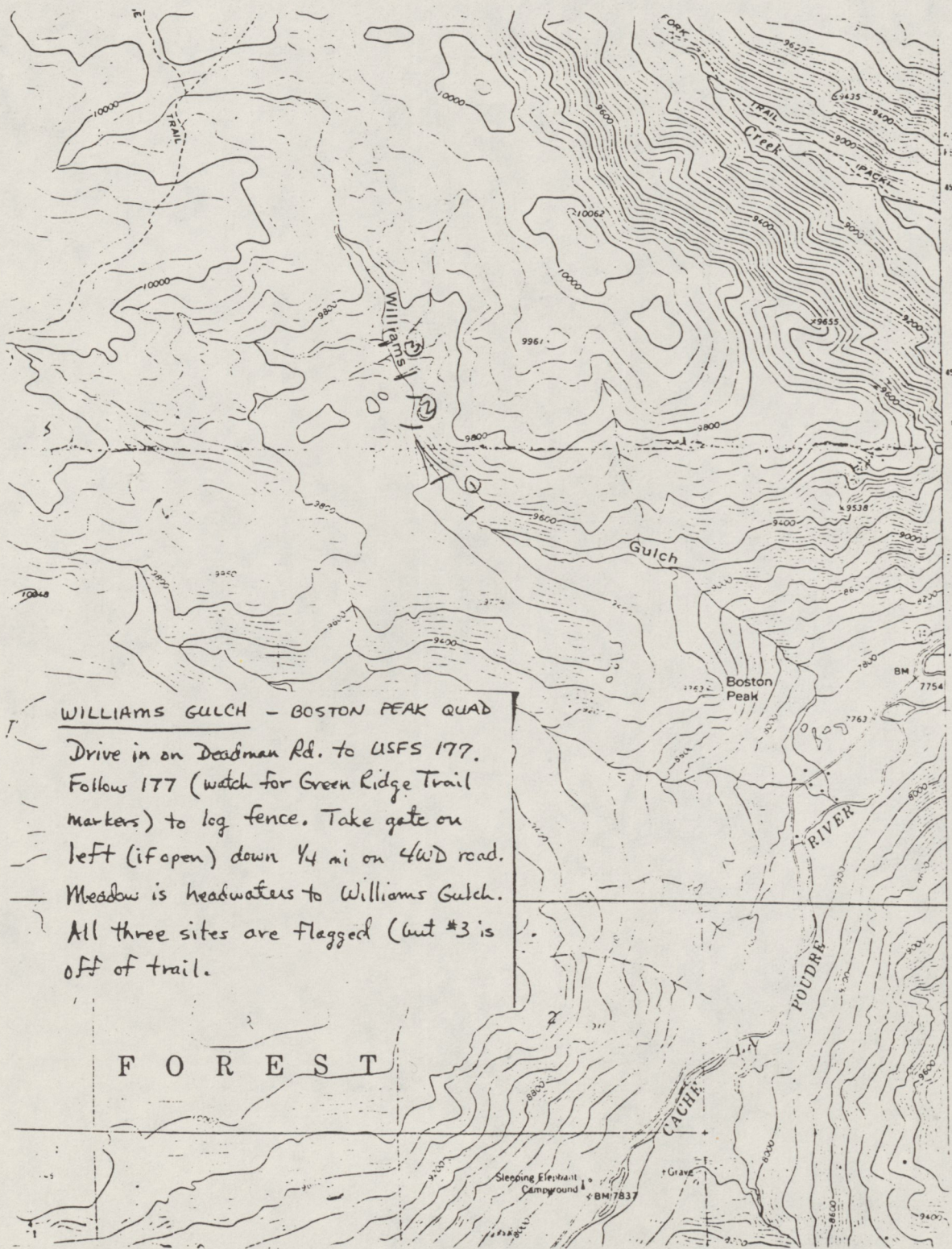
Currently the only reasonable solution appears to be opening up the area to catch and release fishing for greenbacks, and catch and kill for brookies (a la Hidden Valley Creek). This would not be recommended until the 1990-91 regulation period to give us time to monitor the population dynamics of the two species in George and Cornelius and the situation as it now exists at Hidden Valley Creek.

REFERENCES

- Binns, N.A. and F.M. Eiserman. 1979. Quantification of fluvial trout habitat in Wyoming. *Trans. Amer. Fish. Soc.* 108:215-228.
- Culver, S.R. and K.R. Bestgen. 1982. Greenback cutthroat trout recovery project, 1985 progress report. Colorado Division of Wildlife, Fort Collins. 37pp.
- Culver, S.R. and K.R. Bestgen. 1985. Greenback cutthroat trout recovery project, 1985 progress report. Colorado Division of Wildlife, Fort Collins. 37pp.
- Davis, J.A. and S.R. Culver. 1984. Greenback cutthroat trout recovery project 1984 progress report. Colorado Division of Wildlife, Fort Collins. 40pp.
- U.S. Fish and Wildlife Service. 1983. Greenback cutthroat trout recovery plan. Prepared by the Greenback Cutthroat Trout Recovery Team. USFWS, Denver, CO. 45pp.

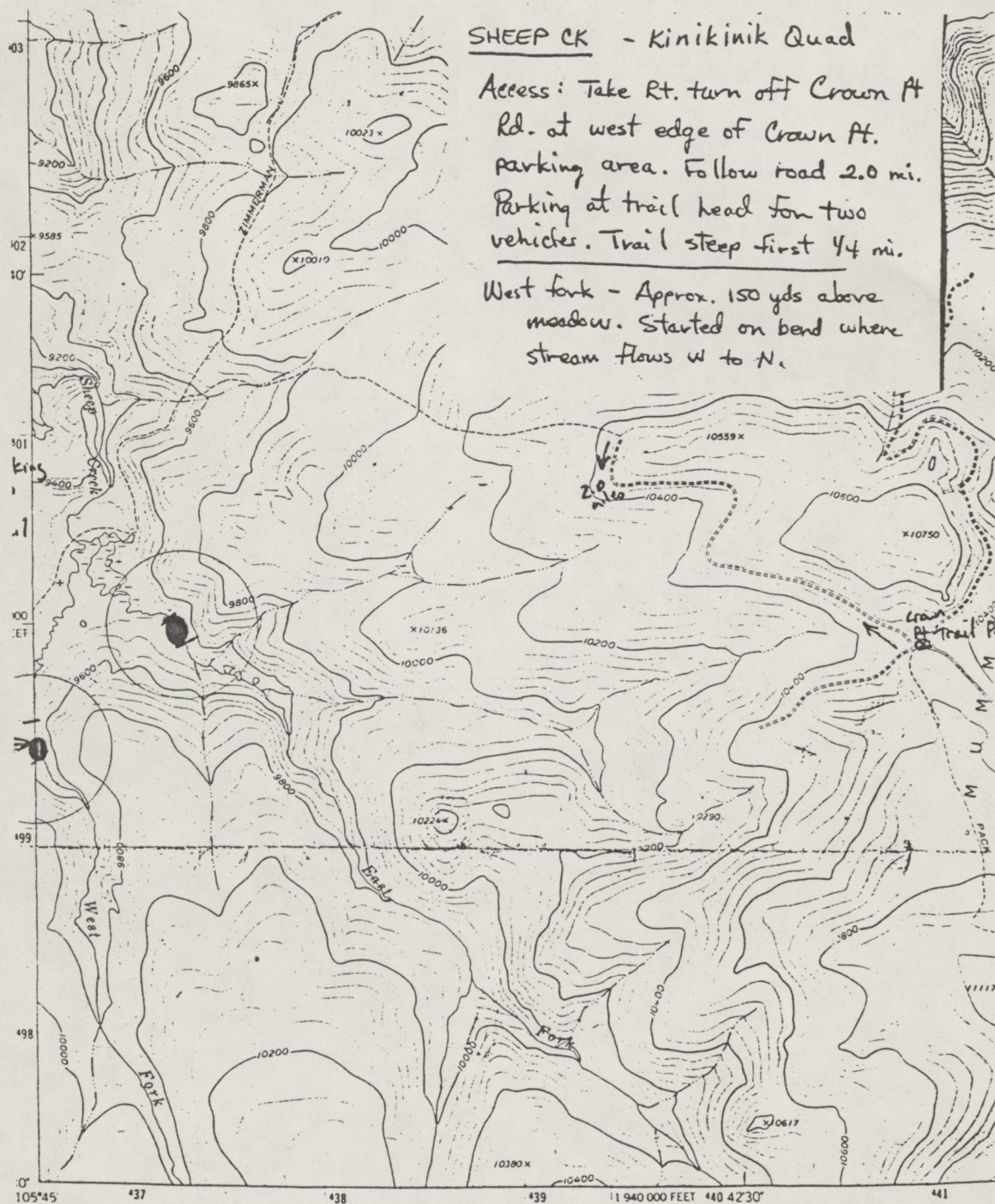
APPENDIX I

Sampling sites on greenback cutthroat trout streams.



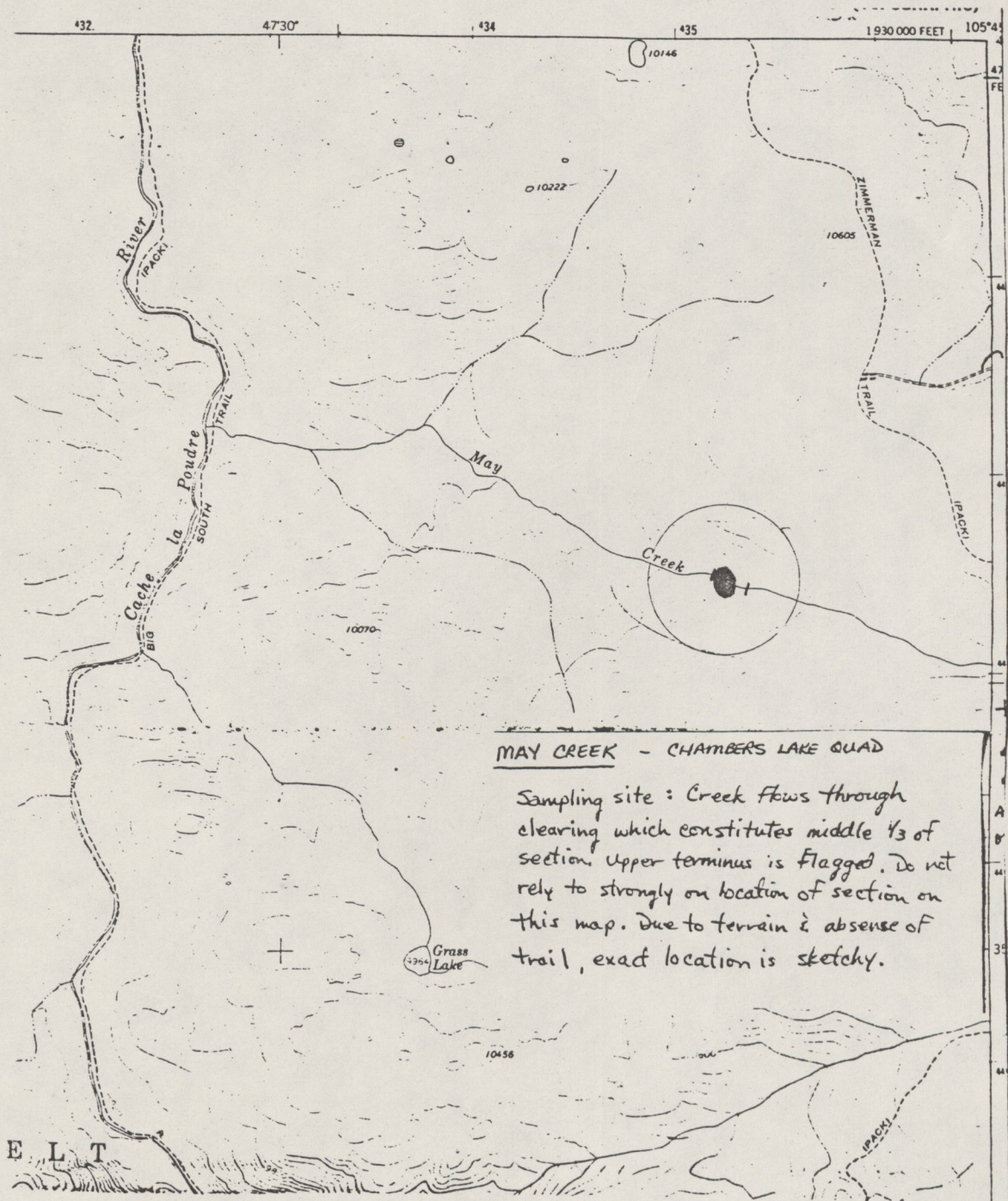
APPENDIX I

Sampling sites on greenback cutthroat trout streams.



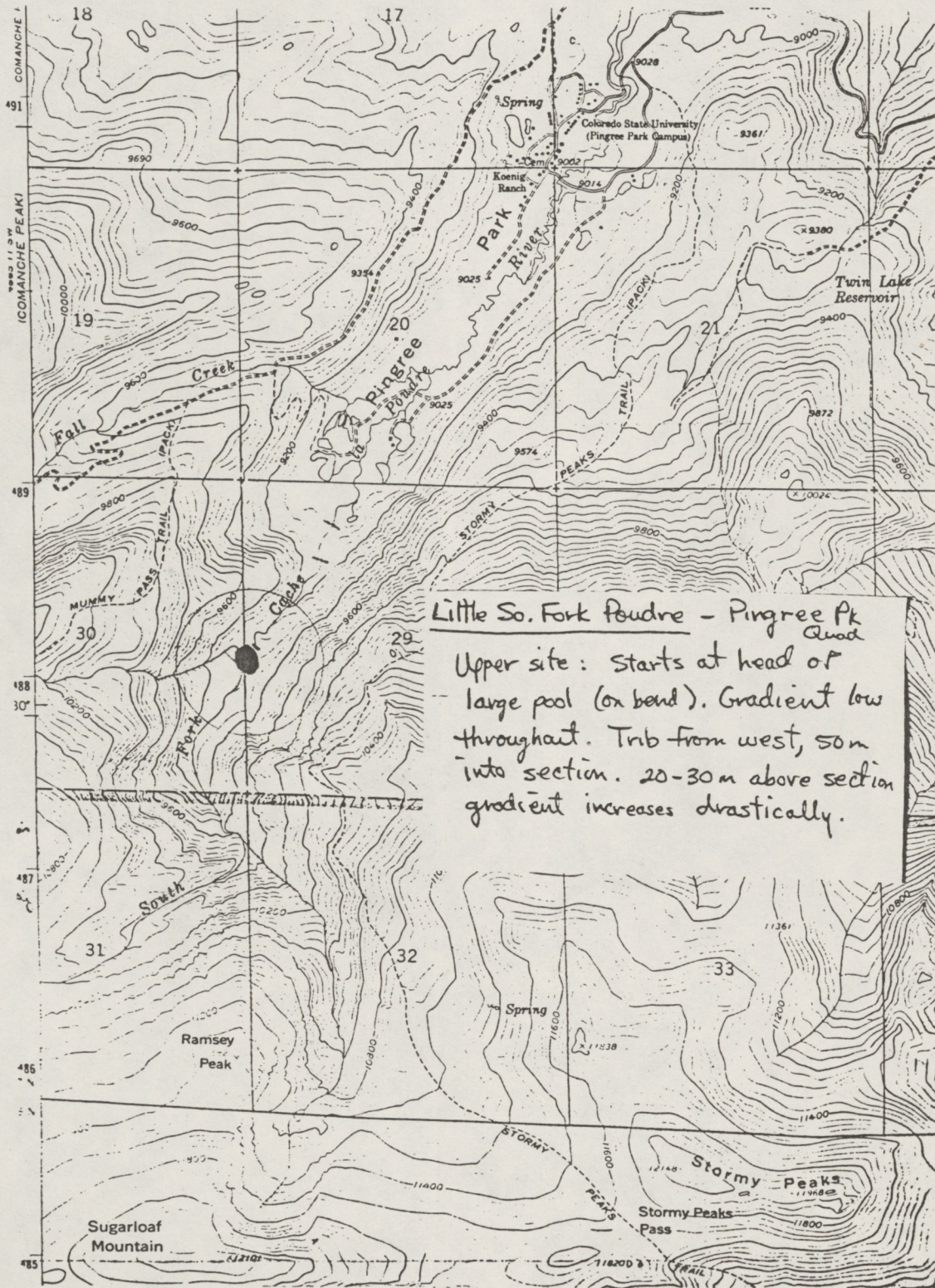
APPENDIX I

Sampling sites on greenback cutthroat trout streams.



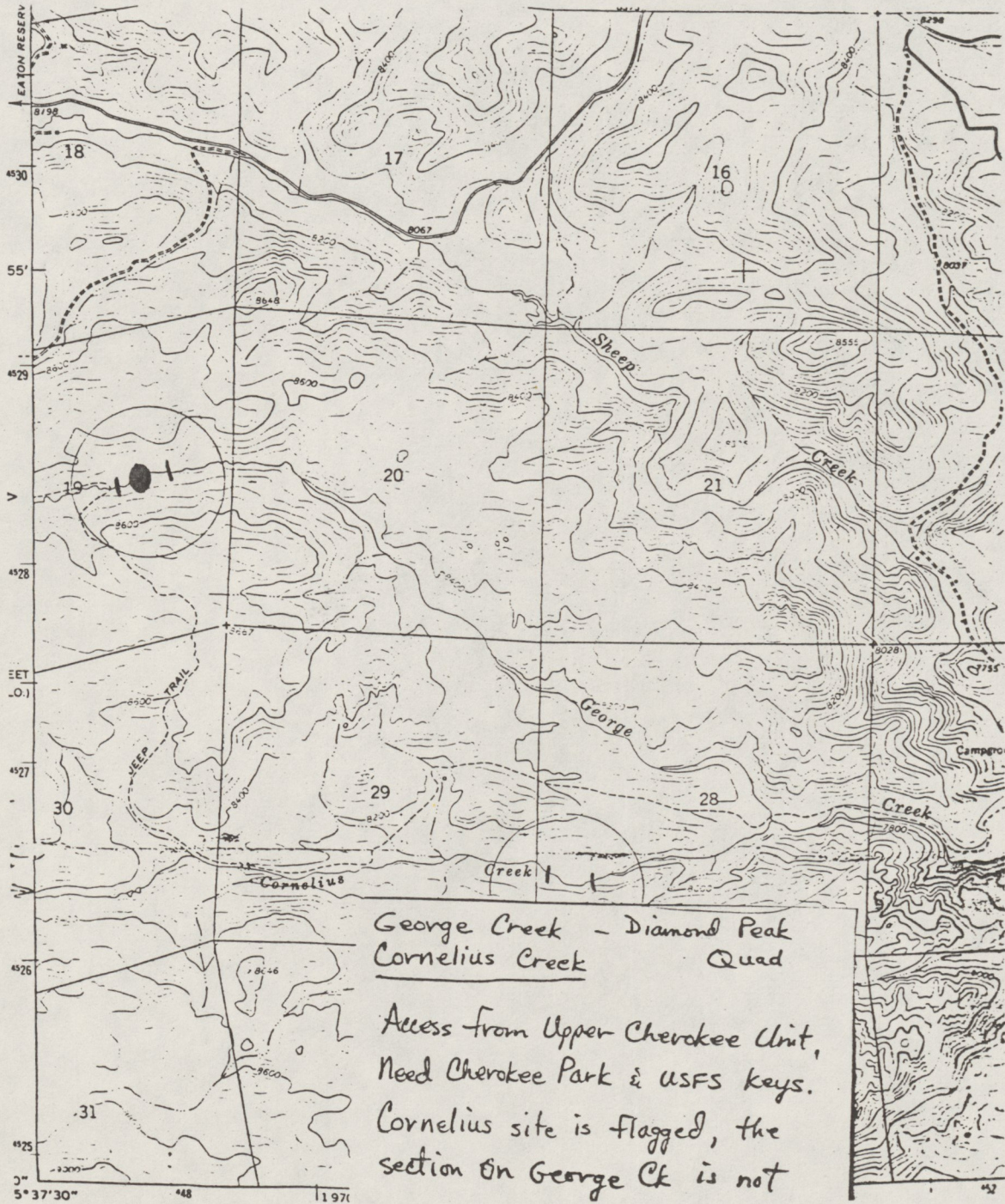
APPENDIX I

Sampling sites on greenback cutthroat trout streams.



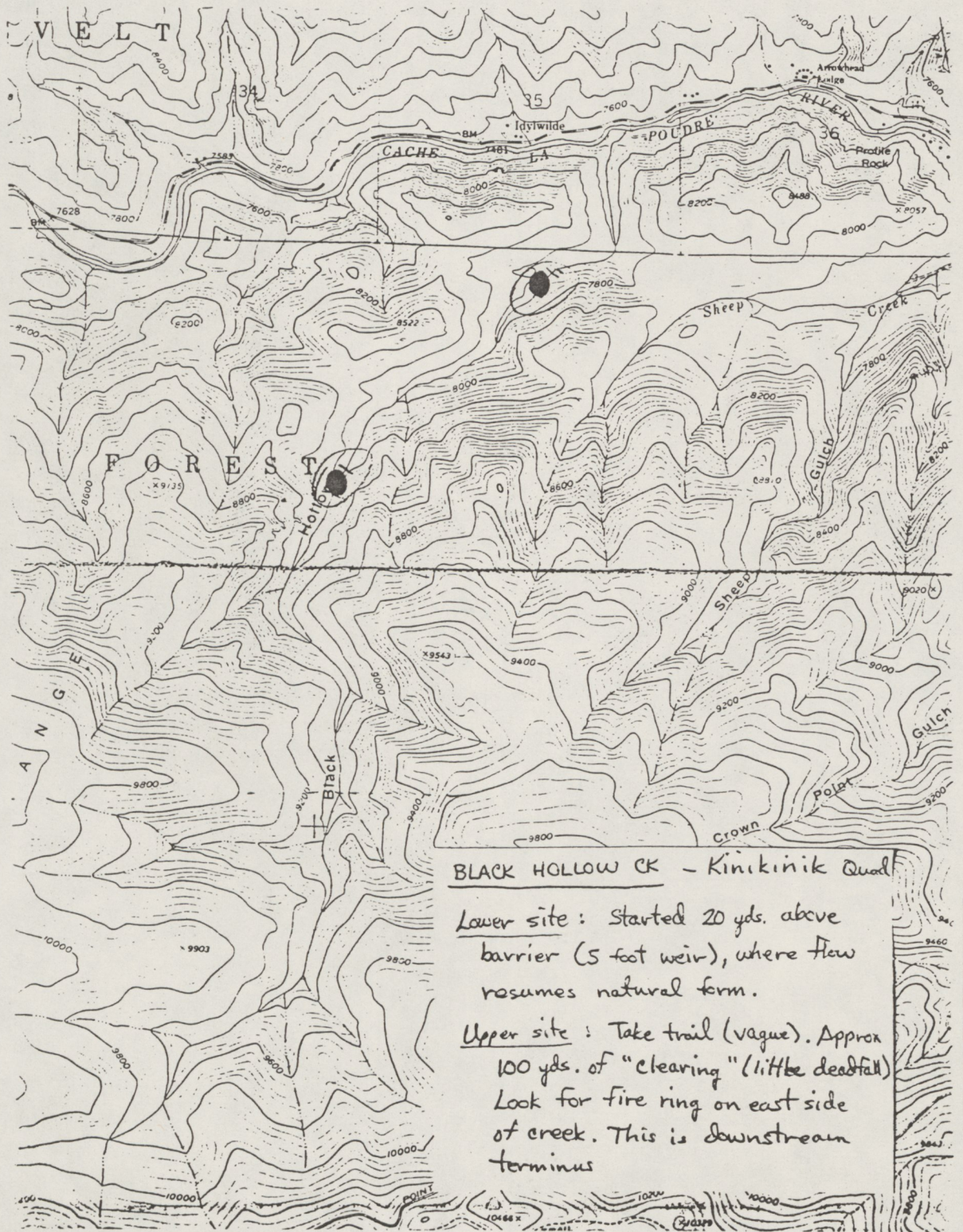
APPENDIX I

Sampling sites on greenback cutthroat trout streams.



APPENDIX I

Sampling sites on greenback cutthroat trout streams.



RECEIVED

MAR 01 2001

STATE PUBLICATIONS
Colorado State Library