

**HEALTHY RIVERS AND STREAMS
CITIZENS ADVISORY BOARD**

**Redstone Inn
Redstone, CO
May 19, 2011 - 4 p.m.**

4:00	Public Comment	
4:05	Board Comment	
4:10	Approval of Minutes April 21, 2011 meeting	
4:15	River District and West Divide Water Conservancy District diligence filing for conditional water rights on the Crystal River	John Ely
	Discussion of Wild and Scenic designation of the Crystal River	John Ely
	Coal Creek and Crystal Confluence Area Potential Projects	Sharon Clarke Roaring Fork Conservancy

Upcoming regular meeting dates

June 16 – Aspen 4:00 pm

July 21 – Aspen 4:00 pm

Aug 18 – Aspen 4:00 pm

All times are subject to variation without notice

Agenda is subject to change

HEALTHY RIVERS AND STREAMS CITIZENS ADVISORY BOARD

Meeting Minutes

April 21, 2011

**Pitkin County Courthouse Annex Plaza One Conference Room
530 E. Main Street Aspen, CO**

Board members present: Ruthie Brown, Bill Jochems, Lisa Tasker, Steve Hunter and Greg Poschman

Board members absent: Andre Wille

Others present: John Ely, Lisa MacDonald, Michael Owsley, Cindy Houben

Public Comment

Ken Neubecker with Western Rivers Institute submitted a \$2500.00 request to the Board for partial funding of an open public forum on the Castle Creek Hydro Electric Project on June 11th at Paepcke Auditorium. The Board accepted Mr. Neubecker's proposal and once the Board establishes its grant review process the request will be placed on an upcoming agenda.

Kate Olson with For the Forest – Introduced herself and advised the Board they will present a funding request on their Hope Mine Restoration project on Castle Creek.

Board Comments

Lisa Tasker reported that ACES is considering an RFP process for a restoration ecologist to work on the Rock Bottom Ranch project.

Approval of Minutes

Ms. Brown moved to approve the minutes of March 17, 2011. Mr. Hunter seconded the motion. Motion passed 5 to 0.

Mr. Neiley joined the meeting at approximately 4:30 pm.

Agricultural Efficiencies - Louis Meyer of Schmueser Gordon Meyer Engineers & Surveyors

Mr. Meyer discussed with the Board a work plan to look at opportunities for Pitkin County in the area of agricultural efficiencies. He discussed what it is, why it has reached a statewide significance and what it means for Pitkin County. In the State of Colorado anywhere from 80 – 85% of water is used by agriculture.

He recommended tasks for Pitkin County to accomplish agricultural efficiencies such as literature research, compile GIS maps of County irrigated lands with the State CDSS information, investigate engineering constraints, investigate institutional and legal constraints, economic evaluation, develop screening criteria leading to selection of demonstration or pilot project, and select and proceed with a pilot project.

Mr. Meyer will work with staff to firm up the recommended tasks and come back to the Board with a proposed recommendation and next steps.

Addition to Agenda – Letter of Support for Roaring Fork Conservancy's Roaring Fork Watershed Quality 2011 Report

Ms. Tasker moved to approve the RFC's letter of support. Mr. Jochems seconded the motion. Motion passed 6 to 0.

Draft protocol and guidelines for award of monetary grants from Pitkin County Healthy Rivers and Streams Fund - John Ely

Mr. Neiley moved to approve the protocol and guidelines for award of monetary grants from the Pitkin County Healthy Rivers and Streams Fund. Mr. Hunter seconded the motion. Motion passed 6 to 0.

Mr. Neiley moved to enter into executive session pursuant to C.R.S. § 24-6-402 (4)(b) for the purpose of discussing River District and West Divide Water Conservancy District - conditional water rights - Crystal River and the City of Aspen's Hydro Electric Plant. It was noted Mr. Tim McFlynn was in the room and an invitation extended to him to stay and participate. Ms. Brown seconded the motion. Motion passed 6 to 0.

Mr. Hunter left the meeting at approximately 6:20 pm.

The Board returned from executive session and reconvened at approximately 7:15 pm.

Ms. Tasker to recommend to the BOCC an appropriation of \$50,000 to further develop an appropriate methodology and protocol for diversion of water out of Castle and Maroon Creeks in conjunction with the City of Aspen's proposed hydro-electric plant. Mr. Neiley seconded the motion. The motion passed 5 to 0.

Mr. Neiley moved to authorize the Chair to sign a letter, if appropriate, in advance of our next meeting to be sent to the City of Aspen expressing that with the withdrawal of the Conduit Exemption License Application in favor of 5 megawatt or less Small Hydro Application that our concerns with the FERC application process will be ameliorated. Chairman Poschman seconded the motion. Motion passed 5 to 0.

Adjourn

The meeting adjourned at approximately at 7:30 pm.

Approved:

Greg Poschman – Chairman
Healthy Rivers and Streams Board

Attest:

Lisa MacDonald

AGENDA ITEM SUMMARY

May 19, 2011

TO: Healthy River and Streams Board

FROM: John Ely, County Attorney

SUBJECT: Colorado River Water Conservation District and West Divide Water Conservancy District diligence filing for conditional water rights on the Crystal River

The Colorado River Water Conservation District and the West Divide Water Conservancy District (the “Districts”) currently hold a large assemblage of conditional water rights in the Crystal River drainage that have been in existence since the 1950s.

The conditional water rights relate to what is generally referred to as the West Divide Project (the “Project”). The purpose of the Project was to export water from the Crystal River to the Divide and Mamm Creek drainages in Garfield County. There, the water would be used to irrigate agricultural lands and be available for municipal and industrial purposes primarily associated with the development of oil shale and supplying water to the communities that would grow around that activity.

The Project proposed construction of five reservoirs and many miles of ditches, canals and siphons to store and transport the water. Three reservoir sites were located in the Crystal drainage at Redstone, Placida and Yank Creek, a tributary of Thompson Creek.

In 1956 the Project was included in the Colorado River Storage Project Act as a potential part of the overall management of water within the Colorado basin by the federal government. The water rights associated with the Project were filed on by the Colorado River District and adjudicated in 1958. The West Divide Water Conservancy District was established in 1964 to assist in the administration of the potential water resources. Every six years since 1958 the Colorado River District and the West Divide Conservancy District have filed diligence applications with the Colorado water court to maintain the conditional rights of the Project.

Apart from the diligence applications, in which the Districts have repeatedly and successfully sought to demonstrate that they are diligently pursuing work to realize the Project, it is difficult to ascertain if any onsite work has ever actually been undertaken.

The federal government withdrew its support for the Project in 1982 determining that the potential cost and benefit of the Project did not justify its completion as part of

the Colorado River Storage Project Act. However, the Districts have persisted in maintaining the Project and associated water rights to the present time in the hope that the water rights may be utilized in some useful manner. Most recently, the Districts requested that Wilderness Workshop amend its Hidden Gems proposal to accommodate the construction of one of the proposed reservoirs.

The scope of the conditional rights in the Crystal River Valley is significant. The Redstone Reservoir is approximately 129,000 acre feet, the Placida Reservoir is approximately 62,000 acre feet and the Yank Creek Reservoir is approximately 14,000 acre feet. The Avalanche Canal is decreed for 1000 cfs (cubic feet per second of flow), and the Four-Mile Canal which travels out of the drainage into Divide Creek is decreed for 818 cfs. By comparison, Ruedi Reservoir is 100,000 acre feet, Paonia Reservoir is 15,000 acre feet and the flow in the Crystal River at the time of this meeting at Avalanche Creek is approximately 500 cfs.

Since the drought of 2002, continuing old conditional water rights has been met with increased scrutiny by the State Water Engineer. Further, recent Supreme Court decisions have emphasized that conditional water rights will probably not survive if the projects they are associated with are too speculative in nature.

The inherent absurdity of a reservoir 30% larger than Ruedi being located on Redstone Boulevard has led many in the past to simply dismiss the likelihood of such a structure or project ever being built. However, it is possible in some cases, for dams and reservoirs to be relocated within the same drainage. Also, since the drought of 2002 has accented the vulnerability of current statewide water planning to climate change, the value of viable storage sites has increased. Although the Districts neither appear to have the ability or inclination to develop the Project, the right could be transferred to an entity that might actually construct the facilities.

Perhaps as a result of opposition to the existing water rights or in recognition that obtaining a continued diligence decree for these rights would be difficult or impossible, the Districts have dramatically downsized the Project. In fact, the project as currently proposed looks nothing like the previously proposed project.

The Colorado River District's press release describes these changes. Briefly, the Redstone Reservoir is to be eliminated and the Placida Reservoir is to be reduced to 4000 acre feet and moved upstream to the vicinity of Bogan Flats. The Yank Creek Reservoir is to be reduced to 5000 acre feet and the Avalanche Canal reduced to a flow of 250 cfs. Diversion of water to Divide Creek and Mamm Creek is to be eliminated.

Although this is significant progress in addressing the health of the Crystal River and concerns of local residents, the correct litmus for evaluating the new proposed project is not how much smaller it is than the original but whether, as proposed, it is appropriate in size, location, scope, practicability, need and likelihood of actual completion.

The only stated purpose for the new project made to date is for hydroelectric power generation and stream management on the lower Crystal River. Given the reduced size of the Placida Dam and the Yank Creek Dam it is difficult to imagine the viability for hydroelectric power generation. Whether or not hydroelectric power generation is part of the new Avalanche Canal or Four-Mile Canal is not clear. Further, it is also difficult to imagine how stream management of low flows on the Crystal can be accomplished with reservoirs of the new size given the fact that current diversions that deplete the river are not satisfied to their decreed amounts. Estimates provided to the County in the past are that 13,000 acre feet would be needed to meet the current irrigation shortages associated with the lower Crystal River leaving none available from the proposed reservoirs for stream flow. At best, management of these reservoirs for this purpose would see widely fluctuating water levels.

For the Districts to obtain a diligence decree they must, at a minimum, demonstrate that they can and will bring the new project to fruition in a reasonable time. It is difficult to see how they would be able to achieve this goal. Of course, we will not know the Districts' final plans until their application is filed on May 31, the last available date to do so. However, even then, there is no security that the new plan will not continue to change.

Requested Board Action: I recommend to the Board that a motion be adopted to advise the BOCC to oppose the current West Divide Project and diligence application of the Colorado River District and West Divide Conservancy District and to reserve sufficient funds for this opposition.

Attachments:

Colorado River Conservation District Press Release

West Divide Project Vicinity Map

Subject:

FW: Colorado River District acts on West Divide rights



CRD Board acts to abandon large transbasin West Divide Project storage rights

The Colorado River District Board of Directors voted April 19, 2011, to abandon most of the Crystal River conditional water rights associated with the West Divide Project, a water development project envisioned in the 1960s that would have been a transbasin diversion moving water from the Crystal River to the West Divide area north of the Colorado River for irrigation and oil shale development.

The limited rights that the Colorado River District seeks to retain will change the focus of the project from one that would have benefitted the Colorado River Valley to one focused on potentially helping the Crystal River drainage with late season flows and create the potential for hydropower development.

The West Divide Project also contained many components located in the West Divide area. These water rights will be maintained to benefit the original West Divide service area, but using in-basin water supplies.

Crystal River components of the original water rights included two large reservoirs on the Crystal River, the 128,728.27 acre-foot Osgood Reservoir which would have inundated the village of Redstone and the 58,009 acre-foot Placita Reservoir farther upstream. Under today's Colorado River District Board direction, water rights to Osgood Reservoir will be abandoned completely. At the same time, the River District will seek to maintain conditional rights for a small, 4,000 acre-foot Placita Reservoir that could in the future help with in-basin, low-flow issues in the Crystal River in late summer.

In the Colorado water rights system, conditional water rights act as priority system placeholders for projects to be developed in the future. Conditional water rights holders must prove to the water court every six years that progress is being made to develop a project, a process known as diligence. The West Divide Project water rights face a diligence filing on May 31. The moves today were made in concurrence with the West Divide Board.

The original West Divide Project was approved by Congress in 1966 as part of the historic Colorado River Storage Project Act that led to the construction of the Animas-LaPlata Project and Ridgway Reservoir, among others. But the Bureau of Reclamation subsequently judged the West Divide project unfeasible on a cost-benefit basis, and it was never granted federal funds. Despite the promise of federal funding, the Colorado River District reconfigured the project and its water rights over the years in anticipation that one day it could be valuable to the Crystal, Roaring Fork and Colorado River valleys.

The Colorado River District filed for the project's original water rights in 1957. They were adjudicated by the water court in 1958 and 1965, dating to a River District era where one of its main roles was to file water rights that would later become Reclamation projects and to help create water conservancy districts to be beneficiaries of those projects.

Two large dam sites were originally decreed on the Crystal River: Osgood and Placita. Most likely, only one would have ever been built. Each was associated with an alternate route to deliver water to the West Divide mesa and areas west in western Garfield County. From Osgood, a canal system was to deliver water down the Crystal and Roaring Fork River

valleys then through a tunnel to the West Divide area. From Placita, a series of tunnels and canals would have conveyed water to the west side of McClure Pass into the Muddy Creek drainage in the Gunnison basin and then tunnelled to the West Divide area. But only the conveyance elements for Osgood were ever decreed.

Here is what the River District Board approved:

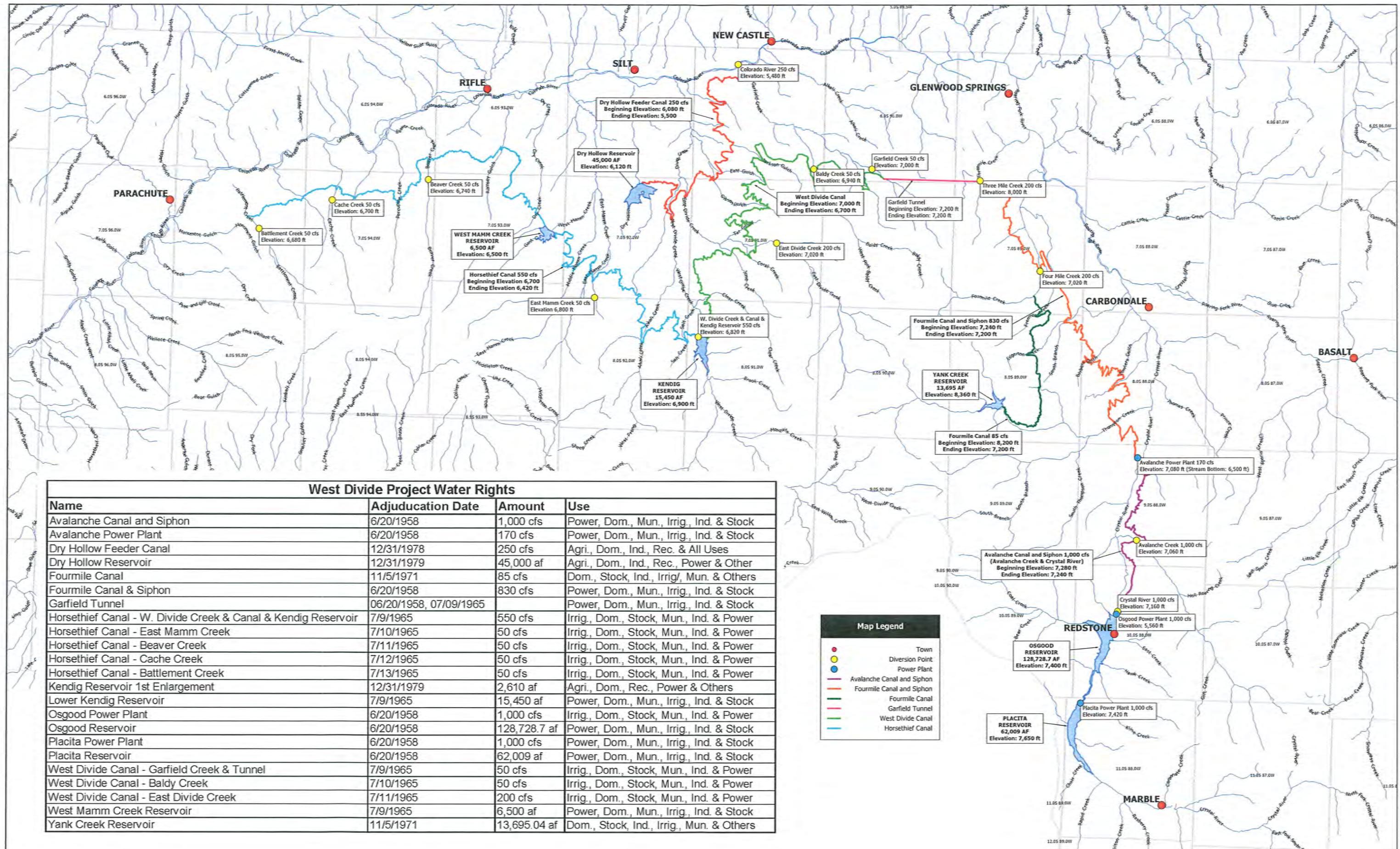
- Abandon the 128,728.27 acre-foot Osgood Reservoir
- Abandon the 1,000 cubic feet per second (cfs) Osgood Power Plant
- Abandon the 830 cfs Fourmile Canal and Siphon diversion point on the Crystal River
- Reduce the 62,009 acre-foot Placita Reservoir to 4,000 acre feet
- Reduce the 1,000 cfs Placita Power Plant to 150 cfs
- Reduce the 1,000 cfs Avalanche Canal and Siphon to 250 cfs
- Reduce the 13,695 acre-foot Yank Creek Reservoir to 5,000 acre feet
- Maintain the 85 cfs Fourmile Canal associated with Yank Creek Reservoir
- Reduce the Fourmile Creek diversion to the Fourmile Canal and Siphon to 50 cfs
- Reduce the 200 cfs Threemile Creek Diversion to Fourmile Canal and Siphon to 50 cfs

For more information, contact Jim Pokrandt at the Colorado River District, 970-945-8522, jpokrandt@crwcd.org.

Jim Pokrandt

Colorado River District
970.945.8522 x 236
970.319.1807 cell

Email secured by Check Point



West Divide Project Water Rights

Name	Adjudication Date	Amount	Use
Avalanche Canal and Siphon	6/20/1958	1,000 cfs	Power, Dom., Mun., Irrig., Ind. & Stock
Avalanche Power Plant	6/20/1958	170 cfs	Power, Dom., Mun., Irrig., Ind. & Stock
Dry Hollow Feeder Canal	12/31/1978	250 cfs	Agri., Dom., Ind., Rec. & All Uses
Dry Hollow Reservoir	12/31/1979	45,000 af	Agri., Dom., Ind., Rec., Power & Other
Fourmile Canal	11/5/1971	85 cfs	Dom., Stock, Ind., Irrig., Mun. & Others
Fourmile Canal & Siphon	6/20/1958	830 cfs	Power, Dom., Mun., Irrig., Ind. & Stock
Garfield Tunnel	06/20/1958, 07/09/1965		Power, Dom., Mun., Irrig., Ind. & Stock
Horsethief Canal - W. Divide Creek & Canal & Kendig Reservoir	7/9/1965	550 cfs	Irrig., Dom., Stock, Mun., Ind. & Power
Horsethief Canal - East Mamm Creek	7/10/1965	50 cfs	Irrig., Dom., Stock, Mun., Ind. & Power
Horsethief Canal - Beaver Creek	7/11/1965	50 cfs	Irrig., Dom., Stock, Mun., Ind. & Power
Horsethief Canal - Cache Creek	7/12/1965	50 cfs	Irrig., Dom., Stock, Mun., Ind. & Power
Horsethief Canal - Battlement Creek	7/13/1965	50 cfs	Irrig., Dom., Stock, Mun., Ind. & Power
Kendig Reservoir 1st Enlargement	12/31/1979	2,610 af	Agri., Dom., Rec., Power & Others
Lower Kendig Reservoir	7/9/1965	15,450 af	Power, Dom., Mun., Irrig., Ind. & Stock
Osgood Power Plant	6/20/1958	1,000 cfs	Irrig., Dom., Stock, Mun., Ind. & Power
Osgood Reservoir	6/20/1958	128,728.7 af	Power, Dom., Mun., Irrig., Ind. & Stock
Placita Power Plant	6/20/1958	1,000 cfs	Power, Dom., Mun., Irrig., Ind. & Stock
Placita Reservoir	6/20/1958	62,009 af	Power, Dom., Mun., Irrig., Ind. & Stock
West Divide Canal - Garfield Creek & Tunnel	7/9/1965	50 cfs	Irrig., Dom., Stock, Mun., Ind. & Power
West Divide Canal - Baldy Creek	7/10/1965	50 cfs	Irrig., Dom., Stock, Mun., Ind. & Power
West Divide Canal - East Divide Creek	7/11/1965	200 cfs	Irrig., Dom., Stock, Mun., Ind. & Power
West Mamm Creek Reservoir	7/9/1965	6,500 af	Power, Dom., Mun., Irrig., Ind. & Stock
Yank Creek Reservoir	11/5/1971	13,695.04 af	Dom., Stock, Ind., Irrig., Mun. & Others



**WEST DIVIDE PROJECT
VICINITY MAP**

Date: March 8, 2011

Map By: T.B.
File Name: WestDivideRights2010.map



AGENDA ITEM SUMMARY

May 19, 2011

TO: River Board

FROM: Sharon Clarke - Land and Water Conservation Specialist
Roaring Fork Conservancy

SUBJECT: Coal Creek and Crystal Confluence Area Potential Projects

Information: A large area of Mancos shale is found in Coal Creek drainage. Mancos shales are very susceptible to erosion, leading to mudflows, landslides, and other slope instability problems. Rogers (2005) lists the area comprising Dutch Creek, Coal Creek, and Redstone as a tier three priority area because of the risk of debris flows, debris avalanches, and associated flooding. It is noted that coal mining activities in the steep, upper part of the Dutch Creek drainage were frequently disrupted by debris flows and the area continues to experience frequent debris flows that feed coarse rock and wood into Coal Creek. This rock and wood collects at the confluence of Coal Creek and the Crystal River causing pooling of water and erosion by both streams, exacerbating the spring flood threat to Redstone and Highway 133.

Coal Creek has also contributed to riparian and instream issues on the main stem of the Crystal River. Riparian and instream habitat is heavily modified or severely degraded on more than 70 percent of the surveyed reaches.

Requested Board Action: Informational – Discussion and comments from the Board

Attachments: Memo re: projects
Restoration Project Proposal

Coal Creek and Crystal Confluence Area Potential Projects

May 19, 2011

Points to Make

- Coal Creek is a major source of water quality issues
- Coal Creek could potentially be impacted more by 5 oil and gas leases within Coal Basin. (See Map)
- Several Roaring Fork Watershed Plan actions are intended to address Coal Creek water resource issues
- Restoration projects are being planned
- Targeted baseline water quality monitoring is needed to assess the effectiveness of restoration efforts. These data need to be collected before restoration begins.

Issues

The following issues are discussed in the 2008 State of the Roaring Fork Watershed:

A large area of Mancos shale is found in Coal Creek drainage. Mancos shales are very susceptible to erosion, leading to mudflows, landslides, and other slope instability problems. Rogers (2005) lists the area comprising Dutch Creek, Coal Creek, and Redstone as a tier three priority area because of the risk of debris flows, debris avalanches, and associated flooding. It is noted that coal mining activities in the steep, upper part of the Dutch Creek drainage were frequently disrupted by debris flows and the area continues to experience frequent debris flows that feed coarse rock and wood into Coal Creek. This rock and wood collects at the confluence of Coal Creek and the Crystal River causing pooling of water and erosion by both streams, exacerbating the spring flood threat to Redstone and Highway 133.

The following constituents exceeded water-quality standards on several occasions at sites on the Crystal River and Coal Creek.

- Total phosphorus (with exceedances on Coal Creek and the lower Crystal River),
- Total recoverable iron (the major source is in the Coal Creek drainage where a historic coal mine is a point source of iron and sediment),
- Selenium (a major source is Mancos Shale),
- Coal Creek contributes to the higher suspended solid concentrations found downstream of its confluence with the Crystal River. Coal Creek is on the state's (CDPHE) monitoring and evaluation list for sediment.

Coal Creek has also contributed to riparian and instream issues on the main stem of the Crystal River. Riparian and instream habitat is heavily modified or severely degraded on more than 70 percent of the surveyed reaches.

Solutions

The 2011 Draft Roaring Fork Watershed Plan identifies project and studies to address issues identified in the 2008 State of the Roaring Fork Watershed Report. Coal Creek is specifically called out in the plan under the following six recommended actions. The first one is identified as an Urgent Action.

Riparian and Instream B1a. Working with landowners, resource experts, and other interested parties, plan and implement riparian/ instream protection and restoration projects.

Coal Creek is one of four areas have been identified that have high visibility and are ecologically significant.

Groundwater B1a. Restore major wetlands areas in the watershed.

Water Quality C1s. Work with the State of Colorado to identify reclamation sites and work with responsible parties to assure that reclamation of mining sites is adequate and sustainable to mitigate impacts on water quality. Perform additional reclamation work as necessary.

Riparian and Instream A1a. Convene a Riparian/Instream Working Group to develop a riparian/instream monitoring program for the watershed.

Riparian and Instream C1b. Investigate the effects of acute and chronic sediment pulses on aquatic ecosystems, differentiating between natural and human-influenced sources of sediment.

Riparian and Instream C1g. Mitigate riparian and instream impacts associated with cattle by managing cattle and as appropriate, fence riparian areas and provide stock water.

The 2011 Draft Roaring Fork Watershed Plan recognizes the importance of collecting water quality data. The first water quality objective is: Obtain water quality data to adequately assess status and trends with the recommendation to: Convene a Water Quality Working Group to identify monitoring objectives, parameters and protocols. This includes gathering and collating baseline data to assess water quality status and trends;

The Redstone Parks and Open Space Management Plan and the Future Forest Initiative Collaborative Forest Landscape Restoration Grant have discussed restoration opportunities for Coal Creek and its confluence with the Crystal River. It is imperative that a well thought out water quality sampling plan is developed and water quality data collected before these restoration efforts occur. Development of the sampling plan will include researching all existing data sets and mining these data as appropriate. The following paragraphs describe the restoration ideas being discussed.

Excerpted from the Redstone Parks and Open Space Management Plan adopted by Pitkin County, December, 2010

The flow of Coal Creek was dramatically changed when the coke ovens were built and community of Redstone was planned. The community of Redstone sits in the historic floodplain for Coal Creek and the Crystal River and when the coke ovens were built, Coal Creek was diverted northward to prevent Redstone from flooding and allow the construction of the coke ovens. When the Colorado Department of Transportation built the Highway 133 bridge at Elk Park the creek was returned back to its original channel, but now has little floodplain due to the levee built in Redstone to prevent flooding. The absence of a floodplain allows extensive sedimentation to flow directly into the Crystal River and still poses a major flood risk to Redstone. When Coal Creek was diverted it developed an extensive floodplain west of Highway 133 before joining the Crystal River North of Redstone. Pitkin County Open Space and Trails staff has met with the Roaring Fork Conservancy, the USDA Forest Service, and the Colorado Division of Wildlife to see if it is feasible to begin a larger planning process to plan for restoration of Coal Creek. From that meeting, and with the current degradation of the creek banks and sediment loading occurring from Coal Creek to the Crystal River it is imperative to continue to work with the Roaring Fork Conservancy and other agencies to determine the scope of a planning process to restore the floodplain of Coal Creek at the junction with the Crystal River. These agencies along with the planning committee have determined some of the benefits that could be achieved with restoration planning for Coal Creek are:

- Reduce the risk of flooding for Redstone.
- Remove sediment from Coal Creek before it reaches the Crystal River.
- Creation of a floodplain for the Crystal River and Coal Creek.
- Wetland creation due to creation of a floodplain could reduce heavy metals from entering the Crystal River.

- Wildlife habitat

Excerpted from the Future Forest Initiative Collaborative Forest Landscape Restoration Grant submitted January, 2011.

Priority 4: Crystal River Watershed projects-The Colorado River meets the water and power needs of the nearly 30 million people within the seven Colorado Basin states and Mexico. Most of the water supply comes from headwater snowmelt. As a major supplier of headwater snowmelt to the Colorado Basin, the mostly high-elevation forested Roaring Fork Watershed is critical to ensuring that an adequate supply of high-quality water flows downstream. Most of these high-elevation areas fall within the White River National Forest which comprises 70 percent of the watershed's area. The Forest helped form and lead the Roaring Fork Watershed Collaborative, an informal gathering of local officials, planners, resource managers and interested citizens, to address critical water issues in the watershed. The Roaring Fork Watershed Plan, including the 2008 State of the Roaring Fork Watershed Report came from this group. The Plan represents a coordinated effort to identify and address water resources issues in the watershed. The companion Roaring Fork Restoration Strategy identifies and addresses forest issues in the watershed.

To address aquatic and forest issues at a landscape-scale, the Crystal River Basin, the largest drainage in the Watershed was selected as the focus watershed restoration project. This Basin contributes more than 50 percent of the snowpack to the watershed and unlike the other major rivers in the watershed it is free-flowing. Coal Creek, a major tributary of the Crystal River, is on the state's 303 (d) list as impaired for iron and on the monitoring and evaluation list for sediment. Sediment delivery from Coal Creek effects the lower 18 miles of the Crystal River consequently, the Colorado Division of Wildlife manages the river as a put and take fishery. The Crystal River is significantly flow altered and more than 70 percent of the riparian and instream habitat is heavily modified to severely degraded. This project will: restore populations of the forest-sensitive Colorado River and the endangered Greenback cutthroat trout; improve water quality, reduce sedimentation, and improve riparian and instream areas for 23 miles of stream. This will be accomplished by obliterating more than seven miles of roads, bank sloping and planting three miles of streams; designing and reconstructing several miles of stream channel using Rosgen designs, restoring vegetation in 300 acres and incorporating carbon sequestration techniques for a historic coal mining area. The project will improve stream flows and riparian habitat, reduce flooding risk and improve the trout fishery, a major economic driver in the Valley. The USFWS estimated the White River National Forest fishery is worth half a billion dollars.

References

Clarke, S., K. Crandall, J. Emerick, M. Fuller, J. Katzenberger, D. Malone, M. Masone, A. Slap, and J. Thomas. 2008. State of the Roaring Fork Watershed report 2008. Sponsor: Ruedi Water and Power Authority. Lead Consultant: Roaring Fork Conservancy.
<http://www.roaringfork.org/watershedplan>.

Clarke, S. R. Sullivan, and M. Fuller. Draft. Roaring Fork Watershed Plan. Sponsor: Ruedi Water and Power Authority. Lead Consultant: Roaring Fork Conservancy. <http://www.roaringfork.org/watershedplan>.

Rogers, W.P. 2005. Critical landslides in Colorado: A year 2002 review and priority list. Open-File Report 03-16. Colorado Geological Survey, Division of Minerals and Geology, Department of Natural Resources.

Thompson Divide Water Quality Sample Sites 2010 With Oil & Gas Leases

Groundwater Sites

(Water Quality sampling of seeps and springs)

SHS = Sunlight Homestead Spring

SMTSP = South Middle Thompson Spring

WCWPS = Wolf Creek Well Pad Spring

YCS = Yank Creek Spring

Surface Water Sites

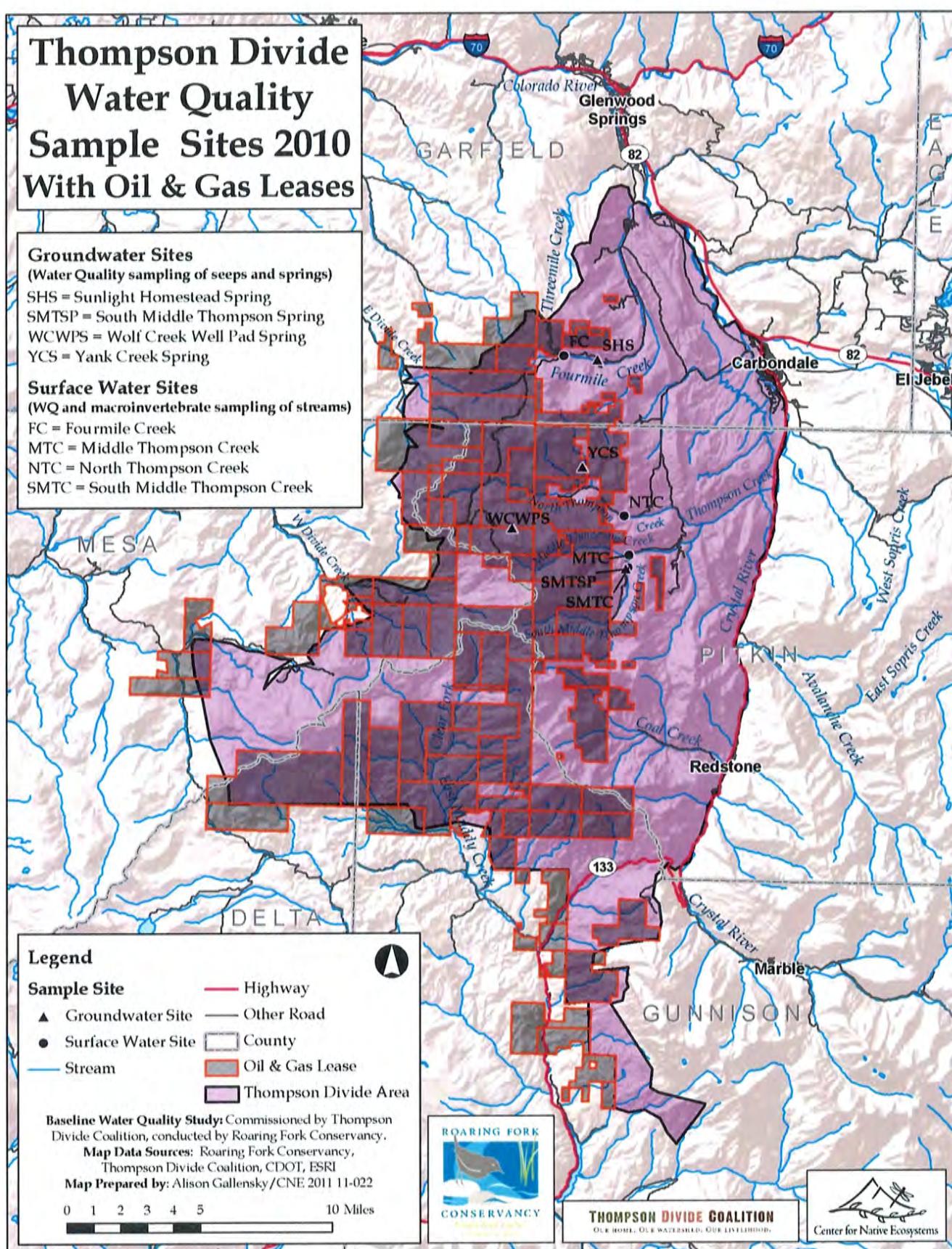
(WQ and macroinvertebrate sampling of streams)

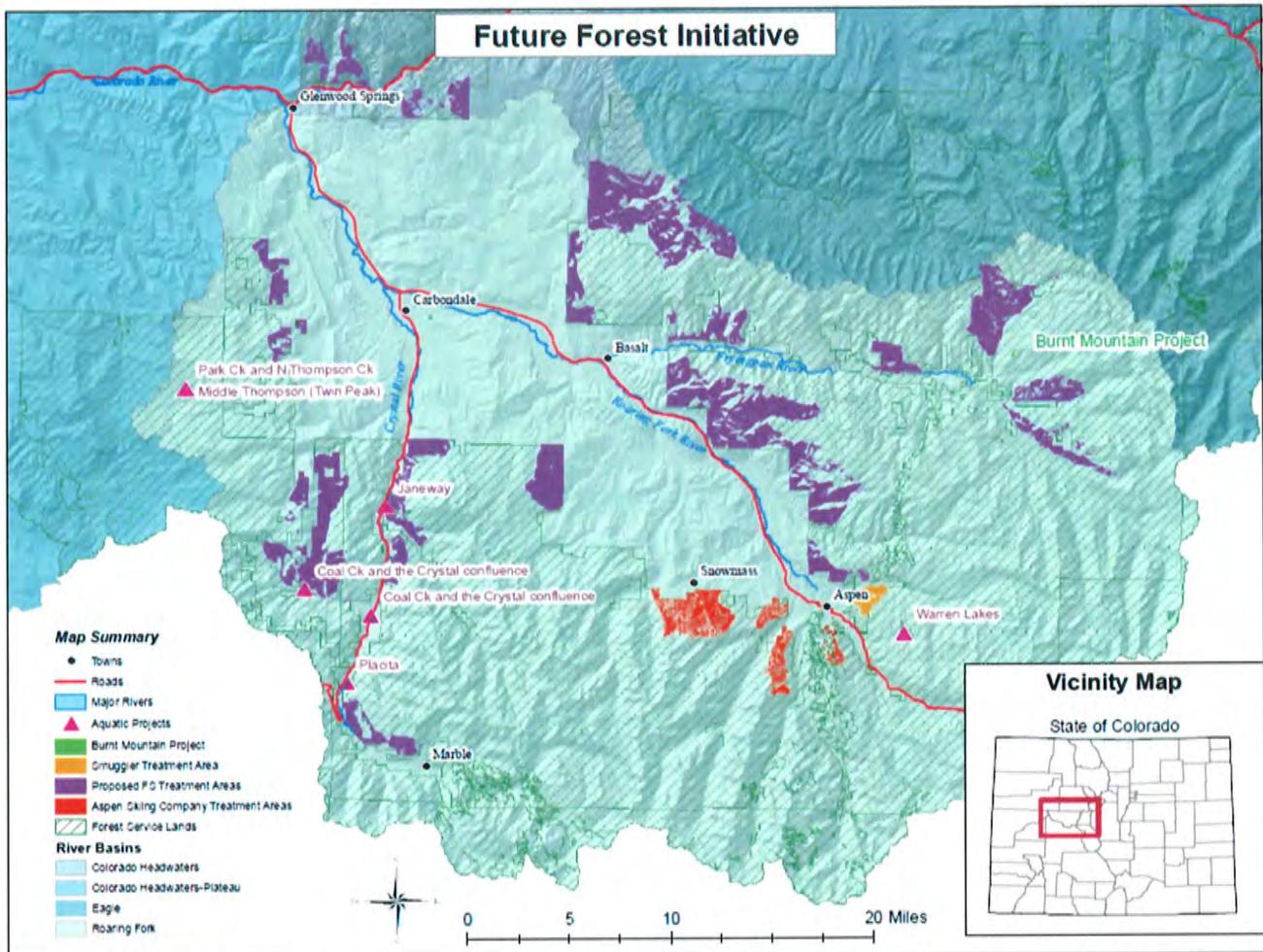
FC = Fourmile Creek

MTC = Middle Thompson Creek

NTC = North Thompson Creek

SMTC = South Middle Thompson Creek





Source: Future Forest Initiative Collaborative Forest Landscape Restoration Grant Submitted January, 2011.

Attachments: White River National Forest – Aspen and Sopris Ranger District Project Proposal Project Category - watershed and landscape level restoration project COAL CREEK and the CRYSTAL RIVER at Redstone Watershed Restoration Project.

White River National Forest – Aspen and Sopris Ranger District Project Proposal
Project Category - watershed and landscape level restoration project
COAL CREEK and the CRYSTAL RIVER at Redstone Watershed Restoration Project
coalbasin_proposals_2.4.11.docx

Project Location: Crystal River, including Coal Creek. The Crystal River is the largest tributary of the Roaring Fork Watershed.

Project History: Steep slopes and geological instability along with past mining, grazing, roads, railroads, and development have all contributed to the stream degradation found in the Crystal Watershed. Major reductions in late/summer and fall streams flows occur in this watershed from irrigation and other water withdrawals. Riparian and instream habitat is heavily modified or severely degraded on more than 70 percent of the surveyed reaches on the Crystal River. Over the past 120 years, the Crystal River has been channelized, straightened and the banks armored to accommodate transportation corridors and other land uses. This has caused the river to down cut disconnecting the river from its historic floodplain. Most of the large alluvial complexes, located where the valley widens and the gradient decreases (Beaver Lake, Placita, Filoha, Janeway, BRB), have been disconnected from the river. These alluvial reaches have the highest biological diversity and complexity for aquatic species and habitat. The most impacted is located at the confluence of Coal Creek, East Creek, and the Crystal River at Redstone, an unincorporated historic coal mining town with a population of 100 people. At the turn of the 20th century, Redstone was designed to house the mine workers and their families, coke the coal in ovens, and transport it to the industrial east. The confluence of Coal Creek with the Crystal River was significantly altered from its historic channel to accommodate the community, coke ovens, railroads, and loading facilities and eventually State Highway 133. Based on historic maps from 1904, Coal Creek historically turned north and through a complex braided channel and alluvial fan. Prior to entering the Crystal River, this area historically sorted and stored natural sediment bedload from Coal Basin. When Highway 133 was constructed in the 1960's, Coal Creek was straightened and shortened by cutting directly through the old alluvial fan into the Crystal River at Redstone. As a consequence, the stored bedload and sediment historically stored in the alluvial fan of Coal Creek is deposited into the mainstem Crystal River at Redstone causing major channel aggradation (raising the riverbed) and the creation of a new alluvial fan at Redstone in the mainstem Crystal River. To mitigate the increased flood risk to the community, portions of the river banks have been riprapped and levied. Other consequences from this unnatural sediment plume/transport from Coal basin are: increased channel instability for a more than a mile, degraded water quality, and impacts to aquatic life for 18 miles of the Crystal River. Coal Creek was mined for coal at the turn of the 20th century. The coal was coked and shipped by rail to the more industrialized east. Coal mining ended in the mid- 1990's and the USFS acquired a majority of the private mining lands. Mining impacts are significant in this watershed. Coal Creek is a known source of iron and is on the State's 303 (d) list as impaired with respect to total recoverable iron and on the state's monitoring and evaluation list for sediment. Over 500 acres of disturbed lands have been identified for treatment in Coal Basin. This includes areas disturbed by past mining activities, roads, and erosion features that connect disturbed areas to streams. The surface area of roads in Coal Basin account for approximately 210 acres, of which 186 acres are considered to be connected to streams by drainage ways. A field inventory conducted in 2010 identified 75 separate erosion features that deliver sediment to Coal Creek and its tributaries. These chronic sediment sources comprise an area of approximately 50 acres. An additional 20 locations have been identified where sediment traps could be constructed to retain sediment that otherwise will enter Coal Creek.

Project Proposal:

The goals of the restoration efforts are to improve riparian and aquatic habitats, water quality and streams flows, and reduce flood risk. Implementing this project will improve the overall health of the watershed that directly

affects approximately 8,000 local residents and thousands of visitors. The first step would be to prepare a detailed restoration plan for this area. This would most likely include the following components:

Improve instream and riparian areas. Work would include:

- Completing a stream survey and restoration design for Coal Creek, East Creek, and the Crystal River confluence reach.
- Reconstructing channels to reconnect historical and new floodplains to stream channels.
- Redesigning and constructing new channels for both Coal Creek and the Crystal River at Redstone using a Rosgen design approach. The approach is based on measured morphological relations associated with bankfull flow, geomorphic valley type, and geomorphic stream type. Bedload transport and storage equilibrium is key to the design.
- Improving instream and riparian habitat using large unanchored wood and boulders (Crystal River at Redstone).
- Improving fish and other aquatic organism passage on Coal and Dutch Creeks.
- Repairing slump/landslide failures adjacent to the road near Bradrich Trailhead.
- Replacing a large corrugated metal pipe on Coal Creek with a bridge at the confluence of Coal and Dutch Creek.

Address connected disturbed areas (CDA). These are disturbed areas that are connected to streams by a distinct drainage way, such as a road ditch or a gully. Connected disturbed areas are chronic sediment sources to Coal Creek and its tributaries. Work would include:

- Rehabilitating 16 miles of road comprising 100 acres of CDA. Road rehabilitation would be accomplished using a combination of mechanical treatments, soil amendment, and revegetation techniques. Heavy equipment would be used to pull culverts, install additional waterbars, rip the road surface, and incorporate soil amendment products. Seed and fertilizer would then be applied to the prepared surfaces.
- Rehabilitating 75 separate erosion features comprising 50 acres of CDA. This would be accomplished using a combination of structural treatments, and hydro-mulching. Structural treatments would involve the installation of biodegradable and permeable sediment fencing. New products have recently been developed that allow for the installation, by hand, of small permeable sediment fences, even in difficult areas. This type of installation would trap sediment in terraces. As a secondary treatment, hydro-mulching would be used to provide an additional cohesion of trapped sediment, and to apply a seed mix to accomplish revegetation.
- Installing 20 new sediment basins to retain sediment that would otherwise enter Coal Creek. Sediment basins would be installed in flat areas near roads using heavy equipment and locally sourced rock.
- Seeding and fertilization of 150 acres of rehabilitated ground.

Promote vegetation recovery. Work would include:

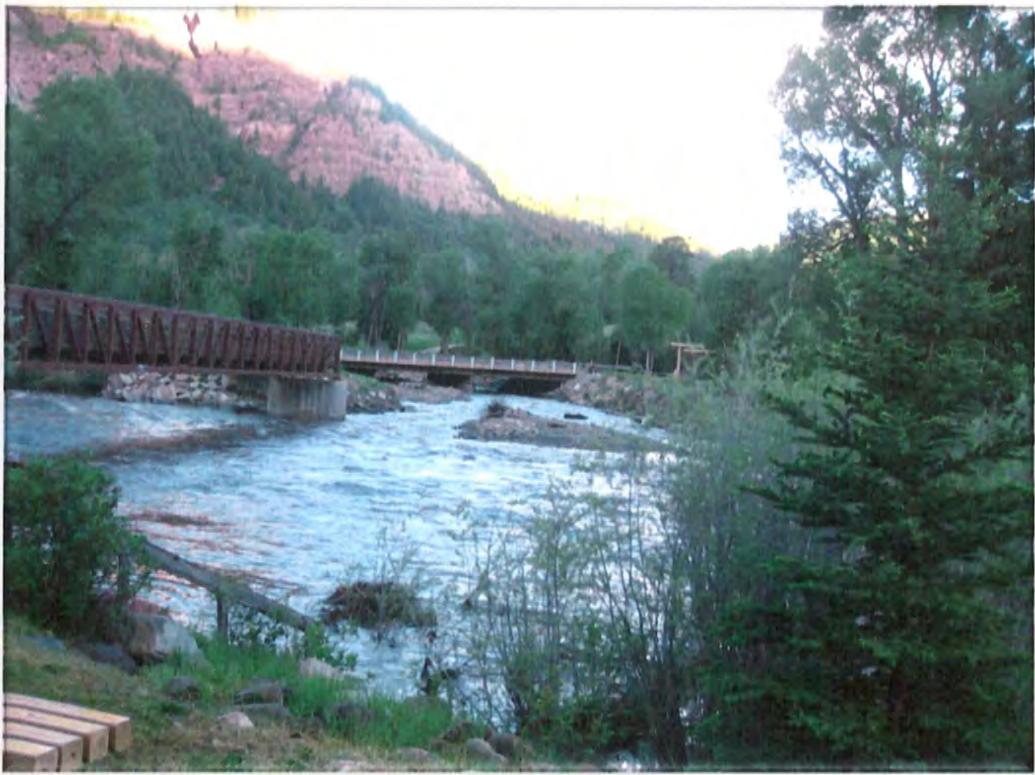
- Restoring heavily disturbed mining areas by amending soils (biochar) in the Coal Creek Watershed.
- Fencing areas from livestock to promote vegetation growth.
- Addressing weed infestations.

Potential partners: USFS; Pitkin County; Colorado Department of Transportation (CDOT); Colorado Division of Wildlife (CDOW); Colorado Department of Mining, Reclamation, and Safety; US Environmental Protection Agency (EPA); USFWS; Federal Highway Administration (FHA); U S Army Corps of Engineers; Colorado Water Conservation Board (CWCB); Redstone Community Association; private landowners; Roaring Fork Conservancy; Colorado Trout Unlimited; Coal Basin Cattleman Association; National Forest Foundation;

Redstone Historical Society; Crystal Valley Environmental Protection Association; Crystal River Caucus, and West Elk Scenic and Historic Byway.

Estimated Costs:

Treatment Type	Acres	Cost per Acre	Total Cost
Landslide stabilization near confluence of Braderich and Coal Creeks	N/A	N/A	\$100 K
Rosgen channel design for Coal/East/Crystal Confluence	N/A	N/A	\$150 K
Coal Creek and Crystal River channel reconstruction and habitat improvements	N/A	N/A	\$2 Million
Bridge at confluence of Coal and Dutch Creeks	N/A	N/A	\$300 K
Biodegradable sediment fence	50 ac	\$ 15 K	\$ 75 K
Hydro mulch/ seed	50 ac	\$ 10 K	\$ 500 K
Biodegradable sediment fence	50 ac	\$ 15 K	\$ 750 K
Road rip and mechanical work	100 ac	\$ 2 K	\$ 200 K
Biochar or compost for soil amendment	100 ac	\$ 10 K	\$ 1 Million
Dry seed/ fertilizer	100 ac	\$ 50.00	\$ 5 K
Sediment traps	20 traps	\$ 2K each	\$ 40 K
Weed treatment			\$5 K
Electric temporary Fence	20 ac	\$ 500.00	\$ 10 K
Total Project Estimate			4.65 Million



Confluence of Crystal to left and Coal Creek straight ahead standing by pedestrian bridge in Redstone, spring run-off June 10, 2010.

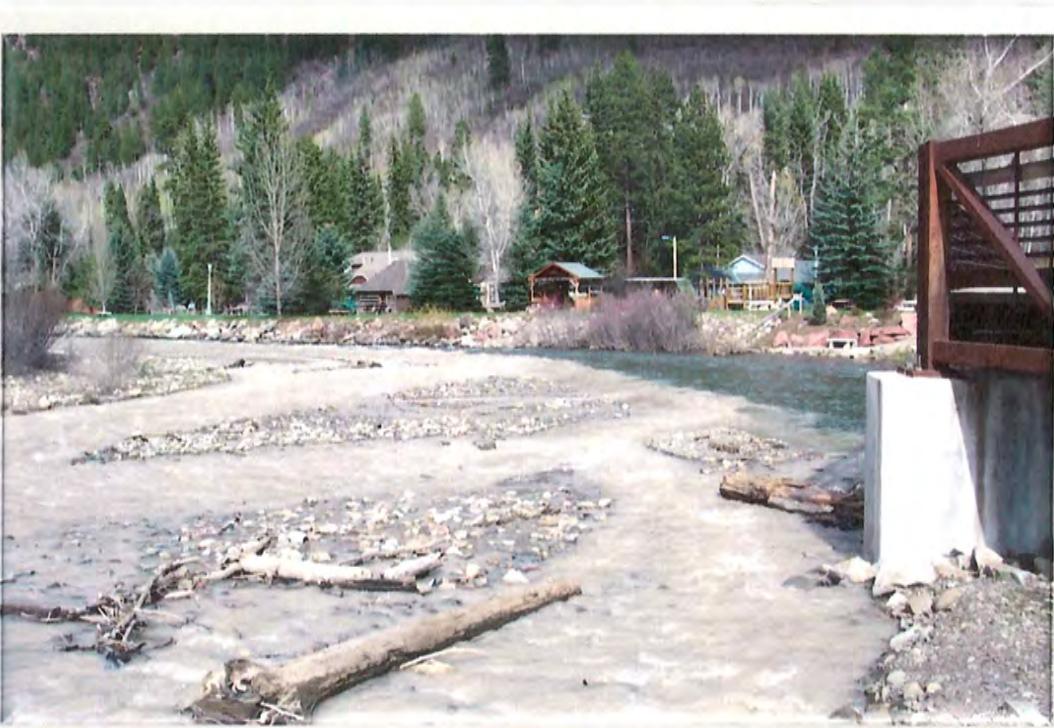


Figure 1. Coal Creek flowing into the Crystal River at Redstone May 15, 2008. Note the sediment plume entering the Crystal from Coal Creek.