S1999 Genetic Sampling Locations Fort Hall Reservation

Stream		
Midnight Cr. 8/4/99	N 42°. 979' W 112°. 566'	5000'
Ross Fork Cr. 8/11/99	N 43°. 00.667' W 112°. 07.462'	
North Toponce	N 42° 55.542' W 112° 05.916'	7,700'
North Toponce	N 42° 55.139' W 112° 05.180'	
North Toponce	N 42° 55.134' W 112° 04.980'	6,300
North Toponce Rez Boundary	N 42° 54.322' W 112° 03.957'	6,000
WF Bannock @ Spring	N 42° 34.656' W 112° 37.313	
WF Bannock @ Meadows	N 42° 34.775' W 112°36.477'	5,100
WF Bannock @ Meadows Site 2	N 42° 34.796' W 112° 36.560'	
Rattlesnake Cr.	N 42° 42.013' W 112° 33.860'	4,300'
Wood Cr.	N 43° 09.108' W 112° 01.851'	5,600'
Big Jimmy @ Mouth	N 43° 01.459' W 112° 36.370'	
BJ 201- 204	N 43° 01.872' W 112° 32.941'	
BJ 205- 208	N 43° 02.037' W 112° 32.899'	
BJ 208- 215	N 43° 02.214' W 112° 32.749'	4,300'
Moonshine Cr	N 42° 40.717' W 112° 39.591'	4,700'

Little Toponce	N 42° 55.514'	
	W 112° 04.514	6,800'
South Fk. Ross Fk.	N 42° 57.877'	
	W 112° 15.009'	5,500'
Garden Cr.	N 43° 12.825'	
	W 112° 06.950'	4,800'
Birch Cr.	N 42° 45.422'	
	W 112° 33.918'	5,200'
Birch #2	N 42° 45.513'	
	W 112° 33.504'	
Birch #3	N 42° 45.619'	
	W 112° 34.941'	4,600'

Plant Communities of the Fort Hall Bottoms (work in progress)

Scirpus acutus, validus
Typha latifolia
Eleocharies rostellata
Juncus balticus
Carex simulata
Salix bebbiana
Elymus triticoides
Carex lanuginose
Spartina gracilis
Salix exigua
Phragmites australis
Symphoricarpus occidentalis
Salicornia rubra
Astragalus diversifolius
Muhlenbergia racemosa
Potentilla fruticosa

Description of Fort Hall Reservation Streams in the American Falls Watershed

The Fort Hall Indian Reservation located in southeastern Idaho, is drained by more than twenty streams. Many small streams drain montane areas of the Reservation and feed into the Blackfoot and Portneuf Rivers which then feed into the Snake River and American Falls Reservoir (respectively). Strongholds of pure Yellowstone cutthroat trout reside in several of these mountain streams. Of particular importance are streams in the Fort Hall Bottoms, a large wetland adjacent (approx. 3500 acres) to the Snake River near its entrance into American Falls Reservoir. These streams are all spring fed, low gradient, and relatively short in length. Negative impacts from reservoir operations to Reservation tributaries to the American Falls Reservoir include streambank failures resulting in widened channels; reduction in riparian, increased summer water temperatures; and deposition of fine sediments on critical spawning habitat.

Of the four primary Bottoms streams, Spring Creek is the largest (12.75 m^3/s and approximately 15 km in length) and Clear Creek is the second largest (4.5 m^3/s and approximately 11 km in length). Other Bottoms streams include the Jimmy Drinks area (spring fed tributaries to the Portnuef) of the lower Portnuef River. Bottoms streams provide critical wintering, spawning, and nursery habitats for adfluvial and resident salmonids (Taki and Arthaud 1993). Wintering and nesting waterfowl, shorebirds, and raptors also heavily use the streams, lateral springs and surrounding marshlands. Endangered bald eagles and trumpeter swans winter, nest and fish on the Bottoms.

Altered component		
Floodplain	lack of flood events due to upstream reservoir operations	3
Pool/Riffle Ratio		3
Large Woody Debris		P
Discharge		1
Low Flow/ Dewatering		2
Peak		P
Increased Fines		3
Temperature Dissolved Oxygen		2
Shade		1
Streambank Stability		3
Reservoir Operations		3
Barriers		
Exotics		3

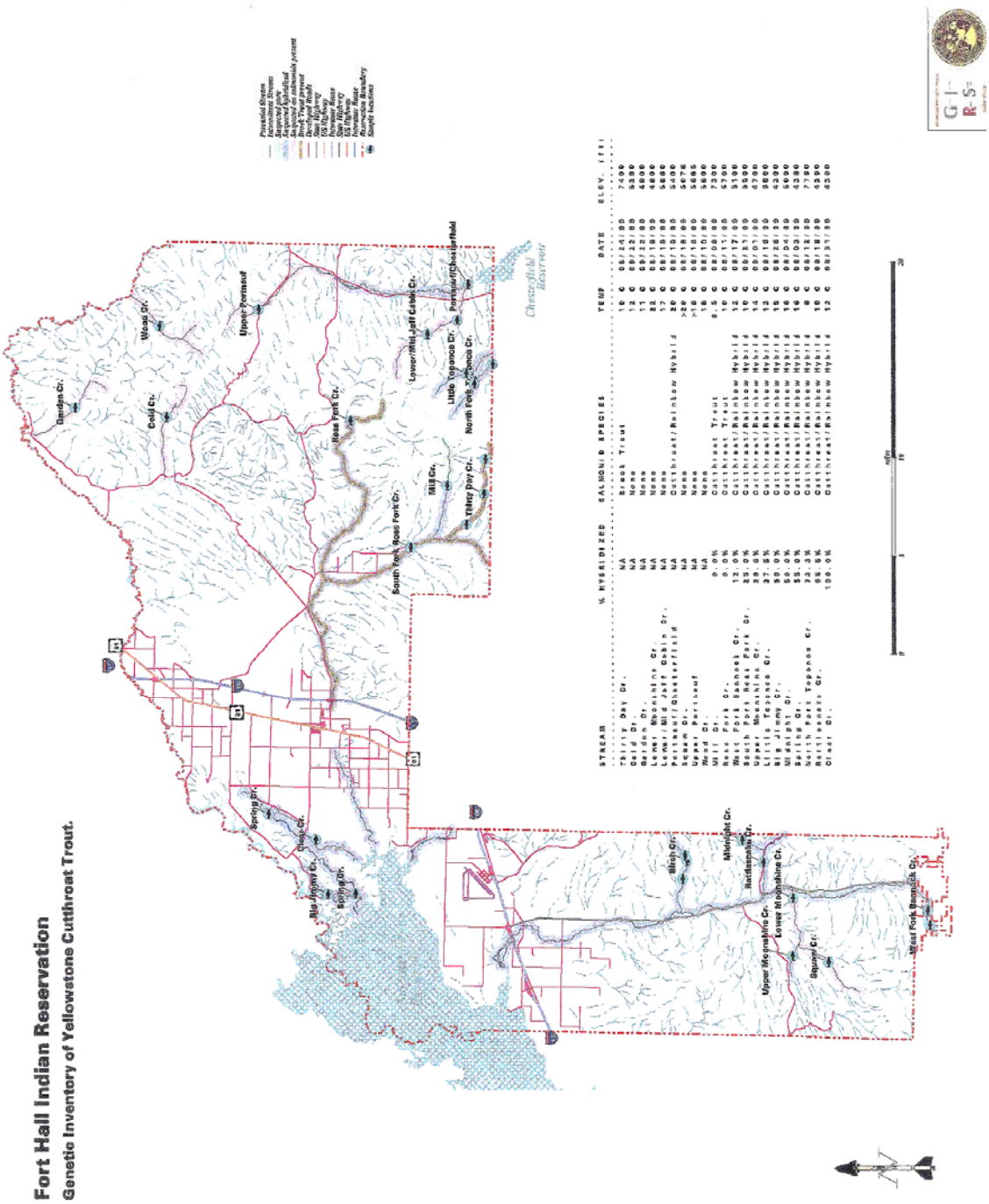

Figure 1. - Map showing locations of genetic sampling sites, species collected, and percent hybridization.

Table 1**. -** Genetic inventory sampling locations, % hybridization, species collected, sample size, water temperature, date sampled, and elevation, August-September 1999.

STREAM	*% HYBRID.*	*SPECIES*	*SAMPLE SIZE*	*TEMP. (C)*	*DATE*	*ELEV. (ft)*
30-Day	NA	BRK	0	10	8/24/99	7400
Birch	Not Complete	HYB	9	9	9/27/99	5200
Cold Creek	NA	NO FISH	0	12	9/22/99	5390
Garden Creek	NA	NO FISH	0	11	9/22/99	4800
Lower Moonshine	NA	SUC,DAC,RSS	0	22	8/18/99	4800
Lower/Mid Jeff Cabin	NA	SUC,DAC,RSS	0	17	8/19/99	5660
Portneuf/Chesterfield	NA	RBT,SUC,DAC	0	20	8/19/99	5400
Squaw Creek	NA	NO FISH	0	>20	8/18/99	5076
Upper Portneuf	NA	DAC	0	>16	8/16/99	5685
Wood Creek	NA	NO FISH	0	16	8/10/99	5600
Mill	0.0%	CUT	25	8.5	8/9/99	7300
Ross Fork	0.0%	CUT	25	10	8/11/99	5700
WF Bannock	12.0%	HYB	25	12	8/17/99	5100
South Fork Ross	25.0%	HYB,BRK,SUC	25	10	9/21/99	5500
Moonshine	28.6%	HYB	25	14	9/1/99	4700
Little Toponce	37.5%	HYB	25	13	8/16/99	6800
Big Jimmy (Fort Hall Bottoms)	50.0%	HYB, SUC	25	19	8/26/99	4300
Midnight	50.0%	HYB	25	16	8/4/99	5000
Spring (Ft. Hall Bottoms)	55.0%	HYB,SUC,RBT	25	16	8/3/99	4380
North Toponce	73.3%	HYB	25	8	8/12/99	7700
Rattlesnake	95.5%	HYB, SUC	25	19	8/18/99	4300
Clear (Ft. Hall Bottoms)	100.0%	HYB	25	12	8/31/99	4300

CUT=Cutthroat trout; HYB=Cutthroat X Rainbow Hybrid; BRK=Brook Trout; RBT=Rainbow Trout; SUC=Sucker spp.; DAC=Longnose Dace; RSS=Redside Shiner.

Genetic Sampling. - In 1999, a genetic inventory of suspected populations of rainbow trout and Yellowstone cutthroat trout was initiated Reservation wide. The Tribes contracted with The University of Montana Wild Trout and Salmon Genetics Laboratory to identify Yellowstone cutthroat trout and rainbow trout. The technique used to determine genetic purity was paired interspersed nuclear DNA element PCR (PINE). PINE analysis uses segments of non-coding DNA (introns) found within genes. The sequence of DNA introns is not constrained by selection and accumulates mutations at a higher rate than surrounding exons (coding DNA). The rate of change observed in most introns is of appropriate magnitude to be different between species but uniform within a species. Individual loci were scored facilitating the identification of F_1 hybrids, backcrosses and hybrids beyond F_1's (Paul Spruell 1999, *personal communication*).

Tribal fisheries collected non lethal tissue samples from twelve streams during summer/fall of 1999. Fish were collected using a Coffelt ® backpack electrofisher. Tissue samples were collected from rainbow trout, cutthroat trout and hybrids regardless of apparent genetic purity. Twenty-five non-lethal fin clips were collected from individual fish, placed in 95% ethanol, labeled, and shipped to the

University of Montana for laboratory analysis. Samples were collected as high in drainage's as salmonids could be found. Thirteen streams were found to contain salmonids. The length of stream sampled varied from a minimum of three pool/riffle sequences to the entire length of the stream. Some fish were collected at one point and some were collected at up to three sites. Ross Fork Creek was longitudinally re-sampled in 2000 to determine the downstream extent of pure Yellowstone cutthroat trout. Data for Birch Creek and the 2000 Ross Fork Creek sample are currently being analyzed by the University of Montana. Presence and absence were determined using genetic inventory data and data from past fish surveys (Taki and Arthaud 1993; Arthaud and Taki 1994; Arthaud et al. 1995; Arthaud et al. 1996; Moser and Colter 1997; Moser 1998; Moser 1999). In June 2000, The University of Montana analyzed the genetic samples and reported the findings to the Shoshone-Bannock Tribes.

Genetic Sampling. - Table 3 shows dates of collection, location, sample size, water temperature, and elevation. Figure 11 shows areas of suspected pure Yellowstone cutthroat trout, suspected hybridized trout, suspected no salmonids, and suspected brook trout populations. Two sites showed no evidence of genetic introgression; Mill Creek and Ross Fork Creek. Mill Creek was sampled approximately one mile from its origin. Past electrofishing surveys approximately one mile downstream of the Mill Creek sampling site yielded rainbow trout, brook trout, cutthroat trout and hybrids. Presence of pure Yellowstone cutthroat trout in the upper reaches of Mill Creek may indicate some environmental barrier to non-natives or a physical passage barrier to non-native fish movement, or a combination of both.