USDA United States Department of Agriculture | Forest Service | San Juan National Forest

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File Code: 2500
Date: March 6, 2017

Linda Bassi
Section Chief
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, Colorado 80203

Dear Ms. Bassi:

The U.S.D.A. Forest Service ("Forest Service") is writing this letter to formally communicate its recommendation for an instream flow water right on Vallecito Creek pursuant to the rules of the Colorado Instream Flow and Natural Lake Level Program. The stream is located in Colorado Water Division 7.

Natural Environment: The natural environment of lower Vallecito Creek consists of resident self-sustaining populations of rainbow, brown, brook trout, as well as hybridized cutthroat trout. The fishery within this reach is an important part of the aquatic ecosystem of Vallecito Creek and is heavily used for recreational fishing. Vallecito Creek is one of several streams that flows into Vallecito Reservoir; all of these streams serve as important spawning habitat for the resident fishery in this reservoir. The natural environment also consists of various aquatic macroinvertebrates, water dependent wildlife habitat, and healthy riparian vegetation.

Location and Land Status: Vallecito Creek originates at the Continental Divide near Hunchback Pass. Vallecito Creek drains into Vallecito Reservoir and is tributary to the Los Pinos River. Vallecito Creek is located in both La Plata County and San Juan County. The recommended reach is approximately 0.5 miles in length and is entirely located on lands managed by the San Juan National Forest.

Segment: The recommended reach begins at the Weminuche Wilderness boundary and extends to the National Forest Boundary upstream of Vallecito Reservoir.
Upper Terminus Weminuche Wilderness Boundary:
Latitude: 37°28'38.237" N Longitude: 107°32'38.482" W
Lower Terminus Forest Service Boundary:
Latitude: 37°28'17.272" N Longitude: 107°32'51.509" W

Biological Summary: Vallecito Creek is a cold-water, moderate-to-high gradient mountain stream. The recommended reach is located in a moderately confined channel with medium to large-sized substrate including many large boulders and some bedrock outcrops. In general, stream condition is good to excellent. Aquatic habitat is comprised of a good mix of riffles, pools, and runs. The riparian corridor has variable width and diversity throughout the reach and is dominated by mixed conifer forest with scattered narrow leaf cottonwood and aspen. The primary understory species are red-osier dogwood and willow.

Fishery surveys were conducted by Colorado Division of Wildlife in 1977, and 1995. These samples documented self-sustaining populations of rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo truta*), brook trout (*Salvelinus fontinalis)* and hybridized cutthroat trout (*Oncorhynchus clarki spp.*).

R2Cross Analysis: In 2016, the Forest Service collected standard R2Cross data and pebble counts at several riffle cross sections in the proposed reach of Vallecito Creek. Data was collected and analyzed using the methodology described in the June 2006 CWCB R2Cross Manual and was processed using the 2008 version of the R2Cross model.

R2Cross can be run using a constant Manning's n that is calculated by the program, or Manning's n can be defined using field measurements of channel roughness. The R2Cross model results, using a constant Manning's n roughness coefficient, are valid or "in range" when the model output yields summer and winter flow recommendations between 0.4 and 2.5 times the stream discharge measured at the time of field survey. The Forest Service collected standard pebble count data at each R2Cross cross section on Vallecito Creek in order to calculate Manning's n roughness coefficient. Pebble counts were used to calculate Manning's n only where initial analysis indicated R2Cross model results were not "in range". For Vallecito Creek, where model results were not in range, the R2Cross field data was processed using the R2Cross model subroutine for a Thorne-Zevenbergen Staging Table. This allowed full utilization of the R2Cross field data collected in 2016. The table below shows a combination of model outputs using the fixed Manning's n subroutine and outputs from the user-defined Thorne-Zevenbergen Manning's n subroutine.

R2Cross Model Results for Vallecito Creek Outside Wilderness				
LOCATION	DATE OF DATA COLLECTION	CHANNEL TOP-WIDTH	2 OF 3 INSTREAM FLOW CRITERIA	3 OF 3 INSTREAM FLOW CRITERIA
Cross Section 1	8/25/2016	54.65 feet	*20.9 cfs	*21.6 cfs
Cross Section 2	8/29/2016	73.57 feet	*76.6 cfs	225.6 cfs
Cross Section 3	9/20/2016	55.24 feet	*21 cfs	*28.3 cfs
		Reach Average	**39.5 cfs**	**91.8 cfs**

* Results calculated using the R2Cross Thorne-Zevenbergen subroutine.

Biologic Instream Flow Recommendation
For the proposed reach of Vallecito Creek from the Weminuche Wilderness boundary to the National Forest boundary, the Forest Service recommends the following:

Biological Instream Flow Recommendation Vallecito Creek Outside Wilderness	
TIME PERIOD	FLOW AMOUNT
January 1 – March 15	20 cfs
March 16 – April 15	33 cfs
April 16 – August 31	92 cfs
September 1 – October 31	70 cfs
November 1 – November 15	45 cfs
November 16 – December 14	31 cfs
December 15 – December 31	25 cfs

Based on currently available data and information the Forest Service has determined these are the minimum flow amounts needed for fish population survival and to preserve the natural environment (described above) to a reasonable degree in the subject reach of Vallecito Creek.

Water Availability: All water rights on Vallecito Creek are located on private lands downstream of the recommended reach. There are no water rights on Vallecito Creek within or upstream of the recommended reach.

The CWCB conducts the analysis to determine if water is available for an instream flow appropriation. The Vallecito Creek stream gage located near the upper terminus of the recommended reach provided excellent information regarding water availability. Preliminary analysis indicates that, in general, water is available to meet the Forest Service instream flow recommendation.

The final assessment of water availability could result in reductions of the recommended flow rates and/or modifications of the Forest Service flow recommendation duration. If this is the case, and future investigations indicate additional water is available, the Forest Service would recommend appropriating the additional water up to the recommended flow amounts and duration to preserve the natural environment to a reasonable degree.

Relationship to Land Management Plans:
Forest Service watershed and aquatic habitat conservation is based on several key federal laws that set a consistent land-and-water stewardship vision (see Appendix). These laws direct Forest Service actions to protect watersheds and aquatic habitat through sound management. In addition, the San Juan Forest Plan calls for Vallecito Creek outside the Weminuche Wilderness to be managed to provide ecological conditions sufficient to support a diversity of native and desired non-native fish species and other aquatic biota in the long-term. It also directs that the management of riparian areas restore the composition, structure, and function of these

ecosystems. In addition, aquatic habitat should support well-distributed populations of vertebrate and invertebrate species.

Establishing an instream flow water right on Vallecito Creek pursuant to the Colorado Instream Flow and Natural Lake Level Program would assist in meeting the Forest Service management obligations and Forest Plan direction summarized above. Thank you for considering the Forest Service recommendation for Vallecito Creek, a stream with many important resource values including, recreation, aesthetics, wildlife, and aquatic species habitat. If you have any questions regarding our instream flow recommendation, please feel free to contact me or Forest Hydrologist Kelly Palmer at (970) 385-1232 or at kapalmer@fs.fed.us.

Sincerely,

Kara L Chadwick

KARA L. CHADWICK
Forest Supervisor

cc: Maribeth Gustafson, Steve Lohr, Anthony Madrid, Kelly Palmer

Appendix

LAWS, REGULATION, AND POLICY GUIDING U.S. FOREST SERVICE AQUATIC RESOURCE MANAGEMENT

Forest Service watershed and aquatic habitat conservation is based on several key federal laws (listed below in chronological order) that set a consistent land-and-water stewardship vision. These laws direct Forest Service actions to protect watersheds and aquatic habitat through sound management. Brief summaries of these laws and their direction for management related to watersheds and aquatic habitat are included below. Federal regulations contain the current interpretations and direction specific to these laws.

1. Organic Administration Act of 1897 (16 U.S.C. 475). This law defines original National Forest purposes to improve and protect the forest, secure favorable conditions of water flows, and furnish a continuous supply of timber. Years of concern about watershed damage led to creation of the National Forest System. Watersheds must be cared for to sustain their hydrologic function as "sponge-and-filter" systems that absorb and store water and naturally regulate runoff. The goals are good vegetation and ground cover, streams in dynamic equilibrium with their channels and flood plains, and natural conveyance of water and sediment.

2. Multiple Use-Sustained Yield Act of 1960 (16 U.S.C. 528). This law expands National Forest purposes to include watershed, wildlife and fish, outdoor recreation, range, and timber and to sustain native ecosystems. Renewable surface resources are to be managed for multiple use and sustained yield of the several products and services that they provide. The principles of multiple use and sustained yield include the provision that the productivity of the land shall not be impaired.

3. Endangered Species Act of 1973 (16 U.S.C. 1531-1536, 1538-1540). This law conserves endangered and threatened species of wildlife, fish, and plants and the ecosystems on which they depend. Federal agencies must conserve endangered and threatened species and cooperate with State and local agencies to resolve resource issues (Section 2). Each Federal agency shall, with the consultation and help of the Secretary of Interior, ensure that any action authorized, funded, or done by the agency is unlikely to jeopardize the continued existence of any endangered or threatened species or result in adverse modification of their critical habitat (Section 7).

4. National Forest Management Act of 1976 (16 U.S.C. 1600-1602, 1604, 1606, 1608-1614). The Forest Service must be a leader in conserving natural resources (Section 2). Programs must protect and, where appropriate, improve the quality of soil and water (Section 5). The overall goal of managing the National Forest System is to sustain the multiple uses of its renewable resources in perpetuity while maintaining the long-term productivity of the land. Maintaining or restoring the health of the land enables the National Forest System to provide a sustainable flow of uses, benefits, products, services and visitor opportunities (36 CFR 219.1 (2005)). The overall goal of the ecological element of sustainability is to provide a framework to contribute to sustaining native ecological systems by providing ecological conditions to support a diversity of native plant and animal species (36 CFR 219.10 (2005)).

Ecological conditions are the components of the biological and physical environment that can affect diversity of plant and animal communities and the productive capacity of ecological systems. These components could include the abundance and distribution of aquatic and terrestrial habitats, roads and other structural developments, human uses, and invasive, exotic species (36 CFR 219.16 (2005)).

5. Federal Land Policy and Management Act of 1976 (43 U.S.C. 1752). Rights-of-way for water diversion, storage, and/or distribution systems, and other uses must include terms and conditions to protect the environment and otherwise comply with the requirements of Section 505, including section (a) (ii): "minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment".

6. Clean Water Act of 1977 (33 U.S.C. 1251, 1254, 1323, 1324, 1329, 1342, 1344). This series of laws was written to restore and maintain the chemical, physical, and biological integrity of the Nation's waters (Section 101). Congress sought to sustain the integrity of water quality and aquatic habitat so that waters of the United States will support diverse, productive, stable aquatic ecosystems with a balanced range of aquatic habitats. All issues are framed by the intent of Congress to improve and preserve the quality of the Nation's waters (540 F2.d 1023; 543 F2.d 1198; 612 F2.d 1231; 97 S.Ct 1340; 97 S.Ct 1672).

Waters of the United States include perennial and intermittent streams, lakes, wetlands, and their tributaries. Aquatic ecosystems are waters of the United States that serve as habitat for interrelated and interacting communities and populations of plants and animals (40 CFR 230.3). Impacts to flow patterns, temperature, dissolved oxygen, sediment, and pollutant levels must be controlled (33 U.S.C. 1311 and 1314; 843 F2.d 1194; 753 F2.d 759). Physical features needed to support existing uses for anti-degradation include substrate, cover, flow, depth, pools, and riffles (40 CFR 131.10, 230.10, and 230.11).

7. Forest Plans. The purpose of the San Juan National Forest Land and Resource Management Plan (Forest Plan) is to provide strategic guidance for future management of all National Forest System lands managed by the San Juan National Forest. It provides a framework for informed decision making, while guiding resource management programs, practices, uses, and projects.

To ensure the long-term sustainability of ecosystems, humans must manage within the physical and biological capabilities of the land, maintain all of the ecological components and processes, and not irreversibly alter ecosystem integrity and resilience. The concept of sustainability is a fundamental component of the Forest Plan and is guided by the Multiple-Use Sustained-Yield Act (MUSY) and the Federal Land Policy and Management Act (FLPMA). Ecological sustainability is intended to provide the ecological conditions that maintain or restore the diversity of native ecosystems and natural disturbance processes. This in turn will maintain suitable habitats for a wide range of plant and animal species and provide for the diversity and viability of plant and animal species, populations and communities.

For lands managed by the USFS, the Planning Rule in 36 CFR 219.19 specifically requires that "[f]ish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area," and "[f]or planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to insure [sic] its continued existence is well distributed in the planning area." Regulation 36 CFR 219.26 requires that "[f]orest planning shall provide for diversity of plant and animal communities and tree species consistent with the overall multiple-use objectives of the planning area. Such diversity shall be considered throughout the planning process." In addition, the FLPMA specifies that special uses granted by the Secretary of Agriculture are subject to terms and conditions that "minimize damage to fish and wildlife habitat and otherwise protect the environment." Agency actions should avoid or minimize impacts to species whose viability has been identified as a concern. USFS actions must not result in loss of population viability or create significant trends toward federal listing (FSM 2670.32).

For riparian area and wetland ecosystems, aquatic ecosystems, and terrestrial ecosystems, specific management direction has been developed that is intended to address the legal, regulatory, and policy requirements for species diversity and population viability. The process applied was to identify a range of key ecosystem elements, determine the importance of those elements to maintaining species diversity and population viability (e.g. limiting factors), define desired future conditions and land management objectives for those elements, and ensure that appropriate management standards and guidelines are in place that address the ecological needs of species and populations. In general, management standards have been developed for those elements determined to have an overriding influence on species diversity or long-term population viability, while other elements that have less influence are typically addressed through the application of guidelines.

TOPOG MAPS: Vallecito Reservoir

Vallecito Creek

Southwest Region

Code No. 43884

Section No. 1

Date: 14 October 1977

Primary Drainage: Los Pinos River

Major Drainage: San Juan River, Code No. 40-SJ

Terminus: Lower

Location: Vallecito Reservoir

T 37 N, R 6 W, Sec. 33

measured flow: 93.6 cfs 10-31-84

Width: 50 ft. Elevation: 7665 ft. Flow: 65.4 c.f.s.
pH: 7.1 pHTH: 0 ppm MO: 16 ppm
Hardness: 4 ppm Conductivity: 96 Mohm/cm
Stream Profile: Yes
Water Temperature @ 14:30 - 44°F

Terminus: Upper

Location: Fall Creek Confluence

T 37 N, R 6 W, Sec. 16

Width: 40 ft. Elevation: 7916 ft. Flow: 65 c.f.s.
pH: 7.1 pHTH: 0 ppm MO: 16 ppm
Hardness: 4 ppm Conductivity: 96 Mohm/cm
Stream Profile: Yes
Water Temperature @ 14:30 - 44°F

SECTION SUMMARY

Meander Factor: 1.05 Length: 3.3 Miles

Width: 45 ft. Flow: Normal Acreage: 18.9

County: La Plata Miles: 3.3

Beaver Dams: None

Physical Stream Damage:
Channelizations: 50%

Accessibility:
Non-surfaced Car: 0.4 Miles
No Established Trail: 2.9 Miles

Land Status:
USFS: 0.3 Miles
Private-Closed: 0.5 Miles
Private-Open: 2.5 Miles

Stocking:
Creel Size: 2.8 Miles
None: 0.5 Miles

Aquatic Vegetation:
Filamentous Algae: Absent
Watercress: No

Stream Size:
Large Stream 36' - 59'

Gradient: 1.4%

Fishery Value: Poor

Fishery Value - Limiting Factors:
Low Temperature A-15
Flash Flood Area A-3
Lack of Reproduction B-4

FISH SAMPLING

Only Station

Elevation: 7900 ft.
Sampling Method: Electro-fishing - 50
Length: 300 ft.
Sampling: Inadequate
Scales Collected: No
Estimated % of Fish Biomass:
Rough Fish: 100%
Estimated % of Rough Fish Biomass
Cottids: 100%

ELECTRO-FISHING RECORD

Station No. 1: Campground
Distance: 300 ft. (0.2755 acre) Width: 40 ft.

Equipment Used: 110V AC

Personnel: Weiler, Nehring, Lashmett, Martinez, Rouch, Green

		SIZE LENGTH IN INCHES									
Sta.	Species	1	2	3	4	5	6	7	8	Total	Avg.
1	Sculpin		1	1	3					5	3.6

Comments: Wt. - 69 g. = ½#/Acre Netted
Too Much Water - Too Few People

CDOW STREAM SURVEY (1991 REVISION)
LEVEL 2 : FIELD SURVEY SUMMARY

STREAM: Vallecito Creek SEC#: 2 WATER CODE: 43896 CDOW REGION: SW
SURVEYORS: Mike Manzanares, Pete Vanderbilt DATE OF SURVEY: 09/21/95
SURVEY LOCATION: T: R: S: ELEVATION: STATION #:
UTM ZONE: 13S UTM X: 275072 UTM Y: 4150983
LOCATION DESCRIPTION: immediately above Fall Creek confluence
STREAM FLOW PROFILE (Y or N): N IF YES-DATE AND TYPE:
HABITAT EVALUATION (Y or N): N IF YES-DATE AND TYPE:
WATER CHEMISTRY ANALYSIS (Y or N): N IF YES-ATTACH SEPARATE ANALYSIS SHEET

FISH PRESENT (Y or N): Y POP. EST. METHOD: NA STATION LENGTH: NA (FEET)
AVG WIDTH: NA (FEET) TOTAL STATION AREA: NA (ACRES)
FLOW (CFS) AT TIME OF SURVEY: NA METHOD:
LIMITING FACTORS TO FISHERY: NA

COMMENTS: Purpose of this survey was to collect trout for whirling disease testing. All fish were sacrificed.

LENGTH-FREQUENCY RECORD (CM)

SPECIES	0 | 2	2 | 4	4 | 6	6 | 8	8 | 10	10 | 12	12 | 14	14 | 16	16 | 18	18 | 20	20 | 22	22 | 24	24 | 26	26 | 28	28 | 30	30 | 32	32 | 34	34 | 36	36 | 38	38 | 40	40 | 42	42 | 44	44 | 46	46 | 48	48 | 50	50 | UP
BRK				1		1			5	4	1															
LOC							3	1																		
NAT							1					1														
RBT											3															
INCHES	2		4		6		8		10		12		14		16		18		20							

SUMMARY INFORMATION

SPECIES	NO. FISH CAUGHT	AVG. LENGTH (CM)	LENGTH RANGE (CM)	AVG. WEIGHT (Grams)	WEIGHT RANGE (Grams)	% TOTAL CATCH	BIOMASS (LB/Acre)	DENSITY (Fish/Acre)	Density Conf. Interval
BRK	12	16.8 (6.6 in)	6.9-20.8	41 g	3-72 g	57 %	NA	NA	NA
LOC	4	13.6 (5.3 in)	12.8-14.2	21	15-25	19	NA	NA	NA
NAT	2	18 (7.1 in)	13.7-22.3	50	20-80	10	NA	NA	NA
RBT	3	21.3 (8.4 in)	20.5-21.9	101	90-115	14	NA	NA	NA

FISH COLLECTION RECORD

WATER: Vallecito Creek #1 CODE: 43884 STATION # A1 DATE: 10/27/95
LOCATION: several braided stream reaches directly west of 1995 kokanee trap site, about ½ mile above Vallecito Reservoir and bounded on upstream side by private property.
PERSONNEL: M. Japhet, P. Vanderbilt
GEAR TYPE: backpack shocker EFFORT: NA
LENGTH OF STATION: NA WIDTH: NA ACREAGE: NA
POP. ESTIMATE MADE? ____ YES __X__ NO

LENGTH-WEIGHT DATA FILE

SPECIES	LENGTH (cm)	WEIGHT (g)	SPECIES	LENGTH (cm)	WEIGHT (g)	SPECIES	LENGTH (cm)	WEIGHT (g)
BRK	10		BRK	7*		LOC	10	
	22			8			10	
	21			10			6	
	10			9			10	
	11			9			9	
	14			10			9	
	7*			7			9	
	7*			8			8	
	7			7			8	
	9			9			11	
	10			7			9	
	8			6			8	
	10						10	
	8		LOC	9			10	
	9			10			9	
	5**			18			10	
	9			10			9	
	7			17			8	
	7			16			8	
	7			8			7	
	7			8			7	
	8			8			7	
	8			10				

COMMENTS: Purpose of survey: A total of 35 brook trout and 32 brown trout were collected at this location for whirling disease testing. Brook and brown trout collected at this location in 10/94 tested positive for whirling disease. A small domestic sewage treatment plant releases effluent into this braided section of Vallecito Creek #1. The high water line of Vallecito Reservoir is immediately adjacent to this stream section, as evidenced by 2 fingerling northern pike which were also caught (and released) during electrofishing for these trout.
*these brook trout fingerlings had noticeably bulging eyes
**this fingerling brook trout had a shortened, deformed body

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Vallecito Creek						CROSS-SECTION NO.: R4-XS1	
CROSS-SECTION LOCATION: Near Vallecito Campground Picnic Area #							
DATE: 08/25/16	OBSERVERS: I. Cadiente, R. Sutton, H. McIntyre						
LEGAL DESCRIPTION	¼ SECTION: NW	SECTION: 16	TOWNSHIP: 37 (N)/S	RANGE: 6 E/(W)	PM: NMPM		
COUNTY: La Plata	WATERSHED: Vallecito	WATER DIVISION: 7	DOW WATER CODE: 43884				
MAP(S) USGS: VALLECITO RES							
MAP(S) USFS: SJNF - Visitors Map							

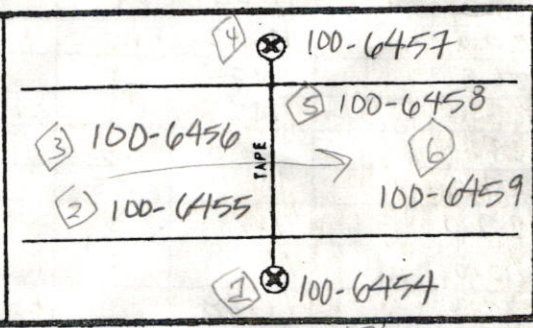
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: Marsh McBirney			
METER NUMBER:	DATE RATED:	CALIB/SPIN _____ sec	TAPE WEIGHT _____ lbs/foot	TAPE TENSION _____ lbs
CHANNEL BED MATERIAL SIZE RANGE	PHOTOGRAPHS TAKEN (YES/NO)	NUMBER OF PHOTOGRAPHS: 5		

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	
② WS Upstream	15.0 TOTL	10.74
③ WS Downstream	LENGTH	11.01
SLOPE	11.01 − 10.74 = 0.27 / 15.0 = 0.018	

SKETCH



LEGEND: Stake ⊗, Station ①, Photo ◇, Direction of Flow

1 - 6454; 3 - 6456; 5 - 6458
2 - 6455; 4 - 6457; 6 - 6459

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

~~11.08 @ 11.0 LEW~~ → MOVED TRIPOD LBF

11.09 @ 50.5 REW

~~RBF 7.22 @ 60.7~~

Benchmark ~~7.55~~

UTM = 13S 0274807 4150571

FORM #ISF FD 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME	CROSS SECTION NO	DATE	SHEET
Vallecito Cr	RHXS1	8/25/16	1 OF 1

BEGINNING OF MEASUREMENT	Gage Reading	TIME
EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) (LEF) / RIGHT	_____ ft	START - 1320 END - 1340

Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	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)
BOP	4.4	~~4.3~~	4.43								
	5.0		4.74								
	5.5		5.05								
LBF	6.0		5.52								
	6.1		8.92								
	7.0		9.58								
	8.2		9.8								
	9.0		9.91								
	9.4		10.39								
	10.0		10.53								
LEW	11.0		10.69	0				0			
	12.8		11.5	.2				1.31			
	14.6		11.21	.4				2.29			
	16.4		11.46	.8				2.42			
	18.2		11.89	1.1				2.95			
	20.0		12.02	1.2				3.52			
TOP OF ROCK	21.8		11.74	.7				3.92			
	23.6	12.34→	~~12.34~~	1.1	12.34 Vert			3.40			
	25.4		12.18	1.3				2.99			
	27.2		12.0	.85				2.06			
	29.0		11.48	.7				2.05			
	30.8		11.40	.9				2.17			
	32.6		11.88	1.0				1.14			
	34.4		11.24	1.5				1.67			
TOP ROCK	36.2		12.24	1.5		STATION 63.3	ELEV. 5.75	1.46			
" "	38.0		12.06	1.4		68.0	5.60	2.33			
" "	39.8		11.28	.4				1.13			
" "	41.6		11.48	1.4	BOP	70.0	5.01	1.27			
" "	43.4		11.93	1.3				2.23			
	45.2		12.81	2.1				1.59			
	47.0		12.65	2.0				1.09			
BEHIND ROCK	48.8		12.36	1.6				.39			
REW	50.3		10.68	0				0			
	~~52.5~~ 52.7		10.55								
	54.9		9.85								
	55.7		9.54								
	57.0		9.34								
	58.0		9.10								
	58.7		8.50			Station	Elev.				
~~RBF~~	59.9		7.69			63.3	5.75				
RBF	60.7		7.23			68.0	5.60				
	61.5		6.28		BOP	70.0	5.01				
TOTALS											

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

REW = 50.3 DISHARGE IN ISAAC'S FIELD NOTE BOOK

PEBBLE COUNT DATA SHEET

Stream: Vallecito Date: 8/25/2016 Sampler: Reid Heather

Reach: R4, XS1 Notes: ISTAT

ments:

Size Range (mm)	Habitat (r = riffle, p = pool, g = glide)	Count	
<2		𝍸 𝍸 𝍸 ||||	(19)
2.8		|	(1)
4			
5.6			
8		||||	(4)
11		|	(1)
16		|	(1)
22.6		𝍸 |||	(8)
32		𝍸 ||||	(9)
45		𝍸 𝍸 𝍸 𝍸 𝍸	(25)
64		𝍸 𝍸 𝍸 |	(16)
90		𝍸 𝍸 ||	(12)
128		𝍸 𝍸	(10)
180		𝍸 𝍸 |	(11)
260		|||	(3)
>260		𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||	(37)
Bedrock			
TOTAL D50		Total = 157	

Note:Enter Total Count and Stream Description (Name, Date, etc.)
Check Cell Notes (Alt.+R ,N (under FORMULA)) for specific information.

Pebble Count Worksheet and Summary

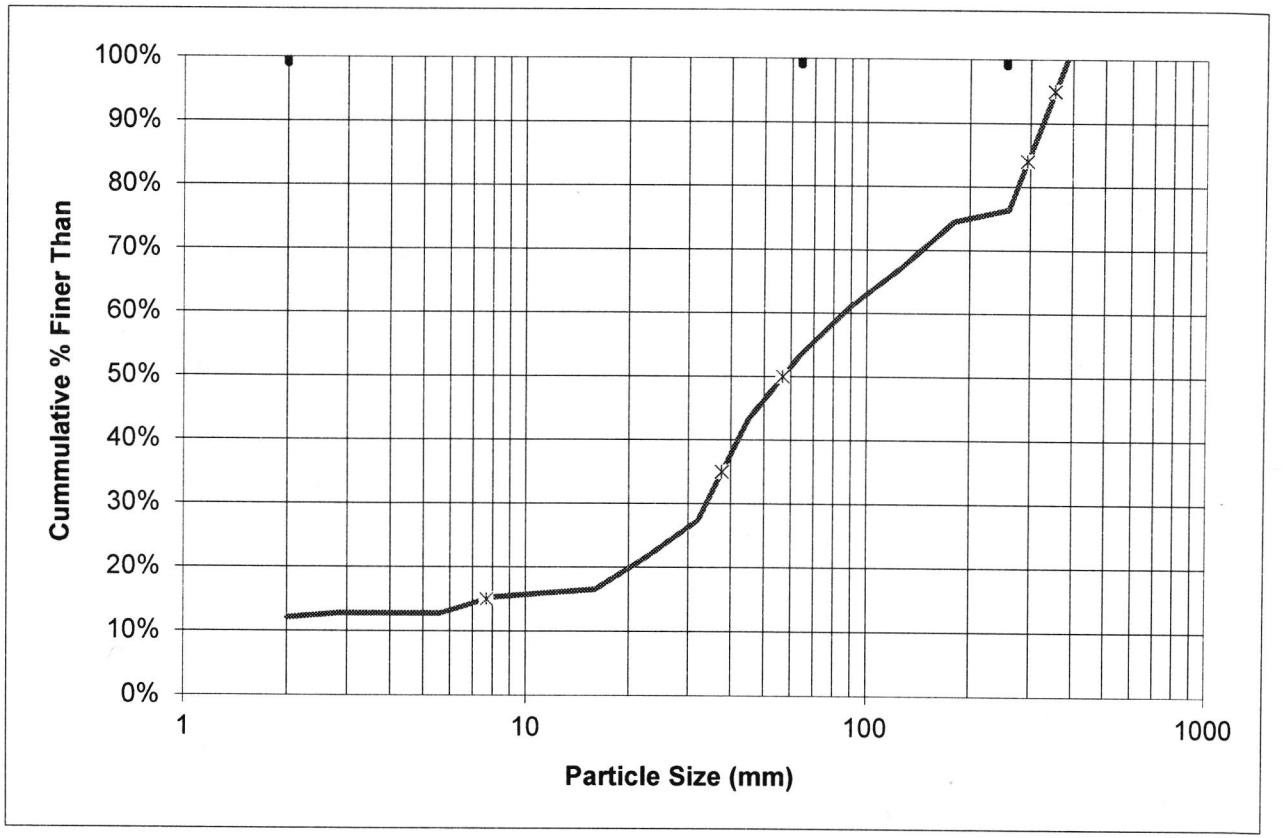
COMMENTS:

Particle Size (mm)	% finer than	Total Count
<2	12%	19
2 - 2.8	13%	1
2.8 - 4	13%	0
4 - 5.6	13%	0
5.6 - 8	15%	4
8 - 11	16%	1
11 - 16	17%	1
16 - 22.6	22%	8
22.6 - 32	27%	9
32 - 45	43%	25
45 - 64	54%	16
64 - 90	61%	12
90 - 128	68%	10
128 - 180	75%	11
180 - 260	76%	3
>260	100%	37

D84 in Ft for R2Cross	0.9667986

STREAM NAME: Vallecito
ID NUMBER: R4XS1
DATE: 8/25/2016
CREW: McIntyre, Sutton(Samplers) Cadiente(Notes)

Particle Size Distribution (mm)	D15	D35	D50	D84	D95
	7.7	37.7	56.7	294.7	353.5



FILENAME: Vallecito_Pebble_Counts.xls ENTERED: 9/14/2016

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

CROSS-SECTION NO.: R4-XS2

STREAM NAME: Vallecito

CROSS-SECTION LOCATION: 25 yards below ~~XS1~~. Between Cottonwood & Aspen

DATE: 8/29/16 OBSERVERS: Porter, Anderson, McIntyre, Sutton

LEGAL DESCRIPTION: % SECTION: NW SECTION: 16 TOWNSHIP: 37 (N/S) RANGE: 6 (E/W) PM: NMPM

COUNTY: La Plata WATERSHED: Vallecito WATER DIVISION: 7 DOW WATER CODE: 43884

MAP(S): USGS: Vallecito Reservoir 513482

USFS: San Juan National Forest Visitor map

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO METER TYPE: Marsh Mcbirney

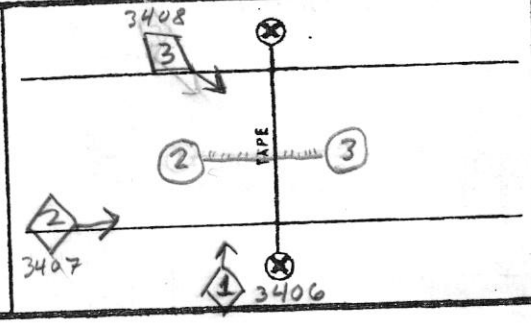
METER NUMBER: DATE RATED: CALIB/SPIN _____ sec TAPE WEIGHT _____ lbs/foot TAPE TENSION _____ lbs

CHANNEL BED MATERIAL SIZE RANGE PHOTOGRAPHS TAKEN (YES/NO) NUMBER OF PHOTOGRAPHS: 3

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	
② WS Upstream	9.0] 18	9.71
③ WS Downstream	9.0]	9.73
SLOPE	0.0011	

SKETCH



LEGEND: Stake ⊗ Station ① Photo ◇ 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

Weather: 85% overcast w/ some dispersed rain showers, 65-70°F, Wind 0-5 mph, Generally wet the previous week. Flow appears to be higher then when XS-1 was conducted.

UTM-Location (RB): 0274799 4150541

FORM #ISF FD 1-85

9.75 LEW @31.8

REW @66.0 1.5 interval

BM = 8.79 ft

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: SJNF Hydro Creek TI (Anderson) H (Porter) | CROSS-SECTION NO: X5-2 | DATE: 8/29/16 | SHEET 1 OF 2

BEGINNING OF MEASUREMENT: EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) (LEFT / RIGHT) | Gage Reading: N/A ft | TIME: 12:05 start Q

Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	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)
BM-Stake	8.79		8.79								
BOP	4.0		4.17								
	6.2		4.57								
	7.6		5.27								
	8.7		6.23								
LBF	9.7		6.38								
	11.5		7.08								
	12.4		7.45								
	14.1		8.02								
	17.3		8.45								
	20.4		9.04								
	22.6		9.56								
	26.7		9.68								
LEW	31.7	1.5	9.75	0				0			
	33.2		10.07	0.2				0.74			
	34.7		10.37	0.5		BEHIND ROCK		0			
	36.2		10.41	0.7				1.12			
	37.7		10.58	0.8				1.91			
	39.2		10.76	0.6		ON ROCK		1.49			
	40.7		11.03	1.3				1.57			
	42.2		11.07	1.25				1.44			
	43.7		11.23	1.4				3.44			
	45.2		11.55	1.4				3.56			
	46.7		11.43	1.3				2.70			
	48.2		11.87	2.4				2.57			
↑	49.7		11.95	2.3				2.83			
TWL	51.2		12.22	2.3				2.98			
↓	52.7		11.93	1.8				3.99			
On Rock	54.2		11.90	1.3				2.02			
	55.7		11.39	2.0				3.20			
	57.2		11.75	2.1				3.32			
	58.7		11.68	1.9				2.58			
	60.2		11.55	1.8				2.43			
	61.7		11.46	1.6				3.83			
	63.2		11.64	1.85				2.12			
	64.7		11.61	1.4				1.03			
REW	66.0	↓	9.75	0				0			
	69.8		9.47								
	72.3		9.20								
	73.7		8.87								
	75.8		8.47								
	77.2		7.66								
TOTALS	79.0		7.30								

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: Vallecito Creek						CROSS-SECTION NO.: R4-XS2	
CROSS-SECTION LOCATION: 25 yrds below XS-1							
DATE: 8/29/16	OBSERVERS: Porter, Anderson, McIntyre, Sutton						
LEGAL DESCRIPTION	% SECTION: NW	SECTION: 16	TOWNSHIP: 37 (N/S)	RANGE: 6 (E/W)	PM:		
COUNTY: La Plata	WATERSHED: Vallecito		WATER DIVISION: 7		DOW WATER CODE:		
MAP(S) USGS: Vallecito Reservoir 513482							
MAP(S) USFS: San Juan National Forest Visitor Map							

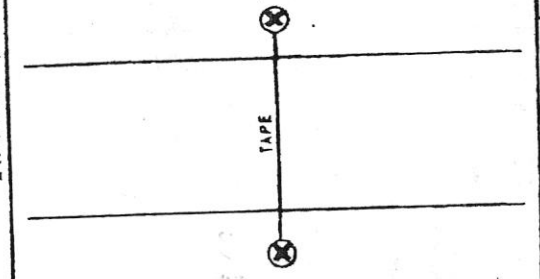
SUPPLEMENTAL DATA

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	PHOTOGRAPHS TAKEN (YES/NO)	NUMBER OF PHOTOGRAPHS:		

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	
(2) WS Upstream		
(3) WS Downstream		
SLOPE		

SKETCH



LEGEND:
- Stake ⊗
- Station (1)
- Photo
- 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

DISCHARGE/CROSS SECTION NOTES

TREAM NAME. SUNF Hydro Crew	CROSS-SECTION NO XS-2	DATE 8/29/16	SHEET 2 OF 2

EGINNING OF MEASUREMENT	EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) (LEFT) / RIGHT	Gage Reading. N/A ft	TIME

Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	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 (ft²)	Discharge (cfs)
	81.0		7.12								
RBF	83.3		6.37								
	83.6		5.57								
	86.5		5.36								
BOP	87.0		5.16								
BM-End			8.79								
TOTALS											

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

PEBBLE COUNT DATA SHEET
Stream: Valley to Creek Date: 8/29/16 Sampler: Porter, Sutton
Reach: R4 XS2 Notes: Anderson
Comments:

Size Range (mm)	Habitat (r = riffle, p = pool, g = glide)	Count
<2		(15)
2.8		
4		(1)
5.6		(2)
8		(1)
11		(4)
16		(13)
22.6		(10)
32		(11)
45		(8)
64		(5)
90		(7)
128		(8)
180		(22)
260		(13)
>260		(42)
Bedrock		
TOTAL D50		Total: 162

Note:Enter Total Count and Stream Description (Name, Date, etc.)
Check Cell Notes (Alt.+R ,N (under FORMULA)) for specific information.

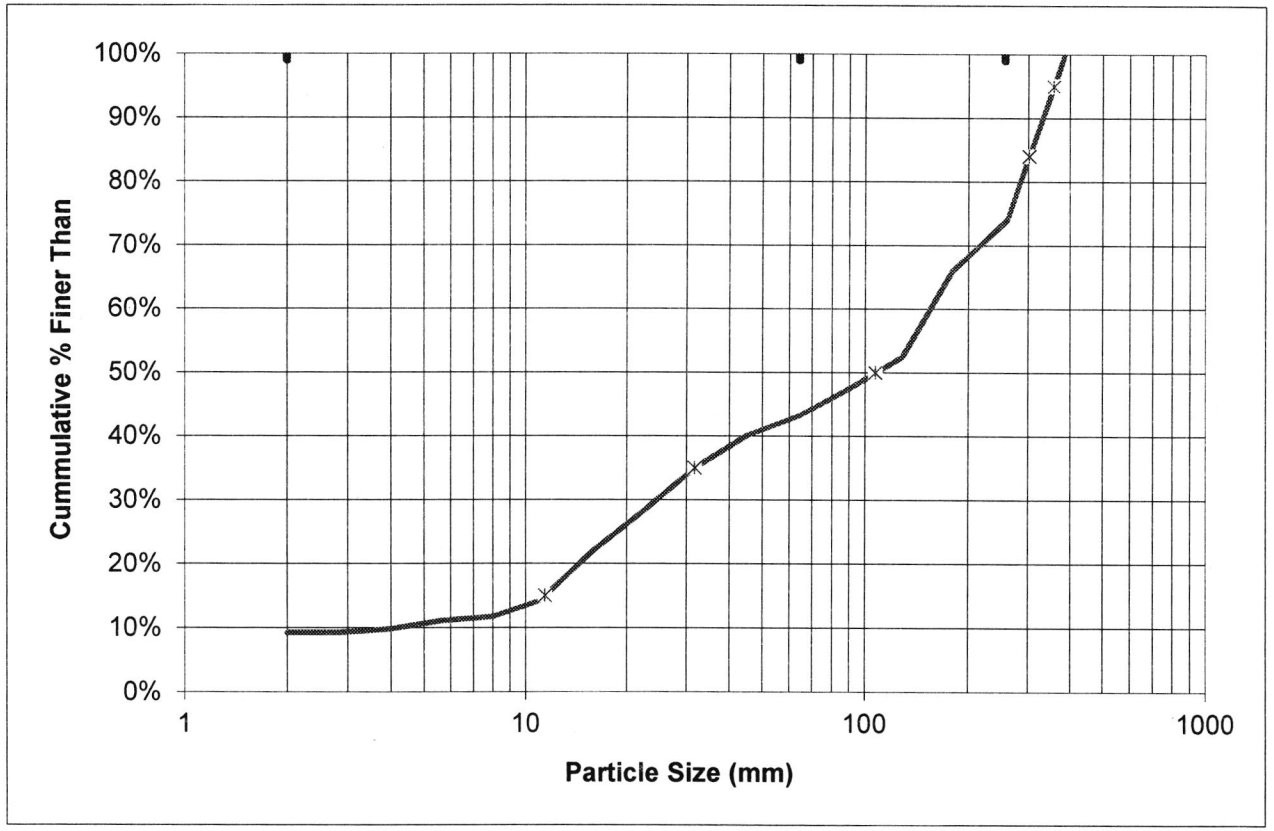
Pebble Count Worksheet and Summary **COMMENTS:**

Particle Size (mm)	% finer than	Total Count
<2	9%	15
2 - 2.8	9%	0
2.8 - 4	10%	1
4 - 5.6	11%	2
5.6 - 8	12%	1
8 - 11	14%	4
11 - 16	22%	13
16 - 22.6	28%	10
22.6 - 32	35%	11
32 - 45	40%	8
45 - 64	43%	5
64 - 90	48%	7
90 - 128	52%	8
128 - 180	66%	22
180 - 260	74%	13
>260	100%	42

D84 in Ft for R2Cross	0.9903718

STREAM NAME: Vallecito
ID NUMBER: R4XS2
DATE: 8/29/2016
CREW: Porter, Sutton(Samplers) Anderson(Notes)

Particle Size Distribution (mm)	D15	D35	D50	D84	D95
	11.4	31.7	107.3	301.9	356.2



FILENAME: Vallecito_Pebble_Counts.xls ENTERED: 9/14/2016

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Vallecito Creek						CROSS-SECTION NO: XS2 XS3	
CROSS-SECTION LOCATION: Reach 4 (≈ 50-75 m upstream of XS2)							
DATE: 9/20/16	OBSERVERS: T.R. Sutton, H.H. McIntyre, (Marsh) D. Anderson						
LEGAL DESCRIPTION	¼ SECTION: NW	SECTION: 16	TOWNSHIP: 37 (N)/S	RANGE: 6 E/(W)	PM: N/M		
COUNTY: La Plata	WATERSHED: Vallecito	WATER DIVISION: 7	DOW WATER CODE: 438841				
MAP(S): USGS: Vallecito Res							
MAP(S): USFS: SJNF							

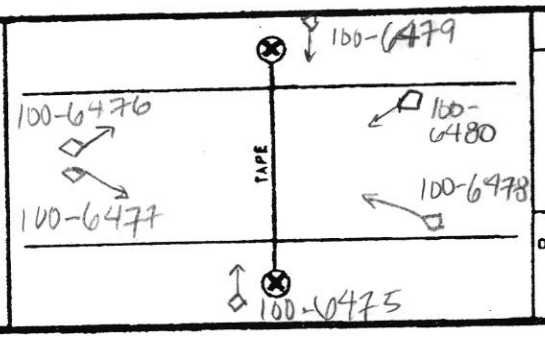
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: Marsh			
METER NUMBER:	DATE RATED:	CALIB/SPIN ____ sec	TAPE WEIGHT ____ lbs/foot	TAPE TENSION ____ lbs
CHANNEL BED MATERIAL SIZE RANGE	PHOTOGRAPHS TAKEN (YES)/NO	NUMBER OF PHOTOGRAPHS: 6		

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	
② WS Upstream	total = 66.5	10.18
③ WS Downstream	~~X~~	11.65
SLOPE	1.47/66.5 = .022	

SKETCH



LEGEND: Stake ⊗, Station ①, Photo ◇, 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

Lateral distance point ① on left bank (Looking downstream)
Overcast ≈ 65°F, Just down stream of large cottonwood, steam in Juniper ground cover

FORM #ISF FO 1-85

COLORADO WATER CONSERVATION BOARD

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Vallecito Creek						CROSS-SECTION NO: XS2 XS3	
CROSS-SECTION LOCATION: Reach 4 (≈ 50-75 m upstream of XS2)							
DATE: 9/20/16	OBSERVERS: T.R. Sutton, H.H. McIntyre, (Marsh) D. Anderson						
LEGAL DESCRIPTION	¼ SECTION: NW	SECTION: 16	TOWNSHIP: 37 (N)/S	RANGE: 6 E/(W)	PM: N/M		
COUNTY: La Plata	WATERSHED: Vallecito	WATER DIVISION: 7	DOW WATER CODE: 438841				
MAP(S): USGS: Vallecito Res							
MAP(S): USFS: SJNF							

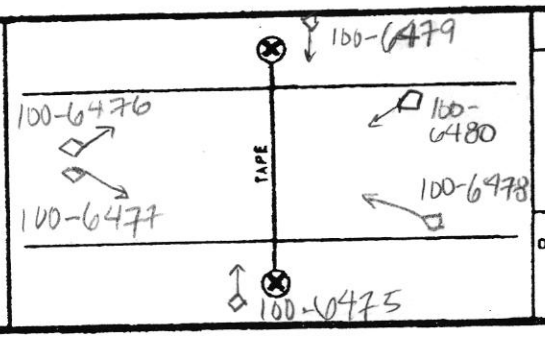
SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO	METER TYPE: Marsh			
METER NUMBER:	DATE RATED:	CALIB/SPIN ____ sec	TAPE WEIGHT ____ lbs/foot	TAPE TENSION ____ lbs
CHANNEL BED MATERIAL SIZE RANGE	PHOTOGRAPHS TAKEN (YES)/NO	NUMBER OF PHOTOGRAPHS: 6		

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	
② WS Upstream	total = 66.5	10.18
③ WS Downstream	~~X~~	11.65
SLOPE	1.47/66.5 = .022	

SKETCH



LEGEND: Stake ⊗, Station ①, Photo ◇, 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

Lateral distance point ① on left bank (Looking downstream)
Overcast ≈ 65°F, Just down stream of large cottonwood, steam in Juniper ground cover

FORM #ISF FO 1-85

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Vallecito Cr. Reach 4 | CROSS-SECTION NO: ~~XS2~~ XS3 | DATE: 9/20/16 | SHEET 1 OF 1

BEGINNING OF MEASUREMENT | EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) | (LEFT) / RIGHT | Gage Reading. _____ ft | TIME 1:00 pm → 1:30 pm

Features: Stake (S) Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	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)
BM			4.58								
BOP	5.0		4.25								
	5.2		4.64								
	6.4		5.52								
Big Boulder	7.2		5.74								
edge ↓	7.3		8.91								
	8.2		9.71								
	10.0		10.12								
	11.3		10.71								
LEW	13.7	2.0	11.25	Ø				Ø			
	15.7		11.53	0.3				0.66			
	17.7		11.90	0.6				2.00			
	19.7		12.08	0.8				2.70			
	21.7		12.29	0.9				2.57			
Rock	23.7		11.36	0.8				2.07			
	25.7		12.42	1.3				1.27			
Rock	27.7		12.12	0.8				1.59			
Rock	29.7		12.00	0.95				0.62			
ROCK	31.7		11.90	0.6				1.14			
	33.7		12.01	0.8				1.36			
ROCK	35.7		11.90	0.6				2.15			
	37.7		12.60	1.2				0.3			
	39.7		12.38	1.1				0.88			
Rock	41.7		11.60	1.1				2.59			
	43.7		12.89	1.3				1.44			
	45.7		12.73	1.4				1.71			
	47.7		13.14	1.8				0.7			
ROCK	49.7		13.09	0.5				1.35			
	51.7		12.58	0.8				0.33			
EDDY	53.7		11.79	0.6				Ø			
REW	54.1	↓	11.25	Ø				Ø			
	56.0		11.02								
	58.7		10.03								
	60.3		9.40								
	60.9		8.26								
RBF	62.5		7.75								
	63.5		6.98								
	65.4		5.89								
BOP	69.0		5.82								
BM			4.58								
TOTALS											

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

RBF 7.75

Note:Enter Total Count and Stream Description (Name, Date, etc.)
Check Cell Notes (Alt.+R ,N (under FORMULA)) for specific information.

Pebble Count Worksheet and Summary

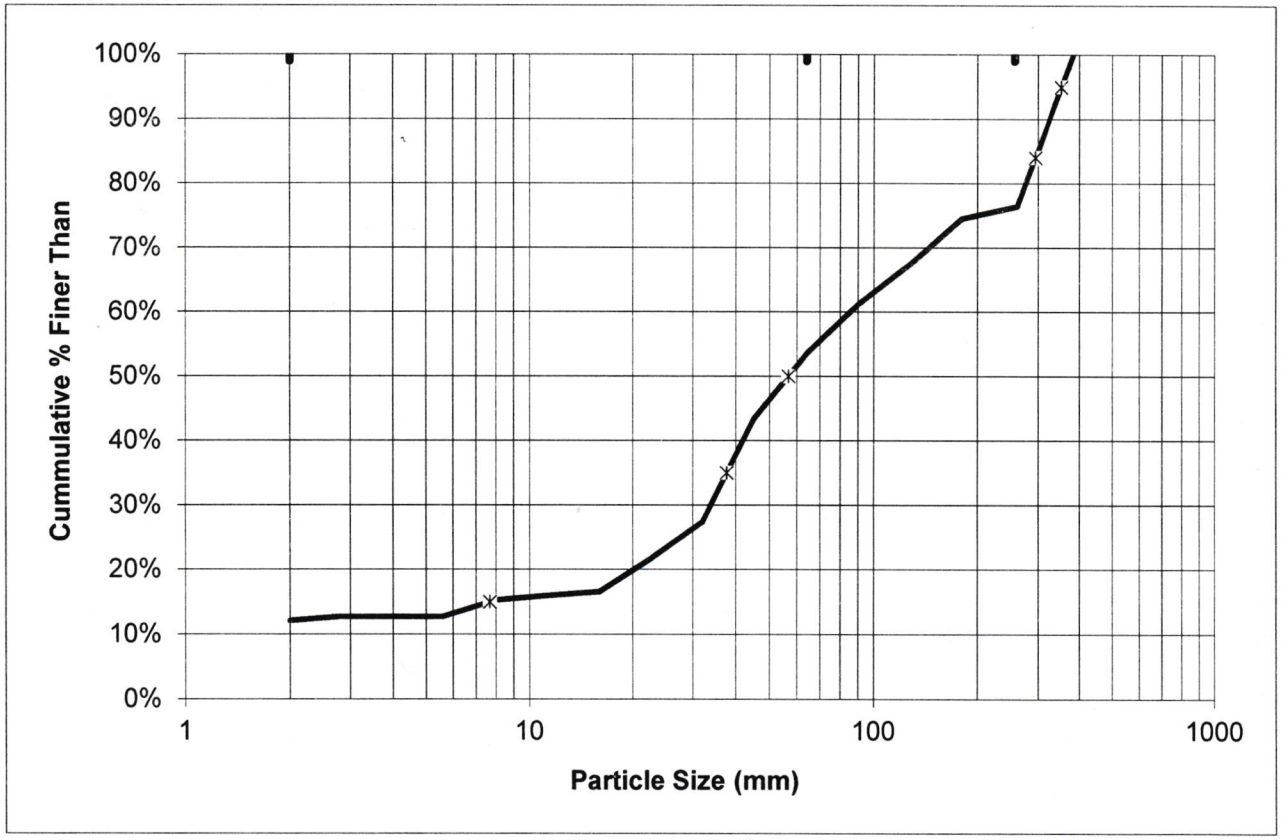
COMMENTS:

Particle Size (mm)	% finer than	Total Count
<2	12%	19
2 - 2.8	13%	1
2.8 - 4	13%	0
4 - 5.6	13%	0
5.6 - 8	15%	4
8 - 11	16%	1
11 - 16	17%	1
16 - 22.6	22%	8
22.6 - 32	27%	9
32 - 45	43%	25
45 - 64	54%	16
64 - 90	61%	12
90 - 128	68%	10
128 - 180	75%	11
180 - 260	76%	3
>260	100%	37

D84 in Ft for R2Cross	**0.9667986**

STREAM NAME: Vallecito
ID NUMBER: R4XS3 *Data originally collected at XS1
DATE: 8/25/2016
CREW: McIntyre, Sutton(Samplers) Cadiente(Notes)

Particle Size Distribution (mm)	**D15**	**D35**	**D50**	**D84**	**D95**
	7.7	**37.7**	**56.7**	**294.7**	**353.5**



FILENAME: Vallecito_Pebble_Counts.xls ENTERED: 10/24/2016

FIELD DATA FOR INSTREAM FLOW DETERMINATIONS

COLORADO WATER CONSERVATION BOARD

COLORADO DIVISION OF WILDLIFE

LOCATION INFORMATION

STREAM NAME: Vallecito Creek

CROSS-SECTION NO.: R4 XS2 XS4

CROSS-SECTION LOCATION: Lowest cross section just down stream of large cottonwood

DATE: 9/20/16 OBSERVERS: R. Sutton, D. Anderson, H. McIntyre

LEGAL DESCRIPTION: % SECTION: NW SECTION: 16 TOWNSHIP: 37 N/S RANGE: 6 E/W PM: NM

COUNTY: La Plata WATERSHED: Vallecito WATER DIVISION: 7 DOW WATER CODE: 4138324

MAP(S): USGS: Vallecito Res USFS: SJNF

SUPPLEMENTAL DATA

SAG TAPE SECTION SAME AS DISCHARGE SECTION: YES / NO METER TYPE: Marsh

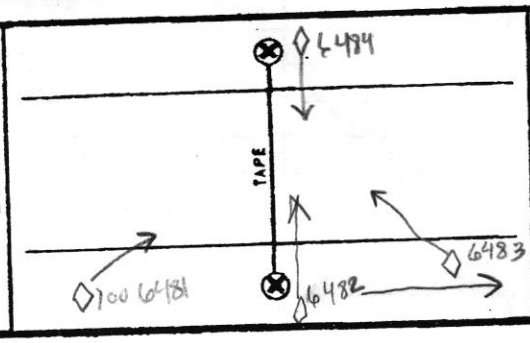
METER NUMBER: DATE RATED: CALIB/SPIN ____ sec TAPE WEIGHT ____ lbs/foot TAPE TENSION ____ lbs

CHANNEL BED MATERIAL SIZE RANGE: PHOTOGRAPHS TAKEN YES/NO NUMBER OF PHOTOGRAPHS: 4

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	
② WS Upstream	27 ft.	9.70
③ WS Downstream		10.21
SLOPE	.51/27 = .019	

SKETCH



LEGEND: Stake ⊗ Station ① Photo ◇ 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

Overcast ≈ 60° F

FORM #ISF FD 1-85

67 → 68

DISCHARGE/CROSS SECTION NOTES

STREAM NAME: Vallecito | CROSS-SECTION NO: R4 X82 X54 | DATE: 9/20/16 | SHEET 1 OF 1

BEGINNING OF MEASUREMENT: EDGE OF WATER LOOKING DOWNSTREAM (0.0 AT STAKE) LEFT / RIGHT | Gage Reading: _____ ft | TIME: 15:15 → 16:00

Features: Stake [S] Grassline (G) Waterline (W) Rock (R)	Distance From Initial Point (ft)	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	STATION Area (ft²)	DEPTH Discharge (cfs)
BM			9.06						COMMENTS	84.0	6.24
LBDP	4.0		3.74							87.0	5.38
	6.5		4.20						RBDP	89.3	4.79
	7.5		4.73						BM		9.06
LBF	9.0		5.74								
	11.0		6.42								
	13.0		7.12								
LBF	15.0		7.73								
	17.0		8.14								
	20.5		8.65								
	24.0		9.19								
	27.0		9.41								
	30.0		9.59								
	33.0		9.97								
	35.0		9.79								
LEW	36.7		10.14	0				0			
	38.2		10.40	.20				1.06			
	39.7		10.44	.15				1.31			
	41.2		10.64	.45		Behind Rock		0.47			
	42.7		10.95	.75				0.81			
	44.2		11.04	.85		Behind Rock		0.61			
	45.7		11.25	.80				2.41			
	47.2		11.37	.70				1.52			
Rock	48.7		11.0	.40		on Rock		1.67			
	50.2		11.78	.70				0.51			
	51.7		11.85	1.1				1.04			
	53.2		11.68	1.0				1.77			
	54.7		11.85	1.1				3.06			
	56.2		11.72	.90				1.52			
	57.7		11.60	1.0				1.62			
	59.2		11.75	.48		on Rock		1.73			
	60.7		11.42	.80				2.17			
	62.2		11.49	.90				1.35			
	63.7		11.49	.60				.96			
ROCK	65.2		10.82	.6		on Rock		.61			
	66.7		11.14	1.0		Behind Rock/eddy		0			
REW	67.7		10.14	0				0			
	71.0		9.70								
	73.5		9.40								
RBF	77.2		7.73								
	79.5		7.53								
	82.3		6.31								
TOTALS											

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

PEBBLE COUNT DATA SHEET

Stream: Vallecito Cr. Date: 9/20/16 Sampler: D. Anderson, R. Sutton

Reach: R4~~SL~~ XS4 Notes: H.M & Intyre

Comments:

Size Range (mm)	Habitat (r = riffle, p = pool, g = glide)	Count
<2		𝍸 𝍸 I (11)
2.8		III (3)
4		II (2)
5.6		IIII (4)
8		𝍸 (5)
11		IIII (4)
16		𝍸 I (6)
22.6		𝍸 𝍸 III (13)
32		𝍸 𝍸 𝍸 IIII (19)
45		𝍸 𝍸 𝍸 (15)
64		𝍸 II (7)
90		𝍸 III (8)
128		𝍸 II (7)
180		𝍸 𝍸 𝍸 III (18)
260		𝍸 II (7)
>260		𝍸 𝍸 𝍸 𝍸 I (26)
Bedrock		
TOTAL D50		155

Note:Enter Total Count and Stream Description (Name, Date, etc.)
Check Cell Notes (Alt.+R ,N (under FORMULA)) for specific information.

Pebble Count Worksheet and Summary

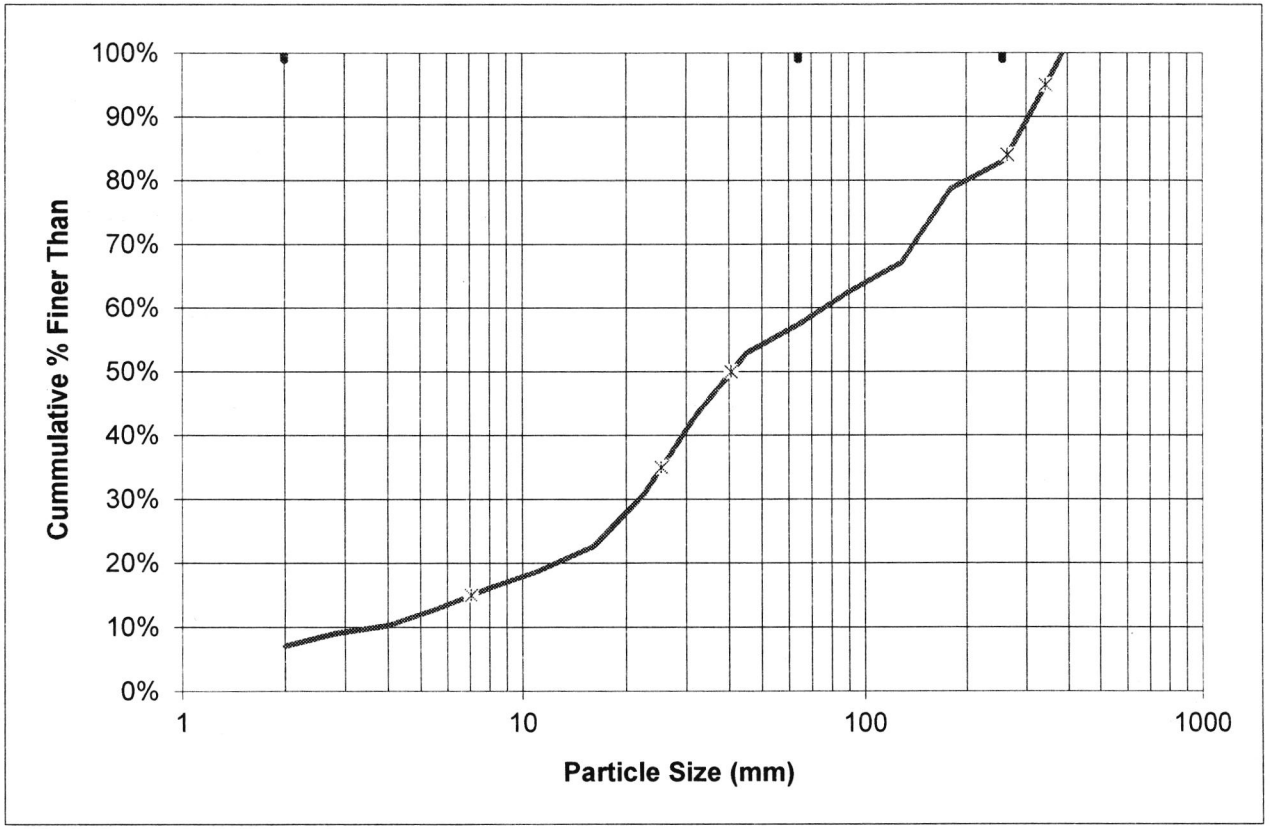
COMMENTS:

Particle Size (mm)	% finer than	Total Count
<2	7%	11
2 - 2.8	9%	3
2.8 - 4	10%	2
4 - 5.6	13%	4
5.6 - 8	16%	5
8 - 11	19%	4
11 - 16	23%	6
16 - 22.6	31%	13
22.6 - 32	43%	19
32 - 45	53%	15
45 - 64	57%	7
64 - 90	63%	8
90 - 128	67%	7
128 - 180	79%	18
180 - 260	83%	7
>260	100%	26

D84 in Ft for R2Cross	0.8685102

STREAM NAME: Vallecito
ID NUMBER: R4~~X82~~ XS4
DATE: 9/20/2016
CREW: Porter, Sutton(Samplers) Anderson(Notes)

Particle Size Distribution (mm)	D15	D35	D50	D84	D95
	7.1	25.3	40.6	264.7	341.9



FILENAME: Vallecito_Pebble_Counts.xls ENTERED: 9/21/2016

Data Input & Proofing

STREAM NAME:	Vallecito Creek
XS LOCATION:	Reach 4
XS NUMBER:	XS-1
DATE:	8/25/2016
OBSERVERS:	I. Cadiente, R. Sutton, H. McIntyre
1/4 SEC:	NW
SECTION:	16
TWP:	37N
RANGE:	6W
PM:	NMPM
COUNTY:	La Plata
WATERSHED:	Vallecito
DIVISION:	7
DOW CODE:	43884
USGS MAP:	Vallecito Res.
USFS MAP:	SJNF - visitors map
	Level and Rod Survey
TAPE WT:	0.0106 lbs / ft
TENSION:	99999 lbs
SLOPE:	0.018 ft / ft

CHECKED BY:.....DATE.....

ASSIGNED TO: .....DATE.....

Total Data Points = 45

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
	BOP	4.40	4.43			0.00	0.00	0.00
		5.00	4.74			0.00	0.00	0.00
		5.50	5.05			0.00	0.00	0.00
1	LBF	6.00	5.32			0.00	0.00	0.00
		6.10	8.92			0.00	0.00	0.00
		7.00	9.58			0.00	0.00	0.00
		8.20	9.80			0.00	0.00	0.00
		9.00	9.91			0.00	0.00	0.00
		9.40	10.39			0.00	0.00	0.00
		10.00	10.53			0.00	0.00	0.00
	LEW	11.00	10.69	0.00	0.00	0.00	0.00	0.00
		12.80	11.50	0.20	1.31	0.36	0.47	11.30
		14.60	11.21	0.40	2.29	0.72	1.65	10.81
		16.40	11.46	0.80	2.42	1.44	3.48	10.66
		18.20	11.89	1.10	2.95	1.98	5.84	10.79
		20.00	12.02	1.20	3.52	2.16	7.60	10.82
	Top of rock	21.80	11.74	0.70	3.92	1.26	4.94	11.04
		23.60	12.34	1.10	3.40	1.98	6.73	11.24
		25.40	12.18	1.30	2.99	2.34	7.00	10.88
		27.20	12.00	0.85	2.06	1.53	3.15	11.15
		29.00	11.48	0.70	2.05	1.26	2.58	10.78
		30.80	11.40	0.90	2.17	1.62	3.52	10.50
		32.60	11.88	1.00	1.14	1.80	2.05	10.88
		34.40	11.24	1.50	1.67	2.70	4.51	9.74
	Top of rock	36.20	12.24	1.50	1.46	2.70	3.94	10.74
	Top of rock	38.00	12.06	1.40	2.33	2.52	5.87	10.66
	Top of rock	39.80	11.28	0.40	1.13	0.72	0.81	10.88
	Top of rock	41.60	11.48	1.40	1.27	2.52	3.20	10.08
	Top of rock	43.40	11.93	1.30	2.23	2.34	5.22	10.63
		45.20	12.81	2.10	1.59	3.78	6.01	10.71
		47.00	12.65	2.00	1.09	3.60	3.92	10.65
		48.80	12.36	1.60	0.39	2.64	1.03	10.76
	REW	50.30	10.68	0.00	0.00	0.00	0.00	0.00
		52.70	10.55			0.00	0.00	0.00
		54.40	9.85			0.00	0.00	0.00
		55.70	9.54			0.00	0.00	0.00
		57.00	9.34			0.00	0.00	0.00
		58.00	9.10			0.00	0.00	0.00
		58.70	8.50			0.00	0.00	0.00
		59.90	7.69			0.00	0.00	0.00
1	RBF	60.70	7.23			0.00	0.00	0.00
		61.50	6.28			0.00	0.00	0.00
		63.30	5.75			0.00	0.00	0.00
		68.00	5.60			0.00	0.00	0.00
	BOP	70.00	5.01			0.00	0.00	0.00
					Totals	41.97	83.54	

STREAM NAME: Vallecito Creek
XS LOCATION: Reach 4
XS NUMBER: XS-1

Constant Manning's n

STAGING TABLE

"GL" = lowest Grassline elevation corrected for sag
"WL" = Waterline corrected for variations in field measured water surface elevations and sag

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
"GL"	7.23	54.65	3.97	5.58	217.07	59.74	100.0%	3.63	1012.52	4.66
	9.75	46.94	1.83	3.06	85.70	49.50	82.9%	1.73	243.88	2.85
	9.80	46.45	1.79	3.01	83.37	49.00	82.0%	1.70	234.46	2.81
	9.85	45.89	1.77	2.96	81.06	48.43	81.1%	1.67	225.51	2.78
	9.90	45.40	1.74	2.91	78.77	47.92	80.2%	1.64	216.54	2.75
	9.95	45.14	1.70	2.86	76.51	47.64	79.7%	1.61	207.10	2.71
	10.00	44.98	1.65	2.81	74.26	47.44	79.4%	1.57	197.58	2.66
	10.05	44.81	1.61	2.76	72.02	47.24	79.1%	1.52	188.25	2.61
	10.10	44.65	1.56	2.71	69.78	47.05	78.8%	1.48	179.10	2.57
	10.15	44.49	1.52	2.66	67.55	46.85	78.4%	1.44	170.14	2.52
	10.20	44.32	1.47	2.61	65.33	46.65	78.1%	1.40	161.37	2.47
	10.25	44.16	1.43	2.56	63.12	46.46	77.8%	1.36	152.80	2.42
	10.30	44.00	1.38	2.51	60.91	46.26	77.4%	1.32	144.42	2.37
	10.35	43.83	1.34	2.46	58.72	46.06	77.1%	1.27	136.23	2.32
	10.40	43.65	1.29	2.41	56.53	45.85	76.8%	1.23	128.27	2.27
	10.45	43.32	1.25	2.36	54.36	45.50	76.2%	1.19	120.77	2.22
	10.50	42.98	1.21	2.31	52.20	45.15	75.6%	1.16	113.47	2.17
	10.55	42.62	1.17	2.26	50.06	44.77	74.9%	1.12	106.42	2.13
	10.60	41.46	1.16	2.21	47.95	43.61	73.0%	1.10	100.83	2.10
	10.65	40.22	1.14	2.16	45.91	42.37	70.9%	1.08	95.60	2.08
	10.70	39.28	1.12	2.11	43.93	41.40	69.3%	1.06	90.19	2.05
"WL"	10.75	39.12	1.07	2.06	41.97	41.21	69.0%	1.02	83.84	2.00
	10.80	38.96	1.03	2.01	40.02	41.03	68.7%	0.98	77.68	1.94
	10.85	38.81	0.98	1.96	38.07	40.84	68.4%	0.93	71.71	1.88
	10.90	38.65	0.93	1.91	36.14	40.65	68.0%	0.89	65.94	1.82
	10.95	38.50	0.89	1.86	34.21	40.46	67.7%	0.85	60.36	1.76
	11.00	38.34	0.84	1.81	32.29	40.27	67.4%	0.80	54.99	1.70
	11.05	38.18	0.80	1.76	30.37	40.08	67.1%	0.76	49.83	1.64
	11.10	38.03	0.75	1.71	28.47	39.89	66.8%	0.71	44.87	1.58
	11.15	37.87	0.70	1.66	26.57	39.70	66.5%	0.67	40.12	1.51
	11.20	37.72	0.65	1.61	24.68	39.51	66.1%	0.62	35.59	1.44
	11.25	37.07	0.62	1.56	22.81	38.82	65.0%	0.59	31.57	1.38
	11.30	35.84	0.59	1.51	20.98	37.53	62.8%	0.56	28.10	1.34
	11.35	34.22	0.56	1.46	19.23	35.83	60.0%	0.54	25.06	1.30
	11.40	32.60	0.54	1.41	17.56	34.14	57.1%	0.51	22.25	1.27
	11.45	29.79	0.54	1.36	16.00	31.25	52.3%	0.51	20.20	1.26
	11.50	27.32	0.53	1.31	14.58	28.69	48.0%	0.51	18.32	1.26
	11.55	26.12	0.51	1.26	13.24	27.41	45.9%	0.48	16.09	1.21
	11.60	24.96	0.48	1.21	11.96	26.17	43.8%	0.46	14.01	1.17
	11.65	23.80	0.45	1.16	10.75	24.93	41.7%	0.43	12.10	1.13
	11.70	22.64	0.42	1.11	9.58	23.69	39.7%	0.40	10.35	1.08
	11.75	21.43	0.40	1.06	8.48	22.40	37.5%	0.38	8.76	1.03
	11.80	19.60	0.38	1.01	7.45	20.68	34.6%	0.36	7.45	1.00
	11.85	18.17	0.36	0.96	6.50	18.95	31.7%	0.34	6.29	0.97
	11.90	16.59	0.34	0.91	5.63	17.28	28.9%	0.33	5.27	0.93
	11.95	14.83	0.33	0.86	4.85	15.45	25.9%	0.31	4.42	0.91
	12.00	13.14	0.32	0.81	4.15	13.68	22.9%	0.30	3.70	0.89
	12.05	11.66	0.30	0.76	3.53	12.14	20.3%	0.29	3.06	0.87
	12.10	10.39	0.29	0.71	2.98	10.80	18.1%	0.28	2.49	0.84
	12.15	9.01	0.28	0.66	2.50	9.36	15.7%	0.27	2.04	0.82
	12.20	7.60	0.27	0.61	2.08	7.89	13.2%	0.26	1.69	0.81
	12.25	6.21	0.28	0.56	1.74	6.44	10.8%	0.27	1.43	0.82
	12.30	5.35	0.27	0.51	1.45	5.54	9.3%	0.26	1.17	0.81
	12.35	4.56	0.26	0.46	1.20	4.71	7.9%	0.26	0.95	0.79
	12.40	4.23	0.23	0.41	0.98	4.35	7.3%	0.23	0.72	0.73
	12.45	3.82	0.20	0.36	0.78	3.93	6.6%	0.20	0.52	0.67
	12.50	3.41	0.18	0.31	0.60	3.50	5.9%	0.17	0.36	0.61

STREAM NAME: Vallecito Creek
XS LOCATION: Reach 4
XS NUMBER: XS-1

Thorne-Zevenbergen D84 Correction Applied
User Supplied D84 = 0.97

GL = lowest Grassline elevation corrected for sag
WL = Waterline corrected for variations in field measured water surface elevations and sag

STAGING TABLE

Velocity based on test of R/D84>1

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	7.23	54.65	3.97	5.58	217.07	59.74	100.0%	3.63	1945.84	8.96
	9.75	46.94	1.83	3.06	85.70	49.50	82.9%	1.73	388.93	4.54
	9.80	46.46	1.79	3.01	83.37	49.00	82.0%	1.70	371.64	4.46
	9.85	45.89	1.77	2.96	81.06	48.43	81.1%	1.67	355.31	4.38
	9.90	45.40	1.74	2.91	78.77	47.92	80.2%	1.64	338.98	4.30
	9.95	45.14	1.70	2.86	76.51	47.64	79.7%	1.61	321.74	4.21
	10.00	44.98	1.65	2.81	74.26	47.44	79.4%	1.57	304.40	4.10
	10.05	44.81	1.61	2.76	72.02	47.24	79.1%	1.52	287.49	3.99
	10.10	44.65	1.56	2.71	69.78	47.05	78.8%	1.48	271.02	3.88
	10.15	44.49	1.52	2.66	67.55	46.85	78.4%	1.44	255.00	3.77
	10.20	44.32	1.47	2.61	65.33	46.65	78.1%	1.40	239.42	3.66
	10.25	44.16	1.43	2.56	63.12	46.46	77.8%	1.36	224.30	3.55
	10.30	44.00	1.38	2.51	60.91	46.26	77.4%	1.32	209.63	3.44
	10.35	43.83	1.34	2.46	58.72	46.06	77.1%	1.27	195.41	3.33
	10.40	43.65	1.29	2.41	56.53	45.85	76.8%	1.23	181.70	3.21
	10.45	43.32	1.25	2.36	54.36	45.50	76.2%	1.19	168.97	3.11
	10.50	42.98	1.21	2.31	52.20	45.15	75.6%	1.16	156.68	3.00
	10.55	42.62	1.17	2.26	50.06	44.77	74.9%	1.12	144.93	2.90
	10.60	41.46	1.16	2.21	47.95	43.61	73.0%	1.10	136.02	2.84
	10.65	40.22	1.14	2.16	45.91	42.37	70.9%	1.08	127.80	2.78
	10.70	39.28	1.12	2.11	43.93	41.40	69.3%	1.06	119.21	2.71
WL	10.75	39.12	1.07	2.06	41.97	41.21	69.0%	1.02	108.86	2.59
	10.80	38.96	1.03	2.01	40.02	41.03	68.7%	0.98	98.94	2.47
	10.85	38.81	0.98	1.96	38.07	40.84	68.4%	0.93	96.95	2.55
	10.90	38.65	0.93	1.91	36.14	40.65	68.0%	0.89	85.61	2.37
	10.95	38.50	0.89	1.86	34.21	40.46	67.7%	0.85	75.23	2.20
	11.00	38.34	0.84	1.81	32.29	40.27	67.4%	0.80	65.77	2.04
	11.05	38.18	0.80	1.76	30.37	40.08	67.1%	0.76	57.18	1.88
	11.10	38.03	0.75	1.71	28.47	39.89	66.8%	0.71	49.41	1.74
	11.15	37.87	0.70	1.66	26.57	39.70	66.5%	0.67	42.41	1.60
	11.20	37.72	0.65	1.61	24.68	39.51	66.1%	0.62	36.13	1.46
	11.25	37.07	0.62	1.56	22.81	38.82	65.0%	0.59	31.05	1.36
	11.30	35.84	0.59	1.51	20.98	37.53	62.8%	0.56	27.02	1.29
	11.35	34.22	0.56	1.46	19.23	35.83	60.0%	0.54	23.68	1.23
	11.40	32.60	0.54	1.41	17.56	34.14	57.1%	0.51	20.64	1.18
	11.45	29.79	0.54	1.36	16.00	31.25	52.3%	0.51	18.73	1.17
	11.50	27.32	0.53	1.31	14.58	28.69	48.0%	0.51	16.94	1.16
	11.55	26.12	0.51	1.26	13.24	27.41	45.9%	0.48	14.50	1.10
	11.60	24.96	0.48	1.21	11.96	26.17	43.8%	0.46	12.29	1.03
	11.65	23.80	0.45	1.16	10.75	24.93	41.7%	0.43	10.31	0.96
	11.70	22.64	0.42	1.11	9.58	23.69	39.7%	0.40	8.55	0.89
	11.75	21.43	0.40	1.06	8.48	22.40	37.5%	0.38	7.02	0.83
	11.80	19.80	0.38	1.01	7.45	20.68	34.6%	0.36	5.80	0.78
	11.85	18.17	0.36	0.96	6.50	18.95	31.7%	0.34	4.75	0.73
	11.90	16.59	0.34	0.91	5.63	17.28	28.9%	0.33	3.85	0.68
	11.95	14.83	0.33	0.86	4.85	15.45	25.9%	0.31	3.12	0.64
	12.00	13.14	0.32	0.81	4.15	13.68	22.9%	0.30	2.52	0.61
	12.05	11.66	0.30	0.76	3.53	12.14	20.3%	0.29	2.00	0.57
	12.10	10.39	0.29	0.71	2.98	10.80	18.1%	0.28	1.55	0.52
	12.15	9.01	0.28	0.66	2.50	9.36	15.7%	0.27	1.21	0.48
	12.20	7.60	0.27	0.61	2.08	7.89	13.2%	0.26	0.95	0.46
	12.25	6.21	0.28	0.56	1.74	6.44	10.8%	0.27	0.78	0.45
	12.30	5.35	0.27	0.51	1.45	5.54	9.3%	0.26	0.60	0.41
	12.35	4.56	0.26	0.46	1.20	4.71	7.9%	0.26	0.46	0.38
	12.40	4.23	0.23	0.41	0.98	4.35	7.3%	0.23	0.31	0.32
	12.45	3.82	0.20	0.36	0.78	3.93	6.6%	0.20	0.20	0.26
	12.50	3.41	0.18	0.31	0.60	3.50	5.9%	0.17	0.13	0.21

(1) velocity = 11.44
(0.546) depth = 21.62
(57.32)% WP = 20.87

Data Input & Proofing

STREAM NAME:	Vallecito Creek
XS LOCATION:	R4
XS NUMBER:	XS2
DATE:	8/29/2016
OBSERVERS:	Porter, Anderson, McIntyre, Sutton
1/4 SEC:	NW
SECTION:	16
TWP:	37N
RANGE:	6W
PM:	NMPM
COUNTY:	La Plata
WATERSHED:	Vallecito
DIVISION:	7
DOW CODE:	43884
USGS MAP:	Vallecito Reservoir
USFS MAP:	SJNF Visitor Map
	Level and Rod Survey
TAPE WT:	0.0106 lbs / ft
TENSION:	99999 lbs
SLOPE:	0.0011 ft / ft

CHECKED BY:.....DATE.....

ASSIGNED TO: .....DATE.....

Total Data Points = 47

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
	BOP	4.00	4.17			0.00	0.00	0.00
		6.20	4.57			0.00	0.00	0.00
		7.60	5.27			0.00	0.00	0.00
		8.70	6.23			0.00	0.00	0.00
1	LBF	9.70	6.38			0.00	0.00	0.00
		11.50	7.08			0.00	0.00	0.00
		12.40	7.45			0.00	0.00	0.00
		14.10	8.02			0.00	0.00	0.00
		17.30	8.45			0.00	0.00	0.00
		20.40	9.04			0.00	0.00	0.00
		22.60	9.56			0.00	0.00	0.00
		26.70	9.68			0.00	0.00	0.00
	LEW	31.70	9.75	0.00	0.00	0.00	0.00	0.00
		33.20	10.07	0.20	0.74	0.30	0.22	9.87
	EDDY	34.70	10.37	0.50	0.00	0.75	0.00	9.87
		36.20	10.41	0.70	1.12	1.05	1.18	9.71
		37.70	10.58	0.80	1.91	1.20	2.29	9.78
	ROCK	39.20	10.76	0.60	1.49	0.90	1.34	10.16
		40.70	11.03	1.30	1.57	1.95	3.06	9.73
		42.20	11.07	1.25	1.44	1.88	2.70	9.82
		43.70	11.23	1.40	3.44	2.10	7.22	9.83
		45.20	11.55	1.40	3.56	2.10	7.48	10.15
		46.70	11.43	1.30	2.70	1.95	5.27	10.13
		48.20	11.87	2.40	2.57	3.60	9.25	9.47
		49.70	11.95	2.30	2.83	3.45	9.76	9.65
		51.20	12.22	2.30	2.98	3.45	10.28	9.92
		52.70	11.93	1.80	3.99	2.70	10.77	10.13
		54.20	11.90	1.30	2.02	1.95	3.94	10.60
	ROCK	55.70	11.39	2.00	3.20	3.00	9.60	9.39
		57.20	11.75	2.10	3.32	3.15	10.46	9.65
		58.70	11.68	1.90	2.58	2.85	7.35	9.78
		60.20	11.55	1.80	2.43	2.70	6.56	9.75
		61.70	11.46	1.60	3.83	2.40	9.19	9.86
		63.20	11.64	1.85	2.12	2.78	5.88	9.79
		64.70	11.61	1.40	1.03	1.96	2.02	10.21
	REW	66.00	9.75	0.00	0.00	0.00	0.00	0.00
		69.80	9.47			0.00	0.00	0.00
		72.30	9.20			0.00	0.00	0.00
		73.70	8.87			0.00	0.00	0.00
		75.80	8.47			0.00	0.00	0.00
		77.20	7.66			0.00	0.00	0.00
		79.00	7.30			0.00	0.00	0.00
		81.00	7.12			0.00	0.00	0.00
1	RBF	83.30	6.37			0.00	0.00	0.00
		83.60	5.57			0.00	0.00	0.00
		86.50	5.36			0.00	0.00	0.00
	BOP	87.00	5.16			0.00	0.00	0.00
					Totals	48.16	125.83	

(1) $\bar{V} = 6.71$

(6.7289) $\bar{d} = 30.86$

(70) %wp = 225.59

STREAM NAME: Vallecito Creek
XS LOCATION: R4
XS NUMBER: XS2

Constant Manning's n

GL = lowest Grassline elevation corrected for sag
WL = Waterline corrected for variations in field measured water surface elevations and sag

STAGING TABLE

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.38	73.57	3.48	5.84	256.24	75.88	100.0%	3.38	1234.07	4.82
	8.87	54.19	1.75	3.35	94.95	55.73	73.4%	1.70	289.81	3.05
	8.92	53.72	1.72	3.30	92.25	55.24	72.8%	1.67	277.84	3.01
	8.97	53.24	1.68	3.25	89.57	54.75	72.2%	1.64	266.10	2.97
	9.02	52.77	1.65	3.20	86.92	54.27	71.5%	1.60	254.62	2.93
	9.07	52.32	1.61	3.15	84.30	53.81	70.9%	1.57	243.29	2.89
	9.12	51.90	1.57	3.10	81.69	53.38	70.3%	1.53	232.14	2.84
	9.17	51.48	1.54	3.05	79.11	52.94	69.8%	1.49	221.23	2.80
	9.22	50.95	1.50	3.00	76.55	52.41	69.1%	1.46	210.84	2.75
	9.27	50.28	1.47	2.95	74.01	51.73	68.2%	1.43	201.10	2.72
	9.32	49.60	1.44	2.90	71.52	51.04	67.3%	1.40	191.61	2.68
	9.37	48.93	1.41	2.85	69.05	50.36	66.4%	1.37	182.37	2.64
	9.42	48.25	1.38	2.80	66.62	49.68	65.5%	1.34	173.37	2.60
	9.47	47.58	1.35	2.75	64.23	48.99	64.6%	1.31	164.62	2.56
	9.52	46.69	1.33	2.70	61.87	48.10	63.4%	1.29	156.59	2.53
	9.57	45.50	1.31	2.65	59.56	46.90	61.8%	1.27	149.46	2.51
	9.62	43.11	1.33	2.60	57.35	44.51	58.7%	1.29	145.29	2.53
	9.67	40.72	1.36	2.55	55.25	42.12	55.5%	1.31	141.67	2.56
	9.72	36.84	1.45	2.50	53.30	38.24	50.4%	1.39	142.33	2.67
	9.77	34.19	1.51	2.45	51.55	35.57	46.9%	1.45	141.27	2.74
	9.82	33.92	1.47	2.40	49.85	35.27	46.5%	1.41	134.33	2.69
WL	9.87	33.65	1.43	2.35	48.16	34.97	46.1%	1.38	127.56	2.65
	9.92	33.38	1.39	2.30	46.48	34.67	45.7%	1.34	120.94	2.60
	9.97	33.11	1.35	2.25	44.82	34.37	45.3%	1.30	114.48	2.55
	10.02	32.85	1.31	2.20	43.17	34.07	44.9%	1.27	108.18	2.51
	10.07	32.58	1.28	2.15	41.54	33.77	44.5%	1.23	102.04	2.46
	10.12	32.29	1.24	2.10	39.92	33.45	44.1%	1.19	96.08	2.41
	10.17	32.01	1.20	2.05	38.31	33.13	43.7%	1.16	90.29	2.36
	10.22	31.72	1.16	2.00	36.71	32.82	43.2%	1.12	84.66	2.31
	10.27	31.44	1.12	1.95	35.14	32.50	42.8%	1.08	79.19	2.25
	10.32	31.15	1.08	1.90	33.57	32.19	42.4%	1.04	73.88	2.20
	10.37	30.86	1.04	1.85	32.02	31.87	42.0%	1.00	68.73	2.15
	10.42	29.24	1.04	1.80	30.52	30.22	39.8%	1.01	65.75	2.15
	10.47	28.77	1.01	1.75	29.07	29.71	39.2%	0.98	61.31	2.11
	10.52	28.29	0.98	1.70	27.65	29.21	38.5%	0.95	57.03	2.06
	10.57	27.81	0.94	1.65	26.24	28.70	37.8%	0.91	52.90	2.02
	10.62	27.36	0.91	1.60	24.87	28.22	37.2%	0.88	48.90	1.97
	10.67	26.91	0.87	1.55	23.51	27.74	36.6%	0.85	45.05	1.92
	10.72	26.45	0.84	1.50	22.17	27.26	35.9%	0.81	41.35	1.86
	10.77	26.03	0.80	1.45	20.86	26.81	35.3%	0.78	37.77	1.81
	10.82	25.72	0.76	1.40	19.57	26.46	34.9%	0.74	34.24	1.75
	10.87	25.41	0.72	1.35	18.29	26.12	34.4%	0.70	30.86	1.69
	10.92	25.09	0.68	1.30	17.03	25.78	34.0%	0.66	27.64	1.62
	10.97	24.78	0.64	1.25	15.78	25.43	33.5%	0.62	24.57	1.56
	11.02	24.47	0.59	1.20	14.55	25.09	33.1%	0.58	21.65	1.49
	11.07	22.88	0.58	1.15	13.36	23.47	30.9%	0.57	19.63	1.47
	11.12	22.37	0.55	1.10	12.23	22.94	30.2%	0.53	17.20	1.41
	11.17	21.87	0.51	1.05	11.12	22.41	29.5%	0.50	14.92	1.34
	11.22	21.37	0.47	1.00	10.04	21.87	28.8%	0.46	12.79	1.27
	11.27	21.05	0.43	0.95	8.98	21.53	28.4%	0.42	10.73	1.19
	11.32	20.78	0.38	0.90	7.94	21.23	28.0%	0.37	8.81	1.11
	11.37	20.51	0.34	0.85	6.90	20.93	27.6%	0.33	7.05	1.02
	11.42	20.03	0.29	0.80	5.89	20.40	26.9%	0.29	5.50	0.93
	11.47	18.51	0.27	0.75	4.92	18.84	24.8%	0.26	4.30	0.87
	11.52	15.84	0.26	0.70	4.06	16.11	21.2%	0.25	3.46	0.85
	11.57	13.62	0.24	0.65	3.33	13.83	18.2%	0.24	2.76	0.83
	11.62	11.57	0.23	0.60	2.69	11.73	15.5%	0.23	2.15	0.80

(1) $\overline{V}$ = 76.60

(.7289) $\overline{d}$ = 8.66

(70)%wp = 82.89

STREAM NAME: Vallecito Creek
XS LOCATION: R4
XS NUMBER: XS2

Thorne-Zevenbergen D84 Correction Applied
User Supplied D84 = 0.99

GL = lowest Grassline elevation corrected for sag
STAGING TABLE *WL* = Waterline corrected for variations in field measured water surface elevations and sag

Velocity based on test of R/D84>1

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	6.38	73.57	3.48	5.84	256.24	75.88	100.0%	3.38	562.76	2.20
	8.87	54.19	1.75	3.35	94.95	55.73	73.4%	1.70	110.77	1.17
	8.92	53.72	1.72	3.30	92.25	55.24	72.8%	1.67	105.52	1.14
	8.97	53.24	1.68	3.25	89.57	54.75	72.2%	1.64	100.39	1.12
	9.02	52.77	1.65	3.20	86.92	54.27	71.5%	1.60	95.40	1.10
	9.07	52.32	1.61	3.15	84.30	53.81	70.9%	1.57	90.50	1.07
	9.12	51.90	1.57	3.10	81.69	53.38	70.3%	1.53	85.69	1.05
	9.17	51.48	1.54	3.05	79.11	52.94	69.8%	1.49	81.02	1.02
	9.22	50.95	1.50	3.00	76.55	52.41	69.1%	1.46	76.60	1.00
	9.27	50.28	1.47	2.95	74.01	51.73	68.2%	1.43	72.51	0.98
	9.32	49.60	1.44	2.90	71.52	51.04	67.3%	1.40	68.55	0.96
	9.37	48.93	1.41	2.85	69.05	50.36	66.4%	1.37	64.71	0.94
	9.42	48.25	1.38	2.80	66.62	49.68	65.5%	1.34	61.00	0.92
	9.47	47.58	1.35	2.75	64.23	48.99	64.6%	1.31	57.40	0.89
	9.52	46.69	1.33	2.70	61.87	48.10	63.4%	1.29	54.16	0.88
	9.57	45.50	1.31	2.65	59.56	46.90	61.8%	1.27	51.35	0.86
	9.62	43.11	1.33	2.60	57.35	44.51	58.7%	1.29	49.91	0.87
	9.67	40.72	1.36	2.55	55.25	42.12	55.5%	1.31	48.71	0.88
	9.72	36.84	1.45	2.50	53.30	38.24	50.4%	1.39	49.49	0.93
	9.77	34.19	1.51	2.45	51.55	35.57	46.9%	1.45	49.39	0.96
	9.82	33.92	1.47	2.40	49.85	35.27	46.5%	1.41	46.51	0.93
WL	9.87	33.65	1.43	2.35	48.16	34.97	46.1%	1.38	43.71	0.91
	9.92	33.38	1.39	2.30	46.48	34.67	45.7%	1.34	40.99	0.88
	9.97	33.11	1.35	2.25	44.82	34.37	45.3%	1.30	38.36	0.86
	10.02	32.85	1.31	2.20	43.17	34.07	44.9%	1.27	35.81	0.83
	10.07	32.58	1.28	2.15	41.54	33.77	44.5%	1.23	33.35	0.80
	10.12	32.29	1.24	2.10	39.92	33.45	44.1%	1.19	30.99	0.78
	10.17	32.01	1.20	2.05	38.31	33.13	43.7%	1.16	28.71	0.75
	10.22	31.72	1.16	2.00	36.71	32.82	43.2%	1.12	26.52	0.72
	10.27	31.44	1.12	1.95	35.14	32.50	42.8%	1.08	24.41	0.69
	10.32	31.15	1.08	1.90	33.57	32.19	42.4%	1.04	22.38	0.67
	10.37	30.86	1.04	1.85	32.02	31.87	42.0%	1.00	20.44	0.64
	10.42	29.24	1.04	1.80	30.52	30.22	39.8%	1.01	19.46	0.64
	10.47	28.77	1.01	1.75	29.07	29.71	39.2%	0.98	22.06	0.76
	10.52	28.29	0.98	1.70	27.65	29.21	38.5%	0.95	19.92	0.72
	10.57	27.81	0.94	1.65	26.24	28.70	37.8%	0.91	17.92	0.68
	10.62	27.36	0.91	1.60	24.87	28.22	37.2%	0.88	16.04	0.64
	10.67	26.91	0.87	1.55	23.51	27.74	36.6%	0.85	14.29	0.61
	10.72	26.45	0.84	1.50	22.17	27.26	35.9%	0.81	12.66	0.57
	10.77	26.03	0.80	1.45	20.86	26.81	35.3%	0.78	11.15	0.53
	10.82	25.72	0.76	1.40	19.57	26.46	34.9%	0.74	9.69	0.50
	10.87	25.41	0.72	1.35	18.29	26.12	34.4%	0.70	8.36	0.46
	10.92	25.09	0.68	1.30	17.03	25.78	34.0%	0.66	7.16	0.42
	10.97	24.78	0.64	1.25	15.78	25.43	33.5%	0.62	6.09	0.39
	11.02	24.47	0.59	1.20	14.55	25.09	33.1%	0.58	5.12	0.35
	11.07	22.88	0.58	1.15	13.36	23.47	30.9%	0.57	4.61	0.34
	11.12	22.37	0.55	1.10	12.23	22.94	30.2%	0.53	3.87	0.32
	11.17	21.87	0.51	1.05	11.12	22.41	29.5%	0.50	3.22	0.29
	11.22	21.37	0.47	1.00	10.04	21.87	28.8%	0.46	2.64	0.26
	11.27	21.05	0.43	0.95	8.98	21.53	28.4%	0.42	2.11	0.24
	11.32	20.78	0.38	0.90	7.94	21.23	28.0%	0.37	1.66	0.21
	11.37	20.51	0.34	0.85	6.90	20.93	27.6%	0.33	1.27	0.18
	11.42	20.03	0.29	0.80	5.89	20.40	26.9%	0.29	0.96	0.16
	11.47	18.51	0.27	0.75	4.92	18.84	24.8%	0.26	0.73	0.15
	11.52	15.84	0.26	0.70	4.06	16.11	21.2%	0.25	0.56	0.14
	11.57	13.62	0.24	0.65	3.33	13.83	18.2%	0.24	0.42	0.13
	11.62	11.57	0.23	0.60	2.69	11.73	15.5%	0.23	0.31	0.12

Data Input & Proofing

STREAM NAME:	Vallecito Creek
XS LOCATION:	R4
XS NUMBER:	XS3
DATE:	9/20/2016
OBSERVERS:	Sutton,McIntyre,Anderson
1/4 SEC:	NW
SECTION:	16
TWP:	37N
RANGE:	6W
PM:	NM
COUNTY:	La Plata
WATERSHED:	vallecito
DIVISION:	7
DOW CODE:	43884
USGS MAP:	Vallecito Res
USFS MAP:	SJNF
	Level and Rod Survey
TAPE WT:	0.0106 lbs / ft
TENSION:	99999 lbs
SLOPE:	0.022 ft / ft

CHECKED BY:.....DATE.....

ASSIGNED TO: .....DATE.....

GL=1	FEATURE	DIST	VERT DEPTH	WATER DEPTH	VEL	A	Q	Tape to Water
			Total Data Points = 38					
	LBOP	5.00	4.25			0.00	0.00	0.00
		5.20	4.64			0.00	0.00	0.00
		6.40	5.52			0.00	0.00	0.00
1	bolder/LBF	7.20	5.74			0.00	0.00	0.00
		7.30	8.91			0.00	0.00	0.00
		8.20	9.71			0.00	0.00	0.00
		10.00	10.12			0.00	0.00	0.00
		11.30	10.71			0.00	0.00	0.00
	LEW	13.70	11.25	0.00	0.00	0.00	0.00	0.00
		15.70	11.53	0.30	0.66	0.60	0.40	11.23
		17.70	11.90	0.60	2.00	1.20	2.40	11.30
		19.70	12.08	0.80	2.70	1.60	4.32	11.28
		21.70	12.29	0.90	2.57	1.80	4.63	11.39
	Rock	23.70	11.36	0.80	2.07	1.60	3.31	10.56
		25.70	12.42	1.30	1.27	2.60	3.30	11.12
	Rock	27.70	12.12	0.80	1.59	1.60	2.54	11.32
	Rock	29.70	12.00	0.95	0.62	1.90	1.18	11.05
	Rock	31.70	11.90	0.60	1.14	1.20	1.37	11.30
		33.70	12.01	0.80	1.36	1.60	2.18	11.21
	Rock	35.70	11.90	0.60	2.15	1.20	2.58	11.30
		37.70	12.60	1.20	0.30	2.40	0.72	11.40
		39.70	12.38	1.10	0.88	2.20	1.94	11.28
	Rock	41.70	11.60	1.10	2.59	2.20	5.70	10.50
		43.70	12.89	1.30	1.44	2.60	3.74	11.59
		45.70	12.73	1.40	1.71	2.80	4.79	11.33
		47.70	13.14	1.80	0.70	3.60	2.52	11.34
	Rock	49.70	13.09	0.50	1.35	1.00	1.35	12.59
		51.70	12.58	0.80	0.33	1.60	0.53	11.78
	Eddy	53.70	11.79	0.60	0.00	0.72	0.00	11.19
	REW	54.10	11.25	0.00	0.00	0.00	0.00	0.00
		56.00	11.02			0.00	0.00	0.00
		58.70	10.03			0.00	0.00	0.00
		60.30	9.40			0.00	0.00	0.00
		60.90	8.26			0.00	0.00	0.00
1	RBF	62.50	7.75			0.00	0.00	0.00
		63.50	6.98			0.00	0.00	0.00
		65.40	5.89			0.00	0.00	0.00
	RBOP	69.00	5.82			0.00	0.00	0.00
					Totals	36.02	49.49	

STREAM NAME: Vallecito Creek
XS LOCATION: R4
XS NUMBER: XS3

Constant Manning's n

GL = lowest Grassline elevation corrected for sag
WL = Waterline corrected for variations in field measured water surface elevations and sag

STAGING TABLE

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	7.75	55.24	3.88	5.39	214.25	59.74	100.0%	3.59	766.07	3.58
	10.30	47.55	1.69	2.84	80.49	49.61	83.0%	1.62	169.62	2.11
	10.35	47.30	1.65	2.79	78.12	49.34	82.6%	1.58	161.95	2.07
	10.40	47.05	1.61	2.74	75.76	49.07	82.1%	1.54	154.44	2.04
	10.45	46.81	1.57	2.69	73.41	48.81	81.7%	1.50	147.08	2.00
	10.50	46.56	1.53	2.64	71.08	48.54	81.2%	1.46	139.88	1.97
	10.55	46.31	1.48	2.59	68.76	48.27	80.8%	1.42	132.83	1.93
	10.60	46.07	1.44	2.54	66.45	48.01	80.4%	1.38	125.94	1.90
	10.65	45.82	1.40	2.49	64.15	47.74	79.9%	1.34	119.21	1.86
	10.70	45.58	1.36	2.44	61.87	47.48	79.5%	1.30	112.64	1.82
	10.75	45.23	1.32	2.39	59.60	47.12	78.9%	1.26	106.37	1.78
	10.80	44.87	1.28	2.34	57.34	46.74	78.2%	1.23	100.29	1.75
	10.85	44.51	1.24	2.29	55.11	46.37	77.6%	1.19	94.36	1.71
	10.90	44.15	1.20	2.24	52.89	46.00	77.0%	1.15	88.59	1.68
	10.95	43.80	1.16	2.19	50.69	45.62	76.4%	1.11	82.99	1.64
	11.00	43.44	1.12	2.14	48.51	45.25	75.7%	1.07	77.55	1.60
	11.05	42.89	1.08	2.09	46.35	44.69	74.8%	1.04	72.48	1.56
	11.10	42.26	1.05	2.04	44.22	44.05	73.7%	1.00	67.67	1.53
	11.15	41.62	1.01	1.99	42.13	43.41	72.7%	0.97	63.02	1.50
	11.20	40.98	0.98	1.94	40.06	42.76	71.6%	0.94	58.54	1.46
	11.25	40.37	0.94	1.89	38.03	42.14	70.5%	0.90	54.20	1.43
WL	11.30	39.97	0.90	1.84	36.02	41.71	69.8%	0.86	49.85	1.38
	11.35	39.58	0.86	1.79	34.03	41.29	69.1%	0.82	45.65	1.34
	11.40	39.01	0.82	1.74	32.07	40.67	68.1%	0.79	41.76	1.30
	11.45	38.41	0.78	1.69	30.13	40.02	67.0%	0.75	38.05	1.26
	11.50	37.82	0.75	1.64	28.22	39.37	65.9%	0.72	34.50	1.22
	11.55	37.26	0.71	1.59	26.35	38.77	64.9%	0.68	31.08	1.18
	11.60	36.74	0.67	1.54	24.50	38.18	63.9%	0.64	27.81	1.14
	11.65	36.02	0.63	1.49	22.68	37.39	62.6%	0.61	24.80	1.09
	11.70	35.31	0.59	1.44	20.90	36.60	61.3%	0.57	21.94	1.05
	11.75	34.59	0.55	1.39	19.15	35.81	59.9%	0.53	19.25	1.01
	11.80	33.85	0.52	1.34	17.44	34.99	58.6%	0.50	16.72	0.96
	11.85	33.05	0.48	1.29	15.76	34.13	57.1%	0.46	14.37	0.91
	11.90	31.99	0.44	1.24	14.13	33.01	55.2%	0.43	12.25	0.87
	11.95	27.94	0.45	1.19	12.63	28.88	48.3%	0.44	11.11	0.88
	12.00	23.90	0.47	1.14	11.34	24.77	41.5%	0.46	10.28	0.91
	12.05	21.61	0.47	1.09	10.21	22.42	37.5%	0.46	9.22	0.90
	12.10	19.58	0.47	1.04	9.18	20.32	34.0%	0.45	8.24	0.90
	12.15	17.94	0.46	0.99	8.24	18.60	31.1%	0.44	7.31	0.89
	12.20	16.45	0.45	0.94	7.38	17.04	28.5%	0.43	6.45	0.87
	12.25	14.96	0.44	0.89	6.60	15.48	25.9%	0.43	5.70	0.86
	12.30	13.64	0.43	0.84	5.88	14.09	23.6%	0.42	5.02	0.85
	12.35	12.74	0.41	0.79	5.22	13.13	22.0%	0.40	4.31	0.83
	12.40	11.68	0.39	0.74	4.61	12.02	20.1%	0.38	3.72	0.81
	12.45	10.74	0.38	0.69	4.05	11.04	18.5%	0.37	3.17	0.78
	12.50	9.94	0.36	0.64	3.54	10.20	17.1%	0.35	2.66	0.75
	12.55	9.14	0.33	0.59	3.06	9.36	15.7%	0.33	2.21	0.72
	12.60	8.35	0.31	0.54	2.62	8.54	14.3%	0.31	1.82	0.69
	12.65	8.08	0.27	0.49	2.21	8.25	13.8%	0.27	1.40	0.63
	12.70	7.80	0.23	0.44	1.82	7.95	13.3%	0.23	1.03	0.57
	12.75	7.11	0.20	0.39	1.44	7.24	12.1%	0.20	0.75	0.52
	12.80	5.97	0.19	0.34	1.11	6.07	10.2%	0.18	0.55	0.49
	12.85	4.83	0.17	0.29	0.84	4.90	8.2%	0.17	0.40	0.47
	12.90	3.88	0.16	0.24	0.63	3.93	6.6%	0.16	0.28	0.45
	12.95	3.44	0.13	0.19	0.44	3.48	5.8%	0.13	0.17	0.39
	13.00	3.00	0.09	0.14	0.28	3.03	5.1%	0.09	0.09	0.31
	13.05	2.56	0.06	0.09	0.14	2.57	4.3%	0.06	0.03	0.22

(1) $\bar{V} = 5.12$

CWCB = 55% → (0.552) $\bar{d} = 28.32$

CWCB = 57.62 (57.49)% WP $= 20.97$

STREAM NAME: Vallecito Creek
XS LOCATION: R4
XS NUMBER: XS3

Thorne-Zevenbergen D84 Correction Applied
User Supplied D84 = 0.97

GL = lowest Grassline elevation corrected for sag
WL = Waterline corrected for variations in field measured water surface elevations and sag

STAGING TABLE

Velocity based on test of R/D84>1

	DIST TO WATER (FT)	TOP WIDTH (FT)	AVG. DEPTH (FT)	MAX. DEPTH (FT)	AREA (SQ FT)	WETTED PERIM. (FT)	PERCENT WET PERIM (%)	HYDR RADIUS (FT)	FLOW (CFS)	AVG. VELOCITY (FT/SEC)
GL	7.75	55.24	3.88	5.39	214.25	59.74	100.0%	3.59	2286.94	10.67
	10.30	47.55	1.69	2.84	80.49	49.61	83.0%	1.62	411.73	5.12
	10.35	47.30	1.65	2.79	78.12	49.34	82.6%	1.58	389.94	4.99
	10.40	47.05	1.61	2.74	75.76	49.07	82.1%	1.54	368.72	4.87
	10.45	46.81	1.57	2.69	73.41	48.81	81.7%	1.50	348.05	4.74
	10.50	46.56	1.53	2.64	71.08	48.54	81.2%	1.46	327.94	4.61
	10.55	46.31	1.48	2.59	68.76	48.27	80.8%	1.42	308.40	4.49
	10.60	46.07	1.44	2.54	66.45	48.01	80.4%	1.38	289.43	4.36
	10.65	45.82	1.40	2.49	64.15	47.74	79.9%	1.34	271.02	4.22
	10.70	45.58	1.36	2.44	61.87	47.48	79.5%	1.30	253.17	4.09
	10.75	45.23	1.32	2.39	59.60	47.12	78.9%	1.26	236.35	3.97
	10.80	44.87	1.28	2.34	57.34	46.74	78.2%	1.23	220.16	3.84
	10.85	44.51	1.24	2.29	55.11	46.37	77.6%	1.19	204.52	3.71
	10.90	44.15	1.20	2.24	52.89	46.00	77.0%	1.15	189.43	3.58
	10.95	43.80	1.16	2.19	50.69	45.62	76.4%	1.11	174.91	3.45
	11.00	43.44	1.12	2.14	48.51	45.25	75.7%	1.07	160.95	3.32
	11.05	42.89	1.08	2.09	46.35	44.69	74.8%	1.04	148.16	3.20
	11.10	42.26	1.05	2.04	44.22	44.05	73.7%	1.00	136.19	3.08
	11.15	41.62	1.01	1.99	42.13	43.41	72.7%	0.97	124.76	2.96
	11.20	40.98	0.98	1.94	40.06	42.76	71.6%	0.94	122.02	3.05
	11.25	40.37	0.94	1.89	38.03	42.14	70.5%	0.90	109.88	2.89
WL	11.30	39.97	0.90	1.84	36.02	41.71	69.8%	0.86	97.66	2.71
	11.35	39.58	0.86	1.79	34.03	41.29	69.1%	0.82	86.40	2.54
	11.40	39.01	0.82	1.74	32.07	40.67	68.1%	0.79	76.64	2.39
	11.45	38.41	0.78	1.69	30.13	40.02	67.0%	0.75	67.72	2.25
	11.50	37.82	0.75	1.64	28.22	39.37	65.9%	0.72	59.50	2.11
	11.55	37.26	0.71	1.59	26.35	38.77	64.9%	0.68	51.87	1.97
	11.60	36.74	0.67	1.54	24.50	38.18	63.9%	0.64	44.87	1.83
	11.65	36.02	0.63	1.49	22.68	37.39	62.6%	0.61	38.81	1.71
	11.70	35.31	0.59	1.44	20.90	36.60	61.3%	0.57	33.31	1.59
	11.75	34.59	0.55	1.39	19.15	35.81	59.9%	0.53	28.33	1.48
	11.80	33.85	0.52	1.34	17.44	34.99	58.6%	0.50	23.87	1.37
	11.85	33.05	0.48	1.29	15.76	34.13	57.1%	0.46	19.93	1.26
	11.90	31.99	0.44	1.24	14.13	33.01	55.2%	0.43	16.54	1.17
	11.95	27.94	0.45	1.19	12.63	28.88	48.3%	0.44	15.00	1.19
	12.00	23.90	0.47	1.14	11.34	24.77	41.5%	0.46	14.07	1.24
	12.05	21.61	0.47	1.09	10.21	22.42	37.5%	0.46	12.54	1.23
	12.10	19.58	0.47	1.04	9.18	20.32	34.0%	0.45	11.13	1.21
	12.15	17.94	0.46	0.99	8.24	18.60	31.1%	0.44	9.73	1.18
	12.20	16.45	0.45	0.94	7.38	17.04	28.5%	0.43	8.44	1.14
	12.25	14.96	0.44	0.89	6.60	15.48	25.9%	0.43	7.34	1.11
	12.30	13.64	0.43	0.84	5.88	14.09	23.6%	0.42	6.34	1.08
	12.35	12.74	0.41	0.79	5.22	13.13	22.0%	0.40	5.26	1.01
	12.40	11.68	0.39	0.74	4.61	12.02	20.1%	0.38	4.39	0.95
	12.45	10.74	0.38	0.69	4.05	11.04	18.5%	0.37	3.61	0.89
	12.50	9.94	0.36	0.64	3.54	10.20	17.1%	0.35	2.90	0.82
	12.55	9.14	0.33	0.59	3.06	9.36	15.7%	0.33	2.29	0.75
	12.60	8.35	0.31	0.54	2.62	8.54	14.3%	0.31	1.79	0.68
	12.65	8.08	0.27	0.49	2.21	8.25	13.8%	0.27	1.27	0.57
	12.70	7.80	0.23	0.44	1.82	7.95	13.3%	0.23	0.87	0.48
	12.75	7.11	0.20	0.39	1.44	7.24	12.1%	0.20	0.58	0.40
	12.80	5.97	0.19	0.34	1.11	6.07	10.2%	0.18	0.39	0.35
	12.85	4.83	0.17	0.29	0.84	4.90	8.2%	0.17	0.25	0.30
	12.90	3.88	0.16	0.24	0.63	3.93	6.6%	0.16	0.16	0.25
	12.95	3.44	0.13	0.19	0.44	3.48	5.8%	0.13	0.08	0.19
	13.00	3.00	0.09	0.14	0.28	3.03	5.1%	0.09	0.04	0.14
	13.05	2.56	0.06	0.09	0.14	2.57	4.3%	0.06	0.01	0.09