

(From: Annual Report for 2009)

APPENDIX 1: File Memos #098-103 for 2010 Surveys.

<i>FM 098–First Spawning Survey</i> -----	13
<i>FM 099–Second Spawning Survey</i> -----	15
<i>FM 100–Third Spawning Survey</i> -----	17
<i>FM 101–Fourth Spawning Survey</i> -----	19
<i>FM 102–Fifth Spawning Survey</i> -----	21
<i>FM 103–First (and only) Summertime Snorkeling Survey</i> -----	23

MEMORANDUM TO THE FILE—#098

File: Gualala River Steelhead Study

From: Richard W. DeHaven

Subject: Spawning survey, Wheatfield Fork, from House Creek confluence downstream 18.7 miles to Wheatfield Fork bridge (just upstream of South Fork confluence), December 19-20, 2009, *the first complete survey of the Index Reach for the 2010 spawning season.*

Personnel, Survey Timing and Methods

I conducted this, a standard survey (by boat) of the Index Reach, alone. On day one (December 19th), I arrived at the mouth of House Creek at 0900 hours, started the survey of the upper 9.3-mile reach at 0940 hours and completed it at 1440 hours, for an average survey rate of 1.86 mph. The following morning, local Sea Ranch resident John Nelson gave me a ride from town back upstream to the starting location at the Annapolis Road bridge, where my boat had been concealed and left the previous afternoon. The lower 9.4-mile half of the Index Reach was then navigated between 0800 and 1200 hours, for an average survey rate of 2.35 mph. Standard survey procedures were followed both days.

Weather, General Stream Conditions and Observer Efficiency

Day one was partly cloudy (high-level cirrus clouds) and calm. However, the diffused sunlight and low sun angle (always an adversity at this time of year on this reach) greatly reduced my ability to see the bottoms of the deepest pools; water clarity was also less than favorable. The hydrograph was in rapid decline and registering between about 120 and 125 cfs at noon at both the Navarro River (index for Wheatfield Fork, Gualala River) and South Fork (Gualala River) stream gages. Based on an MFF classification (*see* 2007 Annual Report, Methods section), Observer Efficiency (OE) was an estimated 40%.

Day two was also calm and overcast, but much brighter (and with a better sun angle, due largely to the less circuitous stream route). Water clarity had also improved to excellent and flow had dropped to about 90 to 95 cfs at the two reference gages. A light rain began at 1100 hours, but had only minor impact on my ability to see the bottoms of remaining pools during the last hour of the survey. Based on an MEE classification, day two OE was an estimated 60%.

Rainfall and River Hydrology from Season Start to this Survey

Based on the VEN rainfall gage as an index, the rainfall season started October 12, 2009, when a 4-day rainfall event totaling 6.9 inches, with a 5.7-inch one day record, occurred. Seven more (1-4-day) rainfall events, totaling a maximum of 2.8 inches each, were recorded prior to the survey. However, the instantaneous flow criteria of 500 cfs designating the start of the steelhead spawning season (*see* 2007 Annual Report, Methods section), did not occur until December 12, 2009. Thus, the spawning season had presumably been underway for about 1 week when the survey was conducted.

Results and Discussion

On day one, I had marginal views of several of the deepest pools, including the YMCA Pool, Park Pool, and Mossy Rock Pool. One adult, size 2 steelhead (*see* Methods, 2007 Annual Report), which appeared to be spent, was observed just downstream of the Indian Spearing Pool. On day two, I had excellent views of most of the favored holding pools and runs, including 100% views of the Yellow Rope, ATV, Angle-log, and A-Frame pools. One more adult, size 2 spent fish was observed.

A relatively large number of juvenile steelhead (JSH) were recorded at scattered locations along both the day one and day two survey reaches. In several instances, these JSH were in schools of 25-50 age 1+ fish presumed to be smolts or fish in the process of molting.

There were no lampreys, lamprey redds, steelhead redds, or fish carcasses found.

The river mouth was checked from behind the Surf Motel on the afternoon of day one, but could not be seen due to very dense fog. However, the mouth appeared to be closed to the sea, since the estuary stage was very high.

During this 2-day survey, a chronic low-back issue resurfaced with a vengeance and led me to an unpleasant decision: It will no longer be possible to conduct two consecutive days of river survey such as this. I have decided that for all future surveys, the Index Reach will be reduced to the lowermost 9.4 miles of stream. This means that henceforth, the population estimates I have been generating will be based on this 9.4 miles of stream instead of the 18.7 miles used over the past nine seasons. This change will begin with the next spawning survey of 2010.

Conclusions

A low number of adult fish were present in the Index Reach. A moderate number of steelhead smolts were present and may have been moving downstream towards the estuary.

Prepared: December 1, 2010 (RWD)

Edited: December 10, 2010 (RWD)

MEMORANDUM TO THE FILE—#099

File: Gualala River Steelhead Study

From: Richard W. DeHaven

Subject: Spawning survey, Wheatfield Fork, from Annapolis Road Bridge downstream 9.4 miles to Wheatfield Fork bridge (just upstream of South Fork confluence), January 4, 2010, *the second complete survey of the revised (shortened) Index Reach for the 2010 spawning season.*

Personnel, Survey Timing and Methods

I conducted this, a standard survey (by boat) of the Index Reach, alone. I arrived at the Annapolis Road Bridge (the new survey starting point) at 0815 hours. I unloaded the boat and gear there (concealed within riparian vegetation), then drove downstream to the take-out point at the Wheatfield Fork bridge. After leaving my auto at the Wheatfield Fork bridge, I rode my motor scooter back to the survey starting point. The motor scooter then assumed the concealed position where the boat had been and the survey was conducted between 0930 and 1245 hrs., for an average survey rate of 2.9 mph. Except for the survey reach (i.e., Index Reach) being reduced from 18.7 to 9.4 miles, survey procedures were the same as all previous surveys.

Weather, General Stream Conditions and Observer Efficiency

The survey was conducted under ideal mid-winter weather conditions—clear sky, calm wind, and warm air temperatures (10+ degrees F above average). The hydrograph was in rapid decline, but was relatively high (roughly 180 and 190 cfs at noon at Navarro River and South Fork [Gualala River] stream gages, respectively) and the water had a distinct greenish tint. Based on an MFE classification (*see* 2007 Annual Report, Methods section), Observer Efficiency (OE) was an estimated 50%.

Rainfall and River Hydrology from Previous Survey to this Survey

Based on the VEN rainfall gage as an index, 8 days of rainfall totaling 2.36 inches occurred between the first survey of the season (Dec 19-20, 2009) and this survey. The maximum 1-day rainfall total in the period was 0.72 inch; and the maximum rise in flow was about 400 cfs. By the survey date, the season-to-date rainfall total stood at 16.84 inches. On the survey date and over the preceding 3 days, the hydrograph was in rapid decline. Thus, overall conditions for adult steelhead migration were excellent throughout the inter-survey period.

Results and Discussion

By mid-afternoon, air temperature was quite balmy—in the low-to-mid 60s (°F). Because of the unusually calm conditions, I had a rare 100% view of the entire bottom of the Shady Lane Run (usually, a quite windy location). However, due to the green tint to the water, views of the bottom at the other major favored holding sites ranged from only about 60 to 90%. Nevertheless, it was apparent that there were relatively few adult fish in the stream. Just one, size 2 spent adult steelhead was observed. There were no steelhead redds, lampreys, lamprey redds, or fish carcasses observed. A few scattered individual juvenile steelhead were observed, but they too, appeared to be in lower than normal abundance and definitely less abundant than on the previous

survey.

The river mouth was checked from behind the Surf Motel at about 1330 hrs. The mouth was open, seas were flat-calm, and a rare offshore wind was blowing. During the drive home, I observed abundant wild-mustard blooms in several locations; this is the earliest in the season I have observed this phenomenon.

This was also the first survey of the shortened (reduced by half) Index Reach. Henceforth, the population estimates I have been generating will be based on this 9.4 miles of stream instead of the 18.7 miles used over the past nine seasons. This change will be detailed in my annual report for 2010.

Conclusions

A low number of adult steelhead were present in the Index Reach. Unseasonably warm, El Nino-driven weather conditions were persisting.

Prepared: December 3, 2010 (RWD)

Edited: December 12, 2010 (RWD)

MEMORANDUM TO THE FILE—#100

File: Gualala River Steelhead Study

From: Richard W. DeHaven

Subject: Spawning survey, Wheatfield Fork, from Annapolis Road Bridge downstream 9.4 miles to Wheatfield Fork bridge (just upstream of South Fork confluence), February 18, 2010, *the third complete survey of the revised (shortened) Index Reach for the 2010 spawning season.*

Personnel, Survey Timing and Methods

I conducted this, a standard survey (by boat) of the Index Reach, with Greg Benke. We arrived at the Annapolis Road Bridge (the new survey starting point) at 0730 hours. After unloading the boats, gear, and Greg there, I drove the vehicle downstream to the take-out point at the Wheatfield Fork bridge. John Nelson of Sea Ranch then shuttled me back to the survey starting point. We then navigated the 9.4-mile survey reach between 0820 and 1215 hrs., for an average survey rate of 2.35 mph. Except for the survey reach (i.e., Index Reach) being reduced from 18.7 to 9.4 miles, survey procedures were the same as previously. That means that fish counts were mine alone—and not based on collaboration between the two of us.

Weather, General Stream Conditions and Observer Efficiency

The survey began under near-ideal mid-winter weather conditions—clear sky, calm wind, and warm air temperatures (5-10 °F above average). By 0900 hrs, however, the sky became partly cloudy with highly diffused and variable lighting conditions. The hydrograph was in rapid decline, but still quite high, at roughly 340-350 cfs at noon at the Navarro River and South Fork (Gualala River) stream gages; also, the water still had a greenish tint. Based on an HFF classification (*see* 2007 Annual Report, Methods section), Observer Efficiency (OE) was relatively low, at an estimated 20%.

Rainfall and River Hydrology from Previous Survey to this Survey

Based on the VEN rainfall gage as an index, the period from January 4th (second survey) to February 18th (this survey) was unusually wet. Rainfall totaling 25.5 inches occurred, with measurable rainfall on 26 days. Maximum 1-day rainfall exceeded 3 inches on 2 days and reached almost 3 inches on another day. During one 11-consecutive-day rainfall event starting January 16th, 17 inches accumulated. By start of the survey, total seasonal rainfall in the watershed had risen dramatically to 42.3 inches.

Nevertheless, stream flow fluctuations during the inter-survey period were relatively modest. The maximum instantaneous flow increase was about 3,500 cfs; this was preceded by another spike of about 1,950 cfs. On remaining days of the period, stream flow rose \leq 400 cfs in response to daily rainfall events.

Results and Discussion

Just as during the previous survey, by mid-afternoon, air temperature was quite balmy—in the low-to-mid 60s (°F). And once again, because of the unusually calm conditions, I had a rare

100% view of the entire bottom of the Shady Lane Run (a generally windy location). However, due to high flow and the green tint to the water, views of the bottom at the other favored holding sites ranged from only about 50 to 80%. Nevertheless, it was evident that finally a modest number of adult steelhead were in the stream, with 22 counted. Individual adult steelhead occurrences (and one steelhead redd) were: 0821 hrs-3A (FR=Fresh-Run)—also one SH redd; 0833-1A (DS=Downstreamer); 0836-2A (FR); 0840-6A (FR); 0844-1A (DS; nearly dead); 0855-1A (DS); 1108-5A (FR); and 1125-3A (FR). Distribution of these 22 fish by size was: 1 size #1; 14 size #2; and 7 size #3.

There were no steelhead redds, lampreys, lamprey redds, or fish carcasses observed (although the adult SH found at 0844 hrs was nearly dead). A few scattered individual juvenile steelhead were observed, but they too, appeared to be in lower than normal abundance and definitely less abundant than during the first survey of this season.

The river mouth was not checked on this trip. On the drive home, I stopped at the Warms Springs Dam hatchery in the Russian River watershed where the count (of adult steelhead) to date of 482 fish was well below average, but substantially above last year's very low total.

This was my fourth survey of the shortened (reduced by half) Index Reach. Henceforth, the population estimates I have been generating will be based on this 9.4 miles of stream instead of the 18.7-mile Index Reach previously used.

Conclusions

Unseasonably warm, El Nino-driven weather conditions continued to prevail. A low-to-moderate number of adult steelhead, mostly fresh-run fish, were moving through the survey reach and limited spawning was occurring there. As in 2009, lampreys were conspicuous by their complete absence from the survey reach.

Prepared: December 6, 2010 (RWD)

Edited: December 8, 2010 (RWD)

MEMORANDUM TO THE FILE—#101

File: Gualala River Steelhead Study

From: Richard W. DeHaven

Subject: Spawning survey, Wheatfield Fork, from Annapolis Road Bridge downstream 9.4 miles to Wheatfield Fork bridge (just upstream of South Fork confluence), March 21, 2010, *the fourth complete survey of the revised (shortened) Index Reach for the 2010 spawning season.*

Personnel, Survey Timing and Methods

I conducted this, a standard survey (by boat) of the Index Reach, alone. I unloaded the boat and gear—and concealed them—near the Annapolis Road bridge on the evening of March 20th. John Nelson of Sea Ranch then shuttled me back to the survey starting point on the morning of the 21st. I then navigated the 9.4-mile survey reach between 0753 and 1045 hrs (record early finish time), for an average survey rate of 3.36 mph—the quickest I have done this route. Except for the survey reach (i.e., Index Reach) being reduced from 18.7 to 9.4 miles, standard survey procedures were followed.

Weather, General Stream Conditions and Observer Efficiency

The survey was done under marginal conditions. Air temperature was unseasonably warm (5-10 degrees F above average) and there was little or no wind, however, a high overcast throughout the day reduced lighting, making it difficult to see into the water. In addition, the stream flow was very high and the water had a green tint. The flows at 1000 hrs at the Navarro River and South Fork (Gualala River) gages were about 425 and 300 cfs, respectively. Both hydrographs were in rapid decline. With the lack of wind, I had a 100% view of the bottom of the Shady Lane Run, but views at other favored fish-holding places averaged only about 50-75%. Based on an HFF classification (*see* 2007 Annual Report, Methods section), Observer Efficiency (OE) was estimated at 20%.

The quick, early-finish survey was essential, because just as I loaded the boat to drive home, a light rain began falling and heavier rain was predicted to follow withing hours.

Rainfall and River Hydrology from Previous Survey to this Survey

Based on the VEN rainfall gage as an index, the period from February 18th (third survey) to March 21st (this survey) was moderately wet. Rainfall totaling 8.1 inches occurred with measurable rainfall on 8 days. Maximum 1-day rainfall amounts ranged from 1.4 to 2.2 inches on four occasions. By start of the survey, total seasonal rainfall in the watershed had risen to 50.4 inches.

Because the watershed was well-charged from previous heavy rainfall, stream flow rises during the inter-survey period were rather substantial. A maximum instantaneous flow increase of about 15,000 cfs and another spike of about 12,000 cfs were recorded. Stream response to the other rainfall events of the period was less than +1,400 cfs per event.

Results and Discussion

Seven adult steelhead were counted as follows: 0802 hrs-2A (DS=Downstreamers) at mouth of Haupt Creek; 0913-2A (DS); and 1003-3A (Fresh-Run) in the A-Frame Run. Distribution of these 7 fish by size was: 2 size #1 and 5 size #2.

One likely steelhead redd was found at 0944 hrs. However, there were neither any other steelhead redds, nor any lampreys, lamprey redds, or fish carcasses observed. A few scattered individual juvenile steelhead were observed.

The river mouth was checked from behind the Surf Motel at about 1930 hrs on March 20th. The mouth was open and seas were moderate. A low cloud ceiling was present over the beach.

During the drive home, mustard plants were seen in proficient blooms at many locations.

Conclusions

Unseasonably warm, El Nino-driven weather conditions continued to prevail. A relatively low number of adult steelhead, including both up-and down-streamers, were moving through the survey reach. Limited, if any, spawning was occurring in the survey reach. Lampreys continued to be conspicuous by their absence from the survey reach.

Prepared: December 8, 2010 (RWD)

Edited: December 10, 2010 (RWD)

MEMORANDUM TO THE FILE—#102

File: Gualala River Steelhead Study

From: Richard W. DeHaven

Subject: Spawning survey, Wheatfield Fork, from Annapolis Road Bridge downstream 9.4 miles to Wheatfield Fork bridge (just upstream of South Fork confluence), April 26, 2010, *the fifth (and final) complete survey of the revised (shortened) Index Reach for the 2010 spawning season.*

Personnel, Survey Timing and Methods

I conducted this, a standard survey (by boat) of the Index Reach, alone. I unloaded the boat and gear—and concealed them—near the Annapolis Road bridge on the evening of April 25th. On the morning of the 26th, I used my scooter to shuttle to the put-in spot after leaving my vehicle at the take-out. I then navigated the 9.4-mile survey reach between 0755 and 1050 hrs, for an average survey rate of 3.24 mph—one of my quickest surveys. Except for the survey reach (i.e., Index Reach) being reduced from 18.7 to 9.4 miles, standard survey procedures were followed.

Weather, General Stream Conditions and Observer Efficiency

This final survey of the 2010 season had to be done under marginal conditions, because rain was predicted for the evening of the 26th. Air temperature was unseasonably warm (5-10 °F above average). A high overcast throughout the day reduced lighting and made it difficult to see into the water. After 1000 hrs a strong upstream wind began blowing. In addition, stream flow was very high (in survey terms) and water had a green tint. Flows at 1000 hrs at the Navarro River and South Fork (Gualala River) index gages were about 395 and 275 cfs, respectively. The hydrographs were in slow decline. Views of the bottoms of favored fish-holding places were only about 50-85%. Based on an HFF classification (*see* 2007 Annual Report, Methods section), Observer Efficiency (OE) was estimated at 20%.

Rainfall and River Hydrology from Previous Survey to this Survey

Based on the VEN gage as an index, the period from March 21st (fourth survey) to April 26th had well above average rainfall. A total of 10.1 inches occurred, with measurable rainfall on 13 days. Maximum 1-day rainfall was 3.0 inches. By the day before the survey, total seasonal rainfall in the watershed had risen to 60.5 inches. The rainfall event which began on the evening of the survey lasted 3 days and deposited another 1.7 inches.

Stream flow increases in response to rainfall during the inter-survey period were moderate. A maximum instantaneous flow increase of about 5,000 cfs occurred, with two other spikes of 1,000 to 2,000 cfs recorded. Stream flow responses to other daily rainfall events of the period were not discernable from the gaging results.

Results and Discussion

No adult steelhead, steelhead carcasses or steelhead redds were found. There was a similar complete lack of any lamprey activity. The river mouth was not checked on this trip. On the

drive home, I stopped at the Don Clausen Fish Hatchery on Dry Creek (Russian River watershed) and found that 1,408 adult steelhead had returned to date, compared with 842 by this date in 2009; both totals are well below long-term averages for the facility. Hatchery personnel indicated that the 2010 spawning run was “all done.”

Conclusions

Steelhead spawning activity was done for the season. For the second year in a row, lampreys failed to show and remained conspicuous by their absence from the survey reach. Stream flows—and recent rainfall—were very high for this late in the season and should result in excellent juvenile steelhead rearing conditions during summer 2010.

Prepared: December 12, 2010 (RWD)

Edited: December 14, 2010 (RWD)

MEMORANDUM TO THE FILE #103

File: Gualala River Steelhead Study

From: Richard W. DeHaven

Subject: 2010 Juvenile Steelhead Snorkeling Survey #1 on July 16, 2010—*the only snorkeling survey conducted in 2010*. (Prepared December 11, 2010; Edited December 13, 2010)

Personnel

I conducted this, the only survey of the 2010 summer season, with Ed Ballard. Ed is a fishery biologist with U. S. Fish and Wildlife Service in Sacramento and has more than 2 decades of experience working with salmonids, including snorkeling surveys of juvenile salmonids. The survey was a long, 1-day event in which all 15 established sites were visited and snorkeled.

Survey Methods

All methods and sites were the same as previously established and modified in 2006. Refer to File Memo #60 and my 2006 annual report for detail. However, we did not measure water volumes at the sample sites. Thus, JSH density can only be judged in relative terms compared to results of previous surveys at the same sites at roughly the same time(s) of year. I snorkeled eight of the sites and Ed snorkeled seven; at each site, the non-snorkeled recorded data. In results, the snorkeler at each site is indicated by his initials (i.e., RD or EB).

Rainfall and Hydrology Prior to the Survey

Total 2010 rainfall in the watershed of 66 inches was about 121% of average (all rainfall statistics based on the Venado [VEN] realtime gage in the upper Russian River watershed, as an index).

However, as I have learned and tried to convey over the course of this study, total seasonal rainfall alone is not a very useful metric for predicting all-important (to JSH [juvenile steelhead] summertime rearing) summer hydrology patterns (i.e., stream flows). Often, intra-seasonal rainfall pattern variations are the greater determinant of summertime hydrology and JSH rearing suitability. This year was no exception.

In particular, October, the start of the rainfall season, was wetter than average (7.4 inches). November (2.9 inches) and December (6.5 inches) were then both drier than average. January (21.2 inches) was much wetter than average, while February (8.1 inches) was roughly average.

Most noteworthy, however, was that the springtime months of March (8.1 inches), April (7.9 inches) and May (3.6 inches), each had well above average rainfall. As a result, Wheatfield Fork flows dramatically increased for several days by up to 5,000 cfs late in the rainfall season. And all-critical recharging of groundwater aquifers occurred just before the onset of harsher summertime conditions (i.e., long day lengths, maximum solar radiation, and high ambient air temperatures typical of summer—all of which can combine to raise water temperatures beyond JSH tolerances). The bottom line was that summertime 2010 unfolded as a period of relatively high stream flows, little or no de-watering, and good-to-excellent JSH rearing conditions.

The favorable JSH rearing conditions were why just one snorkeling survey—at what should have been about the harshest period (to JSH) of summer—was conducted.

Pre-Survey Weather Conditions

Ambient air temperatures (based on records for Santa Rosa, California) for the summertime period just prior to the survey were relatively mild. Only two brief, 2-day, heat waves had occurred, one starting June 12th and a second beginning June 27th. A third, much less significant, heat wave occurred for 1 day on July 15th, the day before the survey.

Moreover, the relatively mild summertime weather continued through the remainder of July and August; just one more 3-day heat wave occurred from August 23-25, 2010, near the end of the critical summertime rearing period for JSH. Clearly, Mother Nature gave a double boost to JSH rearing this summer: relatively high stream flows—which ameliorated water temperatures—and mild air temperatures—which further ameliorated them). Based on my decade on the river, such very good summertime conditions nearly always portend excellent JSH rearing and production within the watershed.

Expectations of JSH Numbers and Density

Numbers of spawning steelhead recorded in 2010 were again (second year) low. Thus, for the second consecutive summer season, I had rather low expectations of numbers and densities of JSH the snorkeling might reveal. During the long drive from my home to the river on July 16th, we both mentally prepared for a possible worst (and first)-case scenario—that we might find very low numbers of JSH at many, if not all, of the 15 sites.

Results and Discussion

Just as in summer 2009, apprehension about a low JSH population proved unfounded. We counted YOY (young-of-year) JSH in the sample reaches at every site and counts at several sites were in moderate-to-high ranges. There were also good showings of age 1+ and 2+ JSH at several sites.

Site-by site observations are briefly summarized below. Further analyses will be provided in future reports, including the 2010 Annual Report.

#1-Wolf Creek (RD): We arrived at 1045 hrs. Water and air temperatures were 65 and 77⁰F, respectively. Surface flow was still continuous and relatively high, probably the highest I have seen at this time of year. JSH numbers were moderate-to-high, with 50 YOY and 50 Age 1+ recorded, primarily in the two pools, but with some fish scattered along the rest of the site. Fifteen GR (Gualala roach) were also recorded. Two photos were taken of the site.

#2-House Creek (RD): We arrived at 1110 hrs. Air temperature was 93⁰F. Water temperatures were: Wheatfield Fork—75⁰; House Creek—70⁰; and confluence area—73⁰F. Both stream forks and the downstream confluence area had high, continuous surface flows, probably the highest I have seen at this time of year. JSH were in moderate abundance, with 75 each YOY and Age 1+ recorded. About 250 GR and 150 TSS (Three-spine stickleback) were also recorded. One photo was taken.

#3-Wheatfield Fork (RD; Lady-in-the Car): We arrived at 1155 hrs. Air temperature was 84⁰F. Water temperature ranged from 65⁰ in the spring-fed upstream refugia area to 65-72⁰F over the remainder of the site. Flow was relatively high, probably the highest I have seen at this time of

year. JSH numbers were moderate-to-high, with 10 YOY and 75 age 1+ recorded, all in fast water of the plunge pool (none in the cold-water refugia). Also, about 1,500 GR and 5 TSS were recorded. Two photos was taken.

At nearby **Site #3a** (RD), 1/4-mi upstream, which was snorkeled 15 minutes before the main site, air and water temperatures were 90^o and 73^oF, respectively. Seventy-five YOY JSH and 50 Age 1+ JSH were recorded; these were relatively high counts for this site. About 250 very large GR and 1,000 much smaller GR were also recorded. Flow was continuous and relatively high. Photos were not taken.

#4-Wheatfield Fork (RD; Annapolis Road bridge): We arrived at 1240 hrs. Water and air temperatures were 75-76^o and 86^oF, respectively. Surface flow was continuous and relatively high, probably the highest I have seen at this time of year. JSH were in relatively high abundance, with 50 YOY, 200 age 1+, and 25 age 2+ recorded along the deep, left-bank area with thermal refugia and abundant woody cover. About 750 GR were also recorded. One photo was taken.

At adjacent **Site #4a** (RD), comprising the riffle and pool beneath the Annapolis Road bridge, at 1245 hrs, the air temperature was 86^o and the water was 75-76^oF. Flow was relatively high, probably the highest I have seen at this time of year, and continuous. JSH were moderately abundant, with 50 YOY and 25 age 1+ recorded in fast water beneath the overhanging woody cover (mostly willows) of the right bank. About 1,000 very large GR were also recorded. One photo was taken.

At **Site #4b** (RD), 1/4-mile farther downstream, at 1300 hours, air temperature was 91^o and water temperature was 70-71^oF; flow was continuous and moderately high. JSH were distributed throughout the site (entire site is shaded by overhanging left-bank woody cover—mostly red alders) and in moderate-to-high abundance, with 50 YOY, 100 age 1+, and 25 age 2+ recorded. Other species recorded included about 500 GR of mixed sizes and 50 TSS. One photo was taken.

#5A-Near North Fork mouth (EB; Upper Section): We arrived at 1528 hrs. Flow was continuous and high for this stage of summer. Water and air temperatures were 71 (sea breeze blowing) and 81^oF, respectively. JSH were in low abundance, with 50 YOY and 4 age 1+ recorded, widely scattered over the site. About 200 GR were also recorded. Two photos were acquired.

#5B-Near North Fork mouth (EB; Lower Section): We arrived at this site at 1545 hrs. Flow was high. Temperatures were 81^o (air) and 71^oF (water). JSH numbers (distributed throughout site) were low, with 20 YOY and 4 age 1+ in cover along the easterly bank. About 50 GR were also recorded. Photos were not taken.

#5C-North Fork Mouth Pool (EB): We arrived at 1500 hrs. Air temperature was 79^oF; a

strong sea breeze was blowing upstream. Water temperature was 63⁰ in the North Fork and 67⁰F in the main stem. Flows in both streams were high for this stage of summer. JSH abundance was low, with 2 YOY, 6 age 1+, and 10 age 2+ recorded in the confluence pool. About 100 GR were also recorded. One photo was taken.

#5D-100 Yards Upstream of North Fork Mouth in the Main Stem (EB): We arrived at the site at 1510 hrs. Water and air temperatures were 70 and 79⁰F, respectively. Surface flow was still continuous and at, or above, the highest level I have seen at this stage of summer. JSH were low in abundance, with 16 YOY and 5 age 1+ widely scattered over the site. Twelve GR were also observed. Photos were not taken.

#6-Twin Bridges (EB; Wheatfield Fork, beneath the Wheatfield Fork bridge): We arrived at 1615 hrs. Water and air temperatures were 68 and 73⁰F, respectively. The air was cool, with a sea breeze and fog rolling upstream. Surface flow was continuous and high—probably the highest I have seen at this time of year. JSH were low in abundance, with just three YOY recorded. Two TSS were also recorded. One photo was taken.

#7-South Fork (EB; beneath the Stewart's Point-Skaggs Springs Road bridge): We arrived at 1345 hrs. Water and air temperatures were 69⁰ and 80⁰F, respectively. Surface flow was continuous and high, probably at the highest level I have seen at this stage of summer. JSH were in low abundance, with 10 YOY and 4 age 1+ recorded; these fish were scattered throughout the site. About 50 GR and 25 TSS were also recorded in this woody debris pile directly under the bridge. Two photos were taken.

#8-Haupt Creek (RD): We arrived at 1315 hrs. Air temperature was 91⁰ and water temperature was 64⁰F. The flow was still continuous and relatively high, probably the highest I have seen at this time of year. JSH were in low abundance, with 25 YOY recorded. Photos were not taken.

#9-Highway 1 Bridge Area (EB): We arrived at the site at 1430 hrs. The sky was overcast with a 5 mph westerly wind. The river mouth was not checked, but was likely closed, because the river stage was extremely high. Water and air temperatures were 71⁰ and 78⁰F, respectively. A low-to-moderate number of JSH, including 50 YOY (widely variable sizes), 10 age 1+, and 2 age 2+, were recorded, widely scattered along vegetation-enhanced (both overhead and instream) shoreline reaches of the site. Fifteen TSS and 25 GR were also recorded. Photos were not taken.

Conclusions

Stream flows at sample sites were uniformly high, owing to above-average seasonal rainfall and springtime rainfall. JSH of various age-classes were present in relatively robust numbers, especially in the upstream (above the estuary) sites, despite the apparent low adult spawning return in 2010.