Bowman N=4
Otokomi. + bull trout data
Red Eagle
Upper, Slide

2/19/87

Bob,

Received your note and data. We're almost there! The only missing data now are for 3 lakes in Upper Missouri Basin -- Katoya, Old Man, and Morning Star Lakes. I believe these were sampled in 1979 or 1980. All three CT populations were identified as Yellowstone CT.

The attached correspondence suggests that data for these 3 lakes were separated out in 1984 to provide posterior gill raker counts — as I recall, these data were needed to complete Table 4. Perhaps this will provide a clue on where to search.

You are correct in your recent note. All of the So. Sask. lakes in Glacier contain Yellowstone CT x rainbow hybrids, so we don't need data for Otokomi, Red Eagle, Slide, etc.

So, if you can find these last 3 data sets - Katoya, Old Man, Morning Star, we've got it.

Thanks,

Leo

Department of Fishery and Wildlife Biology

Colorado State University
Fort Collins, Colorado
80523

Posterior Gillrakers

1st L. Arch

Bowman L. N=4 : 3, 1, 2, 0
range 0 - 3 mean 1.5

(Note high raker count for lewisi: 19, 21, 21, 22 but only 4 spec.)

Ketoya L. N=30 : 7, 3, 12, 13, 9, 5, 8, 10, 7, 7, 8, 4, 6, 3, 8, 9, 6, 4, 5, 4, 12, 5, 4, 13, 6, 9, 3, 6, 6, 11, Σ=203 ÷ N=30; $\bar{x}$ = 6.7666 = 6.8 / Range 3 - 13

Old Man L. N=30 : 3, 8, 10, 7, 5, 5, 6, 6, 6, 2, 5, 2, 5, 4, 6, 2, 3, 6, 4, 5, 2, 6, 5, 6, 4, 2, 3, 3, 4, 5 Σ=140 ÷ N=30; $\bar{x}$ = 4.666 = 4.7 / Range 2 - 10

Otokomi L N=26 : 4, 4, (0? not listed), 5, 3, 13, 4, 14, 13, 1, 13, 12, 10, 3, 8, (0? not listed), 12, 5, 4, 7, 3, 7, 10, 5 (two specimens posterior raker count left blank. Considering other county I doubt these two were zero - figure on basis of N=24) Σ=163, N=22; $\bar{x}$ = 7.409 R: 1 - 14

Not Wild — Red Eagle L. N=6 : 0, 1, 0, 0, 2, 0
(predominant rainbow tract)
[w/o post. rakers] 0 - 2 $\bar{x}$ .5

Lower Slide L. N=~~22~~ 17 : 10, 10, 6, 13, 5, 5, 6, 2, 9, 5, 6, 5, 3, 5, 7, 7, 7, Σ=111, N=17; $\bar{x}$ = 6.529, R=2-13

Upper Slide L. N=5 : 5, 4, 6, 5, 5
4 - 6 $\bar{x}$ 5.0

"MSL" (= Morning Star L.) N=11 : 6, 7, 5, 7, 9, 4, 8, 7, 3, 11, 6 Σ=73 N=11; $\bar{x}$ = 6.636 R: 3 - 11

Department of Fishery and Wildlife Biology

Colorado State University
Fort Collins, Colorado
80523

Dec. 5, 84

Dear Leo:

I found original data sheets (collection dates given are Oct.-Nov. 1950+- June 1950 for upper-lower slide lakes)

I copied the posterior gill raker counts off sheets on enclosed list. I assume you have pocket or desk calculator to get $\bar{x}$ values so I didn't bother figuring, but looking at values it becomes apparent that Red Eagle specimens are predominantly rainbow trout the others predominant Yellowstone w/ some RB hybridization.

Sincerely,
Bob
Happy Holidays

GNP estab. 1910

1909 - 1911 - M.S. Elrod survey - many barren lakes.

1912 - 1917 - Gt. North. R.R. actively stocked particularly eastern waters of Park. - brook, rainbow, cutthroat + kokanee

1919 - constructed Glacier substation hatch. of Bozeman - product of hatch. used solely to stocking Park waters -

Listed records only from 1912 - 1944 29,714,000 cutt fry 2,363,000 eggs, 7,600,000 rainbow, 3,363,000 brook, 51,000 mackinaw, 13,000 salar, 5,000,000 grayling, 350,000 salmon-trout (Columbia). 500,000 lake whitefish, 66,000 golden trout.

Park Serv. 1932 "objectives" - one day anglers would catch composed only of native, wild fish, uncontaminated by introduced sp. - but believed east slope + west slope waters had 2 dif. subsp. cutt. S.c.c. + S.c.b. both very.

golden trout | - L. Wordeman investigated in July Aug. 13-14. 1931 - no golden trout found. - - stocked 21,000 fingerlings Aug. 9, 1928, + 49,500 eyed eggs - July 17, 1929 - letter: W.T. Thompson to (Supt. Bozeman Hatch U.S. Bur Fish. to Earl Wissmore, Chief Ranger G.N.P. -

1915+1916 - B.S. stocking table

Belton, Avalanche Crk (1915) Lake (1916), Bowman, McDonald, Logan, McDermitt and Reynolds lakes

1915 - Bozeman -
egg taking O'Dell Crk
Meadow Crk | Madison

Yellowstone L | - but. Yellowstone shipped out, not to Bozeman

* 1913 - RB eggs taken Madison 260,000 near Ennis & McAllister

Meadow Crk
1918 - BS
1919 - RB

* Prob. MT. fish -

1972 - J. F. R. Bd. 29: 237-241 -

QH1
C743

1916 - source of B.S. eggs to Avalanche L.
1917-18 source RB eggs
- Prior 1916?

— 1916 · Bozeman 35,000 B.S. fry

* No Yellowstone output to Bozeman Yellowstone - 1,427,000 eggs 975,000 fry
Column as mention of Yellowstone → Bozeman

= Belton, Avalanche L.
indent → Bowman, McBride, Larsen, McDermott, Reynolds

1915 - B.S. - stocked same as 16

Bozeman 1915 substn but Avalanche Crk instead of Lt Distrel
O'Dell Crk.
Meadow Crk
Yellowstone L.

1913 - 2.5 mil. grayling
& 260,000 rainbows - Madison R.
near Ennis & McAllister MT.

1913 - S. c. henshawi - eggs not taken at Derby Dam
due to low water fr.
Agr. diversions

cutts — Fed. – Yellowstone L.
+ 89. on Lahontan

+ Mont. F. & G. – lewisi

+ Park waters = lewisi + bouvieri

see letter Thompson – Dissmore

1930: 54,800 golden trout C. F. G. – all in Wondeman L. near Canad. border.

1931 – all B. S. eggs for. Mont. F. & G.

1923 Rep. – 1,332,000 eggs fr. Yellowstone L. sent to Park

Park wat. ——— * 1,389,700 " taken in Glacier Park

where? – c – mention Logging L. ripe in Feb. – good source early eggs –

"1964 Anon. "Brief History". prior 1912. individ. of fish for. Fed.

1912-17 fed & state fish by Grt. Northern –

First recorded plant – 1912. ~~95000~~ brook, cutt. & rainbow

1980 –

– Impact stock

rainbow – replaced by east side

brook – – native – Waterton, St. Mary, McDonald

~~west~~ – Meckinaw + downstream

– Lake whitefish –

grayling

golden

*Kokanee – 1-2-3 park on

Lahontan

+ RB hybrid

Glacier Park -

larger fish 1920 : - Bozeman Fed. Hatch. Established Glacier Park substation.

Prior to that stocking on smaller scale w/ fish supplied by Fed. Hatch. (Bozeman) & prob. ST. -- * Mentions 1922 Rep. Yellowstone success - sim now in progress at Glacier -- * But some "success" already had occurred.

1916 : B.S. stocked in Avalanche, Bowmen, Logan, → McDonald (what source??)

more sources — 1917 : Rainbows : 30,000 in Gunsight L.

— 1918 : Rainbows. Boulder Crk., Gunsight, St. Marys R., Swift Current R. * B.S. in Reg Eagle L.

* Rainbows may be hybrids - - Meadow Crk. trib. Madison R. major egg taking site for Bozeman Hatch. - 1918 states B.S. eggs fm. Meadow Crk. - 1920 - 4,000,000 rainbow eggs taken.

clear statement 1922 - Meadow Crk. Glacier Substation incubates RB eggs fm. Meadow Crk.

* BS eggs - 2 sources Yellowstone L. = wild rainbows

+ state Montana 7 & G. + OR steelhead.

1925 Rep. photos + horse pack stocking

1926 - 1.5 mil. B.S. eggs Mont. F. & G. 350,000 of which stocked in more inaccessable headwater lakes - + Park.

- Calif. goldens - 1928 fm. C.F.G. 25,000.

1929 - Stat. enlarged, operations expand -

* - 89,500 Nev. (exchange) - early B.S. eggs - Pyramid L.

1925 rept. pp. 5, 6 Glacier stocking - horse packing

1926 - 1,486,000 B-S. eggs fm. Mont. F. & G.
350,000 of which planted in more inaccessible headwaters of Park

1928 - 25,000 Calif. golden trout fm. Cal. F. & G.

1929 - Glacier Substation hatchery enlarged & improved.
* lot of 89,500 early B-S. eggs fm. exchange w/ Nev. Fish. Comm.

1930 - 54,800 Calif. golden eggs fm. C. F. & G.
planted in L. Wurdeman near Canad. border
Wurdeman

1931 - all B.S. eggs fm. Mont. F. & G.

→ what source B.S. 1916 ?

Gl. Lever. (1895) 1893 collection - suggest all one sp. - coastwise form as S. mykiss gairdneri.

* - In same vol. Jordan - S. m. gairdneri. S. m. irideus -

Author Index - K. Banister 1950

- Doc. - Dept. Int., Nat. Parks Serv. - Trans. & Proc. Ser. (Proc. First. sci. conf. res. Nat. Parks)

no. 5 vol. 1 : 637-641

C-6 Glac. Rep. stocking.

QH1 36 : 552-561
C143

tw.

Wassem, R. 1979. Postglacial dispersion and present distribution of salmonid fishes in the northern Cascade Range. p. 637-641, in. R.M Linn (ed.) Proc. First Sci. Confer. Sci. Res. Nat. Parks vol. 1. - - Rainbow trout were absent from L. Chelan - Stehekin river system until stocked in 1917.

28556
I 29 91 5 no 5

Reps. U. S. Bur. Fish.

1919 - Lewisville - Antero Egg Coll. STn, Lakes Res. Black Spotted & rainbow. 1918 - Steven Lake

Gl. Park - ST. Marys & Two Medicine rivers B.S. 105,000 each

*1918-9 - Bozeman str. - 1918 B.S. eggs fm. Meadow Crk. Mont. - * - 1922 Meadow Crk. - 49,000,000 rainbow trib. Madison eggs

1918 Glacier RB - Boulder Crk., Gunsight L., St. Marys Ry, Swift Current Crk. - B.S. Reg Eagle L. 7500

1917 30000 Glacier rainbows Gunsight L.

1916 B.S. Avalanche, Beaman, Logan, McDonald

1920: Establishment of brook, brown, Loch Leven, lake, rainbows in Yellowstone Park a noteworthy success. - and similar service in Glacier Park is now in Progress

1920 Auxiliary station at Bozeman Glacier Park str.

1922 - Glacier Substation - incubate eggs fr. Meadow Crk. rainbows (Madison)

Yellowstone L. cutt. + ST. Montana + steelheads fr. OR

Glacier Park Collections
1980

1. Slide Lake
2. Red Eagle Lake
3. Otokomi Lake
4. Kintla Lake
5. Bowman Lake
6. Old Man Lake X #9+10 thrown away
7. Kotoya Lake X decomposed + thrown out

Glacier Park **OFFICE MEMO**

TO: 1923 U S Fish Comm. Rept. **Date**

FROM:

SUBJECT:

REMARKS: p. 60

"An interesting and important feature of the work planting Blackspotted trout eggs in almost inaccessable waters along Cont. Divide. 7 1,000,000 eggs planted - numerous lakes & streams - St. Marys R. & Trib., Hidden L., L. Ellen, Wilson, Grinnel, Belly R., Los, Margaret & Glenns Lks., numerous small streams.

1920 - 20,000 eggs Yellowstone → Glacier Pk.

Leadville (p. 80)
1890 - 1906 adult & yearling (Twin Lakes greenback) distrib. Yellowstone Park

1929 Rept.

Bozeman received in 1928 505,000 yellowstone + Mont. Comm. sent eggs.

- p. 815 - shipment 9,000 golden trout USFS Mont.

1929 p. 763 - Rep. spawning in Feb.-Mar. in Glacier Pk. - Bozeman people investigated Logging L. - ripe ♂ & ♀ with mature eggs found under thick ice - Great benefit of early eggs - efforts will be made to propagate at Logging L. -

~~Columbia~~

	rakers	scales	caeca	teeth
Bowman L.		34-41 (37)		1 no teeth
N=4	19-22 (20.8) *	149-181 (165.3)	28-41 (36)	3 4-9 (5.6)

post rakers 0, 1, 2, 3

*1 34 / 149 scales, 10 pelvics, 3 post. rakers 41 caeca -- no teeth

Perhaps lacustrine specialty in native?

Kintla L.

N=4 large spec. 324-425 mm

1	gotted --	40-49 (43.5)	—	—	—
		151-189 (174.3)			

Missouri

Marias R. drain.

Old Man L.	18-23 (20.5)	35-47 (40.9)	very poor 23-47 (34.9)	2-24 (9.3)
slight rainbow? N=30	2-7 post	149-200 (169.4)	ca. 35-40	
	ca 4-5 - some rainbow?			
Ratoya L.	19-22 (20.5)	35-45 (39.9)	31-59 (44.1)	3-27 (16.4)
N=30	3-13 post. ca. 8 - 4-5 more post.	159-194 (174.9)		
Typ. Yellowstone pure?				

So. Saskatchewan

St. Marys

Red Eagle	19-21 (19.5)	27-37 (31.5)	37-52 (44.8)	5 no teeth
Rainbow N=6		125-149 (136)		1 w/ one

Otokomi	18-21 (19.9)	42-53 (45.9)	22-39 (32.9) ?	3-25 (13.2)
? pure N=26	3-14	160-210 (181.4)	± 3 35	
Slide ? — lower N=17	18-21 (19.7) 2-10	40-46 (43.3) 160-185 (171.6)	33-58 (42.8)	1-33 (12.2)
upper N=5	20-21 (20.4) 5-6	41-51 (44) 163-200 (177.6)	37-58 (42.8)	11-19 (15)
middle N=11	19-22 (20) 3-11	38-46 (42) 164-202 (182.7)	36-43 (39.5)	3-23 (10.2)

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat (Glacier NP) LOCALITY Bowman Lake

COLLECTED BY Leo Marnell DATE 1980

Cat. # _____ Measurements by Eric Wagner DATE 28 Oct 1980

Specimen #	1	2	4	3				
Total L.	285	288	303	196				
Standard L.	342	239	254	163				
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	7 / 1	8 / 1	8 / 2	8 / 0				
(lower)	12 / 2	14 / 0	13 / 0	13 / 0				
(total)	19	22	21	21				
Branchiostegal rays right								
(left)								
Dorsal rays	10 B	9 B	9 B	10 B				
Anal rays	9 B	8 B	8 B	9 B				
Pectoral fin rays	13	14	14	14				
Scales in lateral line								
Scales above lateral line	34	39	41	34				
Scales 2 rows above lat.	149	173	181	158				
Pelvic fin rays	10	9	9	9				
Pyloric caeca	41	38	28	37				
Dentition	0	9	4	4				
	Good							
	spotting							

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY GLACIER NP Kin~~caid~~tla L.

COLLECTED BY Leo Marnell DATE 1980

Cat. # Measurements by Eric Wagner DATE 28 Oct 1980

Specimen #

	1	2	3	4				
Total L.	395	425	357	324				
Standard L.	340	354	290	274				
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)								
(lower)								
(total)								
Branchiostegal rays right								
(left)								
Dorsal rays	9B	10B	9B	9B				
Anal rays	8B	8B	8B	9B				
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	44	41	49	40				
Scales 2 rows above lat.	189	151	182	175				
Pelvic fin rays	9	9	10	10				
Pyloric caeca								
Dentition								

- fine irregular spots concentrated near the tail

A few small spots on the head

lower jaw and viscera missing

Spotting good

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

GLACIER NP

SPECIES Cutthroat LOCALITY Ketoya Lake

COLLECTED BY Marnell DATE 7/17/80

Cat. # _____ Measurements by Eric Wagner DATE 13 Nov 1980

Specimen #	14	3	12	10	28	22		
Total L.	284	249	276	298	246	273		
Standard L.	242	210	230	257	210	235		
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8 | 5	8 | 2	8 | 3	9 | 5	8 | 4	7 | 4		
(lower)	13 | 2	13 | 1	13 | 9	12 | 8	14 | 5	12 | 1		
(total)	21	21	21	21	22	19		
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	41	41	42	39	42			
Scales 2 rows above lat.	178	173	176	166	159			
Pelvic fin rays	9	9	9	9	9			
Pyloric caeca	42	52	40	45	49			
Dentition	27	15	12	3	14	15		

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY Ketoya Lake

COLLECTED BY Leo Mamell DATE 7/17/1980

Cat. # _____ Measurements by Eric Wagner DATE 11 Nov, 1980

Specimen #	9	17	30	27	15	11	8	18
Total L.	273	318	203	249	249	269	252	218
Standard L.	232	272	173	212	210	230	215	185
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	7/4	7/5	8/3	8/2	7/2	8/2	7/3	7/2
(lower)	13/4	12/5	14/4	13/5	12/6	13/2	12/3	12/1
(total)	20	19	22	21	19	21	19	19
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	44	41	38	39	37	44	37	40
Scales 2 rows above lat.	185	188	188	170	171	179	165	168
Pelvic fin rays	9	9	9	9	9	9	9	9
Pyloric caeca	48	47	56	44	38	36	42	43
Dentition	25	19	15	11	14	17	21	17
	spots							
	centered near							
	tail							

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY Ketoya Lake

COLLECTED BY Leo Marnell DATE 7/17/80

Cat. # _____ Measurements by Eric Wagner DATE 11 Nov 1980

Specimen #	7	20	16	5	24	26	25	13
Total L.	258	255	286	252	281	219	239	265
Standard L.	222	215	245	216	241	188	205	226
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	9/3	7/3	8/2	8/3	8/3	8/1	9/3	8/2
(lower)	12/5	14/6	12/4	12/1	13/3	13/3	13/9	13/3
(total)	21	21	20	20	21	21	22	21
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	41	39	38	39	39	40	39	35
Scales 2 rows above lat.	179	170	162	180	194	165	171	181
Pelvic fin rays	10	10	9	9	9	9	9	9
Pyloric caeca ±3	45	37	51	45	45	44	45	45
Dentition	18	13	18	12	27	17	23	24

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY Ketoya Lake

COLLECTED BY Leo Marnell DATE 7/17/80

Cat. # _____ Measurements by Eric Wagner DATE 11 Nov 1980

Specimen #	21	1	29	23	4	2	19	6
Total L.	249	270	225	252	280	231	231	230
Standard L.	210	231	194	217	237	198	197	196
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8/2	8/9	8/2	7/3	8/2	8/4	7/3	8/4
(lower)	11/2	14/9	12/4	13/6	12/1	14/2	12/3	12/7
(total)	19	22	20	20	20	22	19	20
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	43	38	37	45	37	39	39	45
Scales 2 rows above lat.	176	173	188	164	181	173	174	176
Pelvic fin rays	9	10	9	9	9	9	9	9
Pyloric caeca	40	40	31	59	48	40	38	43
Dentition	10	14	13	13	10	12	19	24

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY Old Man Lake

COLLECTED BY Marnell DATE 1980

Cat. # _____ Measurements by Eric Wagner DATE Nov 10, 1980

Specimen #	14	21	23	15	24	17	29
Total L.	369	382	274	234	289	225	211
Standard L.	325	330	237	199	240	192	179
Body D							
Head L							
Orbit L							
Upper Jaw L							
Dors. Orig. to Snt. tip							
Dorsal fin basal L							
Dorsal fin depressed L							
Adip. fin depressed L							
Caudal peduncle D							
Caudal peduncle L							
Vertebrae							
1st Arch gillrakers (up)	7 | 1	8 | 2	7 | 3	8 | 2	8 | 3	8 | 2	7 | 3
(lower)	14 | 2	12 | 6	12 | 7	13 | 5	14 | 2	13 | 3	12 | 3
(total)	21	20	19	21	22	21	19
Branchiostegal rays right							
(left)							
Dorsal rays							
Anal rays							
Pectoral fin rays							
Scales in lateral line							
Scales above lateral line	46	39	47	42	45	38	45
Scales 2 rows above lat.	179	162	163	175	195	170	200
Pelvic fin rays	9	10	9	10	9	9	10
Pyloric caeca	40	33	39	–	–	37	–
Dentition	12	10	4	14	24	0	17

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

GLACIER NP

SPECIES Cutthroat LOCALITY Old Man Lake

COLLECTED BY Lee Marnell DATE 1980

Cat. # _____ Measurements by Eric Wagner DATE 3 Nov 1980

Specimen #

	25	8	2	22	18	16	5	
Total L.	271	Tail Brok.	343	260	221	238	265	
Standard L.	232	201	290	227	185	200	224	
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8 | 2	7 | 2	8 | 2	8 | 2	8 | 2	8 | 2	7 | 2	
(lower)	13 | 4	13 | 2	14 | 0	13 | 3	13 | 0	13 | 2	14 | 2	
(total)	21	20	22	21	21	21	21	
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	35	41	39	39	41	39	36	
Scales 2 rows above lat.	158	180	176	182	168	166	159	
Pelvic fin rays	9	10	10	9	9	10	9	
Pyloric caeca	(37)	–	(38)	(33)	–	–	(34)	
Dentition	3	13	6	12	5	17	5	

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY GLACIER NP Old Man Lake

COLLECTED BY Leo Mamell DATE 1980

Cat. # _____ Measurements by Eric Wagner DATE 3 Nov 1980

Specimen #	11	12	1	6	10	20	7	30
Total L.	204	206	239	247	204	371	215	tail broken
Standard L.	171	177	205	212	171	323	183	155
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8/5	7/2	7/2	8/4	8/2	7/3	7/2	6/3
(lower)	12/1	12/0	13/1	12/2	14/2	12/2	14/0	12/3
(total)	20	19	20	20	22	19	21	18
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	43	40	42	37	39	41	46	37
Scales 2 rows above lat.	162	171	185	171	149	152	176	167
Pelvic fin rays	9	9	10	9	9	9	10	9
Pyloric caeca	–	–	(43)	–	33	–	(47)	30
Dentition	19	6	5	14	5	20	6	3
						scattered		

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat GLACIER N.P. LOCALITY Old Man Lake

COLLECTED BY Leo Marnell DATE 1980

Cat. # _____ Measurements by Eric Cavagnaro DATE 30 Oct 1980

Specimen #	28	3	4	27	13	19	9	26
Total L.	199	410	215	225	381	222	233	209
Standard L.	166	350	184	193	327	190	197	179
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8/3	10/4	7/2	8/2	8/2	8/2	7/3	7/3
(lower)	14/2	13/2	12/2	13/0	14/1	13/1	12/1	11/2
(total)	22	23	19	21	22	21	19	18
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	41	41	39	41	40	46	43	39
Scales 2 rows above lat.	152	172	168	167	166	182	150	159
Pelvic fin rays	9	10	9	9	10	9	9	9
Pyloric caeca ±5	23	33	30	24	45	(35)	(33)	30 +2
Dentition	7	2	6 tiny	5	9	3	0	7

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

GLACIER NP

SPECIES Cutthroat LOCALITY Otokomi Lake

COLLECTED BY Leo Mamell DATE 1980

Cat. # _____ Measurements by Eric Wagner DATE 29 Oct 1980

Specimen #	13	20	7	8	25	23	21	2
Total L.	207	228	216	230	262	201	213	216
Standard L.	178	199	187	196	224	173	182	187
Body D								
Head L.								
Orbit L.								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8/2	8/3	8/	7/4	7/1	8/5	7/2	9/5
(lower)	13/2	13/1	12/	14/4	11/2	12/8	12/2	12/9
(total)	21	21	20	21	18	20	19	21
Branchiostegal rays right								
(left)								
Dorsal rays	9B	8B	9B	9B	8B	9B	9B	10B
Anal rays	9B	9B	9B	9B	9B	9B	9B	9B
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	53	45	51	44	50	45	42	44
Scales 2 rows above lat.	200	177	172	173	187	160	180	160
Pelvic fin rays	9	9	9	9	8	9	9	9
Pyloric caeca +3	30	33	35	33	38	29	32	31
Dentition	12	7	25	10	3	0	14	7
					caeca short & fat	hyb spotting		
		many specimens with good fat reserves				orange	caeca +	

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY Otakami Lake

COLLECTED BY Leo Marnell DATE 1980

Cat. # _____ Measurements by Eric Wagner DATE 30 Oct 1980

Specimen #	4	5	19	11	17	22	14	9
Total L.	230	352	191	231	199	174	235	221
Standard L.	198	295	163	197	169	151	202	190
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8 | 5	8 | 1	8 | 4	9 | 5	9 | 4	8 | 2	8 | 4	6 |
(lower)	12 | 8	13 | 0	13 | 9	11 | 7	12 | 6	11 | 1	12 | 4	12 |
(total)	20	21	21	20	21	19	20	18
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	43	46	51	45	42	47	48	51
Scales 2 rows above lat.	196	200	210	168	164	182	207	177
Pelvic fin rays	9	9	9	9	9	8	9	9
Pyloric caeca ±3	33	29	38	35	35	33	32	34
Dentition	14	22	14	4	14	4	21	20

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

GLACIER NP

SPECIES Cutthroat LOCALITY Otokomi Lake

COLLECTED BY Marnell DATE 7/ 1980

Cat. # _____ Measurements by Eric Wagner DATE 13 Nov 1980

Specimen #	6	3	24	15	10	18	26	16
Total L.	349	379	194	241	222	212	221	218
Standard L.	305	325	165	208	190	182	190	187
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	7/4	8/3	7/3	7/3	8/11	9/4	7/2	8/3
(lower)	12/8	12/2	12/1	11/4	13/2	12/3	10/8	13/2
(total)	19	20	19	18	21	21	17	21
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	46	–	43	49	42	43	42	46
Scales 2 rows above lat.	176	169	177	195	189	175	170	185
Pelvic fin rays	9	9	9	9	9	9	9	9
Pyloric caeca	34	31	33	30	34	22	39	31
Dentition	9	17	3	10	22	11	24	12

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY GLACIER NP Otakomi Lake

COLLECTED BY Marnell DATE 1980

Cat. # _____ Measurements by Eric Wagner DATE 13 NOV 1980

Specimen #	1	12						
Total L.	374	228						
Standard L.	320	194						
Body D								
Head L.								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8 | 2	8 | 3						
(lower)	12 | 6	12 | 4						
(total)	20	20						
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	47	43						
Scales 2 rows above lat.	178	190						
Pelvic fin rays	9	9						
Pyloric caeca	34	37						
Dentition	17	13						

caeca short stubby blobs

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY GLACIER NP Red Eagle Lake

COLLECTED BY _____ DATE 1980

Cat. # _____ Measurements by Eric Wagner DATE Nov 7, 1980

Specimen #	3	1	6	5	2	4		
Total L.	451	635	543	458	257	340		
Standard L.	395	550	465	385	295	288		
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8/0	7/0	8/0	7/0	8/1	8/0		
(lower)	13/0	12/1	12/0	12/0	11/1	11/0		
(total)	21	19	20	19	19	19		
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	33	37	28	32	32	27		
Scales 2 rows above lat.	149	139	130	131	142	125		
Pelvic fin rays	10	10	9	10	10	10	10	
Pyloric caeca	–	–	41	37	49	52		
Dentition	0	1	0	0	0	0		

short stubby caeca

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat LOCALITY GLACIER NP lower Slide Lake

COLLECTED BY Leo Mamell, Eberly DATE June 26, 1980

Cat. # _____ Measurements by Eric J Wagner DATE 4 Nov 1980

Specimen #	13	8	15	9	6	4	7	5
	Lower Slide L.				Upper			
Total L.	485	420	371	406	265	254	255	233
Standard L.	430	355	320	350	227	219	218	199
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	7/6	8/4	7/3	8/4	7/2	7/3	8/2	8/2
(lower)	12/4	12/6	10/3	12/9	13/3	12/2	12/4	12/8
(total)	19	20	18	20	20	19	20	20
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	—		45	44	44	43	42	43
Scales 2 rows above lat.	176	172	164	166	168	166	178	167
Pelvic fin rays	9	9	9	10	9	9	9	9
Pyloric caeca	45	47	38	38	40	51	41	33
Dentition	11	13	12	11	8	4	13	6
		♂						

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

GLACIER NP

SPECIES Cutthroat LOCALITY lower Slide Lake

COLLECTED BY Eberly (Leo Mansell) DATE June 26, 1980

Cat. # _____ Measurements by Eric Wagner DATE 6 Nov 1980

Specimen #	1	16	10	12	2	11	18	14	17
Total L.	268	253	325	324	261	235	240	168	175
Standard L.	226	220	282	286	222	198	203	139	148
Body D									
Head L									
Orbit L									
Upper Jaw L									
Dors. Orig. to Snt. tip									
Dorsal fin basal L									
Dorsal fin depressed L									
Adip. fin depressed L									
Caudal peduncle D									
Caudal peduncle L									
Vertebrae									
1st Arch gillrakers (up)	8/3	7/2	8/2	9/1	8/2	8/3	7/4	7/3	7/4
(lower)	11/6	12/3	12/4	12/4	13/1	12/2	13/3	13/4	12/3
(total)	19	19	20	21	21	20	20	20	19
Branchiostegal rays right									
(left)									
Dorsal rays									
Anal rays									
Pectoral fin rays									
Scales in lateral line									
Scales above lateral line	46	44	44	41	40	45	44	40	45
Scales 2 rows above lat.	180	176	182	172	169	160	182	154	185
Pelvic fin rays	9	10	10	9	9	9	9	9	9
Pyloric caeca	58	45	35	47	34	44	45	43	43
Dentition	1	42	21	14	33	4	15	4	26
					scattered				scatter

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

GLACIER NP

SPECIES Cutthroat LOCALITY Upper Slide Lake

COLLECTED BY Eberly (Leo Mansell) DATE June 26, 1980

Cat. # Measurements by Eric Wagner DATE 4 NOV 1980

Specimen #	9	10	Lower Slide L. 3	4	2			
Total L.	446	477	389	415	485			
Standard L.	385	413	335	355	422			
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8/3	8/2	8/2	8/2	8/3			
(lower)	12/2	13/2	12/4	13/3	12/2			
(total)	20	21	20	21	20			
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	44	41	51	42	42			
Scales 2 rows above lat.	166	176	200	163	183			
Pelvic fin rays	9	9	9	10	10			
Pyloric caeca	41	37	58	38	40			
Dentition	12	11	19	15	18			
				♀				

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

GLACIER

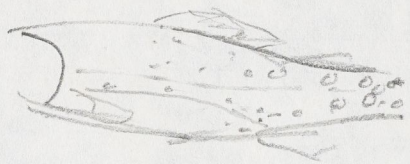
SPECIES Cutthroat LOCALITY MSL

COLLECTED BY Leo Marnell DATE 1980

Cat. # Measurements by Eric Wagner DATE 29 Oct 1980

Specimen #	4	1	6	5	8	11	7	10
Total L.	249	242	249	270	205	175	230	195
Standard L. 28	211	207	213	242	174	149	195	167
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	7/4	7/3	7/2	7/2	7/4	7/1	7/4	8/4
(lower)	14/2	12/4	13/3	12/5	12/5	12/3	13/4	12/3
(total)	21	19	20	19	19	19	20	20
Branchiostegal rays right								
(left)								
Dorsal rays	8B	8B	9B	10B	10B	8B	9B	8B
Anal rays	9B	9B	9B	9B	10B	9B	8B	9B
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	42	41	43	40	43	46	41	38
Scales 2 rows above lat.	180	168	186	179	190	181	179	188
Pelvic fin rays	8	9	8	9	9	9	9	9
Pyloric caeca	36	38	41	41	40	41	43	37
Dentition	7	3	23	8	10	8	8	12
	large spots both above + below lat. line.		large spot above + below					spots above + below

1



CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

(2)

SPECIES Cutthroat LOCALITY GLACIER NP MSL

COLLECTED BY Leo Marnell DATE 1980

Cat. # ______ Measurements by Eric Wagner DATE 29 Oct 1980

Specimen #

	2	9	3					
Total L.	250	195	206					
Standard L.	213	166	175					
Body D								
Head L								
Orbit L								
Upper Jaw L								
Dors. Orig. to Snt. tip								
Dorsal fin basal L								
Dorsal fin depressed L								
Adip. fin depressed L								
Caudal peduncle D								
Caudal peduncle L								
Vertebrae								
1st Arch gillrakers (up)	8 / 2	8 / 5	9 / 2					
(lower)	13 / 1	12 / 6	13 / 4					
(total)	21	20	22					
Branchiostegal rays right								
(left)								
Dorsal rays	10B	9B	10B					
Anal rays	10B	9B	9B					
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	45	41	42					
Scales 2 rows above lat.	193	164	202					
Pelvic fin rays	9	9	9					
Pyloric caeca	38	43	36					
Dentition	14	10	9					
			spots					
			above					
			& below					

Upper Shiste Lake	Total	L	H	M
1st Arch gillrakers	102	20	21	20.4
Scales above lat line	220	41	51	44
Scales 2 rows above 1st 884		163	200	177.6
Pyloric caeca	214	37	58	42.8
Dentition	75	11	19	15

NSL	Total	L	H	M
1st Arch gillrakers	220	19	22	20
Scales above lat line	462	38	46	42
Scales 2 rows above	2010	144	202	182.73
Pyloric caeca	434	36	43	39.45
Dentition	112	3	23	10.18

Bowl Lake	Total 83	L 19	H 22	M 20.75
1st Arch gillrakers				
Pectoral fin rays	55	L 13	H 14	M 13.75
Scales above lt line	148	L 34	H 41	M 37
Scales 2 rows above lat	661	L 149	H 181	M 165.25
Pyloric caeca	144	L 28	H 41	M 36
Dentition	17	L (1.0) 4	H 9	M 5.4

Kincaid L

	T	L 40	H 49	M 43.5
Scales above bt line	174			
Scales 2 rows above bt line	697	L 151	H 189	M 174.25

Kelaya Lake

1st Arch gillrakers	total 614	L 19	H 22	M	20.46
Scales — above lat line	total 1158	L 35	H 45	M	39.93
Scales 2 rows above lat line	total 5073	L 159	H 194	M	174.9
Pyloric caeca	total 1278	L 31	H 59	M	44.06
Dentition	total 492	L 3	H 27	M	16.4

Old Man Lake Gl. N.P.

1ST Arch gillrakers	total 614	L 18	H 23	M	20.46
Scales above lat line	total 1227	L 35	H 47	M	40.9
Scales 2 rows above lat line	total 5082	L 149	H 200	M	169.4
Pyloric caeca	total 492	L 28	H 47	M	34.85
Dentition	total 259	(2-0) L 2	H 24	M	9.25

Otakomi Lake

1st Arch gillrakers	total 517	L 18	H 21	M	19.88
Scales above lat line	total 1148	L 42	H 53	M	45.92
Scales 2 rows above line	total 4717	L 160	H 210	M	181.42
Pyloric caeca	Total 855	L 22	H 39	M	32.88
Dentition	Total 329	(1-0) L 3	H 25	M	13.16

Red Eagle Lake

	total	L	H	M
1st Arch gillrakers	117	19	21	19.5
Scales above lat line	189	27	37	31.5
Scales 2 rows above 1st	816	125	149	134
Pyloric caeca	179	37	52	44.75
Dentition (5-0)	1	1	1	1

Upper Slide Lake (52)

	total	L	H	M
1st Arch gillrakers	437	18	21	19.86
Scales above lat line	870	40	51	43.5
Scales 2 rows above 1st	3805	154	200	172.95
Pyloric caeca	941	33	58	42.77
Dentition	283	1	33	12.86

Lower Slide Lake

	Total	L	H	M
1st Arch gillrakers	335	18	21	19.70
Scales above lat line	650	40	46	43.33
Scales 2 rows above 1st	2917	140	185	171.59
Pyloric caeca	727	33	58	42.76
Dentition	208	1	33	12.23

* Jim Roscoe – data from Pikes Peak most N. Mich. coll. – teeth (+ original)
– rakers
– caeca
– scales

Trappers – 165-220 (191) 39-47 (42-43)
teeth 2-10 (6.6)
caeca 35-63 (42.3)
rakers 18-22 (20.1)

Lake North Mich. specimens

Pikes Peak
teeth
caeca (35, 38, 40, 41, 43, 45, 45, 46, 47) – 57-63
rakers

17	18	19	20
2	1	1	6

scales 169-205 44-47

	* 5	* 4	* 7	13	14
caeca	~~87~~	68 ~~21~~	50	63	57
rakers	21	21	21	20	21
teeth	~~3~~ 4	0	6	17+	7+
scales	33-156	31-32 158	34 158		37-187-191
pelvic	9	9	9		9

(4) 171, 158, ~~152~~ 158 31-32 158 most rakers 1+2

post.

#14 nakes 21 8+13 | 3/3 |
scales 37 - 187-191
pelvic 9
teeth 7+
calcs 57

#7 nakes 21 1/1
~~teeth~~ pelvic 9
teeth - 0
calcs 50
scales 34-158

5 & 7 obvious hybrid spotting

#4 - probable hybrid spotting

13-14 more typical cutthroat

#5 8/14 22 | 3/5 tiny
pelvic 9
teeth 0
calcs 87
teeth 3-4 small
33-156

#13 7/13 3/3
20
scales 39 - 168 ca.
teeth 17+
calcs 63
3

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT 1972

SPECIES S. clarki LOCALITY N. MICHIGAN LAKE

COLLECTED BY TRDINAR DATE 1972

Cat. # _____ Measurements by ROSCOE DATE JUNE 1972

Specimen # (hybrids) 4 5 7 PP 13 PP 14 |HEADS|

Total L.								
Standard L.								
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)	8	7	7	8	8	7	8	
(lower)	13	14	14	12	13	14	12	
(total)	21	21	21	20	21	21	20	
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	33	32	34		37			
Scales 2 rows above lat.	158	156	158		189			
Pelvic fin rays	9	9	9		9			
Pyloric caeca	68	87	50	63	57	49	32	
Dentition	0	4	0	17+	7+	7	8	

GILL RAKERS	N = 7	$\bar{X}$ = 20.7	20 | 21 2 | 5
PYLORIC CAECA	N = 7	$\bar{X}$ = 58.0	RANGE 32-87
DENTITION	N = 7	$\bar{X}$ = 6.1	RANGE 0 (4) - 17+ 2/no teeth

WITHOUT HYBRIDS

GILL RAKERS	N = 4	$\bar{X}$ = 20.5	20 | 21 2 | 2
PYLORIC CAECA	N = 4	$\bar{X}$ = 50.25	32 - 63
DENTITION	N = 4	$\bar{X}$ = 9.75	7 - 17+

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT 1971

SPECIES S. clarki (PIKES PEAK) LOCALITY N. MICHIGAN LAKE

COLLECTED BY TROJNAR DATE 1971

Cat. # _____ Measurements by ROSCOE DATE JUNE 1972

Specimen #	95	92	235	91	83	224	221	
Total L.								
Standard L.								
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	8	8	8	7	7	9
(lower)	12	12	12	12	12	12	13	13
(total)	19	19	20	20	20	19	20	22
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	44	44	49	37	37	40	41	48
Scales 2 rows above lat.	184	186	172	173	173	182	160	182
Pelvic fin rays								
Pyloric caeca	40	38	41	39	—	54	31	36
Dentition	3	4	26	8	23	15	2	9
AGE	II	III	III	II	IV	III	II	

TOTALS

GILL RAKERS $N = 49$ $\bar{x} = 20.4$

17	18	19	20	21	22	23	25
3	3	8	11	14	6	5	1

PYLORIC CAECA $N = 48$ $\bar{x} = 44.98$ RANGE 31-68

DENTITION $N = 49$ $\bar{x} = 9.47$ RANGE 0(1) - 35
2 / no teeth

SCALES ABOVE LAT. L. $N = 48$ $\bar{x} = 40.56$ RANGE 30-49

SCALES 2 ROWS ABOVE LAT. L. $N = 49$ $\bar{x} = 172.47$ RANGE 130-199

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT 1971

SPECIES S. clarki (PIKES PEAK) LOCALITY N. MICHIGAN LAKE

COLLECTED BY TROJNAR DATE 1971

Cat. # _____ Measurements by ROSCOE DATE JUNE 1972

Specimen #	150	127	121	266	133	111	239	108
Total L.								
Standard L.								
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)	8	9	8	7	6	8	8	8
(lower)	13	14	12	11	11	11	12	14
(total)	21	23	20	18	17	19	20	22
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	45	37	37	35	44	44	39	34
Scales 2 rows above lat.	199	175	160	171	173	176	171	160
Pelvic fin rays								
Pyloric caeca	35	49	49	44	36	40	37	68
Dentition	8	137	8	6	1	3	9	1
AGE	II	III	III	II	II	III	III	II

1971

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES S. clarki (PIKES PEAK) LOCALITY N. MICHIGAN LAKE

COLLECTED BY TROJNAR DATE 1971

Cat. # _____ Measurements by ROSCOE DATE JUNE 1972

Specimen #	261	157	274	281	125	14	57	120
Total L.								
Standard L.								
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	8	7	9	9	7	8	8
(lower)	11	12	12	14	13	12	15	12
(total)	18	20	19	23	22	19	23	20
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	45	36	37	—	41	36	42	40
Scales 2 rows above lat.	180	155	175	169	175	180	186	184
Pelvic fin rays		?		?	?	?		
Pyloric caeca	37	58	43	38	47	59	60	49
Dentition	4	13	8	6	24	15	10	19
AGE	II	III	III	II	III	III	III	III

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT 1971

SPECIES S. clarki (PIKES PEAK) LOCALITY N. MICHIGAN LAKE

COLLECTED BY TROJNIAR DATE 1971

Cat. # _____ Measurements by ROSCOE DATE 1972 JUNE

Specimen #	167	124	265	273	260	262	11	15	16
Total L.									
Standard L.									
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)	10	8	8	9	8	8	9	8	11
(lower)	12	13	13	12	13	13	13	14	14
(total)	22	21	21	21	21	21	22	22	25
Branchiostegal rays right									
(left)									
Dorsal rays									
Anal rays									
Pectoral fin rays									
Scales in lateral line									
Scales above lateral line	38	47	46	36	42	43	32	47	40
Scales 2 rows above lat.	167	189	187	159	173	164	152	188	182
Pelvic fin rays									
Pyloric caeca	47	43	36	48	35	50	51	41	47
Dentition	4	8	4	3	6	3	0	3	35
AGE	III	III	II	III	II	II	III	IV	V

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT 1971

SPECIES S. clarki (PIKES PEAK) LOCALITY N. MICHIGAN LAKE

COLLECTED BY TROJNAR DATE 1971

Cat. # _____ Measurements by ROSCOE DATE JUNE 1972

Specimen #	99	12	59	55 ?	58	54	62	156
Total L.								
Standard L.								
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							damaged	
1st Arch gillrakers (up)	7	8	7	9	7	8	8	9
(lower)	14	13	11	14	12	12	9	14
(total)	21	21	18	23	19	20	17	23
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	41	43	41	38	37	36	39	37
Scales 2 rows above lat.	148	184	161	171	166	160	162	156
Pelvic fin rays								
Pyloric caeca	44	41	37	49	46	50	43	54
Dentition	14	5	17	5	3	5	12	15
AGE	III	III	III	III	III	III	III	III

			17	18	19	20	21	22	23	25
GILL RAKERS	N = 25	$\bar{x}$ = 20.9	1	2	3	5	7	4	4	1

PYLORIC CAECA N = 25 $\bar{x}$ = 46.1 RANGE 35 - 60

DENTITION N = 25 $\bar{x}$ = 9.7 RANGE 0 (3) - 35
1 w/o teeth

~~vert. on all~~ Pikes Peak + N. Mich L.

- ~~rest of R. Mich. big spotted~~ - gill rakers - caeca

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT 1971

SPECIES S. clarki (PIKES PEAK) LOCALITY N. MICHIGAN LAKE

COLLECTED BY TROJNAR DATE 1971

Cat. # _____ Measurements by ROSCOE DATE JUNE 1972

Specimen #	60	56	208	35	33	30	18	13
Total L.								
Standard L.								
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)	8	8	8	7	8	8	9	7
(lower)	13	12	13	12	12	13	12	10
(total)	21	20	21	19	20	21	21	17
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	38	40	44	47	44	42	30	46
Scales 2 rows above lat.	176	184	178	194	180	166	130	173
Pelvic fin rays								
Pyloric caeca	52	39	54	34	45	43	63	39
Dentition	10	9	12	6	15	25	0	7
AGE	III	III	III	III	III	III	III	III

(1)

Analysis has been completed on over 300 specimens of cutthroat trout from 28 localities comprising the area on both sides of the Continental Divide in the headwaters of the Snake River and the upper Missouri River system (Madison, Gallatin and Yellowstone drainages).

The major emphasis has been to delineate the distribution of the fine spotted cutthroat trout of the Snake River ~~and~~ attempt a hypothesis on the origins of the fine spotted and large spotted ~~spot~~ forms of cutthroat trout in the Snake River and how they maintain a large measure of genetic integrity in a continuous environment ~~and in the~~ despite fish propagation practices that ~~have~~ favored mixing of the two forms.

Although the data are still much too meager to arrive at any definitive conclusions - such as describing new subspecies - some of the findings ~~are~~ ~~whereas~~ were unexpected and of more than taxonomic interest. ~~The~~ ~~My interpretation of the data and implications for management programs are summa~~

Summary of data interpretation and implications for management programs.

The fine spotted form of the Snake River cutthroat trout ~~was~~ was probably historically limited to the Snake River and tributaries below Jackson Lake. All samples from Pacific Creek and/or above Jackson Lake are large spotted fish. This distribution pattern persists despite a long history of stocking Yellowstone Lake trout throughout the Snake River and more recent stocking of the fine spotted trout in Jackson Lake and in the Snake River above.

The failure of the fine spotted trout when stocked in Jackson Lake (on top of a lake trout population) suggest that if a cutthroat trout fishery is to be established in Jackson Lake, another source of cutthroat trout should be sought. My evaluation of data indicates that the fine spotted form was not the original native cutthroat trout of Jackson Lake - but this can not be proved unless an old museum collection can be found representing the original stock.

The sample of large spotted trout from Owl Creek, a tributary to Jackson Lake, is quite distinct in its low number of pyloric caeca. All samples from above Jackson Lake (and Pacific Creek) are recognizably distinct from all samples of fine spotted trout. None of these samples represent

(3)

Yellowstone trout, although some samples (Pacific Creek, Polecat Creek, Spirea Creek and Crawfish Creek) may have been influenced by previous introductions of Yellowstone stock. The next creel census ~~at~~ on Jackson Lake should pay particular attention to the cutthroat trout sampled - are they fine spotted trout from hatchery plants or are they larger spotted, wild fish ~~and~~ what are the ratios between the two groups? ~~are~~. This may provide an index of genetic fitness ~~as~~ related to ~~surviv~~ survival in Jackson Lake and suggest new ways to approach the problem of cutthroat trout management in Jackson Lake. Stocking of fine spotted trout from the hatchery into waters above Jackson Lake should be scrutinized. First, ~~does~~ do such plants add anything to the fishery and if so are they hybridizing with the native large spotted trout, perhaps eventually to trigger mass hybridization throughout the Snake River if environmental changes come about. If ~~it~~ ~~such an event~~ hybridization ~~lal between fine spotted and la~~ is stimulated between distinct stocks of cutthroat trout in the Snake River, who should bear the blame?

~~What was the historic downstream distribution of the fine spotted Snake River cutthroat trout?~~

Samples of fine spotted cutthroat trout from Game Creek, Willow Creek, Crow Creek and hatchery plants (The hatchery trout from Lake of the Woods are derived from ~~various sites~~ spawners taken from various sites in the Snake River and tributaries) ~~reveal~~ strongly indicate that the fine spotted Snake River cutthroat trout is not a single, homogeneous population, but consists of ~~so~~ ~~it~~ relatively discrete subpopulations. This ~~is~~ appears evident in comparing pyloric caeca counts and the number of basibranchial teeth. The number of specimens and geographical diversity of the samples is small, but the trout from Salt River system (Crow Creek) and the Hoback River drainage (Willow Creek) have many more pyloric caeca ~~than~~ (a genetically fixed trait) than ~~to~~ the Game Creek sample (40-~~59~~ 59 vs. 32-47). ~~Hatchery stock from~~ Three specimens of 1964 hatchery stock have 51-59 caeca while 18 fine spotted hatchery stock taken from Greys River and Smith Fork (Bonneville basin) in 1969 have 32-49 caeca - indicating the genetic diversity of the fine spotted trout being propagated.

The ~~co~~ historical downstream distribution of fine spotted cutthroat trout in the Snake River is not known. The native trout of the Henry's Fork of the Snake

is a large spotted cutthroat, based on Jordan's observations at Henry's Lake in 1889 and a 1970 sample from Falls River. The cutthroat trout in the disrupted streams of the Snake River lava plains, probably isolated from any Snake River connections for ~~1000's~~ thousands of years, are large spotted (based on samples from Fish Creek and Irving Creek. A collection made from Goose Creek, Nevada, the last major tributary to the Snake R. above Shoshone Falls, are very typically large-spotted. The native trout of the Bonneville basin (once exchanging fish fauna with the upper Snake River) are large spotted.

A recent discussion with Dr. David Love, U.S. Geol. Surv., Univ. Wyoming, revealed some geological events that may have played a role in the origins and zoogeography of the large spotted and fine spotted cutthroat trout and the segregation of subpopulations of the fine spotted form. An early stage of glaciation moved down the Snake River through the present Palisades Reservoir site, but the Hoback River Valley and Star Valley (Salt River) were never glaciated and could have served as refuge areas. Subsequent glaciers came only down to just below Jackson Lake. (The present range of the large spotted

cutthroat trout of the upper Snake River was glaciated but ~~that of the fine spotted form where the fine spotted form is found today~~)

Perhaps about 50,000 years ago a large landslide dike formed across the Snake River, below the junction with the Hoback and a large lake was formed for several thousand years - this would have separated trout above and below the dike and some incipient speciation would be expected - but were the trout, if present, large spotted, small spotted, or both? One clue is that when Yellowstone Lake became habitable for fishes after the glaciations, it was invaded by the large spotted form - which is still in Pacific Creek and Two Ocean Creek, indicating that the large spotted form had first access to the connections to Yellowstone Lake.

In 1970, during sampling of introduced Snake River cutthroat trout, two distinct forms were found in South Gap lake in the Snowy Range, resulting from a plant in 1968. Mr. Fred Eiserman, Wyoming Fish and Game, assured me that all cutthroat trout stocked in 1968 were from Snake River spawners (supposedly from fine spotted populations). However two perfectly distinct cutthroat trout were found

in South Gap Lake - a large spotted and a fine spotted form - there is no natural reproduction in South Gap Lake and all trout are from hatchery plants. This situation will be investigated more thoroughly, ~~about~~ because it ~~does~~ suggests that ~~the~~ fine spotted and large spotted populations may be sympatric in ~~the~~ some areas of the Snake River.

Upper Missouri Basin.

The cutthroat trout native to the Gallatin and Madison rivers of the upper Missouri drainage probably share closest affinities with the cutthroat trout of the upper Columbia River system. There are no consistant differences, however, distinguishing these trout from the large spotted trout of the upper Snake River and ~~the~~ it is possible ~~ly~~ that the upper Snake River ~~fish~~ large spotted form were derived from headwater stream transfer from the upper Missouri after the waters of the upper Snake ~~became~~ were deglaciated. Some samples indicate some rainbow trout introgression but upper Grayling Creek, above a barrier, appear to be pure cutthroat trout, and the lower caeca counts (26-35) and basibranchial teeth number (1-14) demonstrate that they are not the result of a plant of Yellowstone Lake stock. A sample from Bear Creek, tributary to Yellowstone Lake,

(8)

but long isolated from gene flow by thermal springs are not typical of the lacustrine populations in Yellowstone Lake. Buckley (1963. Fish and Wildlife Ser. Special Sci. Rept. Fish. 460) stated Bear Creek ~~was also~~ and neighboring Sedge Creek had native populations of cutthroat trout, but 50,000 Yellowstone Lake trout were stocked into Bear Creek in 1939-1940. Probably some introgression has taken place but the Bear Creek trout are still recognizeably different from Yellowstone Lake trout and probably ~~are close to the~~ closely resemble the original invader of the Yellowstone basin from the upper Snake whereas the lake population has undergone more rapid evolutionary divergence due to the selective pressures ~~exert~~ of a large lacustrine environment.

~~The precise distribution of fine spotted and large spotted populations in the Snake R. yet to be established~~

The precise distributional pattern of the original range of the fine spotted and large spotted cutthroat trout of the upper Snake River is yet to be determined.

(1) large – small sympatric
(2) discrete fine –

- Talk w/ Love -

19-20

Fine Spotted — Pacific Crk. - 38
below Jackson L. - Game Crk. -
- Willow Crk - 6
- Hoback R.
- Greys R. - hatchery
- Hatchery stock (Smith Crk 1968 +)
- Crow Crk — 2 - 51-53 ; 1966 - 3 51-59 (54.3)

Case	35-40 / 174-184	
32-47 (39)		15
40-55 (47)		6
32-47 (37.5)		18
34-49 (38.5)		
7 Salt R.		2.3 / 19

Salt - Hoback.

Big Spotted - Snake R. - Jackson L. - above. (+ Pac.)
Pacific Crk ← 4 .23-33 (26.5) - 46/181 11.2 / 11.7 . 10-25 (15.5)
* Owl Crk.
~~Crawfi~~ Polecat Crk.
Crawfish -
Spirea -
Forest Crk
Heart L.

- Other S. Trib. - Irving - Fish Crk - Goose — (Lost R. Love; higher vert. scale 1 Fo.)
- Falls R. - 340 / 20. - 38/160 + 9 0-2
Prob. same rainbow. 2+7 -

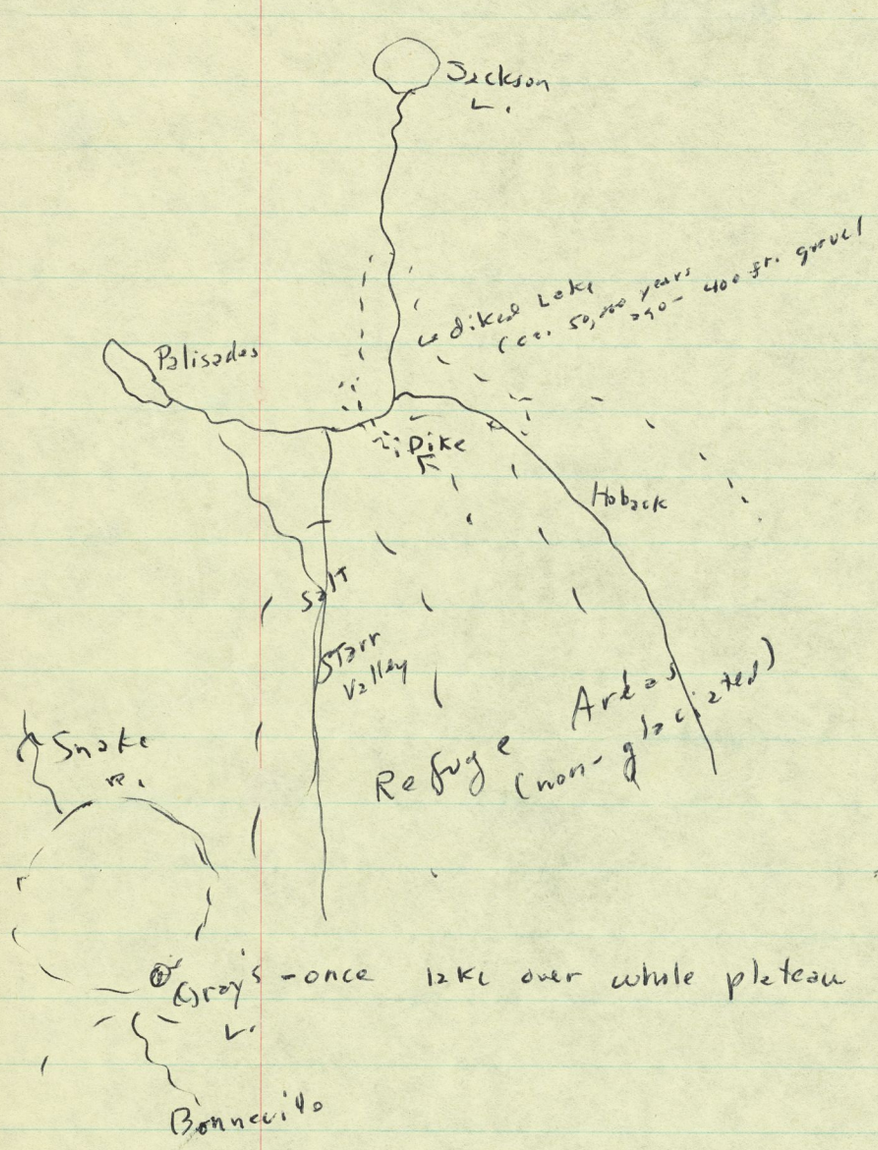
* S. Gap L.

* Hatchery procedure
L. of woods
stock.

* observe above Jackson L.

- Snake R. - Glaciation

- Meeting w/ Dr. Dave Love



- 1st glaciation - scoured out Snake R. down thru Palisades Res. area - Ice lake would have been present in Hoback Valley

- Subsequent glaciations not much below Jackson L.

- but landslide dike formed large lake for many 1000 years (400 ft. gravel deposit) - ca. 50,000 yrs. B.P.

- once lake over whole plateau

* for yellowstone glaciation timetable:
Dr. Gerald M. Richmond, U.S. Geol. Surv.
Fed. Center, Denver, Bldg. 25 - 233-3611
EXT. 8229

*- H. E. Malde, Bldg. 25, Denver Fed. Center
- The Catastrophic late Pleistocene Bonneville flood in The Snake River plain Idaho. Geol. Surv. Prof. Pap. 596 (1968)

- Steven S. Oriel - studied geology of Preston quad. - also Bldg. 25 Fed. Center.

Upper Missouri

			N	– low caeca	– med. scale		low rakers
Gallatin R.	– large spots			~~33~~			
Specimen Crk.	——	19.0	4	33	43 186		1 .2
~~E. Fk.~~ N. Fk.		19.4	9	34 30	43 164	9	4.8
~~M~~ E. Fk. High L.	——	19.7	7	39	38 168 41		7.9 1 no rakers
Gallatin R. ? vert N = 8 but only 7 $\bar{x}$ 53.1 ?		18.8	8	29	184		5.5

Madison

Grayling Crk. –	dark teeth – lower 10 pelvic rays	20	4	26-35 31	41 185	5	1 no rakers 0-18 8.4
"	prob. some hybrid	21	2	31+38	44-46 174+187	P. 10	1 no rakers 0-9
upper O.K.		19-22 20	7	25-37 30.9	38-49-43 175 162-195	7	1-14 6.3

Yellowstone L.

Bear Crk.	17-22 19.8	37-50 44	41 166		1 no rakers 0 3-17-10
Bulkley – 0-20 $\bar{x}$- 9.2	18–21				Yellowstone L 22 10-46

Bear Crk. → E. side Yellowstone L. – stocked in 1939-1940 – 50,000 cutt from Yellowstone L. – but also had native pop. –

✗ Int. between Sedge Crk. – Yellowstone

prob. more sim. to origin stream trout entering Yellowstone basin.

FSC

G.R.	SCALES ABOVE L.S.	L.S.	TEETH
17	46	—	19
19	47	171	33
20	48	162	21
20	44	156	20
19	41	155	23
19	42	176	23
20	42	174	36
20	38	146	21
20	44	186	22
21	45	173	24
21	41	165	43
20	43	151	16
19	51	167	38
19	47	181	10
21	42	158	16
19	—	—	13
19.6	44.1	165.8	23.6

FSC

COLORADO COOPERATIVE FISHERY UNIT

CAT. NO. _____ _____
NO. SPECIMENS

SPECIES _____

LOCALITY _____

_____

COLL. _____ DATE _____

RB

G.R.	SCALES ABOVE	L.S.	TEETH
20	–	–	0
20	29	137	0
19	33	126	0
19	26	122	0
19	31	115	0
20	30	127	0
19.5	29.8	125.4	0

RB

COLORADO COOPERATIVE FISHERY UNIT

CAT. NO. _____ NO. SPECIMENS _____

SPECIES _____

LOCALITY _____

_____

COLL. _____ DATE _____

DENTITION

1. North Mich. L.

Xl RANGE $\bar{X}$

2. Big South Gap L.
   1971 fish. Big-spotted

3. Big South Gap L.
   1970 fish. Big spotted

4. Big South Gap L.
   1971 fish 7ine-spotted

5. Big South Gap L.
   1970 fish 7ine spotted

	M	T	W	Th	F	
					12	13
14	15 (3)	16 (4)	17	18 (4)	19	20
21	22 (4)	23 (4)	24	25	26	27
28	29 (4)	30 (4)	1	2	3	4
5	6 (4)	7 (4)	8	9	10	

GILL RAKERS
PYLORIC CAECA
DENTITION

	Dentition			Pyloric Caeca			Gill Rakers		
	N	Range	$\bar{x}$	N	Range	$\bar{x}$	N	Range	$\bar{x}$
1971 counts (Roscoe)									
N. Michigan L. (1970)	25	2-60	29.16 exposed mouth	25	37-63	45.56	25	16-24	20.76
Big South Gap L. (1970) (A) F.S.	16		28.25 exposed				16		19.63
			↕ due to technique						
Big South Gap L. (1971) F.S.	25	10-39	22.44 (w/o exposing mouth)	29	37-57	(47.4)	26	17-22	19.97
Big South Gap L. (1970) (B) B.S.	14 15		32.00 exposed 36.66	18	37-51	(42.6)	15		20.22
Big South Gap L. (1971) B.S.	17	13-60+	33.9 not exposed but teeth large.				17	18-21	20.16
1970 counts (Schainost)									
Big South Gap L. (1970 Fish) (A) F.S.	Fine spotted 16	10-43	23.6 not exposed				16	17-21	19.6
Big South Gap L. (1970 Fish) (B) B.S.	15 Big spotted	13-75	28.5 not exposed				15	18-23	20.1

Snake R. cutts

+ Yellowstone 8-10 yr old Sr Grup L?

rakers	LOCATION	caeca	N	DENTITION RANGE	DENTITION $\bar{X}$	mouth exposed
16-24 (20.8)	North Michigan Lake	37-63 (45.6)	25	2-60	29.16	+
	Big South Gap Lake 1971 fish big-spotted		17	13-60+	33.9	⊖
N=17 18-21 (20.2)	Big South Gap Lake 1970 fish big-spotted	N=18 37-51 (42.6)	15		36.66	+
	minus#25		14		32.00	
17-22 (20.0)	Big Soubh Gap Lake 1971 fish fine-spotted	37-57 N=29 (47.4)	25	10-39	22.44	O
	Big South Gap Lake 1970 fish fine-spotted		16		28.25	+

↕ due to counting technique

* N. Mich. stocked 1968 fm. eggs at Jackson Hatchery - Apr. 16.

17-25	NORTH MICHIGAN LAKE (PIKES PEAK) 1971	31-68 (44.98)	49	0-35	9.47	O

LOCATION	GILL RAKERS	VERTEBRAE	PYLORIC CAECA	DENTITION
N. MICHIGAN LAKE 1971	17 / 18 / 19 / 20 / 21 / 22 / 23 / 25 3 / 3 / 8 / 11 / 12 / 6 / 5 / 1 N = 49 $\bar{x}$ = 20.43		RANGE 31-68 N = 48 $\bar{x}$ = 44.98	RANGE 0-35 2/no teeth N = 49 $\bar{x}$ = 9.47
N. MICHIGAN LAKE 1972	WITH HYBRIDS: 20 / 21 2 / 5 N = 7 $\bar{x}$ = 20.7 20 / 21 2 / 2 $\bar{x}$ = 20.5		WITH HYBRIDS: RANGE 32-87 N = 7 $\bar{x}$ = 58.0 WITHOUT HYBRIDS: RANGE 32-63 N = 4 $\bar{x}$ = 50.25	RANGE 0[(4)]-17+ 2/no teeth N = 7 $\bar{x}$ = 6.1 RANGE 7-17+ N = 4 $\bar{x}$ = 9.75
LAKE #5 — source for hatchery COLORADO SPRINGS 1970	17 / 18 / 19 / 20 / 21 1 / 5 / 4 / 8 / 4 N = 22 $\bar{x}$ = 19.4		RANGE 32-51 N = 21 $\bar{x}$ = 41.6	RANGE 3-17 N = 22 $\bar{x}$ = 9.0

Big spotted cutt

~~station~~ ~~— golden trout~~
~~[illegible]~~ = Calif.
— ~~Sequoia [illegible]~~

S. Gap. L. 1971

fine spotted

gill rakers N=26 — 15+26 20?

17	18	19	20	21	22
1	2	8	9	5	1

x̄ = 19.97

pyloric caeca N=25 (1 with questionable 31 not counted)

37-39	40-42	43-45	46-48	49-51	52-54	55-57
2	3	5	6	5	5	2

x̄ = ~~47.56~~ 47.41

teeth N=25 — 39-56

10-14	15-19	20-24	25-29	30-34	35-40
5	5	6	3	3	3

x̄ = 22.44

large spotted

gillrakers

18	19	20	21
1	3	5	8

N = 17 (~~19~~) — 13+17 20?
x̄ = 20.16

caeca

N=18 37-51 x̄ = 42.6

teeth N=17 13 - 60+ x̄ = 33.9
(5?)

S. Gap. L 1970

Fine spotted

17	18	19	20	21
1	0	6	6	3

N=16 = 19.63

teeth N=16 10-43 23.6 scales 38-51 (44.1)
146-186 (165.8)

---

large spotted

18	19	20	21	22	23
3	1	6	3	1	1

N=15 x̄ = 20.07

18	19	20	21	22
3	5	11	13	7

teeth N = 15 13-75 x̄ = 28.5

scales 39-45 (42.0)
144-193 (174.1)

1971 1970

8-10. size

l.s.

3-4 yr. s.s.

BIG SPOTTED

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES CUTTHROAT TROUT LOCALITY WYOMING S. GAP L. SNOWY RANGE REPUTED SNAKE R. STOCK

COLLECTED BY TROJNAR DATE AUG. 1971

Cat. # _____ Measurements by ROSCOE DATE _____

Specimen #

	94	97						
Total L.	288	305						
Standard L.								
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	8						
(lower)	12	12						
(total)	19	20						
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line								
Scales 2 rows above lat.								
Pelvic fin rays								
Pyloric caeca	51	43						
Dentition	29	57+						

BIG SPOTTED

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES CUTTHROAT TROUT LOCALITY WYOMING S. GAP L. SNOWY RANGE REPUTED SNAKE R. STOCK

COLLECTED BY TROJNAR DATE AUG. 1971

Cat. # _____ Measurements by ROSCOE DATE _____

Specimen #

	76	77	79	80	81	85	87	90
Total L.	305	295	303	330	296	251	325	327
Standard L.								
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	8	9	8	7	8	9	8
(lower)	11	13	12	12	12	13	12	12
(total)	18	21	21	20	19	21	21	20
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line								
Scales 2 rows above lat.								
Pelvic fin rays								
Pyloric caeca	50	46	43	38	38	37	47	43
Dentition	50+	5?	24	33	23+	13	45	27

BIG SPOTTED - S. GAP L. WYO.

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Cutthroat Trout LOCALITY Wyoming S. Gap Lake Snowy Range Reputed Snake River Stock

COLLECTED BY Trojnar DATE Aug. 1971

Cat. # _____ Measurements by Roscoe DATE _____

Specimen # *'s - from Trojnar's data

	50	51	56	59	68	69	70	72
Total L.	342	334	231	300	336	330	300	320
Standard L.								
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)	8	8	-	9	9	8	8	9
(lower)	11	12	-	12	12	12	13	12
(total)	19	20	-	21	21	20	21	21
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line								
Scales 2 rows above lat.								
Pelvic fin rays								
Pyloric caeca	45	42	45	37	40	42	40	40
Dentition	59+	60+	-	51	29	23	28	21

1971 COUNTS

GILL RAKERS

18	19	20	21
1	3	5	8

$N = 17$

$\bar{X} = 20.16$

PYLORIC CAECA RANGE 37-51 $N = 18$

$\bar{X} = 42.6$

DENTITION RANGE 13-60+ (5?) $N = 17$

$\bar{X} = 33.9$

VERTEBRAE $N = 9$ $\bar{X} = 61.2$

60	61	62	63
3	2	3	1

FINE SPOTTED

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES CUTTHROAT TROUT LOCALITY WYOMING S. GAP L., SNOWY RANGE REPUTED SNAKE R. STOCK

COLLECTED BY TROJNAR DATE AUG. 1971

Cat. # _____ Measurements by ROSCOE DATE _____

Specimen #

	100	101	HA	HE	HD	HL		
Total L.	195	174	-	-	-	-		
Standard L.								
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)	6	7	-	-	7	-		
(lower)	11	12	-	-	12	-		
(total)	17	19	-	-	19	-		
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line								
Scales 2 rows above lat.								
Pelvic fin rays								
Pyloric caeca	45	42	50	49	47	55		
Dentition	13	16	-	-	-	-		

FINE SPOTTED

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES CUTTHROAT TROUT LOCALITY WYOMING S. GAP L. SNOWY RANGE REPUTED SNAKE R. STOCK

COLLECTED BY TROJNAR DATE AUG. 1971

Cat. # _____ Measurements by ROSCOE DATE _____

Specimen #

	83	86	88	89	92	93	95	96
Total L.	164	184	202	218	240	231	235	220
Standard L.								
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	6	7	8	7	7	8	7
(lower)	13	12	13	12	11	12	13	12
(total)	20	18	20	20	18	19	21	19
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line								
Scales 2 rows above lat.								
Pelvic fin rays								
Pyloric caeca	38	53	45	41	47	56	47	50
Dentition	18	16	35	32	25	26+	35	24

FINE SPOTTED

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES CUTTHROAT TROUT LOCALITY WYOMING, S. GAP L., SNOWY RANGE REPUTED SNAKE R. STOCK

COLLECTED BY TROJNAR DATE AUG. 1971

Cat. # _____ Measurements by ROSCOE DATE _____

Specimen #

	63	64	65	66	71	73	78	82
Total L.	226	167	296	177	230	281	194	187
Standard L.								
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	8	7	8	7	7	7	—
(lower)	14	13	13	13	12	13	12	—
(total)	21	21	20	21	19	20	19	—
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line								
Scales 2 rows above lat.								
Pelvic fin rays								
Pyloric caeca	49	53	41	49	47	50	44	39
Dentition	14	13	21	30	21	19	22	10

FINE SPOTTED SNAKE R. cutt

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES CUTTHROAT TROUT LOCALITY WYOMING S. BAR L. SNOWY RANGE
REPUTED SNAKE R. STOCK

COLLECTED BY TROJNAR DATE AUG. 1971

Cat. # _____ Measurements by ROSCOE DATE _____

Specimen #

	52	53	54	55	57	58	60	62
Total L.	257	215	220	178	219	227	217	215
Standard L.								
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	8	8	8
(lower)	13	13	12	12	13	13	14	12
(total)	20	20	19	19	20	21	22	20
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line								
Scales 2 rows above lat.								
Pelvic fin rays								
Pyloric caeca	53	48	~~31~~	43	43	53	47	52
Dentition	23	23	36	32	—	25	18	142

1971 Counts

GILL RAKERS

17	18	19	20	21	22
1	2	8	9	5	1

$N = 26$
$\bar{X} = 19.97$

PYLORIC CAECA

37-39	40-42	43-45	46-48	49-51	52-54	55-57
2	3	5	6	6	5	2

$N = 29$ $\bar{X} = 47.41$

DENTITION

10-14	15-19	20-24	25-29	30-34	35-39
5	5	6	3	3	3

$N = 25$ $\bar{X} = 22.44$

VERTEBRAE $N = 15$ $\bar{X} = 61.6$

60	61	62	63	65
1	8	4	1	1

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES S. CLARKI - FINE SPOTTED LOCALITY N. MICHIGAN LAKE

COLLECTED BY J. TROJNAR DATE

Cat. # Measurements by J. ROSCOE DATE 11/1971

Specimen #

	243	244	270	271	275	276	277	278	242
Total L.									
Standard L.									
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)	9	9	6	9	8	8	8	8	8
(lower)	14	12	12	15	13	13	12	12	13
(total)	23	21	18	24	21	21	20	20	21
Branchiostegal rays right									
(left)									
Dorsal rays									
Anal rays									
Pectoral fin rays									
Scales in lateral line									
Scales above lateral line									
Scales 2 rows above lat.									
Pelvic fin rays									
Pyloric caeca	47	55	39	46	57	37	46	40	41
Dentition	39	19	15	4	48+	11	60+	17	34

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES S. CLARKI - FINE SPOTTED LOCALITY N. MICHIGAN LAKE

COLLECTED BY J. TROJNAR DATE

Cat. # Measurements by J. ROSCOE DATE 11/1971

Specimen #

	182	204	210	211	220	223	237	241
Total L.								
Standard L.								
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)	8	10	7	9	8	8	10	7
(lower)	14	12	12	13	14	13	12	13
(total)	22	22	19	22	22	21	22	20
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line								
Scales 2 rows above lat.								
Pelvic fin rays								
Pyloric caeca	43	60	63	40	47	48	42	38
Dentition	24	28	22	40	2	36	32	29

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

Snake R. cutts stocked 1968

SPECIES S. CLARKI - FINE SPOTTED LOCALITY N. MICHIGAN LAKE, Colo.

COLLECTED BY J. TIZNAR — 1970 DATE

Cat. # Measurements by J. ROSCOE DATE 11/1971

Specimen #

	4	53	63	64	65	82	83	181
Total L.								
Standard L.								
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)	8	10	9	8	4	8	9	6
(lower)	12	12	14	12	12	12	12	12
(total)	20	22	23	20	16 ?	20	21	18
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line								
Scales 2 rows above lat.								
Pelvic fin rays								
Pyloric caeca	46	46	47	59	39	44	49	45
Dentition	25	59	24	33	12	49+	24	43

1971 COUNTS

GILL RAKERS N = 25 $\bar{X}$ = 20.76

16	17	18	19	20	21	22	23	24
1	0	2	1	6	6	6	2	1

PYLORIC CAECA N = 25 $\bar{X}$ = 45.56 RANGE 37-63

DENTITION N = 25 $\bar{X}$ = 29.16 RANGE 2-60

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

Species S. gairdneri - S. clarki Locality BIG SOUTH GAP LAKE

Collected by John Trojnar Date 8/21/70

Cat. # _____ Measurements by SCHAINOST Date 5/7/71

Specimen #	33	34	35	36	37	38	39	40
Total L.	FSC	FSC	FSC	FSC	FSC			
Standard L								
Body D								
Head L								
Oroit L								
Upper Jaw L								
Ders. 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 gill rakers (up)	7	7	7	8	7			
(lower) (J.R. 1971)	13 (13)	12 (12)	12 (13)	13 (13)	12 (12)			
(total) (J.R. 1971)	20 (20)	19 (19)	19 (20)	21 (21)	19 (19)			
Branchiostegal rays right								
(left)								
Dorsal Rays								
Anal rays								
Pectoral fin rays								
Pelvic fin rays								
Scales in lateral line								
Scales above lateral line	43	51	47	42	—			
Scales 2 rows above lat.	151	167	181	158	—			
Scales 2 rows below lat.								
(around)								
Pyloric caeca								
Dentition	16	38	N 10	N 16	N 13			
~~Anal fin base~~ DENTITION J.R. 1971	20	41	18	14+	16			
Anal fin depressed								
Dors. Origin - caudal								
P fin - snout								
P fin caudal								
Pre orbital - Post orbital								

BIG-SPOTTED CUTTHROAT TROUT

GILL RAKERS

18	19	20	21	22	23
3	1	6	3	1	1

$\bar{x} = 20.1$

DENTITION N = 15 RANGE = 13-75 $\bar{x} = 28.5$

SCALES

ABOVE L.L. N = 10 RANGE = 39-45 $\bar{x} = 42.0$

LAT. SERIES N = 14 RANGE = 144-193 $\bar{x} = 174.1$

NOTE: COUNTS BY JR. 1971 WERE DONE AFTER DISSECTION OF HEAD FOR BETTER OBSERVATION.

DENTITION N = 15 $\bar{x} = 36.66$ N = 14 (minus #25) $\bar{x} = 32.0$

GILL RAKERS N = 15 $\bar{x} = 20.22$

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

Species S. gairdneri - S. clarki Locality BIG SOUTH GAP LAKE

Collected by John Trojnar Date 8/21/70

Cat. # _____ Measurements by SCHAINOST Date 5/7/71

Specimen #	25	26	27	28	29	30	31	32
Total L.	BSC	BSC	FSC	BSC	FSC	RB	FSC	FSC
Standard L								
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 gill rakers (up)	8	9	8	8	7	8	8	8
(lower) (JR. 1971)	12 (12)	13 (13)	12 (12)	12 (12)	13 (13)	12 (12)	13 (13)	13 (13)
(total) (JR. 1971)	20 (20)	22 (22)	20 (20)	20 (20)	20 (20)	20 (20)	21 (21)	21 (21)
Branchiostegal rays right								
(left)								
Dorsal Rays								
Anal rays								
Pectoral fin rays								
Pelvic fin rays								
Scales in lateral line								
Scales above lateral line	43	—	38	45	44	30	45	41
Scales 2 rows above lat.	168	174	146	144	186	127	173	165
Scales 2 rows below lat.								
(around)								
Pyloric caeca								
Dentition	75+	47	21	15	22	0	24	43
~~Anal fin base~~ DENTITION JR. 1971	102+	58	22	17	33	0	24	50
Anal fin depressed								
Dors. Origin - caudal								
P fin - snout								
P fin caudal								
Pre orbital - Post orbital								

FINE-SPOTTED CUTTAROAT TROUT

GILL RAKERS

17	19	20	21
1	6	6	3

$\bar{x} = 19.6$

DENTITION N= 16 RANGE= 10-43 $\bar{x} = 23.6$

SCALES

ABOVE L.L. N= 15 RANGE= 38-51 $\bar{x} = 44.1$

LAT. SERIES N= 14 RANGE= 146-186 $\bar{x} = 165.8$

NOTE: COUNTS BY J.R. 1971 WERE DONE AFTER DISSECTION OF HEAD FOR BETTER OBSERVATION.

DENTITION N= 16
$\bar{x} = 28.25$

GILL RAKERS N= 16
$\bar{x} = 19.63$

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

Species S. gairdneri - S. clarki Locality BIG SOUTH GAP LAKE

Collected by John Trojnar Date 8/21/70

Cat. # Measurements by SCHAINOST Date 5/7/71

Specimen #	17	18	19	20	21	22	23	24
Total L.	BSC	RB	BSC	BSC	BSC	BSC	BSC	RB
Standard L								
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 gill rakers (up)	8	7	7	8	7	8	9	7
(lower) (JR.1971)	12 (12)	12 (12)	11 (12)	11 (11)	11 (12)	13 (13)	14 (14)	12 (12)
(total) (JR.1971)	20 (20)	19 (19)	18 (19)	19 (18)	18 (19)	21 (21)	23 (23)	19 (19)
Branchiostegal rays right								
(left)								
Dorsal Rays								
Anal rays								
Pectoral fin rays								
Pelvic fin rays								
Scales in lateral line								
Scales above lateral line	42	26	—	43	39	—	42	31
Scales 2 rows above lat.	174	122	176	171	183	—	168	115
Scales 2 rows below lat.								
(around)								
Pyloric caeca								
Dentition	16	0	15	35	15	13	16	0
Anal fin base DENTITION JR.1971	21	0	17	47	20	17	19	0
Anal fin depressed								
Dors. Origin - caudal								
P fin - snout								
P fin caudal								
Pre orbital - Post orbital								

BS-58 DEN

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

Species S. gairdneri - S. clarki Locality Big South Gap Lake

Collected by John Trojnar Date 8/21/70

Cat. # _____ Measurements by SCHAINOST Date 5/7/71

Specimen #	9	10	11	12	13	14	15	16
Total L.	RB	FSC	FSC	FSC	BSC	BSC	BSC	FSC
Standard L								
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 gill rakers (up)	7	7	8	7	8	7	8	8
(lower) (J.R. 1971)	12 (12)	13 (13)	11 (11)	11 (11)	12 (12)	13 (14)	12 (12)	12 (12)
(total) (J.R. 1971)	19 (19)	20 (20)	19 (19)	19 (18)	20 (20)	20 (22)	20 (20)	20 (20)
Branchiostegal rays right								
(left)								
Dorsal Rays								
Anal rays								
Pectoral fin rays								
Pelvic fin rays								
Scales in lateral line								
Scales above lateral line	33	44	41	42	42	—	—	40
Scales 2 rows above lat.	126	156	155	176	183	178	188	174
Scales 2 rows below lat.								
(around)								
Pyloric caeca								
Dentition	0	20	23	23	54	28	23	36
~~Anal fin base~~ DENTITION J.R. 1971	0	21	25	23	72	32	28	38
Anal fin depressed								
Dors. Origin - caudal								
P fin - snout								
P fin caudal								
Pre orbital - Post orbital								

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES _____ LOCALITY _____

COLLECTED BY _____ DATE _____

Cat. # _____ Measurements by _____ DATE _____

Specimen #	SR 17	SR 18	SR 19	20	21	22	23	24
Total L.								
Standard L.								
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)				8	7	8	8	7
(lower)				11	12	12	11	13
(total)				19	19	20	19	20
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line				49	40	48	37	—
Scales 2 rows above lat.				192	173	170	142	—
Pelvic fin rays								
Pyloric caeca	48	52	55	32	39	35	35	38
Dentition								
	IMMATURE	IMMATURE	IMMATURE					
	♀	♀	♂					

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Salmo clarki LOCALITY No. Michigan Crk

COLLECTED BY Trujillo DATE JUNE 1975

Cat. # _____ Measurements by _____ DATE JUNE 1975

Specimen # SR 9 10 11 12 13 14 15 16 RB?

Total L.								
Standard L.								
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	8	7	8	8	8	8
(lower)	11	11	12	12	11	12	13	13
(total)	18	18	20	19	19	20	21	21
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line		41	36	39	38	41	40	32
Scales 2 rows above lat.		163	182	156	167	167	168	130
Pelvic fin rays								
Pyloric caeca		36	38	31	41	47	49	59
Dentition								
	Female Immature							

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

SPECIES Salmo Clarki LOCALITY N. Michigan CRK

COLLECTED BY Trojnar DATE

Cat. # Measurements by DATE June 1977

Specimen #

	1	2	3	4	5 SR	6	7 SR	8
Total L.								
Standard L.								
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	8	7	8	7	8	7	7
(lower)	11	13	12	12	13	11	13	12
(total)	18	21	19	20	20	19	20	19
Branchiostegal rays right								
(left)								
Dorsal rays								
Anal rays								
Pectoral fin rays								
Scales in lateral line								
Scales above lateral line	35	39	36	46		40		36
Scales 2 rows above lat.	147	145	153	166		165		198
Pelvic fin rays								
Pyloric caeca	43	40	36	41	52	32		33
Dentition					Male Immature		Female Immature	

CHARACTER ANALYSIS SHEET - COLORADO COOPERATIVE FISHERY UNIT

Species S. gairdneri - clarki Locality BIG SOUTH GAP LAKE

Collected by John Trojnar Date 8/21/70

Cat. # _____ Measurements by SCHAINOST Date 5/7/71

Specimen #	1	2	3	4	5	6	7	8
Total L.	FSC	RB	BSC	BSC	BSC	FSC	FSC	RB
Standard L								
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 gill rakers (up)	7	8	7	8	9	7	7	8
(lower) (JR 1971)	10 (10)	12 (12)	11 (11)	13 (13)	12 (12)	12 (12)	13 (13)	12 (12)
(total) (JR 1971)	17 (17)	20 (19)	18 (19)	21 (21)	21 (21)	19 (19)	20 (20)	20 (21)
Branchiostegal rays right								
(left)								
Dorsal Rays								
Anal rays								
Pectoral fin rays								
Pelvic fin rays								
Scales in lateral line								
Scales above lateral line	46	½ of Scales gone	40	41	43	47	48	29
Scales 2 rows above lat.	½ gone		164	193	174	171	162	137
Scales 2 rows below lat.								
(around)								
Pyloric caeca								
Dentition	19	0	25	20	30	~33	21	0
~~Anal fin base~~ DENTITION J.R. 1971	32	0	30	22	48	54	21	0
Anal fin depressed								
Dors. Origin - caudal								
P fin - snout								
P fin caudal								
Pre orbital - Post orbital								

	rakers	scales N = 15	teeth N=16
Fine spotted	N=15 17-21 (19.6)	38-51 (44.1) 146-186 (165.8)	10-38 (23.6)
Large spotted N=15	18-23 (20.1)	39-45 (42.0) 164-193 (174.1)	13-75 (28.5)

	N	Caeca (47.4)		
fine spotted	25	~~17-22 (20.0)~~ 19.63 (42.6)		(28.25)
big	15	(20.22)		(33)

Jim Roscoe's count - opening head and exposing bottom mouth

1. SNAKE RIVER ~~write in~~ ✓
2. Yellowstone River ~~write in~~ ✓
3. PACIFIC CREEK - 1 ✓
4. HEART LAKE - 2 ✓
5. CRAWfish CREEK - 3 · 2 coll. ✓
6. Polecat CREEK - 4 - 2 coll. ✓
7. SPIREA CREEK - 5 ✓
8. FOREST CREEK - 6 - 2 coll. ✓
9. ~~GRAYS RIVER - 7~~
10. Willow CREEK - 8 ✓
11. GAME CREEK - 9 ✓
12. HOBACK RIVER - ~~write~~ in ✓
13. FALLS RIVER - 10 ✓
14. ~~(BERRY CREEK~~
15. OWL CREEK - 11 ✓
16. GRAYLING CREEK - 12 - 2 coll.
UPPER GRAYLING CREEK
17. GALLATIN RIVER - 13 ✓
18. SPECIMEN CREEK (NORTH FORK) - 14 ✓
19. SPECIMEN CREEK (EAST FORK) - 15 ✓
20. JACKSON LAKE - write in ✓
21. Yellowstone LAKE - write in ✓
22. ~~SHOSHONE LAKE~~
23. ~~TURBID LAKE~~
24. BEAR CREEK - 16 - 2 coll ✓
25. ATLANTIC CREEK - 17 ✓
26. ENOS LAKE - 18 ✓
27. TWO OCEAN CREEK - 19 ✓

HIGH LAKE
CROW CRK - trib Salt
FISH CRK.

Smith Fk - Romeville

Crow Crk. (Salt R.)

Fish Crk
Irving Crk,
Trib Salt R.
Goose Crk

- what needed -
- coll. -
- submitted