

GREENBACK CUTTHROAT TROUT RECOVERY PROJECT

1983 Progress Report

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TABLE OF CONTENTS

INTRODUCTION	1
<u>Task Code</u>	<u>Task</u>
1.1	Population and Habitat Monitoring. 3
1.2	Habitat Improvement. 7
1.3	Stream Barrier Maintenance 8
1.6	Enforcement of Regulations 9
2.2	List of Potential Habitat. 10
2.4	Introduction of Pure (Type A) Greenback Cutthroat Trout. 25
2.5	Status of Recently Introduced Greenback Cutthroat Trout. 27

INTRODUCTION

This report summarizes the 1983 greenback cutthroat trout (Salmo clarki stomias) recovery effort in the N.E. Region for the State of Colorado.

In 1983, the greenback cutthroat trout recovery team set an objective to remove the greenback cutthroat trout from the USFWS threatened and endangered species list. This subspecies will be considered recovered when 20 stable greenback cutthroat trout populations are documented within its native range. To meet this objective, six tasks need to be completed:

1. Maintain and enhance historic and stable greenback trout populations and their habitat.
2. Establish or document the existence of 20 stable populations of pure (type A) greenback cutthroat trout within the species' historic range.
3. Establish hatchery and wild populations of pure (type A) greenback trout for broodstock.
4. Document response to angling pressure.
5. Conduct information and education program.
6. Prepare a long-term management plan and cooperative management agreement for the greenback cutthroat trout.

This year's efforts were directed to achieving the first and second task. In 1983, one new greenback trout population was established in

George and Cornelius Creeks. A total of 22 streams were surveyed for potential reclamation sites for greenback trout introduction.

Greenbacks from the Bozeman Fish, Technology Center were stocked in eight streams. Habitat improvement structures were placed in Como Creek. Six streams were surveyed to assess the status of recently introduced greenback trout. Closure signs were posted on three streams. The fish barrier on George and Cornelius Creeks was improved and repaired.

This report is arranged by tasks as outlined in the 1983 greenback cutthroat trout recovery plan.

Task 1.1 POPULATION AND HABITAT MONITORING

Little South Fork of the Poudre

The size of the adult greenback cutthroat trout population was estimated for the headwaters of the Little Fork of the Poudre. The Peterson mark and recapture method was used to estimate the population size. Past population estimates for this stream were inadequate because of the difficulty in collecting fish. This stream is very difficult to electrofish because of high flows, steep gradient, deep pools, large boulders and large debris jams. Our electroshocking equipment was selective for fish over 140 mm. Only one fish less than 140 mm was captured. Therefore, this population estimate is for adult greenbacks over 140 mm. The reason for not capturing smaller fish may also be the result of spawning failure for the past two years. Scale samples were collected, but were difficult to read because of the small scale size. Scale sample data was not included in this report. A total of 44 adult greenbacks were marked with a caudal fin clip and released in a 560 m study section on 30 August, 1, 15 and 22 September 1983. The fin clip was a small hole cut in the caudal fin with a paper punch. Lengths and weights of the marked fish were recorded before being released. A total of 60 fish were captured during the second pass through the study section on 6 October 1983. Lengths and weights were recorded for fish captured. Fourteen of the 60 greenbacks were recaptured. The estimated number of greenback cutthroat trout in the study section for fish larger

than 140 mm was 189 fish with a 95% confidence range of 117 to 260 fish. The total length of greenback cutthroat stream habitat in the Little South Fork of the Poudre was estimated to be 1600 m. The estimated total number of adult greenbacks in this stream is 539 fish with a 95% confidence range of 334 to 744 fish. Fish were also collected outside the study section for lengths and weights. A total of 105 fish were collected in the Little South Fork of the Poudre during 1983. The average length of all greenbacks captured was 208 mm and ranged from 80 mm to 317 mm. The average weight for 59 greenbacks was 100 g and ranged from 20 g to 245 g. Figure 1 illustrates the length frequency of the Little South Fork of the Poudre greenback cutthroat captured during 1983. This graph probably does not show the true fish size distribution for this population, but actually illustrates how electroshocking gear selects for larger fish.

Como Creek

Greenback cutthroat trout were captured from Como Creek on 5 July 1983 for the collection of milt. A total of 17 greenback cutthroat were collected. Greenback milt was collected from eight males, which was placed in eight separate vials. The vials were packed in ice and sent to the USFWS Bozeman Fish, Technology Center in Bozeman, Montana. Bruce Rosenlund of the U.S. Fish and Wildlife Service coordinated the milt taking operation. Length, weight and sex data were recorded. The eight males averaged 184 mm in length and ranged from 135 mm to 228 mm. Male average weight was 67 g and ranged from 20 g to 155 g. Five females averaged 192 mm in length and ranged from 172 mm to 221 mm. Female weights averaged 71 g and ranged 55 to 100 g. A total of four immature

fish were collected. Average juvenile length was 122 mm and ranged from 80 to 148 mm. Juvenile weights averaged 23 g and ranged from 15 to 30 g. The average length for all fish collected on 5 July 1983 was 172 mm and average weight was 60 g.

On 18 July 1984, Como Creek greenbacks were collected just below the University of Colorado Alpine Research Center. Lengths, weights and scale samples were collected. A total of 21 fish were collected. Average greenback length was 141 mm and ranged from 85 to 277 mm. Average fish weight was 30 g and averaged 5 to 84 g. Five of the 21 fish were in the 1+ age group. Average 1+ fish length was 106 mm and ranged from 85 mm to 130 mm. Average weight for 1+ fish was 9 g and ranged from 5 to 20 g. A total of 15 greenbacks were in the 2+ age group. Average 2+ fish length was 138 mm and ranged from 123 to 200 mm. Average 2+ fish weight was 32 g and ranged from 16 g to 84 g. Only one 3+ fish was collected. The 3+ fish length was 211 mm and weighed 84 g. More scale samples are needed in the future to supplement the 1983 data. Additional age information would provide accurate growth rates of Como Creek greenback cutthroat trout. Figure 2 illustrates the length distribution of Como Creek fish collected in 1983.

Black Hollow Creek

Only three greenback cutthroat were collected from Blackhollow Creek on 11 July 1983 for length, weight and scale data. Fish no. 1 was 240 mm long, weighed 125 g and was in the 4+ age group. Fish no. 2 was 193 mm long, weighed 65 g and was in the 3+ age group. Fish no. 3 was 162 mm long, weighed 40 g and was in the 3+ age group. Additional scale data is needed from Black Hollow Creek.

Figure 1. Little South Fork of Poudre greenback cutthroat trout length frequency for fish collected in 1983.

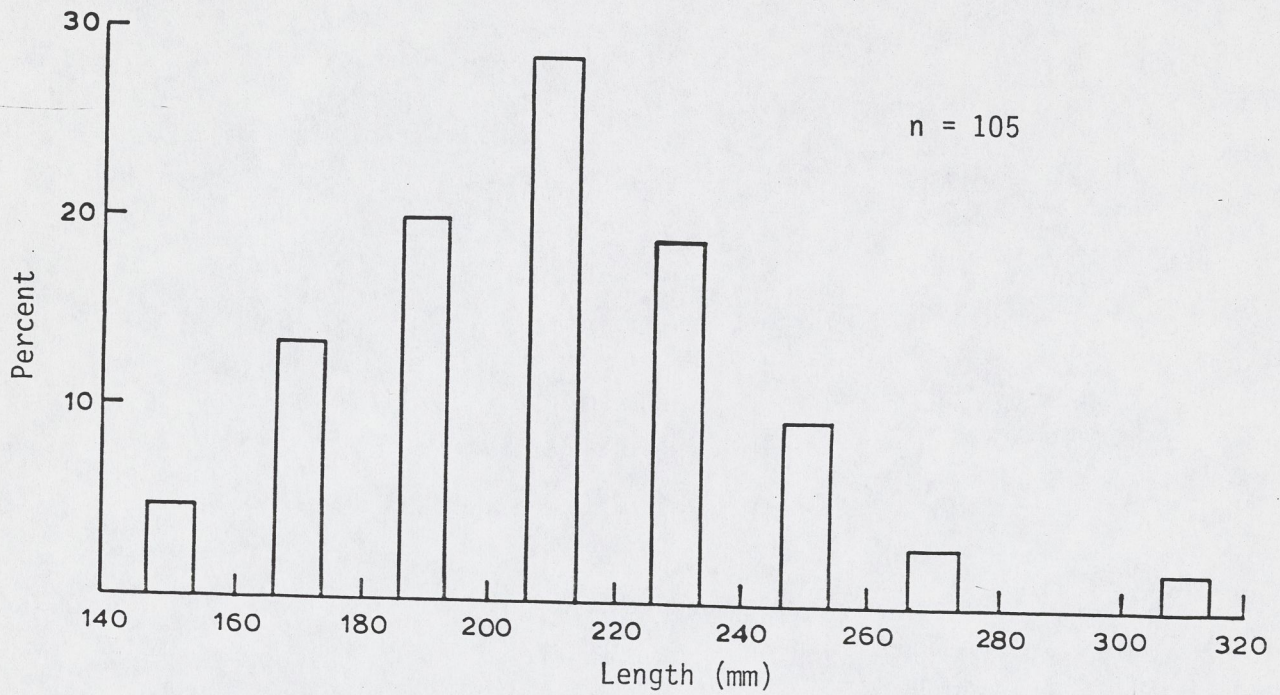
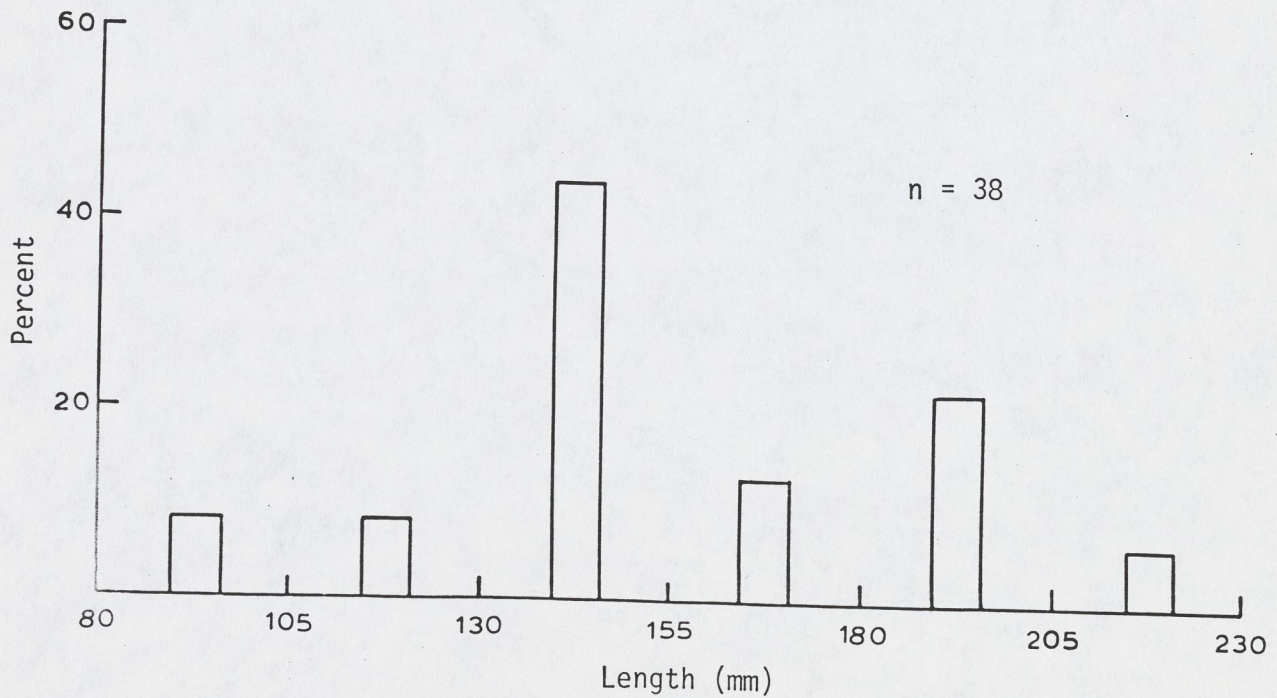


Figure 2. Como Creek greenback cutthroat trout length frequency for fish collected in 1983.



Task 1.2 HABITAT IMPROVEMENT

Como Creek

Como Creek was the site of habitat manipulation in October 1983. Results of a habitat and population study in 1982 showed the need for more deep pools in Como Creek. Bob Stuber of the U.S. Forest Service designed and coordinated the habitat improvement project for Como Creek. A total of 10 log dams were placed in the stream to create plunge pools. ~~Logs were placed in trenches dug into each bank.~~ Reinforcement bars were driven through the end of each log into the ground to insure that the logs will not wash out or roll during peak flow. A wire mesh skirt was stapled to the underneath side of the log. The skirt was laid on the stream bottom, upstream from the log. Rocks were placed on the wire mesh until completely covered. Rocks were placed in the bank trenches and on each bank above and below each log to prevent erosion and eventual diversion of water around each structure. The log structures should be inspected in 1984.

Task 1.3 STREAM BARRIER MAINTENANCE

The rock-filled gabion fish barrier on George and Cornelius Creek was repaired and improved. The unusually high spring runoff washed out a large beaver dam located on Cornelius Creek. The dam held 1.0 surface acres of water. Judging from the size of logs found in the debris jams, flow must have exceeded 100 cfs. Debris had lodged at and below the barrier, which caused water to wash out the soil on the west end of the barrier. Debris caught in willows and alder below the barrier created a large pool and decreased the waterfall drop to less than 0.5 m.

Large rocks were placed in the washed out bank at the end of the barrier to prevent water from flowing around the barrier and stabilize the bank. The debris jam below the barrier was removed as were all the live willows and alders that were within 20 m below the barrier. The water fall drop was restored to the normal 1.25 m.

Overall, the flood did very little damage to the barrier. Willows should be planted in the soil on and around the barrier to help stabilize the soil.

Task 1.6 ENFORCEMENT OF REGULATIONS

Signs, informing the public of stream closure to fishing, were posted near George, Cornelius, East Fork and West Fork of Sheep Creek.

The signs read as follows:

Closed to Fishing

By order of Colorado's Wildlife Commission this stream is closed to all fishing to protect the greenback cutthroat trout. You can help us restore this threatened species to a more secure population by complying with this closure. Report those who do not comply to the Colorado Division of Wildlife by calling 1-800-332-4155 (Operation Game Thief) or 295-0164 if in Denver metro area or 484-2836 in Fort Collins.

Task 2.2 LIST OF POTENTIAL HABITAT

A list of possible streams for reintroduction of greenback trout was established after examination of U.S. Forest Service, U.S. Geological survey maps and stream surveys files on all streams in N.E. region. In 1981, the 692 potential streams were narrowed down to a list of 173 streams and revised in 1982 to 123 streams and again in 1983 to 69 streams (Table 1) by using the following criteria:

- 1) Streams must be in the headwaters of either the Arkansas or South Platte River drainages.
- 2) The headwaters of the streams must be protected from invasion of non-native trout by a waterfall, steep cascade, other impassable barriers, or have a suitable site for a manmade barrier.
- 3) The stream must be in a low-use area.
- 4) The stream must have suitable habitat to support a reproducing population of greenback cutthroat trout. A rating system based on species present, habitat, impassable fish barrier or potential for construction of a fish barrier, accessibility and potential for eradication of nonnative species was set up as follows:

<u>Rating</u>	<u>Criteria</u>
A	Pure greenback cutthroat trout are present.
B	Hybrid greenback cutthroat trout are present.
C	<ol style="list-style-type: none"> 1) Fish barrier present. 2) Good trout habitat. 3) Low fisherman pressure. 4) Ready for greenback cutthroat trout introduction.

Table 1. Revised list of streams to be evaluated for greenback cutthroat trout introduction.

<u>Boulder</u>	<u>Clear Creek</u>	<u>Douglas</u>
Antelope Creek	Barbour Fork	Bear Creek
Arapahoe Creek	Bear Track Creek	Cook Creek
Bell Gulch	Beaver Dam Creek	Dry Gulch
Beaver Creek	Cottonwood Gulch	Jenny Gulch
S. Fk. Mid. Boulder	Devils Canyon	East Plum Creek
Central Gulch	Ethel Creek	Spring Gulch
Chipmunk Gulch	Indian Creek	Star Canyon
Colorado Creek	Lak Fork Creek	
Dry St. Vrain	Lost Creek	<u>Jefferson</u>
Ellsworth Creek	Melvine Creek	<u>Bear Gulch</u>
Hawkins Gulch	Nott Creek	Beaver Creek
Jasper Creek	Ralston Creek	Brush Creek
Keystone Gulch	Rose Creek	
Mammoth Gulch	Ruby Creek	<u>Gilpin</u>
Mitchell Creek	Soda Creek	<u>Arbuckle Gulch</u>
Pennsylvania Gulch	Truesdale Creek	Cottonwood Gulch
Rattlesnake Gulch	Tumbling Creek	Elk Creek
	Warren Gulch	Jenny Creek
<u>Larimer</u>	Watrous Gulch	Macy Gulch
Cedar Creek	West Fork Creek	Pecks Gulch
Dry Creek	Woods Creek	
Fall Creek		
Fox Creek	<u>Park</u>	
Lewstone Creek	<u>Deep Gulch</u>	
Poverty Gulch	Gibson Gulch	
Swamp Creek	Holmes Gulch	
Willow Creek	Jefferson Lake Fork	
	Lake Fork	
	Mill Gulch	
	Slaughterhouse Gulch	

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- 1) Barrier or barrier site present.
 - 2) Good to marginal trout habitat.
 - 3) Moderate fisherman pressure.
 - 4) Good reclamation potential.
 - 5) Work required before introduction.
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- 1) No fish barrier or barrier site present.
 - 2) Poor or marginal habitat.
 - 3) High fishing pressure.
 - 4) Poor reclamation potential.
 - 5) Not recommended for introduction of greenback cutthroat trout.

Twenty of the 123 potential D-rated streams were surveyed in 1983. Surveyed streams were evaluated based on the potential for greenback cutthroat reintroduction. High, moderate, and low priorities were assigned to each stream surveyed as follows:

High priority - should be considered for greenback cutthroat trout reintroduction.

Moderate priority - should be considered if no high priority streams are available.

Low priority - should not be considered for greenback cutthroat trout reintroduction and given an E-rating.

Streams which were surveyed and had good habitat but need to be looked at again were not given a priority rating.

Clear Creek County

Jackwacher Gulch (Tributary of Geneva Creek. R75W, T5S, sec. 28, 33. Elevation: 10,800-11,600 ft)

Jackwacher Gulch was surveyed on 3 August 1983. Trout habitat was poor. Stream gradient was very steep. A beaver dam in the upper reaches created a large pond (1 hectare). An electroshocking survey did not recover any fish from the pond. This is a low priority stream.

Vance Creek (Tributary of Corral Creek. R73W, T4S, sec. 34, 35, R73W, T4S, sec. 1, 2, 3, 5, 8. Elevation: 8,400-10,400 ft)

Vance Creek was surveyed on 12 October 1983. Trout habitat was good with deep pools, good flow (5 cfs) and excellent cover. A 50 m section at the forest and private property boundary was surveyed. Willows and douglas fir were the primary riparian species. Water temperature was 42°F. A total of 23 brook trout (Salvelinus fontinalis) were collected. Fish lengths ranged from 80 to 220 mm and averaged 157 mm. Fish weights ranged from 5 to 120 g. Owners of the property, which Vance Creek flows through, would have to be contacted before this creek could be considered for reclamation. This is a moderate priority stream.

Douglas County

Eagle Creek (Tributary of Trout Creek. R69W, T10S, sec. 4, 8, 9, R69W, T9S, sec. 34. Elevation: 7,000-8,200 ft)

Eagle Creek was surveyed on 25 August 1983. Trout habitat was adequate. This stream was surveyed near a series of beaver ponds, located 2.0 km below the Rampart Range Road. Flow was low (1.5 cfs). Riparian vegetation included willow, alder, cedar, mountain maple, spruce and fir. No fish were captured in a 35 m survey section. No fish were collected from the beaver ponds during one hour of hook and line fishing. A waterfall located .5 m below the study section is a good fish barrier. This stream could support a greenback cutthroat population, but low water flow is a potentially limiting factor. In the future, if surplus greenback cutthroat are available, Eagle Creek should be considered as a potential greenback cutthroat stream. This is a moderate priority stream.

Gove Creek (Tributary of West Plum Creek, R68W, T10S, sec. 10, 11, 15, 21. Elevation: 6,800-8,000 ft)

Gove Creek was surveyed 25 August 1983. Trout habitat was adequate with low flows (1 cfs) 30 cm deep pools and good cover. Water temperature was 54°F at 1400 hour. pH was 7.0 and hardness was 185 mg/l. Willows shaded 50% of the stream. This stream was surprisingly productive. Approximately 90 brook trout were collected in a 50 m section. The average length of 34 fish was 105 mm and ranged from 40 to 210 mm. Only 2 km of trout habitat is available above a series of waterfalls, which are effective fish barriers. This stream would be very easy to reclaim because of the small amount of water. Gove Creek will be considered a moderate priority stream, since the habitat is marginal.

Middle Garber Creek (Tributary of Garber Creek. R69W, T8S, sec. 24, 25, 26. Elevation: 7,000-7,600 ft)

Middle Garber Creek was surveyed on 24 August 1983. Trout habitat was poor with low flow (<1 cfs) and few pools. A 50 m section, 2 km above the confluence with Garber Creek, was surveyed. No fish were collected. This is a low priority stream.

North Garber Creek (Tributary of Garber Creek. R69W, T8S, sec. 13, 14. Elevation: 7,000-7,600 ft)

North Garber Creek was surveyed on 24 August 1983. Trout habitat was poor with low flow (<1 cfs) and steep gradient. A 50 m section, 2 km above the confluence with Garber Creek, was surveyed. Water temperature was 55°F. This stream was heavily shaded from willows and alder. Only two cutthroat x rainbow hybrids were collected. Fish lengths were 160 mm and 175 mm. This is a low priority stream.

Zinn Ranch Ponds (R69W, T9S, sec. 22)

Zinn Ranch Ponds were surveyed on 3 August 1983. A series of five ponds on a small tributary near the headwaters of Jackson Creek were sampled with hook and line. Many brook trout were collected with length range of 140 mm-190 mm. Two ponds, approximately 0.1 hectares each, are located near the confluence with Jackson Creek. Three ponds are located 1.5 km upstream from the lower ponds with a total surface area of approximately 0.2 hectares. Aquatic vascular plants included *potamogeton* and *myriophyllum*. A stand pipe in the lower pond acts as a fish barrier to upstream migration. The ponds are at an elevation of approximately 8,240 and 8,400 feet. The trout habitat in the stream connecting the ponds is marginal with low flow (<1 cfs), few pools and adequate cover. The stream bottom substrate provides good spawning areas.

The Zinn Ranch Ponds would be good brood ponds for greenback cutthroat trout. The easy access and short riparian vegetation would make these ponds workable for taking cutthroat trout spawn in the spring. The lower elevation and thus relative warm water temperature would be conducive to rapid fish growth. The small stream between the ponds would provide some recruitment into the pond populations. These ponds will not provide an adequate number of brood fish in the future to meet the needs of the North East Region, but will be a start in establishing a greenback cutthroat trout brood population in the region.

Brook trout should be removed from the Zinn Ranch Ponds and connecting stream with 2.5% rotenone during August 1984. The ponds should be restocked in the summer of 1985 with fish directly from Como Creek or from the Little South Fork of the Poudre.

Jefferson County

Gunbarrel Creek (Tributary of South Platte River. R70W, T8S, sec. 32, 33, 34. Elevation: 6,320-7,200 ft)

Gunbarrel Creek was surveyed on 16 August 1983. A 100 m reach of stream was surveyed, 2 km above the confluence of the South Platte. Trout habitat was good with good cover, excellent spawning substrate and 30 cm deep pools. Stream banks were stable with willows, alder, pine and juniper providing stream shade. The bottom substrate was 75% gravel and 25% cobble. Stream width averaged 1 m. Flow was 1.5 cfs. A road near the stream in the lower reaches increased the stream silt load. Water temperature at 1600 hour was 60°F and pH was 8.5. Rainbow, brook and brown trout (Salmo trutta) were collected. The average length of three rainbows was 197 mm. The average length of nine brown trout was 137 mm. The average length of three brook trout was 157 mm. No natural fish barriers were found, but there were several good sites for a barrier structure. This stream would be difficult to poison because of poor access. The upper reaches of this stream need to be surveyed. This is a moderate priority stream.

Wigwam Creek (Tributary of South Platte River. R71W, T9S, sec. 10, 11, 12, 13, R72W, T9S, sec. 18, 19, 20)

Wigwam Creek was surveyed on 18 August 1983. Trout habitat was good with deep pools, moderate flow (5 cfs) and adequate cover. Temperature was 48°F at 11:00 am. No toxic levels of heavy metals were found in the Wigwam Creek water sample (Table 2). The majority of this creek flows through an open meadow and beaver ponds. Many of the beaver ponds were blown out during the spring runoff. A waterfall fish barrier is located at 8,800 feet elevation. The habitat is between 8,400 and 10,100 feet

elevation. There is approximately 2.5 miles of habitat not including the many tributaries. Six small streams flow into Wigwam Creek. The stream was sampled with hook and line for approximately 10 man-hours. Many brook trout were collected 140 mm-200 mm in length and four cutthroat trout were collected. The cutthroat appeared to be hybrids.

Wigwam Creek is a high priority stream. Brook trout should be removed from this stream during August 1985.

This creek will be difficult to poison because of the numerous tributaries and beaver ponds. Rotenone (2.5%) should be applied at a constant 5 ppm for six to eight hours to remove all brook trout. Potassium Permanganate is recommended at 3 ppm to detoxify the fish toxicant.

Wildcat Creek (South Platte River. R71W, T10S, sec. 27, 28, 29.
Elevation: 7,000-8,400 ft)

Wildcat Creek was surveyed on 26 August 1983. Trout habitat was poor with low flow (<1 cfs) and few pools. No fish were collected. This is a low priority stream.

Park County

Bluestem Draw (Tributary of Craig Creek. R72W, T8S, sec. 29.
Elevation: 8,800-10,000 ft)

Bluestem Draw was surveyed on 17 August 1983. Trout habitat was adequate with good flow (3 cfs) and moderate gradient. Douglas fir and aspen were the primary vegetation providing shade. A 100 m section above a series of waterfalls was surveyed. Several beaver dams created large pools. Water temperature was 51°F at 1400 hour and pH was 7.5. No fish were captured in the study section. Brook trout were collected

in the lower reaches. No fish lengths or weights were measured. This is a moderate priority stream.

Bruno Gulch (Tributary of Geneva Creek. R75W, T6S. Elevation: 9,700-10,800 ft)

A water sample was collected on 12 October 1983 from Bruno Gulch. The water sample was tested for heavy metal concentrations. No toxic level of heavy metals were found in the water sample (Table 2). Water temperature was 36°F. This stream is still considered a high priority stream.

Camp Creek (Tributary of Deer Creek. R73W, T6S, sec. 21, 29, 30. Elevation: 8,900-11,000 ft)

Camp Creek was surveyed on 27 July 1983. Trout habitat was marginal. Water velocity was high due to moderate gradient. Riparian vegetation included willows, alder and lodgepole pine and provided 95% shading. Water temperature was 46°F at 1530 hour. pH was 7.5. A 75 m section of stream was surveyed just above the Deer Creek Campground. A total of 13 brook trout were collected. Fish lengths ranged 115 mm to 203 mm and averaged 161 mm. This is a low priority stream.

Church Fork (Tributary of Elk Creek. R73W, T6S, sec. 15, 16, 21, 22. Elevation: 8,830-9,760 ft)

Church Fork was surveyed on 28 July 1984. Trout habitat was poor with heavy siltation and low flow (1.5 cfs). A 30 m section of stream located 2 km above the confluence with Elk Creek was surveyed. Stream gradient was 10% and pH was 7.5. Water temperature was 49°F at 1000 hour. No fish were found in the upper section. Beaver ponds located 1.0 km above the confluence with Elk Creek were surveyed. A total of nine brook trout were captured in the ponds. Fish lengths ranged from

60 mm to 220 mm and averaged 156 mm. Fish weights ranged from 5 to 140 g and averaged 61 g. A road along the stream contributed to the heavy silt load in both sections surveyed. This is a low priority stream.

Craig Creek (Tributary of North Fork of South Platte. R72W, T8S, sec. 19, 20, R73W, T8S, sec. 5, 6, 9, 14, 15, 23, 24, R74W, T7S, sec. 35, 36)

Craig Creek was surveyed on 4 August and 17 August 1983. Trout habitat was excellent with deep pools, high flows (15 cfs) and good cover. Cover was primarily undercut banks and overhanging willows. Craig Creek meanders through a willow and grass meadow. The stream banks were stable with campsites and trails being the only perturbation of the riparian vegetation. There were no beaver ponds present. A series of waterfalls at 9,000 to 10,000 ft elevation act as a fish barrier to upstream migration. The length of trout habitat was approximately four miles and at an elevation of 10,200 to 11,000 ft. Craig Creek was sampled with hook and line near the lower trail crossing. A 110 m section was sampled. Twelve brook trout were collected with lengths ranging from 125 mm to 225 mm. A water sample was collected approximately 100 m above where the Payne Creek trail leaves Craig Creek and above the confluence of several small tributaries. Water temperature was 48°F and pH was 7.5 at 11:00 am. No toxic levels of heavy metals were found in the Craig Creek water sample (Table 2).

Craig Creek is an excellent candidate for greenback cutthroat trout reintroduction and will be considered the number one high priority stream which has been surveyed to date for greenback reintroduction.

This stream will be very easy to reclaim since there are no beaver ponds and few tributaries. Brook trout should be removed from Craig

Creek during August 1984. Rotenone (2.5%) is recommended at 5 ppm for six to eight hours. The toxicant should be applied with constant drip stations and backpack sprayers for isolated pools and side channels. Potassium Permagate should be released at a constant 3 ppm to detoxify the rotenone. The detoxification station should be located at the water quality sampling site described above.

Craig Creek is considered by many to be an excellent fishery and is rated the third best stream in the Pike National Forest. This stream does not support a truly quality fishery. Compared to other greenback cutthroat trout streams Craig Creek could easily produce 12-14 inch greenbacks.

Tributary of Craig Creek (Located south of Bluestem Draw. R72W, T8S, sec. 28. Elevation: 8,800-9,600 ft)

A small tributary of Craig Creek was surveyed on 17 August 1983. Trout habitat was marginal with good flow (3 cfs) and moderate gradient. A 50 m section located 10 km above the confluence of Craig Creek was surveyed. Water temperature was 52°F at 1500 hour. pH was 7.5. A total of 10 brook trout were collected ranging from 100 mm to 225 mm. This is a low priority stream.

Deer Creek (Tributary of North Fork of South Platte. R73W, T6S, sec. 18, 19, 20, R74W, T6S, sec. 11, 13, 14. Elevation: 8,900-11,200 ft)

Deer Creek was surveyed on 27 July 1983. Trout habitat was adequate with high flow (25 cfs) and moderate gradient. Douglas fir, lodgepole pine and aspen were the primary vegetation. Water temperature was 45°F and pH was 7.5. A 75 m reach of stream was surveyed. The number of brook trout collected was six. Fish lengths ranged from 95 mm to 178 mm

and averaged 130 mm. No natural fish barriers were found in the lower reaches. Many privately owned cabins were located along the stream below the Deer Creek campground. Upper reaches of this stream should be surveyed. This is a moderate priority stream.

Elk Creek (Tributary of Clear Creek. R73W, T6S, sec. 9, 10, 15.
Elevation: 8,800-10,400 ft)

Elk Creek was surveyed on 28 July 1983. Trout habitat was adequate with a few deep pools, good flow (15 cfs) and 8% gradient. A 100 m section of stream was surveyed near the Indian Creek trail turnoff. Water temperature was 46°F at 1100 hour and pH was 7.5. Water was clear. Pool-riffle ratio was 1 to 5. Alder, willows and aspen shaded 60% of the stream. Roads and trails contributed to the stream silt load. A total of 13 brook trout were collected. Fish lengths ranged from 68 to 202 mm and averaged 137 mm. Fish weights ranged from 3 to 115 g and averaged 39 g. No natural fish barriers were located. This is a moderate priority stream. The upper reaches should be surveyed.

Kirby Gulch (Tributary of Geneva Creek. R75W, T6S, sec. 4, 9, 10.
Elevation: 9,600-11,600 ft)

Kirby Gulch was surveyed on 3 August 1984. Trout habitat was good in lower reaches, with good cover, deep pools and adequate flow (2 cfs). A series of beaver dams created several large ponds in an open meadow. A total of 7 brook trout were captured. Fish lengths ranged from 150 to 220 mm. Fish were not weighed. No fish were captured above a series of falls in the upper reaches. No barrier was found. A potential barrier structure site was located near the confluence with Geneva Creek. This is a moderate priority stream because of the limited amount of habitat.

North Fork of North Elk Creek (Tributary of North Elk Creek. R72W,

T6S, sec. 8, 9, 16. Elevation: 8,900-10,400 ft)

North Fork of North Elk Creek was surveyed on 28 July 1983. A 75 m section of stream located in the upper meadows was surveyed. Trout habitat was good. The stream meanders through an open meadow. Riparian vegetation consisted of grasses and shrubs. Pools were 0.3 to 0.5 m deep. Flow was 3 cfs. Substrate was primarily rubble, gravel and silt with intermittent algae and moss. Water temperature was 58°F at 1400 hour and pH was 7.0. Stream gradient was 3%. Cattle grazing caused banks to slough. Stream invertebrates were abundant. A total of 28 brook trout were collected in the study section. Fish lengths ranged from 70 to 180 mm and averaged 127 mm. Fish weights ranged from 3 to 65 g and averaged 25 g. A total of 23 brook trout were collected in the lower reaches. Fish lengths averaged 133 mm and ranged from 70 to 180 mm. Fish weights ranged 2 g to 66 g and averaged 29 g. No natural fish barrier was located. A good site for a barrier structure was found in the lower reaches near the forest boundary. This stream would be a very good greenback cutthroat trout stream. Before this stream could be considered for reclamation, owners of the property bounding the stream and the lake would have to be contacted. An agreement with the landowners would have to be made to replace any fish killed by poison in the stocked lake. The lake is located 1 km below the potential barrier site. Until an agreement can be made with the property owners this stream will be considered a moderate priority stream.

Tributary of North Fork of North Elk Creek (R72W, T6S, sec. 4, 9, 15. Elevation: 9,100-10,000 ft)

A small tributary flowing from the east into North Fork of North Elk Creek was surveyed on 28 July 1983. Trout habitat was good with deep

pools and good spawning areas. A 100 m section of stream was surveyed at the four-wheel drive road crossing. Riparian vegetation consisted of lodgepole pine and willows. Approximately 20% of the stream was shaded. Flow was 1.5 cfs. Stream gradient was 4%. Water temperature was 52°F at 1400 hour. A total of 27 brook trout were collected. Fish lengths ranged 30 to 191 mm and averaged 111 mm. Fish weights ranged from 13 to 100 g and averaged 37 g. No barrier was found. This stream should be reclaimed only if North Fork of North Elk Creek is reclaimed. This is a moderate priority stream.

Scott Gomer Creek (Tributary of Geneva Creek. R74W, T5S, T6S.

Elevation: 9,320-11,600 ft)

A total of 11 water samples were collected from Scott Gomer Creek for heavy metals analysis. On 21 June 1983, Brenda Melton of the U.S. Forest Service collected 10 samples from Scott Gomer Creek and one sample from Francis Creek, a small tributary of Scott Gomer. These samples were taken during peak flow. One water sample was taken during low flow on 12 October 1983. Potentially toxic levels of copper were measured in five of 11 water samples taken from Scott Gomer and Francis Creek. Toxic levels of lead were measured from one water sample from Scott Gomer Creek (Table 2). In 1982, brook trout were collected from the lower reaches of Scott Gomer and appeared to be in good condition. Physical habitat was rated as excellent for trout. The 1982 habitat evaluation for Scott Gomer Creek was downgraded from excellent to marginal because of the presence of toxic concentrations of copper and lead. This stream was also downgraded to a low priority stream and should be removed from the list of candidate aquatic habitats for introduction of greenback trout.

Table 2. Water quality analysis results from 1983.

Location	Date	Elev. (ft)	Temp.	pH	Cd (ppb)	Cu (ppb)	Pb (ppb)	Ag (ppb)	Zn (ppb)
Scott Gomer #6	6/21/83	11,480	1°C	6.2	1.0	9.0	2.5	<.1	2.4
Bog Pond	6/21/83	11,400	-	5.6	2.8	7.0	2.0	<.1	<2.0
Red Sandy Deposits	6/21/83	11,350	-	5.6	1.1	43*	10.2	<.1	16
Mt. Biarstald Trib.	6/21/83	11,320	-	6.8	<.5	21*	24*	<.1	2.0
Above 1st Ord. Trib.	6/21/83	10,680	1°C	6.8	9.6	2.0	4.1	<.1	<2.0
1st Order Trib.	6/21/83	10,660	-	7.2	<.5	7.0	6.3	<.1	<2.0
Lake Fork Trib.	6/21/83	10,600	-	6.9	<.5	14*	10.2	<.1	2.1
Below Lake Fork	6/21/83	10,320	5°C	7.0	<.5	<1.0	<2.0	<.1	2.0
Below 1st Ord. Trib.	6/21/83	10,640	-	7.1	<.5	7.0	3.0	<.1	<2.0
Scott Gomer Falls	6/21/83	9,320	5°C	7.2	<.5	19*	5.1	<.1	<2.0
Scott Gomer Falls	10/12/83	9,320	40°F	-	<.5	1.8	<.1	<.1	<2.5
Geneva Creek	6/21/83	9,640	-	6.8	<.5	1.0	2.0	<.1	<2.0
Francis Creek	6/21/83	9,940	-	-	<.5	18*	5.0	<.1	<2.0
Bruno Gulch	10/12/83	9,800	36°F	-	<.5	3.0	<.1	<.1	<2.5
Craig Creek	8/17/83	10,200	48°F	-	<.5	9.2	<.1	<.1	<2.5
Wigwam Creek	8/18/83	9,000	48°F	-	<.5	6.0	<.1	<.1	<2.5

*Potentially toxic level.

Task 2.4 INTRODUCTION OF PURE (TYPE A) GREENBACK CUTTHROAT TROUT

In 1983, a total of 11,182 greenback cutthroat trout fry were stocked in seven streams. Fry were transported from the USFWS, Bozeman Fish, Technology Center in Bozeman, Montana to Fort Collins, Colorado on 26 September 1983. Fry not stocked on the day of arrival were held in two 100 gal aquariums at the CDOW Fort Collins research facility. Fish appeared lethargic after they were first placed in the holding aquariums. The same fish appeared much more lively and in better condition the following day. Fry were held up to three days and were not fed during this period. Mortalities were minimal for fish held in the aquariums and fish released. The average greenback fry weight for a 50 fish subsample was 1.07 g. Stocking rates and dates for seven streams in the N.E. region are listed in Table 3.

Table 3. Greenback cutthroat trout stocking record for South Platte drainage for 1983.*

Stream	Date	Estimated no. of fish	Total weight (g)
Black Hollow Creek	9/26	935	1,000
George Creek	9/26	2,243	2,400
Cornelius Creek	9/26	2,308	2,470
May Creek	9/27	701	750
E.&W. Fk. of Sheep Creek	9/27	2,187	2,340
Bard Creek	9/28	2,243	2,400
William Gulch	9/29	421	450
Total		11,038	11,810

*Does not include greenbacks released in Rocky Mountain National Park.

Task 2.5 STATUS OF RECENTLY INTRODUCED GREENBACK CUTTHROAT TROUT

Six new populations of greenback cutthroat trout have been established into reclaimed streams since 1980. Bard Creek, Black Hollow Creek, Hourglass Creek, East and West Fork of Sheep Creek, and Williams Gulch were surveyed in 1983 to determine the success of recent greenback cutthroat introductions. Greenbacks were captured from all streams except Hourglass. The majority of captured greenbacks were from the 1982 planting. A 50 fish subsample of greenbacks released on 5 and 6 October and 11 November 1982 averaged 45 mm and ranged 32 mm to 63 mm. All 1982 fish showed an increase in size. Growth rate comparisons between streams would be meaningless because of the different stream survey dates.

Bard Creek

Bard Creek was first stocked 5 October and 11 November 1982. Nine greenback cutthroat were captured during a electroshocking survey on 19 August 1983. Average fish length was 72.2 mm and ranged from 55 mm to 100 mm. The number of fish recovered for the amount of electroshocking time was disappointingly low. The large size of pools surveyed and the inefficiency of electroshocking gear for collecting small fish may account for the poor capture rate. Future Bard Creek electroshocking surveys should provide a better picture of the population status because greenbacks will be larger and more susceptible to electroshocking gear.

Black Hollow Creek

Only three fish were captured in the lower reaches of Black Hollow Creek on 13 July 1983. One of the fish was 25 mm long and probably was the product of natural reproduction. The other two fish were 100 mm and 110 mm long. These fish may be from the 1982 planting or may be from natural reproduction. This survey did not provide truly representative information for this population because electrofishing was very difficult due to high flows and dense overhanging vegetation.

Hourglass Creek

Hourglass Creek was stocked with greenback cutthroat trout in 1980, 1981 and 1982. An intensive electroshocking survey recovered only five fish in 1982. In 1983, no fish were recovered during an electroshocking survey of a 300 m section of the best trout habitat in Hourglass Creek. This stream should be intensively surveyed one more time in 1984 during low flow to determine if any of the recently stocked greenbacks have survived. If no fish are found in Hourglass, trout habitat parameters should be measured to determine why greenbacks cannot survive in Hourglass. The results of a habitat analysis would provide valuable information on greenback cutthroat trout habitat requirements and help in the future selection of suitable introduction sites.

May Creek

May Creek was surveyed on 31 August 1983. A total of 26 greenbacks were captured and were in good condition. One of the greenback cutthroat was 210 mm and was from the group of fish stocked in 1980. The other 25 fish were from the 1982 stocking and averaged 91.2 mm and ranged from 78 mm to 110 mm.

East and West Fork of Sheep Creek

Sheep Creek was surveyed on 10 October 1983. A total of 22 fish were captured. Average greenback cutthroat length was 98.4 mm and ranged from 80 mm to 112 mm. Average fish weight was 9.35 g and ranged from 5 g to 18 g. Over a one year period the Sheep Creek greenbacks showed a 118.7% increase in average length and a 863.9% increase in average weight.

Williams Gulch

An electroshocking survey on 11 July 1983 found the greenback cutthroat planted in 1981 and 1982 in good condition. Six fish from the 1981 stocking averaged 208 mm in length and ranged from 140 mm to 254 mm. The remaining eight fish were from the 1982 stocking and averaged 50 mm in length and ranged from 40 mm to 60 mm.