AGENDA ITEM or FINAL CONTRACT REVIEW SUBMITTAL FORM

Agenda Item: Colorado Water Conservation Board Presentation

Action Requested: Discussion

Parties to the Agreement:

Term Begins: **Term Ends:** **Grant Contract #:**

Summary:

Please see the attached.

Fiscal Impact: N/A

Submitted by: Katherine Haase **Submitter's Email Address:** khaase@gunnisoncounty.org

Finance Review: ○ Required ◉ Not Required

Comments:

Reviewed by: Discharge Date:

County Attorney Review: ○ Required ◉ Not Required

Comments:

Reveiwed by: Discharge Date: Certificate of Insurance Required

Yes ○ No ○

County Manager Review:

Comments:

Reveiwed by: GUNCOUNTY1\mbirnie Discharge Date: 11/6/2020

○ Consent Agenda ○ Regular Agenda ○ Worksession Time Allotted: 45

Agenda Date: 11/10/2020

Revised April 2015

2021 Instream Flow Recommendations
Gunnison County

Robert Viehl & Julie Nania

November 10, 2020

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Colorado Water Conservation Board
Department of Natural Resources

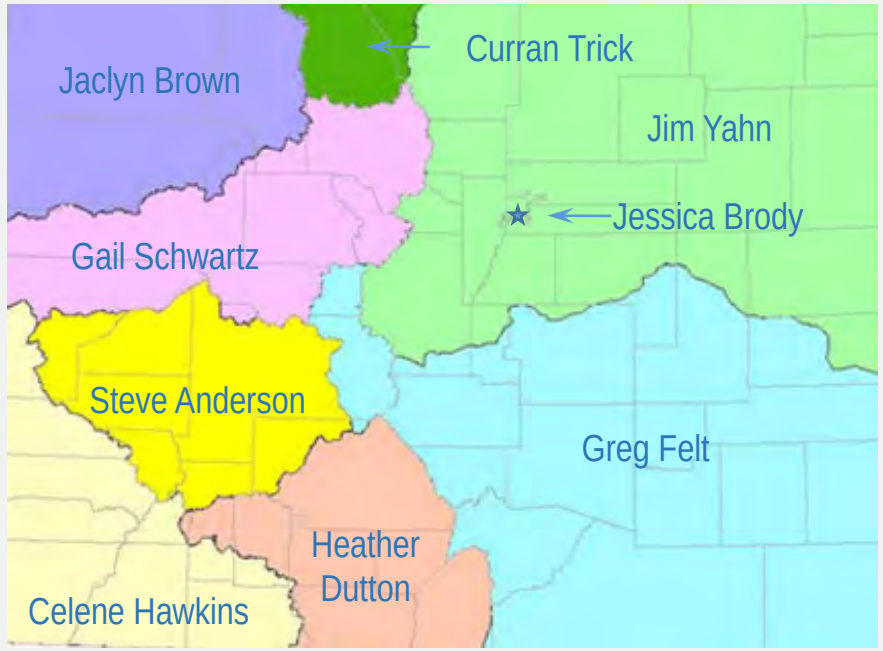
CWCB

To promote the protection, conservation, and development of Colorado's water resources for present and future generations

Provides policy direction on water issues

- Finance and Administration
- Interstate & Federal
- Stream and Lake Protection
- Water Supply Planning
- Watershed & Flood Protection

Board of Directors



Ex-Officio Members:

Dan Gibbs, DNR Director *(voting)*

Rebecca Mitchell, CWCB Director

Phil Weiser, AG

Kevin Rein, State Engineer

Dan Prenzlow, CPW Director

Kate Greenberg, Dept. of Ag Director

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Program History

- Public concern over dry stream reaches
- No mechanism within the water rights system to keep water within a stream for environmental preservation.
- Federal imposition of bypass flows on Fry-Ark project
- Threats of ballot initiative to allow private ISFs

Colorado's Legislature Weighs In

Maintain flows in streams to ensure reasonable preservation of the natural environment and achieve a balance with other beneficial uses of water in the state.

Provide regulatory certainty for water users through continued reliance on the doctrine of prior appropriation.

In 1973, the Colorado Legislature established the Instream Flow Program with the passage of Senate Bill 97:

- *Recognized "the need to correlate the activities of mankind with some reasonable preservation of the natural environment"*
- *Vested the Colorado Water Conservation Board with the authority "on behalf of the people of the state of Colorado, to appropriate or acquire… such waters of natural streams and lakes as may be required to preserve the natural environment to a reasonable degree."*

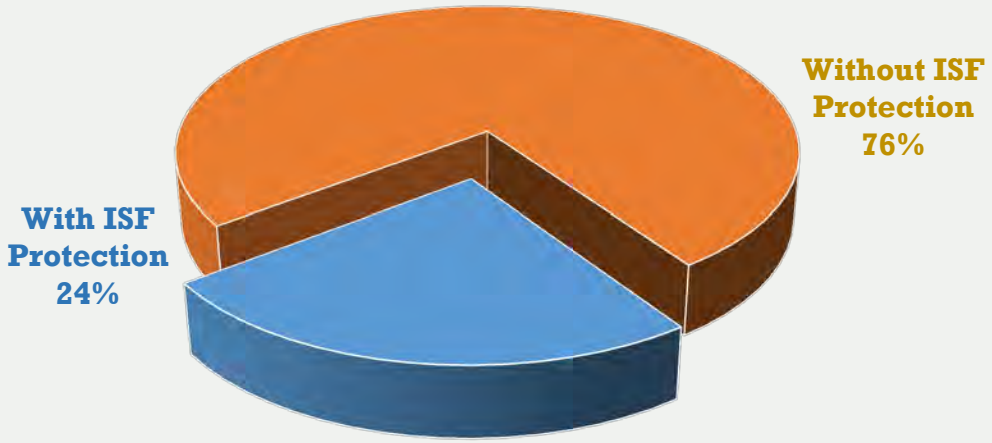
What did the ISF legislation establish?

- ISF and NLL rights are "in-channel" or "in-lake" appropriations of water and are recognized beneficial uses of water.
- Made exclusively by the Colorado Water Conservation Board
- To preserve the natural environment to a reasonable degree
- For "minimum flows" between specific points on a stream, or "levels" on natural lakes
- Administered within the State's water right priority system
- Entitled to stream conditions existing at time of appropriation

Herman Gulch

ISF Program Statistics

39,479 miles of perennial streams



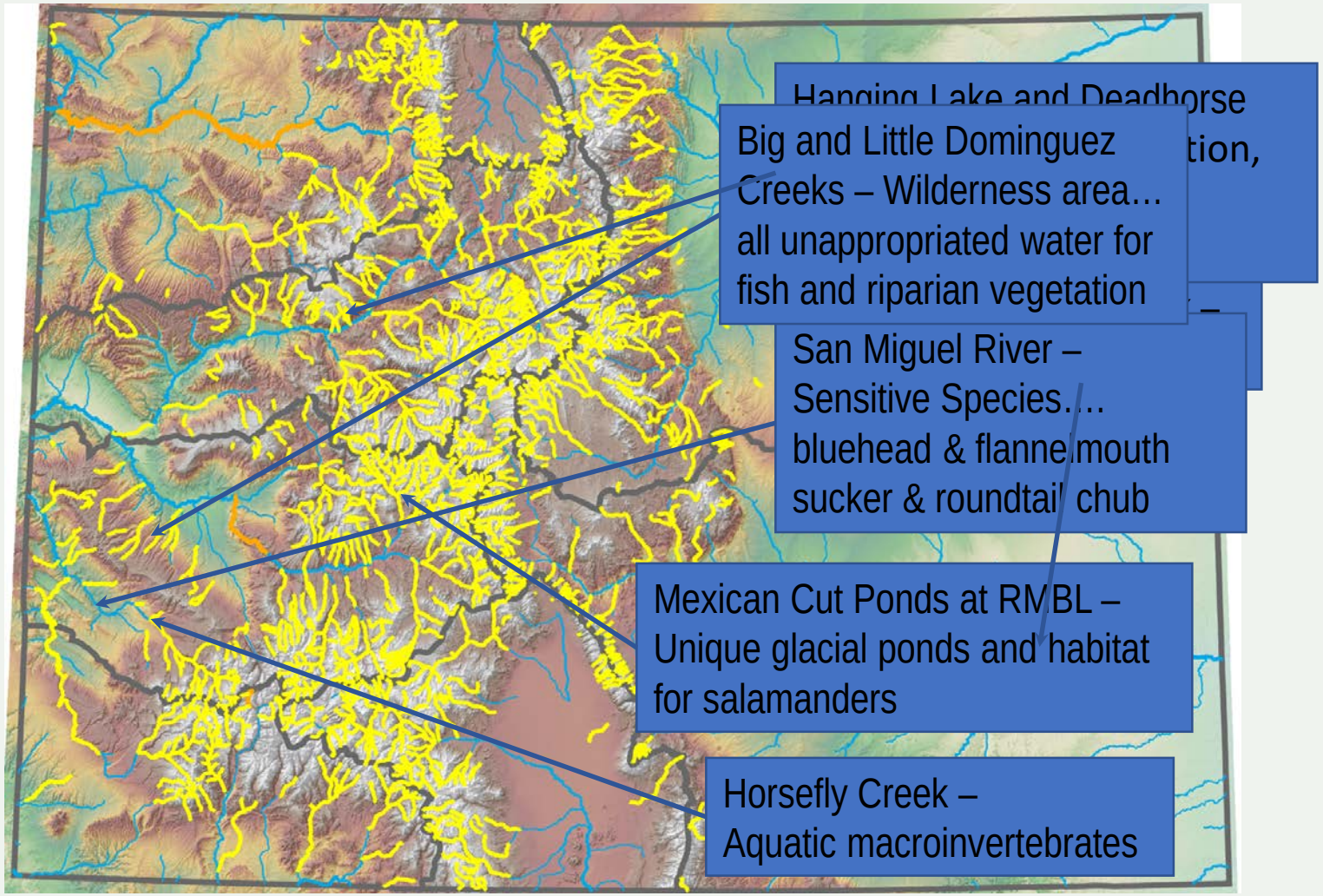
Appropriated
Instream flow water rights on

- 1,684 stream segments,
- covering 9,720 miles of stream,
- and 482 natural lakes

Acquired
Over 43 water right donations or long-term contracts for water totaling

945 stream miles

Distribution of Existing ISF Water Rights in Colorado

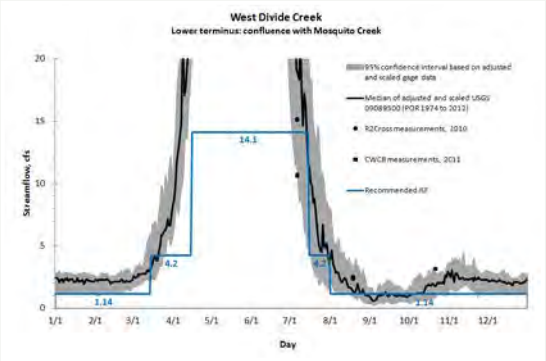


Yellow lines = Appropriations
Orange Lines = Acquisitions

Required Board Findings

A natural environment exists

- Typically identified by the presence of a fishery, but other indicators can be used
  Note: Quantification of the amount of water needed is provided by the recommending entity.



Natural environment will be preserved by the water available for appropriation

- Determined by water right and hydrologic investigations
- Daily **Median** hydrology when available – general CWCB policy to show water available 50% of time

No material injury to other rights

- New appropriations are junior water rights and have no effect on existing senior appropriations
- 37-92-102(3) b. Recognition of existing undecreed uses and exchanges

Natural Environment

There is a natural environment that can be preserved to a reasonable degree

Central stoneroller Nate Cathcart photo 2010

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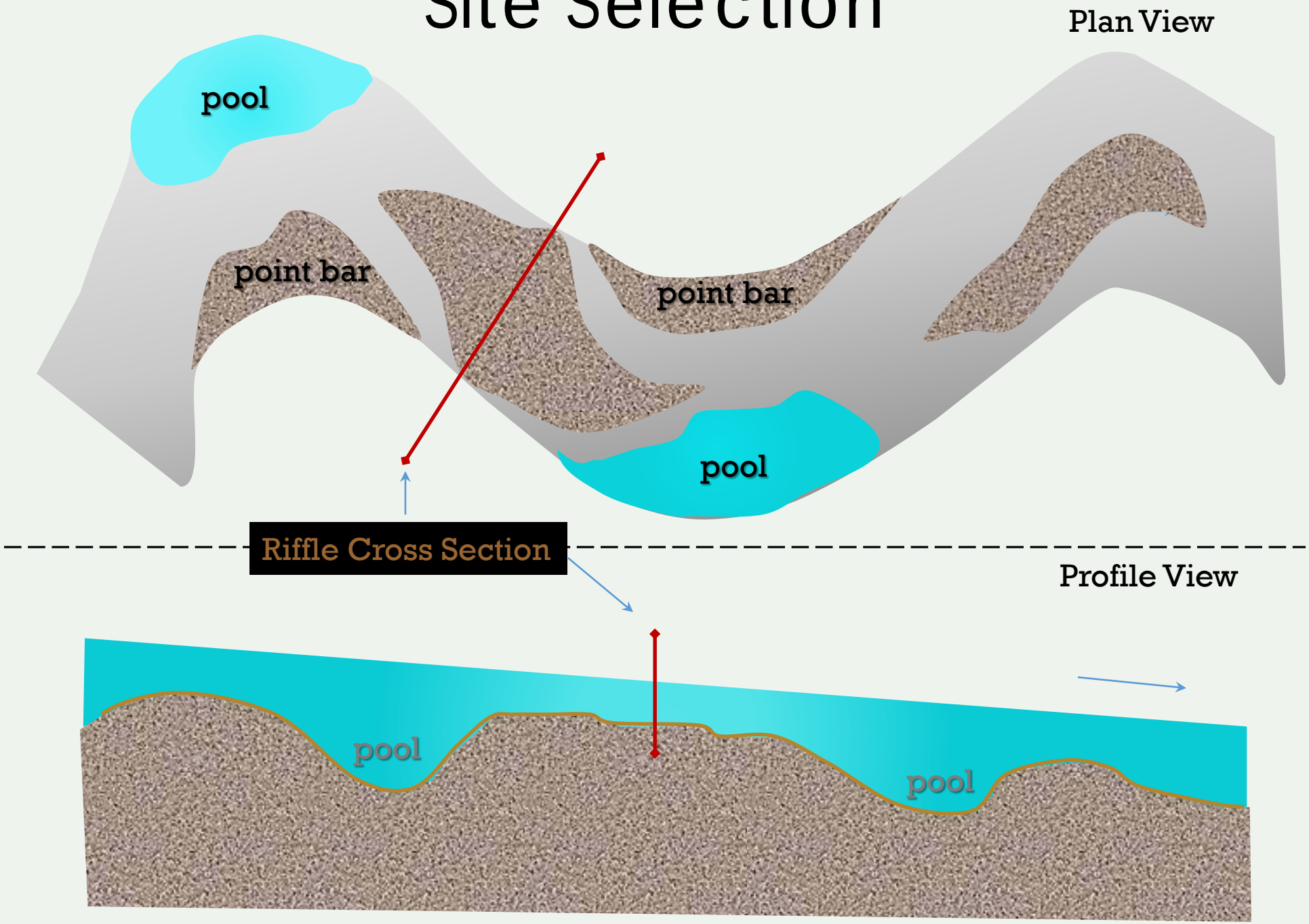
R2Cross

Collect streamflow measurements & channel geometry to model hydraulic parameters of average depth, velocity, and percent wetted perimeter

Kelso Creek

Site Selection



R2CROSS Parameters

- Biological R2CROSS recommendation based on maintaining hydraulic parameters related to stream habitat preferences for fish.
- 3 of 3 required for summer flow; 2 of 3 required for winter flow
- Many original R2Cross recommendations were based solely on 2 of 3

Stream Width (ft)	Average Depth (ft)	Average Velocity (ft/sec)	Wetted Perimeter (%)
1 - 20	0.2	1.0	50
21 - 40	0.21 - 0.40	1.0	50
41 - 60	0.41 - 0.60	1.0	50 - 60
61 - 100	0.61 - 1.00	1.0	70 or greater

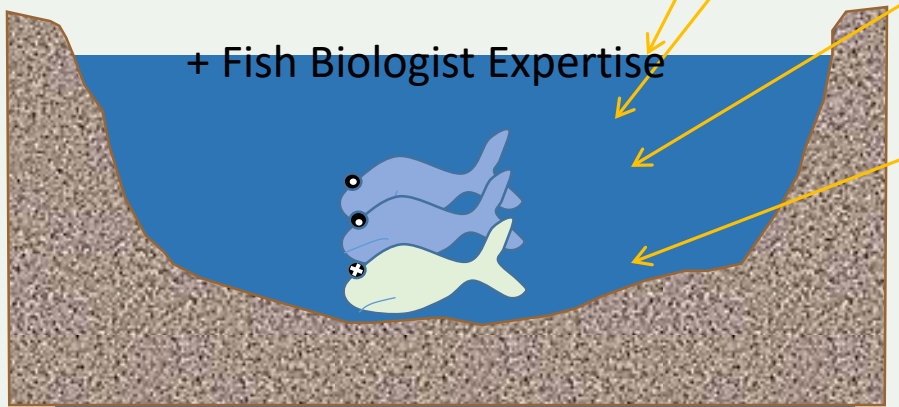
Computations

Manning's Equation

$$Q = \frac{1.486 * A * R^{2/3} * S^{1/2}}{n}$$

where:

Q = discharge (cfs)
A = cross-sectional area (ft)
R = hydraulic radius (ft)
S = slope (ft/ft)
n = Manning's n, a coefficient of roughness



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)
1.55	37.12	1.21	1.7	44.95	37.97	100.00%	1.18	61.22	1.36
1.56	37.08	1.2	1.69	44.66	37.93	99.90%	1.18	60.6	1.36
1.61	36.88	1.16	1.64	42.81	37.69	99.30%	1.14	56.71	1.32
1.66	36.68	1.12	1.59	40.97	37.45	98.60%	1.09	52.94	1.29
1.71	36.48	1.07	1.54	39.14	37.2	98.00%	1.05	49.27	1.26
1.76	36.28	1.03	1.49	37.32	36.96	97.40%	1.01	45.71	1.22
1.81	36.09	0.98	1.44	35.51	36.72	96.70%	0.97	42.26	1.19
1.86	35.89	0.94	1.39	33.71	36.48	96.10%	0.92	38.93	1.15
1.91	35.69	0.89	1.34	31.92	36.24	95.40%	0.88	35.7	1.12
1.96	35.49	0.85	1.29	30.14	36	94.80%	0.84	32.59	1.08
2.01	35.14	0.81	1.24	28.38	35.61	93.80%	0.8	29.68	1.05
2.06	34.78	0.77	1.19	26.63	35.21	92.70%	0.76	26.9	1.01
2.11	34.42	0.72	1.14	24.9	34.81	91.70%	0.72	24.24	0.97
2.16	34.06	0.68	1.09	23.19	34.41	90.60%	0.67	21.69	0.94
2.21	33.64	0.64	1.04	21.49	33.98	89.50%	0.63	19.28	0.9
2.26	32.76	0.61	0.99	19.83	33.08	87.10%	0.6	17.16	0.87
2.31	31.93	0.57	0.94	18.22	32.23	84.90%	0.57	15.16	0.83
2.36	31.38	0.53	0.89	16.63	31.66	83.40%	0.53	13.18	0.79
2.41	30.83	0.49	0.84	15.08	31.09	81.90%	0.49	11.33	0.75
2.46	30.18	0.45	0.79	13.55	30.43	80.10%	0.45	9.62	0.71
2.51	27.55	0.44	0.74	12.08	27.79	73.20%	0.43	8.44	0.7
2.56	26.42	0.41	0.69	10.73	26.66	70.20%	0.4	7.12	0.66
2.61	25.29	0.37	0.64	9.44	25.52	67.20%	0.37	5.92	0.63
2.66	23.62	0.35	0.59	8.24	23.85	62.80%	0.35	4.94	0.6
2.71	22.86	0.31	0.54	7.07	23.08	60.80%	0.31	3.91	0.55
2.76	21.07	0.28	0.49	5.99	21.28	56.10%	0.28	3.13	0.52
2.81	20.27	0.24	0.44	4.96	20.47	53.90%	0.24	2.35	0.47
2.86	19.52	0.2	0.39	3.96	19.72	51.90%	0.2	1.66	0.42
2.91	18.73	0.16	0.34	3.01	18.92	49.80%	0.16	1.07	0.36
2.96	17.41	0.12	0.29	2.1	17.57	46.30%	0.12	0.62	0.3
3.01	13.93	0.09	0.24	1.28	14.07	37.00%	0.09	0.31	0.25
3.06	10.03	0.07	0.19	0.69	10.13	26.70%	0.07	0.14	0.2
3.11	6.81	0.04	0.14	0.27	6.87	18.10%	0.04	0.04	0.14
3.16	2.11	0.02	0.09	0.05	2.13	5.60%	0.02	0.01	0.1
3.21	0.38	0.02	0.04	0.01	0.39	1.00%	0.02	0	0.09

WHAT DOES AN ISF LOOK LIKE?

Water Availability
Water Balance approach, driven by best available data

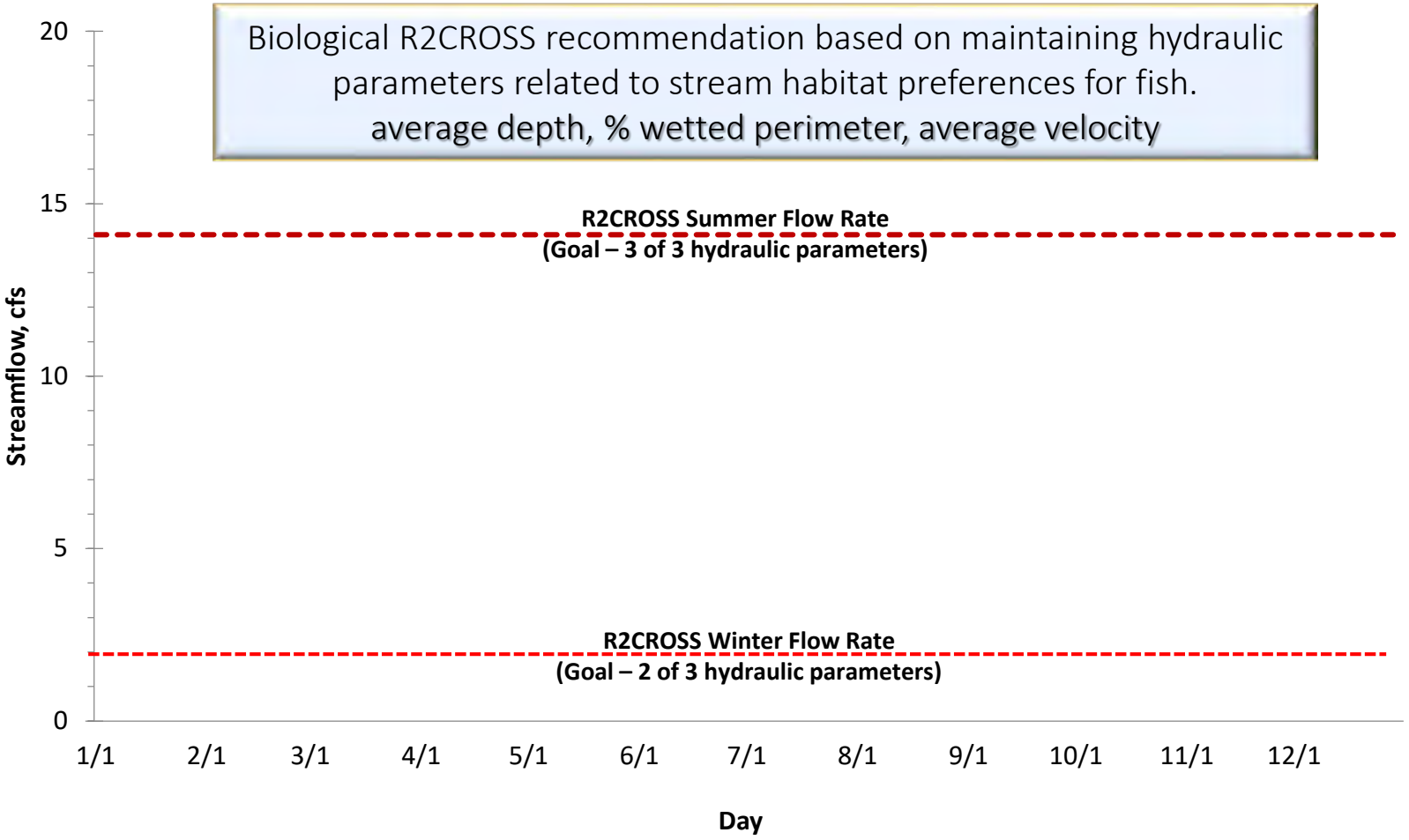
- ✓ Statistical analysis of data to provide *median* daily flow hydrograph when possible.
- ✓ Gage Records +20 years, short term gages, temporary gages, spot flow measurements, diversion records.
- ✓ StreamStats analysis to provide mean monthly hydrograph when data is limited.
- ✓ Detailed CDSS modeling on larger streams.
- ✓ Additional information from water commissioners, land owners, ditch or reservoir operators, resource managers.

Water availability can be viewed as a necessary refinement that may impose limitations on biological quantification model findings.

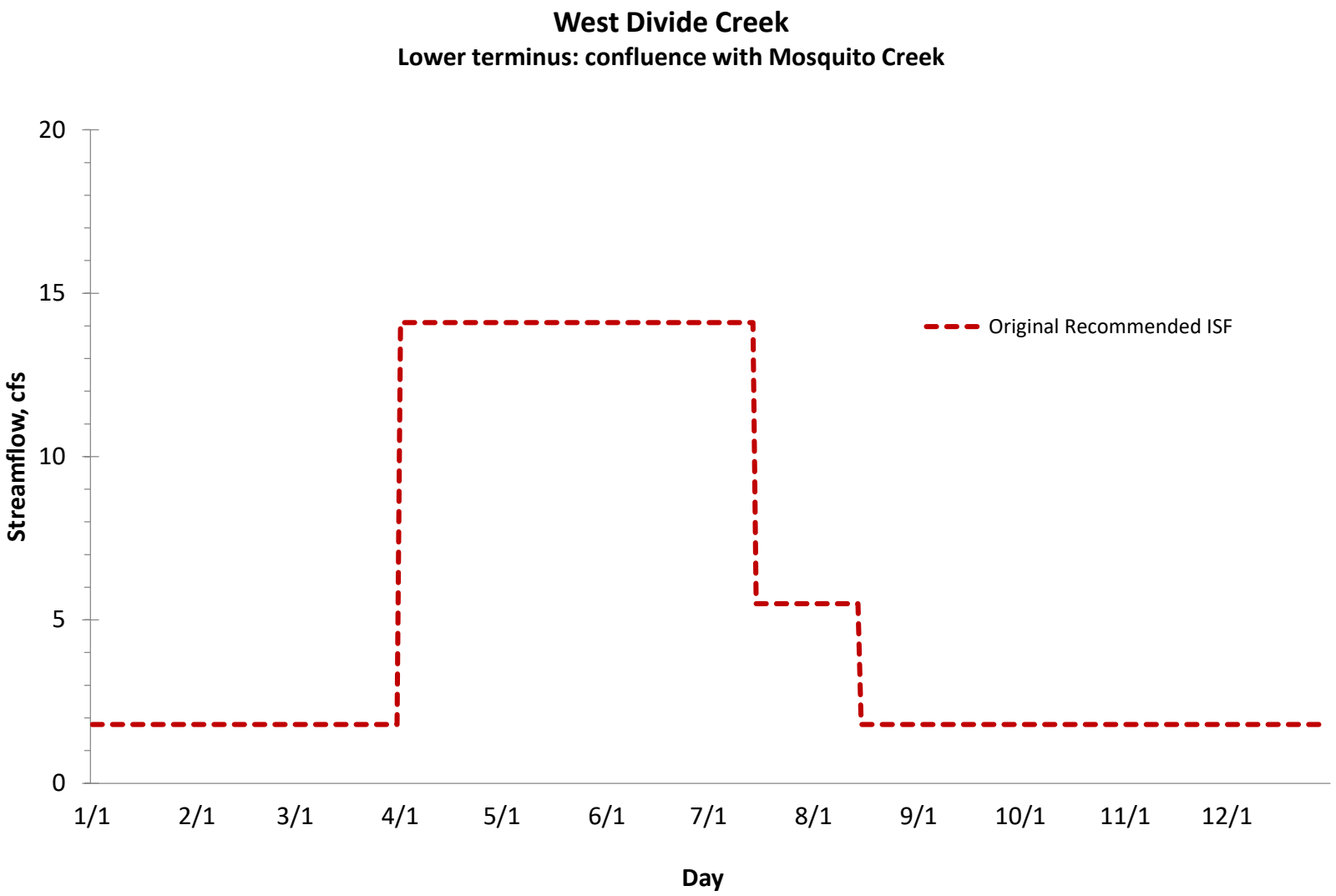
Water Availability

West Divide Creek

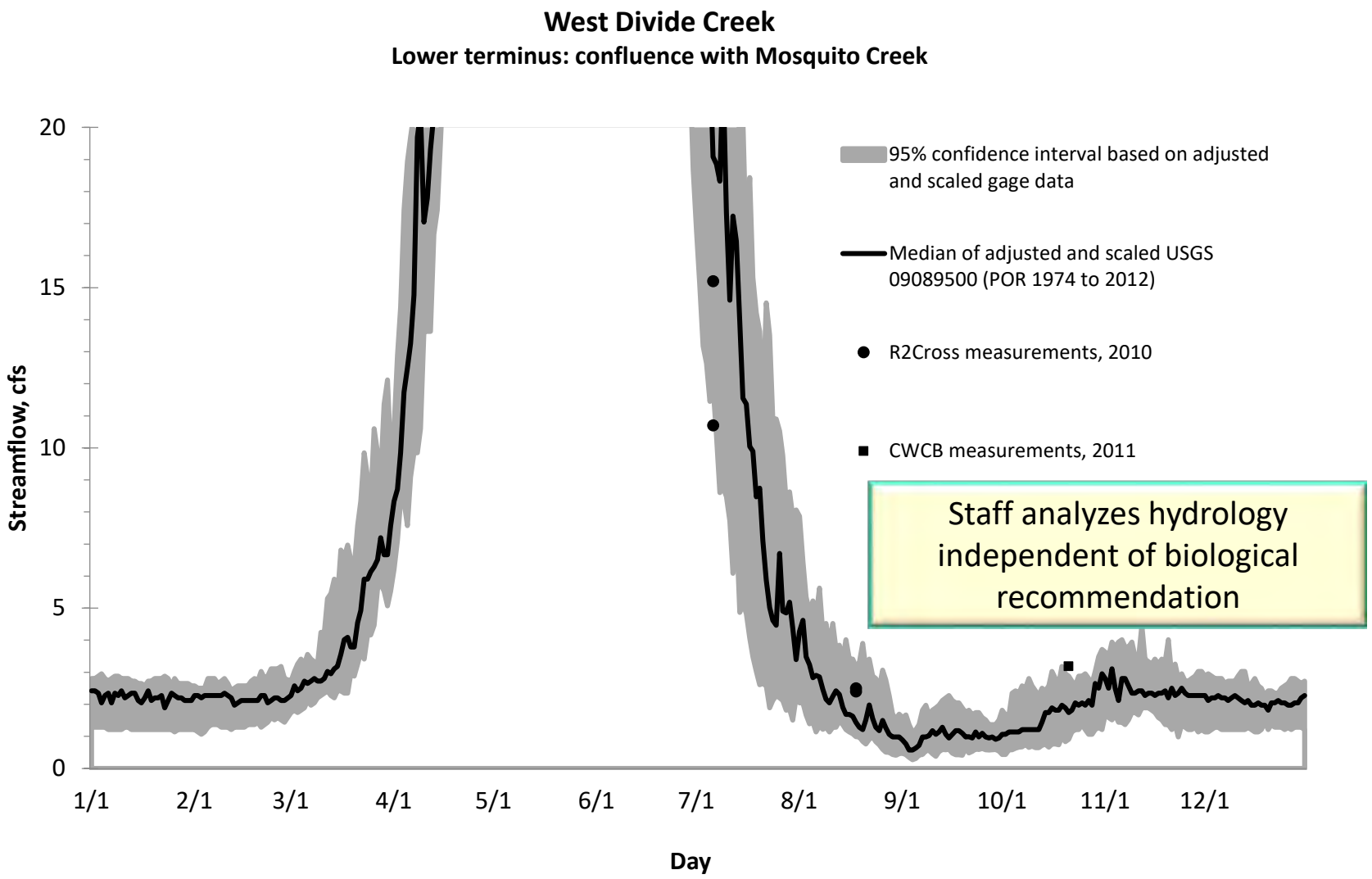
Lower terminus: confluence with Mosquito Creek



Water Availability

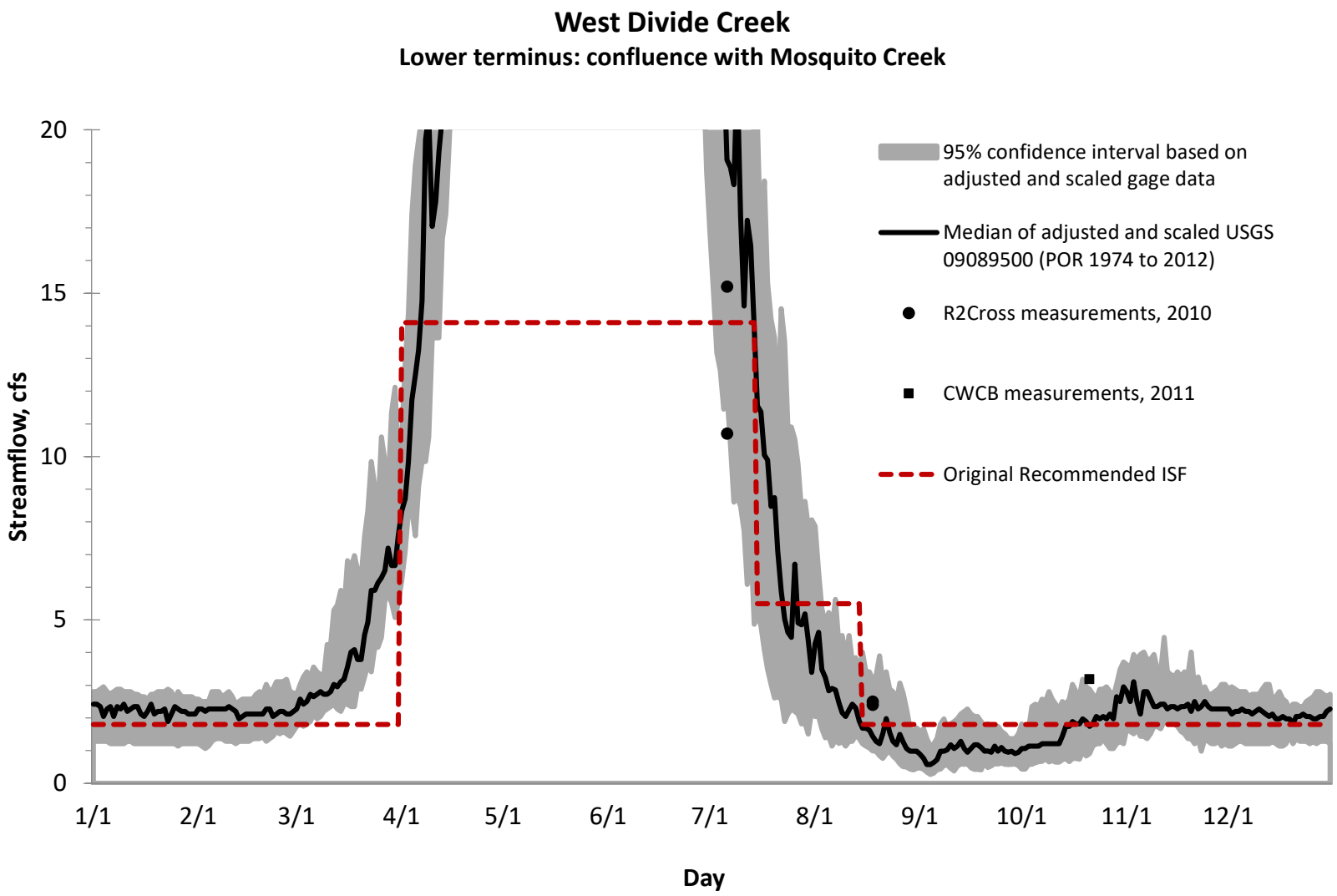


Water Availability



Staff analyzes hydrology independent of biological recommendation

Water Availability



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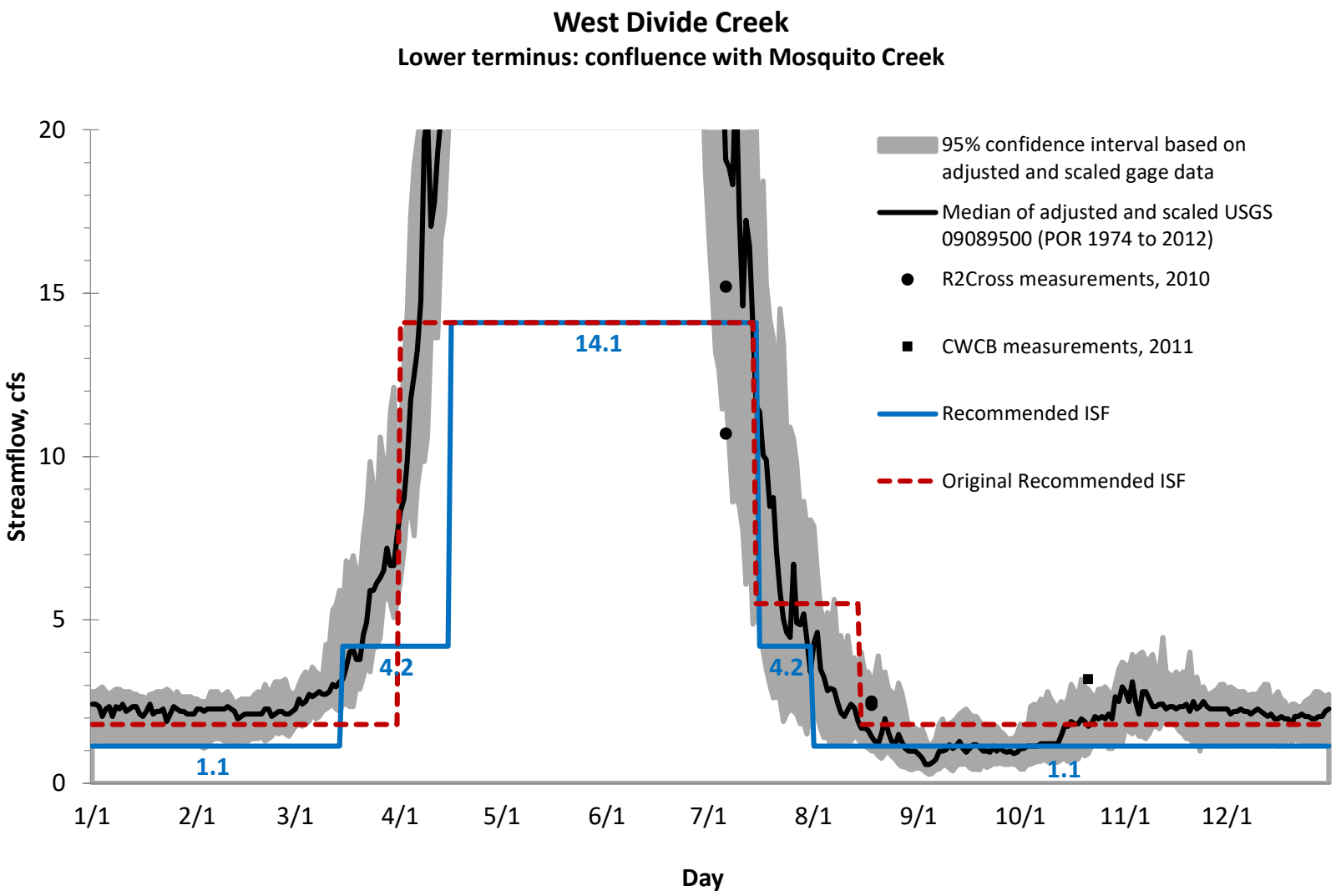
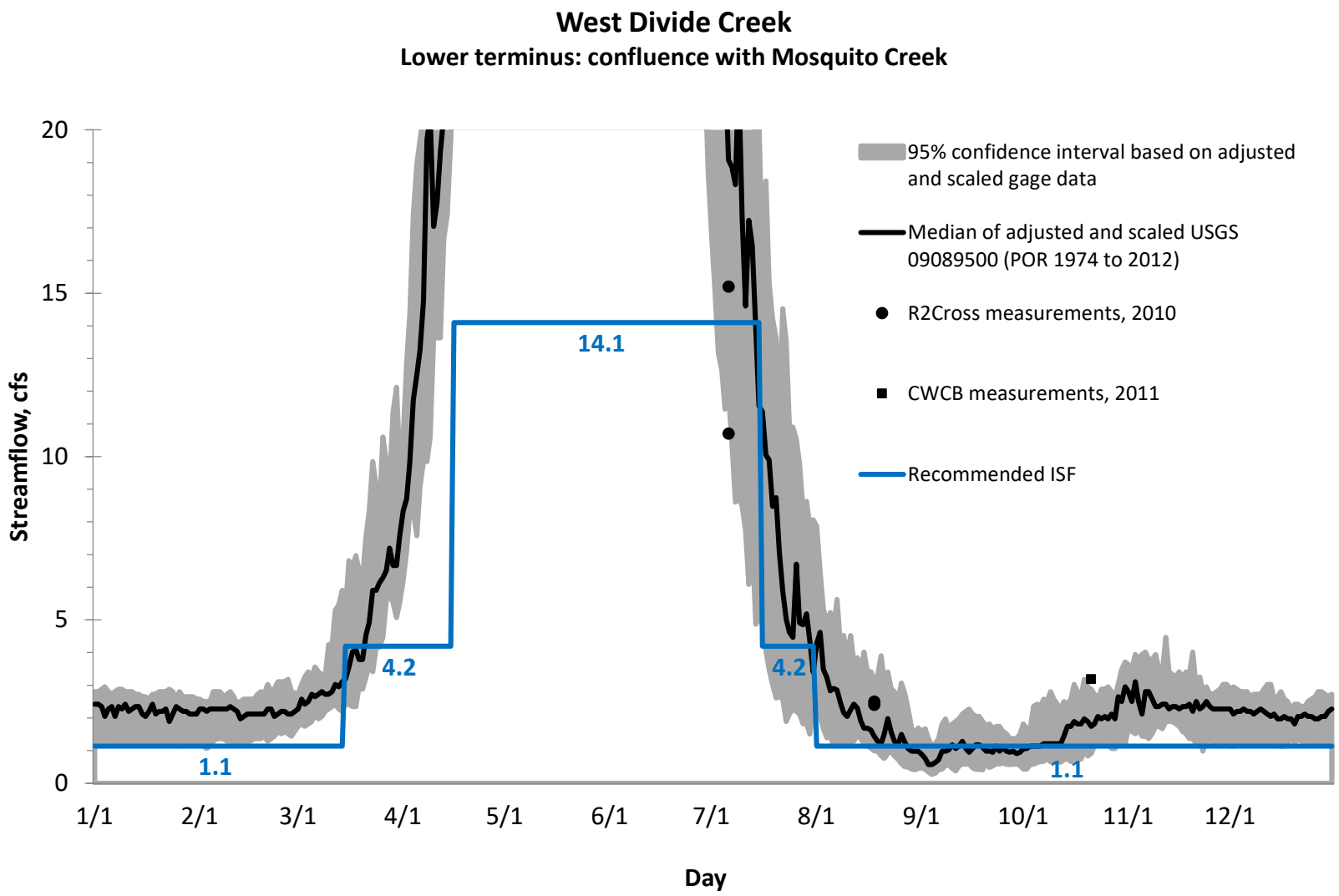
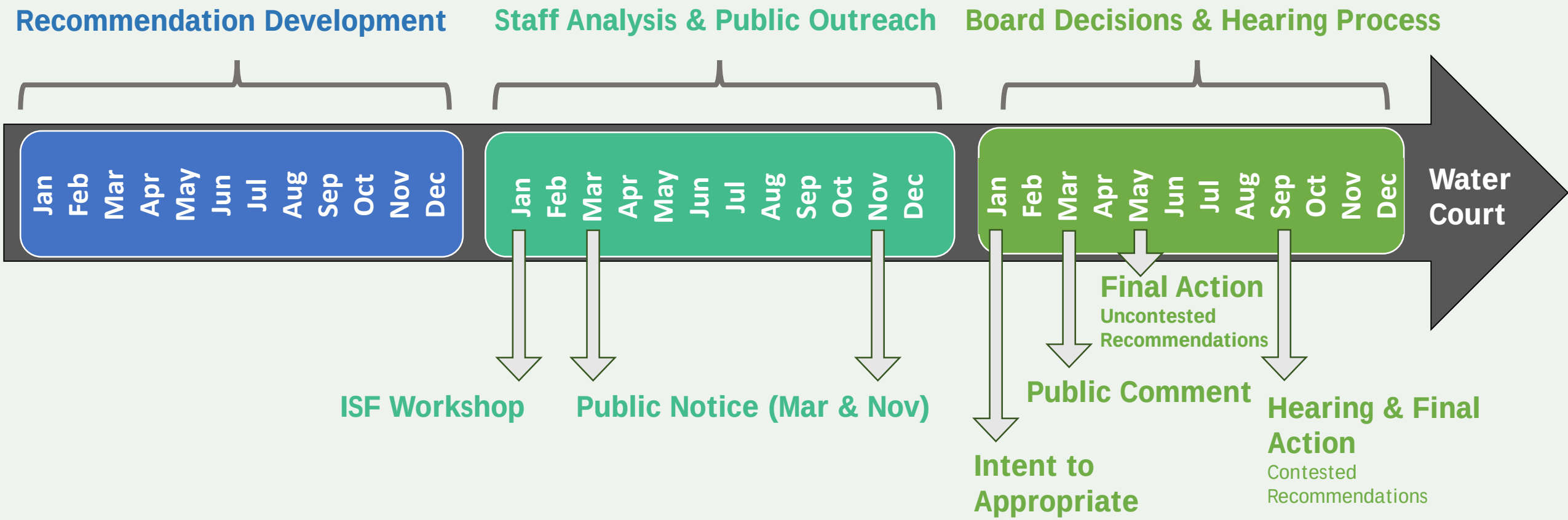


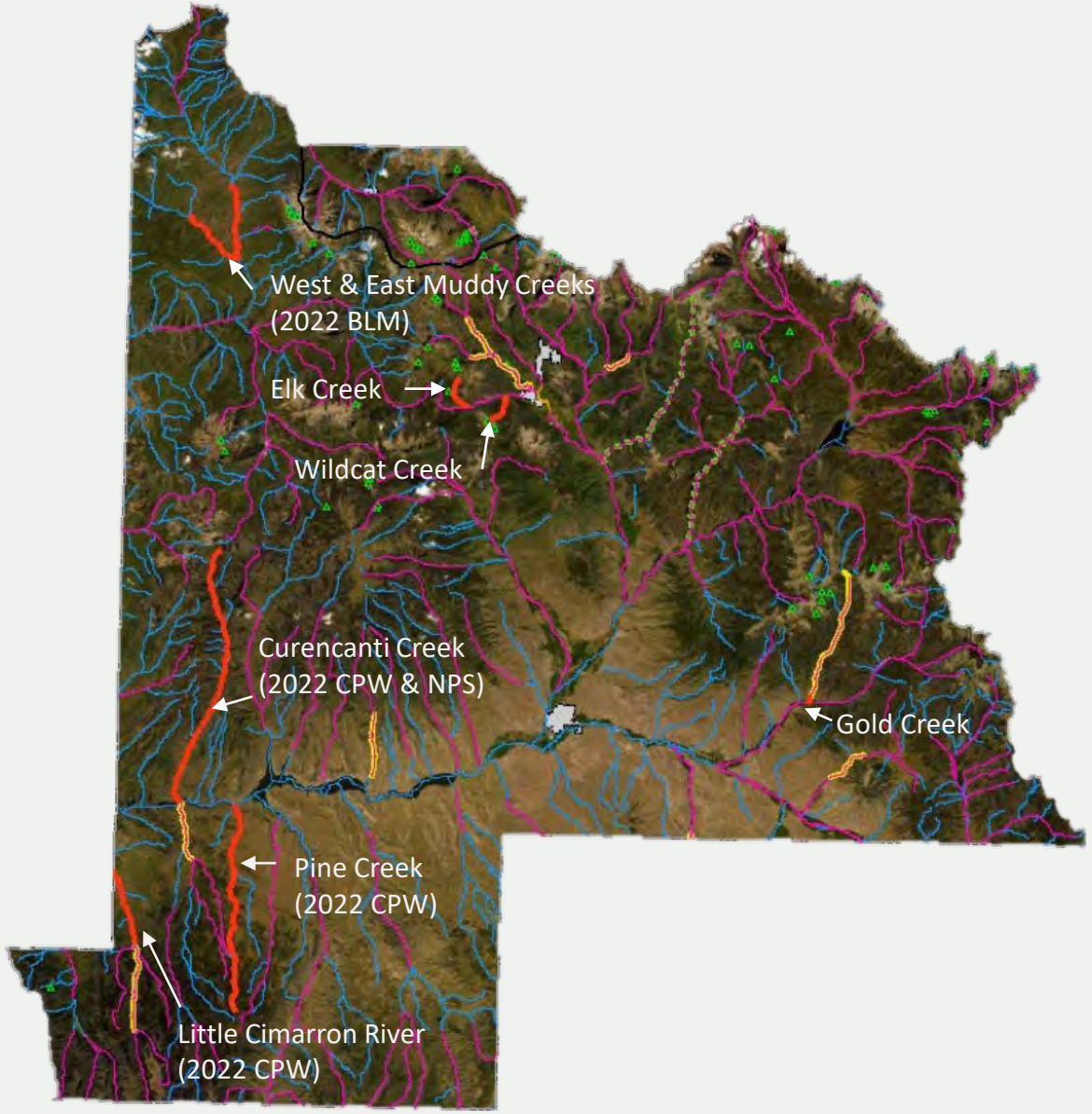
Water Availability



ISF TIMELINE



Timeline shows typical recommendation process, but the exact dates can vary. Please see ISF Rules and CWCB website for more detailed information and important dates.



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Water Division 4

Elk Creek

Instream Flow Right

- Proposing winter and summer instream flow protection on Elk Creek
  - No existing ISF right
  - Water quality improvements from mine reclamation at the headwaters
  - Natural habitat including salamanders, recovering brook trout population, and healthy macroinvertebrate population

Natural Environment

Brook trout fishery

Tiger Salamander

Healthy macroinvetebrate community

Riparian area featuring mixed forest, pine/willow

Steep pool-drop system

Proposed ISF

Timing	Winter Flow Recommendation	Summer Flow Recommendation
ISF Rate CFS	0.1	1.5

Stakeholders

US Forest Service

Colorado Parks & Wildlife

Gunnison County

Water rights owners

The Upper Gunnison River Water Conservancy District

Upper Terminus[1]	Lower Terminus	Total Length (miles)	Land Ownership	
			Private (%)	Public (%)[2]
Headwaters	Confluence with Coal Creek	2.7	Riparian Corridor[3] 15%	Riparian Corridor 85%
			Watershed Composition 16%	Watershed Composition 84%

Water Division 4

Wildcat Creek

Instream Flow Rights

- Proposing a winter and summer instream flow protection on Wildcat Creek
  - No existing ISF right

Natural Environment

Cutthroats of unknown lineage

Small high altitude stream with a pool drop system

Healthy mixed pine and willow riparian area

Proposed ISF

Date Range	12/1 to 3/31	4/1 to 4/30	5/1 to 8/1	9/1 to 11/30
ISF Rate (cfs)	0.36	0.70	2.1	0.65

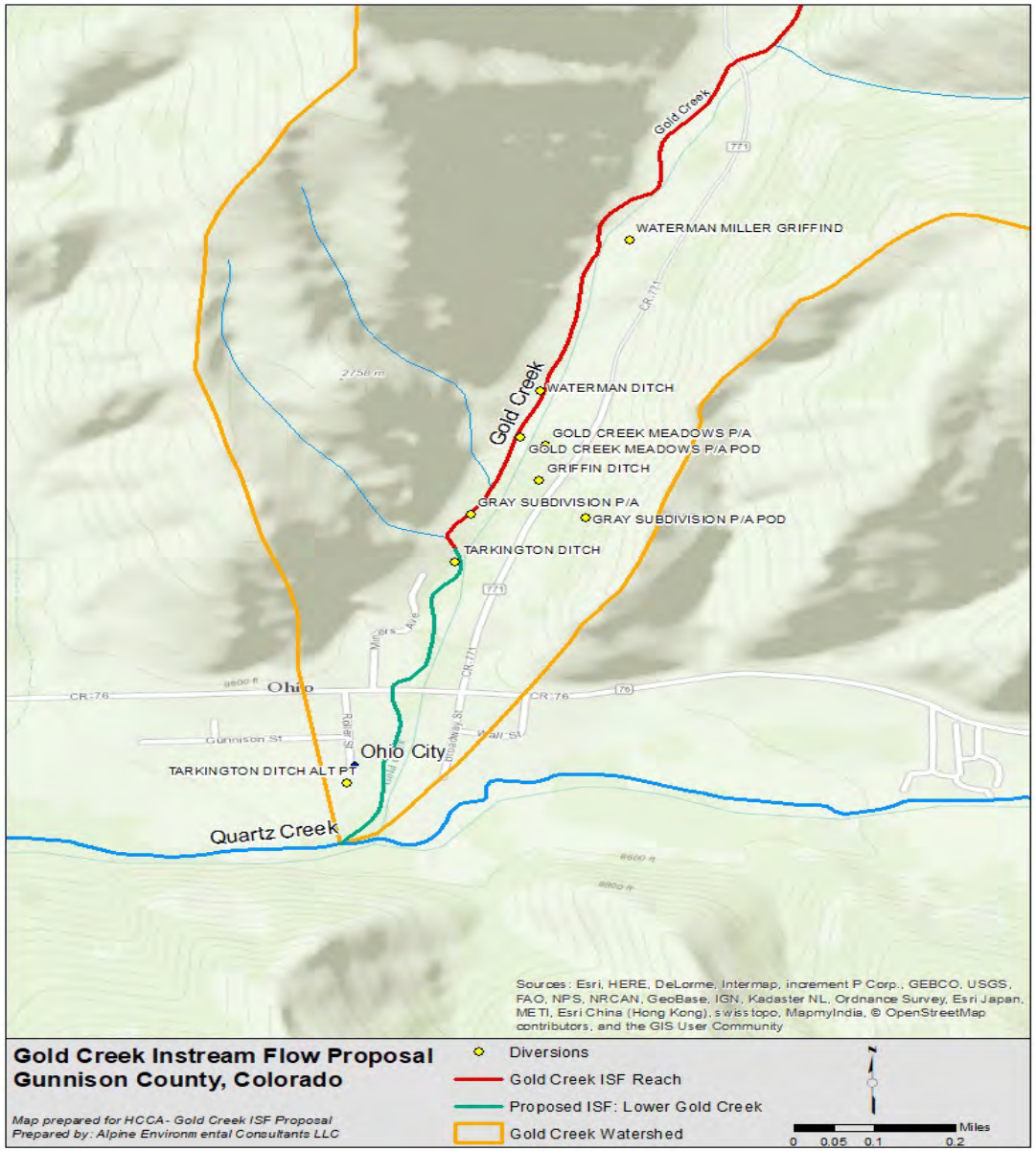
Stakeholders

- US Forest Service
- Colorado Parks & Wildlife
- Gunnison County
- Town of Crested Butte
- The Upper Gunnison River Water Conservancy District
- BLM (partner in 2020)

Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
			Private (%)	Public (%)[2]
Headwaters at Green Lake	Confluence with Coal Creek	2.6	Riparian Corridor[3] 59%	Riparian Corridor 41%
			Watershed Composition 13%	Watershed Composition 87%

Water Division 4

Lower Gold Creek



Instream Flow Rights

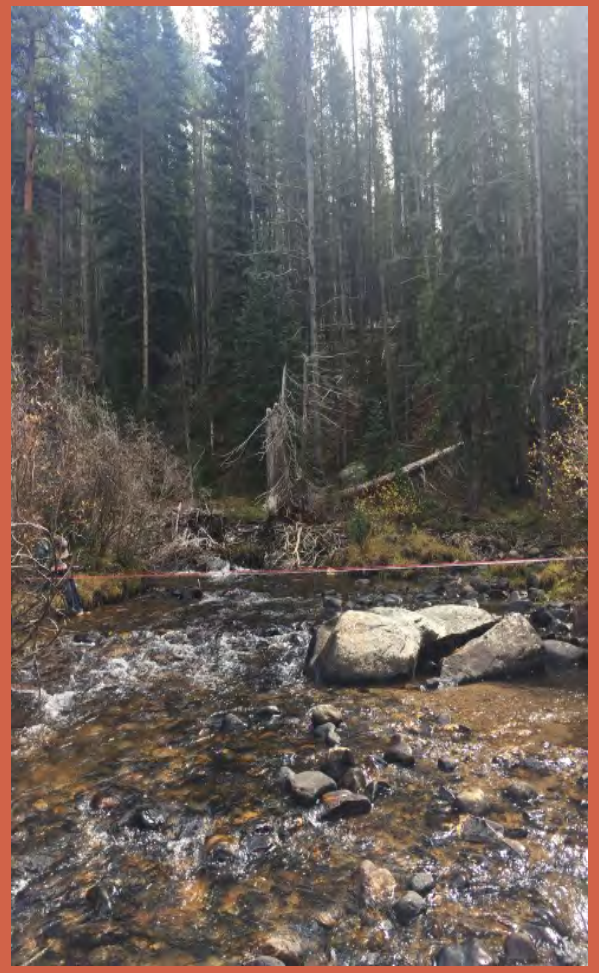
- Proposing new winter and summer instream flow protections on Lower Gold Creek
  - Existing ISF right on Upper Gold Creek
  - No ISF protection on lower Gold Creek from the Tarkington Ditch headgate to the confluence with Quartz Creek

Natural Environment

Fishery (brook trout)

Healthy riparian area featuring alders and willows

Willows and irrigated hay meadows



Proposed ISFs

Timing	3 of 3 Flow Recommendation
ISF Rate CFS	11.0

Stakeholders

- US Forest Service
- Colorado Parks & Wildlife
- Gunnison County
- Water rights owners
- The Upper Gunnison River Water Conservancy District

Instream Flow Reach	Upper Terminus	Lower Terminus	Total Length (miles)	Land Ownership	
				Private (%)	Public (%)
Lower Gold Creek (No existing ISF)	Headgate Tarkington Ditch	Confluence with Quartz Creek	0.47	Riparian Corridor 100%	Riparian Corridor 0% USFS
				Watershed Composition 16%	Watershed Composition 84% USFS

Robert Viehl
CWCB Water Resource Specialist
303-866-3441
rob.viehl@state.co.us

Julie Nania
HCCA Water Program Director
866-349-7104
julie@hccacb.org

Questions/Concerns/Comments?