

## **APPENDIX 1**

Individual File Memos for the 2006 Surveys.

## **MEMORANDUM TO THE FILE #056**

**File:** Gualala River Steelhead Study

**From:** Richard W. DeHaven

**Subject:** Spawning survey, Wheatfield Fork, from House Creek Confluence Downstream 18.3 Miles to South Fork Confluence, December 12-13, 2005, *my first complete survey of the index reach for the 2006 spawning season.*

### **Personnel and Survey Timing**

As usual, I conducted this, my first complete survey for the 2006 steelhead spawning season, alone. The survey was done over the standard 2-day period, with the upper half of the index reach surveyed on day one and the lower half surveyed on day two. The survey dates marked the earliest in the spawning season that I have—so far at least—surveyed the whole index reach.

I arrived at House Creek at 1000 hrs on December 12<sup>th</sup> and surveyed the 8.9-mile upper index reach from 1045 to 1545 hrs, for an average survey rate of 1.78 mph. On December 13<sup>th</sup>, I surveyed the 9.4-mile lower index reach from 0815 to 1330 hrs, for an average survey rate of 1.71 mph. The relatively slow rates on both days were a reflection of the very low flows. As is typically the case, I did not observe another human, except at the put-ins and take-outs, and along the road which borders a portion of the upper survey reach.

### **Survey Methods**

Surveys both days were conducted from one of my 8-foot aluminum mini-drift-boats. All procedures were the same as during my previous surveys in the 2002-2005 spawning seasons, except for one new protocol regarding size of adult fish.

In the past, I have been hesitant to concern myself with this issue, because of the difficulty I believe exists (especially among different observers) with accurately determining size classes based on often very brief observations from above, in a boat, of adults in deep pools (mostly), runs and riffles. Size estimates would likely be much more reliable if made while snorkeling. Nevertheless, I have gradually become more confident of my size-estimating ability as my experience on the index reach, which now totals 24 surveys since 2002, has accumulated. Also, it has become clear that I will be the sole observer during all or most of these spawning surveys (so, observer variation is essentially a non-issue, at this time, at least).

Therefore, on this first survey of 2006 and henceforth, I am instituting and using the following size categories (based on total length) for my observations of adults: size 1=18-24 inches; size 2= 25-31 inches; size 3= $\geq$ 32 inches. I will also make special note of the truly giant adults seen over 35 inches, such as those I recorded during the 2005 spawning season.

### **Weather and Stream Conditions**

The sky was 100 percent overcast throughout day one. On day two, dense morning fog burned off at 1130 hrs and the remainder of the survey was completed under sunny conditions. Wind was not encountered during either day one or two.

Stream flow was very low and still slowly declining. Boating was both difficult and time-consuming (i.e., lots of dragging the boat over shallow reaches and obstacles). Values at the three USGS realtime gages located on the river were roughly (December 14 and 11 readings, respectively) 50-59 cfs on the South Fork, 60-66 cfs on the Wheatfield Fork, and 24-30 cfs on the North Fork. These values were below the ideal survey flows I have identified in the past.

When checked (and photographed) on the afternoon of December 12<sup>th</sup>, the river mouth was blocked by a sandbar and closed. However, based on the recorded flows and low (<2 ft) sandbar height, the mouth was no doubt still regularly opening and closing in response to daily tidal cycles and fluctuating estuary impoundment level.

### **Rainfall and Hydrology Prior to this Initial Spawning Survey**

The first rainfall of the season (based on the Venado realtime gage), a minor 0.04-inch event, occurred on October 15, 2005. Additional rain totaling 2.04 inches fell on October 26-29. Then, about 4.12 inches fell during November 3-8, followed by 5.04 inches during November 28-December 2. The largest single-day event during the period was the 3.44 inches recorded on December 1<sup>st</sup>. No precipitation was recorded during the 10 days prior to the start of the survey, however.

The 4 inches of rain in early November created the first seasonal rise in the Wheatfield Fork hydrograph—to several hundred cfs—and no doubt opened the river's mouth. The late November-early December rainfall resulted in a much larger and longer rise in the Wheatfield Fork hydrograph, which peaked at about 3,000 cfs on December 2<sup>nd</sup>. The hydrograph then went into a relatively rapid decline until the start of the survey. Thus, there were ample periods prior to the survey when adult steelhead may have moved up and down the index reach.

### **Results**

I recorded a total of five adults, but no redds. Thus, this represents the earliest in the spawning season that I have recorded adults. More interesting than this, however, are the observations of JSH (juvenile steelhead). Normally, during such early-season spawning surveys few, if any, JSH are seen. Those that are seen are usually widely scattered individual fish (except in late spring when YOY begin to emerge). However, such was not the case during this survey. I recorded, for the first time ever along the index reach, several large schools of JSH containing hundreds of fish each. These unique observations are, I believe, the direct result of upstream river reaches, including the Wheatfield Fork and its tributaries (instead of the estuary), becoming highly important to JSH rearing—likely for the first time in many years—during the 2005 rearing season. This in turn was due to the higher than normal flows and lower than normal water temperatures that prevailed through the summer of 2005.

***Upper 8.9 miles***—At 1227 hrs three size 1 (fresh-run) adults were recorded together in flatwater habitat. The YMCA Pool (1324 hrs) and Indian Spearing Pool (1541 hrs) were both devoid of adults. At 1532 hrs, a school of about 300 age 1 and age 2 JSH were seen in flatwater habitat; about a dozen individual JSH were also recorded at scattered locations.

**Lower 9.4 miles**—A single, fresh, size 2 adult was recorded in flatwater at 1007 hrs. The second adult, an apparently spent size 1 fish, was recorded in the Yellow Rope Pool at 1040 hrs. Schools of age 1 and age 2 JSH occurred as follows: 1049 hrs= 400 (flatwater-pool complex); 1128=100 (flatwater); 1144=300 (flatwater-pool complex); and 1157=200 (flatwater). In addition, about 2-3 dozen individual JSH were also observed at scattered locations.

### **Conclusions**

Survey conditions were excellent due to low flows and lack of wind. Any redds present would have been readily detected and adults would have been easily seen in all of the deepest pools. The river mouth was closed when viewed on December 12<sup>th</sup>, but likely fluctuating between open and closed. Spawning was not occurring in the index reach, but a few size 1 and 2 adults were moving through to upstream spawning reaches. The spent adult (if that designation is correct) shows that at least some spawning had already occurred upstream of the index reach. The unprecedented large numbers of JSH observed reflects the good rearing conditions of 2005, due to high flows sustained by abundant late-spring rainfall.

*Prepared: January 9-10, 2006; RWD*



## **MEMORANDUM TO THE FILE #057**

**File:** Gualala River Steelhead Study

**From:** Richard W. DeHaven

**Subject:** Spawning survey, Wheatfield Fork, from House Creek Confluence Downstream 18.3 Miles to South Fork Confluence, February 15-16, 2006, *my second complete survey of the index reach for the 2006 spawning season.*

### **Personnel and Survey Timing**

I conducted this, my second complete survey for the 2006 spawning season, alone. The survey was the standard 2-day event. Due to high flows, this was the earliest that the second survey could be conducted, following the first survey completed December 12-13, 2005.

I arrived at House Creek at 0945 hrs on February 15<sup>th</sup> and surveyed the 8.9-mile upper index reach from 1021 hrs to 1413 hrs for an average survey rate of 2.32 mph. On February 16<sup>th</sup>, I surveyed the 9.4-mile lower index reach from 0855-1302 hrs, for an average survey rate of 2.26 mph. These were both relatively rapid survey rates, due to the relatively high, fast-moving flows.

### **Survey Methods**

Surveys both days were conducted from one of my 8-foot aluminum mini-drift-boats. All procedures were the same as during my previous surveys this season and in the 2002-2005 spawning seasons. The new adult size criteria instituted during the first 2006-season survey in December 2005 were followed, i.e., size 1=18-24 inches TL; size 2=25-31 inches TL; size 3= $\geq$ 32 inches TL; with special note made of all adults >35 inches TL.

### **Weather and Stream Conditions**

All of the first day was quite cool (30-50°F) but sunny, with a consistent northerly wind of 5-15 mph; the strongest wind gusts were between noon and 1400 hrs. The second day was equally cool; partly cloudy with light cirrus cloud cover; and windy (continuing northerly), especially between 1230 and 1300 hrs. However, wind the second day was much less a factor (i.e., in preventing observation of the bottom of the stream bed, due to surface turbulence) than during the first day.

Stream flow was relatively high (much higher than I expected, based on the stream-gage values) and slowly declining hydrographs. Values from mid-day to mid-day over the 2-day period for the USGS realtime gages located on the river were: Wheatfield Fork—about 100-95 cfs; South Fork—about 30-25 cfs; and North Fork—about 82-75 cfs. Frankly, I believe that the Wheatfield Fork flow was substantially greater than the 95-100 cfs that the gage indicated—probably something more on the order of 125-135 cfs. At any rate, due to the relatively high flow, wind both days, and partly cloudy conditions on day two, survey conditions were sub-optimal, with the bottoms of some of the pools, riffles and flatwater not visible.

The river mouth was checked and photographed on the afternoon of the 15<sup>th</sup>. It was open and flowing to the sea, although the river-sea connection was difficult to observe because of a low sandbar blocking the view.

### **Rainfall and Hydrology Between the First and Second Surveys**

Nine weeks elapsed between surveys, nevertheless due to rainy weather and high flows, this was the earliest that the second survey could be conducted. In fact, there were some epic rainfall amounts and resultant flows during the interim period.

The primary wet period was late December through early January. In particular, the Venado (VEN) realtime rain gage (located on the Russian River watershed, but a good indicator of Gualala-watershed maximum rainfall) recorded 19 consecutive days of rain totaling 38.20 inches between December 17 and January 4. On each of 4 of these days, over 3 inches were recorded, including 4.40 inches on December 18 and 5.88 inches on December 30. Then, between January 6 and February 4, 17 more days of precipitation occurred, although these were much smaller rainfall events, leaving up to a maximum of 1.16 inches on January 28. The pattern then turned very dry, with no rainfall recorded from February 5 to February 15, the start of this survey.

As a result of the epic rains, there were some epic flows generated at the realtime stream gages, which rose dramatically starting on December 18<sup>th</sup>. In particular, the Wheatfield Fork had three peaks over 10,000 cfs—one to over 20,000 cfs—during late December and early January. There was also a much smaller peak to over 3,000 cfs again on February 4<sup>th</sup>, followed by a slow decline until the survey began. The South Fork and North Fork had several peaks over 5,000 cfs and 10,000 cfs, respectively, during the same period. Unfortunately, continuous gage data are not available over the whole 9-week interim period, since the South Fork gage was inoperable from January 20 to February 1 and the Wheatfield Fork gage was off-line from January 12 to February 1.

### **Results**

Thirty-four adult steelhead were counted—7 along the upper survey reach and 27 along the lower reach. This total was on the low side of what was actually present, since the sub-optimal survey conditions clearly prevented some unknown number of adult fish from being observed and counted.

Two new steelhead redds were found, both along the upper reach. Conditions were good for spotting redds. I did not observe any rough-skin newts, lampreys or lamprey redds along either of the two survey reaches.

I encountered one major new landslide along the lower survey reach (south bank). It clearly occurred during one of the recent high-water events and involves several hundred cubic yards of sediment—and several large conifer trees—sloughing off the adjacent hillside into the river. And downstream from this landslide, I encountered (and photographed) one new, large, channel-spanning fir tree that had eroded off the south bank into the river where it lodged

perpendicular to flow. It will be interesting to observe how long this position across the channel is maintained.

**Upper 8.9 miles**—By time of day (with size, status [spent, fresh-run, or unknown] and habitat-type also indicated), the seven adults occurred as follows: 1045-2 adults, size 2, S, Bedrock Run; 1047- 2 adults, size 1, S, flatwater; 1116-1 adult, size 3, S, Concrete Slab Pool; 1135-1 adult, size unk, unk, pool; and 1409-1 adult, size 3, unk, pool. There were no adults observed in either the YMCA Pool or Indian Spearing Pool, although visibility was marginal and thus fish could easily have been missed. The two redds, the first of the 2006 season, were at 1245 and 1405 hrs, and were marked (orange flagging) as DEH#1 and DEH#2.

**Lower 9.4 miles**—The 27 adults were recorded as follows: 0910-1 adult, size 1, f-r, flatwater; 0927-1 adult, size 2, unk, pool; 1009-1 adult, size 1, S, flatwater; 1040-12 adults, size 3 (6), size 2 (4), size 1 (2), all f-r, deep flatwater; 1045-2 adults, size 2, f-r, pool; 1047-5 adults, size 3 (3), size 1 (2), all f-r, Yellow Rope Pool; 1056-3 adults, size 2 (1), size 1 (2), all f-r, deep flatwater; 1158-1 adult, size 3, S, pool; and 1219-1 adult, size 2, S, riffle. No adults were seen (marginal conditions; so they may have been missed) in either the ATV or Lower Cable pools. These two pools—and the Yellow Rope Pool—all showed the most siltation I have seen during any survey. They are now only about half of their former maximum depth and volumes. If this trend continues, they may no longer be utilized by adult steelhead.

The major new landslide was recorded at 0920 hrs. The channel-spanning new tree was found at 0931 hrs.

### **Conclusions**

Survey conditions were sub-optimal. An unknown percentage of adults were likely missed. All or most of the redds were likely located, however. A moderate number of fresh-run adults were moving upstream, a moderate or low number of spent fish were moving downstream, and a low level on spawning was occurring within the index reach. The river mouth was open and flowing. Major holding pools exhibited new siltation and filling. One major new landslide was encountered.

*Prepared: February 22, 2006; RWD*

## **MEMORANDUM TO THE FILE #058**

**File:** Gualala River Steelhead Study

**From:** Richard W. DeHaven

**Subject:** Spawning survey, Wheatfield Fork, from House Creek Confluence Downstream 8.9 Miles to Annapolis Road Bridge, February 24, 2006, *my third survey (incomplete) of the index reach for the 2006 spawning season.*

### **Personnel and Survey Timing**

I conducted this, my third survey for the 2006 steelhead spawning season, alone. As usual, it was supposed to be a 2-day event covering the entire 18.3-mile index reach 9 days after the previous (February 15-16) survey. However, near the end of the upper survey reach on day 1, I seriously strained my lower back while dragging the boat around an obstacle. As a result, I was unable to finish the lower survey reach on day 2. This was the first time in four years that I have been unable to complete both the upper and lower survey reaches during a planned survey.

I arrived at House Creek at 0945 hrs on February 24<sup>th</sup> and surveyed the 8.9-mile upper index reach from 1017 hrs to 1510 hrs for an average survey rate of 1.78 mph. This was a relatively slow rate, due to the relatively low flow, which necessitated dragging the boat numerous times.

### **Survey Methods**

The survey was conducted from one of my 8-foot aluminum mini-drift-boats. All procedures were the same as during my previous surveys this season and in the 2002-2005 spawning seasons. The new adult size criteria instituted during the first 2006-season survey in December 2005 were followed: size 1=18-24 inches TL; size 2=25-31 inches TL; size 3= $\geq$ 32 inches TL; with special note made of any adults over 35 inches TL.

### **Weather and Stream Conditions**

Both days were sunny and clear, with little or no wind. Air temperature ranged from a low of about 48 to a high of about 65<sup>0</sup>F.

Stream flow was much lower than expected. Values at mid-day for the river's three USGS realtime gages were: Wheatfield Fork—about 65 cfs; South Fork—about 8 cfs; and North Fork—about 44 cfs.

The river mouth was checked and photographed during the late afternoon. It was open, but just barely flowing to the sea through a low sandbar. Surf conditions were relatively calm.

### **Rainfall and Hydrology Between the Second and Third Surveys**

Nine days elapsed between the previous survey and this survey. A relatively small amount of rain (0.12 inches; VEN gage) was recorded during two (Feb 17-18) of those days. The river hydrograph thus continued a steady downward trend through the period between surveys.

## **Results**

Fifty-seven adult steelhead were observed. Conditions for counting adults were excellent, so I am confident that I did not miss a large number of fish. No new steelhead redds were found. However, of the two redds found during the previous survey, one was still discernable and the other was not. Conditions were very good for finding the redds.

I did locate three new lamprey pits, the first of the 2006 season. I did not observe any rough-skinned newts, pond turtles, or frogs, however.

The Indian Spearing Pool contained 12 adult steelhead and six juvenile native Americans milling around on the rocks just above them. By the time I passed through in my little boat there were no gigs, spears, or snagging gear visible along the bank. However, the group saw me coming at least a quarter-mile away and thus had plenty of time to conceal such gear from view.

Recordings of the adult steelhead, by time, size of fish (1, 2, or 3), condition (fresh=FR or spent=S), and habitat type were as follows:

- 1036 hrs-1 adult, size 3, FR, flatwater;
- 1046-3 adults, size 3, FR, Bedrock Run (flatwater);
- 1133-4 adults, size 3 (2) and size 2 (2), FR, deep pool;
- 1146-12 adults, size 3 (4) and size 2 (8), FR, Log Pool;
- 1148-2 adults, size 3 (1) and size 2 (1), S, flatwater;
- 1200-1 adult, size 1, FR, in 6-inch depth at edge of flatwater;
- 1215-3 adults, size 2, S, along edge of flatwater;
- 1256-3 adults, size 3 (2) and size 2 (1), FR, pool tail-out;
- 1349-4 adults, size 1, FR, deep pool;
- 1355-12 adults, size 3 (6) and size 2 (6), FR, deep pool; and
- 1458-12 adults, size 3 (6) and size 2 (6), FR, Indian Spearing Pool.

Therefore, of the 57 total fish seen, my estimate is that 5 were spent and 52 were fresh-run. Also, a total of 5 were size 1 (18-24 inches), 27 were size 2 (25-31 inches), and 25 were size 3 ( $\geq 32$  inches). Adult steelhead were not recorded in either the YMCA Pool or the Concrete Slab Pool where there was excellent visibility of the bottom.

## **Conclusions**

Survey conditions were excellent. Relatively low numbers of both adult steelhead and their redds would likely have been missed. A moderate-to-high number of fresh-run adults were moving upstream to spawning areas and a relatively low number of spent adults were moving back downstream. A low level (if any) of spawning was actually occurring within the 18.3-mile index reach. The river mouth was open and flowing to the sea. A low level of lamprey spawning, the first of the season, was occurring although lampreys were not actually seen.

*Prepared: May 17, 2006; RWD*

## **MEMORANDUM TO THE FILE #059**

**File:** Gualala River Steelhead Study

**From:** Richard W. DeHaven

**Subject:** Spawning survey, Wheatfield Fork, from House Creek Confluence Downstream 18.3 Miles to South Fork Confluence, April 29, 2006, *my fourth survey (third complete survey) of the index reach for the 2006 spawning season.*

### **Personnel and Survey Timing**

I conducted this, my fourth and final survey for the 2006 spawning season, accompanied by a biologist from my former office at the U. S. Fish and Wildlife Service. This was a 1-day marathon event in which the whole 18.3-mile index reach was surveyed. Due to rather epic spring rains and flows, this was the earliest that a final survey for the 2006 season could be conducted. The previous survey, in which only the upper half of the index reach was completed, was on February 24, 2006.

We arrived at House Creek at 0830 hrs on April 29<sup>th</sup> and surveyed the 8.9-mile upper index reach and 9.4-mile lower index reach (consecutively) from 0905 hrs to 1610 hrs, for an average survey rate of 2.61 mph. This was a rapid rate, reflecting the high flow.

### **Survey Methods**

Each of us floated in one of my 8-foot aluminum mini-drift-boats. Procedures were as previously established.

### **Weather and Stream Conditions**

This was a mild, sunny, springtime day with the air temp topping out at 75°F. However, about 1230 hrs we began encountering a periodic (depending on our aspect) upstream breeze which at times put turbulence on the water's surface and slowed downstream progress. The flow was still relatively high. Overall, this made for rather marginal survey conditions, with our ability to view the bottoms of only about half of the deepest pools and runs.

Flows as measured at the USGS gages on the Wheatfield Fork and South Fork are unknown. During the period between the third and fourth spawning surveys, Gualala River Watershed Council (GWRC), which had been operating them as USGS's cooperator, abruptly closed them both down (in terms of Realtime data, at least). GRWC continued to operate the Realtime gage on the North Fork, however, and at mid-day it indicated about 34 cfs. Also, at mid-day, the USGS gage on the Navarro River the best index to Gualala River flow, showed about 375 cfs.

We did not check the river's mouth. However, it was clearly open and flowing to the sea at this relatively high flow level.

### **Rainfall and Hydrology Between the Third and Fourth Surveys**

Nine weeks elapsed between surveys, nevertheless with the high flows, this was the earliest that the fourth and final survey of the season could be conducted. During the last week of February,

over 8 inches of rainfall were recorded (all discussion pertains to the Venado=VEN Realtime gage), with 4.96 inches of the total on February 27<sup>th</sup> alone. For the month of March, rainfall totaled 17 inches, with precipitation during 24 of 31 days. On March 5<sup>th</sup> 4.80 inches of rain fell. And during the first 16 days of April, rainfall totaling nearly 13 inches occurred, with precipitation during all but 2 days. A dry spell finally began on April 17<sup>th</sup>, by which time the seasonal total (since October 1<sup>st</sup>) for the VEN gage stood at nearly 88 inches.

The Navarro River hydrograph soared to between 10,000 and 20,000 cfs at least twice during the 9-week intervening period. While the Wheatfield Fork gage had been taken off-line by GRWC, based on my past experience, it is likely that it also experienced peaks of similar magnitude. The dry spell which started on April 17<sup>th</sup> brought a steadily but slowly declining hydrograph to the various Realtime gages, including the North Fork gage.

### **Results**

Neither any adult steelhead nor their redds were found. While water visibility was frequently marginal, at best, we were able to get reasonably good views of the bottoms of the following major adult holding areas: YMCA Pool; Bedrock Run; Indian Spearing Pool; Log Pool; Yellow Rope Pool; ATV Pool; Lower Cable Run; and Snagging Pool. Based on no fish being observed in any of these favored holding sites, I believe there were relatively few, if any, adult fish present in the river.

A few age 1+ JSH (juvenile steelhead) were observed feeding on the surface at various locations. A few YOY JSH were also seen along the stream margins at various sites. In both cases numbers of JSH appeared lower than in previous years.

One lamprey redd was recorded.

### **Conclusions**

Survey conditions were sub-optimal due to high flows and surface turbulence. Nevertheless, the spawning run appeared to have ended, with zero redds found and zero adults observed moving upstream or downstream. Lamprey spawning was also very low compared to previous years.

*Prepared: May 24, 2006*

## **MEMORANDUM TO THE FILE—#060**

**File:** Gualala River Steelhead Study

**From:** Richard W. DeHaven

**Subject:** 2006 Juvenile Steelhead Snorkeling Surveys, *seasonal survey #1 on June 24-25, 2006.*

### **Purpose and Objectives**

Snorkeling surveys are a proven and effective method of observing and counting juvenile salmonids in streams of various sizes. During June to November of 2004, I conducted six reconnaissance-level snorkeling surveys at nine locations in the Gualala River watershed (DeHaven 2004). From these initial surveys, a long-term (several-year) snorkeling survey protocol was developed for implementation at nine study sites at eight locations. Here I report the first snorkeling survey of the 2006 season at these study sites. Eventually, such snorkeling survey results, or these results in combination with the spawning surveys I have been conducting annually since 2002, may help achieve the goal I am pursuing: determining the present status and trend of the Gualala River's steelhead population.

### **Personnel**

This survey was conducted with a friend from San Francisco, Greg Benke. We also had the assistance of a local resident who lives near the mouth of House Creek and has taught me much about steelhead behavior and ecology not found in books and technical papers. My two assistants measured transects, determined water and air temperatures, and recorded data; I conducted all of the snorkeling activity.

### **Survey Methods**

This was a typical 2-day survey. A detailed description of the snorkeling study sites and methods is provided in my 2005 annual report which can be accessed from my web site. In addition, we implemented snorkeling-only surveys (i.e., without estimating water volumes and fish densities) at six new, 100-ft-long sites located close to the original nine study sites. These snorkel-only sites were: **#3a**-Wheatfield Fork, 1/4-mi upstream from the Lady-in-the-Car site; **#4a**-Wheatfield Fork, directly beneath the Annapolis Road Bridge; **#4b**-Wheatfield Fork, 3/8-mi downstream from the Annapolis Road Bridge (i.e., about 100 yards upstream from the mouth of Haupt Creek); **#9**-Mainstem, at the Highway 1 bridge in the vicinity of the unimproved boat-loading area; **#5c**-Mainstem, at the mouth of the North Fork where it empties into the mainstem; and **#5d**-Mainstem, about 100 yards upstream from the North Fork mouth.

### **Weather and Stream Conditions**

Daylight lengths on this trip were close to being the longest of the year. Also, ambient air temperatures had been relatively hot, due to persistent high pressure aloft, for several days prior to the survey. However, air temperatures moderated during the afternoon of the first day through the second day, due to intrusion of marine air and coastal fog. As usual, the higher air temperatures occurred along the more easterly portions of the watershed, while the westerly portion remained cooler, due to ocean influence.



Flows at the three USGS realtime stream gages in the watershed over the 2-day period are not known. Gualala River Watershed Council, which had been operating the three gages for USGS, abruptly shut down (from realtime access) the last of the three gages—the one on the North Fork—just shortly before the survey. As an index, however, the Navarro River USGS realtime gage (which closely mimics values of flows at the Gualala Wheatfield Fork gage), showed about 60-62 cfs. This amount of flow is well above average for this time of the year.

All sample reaches of the stream had relatively high, continuous surface flows. Such unusual conditions were the result of the epic late-season rainfall that the watershed received during February through April 2006. Refer to File Memo #059, which details my last spawning survey of the 2006 season for discussion of some of the season's astonishing rainfall totals.

The river mouth was blocked by a sandbar when viewed and photographed on the afternoon of June 24, 2006. However, impoundment was nearing maximum stage and the mouth appeared close to breaching and opening to the sea.

### **Results and Discussion**

Tabular summary of results will be provided in my 2006 annual report to be issued in December 2006. Following below are brief site-by-site discussions of results from snorkeling at the nine study sites and six supplemental (snorkel only) sites. Unless otherwise noted, discussion pertains to the 100-ft-long transects.

**#1-Wolf Creek:** Stream flow upon our arrival at 1045 hrs on June 24<sup>th</sup> was similar to the comparable July 2<sup>nd</sup> survey of 2005 and at least several times greater than the flow during the comparable July 3<sup>rd</sup> survey of 2004. The site contained pools (two), riffle, and flatwater habitat. All of the 100-ft sample, except the shallowest portions of the riffle was snorkeled. A total of 100 JSH (versus 140 in 2005) were observed in roughly equal numbers in the two pools of the sample reach. No other species of fish were recorded. Water temperature at 1105 hrs was 66<sup>o</sup>F (air temp=83<sup>o</sup>F). The estimated water volume of the sample was 15 m<sup>3</sup>, the average maximum velocity was 0.7 fps (ft/second), and the total density of JSH was 6.5/m<sup>3</sup> compared with 8.0/m<sup>3</sup> in 2005. The density was the highest recorded at any site during this 2-day snorkeling survey.

**#2-House Creek:** Stream flows in the two converging branches upon our arrival at 0930 hrs on June 24<sup>th</sup> were similar to conditions on the comparable—July 2<sup>nd</sup>—survey of 2005 and at least several times greater than during the comparable—July 3<sup>rd</sup>—survey of 2004. The site contained all three basic habitat types. However, the site could not be snorkeled over its entire length; about 1/4 to 1/3 was too shallow. A total of 50 JSH YOY were recorded compared to 551 JSH of various ages recorded on the July 2, 2005 survey; the JSH seen were uniformly distributed throughout the sample reach. An estimated 700 GR (Gualala roach) were also recorded. Unlike the survey on July 3, 2004, water visibility was relatively good, due to low algae growth. Water temperatures at 0950 hrs (with an air temperature of 74<sup>o</sup>F) were: House Creek—71<sup>o</sup>F; Wheatfield Fork—70<sup>o</sup>F; and 72<sup>o</sup>F just downstream of the confluence. The estimated water volume of the sample was 33 m<sup>3</sup> (versus 38 m<sup>3</sup> in 2005), the average maximum velocity was 1.3 fps, and the total density of JSH was 1.5/m<sup>3</sup>, compared to 14.4/m<sup>3</sup> recorded in 2005.

**#3-Wheatfield Fork** (Lady-in-the Car): Stream flow upon our arrival at 1230 hrs on June 24<sup>th</sup> was similar to the flow on the comparable date (July 2) in 2005 and at least double the flow observed during the July 3, 2004 survey. The site consisted of pool and flatwater habitat. The site was snorkeled over its entire length. A total of 120 JSH (versus 10 in 2005) of various (at least three) age-classes were recorded; YOY were widely distributed, whereas the larger, older fish were all in the plunge pool at the base of the waterfall. No other fish were recorded. Water temperature at 1245 hrs was 76°F (air temp=86°F), about 8° lower than recorded during the July 3, 2004 survey. The estimated water volume of the sample was 29 m<sup>3</sup>, the average maximum velocity was 0.5 fps, and the total density of JSH was 4.1/m<sup>3</sup> (compared to 0.2/m<sup>3</sup> recorded in 2005).

At nearby site #3a, a snorkel-only site, 18 JSH representing three age-classes were recorded; 15 of these were YOY. Four unidentified sculpins were also recorded.

**#4-Wheatfield Fork** (Annapolis Road bridge): Stream flow at the site upon our arrival at 1330 hrs on June 24<sup>th</sup> was similar to the comparable survey on July 2, 2005 and very noticeably higher than observed during the comparable July 3, 2004 survey. The site consisted of essentially one large pool. The entire site was snorkeled. Just as in 2005, JSH were not recorded, whereas a few age 2+ JSH in poor condition (with obvious fin erosion) were observed in the deepest parts of the pool on July 3, 2004. Five unknown sculpins and about 1,000 tadpoles were recorded. Water temperature at 1345 hrs was 79°F (air temp=91°F). The estimated water volume of the sample was 295 m<sup>3</sup>, the average maximum velocity was <0.1 fps, and the density of JSH was zero.

Site #4a, the snorkel-only site just downstream underneath the bridge, yielded 25 YOY JSH and 2 age 2+JSH; all JSH were in the riffle-to-pool transition area. The site was composed of all three basic habitat types. Scattered throughout the site were about 100 GR. Water temperature at 1400 hrs was 79°F, with the air temperature at 93°F.

At snorkel-only site #4b, located about 3/8-mile farther downstream (i.e., just upstream of the mouth of Haupt Creek) from the bridge, 12 YOY JSH and 1 age1+JSH were recorded. The site consisted of a riffle-and-flatwater complex. Water temperature at 1420 hrs was 78°F and the air temperature was 89°F.

**#5A-Near North Fork mouth** (Upper Section): When we arrived at 1300 hrs, this mainstem section of the river was flowing similar to the comparable survey of July 3, 2005. But the site consisted of a single reach of flatwater instead of one large pool with zero velocity (due to closed river mouth) encountered in 2005. The entire site was snorkeled. Water temperature was 70°F (air temp=77°F) at 1310 hrs. JSH YOY (3), age 1+(1), and age 2+(2) were recorded, along with 25 GR. All six steelhead were in the brushy area along the northeasterly shoreline of the site. The estimated water volume of the sample was 333 m<sup>3</sup>, the maximum average velocity was 0.5 fps, and the total density of JSH was <0.1/m<sup>3</sup>—a relatively low figure, but an order of magnitude similar to the 2005 value for the comparable date.

**#5B-Near North Fork mouth (Lower Section):** We arrived here at 1239 hrs. The site consisted of a pool and flatwater complex, just as during the comparable 2005 survey. The entire site was snorkeled. Average maximum velocity was 0.7 fps. Water and air temperatures were the same as at Site #5A. No fish were recorded. The estimated water volume of the sample was 250 m<sup>3</sup>.

Sites 5A and 5B are on the upstream fringes of the river's estuary zone. The low numbers and densities of JSH recorded at these sites in 2005 and 2006 were initially a surprise. But with further reflection, I believe the results are consistent with the relatively good flow and temperature conditions the river is experiencing in both summers, due to well-above-average rainfall and flows. It is likely that, due to the high flows and good water quality, significant numbers of JSH are remaining in upstream areas for rearing. In contrast, under the lower flows and higher water temperatures characteristic of typical summers, most JSH would have either already perished, due to excessive water temperatures, or moved downstream into the estuary to continue rearing.

At nearby site 5c, the pool at the mouth of the North Fork, only four JSH (YOY=1; 1+=1; and 2+=1) were recorded. In addition, the flatwater of site 5d just upstream had no JSH, but 150 GR, 5 TSS (threespine stickleback), and 3 sculpin spp. were recorded. At about 1400 hrs, water temperature was 65°F in the North Fork, 67°F in the confluence area just downstream, and 71°F in the mainstem reach just upstream of the North Fork mouth.

**#6-Twin Bridges (Wheatfield Fork, beneath the Wheatfield Fork bridge):** Upon our arrival at 1100 hrs on June 25<sup>th</sup> this section was flowing noticeably higher than during the comparable (July 3<sup>rd</sup>) survey in 2004, but similar to the comparable (July 3<sup>rd</sup>) survey of 2005. The site was moved upstream slightly from the 2005 location (in an effort to encounter more fish) and consisted of flatwater, versus the flatwater-riffle-pool complex of 2005. The entire site was snorkeled. Only 1 JSH YOY was recorded. No other fish were recorded. However, a quick check of the first pool located downstream (which was in the 2005 sample) revealed 10 JSH YOY and 50 GR. Water temperature at 1120 hrs was 66°F (air temp=69°F). The estimated water volume of the sample was 113 m<sup>3</sup>, the average maximum velocity was 1.2 fps, and the total density of JSH was <0.1/m<sup>3</sup>.

**#7-South Fork (beneath the Stewart's Point-Skaggs Springs Road bridge):** In 2004, this site was not examined during either the July or August reconnaissance surveys. It was first examined on September 14 and 15, 2004, at which time the flow was extremely low (est.<1cfs) and intermittent; nevertheless, JSH of various ages were moderately abundant in the few remaining pools.

During both the comparable (July 3<sup>rd</sup>) survey of 2005 and this year, upon our arrival at the site at 0940 hrs on June 25, 2006, the stream had a significant and continuous flow of at least several cfs. Water temperature at 1000 hrs was 68°F (air temp=67°F). The topography of the site had changed since 2005 and the sample consisted of a pool-riffle-flatwater complex with abundant large woody debris (LWD) in the pool. The entire site except for a few feet of the riffle was

snorkeled. Only 1 JSH YOY, 1 age 1+, and 1 JSH age 2+, along with 150 GR and 2 sculpin spp. were recorded. All fish were recorded in or around the LWD of the pool area. The estimated water volume of the sample was 108 m<sup>3</sup>, the average maximum velocity was 0.5 fps, and the total density of JSH was <0.1/m<sup>3</sup>.

**#8-Haupt Creek:** During the reconnaissance survey of 2004 (July 4<sup>th</sup>) this site had already become intermittent and JSH were relegated to the few remaining, rapidly-drying pools; nevertheless, JSH were relatively abundant. For the comparable (July 3<sup>rd</sup>) survey of 2005, the stream still had a continuous surface flow and relatively abundant JSH. This year, upon our arrival at the sample site at 1442 hrs on June 24<sup>th</sup>, the stream still had a continuous surface flow of a few cfs, but JSH were distinctly low in abundance, with only 2 YOY (and no other fish) recorded. The site was composed of pools and riffles versus a pool-riffle-flatwater complex in 2005. The shallowest riffle sections could not be snorkeled; all other reaches were snorkeled. Water temperature, at 1500 hrs was 70°F (air temp=81°F). The estimated water volume of the sample was 32 m<sup>3</sup> (about double the 2005 volume), the average maximum velocity was 0.4 fps, and the total density of JSH was <0.1/m<sup>3</sup>.

**#9-Highway 1 Bridge Area:** We checked this snorkel-only site on the afternoon of June 25<sup>th</sup>. Water temperature was not recorded, since temperatures are not generally a JSH-limiting factor this far downstream in the estuary. Rafting and canoeing activity in the area was high. Water level was also very high, due to a sandbar blocking the river's mouth. Snorkeling occurred for 100 feet along the brushy right bank (downstream aspect), in the vicinity of the unimproved boat-launching area on the sandbar just downstream of the bridge. Only 1 YOY JSH and 1 age 1+ JSH (and no other species) were recorded.

### **Conclusions**

Except for Wolf Creek and Lady-in-the-Car sites, JSH numbers and densities were comparatively low at the various sites. Whether this reflects low watershed-scale numbers and densities for 2006 is uncertain. The data from three more planned snorkeling surveys for summer 2006 need to be collected and analyzed. However, two conclusions are warranted: (1) Wolf Creek continues to demonstrate its importance to JSH rearing; and (2) exceptionally high rainfall of 2006 appears to have allowed JSH summertime rearing to occur throughout the Wheatfield Fork for the second summer in a row. This unusual observation is in stark contrast to the hostile water conditions and lack of JSH rearing opportunity afforded by most of the Wheatfield Fork in most summers.

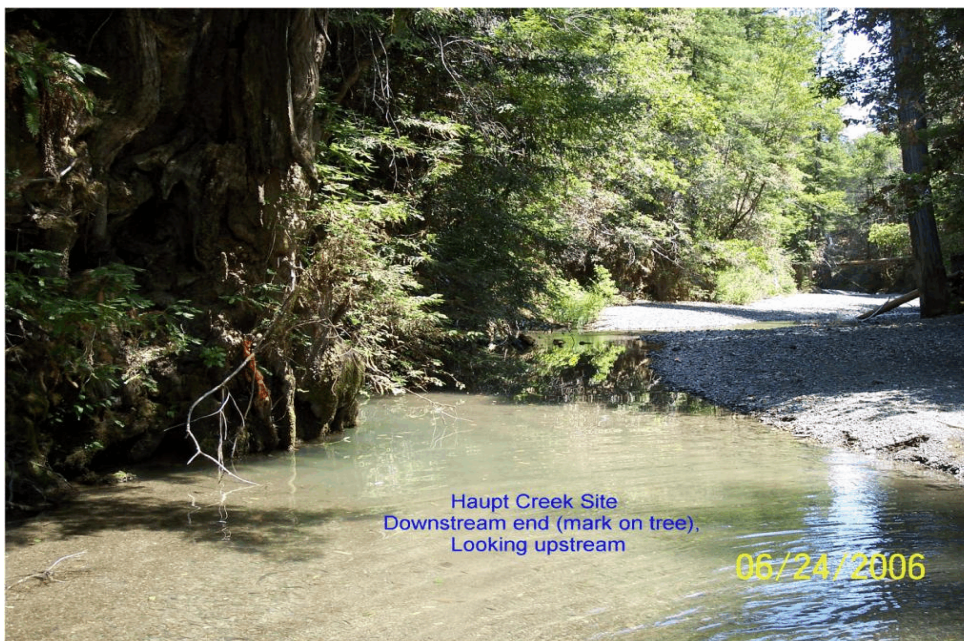
Prepared: July 21, 2006; RWD

**Photo Gallery for the June 24-25, 2006 Snorkeling Survey follows:**









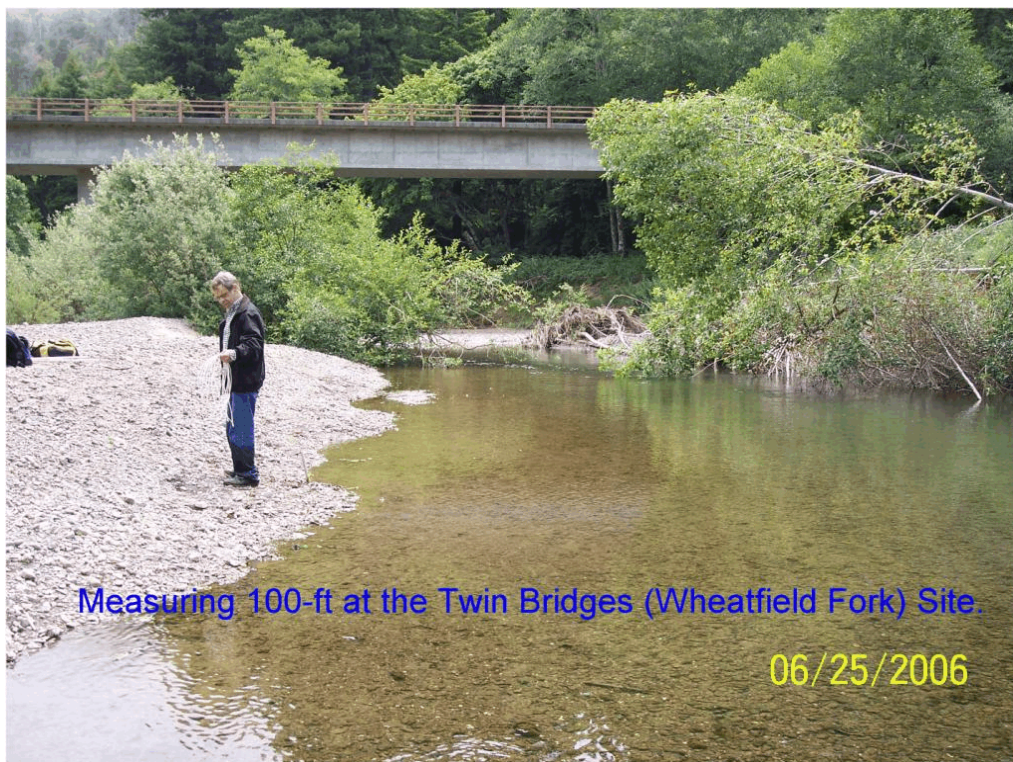








Looking Downstream at the South Fork Site



Measuring 100-ft at the Twin Bridges (Wheatfield Fork) Site









## **MEMORANDUM TO THE FILE #061**

**File:** Gualala River Steelhead Study

**From:** Richard W. DeHaven

**Subject:** 2006 Juvenile Steelhead Snorkeling Surveys, *seasonal survey #2 on July 22-23, 2006.*

### **Personnel**

This survey was conducted with Greg Benke, a San Francisco resident and ardent defender of the river. We also had the assistance of a local resident who has taught me much about steelhead behavior and ecology not found in books and technical papers. My two assistants measured transects, determined water and air temperatures, and recorded data; I conducted all of the snorkeling activity.

### **Survey Methods**

Methods were the same as the previous snorkeling survey on June 24-25, 2006. Please refer to File Memo #60 for details.

### **Weather and Stream Conditions**

Daylight lengths on this trip had declined significantly from the first survey a month earlier. Ambient air temperatures had been and were relatively hot, extending well into the 90s (°F) due to persistent high pressure aloft, for several days prior to the survey. As usual, the higher air temperatures occurred along the more easterly portions of the watershed, while the westerly portion remained cooler, due to ocean influence.

Flows at the three USGS realtime stream gages in the watershed over the 2-day period are not known. As an index, however, the Navarro River USGS realtime gage (which closely mimics values of flows at the Gualala Wheatfield Fork gage), showed about 35-40 cfs. This flow-level is above average for this period of the year.

All sample reaches of the stream had relatively high, continuous surface flows except for the Haupt Creek sample site which had become intermittent.

The river mouth was blocked by a sandbar when viewed and photographed on the afternoon of July 23, 2006.

### **Results and Discussion**

A detailed tabular summary of results will be provided in my 2006 annual report to be issued in December 2006. However, following below are brief site-by-site discussions of results from snorkeling at the nine study sites and six supplemental (snorkel only) sites. Unless otherwise noted, discussions pertain to observations made along the 100-ft-long transects.

**#1-Wolf Creek:** Stream flow upon our arrival at 1050 hrs on July 22<sup>nd</sup> appeared to be substantially lower than during the previous (June 24, 2006) survey. However, the site still contained pools (two), riffle, and flatwater habitat. About one-half of the 100-ft sample, namely

the shallowest portions of the riffle could not be snorkeled. A total of 120 JSH (versus 100 in June) were observed in roughly equal numbers in the two pools of the sample reach. About 250 GR and 20 TSS were also recorded. Water temperature at 1100 hrs was 73°F (air temp=86°F). The estimated water volume of the sample was 13 (versus 15 in June) m<sup>3</sup>, the average maximum velocity was 0.7 fps (ft/second), and the total density of JSH was 10.3/m<sup>3</sup>; this value was the highest density recorded at any site during this 2-day field trip.

**#2-House Creek:** Stream flows in the two converging branches upon our arrival at 0955 hrs on July 22<sup>nd</sup> were noticeably lower than during the June survey. However, the site still contained all three basic habitat types. About 1/4 to 1/3 of the riffle and flatwater was too shallow for snorkeling. A total of 100 (versus 50 in June) JSH of various ages were recorded. All of the JSH except one were in the House Creek pool. About 500 GR and 50 TSS were also recorded. Water temperatures at 1005 hrs (with an air temperature of 83°F) were: House Creek–75°F; Wheatfield Fork–78°F; and 77°F just downstream of the confluence. These were all higher temperatures than recorded in June. The estimated water volume of the sample was 25 m<sup>3</sup> (versus 33 m<sup>3</sup> in June), the average maximum velocity was 1.2 fps, and the total density of JSH was 6.0/m<sup>3</sup>, compared to 1.5/m<sup>3</sup> recorded in June.

**#3-Wheatfield Fork (Lady-in-the Car):** Stream flow upon our arrival at 1220 hrs on July 22<sup>nd</sup> was very similar to the flow during the June survey. The site still consisted of pool and flatwater habitat. The site was snorkeled over its entire length, except for a few feet of the upstream end which flows over the bedrock. No JSH were recored (three otters [two adults and one juvenile]) had just moved through the sample reach prior to the snorkeling event and may have affected the resulting JSH count. One GR and five TSS were recorded. Water temperature at 1235 hrs was 70°F (air temp=89°F) versus 76°F recorded in June. The estimated water volume of the sample was 26 m<sup>3</sup> (a decline of only 3 m<sup>3</sup> from June), the average maximum velocity was 0.4 fps, and the total density of JSH was zero (compared to 4.1/m<sup>3</sup> recorded in June).

At nearby site #3a, a snorkel-only site, 10 JSH YOY were recorded (all in one group, in the fastest water) along with 3 TSS. Water temperature at this site was 82°F, with an air temperature of 97°F.

**#4-Wheatfield Fork (Annapolis Road bridge):** Stream flow at the site upon our arrival at 1300 hrs on July 22<sup>nd</sup> appeared very similar to the June survey conditions. The sample site still consisted of essentially one large pool. The entire site was snorkeled. Twelve JSH representing at least three age-classes were recorded. These fish occurred in the deepest area along the southerly bank, where cool water could be felt upwelling from the bottom. About 750 TSS, 200 GR, and 100s of baby frogs (toads) were recorded. Water temperature at 1315 hrs was 84°F (air temp=100°F). The estimated water volume of the sample was 293 (295 in June) m<sup>3</sup>, the average maximum velocity was <0.1 fps, and the density of JSH was <0.1/m<sup>3</sup>.

At Site #4a, the nearby snorkel-only site just downstream and directly underneath the bridge, eight more JSH were recorded in the brush-covered portion of the riffle. The site was composed of riffle and flatwater. The site also contained about 1,000 GR, 2,500 TSS and 1 sculpin spp.

Water temperature at 1410 hrs was 80°F, with the air temperature at 93°F. At snorkel-only site #4b, located about 1/4-mile farther downstream (i.e., just upstream of the mouth of Haupt Creek) from the bridge, no JSH were recorded. About 700 GR and 1 sculpin spp. were seen, however. The site consisted of a riffle-flatwater complex. Water temperature at 14150 hrs was 82°F with an air temperature of 90°F.

**#5A-Near North Fork mouth (Upper Section):** When we arrived at 1313 hrs on July 23<sup>rd</sup>, this mainstem section of the river was flowing similar to conditions seen in June. The site still consisted of a single stretch of flatwater. The entire site was snorkeled. Water temperature was 70°F (air temp=85°F) at 1315 hrs. Twenty-five JSH, 10 GR, and 10 TSS were recorded. All of the steelhead were in the brushy area along the northeasterly shoreline of the site. The estimated water volume of the sample was 312 (333 in June) m<sup>3</sup>, the maximum average velocity was 0.4 fps, and the total density of JSH was <0.1/m<sup>3</sup>.

**#5B-Near North Fork mouth (Lower Section):** We arrived here at 1237 hrs. The site still consisted of a pool-flatwater complex. The entire site was snorkeled. Average maximum velocity was 0.4 fps. Water temperature at 1245 hrs was 79°F, with an air temperature of 82°F. Although no fish were recorded at the site in June, 112 JSH of at least three age-classes were recorded. The estimated water volume of the sample was 259 m<sup>3</sup>, average maximum velocity was 0.4 fps, and the total density of JSH was 0.4/m<sup>3</sup>.

Sites 5A and 5B are on the upstream fringes of the river's estuary zone. The low numbers and densities of JSH recorded at these sites throughout 2005 and so far in 2006 were surprising. With further reflection, however, I believe the results are consistent with the relatively good flow and temperature conditions the river is experiencing in both summers—good conditions resulting from the well-above-average springtime rainfall and flows. It is likely that significant numbers of JSH are remaining in upstream areas for rearing. In contrast, under the lower flows and higher water temperatures more typical of most summers, most JSH would have either already perished—due to lethal water temperatures, or moved downstream into the estuary to continue rearing.

At nearby site 5c, the pool at the mouth of the North Fork, where four JSH were recorded in June, no JSH were recorded. Water temperature in this pool at 1212 hrs was 65°F, with an air temperature of 81°F.

However, in the flatwater of site 5d located just upstream (and where no JSH were recorded in June) two JSH were recorded. Water temperature was 74°F, with an air temperature of 86°F at 1244 hrs.

**#6-Twin Bridges (Wheatfield Fork, beneath the Wheatfield Fork bridge):** Upon our arrival at 1020 hrs on July 23<sup>rd</sup> the site appeared to have a flow only slightly lower than during the June survey. Nevertheless, pool-flatwater complex best described the site, instead of only flatwater, as recorded during June. The entire site was snorkeled. A total of 50 JSH of at least three age-classes were recorded (mostly in the overhanging brush) versus only 1 JSH recorded in June. About 3,000 GR and 500 TSS were also recorded. A quick check of the first pool located

downstream (which was in the 2005 sample) revealed moderate abundance of JSH, with at least three age-classes also represented. Water temperature at 1028 hrs was 69°F (air temp=79°F). The estimated water volume of the sample was 97 m<sup>3</sup>, the average maximum velocity was 0.7 fps, and the total density of JSH was 0.5/m<sup>3</sup>.

**#7-South Fork** (beneath the Stewart's Point-Skaggs Springs Road bridge): Upon our arrival at the site at 0910 hrs on July 23<sup>rd</sup>, the stream appeared to be flowing about the same as during the June survey. Water temperature at 0930 hrs was 67°F (air temp=68°F). The sample area still consisted of a pool-riffle-flatwater complex with abundant large woody debris (LWD) in the pool. The entire site except for a few feet of the riffle was snorkeled. A total of 157 JSH representing at least three age-classes were recorded; this compares to 3 JSH recorded during June. All JSH were recorded in or around the LWD of the pool area, except for one seen along the left bank. About 500 GR were also recorded, most in the brushy pool. The estimated water volume of the sample was 108 m<sup>3</sup> (the same as recorded in June), the average maximum velocity was 0.2 fps, and the total density of JSH was 1.5/m<sup>3</sup>.

**#8-Haupt Creek:** Upon our arrival at the site at 1440 hrs on July 22<sup>nd</sup>, the stream was rapidly drying and had intermittent surface flow (compared to continuous surface flow in June). Only a few pools remained, all of which were snorkeled. Water temperature, at 1448 hrs was 70°F (air temp=93°F). A total of 40 JSH YOY were recorded (in two of the drying pools), versus only 2 YOY recorded in June. About 150 TSS were also recorded. The estimated water volume of the sample was 11 (32 in June) m<sup>3</sup>, the average maximum velocity was <0.1 fps, and the total density of JSH was 3.6/m<sup>3</sup> in the surface water that remained.

**#9-Highway 1 Bridge Area:** We checked this snorkel-only site on July 23<sup>rd</sup>. Water temperature was 74°F (air temperature 83°F). Rafting and canoeing activity was high—just as observed during the June survey. Water level was also relatively high, due to a sandbar blocking the river's mouth. Snorkeling occurred for 100 feet along the brushy right bank (downstream aspect), in the vicinity of the unimproved boat-launching area on the sandbar just downstream of the bridge. No JSH were recorded; about 500 GR were seen, however.

### **Conclusions**

Except at the Wolf Creek and House Creek sites, JSH numbers and densities remained relatively low at the various sites. Whether this reflects low watershed-scale numbers and densities for 2006 (or just a much wider summer distribution) is not yet clear. The data from remaining snorkeling surveys planned for summer 2006 will need to first be collected and analyzed. Nevertheless, a few preliminary conclusions are starting to emerge from the 2006 snorkeling results collected to date: (1) Wolf Creek continues to demonstrate its importance to JSH rearing; (2) JSH numbers and densities in the estuary remain low; (3) despite high water temperatures, JSH rearing is still occurring throughout most, if not all, of the Wheatfield Fork; and (4) the Twin Bridges site, South Fork site, and Haupt Creek site all showed increases of JSH numbers and densities from the June to July snorkeling surveys. *Prepared: August 30, 2006; RWD*

**Photo Gallery for the July 22-23, 2006 Snorkeling Survey follows:**











## **MEMORANDUM TO THE FILE #062**

**File:** Gualala River Steelhead Study

**From:** Richard W. DeHaven

**Subject:** 2006 Juvenile Steelhead Snorkeling Surveys, *seasonal survey #3 on Oct. 3, 2006.*

### **Personnel**

I conducted this survey, my final one of the 2006 summer snorkeling sites, alone.

### **Survey Methods**

This was a brief, 1-day check of all of the sites, done while walking along the stream bank. Due to my illness and recent (1 week earlier) surgery, I was not able to do any snorkeling. My primary purpose was to determine end-of-summer flow conditions and secondarily to confirm presence/absence of JSH at as many sites as possible.

### **Weather and Stream Conditions**

This late-season survey date was clearly past the summer critical-temperature period for JSH. Also, ambient air temperatures had been well below average for about 1 week before the survey. The first winter storm of the season occurred the day after the survey on October 4-5, 2006, dropping a total of 0.44 inches of rain. This rainfall was mostly absorbed into the dry ground and did not produce runoff.

Flows on the survey date, as measured at the watershed's three stream gages, are unknown. As an index, however, the Navarro River USGS realtime gage (which closely mimics values of flows at the Gualala Wheatfield Fork gage), showed about 6-7 cfs on the survey day. And during the month of September 2006, the flow at the Navarro gage declined from about 10 to 7 cfs.

### **Results and Discussion**

Following are brief, site-by-site observations. Unless otherwise noted, observations pertain to the 100-ft-long sample areas.

**#1-Wolf Creek:** I arrived at 1100 hours. The sky was 100 percent overcast, the wind was calm, and air temperature was 65°F. Water temperature was 55°F. The stream still had a substantial, continuous surface flow. I observed about three dozen GR (Gualala Roach), but no JSH. Because of the low, clear conditions, I am relatively confident there were indeed no JSH in the sample reach. I also checked several pools and flatwater areas both up- and downstream from the site and could not find any JSH.

**#2-House Creek:** I arrived at 1120 hours. Air temperature was still 65°F. Water temperatures around the confluence area ranged from 56 to 58°F. The stream still had a substantial, continuous surface flow in all three areas of the confluence. GR were confirmed, but I could not confirm any JSH. My confidence in the lack of JSH is low, due to the depth, diversity, and abundance of cover at the site.

**#3-Wheatfield Fork** (Lady-in-the Car): I arrived at noon. Air and water temperatures were 65 and 56<sup>0</sup>F, respectively. The stream still had a substantial, continuous surface flow. GR were clearly identified, but no JSH were seen. I am moderately confident that JSH were not present.

At nearby site #3a, a snorkel-only site, flow was still continuous. Air and water temperatures at 1150 hours were 66 and 56<sup>0</sup>F, respectively. No fish were seen and I am moderately confident of this finding.

**#4-Wheatfield Fork** (Annapolis Road bridge): I arrived at 1220 hours. Air and water temperatures were 65 and 58<sup>0</sup>F, respectively. There was still a substantial, continuous surface flow. The main site was too wide and deep to effectively view from the bank.

At the supplemental site just below the bridge hundreds of GR, but no JSH, were seen. I am moderately confident about the lack of JSH.

At supplemental site #4b, located about 3/8-mile farther downstream (i.e., just upstream of the mouth of Haupt Creek) from the bridge, air and water temperatures were 65 and 60<sup>0</sup>F, respectively. Surface flow was still continuous. GR were moderately abundant, but no JSH were seen. I am moderately confident in the lack of JSH.

**#5A-Near North Fork mouth** (Upper Section): See #5B below.

**#5B-Near North Fork mouth** (Lower Section): I examined the various sites along this reach at 1400 hours, when air and water temperatures were 65 and 56<sup>0</sup>F, respectively. All areas had continuous surface flow. Because of excessive depth, width and cover, little of value regarding fish presence/absence could be ascertained while walking along the bank—so I didn't bother to try.

**#6-Twin Bridges** (Wheatfield Fork, beneath the Wheatfield Fork bridge): Upon my arrival at 1430 hours, air and water temperatures were 65 and 57<sup>0</sup>F, respectively. There was still a substantial, continuous surface flow in the Wheatfield Fork. GR were very abundant and JSH were also confirmed, with high confidence.

The South Fork upstream of its mouth was nearly dry. Only a few widely scattered pools remained. The South Fork was viewed from the bridge only.

**#7-South Fork** (beneath the Stewart's Point-Skaggs Springs Road bridge): I arrived at the site at 1300 hours, but due to my recent surgery I was unable to climb down the hill to the stream. As observed from the bridge, the surface flow was low and discontinuous immediately downstream but continuous upstream of the bridge. Nothing could be ascertained about JSH presence/absence.

**#8-Haupt Creek**: I arrived at 1240 hours. The stream lacked any surface flow and was completely dry from its mouth up to and including all of the sample site.

**#9-Highway 1 Bridge Area:** At 1325 hours air and water temperatures were 66 and 59°F, respectively. The river mouth was blocked by a sandbar and the impounded estuary exhibited a moderately high stage. I confirmed GR in the brush along the bank, but no JSH were confirmed. My confidence in the JSH finding is low, however.

### **Conclusions**

The early-winter cold snap with ensuing dramatic decrease in stream temperatures may have triggered a mass emigration of JSH from upstream rearing areas. Low numbers of JSH appeared to be present. Or, high water temperatures during August and September when snorkeling surveys could not be conducted (due to my illness/surgery) may have triggered the emigration. The latter case appears to be less likely than the former, based on well-above-average stream flows during August and September, and snorkeling results observed during these months in summer 2005, a similar water-year.

*Prepared: December 6, 2006; RWD*

**Photo Gallery for the October 4, 2006 Snorkeling Survey follows on ensuing pages:**



Wolf Creek sample site--CDFG flag hanging in tree



Snorkel-only site 1/4-mile upstream of Lady-Car site



House Creek mouth sample site. Most wheatfield Fork flow is entering from downstream on the right (i.e., right background)



Lady-Car site. Small waterfall entering at center.



Annapolis Road bridge site, looking upstream from bridge.



Snorkel-only site beneath the Annapolis Road bridge.





Snorkel-only site 1/4-mile downstream of Annapolis Rd. bridge.



Haupt Creek site.



South Fork site, looking downstream from bridge.



South Fork site, looking upstream from bridge.



Highway 1 Bridge Area site, looking upstream.



River's mouth blocked by a sandbar.





North Fork (entering from left) mouth site.



Near North Fork mouth--lower site, looking downstream.



Near North Fork mouth--upper site, looking upstream.



Wheatfield Twin Bridges site, looking upstream.



Wheatfield Twin Bridges site, looking downstream.



South Fork at Twin Bridges, looking upstream.