

SECTION F FISH HABITAT ASSESSMENT AND SALMONID DISTRIBUTION

INTRODUCTION

Anadromous salmonids inhabiting the Albion River WAU are coho salmon (*Oncorhynchus kisutch*), chinook salmon (*O. tshawytscha*), steelhead trout (*O. mykiss*), and Pacific lamprey (*Lamptera tridentata*). Other non-salmonid species within the Albion River WAU include the three spine stickleback (*Gasterosteus aculeatus*), and sculpin (*Cottus* spp.).

Field surveys were conducted to evaluate the quality and quantity of salmonid habitat in the Albion WAU. Surveys included salmonid habitat typing and assessment, stream gravel permeability measurements and bulk gravel samples. The fish habitat assessment evaluated spawning, rearing and overwintering habitats based on targets derived from scientific literature (Bilby and Ward, 1989; Bisson et al., 1987; CDFG, 1998; Montgomery et al., 1995; Washington Forest Practices Board, 1995) and professional judgment. The habitat data are combined into indices of habitat quality for the different life history stages.

Aquatic species distribution surveys were conducted by the previous landowners (Louisiana-Pacific Corp.) from 1994-1996, and were repeated by MRC from 2000-2002 (MRC 2002). The study consisted of single pass electrofishing or snorkeling surveys in the summer months to assess aquatic species distribution and composition in the Navarro WAU. All organisms observed were identified to the lowest possible taxonomic level.

Permeability and bulk gravel samples were taken in select fish bearing reaches of the Albion WAU to determine an index of spawning gravel quality. Permeability and gravel particle size distributions are stream substrate parameters, which affect survival of incubating salmonid embryos. Salmonid eggs buried under up to a foot of gravel depend on sufficient intragravel water flow for their survival and development. Fine sediment within spawning gravel can impede intragravel water flow, reducing the delivery of dissolved oxygen to eggs, which can increase mortality in the egg to emergence stage. Forest management practices may increase the delivery of fine sediment to the stream channel, potentially impacting spawning gravel. The assessment of substrate permeability and composition are useful in monitoring the effects of increased sediment delivery on salmonid spawning and incubation conditions.

Also included is a summary of historic information on the Albion WAU. The historic perspective incorporates information on stream survey conducted by California Department of Fish and Game dating back to the 1960s.

Historic Perspective

Mainstem Albion

The oldest stream survey on record for the Albion River is a survey done in 1961 by California Department of Fish and Game (CDFG). Approximately 11 miles of the Albion River (from the lagoon area to the upper headwaters) was surveyed in October, 1961. The CDFG survey describes the mainstem Albion River as a low gradient stream with very poor flow throughout the drainage. The substrates are described as mostly bedrock with pockets of gravel in the upper stretches of the stream, and predominately mobile smaller gravels in the lower river.

Coho salmon, steelhead trout, and stickleback were observed during this survey. Coho salmon were detected in intermittent pools throughout the mainstem. These pools left the coho vulnerable to predators. The recommendations for the mainstem Albion River in 1961 were to remove log jams and one natural falls that existed in the upper section of the stream to enhance migration of salmon and steelhead. This survey also discovered some possible problems with domestic water use in Comptche where the stream was drying up faster in summer months and possible pollution problems from houses in Comptche.

In 1966 another survey was conducted by CDFG which included the mainstem of the Albion River and some of its tributaries. The spawning substrate at this time was described similarly to the conditions of 1961, with the upper Albion having spawning substrate associated with bedrock pools and the lower river having unstable smaller gravels that were not conducive to spawning. The 1966 survey indicates eight water diversions in the upper Albion River. CDFG concluded these diversions resulted in loss of habitat during the summer months. Coho salmon, steelhead, stickleback, and one sculpin were netted and identified. The recommendations for the Albion in 1966 were again to remove logjams to enhance fish passage.

The mainstem Albion was surveyed again by CDFG in January and February 1979. The surveyor described the lower river as heavily silted, however good spawning gravels were found in the North Fork and Upper South Fork. During these winter surveys, coho were seen spawning in the South Fork Albion River as well as the North Fork. A number of log jams were documented in the 1979 CDFG survey, but no recommendations were made at the time for removal of wood material.

Railroad Gulch

There are two Railroad Gulch streams in the Albion drainage. One is located four miles upstream from the mouth of the Albion River and the other is located approximately two miles upstream from the confluence of the mainstem Albion River and South Fork Albion River, called East Railroad Gulch. A 1961 survey was conducted by CDFG on the Railroad Gulch located four miles above the mouth of the Albion River. This is a second order stream which is approximately two miles long. The 1961 survey described Railroad Gulch as having remnants of an old railroad bed as well as piers for an elevated railroad. Considerable amounts of woody debris and logjams existed in Railroad Gulch, with slow intermittent flow. Spawning gravels were considered suitable in about 20% of this stream in 1961, with 70% having value as good salmon and steelhead rearing habitat. Coho salmon and steelhead were observed in the main Railroad Gulch, but very few fish were seen in its smaller tributaries. The recommendations for Railroad Gulch in 1961 were to clear all logging debris and cut a channel through marshy areas. In the lower section of Railroad Gulch where there was no debris, it was recommended that the area be left alone to serve as a marsh area for migrating waterfowl.

In 1978 the CDFG survey depicts Railroad Gulch as a low gradient marshy stream with large amounts of woody debris. Suitable spawning gravels were present, but were compacted with silt according to reports. Salmonids were reported throughout the stream, including areas beyond many logjams. The recommendation for Railroad Gulch in 1978 was to clear the stream of logjams.

Pleasant Valley Creek

Pleasant Valley Creek is a first order stream and a tributary to Railroad Gulch. A survey was conducted by CDFG in 1962. The flow during the survey was estimated at 0.25 cfs. Spawning potential for the total stream was determined as about 50% of the area being suitable for adult salmonids. The habitat of this tributary stream was described as good, with logjams and undercut banks. Fish species present included coho salmon and steelhead trout. Logjams noted on this survey were described as not being passage barriers, yet recommendations for this stream were to remove woody material. It is not known at this time if work crews removed any material.

A 1978 CDFG survey of Pleasant Valley Creek had similar results as the 1962 survey. The creek had many small logjams creating excellent rearing habitat, yet not causing fish passage problems. Spawning habitat also is described as excellent in the small tributary system. This stream has two miles of good salmonid habitat; then a natural rock barrier exists. This is the last survey on record with CDFG. No management recommendations were made in 1978.

South Fork Albion

In 1961 the South Fork Albion was surveyed by CDFG. Surveyors found intermittent flow in many areas, with flow up to 0.2 cfs near the confluence at the mainstem Albion River. The upper section of the South Fork was described as a muddy swamp-like section. The lower section contained good spawning gravel and more rubble. Pools are described as being formed by logjams with rootwads, but no bedrock was present in pools. Fish observed were steelhead, coho salmon, and stickleback, but were difficult to quantify with direct observation techniques. The recommendations made by CDFG was to clear all log jams and miscellaneous slash and debris from the South Fork Albion and its tributaries.

A survey of the South Fork Albion done by CDFG in July of 1966 describes the spawning gravels as good and aquatic insect production also good. In this survey 182 coho juveniles, 99 steelhead juveniles, and a few three-spine stickleback were netted. The area between the confluence of the Little North Fork and Harry Johnson Ranch Road (Upper South Fork) is described as having little fishery value because of stagnant pools, low gradient, and mud. Both coho and steelhead were utilizing the stream above the mud flat area. The area below Little North Fork was described as a dry channel with intermittent pools holding trapped juvenile fish. Recommendations in 1966 were to clear four logjams located below Little North Fork. No clearance of the marsh thicket in Upper South Fork was recommended, because no benefit would result. Clearance was also proposed for fifteen small jams in Norden Gulch, Soda Springs Gulch, and the headwaters area.

Kaison Gulch

Kaison Gulch is a first order stream that flows into the mainstem Albion River approximately ½ mile upstream of the South Fork confluence. A distance of 1.5 miles was surveyed in 1962 by CDFG. The stream is described as having good woody cover for juvenile salmonids, but more bedrock substrate than other streams of its size. Steelhead trout were present from the mouth of Kaison Gulch up to about 0.1 mile. Spawning habitat was rated as fair during the 1962 survey. Recommendations made by CDFG were to remove log jams on 1.5 miles of the upper Kaison

Gulch with the exception of the 0.1-mile of the lower creek. No other surveys or documentation are available to substantiate the recommended work on Kaison Gulch.

North Fork Albion

The North Fork Albion River flows in an east to west direction and enters the mainstem of the Albion approximately $\frac{3}{4}$ mile south of the town of Comptche. Only two surveys were found for this stream, one in 1961 and the other in 1966. Both were conducted by CDFG. The entire North Fork was surveyed to the confluence with the mainstem Albion. The surveys state that the mid-portion of the creek was once heavily wooded with redwood, but was currently being used for grazing. The lower section was heavily forested with second growth redwood and Douglas fir. The flow was 0.1 cfs at the confluence with the mainstem Albion River. Substrates were described as predominantly bedrock, with large amounts of gravel, silts, and sand. Spawning areas were considered poor in the lower reaches of the North Fork and fair in the headwaters area. A barrier consisting of an earth dam was observed in the 1961 survey. Coho salmon and steelhead were observed in the North Fork survey. The 1961 recommendations were to remove 66 logjams and to have the stream included in the fish rescue program.

The results of a 1966 survey were similar to those from the 1961 survey. Coho salmon, steelhead, and stickleback were seen. Good spawning gravels and logjams were found. The recommendation was to clear the stream of logjams. The 1966 survey is the last on record for the North Fork Albion and the only other information on file at CDFG is a letter from a resident in Comptche. In the letter dated July 16, 1989, Joan Rosen states that help is needed from the Department of Public Health in identifying polluters of the North Fork Albion River. She states that human fecal material is being discharged into the North Fork Albion and that a private lab analyzed water samples for her. The lab confirmed that both human and animal coliform counts were very high. No other information was found on file to substantiate or refute the claim of this pollution problem.

Marsh Creek

Marsh Creek is a second order stream and tributary to the mainstem Albion River. A survey conducted in 1961 characterized this stream as a low gradient intermittent stream. Coho salmon, steelhead, and stickleback were observed during the survey in small intermittent pools. Surveyors determined logging and fires as the cause of considerable damage to the headwaters of Marsh Creek. The lower section of the creek was littered with trash from nearby ranches. Overall spawning and rearing habitat in Marsh Creek was considered poor. It was recommended that the creek be completely cleared of debris and alder, willow and other brush so the original streambed could be exposed for spawning fish.

On July 12, 1966 CDFG surveyors found Marsh Creek in similar condition as that described in the 1961 survey. Fine gravel bottom, low gradient, and little invertebrate production was noted. Coho salmon, steelhead and stickleback were present. The recommendations for the 1966 survey were to remove eight small log jams and one old stringer bridge which was causing a jam, to encourage the movement of salmon and steelhead juveniles out of the system to the mainstem of the Albion River.

A dam built on Marsh Creek in 1971 by Mr. Richard B. Wells restricted salmon and steelhead of Marsh Creek to the lower 0.7 miles of spawning and rearing habitat. Salmon and steelhead previously used approximately 2.2 miles of Marsh Creek for spawning and rearing. Before the dam was built in 1971, Mr. Thomas J. Grogan had constructed a dam in 1966. This dam was 2.2 miles upstream on Marsh Gulch and blocked anadromous fish passage above this point in the

stream. A survey in 1977 revealed no salmon or steelhead in Marsh Creek. The lower 0.7 miles of stream did not have anadromous fish, possibly as a result of the drought of 1976-77. The survey did reveal that green sunfish had been introduced to the lower impoundment. Eradication of green sunfish was recommended through chemical treatment of the impoundment. On October 24, 1977 Rotenone was used to kill all of the sunfish and a few trout and stickleback in the two acre impoundment.

In November, the reservoir was stocked with rainbow trout, and later, in 1981, approximately 1200 steelhead were planted in Marsh Creek. Since 1981 the CDFG mitigation measures for the dam included stocking Marsh Creek with steelhead when they were available. There is no documentation to verify whether or not stocking actually occurred after 1981.

Tom Bell Creek

Tom Bell Creek is a small second order stream and a tributary to the mainstem Albion River. This creek is approximately three miles west of Comptche. A 1961 CDFG survey described this stream as being low gradient, having intermittent flow and few small pools throughout. Spawning habitat was described as very poor in the upper section and poor in the middle and lower sections. Coho salmon and steelhead juveniles were observed in the few potholes remaining in the stream. The overall condition of the creek was very poor due to past logging and fire damage. The recommendation in 1962 was to clear all debris and brush from the creek. No other surveys were located for Tom Bell Creek, and there is no documentation to confirm that any clearing was completed on this creek.

Large Woody Debris Removal Summary

CDFG records show that a number of different logjam removal crews have worked in the Albion River watershed since 1978. The Center of Education and Manpower Resources (CEMR) conducted LWD accumulation removal from June-September of 1978. During this time chainsaws, handtools and heavy equipment were used to remove accumulations in the Albion River from the confluence up to the Tom Bell flat area. During 1979-1980 CEMR again removed accumulations in the lower mainstem of the Albion River (William Kidd pers. comm.). In 1985 New Growth Forestry removed LWD from the Albion River on the property of Lorne and Margaret Macdonald. In the summer of 1987 New Growth Forestry removed LWD from the South Fork Albion River. The LWD accumulation was located ½ mile upstream from the confluence of the Albion River. The most recent LWD removal was conducted in 1989 by CEMR on Soda Springs Creek, a tributary of Portuguese Gulch that flows into the North Fork of the Albion River.

METHODS

Fish Habitat Assessment

A map of slope gradient and confinement was generated using measurements taken from topographic maps and aerial photos of the Albion WAU (Map E-1). This map identified seven classes of slope gradient: 0-1%, 1-2%, 2-4%, 4-8%, 8-12%, 12-20%, and over 20%. The map also identified stream confinement (determined from the ratio of floodplain width/channel width). The categories were unconfined (<2), moderately confined (2-4), or confined (>4). The criteria utilized for the site selection process were slope gradient, the presence of fish (data obtained from the Louisiana-Pacific fish distribution surveys of 1994-1996), accessibility, stream channel type (response, transport or source reach), if the segment was representative of other stream channel

types in the watershed, and location. The majority of the Albion River WAU is between 0-2% slope, and 90% of the segments surveyed were in these categories. High gradient streams were presumably non-fish bearing; therefore sites were concentrated on the mainstem and major tributaries. A total of 20 segments, ranging between 0% and 5% slope were evaluated for fish habitat quality. However, observations and notes were taken at some sites that were not fish bearing yet influence other fish bearing streams.

Fish habitat assessments were previously conducted in 1993, 1994, and 1995 in the Albion River WAU. All were conducted during low flow conditions, used habitat inventory methods modified from the California Salmonid Stream Restoration Manual (Flosi et al., 1998), and described 100% of the wetted width. The major difference from year to year was site selection and survey distance. The 1993 and 1995 surveys evaluated the same 25, 150 m survey reaches (Appendix-F, Map A-1). In 1994 the assessment was a 100% inventory of five streams (Appendix-F, Map B-1), subdivided into 13 segments of variable length (977ft. -14109 ft.) using Rosgen's channel types.

Twenty stream segments were surveyed in 1998. A survey length of twenty to thirty bankfull widths was used. Data collected during the fish habitat and stream channel surveys provided information on pool frequency, pool spacing, spawning gravel quantity and quality, overwintering substrate, shelter complexity, and large woody debris (LWD). In the 1998 assessment, a survey was conducted at each habitat unit. With the exception of the South Fork, all data was recorded on a habitat inventory form specifically tailored to criteria used in Louisiana-Pacific's Watershed Analysis Manual. The majority of the data used for analysis of the South Fork Albion River Planning Watershed was collected by the CDFG in July 1998 when they completed a 100% habitat survey of the stream. Additional data was collected by Mendocino Redwood Company (MRC) biologists to supplement the CDFG work and make it comparable to MRC fish habitat data for analysis.

Table F-1 displays the indices used for rating measured parameters. Measured fish habitat parameters were weighted and given a numeric scale to develop a quality rating for individual life history stages. Parameters were divided into subsets that correspond with individual life history stages (spawning, summer rearing, and overwintering habitat). The parameters were scored as follows: 1 (poor), 2 (fair), and 3 (good). Parameter weights were applied to the total score that was calculated as shown below. The parameter numbers are in bold and the weights in parentheses.

Spawning Habitat

$$\mathbf{E} (0.25) + \mathbf{F} (0.25) + \mathbf{G} (0.25) + \mathbf{H} (0.25)$$

Summer Rearing Habitat

$$\mathbf{A} (0.20) + \mathbf{B} (0.15) + \mathbf{C} (0.15) + \mathbf{D} (0.15) + \mathbf{F} (0.15) + \mathbf{I} (0.20)$$

Overwintering Habitat

$$\mathbf{A} (0.20) + \mathbf{B} (0.15) + \mathbf{C} (0.15) + \mathbf{D} (0.10) + \mathbf{I} (0.20) + \mathbf{J} (0.20)$$

The overall score would be rated as follows:

1.00 - 1.66 = Poor

1.67 - 2.33 = Fair

2.34 - 3.00 = Good

TableF-1. Fish Habitat Condition Indices for Measured Parameters

Fish Habitat Parameter	Feature	Fish Habitat Quality		
		Poor	Fair	Good
Percent Pool (By length) (A)	Anadromous Salmonid Streams	<25%	25-50%	>50%
Pool Spacing (Reach length/Bankfull/#pools) (B)	Anadromous Salmonid Streams	≥ 6.0	3.0 - 5.9	≤ 2.9
Shelter Rating (Shelter value x % of habitat covered) (C)	Pools	<60	60-120	>120
% Of Pools that are ≥3 ft. residual depth (D)	Pools	<25%	25-50%	>50%
Spawning Gravel Quantity (% of Surface Area) (E)	Pool Tail-outs	<1.5%	1.5-3%	>3%
Percent Embeddedness (F)	Pool Tail-outs	>50%	25-50%	<25%
Subsurface Fines (L-P watershed analysis manual) (G)	Pool Tail-outs	2.31-3.0	1.61-2.3	1.0-1.6
Gravel Quality Rating (L-P watershed analysis manual) (H)	Pool Tail-outs	2.31-3.0	1.61-2.3	1.0-1.6
Key LWD +root wads / 328 ft of stream. (I)	Streams < 40 ft. BFW	<4.0	4.0-6.5	>6.6
	Streams ≥ 40 ft. BFW	<3.0	3.0-3.8	>3.9
Substrate for Over-wintering (J)	All Habitat Types	<20% of Units Cobble or Boulder Dominated	20-40% of Units Cobble or Boulder Dominated	>40% of Units Cobble or Boulder Dominated

For comparative purposes the same analyses were performed on data collected in 1993, 1994, and 1995 (see Appendix F). Before starting the analysis, it was necessary to determine which data from 1993, 1994, and 1995 correlated to segments surveyed in 1998. Using landmarks (stream confluences, bridges, etc.) in addition to survey length measurements, it was possible to approximate distances as well as start and stop points of segments from past survey data. Not all 1998 segments were evaluated in past surveys.

While rearing and overwintering habitat ratings were easily calculated from past data, it was not possible to evaluate spawning habitat because no information existed regarding spawning gravel quantity or quality. In past years, some fish habitat parameters had different descriptive characteristics from parameters in 1998 fish habitat surveys. Therefore, it was necessary to give these different quantitative interpretations. These differences were handled as follows.

For data collected from 1993-1995, the 'pool spacing' parameter was calculated as the percentage of pools out of all surveyed habitat units. The habitat quality ratings for this parameter were <20% (poor), 20%-40% (fair), and >40% (good). No LWD counts were done during 1993 and 1995 surveys. Due to this, it would have been impossible to calculate rearing and overwintering habitat quality. Therefore, the assumption was made that 1993 and 1995 would have similar amounts of large woody debris recruitment and retention as those found during 1994 surveys where a 100% survey of LWD was done. This allowed the habitat assessment to be completed for all three surveys using 1994 LWD data. In 1994 this parameter was described as the number of pieces LWD per 1000 feet. The habitat quality ratings were <15 pieces/1000' (poor), 15-30 pieces/1000' (fair), and >30 pieces/1000' (good). In the 1998 analysis, scores were based on the number of pieces per 328 feet (Table F-1). After pool spacing and LWD parameters were rated as poor, fair, or good, the same method of analysis was used for all years to determine quality of rearing and overwintering habitat.

Stream Gravel Permeability and Bulk Gravel Samples

Stream gravel permeability and bulk gravel samples were collected in 1998 and 2000 on several established stream monitoring segments (similar segments for thalweg profile and cross section surveys). In 1998 both permeability and bulk gravel samples were collected, in 2000 only permeability measurements were taken. The stream segments in the Albion WAU where these observations were taken are segments 3 (upper), 43(lower), 43(upper), and 76 (see Section E - Stream Channel Condition, Map E-1 for exact locations).

The stream gravel permeability was conducted using a stand-pipe as discussed in Terhune (1958) and Barnard and McBain (1994), an electric pump was used to create the water suction in the stand-pipe. The permeability measurements were taken at a depth of 25 centimeters the maximum depth of coho and steelhead spawning. In 1998 the permeability measurements were taken in 4 randomly selected pool tail-out sections along the monitoring segment. At each pool tail-out sampled permeability measurements were taken at 3 sites; the 1/4, 1/2 and 3/4 mark of the wetted channel. This gave a total of 12 permeability measurements along each monitoring segment in 1998. In the year 2000, a total of 26 permeability measurements were taken in each monitoring segment. The measurements were evenly distributed among all pool tail-outs in the segments, with any additional measurements taken in tail-outs behind the deepest pools. The measurement location in each tail-out was randomly selected from an evenly selected 12-point grid in the tail-out. At each measurement location permeability repetitions were taken until the permeability readings no longer were increasing.

The measurement techniques varied from 1998 to 2000 for permeability in the way the locations for sampling was determined and the number of measurement taken. In 1998 an assumption was made without prior study on how many measurements were appropriate. Subsequently a power analysis was performed using 1998 MRC permeability measurements. From that power analysis it was determined that 26 measurements per segment was needed to predict within 20 percent accuracy the survival of emerging fry.

The median permeability measurement for each permeability site in the monitoring segment was used as representative of the site. To characterize the entire monitoring segment the natural log of the geometric mean of the median permeability measurements was determined. The natural log of the permeability is used because of a relationship developed from data from Tagart (1976) and McCuddin (1977) (Stillwater Sciences, 2000) to estimate survival to emergence from permeability data. This relationship equates the natural log of permeability to fry survival ($r^2 = 0.85$, $p < 10^{-7}$). This index needs further improvements, but is currently all we have for interpreting permeability information and biological implications. This relationship is:

$$\text{Survival} = -0.82530 + 0.14882 * \ln \text{ permeability}$$

It is important to understand that the use of this survival relationship is only an index of spawning gravel quality in the segment. The permeability measurements were taken in randomly selected pool tail-outs and are not indicative of where a salmon may select to spawn. Furthermore, spawning salmon have been shown to improve permeability in gravel where a redd was developed (MRC, 2000). Therefore the survival percentage developed is only indicative of the quality of potential spawning habitat and not as an absolute number.

Bulk gravel samples were collected in 1998 within the same 4 pool tail-outs of the monitoring segments where permeability was measured. One bulk gravel sample was taken per tail-out at the location of the permeability observation that was closest to the channel thalweg. After the bulk gravel samples were collected the gravel is dried and sieved through 7 different size-class screens (50, 25, 12.5, 6.3, 4.75, 2.36, 0.85 mm). The weight each gravel size class was determined for each of the bulk gravel samples using a commercial quality scale.

From the sieved bulk gravel samples the fredle index, geometric mean and percent fine particles less than sieve size classes were determined. The survival index for steelhead trout was calculated from the bulk gravel samples using the method described in Tappel and Bjorn (1983). Permeability at the bulk gravel sample location and the mean permeability coefficient for each tail-out depth is calculated.

Aquatic Species Abundance and Distribution

Aquatic species distribution surveys were conducted from 1994-1996 and 1999-2002 across the MRC lands. A hierarchical framework was used to select the initial locations of survey sites in each stream. Major streams were broken into lower, middle and upper reaches. Smaller streams were divided into lower and upper reaches. One site is surveyed in each reach, resulting in 3 sites in larger streams, and 2 sites in smaller streams. Additional sites are added directly downstream and upstream of potential migration barriers to determine which salmonid species these barriers are impacting.

A survey site contains a minimum of two consecutive habitat sequences (pool-riffle sequences) and has a minimum length of ninety feet. The survey method used to determine the aquatic species present is single pass electrofishing or snorkeling.

The effort put forth at each survey site is not sufficient to delineate the absence of a species. If future fishery research develops reasonable methods to determine the probability that a species is absent, these methods will be incorporated into future distribution surveys.

Prior to initiating surveys water quality is measured using a Horiba™ U-10 Water Quality Checker. Measurements taken are water temperature (°C), conductivity (microS/cc), dissolved oxygen (mg/L), and pH. Air temperature is measured with a pocket thermometer and water visibility is estimated. Stream discharge is estimated or measured with a Swiffer™ Model 2100 flow meter. The actual physical parameters measured at each site vary depending on equipment availability. Horiba™ U-10 Water Quality Checkers were not used prior to the surveys in 2000.

The primary survey method is electrofishing using a Smith-Root™ Model 12 (Smith-Root Inc., Vancouver, WA) backpack electrofisher. One person operates the backpack electrofisher while one or two other individuals use dip nets to capture the stunned species. The captured specimens are placed into a five-gallon bucket containing stream water. The aquatic species are enumerated, measured to fork length (fish) or snout-vent length (amphibians) and released back into the units from which they were captured. All vertebrate species are identified to the lowest possible taxonomic level.

Diving (snorkeling) is used to assess species presence when stream conditions are considered adequate or when elevated stream temperatures have the potential to adversely impact the health of the animals being electrofished. The basic survey unit for diving consists of a minimum of two pools, however if riffles are deep enough to allow underwater observation these units are sampled. Depending on the channel width, one to four divers are used for the field surveys. The diver(s) enters the survey unit from the downstream end and waits approximately one-minute before proceeding upstream to observe species. If the water velocity is too fast for divers to proceed upstream, the unit is surveyed by floating downstream. Dive slates are used to record data underwater. During the survey, salmonid species are enumerated by size class according to pre-determined size class categories (<70mm, 70–130mm, >130mm). All other vertebrate species observed during the field surveys are identified to the lowest possible taxonomic level.

Fish abundance surveys were conducted at index stations that were established in 1991. Sites were randomly chosen (using a random numbers table and stream length) throughout the Albion River Watershed and surveyed until 1996. There were three index stations in the mainstem Albion River and three index stations in South Fork Albion. Sites were permanently marked with plastic signs nailed to trees at the beginning and end of each index station location (see Map E-1, Stream Channel module). The electrofishing methodology (Platts et al. 1983) used to sample fish abundance index stations required using block nets (mesh size 4.8 mm) to create thirty meter sampling stations. Each thirty meter station included multiple pool/riffle sequences and block nets prevented emigration and immigration of juvenile salmonids. At some stations more than thirty meters were blocked off to include entire habitat units. Index stations were electrofished using a Smith-Root Model 12 Backpack Shocker and a multi-pass removal method. After one electrofishing pass was completed, each collected fish was anesthetized, measured to obtain fork lengths and weighed (wet weights). Wet weights were determined using an Ohaus CT1200-S digital balance. After fish measurements were completed, fish were allowed to recover in holding buckets and later released in habitat units downstream of the index station. Successive electrofishing passes were made within the station until a 50% reduction in the number of fish from the preceding pass was achieved. Information on physical characteristics of the index station was also recorded.

In October 1998, snorkel surveys were conducted in place of multi-pass depletion electrofishing surveys that were conducted at the six index stations in the past. The snorkel survey method consisted of two crewmembers snorkeling side by side through the entire length of a pool. Each crewmember counted and identified any fish or other aquatic species observed in their half of the pool. Riffles were excluded from the survey area due to shallow depths, making them difficult to survey with direct underwater observations. After making a single pass through the pool, the total length and several depth measurements were recorded. Two pools were surveyed at each of the six locations.

RESULTS

Fish Habitat Assessment

The following tables and maps summarize the 1998 fish habitat assessment data. Table F-2 presents the scores and ratings for each fish habitat parameter. Every parameter is assigned two values. The 'score', in the first column, is the value assigned to the habitat characteristic in the field. The 'rating', in the second column, is the corresponding value derived from the calculation of habitat parameter weightings. This rating is then used in the overall equation for each life history stage. A quality rating for each segment's spawning, rearing, and overwintering habitats are listed in Table F-3. The last two tables (Tables F-4 and F-5) compare rearing and overwintering habitats for 1993, 1994, 1995, and 1998.

This fish habitat assessment is separated into a discussion of current habitat conditions (1998) and a comparison of current conditions to habitat conditions in previous years (1993, 1994, & 1995). In the current habitat conditions section each of the four planning watersheds in the Albion River WAU is discussed separately. Individual planning watersheds contains between 1 and 8 surveyed stream segments.

Current Habitat Conditions (1998)

Lower Albion River

Segments surveyed in the Lower Albion River Planning Watershed (stream segments 3, 4, 5, 6, 15, 20, and 21) ranged between 0-4% slope. The lower Albion segments fall into geomorphic units 1-4. These units are depositional units of varying confinement. Spawning habitat rated 'fair' in segments 4, 6, 15, 20, and 21 and 'good' in both surveyed areas of segment 3 as well as in segment 5. The primary difference between a 'good' or a 'fair' rating was the quantity of spawning gravel available because all segments had similar scores for subsurface fines, gravel quality, and embeddedness. Rearing habitat rated 'fair' most often, with only the lower part of segment 3 scoring 'good'. Since most of the segments had moderate amounts of LWD and a high pool by length percentage, the rearing habitat value was most affected by low shelter complexity and percentage of residual pool depths less than three feet deep. A 'poor' rating in one or both of these categories prevented rearing habitat from scoring in the 'good' range. All eight segments scored 'fair' for overwintering habitat. A severe lack of large substrate throughout the Lower Albion River contributed to the prevalence of 'fair' scores. All segments lacked large substrate. Ratings for pool spacing, shelter complexity, and residual pool depth parameters determined whether or not the overwintering habitat rated as 'fair' or 'good'. Each of segments determined as 'fair' for overwintering habitat rated 'poor' in two or three of the parameters for overwintering habitat.

Middle Albion River

Segments surveyed in the Middle Albion River Planning Watershed (stream segments 43, 44, 45, and 50) had slope gradients ranging from 0-4%. The middle Albion River segments fall into geomorphic units 2 and 3. These units are depositional reaches of varying confinement. Spawning habitat rated 'good' in segments 44, 45, and the lower part of 43 compared to 'fair' scores for the upper part of 43 and for segment 50. All segments had moderate to low levels of embeddedness and fair to good quality gravel. Segments that rated 'good' each had two 'good' and two 'fair' scores in spawning gravel quality, embeddedness, spawning gravel quantity, and subsurface fines categories. The upper section of segment 43 rated as 'fair' for all four parameters while segment 50 had three 'fair' scores and a 'poor' for subsurface fines (indicating high fine particle levels). Both of these combinations resulted in an overall spawning habitat score of 'fair' rather than 'good'. Four of the five surveyed segments rated 'fair' in rearing habitat while segments 44 rated 'good'. All segments had a high percentage of pools by stream length and moderate amounts of large woody debris therefore, it became apparent that rearing habitat ratings were influenced primarily by differences in percentage of pools with residual depth greater than three feet, shelter complexity, embeddedness, and pool spacing. For these components of rearing habitat, segments 43 (both lower and upper sections) and 50 had a combination of 'fair' and 'poor' scores resulting in an overall 'fair' rating while the other two segments had a combination of 'good' and 'fair' scores resulting in an overall 'good' rating. All segments scored 'fair' for overwintering habitat except segment 44 which scored 'good'. Similar to the rearing scores, overwintering ratings were affected by pool conditions and amounts of large woody debris but the presence or absence of large substrate determined whether the overall score was 'fair' or 'good'. Segment 44, the only segment which had a 'fair' substrate rating was also the one segment which rated 'good' for overwintering habitat.

South Fork Albion River

The segments surveyed in the South Fork Albion River Planning Watershed (stream segments 76, 77, 78, 79, 80, and 91) all had slopes between 0-2%. The South Fork Albion segments fall into geomorphic units 2-4. These units are depositional reaches varying in confinement. Four out of six segments had 'fair' spawning habitat while one segment (78) rated 'poor' and another (76) rated 'good'. All segments had sufficient quantities of spawning gravel but the quality and embeddedness of the gravel as well as the amount of subsurface fines varied from segment to segment. Segment 78 rated 'poor' due to highly embedded gravel and high levels of fine particles in the substrate. Conversely, segment 76 rated 'good' reflecting low levels of fine particles in the substrate and gravel with low embeddedness. The remaining segments fell somewhere in between, with some fine particles and moderate levels of embeddedness. Rearing habitat rated 'fair' in all segments. While all segments had ample amounts of large woody debris and frequent pool spacing; high levels of embeddedness of the substrate and lack of pool shelter complexity prevented 'good' ratings for rearing habitat. Like rearing habitat, overwintering habitat rated 'fair' in all segments. This was due to a combination of 'good' scores (large woody debris, pool spacing) and 'poor' scores (shelter, overwintering substrate). Large substrate, such as cobbles and boulders, is an essential part of overwintering habitat as it provides shelter in the form of velocity breaks during high water events. There is a lack of large substrate in the South Fork Albion Planning Watershed.

Upper Albion River

Mendocino Redwood Company does not own a significant portion of land in the Upper Albion River Planning Watershed therefore, only one segment (114) was surveyed. Segment 114 has a slope of 0-2%. The upper Albion segment is in geomorphic unit 2. This unit is a confined

depositional reach. Spawning habitat consisted of fair amounts of good quality spawning gravel with low embeddedness and low amounts of subsurface fines and an overall rating of 'good'. Although the segment had a high percentage of pools, the lack of shelter complexity and low number of pools with a residual depth of greater than three feet prevented it from attaining a 'good' score in the rearing or overwintering categories. Better scores in other parameters such as embeddedness and large woody debris contributed to a 'fair' rating for rearing habitat. 'Fair' overwintering habitat was characterized by an abundance (46%) of small and large cobble that provides an element of substrate roughness that is particularly important for juvenile steelhead. This overwintering substrate score was the second best for all 20 segments surveyed. A high frequency of pools combined with a suitable amount of LWD created the overwintering conditions coho require.

Comparison to Previous Habitat Conditions (1993-1995)

Past and present rearing and overwintering habitat assessments are summarized in Tables F-4 and F-5, respectively. Since 1993, the condition of the Lower Albion River Planning Watershed appears to have remained stable. The lower section of segment 3 consistently received the best ratings for rearing and overwintering habitats. Segment 20 had a fairly low overwintering rating. Most segments scored in the fair to good range for every survey year. Over the past few years, there has been limited change in the condition of rearing and overwintering habitat in the Middle Albion Planning Watershed. Segment 44 consistently received the best ratings for rearing and overwintering habitats. All scores from 1993 until 1998 were in the 'fair' range except segment 44, which had a 'good' rating for rearing and overwintering habitats. Segment 91 had a fairly low overwintering rating. In both present and past surveys, all segments in the South Fork Albion River Planning Watershed have scored 'fair' or 'good' in rearing and overwintering habitat quality. The one segment in the Upper Albion River Planning Watershed was last surveyed in 1994. The condition of the rearing and overwintering habitat does not seem to have changed significantly since then.

Table F-2. Summary of Fish Habitat Parameters, with Field Scores and Corresponding Ratings. Albion River Watershed Analysis Unit, Mendocino, CA, July/August, 1998.

Segment	A. % Pool by stream length		B. Pool Spacing		C. Shelter rating		D. % of all pools with residual depth \geq 3 ft.		E. Spawning gravel quantity		F.% Embeddedness		G. Sub-surface fines		H. Gravel Quality		I. Key LWD + rootwads / 328 ft.		J. % Over-wintering substrate	
	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating
3(1)	79	3	1.6	3	57	1	44	2	3	3	good	3	1.7	2	2.1	2	24.9	3	0	1
3(2)	85	3	1.9	3	45	1	50	2	2.9	2	fair	2	1.4	3	1.5	3	2.2	1	7	1
4	74	3	1.7	3	32	1	0	1	2.2	2	fair	2	2.2	2	1.4	3	13.9	3	0	1
5	53	3	2.5	3	48	1	13	1	3	3	fair	2	1.6	3	2.1	2	24.9	3	0	1
6	37	2	3.3	2	33	1	0	1	3	3	fair	2	2	2	2.2	2	22.9	3	0	1
15	64	3	2.7	3	19	1	0	1	2.8	2	fair	2	2	2	1.5	3	43.9	3	0	1
20	43	2	5.4	2	19	1	0	1	2.3	2	fair	2	1.2	3	2.3	2	24.5	3	13	1
21	41	2	5.9	2	33	1	0	1	2.7	2	fair	2	2.2	2	2.1	2	31.9	3	7	1
43(1)	69	3	2.9	3	16	1	17	1	3	3	fair	2	1	3	1.2	3	3.4	1	11	1
43(2)	86	3	2.5	3	42	1	18	1	1.8	2	fair	2	1.7	2	2	2	5.1	2	29	2
44	86	3	2.3	3	49	1	38	2	3	3	fair	2	1.3	3	2.2	2	9.3	3	33	2
45	42	2	2.8	3	30	1	5	1	2	2	good	3	1.5	3	1.8	2	19.7	3	24	2
50	52	3	3	2	17	1	11	1	1.5	2	fair	2	2.7	1	1.7	2	6.4	3	0	1
76	36	2	3.3	2	20	1	25	2	3	3	fair	2	1.6	3	1.3	3	4.4	2	83	3
77	42	2	2.5	3	5	1	33	2	2.5	2	fair	2	2.2	2	1.9	2	4.1	2	0	1
78	22	1	1.1	3	30	1	67	3	1.6	2	poor	1	2.9	1	2.5	1	78.9	3	0	1
79	54	3	2.1	3	20	1	33	2	1.8	2	poor	1	2.1	2	1.7	2	17.6	3	0	1
80	43	2	2.5	3	5	1	0	1	2.7	2	poor	1	2.1	2	1.5	3	20.9	3	50	3
91/93	20	1	2.4	3	10	1	0	1	2.9	2	poor	1	1.7	2	2.1	2	44.2	3	0	1
114	62	3	2.8	3	20	1	18	1	2.8	2	good	3	1.4	3	1.3	3	6.4	2	46	3

Table F-3. Summary of Fish Habitat Ratings for Three Life History Stages. Albion River WAU, Mendocino County, CA. 1998

Segment	Slope gradient class (percent)	Spawning habitat score	Spawning habitat rating	Rearing habitat score	Rearing habitat rating	Over-wintering habitat score	Over-wintering habitat rating
3(1)	0-2	2.50	good	2.55	good	2.20	fair
3(2)	0-1	2.50	good	2.00	fair	1.80	fair
4	0-2	2.25	fair/good	2.25	fair/good	2.10	fair
5	0-2	2.50	good	2.25	fair/good	2.10	fair
6	1-2	2.25	fair/good	1.90	fair	1.75	fair
15	1-2	2.25	fair/good	2.25	fair/good	2.10	fair
20	0-2	2.25	fair/good	1.90	fair	1.75	fair
21	2-4	2.00	fair	1.90	fair	1.75	fair
43(1)	0-1	2.75	good	1.85	fair	1.70	fair/poor
43(2)	1-2	2.00	fair	2.05	fair	2.10	fair
44	0-2	2.50	good	2.40	good	2.40	good
45	1-4	2.50	good	2.20	fair	2.10	fair
50	0-2	1.75	fair	2.10	fair	1.95	fair
76	0-2	2.75	good	1.85	fair	2.05	fair
77	1-2	2.00	fair	2.00	fair	1.80	fair
78	0-1	1.25	poor	2.00	fair	1.90	fair
79	0-1	1.75	fair	2.25	fair/good	2.20	fair
80	1-2	2.00	fair	1.90	fair	2.30	fair/good
91/93	0-2	1.75	fair	1.70	fair/poor	1.70	fair/poor
114	0-2	2.75	good	2.20	fair	2.30	fair/good

Table F-4. Comparison of Rearing Habitat 1993-1995, 1998 Albion River Watershed Analysis Unit, Mendocino, CA.

	Rearing 98			Rearing 95			Rearing 94			Rearing 93		
	seg #	overall	rating	seg #	overall	rating	seg #	overall	rating	seg #	overall	rating
Lower Albion River PLWS	3(1)	2.55	good	A22	2.15	fair	1	2.60	good	A22	2.45	good
	3(2)	2.10	fair	A4	2.00	fair	1	2.30	fair/good	A4	1.85	fair
	4	2.25	fair/good	**	**	**	10	2.15	fair	**	**	**
	5	2.25	fair/good	**	**	**	11	2.15	fair	**	**	**
	6	1.90	fair	**	**	**	11	1.80	fair	**	**	**
	15	2.25	fair/good	**	**	**	12	2.10	fair	**	**	**
	20	1.90	fair	**	**	**	**	**	**	**	**	**
21	1.90	fair	**	**	**	**	**	**	**	**	**	
Middle Albion River PLWS	43(1)	1.85	fair	B1	2.00	fair	2	2.30	fair/good	B1	2.00	fair
	43(2)	2.05	fair	B20	2.30	fair/good	3	2.15	fair	B20	2.15	fair
	44	2.40	good	B40	2.00	fair	4	2.00	fair	B40	2.15	fair
	45	2.20	fair	**	**	**	**	**	**	**	**	**
	50	2.10	fair	**	**	**	**	**	**	**	**	**
South Fork Albion River PLWS	76	1.85	fair	C8	2.00	fair	6	2.15	fair	C8	1.85	fair
	77	2.00	fair	C24	1.70	fair/poor	6	2.00	fair	C24	2.00	fair
	78	2.00	fair	C35	2.00	fair	8	1.85	fair	C35	2.45	good
	79	2.25	fair/good	C54	1.85	fair	9	2.00	fair	C54	2.45	good
	80	1.90	fair	C54	1.85	fair	9	2.00	fair	C54	2.45	good
	91	1.70	fair/poor	**	**	**	**	**	**	**	**	**
Upper Albion River PLWS	114	2.20	fair	**	**	**	5	2.15	fair	**	**	**

**= No Survey

Table F-5. Comparison of Overwintering Habitat 1993-1995, 1998 Albion River Watershed Analysis Unit, Mendocino, CA.

	Overwintering 98			Overwintering 95			Overwintering 94			Overwintering 93		
	seg #	overall	rating	seg #	overall	rating	seg #	overall	rating	seg #	overall	rating
Lower Albion River PLWS	3(1)	2.35	good/fair	A22	2.10	fair	1	2.20	fair	A22	2.10	fair
	3(2)	1.95	fair	A4	1.95	fair	1	2.00	fair	A4	1.70	fair/poor
	4	2.25	fair/good	**	**	**	10	1.95	fair	**	**	**
	5	2.25	fair/good	**	**	**	11	1.85	fair	**	**	**
	6	1.90	fair	**	**	**	11	1.50	poor	**	**	**
	15	2.10	fair	**	**	**	12	1.80	fair	**	**	**
	20	1.75	fair	**	**	**	**	**	**	**	**	**
	21	1.90	fair	**	**	**	**	**	**	**	**	**
Middle Albion River PLWS	43(1)	1.70	fair/poor	B1	1.85	fair	2	2.00	fair	B1	1.85	fair
	43(2)	2.25	fair/good	B20	2.30	fair/good	3	2.15	fair	B20	1.85	fair
	44	2.55	good	B40	2.20	fair	4	2.05	fair	B40	2.20	fair
	45	2.25	fair/good	**	**	**	**	**	**	**	**	**
	50	1.95	fair	**	**	**	**	**	**	**	**	**
South Fork Albion River PLWS	76	2.05	fair	C8	2.15	fair	6	1.85	fair	C8	2.10	fair
	77	1.80	fair	C24	1.70	fair/poor	7	1.80	fair	C24	2.25	fair/good
	78	2.05	fair	C35	2.00	fair	8	1.70	fair/poor	C35	2.10	fair
	79	2.20	fair	C54	1.85	fair	9	1.70	fair/poor	C54	2.30	fair/good
	80	2.30	fair/good	C54	1.85	fair	9	1.85	fair	C54	2.30	fair/good
	91	1.70	fair/poor	**	**	**	**	**	**	**	**	**
Upper Albion River PLWS	114	2.30	fair	**	**	**	5	1.85	fair	**	**	**

**=No Survey

Stream Gravel Permeability and Bulk Gravel Samples

Results from permeability samples for the Albion WAU are presented in Table F-6. MRC used the following criteria for evaluating permeability: 0-3000 cm/hr is deficient, 3000-10,000 cm/hr is marginal, and >10,000 cm/hr is on target. The geometric mean permeability observations for the in the Albion WAU showed 2 segments showing marginal, and 2 deficient mean permeability. In the Albion WAU, segment 3(upper), on the Albion River just below the confluence of the South Fork and mainstem, shows the best permeability. Segments 43 lower and upper areas, on the mainstem Albion above the confluence of the South Fork, showed deficient to marginal permeability mean observations. The South Fork shows deficient permeability mean observations. These observations are something that will have to be watched over time. A mean observation, as presented for the segments, provides an index of the segment's condition, however, even with the low mean observations all of the segments have permeability observations in the range of the marginal and on target criteria, except for the South Fork with only deficient and marginal. This suggests that though a mean observation is low, and of concern, there are areas of good quality spawning gravels within the segments sampled.

Table F-6. Permeability Results from Select Stream Segments of the Albion WAU, 1998 and 2000.

Stream Name (segment #)	Year	Geometric Mean Permeability for Segment (cm/hr)	Standard Error Permeability (cm/hr)	Range of Permeability Observations (cm/hr)	Survival Index (Taggart/McCuddin)
Albion River (3 lower)	1998	12244	4984	135-100843	58%
	2000	5137	1104	427-44758	45%
Albion River (43 lower)	1998	3434	4399	1-80578	39%
	2000	1086	1881	1-97808	21%
Albion River (43 upper)	1998	1490	988	1-31706	21%
	2000	1075	988	1-31706	21%
South Fork Albion (76)	1998	16	122	1-2166	0
	2000	71	139	1-5154	0

Generally, the percentage of fine sediment (<0.85 mm and <6.3 mm) was found to be low in the Albion WAU. Almost all of the locations sampled had percent fine particles less than 0.85 mm under 14-20 percent, especially considering that when a fish spawns a significant portion of these fines will be cleaned. Fredle indices and the geometric means for the sampled locations were a little low, however, when stream gravels are worked by a spawning fish these values will change.

These survival indices reflect conditions at pool tail-outs where a spawning fish has not worked the gravel into a redd. Therefore they reflect the relative quality of stream gravel that a spawning fish encounters upon entering the stream. Areas of stream gravel with a high survival percentage would likely be preferred by spawning fish and likely have better survival success for emerging fish. Areas of stream gravel with a low survival index percentage may not be of completely poor quality; particularly because the permeability and gravel quality will be improved following redd development.

Table F-7. Stream Gravel Ratings and Permeability for Select Stream Segments of the Albion WAU.

	Geometric Mean	Fredle Index	Percent <0.85 mm	Percent <6.3 mm	Permeability at McNeil site (cm/hr)	Tappel/Bjorn Index (% survival)	Mean tail-out Permeability (cm/hr)	Permeability Quality Rating
Seg 3(upper) Tail-out # 3, 0-18 cm	15	4.3	1%	18%	42560	98%	38467	High
Seg 3(upper) Tail-out # 3, 18-30 cm	11	2.6	4%	26%	44952	87%	39259	High
Seg 3(upper) Tail-out # 4, 0-18 cm	10	2.6	5%	31%	11698	84%	2122	Moderate
Seg 3(upper) Tail-out # 4, 18-30 cm	9	1.5	11%	28%	1805	54%	6621	High
Seg 3(upper) Tail-out # 6, 0-18 cm	9	1.9	8%	31%	3552	68%	19215	High
Seg 3(upper) Tail-out # 6, 18-30 cm	10	2.7	5%	28%	79520	84%	52346	High
Seg 3(upper) Tail-out # 7, 0-18 cm	9	2.9	1%	31%	35904	100%	17627	High
Seg 3(upper) Tail-out # 7, 18-30 cm	6	1.7	14%	42%	5165	25%	34226	High
Seg 43(lower) Tail-out # 1, 0-18 cm	11	4.4	0%	18%	38880	100%	34263	High
Seg 43(lower) Tail-out #1, 18-30 cm	6	1.7	2%	68%	34144	100%	24909	High
Seg 43(lower) Tail-out # 3, 0-18 cm	14	5.1	0%	16%	63776	99%	62592	High
Seg 43(lower) Tail-out # 3, 18-30 cm	11	2.9	2%	27%	75600	98%	63328	High
Seg 43(lower) Tail-out # 6, 0-18 cm	7	0.6	13%	43%	739	36%	1256	Low
Seg 43(lower) Tail-out # 6, 18-30 cm	4	0.4	20%	58%	746	0%	1497	Low
Seg 43(lower) Tail-out # 7, 0-18 cm	6	0.5	17%	44%	778	9%	1560	Low
Seg 43(lower) Tail-out 7, 18-30 cm	5	0.5	19%	50%	680	0%	1108	Low
Seg 43(upper) Tail-out # 1, 0-18 cm	15	1.3	5%	31%	37248	82%	45785	High
Seg 43(upper) Tail-out # 1, 18-30 cm	7	0.9	10%	44%	65928	53%	54790	High
Seg 43(upper) Tail-out # 2, 0-18 cm	9	1.5	6%	35%	10459	80%	13476	High
Seg 43(upper) Tail-out #2, 18-30 cm	7	1.1	10%	52%	1546	51%	1482	Low
Seg 43(upper) Tail-out # 3, 0-18 cm	14	1.9	5%	26%	12149	82%	9440	High
Seg 43(upper) Tail-out 3, 18-30 cm	9	1.4	8%	37%	850	64%	2212	Moderate
Seg 43(upper) Tail-out # 5, 0-18 cm	12	2.9	4%	23%	795	86%	3428	Moderate
Seg 43(upper) Tail-out #5, 18-30 cm	10	3.9	6%	19%	624	77%	378	Low
Seg 76 Tail-out # 2, 0-18 cm	14	1.2	7%	31%	2976	76%	2976	Moderate
Seg 76 Tail-out # 2, 18-30 cm	7	0.6	10%	50%	232	50%	232	Low
Seg 76 Tail-out # 3, 0-18 cm	16	1.8	6%	27%	3178	79%	2964	Moderate
Seg 76 Tail-out # 3, 18-30 cm	9	0.8	9%	41%	2052	62%	908	Low
Seg 76 Tail-out # 4, 0-18 cm	21	2.4	3%	21%	3840	95%	2303	Moderate
Seg 76 Tail-out # 4, 18-30 cm	10	1.2	6%	37%	77	77%	303	Low
Seg 76 Tail-out # 7, 0-18 cm	24	3.9	5%	18%	1154	86%	1951	Low
Seg 76 Tail-out # 7, 18-30 cm	11	1.0	11%	29%	77	52%	77	Low

Aquatic Species Distribution and Abundance

Fish distribution surveys were conducted from 1994-1996 and 2000-2002. Map F-1 illustrates the distributions of steelhead trout, coho salmon, and other non-salmonid fish species (sculpin, sticklebacks, and pacific lamprey) in the Albion WAU. The tabulated data is presented in Appendix F. Both coho and steelhead are present in the mainstem and major tributaries however, steelhead are more likely to inhabit smaller, higher gradient tributaries.

Six index stations within the Albion River WAU have been electrofished annually using a multi-pass removal method from 1991-1996. In 1998 index stations were sampled using snorkel survey methods. Surveys in 1998 found steelhead trout and coho salmon at all six index stations within the Albion River and the South Fork of the Albion. Sculpin were observed at three stations in the mainstem Albion River and stickleback found in five of the six stations. Coho salmon densities ranged between 0.03 to 0.47 fish/square meter and average density of 0.19 fish/square meter. Lower coho densities were seen in 1998 compared to the survey in 1996, however there were higher coho salmon densities at two of the three-mainstem index stations (Figure F-1).

The Coho salmon life history cycle, unlike steelhead trout, sticks to a three-year cycle. It is more appropriate therefore to compare coho densities at three-year intervals (Figure F-2). The 1998 coho densities should be compared with 1995 densities. In 1998 three sites of the six index stations have higher densities, one station (lower mainstem Albion River) is the same and two stations in the South Fork Albion have lower coho densities. Steelhead trout densities ranged between 0.13 to 0.30 steelhead/square meter with an average density of 0.21 steelhead/square meter. Higher densities were found at three of the six index stations in 1998 compared to 1996 data, and the three other stations had similar densities as 1996 (Figure F-3).

Figure F-1. Juvenile coho salmon densities at index stations surveyed from 1991-1996 and 1998 in the Albion River, Mendocino co., California.

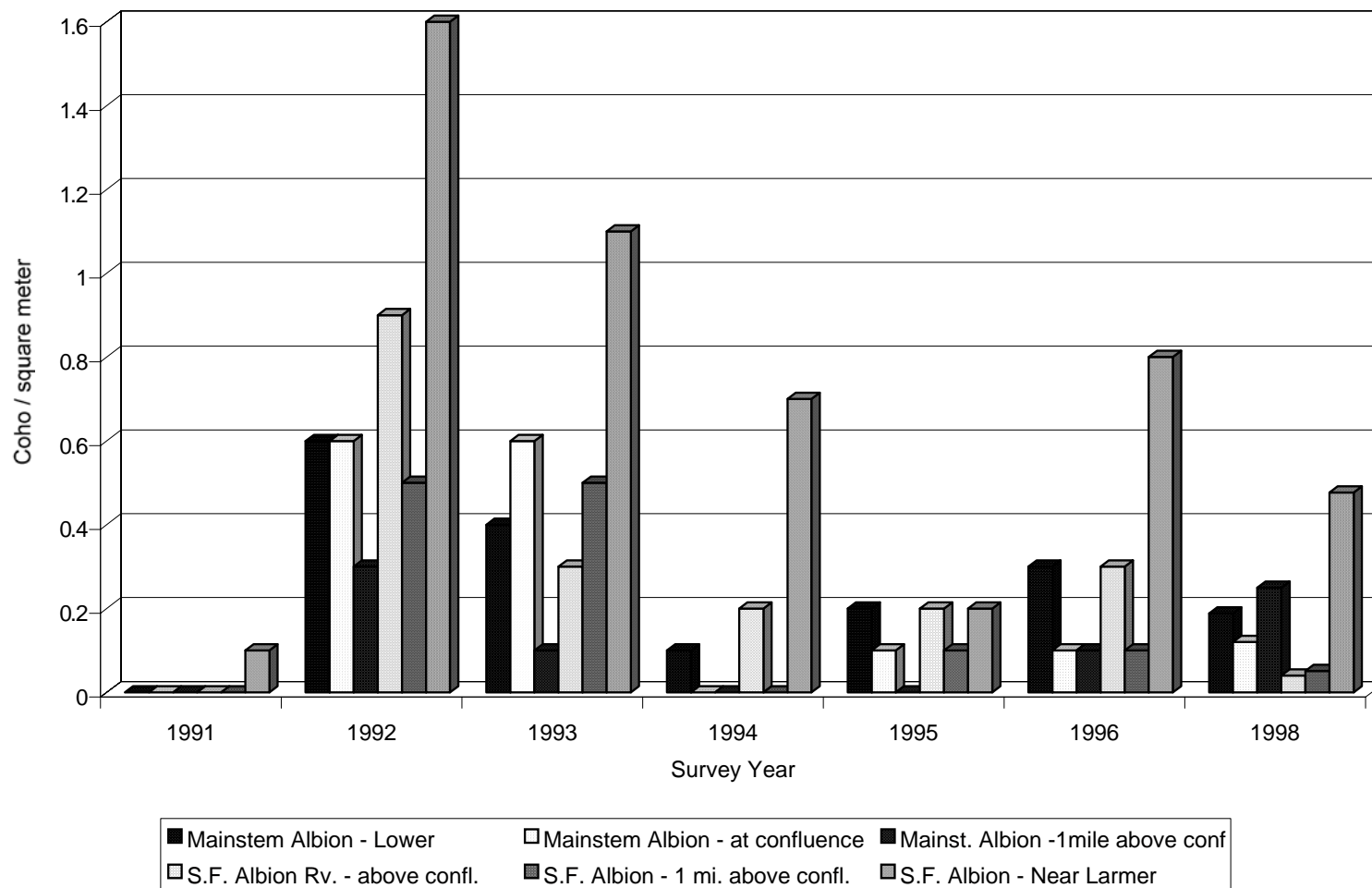


Figure F-2. Juvenile coho salmon life cycle trends at index stations in the Albion River, Mendocino co., California.

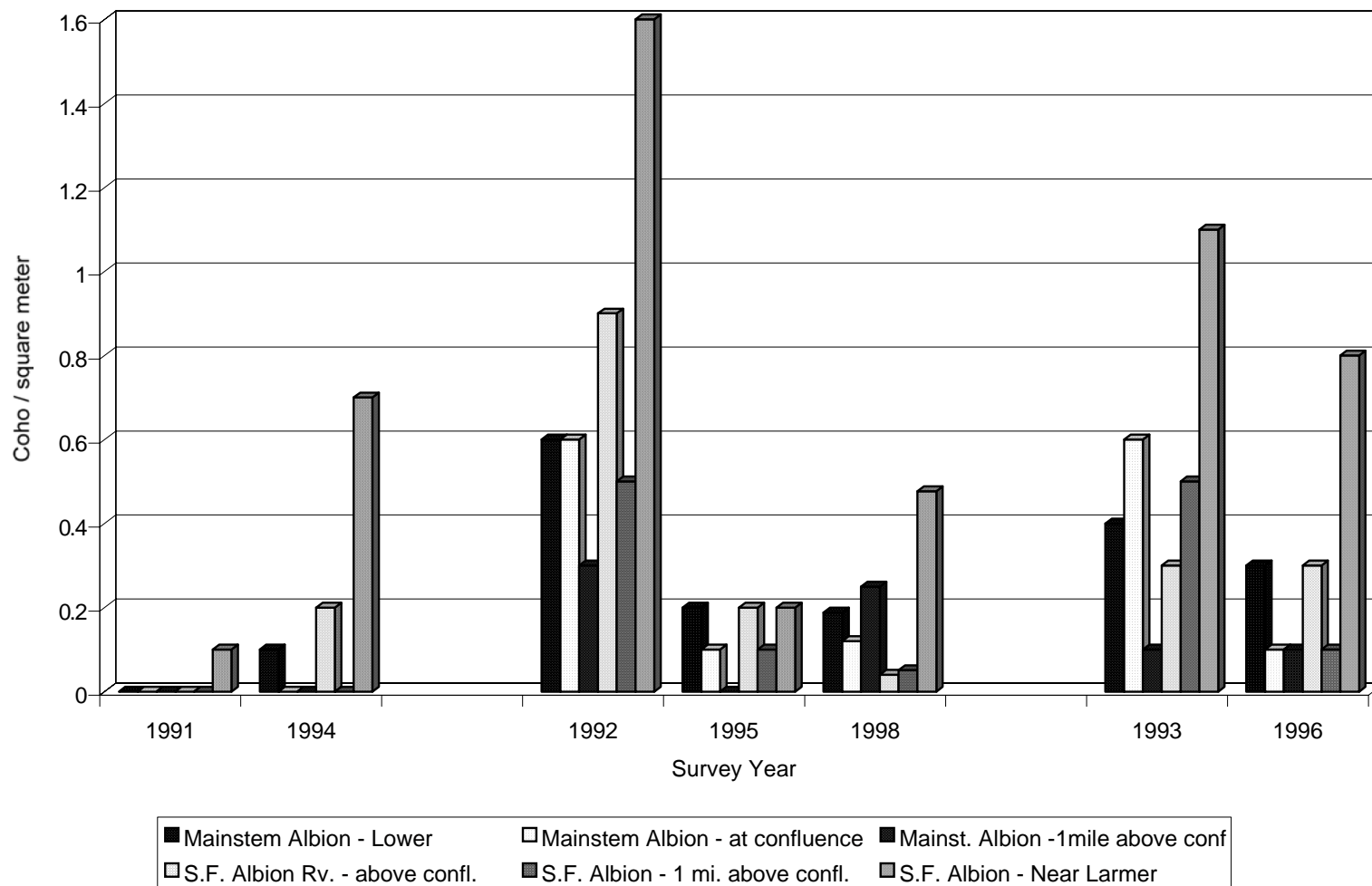
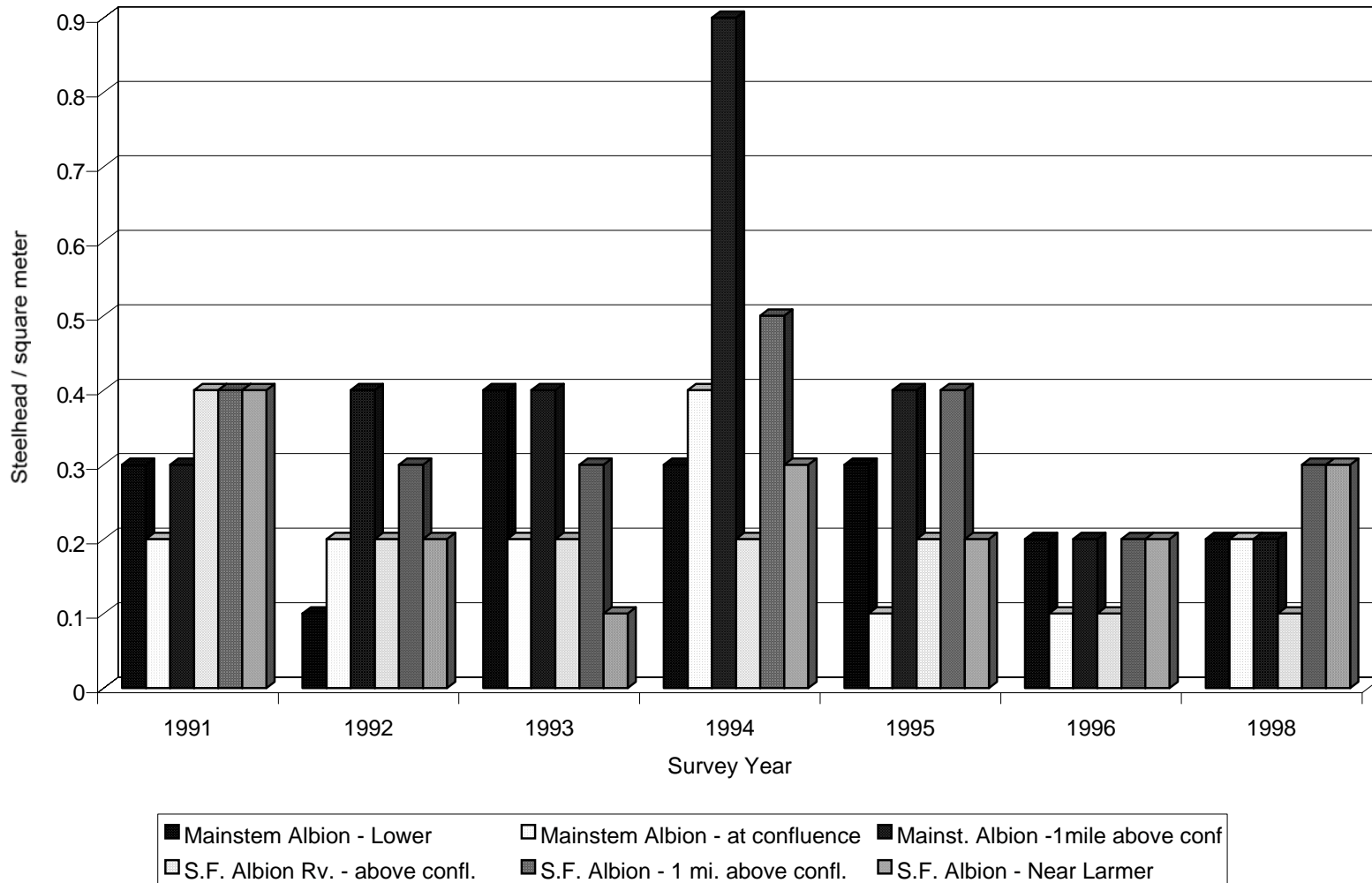


Figure F-3. Juvenile steelhead trout densities at index stations surveyed from 1991-1996 and 1998 in the Albion River, Mendocino co., California.



LITERATURE CITED

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Appendix F
Fish Habitat Assessment

Table A73. Summary of results for aquatic species surveys within the Buckhorn Creek watershed, Mendocino Co., California. Refer to Map 14.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
TRIB TO BUCKHORN CREEK #1	78-01	7/15/1996	PRESENT	PRESENT				PGS
TRIB TO BUCKHORN CREEK #1	78-01	8/21/2000	4					PGS
TRIB TO BUCKHORN CREEK #1	78-01	7/30/2001	2					PGS
TRIB TO BUCKHORN CREEK #1	78-01	7/25/2002						PGS
BUCKHORN CREEK	78-35	8/21/2000						PGS
BUCKHORN CREEK	78-35	7/30/2001	1					PGS
BUCKHORN CREEK	78-35	7/25/2002	4	1	1			PGS

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table B73. Summary of site parameters within the Buckhorn Creek watershed, Mendocino Co., California. Refer to Map 14.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
TRIB TO BUCKHORN CREEK #1	78-01	7/15/1996	E	5			2	1		13.5	
TRIB TO BUCKHORN CREEK #1	78-01	8/21/2000	E	1	127	54:46:0	3	1	7	13	6.3
TRIB TO BUCKHORN CREEK #1	78-01	7/30/2001	E	4	105	54:46:0	3	1	7.9	12.5	6.6
TRIB TO BUCKHORN CREEK #1	78-01	7/25/2002	E		56	73:27:0	3	1	8.04	12.7	6.6
BUCKHORN CREEK	78-35	8/21/2000	E	2	114	38:62:0	1	1	7.5	13	6.4
BUCKHORN CREEK	78-35	7/30/2001	E	2	138	38:62:0	3	1	9.2	11.8	6.8
BUCKHORN CREEK	78-35	7/25/2002	E	2	98	39:39:22	3	1	7.5	12.2	6.7

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table A74. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
DEADMAN GULCH	78-02	7/15/1996						PGS
DEADMAN GULCH	78-02	7/24/2000				6	1	PR
DEADMAN GULCH	78-02	7/31/2001				1		PR
DEADMAN GULCH	78-02	8/16/2002				3		
DEADMAN GULCH	78-38	7/31/2001						PGS
RAILROAD GULCH	78-03	7/25/1994	3	2				PGS
RAILROAD GULCH	78-03	8/1/1995	PRESENT			PRESENT		PGS SCP STB
RAILROAD GULCH	78-03	7/16/1996	PRESENT	PRESENT	PRESENT	PRESENT		SCP STB
RAILROAD GULCH	78-03	7/24/2000	1			6	2	SCP
RAILROAD GULCH	78-03	7/31/2001	25			31		STB
RAILROAD GULCH	78-03	8/16/2002				32		STB
TRIB TO RAILROAD GULCH #1	78-04	8/2/1995	PRESENT	PRESENT	PRESENT			PGS
TRIB TO RAILROAD GULCH #1	78-04	7/13/1996				PRESENT		
TRIB TO RAILROAD GULCH #1	78-04	7/13/2000	2			4		PGS
TRIB TO RAILROAD GULCH #1	78-04	8/1/2001	1	2				PGS PR

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A75. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
TRIB TO RAILROAD GULCH #1	78-04	8/29/2002	1			4		PGS
TRIB TO RAILROAD GULCH #1	78-41	8/29/2002	3	1				PGS
RAILROAD GULCH	78-05	8/2/1995	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	
RAILROAD GULCH	78-05	7/13/1996	PRESENT			PRESENT		
RAILROAD GULCH	78-05	7/13/2000	2			3		
RAILROAD GULCH	78-05	8/1/2001	3	1		1		PR
RAILROAD GULCH	78-06	7/13/1996	PRESENT	PRESENT		PRESENT	PRESENT	
RAILROAD GULCH	78-06	7/13/2000						PGS
RAILROAD GULCH	78-06	8/1/2001	3					PGS
RAILROAD GULCH	78-06	8/29/2002	1			2		PGS
TRIB TO RAILROAD GULCH #2	78-07	7/13/1996						
TRIB TO RAILROAD GULCH #2	78-07	7/13/2000	4			3		PGS
TRIB TO RAILROAD GULCH #2	78-07	8/1/2001	3					
TRIB TO RAILROAD GULCH #2	78-07	8/29/2002	1	1		5		
PLEASANT VALLEY CREEK	78-08	7/25/1994		4				PGS

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A76. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
PLEASANT VALLEY CREEK	78-08	8/1/1995	PRESENT			PRESENT		PGS
PLEASANT VALLEY CREEK	78-08	7/16/1996	PRESENT	PRESENT				PGS SCP
PLEASANT VALLEY CREEK	78-08	7/24/2000				3		
PLEASANT VALLEY CREEK	78-08	7/31/2001				2		STB
PLEASANT VALLEY CREEK	78-08	8/16/2002				29		STB
PLEASANT VALLEY CREEK	78-09	7/16/1996	PRESENT	PRESENT				
PLEASANT VALLEY CREEK	78-09	7/24/2000				1		PR STB
SLAUGHTERHOUSE GULCH	78-10	7/15/1996		PRESENT	PRESENT	PRESENT		PGS
SLAUGHTERHOUSE GULCH	78-10	7/24/2000		1				PGS
SLAUGHTERHOUSE GULCH	78-10	7/31/2001						PGS
SLAUGHTERHOUSE GULCH	78-10	8/15/2002	13	1				
DUCKPOND GULCH	78-11	7/15/1996				PRESENT		PGS
DUCKPOND GULCH	78-11	7/24/2000					1	STB
DUCKPOND GULCH	78-11	8/16/2002				21		
ALBION RIVER	78-12	7/25/1994	6	4		1	2	SCP STB

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A77. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
ALBION RIVER	78-12	8/1/1995	PRESENT			PRESENT		SCP STB
ALBION RIVER	78-12	7/15/1996	PRESENT	PRESENT	PRESENT	PRESENT		SCP STB
ALBION RIVER	78-12	7/24/2000	4	1		3		SCP STB
ALBION RIVER	78-12	7/31/2001	2			3		STB
ALBION RIVER	78-12	8/16/2002				31		STB
TRIB TO ALBION RIVER #1	78-39	7/31/2001	1	1				PGS STB
TRIB TO ALBION RIVER #1	78-39	8/15/2002	12					STB
ALBION RIVER	78-13	7/25/1994	4	1			1	PGS STB
ALBION RIVER	78-13	6/8/1995	PRESENT	PRESENT	PRESENT	PRESENT		STB
ALBION RIVER	78-13	6/5/1996	PRESENT	PRESENT		PRESENT		PGS STB
ALBION RIVER	78-13	8/21/2000	1	1	1	16	2	SCP
ALBION RIVER	78-13	4/12/2002	10	6		26	13	CHK
ALBION RIVER	78-14	7/25/1994	25	2				CRY PGS SCP STB
ALBION RIVER	78-14	6/8/1995	PRESENT	PRESENT	PRESENT	PRESENT		PGS STB
ALBION RIVER	78-14	6/5/1996	PRESENT			PRESENT		BLF CRY PGS STB

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A78. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
ALBION RIVER	78-14	7/25/2000	5			3		PGS SCP
ALBION RIVER	78-14	7/26/2001	3			8		
ALBION RIVER	78-14	7/12/2002	4			18		STB
SF ALBION RIVER	78-15	7/25/1994	6	3		3	2	PGS SCP
SF ALBION RIVER	78-15	6/8/1995	PRESENT			PRESENT		PGS SCP STB
SF ALBION RIVER	78-15	6/5/1996	PRESENT			PRESENT		SCP STB
SF ALBION RIVER	78-15	7/25/2000	6	1		8	1	PGS
SF ALBION RIVER	78-15	8/10/2001	20			9		PR STB
SF ALBION RIVER	78-15	7/12/2002	7			25		
NORDEN GULCH	78-37	7/27/2000		1				PGS
NORDEN GULCH	78-37	7/26/2001			1			PGS
NORDEN GULCH	78-37	8/16/2002		2		4		PGS
NORDEN GULCH	78-40	8/16/2002					1	PGS
SF ALBION RIVER	78-16	7/26/1994	35	10	3		6	PGS STB
SF ALBION RIVER	78-16	6/20/1995	PRESENT	PRESENT	PRESENT	PRESENT		PGS STB

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A79. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
SF ALBION RIVER	78-16	6/10/1996	PRESENT	PRESENT	PRESENT	PRESENT		PGS RSN STB
SF ALBION RIVER	78-16	7/26/2000	7			12		STB
SF ALBION RIVER	78-16	7/26/2001	1			3	2	STB
SF ALBION RIVER	78-16	7/12/2002	8			70		STB
LITTLE NF ALBION RIVER	78-17	7/26/1994	12					PGS
LITTLE NF ALBION RIVER	78-17	8/1/1995						
LITTLE NF ALBION RIVER	78-17	7/12/1996	PRESENT			PRESENT		PGS
LITTLE NF ALBION RIVER	78-17	7/26/2000	10	2		5		PGS
TRIB TO SF ALBION RIVER #1	78-18	7/12/1996		PRESENT				
TRIB TO SF ALBION RIVER #1	78-18	7/27/2000						PGS
SF ALBION RIVER	78-19	6/26/1994	5	2	1	3	11	CRY PGS STB
SF ALBION RIVER	78-19	8/1/1995	PRESENT		PRESENT			STB
SF ALBION RIVER	78-19	7/12/1996	PRESENT		PRESENT	PRESENT		PGS
SF ALBION RIVER	78-19	7/26/2000	9	1		9	1	PGS
SF ALBION RIVER	78-19	7/26/2001		1		6	2	PGS STB

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A80. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
SF ALBION RIVER	78-19	7/12/2002	9			75		
BULL TEAM GULCH	78-20	7/12/1996	PRESENT	PRESENT	PRESENT			PGS
BULL TEAM GULCH	78-20	7/27/2000		3		3		CRY PGS
BULL TEAM GULCH	78-20	7/26/2001		1	3			PGS
BULL TEAM GULCH	78-20	8/16/2002				10		
SF ALBION RIVER	78-21	7/12/1996	PRESENT	PRESENT				PGS
SF ALBION RIVER	78-21	7/27/2000		2				
SF ALBION RIVER	78-21	7/26/2001		2				
WINERY GULCH	78-22	7/12/1996	PRESENT	PRESENT				CRY PGS
WINERY GULCH	78-22	7/27/2000	10					CRY
WINERY GULCH	78-22	7/26/2001		1				CRY PGS
WINERY GULCH	78-22	8/16/2002				15		
WINERY GULCH	78-23	7/12/1996	PRESENT	PRESENT				PGS
WINERY GULCH	78-23	7/27/2000						
ALBION RIVER	78-24	7/25/1994	9	5			2	CRY SCP STB

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

[*Click here to view physical data.](#)
[*Click on a Site ID to view map.](#)

Table A81. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
ALBION RIVER	78-24	6/8/1995	PRESENT	PRESENT		PRESENT		STB
ALBION RIVER	78-24	6/5/1996	PRESENT			PRESENT		BLF CRY STB
ALBION RIVER	78-24	8/10/2001	50	3		21		CRY PR STB
ALBION RIVER	78-24	7/12/2002	5	1		29		STB
KAISON GULCH	78-25	8/26/1996	PRESENT	PRESENT				PGS
KAISON GULCH	78-25	7/25/2000	1					PGS RLF
KAISON GULCH	78-25	7/27/2001						PGS
KAISON GULCH	78-36	9/20/2000						PGS
EAST RAILROAD GULCH	78-26	7/26/1994		1				PGS
EAST RAILROAD GULCH	78-26	8/1/1995						PGS
EAST RAILROAD GULCH	78-26	7/12/1996		PRESENT		PRESENT		PGS
EAST RAILROAD GULCH	78-26	7/25/2000				8	2	PGS
EAST RAILROAD GULCH	78-26	7/25/2001				7		PGS
EAST RAILROAD GULCH	78-26	8/16/2002				22	1	
EAST RAILROAD GULCH	78-27	7/15/1996				PRESENT		PGS

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A82. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
EAST RAILROAD GULCH	78-27	7/25/2000						PGS
EAST RAILROAD GULCH	78-27	7/25/2001						PGS
EAST RAILROAD GULCH	78-27	8/16/2002				8	1	PGS
TOM BELL CREEK	78-28	8/2/1995	PRESENT			PRESENT		PGS
TOM BELL CREEK	78-28	7/12/1996				PRESENT		BLF
TOM BELL CREEK	78-28	7/25/2000			1			PGS
TOM BELL CREEK	78-29	7/12/1996	PRESENT	PRESENT	PRESENT			RLF
TOM BELL CREEK	78-29	7/25/2000	1	3				CRY
TOM BELL CREEK	78-29	7/25/2001		1				CRY PGS
TOM BELL CREEK	78-29	7/12/2002	3			12		
TOM BELL CREEK	78-30	8/2/1995	PRESENT	PRESENT				PGS
TOM BELL CREEK	78-30	7/25/2000	19					
TOM BELL CREEK	78-30	7/25/2001			3			
TOM BELL CREEK	78-30	8/16/2002	11			20		RLF
ALBION RIVER	78-31	7/26/1994	8	12	1			CRY STB

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A83. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
ALBION RIVER	78-31	6/7/1995	PRESENT	PRESENT		PRESENT		CRY PGS STB
ALBION RIVER	78-31	6/10/1996	PRESENT	PRESENT	PRESENT	PRESENT		BLF CRY STB
ALBION RIVER	78-31	7/25/2000	15	6		1		
ALBION RIVER	78-31	7/25/2001	5	4		1		CRY STB
ALBION RIVER	78-31	7/12/2002	1			17		
NF ALBION RIVER	78-32	7/26/1994	3	1			2	STB
NF ALBION RIVER	78-32	6/7/1995	PRESENT	PRESENT	PRESENT	PRESENT		STB
NF ALBION RIVER	78-32	6/18/1996	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	STB
NF ALBION RIVER	78-32	7/26/2000	3	1		4		STB
NF ALBION RIVER	78-32	7/25/2001	3			6	1	PGS STB
NF ALBION RIVER	78-32	7/12/2002	8			38		STB
ALBION RIVER	78-33	7/26/1994	1	8	3			
ALBION RIVER	78-33	8/2/1995	PRESENT	PRESENT	PRESENT			PGS YLF
ALBION RIVER	78-33	7/15/1996	PRESENT					PGS
ALBION RIVER	78-33	7/26/2000	2	1	1			PGS

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A84. Summary of results for aquatic species surveys within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
ALBION RIVER	78-33	7/27/2001	1		1			PGS
ALBION RIVER	78-34	7/15/1996	PRESENT	PRESENT				YLF
ALBION RIVER	78-34	7/26/2000			1			PGS
ALBION RIVER	78-34	7/27/2001			1			PGS

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
 *Click on a Site ID to view map.

Table B74. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofisch d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
DEADMAN GULCH	78-02	7/15/1996	E	7			3	2		13	
DEADMAN GULCH	78-02	7/24/2000	E	1	93	31:69:0	1	1	9.9	12	5.9
DEADMAN GULCH	78-02	7/31/2001	E	2	71	39:61:0	3	1	8.32	12.3	5.9
DEADMAN GULCH	78-02	8/16/2002	D		45	100:0:0	3	1	9.8	13.6	7.2
DEADMAN GULCH	78-38	7/31/2001	E	2	100	26:74:0	3	1	10.17	12.5	6.5
RAILROAD GULCH	78-03	7/25/1994	E	5	80		2	1		13	
RAILROAD GULCH	78-03	8/1/1995	E	10			2	1		14.5	
RAILROAD GULCH	78-03	7/16/1996	E	11			2	2		14	
RAILROAD GULCH	78-03	7/24/2000	E	1	116	62:38:0	3	1	10.3	14	6.8
RAILROAD GULCH	78-03	7/31/2001	V		100	100:0:0	3	1	5.94	20	6.9
RAILROAD GULCH	78-03	8/16/2002	D		100	100:0:0	3	1	9.7	14	7
TRIB TO RAILROAD GULCH #1	78-04	8/2/1995	D				2	1		13.5	
TRIB TO RAILROAD GULCH #1	78-04	7/13/1996	D				3	2		12	
TRIB TO RAILROAD GULCH #1	78-04	7/13/2000	D		104	54:46:0	3	1		12.4	7.5
TRIB TO RAILROAD GULCH #1	78-04	8/1/2001	E	2	93	58:42:0	3	1	10.82	12.2	6.6

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B75. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofisch d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
TRIB TO RAILROAD GULCH #1	78-04	8/29/2002	E	2	101	41:59:0	3	1	9.9	12.9	7.2
TRIB TO RAILROAD GULCH #1	78-41	8/29/2002	E	1	106	62:38:0	3	1	8.9	13	7
RAILROAD GULCH	78-05	8/2/1995	D				3	1		15	
RAILROAD GULCH	78-05	7/13/1996	D				3	2		13	
RAILROAD GULCH	78-05	7/13/2000	D		140	84:16:0	3	1	9.99	12.7	7.6
RAILROAD GULCH	78-05	8/1/2001	E	2	122	75:25:0	3	1	10.02	12	6.8
RAILROAD GULCH	78-06	7/13/1996	D				3	1		12.5	
RAILROAD GULCH	78-06	7/13/2000	D		88	60:40:0	3	1	9.35	12.7	7.3
RAILROAD GULCH	78-06	8/1/2001	E	2	79	47:53:0	3	1	7.95	12.5	6.7
RAILROAD GULCH	78-06	8/29/2002	E	1	13	23:77:0	3	1	8.6	13.3	6.2
TRIB TO RAILROAD GULCH #2	78-07	7/13/1996	V	5			3	1		12.5	
TRIB TO RAILROAD GULCH #2	78-07	7/13/2000	D		87	38:45:17	3	1	9.19	13	7.6
TRIB TO RAILROAD GULCH #2	78-07	8/1/2001	E	2	92	55:45:0	3	1	7.3	13.2	7.1
TRIB TO RAILROAD GULCH #2	78-07	8/29/2002	E	1	25	100:0:0	3	1	8.6	13	6.6
PLEASANT VALLEY CREEK	78-08	7/25/1994	E	5	75		2	1		14	

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

[*Click here to view biological data.](#)

[*Click on a Site ID to view map.](#)

Table B76. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
PLEASANT VALLEY CREEK	78-08	8/1/1995	E	4			2	1		15	
PLEASANT VALLEY CREEK	78-08	7/16/1996	E	10			3	1		13.5	
PLEASANT VALLEY CREEK	78-08	7/24/2000	E	1	103	64:36:0	3	1	7.6	15	6.9
PLEASANT VALLEY CREEK	78-08	7/31/2001	V		100	100:0:0	2	1	6.69	15	6.9
PLEASANT VALLEY CREEK	78-08	8/16/2002	D		100	100:0:0	3	1	9.3	14.4	6.8
PLEASANT VALLEY CREEK	78-09	7/16/1996	E	8			3	1		13.5	
PLEASANT VALLEY CREEK	78-09	7/24/2000	E	2	108	70:30:0	2	1	7	14	7
SLAUGHTERHOUSE GULCH	78-10	7/15/1996	E	6			2	1		13.5	
SLAUGHTERHOUSE GULCH	78-10	7/24/2000	E	3	68	81:13:6	3	1	9.3	12	6.2
SLAUGHTERHOUSE GULCH	78-10	7/31/2001	E	3	109	100:0:0	3	1	8.55	12.3	6
SLAUGHTERHOUSE GULCH	78-10	8/15/2002	D		106	100:0:0	3	1	8.7	13.4	7.2
DUCKPOND GULCH	78-11	7/15/1996	E	6			2	1		14	
DUCKPOND GULCH	78-11	7/24/2000	E	2	93	84:0:16	3	1	8.9	13	7
DUCKPOND GULCH	78-11	8/16/2002	D		49	100:0:0	3	1	8.6	13.9	7.4
ALBION RIVER	78-12	7/25/1994	E	5	50		2	1		15	

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B77. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
ALBION RIVER	78-12	8/1/1995	E	8			2	2		17	
ALBION RIVER	78-12	7/15/1996	E	11			1	2		15.5	
ALBION RIVER	78-12	7/24/2000	E	2	143	66:0:34	3	1	7	16	7.4
ALBION RIVER	78-12	7/31/2001	V		100	100:0:0	2	2	5.15	18	6.8
ALBION RIVER	78-12	8/16/2002	D		100	100:0:0	3	2	6	17.4	6.8
TRIB TO ALBION RIVER #1	78-39	7/31/2001	E	2	108	87:13:0	3	1		14.6	7.5
TRIB TO ALBION RIVER #1	78-39	8/15/2002	D		106	100:0:0	3	1	5.5	16.3	6.3
ALBION RIVER	78-13	7/25/1994	E	5	65		3	1		16	
ALBION RIVER	78-13	6/8/1995	D				3	3		14	
ALBION RIVER	78-13	6/5/1996	D				3	3		15.5	
ALBION RIVER	78-13	8/21/2000	E	3	274	90:10:0	3	1	8.1	16	7.1
ALBION RIVER	78-13	4/12/2002	D		200	100:0:0	3	2			
ALBION RIVER	78-14	7/25/1994	E	5	105		3	1		17	
ALBION RIVER	78-14	6/8/1995	D				3	3		14	
ALBION RIVER	78-14	6/5/1996	D				3	3		15	

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B78. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
ALBION RIVER	78-14	7/25/2000	E	3	124	65:35:0	3	1	7.2	15	7.3
ALBION RIVER	78-14	7/26/2001	D		123	100:0:0	3	2	6.63	15.2	7.4
ALBION RIVER	78-14	7/12/2002	D		90	100:0:0	3	2	6.7	15.7	7
SF ALBION RIVER	78-15	7/25/1994	E	5	90		3	0		17	
SF ALBION RIVER	78-15	6/8/1995	D				3	2		14	
SF ALBION RIVER	78-15	6/5/1996	D				3	2		15	
SF ALBION RIVER	78-15	7/25/2000	E	6	226	58:42:0	3	1	7	15	7.5
SF ALBION RIVER	78-15	8/10/2001	D		104	100:0:0	3	0	6.94	15.1	7.2
SF ALBION RIVER	78-15	7/12/2002	D		90	100:0:0	3	1	8	14.7	7.4
NORDEN GULCH	78-37	7/27/2000	E	3	137	38:51:11	3	1	8	18	7.9
NORDEN GULCH	78-37	7/26/2001	E	2	99	61:39:0	3	1	6.36	13.6	7.4
NORDEN GULCH	78-37	8/16/2002	E	1	68	69:31:0	3	1	7.9	14.1	7.3
NORDEN GULCH	78-40	8/16/2002	E	1	25	80:20:0	3	0	5.9	13.4	7.1
SF ALBION RIVER	78-16	7/26/1994	E	5	65		3	1		15	
SF ALBION RIVER	78-16	6/20/1995	D				2	3		13.5	

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

[*Click here to view biological data.](#)
[*Click on a Site ID to view map.](#)

Table B79. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
SF ALBION RIVER	78-16	6/10/1996	D				3	2		13	
SF ALBION RIVER	78-16	7/26/2000	E	4	117	49:51:0	2	1	6.4	15	6.9
SF ALBION RIVER	78-16	7/26/2001	E	2	122	80:20:0	3	2	4.9	14	6.9
SF ALBION RIVER	78-16	7/12/2002	D		95	100:0:0	3	1		14.5	6.8
LITTLE NF ALBION RIVER	78-17	7/26/1994	E	5	30		3	0		13.5	
LITTLE NF ALBION RIVER	78-17	8/1/1995									
LITTLE NF ALBION RIVER	78-17	7/12/1996	E	2			3	0		14	
LITTLE NF ALBION RIVER	78-17	7/26/2000	E	2	98	49:51:0	3	1	7.8	15	7.5
TRIB TO SF ALBION RIVER #1	78-18	7/12/1996	E	3			2	1		14	
TRIB TO SF ALBION RIVER #1	78-18	7/27/2000	E	2	126	67:21:12	3	1	7.2	13	7.6
SF ALBION RIVER	78-19	6/26/1994	E	5	135		3	1		14	
SF ALBION RIVER	78-19	8/1/1995	E	10			2	1		17	
SF ALBION RIVER	78-19	7/12/1996	E				3	1		15	
SF ALBION RIVER	78-19	7/26/2000	E	2	114	69:31:0	3	1	7.1	15	7.1
SF ALBION RIVER	78-19	7/26/2001	E	2	97	35:13:52	3	2	4.62	13.3	6.7

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B80. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
SF ALBION RIVER	78-19	7/12/2002	D		95	100:0:0	3	0	6.3	14.8	6.4
BULL TEAM GULCH	78-20	7/12/1996	E	6			2	1		14.5	
BULL TEAM GULCH	78-20	7/27/2000	E	2	89	75:25:0	3	1	7.6	15	7.6
BULL TEAM GULCH	78-20	7/26/2001	E	3	112	65:35:0	3	0	5.8	13.1	6.9
BULL TEAM GULCH	78-20	8/16/2002	E	2	91	97:3:0	3	0	4.5	13.7	6.8
SF ALBION RIVER	78-21	7/12/1996	E	5			2	1		13.5	
SF ALBION RIVER	78-21	7/27/2000	E	4	188	83:17:0	1	1	6.73	13	7.6
SF ALBION RIVER	78-21	7/26/2001	E	2	66	100:0:0	3	1	7.6	12.7	7.2
WINERY GULCH	78-22	7/12/1996	E	6			2	1		13	
WINERY GULCH	78-22	7/27/2000	E	2	81	59:21:20	3	1	7.3	14	7.6
WINERY GULCH	78-22	7/26/2001	E	4	115	73:27:0	3	1	8.3	12.9	6.9
WINERY GULCH	78-22	8/16/2002	E	2	110	100:0:0	3	0	8.1	13.3	7.3
WINERY GULCH	78-23	7/12/1996	E	8						13	
WINERY GULCH	78-23	7/27/2000	E	1	126	58:42:0	3	1	8.2	13	7.9
ALBION RIVER	78-24	7/25/1994	E	5	100		3	1		17	

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B81. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
ALBION RIVER	78-24	6/8/1995	D				3	3		14	
ALBION RIVER	78-24	6/5/1996	D				3	2		17	
ALBION RIVER	78-24	8/10/2001	D		102	100:0:0	3	2	5	15.6	7.3
ALBION RIVER	78-24	7/12/2002	D		85	100:0:0	3	2	6.3	15.6	7.1
KAISON GULCH	78-25	8/26/1996	E	3			3	1		12.5	
KAISON GULCH	78-25	7/25/2000	E	2	103	30:70:0	3	1	7.9	13	7.1
KAISON GULCH	78-25	7/27/2001	E	2	105	61:39:0	3	1	7.62	13.1	7.1
KAISON GULCH	78-36	9/20/2000	E	4	100	48:52:0	3	1	5.7	14	7
EAST RAILROAD GULCH	78-26	7/26/1994	E	5	75		3	1		15.5	
EAST RAILROAD GULCH	78-26	8/1/1995	E	5			2	1		17	
EAST RAILROAD GULCH	78-26	7/12/1996	E	7			2	3		15	
EAST RAILROAD GULCH	78-26	7/25/2000	E	2	115	87:13:0	3	1	7	14	6.8
EAST RAILROAD GULCH	78-26	7/25/2001	E	2	108	66:34:0	3	1	6.9	13.7	7.2
EAST RAILROAD GULCH	78-26	8/16/2002	E	2	90	100:0:0	3	0	6.9	13.5	7.1
EAST RAILROAD GULCH	78-27	7/15/1996	E	9			3	1		13	

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B82. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
EAST RAILROAD GULCH	78-27	7/25/2000	E	4	104	56:44:0	3	1	6.9	14	6.6
EAST RAILROAD GULCH	78-27	7/25/2001	E	3	100	77:0:23	3	0	5.2	12.7	6.2
EAST RAILROAD GULCH	78-27	8/16/2002	E	3	102	93:7:0	3	0	5.9	13	6.9
TOM BELL CREEK	78-28	8/2/1995	E	4			1	0		15.5	
TOM BELL CREEK	78-28	7/12/1996	E	6			2	1		15	
TOM BELL CREEK	78-28	7/25/2000	E	5	96	100:0:0	3	1	5	13	6.7
TOM BELL CREEK	78-29	7/12/1996	E	6			2	1		15.5	
TOM BELL CREEK	78-29	7/25/2000	E	4	71	72:28:0	3	0	7.7	14	6.3
TOM BELL CREEK	78-29	7/25/2001	E	3	96	80:20:0	3	0	7.1	14	7.1
TOM BELL CREEK	78-29	7/12/2002	D		94	100:0:0	3	0	6.5	14.3	7.2
TOM BELL CREEK	78-30	8/2/1995	E	6			1	0		16.5	
TOM BELL CREEK	78-30	7/25/2000	E	3	123	61:39:0	1	1	6.5	14	6.9
TOM BELL CREEK	78-30	7/25/2001	E	3	83	66:34:0	3	0	6.23	14.1	6.4
TOM BELL CREEK	78-30	8/16/2002	V		74	86:14:0	3	0	6.8	12.9	7.1
ALBION RIVER	78-31	7/26/1994	E	5	145		3	1		18.5	

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B83. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
ALBION RIVER	78-31	6/7/1995	D				2	3		14.5	
ALBION RIVER	78-31	6/10/1996	D				3	2		13	
ALBION RIVER	78-31	7/25/2000	E	4	121	61:12:26	3	1	7.7	15	7.7
ALBION RIVER	78-31	7/25/2001	E	3	85	86:0:14	3	2	7.2	16.4	7.6
ALBION RIVER	78-31	7/12/2002	D		83	100:0:0	3	2	8	15.8	7.4
NF ALBION RIVER	78-32	7/26/1994	E	5	140		3	1		15	
NF ALBION RIVER	78-32	6/7/1995	D				2	2		13	
NF ALBION RIVER	78-32	6/18/1996	D				3	2		10.5	
NF ALBION RIVER	78-32	7/26/2000	E	4	107	64:36:0	3	1	7.7	14	7.2
NF ALBION RIVER	78-32	7/25/2001	E	3	107	43:12:45	3	1	6.13	13.5	7.2
NF ALBION RIVER	78-32	7/12/2002	D		94	100:0:0	3	1	7.1	14.9	7.1
ALBION RIVER	78-33	7/26/1994	E	5	84		2	1		16	
ALBION RIVER	78-33	8/2/1995	E	6			2	1		15	
ALBION RIVER	78-33	7/15/1996	D				3	1		14.5	
ALBION RIVER	78-33	7/26/2000	E		83	58:42:0	3	1	8.9	14	7.5

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B84. Summary of site parameters within the Albion River watershed, Mendocino Co., California. Refer to Maps 14-16.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
ALBION RIVER	78-33	7/27/2001	E	2	109	33:28:39	3	1	8.3	12.2	6.6
ALBION RIVER	78-34	7/15/1996	D				2	1		14	
ALBION RIVER	78-34	7/26/2000	E	3	150	57:43:0	3	1	8.8	14	7.2
ALBION RIVER	78-34	7/27/2001	E	2	77	71:29:0	3	1	7.5	12	6.8

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

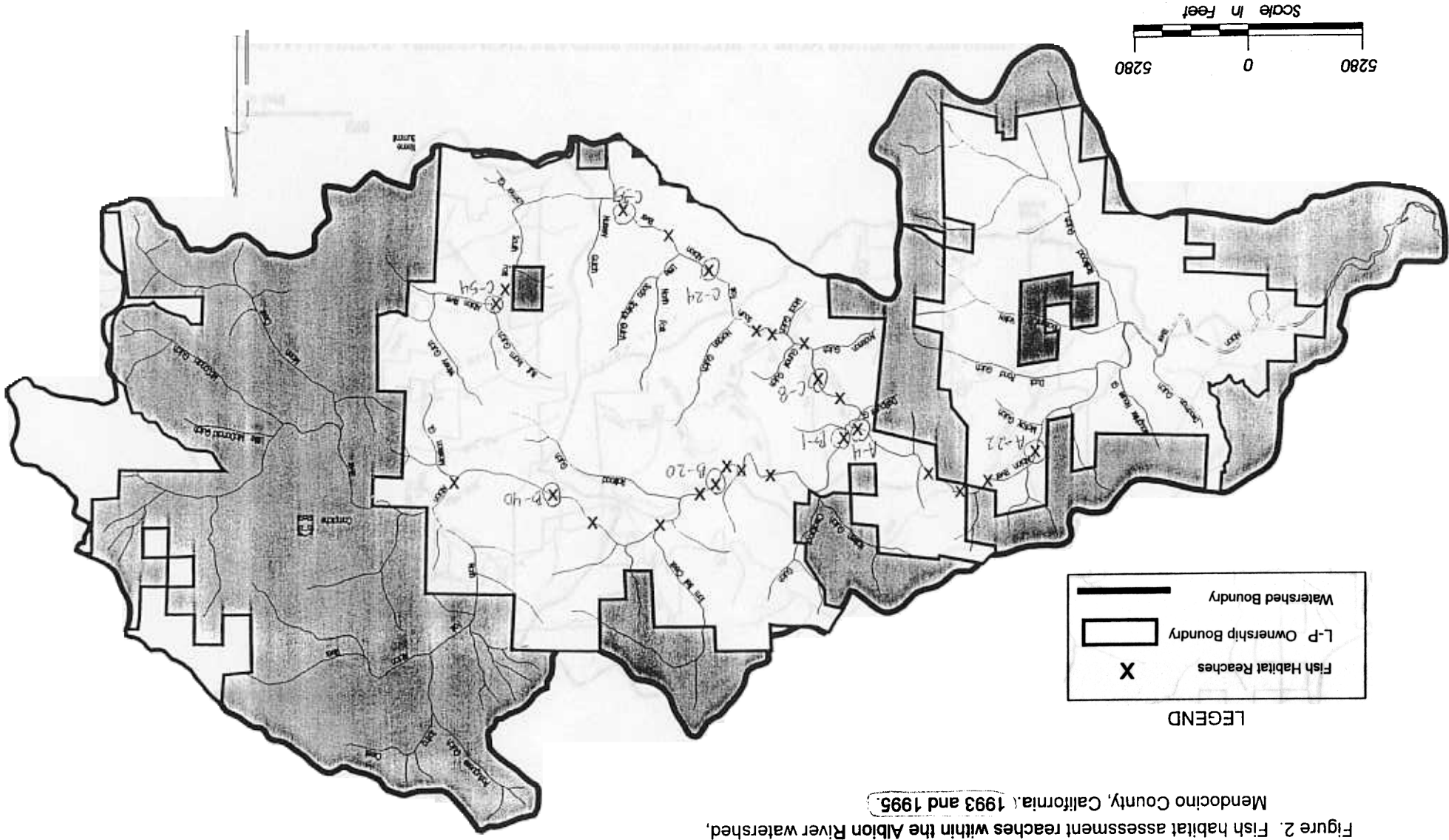


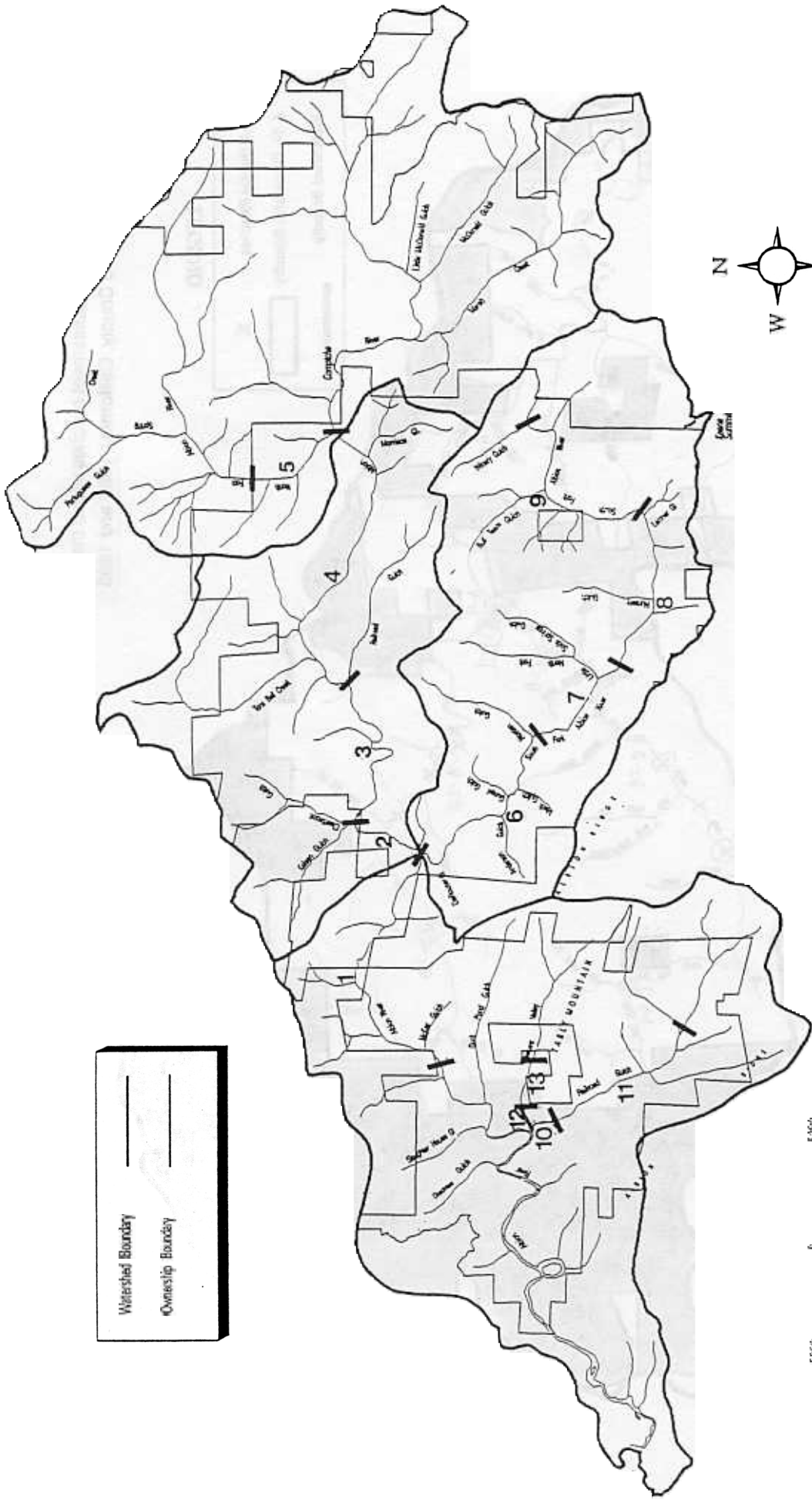
Figure 2. Fish habitat assessment reaches within the Albion River watershed, Mendocino County, California, 1993 and 1995.

Table X-b. Summary of fish habitat parameters, with field scores and corresponding ratings. Albion watershed analysis unit, Mendocino, CA, July, 1994.

1998		1994		A. % Pool by stream length		B. Pool Spacing (%pool)		C. Shelter rating		D. % of all pools with residual depth \geq 3 ft.		E. Spawning gravel quantity		F. % Embeddedness		G. Sub-surface fines		H. Gravel Quality		I. Key LWD + rootwads / 1000 ft.		J. % Over-wintering substrate	
Segment #	Segment #	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating
3 (lower)	1	86	3	63	3	76	3	60	3	n/a	n/a	good	3	n/a	n/a	n/a	n/a	6.2	1	0	1		
3 (upper)	1	66	3	55	3	76	3	17	1	n/a	n/a	good	3	n/a	n/a	n/a	n/a	6.2	1	9	1		
4	10	97	3	71	3	42	2	40	2	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	6.2	1	0	1		
5	11	78	3	57	3	45	2	0	1	n/a	n/a	good	3	n/a	n/a	n/a	n/a	6.2	1	0	1		
6	11	47	2	50	2	33	2	0	1	n/a	n/a	good	3	n/a	n/a	n/a	n/a	6.2	1	0	1		
15	12	28	2	65	3	77	3	0	1	n/a	n/a	good	3	n/a	n/a	n/a	n/a	6.2	1	0	1		
20	NO SURVEY																						
21	NO SURVEY																						
43 (lower)	2	74	3	56	3	66	3	11	1	n/a	n/a	good	3	n/a	n/a	n/a	n/a	6.2	1	0	1		
43 (upper)	3	86	3	53	3	39	2	25	2	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	6.2	1	33	2		
44	4	87	3	60	3	45	2	0	1	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	6.2	1	40	2		
45	NO SURVEY																						
50	NO SURVEY																						
76	6	62	3	67	3	31	2	0	1	n/a	n/a	good	3	n/a	n/a	n/a	n/a	7.8	1	13	1		
77	7	75	3	50	3	25	1	33	2	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	7.8	1	11	1		
78	8	90	3	55.0	3	27	1	17	1	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	7.8	1	0	1		
79	9	88	3	80	3	26	1	0	1	n/a	n/a	good	3	n/a	n/a	n/a	n/a	7.8	1	0	1		
80	9	70	3	68	3	35	2	4	1	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	7.8	1	0	1		
91	NO SURVEY																						
114	5	73	3	56	3	31	2	0	1	n/a	n/a	good	3	n/a	n/a	n/a	n/a	3.4	1	0	1		

Table X-a. Summary of fish habitat parameters, with field scores and corresponding ratings. Albion watershed analysis unit, Mendocino, CA, July, 1993.																					
1998	1993	A. % Pool by stream length		B. Pool Spacing (%pool)		C. Shelter rating		D. % of all pools with residual depth >3 ft.		E. Spawning gravel quantity		F. % Embeddedness		G. Sub-surface fines		H. Gravel Quality		I. Key LWD + rootwads / 1000 ft.*		J. % Over-wintering substrate	
Segment #	Segment #	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating
3(lower)	A22	98	3	83	3	72	3	40	2	n/a	n/a	good	3	n/a	n/a	n/a	n/a	6.2	1	0	1
3 (upper)	A4	84	3	67	3	22	1	16	1	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	6.2	1	0	1
4	NO SURVEY																				
5	NO SURVEY																				
6	NO SURVEY																				
15	NO SURVEY																				
20	NO SURVEY																				
21	NO SURVEY																				
43 (lower)	B1	68	3	67	3	57	2	17	1	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	6.2	1	0	1
43 (upper)	B20	91	3	67	3	35	2	0	1	n/a	n/a	good	3	n/a	n/a	n/a	n/a	6.2	1	0	1
44	B40	84	3	70	3	122	3	0	1	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	6.2	1	30	2
45	NO SURVEY																				
50	NO SURVEY																				
76	C8	61	3	50	3	10	1	0	1	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	7.8	1	50	3
77	C24	60	3	81	3	47	2	0	1	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	7.8	1	90	3
78	C35	98	3	89	3	141	3	25	2	n/a	n/a	good	3	n/a	n/a	n/a	n/a	7.8	1	0	1
79	C54	92	3	80	3	66	3	38	2	n/a	n/a	good	3	n/a	n/a	n/a	n/a	7.8	1	20	2
80	C54	92	3	80	3	66	3	38	2	n/a	n/a	good	3	n/a	n/a	n/a	n/a	7.8	1	20	2
91	NO SURVEY																				
114	NO SURVEY																				
																		*Used LWD data collected in 1994			

Albion River Watershed



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1994

Parameter Summary

Table X-c. Summary of fish habitat parameters, with field scores and corresponding ratings. Albion watershed analysis unit, Mendocino, CA, July, 1995.																					
1998	1995	A. % Pool by stream length		B. Pool Spacing (%pool)		C. Shelter rating		D. % of all pools with residual depth \geq 3 ft.		E. Spawning gravel quantity		F. % Embeddedness		G. Sub-surface fines		H. Gravel Quality		I. Key LWD + rootwads / 1000 ft.*		J. % Over-wintering substrate	
		Segment #	Segment #	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating
3 (lower)	A22	97	3	75	3	61	3	50	2	n/a	n/a	poor	1	n/a	n/a	n/a	n/a	6.2	1	0	1
3 (upper)	A4	81	3	0.4	2	65	3	50	2	n/a	n/a	poor	1	n/a	n/a	n/a	n/a	6.2	1	0	1
4	NO SURVEY																				
5	NO SURVEY																				
6	NO SURVEY																				
15	NO SURVEY																				
20	NO SURVEY																				
21	NO SURVEY																				
43 (lower)	B1	89	3	63	3	no data	2	20	1	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	6.2	1	0	1
43 (upper)	B20	100	3	100	3	73	3	33	2	n/a	n/a	fair	2	n/a	n/a	n/a	n/a	6.2	1	33	2
44	B40	89	3	75	3	130	3	0	1	n/a	n/a	poor	1	n/a	n/a	n/a	n/a	6.2	1	38	2
45	NO SURVEY																				
50	NO SURVEY																				
76	C8	75	3	60	3	37	2	33	2	n/a	n/a	poor	1	n/a	n/a	n/a	n/a	7.8	1	20	2
77	C24	64	3	54	3	28	1	0	1	n/a	n/a	poor	1	n/a	n/a	n/a	n/a	7.8	1	15	1
78	C35	100	3	100	3	71	3	0	1	n/a	n/a	poor	1	n/a	n/a	n/a	n/a	7.8	1	0	1
79	C54	95	3	92	3	30	2	18	1	n/a	n/a	poor	1	n/a	n/a	n/a	n/a	7.8	1	0	1
80	C54	95	3	92	3	30	2	18	1	n/a	n/a	poor	1	n/a	n/a	n/a	n/a	7.8	1	0	1
91	NO SURVEY																				
114	NO SURVEY																				
																		*Used LWD data collected in 1994			