2001 Summer Steelhead Survey Report

Report prepared by Deva Wheeler, Mattole Salmon Group, Petrolia, CA

The 2001 Mattole River Summer Steelhead Surveys took place from August 7th through August 9th, representing the sixth consecutive year of direct observation counts of summer steelhead in the Mattole watershed. The purpose of this survey was to enumerate summer steelhead and identify their preferred holding habitat in the mainstem Mattole River. In addition, locating cold-water areas in the mainstem and identifying the distribution of three species of juvenile salmonids was of prime concern. Snorkel observations were conducted on designated reaches with the help of fourteen surveyors (Table 1). The survey crew was made up of local residents and volunteers from both the North Coast Regional Water Quality Control Board (NCRWQCB), and the Steelhead Research and Monitoring Program (SRAMP) of the California Department of Fish and Game.

Observations of steelhead were recorded by size class. Steelhead with an estimated fork length of greater than sixteen inches were designated summer steelhead. Summer steelhead are adult steelhead which enter the river in spring, before the mouth closes. They spend the summer instream before spawning during the ensuing rainy season.

Half-pounders are 99% immature male and female steelhead which enter the river in the spring, ascend the mainstem and some large tributaries, and feed instream through the winter, after which they return to the ocean. Most half-pounders then spend only a few months in the ocean before they return to freshwater as maturing fish (Barnhart, 1996). Half-pounders are typically between 12 and 16 inches in length, and they do not have parr marks, as do their resident counterparts. In this year's summer steelhead dives, length was the primary feature used in identifying "half-pounders," therefore some number of the fish we called "half-pounders" could have been resident rainbow trout.

During the course of the survey, a total of seventeen (17) adults and forty (40) "half-pounders" were observed over approximately 31.3 miles surveyed (Table 2).

This report includes information on incidental stream and air temperatures (Table 3), survey reach lengths, location and personnel (Table 1), numbers of steelhead greater than or equal to 12 inches in fork length, as well as numbers of Western pond turtles (Table 2). In addition, the presence of all observed juvenile coho and chinook salmon was noted. This report also includes discussion, habitat descriptions and future recommendations. This type of information can be useful in determining the needs and habits of local riverine fauna, and establishing land-use practices that promote stewardship and conservation.

Today, issues of habitat and species loss command the attention of local, state and federal agencies, community members, and scientists. An understanding and awareness of the watershed's response to human activities, as well as the inherent and economic value of local natural resources, remains incomplete. Monitoring projects like the summer steelhead survey provide meaningful biological information to fill existing gaps in our knowledge. In addition, the quantitative and qualitative analysis of collected field data may indicate levels of functionality throughout the watershed along a spectrum of spatial and temporal scales.

Table 1. Description of dive reaches, including: beginning and ending point; survey mileage; dive personnel for 2001

6th Annual Mattole Summer Steelhead Dive, 2001				
Reach #	**Reach Name and Location**	**Survey Date**	**Personnel**	**Mileage**
1	Phillips Cr.(RM 60.4) to Lost River Cr.(RM 58.8)	NA	Not Surveyed	NA
2	Lost River Cr.(RM 58.8) to Stanley Cr. (RM 57.1)	8/7	Cisco Benemann, Deva Wheeler*	1.7
3	Thompson Cr. (RM 58.4+.15, mouth to confluence with Yew Cr.)	8/7	Cisco Benemann, Deva Wheeler*	0.1
4	McKee Cr. (RM 52.8) to Crooks (RM 51.3)	8/7	Maureen Roche*	1.5
5	Crook's (RM 51.3) to Big Finley Cr. (RM 47.4)	8/7	Seth Ricker*, Bryan McFadin	3.9
6	Big Finley Cr. (RM 47.4) to Deer Lick Cr. (RM 45.8)	8/7	Colum Coyne*, Noah Stafslien*	1.6
7	Bear Cr. (RM 42.8) to Mattole Canyon Cr. (RM 41.1)	8/8	Colum Coyne*, Cisco Benemann	1.7
8	Honeydew Slide (RM 27.0) to Bundle Prairie Cr. (RM 24.4)	8/8	Campbell Thompson*, Noah Stafslien*	2.6
9	Lower Honeydew Cr. (RM 26.5+.6)	NA	Not Surveyed	NA
10	Bundle Prairie Cr.(RM 24.4) to Triple Junction High School (RM 21.3)	8/8	Laurel House*, Maureen Roche*	3.1
11	Saunders Cr. (RM 19.9) to Squaw Cr. (RM 14.9)	8/9	Bryan McFadin*, Cisco Benemann*	5.0
12	Squaw Cr. (RM 14.9) to Lindley Bridge (RM 12.6)	8/9	Pam Sturgeon, Maureen Roche*	2.3
13	Lindley Bridge (RM 12.6) to Conklin Cr. (RM 7.8)	NA	Not Surveyed	NA
14	Conklin Cr. (RM 7.8) to Hideaway Bridge (RM 5.2)	8/9	Michael Evenson*, Seth Zuckerman*	2.6
15	Hideaway Bridge (RM 5.2) to Stansberry Cr. (RM 1.3)	8/8	Collin Anderson*, Olympia Franklin	3.9
16	Stansberry Cr. (RM 1. 3) to Ocean (RM 0.0)	8/8	Bryan McFadin, Deva Wheeler*	1.3
			Total Miles Surveyed: 31.3	

'*****' denotes prior summer steelhead diving experience
'**RM**' denotes River Mile along the mainstem Mattole River
the number following a '**+**' denotes mileage up a tributary from its mouth

Table 2. Summary of summer steelhead, half-pounders, juvenile salmonids, and Western pond turtle observations between the headwaters and the mouth of the mainstem Mattole River, August 7-9, 2001.

REACH	ADULTS (>16 inches)	HALF-LBS (12-16 inches)	Juvenile COHO	Juvenile CHINOOK	Juvenile STEELHEAD <12 inches	Western Pond TURTLES
1	NA	NA	NA	NA	NA	NA
2	0	0	Yes	Single sighting	Yes	0
3	0	0	Yes	No	Yes	0
4	0	7	Single sighting	No	Yes	0
5	2	3	No	No	Yes	1
6	1	5	No	No	Yes	3
7	0	1	No	No	Yes	3
8	3	2	No	No	Yes	0
9	NA	NA	NA	NA	NA	NA
10	3	11	No	No	Yes	1
11	0	0	No	No	Yes	0
12	1	8	No	No	Yes	0
13	NA	NA	NA	NA	NA	NA
14	1	1	No	No	Yes	0
15	3	0	No	No	Yes	0
16	3	2	No	No	Yes	1
Totals:	17	40	2-3 reaches	Single sighting	All reaches	9

Table 3. 2001 Mattole stream and air temperatures recorded by hand-held thermometer on summer steelhead survey dates, (page 1 of 2).

2001 Stream and Air Temperatures Recorded During Summer Steelhead Survey						
Date	**Location**	**Reach # & letter code**	**Time**	**Tributary Temp. (ºF)**	**Mattole Temp. (ºF)**	**Air Temp (ºF)**
8/7/01	Lost River Cr.	2A	1600	60	62	74
8/7/01	Helen Barnum Cr.	2B	1600	58	62	74
8/7/01	Yew Cr.	3A	1430	62	--	--
8/7/01	Thompson Cr. us confluence with Yew Cr.)	3B	1430	65	--	--
8/7/01	Baker Cr.	2C	1300	63	--	--
8/7/01	Stanley Cr.	2D	1115	59	63	71
8/7/01	McKee Cr.	4A	1000	58	62	74
8/7/01	Bridge Cr.	4B	1100	64	66	--
8/7/01	Sinkyone Cr. (aka Buck's Cr.)	4C	1200	60	66	--
8/7/01	Crook's (RM 51.1)	4D	1400	--	70	92
8/7/01	Crook's (RM 51.1)	5A	1120	--	63	76
8/7/01	~ 1 mile ds Crook's	5B	1240	--	64/60@12ft.	--
8/7/01	Nooning Cr.	5C	1330	59	--	--
8/7/01	seep on right bank	5D	1510	--	70surface/60@3ft.	--
8/7/01	seep on right bank	5E	1645	--	73surface/60@6ft.	--
8/7/01	Big Finley Cr.	5F	1800	60	75	88
8/7/01	Big Finley Cr.	6AB	1000	58	64surface/58@4ft.	80
8/7/01	2 pools ds Big Finley Cr.	6C	1130	--	68	--
8/8/01	Bear Cr.	7A	0930	--	69	75
8/8/01	Mattole Canyon Cr.	7B	~1430	--	80	--
8/8/01	No temps.; defective thermometer	8	--	--	--	--
8/8/01	ds Bundle Prairie Cr.	10A	1030	--	72	72
8/8/01	Woods Cr.	10B	1100	64	78	--
8/8/01	Kendall Gulch	10C	1430	66	82	86
8/8/01	Bridge @ Triple Junction High School	10D	1530	--	82	80
8/9/01	Mattole @ Saunders Cr. (creek mouth dry)	11A	1040	--	73	73
8/9/01	near seep on RB	11B	1146	--	64@7ft.	--
8/9/01	beginning of gooseneck	11C	1330	--	77surface/70@6ft	75
8/9/01	RB trib., mouth subsurface	11D	1400	60	--	--
8/9/01	small seep on side channel	11E	--	--	77surface/70@2.5ft.	--
8/9/01	small seep on side channel	11F	--	--	77	--
8/9/01	RB tributary	11G	--	61	77	--
8/9/01	RB tributary	11H	--	61	77surface/70@3ft.	--
8/9/01	8-9 ft. Pool	11I	1500	--	77surface/70@2ft.	78

Comment [ME1]:

Table 3 Continued. 2001 Mattole stream and air temperatures recorded by hand-held thermometer on summer steelhead survey dates

Date	Location	Reach # & letter code	Time	Tributary Temp. (ºF)	Mattole Temp. (ºF)	Air Temp (ºF)
8/9/01	small seep on side channel	11J	1520	--	81surface/73@2ft.	--
8/9/01	side channel created by seep	11K	1620	--	81surface/73@2ft.	--
8/9/01	side channel created by seep	11L	1630	--	81	--
8/9/01	Squaw Cr.	11M	1635	72	72	--
8/9/01	Squaw Cr.	12A	1030	66	72ms/66 backwater	70
8/9/01	Backwater pool w/ cold trib. (LB @ A.WAY)	12B	1100	56	80ms/70 backwater	--
8/9/01	RB backwater @ Grange	12B	1130	--	80	--
8/9/01	RB trib. @ "Buck's Hole"	12D	1145	62	80ms/65backwater	--
8/9/01	backwater pool	12E	1200	--	80	--
8/9/01	Green Fir Cr.	12F	1500	68	82	--
8/9/01	Wild Turkey Cr.	12G	1520	60	82	--
8/9/01	Lindley Bridge	12H	1530	--	80	80
8/9/01	Conklin Cr.	14A	1415	81	80	84
8/9/01	"Runyon Hole"	14B	1445	--	80 @ 10ft.	--
8/9/01	RB backwater pool	14C	1530	--	78-82 @ 2ft.	--
8/9/01	former "Robert's Hole", LB backwater	14D	1600	--	61-73 @ 5ft.	--
8/9/01	old USGS gaging station	14E	1720	--	80 @ 5ft.	--
8/9/01	Clear Cr.	14F	1740	61	80	--
8/9/01	LB cold pool	14G	--	--	72	--
8/9/01	LB cold pool	14H	--	--	80surface/72 @6ft.	--
8/9/01	"Tonalu Hole" (us end)	14I	1815	--	79	--
8/9/01	East Mill Cr.	14J	1835	64	79	--
8/9/01	Hideaway Bridge	14K	1845	--	79	63
8/8/01	Hideaway Bridge	15A	1010	--	--	68
8/8/01	Lower North Fork	15B	1050	75	72 @ 3ft.	70
8/8/01	Drewry Hole	15C	1245	--	73	--
8/8/01	Mattole @ Mill Creek (creek mouth subsurface)	15D	1320	--	75	75
8/8/01	Mattole @ Stansberry Cr. (creek mouth subsurface)	15E	1515	--	70	75
8/8/01	RB channel us Stansberry Cr.	16A,B	1130		68 main channel/70 RB channel	60
8/8/01	Collins Gulch	16C	1315	59	--	--
8/8/01	Lagoon, north embayment	16D	1400	67		--
8/8/01	Lagoon, top of LB channel	16E	1530	--	74surface/77@2ft.	--
8/8/01	Mattole @ Stansberry Cr., LB channel	16F	1600	--	76	68

Comment [ME2]:

***Letter codes** (associated with reach #) correspond to locations as mapped on field forms.

*All water temperatures were taken at a depth of approximately 1 ft. (or where water was thoroughly mixed), except where a greater depth is stated. Where "surface" is stated, a depth of approximately 1ft. is assumed. Thermometers were checked against a lab-tested thermometer prior to use in the field

* Abbreviations: **us**: upstream; **ds**: downstream; **ms:** mainstem Mattole**; LB/RB**: left bank/right bank (looking downstream); **trib**: tributary

Other Sightings:

Bullfrog tadpoles in reaches and 4 and 6, and an adult bullfrog in reach 4; crayfish in reach 5 only; aggressive pitbull in reach 4; pair of golden eagles in reach 8; merganser; great blue heron; green heron; osprey; belted kingfisher; egret; American dipper; rough-skinned newt; pacific giant salamander; garter snake; freshwater clam; yellow-legged frog tadpoles and adults; threespine stickleback; wood duck; cattle; humans.

Other Adult Salmonid Sightings:

Described here are this year's observations of adult steelhead that could have been summer steelhead, but that did not occur during official summer steelhead survey dives.

On May 22nd the author observed a ~30 inch steelhead in the Mattole River at the mouth of Clear Creek. On the same day, the author also saw a 30 inch fresh male steelhead carcass and a live ~19 inch steelhead at the Drewry Hole, downstream of Petrolia.

On May 31st a ~20 inch steelhead was seen by the author and a local resident in Westlund Creek, at the crossing 1.2 miles upstream from its confluence with the Mattole River. The fish was in a very small pool, with a maximum depth of ~1.5 feet. It is unclear whether the fish was a summer steelhead or a late winter-run fish.

In mid-July, Bryan McFadin of the North Coast Regional Water Quality Control Board (NCRWQCB) was visiting the Mattole, and observed an adult salmonid in Honeydew Creek at the BLM campground. He described the fish as being at least 20 inches long and having a bright red body, green head, and un-pointed nose. McFadin, not a biologist but a fisherman, felt strongly that the fish was not a steelhead. Approximately two weeks later, the author visited the creek. A local woman who was present said that she and her son had seen the fish on more than one occasion and that it had died a few days earlier. They had removed the carcass from the pool and placed it in the riffle below. When shown diagrams of adult salmon, the woman identified the diagram of the sockeye salmon as most closely resembling the fish she had seen, which she also claims was bright red. The author searched the area, but did not locate the carcass. The species identification of the fish described here is uncertain. It would be unlikely to see a salmon of any kind in the Mattole River in mid-July. Furthermore, observations of sockeye salmon have never been recorded in the Mattole River.

On September 20th a male steelhead of ~34 inches was seen by the author and Colum Coyne in the "blue lagoon" hole, 3.1 miles up Mattole Canyon Creek. Other local residents observed this large steelhead, in addition to a smaller one in the same hole prior to, and subsequent to the Sept. 20th sighting.

On September 21st a ~28 inch steelhead was seen in the Wingdam Hole. The fish was seen at various times throughout the summer, but not during the summer steelhead dive.

Habitat:

Seeps, springs and cold pools were observed throughout the mainstem, often isolated by long stretches with high-temperature waters between them. Many of the existing deep pools were stratified and noticeably cooler at the bottom. This year a relatively few summer steelhead were seen in the upper survey reaches (3 in the upper 6 reaches). This was probably due to inaccessibility caused by unusually low flows. In the cool, upper reaches of the mainstem, adult steelhead were observed in pools and runs that did not necessarily possess cover. In the lower reaches of the river, juvenile and adult fish were found almost exclusively in runs and pools containing instream vegetative cover, such as overhanging willow roots, and/or woody debris.

Where cool temperatures, depth and cover were all present, the greatest concentrations of fish were seen. Reach 15 was particularly rich in this respect. Reaches containing only sparse vegetative cover supported the fewest juvenile steelhead. This was exemplified by reach 10, in which many cows and no juvenile steelhead were observed in the lower 2 miles of the reach.

Discussion

Summer steelhead once populated many of California's large streams and rivers, including most large tributaries of the San Joaquin and Sacramento rivers. Today they are confined to a handful of Northcoast streams possessing either deep holding pools, or significant cool summer flows (Gerstung 1996). As indicated in previous Mattole Salmon Group summer steelhead reports, cold-water refugia appear to be very important to both adult and juvenile salmonids during summer in the Mattole River basin. The direct relationship between cold-water refugia and salmonid habitat utilization was particularly evident in the lower, warmer reaches. Use of thermally stratified pools by adult summer steelhead has not been reported in more northern rivers, which tend to maintain sufficiently cool summer flows. However, the Mattole summer steelhead population is subjected to elevated stream temperatures and low summer flows, which may result in high metabolic demands to survive thermal stress.

Water temperatures also appear to greatly affect the range and preferred habitat of juvenile salmonids. For juvenile steelhead, temperatures ranging from 68 – 75º F can lead to growth suppression and early mortality (Brett 1979). A recent study of the distribution of juvenile coho salmon in relation to temperature in 21 tributaries of the Mattole River was completed by the Mattole Salmon Group and Redwood Sciences Laboratory (Welsh et al. 2001). The study found juvenile coho salmon only in tributaries with MWAT values (Mean Weekly Average Temperature) greater than 62º F, and MWMT values (Mean Weekly Maximum Temperature) greater than 64.4º F. MWAT is determined by the highest average of mean daily temperatures of any 7-day period, and MWMT is determined by the highest average of maximum daily temperatures over any 7-day period. Coho were found in 9 of the 21 streams surveyed.

It is not known how deep, stratified pools change through time. One study revealed that channel structural features, such as gravel bars encroaching into pools, strongly influenced the development of stratified pools (Nielsen and Lisle, 1994). The same study also described stratification, as a result of pool scour from winter flows, that remained relatively unmixed through summer. The authors suggest a long-term temporal scale is necessary to understand and analyze the geomorphic conditions leading to the formation of stratified pools, and the role such pools may play in fish communities that experience thermal stress.

Recommendations:

- Continue efforts to retain and introduce instream large woody debris for habitat complexity. Make repairs to aging log structures in the estuary so their intended benefits might be attained and enhanced.
- Compare collected point-source temperature data with computerized temperature logger measurements, and overlay these with fish distributions.
- Evaluate the relative importance of physical factors leading to thermal stratification of pools in different stream reaches.
- Reestablish riparian forest in order to provide bank stabilization, shade, cover and cooler

summer temperatures, and provide source of woody debris for shaping complex instream habitat.

- Follow up identified research needs from Nielsen and Lisle (1994)
- Future restoration and monitoring projects should be prioritized according to cost effectiveness and protection of vital refugia, and combined with cooperative conservation and management endeavors.
- Map cold areas and summer steelhead observations

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