CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

NORTH COAST REGION

Interoffice Communication

TO: Frank Reichmuth
Charles Greene

DATE: November 27, 1989

FROM: Bob Klamt

SUBJECT: Stream survey - N. Fk. Garcia

On August 22, 23, and 24, 1989, we conducted a general stream survey of the N. Fork of the Garcia River, Mendocino County. Additional observers present on those days were: Aug. 22 - Mark Harvey, Charles Greene, Jack Monschke; Aug. 23 — Charles Greene, Charll Stoneman; Aug. 24 — Bill Winchester, Charles Greene, Charll Stoneman. The observations contained herein provide a general description of the stream as observed on those dates. Some measurements of pool and substrate quality and channel stability were obtained, and are supportive of the observations.

The N. Fork of the Garcia is about 7 miles long with 7 major tributaries and a total drainage area of about 10 square miles (Figure 1). The headwaters originate in steep moderately—dissected coastal hills characterized by a mixed forest of second—growth redwood, fir, tanoak, and madrone with occasional meadows. The V—shaped canyon grades into a U—shape at the extreme lower end (last 1.6 miles) prior to its confluence with the Garcia River (mouth). The stream is typified by a well—defined channel (except in the extreme lower end) and an excellent riparian corridor. Stream temperature was 13—15°C throughout the entire length. Our survey was conducted in three stages from the lower end upstream due to access, but we discovered that the stream had four distinct reaches. For that reason, the observations are presented by section from the mouth upstream to the headwaters.

Lower Section

The extreme lower section of the N. Fk. Garcia River is shallow (about 1% slope), of old depositional material, and in a U—shaped canyon of 50—60% slope. The stream appears to have meandered in search of a stable stream channel over the years. The stream currently occupies a defined inner channel averaging about 2O feet across except during high flows when secondary channels appear to carry a significant portion of the flow. Even during high flows it appears that the stream is contained within its outer channel (50—75 feet wide, bank-to-bank), and does not encroach on the flood plain to any significant degree. Although the stream will likely continue to degrade, it appears that it is in a stable channel, at least until some catastrophic event (e.g., flood of '64).

The streambed was composed of rubble and gravel and generally embedded to compaction with small gravel and sand. Suitable spawning substrate for coho salmon and steelhead was confined to moderately-sized (20—50 square feet) packets within rubble areas. We observed a couple of lamprey redds and one possible salmonid redd in this section. Stream substrate cores of suitable spawning areas were taken during a later sampling effort (9/18 & 19/89) at stations #1 and #2. The average and standard deviation of percent fine material (<1.0 mm) for ten (10) measurements at each station were: Stn #1 — 17.4%, 2.32 and Stn #2 -13.0%, 6.31.

Rearing habitat was predominantly rubble (though absent of surface flow) and a few small scour pools formed at root wads and stream bends. At the time of the survey no surface flow was evident until 1.4 miles upstream of the mouth. Some of the larger pools did have water and fish at an earlier date (Aug 8, 1989), although no fish were observed in those isolated and smaller pools during the Aug 22 survey.

Lower—middle Section

About 1.6 miles from the mouth, the canyon closes in as the flood plain becomes virtually nonexistent. The slopes were steeper in this reach, approaching 80%. Riparian canopy was nearly 10O% and surface flow was evident. Although no flow measurements were performed, I estimated the flow rate at 5 cfs. The inner stream channel averaged about 25 feet wide and was contained in a well-defined outer channel of about 50 feet, bank—to—bank. Stream gradient averaged about 2%. Occasionally high flows appear to leave the outer channel, but generally did not compromise bank integrity. At the upper end of this section, the gradient lessened to about 0.5%, and there was more fine material in the bed. The slopes steepened to over 80% in areas and dry ravelling caused deposition of fine material in the streambed.

The streambed was composed of large rubble and boulders with pocket pools linked by small cascades. As in the lower section, the boulders and rubble were cemented with gravel and sand. Sand was evident in depositional areas behind larger boulders and in the pools. Suitable spawning habitat in this section was limited to small pockets at the tails of the larger pools. The upper portion of this section contained more gravels of spawning size, however, the 2-10 mm size sands were visible behind individual rocks in the stream. As mentioned above, dry ravelling was evident from the steep slopes.

Pools averaged about 1/3 of the average channel width and were of generally good quality, affording good cover for juvenile salmonids. The rubble and boulder areas also provided good rearing habitat. The stream supported the usual populations of clean water aquatic invertebrates: dragonflies, damselflies, mayflies, Caddisflies, Stoneflies, true bugs, and beetles. Juvenile salmonids were observed in both pool and rubble/boulder areas at an estimated 1OO fish per 100 feet of stream. Preliminary identification by remote visual observation indicated two age classes of steelhead, resident rainbow trout, and possibly coho salmon. Later seining (9/19/89) in the lower reach, however, revealed no salmon.

Upper-middle Section

This section was typified by a V–shaped canyon with 80—100% + slopes and steeper gradient (3—5%) stream channel. The channel was generally not partitioned into inner and outer channels, rather the slopes came directly to the streambanks except on wide turns in the channel. Average channel width was approximately 15 feet. Dry ravelling was still evident in some locations. High flows had compromised bank integrity in a number of locations and a few active slides were observed. Additionally, log jams associated with channel constrictions formed possible barriers to anadromous fish migration. Near the middle of this section a very steep section (approx 10O ft rise in 300 feet) culminated in a 15—20 foot high falls, farming a complete barrier to anadromous fish migration. The stream channel then "staircased" through boulder and bedrock before flattening out for a short distance. The gradient then steepened through the rest of the section, again typified by rubble and boulder substrate and depositional areas of gravel and sand.

The streambed in this section generally was composed of rubble and boulders with gravel pockets and areas of bedrock. Sand was still evident behind the larger boulders and in large pools, but the higher energy of this section kept sand from depositing in the streambed uniformly. The exception to this was the short reach upstream of the falls, where a definite depositional area consisted of cobble, gravel, and sand. Although the rubble and boulders were not as tightly cemented as in the lower reaches of the stream, the gravels contained large amounts of sand. Stream substrate cores from that area (Stn #3) and the steeper area upstream (Stn #4) were obtained from the gravels on 9—7-89 and 9-21-89, respectively. The average and standard deviation of percent fine material (<1.0 mm) for ten (1O) measurements at each station were: Stn #3 - 25.4, 4.6 and Stn #4 - 25.9, 6.1.

Juvenile salmonid rearing areas were still in good abundance as plunge pools, pocket pools, and rubble—littered runs. Salmonids were observed in all areas up to the falls at approximately 50 fish/100 feet of stream, tapering off to about 25 fish/100 feet as the stream gradient steepened drastically. Resident rainbow trout were still observed in the larger pools, and were the only fish observed upstream of the falls.

Upper Section

This section was much flatter than the middle section of the stream. The inner stream channel averaged about 1O feet in width and meandered through a flood plain for most of the surveyed section. The canyon slopes were 40-60%, and stream gradient less than 1%. High flows had compromised bank integrity for most of this section, creating undercut and unstable banks. A few small log jams were observed. The riparian corridor was still virtually 1OO% canopy, although some clearings were evident high in the drainage.

The streambed in this section generally was composed of gravel and sand with constrictions and other high energy areas primarily composed of rubble and cobble. Although the stream substrate was not as tightly cemented as in the lower reaches of the stream, the gravels contained large amounts of fine sand and organic debris. Stream substrate cores from the area (Stn #5) were obtained from the gravels on 9—20-89. The average and standard deviation of percent fine material (<1.0 mm) for ten (10) measurements was: 30.1, 6.1.

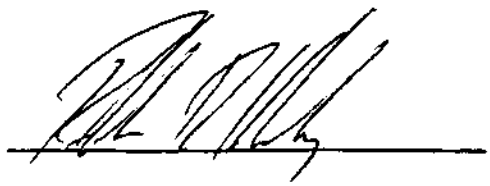
The only fish observed were resident rainbow trout, but very few in comparison to other sections of the stream. Habitat for juveniles and adults consisted of plunge and scour pools.

Summary

The main stem North Fork of the Garcia River is generally deficient in spawning habitat for anadromous salmonids. Spawning size materials were usually found in small pockets and often did not comprise a sufficiently large area to accommodate a typically sized steelhead redd. Obviously, adults find areas in which to spawn, based on the numbers of juvenile anadromous salmonids observed. Substrate cores of spawning gravels indicated that the spawning gravels that do exist were embedded with fine material to a level at which survival of egg to alevin begins to decrease significantly.

The rearing habitat was excellent, complimented by the abundant riparian canopy. Pool and run areas were numerous and used by the salmonids we observed in the stream. A healthy population of aquatic invertebrates indicated a sufficient base of primary productivity, and no real "nuisance" or problem growths of algae or diatoms were observed. Again, the excellent riparian corridor undoubtedly prevents such growths due to decreased solar insolation and consequent low water temperatures.

My basic impression of the stream is one that is on the way to recovery from past erosional problems in the drainage, not unlike a lot of coastal streams. Although a good portion of the stream channel is in a stable condition, there are areas that are undergoing active degradation and at least two major areas of aggradation. I am impressed by the numbers and health of juvenile anadromous salmonids in the stream, though I believe it is capable of sustaining a much higher density. Likely the spawning habitat is the primary limiting factor, in terms of both the amount of spawning gravels and condition of the gravels that do exist. I think that given the opportunity to reach a stasis from a hydrologic standpoint, the N. Fk. Garcia could become a prime steelhead and coho producer.



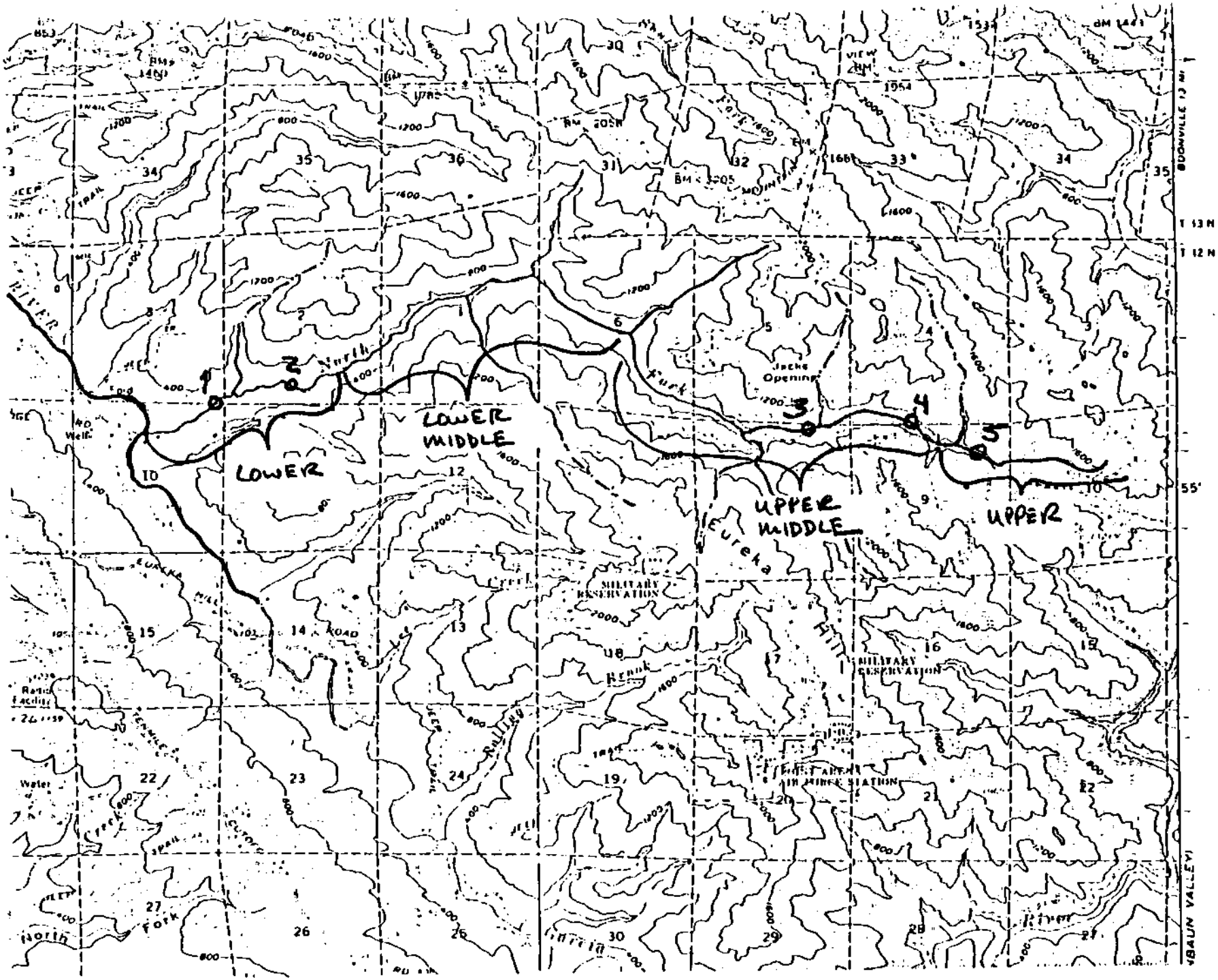


FIGURE 1. N. FORK GARCIA RIVER. O=SEDIMENT SAMPLING SITE