

## **Habitat Inventory**

### **Scott River Mainstem – Horn Lane to above Fay Lane**

#### **Watershed Overview**

This portion of the Scott River mainstem includes the area from the Horn Lane Bridge outside of Etna to 1.1 miles above the Fay Lane Bridge, 6 miles north of Callahan. (See **Map #4**) This reach is immediately downstream of the tailings piles north of Callahan. The tailings are six miles of dredger piles created by the Yuba dredge in the 1930's. Legal description of this reach is T41N R9W Sec 35 and T42N R9W Sec 2,11,13,14,24. Elevation ranges from 2800 to 2860 feet.

This section is broken out into three stream reaches based on Channel Typing. Reach 1 (Scott 1) is from the Horn Lane Bridge to the Scott Valley Irrigation District Ditch (SVID). Reach 2 (Scott 2) is SVID to the mouth of French Creek. Reach 3 (Scott 3) is from the mouth of French Creek upstream to approximately 5,808 feet above the Fay Lane Bridge. Tributaries include McConaughey Gulch (ephemeral) and French Creek.

#### **Habitat Restoration and Protection Efforts**

The reaches Scott 2 and Scott 3 include part of the Fay Lane Restoration Project, a 4.5 mile section of the river. The Fay Lane Restoration Project was funded by the Cantara Trustee Council in 1996. The goal of the project was to stabilize eroding banks, providing a stable single thread channel, and establish a permanent protected riparian area. At completion of this project, 7,200 feet of stream bank stabilization were implemented at 14 sites, 102 in-stream structures were placed, 9 miles of riparian fencing were constructed, 71 acres of riparian planting (willow, cottonwood, alder). Two fish screens were installed and 2 stockwater systems installed.



Scott River at French Creek – Looking South

#### **Habitat Inventory Results**

The habitat inventory was conducted July 23-31<sup>st</sup> 2003. The total length of stream surveyed was 33,683 feet (6.4 mi).

#### **Channel Type**

**Scott 1 and 2** were channel typed as F4 channel type from Horn Lane bridge to the French Creek. F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominated substrates. **Scott 2** was channel typed as F3; F3

channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and cobble-dominated substrates

**Habitat Type**

Table 1 summarizes the level II riffle, flatwater and pool habitat types.

**Table 1 – Level II Habitat Types by Percent Occurrence**

Reach	Pool	Riffle	Flatwater	Dry
Scott # 1	17%	42%	40%	0%
Scott # 2	30%	30%	41%	0%
Scott # 3	14%	41%	43%	0%

**Table 2 – Level II Habitat Types by Percent Total Length**

Reach	Pool	Riffle	Flatwater	Dry
Scott # 1	10%	26%	64%	0%
Scott # 2	20%	18%	62%	0%
Scott # 3	9%	34%	67%	0%

**Graph #1a-c** shows Level IV habitat by percent occurrence. All three reaches were predominantly low gradient riffle, combined with run/glides.

**Instream Cover and Shelter Rating**

**Cover**

Instream shelter is composed of those elements within a stream channel that provide salmonids protection from predation, reduce water velocities so fish can rest and conserve energy, and allow separation of territorial units to reduce density related competition. These elements are: undercut banks, small and large woody debris, root mass, terrestrial vegetation, aquatic vegetation, bubble curtain, boulders, and bedrock ledges.

Table 3 shows mean percent cover by Level IV habitat type for each reach.

**Table 3 Mean Percent Cover by Level IV Habitat Type**

Habitat Type	n	Undercut Bank	SWD	LWD	Root Mass	Terrestrial Veg	Aquatic Vegetation	White Water	Boulders	Bedrock Ledge
<b>Scott # 1</b>										
LGR	3	0	33	0	0	60	0	70	0	0
CAS	1	0	20	0	0	20	0	20	40	0
GLD	2	0	0	0	0	35	20	0	45	0
RUN	1	0	10	0	0	80	10	0	0	0
SRN	1	10	30	10	0	20	10	0	20	0
MCP	5	0	4	0	0	40	16	0	40	0
CRP	2	0	15	10	10	15	0	0	50	0
SCP	2	15	0	0	0	85	0	0	0	0
<b>Scott # 2</b>										
LGR	2	10	0	0	10	50	0	10	20	0
GLD	1	15	0	0	0	70	0	0	15	0
RUN	1	0	0	0	0	100	0	0	0	0
MCP	1	0	5	0	0	80	5	0	10	0
LSBo	5	2	4	0	1	22	0	1	70	1
SCP	1	0	0	0	0	0	0	0	100	0
DPL	1	10	5	0	0	70	0	0	15	0
<b>Scott # 3</b>										
LGR	5	0	0	0	0	40	10	30	20	0
HGR	1	0	0	0	0	20	0	80	0	0
GLD	1	0	100	0	0	0	0	0	0	0
RUN	2	0	30	0	55	5	0	0	10	0
SRN	1	0	0	0	0	80	0	0	20	0
MCP	3	0	0	0	0	27	0	13	60	0
CCP	1	0	0	0	0	0	0	0	100	0
CRP	2	0	0	0	0	13	0	0	88	0
LSL	5	6	38	8	16	30	2	0	0	0
LSBo	1	0	0	0	0	20	0	0	80	0
SCP	1	25	25	0	10	40	0	0	0	0
DPL	1	0	0	0	0	100	0	0	0	0

(LGR)low gradient riffle, (HGR)high gradient riffle, (CAS)Cascade, (BRS)Bedrock Sheet,(POW)pocket water, (GLD)glide,RUN(run), (SRN)step runs, (EDW)Edgewater,(MCP)mid-channel pool,(CCP) channel confluence pool, (STP)step pool, (CRP)Corner pool, (LSL) lateral scour pool-log, (LSR) lateral scour pool-root wad, (LSBk) lateral scour bedrock-formed, (LSBo) lateral scour boulder-formed (SCP)secondary channel pool,(BPB) Backwater Pool – Boulder formed, (BPR) Backwater Pool -Root Wad formed, (BPL) Backwater Pool-log formed, (DPL)dammed pool

All three reaches showed terrestrial vegetation and boulder as the dominant cover type.

**Pool Cover**

Graph # 2a-2c show mean percent cover in pools by reach. Scott 1 and Scott 3 had the greatest variety of cover. However, all three reaches showed terrestrial vegetation making up at least 30% of the cover in pools.

**Shelter Rating**

Each habitat unit fully measured had a shelter value assigned, on a scale of 0-3. A zero value denotes no shelter, 1(low), 2 (medium), 3 (high). Then a value is assigned for percent of unit covered, and all cover is then classified according to the above listed nine cover types. The shelter rating is calculated for each fully-described habitat unit by multiplying shelter value and percent total unit covered. Thus shelter ratings can range from 0-300, and expressed as mean value by

habitat type within stream reach. In the reaches surveyed in the Scott River during 2003, shelter values ranged from 0-160.

**Table IV Shelter Rating by Level II Habitat Type**

Habitat Type	Scott 1		Scott 2		Scott 3	
	rating	n	rating	n	rating	n
Riffle	9	22	5	8	0	41
Flatwater	5	21	0	11	3	43
Pool	5	9	11	8	11	14

n = # of units surveyed

**Table V Shelter Rating by pool type.**

Habitat Type	Scott 1		Scott 2		Scott 3	
	rating	n	rating	n	rating	n
Main	4	5	0	1	0	4
Scour	13	2	15	5	16	8
Backwater	0	2	5	2	15	2

**Wood**

For each fully described habitat unit a count was made of all wood within bankfull width of the stream channel. Wood was counted in the following categories: diameter>4", diameter>18", diameter>12" and L>20', D>12" & 6'<L>20'. See **Appendix B. Woody Debris** for a comparison of all the reaches surveyed in 2003.

	D>4"	all D>1'	D>1' L>20'	D>18"
<b>Scott River - Rch1</b>	14.5	10.3	9.3	0.0
<b>Scott River - Rch2</b>	7.5	6.3	1.3	0.6
<b>Scott River - Rch3</b>	14.5	16.4	11.6	1.9

**Pool Habitat**

A total of 32 pools were identified in the survey reach.

**Graph # 3a-c** summarizes maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. CDFG identifies pools with depths greater than 2 feet as primary pools. Pools greater than 3 feet have been identified as ideal for coho salmon.(Moyle 2002). Nine of the pools (21%) had a depth greater than three feet, four pools (9.5%) had a depth greater than four feet, and twenty six (62%) of the remaining pools had a depth greater than 2 feet.

**Table 7 Dominant Substrate by Habitat Type(Percent)**

Habitat Type	Silt/Clay	Sand	Gravel	Small Cobble	Large Cobble	Boulder	Bedrock
<b>Scott # 1</b>							
LGR	0	0	100	0	0	0	0
CAS	0	0	0	0	0	100	0
GLD	0	50	50	0	0	0	0
RUN	0	0	100	0	0	0	0
SRN	0	0	100	0	0	0	0
MCP	0	80	20	0	0	0	0
CRP	50	0	50	0	0	0	0
SCP	100	0	0	0	0	0	0
<b>Scott # 2</b>							
LGR	0	0	100	0	0	0	0
GLD	0	0	100	0	0	0	0
RUN	0	0	100	0	0	0	0
MCP	0	100	0	0	0	0	0
LSBo	40	0	60	0	0	0	0
SCP	100	0	0	0	0	0	0
DPL	0	100	0	0	0	0	0
<b>Scott # 3</b>							
LGR	0	0	0	67	33	0	0
HGR	0	0	0	100	0	0	0
GLD	0	0	100	0	0	0	0
RUN	0	0	50	50	0	0	0
SRN	0	0	0	100	0	0	0
MCP	67	0	33	0	0	0	0
CCP	0	100	0	0	0	0	0
CRP	0	50	50	0	0	0	0
LSL	0	40	0	40	0	0	0
LSBo	0	0	0	100	0	0	0
SCP	0	100	0	0	0	0	0
DPL	0	0	100	0	0	0	0

**Pool Tail-Out:** Pool tail substrate composition was measured at all pools. In addition, the depth of cobble embeddedness was estimated at pool-tailouts. See **Graph # 4a-c** for pool tail substrate composition. Scott 1 and Scott 3 were predominately gravel, and Scott 2 was a mixture of sand, gravel, large & small cobble, with small cobble being dominant. **Graphs # 5a-c** shows the pool tail embeddedness.

#### **Riparian and Canopy Cover**

Canopy cover was measured at the top of each fully described unit. **Graphs #6a-c** shows Percent Canopy Cover. The entire reach was 98-100 % open, with deciduous trees making up the cover.. **Graph # 7a-c** show dominant vegetative bank cover, by percentage. All three reaches were dominated by brush, with Scott 2 showing the most deciduous trees at 29%, and Scott 3 having most non-vegetated bank. **Graph # 8a-c** shows Dominant Bank Composition by percentage. All three reaches were cobble/gravel, with 13-18% silt/clay.

## **Discussion**

The mainstem Scott River was Channel and Habitat typed from the Horn Lane Bridge to 1.1 miles above the Fay Lane Bridge. The total length of stream surveyed was 33,683 feet (6.4 mi).

**Scott 1 and 2** were channel typed as F4 channel type from Horn Lane bridge to the mouth of French Creek. F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominated substrates. **Scott 3** (French Cr. To above Fay Lane) was channel typed as F3; cobble-dominated substrates.

It should be noted that this 6.4 miles was the only valley section of the Scott River Mainstem habitat typed during 2003. As such, there is no other reach to serve as a basis for comparison. Therefore, this data can only be used as a point of comparison from the 1996, pre Cantara project, as well as a baseline for the future. Future habitat inventory should include the valley mainstem north of Horn Lane to Meamber Gulch.

## **Instream Cover and Shelter**

Riffle and pool habitat are the primary types used by salmonids for summer rearing. Riffles provide feeding habitat for salmonids, and pools provide both thermal refugia, and refuge from predation. Instream habitat measured during this inventory looked at two components: complexity(variety) of instream cover features, and percent of habitat unit covered. A high percentage of flatwater (such as glides and runs) can indicate aggradation, such as pool filling. Flatwater typically provides less feeding habitat and cover than riffle or pool habitats.

The pool to riffle ratios were 1:2.5, 1:1, and 1:3.5 respectively. In 1996 the California Dept of Fish and Game (CDFG) completed Level II habitat typing on a 1.6 mile reach beginning below the mouth of French Creek.( a portion of Scott 2 & 3). In this reach the pool to riffle ratio was 1:1.6.

## **Riffle and Flatwater**

Flatwater habitat ranged from 62-67% of the total length surveyed, riffle habitat made up 18-34 % of total length surveyed. Shelter ratings for both flatwater and riffle were the poorest documented in the watershed for 2003, ranging from 0-9. Terrestrial vegetation was the dominant form of cover in riffle/flatwater. This is poor quality cover for riffles because it covers only the edges of the habitat, while salmonids must use the whole riffle for feeding.

## **Pools**

Pools made up 9-20% of the total length surveyed. A total of 32 pools were identified in the survey reach, for a total of 5 pools per mile. Thirty-one (31) of the 32 (97%) pools had a depth greater than 3 feet, and 22 (69%) had a depth greater than 4 feet. Shelter ratings for pools were the poorest documented in 2003, ranging from 5-11. The low shelter rating was due to the small percent of pool covered. In the 1996 survey of the Cantara reach, 80% of pools had a depth greater than 3 feet.

Pools in reach #1 and #3 showed a fair complexity of cover, while reach # 2 showed boulder dominating, at 61% of cover. Based on the complexity of pool cover, Scott # 1 and 3 received a med-high ranking in pool shelter for streams surveyed in the Scott in 2003. Scott # 2 received a low ranking. The ranking criteria was: Low = 1-3 types of shelter, Med = 4-6 shelter types, High = 7-9 shelter types.

**Spawning**

The pool tailout substrate is used as an indicator of spawning suitability. Dominant substrate in Scott 1, 2, 3 was small cobble and gravel, which is preferable for spawning. Embeddedness was in the range of 0-50%, embeddedness values of less than 25% are considered optimal. Reach 2 showed the most embeddedness, and could potentially be influenced by sediment movement out of French Creek. Overall, the survey reach appears to be very suitable for salmonid spawning. This section of the Scott River is used annually by Chinook salmon for spawning. (CDFG Carcass Surveys)

**Summary**

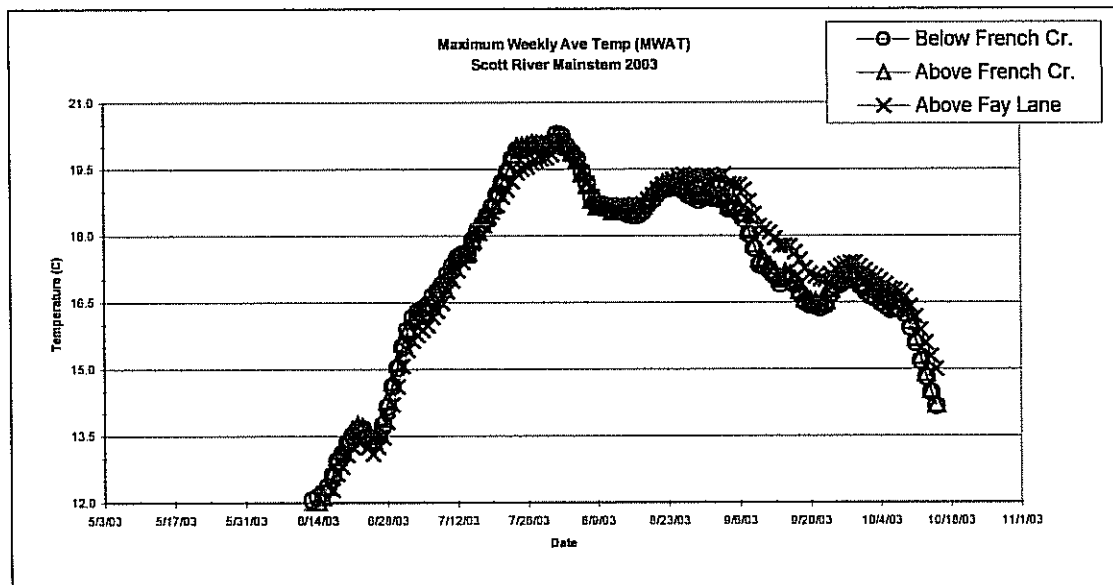
Reach 2 - SVID to French Creek, is heavily influenced by French Creek. Instream conditions in this reach will continue to be affected by French Creek. McNeil data collected in French Creek in 2000 indicated that at that time, sediment was still moving out of French Creek. Future monitoring in this reach may show an improvement in instream conditions, as sediment continues to move downstream. Reach 1, Horn Lane to SVID, is impacted by the SVID dam. The California Dept. of Fish and Game is removing and constructing a new Fish Ladder and Diversion Structure at SVID. This may affect instream conditions in this Reach. Reach 3, above French Creek, shows potential for high quality habitat. In the area just above this reach, the river begins to braid, and there is a large amount of beaver activity. Time constraints did not allow this reach to be surveyed. This should be a high priority for both future habitat typing, as well as some winter rearing studies.

**Water Quality**

**Temperature**

Continuous recording dataloggers (Onset Stowaway) were placed in Reach #2 and # 3 from mid-May through October 15<sup>th</sup>, 2003. Graph # 9 shows the Maximum Weekly Average Temperature (MWAT) for this period.

**Graph # 9**



The six year average MWAT for these locations are: Below French Creek 19.4° C, above French Creek 19.5° C, and above Fay lane 19.7° C. This is outside the optimal range for salmonid

summer rearing. However, by mid-October, when Chinook are spawning temperatures have dropped to an acceptable range.

**Macroinvertebrates**

No macroinvertebrate samples were collected in this reach of the Scott River.

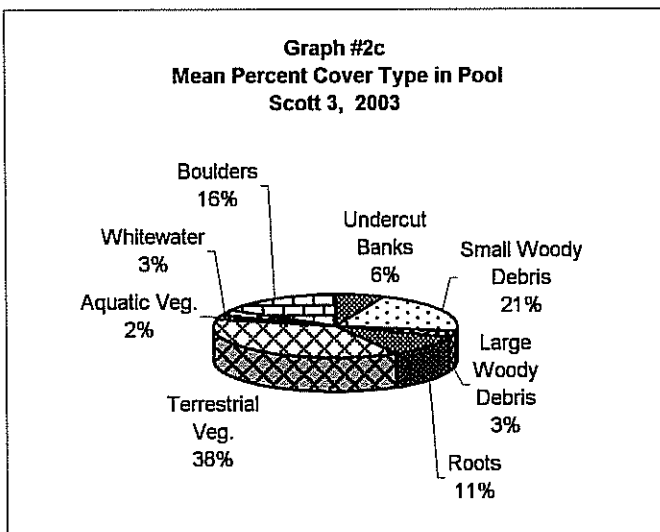
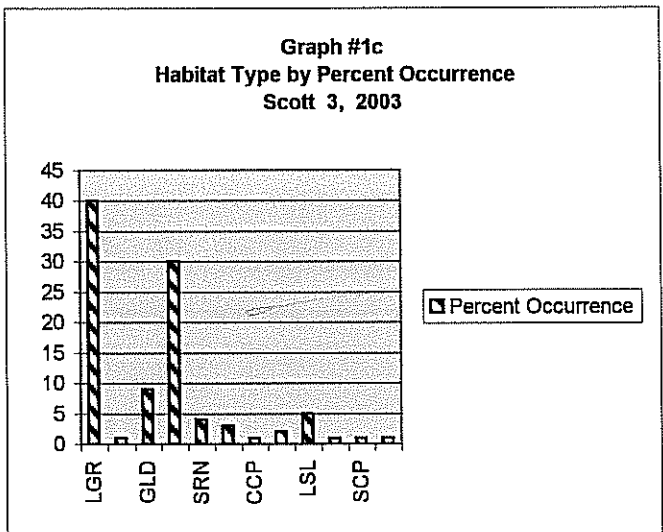
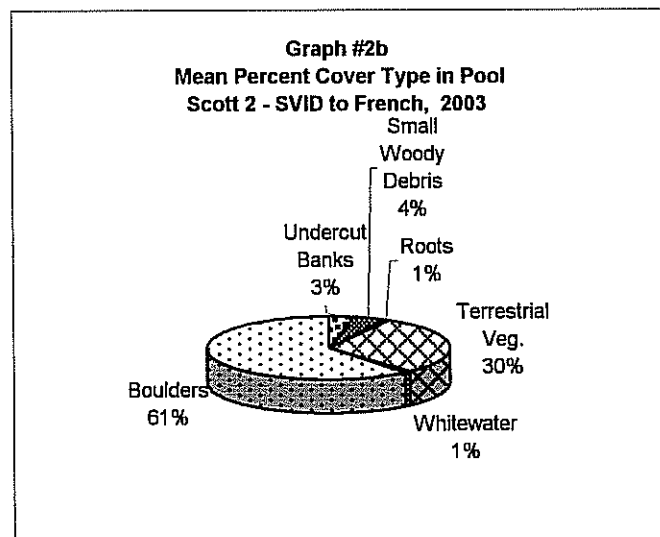
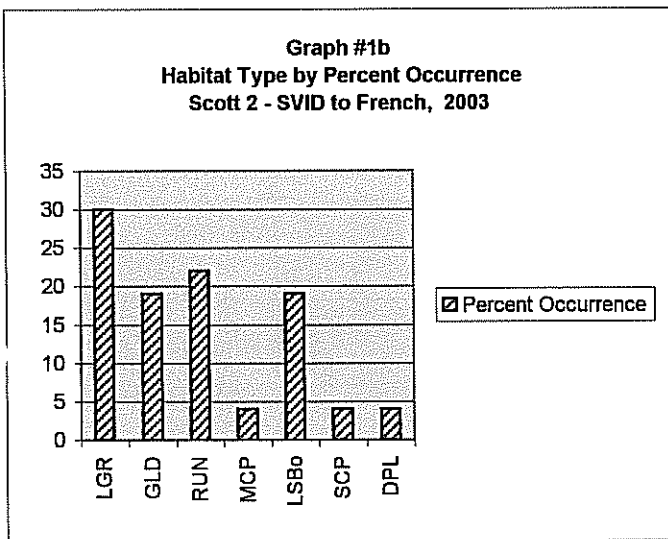
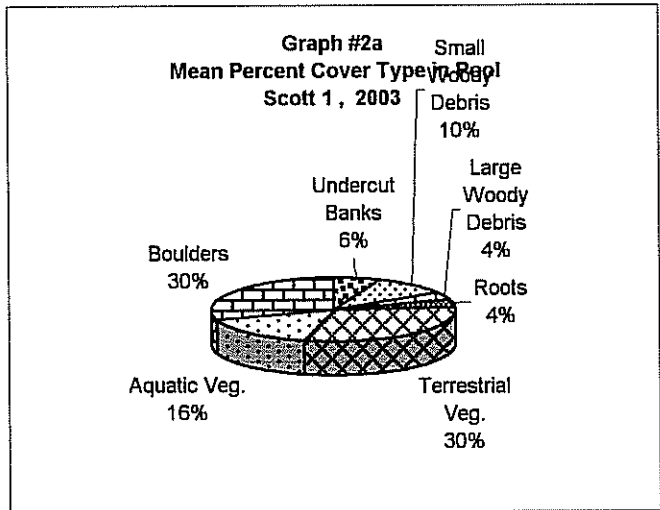
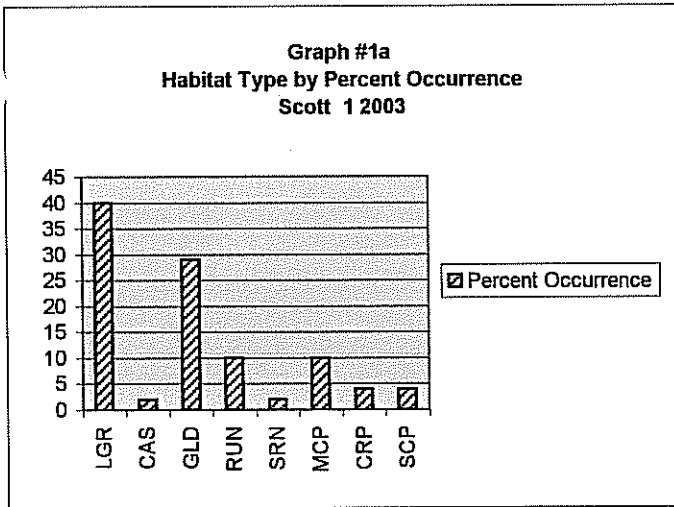
**Water Quality Summary**

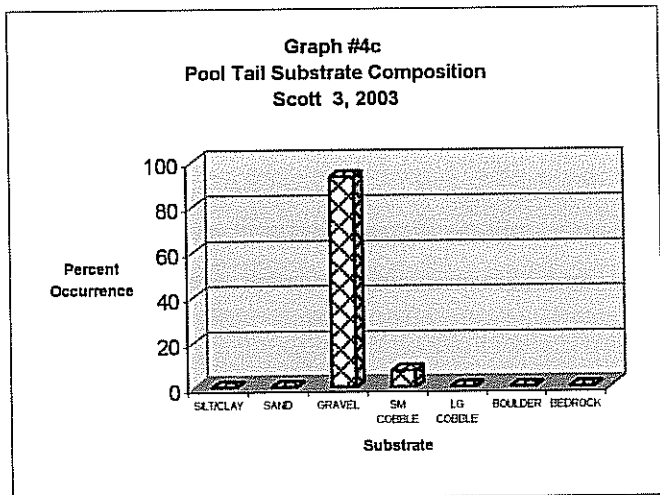
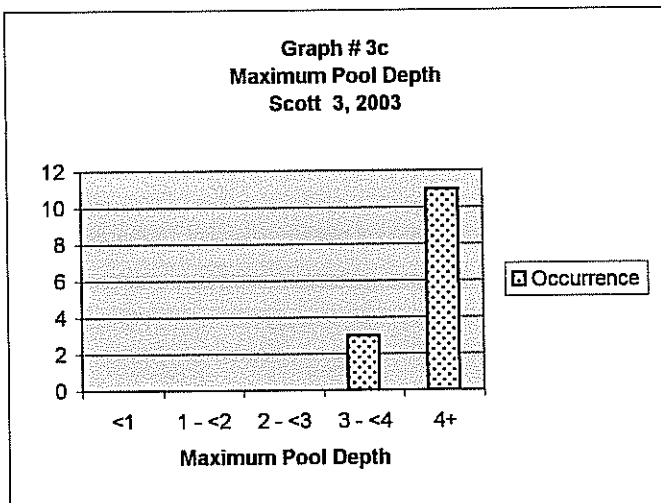
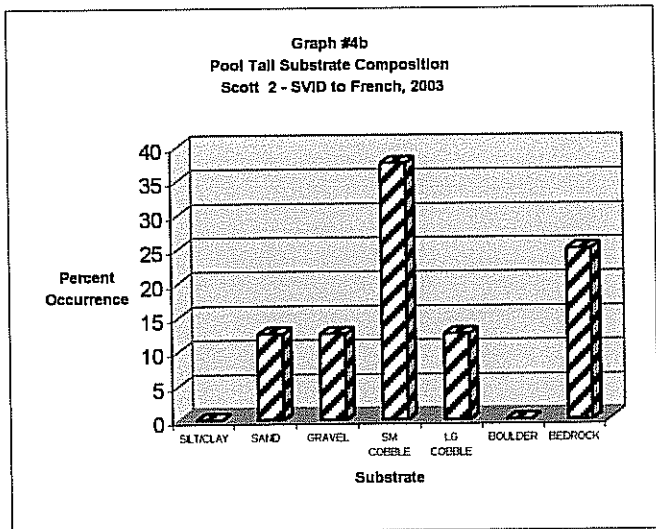
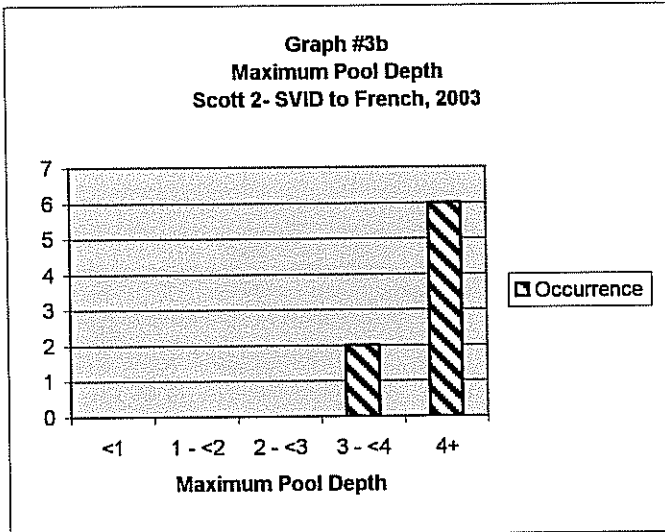
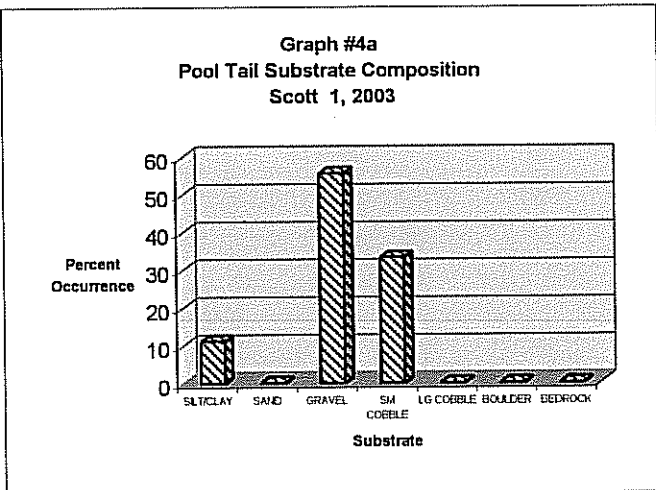
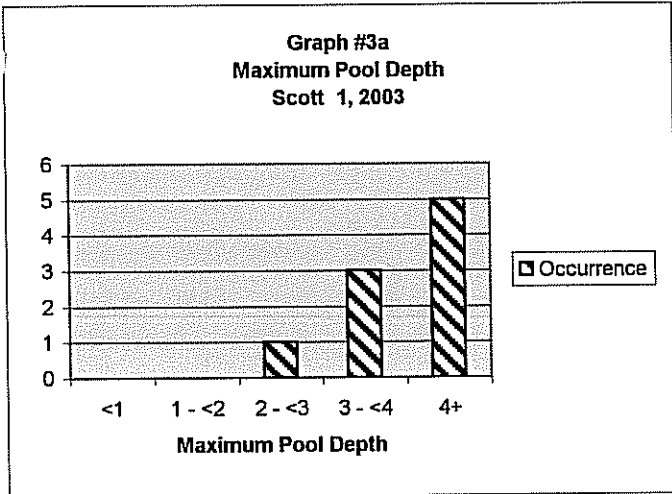
Water temperature in the Scott River Mainstem is limited by the wide flood plain, and limited canopy cover. The SRWC and RCD have implement many riparian revegetation projects, and the fluctuations in water table appears to be a major limiting factor to success. Some plantings are thriving, and over the long term riparian conditions should improve.

**Recommendations:**

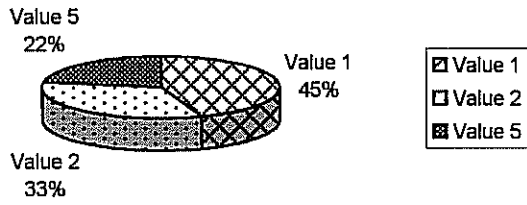
This reach should be considered of primary importance for chinook spawning, and as a corridor for salmonid migration. Water management in the mainstem should focus on providing fall passage for salmonid spawning. This reach should not be a high priority for summer rearing improvement projects, as it will continue to be impacted by the tributaries and the tailings. In addition, summer water temperatures are currently not suitable for rearing.



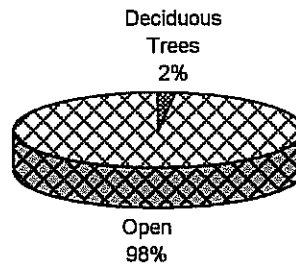




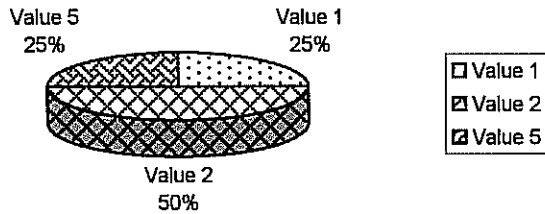
**Graph #5a**  
**Pool Tail Percent Embeddedness**  
**Scott 1 - Cantara, 2003**



**Graph #6a**  
**Percent Canopy by Reach**  
**Scott 1 - Cantara, 2003**

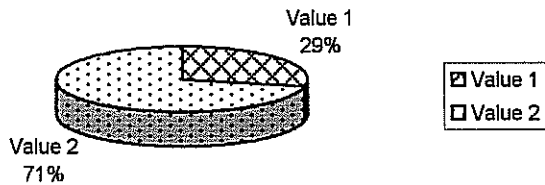


**Graph #5b**  
**Pool Tail Percent Embeddedness**  
**Scott 2- SVID to French, 2003**

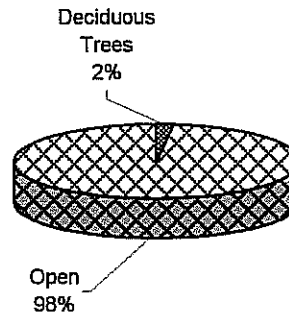


Scott Reach # 2  
No Canopy Cover

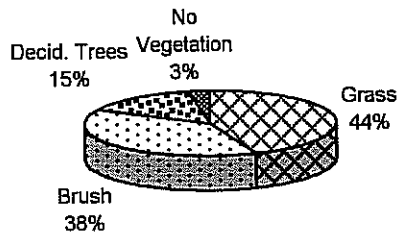
**Graph #5c**  
**Pool Tail Percent Embeddedness**  
**Scott 3, 2003**



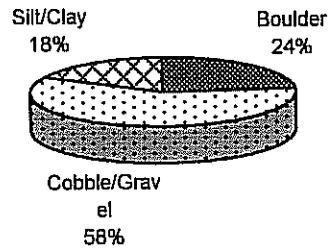
**Graph #6c**  
**Percent Canopy by Reach**  
**Scott 3, 2003**



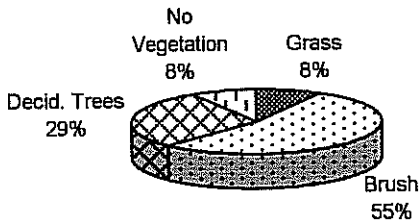
**Graph #7a**  
**Dominant Bank Vegetation in Survey Reach**  
**Scott 1 Cantara, 2003**



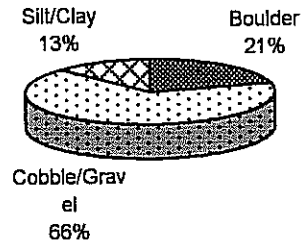
**Graph #8a**  
**Dominant Bank Composition**  
**Scott 1 - Cantara, 2003**



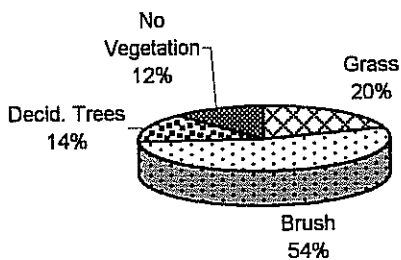
**Graph #7b**  
**Dominant Bank Vegetation**  
**Scott 2- SVID to French, 2003**



**Graph #8b**  
**Dominant Bank Composition**  
**Scott River - Reach2 -SVID to French, 2003**



**Graph #7c**  
**Dominant Bank Vegetation in Survey Reach**  
**Scott 3, 2003**



**Graph #8c**  
**Dominant Bank Composition**  
**Scott 3, 2003**

