CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT

Jack Smith Creek
Report Revised April 14, 2006
Report Completed 2002
Assessment Completed 1999

INTRODUCTION

A stream inventory was conducted during the summer of 1999 on Jack Smith 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 Jack Smith 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 Chinook salmon, 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

Jack Smith Creek is a tributary to Seward, which is a tributary to Forsythe Creek, a tributary of the Russian River, located in Mendocino County, California (see Jack Smith Creek map, page 2). The legal description at the confluence with Eldridge Creek is T16N, R13W, S11. Its location is 039°15'38.7" N. latitude and 123°15'47.6" W. longitude. Year round vehicle access exists from Highway 101 near Calpella, west on Uva Drive to Ranch Road.

Jack Smith Creek and its tributaries drain a basin of approximately 5.1 square miles. Jack Smith Creek is a second order stream and has approximately 5.9 miles of blue line stream, according to the USGS Laughlin Range 7.5 minute quadrangle. In 1999, summer flow was measured as approximately 0.17 cfs, 100 feet upstream from the confluence with Eldridge. Elevations range from about 997 feet at the mouth of the creek to 2400 feet in the headwaters. Redwood forest dominates the watershed. The watershed is owned primarily by Mendocino Redwood Company as well as by private landowners and some land within the watershed is managed for timber production, agricultural production and livestock grazing.

The only sensitive animal listed in the CNPS Inventory and DFG's Natural Diversity Database within the Jack Smith Creek watershed is the Northern Spotted Owl (*Strix occidentalis caurina*), which has a federal status of threatened but no listing within California. During the habitat inventory, surveyors also observed steelhead (*Onchorynchus mykiss*), which are federally listed as threatened, and yellow-legged frogs (*Rana boylii*), which are considered sensitive by the U.S. Forest Service.

METHODS

The habitat inventory conducted in Jack Smith Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 1998). 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 Jack Smith 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 are 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 (1998). 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. Temperatures are also recorded using remote temperature recorders which log temperature every two hours, 24 hours/day.

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". Jack Smith 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. 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 are 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 Jack Smith 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). "Not suitable" (value 5) is assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, absence of particulate substrate (e.g. bedrock), 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 Jack Smith 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:

In all fully measured habitat units, dominant and sub-dominant substrate elements are visually estimated using a list of seven size classes: Silt/Clay, Sand, Gravel, Small Cobble, Large Cobble, Boulder, and Bedrock.

8. Canopy:

Stream canopy density is estimated using modified handheld spherical densiometers as described in the California Salmonid Stream Habitat Restoration Manual (1998). Canopy density relates to the amount of stream shaded from the sun. In Jack Smith 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. Finally, the total canopy over each habitat unit is visually divided into evergreen and deciduous, and the estimated percentages are recorded.

9. Bank Composition and Vegetation:

Banks may be composed primarily of (1) Bedrock, (2) Boulders, (3) Cobble/Gravel, or (4) Silt/Clay/Sand, and may be covered predominantly with (5) Grass, (6) Brush, (7) Deciduous Trees, (8) Coniferous Trees, or (9) No Vegetation at all. These factors influence the ability of stream banks to withstand winter flows. For each fully measured habitat unit in Jack Smith Creek, the dominant Bank Composition Type and Vegetation Type of both the right and left banks were chosen from the options above. Additionally, the percentage of vegetal coverage was estimated and recorded for each bank.

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 CDFG. 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 Jack Smith 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
- Percent Bank Composition and Bank Vegetation

HISTORICAL STREAM SURVEYS

Jack Smith Creek was surveyed by CDFG in 1964, 1972, 1974, 1977, 1981 and 1987. Log jam barrier removal projects were implemented in 1985 and 1986.

In October 1964, surveyors observed extensive logging damage in a 3 mile section of stream near the headwaters. The overabundance of silt and debris was attributed to a logging operation in 1962. No total barriers were identified, but gravel banks built up behind debris jams posed a threat during high flow events. The general estimate was that the stream was badly damaged by logging, though it appeared somewhat stabilized.

In the June 1972 survey, several fish barriers were identified and pollution of the stream by cattle in the lower section was noted. It was estimated that Jack Smith Creek offered roughly 5 miles of potential spawning and nursery grounds, despite the fact that it didn't appear to be used as a steelhead spawning stream at that time. The major limiting factor was thought to be low winter flows.

In the July 1974 survey it was concluded that Jack Smith Creek had some potential for a small fishery if landowner cooperation were to occur, and that the stream basin and surrounding vegetation were in good condition.

In the June 1977 survey it was noted that there was little evidence of good fish habitat and flows were undesirably low.

The October 1981 survey was conducted in response to a timber harvest plan. It was noted that there was a significant amount of woody material (slash) in the stream and that the streambed was aggraded, with gravel areas of intermittent surface flow. A lack of fish in certain areas was attributed to past timber activities. This gravel over-burden, which reduced fish habitat, was especially noticeable in the upper section of Jack Smith Creek. Canopy was also evaluated during this survey—estimated at 50% in the lower section of stream, after timber harvest operations, and 10-20% or less in the upper sections of stream, with large trees being scarce and most of the canopy consisting of hardwoods. A spotted owl nest tree was flagged for retention in the face of future timber harvest plans.

Several log jam fish barriers were removed from Jack Smith Creek in 1985 and 1986.

The April 1987 survey was also conducted in response to a pending timber harvest plan. It was noted that Jack Smith Creek was a salmonid spawning and nursery stream for approximately 6 miles and was recovering from significant long-term damage due to logging. It was also noted that use of the old road system, as proposed in the timber harvest plan, would result in "significant adverse long-term effects on the beneficial uses of fish habitat in Jack Smith Creek."

HABITAT INVENTORY RESULTS

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

The habitat inventory of September 15 to October 6, 1999 was conducted by AmeriCorps Interns Andrea Kudrez and Rob Turner with supervision and analysis by CDFG. The survey began at the confluence with Eldridge Creek and extended up Jack Smith Creek to what appeared to be the end of anadromous fish passage at a series of log jams. The total length of the stream surveyed was 31,286 feet, with an additional 104 feet of side channel.

A flow of 0.17 cfs was measured on September 21, 1999 at habitat unit #5, 100 feet above the survey start with a Marsh-McBirney Model 2000 flowmeter.

This section of Jack Smith Creek has 5 channel types: from the mouth to1,698 feet an F3; next 2,864 feet an F1; next 17,892 feet an F4; next 6,778 feet a G4 and the upper 2,054 feet an A4.

F3 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly cobble substrate.

F1 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly bedrock substrate.

F4 channel types are entrenched meandering riffle/pool channels on low gradients (<2%) with a high width/depth ratio and a predominantly gravel substrate.

G4 channel types are characterized as well-entrenched "gully" step-pool channels with a low width/depth ratio, a moderate gradient (2-4%) and a predominantly gravel substrate.

A4 channel types are steep (4-10%), narrow, cascading, step-pool streams with a high energy/debris transport associated with depositional soils and a predominantly gravel substrate.

Water temperatures on the survey dates ranged from 52°F to 68°F. Air temperatures ranged from 53°F to 89°F.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 37% pool units, 35% flatwater units, 24% riffle units, and 3% dry streambed units. Based on total **length** there were 57% flatwater units, 28% pool units,13% riffle units, and 3% dry streambed units.

Five hundred fifty habitat units were measured and 14% 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 mid-channel pools at 27%, step runs at 27%, low gradient riffles at 23% and runs at 9%. By percent total length, step runs made up 49%, mid-channel pools

21%, low gradient riffles 13%, and runs 8%.

Two hundred and six pools were identified (Table 3). Main Channel pools were most often encountered at 74%, and comprised 77% of the total length of pools.

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. One hundred and six of the 206 pools (51%) had a depth of two feet or greater. These deeper pools comprised 16% 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 34. Flatwater had the lowest rating with 13 and riffles rated 16 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 53, main channel pools rated 28, and backwater pools rated 26 (Table 3).

Table 5 summarizes fish shelter by habitat type. By percent area, the dominant pool shelter types were boulders at 28%, large woody debris at 25%, undercut banks at 17%, and root masses at 13%.

Table 6 summarizes the dominant substrate by habitat type. Gravel was the dominant substrate observed in 11 of the13 low gradient riffles measured. Small cobble was dominant in 1 of the low gradient riffles.

No mechanical gravel sampling was conducted in 1999 surveys due to inadequate staffing levels.

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 204 pool tail-outs measured, 37 had a value of 1 (18%); 89 had a value of 2 (44%); 39 had a value of 3 (19%); and 5 had a value of 4 (2%). Thirty four (17%) riffles rated a 5 (unsuitable substrate type for spawning). On this scale, a value of one is best for fisheries.

The mean percent canopy density for the stream reach surveyed was 68%. The mean percentages of deciduous and evergreen trees were 58% and 42%, respectively.

For the entire stream reach surveyed, the mean percent right bank vegetated was 83% and the mean percent left bank vegetated was 82%. For the habitat units measured, the dominant vegetation types for the stream banks were: 50% deciduous trees, 43% evergreen trees and 7% grass. The dominant substrate for the stream banks were: 74% silt/clay/sand, 21% cobble/gravel, 3% bedrock and 2% boulder.

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

During the October 1964 survey conducted by CDFG, the fish population in Jack Smith Creek was estimated to be 95% steelhead and 5% rough fish, including sucker, pikeminnow and roach.

Steelhead averaged 20 per 100 feet and were an average of 3 inches in length.

During the June 1972 survey conducted by CDFG, pikeminnow and steelhead were observed in the lower section of the stream, with steelhead at an estimated abundance of 15 per 100 feet for 1-3 inch fish and 20 per 100 feet for 4-6 inch fish. In the upper section of stream a "few" rainbow trout/steelhead 4-6 inches in length were observed.

On October 18, 1999 a biological inventory was conducted on two sites in Reach 1 of Jack Smith Creek to document the fish species composition and distribution. The sites were single pass electrofished using one Smith Root Model 12 electrofisher. Fish from each site were counted by species and returned to the stream. A random sample of fish were selected from each reach and tissues were taken for genetic analysis. The air temperature was 72° and the water temperature was 53°. The observers were Sean Higgins (AmeriCorps Intern) and Bryan Freele (DFG).

The inventory of the first site in Reach 1 started just upstream of the hobo temp location near habitat unit #10 and ended approximately 323 feet upstream. In riffle and flatwater habitat types, 50 steelhead (ranging from 40-145mm) were observed, along with 13 yellow-legged frogs and one Pacific Giant salamander.

The inventory of the second site in Reach 1 started at habitat unit #37 and ended approximately 96 feet upstream. In pool habitat types (the only types observed), 25 steelhead (ranging from 50-160mm) were observed, along with one California roach, one Pacific Giant salamander and several yellow-legged frogs. Many tree frogs were also observed.

On October 21, 1999 a second biological inventory was conducted on two sites on the upper section of Jack Smith Creek, in Reach 3. The sites were single pass electrofished using one Smith Root Model 12 electrofisher. Fish from each site were counted by species and returned to the stream. A random sample of fish were selected from each reach and tissues were taken for genetic analysis. The air temperature was 60° and the water temperature was 48°. The observers were Sean Higgins (AmeriCorps Intern) and Bryan Freele (DFG).

The inventory of the first site in Reach 3 started at habitat unit #104 and ended at habitat unit #108. In riffle and flatwater habitat types, 31 steelhead (ranging from 40-150mm) were observed, along with 29 California roach, eight yellow-legged frogs and three Pacific Giant salamanders.

The inventory of the second site in Reach 3 started at habitat unit #327 and ended at habitat unit #337. In Riffle, pool and flatwater habitat types, 25 steelhead (ranging from 40-135mm) were observed, along with 14 yellow-legged frogs and five Pacific Giant salamanders.

During the habitat inventory, no salmonids/anadromous salmonids were observed upstream of unit #539, 31,014 feet above the confluence with Forsythe Creek, where a series of log and debris jams (which extend through unit #545) appear to impede further passage. Resident rainbow trout were not observed above this point.

A summary of historical and recent data collected appears in the table below.

Table 1. Species Observed in Historical and Recent Surveys

YEARS	SPECIES	SOURCE	Native/Introduced
1964, 1972,1999	Steelhead	DFG	N
1964	Sacramento Sucker		
1964	Sacramento Pikeminnow		
1964,1999	California Roach	DFG	N
1999	Pacific Giant Salamander	DFG	N
1999	Yellow-legged Frog	DFG	N

Historical records reflect that fish rescue/transfer operations into Jack Smith Creek occurred in 1915, 1990, 1992, 1993, 1996 and 1997. It was also noted in a letter from CDFG to CDF that in the winter of 1989-90 Lousiana-Pacific, in cooperation with CDFG and Cloverdale CASTERS, planted a number of adult steelhead in Jack Smith Creek for spawning purposes. The fish were from Russian River stock and were “relocated to restore fish runs lost because of the barriers”.

Table 2. Summary of fish hatchery stocking into Jack Smith Creek

YEAR	SOURCE	SPECIES	#	SIZE
1915	Upper Eel River	SH	?	?
1990	Russian River	SH	?	YEAR
1990	Russian River	SH	10	YEAR
1992	Russian River	SH	12	YEAR
1993	Russian River	SH	14	YEAR

Table 2. Summary of fish hatchery stocking into Jack Smith Creek

1996	Russian River	SH	44	YEAR
1997	Russian River	SH	55	YEAR

SH = steelhead

ADULT SURVEYS:

No carcass surveys were conducted on Baker's Creek in 1999, due to inadequate staffing levels.

DISCUSSION

Jack Smith Creek has 5 channel types: F3 (1,698 ft.), F1 (2,864 ft.), F4 (17,892 ft.), G4 (6,778 ft.) and A4 (2,054 ft.).

According to the DFG Salmonid Stream Habitat Restoration Manual, F3 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.

F1 channel types are good for bank-placed boulders and fair for single wing-deflectors and log cover.

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.

G4 channel types are good for bank-placed boulders and fair for low-stage weirs, opposing wing-deflectors and log cover.

A4 channel types are good for bank-placed boulders and fair for low-stage weirs, opposing wing-deflectors and log cover.

Many site specific projects can be designed within F 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, September 15 to October 6, 1999 ranged from 52°F to 68°F. Air temperatures ranged from 53°F to 89°F. The warmer water temperatures were recorded in Reach 2. This temperature regime is generally favorable to steelhead in the Russian River Basin, though the known threshold stress level for salmonids is 65°F. It is possible, but not likely, that the highest temperatures, if sustained, could be detrimental to salmonids.

Pools comprised 28% 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 Jack Smith Creek, the pools are relatively deep with 51% having a maximum depth of at least 2 feet. These pools comprised 16% of the total length of stream habitat. However, in coastal coho and steelhead streams, it is generally desirable to have primary pools comprise approximately 50% of total habitat length.

The mean shelter rating for pools was 34. 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 boulders (28%), large woody debris (25%), undercut banks (17%), and root masses (13%). Log and root wad cover in the pool and flatwater habitats would improve both summer and winter salmonid habitat. Log cover provides rearing fry with protection from predation and rest from water velocity, and also divides territorial units to reduce density-related competition.

Twelve of the 13 low gradient riffles measured (92%) had either gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

Twenty two of the pool tail-outs measured had embeddedness ratings of either 3 or 4. Only 18% had a rating of 1. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. In a reach comparison, Reaches 1 and 5 had the best ratings and Reaches 2, 3 and 4 had the poorest ratings.

The higher the percent of fine sediment, the lower the probability that eggs will survive to hatch. This is due to the reduced quantity of oxygenated water able to percolate through the gravel, or because of fine sediment capping the redd and preventing fry emergence.

The mean percent canopy for the survey was 68%. This is a relatively moderate percentage of canopy, since 80 percent is generally considered desirable. Reach 2 had the lowest percent canopy at 55%.

GENERAL MANAGEMENT RECOMMENDATIONS

Jack Smith Creek should be managed as an anadromous, natural production stream.

Winter storms bring down many large trees and other woody debris into the stream, which increase the number and quality of pools. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. Efforts to increase flood protection or improve fish access in the short run, have led to long term problems in the system. Landowners should be sensitive about the natural and positive role woody debris plays in the system, and encouraged not to remove woody debris from the stream, except under extreme buildup and only under guidance by a fishery professional.

PRIORITY FISHERY ENHANCEMENT OPPORTUNITIES

1) Active and potential sediment sources related to the road system in the Jack Smith Creek watershed should be mapped and treated according to their potential for sediment yield to the stream and its tributaries.

2) **Actively eroding banks in all reaches of Jack Smith Creek would benefit from the utilization of bio-technical vegetative techniques to reestablish floodplain benches and a defined low flow channel. This would discourage lateral migration of the base flow channel and decrease bank erosion.**

3) Where feasible, increase woody cover in the pool and flatwater habitat units along the entire stream. Most of the existing shelter is from boulders and large woody debris. Adding more complex large woody cover is desirable. Combination cover/scour structures constructed with boulders and woody debris would be effective in many flatwater and pool locations. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion. In some areas the material is at hand.

4) Where feasible, design and engineer pool enhancement structures to increase the number of pools in all reaches of Jack Smith Crek. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.

5) Increase the canopy in the middle reaches of Jack Smith Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels (particularly in portions of Reaches 2 and 3). The non-anadromous reach above the survey section should be assessed for planting and treated as well, since water temperatures throughout are effected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

APPENDIX B. PROBLEM SITES AND LANDMARKS:
JACK SMITH 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 LENGTH (FT)	COMMENTS
4.00	177	This is the start of full sampling, there is pea gravel shelter and @ 26' into the unit there is a Hobo Temp.
6.00	220	Surveyors observed 1+ Steelhead.

14.00	622	The surveyors observed 1+ Steelhead, young of the year, and possibly Roach.
23.00	1052	Surveyors observed 1+ Steelhead.
24.00	1217	Surveyors observed Roach young of the year.
27.00	1356	Surveyors observed 1+ Steelhead.
36.00	1684	The surveyors observed 2+ salmonid.
44.00	2189	Surveyor observed Roach young of the year.
45.00	2303	At 70 ft. into the unit there is PVC pipe crossing the stream, 10 ft. above the channel.
49.00	2808	Surveyor found possible Roach fish and 1+ Steelhead.
60.00	3572	The surveyor observed non-salmonid young of the year.
69.00	4007	The surveyor observed salmonid young of the year.
78.00	4605	The surveyor observed 1" non-salmonid.
80.00	4663	The surveyor observed 2+ salmonid.
88.00	5386	There is road access through the Bowen property on the left bank.
96.00	6062	At 135 ft. into the unit there is a dry tributary on the left bank.
108.00	6587	38 ft into the unit, there is Log debri accumilation 5 ft high, 5 ft long, and 35 ft. wide. There are 15 pieces of large woody debri not holding gravel.
112.00	6989	At 38 ft. into the unit there is a barbed wire fence 6 ft. high and 2 ft. above the water. There are also 2+ steelhead in the pool.
121.00	7713	At 17 ft. into the unit there is a dry tributary on the right bank.
122.00	7767	At 3 ft. into the unit there are 2+ salmonid and a Blue Goo slide 50 ft. long, and 25 ft. high on the left bank.
125.00	7850	At 13 ft. into the unit there is a dry tributary on the right bank.
126.00	7925	At 15 ft. into the unit there is a dry tributary on the right bank.
127.00	7990	There is live oak on the left bank.
130.00	8428	At 272 ft. into the unit there is

		Log Debris Accumulation measuring 70 ft. long, 10 ft. high, and 30 ft. wide and it is not holding sediment.
146.00	9948	At 34 ft. there is a fence line 7 ft. above the creek.
152.00	10479	There is a possible channel change in this unit.
154.00	10659	At 20 ft. into the unit there is a failure on the left bank, measuring 40 ft. long, and 20 ft. high.
156.00	10692	At 0 ft. there is Log Debris Accumulation measuring 15 ft. long, 15 ft. wide and 10 ft. high and it is not holding sediment.
158.00	10753	At 12 ft. into the unit there is Log Debris Accumulation, measuring 5 ft. long, 17 ft wide, and 7 ft. high, and holding 3 ft. of sediment.
160.00	10849	At 12 ft. into the unit there is Log Debris Accumulation measuring 5 ft. long, 17 ft. wide, 7 ft high, and holding 3 ft. of sediment.
162.00	10937	At 28 ft. into the unit there is a dry tributary on the left bank.
177.00	11637	At 50 ft. into the unit, there is a failure on the left bank measuring, 335 ft. long, 20 ft. high and, 4 ft. wide.
184.00	11885	At 0 ft, there is a left bank failure measuring 50 ft. long, 30 ft. high, and 4 ft. wide.
185.00	11896	At 0 ft. there is Log Debris Accumulation, measuring 50 ft. long, 70 ft. wide, 12 ft. high, holding approx. 6 ft. of sediment, There are also approx. 100 pieces of Large Woody Debris.
196.00	12614	At 10 ft. into the unit there is a failure on the left bank measuring 120 ft. long, 35 ft. high and 8 ft. wide.
200.00	12741	At 14 ft. into the unit there is 1 piece of Large Woody Debris that is holding 2 ft. of sediment.
202.00	12833	At 1 ft. into the unit there is a dry tributary on the left bank.

204.00	12946	At 47 ft. into the unit, there is a tributary on the right bank that is mostly dry with some pockets of water <1 ft. deep. and 59 degrees F.
206.00	13117	At 10 ft. into the unit there is a left bank failure measuring 75 ft. long, 6 ft. wide and, 50 ft. high. Also, at 100 ft. into the unit there is Log Debris Accumulation measuring 15 ft. long, 40 ft. wide, and 12 ft. high. There are approx. 50 pieces of Large Woody Debris and 2 root wads as well.
211.00	13350	At 20 ft. into the unit there is a 6 ft. drop to plunge pool.
218.00	13550	There is a possible channel change in this unit.
219.00	13570	At 0 ft. There is a failure on the left bank measuring 100 ft. long, 50 ft. high and, 4 ft. wide.
220.00	13635	At 12 ft. into the unit, there is a huge Madrone, Large Woody Debris, in the creek.
223.00	13695	At 0 ft. there is failure on the left bank measuring 100 ft. long, 30 ft. high and, 4 ft. wide.
232.00	14148	At 62 ft. into the unit there is a roadcut.
234.00	14262	At 12 ft. into the unit there is a 2" PVC pipe going through the channel. At 21 ft. into the unit, there is a tributary on the right bank that has a temp. of 59o.
235.00	14290	At 26 ft. into the unit there is a pvc pipe extending from a house onto the left bank and into the creek.
251.00	15235	At 5 ft. into the unit there is Log Debris Accumulated measuring 15 ft. long, 17 ft. wide, 4 ft. high and it is not holding sediment. There is also approx. 6 pieces of Large Woody Debris.
257.00	15378	At 4 ft. into the unit there is Log Debris Accumulation measuring 15 ft

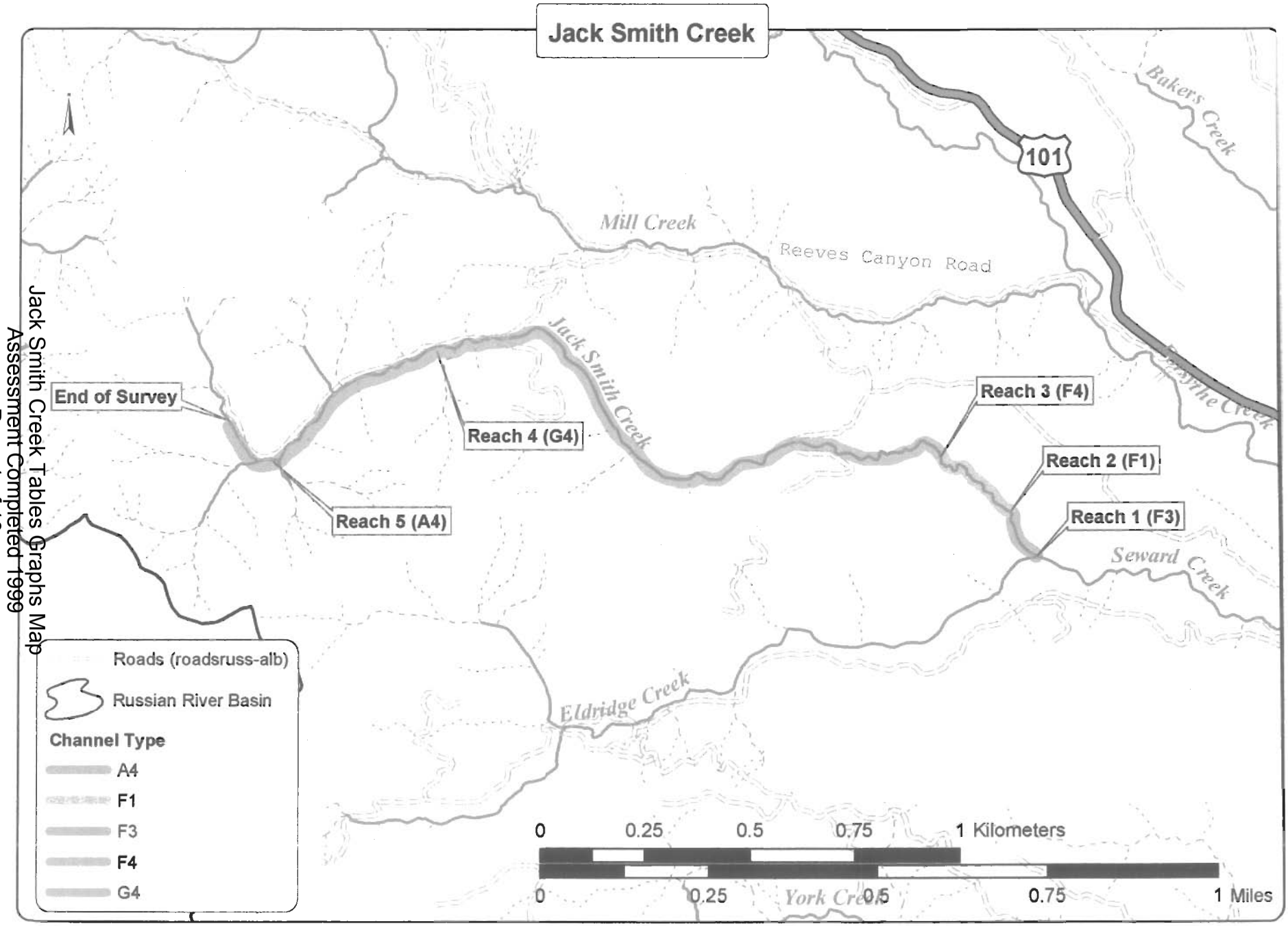
		long, 25 ft. wide, 4 ft. high and, is holding 3 ft. of gravel. There is also approx. 50 pieces of Large Woody Debris.
264.00	15675	At 8 ft. into the unit there is a road to the creek on the left bank.
265.00	15755	On the left bank there is a tree house 30 ft. above the channel.
281.00	17097	At 68 ft. into the unit there is Log Debris Accumulation measuring 35 ft. long, 45 ft. wide and, 8 ft. high. There is also approx. 50 Large and Small Woody Debris.
282.00	17112	Water may go subsurface beneath a Log Debris Accumulation
290.00	17583	At 155 ft. into the unit there was left bank failure measuring 70 ft. long, 2 ft. wide and, 10 ft. high.
291.00	17645	At 0 ft. into the unit there is Log Debris Accumulation measuring 31 ft. long x 15 ft. wide x 6 ft. high and is retaining 1 ft. of gravel.
319.00	19223	At 131 ft. into the unit there is a road crossing through the creek.
342.00	20448	At 30 ft. into the unit there is Log Debris Accumulation measuring 14 ft. long x 11 ft. wide x 2 ft. high and is not holding sediment.
348.00	20670	There is good winter pool cover in this unit.
380.00	22118	In this unit there is a 3 ft. plunge.
386.00	22437	At 33 ft. into the unit there is a tributary on the right bank measuring 54degrees. There is a high gradient A channel that is mostly dry. The surveyor walked 100 ft. and no fish were observed.
388.00	22494	There is a possible channel change in this unit. Also, there is a road, in good condition, paralleling the creek and not resulting in any major slides.
399.00	23205	At 20 ft. into the unit there is 3

		pieces of Large Woody Debris in the creek creating a 1 ft. plunge.
406.00	23463	At 0 ft. there is Log Debris Accumulation and approx. 20 pieces of Large Woody Debris.
416.00	23855	At 254 ft. into the unit there is Log Debris Accumulation measuring 20 ft. long, 30 ft. wide and, 9 ft. high. There are approx. 30 pieces of Large Woody Debris holding 2 ft. of gravel.
417.00	24134	There is a road on the left bank approx 20 ft. from the channel in this unit.
428.00	24541	At 0' there is Log Debris Accumulation measuring 28 ft. long, 30 ft. wide, 9 ft. high and holding 6 ft. of sediment. There is also approx. 18 pieces of Large Woody Debris.
429.00	24568	The water goes subsurface in this unit.
430.00	24612	At 38 ft. into the unit, there is Log debris accumulation measuring 33 ft. long, 15 ft. wide, 9 ft. high and holding 8 ft. gravel. 30 pieces of Large woody debris.
431.00	24622	Under the Log Debris Accumulation there is possibly subsurface flow.
432.00	24634	There is a log debris accumulation at the upstream end of the unit creating a 6 foot plunge. Twelve feet into the unit the water flow is subsurface. The pool tail out is covered by another log debris accumulation, thus hindering the surveyor's ability to view the pool tail substrate.
445.00	25297	The water goes subsurface at the end of this unit for less than 1 unit.
448.00	25477	There is a 4 ft. plunge in this unit.
449.00	25495	On the left bank there is a road 15 ft. from the channel.
467.00	26357	At 16 ft. temp is 55 degrees F and on the left bank There is a road that crosses the tributary 150 ft. upstream. There was a culvert

		removed and logs were placed in the channel. The aquatic invert community on subtrak changes from caddisfly /Mayfly dominated to worm-like and silt-encased caddisfly larvae. There is red silt-like algae appearing in channel. (Illustration on form)
469.00	26454	There is a great undercut 3 ft. on each side.
477.00	26943	There is a road channel 5 ft. from redwoods.
496.00	28626	In this unit Caddisflies and Mayflies are becoming more abundant in the substrate.
504.00	29146	The channel is filled with a red, silt-like algae.
508.00	29263	The road is further from the creek and there is a possible channel change.
511.00	29676	At 96 ft. into the unit there is Log debris accumulation measuring 25 ft. long, 30 ft. wide, 7 ft. high and, holding 2 ft. of sediment. There is approx. 15 pieces of large woody debris.
513.00	29812	At 16 ft. into the unit there is a very dry tributary. the surveyor walked approx. 800 ft. upstream and did not observe any water or fish.
528.00	30738	The water is cleared of red algae.
537.00	30961	At 34 ft. into the unit there is log debris accumulation measuring 10 ft. long, 30 ft. wide, and 7 ft. high. There is approx. 10 pieces of large woody debris holding 2 ft. of gravel.
539.00	31014	At 6 ft. into the unit there is log debris accumulation measuring 20 ft. long, 25 ft. wide, 8 ft. high and holding 8 ft. of sediment. There is approx. 7 pieces of wood.
541.00	31033	The temperature taken here is 55oF. At 6 ft. into the unit there is log debris accumulation measuring 28 ft. long, 20 ft. wide, and 5 ft. high. There is approx. 5 pieces of large woody debris holding approx.

		3 ft. of sediment.
543.00	31061	At 11 ft. into the unit there is log debris accumulation measuring 15 ft. long, 18 ft. wide, 9 ft. high and holding 4 ft. of sediment. There is also approx. 10 pieces of large woody debris and 1 root wad.
545.00	31247	At 17 ft. into the unit there is right bank failure measuring 85 ft. long, 10 ft. wide, and 40 ft. high. At 76 ft. into the unit there is log debris accumulation measuring 25 ft. long, 20 ft. wide, 10 ft. high and holding 5 ft. of sediment. There is also approx. 15 pieces of large woody debris.
547.00	31286	There are no fish observed for 1063 ft There is log debris accumulation at units 539, 541, 543, or 545,

END SURVEY Survey ended at habitat unit #547



Jack Smith Creek Tables Graphs Map
Assessment Completed 1999
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Prepared by: Z. Young, UC Berkeley, May 1, 2002

Jack Smith Creek — Drainage: Eldridge Creek; Forsythe Creek; Russian River

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 09/15/99 to 10/06/99

Confluence Location: QUAD:Laughlin Range LEGAL DESCRIPTION: T16NR13WS11 LATITUDE: 39°15'39" LONGITUDE: 123°15'48"

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
131	13	RIFFLE	24	31	4096	13	6.9	0.3	167	21872	47	6204	0	16
194	22	FLATWATER	35	91	17738	57	11.2	0.7	1018	197532	332	64399	0	13
206	44	POOL	37	42	8644	28	10.3	1.1	426	87658	497	102458	421	34
16	0	DRY	3	53	850	3	0.0	0.0	0	0	0	0	0	0
3	0	NOT SURVE	1	21	62	0	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.)
550	79	31390	307061	173060

Jack Smith Creek | Drainage: Eldridge Creek; Forsythe Creek; Russian River

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS | Survey Dates: 09/15/99 to 10/06/99

Confluence Location: QUAD:Laughlin RangeLEGAL DESCRIPTION: T16NR13WS11 LATITUDE: 39°15'39" LONGITUDE: 123°15'48"

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 %
124	10	LGR	23	32	3972	13	7	0.3	0.9	195	24237	54	6668	0	10	70
5	3	HGR	1	20	99	0	8	0.4	0.7	84	422	33	163	0	37	37
2	0	BRS	0	13	25	0	4	0.1	0.1	16	32	2	3	0	0	57
47	10	RUN	9	51	2412	8	7	0.9	1.5	418	19663	366	17183	0	7	67
147	12	SRN	27	104	15326	49	15	0.4	2.0	1618	237852	295	43402	0	18	68
150	22	MCP	27	44	6545	21	10	1.1	4.5	438	65650	524	78560	442	27	68
2	1	STP	0	76	152	0	12	1.0	3.5	773	1546	757	1514	603	45	90
1	1	CRP	0	128	128	0	13	1.7	3.0	1581	1581	2687	2687	2371	20	90
15	4	LSL	3	37	553	2	10	1.2	5.0	353	5291	438	6576	400	52	62
15	5	LSR	3	42	633	2	11	0.9	3.4	449	6729	399	5991	328	42	69
1	1	LSBk	0	31	31	0	8	0.6	1.6	231	231	138	138	46	10	45
12	4	LSBo	2	31	372	1	11	0.9	3.5	330	3958	315	3780	266	75	58
4	2	PLP	1	19	75	0	19	1.2	4.4	351	1403	534	2136	440	55	87
3	1	BPB	1	27	82	0	9	0.6	1.7	225	676	144	432	114	13	45
2	2	BPR	0	28	55	0	7	0.9	3.1	225	450	257	513	215	40	48
1	1	DPL	0	18	18	0	8	0.9	1.8	144	144	130	130	115	40	82
16	0	DRY	3	53	850	3	0	0.0	0.0	0	0	0	0	0	0	82
3	0	NS	1	21	62	0	0	0.0	0.0	0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
550	79	31390	369863	169877

Jack Smith Creek — Drainage: Eldridge Creek; Forsythe Creek; Russian River

Table 3 SUMMARY OF POOL TYPES — Survey Dates: 09/15/99 to 10/06/99

Confluence Location: QUAD:Laughlin RangeLEGAL DESCRIPTION: T16NR13WS11 LATITUDE: 39°15'39" LONGITUDE: 123°15'48"

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
152	23	MAIN	74	44	6697	77	10.1	1.1	442	67195	527	80074	445	28
48	17	SCOUR	23	37	1792	21	11.3	1.0	400	19192	444	21309	380	53
6	4	BACKWATER	3	26	155	2	8.2	0.8	212	1270	179	1075	148	26

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
206	44	8644	87657	102458

Jack Smith Creek | Drainage: Eldridge Creek; Forsythe Creek; Russian River

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES | Survey Dates: 09/15/99 to 10/06/99

Confluence Location: QUAD:Laughlin RangeLEGAL DESCRIPTION: T16NR13WS11 LATITUDE: 39°15'39" LONGITUDE: 123°15'48"

UNITS MAX DPTH 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
150	MCP	73	3	2	75	50	56	37	13	9	3	2
2	STP	1	0	0	1	50	0	0	1	50	0	0
1	CRP	0	0	0	0	0	0	0	1	100	0	0
15	LSL	7	0	0	3	20	7	47	4	27	1	7
15	LSR	7	0	0	6	40	7	47	2	13	0	0
1	LSBk	0	0	0	1	100	0	0	0	0	0	0
12	LSBo	6	0	0	6	50	5	42	1	8	0	0
4	PLP	2	0	0	0	0	3	75	0	0	1	25
3	BPB	1	0	0	3	100	0	0	0	0	0	0
2	BPR	1	0	0	1	50	0	0	1	50	0	0
1	DPL	0	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS
206

Jack Smith Creek | Drainage: Eldridge Creek; Forsythe Creek; Russian River

Table 5 - Summary of Shelter by Habitat Type | Survey Dates: 09/15/99 to 10/06/99

Confluence Location: QUAD:Laughlin RangeLEGAL DESCRIPTION: T16NR13WS11 LATITUDE: 39°15'39" LONGITUDE: 123°15'48"

UNITS MEASURED	UNITS SHELTER MEASURED	HABITAT TYPE	% TOTAL UNDERCUT BANKS	% TOTAL SWD	% TOTAL LWD	% TOTAL ROOT MASS	% TOTAL TERR. VEGETATION	% TOTAL AQUATIC VEGETATION	% TOTAL WHITE WATER	% TOTAL BOULDERS	% TOTAL BEDROCK LEDGES
124	10	LGR	11	39	0	3	10	0	4	33	0
5	3	HGR	0	30	0	0	0	0	35	35	0
2	0	BRS	0	0	0	0	0	0	0	0	0
47	10	RUN	16	19	4	2	33	0	0	22	5
147	12	SRN	7	14	3	5	25	0	5	41	0
150	144	MCP	20	11	23	11	6	0	0	28	1
2	2	STP	0	6	38	0	0	0	0	57	0
1	1	CRP	50	0	0	50	0	0	0	0	0
15	14	LSL	11	22	56	8	0	0	0	3	0
15	15	LSR	20	8	23	41	0	0	0	9	0
1	1	LSBk	0	50	0	0	0	0	0	50	0
12	12	LSBo	6	5	18	0	0	3	1	63	3
4	4	PLP	10	12	9	0	0	0	36	30	3
3	3	BPB	17	17	0	0	33	0	0	30	3
2	2	BPR	36	11	39	4	0	0	0	11	0
1	1	DPL	0	0	50	0	0	0	0	50	0
16	0	DRY	0	0	0	0	0	0	0	0	0
3	0	NS	0	0	0	0	0	0	0	0	0
ALL HABITAT TYPES 550	234		16	12	23	12	6	0	2	29	1
POOLS ONLY 206	199		17	11	25	13	4	0	1	28	1

Jack Smith Creek | Drainage: Eldridge Creek; Forsythe Creek; Russian River

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE | Survey Dates: 09/15/99 to 10/06/99

Confluence Location: QUAD:Laughlin RangeLEGAL DESCRIPTION: T16NR13WS11 LATITUDE: 39°15'39" LONGITUDE: 123°15'48"

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
154	13	LGR	0	0	85	8	8	0	0
5	3	HGR	0	0	33	0	0	67	0
2	1	BRS	0	0	0	0	0	0	100
97	12	RUN	8	8	75	0	0	0	8
57	11	SRN	0	0	55	9	9	18	9
150	21	MCP	10	10	62	5	5	10	0
2	1	STP	0	0	0	0	0	100	0
1	1	CRP	0	100	0	0	0	0	0
16	4	LSL	25	0	75	0	0	0	0
5	5	LSR	0	20	80	0	0	0	0
1	1	LSBk	0	100	0	0	0	0	0
12	4	LSBo	0	25	25	0	0	50	0
4	2	PLP	0	0	50	0	0	0	50
3	1	BPB	100	0	0	0	0	0	0
2	2	BPR	0	100	0	0	0	0	0
1	1	DPL	0	0	100	0	0	0	0
6	3	DRY	0	33	67	0	0	0	0
3	0	NS	0	0	0	0	0	0	0

Jack Smith Creek

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

Mean Percent Canopy	Mean Percent Evergreen	Mean Percent Deciduous	Mean Right bank % Cover	Mean Left Bank % Cover
68.10	41.69	57.83	83.03	81.85

APPENDIX B.

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Bedrock	5	1	3.45
Boulder	1	2	1.72
Cobble/Gravel	20	16	20.69
Silt/clay	61	68	74.14

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Percent Total Units
Grass	4	8	6.90
Brush	0	0	0
Deciduous Trees	50	37	50
Evergreen Trees	33	42	43.10
No Vegetation	0	0	0

APPENDIX C. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Jack Smith Creek
SAMPLE DATES: 09/15/99 to 10/06/99
SURVEY LENGTH:
MAIN CHANNEL: 31167 ft. SIDE CHANNEL: 104 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Laughlin Range Latitude: 39°15'39"
Legal Description: T16NR13WS11 Longitude: 123°15'48"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1 (Units 1-37)

Channel Type: F3	Mean Canopy Density: 78%
Main Channel Length: 1626 ft.	Evergreen Component: 16%
Side Channel Length: 104 ft.	Deciduous Component: 84%
Riffle/Flatwater Mean Width: 6.0 ft.	Pools by Stream Length: 30%
Pool Mean Depth: 1.1 ft.	Pools >=2 ft. Deep: 75%
Base Flow: 0.2 cfs	Pools >=3 ft. Deep: 17%
Water: 63-64°F Air: 73-78°F	Mean Pool Shelter Rtn: 35
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 73%	Occurrence of LOD: 49%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 46% 2. 31% 3. 15% 4. 0% 5. 8%

STREAM REACH 2 (Units 38-77)

Channel Type: F1	Mean Canopy Density: 55%
Main Channel Length: 2817 ft.	Evergreen Component: 7%
Side Channel Length: 0 ft.	Deciduous Component: 93%
Riffle/Flatwater Mean Width: 8.0 ft.	Pools by Stream Length: 25%
Pool Mean Depth: 1.0 ft.	Pools >=2 ft. Deep: 56%
Base Flow: 0.2 cfs	Pools >=3 ft. Deep: 19%
Water: 64-68°F Air: 81-89°F	Mean Pool Shelter Rtn: 18
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 87%	Occurrence of LOD: 33%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 25% 2. 44% 3. 0% 4. 13% 5. 19%

STREAM REACH 3 (Units 78-387)

Channel Type: F4	Mean Canopy Density: 66%
Main Channel Length: 17892 ft.	Evergreen Component: 36%
Side Channel Length: 0 ft.	Deciduous Component: 63%
Riffle/Flatwater Mean Width: 7.6 ft.	Pools by Stream Length: 30%
Pool Mean Depth: 1.0 ft.	Pools >=2 ft. Deep: 53%
Base Flow: 0.2 cfs	Pools >=3 ft. Deep: 15%
Water: 53-66°F Air: 62-87°F	Mean Pool Shelter Rtn: 31
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 82%	Occurrence of LOD: 43%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 15% 2. 45% 3. 20% 4. 0% 5. 20%

STREAM REACH 4 (Units 388-507)

Channel Type: G4	Mean Canopy Density: 71%
Main Channel Length: 6778 ft.	Evergreen Component: 64%
Side Channel Length: 0 ft.	Deciduous Component: 36%
Riffle/Flatwater Mean Width: 20.4 ft.	Pools by Stream Length: 27%
Pool Mean Depth: 1.4 ft.	Pools >=2 ft. Deep: 48%
Base Flow: 0.2 cfs	Pools >=3 ft. Deep: 10%
Water: 52-55°F Air: 53-66°F	Mean Pool Shelter Rtn: 48
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Boulders
Bank Vegetative Cover: 85%	Occurrence of LOD: 51%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 51 ft.

Embeddness Value: 1. 13% 2. 43% 3. 26% 4. 6% 5. 13%

STREAM REACH 5 (Units 508-547)

Channel Type: A4	Mean Canopy Density: 76%
Main Channel Length: 2054 ft.	Evergreen Component: 84%
Side Channel Length: 0 ft.	Deciduous Component: 16%
Riffle/Flatwater Mean Width: 2.8 ft.	Pools by Stream Length: 5%
Pool Mean Depth: 0.7 ft.	Pools >=2 ft. Deep: 13%
Base Flow: 0.2 cfs	Pools >=3 ft. Deep: 0%
Water: 54-55°F Air: 59-69°F	Mean Pool Shelter Rtn: 28
Dom. Bank Veg.: Deciduous Trees	Dom. Shelter: Large Woody Debris
Bank Vegetative Cover: 93%	Occurrence of LOD: 73%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 799 ft.

Embeddness Value: 1. 38% 2. 50% 3. 13% 4. 0% 5. 0%