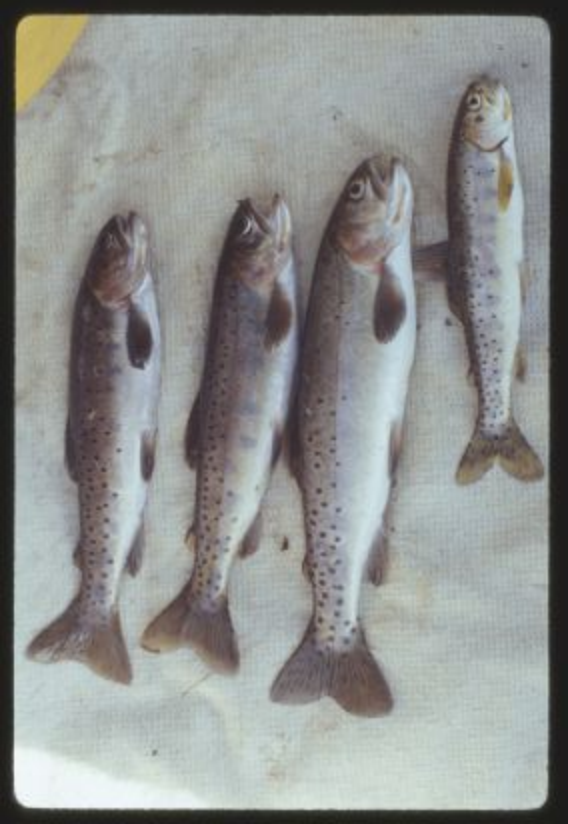


3

Big River

Mid west


4
Basin Cr.
Big River

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES WEST SLOPE CUTTHROAT LOCALITY HARRISON CRK. → S.FK. FLATHEAD R. FLATHEAD N.F., FLATHEAD CO. T24N R14W S.10

COLLECTED BY _____ DATE 8-3-72

Cat. # _____ Measurements by ROSCOE DATE 7-73

Specimen # 10

	9	DOLLY VARDEN 10						
Total L.	140							
Standard L.	116							
Body D								
Head L	29							
Oroit L	8							
Upper Jaw L	15							
Dors. Orig. to Snt. tip	55							
Dorsal fin basal L								
Dorsal fin depressed L	29							
Adip. fin depressed L	11							
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	7							
(lower)	11							
(total)	18							
Branchiostegal rays right	13							
(left)	12							
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	45							
Scales 2 rows above lat.	180							
Pelvic fin rays	9							
Pyloric caeca	38							
Dentition	5							

7
33
36
8
84

9) 84 9.3

64
59
62
72
72
60
68
48
80
9) 586
54
46
45

9) 31 3.4
27
40

9) 68 7.5
63
50

9) 55 6

Affinities

Bonneville + Snake River

W.S. + E.S.

?Yellowstone

1. Bonneville into Snake - (fish already in Snake and Columbia) introduced Bonneville stock
2. then catastrophe with falls formed, lava flows, fish life destroyed except for isolated pops. (Yellowstone N.P. formed?)
3. connection with Bonneville ceased

so:

1. Snake River stock from Bonneville influence after catastrophe
2. isolated pops. show relict Bonneville or Columbia characters
3. ?Yellowstone intermediate?

vert. $\bar{x}$ >60.0 teeth 5-15 / 15-20 Yellowstone

rakers - >19.0 caeca - <35

Scales 40-42 / 160-170

*Straight Crk. - perhaps good -

not summarized

N=10 vert. 60-63 (61.2 ? hi)

N=16 scales 40-46 / 151-181 hi rakers 17|18|19|20 / 2|8|4|2 18.4 ✓

N=16 Caeca 27-46 —

teeth 4-17 all pelvics all 9

spotting - essentially good.

~~Spotted Bear~~

Moose Crk.

N=17 vert. 59-62 60.8 ✓

19 rakers 17-23 19.6 hi - Yellowstone influence ?

scales 19. 38-47 / 150-192 41.0 / 172.6 ✓

teeth 19. 3-19 9.7 ✓ pelvics 9-10 9.2

caeca 19 30-46 (36.6) ✓

spotting - ? - variable - small-med. w/ basic arrangem

Overwhich - Bitterroot

N=13 vert. 59-63 61.5 hi

20 rakers 19-23 20.65 hi

scales 20 40-44 / 153-189 41.95 / 175.25 ?

Yellowstone influence

20 teeth 0-16 1-16 (7.7) - rainbow

20 caeca 24-46 36.3 ✓ pelvics 9/12 | 10/8 9.4

spotting ? large, sparse, atypical 2/4 | 8

Little Stoney

9 vert. 60-62 60.7 ✓

rakers 16 18-22 20.8 Yellowstone ?

Scales 10 41-46 42.3
162-181 171.1

caeca 27-39 34.2 pelvic 9-11 9.5

teeth 4-23 (11.4)

spotting - large

Congdon -

12 vert 60-63 61.6 high

rakers 15 18-22 19.9 high

Scales 15 37-43 40.0 ✓ rainbow ?
139-179 163.3 ✓

caeca 15 25-43 35.5 ✓ pelvic 9-

spotting variable (but ~~not~~ but) patches red

teeth 0-15 14% 7.1

Arrasta -

8 vert. 60-61 60.7 ✓

rakers 12 16-20 19.0 ✓

Scales 12 40-46 41.2 ✓
152-196 170.6 ✓ pelvic 9-10 ? 9.3 rainbow ?

Caeca 12 32-38 35.8 ✓

teeth 12 2-8 4.7 ✓

spotting - not typical.

Ross Crk. - prob. good stock

not summarized vert. 10 59-62 60.8 ✓

rakers 10 17-21 17|18|19|20|21
1 4 2 2 1 18.8 ✓

Scales 10 38-42 —
150-176 — pelvic 8.9

caeca 9 29-42

teeth 10 6-24

spotting variable, but ~~fairly~~ good.

Brj Rock Crk.

prob. 0.1%; slight influence rainbow? Yellowstone.?

not summarized

vert. 14 60-62 60.7 ~

rakers 18-21 cz 20 hi

16 scales 40-43
147-188 pelvic 9-10 8.2

~~Teeth~~ caeca 34-47

16 teeth. 6-16 all

spotting. Not typ. -

Chippy Crk.

14 vert, 59-61 59.7 ✓

16 rakers 16. 18-21 19.56 hi. Yellowstone.?

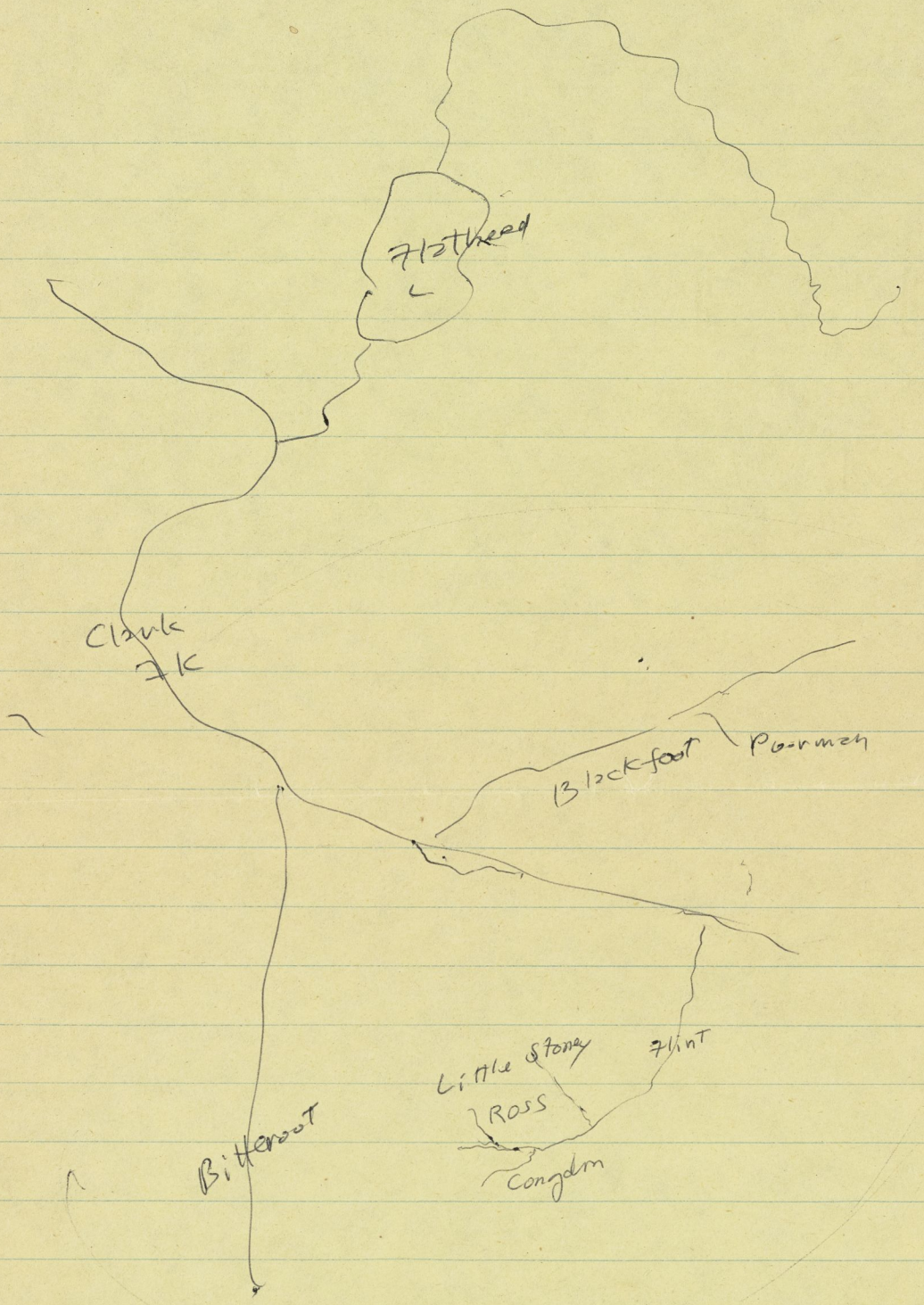
16 scales 40-43 42.1 ✓
162-188 176.56

caeca 16 32-47 39.4 *

pelvic all 9

teeth - 5-30 - 13.9 hi all

spotting. — ? essentially good.


Flathead
Clark Fk
Blackfoot
Bitterroot
Little Stony
Flint
Ross
Congdm

spotting

Moose Crk

some typical w.s. - larger spec. w/ more med size spots
but basic arrangement.

Overwhich - large, sparse - not typical

Congdon - more typical & but not precise

Arrastas - med - not typical

Big Rock. - Sparser - not typ.

Chipping - slightly larger than expected but essentially good

Little Stoney - large spot

Straight Crk - - as w/ Chipping

Cherry 60.7

Ross Fork 60.8 12

Cliee 60.6

Shave Gulch 60.4

Bear Trap 61.3

Poorman 61.0 - best spots

Little Blackfoot 60.6

Lower Elliot L. 59.5

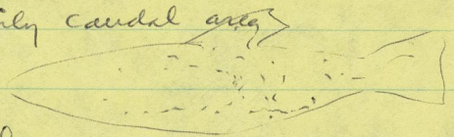
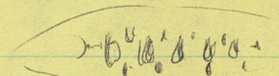
Weei Cr 60.5

Ward 60.9

Moose 60.8

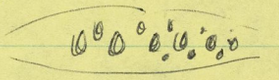
- Lolo 61.2

color slides sent by Gordon Haugen

Alice Crk. A. big - med. spotted - mainly caudal area
larger specimen
B. " med. spots 
not typical West Slope C. - variable - 1 large, sparse
2 - med. - small more profuse
D. - middle specimen large spotted - almost stonias - like . - but all seem to have "west slope" like pattern to some degree 
- arc - like arrangement
- colors - dull - brassy - faint burnished rose hues around l. l.
E - med - spots - more west slope - like 
pair mark
F . big

---

* Poorman's Crk. - A. - - typical west-slope -
?
B - " lighter, more silvery spec.
than Alice Crk.

Lower Elliot Lk. - A. - med., sparse spot - not typical
B. med. - large, sparse - on caudal area
pair marks pronounced - 
colors, dull

Little Blackfoot R. - large spots - atypical, but in
A typical arrangement
B " med..

Shave Gulch - silvery - A typical arrangement but slightly
larger than "normal". B - " , large spots C - N=4 1 typical
westsl. - 1 large, sparse, 2 intermed. C - "

Poorman's Crk. . A - 2 small, profuse, typical - largest spec. - med.

B 2 Typical 1 med. sparse

C 3 typical

Congdon Crk A - med. - large spot

B 1 large, sparse, 2 med.

C - " - more patches of red on side

D "

Bear Trap Crk. A more typical westslope . but -
x?

B "

C - " but 1 w/ larger, sparser.

x ? Ross Fork. A. perhaps good, but slightly larger and sparser than "normal" B - good

Arrastra Crk. - A larger, sparser

B "

C " - but basic westslope arrangement noted - prob. some introduction superimposed.

Little Stoney - A larger . sparser

B - even more so

C " - but one w/ basic westsl. arrangement

D "

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Flathead National Forest
Kalispell, Montana 59901

REPLY TO: 2620 Planning

November 6, 1973

SUBJECT: Griffin Creek Cutthroat

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

Enclosed are the slides of the fish I sent you from Griffin Creek. They appear to be more like yellowstone cutthroat than Westslope in spotting.

I believe this is an isolated population and would not be changed since they were stocked in 1951.

They do not look like the cutthroat collected in 1972 in lower Griffin Creek.

I have not been able to collect any cutthroat from the Kootenai drainage, but will next spring.

In the list of streams I sent you, the South Fork Drainage was left out. Spotted Bear, Bunker Harrison and Upper Twin Creek are all in the South Fork of the Flathead. The streams down to the Spotted Bear River are in the North Fork.

Thanks for the information on the fish samples.

Osborne Casey

OSBORNE CASEY
Fishery Biologist

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Lolo NF

REPLY TO: 2620 Wildlife Planning

August 15, 1973

SUBJECT: West Slope Cutthroat Study

TO: Dr. Robert Behnke
Bureau of Sport Fisheries and Wildlife
Colorado Cooperative Fishery Unit
Colorado State University
Fort Collins, Colo. 80521

Dr. Behnke:

It would be greatly appreciated if you could provide us with the taxonomic status of trout which were sent to you last summer from the following streams and lakes in the Lolo and Bitterroot National Forests of Montana:

Creek	Location
60 | 61 | 62 / 5 | 6 | 1 60.7 Cherry Creek	NE¼ Sec. 14, T20N, R29W ? WALLACE
60 | 61 | 62 / 7 | 4 | 3 60.7 Big Rock Creek	T25N, R26W, Sec. 34 WALLACE
59 | 60 | 61 / 5 8 1 59.7 Chippy Creek	T24N, R26W, Sec. 32 & 33 WALLACE
Murr Creek	T25N, R26W, Sec. 10 & 11 WALLACE
unknown Crk.? Bear Trap Spotted Bear Bear Creek	T23N, R26W, Sec. 9 WALLACE
60 | 61 | 62 | 63 / 2 | 4 | 3 | 3 61.6 Congdon Creek	T4N, R17W, Sec. 2 & ?3 BUTTE (NOT NAMED)
59 | 60 | 61 | 62 / 1 | 1 | 7 | 1 60.8 Ross Fork ~ good?	T4N, R17W, Sec. 10 & 11 BUTTE
60 | 61 | 62 / 4 | 4 | 1 60.7 Little Stoney	T6N, R17W, Sec. 3 & 4 BUTTE (NOT NAMED)
Carp Creek	T3N, R15W, Sec. 3 BUTTE
60 | 61 / 2 | 6 60.7 Arrasta Creek	T15N, R10W, Sec. 24 CHOTEAU
60 | 61 / 7 | 9 60.6 Alice Creek Big spots - med 2 typical	T16N, R7W, Sec. 14 CHOTEAU

Creek (Con't)	Location
59|60|61|62 1 4 2 1 60.4 OK Shave Gulch ~~—~~ variable	T15N, R6W, Sec. 21 CHOTEAU
60|61|62 1 4 3 61.25 OK Bear Trap — almost	T15N, R6W, Sec. 27 CHOTEAU (NOT NAMED)
60|61|62 4 6 4 61.0 OK Poorman - good	T14N, R9W, Sec. 36 BUTTE
59|60|61 3 2 1 59.5 OK Lower Elliot Lake — large	T7N, R11W, Sec. 29 BUTTE
60|61|62 4 3 1 60.6 OK Little Blackfoot - atypical	T7N, R7W, Sec. 2 & 3 BUTTE
OK Warm Spring Creek	6 miles upstream from I-90 West of Garrison BUTTE
59|60|61|62 1 6 7 1 60.5 OK Deer Creek	T46N, R30W, Sec. 22 & 15
60|61|62 3 5 2 60.9 OK Ward Creek	T46N, R29W, Sec. 31
59|60|61|62 1 4 4 3 60.8 OK Moose Creek	T2N, R17W, Sec. 4 ~~DIA~~ DILLON
59|61|62|63 1 6 4 2 61.5 OK Overwhich Creek	T1S, R20W, Sec. 28, 33, & 34 ELK CITY
60|61|62|63 3 4 1 2 61.2 OK Lolo Creek (W. FK.?)	T10N, R24W, Sec. 2 HAMILTON
60|61|62|63 3 4 2 2 61.2 OK Straight Creek	T13N, R26W, Sec. 10 HAMILTON

Your cooperation has been greatly appreciated.

Gordon Haugen

GORDON HAUGEN
Fisheries Biologist

~~Little Blackfoot Cek~~ ~~T7N R7W~~

Gorden Haugen's
collections

STANDARD CONVERSIONS WESTSLOPE

	WHALE CRK.	PUZZLE CRK	COAL CRK	HARRISON CRK	DEAN CRK.	MINER CRK	CLACK CRK	HAY CRK	BIG CRK
HEAD L.	243.4	253.6	240.0	234.6	277.6	226.7	232.3	239.1	236.8
ORBIT L.	67.4		69.2	67.3	76.4	65.6	63.6	74.3	~~117.3~~
UPPER JAW L.	132.8	125.2	132.9	128.4	162.8	123.0	132.3	129.1	117.3
DORSAL ORIG. → SNT. TIP	461.9	469.9	457.5	461.0	499.9	476.4	472.8	456.9	460.7
DORSAL FIN DEPRESSED L.	221.4	254.2	224.2	225.8	227.6	227.6	224.2	220.6	232.9
ADIPOSE FIN DEPRESSED L.	89.1	93.1	81.4	85.4	84.0	92.0	94.6	97.9	86.6
CAUDAL PEDUNCLE D		114.6							107.4
" " L.		169.8							169.1

	GRIFFIN CRK	SPOTTED BEAR R.	GOOD CRK	GATEWAY CRK	BASIN CRK	UPPER TWIN CRK	TUCHUCK	GOOD, PLUME + GREEN CRKS	BUNKER CRK
HEAD L.	265.1	237.4	271.9	271.4	251.7	244.5	260.9	258.9	260.2
ORBIT L.	69.3	75.1	78.2	77.4	69.5	~~117.2~~	73.8	73.1	132.9
UPPER JAW L.	147.5	129.8	146.5	149.8	138.3	117.2	134.8	142.5	469.6
DORSAL ORIG. → SNT. TIP	498.8	457.5	486.9	498.1	490.3	459.6	495.6	477.3	248.2
DORSAL FIN DEPRESSED L.	222.9	225.6	232.6	~~23~~.1	231.5	239.2	234.8	231.6	89.2
ADIPOSE FIN DEPRESSED L.	92.3	90.2	82.5	88.7	83.2	85.0	82.5	84.3	109.5
CAUDAL PEDUNCLE D.						105.1			156.1
" " L.						157.7			↓

	REVIAS CRK	CROW CRK	TRAIL CRK	SOUP CRK	S. FK COLD CRK	ELK CRK	N. FK. COLD CRK	L. WASOOTCH BEAVER PONDS	BRETT CRK
HEAD L.	264.6	270.3	243.5	272.7	281.3	241.8	281.9	271.1	275.7
ORBIT L.	83.5	80.4	~~123.4~~	81.8	83.1	65.3	84.7	80.9	1
UPPER JAW L.	145.9	149.1	123.9	154.5	156.1	137.2	154.5	154.2	138.1
DORSAL ORIG. → SNT. TIP	486.2	505.0	437.9	500.0	514.8	483.6	506.4	496.6	437.8
DORSAL FIN DEPRESSED L.	247.3	233.3	246.1	227.2	225.9	228.7	232.0	232.2	272.6
ADIPOSE FIN DEPRESSED L.	90.2	92.8	82.2	90.9	95.1	84.9	94.4	82.1	91.3
CAUDAL PEDUNCLE D.			107.1						109.2
" " L.			168.2						157.4

STANDARD CONVERSIONS

	S.Fk. Granite Crk.	Moose Crk	Overwhich Crk	Straight Crk	Arrastra Crk	Chippy Crk	Little Stony Crk	Ross Crk
Head L.	261.8	256.3	254.0	270.8	260.8	272.6	261.6	260.4
Orbit L.	—	69.1	62.5	75.4	70.4	75.8	70.1	70.5
Upper Jaw L.	133.5	143.3	144.2	158.5	149.5	163.0	153.8	152.5
Dorsal Orig → Snt. Tip	457.5	501.1	499.6	503.1	498.3	515.2	499.1	491.6
Dorsal Fin Depressed L.	265.0	238.3	217.8	239.5	232.2	229.6	230.4	242.9
Adipose Fin Depressed L.	92.9	94.8	90.2	92.5	82.6	93.4	94.9	94.3
Caudal Peduncle D.	109.6							
" " L.	162.4							

	Big Rock Crk	Congdon Crk	N.Fk. Lost Crk	Lolo Crk	Griffin Crk 9-73	N.Fk. Lost Crk	Mink Crk.	Lower Elliot L.
Head L.	261.8	265.4	258.8	259.2	259.8 OK	254.6	275.0	253.0
Orbit L.	75.2	76.6	66.8	66.9	66.1	65.4	80.9	70.4
Upper Jaw L.	148.1	148.5	148.4	148.7	144.0	143.0	149.3	138.6
Dorsal Orig → Snt. Tip	495.5	495.1	495.7	495.7	483.5	495.7	504.1	497.5
Dorsal Fin Depressed L.	239.2	241.1	224.2	225.5	228.6	211.0	210.4	226.3
Adipose Fin Depressed L.	87.8	90.0	87.5	89.1	87.9	71.1	86.5	80.7
Caudal Peduncle D.								
" " L.								

	Cherry Crk.	Poorman Crk.	Bear Trap Crk	Deer Crk.	Pickle Jar L.	Lolo Crk.	Wala Wala	Tribs → Swan R.
Head L.	266.4	256.3	261.6	269.1	249.1	258.4	249.7	264.0
Orbit L.	76.9	70.3	70.0	77.9	68.9	67.9	62.9	78.5
Upper Jaw L.	154.7	138.1	145.1	157.4	131.2	147.7	138.4	143.9
Dorsal Orig. → Snt. Tip	498.6	497.8	505.6	511.0	492.7	510.6	478.4	504.2
Dorsal Fin Depressed L.	228.3	233.8	235.0	231.8	210.6	221.7	218.5	229.3
Adipose Fin Depressed L.	90.3	84.0	83.3	87.6	84.2	90.7	89.5	84.0

STANDARD CONVERSIONS

	Little Blackfoot R.	Patrick Crk	Tribs > Snake R.	Straight Crk	McGregor Crk
Head L.	265.3	288.3	266.6	270.8	257.4
Orbit L.	74.3	85.3	77.0	75.4	72.2
Upper Jaw L.	147.6	166.0	143.0	158.5	138.5
Dorsal Orig > Snt. Tip	505.6	508.5	500.5	503.1	481.2
Dorsal Fin Depressed L.	233.1	250.0	231.3	239.5	223.5
Adipose Fin Depressed L.	88.6	89.7	95.7	92.5	85.0

Dorsal Orig. → S. T.

Value	Count	Names
430	(2)	Trail, Brett Crk
440	(0)	
450	(5)	S.F. Granite, V. Twin, Navy, Spotted Bear, Coal
460	(5)	Bunker, Puzzle, Whale, Big, Harrison
470	(4)	Wala Wala, Good (P+G), Clack, Miner
480	(5)	McGregor, Griffin 9-73, Good, Reginas, Elk
490	(17)	Pickle Jar L., Poorman, Cherry, L. Elliot L., N.F.K. Lost, Dean, L. Wasootch, Gateway, Congdon, Tuchuck, Griffin, Big Rock, Arrasta, Zombey, Ross, Basin, Overwhich
500	(11)	Tribs → Snake R., Patrick, L. Blackfoot R., Tribs → Swan R., Bear Trap, Mink, Straight, N.F. Cold, Crow, Long, Moose
510	(4)	Zolo, Deer, SF Cold, Chippy

Head Length

220
- Miner

230
- Big
- Spotted Bear
- Clack
- Hay
- Harrison

240
- Wala Wala
- Picklejar
- Trail
- U. Twin
- Elk
- Whale
- Coal

250
- McGregor
- Zelo
- Poorman
- L. Elliot L.
- N.FK. Lost
- Griffin 9-73
- Moose
- Puzzle
- Good, Plume & Gregg
- Basin
- Overwhich

260
- Tribs → Snake R.
- L. Blackfoot R.
- Tribs → Swan R.
- Deer
- Bear Trap
- Cherry
- Ross
- Bunker
- Little Stony
- Revras
- Congdon
- S.FK. Granite
- Big Rock
- Twichuck
- Griffin
- Arrasta

270
- Mink
- Brett
- Straight
- L. Wasootch
- Good
- Chippy
- Dean
- Gateway
- Soup
- Crow

280
- Patrick
- S.FK. Cold
- N.FK. Cold

Upper Jaw L.

.1100	.1200	.1300	.1400	.1500	.1600
BIG	PUZZLE	McGREGOR	TRIBS > SNAKE R.	DEER	PATRICK
U. TWIN	TRAIL	WALA WALA	L. BLACKFOOT R.	CHERRY	CHIPPY
	SPOTTED BEAR	PICKLE JAR L.	TRIBS > SWAN R.	STRAIGHT	DEAN
	HAY	POORMAN	DEATRAP	L. WASOOTCH	
	HARRISON	L. ELLIOT L.	MINK	ROSS	
	MINER	BRETT	N. FK. LOST	S. FK. COLD	
		BUNKER	GOLD	SOUP	
		S. FK GRANITE	Duffin 9-23	N. FK. COLD	
		ELK	GOOD	L. STONY	
		TUCHUCK	GATEWAY		
		BASIN	CROW		
		COAL	REVIAS		
		WHALE	GONGDON		
		CLACK	BIG ROCK		
			ARRASTA		
			GP-6		
			GRIFFIN		
			MOOSE		
			DUDEWICH		

Orbit 2.

WALA WALA
PICKETT L.
N.FK DOST
Griffin 9-73
GRIFFIN
MOOSE
BASIN
OVERWHICH
ELK
WHALE
COAL
CLACK
HARRISON
MINER

60

MCGREGOR
TRIBS → SNAKE
L. BLACKFOOT
TRIBS → SWANK.
DEER
BEAR TRAP
POORMAN
CHERRY
L. ELLIOTT
STRAIGHT
GOOD
CHIPPY
DEAN
GATEWAY
ROSS
L. STONY
CONGDON
BIG ROCK
TUCHUCK
ARRASTA
GOOD PLUME, GREEN
SPOTTED BEAR
HAY

70

PATRICIC
MINK
L. WASSOTCH
REVIAS
SOUP
CROW
S.F. COLD
N.F. COLD

80

90

100

U. Twin
Big

110

Puzzle
Trail

120

Brett
Bunker
S.F.K. Granite

130

Dorsal fin L.

McGREGOR
TRIBS→SWAN R.
CHERRY
L. ELLIOT L.
LOLO
GRIFFIN 9-72
GRIFFIN
HAY
CLACK
S. FK. COLD
DEAN
HARRISON
CHIPPY
MINER
SOUP
SPOTTED BEAR
ELK
W/HALE
COAL

TRIBS → SNAKE R.
L. BLACKFOOT R.
DEER
BEAR TRAP
POORMAN
ARRASTA
L. STONY
BIG ROCK
6, P + 6
L. WASOOTCH
CROW
GATEWAY
B16
GOOD
N. FK COLD
TUCHUCK
STRAIGHT
V. TWIN
MOOSE
BASIN

CONGDON
ROSS
TRAIL
REVIAS
BUNKER

PATRICK
PUZZLE

S. FK. GRANITE

BRETT

WALA WALA
PICKLE JAR L.
MINK
N. FK. LOST
DVER WHICH

.2100 .2200 .23 .24 .25 .26 .27

MIGRATORY	NON-MIGRATORY
BIG CRK	BUNKER CRK.
HARRISON CRK.	DEAN CRK
COAL CRK	HAY CRK
SPOTTED BEAR R.	GOOD CRK.
PUZZLE CRK	GATEWAY CRK.
MINER CRK.	TUCHUCK CRK
CLACK CRK.	UPPER TWIN CRK.
TRAIL CRK.	WHALE CRK.
BASIN CRK	

- migratory fish appear to have somewhat finer spots on caudal peduncle and more spots along back → anterior to dorsal
- non-migratory have fewer, but larger spots primarily on caudal peduncle, few anterior to dorsal fin

Poorman → Blackfoot → C.F.	Patrick → Flathead
Alice 7 → " → "	Cherry → C.F.
L. Clearwater L → C.F.	Goat Crk → Swan
Bear Trap Crk → Blackfoot → C.F.	Big Rock → Thompson R → C.F.
Little Blackfoot R.	Beaver Crk → Swan
Lolo → Lochsa R. → Clearwater (Idaho	Little Stony → Rock Crk → C.F.
Straight Crk → Fish Crk → C.F.	Glacier Crk
McGregor → C.F. ?	~~Elk Crk → Swan~~
Arrasta → B.F → C.F.	Chippy → Thompson R → C.F.
Shave Gulch → BF → C.F.	Congdon → Rock Crk → C.F.
N.FK Lost Crk → Swan	~~Soup Crk → Swan~~
Kraft Crk → Swan	Griffin → Flathead
Ward → St. Regis → C.F.	~~N.Fk. Cold Crk → Swan~~
Lake Abundance?	~~S.F " " → "~~
Cold Crk → Swan	~~Overwhich → Bitterroot~~
Ross → B.F → C.F.	Big River Meadows

80
54.25
7.50
30.00
171.75
150
322

2.56/wk
3
76.80

24.50
54.25
7.50
30.00
116.25
51.20/wk
253.60

CUTTHROAT SPECIMENS — Collected by Bill Hill

Ref. No. 1
Haywood Creek (Pondera County) T28N-R10W-Sec21
20 miles west of Dupuyer (on Blackfeet Indian Reservation)
Tributary to No. Fk. Birch Creek - Marias Drainage
No other species present.
Barrier present, CT above barrier.
Total lengths of specimens (inches) 7.4, 5.6
Collected August 2, 1972

Ref. No. 2
Sheep Creek (Teton County) T27N-R9W-Sec6
17 miles west of Dupuyer (½ mile below Forest Service boundary)
Tributary of Dupuyer Creek - Marias Drainage
Brook trout also present
Water temp 47°F. TDS 150 ppm NaCl
Lengths (in.) and weights (lbs.) of specimens: 6.7 0.13
Collected August 2, 1972 9.0 0.32
10.8 0.59

Ref. No.3
So. Fk. Dupuyer Creek (Teton County) T27N-R9W-Sec35
15 miles Southwest of Dupuyer (¼ mile above Forest boundary)
Tributary to Dupuyer Creek - Marias Drainage
No other species present.
Barrier present, CT above barrier.
Water temp 47°F. TDS 150 ppm NaCl
Length and weight of specimens: 6.5 0.09
Collected August 3, 1972 7.5 0.15
9.0 0.25

Ref. No. 4 No.Fk. Dupuyer Creek (Teton County) T27N-R9W-Sec14
14 miles Southwest of Dupuyer (1½ miles below Forest boundary)
Tributary to Dupuyer Creek - Marias Drainage
Brook Trout also present
Water temp 46°F. TDS 170 ppm NaCl
Length and weight of specimen: 9.1 0.32
Collected August 3, 1972

Ref. No. 5
No. Fk. Little Badger Creek (Glacier County) T30N-R11W-Sec25
18 miles Southwest of Browning (½ mile above Forest boundary)
Tributary to Badger Creek - Marias Drainage
No other species present.
May be yellowstone cutthroat since this species occurs in Kiyo Lake on a side drainage and have access to the collection site.
Lengths and weights of specimens: 6.7 0.11
Collected August 31, 1972 7.8 0.17
7.5 0.14
7.6 0.17
9.9 0.38

(2) EAST SLOPE - UPPER MISSOURI BASIN

Locality	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
LITTLE GOOSE LAKE → STILLWATER CRK. MONTANA	2	2	2	1						1	0	3	6	5				15	29-40	34.9	14 / 15	40-45 / 167-186	43.0 / 174.7				15	9-10	9.06	15	10-38	20.1
	N=7			$\bar{X}$=61.2				N=15					$\bar{X}$=19.9																		
GALLATIN RIVER 9/10/70 YNP	3	3	1							1	2	3	2					8	27-35	29.6	8 / 8	38-44 / 175-197	41.5 / 184.0				8	9	9.0	8	2-10	5.5
	N=7			$\bar{X}$=60.7				N=8					$\bar{X}$=18.8																		
~~E. FK. SPECIMEN CRK (MONTANA BEFORE)~~ 9-10-70 YNP			→								2	2	4	1				9	~~35-43~~ 26-33	30.4	8 / 8	37-50 / 147-196	43.3 / 164.7				9	8-9	8.8	9	1-13	4.8
	N=8			$\bar{X}$=61.0				N=9					$\bar{X}$=19.4																		
UPPER GRAYLING CRK. YNP	2	1										3	2	1	1			7	25-37	30.9	6 / 6	38-49 / 162-195	43.2 / 175.3				7	9-10	9.1	7	1-14	6.3
	N=3			$\bar{X}$=60.6				N=7					$\bar{X}$=20.0																		
SILVER CRK 11-16-71 MONTANA	2	7	1							4	5	5						14	28-37	33.0	14 / 14	37-41 / 144-162	40.0 / 155.1				14	8-9	8.9	14	0-10 (2 w/o)	3.86
	N=10			$\bar{X}$=60.9				N=14					$\bar{X}$=18.1																		
~~GALLATIN R. 9/10/70 YNP~~	~~3~~	~~3~~	~~1~~								~~1~~	~~2~~	~~3~~	~~2~~				8	~~27-35~~ 29.6	29.6	8 / 8	38-44 / ~~175-197~~	~~41.5~~ 184.0				~~8~~ 9	9.0	8	2-10	5.5
	~~N=7~~			~~$\bar{X}$=60.7~~				~~N=8~~					~~$\bar{X}$=18.8~~																		

(3) EASTSLOPE CUTTHROAT

Locality	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
HAYWOOD CRK → MARIAS R.										1			1					2	28,33	30.5	2	37,39	38.0				2	9	9.0	2	21,134	17.0
PONDERA CO MONTANA								N=2						$\bar{X}$=18.5							2	147,149	148.0								
N.FK. LITTLE BADDER CRK → MARIAS R.											1	1	1	2				5	30-39	32.8	5	40-44	42.0				5	9	9.0	5	2-13	8.4
GLACIER CO. MONTANA								N=5						$\bar{X}$=19.8							5	161-185	174.0								
SHEEP CRK. → MARIAS R.													1	2				3	20-34	29.3	3	42-44	43.6				3	9-10	9.3	3	5-14	10.3
TETON CO. MONTANA								N=3						$\bar{X}$=20.6							3	177.3									
S.FK. DUPUYER CRK. → MARIAS CRK												2	1					3	28-44	36.0	3	41-44	42.6				3	9-10	9.6	3	7-9	7.3
TETON CO. MONTANA								N=3						$\bar{X}$=19.6							3	161-169	165.3								
N.FK. DUPUYER CRK → MARIAS R.																					4	43					9			17	
TETON CO. MONTANA														21								199									

(1) EAST SLOPE - UPPER MISSOURI BASIN

Locality	59	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
CRATER LAKE MEAGHER CO. MONTANA (PURE?)	2	4	7								1	2	3	2	4	1			13	29-44	35.3	13	40-46	42.7				13	8-9	8.9	13	1-21	9.46
		N=13		$\bar{X}$=60.4					N=13			$\bar{X}$=19.7										12	158-195	183.4								
ELKHORN CRK. TRIB → WILLOW CRK → HOLTER RES. MONTANA			1	2								1	2	3					6	28-40	34.2	4	39-44	41.0				6	9	9.0	6	0-22 2 w/o teeth	7.6
		N=3		$\bar{X}$=61.7					N=6			$\bar{X}$=19.3										6	147-167	157.5								
ROCK CRK JIM BALL BASIN TRIB → SMITH R. (HYBRIDS?) MONTANA				2								1	1	1	1				4	30-33	32.0	4	39,40,40,42	40.25				4	8-9	8.75	4	0,1,2,4	1.75
		N=2		$\bar{X}$=62.0					N=4			$\bar{X}$=19.5										4	155,156,158,159	157.0								
DREDGE PITS AT HEAD OF IRON MINE CREEK MEAGHER CO. MONTANA (PURE?)		1	1	1								1	2						3	28,31,41	33.3	3	40,41,42	41.0				3	9	9.0	3	6,7,10	7.7
		N=3		$\bar{X}$=61.0					N=3			$\bar{X}$=18.7										3	155,175,177	169.0								
WOLSEY CRK. → SMITH RIV. ~~MONT.~~ MONTANA			4								2	2	2	1					5	29-39	32.4	VERY POOR CONDITION ?						7	9	9.0	7	1-13	6.6
		N=4		$\bar{X}$=61.0					N=7			$\bar{X}$=18.3										4	165-189	179.0								
COUGAR CRK. → MADISON RIV. YNP		3	6									4	11	3	2				20	29-44	33.3	20	40-45	43.4				20	9-10	9.1	20	1-13	4.7
		N=9		$\bar{X}$=60.7					N=20			$\bar{X}$=19.2										20	170-204	182.8								
GALLATIN RIVER, SUMMER 1972 YELLOWSTONE NAT'L PARK ~~MONTANA~~		1	3	1								1	2	3					5	28-39	31.4	6	39-43	41.5				8	9	9.0	6	1-22	8.5
		N=5		$\bar{X}$=61.0					N=6			$\bar{X}$=19.3										6	164-202	179.0								

Yellowstone drainages
Rock Crk
Shields R.
+ trib.

- add data

Grayling Crk.

High L.
+ ?

- compare w/ westslope

Proposal for a comprehensive study of the systematics of the westslope cutthroat trout: A basic prerequisite for their preservation and management.

INTRODUCTION

Two years of collections of specimens and accumulation of data has prepared the foundation to initiate a graduate student thesis project on the systematics of westslope cutthroat trout, which should provide definitive conclusions on diagnostic characters and the taxonomic position of this fish.

Formerly, the westslope cutthroat was listed as an endangered, but undescribed species in the U.S. Dept. Interior's "red book." Currently (1973), because of its uncertain taxonomic status, it has been assigned an "undetermined" status. There is no doubt, however, that pure populations of the cutthroat trout indigenous to the upper Columbia River system have been eliminated from the bulk of their former range, are rare and in need of special attention to preserve the remaining stocks.

The basic problem obstructing efforts to protect or manage the westslope cutthroat is the taxonomic confusion surrounding this fish. How can a pure population be recognized if it is found when no adequate published description exists? The native cutthroat trout of the upper Columbia River system are a subspecies of Salmo clarki, but to what subspecies they should be assigned is not yet known.

The information necessary to answer these questions will be developed from this proposed study.

STUDY PLAN

Collections, including museum material, consisting of more than 50 samples and almost 1000 specimens are now available in the Systematics

Laboratory of the Colorado Cooperative Fishery Unit. These samples are from diverse areas of the upper Columbia, South Saskatchewan and upper Missouri river basins. Several characters, such as the number of vertebrae, scales, gillrakers, pyloric caeca and spotting pattern are recorded, compared and evaluated to reveal consistant modes of similarity providing a definition of the characters possessed by the cutthroat trout native to the upper Columbia River drainage and allow for the recognition of essentially pure populations. Comparisions with samples of cutthroat trout from the upper Missouri River system of Montana will determine if the name Salmo clarki lewisi also applies to the westslope cutthroat. Comparisons of museum specimens from diverse segments of the Columbia basin will determine the original distribution of westslope cutthroat and provide an indication to the possibility that more than one subspecies of cutthroat trout (excepting S. c. clarki) is native to this large drainage.

Supplementary data on protein polymorphism should be available from research on biochemical analysis of westslope cutthroat trout by Mr. Gary Reinitz, a graduate student at the University of Montana. Mr. Reinitz' research, however, will not provide definitive information on the diagnosis of westslope cutthroat trout. This is due to the minute fraction of the total genotype that is surveyed by biochemical techniques and to the fact that almost certainly no qualitative differences between the proteins of cutthroat trout and other cutthroat (and probably rainbow) trout will be found. That is, the genes governing the proteins are not specific to the westslope cutthroat trout native to the upper Columbia River basin, but are shared with other cutthroat and most likely, rainbow trout. The best evaluation of the total genotype, for systematic purposes, is still a critical study of several phenotypic characters.

PROGRESS TO DATE

The determination of the diagnostic characters is largely completed. Consistant similarities of several characters from many samples allows us to place quantitative values on characters expected to be found in pure westslope cutthroat trout populations. From this data, the effects of hybridization with rainbow trout and/or Yellowstone cutthroat trout can be detected. Samples can now be run through the examination process and their relative pureness determined.

A compilation and synthesis of information available from field biologists and from the literature on ecological and life history aspects of westslope cutthroat trout will be made. Bringing diverse bits of information together on the biology of this trout, including such items as habitat preference, migratory tendencies, lacustrine populations, age, growth, food habits, etc., will be a valuable source of data for the management of this trout.

During the past year, Mr. James Roscoe has been assigned to the westslope cutthroat project while he was employed as a work-study student. Mr. Roscoe is now enrolled as a graduate student and plans to complete the project for his graduate research and thesis. Mr. Roscoe is presently supported by work-study funds, supplemented by a modest grant from the National Park Service.

Dr. Richard Wallace, Department of Zoology, University of Idaho has long been interested in the native cutthroat trout of Idaho. Dr. Wallace has made numerous significant collections from key segments of the Columbia River basin and plans to bring his collection to Colorado State University during a sabbatical leave this winter and spring and collaborate in this study. His contribution should ensure comprehensive authoratative treatment of a difficult systematic problem.

(11)

WESTSLOPE CUTTHROAT (IDAHO)

Locality	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
TUMBLEDOWN CRK. IDAHO	2	4	0	1					3	2	1	1						7	33-47	39.6	5	41-44	42.2				9	9	9.0	5	2-8	5.2
	N=7			$\bar{X}$=61.0				N=7					$\bar{X}$=17.0								5	150-164	158.2								
BAYVIEW CRK + OLDMAID CRK. IDAHO	3	7	1							5	0	1	1					10	32-39	35.4	7	40-44	41.86				12	8-9	8.67	7	7-13	7.57
	N=12			$\bar{X}$=60.8				N=7					$\bar{X}$=17.7								7	158-183	172.7								

(10)

WESTSLOPE CUTTHROAT (IDAHO FISH)

Locality	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
DIG CRK AT DOT CRK. → ST JOE R.		2	2							1	2	0	0	1				4	33-42	38.2	4 4 4	40-42 163-191	40.8 174.5				4	8-9	8.5	4	4-8	6.0
IDAHO	~~X~~ = 4							N = 4										$\bar{X}$ = 61.5													
SPRUCE CRK → L. PEND ORIELLE	4	6	3								3	4						13	24-45	37.9	7 7 7	38-44 150-189	40.9 166.0				13	7-9	8.3	7	0-11 1 w/o	6.7
IDAHO	N = 13							N = 7										$\bar{X}$ = 60.9													
TEPEE CRK. → RILEY CRK.	6	4	1								3	1	2	1				11	27-41	33.3	7 7 7	38-43 160-181	41.0 171.1				11	8-10	9.0	7	3-14	6.7
COUR d'ALENE SYSTEM IDAHO	N = 11							N = 7										$\bar{X}$ = 60.5													
E. FK. PINE CRK.	3	7																10	(17) 27-41		6 6 6	36-41 132-162	38.5 147.3				10	9	9.0	6	4-15+	8.8
IDAHO	N = 10							N = 6										$\bar{X}$ = 59.7													
KALISPELL CRK → PRIEST LAKE	5	1	1	1							1	3	3	1				8	34-40	36.4	7 7 7	36-45 148-175	41.7 167.6				8	8-9	8.9	7	0-24 1 w/o	10.0
IDAHO	N = 8							N = 8										$\bar{X}$ = 60.75													
CAREYWOOD CRK	1	2	3	0	2			1	3	1								8	21-28	25.4	5 5 5	40-43 160-172	41.6 167.2				8	9	9.0	5	0-5 2 w/o	1.8
IDAHO	N = 8							N = 5										$\bar{X}$ = 62.0													
W. GOLD CRK → L. PEND ORIELLE	1	5	7	0	3				2	3	3	3	3	2				16	31-61	44.1	7 7 7	37-42 150-175	40.0 163.7				16	7(1), 9		7	1-12	5.7
IDAHO	N = 16							N = 16										$\bar{X}$ = 60.8													

(9) WESTSLOPE CUTTHROAT

Locality	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
GOAT CRK → SWAN R.		1										1						1			41						1			1
MONTANA					61									19				37			160						9			5
N.FK. LOST CRK → SWAN RIVER		1	1											1	1			2	32,33		2	40,44	42.0				2	4,7		2
MONTANA			N=2		61.5							N=2		21.5						32.5	2	166,180	173.0				9			5.5
LOLO CRK → BITTERROOT → CLARK FORK	1	2	5							1	1	5	1	1				9	28-36		9	35-41	39.11				9	9		9	3-17
MONTANA		N=8			$\bar{X}$=61.5				N=9					$\bar{X}$=19.0						30.66	9	161-180	169.55					9.0			7.77
GRIFFIN CRK → STILLWATER R. 9-73										1	1	4	4	1				11	24-47		4	40-44	42.27				11	9-10		4	1-15
MONTANA									N=11					$\bar{X}$=19.27						35.18	11	146-183	166.82					9.2			8.73
LITTLE BLACKFOOT RIVER → CLARK FORK	4	3	1							1	2	3	3	1				10	31-39		10	33-43	39.4				10	9		10	4-12
LEWIS + CLARK CO. MONTANA		N=8			$\bar{X}$=60.6				N=10					$\bar{X}$=19.1						36.0	10	139-186	164.4					9.0			6.8
BEAVER CRK → SWAN R.	1	4	2	1						2	3	3	0	1	1			10	32-39		10	37-42	39.5				10	9-10		10	3-13
MONTANA		N=8			$\bar{X}$=61.3				N=10					$\bar{X}$=18.9						34.9	10	159-184	169.5					9.2			8.0

(8) WESTSLOPE CUTTHROAT

Locality	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
GLACIER CRK. → SWAN R. MONTANA	2	2										1	1	2				4	35-39	37.25	4	39-43	41.0				4	9-10	9.25	4	1-3	2.25
	N=4			$\bar{X}$=60.5				N=4				$\bar{X}$=20.25									4	146-164	157.25								
KRAFT CRK. → SWAN RIV. MONTANA	1										1	0	2					3	36-40	37.6	3	38,41,41	40.0				3	9	9.0	3	3-10	6.6
				60				N=3				$\bar{X}$=19.3									3	159-170	163.3								
COLD CRK → SWAN R. MONTANA	1	1											1	1				1		32	1		40 / ~~60~~ 172				1	9		1	2.5
				60									20																	
SFK. COLD CRK → SWAN RIV. MONTANA		2										1	1	1				3	36-38	37.0	3	40-41	40.7				3	9	9.0	3	6, 6, 11	7.7
	N=2			61.0				N=3				$\bar{X}$=20.0									3	154-168	161.6								
N.FK. COLD CRK → SWAN R. MONTANA		2								1	1	2						4	37-45	39.7	4	37-39	38.25				4	9	9.0	4	2-8	5.0
	N=2			61.0				N=4				$\bar{X}$=18.25									4	143-177	160.5								
SOUP CRK. → SWAN RIV. MONTANA		1												1				1		35	1		41				1	9		2	
				61										21									164								
ELK CRK. → SWAN R. MONTANA		1												1				1		38	1		41				1	9		1	9
				61										21									157								

(7)

WESTSLOPE CUTTHROAT

Locality	Vertebrae 59	60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
L. ABUNDANCE → ROSS FK. ROCK CRK			1	5	3							3	6	1	2				2	35,43	39.0	12	35-45	39.6				12	8-9	8.9	12	2-27	11.8
DEERLODGE CO. MONTANA		N=9			$\bar{X}$=62.2				N=12						$\bar{X}$=19.2							12	(54-18)	168.5								
LOWER ELLIOT L. → CLARK FORK	3	2	1									1	3	1	3	2			10	33-43	37.2	10	36-48	41.1				10	8-9	8.9	10	0-7 1 w/o	3.9
DEERLODGE CO. MONTANA		N=6			$\bar{X}$=59.5				N=10						$\bar{X}$=20.2							10	153-(174)-199	165.4								
PATRICK CRK. → FLATHEAD R.		2	3	2								1	0	2	1	4	2		10	27-36	31.8	10	41-44	42.1				10	9-10	9.1	10	8-24	13.8
LOLO N.F. MONTANA		N=7			$\bar{X}$=61.0				N=10						$\bar{X}$=21.3							10	155-175	163.5								
MCGREGOR CRK. ? → CLARK FORK		1	1	3	2							2	4	1					4	31-51	41.2	7	30-38	36.0				7	9-10	9.7	7	0-1 5 w/o	0.28
MONTANA		N=7			$\bar{X}$=61.9				N=7						$\bar{X}$=18.8							7	138-158	146.0								
PICKLE JAR LAKES #3												1	3	6	5	2			17	23-36	30.1	17	36-40	38.6				17	8-9	8.94	17	2-23	11.7
ALBERTA		yellowstone ?							N=17						$\bar{X}$=19.2							17	151-170	159.9								
WALA WALA		X											1	4	1				6	26-35	30.5	6	(30)45-52	47.8 (44.8)				6	9	9.0	6	5-12	6.8
WASHINGTON		yellowstone							N=6						$\bar{X}$=20.0							6	(138)160-161	168.0 (162.6)								
MINK CRK. → PORT NEUFER → SNAKE R.													4	3	2				5	37-51(45	42.4	9	39-46	41.4				9	9-10	9.1	9	5-16	10.1
IDAHO									N=9						$\bar{X}$=19.78							9	148-168	157.0								

(6)

WESTSLOPE CUTTHROAT

Locality	59	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
ROSS CRK. → BLACKFOOT → CLARK FORK	1	1	7	1							1	4	2	2	1				9	29-42	36.5	10	38-42	40.4				10	8-9	8.9	10	6-24	13.1
MISSOULA CO. MONTANA		N=10				$\bar{X}$=60.8			N=10						$\bar{X}$=18.8				10	150-176	165.1											
STRAIGHT CRK → FISH CRK → CLARK FORK		3	4	1	2						2	8	4	2					16	27-46	37.8	16	40-46	42.7				15	9	9.0	16	4-17	8.25
MINERAL CO. MONTANA		N=10				$\bar{X}$=61.2			N=16						$\bar{X}$=18.37				16	155-181	167.8											
CHERRY CRK → CLARK FORK		5	6	1							1		5	4	1	1			4	~~33-44~~ 39-47	~~42.5~~ 43.0	12	37-44	40.8				12	9	9.0	12	3-12	6.75
SANDERS CO. MONTANA		N=12				$\bar{X}$=60.7			N=12						$\bar{X}$=18.6				12	146-195	164.4											
DEER CRK → ST. REGIS → CLARK FORK	1	6	7	1							1	5	5	3	2				16	31-47	41.2	16	38-46	40.7				16	9-10	9.2	16	1-23	11.4
MINERAL CO. MONTANA		N=15				$\bar{X}$=60.5			N=16						$\bar{X}$=19.0				16	149-189	174.1											
WARD CRK → ST. REGIS → CLARK FORK		3	5	2							1	2	4	4					11	36-42	39.3	11	38-42	40.1				11	8-9	8.9	11	4-9	6.7
MINERAL CO. MONTANA		N=10				$\bar{X}$=60.9			N=11						$\bar{X}$=18.0				11	165-188	174.9											
ALICE CRK → BLACKFOOT R. → CLARK FORK		7	9									2	5	9					16	26-38	33.6	16	38-43	41.0				16	8-9	8.8	16	1-13	5.3
L + C. CO. MONTANA		N=16				$\bar{X}$=60.6			N=16						$\bar{X}$=19.4				16	152-180	166.4											
SHAVE GULCH CRK → BLACKFOOT R → CLARK FORK	1	4	2	1								1	0	6	1	4			12	30-43	34.3	12	38-43	40.25				12	9-10	9.25	12	0-8 1 w/o	4.1
L + C. CO. MONTANA		N=8				$\bar{X}$=60.4			N=12						$\bar{X}$=20.6				12	146-172	161.75											

(5)

WESTSLOPE CUTTHROAT

Locality 59	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
LOWER WASOOTCH BEAVER PONDS → KANANASKIS RIV. ALBERTA								2	3	15	3	2						10	32-50	43.8	25	31-42	37.4				25	8-10	9.0	24	1-15	5.5
								N=25							$\bar{X}$=17.0						25	137-178	157.1								
CHIPPY CRK. → CLARK FORK FLATHEAD CO. MONTANA	5	8	1							8	1	8	4	3				16	32-47	39.4	16	40-43	42.1				14	9	9.0	16	5-30	13.9
		N=14			$\bar{X}$=59.7			N=16						$\bar{X}$=19.56							16	162-188	176.5								
ARRASTA CRK. → CLARK FORK POWELL CO. MONTANA		2	6							1	1	1	3	6				12	32-38	35.75	12	40-46	41.2				12	9-10	9.25	12	2-8	4.7
		N=8			$\bar{X}$=60.7			N=12						$\bar{X}$=19.0							12	152-196	170.6								
CONGDON CRK. → CLARK FORK RAVALLI CO. MONTANA		2	4	3	3						1	4	6	3	1			15	25-43	35.5	15	37-43	40.0				15	9	9.0	15	0-15 1 L0/0	7.1
		N=12			$\bar{X}$=61.6			N=15						$\bar{X}$=19.9							15	139-179	163.3								
BEAR TRAP CRK. → BLACKFOOT R. → CLARK FORK MONTANA		1	4	3						1	1	3	2	1				8	31-40	36.1	8	38-42	40.25				8	9	9.0	8	4-12	7.0
		N=8			$\bar{X}$=61.25			N=8						$\bar{X}$=18.1							8	154-173	163.5								
FOORMAN CRK. → BLACK FOOT R. → CLARK FORK LEWIS + CLARK CO. MONTANA		4	6	4						1	2	3	7	2	0	0	1	16	30-48	37.75	16	39-46	42.3				16	9	9.0	16	2-11	5.2
		N=14			$\bar{X}$=61.0			N=16						$\bar{X}$=19.75							16	154-175	162.75								
BIG ROCK CRK. → THOMPSON R → CLARK FORK FLATHEAD CO. MONTANA		7	4	3							2	3	7	4				16	34-47	39.2	16	40-44	41.2				16	9-10	9.1	16	6-16	10.2
		N=14			$\bar{X}$=60.7			N=16						$\bar{X}$=19.8							16	140-188	170.0								

4

WESTSLOPE CUTTHROAT

Locality 59	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
CROW CRK.	5	3	0	1							1	8	0	1				10	33-43	37.3	10	39-45	42.1				10	9-10	9.1	10
FLATHEAD I.R. LAKE CO. MONTANA	N=9			$\bar{X}$=60.6				N=10						$\bar{X}$=19.1							10	150-181	166.0							3-8 5.9
MOOSE CRK → BITTERROOT R.	1	4	9	3						3	1	4	6	4	0	1		19	30-46	36.6	19	38-47	41.0				19	9-10	9.2	19
RAVALLI CO. MONTANA	N=17			$\bar{X}$=61.2				N=19						$\bar{X}$=19.6							19	150-192	172.6							3-19 9.7
OVERWHICH CRK. → BITTERROOT R.	1	0	6	4	2							3	6	8	1	2		20	24-46	36.25	20	40-44	41.45				20	9-10	9.4	20
RAVALLI CO. MONTANA	N=13			$\bar{X}$=61.5				N=20						$\bar{X}$=20.65							20	153-189	175.25							0-16 1 w/o 7.65
LITTLE STONY CRK → CLARK FORK	4	4	1								1	0	3	3	3			10	27-39	34.2	10	41-46	42.3				10	9-11	9.5	10
GRANITE CO. MONTANA	N=9			$\bar{X}$=60.7				N=10						$\bar{X}$=21.7							10	162-181	171.1							4-23 11.4
GATEWAY CRK (BIG RIVER MEADOWS)	2	3	3							1	5	3	2					11	37-43	39.7	11	37-43	39.7				11	9	9.0	11
FLATHEAD N.F. MONTANA	N=8			$\bar{X}$=61.1				N=11						$\bar{X}$=18.5							11	152-172	160.3							2-20 8.8
GRIFFIN CRK. → FLATHEAD R.	1	1								1	1			1				3	33,34,39	35.3	3	39,39,40	39.3				3	9-10	9.3	3
FLATHEAD CO. MONTANA	N=2			$\bar{X}$=60.5				N=3						$\bar{X}$=18.7							3	144,162,165	157.0							7-15 12.0
PLUM CRK, GREGG CRK, GOOD CRK	1	4										4	1	1				6	34-47	39.0	6	39-42	40.8				6	9-10	9.2	6
	N=5			$\bar{X}$=60.8				N=6						$\bar{X}$=19.5							6	152-190	173.3							0-8 1 w/o 4.2

(3)

WESTSLOPE CUTTHROAT

Locality	Vertebrae 59	60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
CLACK CRK.			2	4								2	2	2					6	32-42	37.8	6	39-46	42.3				6	9-10	9.5	6	0-9 1 w/o	4.3
FLATHEAD CO. MONTANA		N=6				$\bar{X}$=61.7			N=6						$\bar{X}$=19.0							6	162-195	178.7								
SPOTTED BEAR R. 1		3	2								1	0	5	3	1				10	32-45	38.3	10	40-46	41.4				10	9	9.0	10	1-11	6.0
FLATHEAD CO. MONTANA		N=6				$\bar{X}$=60.5			N=10						$\bar{X}$=19.3							10	149-175	164.7								
HARRISON CRK. 1		4	3								1	1	4	0	3				9	27-46	36.1	9	41-46	43.4				9	9	9.0	9	0-13 1 w/o	7.5
FLATHEAD CO. MONTANA		N=8				$\bar{X}$=60.25			N=9						$\bar{X}$=19.3							9	148-180	165.1								
HAY CRK.		1	1	5	1						2	9	1						12	24-43	35.4	12	40-44	41.4				12	9-10	9.1	12	2-8	4.5
FLATHEAD CO. MONTANA		N=8				$\bar{X}$=61.75			N=12						$\bar{X}$=17.9							12	149-189	173.5								
BASIN CRK.			1	2	1							1	1	0	1	1			4	33-44	38.7	4	40-43	40.7				4	8-9	8.5	4	4-8	7.0
FLATHEAD CO. MONTANA		N=4				$\bar{X}$=62.0			N=4						$\bar{X}$=20.0							4	167-182	177.2								
GOOD CRK.		1	2	1								3	1	4					8	30-44	38.9	8	41-44	42.4				8	9	9.0	8	0-8 1 w/o	3.1
FLATHEAD CO. MONTANA		N=4				$\bar{X}$=61.0			N=8						$\bar{X}$=19.1							8	163-182	169.5								
TUCHUCK CRK.			2										1	0	1				2	33,38	35.5	2	41,44	42.5				2	9	9.0	2	4,11	7.5
FLATHEAD CO. MONTANA		N=2				$\bar{X}$=61.0			N=2						$\bar{X}$=20.0							2	169,172	170.5								

(2)

WEST SLOPE CUTTHROAT

Locality	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranchial teeth N
REVIAS CRK, FLATHEAD I.R. MONTANA	2	1								1	1	1	1		1			5	30-39	34.6	5	39-44	42.2				5	9-10		5	3-17	7.6
	N=4				$\bar{X}$=60.0			N=5						$\bar{X}$=19.2							5	156-179	169.4								
BIG CREEK, FLATHEAD N.F. MONTANA	5	3	1									3	5	2				10	31-42	36.7	10	41-45	42.2				10	9-10		10	1-17	8.1
	N=9				$\bar{X}$=60.5			N=10						$\bar{X}$=19.9							10	156-187	169.5								
UPPER TWIN CRK, FLATHEAD N.F. MONTANA	4	5										6	1	3				8	30-40	35.6	10	39-43	41.2				10	9		10	3-14	7.8
	N=9				$\bar{X}$=60.5			N=10						$\bar{X}$=19.7							10	150-178	166.0								
TRAIL CRK, FLATHEAD N.F. MONTANA	2	3	4							1	1	2	5					9	31-42	36.55	9	39-43	41.67				9	9-10		9	0-8 1 w/o	3.77
	N=9				$\bar{X}$=61.2			N=10						$\bar{X}$=19.2							9	152-171	162.4								
WHALE CRK. FLATHEAD CO. MONTANA	1	4	3	3							4	3	4					11	34-45	37.9	11	40-44	41.6				9 11	9-10		11	1-27	10.9
	N=11				$\bar{X}$=61.8			N=11						$\bar{X}$=19.0							11	172-198	182.7								
MINER CRK. FLATHEAD CO. MONTANA	3	3									1	2	3					6	37-48	43.7	6	35-40	37.7				6	9	9.0	6	2-4	4.3
	N=6				$\bar{X}$=60.5			N=6						$\bar{X}$=18.3							6	161-178 173	167.7								
PUZZLE CRK FLATHEAD CO. MONTANA	2	2	2	2								7	6	1	2			16	28-38	33.25	14	39-44	41.3				14	9-10	9.1	14	1-13	5.5
	N=8				$\bar{X}$=61.5			N=16						$\bar{X}$=20.5							14	139-184	166.0								

(1) WEST SLOPE

Locality	Vertebrae 60	61	62	63	64	65	66	Gillrakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchio-stegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basi-branchial teeth N
COMPOSITE SAMPLES "TYPICAL"																			25-50 (32-42)			145-190 (155-173) 36-44 (38-42)						9			1-25 (6-12)
	59-62				(60-61)			17-21				(18-19)																			
S. FK. GRANITE CRK.	2	4	2							2	8	7	2	1	1			21	24-49	34.9	20	38-43	40.8				21	8-9		21	1-14	6.1
	N=8				$\bar{X}$=61.0			N=21						$\bar{X}$=18.8							20	151-182	166.9								
BRETT CRK.	1	10	3								1	6	9	4				20	31-44	36.2	20	37-45	40.0				20	8-10		20	0-16 2 w/o	8.8
	N=14				$\bar{X}$=61.1			N=20						$\bar{X}$=19.8							20	130-172	156.3								
DEAN CRK. MONTANA	1	2	8	1					1		1	8						10	29-43	36.0	10	40-42	41.0				10	9	9.0	10	4-17+	9.9
	N=12				$\bar{X}$=60.75			N=10						$\bar{X}$=18.6							10	158-191	172.4								
ARLEE HATCHERY (EGGS FROM JOCKO CRK) MONTANA	4	5								3	11	3	3					20	27-59	40.85	13	37-41	38.5				20	9	9.0	20	3-22	9.5
	N=10				$\bar{X}$=60.4			N=20						$\bar{X}$=18.3							20	141-175	158.9								
BUNKER CRK. FLATHEAD N.F. MONTANA	2	5	2							2	4	4						10	32-46	37.4	10	43-48	44.1				10	9	9.0	10	0-4 4 w/o	1.3
	N=9				$\bar{X}$=61.0			N=10						$\bar{X}$=18.2							10	170-205	193.1								
COAL CRK. FLATHEAD N.F. MONTANA	1	4	6								2	4	1	3	0	1		11	30-43	37.5	11	39-45	42.4				11	9	9.0	11	0-20+ 1 w/o	6.6
	N=11				$\bar{X}$=61.5			N=11						$\bar{X}$=19.8							11	155-180	169.7								

Table 1. Meristic characters for five essentially pure populations of westslope cutthroat trout.

Collection location	N	Vertebrae	Gill Rakers	Scales above lateral line	Scales in lateral series	Pyloric Caeca	Dorsal branchiostegals
S.F.R. Granite Crk. Pend Oreille Co. Idaho	21	60-62 61.0 (0.76)	17-22 18.8 (1.22)	38-43 40.8 (1.41)	151-182 167.4 (9.47)	24-48 34.9 (5.44)	1-14 6.1 (3.88)
Poorman Crk. Lewis and Clark Co. Montana	16	60-62 61.0 (0.78	17-24 19.8 (1.57)	39-46 42.3 (1.62)	154-175 162.8 (7.64)	30-48 37.8 (5.34)	2-11 5.2 (3.06)
Ross Crk. Missoula Co. Montana	10	59-62 60.8 (0.79)	17-21 18.8 (1.23)	38-42 40.4 (1.27)	150-176 165.1 (7.40)	29-42 36.6 (3.53)	6-24 13.1 (5.43)
Spotted Bear River Flathead Co. Montana	10	59-62 60.5 (1.22)	17-21 19.3 (1.06)	40-46 41.4 (2.07)	149-175 163.7 (9.20)	32-45 38.3 (4.60)	1-11 6.0 (3.33)
Upper Twin Crk. Flathead Co. Montana	10	60-61 60.5 (0.53)	19-21 19.7 (0.95)	39-43 41.2 (1.03)	150-178 166.0 (8.19)	30-40 35.7 (3.09)	3-14 7.8 (3.33)
Total Average		60.76	19.26	41.2	165.D	36.6	7.7

Table 2. Meristic characters for five representative populations of Upper Missouri River cutthroat trout, *S. clarki lewisi*.

Collection	n	Vertebrae	Gill Rakers	Scales above lateral line	Scales in lateral series	Pyloric Caeca	Basibranchial teeth
Cougar Crk. YNP Wyoming	20	60-61 60.7 (0.50)	18-21 19.15 (0.88)	40-45 43.35 (1.31)	170-204 182.8 (9.58)	29-44 33.25 (4.00)	1-13 4.7 (2.58)
E.F.K. Specimen Crk. YNP Wyoming	9	60-62 61.0 (0.93)	18-21 19.44 (1.01)	37-50 43.33 (3.87)	147-196 164.78 (15.59)	26-33 30.44 (2.24)	1-13 4.78 (3.80)
Upper Grayling Crk. YNP Wyoming	7	60-61 60.6 (0.58)	19-22 20.0 (1.15)	38-49 43.14 (3.80)	162-195 175.29 (11.79)	25-37 30.86 (4.18)	1-14 6.29 (4.23)
N.F.K. Little Badger Crk. Glacier Co. Montana	5	60-61 60.6 (0.55)	18-21 19.8 (1.30)	40-44 42.0 (1.58)	161-185 174.0 (10.68)	30-39 32.8 (3.70)	2-13 8.40 (4.51)
Iron Mine Crk. Meagher Co. Montana	3	60-62 61.0 (1.00)	18-19 18.67 (0.58)	40-42 41.0 (1.00)	155-177 169.0 (12.17)	28-41 33.33 (6.81)	6-10 7.67 (2.08)
Total Average		60.76	19.42 (0.52)	42.58 (1.09)	172.76 ( )	32.14 ( )	6.38 (1.67)

Table 3. Meristic characters for ~~two populations~~ of cutthroat trout from the South Saskatchewan River system, Alberta, Canada

Collection	n	Vertebrae	Gill Rakers	Scales above lateral line	Scales in lateral line	Pyloric Caeca	Basibranchial teeth
Pickle Jar L. #3	17	59-61	17-21	36-40	151-170	23-36	2-23
Big Dow N.F. Alberta		60.2 (0.66)	19.24 (1.09)	38.65 (1.32)	159.94 (6.03)	30.12 (3.66)	11.71 (5.90)
Lower Wasootch Beaver Ponds	25	59-63	15-19	31-42	137-178	32-50	1-15
Kananaskis R. Alberta		61.4 (1.30)	17.0 (0.96)	37.44 (2.42)	157.08 (8.54)	43.16 (6.48)	5.48 (3.42)
Total Average		60.8	18.12	38.00	158.51	36.86	8.59

Table 4. Meristic characters for five representative populations of Yellowstone cutthroat trout.

Collection location	N	Vertebrae	Gill Rakers	Scales above lateral line	Scales in lateral series	Pyloric Caeca	Basibranchial teeth
Bear Crk. YNP Wyoming	33	59-62 61.4	19-23 20.24 (0.94)	39-50 43.24 (2.08)	159-188 174.12 (8.22)	37-56 45.85 (4.85)	2-30 12.33 (7.20)
Yellowstone River at 3-mile Hole YNP Wyoming	15	60-62 61.0	18-23 20.60 (1.45)	38-53 43.93 (4.82)	156-179 168.00 (7.41)	39-60 47.07 (5.66)	7-53 21.40 (11.71)
Yellowstone River at 7-mile Hole YNP Wyoming	7	59-62 61.5	19-21 20.00 (0.82)	42-51 45.71 (4.39)	147-173 160.57 (9.29)	42-60 50.71 (5.88)	12-32 24.71 (7.43)
Yellowstone L. YNP Wyoming	16	61-63 61.7	19-22 20.00 (0.89)	37-46 40.06 (2.79)	161-187 179.19 (7.30)	26-47 38.56 (5.18)	10-46 22.31 (10.44)
S. Paintrock Crk. Bighorn Co. Wyoming	27	61-63 62.2	18-22 19.11 (0.85)	40-51 43.85 (2.41)	146-184 164.96 (7.60)	33-50 41.52 (4.61)	1-15 6.04 (3.42)
Total averages		61.6	19.98	43.36	169.37	44.75	15.42

Table 5. Comparison of westslope cutthroat trout, upper Missouri River cutthroat trout (*S. c. lewisi*) and Yellowstone cutthroat trout.

Source	N	Scales in lateral series, range and mean	d.f., t (α=.001)	Gill Rakers range and mean	d.f., t (α=0.01)	Scales above lateral line, range and mean	d.f., t (α=0.01)
Westslope cutthroat	516	130-205 168.18		16-24 19.36		30-48 41.15	
			667, 0.550 N.S.		667, 4.286 S.		667, 0.781 N.S.
Upper Missouri River cutthroat *S. c. lewisi*	153	137-204 168.89		15-22 18.82		31-50 40.95	
			348, 0.867 N.S.		348, 4.708 S.		348, 5.328 S.
Yellowstone cutthroat	197	128-197 170.13		17-23 19.93		31-53 42.90	
			711, 2.029 S.		711, 6.064 S.		711, 5.972 S.
Westslope cutthroat	516	130-205 168.18		16-24 19.36		30-48 41.15	

N.S. - nonsignificant S. - significant

Table 5. (cont.)

Source	n	Pyloric Caeca range and mean	df, $t(\alpha=0.01)$	Basibranchial teeth range and mean	d.f., $t(\alpha=0.01)$
Westslope cutthroat	516	24-51 36.58		0-30 7.46	
			667, 7.822		667, 1.266
			S.		N.S.
Upper Missouri River cutthroat *L. c. lewisi*	153	20-50 33.06		0-23 6.86	
			348, 14.924		348, 9.751
			S.		S.
Yellowstone cutthroat	197	26-63 42.85		0-53 14.29	
			711, 11.654		711, 9.751
			S.		S.
Westslope cutthroat	516	24-51 36.58		0-30 7.46	

N.S. = nonsignificant S. = significant

— list of all west slope upper Missouri samples examined

*- virtually pure - consistent ~~dif~~ similarities

**- obvious hybrids w/ rainbow and/or Yellowstone trout

***- non-committal - sample too small or characters inconsistent ~~with dis~~ may be due to random differentiation in small local pop. or unusual environmental influence —

MONTANA

LOCALITY	VERTEBRAE 59	60	61	62	63	64	65	66	GILLRAKERS 15	16	17	18	19	20	21	22	23	24	PYLORIC CAECA N	RANGE	X̄	SCALES, LAT. SER. AND ABOVE LAT. LINE N	RANGE	X̄	BRANCHIOSTEGAL RAYS N	RANGE	X̄	PELVIC FIN RAYS N	RANGE	X̄	BASIBRANCH TEETH N
Montana west slope stock Socko Crk. Hatch. (2 crib, Hungry Horse Res.)	1	4	5								3	11	3	3					20	27-59	(40.9)	13	37-41	(38.5)	20	9-11	(10.4)	20	all 9		20	3-22	(9.45)
	10		59-61			(60.4)			20		17-20				(18.3)				20	141-175	(158.9)					9-12	(10.9)					
225-297mm. Silver Crk. Nov. 71	0	2	7	1							4	5	5						14	28-37	(33.0)	14	37-41	(40.0)	14	9-12	(10.6)	14	8,9		14	2 no teeth	
	10					(60.9)			14						(18.1)				14	144-162	(155.1)				14	10-12	(10.9)		8-9		12	1-10	(3.9)
117-158 mm. Silver Crk. Sept. 71	1	3	0	1							3	1	1						5	27-34	(31.8)	not countable						9		5	2 no teeth	
						(60.2)																								3	1-7	
Silver Crk. 95-149mm 1970					1														3	30, 30-45		3	36-37					9		3	1 no teeth	
																						3	145-168							2-2,3	
Yellowstone 1969 via McBride L. & Big Timber Hatchery - 1971 (Hatchery raised)		2	4	3							1	3	6	5					15	30-49	(45.3)	10	37-43	(38.2)	9-11		(10.0)	11=9			15	
	9					61.1			15									19.0				10	168-205	(184.6)	9-11		(10.2)	4=10			13-33	(18.2)
Yellowstone L. stock held in hatchery since 1955			5	5	5							1	3	4	6	1			15	30-42	(36.6)	15	37-42	(39.3)	8-11		(9.3)	4=9			15	
	15					62.0			15									20.5				15	156-175	(164.7) (not very reliable)	8-11		(9.5)	11=10			15-30	21.3
X Yellowstone L. N=40	N=72	8	25	32	7						1	11	18	17	9	5			31-51	(42) (41.2)		36-~~45~~ 46		(44)			(10.6)	~~4~~		~~9~~			10-46
		~~18~~	~~72~~ 76	~~28~~ 32		~~61.5~~	~~20.6~~				18-23				20.6									(174)			(10.7)	11		~~10~~			(22.3)
Yellowstone L. 9-10 yr old fish S. Grn. L. Wyo.	131																		18	37-51	(42.6)		39-43	(42)						9		13-~~75~~ 60
									N=17		18-23				20.2								144-193	(174)								(33)
Typical hatch. Rainbow trout																			40-70	(50-55)		25-30	120-~~146~~		10-~~12~~			10			no w	
			61-65	(63)							17-21	(19)																				

Dean Crk. S. Fk. Flathead.

vert.	59	60	61	62
	1	2	8	1

60.75

rakers	16	18	19
	1	1	8

18.6

Scales 40-42 (41.0)

158-191 (172.4)

coxae 29-43 (36.0)

pelvics >11 ?

teeth 4-17 (9.3)

UPPER MISSOURI BASIN

Locality	Vertebrae 60	61	62	63	64	65	66	Gill rakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranch teeth N	range	$\bar{X}$
UPPER GRAYLING CRK.	2		1									3	2	1	1			7	25-37	30.9	6	38-49	43.2	7	10-11	10.6	7	9-10	9.1	7	1-14	6.3
	N=3			$\bar{X}$=60.6				N=7					$\bar{X}$=20.0								6	162-195	175.3	7	10-12	11.0						
GRAYLING CRK 8/28/70 NEAR STA. 3	1	2	1								1		1		2	1		4	25-35	31.0	5	38-45	41.8	5	10-11	10.4	5	9	9.0	5	0-18	8.4
	N=5			$\bar{X}$=61.0				N=5					$\bar{X}$=20.0								5	177-191	185.4	5	10-12	10.8					1 w/o teeth	
N. FK. SPECIMEN CRK.		4									2	1	1					4	29-37	33.3	4	39-47	43.5	4	10-11	10.25	4	9	9.0	4	0-3	2.0
	N=4			$\bar{X}$=61.0				N=4					$\bar{X}$=19.0								4	169-202	186.0	4	9-11	10.5					1 w/o teeth	
E. FK. SPECIMEN CRK.	1	2	1								2	2	4	1				9	26-33	30.4	8	37-50	43.3	9	10-11	10.6	9	8-9	8.8	9	1-13	4.8
	N=8			61.0				N=9					$\bar{X}$=19.4								8	147-196	164.7	9	10-12	10.7						
GALLATIN RIV.	3	3	1							1	2	3	2					8	27-35	29.6	8	38-44	41.5	8	10-12	10.6	8	9	9.0	8	2-10	5.5
	N=7			$\bar{X}$=60.7				N=8					$\bar{X}$=18.8								8	175-197	184.0	8	10-12	10.8						
HIGH LAKE	3	3	1								1	2	1	2				7	35-43	39.0	7	36-40	37.9	6	10-11	10.7	7	8-9	8.9	7	0-13	7.9
	N=7			$\bar{X}$=61.7				N=6					$\bar{X}$=19.7								7	158-178	168.4	6	10-11	10.7					1 w/o teeth	
GRAYLING CRK. 8/30/70 NEAR ROAD ½ MI. S. WHERE CRK. LEAVES ROAD DOWNSTREAM		2												2				2	31,38		2	44,46		2	10,11		2	10	10.0	2	0,9	
	N=2			$\bar{X}$=61.0				N=2					$\bar{X}$=21.0								2	174,187		2	9,11							

MONTANA WEST SLOPE CUTTHROAT

Locality	59	Vertebrae 60	61	62	63	64	65	66	Gill rakers 15	16	17	18	19	20	21	22	23	24	Pyloric caeca N	range	$\bar{X}$	Scales, lat. ser. and above lat. line N	range	$\bar{X}$	Branchiostegal rays N	range	$\bar{X}$	Pelvic fin rays N	range	$\bar{X}$	Basibranch teeth N
ARLEE HATCH. EGGS FROM JOEKO CRK.	1	4	5								3	11	3	3					20	27-59	40.85	13	37-41	38.5	20	9-11	10.4	20	9	9.0	20	3-22	9.45
		N=11			$\bar{X}$=60.4				N=20				$\bar{X}$=18.3									20	141-175	158.9	20	9-12	10.9						
DEAN CRK. MISSOURI	1	2	8	1					1		1	8							10	29-43	36.0	10	40-42	41.0	10	10-12	10.6	10	9	9.0	10	4-17+	9.9
		N=12			$\bar{X}$=60.75				N=10				$\bar{X}$=18.6									10	158-191	172.4	10	10-13	11.3						
SILVER CRK. 3 LOTS COMBINED N=14 N=3 N=5	1	5	7	2	1						7	7	8						22	27-37	33.0	17	36-41	39.4	22	9-12	10.5	19	8-9	9.0	22	0-10	2.9
		N=16			$\bar{X}$=60.6				N=22				$\bar{X}$=18.0									17	144-168	154.6	12	10-12	10.9				5 w/o teeth		

Jim Roscoe

Native Distribution of Some Montana Fishes

prob. used same routes (see Hoff (Copeia) for data on geographic variation for comparison w/ cutthroat

Prosopium

	East Slope			West Slope		
	Upper Missouri	Yellow-stone	South Saskatch	Clark Fork	Kootenai	
Salmo clarki[1,2]	+	+	+	+	+	
Salvelinus malma[2]			+	+	+	
S. namaycush[3]	+		+	+ ?		(Eigenmann 1894)
Prosopium williamsoni[1,2]	+	+	+	+	+	
P. coulteri[3]			+ (1A)	+	+	
Thymallus arcticus[3]	+		+			
Rhinichthys[1,3]						
cataractae	+	+	+	+	+	
← Catostomus						
catostomus[3]	+	+	+	+	+	
C. plytyrhynchus[1,4]	+	+				
Lota lota[3]	+	+	+		+	
Cottus bairdi[1,4]	+	+	+			
C. ricei[3]			+			
C. cognatus[2]				+	+	
C. rotheus					+	
C. confusus				+		
deepwater sculpin			+			

[1] Present also in Bonneville basin and upper Snake River. + Green R. (except Rhinichthys)

2 from west (coast) but S. clarki & Sal. malma both have inland form. (notes fm. Crowder)

3 from north (+ east in most cases)

4 from south (Great Basin area)

(1A) Not recorded from Montana, but Lindsey and Franzin (1972. J. F. R. B. C., 29(12):1772-1775) described P. c. from Waterton Lks., Glac. N.P., Alberta, just over border, in So. Sask. drainage.

TEPEE CRK.

	3	5	2	7	1	8	6	$\bar{X}$	S^2	S
GR U	6	8	7	8	7	8	8			
L	12	11	11	13	11	12	12			
T	18	19	18	21	18	20	20	19.14	1.48	1.21
SA	43	40	38	43	42	40	41	41.0	3.3	1.83
S2	170	169	178	181	166	174	160	171.14	51.48	7.17
D	3	7	5	7	14	4	8	6.86	13.14	3.63

E.FK. PINE CRK

	5	2	1	3	6	4	$\bar{X}$	S^2	S
GR U	7	7	7	7	7	7			
L	11	12	12	11	12	12			
T	18	19	19	18	19	19	18.67	0.266	0.515
SA	37	36	40	37	40	41	38.5	4.3	2.07
S2	144	162	150	132	144	152	147.3	100.27	10.01
D	5	15+	9	4	10	10+	8.8	15.77	3.97

SPRUCE CRK.

	1	2	4	5		6	8	$\bar{X}$	S^2	S
GR U	7	8	7	7	7	7	7			
L	12	11	11	11	12	11	12			
T	19	19	18	18	19	18	19	18.57	0.29	0.53
SA	44	39	40	40	38	42	43	40.86	4.81	2.19
S2	175	150	180	162	145	189	161	166.0	257.3	16.04
D	8	11	4	10	4	0	10	6.7		

BIG CRK

	1				$\bar{X}$	S^2	S
GR U	7	6	8	6			
L	11	12	13	11			
T	18	18	21	17	18.5	3.0	1.73
SA	40	40	41	42	40.75	0.92	0.96
S2	191	163	171	173	174.5	139.67	11.82
D	8	5	7	4	6.0	3.3	1.83

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

T51N, R2E, S12

SPECIES West Slope Cutthroat LOCALITY Tepee Cr. At Riley Cr. Coeur d'Alene System Idaho

COLLECTED BY P. Lammeyer DATE Summer 1973

Cat. # _____ Measurements by L. Wagner DATE _____

Specimen #	1	2	3	4	5	6	7	8	
Total L.	195	184	190	143	165	139	153	140	
Standard L.	169	157	161	123	143	121	132	122	
Body D									
Head L	46	41	38	32	40	30	33	28	
Oroit L	13	11	10	9	10	10	10	9	
Upper Jaw L	28	23	20	17	19	18	19	15	
Dors. Orig. to Snt. tip	86	78	76	60	66	58	62	53	
Dorsal fin basal L									
Dorsal fin depressed L	39	35	37	28	32	28	29	28	
Adip. fin depressed L	14	11	13	10	13	11	11	9	
Caudal peduncle D	19	15	16	13	15	13	13	12	
Caudal peduncle L	28	24	25	20	23	21	23	20	
Vertebrae	61	60	60	60	62	61	60	60	60.5
1st Arch gillrakers (up)	7	7	7	7	7	8	7	7	19.14
(lower)	11	11	12	12	11	12	12	13	
(total)	18	18	19	19	18	20	19	20	
Branchiostegal rays right	10	10	11	9	8	9	11	11	
(left)	12	12	11	10	10	10	11	12	
Dorsal rays									
Anal rays									
Pectoral fin rays									
Scales in lateral line									
Scales above lateral line	39	42	43	38	42	42	44	43	41.0
Scales 2 rows above lat.	189	246	210	175	167	183	204	187	171.14
Pelvic fin rays	10	8	9	9	9	9	9	9	9
Pyloric caeca	29	30	37	26	36	41	31	36	33.4
Dentition	6	4	1	2	7	4	7	3	6.86

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

T51N, R2E, S12

SPECIES West Slope Cutthroat LOCALITY Teppee Cr At Riley Cr. Coeur d'Alene System Idaho

COLLECTED BY P. Laumeyer DATE Summer 1973

Cat. # _____ Measurements by L. Wagner DATE _____

Specimen #

	9	10	11					
Total L.	113	113	120					
Standard L.	97	95	103					
Body D								
Head L	23	20	26					
Oroit L	8	8	8					
Upper Jaw L	13	13	14					
Dors. Orig. to Snt. tip	47	44	47					
Dorsal fin basal L								
Dorsal fin depressed L	20	21	23					
Adip. fin depressed L	7	6	9					
Caudal peduncle D	10	10	11					
Caudal peduncle L	16	16	17					
Vertebrae	61	60	61					
1st Arch gillrakers (up)	6	7	6					
(lower)	12	11	12					
(total)	18	18	18					
Branchiostegal rays right	11	10	11					
(left)	12	10	12					
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	38	37	44					
Scales 2 rows above lat.	178	163	221					
Pelvic fin rays	9	9	9					
Pyloric caeca	38	36	27					
Dentition	2	0	11					

T47N, R3E, S10

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES West Slope Cutthroat LOCALITY Big Cr. At Dot Cr. → St. Joe R. Coeur d'Alene System Idaho

COLLECTED BY P. Laumeyer DATE Summer 1973

Cat. # _____ Measurements by L. Wagner DATE _____

Specimen #

	1	2	3	4	5	6	7	8
Total L.	141	129	116	110				
Standard L.	119	108	108	92				
Body D								
Head L	30	28	26	26				
Oroit L	9	9	8	8				
Upper Jaw L	16	15	14	15				
Dors. Orig. to Snt. tip	57	50	46	44				
Dorsal fin basal L								
Dorsal fin depressed L	27	26	25	23				
Adip. fin depressed L	12	12	9	9				
Caudal peduncle D	13	12	11	10				
Caudal peduncle L	18	17	16	15				
Vertebrae	61	62	61	62	61.5			
1st Arch gillrakers (up)	7	6	8	7	18.5			
(lower)	11	12	13	11				
(total)	18	18	21	18				
Branchiostegal rays right	10	11	10	11				
(left)	11	12	11	12				
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	40	42	39	41	40.75			
Scales 2 rows above lat.	190	174	187	193	174.5			
Pelvic fin rays	9	8	8	9	8.5			
Pyloric caeca	33	39	42	40	38.2			
Dentition	8	3	3	1	6.0			

V 61
GR 19
Isc 168
~~Pc~~
SALL 41
PC 37
O 7.4

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CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

T54N, R1E, S36

SPECIES West Slope Cutthroat LOCALITY Spruce Creek → L. Pend Oreille Coeur d'Alene System

COLLECTED BY P. Laumeyer DATE Summer 1973

Cat. # _____ Measurements by L. Wagner DATE _____

Specimen #	1	2	3	4	5	6	7	8	
Total L.	208	183	122	141	162	158	135	143	
Standard L.	179	158	105	122	139	135	115	122	
Body D									
Head L	44	43	29	33	33	31	29	30	
Oroit L	12	11	9	10	10	10	9	9	
Upper Jaw L	24	24	16	18	18	18	17	18	
Dors. Orig. to Snt. tip	91	78	48	59	61	62	53	58	
Dorsal fin basal L	39								
Dorsal fin depressed L	39	34	26	28	29	29	28	27	
Adip. fin depressed L	13	11	8	11	13	12	10	9	
Caudal peduncle D	20	16	11	13	13	13	11	13	
Caudal peduncle L	27	26	18	18	21	22	17	20	
Vertebrae	61	61	61	61	61	61	62	62	60.9
1st Arch gillrakers (up)	7	8	7	7	6	7	7	7	12.57
(lower)	12	11	13	11	11	11	12	12	
(total)	19	19	20	18	17	18	19	19	
Branchiostegal rays right	12	10	10	14	11	8	11	11	
(left)	13	11	11	11	12	9	12	12	
Dorsal rays									
Anal rays									
Pectoral fin rays									
Scales in lateral line									
Scales above lateral line	44	41	39	41	38	43	41	40	40.86
Scales 2 rows above lat.	198	178	150	190	179	200	172	173	166.0
Pelvic fin rays	9	8	9	8	9	8	7	9	8.5
Pyloric caeca	39	36	44	36	45	33	24	39	38.0
Dentition	4	8	4	4	7	0	3	9	6.7

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

T54N, R1E, S36

SPECIES West Slope Cutthroat LOCALITY Spruce Creek → L. PEND ORIELLE Coeur d'Alene system

COLLECTED BY P. Laumeyer DATE Summer 1982

Cat. # _____ Measurements by L. Wagner DATE _____

Specimen #	9	10	11	12	13	14	15	16
Total L.	133	127	120	98	104			
Standard L.	113	107	102	115	87			
Body D								
Head L	29	28	26	25	22			
Oroit L	9	8	9	8	7			
Upper Jaw L	15	15	14	13	12			
Dors. Orig. to Snt. tip	49	49	45	45	40			
Dorsal fin basal L								
Dorsal fin depressed L	27	25	23	22	21			
Adip. fin depressed L	9	9	9	8	9			
Caudal peduncle D	11	12	10	10	9			
Caudal peduncle L	19	17	17	17	13			
Vertebrae	62	60	60	60	60			
1st Arch gillrakers (up)	7	7	7	7	7			
(lower)	12	12	13	11	12			
(total)	19	19	20	18	19			
Branchiostegal rays right	10	11	10	10	11			
(left)	11	12	11	13	13			
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	40	45	42	41	38			
Scales 2 rows above lat.	166	168	174	180	171			
Pelvic fin rays	9	8	9	9	9			
Pyloric caeca	38	37	40	41	41			
Dentition	4	5	0	3	5			

T48N, R2E, S2

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES West slope cutthroat (?) LOCALITY E. Fk. Pine Crk. Idaho
Coeur d'alene drainage

COLLECTED BY P. Leumeyer DATE Summer 1973

Cat. # _____ Measurements by L. Wagner DATE _____

Specimen #	1	2	3	4	5	6	7	8	
Total L.	164	165	153	144	146	150	113	104	
Standard L.	139	143	131	123	126	127	97	88	
Body D									
Head L	40	40	38	31	35	34	27	23	
Oroit L	11	11	11	10	10	10	8	7	
Upper Jaw L	22	22	22	17	19	20	14	12	
Dors. Orig. to Snt. tip	69	71	62	55	61	60	45	40	
Dorsal fin basal L	3								
Dorsal fin depressed L	32	35	30	30	30	31	23	21	
Adip. fin depressed L	15	11	12	13	12	11	9	9	
Caudal peduncle D	16	17	14	14	15	14	10	9	
Caudal peduncle L	22	22	21	21	20	20	14	14	
Vertebrae	59	60	60	60	60	60	59	59	59.7
1st Arch gillrakers (up)	7	7	7	7	7	7	7	7	18.67
(lower)	12	12	11	11	11	12	11	12	
(total)	19	19	18	18	18	19	18	19	
Branchiostegal rays right	11	10	11	11	12	9	11	11	
(left)	12	11	12	12	12	10	10	12	
Dorsal rays									
Anal rays									
Pectoral fin rays									
Scales in lateral line									
Scales above lateral line	43	40	41	42	39	39	38	39	38.5
Scales 2 rows above lat.	153	165	151	164	157	156	148	151	147.3
Pelvic fin rays	9	9	9	9	9	9	9	9	9
Pyloric caeca	29	34	27	27	32	34	28	37	32.0
Dentition	8	22	0	0	6	2	0	7	8.8

T48N, R2E, S2

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES West Slope Cutthroat ? LOCALITY E. Fk. Pine Crk Idaho Coeur d'alene system

COLLECTED BY P. Laumeyer DATE Summer 1973

Cat. # _____ Measurements by L. Wagner DATE _____

Specimen #

	9	10						
Total L.	110	100						
Standard L.	93	84						
Body D								
Head L	26	24						
Oroit L	8	8						
Upper Jaw L	15	13						
Dors. Orig. to Snt. tip	44	39						
Dorsal fin basal L								
Dorsal fin depressed L	22	20						
Adip. fin depressed L	10	8						
Caudal peduncle D	10	9						
Caudal peduncle L	12	12						
Vertebrae	60	60						
1st Arch gillrakers (up)	7	7						
(lower)	11	12						
(total)	18	19						
Branchiostegal rays right	10	11						
(left)	11	12						
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	37	43						
Scales 2 rows above lat.	171	153						
Pelvic fin rays	9	9						
Pyloric caeca	31	41						
Dentition	10	4						

BAYVIEW + OLDMAID CRK

	1	2	3	4	5	6	7	8	9	10
GRU	7	6	6	8	6				9	7
L	10	11	11	11	11		$\bar{X}$	S^2 S	11	10
T	17	17	17	19	17		17.7	1.57 1.25	20	17
SA	42	40	43	42	44		41.86	1.81 1.34	41	41
S2	177	164	174	182	183		172.71	84.51 9.20	158	171
D	4	4	7	12	7		7.57	12.95 3.60	13	6

CAREYWOOD CRK.

	1	2	3	4	8	$\bar{X}$	S^2	S
GRU	6	7	6	6	6			
L	10	10	10	10	9			
T	16	17	16	16	15	16.0	0.5	0.71
SA	43	40	42	41	42	41.6	1.3	1.14
S2	172	160	171	165	168	167.2	23.7	4.87
D	5	1	0	0	3	1.8		

TUMBLEDOWN CRK

	1	3	4	5	8	$\bar{X}$	S^2	S
GRU	7	7	6	6	7			
L	11	10	10	10	11			
T	18	17	16	16	18	17.0	1.0	1.0
SA	42	41	44	42	42	42.2	1.2	1.1
S2	164	161	155	150	161	158.2	31.7	5.6
D	5	8	4	2	7	5.2	5.7	2.4

KALISPELL CRK

	1	3	4	5	6	7	8	$\bar{X}$	Δ^2	S
GRU	8	8	9	8	7	8	8			
L	13	12	11	12	11	12	11			
T	21	20	20	20	18	20	19	19.7	0.90	0.95
SA	45	45	40	40	42	44	36	41.7	10.90	3.30
S2	175	175	168	175	168	164	148	167.57	92.62	9.68
D	6	1	24	12	7	0	22	10.0	76.5	8.75

W. GOLD CRK

	6	15	5	11		14	1
GRD	6	7	7	6	8	7	6
L	11	12	11	11	11	12	11
T	17	19	18	17	19	19	17
SA	40	40	41	38	42	37	42
SZ	175	160	156	170	150	160	175
D	7	7	1	2	12	8	3

$\bar{x}$	s^2	s
18.0	1.0	1.0
40.0	3.67	1.91
163.71	94.90	9.7
5.71	15.24	3.90

NOT USED IN ANALYSIS

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

1/2

SPECIES WESTSLOPE LOCALITY 1. ABUNDANCE

COLLECTED BY _____ DATE _____

Cat. # _____ Measurements by CONVERSIONS DATE _____

Specimen #	001	002	003	004	005	006	007	008
Total L.								
Standard L.	192	189	195	167	180	181	179	186
Body D								
Head L	258	254	246	257	272	254	279	258
Oroit L	71	62	72	72	78	72	73	70
Upper Jaw L	142	138	138	138	144	144	173	145
Dors. Orig. to Snt. tip	478	471	492	479	478	486	497	495
Dorsal fin basal L								
Dorsal fin depressed L	203	238	226	240	222	221	223	183
Adip. fin depressed L	093	090	077	078	072	077	101	075
Caudal peduncle D	...	...	...	...	...	...	...	...
Caudal peduncle L	...	...	...	...	...	...	...	...
Vertebrae								
1st Arch gillrakers (up)	007	009	008	007	007	008	009	009
(lower)	011	012	011	012	011	011	011	012
(total)	018	021	019	019	018	019	020	021
Branchiostegal rays right	010	010	010	010	010	010	009	011
(left)	010	010	012	010	010	009	010	012
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	038	043	041	037	039	038	035	042
Scales 2 rows above lat.	158	180	175	181	158	178	154	174
Pelvic fin rays	9	9	9	9	9	8	9	9
Pyloric caeca	—	35	—	—	—	—	—	43
Dentition	002	027	017	012	008	021	010	016

1/2

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES WESTSLOPE CUTTHROAT LOCALITY L. ABUNDANCE → ROSS FORK ROCK CRK DEER LODGE N.F. T3N R18W S.1

COLLECTED BY HAUGEN DATE

Cat. # 24 Measurements by ROSCOE DATE 10-73

Specimen #

	1	2	3	4	5	6	7	8
Total L.	218	225	231	200	216	215	214	220
Standard L.	182	189	195	167	180	181	179	186
Body D								
Head L	47	48	48	43	49	46	50	48
Oroit L	13	12	14	12	14	13	13	13
Upper Jaw L	26	26	27	23	26	26	31	27
Dors. Orig. to Snt. tip	87	89	96	80	86	88	89	92
Dorsal fin basal L								
Dorsal fin depressed L	37	45	44	40	40	40	40	34
Adip. fin depressed L	17	17	15	13	13	14	18	14
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								

VERTEBRAE	N = 9	$\bar{x}$ = 62.2	$\frac{61}{1}\ \frac{62}{5}\ \frac{63}{3}$
GILL RAKERS	N = 12	$\bar{x}$ = 19.2	$\frac{18}{3}\ \frac{19}{6}\ \frac{20}{1}\ \frac{21}{2}$
SCALES ABOVE LAT. L.	N = 12	$\bar{x}$ = 39.6	35-45
SCALES 2 ROWS ABOVE LAT. L.	N = 12	$\bar{x}$ = 168.5	154-181
PELVIC FIN RAYS	N = 12	$\bar{x}$ = 8.9	$\frac{8}{1}\ \frac{9}{11}$
PYLORIC CAECA	N = 2	$\bar{x}$ = 39.0	35, 43

SAMPLE IN POOR CONDITION; CAECA HAD DETERIORATED BADLY, WERE NOT SLIT OR INJECTED

DENTITION	N = 12	$\bar{x}$ = 11.8	2-27

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES WESTSLOPE LOCALITY 2. ABUNDANCE

COLLECTED BY _____ DATE _____

Cat. # _____ Measurements by CONVERSION DATE _____

Specimen #

	009	010	011	012				
Total L.								
Standard L.	161	170	172	155				
Body D								
Head L	261	259	254	245				
Oroit L	69	71	69	77				
Upper Jaw L	149	141	133	129				
Dors. Orig. to Snt. tip	484	494	497	490				
Dorsal fin basal L								
Dorsal fin depressed L	217	182	208	226				
Adip. fin depressed L	099	088	081	084				
Caudal peduncle D	...	...	...	...				
Caudal peduncle L	...	...	...	...				
Vertebrae								
1st Arch gillrakers (up)	008	008	007	007				
(lower)	011	011	011	012				
(total)	019	019	018	019				
Branchiostegal rays right	010	010	010	010				
(left)	010	010	011	011				
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	039	045	039	039				
Scales 2 rows above lat.	158	177	172	157				
Pelvic fin rays	9	9	9	9				
Pyloric caeca	-	-	-	-				
Dentition	004	008	009	008				

2/2

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES WESTSLOPE CUTTHROAT LOCALITY L. ABUNDANCE → ROSS FK. ROCK CRK DEER LODGE N.F. T3N R18W S.1

COLLECTED BY HAUGEN DATE

Cat. # 24 Measurements by ROSCOE DATE 10-73

Specimen #

	9	10	11	12				
Total L.	194	202	206	187				
Standard L.	161	170	173	155				
Body D								
Head L	42	44	44	38				
Oroit L	11	12	12	12				
Upper Jaw L	24	24	23	20				
Dors. Orig. to Snt. tip	78	84	86	76				
Dorsal fin basal L								
Dorsal fin depressed L	35	31	36	35				
Adip. fin depressed L	16	15	14	13				
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								

NOT USED IN ANALYSIS

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

1/2

SPECIES WESTSLOPE LOCALITY CHERRY CRK

COLLECTED BY _____ DATE _____

Cat. # _____ Measurements by CONVERSIONS DATE _____

Specimen #	001	002	003	004	005	006	007	008
Total L.								
Standard L.	136	153	132	132	133	143	139	139
Body D								
Head L	272	281	223	250	256	266	288	259
Oroit L	24	24	21	23	25	20	23	26
Upper Jaw L	154	163	167	136	150	147	165	144
Dors. Orig. to Snt. tip	507	503	508	485	481	490	518	482
Dorsal fin basal L								
Dorsal fin depressed L	213	235	235	227	225	231	230	223
Adip. fin depressed L	096	098	083	091	083	098	094	094
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	007	007	006	007	008	007	007	007
(lower)	012	011	010	012	012	014	011	011
(total)	019	018	016	019	020	021	018	018
Branchiostegal rays right	010	011	011	010	011	010	012	011
(left)	012	012	011	011	011	011	011	012
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	037	042	039	042	040	041	040	041
Scales 2 rows above lat.	166	167	162	146	159	159	170	166
Pelvic fin rays	9	9	9	9	9	9	9	9
Pyloric caeca	ROTTEN	—	—	—	—	39	47	—
Dentition	006	005	005	009	011	012	003	009

X

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

1/2

SPECIES WESTSLOPE CUTTHROAT LOCALITY CHERRY CRK → CLARK FORK
SANDERS CO. MONTANA T20N R29W

COLLECTED BY HAUGEN DATE 7-10-72

Cat. # _____ Measurements by ROSLOE DATE 9-73

Specimen #

	1	2	3	4	5	6	7	8
Total L.	160	183	159	157	158	169	166	167
Standard L.	136	153	132	132	133	143	139	139
Body D								
Head L	37	43	36	33	34	38	40	36
Oroit L	10	12	12	11	10	10	10	12
Upper Jaw L	21	25	22	18	20	21	23	20
Dors. Orig. to Snt. tip	69	77	67	64	64	70	72	67
Dorsal fin basal L								
Dorsal fin depressed L	29	36	31	30	30	33	32	31
Adip. fin depressed L	13	15	11	12	11	14	13	13
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								

VERTEBRAE	N = 12	$\bar{x}$ = 60.7	60 | 61 | 62 5 | 6 | 1
GILL RAKERS	N = 12	$\bar{x}$ = 18.6	16 | 18 | 19 | 20 | 21 1 | 5 | 4 | 1 | 1
SCALES ABOVE LAT. L.	N = 12	$\bar{x}$ = 40.8	37-44
SCALES 2 ROWS ABOVE LAT. L.	N = 12	$\bar{x}$ = 164.4	146-195
PELVIC FIN RAYS	N = 12	$\bar{x}$ = 9.0	9 12
PYLORIC CAECA	N = 4	$\bar{x}$ = 42.5	39-47

SPECIMENS WERE NOT PROPERLY PRESERVED,
CAECA WERE EITHER ROTTEN OR TOO SOFT TO COUNT

DENTITION	N = 12	$\bar{x}$ = 6.75	3-12

ONLY ABOUT HALF OF TOTAL SAMPLE EXAMINED

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES WESTSLOPE LOCALITY CHERRY CRK

COLLECTED BY _____ DATE _____

Cat. # _____ Measurements by CONVERSIONS DATE _____

Specimen #

Total L.								
Standard L.	158	170	154	170				
Body D								
Head L	247	271	266	271				
Oroit L	70	65	78	82				
Upper Jaw L	139	165	156	171				
Dors. Orig. to Snt. tip	494	512	487	518				
Dorsal fin basal L								
Dorsal fin depressed L	241	229	227	224				
Adip. fin depressed L	89	100	84	76				
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	7	7	7	6				
(lower)	12	11	12	12				
(total)	19	18	19	18				
Branchiostegal rays right	12	11	12	11				
(left)	13	11	13	11				
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	42	41	44	41				
Scales 2 rows above lat.	160	167	195	156				
Pelvic fin rays	9	9	9	9				
Pyloric caeca	44	40	—	—				
Dentition	3	8	3	7				

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES WESTSLOPE CUTTHROAT LOCALITY CHERRY CRK → CLARK FORK SANDERS CO. MONTANA T20N R29W

COLLECTED BY HAUGEN DATE 7-10-72

Cat. # _____ Measurements by ROSCOE DATE 9-73

Specimen #	9	10	11	12				
Total L.	188	201	181	202				
Standard L.	158	170	154	170				
Body D								
Head L	39	46	41	46				
Oroit L	11	11	12	14				
Upper Jaw L	22	28	24	29				
Dors. Orig. to Snt. tip	78	87	75	88				
Dorsal fin basal L								
Dorsal fin depressed L	38	39	35	38				
Adip. fin depressed L	14	17	13	13				
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES WESTSLOPE CUTTHROAT LOCALITY N.FK. LOST CRK. → SWAN RIVER MONTANA T25N R17W S.31

COLLECTED BY _____ DATE 7-27-72

Cat. # _____ Measurements by ROSCOE DATE 12-73

Specimen #

	1	2						
Total L.	231	185						
Standard L.	196	155						
Body D								
Head L	48	41						
Oroit L	13	10						
Upper Jaw L	27	23						
Dors. Orig. to Snt. tip	97	77						
Dorsal fin basal L								
Dorsal fin depressed L	41	33						
Adip. fin depressed L	14	11						
Caudal peduncle D								
Caudal peduncle L								
Vertebrae	61	62						
1st Arch gillrakers (up)	7	10						
(lower)	14	12						
(total)	21	22						
Branchiostegal rays right	12	11						
(left)	11	11						
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	44	40						
Scales 2 rows above lat.	180	166						
Pelvic fin rays	9	9						
Pyloric caeca	32	33						
Dentition	4	7						

VERTEBRAE	N = 2	$\bar{x}$ = 61.5	$\frac{61}{1}\frac{62}{1}$
GILL RAKER	N = 2		21-22
SCALES ABOVE LAT. L.	N = 2	40-44	
SCALES 2 ROWS ABOVE LAT. L.	N = 2	166-180	
PELVIC FIN RAYS	N = 2	9	
PYLORIC CAECA	N = 2	32, 33	
DENITION	N = 2	4, 7	

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES WESTSLOPE CUTTHROAT LOCALITY SOUP CRK. → SWAN RIVER MONTANA T24N R12W S.27

COLLECTED BY _____ DATE 8-10-72

Cat. # _____ Measurements by ROSCOE DATE AUG. 1973

Specimen #	1							
Total L.	131							
Standard L.	110							
Body D								
Head L	30							
Oroit L	9							
Upper Jaw L	17							
Dors. Orig. to Snt. tip	55							
Dorsal fin basal L								
Dorsal fin depressed L	25							
Adip. fin depressed L	10							
Caudal peduncle D								
Caudal peduncle L								
Vertebrae	61							
1st Arch gillrakers (up)	8							
(lower)	13							
(total)	21							
Branchiostegal rays right	11							
(left)	11							
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	41							
Scales 2 rows above lat.	164							
Pelvic fin rays	9							
Pyloric caeca	35							
Dentition	2							

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES WESTSLOPE CUTTHROAT LOCALITY ELK CRK → SWAN RIVER MONTANA T20N R17W S.35

COLLECTED BY _____ DATE 8-22-72

Cat. # _____ Measurements by ROSCOE DATE AUG. '73

Specimen #

	1							
Total L.	181							
Standard L.	153							
Body D								
Head L	37							
Oroit L	10							
Upper Jaw L	21							
Dors. Orig. to Snt. tip	74							
Dorsal fin basal L								
Dorsal fin depressed L	35							
Adip. fin depressed L	13							
Caudal peduncle D								
Caudal peduncle L								
Vertebrae	61							
1st Arch gillrakers (up)	8							
(lower)	13							
(total)	21							
Branchiostegal rays right	11							
(left)	12							
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	41							
Scales 2 rows above lat.	157							
Pelvic fin rays	9							
Pyloric caeca	38							
Dentition	9							

MONTANA WEST SLOPE CUTTS

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES S. c. lewisi LOCALITY MONTANA EGGS FROM JOCKO CRK. TRIB, HUNGRY HORSE RES., RAISED AT ARLEE HATCHERY AGE 3+

COLLECTED BY _____ DATE Dec. '71

Cat. # _____ Measurements by ROSCOE DATE Dec '71

Specimen #	1	2	3	4	5	6	7	8
Total L.	291	279	274	295	297	275	266	290
Standard L.	252	545	237	266	257	238	232	248
Body D								
Head L								
Oroit 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	ON	BACK						
1st Arch gillrakers (up)	7	7	7	7	7	7	7	6
(lower)	11	10	11	11	11	12	11	11
(total)	18	17	18	18	18	19	18	17
Branchiostegal rays right	11	10	11	10	10	10	9	10
(left)	10	11	10	11	11	11	10	11
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	—	—	38	41	40	37	—	39
Scales 2 rows above lat.	153	159	144	169	165	147	162	161
Pelvic fin rays	9	9 deformed	9	9 deformed	9	9 deformed	9	9
Pyloric caeca	33	42	42	38	44	42	36	41
Dentition	6	11	15	7	9	14	8	10

only 11 of 20 X-rayed
1 with fusion

VERTEBRAE

59	60	61
1	4	5

60.4

GILL RAKERS

17	18	19	20
3	11	3	3

N = 20 $\bar{x}$ = 18.3

BRANCHIOSTEGAL RAYS

(R)

9	10	11
2	8	10

N = 20 $\bar{x}$ = 10.4

(L)

9	10	11	12
3	6	9	2

N = 20 $\bar{x}$ = 10.9

PELVIC FIN RAYS N = 20 $\bar{x}$ = 9

PYLORIC CAECA N = 20 $\bar{x}$ = 40.85 RANGE - 27 - 59

DENTITION N = 20 $\bar{x}$ = 9.45 RANGE - 3 - 22

SCALES ABOVE LAT. LINE N = 13 $\bar{x}$ = 38.5 RANGE 37-41

SCALES 2 ROWS ABOVE LAT. LINE N = 20 $\bar{x}$ = 158.9 RANGE 141 - 175

#	16	17	18	19	20
P.C.	38	26	49	43	27½
DEN.	8	9	15	6	10
G.R.	11-18	11-18	11-18	12-19	12-20

This stock now being raised at Jocko Crk. Hatchery as Montana west slope cutth. - originally eggs taken from 2 tributaries to Hungry Horse Reservoir, So. Fk. Flathead R. - So Fk. drainage largely in Bob Marshall wilderness area & try to reserve for indigenous cutts & Dolly Varden. Hungry Horse Crk. + one other (unnamed) Eggs taken in June 29 1965 & June 27 1967 - brood fish spawned 1968 - This sample 3 yr. old hatchery raised fish.

MONTANA WEST SLOPE CUTTS

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES S. c. lewisi LOCALITY MONTANA EGGS FROM JOCKO CRK. TRIB HUNGRY HORSE RES. RAISED AT ARLEE HATCH. AGE 3+

COLLECTED BY _____ DATE DEC. '71

Cat. # _____ Measurements by ROSCOE DATE DEC. '71

Specimen #	9	10	11	12	13	14	15	16
Total L.	278	261	252	245	225	251	264	259
Standard L.	243	229	220	215	195	216	228	224
Body D								
Head L								
Oroit 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	7	7	6	7	7	8	7
(lower)	13	12	10	12	11	11	12	11
(total)	20	19	17	18	18	18	20	18
Branchiostegal rays right	11	10	11	11	10	9	11	11
(left)	10	11	11	10	9	12	9	11
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	—	38	39	38	—	39	—	37
Scales 2 rows above lat.	168	175	166	150	161	164	NO LATERAL LINE PRESENT	163
Pelvic fin rays	deformed	9	9	9	9	9	9	9
Pyloric caeca	46	37	41	42	41	59	40	38
Dentition	11	3	3	7	22	10	12	3

MONTANA WEST SLOPE CUTTS

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES S. c. lewisi LOCALITY MONTANA EGGS FROM JOCKO CRK. TRIB HUNGRY HORSE RES. RAISED AT ARLEE HATCH. AGE 3+

COLLECTED BY _____ DATE DEC. '71

Cat. # _____ Measurements by ROSCOE DATE DEC. '71

Specimen #	17	18	19	20				
Total L.	247	222	191	152				
Standard L.	218	187	171	128				
Body D								
Head L								
Oroit 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	ON	BACK						
1st Arch gillrakers (up)	7	7	7	8				
(lower)	11	11	12	12				
(total)	18	18	19	20				
Branchiostegal rays right	11	11	11	10				
(left)	11	12	10	9				
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	—	40	37	37				
Scales 2 rows above lat.	162	154	155	141				
Pelvic fin rays	9	9	9	9				
Pyloric caeca	36	49	43	27				
Dentition	9	13	6	10				

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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INT 415

native (?) trout in drainage
Big Horn
(Yellowstone)
B.L.M.

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

44

IN REPLY REFER TO

RM:RHH
6620

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
District Office
P. O. Box 119
Worland, Wyoming 82401

December 21, 1973

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

Dear Dr. Behnke:

I appreciated your November reply and enjoyed reviewing your report. Lou Pechacek and I have discussed the possibility of pure cutthroat populations since we made the collection of South Paintrock cutthroat you mentioned in your letter. The stream which may also hold native cutthroat that BLM is now concerned with is Deer Creek located northeast from Lovell, Wyoming. The stream is located in Big Horn County and drains into Porcupine Creek which drains into "Big Horn Lake". Since management conflicts threaten total miles of stream habitat (quite remote area), we hope to conduct a stream survey, etc. next spring-summer.

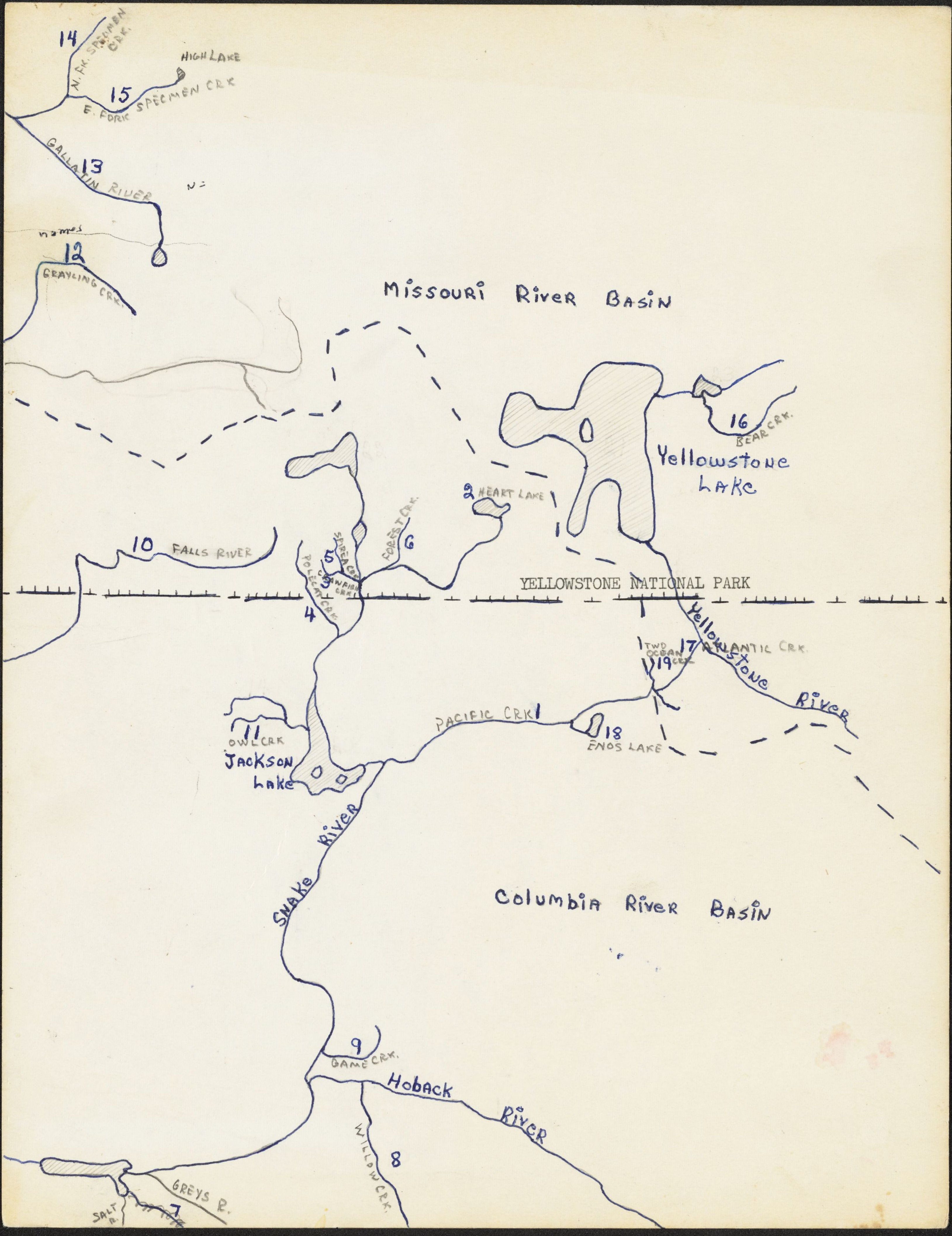
As we find stream possibilities, we will try to forward information to you. Unfortunately some of the older plantings' records are sketchy which makes an evaluation of this type somewhat difficult.

Sincerely yours,

Bob Haburchak

Robert H. Haburchak
Wildlife Management Biologist

LOCALITY	BASIBRANCHIAL TEETH			PYLORIC CAECA			SCALES lateral series and above lateral line			VERTEBRAE		
	N	Range	Mean	N	Range	Mean	N	Range	Mean	N	Range	Mean
Upper Missouri River Basin												
Grayling Creek 8-28-70 near Station 3	5	0-18 (1 no teeth)	8.4	4	25-35	31.0	5 5	177-191 38-45	185.4 41.8	4	60-62	61.0
Grayling Creek 8-30-70	2	0-9 (1 no teeth)	4.5	2	31-38	34.5	2 2	174-187 44-46	180.5 45.0	2	61	61.0
Upper Grayling Creek 8-28-70	7	1-14	6.3	7	25-37	30.9	6 6	162-195 38-49	175.3 43.2	3	60-62	60.6
Bear Creek 7-24-70	7	0-11 (1 no teeth)	6.0	7	40-50	43.9	7 7	157-172 38-42	164.9 40.1	16	60-62	61.1
Bear Creek 7-24-70	10	3-17	10.8	10	37-50	44.4	10 10	155-181 39-45	167.9 41.8			
Two Ocean Creek 8-67	3	5-14	9.0	3	33-50	40.3	3 3	167-185 41-43	174.6 41.8	3	61-62	61.7
Yellowstone Lake summer, '67 + 10 from Atlantic Creek	16	10-46	22.3	15	33-45	39.4	16 16	161-187 37-46	179.2 40.6	12	61-63	61.7
Atlantic Creek	10	11-46	24.7	10	31-47	38.5	10 10	176-187 31-45	181.4 40.3	6	61-63	61.6
Gallatin River Drainage												
North Fork Specimen Creek 9-10-70	4	0-3 (1 no teeth)	2.0	4	29-37	33.3	4 4	169-202 39-47	186.6 43.5	4	61	61.0
East Fork Specimen Creek 9-10-70	9	1-13	4.8	9	26-33	30.4	8 8	147-196 37-50	164.7 43.3	8	60-62	61.0
Gallatin River 9-10-70	8	2-10	5.5	8	27-35	29.6	8 8	175-197 38-44	184.0 41.5	7	60-62	60.7
High Lake 9-3-70 trib. to North Fork Specimen Creek	7	0-13 (1 no teeth)	7.9	7	35-43	39.0	7 7	158-178 36-40	168.4 37.9	7	61-63	61.7


14
N. FK. SPECIMEN CRK.
HIGH LAKE
15
E. FORK SPECIMEN CRK
GALLATIN 13 RIVER
12
GRAYLING CRK.
Missouri River Basin
16
BEAR CRK.
Yellowstone Lake
2 HEART LAKE
10 FALLS RIVER
5
SPREAD CRK.
FOREST CRK.
6
POLECAT CRK.
CRAWFISH CRK
3
4
YELLOWSTONE NATIONAL PARK
Yellowstone River
TWO OCEAN CRK
17 ATLANTIC CRK.
19
PACIFIC CRK 1
18
ENOS LAKE
11
OWL CRK
Jackson Lake
Snake River
Columbia River Basin
9
GAME CRK.
Hoback River
WILLOW CRK.
8
GREYS R.
SALT R.
7