

Adult Steelhead Spawning Survey Report – 2002

Scott River Tribs:

- Canyon Creek
- Kelsey Creek
- Moffett Creek
- Mill Creek (Scott Bar)
- Tompkins Creek
- South Fork Scott

by

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for the

US Forest Service

Adult Steelhead Spawning Survey Report, 2002

Submitted by Sue Maurer, June 13, 2002

Introduction:

Steelhead redd surveys were conducted between 3/21/02 and 5/6/02 on six tributaries within the middle Klamath region. The goal of the SRAMP was to make presence or absence spawning observations, to determine run timing and relative trends over time of the adult steelhead trout. These six streams were surveyed in 2001 and were selected because of the following factors: accessibility because of public land, they were representative of each sub-basin and they had adequate flow. The Shasta sub-basin did not have a suitable tributary, thus was not represented in the survey.

The USFS, Happy Camp Ranger District assisted with surveys on Grider Creek. The Salmon River Restoration Council assisted with some of the surveys within the Salmon River sub-basin and completed surveys on additional streams as well. The USFS, Scott River Ranger District also assisted with the surveys and completed additional surveys within the Scott sub-basin and on other mainstem Klamath River tributaries. Both additional data sets are included in this report, but are not part of the report results. Below are a list of the creeks that were surveyed by the CDFG, SRAMP:

Canyon Cr.	Scott River Sub-basin
Grider Cr.	Mainstem Klamath River
North Russian Cr.	Salmon River Sub-basin
Nordheimer Cr.	Salmon River Sub-basin
Knownothing Cr.	Salmon River Sub-basin
Blackbear Cr.	Salmon River Sub-basin

A cooperative survey within the Scott River sub-basin took place on 3/26/02. Participants included agency personnel from the USFS, Scott River Ranger District, CDFG and community volunteers. Data is included in the USFS data table. The following streams were surveyed:

- Kelsey Cr.
- Kelsey Spawning Channel
- Middle Cr.
- Moffett Cr.
- Mill Cr. (Scott Bar)
- Tompkins Cr.
- South Fork Scott River

Methods:

A two-pass survey was implemented on each stream between 3/21/02 and 5/6/02. Nordheimer, Knownothing and Blackbear were only surveyed once at the beginning of the season. The initial survey was conducted at the beginning of the spawning run and the second survey near the end of the run.

Tributaries were surveyed on-site by teams of two persons, moving from the upstream end to the downstream end of each reach. At the beginning and end of each survey the start and end time, air and water temperatures, weather conditions and surveyors names were recorded on the data sheet. Members of the team walked on opposite sides of the creek and moved in coordination until a redd was located. A criteria of 80% confidence by both team members was used to determine if a site was really a redd. Once a redd was located the position was entered into a hand held Garmin GPS unit and given a specific GPS name code. Data about each redd was noted on a field data sheet, which included the habitat type (pool, riffle, run), GPS name code and coordinates and notes. Redds with fish on them were distinguished from redds without fish. The location of the redd was also field mapped. If no GPS was available, this was noted. Each redd was flagged on the bank opposite the pott and the date, GPS code and surveyors initials were written on the flag.

Most streams were able to be surveyed safely in neoprene waders and felt soled wading boots. A wading staff is recommended. Canyon Cr. and Nordheimer Cr. require floating through steep-walled canyons and are best surveyed wearing dry suits at this time of the year due to very cold water temperatures.

Garmin GPS units were set at DATUM: NAD 27, and were read in the lat/long coordinate system, for ease in field location. However when the coordinates are exported, the DATUM is automatically changed to WGS84 and the coordinates can be converted into UTM or lat/long at the users preference.

Results:

Steelhead spawning presence was observed in all six streams. The total number of redds identified during the survey period in these streams was 96, as seen in Table 1. Ten live fish were observed during the course of the survey, nine of these were observed during the first pass. Grider Creek exhibited the greatest number of redds (51), of which the majority were found in riffle habitat (23). Location of redds within the other streams were more distributed throughout all three habitat types. Percentages of this distribution can be seen in Table 2. Overall percentages of habitat utilization for steelhead redds was 32.3% pools, 36.5% runs and 31.2% riffles. Redds in pools were in the tailouts of those pools.

The majority of the redds (66) were observed during the first pass, which took place in late March. Some fresh redds were observed and one live fish during the second pass in early May. This indicates the timing of this year's steelhead run took place from early-mid March through early May. One fresh carcass was found on the second survey of Grider Cr. It was a 46cm male with no fin clips. Tissue from the operculum and scales were taken.

Overall trends in spawning activity, as compared to 2001, shows less activity in most streams, except for Canyon Cr., which had the same number of redds (14) in both 2001 and 2002.

Discussion:

Identification of steelhead redds was relatively easy early in this season because there were no real high flows which scoured and moved gravel size substrate. Algae and silt were found on the substrate and cleaned areas where steelhead constructed redds were quite noticeable in contrast. During the survey period, however, two high flows occurred between the first and second pass. Redds constructed between the first pass and the first high flow were not identifiable during the second pass because the gravels were flattened and the potts were no longer distinct. This became evident when observing the location of the redds flagged from the first pass. Most were not distinguishable during the second pass, even though they were flagged. The second pass took place shortly after the second high flow and many of the redds constructed prior to that flow still had some form to them and were considered redds if they met the 80% confidence criteria. Redds constructed after the second high flow were distinguished by their form, but the contrast, as in the first pass, to the algae covered substrate and the area the fish worked could no longer be noticed. The bedload had moved and much of the entire stream appeared shiny and clean. Depositional areas had to be determined as opposed to actual redds. It is assumed that there were more redds constructed in each stream than the totals identified in this survey. Because Knownothing Cr., Nordheimer Cr. and Blackbear Cr. were only surveyed once (at the beginning of the season), the total number of redds in each of these streams is not comparable to those from 2001.

The use of the hand-held Garmin GPS unit has some limitations in deep canyons, where satellite coverage is sometimes limited or where the signal can bounce off canyon walls. Using the averaging feature may provide better accuracy, but some locations defined by GPS coordinates may be skewed. Accurate field mapping by surveyors is as important as the use of the GPS to determine actual location, especially when no satellites are available.

Adult coho salmon spawning took place throughout the Scott River watershed and in Grider Cr. this past winter (2001-2002). Of the six streams surveyed in this project, only Canyon Cr. was surveyed for coho spawning. Older, larger redds were observed in Grider Cr. and may have been coho redds. Surveyors did not include these redds in this survey. The extent of coho salmon spawning in the Salmon River watershed is unknown.

Snorkeling took place during the survey on Canyon Cr. in selected habitats for the purpose of observing juvenile (1+, 2+) habitat usage and behavior. Similar snorkel observations took place on the South Fork Scott River, the East Fork Scott River and in French Cr. (although not part of this survey) in late March as well. Water temperatures in March and April were 2° C-6° C. Interestingly, no fish at all were observed during these snorkel surveys, except for spawning adult steelhead. Two possible hypotheses developed: 1) the fish are hiding during the daytime and could be observed at night. 2)

the fish have moved down into the mainstem and would migrate back up the tributary later in the season when the water temperatures increased and food supply was greater. On 5/14/02 four habitat units were dived in the afternoon and again at night to try to test these hypotheses. Water temperatures, however had warmed to 10° C during the day and remained the same at 2100 hours that night. 2+ fish were observed in the dive units during the day. 1+ and more 2+ fish were observed during the night dive in each of the units. Unfortunately this effort took place too late in the season to fully test these hypotheses and is obviously limited in scope. This still may warrant further investigation.

Recommendations:

Understanding the presence/absence of adult steelhead spawners, the distribution and upper extent of the spawning range and the relative numbers of redds throughout the middle Klamath region, including the Scott, Shasta and Salmon Rivers, as well as the tributaries to the mainstem Klamath, is important for the understanding and management of the steelhead trout population. Surveying each stream at a minimum of once every other week would provide a more accurate count of the total number of redds in each stream. Adequate skilled personnel and funding to accomplish these surveys is required in order to do this well. Local volunteer effort is valuable, but is not adequate to accomplish these surveys.

TABLE 1
2002 Adult Steelhead Spawning Survey

Stream	Reach Description	Reach Distance (km)	Total # of Redds	Redds/km	Total # Live Fish
Canyon Cr.	Deep Cr. to Mouth	4.31	14	3.2	4
Grider Cr.	Bark Shanty Cr. to Bridge	7.816	51	6.5	3
Knownothing Cr.	Conf. E/W Forks to Mouth	4.763	1	0.2	1
N. Russian Cr.	Bridge to Mouth	4.283	17	4	2
Nordheimer Cr.	Bennett Flat to Mouth	4.97	11	2.2	0
Blackbear Cr.	God's Hand to Mouth	3.2	2	0.6	0
Total			96		10

TABLE 2
2002 Adult Steelhead Spawning Survey
Pass 1

Stream	Reach Description	Reach Distance (km)	Date of Survey	# Redds Total	# Redds/ Habitat		# Redds/ Run Habitat		# Redds/ Riffle Habitat		# Live Fish
					Pool	Habitat	Run	Habitat	Riffle	Habitat	
Canyon Cr.	Deep Cr. to Mouth	4.31	4/8/02	7	2	4	1	3	1	3	
Grider Cr.	Bark Shanty Cr. to Bridge	7.816	3/25/02	29	3	13	13	3	13	3	
Knownothing Cr.	Conf. E/W Forks to Mouth	4.763	4/4/02	1	1	0	0	0	0	1	
N. Russian Cr.	Bridge to Mouth	4.283	3/21/02	16	3	8	5	2	5	2	
Nordheimer Cr.	Bennett Flat to Mouth	4.97	3/21/02	11	6	5	0	0	0	0	
Blackbear Cr.	God's Hand to Mouth	3.2	3/28/02	2	2	0	0	0	0	0	
Totals				66	17	30	19	9	45	29	
Percentages					26	45	29				

Pass 2

Stream	Reach Description	Reach Distance (km)	Date of Survey	# Redds Total	# Redds/ Habitat		# Redds/ Run Habitat		# Redds/ Riffle Habitat		# Live Fish
					Pool	Habitat	Run	Habitat	Riffle	Habitat	
Canyon Cr.	Deep Cr. to Mouth	4.31	5/3/02	7	3	3	1	1	1	1	
Grider Cr.	Bark Shanty Cr. to Bridge	7.816	5/4/02	22	10	2	10	0	10	0	
N. Russian Cr.	Bridge to Mouth	4.283	4/25/02	1	1	0	0	0	0	0	
Totals				30	14	5	11	1	11	1	
Percentages					47	16.5	36.5				

Salmon River Restoration Council in cooperation with the Karuk Tribe and Dept. of Fish and Game

Salmon River Winter Steelhead 2002 Data

Date	Reach	Participants	Redd #	Air Temp	H2O Temp	Canopy %	Instream cover	Habitat type	Spawn Area sq ft available	% Area used	Comments
3/14/02	Matthews	Cathy Leavens Candace Wase	0								No Redds
3/14/02	St Claire 3 mi. to mouth	Pete Cafferata Forest Buchin	1 2 3 4 0			15 35 15 5	bubble/rockledge Rock Rock/Bubble Man made log	tail out shallow pool run head of riffle run	70 20 60 15x3	5x8 2x5 2.5x6 6x2	male and female live on redd trading positions
3/14/02	Crawford 3 mi. to mouth	Adam Jacobs Peter Brucker	0								No Redds
3/21/02	Specimen	Adam Jacobs Irie Swift	1 2 3 0	19.5C	8C	75 30 0	Boulder log log	run run run	11 20 50	6 19 24	One Live at .5 mile Partly Cloudy 10:30 am - 3:30 pm
3/21/02	Kelly Gulch	Cathy Leavens Candace Wase	0								Not good access at mouth shallow ribbons to culvert
3/21/02	North Russian	Sue Maurer	DFG	HAS COPY							
3/21/02	Nordhiemer	Pete Cafferata	DFG	HAS COPY							
3/26/02	Butler .4 mi. to mouth	Toz Soto Slate Boykin	1 2 3			90 90 90	Boulder Boulder Boulder	riffle riffle riffle	20 30 30	8 6 6	redds were all below falls at mp .4 falls are 75 ft high 2 stlhd on one redd
3/27/02	Merril 2 mi. to mouth	Toz Soto George Pearlringi	1	24C	11C	80	wood undercut bank	riffle	10	6	#1 small redd (1/2in.-2in.) gravel many resident spawning redds were in small gravels (.5-1.5in.dia.)Redd size(1ft.x.5ft.)
3/28/02	Methodist	Cathy Leavens Candace Wase	0	13.5C	6.5C						NO REDDS Found 15 old flags from 2001 with good habitat but no new activity
3/28/02	Black Bear	Pete Cafferata	DFG	HAS COPY							
4/4/02	Crapo	Cathy Leavens Jessica Hanscom Candace Wase	0	13C	8C		WASHED OUT				NO REDDS Barrier one mile up 10 foot falls High Flow
4/4/02	St Claire	Adam Jacobs	WASHED OUT				NO SURVEY				
4/4/02	Plummer	Nat Pennington	WASHED OUT				NO SURVEY				
4/4/02	Knownothing	Pete Cafferata	DFG	HAS COPY							
4/28/02	North Russian	Pete Cafferata	DFG	HAS COPY							
5/2/02	Whites Gulch lower mile	Nat Pennington	1 2 3 4	15C	7C	?	undercut Pool Wood	pool tail crest low grad.riffle pool tail	2x2 2x3 3x3	2x2 2x2 3x3	observed 1 live fish @ Redd #2 creek seems sediment impacted

ADULT STEELHEAD SURVEY, 2002 USFS DATA

CODE#	STREAM	REACH DESCRIPTION	REACH CODE	SURVEYOR(S)	DATE	PASS #	START TIME	H ₂ O TEMP °C	AIR TEMP °C	END TIME	H ₂ O TEMP °C	AIR TEMP °C	WEATHER	METHOD	REDDS FLAGGED (Y or N)
	Taylor	1.5 miles above confluence down		Reber, Reid	3/4/02	1	14:00	10	NA	15:15	NA	NA	CLEAR	WALK	N
	Taylor	Bridge down to 1.5 miles		Kreidler, Salzman	3/4/02	1	14:00	10	72	15:00	NA	NA	CLEAR	WALK	N
	Horse Creek	Bridge at 44N77 down to 0.10 miles above private (1.5 miles)		Reber, Reid	4/12/02	1	12:20	NA	23	15:30	NA	NA	CLEAR	WALK	Y
	Horse Creek	Start 44N77, walk up 2.0 miles		Salzman	4/5/02	1	13:00	8	NA	15:15	NA	NA	CLOUDY	WALK	Y
SFK01S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK02S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK03S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK04R	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	Y
SFK05S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK06S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK07S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK08S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK09S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK10S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK11S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N

ADULT STEELHEAD

CODE#	STREAM	#REDDS W/FISH	#REDDS WO/FISH	#FISH	GPS Y or N	LAT	LONG	NOTES
	Taylor	0	0	0	N			Woody debris in the channel creating plunge pools. Substrate is composed of large boulders.
	Taylor	0	0	0	N			Mostly cascading water with some high-gradient riffles. Substrate either small boulders (large rocks) or sand.
	Horse Creek	2	30	2	N			Large woody debris was removed approx. 10-15 yrs. Ago. Presently, the amount of wood in the channel is increasing causing plunge pools and lateral scour pools. Riparian reserve is composed of old growth canopy with shade near 100.
	Horse Creek	1	2	2	N			Fast moving water, slightly cloudy. Variety of substrate from fines to boulders. Interest FHIP multicascaade 1.5 miles from the bridge.
SFK01S	S. Fork Scott	0	0	0	N			Snorkeled pool at Fox Cr., 100 ft. up Fox Cr. and side channel opposite Fox Cr. No fish observed. Undercut bank w/ SWD. Good YOY habitat, no 1+ observed.
SFK02S	S. Fork Scott	0	0	0	Y			Snorkeled backwater pool, bedrock formed. No LWD. No fish observed.
SFK03S	S. Fork Scott	0	0	0	Y			Snorkeled main channel pool w/ bedrock ledge, white water, no wood. No fish observed.
SFK04R	S. Fork Scott	0	1	0	Y			Reed constructed in eddy-built backward.
SFK05S	S. Fork Scott	0	0	0	Y			Snorkeled pool, bedrock formed. No fish observed.
SFK06S	S. Fork Scott	0	0	0	Y			Snorkeled bedrock formed LSP pool below ditch return (concrete box). Bedrock ledge, white water, no wood. No fish observed.
SFK07S	S. Fork Scott	0	0	0	Y			Snorkeled run below SFK06S, shallow/fast, no wood, white water, boulder cover. No fish observed.
SFK08S	S. Fork Scott	0	0	0	Y			Snorkeled LGR w/ willows growing mid channel at head of large bar upstream of Boulder Cr. No fish observed.
SFK09S	S. Fork Scott	0	0	0	Y			Snorkeled shallow pool below possible juvenile velocity barrier. No fish observed.
SFK10S	S. Fork Scott	0	0	0	Y			Snorkeled pool w/ bedrock in middle, river left downstream one riffle from SFK09S. No wood. No fish observed.
SFK11S	S. Fork Scott	0	0	0	Y			Snorkeled LSP/bedrock formed. Deep, no wood. No fish observed. Reed in tailout.

CODE	STREAM	REACH DESCRIPTION	REACH CODE	SURVEYOR(S)	DATE	PASS #	START TIME	H ₂ O TEMP °C	AIR TEMP °C	END TIME	H ₂ O TEMP °C	AIR TEMP °C	WEATHER	METHOD	REDDS FLAGGED (Y or N)
SFK12R	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	Y
SFK13S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
SFK14R	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	Y
SFK15R	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	Y
SFK16S	S. Fork Scott	Fox Creek to Boulder Creek		Maurer, Eller	3/26/02	1	11:05	2	17	16:07	4	17	NA	WALK	N
	Kelsey	Artificial Spawning Channel		Salzman, Flickinger	3/26/02	2	13:15	6	NA	15:00	6	NA	NA	WALK	Y
	Middle	1 mile up from mouth down (Lower Middle Crk.)		Flickinger, Salzman	3/26/02	1	10:30	6	15	12:45	6	17	NA	WALK	N
	Kelsey	Lower 1 mile to mouth		Flickinger, Salzman	3/26/02	1	13:15	6	18	15:00	6	18	NA	WALK	Y
	Moffett	1.2-0.2 mi above Hwy 3		Flickinger, Salzman	3/26/02		16:05	11	NA	17:05	11	NA	NA	WALK	N
	Middle	Tributary to Horse, Mouth up?, T17N, R11W, Sec 32		Reber?	4/25/02	1	NA	9	NA	NA	NA	NA	NA	NAWALK	N
	Kelsey	Kelsey Channel		Salzman	5/3/02	3	16:30	9.5	11	17:00	NA	NA	NA	WALK	Y
	Barkhouse	Mouth to 2nd County Bridge, 0.75 mi		Reber, Salzman	4/11/02	1	14:00	11.5	23.9	16:00	NA	NA	NA	NAWALK	N
	Scott Bar Mill	Mouth to 6 Miles		Reber, Kreidler, Yokel	3/26/02								Clear	Walk	N
	Tompkins	From Low Water Crossing to Potato Patch		Reber, Kreidler, Yokel	3/26/02								Clear	Walk	N

CODE	STREAM	#REDDSW/FISH	#REDDSWO/FISH	#FISH	GPS Y or N	LAT	LONG	NOTES
SFK12R	S. Fork Scott	0	1	0	Y			Redd in tailout of LSP pool.
SFK13S	S. Fork Scott	0	0	0	Y			Snorkeled run habitat w/ 2 old coho redds 1/11/02. Not much undercut, some overhanging alders & willows. No fish observed.
SFK14R	S. Fork Scott	0	1	0	Y			Redd in same run as SFK15R, just above Boulder Cr.
SFK15R	S. Fork Scott	0	1	0	Y			Redd in same run as SFK14R, just above Boulder Cr. Redd consists of 2 spots. Built on top of coho redds SFK47R (2 redds).
SFK16S	S. Fork Scott	0	0	0	Y			Snorkeled deep, swift run and conf. of Boulder Cr. No wood. No fish observed.
	Kelsey	0	1	0	N			3 Redds location previously flagged by J. Kijgore on 1/26/02. 1 new redd in 2nd section down from road crossing.
	Middle	0	0	0	N			Coarse gravel/small cobble substrate rare (only #6 sites had substrate that was suitable for spawning). Several barriers were 4-7 ft. high. Mouth of Middle Creek also presents passage difficulties. Flagged (in pink) the start pt.
	Kelsey	0	4	0	N			1 Redd likely (just above road/bridge crossing.) 2 redds (questionable) further upstream. Not much suitable spawning substrate.
	Moffett	0	0	0	N			Major sediment/silt embeddedness covering entire stream channel. Little opportunity for spawning.
	Middle	0	0	0	N 17N	11W		Water was cloudy. Lots of grey silt. Lots of sediment. Stream is very embedded.
	Kelsey	0	1	0	N			New Redd is two-thirds of the way down in the 4th bin.
	Barkhouse	NA	16	6	N			Excellent cover. Good mature Alder and Cottonwood canopy. Lower section of stream has water diversion that needs a screen. Looks like there is evidence of a salmon redd, need to dive to confirm. Approximately 12 test redds are present.
	Scott Bar Mill	1	1	1	N			Not a lot of usable cobble.
	Tompkins	0	0	0	N			Lots of flood damage. 1997 flood?. Stream has established new channel. Not a lot of spawning grounds/habitat available. Large amount of woody debris.

CODE#	STREAM	REACH DESCRIPTION	REACH CODE	SURVEYOR(S)	DATE	PASS #	START TIME	H ₂ O TEMP °C	AIR TEMP °C	END TIME	H ₂ O TEMP °C	AIR TEMP °C	WEATHER	METHOD	REDDS FLAGGED (Y or N)
EFK01R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK02F	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	N
EFK03R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK04R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK05S	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	N
EFK06R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK07R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK08S	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	N
EFK09R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK10R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK11S	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	N
EFK12S	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	N
EFK13R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK14R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y

CODL	STREAM	#REDDS W/FISH	#REDDS WO/FISH	#FISH	GPS Y or N	LAT	LONG	NOTES
EFK01R	E. Fk Scott	1	0	1	Y			One adult, probably female.
EFK02F	E. Fk Scott	0	0	2	Y			Snorkled LSP w/ terr. veg cover and SWD instream. One female and one small male (1/2 lb'er) observed.
EFK03R	E. Fk Scott	0	1	0	Y			Two spots.
EFK04R	E. Fk Scott	0	1	0	Y			Landowner observed 2 fish spawning on 3/4/02. Redd not distinguishable now.
EFK05S	E. Fk Scott	0	0	0	Y			Snorkel location. No fish observed.
EFK06R	E. Fk Scott	0	1	0	Y			
EFK07R	E. Fk Scott	0	1	0	Y			
EFK08S	E. Fk Scott	0	0	0	Y			Snorkled LSP w/ undercut bank and SWD. Boulder in middle of channel. No fish observed.
EFK09R	E. Fk Scott	0	1	0	Y			
EFK10R	E. Fk Scott	0	1	0	Y			
EFK11S	E. Fk Scott	0	0	0	Y			Snorkled pool w/ bedrock ledge, spring seep. No wood. No fish observed.
EFK12S	E. Fk Scott	0	0	0	Y			Snorkled backwater pool w/ rootwads, may be beaver den. No fish observed.
EFK13R	E. Fk Scott	1	0	1	Y			One fish observed near redd.
EFK14R	E. Fk Scott	0	1	0	Y			

CODL	STREAM	REACH DESCRIPTION	REACH CODE	SURVEYOR(S)	DATE	PASS #	START TIME	H ₂ O TEMP °C	AIR TEMP °C	END TIME	H ₂ O TEMP °C	AIR TEMP °C	WEATHER	METHOD	REDDS FLAGGED (Y or N)
EFK15R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK16R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK17S	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	N
EFK18R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK19R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK20R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK21R	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	Y
EFK22S	E. Fk Scott	J Phelps Ranch		Maurer, McNeil, J. Phelps, R. Phelps	4/1/02	1	9:54	7	23	14:00	10	23	Clear	Walk/Dive	N
FRE01S	French Cr.	Broken K Ranch		Maurer	4/5/02	1	15:25	8	18	17:14	8	13	partial cloudy	walk/dive	N
FRE02S	French Cr.	Broken K Ranch		Maurer	4/5/02	1	15:25	8	18	17:14	8	13	partial cloudy	walk/dive	N
FRE03S	French Cr.	Broken K Ranch		Maurer	4/5/02	1	15:25	8	18	17:14	8	13	partial cloudy	walk/dive	N
FRE04S	French Cr.	Broken K Ranch		Maurer	4/5/02	1	15:25	8	18	17:14	8	13	partial cloudy	walk/dive	N

CODE	STREAM	#REDDS W/FISH	#REDDS W/OFISH	#FISH	GPS Y or N	LAT	LONG	NOTES
EFK15R	E. Fk Scott	0	1	0	Y			Older redd.
EFK16R	E. Fk Scott	0	1	0	Y			
EFK17S	E. Fk Scott	0	0	0	Y			Snorkled mid channel- undercut bank, little wood. No fish observed.
EFK18R	E. Fk Scott	0	1	0	Y			Redd located just below Grouse Cr., near EFK19R & EFK20R. Photo #21.
EFK19R	E. Fk Scott	0	1	0	Y			Redd located just below Grouse Cr., near EFK18R & EFK20R. Photo #21.
EFK20R	E. Fk Scott	0	1	0	Y			Redd located just below Grouse Cr., near EFK18R & EFK19R. Photo #21.
EFK21R	E. Fk Scott	0	1	0	Y			Redd located at end of reach. May still be in progress. Flushed pair of canada geese.
EFK22S	E. Fk Scott	0	0	0	Y			Snorkled end of reach. No fish observed.
FRE01S	French Cr.	0	0	0	Y			Snorkled swift glide habitat w/ minor undercut bank and SWD, below inflow site. No fish observed.
FRE02S	French Cr.	0	0	0	Y			Snorkled shallow pool at beginning of braided reach. LWD/SWD. No fish observed.
FRE03S	French Cr.	0	0	0	Y			Snorkled swift glide habitat w/ LWD across stream- small debris jam w/ quiet water behind. No fish observed.
FRE04S	French Cr.	0	0	0	Y			Snorkled swift/deep glide habitat w/ deep undercut bank-probable beaver den w/ cuttings back under bank. No fish observed.

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