



IDAHO DEPARTMENT OF FISH AND GAME

EAGLE FISH GENETICS LAB
1800 Trout Road
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Dirk Kempthorne / Governor
Steven M. Huffaker / Director

June 20, 2006

MEMORANDUM

To: Jim Derito, Conservation Director, Henrys Fork Foundation
From: Matthew Campbell, Christine Cegelski, Eagle Fish Genetics Lab
Subject: Genetic results, Henrys Fork Yellowstone cutthroat samples

Jim,

We have completed the genetic analyses on 256 Yellowstone cutthroat trout samples collected from seven sample locations in the Henrys Fork drainage (Figure 1 and Table 1). The primary objective of this study was to assess the purity of Yellowstone cutthroat trout from these areas. A secondary objective, if possible, was to determine the origin of Yellowstone cutthroat trout in the Fall and Bechler Rivers. You mentioned previously that both of these rivers were historically fishless, isolated above natural waterfalls, and that the existing populations may be of Yellowstone Lake origin (Yellowstone Lake Hatchery, WY) or Henrys Lake origin (Ashton and Warm River Hatcheries, ID). You also mentioned that Yellowstone National Park personnel believe that westslope cutthroat trout may have been stocked in these areas in addition to rainbow trout. In order to address the first objective (purity) we screened samples with a mitochondrial DNA (mtDNA) marker diagnostic between Yellowstone cutthroat trout, westslope cutthroat trout and rainbow trout, and seven diagnostic nuclear DNA (nDNA) markers (Occ16, Occ34, Occ35, Occ36, Occ37, Occ38 and OM55). The nDNA markers are co-dominant Simple Sequence Repeat (SSR) markers which are diagnostic based on size differences in the Polymerase Chain Reaction (PCR) products between rainbow trout and cutthroat trout (Ostberg and Rodriquez 2002). One locus (OMM55) is also diagnostic between all three taxa (Yellowstone cutthroat trout, westslope cutthroat trout and rainbow trout).

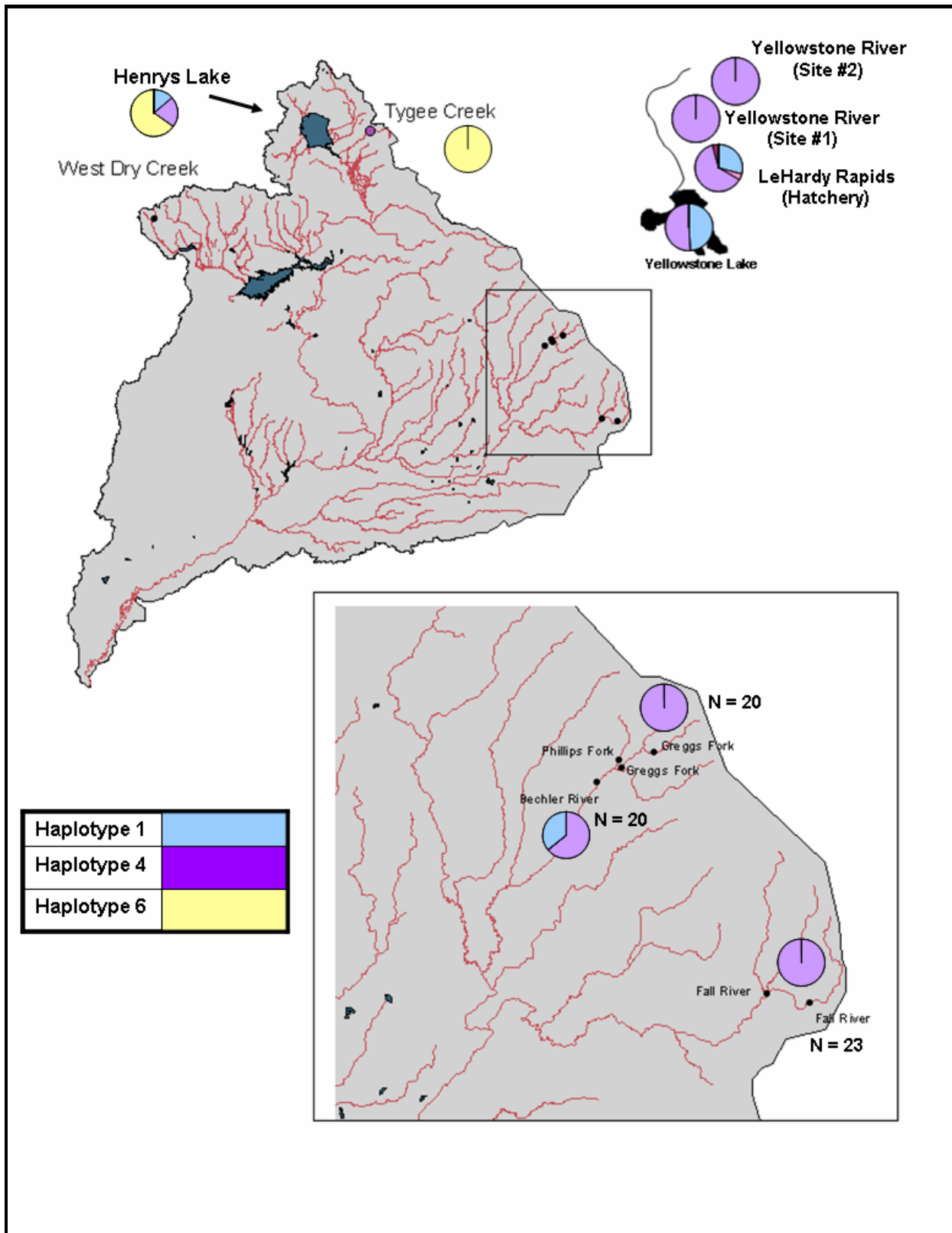


Figure 1. Sampling locations in Henrys Fork drainage and haplotype frequencies (represented by pies). Phillips Fork samples (N = 2; Haplotype 1) not shown.

To address the second objective, concerning the origin of Yellowstone cutthroat trout in the Fall and Bechler Rivers (Henrys Lake strain or Yellowstone Lake strain), we screened a subset of samples from these areas with a mtDNA Restriction Fragment Length Polymorphism (RFLP) marker that has previously yielded haplotype differences between Henrys Lake and Yellowstone Lake cutthroat trout (Campbell 2002).

Table 1. Genetic samples collected in the Henrys fork drainage in 2005.

Stream	Location Description	UTM Zone (NAD27)	Easting	Northing	Length of sampling (m)	Date of sampling	# of samples	Putative species
Fall River	1.7 km above Beula Lake	12	520065	4889121	100	9-21-05	50	All YCT, except fish #11 may be hybrid
Fall River	1.2 km below Beula Lake (and below Bradley Falls)	12	517432	4889733	200	9-22-05	56	All YCT
Bechler River	1.5 downstream from Three Rivers Junction	12	507526	4903036	400	9-16-05	52	All YCT
Greggs Fork	0.45 km upstream from confluence with Bechler River, above Forlorn Falls and below Twister Falls	12	508999	4903849	425	9-13-05 and 9-14-05	25	All YCT, except fish #'s 1,2, and 11 may be hybrids
Greggs Fork	3.2 km upstream from Bechler River confluence, above Twister Falls	12	511030	4904679	100	9-14-05	23	All YCT, note #19 and #32 are whole fry
Phillips Fork	0.6 km upstream from Bechler River confluence, above Phillips Fork Falls	12	508879	4904328	450	9-15-05	37	All YCT
West Dry tributary	1.1 km upstream from West Dry Creek	12	438681	4928406	100	8-8-05	13	All YCT, except #5

Results (purity)-

We did not find any evidence of rainbow trout or westslope cutthroat trout hybridization/introgression in any of the sample locations examined. All samples exhibited genotypes/haplotypes indicative of pure Yellowstone cutthroat trout (Appendix A). The probability of detecting introgression within a population is dependent on the number of samples examined and the number of diagnostic loci/alleles examined. Sample sizes for all of the sample locations in this study (except for West Dry tributary, N = 13) were sufficient to have >95% probability of detecting as little as 1% rainbow trout introgression.

Results (origin)-

Two haplotypes (Haplotype 1 and Haplotype 4) were observed among a subset of 65 samples screened (Figure 1). Haplotype 4 was the only haplotype observed among 23 samples from the Fall River and 20 samples from the Greggs Fork. Both haplotypes were observed in 20 samples from the Bechler River (Haplotype 1, N = 8; Haplotype 4, N = 12). Only 2 samples were screened from the Phillips Fork and both samples exhibited Haplotype 1. Haplotypes 1 and 4 are the most common haplotypes observed in Yellowstone Lake and in samples from the LeHardy Rapids Fish Hatchery. Haplotype 4 is fixed in two other populations we have examined from the Yellowstone River. Haplotype 1 and Haplotype 4 are also found in Henrys Lake (~10% and ~23% respectively). However, based on historical stocking records, and the frequency pattern of these two haplotypes in Henrys Lake tributaries, we have previously proposed that their presence in the lake may be the result of introductions of cutthroat trout from Yellowstone Lake (Campbell 2002).

The most common haplotype observed in Henrys Lake (~67%) and fixed in samples from Tyghee Creek (a tributary just below the lake) is Haplotype 6. This haplotype is not present in samples from Yellowstone Lake or the Yellowstone River and has not been observed in any drainages outside of Idaho. The fact that Haplotype 6 is not observed among the 65 samples examined in this study suggests that these pure Yellowstone cutthroat trout populations are most likely not of Henrys Lake strain/origin, and are more likely the product of past introductions from Yellowstone Lake strain/origin Yellowstone cutthroat trout.

Please call me if you have any questions or comments.

Sincerely,

Matthew Campbell

Ostberg, C. O., and Rodriguez, R. J., 2002. Novel molecular markers differentiate *Oncorhynchus mykiss* (rainbow trout and steelhead) and the *O. clarki* (cutthroat trout) subspecies. *Molecular Ecology Notes* 2 (3), 197-202.

Campbell, M.R., J. Dillon and M.S. Powell, 2002. Hybridization and introgression in a managed, native population of yellowstone cutthroat trout: genetic detection and management implications. *Trans. Am. Fish. Soc.* 131(3):364-375.

Appendix A. Raw scores

Henrys Fork-
Fall River
(below Beula
Lake)

	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
HFFR-01	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-02	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-03	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-04	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-05	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-06	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-07	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-08	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-09	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-10	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-11	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-12	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-13	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-14	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-15	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-16	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-17	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-18	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-19	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-20	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-21	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-22	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-23	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-24	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-25	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-26	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-27	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-28	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-29	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-30	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-31	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Keeping Idaho's Wildlife Heritage

Appendix A. Raw scores

(Continued)

Henrys Fork-

Fall River

(below Beula

Lake)

	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
HFFR-32	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-33	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-34	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-35	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-36	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-37	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-38	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-39	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-40	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-41	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-42	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-43	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-44	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-45	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-46	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-47	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-48	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-49	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
HFFR-50	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Henrys Fork-

Fall River

(Below Beula

Lake)

	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
FR-01	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-02	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-03	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-04	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-05	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-06	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-07	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-08	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Appendix A. Raw scores

(Continued)

Henrys Fork-

Fall River

(Below Beula

Lake)

	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
FR-09	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-10	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-11	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-12	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-13	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-14	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-15	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-16	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-17	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-18	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-19	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-20	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-21	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-22	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-23	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-24	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-25	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-26	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-27	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-28	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-29	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-30	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-31	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-32	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-33	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-34	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-35	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-36	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-37	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-38	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Appendix A. Raw scores

(Continued)

Henry's Fork-
Fall River

(Below Beula
Lake)

	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
FR-39	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-40	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-41	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-42	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-43	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-44	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-45	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-46	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-47	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-48	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-49	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-50	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-51	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-52	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-53	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-54	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-55	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
FR-56	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Henry's Fork-
Bechler River

	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
BR-01	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-02	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-03	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-04	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-05	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-06	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-07	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-08	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-09	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS
BR-10	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-11	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Keeping Idaho's Wildlife Heritage

Appendix A. Raw scores

(Continued)

Henry's Fork- Bechler River	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
BR-12	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-13	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS
BR-14	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-15	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-16	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-17	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-18	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-19	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-20	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-21	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS
BR-22	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-23	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-24	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-25	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-26	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-27	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-28	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-29	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-30	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-31	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-32	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-33	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-34	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-35	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-36	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-37	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-38	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-39	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-40	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-41	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-42	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS
BR-43	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Appendix A. Raw scores

(Continued)

Henry's Fork- Bechler River	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
BR-44	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-45	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-46	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-47	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-48	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-49	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-50	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-51	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
BR-52	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Henry's Fork-

Greggs Fork
(Below
Twister Falls)

Henry's Fork- Greggs Fork (Below Twister Falls)	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
GR-01	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-02	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-03	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-04	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-05	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-06	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-07	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-08	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-09	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-10	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-11	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-12	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-13	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-14	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-15	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-16	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-17	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS
GR-18	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-19	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-20	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Keeping Idaho's Wildlife Heritage

Appendix A. Raw scores

(Continued)

Henrys Fork-
Greggs Fork

(Below
Twister Falls)

	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
GR-21	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-22	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-23	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-24	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-25	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Henrys Fork-
Greggs Fork

(Above
Twister Falls)

	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
GR-01	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-02	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-03	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS	MISS
GR-04	YCT	MISS	MISS	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-05	YCT	MISS	MISS	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-06	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-07	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-08	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-09	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-10	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-11	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-12	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-13	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-14	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-15	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-16	YCT	MISS	MISS	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-17	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-18	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
GR-19	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-20	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-21	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
GR-22	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Appendix A. Raw scores

(Continued)

Henry's Fork-
Greggs Fork

(Above
Twister Falls)
GR-23

Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

Henry's Fork-
Phillips Fork

PF-01

Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT

PF-02

YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
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PF-03

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-04

YCT	MISS	MISS	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-05

YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
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PF-06

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-07

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-08

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-09

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-10

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-11

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-12

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-13

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-14

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-15

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-16

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-17

YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
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PF-18

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-19

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-20

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-21

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-22

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-23

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-24

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-25

YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-26

YCT	MISS	MISS	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
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PF-27

YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
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PF-28

YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
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Appendix A. Raw scores

(Continued)

Henry's Fork- Phillips Fork	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	
PF-29	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
PF-30	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
PF-31	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
PF-32	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
PF-33	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
PF-34	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
PF-35	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
PF-36	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
PF-37	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
Henry's Fork- West Dry Creek Tributary	Dloop (Rsa-I)	Occ16	Occ16	Occ34	Occ34	Occ35	Occ35	Occ36	Occ36	Occ37	Occ37	Occ38	Occ38	OM55	OM55	GENETIC ID
WD-01	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-02	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-03	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-04	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-05	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-06	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-07	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-08	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-09	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-10	YCT	B	B	B	B	B	B	B	B	B-1	B-1	B	B	YCT	YCT	YCT
WD-11	YCT	B	B	B	B	B	B	B	B	B	B	B	B	YCT	YCT	YCT
WD-12	YCT	B	B	B	B	B	B	B	B	MISS	MISS	B	B	YCT	YCT	YCT
WD-13	YCT	B	B	B	B	B	B	B	B	MISS	MISS	B	B	YCT	YCT	YCT