COLORADO
Parks and Wildlife
Department of Natural Resources

Water Resources Section – Aquatic, Terrestrial, and Natural Resources Branch

January 6, 2021

Ms. Linda Bassi, Chief
Stream and Lake Protection Section
Colorado Water Conservation Board
1313 Sherman Street, Suite 721
Denver CO 80203

Subject: Instream Flow Recommendations for Rincon La Vaca Creek in Water Division 7, Hinsdale County to be presented at the January 2021 CWCB Meeting

Dear Ms. Bassi:

The information contained in and referred to in this letter forms the scientific and biological basis for an instream flow (ISF) recommendation on Rincon La Vaca Creek in Water Division 7. The field investigations quantifying this ISF recommendation were conducted by Colorado Parks and Wildlife (CPW) personnel in 2016 and 2020. Investigations were originally initiated in 2014 by US Forest Service (USFS) personnel to explore an instream flow recommendation in relation to compliance with the Aquatic Habitat Standard since Rincon La Vaca Creek is a fish-bearing stream. CPW developed this ISF recommendation in cooperation with the USFS, and the USFS is supportive of this effort. CPW owns and operates the Weminuche Pass Ditch on Rincon La Vaca Creek, a transbasin ditch with water rights decreed for 40 cfs. The Weminuche Pass Ditch diverts water out of Rincon La Vaca Creek in Water Division 7 into Weminuche Creek in Water Division 3. During most years, Weminuche Pass Ditch has the legal ability to dewater the lower reach of Rincon La Vaca Creek during its season of operation. In an interest to see the fishery sustained, CPW agreed to bypass flows that would help protect the natural environment to a reasonable degree and would prefer to use an ISF appropriation for administration and protection of bypass flows. The ISF recommendation on Rincon La Vaca Creek was postponed until 2020 to continue discussions surrounding a special use permit, as well as to collect additional field data in order to refine the recommendation. This stream reach was presented to interested parties at a number of past ISF Workshops and to Hinsdale County Commissioners in December 2020. It is the CPW staff's opinion that the information contained in this letter is sufficient for the CWCB's staff to recommend an ISF appropriation to the Board on Rincon La Vaca Creek and to specifically address the findings required in Rule 5(i) of the Instream Flow Program Rules.

CPW participates in the ISF Program and develops instream flow recommendations for the Board's consideration in an effort to address CPW's legislative declarations "… that the wildlife

and their environment are to be protected, preserved, enhanced, and managed for the use, benefit, and enjoyment of the people of this state and its visitors … and that, to carry out such program and policy, there shall be a continuous operation of planning, acquisition, and development of wildlife habitats and facilities for wildlife-related opportunities" (See §33-1-101 (1) C.R.S.), and "… that the natural, scenic, scientific, and outdoor recreation areas … be protected, preserved, enhanced and managed for the use, benefit, and enjoyment of the people of this state and (its) visitors … and that, to carry out such program and policy, there shall be a continuous operation of acquisition, development, and management of … lands, waters, and facilities." (See §33-10-101 (1) C.R.S.).

In addition to these broad statutory guidelines, CPW's strategic planning document (CPW Strategic Plan, 2015) explains current agency goals to, "[c]onserve wildlife and habitat to ensure healthy sustainable populations and ecosystems." In order to, "protect and enhance water resources for fish and wildlife populations," by pursuing, "partnerships and agreements to enhance instream flows, protect reservoir levels, and influence water management activities," and to, "[a]dvocate for water quality and quantities to conserve aquatic resources." In addition to the CPW strategic plan, the agency's fish and wildlife conservation activities are also directed by the State Wildlife Action Plan (2002, Revised 2015). The goals and priorities from these documents direct CPW to advocate for the preservation of the state's fish and wildlife resources and natural environment, and therefore link CPW's mission to the goals and priorities of CWCB's ISF/NLL Program.

Recommended Segments

CPW is proposing an ISF recommendation on Rincon La Vaca Creek from its headwaters (located at approximately UTM 13S 288830 4170340) to the confluence with Los Pinos Creek (UTM 13S 294776 4171003). The reach is approximately 4.5 miles in length. All of the proposed reach is within the Weminuche Wilderness managed as part of the San Juan National Forest.

Natural Environment and Biological Summary

Rincon La Vaca Creek is a tributary of Los Pinos Creek located in the northeastern Weminuche Wilderness, close to the continental divide between the Pine and Rio Grande Basins. The stream drains approximately 6 square miles. The stream's hydrology is dominated by high elevation snowmelt; the basin receives approximately 40 inches of precipitation a year. Average basin elevation in close to 12,000 feet. Rincon La Vaca Creek is a first order headwaters stream. The upper portion of Rincon La Vaca Creek is high gradient; towards the confluence with Los Pinos Creek, the stream becomes lower gradient and more sinuous, providing suitable fish habitat compared to the high-gradient upper reach. USFS noted that the fishery is self-sustaining, observing multiple age classes of fish. The fish have been identified as Colorado River cutthroat trout by CPW with genetic information pending.

R2Cross Background

Initial biological instream flow recommendations were developed using the R2Cross methodology (Espegren, 1996). R2Cross uses field data that has been collected in a riffle habitat type. Riffles are often the limiting habitat type in streams during low flow events, so maintaining

specific conditions across riffle habitat types will also maintain aquatic habitat in pools and runs for most life stages of fish and macroinvertebrates (Nehring, 1979). The R2Cross model uses field data, including a survey of cross-sectional channel geometry, a longitudinal slope of the water surface, and a flow measurement, as input to a single transect hydraulic model. R2Cross uses Manning's equation to model a stage-discharge relationship and compute corresponding hydraulic parameters of average depth, average velocity, and percent wetted perimeter over modeled stages. Maintaining these three hydraulic parameters at specified levels should ensure conditions that allow movement of fish from riffle to riffle and adequate depths, velocities, and oxygenation for production of macroinvertebrates and development of trout eggs.

Baseflow recommendations are typically developed based on the flows that meet two of three hydraulic criteria and summer flow recommendations are based on hydraulic criteria that meet three of three hydraulic criteria (as described in Nehring 1979 and Espergren 1996).

Manning's equation relies on a roughness coefficient computed with information collected at the time of the survey, so the most accurate application of the model is for flows ranging between 40 to 250 percent of the surveyed flow. Many of the cross-sections on Rincon La Vaca Creek prior to 2020 were unable to achieve flow recommendations that fell within the recommended range of 40 to 250 percent, particularly for flow meeting two of three criteria, or the baseflow recommendation.

Initial Biological Flow Recommendations

USFS and CPW have collected cross-sectional data sets on Rincon La Vaca Creek. The results of the R2CROSS analysis are summarized below.

Cross-Section & Collector	Bankfull Channel Width	Date	Flow Measured	Model Accuracy Range	Flow Meeting Two Criteria	Flow Meeting Three Criteria
XS-3 CPW	14.6 ft	9/29/2020	2.75 cfs	1.1 – 7 cfs	1.15 cfs	2.73 cfs
XS-4 CPW	13.5 ft	9/29/2020	3.43 cfs	1.4 – 9 cfs	Out of range	3.79 cfs
XS-1 CPW	12.3 ft	10/6/2016	6.97 cfs	2.8 – 17 cfs	Out of range	Out of range
XS-2 CPW	11.9 ft	10/6/2016	7.29 cfs	2.9 – 18 cfs	Out of range	Out of range
XS-1 USFS	10.5 ft	9/11/2014	3.62 cfs	1.5 – 9 cfs	Out of range	4.22 cfs[1]
XS-2 USFS	8.7 ft	9/11/2014	3.91 cfs	1.6 – 9.8 cfs	Out of range	2.10 cfs
XS-3 USFS	10.4 ft	9/11/2014	3.90 cfs	1.6 – 9.8 cfs	Out of range	2.36 cfs
Average Cross Section Results					**1.15 cfs**	**2.75 cfs**

[1]The USFS did not include results from their XS 1 in their analysis because bankfull indicators were not well defined, and the riffle was higher gradient and shorter than their XS 2 and 3. Deferring to USFS expertise, USFS XS 1 results were not included in the flow recommendation.

The initial biological recommendation is 2.8 cfs in the summer, which maintains an average velocity of 1 foot per second (fps), average depth of at least 0.2 feet, and at least 50 percent wetted perimeter of the stream channel on average over the measured cross-sections. The initial biological recommendation in the winter is 1.2 cfs, which maintains depths of 0.2 feet on average and over 50 percent wetted perimeter. During the season of use for the ditch (approximately May through October, depending on when it is assessable), bypass will be set to 2.8 cfs. It is

expected outside of the season of use for the ditch (approximately November through April), the Weminuche Pass Ditch will bypass all of the native flow in the creek. The recommended instream flow rate during the baseflow period is 1.2 cfs.

Water Availability

In order to make a preliminary determination whether water is available for the R2Cross-based flow recommendations, CPW examined basic hydrologic data using USGS StreamStats regression estimates for monthly flow statistics. Based on this data (below), there is water available in May through October to meet the required summer flow rate of 2.8 cfs and in November through April to meet in required baseflow rate of 1.2 cfs.

Mean Monthly Flow Statistic (USGS StreamStats)	Estimated Flow (above confluence with Los Pinos Creek)
January	1.87 cfs
February	1.8 cfs
March	2.26 cfs
April	7.06 cfs
May	26.9 cfs
June	37.2 cfs
July	17.6 cfs
August	6.93 cfs
September	6.35 cfs
October	3.87 cfs
November	3.59 cfs
December	2.47 cfs

The only water right within the proposed reach is the Weminuche Pass Ditch. Records indicate that diversions average 4 to 13 cfs depending on the month. Some years the ditch is only operable during runoff (approximately June through July) because of downstream senior calling rights. On above average years, water is again diverted in September or October depending on water availability. Maximum diversions are approximately 33 cfs in the month of June, although embankment failures have limited diversions in recent years. Diversions are ultimately stored in Rio Grande Reservoir, and released to supplement historically irrigated lands below the reservoir for wildlife benefits in Water Division 3.

Final Biological Flow Recommendation

CPW's analysis indicates that the following flow rates are needed to protect the natural environment to a reasonable degree, and that water is available to meet these flow recommendations:

- Summer Flow Recommendation: 2.8 cfs (May 1 through October 31)
    - Maintains adequate depth, velocity, and wetted perimeter during the summer period when fish are most active.
- Baseflow Recommendation: 1.2 cfs (November 1 through April 30)

- Maintains available habitat and allows fish movement during the overwintering period.

The purpose of this letter is to formally transmit this ISF recommendation to CWCB for their Board's consideration. Based on CPW's opinion that there is a flow-dependent natural environment in Rincon La Vaca Creek, this stream can be preserved to a reasonable degree with an ISF water right in the recommended rates. Regional CPW staff have committed to bypassing the summer ISF rate of 2.8 cfs at the Weminuche Pass Ditch as soon as it is accessible in the spring. This practice will be memorialized through CPW's special use permit authorization with the USFS and through the instream flow water right. Please refer to attachments which include; R2Cross field forms, R2Cross output, photographs of fish observed in Rincon La Vaca Creek in 2020, photographs at 2020 cross section locations, and the USFS fisheries analysis summary.

CPW personnel will be available at the January 2021 CWCB meeting to answer any questions that the Board might have regarding these flow recommendations. We appreciate your consideration.

Sincerely,

Katie Birch

Katie Birch
CPW Instream Flow Program Coordinator
Attachments (as stated)

FISHERIES ANALYSIS OF RINCON LA VACA CREEK September 18, 2014

Summary

A Hydrologist Analysis of the Weminuche Pass and Pine River Weminuche Pass Ditches indicated that the 40 cubic feet per second (cfs) water right for the Weminuche Pass Ditch was sufficient to dewater Rincon La Vaca Creek during the period of use for the ditch. As a known fish bearing stream it is necessary to assess if the aquatic habitat standard (Standard 2.5.18) in the Final San Juan National Forest Land and Resource Management Plan of 2013 is being met in Rincon La Vaca before issuing a Ditch Bill Easement for the Ditch. Data collected on 09/11/2014 indicates that a minimum of 2.11 cfs be maintained in Rincon La Vaca Creek below the Weminuche Pass Ditch diversion to support Standard 2.5.18. Due to precision limitations of the diversion structure and the quality of habitat in Rincon La Vaca Creek, I recommend that a minimum of 2.0 cfs be maintained in Rincon La Vaca Creek at all times. Both the bankfull indicator and the self-sustaining fish population in Rincon La Vaca Creek suggest that the aquatic habitat standard is being met during periods of operation for the Weminuche Pass Ditch. I recommend that discharge data be collected in Rincon La Vaca Creek in the spring of 2015 to verify this assumption.

Background

Rincon La Vaca Creek is located in Hinsdale County at the northern boundary of the San Juan National Forest and is contained entirely within the Weminuche Wilderness. The watershed is approximately 4,500 acres in size and drains water from over 13,800 feet in elevation to approximately 10,500 feet at the confluence with Los Pinos River. Rincon La Vaca is approximately 4.5 miles in length from the headwaters to the confluence with Los Pinos River; it is unlikely that the upper reaches of Rincon La Vaca support fish populations due to the high elevation and steep terrain.

The Weminuche Pass Ditch (aka Raber Lohr) diverts water from Rincon La Vaca Creek at an elevation of approximately 10,600 feet and affects approximately 0.6 miles of the lower reaches of Rincon La Vaca Creek. Based on field observations, the lower reaches of Rincon La Vaca Creek contain the most suitable habitat for fish populations due to the lower gradient and meandering nature of this stream reach when compared to the headwater reaches. Multiple age classes of fish including young of year fish were observed during a recent field visit suggesting that natural fish recruitment is occurring in the lower reaches of Rincon La Vaca. No fish surveys were conducted during the field visit but the fish population in Rincon La Vaca appeared robust at the time of the field visit with no signs of impacts due to water withdrawals from the creek.

The water right for the Weminuche Pass Ditch is for 40 cfs as noted in the Hydrologist Analysis of Weminuche Pass and Pine River Weminuche Pass Ditches. Also noted in the Hydrologist Analysis is that Rincon La Vaca rarely flows 40 cfs, even during spring runoff. The diversion of water to Weminuche Pass Ditch is subject to call for senior water rights downstream which typically limits diversion to spring runoff season ending in late June or early July on the average year. On high water years, water is again diverted in September or October based on water availability. Regardless of the actual season of use for the Weminuche Pass Ditch, the potential remains that the ditch dewaters Rincon La Vaca below the diversion during the period of use for the ditch. There is no Colorado Water Conservation Board

Instream Flow water right on Rincon La Vaca or on the Los Pinos River in the immediate vicinity of the confluence with Rincon La Vaca that would require that water remain in the creek.

The aquatic habitat standard (Standard 2.5.18) in the Final San Juan National Forest Land and Resource Management Plan of 2013 requires that "where native or desired non-native fish species occur a minimum level of aquatic habitat shall be maintained by identifying the minimum flow rates required to support that habitat". The presence of a naturally reproducing fish population below the Weminuche Pass Ditch diversion in Rincon La Vaca Creek and a water right sufficient to dewater the creek during the season of use for the ditch supports the need to assess the minimum level of aquatic habitat necessary to meet Standard 2.5.18.

Data Collection and Analysis

On September 11, 2014 data was collected on Rincon La Vaca Creek to determine the minimum amount of water necessary to meet the aquatic habitat standard. Weminuche Pass Ditch was not flowing at the time the field work was completed. The field work consisted of collecting data in three riffle habitats using the R2CROSS methodology in Rincon La Vaca Creek below the diversion of Weminuche Pass Ditch (Figure 1). The collected data is also sufficient for analysis using WinXSPro software. Both R2CROSS and WinXSPro software were utilized to analyze the cross section data and provide the determination to meet Standard 2.5.18 in Rincon La Vaca Creek.

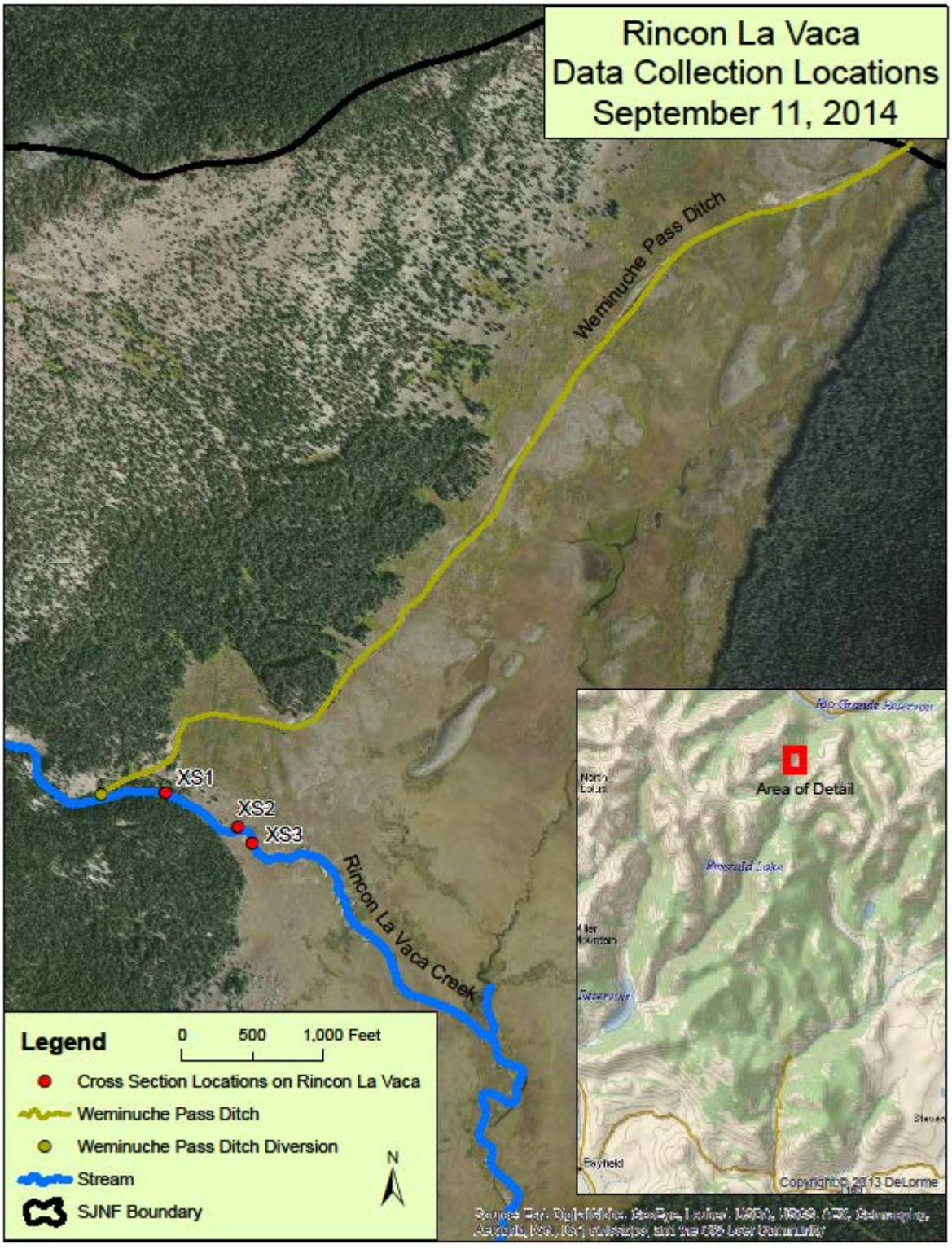


Figure 1. Map depicting Rincon La Vaca Creek, Weminuche Pass Ditch and Diversion, and the three selected cross section locations for data collection and analysis.

Cross section 1 was located in the first riffle habitat located below the diversion. This site was chosen primarily because of its close proximity to the Weminuche Pass Ditch diversion. While the site exhibited laminar flow the bankfull indicator was not well defined on either bank and the riffle habitat was very small in length when compared to the other two cross section locations. Upon analysis of the collected data, it was also noted that the slope of this site was much steeper than the other two cross section locations. It was deemed that the lack of a bankfull indicator significantly reduced the confidence of the collected data at this site and therefore the data should not be utilized to determine the minimum amount of water necessary to meet Standard 2.5.18 of the current Forest Plan. Data from cross section 1 is not included in this analysis.

The data collected at cross section 2 indicates that 2.11 cfs should be maintained in Rincon La Vaca creek to meet Standard 2.5.18 of the Forest Plan. The measured discharge at this location was 3.91 cfs, the local slope collected at the hydraulic control points for the low gradient riffle habitat was calculated at 0.00321932 (ft/ft), the cross sectional area was calculated at 3.09 square feet, and the hydraulic radius was calculated 0.36 feet at the water surface. This information was used to back-calculate Manning's roughness coefficient (n) at 0.0336 for cross section 2. R2CROSS and WinXSPro software was used to analyze the data and extrapolate mean depth, wetter perimeter, and mean velocity at increments of 0.05 feet in R2CROSS and 0.01 feet in WinXSPro to assess at what discharge the aquatic habitat standard is met. Table 1 displays the specific metrics that meet the aquatic habitat standard using both software programs. The complete datasets for cross section 2 are retained in the project file at the Columbine Ranger District and are available for review by request.

Table 1. Results of the data collected at Cross Section 2 for both R2CROSS and WinXSPro at the minimum flow necessary to meet Standard 2.5.18. The average velocity of 1.00 feet per second is the limiting metric to meet the Standard 2.5.18 of the Forest Plan. The difference in the values from R2CROSS and WinXSPro are due to the more precise data analysis available in the WinXSPro software with the ability to display data in increments of 0.01 feet.

Results at Cross Section 2		
R2CROSS Data Analysis at 2.11 c.f.s.		
Average Depth (ft.)	Percent Wetted Perimeter	Average Velocity (ft./sec.)
0.27	85%	1.00
WinXSPro Data Analysis at 2.22 c.f.s.		
Average Depth (ft.)	Percent Wetted Perimeter	Average Velocity (ft./sec.)
0.28	85%	1.00
Minimum stream habitat necessary to meet Standard 2.5.18		
Average Depth (ft.)	Percent Wetted Perimeter	Average Velocity (ft./sec.)
≥ 0.2	50%	1.00

The data collected at cross section 3 indicates that 2.18 cfs should be maintained in Rincon La Vaca creek to meet Standard 2.5.18 of the Forest Plan. The measured discharge at this location was 3.90 cfs, the local slope collected at the hydraulic control points for the low gradient riffle habitat was calculated at 0.00720165 (ft/ft), the cross sectional area was calculated at 3.32 square feet, and the hydraulic radius was calculated 0.38 feet at the water surface. This information was used to back-calculate Manning's

roughness coefficient (n) at 0.0565 for cross section 3. R2CROSS and WinXSPro software was used to analyze the data and extrapolate mean depth, wetter perimeter, and mean velocity at increments of 0.05 feet in R2CROSS and 0.01 feet in WinXSPro to assess at what discharge the aquatic habitat standard is met. The complete datasets for cross section 3 are retained in the project file at the Columbine Ranger District and are available for review by request.

Table 2. Results of the data collected at Cross Section 3 for both R2CROSS and WinXSPro at the minimum flow necessary to meet Standard 2.5.18. Full results for Cross Section 3 are displayed in Appendix D for R2CROSS and Appendix E for WinXSPro. The average velocity of 1.00 feet per second is the limiting metric to meet the Standard 2.5.18 of the Forest Plan. The difference in the values from R2CROSS and WinXSPro are due to the more precise data analysis available in the WinXSPro software with the ability to display data in increments of 0.01 feet.

Results at Cross Section 3		
R2CROSS Data Analysis at 2.365 c.f.s.		
Average Depth (ft.)	Percent Wetted Perimeter	Average Velocity (ft./sec.)
0.32	70%	1.00
WinXSPro Data Analysis at 2.18 c.f.s.		
Average Depth (ft.)	Percent Wetted Perimeter	Average Velocity (ft./sec.)
0.32	66%	1.00
Minimum stream habitat necessary to meet Standard 2.5.18		
Average Depth (ft.)	Percent Wetted Perimeter	Average Velocity (ft./sec.)
≥ 0.2	50%	1.00

Final Recommendation

The minimum amount of water necessary to meet Standard 2.5.18 in Rincon La Vaca Creek is 2.11 cfs supported by the data collected on 09/11/2014. Based on the available habitat in Rincon La Vaca Creek and limitations with small increments of adjustment in the diversion structure, I recommend that a minimum of 2.0 cfs be maintained in Rincon La Vaca Creek at all times.

The bankfull indicator at the time the data was collected is most likely created when the Weminuche Pass Ditch is in operation suggesting that the aquatic habitat standard is being met during the period of operation of Weminuche Pass Ditch. The field observed self-sustaining fish population in Rincon La Vaca Creek also suggests that the aquatic habitat standard is being met in Rincon La Vaca during periods of operation of Weminuche Pass Ditch. I highly recommend that additional field data is collected during the season of use in mid to late June of 2015 to confirm these assumptions.

Clay Kampf
Fisheries Biologist
San Juan National Forest

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Rincon la Vaca					CROSS-SECTION NO.: 1(5)	
CROSS-SECTION LOCATION: in Meadow DS of diversion						
DATE: 9/29/20	OBSERVERS: KS LFS KB RU					
LEGAL DESCRIPTION	¼ SECTION:	SECTION:	TOWNSHIP: N/S	RANGE: E/W	PM:	
COUNTY:	WATERSHED: LOS PINOS		WATER DIVISION: 7		DOW WATER CODE:	
MAP(S): USGS:	13S 294284					
USFS:	4171382					

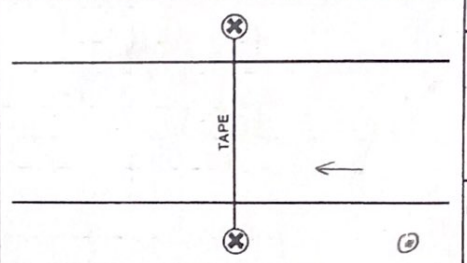
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES (NO)	METER TYPE: Flow tracker 2 "Rincon LV-01" measurred 300 yds d/s			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: ____ lbs/foot	TAPE TENSION: ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: Large Cobble - Sand	PHOTOGRAPHS TAKEN: (YES)/NO	NUMBER OF PHOTOGRAPHS: KS		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	* 5.72
⊗ Tape @ Stake RB	0.0	* 5.71
① WS @ Tape LB/RB	0.0	
② WS Upstream	⊛	← 5.44 @ 26ft US
③ WS Downstream	⊛	← 5.99 @ 15.3ft DS
SLOPE		1.39%

SKETCH



LEGEND:
- Stake ⊗
- Station ①
- Photo ◇①→
- Direction of Flow ←→

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO	DISTANCE ELECTROFISHED: ____ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/NO

LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)

SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:

COMMENTS

Calm flow, some standing waves @ top/bottom of riffle. Even flow in cross-section. 3 large fish spotted, stone flies, cased caddis, mayflies, bryophyte.

Good riparian connectivity to floodplain. Wide wet meadow w/ little bank erosion. Some island formation

FORM #ISF FD 1-85

Q-27539

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Rincon La Vaca | CROSS-SECTION NO.: \ | DATE: 9/29/20 | SHEET 2 OF 2

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM: (0.0 AT STAKE) LEFT / RIGHT | Gage Reading: ____ ft | TIME: 10:22 AM

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft) LB	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
S	0		4.66								
	1.65		4.72								
	2.40		4.90								
BF	5.20		4.80								
	5.76		4.98								
	6.30		5.10								
	7.00		5.29								
	7.65		5.40								
	8.30		5.50								
WS	9.20		5.72	0							
	9.7		5.90	0.12							
	10.1		6.0	0.26							
	10.5		5.97	0.22							
	10.9		6.01	0.26							
	11.3		6.03	0.30							
	11.7		6.01	0.31							
	12.1		6.07	0.36							
	12.5		6.09	0.40							
	12.9		6.04	0.34							
	13.3		6.05	0.32							
	13.7		5.96	0.31							
	14.1		6.05	0.38							
	14.5		6.06	0.39							
	14.9		6.13	0.44							
	15.3		6.15	0.51							
	15.7		6.10	0.46							
	16.1		6.15	0.49							
	16.5		6.13	0.45							
	16.9		6.01	0.32							
	17.3		5.85	0.13							
WS	17.7		5.71	0							
	18.1		5.40								
	18.7		5.19								
	19.4		4.96								
BF	19.9		4.83								
	20.9		4.70								
S	22.46		4.30								
TOTALS:											2.75

End of Measurement | Time: | Gage Reading: ____ ft | CALCULATIONS PERFORMED BY: | CALCULATIONS CHECKED BY:

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Rincon La Vaca						CROSS-SECTION NO.: 2(4)
CROSS-SECTION LOCATION: in higher gradient section d/s of Wenimuche Pass Ditch						
DATE: 9/29/20	OBSERVERS: KB KS LS RH					
LEGAL DESCRIPTION	¼ SECTION:	SECTION:	TOWNSHIP: N/S	RANGE: E/W	PM:	
COUNTY:	WATERSHED: Pinos		WATER DIVISION: 7		DOW WATER CODE:	
MAP(S): USGS: UTM 13S 294155						
USFS: 4171489						

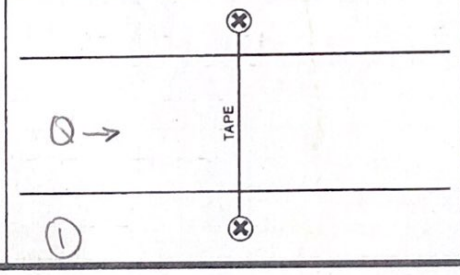
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / (NO)	METER TYPE:			
METER NUMBER:	DATE RATED:	CALIB/SPIN: ____ sec	TAPE WEIGHT: ____ lbs/foot	TAPE TENSION: ____ lbs
CHANNEL BED MATERIAL SIZE RANGE: gravel to large cobble	PHOTOGRAPHS TAKEN: (YES)/NO	NUMBER OF PHOTOGRAPHS: KB		

CHANNEL PROFILE DATA

STATION	DISTANCE FROM TAPE (ft)	ROD READING (ft)
⊗ Tape @ Stake LB	0.0	
⊗ Tape @ Stake RB	0.0	
① WS @ Tape LB/RB	0.0	6.61 / 6.63
② WS Upstream		6.60 @ 3.3 ft US
③ WS Downstream		6.85 @ 7.5 ft DS
SLOPE	2.390	

SKETCH



LEGEND:
- Stake ⊗
- Station ①
- Photo ①→
- Direction of Flow

AQUATIC SAMPLING SUMMARY

STREAM ELECTROFISHED: YES/NO	DISTANCE ELECTROFISHED: ____ ft	FISH CAUGHT: YES/NO	WATER CHEMISTRY SAMPLED: YES/NO

LENGTH - FREQUENCY DISTRIBUTION BY ONE-INCH SIZE GROUPS (1.0-1.9, 2.0-2.9, ETC.)

SPECIES (FILL IN)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	>15	TOTAL

AQUATIC INSECTS IN STREAM SECTION BY COMMON OR SCIENTIFIC ORDER NAME:

COMMENTS

Forested higher gradient XS u/s of XS 1. Q = 3.4337

Good habitat. Long runs w/ undercut banks & rip. cover. Large pools in high gradient section.

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Rincon La Vaca	CROSS-SECTION NO.: 2	DATE: 9/20	SHEET 2 OF 2
BEGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM: LEFT / RIGHT (0.0 AT STAKE)	Gage Reading: ____ ft	TIME: 11:30 AM

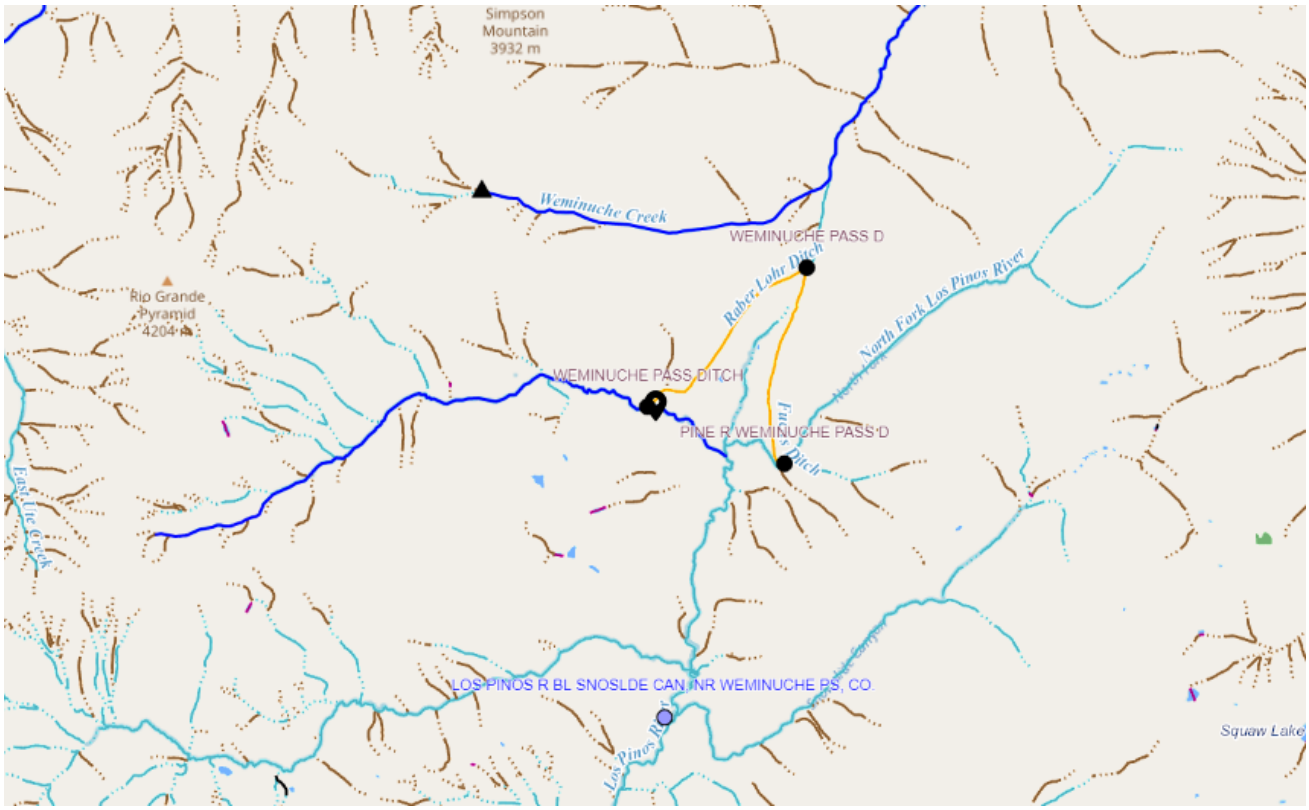
Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft) (LB)	Width (ft)	Total Vertical Depth From Tape/Inst (ft)	Water Depth (ft)	Depth of Observation (ft)	Revolutions	Time (sec)	Velocity (ft/sec) At Point	Velocity (ft/sec) Mean in Vertical	Area (ft^2)	Discharge (cfs)
S	0		5.37								
	0.8		5.69								
	1.2		5.97								
BF	1.5		6.17								
WS	1.7		6.61	0							
	1.7		6.90	0.3							
	2.0		6.95	0.35							
	2.5		6.93	0.35							
	3.0		6.95	0.35							
	3.5		6.99	0.4							
	4.0		7.07	0.53							
	4.5		7.03	0.45							
	5.0		7.00	0.4							
	5.5		7.01	0.42							
	6.0		6.98	0.4							
	6.5		6.97	0.41							
	7.0		6.96	0.4							
	7.5		7.05	0.5							
	8.0		6.92	0.35							
	8.5		6.98	0.4							
	9.0		6.87	0.3							
	9.5		6.75	0.16							
	10.0		6.77	0.2							
	10.5		6.81	0.25							
	11.0		6.83	0.3							
	11.5		6.66	0.1							
WS	12.0		6.63	0							
	12.5		6.50								
	13.9		6.40								
BF	15.0		6.18								
	15.5		5.84								
S	17.5		5.19								
TOTALS:											

End of Measurement	Time:	Gage Reading: ____ ft	CALCULATIONS PERFORMED BY:	CALCULATIONS CHECKED BY:

R2Cross RESULTS

Stream Name: Rincon La Vaca
Stream Locations: First XS Below Raber Lohr Ditch
Fieldwork Date: 09/11/2014
Cross-section: 1
Observers: Kampf Herchmer Straub
Coordinate System: UTM Zone 13
X (easting): 294092
Y (northing): 4171542
Date Processed: 01/14/2021
Slope: 0.018
Computation method: Manning's n
R2Cross data filename: R2CrossData_RinconLV_9-11-2014-1.xlsx
R2Cross version: 1.1.17

LOCATION



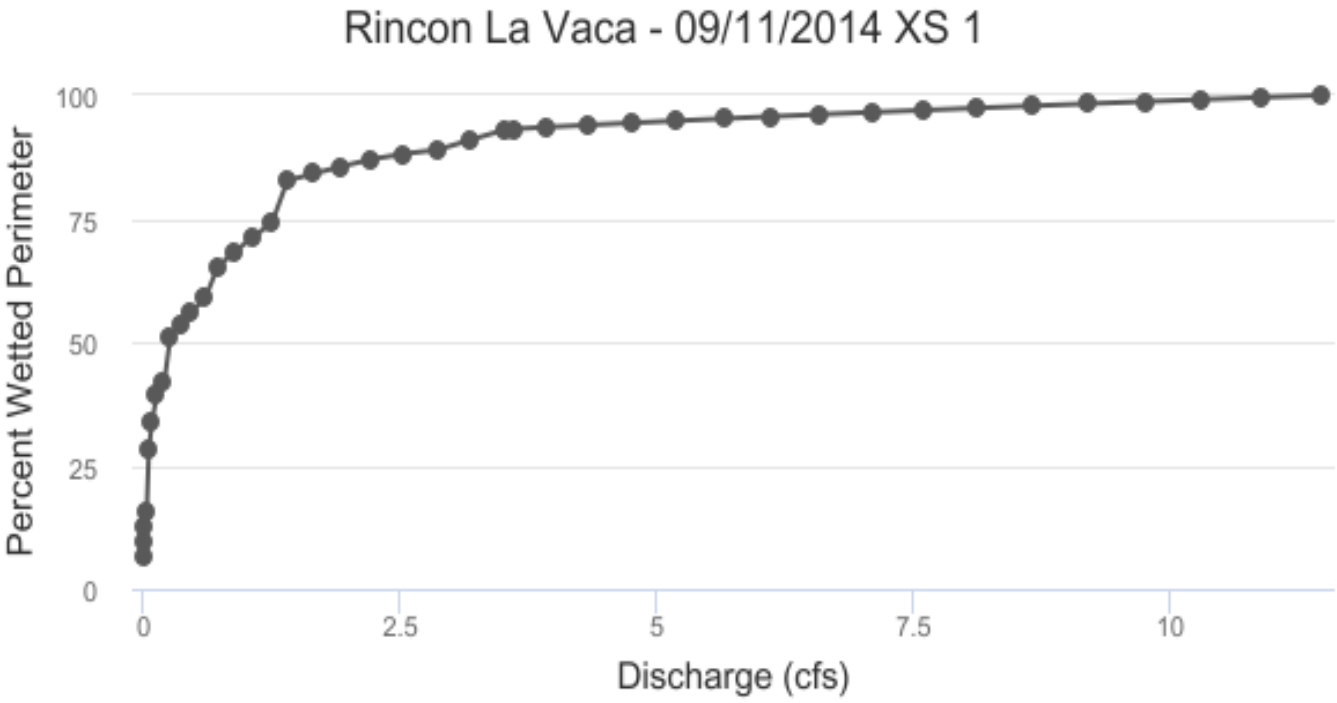
ANALYSIS RESULTS

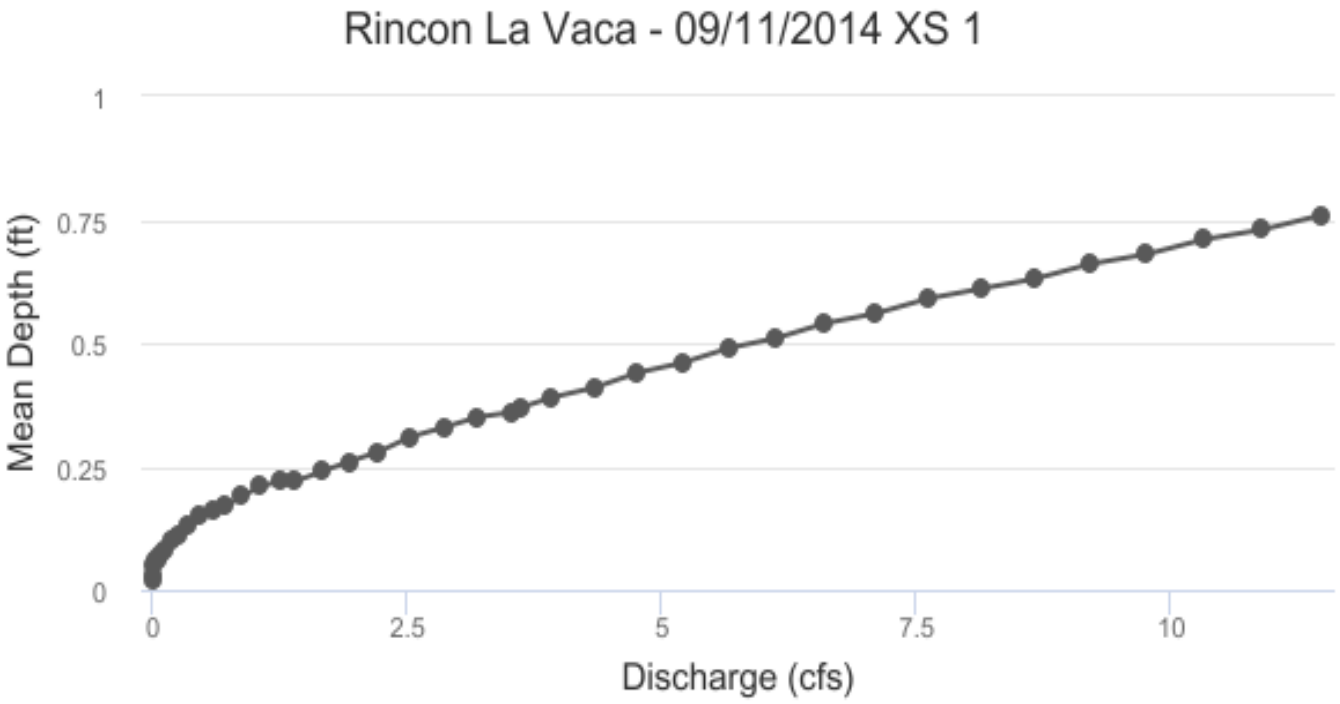
Habitat Criteria Results

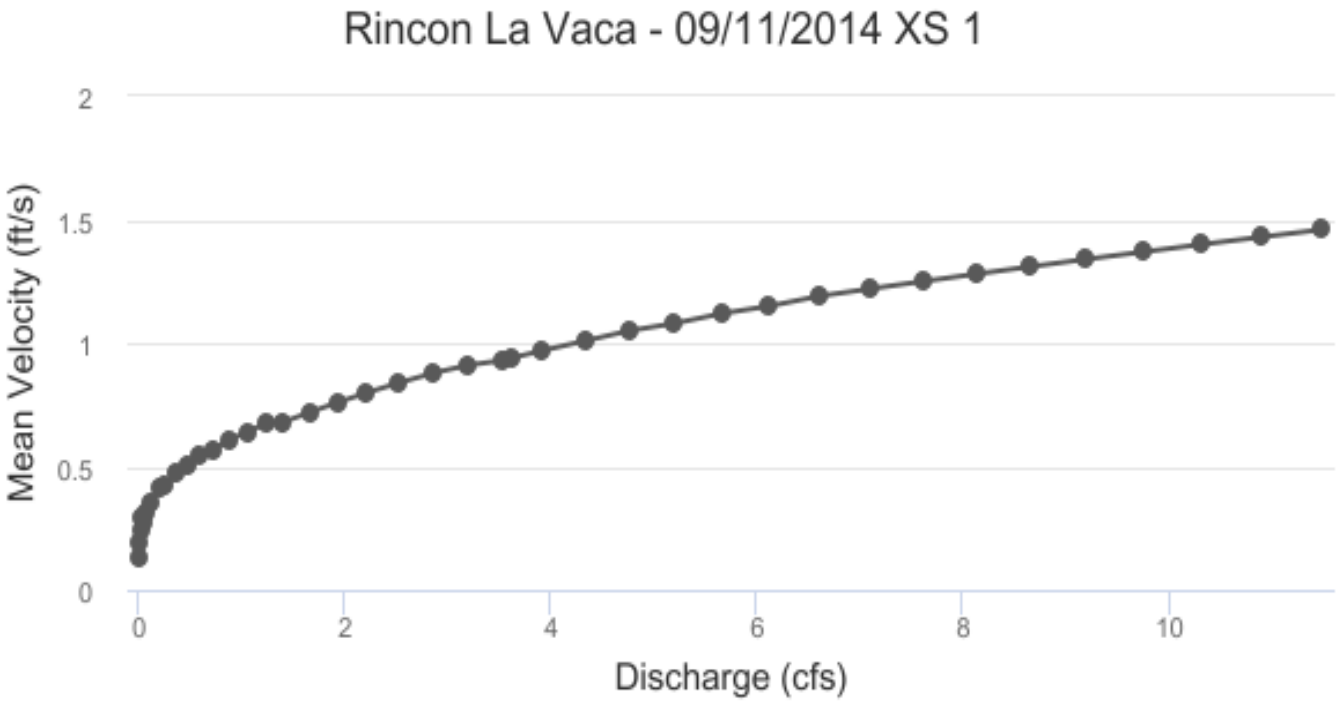
Bankfull top width (ft) = 10.45

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft) **	0.2	1.0
Percent Wetted Perimeter (%) **	50.0	0.26
Mean Velocity (ft/s)	1.0	4.22

**Values highlighted in yellow indicate that the discharge is less than 40% of measured Q or greater than 250% of measured Q.




Rincon La Vaca - 09/11/2014 XS 1
Mean Depth (ft)
1
0.75
0.5
0.25
0
0
2.5
5
7.5
10
Discharge (cfs)


Rincon La Vaca - 09/11/2014 XS 1
Mean Velocity (ft/s)
2
1.5
1
0.5
0
0
2
4
6
8
10
Discharge (cfs)

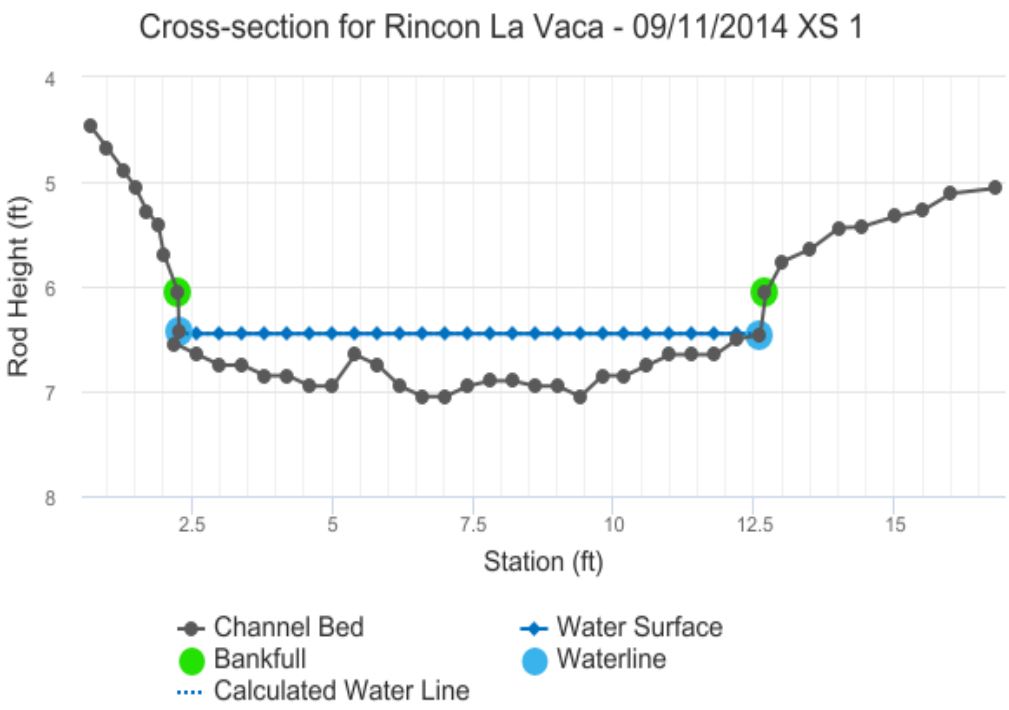
STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (SQ ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	6.06	10.45	0.76	0.99	7.89	11.67	100.00%	0.68	1.46	11.49
	6.08	10.44	0.73	0.97	7.63	11.62	99.57%	0.66	1.43	10.9
	6.11	10.43	0.71	0.94	7.37	11.57	99.14%	0.64	1.4	10.32
	6.13	10.43	0.68	0.92	7.12	11.52	98.71%	0.62	1.37	9.76
	6.16	10.42	0.66	0.89	6.86	11.47	98.28%	0.6	1.34	9.2
	6.18	10.41	0.63	0.87	6.6	11.42	97.85%	0.58	1.31	8.66
	6.21	10.4	0.61	0.84	6.34	11.37	97.41%	0.56	1.28	8.13
	6.23	10.4	0.59	0.82	6.08	11.32	96.98%	0.54	1.25	7.61
	6.26	10.39	0.56	0.79	5.83	11.27	96.55%	0.52	1.22	7.1
	6.28	10.38	0.54	0.77	5.57	11.22	96.12%	0.5	1.19	6.6
	6.31	10.37	0.51	0.74	5.31	11.17	95.69%	0.48	1.15	6.12
	6.33	10.37	0.49	0.72	5.06	11.12	95.26%	0.45	1.12	5.66
	6.36	10.36	0.46	0.69	4.8	11.07	94.83%	0.43	1.08	5.2
	6.38	10.35	0.44	0.67	4.54	11.02	94.40%	0.41	1.05	4.76
	6.41	10.34	0.41	0.64	4.29	10.97	93.97%	0.39	1.01	4.34
	6.43	10.34	0.39	0.62	4.03	10.92	93.53%	0.37	0.97	3.92
Waterline	6.45	10.34	0.37	0.6	3.84	10.88	93.18%	0.35	0.94	3.62
	6.46	10.35	0.36	0.59	3.78	10.86	93.07%	0.35	0.93	3.53
	6.48	10.15	0.35	0.57	3.52	10.62	91.00%	0.33	0.91	3.19
	6.51	9.96	0.33	0.54	3.27	10.38	88.96%	0.32	0.88	2.87
	6.53	9.91	0.31	0.52	3.03	10.28	88.11%	0.29	0.84	2.53
	6.55	9.82	0.28	0.49	2.78	10.16	87.02%	0.27	0.8	2.22
	6.58	9.65	0.26	0.47	2.54	9.99	85.58%	0.25	0.76	1.93
	6.6	9.49	0.24	0.45	2.31	9.82	84.14%	0.23	0.72	1.66
	6.63	9.33	0.22	0.42	2.07	9.65	82.70%	0.21	0.68	1.4

	6.65	8.35	0.22	0.4	1.85	8.66	74.16%	0.21	0.68	1.25
	6.68	8.02	0.21	0.37	1.64	8.31	71.18%	0.2	0.64	1.06
	6.7	7.69	0.19	0.35	1.45	7.96	68.20%	0.18	0.61	0.88
	6.73	7.36	0.17	0.32	1.26	7.61	65.23%	0.17	0.57	0.72
	6.75	6.63	0.16	0.3	1.09	6.87	58.87%	0.16	0.55	0.6
	6.78	6.35	0.15	0.27	0.93	6.57	56.30%	0.14	0.51	0.47
	6.8	6.07	0.13	0.25	0.77	6.27	53.72%	0.12	0.47	0.36
	6.83	5.79	0.11	0.22	0.63	5.97	51.14%	0.1	0.42	0.26
	6.85	4.71	0.1	0.2	0.49	4.87	41.75%	0.1	0.41	0.2
	6.88	4.48	0.08	0.17	0.37	4.62	39.57%	0.08	0.35	0.13
	6.9	3.83	0.07	0.15	0.27	3.94	33.76%	0.07	0.31	0.08
	6.93	3.2	0.06	0.12	0.18	3.29	28.16%	0.05	0.27	0.05
	6.95	1.79	0.06	0.1	0.11	1.85	15.82%	0.06	0.29	0.03
	6.98	1.44	0.05	0.07	0.07	1.48	12.72%	0.05	0.24	0.02
	7.0	1.09	0.03	0.05	0.04	1.12	9.62%	0.03	0.19	0.01
	7.03	0.75	0.02	0.02	0.01	0.76	6.52%	0.02	0.13	0.0

MODEL SUMMARY

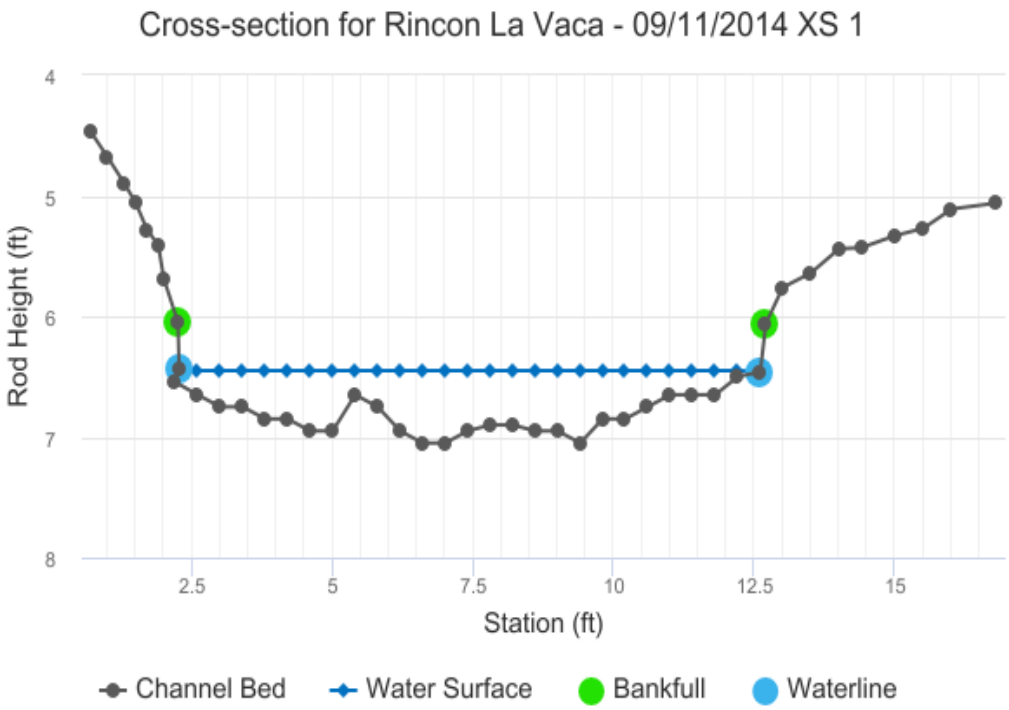
Measured Flow (Qm) =	3.62
Calculated Flow (Qc) =	3.62
(Qm-Qc)/Qm * 100 =	-0.10%
Measured Waterline (WLm) =	6.45
Calculated Waterline (WLc) =	6.45
(WLm-WLc)/WLm * 100 =	-0.08%
Max Measured Depth (Dm) =	0.6
Max Calculated Depth (Dc) =	0.6
(Dm-Dc)/Dm * 100 =	0.02%
Mean Velocity =	0.94
Manning's n =	0.105
0.4 * Qm =	1.45
2.5 * Qm =	9.05



FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0.7	4.47		
	1	4.68		
	1.3	4.9		
	1.5	5.06		
	1.7	5.28		
	1.9	5.41		
	2	5.69		
Bankfull	2.25	6.05		
Waterline	2.27	6.43	0	0
	2.2	6.545	0.1	0
	2.6	6.65	0.2	0.58
	3	6.75	0.3	0.34
	3.4	6.75	0.3	0.16
	3.8	6.85	0.4	0.95
	4.2	6.85	0.4	1.42
	4.6	6.95	0.5	0.35
	5	6.95	0.5	0.37
	5.4	6.65	0.2	1.37
	5.8	6.75	0.3	1.25
	6.2	6.95	0.5	1.32
	6.6	7.05	0.6	1.42
	7	7.05	0.6	1.12
	7.4	6.95	0.5	0.95
	7.8	6.9	0.45	1.18
	8.2	6.9	0.45	1.21
	8.6	6.95	0.5	0.89
	9	6.95	0.5	1.5
	9.4	7.05	0.6	1.63
	9.8	6.85	0.4	0.5
	10.2	6.85	0.4	0.13

	10.6	6.75	0.3	0.8
	11	6.65	0.2	0.82
	11.4	6.65	0.2	0.7
	11.8	6.65	0.2	0.6
	12.2	6.5	0.05	0
Waterline	12.6	6.46	0	0
Bankfull	12.7	6.06		
	13	5.76		
	13.5	5.64		
	14	5.44		
	14.4	5.43		
	15	5.33		
	15.5	5.27		
	16	5.11		
	16.8	5.06		



COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (SQ ft)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.13	0.1	0.02	0	0
0.41	0.2	0.08	0.05	1.28
0.41	0.3	0.12	0.04	1.13
0.4	0.3	0.12	0.02	0.53
0.41	0.4	0.16	0.15	4.2
0.4	0.4	0.16	0.23	6.28
0.41	0.5	0.2	0.07	1.93
0.4	0.5	0.2	0.07	2.04
0.5	0.2	0.08	0.11	3.03
0.41	0.3	0.12	0.15	4.14
0.45	0.5	0.2	0.26	7.3
0.41	0.6	0.24	0.34	9.42
0.4	0.6	0.24	0.27	7.43
0.41	0.5	0.2	0.19	5.25
0.4	0.45	0.18	0.21	5.87
0.4	0.45	0.18	0.22	6.02
0.4	0.5	0.2	0.18	4.92
0.4	0.5	0.2	0.3	8.29
0.41	0.6	0.24	0.39	10.81
0.45	0.4	0.16	0.08	2.21
0.4	0.4	0.16	0.02	0.57

0.41	0.3	0.12	0.1	2.65
0.41	0.2	0.08	0.07	1.81
0.4	0.2	0.08	0.06	1.55
0.4	0.2	0.08	0.05	1.33
0.43	0.05	0.02	0	0
0.4	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

DISCLAIMER

"The Colorado Water Conservation Board makes no representations about the use of the software contained in the R2Cross platform for any purpose besides that for which it was designed. To the maximum extent permitted by applicable law, all information, modeling results, and software are provided “as is” without warranty or condition of any kind, including all implied warranties or conditions of merchantability, or fitness for a particular purpose. The user assumes all responsibility for the accuracy and suitability of this program for a specific application. In no event shall the Colorado Water Conservation Board or any state agency, official or employee be liable for any direct, indirect, punitive, incidental, special, consequential damages or any damages whatsoever including, without limitation, damages for loss of use, data, profits, or savings arising from the implementation, reliance on, or use of or inability to use the R2Cross platform.

R2Cross RESULTS

Stream Name: Rincon La Vaca
Stream Locations: Second XS Below Raber Lohr Ditch
Fieldwork Date: 09/11/2014
Cross-section: 2
Observers: Kampf Herchmer Straub
Coordinate System: UTM Zone 13
X (easting): 294230
Y (northing): 4171449
Date Processed: 01/14/2021
Slope: 0.0032
Computation method: Manning's n
R2Cross data filename: R2CrossData_RinconLV_9-11-2014-2.xlsx
R2Cross version: 1.1.17

LOCATION

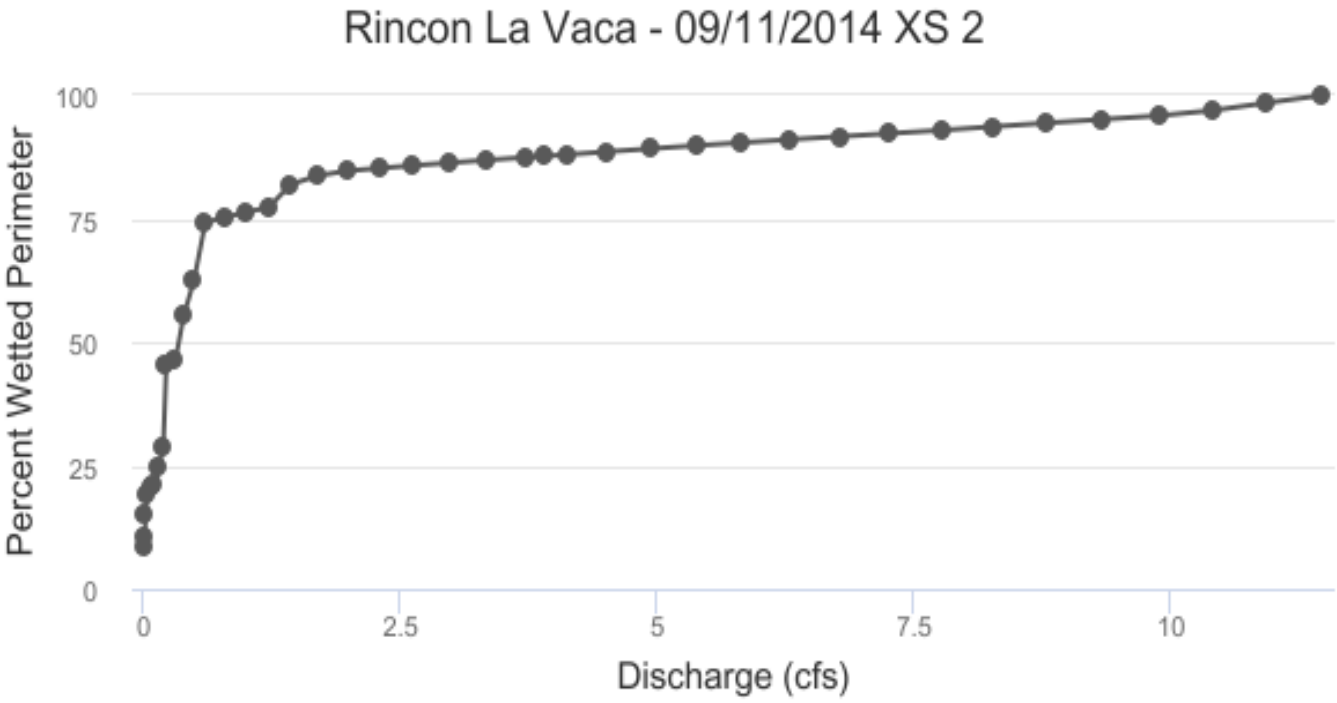
ANALYSIS RESULTS

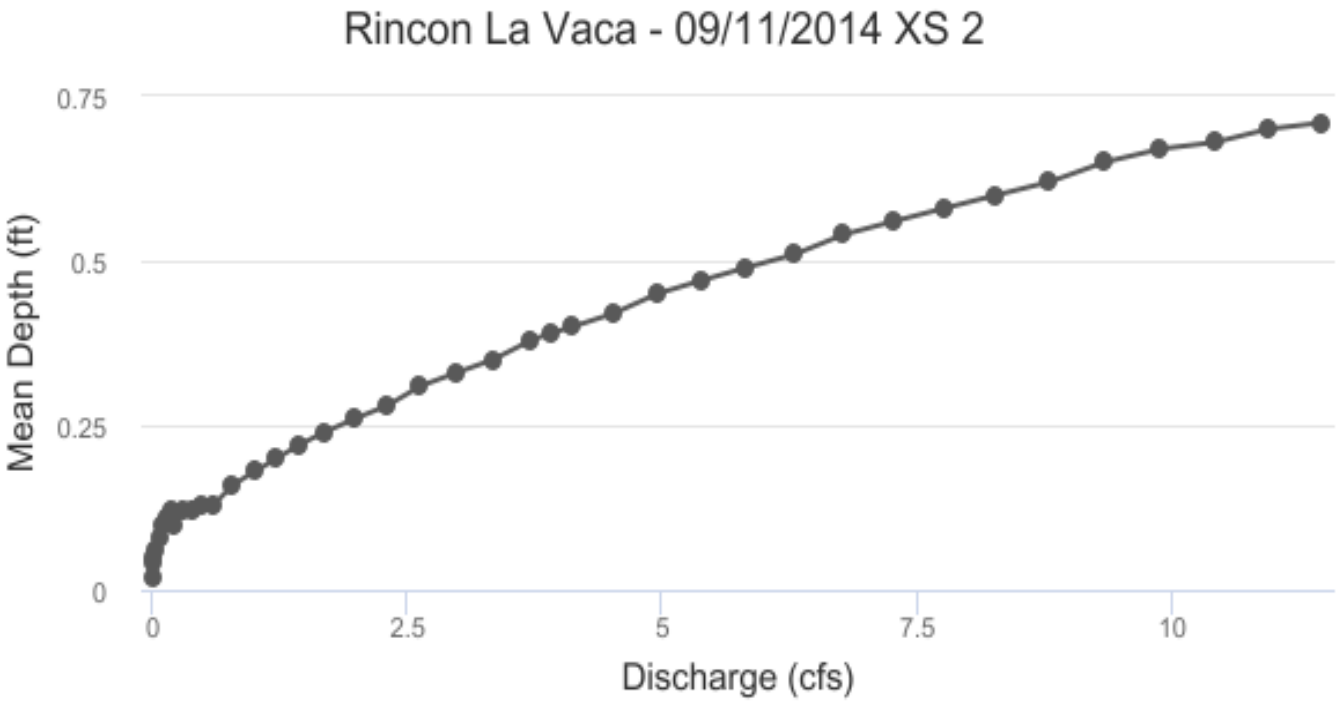
Habitat Criteria Results

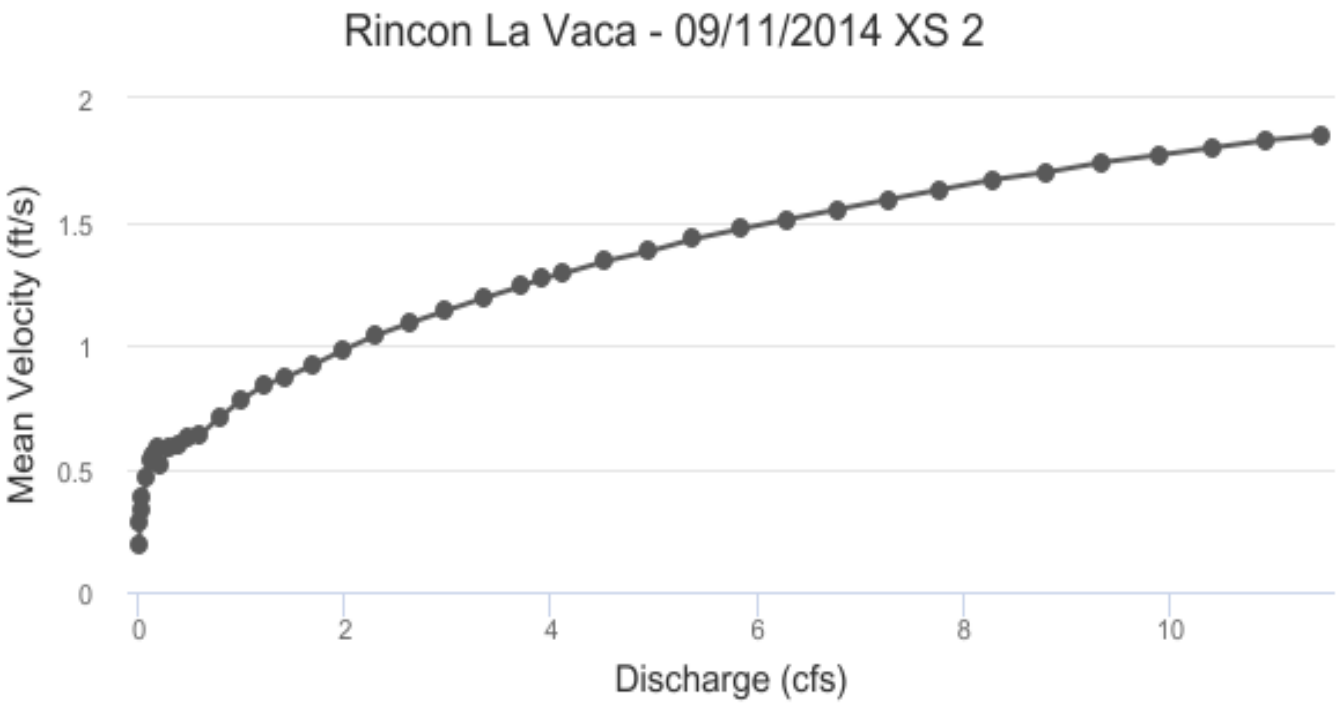
Bankfull top width (ft) = 8.7

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft) **	0.2	1.2
Percent Wetted Perimeter (%) **	50.0	0.34
Mean Velocity (ft/s)	1.0	2.1

**Values highlighted in yellow indicate that the discharge is less than 40% of measured Q or greater than 250% of measured Q.




Rincon La Vaca - 09/11/2014 XS 2
Mean Depth (ft)
0.75
0.5
0.25
0
0
2.5
5
7.5
10
Discharge (cfs)


Rincon La Vaca - 09/11/2014 XS 2
Mean Velocity (ft/s)
2
1.5
1
0.5
0
0
2
4
6
8
10
Discharge (cfs)

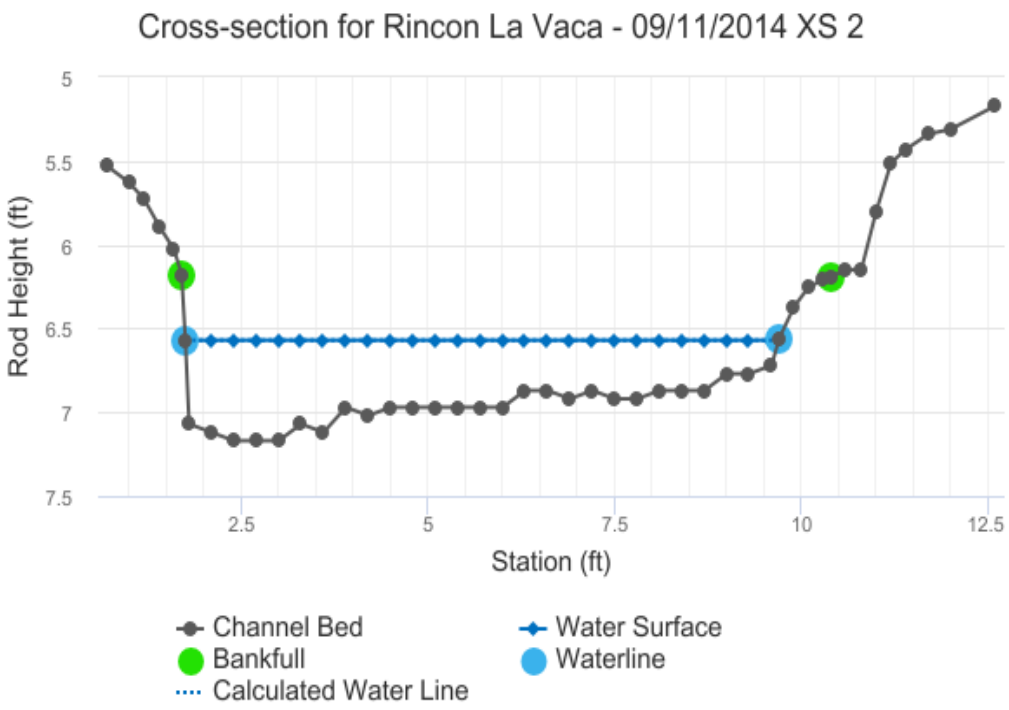
STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (SQ ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	6.19	8.7	0.71	0.98	6.21	9.81	100.00%	0.63	1.85	11.48
	6.21	8.57	0.7	0.96	5.99	9.67	98.48%	0.62	1.83	10.94
	6.24	8.45	0.68	0.93	5.79	9.52	96.95%	0.61	1.8	10.42
	6.26	8.37	0.67	0.91	5.58	9.41	95.86%	0.59	1.77	9.89
	6.29	8.32	0.65	0.88	5.38	9.34	95.12%	0.58	1.74	9.34
	6.31	8.28	0.62	0.86	5.17	9.26	94.39%	0.56	1.7	8.8
	6.34	8.23	0.6	0.83	4.97	9.19	93.65%	0.54	1.67	8.28
	6.36	8.19	0.58	0.81	4.77	9.12	92.91%	0.52	1.63	7.77
	6.39	8.16	0.56	0.78	4.57	9.05	92.26%	0.5	1.59	7.27
	6.41	8.13	0.54	0.76	4.37	8.99	91.64%	0.49	1.55	6.78
	6.43	8.1	0.51	0.73	4.17	8.93	91.03%	0.47	1.51	6.3
	6.46	8.07	0.49	0.71	3.97	8.87	90.41%	0.45	1.47	5.83
	6.48	8.04	0.47	0.69	3.77	8.81	89.80%	0.43	1.43	5.38
	6.51	8.01	0.45	0.66	3.58	8.75	89.19%	0.41	1.38	4.95
	6.53	7.98	0.42	0.64	3.38	8.69	88.57%	0.39	1.34	4.52
	6.56	7.95	0.4	0.61	3.19	8.63	87.96%	0.37	1.29	4.12
Waterline	6.57	7.94	0.39	0.6	3.09	8.6	87.67%	0.36	1.27	3.91
	6.58	7.94	0.38	0.59	2.99	8.58	87.41%	0.35	1.24	3.72
	6.61	7.92	0.35	0.56	2.8	8.53	86.86%	0.33	1.19	3.34
	6.63	7.9	0.33	0.54	2.6	8.47	86.31%	0.31	1.14	2.98
	6.66	7.88	0.31	0.51	2.41	8.42	85.77%	0.29	1.09	2.63
	6.68	7.86	0.28	0.49	2.22	8.36	85.22%	0.27	1.04	2.3
	6.7	7.85	0.26	0.47	2.03	8.31	84.68%	0.24	0.98	1.98
	6.73	7.78	0.24	0.44	1.83	8.21	83.68%	0.22	0.92	1.69
	6.75	7.63	0.22	0.42	1.64	8.04	81.91%	0.2	0.87	1.43

	6.78	7.21	0.2	0.39	1.46	7.59	77.33%	0.19	0.84	1.22
	6.8	7.13	0.18	0.37	1.29	7.49	76.29%	0.17	0.78	1.0
	6.83	7.05	0.16	0.34	1.11	7.39	75.25%	0.15	0.71	0.79
	6.85	6.98	0.13	0.32	0.94	7.28	74.21%	0.13	0.64	0.6
	6.88	5.86	0.13	0.29	0.78	6.14	62.51%	0.13	0.63	0.49
	6.9	5.19	0.12	0.27	0.64	5.44	55.39%	0.12	0.6	0.39
	6.92	4.35	0.12	0.24	0.52	4.56	46.46%	0.11	0.59	0.31
	6.95	4.27	0.1	0.22	0.42	4.46	45.42%	0.09	0.52	0.22
	6.97	2.65	0.12	0.2	0.32	2.81	28.64%	0.11	0.59	0.19
	7.0	2.31	0.11	0.17	0.26	2.43	24.80%	0.11	0.56	0.15
	7.02	2.0	0.1	0.15	0.21	2.09	21.32%	0.1	0.54	0.11
	7.05	1.95	0.08	0.12	0.16	2.01	20.51%	0.08	0.46	0.07
	7.07	1.87	0.06	0.1	0.11	1.91	19.41%	0.06	0.38	0.04
	7.1	1.45	0.05	0.07	0.07	1.48	15.03%	0.05	0.33	0.02
	7.12	1.04	0.04	0.05	0.04	1.05	10.73%	0.04	0.28	0.01
	7.15	0.82	0.02	0.02	0.02	0.83	8.42%	0.02	0.19	0.0

MODEL SUMMARY

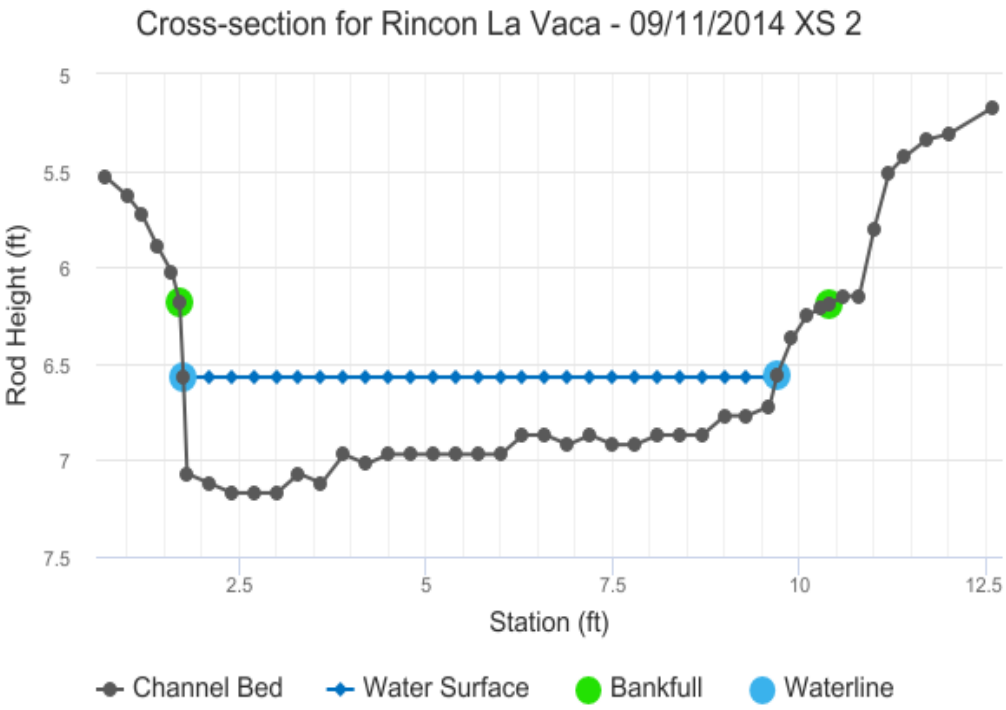
Measured Flow (Qm) =	3.91
Calculated Flow (Qc) =	3.91
(Qm-Qc)/Qm * 100 =	-0.08%
Measured Waterline (WLm) =	6.57
Calculated Waterline (WLc) =	6.57
(WLm-WLc)/WLm * 100 =	-0.08%
Max Measured Depth (Dm) =	0.6
Max Calculated Depth (Dc) =	0.6
(Dm-Dc)/Dm * 100 =	-0.01%
Mean Velocity =	1.27
Manning's n =	0.034
0.4 * Qm =	1.56
2.5 * Qm =	9.78



FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0.7	5.53		
	1	5.63		
	1.2	5.73		
	1.4	5.89		
	1.6	6.03		
Bankfull	1.7	6.18		
Waterline	1.75	6.57	0	0
	1.8	7.07	0.5	0.9
	2.1	7.12	0.55	1.03
	2.4	7.17	0.6	1.42
	2.7	7.17	0.6	1.44
	3	7.17	0.6	1.47
	3.3	7.07	0.5	1.64
	3.6	7.12	0.55	1.31
	3.9	6.97	0.4	1.64
	4.2	7.02	0.45	1.44
	4.5	6.97	0.4	1.23
	4.8	6.97	0.4	1.44
	5.1	6.97	0.4	1.34
	5.4	6.97	0.4	0.6
	5.7	6.97	0.4	0.75
	6	6.97	0.4	0.9
	6.3	6.87	0.3	1.15
	6.6	6.87	0.3	1.01
	6.9	6.92	0.35	1.57
	7.2	6.87	0.3	0.72
	7.5	6.92	0.35	1.06
	7.8	6.92	0.35	1.46
	8.1	6.87	0.3	1.38
	8.4	6.87	0.3	1.49

	8.7	6.87	0.3	1.59
	9	6.77	0.2	1.59
	9.3	6.77	0.2	1.35
	9.6	6.72	0.15	0.38
Waterline	9.7	6.56	0	0
	9.9	6.37		
	10.1	6.25		
	10.3	6.21		
Bankfull	10.4	6.19		
	10.6	6.15		
	10.8	6.15		
	11	5.8		
	11.2	5.51		
	11.4	5.43		
	11.7	5.34		
	12	5.31		
	12.6	5.17		



COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (SQ ft)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.5	0.5	0.09	0.08	2.01
0.3	0.55	0.17	0.17	4.35
0.3	0.6	0.18	0.26	6.54
0.3	0.6	0.18	0.26	6.63
0.3	0.6	0.18	0.26	6.77
0.32	0.5	0.15	0.25	6.29
0.3	0.55	0.17	0.22	5.53
0.34	0.4	0.12	0.2	5.03
0.3	0.45	0.14	0.19	4.97
0.3	0.4	0.12	0.15	3.77
0.3	0.4	0.12	0.17	4.42
0.3	0.4	0.12	0.16	4.11
0.3	0.4	0.12	0.07	1.84
0.3	0.4	0.12	0.09	2.3
0.3	0.4	0.12	0.11	2.76
0.32	0.3	0.09	0.1	2.65
0.3	0.3	0.09	0.09	2.33
0.3	0.35	0.1	0.16	4.22
0.3	0.3	0.09	0.06	1.66
0.3	0.35	0.1	0.11	2.85
0.3	0.35	0.1	0.15	3.92
0.3	0.3	0.09	0.12	3.18
0.3	0.3	0.09	0.13	3.43

0.3	0.3	0.09	0.14	3.66
0.32	0.2	0.06	0.1	2.44
0.3	0.2	0.06	0.08	2.07
0.3	0.15	0.03	0.01	0.29
0.19	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

DISCLAIMER

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R2Cross RESULTS

Stream Name: Rincon La Vaca
Stream Locations: Third XS Below Raber Lohr Ditch
Fieldwork Date: 09/11/2014
Cross-section: 1
Observers: Kampf Herchmer Straub
Coordinate System: UTM Zone 13
X (easting): 294260
Y (northing): 4171425
Date Processed: 01/14/2021
Slope: 0.0072
Computation method: Manning's n
R2Cross data filename: R2CrossData_RinconLV_9-11-2014-3.xlsx
R2Cross version: 1.1.17

LOCATION

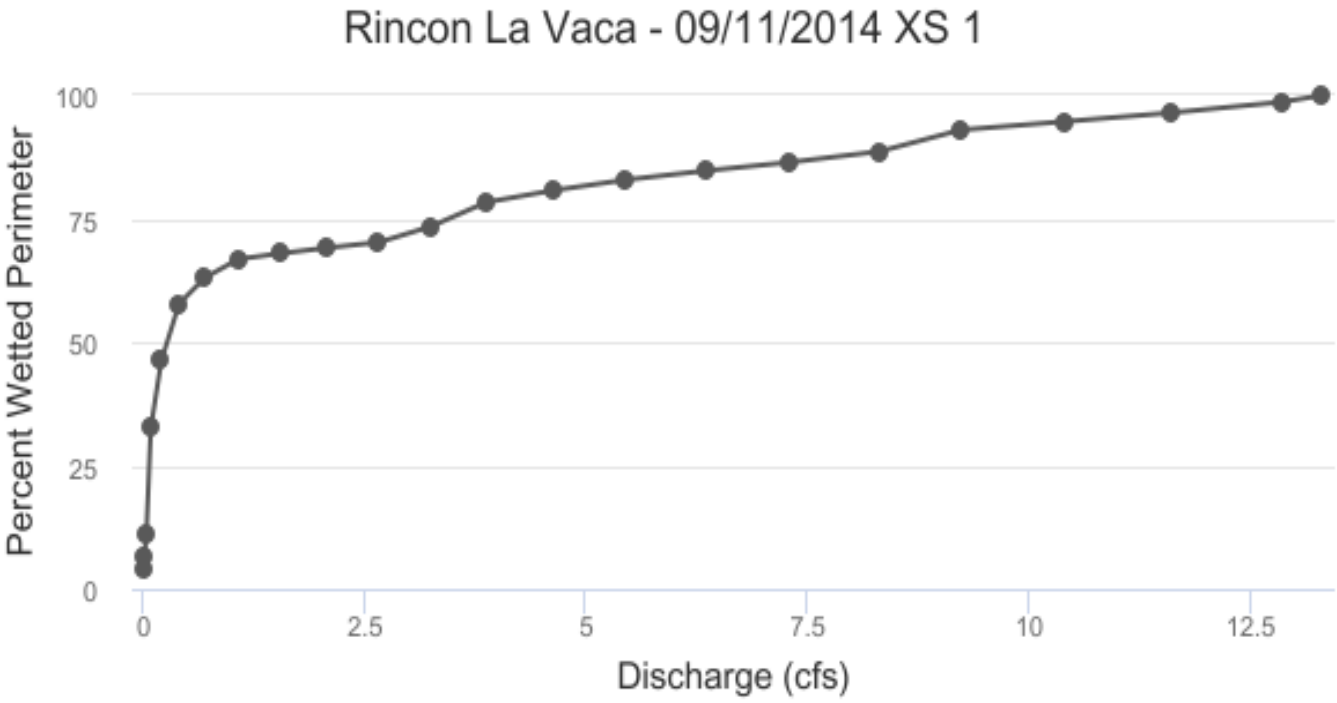
ANALYSIS RESULTS

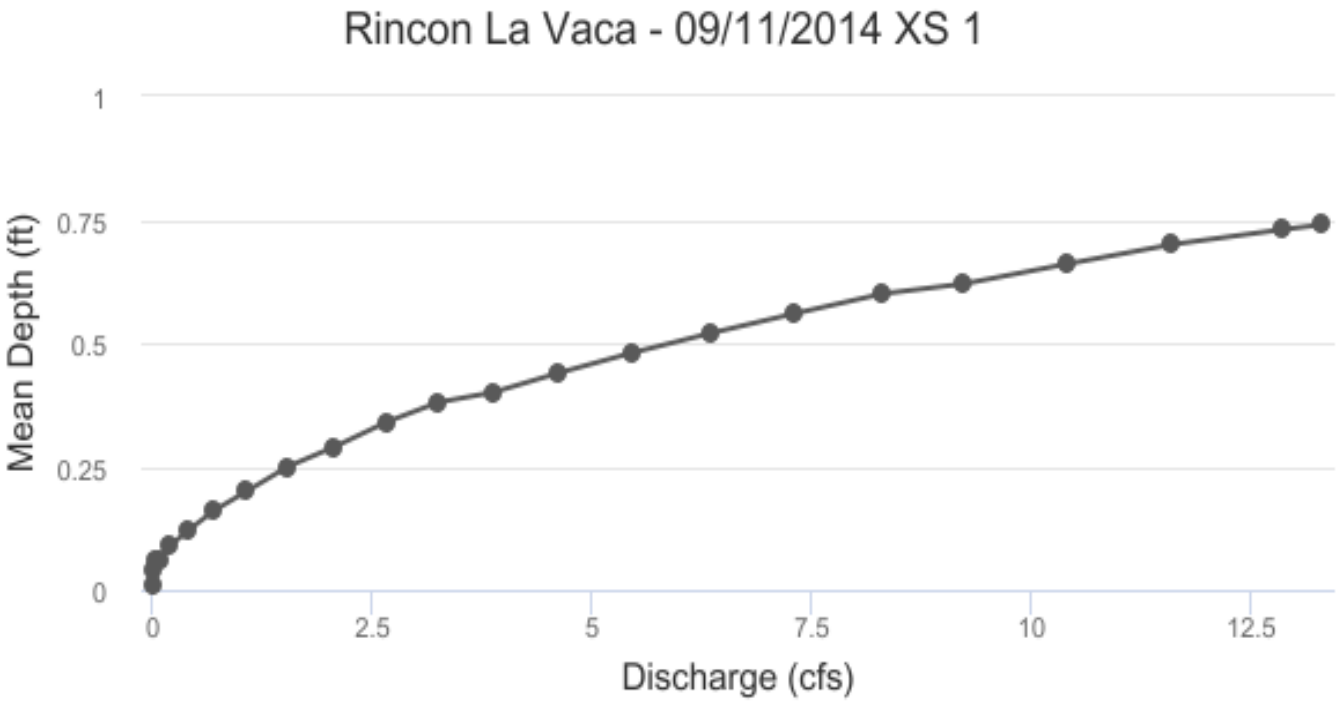
Habitat Criteria Results

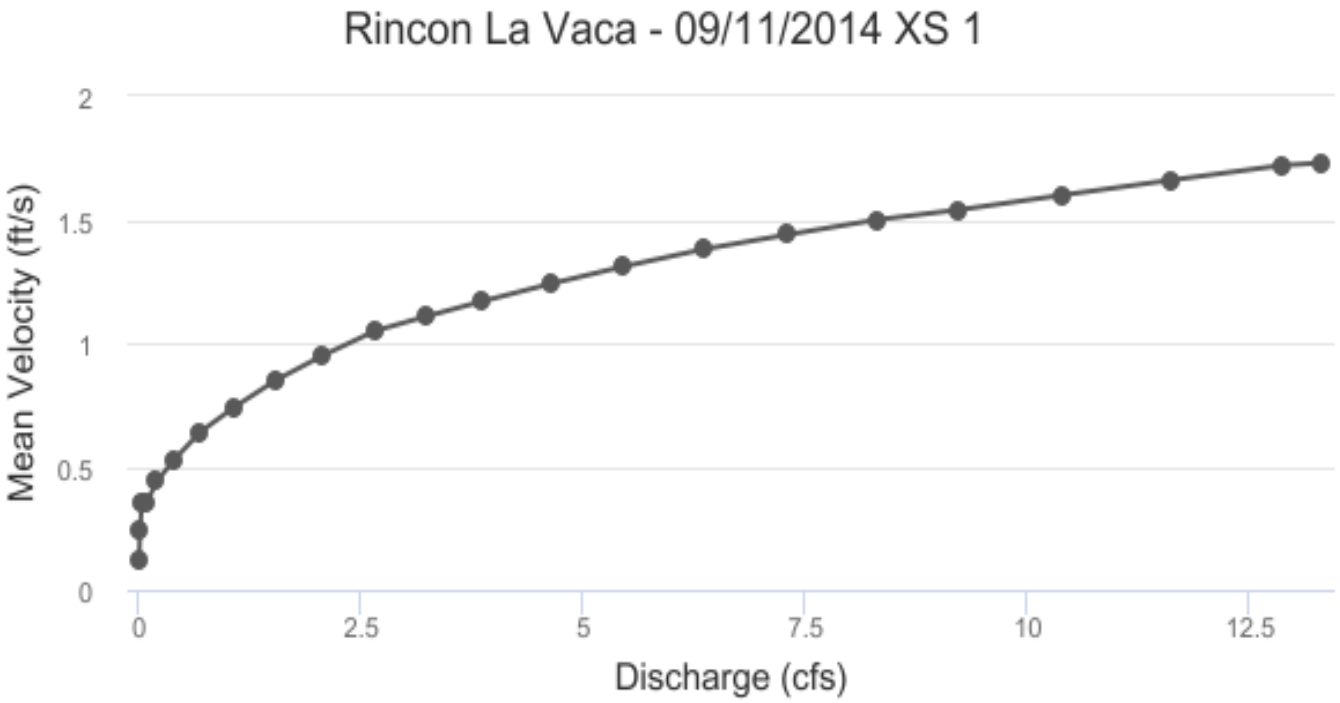
Bankfull top width (ft) = 10.39

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft) **	0.2	1.07
Percent Wetted Perimeter (%) **	50.0	0.26
Mean Velocity (ft/s)	1.0	2.36

**Values highlighted in yellow indicate that the discharge is less than 40% of measured Q or greater than 250% of measured Q.




Rincon La Vaca - 09/11/2014 XS 1
Mean Depth (ft)
1
0.75
0.5
0.25
0
0
2.5
5
7.5
10
12.5
Discharge (cfs)

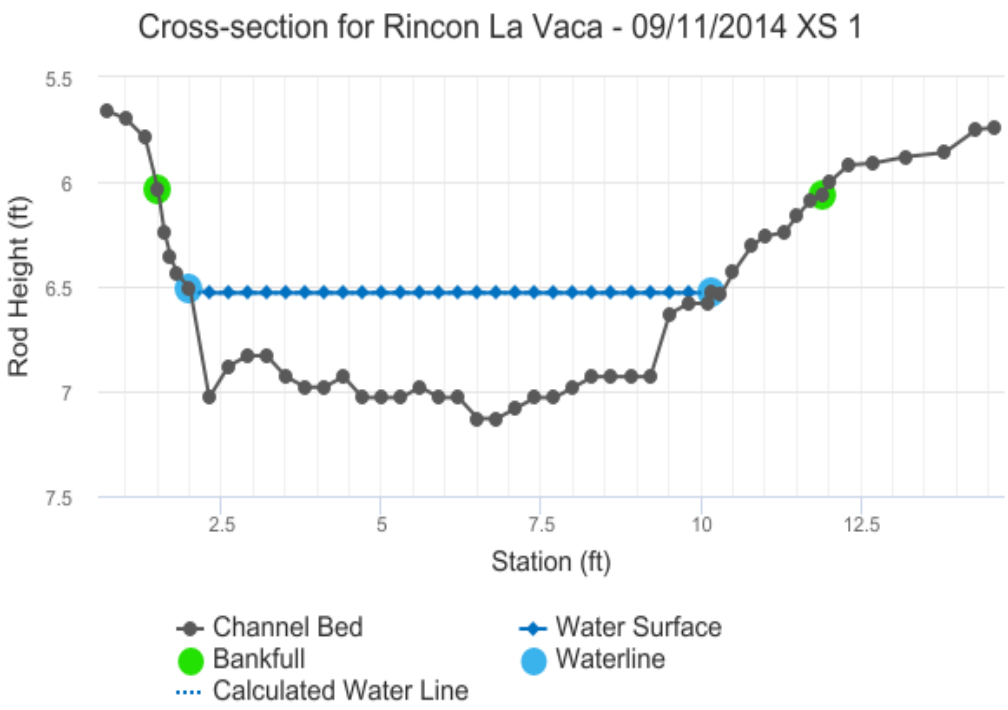

Rincon La Vaca - 09/11/2014 XS 1
Mean Velocity (ft/s)
2
1.5
1
0.5
0
0
2.5
5
7.5
10
12.5
Discharge (cfs)

STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (SQ ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	6.06	10.39	0.74	1.07	7.69	11.26	100.00%	0.68	1.73	13.32
	6.08	10.25	0.73	1.05	7.49	11.11	98.63%	0.67	1.72	12.86
	6.13	10.04	0.7	1.0	6.98	10.86	96.45%	0.64	1.66	11.61
	6.18	9.88	0.66	0.95	6.48	10.66	94.66%	0.61	1.6	10.4
	6.23	9.73	0.62	0.9	5.99	10.47	92.97%	0.57	1.54	9.23
	6.28	9.27	0.6	0.85	5.52	9.98	88.60%	0.55	1.5	8.31
	6.33	9.06	0.56	0.8	5.06	9.74	86.44%	0.52	1.44	7.31
	6.38	8.89	0.52	0.75	4.61	9.54	84.70%	0.48	1.38	6.35
	6.43	8.71	0.48	0.7	4.17	9.33	82.87%	0.45	1.31	5.45
	6.48	8.5	0.44	0.65	3.74	9.09	80.73%	0.41	1.24	4.63
Waterline	6.53	8.26	0.4	0.6	3.32	8.82	78.32%	0.38	1.17	3.87
	6.58	7.76	0.38	0.55	2.92	8.27	73.45%	0.35	1.11	3.25
	6.63	7.43	0.34	0.5	2.54	7.91	70.22%	0.32	1.05	2.66
	6.68	7.35	0.29	0.45	2.17	7.78	69.08%	0.28	0.95	2.07
	6.73	7.27	0.25	0.4	1.8	7.65	67.94%	0.24	0.85	1.54
	6.78	7.19	0.2	0.35	1.44	7.52	66.80%	0.19	0.74	1.07
	6.83	6.82	0.16	0.3	1.08	7.1	63.02%	0.15	0.64	0.69
	6.88	6.29	0.12	0.25	0.76	6.51	57.76%	0.12	0.53	0.4
	6.93	5.06	0.09	0.2	0.45	5.21	46.28%	0.09	0.44	0.2
	6.98	3.59	0.06	0.15	0.23	3.67	32.61%	0.06	0.35	0.08
	7.03	1.2	0.06	0.1	0.08	1.23	10.90%	0.06	0.35	0.03
	7.08	0.75	0.04	0.05	0.03	0.77	6.79%	0.03	0.24	0.01
	7.12	0.43	0.01	0.01	0.01	0.44	3.90%	0.01	0.12	0.0

MODEL SUMMARY

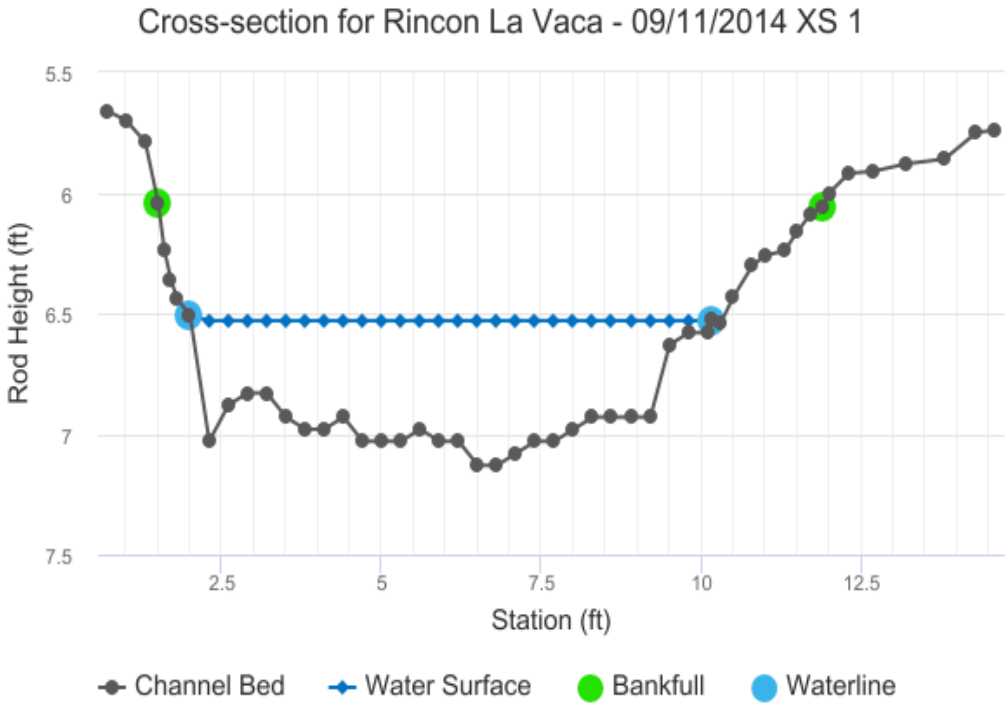
Measured Flow (Qm) =	3.9
Calculated Flow (Qc) =	3.87
(Qm-Qc)/Qm * 100 =	0.72%
Measured Waterline (WLm) =	6.52
Calculated Waterline (WLc) =	6.53
(WLm-WLc)/WLm * 100 =	-0.19%
Max Measured Depth (Dm) =	0.6
Max Calculated Depth (Dc) =	0.6
(Dm-Dc)/Dm * 100 =	-0.05%
Mean Velocity =	1.17
Manning's n =	0.056
0.4 * Qm =	1.56
2.5 * Qm =	9.75



FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0.7	5.66		
	1	5.7		
	1.3	5.79		
Bankfull	1.5	6.04		
	1.6	6.24		
	1.7	6.36		
	1.8	6.44		
Waterline	2	6.51	0	0
	2.3	7.03	0.5	0
	2.6	6.88	0.35	0.8
	2.9	6.83	0.3	1.27
	3.2	6.83	0.3	1.66
	3.5	6.93	0.4	1.14
	3.8	6.98	0.45	1.34
	4.1	6.98	0.45	1.1
	4.4	6.93	0.4	0.99
	4.7	7.03	0.5	1.1
	5	7.03	0.5	1.67
	5.3	7.03	0.5	1.32
	5.6	6.98	0.45	1.08
	5.9	7.03	0.5	1.14
	6.2	7.03	0.5	1.3
	6.5	7.13	0.6	1.64
	6.8	7.13	0.6	1.9
	7.1	7.08	0.55	1.62
	7.4	7.03	0.5	1.79
	7.7	7.03	0.5	1.37
	8	6.98	0.45	1.41
	8.3	6.93	0.4	1.03
	8.6	6.93	0.4	0.94

	8.9	6.93	0.4	0.17
	9.2	6.93	0.4	0.14
	9.5	6.63	0.1	0
	9.8	6.58	0.05	0
	10.1	6.58	0.05	0
Waterline	10.15	6.525	0	0
	10.3	6.54		
	10.5	6.43		
	10.8	6.3		
	11	6.26		
	11.3	6.24		
	11.5	6.16		
	11.7	6.09		
Bankfull	11.9	6.06		
	12	6		
	12.3	5.92		
	12.7	5.91		
	13.2	5.88		
	13.8	5.86		
	14.3	5.75		
	14.6	5.74		


Cross-section for Rincon La Vaca - 09/11/2014 XS 1
Rod Height (ft)
5.5
6
6.5
7
7.5
2.5
5
7.5
10
12.5
Station (ft)
Channel Bed
Water Surface
Bankfull
Waterline

COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (SQ ft)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.6	0.5	0.15	0	0
0.34	0.35	0.1	0.08	2.15
0.3	0.3	0.09	0.11	2.93
0.3	0.3	0.09	0.15	3.83
0.32	0.4	0.12	0.14	3.51
0.3	0.45	0.14	0.18	4.64
0.3	0.45	0.14	0.15	3.81
0.3	0.4	0.12	0.12	3.05
0.32	0.5	0.15	0.17	4.23
0.3	0.5	0.15	0.25	6.42
0.3	0.5	0.15	0.2	5.08
0.3	0.45	0.14	0.15	3.74
0.3	0.5	0.15	0.17	4.38
0.3	0.5	0.15	0.2	5
0.32	0.6	0.18	0.3	7.57
0.3	0.6	0.18	0.34	8.77
0.3	0.55	0.17	0.27	6.85
0.3	0.5	0.15	0.27	6.88
0.3	0.5	0.15	0.21	5.27
0.3	0.45	0.14	0.19	4.88
0.3	0.4	0.12	0.12	3.17
0.3	0.4	0.12	0.11	2.89

0.3	0.4	0.12	0.02	0.52
0.3	0.4	0.12	0.02	0.43
0.42	0.1	0.03	0	0
0.3	0.05	0.01	0	0
0.3	0.05	0.01	0	0
0.07	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

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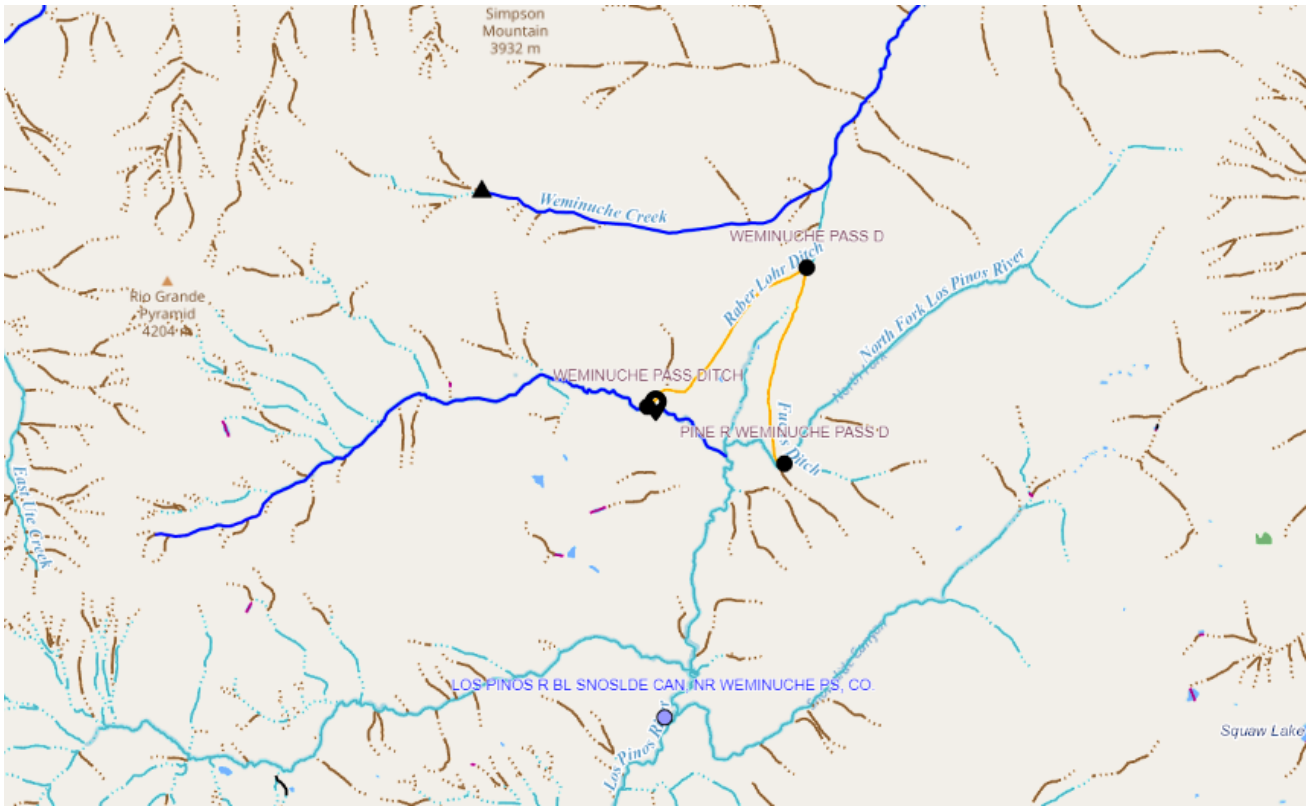
R2Cross RESULTS

Stream Name: Rincon La Vaca
Stream Locations: 150 ft. ds of diversion
Fieldwork Date: 10/06/2016
Cross-section: 1
Observers: Skinner Tyler
Coordinate System: UTM Zone 13
X (easting): 294041
Y (northing): 4171545
Date Processed: 01/14/2021
Slope: 0.018
Computation method: Manning's n
R2Cross data filename: R2CrossData_RinconLV_10-6-2016-1.xlsx
R2Cross version: 1.1.17

LOCATION



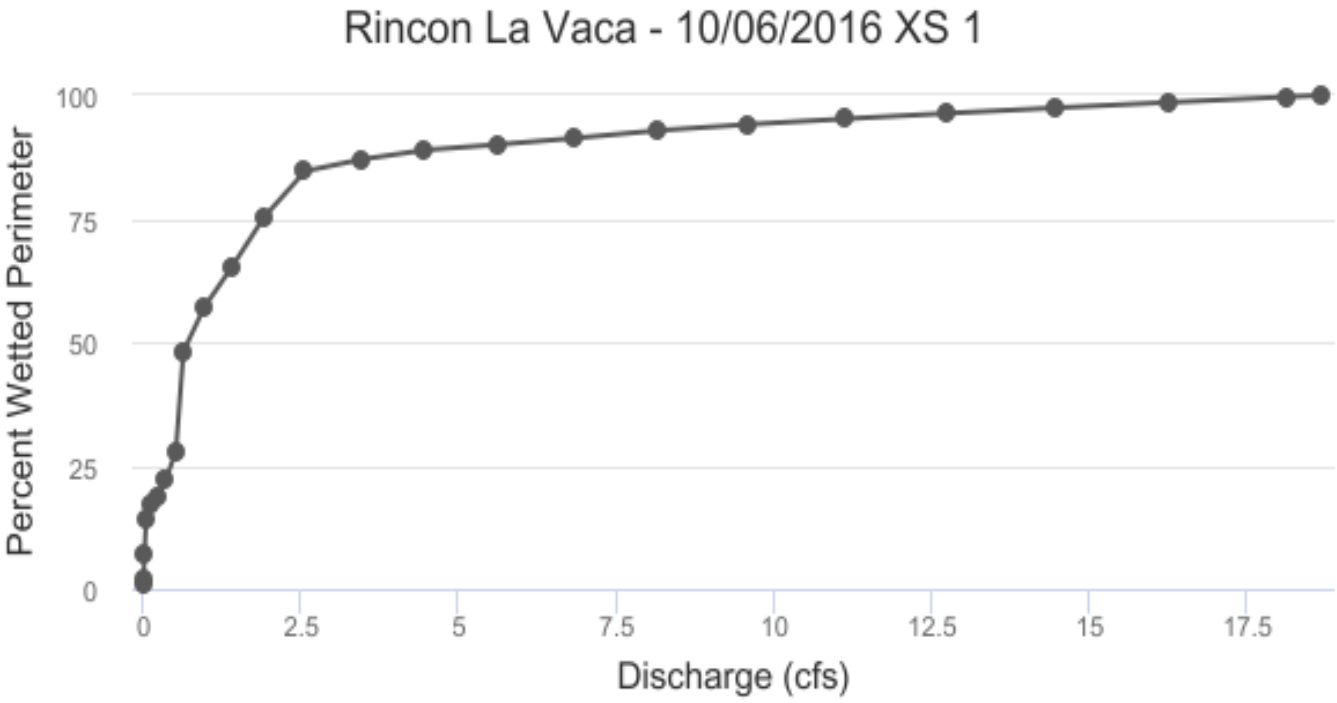
ANALYSIS RESULTS

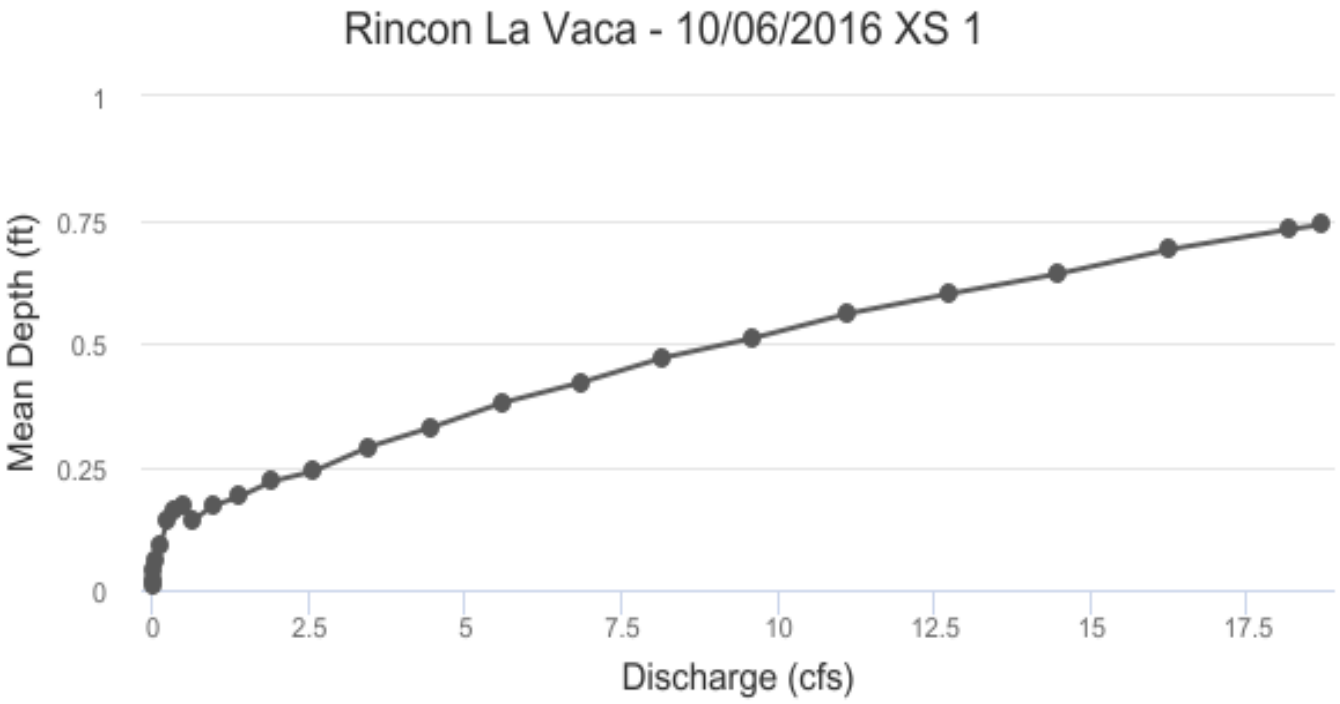
Habitat Criteria Results

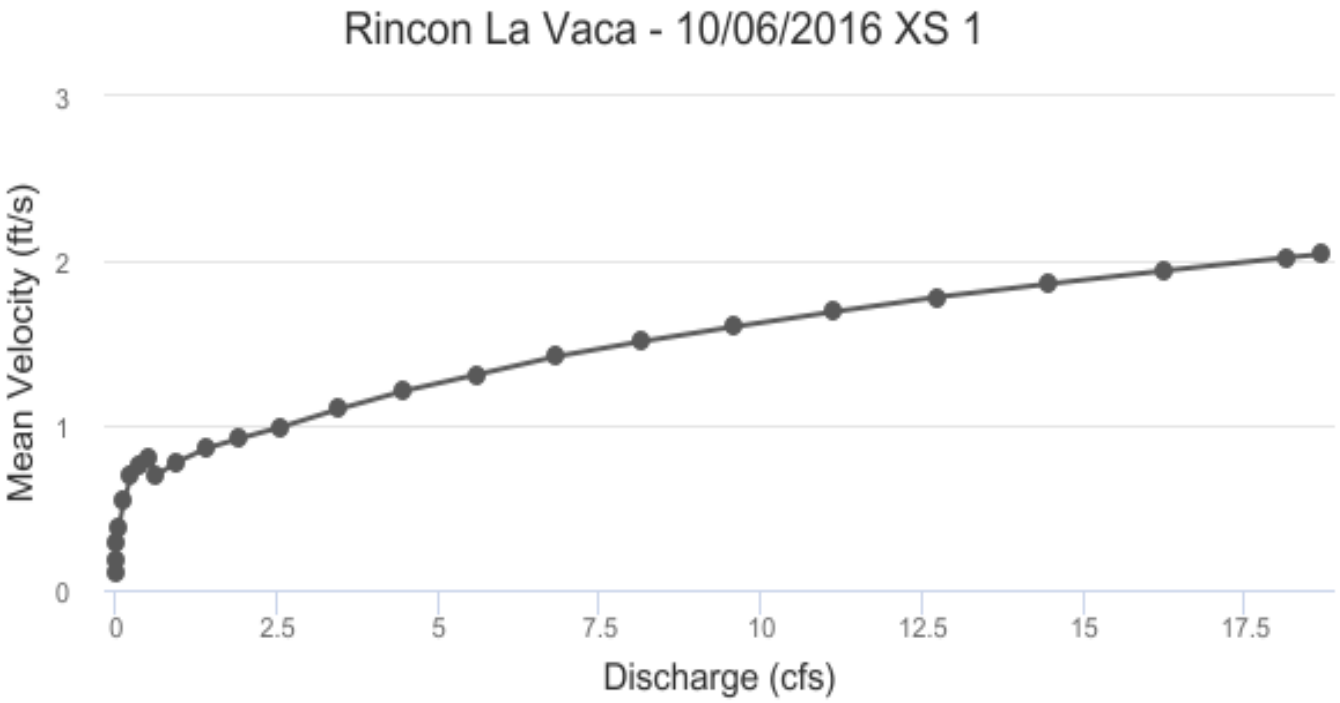
Bankfull top width (ft) = 12.32

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft) **	0.2	1.53
Percent Wetted Perimeter (%) **	50.0	0.7
Mean Velocity (ft/s) **	1.0	2.68

**Values highlighted in yellow indicate that the discharge is less than 40% of measured Q or greater than 250% of measured Q.




Rincon La Vaca - 10/06/2016 XS 1
Mean Depth (ft)
1
0.75
0.5
0.25
0
0
2.5
5
7.5
10
12.5
15
17.5
Discharge (cfs)

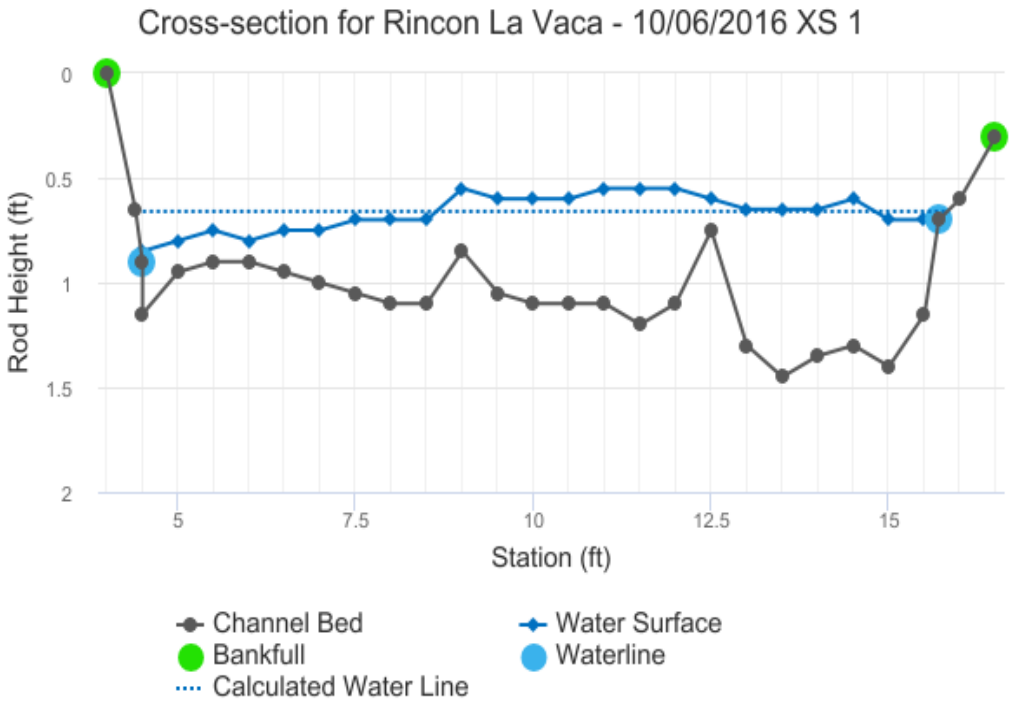

Rincon La Vaca - 10/06/2016 XS 1
Mean Velocity (ft/s)
3
2
1
0
0
2.5
5
7.5
10
12.5
15
17.5
Discharge (cfs)

STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (SQ ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	0.3	12.32	0.74	1.15	9.17	13.95	100.00%	0.66	2.04	18.7
	0.31	12.28	0.73	1.14	8.99	13.91	99.68%	0.65	2.02	18.15
	0.36	12.17	0.69	1.09	8.38	13.75	98.56%	0.61	1.94	16.26
	0.41	12.05	0.64	1.04	7.77	13.59	97.44%	0.57	1.86	14.46
	0.46	11.94	0.6	0.99	7.17	13.44	96.33%	0.53	1.78	12.74
	0.51	11.83	0.56	0.94	6.58	13.28	95.21%	0.5	1.69	11.12
	0.56	11.71	0.51	0.89	5.99	13.13	94.09%	0.46	1.6	9.59
	0.61	11.58	0.47	0.84	5.41	12.95	92.85%	0.42	1.51	8.15
Waterline	0.66	11.4	0.42	0.79	4.83	12.74	91.30%	0.38	1.42	6.84
	0.71	11.27	0.38	0.74	4.27	12.55	90.00%	0.34	1.31	5.61
	0.76	11.19	0.33	0.69	3.7	12.4	88.90%	0.3	1.21	4.47
	0.81	11.03	0.29	0.64	3.15	12.14	87.01%	0.26	1.1	3.46
	0.86	10.81	0.24	0.59	2.6	11.8	84.62%	0.22	0.99	2.56
	0.91	9.64	0.22	0.54	2.08	10.51	75.32%	0.2	0.92	1.91
	0.96	8.39	0.19	0.49	1.63	9.1	65.25%	0.18	0.86	1.4
	1.01	7.4	0.17	0.44	1.24	7.96	57.05%	0.16	0.78	0.96
	1.06	6.3	0.14	0.39	0.89	6.71	48.10%	0.13	0.7	0.63
	1.11	3.63	0.17	0.34	0.63	3.9	27.95%	0.16	0.8	0.51
	1.16	2.95	0.16	0.29	0.47	3.12	22.35%	0.15	0.76	0.36
	1.21	2.45	0.14	0.24	0.33	2.58	18.46%	0.13	0.69	0.23
	1.26	2.3	0.09	0.19	0.22	2.4	17.17%	0.09	0.54	0.12
	1.31	1.91	0.06	0.14	0.11	1.97	14.11%	0.05	0.38	0.04
	1.36	0.96	0.04	0.09	0.04	1.0	7.14%	0.04	0.29	0.01
	1.41	0.3	0.02	0.04	0.01	0.31	2.19%	0.02	0.18	0.0
	1.44	0.12	0.01	0.01	0.0	0.13	0.92%	0.01	0.1	0.0

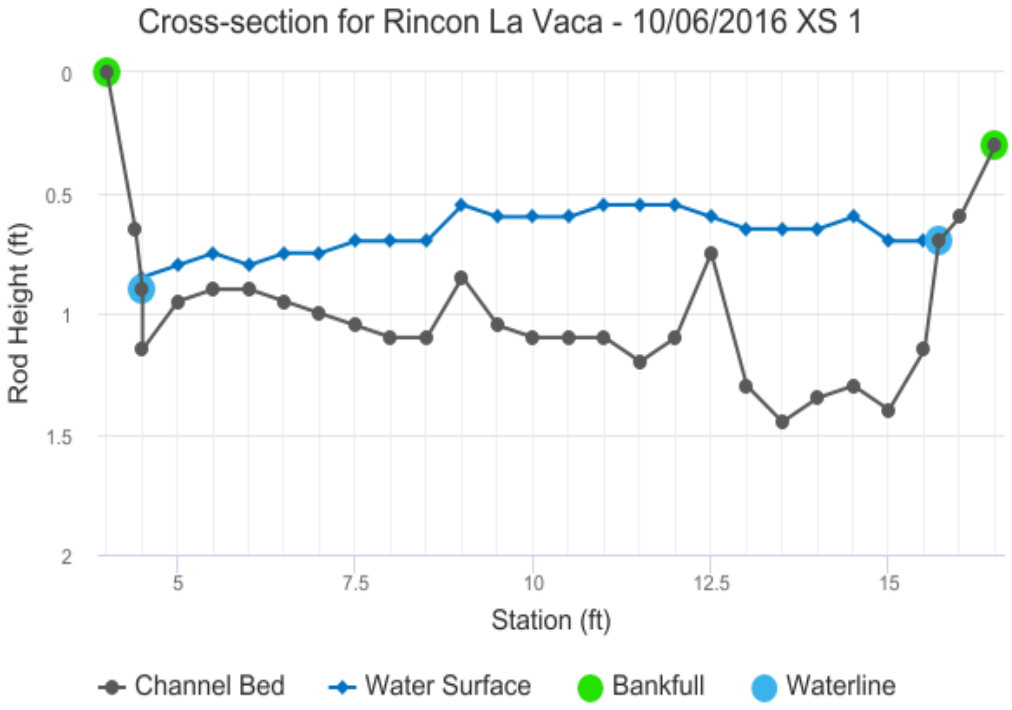
MODEL SUMMARY

Measured Flow (Qm) =	6.97
Calculated Flow (Qc) =	6.84
(Qm-Qc)/Qm * 100 =	1.93%
Measured Waterline (WLm) =	0.8
Calculated Waterline (WLc) =	0.66
(WLm-WLc)/WLm * 100 =	16.96%
Max Measured Depth (Dm) =	0.8
Max Calculated Depth (Dc) =	0.79
(Dm-Dc)/Dm * 100 =	1.79%
Mean Velocity =	1.42
Manning's n =	0.074
0.4 * Qm =	2.79
2.5 * Qm =	17.43



FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
Bankfull	4	0		
	4.4	0.65		
Waterline	4.5	0.9	0	0
	4.5	1.15	0.3	1.11
	5	0.95	0.15	1.11
	5.5	0.9	0.15	1.15
	6	0.9	0.1	1.06
	6.5	0.95	0.2	1.27
	7	1	0.25	1.05
	7.5	1.05	0.35	1.25
	8	1.1	0.4	1.96
	8.5	1.1	0.4	0.41
	9	0.85	0.3	1.17
	9.5	1.05	0.45	1.46
	10	1.1	0.5	0.99
	10.5	1.1	0.5	1.28
	11	1.1	0.55	1.61
	11.5	1.2	0.65	2.08
	12	1.1	0.55	1.51
	12.5	0.75	0.15	1.87
	13	1.3	0.65	2.48
	13.5	1.45	0.8	1.72
	14	1.35	0.7	1.51
	14.5	1.3	0.7	1.23
	15	1.4	0.7	1.16
	15.5	1.15	0.45	0.71
Waterline	15.7	0.7	0	0
	16	0.6		
Bankfull	16.5	0.3		


Cross-section for Rincon La Vaca - 10/06/2016 XS 1
Rod Height (ft)
0
0.5
1
1.5
2
5
7.5
10
12.5
15
Station (ft)
Channel Bed
Water Surface
Bankfull
Waterline

COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (SQ ft)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.25	0.3	0.07	0.08	1.19
0.54	0.15	0.07	0.08	1.19
0.5	0.15	0.07	0.09	1.24
0.5	0.1	0.05	0.05	0.76
0.5	0.2	0.1	0.13	1.82
0.5	0.25	0.12	0.13	1.88
0.5	0.35	0.17	0.22	3.14
0.5	0.4	0.2	0.39	5.62
0.5	0.4	0.2	0.08	1.18
0.56	0.3	0.15	0.18	2.52
0.54	0.45	0.23	0.33	4.71
0.5	0.5	0.25	0.25	3.55
0.5	0.5	0.25	0.32	4.59
0.5	0.55	0.28	0.44	6.35
0.51	0.65	0.33	0.68	9.69
0.51	0.55	0.28	0.42	5.96
0.61	0.15	0.07	0.14	2.01
0.74	0.65	0.33	0.81	11.56
0.52	0.8	0.4	0.69	9.87
0.51	0.7	0.35	0.53	7.58
0.5	0.7	0.35	0.43	6.17
0.51	0.7	0.35	0.41	5.82
0.56	0.45	0.16	0.11	1.6
0.49	0	0	0	0
0	0	0	0	0
0	0	0	0	0

DISCLAIMER

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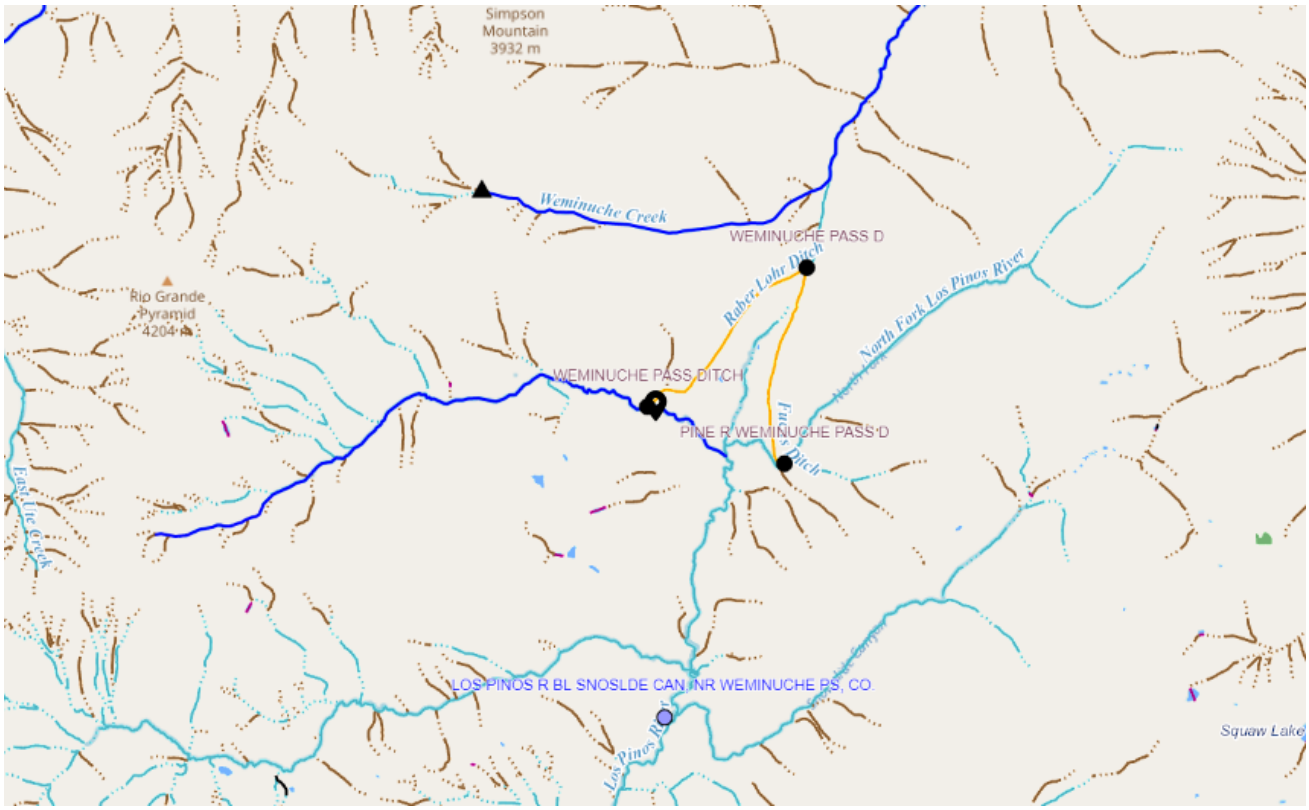
R2Cross RESULTS

Stream Name: Rincon La Vaca
Stream Locations: 350 ft. ds of diversion
Fieldwork Date: 10/06/2016
Cross-section: 2
Observers: Skinner Tyler
Coordinate System: UTM Zone 13
X (easting): 294093
Y (northing): 4171540
Date Processed: 01/14/2021
Slope: 0.033
Computation method: Manning's n
R2Cross data filename: R2CrossData_RinconLV_10-6-2016-2.xlsx
R2Cross version: 1.1.17

LOCATION



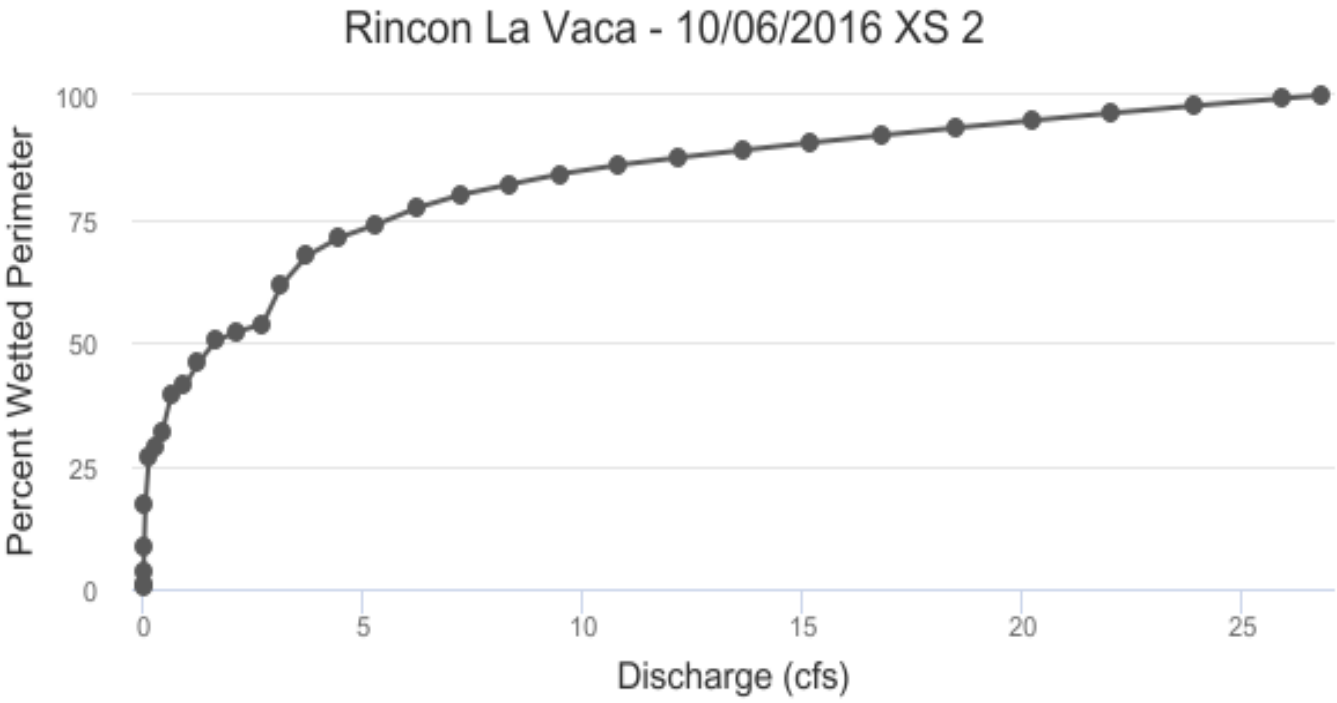
ANALYSIS RESULTS

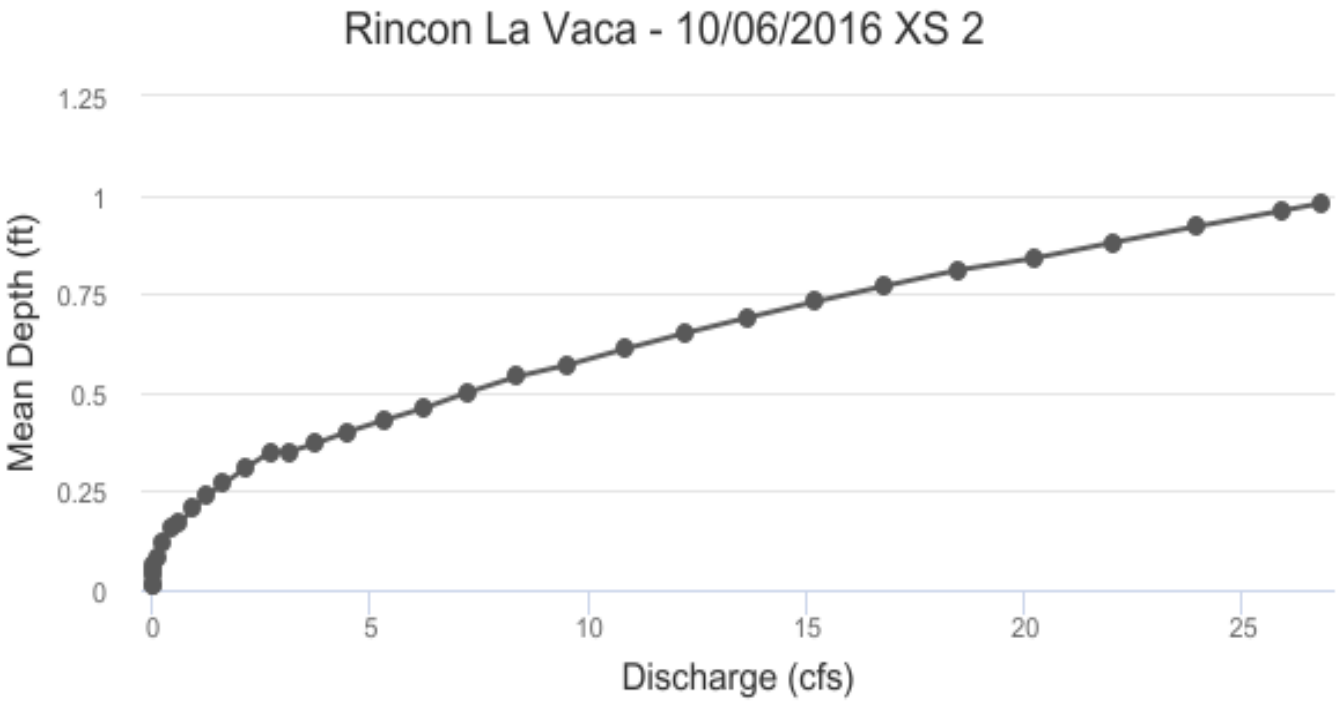
Habitat Criteria Results

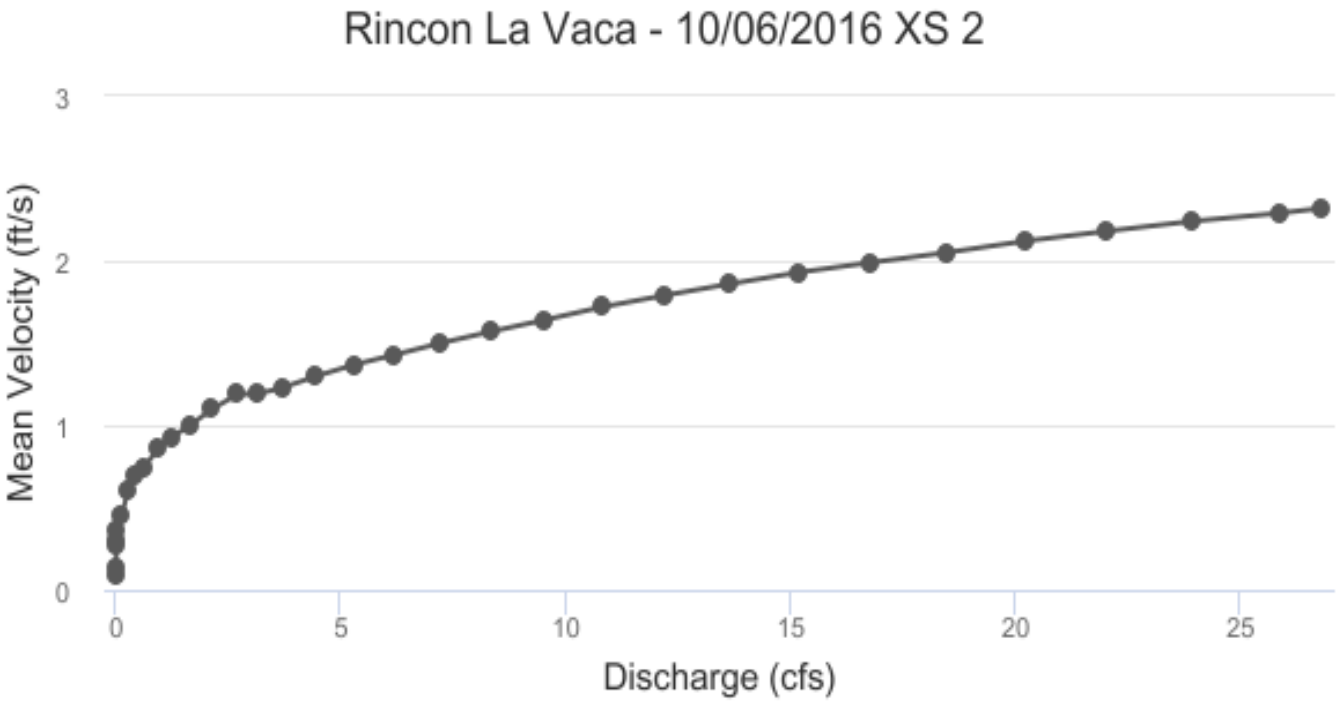
Bankfull top width (ft) = 11.85

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft) **	0.2	0.83
Percent Wetted Perimeter (%) **	50.0	1.62
Mean Velocity (ft/s) **	1.0	1.64

**Values highlighted in yellow indicate that the discharge is less than 40% of measured Q or greater than 250% of measured Q.




Rincon La Vaca - 10/06/2016 XS 2
Mean Depth (ft)
1.25
1
0.75
0.5
0.25
0
0
5
10
15
20
25
Discharge (cfs)


Rincon La Vaca - 10/06/2016 XS 2
Mean Velocity (ft/s)
3
2
1
0
0
5
10
15
20
25
Discharge (cfs)

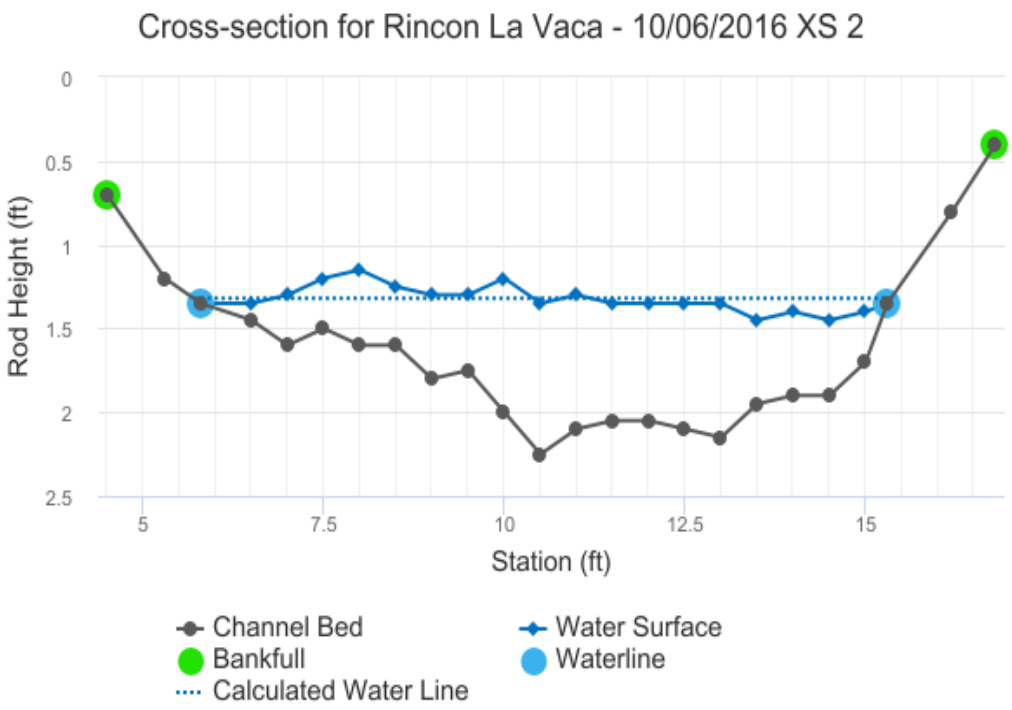
STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (SQ ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	0.7	11.85	0.98	1.55	11.56	12.68	100.00%	0.91	2.32	26.83
	0.72	11.78	0.96	1.53	11.28	12.59	99.32%	0.9	2.29	25.89
	0.77	11.62	0.92	1.48	10.7	12.41	97.87%	0.86	2.24	23.92
	0.82	11.46	0.88	1.43	10.12	12.22	96.39%	0.83	2.18	22.03
	0.87	11.3	0.84	1.38	9.55	12.03	94.89%	0.79	2.12	20.22
	0.92	11.14	0.81	1.33	8.99	11.84	93.39%	0.76	2.05	18.47
	0.97	10.98	0.77	1.28	8.44	11.65	91.89%	0.72	1.99	16.8
	1.02	10.82	0.73	1.23	7.89	11.46	90.39%	0.69	1.93	15.19
	1.07	10.66	0.69	1.18	7.35	11.27	88.89%	0.65	1.86	13.66
	1.12	10.49	0.65	1.13	6.83	11.08	87.39%	0.62	1.79	12.2
	1.17	10.33	0.61	1.08	6.31	10.89	85.89%	0.58	1.72	10.82
	1.22	10.13	0.57	1.03	5.79	10.66	84.09%	0.54	1.64	9.52
	1.27	9.88	0.54	0.98	5.29	10.39	81.96%	0.51	1.57	8.34
Waterline	1.32	9.63	0.5	0.93	4.8	10.12	79.84%	0.47	1.5	7.22
	1.37	9.32	0.46	0.88	4.33	9.78	77.16%	0.44	1.43	6.21
	1.42	8.92	0.43	0.83	3.87	9.36	73.85%	0.41	1.37	5.31
	1.47	8.62	0.4	0.78	3.44	9.03	71.20%	0.38	1.3	4.46
	1.52	8.17	0.37	0.73	3.01	8.55	67.43%	0.35	1.23	3.71
	1.57	7.46	0.35	0.68	2.62	7.8	61.52%	0.34	1.19	3.13
	1.62	6.51	0.35	0.63	2.28	6.81	53.68%	0.33	1.19	2.71
	1.67	6.34	0.31	0.58	1.96	6.61	52.10%	0.3	1.1	2.14
	1.72	6.13	0.27	0.53	1.64	6.37	50.27%	0.26	1.0	1.64
	1.77	5.6	0.24	0.48	1.35	5.82	45.88%	0.23	0.93	1.25
	1.82	5.04	0.21	0.43	1.08	5.23	41.26%	0.21	0.86	0.94
	1.87	4.82	0.17	0.38	0.84	4.98	39.31%	0.17	0.75	0.63

	1.92	3.92	0.16	0.33	0.62	4.07	32.07%	0.15	0.7	0.43
	1.97	3.49	0.12	0.28	0.43	3.62	28.58%	0.12	0.6	0.26
	2.02	3.27	0.08	0.23	0.26	3.38	26.64%	0.08	0.45	0.12
	2.07	2.08	0.06	0.18	0.12	2.16	17.05%	0.06	0.36	0.04
	2.12	1.01	0.05	0.13	0.05	1.06	8.39%	0.04	0.31	0.01
	2.17	0.41	0.04	0.08	0.02	0.44	3.46%	0.04	0.27	0.0
	2.22	0.14	0.01	0.03	0.0	0.15	1.20%	0.01	0.13	0.0
	2.23	0.08	0.01	0.02	0.0	0.09	0.68%	0.01	0.09	0.0

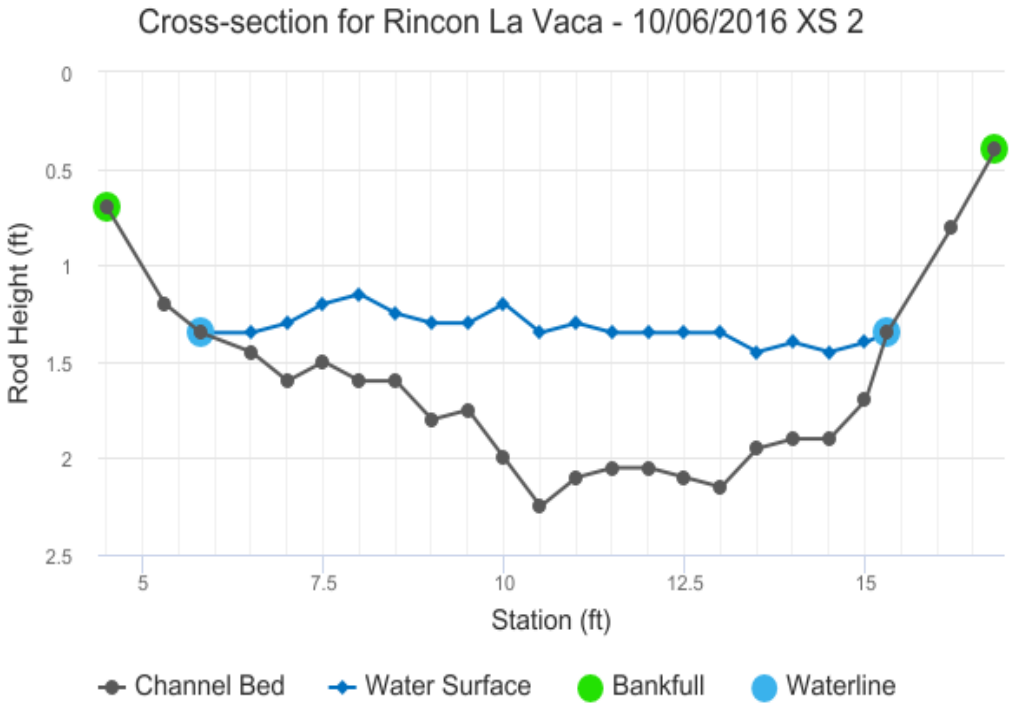
MODEL SUMMARY

Measured Flow (Qm) =	7.29
Calculated Flow (Qc) =	7.22
(Qm-Qc)/Qm * 100 =	0.95%
Measured Waterline (WLm) =	1.35
Calculated Waterline (WLc) =	1.32
(WLm-WLc)/WLm * 100 =	1.97%
Max Measured Depth (Dm) =	0.9
Max Calculated Depth (Dc) =	0.93
(Dm-Dc)/Dm * 100 =	-2.96%
Mean Velocity =	1.5
Manning's n =	0.109
0.4 * Qm =	2.92
2.5 * Qm =	18.22



FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
Bankfull	4.5	0.7		
	5.3	1.2		
Waterline	5.8	1.35	0	0
	6.5	1.45	0.1	1.12
	7	1.6	0.3	1.31
	7.5	1.5	0.3	1.14
	8	1.6	0.45	1.71
	8.5	1.6	0.35	2.45
	9	1.8	0.5	4.22
	9.5	1.75	0.45	3.11
	10	2	0.8	1.94
	10.5	2.25	0.9	3.36
	11	2.1	0.8	2.2
	11.5	2.05	0.7	0.94
	12	2.05	0.7	0.24
	12.5	2.1	0.75	0.64
	13	2.15	0.8	0.76
	13.5	1.95	0.5	0.09
	14	1.9	0.5	0.25
	14.5	1.9	0.45	0.34
	15	1.7	0.3	0
Waterline	15.3	1.35	0	0
	16.2	0.8		
Bankfull	16.8	0.4		


Cross-section for Rincon La Vaca - 10/06/2016 XS 2
Rod Height (ft)
0
0.5
1
1.5
2
2.5
5
7.5
10
12.5
15
Station (ft)
Channel Bed
Water Surface
Bankfull
Waterline

COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (SQ ft)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.71	0.1	0.06	0.07	0.92
0.52	0.3	0.15	0.2	2.7
0.51	0.3	0.15	0.17	2.35
0.51	0.45	0.23	0.38	5.28
0.5	0.35	0.17	0.43	5.88
0.54	0.5	0.25	1.05	14.47
0.5	0.45	0.23	0.7	9.6
0.56	0.8	0.4	0.78	10.65
0.56	0.9	0.45	1.51	20.74
0.52	0.8	0.4	0.88	12.07
0.5	0.7	0.35	0.33	4.51
0.5	0.7	0.35	0.08	1.15
0.5	0.75	0.38	0.24	3.29
0.5	0.8	0.4	0.3	4.17
0.54	0.5	0.25	0.02	0.31
0.5	0.5	0.25	0.06	0.86
0.5	0.45	0.23	0.08	1.05
0.54	0.3	0.12	0	0
0.46	0	0	0	0
0	0	0	0	0
0	0	0	0	0

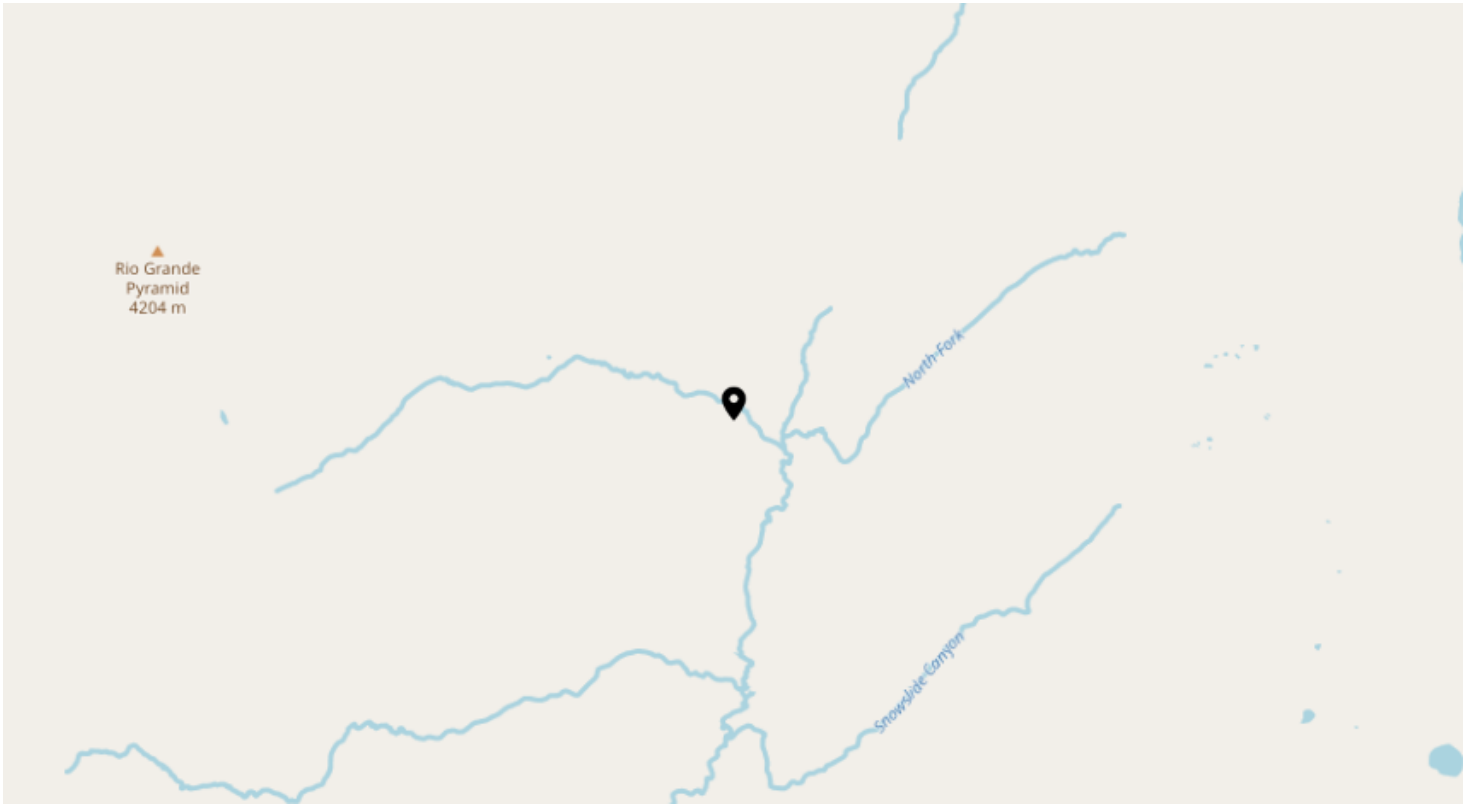
DISCLAIMER

"The Colorado Water Conservation Board makes no representations about the use of the software contained in the R2Cross platform for any purpose besides that for which it was designed. To the maximum extent permitted by applicable law, all information, modeling results, and software are provided “as is” without warranty or condition of any kind, including all implied warranties or conditions of merchantability, or fitness for a particular purpose. The user assumes all responsibility for the accuracy and suitability of this program for a specific application. In no event shall the Colorado Water Conservation Board or any state agency, official or employee be liable for any direct, indirect, punitive, incidental, special, consequential damages or any damages whatsoever including, without limitation, damages for loss of use, data, profits, or savings arising from the implementation, reliance on, or use of or inability to use the R2Cross platform.

R2Cross RESULTS

Stream Name: Rincon La Vaca
Stream Locations: In Meadow d/s of Weminuche Pass Ditch
Fieldwork Date: 09/29/2020
Cross-section: 1
Observers: Scheel Fields-Sommers Birch Unterreiner
Coordinate System: UTM Zone 13
X (easting): 294284
Y (northing): 4171382
Date Processed: 12/07/2020
Slope: 0.0133
Computation method: Manning's n
R2Cross data filename: R2CrossData-RinconLaVaca-3-9-29-2020_Q=2.75.xlsx
R2Cross version: 1.0.30

LOCATION



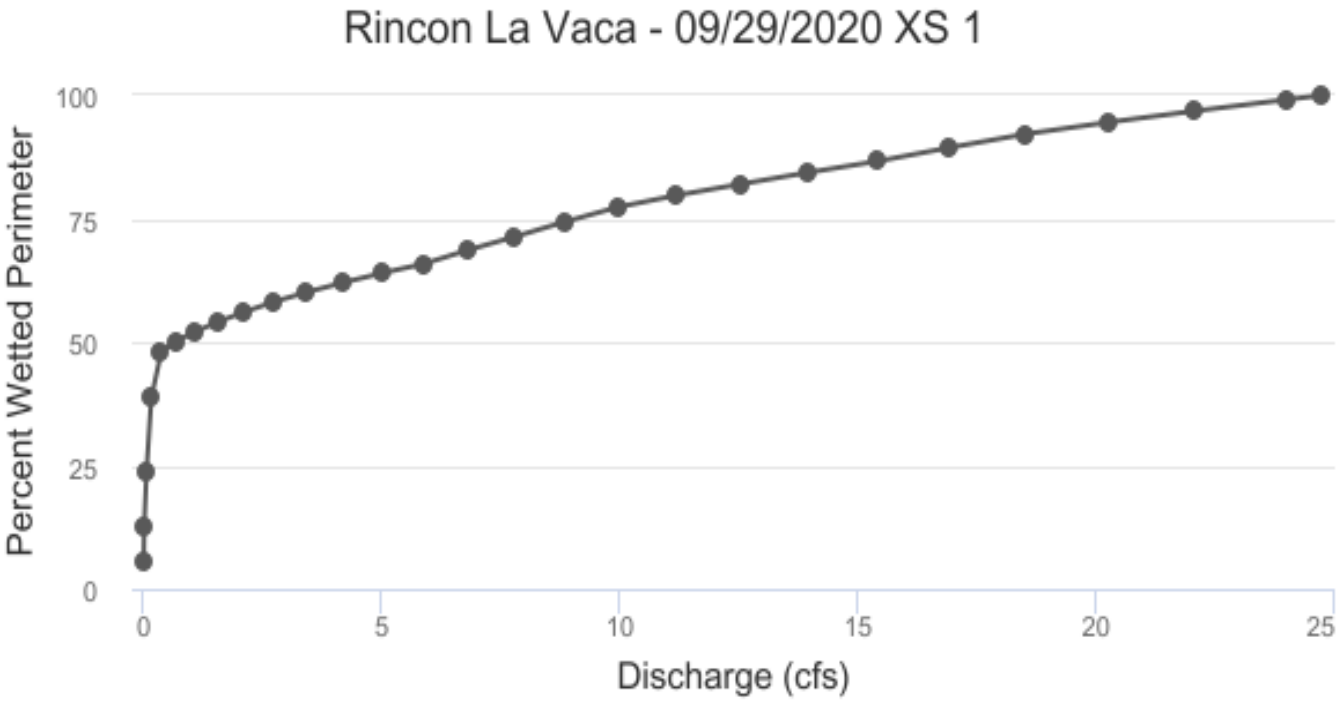
ANALYSIS RESULTS

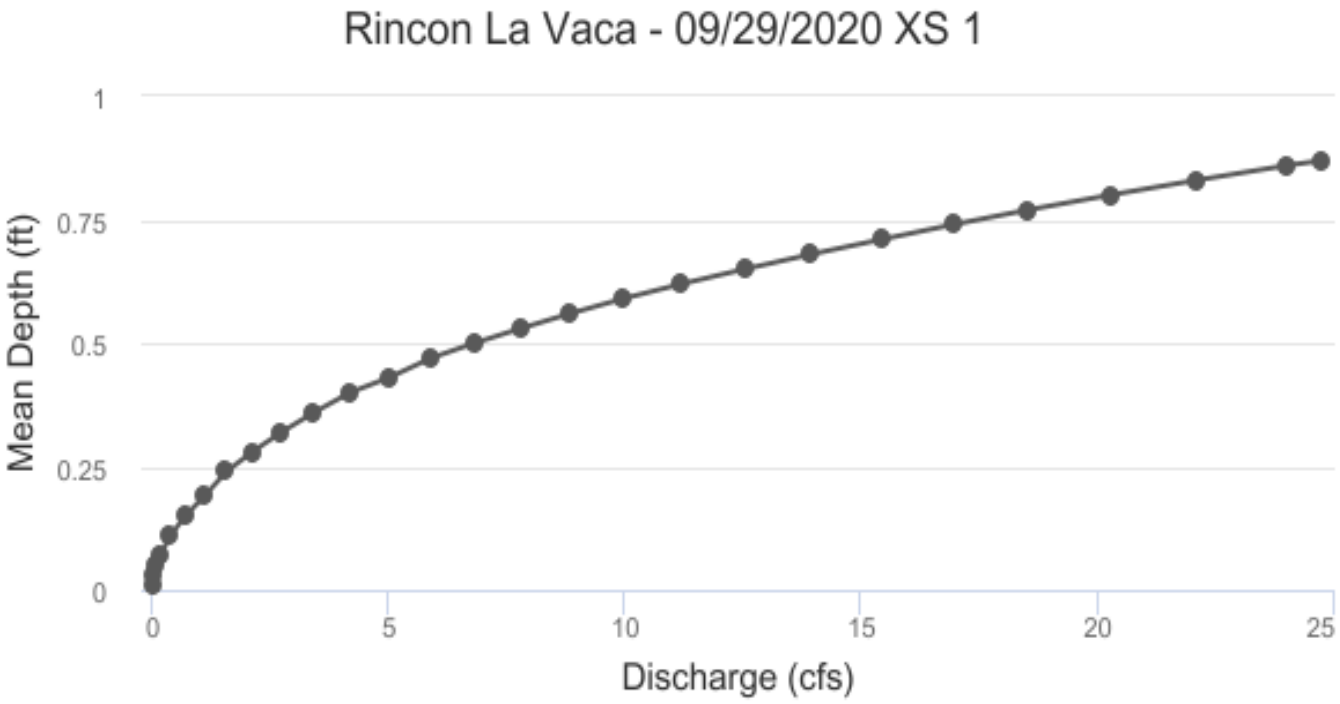
Habitat Criteria Results

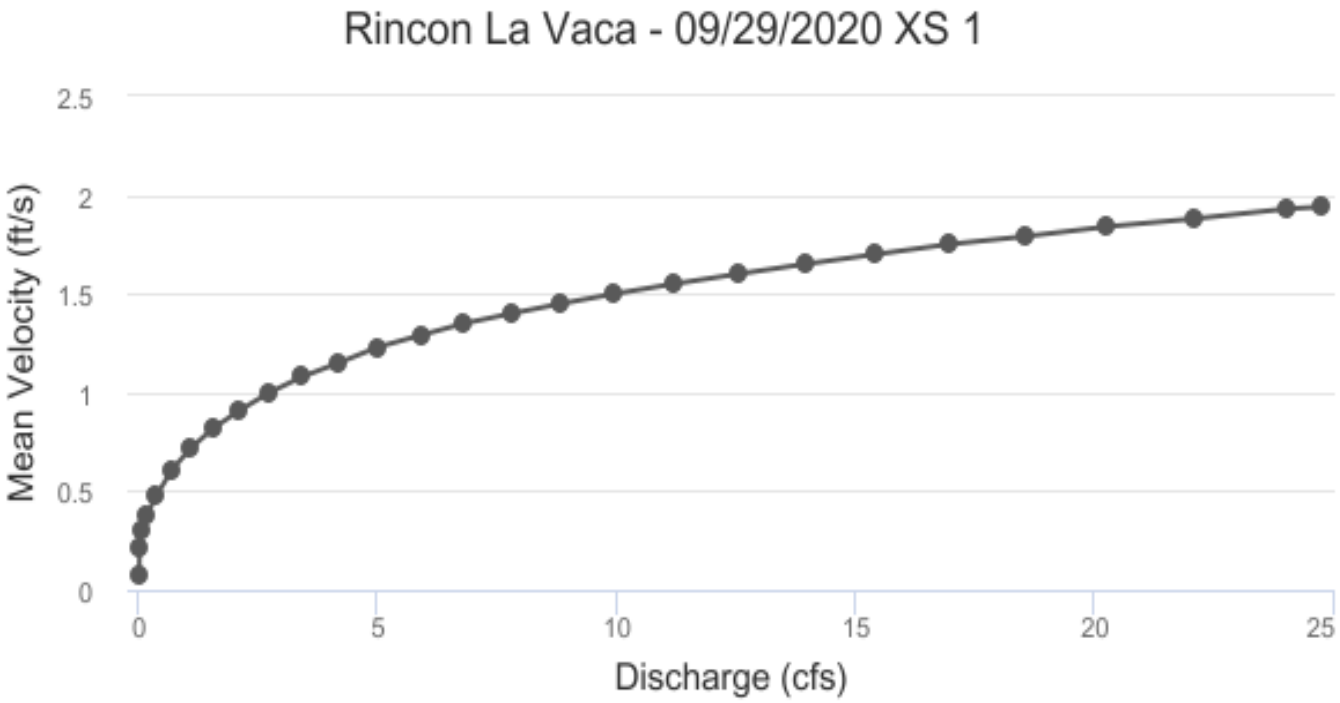
Bankfull top width (ft) = 14.62

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft)	0.2	1.15
Percent Wetted Perimeter (%) **	50.0	0.65
Mean Velocity (ft/s)	1.0	2.73

**Values highlighted in yellow indicate that the discharge is less than 40% of measured Q or greater than 250% of measured Q.




Rincon La Vaca - 09/29/2020 XS 1
Mean Depth (ft)
1
0.75
0.5
0.25
0
0
5
10
15
20
25
Discharge (cfs)


Rincon La Vaca - 09/29/2020 XS 1
Mean Velocity (ft/s)
2.5
2
1.5
1
0.5
0
0
5
10
15
20
25
Discharge (cfs)

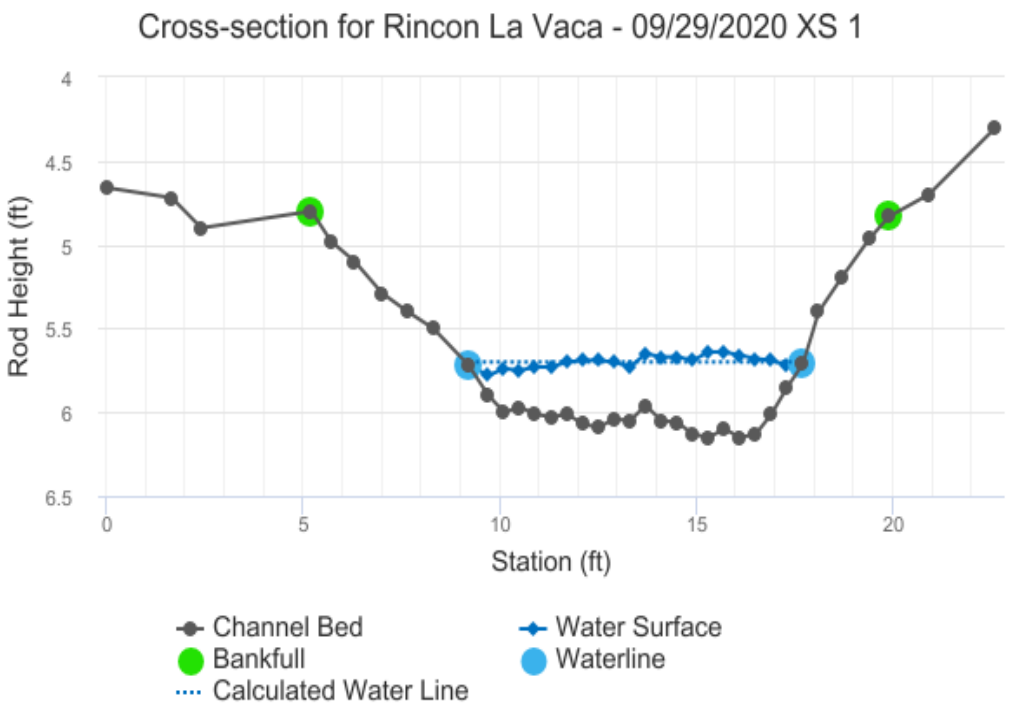
STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (SQ ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	4.83	14.62	0.87	1.32	12.74	15.08	100.00%	0.84	1.94	24.77
	4.85	14.49	0.86	1.3	12.46	14.95	99.12%	0.83	1.93	24.02
	4.9	14.16	0.83	1.25	11.75	14.6	96.83%	0.8	1.88	22.1
	4.95	13.83	0.8	1.2	11.05	14.26	94.53%	0.77	1.84	20.27
	5.0	13.49	0.77	1.15	10.36	13.9	92.16%	0.75	1.79	18.54
	5.05	13.08	0.74	1.1	9.7	13.48	89.41%	0.72	1.75	16.94
	5.1	12.68	0.71	1.05	9.06	13.07	86.65%	0.69	1.7	15.43
	5.15	12.34	0.68	1.0	8.43	12.72	84.32%	0.66	1.65	13.94
	5.2	12.01	0.65	0.95	7.82	12.37	82.00%	0.63	1.6	12.54
	5.25	11.68	0.62	0.9	7.23	12.02	79.73%	0.6	1.55	11.2
	5.3	11.33	0.59	0.85	6.65	11.66	77.33%	0.57	1.5	9.96
	5.35	10.9	0.56	0.8	6.1	11.21	74.34%	0.54	1.45	8.84
	5.4	10.46	0.53	0.75	5.56	10.76	71.35%	0.52	1.4	7.8
	5.45	10.07	0.5	0.7	5.05	10.35	68.63%	0.49	1.35	6.81
	5.5	9.68	0.47	0.65	4.56	9.94	65.89%	0.46	1.29	5.9
	5.55	9.41	0.43	0.6	4.08	9.64	63.95%	0.42	1.23	5.0
	5.6	9.14	0.4	0.55	3.62	9.35	62.02%	0.39	1.15	4.18
	5.65	8.87	0.36	0.5	3.17	9.06	60.08%	0.35	1.08	3.42
Waterline	5.7	8.6	0.32	0.45	2.73	8.77	58.14%	0.31	1.0	2.73
	5.75	8.31	0.28	0.4	2.31	8.46	56.08%	0.27	0.91	2.11
	5.8	8.03	0.24	0.35	1.9	8.16	54.10%	0.23	0.82	1.56
	5.85	7.74	0.19	0.3	1.5	7.86	52.12%	0.19	0.72	1.09
	5.9	7.48	0.15	0.25	1.12	7.58	50.25%	0.15	0.61	0.69
	5.95	7.16	0.11	0.2	0.76	7.24	47.99%	0.1	0.48	0.37
	6.0	5.79	0.07	0.15	0.43	5.84	38.75%	0.07	0.38	0.16

	6.05	3.57	0.05	0.1	0.19	3.6	23.90%	0.05	0.3	0.06
	6.1	1.89	0.03	0.05	0.06	1.91	12.66%	0.03	0.21	0.01
	6.13	0.84	0.01	0.01	0.01	0.84	5.59%	0.01	0.08	0.0

MODEL SUMMARY

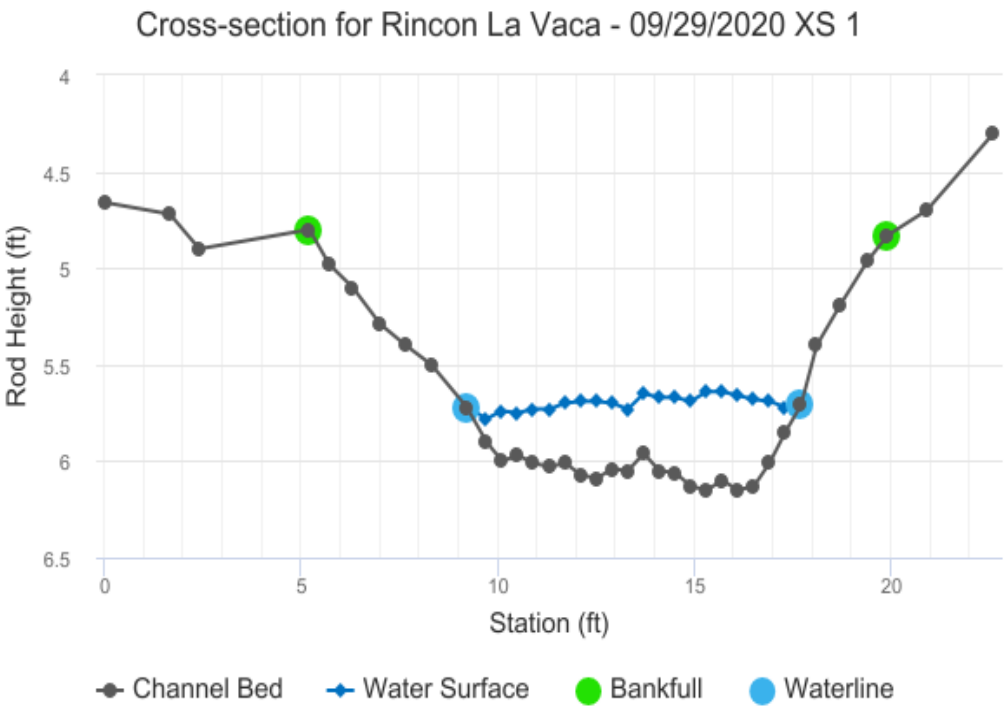
Measured Flow (Qm) =	2.75
Calculated Flow (Qc) =	2.73
(Qm-Qc)/Qm * 100 =	0.81%
Measured Waterline (WLm) =	5.71
Calculated Waterline (WLc) =	5.7
(WLm-WLc)/WLm * 100 =	0.28%
Max Measured Depth (Dm) =	0.51
Max Calculated Depth (Dc) =	0.45
(Dm-Dc)/Dm * 100 =	11.58%
Mean Velocity =	1
Manning's n =	0.079
0.4 * Qm =	1.1
2.5 * Qm =	6.88



FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	4.66		
	1.65	4.72		
	2.4	4.9		
Bankfull	5.2	4.8		
	5.7	4.98		
	6.3	5.1		
	7	5.29		
	7.65	5.4		
	8.3	5.5		
Waterline	9.2	5.72	0	
	9.7	5.9	0.12	
	10.1	6	0.26	
	10.5	5.97	0.22	
	10.9	6.01	0.28	
	11.3	6.03	0.3	
	11.7	6.01	0.31	
	12.1	6.07	0.38	
	12.5	6.09	0.4	
	12.9	6.04	0.34	
	13.3	6.05	0.32	
	13.7	5.96	0.31	
	14.1	6.05	0.38	
	14.5	6.06	0.39	
	14.9	6.13	0.44	
	15.3	6.15	0.51	
	15.7	6.1	0.46	
	16.1	6.15	0.49	
	16.5	6.13	0.45	
	16.9	6.01	0.32	
	17.3	5.85	0.13	

Waterline	17.7	5.71	0
	18.1	5.4	
	18.7	5.19	
	19.4	4.96	
Bankfull	19.9	4.83	
	20.9	4.7	
	22.6	4.3	



COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (SQ ft)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.53	0.12	0.05	0.05	1.98
0.41	0.26	0.1	0.1	3.81
0.4	0.22	0.09	0.09	3.22
0.4	0.28	0.11	0.11	4.1
0.4	0.3	0.12	0.12	4.4
0.4	0.31	0.12	0.12	4.54
0.4	0.38	0.15	0.15	5.57
0.4	0.4	0.16	0.16	5.86
0.4	0.34	0.14	0.14	4.98
0.4	0.32	0.13	0.13	4.69
0.41	0.31	0.12	0.12	4.54
0.41	0.38	0.15	0.15	5.57
0.4	0.39	0.16	0.16	5.71
0.41	0.44	0.18	0.18	6.45
0.4	0.51	0.2	0.21	7.47
0.4	0.46	0.18	0.19	6.74
0.4	0.49	0.2	0.2	7.18
0.4	0.45	0.18	0.18	6.59
0.42	0.32	0.13	0.13	4.69
0.43	0.13	0.05	0.05	1.91

0.42	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

DISCLAIMER

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R2Cross RESULTS

Stream Name: Rincon La Vaca
Stream Locations: D/s of Weminuche Pass Ditch
Fieldwork Date: 09/29/2020
Cross-section: 2
Observers: Scheel Fields-Sommers Birch Unterreiner
Coordinate System: UTM Zone 13
X (easting): 294155
Y (northing): 4171489
Date Processed: 12/07/2020
Slope: 0.0231
Computation method: Manning's n
R2Cross data filename: R2CrossData-RinconLaVaca-4-9-29-2020_Q=3.4337.xlsx
R2Cross version: 1.0.30

LOCATION

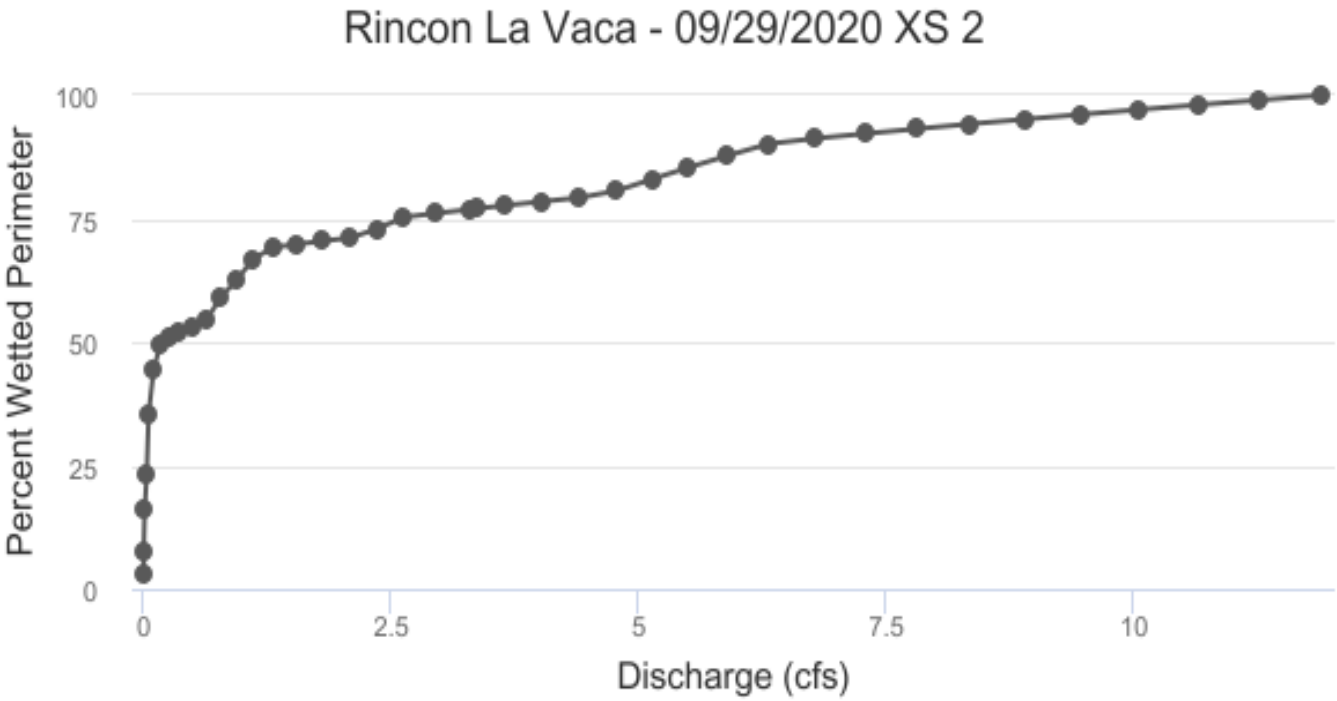
ANALYSIS RESULTS

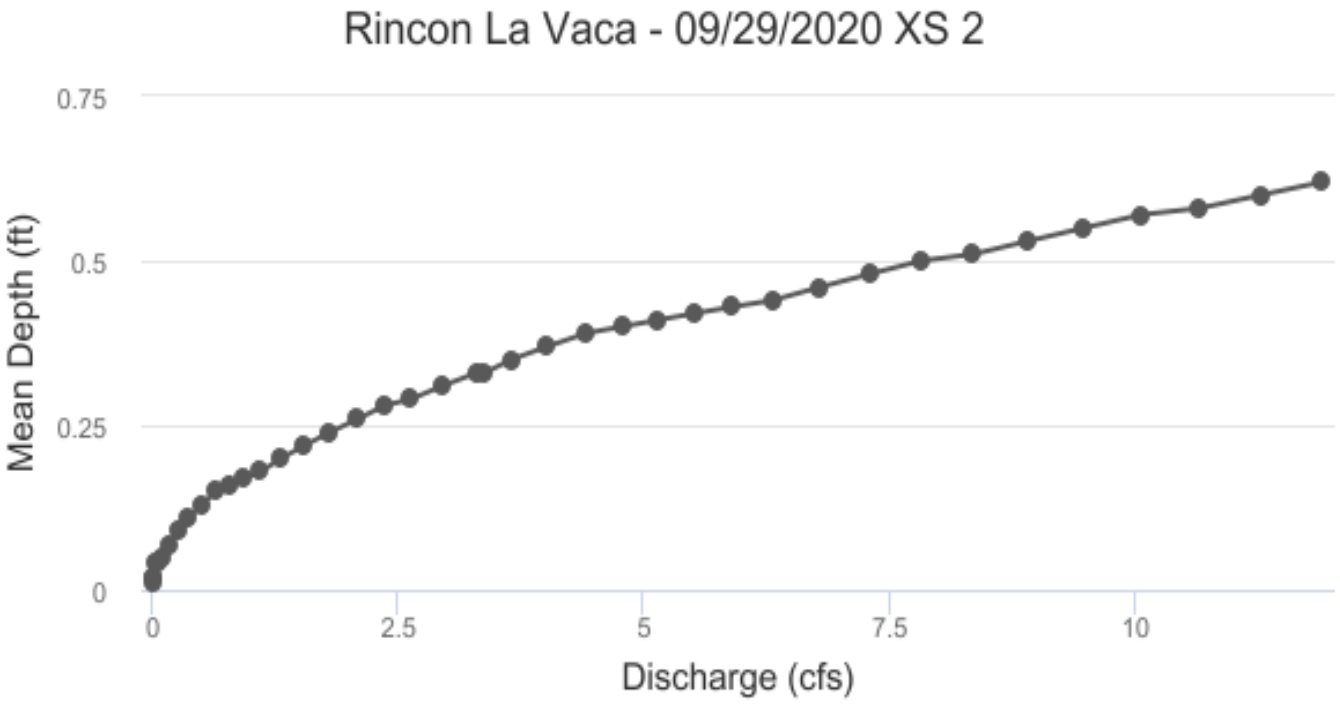
Habitat Criteria Results

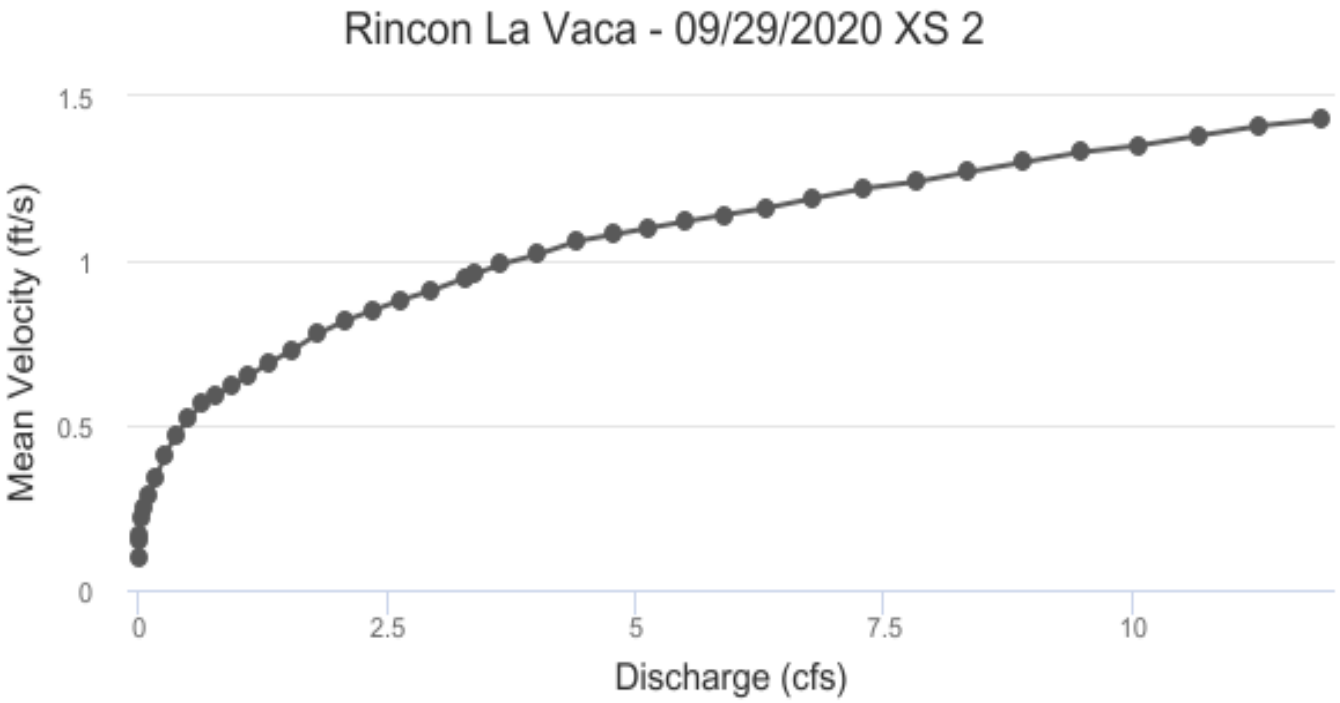
Bankfull top width (ft) = 13.5

	Habitat Criteria	Discharge (cfs) Meeting Criteria
Mean Depth (ft) **	0.2	1.32
Percent Wetted Perimeter (%) **	50.0	0.18
Mean Velocity (ft/s)	1.0	3.79

**Values highlighted in yellow indicate that the discharge is less than 40% of measured Q or greater than 250% of measured Q.




Rincon La Vaca - 09/29/2020 XS 2
Mean Depth (ft)
0.75
0.5
0.25
0
0
2.5
5
7.5
10
Discharge (cfs)


Rincon La Vaca - 09/29/2020 XS 2
Mean Velocity (ft/s)
1.5
1
0.5
0
0
2.5
5
7.5
10
Discharge (cfs)

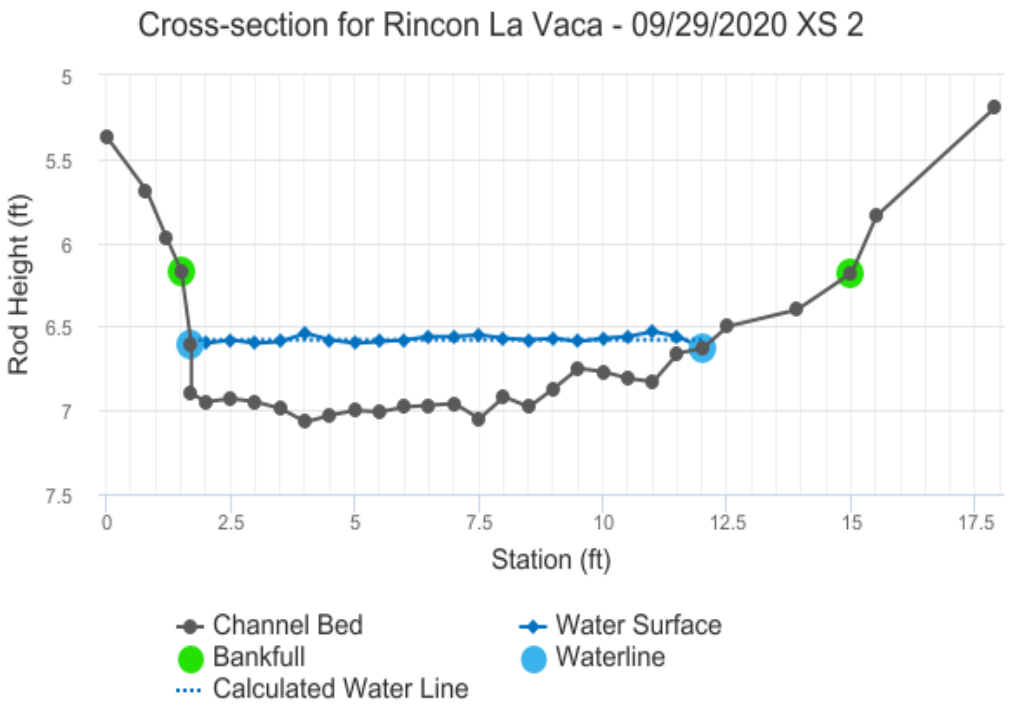
STAGING TABLE

Feature	Distance to Water (ft)	Top Width (ft)	Mean Depth (ft)	Maximum Depth (ft)	Area (SQ ft)	Wetted Perimeter (ft)	Percent Wetted Perimeter	Hydraulic Radius (ft)	Mean Velocity (ft/s)	Discharge (cfs)
Bankfull	6.18	13.5	0.62	0.89	8.32	14.21	100.00%	0.59	1.43	11.91
	6.2	13.37	0.6	0.87	8.02	14.07	99.03%	0.57	1.41	11.28
	6.22	13.25	0.58	0.85	7.72	13.93	98.06%	0.55	1.38	10.66
	6.25	13.13	0.57	0.82	7.43	13.79	97.09%	0.54	1.35	10.06
	6.27	13.01	0.55	0.8	7.14	13.66	96.12%	0.52	1.33	9.48
	6.29	12.89	0.53	0.78	6.85	13.52	95.15%	0.51	1.3	8.91
	6.31	12.77	0.51	0.76	6.56	13.38	94.18%	0.49	1.27	8.35
	6.34	12.65	0.5	0.73	6.28	13.24	93.21%	0.47	1.24	7.82
	6.36	12.52	0.48	0.71	6.0	13.1	92.23%	0.46	1.22	7.3
	6.38	12.4	0.46	0.69	5.72	12.97	91.26%	0.44	1.19	6.79
	6.4	12.26	0.44	0.67	5.45	12.81	90.14%	0.43	1.16	6.31
	6.42	11.94	0.43	0.65	5.18	12.47	87.77%	0.42	1.14	5.9
	6.45	11.62	0.42	0.62	4.92	12.13	85.40%	0.41	1.12	5.51
	6.47	11.29	0.41	0.6	4.66	11.8	83.03%	0.4	1.1	5.14
	6.49	10.97	0.4	0.58	4.42	11.46	80.66%	0.39	1.08	4.78
	6.51	10.79	0.39	0.56	4.17	11.26	79.26%	0.37	1.06	4.41
	6.54	10.7	0.37	0.53	3.93	11.15	78.46%	0.35	1.02	4.02
	6.56	10.6	0.35	0.51	3.7	11.03	77.67%	0.34	0.99	3.65
Waterline	6.58	10.53	0.33	0.49	3.52	10.95	77.07%	0.32	0.96	3.38
	6.58	10.5	0.33	0.49	3.46	10.92	76.88%	0.32	0.95	3.3
	6.6	10.41	0.31	0.47	3.23	10.81	76.08%	0.3	0.91	2.95
	6.62	10.32	0.29	0.45	3.0	10.7	75.30%	0.28	0.88	2.63
	6.65	10.01	0.28	0.42	2.77	10.37	72.97%	0.27	0.85	2.36
	6.67	9.77	0.26	0.4	2.55	10.1	71.11%	0.25	0.82	2.09
	6.69	9.71	0.24	0.38	2.34	10.01	70.47%	0.23	0.78	1.81

	6.71	9.64	0.22	0.36	2.12	9.92	69.82%	0.21	0.73	1.55
	6.74	9.58	0.2	0.33	1.91	9.83	69.18%	0.19	0.69	1.31
	6.76	9.26	0.18	0.31	1.7	9.49	66.78%	0.18	0.65	1.1
	6.78	8.68	0.17	0.29	1.5	8.88	62.50%	0.17	0.62	0.94
	6.8	8.25	0.16	0.27	1.31	8.41	59.22%	0.16	0.59	0.78
	6.83	7.62	0.15	0.24	1.13	7.76	54.60%	0.15	0.57	0.64
	6.85	7.39	0.13	0.22	0.97	7.51	52.83%	0.13	0.52	0.5
	6.87	7.3	0.11	0.2	0.8	7.39	52.01%	0.11	0.47	0.37
	6.89	7.2	0.09	0.18	0.64	7.26	51.12%	0.09	0.41	0.26
	6.91	7.01	0.07	0.16	0.48	7.06	49.72%	0.07	0.34	0.17
	6.94	6.25	0.05	0.13	0.33	6.3	44.32%	0.05	0.29	0.1
	6.96	5.02	0.04	0.11	0.21	5.05	35.55%	0.04	0.25	0.05
	6.98	3.24	0.04	0.09	0.12	3.27	23.02%	0.04	0.22	0.03
	7.0	2.25	0.02	0.07	0.06	2.27	15.98%	0.02	0.17	0.01
	7.03	1.08	0.02	0.04	0.02	1.09	7.70%	0.02	0.15	0.0
	7.05	0.44	0.01	0.02	0.0	0.44	3.11%	0.01	0.1	0.0

MODEL SUMMARY

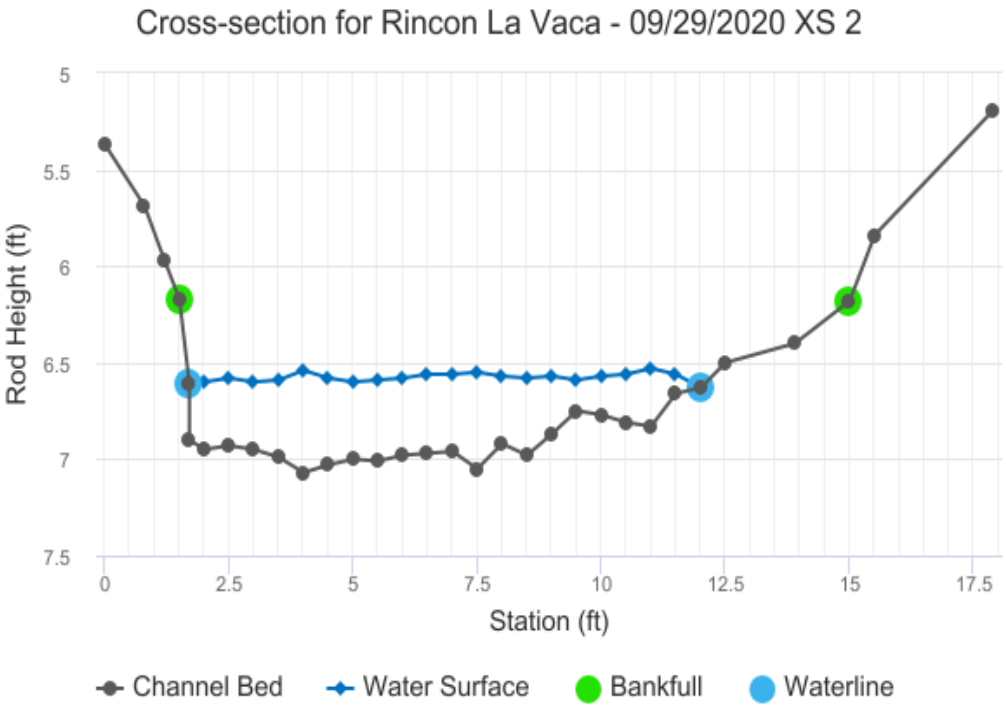
Measured Flow (Qm) =	3.43
Calculated Flow (Qc) =	3.38
(Qm-Qc)/Qm * 100 =	1.56%
Measured Waterline (WLm) =	6.62
Calculated Waterline (WLc) =	6.58
(WLm-WLc)/WLm * 100 =	0.68%
Max Measured Depth (Dm) =	0.53
Max Calculated Depth (Dc) =	0.49
(Dm-Dc)/Dm * 100 =	6.62%
Mean Velocity =	0.96
Manning's n =	0.111
0.4 * Qm =	1.37
2.5 * Qm =	8.58



FIELD DATA

Feature	Station (ft)	Rod Height (ft)	Water depth (ft)	Velocity (ft/s)
	0	5.37		
	0.8	5.69		
	1.2	5.97		
Bankfull	1.5	6.17		
Waterline	1.7	6.61	0	
	1.7	6.9	0.3	
	2	6.95	0.35	
	2.5	6.93	0.35	
	3	6.95	0.35	
	3.5	6.99	0.4	
	4	7.07	0.53	
	4.5	7.03	0.45	
	5	7	0.4	
	5.5	7.01	0.42	
	6	6.98	0.4	
	6.5	6.97	0.41	
	7	6.96	0.4	
	7.5	7.05	0.5	
	8	6.92	0.35	
	8.5	6.98	0.4	
	9	6.87	0.3	
	9.5	6.75	0.16	
	10	6.77	0.2	
	10.5	6.81	0.25	
	11	6.83	0.3	
	11.5	6.66	0.1	
Waterline	12	6.63	0	
	12.5	6.5		
	13.9	6.4		
Bankfull	15	6.18		

	15.5	5.84
	17.9	5.19



COMPUTED FROM MEASURED FIELD DATA

Wetted Perimeter (ft)	Water Depth (ft)	Area (SQ ft)	Discharge (cfs)	Percent Discharge
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0.29	0.3	0.04	0.04	1.28
0.3	0.35	0.14	0.14	3.98
0.5	0.35	0.17	0.17	4.97
0.5	0.35	0.17	0.17	4.97
0.5	0.4	0.2	0.2	5.68
0.51	0.53	0.27	0.26	7.53
0.5	0.45	0.23	0.22	6.39
0.5	0.4	0.2	0.2	5.68
0.5	0.42	0.21	0.2	5.97
0.5	0.4	0.2	0.2	5.68
0.5	0.41	0.2	0.2	5.82
0.5	0.4	0.2	0.2	5.68
0.51	0.5	0.25	0.24	7.1
0.52	0.35	0.17	0.17	4.97
0.5	0.4	0.2	0.2	5.68
0.51	0.3	0.15	0.15	4.26
0.51	0.16	0.08	0.08	2.27
0.5	0.2	0.1	0.1	2.84
0.5	0.25	0.12	0.12	3.55
0.5	0.3	0.15	0.15	4.26
0.53	0.1	0.05	0.05	1.42
0.5	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

0	0	0	0	0
0	0	0	0	0

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Discharge Measurment Field Visit Data Report *(Filters: Name begins with Los Pinos River; Division = 7;)*

Div	Name	CWCB Case Number	Segment ID	Meas. Date	UTM	Location	Flow Amount (cfs)	Meas #	Rating	Station ID
7	Los Pinos River		18/7/A-002	09/29/2020	UTMx: 294146 UTMy: 4171543	Rincon La Vaca Creek, 100ft to 500ft downstream of diversion strucutre.	3.43	2	Good	
7	Los Pinos River		18/7/A-002	09/29/2020	UTMx: 294320 UTMy: 4171428	Rincon La Vaca Creek, 100ft to 500ft downstream of diversion strucutre.	2.75	1	Good	

Discharge Measurement Summary

Site name	Rinconlv
Site number	01
Operator(s)	Kb
File name	Rinconlv_20200929-104121.ft
Comment	

Start time	9/29/2020 9:59 AM
End time	9/29/2020 10:36 AM
Start location latitude	37.667
Start location longitude	-107.332
Calculations engine	FlowTracker2

Sensor type	Top Setting
Handheld serial number	FT2H1747037
Probe serial number	FT2P1747048
Probe firmware	1.30
Handheld software	1.7

# Stations	Avg interval (s)	Total discharge (ft³/s)
22	40	2.754

Total width (ft)	Total area (m²)	Wetted Perimeter (ft)
5.350	0.367	5.574

Mean SNR (dB)	Mean depth (ft)	Mean velocity (m/s)
30.978	0.739	0.212

Mean temp (°C)	Max depth (ft)	Max velocity (m/s)
2.928	0.830	0.315

Discharge Uncertainty		
Category	**ISO**	**IVE**
Accuracy	1.0%	1.0%
Depth	0.4%	3.2%
Velocity	0.5%	4.1%
Width	0.1%	0.1%
Method	1.8%	
# Stations	2.3%	
Overall	**3.2%**	**5.3%**

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

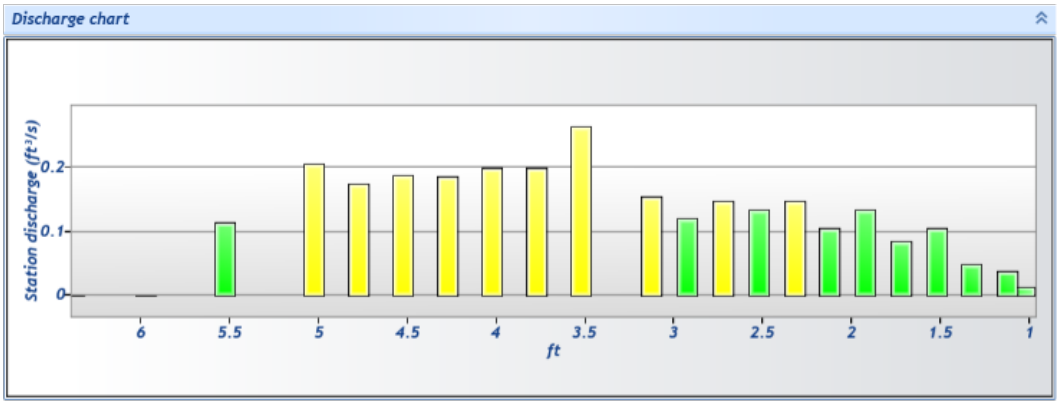
Summary overview

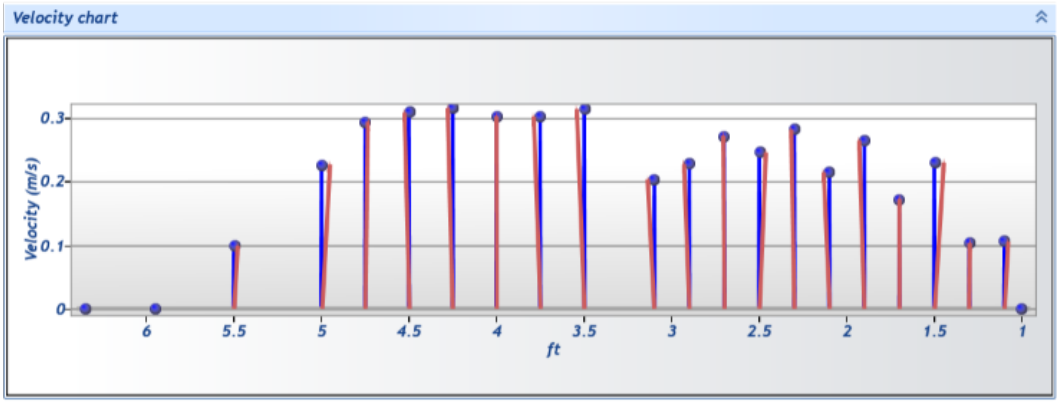
No changes were made to this file
Quality control warnings

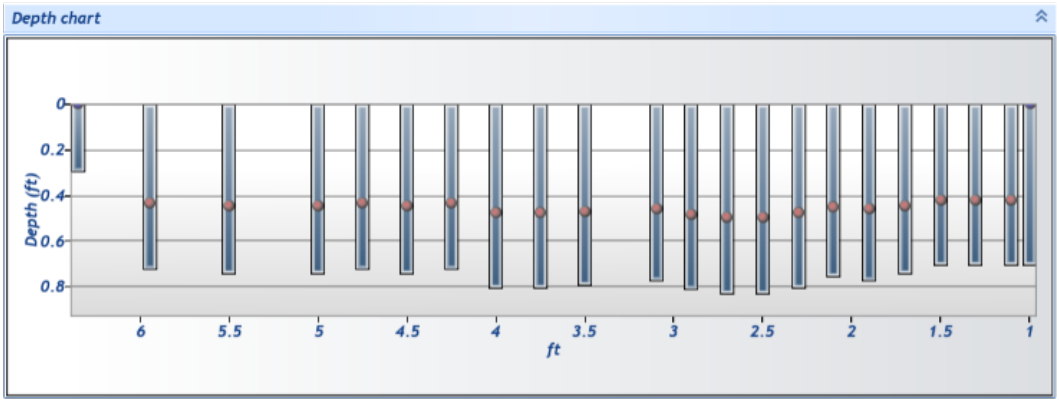
Discharge Measurement Summary

Site name	Rinconlv
Site number	01
Operator(s)	Kb
File name	Rinconlv_20200929-104121.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.000%
Station discharge caution	5.000% >= Station discharge < 10.000%
Station discharge warning	Station discharge >= 10.000%







Discharge Measurement Summary

Site name	Rinconlv
Site number	01
Operator(s)	Kb
File name	Rinconlv_20200929-104121.ft
Comment	

Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (m/s)	Correction	Mean Velocity (m/s)	Area (m²)	Flow (ft³/s)	%Q	
0	9:59 AM	1.000	None	0.700	0.000	0.000	0	0.000	1.000	0.105	0.003	0.012	0.439	✓
1	10:03 AM	1.100	0.6	0.700	0.600	0.420	80	0.105	1.000	0.105	0.010	0.036	1.317	✓
2	10:05 AM	1.300	0.6	0.700	0.600	0.420	80	0.104	1.000	0.104	0.013	0.048	1.729	✓
3	10:07 AM	1.500	0.6	0.700	0.600	0.420	80	0.229	1.000	0.229	0.013	0.105	3.823	✓
4	10:08 AM	1.700	0.6	0.740	0.600	0.444	80	0.172	1.000	0.172	0.014	0.084	3.040	✓
5	10:10 AM	1.900	0.6	0.770	0.600	0.462	80	0.264	1.000	0.264	0.014	0.133	4.843	✓
6	10:14 AM	2.100	0.6	0.750	0.600	0.450	80	0.214	1.000	0.214	0.014	0.105	3.824	✓
7	10:16 AM	2.300	0.6	0.800	0.600	0.480	80	0.281	1.000	0.281	0.015	0.148	5.356	✓
8	10:17 AM	2.500	0.6	0.830	0.600	0.498	80	0.245	1.000	0.245	0.015	0.133	4.846	✓
9	10:18 AM	2.700	0.6	0.830	0.600	0.498	80	0.272	1.000	0.272	0.015	0.148	5.372	✓
10	10:21 AM	2.900	0.6	0.810	0.600	0.486	80	0.227	1.000	0.227	0.015	0.121	4.378	✓
11	10:22 AM	3.100	0.6	0.770	0.600	0.462	80	0.203	1.000	0.203	0.021	0.154	5.585	✓
12	10:23 AM	3.500	0.6	0.790	0.600	0.474	80	0.313	1.000	0.313	0.024	0.264	9.587	✓
13	10:34 AM	3.750	0.6	0.800	0.600	0.480	80	0.302	1.000	0.302	0.019	0.198	7.185	✓
14	10:24 AM	4.000	0.6	0.800	0.600	0.480	80	0.302	1.000	0.302	0.019	0.198	7.204	✓
15	10:32 AM	4.250	0.6	0.720	0.600	0.432	80	0.315	1.000	0.315	0.017	0.186	6.752	✓
16	10:26 AM	4.500	0.6	0.740	0.600	0.444	80	0.308	1.000	0.308	0.017	0.187	6.788	✓
17	10:36 AM	4.750	0.6	0.720	0.600	0.432	80	0.294	1.000	0.294	0.017	0.173	6.296	✓
18	10:27 AM	5.000	0.6	0.740	0.600	0.444	80	0.227	1.000	0.227	0.026	0.206	7.490	✓
19	10:28 AM	5.500	0.6	0.740	0.600	0.444	80	0.099	1.000	0.099	0.033	0.114	4.149	✓
20	10:30 AM	5.950	0.6	0.720	0.600	0.432	80	0.000	1.000	0.000	0.028	0.000	-0.003	✓
21	10:32 AM	6.350	None	0.290	0.000	0.000	0	0.000	1.000	0.000	0.005	0.000	-0.001	✓

Discharge Measurement Summary

Site name	Rinconlv
Site number	01
Operator(s)	Kb
File name	Rinconlv_20200929-104121.ft
Comment	

Quality Control Settings	
Maximum depth change	50.000%
Maximum spacing change	100.000%
SNR threshold	10.000 dB
Standard error threshold	0.010 m/s
Spike threshold	10.000%
Maximum velocity angle	20.000 deg
Maximum tilt angle	5.000 deg

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
20	10:30 AM	5.950	0.6	0.720	0.600	0.432	SNR Threshold Variation

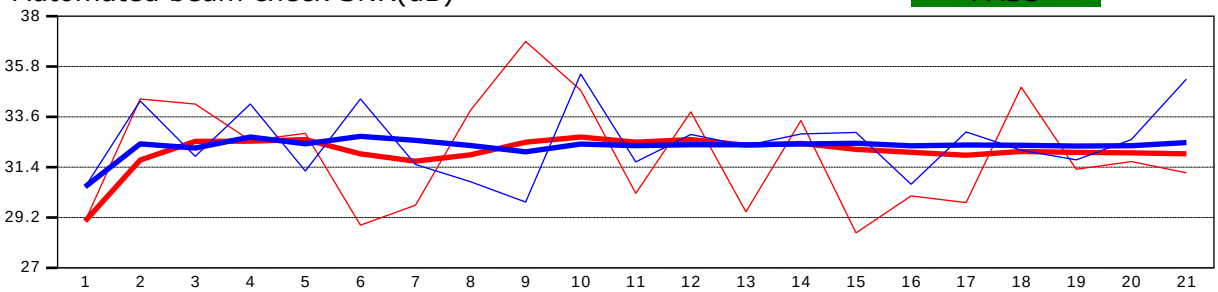
Discharge Measurement Summary

Site name	Rinconlv
Site number	01
Operator(s)	Kb
File name	Rinconlv_20200929-104121.ft
Comment	

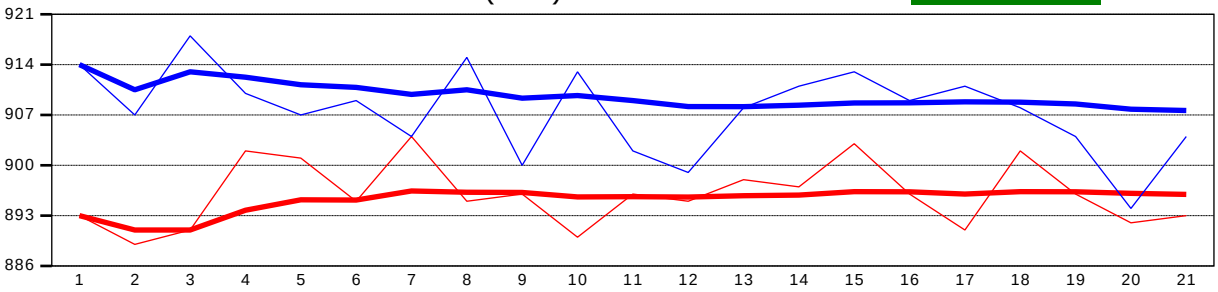
Beam 1	
Beam 2	

Automated beam check Start time 9/29/2020 10:38:26 AM

Automated beam check SNR(dB) PASS



Automated beam check Noise level(cnts) PASS



Automated beam check Quality control warnings
No quality control warnings

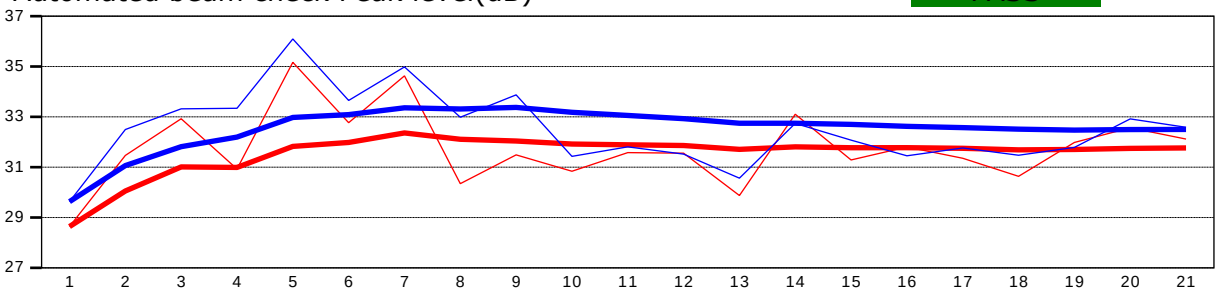
Discharge Measurement Summary

Site name	Rinconlv
Site number	01
Operator(s)	Kb
File name	Rinconlv_20200929-104121.ft
Comment	

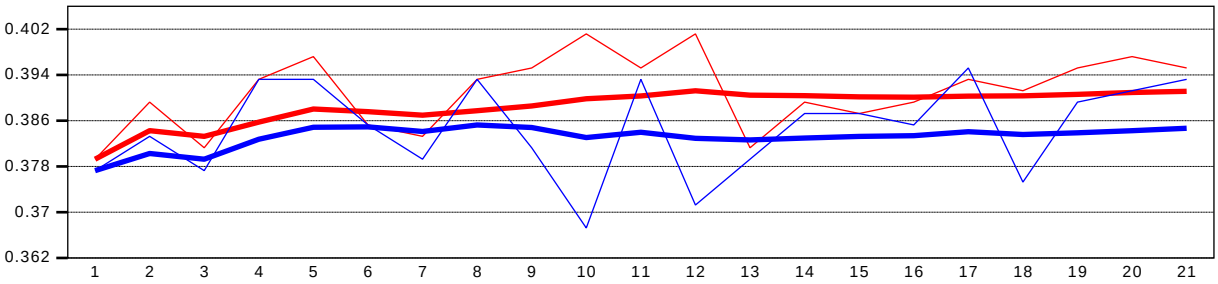
Beam 1	
Beam 2	

Automated beam check Start time 9/29/2020 10:38:26 AM

Automated beam check Peak level(dB) PASS



Automated beam check Peak position(ft) PASS



Automated beam check Quality control warnings

No quality control warnings

Discharge Measurement Summary

Site name	RlavacaUpper
Site number	92920202
Operator(s)	Lfs
File name	RlavacaUpper_20200929-112824.ft
Comment	

Start time	9/29/2020 10:57 AM
End time	9/29/2020 11:25 AM
Start location latitude	37.668
Start location longitude	-107.334
Calculations engine	FlowTracker2

Sensor type	Top Setting
Handheld serial number	FT2H1747037
Probe serial number	FT2P1747048
Probe firmware	1.30
Handheld software	1.7

# Stations	Avg interval (s)	Total discharge (ft³/s)
21	40	3.434

Total width (ft)	Total area (m²)	Wetted Perimeter (ft)
5.900	0.249	6.167

Mean SNR (dB)	Mean depth (ft)	Mean velocity (m/s)
40.957	0.454	0.391

Mean temp (°C)	Max depth (ft)	Max velocity (m/s)
4.469	0.810	0.689

Discharge Uncertainty		
Category	**ISO**	**IVE**
Accuracy	1.0%	1.0%
Depth	0.4%	5.1%
Velocity	0.6%	5.7%
Width	0.1%	0.1%
Method	1.8%	
# Stations	2.4%	
Overall	**3.2%**	**7.7%**

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

Summary overview

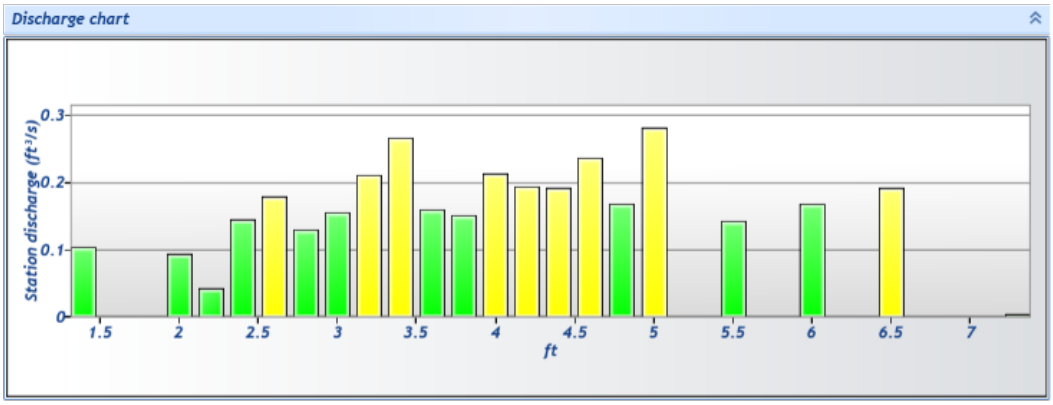
No changes were made to this file
Quality control warnings

Discharge Measurement Summary

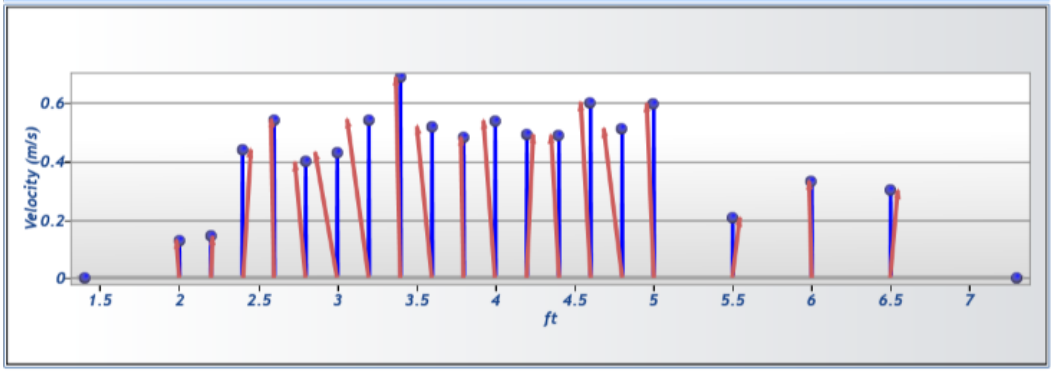
Site name	RlavacaUpper
Site number	92920202
Operator(s)	Lfs
File name	RlavacaUpper_20200929-112824.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.000%
Station discharge caution	5.000% >= Station discharge < 10.000%
Station discharge warning	Station discharge >= 10.000%

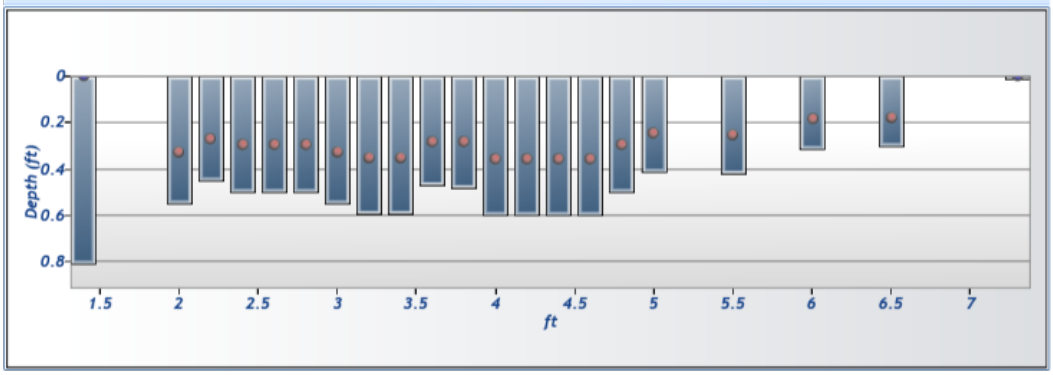
Discharge chart



Velocity chart



Depth chart



Discharge Measurement Summary

Site name	RlavacaUpper
Site number	92920202
Operator(s)	Lfs
File name	RlavacaUpper_20200929-112824.ft
Comment	

Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (m/s)	Correction	Mean Velocity (m/s)	Area (m²)	Flow (ft³/s)	%Q	
0	10:57 AM	1.400	None	0.810	0.000	0.000	0	0.000	1.000	0.130	0.023	0.104	3.024	✓
1	10:58 AM	2.000	0.6	0.550	0.600	0.330	80	0.130	1.000	0.130	0.020	0.094	2.737	✓
2	11:00 AM	2.200	0.6	0.450	0.600	0.270	80	0.144	1.000	0.144	0.008	0.042	1.238	✓
3	11:02 AM	2.400	0.6	0.500	0.600	0.300	80	0.440	1.000	0.440	0.009	0.144	4.206	✓
4	11:03 AM	2.600	0.6	0.500	0.600	0.300	80	0.545	1.000	0.545	0.009	0.179	5.204	✓
5	11:04 AM	2.800	0.6	0.500	0.600	0.300	80	0.398	1.000	0.398	0.009	0.131	3.801	✓
6	11:05 AM	3.000	0.6	0.550	0.600	0.330	80	0.432	1.000	0.432	0.010	0.156	4.536	✓
7	11:07 AM	3.200	0.6	0.590	0.600	0.354	80	0.544	1.000	0.544	0.011	0.211	6.135	✓
8	11:08 AM	3.400	0.6	0.590	0.600	0.354	80	0.689	1.000	0.689	0.011	0.267	7.764	✓
9	11:09 AM	3.600	0.6	0.470	0.600	0.282	80	0.520	1.000	0.520	0.009	0.160	4.668	✓
10	11:11 AM	3.800	0.6	0.480	0.600	0.288	80	0.483	1.000	0.483	0.009	0.152	4.431	✓
11	11:12 AM	4.000	0.6	0.600	0.600	0.360	80	0.540	1.000	0.540	0.011	0.213	6.191	✓
12	11:13 AM	4.200	0.6	0.600	0.600	0.360	80	0.491	1.000	0.491	0.011	0.193	5.635	✓
13	11:14 AM	4.400	0.6	0.600	0.600	0.360	80	0.490	1.000	0.490	0.011	0.193	5.614	✓
14	11:17 AM	4.600	0.6	0.600	0.600	0.360	80	0.603	1.000	0.603	0.011	0.237	6.916	✓
15	11:16 AM	4.800	0.6	0.500	0.600	0.300	80	0.513	1.000	0.513	0.009	0.168	4.904	✓
16	11:19 AM	5.000	0.6	0.410	0.600	0.246	80	0.598	1.000	0.598	0.013	0.282	8.203	✓
17	11:20 AM	5.500	0.6	0.420	0.600	0.252	80	0.207	1.000	0.207	0.020	0.143	4.153	✓
18	11:22 AM	6.000	0.6	0.310	0.600	0.186	80	0.333	1.000	0.333	0.014	0.169	4.926	✓
19	11:23 AM	6.500	0.6	0.300	0.600	0.180	80	0.300	1.000	0.300	0.018	0.192	5.597	✓
20	11:25 AM	7.300	None	0.010	0.000	0.000	0	0.000	1.000	0.300	0.000	0.004	0.115	✓

Discharge Measurement Summary

Site name	RlavacaUpper
Site number	92920202
Operator(s)	Lfs
File name	RlavacaUpper_20200929-112824.ft
Comment	

Quality Control Settings	
Maximum depth change	50.000%
Maximum spacing change	100.000%
SNR threshold	10.000 dB
Standard error threshold	0.010 m/s
Spike threshold	10.000%
Maximum velocity angle	20.000 deg
Maximum tilt angle	5.000 deg

Quality control warnings

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
2	11:00 AM	2.200	0.6	0.450	0.600	0.270	Boundary Interference,Standard Error > QC
3	11:02 AM	2.400	0.6	0.500	0.600	0.300	Stn Spacing > QC,Standard Error > QC
4	11:03 AM	2.600	0.6	0.500	0.600	0.300	Standard Error > QC
5	11:04 AM	2.800	0.6	0.500	0.600	0.300	Standard Error > QC
6	11:05 AM	3.000	0.6	0.550	0.600	0.330	Standard Error > QC
7	11:07 AM	3.200	0.6	0.590	0.600	0.354	Standard Error > QC
8	11:08 AM	3.400	0.6	0.590	0.600	0.354	Standard Error > QC
12	11:13 AM	4.200	0.6	0.600	0.600	0.360	Standard Error > QC
13	11:14 AM	4.400	0.6	0.600	0.600	0.360	Standard Error > QC
17	11:20 AM	5.500	0.6	0.420	0.600	0.252	Standard Error > QC
18	11:22 AM	6.000	0.6	0.310	0.600	0.186	Standard Error > QC

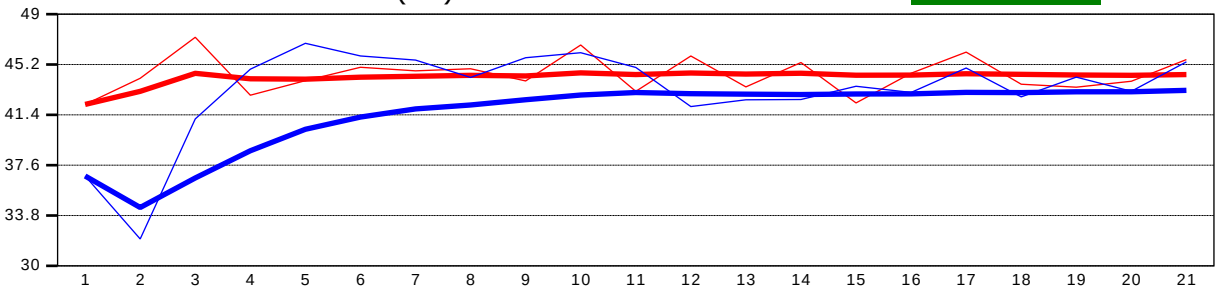
Discharge Measurement Summary

Site name	RlavacaUpper
Site number	92920202
Operator(s)	Lfs
File name	RlavacaUpper_20200929-112824.ft
Comment	

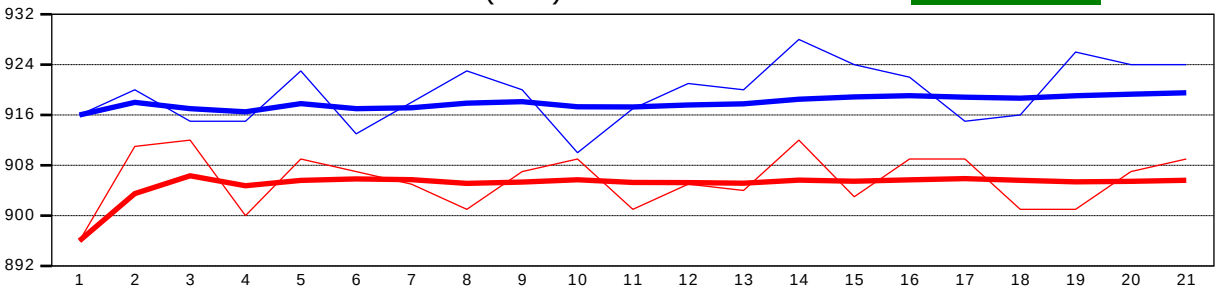
Beam 1	
Beam 2	

Automated beam check Start time 9/29/2020 10:55:36 AM

Automated beam check SNR(dB) PASS



Automated beam check Noise level(cnts) PASS



Automated beam check Quality control warnings

No quality control warnings

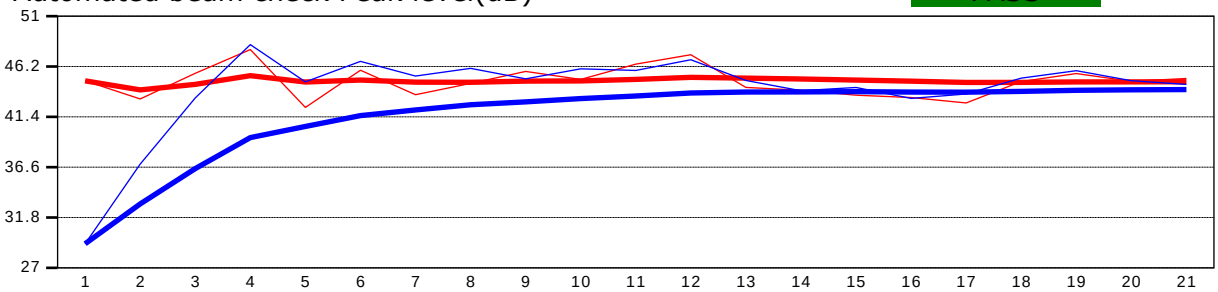
Discharge Measurement Summary

Site name	RlavacaUpper
Site number	92920202
Operator(s)	Lfs
File name	RlavacaUpper_20200929-112824.ft
Comment	

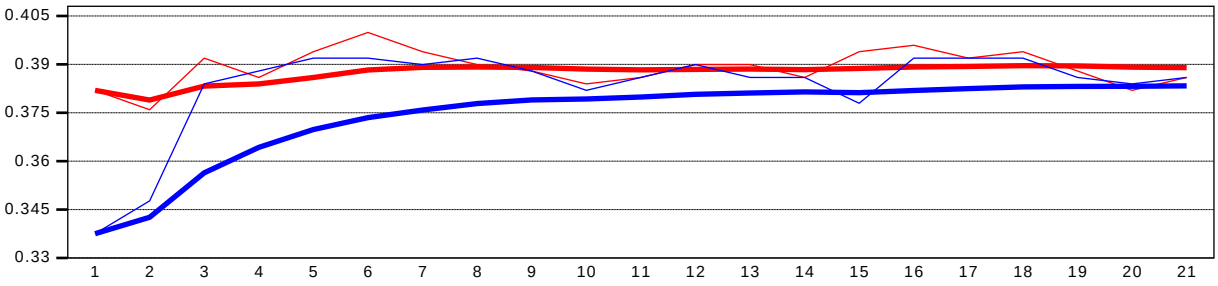
Beam 1	
Beam 2	

Automated beam check Start time 9/29/2020 10:55:36 AM

Automated beam check Peak level(dB) PASS



Automated beam check Peak position(ft) PASS



Automated beam check Quality control warnings

No quality control warnings

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