

F7 Stream Reach Summary

Study Reach: F7, Fraser River - Ranch Creek confluence downstream to Canyon below Strawberry Road.

Reach Description: Approximate channel length: 1 ½ miles, approximate channel slope 0.6%.

This portion of the Fraser River is similar to F6 in that the channel and valley slope is relatively flat and sinuous, and wetlands-type vegetation dominates the landscape. In this reach, the Fraser and Ranch Creek confluence resulting in a large wetlands complex adjacent to the Town of Tabernash and upstream of the canyon. Tabernash Meadows Sanitation District WWTP and Crooked Creek flows enter the river upstream of the Fraser River Canyon. A railroad follows the left bank, confining the overbanks in some locations. This is a popular reach for angling. The downstream section of the reach, where it approaches F8, is on BLM land accessible from Strawberry Road.



Fraser River below Ranch Creek Confluence



Fraser River Upstream of Canyon

Flow Recommendations:

Environmental Flow Methodology: A study site was not established within this reach. Only CWCB instream flow recommendations are available. CWCB flows are evaluated by analyzing wetted perimeter-flow relations from surveyed cross-section data collected by Ecological Resource Consultants (2006) and provided by the U. S. Army Corps of Engineers.

Water Users:

- Irrigators, municipalities and industry flow-related issues: There are no local water diverters in F7.
- Recreational Flows: Angling is the predominant use. Some private recreational kayaking may occur in this reach under specific flow conditions.

Summary of Flows:

CWCB flows

- 30 cfs summer (05/15 – 09/15)
- 19 cfs for winter (09/16 – 5/14)

Water Users

- Irrigators, municipalities and industry: No diversions are present in this reach.
- Recreation
 - Kayaking: 250-700 cfs
 - Angling: 60-200 cfs

Stream Assessments: In August 2008 Tetra Tech conducted two stream assessments in F7. These included Stream Reach Inventory /Channel Stability Evaluation (SRI/CSE) and the EPA Habitat Quality Assessment (HQA). The SRI/CSE evaluation scored in the ‘fair’ category reflecting bank instabilities and

erosion due to the adjacent railroad and other land uses. The EPA HQA evaluation scored in the 'suboptimal' range. Overall, the stream assessments did not reveal any issues of significant concern except for minor anthropogenic impacts from the railroad embankment, road crossings and agricultural related land use. Results of both assessments are summarized in the following table. Details and methodology are presented in Appendix A.

Reach F7 Stream Assessments			
Stream Reach Inventory/Channel Stability Evaluation		EPA Habitat Quality Assessment	
Attribute		Attribute	Score
Upper Banks		Channel	
1	Landform Slope	4	1 Aquatic Habitat Barriers/ Diversion
2	Mass wasting hazard	6	2 Aquatic Structure as Cover
3	Debris Jam Potential	4	3 Velocity/ Depth Regimes
4	Vegetation Cover	6	4 Channel Flow Status
Upper Bank Score: 20		5	Channel Alteration
Lower Banks		6	Frequency of Riffles
5	Channel Capacity	3	7 Channel Sinuosity
6	Bank Rock Content	5	Channel Score 100
7	Flow obstructors & Deflectors	4	Banks
8	Cutting	8	8 Bank Stability
9	Deposition	8	9 Riparian Vegetation Cover and Disturbance
Lower Bank Score: 28		10	Riparian Vegetation zone width
Channel Bottom		Bank Score 46	
10	Rock Angularity	3	Total Score 146
11	Brightness	3	Notes
12	Consolidation/Particle Packing	4	
13	Bottom size distribution	8	
14	Bed Scour and Deposition	12	
15	Clinging Aquatic Veg	3	
Channel Bottom Score: 33			
Total Score: 81			

Spawning Observations: No spawning survey was conducted in Reach F7.

Hydrologic Records: USGS Gage Station 09033300 is a seasonal gage located 600 feet downstream of the confluence of Crooked Creek. This gage has been in operation within reach F7 since 1999, with 9 years of seasonal (April 1 - Sept 30) data collected (1999 - 2007) and 4 years of complete data (1999 - 2002). Based upon this short record, the daily streamflow exceedence plots suggest the CWCB flow recommendations are somewhat low compared to the recommended environmental flow targets proposed for Reach F6 just upstream., especially during the April through September period when daily median flows range from over 400 cfs down to about 25 cfs. The 1.25- and 2- year return period high flows are 248 and 592 cfs, respectively, a flow range that surpasses the flushing flow recommendation made for F6.

Water Temperature: F7 is a Tier II stream reach as designated by CDPHE with a chronic temperature standard of 18.2°C MWAT and an acute temperature standard of 23.8°C DM. Although, there are no temperature data available for this reach, temperature data reviewed in reaches F6 and F9 indicate stream temperatures for the Fraser River in this area are generally below the MWAT and DM standards. However, some exceedences have occurred and resulted in placement of F7 on the 303 (d) list of impaired waters for temperature, with a low priority.

Water Quality: Available data in reach F6, immediately upstream, shows elevated pH. Phosphorus readings have also exceeded criteria approximately 60% of the time, often by two or three times the standard criteria established for this study since 1995. As of April 2010 this reach of the Fraser River has been placed by the State of Colorado on the 303(d) list for monitoring and evaluation for copper.

Water Supply Issues (UPCO): There are no reported water supply issues under current or future conditions.

Summary of Results and Additional Remarks:

1. CWCB flow recommendations are somewhat low compared to the recommended environmental flow targets. Analysis of the ERC cross-sections indicates that the inflection points for wetted perimeter suggest an instream flow in the 30 to 50 cfs range would be appropriate, a flow range more closely aligned with the environmental flow targets for F6.
2. The stream assessment did not reveal any issues of significant concern.
3. Temperatures and water quality appear supportive of a cold-water fishery.
4. Flows for water users including recreation are generally adequate.
5. Electrofishing data collected in 2007 by GEI Consultants indicate brown, rainbow, and brook trout occur within this reach, comprising 71, 26, and 3 percent of the game fish collected, respectively (GEI 2007).
6. Reach F7 is a popular fishing area for both local anglers and guides. As a result, the public access has affected this area with some minor impacts to vegetation and the channel banks.
7. Reach F7 at the confluence with Ranch Creek and the lower portion of Ranch Creek itself appear to have high potential for providing quality trout spawning habitat if suitable flows can be provided and structural restoration is undertaken.

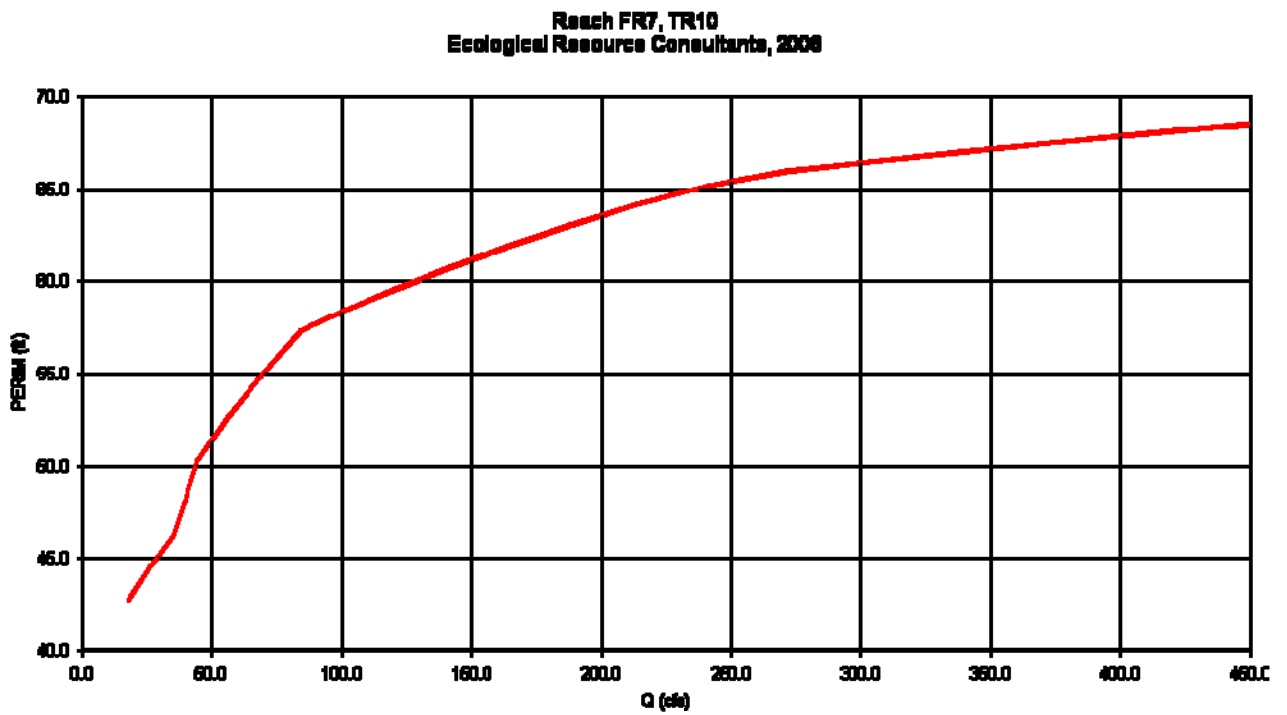
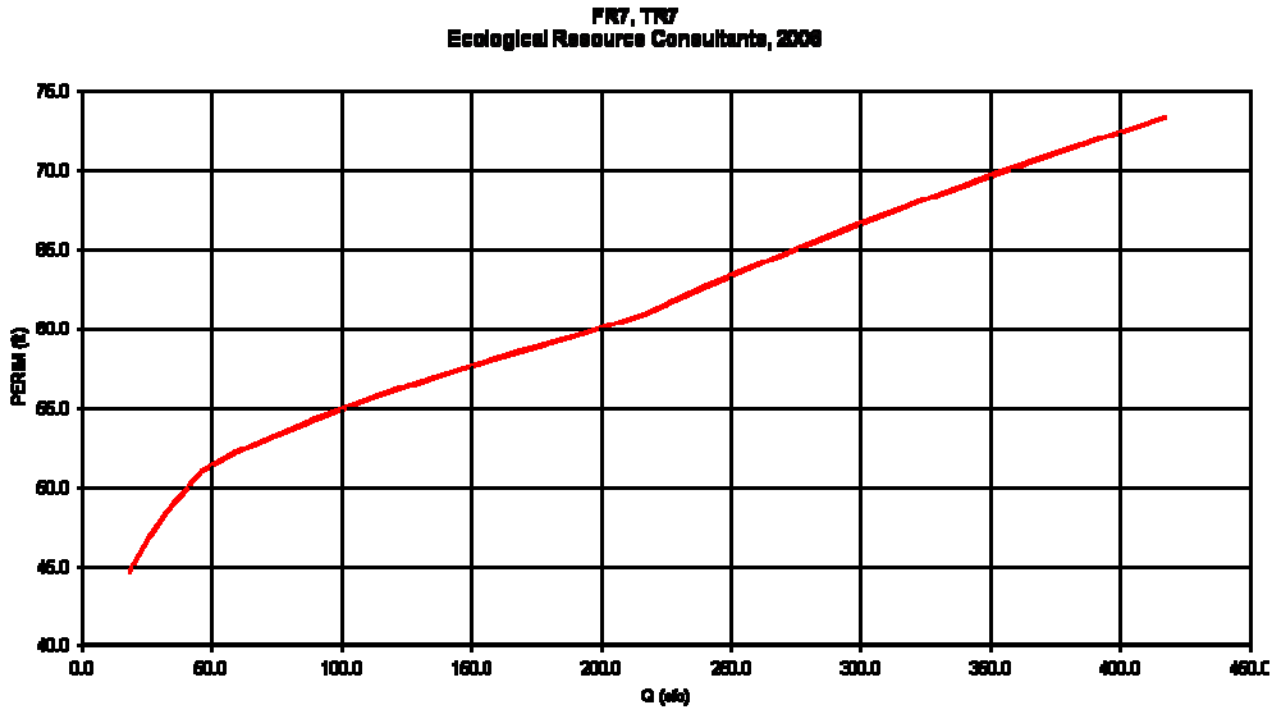
Restoration Opportunities: Restoration opportunities presented for F7 are aimed at reducing the impacts of elevated water temperatures, improving spawning habitat development and improving public access. Specific recommendations include the following:

- ✓ Explore river restoration and public access improvement opportunities at the confluence of Ranch Creek along the east banks of the Fraser and Ranch Creek. This could potentially include the conversion of private land to a conservation easement with public access. Specific restoration components would be aimed at improving spawning conditions and cover for adult trout as well as providing shade for relief from elevated water temperatures.
- ✓ Consider site-specific bank and trail restoration to stabilize the areas impacted from public use. This might include formalizing footpaths and soil stabilization of fishing access points.

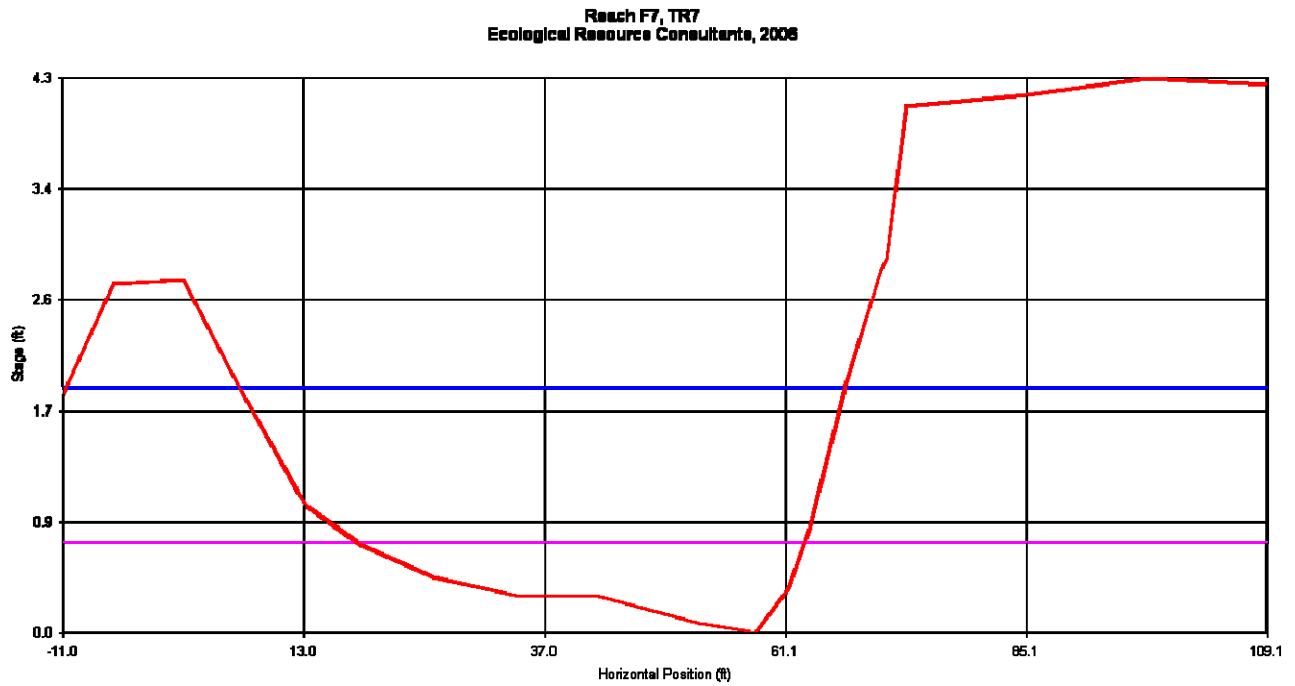
Monitoring: Establish and implement a monitoring program. Parameters should include pH and phosphorus monitoring to identify the source of the high readings observed at the upstream end of this reach. Once the sources are identified, appropriate remediation measures should be taken. Surface water temperature monitoring should also be continued. Consider the addition of air temperature monitoring.

Support Data

Wetted Perimeter-Flow Relationship



Transect and Bedload Threshold Plots and Tables

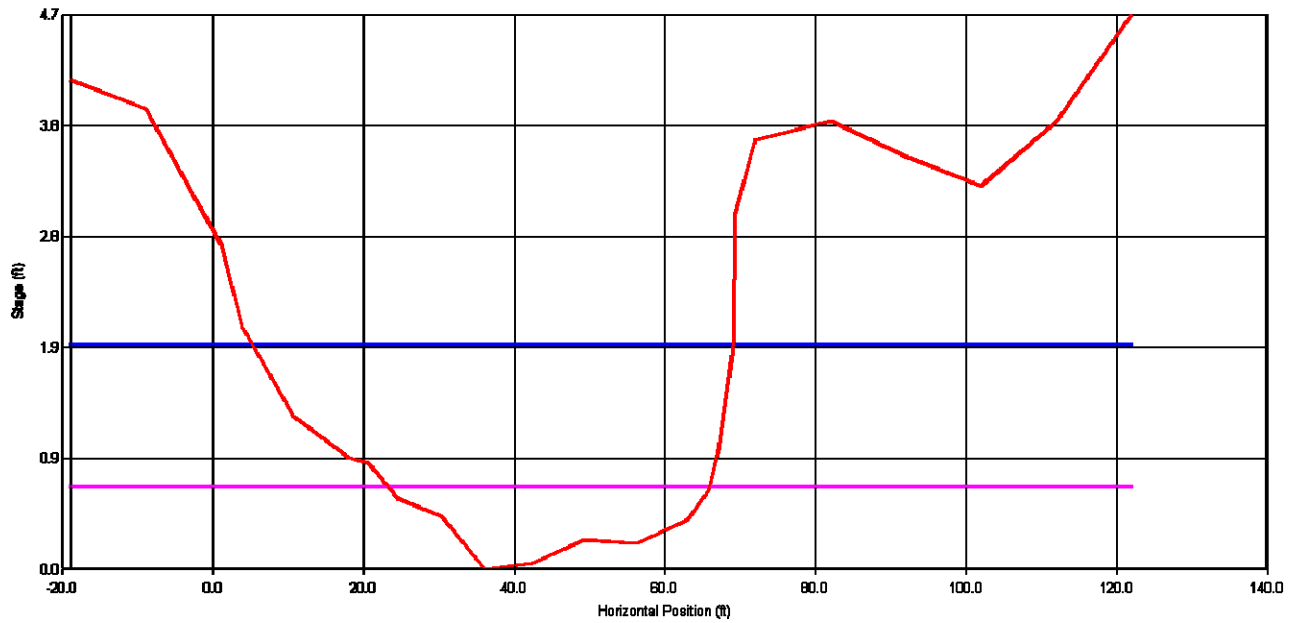


Reach F7, TR7
Ecological Resource Consultants, 2006

Resistance Method: Jarrett's Equation

STAGE (ft)	AREA (sq ft)	PERIM (ft)	WIDTH (ft)	R (ft)	DHYD (ft)	SLOPE (ft/ft)	n	VAVG (ft/s)	Q (cfs)	SHEAR (psf)
0.7	18.35	44.66	44.59	0.41	0.41	0.005	0.060	0.96	17.7	0.13
0.8	22.92	46.90	46.82	0.49	0.49	0.005	0.058	1.11	25.5	0.15
0.9	27.71	49.05	48.95	0.57	0.57	0.005	0.057	1.26	34.8	0.18
1.0	32.71	51.00	50.88	0.64	0.64	0.005	0.056	1.40	45.7	0.20
1.1	37.86	52.17	52.04	0.73	0.73	0.005	0.055	1.55	58.5	0.23
1.2	43.11	53.24	53.08	0.81	0.81	0.005	0.054	1.69	73.0	0.25
1.3	48.47	54.30	54.12	0.89	0.90	0.005	0.053	1.84	89.0	0.28
1.4	53.94	55.37	55.17	0.97	0.98	0.005	0.052	1.97	106.5	0.30
1.5	59.51	56.43	56.21	1.05	1.06	0.005	0.052	2.11	125.5	0.33
1.6	65.18	57.50	57.25	1.13	1.14	0.005	0.051	2.24	145.9	0.35
1.7	70.96	58.56	58.29	1.21	1.22	0.005	0.051	2.37	167.9	0.38
1.8	76.84	59.63	59.34	1.29	1.29	0.005	0.050	2.49	191.3	0.40
1.9	82.83	60.93	60.57	1.36	1.37	0.005	0.050	2.60	215.61 *	0.42

Reach F7, TR10
Ecological Resource Consultants, 2006



Reach F7, TR10
 Ecological Resource Consultants, 2006

Resistance Method: Jarrett's Equation

STAGE (ft)	AREA (sq ft)	PERIM (ft)	WIDTH (ft)	R (ft)	DHYD (ft)	SLOPE (ft/ft)	n	VAVG (ft/s)	Q (cfs)	SHEAR (psf)
0.7	18.12	42.79	42.75	0.42	0.42	0.005	0.060	0.99	17.9	0.13
0.8	22.48	44.52	44.46	0.50	0.51	0.005	0.058	1.14	25.7	0.16
0.9	27.02	46.26	46.18	0.58	0.59	0.005	0.057	1.29	34.9	0.18
1.0	31.87	50.30	50.20	0.63	0.63	0.005	0.056	1.38	44.0	0.20
1.1	37.01	52.64	52.52	0.70	0.70	0.005	0.055	1.51	55.7	0.22
1.2	42.38	54.97	54.83	0.77	0.77	0.005	0.054	1.63	68.9	0.24
1.3	47.98	57.30	57.13	0.84	0.84	0.005	0.054	1.74	83.5	0.26
1.4	53.75	58.45	58.26	0.92	0.92	0.005	0.053	1.88	101.1	0.29
1.5	59.63	59.60	59.38	1.00	1.00	0.005	0.052	2.02	120.3	0.31
1.6	65.62	60.75	60.51	1.08	1.08	0.005	0.051	2.15	141.1	0.34
1.7	71.73	61.90	61.63	1.16	1.16	0.005	0.051	2.28	163.5	0.36
1.8	77.95	63.06	62.76	1.24	1.24	0.005	0.050	2.41	187.5	0.39
1.9	84.28	64.18	63.84	1.31	1.32	0.005	0.050	2.53	213.2	0.41

Hydrographs and Exceedence Plots and Tables

