2002 Summer Steelhead Survey Report

Report prepared by Deva Wheeler, Mattole Salmon Group

The seventh annual summer steelhead survey was conducted in the mainstem Mattole River between July 29 and August 23, 2002. The purpose of the summer steelhead survey was to enumerate summer-run steelhead and "half-pounders," and to identify their preferred holding habitat in the mainstem Mattole River. In addition, locating cold-water areas in the river's mainstem and identifying the distribution of three species of juvenile salmonids was of prime concern.

Summer steelhead are adult steelhead which enter the river in spring, before the river mouth closes for the summer. 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 (12-16in.) in length, and they do not have parr marks, as do their resident counterparts.

Eleven surveyors, working in teams of two, performed direct underwater observation counts in approximately 28.4 miles of the Mattole River. The survey comprised thirteen reaches that ranged in length from 1.4 to 4.8 miles (Table 1). A total of fifteen (15) adult summer steelhead (>16 inches in length) and twenty-two (22) half-pounders (12-16 inches in length) were counted. These figures are on the low end of average for the past seven years. The fewest summer steelhead ever counted in the Mattole River summer steelhead survey was 12 in 32.7 miles in 2000. The greatest number counted was 45 in 44.9 miles in 1998. The maximum count for half-pounders was 126 in 32.7 miles in 2000. The minimum count for half-pounders was 19 in 39.3 miles in 1997.

Juvenile steelhead were noted in all survey reaches, while juvenile chinook salmon and coho salmon were observed in only three reaches each (Table 2). Cold areas were noted in all survey reaches (Table 3). These figures were typical for the last few years of summer steelhead surveys.

This report includes information on incidental stream and air temperatures (Table 3), survey reach lengths, location and personnel (Table 1) and numbers of steelhead greater than or equal to 12 inches in fork length (Table 2). In addition, the presence of all observed juvenile steelhead and coho and chinook salmon was noted (Table 2). 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.

Survey Methods

The survey was conducted in as few consecutive days as possible to ensure similar hydrologic and thermal conditions on survey days. Each reach was surveyed by a team of two people, at least one of which had prior experience participating in the summer steelhead survey, and experience identifying juvenile salmonids. At least one surveyor from each team participated in an in-field juvenile salmonid identification workshop with a qualified biologist in waters bearing coho salmon, chinook salmon and steelhead, and was also oriented to field methods and protocols with the project coordinator.

Surveyors snorkeled every area of the mainstem in their assigned reach that was deep enough to snorkel. Steelhead observations were recorded by size class. Steelhead with an estimated fork length of greater than sixteen inches (>16in.) were designated summer steelhead, and those with a fork length between 12 and 16 inches (12-16 in.) were called half-pounders. 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.

Each summer steelhead sighting was marked on a topographic map with a corresponding case #; the steelhead's fork length was estimated and recorded, and the location and habitat in which it was sighted was described. For each half-pounder sighting, a fork length estimate and habitat description was recorded. Juvenile salmonids were not counted, but the habitat and location in which they were observed was recorded.

With calibrated hand-held thermometers, air and water temperatures were recorded at the beginning and end of each survey reach, and in tributaries and cold pools and seeps throughout the reach. As each temperature was recorded, the time of day was noted.

Table 1. Description of dive reaches, including: beginning and ending point; total mileage; dive personnel for 2002

7th Annual Mattole Summer Steelhead Dive, 2002						
Reach #	**Reach Name and Location**	**Survey Date**	**Personnel**	**Mileage**	**Summer Steelhead**	**Half-Pounders**
1	Phillips Cr.(RM 60.4) to Lost River Cr.(RM 58.8)	7/29	Cisco Benemann & Campbell Thompson*	1.6	0	0
2	Lost River Cr.(RM 58.8) to Stanley Cr. (RM 57.1) & Thompson Cr. (RM 58.4+ 0.15, mouth to confluence with Yew Ck.)	7/29	Cisco Benemann & Campbell Thompson*	1.7+ 0.15	0	1
3	McKee Cr. (RM 52.8) to Crook's (RM ~51.1)	8/1	Maureen Roche* & Campbell Thompson*	~2.5	0	2
4	Crook's (RM ~51.1) to Tom's Hole (Patty's) (RM ~49.4)	7/29	Maureen Roche* & Colum Coyne*	~1.7	5	5
5	Tom's Hole (Patty'(RM ~49.4) to Big Finley Cr. (RM 47.4)	7/29	Olympia Franklin* & Jessica DeKelver	~2.0	1	2
6	Big Finley Cr. (RM 47.4) to Shepp's (RM~46.0)	7/29	Noah Stafslien* & Reid Bryson	~1.4	2	0
7	Bear Cr. (RM 42.8) to Klossen's Hole (ds Mattole Canyon Cr.)(RM~39.9)	7/30	Colum Coyne* & Reid Bryson	~1.9	3	1
8	Honeydew Slide (RM 27.0) to Bundle Prairie Cr. (RM 24.4)	NA	NA	NA (2.6)	NA	NA
9	Bundle Prairie Cr.(RM 24.4 to Triple Junction High School (RM 21.3)	8/2	Olympia Franklin* & Jennifer Walts	2.9	0	5
10	Saunders Cr. (RM 19.7) to Squaw Cr. (RM 14.9)	NA	NA	NA (4.8)	NA	NA
11	Squaw Cr. (RM 14.9) to Lindley Bridge (RM 12.6)	7/30	Olympia Franklin* & Marika Smith	2.3	1	0
12	Lindley Bridge (RM 12.6) to Conklin Cr. (RM 7.8)	8/23	Olympia Franklin* & Yarrow King	4.8	2	2
13	Conklin Cr. (RM 7.8) to Hideaway Bridge (RM 5.2)	7/30	Maureen Roche* & Cisco Benemann*	2.6	0	0
14	Hideaway Bridge(RM 5.2) to Stansberry Cr.(RM 1.3)	7/31	Olympia Franklin* & Marika Smith	3.9	1	4
15	Stansberry Cr. (RM 1. 3) to Ocean (RM 0.0)	NA	NA	NA (1.3)	NA	NA
Totals:			**11 surveyors**	**~28.4 miles**	**15 Summer Steelhead**	**22 Half-Pounders**

'*****'denotes prior summer steelhead diving experience; '**+**' denotes tributary mileage;
'**RM**' = River Mile; **ds** = downstream; **NA** = not applicable

Table 2. Summary of summer steelhead, half-pounders, and juvenile salmonid observations between the headwaters and the mouth of the mainstem Mattole River, 7/29-8/23, 2002.

REACH	ADULTS (>16 in.)	HALF-LBS (12-16 in.)	Juvenile COHO	Juvenile CHINOOK	Juvenile STEELHEAD <12 inches
Phillips Cr. to Lost River Cr.	0	0	Yes, throughout	No	Yes, throughout
Lost River Cr., to Stanley Cr. & Thompson Cr. (mouth to confluence with Yew Cr.)	0	1	Yes, throughout	Yes, Stanley Cr. confluence	Yes, throughout
McKee Cr. to Crook's	0	2	Yes (3) 2nd and 4th pools ds McKee Cr.	Yes (1) 2nd pool ds McKee Cr.	Yes, throughout
Crook's to Tom's Hole (Patty's)	5	5	No	No	Yes, throughout
Tom's Hole (Patty') to Big Finley Cr.	1	1	No	No	Yes, throughout
Big Finley Cr. to Shepp's	2	2	No	No	Yes, throughout
Bear Cr. to Klossen's Hole (ds Mattole Canyon Cr.)	3	0	No	No	Yes, throughout
Honeydew Slide to Bundle Prairie Cr.	NA	NA	NA	NA	NA
Bundle Prairie Cr. to Triple Junction Highschool	0	5	No	No	Yes, beginning and end of reach
Saunders Cr. to Squaw Cr.	NA	NA	NA	NA	NA
Squaw Cr. to Lindley Bridge	1	0	No	No	Yes, near fast-moving water, vegetative cover, woody debris and undercut banks
Lindley Bridge to Conklin Cr.	2	2	No	single sighting	Yes, deep areas, runs, vegetative cover and woody debris
Conklin Cr. to Hideaway Bridge	0	0	No	No	Yes, shady pools and runs
Hideaway Bridge to Stansberry Cr.	1	4	No	No	Yes, near fast-moving water, vegetative cover, woody debris and undercut banks
Stansberry Cr. to Ocean	NA	NA	NA	NA	NA
Totals	15	22	3 reaches	2-3 reaches	all reaches

Table 3. Mattole stream and air temperatures recorded by hand-held thermometer on summer steelhead survey dates, 2002.

2002 Stream and Air Temperatures Recorded During Summer Steelhead Survey						
Date	**Location**	**Reach # & letter code**	**Time**	**Tributary Temp. (ºF)**	**Mattole Temp. (ºF)**	**Air Temp (ºF)**
7/29	Dream Stream	1A	1725	54	--	--
7/29	Big Jackson Cr.	1B	1800	53.5	--	--
7/29	Phillips Cr.	1C	1846	54	--	--
7/29	Helen Barnum Cr.	2A	1645	56	--	--
7/29	Lost River Cr.	2B	1645	56.5	--	--
8/1	McKee Cr.	3F, G	1100	60	63	78
8/1	Bridge Cr.	3H	1300	60	--	--
8/1	Sinkyone Cr.	3I	1315	60	--	--
8/1	Mattole @ Crook's home (RM~51.1)	3J	140 0	--	66	72
7/29	Mattole @ Crook's	4A	1235	--	65	78
7/29	2nd pool ds Crook's	4B	1300	--	62 @ 9ft.	--
7/29	LB trib. and pool	4C	1600	56	69 surface/62 @ 9ft.	--
7/29	Nooning Cr.	4D	1700	58	68	--
7/29	Tom's Hole/Patty's	4E	2048	--	69	76
7/29	Tom's Hole/Patty's	5A	1202	--	65	76
7/29	us Big Finley Cr.	6A	1220	--	63	--
7/29	Big Finley Cr./pool	6B,C	1220	58	62 @ surface/ 60 @ 12 ft.	72
7/29	trough between Big Finley and WNW bend	6F	1310	--	66 @ 5ft.	76
7/29	pool at WNW bend (us Little Finley Cr.)	6G	1335	--	66 @ 8ft.	80
7/29	pool ~ 300ft. ds 6G	6H	1415	--	67 @ surface/64 @ 7ft.	85
7/29	pool us Little Finley Cr.	6I	1505	--	67 @ 6ft.	85
7/29	Little Finley Cr.	6J,K	1520	65	70	--
7/29	ds Little Finley Cr.	6L	1520	--	69	--
7/29	pool ds Little Finley Cr.	6M	1545	--	66 @ 8ft.	86
7/29	backwater pool near end of reach	6N	1615	--	70 @ 5ft.	78
8/2	Bundle Prairie Cr.	9A	1030	--	69	70
8/2	rocky pool ds Dirty Cr.	9B	~1230	--	68 @ 15ft.	65
8/2	Rupes place	9C	1400	--	70 @ 14ft.	70
8/2	Tripple Junction High School	9D	1630	--	74	64
7/30	Squaw Cr.	11A	1000	63.5	67	64.5
7/30	LB trib, with backwater pool	11B	1020	56	--	--
7/30	LB trib ~200 yds ds 11B	11G	1040	68	--	--
7/30	ds Way Park swimming hole	11C	1105	--	66 @ 4ft.	--
7/30	RB trib @ Jimmy Greenfield's pool	11D	1155	58	--	--
8/23	Lindley Bridge	12A	1000	--	64.5	65

Table 3 Contd. Mattole stream and air temperatures recorded by hand-held thermometer on summer steelhead survey dates, 2002.

Date	Location	Reach # & letter code	Time	Tributary Temp. (ºF)	Mattole Temp. (ºF)	Air Temp (ºF)
8/23	~ _ mile ds Lindley Bridge	12B	1115	--	66	71
8/23	RB trib	12C	~1230	65	--	--
8/23	RB trib	12D	~1245	57	--	--
8/23	run us McGinnis Cr.	12E	~1430	--	69 @ 4ft.	62
8/23	Conklin Cr.	12F,G	1500	63	70.2	61
7/30	Conklin Cr.	13A,B	1100	66	69	71
7/30	Clear Cr.	13C	1415	59	--	--
7/30	East Mill Cr.	13D	1500	60	--	--
7/31	Hideaway Bridge	14A	0854	--	65	57
7/31	North Fork Mattole River	14B	0907	65	--	--
7/31	RB pool ds Jeffry Gulch	14C	0942	--	64 @ 4ft.	--
7/31	Mill Cr.	14D	1130	56	--	--
7/31	us Stansberry Cr.	14F	1230	--	65	58

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

Other Sightings:
Below is a list of other sightings gathered during the summer steelhead survey. It uses vernacular terms and is by no means complete. Lack of a noted observation in a reach does not signify the absence of the animal or item in question. When no reach number is given, the animal was probably sighted in most or all reaches.

freshwater mussels (2,3,4,5,6)
turtles (3,4,5,6,9,11,12, 13, 14) *well over 31 turtles were seen; in some reaches they were not counted*
crayfish (5)
American dipper (4)
mergansers (4)
Yellow Legged frog (4)
egret (9, 14)
cattle (9,12,14)
Great Blue Heron (14)
Night Heron (14)
buck (3)
trash (1,2,5)
evidence of fishing (9,12,13)
dogs (1)
stickleback
newts
garter snakes
kingfisher
ducks

Habitat:
Coho and chinook juveniles, found in only the upper reaches of the mainstem, were distributed among microcosms of complex habitat that included large wood, undercut banks, overhanging vegetation, boulders, and cool water temperatures. Juvenile coho were seen only in reaches 1 through 3. Chinook juveniles were observed in reaches 2 and 3, with an additional single sighting in reach 13. In efforts to conserve and restore habitat for the survival of these threatened species, the importance of complexity cannot be overemphasized.

Seeps, springs and cold pools were observed throughout the basin, often isolated by long stretches with high-temperature waters between them. Most of the existing deep pools were stratified and noticeably cooler at the bottom. Past Mattole Salmon Group temperature studies have found that little stratification occurs in pools < 6 ft. deep.

In the first three survey reaches, no summer steelhead were seen. This was probably due in part to low spring water flows which seemed to confine summer steelhead to lower reaches of the river. In other survey reaches, half-pounders and summer steelhead were seen in deep pools and runs with vegetative cover. Especially in the lower reaches of the river, where water temperatures tend to be higher, all age classes of fish were found almost exclusively in runs and pools containing live vegetative cover (such as overhanging willow roots), and/or woody debris. Deep, well oxygenated pools containing vegetative cover seemed to be the habitat type most preferred by fish of all age classes in all survey reaches. Cool areas in the lower river tended to contain larger numbers of fish than their warm counterparts.

Discussion
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.

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 north coast 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 greater than 62º F, and MWMT values 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.

<u>Recommendations:</u>

- 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 and habitat features such as cold areas.
- 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 sources of woody debris for shaping complex instream habitat.
- 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.
- Expand our studies of cold pools and other cold areas to examine which habitat features, such as oxygenation and cover, lead to the greatest use of these cold areas by juvenile and adult salmonids, and concentrate restoration efforts to maximize usability of these areas.

<u>Literature Cited</u>

Barnhart, R. 1996. Half-Pounders. Streamkeepers Log (Newsletter of California Trout), Special Steelhead Edition, Entry No. 72.

Brett, J.R. 1979. Environmental factors and growth. Pages 599-675 *in* W.S. Hoar, D.J. Randall, and J.R. Brett, editors. Fish physiology, volume 8. Academic Press, New York.

Gerstung, E. 1996. Half-Pounders. Special Steelhead Edition. Newsletter of California Trout. Entry No. 72 Twenty-Fifth Year.

Welsh, Hartwell H. Jr., Garth R. Hodgson, Bret C. Harvey, and Maureen F. Roche. 2001. Distribution of Juvenile Coho Salmon in Relation to Water Temperatures in Tributaries of the Mattole River, California. North American Journal of Fisheries Management 21(3): 464-470