MERISTIC ANALYSIS
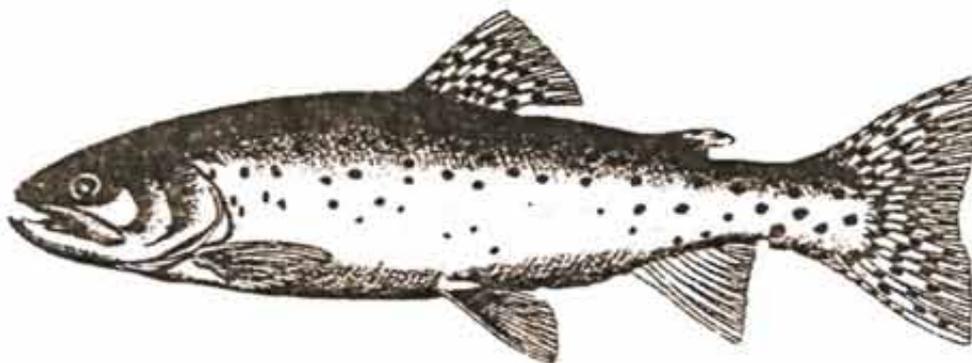
FOR BONNEVILLE AND COLORADO RIVER

CUTTHROAT TROUT

IN THE STATE OF UTAH

ANNUAL REPORT 2001

Publication Number 02-15

Kevin K. Conway, Director

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Final Report
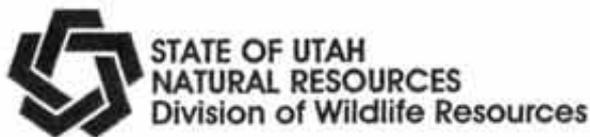May 2002

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STATE OF UTAH
NATURAL RESOURCES
Division of Wildlife Resources

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Introduction

Allendorf et al. (2001) describe hybridization as the "inbreeding of individuals from genetically distinct populations, regardless of the taxonomic status of the populations" (p. 621). For hybridization to occur species must exhibit some degree of spatial and temporal overlap during the reproductive portion of their life history. Geological and environmental barriers may prevent spatial overlap and therefore hybridization. Natural causes or human influence can stimulate hybridization. Removal of a geological barrier, a change in an environmental condition or stocking of nonnatives may allow for species to combine and potentially hybridize.

Introgressive hybridization with introduced nonnative salmonids has been identified as a concern for the native cutthroat populations in Utah. Utah has three subspecies of cutthroat trout, the Bonneville cutthroat trout (*Oncorhynchus clarki utah*), the Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*), and the Yellowstone cutthroat trout (*Oncorhynchus clarki bouvieri*). In Utah, Colorado River cutthroat trout (CRCT) were historically found in the tributaries of the Colorado River and the Green River. Bonneville cutthroat trout (BCT) were found throughout the Bonneville Basin. Yellowstone cutthroat trout were found in the Raft River drainage in the northwest corner of Utah. Nonnative salmonids stocked in Utah have had a negative effect on native cutthroat trout.

The Proposed Policy on the Treatment of Intercrosses and Intercross Progeny (50 CFR Part 424, 61 FR 26) states that conserving species under the Endangered Species Act extends to hybrids, if the progeny share traits that characterize the taxon of the listed parent, and if the progeny more closely resembles the listed parents taxon than an entity intermediate between it and the other known or suspected nonlisted parent stock (Toline and Lentsch 1999). This policy has not been finalized, but U.S. Fish and Wildlife Service supports the draft. Meristic analysis is a tool that is used to identify individuals within a population that exhibit physical characteristics resembling cutthroat trout or an intermediate between cutthroat trout and rainbow trout (*Oncorhynchus mykiss*).

The purpose for conducting meristic analysis on populations of cutthroat trout is to assist in determining the extent of hybridization in a given population. The extent of hybridization in cutthroat trout populations is being further evaluated through a review of historic stocking records and by molecular analysis.

Methods

Current methods used are described by Hudson and Davis (2000). Scales above the lateral line, lateral line scales, basibranchial teeth, and pyloric caeca character counts were used in a hybrid index formula developed by Hubbs and Kuronuma (1942) and modified by Gilbert (1978) to determine extent of hybridization. Indices for each

character, an average index of the character indices for each fish, and a population average index were determined. The hybrid index formula is as follows:

$$I_a = 100*(U_a-M_1)/(M_2-M_1)$$

where, I_a is the index value for fish$_a$, U_a is the character count for fish$_a$, M_1 is the adjusted mean of the character range for species one, and M_2 is the mean of the character range for species two.

I_a will determine if a character from fish$_a$ more closely resembles species one (I_a between 0 and 30), species two (I_a between 70 and 100), or a hybridization of one and two (I_a between 30 and 70) (Mayhew, 1983). Zero represents purity in species one and 100 represents purity in species two. I_a values less than zero or greater than one hundred occur when character values fall beyond the range of the adjusted mean values for species one and two. The character counts beyond the range of the adjusted mean values for species one and two have the same impact as the adjusted mean values, so the negative I_a values are converted to zero and those over one hundred are converted to one hundred.

Adjusted mean values were used to calculate index values in the 2001 report to maintain consistency with the 2000 report. The character range as described in Trotter (1987) and Behnke (1992), mean value of the character range, and adjusted mean value of the character range for BCT, CRCT and rainbow trout are listed in Appendix A. The mean value for a character was adjusted to ensure that the character range for species one found in the literature fell within the 0 to 30 index range. For example if a BCT had a lateral line scale count of 140 (U_a), which is the low value within the character range for BCT, and the mean values found in the literature were used in the index formula for the BCT character range (M_1=160) and for rainbow trout character range (M_2=130), the index value would be 66 indicating a hybrid range character rather than a character within the BCT range. Using the adjusted mean for lateral line scales (M_1=144.2) rather than the mean (M_1=160) in the index formula yields an index of 30, which is within the range for BCT.

Results

A summary of the index values for putative BCT and putative CRCT are found in Tables 1 and 2, respectively. One population average index out of 19 putative BCT populations was within the hybrid range. Eighteen population average indices were within the range for BCT. One population average index out of 18 putative CRCT populations was also within the hybrid range. Seventeen population average indices were within the range for CRCT.

The number and proportion of average indices for individual fish in a population within the hybrid and rainbow trout range were reported. Out of 19 BCT trout populations, five populations had all individual fish average indices within the range for BCT. Seven populations had 10 percent of the individual fish average indices within the hybrid or

Table 1. Summary data for putative Bonneville cutthroat trout populations.

Water ID	Stream name	Ave I_1	Ave I_2	Ave I_3	Ave I_4	Ave I_5	Ave I_6	Ave I_7	Ave I_8	Ave I_9	Ave I_{10}	mean	#HI	%HI	#HC/#TC	%HC
IV AP 030D 01A	Wolf Creek South Fork	1.9	1.9	3.5	0.0	0.0	31.7	0.0	4.3	0.0	5.1	4.8	1	10.0	1/40	2.5
IV AP 030D 02	Ogden River North Fork High	24.9	6.7	8.3	32.5	0.0	15.0	28.1	13.4	4.3	24.5	15.8	0	0.0	8/40	20.0
IV AP 130	Line Creek	28.5	11.0	40.7	13.2	13.2	7.9	12.1	22.9	15.0	19.7	18.4	1	10.0	10/27	37.0
IV AP 140	Deep Creek North Fork	7.9	9.9	4.3	6.7	0.0	x	x	x	x	x	5.7	0	0.0	1/17	5.9
IV AP 140	Deep Creek South Fork	35.4	39.6	27.7	11.5	11.5	x	x	x	x	x	25.1	2	40.0	7/19	36.8
IV AP 230 01	Chalk Creek Med-Low	0.0	4.8	5.9	0.0	24.2	5.1	15.8	28.5	34.1	9.5	12.8	1	10.0	6/40	15.0
IV AP 230B 01	Huff Creek	8.3	15.4	10.7	17.4	28.1	26.1	10.2	9.1	39.6	19.0	18.4	1	10.0	15/40	37.5
IV AQ 200A	Birch Creek High	13.1	5.9	7.5	42.8	3.5	19.8	5.9	3.5	19.8	9.9	13.2	1	10.0	6/40	15.0
Not Available	Petectneet Creek Right Fork	27.7	25.3	1.1	19.4	5.9	25.8	8.3	33.3	16.2	3.5	16.7	1	10.0	9/38	23.7
Not Available	Wimmer Ranch Creek	8.3	0.0	25.3	12.3	30.9	10.7	5.9	3.5	21.8	7.9	12.6	1	10.0	7/38	18.4
V AF 040A 01	Little Deer Creek South Fork	2.7	33.3	9.9	9.9	15.0	22.2	12.3	31.7	3.5	8.3	14.9	2	20.0	10/40	25.0
V AK 020B 01	Little Diamond Creek	16.2	5.9	12.3	41.2	11.5	1.9	33.3	67.0	51.7	10.7	25.2	4	40.0	13/40	32.5
V AK 020G 01	Cottonwood Creek	34.1	16.6	35.7	13.9	7.5	11.5	38.9	26.2	7.5	19.4	21.1	3	30.0	13/40	32.5
V AK 040H 01	Clear Creek Right Fork	4.3	0.0	4.3	8.3	21.4	6.7	1.1	11.5	16.6	10.7	8.5	0	0.0	7/40	17.5
VI AA 510G 01	Deep Creek	1.9	6.7	6.7	35.7	6.7	11.5	15.8	15.0	38.9	9.1	14.8	2	20.0	8/40	20.0
VI AB 050A 2	Birch Creek	15.4	14.6	13.1	12.3	11.5	13.1	18.6	27.0	15.4	15.4	15.6	0	0.0	11/40	27.5
VI AB 070A	North Creek North Fork Lower	26.4	58.3	58.4	78.2	74.2	30.1	56.1	31.4	55.0	49.4	51.8	9	90.0	24/39	61.5
VI AB 070A	North Creek North Fork Middle	8.9	34.9	1.1	1.9	1.9	39.6	26.6	30.9	11.8	9.1	16.7	3	30.0	9/39	23.1
VI AB 070A	North Creek North Fork Upper	29.3	11.5	4.3	6.7	7.5	3.5	2.7	5.9	22.6	3.5	9.7	0	0.0	3/40	7.5

Where,

0 = Bonneville cutthroat trout

30 - 70 = Hybrid

100 = Rainbow trout

Ave I_a = The average character index for the individual fish within the sample

#HI = The number of hybrid and rainbow trout range individual average indices

%HI = percent of hybrid and rainbow trout range individual fish average indices

#HC = The number of hybrid and rainbow trout range individual character indices for the sample

#TC = The total number of individual characters for the sample

%HC = The percent of hybrid and rainbow trout range individual character indices for the sample

x = Individuals too small, damaged, or absent for accurate results

Table 2. Summary data for putative Colorado River cutthroat trout populations.

Water ID	Stream name	Ave I_1	Ave I_2	Ave I_3	Ave I_4	Ave I_5	Ave I_6	Ave I_7	Ave I_8	Ave I_9	Ave I_{10}	mean	#HI	%HI	#HC/#TC	%HC
I AJ 110 C	Boulder Creek East Fork	0.0	1.1	3.6	3.6	0.0	0.0	0.0	1.5	1.8	0.3	1.2	0	0.0	0/39	0.0
I BG 03	Indian Creek	14.7	38.7	18.3	14.1	45.6	13.8	20.4	17.2	14.4	27.2	22.4	2	20.0	12/40	30.0
I BQ 050 01	Roc Creek Station A	4.5	10.7	1.1	5.1	5.9	4.3	30.9	8.3	3.5	1.1	7.5	1	10.0	3/40	7.5
I BQ 050A 01	Taylor Creek	5.5	5.7	1.1	7.5	2.9	0.5	0.0	0.3	34.8	1.1	5.9	1	10.0	1/40	2.5
I BQ 070 03	La Sal Creek	3.6	3.4	0.0	1.8	0.9	0.0	7.0	20.2	0.0	7.1	4.4	0	0.0	1/40	2.5
I BQ Not Assigned	La Sal Creek Ditch Main Diversion	5.3	4.7	42.2	14.1	9.9	11.7	11.2	44.9	7.5	33.9	18.5	3	30.0	7/40	17.5
II AI 130M 05	Lake Canyon Creek	4.1	12.5	3.5	13.6	4.3	20.0	12.2	3.5	4.5	11.9	9.0	0	0.0	5/40	12.5
II AI 130N	Nuck Woodward Creek	27.5	20.2	23.5	17.5	51.9	40.8	19.7	22.0	24.4	24.5	27.2	2	20.0	14/36	38.9
II AI 139M 01 01	Scad Valley Creek	0.0	0.0	4.2	28.6	19.1	23.2	29.4	9.3	5.5	7.6	12.7	0	0.0	5/38	13.2
II AK 100A 01	Gordon Creek North Fork	12.0	14.4	15.9	13.3	15.3	30.2	20.9	3.1	32.3	18.0	17.5	2	20.0	10/40	25.0
II AK 170A 01	Kyune Reservoir Creek	8.9	76.4	7.6	67.9	79.0	45.2	61.7	41.7	9.9	10.5	40.9	6	60.0	16/37	43.2
II AK 190B 01 A01	White River Middle Fork	6.7	4.7	17.8	25.0	11.6	5.1	8.3	15.8	5.4	3.7	10.4	0	0.0	5/40	12.5
II BB Not Assigned	Steer Gulch	1.1	0.0	2.0	9.1	11.5	6.8	12.2	5.9	21.1	5.3	7.5	0	0.0	2/40	5.0
II BE 020B 04 01	Garfield Creek	24.3	18.4	23.1	25.1	12.0	20.0	25.2	16.5	4.2	7.8	17.7	0	0.0	9/40	22.5
II BE 020D 01	Brown Duck Creek	18.8	5.6	11.1	5.3	13.5	11.8	16.5	17.4	9.6	12.4	12.2	0	0.0	9/40	22.5
II BE 1501 01	Duchesne River Little west Fork	0.0	0.0	0.0	3.3	0.0	x	x	x	x	x	0.7	0	0.0	0/20	0.0
II BE 150F 01	Vat Creek	0.0	0.3	0.0	0.0	42.7	x	x	x	x	x	8.6	1	20.0	1/14	7.1
II CJ 040B	Beaver Creek Middle Fork	4.1	3.6	2.4	0.7	0.0	25.9	x	x	x	x	6.1	0	0.0	1/23	4.3

Where,

0 = Colorado River cutthroat trout

30 - 70 = Hybrid

100 = Rainbow trout

Ave Ia = The average character index for the individual fish within the sample

#HI = The number of hybrid and rainbow trout range individual average indices

%HI = percent of hybrid and rainbow trout range individual fish average indices

#HC =The number of hybrid and rainbow trout range individual character indices for the sample

#TC = The total number of individual characters for the sample

%HC = The percent of hybrid and rainbow trout range individual character indices for the sample

x = Individuals too small, damaged, or absent for accurate results

rainbow trout range, two populations had 20 percent, two had 30 percent, two had 40 percent and one had 90 percent of the individual fish average indices in the population within the hybrid and rainbow trout range. Two BCT populations had small sample sizes and those data should be interpreted with care. Out of 18 CRCT populations, 10 populations had all individual fish average indices within the range for the CRCT. Two populations had 10 percent of the individual fish average indices within the hybrid and rainbow trout range, four populations had 20 percent, one had 30 percent, and one population had 60 percent within the hybrid and rainbow trout range. Three CRCT populations had small sample sizes.

The number and proportion of hybrid and rainbow trout range character indices in a population were also reported. The proportion of hybrid and rainbow trout range character indices is the total number of hybrid and rainbow trout range character indices in a population divided by the total number of characters counted in a population. The total number of characters counted in a population varied between populations. The number of individual fish in a sample was not always the same and sometimes characters were too damaged to count. The proportion allows for comparison across populations, but data from populations with small sample sizes and low character counts should be interpreted with care.

The results for each population are summarized below. The information has been separated into putative BCT and putative CRCT for convenience. This summary is based on the data found in Appendices B and C.

Putative Bonneville Cutthroat Trout

Wolf Creek South Fork
IV AP 030D 01A

The population average index (4.8) for Wolf Creek –South Fork was within the range for BCT. The individual fish average indices and character indices for nine out of 10 fish were within the range for BCT. One fish had an individual fish average index (31.7) within the hybrid range and a character index for basibranchial teeth within the range for rainbow trout. Of the characters counted, 2.5% of the character indices were within the hybrid range.

Odgen River - North Fork (high)
IV AP 030D 02

The population index average (15.8) for Ogden River - North Fork (high) was within the range for BCT. The individual fish average indices for nine out of 10 fish were within the range for BCT. One fish had an individual fish average index (32.5) within the hybrid range and a rainbow trout range character index for basibranchial teeth. Six additional fish had at least one hybrid or rainbow trout range character index. Of the

characters counted, 20% of the character indices were within the hybrid or rainbow trout range.

Line Creek
IV AP 130

The population index average (18.4) for Line Creek was within the range for BCT. The individual fish average indices for nine out of 10 fish were also within the range for BCT. One fish had an individual fish average index (40.7) and two character indices (scales above the lateral line and basibranchial teeth) within the hybrid range. Seven addition fish had at least one character index within the hybrid range. The fish did not preserve well, so counts were not obtained for basbranchial teeth in three fish and pyloric caeca in all 10 fish. Of the characters counted, 37% of the character indices were within the hybrid or rainbow trout range.

Deep Creek North Fork
IV AP 140

Five fish were analyzed for Deep Creek - North Fork. The population average index (5.7) and the individual fish average indices were all within the range for BCT. Scales above the lateral line and the lateral line scales were not counted in one fish due to size. Pyloric caeca was not counted in another fish. Only one individual character index for scales above the lateral line fell into the hybrid range. All other countable character indices were in the range for BCT. Of the characters counted, 5.9% of the character indices were within the hybrid range.

Deep Creek South Fork
IV AP 140

Five fish were analyzed for Deep Creek South Fork. The population average index (25.1) was within the range for BCT. Two out of five fish had hybrid range individual fish average indices (35.4 and 39.6). Three addition fish had one character range index within the hybrid or rainbow trout range. Of the characters counted, 36.8% of the character indices were within the hybrid or rainbow trout range.

Chalk Creek (medium-low)
IV AP 230 01

The population average index (12.8) for Chalk Creek (medium-low) was within the range for BCT. Nine out of 10 fish had individual fish average indices within the BCT

range. One fish had a hybrid range individual fish average index (34.1), a rainbow trout range character index for pyloric caeca and a hybrid range character index for basibranchial teeth. Three additional fish had at least one character index in the hybrid or rainbow trout range. Of the characters counted, 15% of the character indices were within the hybrid or rainbow trout range.

Huff Creek
IV AP 230B 01

The population average index (18.4) for Huff Creek was within the range for BCT. The individual fish average indices for nine out of 10 fish were also within the BCT range. One fish had a hybrid range individual fish average index (39.6). All 10 fish had at least one hybrid or rainbow trout range character index. Nine out of 10 fish had hybrid range character indices for scales above the lateral line. Of the characters counted, 37.5% of the character indices were within the hybrid or rainbow trout range.

Birch Creek High
IVAQ 200A

The population average index (13.2) for Birch Creek High was within the range for BCT range. The individual fish average indices for nine out of 10 fish were also within the range for BCT. The fish with the individual fish average index (42.8) within the hybrid range had a hybrid range character for basibranchial teeth and a rainbow trout range character for pyloric caeca. Five out of 10 fish were within the BCT range for all character indices. Four other fish had character indices within the hybrid or rainbow trout range. Of the characters counted, 15% of the character indices were within the hybrid or rainbow trout range.

Peteetneet Creek Right Fork
Spanish Fork Drainage

The population average index (16.7) for Peteetneet Creek Right Fork was within the range for BCT. The individual fish average indices for nine out of 10 fish were also within the range for BCT. The fish with the individual fish average index (33.3) within the hybrid range had a hybrid range character index for scales above the lateral line and a rainbow trout range character index for basibranchial teeth. Six other fish also had hybrid or rainbow trout range character indices. Of the characters counted, 23.7% of the character indices were within the hybrid or rainbow trout range.

Wimmer Ranch Creek
None

The population average index (12.6) for Wimmer Ranch Creek was within the range for BCT. The individual fish average indices for nine out of 10 fish were also within the BCT range. The fish with the individual fish average index (30.9) within the hybrid range had a rainbow trout range character index for basibranchial teeth. Five other fish had character indices within the hybrid range. Of the characters counted, 18.4% of the character indices were within the hybrid range.

Little Deer Creek South Fork
V AF 040A 01

The population average index (14.9) for Little Deer Creek South Fork was within the range for BCT. The individual fish average indices for eight out of 10 fish were also within the BCT range. Of the two fish that were within the hybrid range for individual fish average indices, one (33.3) had a hybrid range character index for scales above the lateral line and a rainbow trout range character index for basibranchial teeth. The other (31.7) had a rainbow trout range character index for basibranchial teeth. Six additional fish had at least one character index within the hybrid range. Of the characters counted, 25% of the character indices were within the hybrid or rainbow trout range.

Little Diamond Creek
V AK 020B 01

The population average index (25.2) for Little Diamond Creek was within the range for BCT. The individual fish average indices for six out of 10 were also within the BCT range. Four fish had hybrid range individual fish average indices (33.3, 41.2, 51.7, 67.0). Eight fish had at least one character index within the hybrid or rainbow trout range. Of the characters counted, 32.5% of the character indices were within the hybrid or rainbow trout range.

Cottonwood Creek
V AK 020G 01

The population average index (21.1) for Cottonwood Creek was within the range for BCT. The individual fish average indices for seven out of 10 fish were also within the BCT range. Three fish had individual fish average indices within the hybrid range (34.1, 35.7, and 38.9). All three fish had hybrid range character indices for scales above the lateral line and rainbow trout range character indices for basibranchial teeth. Five additional fish had at least one character index within the hybrid or rainbow trout range. Of the characters counted, 32.5% of the character indices were within the hybrid or rainbow trout range.

Clear Creek Right Fork
V AK 040H 01

The population average index (8.5) for Clear Creek Right Fork was within the range for BCT. All 10 fish were also within the BCT range for individual fish average indices. All character indices for five fish were within the range for BCT. The other five fish had at least one hybrid range character index. Of the characters counted, 17.5% of the character indices were within the hybrid or rainbow trout range.

Deep Creek
VI AA 510G

The population average index (14.8) for Deep Creek was within the range for BCT. Eight out of 10 fish were also in the BCT range for individual fish average indices. Two fish had hybrid range individual fish average indices (38.9, 35.7). The character indices for scales above the lateral line were within the hybrid range and the character indices for basibranchial teeth were within the rainbow trout range for both fish. Four additional fish had one hybrid range character index each. Of the characters counted, 20% of the character indices were within the hybrid range.

Birch Creek
VI AB 050A 2

The population average index (15.6) for Birch Creek was within the range for BCT. All 10 fish were also within the BCT range for individual fish average indices. All 10 fish had at least one character index within the hybrid or rainbow trout range. Of the characters counted, 27.5% of the character indices were within the hybrid or rainbow trout range.

North Creek Lower North Fork
VI AB 070 A

The population average index (51.8) for North Creek Lower North Fork was within the hybrid range. One out of 10 fish had an individual fish average index (26.4) within the BCT range, seven had individual fish average indices (58.3, 58.4, 30.1, 56.1, 31.4, 55.0, 49.4) within the hybrid range and two were within the rainbow trout range (78.2, 74.2). All fish had at least one hybrid or rainbow trout range character index. Of the characters counted, 61.5% of the character indices were within the hybrid or rainbow trout range.

North Creek North Fork Middle Station
VI AB 070 A

The population average index (16.7) for North Creek North Fork Middle Station was within the range for BCT. The individual fish average indices for seven out of 10 fish were also within the BCT range. Three fish were in the hybrid range for individual fish average indices (34.9, 39.6, and 30.9). Four fish had all BCT range character indices. The additional six fish had at least one character index within the hybrid or rainbow trout range. Of the characters counted, 23.1% of the character indices were within the hybrid or rainbow trout range.

North Creek North Fork Upper Station
VI AB 070 A

The population average index (9.7) for North Creek North Fork Upper Station was within the range for BCT. All 10 fish were also within the BCT range for individual fish average indices. Seven fish had all BCT range character indices. Three fish had one character index within the hybrid range or the rainbow trout range. Of the characters counted, 7.5% of the character indices were within the hybrid or rainbow trout range.

Putative Colorado River Cutthroat Trout

Boulder Creek East Fork
I AJ 110C

The population average index (1.2) for Boulder Creek East Fork was within the range for CRCT. All the individual fish average indices and all the character indices for each fish were also within the range for CRCT. Pyloric caeca were not counted for one fish.

Indian Creek
I BG 03

The population average index (22.4) for Indian Creek was within the range for CRCT. Eight out of 10 fish were within the CRCT range for individual fish average indices. Two fish were within the hybrid range for individual fish average indices (38.7, 45.6). Nine fish had at least one hybrid or rainbow trout range character index. Of the characters counted, 30% of the character indices were within the hybrid or rainbow trout range.

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Roc Creek
I BQ 050 01

The population average index (7.5) for Roc Creek was within the range for CRCT. The individual fish average indices for nine out of 10 fish were also within the CRCT. One fish had a hybrid range individual fish average index (30.9) with a rainbow trout range character index for basibranchial teeth. Two fish had hybrid range character indices for scales above the lateral line. Of the characters counted, 7.5% of the character indices were within the hybrid or rainbow trout range.

Taylor Creek
I BQ 050A01

The population average index (5.9) for Taylor Creek was within the range for CRCT. Nine out of 10 fish were within the CRCT range for individual fish average indices and individual character indices. One fish had an individual fish average index (34.8) within the hybrid range and a rainbow trout range individual character index for basibranchial teeth. Of the characters counted, 2.5% of the character indices were within the rainbow trout range.

La Sal Creek (section 3)
I BQ 070 03

The population average index (4.4) for La Sal Creek (section 3) was within the range for CRCT. All 10 fish were also within the CRCT range for individual fish average indices. Only one fish had a hybrid range character index for basibranchial teeth. All other character indices were within the CRCT range. Of the characters counted, 2.5% of the character indices were within the hybrid range.

La Sal Creek Ditch - Main Diversion
Water ID not assigned to this stream

The La Sal Creek Ditch - Main Diversion population average index (18.5) was within the range for CRCT. The individual fish average indices for seven out of 10 fish were also within the CRCT range. Three fish had hybrid range individual fish average indices (42.2, 44.9, and 33.9) with hybrid range character indices for scales above the lateral line and rainbow trout range character indices for basibranchial teeth. One other fish had a hybrid range character index for scales above the lateral line. Of the characters counted, 17.5% of the character indices were within the hybrid or rainbow trout range.

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Lake Canyon Creek
II AI 130M 05

The Lake Canyon Creek population average index (9.0) was within the range for CRCT. All 10 fish were also within the CRCT range for individual fish average indices. Four fish had one hybrid range character index. Of the characters counted, 12.5% of the character indices were within the hybrid range.

Nuck Woodward Creek
II AI 130N

The Nuck Woodward population average index (27.2) was within the range for CRCT. Eight out of 10 fish were within the CRCT range for individual fish average indices. Two fish had individual fish average indices (51.9, 40.8) within the hybrid range. Nine fish had at least one hybrid or rainbow trout range character index. Basibranchial teeth were not counted in four fish. Of the characters counted, 38.9% of the character indices were within the hybrid or rainbow trout range.

Scad Valley Creek
II AI 139M 01 01

The Scad Valley Creek population average index (12.7) was within the range for CRCT. All 10 fish were also within the CRCT range for individual fish average indices. Four fish had at least one hybrid or rainbow trout range character index. Basibranchial teeth were not counted in two fish due to damage. Of the characters counted, 13.2% of the character indices were within the hybrid or rainbow trout range.

Gordon Creek - North Fork
II AK 100A 01

The Gordon Creek – North Fork population average index (17.5) was within the range for CRCT. Eight out of 10 fish were also within the CRCT range for individual fish average indices. Two fish were in the hybrid range (30.2, 32.3) for individual fish average indices. Nine fish had at least one hybrid or rainbow trout range character index. Of the characters counted, 25% of the character indices were within the hybrid or rainbow trout range.

Kyune Reservoir Creek
II AK 170A 01

The Kyune Reservoir Creek population average index (40.9) was within the hybrid range. Four out of 10 fish for individual fish average indices and all individual character

indices were within the CRCT range. Four fish had individual fish average indices (67.9, 45.2, 61.7, and 41.7) within the hybrid range and two fish had individual fish average indices (76.4, 79.0) within the rainbow trout range. Five fish had at least one hybrid or rainbow trout character range index. Pyloric caeca were not counted in three fish. Of the characters counted, 43.2% of the character indices were within the hybrid or rainbow trout range.

White River - Middle Fork *
II AK 190 B01 A01
*(This population listed in the 2000 report (Hudson and Davis 2000), was actually White River Right Fork Upper II AK 190A)

The White River – Middle Fork population average index (10.4) was within the range for CRCT. All 10 individual fish average indices were also within the CRCT range. Five fish had at least one character index within the hybrid or rainbow trout range. Of the characters counted, 12.5% of the character indices were within the hybrid or rainbow trout range.

Steer Gulch (West Willow Creek)
None Available

The Steer Gulch (West Willow Creek) population average index (7.5) was within the range for CRCT. All 10 individual fish average indices were also within the CRCT range. Only one fish had hybrid range character indices for scales above the lateral line and lateral line scales. Of the characters counted, 5% of the character indices were within the hybrid range.

Garfield Creek
II BE 020B 04 01

The Garfield Creek population average index (17.7) was within the range for CRCT. All 10 individual fish average indices were also within the CRCT range. Seven fish had at least one hybrid or rainbow trout range character index. Of the characters counted, 22.5% of the character indices were within the hybrid or rainbow trout range.

Brown Duck Creek
II BE 020D 01

The Brown Duck Creek population average index (12.2) was within the range for CRCT. All 10 individual fish average indices were also within the CRCT range. Two fish had all CRCT range character indices. Eight fish had at least one hybrid range character

index. Of the characters counted, 22.5% of the character indices were within the hybrid range.

Little West Fork – Duchesne River
II BE 150I 01

The Little West Fork – Duchesne River population average index (0.7) was within the range for CRCT. Only five fish were available for meristic analysis. All five individual fish average indices and individual character indices were within the CRCT range.

Vat Creek
II BE 150F01

Five fish were available for meristic analysis in the Vat Creek sample. Pyloric caeca were not counted in one fish, pyloric caeca and basibranchial teeth were not counted in a second fish, and lateral line scales, pyloric caeca and basibranchial teeth were not counted in a third fish. Due to the low number of fish within the sample and the low number of characters counted per fish, care should be taken in interpreting these data. The population average index (8.6) was within the range for CRCT. The individual fish average indices for four fish were within the CRCT character range. The individual fish average index (42.7) for one fish was within the hybrid range, but the individual fish average index was based on one character index, the scales above the lateral line. Of the characters counted, 7.1% of the character indices were within the hybrid range.

Beaver Creek – Middle Fork
II CJ 040B

The Beaver Creek – Middle Fork population average index (6.1) was within the range for CRCT. Six fish were available for meristic analysis. All six individual fish average indices were also within the CRCT range. One fish had a rainbow trout character index for basibranchial teeth. All other character indices were within the CRCT range. Of the characters counted, 4.3% of the character indices were within the rainbow trout range.

Discussion

As noted in the 2000 Annual Report (Hudson and Davis 2000), there are limitations associated with interpreting the results using the hybrid index formula. The hybrid index does not take into account hybridization between cutthroat subspecies and may bias the rainbow and cutthroat trout hybridization results. Some character count ranges overlap between rainbow and cutthroat trout and between cutthroat trout subspecies.

An individual with an index close to zero is no more pure than an individual with an index close to 30. The index is an indication of how close the character counts are to the adjusted mean of the character counts found by Trotter (1987) and Behnke (1992). Individuals with hybrid range average indices may have several hybrid range character indices or one rainbow trout range character index and several cutthroat trout range character indices close to 30.

With the limitations taken into consideration, the hybrid index results indicate 17 of the populations analyzed in 2001 have indices within the range for BCT and 18 of the populations analyzed in 2001 have indices within the range for CRCT. If genetics results verify these results, those populations will be available for the conservation of BCT and CRCT in Utah.

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Appendices

Appendix A. Character ranges for Bonneville cutthroat trout, Colorado River cutthroat trout, and rainbow trout.

	Bonneville cutthroat trout			Colorado River cutthroat trout			Rainbow trout		
Character	Range (literature)	Mean	Adjusted Mean	Range (literature)	Mean	Adjusted Mean	Range (literature)	Mean	Adjusted Mean
Scales above the lateral line	38-46	42	42.7	38-48	43	42.7	26-28	27	27
Lateral line scales	140-180	160	144.2	170-205	187	187	120-140	130	130
Pyloric caeca	25-55	40	48	24-45	35	41	50-60	55	55
Basibranchial teeth	up to 90	6	3	yes	6	3	no	0	0

Appendix B

Appendix B. Putative Bonneville cutthroat trout

Population: **Wolf Creek - South Fork**
Water ID: IV AP 030D 01A
Population Average = 4.8

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	41.5	7.6	41.5	7.6	40.5	14.0	42.5	0.0	42.5	0.0
Lateral Line Scales	130.0	144.2	163.5	0.0	189.0	0.0	179.5	0.0	187.5	0.0	161.0	0.0
Gill Rakers	20.5	18.5	19.0	x	18.0	x	19.0	x	17.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	5.0	0.0	3.0	0.0	3.0	0.0	4.0	0.0
Pyloric Caeca	55.0	48.0	40.0	0.0	30.0	0.0	35.0	0.0	36.0	0.0	38.0	0.0
			Ave I_1 =	1.9	Ave I_2 =	1.9	Ave I_3 =	3.5	Ave I_4 =	0.0	Ave I_5 =	0.0

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	38.5	26.8	45.0	0.0	40.0	17.2	43.5	0.0	39.5	20.4
Lateral Line Scales	130.0	144.2	156.5	0.0	170.0	0.0	175.0	0.0	186.5	0.0	178.5	0.0
Gill Rakers	20.5	18.5	17.0	x	17.0	x	19.0	x	20.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	0.0	100.0	6.0	0.0	4.0	0.0	5.0	0.0	7.0	0.0
Pyloric Caeca	55.0	48.0	37.0	0.0	43.0	0.0	39.0	0.0	38.0	0.0	36.0	0.0
			Ave I_6 =	31.7	Ave I_7 =	0.0	Ave I_8 =	4.3	Ave I_9 =	0.0	Ave I_{10} =	5.1

$I_a = 100 * [(U_a - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout
B = the adjusted mean of the character range for Bonneville cutthroat trout
U_a = the raw character count for each fish
I_a = the character hybrid index for each fish
Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **Ogden River - North Fork (high)**
Water ID: IV AP 030D 02
Population Average = 15.8

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	37.5	33.1	38.5	26.8	37.5	33.1	38.0	29.9	43.0	0.0
Lateral Line Scales	130.0	144.2	151.5	0.0	176.5	0.0	165.0	0.0	159.0	0.0	157.0	0.0
Gill Rakers	20.5	18.5	18.0	x	21.0	x	17.0	x	21.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	1.0	66.7	4.0	0.0	8.0	0.0	0.0	100.0	8.0	0.0
Pyloric Caeca	55.0	48.0	40.0	0.0	47.0	0.0	44.0	0.0	38.0	0.0	42.0	0.0
			Ave I_1 =	24.9	Ave I_2 =	6.7	Ave I_3 =	8.3	Ave I_4 =	32.5	Ave I_5 =	0.0

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	38.5	26.8	38.5	26.8	39.5	20.4	40.0	17.2	38.5	26.8
Lateral Line Scales	130.0	144.2	156.5	0.0	179.5	0.0	161.5	0.0	169.0	0.0	173.0	0.0
Gill Rakers	20.5	18.5	18.0	x	19.0	x	21.0	x	17.0	x	21.0	x
Basibranchial Teeth	0.0	3.0	2.0	33.3	3.0	0.0	2.0	33.3	8.0	0.0	5.0	0.0
Pyloric Caeca	55.0	48.0	43.0	0.0	54.0	85.7	45.0	0.0	36.0	0.0	53.0	71.4
			Ave I_6 =	15.0	Ave I_7 =	28.1	Ave I_8 =	13.4	Ave I_9 =	4.3	Ave I_{10} =	24.5

$I_a = 100 * [(U_a - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

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Appendix B. Putative Bonneville cutthroat trout

Population: **Line Creek**
Water ID: IV AP 130
Population Average = 18.4

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	34.5	52.2	37.5	33.1	34.0	55.4	36.5	39.5	36.5	39.5
Lateral Line Scales	130.0	144.2	174.0	0.0	169.0	0.0	159.0	0.0	172.0	0.0	191.0	0.0
Gill Rakers	20.5	18.5	19.0	x	x	x	17.0	x	20.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	2.0	33.3	3.0	0.0	1.0	66.7	4.0	0.0	5.0	0.0
Pyloric Caeca	55.0	48.0	x	x	x	x	x	x	x	x	x	x
			Ave I_1 =	28.5	Ave I_2 =	11.0	Ave I_3 =	40.7	Ave I_4 =	13.2	Ave I_5 =	13.2

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	39.0	23.6	37.0	36.3	35.5	45.9	38.0	29.9	36.5	39.5
Lateral Line Scales	130.0	144.2	179.0	0.0	170.0	0.0	171.5	0.0	172.0	0.0	162.5	0.0
Gill Rakers	20.5	18.5	19.0	x	19.0	x	17.0	x	18.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	5.0	0.0	x	x	x	x	x	x
Pyloric Caeca	55.0	48.0	x	x	x	x	x	x	x	x	x	x
			Ave I_6 =	7.9	Ave I_7 =	12.1	Ave I_8 =	22.9	Ave I_9 =	15.0	Ave I_{10} =	19.7

$I_a = 100 * [(U_a - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **Deep Creek_NF**
Water ID: IV AP 140
Population Average = 5.7

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	39.0	23.6	36.5	39.5	40.0	17.2	38.5	26.8	x	x
Lateral Line Scales	130.0	144.2	173.5	0.0	181.5	0.0	181.0	0.0	178.0	0.0	x	x
Gill Rakers	20.5	18.5	18.0	x	21.0	x	20.0	x	20.0	x	x	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	4.0	0.0	7.0	0.0	6.0	0.0	4.0	0.0
Pyloric Caeca	55.0	48.0	x	x	40.0	0.0	x	0.0	43.0	0.0	46.0	0.0
			Ave I_1 =	7.9	Ave I_2 =	9.9	Ave I_3 =	4.3	Ave I_4 =	6.7	Ave I_5 =	0.0

$I_a = 100 * [(U_a - B)/(R - B)]$
where, R = the mean of the c
B = the adjusted mean of the character range for Bonneville cutthroat trout
U_a = the raw character count for each fish
I_a = the character hybrid index for each fish
Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **Deep Creek-SF**
Water ID: IV AP 140
Population Average = 25.1

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	36.5	39.5	33.5	58.6	41.0	10.8	35.5	45.9	35.5	45.9
Lateral Line Scales	130.0	144.2	174.0	0.0	154.5	0.0	180.0	0.0	155.5	0.0	158.5	0.0
Gill Rakers	20.5	18.5	19.0	x	20.0	x	19.0	x	20.0	x	x	x
Basibranchial Teeth	0.0	3.0	1.0	66.7	0.0	100.0	0.0	100.0	5.0	0.0	3.0	0.0
Pyloric Caeca	55.0	48.0	x	x	35.0	0.0	38.0	0.0	37.0	0.0	44.0	0.0
			Ave I_1 =	35.4	Ave I_2 =	39.6	Ave I_3 =	27.7	Ave I_4 =	11.5	Ave I_5 =	11.5

$I_a = 100 * [(U_a - B)/(R-B)]$

where, R = the mean of the c

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **Chalk Creek - (medium-low)**
Water ID: IV AP 230 01
Population Average = 12.8

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	45.0	0.0	40.0	17.2	39.0	23.6	43.0	0.0	36.5	39.5
Lateral Line Scales	130.0	144.2	161.5	0.0	167.5	2.0	173.0	0.0	174.0	0.0	156.5	0.0
Gill Rakers	20.5	18.5	19.0	x	19.0	x	18.0	x	20.0	x	21.0	x
Basibranchial Teeth	0.0	3.0	8.0	0.0	3.0	0.0	7.0	0.0	10.0	0.0	3.0	0.0
Pyloric Caeca	55.0	48.0	41.0	0.0	47.0	0.0	39.0	0.0	37.0	0.0	52.0	57.1
			Ave I_1 =	0.0	Ave I_2 =	4.8	Ave I_3 =	5.9	Ave I_4 =	0.0	Ave I_5 =	24.2

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	39.5	20.4	39.5	20.4	40.5	14.0	40.0	17.2	39.0	23.6
Lateral Line Scales	130.0	144.2	150.5	0.0	165.0	0.0	168.5	0.0	182.5	0.0	163.0	0.0
Gill Rakers	20.5	18.5	21.0	x	20.0	x	20.0	x	18.0	x	21.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	8.0	0.0	7.0	0.0	2.0	33.3	4.0	0.0
Pyloric Caeca	55.0	48.0	44.0	0.0	51.0	42.9	56.0	100.0	54.0	85.7	49.0	14.3
			Ave I_6 =	5.1	Ave I_7 =	15.8	Ave I_8 =	28.5	Ave I_9 =	34.1	Ave I_{10} =	9.5

$I_a = 100 * [(U_a-B)/(R-B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

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Appendix B. Putative Bonneville cutthroat trout

Population: **Huff Cr.**
Water ID: IV AP 230B 01
Population Average = 18.4

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	37.5	33.1	33.0	61.8	36.0	42.7	37.0	36.3	35.5	45.9
Lateral Line Scales	130.0	144.2	165.0	0.0	157.0	0.0	157.5	0.0	166.0	0.0	160.5	0.0
Gill Rakers	20.5	18.5	18.0	x	17.0	x	19.0	x	18.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	4.0	0.0	3.0	0.0	4.0	0.0	2.0	33.3	1.0	66.7
Pyloric Caeca	55.0	48.0	38.0	0.0	39.0	0.0	43.0	0.0	40.0	0.0	44.0	0.0
			Ave I_1 =	8.3	Ave I_2 =	15.4	Ave I_3 =	10.7	Ave I_4 =	17.4	Ave I_5 =	28.1

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	37.5	33.1	41.5	7.6	37.0	36.3	33.5	58.6	36.0	42.7
Lateral Line Scales	130.0	144.2	175.0	0.0	155.5	0.0	161.5	0.0	150.5	0.0	166.0	0.0
Gill Rakers	20.5	18.5	20.0	x	18.0	x	20.0	x	16.0	x	17.0	x
Basibranchial Teeth	0.0	3.0	6.0	0.0	2.0	33.3	6.0	0.0	0.0	100.0	2.0	33.3
Pyloric Caeca	55.0	48.0	53.0	71.4	40.0	0.0	36.0	0.0	36.0	0.0	41.0	0.0
			Ave I_6 =	26.1	Ave I_7 =	10.2	Ave I_8 =	9.1	Ave I_9 =	39.6	Ave I_{10} =	19.0

$I_a = 100 * [(U_a-B)/(R-B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

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Appendix B. Putative Bonneville cutthroat trout

Population: **Birch Creek - High**
Water ID: IV AQ 200A
Population Average = 13.2

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	34.5	52.2	39.0	23.6	38.0	29.9	42.0	4.5	40.5	14.0
Lateral Line Scales	130.0	144.2	166.5	0.0	169.5	0.0	169.5	0.0	170.5	0.0	172.5	0.0
Gill Rakers	20.5	18.5	17.0	x	18.0	x	18.0	x	17.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	6.0	0.0	10.0	0.0	1.0	66.7	15.0	0.0
Pyloric Caeca	55.0	48.0	45.0	0.0	38.0	0.0	42.0	0.0	55.0	100.0	46.0	0.0
			Ave I_1 =	13.1	Ave I_2 =	5.9	Ave I_3 =	7.5	Ave I_4 =	42.8	Ave I_5 =	3.5

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	41.5	7.6	39.0	23.6	40.5	14.0	41.5	7.6	36.5	39.5
Lateral Line Scales	130.0	144.2	179.5	0.0	179.0	0.0	183.0	0.0	175.5	0.0	163.5	0.0
Gill Rakers	20.5	18.5	19.0	x	19.0	x	18.0	x	18.0	x	17.0	x
Basibranchial Teeth	0.0	3.0	7.0	0.0	7.0	0.0	4.0	0.0	5.0	0.0	3.0	0.0
Pyloric Caeca	55.0	48.0	53.0	71.4	33.0	0.0	45.0	0.0	53.0	71.4	48.0	0.0
			Ave I_6 =	19.8	Ave I_7 =	5.9	Ave I_8 =	3.5	Ave I_9 =	19.8	Ave I_{10} =	9.9

$I_a = 100 * [(U_a-B)/(R-B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

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Appendix B. Putative Bonneville cutthroat trout

Population: **Peteetneet Cr.- RF**
Water ID: None (Spanish Fork Drainage)
Population Average = 16.7

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	41.0	10.8	36.0	42.7	42.0	4.5	41.0	10.8	39.0	23.6
Lateral Line Scales	130.0	144.2	172.0	0.0	154.5	0.0	188.0	0.0	185.0	0.0	177.5	0.0
Gill Rakers	20.5	18.5	19.0	x	21.0	x	19.0	x	18.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	0.0	100.0	2.0	33.3	6.0	0.0	1.0	66.7	4.0	0.0
Pyloric Caeca	55.0	48.0	40.0	0.0	x	x	43.0	0.0	46.0	0.0	41.0	0.0
			Ave I_1 =	27.7	Ave I_2 =	25.3	Ave I_3 =	1.1	Ave I_4 =	19.4	Ave I_5 =	5.9

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	41.0	10.8	43.0	0.0	37.5	33.1	32.5	65.0	40.5	14.0
Lateral Line Scales	130.0	144.2	169.5	0.0	200.0	0.0	193.0	0.0	152.5	0.0	196.0	0.0
Gill Rakers	20.5	18.5	20.0	x	18.0	x	19.0	x	22.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	1.0	66.7	2.0	33.3	0.0	100.0	6.0	0.0	4.0	0.0
Pyloric Caeca	55.0	48.0	x	x	48.0	0.0	37.0	0.0	41.0	0.0	38.0	0.0
			Ave I_6 =	25.8	Ave I_7 =	8.3	Ave I_8 =	33.3	Ave I_9 =	16.2	Ave I_{10} =	3.5

$I_a = 100 * [(U_a - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

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Appendix B. Putative Bonneville cutthroat trout

Population: **Wimmer Ranch Creek**
Water ID: none given
Population Average = 12.6

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	37.5	33.1	42.5	0.0	36.0	42.7	35.0	49.0	39.0	23.6
Lateral Line Scales	130.0	144.2	192.0	0.0	181.5	0.0	151.0	0.0	159.0	0.0	165.5	0.0
Gill Rakers	20.5	18.5	20.0	x	19.0	x	20.0	x	18.0	x	17.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	4.0	0.0	2.0	33.3	4.0	0.0	0.0	100.0
Pyloric Caeca	55.0	48.0	42.0	0.0	43.0	0.0	x	x	39.0	0.0	44.0	0.0
			Ave I_1 =	8.3	Ave I_2 =	0.0	Ave I_3 =	25.3	Ave I_4 =	12.3	Ave I_5 =	30.9

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	36.0	42.7	39.0	23.6	40.5	14.0	39.5	20.4	39.0	23.6
Lateral Line Scales	130.0	144.2	154.0	0.0	178.0	0.0	170.5	0.0	166.0	0.0	159.0	0.0
Gill Rakers	20.5	18.5	19.0	x	19.0	x	19.0	x	20.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	4.0	0.0	8.0	0.0	7.0	0.0	1.0	66.7	x	x
Pyloric Caeca	55.0	48.0	43.0	0.0	41.0	0.0	35.0	0.0	38.0	0.0	37.0	0.0
			Ave I_6 =	10.7	Ave I_7 =	5.9	Ave I_8 =	3.5	Ave I_9 =	21.8	Ave I_{10} =	7.9

$I_a = 100 * [(U_a-B)/(R-B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **Little Deer Creek - South Fork**
Water ID: V AF 040A 01
Population Average = 14.9

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	41.0	10.8	37.5	33.1	36.5	39.5	36.5	39.5	38.5	26.8
Lateral Line Scales	130.0	144.2	187.0	0.0	155.0	0.0	172.5	0.0	146.0	0.0	162.0	0.0
Gill Rakers	20.5	18.5	19.0	x	19.0	x	20.0	x	20.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	20.0	0.0	0.0	100.0	5.0	0.0	3.0	0.0	2.0	33.3
Pyloric Caeca	55.0	48.0	40.0	0.0	36.0	0.0	40.0	0.0	42.0	0.0	40.0	0.0
			Ave I_1 =	2.7	Ave I_2 =	33.3	Ave I_3 =	9.9	Ave I_4 =	9.9	Ave I_5 =	15.0

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	34.0	55.4	35.0	49.0	38.5	26.8	40.5	14.0	37.5	33.1
Lateral Line Scales	130.0	144.2	162.0	0.0	174.5	0.0	166.0	0.0	169.5	0.0	170.5	0.0
Gill Rakers	20.5	18.5	19.0	x	19.0	x	20.0	x	20.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	2.0	33.3	4.0	0.0	0.0	100.0	11.0	0.0	6.0	0.0
Pyloric Caeca	55.0	48.0	34.0	0.0	39.0	0.0	44.0	0.0	37.0	0.0	43.0	0.0
			Ave I_6 =	22.2	Ave I_7 =	12.3	Ave I_8 =	31.7	Ave I_9 =	3.5	Ave I_{10} =	8.3

$I_a = 100 * [(U_a - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

30

Appendix B. Putative Bonneville cutthroat trout

Population: **Little Diamond Creek**
Water ID: V AK 020B 01
Population Average = 25.2

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	32.5	65.0	39.0	23.6	35.0	49.0	32.5	65.0	35.5	45.9
Lateral Line Scales	130.0	144.2	178.5	0.0	155.5	0.0	167.5	0.0	151.5	0.0	161.0	0.0
Gill Rakers	20.5	18.5	20.0	x	18.0	x	18.0	x	18.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	4.0	0.0	3.0	0.0	0.0	100.0	5.0	0.0
Pyloric Caeca	55.0	48.0	47.0	0.0	36.0	0.0	36.0	0.0	44.0	0.0	37.0	0.0
			Ave I_1 =	16.2	Ave I_2 =	5.9	Ave I_3 =	12.3	Ave I_4 =	41.2	Ave I_5 =	11.5

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	41.5	7.6	37.5	33.1	32.0	68.2	29.5	84.1	36.0	42.7
Lateral Line Scales	130.0	144.2	164.5	0.0	165.0	0.0	147.5	0.0	143.0	8.5	170.5	0.0
Gill Rakers	20.5	18.5	19.0	x	19.0	x	20.0	x	17.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	0.0	100.0	0.0	100.0	0.0	100.0	4.0	0.0
Pyloric Caeca	55.0	48.0	39.0	0.0	31.0	0.0	55.0	100.0	49.0	14.3	36.0	0.0
			Ave I_6 =	1.9	Ave I_7 =	33.3	Ave I_8 =	67.0	Ave I_9 =	51.7	Ave I_{10} =	10.7

$I_a = 100 * [(U_a - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

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Appendix B. Putative Bonneville cutthroat trout

Population: **Cottonwood Creek**
Water ID: V AK 020G 01
Population Average = 21.1

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	37.0	36.3	37.5	33.1	36.0	42.7	37.5	33.1	38.0	29.9
Lateral Line Scales	130.0	144.2	157.0	0.0	156.5	0.0	151.0	0.0	141.0	22.5	160.5	0.0
Gill Rakers	20.5	18.5	19.0	x	18.0	x	18.0	x	19.0	x	17.0	x
Basibranchial Teeth	0.0	3.0	0.0	100.0	2.0	33.3	0.0	100.0	7.0	0.0	4.0	0.0
Pyloric Caeca	55.0	48.0	46.0	0.0	43.0	0.0	36.0	0.0	36.0	0.0	28.0	0.0
			Ave I_1 =	34.1	Ave I_2 =	16.6	Ave I_3 =	35.7	Ave I_4 =	13.9	Ave I_5 =	7.5

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	35.5	45.9	37.5	33.1	31.5	71.3	38.0	29.9	30.5	77.7
Lateral Line Scales	130.0	144.2	157.0	0.0	141.0	22.5	165.0	0.0	144.5	0.0	150.5	0.0
Gill Rakers	20.5	18.5	19.0	x	18.0	x	18.0	x	19.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	0.0	100.0	2.0	33.3	3.0	0.0	4.0	0.0
Pyloric Caeca	55.0	48.0	35.0	0.0	35.0	0.0	33.0	0.0	41.0	0.0	37.0	0.0
			Ave I_6 =	11.5	Ave I_7 =	38.9	Ave I_8 =	26.2	Ave I_9 =	7.5	Ave I_{10} =	19.4

$I_x = 100 * [(U_x - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_x = the raw character count for each fish

I_x = the character hybrid index for each fish

Ave I_x = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

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Appendix B. Putative Bonneville cutthroat trout

Population: **Clear Creek - RF**

Water ID: V AK 040I1 01

Population Average = 8.5

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	40.0	17.2	47.5	0.0	40.0	17.2	37.5	33.1	34.5	52.2
Lateral Line Scales	130.0	144.2	176.0	0.0	194.5	0.0	184.0	0.0	165.5	0.0	175.5	0.0
Gill Rakers	20.5	18.5	20.0	x	21.0	x	19.0	x	19.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	5.0	0.0	11.0	0.0	3.0	0.0	2.0	33.3
Pyloric Caeca	55.0	48.0	39.0	0.0	38.0	0.0	41.0	0.0	43.0	0.0	38.0	0.0
			Ave I_1 =	4.3	Ave I_2 =	0.0	Ave I_3 =	4.3	Ave I_4 =	8.3	Ave I_5 =	21.4

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	38.5	26.8	42.0	4.5	35.5	45.9	37.5	33.1	36.0	42.7
Lateral Line Scales	130.0	144.2	178.5	0.0	177.0	0.0	170.5	0.0	178.5	0.0	174.5	0.0
Gill Rakers	20.5	18.5	18.0	x	19.0	x	20.0	x	17.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	9.0	0.0	7.0	0.0	6.0	0.0	2.0	33.3	5.0	0.0
Pyloric Caeca	55.0	48.0	37.0	0.0	35.0	0.0	48.0	0.0	46.0	0.0	37.0	0.0
			Ave I_6 =	6.7	Ave I_7 =	1.1	Ave I_8 =	11.5	Ave I_9 =	16.6	Ave I_{10} =	10.7

$I_a = 100 * [(U_a-B)/(R-B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville

30 - 70 = Hybrid

100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **Deep Creek**
Water ID: **VI AA 510G**
Population Average = 14.8

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	41.5	7.6	38.5	26.8	38.5	26.8	36.0	42.7	38.5	26.8
Lateral Line Scales	130.0	144.2	163.5	0.0	161.5	0.0	156.0	0.0	161.0	0.0	159.0	0.0
Gill Rakers	20.5	18.5	20.0	x	20.0	x	20.0	x	19.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	6.0	0.0	3.0	0.0	6.0	0.0	0.0	100.0	4.0	0.0
Pyloric Caeca	55.0	48.0	42.0	0.0	41.0	0.0	41.0	0.0	37.0	0.0	42.0	0.0
			Ave I_1 =	1.9	Ave I_2 =	6.7	Ave I_3 =	6.7	Ave I_4 =	35.7	Ave I_5 =	6.7

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	35.5	45.9	38.0	29.9	38.5	26.8	34.0	55.4	37.0	36.3
Lateral Line Scales	130.0	144.2	147.0	0.0	161.0	0.0	156.5	0.0	151.0	0.0	149.5	0.0
Gill Rakers	20.5	18.5	19.0	x	20.0	x	21.0	x	20.0	x	20.0	x
Basibranchial Teeth	0.0	3.0	4.0	0.0	2.0	33.3	2.0	33.3	0.0	100.0	5.0	0.0
Pyloric Caeca	55.0	48.0	41.0	0.0	41.0	0.0	42.0	0.0	37.0	0.0	41.0	0.0
			Ave I_6 =	11.5	Ave I_7 =	15.8	Ave I_8 =	15.0	Ave I_9 =	38.9	Ave I_{10} =	9.1

$I_a = 100 * [(U_a - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **Birch Creek**
Water ID: VI AB 050A 2
Population Average = 15.6

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	33.0	61.8	33.5	58.6	34.5	52.2	35.0	49.0	35.5	45.9
Lateral Line Scales	130.0	144.2	152.5	0.0	153.2	0.0	150.5	0.0	151.0	0.0	151.0	0.0
Gill Rakers	20.5	18.5	20.0	x	18.0	x	18.0	x	20.0	x	20.0	x
Basibranchial Teeth	0.0	3.0	7.0	0.0	11.0	0.0	12.0	0.0	16.0	0.0	4.0	0.0
Pyloric Caeca	55.0	48.0	47.0	0.0	35.0	0.0	41.0	0.0	43.0	0.0	42.0	0.0
			Ave I_1 =	15.4	Ave I_2 =	14.6	Ave I_3 =	13.1	Ave I_4 =	12.3	Ave I_5 =	11.5

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	34.5	52.2	31.0	74.5	31.0	74.5	33.0	61.8	33.0	61.8
Lateral Line Scales	130.0	144.2	151.5	0.0	151.0	0.0	155.0	0.0	149.0	0.0	166.5	0.0
Gill Rakers	20.5	18.5	19.0	x	18.0	x	18.0	x	21.0	x	20.0	x
Basibranchial Teeth	0.0	3.0	8.0	0.0	11.0	0.0	2.0	33.3	5.0	0.0	8.0	0.0
Pyloric Caeca	55.0	48.0	42.0	0.0	39.0	0.0	43.0	0.0	37.0	0.0	38.0	0.0
			Ave I_6 =	13.1	Ave I_7 =	18.6	Ave I_8 =	27.0	Ave I_9 =	15.4	Ave I_{10} =	15.4

$I_a = 100 * [(U_a-B)/(R-B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **North Creek Lower North Fork**
Water ID: VI AB 070 A
Population Average = 51.8

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	30.5	77.7	37.5	33.1	28.0	93.6	29.0	87.3	27.5	96.8
Lateral Line Scales	130.0	144.2	144.0	1.4	148.5	0.0	138.5	40.1	136.5	54.2	148.0	0.0
Gill Rakers	20.5	18.5	18.0	x	16.0	x	18.0	x	18.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	*	x	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
Pyloric Caeca	55.0	48.0	34.0	0.0	57.0	100.0	44.0	0.0	53.0	71.4	57.0	100.0
			Ave I_1 =	26.4	Ave I_2 =	58.3	Ave I_3 =	58.4	Ave I_4 =	78.2	Ave I_5 =	74.2

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	39.5	20.4	30.0	80.9	31.5	71.3	28.5	90.4	32.0	68.2
Lateral Line Scales	130.0	144.2	179.5	0.0	138.0	43.7	136.5	54.2	140.0	29.6	140.0	29.6
Gill Rakers	20.5	18.5	17.0	x	17.0	x	18.0	x	17.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	0.0	100.0	0.0	100.0	5.0	0.0	0.0	100.0	0.0	100.0
Pyloric Caeca	55.0	48.0	38.0	0.0	38.0	0.0	33.0	0.0	34.0	0.0	38.0	0.0
			Ave I_6 =	30.1	Ave I_7 =	56.1	Ave I_8 =	31.4	Ave I_9 =	55.0	Ave I_{10} =	49.4

$I_a = 100 * [(U_a-B)/(R-B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **NF-North Creek-Middle Station**
Water ID: **VI AB 070 A**
Population Average = 16.7

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	38.5	26.8	36.5	39.5	42.0	4.5	41.5	7.6	41.5	7.6
Lateral Line Scales	130.0	144.2	157.0	0.0	145.0	0.0	178.0	0.0	183.0	0.0	178.5	0.0
Gill Rakers	20.5	18.5	20.0	x	18.0	x	17.0	x	18.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	*	x	0.0	100.0	4.0	0.0	6.0	0.0	8.0	0.0
Pyloric Caeca	55.0	48.0	46.0	0.0	40.0	0.0	45.0	0.0	39.0	0.0	43.0	0.0
			Ave I_1 =	8.9	Ave I_2 =	34.9	Ave I_3 =	1.1	Ave I_4 =	1.9	Ave I_5 =	1.9

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	33.5	58.6	32.0	68.2	39.0	23.6	40.5	14.0	37.0	36.3
Lateral Line Scales	130.0	144.2	152.5	0.0	143.5	4.9	189.0	0.0	187.0	0.0	170.0	0.0
Gill Rakers	20.5	18.5	19.0	x	18.0	x	18.0	x	17.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	0.0	100.0	2.0	33.3	0.0	100.0	2.0	33.3	7.0	0.0
Pyloric Caeca	55.0	48.0	42.0	0.0	42.0	0.0	46.0	0.0	44.0	0.0	42.0	0.0
			Ave I_6 =	39.6	Ave I_7 =	26.6	Ave I_8 =	30.9	Ave I_9 =	11.8	Ave I_{10} =	9.1

$I_a = 100 * [(U_a - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix B. Putative Bonneville cutthroat trout

Population: **North Fork-North Creek-Upper Station**
Water ID: VI AB 070 A
Population Average = 9.7

Character	R	B	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	40.0	17.2	35.5	45.9	40.0	17.2	38.5	26.8	38.0	29.9
Lateral Line Scales	130.0	144.2	163.0	0.0	161.0	0.0	165.5	0.0	171.5	0.0	177.5	0.0
Gill Rakers	20.5	18.5	20.0	x	18.0	x	18.0	x	17.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	0.0	100.0	5.0	0.0	13.0	0.0	10.0	0.0	10.0	0.0
Pyloric Caeca	55.0	48.0	43.0	0.0	36.0	0.0	40.0	0.0	42.0	0.0	41.0	0.0
			Ave I_1 =	29.3	Ave I_2 =	11.5	Ave I_3 =	4.3	Ave I_4 =	6.7	Ave I_5 =	7.5

Character	R	B	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	40.5	14.0	41.0	10.8	39.0	23.6	39.0	23.6	40.5	14.0
Lateral Line Scales	130.0	144.2	174.5	0.0	165.0	0.0	165.5	0.0	167.0	0.0	171.5	0.0
Gill Rakers	20.5	18.5	20.0	x	*	x	18.0	x	19.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	6.0	0.0	11.0	0.0	9.0	0.0	1.0	66.7	3.0	0.0
Pyloric Caeca	55.0	48.0	48.0	0.0	42.0	0.0	40.0	0.0	43.0	0.0	41.0	0.0
			Ave I_6 =	3.5	Ave I_7 =	2.7	Ave I_8 =	5.9	Ave I_9 =	22.6	Ave I_{10} =	3.5

$I_a = 100 * [(U_a - B)/(R - B)]$

where, R = the mean of the character range for rainbow trout

B = the adjusted mean of the character range for Bonneville cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Bonneville
30 - 70 = Hybrid
100 = Rainbow

Appendix C

Appendix C. Putative Colorado River cutthroat trout

Population: **East Fork - Boulder Creek**
Water ID: I AJ 110C
Population Average = 1.2

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	45.5	0.0	46.5	0.0	49.0	0.0	44.0	0.0	48.0	0.0
Lateral Line Scales	130.0	187.0	188.0	0.0	184.5	4.4	206.0	0.0	192.5	0.0	194.5	0.0
Gill Rakers	20.5	19.0	19.0	x	18.0	x	19.0	x	18.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	6.0	0.0	5.0	0.0	7.0	0.0	10.0	0.0	4.0	0.0
Pyloric Caeca	55.0	41.0	41.0	0.0	38.0	0.0	43.0	14.3	43.0	14.3	40.0	0.0
			Ave I_1 =	0.0	Ave I_2 =	1.1	Ave I_3 =	3.6	Ave I_4 =	3.6	Ave I_5 =	0.0

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	52.0	0.0	47.5	0.0	47.5	0.0	45.5	0.0	42.5	1.3
Lateral Line Scales	130.0	187.0	199.5	0.0	197.5	0.0	183.5	6.1	183.0	7.0	191.5	0.0
Gill Rakers	20.5	19.0	19.0	x	19.0	x	19.0	x	18.0	x	20.0	x
Basibranchial Teeth	0.0	3.0	10.0	0.0	6.0	0.0	9.0	0.0	14.0	0.0	6.0	0.0
Pyloric Caeca	55.0	41.0	40.0	0.0	*	x	33.0	0.0	41.0	0.0	41.0	0.0
			Ave I_6 =	0.0	Ave I_7 =	0.0	Ave I_8 =	1.5	Ave I_9 =	1.8	Ave I_{10} =	0.3

$I_a = 100 * [(U_a - C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

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Appendix C. Putative Colorado River cutthroat trout

Population: **Indian Creek**
Water ID: I BG 03
Population Average = 22.4

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	38.0	29.9	38.5	26.8	35.5	45.9	37.0	36.3	35.0	49.0
Lateral Line Scales	130.0	187.0	170.5	28.9	171.0	28.1	171.5	27.2	175.5	20.2	168.0	33.3
Gill Rakers	20.5	19.0	18.0	x	20.0	x	20.0	x	19.0	x	21.0	x
Basibranchial Teeth	0.0	3.0	4.0	0.0	0.0	100.0	6.0	0.0	3.0	0.0	0.0	100.0
Pyloric Caeca	55.0	41.0	41.0	0.0	37.0	0.0	29.0	0.0	38.0	0.0	36.0	0.0
			Ave I_1 =	14.7	Ave I_2 =	38.7	Ave I_3 =	18.3	Ave I_4 =	14.1	Ave I_5 =	45.6

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	40.0	17.2	39.0	23.6	36.0	42.7	37.5	33.1	36.0	42.7
Lateral Line Scales	130.0	187.0	169.5	30.7	154.0	57.9	172.0	26.3	173.0	24.6	161.5	44.7
Gill Rakers	20.5	19.0	19.0	x	21.0	x	20.0	x	20.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	9.0	0.0	9.0	0.0	10.0	0.0	4.0	0.0	4.0	0.0
Pyloric Caeca	55.0	41.0	42.0	7.1	35.0	0.0	40.0	0.0	39.0	0.0	44.0	21.4
			Ave I_6 =	13.8	Ave I_7 =	20.4	Ave I_8 =	17.2	Ave I_9 =	14.4	Ave I_{10} =	27.2

$I_a = 100 * [(U_a - C)/(R - C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

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Appendix C. Putative Colorado River cutthroat trout

Population: **Roc Creek**

Water ID: **I BQ 050 01**

Population Average = 7.5

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	41.0	10.8	36.0	42.7	42.0	4.5	39.5	20.4	39.0	23.6
Lateral Line Scales	130.0	187.0	193.0	0.0	194.0	0.0	199.0	0.0	202.5	0.0	199.0	0.0
Gill Rakers	20.5	19.0	19.0	x	19.0	x	18.0	x	21.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	5.0	0.0	5.0	0.0	9.0	0.0	11.0	0.0	13.0	0.0
Pyloric Caeca	55.0	41.0	42.0	7.1	30.0	0.0	36.0	0.0	25.0	0.0	33.0	0.0
			Ave I_1 =	4.5	Ave I_2 =	10.7	Ave I_3 =	1.1	Ave I_4 =	5.1	Ave I_5 =	5.9

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	40.0	17.2	39.0	23.6	37.5	33.1	40.5	14.0	42.0	4.5
Lateral Line Scales	130.0	187.0	195.5	0.0	199.5	0.0	200.5	0.0	200.5	0.0	205.5	0.0
Gill Rakers	20.5	19.0	18.0	x	20.0	x	19.0	x	19.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	10.0	0.0	0.0	100.0	8.0	0.0	22.0	0.0	5.0	0.0
Pyloric Caeca	55.0	41.0	30.0	0.0	31.0	0.0	33.0	0.0	32.0	0.0	37.0	0.0
			Ave I_6 =	4.3	Ave I_7 =	30.9	Ave I_8 =	8.3	Ave I_9 =	3.5	Ave I_{10} =	1.1

$I_a = 100 * [(U_a - C)/(R - C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River

30 - 70 = Hybrid

100 = Rainbow

Appendix C. Putative Colorado River cutthroat trout

Population: **Taylor Creek**
Water ID: I BQ 050A 01
Population Average = 5.9

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	41.5	7.6	42.5	1.3	42.0	4.5	41.0	10.8	42.0	4.5
Lateral Line Scales	130.0	187.0	205.0	0.0	189.5	0.0	203.0	0.0	176.0	19.3	192.5	0.0
Gill Rakers	20.5	19.0	20.0	x	19.0	x	20.0	x	18.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	12.0	0.0	8.0	0.0	17.0	0.0	14.0	0.0	20.0	0.0
Pyloric Caeca	55.0	41.0	43.0	14.3	44.0	21.4	40.0	0.0	32.0	0.0	42.0	7.1
			Ave I_1 =	5.5	Ave I_2 =	5.7	Ave I_3 =	1.1	Ave I_4 =	7.5	Ave I_5 =	2.9

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	42.5	1.3	43.5	0.0	42.5	1.3	41.0	10.8	44.5	0.0
Lateral Line Scales	130.0	187.0	186.5	0.9	198.5	0.0	194.5	0.0	179.0	14.0	184.5	4.4
Gill Rakers	20.5	19.0	18.0	x	19.0	x	18.0	x	19.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	6.0	0.0	21.0	0.0	6.0	0.0	0.0	100.0	16.0	0.0
Pyloric Caeca	55.0	41.0	40.0	0.0	34.0	0.0	41.0	0.0	43.0	14.3	37.0	0.0
			Ave I_6 =	0.5	Ave I_7 =	0.0	Ave I_8 =	0.3	Ave I_9 =	34.8	Ave I_{10} =	1.1

$I_a = 100 * [(U_a - C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

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Appendix C. Putative Colorado River cutthroat trout

Population: **La Sal Creek (section 3)**
Water ID: I BQ 070 03
Population Average = 4.4

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	44.5	0.0	41.0	10.8	47.0	0.0	43.5	0.0	43.0	0.0
Lateral Line Scales	130.0	187.0	210.0	0.0	185.5	2.6	191.0	0.0	192.0	0.0	185.0	3.5
Gill Rakers	20.5	19.0	17.0	x	18.0	x	19.0	x	20.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	22.0	0.0	3.0	0.0	6.0	0.0	5.0	0.0	16.0	0.0
Pyloric Caeca	55.0	41.0	43.0	14.3	33.0	0.0	40.0	0.0	42.0	7.1	30.0	0.0
			Ave I_1 =	3.6	Ave I_2 =	3.4	Ave I_3 =	0.0	Ave I_4 =	1.8	Ave I_5 =	0.9

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	44.5	0.0	43.5	0.0	40.5	14.0	44.0	0.0	41.0	10.8
Lateral Line Scales	130.0	187.0	194.0	0.0	171.0	28.1	189.0	0.0	201.5	0.0	177.0	17.5
Gill Rakers	20.5	19.0	19.0	x	19.0	x	20.0	x	19.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	7.0	0.0	4.0	0.0	1.0	66.7	15.0	0.0	15.0	0.0
Pyloric Caeca	55.0	41.0	36.0	0.0	38.0	0.0	37.0	0.0	33.0	0.0	35.0	0.0
			Ave I_6 =	0.0	Ave I_7 =	7.0	Ave I_8 =	20.2	Ave I_9 =	0.0	Ave I_{10} =	7.1

$I_a = 100 * [(U_a - C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

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Appendix C. Putative Colorado River cutthroat trout

Population: **LaSal Creek Ditch - Main Diversion**
Water ID: water ID not assigned to this stream

Population Average = 18.5

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	40.5	14.0	40.0	17.2	36.0	42.7	38.0	29.9	36.5	39.5
Lateral Line Scales	130.0	187.0	198.0	0.0	186.0	1.8	172.0	26.3	172.0	26.3	187.0	0.0
Gill Rakers	20.5	19.0	19.0	x	18.0	x	18.0	x	20.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	5.0	0.0	4.0	0.0	0.0	100.0	6.0	0.0	5.0	0.0
Pyloric Caeca	55.0	41.0	42.0	7.1	35.0	0.0	30.0	0.0	36.0	0.0	38.0	0.0
			Ave I_1 =	5.3	Ave I_2 =	4.7	Ave I_3 =	42.2	Ave I_4 =	14.1	Ave I_5 =	9.9

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	38.0	29.9	41.5	7.6	34.5	52.2	39.5	20.4	37.5	33.1
Lateral Line Scales	130.0	187.0	177.5	16.7	174.0	22.8	171.5	27.2	181.5	9.6	185.5	2.6
Gill Rakers	20.5	19.0	18.0	x	20.0	x	18.0	x	18.0	x	20.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	6.0	0.0	0.0	100.0	6.0	0.0	0.0	100.0
Pyloric Caeca	55.0	41.0	39.0	0.0	43.0	14.3	33.0	0.0	39.0	0.0	38.0	0.0
			Ave I_6 =	11.7	Ave I_7 =	11.2	Ave I_8 =	44.9	Ave I_9 =	7.5	Ave I_{10} =	33.9

$I_a = 100 * [(U_a - C)/(R - C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

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Appendix C. Putative Colorado River cutthroat trout

Population: **Lake Canyon Creek**
Water ID: II AI 130M 05
Population Average = 9.0

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	41.5	7.6	44.5	0.0	44.0	0.0	46.5	0.0	41.5	7.6
Lateral Line Scales	130.0	187.0	182.0	8.8	197.5	0.0	179.0	14.0	184.5	4.4	181.5	9.6
Gill Rakers	20.5	19.0	18.0	x	18.0	x	19.0	x	19.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	5.0	0.0	6.0	0.0	5.0	0.0	6.0	0.0	12.0	0.0
Pyloric Caeca	55.0	41.0	34.0	0.0	48.0	50.0	38.0	0.0	48.0	50.0	37.0	0.0
			Ave I_1 =	4.1	Ave I_2 =	12.5	Ave I_3 =	3.5	Ave I_4 =	13.6	Ave I_5 =	4.3

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	38.0	29.9	46.0	0.0	47.5	0.0	41.0	10.8	44.0	0.0
Lateral Line Scales	130.0	187.0	195.0	0.0	183.5	6.1	183.0	7.0	187.5	0.0	168.0	33.3
Gill Rakers	20.5	19.0	19.0	x	18.0	x	18.0	x	17.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	6.0	0.0	3.0	0.0	4.0	0.0	5.0	0.0	3.0	0.0
Pyloric Caeca	55.0	41.0	48.0	50.0	47.0	42.9	42.0	7.1	42.0	7.1	43.0	14.3
			Ave I_6 =	20.0	Ave I_7 =	12.2	Ave I_8 =	3.5	Ave I_9 =	4.5	Ave I_{10} =	11.9

$I_a = 100 * [(U_a - C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

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Appendix C. Putative Colorado River cutthroat trout

Population: **Nuck Woodward Creek**
Water ID: II AI 130N
Population Average = 27.2

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	38.5	26.8	38.5	26.8	40.5	14.0	37.0	36.3	37.0	36.3
Lateral Line Scales	130.0	187.0	164.0	40.4	180.0	12.3	167.0	35.1	176.0	19.3	176.0	19.3
Gill Rakers	20.5	19.0	19.0	x	19.0	x	21.0	x	19.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	8.0	0.0	x	x	3*	x	4.0	0.0	x	x
Pyloric Caeca	55.0	41.0	47.0	42.9	44.0	21.4	44.0	21.4	43.0	14.3	59.0	100.0
			Ave I_1 =	27.5	Ave I_2 =	20.2	Ave I_3 =	23.5	Ave I_4 =	17.5	Ave I_5 =	51.9

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	36.5	39.5	39.0	23.6	37.0	36.3	37.0	36.3	40.0	17.2
Lateral Line Scales	130.0	187.0	173.5	23.7	180.0	12.3	170.0	29.8	180.5	11.4	169.5	30.7
Gill Rakers	20.5	19.0	18.0	x	20.0	x	19.0	x	19.0	x	21.0	x
Basibranchial Teeth	0.0	3.0	12*	100.0	7.0	0.0	x	x	8.0	0.0	16.0	0.0
Pyloric Caeca	55.0	41.0	40.0	0.0	47.0	42.9	38.0	0.0	48.0	50.0	48.0	50.0
			Ave I_6 =	40.8	Ave I_7 =	19.7	Ave I_8 =	22.0	Ave I_9 =	24.4	Ave I_{10} =	24.5

$I_a = 100 * [(U_a-C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

Appendix C. Putative Colorado River cutthroat trout

Population: **Scad Valley Creek**

Water ID: II AI 139M 01 01

Population Average = 12.7

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	43.5	0.0	44.5	0.0	46.0	0.0	36.0	42.7	39.5	20.4
Lateral Line Scales	130.0	187.0	187.0	0.0	199.5	0.0	177.5	16.7	162.5	43.0	166.0	36.8
Gill Rakers	20.5	19.0	20.0	x	19.0	x	20.0	x	17.0	x	*	x
Basibranchial Teeth	0.0	3.0	5.0	0.0	8.0	0.0	7.0	0.0	*	x	*	x
Pyloric Caeca	55.0	41.0	37.0	0.0	29.0	0.0	39.0	0.0	28.0	0.0	36.0	0.0
			Ave I_1 =	0.0	Ave I_2 =	0.0	Ave I_3 =	4.2	Ave I_4 =	28.6	Ave I_5 =	19.1

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	44.0	0.0	37.5	33.1	42.0	4.5	39.5	20.4	38.5	26.8
Lateral Line Scales	130.0	187.0	188.5	0.0	179.5	13.2	172.5	25.4	186.0	1.8	185.0	3.5
Gill Rakers	20.5	19.0	17.0	x	18.0	x	19.0	x	18.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	6.0	0.0	4.0	0.0	7.0	0.0	14.0	0.0	11.0	0.0
Pyloric Caeca	55.0	41.0	54.0	92.9	51.0	71.4	42.0	7.1	40.0	0.0	37.0	0.0
			Ave I_6 =	23.2	Ave I_7 =	29.4	Ave I_8 =	9.3	Ave I_9 =	5.5	Ave I_{10} =	7.6

$I_a = 100 * [(U_a - C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River

30 - 70 = Hybrid

100 = Rainbow

Appendix C. Putative Colorado River cutthroat trout

Population: **Gordon Creek - North Fork**
Water ID: II AK 100A 01
Population Average = 17.5

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	37.0	36.3	41.5	7.6	41.0	10.8	36.0	42.7	37.0	36.3
Lateral Line Scales	130.0	187.0	184.5	4.4	188.5	0.0	185.5	2.6	181.0	10.5	181.0	10.5
Gill Rakers	20.5	19.0	17.0	x	19.0	x	19.0	x	19.0	x	20.0	x
Basibranchial Teeth	0.0	3.0	6.0	0.0	5.0	0.0	6.0	0.0	7.0	0.0	5.0	0.0
Pyloric Caeca	55.0	41.0	42.0	7.1	48.0	50.0	48.0	50.0	40.0	0.0	43.0	14.3
			Ave I_1 =	12.0	Ave I_2 =	14.4	Ave I_3 =	15.9	Ave I_4 =	13.3	Ave I_5 =	15.3

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	40.5	14.0	35.5	45.9	44.0	0.0	42.5	1.3	35.0	49.0
Lateral Line Scales	130.0	187.0	179.0	14.0	165.5	37.7	180.0	12.3	171.0	28.1	182.0	8.8
Gill Rakers	20.5	19.0	19.0	x	17.0	x	18.0	x	18.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	6.0	0.0	3.0	0.0	5.0	0.0	0.0	100.0	9.0	0.0
Pyloric Caeca	55.0	41.0	54.0	92.9	40.0	0.0	38.0	0.0	41.0	0.0	43.0	14.3
			Ave I_6 =	30.2	Ave I_7 =	20.9	Ave I_8 =	3.1	Ave I_9 =	32.3	Ave I_{10} =	18.0

$I_a = 100 * [(U_a - C)/(R - C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

Appendix C. Putative Colorado River cutthroat trout

Population: **Kyune Reservoir Creek**
Water ID: II AK 170A 01
Population Average = 40.9

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	41.5	7.6	29.5	84.1	40.5	14.0	31.5	71.3	29.0	87.3
Lateral Line Scales	130.0	187.0	171.0	28.1	134.0	93.0	182.0	8.8	134.0	93.0	127.5	100.0
Gill Rakers	20.5	19.0	17.0	x	17.0	x	19.0	x	19.0	x	17.0	x
Basibranchial Teeth	0.0	3.0	7.0	0.0	0.0	100.0	8.0	0.0	0.0	100.0	0.0	100.0
Pyloric Caeca	55.0	41.0	35.0	0.0	45.0	28.6	*	x	42.0	7.1	45.0	28.6
			Ave I_1 =	8.9	Ave I_2 =	76.4	Ave I_3 =	7.6	Ave I_4 =	67.9	Ave I_5 =	79.0

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	30.0	80.9	31.5	71.3	34.5	52.2	40.5	14.0	39.0	23.6
Lateral Line Scales	130.0	187.0	124.5	100.0	144.0	75.4	145.5	72.8	178.0	15.8	176.5	18.4
Gill Rakers	20.5	19.0	18.0	x	18.0	x	20.0	x	20.0	x	17.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	0.0	100.0	*	x	7.0	0.0	9.0	0.0
Pyloric Caeca	55.0	41.0	36.0	0.0	29.0	0.0	39.0	0.0	*	x	32.0	0.0
			Ave I_6 =	45.2	Ave I_7 =	61.7	Ave I_8 =	41.7	Ave I_9 =	9.9	Ave I_{10} =	10.5

$I_x = 100 * [(U_x-C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_x = the raw character count for each fish

I_x = the character hybrid index for each fish

Ave I_x = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

Appendix C. Putative Colorado River cutthroat trout

Population: **Middle Fork - White River**
Water ID: II AK 190 B01 A01
Population Average = 10.4

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	38.5	26.8	40.0	17.2	41.0	10.8	41.0	10.8	36.5	39.5
Lateral Line Scales	130.0	187.0	203.0	0.0	186.0	1.8	181.0	10.5	185.0	3.5	183.0	7.0
Gill Rakers	20.5	19.0	19.0	x	19.0	x	19.0	x	19.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	17.0	0.0	9.0	0.0	8.0	0.0	25.0	0.0	8.0	0.0
Pyloric Caeca	55.0	41.0	38.0	0.0	35.0	0.0	48.0	50.0	53.0	85.7	34.0	0.0
			Ave I_1 =	6.7	Ave I_2 =	4.7	Ave I_3 =	17.8	Ave I_4 =	25.0	Ave I_5 =	11.6

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	39.5	20.4	37.5	33.1	39.0	23.6	43.0	0.0	42.0	4.5
Lateral Line Scales	130.0	187.0	196.0	0.0	194.0	0.0	164.5	39.5	198.0	0.0	181.0	10.5
Gill Rakers	20.5	19.0	20.0	x	17.0	x	18.0	x	17.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	4.0	0.0	6.0	0.0	7.0	0.0	9.0	0.0	10.0	0.0
Pyloric Caeca	55.0	41.0	17.0	0.0	41.0	0.0	32.0	0.0	44.0	21.4	35.0	0.0
			Ave I_6 =	5.1	Ave I_7 =	8.3	Ave I_8 =	15.8	Ave I_9 =	5.4	Ave I_{10} =	3.7

$I_a = 100 * [(U_a-C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

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Appendix C. Putative Colorado River cutthroat trout

Population: **Steer Gulch (West Willow Cr.)**
Water ID: none given
Population Average = 7.5

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	42.0	4.5	45.5	0.0	44.5	0.0	41.5	7.6	40.0	17.2
Lateral Line Scales	130.0	187.0	189.5	0.0	191.0	0.0	182.5	7.9	192.0	0.0	170.5	28.9
Gill Rakers	20.5	19.0	20.0	x	17.0	x	17.0	x	18.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	22.0	0.0	16.0	0.0	16.0	0.0	8.0	0.0	26.0	0.0
Pyloric Caeca	55.0	41.0	40.0	0.0	37.0	0.0	41.0	0.0	45.0	28.6	40.0	0.0
			Ave I_1 =	1.1	Ave I_2 =	0.0	Ave I_3 =	2.0	Ave I_4 =	9.1	Ave I_5 =	11.5

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	40.5	14.0	39.5	20.4	40.5	14.0	35.5	45.9	44.0	0.0
Lateral Line Scales	130.0	187.0	179.5	13.2	183.0	7.0	181.5	9.6	165.0	38.6	175.0	21.1
Gill Rakers	20.5	19.0	17.0	x	18.0	x	18.0	x	18.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	16.0	0.0	21.0	0.0	12.0	0.0	11.0	0.0	13.0	0.0
Pyloric Caeca	55.0	41.0	33.0	0.0	44.0	21.4	30.0	0.0	38.0	0.0	32.0	0.0
			Ave I_6 =	6.8	Ave I_7 =	12.2	Ave I_8 =	5.9	Ave I_9 =	21.1	Ave I_{10} =	5.3

$I_a = 100 * [(U_a - C)/(R - C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

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Appendix C. Putative Colorado River cutthroat trout

Population: **Garfield Creek**

Water ID: II BE 020B 04 01

Population Average = 17.7

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	40.5	14.0	40.5	14.0	38.0	29.9	40.0	17.2	39.0	23.6
Lateral Line Scales	130.0	187.0	139.5	83.3	153.0	59.6	151.5	62.3	139.5	83.3	173.0	24.6
Gill Rakers	20.5	19.0	18.0	x	18.0	x	16.0	x	18.0	x	17.0	x
Basibranchial Teeth	0.0	3.0	9.0	0.0	5.0	0.0	6.0	0.0	4.0	0.0	6.0	0.0
Pyloric Caeca	55.0	41.0	39.0	0.0	21.0	0.0	34.0	0.0	34.0	0.0	35.0	0.0
			Ave I_1 =	24.3	Ave I_2 =	18.4	Ave I_3 =	23.1	Ave I_4 =	25.1	Ave I_5 =	12.0

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	44.0	0.0	35.0	49.0	41.0	10.8	48.0	0.0	42.5	1.3
Lateral Line Scales	130.0	187.0	160.5	46.5	157.5	51.8	155.5	55.3	177.5	16.7	170.0	29.8
Gill Rakers	20.5	19.0	18.0	x	19.0	x	18.0	x	20.0	x	20.0	x
Basibranchial Teeth	0.0	3.0	2.0	33.3	6.0	0.0	4*	0.0	5.0	0.0	4.0	0.0
Pyloric Caeca	55.0	41.0	29.0	0.0	35.0	0.0	33.0	0.0	35.0	0.0	34.0	0.0
			Ave I_6 =	20.0	Ave I_7 =	25.2	Ave I_8 =	16.5	Ave I_9 =	4.2	Ave I_{10} =	7.8

$I_a = 100 * [(U_a - C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River

30 - 70 = Hybrid

100 = Rainbow

Appendix C. Putative Colorado River cutthroat trout

Population: **Brown Duck Creek**
Water ID: II BE 020D 01
Population Average = 12.2

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	36.0	42.7	40.0	17.2	41.5	7.6	41.0	10.8	37.5	33.1
Lateral Line Scales	130.0	187.0	168.5	32.5	184.0	5.3	166.0	36.8	181.0	10.5	175.0	21.1
Gill Rakers	20.5	19.0	19.0	x	19.0	x	15.0	x	19.0	x	21.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	6.0	0.0	4.0	0.0	4.0	0.0	7.0	0.0
Pyloric Caeca	55.0	41.0	36.0	0.0	35.0	0.0	26.0	0.0	24.0	0.0	34.0	0.0
			Ave I_1 =	18.8	Ave I_2 =	5.6	Ave I_3 =	11.1	Ave I_4 =	5.3	Ave I_5 =	13.5

Character	R	C	U_6	I_6	U_7	I_7	U_8	I_8	U_9	I_9	U_{10}	I_{10}
Scales Above Lat. Line	27.0	42.7	36.5	39.5	35.5	45.9	38.5	26.8	37.5	33.1	36.0	42.7
Lateral Line Scales	130.0	187.0	182.5	7.9	175.5	20.2	162.5	43.0	184.0	5.3	183.0	7.0
Gill Rakers	20.5	19.0	19.0	x	19.0	x	18.0	x	20.0	x	18.0	x
Basibranchial Teeth	0.0	3.0	4.0	0.0	3.0	0.0	9.0	0.0	5.0	0.0	4.0	0.0
Pyloric Caeca	55.0	41.0	35.0	0.0	31.0	0.0	36.0	0.0	37.0	0.0	31.0	0.0
			Ave I_6 =	11.8	Ave I_7 =	16.5	Ave I_8 =	17.4	Ave I_9 =	9.6	Ave I_{10} =	12.4

$I_a = 100 * [(U_a - C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

Appendix C. Putative Colorado River cutthroat trout

Population: **Little West Fork - Duchesne River**
Water ID: II BE 150I 01
Population Average = 0.7

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	48.5	0.0	48.5	0.0	47.0	0.0	44.0	0.0	46.5	0.0
Lateral Line Scales	130.0	187.0	208.5	0.0	201.5	0.0	199.0	0.0	179.5	13.2	195.0	0.0
Gill Rakers	20.5	19.0	18.0	x	17.0	x	19.0	x	20.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	12.0	0.0	19.0	0.0	11.0	0.0	4.0	0.0	5.0	0.0
Pyloric Caeca	55.0	41.0	26.0	0.0	29.0	0.0	32.0	0.0	34.0	0.0	26.0	0.0
			Ave I_1 =	0.0	Ave I_2 =	0.0	Ave I_3 =	0.0	Ave I_4 =	3.3	Ave I_5 =	0.0

$I_a = 100 *[(U_a-C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow

Appendix C. Putative Colorado River cutthroat trout

Population: **Vat Creek**

Water ID: II BE 150F 01

Population Average = 8.6

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	44.0	0.0	42.5	1.3	43.5	0.0	43.0	0.0	36.0	42.7
Lateral Line Scales	130.0	187.0	200.5	0.0	193.0	0.0	196.5	0.0	201.0	0.0	x	x
Gill Rakers	20.5	19.0	17.0	x	18.0	x	x	x	19.0	x	19.0	x
Basibranchial Teeth	0.0	3.0	3.0	0.0	13.0	0.0	x	x	5.0	0.0	x	x
Pyloric Caeca	55.0	41.0	x	x	29.0	0.0	x	x	32.0	0.0	x	x
			Ave I_1 =	0.0	Ave I_2 =	0.3	Ave I_3 =	0.0	Ave I_4 =	0.0	Ave I_5 =	42.7

$I_a = 100 * [(U_a - C)/(R - C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River

30 - 70 = Hybrid

100 = Rainbow

Appendix C. Putative Colorado River cutthroat trout

Population: **Beaver Creek - Middle Fork**
Water ID: II CJ 040B
Population Average = 6.1

Character	R	C	U_1	I_1	U_2	I_2	U_3	I_3	U_4	I_4	U_5	I_5
Scales Above Lat. Line	27.0	42.7	44.0	0.0	43.5	0.0	46.5	0.0	45.5	0.0	46.5	0.0
Lateral Line Scales	130.0	187.0	180.0	12.3	193.0	0.0	181.5	9.6	185.5	2.6	191.5	0.0
Gill Rakers	20.5	19.0	21.0	x	20.0	x	20.0	x	20.0	x	17.0	x
Basibranchial Teeth	0.0	3.0	4.0	0.0	5.0	0.0	5.0	0.0	7.0	0.0	3.0	0.0
Pyloric Caeca	55.0	41.0	x	x	43.0	14.3	33.0	0.0	34.0	0.0	37.0	0.0
			Ave I_1 =	4.1	Ave I_2 =	3.6	Ave I_3 =	2.4	Ave I_4 =	0.7	Ave I_5 =	0.0

Character	R	C	U_6	I_6
Scales Above Lat. Line	27.0	42.7	46.0	0.0
Lateral Line Scales	130.0	187.0	185.0	3.5
Gill Rakers	20.5	19.0	21.0	x
Basibranchial Teeth	0.0	3.0	0.0	100.0
Pyloric Caeca	55.0	41.0	35.0	0.0
			Ave I_6 =	25.9

$I_a = 100 *[(U_a-C)/(R-C)]$

where, R = the mean of the character range for rainbow trout

C = the adjusted mean of the character range for Colorado River cutthroat trout

U_a = the raw character count for each fish

I_a = the character hybrid index for each fish

Ave I_a = the average of the character hybrid indices for each fish

0 = Colorado River
30 - 70 = Hybrid
100 = Rainbow