CALIFORNIA DEPARTMENT OF FISH AND GAME
STREAM INVENTORY REPORT
Atascadero Creek
Report Revised April 14, 2006
Report Completed 2000
Assessment Completed 1995

INTRODUCTION

A stream inventory was conducted during the summer of 1995 on Atascadero Creek to assess habitat conditions for anadromous salmonids. 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 Atascadero Creek. The objective of the biological inventory was to document the salmonid and other aquatic species present and their distribution. After analysis of historical information and data gathered recently, stream restoration and enhancement recommendations are presented.

WATERSHED OVERVIEW

Atascadero Creek is a third order creek and is a major tributary to Green Valley Creek. The confluence with Green Valley Creek is approximately 1.5 miles upstream from Forestville. Atascadero Creek drains an area of about 14 square miles of rolling hills and open valley, discharging flow in a northwest direction. The stream within the channel is bowl-shaped and covered by an extremely dense growth of riparian vegetation. The creek is accessed from Burnside Road, Barnett Valley Road, Watertrough Road, Mill Station Road, Graton Road, Occidental Road, and Green Valley Road.

Atascadero Creek is approximately 8 miles long and terminates in the Atascadero Marsh northwest of Graton. The 100 year flood plain is about 600' wide south of the Jonive Creek confluence and broadens to about 1100' north of the confluence. Elevations within the watershed range from 919' in the headwater areas to 80' at the Atascadero Creek Marsh.

Land use within the watershed is a mix of diverse agriculture and rural residential. Three natural resource conservation areas extend along the western boundary north of Bodega Highway. There is industrial land use in Graton adjacent to Atascadero Creek. The creek, along with Jonive Creek and the tributary draining Pitkin Marsh, are designated in the Sonoma County General Plan as riparian corridors. Atascadero Creek Marsh is designated critical habitat, and a significant portion of the watershed is designated as scenic landscape.

The following table includes sensitive plants and animals listed in DFG's Natural Diversity Database as occurring within Atascadero Creek Watershed:

Common Name	Scientific Name
Sebastopol Meadowfoam	*Lymnanthus vinculans*
White Sedge	*Carex albida*
Pitkin Marsh Indian Paintbrush	*Castilleja uliginosa*
Pitkin Marsh Lily	*Lilium pardalinum ssp. pitkinense*
California Beaked Rush	*Rhynchospora californica*
Thurber's Reed Grass	*Calamagrostis crassiglumis*
Swamp Harebell	*Campanula californica*
Yellow Larkspur	*Delphinium luteum*
Vine Hill Clarkia	*Clarkia imbricata*
Showy Indian Clover	*Trifolium amoenum*
Sonoma Alopecurus	*Alopecurus aequalis var. sonomensis*
Rincon Ridge Manzanita	*Arctostaphylos stanfordiana spp. decumbens*
Rincon Ridge Ceanothus	*Ceanothus confusus*
Vine Hill Manzanita	*Arctostaphylos densiflora*
California Freshwater Shrimp	*Syncaris pacifica*

Stream Surveys:

Stream surveys were conducted on Atascadero Creek in July of 1969 and September of 1973. The 1969 survey covered the entire length of the creek from the headwaters to the confluence with Green Valley Creek. Flow was intermittent in the headwaters. Flow near the Highway 12 bridge measured .068 cfs, and flow near Mill Station Road bridge measured 0.50 cfs. Generally, flow velocity was low throughout the surveyed area. A general description of the physical habitat follows: The creek width ranged from 1' to 500' with a mean of 5'. The depth ranged from 1/4" to 8' with an average of 1'. Temperatures recorded 3/4 mile downstream from Barnett Valley bridge were water, 58°F and air, 67°F. Temperatures measured near the Highway 13 bridge were

water, 59°F and air, 76°F, and temperatures near Mill Station Road bridge were water, 67°F and air, 70°F. Mean pool measurements were 25' long by 7' wide by 2' deep. The Pool to riffle ratio was 80:20. The streambed bottom consisted of 70% mud, 15% hardpan-clay, 10% gravel, 5% bedrock. A dense streamside vegetative growth comprised of willow, maple, blackberry and poison oak provided a riparian canopy covering 95% of the stream.

Less than 1% of the stream appeared suitable for salmonid spawning, mostly occurring in the headwaters. Nursery habitat was exclusively in the headwaters. Fish shelter was comprised of deep pools and dense overhanging vegetation. A 4' falls was observed approximately 200' downstream from the Barnett Valley bridge and no fish were seen above this falls. There were no springs observed, however some seepage was noted. No diversions were observed on Atascadero creek, though numerous private dumps were apparent along the stream banks. Fish present included: Juvenile steelhead and/or rainbow trout (3/4 - 1"), stickleback, roach and sculpin. The juvenile steelhead and/or rainbow trout were observed only in a 1/4 mile section of stream within the headwaters.

The purpose of the 1973 survey was to evaluate effects of discharged wastes by the Sebastopol Co-op apple cannery located near Barlow Creek, a tributary to Atascadero Creek. There were indications that the wastes were significantly reducing the creek's spawning and rearing habitat for fresh water fish species. Samples were taken at five sites along Atascadero Creek and one site at Barlow Creek. Field tests were made for dissolved oxygen, water temperature and Ph along visible lengths of Atascadero and Barlow Creeks. Water samples were taken at various sites and analyzed. Bottom samples were taken from Atascadero Creek 1/10 mile upstream of the confluence with Barlow Creek in clear water, and one mile downstream from the confluence in murky water. The samples were analyzed for types and diversity of aquatic life present. The results showed that high runoff of organic waste into Barlow Creek was degrading Atascadero Creek's water quality. The section of Atascadero Creek upstream from the cannery was a notably clean-water environment, while the stream at the confluence with Barlow Creek was dramatically less clean. Conclusions from the stream survey suggested the stream could support considerably more clean-water organisms and fish if an effort were made to eliminate apple cannery waste discharges.

METHODS

The habitat inventory conducted in Atascadero Creek follows the methodology presented in the California Salmonid Stream Habitat Restoration Manual (Flosi and Reynolds, 1991). The Americorps members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and

Game (DFG) under the supervision of DFG's Russian River Basin Planner, Robert Coey in May 1995. This inventory was conducted by a two person team.

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 Atascadero 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 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 by David Rosgen (1985). 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 four measured parameters used to determine channel type: 1) water slope gradient, 2) channel confinement, 3) width/depth ratio, 4) substrate composition.

3. Temperatures:

Water and air temperatures, and time taken, 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 Ryan Tempmentors 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". Atascadero 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. Channel dimensions were measured using hip chains, range finders, tape measures, and stadia rods. Unit measurements

included mean length, mean width, mean depth, and maximum depth. Pool tail crest depth at each pool unit was measured in the thalweg. All measurements were taken 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 Atascadero Creek, embeddedness was ocularly 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).

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 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 Atascadero 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 habitat units, dominant and sub-dominant substrate elements were ocularly estimated using a list of seven size classes.

8. Canopy:

Stream canopy is estimated using hand held spherical densiometers and is a measure of the water surface shaded during periods of high sun. In Atascadero Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of each unit. The area of canopy was further analyzed to estimate its percentages of coniferous or deciduous trees, and the results recorded.

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 Atascadero Creek, the dominant composition type in both the right and left banks was selected from a list of eight options on 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 the Habitat Program, a dBASE IV data entry program developed by the California Department of Fish and Game (DFG). This program also processes and summarizes the data.

The Habitat Runtime program produces the following tables:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Dominant substrates by habitat types
- Shelter type areas by habitat types

Graphics are produced from the tables using Lotus 1,2,3. Graphics developed for Atascadero Creek include:

- Level II Habitat Types by % Occurrence
- Level IV Habitat Types by % Occurrence
- Pool Habitat Types by % Occurrence
- Maximum Depth in Pools
- Percent Embeddedness by Reach
- Percent Cover Types in Pools
- Substrate Composition in Low Gradient Riffles
- Mean Percent Canopy
- Percent Bank Composition
- Percent Canopy by Reach

HABITAT INVENTORY RESULTS

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

The habitat inventory of July 14 - 21, 1995 was conducted by Pamela

Higgins, Kurt Gregory (Americorps), and Gregory Bates (volunteer). The survey began at the Occidental Road Bridge and extended up Atascadero Creek to the end of access permission. The total length of the stream surveyed was 14,516 feet.

Flow was estimated to be 0.79 cfs at the Mill Station Road bridge, and 0.099 cfs at the Watertrough Road crossing. Both flow readings were taken on July 14, 1995 with a Marsh-McBirney Model 2000 flowmeter.

This section of Atascadero Creek has two channel types, a B6 from the start of the survey at the Occidental Road Bridge to 13,253 ft. upstream, and an B4 for the upper 1,263 ft. B6 channels are moderately confined, moderate gradient (2-4%), riffle dominated streams with predominately silt/clay substrate. B4 channels are similar but with a gravel substrate.

Water temperatures recorded by field observers ranged from 60°F to 65°F. Air temperatures ranged from 59°F to 85°F. A Ryan Tempmentor was placed in a pool near Mill Station Road and recorded temperatures every two hours from July 20 - October 10, 1995. The highest temperature recorded was 64.9°F. and the lowest was 53.1°F. The mean of the daily highs was 62.8°F for the last 11 days of July, 61.7°F. for August, 60.5°F. for September and 58.2°F. for the first 10 days of October (see Tempmentor summary graph).

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. By percent occurrence, pools made up 45%, flatwater 36%, and riffles 19% (Graph 1). Flatwater habitat types made up 82% of the total survey length, pools 11%, and riffles 7%.

Thirteen Level IV habitat types were identified. The data are summarized in Table 2. The most frequent habitat types by percent occurrence were glides, 23%; mid-channel pools, 22%; and low gradient riffles, 19% (Graph 2). By percent total length, glides made up 77%, low gradient riffles 7%, and mid-channel pools 6%.

Fifty-six pools were identified (Table 3). Main channel pools were most often encountered at 54%, and comprised 62% of the total length of pools (Graph 3).

Table 4 is a summary of maximum pool depths by pool habitat types. Depth is an indicator of pool quality. Thirteen of the 56 pools (23%) had a depth of three feet or greater (Graph 4).

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 in general rated 44 (Table 1). Of the pool types, the backwater pools had the highest mean shelter rating at

75, main channel pools rated 48, and scour pools 33 (Table 3).

Table 10 summarizes total cover by habitat type. Small woody debris is the dominant cover type for pools in Atascadero Creek. Large woody debris and undercut banks are the next most common cover types. Graph 6 describes the pool cover in Atascadero Creek.

Gravel was the dominant substrate observed in 33% of the low gradient riffles measured (Graph 7). Large cobble and silt/clay were dominant substrates in the remaining low gradient riffles.

No mechanical gravel sampling was conducted in the 1995 surveys due to inadequate staffing levels, however, dominant substrate types observed and embeddedness ratings results are presented below.

Pool tail embeddedness, is a measure of the suitability of spawning gravel. Reach 1 was found to be very embedded with 94% of the pools having a rating of 4 (75-100% embedded). Reach 2 was a little better, but still highly embedded with 25% of the pools with a rating of 4 and 63% with a rating of 3. A value of one is best for the needs of salmon and steelhead (Graph 5).

Only 28% of Atascadero Creek lacked shade canopy. Sixty-five percent of the stream had a canopy consisting of coniferous trees and 7% had a canopy of deciduous trees. Graph 8 describes the overall canopy in Atascadero Creek. On a reach by reach comparison, 26% of Reach 1 and 31% of Reach 2 lacked shade canopy (Graph 11).

The mean percent right bank vegetated was 56% and the mean percent left bank vegetated was 54%. For the habitat units measured, the dominant vegetation types for the stream banks were: 63% coniferous trees, 18% brush, 13% deciduous trees and 6% bare soil. The dominant substrate for the stream banks were: 90% silt/clay, 8% bedrock and 2% cobble/gravel. The dominant vegetation types for the stream banks were: 63% coniferous trees, 18% brush, 13% deciduous trees and 6% bare soil (Graph 9).

BIOLOGICAL INVENTORY

JUVENILE SURVEYS:

The 1969 survey of Atascadero Creek noted juvenile steelhead and/or rainbow trout (3/4-1") only in a 1/4 mile section in the headwaters.

On July 26, 1995 on Atascadero Creek, the air temperature was 70°F and the water temperature was 58°F.

The inventory of Reach 1 of Atascadero Creek was conducted starting 100 yards downstream of the confluence with Jonive Creek in habitat

units 16-20. In glide, riffle and pool habitat types, no steelhead were observed. However, numerous stickleback and sculpin were noted.

The following tables summarize species observed in biological surveys:

SUMMARY OF SPECIES OBSERVED IN ATASCADERO CREEK

SPECIES	YEAR	Native/Introduced
Steelhead	1969	N
Sculpin	1995	N
Stickleback	1995	N

Historical records reflect 15,400 steelhead fingerlings were stocked in Atascadero Creek from Warm Springs Hatchery in 1984. No known fish rescue operations have occurred in the watershed.

ADULT SURVEYS:

The 1969 survey noted a 4' falls approximately 200' downstream from Barnett Valley bridge, and no fish were seen above the falls.

No recent spawning/carcass surveys have been conducted by DFG on Atascadero Creek or Jonive Creeks.

DISCUSSION

This section of Atascadero Creek has two channel types, a B6 from the Occidental Road Bridge to 13,253 feet upstream, and a B4 in the upper 1,263 feet.

The B6 channel type is excellent for bank-placed boulders and log cover. B6 channels are also good for low-stage weirs, single and opposing wing-deflectors, and channel constrictors. They are fair for medium-stage weirs and boulder clusters. This reach would benefit from an increase in large organic debris for rearing habitat.

The B4 channel type in the upper section is excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors and log cover. Medium-stage plunge weirs may also be good for this channel. However, any work considered will require careful design, placement, and construction that must include protection for the unstable banks.

The mean shelter rating for pool habitat types was low at 44. A

pool shelter rating of approximately 80 is desirable. The relatively small amount of pool cover that now exists is being provided primarily by small woody debris. Log and root wad cover structures in the pool and flatwater habitats are needed to improve 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.

Flatwater habitat types comprised 82% of the total length of this survey, pools 11%, and riffles 7%. Most of the flatwater habitat consisted of glides. Nine glide habitat units over 100 feet long made up 72% of the stream length. In third and fourth 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. The pools are relatively shallow in Atascadero Creek with only 13 of the 56 pools (23%) having a maximum depth greater than 3 feet. These pools comprised only 4% 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. Therefore, installing structures that will increase pool habitat is recommended for Atascadero Creek for locations where their installation will not subject the structures to high stream energy.

Spawning areas are generally found in low gradient riffles at the tail-outs of pools. The higher the percent of fine sediment in these areas, 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.

Pool tail embeddedness, is a measure of the suitability of spawning gravel. Reach 1 was found to be highly embedded with 94% of the pools having a rating of 4 (75-100% embedded) and 6% with a rating of 3 (50-75% embedded). Reach 2 was only slightly better, but still highly embedded with 25% of the pools rating 4 and 63% rating 3. A value of one is best for the needs of salmon and steelhead. Reach 2 contains 69% of the total length of riffle habitat. However, observations indicate the majority of riffles encountered to be poor habitat for spawning.

The mean percent canopy for the entire survey reach was 72%. This is a fair percentage of canopy since 80% is generally considered desirable. Large trees contribute shade, increase bank stability and eventually provide a long term source of large woody debris needed for instream structure.

The water temperatures recorded daily by crew personnel ranged from 60°F to 65°F. The mean of the daily highs measured with remote

recorders for the month of July was 62.8°F, August 61.7°F, September 60.5°F and october 58.2°F.

SUMMARY

Biological surveys were conducted to document fish distribution and are not necessarily representative of population information. No salmonids were observed in the 1995 survey of Atascadero Creek, although steelhead and/or rainbow trout juveniles were noted in the 1969 survey and historical notes indicate steelhead were once common in the creek.

In general, Atascadero Creek is poor for steelhead habitat. Deep pools with adequate shelter are lacking and stream temperatures are high. Riffle habitat is unsuitable for spawning due to high gravel embeddedness. Any work considered in these streams will require careful design, placement, and construction that must include protection for any unstable banks.

GENERAL RECOMMENDATIONS

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

The winter 1995/96 storms brought down many large trees and other woody debris into the stream, which increased the number and quality of pools since the date of this survey. This woody debris, if left undisturbed, will provide fish cover and rearing habitat, and offset channel incision. Many signs of recent and historic tree and log removal were evident in the active channel during our survey. Past 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 educated 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.

SPECIFIC FISHERY ENHANCEMENT RECOMMENDATIONS

1) Access for migrating salmonids is an ongoing potential problem in Reach 1 where there are several dams, therefore, fish passage should be monitored, and improved where possible.

2) For sources of upslope and in-channel erosion, utilize biotechnical approaches. Near-stream riparian planting along any portion of the stream should be encouraged to provide bank stability and a buffering against agricultural, grazing and

urban runoff.

3) Where feasible, design and engineer pool enhancement structures to increase the number of deep pools in Atascadero Creek. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion

4) Where feasible, increase woody cover in the pool and flatwater habitat units along the entire stream. Most of the existing cover is from small woody debris and undercut banks. Adding high quality complexity with larger woody cover is desirable. Combination cover/scour structures constructed with boulders and woody debris would be effective in many flatwater and pool locations in the upper reaches.

RESTORATION IMPLEMENTED

1) Encourage Best Management Practices with agricultural landowners and increase monitoring of water quality conditions.(GRCD Watershed Coordinator)

PROBLEM SITES AND LANDMARKS - ATASCADERO CREEK SURVEY COMMENTS

HABITAT UNIT #	STREAM LENGTH (FT)	COMMENTS
1.00	3000	AT OCCIDENTAL BRIDGE 100 YARDS. UNATTACHED OLD WOODEN BRIDGE; WATER STILL, FILM ON TOP
2.00	3040	LG. COBBLE ASPHALT
5.00	3147	AT MILL STA. BRIDGE, COBBLE ASPHALT
6.00	4647	VERY DEEP NEAR END OF UNIT, LG/SM WOODY DEB. 8 X 13 X 20; NO FISH BARRIER
11.00	4770	FORMER BRIDGE 16 X 8.5 X 9; SCOUR AT FOOT OF BRIDGE
13.00	4992	MASSIVE DAM 20 X 15 X 10 FISH BARRIER
15.00	5312	FISH PRESENT
18.00	5456	CONFLUENCE WITH JONIVE
19.00	6256	SURVEYING FROM PATH ON LF. BANK, VERY THICK BRUSH
20.00	6298	JUST ABOVE FOOT BRIDGE
21.00	9798	DAM 7 X 5 X 6, FISH BARRIER
27.00	9963	½" FRY (UNKNOWN SPECIES)
40.00	10900	SPRING RT. BANK; EROSION RT. BANK
50.00	11519	DIFFICULT TO ACCESS
56.00	12126	SURVEY ON SIDE OF CREEK FROM FIRST DAM
60.00	12367	TRIB. ON RT. BANK 61°F MID

		UNIT
61.00	12385	DAM AT END OF UNIT
67.00	12572	DAM AT END OF UNIT
76.00	12827	FISH OBSERVED, NOT STEELHEAD
88.00	13258	BEGIN GARCIA PROP., STREAM THINNING/SHALLOW
92.00	13375	TRIB. ON RT. BANK DRY OR IRRIGATION DITCH
94.00	13418	STREAM VERY THIN AND SHALLOW
105.00	13838	IRRIGATION DITCH MIDWAY RT. BANK
110.00	14028	BEDROCK CHANNEL NARROW HIGH WALLS
113.00	14125	BEDROCK VERY NARROW MASSIVE OBSTRUCTION CONCRETE BLOCKS
115.00	14168	ATASCADERO CONFLUENCE DRY/THICK BRUSH
116.00	14183	NO FISH OBSERVED
121.00	14365	NO FISH OBSERVED ABOVE DAM
124.00	14525	END SURVEY, BRUSH EXTREMELY THICK