CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT
Jonive Creek
Report Revised April 14, 2006
Report Completed 2005
Assessment Completed 2001

INTRODUCTION

A stream inventory was conducted July 31, 2001 to August 2, 2001 on Jonive Creek. The survey began at the confluence with Atascadero Creek and extended upstream 21,508 feet.

The Jonive Creek inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Jonive Creek. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

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

Jonive Creek is a tributary to Atascadero Creek, is a tributary to Green Valley Creek, is a tributary to Russian River, a tributary to Pacific Ocean, located in Sonoma County, California (Map 1). Jonive Creek's legal description at the confluence with Atascadero Creek is T07N R09W S33. Its location is 38:24:20.0 N latitude and 122:51:24.0 W longitude, Jonive Creek's LLID number 1228568384055. Jonive Creek is a third order stream and has approximately 3.87 miles of blue line stream according to the USGS Camp Meeker, Two Rock, Valley Ford and Sebastopol 7.5 minute quadrangles. Jonive drains a watershed of approximately 6.29 square miles. Elevations range from about 118 feet at the mouth of the creek to 741 feet in the headwater areas. Mixed hardwood forest and agriculture dominate the watershed. The watershed is primarily privately owned and is managed for rangeland/agriculture. Vehicle access exists via Highway 101 to Highway 12 near Santa Rosa. From Santa Rosa, take Highway 12 west 7.5 miles to Mills Station Road. Take Mills Station Road 1.6 miles north to the mouth of Jonive Creek at Poplar road.

METHODS

The habitat inventory conducted in Jonive Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al., 1998). The California Department of Fish and Game field crew and/or the Watershed Stewards Project/AmeriCorps (WSP/AmeriCorps) Members 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.

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and

their lengths are measured. All pool units are measured for maximum depth, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are measured for all the parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for complete measurement.

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 Jonive Creek to record measurements and observations. There are nine components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) at the bottom of the stream survey reach using a Marsh-McBirney Model 2000 flow meter.

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. Channel characteristics are measured using a clinometer, hand level, hip chain, tape measure, and a stadia rod.

3. Temperatures:

Both water and air temperatures are measured and recorded at every tenth habitat unit. The time of the measurement is also recorded. Both temperatures are taken in degrees 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 temperatures at set intervals, 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". Jonive 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 measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Jonive 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) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, 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. The shelter rating is calculated for each fully-described habitat unit by multiplying shelter value and percent cover. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All cover is then classified according to a list of nine cover types. In Jonive Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. 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-described habitat units, dominant and sub-dominant substrate elements were visually estimated using a list of seven size classes and recorded as a one and two, respectively. In addition, the dominant substrate composing the pool tail-outs is recorded for each pool.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Jonive 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 ocularly into percentages of evergreen or deciduous trees.

9. Bank Composition and Vegetation:

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 Jonive Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in Jonive Creek. In addition, three sites were electrofished using a Smith-Root Model 12 electrofisher. 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 Residual Pool Depths by Habitat Types
- Mean Percent Cover by Habitat Type
- Dominant Substrates by Habitat Type
- Mean Percent Vegetative Cover for Entire Stream
- Fish Habitat Inventory Data Summary by Stream Reach (Table 8)
- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Jonive Creek include:

- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence
- Pool Types by Percent Occurrence
- Maximum Residual Depth in Pools
- Percent Embeddedness
- Mean Percent Cover Types in Pools
- Substrate Composition in Pool Tail-outs
- Mean Percent Canopy
- Dominant Bank Composition by Composition Type
- Dominant Bank Vegetation by Vegetation Type

HABITAT INVENTORY RESULTS

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

MAINSTEM JONIVE CREEK

The habitat inventory of July 31, to August 2, 2001 was conducted by J. Smith and C. Sangiacomo (WSP). The total length of the stream surveyed was 21,508 feet.

Stream flow was not measured on Jonive Creek.

Jonive Creek is an F5 channel type for the entire 20,908 feet of the stream surveyed. F5 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and sand-dominant substrates.

Water temperatures taken during the survey period ranged from 58 to 63 degrees Fahrenheit. These temperatures provide suitable conditions for salmonid species. Air temperatures ranged from 57 to 72 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 11% riffle units, 64% flatwater units, 21% pool units, 3% dry units, and 2% culvert units (Graph 1). Based on total length of Level II habitat types there were 5% riffle units, 87% flatwater units, 6% pool units, and 2% culvert units(Graph 2).

Eight Level IV habitat types were identified (Table 2). Based on percent total length, runs made up 56%, glides 29%, mid-channel pools 4%, and low-gradient riffles 4%. The most frequent habitat types by percent occurrence were runs, 37%; glides, 27%; and mid-channel pools, 14% (Graph 3).

A total of 25 pools were identified (Table 3). Main-channel pools were the most frequently encountered, at 68%, and comprised 75% of the total length of all pools (Graph 4).

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Twenty of the 25 measured pools (80%) had a depth of three feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 25 pool tail-outs measured, 22 had a value of one (88%); zero had a value of two; one had a value of three (4%); two had a value of four (8%); and zero had a value of five (Graph 6). On this scale, a value of one indicates the highest quality of spawning substrate.

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. Riffle habitat types had a mean shelter rating of three, flatwater habitat types had a mean shelter rating of 13, and pool habitats had a mean shelter rating of 33 (Table 1). Of the pool types, the main-channel pools had the highest mean shelter rating at 42. Scour pools had a mean shelter rating of 15, (Table 3).

Table 5 summarizes mean percent cover by habitat type. Undercut banks are the dominant cover types in Jonive Creek. Graph 7 describes the pool cover in Jonive Creek. Undercut banks are the dominant pool cover type followed by small woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 87% of pool tail-outs while bedrock was the next most frequently observed substrate type, at 9%.

The mean percent canopy density for the surveyed length of Jonive Creek was 91%. The mean percentage of evergreen and deciduous trees were 53% and 38%, respectively. Graph 9 describes the mean percent canopy in Jonive Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 69%. The mean percent left bank vegetated was 54%. The dominant elements composing the structure of the stream banks consisted of 2% bedrock, and 98% sand/silt/clay (Graph 10). Deciduous trees were the dominant vegetation type observed in 43% of the units surveyed. Additionally, 41% of the units surveyed had evergreen trees as the dominant vegetation type, and 14% had brush as the dominant vegetation (Graph 11).

BIOLOGICAL INVENTORY RESULTS

On 11/06/01 a biological inventory was conducted at the first site on Jonive Creek to document fish species composition and distribution. The site, Lat. N 38° 23'53.1", Long W 122°52'00.3", was triple pass seine netted. Fish from the site were counted by species, and returned to the stream. The air temperature was 50ºF and the water temperature was 50ºF. The crew members were D. Hines and D. Mitchel.

The inventory began at 9:00 hours in Reach 1. Habitat types surveyed were lateral scour pool - bedrock formed, mid-channel pools, runs and glides. The following table displays the information yielded from this site.

Species Observed	**Numbers Recorded at Site 1**
Steelhead Y+	2
Steelhead 2 +	2
Sculpin	24
Stickleback	12
Freshwater Shrimp	16
Lamprey	4

On 11/09/01 a biological inventory was conducted at the second site on Jonive Creek. The site began at Lat. N 38°24'7.1", Long W 122°51'40.4", and ended at Lat. N 38°23'58.5", Long. W 122°51'52.9". Fish from the site were counted by species, and returned to the stream. The air temperature ranged from 67-68ºF and the water temperature was 50ºF. The crew members were J. Newell and D. Mitchel.

The inventory began at 10:37 hours in Reach 1 and ended at 12:20 hours. Habitat types surveyed were lateral scour pool - bedrock formed, mid-channel pools, runs and glides. The total length fished was 565ft. The following table displays the information yielded from this site.

Species Observed	**Numbers Recorded at Site 2**
Steelhead YOY	3
Steelhead Y+	3
Sculpin	29
Lamprey	5
Freshwater Shrimp	24
Stickleback	16
Crawfish	1
Roach	1

On 11/09/01 a biological inventory was conducted at the third site on Jonive Creek. The site began at Lat. N 38°23'26.1", Long W 122°53'2.1" and ended at Lat. N 38°23'23.3" and Long. W 122°53'7.1". Fish from the site were counted by species, and returned to the stream. The air temperature ranged from 70-73ºF and the water temperature was 50ºF. The crew members were J. Newell and D. Mitchel.

The inventory began at 13:00 hours in Reach 1 and ended at 14:20 hours. Habitat types surveyed were lateral scour pool - bedrock formed, mid-channel pools, runs and glides. The total length of channel surveyed was 372 feet. The following table displays the information yielded from this site.

Species Observed	**Numbers Recorded at Site 3**
Steelhead 2+	2
Steelhead Y+	5
Sculpin	27
Lamprey	15
Freshwater Shrimp	20
Bull Frog	1

There is no record of hatchery stocking or fish rescue/transfer operations in Jonive Creek.

DISCUSSION

Jonive Creek is an F5 channel type. The suitability of F5 channel types for fish habitat improvement structures is as follows: F5 channel types are good for bank-placed boulders, fair for plunge weirs, single and opposing wing-deflectors, channel constrictors and log cover, and poor for boulder clusters.

The water temperatures recorded on the survey days July 31 to August 2, 2001, were within the suitable range for salmonids.

Riffle habitat types comprised 5% of the total length of this survey, flatwater 87%, and pools 6%. The pools are relatively deep, with 20 of the 25 (80%) measured pools having a maximum depth greater than three feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In third order streams, a primary pool is defined to have a maximum depth of at least three feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

Twenty-two of the 25 pool tail-outs measured had embeddedness ratings of one or two. Two of the pool tail-outs had embeddedness ratings of three or four. None of the pool tail-outs had a rating of five, which is considered unsuitable for spawning. Cobble embeddedness measured to

be 25% or less, a rating of one, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in Jonive Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Twenty-two of the 25 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter for flatwater was three. The mean shelter rating for pools was 33. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by undercut banks in all habitat types. Additionally, small woody debris contributes a small amount. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density is 91%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was moderate at 69% and 54%, respectively. In areas of stream bank erosion or where bank vegetation is not at acceptable levels, planting endemic trees species, in conjunction with bank stabilization, is recommended.

GENERAL RECOMMENDATIONS

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

Winter storms often bring down large trees and other woody debris into the stream, which increases the number and quality of pools. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. 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.

RECOMMENDATIONS

1. Fish passage should be monitored and improved where possible.

2. Increase woody cover in the pools and flatwater habitat units. Most of the existing cover is from undercut banks. Adding high quality complexity with log and root wad cover is desirable.

3. Active and potential sediment sources related to the road system need to be mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

4. Inventory and map sources of stream bank erosion and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream.

COMMENTS AND LANDMARKS

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

0'	Begin survey. Vineyard starts LB
336'	6-7" Salmonid
794'	Garbage in Creek; LWD (HW/1.5/10/C/15)
1697'	15.2" Dark Fish Not Steelhead (5 YOY/1YOY+)
1839'	LWD (HW/1.5/10/B/16)
2806'	Vineyard ends
2821'	LWD (HW/1.5/10/C/10); spring 400' in HU
4154'	20 fish <3" not Steelhead; NO GPS
4216'	Livestock in stream 650' in HU; 5 year plus; Rip Rap LB 400' in HU
4984'	Dry trib LB; Bridge 240' in HU
5573'	25' dry trib RB; 25' pump in stream
5693'	Pump in creek RB 98'
5853'	Culvert LB 110' Rip Rap LB 200'
6291'	Bridge 400'/38`23'41.7"/122`52'24.1"
8257'	Bridge 50' in HU
8320'	Pump RB 20'; Barn in danger of falling in creek 20'; Retaining wall LB in HU 100' long
8660'	7" Steelhead
9449'	Bridge 200'
10064'	Sexton Creek RB/Rip Rap NO GPS
10497'	Dry Trib RB 5-8" fish (Steelhead)
11162'	Unused old dam/ 150' in HU
11475'	5 YOY
11717'	Dry Trib LB 100’ in HU
12020'	8" Steelhead
12363'	Box Culvert
12393'	Old bridge unused
12739'	Bridge 158' in HU/ Redwood Creek/ LB 0' in HU
13005'	Retaining wall RB 10' in HU
13884'	Box culvert
14385'	Tire wall 100' in HU. LB 5' x 50'; Tires on bank/ Yard waste on bank 15'x25'x5'/ Pump LB
15025'	Retaining wall LB 35' in HU
15883'	Bridge Box culvert
15969'	Pump 50' in HU
16261'	Dry Trib RB 0' in HU; Wet Trib LB 200' in HU; Rip Rap RB 400' in HU; Pump RB 350' in HU; Culvert RB 400' in HU
17092'	Dry Trib LB 117’ in HU
17363'	LWD (RW/4.0?6/F/6); 6" Steelhead
17388'	Pump 900' in HU; 6" Steelhead; 3' Dam and Pump in creek; Culvert 1530' in HU; Dry Trib 1730
19640'	Culvert RB 10'
19725'	Dry Trib LB 250
20529'	House Back wall in channel; wet trib LB 550'
21129'	Road crossing; culvert 0' in HU
21186'	End of survey due to dam in creek.

REFERENCES

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.