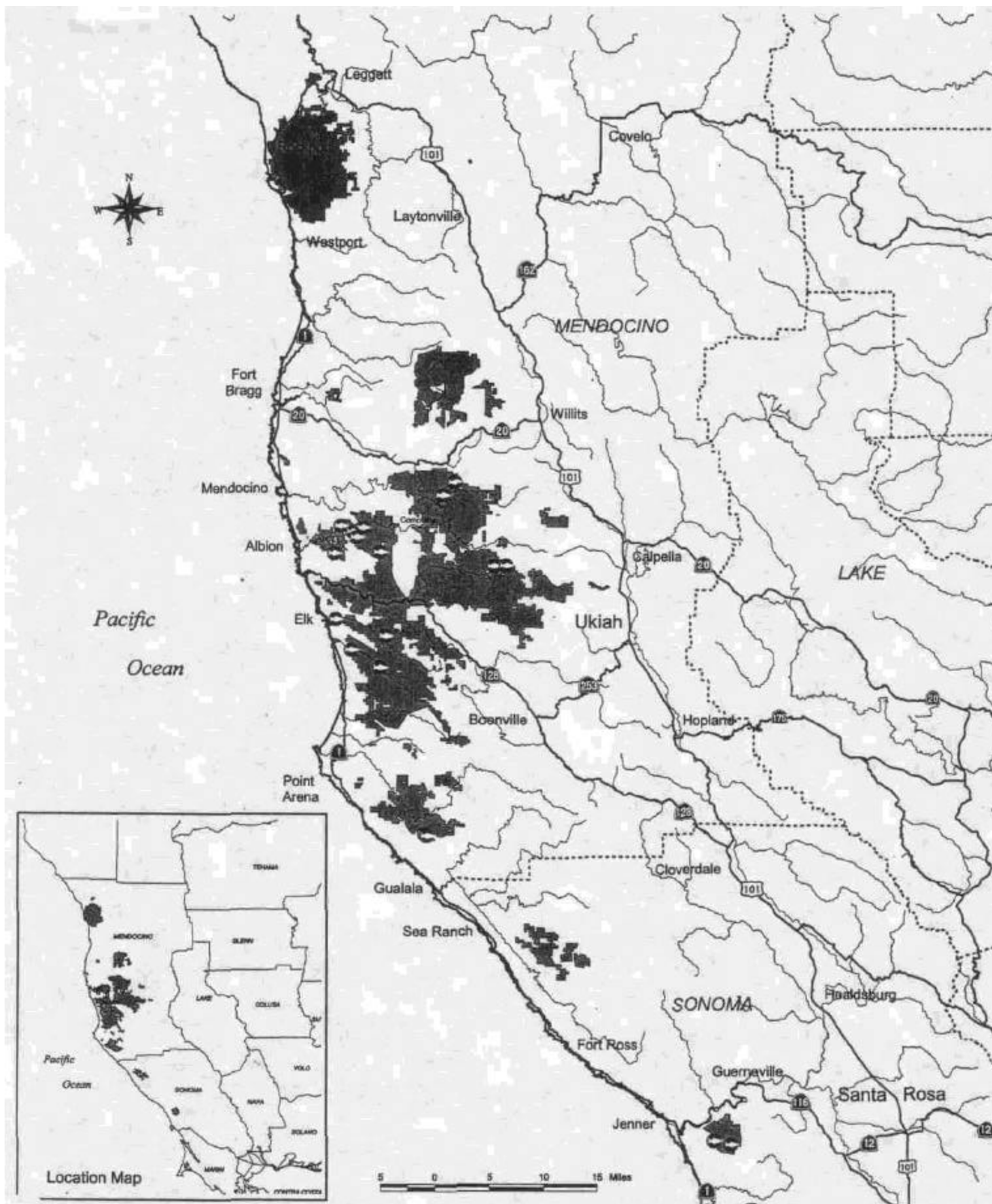


SUMMARY OF FISH INDEX SITE MONITORING IN WATERSHEDS
WITHIN MENDOCINO REDWOOD COMPANY'S OWNERSHIP IN
MENDOCINO AND SONOMA COUNTIES:
1987-1996.

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OVERVIEW

In response to the lack of information available on trends in juvenile salmonid densities in watersheds within the ownership of Louisiana-Pacific Corporation in Mendocino and Sonoma counties (now Mendocino Redwood Company, [MRC]), electrofishing sites were sampled beginning in 1986. Data was collected at these sites to develop baseline data of the salmonid densities; to observe changes over time, and to document distribution of fish species throughout the various watersheds. Many of the initial electrofishing sites were sampled to collect data for individual timber harvest plans (THPs). In 1991, in the Albion River watershed, a watershed monitoring plan was developed and implemented which included permanently marking electrofishing sites and adding sites yearly to begin to develop baseline data in this area. Sites in other watersheds were also permanently marked and data collection continued. However, due to a variety of circumstances, gaps exist in data gathered at some electrofishing sites throughout the study area.

Doloff et al. (1993) cite inventories of habitat and fish density trends as primary sources of information for the evaluation of watershed conditions and the management of aquatic resources. With this in mind, MRC wanted to consolidate, analyze and report all existing juvenile salmonid density monitoring data throughout the ownership. Although not all sites were monitored in all years, the value of the collected data is the development of baseline information, which will be used by MRC to look at juvenile salmonid density trends over time.

The analysis and consolidation of this data identifies areas where salmonid species numbers show a downward trend in densities. Further investigation of fish densities is needed in these areas to determine the cause of declining trends in fish densities and to consider restoration or enhancement work. Areas where salmonid density trends are stable or increasing were also identified. These areas are meaningful in determining important components of fish habitat where production is successful. A semi-quantitative electrofishing method is presented as a way to increase the number of sites which can be visited, decrease survey time, and increase reliability of data gathered through wider coverage in particular watersheds.

Reports on fish distribution, stream temperature monitoring and habitat typing and several watershed analyses exist for areas, which overlap juvenile salmonid density monitoring sites. With the variety of extraneous factors which can affect fish during different life history stages (e.g. fishing pressure, predation, disease, flow conditions, weather cycles, and ocean cycles) it is critical to use all available information in making management decisions with regards to aquatic resources in forested watersheds.

INTRODUCTION

Estimating juvenile salmonid numbers in terms of distribution and abundance is an important part of fisheries management, yet actually assessing the number of fish in a stream is a difficult problem. Fish are highly mobile, difficult to see, difficult to catch, and live in three dimensions (Overton and McDonald 1998). The abundance of juvenile salmon and trout in streams is a function of many factors including abundance of newly emerged fry, quantity and quality of suitable habitat, abundance and composition of food and interactions with other fishes, birds and mammals (Meehan 1991). The Albion, Garcia, and Big River watersheds as well as Elk, and Willow Creek in Mendocino and Sonoma Counties support populations of coho salmon (*Oncorhynchus kisutch*) and steelhead trout (*O. mykiss*). Greenwood Creek in Mendocino County supports a population of steelhead trout (*O. mykiss*) both anadromous and resident. Juvenile coho salmon typically rear in freshwater for one year before migrating to the ocean. Steelhead trout can spend several years rearing in freshwater before migrating to the ocean (Everest 1987). To develop a better understanding of fish density trends in these systems, multiple-pass removal method electrofishing was initiated in 1986.

Drainage descriptions

Table 1. Watershed area and percent MRC forestlands.

Watershed	Watershed Area (sq. mi.)	MRC Ownership (sq. mi.)	MRC Ownership (%)
Garcia River	114	18	16
Big River	118	53	45
Greenwood Creek	31	15	48
Elk Creek	29	22	76
Albion River	43	23	54
Willow Creek	18	5	28

Table 2. Watershed species composition in MRC forestlands.

Watershed	Coho Salmon	Steelhead	Other Species *
Garcia River	X	X	SCP, TSS, SS, PL
Big River	X	X	SCP, TSS, PL
Greenwood Creek		X	SCP, TSS, PL
Elk Creek ..	X	X	SCP, TSS, PL
Albion River	X	X	SCP, TSS, PL
Willow Creek	X	X	SCP, TSS, PL

* = SCP- Sculpin (*Cottus sp.*), TSS- Three spine stickleback (*Gasterosteus aculeatus*), SS- Sacramento sucker (*Castomus occidentalis*), and PL- Pacific lamprey (*Lampetra tridentata*)

The mouth of the Garcia River is approximately 44 miles south of Fort Bragg and just north of the town of Point Arena. This coastal watershed drains into the Pacific Ocean and is located in southwestern Mendocino county, California, at 123 degrees 44' W latitude and 38 degrees 56' N. The Garcia River watershed encompasses an area approximately 114 square mile in size and divided into twelve different planning watersheds. Elevation ranges from sea level to 2,470 feet. Mendocino Redwood Company holds 16% of the Garcia River watershed; however, of the 5,600 acre South Fork Garcia planning watershed (where the fish population index stations were located), MRC owns 92 percent. Coho salmon (*O. kisutch*) and steelhead (*O. mykiss*) are currently known to reside in the watershed. In addition, fall run chinook salmon (*O. tshawytscha*) are reported to have occurred historically in the mainstem Garcia River (The Garcia River Enhancement Plan, 1992).

Big River is a coastal watershed that drains into the Pacific Ocean and is located in Mendocino county, California, at 123 degrees 46' W latitude 39 degrees 18' N longitude. The mouth is located on the south side of the town of Mendocino and approximately 10 miles south of Fort Bragg. This watershed is about 118 square miles and includes ten planning watersheds. Big River rises from sea level to 2,810 feet in elevation. MRC ownership contains 45% of the Big River watershed. Coho salmon and steelhead are currently known to reside in the watershed.

The South Coast area includes Greenwood and Elk Creek. Greenwood Creek is a coastal stream, which drains into the Pacific Ocean approximately 30 miles south of Fort Bragg and just north of the town of Elk. This watershed is located in Mendocino county, California, at 123 degrees 42' W latitude 39 degrees 07' N longitude. The drainage area encompasses roughly 31 square miles, with elevations ranging from sea level to 1,600 feet above sea level. Three planning watersheds make up the Greenwood WWAA and MRC owns about 48% of the land in this watershed. Steelhead trout are currently known to reside in the watershed. Historic records (California Department of Fish and Game [CDFG]) of Greenwood Creek dating back to the late 1960's show presence of steelhead trout but coho salmon are not believed to have been present in this watershed. Elk Creek is a coastal watershed that drains into the Pacific Ocean and is located in Mendocino county, California, at 123 degrees 42' W latitude 39 degrees 05' N longitude. The mouth is approximately 32 miles south of Fort Bragg and just south of the town of Elk. Elk Creek watershed includes about 29 square miles and comprises two planning watersheds. Elevations in the basin range from sea level to 2,736 feet MRC owns approximately 76% of the watershed. Coho salmon and steelhead are currently known to reside in the watershed.

The Albion River is located in Mendocino county, California, at 123 degrees 46' W latitude and 39 degrees 14' N longitude and drains into the Pacific Ocean approximately 17 miles south of Fort Bragg and 125 miles north of San Francisco. The Albion River watershed encompasses roughly 43 square miles. Elevations in this basin range from sea level to 1,120 feet. The Albion River is comprised of four planning watersheds, with MRC's holdings including approximately 54 percent. Coho salmon and steelhead are currently known to reside in the watershed.

Willow Creek drains into the Russian River just before the Russian flows into the Pacific Ocean in Sonoma County, California. The mouth of Willow Creek is approximately 60 miles south of the town of Point Arena. The basin is about 18 square miles and elevations range from 80 feet to 1,480 feet. MRC timber-lands comprise approximately 28% of the Willow Creek planning watershed. Coho salmon and steelhead are currently known to reside in the watershed.

GOAL AND OBJECTIVES

The original scope of the index station monitoring project was to gather time-series data on relative abundance of fish and evaluate trends within individual streams. Due to personnel changes, variability in resources allocated to continue monitoring all sites, and ultimately the sale of the ownership where juvenile salmonid density monitoring was performed, the progress of this project as well as analysis of the data were not well documented or summarized. The goal of this report was to summarize and evaluate ten years of electrofishing data from juvenile salmonid density monitoring sites and establish base line data to look at trend monitoring in the future. In order to achieve this goal, a database was created to expedite the analysis of a large amount of data and make future data analysis readily accessible. Summaries and analysis of juvenile salmonid density monitoring data are presented in this report as a resource to be used by Mendocino Redwood Company in making informed decisions on land use practices within forested watersheds which might impact fisheries resources.

The objective of juvenile salmonid density site sampling is to monitor species composition and relative abundance of species, especially coho salmon and steelhead trout during their juvenile life stage in freshwater, over time. This type of sampling is not an attempt to quantify total fish populations as there are many factors influencing these anadromous populations: such as year class variability, ocean mortalities, parasitism, over fishing, predation, density-dependent effects, and limiting freshwater habitat.

METHODS

Juvenile salmonid density monitoring was conducted in streams within Louisiana-Pacific Corporation's (L-P) ownership, currently Mendocino Redwood Company, in the Albion, Big River, and Garcia River watersheds in Mendocino County. Smaller South Coast area streams (Elk Creek and Greenwood Creek) in Mendocino County were also monitored. In Sonoma County, electrofishing sites were located in Willow Creek, a tributary to the Russian River (Figures 1a - 1g). The number of sites surveyed increased from two in 1987 to a high of 19 in 1993. Some sites were not surveyed each year. Juvenile salmonid density monitoring stations were demarcated with plastic tags posted on streamside trees. Juvenile salmonid density monitoring was conducted in late summer and early fall when stream discharge was at a minimum and higher summer temperatures have abated. Stations were electro fished with a Smith-Root Model 12-backpack electrofisher (Smith-Root Inc., Vancouver, WA), using a multiple pass removal method. The minimum length for each index monitoring station was 30m, however, stations varied in length because complete habitat units were included to define an index station. Prior to electrofishing, each habitat unit was blocked on the upstream and downstream end with nylon block nets (mesh size 4.8 mm). One field crew-member electrofished while the other crew member(s) netted stunned fish and placed them in five-gallon buckets filled with stream water. Water in the buckets was aerated using a battery-operated (DC) aerator. Upon completion of each electrofishing pass, fork lengths and wet weights were measured for every collected fish. Fork lengths were measured using a plastic tray equipped with a ruler and wet weights were determined with an Ohaus CT600 digital balance (Ohaus Corporation, Fiorham Park, NJ). Prior to 1991, biomass data was gathered by using a graduated cylinder to obtain a displacement measurement for a group of fish rather than individuals. Successive electrofishing passes were made within each habitat unit until a 50 percent reduction in the number offish from the preceding pass was achieved. After all electrofishing passes were completed, fish were released back into the habitat unit from which they were captured.

Stream physical parameters (i.e. length, width, depth, and discharge) were measured and recorded for each habitat unit of the survey stations. Width and depth measurements were taken at fixed intervals over the length of each habitat unit and then averaged. Stream discharge was measured with a Marsh-McBimey flow meter (Marsh-McBimey Inc., Gaithersburg, MD) and a top set wading rod.

Fish densities were calculated using data attained from multiple -pass removal surveys combined with stream physical parameters. The data from these surveys was analyzed using Microfish 3.0 software (Van Deventer and Platts 1985) which calculated the expected fish densities for individual species at each index station.

RESULTS

Tables 1-9a summarize stream physical parameters and locations of each survey station. Coho salmon (*O. kisutch*), steelhead trout (*O. mykiss*), threespine stickleback (*Gasterosteus aculeatus*), Pacific lamprey (*Lampetra tridentata*) and sculpin (*Cottus spp.*) comprised the fish species found at monitoring sites in the Garcia River, Big River, Elk Creek, Greenwood Creek, Albion River, and Russian River watersheds from 1987-1996. Not all species were found at every site or stream; Table 2 shows species present by watershed. Salmonids are the focus of this report.

Density tables and charts

Observed and expected salmonid relative densities (numbers of fish/m²) are shown in Tables 1b-9b. Expected relative densities are the site population estimates achieved by running site data through Microfish 3.0. Information in these tables varies by year as not every site was monitored every year. In 1987, monitoring stations ES-16 and 17 in the Garcia River watershed were the only sites monitored. Number of sites monitored per year gradually increased with all nineteen sites being monitored in 1993. The Albion River watershed has the most consistent data with all seven sites in this watershed monitored continuously from 1991-1996.

Figures 2a - 2h compare annual coho and steelhead densities on a watershed basis. These figures are based on observed densities. Steelhead numbers for two index monitoring sites in the Garcia watershed (Fig. 2a) show densities at a high in 1987 then dropping off through 1993 and rising again in 1994. High densities ranged from 1.0 - 1.5 fish/m² and low densities from 0.4 - 0.6 fish/m². The last year these sites were monitored was 1994 when densities ranged from 0.6 - 1.0 fish/m². Coho were found at the SF Garcia site in 1987 only. No chart was created, however, coho density was 0.1 fish/m².

In the Big River watershed, steelhead densities for four monitoring sites are shown in Figure 2b. From 1990-1992, only Gates Cr. - Upper and Lower sites were monitored. Density trends at these sites varied with Gates Cr. - Lower showing an increase in density over the years (from 0.4 - 0.9 fish/m²) and Gates Cr. - Upper increasing from 0.1 - 0.8 fish/m² and then dropping off to 0.2 fish/m² in 1994. It is difficult to do much comparison with only two years of data at the Big Rv. and NF Big Rv. sites, however both showed slight declines in density from 1993-1994. Six coho salmon were found at the NF Big Rv. site in 1993.

South Coast Area monitoring sites include two creeks with separate drainages - Elk Creek and Greenwood Creek. Each creek has two monitoring sites, a lower and an upper. Sites were , monitored from 1990 - 1994, with the exception of 1991 when none of the sites were monitored. Steelhead densities show an overall upward trend from 1990 - 1994 (Figure 2c). All sites showed higher densities in 1994 than in 1990, with Elk Creek - Upper and Greenwood Creek - Lower actually doubling their steelhead

densities in 1994 (from 0.4 - 0.8 fish/m² and from 0.3 — 0.6 fish/m², respectively). Coho salmon were found in 1992 only at the Elk Creek - Lower and Upper sites. Densities were 0.3 and 0.0 fish/m², respectively. The 0.0 indicates that fish were present in sufficiently low abundance that rounding resulted in 0.0 fish/m².

The most consistently monitored watershed from the onset of index station electrofishing was the Albion River watershed. Monitoring began here in 1988 with one site and from 1991-1996, all seven of the sites in this watershed were monitored. Overall, steelhead densities in the Albion River are on a downward trend. Density values in 1996 ranged from 0.1 - 0.3 fish/m² for all sites (Figure 2d). However, high densities for these sites were approximately 0.4 fish/m² with the exception of Railroad Gulch, which had highs of 1.6 fish/m² in 1989, and 0.5 and 0.6 in 1991 and 1992, respectively. The Mainstem Albion - Imile above the conf. site spiked a high of 0.9 fish/m² in 1994. Coho salmon were consistently present in the Albion River watershed (Figure 2e). Year to year comparisons are difficult for coho as they show a very distinct three-year life history trend. Figure 2f demonstrates this trend. For the most recent year of data (1996) coho are mainly comprised of progeny from the 1993 year-class. Densities remained stable or dropped slightly at three of the sites; Mainstem Albion - Lower, Mainstem Albion - Imile above confluence, and SF Albion - above confluence. More significant declines (between 0.3 and 0.4 fish/m²) in density were noted at the Mainstem Albion - at confluence, SF Albion - Imile above confluence, and SF Albion - near Larmer Gulch sites. The Railroad Gulch site showed a 0.3 fish/m² increase from 1993 to 1996. In comparing 1996 data to 1990, the first year this cohort was measured, density increased at all three sites (Mainstem Albion - at confluence, Mainstem Albion - Imile above confluence, and Railroad Gulch) in 1996. Increases in density ranged from 0.1 - 0.4 fish/m².

Sites in the Willow Creek watershed were the only sites from Sonoma County. There was an upper and a lower site in Willow Creek and both were monitored from 1990 - 1994. In 1992, the Willow Creek - Upper site was not monitored and in 1994, Willow Creek - Lower was not monitored. Steelhead densities at the two sites demonstrated opposite trends over the years (Figure 2g). The Willow Creek - Lower site increased, then decreased then increased again and on the last survey in 1993, had a steelhead density of 0.4 fish/m². Conversely, the Willow Creek - Upper site steelhead density decreased then increased and increased to high of 0.6 fish/m² on the last survey in 1994. Coho salmon were found in 1990 only at the Willow Creek - Upper site. Coho density was 0.4 fish/m².

Biomass and length-frequency distributions

Salmonid relative biomass and fork length distributions are shown in Tables 1-9C. Length distributions for each species collected during electrofishing are expressed as number offish measured with the range of fork lengths in parentheses. Length-frequency distributions for coho salmon and steelhead are shown by watershed in Figures 3a - 3g. Size-class to age-class breakdowns are similar for coho salmon and steelhead (0 - 70 mm = 0+, 70-130 mm = 1+, > 130mm=2+).

In the Garcia River watershed, the majority of steelhead found in all years were 0+ age class (Figure 3 a). Numbers offish in the 1+ age class were less than one-third of the 0+ class and there were only one or two fish in the 2+ age class for all years. Steelhead biomass at the Flemming Creek site showed a sharp decrease from 1987(3.5 g/m²) to 1992 (2.6 g/m²) and then a steady increase to 4.1 g/m² in 1994 (Tables 3,4,5, and 9c). The S. Fk. Garcia site showed an overall decrease in biomass from 2.1 g/m² (1987) to 1.6 g/m² (1993) and finally 1.8 g/m² in 1994. Ten coho were present in 1987 at the S. Fk. Garcia site and lengths ranged from 58 - 73 mm. Coho biomass was 0.3 g/m² (Table 9c).

In 1990 - 1992, Gates Cr. - Upper and Lower were the only sites monitored in the Big River watershed. In 1990 and 1991, there were more steelhead in the 1+ age class than in the 0+ age class. This changed dramatically in 1992 and there continued to be 2-3 times more steelhead in the 0+ than in the 1+ age class with the addition of the Big Rv. and N. Fk. Big R. sites in 1993 and 1994 (Figure 3b). Steelhead biomass for both Gates Creek sites showed an overall increasing trend. At the Gates Cr. - Lower site biomass ranged from 2.3 - 5.1 g/m² (1990 -1994, respectively). Gates Cr. - Upper biomass ranged from 0.9 - 2.1 g/m². Both Gates Creek sites had highs for years studied in regards to steelhead biomass numbers in 1993 (Gates Cr. -Lower, 5.3 g/m² and Gates Cr. - Upper, 3.9 g/m²). Steelhead biomass at the Big Rv. site decreased from 2.6 g/m² in 1993 to 1.1 g/m² in 1994. At the N. Fk. Big R. site biomass increased slightly from 3.3 g/m² in 1993 to 3.4 g/m² in 1994. Six coho salmon were found at the N. Fk. Big R. site in 1993 with lengths ranging from 63 - 73 mm). Coho biomass was 0.3 g/m² (Tables 3-7c).

Figures 3c and 3d display the distribution of steelhead lengths for the Greenwood Creek and Elk Creek watersheds. Combined Lower and Upper sites in each of these watersheds had a higher percentage of 1+ steelhead than other monitored watersheds. Numbers of steelhead in the 1+ age class were 50 - 75% of those in the 0+ age class. For many years biomass showed an upward trend at all sites, with the exception of Greenwood Cr. - Upper, where biomass decreased significantly from 6.5 g/m² in 1990 to 2.6 g/m² in 1994 (Tables 3,4,5, and 7c). At the Elk Cr. - Lower site, biomass ranged from 0.3 g/m² in 1990 to 3.3 g/m² in 1994. Elk Cr. -Upper site was similar with biomass ranging from 0.4 g/m² (1990) - 2.9 g/m² (1994). Increases were not as great at the Greenwood Cr. - Lower site where biomass ranged from 1.9 g/m² (1990) - 2.6 g/m² (1994). Coho were present at both Elk Creek sites in 1992 only. Fifty coho were found at the Elk Cr. - Lower site ranging from 63 - 84 mm. Biomass was 1.7 g/m² (Table 5c). At the Elk Creek - Upper site, five coho were found ranging in size from 72 - 75 mm. Biomass was 0.2 g/m².

In the Albion River watershed majorities of the steelhead for all survey years were comprised of the 0+ age class (Figure 3e). Numbers of steelhead in the 1+ age class were generally one-third to one-eighth of those in the 0+ age class. There were few (from 1-5) fish in the 2+ age class in each year. Coho salmon found in the Albion River watershed were mainly 0+ age class (Figure 3f). However, the disparity between 0+ and 1+ age class was not as apparent for coho as it was for steelhead. In several years there were more coho in the 1+ age class than the 0+. Tables 1 - 9c show biomass and length distributions for the Albion watershed.

The Willow Creek watershed was the only monitored watershed from Sonoma County included in this report. An Upper and Lower site were electrofished from 1990 - 1994. In 1990,1992, and 1993 the Willow Creek watershed had almost equal numbers of steelhead represented in the 0+ and 1+ age classes. The only year which had many more fish in the 0+ age class was 1991 (Figure 3g). Steelhead biomass at the Willow Cr. - Lower site increased from 1.4 g/m² in 1990 to 2.8 g/m² in 1993 (Tables 3 - 7c). This site was not monitored in 1994. At the Willow Cr. - Upper site, steelhead biomass decreased from 3.1 g/m² in 1990 to 0.8 g/m² in 1993. In 1994, biomass was up to a high of 4.3 g/m². Coho were found at the Willow Cr. - Upper site in 1990 only. Seventeen coho with lengths ranging from 52-70 mm were found. Biomass was calculated as 1.3 g/m².

DISCUSSION AND MANAGEMENT RECOMMENDATIONS

The primary purpose of collecting salmonid density data in watersheds in Mendocino and Sonoma

Counties was to obtain baseline data for comparison of year-to-year trends in fish densities. This data will aid in pinpointing productive areas where habitat protection is a consideration and areas of concern where habitat restoration and improvement projects may prove beneficial.

In the Garcia River watershed, coho salmon were found only in 1987 at the SF Garcia monitoring site. Density was calculated at 0.1 fish/m². This watershed was monitored until 1994 with no subsequent records of coho. Summary reports showed that surveys were done in 1988 and coho were found with a density of 0.5 fish/m², however, the Department of Fish and Game collected this data and data sheets were not available to validate reported densities. Because coho were not found in this watershed in succeeding years of survey, the area is key for further investigation and possible restoration projects. It should be noted that the California Department of Fish and Game planted approximately 30,000 juvenile coho salmon in the South Fork Garcia River on 16 May 1988 and spread 24,000 fish from Flemming Creek to the Mouth of South Fork Garcia on 24 May 1988. Plantings were done after electrofishing surveys were performed in 1988. Steelhead densities dropped overall in this watershed but were beginning to rise again in the last year of survey. Fish densities should be looked at again in this area as the last year of data was collected five years ago and steelhead densities were rising at that time.

As a whole, steelhead densities in the Big River watershed showed stable or increasing numbers. Densities did rise and fall in Gates Creek; however, densities were higher in 1994 than in 1990. It would be necessary to perform more surveys at the Big River sites to determine any reliable trends as only two years of data were collected there. The NF Big Rv. site should be surveyed again to determine coho salmon presence or absence.

The South Coast Area, Elk Creek in particular, is another area of concern for coho salmon. Coho were found in only one out of five years of survey (1992). Coho densities for 1992 were low, from 0.0 to 0.3 fish/m², indicating that progeny from the last three-year cycle were returning in very low numbers. In the years that correspond with 1992 returning coho, 1989 and 1995, no data exists for Elk Creek to determine life cycle trends. Elk Creek is a good candidate for further investigation. Steelhead densities in Elk Creek and Greenwood Creek have either remained stable or increased dramatically. Steelhead in these drainages also showed larger densities of 1+ and 2+ size class fish when compared to other areas. This might indicate that fish habitat conditions in these drainages are conducive to supporting over-wintering fish. Habitat conditions should be surveyed in the future to quantify current habitat conditions.

The Albion River watershed was the only catchment where coho salmon were found consistently enough to develop relationships of coho densities correlated with juvenile coho life cycle trends. It seems that progeny from the 1988 and 1990 year-class have returned with fairly stable or increasing densities. Progeny from the 1989 year-class did not fair as well with densities dropping dramatically in 1995. It is interesting to note that while coho salmon populations have remained stable or increased in the Albion, steelhead densities have demonstrated a downward trend at all sites in this watershed. This could be showing an inverse relationship between coho and steelhead densities.

In Sonoma County, data from the Willow Creek watershed highlights another area of concern for coho salmon production. Although this watershed was surveyed for five years, coho were found only in 1990 at one monitoring site. In this case, fish from 1990 would be returning in 1993 and none were detected at either Willow Creek site during this year. Steelhead densities in this watershed generally seemed on an upward trend.

The interrelations among salmonid fishes and their habitats are complex; habitat alterations, whether cause by natural processes or by human activities, can dramatically change the diversity and productivity

offish densities (Meehan 1991). Thus, it is important to monitor trends in fish densities and to use other available information on habitat, temperature, storm events, etc. while making management decisions involving fisheries resources. The data presented herein gives an overview of coho salmon and steelhead densities in Mendocino and Sonoma Counties (within MRC ownership), however; gaps exist in the data that make it less reliable and harder to draw conclusions from. Bagliniere and Champigneulle (1986) state that rational management of a migratory salmonid population in a drainage system requires a good knowledge of the juvenile population and the development of a method for estimating its production. A semi-quantitative electrofishing approach presented in Crozier and Kennedy (1994) can provide reliable information to fishery managers "on distribution of natural spawning in rivers. This approach is less time consuming than the quantitative approach described above and allows for more sampling sites spread throughout a watershed. The authors believe that semi-quantitative electrofishing would be advantageous in that 0+ numbers derived from surveys provide an indication of the success of spawning in various parts of a catchment as well as overall year-class strength. Kennedy (1981) also found that quantitative sampling of selected short sections of river (index sites) is sensitive to non-uniform distribution of 0+ salmonids and may provide misleading information on stock status as a whole. Semi-quantitative sampling, with the use of broad density classifications throughout a river system instead of point estimates should avoid the problem of non-uniform distribution of 0+ salmonids (Crozier and Kennedy, 1994). Juvenile salmonid density data collected to date in Mendocino and Sonoma Counties is valuable to managers and should be continued and improved upon to provide a reliable source of information for making management decisions.

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Table 1 -b. Number of fish taxa and observed and expected relative density of salmonids at fish index monitoring station^ in the Albion River watershed, Mendocino Co., California. Summer and Fall, 1996. [0.0] Indicates fish present in low abundance.

MONITORING STATION LOCATION	MONITORING STATION REF.	NO. OF FISH TAXA	OBSERVED RELATIVE DENSITY OF SALMONIDS (NO./ M2)		EXPECTED RELATIVE DENSITY OF SALMONIDS (NO./M2)	
			STH	COH	STH	COH
MAINSTEM ALBION R. - LOWER	ES-5	4	0.2	0.3	0.2	0.3
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	4	0.1	0.1	0.1	0.1
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	3	0.3	0.2	0.3	0.2
S. FK. ALBION R. - ABOVE CONFLUENCE	ES-8	3	0.1	0.3	0.1	0.3
S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	ES-9	4	0.2	0.1	0.2	0.2
S. FK. ALBION R. - NEAR LARMER GULCH	ES-10	2	0.2	0.8	0.2	0.9
RAILROAD GULCH	ES-11	2	0.3	0.5	0.3	0.5

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 1-c. Relative biomass and length distribution of salmonids at fish index monitoring stations in the Albion River watershed, Mendocino Co., California. Summer and Fall 1996.

MONITORING STATION LOCATION	MONITORING STATION REF.	RELATIVE BIOMASS OF SALMONIDS (G WET MASS/M2)		LENGTH DISTRIBUTION FOR SALMONIDS (MM) N (RANGE)	
		STH	COH	STH	COH
MAINSTEM ALBION Ft.- LOWER	ES-5	0.8	1.0	20 (37-119)	33 (50-83)
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	1.4	0.3	23 (46-177)	20 (55-85)
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	1.1	0.4	60 (53-144)	34 (55-72)
S. FK. ALBION R. - ABOVE CONFLUENCE	ES-8	0.1	0.8	6 (47-77)	34 (52-70)
S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	ES-9	0.4	0.7	21 (41-101)	17 (49-69)
S. FK. ALBION R. - NEAR LARMER GULCH	ES-10	1.0	1.4	14 (37-121)	73 (41-72)
RAILROAD GULCH	ES-11	0.8	1.0	16 (41-102)	26 (45-65)

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 2-b. Number of fish taxa and observed and expected relative density of salmonids at fish index monitoring stations in the Albion River watershed, Mendocino Co., California. Summer and Fall 1995. [0.0] Indicates fish present in low abundance.

MONITORING STATION LOCATION	MONITORING STATION REF.	NO. OF FISH TAXA	OBSERVED RELATIVE DENSITY OF SALMONIDS (NO./M2)		EXPECTED RELATIVE DENSITY OF SALMONIDS (NO./M2)	
			STH	COH	STH	COH
MAINSTEM ALBION R. - LOWER	ES-5	4	0.3	0.2	0.4	0.3
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	4	0.1	0.1	0.2	0.1
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	4	0.4	0.0	0.5	0.0
S.FK. ALBION R. - ABOVE CONFLUENCE	ES-8	3	0.2	0.2	0.6	0.2
S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	ES-9	4	0.4	0.1	0.4	0.2
S. FK. ALBION R. - NEAR LARMER GULCH	ES-10	3	0.2	0.2	0.2	0.3
RAILROAD GULCH	ES-11	2	0.3	0.0	0.4	0.0

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON

Table 2-c. Relative biomass and length distribution of salmonids at fish index monitoring stations in the Albion River watershed, Mendocino Co., California. Summer and Fall 1995.

MONITORING STATION LOCATION	MONITORING STATION REF.	RELATIVE BIOMASS OF SALMONIDS (G WET MASS/M ²)		LENGTH DISTRIBUTION OF SALMONIDS (MM) N (RANGE)	
		STH	COH	STH	COH
MAINSTEM ALBION R. - LOWER	ES-5	0.2	0.1	66(32-158)	46(47-85)
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	1.1	0.2	33(41-151)	13(55-70)
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	1.5	0.1	88 (48- 200)	7 (59-77)
8. FK. ALBION R. - ABOVE CONFLUENCE	ES-S	0.7	0.4	24(33-123)	21(48-74)
S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	ES-9	0.6	0.3	35(32-80)	8(56-70)
S. FK. ALBION R. - NEAR LARMER GULCH	ES-10	0.3	0.9	17(38-72)	25(53-112)
RAILROAD GULCH	ES-11	1.59	0.1	21 (38-135)	2(58-64)

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 3-a. Survey parameters of fish index monitoring stations in the Garcia River, Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co. and the Russian River watershed, Sonoma Co., California. Summer and Fall 1994.

WATERSHED	MONITORING STATION LOCATION	MAP REF. (MONITORING STATION REF.)	SURVEY DATE MMDD	SURVEY METHOD h=ELECTR O-FISHING; n=DIVER OBSVR.	SURVEY EFFORT (MIN.)	TOTAL' STATION LENGTH (M)	MEAN WIDTH (M)	MEAN DEPTH (M)
GARCIA RIVER	S. FK. GARCIA R. - BELOW FLEMMING CR.	1-F (ES-16)	09/27	E	23.4	33.5	3.3	0.1
GARCIA RIVER	FLEMMING CR.- ABOVE CONFLUENCE	1-F (ES-17)	09/26	E	24.4	30.0	2.6	0.1
BIG RIVER	GATES CR.- LOWER	1-B (ES-3)	09/20	E	22.6	36.9	2.2	0.2
BIG RIVER	GATES CR.- UPPER	1-B (ES-4)	09/20	E	14.6	30.0	2.8	0.2
BIG RIVER	BIG R.- WILDHORSE OPENING	1-A (ES-2)	09/15	E	23.8	35.0	5.7	0.2
BIG RIVER	N.FK.BIGR.- EAST BRANCH	1-A (ES-1)	09/14	E	17.2	30.0	2.2	0.3
ELK CREEK	ELKCR.- LOWER	1-E (ES-14)	08/23	E	34.2	30.0	5.6	0.5
ELK CREEK	ELKCR.- UPPER	1-E (ES-15)	08/23	E	37.6	30.0	4.9	0.2
GREENWOOD CREEK	GREENWOOD CR.- LOWER	1-D (ES-12)	08/22	E	45.4	30.0	5.1	0.2
GREENWOOD CREEK	GREENWOOD CR.- UPPER	1-D (ES-13)	08/19	E	40.8	30.0	5.5	0.4
ALBION RIVER	MAINSTEM ALBION R.- LOWER	1-C (ES-5)	08/15	E	21.0	43.5	2.4	0.2
ALBION RIVER	MAINSTEM ALBION R.- AT CONFLUENCE	1-C (ES-6)	08/16	E	35.5	44.7	3.2	0.2
ALBION RIVER	MAINSTEM ALBION R.- 1MI ABOVE CONFLUENCE	1-C ES-7)	08/16	E	56.1	48.0	2.5	0.2
ALBION RIVER	S. FK. ALBION R.- ABOVE CONFLUENCE	1-C (ES-8)	08/17	E	24.1	34.2	3.8	0.2
ALBION RIVER	S. FK. ALBION R.- 1MI ABOVE CONFLUENCE	1-C (ES-9)	08/17	E	19.0	38.1	2.2	0.1
ALBION RIVER	S. FK. ALBION R.- NEAR LARMER GULCH	1-C (ES-10)	08/17	E	14.6	24.3	2.1	0.2
ALBION RIVER	RAILROAD GULCH	1-C (ES-11)	08/18	E	21.8	32.5	1.9	0.1
RUSSIAN RIVER	WILLOW CR.- UPPER	1-G (ES-19)	09/28	E	11	26.7	1.7	0.1

Table 3-b. Number of fish taxa, and observed and expected relative density of salmonids at fish index monitoring stations in the Garcia River, Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co. and the Russian River watershed, Sonoma Co., California. Summer and fall, 1994. [0.0] Indicates fish present in low abundance.

MONITORING STATION LOCATION	MONITORING STATION REF.	NO. OF FISH TAXA	OBSERVED RELATIVE DENSITY OF SALMONIDS (NO./M2)		EXPECTED RELATIVE DENSITY OF SALMONIDS (NO./M2)	
			STH	COH	STH	COH
S. FK. GARCIA R. - BELOW FLEMMING CR.	ES-16	1	0.6		0.7	
FLEMMING CR. - ABOVE CONFLUENCE	ES-17	1	1.0		1.1	
GATES CR. - LOWER	ES-3	2	0.9		0.9	
GATES CR. - UPPER	ES-4	3	0.2		0.2	
BIG R. - WILDHORSE OPENING	ES-2	3	0.3		0.4	
N.FK.BIGR. - EAST BRANCH	ES-1	2	0.7		0.8	
ELKCR. - LOWER	ES-14	3	0.4		0.6	
ELKCR. - UPPER	ES-15	1	0.8		1.2	
GREENWOOD CR. - LOWER	ES-12	4	0.6		0.7	
GREENWOOD CR. - UPPER	ES-13	1	0.6		0.8	
MAINSTEM ALBION R. - LOWER	ES-5	3	0.3	0.1	0.3	0.1
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	4	0.4	0.0	0.4	0.1
MAINSTEM ALBION R. - 1MI ABOVE CONFLUENCE	ES-7	3	0.9		0.9	
S. FK. ALBION R. - ABOVE CONFLUENCE	ES-8	3	0.2	0.2	0.2	0.2
S. FK. ALBION R. - 1MI ABOVE CONFLUENCE	ES-9	4	0.5	0.0	0.5	0.0
S. FK. ALBION R. - NEAR LARMER GULCH	ES-10	3	0.3	0.7	0.6	0.7 •
RAILROAD GULCH	ES-11	2	0.2	0.0	0.2	0.0
WILLOW CR. - UPPER	ES-19	1	0.6		0.7	

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 3-c. Relative biomass and length distribution of salmonids at fish index monitoring stations in the Garcia River, Big River, Elk Creek, Greenwood Creek and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1994.

MONITORING STATION LOCATION	MONITORING STATION REF.	RELATIVE BIOMASS OF SALMONIDS (G WET MASS/M2)		LENGTH DISTRIBUTION OF SALMONIDS (MM) MEDIAN (N, RANGE)	
		STH	COH	STH	COH
S. FK. GARCIA R. - BELOW FLEMMING CR.	ES-16	1.8		69(40-113)	
FLEMMING CR.	ES-17	4.1		81(38-148)	
GATES CR. - LOWER	ES-3	5.1		69(39-153)	
GATES CR. - UPPER	ES-4	2.1		16(40-183)	
BIG R. - WILDHORSE OPENING	ES-2	1.1		56 (47-175)	
N.FK.BIGR. - EAST BRANCH	ES-1	3.4		48(43-168)	
ELKCR. - LOWER	ES-14	3.3		63(40-173)	
ELKCR- UPPER	ES-15	2.9		115(41-129)	
GREENWOOD CR. - LOWER	ES-12	2.6		90(44-132)	
GREENWOOD CR. - UPPER	ES-13	2.6		101(37-215)	
MAINSTEM ALBION R. - LOWER	ES-5	0.9	0.2	31(33-141)	5(65-79)
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	2.6	0.2	53(36-153)	6(69-93)
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	2.2		103(32-145)	
S. FK. ALBION R. - ABOVE CONFLUENCE	ES-fl	0.3	1.0	27(55-98)	30(40-96)
S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	ES-9	1.1	0.1	34(38-119)	1(80-80)
S. FK. ALBION R. - NEAR LARMER GULCH	ES-10	0.2	4.0	13(36-88)	35(62-95)
RAILROAD GULCH	ES-11	0.8	0.1	9(50-110)	1(83-83)
WILLOW CR. - UPPER	ES-19	4.3		26(42-142)	

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 4-a. Survey parameters offish index monitoring stations in the Garcia River, Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1993. [-] Indicates data not recorded.

WATERSHED	MONITORING STATION LOCATION	MAP REF. (MONITORING STATION REF.)	SURVEY DATE MMDD	SURVEY METHOD E=ELECTR O-FISHING; D=DIVER OBSVR.	SURVEY EFFORT (MIN.)	TOTAL STATION LENGTH (M)	MEAN WIDTH (M)	MEAN DEPTH (M)
GARCIA RIVER	S. FK. GARCIA R. - BELOW FLEMMING CR.	1-F (ES-16)	11/22	E	-	36	2.9	0.1
GARCIA RIVER	FLEMMING CR. - ABOVE CONFLUENCE	1-F (ES-17)	11/22	E	-	30	2.2	0.1
BIG RIVER	GATES CR. - LOWER	1-B (ES-3)	10/06	E	-	34.5	2.4	0.2
BIG RIVER	GATES CR. - UPPER	1-B (ES-4)	10/06	E	-	30.0	2.4	0.2
BIG RIVER	BIG R. - WILDHORSE OPENING	1-A (ES-2)	10/13	E	-	30.0	5.5	0.2
BIG RIVER	N.FK.BIGR. - EAST BRANCH	1-A (ES-1)	10/12	E	-	30.0	2.2	0.1
ELK CREEK	ELKCR. - LOWER	1-E (ES-14)	09/30	E	-	40.2	6.5	0.4
ELK CREEK	ELKCR. - UPPER	1-E (ES-15)	09/23	E	-	31.5	5.9	0.2
GREENWOOD CREEK	GREENWOOD CR. - LOWER	1-D (ES-12)	09/29	E	-	34.2	5.7	0.2
GREENWOOD CREEK	GREENWOOD CR. - UPPER	1-D (ES-13)	09/22	E	-	46.2	6.0	0.3
ALBION RIVER	MAINSTEM ALBION R. - LOWER	1-C (ES-5)	08/18	E	-	53.1	2.7	0.2
ALBION RIVER	MAINSTEM ALBION R. - AT CONFLUENCE	1-C (ES-6)	08/19	E	-	33.0	2.1	0.2
ALBION RIVER	MAINSTEM ALBION R. - 1MI ABOVE CONFLUENCE	1-C (ES-7)	08/23	E	-	48.6	3.1	0.2
ALBION RIVER	S. FK. ALBION R. - ABOVE CONFLUENCE	1-C (ES-8)	08/20	E	-	34.8	3.4	0.2
ALBION RIVER	S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	1-C (ES-9)	08/30	E	-	38.1	2.1	0.1
ALBION RIVER	S. FK. ALBION R. - NEAR LARMER GULCH	1-C (ES-10)	08/30	E	-	24.0	3.1	0.4
ALBION RIVER	RAILROAD GULCH	1-C (ES-11)	09/02	E	-	30.0	2.1	0.1
RUSSIAN RIVER	WILLOW CR. - LOWER	1-G (ES-18)	11/11	E	-	33.9	3.1	0.4
RUSSIAN RIVER	WILLOW CR. - UPPER	1-G (ES-19)	11/11	E	-	30.0	2.3	0.1

Table 4-b. Number of fish taxa, and observed and expected relative density of salmonids at fish index monitoring stations in the Garcia River, Big River, Elk Creek, Greenwood Creek, and Albion River v Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1993.

MONITORING STATION LOCATION	MONITORING STATION REF.	NO. OF FISH TAXA	OBSERVED RELATIVE DENSITY OF SALMONIDS (NO./M2)		EXPECTED RELATIVE DENSITY OF SALMONIDS (NO./M2)	
			STH	COH	STH	COH
S.FK. GARCIA R.- BELOW FLEMMING CR.	ES-16	1	0.6		0.6	
FLEMMING CR.- ABOVE CONFLUENCE	ES-17	1	0.4		0.4	
GATES CR.- LOWER	ES-3	2	0.5		0.6	
GATES CR.- UPPER	ES-4	3	0.5		0.5	
BIG R.- WILDHORSE OPENING	ES-2	4	0.5		0.6	
N.FK.BIGR.- EAST BRANCH	ES-1	3	0.8	0.1	0.8	0.1
ELKCR.- LOWER	ES-14	3	0.3		0.3	
ELKCR.- UPPER	ES-15	1	0.5		0.5	
GREENWOOD CR.- LOWER	ES-12	3	0.5		0.5	
GREENWOOD CR.- UPPER	ES-13	2	0.4		0.5	
MAINSTEM ALBION- LOWER	ES-5	4	0.4	0.4	0.4	0.4
MAINSTEM ALBION- AT CONFLUENCE	ES-6	4	0.2	0.6	0.2	0.6
MAINSTEM ALBION- 1 MI ABOVE CONFLUENCE	ES-7	4	0.4	0.1	0.4	0.1
S, FK. ALBION- ABOVE CONFLUENCE	ES-8	3	0.2	0.3	0.2	0.3
S. FK. ALBION- 1 MI ABOVE CONFLUENCE	ES-9	4	0.3	0.5	0.3	0.5
S. FK. ALBION- NEAR LARMER GULCH	ES-10	3	0.1	1.1	0.1	1.4
RAILROAD GULCH	ES-11	2	0.2	0.2	0.3	0.2
WILLOW CR.- LOWER	ES-18	3	0.4		0.4	
WILLOW CR.- UPPER	ES-19	1	0.2		0.2	

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON; CHK=CHINOOK SALMON; CTT=CUTTROAT TROUT.

Table 4-c. Relative biomass and length distribution of salmonids at fish index monitoring stations in the Garcia River, Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1993.

MONITORING STATION LOCATION	MONITORING STATION REF.	RELATIVE BIOMASS OF SALMONIDS (G WET MASS/M2)		LENGTH DISTRIBUTION OF SALMONIDS (MM) N (RANGE)	
		STH	COH	STH	COH
S. FK. GARCIA R.- BELOW FLEMMING CR.	ES-16	1.6		61 (47-100)	
FLEMMING CR.- ABOVE CONFLUENCE	ES-17	3.2		28 (45-198)	
GATES CR.- LOWER	ES-3	5.3		103(52-138)	
GATES CR.- UPPER	ES-4	3.9		33(53-167)	
BIG R.- WILDHORSE OPENING	ES-2	2.6		81(56-170)	
N.FK.BIGR.- EAST BRANCH	ES-1	3.3	0.3	52(49-160)	6(63-73)
ELKCR.- LOWER	ES-14	3.4		84 (43-143)	
ELKCR.- UPPER	ES-15	1.8		84 (59-175)	
GREENWOOD CR.- LOWER	ES-12	3.0		94(60-178)	
GREENWOOD CR.- UPPER	ES-13	2.1		117(46-184)	
MAINSTEM ALBION R.- LOWER	ES-5	1.3	1.2	52(39-133)	51(50-84)
MAINSTEM ALBION R.- AT CONFLUENCE	ES-6	1.4	1.7	15(37-108)	41(51-86)
MAINSTEM ALBION R.- 1 MI ABOVE CONFLUENCE	ES-7	1.2	0.2	63(49-85)	8(54-80)
S.FK. ALBION R.- ABOVE CONFLUENCE	ES-8	0.4	0.7	22 (44- 94)	35(47-73)
S. FK. ALBION R.- 1 MI ABOVE CONFLUENCE	ES-9	0.7	1.0	24 (37-108)	36(49-70)
S. FK. ALBION R.- NEAR LARMER GULCH	ES-10	0.5	2.2	6(39-125)	83(40-97)
RAILROAD GULCH	,ES41	1.7	0.6	14 (46-158)	13(52-68)
/•					
WILLOW CR.- LOWER /	ES-18	2.8		38 (49-165)	
WILLOW CR.- UPPER	ES-19	0.8		11(55-98)	

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 5-a. Survey parameters of fish index monitoring stations in the Garcia River, Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1992. [-] Indicates data not recorded.

WATERSHED	MONITORING STATION LOCATION	MAPREF. (MONITORING STATION REF.)	SURVEY DATE MM/DD	SURVEY METHOD E=ELECTR O=FISHING; D=DIVER OBSVR.	SURVEY EFFORT (MIN.)	TOTAL STATION LENGTH (M)	MEAN WIDTH (M)	MEAN DEPTH (M)
GARCIA RIVER	FLEMMING CR.- ABOVE CONFLUENCE	1-F (ES-17)	10/28	E	-	30.0	2.6	0.2
BIG RIVER	GATES CR.- LOWER	1-B (ES-3)	10/09	E	-	31.0	2.3	0.2
BIG RIVER	GATES CR.- UPPER	1-B (ES-4)	10/09	E	-	31.0	1.7	0.1
ELK CREEK	ELK CR.-LOWER	1-E (ES-14)	9/01	E	-	34.0	4.4	0.4
ELK CREEK	ELK CR.-UPPER	1-E (ES-15)	9/01	E	-	30.0	4.9	0.2
GREENWOOD CREEK	GREENWOOD CR.- LOWER	1-D (ES-12)	09/04	E	-	30.0	6.3	0.2
GREENWOOD CREEK	GREENWOOD CR.- UPPER	1-D (ES-13)	09/10	E	-	30.0	5.5	0.3
ALBION RIVER	MAINSTEM ALBION R.- LOWER	1-C (ES-5)	08/19	E	-	47.0	2.7	0.2
ALBION RIVER	MAINSTEM ALBION R.- AT CONFLUENCE	1-C (ES-6)	07/31	E	-	30.0	2.2	0.2
ALBION RIVER	MAINSTEM ALBION R.- 1 MI ABOVE CONFLUENCE	1-C (ES-7)	08/18	E	-	30.0	2.9	0.5
ALBION RIVER	S.FK. ALBION R.- ABOVE CONFLUENCE	1-C (ES-8)	07/31	E	-	30.0	2.9	0.2
ALBION RIVER	S. FK. ALBION R.- 1MI ABOVE CONFLUENCE	1-C (ES-9)	08/18	E	-	30.0	2.1	0.2
ALBION RIVER	S. FK. ALBION R.- NEAR LARMER GULCH	1-C (ES-10)	08/18	E	-	21.0	2.0	0.3
ALBION RIVER	RAILROAD GULCH	1-C (ES-11)	06/19	E	-	30.0	1.5	0.1
RUSSIAN RIVER	WILLOW CR.- LOWER	1-G (ES-18)	11/10	E	-	38.5	2.4	0.1

Table 5-b. Number of fish taxa, and observed and expected relative density of salmonids at fish index monitoring stations in the Garcia River, Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co., And the Russian River watershed, Sonoma Co., California. Summer and Fall 1992.

MONITORING STATION LOCATION	MONITORING STATION REF.	NO. OF FISH TAXA	OBSERVED RELATIVE DENSITY OF SALMONIDS (NO./M2)		EXPECTED RELATIVE DENSITY OF SALMONIDS (NO./ M2)	
			STH	COH	STH	COH
FLEMMING CR. - ABOVE CONFLUENCE	ES-17	1	0.6		0.6	
GATES CR. - LOWER	ES-3	2	0.3		0.3	
GATES CR. - UPPER	ES-4	3	0.8		0.8	
ELK CR. - LOWER	ES-14	4	0.3	0.3	NO DATA	NODATA
ELK CR. - UPPER	ES-15	2	0.8	0.0	NO DA TA	NODATA
GREENWOOD CR. - LOWER	ES-12	3	0.2		0.2	
GREENWOOD CR. - UPPER	ES-13	2	0.4		0.5	
MAINSTEM ALBION R. - LOWER	ES-5	4	0.1	0.6	0.1	0.6
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	4	0.2	0.6	0.2	0.7
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	4	0.4	0.3	0.4	0.3
S. FK. ALBION R. - ABOVE CONFLUENCE	ES-8	3	0.2	0.9	0.2	1.0
S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	ES-9	3	0.3	0.5	0.3	0.6
S. FK. ALBION R. - NEAR LARMER GULCH	ES-10	3	0.2	1.6	0.2	1.6
RAILROAD GULCH	ES-11	1	0.7		0,7	
WILLOW CR. - LOWER	ES-18	3	0.2		0.2	

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 5-c. Relative biomass and length distribution of salmonids at fish population index stations in the Garcia River, Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1992.

MONITORING STATION LOCATION	MONITORING STATION REF.	RELATIVE BIOMASS OF SALMONIDS (G WET MASS/M ²)		LENGTH DISTRIBUTION OF SALMONIDS (MM) N (RANGE.)	
		STH	COH	STH	COH
FLEMMINGCR. - ABOVE CONFLUENCE	ES-17	2.6	-	49(42-153)	-
GATES CR. - LOWER	ES-3	4.9	-	56(46-176)	-
GATES CR. - UPPER	ES-4	0,9	-	15(41-113)	-
ELK CR. - LOWER	ES-14	5,5	1.7	47(31-176)	50(63-84)
ELK CR. - UPPER	ES-15	3.8	0.2	115(40-179)	5(72-75)
GREENWOOD CR. - LOWER	ES-12	1.6	-	40(57-140)	-
GREENWOOD CR. - UPPER	ES-13	3.9	-	70 (54-165)	-
MAINSTEM ALBION R. - LOWER	ES-5	1.2	1.3	14(42-165)	70(44-79)
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	1.2	1.5	10(47-120)	39 (48- 77)
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	0.8	0.5	37 (38-108)	25(45-65)
S. FK. ALBION R. - ABOVE CONFLUENCE	ES-8	1.4	1.8	19(38-167)	77(41-74)
S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	ES-9	0.6	1.1	16 (39-100)	33(43-68)
S. FK. ALBION R. - NEAR LARMER GULCH	ES-10	1.1	4.0	10 (36-134)	69(40-127)
RAILROAD GULCH	ES-11	2,4	-	32(33-135)	-
WILLOW CR. - LOWER	ES-18	1,5	-	17(55-145)	-

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 6-a. Survey parameters of fish index monitoring stations in the Big River and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1991. (-) indicates data not recorded.

WATERSHED	MONITORING STATION LOCATION	MAPREF. (MONITORING STATION REF.)	SURVEY DATE MM/DD	SURVEY METHOD E=ELECTR O=FISHING; D=DIVER OBSVR.	SURVEY EFFORT (MIN.)	TOTAL STATION LENGTH (M)	MEAN WIDTH (M)	MEAN DEPTH (M)
BIG RIVER	GATES CR. - LOWER	1-B (ES-3)	11/15	E	-	38.0	2.3	0.2
BIG RIVER	GATES CR. - UPPER	1-B (ES-4)	11/15	E	-	30.0	1.9	0.1
ALBION RIVER	MAINSTEM ALBION R. - LOWER	1-C (ES-5)	07/15	E	24.4	30.0	3.3	0.1
ALBION RIVER	MAINSTEM ALBION R. - AT CONFLUENCE	1-C (ES-6)	07/15	E	30.7	30.0	2.8	0.3
ALBION RIVER	MAINSTEM ALBION R. - 1MI ABOVE CONFLUENCE	1-C (ES-7)	07/16	E	-	30.0	3.4	0.9
ALBION RIVER	S.FK. ALBION R. - ABOVE CONFLUENCE	1-C (ES-8)	07/15	E	-	30.0	2.1	-
ALBION RIVER	S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	1-C (ES-9)	07/16	E	-	30.0	2.1	0.2
ALBION RIVER	S. PK. ALBION R. - NEAR LARMER GULCH	1-C (ES-10)	07/18	E	-	30.0	2.6	0.3
ALBION RIVER	RAILROAD GULCH	1-C (ES-11)	07/01	E	25.2	30.0	1.8	0.1
RUSSIAN RIVER	WILLOW CR. - LOWER	1-G (ES-18)	09/14	E	-	64.8	1.5	0.1
RUSSIAN RIVER	WILLOW CR- UPPER	1-G (ES-19)	09/13	E	-	30.0	1.3	0.1

Table 6-b. Number of fish taxa, and observed and expected relative density of salmonids at fish index monitoring stations in the Big River and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1991. [0.0] Indicates fish present in low abundance.

MONITORING STATION LOCATION	MONITORING STATION REF.	NO. OF FISH TAXA	OBSERVED RELATIVE DENSITY OF SALMONIDS (NO./ M2)		EXPECTED RELATIVE DENSITY OF SALMONIDS (NO./M2)	
			STH	COH	STH	COH
GATES CR. - LOWER	ES-3	2	0.5		0,5	
GATES CR. - UPPER	ES-4	3	0.1		0.1	
MAINSTEM ALBION R. - LOWER	ES-5	4	0.3	0.0	0.3	0.0
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	3	0.2		0.2	
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	3	0.3		0,3	
S.FK. ALBION R. - ABOVE CONFLUENCE	ES-8	2	0.4		0,4	
S. FK. ALBION R. - 1 MI ABOVE CONFLUENCE	ES-9	3	0.4		0.4	
S. FK ALBION R. - NEAR LARMER GULCH	ES-10	3	0.4	0.1	0.4	0.1
RAILROAD GULCH	ES-11	1	0.6		0.6	
WILLOW CR. - LOWER	ES-18	3	0.5		0.6	
WILLOW CR. - UPPER	ES-19	1	0.1		0.1	

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 6-c. Relative biomass and length distribution of salmonids at fish index monitoring stations in the Big River and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1991.

MONITORING STATION LOCATION	MONITORING STATION REF.	RELATIVE BIOMASS OF SALMONIDS (G WET MASS/M ²)		LENGTH DISTRIBUTION OF SALMONIDS (MM) N(RANGE)	
		STH	COH	STH	COH
GATES CR. - LOWER	ES-3	5.3		45(55-170)	
GATES CR. - UPPER	ES-4	0.8		6(55-135)	
MAINSTEM ALBION R. - LOWER	ES-5	1.9	0.2	26(43-149)	4(70-75)
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	0.7		20(37-104)	
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	1.2		33(40-115)	
S.FK. ALBION R. - ABOVE CONFLUENCE	ES-8	0.7		25(40-88)	
S. FK. ALBION R. - 1MI ABOVE CONFLUENCE	ES-9	0.6		24(40-72)	
S. FK. ALBION R. - NEAR LARMER GULCH	ES-10	0.4	1.1	29(36-56)	8(80-114)
RAILROAD GULCH	ES-11	2.5		31 (31-125)	
WILLOW CR. - LOWER	ES-18	1.8		41(55-135)	
WILLOW CR. - UPPER	ES-19	1.5		3(100-133)	

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 7-a. Survey parameters offish population index stations in the Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co. California. Summer and Fall 1990. (-) Indicates data not recorded.

WATERSHED	MONITORING STATION LOCATION	MAPREF. (MONITORING STATION REF.)	SURVEY DATE MMDD	SURVEY METHOD E=ELECTR O-FISHING; D=DIVER OBSVR.	SURVEY EFFORT (MIN.)	TOTAL STATION LENGTH (M)	MEAN WIDTH (M)	MEAN DEPTH (M)
BIG RIVER	GATES CR. - LOWER	1-B (ES-3)	11/16	E	-	30.0	2.6	0.2
BIG RIVER	GATES CR. - UPPER	1-B (ES-4)	11/16	E	-	30.0	2.5	0.2
ELK CREEK	ELK CR.-LOWER	1-E(ES-14)	09/06	E	-	30.0	6.1	-
ELK CREEK	ELK CR.-UPPER	1-E(ES-15)	09/25	E	-	30.0	7.7	0.3
GREENWOOD CREEK	GREENWOOD CR. - LOWER	1-D (ES-12)	10/17	E	44.6	30.0	6.3	0.2
GREENWOOD CREEK	GREENWOOD CR. - UPPER	1-D (ES-13)	10/16	E	34.3	30.0	5.1	0.4
ALBION RIVER	MAINSTEM ALBION R. - AT CONFLUENCE	1-C (ES-6)	11/07	E	-	30.0	3.2	0.3
ALBION RIVER	MAINSTEM ALBION R. - 1MI ABOVE CONFLUENCE	1-C (ES-7)	11/12	E	-	30.0	3.6	0.3
ALBION RIVER	S. FK. ALBION R. - ABOVE CONFLUENCE	1-C (ES-8)	11/07	E	-	30.0	2.0	0.1
ALBION RIVER	S. FK. ALBION R. - 1MI ABOVE CONFLUENCE	1-C (ES-9)	11/12	E	-	30.0	2.4	0.2
ALBION RIVER	RAILROAD GULCH	1-C (ES-11)	06/08	E	-	30.0	1.9	0.1
RUSSIAN RIVER	WILLOW CR.- LOWER	1-G (ES-18)	10/06	E	39.7	59.8	2.4	0.2
RUSSIAN RIVER	WILLOW CR.- UPPER	1-G (ES-19)	10/05	E	-	30.0	1.4	0.1

Table 7-b. Number of fish taxa, and observed and expected relative density of salmonids at fish index monitoring stations in the Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1990. [0.0] Indicates fish present in low abundance.

MONITORING STATION LOCATION	MONITORING STATION REF.	NO. OF FISH TAXA	OBSERVED RELATIVE DENSITY OF SALMONIDS (NO./M2)		EXPECTED RELATIVE DENSITY OF SALMONIDS (NO./M2)	
			STH	COH	STH	COH
GATES CR. - LOWER	ES-3	2	0.4		0.4	
GATES CR. - UPPER	ES-4	3	0.1		0.1	
ELK CR. -LOWER	ES-14	3	0.3		NO DATA	
ELK CR. -UPPER	ES-15	1	0.4		NO DATA	
GREENWOOD CR. - LOWER	ES-12	3	0.3		0.3	
GREENWOOD CR. - UPPER	ES-13	2	0.6		0.6	
MAINSTEM ALBION- AT CONFLUENCE	ES-6	4	0.2	0.0	0.2	0.0
MAINSTEM ALBION- 1MI ABOVE CONFLUENCE	ES-7	4	0.2	0.0	0.2	0.0
S. FK ALBION- ABOVE CONFLUENCE	ES-8	2	0.2		0.2	
S.FK. ALBION- 1MI ABOVE CONFLUENCE	ES-9	2	0.2		0.2	
INDEX STATION- RAILROAD GULCH	ES-11	2	0.5	0.1	0.6	0.1
WILLOW CR. - LOWER	ES-18	3	0.2		0.2	
WILLOW CR. - UPPER	ES-19	2	0.4	0.4	0.4	0.4

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 7-c. Relative biomass and length distribution of salmonids at fish index monitoring stations in the Big River, Elk Creek, Greenwood Creek, and Albion River watersheds, Mendocino Co., and the Russian River watershed, Sonoma Co., California. Summer and Fall 1990.

MONITORING STATION LOCATION	MONITORING STATION REF.	RELATIVE BIOMASS OF SALMONIDS (G WET MASS/M2)		LENGTH DISTRIBUTION OF SALMONIDS (MM) N (RANGE)	
		STH	COH	STH	COH
GATES CR. - LOWER	ES-3	2.3		33(55-120)	
GATES CR. - UPPER	ES-4	0.9		7 (65-125)	
ELK CR. -LOWER	ES-14	2.5		55 (46-167)	
ELK CR. -UPPER	ES-15	3.1		93 (52-170)	
GREENWOOD CR. - LOWER	ES-12	1.9		60 (58-147)	
GREENWOOD CR. - UPPER	ES-13	6.5		84(54-220)	
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6	1.2	0.3	23(42-159)	2(78-96)
MAINSTEM ALBION R. - 1 MI ABOVE CONFLUENCE	ES-7	0.3	0.1	19(39-63)	2(79-91)
S. FK. ALBION R. - ABOVE CONFLUENCE	ES-8	0.6		12(45-103)	
S. FK. ALBION R. - 1MI ABOVE CONFLUENCE	ES-9	0.5		12(48-75)	
RAILROAD GULCH	ES-11	2.8	1.1	31 (40-151)	8(68-83)
WILLOW CR. - LOWER	ES-18	1.4		26(60-130)	
WILLOW CR. - UPPER	ES-19	3.1	1.3	18(55-135)	17(52-70)

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 8-a. Survey parameters of fish population index stations in the Albion River watershed, Mendocino Co., California. Spring 1989 and 1988. (-) Indicates data not recorded.

WATERSHED	MONITORING STATION LOCATION	MAP REF. (MONITORING STATION REF./ YEAR)	SURVEY DATE MMDD	SURVEY METHOD E=ELECTR O- FISHING; D=DIVER OBSVR.	SURVEY EFFORT (MIN.)	TOTAL STATION LENGTH (M)	MEAN WIDTH (M)	MEAN DEPTH (M)
ALBION RIVER	MAINSTEM ALBION R. - AT CONFLUENCE	1-C (ES-6/89)	06/15	E	-	30.0	2.7	0.3
ALBION RIVER	S. FK. ALBION R. - ABOVE CONFLUENCE	1-C (ES-8/89)	06/15	E	-	30.0	2.1	0.1
ALBION RIVER	RAILROAD GULCH	1-C (ES-1/89)	05/25	E	-	30.0	1.8	0.1
ALBION RIVER	RAILROAD GULCH	1-C (ES-11/88)	05/19	E	-	30.0	1.7	0.1

Table 8-b. Number offish taxa, and observed and expected relative density of salmonids at fish index monitoring stations in the Albion River watershed, Mendocino Co., California. Spring 1989 and 1988.

MONITORING STATION LOCATION	MONITORING STATION REF./ YEAR	NO. OF FISH TAXA	OBSERVED RELATIVE DENSITY OF SALMONIDS (NO./M2)		EXPECTED RELATIVE DENSITY OF SALMONIDS (NO./M2)	
			STH	COH	STH	COH
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6/89	4	0.1	0.7	0.1	0.8
S.FK. ALBION R. - ABOVE CONFLUENCE	ES-8/89	3	0.3	0.9	0.4	0.9
RAILROAD GULCH	ES-11/89	2	1.6	0.8	2.1	0.8
RAILROAD GULCH	ES-11/88	2	0.3	1.5	0.3	1.5

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 8-c. Relative biomass and length distribution of salmonids at fish index monitoring stations in the Albion River watershed, Mendocino Co., California. Spring 1989 and 1988.

MONITORING STATION LOCATION	MONITORING STATION REF./YEAR	RELATIVE BIOMASS OF SALMONIDS (G WET MASS/ M2)		LENGTH DISTRIBUTION OF SALMONIDS (MM) N (RANGE)	
		STH	COH	STH	COH
MAINSTEM ALBION R. - AT CONFLUENCE	ES-6/89	0.7	1.5	10(47-142)	57(32-68)
S. FK. ALBION R. - ABOVE CONFLUENCE	ES-8/89	0.5	1.0	24(33-114)	32(37-65)
RAILROAD GULCH	ES-11/89	1.9	1.1	88(30-125)	43(38-74)
RAILROAD GULCH	ES-11/89	1.7	1.9	13(62-95)	73(35-71)

WECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Table 9-a. Survey parameters of fish index monitoring stations in the Garcia River watershed, Mendocino Co., California. Summer 1987. [-] Indicates data not recorded.

WATERSHED	MONITORING STATION LOCATION	MAP REF. (MONITORING STATION REF./ YEAR)	SURVEY DATE MM/DD	SURVEY METHOD E=ELECTR O- FISHING; D=DIVER OBSVR.	SURVEY EFFORT (MIN.)	TOTAL STATION LENGTH (M)	MEAN WIDTH (M)	MEAN DEPTH (M)
GARCIA RIVER	S. FK. GARCIA R. - BELOW FLEMMING CR.	1-F(ES-16)	08/17	E	26.4	30.0	2.9	0.1
GARCIA RIVER	FLEMMING CR. -ABOVE CONFLUENCE	1-F (ES-17)	08/17	E	35.6	30.0	1.9	0.1

Table 9-b. Number of fish taxa, and observed and expected relative density of salmonids at fish index monitoring stations in the Garcia River watershed, Mendocino Co., California. Summer 1987.

MONITORING STATION LOCATION	MONITORING STATION REF./ YEAR	NO. OF FISH TAXA	OBSERVED RELATIVE DENSITY OF SALMONIDS (NO./M2)		EXPECTED RELATIVE DENSITY OF SALMONIDS (NO./M2)	
			STH	COH	STH	COH
S. FK. GARCIA R. - BELOW FLEMMING CR.	ES-16/87	3	1.5		NO DATA	
FLEMMING CR, -ABOVE CONFLUENCE	ES-17/87	1	1.0	0.1	NO DATA	NO DATA

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON

Table 9-c. Relative biomass and length distribution of salmonids at fish population index stations in the Garcia River watershed, Mendocino Co., California. Summer 1987.

MONITORING STATION LOCATION	MONITORING STATION REF./YEAR	RELATIVE BIOMASS OF SALMONIDS (G WET MASS/M2)		LENGTH DISTRIBUTION OF SALMONIDS (MM) N (RANGE)	
		STH	COH	STH	COH
S. FK. GARCIA R. - BELOW FLEMMING CR.	ES-16/87	2.1	0.3	82 (35-130)	10(58-73)
FLEMMING CR. - ABOVE CONFLUENCE	ES-17/87	3.5			84(31-112)

SPECIES ABBREVIATION: STH=STEELHEAD TROUT; COH=COHO SALMON.

Figure 2a: Steelhead densities at two index monitoring sites in the Garcia River watershed, Mendocino County, CA. 1987, 1991 - 1994. In 1992, Flemming Creek was the only site monitored in this watershed.

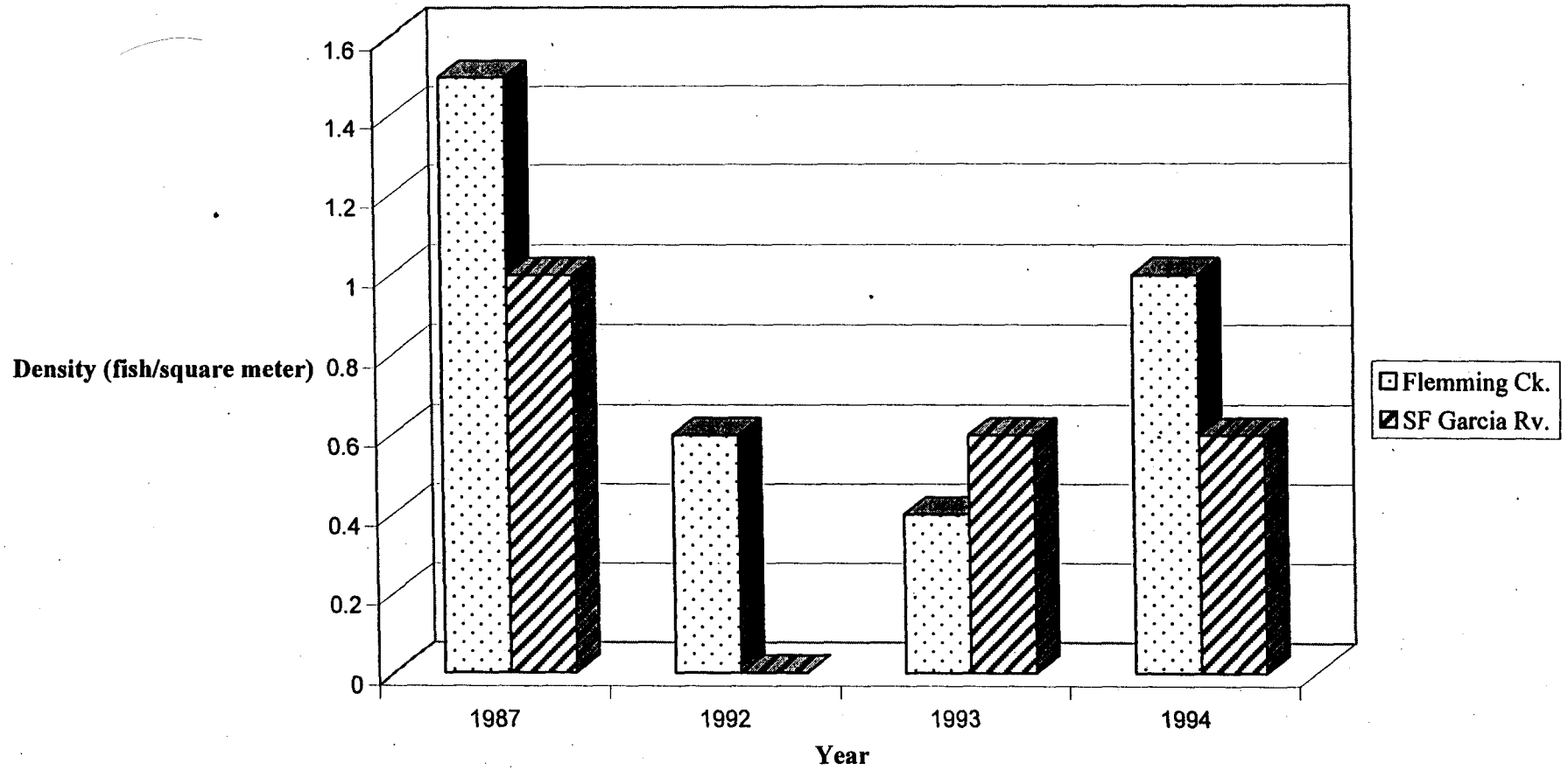


Figure 2b: Steelhead densities at four index monitoring sites in the Big River watershed, Mendocino County, CA. 1990 - 1994. Big Rv. - Wildhorse opening and NF Big Rv. - East Branch were not surveyed from 1990 - 1992.

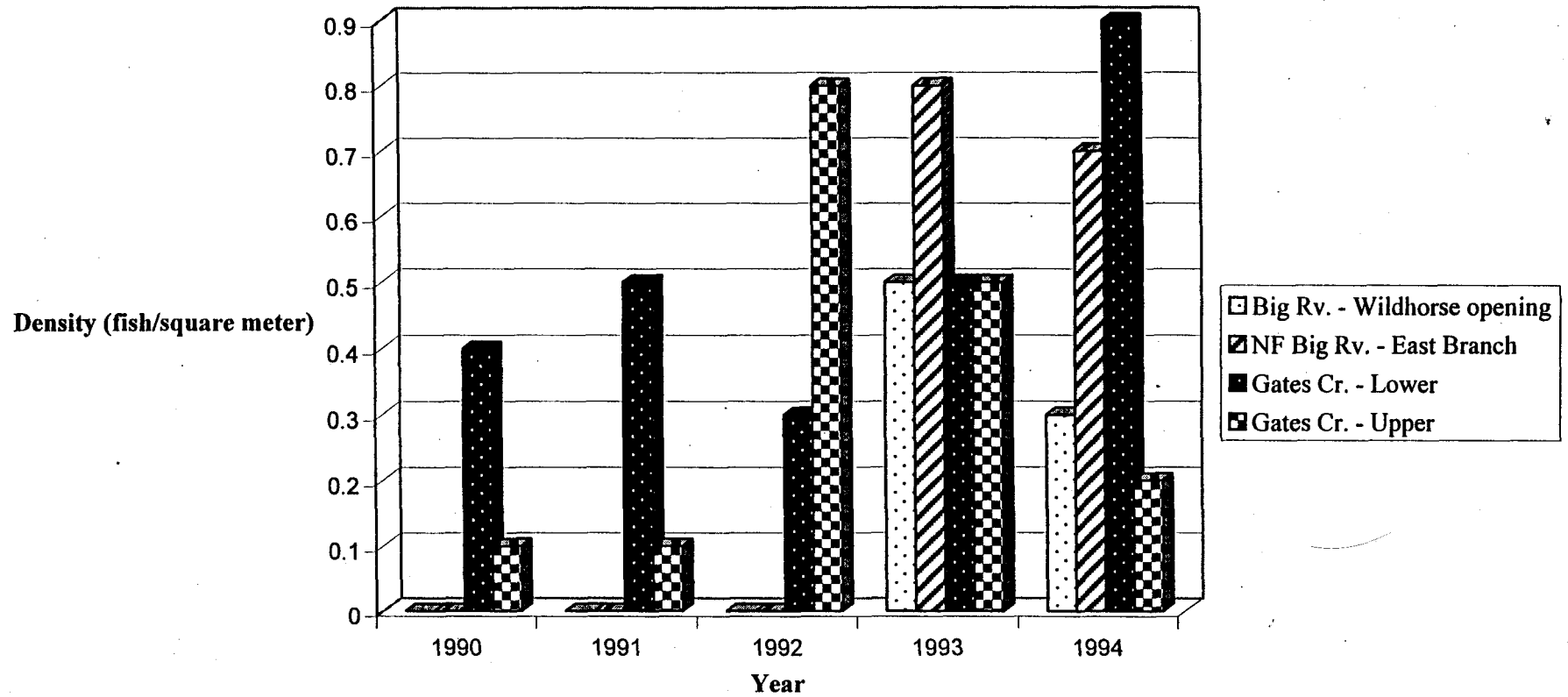


Figure 2c: Steelhead densities at four index monitoring sites in the South Coast Area, Mendocino County, CA. 1990 - 1994. None of the four sites was monitored in 1991.

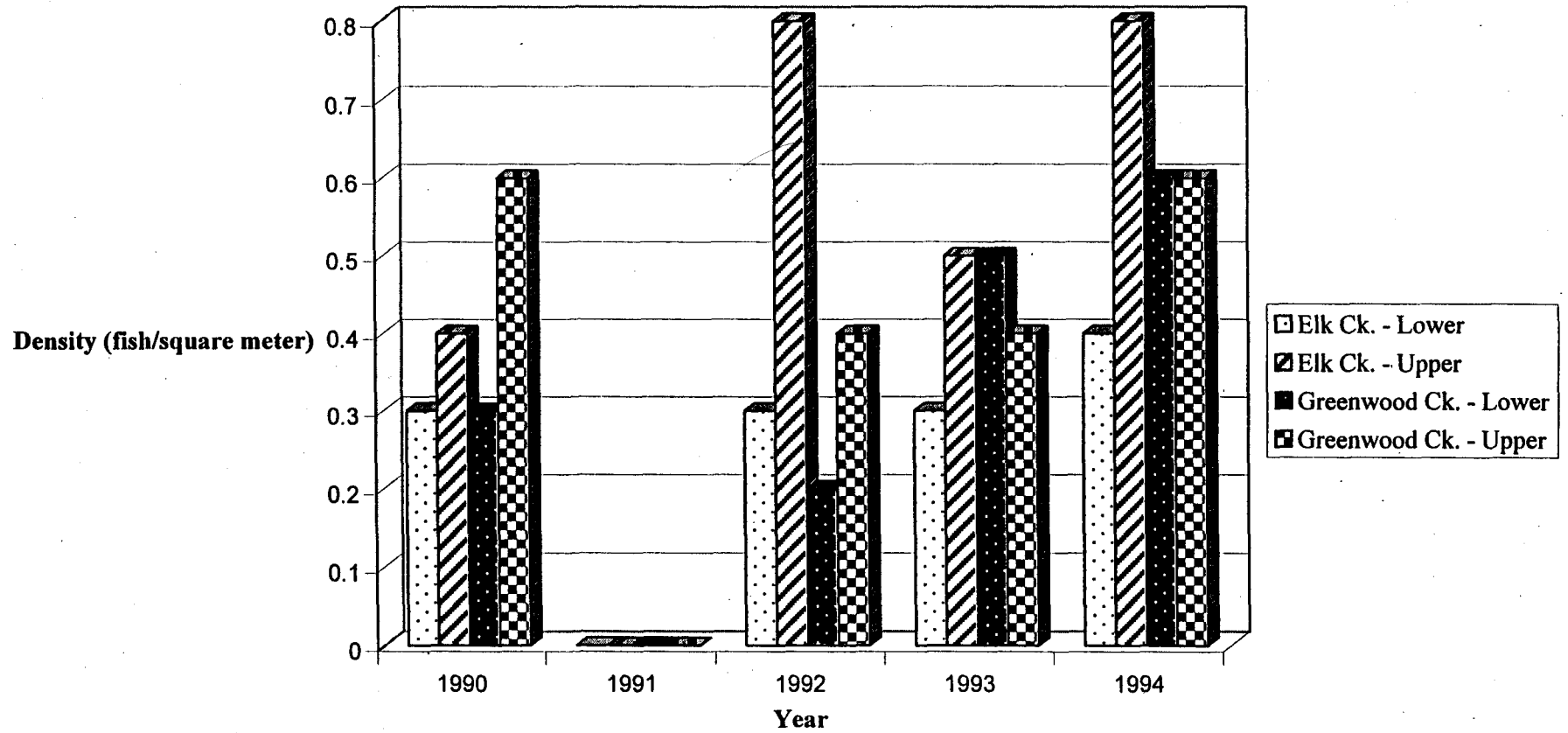


Figure 2d: Steelhead densities at seven index monitoring sites in the Albion River watershed, Mendocino County, CA. 1988-1996. In 1988, only one site was monitored, three in 1989, five in 1990, and all seven sites were monitored from 1991-1996.

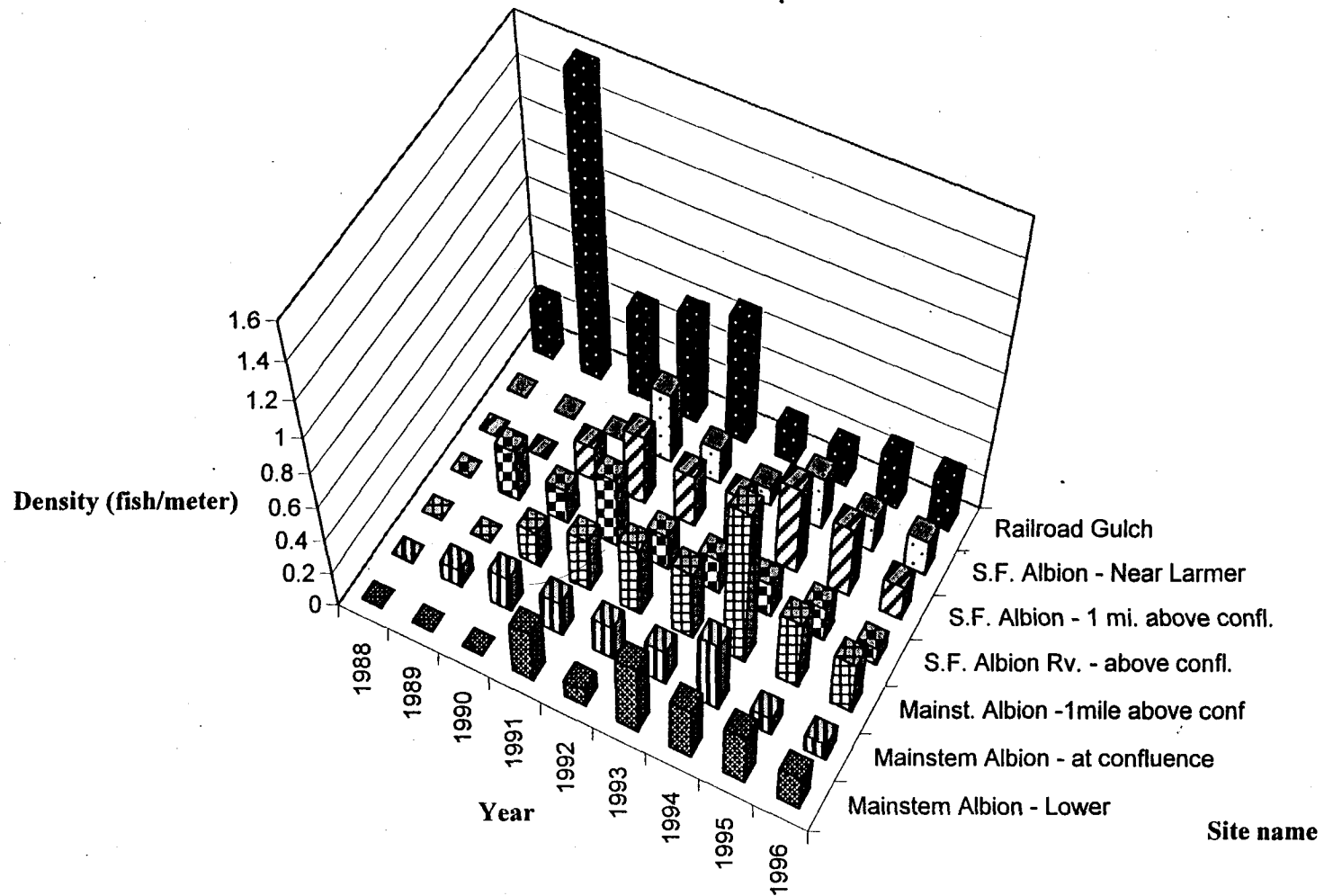


Figure 2e: Coho densities at seven index monitoring sites in the Albion River Watershed, Mendocino County, CA. 1988-1996. In 1988, only one site was monitored, three in 1989, five in 1990, and all seven sites were monitored from 1991-1996.

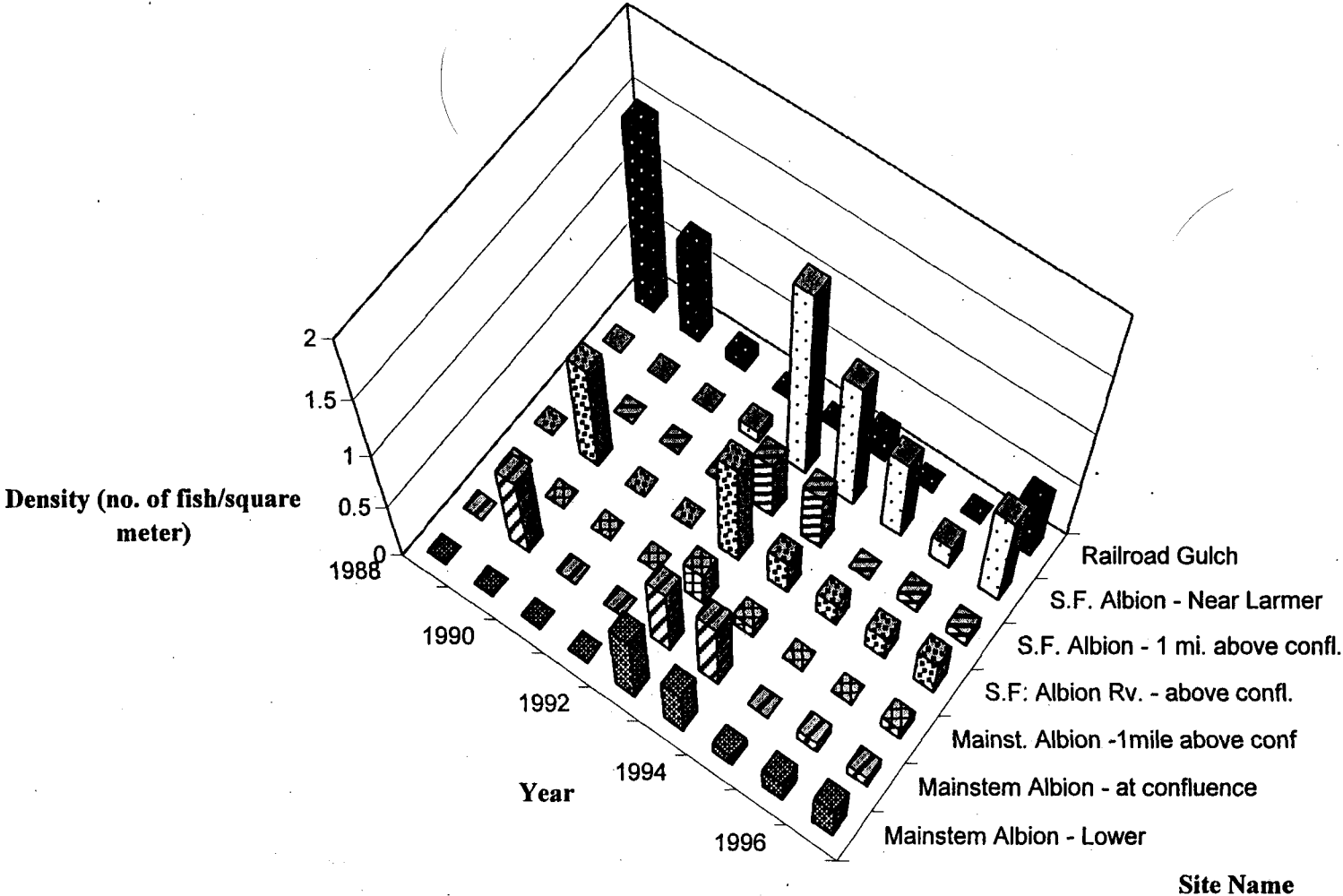


Figure 2f: Coho densities correlated with juvenile coho salmon life cycle trends in the Albion River watershed, Mendocino County, CA. 1988-1996. In 1990, Mainstem Albion - Lower and SF Albion - Larmer Gulch were not monitored.

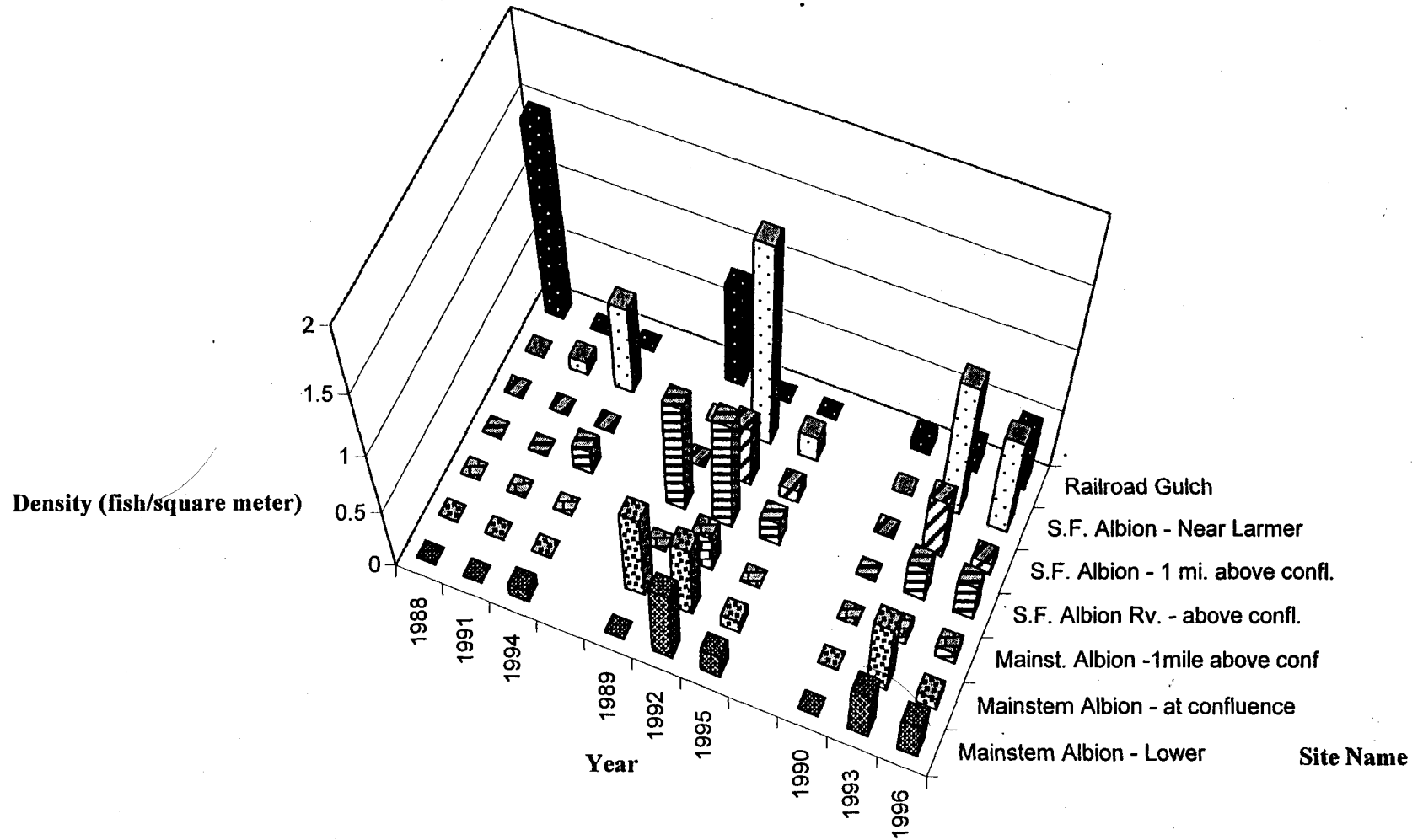


Figure 2g: Steelhead densities at two index monitoring sites in the Willow Creek watershed, Sonoma County, CA. 1990 - 1994. In 1992, the Willow Cr. - Upper site was not monitored and in 1994, the Willow Cr. - Lower site was not monitored.

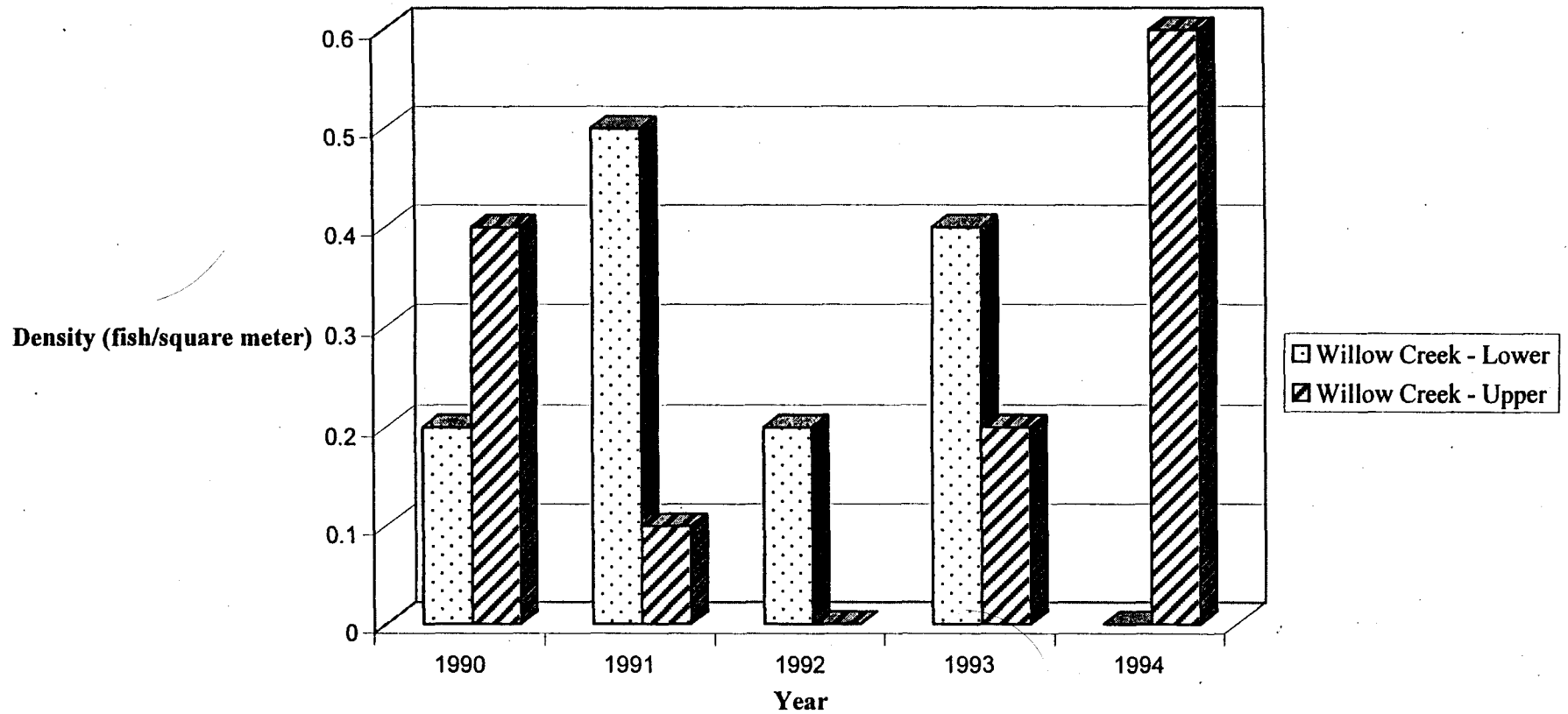


Figure 3a: Steelhead Length frequency histogram for the Garcia River watershed, Mendocino County, CA. Includes data from two index monitoring sites - South Fork Garcia and Flemming Cr. No survey was done at South Fork Garcia site in 1992.

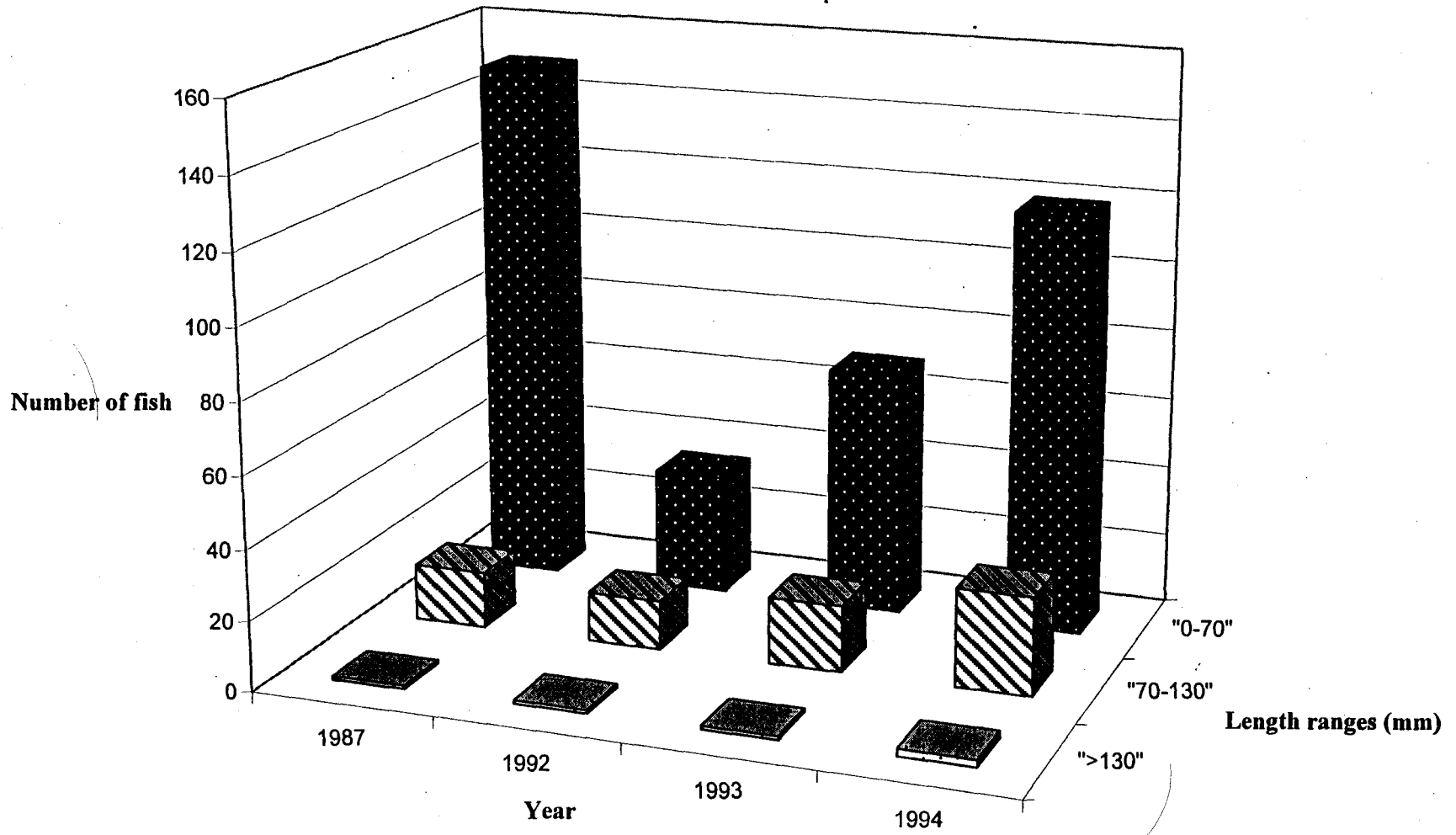


Figure 3b: Steelhead length frequency histogram for Big River watershed, Mendocino County, CA. Includes data from four index monitoring sites. Big Rv. - Wildhorse opening and NFk Big Rv. - East Branch were monitored in 1993 and 1994 only.

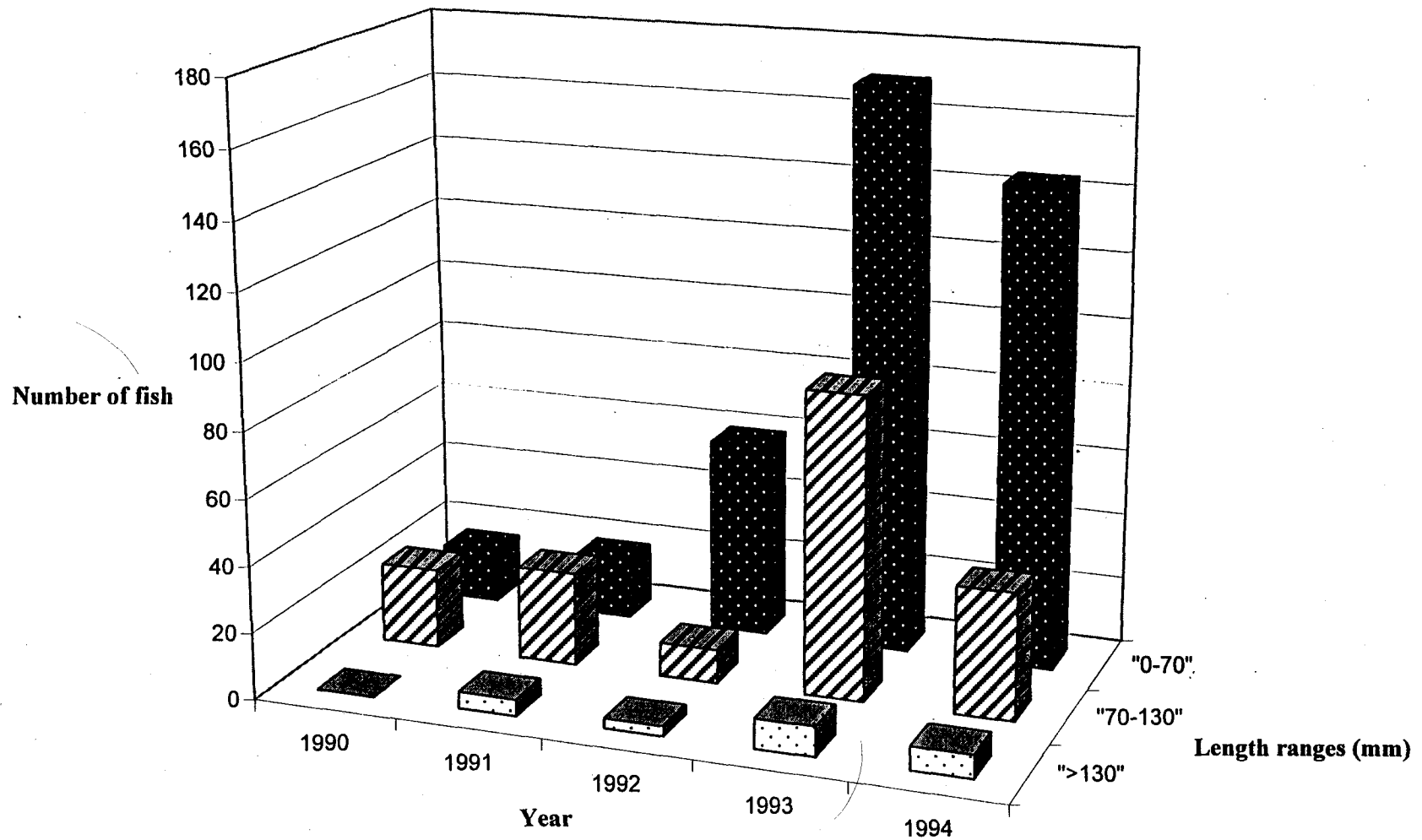


Figure 3c: Steelhead length frequency histogram for the Greenwood Creek watershed, Mendocino County, CA. Includes data from two index monitoring sites, Greenwood Cr. - Lower and Upper.

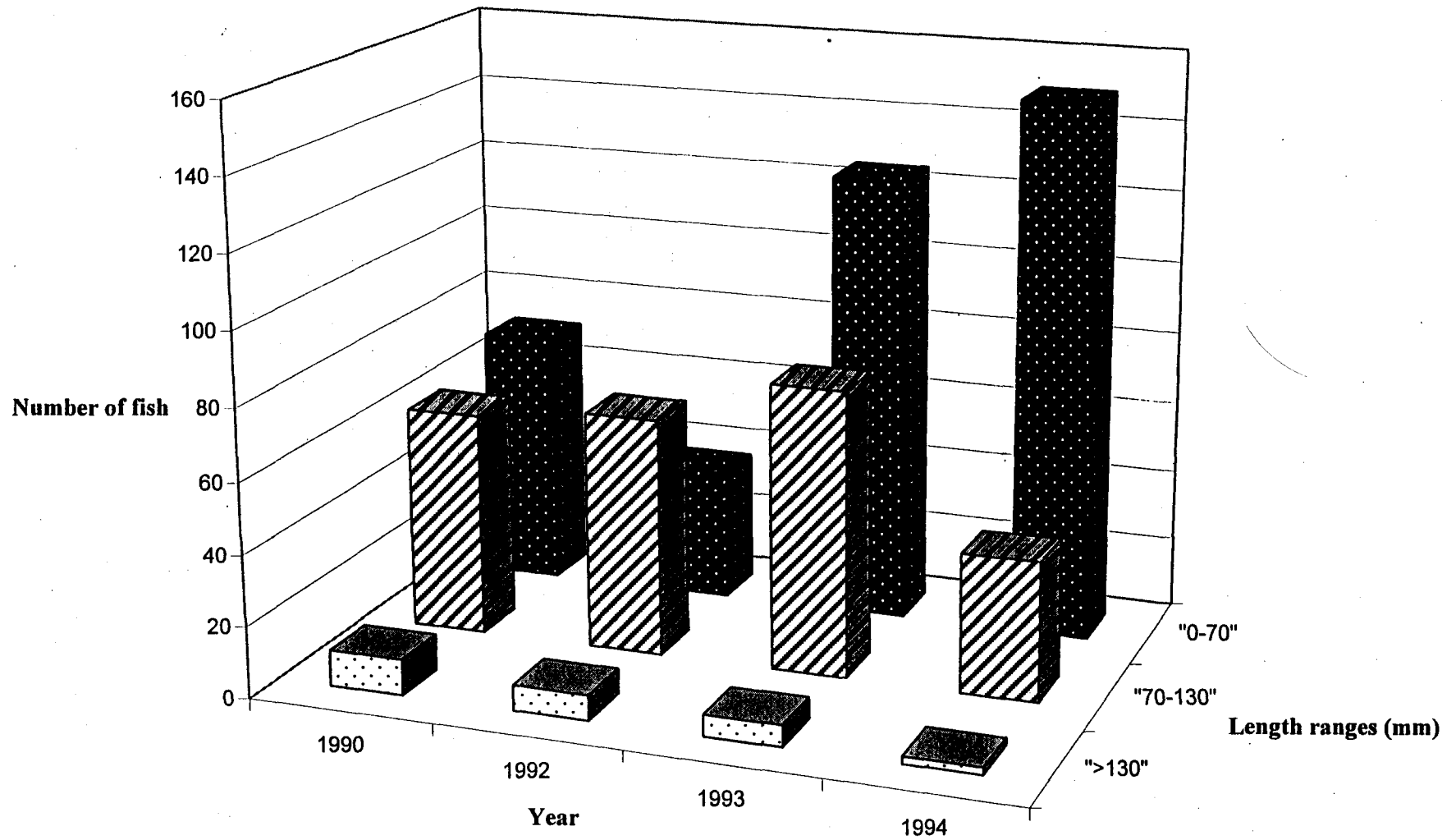


Figure 3d: Steelhead length frequency histogram for the Elk Creek watershed, Mendocino County, CA. Includes data from two index monitoring sites, Elk Cr.- Lower and Elk Cr.- Upper.

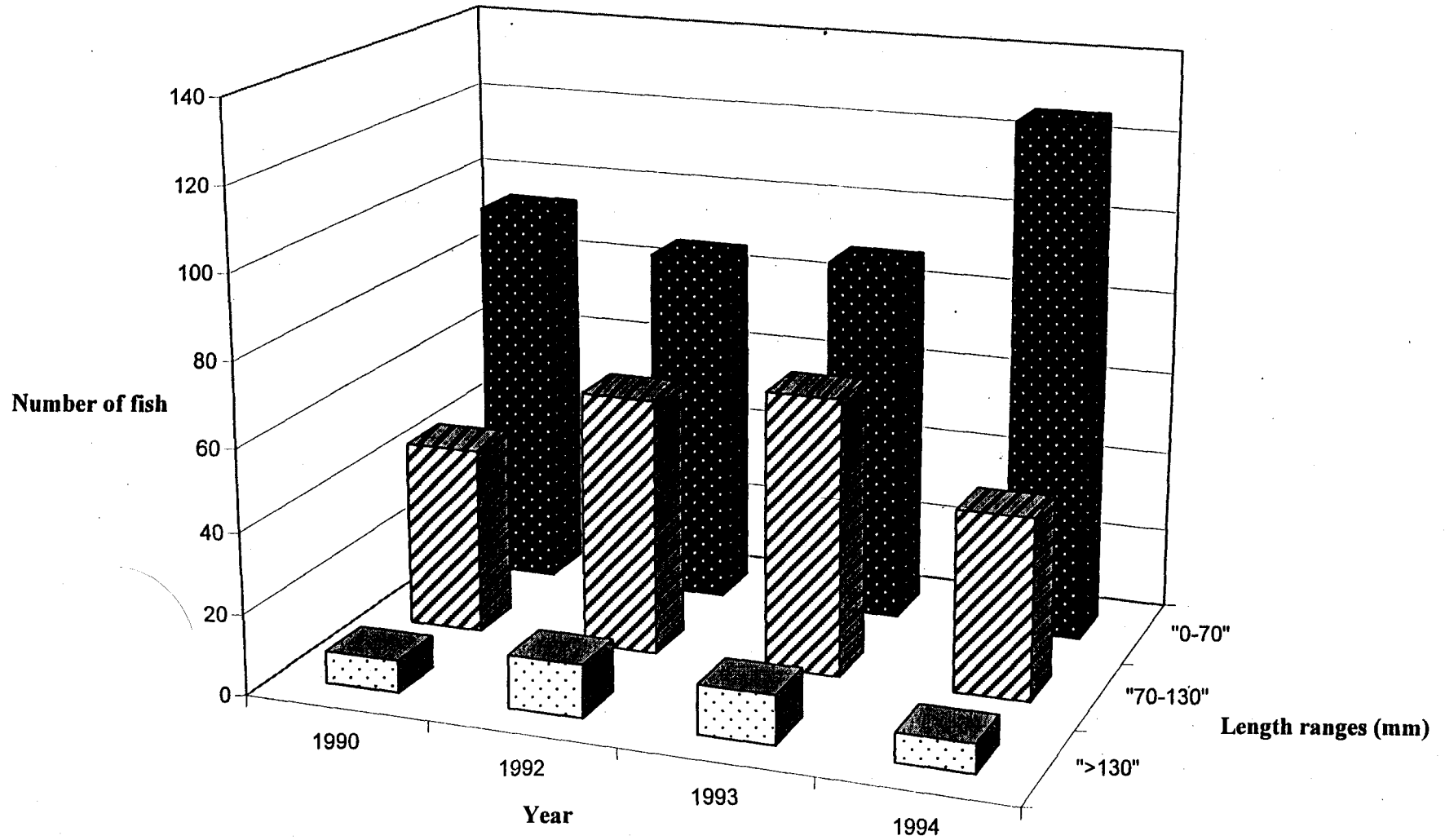


Figure 3e: Steelhead length frequency histogram for the Albion Watershed, Mendocino County, CA. Includes data from seven index monitoring sites. One site was monitored in 1988, 3 in 1989, 5 in 1990, 7 in 1991-1996.

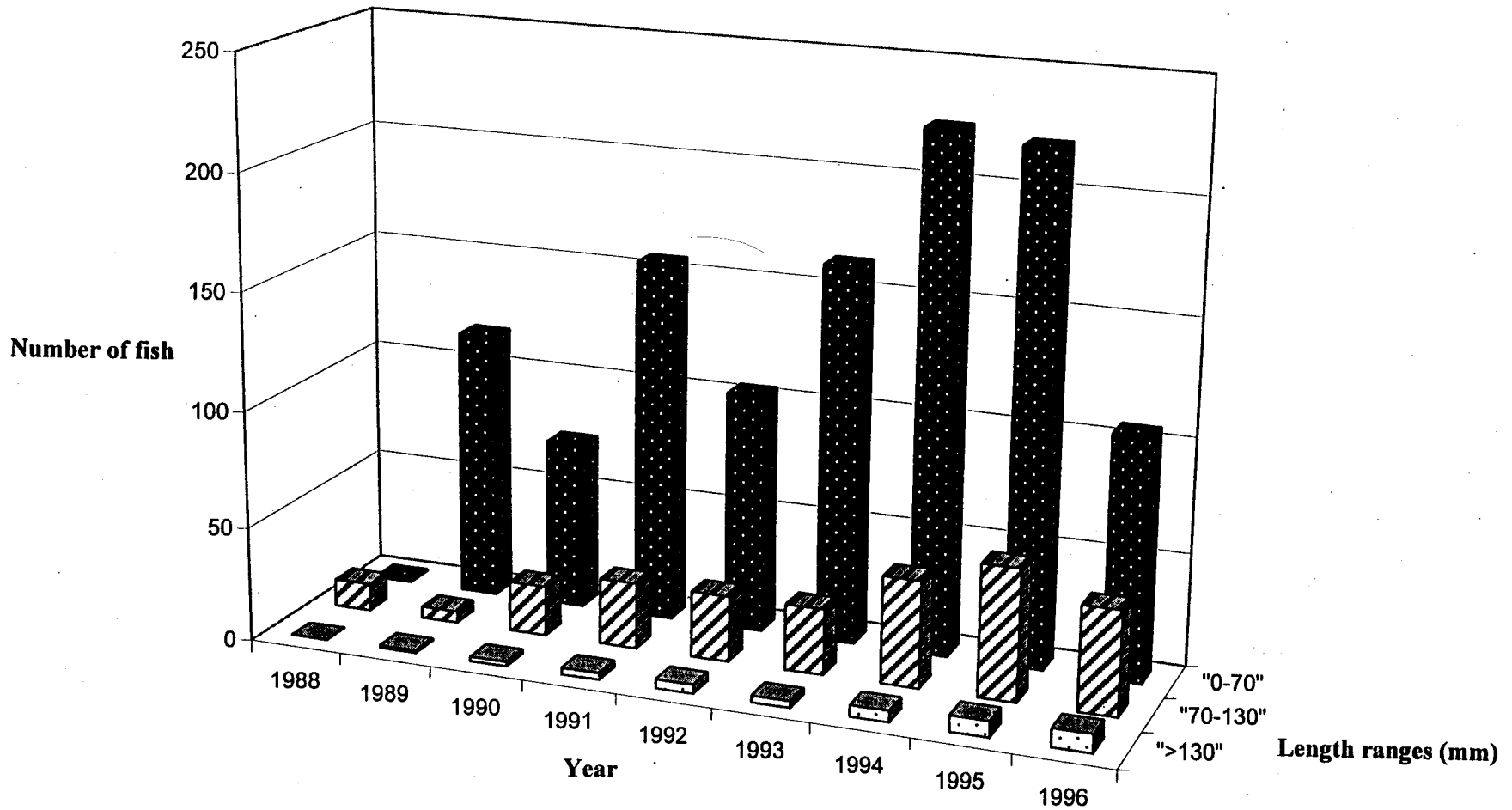


Figure 3f: Coho length frequency histogram for the Albion River watershed, Mendocino County, CA. Includes data from seven index monitoring sites. One site was monitored in 1988, 2 in 1989, 5 in 1990, and all 7 from 1991-1996.

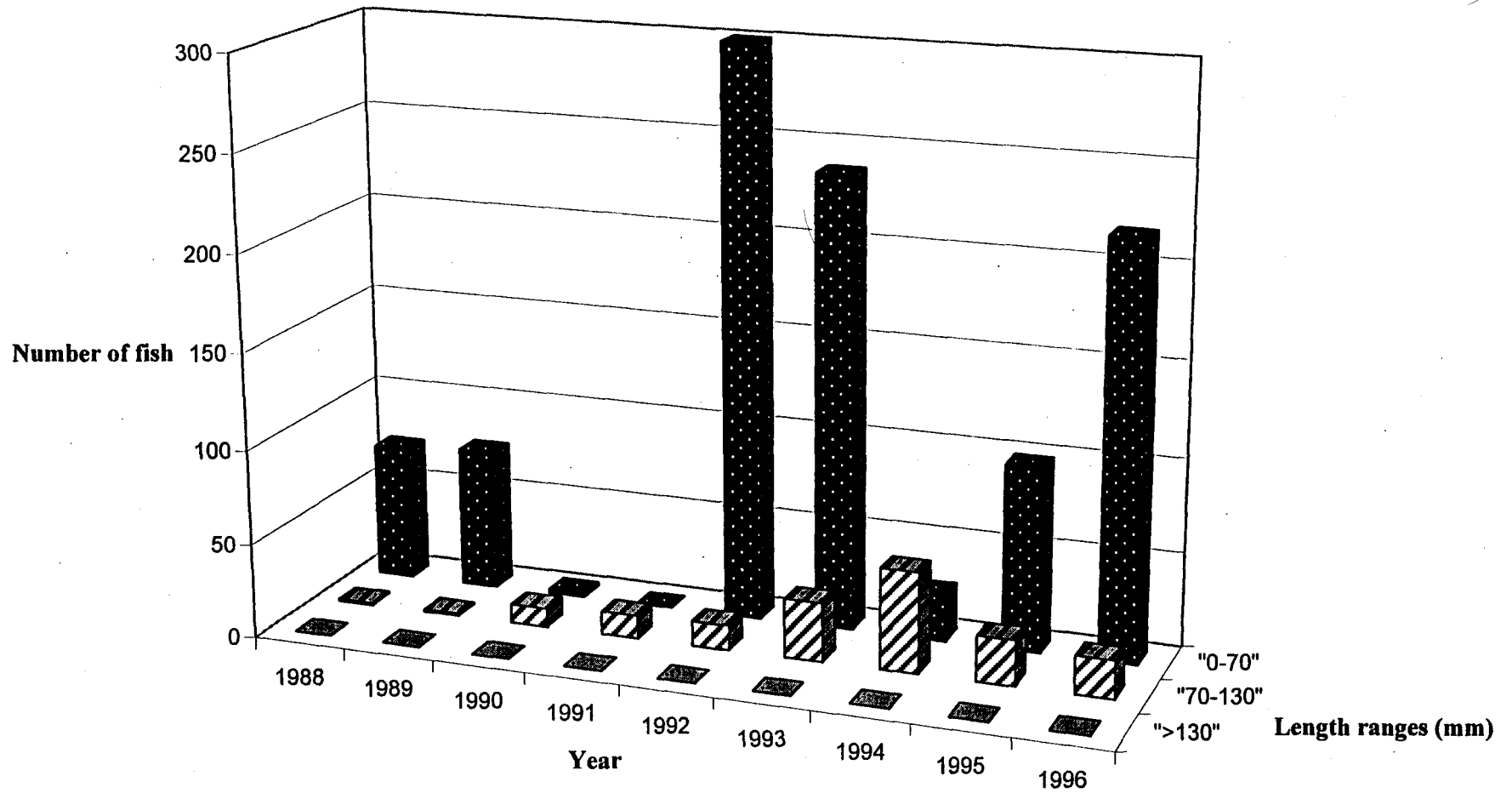


Figure 3g: Steelhead length frequency histogram for Willow Cr. watershed, Sonoma County, CA. Includes data from two index monitoring sites. In 1992, Lower site only monitored. In 1994, Upper site only monitored.

