CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT
Sheephouse Creek
Report Revised April 14, 2006
Report Completed 2000
Assessment Completed 1996

INTRODUCTION

A stream inventory was conducted during the summer of 1996 on Sheephouse Creek. The inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the amount and condition of available habitat to fish, and other aquatic species with an emphasis on anadromous salmonids in Sheephouse Creek. The objective of the biological inventory was to document the salmonid and other aquatic species present and their distribution.

The objective of this report is to document the current habitat conditions, and recommend options for the potential enhancement of habitat for coho salmon and steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's north coast streams.

WATERSHED OVERVIEW

Sheephouse Creek is a tributary to the Russian River, located in Sonoma County, California (see Sheephouse Creek map, page 2). The legal description at the confluence with the Russian River is T7N, R11W. Its location is 38°26'58" N. latitude and 123°5'22" W. longitude. Seasonal vehicle access exists from a private road via HWY 116 near Jenner.

Sheephouse Creek and its tributaries drain a basin of approximately 3.4 square miles. The East Fork of Sheephouse Creek and 2 minor unnamed tributaries were also inventoried and the results are included in this report. Sheephouse Creek is a second order stream and has approximately 6.3 miles of blue line stream, according to the USGS Duncans Mills 7.5 minute quadrangles. Elevations range from about 40 feet at the mouth of the creek to 640 feet in the headwaters. Coniferous forest dominates the watershed, but there are zones of grassland and oak-woodland in the upper watershed. The watershed is entirely privately owned, and primarily managed for timber production.

METHODS

The habitat inventory conducted in Sheephouse Creek follows the

methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds, 1994). The AmeriCorps Volunteers that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). This inventory was conducted by a two person team and was supervised by Bob Coey, Russian River Basin Planner (DFG).

HABITAT INVENTORY COMPONENTS

A standardized habitat inventory form has been developed for use in California stream surveys and can be found in the California Salmonid Stream Habitat Restoration Manual. This form was used in Sheephouse Creek to record measurements and observations. There are nine components to the inventory form: flow, channel type, temperatures, habitat type, embeddedness, shelter rating, substrate composition, canopy, and bank composition.

1. Flow:

Flow is measured in cubic feet per second (cfs) at the bottom of the stream survey reach using standard flow measuring equipment, if available. In some cases flows are estimated. Flows were also measured or estimated at major tributary confluences.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1985 rev. 1994). This methodology is described in the California Salmonid Stream Habitat Restoration Manual. Channel typing is conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There are five measured parameters used to determine channel type: 1) water slope gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity.

3. Temperatures:

Water and air temperatures, and time, are measured by crew members with hand held thermometers and recorded at each tenth unit typed. Temperatures are measured in Fahrenheit at the middle of the habitat unit and within one foot of the water surface.

4. Habitat Type:

Habitat typing uses the 24 habitat classification types defined by McCain and others (1988). Habitat units are numbered sequentially

and assigned a type identification number selected from a standard list of 24 habitat types. Dewatered units are labeled "DRY". Sheephouse Creek habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All unit lengths were measured, additionally, the first occurrence of each unit type and a randomly selected 10% subset of all units were completely sampled (length, mean width, mean depth, maximum depth and pool tail crest depth). All measurements were in feet to the nearest tenth.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out reaches is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Sheephouse Creek, embeddedness was visually estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3), 76 - 100% (value 4). Additionally, a rating of "not suitable" (NS) was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, having a bedrock tail-out, or other considerations.

6. Shelter Rating:

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. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All shelter is then classified according to a list of nine shelter types. In Sheephouse Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the shelter. The shelter rating is calculated for each habitat unit by multiplying shelter value and percent covered. Thus, shelter ratings can range from 0-300, and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully measured habitat units, dominant and sub-dominant substrate elements were visually estimated using a list of seven size classes.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the California Salmonid Stream Habitat Restoration Manual, 1994. Canopy density relates to the amount of stream shaded from the sun. In Sheephouse Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated visually into percentages of evergreen or deciduous trees.

9. Bank Composition:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand winter flows. In Sheephouse Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully measured unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation was estimated and recorded.

BIOLOGICAL INVENTORY

Biological sampling during stream inventory is used to determine fish species and their distribution in the stream. Biological inventory is conducted using one or more of three basic methods: 1) stream bank observation, 2) underwater observation, 3) electrofishing. These sampling techniques are discussed in the California Salmonid Stream Habitat Restoration Manual.

DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat, a dBASE IV data entry program developed by Tim Curtis, Inland Fisheries Division, California Department of Fish and Game. This program processes and summarizes the data, and produces the following tables and appendices:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Shelter by habitat types
- Dominant substrates by habitat types
- Vegetative cover and dominant bank composition
- Fish habitat elements by stream reach

Graphics are produced from the tables using Lotus 1,2,3. Graphics

developed for Sheephouse Creek include:

- Level II Habitat Types by % Occurrence and % Total Length
- Level IV Habitat Types by % Occurrence
- Pool Habitat Types by % Occurrence
- Maximum Depth in Pools
- Pool Shelter Types by % Area
- Substrate Composition in Low Gradient Riffles
- Percent Cobble Embeddedness by Reach
- Mean Percent Canopy
- Mean Percent Canopy by Reach
- Percent Bank Composition and Bank Vegetation

HABITAT INVENTORY RESULTS FOR SHEEPHOUSE CREEK

* ALL TABLES AND GRAPHS ARE LOCATED AT THE END OF THE REPORT *

The habitat inventory of July 1-18, 1996 was conducted by Elaine Hards (Intern), John Fort (DFG), Eddie Sanchez, and Sarah Nossaman (Americorps). The data was analyzed by Ken Bunzel (DFG). The survey began at the confluence with the Russian River and extended up Sheephouse Creek to a point 2,397 feet past the confluence of the Northeast tributary. The survey ended because flows dwindled and habitat typing became difficult because of slash covering the creek. The total length of the stream surveyed was 15,851 feet (3 miles), with an additional 221 feet of side channel. A flow of .166 cfs was measured with a Marsh-McBirney Model 2000 flowmeter on July 23, 1996 underneath the, Hwy 116 overpass at the confluence with the Russian River.

This section of Sheephouse Creek has three channel types: from the mouth to 2,000 feet an E4, the middle 11,473 feet an F4 and the upper 2,379 feet a B3. E4 channels are low gradient (<2%), meandering riffle/pool gravel channels with low width/depth ratio, very efficient and stable with a high meander width ratio.

F4 channel types are entrenched meandering riffle/pool channels on low gradients with a high width/depth ratio and a predominantly gravel substrate.

B3 channel types are moderately entrenched, moderate gradient (2-4%), riffle dominated channels, with infrequently spaced pools, a very stable plan and profile, stable banks and have a predominantly cobble substrate.

Water temperatures ranged from 55-58°F and air temperatures ranged from 57-73°F. Summer temperatures were also measured by Jim Berry

(landowner) using a remote temperature recorder placed in a pool near the mouth (see Temperature Summary graphs at end of report). The recorder logged temperatures every 2 hours from July 9 - August 8 and again from August 14 - November 15, 1996. The highest temperature recorded was 58°F in July and the lowest was 44°F in November.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 39% pool units, 35% flatwater units, 23% riffle units, and 2% dry streambed units. Based on total **length** there were 51% flatwater units, 23% pool units, 22% riffle units, and 4% dry streambed units (Graph 1).

Three hundred, twenty-four habitat units were measured and 15% were completely sampled. Seventeen Level IV habitat types were identified. The data is summarized in Table 2. The most frequent habitat types by percent **occurrence** were runs at 24%, low gradient riffles 23%, root wad scour pools 19% and glides 10% (Graph 2). By percent total **length**, runs made up 42%, low gradient riffles 22%, root wad scour pools 11%, and glides 8%.

One hundred, twenty-seven pools were identified (Table 3). Scour pools were most often encountered at 81%, and comprised 78% of the total length of pools (Graph 3).

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Seventy of the 127 pools (55%) had a depth of two feet or greater (Graph 4). These deeper pools comprised 14% of the total length of stream habitat.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Pool types had the highest shelter rating at 65. Riffle had the lowest rating with 7 and flatwater rated 9 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 67, main channel pools rated 59, and backwater pools rated 39 (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were root masses at 37%, large woody debris 26%, undercut banks 19%, and small woody debris 14%. Graph 5 describes the pool shelter in Sheephouse Creek.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 9 of the 10 low gradient riffles measured. (Graph 6).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 122 pool tail-outs measured, 18 had a value of 1 (15%); 81 had a value of 2 (66%); 21 had a value of 3 (17%); and 2 had a value of 4 (2%). On this scale, a value of one is best for fisheries.

The mean percent canopy density for the stream reach surveyed was 94%. The mean percentages of deciduous and evergreen trees were 43% and 57%, respectively. Graph 8 describes the canopy for the entire survey.

For the entire stream reach surveyed, the mean percent right bank vegetated was 76% and the mean percent left bank vegetated was 73%. For the habitat units measured, the dominant vegetation types for the stream banks were: 55% evergreen trees, 29% deciduous trees, 8% brush, 7% grass and 1% bare soil. The dominant substrate for the stream banks were: 88% silt/clay/sand, 9% cobble/gravel, 2% boulder and 1% bedrock (Graph 10).

HABITAT INVENTORY RESULTS FOR SOUTHWEST TRIBUTARY

The habitat inventory of July 26 - August 6, 1996 was conducted by Sarah Nossaman and Eddie Sanchez (AmeriCorps). The survey began at the confluence with Sheephouse Creek and extended up the tributary until flows dwindled and the stream became unsuitable for salmonids at 7088 feet. This section of the Southwest Tributary has an F4 channel type.

Water temperatures were 55°F and air temperatures ranged from 56-66°F.

Based on frequency of ***occurrence*** *there were 36% pool units, 28% flatwater units, 26% riffle units, and 10% dry streambed units. Based on total* ***length*** *there were 79% dry streambed units, 8% riffle units, 8% flatwater units, and 5% pool units.*

The most frequent habitat types by percent ***occurrence*** *were low gradient riffles at 26%, runs 21%, and log scour pools 10%. By percent total* ***length****, dry streambed made up 79%, low gradient riffles 8%, runs 6%, and root wad scour pools 2%.*

Scour pools were most often encountered at 96%, and comprised 92% of the total length of pools. Thirty five percent had a depth of two feet or greater, and comprised 2% of the total length. Pools in general had a mean shelter rating of 49. Dominant pool shelter

types were root masses at 34%, boulders 28%, and large woody debris 25%.

Gravel was the dominant substrate observed. Of the 24 pool tail-outs measured, three had a value of 1 (13%); ten had a value of 2 (42%); five had a value of 3 (21%); and six had a value of 4 (25%).

The mean percent canopy density for the stream reach surveyed was 93%. The mean percentages of deciduous and evergreen trees were 46% and 54%, respectively. The dominant substrate for the stream banks were: 79% silt/clay/sand and 21% boulder.

HABITAT INVENTORY RESULTS FOR EAST FORK SHEEPHOUSE CREEK

The habitat inventory of July 24 - August 13, 1996 was conducted by Sarah Nossaman and Eddie Sanchez (AmeriCorps). The survey began at the confluence with Sheephouse Creek and extended up the East Fork until habitat typing was no longer possible because of slash completely covering the creek, at 3,391 feet.

This section of the East Fork has an F4 channel type. Water temperatures ranged from 55-58°F. Air temperatures ranged from 58-75°F. Based on frequency of ***occurrence*** *there were 35% flatwater units, 25% riffle units, 22% pool units, and 18% dry streambed units. Based on total* ***length*** *there were 36% flatwater units, 28% dry streambed units, 28% riffle units, and 9% pool units.*

The most frequent habitat types by percent ***occurrence*** *were runs at 31%, low gradient riffles 25%, dry streambed 18% and log scour pools 10%. By percent total* ***length****, runs made up 32%, dry streambed 28%, low gradient riffles 28%, and log scour pools 4%.*

Scour pools were most often encountered at 95%, and comprised 91% of the total length of pools. 10% had a depth of two feet or greater, and comprised 1% of the total length of stream habitat. Pool types in general had a shelter rating of 55. Dominant pool shelter types were large woody debris at 51%, root masses 22%, and undercut banks 12%.

Gravel was the dominant substrate observed. Of the 18 pool tail-outs measured, three had a value of 1 (17%); eight had a value of 2 (44%); seven had a value of 3 (39%); and none had a value of 4.

The mean percent canopy density for the stream reach surveyed was 92%. The mean percentages of deciduous and evergreen trees were 18% and 82%, respectively. The dominant substrates for the stream banks were silt, clay and sand.

HABITAT INVENTORY RESULTS FOR NORTHEAST TRIBUTARY

The habitat inventory of August 9, 1996 was conducted by Sarah Nossaman and Eddie Sanchez (AmeriCorps). The survey began at the confluence with Sheephouse Creek and extended up the tributary until flows dwindled and habitat typing became difficult because of slash covering the creek.

This section of the Northeast tributary has an F3 channel type. Water temperatures ranged from 57-58°F and air temperatures ranged from 70-77°F.

*Based on frequency of **occurrence** there were 56% flatwater units, 28% pool units, 11% riffle units, and 6% dry streambed units. Based on total **length** there were 83% flatwater units, 8% riffle units, 5% pool units, and 3% dry streambed units.*

*The most frequent habitat types by percent **occurrence** were runs at 44%, log scour pools 17%, low gradient riffles 11% and glides 11%. By percent total **length**, runs made up 78%, low gradient riffles 8%, glides 6%, and log scour pools 3%.*

None of the pools had a depth of two feet or greater. Pools in general had a mean shelter rating of 100, with dominant shelter types being large woody debris at 43%, small woody debris 26%, root masses 20%, and undercut banks 6%.

Large cobble and gravel was the dominant substrate observed 80% of the tail-outs rated either 1 or 2.

The mean percent canopy density for the stream reach surveyed was 85%. The mean percentages of deciduous and evergreen trees were 1% and 99%, respectively. The dominant substrate for the stream banks were silt, clay, and sand.

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

On August 7, 1996 a biological inventory was conducted in two sites of Sheephouse Creek to document fish species composition and distribution. Each site was single pass electrofished using one Smith Root Model 12 electrofisher. Fish from each site were counted by species, and returned to the stream. The air temperature ranged from 57-62°F and the water temperature ranged

from 55-56°F. The observers were Sanchez (AmeriCorps), Nossaman (AmeriCorps), and Coey.

The inventory of Reach 1 started at the mouth and ended at the first house approximately 635 feet upstream in habitat units 1-16. In riffle and pool habitat types 39 0+, sixteen 1+, and one 2+ steelhead were observed (9/100') along with 126 sculpin (Cottus Sp.), 2 three-spined stickleback, 2 coho, and one dead Russian River Tule Perch.

The Reach 1 inventory was continued starting 800 feet upstream from the barn and extending for approximately 560 feet in habitat units 97-111. In pool, riffle, and run habitat types twenty two 0+ and three 1+ steelhead were observed (5/100') along with 52 sculpin, 1 Red-legged Frog, and 1 Tree Frog.

The inventory of Reach 1 was continued starting 100 yards downstream from the East Fork of Sheephouse and ending approximately 1500 feet upstream in habitat units 196-226. In pool, riffle, and run habitat types, 63 0+, 16 1+, five 2+ steelhead, and one Resident Rainbow Trout were observed (6/100') along with 12 sculpin, 9 crayfish, and 9 Pacific Giant Salamanders. A large sculpin was observed, approximately 6" in length.

The inventory of the East Fork of Sheephouse Creek started in habitat unit 1 and ended approximately 300 feet upstream in habitat unit 15. In pool and run habitat types above the log jam (units 8-15) no steelhead were seen, however, 8 Pacific Giant Salamanders were observed along with 1 Red-legged Frog. In pool, run, and riffle habitat types below the log jam two 0+, two 1+, and one 2+ steelhead were observed (2/100') along with 1 sculpin, 2 Pacific Giant Salamanders, and one crayfish. Young of the year salmonids were seen earlier in this tributary in areas later the stream was dry.

The inventory of the Southwest tributary started at the beginning of the reach and continued for approximately 700 feet in habitat units 4-30. In riffle and pool habitat types 25 0+, fourteen 1+, and two 2+ steelhead were observed (6/100') along with 2 sculpin and 12 Pacific Giant salamanders. Jim Berry commented that this tributary was dry throughout the drought years (1987-1994).

No salmonids were observed in the northeast tributary where log jams occur near the mouth.

A summary of 1996 data collected appears in the table below.

Summary of Species Observed in 1996 Surveys			
YEARS	**SPECIES**	**SOURCE**	**Native/Introduced**
1996	Steelhead	DFG	N
1996	Coho	DFG	N
1996	Sculpin	DFG	N
1996	Three-spined Stickleback	DFG	N
1996	Russian River Tule Perch	DFG	N
1996	Pacific Giant Salamander	DFG	N
1996	Red-legged Frog	DFG	N
1996	Crayfish	DFG	N

No introduced fish species were found during the surveys and historical records indicate no hatchery stocking, rescues or transfers have occurred in the watershed.

DISCUSSION FOR SHEEPHOUSE CREEK

Sheephouse Creek has three channel types: E4, F4 and B3. The lower 2000 feet is an E4 channel type. E4 channels are low gradient (<2%), meandering riffle/pool gravel channels with low width/depth ratios, usually very efficient and stable, with a high meander width ratio. The channel in Sheephouse Creek is a meadow-like depositional zone influenced by tidewater. Normally E4 channels are very efficient at transporting sediment. However, the backwater effect created by tidewater, causes the excess sediment load generated by upstream landuse practices, to deposit within the channel. Thus, gravel bar formation within the bankful channel has induced lateral bank erosion and increased the rate of flooding. This has been verified by nearby landowners.

According to the DFG Salmonid Stream Habitat Restoration Manual, E4 channels are good for bank-placed boulders, fair for opposing wing-deflectors, and poor for medium-stage weirs, boulder clusters and single wing-deflectors. These type of structures placed within the bankfull channel would decrease channel width, increase sediment transport and reduce flooding to nearby structures.

There are 13,473 feet of F4 channel type in Reach 1. F4 channel types are good for bank-placed boulders and fair for low-stage weirs, single and opposing wing-deflectors, channel constrictors and log cover.

There are 2,379 feet of B3 channel type in Reach 2. These channel types are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors and log cover. They are also good for medium-stage plunge weirs. Many site specific projects can be designed within these channel types, especially to increase pool frequency, volume and shelter. Any work considered will require careful design, placement, and construction that must include protection for any unstable banks.

The water temperatures recorded on the survey days July 1-23, 1996 ranged from 55-58°F. Air temperatures ranged from 57-73°F. This temperature regime is favorable to salmonids.

Summer temperatures measured using a remote temperature recorder placed in a pool near the mouth ranged from 44-58°F. The Temperature Summary graphs shows that for the entire summer and fall this reach exhibited temperatures favorable to salmonids.

Pools comprised 23% of the total **length** of this survey. In first and second order streams a primary pool is defined to have a maximum depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. In Sheephouse Creek, the pools are relatively shallow with 55% having a maximum depth of at least 2 feet. These pools comprised 14% of the total length of stream habitat. In coastal coho and steelhead streams, it is generally desirable to have primary pools comprise approximately 50% of total habitat length. log structures would increase pool habitat and in locations where their installation will not jeopardize any unstable stream banks, or subject the structures to high stream energy.

The mean shelter rating for pools was 65. However, a pool shelter rating of approximately 80 is desirable. The pool shelter that now exists is being provided primarily by root masses (37%), large woody debris (26%), undercut banks (19%), and small woody debris (14%).

Log and root wad cover structures in the pool and flatwater habitats are needed to improve both summer and winter salmonid habitat. Log cover structures provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

Nine of the 10 low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids. However, 62% of the pool tail-outs measured had embeddedness ratings of 2. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. In Sheephouse Creek, the quality of spawning habitat appears to be "fair".

The mean percent canopy for the survey was 94%. This is an excellent percentage of canopy, since 80 percent is generally considered desirable.

Numerous gullies and road related erosion points were noted along the west access road of the creek. The east-side access road was not observed, but it is likely in similar condition. Sedimentation to the creek could be decreased through changes in road maintenance.

During the habitat inventory of Sheephouse Creek, no salmonids were observed upstream of habitat unit 290, 2.6 miles from the mouth, where a log jam appears to impede further passage. Approximately 2000' of suitable habitat exists above this dam. The stream is dry for 20 feet above here and there is another log jam with potential for blocking fish passage about 500 feet upstream.

DISCUSSION FOR SOUTHWEST TRIBUTARY

The Southwest Tributary has an F4 channel type. The temperature regime is favorable to salmonids and canopy is excellent. These channel types are good for bank-placed boulders as well as single and opposing wing-deflectors. They are fair for low-stage weirs, boulder clusters, channel constrictors and log cover.

In the Southwest Tributary, the pools are relatively shallow with only 2% of the total length of stream habitat, being primary pools. The mean shelter rating for pools was 49. However, a pool shelter rating of approximately 80 is desirable. The relatively small amount of pool shelter that now exists is being provided primarily by root masses (34%), boulders (28%), and large woody debris (25%).

The low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids. However, pool embeddedness ratings were high. Only 13% had a rating of 1. In the Southwest Tributary, sediment sources should be mapped and rated according to their potential sediment yields, and control measures taken.

DISCUSSION FOR EAST FORK SHEEPHOUSE CREEK

The East Fork has 3391 feet of F4 channel type. The temperature regime is favorable to salmonids and canopy is excellent.

In the East Fork, the pools are relatively shallow with only 1% of the total length of stream habitat being primary pools. The mean shelter rating for pools was 55, with shelter being provided primarily by large woody debris (51%), root masses (22%), and undercut banks 12%.

All of the low gradient riffles measured had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids. However, 39% of the pool tail-outs measured had embeddedness ratings of either 3 or 4. In the East Fork of Sheephouse Creek, no salmonids were observed upstream of a log jam in habitat unit 8, about 125 feet from the mouth.

DISCUSSION FOR NORTHEAST TRIBUTARY

The Northeast tributary has an F3 channel type.

The mean shelter rating for pools was 100, and is being provided primarily by large woody debris (43%), small woody debris (26%), root masses (20%), and undercut banks (6%). In the Northeast tributary, large cobble is the dominant substrate and the amount of fine sediment in potential spawning appears minimal.

The mean percent canopy for the survey was 85%, which is excellent. No salmonids were observed in the northeast tributary where log jams occur near the mouth.

SUMMARY

In conclusion, biological surveys were conducted to document fish distribution and are not necessarily representative of population information. Steelhead were found throughout Sheephouse Creek, while only 2 juvenile coho were found near the mouth. This is likely because physiological and environmental requirements for coho are more stringent than for steelhead, and coho were likely present but not observed in deeper sheltered pools. The 1996 summer surveys documented fewer 0+ fish than expected, indicating poor spawning conditions in Sheephouse Creek. This is likely linked to the lack of large wood which provides resting cover for adults and young juveniles, and high levels of fine sediment. However, many 1+ fish were observed indicating good rearing conditions in general.

In general, stream shade canopy is very good and water temperatures are suitable for salmonids. There is sufficient gravel, however embeddedness levels are higher than desirable for salmonid spawning. Shelter ratings and the quantity of pool habitat are both low, with the exception of the northeast branch (except here a barrier exists at the mouth). Log debris accumulations in the upper portions of Sheephouse and its tributaries limit salmonid access.

GENERAL RECOMMENDATIONS

Sheephouse Creek and its tributaries should be managed as an anadromous, natural production streams.

Access for migrating salmonids is an ongoing potential problem in the Southwest and Northeast tributaries of Sheephouse Creek, and where log debris from upslope timber harvest operations periodically moves downslope. Log jams should be monitored at these sites, while carefully preserving LWD for shelter on Sheephouse Creek and its tributaries. Many jams were modified in 1998 by the landowner.

Woody debris placed by a landowner, if left undisturbed, will provide fish shelter and rearing habitat. Landowners should be encouraged not to remove woody debris from the stream, except under extreme buildup and only under guidance by a fishery professional.

Future bank erosion problems should be treated with bio-engineering stabilization structures to reduce the amount of fine sediment entering the stream. Rootwad wing deflectors have been placed at many sites and have proven to be very effective.

SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS

1) Road related erosion should be identified and corrected. Improved road maintenance strategy should be explored with all landowners. Many low cost/high benefits strategies exist.

2) In Reach 1, bank-placed boulders, opposing wing-deflectors, and vortex weirs placed within the bankfull channel would decrease channel width, increase sediment transport and reduce flooding to nearby structures. Some gravel extraction, in low flow areas, without disturbing point bars may be recommended.

3) Pool enhancement structures placed by a landowner to increase

the number and depth of pools, should be monitored for effectiveness and anchoring should be inspected periodically (see attached). Run and glide habitats could easily be converted to pools with the addition of woody debris, where the banks are stable or in conjunction with stream bank armor to prevent erosion. Large logs would not necessarily need anchoring in this stream.

4) Cross-sections to monitor sediment transport should continue to be monitored by DFG staff.

PROBLEM SITES AND LANDMARKS - SHEEPHOUSE CREEK SURVEY COMMENTS

The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey reach.

HABITAT UNIT #	STREAM LEN (FT.)	COMMENTS
1.00	68	SMALL COBBLE DAM MAN MADE
2.00	123	SLIGHT BANK EROSION 20 FT LONG X 10 FT HIGH
5.00	257	CORNER BANK ERODING
14.00	544	RT BANK IS LAWN
18.00	711	RD NEXT TO CRK-BANK STABILIZATION (SMALL AMOUNT DONE)
19.00	731	GREEN TREE FROG
24.00	929	DRY TRIB LF BANK, RT BANK ERODIBLE, RIP RAP
26.00	1021	THIS AREA IS HIGHLY ERODIBLE
28.00	1173	LF BANK REACH HAS ACCESS ROAD
29.00	1215	ERODIBLE LEFT BANK
33.00	1357	RIP RAP HIGHLY ERODIBLE BANK, BUNK HOUSE
37.00	1454	SCULPINS, GOOD EF
43.10	1821	INCREDIBLE HABITAT
44.00	1851	WIRE FENCE ALONG BANK
47.00	1995	TELEPHONE POLE
48.00	2057	PVC PIPE 2 IN. W/ STRAINER
49.00	2095	2 IN. WATER DIVERSION PIPE LF BANK W/ SCREEN
57.00	2543	CULVERT RT BANK-SEE FORM
61.00	2649	SPRING RT BANK, TEMP-55
64.00	2718	3 IN. WATER DIVERSION, NO SCREEN
72.00	3042	CONFLUENCE DRY, LARGE METAL BARN RIGHT BANK
117.00	4851	DRY TRIB LF BANK

128.00	5209	LOW STAGE DIAG. WEIR
136.00	5527	POSS TEMPMENTOR PLACEMENT
138.00	5611	2+ SALMONIDS
139.00	5654	CRAYFISH
140.00	5744	BLOWOUT RT BANK-SEE FORM
141.00	5775	CHANNEL DOWNCUTTING
143.00	5899	LOG JAM-SEE FORM
150.00	6211	SCULPIN AND CRAYFISH
159.00	6579	2+ SALMONIDS
164.00	6723	OBSERVING MORE SALMONIDS THAN DOWNSTREAM
171.00	6989	2+ SALMONIDS
178.00	7335	NUMEROUS YOY FISH
192.00	8069	2+ FISH
195.00	8170	3+ SALMONID
207.00	8822	DIRT UP TO THE EDGE OF BANK
211.00	8977	DIRT RD ON RT BANK STOPS (ENDS)
214.00	9124	CONFLUENCE W/ EAST FORK TEMP-56
228.00	9760	POSS. CHANNEL CHANGE
235.00	9916	1+ SHD, RETURNS TO F4 CHANNEL
236.00	10241	1+ SHD
239.00	10394	2- 1+ SHD
243.00	10788	1+ SHD, CRAYFISH
252.00	11615	RED-LEGGED FROG, CRAYFISH,5- 0+ SHD, DRY TRIB RT BANK
253.00	11636	1+ SHD CRAYFISH
255.00	12113	CRAYFISH
256.00	12324	0+ SHD, 1+ SHD
257.00	12343	DRY SIDE CHANNEL RT
258.00	12362	POSS LOG JAM (SEE FORM)
260.00	12420	TIMBER HARVEST LOGS IN CREEK FROM UNITS 259-260.1
261.00	12694	15- 0+ SHD, 1+ SHD
262.00	12707	2 + SHD MAJOR LOG PILE UP ON RT BANK
263.00	12811	SUBSTRATE CHANGING POSS CHANGE TO F2
265.00	12927	LOG JAM- SEE FORM
272.00	13124	BANKS COVERED W/ TIMBER SLASH
273.00	13226	MANY LOGS FALLEN ACROSS INTO CREEK
276.00	13338	1+ SHD
277.00	13467	CONFLUENCE OF UPPER NW + NE FORKS, TEMP-58 AT CONF
278.00	13479	GOING UP WEST FORK SLASH COVERING CREEK.
280.00	13533	0+ SHD
285.00	13707	1+ SHD
290.00	13802	MAJOR LOG JAM-SEE FORM
291.00	14002	NEWTS
293.00	14080	NEWTS, HIGHLY ERODIBLE RT BANK

299.00	14701	DRY TRIB RT, LOG JAM-SEE FORM,
304.00	14800	LANDSLIDE RT BANK-75'H X 100'L X 30'W DEBRIS COVERING CHANNEL
305.00	14842	ENTIRE NORTH SECTION OF CREEK IS COVERED BY REDWOOD SLASH. WHOLE TREES DUE TO EROSION-#296-305=721 FT
307.00	14905	LOG JAM
309.00	14979	ERODED RT BANK, DRY TRIB LF BANK
311.00	15422	DRY TRIB RT BANK, LOG JAM
313.00	15635	OLD METAL WATER PIPE
315.00	15716	MAIN CHANNEL CLOGGED W/ LOGS + DEBRIS
316.00	15726	NEWTS
319.00	15865	DRY ABOVE THIS UNIT, END SURVEY, DRY TRIB RT BANK

PROBLEM SITES AND LANDMARKS - EAST FORK SHEEPHOUSE SURVEY COMMENTS

HABITAT UNIT #	*STREAM LEN (FT.)*	*COMMENTS*
2.00	*39*	*NATURAL LOG WEIR*
8.00	*128*	*LOG JAM-SEE FORM, DRY ABOVE JAM-GRAVEL BUILD UP*
9.00	*186*	*BRIDGE-25'W X 14'L X 2.5'H ABOVE STREAMBED, OLD LOG BRIDGE COVERED W/ VEG.*
33.00	*1143*	*DRY TRIB LF BANK*
42.00	*1412*	*LOG JAM SEE FORM*
48.00	*1624*	*PACIFIC GIANT SALAMANDERS*
57.00	*1904*	*PACIFIC GIANT SALAMANDER*
59.00	*1967*	*LOG JAM 45'L X 18'W X 4'H RETAINING GRAVEL. DOWNCUTTING, 1.5' NOT BARRIER*
63.00	*2042*	*LOG WEIR SEEMS TO BE FISH BARRIER, DOWNCUTTING 4 FT.*
64.00	*2060*	*3 P.G. SALAMANDERS*
67.00	*2185*	*RED-LEGGED FROG ENTERING TIMBER HARVEST AREA*
69.00	*2251*	*DRY TRIB RT BANK*
70.00	*2260*	*LOG JAM 35'L X 25'W X 7'H NOT BARRIER*
83.00	*2755*	*DRY TRIB RT BANK*
84.00	*2817*	*SLASH COVERS CHANNEL, LOGS OVER CRK, APPEAR PUSHED IN BY TRACTOR*
86.00	*2871*	*LOG JAM 10'H X 15'W X 7'L, DOWNCUTTING 3 FT, RETAINING GRAVEL,*

		NOT BARRIER.
95.00	3296	SLASH COMPLETELY COVERING CHANNEL CAN'T SEE CREEK
96.00	3380	WET TRIB LF BANK, 60/60 AT CONFLUENCE, TRIB IS 20 FT RIFFLE AND THEN BECOMES COMPLETELY COVERED, MAKING HAB. TYPING IMPOSSIBLE IN HEADWATERS AREA. LOGGING CURRENTLY OCCURRING UPSTREAM. END OF SURVEY.

PROBLEM SITES AND LANDMARKS - SOUTHWEST TRIB SURVEY COMMENTS

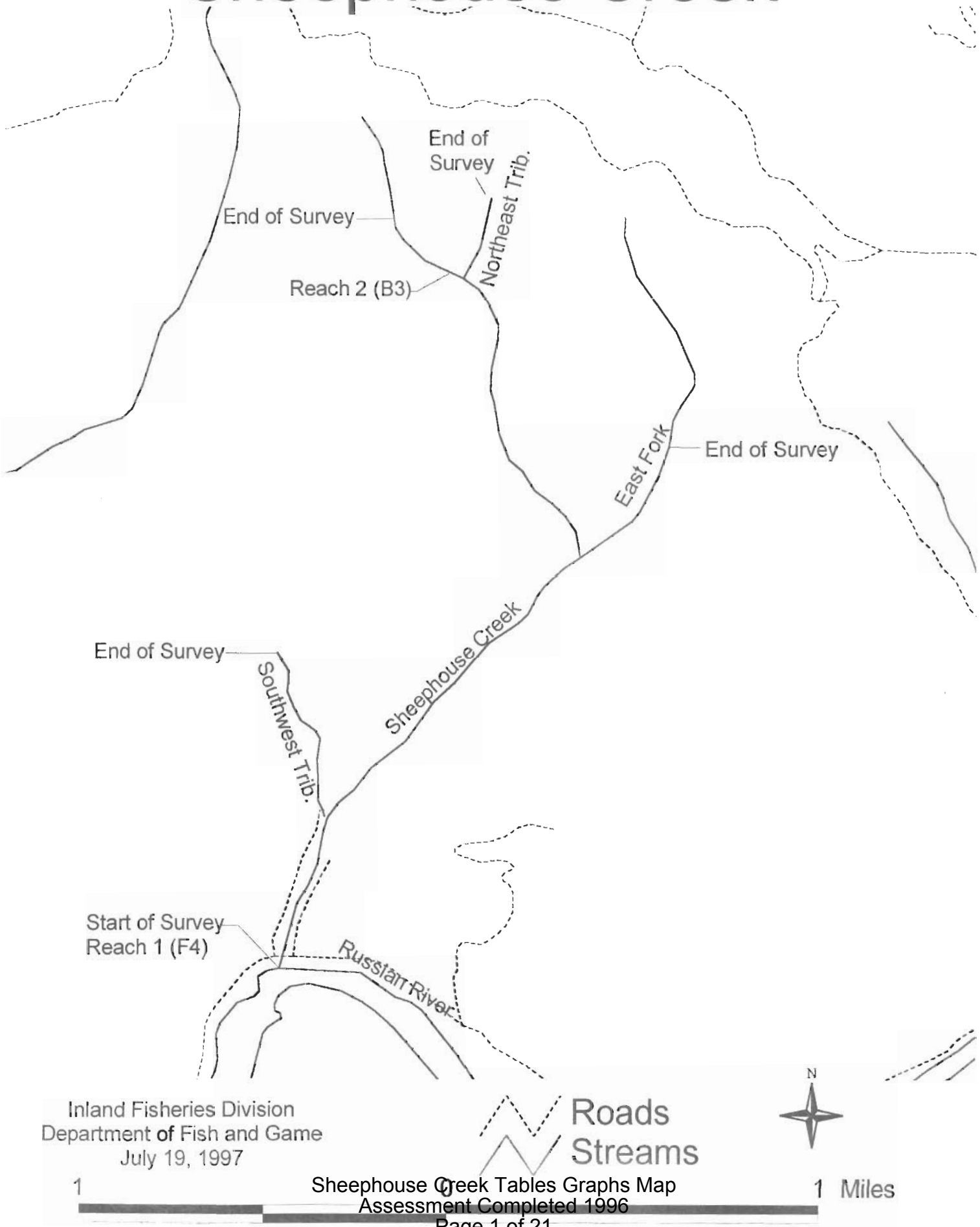
HABITAT UNIT #	STREAM LEN (FT.)	COMMENTS
1.00	1114	2 CULVERTS 2.5 FT DIAMETER UNDER BRIDGE #1, 20'L, DRY TRIB RT BANK AT 1056 FT.
2.00	1129	0+ SHD, POSS. CHANNEL CHANGE
4.00	1196	1+ SHD
6.00	1230	1+ SHD-3
9.00	1283	1+ SHD
10.00	1337	NEWTS
23.00	1643	0+ SHD
26.00	1767	LOG JAM-6'H X 11'W X 14'L. DOWN CUTTING 2 FT, RETAINING GRAVEL. NOT FISH BARRIER
27.00	1848	0 + SHD
30.00	1888	LOG JAM-3'H X 4'L X 12'W, DOWNCUTTING 2.5 FT, RETAINING GRAVEL,POSS. DRY CHANNEL ABOVE JAM.
32.00	1912	SMALL LOG JAM 2.5'L X 17'W, DOWN CUT 2.5 FT, RETAINING GRAVEL
38.00	2029	LOG JAM-4.5'H X 27'W X 6'L, DOWNCUTTING 4.6 FT, RETAINING GRAVEL.
39.00	2048	POSS. CHANNEL CHANGE
42.00	2131	1+ SHD
52.00	2340	LOG JAM- 15'L X 27'W X 5.5'H, NOT RETAINING GRAVEL OR DOWNCUTTING. , CHANNEL TYPED-F4
58.00	2486	1 + SHD
59.00	2522	1+ AND 0+ SHD

60.00	2538	DRY TRIB LT BANK
61.00	6938	LOG JAM (SEE FORM) AT LEAST 4 MORE LOG JAMS IN THIS DRY SECTION
65.00	6977	NEWTS
72.00	7089	EUTROPHICATION OCCURRING ALONG WITH MAJOR IRON DEPOSITS, FILLING THE CHANNEL WITH ORANGE AND GREEN BLOMS AND THICK GROWTHS OF AQUATIC PLANTS FROM THIS UNIT UNTIL THE CHANNEL GOES DRY IN THE HEADWATERS. NO FISH SEEN SINCE UNIT #59 AND NO VIABLE HABITAT OBSERVED ABOVE THIS UNIT. END OF ANADROMY

PROBLEM SITES AND LANDMARKS - NORTHEAST TRIB SURVEY COMMENTS

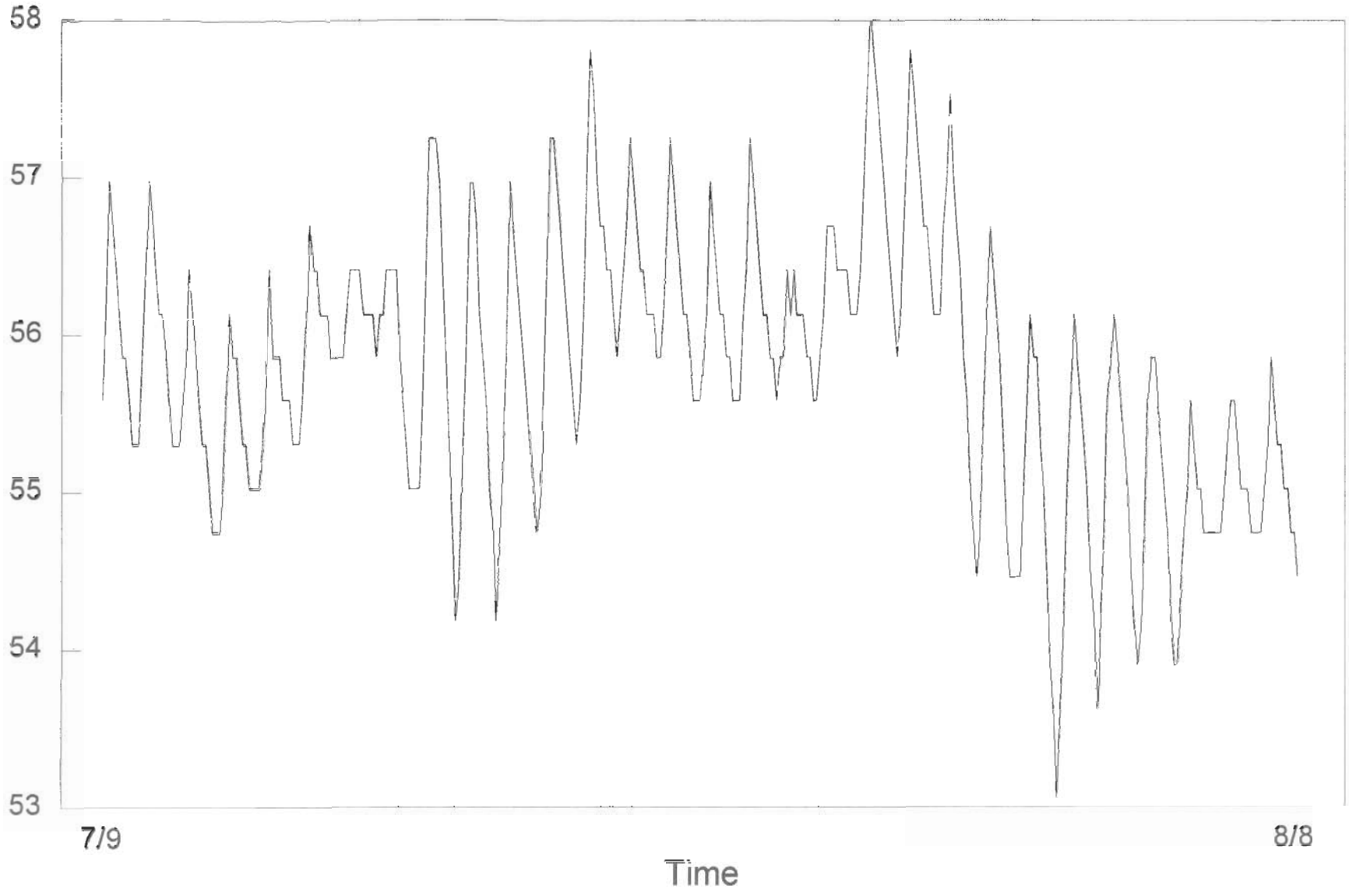
HABITAT UNIT #	STREAM LEN (FT.)	COMMENTS
2.00	74	HIGHLY ERODIBLE LF BANK 40'H X 50'L X 20'W FALLEN TREES IN CK
3.00	143	LOG JAM(SEE FORM)
5.00	260	LOG JAM (SEE FORM)
7.00	280	PACIFIC GIANT SALAMANDER
10.00	373	LOG JAM (SEE FORM) SLASH EVERYWHERE!
14.00	475	SLASH EVERYWHERE! ALMOST IMPOSSIBLE TO WALK CREEK IN THESE UNITS
15.00	497	LOG JAM 22'L X 15'W X 6'H. RETAINING GRAVEL, DRY ABOVE.
18.00	746	NO FISH SEEN TODAY, CREEK COVERED W/ SLASH FOR HUNDREDS OF FT. END OF SURVEY.

Sheephouse Creek



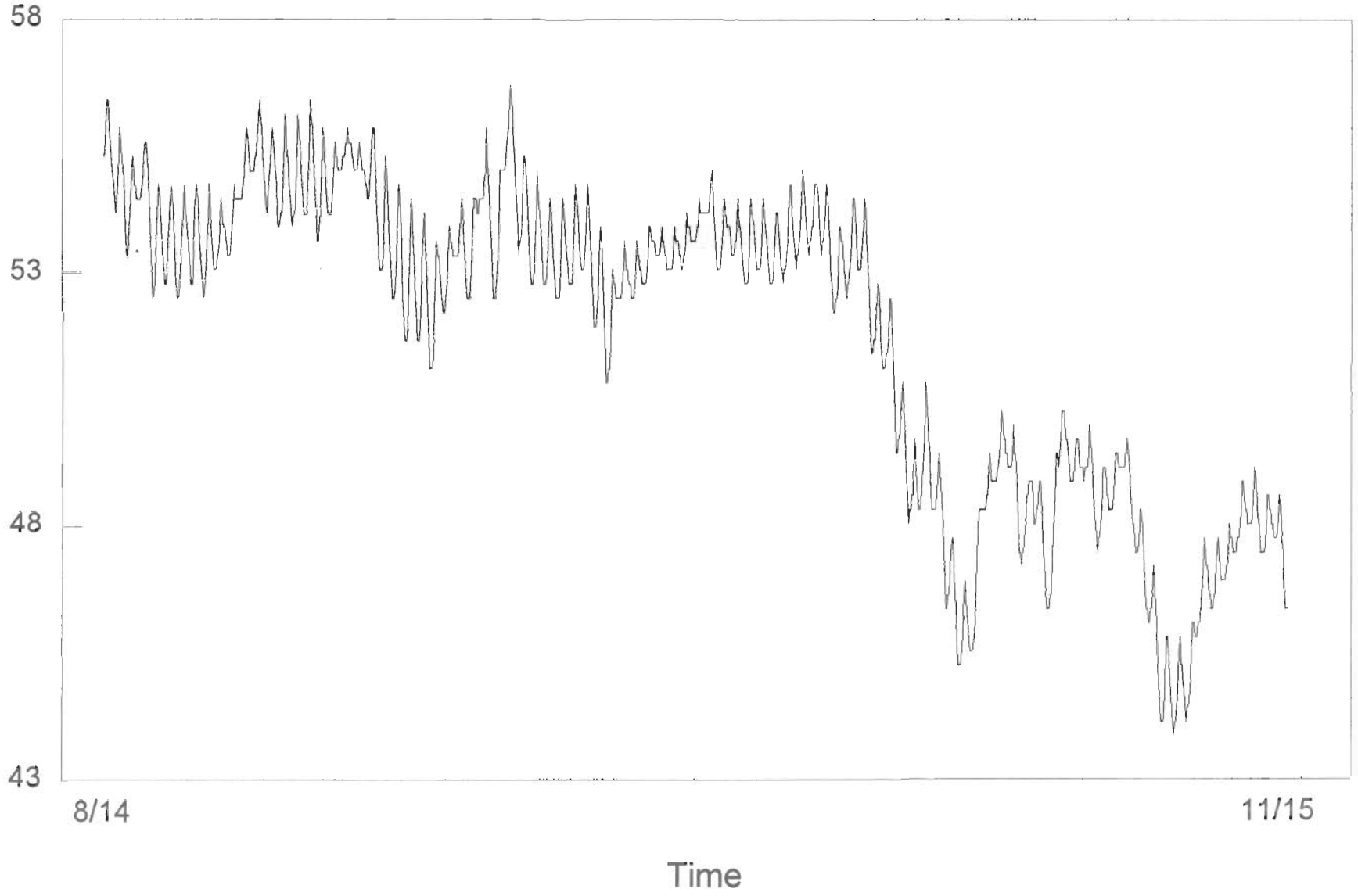
Sheephouse Creek

Hobo Temp Logger Data (7/9 - 8/8, 1996)



Sheephouse Creek

Hobo Temp Logger Data (8/14 - 11/15, 1996)



Sheephouse Creek Tables Graphs Map
Assessment Completed 1996
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Sheephouse Creek | Drainage: Russian River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES | Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W | LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	ESTIMATED TOTAL AREA (sq.ft.)	MEAN VOLUME (cu.ft.)	ESTIMATED TOTAL VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
76	9	RIFFLE	23	47	3548	22	8.6	0.2	261	19845	44	3368	0	7
115	13	FLATWATER	35	72	8244	51	8.9	0.5	329	37809	208	23904	0	9
127	28	POOL	39	29	3689	23	9.6	1.0	281	35646	303	38423	242	65
6	0	DRY	2	99	591	4	0.0	0.0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
324	50	16072	93300	65696

Sheephouse Creek

Drainage: Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W

LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

HABITAT UNITS #	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM DEPTH ft.	MEAN AREA sq.ft.	TOTAL AREA EST. sq.ft.	MEAN VOLUME cu.ft.	TOTAL VOLUME EST. cu.ft.	MEAN RESIDUAL POOL VOL cu.ft.	MEAN SHELTER RATING	MEAN CANOPY %
76	9	LGR	23	47	3548	22	9	0.2	0.8	261	19845	44	3368	0	7	95
31	4	GLD	10	42	1290	8	9	0.6	1.5	377	11672	224	6954	0	8	93
78	7	RUN	24	86	6727	42	5	0.4	1.7	223	17394	79	6173	0	7	94
6	2	EDW	2	38	226	1	17	1.0	1.7	512	3072	625	3753	0	15	77
15	3	MCP	5	35	521	3	11	1.1	4.7	390	5850	468	7020	388	70	98
2	1	CCP	1	31	63	0	13	0.9	2.5	397	794	329	657	249	20	98
3	3	STP	1	41	122	1	9	1.0	2.6	306	919	361	1082	314	30	95
8	3	CRP	2	39	310	2	8	1.2	3.0	362	2892	428	3426	315	26	81
22	5	LSL	7	26	568	4	10	0.8	3.0	246	5417	218	4806	163	86	98
62	6	LSR	19	30	1830	11	10	1.0	4.5	285	17646	312	19360	252	67	97
2	0	LSBk	1	17	33	0	11	1.2	2.4	170	339	203	407	170	50	0
4	2	LSBo	1	14	57	0	8	1.1	2.6	104	415	121	483	90	51	97
5	2	PLP	2	15	77	0	9	0.8	3.3	155	774	150	751	105	54	88
2	1	SCP	1	30	60	0	8	0.9	2.4	225	450	216	432	167	45	98
1	1	BPR	0	37	37	0	5	0.6	1.7	183	183	110	110	0	30	90
1	1	BPL	0	14	14	0	4	0.6	1.1	56	56	34	34	28	35	95
6	0	DRY	2	99	591	4	0	0.0	0.0	0	0	0	0	0	0	85

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
324	50	16072	87717	58817

Sheephouse Creek

Drainage: Russian River

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W

LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA EST. (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME EST. (cu.ft.)	MEAN RESIDUAL POOL VOL. (cu.ft.)	MEAN SHELTER RATING
20	7	MAIN	16	35	705	19	10.8	1.1	378	7563	438	8759	363	59
103	18	SCOUR	81	28	2874	78	9.6	1.0	266	27348	282	29027	221	67
4	3	BACKWATER	3	28	111	3	6.0	0.8	172	689	144	575	120	39

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
127	28	3689	35600	38361

Sheephouse Creek | Drainage: Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES | Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W | LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

UNITS MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH	<1 FOOT PERCENT OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	1-<2 FOOT PERCENT OCCURRENCE	2-<3 FT. MAXIMUM DEPTH	2-<3 FOOT PERCENT OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	3-<4 FOOT PERCENT OCCURRENCE	>=4 FEET MAXIMUM DEPTH	>=4 FEET PERCENT OCCURRENCE
15	MCP	12	0	0	7	47	4	27	0	0	4	27
2	CCP	2	0	0	0	0	2	100	0	0	0	0
3	STP	2	0	0	1	33	2	67	0	0	0	0
8	CRP	6	1	13	0	0	6	75	1	13	0	0
22	LSL	17	1	5	12	55	7	32	2	9	0	0
62	LSR	49	1	2	26	42	24	39	10	16	1	2
2	LSBk	2	0	0	0	0	2	100	0	0	0	0
4	LSBo	3	0	0	2	50	2	50	0	0	0	0
5	PLP	4	0	0	3	60	1	20	1	20	0	0
2	SCP	2	0	0	1	50	1	50	0	0	0	0
1	BPR	1	0	0	1	100	0	0	0	0	0	0
1	BPL	1	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS
127

Sheephouse Creek

Drainage: Russian River

Table 5 - Summary of Shelter by Habitat Type

Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W

LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

UNITS MEASURED	UNITS SHELTER MEASURED	HABITAT TYPE	SQ. FT. UNDERCUT BANKS	SQ. FT. SWD	SQ. FT. LWD	SQ. FT. ROOT MASS	SQ. FT. TERR. VEGETATION	SQ. FT. AQUATIC VEGETATION	SQ. FT. WHITE WATER	SQ. FT. BOULDERS	SQ. FT. BEDROCK LEDGES
76	10	LGR	20	37	89	0	0	0	0	3	0
31	5	GLD	57	0	0	25	0	0	0	25	0
78	8	RUN	16	6	0	76	0	0	0	0	0
6	2	EDW	235	5	0	43	0	0	0	0	0
15	15	MCP	439	185	429	713	11	0	9	0	0
2	2	CCP	31	0	0	4	0	0	0	9	0
3	3	STP	6	0	33	71	0	0	0	52	0
8	6	CRP	29	60	16	141	86	0	0	23	0
22	22	LSL	287	468	881	247	31	0	0	18	0
62	62	LSR	891	584	947	2471	96	0	0	12	0
2	2	LSBk	36	10	10	3	0	0	0	6	4
4	4	LSBo	5	12	68	0	0	0	0	69	0
5	5	PLP	46	11	172	0	0	0	0	13	0
2	2	SCP	64	66	0	0	0	0	0	0	0
1	1	BPR	0	23	0	4	0	0	0	0	0
1	1	BPL	10	0	0	10	0	0	0	0	0
6	0	DRY	0	0	0	0	0	0	0	0	0
TOTAL 324	150		2172	1467	2645	3808	224	0	9	230	4
			21%	14%	25%	36%	2%	0%	0%	2%	0%
TOTAL FOR POOLS 127	125		1844	1419	2556	3664	224	0	9	202	4
			19%	14%	26%	37%	2%	0%	0%	2%	0%

Sheephouse Creek

Drainage: Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 07/01/96 to 07/23/96

Confluence Location: QUAD: DUNCAN MIL LEGAL DESCRIPTION: T7NR11W

LATITUDE: 38°26'58" LONGITUDE: 123°5'22"

TOTAL HABITAT UNITS	UNITS SUBSTRATE MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
10	10	LGR	0	0	90	0	0	10	0
4	4	GLD	0	25	75	0	0	0	0
7	7	RUN	0	0	100	0	0	0	0
2	2	EDW	0	0	100	0	0	0	0
3	3	MCP	33	67	0	0	0	0	0
1	1	CCP	0	100	0	0	0	0	0
3	3	STP	0	67	33	0	0	0	0
3	3	CRP	0	33	67	0	0	0	0
5	5	LSL	0	80	20	0	0	0	0
6	6	LSR	0	33	67	0	0	0	0
0	0	LSBk	0	0	0	0	0	0	0
2	2	LSBo	0	50	50	0	0	0	0
2	2	PLP	0	100	0	0	0	0	0
1	1	SCP	100	0	0	0	0	0	0
1	1	BPR	0	100	0	0	0	0	0
1	1	BPL	0	0	100	0	0	0	0
1	1	DRY	0	0	100	0	0	0	0

Sheephouse Creek

APPENDIX A. Summary of Mean Percent Vegetative Cover for Entire Stream

Mean Percent Canopy	Mean Percent Evergreen	Mean Percent Decidous	Mean Right bank % Cover	Mean Left Bank % Cover
94.29	56.51	42.86	76.27	73.27

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Bedrock	0	1	0.93
Boulder	1	1	1.85
Cobble/Gravel	4	6	9.26
Silt/clay	49	46	87.96

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Grass	7	1	7.41
Brush	5	4	8.33
Deciduous Trees	13	18	28.70
Evergreen Trees	29	30	54.63
No Vegetation	0	1	0.93

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Sheephouse Creek
SAMPLE DATES: 07/01/96 to 07/23/96
STREAM LENGTH: 15851 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: DUNCAN MIL — Latitude: 38°26'58"
Legal Description: T7NR11W — Longitude: 123°5'22"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 01

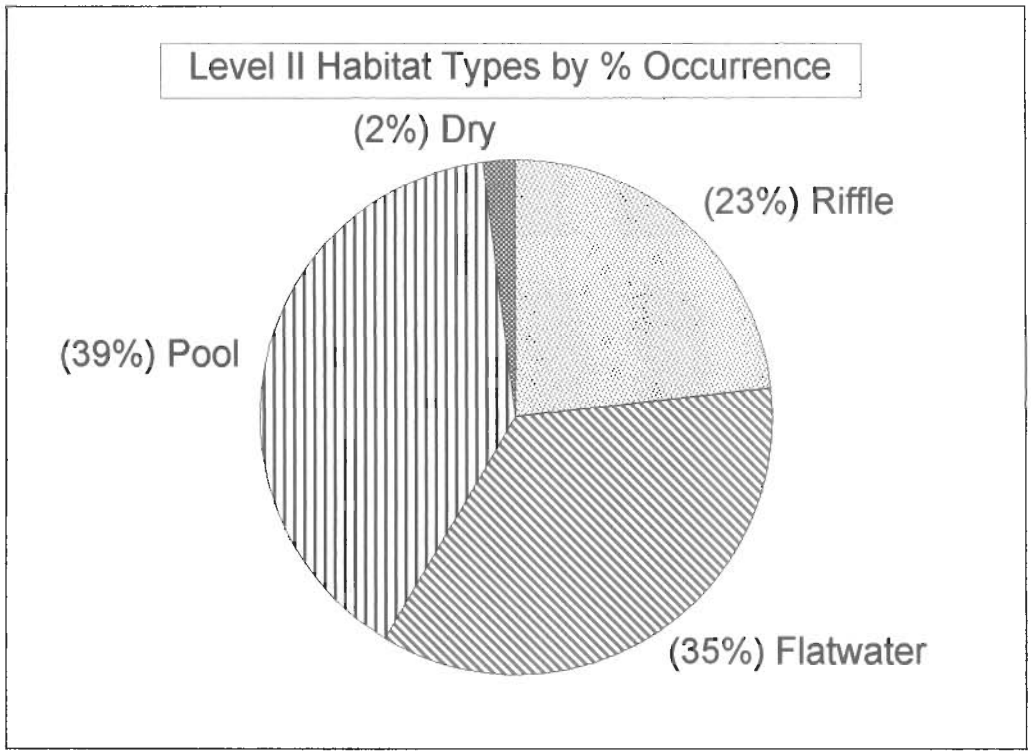
Channel Type: F4	Canopy Density: 94%
Channel Length: 13473 ft.	Evergreen Component: 50%
Riffle/Flatwater Mean Width: 8 ft.	Deciduous Component: 49%
Total Pool Mean Depth: 1.1 ft.	Pools by Stream Length: 25%
Base Flow: 0.2 cfs	Pools >=3 ft. deep: 17%
Water: 55 - 71 °F Air: 57 - 73 °F	Mean Pool Shelter Rtn: 69
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Root masses
Vegetative Cover: 78%	Occurrence of LOD: 40%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.
Embeddness Value: 1. 14% 2. 67% 3. 19% 4. 0%	

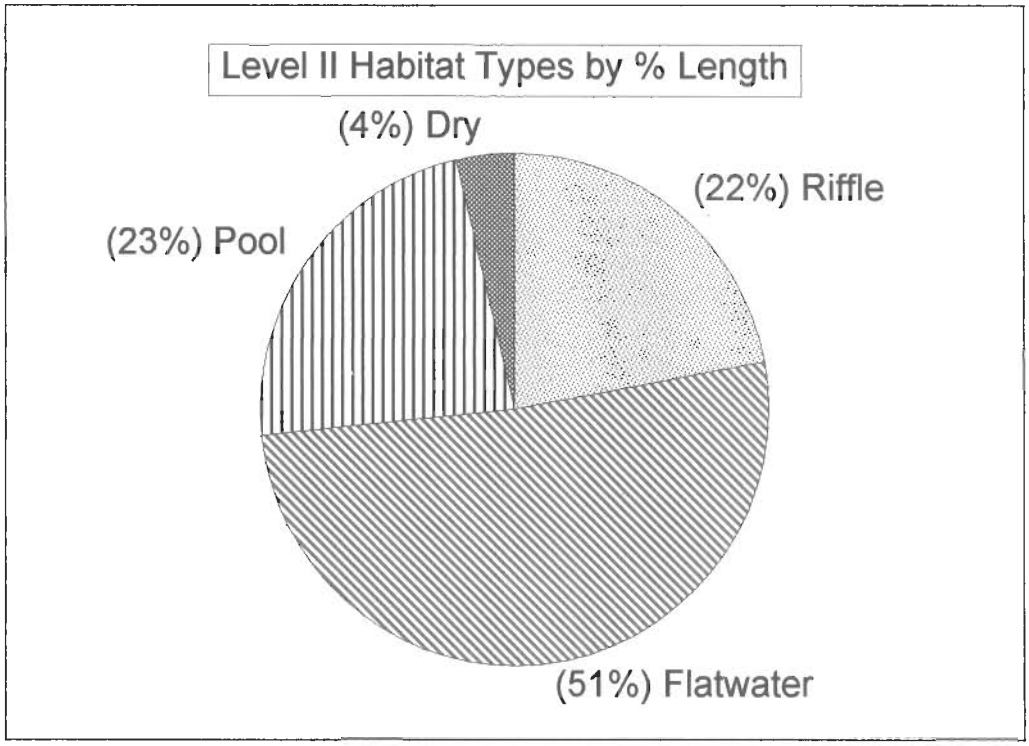
STREAM REACH 02

Channel Type: B3	Canopy Density: 94%
Channel Length: 2379 ft.	Evergreen Component: 97%
Riffle/Flatwater Mean Width: 4 ft.	Deciduous Component: 3%
Total Pool Mean Depth: 0.6 ft.	Pools by Stream Length: 7%
Base Flow: 0.2 cfs	Pools >=3 ft. deep: 0%
Water: 56 - 57 °F Air: 65 - 70 °F	Mean Pool Shelter Rtn: 40
Dom. Bank Veg.: Evergreen Trees	Dom. Shelter: Large Woody Debris
Vegetative Cover: 62%	Occurrence of LOD: 62%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 591 ft.
Embeddness Value: 1. 21% 2. 64% 3. 0% 4. 14%	

Sheephouse

Level II Habitat Types

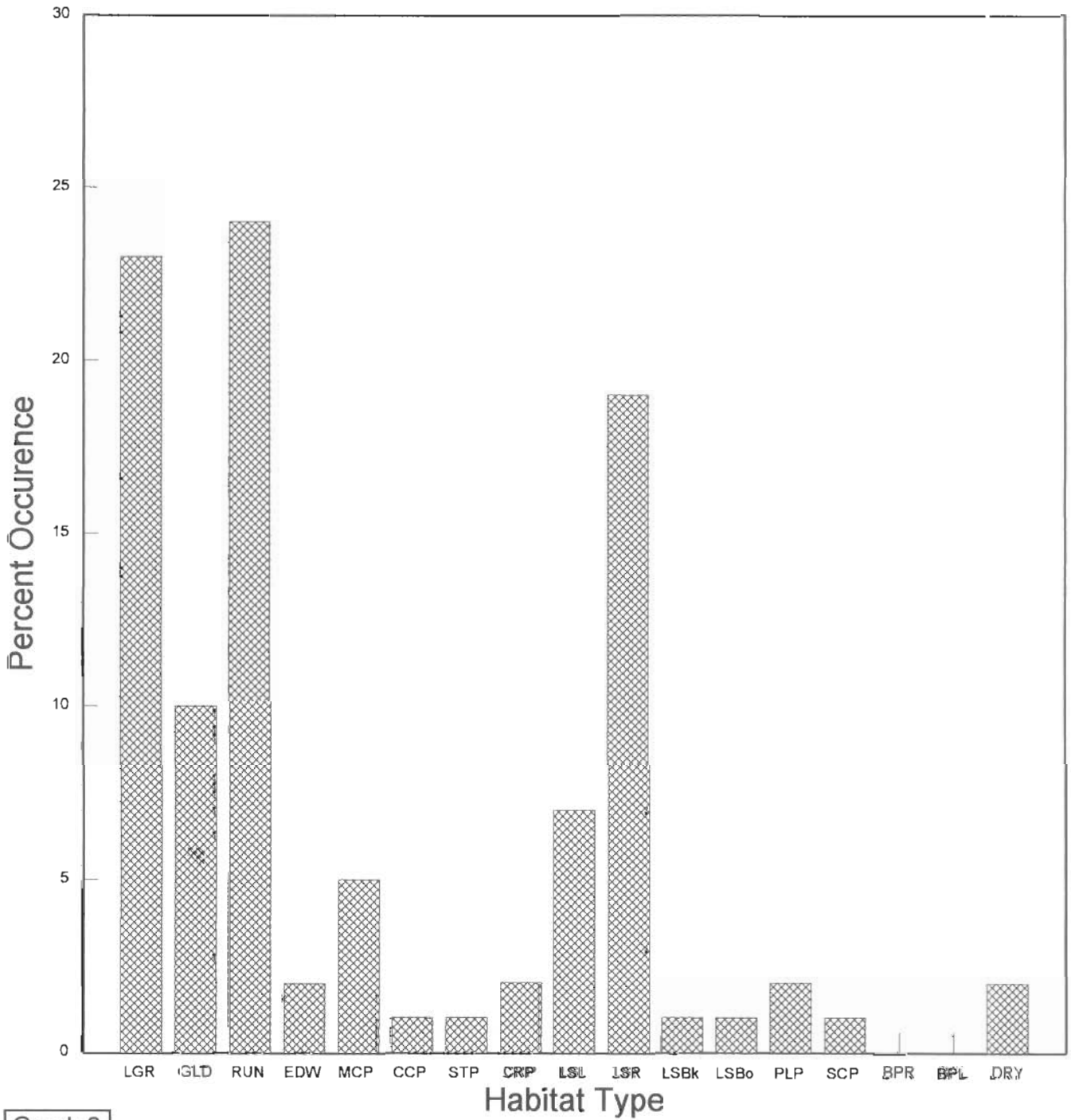




Graph 1

Sheephouse Creek

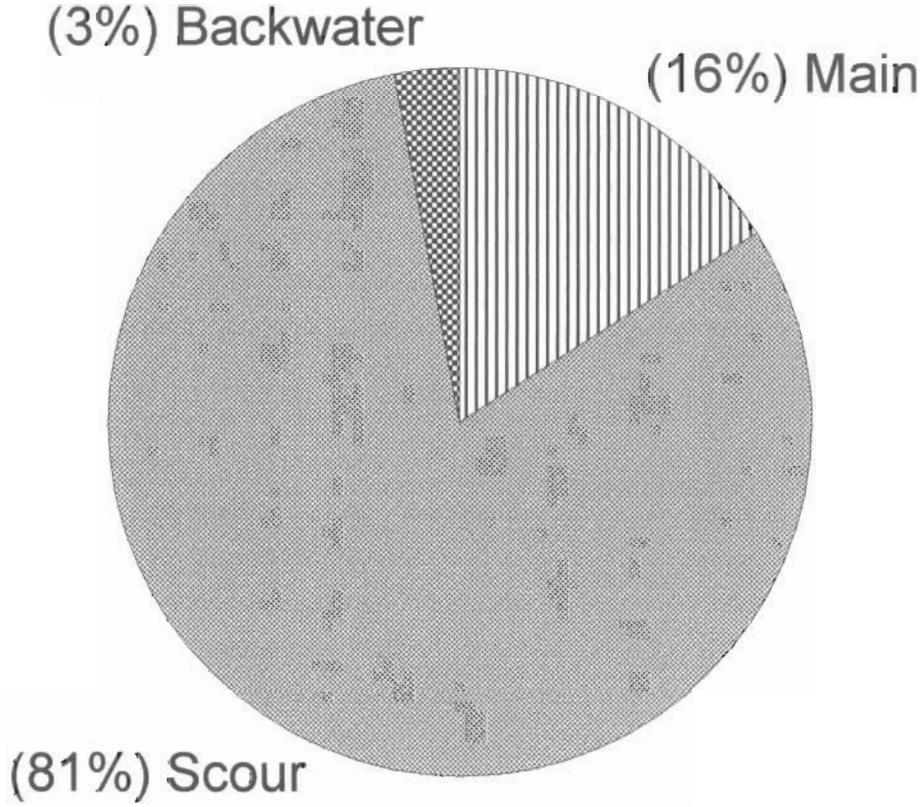
Level IV Habitat Types by % Occurrence



Graph 2

Sheephouse Creek

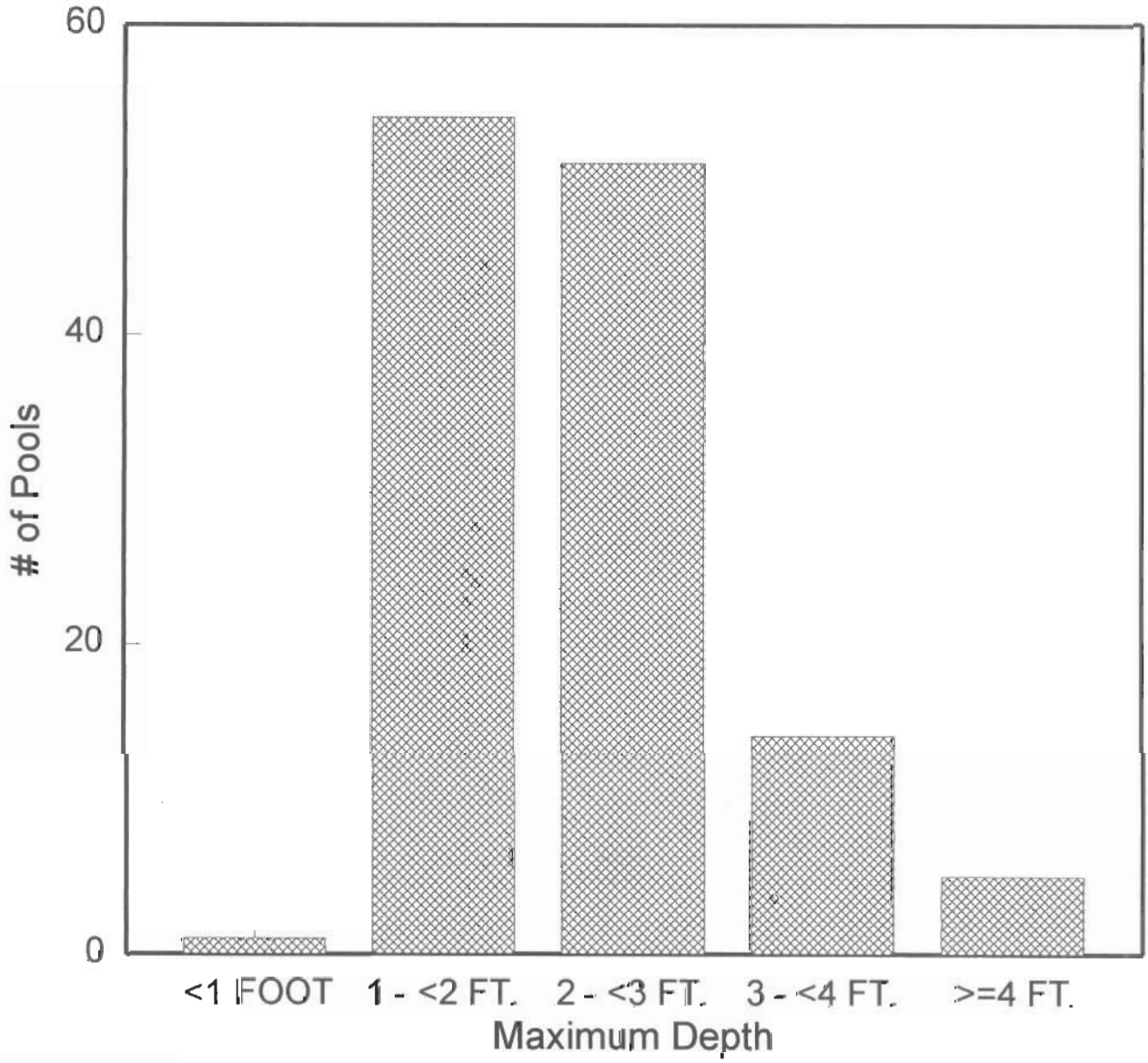
Pool Habitat Types by % Occurrence



Graph 3

Sheephouse Creek

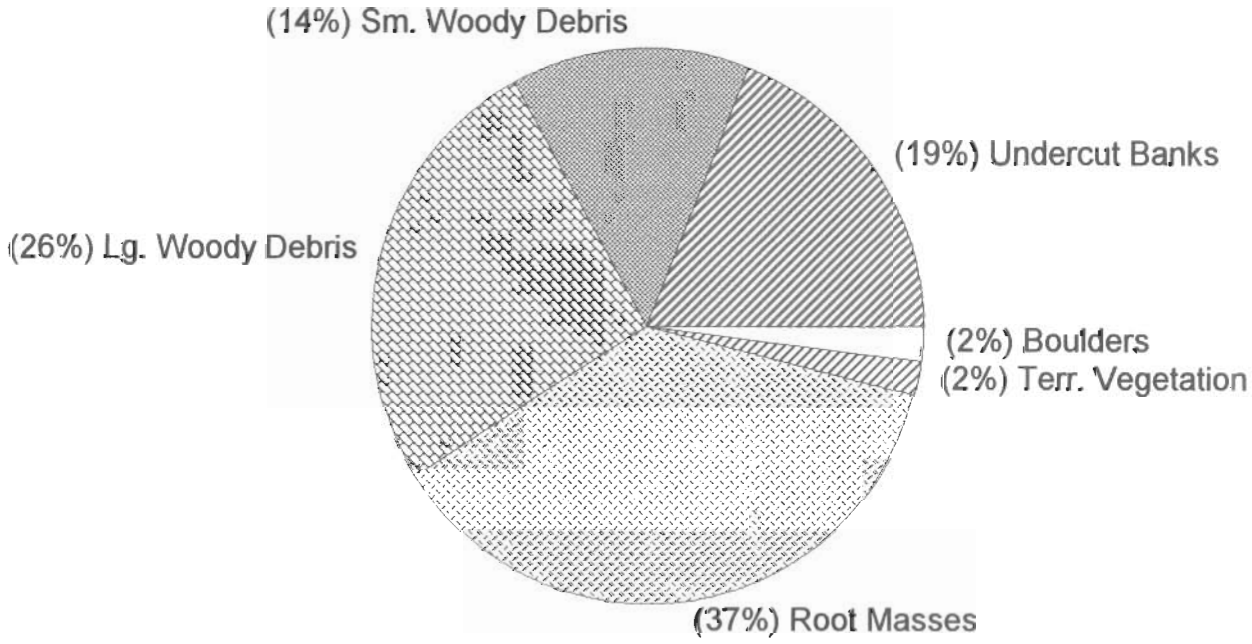
Maximum Depth in Pools



Graph 4

Sheephouse Creek

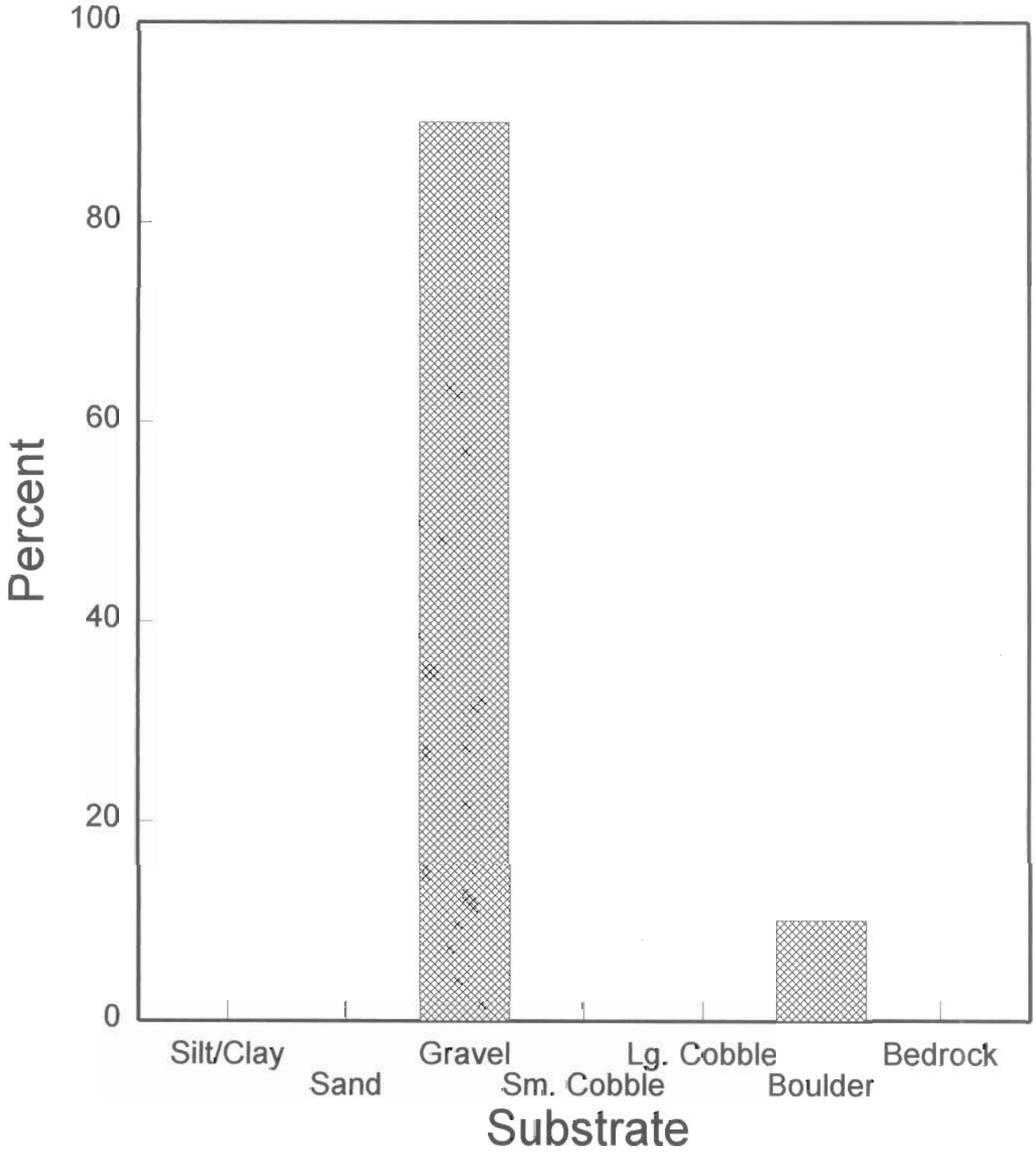
Pool Shelter Types by % Area



Graph 5

Sheephouse Creek

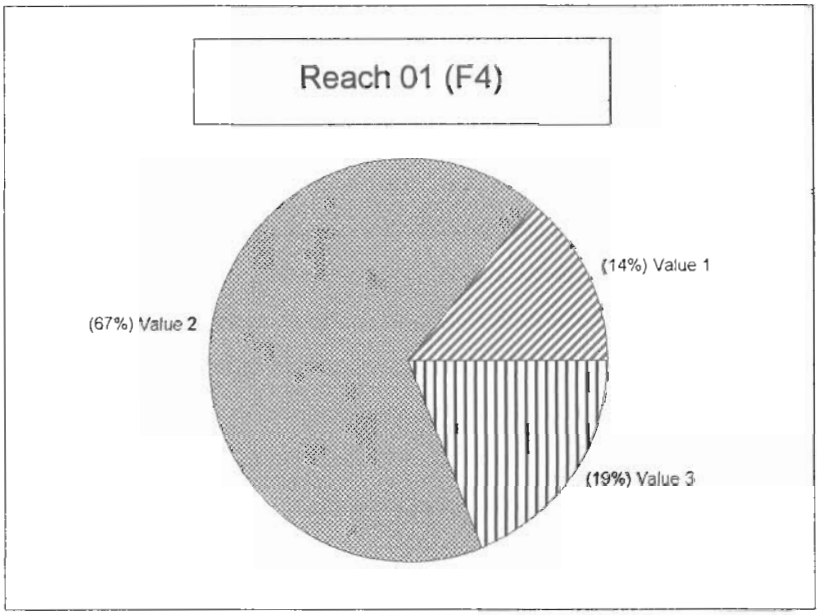
Substrate Composition in Low Gradient Riffles

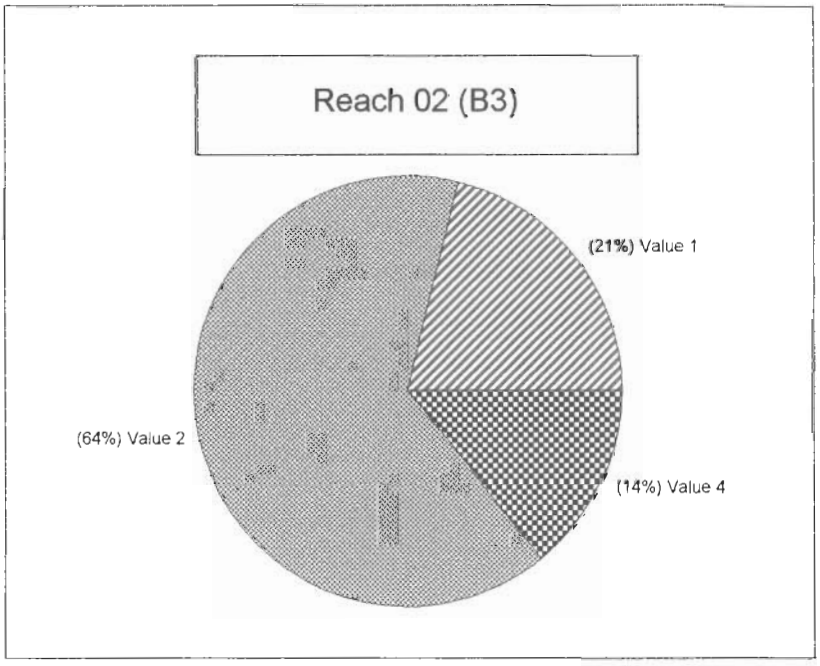


Graph 6

Sheephouse Creek

Percent Cobble Embeddedness by Reach



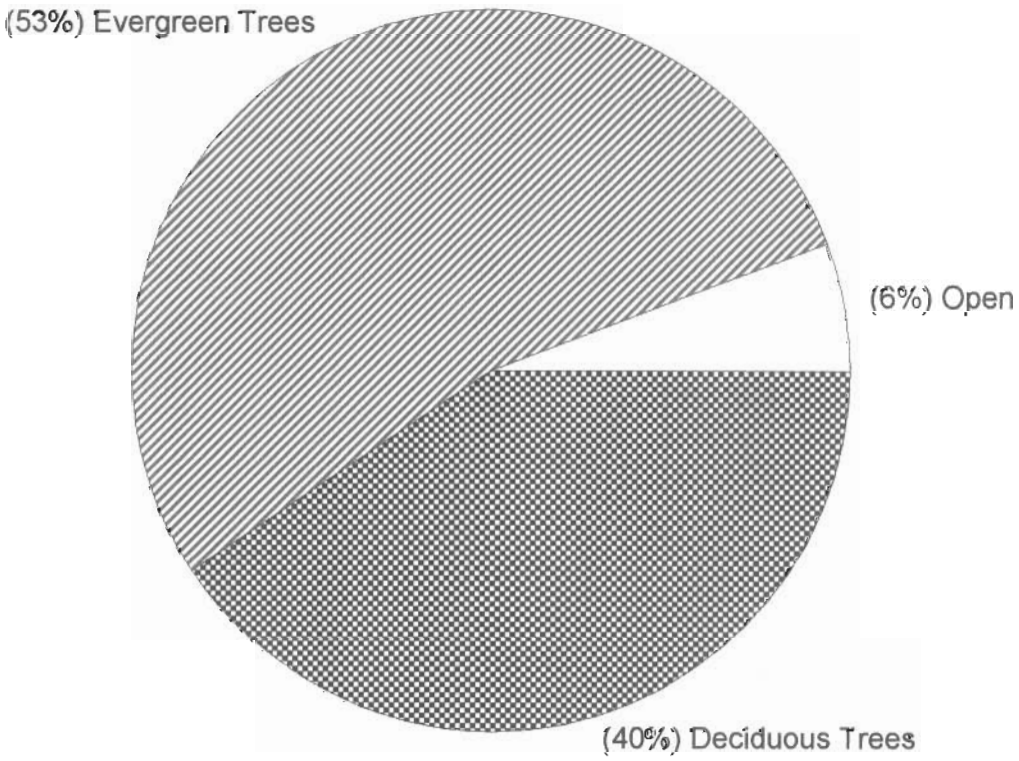


Value 1 = <25% Value 2 = 25-50% Value 3 = 51-75% Value 4 = >76%

Graph 7

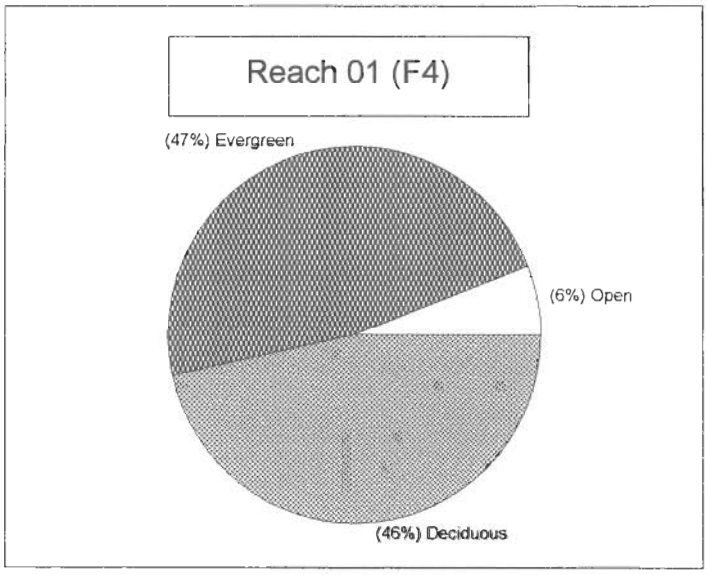
Sheephouse Creek

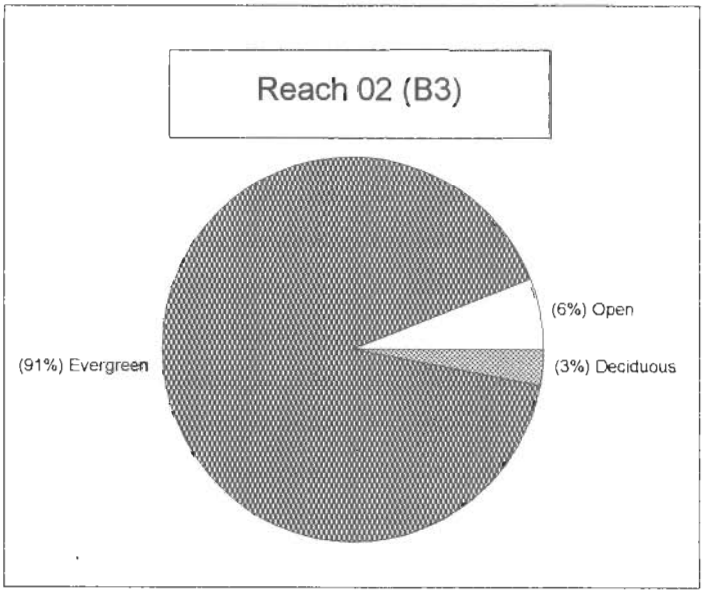
Mean Percent Canopy



Graph 8

Sheephouse Creek
Percent Canopy By Reach

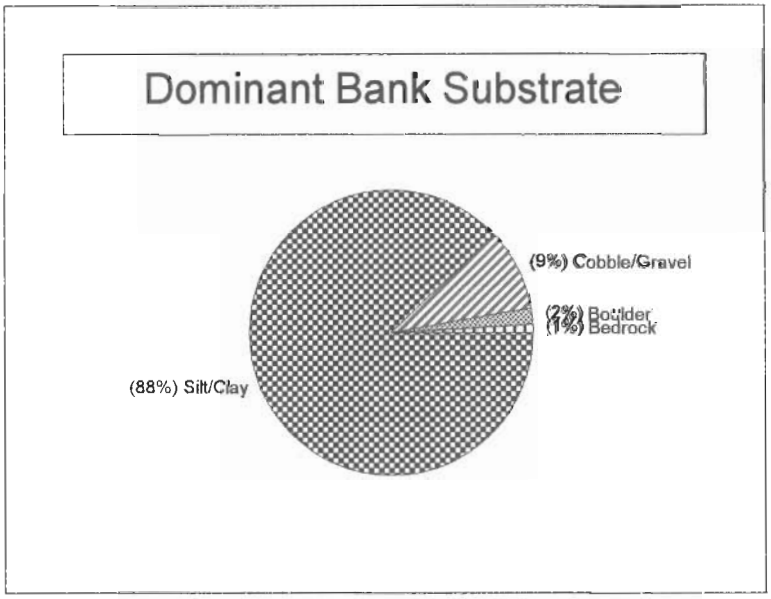


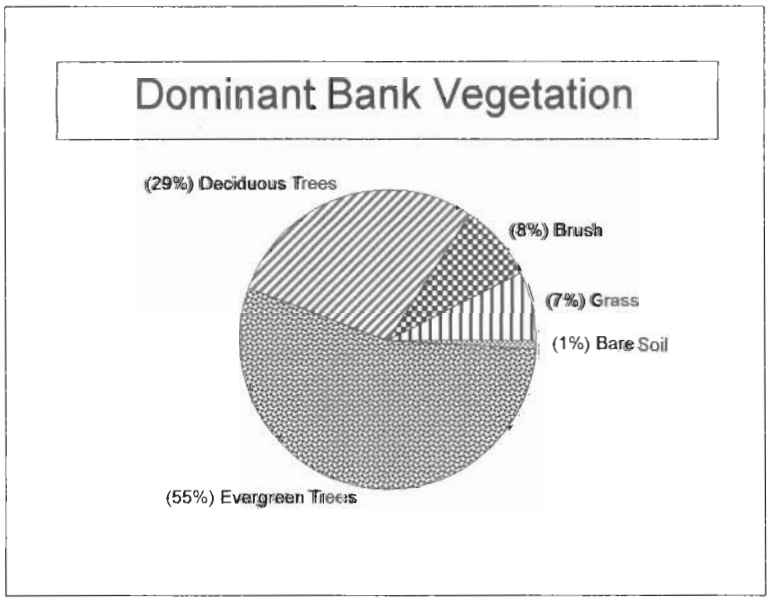


Graph 9

Sheephouse

Percent Bank Composition





Graph 10