

November 15, 1976

Mr. Donald Andriano
Utah Division of Wildlife Resources
1596 W. North Temple
Salt Lake City, Utah 84116

Dear Don:

I was glad to receive your recent letter and I hope the time used in my reply will be time well spent.

Let me attempt to make clear a few points concerning trout taxonomy, the validity of subspecies, particularly as it relates to the Endangered Species Law (P.L. 93-205), and the relationship between systematics and fish management. To assist, I will enclose several reprints including a recent bulletin from the Forest Service.

I have been collecting, examining and analyzing trout specimens for 20 years. I have stated many times that there are no clear-cut differences between most of the recognized subspecies of cutthroat trout and it makes little difference if one recognizes the subspecies names as valid names or not. The important point concerns the question of a particular trout being indigenous to a particular geographical area and this point is recognized in the Endangered Species Act by defining a species to include "subspecies, smaller taxa and any population segment thereof." Thus the main consideration of Utah Division of Wildlife Resources should not be concerned with the validity of Salmo clarki utah, S. C. pleurilicus, etc. but to ask if a cutthroat trout was indeed native to the Bonneville basin and to the Colorado River system of the state and what is the present status of these trout.

This, of course, leads to the logical questions of, how distinct is the native trout of the Bonneville basin and the Colorado River system? How can they be identified? Can hybrid populations be recognized from pure populations?

It would be great if some almost magical new technique such as electrophoresis of protein patterns, examining gene loci could answer these questions, but it can not. If it does not work to separate rainbow trout from cutthroat trout, it is not likely to separate subspecies of cutthroat trout. As noted in my reports on Bonneville trout, the Utah State studies did, however, detect an aberrant LDH pattern in the Snake Valley cutthroat trout, and I used this

evidence of a null allele or a gene inhibited from putting out its product, to support my morphologically based conclusions that the Snake Valley cutthroat is a distinct divergence from other Bonneville basin cutthroat trout, and it is certainly a very rare, "population segment of S. clarki". The two populations known from Utah, in Trout Creek and Birch Creek, would have been lost this summer if my student, Terry Hickman, had not been conducting the BLM survey in the Deep Creek Mountains--barriers protecting these populations from hybridization washed out.

You expressed doubts on the validity of separating subspecies (or geographical groups) of cutthroat trout on morphological and anatomical evidence, perhaps in relation to direct environmental (non-genetic) influence on the characters I use to identify trout specimens. I have tested numerous populations consisting of parent stock and those derived from introductions of the parent stock, for example, Yellowstone Lake cutthroat of Yellowstone Lake and this same trout after several generations in other lakes. This provides an evaluation of environmental influence on the characters of a common genotype. I find some characters such as pyloric caeca and basibranchial teeth exhibit no significant change in different environments, others, such as scale numbers may change by about five per cent.

Although clear-cut differences without overlap may not exist between cutthroat trout subspecies, I do find consistent significant differences in mean values of several characters and in spotting pattern and colorations. For example, if you ever have the opportunity to compare the native trout of the Colorado River system with the native trout of the Bonneville basin, you would note a striking difference in coloration in mature fish and to a lesser extent, in their spotting pattern. To evaluate the relative purity of a trout resembling the native trout, I compare characters to see how closely they approximate expected values of the "subspecies" and to detect any evidence of hybridization with rainbow trout and, perhaps, Yellowstone Lake cutthroat trout.

If all of my studies over the years lack validity then I am a fraud and a liar.

There is a little doubt in my mind that all of the native trout in Utah are extremely rare as pure populations.

I realize you fear the Endangered Species Act as a possible encroachment of states rights, but I hope you will realize that to continually ignore the native trout or haggle over the validity of scientific names can be an unwise course. There has been an awakening of interest in native fish fauna, particularly among environmental action groups and I expect this will be further stimulated by the publication of the enclosed bulletin on native trouts. If, for example, at a public meeting, you are asked by someone representing an organization such as the Sierra Club or Wilderness Society, What are the native trouts of Utah? What is their status? What are you doing for them? An expression of concern will not be sufficient.

If the present situation in Snake Valley became widely known, there would be demands to have this trout declared endangered and its management turned over to the federal government.

Earlier this year I requested a collecting permit to facilitate the study of the Snake Valley cutthroat trout. A refusal, signed by present Director Smith, said in effect that if the BLM wanted information on native trout they could get it from the Division of Wildlife Resources. How could you provide information on the identifications desired by the BLM? Your biologists were instructed not to send specimens to me. How do you intend to find out where native trout populations may yet exist?

I would suggest that you can use your native trout as a definite asset, particularly as a lever with federal agencies such as the USFS and BLM, to improve habitat, create new fisheries and to demand equal or preferential treatment of fisheries in multiple use management in competition with livestock grazing, logging, etc. Wyoming is following this course of action and it looks very promising. A report I wrote for Wyoming G and F last year identified S. C. Utah in a Bear River tributary. This in turn led to a BLM project I just completed on this trout and its habitat (badly degraded from overgrazing). Eventually, a Habitat Management Plan should be instituted improving the habitat, possibly construction of reservoirs for stocking with native trout and creating a fishery where none exist today. The native cutthroat trout is much more attractive in generating federal funding, such as Sikes Act money, than is the hatchery rainbow trout.

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Finally, on trout systematics and fish management, you commented that it would be beneficial if systematists made their work more relevant. I can only say I fully agree and have been saying so and trying to do this for at least 10 years. Please take the time to read the enclosures. In reviewing my letter, it must appear that I am angry. Actually, I am not and my intent is an expression of concern that a rapidly vanishing and potentially very valuable resource will be further eroded by squabbling over matters of state and federal jurisdiction and the validity of scientific names. An ambitious program directed to find out what are your native trout, where do they exist, what can be done for them in the way of habitat protection and re-introduction--is the most certain direction to insure that there is no federal encroachment of management of Utah fishes.

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Sincerely,

Bob Bohnke



S. c. utah
S. c. pleuriticus

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

December 29, 1972

Mr. Don Duff, Fisheries Biologist
BLM, P.O. Box 11505
Salt Lake City, Utah 84111

Dear Don:

I received the set of maps and have gone over them to look for areas that might hold native cutthroat trout. There are four subspecies of cutthroat trout native to Utah: all are very rare and one may be extinct in Utah. Salmo clarki utah is native to the main Bonneville basin, Bear, Provo, Jordan, Sevier river drainages. It also occurs in the Virgin River drainage (at least in the stream near Pine Valley), but it is not known if they were native to the Virgin drainage or introduced by early settlers. In any event, remote headwater streams in the Virgin drainage may be the most likely sources of pure S. c. utah. The original distribution of the Green River-Colorado R. basin cutthroat, S. c. pleuriticus, extended south to the Dirty Devil River on the west and to the San Juan River on the east. It is certainly ^{hopeful} some populations will be found. A third subspecies of cutthroat was native to Snake Valley of the extreme western side of the Bonneville basin of Utah and Nevada. Snake Valley is drained by Trout Creek, tributary to the Great Salt Lake Desert. This trout is known only from Nevada and all collecting in Utah (Trout Creek and Deep Creek tributaries) found only rainbow trout or rainbow x cutthroat hybrids (Johnson Creek on Goshute Indian Reservation). The cutthroat trout native to the Snake River ^{← S. c. iowisii 4th subsp.} drainage. Collections this summer, and a talk with Mr. Kimber, the Game Warden in Snowville, indicate that the only native population of cutthroat trout presently in the Raft River drainage is in One Mile Creek, a tiny tributary which I collected at the border of the Sawtooth National Forest. I haven't analyzed this sample yet and can't comment on its purity, but the trout in One Mile Creek are the large-spotted variety of cutthroat trout, not the fine-spotted type, characteristic of the Snake River in Wyoming.

To be more specific in suggesting some ideas for any collecting you may do, I'll comment on each of the eight BLM maps:

Mr. Don Duff
December 29, 1972
page 3

7. Northwest: Snake Valley drains northward along the Nevada border. Don Cain (BLM, Ely, Nev.) and Frank Dodge (Nev. F. & G.) checked several streams in this area and a Utah Fish and Game survey was made in 1957. It appears that the native cutthroat trout is gone from the Snake Valley of Utah. In 1972 I checked the area north of the Great Salt Desert (Grouse Creek Mtns. and Grouse Creek drainage). It is doubtful that trout were native to Grouse Creek in historical times because of intermittent drought.

I talked to 90 year old Elmer Kimber at his home in Grouse Creek. Mr. Kimber said that when he was a boy the only stream in the Grouse Creek drainage with trout (and the only permanent stream in the valley) was Death Creek, west of Etna. He remembered catching a mess of trout from Death Creek in 1897 and he and his brother carried some over to a small stream on the other side of the divide. A reservoir has been built near Etna, stocked with rainbow trout and Mr. Kimber believed there were no "native" trout left in Death Creek. If you are in the area, however, I would appreciate checking on the possibility of cutthroat trout in the headwaters of Death Creek, perhaps there is a barrier that has isolated them. The Raft River drainage is on this map and as I mentioned, the only cutthroat trout are in One Mile Creek. All of the Bonneville tributaries of the Raft River Mountains were stocked with rainbow trout in the headwaters and Mr. Kimber, the Game Warden at Snowville, doubted that any native trout persist.

8. Northeast: Should be a promising area for S. c. pleuriticus. Of particular interest is the South Fork Sheep Creek in Ashley National forest. A 1936 collection of cutthroat trout turned up a high proportion of specimens without dorsal fins. Perhaps cutthroat trout are gone from this site, but I'd like to find out if they are there, and if so, is the dorsal fin anomaly still present in the population?

I hope you'll find time in the coming year to upgrade the quantity of information I have available on native trout in Utah - probably the least known of all the western states.

I'll send a copy of this letter to Mr. Dunham of the Forest Service as many of the areas discussed above are on National Forests.

Sincerely,

Robert Behnke

RB:smb

Mr. Don Duff
December 29, 1972
page 2

1. The Southcentral map covers part of the Sevier River drainage (Bonneville), the Green River drainage (below area of native distribution of cutthroat trout) and some of the Virgin drainage. Asay Creek, tributary to the Sevier may have a pure population of S. c. utah in upper sections. I have two specimens of cutthroat trout collected near Hatch, Utah (data included in the Bonneville Report) that appear to be S. c. utah. I would very much like to obtain larger samples of cutthroat trout from Asay Creek (or any other Sevier tributary). The headwater tributaries in the Virgin basin may prove interesting.
2. East Central: All of this area is part of native range of S. c. pleuriticus (Green River drainage). I have seen no specimens from this area and know little about it.
3. Southeast: Would expect that this area is too hot and arid to include much potential cutthroat trout habitat. The most likely area would appear to be the higher elevations on the Manti-Lasal National Forest, particularly tributaries of Cottonwood Wash, of the San Juan drainage. If you hear of rumors concerning native trout in any area on this map, please make note of them.
4. Central: Covers the Green River-Colorado River drainage below native occurrence of S. c. pleuriticus and parts of Sevier R. drainage where S. c. utah was native. I have no information on this area.
5. Southwest: This area covers the area in the Santa Clara-Virgin R. drainage where I collected S. c. utah near Pine Valley in 1959. It shows numerous small tributary streams that may be likely sources of native cutthroat trout. I have heard from John Neuhold of Utah State University that he caught cutthroat trout in small streams around Navajo Reservoir. This might be a promising area, with many remote headwater streams in both Virgin and Sevier R. drainages.
6. West Central: Mainly covers Sevier R. drainage. I have data on specimens collected from Beaver R. in 1872 and Mammoth Creek in 1915. I doubt cutthroat trout could be found at these sites today. Part of Snake Valley, the native range of the undescribed subspecies, is found on the extreme northwest section of this map. This is extremely arid country but it looks like some permanent streams might be found in the Confusion Range and perhaps the House Range (Sevier drainage). It would be important to gather all the information possible on the area around Snake Valley.

changes in characters in introduced fish

* - Mt. Wheeler - Pine Co. → Hampton

V, I: Dukravets & Machulin 1974
→ Goshato

Ophiocephalus

no. 1 : 179-181

A Cutthroat stream in White Pine County

A second investigation of the garnet mining operation in Hampton Creek found the 'Gorco' Company to be in violation of the State Engineer's office on two counts: (1) a diversion of the stream has been made without authorization, and (2) an impoundment in excess of ten feet has been constructed, also without authorization.

On July 9, an aerial drop of 800 cutthroat (S. c. henshawi) was made into Baker Lake in the South Snake Range of White Pine County. The plant was highly successful with near $96\frac{1}{2}$ percent survival. The cutthroat were one year plus in age averaging $3\frac{1}{2}$ inches in length with several running up to 6 inches. The trout, 200 at a time, were transported in 5 gallons of water at 52°F with periodic aeration by use of an electric pump and exhibited no distress on the 10-12 minute flight. The fish were held in the container for 20 minutes without aeration before showing any distress.

The relatively heavy plankton blooms in Baker Lake should give a boost to the ultimate success of this introduction.

~~Oszy Wernsmann~~

Rt. 1

Box 61

Fleming, Colo.

80728

Field Trip

Utah

- Stelmaker - U.F.S

- Don Duff

- Aszy

- Towave

		Sent	
M	T	W	T
3	4	5	6

Idaho

- Esay

Bob Bell Jerome

- Walker

Wyo

- Rollason

- N.P.

- Pinalis

~~Oszy Wernsmann~~

Utah

cutthroats

8

Pure Populations of Salmo clarki utah

Wyoming

Bear River System

Thomas Fork Drainage (Lincoln Co.)

1. Raymond Creek

Presently impacted by livestock grazing, mineral exploration, and past stocking of brook trout.

Other creeks in this drainage: Coal, Salt, Giraffe, Smithfield, Smith Fork and Rock Creeks contain good representative S. c. utah, that are slightly hybridized from rainbow and other cutthroat subspecies. But resistance of these non-native genotypes is working to restore the native genotype. At present these are not good for S. c. utah brood stock.

Nevada

Mt. Moriah Area (White Pine Co.)

2. Hendrys Creek

Suffered about a 50% mortality in 1977 due to drought.

3. Hampton Creek

S. c. utah were introduced from Pine Creek in 1953. About 50% mortality was recorded in 1977 due to the drought. This is a small, overgrown creek subject to "cloud burst" elimination. There were about 100 cutthroat present prior to 1977.

Mt. Wheeler (White Pine Co.)

4. Pine Creek (Co. 100 cutthroat)

Located outside of native S. c. utah range. The stream is very small and subject to several potential impacts.

Egan Range (White Pine Co.)

5. Water Creek

S. c. utah introduced in 1977 from Goshute Creek. Located outside of native S. c. utah range.

Steptoe Valley (White Pine Co.)

6. Clear Creek

S. c. utah introduced in 1977 from Goshute Creek (a total of 71 cutthroat were introduced into Clear and Water Creeks). Located outside of native S. c. utah range.

Cherry Creek Range (White Pine Co.)

7. Goshute Creek

S. c. utah introduced from Pine Creek in 1960. Located outside of native range. A 38% mortality was recorded in 1977 due to the drought.

Utah

Deep Creek Mtns. (Juab Co.)

8. Trout Creek (Co. 800 cutthroat)

Presently impacted by introduced rainbow trout existing in the area. There is also mining explorations planned for the area.

Jordan River Drainage (Salt Lake Co.)

9. Willow Creek

Small creek, located east of Salt Lake City in a tributary of Little Cottonwood Creek.

An Apartment complex is planned about 1/10 miles from Willow Creek.

Sevier River Drainage (Beaver Co.)

10. Birch Creek

Small creek located near Beaver, Utah.

Suffered a 30% mortality in 1977 due to drought.

11. Sam Stow Creek

Introduced S. c. utah from Birch Creek during 1977.

Virgin River Drainage (Washington Co.)

12. Water Canyon

Small creek, located outside of native S. c. utah range

13. Reservoir Canyon

Small creek, with S. c. utah only in extreme headwaters. Rainbow trout are found below headwaters area. Creek is located outside of native S. c. utah range.

A total of 13 streams contain pure populations of S. c. utah. Most of which are subjected to various impacts (climatic, degradation of habitat and hybridization) which could eliminate or drastically reduce the numbers of cutthroat. Three streams (Water, Clear and Sam Stow) have been stocked this year and successful reproduction has not been determined.

The states of Nevada and Wyoming recognize S. c. utah as a rare species. The streams in Nevada which contain S. c. utah are closed to fishing. The Bonneville Chapter of AFS recognizes S. c. utah as endangered.

Material obtained from thesis by Terry J. Hickman, Colorado State University, to be completed in the Spring of 1978.

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A new mining interest in Hampton Creek of the North Snake Range of White Pine County threatens the existence of the entire stream. The mineral is garnet for which an apparent substantial market is developing. It is to be a placer-type operation with the garnet being separated from the remainder of the material by a washing process. Nearly one-mile of stream will be lost at once as the water will be diverted to the mill for storage and to carry the tailing material into a silt retention basin. The entire stream bottom is located within placer and lode mining claims and may be dredged for the garnet. It appears that the only control we have presently is in regards to any resulting pollution of the stream below. This stream contains four-miles of fishable water and supports the only fishable population of the Utah cutthroat in the state.