

Final Report
Spawning Ground Surveys, 2010-2011
Season
Mattole River Watershed



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Final Report

Spawning Ground Surveys, 2010-2011 Season, Mattole River Watershed

Abstract

The Mattole Salmon Group (MSG) has conducted annual spawning ground surveys in selected mainstem and tributary reaches in the Mattole River watershed for 30 consecutive seasons, from 1981-82 through 2010-2011. Data are used to track long-term trends in escapement and spawner distribution for fall-run Chinook Salmon (*Oncorhynchus tshawytscha*) and Coho Salmon (*O. kisutch*). Some data are incidentally collected on Steelhead (*O. mykiss*). The 2010-2011 spawning ground surveys covered 71.38 miles of mainstem and tributary habitat with an accumulated total of 177.93 miles surveyed due to repeat surveys in some reaches. This included coverage of approximately 71.7% of the total available habitat in the mainstem (46.61 surveyed miles of the approximately 65 total river miles). The definition of available habitat was based on past survey observations and correlates well with GIS and IP modeling. The percentage of tributary habitat surveyed was lower than the mainstem; total available tributary habitat is less well defined due to more stringent property access restrictions. The 2010-11 spawner season was characterized by a very early mouth opening followed by a month of no rain. From late October through December there were numerous closely spaced, short rainfall events of average storm intensity. This resulted in relatively steady and moderate stream flows, particularly during the middle of the season which limited opportunities for surveys of the middle and lower mainstem as well as lower-river tributaries. Surveys began on October 18, 2010 and continued intermittently as weather allowed through the last survey on January 28, 2011.

Relative to the past 16 years, the Mattole had a diminished Chinook Salmon run during the 2010-11 season. The number of observed redds and live fish was lower than average and the Escapement Index was the third lowest for that period. Coho Salmon escapement appeared increased relative to the 2009-2010 season but not relative to 2008-09 and was near the lowest point of the past 16 years.

Introduction

The 2010-11 season marked the 30th consecutive year of spawning ground surveys in the Mattole River watershed. These surveys provide data on the distribution and relative abundance of live salmon spawners, carcasses, and redds (spawning nests) in key tributaries and selected mainstem reaches.

Surveys are conducted by a resident network of trained volunteers and paid personnel by wading, canoeing or snorkeling specified stream segments one or more times during the salmon spawning season. Surveys are generally conducted from November through late January. Data are used as an indicator of changes or trends in salmon escapement, and for evaluation of progress towards restoration goals. For further background information on the program and its past data as well as data analysis techniques, please refer to the *State of the Salmon* report section on spawning surveys (Mattole Salmon Group 2005).

Methods

Protocols

The MSG protocol for conducting spawning ground surveys in the Mattole has remained consistent from the 1985-86 season to the present. This protocol consists of selection of reaches to be surveyed and field procedures such as how redds are measured and recorded, etc. In the fall of 1997, a detailed, 14-page training manual and new data forms that facilitated the recording of information in the field were developed. Minor updates to the manual and field forms were done in November 1998, 2003, 2008 and 2009 (Peterson and Thompson 2009).

During the 2010-11 season, MSG also conducted surveys utilizing the California Department of Fish and Game (DFG) Mattole Sampling Frame Design (Garwood and Ricker 2008) and GRTS random draw for reach selection as well as the DFG protocol for field procedures (Gallagher et al. 2007).

Training

Surveyors are trained in fish identification techniques and carcass handling using a salmon carcass (when available) as well as photos and videos of live fish, redds and carcasses from past survey seasons. For the 2010-11 season, training was led by DFG Associate Biologist Seth Ricker on November 6, 2010 focusing on the use of the DFG protocol as well as fish identification, field safety, etc. As in past years, on-the-job field training and quality control consisted of experienced surveyors accompanying new participants for at least the first few outings of the season or until they demonstrated proficiency. As soon as possible after each survey, MSG Project Coordinator Campbell Thompson reviewed data sheets and debriefed surveyors in order to clarify and correct the survey forms as necessary. After data entry, Campbell Thompson thoroughly checked each entry for errors. In addition, a more formal Quality Assurance Plan was prepared (Ricker and Thompson 2010) and approved by the DFG Contract Manager Trevor Tollefson.

Data

All survey forms, maps, photographs, scale samples and ancillary information are kept on file by the MSG. These materials are available for review by contacting the MSG Project Coordinator. For the 2010-11 season, all these materials are also provided to DFG. Mattole Salmon Group (2005) consolidated and analyzed the 1994-2004 Microsoft Word survey data. Much of past spawning survey data are digitized as layers in a Geographic Information System (GIS) maintained by the MSG. In addition, data from the 2010-11 season are entered into the California Monitoring Plan Aquatic Survey Program database which is an Access 2002-based relational database maintained by the DFG.

All unidentified observations were recorded as “unknown species.” All carcasses were examined for artificial marks and tags such as fin or maxillary clips, spaghetti tags, radio antennas, etc.

Data Analysis

In order to compare survey seasons with varying amounts of survey coverage (total miles surveyed) and survey effort (accumulated miles surveyed) MSG utilizes an “Escapement Index” (EI) that is the number of redds for a given species divided by the accumulated miles surveyed for a particular watershed unit in order to correct for variation in survey effort and a similar ratio using total miles to correct for variation in survey coverage (Mattole Salmon Group 2005). EI has

in the past always been rounded to one decimal place but last season's Coho Salmon EI was so low (0.008) it was necessary to shift to three decimal places in order for it to show at all.

Reaches Surveyed

For the 2010-11 adult run reaches to be surveyed were selected by two methods as outlined in the 2010-11 Spawning Survey Reach Plan (Thompson 2010) and approved by Trevor Tollefson. Half of the reaches to be surveyed were selected using the ongoing MSG method utilizing index reaches. Index reaches are reaches established by professional experience and then monitored annually to facilitate comparison between years. The other half of the reaches to be surveyed were selected using a Generalized Random Tessellation Stratified (GRTS) random draw from Garwood and Ricker (2008).

The 20 streams surveyed during the 2010-11 season are listed below. Note that some streams contained more than one survey reach. Streams are listed in order from the headwaters downstream. This is the usual order in which reaches are surveyed as that is the same order in which they clear up following a storm event. Maps of survey coverage are presented in Figures 3-5 in the Results section of this report.

Surveyed Streams:

Danny's Creek (river mile 58.4+2.2)
Yew Creek (river mile 58.4+0.15)
Lost River Creek (river mile 58.8)
Ancestor Creek (river mile 60.8+0.15)
Upper Mattole mainstem from Hulse Creek (river mile 60.5) to Metz Bridge (river mile 57.4)
Thompson Creek (river mile 58.4)
Baker Creek (river mile 57.6)
Upper Mill Creek (river mile 56.2)
Vanauken Creek (river mile 54.0)
McKee Creek (river mile 52.8)
Bridge Creek (river mile 52.1)
Mattole mainstem through Whitethorn (river mile 57.4 to 51.2)
South Fork of Bear Creek (river mile 42.8+6.0)
Mattole mainstem from Big Finley Creek (river mile 47.4) to Bear Creek (river mile 42.8)
Bear Creek mainstem (river mile 42.8+2.1)
Mattole mainstem from Bear Creek (river mile 42.8) to Honeydew Creek (river mile 26.5)
Sholes Creek (river mile 36.6)
Fourmile Creek (river mile 34.6)
Mattole mainstem from river mile 10.96 to Stansberry Creek (river mile 1.3)
East Mill Creek (river mile 5.4)

Surveys of a given reach were scheduled to maximize the observation of live fish, redds and carcasses. For a complete explanation of the factors involved and how this is accomplished please refer to Mattole Salmon Group (2005).

Personnel

Nineteen people were involved in the survey effort during the 2010-11 season. All the surveyors received training in the current protocols, including seven new surveyors. MSG's Project Coordinator for spawner surveys (Campbell Thompson) was involved in 54.15 miles of survey,

or about 30% of the total accumulated mileage. This is important for quality assurance and in-the-field training.

Results

Tabular summaries of the 2010-11 survey results are appended at the end of this report. Table 1 shows the individual survey reaches selected for the 2010-11 season and the dates they were surveyed. Tables of observation data were prepared separately for mainstem reaches (Tables 2-4), upper river tributaries (Tables 5-7) and lower river tributaries (Tables 8-10). Within each of these groups, there is a separate table for observations of live fish (Tables 2, 5 and 8), carcasses (Tables 3, 6 and 9), and redds (Tables 4, 7 and 10). A summary of the past seventeen years of Mattole spawning ground surveys is presented in Table 11. Table 12 contains the Escapement Index data for all the years of the summary table. Figure 1 is a chart of river discharge during the 2010-11 season and Figure 2 is a chart of river discharges during the spawning season comparing 2010-11 with flows for the past four seasons. Figures 3-5 are maps of the area and reaches surveyed in 2010-11. Figure 6 depicts survey effort and coverage for each season since 1994-95. Figures 7-9 show the total number of live fish, redds, and carcasses observed by species for all of the seasons since 1994-95. Figures 10-14 depict the Escapement Index for Chinook Salmon and Coho Salmon for four separate subbasins for all seasons since 1994-95.

Discharge and Run Timing

Survey timing during the 2010-11 season was roughly comparable to inventory efforts in past years with the exception of some early surveys (due to the early mouth opening) and some later surveys. From October 18, 2010 through January 28, 2011, a total of 82 surveys were conducted. Rainfall timing was earlier and higher during this season than recent years. Figure 1 shows the discharge in cubic feet per second (flow) in the Mattole mainstem at Ettersburg during the survey season. A graph comparing discharge this season with the previous four can be found in Figure 2. In 2010 the mouth of the river first opened on September 19 (roughly a month earlier than typical) and salmon began migrating into the river. There was no more rain until late October however, and the mouth re-closed on September 24. Surveys commenced on October 18, 2010 with great visibility in the lower river. It was immediately apparent from these early surveys that there were very few fish in the river from the brief early mouth opening. The live fish that had entered the river were trapped by low flows in mainstem pools downstream of Conklin Creek at river mile 7.8. No evidence of spawning was detected at this time. Following a second mouth opening on October 24 more fish entered the river and the rains continued allowing fish to migrate upstream.

Surveys in November were limited to tributaries and the middle and upper mainstem due to higher discharge and limited visibility. These surveys had very few detections. By early December with frequent rains continuing, many of the first wave of Chinook Salmon began to spawn in the upper mainstem and upper tributaries in the Whitethorn area (Tables 4, 7 and 10). However, while storm events were small and resulted in moderate flows, they were also frequent, resulting in insufficient time for the mainstem and downriver tributaries to clear up sufficiently for survey visibility. As a result, the amount of stream miles surveyed at least once this season went down compared to last season, while accumulated miles surveyed increased due to many repeat surveys in the headwaters reaches that did clear.

Figure 2 demonstrates that as usual, the rain stopped soon after New Years, and in early January a more complete survey series was done. Chinook Salmon continued to arrive in the headwaters in some numbers, as did the beginning of the Steelhead run, while Coho Salmon remained

notably few. Late January saw more sustained dry weather and lower flows. Due to the low numbers of Coho Salmon observations the decision was made to survey later than usual in hopes of detecting a late run of Coho Salmon. Surveyors at this time (late January) saw the lack of live fish typical of the end of the Chinook Salmon and Coho Salmon runs and the arrival in the headwaters of fresh Steelhead. The last survey took place on January 28, 2011. The extended survey season allowed unusually late surveys that observed many redds of unknown species and Steelhead redds.

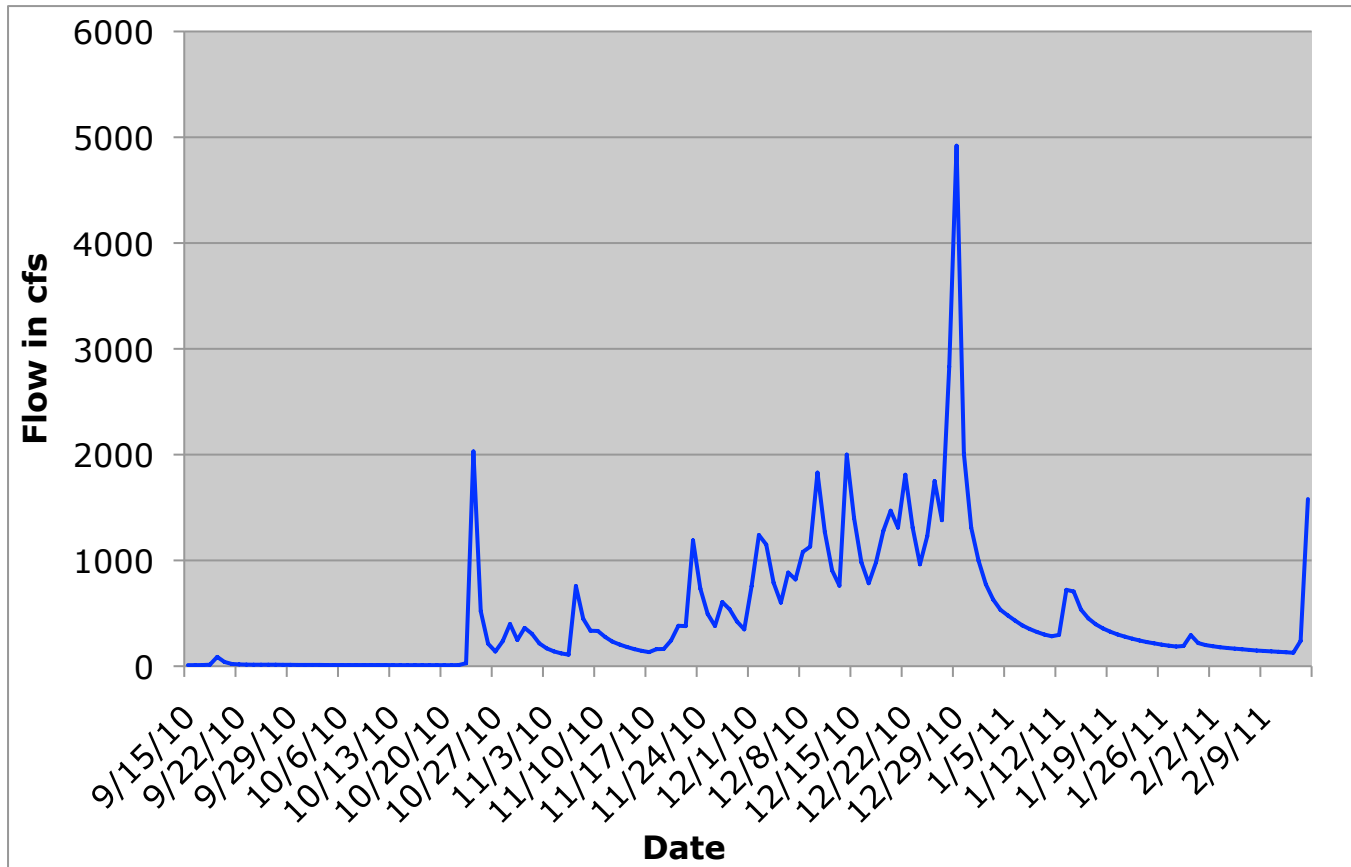


FIGURE 1: Mattole River mainstem discharge at Ettersburg during the 2010-11 MSG spawning survey season.

This data is daily mean discharge from an automatic gage operated by the U.S. Geological Survey located at the bridge in Ettersburg where the county road (Telegraph Ridge Rd./Wilder Ridge Rd.) crosses the Mattole River. Further information on the gage as well as water temperature and stage height can be found on the internet at:

http://waterdata.usgs.gov/nwis/uv?dd_cd=01%2C02%2C03&format=gif&period=30&site_no=11468900. Similar information is available for a USGS gage in Petrolia.

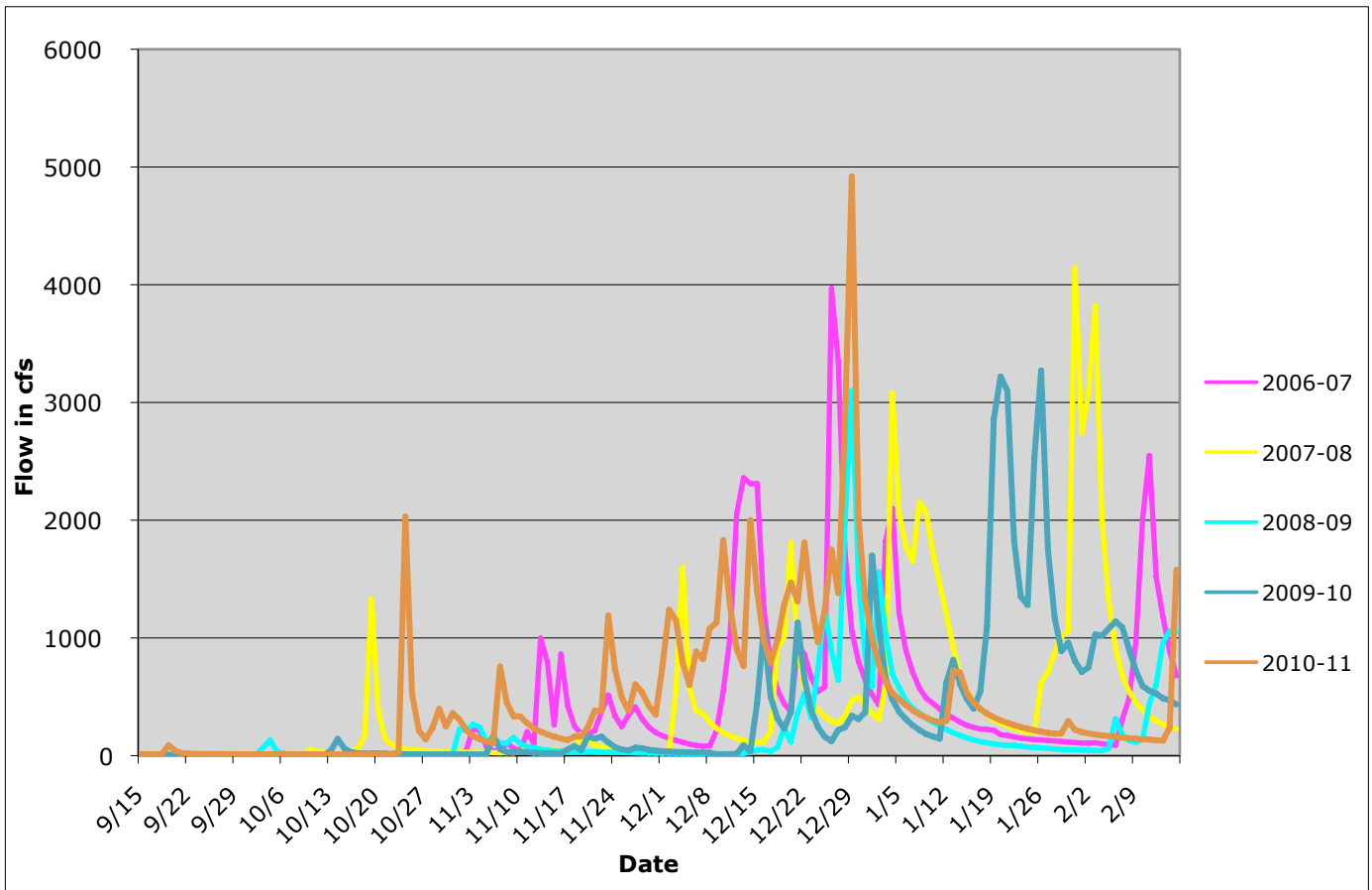


FIGURE 2: Comparison of Mattole River mainstem discharge at Ettersburg during the spawning season, 2006-07 through 2010-11.

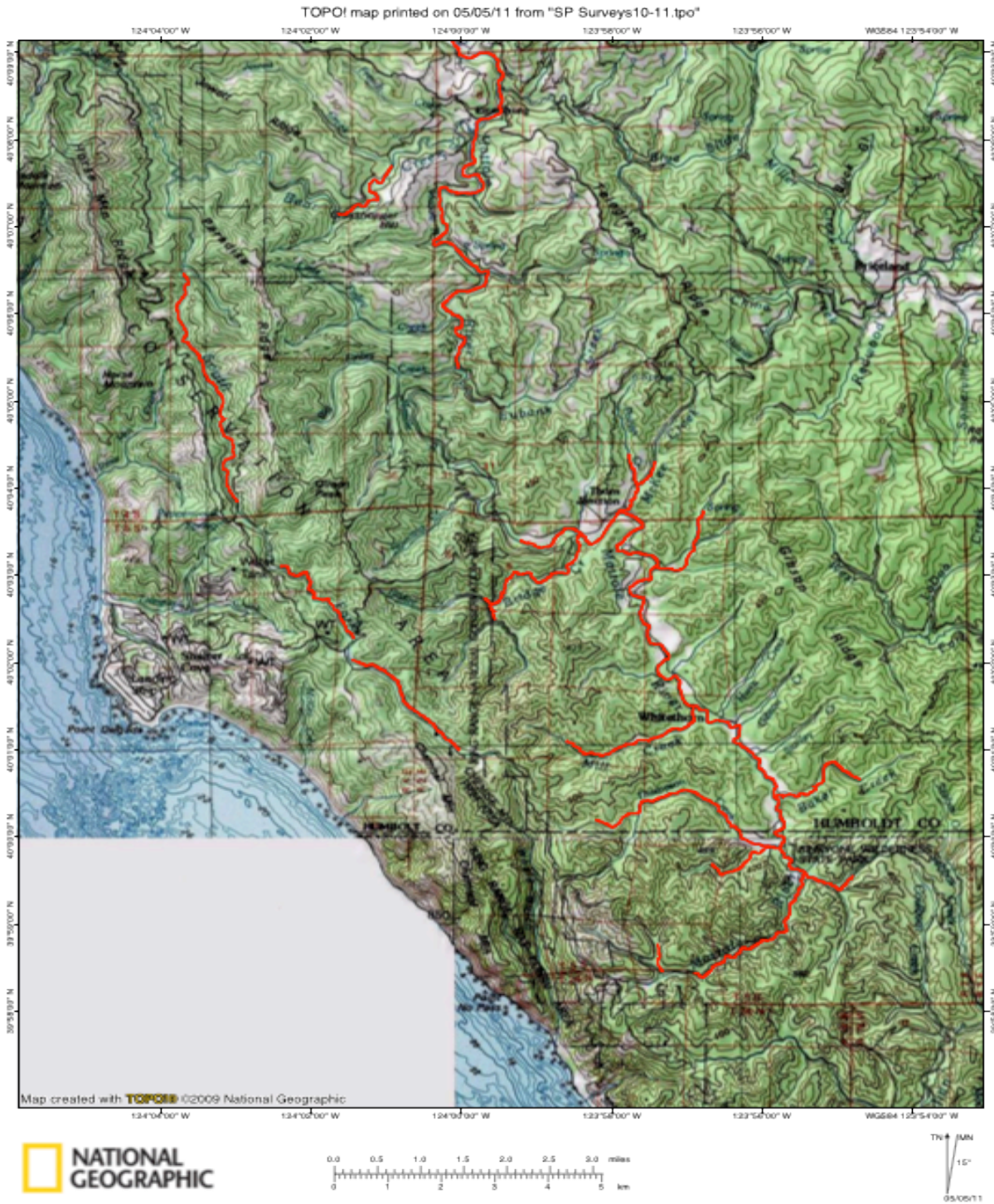


FIGURE 3: Map of surveyed reaches in upper Mattole River, 2010-11. Surveyed reaches are shown in red. Note that base map may be distorted due to formatting of document. Note also that Figure 3 is a different scale than Figs. 4 and 5.



FIGURE 4: Map of surveyed reaches in middle Mattole River, 2010-11. Surveyed reaches are shown in red. Note that base map may be distorted due to formatting of document. Note also that Figure 4 is a different scale than Figs. 3 and 5.

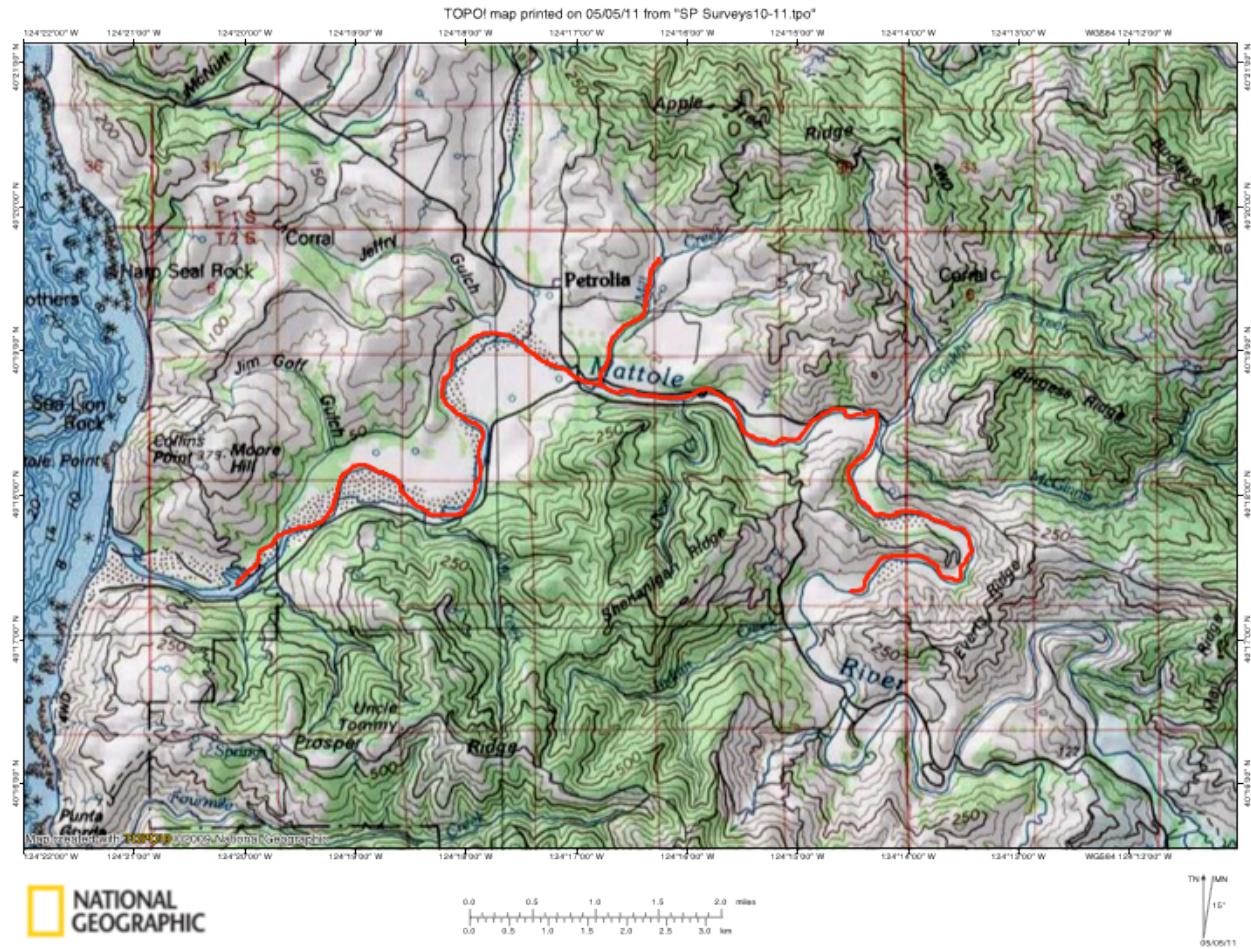


FIGURE 5: Map of surveyed reaches in lower Mattole River, 2010-11. Surveyed reaches are shown in red. Note that base map may be distorted due to formatting of document. Note also that Figure 5 is a different scale than Figs. 3 and 4.

Survey Effort

Figure 6 shows miles surveyed and accumulated miles from 1994 to 2011. During the 2010-11 season 71.38 miles of mainstem and tributary habitat were inventoried. Some reaches were covered two or more times, resulting in 177.93 accumulated miles of survey. In the mainstem Mattole, 46.61 miles were surveyed (104.82 accumulated miles), comprising about 71.7% of the entire mainstem length. In the tributaries, 24.77 miles were covered (73.11 accumulated miles) in 11 sub-basins containing historically productive salmon habitat. About 33.5% of the tributary coverage was focused on Bear Creek, the Mattole’s third-largest tributary.

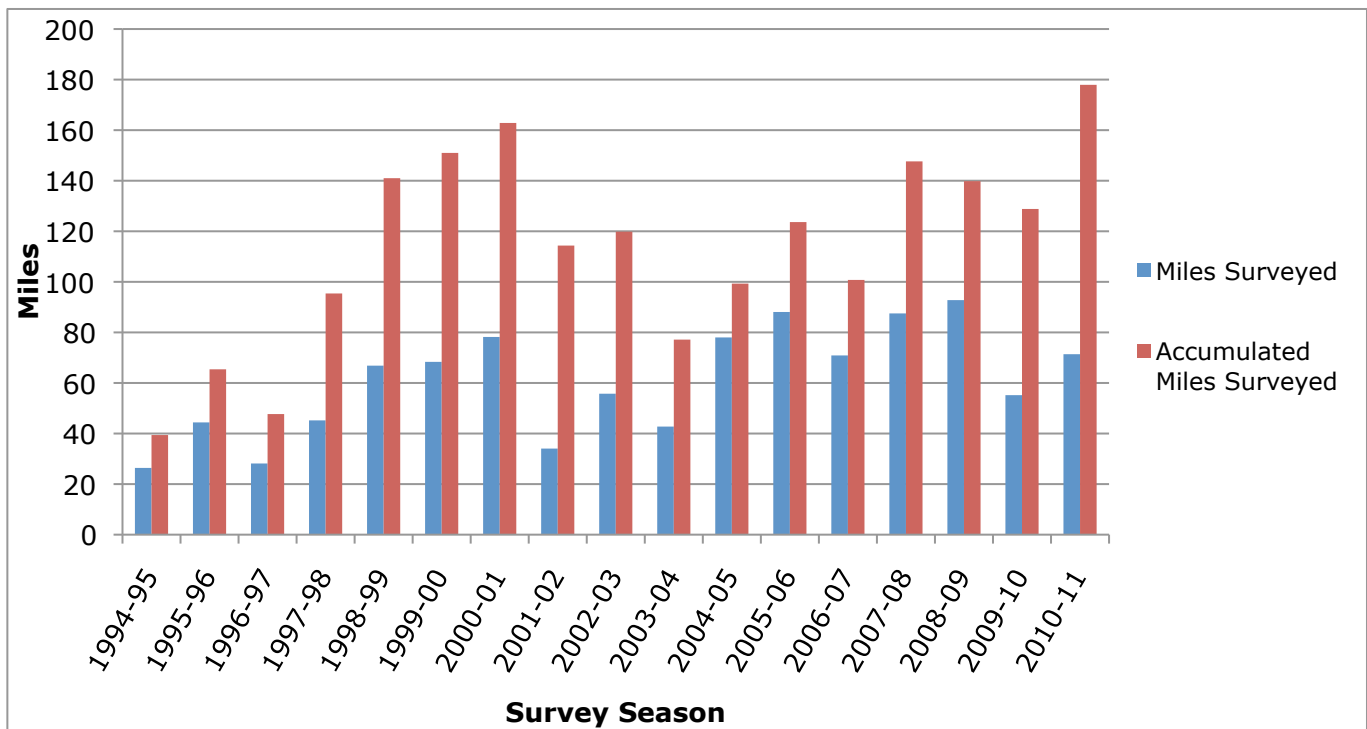


FIGURE 6: Survey effort and coverage for 1994-2011. The red bars show the accumulated miles surveyed each season (survey effort) and the blue bars show the miles of stream that were covered each season (survey coverage).

The 2010-11 accumulated mileage is higher than the accumulated mileage from all seasons in the past 16 years. The survey coverage is closer to the average over the past 16 years, but still higher than the average.

Observations of live fish and redds in the “unknown” species category were high relative to positive identifications of all species besides Chinook Salmon (Figures 7 and 8). “Unknown” species carcass observations were low (n=1, Figure 9). The number of “unknown” species category live fish observed rose, as did the observations of live Coho Salmon and Steelhead. Combined with the decrease in live Chinook Salmon observations these results suggest survey effort and location may have been the principal influence on live fish observations.

Live fish observations of Chinook Salmon were lower (75) during the 2010-11 season than any season since 1999-2000 (Figure 7). As previously mentioned, the season’s higher flows prevented extensive and repeated surveys of lower mainstem reaches during a period in which fish were trapped there by low flow.

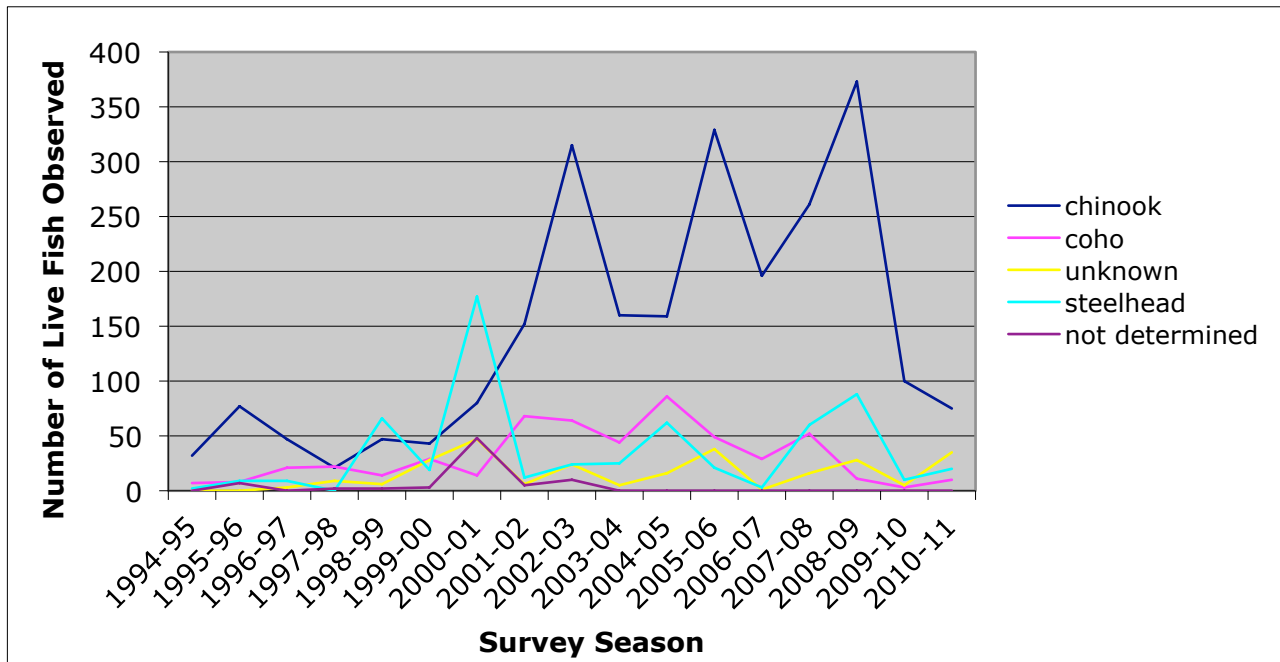


FIGURE 7: Observations of Live Adult Salmonids. Shown by species for all reaches combined from 1994-95 through 2010-11.

The number of redds observed this season (Figure 8) was higher than last season for all species except Steelhead. Unfortunately, for all species other than “unknown” there were fewer redds observed during the 2010-11 season than the average over the past fifteen years. Including the “unknown” redds, the total number of redds observed was still below the average despite the highest accumulated survey effort during the past 16 years. Coho Salmon in particular had fewer redds observed (5) than any year in the past 30 years of surveys with the exception of last season. Observations of “unknown” redds was high, particularly during the late-season surveys near the end of January.

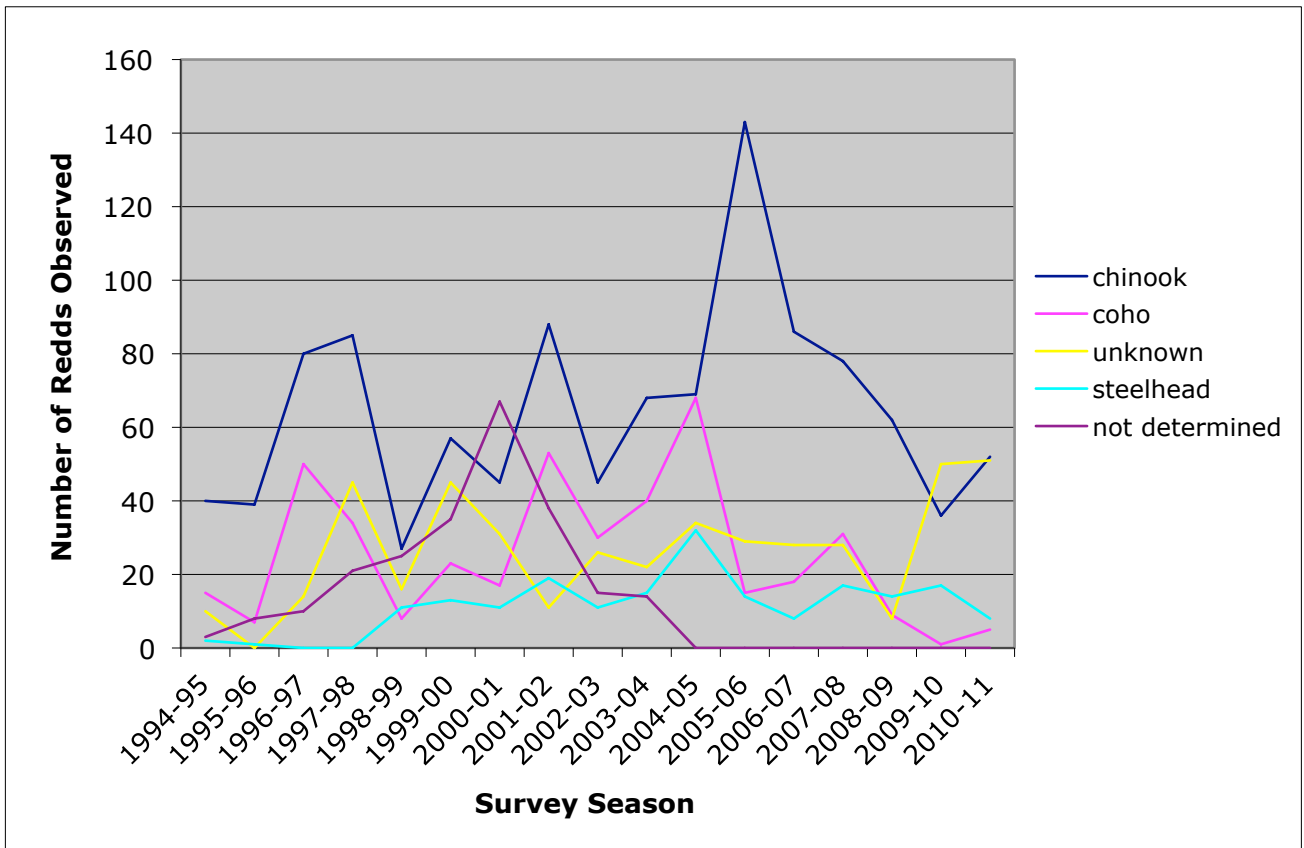


FIGURE 8: Observations of Redds. Shown by species for all reaches combined from 1994-95 through 2010-11.

Chinook Salmon carcass recoveries were higher (42) than the 16-year average (Figure 9). Carcass recoveries for all other species were low.

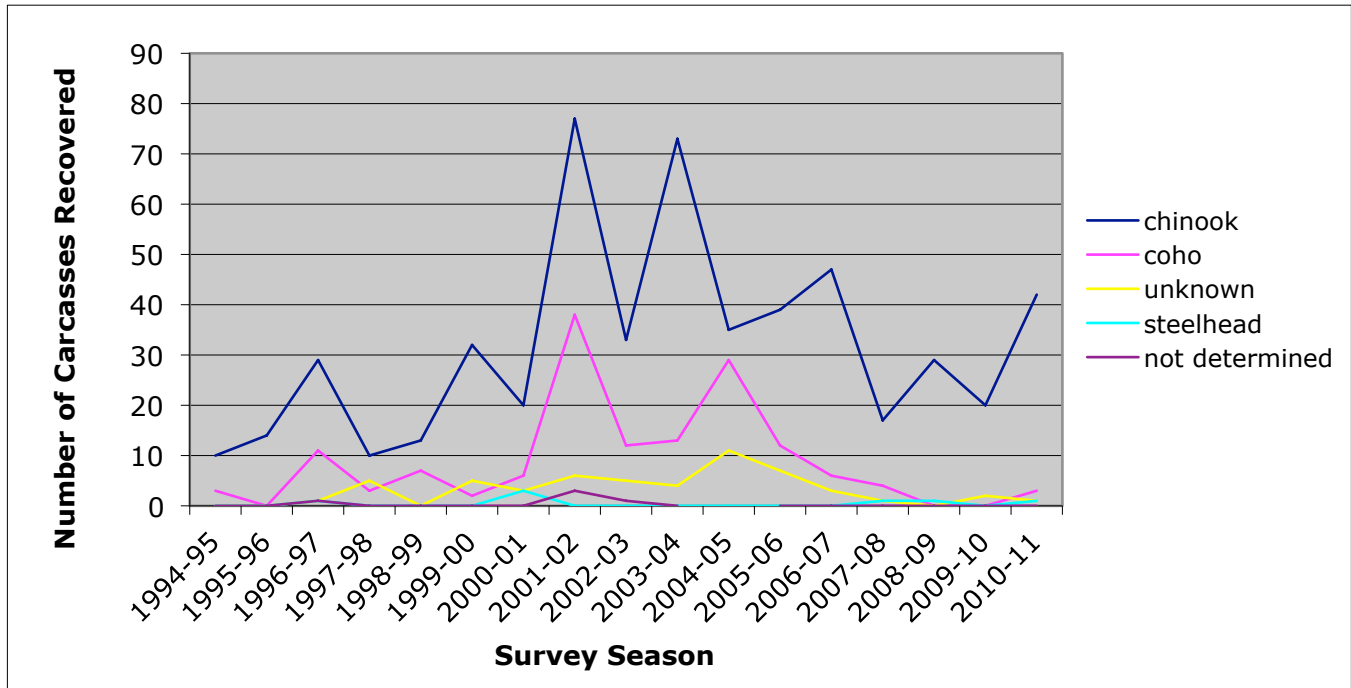


FIGURE 9: Observations of Carcasses. Shown by species for all reaches combined from 1994-95 through 2010-11.

The comparison between years using numbers of observations as in Figures 7, 8 and 9 is complicated not only by the difference between years in rainfall and flow timing but also by the fact that survey coverage and effort varies by season.

In the case of this season, using the EI for all reaches combined over the past 16 years (Figure 10), shows the Mattole Chinook Salmon run remained low relative to the past ten seasons and the Coho Salmon run was lower than all but one other year (2009-10) in these records. EI for Coho Salmon in all reaches combined was 0.028.

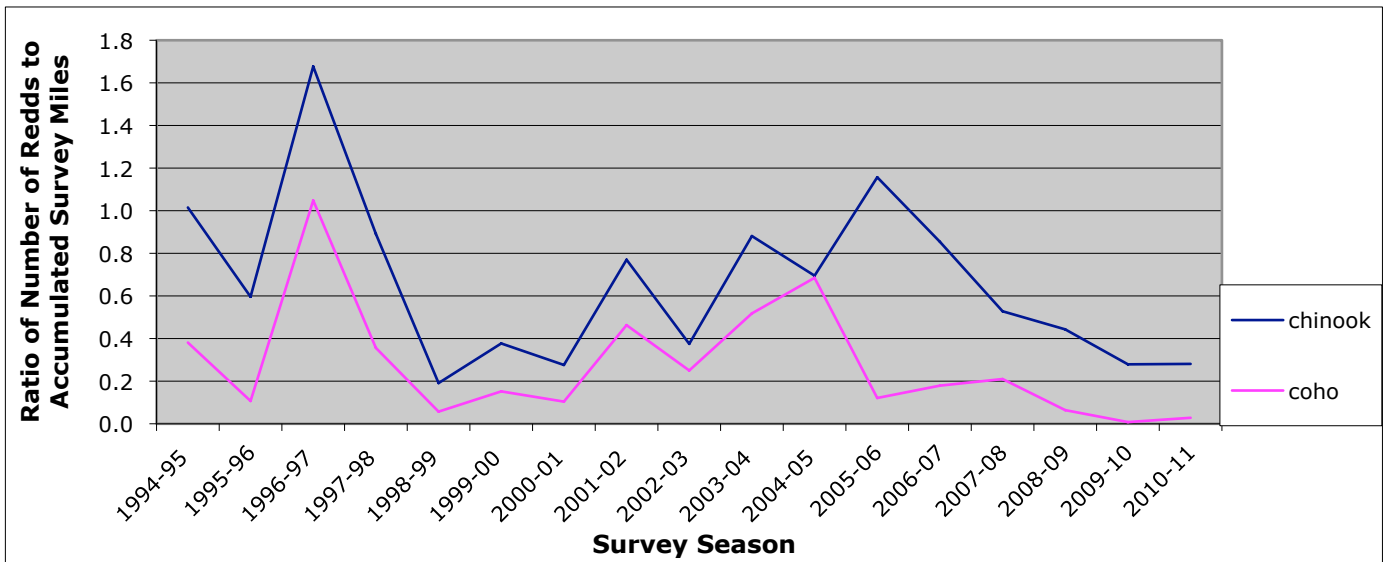


FIGURE 10: Escapement Index for all reaches combined. Shown by species for all reaches combined from 1994-95 through 2010-11. The EI is a comparison of number of redds observed corrected for amount of survey effort.

Figures 11 and 12 show increases in all the EIs for tributaries and the upper mainstem, with the exception of the Coho Salmon EI in the uppermost mainstem (Figure 12), which was zero this season and last.

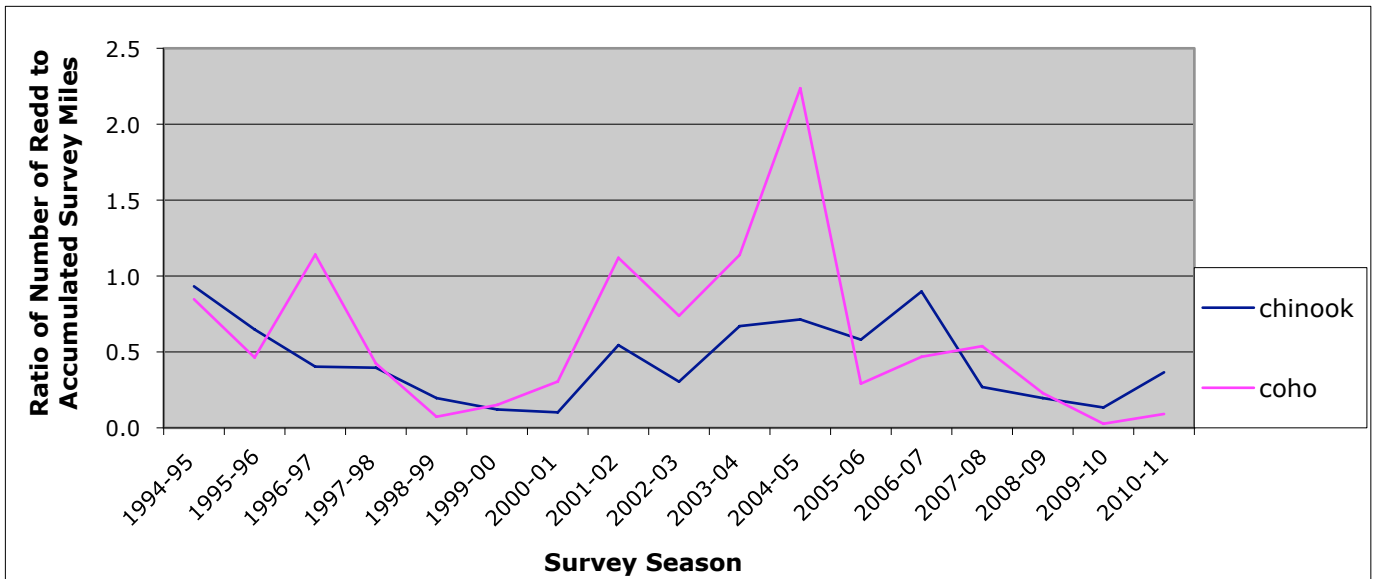


FIGURE 11: Escapement Index for all tributaries (except Bear Creek) combined. Shown by species for all tributary reaches (except Bear Cr.) combined from 1994-95 through 2010-11.

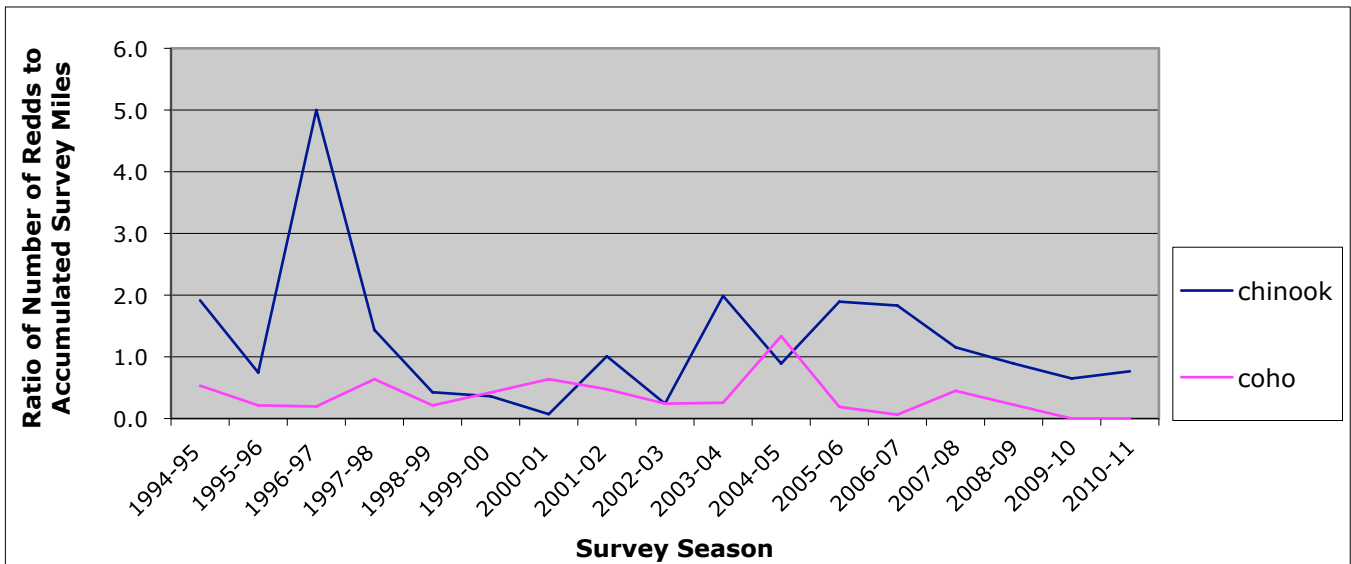


FIGURE 12: Escapement Index for uppermost mainstem Mattole River. Shown by species for all uppermost mainstem reaches (upstream of Metz bridge located at river mile 57.4) combined from 1994-95 through 2010-11.

Figure 13 showing the EI for Bear Creek indicates that there were no Coho Salmon redds observed in this large subbasin during the 2010-11 season despite repeated surveys. The decrease in Chinook Salmon EI for this season represents 2 redds, as opposed to one last season. This is an example of how increased survey effort can cause the EI to go down while observations go up. During the 2009-10 season there were an accumulated total of 6.38 miles of surveys in Bear Creek, while the 2010-11 season had an accumulated total of 18.44 miles surveyed.

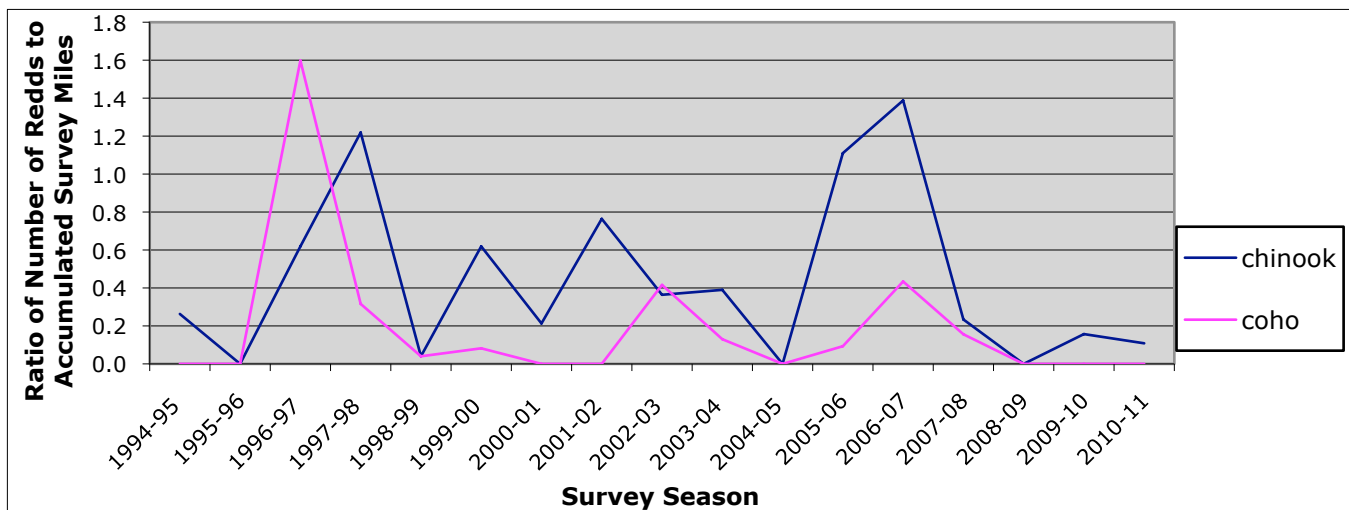


FIGURE 13: Escapement Index for Bear Creek. Shown by species for all seasons since 1994-95. Reaches were surveyed in all seasons.

There were no right maxillary or adipose fin clips recovered. MSG continues to look for these and other marks in order to detect any straying from watersheds outside the Mattole.

Discussion

The 2010-11 season had more frequent rains and higher flows than the past 4 years. This meant good opportunities for spawners to reach their choice of habitat unmolested by poachers and predators, and relatively few opportunities for surveyors to observe them outside of the headwaters reaches. Frequent small storms maintain higher flows which create poor visibility due to higher turbidities resulting from fine sediment transport. Poor visibility in the water prevents surveyors from observing salmon and evidence of spawning. The lower and middle reaches of the Mattole mainstem and most tributary reaches in the watershed downstream of Bear Creek require a week or more to clear up. The result is that frequent rains prevent surveys of these reaches. During 2010-11 this resulted in many of the longer reaches in the lower mainstem going unsurveyed throughout the season and thus lower total length surveyed. Many repeat surveys of short reaches in the upper watershed which clear in days after a rain increased the accumulated miles and number of surveys.

The availability of personnel and funding this season enabled many surveys to take place rapidly in the short breaks between storms. These factors also allowed the extension of the survey season to include late January, which also contributed to increasing accumulated mileage and the number of surveys. Overall, survey effort was better than ever in the reaches that were surveyable this season, which were the upper mainstem and upriver tributaries, while some lower-river reaches went unsurveyed.

The frequent repeat surveys with small intervening flow events allowed improved carcass recovery by limiting the role of very high flows in removing carcasses from reaches before they could be recovered as well as minimizing the number of carcasses not observed due to predation or decomposition during the periods between surveys.

“UNKNOWN” SPECIES

The high number of “unknown” live fish and redds observed reflects the difficulty of positively separating Coho Salmon and Steelhead observations in these two categories under field conditions. Coho Salmon and Steelhead tend to be more visible in smaller streams than in the mainstem, due to their higher likelihood of being actively spawning in these habitats. They are more likely to be migrating or holding in the mainstem, behaviors during which both Coho Salmon and Steelhead are much more stealthy than Chinook Salmon. As a result, increased survey effort in tributaries relative to the mainstem tends to increase the number of “unknown” live fish and redds observed while decreasing the observations of live Chinook Salmon, which are easily observed and identified in the mainstem. There may also have been more Steelhead and Coho Salmon present in the surveyed area this season. The number of “unknown” redds in particular was considerable due to the difficulty in identifying an unoccupied redd to species, particularly where Coho Salmon and Steelhead are concerned since they have relatively more overlap in their redd characteristics, timing and habitat selection than Chinook Salmon. Hence, the surveys during the later part of the season (when the Steelhead arrive in larger numbers) resulted in unusually high numbers of “unknown” species redds. It is notable that the number of “unknown” and Coho Salmon redd observations rose while Steelhead observations fell, suggesting that part of the increase in “unknown” redds may have been Steelhead redds attributed to “unknown”.

The low number of “unknown” carcasses reflects the relative ease of positively identifying carcasses.

STEELHEAD

Unfortunately, despite the Steelhead’s status as a Federally listed threatened species here in the Mattole, funding has not been available for continuing the spawner survey program from January until April or June. Thus, spawning surveys do not occur during the majority of the Steelhead run which typically begins in earnest in January and has been observed to continue as late as June 22 in wet years. As a result, data on spawning of Steelhead in the Mattole is incomplete and cannot effectively represent the species’ population size, trends or geographic location and extent.

COHO SALMON

Despite the possibility of missed observations, which is true for all species and in almost every year, the data collected show that the adult Coho Salmon run was significantly depressed during 2010-11. Compared to the record since 1980, Coho Salmon observations were lower than in any prior year except 2009-10. Higher flows during the 2010-11 season focused survey effort in the upper mainstem and tributaries where almost all Coho Salmon spawning observations have historically occurred. In addition, the extension of the survey season to late January decreased the likelihood of late spawning activity being missed. As a result, the low number of Coho Salmon redds observed during the 2010-11 season is likely the result of a low escapement rather than an artifact of survey conditions and effort. Observations of live fish and carcass recoveries were also very low. This was also likely due to very low escapement of Coho Salmon.

Coho Salmon spawning activity was concentrated in two upper tributaries despite a lack of limitations to migration posed by low flows. The only observed Coho Salmon redds were located in the Thompson Creek subbasin (river mile 58.4) and the McKee Creek subbasin (river mile 52.8). The Thompson Creek subbasin is usually responsible for more Coho Salmon redd observations than all other subbasins combined. This was true during the 2010-11 season as well. The McKee Creek subbasin has historically had observations of Coho Salmon redds but not live adults or carcasses, raising questions about the accuracy of the species determination of Coho Salmon redds in McKee Creek.

The 2010-11 adult Coho Salmon run was primarily the progeny of the 2007-08 spawning season, which by most measures was high compared to the past 6 years (see Figures 7-8 and 10-12 above). Analysis of scales from returned Coho Salmon adults in the Mattole has consistently shown that the vast majority of returning adults are three years of age. Hence, adult returns in 2010-11 were primarily derived from the juveniles that reared in the summer of 2008. This would seem to indicate that the 2010-11 escapement should have been strong. In addition, 2009 was considered a year of relatively good ocean conditions for juvenile salmonids. This was expected to result in improved Coho Salmon returns in 2010-11. The very small observed increase in Coho Salmon escapement during the 2010-11 season disappointed this expectation however.

The majority of good-quality Coho Salmon juvenile oversummer rearing habitat in the Mattole is located in the headwaters and upper tributaries, also referred to as the Southern subbasin (California Department of Fish & Game 2004; Downie 2003). During the summer of most years, many reaches in that area dry up or experience very low flows, resulting in the death of most of the season’s juvenile Coho Salmon. 2008 was a below-average summer relative to the past 9 years of summer flows (T. McKee, pers. comm. 2011). Additionally, there is increasing scientific literature documenting the importance of overwintering freshwater habitat for juvenile Coho

Salmon and documenting a relative lack of this habitat in streams today. This suggests ocean conditions may have played a smaller role in driving Mattole Coho Salmon populations than instream habitat for this cohort. However, this data set alone cannot determine factors driving escapement.

CHINOOK SALMON

For Chinook Salmon, there was a noticeable decrease in observations of live fish, while observations of redds and carcasses increased from last season. This change was particularly noticeable for live fish observations, which were at the highest level for the entire period since 1994 in 2008-09. This would appear to indicate that the escapement was low, however, this is countered by the increased observations of redds and carcasses. The reaches of the mainstem between Honeydew Creek (river mile 26.5) and river mile 10.6 went unsurveyed this season due to higher flows and these reaches typically produce significant numbers of live Chinook Salmon observations. In many years trapping of fish in pools of the lower mainstem at low flow occurs early in the spawning season and allows thorough observation of species composition and individual size, but can also result in extensive repeat observations of individual fish, thus artificially inflating the live fish observations. This is particularly true for Chinook Salmon because they are typically the prevalent species present during this period and the most easily observed under these conditions due to their large size and schooling behavior which prevents effective concealment.

The observed increase in Chinook Salmon redd observations and carcass recoveries is in opposition to the decrease in live Chinook Salmon observations. The increase in carcass recoveries most likely resulted from improved survey coverage for carcass observations. The increase in redd observations could have resulted from the increased survey effort or an increase in escapement or both. Using the EI to account for the survey effort and survey coverage however suggests that the escapement was up slightly. Redds are generally the most reliable observations for estimating escapement since they have a longer period of time in which they are observable and do not change location once constructed, eliminating multiple counting of the same redd. Additionally, given the fact that carcass observations were much higher compared to recent years despite only moderately better conditions for their recovery, it is likely that Chinook Salmon escapement was higher in 2010-11 than in 2009-10 but still lower than recent years. Comparison to the entire period since 1994 indicates that this escapement was similar to that observed in the late 1990s and that survey coverage was also similar this season to that in the late 1990s. On the whole, the 2010-11 Chinook Salmon escapement, while not as low as Coho Salmon escapement, was close to the average since 1994, and certainly disappointing relative to the mid-2000s.

Analysis of scales from returned Chinook Salmon adults in the Mattole has shown that the large majority of adult returns are three years of age, but some fish return at four years of age. Hence, adult returns in 2010-11 were primarily derived from the juveniles that hatched and reared in the spring and summer of 2008. Referring to the above Figures (7-13) indicates that the 2007-08 Chinook Salmon escapement was relatively average. As discussed above for Coho Salmon, the summer flows of 2008 resulted in conditions which did not allow many Chinook Salmon juveniles to rear over the summer in the river that year. Juveniles which rear oversummer in fresh water achieve larger size before entering the ocean which can be expected to increase their survival at sea and resulting return to spawn in 2010-11. However, this juvenile life history is less dominant in Chinook Salmon than in Coho Salmon, so that the majority of Chinook Salmon young-of-the-year went to sea in Spring of 2008. Ocean conditions during the summers of 2008 and 2009 were considered good for juvenile Chinook Salmon which seems to have played a

decisive role in shaping the Mattole Chinook Salmon escapement in 2010-11. This is to be expected in a species that has relatively little reliance on freshwater juvenile rearing.

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Table 1: Survey Coverage

Protocol	Reach ID	Reach Name	Dates Surveyed					
DFG	295	Mainstem - Sholes to Middle	1/11/11	1/28/11				
	570	Upper North Fork - Rattlesnake Cr.						
	310	Mainstem - Lost River to Big Jackson	11/24/10	11/30/10	12/12/10	12/23/10	1/4/11	1/17/11
	819	Bear Cr. - Jewett Cr. upstream	1/28/11					
	275	Mainstem - Hideaway to Lower Mill Cr	10/20/10					
	733	Sholes Cr.	1/10/11	1/27/11				
	425	East Mill Cr.	11/16/10	12/24/10	1/9/11	1/20/11		
	963	Lost River	12/12/10	12/24/10	1/5/11	1/17/11		
	911	Bridge Cr. mainstem	11/30/10	12/16/10	1/5/11	1/19/11		
	299	Mainstem - Bear Cr. to Sholes Cr.	1/10/11	1/27/11				
	482	Squaw Cr.						
MSG	956	Thompson Cr.	11/30/10	12/12/10	12/23/10	1/4/11	1/18/11	
	960	Danny's Cr.	12/15/10	12/22/10	1/3/11	1/24/11		
	958	Yew Cr.	12/4/10	12/17/10	1/4/11	1/24/11		
	951	Baker Cr.	12/4/10	12/15/10	1/5/11	1/19/11		
	915	Upper Bridge Cr.	11/30/10	12/16/10	1/5/11	1/19/11		
	827	South Fork Bear - upper	11/30/10	12/17/10	1/5/11	1/25/11		
	826	South Fork Bear - Lingel's	12/4/10	12/17/10	1/6/11	1/26/11		
	824	South Fork Bear - Tolkan to Queen	1/6/11					
	309	Mainstem - Mendo to Metz	12/5/10	12/17/10	1/5/11	1/18/11		
	307	Mainstem - McKee to Huckle	11/13/10	1/7/11	1/21/11			
	302	Mainstem - Big Finley to Bear	11/14/10	1/9/11				
	279	Mainstem - Lindsey's to Runyon	10/18/10					
	277	Mainstem - Runyon to Lower North Fork	10/19/10					
	275	Mainstem - Lower N. Fork to Stansberry Cr.	10/20/10					
	939	Upper Mill Cr.	12/4/10	12/16/10				
	928	Vanauken Cr.	12/4/10	1/7/11				
	924/926	McKee Cr.	12/4/10	12/16/10	1/6/11			
	972	Ancestor Cr.	12/15/10	1/3/11				
823	South Fork Bear - Horse Mtn. to Tolkan	1/7/11						
715	Fourmile Cr.	1/11/11						

TABLE 2: Mainstem Mattole 10-11 Spawner Surveys: Live Fish Observed

Survey Reach	Survey Date (m/d/y)	Reach Length (miles)	Survey Personnel	Live Fish Seen (number observed) (RM indicates a right maxillary clip and AD indicates an adipose fin clip)																
				Chinook Males (>22"FL)	Chinook Jacks (<22"FL)	Chinook Females	Chinook Sex Unknown	Marked Chinook	Coho Males (>20" FL)	Coho Jacks (<20"FL)	Coho Females	Coho Sex Unknown	Steelhead Males	Steelhead Females	Steelhead Sex Unknown	Unknown Males	Unknown Females	Unknown Species & Sex		
Upper Mainstem (MS) (from US to DS)																				
MS Mattole: Mendo County Br. to Hulise Cr.	11/24/10	2.37	SB,AP																	
MS Mattole: Mendo County Br. to Hulise Cr.	11/30/10	2.37	CT,SA																	
MS Mattole: Mendo County Br. to Hulise Cr.	12/12/10	2.37	GP,MP																	
MS Mattole: Mendo County Br. to Hulise Cr.	12/23/10	2.37	GP,CP				1													
MS Mattole: Mendo County Br. to Hulise Cr.	1/4/11	2.37	GP,CP	2			1													
MS Mattole: Mendo County Br. to Hulise Cr.	1/17/11	2.37	NQ,CP																	
MS Mattole: Mendo County Br. to Metz Br.	12/5/10	2.12	CT	1	1															
MS Mattole: Mendo County Br. to Metz Br.	12/17/10	2.12	CT,MP	1																
MS Mattole: Mendo County Br. to Metz Br.	1/3/11	2.12	CT, SB																	
MS Mattole: Mendo County Br. to Metz Br.	1/5/11	2.12	CT	1			1													
MS Mattole: Mendo County Br. to Metz Br.	1/18/11	2.12	CT												2					
MS Mattole: Metz Br. to McKee Cr.	11/13/10	5.29	CT,SW																	
MS Mattole: Spot check @ Danny Metz's	12/20/10	0.10	CT																	
MS Mattole: Metz Br. to McKee Cr.	1/7/11	5.29	CT,SA									1								
MS Mattole: Metz Br. to McKee Cr.	1/21/11	5.29	KC,MH												1					
MS Mattole: McKee Cr. to Huckleberry Ln.	11/13/10	1.63	CT,SW																	
MS Mattole: McKee Cr. to Huckleberry Ln.	1/7/11	1.63	CT,SA	1			2													
MS Mattole: McKee Cr. to Huckleberry Ln.	1/21/11	1.63	KC,MH																	
MS Mattole: Big Finley Cr. to Bear Cr.	11/14/10	5.10	CT,MH						1											
MS Mattole: Big Finley Cr. to Bear Cr.	1/9/11	5.10	CT,SA	2			8				1			1	2					
Middle Mainstem (from US to DS)																				
MS Mattole: Bear Cr. to Sholes Cr.	1/10/11	6.58	FB, NQ	2			1									3		7		
MS Mattole: Bear Cr. to Sholes Cr.	1/27/11	6.58	MH,SA													1		10		
MS Mattole: Sholes Cr. to Honeydew Cr.	1/11/11	12.16	FB, NQ				1											6		
MS Mattole: Sholes Cr. to Honeydew Cr.	1/28/11	12.16	MH,SA											3				11		
Lower Mainstem (from US to DS)																				
MS Mattole: Lindsey's to Runion Hole	10/18/10	3.45	T,MH, SB, SA,DH				0													
MS Mattole: Runion Hole to Lower North Fork	10/19/10	3.28	SB, SA			2										3				
MS Mattole: Hideaway Br.	11/3/10	0.10	SB																	
MS Mattole: Lower North Fork to Stansberry Cr.	10/20/10	4.63	SB,SA,MH,DH													4				

TABLE 3: Mainstem Mattole 10-11 Spawner Surveys: Carcasses Observed

Survey Reach	Survey Date (m/d/y)	Reach Length (miles)	Survey Personnel	Carcasses (number observed and path numbers)													
				Chinook Males (>22"FL)	Chinook Jacks (<22"FL)	Chinook Females	Chinook Sex Unknown	Marked Chinook	Coho Males (>20" FL)	Coho Jacks (<20"FL)	Coho Females	Coho Sex Unknown	Steelhead Males	Steelhead Females	Steelhead Sex Unknown	Unknown Males	Unknown Females
Upper Mainstem (from US to OS)																	
MS Mattole: Mendo County Br. to Hulise Cr.	11/24/10	2.37	SB,AP														
MS Mattole: Mendo County Br. to Hulise Cr.	11/30/10	2.37	CT,SA														
MS Mattole: Mendo County Br. to Hulise Cr.	12/12/10	2.37	GP,MF														
MS Mattole: Mendo County Br. to Hulise Cr.	12/23/10	2.37	GP,CP														
MS Mattole: Mendo County Br. to Hulise Cr.	1/4/11	2.37	GP,CP														
MS Mattole: Mendo County Br. to Hulise Cr.	1/17/11	2.37	NQ,CP					1,1-1,3									
MS Mattole: Mendo County Br. to Metz Br.	12/5/10	2.12	CT	1,1-1,3-2,2			1,1	1,3									
MS Mattole: Mendo County Br. to Metz Br.	12/17/10	2.12	CT,MF					2,2-3,3									
MS Mattole: Mendo County Br. to Metz Br.	1/3/11	2.12	CT, SB	2,2													
MS Mattole: Mendo County Br. to Metz Br.	1/5/11	2.12	CT	1,3				1,2-2,3	1,3								
MS Mattole: Mendo County Br. to Metz Br.	1/18/11	2.12	CT						1,3								
MS Mattole: Metz Br. to McKee Cr.	11/13/10	5.29	CT,SW														
MS Mattole: Spot check @ Danny Metz's	12/20/10	0.10	CT	1,5													
MS Mattole: Metz Br. to McKee Cr.	1/7/11	5.29	CT,SA	1,1				2,2-2,3	1,2								
MS Mattole: Metz Br. to McKee Cr.	1/21/11	5.29	KC,MH														
MS Mattole: McKee Cr. to Huckleberry Ln.	11/13/10	1.63	CT,SW														
MS Mattole: McKee Cr. to Huckleberry Ln.	1/7/11	1.63	CT,SA					3,1	1,3								
MS Mattole: McKee Cr. to Huckleberry Ln.	1/21/11	1.63	KC,MH						1,3								
MS Mattole: Big Finley Cr. to Bear Cr.	11/14/10	5.10	CT,MH														
MS Mattole: Big Finley Cr. to Bear Cr.	1/9/11	5.10	CT,SA					2,1									
Middle Mainstem (from US to DS)																	
MS Mattole: Bear Cr. to Sholes Cr.	1/10/11	6.58	FB, NQ						1,1								1,3
MS Mattole: Bear Cr. to Sholes Cr.	1/27/11	6.58	MH,SA	1,2													
MS Mattole: Sholes Cr. to Honeydew Cr.	1/11/11	12.16	FB, NQ	1,1													
MS Mattole: Sholes Cr. to Honeydew Cr.	1/28/11	12.16	MH,SA														
Lower Mainstem (from US to OS)																	
MS Mattole: Lindsey's to Runion Hole	10/18/10	3.45	TJ,MH, SB, SA,DH														
MS Mattole: Runion Hole to Lower North Fork	10/19/10	3.28	SB, SA														
MS Mattole: Hideaway Br.	11/3/10	0.10	SB					1,1									
MS Mattole: Lower North Fork to Stansberry Cr.	10/20/10	4.63	SB,SA,MH,DH														

TABLE 4: Mainstem Mattole 10-11 Spawner Surveys: Definite Fresh Redds Observed

Survey Reach	Survey Date (m/d/y)	Reach Length (miles)	Survey Personnel	Fresh Redds (number of redds and number occupied)							
				Chinook Total	Chinook Occupied	Coho Total	Coho Occupied	Steelhead Total	Steelhead Occupied	Unknown Total	Unknown Occupied
Upper Mainstem (from US to DS)											
MS Mattole: Mendo County Br. to Hulise Cr.	11/24/10	2.37	SB,AP								
MS Mattole: Mendo County Br. to Hulise Cr.	11/30/10	2.37	CT,SA	1	0						
MS Mattole: Mendo County Br. to Hulise Cr.	12/12/10	2.37	GP,MF	1	0						
MS Mattole: Mendo County Br. to Hulise Cr.	12/23/10	2.37	GP,CP	4	1					1	0
MS Mattole: Mendo County Br. to Hulise Cr.	1/4/11	2.37	GP,CP	4	1					2	0
MS Mattole: Mendo County Br. to Hulise Cr.	1/17/11	2.37	NQ,CP							5	0
MS Mattole: Mendo County Br. to Metz Br.	12/5/10	2.12	CT	4	1			2	0		
MS Mattole: Mendo County Br. to Metz Br.	12/17/10	2.12	CT,MF	2	0					4	0
MS Mattole: Mendo County Br. to Metz Br.	1/3/11	2.12	CT, SB								
MS Mattole: Mendo County Br. to Metz Br.	1/5/11	2.12	CT	3	1						
MS Mattole: Mendo County Br. to Metz Br.	1/18/11	2.12	CT					1	0	1	0
MS Mattole: Metz Br. to McKee Cr.	11/13/10	5.29	CT,SW								
MS Mattole: Spot check @ Danny Metz's	12/20/10	0.10	CT								
MS Mattole: Metz Br. to McKee Cr.	1/7/11	5.29	CT,SA								
MS Mattole: Metz Br. to McKee Cr.	1/21/11	5.29	KC,MH								
MS Mattole: McKee Cr. to Huckleberry Ln.	11/13/10	1.63	CT,SW								
MS Mattole: McKee Cr. to Huckleberry Ln.	1/7/11	1.63	CT,SA	1	1						
MS Mattole: McKee Cr. to Huckleberry Ln.	1/21/11	1.63	KC,MH								
MS Mattole: Big Finley Cr. to Bear Cr.	11/14/10	5.10	CT,MH								
MS Mattole: Big Finley Cr. to Bear Cr.	1/9/11	5.10	CT,SA	7	3						
Middle Mainstem (from US to DS)											
MS Mattole: Bear Cr. to Sholes Cr.	1/10/11	6.58	FB, NQ								
MS Mattole: Bear Cr. to Sholes Cr.	1/27/11	6.58	MH,SA	1	0						
MS Mattole: Sholes Cr. to Honeydew Cr.	1/11/11	12.16	FB, NQ								
MS Mattole: Sholes Cr. to Honeydew Cr.	1/28/11	12.16	MH,SA								
Lower Mainstem (from US to DS)											
MS Mattole: Lindsey's to Runion Hole	10/18/10	3.45	T,MH, SB, SA,DH								
MS Mattole: Runion Hole to Lower North Fork	10/19/10	3.28	SB, SA								
MS Mattole: Hideaway Br.	11/3/10	0.10	SB								
MS Mattole: Lower North Fork to Stansberry Cr.	10/20/10	4.63	SB,SA,MH,DH								

TABLE 5: Upper Mattole River Tributaries: 10-11 Spawner Surveys: Live Fish Observed

Survey Reach	Survey Date (m/d/y)	Reach Length (miles)	Survey Personnel	Live Fish Seen (number observed) (RM indicates a right maxillary clip and AD indicates an adipose fin clip)													
				Chinook Males (>22"FL)	Chinook Jacks (<22"FL)	Chinook Females	Chinook Sex Unknown	Marbled Chinook	Coho Males (>20" FL)	Coho Jacks (<20"FL)	Coho Females	Coho Sex Unknown	Steelhead Males	Steelhead Females	Steelhead Sex Unknown	Unknown Males	Unknown Females
US Tribs (Bear Cr. and up, from US to DS)																	
Ancestor Cr.: County Rd. to forks above McNasty Cr.	12/15/10	0.39	GRSA,DH														
Ancestor Cr.: County Rd. to footbridge	1/3/11	0.25	CT, SB														
Lost River: conf. w/Mattole to Falk line	12/12/10	0.79	CT														
Lost River: conf. w/Mattole to Falk line	12/24/10	0.79	KC,CP														
Lost River: conf. w/Mattole to Falk line	1/6/11	0.79	DH, CP														
Lost River: conf. w/Mattole to Falk line	1/17/11	0.79	NQ,CP														
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	12/15/10	0.61	GRSA,DH														
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	12/22/10	0.61	CT														
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	1/3/11	0.61	CT, SB														
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	1/24/11	0.61	KC,MH														
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	12/4/10	0.90	KC,SA														
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	12/17/10	0.90	FB, NQ														
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	1/4/11	0.90	CT														
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	1/24/11	0.90	KC,MH														
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	11/30/10	2.20	NQ,VG														
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	12/12/10	2.20	FB,GP,MH	5	2	2			3	1							
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	12/23/10	2.20	CT,KC			2											
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	1/4/11	2.20	SB,DH														
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	1/18/11	2.20	SA,DH									1					
Baker Cr.: conf. w/ Mattole to usual major forks	12/4/10	0.94	JG,SB														
Baker Cr.: conf. w/ Mattole to major bend above quarry	12/15/10	1.50	CT														
Baker Cr.: conf. w/ Mattole to major bend above quarry	1/5/11	1.50	GP,CP														
Baker Cr.: conf. w/ Mattole to major bend above quarry	1/19/11	1.50	CT,DH														
Upper Mill Cr.: conf. w/ Mattole to new spot	12/4/10	2.00	CT,DH														
Upper Mill Cr.: conf. w/ Mattole to new spot	12/16/10	2.00	FB,DH												1		
Upper Mill Cr.: conf. w/ Mattole to new spot	1/6/11	2.00	FB, TG														
Vanauken Cr.: conf. w/ Mattole to usual rd. crossing	12/4/10	1.14	MH,VG														
Vanauken Cr.: conf. w/ Mattole to usual rd. crossing	1/7/11	1.14	GP,DH														
McKee Cr.: conf. w/ Mattole to Painter Cr.	12/4/10	0.50	KC,SA														
McKee Cr.: conf. w/ Mattole to third major fork	12/16/10	0.91	GP														
McKee Cr.: conf. w/ Mattole to Painter Cr.	1/6/11	0.50	DH, CP														
Painter Cr.: conf. w/McKee Cr. to map point	1/6/11	0.48	DH, CP														
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	11/30/10	2.37	WK,SB														
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	12/16/10	2.37	NQ,SA	6	1	14	1										
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	1/5/11	2.37	FB, SB	1		2											
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	1/19/11	2.37	KC,CP									1					
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	11/30/10	1.78	KC,MH														
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	12/17/10	1.78	KC,WK														
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	1/5/11	1.78	NQ, DH														
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	1/25/11	1.78	MH,CP														
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	12/4/10	1.60	NQ,FB														
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	12/17/10	1.60	GP														
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	1/6/11	1.60	CT, KM														
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	1/26/11	1.60	MH,SA										1				
So. Fk. Bear Cr.: Tolkan CG to Queens Mine Rd.	1/6/11	1.63	NQ,CT														
So. Fk. Bear Cr.: Horse Mt. CG to Tolkan CG	1/7/11	1.97	KC,CP														
Bear Cr.: Jewett Cr. to Jewett Ridge	1/28/11	1.32	SB,CP														

TABLE 6: Upper Mattole River Tributaries: 10-11 Spawner Surveys: Carcasses Observed

Survey Reach	Survey Date (m/d/y)	Reach Length (miles)	Survey Personnel	Carcasses (number observed and path numbers)													
				Chinook Males (>22"FL)	Chinook Jacks (<22"FL)	Chinook Females	Chinook Sex Unknown	Marked Chinook	Coho Males (>20" FL)	Coho Jacks (<20"FL)	Coho Females	Coho Sex Unknown	Steelhead Males	Steelhead Females	Steelhead Sex Unknown	Unknown Males	Unknown Females
US Tribs (Bear Cr. and up from US to DS)																	
Ancestor Cr.: County Rd. to forks above McNasty Cr.	12/15/10	0.39	GRSA,DH														
Ancestor Cr.: County Rd. to footbridge	1/3/11	0.25	CT, SB														
Lost River: conf. w/Mattole to Falk line	12/12/10	0.79	CT														
Lost River: conf. w/Mattole to Falk line	12/24/10	0.79	KC,CP														
Lost River: conf. w/Mattole to Falk line	1/6/11	0.79	DH, CP														
Lost River: conf. w/Mattole to Falk line	1/17/11	0.79	NQ,CP														
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	12/15/10	0.61	GRSA,DH														
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	12/22/10	0.61	CT														
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	1/3/11	0.61	CT, SB														
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	1/24/11	0.61	KC,MH														
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	12/4/10	0.90	KC,SA														
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	12/17/10	0.90	FB, NQ														
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	1/4/11	0.90	CT														
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	1/24/11	0.90	KC,MH														
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	11/30/10	2.20	NQ,VG														
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	12/12/10	2.20	FB,GP,MH	1,1													
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	12/23/10	2.20	CT,KC				1,1		1,3								
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	1/4/11	2.20	SB,DH														
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	1/18/11	2.20	SA,DH														
Baker Cr.: conf. w/ Mattole to usual major forks	12/4/10	0.94	JG,SB														
Baker Cr.: conf. w/ Mattole to major bend above quarry	12/15/10	1.50	CT														
Baker Cr.: conf. w/ Mattole to major bend above quarry	1/5/11	1.50	GP,CP														
Baker Cr.: conf. w/ Mattole to major bend above quarry	1/19/11	1.50	CT,DH														
Upper Mill Cr.: conf. w/ Mattole to new spot	12/4/10	2.00	CT,DH														
Upper Mill Cr.: conf. w/ Mattole to new spot	12/16/10	2.00	FB,DH														
Upper Mill Cr.: conf. w/ Mattole to new spot	1/6/11	2.00	FB, TG														
Vanauken Cr.: conf. w/ Mattole to usual rd. crossing	12/4/10	1.14	MH,VG														
Vanauken Cr.: conf. w/ Mattole to usual rd. crossing	1/7/11	1.14	GP,DH														
McKee Cr.: conf. w/ Mattole to Painter Cr.	12/4/10	0.50	KC,SA														
McKee Cr.: conf. w/ Mattole to third major fork	12/16/10	0.91	GP														
McKee Cr.: conf. w/ Mattole to Painter Cr.	1/6/11	0.50	DH, CP														
Painter Cr.: conf. w/McKee Cr. to map point	1/6/11	0.48	DH, CP														
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	11/30/10	2.37	WK,SB														
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	12/16/10	2.37	NQ,SA	1,2													
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	1/5/11	2.37	FB, SB	1,1			1,1-1,2										
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	1/19/11	2.37	KC,CP				2,2		1,2								
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	11/30/10	1.78	KC,MH														
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	12/17/10	1.78	KC,WK														
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	1/5/11	1.78	NQ, DH														
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	1/25/11	1.78	MH,CP														
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	12/4/10	1.60	NQ,FB														
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	12/17/10	1.60	GP														
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	1/6/11	1.60	CT, KH														
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	1/26/11	1.60	MH,SA														
So. Fk. Bear Cr.: Tolkan CG to Queens Mine Rd.	1/6/11	1.63	NQ,CT														
So. Fk. Bear Cr.: Horse Mt. CG to Tolkan CG	1/7/11	1.97	KC,CP						1,3								
Bear Cr.: Jewett Cr. to Jewett Ridge	1/28/11	1.32	SB,CP														

TABLE 7: Upper Mattole River Tributaries: 10-11 Spawner Surveys: Definite Fresh Redds Observed

Survey Reach	Survey Date (m/d/y)	Reach Length (miles)	Survey Personnel	Fresh Redds (number of redds and number occupied)							
				Chinook Total	Chinook Occupied	Coho Total	Coho Occupied	Steelhead Total	Steelhead Occupied	Unknown Total	Unknown Occupied
US Tribs (Bear Cr. and up from US to DS)											
Ancestor Cr.: County Rd. to forks above McNasty Cr.	12/15/10	0.39	GRSA,DH								
Ancestor Cr.: County Rd. to footbridge	1/3/11	0.25	CT, SB								
Lost River: conf. w/Mattole to Falk line	12/12/10	0.79	CT								
Lost River: conf. w/Mattole to Falk line	12/24/10	0.79	KC,CP								
Lost River: conf. w/Mattole to Falk line	1/6/11	0.79	DH, CP								
Lost River: conf. w/Mattole to Falk line	1/17/11	0.79	NQ,CP								
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	12/15/10	0.61	GRSA,DH			1	0				
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	12/22/10	0.61	CT			1	0			1	0
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	1/3/11	0.61	CT, SB					2	0	2	0
Danny's Cr.: conf. w/ Thompson Cr. to usual major forks	1/24/11	0.61	KC,MH							2	0
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	12/4/10	0.90	KC,SA								
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	12/17/10	0.90	FB, NQ								
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	1/4/11	0.90	CT								
Yew Cr.: conf. w/ Thompson Cr. to usual major bend	1/24/11	0.90	KC,MH								
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	11/30/10	2.20	NQ,VG							3	0
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	12/12/10	2.20	FB,GP,MH	4	2	1	0			3	0
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	12/23/10	2.20	CT,KC	3	0	1	0			1	0
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	1/4/11	2.20	SB,DH							2	0
Thompson Cr.: conf. w/ Mattole to conf. w/ Danny's Cr.	1/18/11	2.20	SA,DH							1	0
Baker Cr.: conf. w/ Mattole to usual major forks	12/4/10	0.94	JG,SB								
Baker Cr.: conf. w/ Mattole to major bend above quarry	12/15/10	1.50	CT								
Baker Cr.: conf. w/ Mattole to major bend above quarry	1/5/11	1.50	GP,CP								
Baker Cr.: conf. w/ Mattole to major bend above quarry	1/19/11	1.50	CT,DH					1	0	1	0
Upper Mill Cr.: conf. w/ Mattole to new spot	12/4/10	2.00	CT,DH								
Upper Mill Cr.: conf. w/ Mattole to new spot	12/16/10	2.00	FB,DH							4	0
Upper Mill Cr.: conf. w/ Mattole to new spot	1/6/11	2.00	FB, TG								
Vanauken Cr.: conf. w/ Mattole to usual rd. crossing	12/4/10	1.14	MH,VG							1	0
Vanauken Cr.: conf. w/ Mattole to usual rd. crossing	1/7/11	1.14	GP,DH								
McKee Cr.: conf. w/ Mattole to Painter Cr.	12/4/10	0.50	KC,SA								
McKee Cr.: conf. w/ Mattole to third major fork	12/16/10	0.91	GP			1	0				
McKee Cr.: conf. w/ Mattole to Painter Cr.	1/6/11	0.50	DH, CP								
Painter Cr.: conf. w/McKee Cr. to map point	1/6/11	0.48	DH, CP								
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	11/30/10	2.37	WK,SB								
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	12/16/10	2.37	NQ,SA	12	9					1	0
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	1/5/11	2.37	FB, SB								
Bridge Cr.: conf. w/ Mattole to bridges on E. and W. Forks	1/19/11	2.37	KC,CP	1	0			1	0	2	0
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	11/30/10	1.78	KC,MH								
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	12/17/10	1.78	KC,WK								
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	1/5/11	1.78	NQ, DH							1	0
S. Fork Bear Cr.: Hidden Valley Cr. To forks by Edward's	1/25/11	1.78	MH,CP	1	0					3	0
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	12/4/10	1.60	NQ,FB								
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	12/17/10	1.60	GP								
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	1/6/11	1.60	CT, KH							2	0
So. Fk. Bear Cr.: Lingel/Brown Br. To Shelter Cove Rd.	1/26/11	1.60	MH,SA					1	0	2	0
So. Fk. Bear Cr.: Tolkan CG to Queens Mine Rd.	1/6/11	1.63	NQ,CT							1	0
So. Fk. Bear Cr.: Horse Mt. CG to Tolkan CG	1/7/11	1.97	KC,CP	1	0						
Bear Cr.: Jewett Cr. to Jewett Ridge	1/28/11	1.32	SB,CP								

TABLE 8: Lower Mattole River Tributaries: 10-11 Spawner Surveys: Live Fish Observed

Survey Reach	Survey Date (m/d/y)	Reach Length (miles)	Survey Personnel	Live Fish Seen (number observed) (RM indicates a right maxillary clip and AD indicates an adipose fin clip)															
				Chinook Males (>22"FL)	Chinook Jacks (<22"FL)	Chinook Females	Chinook Sex Unknown	Marked Chinook	Coho Males (>20" FL)	Coho Jacks (<20"FL)	Coho Females	Coho Sex Unknown	Steelhead Males	Steelhead Females	Steelhead Sex Unknown	Unknown Males	Unknown Females	Unknown Species & Sex	
DS Tribs (from US to DS)																			
Sholes Cr.: conf. w/Mattole to 2nd trib on left	1/10/11	1.40	FB, NQ																
Sholes Cr.: conf. w/Mattole to 2nd trib on left	1/28/11	1.40	HW,SA																
Fourmile Cr.: conf. w/Mattole to first major fork	1/11/11	0.56	FB, NQ																
East Mill Cr.: conf. w/Mattole to upper fork	11/16/10	1.22	SB,SA,DH																
East Mill Cr.: conf. w/Mattole to upper fork	12/24/10	1.22	GP,RY																
East Mill Cr.: conf. w/Mattole to upper fork	1/9/11	1.22	KC,CP																
East Mill Cr.: conf. w/Mattole to upper fork	1/20/11	1.22	SA,DH																

TABLE 9: Lower Mattole River Tributaries: 10-11 Spawner Surveys: Carcasses Observed

Survey Reach	Survey Date (m/d/y)	Reach Length (miles)	Survey Personnel	Carcasses (number observed and path numbers)													
				Chinook Males (>22"FL)	Chinook Jacks (<22"FL)	Chinook Females	Chinook Sex Unknown	Marked Chinook	Coho Males (>20" FL)	Coho Jacks (<20"FL)	Coho Females	Coho Sex Unknown	Steelhead Males	Steelhead Females	Steelhead Sex Unknown	Unknown Males	Unknown Females
DS Tribs (from US to DS)																	
Sholes Cr.: conf. w/Mattole to 2nd trib on left	1/10/11	1.40	FB, NQ														
Sholes Cr.: conf. w/Mattole to 2nd trib on left	1/28/11	1.40	HH,SA														
Fourmile Cr.: conf. w/Mattole to first major fork	1/11/11	0.56	FB, NQ														
East Mill Cr.: conf. w/Mattole to upper fork	11/16/10	1.22	SB,SA,DH														
East Mill Cr.: conf. w/Mattole to upper fork	12/24/10	1.22	G,PR,Y											1,1			
East Mill Cr.: conf. w/Mattole to upper fork	1/9/11	1.22	KC,CP														
East Mill Cr.: conf. w/Mattole to upper fork	1/20/11	1.22	SA,DH														

TABLE 10: Lower Mattole River Tributaries: 10-11 Spawner Surveys: Definite Fresh Redds Observed											
Survey Reach	Survey Date (m/d/y)	Reach Length (miles)	Survey Personnel	Fresh Redds (number of redds and number occupied)							
				Chinook Total	Chinook Occupied	Coho Total	Coho Occupied	Steelhead Total	Steelhead Occupied	Unknown Total	Unknown Occupied
DS Tribs (from US to DS)											
Sholes Cr.: conf. w/Mattole to 2nd trib on left	1/10/11	1.40	FB, NQ							2	0
Sholes Cr.: conf. w/Mattole to 2nd trib on left	1/28/11	1.40	HW, SA							2	0
Fourmile Cr.: conf. w/Mattole to first major fork	1/11/11	0.56	FB, NQ							1	0
East Mill Cr.: conf. w/Mattole to upper fork	11/16/10	1.22	SB, SA, DH								
East Mill Cr.: conf. w/Mattole to upper fork	12/24/10	1.22	GP, RY								
East Mill Cr.: conf. w/Mattole to upper fork	1/9/11	1.22	KC, CP								
East Mill Cr.: conf. w/Mattole to upper fork	1/20/11	1.22	SA, DH								

TABLE 11: Data summary for 1994-95 through 2010-2011 seasons: Spawner Surveys, Mattole River watershed

Spawning ground surveys in the Mattole, ongoing since the 1981-82 season, have focused primarily on assessments of fall-run chinook salmon. Survey effort, coverage and timing have varied somewhat from season to season, depending upon such factors as funding, availability of trained personnel, weather conditions and water visibility. Number of redds per mile was calculated as total redds divided by reach length. Surveys conducted by the Mattole Salmon Group (phone 707-629-3433; fax 707-629-3435; e-mail: msg@mattolesalmon.org). Data summary for 1994-2003 prepared by Gary D. Peterson, MSG fisheries biologist (last updated February 2003), and data summary for 2003-2011 prepared by Campbell Thompson, MSG Project Coordinator and fisheries biologist (last updated April 2011). Starting with 2004-05, UN and ND are lumped together as UN.

Key to Abbreviations: KS = king (chinook) salmon; SS = silver (coho) salmon; UN = unknown if chinook or coho; SH = steelhead; ND = species not determined

Survey Season & inclusive dates	Survey Reaches (results displayed for 6 mainstem segments, for Bear Creek, & as pooled data for all other Mattole tributaries)	Reach Length (miles)	Accumulated Survey Miles	Live Fish Seen					Carcasses & Skeletons					Number of Definite Redds					Number of Redds Per Mile		
				KS	SS	UN	SH	ND	KS	SS	UN	SH	ND	KS	SS	UN	SH	ND		Total Redds	
1994-95 11/14/94 to 1/23/95	Mattole headwaters index reach (Stanley Creek to Hulse Creek)	4.7	9.4	9	4	-	-	-	1	2	-	-	-	18	5	6	-	3	32	6.8	
	upper mainstem, Whitethorn area to Thorn Jct. (Stanley Cr. to McKee Cr.)	<i>not surveyed</i>																			
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	1.6	1.6	4	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3	1.9
	middle mainstem index reach above Ettersburg (Eubanks Cr. to Bear Cr.)	1.6	3.2	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	0.6
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	0.5	1	-	-	-	-	-	7	-	-	-	-	-	1	-	-	-	-	1	2
	lower mainstem Mattole River (downstream from Honeydew Creek)	0.6	0.6	15	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3	5
	tributaries (except Bear Creek)	9.8	11.8	2	3	-	2	-	2	1	-	-	-	-	11	10	3	2	-	26	2.7
	Bear Creek (enters Mattole River at Ettersburg)	7.6	11.4	-	-	-	-	-	-	-	-	-	-	-	3	-	1	-	-	4	0.5
ALL REACHES COMBINED 1994-95 SEASON	26.4	39.4	32	7	-	2	-	10	3	-	-	-	-	40	15	10	2	3	70	2.7	
1995-96 12/1/95 to 1/15/96	Mattole headwaters index reach (Stanley Creek to Hulse Creek)	4.7	9.4	6	3	-	-	-	-	-	-	-	-	7	2	-	-	4	13	2.8	
	upper mainstem, Whitethorn area to Thorn Jct. (Stanley Cr. to McKee Cr.)	4.1	4.1	3	-	-	2	-	-	-	-	-	-	1	-	-	1	-	2	0.5	
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	2.1	4.2	11	-	-	-	-	1	-	-	-	-	3	-	-	-	-	3	1.4	
	middle mainstem index reach above Ettersburg (Eubanks Cr. to Bear Cr.)	4.9	11.3	23	-	-	-	-	7	-	-	-	-	16	-	-	-	-	16	3.3	
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	8.2	10.2	3	1	-	-	-	1	-	-	-	-	4	-	-	-	1	5	0.6	
	lower mainstem Mattole River (downstream from Honeydew Creek)	4	4	28	-	-	-	6	2	-	-	-	-	1	-	-	-	-	1	0.3	
	tributaries (except Bear Creek)	7.5	10.8	3	4	-	4	1	3	-	-	-	-	7	5	-	-	2	14	1.9	
	Bear Creek (enters Mattole River at Ettersburg)	8.9	11.4	-	-	-	3	-	-	-	-	-	-	-	-	-	-	1	1	0.1	
ALL REACHES COMBINED 1995-96 SEASON	44.4	65.4	77	8	-	9	7	14	-	-	-	-	-	39	7	-	1	8	55	1.2	

Survey Season & inclusive dates	Survey Reaches (results displayed for 6 mainstem segments, for Bear Creek, & as pooled data for all other Mattole tributaries)	Reach Length (miles)	Accumulated Survey Miles	Live Fish Seen					Carcasses & Skeletons					Number of Definite Redds					Number of Redds Per Mile	
				KS	SS	UN	SH	ND	KS	SS	UN	SH	ND	KS	SS	UN	SH	ND		Total Redds
1996-97 12/13/96 to 1/10/97	Mattole headwaters index reach (Stanley Creek to Hulse Creek)	4.7	10.2	33	8	2	-	-	27	1	1	-	1	51	2	1	-	9	63	13.4
	upper mainstem, Whitethorn area to Thorn Jct. (Stanley Cr. to McKee Cr.)	<i>not surveyed</i>																		<i>not surveyed</i>
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	1.6	3.2	3	-	-	-	-	2	-	-	-	-	11	-	-	-	-	11	6.9
	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	<i>not surveyed</i>																		<i>not surveyed</i>
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	<i>not surveyed</i>																		<i>not surveyed</i>
	lower mainstem Mattole River (downstream from Honeydew Creek)	<i>not surveyed</i>																		<i>not surveyed</i>
	tributaries (except Bear Creek)	9.25	14.9	5	3	1	1	-	-	3	-	1	-	6	17	1	-	-	24	2.6
	Bear Creek (enters Mattole River at Ettersburg)	12.6	19.4	1	9	-	-	-	-	7	-	-	-	12	31	12	-	1	56	4.4
ALL REACHES COMBINED 1996-97 SEASON	28.15	47.7	47	21	3	9	-	29	11	1	1	1	80	50	14	-	10	154	5.5	
1997-98 11/28/97 to 1/10/98	Mattole headwaters index reach (Stanley Creek to Hulse Creek)	4.7	18.8	8	9	4	-	-	1	3	-	-	-	27	12	14	-	9	62	13.2
	upper mainstem, Whitethorn area to Thorn Jct. (Stanley Cr. to McKee Cr.)	<i>not surveyed</i>																		<i>not surveyed</i>
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	1.6	6.4	2	-	1	-	-	2	-	-	-	-	6	-	-	-	-	6	3.8
	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	4.6	4.6	1	-	-	-	-	1	-	-	-	-	11	-	-	-	-	11	2.4
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	8.1	8.1	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-	0	0
	lower mainstem Mattole River (downstream from Honeydew Creek)	<i>not surveyed</i>																		<i>not surveyed</i>
	tributaries (except Bear Creek)	16.35	35.35	-	12	-	-	2	-	-	1	-	-	14	15	5	-	10	44	2.7
	Bear Creek (enters Mattole River at Ettersburg)	9.85	22.15	10	1	-	-	-	4	-	4	-	-	27	7	26	-	2	62	6.3
ALL REACHES COMBINED 1997-98 SEASON	45.2	95.4	21	22	9	-	2	10	3	5	-	-	85	34	45	-	21	185	4.1	

Survey Season & inclusive dates	Survey Reaches (results displayed for 6 mainstem segments, for Bear Creek, & as pooled data for all other Mattole tributaries)	Reach Length (miles)	Accumulated Survey Miles	Live Fish Seen					Carcasses & Skeletons					Number of Definite Redds						Number of Redds Per Mile
				KS	SS	UN	SH	ND	KS	SS	UN	SH	ND	KS	SS	UN	SH	ND	Total Redds	

1998-99 12/4/98 to 1/29/99 (+ spot check on 2/11/99)	Mattole headwaters index reach (Stanley Creek to Hulse Creek)	4.7	18.8	7	2	2	3	-	2	2	-	-	-	8	4	7	3	6	28	6
	upper mainstem, Whitethorn area to Thorn Jct. (Stanley Cr. to McKee Cr.)	4.3	8.6	1	-	-	3	-	2	2	-	-	-	1	-	6	1	1	9	2.1
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	1.6	5.5	8	1	2	8	-	1	-	-	-	-	1	-	-	-	1	2	1.3
	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	4.6	9.2	14	-	1	-	-	3	1	-	-	-	6	-	-	-	1	7	1.5
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	9.75	21.2	12	-	-	29	-	4	1	-	-	-	2	-	-	-	-	2	0.2
	lower mainstem Mattole River (downstream from Honeydew Creek)	11.5	11.8	1	-	-	8	-	-	-	-	-	-	-	-	-	-	-	0	0
	tributaries (except Bear Creek)	20	40.85	4	6	1	11	-	-	1	-	-	-	8	3	1	5	10	27	1.4
	Bear Creek (enters Mattole River at Ettersburg)	10.4	25.05	-	5	-	4	2	-	-	-	-	-	1	1	2	2	6	12	1.2
ALL REACHES COMBINED 1998-99 SEASON	66.85	141	47	14	6	66	2	13	7	-	-	-	27	8	16	11	25	87	1.3	

1999- 2000 11/24/99 to 1/27/00	Mattole headwaters index reach (Stanley Creek to Hulse Creek)	4.7	16.6	3	7	1	8	1	-	-	-	-	-	6	7	9	3	12	37	7.9
	upper mainstem, Whitethorn area to Thorn Jct. (Stanley Cr. to McKee Cr.)	4.3	8.6	3	2	3	-	-	2	-	-	-	-	6	2	6	-	1	15	3.5
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	1.6	4.8	10	3	-	-	-	-	-	1	-	-	10	-	2	-	-	12	7.5
	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	4.6	18.4	12	10	17	4	1	7	-	3	-	-	9	7	8	-	-	24	5.2
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	9.75	21.2	7	-	1	3	-	10	-	1	-	-	7	-	3	-	-	10	1
	lower mainstem Mattole River (downstream from Honeydew Creek)	12	24	1	-	-	1	-	2	-	-	-	-	-	-	-	-	-	0	0
	tributaries (except Bear Creek)	18.3	33.15	-	1	-	3	1	2	2	-	-	-	4	5	4	5	15	33	1.8
	Bear Creek (enters Mattole River at Ettersburg)	13.1	24.25	7	6	6	-	-	9	-	-	-	-	15	2	13	5	7	42	3.2
ALL REACHES COMBINED 1999-2000 SEASON	68.35	151	43	29	28	19	3	32	2	5	-	-	57	23	45	13	35	173	2.5	

Survey Season & inclusive dates	Survey Reaches (results displayed for 6 mainstem segments, for Bear Creek, & as pooled data for all other Mattole tributaries)	Reach Length (miles)	Accumulated Survey Miles	Live Fish Seen					Carcasses & Skeletons					Number of Definite Redds						Number of Redds Per Mile	
				KS	SS	UN	SH	ND	KS	SS	UN	SH	ND	KS	SS	UN	SH	ND	Total Redds		
2000-2001	Mattole headwaters index reach (Stanley Creek to Hulse Creek)	4.7	14.1	-	5	2	7	-	-	2	-	2	-	1	9	14	8	34	56	11.9	
	upper mainstem, Whitethorn area to Thorn Jct. (Stanley Cr. to McKee Cr.)	4.3	8.6	-	-	-	3	-	-	-	-	-	-	-	-	5	-	3	8	1.9	
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	1.6	3.2	-	3	-	-	1	-	-	-	-	-	-	-	-	-	1	1	0.6	
	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	4.6	13.8	-	-	1	1	3	4	1	1	-	-	5	1	2	-	9	17	3.7	
	12/2/00 to 2/2/01	middle mainstem below Ettersburg (Bear Creek to Bundle Prairie Creek)	17.5	46.75	66	2	27	81	27	11	-	2	-	-	27	1	7	-	7	42	2.4
	lower mainstem Mattole River (downstream from Bundle Prairie Cr.)	23.9	42.6	10	-	17	83	17	2	-	-	-	-	7	-	-	-	1	8	0.3	
	tributaries (except Bear Creek)	12.25	19.7	-	4	-	-	-	-	3	-	1	-	2	6	3	3	9	23	1.9	
	Bear Creek (enters Mattole River at Ettersburg)	9.35	14.1	4	-	-	2	-	3	-	-	-	-	3	-	-	-	3	6	0.6	
ALL REACHES COMBINED 2000-2001 SEASON	78.2	162.85	80	14	47	177	48	20	6	3	3	-	45	17	31	11	67	171	2.2		
2001-2002	Mattole headwaters index reach (Stanley Creek to Hulse Creek)	4.7	33.7	87	32	2	2	-	34	28	3	-	1	34	16	2	10	17	79	16.8	
	upper mainstem, Whitethorn area to Thorn Jct. (Stanley Cr. to McKee Cr.)	4.3	11	14	5	4	4	1	18	4	-	-	-	9	-	-	-	-	9	2.1	
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	1.6	3.2	5	-	-	-	-	2	1	-	-	-	4	-	-	-	-	4	2.5	
	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	4.6	4.6	-	-	-	-	2	1	-	-	-	-	1	-	-	-	-	1	0.2	
	11/30/01 to 1/24/02	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	<i>not surveyed</i>																	<i>not surveyed</i>	
	lower mainstem Mattole River (downstream from Honeydew Creek)	<i>not surveyed</i>																	<i>not surveyed</i>		
	tributaries (except Bear Creek)	9.95	33.05	10	31	-	3	2	5	5	2	-	2	18	37	9	8	19	91	9.1	
	Bear Creek (enters Mattole River at Ettersburg)	8.9	28.8	36	-	-	3	-	17	-	1	-	-	22	-	-	1	2	25	2.8	
ALL REACHES COMBINED 2001-2002 SEASON	34.05	114.35	152	68	6	12	5	77	38	6	-	3	88	53	11	19	38	209	6.1		

Survey Season & inclusive dates	Survey Reaches (results displayed for 6 mainstem segments, for Bear Creek, & as pooled data for all other Mattole tributaries)	Reach Length (miles)	Accumulated Survey Miles	Live Fish Seen					Carcasses & Skeletons					Number of Definite Redds						Number of Redds Per Mile
				KS	SS	UN	SH	ND	KS	SS	UN	SH	ND	KS	SS	UN	SH	ND	Total Redds	

2002-2003	Mattole headwaters index reach (Stanley Creek to Hulse Creek)	4.7	16.6	4	14	3	1	-	4	-	-	-	1	4	4	3	1	1	13	2.8	
	upper mainstem, Whitethorn area to Thorn Jct. (Stanley Cr. to McKee Cr.)	4.3	8.75	-	3	1	1	-	11	4	1	-	-	1	1	1	-	1	4	0.9	
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	1.6	3.2	-	-	-	-	-	4	2	-	-	-	1	-	-	-	-	1	0.6	
	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	<i>Not Surveyed</i>																			<i>not surveyed</i>
	11/21/02 to 1/20/03	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	2.9	2.9	4	1	1	-	2	2	-	1	-	-	1	-	-	-	-	1	0.3
	lower mainstem Mattole River (downstream from Honeydew Creek)	25	46.01	281	18	17	13	8	8	-	-	-	-	24	-	-	-	-	4	28	1.1
	tributaries (except Bear Creek)	9.15	23.05	16	20	1	8	-	2	4	1	-	-	7	17	13	10	8	55	6	
	Bear Creek (enters Mattole River at Ettersburg)	8.1	19.25	10	8	1	1	-	2	2	2	-	-	7	8	9	-	1	25	3.1	
	ALL REACHES COMBINED 2002-2003 SEASON	55.75	119.85	315	64	24	24	10	33	12	5	-	1	45	30	26	11	15	127	2.3	

2003-2004	Mattole headwaters index reach (Metz's bridge to Hulse Creek)	5	15.6	58	17	4	-	-	38	6	1	-	-	31	4	10	-	-	45	9	
	upper mainstem, Whitethorn area to Thorn Jct. (Upper Mill Cr. to McKee Cr.)	4.2	8.4	17	-	-	6	-	16	-	1	-	-	6	-	1	2	2	11	2.6	
	upper mainstem, Thorn Junction index reach (McKee Cr. to "Raintree" area)	1.6	3.2	11	-	-	-	-	8	-	-	-	-	2	-	-	-	-	2	1.3	
	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	4.6	4.7	-	-	-	1	-	-	-	-	-	-	3	-	-	-	-	3	0.7	
	12/7/2003 to 1/23/2004	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	<i>not surveyed</i>																		<i>not surveyed</i>
	lower mainstem Mattole River (downstream from Honeydew Creek)	<i>not surveyed</i>																			<i>not surveyed</i>
	tributaries (except Bear Creek)	19.45	29.85	45	25	1	18	-	11	7	2	-	-	20	34	11	13	12	90	4.6	
	Bear Creek (enters Mattole River at Ettersburg)	7.9	15.4	29	2	0	0	-	-	-	-	-	6	2	-	-	-	8	1		
	ALL REACHES COMBINED 2003-2004 SEASON	42.75	77.15	160	44	5	25	-	73	13	4	-	-	68	40	22	15	14	159	3.7	

Survey Season & inclusive dates	Survey Reaches (results displayed for 6 mainstem segments, for pooled upper river tributaries (Bear Creek and up), & as pooled data for lower river tributaries (downstream of Bear Cr.)	Reach Length (miles)	Accumulated Survey Miles	Live Fish Seen				Carcasses & Skeletons				Number of Definite Redds					Number of Redds Per Mile
				KS	SS	UN+ ND	SH	KS	SS	UN+ ND	SH	KS	SS	UN+ ND	SH	Total Redds	

2004-	Mattole headwaters index reach (Metz's bridge to Hulse Creek)	4.49	13.47	11	13	1	2		10	20	3	-		12	18	9	4		43	9.6
	upper mainstem, Whitethorn area to Thorn Jct. (Upper Mill Cr. to McKee Cr.)	4.12	8.24	-	7	-	46		5	1	1	-		2	2	4	7		15	3.6
	upper mainstem, Thorn Junction index reach (McKee Cr. to Huckleberry Ln.)	1.63	3.26	3	-	-	-		-	-	-	-		1	1	-	1		3	1.8
2005	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	5.1	5.1	39	11	3	2		5	-	-	-		13	-	-	-		13	2.5
	11/20/04 to 1/24/05 middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	18.74	18.74	37	10	9	2		-	-	-	-		11	-	-	-		11	0.6
	lower mainstem Mattole River (downstream from Honeydew Creek)	23.32	23.32	64	11	-	4		2	-	2	-		15	-	-	-		15	0.6
	upper river tributaries (Bear Creek and upstream)	14.74	20.57	2	34	3	4		8	8	2	-		13	47	21	20		101	6.8
	lower river tributaries (downstream of Bear Creek)	5.87	6.6	3	-	-	2		5	-	3	-		2	-	-	-		2	0.3
	ALL REACHES COMBINED 2004-2005 SEASON	78.01	99.3	159	86	16	62		35	29	11	-		69	68	34	32		203	2.6

2005-	Mattole headwaters index reach (Metz's bridge to Hulse Creek)	4.49	15.84	59	8	3	11		11	3	4	0		30	3	8	5		46	10.2
	upper mainstem, Whitethorn area to Thorn Jct. (Upper Mill Cr. to McKee Cr.)	5.29	7.63	40	15	5	2		6	0	0	0		16	0	0	0		16	3.0
	upper mainstem, Thorn Junction index reach (McKee Cr. to Huckleberry Ln.)	1.63	1.63	24	0	1	0		1	0	0	0		12	0	1	0		13	8.0
2006	middle mainstem index reach above Ettersburg (Big Finley Cr. to Bear Cr.)	5.1	5.1	82	1	2	0		3	0	0	0		40	0	2	0		42	8.2
	11/19/05 to 1/25/06 middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	18.74	18.74	25	5	1	0		6	1	0	0		10	0	1	0		11	0.6
	lower mainstem Mattole River (downstream from Honeydew Creek)	26.05	26.05	39	4	19	3		0	0	0	0		1	0	0	0		1	0.0
	upper river tributaries (Bear Creek and upstream)	19.54	41.41	53	16	7	5		11	8	2	0		30	12	17	9		68	3.5
	lower river tributaries (downstream of Bear Creek)	7.24	7.24	7	0	0	0		1	0	1	0		4	0	0	0		4	0.6
	ALL REACHES COMBINED 2005-2006 SEASON	88.08	123.64	329	49	38	21		39	12	7	-		143	15	29	14		201	2.3

Survey Season & inclusive dates	Survey Reaches (results displayed for 6 mainstem segments, for pooled upper river tributaries (Bear Creek and up), & as pooled data for lower river tributaries (downstream of Bear Cr.)	Reach Length (miles)	Accumulated Survey Miles	Live Fish Seen				Carcasses & Skeletons				Number of Definite Redds					Number of Redds Per Mile
				KS	SS	UN+ ND	SH	KS	SS	UN+ ND	SH	KS	SS	UN+ ND	SH	Total Redds	

2006- 2007 11/10/06 to 1/16/07	Mattole headwaters index reach (Hulse Creek to Metz's bridge)	4.49	15.84	35	9	0	2		27	1	0	0		29	1	7	1		38	8.5
	upper mainstem, Whitethorn area to Thorn Jct. (Metz's bridge to McKee Creek)	5.29	6.46	6	2	0	0		1	0	0	0		0	0	2	0		2	0.4
	upper mainstem, Thorn Junction index reach (McKee Creek to Huckleberry Lane)	1.63	1.63	0	0	0	0		0	0	0	0		2	0	0	0		2	1.2
	middle mainstem index reach above Ettersburg (Big Finley Creek to Bear Creek)	5.10	5.10	17	2	0	0		1	0	0	0		4	0	0	1		5	1.0
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	18.74	18.74	54	2	0	0		2	0	0	0		12	0	1	0		13	0.7
	lower mainstem Mattole River (downstream from Honeydew Creek)	15.84	15.84	19	2	1	0		0	0	0	0		0	0	1	0		1	0.1
	upper river tributaries (Bear Creek and upstream)	16.40	33.75	65	12	0	1		16	5	3	0		38	17	17	6		78	4.8
	lower river tributaries (downstream of Bear Creek)	3.40	3.40	0	0	0	0		0	0	0	0		1	0	0	0		1	0.3
	ALL REACHES COMBINED 2006-2007 SEASON	70.89	100.76	196	29	1	3		47	6	3	0		86	18	28	8		140	2.0

2007- 2008 11/5/07 to 1/23/08	Mattole headwaters index reach (Hulse Creek to Metz's bridge)	4.49	15.59	15	4	0	1		4	2	0	0		18	7	7	0		32	7.1
	upper mainstem, Whitethorn area to Thorn Jct. (Metz's bridge to McKee Creek)	5.29	10.55	1	2	0	7		3	0	0	0		6	2	3	1		12	2.3
	upper mainstem, Thorn Junction index reach (McKee Creek to Huckleberry Lane)	1.63	3.26	11	3	1	12		3	0	0	0		9	0	0	2		11	6.7
	middle mainstem index reach above Ettersburg (Big Finley Creek to Bear Creek)	5.10	10.20	36	1	0	28		1	0	0	1		19	0	2	2		23	4.5
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	18.74	18.74	21	9	0	1		0	0	0	0		4	0	0	1		5	0.3
	lower mainstem Mattole River (downstream from Honeydew Creek)	25.67	39.33	164	18	10	4		3	0	0	0		9	0	3	0		12	0.5
	upper river tributaries (Bear Creek and upstream)	18.76	36.86	13	15	5	3		3	2	1	0		11	22	13	9		55	2.9
	lower river tributaries (downstream of Bear Creek)	7.86	13.12	0	0	0	4		0	0	0	0		2	0	0	2		4	0.5
	ALL REACHES COMBINED 2007-2008 SEASON	87.54	147.65	261	52	16	60		17	4	1	1		78	31	28	17		154	1.8

Survey Season & inclusive dates	Survey Reaches (results displayed for 6 mainstem segments, for pooled upper river tributaries (Bear Creek and up) & as pooled data for lower river tributaries (downstream of Bear Cr.)	Reach Length (miles)	Accumulated Survey Miles	Live Fish Seen				Carcasses & Skeletons				Number of Definite Redds					Number of Redds Per Mile
				KS	SS	UN+ND	SH	KS	SS	UN+ND	SH	KS	SS	UN+ND	SH	Total Redds	

2008-2009 10/22/08 to 1/20/09	Mattole headwaters index reach (Hulse Creek to Metz's bridge)	4.49	8.98	24	2	1	1		13	0	0	0		8	2	1	2		13	2.9
	upper mainstem, Whitethorn area to Thorn Jct. (Metz's bridge to McKee Creek)	5.29	5.29	0	0	0	0		0	0	0	0		1	0	0	0		1	0.2
	upper mainstem, Thorn Junction index reach (McKee Creek to Huckleberry Lane)	1.63	1.63	0	0	0	0		0	0	0	0		0	0	0	0		0	0.0
	middle mainstem index reach above Ettersburg (Big Finley Creek to Bear Creek)	5.10	5.10	26	0	0	2		6	0	0	0		10	0	0	0		10	2.0
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	18.74	18.74	2	0	16	14		1	0	0	0		1	0	0	0		1	0.1
	lower mainstem Mattole River (downstream from Honeydew Creek)	28.39	60.58	320	9	11	64		8	0	0	0		36	0	1	0		37	1.3
	upper river tributaries (Bear Creek and upstream)	20.51	28.78	1	0	0	7		1	0	0	1		4	7	3	7		21	1.0
	lower river tributaries (downstream of Bear Creek)	8.62	10.73	0	0	0	0		0	0	0	0		2	0	3	5		10	1.2
ALL REACHES COMBINED 2008-2009 SEASON	92.77	139.83	373	11	28	88		29	0	0	1		62	9	8	14		93	1.0	

2009-2010 11/16/09 to 2/3/10	Mattole headwaters index reach (White fence to Metz's bridge)	4.78	18.5	14	2	0	1		8	0	1	0		12	0	10	5		27	5.6
	upper mainstem, Whitethorn area to Thorn Jct. (Metz's bridge to McKee Creek)	5.29	10.33	10	0	0	5		6	0	0	0		6	0	2	0		8	1.5
	upper mainstem, Thorn Junction index reach (McKee Creek to Huckleberry Lane)	1.63	3.26	2	0	0	0		1	0	0	0		3	0	0	0		3	1.8
	middle mainstem index reach above Ettersburg (Big Finley Creek to Bear Creek)	not surveyed		0	0	0	0		0	0	0	0		0	0	0	0		0	0.0
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	not surveyed		0	0	0	0		0	0	0	0		0	0	0	0		0	0.0
	lower mainstem Mattole River (downstream from Honeydew Creek)	26.05	52.97	72	0	2	1		1	0	0	0		9	0	2	0		11	0.4
	upper river tributaries (Bear Creek and upstream)	15.14	41.48	2	1	3	3		4	0	1	0		6	1	36	12		55	3.6
	lower river tributaries (downstream of Bear Creek)	2.29	2.29	0	0	0	0		0	0	0	0		0	0	0	0		0	0.0
ALL REACHES COMBINED 2009-2010 SEASON	55.18	128.83	100	3	5	10		20	0	2	0		36	1	50	17		104	1.9	

Survey Season & inclusive dates	Survey Reaches (results displayed for 6 mainstem segments, for pooled upper river tributaries (Bear Creek and up) & as pooled data for lower river tributaries (downstream of Bear Cr.)	Reach Length (miles)	Accumulated Survey Miles	Live Fish Seen				Carcasses & Skeletons				Number of Definite Redds					Number of Redds Per Mile
				KS	SS	UN+ND	SH	KS	SS	UN+ND	SH	KS	SS	UN+ND	SH	Total Redds	

2010-2011 10/18/10 to 1/28/11	Mattole headwaters index reach (Hulse Creek to Metz's bridge)	4.49	24.82	9	0	0	1	21	1	0	0	19	0	13	3	35	7.8
	upper mainstem, Whitethorn area to Thorn Jct. (Metz's bridge to McKee Creek)	5.29	15.97	0	1	0	1	7	0	0	0	0	0	0	0	0	0.0
	upper mainstem, Thorn Junction index reach (McKee Creek to Huckleberry Lane)	1.63	4.89	3	0	0	0	5	0	0	0	1	0	0	0	1	0.6
	middle mainstem index reach above Ettersburg (Big Finley Creek to Bear Creek)	5.10	10.20	10	2	0	3	2	0	0	0	7	0	0	0	7	1.4
	middle mainstem below Ettersburg (Bear Creek to Honeydew Creek)	18.74	37.48	14	3	34	4	2	1	1	0	1	0	0	0	1	0.1
	lower mainstem Mattole River (downstream from Honeydew Creek)	11.36	11.46	2	0	0	7	1	0	0	0	0	0	0	0	0	0.0
	upper river tributaries (Bear Creek and upstream)	21.59	64.87	37	4	1	3	11	1	0	0	22	5	33	5	65	3.0
	lower river tributaries (downstream of Bear Creek)	3.18	8.24	0	0	0	0	0	0	0	1	0	0	5	0	5	1.6
ALL REACHES COMBINED 2010-2011 SEASON	71.38	177.93	75	10	35	19	49	3	1	1	50	5	51	8	114	1.6	

TABLE 12: Escapement Index for chinook and coho by reach and combined. See State of the Salmon (MSG 2005) for further information.

Escapement Index (EI) by basin Note: EI is number of redds per mile surveyed (accumulated survey miles)

Season	Mainstem Metz bridge to Hulse Cr.	Mainstem Metz bridge to Hulse Cr.	Mainstem Big Finley Cr. to Metz Bridge	Mainstem Big Finley Cr. to Metz Bridge	Mainstem Bear Cr. to Big Finley Cr.	Mainstem Bear Cr. to Big Finley Cr.	Mainstem Honeydew Cr. to Bear Cr.	Mainstem Honeydew Cr. to Bear Cr.	Mainstem mouth to Honeydew Cr.	Mainstem mouth to Honeydew Cr.	All tributaries except Bear Cr.	All tributaries except Bear Cr.	Bear Cr.	Bear Cr.	Upper river tributaries Bear Cr. and US	Upper river tributaries Bear Cr. and US	Lower river tributaries, DS of Bear Cr.	Lower river tributaries, DS of Bear Cr.	All reaches Combined	All reaches Combined	Number of redds, all reaches combined	Number of redds, all reaches combined	All reaches except MS Hwy down
	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Chinook	Coho	Coho
1994-95	1.915	0.532	1.875	0.000	0.313	0.000	1.000	0.000	5.000	0.000	0.932	0.847	0.263	0.000					1.015	0.381	40	15	0.387
1995-96	0.745	0.213	0.482	0.000	1.416	0.000	0.392	0.000	0.250	0.000	0.648	0.463	0.000	0.000					0.596	0.107	39	7	0.114
1996-97	5.000	0.196	3.438	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.403	1.141	0.619	1.598					1.677	1.048	80	50	1.048
1997-98	1.436	0.638	0.938	0.000	2.391	0.000	0.000	0.000	0.000	0.000	0.396	0.424	1.219	0.316					0.891	0.356	85	34	0.356
1998-99	0.426	0.213	0.142	0.000	0.652	0.000	0.094	0.000	0.000	0.000	0.196	0.073	0.040	0.040					0.191	0.057	27	8	0.062
1999-00	0.361	0.422	1.194	0.149	0.489	0.380	0.330	0.000	0.000	0.000	0.121	0.151	0.619	0.082					0.377	0.152	57	23	0.181
2000-01	0.071	0.638	0.000	0.000	0.362	0.072	0.578	0.021	0.164	0.000	0.102	0.305	0.213	0.000					0.276	0.104	45	17	0.141
2001-02	1.009	0.475	0.915	0.000	0.217	0.000	0.000	0.000	0.000	0.000	0.545	1.120	0.764	0.000					0.770	0.463	88	53	0.463
2002-03	0.241	0.241	0.167	0.084	0.000	0.000	0.345	0.000	0.522	0.000	0.304	0.738	0.364	0.416					0.375	0.250	45	30	0.406
2003-04	1.987	0.256	0.690	0.000	0.638	0.000	0.000	0.000	0.000	0.000	0.670	1.139	0.390	0.130					0.881	0.518	68	40	0.518
2004-05	0.891	1.336	0.261	0.261	2.549	0.000	0.587	0.000	0.643	0.000	0.714	2.237	0.000	0.000	0.632	2.285	0.303	0.000	0.695	0.685	69	68	0.895
2005-06	1.894	0.189	3.024	0.000	7.843	0.000	0.534	0.000	0.038	0.000	0.581	0.291	1.110	0.093	0.724	0.290	0.552	0.000	1.157	0.121	143	15	0.154
2006-07	1.831	0.063	0.247	0.000	0.784	0.000	0.640	0.000	0.000	0.000	0.898	0.468	1.388	0.434	1.126	0.504	0.294	0.000	0.854	0.179	86	18	0.212
2007-08	1.155	0.449	1.086	0.145	1.863	0.000	0.213	0.000	0.229	0.000	0.269	0.538	0.234	0.156	0.298	0.597	0.152	0.000	0.528	0.210	78	37	0.286
2008-09	0.891	0.223	0.145	0.000	1.961	0.000	0.053	0.000	0.594	0.000	0.196	0.229	0.000	0.000	0.139	0.243	0.186	0.000	0.443	0.064	62	9	0.114
2009-10	0.649	0.000	0.662	0.000	0.000	0.000	0.000	0.000	0.170	0.000	0.134	0.027	0.157	0.000	0.145	0.024	0.000	0.000	0.279	0.008	36	1	0.013
2010-11	0.766	0.000	0.048	0.000	0.686	0.000	0.027	0.000	0.000	0.000	0.366	0.091	0.108	0.000	0.339	0.077	0.000	0.000	0.281	0.028	50	5	0.03
Average	1.251029412	0.357882353	0.900817647	0.037588235	1.303776471	0.026588235	0.281917647	0.001235294	0.447647059	0	0.439694118	0.604847059	0.440494118	0.192058824	0.200182353	0.236470588	0.087470588	0	0.663882353	0.2783	64.58823529	25.29411765	0.316470588