



PAUL LAXALT
GOVERNOR

STATE OF NEVADA

DEPARTMENT OF FISH AND GAME

1100 VALLEY ROAD, RENO, NEVADA • TELEPHONE 784-6214

MAIL: P.O. BOX 10678, RENO, NEVADA 89510



FRANK W. GROVES
DIRECTOR

IN REPLY REFER TO:

February 8, 1971

Dr. Robert Behnke
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

Dear Dr. Behnke:

I have intended to write to you for the past few weeks to let you know of recent developments. Upon receiving your letter in tonight's mail, I was spurred into action.

Thanks to information supplied by you, I am happy to say that the presentation at the Fisheries Society meeting in Sacramento went off quite well. I am enclosing a copy of that paper.

I received authorization from the Goshute Tribal Council on January 13, 1971 to collect fish from any or all of the streams on the reservation including Johnson Creek. I understand that there are several streams tributary to Deep Creek which have fish in them. I intend to check as many as time will allow and have very high hopes on Johnson Creek. I will start the collections this spring as soon as the snow melts and the streams become accessible.

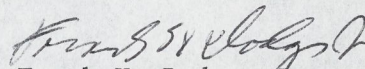
Some interesting news on the origin of the Mill Creek cutthroat has turned up. I had an opportunity to talk with two old timers, George and Burt Robison who were raised in the Baker area. George was born in 1884 and Burt is a few years his junior. They both remember fishing the Baker area streams when they were boys. In the late 1890's George remembers going up

both Hendry's Creek and Lehman Creek with his folks on camping trips. Both streams had lots of trout and fishing was very good. Baker Creek and Snake Creek had fish in them too. George states that his family used to camp on Lehman Creek for about two weeks every summer. Trout were very plentiful in the lower part of the stream but if you walked way up the creek the fish got larger. He remembers catching fish about 14 inches long just a short distance below Stella Lake.

There exists today an old ghost town called Osceola on the west side of the Snake Range. Placer mining for gold was the object of its existence. In the late 1800's a ditch was dug with Chinese labor which brought the water from Lehman Creek around the mountain where it could be used for placering. According to Burt Robison this ditch became populated with trout from Lehman Creek. He remembers that about 1905 the ditch broke in the Mill Creek drainage and Mill Creek became accidentally stocked with trout from Lehman Creek.

This seems to be a reasonable approach to the origin of the Mill Creek cutthroat. I have no reason to doubt the truthfulness of the Robison brother's statements. If this is how the Mill Creek trout got started then they are probably a pure strain and the difference between the Mill Creek and Pine Creek specimens could be attributed to sampling error due to the small number of fish collected. I shall attempt to collect more Mill Creek specimens for your examination this coming summer but I am quite certain that we have a pure strain in Mill Creek.

Sincerely,



Frank H. Dodge, Jr.
Fish and Game Agent II
Nevada Dept. of Fish and Game
P.O. Box 1109
Ely, Nevada 89301

FHD:gp

Enc. - 1

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SHORT NOTE TRANSMITTAL

1/15/75
(Date)

TO : Dr. Robert Behnke
FROM : Don Duff, BLM
SUBJECT: Trout Creek cutthroat

Bob- here are 20 cutthroat samples collected in the Deep Creek Mtns last October. A letter follows separately with additional info on our collection trip.

I hope these samples will give us the verification we're looking for.

Note: Return this form when action is completed or attach it to data requested.

Sincerely,
Don Duff

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ROUTING AND TRANSMITTAL SLIP

TO			ACTION	ROOM NO.
CODE	NAME	ORGANIZATION		
	Dr. Robert Behnke			
	c/o Colorado Cooperative			
	Fishery Unit			

Indicate Action by Number

- | | |
|----------------------------|---------------------|
| 1. Necessary action | 6. Note and surname |
| 2. Approval | 7. Note and return |
| 3. Signature | 8. Your information |
| 4. Prepare reply | 9. See me |
| 5. Your comment and return | 10. |

From	Don Duff	Date	1/15	Room No.	
Office	BJM - SLC			Phone	

Remarks

Bob - 20 cutthroat trout are being sent today under separate cover for your analysis. These are from Trout Creek & enclosed is a copy of my report to Utah DWR on our trip.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ROUTING AND TRANSMITTAL SLIP

TO			ACTION	ROOM NO.
CODE	NAME	ORGANIZATION		
	Bob Behnke			
	Colo Coop. Fishery Unit			
	Rm 102 Coop Units Bldg			
	Ft Collins 80521			

Indicate Action by Number

- | | |
|----------------------------|---------------------|
| 1. Necessary action | 6. Note and surname |
| 2. Approval | 7. Note and return |
| 3. Signature | 8. Your information |
| 4. Prepare reply | 9. See me |
| 5. Your comment and return | 10. |

From <i>Don Duff</i>	Date	Room No.
Office <i>BLM</i>		Phone <i>801-524-5326</i>

Remarks
Bob - here are 8 cutthroat samples from Trout Creek, Deep Creek Mtns, Juab County Utah collect by rod & reel on 5/21/74 by Josh Warburton & myself. The remaining 4 samples will be sent as soon as I can get another shipping permit from the state.

Don Duff

11 Col. road West
Collected in
Creek, elevation approx.
8000 ft. and higher
to near 9500 ft. on
the East side of the
Deep Creek Mts.
in Western Utah.

Collection made by
Joshua Warburton &
John Howe of the
Salt Lake District, BLM.

June 12 & 13th, 1974.

phone-524-5348.

Whitefish character in
new lake - D. F. R. B. C.
1974 (1) - Loch

...y parasitism on reservoir fish populations
pared to 16% during 1973.

ors:

Stephen W. Pettit
Fishery Research Biologist

Will Reid
Senior Fishery Research Biologist

John Sneva
Fisheries Technician



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

January 14, 1972

Mr. William E. Ireland
Acting District Manager
Bureau of Land Management
Pioche Star Route
Ely, Nevada 89301

Dear Mr. Ireland:

I would like to cooperate in every way to assist the BLM's implementation of the Goshute Creek Management Plan to enhance the survival of a rare and undescribed subspecies of cutthroat trout. However, one of the key points requested, that of placement of this particular trout on the official Dept. of Interior's rare and endangered species list, is beyond my authority.

In reference to your other questions concerning the separation of this trout (which I call the Mt. Wheeler cutthroat trout) from Salmo clarki utah and its classification, I can provide more definite answers. A report I prepared on Bonneville cutthroat trout, dated December, 1970, contains the data and reviews the evidence that a differentiated form of cutthroat trout was native to the Deep Creek Range of the western part of the Bonneville Basin and has persisted via an early transplant into Pine Creek on the west slope of Mt. Wheeler. There is little more I can add to this report except that an attempt was made by Mr. Cain of the BLM and Mr. Dodge of Nevada Fish and Game to locate sources of cutthroat trout in the Deep Creek Range to verify the parental source of the present Mt. Wheeler population. Unfortunately, the only trout found with cutthroat characteristics turned out to be a rainbow trout x cutthroat trout hybrid.

Both Dr. R.R. Miller of the University of Michigan and I agree that the stock of trout in Pine Creek is sufficiently differentiated from the typical Bonneville trout (S. c. utah) to warrant its classification as a new subspecies. The problems of publishing a formal description concern the lack of knowledge on the original source of the parental stock used to establish the Pine Creek population and insufficient material to adequately characterize the range of variability of the diagnostic characters.



Mr. William E. Ireland
January 14, 1971
Page 2

For your purposes, however, the justification for considering this trout as rare or endangered rests on specific mention of Mt. Wheeler trout under *Salmo clarki* utah, in the International Union for Conservation of Nature's book of rare and endangered fishes (a copy of the write-up is included in the Bonneville trout report). I would consider this citation as official recognition that the Mt. Wheeler cutthroat trout is rare (or endangered), justifying the implementation of the Goshute Plan.

The official Department of Interior's red book of rare and endangered species has not provided updated and revised information on fishes for some years and the old section on fishes is highly unsatisfactory and sometimes erroneous. To my knowledge, there is no ichthyological expertise associated with the rare and endangered species office of the Dept. of Interior, so I anticipate that any new revisions of rare fishes will essentially follow the I.U.C.N. listings.

We are faced with the identical problem of obtaining formal rare or endangered designation from the Dept. of Interior for several other groups of trout such as the Humboldt cutthroat trout and the Alvord basin cutthroat trout (now limited to two small streams), although these trouts are included in the I.U.C.N. book. Last month I had an urgent request on the status of the rare Green River cutthroat trout, *Salmo clarki pleuriticus*, from the Pinedale, Wyoming, office of BLM where a small population persists on BLM land undergoing oil exploration. To date, we have received no response from the rare and endangered species office on a request for a formal designation of the status of this trout. I recently discussed this frustrating problem with Paul Cuplin, BLM Fisheries Biologist in Denver and Mr. Cuplin will initiate action in an attempt to find where the problem lies in this lack of responsiveness from the rare and endangered species office. In the meantime, implementation of projects such as your Goshute Plan are being unduly delayed.

I have been informed that some funds may be available to expand my trout investigation this year. One of the major undertakings planned is a field trip to obtain adequate samples of specimens in the Mt. Wheeler - Mt. Moriah area, the Humboldt drainage and the Alvord basin, which will provide the basis for the published description of three new subspecies of cutthroat trout. I will contact Nevada Fish and Game and BLM biologists to arrange schedules and request their assistance.

Sincerely yours,

Robert Behnke
Assistant Unit Leader

cc: Frank Dodge; Pat Coffin; Bob Borovic, Paul Cuplin



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

March 8, 1973

Mr. Frank Dodge
Nevada Dept. Fish and Game
P.O. Box 1109
Ely, Nevada 89301

Dear Frank:

We're still re-working data and double and triple checking specimens to get an acceptable level of accuracy in some difficult characters such as scale counts. There is also the problem in unexpected character values found in small populations such as Pine Creek, Hampton Creek, Goshute Creek due to "founder's principle" and genetic drift. However, comparisons of several samples from Pine, Hampton and Goshute creeks, now permit a valid evaluation of the diagnostic characters of the trout once native to Snake Valley on the Bonneville side of the divide, and a more definitive statement on the sample you obtained last June from the upstream limits of trout distribution in Hendrys Creek.

Coloration, spotting and morphology: In these characters the Hendrys Creek fish appear identical to the Pine Creek trout and its derivatives in Hampton and Goshute creeks.

Vertebrae number: Pine Creek, 60-64 (62.3); Goshute Creek, 61-64 (62.3); Hampton Creek 59-63 (61.5). All these populations are from a common genotype and the lower values in Hampton Creek may be due to direct environmental effect and/or "founder's principle" whereby the introduced fish from Pine Creek that survived to establish breeding populations were not representative of modal values of parental population but were skewed toward one extreme or the other in the natural range of variability (also this effect is apparent in gillraker numbers). I would surmise that the populations once native to Snake Valley probably had vertebral counts of 60-64 with mean values of 62-62.5. Your sample of trout from the head of Hendrys Creek are 61-64 (62.4) (N=17).

Mr. Frank Dodge
March 8, 1973
Page 2

Gillraker numbers: Pine Creek, 19-25 (22.0); Hampton, 20-23 (20.9); Goshute, 17-22 (20.0). Gillraker numbers are generally stable and little affected by environmental influences. The surprising difference between the 3 localities from a common genotype is likely due to the "founder's principle". It may be that the Pine Creek population have higher counts than the parental stock from which they were established. I would assume that modal values of 20-22 were found in the original populations of Snake Valley cutthroat. Your Hendrys Creek sample is 18-23 (20.9) (N=20).

Pyloric caeca: Individual variability ranges from 25-47; the mean values are: Pine Creek (33.6); Hampton Creek (32.1); Goshute Creek (36.4); Hendrys Creek (36.1).

Scale counts mean values: Pine Creek (147); Hampton (144[?]); Goshute (144); Hendrys (142). These counts are lower than in any other subspecies of cutthroat trout except for the Humboldt cutthroat.

Basibranchial teeth counts have great individual variability (5-90) but mean values are higher than for any other subspecies of cutthroat trout. Pine Creek (27.3); Hampton (27.3); Goshute (28.6); Hendrys (23.5). A single specimen (of 20) from your June, 1972, sample from Hendrys Creek completely lacked basibranchial teeth - and this is the only evidence of possible rainbow trout influence in this sample. This sharply contrasts with the 7 specimens you collected "above the falls" in the headwaters of Hendrys Creek in 1970. Four of those 7 specimens lacked basibranchial teeth. Other characters differ between your 1970 and 1972 samples and I am certain that the 2 samples (1970, N=7 and 1972, N=20) could not have been from a continuous interbreeding, homogeneous population. There must be some degree of reproductive segregation between the populations represented by your 1970 and 1972 samples, although both occur in the headwater section above a falls. I would urge that every effort be made to protect the population you sampled last June and prevent any mixing with the more hybridized population occurring downstream (but above the falls). I endorse your suggestion made in a letter to Jack Wilcox that the fishes in Hendrys Creek be eradicated below a point where you made the collections last June. This would allow the entire stream to be inhabited by essentially pure Snake Valley cutthroat of the original type. Also transplants to barren streams (or those made barren by eradication) should be attempted this year. The population in the very headwaters of Hendrys Creek is the best example of the original cutthroat trout native to the Snake Valley area. All other streams with cutthroat trout phenotypes in the Trout Creek-Deep Creek drainages are definitely hybrids (Muncy, Mill, Johnson).

Mr. Frank Dodge
March 8, 1973
Page 3

The 1972 sample from Mill Creek is interesting. The vertebrae count (60-64 [62.1]) is lower than that found in the 6 specimens you collected from there in 1970 (63.5). They are predominantly cutthroat of the native type but the gillrakers are 17-22 (19.3), scales 139-175 (154), basibranchial teeth 2-27 (13.2) and caeca 34-58 (42.2). The Muncy Creek sample is also predominantly cutthroat (but with more evidence of rainbow hybridization than Mill Creek). They have fewer vertebrae (60.9), gillrakers (19.1) and scales (134) than the other samples and 2 of 15 lack basibranchial teeth (mean total count of sample is 8.7).

When the data is ready to proceed with a formal description of a new subspecies, I'll probably use the Hendrys Creek sample for a type specimen and the headwaters of Hendrys Creek will be the type locality for the subspecies. So, these are a most important population.

Sincerely yours,

Robert Behnke

RB:dch
cc: Mr. Dean Doell



MIKE O'CALLAGHAN
GOVERNOR

STATE OF NEVADA
DEPARTMENT OF FISH AND GAME

1100 VALLEY ROAD, RENO, NEVADA • TELEPHONE 784-6214

MAIL: P.O. BOX 10678, RENO, NEVADA 89510



FRANK W. GROVES
DIRECTOR

IN REPLY REFER TO:

February 14, 1973

C
O
P
Y

Jack Wilcox
District Ranger
Humboldt National Forest
Ely, Nevada 89301

Dear Jack:

On June 20, 1972 your able assistant Mont Lewis and I collected 20 cutthroat specimens from the extreme headwaters of Hendry's Creek and sent them to Dr. Robert Behnke of Colorado State University for identification. You are probably aware that earlier cutthroat specimens from lower down on the stream proved to be cutthroat-rainbow hybrids even though they appear externally to be pure cutthroats.

Dr. Behnke reports in his latest correspondence that the specimens from the extreme headwaters are a pure strain and feels that there must be a natural barrier that has prevented their hybridization. I have never observed anything on Hendry's Creek which would be a good enough barrier to prevent upstream movement and eventual hybridization. There are several spots - a large sloping boulder and several small beaver dams - that I thought might be sufficient barriers but this was disapproved when we found hybrids higher in the stream. I feel that it will only be a matter of time before the entire stream will become populated with hybrids and we will lose a natural population of a pure strain of an extremely rare cutthroat trout.

I am proposing a plan whereby we may be able to save the pure strain in Hendry's Creek and establish this strain in other streams of the area. My plan calls for the eradication of present trout populations in selected isolated streams and then restocking with pure cutthroat stock from Pine Creek or Goshute Creek. In Hendry's Creeks' case we could eradicate the trout population below a point in the headwaters area above which we felt was a pure strain. With no competition for food and space the remaining

headwaters cutthroat should redistribute themselves downstream. If necessary, we could make a small restocking downstream to hurry the process but I don't think it would be necessary.

I feel that we should attempt to extend the range of this cutthroat into enough streams so that eventually it could be removed from the list of rare species and possibly furnish an exciting fishing experience to those who like to fish isolated streams.

To be able to stock these rare cutthroat and retain their purity, we must first have a stream which is either devoid of fish or have fish which do not hybridize with cutthroat. Unfortunately, fishable streams of this type are nonexistent in this area.

The area does have a number of streams which are presently furnishing very little or no fishing. As a general rule these streams are inaccessible and have been planted with rainbow trout. Rainbow trout, because they are so easily accessible in other streams, do not furnish a high enough quality fishing experience to stimulate angler interest. Lack of angler interest in small inaccessible streams is also related to the size of trout they catch. As a rule, rainbow trout in these small streams rarely get over eight inches long. This strain of cutthroat trout commonly reach lengths of 8 to 12 inches and are much more enjoyable to catch.

Streams which may be considered for this project are as follows:

North Snake Range:

Hendry's Creek
Smith Creek
Deadman Creek
Deep Canyon Creek
Nigger Creek

Schell Creek Range:

Bassett Creek
Muncy Creek
Odgers Creek
Meadow Creek

There are others that could be added to the list if the everything worked to satisfaction but only one or two streams could be treated and restocked in any one year because of the work involved and the shortage of fish to restock with. Only one or two streams such as Hendry's Creek and Nigger Creek should be done to start with and then a period of several years allowed to study the transplant to see if the project will work. Then if it works, go ahead with one or two more streams annually.

Jack Wilcox

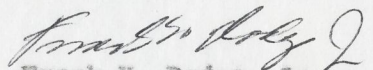
-3-

February 14, 1973

Before treatment, each stream should probably have an environmental impact statement prepared on it and a very complete population inventory conducted. This would be necessary to preclude the possible eradication of other wildlife species which may also be rare. Some of the North Snake Range streams are within the proposed Mt. Moriah Wilderness Area and this may also have an affect upon the proposal in that range.

Could you let me know how the United States Forest Service would react to such a proposal. If you have any questions on it please don't hesitate to call.

Sincerely,


Frank H. Dodge, Jr.
Fish and Game Agent II

FHD:gp

cc: Reno Hqs.
Region II Hqs.
B.L.M. Ely Dist.
Dr. Robert Behnke ✓

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
HUMBOLDT NATIONAL FOREST
BAKER, NEVADA 89311

2810
July 18, 1970



Dr. Robert Behnke
Bureau of Sport Fisheries & Wildlife
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

Dear Dr. Behnke:

Thank you for the information on the Hendrys Creek cutthroat trout. I am setting up a special management unit for the area to protect these values.

As Frank Dodge has probably told you there has been a request to build a mining road in Hendrys Creek. State Fish and Game and Forest Service fishery specialists studied the area last week. Their analysis showed that if a road was built the results would either damage or destroy the cutthroat population.

It would be helpful if you could obtain statements for me from the rare and endangered species committees as mentioned in your letter. This type of documentation will be extremely valuable if the miners insist upon building the road in Hendrys Creek.

Any additional information you may have on these trout would also be appreciated.

Sincerely,

/s/ John R. Glenn

JOHN R. GLENN
District Ranger

MT. Wheeler -
Humboldt tract
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
HUMBOLDT NATIONAL FOREST
976 Mountain City Highway
Elko, Nevada 89801

2610

January 16, 1973

Dr. Robert Behnke
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521



Dear Bob:

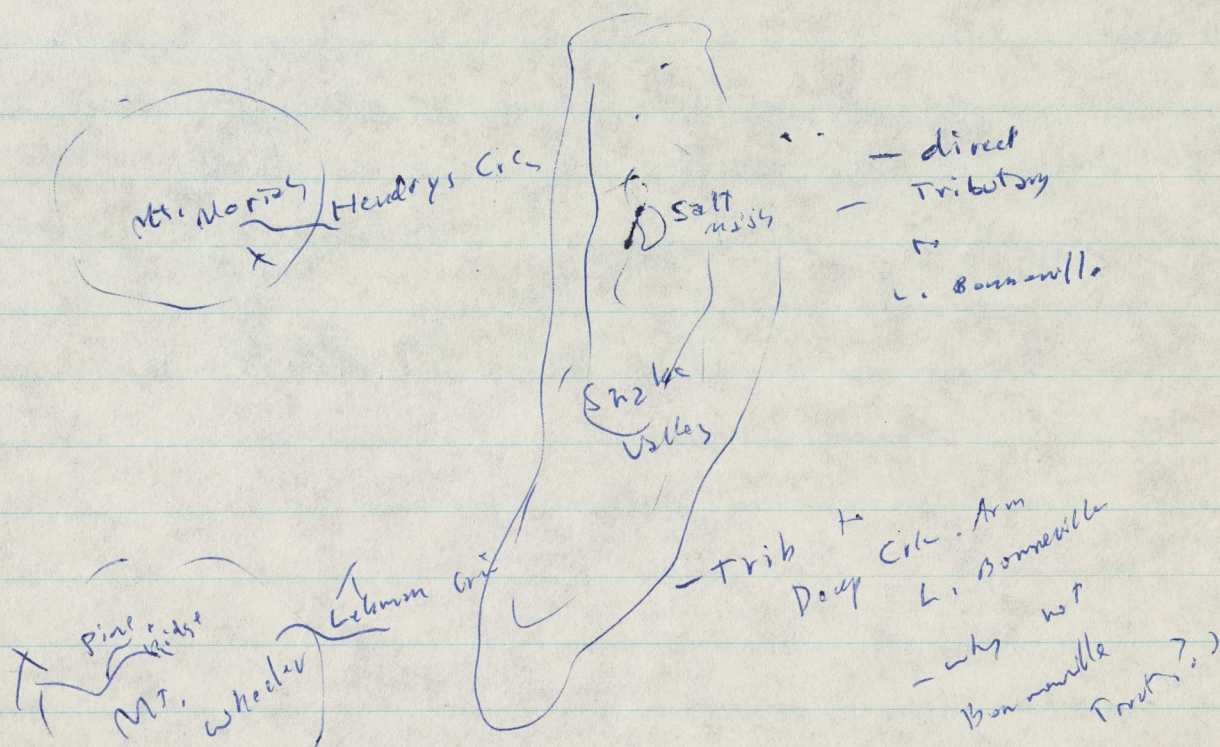
Attached are the fish planting records that we have in our files
for the Mountain City and Ely Ranger Districts.

Dean D. Doell
DEAN D. DOELL
Wildlife Biologist

Enclosure

(221) Custom House Denver
 U.S. Govt → Customs → health certificate
 Inc. vet. meat standards
 of U.S. Health Sta
 - 10 Specs
 E. Slope

Hendry's Cr. (Bonnieville side) Mt.
 Moriah, 12050 ft. - Nevada Nat. Zoo.
 (Both Lehman Cr. & Hendry's Cr. trib.
 to Snake Valley - White Pine Co., Nev.



Threatened by mining

- Distinctive head, body.
- males 20.5 (18-22) vs. 21.5 (19-23) n=3
- Teeth small - vs. 6-46 (23)
- more spec. - Bonnieville - + Schell Cr. range.
- any rainbows or hybrids seen? - one of the 10 look different
- Definitely protected

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
HUMBOLDT NATIONAL FOREST
976 Mountain City Highway
Elko, Nevada 89801

1350 (2600)

July 25, 1973



Dr. Robert Behnke
Colorado Cooperative Fisheries Unit
Colorado State University
Ft. Collins, Colorado 80521

Dear Bob:

Thanks for the copy of your report to the U.S. Bureau of Fish and Wildlife on the Mt. Wheeler cutthroat trout. We will make good use of this report.

We are processing two requests from the Nevada Fish & Game Department which were proposed by Frank Dodge to eradicate the planted fish in lower Hendrys Creek and Muncy Creek. If we get approval from the Department of Agriculture Pesticide Use Coordinating Committee, he plans to complete the project in August.

Dean Doell has transferred to the Boise National Forest in Boise, Idaho. We will not be filling his position at least for the present, so address correspondence to me.

Sincerely,

VERNON E. SYLVESTER
Range & Wildlife Staff Officer

Acc. 1953-XI:30

Spring Creek Rearing Sta.
Baker, Nev.

19 October 1953

Dear Mr. Miller:

I'm of the definite opinion that those cutthroat trout that are now present in Pine Creek are of a pure strain. To my knowledge, within recent years, no introduction of trout have been made in this creek. As far back as 1919 from the forest service records I can find no data were plants have been made in Pine Creek by the county or forest service, though I'll agree that their records are probably not entirely accurate nor complete. The White Pine county board during the past few years has closed this stream to fishing.

Note:
I need Trout Creek in my report of I:8:1954

Those cutthroat in Pine Creek are highly possible the Utah Lake cutthroat of which you mentioned. This creek does not appear to be an ideal creek for any species of trout. The fact that they are restricted to approximately one-half mile of stream, none occurring at the upper elevations, would somewhat indicate that the original plant was made at the lower elevation with no or very little upstream migration.

The North Fork of Cleve Creek has rainbow present up to the headwaters with some hybrids present throughout its length. Muncy Creek on the other hand has a possible pure strain of cutthroat present at the upper reaches of the creek with much hybridization occurring along the lower sections since rainbow have been introduced into that stream during the past.

In Snake Valley in the Snake Range no checks have been made for the pure strain cutthroat. Snake Creek, Lehman Creek and Hendry Creek have had the "native cutthroat according to individuals who have spent the greater portion of their lives in this area. According to Mr. Kaufman, he had been told by an old-timer that Hendry Creek was the only creek that contained the "native"-- that these aforementioned creeks were stocked from those obtained from Hendry Creek. The three mentioned creeks have since been planted at their headwaters with rainbow and yellowstone cutthroat.

I would certainly appreciate any help that you can give me in the determination of this subspecies of cutthroat. A few of these species have been held here at the station for future propagation; however, I will more than gladly send a couple of specimens if you will instruct me on your procedure for preserving these trout for shipment.

B. Reid
XI:30:54

Yours very truly,

Ted C. Frantz
Ted C. Frantz

P.S. Several other species of fish occur in Lake and Spring Creeks in the Snake Range which you are probably already familiar--Utah sucker, Utah Gila and Cottus bairdi semiscaber.

Hendry's Ck



PAUL LAXALT
GOVERNOR

STATE OF NEVADA

DEPARTMENT OF FISH AND GAME

1100 VALLEY ROAD, RENO, NEVADA • TELEPHONE 784-6214

MAIL: P.O. BOX 10678, RENO, NEVADA 89510



FRANK W. GROVES
DIRECTOR

IN REPLY REFER TO:

August 12, 1970

Dr. Robert Behnke
Bureau of Sport Fisheries & Wildlife
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

Dear Dr. Behnke:

These cutthroat were collected from a very small stream on the east side of the Snake Range called Mill Creek. The stream is only about a foot wide in many places, and I had difficulty collecting fish of any size. The fish were collected on July 30, 1970 so they have only been in formalin about two weeks. I am air mailing them in a fairly strong solution, however.

Mill Creek is located between Lehman Creek on the south and Strawberry Creek on the north. The stream was never included in our stream surveys of the 1950's and we have no records at all on this stream. There are no records that the stream has ever been planted, and I found nothing but cutthroat in the stream.

The fish appear very similar to the cutthroat from Pine and Hendry's Creeks. They do not seem to be quite as "husky" in appearance with the deep peduncle and large fins however.

I am anxiously awaiting your analysis of these fish. As time permits I intend to make a thorough search of other streams in the area to see if they too have cutthroat.

Sincerely,

Frank H. Dodge, Jr.

Frank H. Dodge, Jr.
Fish and Game Agent II
Nevada Dept. of Fish and Game
P.O. Box 1109
Ely, Nevada 89301

FHD:gp

THE UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN, U. S. A. 48104

MUSEUM OF ZOOLOGY

July 31, 1970

Dr. Robert J. Behnke
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

Dear Bob:

The copy of my reply to John Glenn which was mailed to you earlier today was in response to your letter of July 27. I hope it helps to prevent the road builders.

Enclosed herewith is a copy of Ted Frantz's letter to me of 19 October 1953 regarding the Pine Creek cutthroat. Note his statement that Hendrys Creek (and two others) were planted "at their headwaters" with rainbow and yellowstone cutthroat. Might this not explain why you find the present cutthroat there does not have the basibranchial teeth characteristic of the Pine Creek cutthroat (which may well have come from Hendrys Creek)?

Again, we are 50 or more years too late in our attempts to get pure trout stocks! However, even if the present Hendrys cutthroat is not pure (and that is surely a strong possibility), once the creek is set aside it would be possible to rectify the situation by stocking the Pine Creek fish.

Sincerely,

Bob

Robert R. Miller
Curator of Fishes

RRM:mw
enc.



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

January 14, 1972

Mr. William E. Ireland
Acting District Manager
Bureau of Land Management
Pioche Star Route
Ely, Nevada 89301

Dear Mr. Ireland:

I would like to cooperate in every way to assist the BLM's implementation of the Goshute Creek Management Plan to enhance the survival of a rare and undescribed subspecies of cutthroat trout. However, one of the key points requested, that of placement of this particular trout on the official Dept. of Interior's rare and endangered species list, is beyond my authority.

In reference to your other questions concerning the separation of this trout (which I call the Mt. Wheeler cutthroat trout) from Salmo clarki utah and its classification, I can provide more definite answers. A report I prepared on Bonneville cutthroat trout, dated December, 1970, contains the data and reviews the evidence that a differentiated form of cutthroat trout was native to the Deep Creek Range of the western part of the Bonneville Basin and has persisted via an early transplant into Pine Creek on the west slope of Mt. Wheeler. There is little more I can add to this report except that an attempt was made by Mr. Cain of the BLM and Mr. Dodge of Nevada Fish and Game to locate sources of cutthroat trout in the Deep Creek Range to verify the parental source of the present Mt. Wheeler population. Unfortunately, the only trout found with cutthroat characteristics turned out to be a rainbow trout x cutthroat trout hybrid.

Both Dr. R.R. Miller of the University of Michigan and I agree that the stock of trout in Pine Creek is sufficiently differentiated from the typical Bonneville trout (S. c. utah) to warrant its classification as a new subspecies. The problems of publishing a formal description concern the lack of knowledge on the original source of the parental stock used to establish the Pine Creek population and insufficient material to adequately characterize the range of variability of the diagnostic characters.



Mr. William E. Ireland
January 14, 1971
Page 2

For your purposes, however, the justification for considering this trout as rare or endangered rests on specific mention of Mt. Wheeler trout under *Salmo clarki* utah, in the International Union for Conservation of Nature's book of rare and endangered fishes (a copy of the write-up is included in the Bonneville trout report). I would consider this citation as official recognition that the Mt. Wheeler cutthroat trout is rare (or endangered), justifying the implementation of the Goshute Plan.

The official Department of Interior's red book of rare and endangered species has not provided updated and revised information on fishes for some years and the old section on fishes is highly unsatisfactory and sometimes erroneous. To my knowledge, there is no ichthyological expertise associated with the rare and endangered species office of the Dept. of Interior, so I anticipate that any new revisions of rare fishes will essentially follow the I.U.C.N. listings.

We are faced with the identical problem of obtaining formal rare or endangered designation from the Dept. of Interior for several other groups of trout such as the Humboldt cutthroat trout and the Alvord basin cutthroat trout (now limited to two small streams), although these trouts are included in the I.U.C.N. book. Last month I had an urgent request on the status of the rare Green River cutthroat trout, *Salmo clarki pleuriticus*, from the Pinedale, Wyoming, office of BLM where a small population persists on BLM land undergoing oil exploration. To date, we have received no response from the rare and endangered species office on a request for a formal designation of the status of this trout. I recently discussed this frustrating problem with Paul Cuplin, BLM Fisheries Biologist in Denver and Mr. Cuplin will initiate action in an attempt to find where the problem lies in this lack of responsiveness from the rare and endangered species office. In the meantime, implementation of projects such as your Goshute Plan are being unduly delayed.

I have been informed that some funds may be available to expand my trout investigation this year. One of the major undertakings planned is a field trip to obtain adequate samples of specimens in the Mt. Wheeler - Mt. Moriah area, the Humboldt drainage and the Alvord basin, which will provide the basis for the published description of three new subspecies of cutthroat trout. I will contact Nevada Fish and Game and BLM biologists to arrange schedules and request their assistance.

Sincerely yours,

Robert Behnke
Assistant Unit Leader

cc: Frank Dodge; Pat Coffin; Bob Borovic, Paul Cuplin



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

January 14, 1972

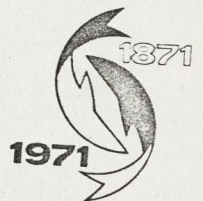
Mr. William E. Ireland
Acting District Manager
Bureau of Land Management
Pioche Star Route
Ely, Nevada 89301

Dear Mr. Ireland:

I would like to cooperate in every way to assist the BLM's implementation of the Goshute Creek Management Plan to enhance the survival of a rare and undescribed subspecies of cutthroat trout. However, one of the key points requested, that of placement of this particular trout on the official Dept. of Interior's rare and endangered species list, is beyond my authority.

In reference to your other questions concerning the separation of this trout (which I call the Mt. Wheeler cutthroat trout) from Salmo clarki utah and its classification, I can provide more definite answers. A report I prepared on Bonneville cutthroat trout, dated December, 1970, contains the data and reviews the evidence that a differentiated form of cutthroat trout was native to the Deep Creek Range of the western part of the Bonneville Basin and has persisted via an early transplant into Pine Creek on the west slope of Mt. Wheeler. There is little more I can add to this report except that an attempt was made by Mr. Cain of the BLM and Mr. Dodge of Nevada Fish and Game to locate sources of cutthroat trout in the Deep Creek Range to verify the parental source of the present Mt. Wheeler population. Unfortunately, the only trout found with cutthroat characteristics turned out to be a rainbow trout x cutthroat trout hybrid.

Both Dr. R.R. Miller of the University of Michigan and I agree that the stock of trout in Pine Creek is sufficiently differentiated from the typical Bonneville trout (S. c. utah) to warrant its classification as a new subspecies. The problems of publishing a formal description concern the lack of knowledge on the original source of the parental stock used to establish the Pine Creek population and insufficient material to adequately characterize the range of variability of the diagnostic characters.



Mr. William E. Ireland
January 14, 1971
Page 2

For your purposes, however, the justification for considering this trout as rare or endangered rests on specific mention of Mt. Wheeler trout under *Salmo clarki utah*, in the International Union for Conservation of Nature's book of rare and endangered fishes (a copy of the write-up is included in the Bonneville trout report). I would consider this citation as official recognition that the Mt. Wheeler cutthroat trout is rare (or endangered), justifying the implementation of the Goshute Plan.

The official Department of Interior's red book of rare and endangered species has not provided updated and revised information on fishes for some years and the old section on fishes is highly unsatisfactory and sometimes erroneous. To my knowledge, there is no ichthyological expertise associated with the rare and endangered species office of the Dept. of Interior, so I anticipate that any new revisions of rare fishes will essentially follow the I.U.C.N. listings.

We are faced with the identical problem of obtaining formal rare or endangered designation from the Dept. of Interior for several other groups of trout such as the Humboldt cutthroat trout and the Alvord basin cutthroat trout (now limited to two small streams), although these trouts are included in the I.U.C.N. book. Last month I had an urgent request on the status of the rare Green River cutthroat trout, *Salmo clarki pleuriticus*, from the Pinedale, Wyoming, office of BLM where a small population persists on BLM land undergoing oil exploration. To date, we have received no response from the rare and endangered species office on a request for a formal designation of the status of this trout. I recently discussed this frustrating problem with Paul Cuplin, BLM Fisheries Biologist in Denver and Mr. Cuplin will initiate action in an attempt to find where the problem lies in this lack of responsiveness from the rare and endangered species office. In the meantime, implementation of projects such as your Goshute Plan are being unduly delayed.

I have been informed that some funds may be available to expand my trout investigation this year. One of the major undertakings planned is a field trip to obtain adequate samples of specimens in the Mt. Wheeler - Mt. Moriah area, the Humboldt drainage and the Alvord basin, which will provide the basis for the published description of three new subspecies of cutthroat trout. I will contact Nevada Fish and Game and BLM biologists to arrange schedules and request their assistance.

Sincerely yours,

Robert Behnke
Assistant Unit Leader

cc: Frank Dodge; Pat Coffin; Bob Borovic, Paul Cuplin

James Mullan, Fishery Management Biologist
Vernal, Utah

January 8, 1971

Regional Supervisor, Division of Fishery Services

Goshute Indian Reservation, Bonneville Cutthroat Trout

Attached is copy of report and memorandum by Dr. Robert Behnke regarding the Bonneville Cutthroat Trout.

Dr. Behnke is very much interested in making collections of cutthroat trout on the Goshute Indian Reservation in hopes of locating the native trout of Utah. As you may recall, I made a field reconnaissance of the area in 1959 but did not attempt to collect fish since the Tribe was only concerned at that time with possible reservoir sites.

Apparently, the Tribe has not responded to a request by the two students to make collections on the Reservation. Since the Reservation is within your project responsibilities, Dr. Behnke will be working through you on this matter. The B.I.A. offices that have trust responsibilities of the Goshute Indian Reservation are located in Carson City, Nevada. I believe at this point their assistance in securing permission to make a survey of the waters on the Reservation would be appropos. The Tribal people were once interested in developing their waters for their own use and funds may now be available through the many poverty programs offered today to help them.

I would recommend that you contact Dr. Behnke and the B.I.A. at Carson City regarding this matter. We understand that the Utah Division of Fish and Game also assisted in making collections in Deep Creek on the Goshute Reservation some time in 1955-57 and found a mixed population. This information came to me secondhand through a school teacher who I contacted while on reconnaissance near the Reservation. I believe it was made by a Chinese fishery biologist employed by the State of Utah. I do not recall his name.

Robert L. Azevedo

cc - Dr. Behnke

Hendry's Crk.
cutt. est. spawning

FIELD TRIP REPORT

HENDRY'S CREEK

June 20, 1972

Personnel Present: Frank Dodge, Nevada Department of Fish and Game
Mont Lewis, United States Forest Service

Purpose of Trip: Collect cutthroat trout specimens from extreme headwaters of Hendry's Creek for identification by Dr. Behnke of Colorado State.

Detail: From the end of the road in Hendry's Creek we walked for 1 3/4 hours upstream to a point where volume was small enough that over-winter survival of trout would be doubtful and trout could no longer be observed in the stream.

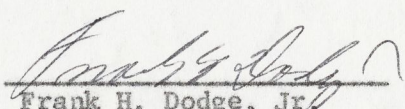
During the walk up the canyon, cutthroat were observed to be very plentiful and of exceptional size. Cutts to 12 inches in length were observed and specimens 8 to 10 inches were very common. In most sections of the stream several could be observed in each small pool.

In the upper mile of stream where the cutthroat were found to exist they were actively engaged in spawning. The date was June 20th and water temperature was 52 degrees. Due to calcification of the stream bottom, good spawning areas were hard to find. The trout were utilizing, what to me seemed poor areas with very large gravel or rubble sized rocks and seemed to have difficulty building suitable redds.

The trout collections were made with hook and line. Fishing for these beautiful trout was a fantastic experience and 20 nice specimens were obtained in just a few minutes. The collection area was that part of the stream which runs from north to south before the canyon turns and runs in an east-west direction. The collection area was about one-fourth mile above where a small tributary stream came in from the west.

Evidence of modern man in the canyon was everywhere and it was quite interesting to read some of the old names and dates. One large cottonwood with a 57 inch circumference had a still readable date of 1879. The accompanying name on the tree was unreadable but in talking with Fred Baker of Baker, Nevada he stated that he also had seen this name and believed it to be that of Thomas Bassett, an early pioneer in the area.

Prepared by:


Frank H. Dodge, Jr.

cc: Jack Wilcox, W.S.F.S. ✓

TROUT CREEK Deep Cr. Mtn. Range

Kunza Cabin

Mine Area

Fish sample
10/19/74
6 fish

#1
Fish sample
10/19/74
2 fish

#2
Sun Garden

Fish sample
10/19/74
2 fish

Dry
10/19/74

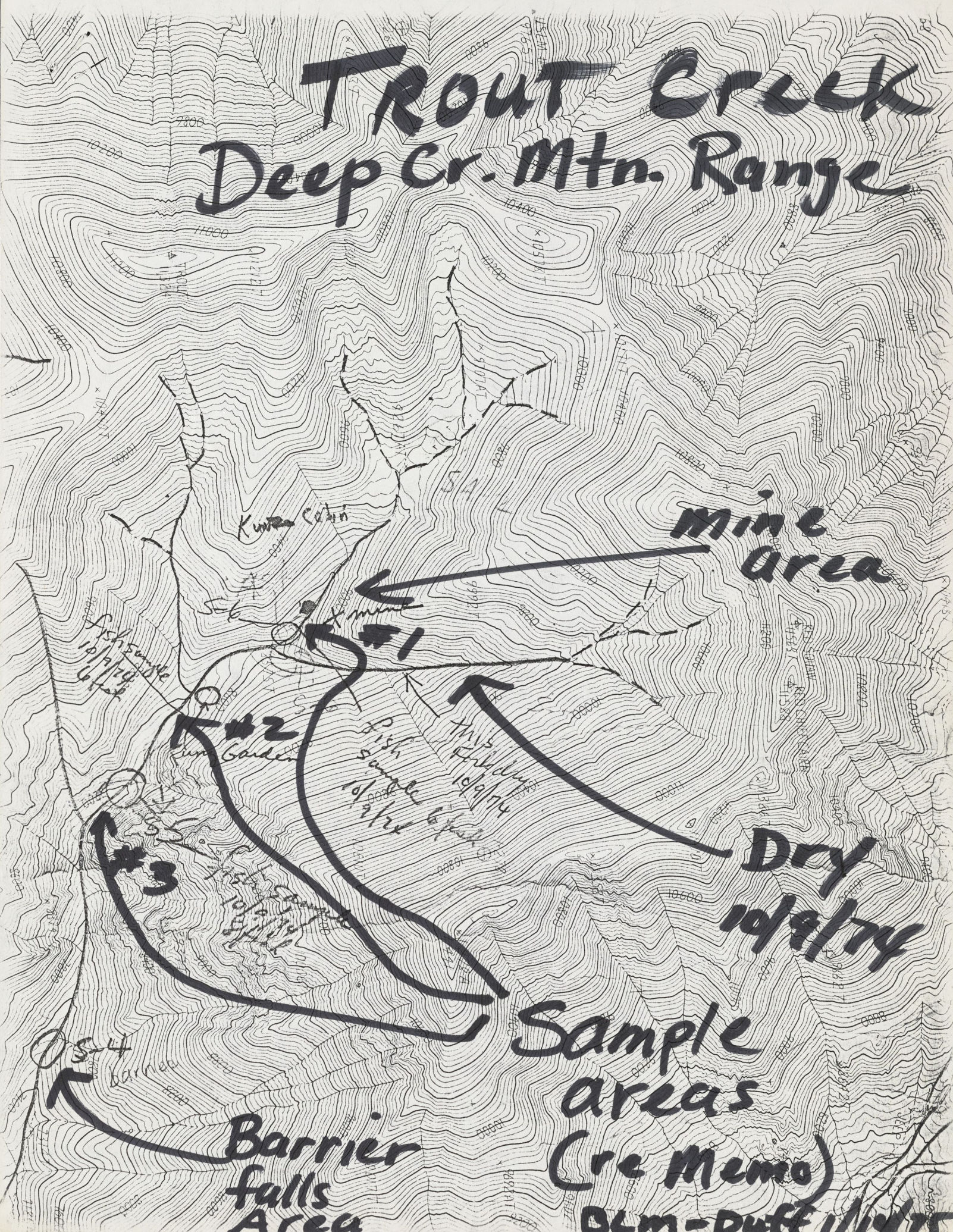
#3

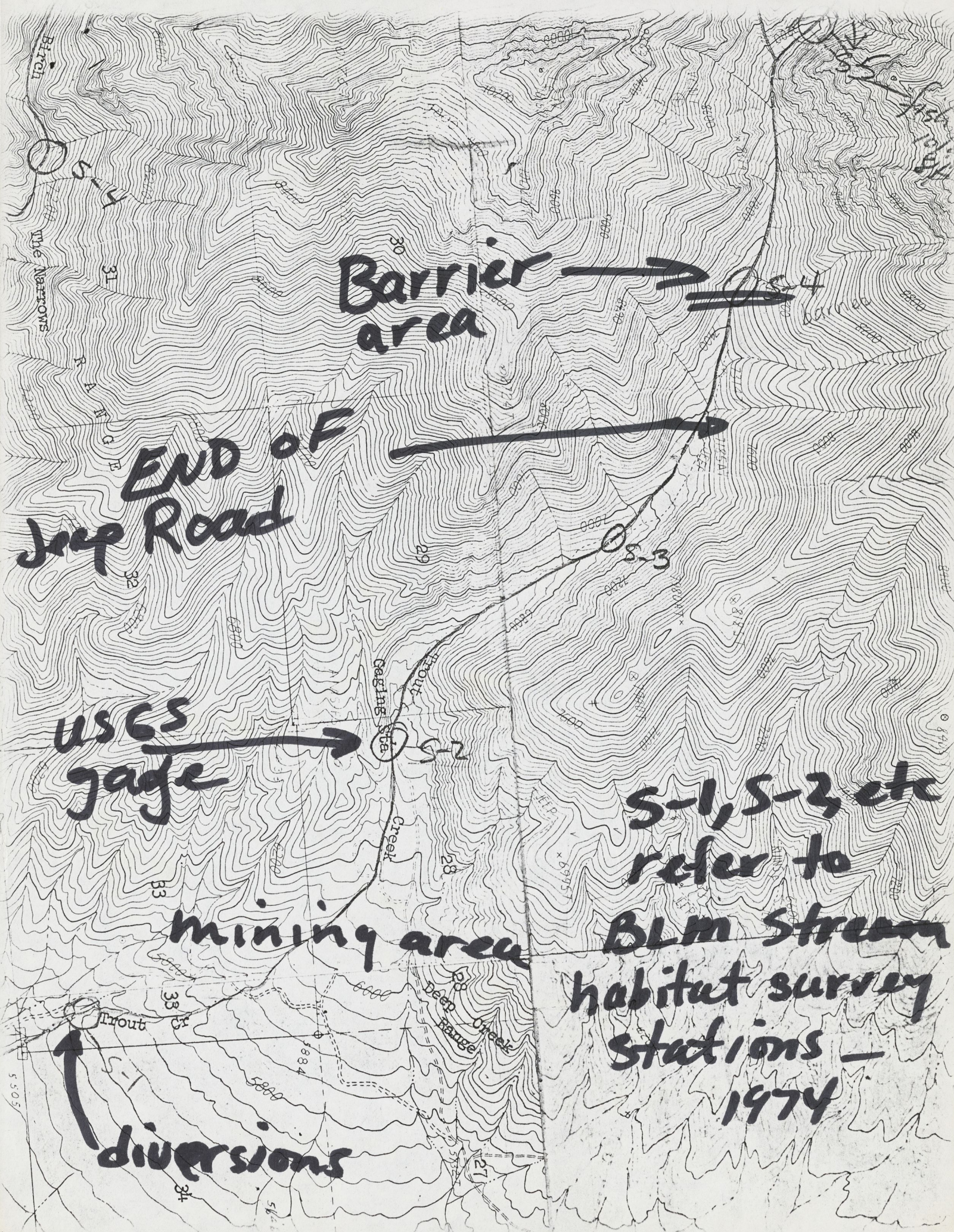
Sample
areas
(re Memo)

Barrier
falls
Area

DLM-Duff 1/14/75

#4
barrier





Barrier area

END OF Jeep Road

USGS gage

mining area

diversions

S-1, S-2, etc refer to BLM Stream habitat survey stations - 1974

Caring Creek

Trout Creek

Deep Range Creek

BIRCH

THE NARROWS

RANGE

5305

9 474

FOR: Terry Hickman

COLLECTED: SKULL VALLEY INDIAN RESERVATION
Tooele County, Utah
3-22-79

FROM: Hickman Creek

Stream originates on Desert Peak in the south end of the Stansbury mts. and flows west toward Nevada, but goes underground prior to reaching SKULL Valley

area is approximately 14 miles N and 3 miles E of Panguitch, Utah.

(over)

D. Robinson USFWS

- stream shows sign of massive flooding in not-to-distant past, this was reported to have wiped out all fish and the local Indians hook & lined fish to restock.
- fish are reproducing successfully in collection site
- stream on Indian land is 14,000 feet long and approximately 2' wide aver. Good habitat
- flows range from 1.1 to 3.2 cfs
- stream originates on Forest Service land, but this part of stream not checked out.
- No natural barriers readily apparant.

phone 801/789-0351

DR

447 E. Main
Jernal, Utah
84078

June 20, 1957 Loo

Utah Fish & Game Stream Survey Sheet

West Hickman Crk. has thick willow growth
on Indian Res., - "looks good for trout"
road very rough - no fish sample, no known stocking
- Location of station: 5 mi. up canyon, on Indian Res.
air temp 55, water 38° 3 cfs.
x width 6ft. ; many pools.

E Hickman - June 19, 57 - 1 cfs 2159' water 49°
conifers at headwaters. - sheep grazing - no barriers or diversion
- Not recommended for stocking.
suspected intermittent
No stocking history

- Skull Valley Ind. Res. Tooele Co. -
Hickman Crk. - originates Desert Peak - flows westward -
goes underground before reaching Skull Valley.

Del Robinson
447 E. Main
Vernal Utah, 84078

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES *S. clarki utah* (hybrid?) LOCALITY Utah, Skull Valley, Hinkleman
Crk., Toole Co.

COLLECTED BY Robinson DATE 1979

Cat. # _____ Measurements by _____ DATE _____

Specimen #

	1	2	3	4	5	6	7	8	9
Total L.	248	94	98	102	88	116	63	100	79
Standard L.									
Body D									
Head L.									
Orbit L.									
Upper Jaw L									
Dors. Orig. to Snt. tip									
Dorsal fin basal L									
Dorsal fin depressed L									
Adip. fin depressed L									
Caudal peduncle D									
Caudal peduncle L									
Vertebrae									
1st Arch gillrakers (up)	7/0	5/0	8/0	7/0	6/0	8/0	8/0	7/0	7/3
(lower)	13/0	11/0	11/1	10/0	10/0	12/0	11/0	10/0	11/0
(total)	20	16	19	17	16	20	19	17	18
Branchiostegal rays right									
(left)									
Dorsal rays									
Anal rays									
Pectoral fin rays									
Scales in lateral line									
Scales above lateral line	27	36?	21?	31?	28	30?	-	30	-
Scales 2 rows above lat.	134	128	125	124	138	141	-	136	(111)
Pelvic fin rays									
Pyloric caeca	56	47	51	37	47	48	?39	?43	50?
Dentition	0	0	0	0	0	0	0	0	

↓
ROOTS possible



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

August 9, 1972

Dr. Carl L. Hubbs
Scripps Institute of Oceanography
P.O. Box 109
La Jolla, California 92037

Dear Dr. Hubbs:

I have just returned from my field trip through Oregon and Nevada. I collected and traveled around the Alvord basin for three full days. I made collections of the unusual cyprinid from the Borax Lake area and from the Red Point Springs area on the west side of the valley between Denio and Fields. I checked your type locality at the junction of Little Trout and Trout Creeks and observed an abundant chub population there. This site is now posted so I didn't chance to seine. The environment looks excellent, however, both streams had good flows of clear, cold water - ideal trout habitat - which amazed me after observing the habitat of the Borax Lake area. These races must be physiologically quite different even if they do not reveal trenchant morphological differentiation. I did try seining in lower Trout Creek, but the water was swift and deep and we found only rainbow trout. I was wondering if you found this same chub in Willow or whitehorse Creeks? They both appear to provide good chub habitat but we saw no fish other than cutthroat trout. I suspect that there may not have been any direct connection between these drainages and the Alvord sump for a considerable period of time--a matter I'll return to later in discussing the Alvord native trout.

I became fascinated with the Alvord chub and have several questions for you. How many forms do you recognize? Do you have any definitive information or specimens of the mysterious "giant chub" the local people talk about? You told me you once swam out and dove into the deep "hole" in Borax Lake looking for them. I heard various stories but all second or third hand legends. The local people believe the chubs live underground and appear whenever a well is sunk. Some were surprised to find that indeed these

Dr. Carl L. Hubbs
August 9, 1972
Page 2

chubs do have eyes. I heard about large chubs inhabiting a well at Red Point. This well was encased in a large culvert-like structure. I weighted down a seine with large rocks and sank it into the well and came up with 100's of chubs but none over 3-3 1/2 inches. I placed about ten in a 10 liter jug and transported them back to Fort Collins. They are all alive after 11 days confinement without food. I note they have numerous short gillrakers and an intestine about equal to body length. I suspect they are opportunistic feeders on a variety of items. The Red Point locality is opposite Pueblo Slough but there are no direct connections. An excavated pond at Red Point was swarming with chubs, but none were seen in an identical pond next to it stocked with rainbow trout. The caretaker said he found many in the trout stomachs which suggests they are quite vulnerable to predation.

At Borax Lake chubs were found only at the very outlet, in flowing water. The lake below Borax Lake had no chubs, but they swarm in all the ramifying rivulets between the lakes. They appear to be limited to rapidly flowing water at Borax Lake. When a vehicle drives across the wet area below Borax Lake, the tire tracks create new rivulets that become new chub habitat. The BLM controls the land in the area but not the water rights. This may pose a threat to the chub and it would be advisable to have certain habitats protected to insure perpetuation of the Borax chub. The BLM in the Ely, Nevada area has created ponds for rare desert fishes. The BLM has initiated some action to enhance the survival of the Alvord cutthroat trout in Whitehorse Creek. The watershed is badly overgrazed and the stream is warm and silted, but the trout are still abundant. Grazing has been restricted, stream improvement devices and willow plantings made in the headwaters and stock has been introduced into Antelope Creek, a formerly barren tributary. The formal description of the Alvord trout and the chubs, pointing out the threatening factors and suggesting remedial measures should greatly help to enhance survival of the relict fauna. The BLM personnel seem receptive and eager to do something, but want more authoritative information on the taxonomic status of the fishes. So in reference to the point raised in your letter of July 13 - to publish descriptions piecemeal or in a single definitive paper - there are good reasons to get publications out as soon as possible on the Alvord fauna, so there will be no excuse for various agencies not taking action to preserve these unique fishes. I plan to describe the Alvord, Humboldt and Mt. Wheeler cutthroat trouts in a single manuscript. The BLM, the Forest Service and Nevada Fish and Game have already taken an interest in the Mt. Wheeler and Humboldt cutthroat and new populations have been established.

Dr. Carl L. Hubbs
August 9, 1972
Page 3

I sampled the very headwaters of Trout Creek, the East Fork of Trout Creek and the Cottonwood Creek (tributary to Pueblo Slough). These waters appear to be the only sources of possible native trout in streams tributary to the Alvord Desert (excepting Thousand and Virgin Creeks in Nevada which have only rainbow trout now and had typical S. c. henshawi in your collection of 1934). I found only rainbow trout, but some specimens have cutthroat marks and erratic spotting. The same type of trout also is now found in the headwater tributaries of the Quinn River drainage of the Lahontan basin, just to the south of the Alvord basin. Undoubtedly, cutthroat trout were in Trout Creek before rainbows were introduced, but I wonder if they were native, and if so were they similar to the Whitehorse and Willow Creek populations? I heard a story of a claim by an old resident that he had helped first stock Trout Creek (was it barren of trout before this stocking?). Several years ago I examined your 1934 collection from Virgin Creek, Nevada (UMMZ 130532) and found they appear to be very typical S. c. henshawi. As you pointed out in a letter (Aug. 1, 1969), there may have been a connection from Summit Lake, providing access to Virgin and Thousand Creeks for S. c. henshawi. What was the native trout, if any of Trout Creek then? They may have been derived from a common ancestor of the Willow and Whitehorse stocks during a high level of Alvord Lake (if there was a lacustrine connection I expect the Alvord chub should be in Willow and Whitehorse creeks), they may have been S. c. henshawi, either from a natural connection from Summit Lake via Thousand and Virgin Creek drainage during wetter periods, or by early introductions by man, probably from the Quinn River drainage. I once noted that UMMZ collections 130491-130494 are samples of trout from Trout Creek made in 1934. Only 130493 is listed as "alvordensis" the others as S. gairdneri or hybrids. I will ask Bob Miller for the loan of these specimens and see if I can interpret the characteristics of the original Trout Creek trout. I am convinced that the basic coloration and spotting pattern of the Willow and Whitehorse Creek populations ally them with Lahontan basin cutthroat trout and not Columbia River basin trout. You and Bob can let me know if you want to examine my chub samples from the Borax Lake and Red Point areas. I didn't have much time for other than cutthroat trout collections. I did make collections in the Malheur-Harney basin and Malheur River and So. Fork Owyhee tributaries for red-banded trout. I found one population of trout I tentatively refer to as the red-banded group in an isolated tributary of the So. Fork Owyhee drainage in Nevada, living in a badly degraded stream with a water temperature of 83°F. Frazier Creek, a small stream in the Humboldt drainage has water temperatures recorded at 78°F and has an abundant cutthroat population. Whitehorse Creek must approach such temperatures during the summer also.

Dr. Carl L. Hubbs
August 9, 1972
Page 4

I got a sample of the desert dace from Steptoe Creek in Steptoe Valley near Ely. White River suckers, springfish and spine-dace were collected at and near Preston, Nevada, but Frank Dodge of Nevada Fish and Game said he has sent specimens from these localities to Bob Miller. Guppies now swarm in all the springs at Preston, greatly outnumbering the springfish. I examined a fish fossil from the Alvord basin. Mr. Ed Farnum, who lives about one mile down the road toward Denio from my collecting site at Red Point, had a diatomaceous block he picked up in the Trout Creek area: "over the hogback heading toward Whitehorse Ranch about one mile from Allen's Ranch." The fossil appears to be an Archoplites-like centrarchid. It is about 9 inches in length with about 30-32 vertebrae, about 10 dorsal spines and about 5 anal spines. What information do you have on Alvord fossil fishes?

I have a specimen of an unidentified chub of the Gila group from the South Fork Owyhee River near the Oregon-Idaho border. It is 206 mm. T.L., D. 10, A. 8, P. 13, V. 9, L.L. 80, Teeth 2,4-4,2 sickle shaped, jaws almost terminal (slightly sub-terminal), upper jaw moderately long - almost reaches anterior rim of orbit, head 45 mm., orbit 7 mm., gillrakers short, 5 + 8, tail forked, dorsal and anal fins falcate, dorsal origin very slightly posterior to pelvic origin. Dark, slate colors above with slightly darker lateral band, lateral line slightly decurved, jaws protrusible - no frenum, no barbels, caudal peduncle relatively narrow. I must admit my ignorance when confronted with unfamiliar cyprinids, but this specimen doesn't seem to key out to any Columbia River basin species known from Oregon. Of the cyprinids I know, it most resembles Gila robusta. If you or Bob can't identify it from my description, I'll send it to one of you.

In the 1948 Hubbs and Miller paper on Great Basin fishes it was stated that the outlet of the Fort Rock basin to the Columbia River basin was not known. I'm sure you've been informed by now of the deep canyon that cuts through the lava across "Horse Ridge" right at highway 20 about 10 miles east of Bend. There is a sign at this spot telling of the outlet channel of an ancient lake. The now dry canyon connects to Crooked River, a tributary of the Deshutes.

Hope Bob is fully recovering from his recent ordeal.

Sincerely,

Robert J. Behnke
Assistant Leader

jrl
cc: R. Miller, G. Baxter.

8. TICK OFFSET MASTER - 3000 SERIES GUM LINE FOR TOP EDGE OF PAPER

ENVIRONMENTAL ANALYSIS

RESTORATION OF NATIVE CUTTHROAT POPULATIONS
IN WHITE PINE COUNTY, NEVADA

Introduction

Old pluvial Lake Bonneville in western Utah and extreme eastern Nevada was once a very large body of water. One arm of the lake inundated what is now known as Snake Valley in eastern White Pine County, Nevada. Cutthroat trout in recent times have been known to occur in some of the streams of the Snake Range which were tributary to Lake Bonneville but the status of these cutthroat has never been clear. They have historically been thought of as a remnant population of the rare and endangered Bonneville cutthroat trout, Salmo Clarki utah, but recent studies have shown that the fish is a new undescribed subspecies of cutthroat trout that is native and unique to the area. For convenience we shall call this trout the Mt. Wheeler cutthroat.

The Mt. Wheeler cutthroat no doubt used to occur naturally in old Lake Bonneville but as the lake dried up the cutthroat were forced to live in the only other available habitat - the surrounding streams tributary to the dying lake. Since then this cutthroat has involved into a trout which is very well adapted to a stream type habitat. It has the unique obitity in small turbulent streams to attain a size that is attractive to anglers. In streams where they occur, 8 to 10 inch cutthroat are common and fine 12-inch and over specimens can also be caught.

In the late 1880's early pioneers to Eastern Nevada transplanted some of these cutthroat into Pine Creek on the western side of Mt. Wheeler, and until recently we thought that this was the only surviving population of a pure strain

B. DICK OFFSET MASTER - 3000 SERIES
GUIDE LINE FOR TOP EDGE OF PAPER

of this cutthroat. In recent years, populations have also been introduced and become well established in Hampton Creek and Goshute Creek and an indigenous pure strain has been identified in the extreme headwaters of Hendry's Creek. Several other streams in both Snake Valley and Spring Valley have populations that have been hybridized to various degrees with the introduced rainbow trout. This cutthroat is believed to be extinct in all but the above mentioned waters.

The Problem

Eastern Nevada has many small inaccessible streams with abundant populations of stunted rainbows. These streams receive very little angler use because the fishermen are just not interested in catching 5 to 6 inch rainbows. Many of the streams show virtually no angler use. Rainbows in small inaccessible streams more often than not, reproduce to a point that their growth is stunted and anglers loose interest in catching them.

Streams containing the Mt. Wheeler cutthroat are closed to fishing at the present time to protect the species. Prior to 1971, and before it was recognized that Hendry's Creek had a pure strain of the Mt. Wheeler cutthroat, the stream was open to fishing. Hendry's Creek has a very abundant population of stunted rainbows in the lower sections of the stream but the anglers who fished the stream did not fish for them; they walked to the headwaters area where they could catch the larger native cutthroat.

At the present time we do not know the management possibilities that this cutthroat has and until we do I think we should take the necessary measures to protect and enhance the population as much as possible. This is especially true when we consider its current rare status. The total numbers of these cutthroat in existence cannot be but just a few thousand. Goshute Creek, with about 6

miles of marginal habitat, holds the greatest number of these cutthroat with about 1,500 fish. Pine and Hampton Creeks are extremely small streams with little fishable length and only support a few hundred trout. Hendry's Creek will support a substantial population when the hybrids are eliminated from the drainage below the headwaters but at the present time there is probably no more than 200 pure strain fish in the headwaters. A project to remove the hybrids from Hendry's Creek with antimycin fish toxicant is scheduled for the summer of 1974. This will allow the pure cutthroat in the headwaters to repopulate the entire stream. With no competition for food and space and very good available habitat the remaining headwaters cutthroat should quickly repopulate the stream.

Proposed Action

The Hendry's Creek project is the first step in a project which calls for the removal of existing fish populations from several small inaccessible streams in Eastern Nevada. In Hendry's Creek case the fish population would be removed below a point in the headwaters area above which was found a pure strain of cutthroats. The headwaters cutthroat would then be allowed to repopulate the remainder of the stream. An environmental analysis of the Hendry's Creek project was written up in 1973 with final approval from the Pesticide Use Coordinating Committee coming on August 1, 1973.

After Hendry's Creek, the proposal is to remove present fish populations from selected isolated streams and then restock with pure cutthroat stock from Pine Creek and Goshute Creek. A fish toxicant known as antimycin will be used in removing the unwanted fish from each stream. It has several qualities which make it a more desirable fish toxicant than rotenone, including; 1) treatment is done in parts per billion rather than parts per million requiring a very dilute chemical level; 2) the action of antimycin is irreversible after exposure to the

lethal concentration; 3) the chemical is non-repelling to fish; 4) has little or no effect on aquatic life other than fish; 5) and break down rapidly into non-residual compounds. The antimycin compound is an antibiotic produced in cultures of *Streptomyces* and is an irreversible inhibitor of cellular respiration.

Several formulations of antimycin are available for use depending on needs. On the streams involved in this project, the primary formulation to be used will be a cake formulation with the consistency of bar soap which gradually dissolves in water. The bar is 4" x 4" x 1" and contains 35 grams of active ingredient. It is designed for use in moving water and will be the primary formulation used. In still-water areas such as beaver ponds, a sand formulation which is antimycin coated on sand grains may be used.

A concentration of 10 to 20 ppb will be sought with volume flow, water temperature and pH at the time of application determining how much of the toxicant will be used. Warmer water temperatures and reduced flows of late summer will require less toxicant to reach the desired concentration. The antimycin toxicant is very sensitive to pH and tends to breakdown rapidly with higher pH values. When the pH is higher than 8.0 the concentration will have to be increased accordingly in order to totally remove the undesirable fish population.

The antimycin bars will be placed so that they will last about four hours before being completely dissolved. The bolt of toxicant bearing water will then drift downstream and be replaced by fresh water that is safe for fish.

After treatment each stream will be checked with electroshocking equipment to make certain that complete removal of the undesirable fish population was attained. It will then be restocked with about 50 pure strain cutthroat from either Pine Creek or Goshute Creek. Since there is a limited base

population in both Pine and Goshute Creeks from which to transplant fish, and the amount of time and work involved in treating one stream is considerable, it would probably be impractical to treat more than two streams in one summer. It would also be imperative that the cutthroat populations in Pine and Goshute Creeks be kept at the highest possible levels to insure that cutthroat were available for two transplants a year. The habitat in these two streams should be kept in the best possible condition and their populations enhanced as much as possible. Fishing season should remain closed on Pine and Goshute Creeks. It would not be necessary to close the fishing season on waters that were treated and transplanted with the cutthroat. It is felt that season closure and its publication in the regulations would only attract public attention to the stream and at this stage in the project the attention would be undesirable. The streams are presently receiving little or no angler use and this use should have no effect on the cutthroat becoming established once they are planted in the streams.

The eventual goal will be to get the Mt. Wheeler cutthroat established in enough streams so that it could be taken off the endangered list and opened to public fishing. This can be accomplished if we are able to extend its range into enough streams.

There will be no irreversible or irretrievable impact upon the environment due to this project. On the contrary, the Mt. Wheeler cutthroat trout as an endangered wildlife species could face extinction if we failed to take positive action to preserve it. If for some unforeseen reason the cutthroat would not establish in a particular stream it would take little expense and time to reestablish rainbow.

A total of 21 streams have been selected as suitable to receive Mt. Wheeler cutthroat. These streams are all in White Pine County Nevada and are listed in the attached table showing data on their characteristics. Each of these streams will be closely examined to determine their priority ranking as to when they would be treated and if any special treatment procedures would be required. As mentioned earlier, only two of the streams would be treated and restocked in any one year because of the time and work involved and the cutthroat planting stock is in short supply. After each stream is restocked with a minimum of 50 pure strain native cutthroat it will no doubt take several years for the cutthroat to completely repopulate the stream. The streams will remain open to fishing and the status of each streams population will be monitored with electro-shocking equipment as time permits.

The water from all of the streams in this project is used for irrigation but antimycin has no affect upon vegetation, nor would it have any affect upon any animals that might eat the vegetation. In a few cases, water from a stream is also used for cullinary water by the ranch. In these cases, even though antimycin is believed to be harmless to man, the rancher would be advised not to pull any water from the stream for drinking purposes until the fish toxicant has cleared itself from the stream. This is only a matter of hours after the project is started. Where a stream is used for cullinary water, all dead fish will be removed from the water after completion of the project. In all cases, ranchers, or any other interested person, will be advised of the project and how the fish toxicant works.

The project would call for total removal of the present fish population from all the streams except Silver Creek. Silver Creek is the most

heavily fished stream in the project. There is an average of 744 angler days of use on Silver Creek in one year. There is a 13 acre terminal reservoir located on private property of the Silver Creek Ranch. The reservoir receives from 1,500 to 2,000 angler days of use annually and is a valuable fisheries. The angler use on the stream is primarily on private property in the first three miles of stream just above the reservoir. There is a very good population of wild brown trout in that section of stream. The remainder of the stream receives very light angler use. The trout population above the mouth of the canyon would be removed and replaced with Mt. Wheeler cutthroat. This would necessitate construction of a fish barrier just below the canyon mouth to prevent hybridization with rainbows moving upstream. Potassium permanganate is a very efficient neutralizer of the antimycin fish toxicant and would be applied at the fish barrier to prevent removal of the fish population below that point.

Prepared by: Frank H. Dodge, Jr.

January 8, 1974

TABLE I - STREAM DATA
STREAMS TO BE CONSIDERED FOR NATIVE CUTTHROAT TRANSPLANTS

<u>Mt. Range & Stream</u>	<u>Fishable Length Miles</u>	<u>Normal Summer Flow (cfs)</u>	<u>Average Velocity Ft/Sec</u>	<u>Summer Temp. Range</u>	<u>PH</u>	<u>Spawning Potential</u>	<u>Fish Species Present</u>	<u>*Fish Habitat Quality</u>	<u>5 Yr Avg Days Use</u>
SCHELL CREEK RANGE									
Seigel Creek	2.0	0.7	1.2	55°-65°F	8.1	Fair	1	Pr-Fr	0
Muncy Creek	4.5	2.0	1.1	50°-60°F	7.9	Fair	1,2,3,4	Good	182
Meadow Creek	3.5	1.0	1.4	50°-65°F	7.6	Fair	1,2,3,4	Good	25
Piermont Creek	4.5	1.2	1.1	50°-60°F	7.6	Fair	1,2,3,4	Good	80
Bassett Creek	5.5	2.0	1.4	50°-60°F	7.2	Good	1,4	Gd-Ex	68
Nigger Crk (Little)	3.0	0.7	1.1	55°-60°F	7.2	Fair	1	Good	42
Odgers Creek	4.0	2.0	1.3	55°-60°F	7.2	Fair	1,4	Gd-Ex	3
Vipont Creek	2.5	0.5	1.1	55°-65°F	7.1	Good	1,3	Fair	0
Indian Crk (Sp Vly)	2.0	0.5	1.1	55°-65°F	7.5	Good	1	Fair	0
Sunkist Creek	0.8	0.8	1.2	55°-60°F	7.6	Fair	3	Pr-Fr	0
SNAKE RANGE									
Smith Creek	2.0	3.0	1.4	50°-65°F	8.3	Pr-Fr	1,3	Fair	3
Deadman Creek	5.0	1.8	1.4	50°-60°F	8.1	Good	1,3	Good	7
Deep Canyon Creek	3.0	1.6	1.4	50°-60°F	8.0	Good	1,3	Good	0
Silver Creek	10.0	3.0	1.5	55°-65°F	8.3	Good	1,2,3,4	Gd-Ex	744
Big Wash Creek	7.0	3.0	1.0	50°-65°F	?	Good	3	Good	0
Willard Creek	3.0	0.5	0.9	50°-60°F	7.3	Fair	1,4	Pr-Fr	0
Williams Creek	2.0	0.8	1.2	50°-55°F	7.3	Poor	1	Fair	74
Nigger Creek	7.0	2.5	1.4	50°-65°F	8.3	Fair	1,2,3,4	Fr-Gd	247
Shingle Creek	4.0	1.6	1.5	50°-55°F	7.5	Fair	1,2,4	Good	3
DIAMOND RANGE									
Water Canyon Creek	2.0	0.9	1.4	55°-65°F	?	Fair	1	Fair	0
EGAN RANGE									
Water Canyon Creek	4.5	1.6	2.3	55°-65°F	8.4	Poor	None	Poor	0

* Fish species present 1-Rainbow Trout, 2-Brown Trout, 3-Brook Trout, 4-Cutthroat Hybrids



MIKE O'CALLAGHAN
GOVERNOR

STATE OF NEVADA
DEPARTMENT OF FISH AND GAME

1100 VALLEY ROAD, RENO, NEVADA • TELEPHONE 784-6214
MAIL: P.O. BOX 10678, RENO, NEVADA 89510



GLEN K. GRIFFITH
DIRECTOR

IN REPLY REFER TO:

10 January 1974

Dr. Robert Behnke
Assistant Unit Leader
Bureau of Sports Fisheries & Wildlife
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colorado 80521

Dear Bob:

I will be transferring shortly to the Western side of the state and thought I had better bring you up to date on my cutthroat project before I leave.

Early last fall I tried unsuccessfully to eradicate the hybrid population in Hendry's Creek. The water was too cold and pH too high to get a complete kill. It is scheduled for treatment again during the heat of the summer of 1974 and will be handled by my replacement here.

I have attached a copy of an environmental analysis on the cutthroat project which I hope my replacement will continue to work on. If this is carried through to completion, it should give the Mt. Wheeler cutthroat a new lease on life.

It has been a pleasure to know and work with you but I have received a good promotion and must move on. My new address will be:

Mason Valley W.M.A.
Lux Lane, Box 1
Yerington, Nevada 89447 Phone 463-2741

Best of Luck!

Regards,

Frank H. Dodge, Jr.

Frank H. Dodge, Jr.
Fish & Game Agent II
Nev. Dept. of Fish & Game
P.O. Box 1109
Ely, Nevada 89301

M.T. Wheeler
Bismarville Trout

BLM Repts.
Duff

- Robt, Byars
BLM
P.O. Box 1509
Grand Junction, Colo.
81501

A GENERALIZED COMPUTER SIMULATION MODEL
FOR FISH POPULATION STUDIES
→ Bismarville
13