CALIFORNIA TROUT

KEEPER OF THE STREAMS

To: All Interested Parties April 15, 1999
From: Thomas J. Weseloh, North Coast Manager, California Trout
Subject: 1998 Mattole River Summer Steelhead Survey Summary

The 1998 Mattole River Summer Steelhead Surveys took place August 12 through August 27, representing the third consecutive year of direct observation counts on the Mattole. The purpose of this survey is to enumerate summer steelhead and identify their preferred holding habitat on the Mattole River. Snorkel observations were conducted on designated reaches and spot-check locations with the help of twelve surveyors. Observations of steelhead were recorded by size class; steelhead over sixteen inches fork length are adult fish, and steelhead from twelve to sixteen inches are half-pounders. A total of forty-four (44) adults and eighty-five (85) half-pounders were observed over approximately forty-five miles surveyed (Table 1).

This report includes information on stream and air temperatures, survey reaches, distances, personnel, and future recommendations. Further observations were recorded for presence of juvenile salmonids, as well as other species present on the Mattole River. This type of information can be useful in determining the needs and habits of local riverine fauna, and establish land use practices that promote stewardship and conservation.

The Mattole River watershed includes some of the most remote and wild areas of California's remarkable coast. The local climate is distinguished by stormy, wet winters with average basinwide precipitation of 185cm (Busby et al. 1988), and hot, dry summers -- these conditions play a large role in determining the establishment and distribution of vegetation and animal life throughout the basin (Day 1996). The human population is scattered throughout the ridges and valleys of the watershed, with diverse livelihoods and interests. 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, remain incomplete. Monitoring projects like the summer steelhead survey provide meaningful biological information to fill existing gaps. 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.

This survey was made possible through the cooperative efforts of the Mattole Salmon Group, California Trout, AmeriCorps Watershed Stewards Project, and the Humboldt Fish Action Council.

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Table 1. Distribution of summer steelhead, juvenile coho, juvenile chinook, and western pond turtle observations from headwaters to mouth of mainstem Mattole.

REACH	ADULTS	HALF-LBS	COHO	CHINOOK	TURTLES
1	0	3	Yes	Yes	No
2	0	0	Yes	Yes	No
3	0	0	Yes	Yes	No
4	5	1	Yes	No	No
5	9	21	Yes	No	Yes
6	7	9	Yes*	No	No
7	1	3	No	No	No
8	4	2	No	No	Yes
9	0	0	No	No	No
10	5	20	No	No	Yes
11	0	0	No	No	Yes
12	1	0	No	No	No
13	1	2	No	No	Yes
14	8	12	No	No	No
15	3	12	No	No	No
16	0	0	No	No**	No
Total	44	85	--	--	--

Note: Reach eleven was not surveyed in 1997 due to access denial by property owner. However, access was allowed in time for 1998 summer steelhead dive.

*Juvenile coho were observed only as far down as the mouth of McKee Ck. in 1997, and sighted more than five miles further downstream in 1998. Also, NMFS coho divers Jason Johnson and Trevor Lucas checked rivermiles 41-27, Bear Ck. and Honeydew Ck., in 7/98 — zero summer steelhead were observed.

**Juvenile chinook were found in the lagoon in 1997 for the first time in ten years. Also, the 1998 survey counted only a few hundred juvenile steelhead in the lagoon, compared with more than ten thousand juveniles observed every year for the past decade.

Discussion

As indicated in previous summer steelhead reports, cold water refugia appears 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 on the lower, warmer reaches. Seeps, springs, and cold pools were observed throughout the basin, often isolated by stretches of high temperature waters between them. The available deep pools were stratified and noticeably cooler at the bottom. However, it is not known how these pools change through time, nor the duration or accessability values which may be important for adult steelhead over summer. One study revealed that channel structure features, such as gravel bars encroaching into pools, strongly influenced the development of stratified pools

(Nielsen et al. 1994). The same study also described stratification as a result of pool scour from winter flows that remained relatively unmixed through summer. The authors suggest a long-term temporal scale is necessary to understand and analyze the geomorphic conditions leading to the formation of stratified pools, and the role such pools may play in fish communities that experience marginal habitat conditions due to thermal stress. Use of stratified summer pools by adult summer steelhead populations has not been detected in more northern rivers, which tend to maintain sufficiently cool summer flows. However, the Mattole summer steelhead population is subject to high ambient stream temperatures and low summer flows, which may result in high metabolic demands to survive thermal stress. For juvenile steelhead, temperatures ranging from 68 - 75 degrees ferenheit can lead to growth suppression and early mortality (Brett 1979). The energy required to deal with thermal stress must be diverted from other important processes such as growth and reproduction, and it seems likely that high summer temperatures limit the range of salmonids in California (Bennett 1987).

In addition, the estuary's role in steelhead and salmon survival strategies deserves further examination. Life history patterns which include estuarine residency have been detected in a significant portion of the Mattole steelhead run. Otolith analysis from steelhead indicated fish with less growth in freshwater had a large increase in growth from the onset of estuarine residency to ocean entry (Day 1996). Juvenile steelhead residing in the estuary before marine entry (57% of 4-year olds) were initially smaller than stream reared cohorts. However, estuary reared fish entered the ocean 1.4 cm larger due to 40% relative growth observed while in the estuary. As river mouth closures vary on an annual basis, the length of estuary residence depends on existing physical factors within and affecting the estuary. Previous snorkel surveys showed that while fish remained for several weeks when the river mouth was open, spontaneous emigrations would occur *en masse*, leaving the estuary devoid of juvenile fish (Day 1996). This may explain the low numbers of juvenile steelhead observed in this season's summer steelhead dive (see Table 1**).

Other Sightings: juvenile steelhead, chinook, coho and coastal cutthroat trout; yellow-legged frog; bullfrog; three-spined stickleback; lamprey (live individuals and carcasses); crayfish; merganser; blue heron; green heron; spotted sandpiper; swallow; elegant tern; snowy plover; American dipper; rough-skinned newt; pacific giant salamander; egret; garter snake; yellow racer; osprey; leech; kingfisher; freshwater clam; black-tailed deer; wood duck; and humans.

Garbage: less garbage observed throughout the basin, as storm events of 1997 flushed the system

Human Encounters: groups of up to ten swimmers were scattered about reaches five and seven, mostly unaware they shared holes with sometimes hundreds of juvenile steelhead (ranging in size from three to ten inches). Party of three fisher people encountered at Squaw Bridge on reach twelve, and two more just downstream at the A.W. Way hole. Fishing line and hooks found upstream of Indian Ck. (reach thirteen) and downstream of Conklin Ck. (reach fourteen).

Habitat: Channel aggradation was observed in upper reaches, as well as degradation resulting in new or deeper pools. Coho juveniles found in upper reaches of the mainstem Mattole were distributed among microcosms of complex habitat that included large wood, undercut banks, overhanging vegetation, boulders, and cool water temperatures. In trying to conserve and restore habitat for the survival of this endangered species, the importance of complexity as described above cannot be overemphasized.

Recommendations:

- Halt fishing to protect summer steelhead, cutthroat, and stressed trout during periods of high temperature (over 70 degrees Farenheit).
- Continue attempts to retain large woody debris and provide complex habitat. Make repairs to aging structures so their intended results might be attained.
- Compare collected temperature data with hobo temperature data, and overlay these with fish distributions.
- Evaluate the relative importance of physical factors leading to stratification in different stream reaches.
- Reestablish riparian forest in effort to provide shade and cooler temperatures, and provide source of debris for shaping complex instream habitat.
- Catalog all water withdrawals and their locations. During hot summer months, with base flows <19cfs, water removal may affect water temperatures and negatively impact salmonids.
- Follow up identified research needs from Nielsen et al. (1994) and Day (1996).
- 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.
- Engage six local schools in projects to remove garbage in ten river miles each.

Table 2. Description of reaches, including beginning and ending points, and total mileage; dive personnel for 1998

Dive Reaches, Personnel, and Mileage		
1	Phillips to Big Alder (6 pools) — Maureen Roche*, Albert Dunlap*	2.6
2	Lost River to Gibson Ck. — Pat Moorhouse*, Albert Dunlap*	2.0
3	Thompson Ck. (6 pools, plus dammed lake) — P. Moorhouse*, A. Dunlap*	0.3
4	McKee Ck. to Raintree — Tom Weseloh*, Colum Coyne*	1.8
5	Raintree to Eubanks Ck. — M. Roche*, Garth Hodgson	3.3
6	Eubanks Ck. to Bear Ck. — C. Coyne*, T. Weseloh*	4.9
7	Bear Ck. to Mattole Canyon Ck. — M. Roche*, Danny Gainok*	3.4
8	Honeydew Slide to Woods Ck. — T. Weseloh*, P. Moorhouse*	2.9
9	Lower Honeydew Ck. to Honeydew Bridge — M. Roche*	1.0
10	Woods Ck. to Triple Junction High School — M. Roche*, D. Gainok*	3.4
11	Cook Ck. to Squaw Ck. — Deva Taylor*, Jeremy Wheeler*	4.6
12	Squaw Ck. to Lindley Bridge — D. Taylor*, J. Wheeler*	2.4
13	Lindley Bridge to Conklin Ck. — D. Taylor*, Michelle Warner	4.5
14	Conklin Ck. to Hideaway Bridge — M. Roche*	2.8
15	Hideaway Bridge to Rex's — M. Roche*, Sandy Antonson	2.0
16	Rex's to Ocean — M. Roche*, Tom Dietrich	3.0
Total	Mattole Summer Steelhead Survey	44.9 miles

*Denotes prior summer steelhead diving experience.

Table 3. Stream and ambient temperatures recorded on survey dates.

Stream and Ambient Temperatures*

Date	Location	Reach	Time	Tributary	Mattole R.	Air
8/12/98	Upstream Lost R. hut	1	1130	--	60	76
	Dream stream	1	1600	58	62	--
	Arcanum Ck.	1	1630	56	62	--
	Bearpaw Ck.	1	1700	60	62	--
	Phillips Ck.	1	1730	60	62	--
8/13/98	preschool	2	1045	--	61	71
8/13/98	Thompson Ck.	3	1300	64	--	--
8/12/98	McKee Ck.	4	1225	59	65	89
	Bridge Ck.	4	--	64	68	--
	Raintree	4	1625	--	72	--
8/15/98	Crook's	5	1130	--	68	74
	first 20' pool, l. trib	5	1230	58	68	--
	Nooning Ck.	5	1350	60	70	--
	r. trib.	5	1400	60	70	--
	l. trib.	5	1410	58	72	--
	l. trib.	5	1415	58	72	--
	Eubanks	5	1930	dry	72	--
8/13/98	Big Finley	6	1145	61	69	--
	Little Finley	6	1330	67	70	--
	Ladybug Ck.	6	1530	61	77	--
	Grasshopper Ck.	6	1630	71	--	--
	Blue Slide	7	1500	--	74	--
	Mattole Canyon Ck.	7	1815	dry	--	--
8/14/98	trib. u. of slide	8	1130	61	73	--
8/14/98	trib. d. of slide	8	1130	74	73	--
	N. Fork Mattole	8	1500	77	83	--

Stream and Ambient Temperatures*

Date	Location	Reach	Time	Tributary	Mattole R.	Air
8/18/98	Honeydew Ck.	9	1200	74	74	74
	lower Honeydew Ck.	9	1400	76	--	--
8/14/98	Woods Ck.	10	1030	64	71	75
	Blue Goo slide	10	1230	dry	--	--
	Kendall Ck.	10	1300	64	--	--
	Danisch Ck.	10	1315	64	78	--
	Triple Junction High	10	1445	--	79	87
8/21/98	Squaw Ck.	12	1050	59	65	--
	A.W. Way pool	12	1055	64	--	--
	A.W. Way pool #2	12	1055	58	--	--
	trib. At diving board	12	1055	55	69	--
	Lindley bridge	12	1355	--	70	--
	Conklin Ck.	14	1100	70	70	70
	backwater	14	1230	64	74	--
	Clear Ck.	14	1430	60	74	--
8/27/98	Hideaway Bridge	15	1200	--	68	72
	lower North Fork	15	1230	72	74	--
	Titus	15	1330	58	72	--
	Mill Ck.	15	1500	60	72	--
	Stansberry Ck.	15	1735	--	74	--
8/24/98	Stansberry Ck.	16	1135	58	64	68
	Collins	16	1400	60	74	--
	n. bay of lagoon	16	1530	--	68	--

*All temperatures given in degrees fahrenheit; no temperatures collected for reaches eleven and thirteen.

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