

2011 Monitoring Report for the Scott River Water Trust



Prepared by Danielle Yokel

Siskiyou Resource Conservation District
450 Main Street
Etna CA 96027

Acknowledgements

This monitoring effort was completed with the help of the following individuals:

Gary Black – Siskiyou RCD

Greg Farnam - Landowner

Tom Franklin – Siskiyou RCD

Rankin Holmes – Ecosystem Economics & NFWF Project Leader

Phil Huckobey - California Dept. of Water Resources Watermaster

Carson Jeffres – U.C. Center for Watershed Science

Morgan Knechtle – California Dept. of Fish and Game

Jim Morris –Landowner, Scott Valley Irrigation District

Andrew Nichols – U.C. Davis Center for Watershed Science

Mary Olswang – California Dept. of Fish and Game

Gareth Plank –Landowner

Becky Schenone - Landowner

Joe Scott - California Dept. of Water Resources

Sari Sommarstrom – Scott River Water Trust

John Spencer -Landowner

Peter Thamer – Siskiyou RCD

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Introduction

During the summer and fall of 2011, the Scott River Water Trust performed its 4th year of forbearance transactions with adjudicated water users in Scott Valley. The purpose of the Water Trust Program is to help improve instream conditions for salmon and steelhead in priority stream reaches by getting landowners to forbear all or part of their decreed water right in exchange for fair financial compensation. Priority reaches were originally identified for the Water Trust in 2007 (Quigley 2007a), with additional reaches added based upon known presence of coho salmon, a priority species due to its threatened status.

Forbearance agreements (water leases) were completed in 2011 on Patterson Creek and French Creek during the summer juvenile fish rearing period and on the mainstem Scott River for the fall adult salmon migration period (Tables 1 and 2).

Table 1: Water Trust Summer Leases for 2011

Stream / Tributary / Diversion no.	Date Began	Date Ended	Flow leased (cfs)	Total acre-feet leased	Distance of benefit (feet)
French Creek / Miner's Ck					
#36	8-19-10	9-30-10	0.25	20.0	2,500
French Creek					
#48	8-22-11	9-30-10	0.76	60.8	5,050
Patterson Creek					
#390-10	7-7-11	9-30-10	5.0 to 0.2	100*	6,150
TOTAL		42 to 85 days	0.2 to 5.0 cfs	180.8 ac-ft	13,700 ft (2.6 miles)

**Plus 100 acre-feet of donated water at Patterson Creek lease site*

Table 2: Water Trust Fall Leases for 2011

Site / Diversion #	Date Began	Date Ended	Flow leased (cfs)	Total volume (acre-feet)	Distance of benefit (miles)
223-13 / 2 leases	Oct. 15	Nov. 28	8 cfs	720	47
TOTAL		45 days	8 cfs	720 ac-ft	47 miles

Objectives

The main objectives of the monitoring effort for the Scott River Water Trust are to answer the following questions (Yokel 2009):

- 1.) Was the amount of water paid for provided?
- 2.) Was there an instream effect on stream discharge and/or pool volume below the lease site?
- 3.) What was the extent(distance) of downstream impact on flows?
- 4.) Was water temperature affected by leases?

Water Year Type

The 2011 Water Year (10/1/10 to 9/30/11) can be classified as a Wet Type based on several indicators. Although little precipitation occurred during January and February, a very wet March and May helped to significantly improve water conditions for the summer and fall seasons. Precipitation at Fort Jones totaled 23.19", or 106% of average (CDWR 2011). However, the May 1st snow survey for five snow course sites in the upper watershed averaged 171% of average for equivalent water content (USFS 2011). By October 1st, annual runoff had reached 556,700 acre-feet at the USGS gage at river mile 21, representing 100,000 ac-ft more than the mean annual runoff during the past 70 years of record (USGS 2011).

Methods

The Monitoring Program for the Water Trust was first outlined five years ago (Quigley 2007b). Refinements and updates in methods are made each year, as described in the annual monitoring reports prepared for the Water Trust by the Siskiyou Resource Conservation District (RCD) staff (e.g., Yokel 2008). In 2011, RCD staff again monitored water temperature and stream flow before and after these transactions. For two specific transactions (Patterson Creek and Scott River), fish habitat parameters were measured and photopoints were taken using field monitoring protocols proposed by consultants to the National Fish and Wildlife Foundation (NFWF) for a special pilot program (Holmes et al. 2011.)

Stream Flow

Instantaneous streamflow was measured before and after each lease using the FlowTracker Handheld-ADV (by SonTek/ YSI). This flowmeter is the same model used by the California Dept. of Water Resources (DWR) Watermaster and is known for high precision in low flow ranges (down to 0.001 m/s). Flow measurements are performed at hydrologic control points (e.g. pool tail out) with uniform laminar water velocities along a cross-section, following USGS methods (Rantz 1982, Yokel 2009.)

Onset HOBO Water Level Loggers (U20-001-01) were utilized in selected locations (i.e., Patterson Creek and Scott River) to measure continuous streamflows above and below the point of diversion (POD). The level loggers were placed in vented PVC tubes attached to a T Post and staff gage. The devices were set into the deepest section of a pool. Pressure transducers were used to collect 15 min water level data at each location. The collected data was converted to river stage using "barometric conversion compensation" in HoboWater Pro (Onset Computer Corporation). Barometric data is collected at a location on the Scott River mainstem, and a location in Kidder Creek. USGS methodology was applied to develop rating curves for each location (Buchanan 1969).

Preliminary flow data were also available from the DWR gage located on lower French Creek. The DWR Watermaster also provided streamflow estimates near points of diversion (PODs) that were being considered for leasing, to help the Water Trust assess the relative flow benefit during the season.

Diversion Flow

In streams where the DWR Watermaster does not measure diversion amounts, the RCD staff must validate the amount of flow being diverted before and after the transaction. Flow measurements within the ditch are taken to determine the net diversion amount (if a flow bypass is involved.) Ideally, a weir structure is available as the point of most accurate measurement. For 2011, both the Patterson and Scott River diversions were measured by the RCD while the French Creek diversions were verified by the DWR Watermaster Phil Huckobey.

Stream Temperature

Onset HOBO Water Temp Pro v2 Loggers were utilized to collect 30 minute water temperature data at each location. Data loggers were placed in riffle habitats selected on a site specific basis. The water temperature loggers were calibrated in both an ice and air bath and the calibration data was analyzed to insure each device's accuracy. We attempted to place the devices in stream a minimum of 24 hours prior to water being diverted in order to collect sufficient data.

Excel 2010 spreadsheets were used to develop daily minimum, maximum, and average water temperature data.

Aquatic Habitat

Protocols utilized were those identified in the draft "NFWF Natural Resource Conservation Service Conservation Innovation Grant (CIG) Field Monitoring Protocols" (Holmes et al. 2011). Stream transects (cross-sections) were placed at uniform units along the reach of interest, and in additional habitat units selected using professional judgment. Results will be described in a separate report by the NFWF consultants (Holmes, personal communication.)

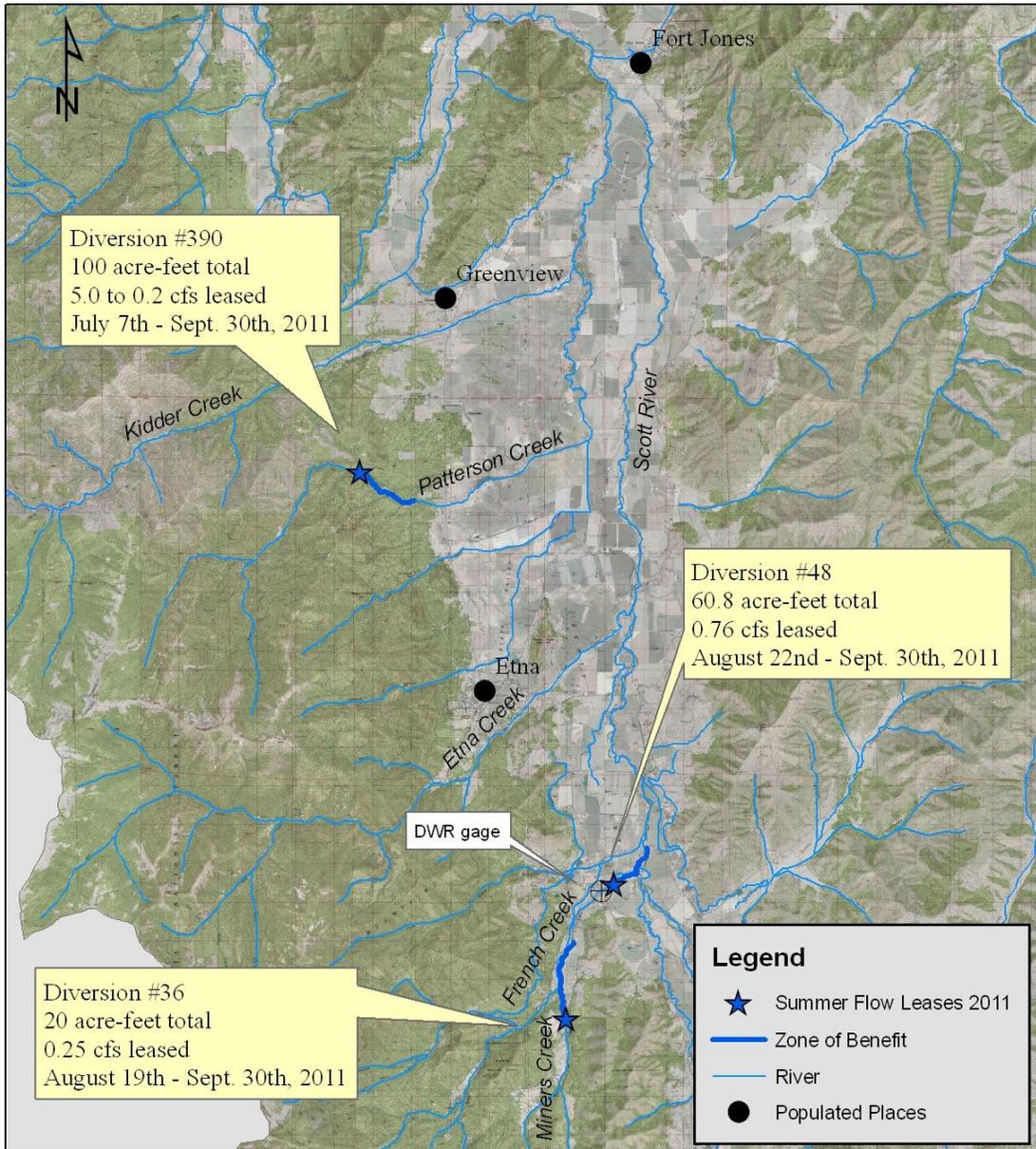
On June 26th Siskiyou RCD Staff, Ann Willis (Watercourse Engineers Inc.), Andrew Nichols (U.C. Davis Center for Watershed Science), and Carson Jeffres (U.C. Davis Center for Watershed Science) established monitoring locations for the Patterson Creek transaction. During this field visit locations for flow stations, habitat monitoring, and water temperature monitoring were selected for the NFWF field protocols. See Map 3 for locations of monitoring sites on Patterson Creek. Similarly, transects were also located for the fall lease site on the Scott River.

Project Locations

All leases were within Scott Valley. Maps 1 and 2 show the locations of the summer and fall leases, respectively. Summer leases targeted summer rearing habitat in priority tributaries. The Fall lease was targeting adult upstream passage and spawning habitat initially for Chinook salmon, and later for coho salmon, on the mainstem Scott River.

Map 1

Scott River Water Trust Summer Leases 2011



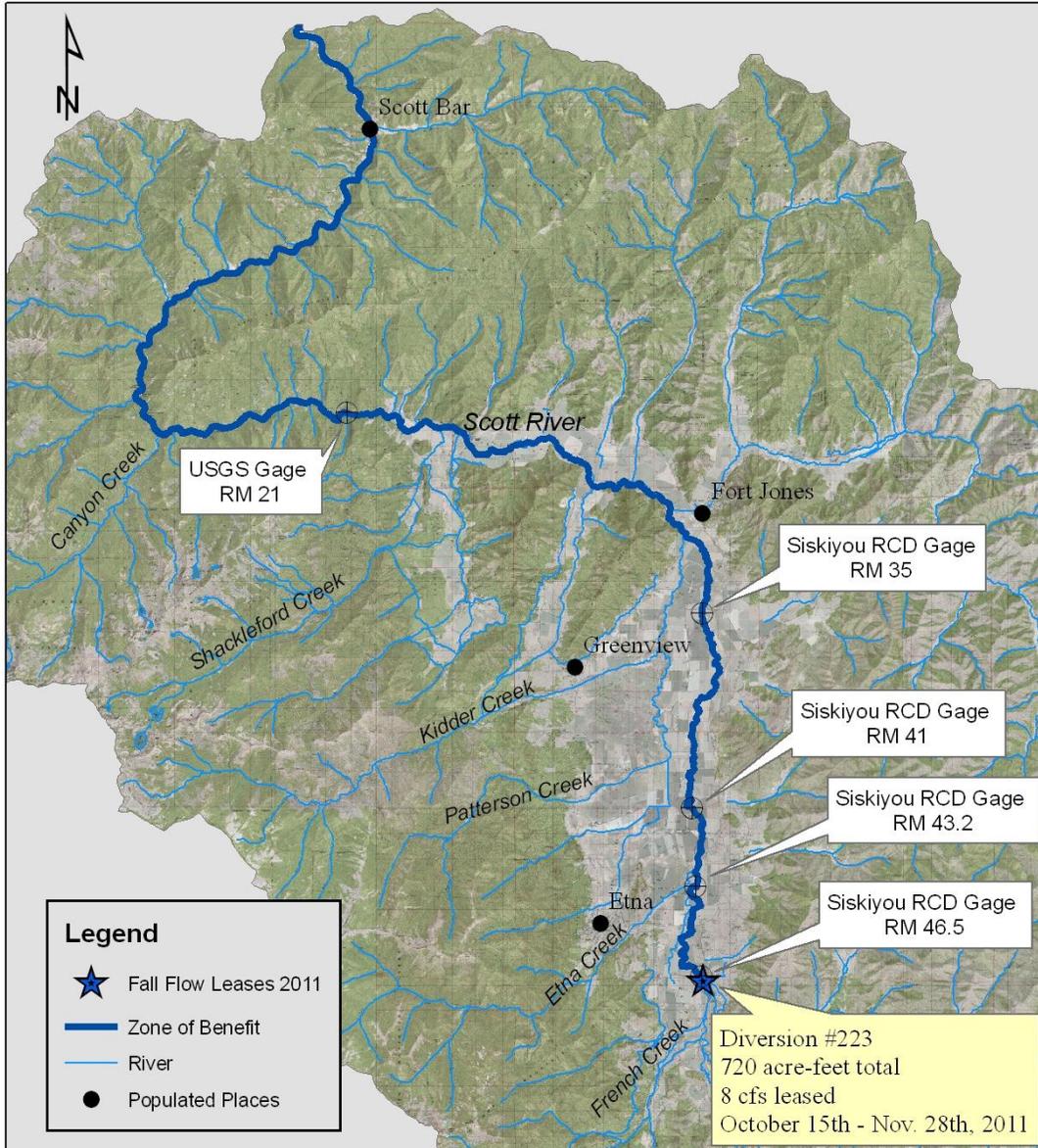
0 0.5 1 2 Miles
[Scale bar]

Cartography by E. Yokel
USDA NRCS - Yreka FO - February 2012



Map 2

Scott River Water Trust Fall Lease 2011



0 1.5 3 6 Miles

Cartography by E. Yokel
USDA NRCS - Yreka FO - February 2012

Monitoring Results - Summer Lease Transactions

Patterson Creek

Diversion Site: Upper Patterson Creek: Diversion #390-10 (Scott River Decree)

Date Lease Began: July 7, 2011

Date Lease Ended: September 30, 2011

Water Right: 5.00 cfs, 1st priority right

Diversion Amount at Start of Lease: 5.21 cfs Leased Amount: 100%

Stream Discharge at Start of Lease: 30.7 cfs (above POD); 23.7 cfs (below POD).

Fish Species Present: Coho salmon spawners were noted in vicinity in Nov-Dec 2010 (Yokel 2011). Carson Jeffries verified the presence of coho salmon juveniles on June 26th, when the monitoring stations were established. Juvenile coho salmon were observed as far upstream as the Point of Diversion (POD).

The Patterson Creek forbearance agreement became effective on July 7th, 2011, with the Water User agreed to forbear all decreed water rights to this diversion after this date to the end of the irrigation season. The next potentially active diversion is ~ 2 miles downstream from the Point of Diversion (POD). In between lies an alluvial fan where the stream goes sub-surface every year; water subs out below the fan. During the lease period, the creek was surveyed to determine where the creek dried up below the lease site and the distance was found to be 6,149 feet downstream from the point of diversion, or 1.16 Miles (source: Steve MacDonald, CDFG, for GPS coordinates and Rankin Holmes for mapping distance.) Views of the lease site between July 6-11 are shown below (Figures 1-4).



Figure 1. Pre-lease (at 7 cfs gross diversion amount): above bypass



Figure 2. Patterson Creek above the POD one day before the transaction began on July 7th. Discharge was measured at 30 cfs.



Figure 3. Patterson Creek below the fish screen bypass return, before Transaction



Figure 4. Patterson Creek below the fish screen bypass return, July 11th .

Streamflow - Patterson Creek

Three stream flow gaging sites were established, one 500 feet above the point of diversion, one 20 feet below the fish screen by-pass return, and one at the bottom of the protected reach, approximately 500 feet downstream from the habitat transect "J". The first two gages were established on June 26th, the third site was established on July 1st . Stream discharge measurements were collected at each discharge station at the time of establishment. See Table 3 for all instantaneous discharge measurements collected manually with flow meter. These measurements were used to develop rating curves for each flow station and to test the CIG protocols.

Table 3. Discharge measurements collected on Patterson Creek, 7/1 to 9/19 (cfs)

Location	Date	Date	Date	Date	Date	Date	Date	Date
	7/1/2011	7/6/2011	7/7/2011	7/15/2011	7/23/2011	8/3/2011	8/24/2011	9/19/2011
Above POD	43.7	30.7	30	13.04	8.2	4.2	2.11	0.91
Below Bypass*	-	23.73	22.06	12.65	7.23	4.19	1.83	0.81
Bottom of reach	-	21.97	-	-	7.4	3.66	1.4	0.14
Head of ditch	8		6.98	-	-	-		
after bypass	6.38		5.21	-	-	-		

*- Note this site is difficult to get an accurate discharge measurement because the wetted width of the channel is quite narrow & deep, especially compared to the site above the POD.

Discharge measurements were used to develop rating curves for each location. Rating curves were developed using the methodology utilized by the California Department of Water Resources. Rating curves were applied to the stage data collected to calculate daily cfs values for each location. Figures 5 and 6 show the results.

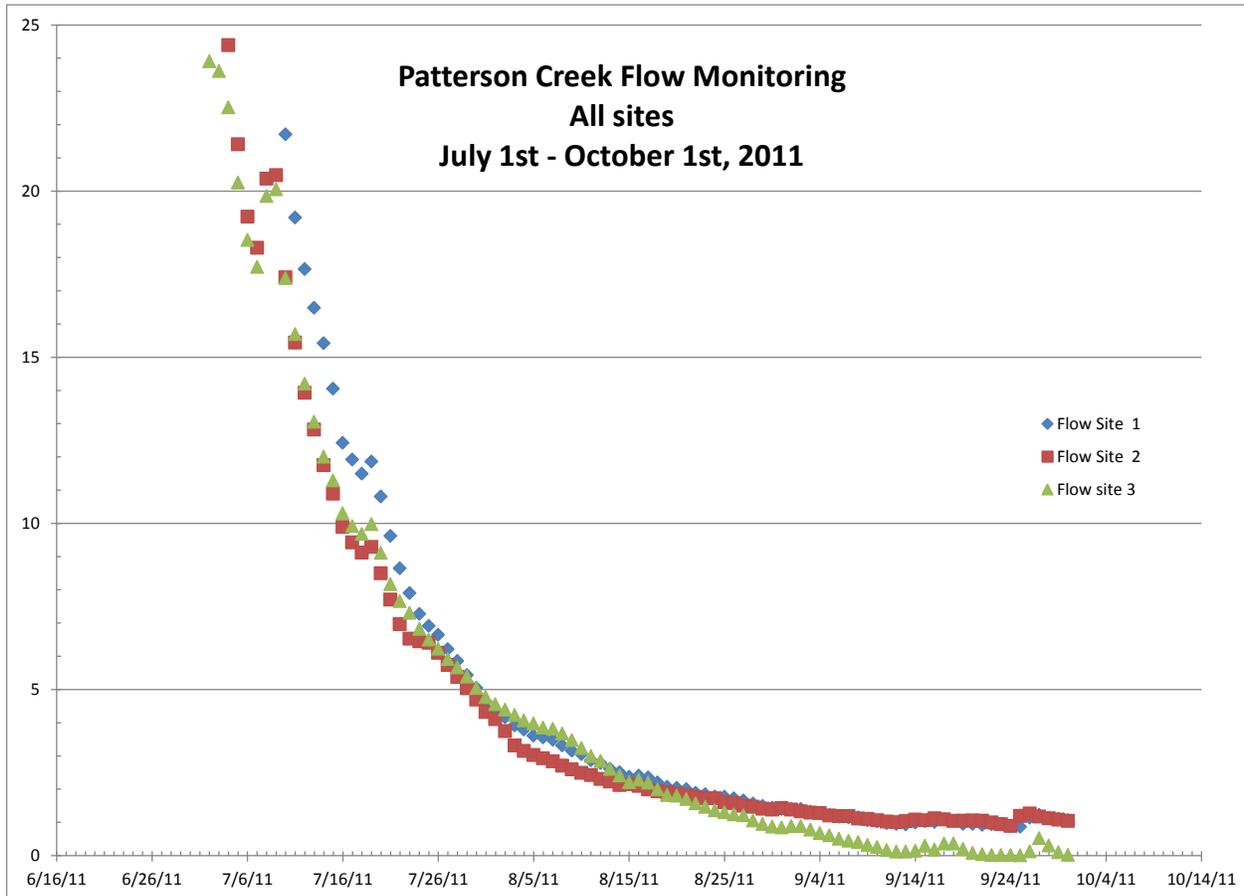


Figure 5. Flow data for Patterson Creek : all three stations July1st – October 1st, 2011 (in cfs)

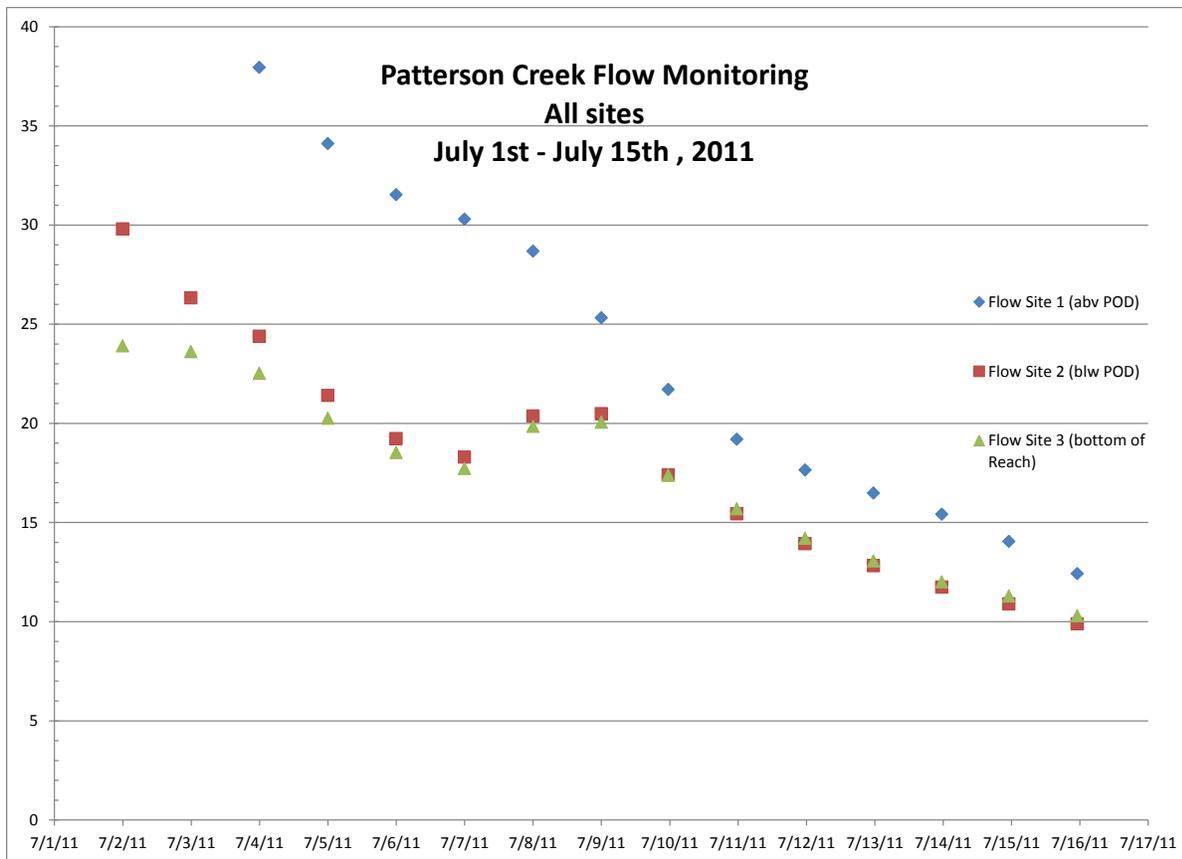


Figure 6. Flow at all three sites, just prior to and after the transaction (in cfs)

Water Temperature - Patterson Creek

Water temperature data (30 Minute intervals) was collected in four locations in Patterson Creek: above the point of diversion, below the fish screen bypass return, approximately half way down the protected reach, and at the bottom of the reach. Figures 7 thru 9 show the water temperature data collected on Patterson Creek.

During the period of the lease (July 7th – September 30th), daily maximum temperatures in the reach did not exceed 17°C, which is considered suitable for salmonids. Figure 9 shows water temperatures at the site directly below the fish screen bypass. The graph appears to show a slight decrease in water temperature on 7/8 directly following the lease start on 7/7. It is difficult to draw any conclusions beyond that point because water temperatures in the Scott River tributaries tend to naturally continue to increase until the end of July.

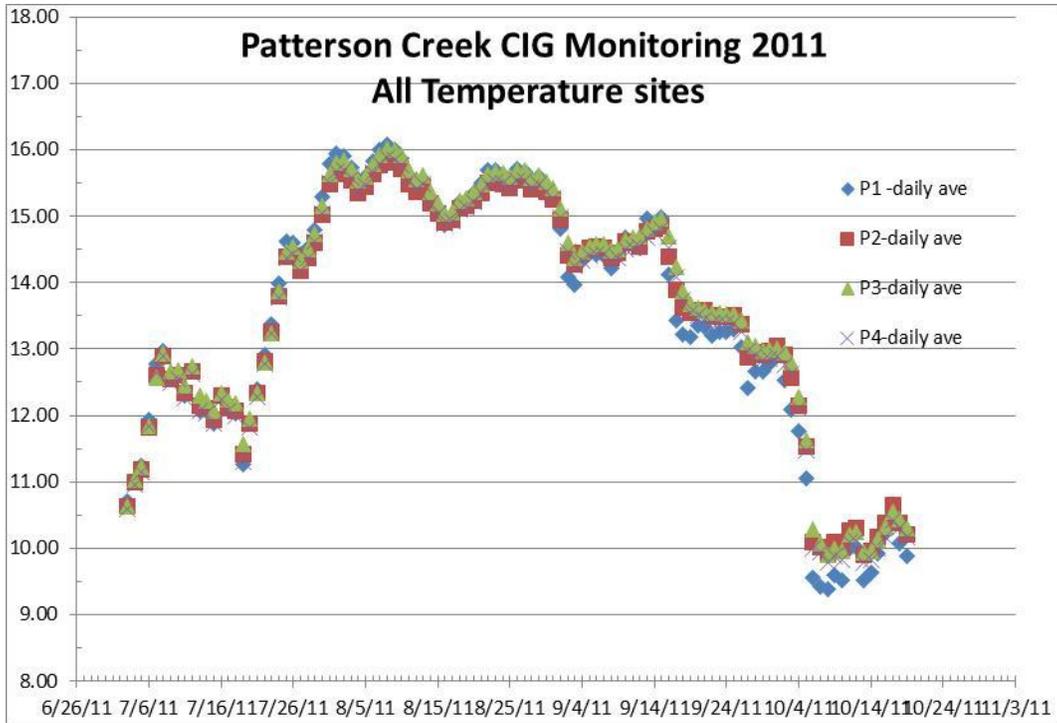


Figure 7. Daily Average Water Temperature Data, all sites on Patterson Creek (°C)

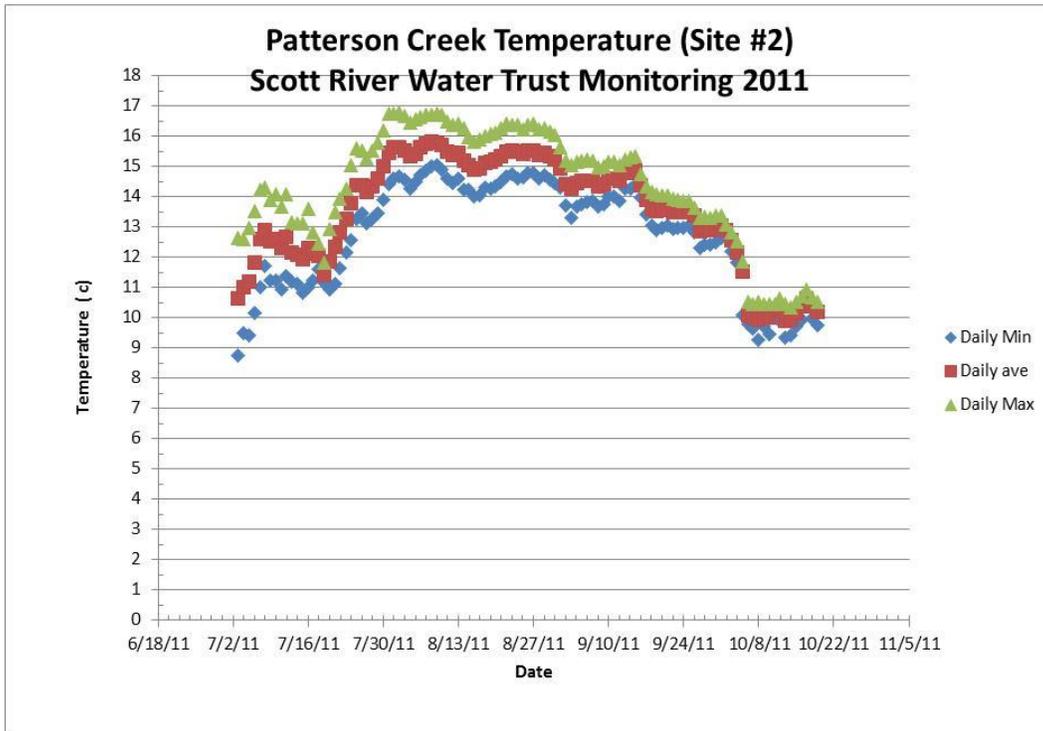


Figure 8. Daily Min, Max, Average Water Temperature, Site 2, Patterson Creek (°C)

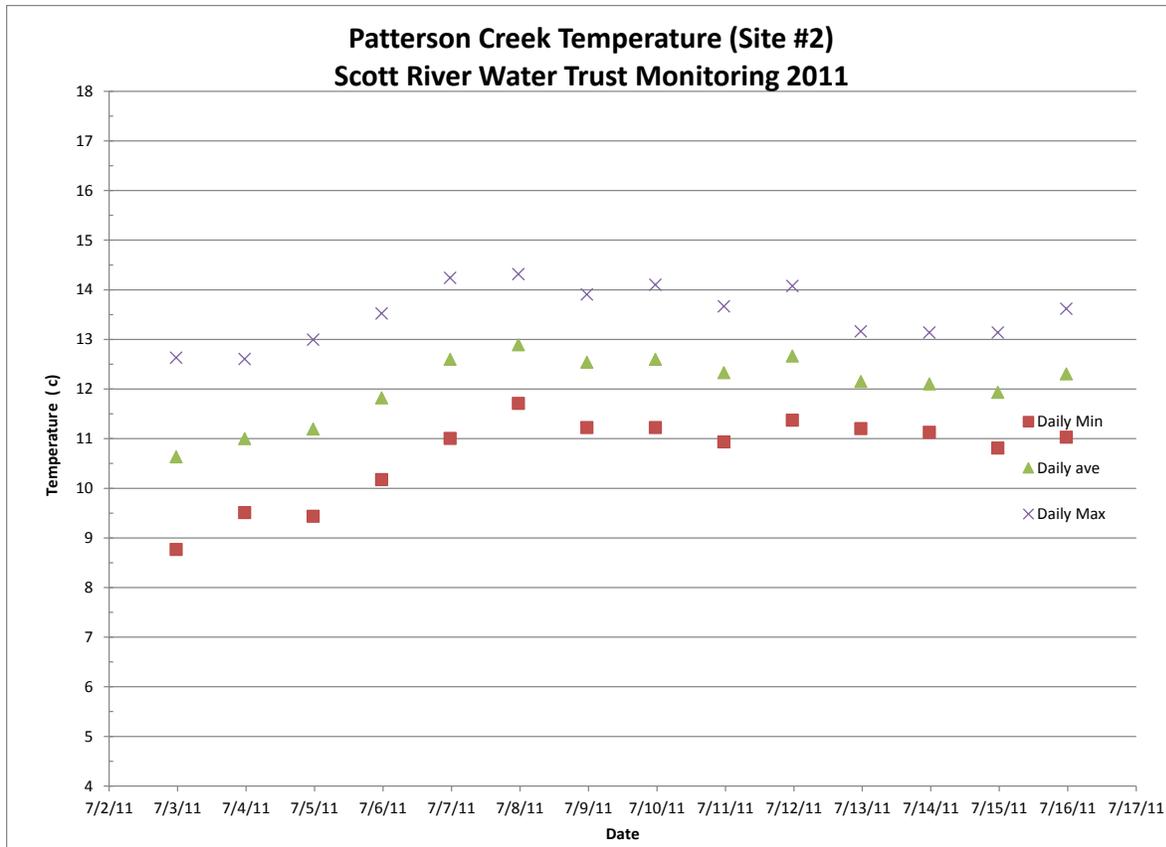


Fig. 9. Daily Min, Max, Average Water Temperature at Site 2: before/after lease began on 7/7.

Aquatic Habitat - Patterson Creek

Siskiyou RCD staff collected aquatic habitat data along 11 established transects, following the NFWF-CIG protocols. This effort involved collecting water depths at set locations along an established cross-section. These locations were measured a total of four times: immediately before and after the lease started, and two additional times during the course of the lease transaction. No post-lease transaction measurements were taken, as the ditch was turned off the entire season, and ending the lease did not change instream flows. All data were provided to UC Davis and Watercourse Engineering for analysis for their NFWF-CIG Protocol project (Rankin et al. 2011).



Figure 10. Comparison of transect "I" habitat for July 11th and Sept 19th, 2011

Patterson Creek Lease summary

The California Dept. of Fish and Game warden verified the distance of the diversion benefit in September 2011 to be 6,149 feet (1.2 miles) below the POD to where the dry reach began, or approximately $\frac{1}{2}$ mile upstream from the Hwy 3 bridge. Map 3 below depicts this zone of benefit. Again, this observation was during the baseflow period and represents the minimum distance benefited. Prior to the baseflow, the transaction affected at least the two mile reach until the next point of diversion. The reach above and below the Hwy 3 bridge is an alluvial fan deposit that goes dry every year even when no diversions occur. Additionally, the leased water in July likely enhanced connectivity of Patterson Creek to the Scott River, allowing juvenile fish to redistribute to other locations in the system during this critical mid-summer period. In addition, at the same time the warden verified the presence of salmonid fish throughout the reach.



Map 3. Location of Patterson Creek zone of benefit below lease site (Google Earth map).

French Creek - Lower

Diversion Site: lower French Creek; #48 - French Creek Decree

Date Lease Began: August 22-23, 2011

Date Lease Ended: September 30, 2011

Water Right: 0.76 cfs, 7th priority (French Creek Decree)

Diversion Amount on Lease Start Date: 0.68 cfs

Stream Discharge Before Lease Began: 3.5 cfs After Lease Began: not done

(Ditch and flow measurements were performed by Phil Huckobey (California Dept of Water Resources) and Tom Franklin (Siskiyou RCD) on 8/22.)

Downstream Benefit: To at least the mouth of French Creek for 1300 feet, and probably to the next diversion site in the Scott River 5,050 feet downstream (Yokel 2010.)

Fish Presence: Coho salmon spawners were noted in the vicinity during 2010 Coho Spawner Survey by the RCD (Yokel 2011). CDFG (Mary Olswang and Morgan Knechtle, personal communications) noted the following juvenile fish species present above the fish screen within the ditch: coho salmon, steelhead, dace, sculpin, and lamprey.

All of the diverted water was returned to the creek on 8/22 except for 0.25 cfs, which was left running until CDFG staff could haze the long ditch for salmonids above the fish screen. Mary Olswang and Morgan Knechtle of CDFG assisted Siskiyou RCD staff in hazing the ditch on 8/23. The following fish were rescued from the ditch, which was then shut down completely: 5 coho, 16 steelhead, 14 dace, 1 sculpin and 1 lamprey ammocoete.

Figure 11 shows the daily average flows in French Creek above the lease site and above Hwy 3 at the DWR gage during the period of the transaction. Flows dropped from 12 cfs on 8/1 to below 1 cfs by 8/24 for the rest of the season. It should be noted that the flow increases below this gage due to sub-surface recharge.

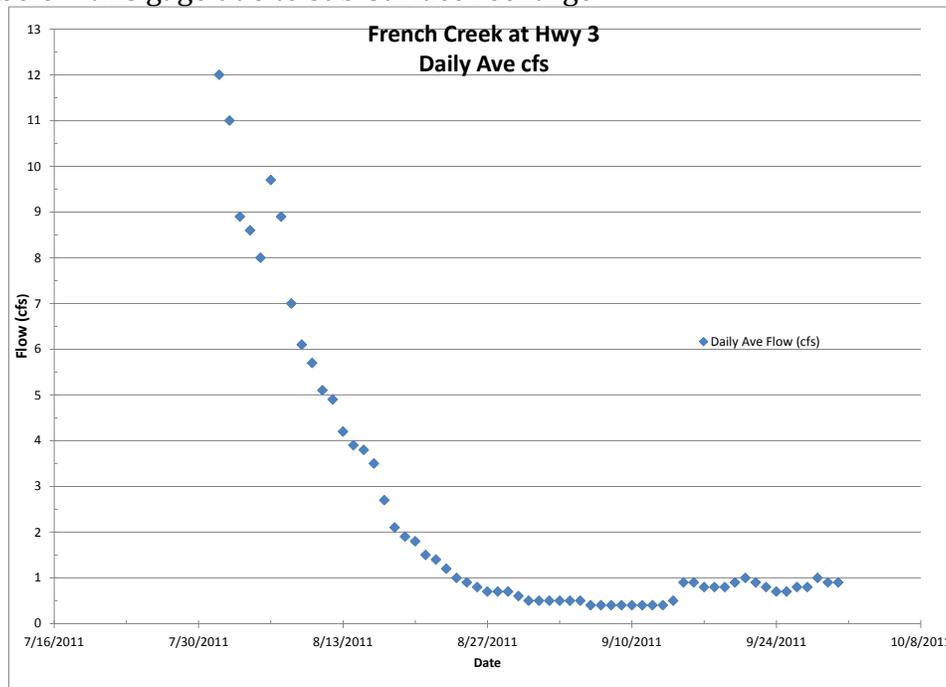


Figure 11. Daily Average Flows (cfs) French Creek at DWR gage (CDWR 2011b)

Figure 12 shows the daily Minimum, Maximum and Average water temperatures in a riffle within the reach during the summer of 2012. Average daily temperature steadily increased from 7.6 °C in mid-June to 17.0°C by mid-September. Usually, water temperature peaks around early August but the higher snowpack and delayed runoff may have delayed the timing in 2011. Daily fluctuations ranged from 5 to 7 degrees in this riffle. While the max temperatures >20 °C would be challenging for salmonid growth and survival, the average and min temperatures provide more optimum conditions. Juvenile coho and steelhead may also move from the riffle environment to cooler locations such as pools with groundwater influx during the hottest time of the day.

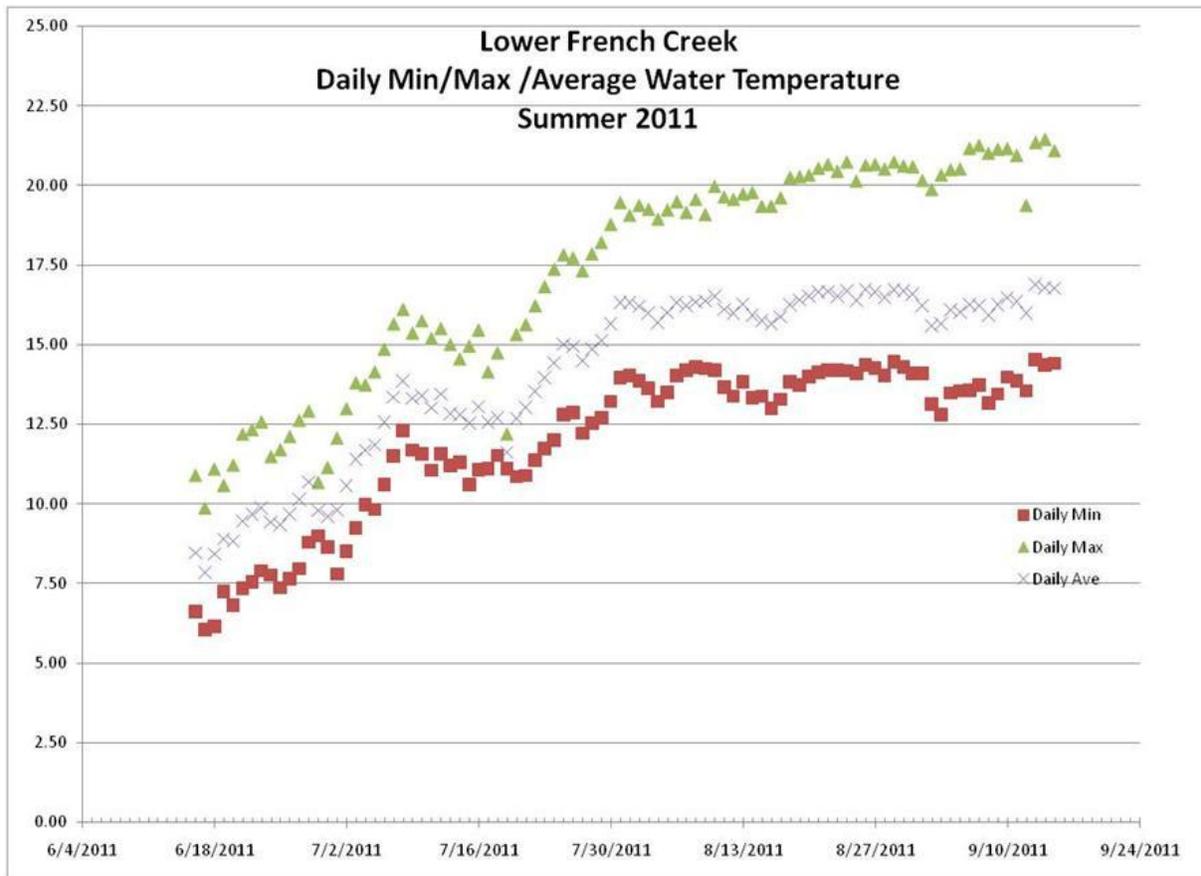


Figure 12. Daily Min/Max/Ave water temperature in lower French Creek (°C)

Potential changes in water temperature caused by the additional water from the lease can be assessed from Figure 13. Looking at the 8/22 to 8/23 timing when the diversion's water was released, the data do not appear to reveal any change in stream temperature. This result is consistent with past monitoring results for this site.

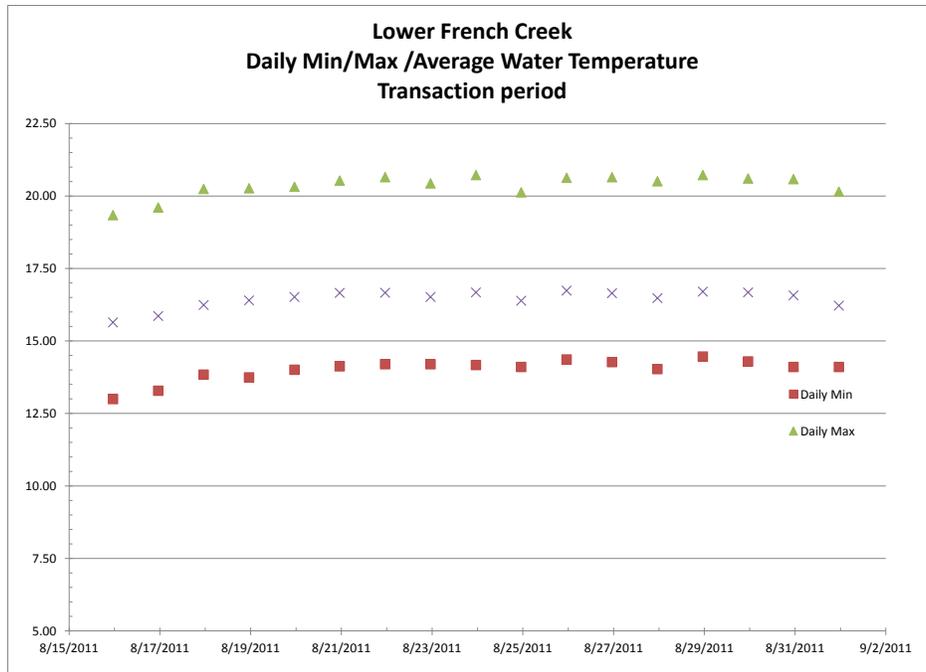


Figure 13. Daily Min/Max/Average Water temperature in lower French Creek, before and after the transaction released water on 8/22-23.

French Creek - Miners Creek tributary

Diversion Site: lower Miner’s Creek; #36 - French Creek Decree

Date Lease Began: August 19, 2011

Date Lease Ended: September 30, 2011

Water Right: 0.25 cfs, 1st priority

Diversion Amount on Lease Start Date: 0.30 cfs (CDWR Watermaster measurement)

Stream Discharge Before Lease Began: ~1.0 cfs After Lease Began: ~1.0-1.5 cfs
(CDWR Watermaster estimate)

Downstream Benefit: To next active diversion, estimated to be 2,500 ft. to mouth of Miner’s Creek plus 3,500 ft. of French Creek.

Fish Presence: Coho salmon spawners were noted in the vicinity during 2010 Coho Spawner Survey by the RCD (Yokel 2011). No dive surveys were done to confirm in August to confirm presence of juvenile salmonids; this reach has supported them in the past.

No instream flow data was collected on this site and no gages are located nearby.

Water Temperature Data

Figure 14 shows the stream temperature data collected in Miners Creek, with the average ranging from 14.9 to 11.5 °C. The peak temperature of 17.2°C is fine for salmonid growth and survival. When overlain with air temperature data collected in Etna, the water temperature data appears to follow the same trend as air temperature data.

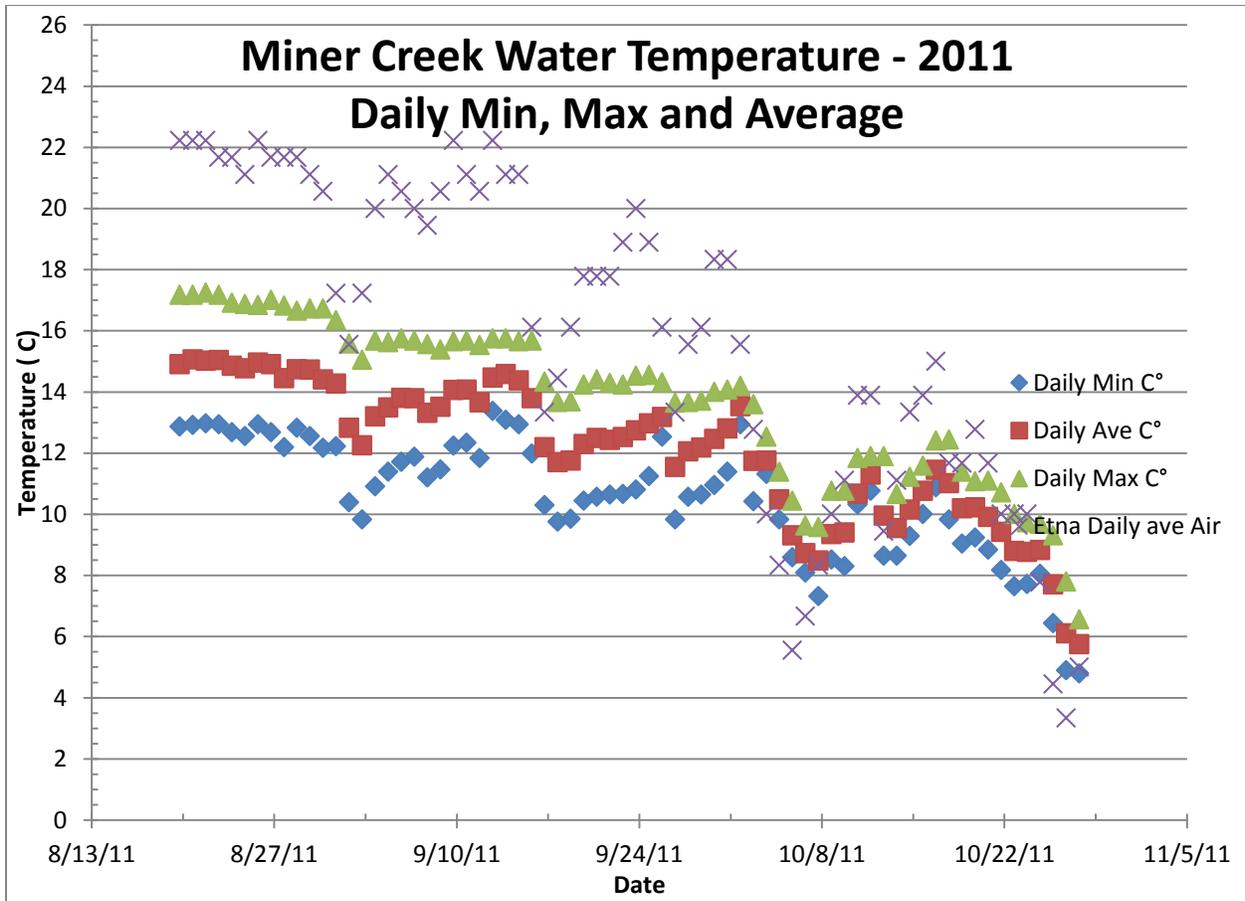


Figure 14. Daily minimum, maximum and average water temperature in Miners Creek, overlaid with average air temperature at Etna.

[Air temp data from: www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KCAETNA4]

Monitoring Results - Fall Lease Transaction

The Scott River's flow at the USGS gage (RM 21) was 70 cfs on Oct. 1st. As flow was adequate for upstream salmon migration, the Water Trust's primary purpose for a fall lease was to test the NFWF-CIG Monitoring Protocols for spawning habitat (Rankin et al 2011.) Those results are to be reported separately by the NFWF contractors.

Scott River Mainstem

Diversion Site: Mid-Scott River, at mile 46.7 (Young's Dam); #223-13 - Scott River Decree

Date Lease Began: October 15, 2011

Date Lease Ended: November 28, 2011

Water Right: reasonable amount for stockwater use for Scott Valley Irrigation District users

Diversion Amount at Start of Lease: 17.2 cfs (see explanation below); 13 cfs planned use

Leased Amount: 8.0 cfs (5 cfs remained for stockwater use)

Stream Discharge at Start of Lease: 50.3 cfs below POD & bypass

Fish Species Present: Scott River’s Chinook salmon run in 2011 first entered the Scott Valley reach on 9/24, peaked between 10/6-10/18, and stopped about 11/28; a total of 4,538 Chinook were counted moving upstream of the CDFG video weir at RM 18. The coho salmon run began on 10/19 and ended on 12/31; a total of 344 coho were counted. Steelhead adults and sub-adults were also present during the same period before the weir was removed on 1/1/12; a total of 449 steelhead were counted (Knechtle and Chesney 2012).

Distance of Benefit: 46.7 miles to mouth of Scott River (no downstream surface diversions after irrigation season ends on Oct. 1st)

RCD staff established and conducted 7 pre-lease habitat transects per CIG protocols between Young’s Dam (RM 46.7) and Horn Lane Bridge (RM 44.6) on Oct. 12th. Due to a misunderstanding by the ditchtender, the diversion amount was reduced on Oct. 13th to 5 cfs (the expected flow to remain in the ditch) without the RCD performing pre-lease flow measurements within the ditch or instream. On Oct. 15th, the intended start date, adjustments had to be made. The bypass gage was first closed by the Ditchtender to allow all extra water to pass through the fish ladder, rather than have the bypass flow exit at the bottom of the ladder, to see if migrating salmon might be better attracted to using the fish ladder. No upstream migrants had been documented using the new fish ladder since its construction by CDFG in 2009. The ditchtender reopened the headgate to allow the estimated pre-lease diversion amount for stockwater. Due to the design of the diversion and fish screen structures, it took time to make the needed adjustment in flow. At the time of the in-ditch monitoring, the amount was still being adjusted down to the estimated 13 cfs needed for full stockwater use (Figures 15 and 16).

Map 4 shows the location of the Fall Flows Lease transaction, and the location of the flow monitoring sites.

Streamflow

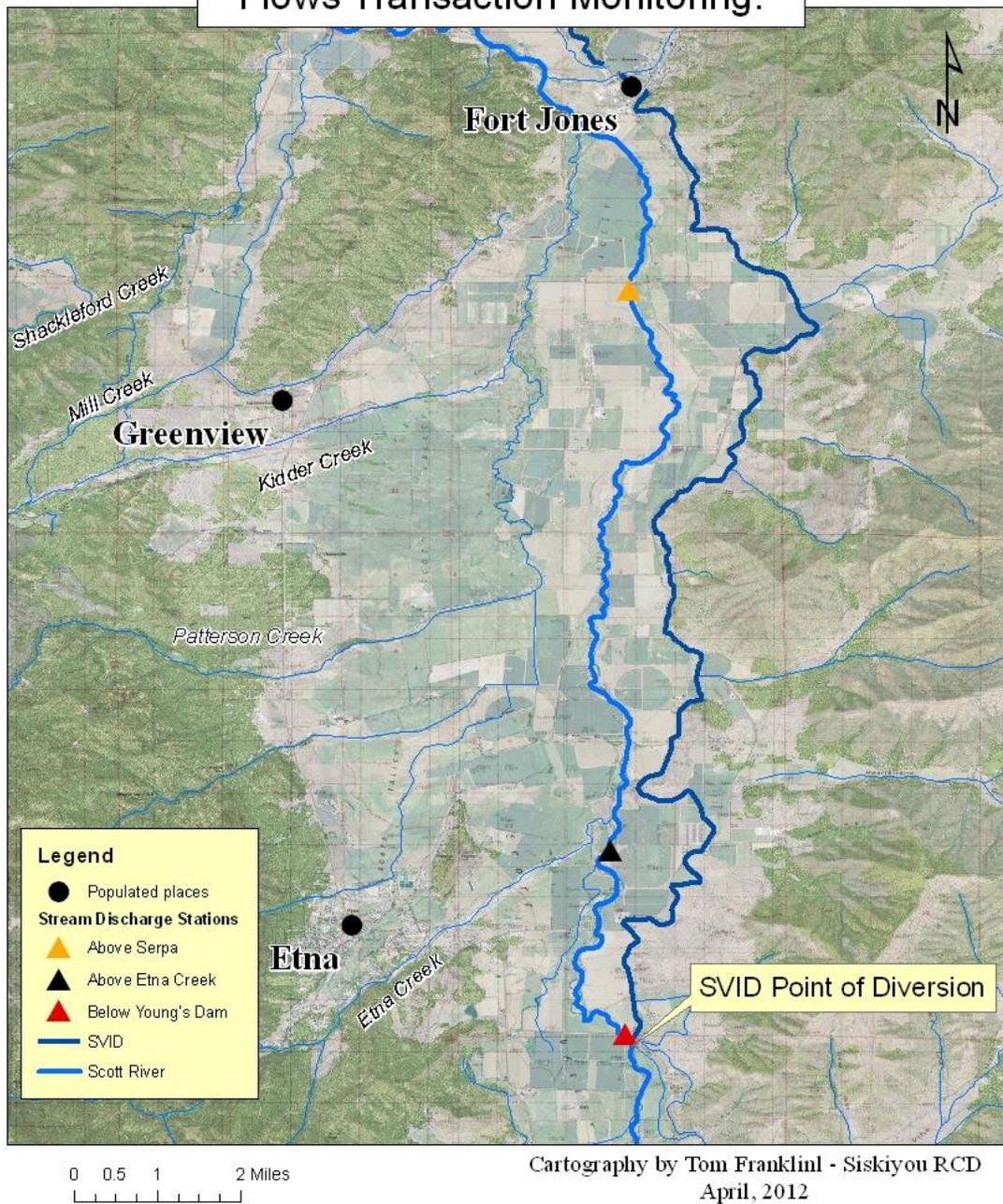
Four continuous flow monitoring stations were planned for this transaction: directly downstream from SVID’s POD (RM 46.5), above Etna Creek (RM 43.2), below Etna Creek (RM 41), and at Serpa Lane (RM 35). All four locations were established during the summer of 2011, and were functioning when the lease went into effect on October 15th, 2011.

Unfortunately, equipment failure led to the loss of all continuous flow data collected at the site directly below the POD. The next closest flow station was approximately 3.3 miles downstream, above Etna Creek. Fortunately, instantaneous discharge measurements were obtained by RCD staff during the lease period, indicating the flows shown in **Table 4**.

Table 4. Discharge measurements collected in the SVID diversion.

SVID transaction discharge measurements			
		staff	cfs
10/15/2011	ditch staff	1.6	
	Gage below SVID	3.03	
11:40	ditch staff	2.37	17.17
2:46	ditch staff	1.64	4.53
3:24	Gage below SVID	3.04	50.27
10/18/2011	ditch staff	1.69	5.707
11/11/2011	ditch staff	1.08	1.01

Scott River Water Trust 2011 Fall
Flows Transaction Monitoring.



Map 4. Location of 3 of the Flow Monitoring Sites during the Fall lease period



Figure 15. RCD staff measuring the ditch flow on 10/15 with SonTek FlowTracker.



Figure 16. View of fall lease site at RM 47 with fish ladder on 10/15.

Figure 17 below compares the flows of the three RCD gages in the mid-Scott River reach to the USGS gage at RM 21. The same pattern of flow is apparent, with the upstream flows representing 36 to 78% of the downstream flow during this period. Etna Creek was not yet connected through the alluvial fan at the mouth. Precipitation around 10/7-10/10 increased the runoff, with little rainfall occurring again until late November.

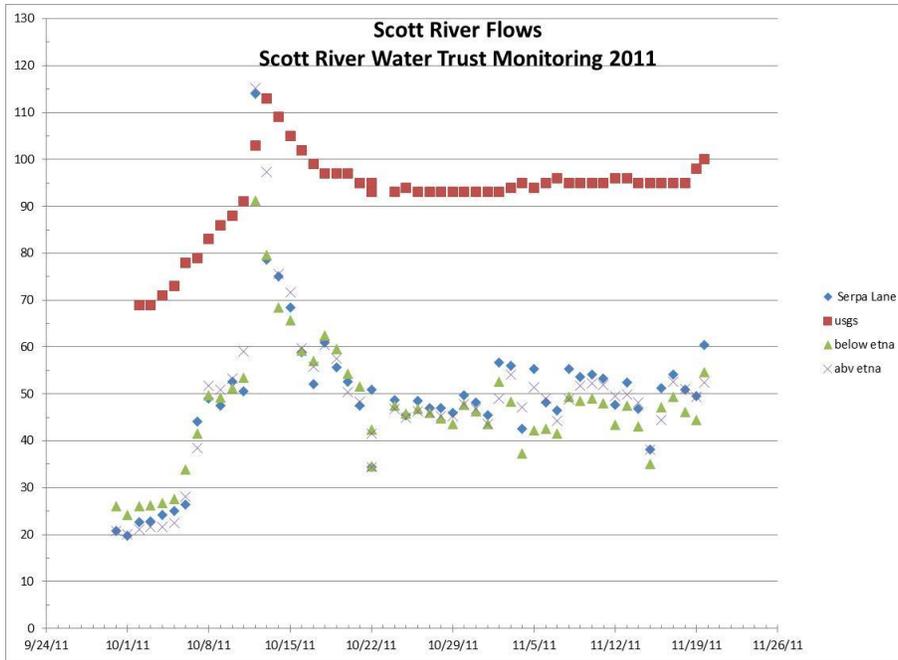


Figure 17. Discharge in Scott River mainstem, all flow locations, 10/1-11/21 (cfs)

What began as an above median flow in the Scott River in early October 2011 ended up becoming a significantly below median flow by mid-November, as indicated by the USGS gage records (Fig. 18).

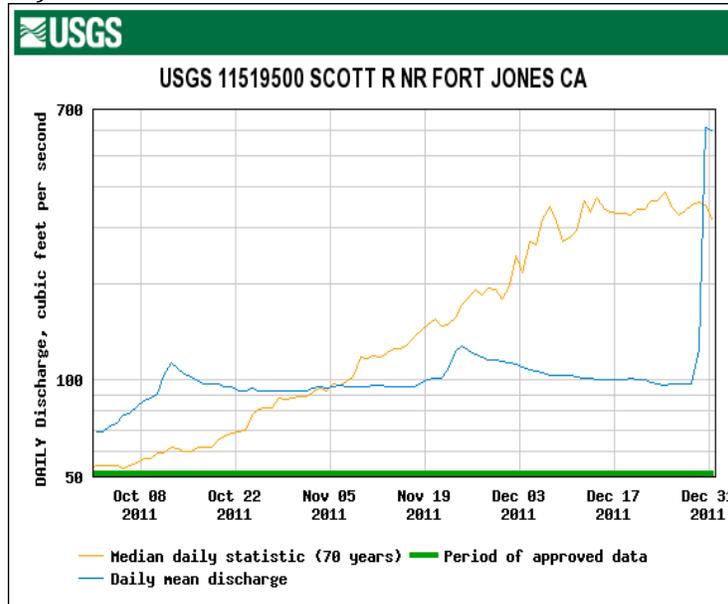


Figure 18. Flow records at USGS gage (RM 21) for fall period.

Around the time the lease began, flows peaked at 125 cfs (10/12) at the gage located 3.3 miles below the POD (Fig. 19). As described above, the diversion was adjusted on 10/13 and 10/15 by about 8-12 cfs. The data show a brief decline in minimum daily flow on 10/16. Otherwise, the relative changes were not very measurable at these flows.

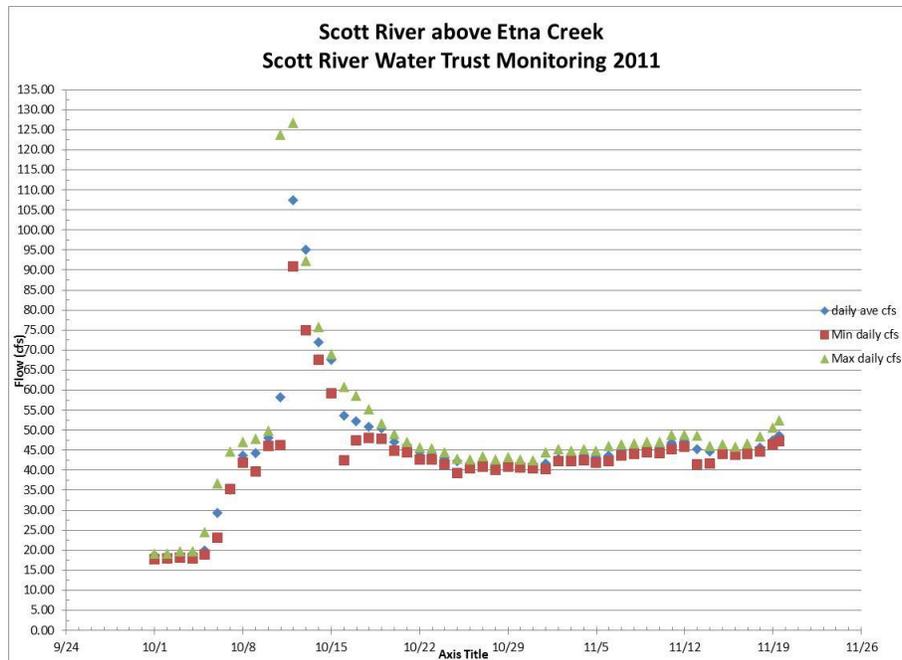


Figure 19. Flows in Scott River mainstem, above the mouth of Etna Creek (RM 43.2)

Chinook salmon were observed using the new fish ladder over Young’s Dam for the first time since its construction in 2009 and verified through a recording device (DIDSON camera) placed by CDFG between 10/28 and 11/10 (which was during the lease period). Of the 627 salmon swimming upstream, 58% used the fishway and 42% the roughed channel below the dam (Morgan Knechtle, pers. comm.). Whether the added flows through the ladder from the lease and the shut-off of the bypass contributed to this improved fish passage, or not, cannot be determined from the data. But the results were encouraging.

CONCLUSIONS & RECOMMENDATIONS

- The 2011 monitoring effort was the first for the Water Trust during a Wet Water Year type. Fewer transactions were needed to benefit low flow reaches, and only 4 lease sites needed to be monitored. As a result of higher flow conditions, any changes in stream flows and habitat due to the addition of water from the leases were less able to be detected through the monitoring efforts.
- Despite leasing all of the upstream diversion on July 7th in Patterson Creek, the alluvial fan reach below the site near the Highway 3 bridge went dry within a few weeks. This natural phenomenon occurs each year, even in wet years like 2011. This year the zone of habitat benefit below the lease site extended 6,149 feet before reaching the alluvial fan.
- Coho salmon juvenile presence was confirmed at the Patterson Creek site from a snorkel survey and at the lower French Creek site from fish trapping in the ditch. Coho presence was assumed at the Miners Creek site from confirmed adult coho spawner sitings near the reach during the previous winter. Steelhead juveniles were also confirmed at the lower French Creek site. In the future, dive surveys at each summer lease site would best identify the fish species present.

- Water temperature did not appear to be significantly reduced from the added flows at any of the summer lease sites. This finding is similar to past years' results. Measured temperatures were all found to be within the range to support juvenile salmonid growth and survival.
- Upstream migration by Chinook and coho salmon spawners in the fall over Young's Dam may have been improved by the added lease flows through the fish ladder, though the monitoring effort was not designed for that assessment. The new fish ladder was successfully used by adult salmon for the first time since constructed in 2009.
- More intensive monitoring efforts were conducted on one summer and one fall lease site as part of a special grant project with NFWF to test proposed, standardized field monitoring protocols for instream flow transactions. Until more analysis is done, it is unknown how much this intensive level will be applicable to future monitoring here.

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