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Greenback Cutthroat Trout Recovery Project
1981 Progress Report

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State of Colorado

Department of Natural Resources

Division of Wildlife

Nongame Program Management

6060 Broadway

Denver, Colorado 80216

October, 1982

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I. Introduction

This report summarizes the 1981 greenback cutthroat trout recovery effort in the North East Region for the state of Colorado.

In 1977, the greenback cutthroat recovery team set a goal of restoring stable, self-sustaining populations of greenback cutthroat trout (Salmo clarki stomias) until said populations have reached a point where their survival is assured. To meet this goal, three objectives were established:

- 1) Determine if and where additional greenback cutthroat trout populations still exist.

- 2) Reintroduce greenback cutthroat trout into suitable habitat in the historic range.

- 3) Monitor and protect known populations.

This years efforts were directed to achieving the second and third objectives. In 1981, one new greenback cutthroat trout population was established in Williams Gulch. A total of 28 streams were surveyed for potential reclamation sites for greenback cutthroat trout reintroduction. Nonnative trout species were removed from several sites scheduled for greenback trout introduction. These sites included East and West Forks of Sheep Creek, George Creek, and Cornelius Creek. In an effort to evaluate greenback cutthroat trout habitat requirements, a methodology for quantifying stream habitat was developed.

II. Status of Existing Populations.

Five populations of greenback cutthroat trout are presently managed in the North East region (Table 1.) None of the populations at this point in time can be considered stable populations.

Table 1. Existing greenback cutthroat trout populations.

<u>County</u>	<u>Stream</u>	<u>Drainage</u>
Boulder	Como Creek	Boulder Creek
Clear Creek	-	-
Douglas	-	-
Jefferson	-	-
Gilpin	-	-
Larimer	Black Hollow	Poudre River
	Hourglass	Poudre River
	Little South Fork of Poudre River	Poudre River
	May Creek	Poudre River
Park	-	-

Como Creek

Habitat degradation and fishing are the main problems confronting the Como Creek population. Habitat degradation is manifested mainly in the lack of good deep pools and excessive silt loads. Washout from four wheel drive roads which run alongside and cross Como Creek in the lower sections is the main source of

siltation. Silt build up in the stream is a limiting factor to both reproductive success and food production. Fishing pressure is still a factor limiting this population. Although no anglers were encountered, there was evidence of fishing.

Blackhollow Creek

New signs were posted on Black Hollow Creek to alert the public of the status of the Black Hollow population. Letters explaining the status of the greenback cutthroat trout and of the Black Hollow Creek population (see appendix A) were also distributed to all landowners living near Black Hollow Creek. No attempt was made to collect any fish from this area during the 1981 field season.

Little South Fork of the Poudre

Several attempts were made in June to collect adult fish for an egg taking operation. Unfortunately, no fish over 10cm were captured. During 1980, large fish up to 30cm were collected. Based on evidence of camping along the stream, we suspect this population has been depleted due to fishing.

Signs were posted to alert the public of the status of this population. Furthermore, all landowners adjacent to the U.S. Forest Service property were notified of the status of the greenback cutthroat and fishing regulations (see appendix A).

During late August and early September fry traps were installed in the creek to determine if reproduction had been successful during 1981 and catch fry for transportation to a more secluded area upstream. No fry were captured.

May Creek

May Creek was sampled twice to determine the status of fish stocked during 1980. No fish were sampled on either occasion.

Hourglass Creek

During June, Hourglass Creek was examined to determine if fish were present from the 1980 stocking. Fish were observed in the same location of the previous years planting. More greenback cutthroat were stocked to increase the size of the existing population. During July, approximately 96 greenbacks were planted. These fish were transported from a fish hauling truck to the stocking site in twelve plastic bags (approximately 8 fish per bag) by horseback. All fish were acclimated to the stream temperature and released. No mortalities were observed.

III. Establishment of New Populations

One new population was established in 1981. Williams Gulch, tributary of the Cache la Poudre River, in Larimer county was stocked with approximately 48 greenbacks in July. These fish were transported from a fish hauling truck to the stocking site in six plastic bags (approximately 8 fish per bag) by horseback. All fish were acclimated to the stream temperature and released. No mortalities were observed.

IV. Stream Restoration Projects

East and West Forks of Sheep Creek, George Creek and Cornelius Creek were the sites of stream restoration efforts in 1981. These

streams were treated with synergized rotenone (2.5%) to remove nonnative trout species. Potassium permanganate was used to detoxify the rotenone. Concentrations, exposure times, and total amount of rotenone and potassium permanganate for both fish removal projects are listed in table 2. Rotenone was released into the streams using modified small animal waterers. A 1/16 inch hole was drilled into the trough of the waterers. A constant head of water in the trough created a steady flow through the hole. Potassium permanganate was applied using modified five gallon gerry cans. A trough was welded near the top of the can. A .25 inch hole was drilled into the bottom of the trough. Rotenone was applied to isolated and low flow pools using insecticide sprayers.

East and West Forks of Sheep Creek were poisoned in 1980 using rotenone. Unfortunately rainbow trout were collected during an electrofishing survey during July of 1981. The reason for an incomplete kill in 1980 may be due to heavy rains prior to the poisoning of Sheep Creek. A higher than normal influx of freshwater into both forks may have diluted the concentration of toxicant released into the streams. Both forks of Sheep Creek were poisoned again on 10 September 1981. Since no fish were collected in the upper sections of the east and west forks in 1981, the rotenone drip stations were located in the lower reaches above small impassable waterfalls. The two drip stations were approximately 1.5 miles above the natural waterfall barrier. The detoxifying drip station was located above the waterfall fish barrier on Sheep Creek.

George and Cornelius Creeks were surveyed in 1981 and were considered suitable streams for greenback cutthroat trout

reintroduction based on reclamation potential and adequate trout habitat. Brook trout (Salvelinus fontinalis) was the primary species found with a few brown trout (Salmo trutta) collected in the lower reaches of both streams.

A fish barrier was constructed in George Creek approximately 0.5 miles below the confluence of Cornelius Creek. The Young Adult Conservation Corps (YACC), under the direction of Jim Smith, helped design and build the fish barrier. The barrier was constructed of rock-filled gabion baskets. The completed rock dam created a one meter high waterfall. Below the waterfall large boulders were positioned to prevent scouring of the bottom substrate and undermining of the barrier. The barrier was lined with black plastic to prevent seepage through the rock-filled baskets.

After construction of the barrier was completed, George and Cornelius Creeks were poisoned on 19 August 1981. The five toxicant drip stations were placed equal distances apart, with two on Cornelius Creek and three on George Creek. The detoxification station was located below the gabion fish barrier. Members of the YACC helped by maintaining the rotenone drip stations.

East and West Forks of Sheep Creek, George Creek, and Cornelius Creek should be surveyed in 1982 to assess the results of 1981 fish removal efforts. If both projects were successful, greenback cutthroat trout should be reintroduced in 1982.

Table 2. Concentrations, exposure times, and total amount of rotenone and potassium permanganate used for fish removal projects.

	Sheep Creek			George Cornelius	
	East Fork	West Fork	Mainstream	Creek	Creek
<u>discharge</u>	3.5cfs	3.5cfs	7.0cfs	0.7cfs	0.8cfs
<u>rotenone</u>					
concentration	5ppm	5ppm	5ppm	5ppm	5ppm
total used *	10.7 l	10.7 l	21.4 l	4.0 l	5.8 l
exposure time	6hrs	6hrs	6hrs	6hrs	6hrs
<u>potassium permanganate</u>					
concentration			3ppm		3ppm
total used			15.0kg		30.0kg
exposure time			12hrs		30hrs

* Does not include rotenone used for spraying isolated pools.

V. Habitat Evaluation Procedure Development

In an effort to develop a methodology for evaluating streams for greenback introductions, two habitat models were examined. These models included the Habitat Suitability Index (HSI) developed by the U.S. Fish and Wildlife Service and Binns (1979) Habitat Quality Index (HQI). These models were examined with the objective of quantitatively evaluating candidate streams prior to introductions of greenback cutthroat trout so that a prior estimate of their performance after introduction could be made. At present, candidate streams are selected mainly on subjective opinions. Field forms were developed to record information required by both models and a permanent file form was developed to summarize the field information (see appendix B). These methodologies were performed on Como Creek. These measurements and complete analysis of the methodologies is not complete at this time.

VI. Stream Surveys

A list of possible streams for reintroduction of greenback trout was established after examination of U.S. Service, U.S. Geological survey maps and stream surveys files on all streams in N.E. region. The 692 potential streams were narrowed down to a list of 173 streams (Table 3) 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:

rating

criteria

- | | |
|---|---|
| A | Pure greenback cutthroat trout are present. |
| B | Hybrid greenback cutthroat trout are present. |
| C | 1) Fish barrier present.
2) Good trout habitat.
3) Low fisherman access.
4) Ready for greenback cutthroat trout introduction. |
| D | 1) Barrier or barrier site present.
2) Good to marginal trout habitat.
3) Marginal fisherman access.
4) Good reclamation potential.
5) Work required before introduction. |
| E | 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. |

Table 3. List of Streams to be Evaluated for Greenback Cutthroat Trout Introduction

<u>Boulder</u>	<u>Clear Creek</u>	<u>Douglas</u>	<u>Jefferson</u>	<u>Gilpin</u>	<u>Larimer</u>	<u>Park</u>
Antelope	Barbour Fork	Bear Creek	Bear Creek	Arbuckle Gulch	Beaver	Bluestern Draw
Arapahoe	Bard Creek	Camp Creek	Bear Gulch	Cottonwood Gulch	Little Beaver Creek	Bone Gulch
Bear Gulch	Bear Track Creek	Cook Creek	Beaver Creek	Elk Creek	Boston Peak Creek	Bruno Gulch
Bell Gulch	Beaver Dam Creek	Dry Gulch	Brusch Creek	Elk Creek	Box Elder Creek	Burning Bear Creek
Beaver Creek	Blue Creek	Eagle Creek	Cabin Creek	Jenny Creek	Cedar Creek	Camp Creek
South Fork Middle Boulder	West Chicago Creek	Fourmile Creek	Deer Creek	Macy Gulch	Cow Creek	Craig Creek
Buck Gulch	Chicago Creek	Garber Creek	Elk Creek	Pecks Gulch	Dry Creek	Deep Gulch
Caribou Creek	Cottonwood Gulch	Middle Garber Creek	Field Creek		Deer Creek	Deer Creek
Cave Creek	Cumberland Gulch	North Garber Creek	Freeman Creek		Duck Creek	Duck Creek
Central Gulch	Devils Canyon	South Garber Creek	Green Mountain Creek		North Elk Creek	North Elk Creek
Chipmunk Gulch	Dry Gulch	Gove Creek	Gunbarrel Creek		North Fork Elk Creek	North Fork Elk Creek
Colorado Creek	Ethel Creek	Jenny Gulch	McCurdy Creek		Francis Creek	Francis Creek
Coulson Gulch	Fall River	Metz Canyon	Morrison Creek		Geneva Creek	Geneva Creek
Delonde Creek	Grizzly Gulch	Pine Creek	Redskin Creek		Gibson Gulch	Gibson Gulch
Dry St. Vrain	Herman Gulch	East Plum Creek	Rolling Creek		Gurnsey Creek	Gurnsey Creek
Ellsworth Creek	Hoop Creek	Spring Gulch	North Rolling Creek		Holmes Gulch	Holmes Gulch
Fourmile Creek	Indian Creek	Star Canyon	Tanglewood Creek		Jefferson Creek	Jefferson Creek
Hawkins Gulch	Kenney Gulch	Trout Creek	Tramway Creek		Jefferson Lake Fork	Jefferson Lake Fork
Horseshoe Creek	Lake Fork Creek	Turkey Creek	Wigwam Creek		Kenosha Creek	Kenosha Creek
Jasper Creek	Lake Fork	Little Turkey Creek			Kirby Gulch	Kirby Gulch
Keystone Gulch	Lost Creek	Watson Park Creek			Lake Fork	Lake Fork
Mammoth Gulch	Leavenworth Creek	Wild Cat Creek			Lamping Creek	Lamping Creek
Mitchell Creek	Mud Creek				Mill Gulch	Mill Gulch
Park Creek	Melvine Creek				Sawmill Gulch	Sawmill Gulch
Pennsylvania Gulch	Mill Creek				Scott Gomer Creek	Scott Gomer Creek
Rattlesnake Gulch	Nott Creek				Shute Town Creek	Shute Town Creek
West Fork Little Thompson	Quayle Creek				Slaughterhouse Gulch	Slaughterhouse Gulch
	Ralston Creek				Threemile Creek	Threemile Creek
	Rose Creek					
	Ruby Creek					
	Ruby Creek					
	Soda Creek					
	Steel Creek					
	Stevens Gulch					
	Truesdale Creek					
	Tumbling Creek					
	Vance Creek					
	Warren Gulch					
	Watrous Gulch					
	West Fork Creek					
	Wide Awake Gulch					
	Woods Creek					

Twenty-eight of the 173 potential D-rated streams were surveyed in 1981. 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 a E-rating.

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

The following is an annotated list of streams which were inventoried during 1981. Streams are listed by county.

Boulder County

Caribou Creek (tributary of North Boulder Creek)

Surveyed on 24 September 1981. Stream habitat was marginal due to human activity in the area. Heavy use from four-wheel drive vehicles has destroyed much of the riparian ground cover and mining activity near the headwaters have resulted in heavy siltation of the stream bottom. The siltation problem could be eliminated if all roads were closed and erosion control structures were installed in damaged areas. Other habitat parameters like pool size, flow, and cover were good. The lower reaches of Caribou Creek flows through Caribou Ranch. James Guencio, owner of the Caribou Ranch, has

offered his support in restoring the upper sections of Caribou Creek to its natural conditions, building a fish barrier, and reintroducing the greenback cutthroat trout. This is a moderate priority stream.

Como Creek(tributary of North Boulder Creek)

Surveyed on 22 September 1981. The lower reaches of Como Creek below the waterfall barrier and located on the Caribou Ranch was surveyed. Habitat was good with deep pools, adequate cover, and good flow (3.0cfs). An intense electroshocking survey was conducted to determine if any greenback cutthroat were below the waterfall. No greenback trout were captured. The only species found was brook trout. James Guercio, the owner of the Caribou Ranch, expressed some interest in the reclamation of the lower reaches of Como Creek.

Fourmile Creek(tributary of Boulder Creek)

Surveyed on 23 September 1981. Upper reaches were surveyed above Highway 72. Trout habitat was marginal with moderate flow and a few deep pools. No natural fish barriers were found, but several potential barrier sites were present. Brook trout was the only species collected. This is moderate priority stream.

Clear Creek County

Bard Creek(tributary of Clear Creek)

Surveyed on 1 October 1981. Bard Creek was brought to our attention by Steve Puttman after his stream survey crew found the

stream barren of fish and the habitat suitable for trout. Our survey found the habitat good with large deep pools, adequate cover and moderate flow (3.0cfs). Numerous beaver dams are present creating many large ponds. No fish were collected from reaches we sampled. A series of gradient falls act as a natural fish barrier. The results of water quality analysis indicated no lethal concentrations of heavy metals were present in the water samples collected. (See table 4). A second water sample will be collected in 1982 during peak flow and analyzed for toxic elements. Bard Creek is a high priority stream since it is barren of fish, has a natural fish barrier, and has good cutthroat trout habitat. This stream will be stocked with greenback cutthroat trout in 1982 if the results of the second water analysis are favorable. An environmental assessment report is being prepared by the U.S. Forest Service.

Blue Creek (tributary of West Fork of Clear Creek)

Surveyed on 3 October 1982. Habitat was poor with low flow and high gradient. This is a low priority stream.

Chicago Creek (tributary of Clear Creek)

Surveyed on 1 October 1982. Habitat in lower reaches was good with large pools, good cover, and high flow (5.0cfs). Spawning habitat was adequate for cutthroat trout above Idaho Springs reservoir. The drain pipe in the reservoir is an effective fish barrier. Several small lakes at the headwaters of Chicago creek and the upper sections of the stream should be surveyed in 1982. This is a potential high priority stream.

West Chicago Creek (tributary to Chicago Creek)

Surveyed on 1 October 1981. Habitat in lower reaches was poor with high gradient and few pools. No fish were observed. The West Chicago Creek area receives high recreational use. The upper reaches should be surveyed. This is a low priority stream.

Cumberland Gulch (tributary to Clear Creek)

Surveyed on 30 September 1982. Habitat was poor with low flow (<1.0cfs) and no pools. No fish were observed. No fish barrier was found. This is a low priority stream.

Dry Gulch (tributary of Clear Creek)

Surveyed on 4 October 1982. Habitat in lower reaches was poor. Flow was moderate (2.0cfs). Further investigation is needed.

Fall River (tributary of Clear Creek)

Surveyed on 30 September 1981. Cutthroat trout habitat was marginal with good cover and adequate pools. Extreme flow fluctuations were caused by variable water release rates from the reservoir at the headwaters. Brook trout was the only species observed. No natural fish barrier was found. Most of the stream is on private property. This is a low priority stream.

Grizzly Gulch (tributary of Quayle Creek)

Surveyed on 3 October 1981. Habitat was moderate with few pools, little cover and moderate flow (1.5cfs). The bottom substrate had a scoured appearance with limited periphyton present. Hach kit water

analysis results were Ph of 8.0, hardness of 102.6, and nitrate nitrogen of 0.2mg/l. No fish were observed. Steep gradient in lower reaches act as a natural fish barrier. This is a low priority stream.

Herman Gulch(tributary of Clear Creek)

Surveyed on 4 October 1981. Trout Habitat was poor in lower reaches. Flow was moderate (2.0cfs). No fish were observed. Further investigation is needed.

Hoop Creek(tributary of West Fork of Clear Creek)

Surveyed on 3 October 1981. Habitat was poor with low flow and high gradient. No fish were observed This is a low priority stream.

Leavenworth Creek(tributary of South Clear Creek)

Surveyed on 29 September 1982. Habitat was moderate to good with adequate cover, deep pools, and good flow(4.0cfs). No fish were collected or observed. A series of waterfalls in the lower reaches are an effective fish barrier. The results of water quality analysis indicate no lethal concentrations of heavy metals (see table 4). A second water sample will be collected and analyzed during peak flow in 1982. The results should indicate if any toxic levels of heavy metals are leaching from the numerous mine tailings present in the watershed. Leavenworth Creek is a high priority stream and should be stocked with greenback cutthroat trout in 1982 if the results of the second water quality analysis are favorable. An environmental assessment report will be prepared by the U.S. Forest Service.

Mill Creek(tributary of Clear Creek)

Surveyed on 30 September 1982. Habitat was moderate to good with large deep pools, good cover, and discharge of 3.0cfs. Numerous beaver dams are located approximately two miles from the confluence. Four hybrid cutthroat trout were collected and numerous brook trout (5-35cm) were collected. No barrier was found. Access was limited to four wheel drive roads and foot trails. The lower reaches flow through private property and the upper reaches are on U.S. Service property. This is a moderate priority stream.

Mud Creek(tributary of West Fork of Clear Creek)

Surveyed on 1 October 1981. Habitat in upper reaches was poor with low flow, steep gradient and shallow pools. Habitat in the lower sections was moderate with good flow (2.5cfs), few pools in the mainstream, and good cover. Many deep beaver ponds were present. No fish were collected or observed. A series of waterfalls act as a fish barrier. The barrier was located just above the confluence with West Fork of Clear Creek. Access is limited to four wheel drive vehicles and foot trails. Mud Creek is a water supply stream for Empire, Colorado. Since this stream is barren of fish, a water quality analysis should be conducted. This is a moderate priority stream.

Qualye Creek(tributary of Clear Creek)

Surveyed on 4 October 1982. Habitat was moderate with good flow (4.0cfs). No fish barrier was found. Further investigation is needed.

Stevens Gulch(tributary of Quayle Creek)

Surveyed on 3 October 1982. Habitat was poor to moderate with few pools, little cover and moderate flow (2.0cfs). The stream bottom substrate in Stevens Gulch had the appearance of a scoured stream with limited periphyton present. No fish were observed. A waterfall fish barrier was present. This is a low priority stream.

Woods Creek(tributary to Urad Reservoir)

Surveyed on 2 October 1982. Wood Creek is located near the AMAX mine reclamation project. Numerous rock filled Gabion baskets were placed in the stream which created deep plunge pools. The habitat was marginal to good with deep pools, moderate cover and moderate flows (2.0cfs). Brook trout were present. The drain pipe in the Urad Reservoir is an effective fish barrier. Further investigation is needed. Woods Creek is a moderate priority stream.

Table 4. Bard and Leavenworth Creek heavy metal Concentrations.

<u>Metal</u>	<u>Bard</u>	<u>Leavenworth</u>
Cadmium	<.2 ppb	<.2 ppb
Copper	<1 ppb	1 ppb
Lead	<1 ppb	1.3 ppb
Silver	.05 ppb	.05 ppb
Zinc	<10 ppb	<10 ppb

Larimer County

Boston Peak Creek (tributary to Cache la Poudre River, west of Boston Peak)

Surveyed on 13 October 1981. Trout habitat was marginal with low flows (<1.0cfs) and few pools. An impassable waterfall fish barrier is present in the lower reaches. No fish were sampled. If nearby Williams Gulch greenback cutthroat trout population is successfully reestablished to a stable level, greenbacks should be transplanted from Williams Gulch to Boston Peak Creek. Low cost and effort would justify an attempt to establish a new greenback trout population. This is a moderate priority stream.

Cow Creek (tributary of West Creek)

Surveyed on 14 October 1981. Trout habitat was good with moderate flow (2.0cfs), deep pools and sufficient cover. No fish barrier was found. The majority of Cow Creek flows through private property. Cooperation with landowners would be required to reclaim this stream. This is a moderate priority stream.

Hell Canyon Creek (tributary of North Fork of Little Thompson River)

Surveyed on 15 October 1981. Habitat was poor due to low or no flow. No fish were observed. This is a low priority stream.

North Fork of Little Thompson River

(tributary of Little Thompson River)

Surveyed on 15 October 1981. Habitat was poor due to extreme fluctuations because of water diversion. Longnose suckers were the only species observed. This is a low priority stream.

Stove Prairie Gulch (tributary of Cache la Poudre River)

Surveyed on 22 October 1981. Habitat was poor due to low flow (<1.0cfs). No fish were observed. This is a low priority stream.

West Fork of Little Thompson River

(tributary of Little Thompson River)

Surveyed on 16 October 1981. Trout habitat was good with sufficient flow (3.0cfs), deep pools, and high cover areas. This stream is located on the property of many private owners. No fish barrier was found. This is a low priority stream.

Park County

Bruno Gulch (Tributary of Geneva Creek)

Surveyed on 6 October 1982. Habitat was good with large deep pools, good cover and good flow (3.0cfs). Ph was 8.0, Hardness was 51.3mg/l and nitrate nitrogen was 0.02mg/l. Brook trout was the only species collected. No barrier was found, but there is a potential barrier site near the confluence with Geneva Creek. The acid water of Geneva Creek presently acts as a fish barrier. In 1982 the upper reaches should be surveyed and the potential for greenback trout reintroduction investigated. This is a moderate priority stream.

Geneva Creek(tributary of North Fork of South Platte River)

Surveyed on 6 October 1981. Habitat appeared good with adequate cover, deep pools, and high discharge (7.0cfs). In the upper sections of the stream a red precipitate covered the bottom substrate. The Ph in this section was 4.0 (4.0 was the lower limit of our Ph test) and hardness was 119.7mg/l. Below the confluence with Kirby Creek the bottom substrate was covered with a white precipitate and the Ph was 5.0. The acid water was probably due to mining activities located near the headwaters. A waterfall barrier was located just above the confluence of Scott Gomer Creek. Geneva Creek is a low priority stream. The potential of Geneva Creek acid water problem being cleaned up should be investigated.

Kirby Creek(tributary of Geneva Creek).

Surveyed on 6 October 1981. Habitat was poor with low flow (<1.0cfs) and high siltation of bottom substrate. Ph was 7.5. This is a low priority stream.

Scott Gomer Creek(tributary of Geneva Creek).

Surveyed on 6 October 1981. Habitat was good with high flow (6.0cfs), many deep pools and high cover area. Ph was 7.5 and hardness was 68.4 mg/l. A natural waterfall located above the confluence with Geneva Creek suffices as a fish barrier. In 1982 the upper reaches should surveyed for suitable cutthroat trout habitat and fish. This is a potential high priority stream.

Smelter Gulch (tributary of Geneva Creek)

Surveyed on 6 October 1981. Habitat was poor to marginal with steep gradients, good cover, and few pools. Ph was 7.5 and hardness was 68.4mg/l. A good waterfall fish barrier is located above the confluence with Geneva Creek. Upper reaches should be surveyed for suitable fish habitat and fish. This is a low priority stream.

VII. Recommendations

- Habitat evaluation procedure development.

Quantitative evaluation of candidate streams would be a useful tool to the management of greenback cutthroat trout. Development of an appropriate evaluation procedure should include monitoring of introduced populations. For example how does growth; biomass; population size; recruitment; compare to what was predicted by the model. This type of model application would also be useful in predicting response of greenback populations to habitat improvement. In Como Creek, measurements were made prior to improvements. By approximating what variables will be affected by improvements a prediction of the population response could be made. After the habitat improvements have been implemented, results can be compared by closely monitoring the population.

VIII. References

- Binns, N.A. and F.R.Eiserman. 1979. Quantification of fluvial trout habitat in Wyoming. Transactions of the American Fisheries Society 108:215-228.

Appendix A: Letters to landowners.

STATE OF COLORADO
Richard D. Lamm, Governor
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WILDLIFE

Jack R. Grieb, Director
6060 Broadway
Denver, Colorado 80216 (825-1192)

Northeast Regional Office
317 West Prospect Street
Fort Collins, CO 80526



July, 1981

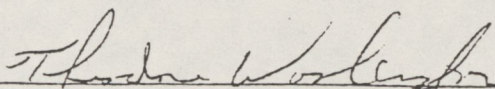
Dear Landowners:

The greenback cutthroat trout illustrated on the following page is on the federal and state threatened species list. This colorful trout typically displays large pronounced spots and red coloration over the lower sides, throat, and belly regions. The greenbacks, which are native to Colorado, are presently found only in a few isolated streams. One of those few remaining populations of this rare trout exists in the headwaters of the Little South Fork of the Poudre River above the Roosevelt National Forest boundary (see map on attached page). During the past five years this population of greenback cutthroat trout has been closely monitored by the Colorado Division of Wildlife. The results from these surveys indicate the number of these fish is rapidly declining.

This year a serious effort is being made to reverse that trend. Signs will be posted near the stream informing visitors of the closure to angling and status of the greenback cutthroat. It is a federal and state offense to capture and/or consume these fish. You can help us restore this population to a more stable level by contacting the Law Enforcement section of the Division at one of the numbers listed below if you know of any one fishing in the area indicated on the map:

825-1192 (Denver)
484-2836 (Fort Collins)

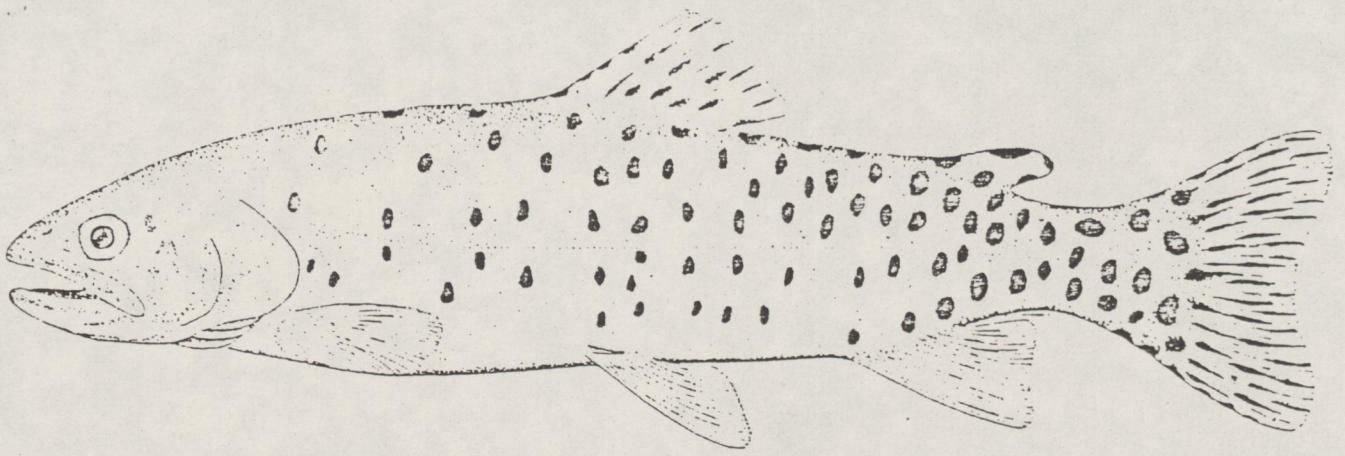
Your cooperation is greatly appreciated.



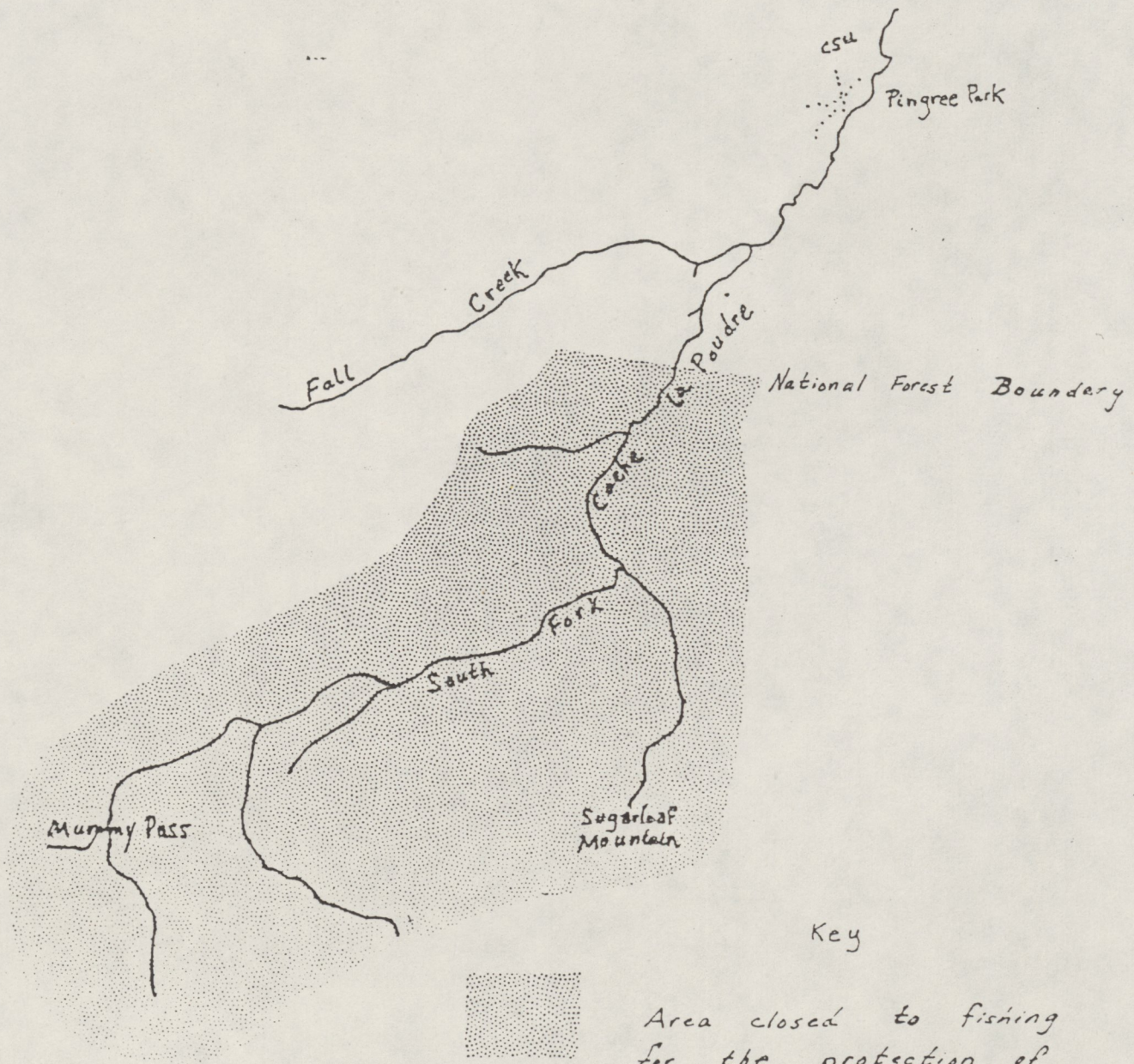
Theodore Washington, Wildlife Biologist
Colorado Division of Wildlife

TW/jsk

Attachment



GREENBACK CUTTHROAT
Salmo clarki stomias

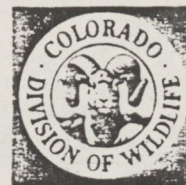


Key
Area closed to fishing
for the protection of
Greenback Cutthroat trout

STATE OF COLORADO
Richard D. Lamm, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE

Jack R. Grieb, Director
6060 Broadway
Denver, Colorado 80216 (825-1192)

Northeast Regional Office
317 West Prospect Street
Fort Collins, CO 80526



July, 1981

Dear Landowners:

The greenback cutthroat trout illustrated on the following page is on the federal and state threatened species list. This colorful trout typically displays large pronounced spots and red coloration over the lower sides, throat, and belly regions. The greenbacks are native to Colorado and are presently found only in a few isolated streams.

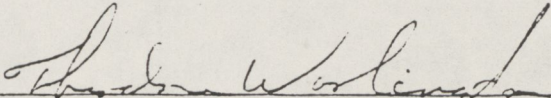
One of the few remaining populations of this rare trout exists in Blackhollow Creek. Its near extinction was the result of habitat degradation from man's exploitation of natural resources and the introduction of nonnative trout species. The brook trout replaced the greenback in high mountain streams; brown trout replaced greenbacks in lower, larger rivers; and the rainbow and other cutthroat trout hybridized with the greenbacks.

In 1967 the U.S. Forest Service and Colorado Division of Wildlife constructed a fish barrier on Blackhollow Creek, and all nonnative trout species were removed. However, several years later a fisherman reintroduced brook trout above the barrier. As a result, brook trout soon replaced the greenback cutthroat in Blackhollow Creek. In 1979 the brook trout were again removed, and greenbacks were reintroduced in 1980. Unfortunately, during the summer of 1980 two young boys were caught trying to reintroduce a large, live rainbow trout above the barrier. This reintroduction attempt was illegal and would have resulted in the loss of two years' work on Blackhollow.

This year a serious effort is being made to inform the public on the status of the greenback cutthroat trout in Blackhollow Creek. Signs will be posted near the stream informing visitors of the closure to angling and status of the greenback cutthroat. It is a federal and state offense to capture and/or consume these fish. It is also a state offense to transport live game fish captured from state waters. You can help us restore this population to a more stable level by contacting the Law Enforcement section of the Division at one of the numbers listed below if you know of any one fishing in Blackhollow Creek:

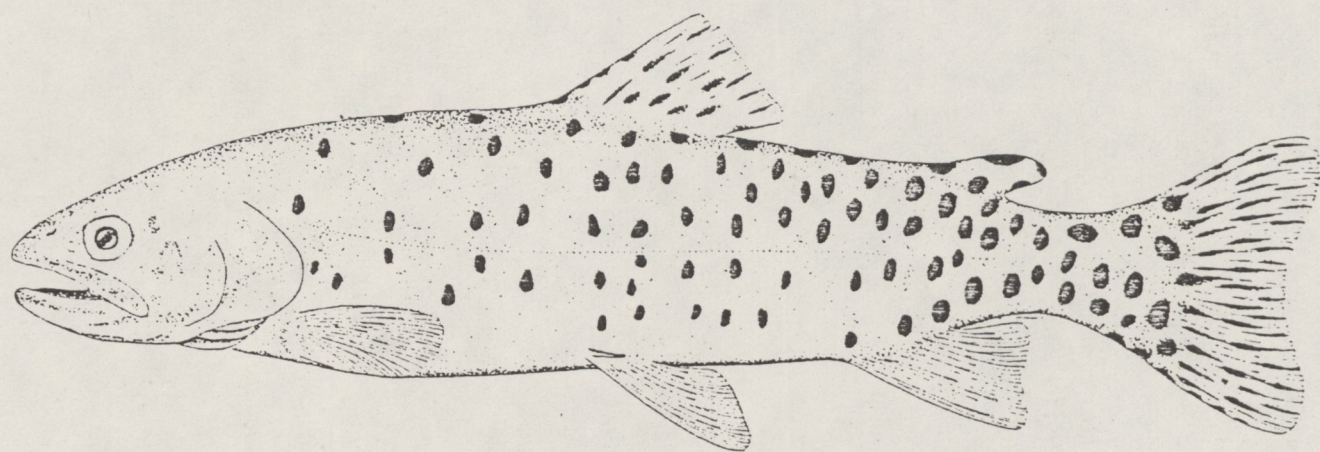
825-1192 (Denver)
484-2836 (Fort Collins)

Your cooperation is greatly appreciated.


Theodore Washington, Wildlife Biologist
Colorado Division of Wildlife

TW/jsk

DEPARTMENT OF NATURAL RESOURCES, Monte Pascoe, Executive Director • WILDLIFE COMMISSION, Wilbur Redden, Chairman
Donald Fernandez, Vice Chairman • James Smith, Secretary • Jean K. Tool, Member • Vernon C. Williams, Member
Michael Higbee, Member • Sam Caudill, Member • Richard Divelbiss, Member



GREENBACK CUTTHROAT
Salmo clarki stomias

Appendix B: Field forms and habitat evaluation forms.

HSI Determinations

I. Average Value Method

Component	Section					Reach
	1	2	3	4	5	
C _A						
C _J						
C _F						
C _E						
C _O						
Species HSI						

II. Average Value Probability Method

Component	Section					Reach
	1	2	3	4	5	
C _A						
C _J						
C _F						
C _E						
C _{OF}						
C _{OQ}						
Species HSI						
Non-Compensatory						
Compensatory						

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