

***Final Report***  
Summer Steelhead Survey, 2008 Season  
Mattole River Watershed

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## Introduction

The 13<sup>th</sup> annual Summer Steelhead Dive surveys were conducted in the Mattole Watershed (Figure 1) on July 18-19, 2008. One additional Summer Steelhead snorkel survey was conducted on August 7, 2008.

The purpose of the summer steelhead survey was to enumerate summer-run adult steelhead and “half-pounders” holding in the Mattole River during the summer months and identify their preferred habitat in the mainstem Mattole River and the lower sections of two major tributaries, Bear Creek and Honeydew Creek. In addition, locating “cold-water areas” in the survey reaches and identifying the distribution of three species of juvenile salmonids was of prime concern.

Adult Summer Steelhead 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 usually between January and March. “Half-pounders” are 99% immature male and female steelhead. “Half-pounders” enter the river in the spring, then ascend the mainstem and some large tributaries. They feed instream through the winter, after which they return to the ocean. Some “half-pounders” spend only a few months in the ocean before they return to freshwater as maturing fish (Barnhart and Gerstung 1996), while others spend 1-2 years in the ocean before returning to spawn (Busby et al. 1996). “Half-pounders” are typically steelhead between 12 and 16 inches in length without parr marks.

Forty-two surveyors, working in teams of two or more, performed direct underwater observation counts in approximately 56 river miles of the Mattole (59.3 accumulated miles of the mainstem were surveyed due to slight overlapping of reaches in some cases) and 6.25 miles of tributaries. In total, 65.55 miles were surveyed in 2008. The survey comprised twenty-five reaches, varying in length from 1.3 to 4.8 miles (Table 1).

A total of 36 adult summer steelhead (>16 inches in length) and 73 half-pounders (12-16 inches in length) were counted during the 2008 surveys. The 2008 adult summer steelhead count was the second highest on record over the past thirteen years of dives. The greatest number of adults counted was 45 in 44.9 miles surveyed (0.98 adults per mile) in 1998 (Figure 3). In comparison, divers observed 16 adults in 2007 and 19 in 2006. Divers saw more “half-pounders” in 2007 (79) than in 2008. More notably, the “half-pounder” counts in the past two years were much higher than in the six years prior (an average of 33 “half-pounders” were observed in 2001-2006).

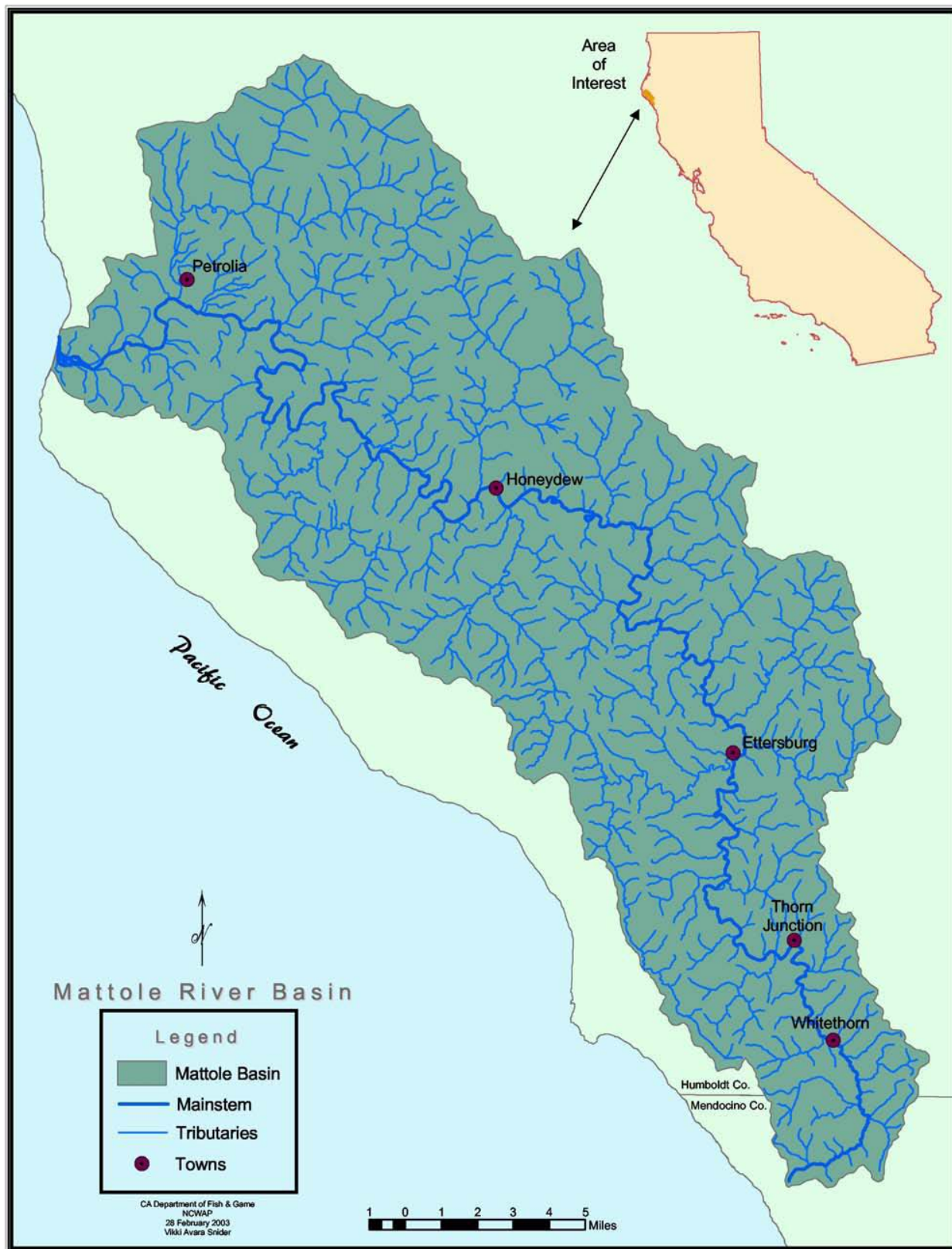
The number of adults observed per mile of survey effort in 2008 was the second highest recorded over the past thirteen years (0.55). Adult observations per mile were noticeably higher in 2008 than in the five years prior (average of 0.28 per mile in 2003-2007). The lowest number of adult sightings per stream mile ever recorded was in 2003 (0.19 adults per mile, Figure 4). The number of “half-pounders” observed per mile of survey effort in 2008 (1.11) was slightly less than “half-pounders” per mile observed in 2007 (1.21) but notably higher than in the four years prior (0.63 “half-pounders” per mile were observed in 2003-2006) (Figure 4). The maximum count for “half-pounders” was in 2000; 96 were observed in 32.7 miles surveyed (2.95 per mile; Table 2).

Juvenile steelhead were noted in all survey reaches, while juvenile coho salmon were observed in only five reaches (Table 3). Juvenile coho were observed exclusively in the upper mainstem, where they

were most abundant in the uppermost three reaches surveyed. Juvenile Chinook salmon were observed in seven reaches in 2008, encompassing the upper Mattole (reaches 2, 3, 5) the middle Mattole (reach 23), the lower Mattole (reach 15/15B), the Mattole Estuary (reach 16), and Honeydew Creek (reach 18). Cold areas were noted in all survey reaches (Appendix B, Table B-2). Temperatures recorded in 2008 were similar to those recorded in 2007 and comparable to typical temperatures documented since the 2000 Summer Steelhead Dive (Appendix C, Table C-3).

This report includes information on survey reach lengths, location and personnel (Table 1), observations of steelhead greater than or equal to 12 inches in fork length (Table 3), and 1996-2008 summer steelhead counts (Table 2). In addition, the presence of all observed juvenile steelhead and coho and Chinook salmon was noted (Table 3). This report also includes discussion, habitat descriptions and future recommendations. Appendices include background information on steelhead in the Mattole River (Appendix A), 1996-2008 results by reach (Appendix B), and observations of other species and temperatures recorded in the 2008 summer steelhead surveys (Appendix C). 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.

Figure 1. Mattole Watershed



Source: Downie et al. 2003

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## Methods

Summer steelhead surveys were 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 or more people, at least one of which had prior experience participating in summer steelhead surveys and/or 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 juvenile coho salmon and steelhead, and was 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 were designated adult summer steelhead, and those with a fork length between 12 and 16 inches were recorded as “half-pounders.” Length was the primary feature used in identifying “half-pounders;” therefore, some number of the observed “half-pounders” may have been resident rainbow trout. It is unknown whether 12”-16” steelhead seen in the Mattole are true “half-pounders;” however, the term is used hereafter in this report for this size-class of fish.

Each summer steelhead sighting was marked on a topographic map with a corresponding case number. For each individual sighted 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, rather noted for presence or absence, and the habitat and location in which they were observed was recorded. In a few cases where surveyors did count juvenile salmonids, that data is provided in Table 3.

Air and water temperatures were recorded at the beginning and end of each survey reach with calibrated hand-held thermometers. Temperatures were also recorded in tributaries, cold pools and seeps throughout the reach (Appendix B, Table B-2). The time of day of the temperature reading was noted. Additionally, crayfish, bullfrog, tadpole, and freshwater mussel sightings were recorded and mapped (Appendix B, Table B-1).

## Results

In 2008, MSG divers observed 36 adult summer steelhead and 73 “half-pounders” in 65.55 miles surveyed (25 reaches; Table 1). Surveys occurred throughout the Mattole watershed, including the upper Mattole (river miles 58.8 to 46.0; reaches 2, 19, 24, 3, 4, 5, and 6), middle Mattole (river miles 46.0 to 27.0; reaches 20, 7, 21, 22, 8, and 23), and the lower Mattole (river miles 27.0 to the ocean; reaches 9, 10, 25, 11, 12, 13, 14, 15, 15B, and 16). In addition, surveys occurred within three tributaries: Thompson Creek [river mile (RM) 58.4 +0.15, part of reach 2], Bear Creek (RM 42.8 +3.6, reach 17) and Honeydew Creek (RM 26.5 +2.5, reach 18). Thirty-three adult summer steelhead and 65 “half-pounders” were observed in the Mattole mainstem, while 3 adult summer steelhead and 8 “half-pounders” were observed in tributaries.

Adult summer steelhead were distributed in the middle and lower Mattole and lower reaches of the upper mainstem in 2008 (Figure 2). The pattern of observation in 2008 differed from the usual observed distribution. In most survey years, adult summer steelhead have been concentrated in the

middle river and lower reaches of the upper Mattole. In 2008, while observations in the middle and upper river remained relatively constant, there were an unusually high number of observations in the lower Mattole. 2008 was a low water year in the Mattole, with an early mouth closure of May 15 and lack of spring rain. The low river conditions appeared to isolate adult summer steelhead to habitat lower in the river system than usual. Upriver, the water was too shallow to support overwintering adults in some cases, and lack of deep enough water for migration likely isolated fish earlier in the year and in habitat further downstream.

Surveyors documented 3 adult summer steelhead in the upper Mattole [reaches 5(2) and 6(1)]. In the middle Mattole, divers found 14 adults [reaches 20(4), 7(1), 21A(5), 21B(2), 22(1), and 23(1)]. The greatest number of adult summer steelhead observations in 2008 (16) occurred in the lower river [reaches 9(2), 10(6), 15(6), 15B(2)]. As reaches 15 and 15 B overlap, it is likely the total number of fish observed in the lower river was also 14. All adult summer steelhead observations in the lower river were concentrated in two general regions, reaches 9 and 10 (RM 27.4 to 21.3, from the Honeydew Slide to Triple Junction High School) and reach 15/15B (RM 3.9 to 1.3). Adult summer steelhead and “half-pounder” presence was also documented in the two major tributaries surveyed in 2008. Two adult steelhead and five “half-pounders” were observed in Bear Creek. Honeydew Creek surveyors found one adult summer steelhead and three “half-pounders.” No adults or “half-pounders” were observed in Thompson Creek.

“Half-pounders” were also observed throughout the Mattole mainstem. There were more observations of this size-class of steelhead than adults, and they were more widely distributed, with observations also occurring in the upper reaches where adults were not found (“half-pounders” were sighted in 18 reaches, while adults were observed in 13). In reach 21A alone (RM 41.1 to 39.0), 18 half-pounders were observed.

**Table 1. 2008 Adult and “Half-pounder” Summer Steelhead Dive Results**

Reach #	River Mile (RM) Location	Location and Reach Name	Survey Date	Personnel	Mileage	Adult Summer Steelhead (>16")	"Half-Pounders" (12"-16")
1	RM 60.4 - RM 58.8	Upper Mattole:	N/A	N/A	N/A (1.6)	N/A	N/A
		Phillips Creek to Lost River Creek					
2	RM 58.8 - RM 57.1	Upper Mattole:	7/18	Maureen Roche*, Kevin Cook	1.7 + 0.15	0	1
		Lost River Creek to Stanley Creek, including partial survey (0.15 miles) of Thompson Creek (RM 58, mouth to confluence with Yew Creek)					
19	RM 57.1 - RM 55.6	Upper Mattole:	7/18	Tom Campbell*, Laura Lasseter	~1.5	0	1
		Stanley Creek to Anderson Creek					
24	RM 55.6 - RM 54.0	Upper Mattole:	7/19	Tom Campbell*, Laura Lasseter	~1.6	0	0
		Anderson Creek to Van Arken Creek					
3	RM 52.8 - RM 51.3	Upper Mattole:	7/18	Jill Grbavac*, Sarah Bangen	~1.5	0	2
		McKee Creek to Crook's					
4	RM ~51.3 - RM ~49.4	Upper Mattole:	7/18	Amy Baier*, Jerry Baier	~1.9	0	3
		Crook's to Tom's Hole (Patty's)					
5	RM ~49.4 - RM 47.4	Upper Mattole:	7/18	Colum Coyne*, Keytra Meyer*	~2.0	2	1
		Tom's Hole to Big Finley Creek					
6	RM 47.4 - RM ~46.0	Upper Mattole:	7/18	Will Kelly*	~1.4	1	1

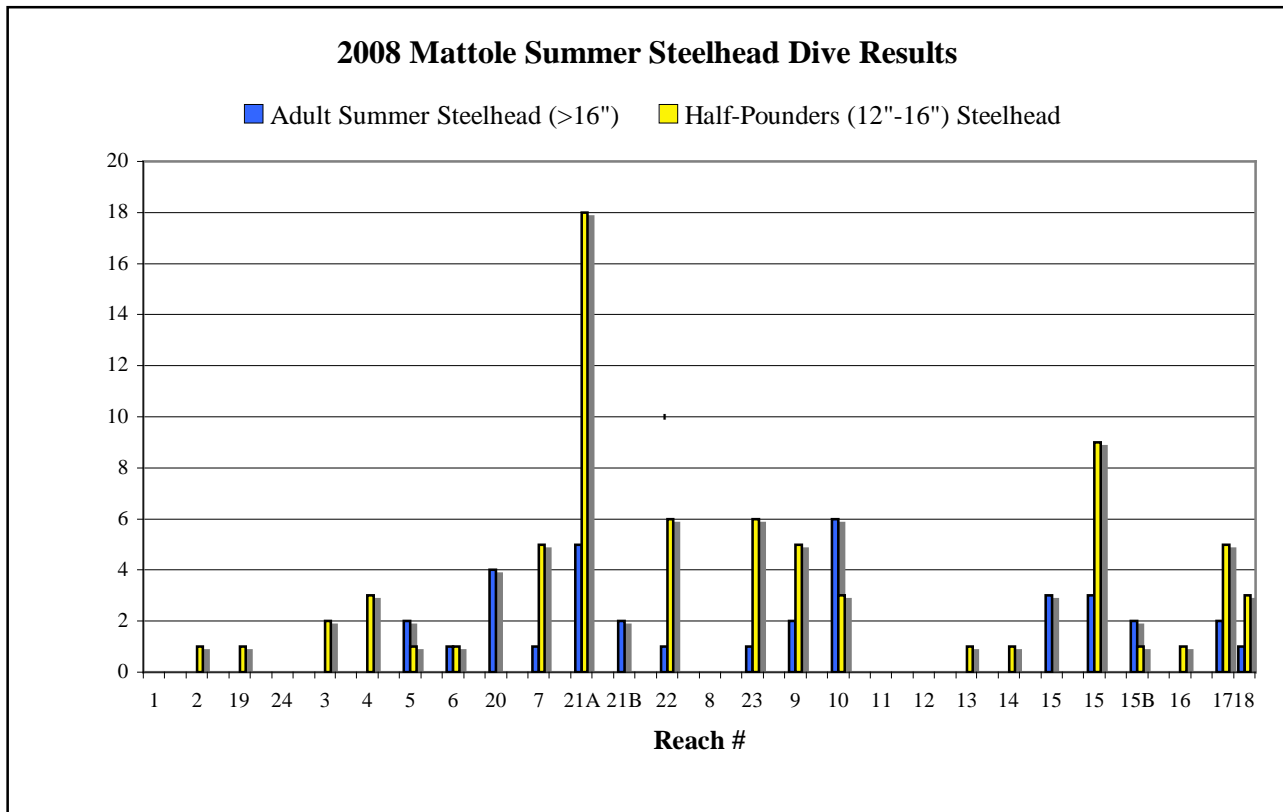


		Big Finley Creek to Schepp's		Monica Scholey			
20	RM ~46.0 - RM 42.7	Middle Mattole: Schepp's to upstream of Bear Creek	7/18	Noah Stafstien*, Flora Brain	~3.3	4	0
7	RM 42.7 - RM ~ 39.9	Middle Mattole: Upstream of Bear Creek to Klossen's Hole (downstream of Mattole Canyon Creek)	7/19	Tony Heacock*, Steve Gough*, Phil Heacock	2.8	1	5
21A	RM 41.1 - RM 39.0	Middle Mattole: Mattole Canyon Creek to Grindstone Creek	7/19	Maureen Roche*, Kimi Feuer, Karen Auel	2.1	5	18
21B	RM 39.0 - RM 34.6	Middle Mattole: Grindstone Creek to Fourmile Creek	7/19	Sean James*, Aaron Johnson*, Zane	4.4	2	0
22	RM 34.6 - RM 32.8	Middle Mattole: Fourmile Creek to Gilham Creek	7/19	Jill Grbavac*, John Deibner-Hanson	1.8	1	6
8	RM 32.8 - RM 30.4	Middle Mattole: Gilham Creek to Dry Creek	7/19	Keytra Meyer*, Pete Tans	2.4	0	0
23	RM 30.4 - RM 27.0	Middle Mattole: Dry Creek to Honeydew Slide	7/19	Kate Cenci*, Kevin Cook, Sara Bangen	3.4	1	6
9	RM 27.4 - RM 24.4	Lower Mattole: Honeydew Slide to Bundle Prairie Creek	7/18	Sean James*, Cisco Benemann*, Roxaine Kessler	3	2	5
10	RM 24.4 - RM 21.3	Lower Mattole: Bundle Prairie Creek to Triple Junction High School	7/18	Deva Wheeler*, Sonja Kulstadt-Hurst	3.1	6	3
11	RM 19.7 - RM 14.9	Lower Mattole: Saunders Creek to Squaw Creek	7/19	Jen Hayes*, Melissa Scott	4.8	0	0
12	RM 14.9 - RM 12.6	Lower Mattole: Squaw Creek to Lindley Bridge	7/15	Jill Grbavac*, Otter Anderson, Serenity Douglas, David Smith	2.3	0	0
13	RM 12.6 - RM 7.8	Lower Mattole: Lindley Bridge to Conklin Creek	7/19	Cisco Benemann*, Roxaine Kessler, Greg Goldsmith*	4.8	0	1
14	RM 7.8 - RM 5.2	Lower Mattole: Conklin Creek to Hideaway Bridge	7/19	Amy Baier*, Jerry Baier, Brian Haas	2.6	0	1
15	RM 5.2 - RM 3.9	Lower Mattole: Hideaway Bridge to MSG Downstream Migrant Trap	7/16	Cam Thompson*, Payton Luce, Devin Pritchard-Peterson	1.3	3	0
15	RM 3.9 - RM 1.3	Lower Mattole: MSG Downstream Migrant Trap to Stansberry Creek	7/16	Maureen Roche*, Whitney Buttlerman, Kevin Andersen	2.6	3	9
15B	RM 3.0 - RM 1.3	Lower Mattole: Mattole Salmon Group office to Stansberry Creek	7/19	Michael Evenson*, Nathan Scheinman	1.7	2	1
16	RM 1.3 - RM 0.0	Lower Mattole: Stansberry Creek to Ocean	7/16	Amy Baier*, Jerry Baier, Kate Cenci*, Jill Grbavac*, Will Kelly*	1.3	0	1

17	RM 42.8 + 3.6	Bear Creek (Geppert/Spence's to mouth)	8/7	Kate Cenci*, Will Kelly*	(+~3.6)	2	5
18	RM 26.5 + 2.5	Honeydew Creek (Maureen Catalina's to 2.5 miles upstream of Bear Wallow Slide)	7/19	Will Kelly*, Monica Scholey	(+~2.5)	1	3
		Totals			65.55 total survey miles**	36	73

Key: \*denotes prior survey experience, + denotes tributary mileage, N/A=not applicable, \*\*65.55 total survey miles includes 6.25 miles of Mattole tributaries, 59.3 total mainstem survey miles, and 56 mainstem river miles surveyed (due to slight overlap of reaches in a few cases).

**Figure 2. Mattole Salmon Group Summer Steelhead Dive Observations by reach.**



See Table 1 for 2008 reach locations. Reaches 1 through 16 are Mattole mainstem reaches, listed from the headwaters (1) to the Pacific Ocean (16); however, reach 2 contains 0.15 miles of Thompson Creek. Reaches 17 and 18 are tributaries: Bear Creek and Honeydew Creek, respectively. Letter codes refer to variations of past reaches (See Appendix B, Table B-1 and B-2, for reach locations surveyed in 1996-2008).

**1996-2008**

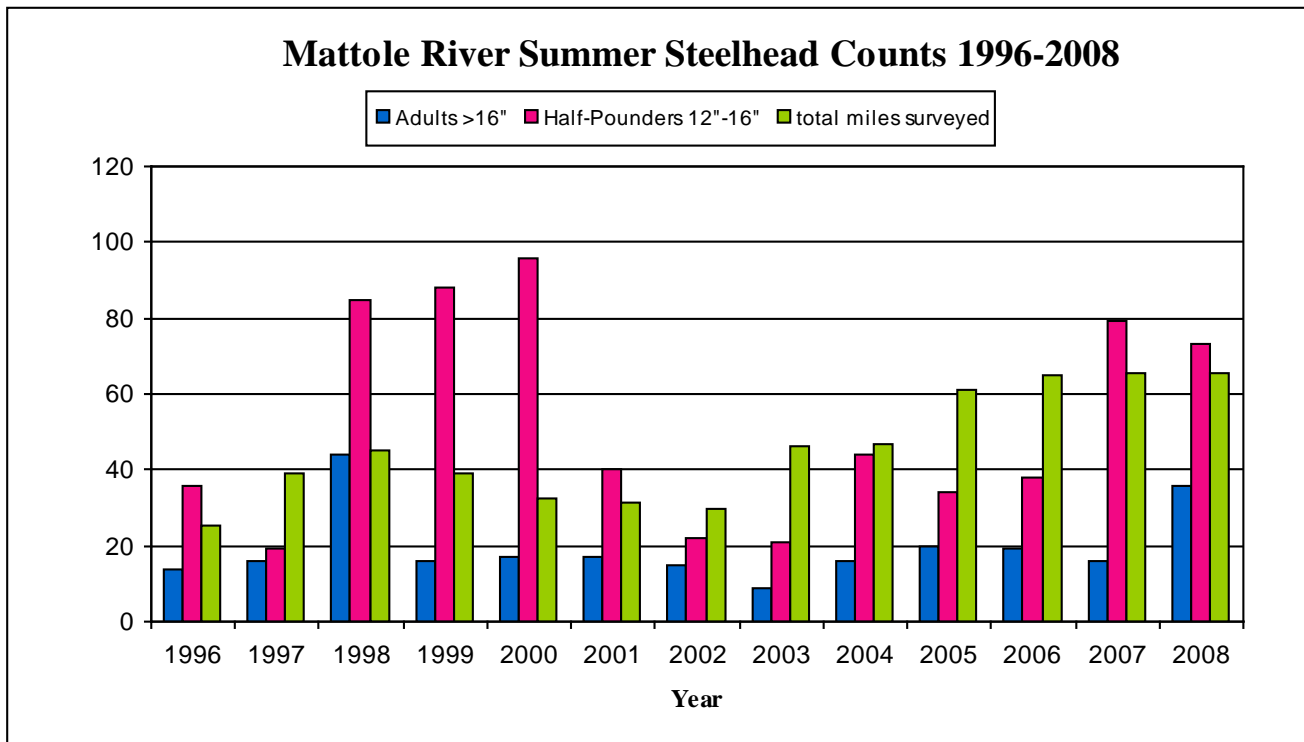
The greatest number of adult summer steelhead documented in the Mattole was 44 in 1998 (Table 2). The greatest number of “half-pounders” documented was 96 in 2000. Relatively high numbers of “half-pounder” observations have occurred in the past two years (79 in 2007 and 73 in 2008). In 2003, divers observed only 9 adult summer steelhead and 21 “half-pounders.” Adult summer steelhead observations over the past since 1998 have been at a consistent low; approximately 14-20 individuals have been documented in most years of the Summer Steelhead Dive despite more miles surveyed over

the past four years (Figure 3). 2008 was the exception to this trend, with 36 adult sightings during this year's dives.

Steelhead observed per mile of survey effort has been the MSG's primary means of comparing survey results from the Summer Steelhead Dive over the thirteen years of surveys. In 2008, MSG divers observed approximately 0.55 adults per mile (36 adults in 65.55 miles, Table 2), the second greatest slightly less than the 0.29 adults per mile seen in 2006. 0.33 adult summer steelhead per mile seen in 2005. MSG surveyors documented 0.19 and 0.34 adults per mile in 2003 and 2004, respectively (Table 2).

Steelhead counts by MSG divers during the Summer Steelhead Dive have shown a noticeable decline in recent years. Over the past four years, MSG divers observed less steelhead per mile (both adults and "half-pounders") than in the seven years prior (Figure 4). From 1996-2002, the average numbers of adults observed per mile was 0.56; in comparison, an average of 0.29 adults per mile were seen during the 2003-2006 survey years. "Half-pounder" sightings per mile have shown an even more severe decline; an average of 1.57 "half-pounders" per mile were seen in 1996-2002, while an average of 0.63 "half-pounder" sightings per mile occurred in 2003-2006.

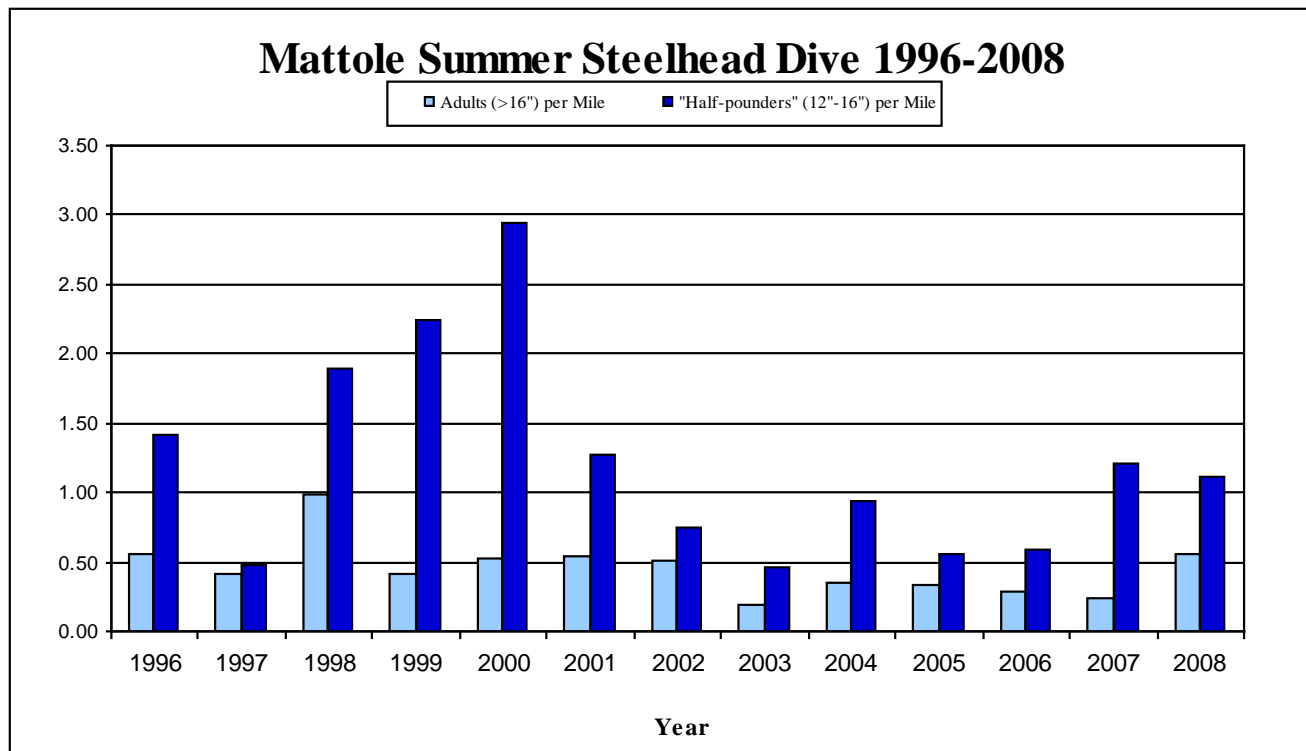
**Figure 3. Mattole Salmon Group Summer Steelhead Dive Counts. Direct dive observation of adult steelhead (>16"), "half-pounders" (12"-16") and miles surveyed in the summer months, 1996-2008.**



**Table 2. Adult Summer Steelhead and “half-pounder” Counts in the Mattole River and tributaries, 1996-2008.**

YEAR	ADULTS	HALF-POUNDERS	MS Miles	Trib Miles	MILES	Adults (>16") per Mile	"Half-pounders" (12"-16") per Mile
1996	14	36	23.6	1.7	25.3	0.55	1.42
1997	16	19	38	1.3	39.3	0.41	0.48
1998	44	85	44.6	0.3	44.9	0.98	1.89
1999	16	88	37.4	1.9	39.3	0.41	2.24
2000	17	96	32.4	0.15	32.55	0.52	2.95
2001	17	40	31.2	0.15	31.35	0.54	1.28
2002	15	22	29.3	0.15	29.45	0.51	0.75
2003	9	21	40	6.25	46.25	0.19	0.45
2004	16	44	40.5	6.25	46.75	0.34	0.94
2005	20	34	54.6	6.25	60.85	0.33	0.56
2006	19	38	58.6	6.25	64.85	0.29	0.59
2007	16	79	59.3	6.25	65.55	0.24	1.21
2008	36	73	59.3	6.25	65.55	0.55	1.11

**Figure 4. Steelhead per mile observed during MSG Summer Steelhead Dives, 1996-2008.**



**Results by Reach, 1996-2008**

See Table 1 and Appendix B, 1996-2008 Summer Steelhead Dive Tables and Figures, for data on results per reach from 1996 to 2008. Note that letter codes refer to variances between current and past reaches. Contact the MSG for a map of 2000-2008 Summer Steelhead Sightings.

## Upper Mattole

Summer steelhead are rarely spotted in the upper headwaters of the Mattole. MSG surveyors have never observed adult summer steelhead in reach 1 (RM 60.4 – RM 58.8), the uppermost reach, despite 6 years of surveys (1997-2000, 2002, 2004). The lack of observations may be due to the small size of the stream itself and lack of deep pool habitat. However, naturally occurring and MSG-constructed complex large woody debris structures provide relatively abundant cover in reach 1; therefore, a small population of elusive summer steelhead may have evaded observation. In the past few years, reach one has not been surveyed.

Over thirteen years of surveys, two adult steelhead have been observed in reach 2/2A (RM 58.8 – RM 57.1; 1999 & 2003). Both of these observations occurred in the same location, which is the largest, deepest pool in the Mattole basin upstream of Upper Mill Creek (RM 56.2) and features two complex LWD structures constructed by the MSG (MSG 2005). However, “half-pounders” are often observed in reach 2/2A; in thirteen years of surveys, a total of 45 “half-pounders” have been observed (24 were observed during the 1999 survey). One “half-pounder” was observed during the 2008 dives.

Prior to 2005, 4.3 miles of unsurveyed river separated reach 2 (RM 58.8 – RM 57.1) and reach 3/3A (RM 52.8 – 52.1). Some deep pools are present in this stretch of the river, but there had never been a confirmed summer steelhead sighting due to the lack of surveys. In 2005, MSG added Reach 19 to the Summer Steelhead Dive (RM 57.1 - RM 55.6). Two adults and twelve “half-pounders” have been observed during the four subsequent survey years. This year, surveyors found only one “half-pounder” and commented much of the reach was too shallow to dive due to low water. Reach 24 (RM 55.6 - RM 54.0, between reach 19 and reach 3/3A) was added in 2006. Surveyors did not observe any summer steelhead or “half-pounders” in reach 24 and reported the reach was less than ideal for summer steelhead, mainly shallow with few deep pools or woody debris cover, so it was not surveyed in 2007. In 2008, divers also reported shallow conditions and did not find either adults or “half-pounders” in reach 24.

Multiple sightings of adult summer steelhead and “half-pounders” have occurred in reaches 3/3A through 6 (RM 52.8 – RM 46.0) every year since 1996. This 6.8-mile stretch of the Mattole River contains habitat considered favorable for summer steelhead. Here the river flows through bedrock gorges and contains deep cold pools. In addition to large deep pools, this stretch of the Mattole also contains numerous large boulders and logs, which improve cover and habitat complexity. Water temperatures remain cooler here than in the lower Mattole, thus it is more favorable for over-summering. Out of a total of 255 adult summer steelhead observed in the Mattole River over the past twelve years of surveys, 87 of those sightings occurred in reaches 3 through 6, representing ~34% of total summer steelhead sightings over twelve years. In 2008, only two of the 36 adult summer steelhead sightings were observed in these reaches, although 10 of 73 “half-pounders” were found here.

In the upper Mattole, divers consistently observe more summer steelhead downstream of McKee Creek (RM 52.8) than in the three upstream reaches near the Mattole headwaters (reach 2, 19, and 24). 2008 adult observations tended to occur farther downstream than is typical. Throughout the upper Mattole, (reaches 2, 19, 24, and 3A through 6 (RM 58.8 – RM 46.0)), 3 summer steelhead were observed in 2008. Three

summer steelhead were observed in reaches 3 through 6 (RM 52.8 – 46.0),. Low water is likely to have contributed to fewer observations of adults and “half-pounders” in the upper Mattole in 2008.

Low water confined larger fish to isolated pools or other less than ideal habitat earlier in the year. Even where deep pools existed in the upper Mattole, the habitat in between the pools was so shallow as to create barriers to migration. Warm temperatures coupled with lack of spring rain caused lower water sooner in summer 2008 than in recent years when at least one significant spring rain event has occurred. In the upper Mattole, summer steelhead often utilize the deep pools and cool water temperatures found in the mainstem downstream of McKee Creek. It appears fewer adults were able to inhabit this prime habitat this year due to lack of water in much of the upper Mattole this year. In future years, it will be interesting to see if this is a trend common to low water years in general, or if 2008 was unusual.

### Middle Mattole

Reaches 7 (RM 42.7 – RM 39.9) and 8 (RM 32.8 – RM 30.4) are widely separated from each other as well as other reaches. This section of the mid-Mattole is noted for few road access points and relatively large property ownerships. In the 2005 State of the Salmon report, the MSG recommended efforts to add survey reaches in this part of the river. Winter survey work by boat revealed the presence of many large deep pools in this area, which are relatively well shaded by steep ridges on both sides, making this likely habitat for summer steelhead.

The MSG surveyed Reach 7 every year from 1996-2008. A total of 11 adult summer steelhead and 67 “half-pounders” were seen in the past thirteen years of dives. The greatest number of adults seen in reach 7 was 4 in 1999. This year, surveyors located one adult and five “half-pounders.” MSG divers have surveyed reach 8 for the past six years, yielding observations of one adult summer steelhead and seven “half-pounders.” There were no observations of larger size-class steelhead in reach 8 in 2008. Relatively consistent sightings over previous years support the conclusion that these reaches do provide suitable habitat that is utilized by summer steelhead.

Reaches 20-22 were added in 2005 as part of efforts to expand the MSG Summer Steelhead Dive and quantify summer steelhead presence/absence throughout the Mattole mainstem. These reaches include ideal summer steelhead habitat, containing a number of large pools and in addition to being relatively isolated from human impacts by their remoteness. Reach 20 is the stretch of the Mattole River between reaches 6 & 7 (RM 46.0 - RM 42.7). Reach 21 (RM 41.1 - RM 34.6) and reach 22 (RM 34.6 - RM 32.8) comprise the stretch between reaches 7 & 8. In 2008, another access point near Grindstone Creek (RM 39.0) was secured, and reach 21 was surveyed in two stretches, reach 21A (Mattole Canyon Creek (RM 41.1)) and 21B (Grindstone Creek to Fourmile Creek (RM 34.6)). Whereas in past years, an overnight survey was needed to survey reach 21, breaking the reach into two made a day survey by two separate teams feasible and will likely continue in the future if possible.

In reach 20, 2008 surveyors saw four adult summer steelhead; three were in the bottom of deep pools. They also noted low water in reach 20 and found much of it too shallow to dive. In four years, divers have found seven adults total, almost always in deep pools present in the reach. In reach 21A, divers found 5 summer steelhead and 18 “half-pounders,” by far the greatest number of observations in any reach this year. Adult sightings occurred in deep pools, while “half-pounders” were also found under rootwads and in riparian vegetation. In four survey years, divers have seen nineteen adults and twenty “half-pounders” in reach 21, which is often considered the stretch of the Mattole most utilized by summer steelhead and containing the prime summer steelhead habitat. This year, reach 21 was

surveyed in two sections: divers found five adults and two “half-pounders” in reach 21 A (RM 41.1 to RM 39.0) and two more adults in reach 21B (RM 39.9 to RM 34.6) for a total of seven adults. Divers also located one adult and six “half-pounders” in reach 22 in 2008. Continuing survey of reaches 20-22 is recommended in the future due to sightings over the past two years as well as presence of favorable summer steelhead habitat in this middle section of the Mattole.

Reach 23 (RM 30.4-RM 27.0), from Dry Creek to the Honeydew Slide, was also added in 2005 in efforts to expand the mainstem mileage in the summer steelhead survey. Since surveys began four years ago, MSG divers found one adult in 2008 and one last year. In addition, twenty-one “half-pounders” have been observed in reach 23, indicating larger size-class steelhead frequently utilize the favorable habitat that exists in this stretch of the Mattole.

In comparison with the ~0.55 adults observed per mile during the 2008 Summer Steelhead Dive, surveyors observed 1.03 adults/mile in reaches 20-22 in 2008. In the middle Mattole, reaches 7 and 8 and reaches 20-22 and 23, the middle 19 mile section of the Mattole, summer steelhead sightings were 0.69 fish/mile in 2008 (14 adults in 20.2 miles surveyed, there is a slight overlap of reach 7 and reach 21A), suggesting that deep, cool pools in the mid-river are crucial habitat for summer steelhead in the Mattole. Cooler summer water temperatures than the lower mainstem Mattole and presence of deep pools in the mid-river represent some of the best oversummering habitat for steelhead. Additionally, summer fishing is prohibited in this area, and its remoteness makes poaching less likely. Survey observations support that Mattole summer steelhead utilize these favorable conditions for oversummering.

#### Lower Mattole

Reaches 9/9A (RM 27.4 - RM 24.1) and 10/10A (RM 24.4 – RM 21.3) mark the emergence of the river from the mid-river canyon into the broad valley of the lower Mattole. The river channel here is frequently wide and shallow, lacking sufficient riparian cover or proximity to hill slopes to provide shade from solar radiation. From the confluence of Honeydew Creek and further on downstream, the county road is in close proximity to the river. Despite these issues, adult steelhead have been spotted every year in these reaches.

In 2008, MSG divers spotted two adult summer steelhead and five half-pounders in reach 9. Interestingly, both adults were seen in a rocky, deep run and the “half-pounders” were observed in all habitat types. The lack of deep pool habitat and shallow, aggraded channel may force any larger size-class steelhead caught in these reaches during the low flow of summer to hold in less than ideal habitat until the river rises with the fall rains. Six adults were observed by MSG surveyors in reach 10 in 2008, the greatest number of adult observations in this reach in thirteen years of surveys. Divers also saw three “half-pounders” in reach 10 this year. Most larger size-class steelhead in reach 10 were found in deep pools, although surveyors located one adult in a riffle. During the 2000 survey, five adults were observed in reach 9. Eight adult summer steelhead were also observed in the two reaches in 1998, the year with the greatest number of adult sightings. In total, forty-six adult summer steelhead were documented in reaches 9/9A (28) and 10/10A (18) from 1996-2008 (~18% of 255 sightings over the thirteen years of surveys).

Reach 25 (RM 21.3 – RM 19.7) was added to the Summer Steelhead Dive in 2006. No adult summer steelhead or “half-pounders” were seen in the reach. The reach is mainly shallow and aggraded, with

little area deep enough to snorkel or provide habitat for summer steelhead. Due to lack of habitat, reach 25 was not surveyed in 2007 or 2008.

Summer steelhead sightings are infrequent in the lower 20 miles of the Mattole River (reaches 11-16). The lower mainstem has a wide, shallow, meandering channel, and deep pool habitat is rare. High air and water temperatures characterize the lower river, and there is a lack of riparian cover or habitat for summer steelhead, although a few deep pools and cold refugia do exist. Nevertheless, there are a small number of sightings in each reach over the years. Sightings of summer steelhead in this stretch of the lower river tend to occur in isolated pools where local conditions have permitted coexistence of complex cover with a localized cold seep. In 2008, there were three adult summer steelhead sightings in the lower 20 miles, which is unusual. Two of these sightings occurred in reach 15/15B (RM 5.2 – RM 1.3): One adult was located downstream of the Hideaway Bridge under riparian cover, and one adult was found in the Mill Creek pool, one of the coolest and deepest refugia pools in the lower river adjacent to Lower Mill Creek. One adult summer steelhead was also found in reach 16 (RM 1.3 – RM 0.0), a quarter mile downstream of Stanberry Creek, not far from the Mattole Estuary. A few “half-pounders” are usually spotted in the lower river each year; there were five “half-pounders” observed in reaches 11-16 in 2006.

In the lower Mattole (RM 27.0 – 0), ~0.58 summer steelhead were observed per mile in 2008 (16 in 27.5 miles surveyed). In comparison, surveyors found ~0.20 adults per mile in 2006; in 2007, not a single adult was observed in the lower Mattole. 0.29 with the summer steelhead observed per mile in reaches 3A-6 (RM 52.8 - 46.0) and 0.69 summer steelhead observed per mile in the middle Mattole (RM 46.0 – 27.0), the lower Mattole had significantly less observations per mile. The low number of summer steelhead observed is typical of past survey years and not surprising considering the high water temperatures and lack of oversummering habitat in the lower river.

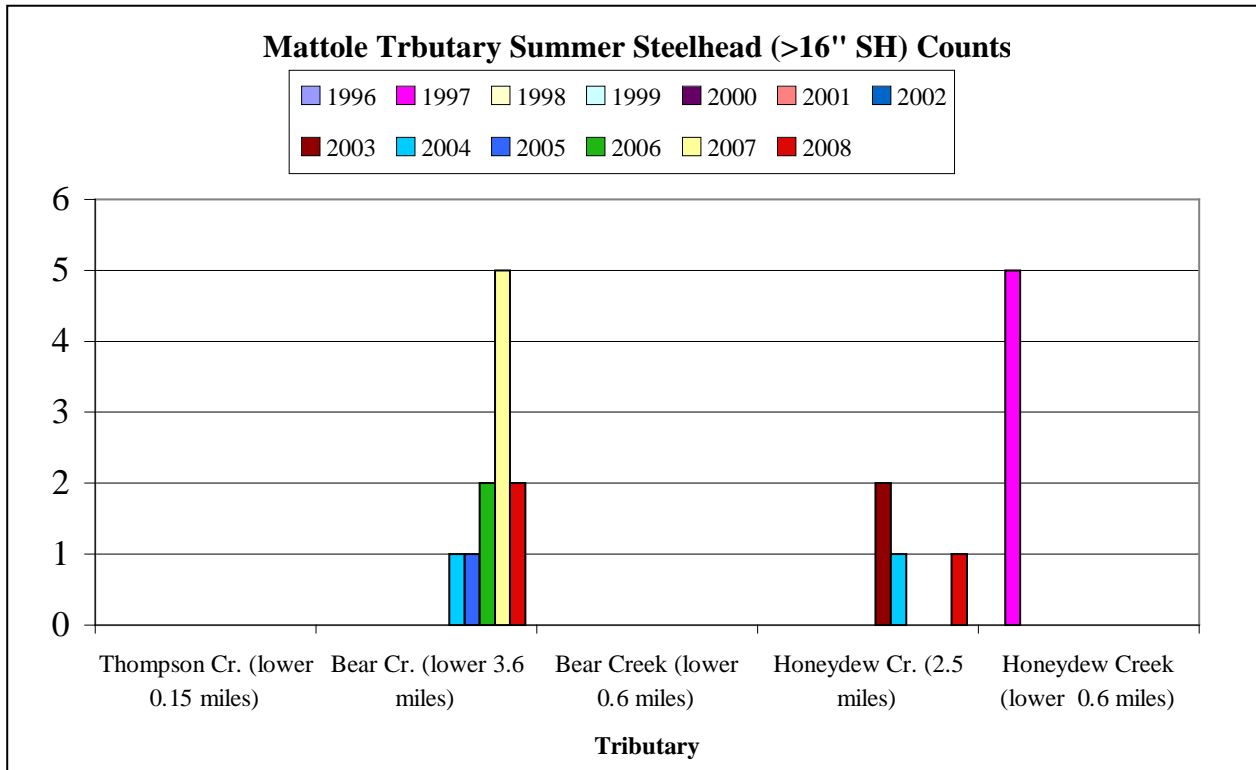
### Mattole Tributaries

The MSG has also examined presence of summer steelhead in tributaries of the Mattole by conducting snorkel surveys in three creeks over the past thirteen years (Figure 5). The tributaries include Thompson Creek, Bear Creek, and Honeydew Creek. Only the largest, lower portions of each are surveyed.

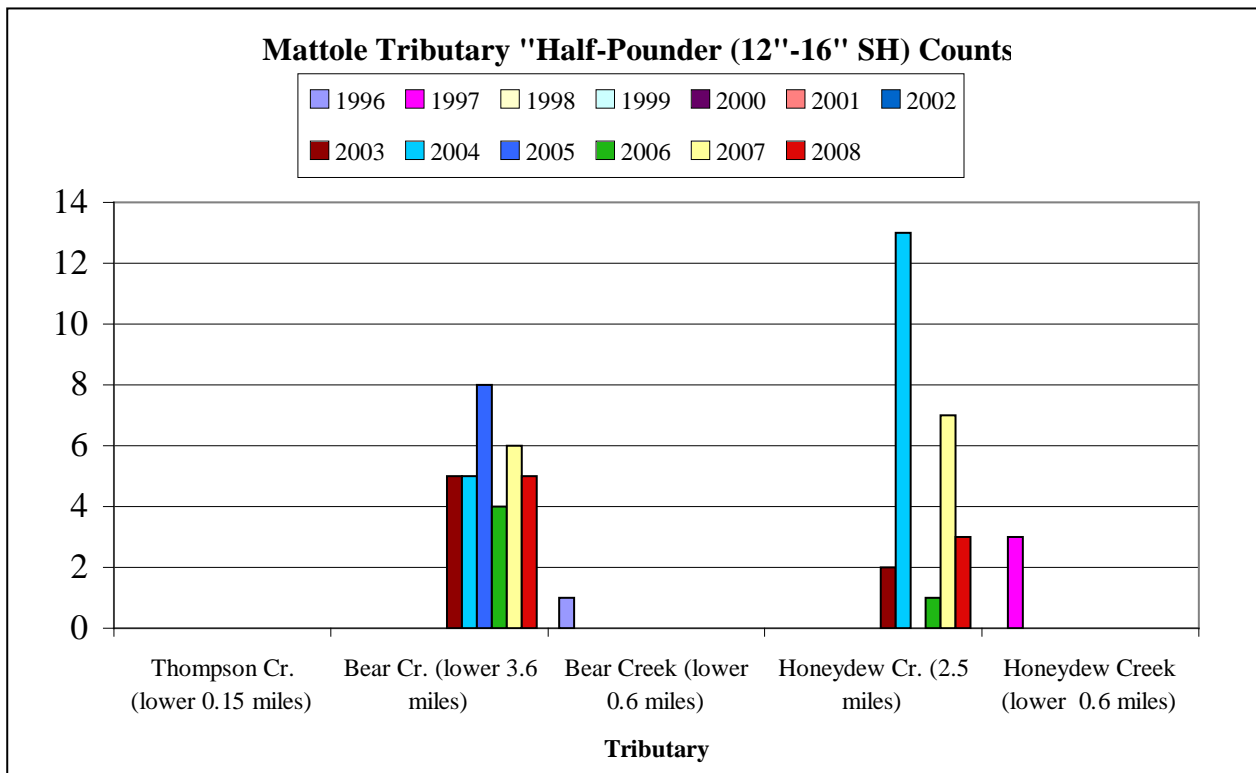
Despite thirteen years of surveys in Thompson Creek (which enters the Mattole at RM 58.4), summer steelhead have never been observed. Thompson Creek is near the Mattole headwaters. Relative to the Mattole’s major tributaries it is small, lacking large, deep pools, which are usually prime summer steelhead habitat (Nakamoto 1994). The small size of the stream may prevent large numbers of summer steelhead from oversummering in Thompson Creek. Nonetheless, a small population of summer steelhead may have eluded observation in Thompson Creek and may be present in other tributaries that have not been surveyed.



**Figure 5. 1996-2008 Summer Steelhead Counts in Mattole Tributaries.**



**Figure 6. 1996-2008 "Half-pounder" Counts in Mattole Tributaries.**



The lower 0.6 miles of Bear Creek (reach 17; RM 42.8 + 0.6) was surveyed in 1996, although no summer steelhead were located. In 2003-2008, MSG divers surveyed the lower 3.6 miles of Bear Creek; eleven adult summer steelhead and thirty-three “half-pounders” have been observed in the past six years (See Figure 5). MSG surveyors located 2 adult summer steelhead and 5 “half-pounders” in the lower 3.6 miles of Bear Creek in 2008 (See Figure 6). Bear Creek maintains significant summer flow and cool temperatures throughout the summer. The upper section of the 3.6 mile reach contains numerous bedrock and boulder pools and is shaded by a deep bedrock gorge, prime summer steelhead habitat, and this is where most sightings do occur. The upper section of the Bear Creek reach is also very remote; much of the upper subshed is owned and protected by the BLM and is not accessible by road. The lower section is characterized by large land ownerships, cattle-grazing and sedimentation, but still contains pools and relatively cool water; thus it meets minimum requirements for summer steelhead habitat.

Honeydew Creek (reach 18, RM 26.5 +2.5) has produced observations of adult summer steelhead (record number of summer steelhead sightings was 5 in 1997) (See Figure 5). “Half-pounders” are consistently observed in Honeydew Creek; surveyors found a record number of thirteen “half-pounders” in 2004 (See Figure 6). The lower 0.6 miles of Honeydew Creek was surveyed from 1996 - 1999, and a 2.5 mile mid-section of Honeydew Creek was surveyed from 2003 -2008. This year, MSG surveyors found one summer steelhead and three half-pounders in Honeydew Creek. Over the past six years of surveys, four adult summer steelhead were located in the mid-section of Honeydew, suggesting that summer steelhead utilize habitat throughout this tributary. During the same time period, divers also found twenty-six “half-pounders.” Honeydew Creek contains deep pools and significant cool summer flow, thus it is able to support at least a small number of oversummering steelhead greater than 12”.

It is likely that additional survey effort in lower reaches of the largest Mattole tributaries may increase our observed population size. It should be noted however that these two streams are the least impacted by human land practices of all the large tributaries due the large proportion of their watersheds that are part of the King Range National Conservation Area (MSG 2005).

### **Juvenile Salmonid Distribution**

Juvenile steelhead were found in all survey reaches in 2000 through 2008. Juvenile coho were observed in five reaches, while juvenile Chinook were found in seven reaches (Table 3). Juvenile coho were observed exclusively in the upper Mattole mainstem upstream of river mile 47.4, although they were most numerous in the three uppermost reaches (upstream of RM 54.0; reaches 2, 19, and 24). Downstream of RM 54.0, coho were observed in only two isolated locations, in the deep pool at Junction Hole and near a cold spring in the Noonning Creek Gorge (only a single coho was observed). The observed coho distribution during the 2008 Summer Steelhead Dive was nearly identical to that observed in 2007, except coho were not observed in the Mattole Estuary in the 2008 survey. Woody cover seemed to influence coho habitat utilization.

In 2008, juvenile Chinook were found throughout the Mattole River, in the upper (reaches 2, 3, and 5), middle (reach 23, only 2 individuals were sighted), and lower mainstem (reach 15), and in the estuary (reach 16). Chinook were also observed in Honeydew Creek near its confluence with the west fork of Honeydew Creek. This is the first confirmed sighting of Chinook in Honeydew Creek in recent years. More Chinook were observed in 2008 than in recent years, which is consistent with the early mouth

closure and MSG DSMT observations. Warm temperatures and low water does not bode well for their oversummer survival. As in past years, the difference in distribution of coho and Chinook was noticeable. Coho have been observed oversummering exclusively in the upper mainstem. Chinook have been distributed in favorable micro-habitats throughout the river, although more Chinook are usually found in the upper mainstem. In years when the mouth of the river closes earlier, such as this year, MSG divers find thousands of Chinook oversummering in the estuary and lower mainstem. Dives in the estuary and lower river throughout the summer confirm the nearly complete demise of these fish due to poor habitat conditions, most notably high water temperature and resulting metabolic stress.

Juvenile salmonids in the Mattole during the summer months are exposed to increased water temperature, low flows and lack of riparian shading. Temperatures of 68°F and higher have been documented as stressful to juvenile Chinook and coho, while temperatures over 77°F may result in mortality (Brett 1952). Summer water temperatures in some reaches of the lower Mattole regularly reach 78°F, and temperatures over 68°F in many locations are not uncommon. Thermal refugia such as tributaries, cold seeps, and isolated pools provide critical summer habitat for juvenile salmonids.

**Table 3. Summary of adult summer steelhead, “half-pounders,” and juvenile salmonid observations between the headwaters and the mouth of the Mattole River, July 18-19 and August 7, 2008.**

Reach #	River Mile (RM) Location	Location and Reach Name	Adults (>16")	Half-Pounders (12-16")	Juvenile COHO	Juvenile CHINOOK	Juvenile STEELHEAD (<12")
1	RM 60.4 - RM 58.8	Upper Mattole: Phillips Creek to Lost River Creek	N/A	N/A	N/A	N/A	N/A
2	RM 58.8 - RM 57.1	Upper Mattole: Lost River Creek to Stanley Creek, including partial survey (0.15 miles) of Thompson Creek (RM 58, mouth to confluence with Yew Creek)	0	1	1141	217	3871
19	RM 57.1 - RM 55.6	Upper Mattole: Stanley Creek to Anderson Creek	0	1	Yes, ~200	No	Yes, 1000 >4", 100 >4"
24	RM 55.6 - RM 54.0	Upper Mattole: Anderson Creek to Van Arken Creek	0	0	Yes	No	Yes
3	RM 52.8 - RM 51.3	Upper Mattole: McKee Creek to Crook's	0	2	Yes, in Junction Hole	Yes, in Junction Hole and 2 sightings downstream	Yes, entire reach, all habitats
4	RM ~51.3 - RM ~49.4	Upper Mattole: Crook's to Tom's Hole (Patty's)	0	3	No	No	Yes, entire reach
5	RM ~49.4 - RM 47.4	Upper Mattole: Tom's Hole to Big Finley Creek	2	1	1 @ cold spring	12 @ case #1	Yes, throughout
6	RM 47.4 - RM ~46.0	Upper Mattole: Big Finley Creek to Schep's	1	1	No	No	Yes, entire reach
20	RM ~46.0 - RM 42.7	Middle Mattole: Schep's to upstream of Bear Creek	4	0	No	No	Yes, entire reach
7	RM 42.7 - RM ~ 39.9	Middle Mattole: Upstream of Bear Creek to Klossen's Hole (downstream of Mattole Canyon Creek)	1	5	No	No	Yes, in runs and riffles, also near banks
21A	RM 41.1 - RM 39.0	Middle Mattole:	5	18	No	No	Yes, entire

		Mattole Canyon Creek to Grindstone Creek					reach, all habitats
21B	RM 39.0 - RM 34.6	Middle Mattole: Grindstone Creek to Fourmile Creek	2	0	No	No	Yes, entire reach
22	RM 34.6 - RM 32.8	Middle Mattole: Fourmile Creek to Gilham Creek	1	6	No	No	Yes, entire reach, mostly shallows and LWD + SWD
8	RM 32.8 - RM 30.4	Middle Mattole: Gilham Creek to Dry Creek	0	0	No	No	Yes, throughout, but most in pools with cold seeps
23	RM 30.4 - RM 27.0	Middle Mattole: Dry Creek to Honeydew Slide	1	6	No	Yes, 2 in 2nd pool	Yes, entire reach
9	RM 27.4 - RM 24.4	Lower Mattole: Honeydew Slide to Bundle Prairie Creek	2	5	No	No	Yes
10	RM 24.4 - RM 21.3	Lower Mattole: Bundle Prairie Creek to Triple Junction High School	6	3	No	No	Yes in cover & vegetation
11	RM 19.7 - RM 14.9	Lower Mattole: Saunders Creek to Squaw Creek	0	0	No	No	Yes, more in pools
12	RM 14.9 - RM 12.6	Lower Mattole: Squaw Creek to Lindley Bridge	0	0	No	No	Yes, entire reach
13	RM 12.6 - RM 7.8	Lower Mattole: Lindley Bridge to Conklin Creek	0	1	No	No	Yes, entire reach
14	RM 7.8 - RM 5.2	Lower Mattole: Conklin Creek to Hideaway Bridge	0	1	No	No	Yes, entire reach
15	RM 5.2 - RM 3.9	Lower Mattole: Hideaway Bridge to MSG Downstream Migrant Trap	3	0	No	Yes	Yes, throughout
15	RM 3.9 - RM 1.3	Lower Mattole: MSG Downstream Migrant Trap to Stansberry Creek	3	9	No	Yes, 2695	Yes, 14,443, in willows, moderate velocity, 2' deep water
15B	RM 3.0 - RM 1.3	Lower Mattole: Mattole Salmon Group office to Stansberry Creek	2	1	No	Yes	Yes
16	RM 1.3 - RM 0.0	Lower Mattole: Stansberry Creek to Ocean	0	1	No	Yes, entire reach	Yes, entire reach
17	RM 42.8 + 3.6	Bear Creek (Geppert/Spence's to mouth)	2	5	No	No	Yes, entire reach
18	RM 26.5 + 2.5	Honeydew Creek (Maureen Catalina's to 2.5 miles upstream of Bear Wallow Slide)	1	3	No	Yes, 2nd pools of W.Fork confluence	Yes, entire reach
		Totals*	13 reaches	18 reaches	5 reaches	7 reaches	All reaches

\*Reaches 15 and 15B are counted just once as they completely overlap.

## Non-salmonid Species

Observations of non-salmonid species, including western pond turtles, freshwater mussels, bullfrog tadpoles, crayfish, and notes recorded by divers during the 2008 Summer Steelhead Dive are summarized in Appendix C, Table C-1.

Since 1999, MSG divers have noted western pond turtle sightings during the Summer Steelhead Dive. Over the past ten years, MSG divers have observed well over 200 turtles throughout the Mattole, downstream of McKee Creek (RM 52.8) to the Estuary. In 2008, 27 turtles were observed, from RM 52.8 (McKee Creek) to RM 1.3 (Stansberry Creek) and in Bear Creek. Divers began mapping turtle sightings in 2007. A summary table of turtle sightings is available upon request.

As a watershed-wide dive survey, the Summer Steelhead Dive is a good opportunity to observe the distribution of aquatic invasives as well. Freshwater mussels inhabit the entire upper Mattole and are spreading into the middle river as well. In 2008, divers observed mussels from RM 58.8 (Lost River Creek) to RM 42.7 (Bear Creek), with the greatest concentration from RM 52.8 (McKee Creek) to RM 42.7 (reaches 3, 4, 5, 6 and 20). Bullfrog tadpoles were observed in only two reaches, both in the lower river (reach 11, RM 19.7 to 14.9, and reach 14, RM 7.8 to 5.2). Crayfish were distributed from RM 51.3 (ds of Bridge Creek) to RM 42.7 (Bear Creek). Surveyors reported seeing great numbers of crayfish throughout the river downstream of the Nooning Creek gorge to Bear Creek, although a few were observed upstream of the gorge. This is roughly the same area where mussels were prevalent as well.

## **Temperatures**

A summary of incidental stream and air temperature data gathered during the Summer Steelhead Dive are also provided in Appendix C, Table C-3. The temperatures recorded during this year's Summer Steelhead Dive were similar to those recorded in 2007 and comparable to prior years. The 2008 Summer Steelhead Dive occurred close to the period where maximum temperatures were reached at many MSG Temperature Monitoring sites (See 2008 Temperature Monitoring Report for further information). Temperatures recorded during the 2008 Summer Steelhead Dive are likely to represent peak or near-peak temperatures during summer 2008.

2008 was a low water year, with lack of significant spring or summer rainfall. Many of the SSD surveyors in the upper river noted low water this year. The upper mainstem dried to a series of disconnected pools in late summer. In recent years, spring rains (2005 and 2006) and an unusual summer rain event (2007) have delivered needed flow and lowered water temperatures in the Mattole, creating more favorable conditions than in the few years prior. 2008 had no such late rain event to ameliorate river conditions for overwintering salmonids. Summer water temperatures in the Mattole remained much warmer than ideal for overwintering juveniles and summer steelhead (Barnhardt 1986). Excessively high summertime water temperatures in the Mattole have been identified as a primary limiting factor in the survival of native anadromous fish stocks (Downie et al. 2002, Coates et al. 2002). Temperatures in the middle and lower mainstem were often between 75-80°F, which is considered detrimental to all juvenile salmonid survival (Brungs and Jones 1977, Brett 1952).

## **Habitat Utilization**

Although steelhead are highly-adaptable, watersheds must meet certain habitat requirements to support these fish. Steelhead have a greater physiological tolerance to water temperature than other salmonids;

nevertheless, they require cool water throughout their life history (Israel 2003). Habitat complexity is also important. According to Nakamoto (1994), “Adult summer steelhead typically overwinter in the deepest pools (Jones 1980; Freese 1982) where instream cover or riparian shading is available. Maximum water temperature may also determine habitat use (Hooper 1973; Freese 1982; Barnhardt 1986).”

During the MSG dives, most summer steelhead were observed in characteristic overwintering habitat: deep pools, under large wood or riparian cover, and in thermal refugia such as stratified pools, cold seeps, and near cool-water tributaries. To a lesser extent, summer steelhead were also observed in riffles and fast-moving water in areas without ideal habitat. Over the past thirteen years of dive surveys on the Mattole, identification of summer steelhead distribution, habitat and cold water refugia indicate that temperature is a major factor influencing summer steelhead distribution in the Mattole.

Nielsen and Lisle (1994) found thermally stratified pools provided refuge for young-of-the-year, yearling, and adult steelhead in marginal habitats of the Eel River, where water temperatures reached “upper incipient lethal levels.” Past Summer Steelhead Dives have documented some pools in the Mattole with thermal stratification of up to ten degrees Fahrenheit.

Habitat utilization by adult summer steelhead is affected by habitat complexity as well as temperature. While many of the adult steelhead (>16”) observed in the Mattole during the summer were seen in cold pools, they were also observed in shallow water in areas with riparian cover. Nakamoto (1994) reported that distribution of adult summer steelhead was more strongly correlated with physical stream characteristics than available thermal refugia. Boulder, large woody debris, and undercut banks create physical structure and provide hydraulic heterogeneity, increasing the habitat available for steelhead in the form of cover from predators, visual separation of juvenile territories, and refuge during high flows (Everest et al., 1985).

According to Bjornn and Reiser [(1991) in Spence et al. 1996], steelhead require approximately 18cm water depth for passage. Thus the river’s small channel size near its source and discontinuous pools increasingly observed in late summer present a threat to both juvenile salmonids and adult summer Mattole steelhead.

While the extent to which water temperature or physical habitat characteristics affect the distribution of summer steelhead in the Mattole is unknown, a combination of thermal stress, habitat preferences and migratory barriers are likely to guide their habitat selection. Results seem to indicate mid-river pools, thermal refugia and vegetative cover are vital habitat needs of the species. Further study is needed to quantify the habitat needs of Mattole summer steelhead in order to ensure the efficacy of future restoration efforts.

## **Conclusion**

Over the past thirteen years of Summer Steelhead Dives, divers observed an average of 19.62 adult (>16”) steelhead. The lowest number of summer steelhead observed was 9 in 2003, while the highest number observed was 44 in 1998. The second highest number of summer steelhead observed in most survey years is between fifteen and twenty individuals. Consistent observations of adult steelhead over sixteen inches throughout eleven survey years confirm that a small population of adult steelhead inhabit the Mattole River during the summer months. It is unknown whether these fish represent a

genetically distinct population or if they are fish genetically similar to the winter steelhead run with a variant of life cycle behavior. In either case, these fish contribute greatly to the diversity of life history in the Mattole steelhead population, and are therefore important to study and preserve.

The MSG has learned much about the habitat distribution of summer steelhead throughout the Mattole Watershed. Upstream of McKee Creek (RM 42.8), near the Mattole headwaters, few summer steelhead are observed, likely due to the small size of the mainstem and hence lack of deep pool habitat, as well as recent issues with low flow during the summer months. Consistently, the greatest number of summer steelhead per mile have been observed from McKee Creek (RM 52.8) to Dry Creek (RM 30.4). Cooler summer water temperatures here (in comparison with the lower river) and presence of deep pools in the upper and middle river represent the best oversummering habitat for adult steelhead in the Mattole. Less frequently, summer steelhead are observed in cool, favorable microsites such as deep pools and areas with instream cover such as large wood and boulders in the lower river. Summer steelhead also oversummer in Honeydew Creek and Bear Creek, the two largest tributaries to the Mattole.

The influence of low water on adult summer steelhead distribution 2008 in the future low water It will be interesting to see if the same pattern of observation is consistent with low water years in the future. Summer steelhead isolated to marginal habitat downstream instead of their characteristic deep pool oversummering habitat, individual fish are put under stress that can undermine their survival and put stress on this sub-population as a whole. Because so few individuals exist, they are subject to elevated threats from poachers as well as elevated summer water temperatures, as climatic conditions may dramatically change or vary in current and future years. Since the Mattole is the southern extent of summer steelhead, it is possible these fish are on a trajectory doomed by their life history strategy.

While there is some uncertainty about the true genetic lineage of Mattole summer steelhead, consistent observations combined with historical evidence strongly suggest that a summer run of Mattole steelhead does exist. Given the extent of habitat degradation within the watershed and the increased susceptibility of summer steelhead to threats ranging from elevated water temperatures to poachers, it is quite likely that the current summer steelhead population may be but the last vestige of what was once the epitome of diversity and strength among Mattole salmonids.

Analysis of summer steelhead and “half-pounders” observed per mile, as a measure of relative abundance, is one of the MSG’s most consistent means of evaluating annual summer steelhead returns (Table 2). For the period from 1996 through 2002 the average number of adult summer steelhead observed per mile was 0.56. From 2003 to 2006, the average has fallen to 0.29 adult summer steelhead per mile. An even more dramatic reduction can be seen in the average “half-pounders” per mile during the same periods. From 1996 to 2002 an average of 1.57 “half-pounders” were seen per mile. Since 2003 the average per mile has been 0.63.

Recognizing the need to learn more about Mattole summer steelhead the MSG has initiated discussions with Research Geneticist Dr. Carlos Garza, NOAA Fisheries – Santa Cruz, CA. Dr. Garza, among whose specialties are genetic population analyses of Pacific salmonids, has indicated a strong interest in incorporating the study of Mattole summer steelhead into his current research. According to his preliminary assessment based on data supplied by the MSG and his extensive knowledge of current summer steelhead populations, Dr. Garza believes that the Mattole summer steelhead population may

be the southernmost of coastal summer steelhead populations on the Pacific Coast (Carlos Garza, pers comm.).

With potential sample sizes likely to be below 50 individuals for any given year it is clear that any sample collection must be performed with the utmost respect and concern for the individual fish sampled. Needless to say, the mortality rate for sample collection must be kept to a minimum. Fortunately, Dr. Garza has described a process whereby small tissue samples from live summer steelhead in the wild. The MSG is confident that with proper precautions threats to fish being sampled can be sufficiently reduced.

The research proposed by Dr. Garza offers great potential for increasing our understanding of Mattole summer steelhead in a manner that minimally impacts the survival of each individual fish. However, if the benefits of a partnership with Dr. Garza are to be realized the MSG must first insure the support of all applicable government agencies and the community.

However, directed research alone will not improve the recovery prospects for Mattole summer steelhead. In order to ensure their survival in the short-term it is imperative to restore known mainstem and tributary habitat. Many proposed instream habitat and riparian revegetation projects are designed to benefit known summer steelhead habitat. Instream habitat enhancement projects can provide nearly immediate benefits by deepening pools, providing complex cover and adding organic debris to the river channel. Riparian revegetation projects keep water temperatures cool and provide bank stability once mature.

With over two decades of habitat restoration experience, the Mattole Salmon Group is uniquely familiar with the opportunities for restoration in the Mattole Watershed and the steps needed to make restoration a reality.

## **Recommendations**

- A genetic microsatellite investigation of Mattole steelhead to determine the variability in life history, migration, and behavior of Mattole summer and winter steelhead runs.
- Depending on results from genetic analysis revise appropriate management plans (Mattole Watershed Plan, California Steelhead Restoration and Management Plan, protections, King Range Management Plan, etc.) and protections (ESA, CESA, etc.).
- Develop and implement a quantitative monitoring protocol for determining specific habitat needs for recovery of the Mattole summer steelhead population.
- Continue to implement the MSG Summer Steelhead Dive in future years as described in the Mattole Salmon Group Salmonid Population Monitoring Plan.
- Continue monitoring of the thirteen index reaches, tributary reaches in Honeydew and Bear Creeks, and new mainstem reaches added in 2005 and 2006.



- Expand the MSG Summer Steelhead Dive to include previously unsurveyed areas, and expand summer steelhead monitoring in creeks whose habitat and thermal conditions could support summer steelhead.
- Implement habitat restoration projects to protect and enhance known summer steelhead habitat
- Include consideration of summer steelhead populations and habitat needs in future restoration projects.
- Encourage water conservation throughout the Mattole Watershed, but especially
- Educate the local community about this rare neighbor and encourage community stewardship of the small summer steelhead population.
- Update/revise datasheets to include mapping of “half-pounder” sightings, estimated flow, and description of change in habitat (i.e. large wood or sediment movement), if applicable.

## References

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**Appendix B, Mattole Salmon Group Summer Steelhead Dive Summary Tables, 1996-2008**

**Table B-1. Adult Summer Steelhead Observations, MSG Summer Steelhead Dives**

Reach #	Reach Description	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	Total
1	Phillips Cr.(RM 60.4) to Lost River Cr.(RM 58.8)					0		0		0	0	0	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.)	0	0	0	0	0	1	0							1
2A	Lost River Cr. (RM 58.8) to Stanley Cr. (RM 57.1)								0	0	1	0	0	0	1
2B	Thompson Cr. (RM 58.4+ 0.15, mouth to confluence with Yew Cr.)					0			0	0	0	0	0	0	0
19	Stanley Cr. (RM 57.1) to Anderson Cr. (RM ~55.6)	0	1	0	1										2
24	Anderson Creek (RM 55.6) to Van Arken Creek (RM 54.0)	0	0	0											0
3	McKee Cr. (RM 52.8) to Crooks (RM 51.3)	0	0				0	0	0	4	3	5	0		12
3A	McKee Cr. (RM 52.8) to Bridge Cr. (RM 52.1)			0	0	1									1
4	Crook's (RM ~51.3) to Tom's Hole (Patty's) (RM ~49.4)	0	0	2	2	0	3	5							12
4A	Crooks RM (51.3) to Big Finley Ck. (RM 47.4)								2	3	1	9	7	4	26
5	Tom's Hole (RM ~49.4) to Big Finley Cr. (RM 47.4)	2	1	0	0	4	0	1							8
6	Big Finley Cr. (RM 47.4) to Shepp's (RM~46.0)	1	1	1	6	0	0	2							11
6A	Big Finley Cr. (RM 47.4) to Deer Lick Cr. (RM 45.8)								1	1	2	7	0	6	17
20	Schepps' (RM ~46.0) to us Bear Cr. (RM 42.7)	4	1	1	1										7
7	Us. Bear Cr. (RM 42.7) to Klossen's Hole (ds Mattole Canyon Cr.)(RM~39.9)	1	0	1	0	0	0	3	0	1	4	1	0	0	11
21	Mattole Canyon Cr. (RM 41.1) to Fourmile Cr. (RM 34.6)		2	6	4										12

<b>21A</b>	Mattole Canyon Cr. (RM 41.1) to Grindstone Cr. (RM 39.0)	5													<b>5</b>
<b>21B</b>	Grindstone Cr. (RM 39.0) to Fourmile Cr. (RM 34.6)	2													<b>2</b>
<b>22</b>	Fourmile Cr. (RM 34.6) to Gilham Cr. (RM 32.8)	1	4		1										<b>6</b>
<b>8</b>	Gilham Cr. (RM 32.8) to Dry Cr. (RM 30.4)	0		0	0	0	1								<b>1</b>
<b>8A</b>	Gilham Cr. (RM 32.8) to Middle Cr. (RM 31.3)		0												<b>0</b>
<b>8B</b>	Middle Cr. (RM 31.3) to Dry Cr. (RM 30.4)		0												<b>0</b>
<b>23</b>	Dry Creek (RM 30.4) to Honeydew Slide (RM 27.0)	1	1	0	0										<b>2</b>
<b>9</b>	Honeydew Slide (RM 27.0) to Bundle Prairie Cr. (RM 24.4)	2	0		3	1	2		3	5				2	<b>18</b>
<b>9A</b>	Honeydew Slide (27) to Woods Ck.(24.1)			3							2	4	1		<b>10</b>
<b>10</b>	Bundle Prairie Cr. (RM 24.4 to Triple Junction High School (RM 21.3)	6	0	0	0	3	0	0	3						<b>12</b>
<b>10A</b>	Woods Ck.(RM 24.1 to Triple Junction HS (RM 21.3)									0		5	1		<b>6</b>
<b>25</b>	Triple Junction High School (RM 21.3) to Saunders Creek (RM 19.7)			0											<b>0</b>
<b>11</b>	Saunders Cr. (RM 19.7) to Squaw Cr. (RM 14.9)	0	0	0	0	1	0		0		0	0		0	<b>1</b>
<b>12</b>	Squaw Cr. (RM 14.9) to Lindley Bridge (RM 12.6)	0	0	0	0	0	0	1	1	0	0	1	0	0	<b>3</b>
<b>13</b>	Lindley Bridge (RM 12.6) to Conklin Cr. (RM 7.8)	0	0	0	0	0	0	2		1	1	1	0		<b>5</b>
<b>14</b>	Conklin Cr. (RM 7.8) to Hideaway Bridge (RM 5.2)	0	0	0	0	2	0	0	1	1	0	8	1		<b>13</b>
<b>15</b>	Hideaway Bridge (RM 5.2) to Stansberry Cr. (RM 1.3)	6	0	1	1	0	0	1	3	0	2	3		2	<b>19</b>
<b>15A</b>	Hideaway Bridge (RM 5.2) to Rex's (MSG Office) (RM 3.0)												1		<b>1</b>
<b>15B</b>	MSG Office (RM 3.0) to Stansberry Creek (RM 1.3)	2	0	1											<b>3</b>
<b>16</b>	Stansberry Cr. (RM 1.3) to Ocean (RM 0.0)	0	0	1	0	2	0		3	1	0	0		0	<b>7</b>

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<b>16A</b>	Rex's (MSG Office)(RM 3.0) to Ocean												0		<b>0</b>
<b>17</b>	Bear Cr. (Geppert/Spencer's to mouth) (lower 3.6 miles)	2	5	2	1	1	0								<b>11</b>
<b>17A</b>	Bear Creek (lower 0.6 miles)												0		<b>0</b>
<b>18</b>	Honeydew Cr. Maureen Catalina's to 2.5 miles us Bear Wallow Slide	1	0	0		1	2								<b>4</b>
<b>18A</b>	Honeydew Creek (lower 0.6 miles)										0	0	5	0	<b>5</b>
	<b>Totals</b>	<b>36</b>	<b>16</b>	<b>19</b>	<b>20</b>	<b>16</b>	<b>9</b>	<b>15</b>	<b>17</b>	<b>17</b>	<b>16</b>	<b>44</b>	<b>16</b>	<b>14</b>	<b>255</b>

**Table B-2. "Half-pounder" (12"-16" steelhead) Observations, MSG Summer Steelhead Dive**

<b>Reach #</b>	<b>Reach Description</b>	<b>2008</b>	<b>2007</b>	<b>2006</b>	<b>2005</b>	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>	<b>2000</b>	<b>1999</b>	<b>1998</b>	<b>1997</b>	<b>1996</b>	<b>Total</b>
<b>1</b>	Phillips Cr.(RM 60.4) to Lost River Cr.(RM 58.8)					0		0		0	4	3	0		<b>7</b>
<b>2</b>	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.)	1	3	0	2	3	2	1							<b>12</b>
<b>2A</b>	Lost River Cr.(RM 58.8) to Stanley Cr. (RM 57.1)								0	8	24	0	1	0	<b>33</b>
<b>2B</b>	Thompson Cr. (RM 58.4+.15, mouth to confluence with Yew Cr.)					0			0	0	0	0	0	0	<b>0</b>
<b>19</b>	Stanley Cr. (RM 57.1) to Anderson Cr. (RM 55.6)	1	8	3	0										<b>12</b>
<b>24</b>	Anderson Creek (RM 55.6) to Van Arken Creek (RM 54.0)	0	0	0											<b>0</b>
<b>3</b>	McKee Cr. (RM 52.8) to Crooks (RM 51.3)	2	2				2	2	7	13	9	1	3		<b>41</b>
<b>3A</b>	McKee Cr. (RM 52.8) to Bridge Cr. (RM 52.1)			0	1	0									<b>1</b>
<b>4</b>	Crook's (RM ~51.3) to Tom's Hole (Patty's) (RM ~49.4)	3	0	4	0	3	2	5							<b>17</b>
<b>4A</b>	Crook's RM (51.1) to Big Finley Ck. (RM 47.4)								3	5	10	21	0	3	<b>42</b>
<b>5</b>	Tom's Hole (RM ~49.4) to Big Finley Cr. (RM 47.4)	1	2	1	5	3	1	2							<b>15</b>

<b>6</b>	Big Finley Cr. (RM 47.4) to Shepp's (RM~46.0)	1	6	3	2	4	0	0							<b>16</b>
<b>6A</b>	Big Finley Cr. (RM 47.4) to Deer Lick Cr. (RM 45.8)								5	1	1	9	0	6	<b>22</b>
<b>20</b>	Schepps' (RM ~46.0) to us Bear Cr. (RM 42.7)	0	4	1	2										<b>7</b>
<b>7</b>	Us. Bear Cr. (RM 42.7) to Klossen's Hole (ds Mattole Canyon Cr.)(RM~39.9)	5	4	0	1	0	2	1	1	30	17	3	2	1	<b>67</b>
<b>21</b>	Mattole Canyon Cr. (RM 41.1) to Fourmile Cr. (RM 34.6)		4	7	1										<b>12</b>
<b>21A</b>	Mattole Canyon Cr. (RM 41.1) to Grindstone Cr. (RM 39.0)	18													<b>18</b>
<b>21B</b>	Grindstone Cr. (RM 39.0) to Fourmile Cr. (RM 34.6)	0													<b>0</b>
<b>22</b>	Fourmile Cr. (RM 34.6) to Gilham Cr. (RM 32.8)	6	6		1										<b>13</b>
<b>8</b>	Gilham Cr. (RM 32.8) to Dry Cr. (RM 30.4)	0		1	1	0	1								<b>3</b>
<b>8A</b>	Gilham Cr. (RM 32.8) to Middle Cr. (RM 31.3)		2												<b>2</b>
<b>8B</b>	Middle Cr. (RM 31.3) to Dry Cr. (RM 30.4)		2												<b>2</b>
<b>23</b>	Dry Creek (RM 30.4) to Honeydew Slide (RM 27.0)	6	15	0	0										<b>21</b>
<b>9</b>	Honeydew Slide (RM 27.0) to Bundle Prairie Cr. (RM 24.4)	5	2		2	4	0		2	15				14	<b>44</b>
<b>9A</b>	Honeydew Slide (27) to Woods Ck. (24.1)			5							3	2	4		<b>14</b>
<b>10</b>	Bundle Prairie Cr. (RM 24.4) to Triple Junction High School (RM 21.3)	3	2	3	3	3	1	5	11						<b>31</b>
<b>10A</b>	Woods Ck. (RM 24.1) to Triple Junction HS (RM 21.3)									0		20	0		<b>20</b>
<b>25</b>	Triple Junction High School (RM 21.3) to Saunders Creek (RM 19.7)			0											<b>0</b>
<b>11</b>	Saunders Cr. (RM 19.7) to Squaw Cr. (RM 14.9)	0	0	0	0	0	1		0		1	0		1	<b>3</b>
<b>12</b>	Squaw Cr. (RM 14.9) to Lindley Bridge (RM 12.6)	0	1	1	1	0	1	0	8	0	2	0	3	8	<b>25</b>
<b>13</b>	Lindley Bridge (RM 12.6) to Conklin Cr. (RM 7.8)	1	1	1	0	0	1	2		3	2	2	1		<b>14</b>

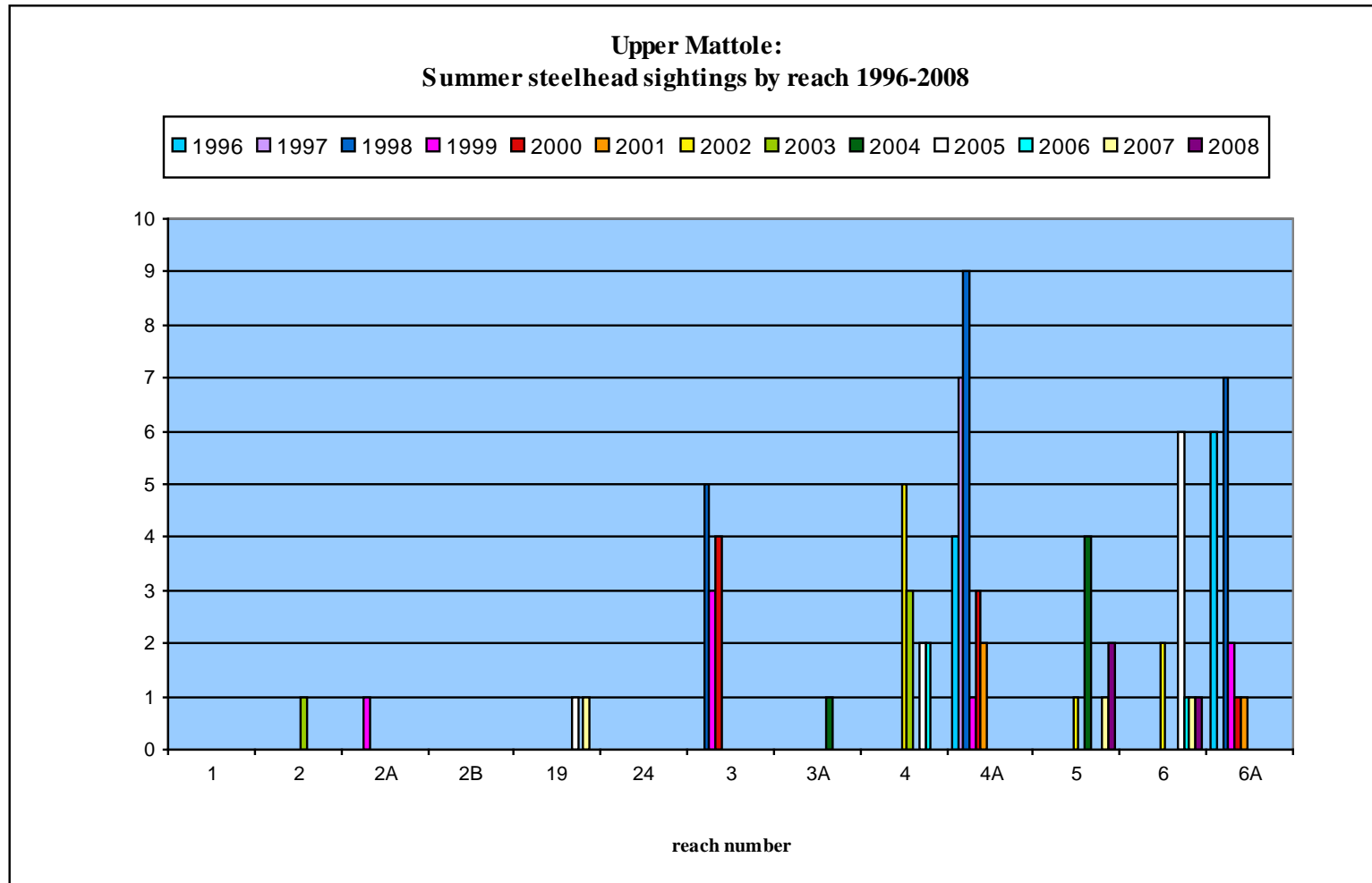
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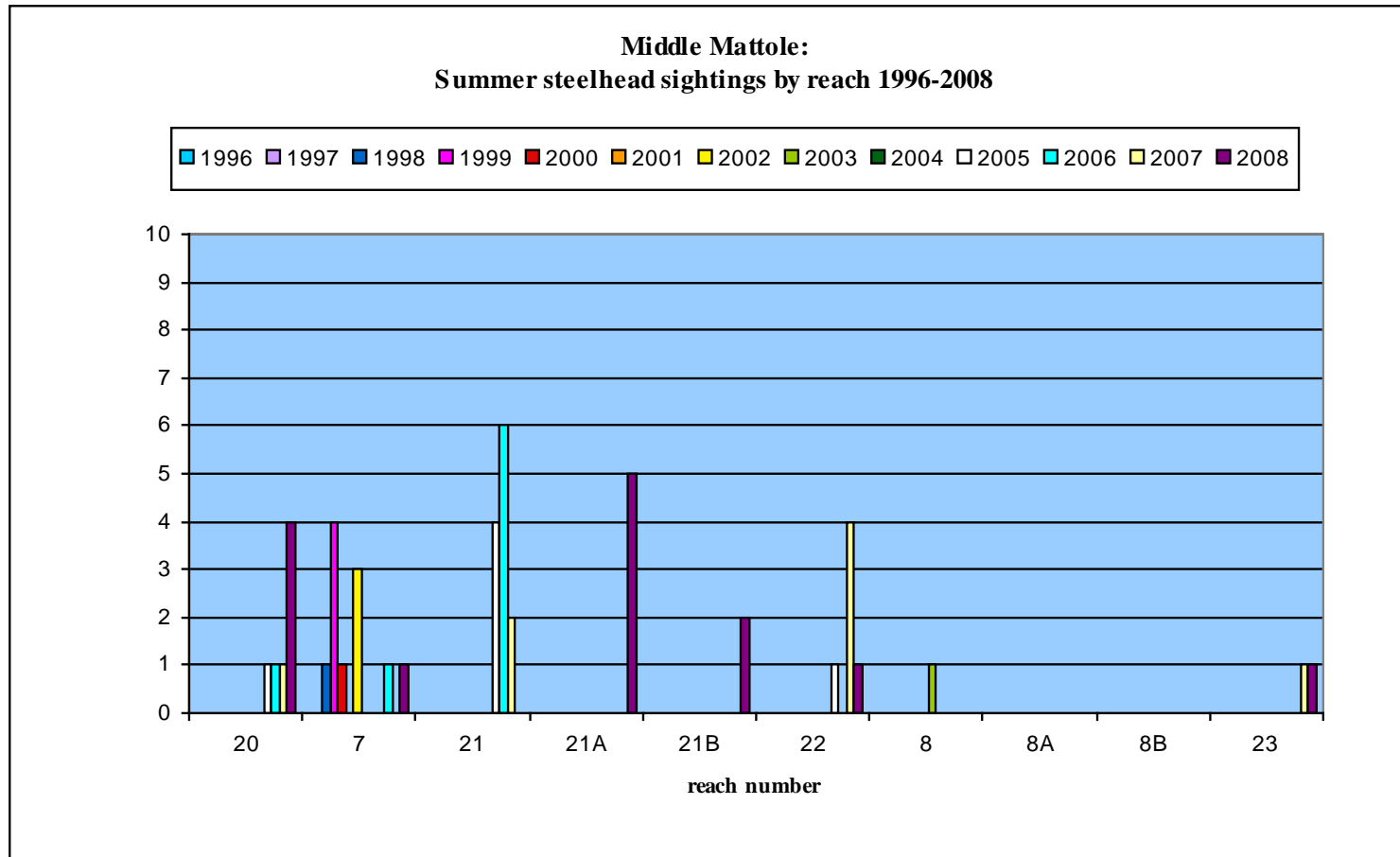
<b>14</b>	Conklin Cr. (RM 7.8) to Hideaway Bridge (RM 5.2)	1	0	1	2	4	0	0	1	1	7	12	0		<b>29</b>
<b>15</b>	Hideaway Bridge (RM 5.2) to Stansberry Cr. (RM 1.3)	9	1	1	0	2	0	4	0	4	6	12		2	<b>41</b>
<b>15A</b>	Hideaway Bridge (RM 5.2) to Rex's (MSG Office)( RM 3.0)												1		<b>1</b>
<b>15B</b>	MSG Office (RM 3.0) to Stansberry Creek (RM 1.3)	1	1	1											<b>3</b>
<b>16</b>	Stansberry Cr. (RM 1.3) to Ocean (RM 0.0)	1	0	0	2	0	0		2	16	2	0		0	<b>23</b>
<b>16A</b>	Rex's (MSG Office)(RM 3.0) to Ocean												1		<b>1</b>
<b>17</b>	Bear Cr. (Geppert/Spencer's to mouth)	5	6	4	8	5	5								<b>33</b>
<b>17A</b>	Bear Creek (lower 0.6 miles)													1	<b>1</b>
<b>18</b>	Honeydew Cr. Maureen Catalina's to 2.5 miles us Bear Wallow Slide	3	7	1		13	2								<b>26</b>
<b>18A</b>	Honeydew Creek (lower 0.6 miles)										0	0	3	0	<b>3</b>
	<b>Totals</b>	<b>73</b>	<b>79</b>	<b>38</b>	<b>34</b>	<b>44</b>	<b>21</b>	<b>22</b>	<b>40</b>	<b>96</b>	<b>88</b>	<b>85</b>	<b>19</b>	<b>36</b>	<b>675</b>



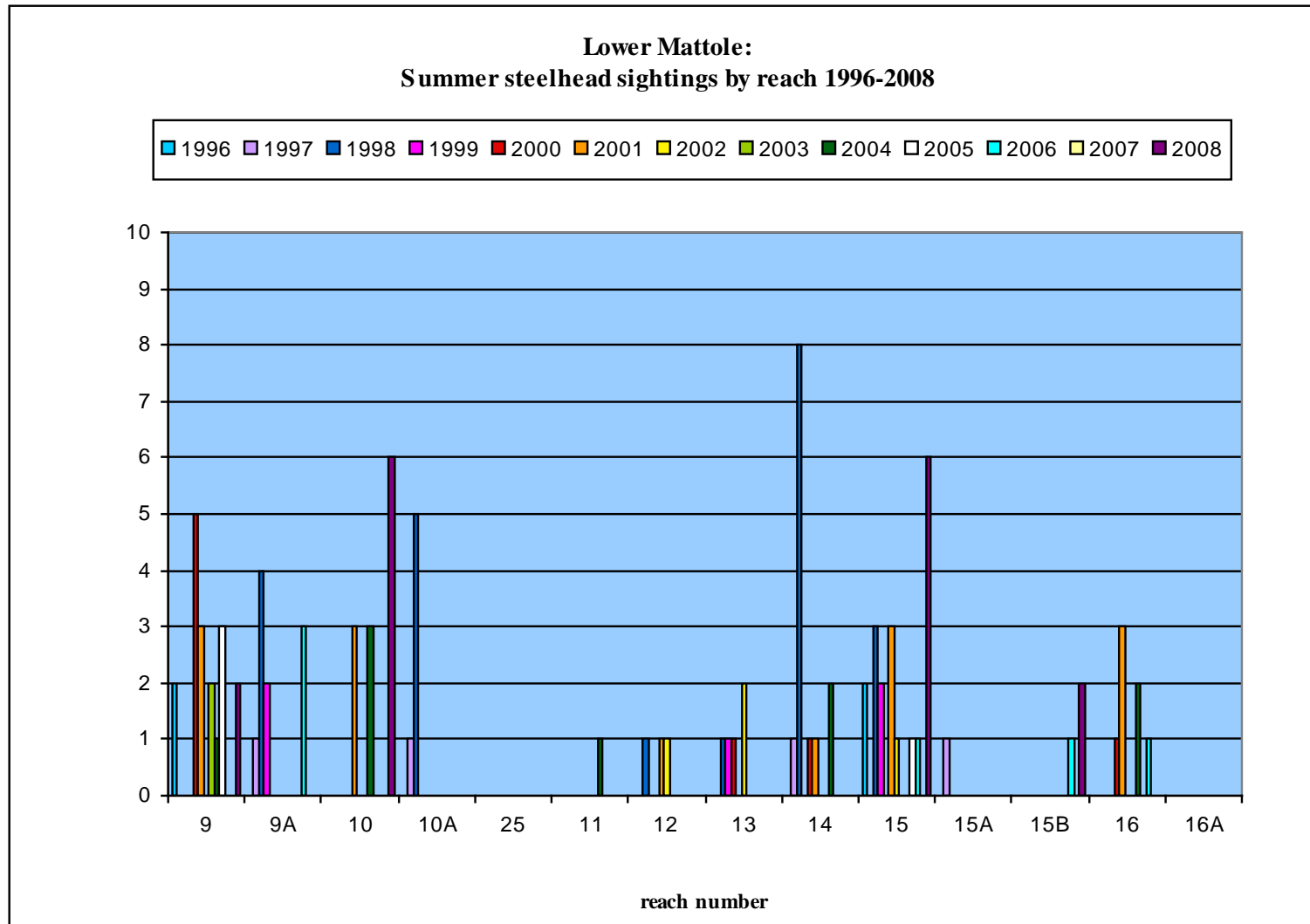
**Figure B-1. 255 summer steelhead (>16") were observed in dive surveys in 1996-2008. Adult steelhead were observed throughout the watershed, but seemed to utilize pool habitat and thermal refugia in the mid-river to the greatest extent.**



**Figure B-2. Middle Mattole: Summer Steelhead Sightings by Reach, 1996-2008.**



**Figure B-3. Lower Mattole: Summer Steelhead Sightings by Reach, 1996-2008.**



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**Appendix C. Temperature recordings and other species observed during the MSG 2008 Summer Steelhead Dive**

**Table C-1. Summary of Freshwater Mussels, Bull Frog Tadpoles, Crayfish, Western Pond Turtles, and other species seen by divers between the headwaters and the mouth of the Mattole River, during summer steelhead surveys, July-August 2008.**

Reach #	River Mile (RM) Location	Location and Reach Name	Freshwater Mussels	Bull Frog Tadpoles	Crayfish	Western Pond Turtles	Other	Notes
1	RM 60.4 - RM 58.8	Upper Mattole: Phillips Creek to Lost River Creek	N/A	N/A	N/A	N/A	N/A	N/A
2	RM 58.8 - RM 57.1	Upper Mattole: Lost River Creek to Stanley Creek, including partial survey (0.15 miles) of Thompson Creek (RM 58, mouth to confluence with Yew Creek)	~12	No	No	No	rough-skinned newt/egg cases, stickleback, leopard liles, 2 snakes pale yellow 18", 2 ducks	No Lamprey carcasses, Tannin-stain in deep pools, 3 new log jams
19	RM 57.1 - RM 55.6	Upper Mattole: Stanley Creek to Anderson Creek	No	No	No	No	N/A	Water very low, most of reach too shallow to dive
24	RM 55.6 - RM 54.0	Upper Mattole: Anderson Creek to Van Arken Creek	No	No	No	No	N/A	Low water, unable to dive much of reach
3	RM 52.8 - RM 51.3	Upper Mattole: McKee Creek to Crook's	~60 throughout reach in 2 sites	No	No	1	rough-skinned newts, stickleback (mostly pregnant), snake	N/A
4	RM ~51.3 - RM ~49.4	Upper Mattole: Crook's to Tom's Hole (Patty's)	~170 total in reach, in 3 sites, all upstream of the gorge area	No	6	No	rough-skinned newts, people swimming, stickleback, 1 aquatic snake	the gorge is beautiful!
5	RM ~49.4 - RM 47.4	Upper Mattole: Tom's Hole to Big Finley Creek	Yes, on river bar, none on water	No	Yes, lots	3	newt, snakes (1 eating a steelhead), people, dogs, otter scat, merganser	N/A
6	RM 47.4 - RM	Upper Mattole:	Yes, ~112,	No	Yes, entire	1, start of	salamanders,	Mussels

	~46.0	Big Finley Creek to Schepp's	nearly entire reach		reach	long pool 1/2 mile us Little Finley Creek	garter snakes, rough-skinned newts, alligator lizard	along the entire stretch starting just ds of the Big Finley pool
20	RM ~46.0 - RM 42.7	Middle Mattole: Schepp's to upstream of Bear Creek	Yes, ~100s in 2 sites	No	Yes, lots throughout	4, (3 in pool ds Hart's Creek and 1 ds)	1 merganzer, crawdads in Wolf Creek, blue-tailed skink, rough-skinned newt	only surveyed to first French road crossing at Wolf Creek, as remainder looked very shallow, no pools
7	RM 42.7 - RM ~39.9	Middle Mattole: Upstream of Bear Creek to Klossen's Hole (downstream of Mattole Canyon Creek)	No	No	No	No	red-headed merganzers, 3 water snakes	4500 SH yoy and 40 SH smolts throughout reach
21A	RM 41.1 - RM 39.0	Middle Mattole: Mattole Canyon Creek to Grindstone Creek	No	No	6 carcasses	6	2 kingfisher, 20 killdeer, yellow legged frog juveniles, osprey, 6 merganzers	3rd pool 1.5" screened intake, 4 people, 2 dogs, 12 inner tunes, 7 chairs
21B	RM 39.0 - RM 34.6	Middle Mattole: Grindstone Creek to Fourmile Creek	No	No	No	No	N/A	N/A
22	RM 34.6 - RM 32.8	Middle Mattole: Fourmile Creek to Gilham Creek	No	No	No	1	snakes, merganzer ducklings, stickleback	N/A
8	RM 32.8 - RM 30.4	Middle Mattole: Gilham Creek to Dry Creek	No	No	No	1	merganzers, snakes, frogs, people	lots of cows in the river
23	RM 30.4 - RM 27.0	Middle Mattole: Dry Creek to Honeydew Slide	No	No	No	No	N/A	N/A
9	RM 27.4 - RM 24.4	Lower Mattole: Honeydew Slide to Bundle Prairie Creek	No	No	No	No	N/A	N/A
10	RM 24.4 - RM 21.3	Lower Mattole: Bundle Prairie Creek to Triple Junction High School	No	No	No	No	3 families of merganzers	1 10" SH near case #1, half-pounders were in deep pools
11	RM 19.7 - RM 14.9	Lower Mattole: Saunders Creek to Squaw Creek	No	4,000! Backwater, at mouth of Saunders Creek	No	1, in pool at Saunders Creek	N/A	N/A
12	RM 14.9 - RM 12.6	Lower Mattole: Squaw Creek to Lindley	No	No	No	1, in a small hole	rough-skinned	N/A

		Bridge				us Lindley Bridge	newt, stickleback	
13	RM 12.6 – RM 7.8	Lower Mattole:  Lindley Bridge to Conklin Creek	No	No	No	2	western toad, garter snakes, killdeer young (still downy), yellow-legged frog, sculpin	N/A
14	RM 7.8 – RM 5.2	Lower Mattole:  Conklin Creek to Hideaway Bridge	No	Yes, ~100 not far downstream of Conklin Creek (RM 7.8)	No	No	rough skinned newts, frogs, stickleback	found fishing hook with line attached
15	RM 5.2 – RM 3.9	Lower Mattole:  Hideaway Bridge to MSG Downstream Migrant Trap	No	No	No	1 @ case #1 (3 adult SH)	old fishing lead weight and broken hook, algae encrusted	N/A
15	RM 3.9 - RM 1.3	Lower Mattole:  MSG Downstream Migrant Trap to Stansberry Creek	No	No	No	4	osprey, newt, freshwater snails, stickleback, killdeer, 2 great blue heron, 9 merganser + 8 juveniles, western toad mort, yellow-legged frog, violet swallow	N/A
15B	RM 3.0 – RM 1.3	Lower Mattole:  Mattole Salmon Group office to Stansberry Creek	No	No	No	No	N/A	N/A
16	RM 1.3 – RM 0.0	Lower Mattole:  Stansberry Creek to Ocean	No	No	No	No	Lots of Chinook in the pool at Stansberry Creek, stickleback especially in estuary section 3 and 4	Found old fishing hook ds of Stansberry in a log, same location as half-pounder, see estuary datasheet for more info
17	RM 42.8 + 3.6	Bear Creek (Geppert/Spence's to mouth)	No	No	No	1	N/A	N/A
18	RM 26.5 + 2.5	Honeydew Creek (East Fork confluence to Maureen Catalina's)	No	No	No	No	N/A	N/A
		Totals	6 reaches	2 reaches	4 reaches*	27 turtles	--	--

\*a 5th reach had crayfish carcasses





**Table C-2. Mattole stream and air temperatures were recorded by handheld thermometers during Summer Steelhead Survey dates, July-August 2008.**

Date	Location	Reach # / Letter Code	Time	Tributary Temp (°F)	Mattole Temp (°F)	Air Temp (°F)
7/18	Lost River (RM 58.8)	2/A	10:15	60 @ 4"	60	62
7/18	Helen Barnum Creek (RM 58.7)	2/B	10:20	58	60	62
7/18	Thompson Creek (RM 58.4)	2/C	12:00	60	60	70
7/18	Yew Creek (RM 58.4 +0.15)	2/D	13:00	60	--	70
7/18	Baker Creek (RM 57.6) - mouth dry, no trickle	2/E	15:00	60 @ 4"	60	76
7/18	Stanley Creek (RM 57.1) (End)	2/F	16:20	60 @ 4"	60	80
7/18	Stanley Creek (RM 57.1) (Start)	19/A	13:00	56	--	78
7/18	Metz Bridge (RM 56.9)	19/B	--	61 @ 4'	--	--
7/18	Mattole us Anderson Creek	19/C	--	--	64	--
7/18	Anderson Creek (RM 55.6)	19/D	15:30	57 @ 1'	--	--
7/18	Start - McKee Creek/Junction Hole	3/A	10:45	58 @ 4"	61 @ 4"	68
7/18	Bridge Creek (RM 52.1)	3/B	12:30	61 @ 3"	67 @ 3"	72
7/18	RB trib, ds bridge	3/C	12:45	59 @ 2"	66 @ 2"	72
7/18	RB trib	3/D	13:30	58 @ 2"	68 @ 2"	68
7/18	End - Crook's	3/E	14:30	--	68	68
7/18	Crook's (RM 51.3)	4/A	12:45	54	64	70
7/18	LB trickle @ Tom's Hole	4/B	19:00	--	--	--
7/18	Tom's Hole (RM ~49.4)	4/C	19:05	--	63	65
7/18	Tom's Hole	5/A	12:30	--	64	70
7/18	Case #1, pool with adult	5/B	--	--	70	--
7/18	spring	5/C	--	61	--	--
7/18	Eubanks Creek (RM 47.8), barely flowing	5/D	--	62	70	68
7/18	Big Finley Creek (RM 47.4)	5/E	--	61	65	65
7/18	Start - upstream of Big Finley Creek (RM 47.4)	6/A	12:00	--	65 @ 3.5'	70
7/18	Big Finley Creek (RM 47.4)	6/B	12:05	58 @ 11'	61	70
7/18	First big bend	6/C	14:00	--	67	70
7/18	Large pool	6/D	15:00	--	66	--
7/18	Little Finley Creek (RM 46.8)	6/E	15:30	62	--	--
7/18	Deer Lick Creek (RM 45.9)	6/F	16:00	58 @ 2'	71 @ 2'	--
7/18	End - Schepp's	6/G	16:45	--	72 @ 2'	82
7/18	Mattole @ Hart's Creek confluence	20/A	11:30	Dry	65 @ 1.5'	72
7/18	Pool below Hart's Creek	20/B	11:32	--	64 @ 6.5'	72
7/18	Trib on LB	20/C	12:30	59 @ 8"	66 @ 3'	--
7/18	Grasshopper Hill Creek (RM 45.0)	20/D	13:15	57 @ 2"	70 @ 2'	80
7/18	Bedrock pool on LB (SH #2, 16")	20/E	15:00	--	66 @ 9'	--
7/18	SH #3 (30")	20/F	--	--	67 @ 7'	--
7/18	SH #4 (18")	20/G	--	--	68 @ 11'	--
7/18	RB trib (Wolf Creek)	20/H	--	79 @ 6"	79 @ 6"	--
7/19	1 mile upstream of Bear Creek (Start)	7/A	13:24	--	76	83
7/19	confluence of Bear Creek and Mattole River	7/B	14:30	--	74	85
7/19	us Ettersburg Bridge	7/C	15:30	--	75	85
7/19	ds Blue Slide Creek	7/D	16:20	--	74	85
7/19	Mattole Canyon Creek (RM 41.1)	21A/A	13:00	dry for .25 mile	76	80
7/19	Grindstone Creek (RM 39.0)	21A/B	17:00	61 - 100' us	79	80
7/19	Mattole @ Grindstone Creek	21B/A	12:00	--	75	88

7/19	Start- us Fourmile Creek @ Hall's river road	22/A	11:50	--	73 @ 2'	74
7/19	Fourmile Creek confluence	22/B	12:30	68	75 @ 4'	78
7/19	End-Gilham Creek	22/C	16:30	64	80 @ 2'	77
7/19	Start- Gilham Creek	8/A	13:00	60 @ 1'	63 @ 1'	87
7/19	cold pool w/seep	8/B	--	--	66 @ 6'	94
7/19	End- Dry Creek	8/C	--	--	78 @ 2'	
7/19	Mattole us Dry Creek/Dry Creek	23/A	12:30	69 @ 4"	74 @ 1'	--
7/19	Mattole @ deep bedrock pool w/ half-pounders	23/B	13:45	--	73.5 @ 10'	--
7/19	Mattole us gulch/gulch	23/C	15:00	63 @ 4"	75 @ 1'	69
7/19	Mattole us drainage/drainage	23/D	16:00	61.5 @ 4"	76 @ 2'	--
7/19	Mattole us Honeydew Slide/ small drainage	23/E	17:00	63 @ 4"	76 @ 1'	--
7/18	Start-Honeydew Slide @ Boudoin's	9/A	10:45		72	82
7/18	Honeydew Creek	9/B	N/A	67	72	82
7/18	Upper North Fork	9/C	N/A	77	72	82
7/18	Case #1	9/D	N/A		67 @ 6'	82
7/18	Mattole @ Bundle Prairie Creek (RM 24.4)	10/A	11:00	--	71	73
7/18	Cold seep from LB	10/B	12:00	--	74 MS/ 68 seep	--
7/18	Kendall Gulch	10/C	14:15	60	78	--
7/18	Mattole @ Triple Junction High School	10/D	15:00	--	79	90
7/19	Saunders Creek (dry at confluence)	11/A	10:40	73 @ 6"	69 @ 6"	80
7/19	Below Saunders pool	11/B	--	--	71 @ 15"	--
7/19	pool ds Granny Creek	11/C	--	--	69 @ 4'	75
7/19	pool ds	11/D	--	--	66 @ 12'	82
7/19	Tributary- Thornton Creek (RM 17.2)	11/E	--	58 @ 4"	74 @ 4"	68
7/19	Tributary (pool) off Evert's Ridge	11/F	--	55	75.5 @ 10'	78
7/19	Squaw Creek	11/G	--	70 @ 4"	78 @ 4"	74
7/15	Start- Mattole @ Squaw Creek confluence	12/A	10:00	62	66	62
7/15	End- Lindley Bridge	12/B	12:30	--	70	67
7/19	Lindley Bridge	13/A	10:30	--	64	68
7/19	Indian Creek	13/B	11:00	--	53.5	--
7/19	McGinnis Creek	13/C	15:35	--	60	--
7/19	Conklin Creek (RM 7.8)	13/D	15:50	--	68	--
7/19	Mattole @ Conklin Creek (RM 7.8)	14/A	12:00	--	69	78
7/19	Conklin Creek (RM 7.8) - flowing subsurface	14/B	12:02	68	--	78
7/19	Mattole- 10' pool just ds Conklin @ bend	14/C	12:15	--	70	--
7/19	Mattole- 10' pool just ds Conklin @ bend- deep	14/D	12:15	--	70	--
7/19	Clear Creek confluence (RM 6.1)	14/E	14:30	65	75	--
7/19	Hideaway Bridge (RM 5.2)	14/F	15:00	--	75	--
7/16	Hideaway Bridge (RM 5.2)	15/A	10:45	--	66	61
7/16	Case #1 (cold pool), mouth of Jeffry Gulch	15/B	13:30	--	71 @ 6"	--
7/16	Case #1, mouth of Jeffry Gulch (deep)	15/C	13:30	--	61/64 @ 2'	--
7/16	DSMT (takeout) (RM 3.9)	15/D	15:00	--	73	--
7/16	Mattole @ DSMT, RM 3.5	15/E	10:15	--	68	62
7/16	Titus Creek (RM 3.2)	15/F	10:30	56	70	--
7/16	Tom Scott Creek (RM 3.1)	15/G	10:40	58	70	--
7/16	Mill Creek (RM 2.8)	15/H	12:00	58	72	--
7/16	Jim Goff Gulch (RM 1.8)	15/I	15:00	56	74	--
7/16	Mattole @ Stansberry Creek (RM 1.3)	15/J	14:40	Dry	74	70
7/19	Wingdam (RM 2.9)	15B/A	--	--	66	64
7/19	Mill Creek (RM 2.8)	15B/B	--	57	67	62.64
7/19	Groeling run willows	15B/C	--	--	70	60

7/19	Jim Goff Gulch run	15B/D	--	--	70	60
7/19	Spring Pond	15B/E	--	--	70	70
7/19	Stansberry Creek (RM 1.3)	15B/F	--	--	67-70	67
7/16	Stansberry Creek (RM 1.3)	16/A	11:35	58	--	68
7/16	Mattole us Stansberry Creek	16/B	11:40	--	64	68
7/16	section 6 in estuary, near log	16/C	13:00	--	65	--
7/16	section 4 in estuary, LB	16/D	14:20	--	65	--
7/16	section 5- estuary	16/E	15:00	--	65	--
7/16	section 3- estuary	16/F	11:00	--	67	--
7/16	section 2- estuary	16/G	13:00	--	68	--
7/16	section 1- estuary	16/H	14:30	--	67	60
8/7	Start- Bear Creek @ Geppert/Spence's	17/A	11:30	--	60 @ 0.5'	71.5
8/7	Large RB pool (bedrock)	17/B	--	--	63 @ 8'	--
8/7	RB trib	17/C	--	56	62.5 @ 0.25'	--
8/7	Case #1 (bottom)	17/D	--	--	63 @ 8.5'	--
8/7	Case #1 (top)	17/E	--	--	70 @ 1'	--
7/19	Honeydew Creek (Start-East Fork confluence)	18/A	11:00	--	62	68
7/19	East Fork of Honeydew Creek	18/B	12:00	59	--	78
7/19	Honeydew Creek/West Fork confluence	18/C	13:30	59	61	71
7/19	Upstream of West Fork confluence	18/D	13:30	--	61	71
7/19	Honeydew Creek- end	18/E	17:20	--	63	73