

AGENDA

**HEALTHY RIVERS AND STREAMS
CITIZENS ADVISORY BOARD
November 16, 2010 4 p.m.
Airport Operations Center
Aspen, CO 81611**

- 4:00 Public Comment**
- 4:05 Board Comments**
- 4:10 Approval of the Minutes**
October 21, 2010
- 4:15 ACES**
Presentation by Tom Cardamone
- 4:45 Roaring Fork Conservancy & RWAPA Watershed Plan Update**
Sharon Clarke and Mark Fuller
- 5:30 Colorado River District**
Discussion of funding request
- 5:45 Establish procedures for review and comment requests**

*Agenda is subject to change
Item times are approximate*

HEALTHY RIVERS AND STREAMS CITIZENS ADVISORY BOARD

Meeting Minutes
Basalt Town Hall, 4:00 pm
October 21, 2010
Basalt, CO

Board members present: Ruthie Brown, Bill Jochems, Lisa Tasker, Andre Wille, Greg Poschman, Steve Hunter, Rick Neiley Jr.

Board members absent: None

Others present: John Ely, Lisa MacDonald, Michael Owsley, Sam and Tillie Walton

Public Comment

Tillie Walton- Requested the Board take some action on the hydro power issue because the quality and quantity of our streams is what the Board promotes. She asked if the Board could look at some alternatives, such as conservation for solutions to maintain the quantity of the rivers.

Sam Walton – Very interested in healthy rivers and streams and is glad to hear everyone talking.

Board Comments

Bill Jochems updated the Board on an event he and Greg Poschman attended at the Rock Bottom Ranch. The Waltons presented a film on the river restoration efforts on the Lower Colorado River near Yuma, AZ. It was a very impressive presentation.

The presentation was open to the public, Ms. Walton would be happy to get a copy of the video to the Board.

Approval of Minutes

Mr. Tasker moved to approve the minutes of August 16 and September 17, 2010. Mr. Hunter seconded the motion. Motion passed 6 to 0.

2011 Budget

John Ely and Lisa MacDonald presented the 2011 budget line items to the Board. The only increase in the operational budget was in the dues and membership line item due to the Board of County Commissioners recommending the Board pay for dues/memberships to Ruedi Water and Power authority and the Colorado River Head Water forum. This increased the line item by \$4750.00

Mr. Jochems moved to approve the 2011 line items budget. Mr. Wille seconded the motion. The motion passed 6 to 0.

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

City of Aspen Hydro Electric Plant Discussion

John Ely updated the Board on the independent analysis of the City of Aspen's proposed hydroelectric plant since the last board meeting in Redstone.

Mr. Ely stated the search for potential experts to review all reports and products that were generated by the City in regards to hydrology and biology and the impacts associated with diversions of water from Maroon and Castle Creeks to power the turbine to run the plant is proceeding. The analysis would not only include reports, conclusions and studies but would also look at the contracts that generated them to analyze the scope of work to see if there are any unanswered questions or any questions that needed to be further explored and to test the conclusion as to whether or not there would be or would not be an impact on the health of either Maroon or Castle Creeks.

Discussions ensued about potential experts, the process and the Board's position on the project.

The Board gave direction to include in the independent review a hydrologist, biologist and an engineer.

Executive Session

The Board moved into executive session pursuant C.R.S. 24-6-4 402 (4)(b) for the purpose of discussing in stream flows strategies at 5:47 p.m.

The Board returned from executive session and reconvened at approximately 6:45 p.m.

Ms. Tasker moved to approve an expenditure of \$100,000 for legal and engineering fees for the establishment of a recreational in channel diversion. Mr. Neiley seconded the motion. The motion passed 7 to 0.

Mr. Ely discussed with the Board setting up regular joint meetings with the Board of County Commissioners as well as with the Open Space and Trails Board. These will begin in 2011.

Adjourn

The Board meeting adjourned at approximately 6:55 p.m.

Approved:

Attest:

Ruthie Brown – Chairman
Healthy Rivers and Streams
Citizens Advisory Board

Lisa MacDonald

MEMORANDUM

TO: Healthy Rivers and Streams Board
FROM: Mark Fuller, Director, Ruedi Water and Power Authority
Rick Lofaro and Sharon Clarke, Roaring Fork Conservancy
RE: Watershed Plan Update and Funding Request - \$38,000
DATE: 11/11/10

This is an update on the status of the Roaring Fork Watershed Plan and to request your assistance in funding the completion of that Plan.

The Ruedi Water and Power Authority and the Roaring Fork Conservancy, along with various consultants and volunteer technical advisors, are in the process of developing a set of recommendations that will make up Phase II of the Roaring Fork Watershed Plan. The Plan addresses five categories of water issues including Ground Water, Regional Water Management, Surface Water, Water Quality and Instream and Riparian Areas. The recommendations associated with these categories will include policy and legislative recommendations, project and program recommendations, and recommendations for further study. They will be finalized, collected into a final document along with other elements such as implementation strategies, and presented to local governments, water management agencies and interested parties over the next several months.

On November 16th we will review a sample of the recommendations addressing the Surface Water and Instream and Riparian Habitat elements and familiarize you with the format and contents of the Plan. The complete Draft Recommendations have been forwarded to John Ely and other relevant County staff for comments and are available for the HRSF Board and BOCC to review if desired. We will also review our approach to implementation of the Plan. A partnership with the University of Michigan has brought us assistance in the form of a team of graduate students who have been working over the past year to research and collate appropriate implementation strategies. We are also convening a committee of local leaders, including members of the RWAPA and Roaring Fork Conservancy Boards, to discuss institutional opportunities and barriers to Plan implementation. Once the final draft of the Plan is ready, I would like to schedule a half-day workshop with your Board and others to review the recommendations in detail and to brainstorm prioritization of projects and implementation responsibilities and resources. Doing this prior to taking the report to the County Commissioners would assure that we have consensus on the findings of the Plan and on next steps to recommend to the BOCC.

RWAPA and RFC would like to request funding assistance for the completion of the Plan. The Plan has taken longer than expected and has involved more hours of labor than can be covered by our budget of \$91,000. We estimate that it will take approximately \$38,000 in additional funding to cover the projected shortfall. Public meetings, labor (mostly associated with research and writing time) and consultation beyond that which was anticipated in the original work plan have generated those costs. The scope and complexity of the planning process has grown as we have delved deeper into the Valley's water issues while simultaneously attempting to maintain the public involvement that has been a hallmark of the planning process. Despite many hours of services donated in-kind and relatively low per-hour costs, our efforts to control costs and produce a comprehensive report within the original budget

have not been sufficient. Pitkin County has demonstrated its commitment to the Watershed Planning effort through previous donations to this project and through its membership in RWAPA. We hope that your Board will continue that commitment through a grant to RWAPA covering the planning cost shortfall. A separate request to jump-start the implementation of the Plan by funding a few important near-term projects is being forwarded to you by the Roaring Fork Conservancy.

MEMORANDUM

TO: Healthy Rivers and Streams Board
FROM: Rick Lofaro and Sharon Clarke, Roaring Fork Conservancy
RE: Funding Request - \$5,000
DATE: 11/11/10

RFC would like to request funding for two recommended actions that are considered special priorities (consistent with Watershed Plan) and two educational events. The special priorities are a document on Water Conservation and a planning process for a riparian/wetlands restoration project. Besides the obvious direct benefits of these actions, they would 1) cultivate momentum and enthusiasm for tackling other actions, 2) be good publicity for the HRSF Board, and 3) demonstrate to the East Slope that we are aggressively working on local protection and improvement of conditions along our rivers and not focusing entirely on them as the "villain".

The proposal for the document is titled "Opportunities for Water Conservation – Options and Recommendations for the Roaring Fork Watershed" and is anticipated to be low cost (\$2-3K) and completed within 6 months. This document is needed to help guide a watershed wide water conservation campaign.

The restoration project would: 1) have high visibility, 2) improve riparian and instream conditions and the baseflows, 3) be a showcase for the public, and 4) foster collaboration. The first step for the project is to convene a working group to develop a restoration plan. Northstar and the Coal Creek Confluence with the Crystal are possibilities as is a project to improve ditch efficiencies while improving instream habitat and fish and boat passage such as near Basalt (Home Supply Ditch). Northstar is a contender because of its high visibility and biological significance. The number of entities/people to coordinate with would be large and the visibility could be both positive and negative. Our intention is to gage your interest in this and return with more specifics.

Lastly, RFC would like to request funding for two planned 2011 Watershed Exploration educational events-Roaring Fork Headwaters Diversion Tour and Inside Ruedi Reservoir and Dam Tour. These both contribute to the public education that is recommended in the watershed plan. The cost for both of these would be \$2,000.

Recommended Actions to Achieve Riparian and Instream Goals and Objectives

Goal: To protect and restore the functions of riparian and instream areas.

Riparian areas have the highest species richness of all major ecosystems in Colorado, but they cover only one to two percent of the land area. In addition to providing high quality wildlife habitat and supporting biological diversity, these ecosystems perform numerous other critical natural functions. Riparian areas remove nutrients and other constituents that can impair water quality, enhance the structural diversity of aquatic habitat, and support hydrologic processes and patterns by stabilizing stream channels and maintaining sustainable instream flows (by facilitating the infiltration of flooding flows). Finally, riparian areas provide aesthetically and naturally rich places for human use.

The Roaring Fork Watershed is dominated by montane cold headwater streams that provide high quality water for downstream habitats supporting a wide array of aquatic and terrestrial species. Streams serve as important conduits for natural materials - transporting water, nutrients, sediments, and other substances. They provide recreational opportunities, such as boating, fishing and wildlife viewing, and support hydropower production and consumptive water uses like agricultural irrigation and the provision of municipal drinking water.

A. Objective: Assess the condition of riparian/instream habitat for all major streams in the watershed.

A monitoring program is needed to determine the status of riparian and instream areas (including associated wildlife populations), as well as trends impacting their overall condition. Ongoing monitoring would allow identification of areas where conditions are improving, as well as areas where protection and restoration efforts should be focused.

1. Summary of Action Required: Develop and implement a riparian/instream monitoring program.

- **Priority: High**
- **Lead Entity(ies): TBD**
- **Responsible Party(ies): BLM, CDOW, CNHP, CSU, Local jurisdictions, MSCD, NRCS, RFAS, RFC, SHI, TNC, USFS**

a. Convene a Riparian/Instream Working Group to develop a riparian/instream monitoring program for the watershed. Charge the Working Group with the following tasks:

- Identify parameters (indicators), sampling locations, sampling protocols, and resurveying intervals to adequately assess riparian/instream status and trends.
 - Include species distribution information and population status and trends for breeding, resident and wintering birds, as well as for small, medium, and large mammals. Identify important migratory stopover sites. Develop a Bird Index of Biotic Integrity specifically tailored to the watershed.
 - Identify desirable fish (including non-game fish), fish habitat, and macroinvertebrates. Work with the Water Quality Working Group to ensure that adequate stream temperature and dissolved oxygen data are collected across the watershed to monitor

impacts on aquatic wildlife from changes in land use, etc., and to help inform studies on the impact of climate change on aquatic organisms.

- Include an assessment of upland habitat conditions (including soil disturbance/erosion, vegetative ground cover/deforestation, browse level), that influence stream health. (S &P)

- Collect and analyze riparian/ instream data on stream reaches where assessments have not been performed. (P)
- Review and provide recommendations for the modification/consolidation of existing riparian/instream data collection programs. (S)
- Identify sources of ongoing funding for the riparian/instream monitoring program and make strategic recommendations for securing funding. (S&P)
- Develop a mechanism to analyze and report the results of the riparian/instream monitoring program and to address areas of concern. (P)
- Design a companion monitoring strategy for more intensive, site-specific assessments of riparian and instream management impacts, restoration efforts, and adaptive management actions. (P)

RIPARIAN AND INSTREAM HABITAT ASSESSMENT NEEDS INCLUDE:

Hunter, Woody, Lincoln, Capitol, Sopris, Coal, Prince, Thompson, and Threemile creeks; and the Upper Fryingpan River Watershed.

B. Objective: Enhance and preserve native riparian and instream flora and fauna (including wild, naturally reproducing fish communities).

As discussed in the *State of the Roaring Fork Watershed Report 2008*, healthy riparian areas provide the diverse natural resources necessary to support a rich community of wildlife. The functions and values of riparian areas fall into five categories: protecting water quality, maintaining sustainable instream flows, maintaining the natural shape of the stream channel, maintaining biodiversity, and providing sustainable wildlife habitat.

Sustainable and functional riparian ecosystems require native vegetation with high quality, vigor, good cover, even distribution of all age-classes of woody plant species, and no noxious weeds. Where woody species are an important component of the historic plant community, an even distribution of all age-classes of woody plant species provides ecosystem resilience and is essential to site maintenance and recovery from disturbance.

Wildlife species can be used to indicate habitat condition and to monitor and assess the effects of land uses and management strategies. They integrate and respond to environmental characteristics, selecting habitat based on the presence and quality of those characteristics. Mammalian indicators of good quality riparian habitat include mink, Western jumping mouse, and water shrew. In the Roaring Fork Watershed, depending on elevation, the presence of disturbance-intolerant, riparian-dependent songbirds such as Lincoln's sparrow, Wilson's warbler, the willow flycatcher, MacGillivray's warbler, the red-naped sapsucker, Swainson's thrush, and Lewis's woodpecker are good indicators of intact riparian habitat. The American dipper is a good indicator of the quality of stream habitat. Today, the decline of native Colorado River cutthroat trout (CRCT) and boreal toad populations are of particular concern in the watershed

CRCT historically occupied 34,500 km of Colorado’s streams. Today, unhybridized populations of CRCT, or those of particular ecological significance; occupy less than 10 percent of their historical range. As discussed in the *State of the Roaring Fork Watershed Report 2008*, hybridization with rainbow trout, competition with non-native trout, and whirling disease, have all impacted CRCT populations. The USFS has designated the CRCT a sensitive species, the BLM has provided the CRCT with a similar status, and in the State of Colorado they are a species of special concern. In addition to the economic benefit derived from the Roaring Fork Watershed’s thriving trout populations in its Gold Medal streams, trout are an important aquatic species in mountain stream ecosystems. Trout are dependent on clear and cold water – both at risk from global warming; the cumulative effects of alterations to streams’ thermal regimes and flow patterns will likely affect trout spawning in the future.

Since 1970, there has been a dramatic decline in boreal toad and other amphibian populations. Reasons for the decline have not been definitively identified, but may include the presence of toxins or a habitat disturbance that suppresses the immune system, making the toad more susceptible to a fungus - *Chytridiomycosis* (which also kills chorus frogs). Already, one breeding population of boreal toads in the Roaring Fork Watershed is believed to have been extirpated by *Chytridiomycosis* and the fungus has been documented in another population. The boreal toad is listed by the State of Colorado as an endangered species.

1. Summary of Action Required: Maintain/increase the extent and continuity of native riparian plant communities so that riparian and aquatic systems are functionally connected.

- **Priority: High**
- **Lead Entity(ies): TBD**
- **Responsible Party(ies): AVLT, BLM, CDOW, CNHP, CTU, Local jurisdictions, MSCD, NRCS, private landowners, RFAS, RFC, SHI, TNC, USFS**

a. Pursue opportunities for riparian/instream protection and restoration where:

- Small changes in land management or small projects will yield significant riparian/instream improvements
- Significant ecological benefit will be derived from changes in land management or a project;
- Program support exists and access to the riparian/instream area is relatively uncomplicated;
- Partnerships can be developed for example using the Wyden Amendment for USFS involvement. (S&P)

b. On an ongoing basis, reassess the Colorado Natural Heritage Program’s Potential Conservation Areas for changes in resource conditions or management needs. (S)

EXAMPLE RIPARIAN/INSTREAM LAND MANAGEMENT CHANGES AND PROJECT TYPES AND LOCATIONS:

- Riparian plantings and restoration,
- Mitigating effects of channel incision by reducing bank slope,
- Using large unanchored wood and boulders to improve fish habitat, and
- Exploring options to minimize livestock impacts.
- Managing weeds

Upper Roaring Fork River, Roaring Fork River near Emma, mainstem Fryingpan River below Ruedi Reservoir, Crystal River at Placita, North and Middle Thompson creeks, and Fourmile Creek.

LOCATIONS WHERE SIGNIFICANT ECOLOGICAL BENEFIT MAY BE DERIVED INCLUDE:

Large alluvial areas such as Northstar, Cattle Creek confluences with the Roaring Fork River, Roaring Fork River near Emma, USFS Tree Farm, Thompson Creek confluences with the Crystal River, the Crystal River at Placita, and ????.

LOCATIONS WHERE PROGRAM SUPPORT MAY EXIST INCLUDE:

Public open space and conservation easements such as the Cattle Creek, Burry, Filoha, Blue Creek, Grange, Emma, North Star, USFS Tree Farm, Cold Mountain Ranch, Thompson Creek confluence, Redstone Boulders; and AVLT and Pitkin County Open Space and Trails properties.

c. Assess greenways as an effective tool for protecting riparian areas in the watershed and pursue greenways, as appropriate. (S&P)

d. Research wetland mitigation banks and work to develop such a program, if warranted. (S&P)

e. Working with landowners, resource experts, and other interested parties, plan and implement riparian/ instream protection and restoration projects, including:

- Working with willing landowners on conservation easements or acquisitions;
- Revitalizing historic wetlands and reconnecting stream channels to the historic floodplain;
- Working with the USFS and BLM to protect or restore high quality and priority riparian areas on lands they manage;
- Introducing beavers to create dams and wetland areas in appropriate stream reaches;
- Working on ways to manage the timing of available streamflows (high and low), their duration, rise and fall rate, and inter-annual variation to maintain or restore riparian/instream health; and
- Addressing the reclamation of Coal Basin from a “whole watershed” perspective. (P)

OPPORTUNITIES FOR PROTECTION RESTORATION INCLUDE:

- Crystal River-Janeway,
- Redstone/Coal Creek confluence,
- Coal Basin,
- Thompson Creek confluence,
- Upper Roaring Fork River-Northstar, and
- Roaring Fork near Emma area.

f. Investigate regional planning mechanisms available for protection of riparian areas (e.g., a special district crossing jurisdictional boundaries) and funding available to support such a regional effort. (S)

g. Support state and federal tax credits for donations of conservation easements. Investigate additional tax incentives for such donations; work with interested parties on adoption of new incentives. (P)

2. Summary of Action Required: Maintain or increase the population size and distribution of all riparian-dependent wildlife species, particularly indicator species.

- **Priority: High**
- **Lead Entity(ies): CDOW**
- **Responsible Party(ies): BLM, CNHP, CTU, private landowners, RFAS, USFS**

a. Using the results of the watershed-specific Bird Index of Biotic Integrity, implement habitat improvement projects. (P)

b. Determine the potential impact of climate change on riparian-dependent wildlife. (S)

c. Implement projects that promote beaver activity. (P)

d. In conjunction with local land use approvals, require the design and execution of site-specific adaptive management plans to evaluate and minimize the impacts of development on riparian areas. (L)

e. Inventory and maintain or increase the population size and range, of all federally listed plant species such as Ute ladies' tresses. (S&P)

3. Summary of Action Required: Maintain or increase the population size, range, and purity of all existing Colorado River cutthroat trout populations.

- **Priority: High**
- **Lead Entity(ies): CDOW**
- **Responsible Party(ies): BLM, CTU, USFS**

a. Determine the optimum number of CRCT populations and implement projects that work toward this goal, including projects that:

- Reduce whirling disease transmission to CRCT populations;
- Protect CRCT spawning areas;
- Create barriers for non-native fish
- Improve CRCT passage by replacing culverts;
- Reduce land use impacts (e.g., sedimentation, chemicals in stormwater runoff from roads, low flows, and stream channelization) affecting CRCT populations;
- Stop the put and take of rainbow trout and encourage CRCT, including exploring the possibility of CDOW releasing CRCT; and
- Reflect the 2006 *Conservation Strategy for Colorado River Cutthroat Trout* and any subsequent agreements. (P, S, &L)

b. Conduct fish surveys above natural and man-made barriers to determine if there are additional populations of CRCT in the watershed. Increase/institute monitoring of all identified CRCT populations. (S&P)

c. Study the potential effects of climate change on CRCT populations. (S)

4. Summary of Action Required: Assess the condition of wild, naturally-reproducing fish communities; improve existing communities.

- **Priority: Medium**
- **Lead Entity(ies): CDOW**
- **Responsible Party(ies): BLM, CTU, USFS**

a. Determine the optimum population size for native suckers (e.g., bluehead, flannelmouth) and implement a management plan to achieve the target populations. (S &P)

b. Determine the effect of stream temperature on wild, naturally-reproducing fish species distribution and initiate actions to ensure that maximum temperatures are not exceeded. Study the potential effects of climate change on wild, naturally-reproducing fish communities. (S)

COLORADO RIVER CUTTHROAT PROTECTION/RESTORATION OPPORTUNITIES INCLUDE:

Spawning Area Protection

Middle and North Thompson, Cattle, Hunter, and Avalanche creeks; and Upper Crystal, Upper Fryingpan, and Upper Roaring Fork Watersheds.

Barriers Creation

Cunningham, Park, Middle and North Thompson, and the North Fork of Lost Trail creeks.

Culvert Replacement

Fryingpan, Crystal, Cattle and East and West Sopris watersheds.

Reduction of Land Use Impacts

Mid Thompson, North Thompson, and North Fork of Lost Trail creeks.

EXAMPLE OPPORTUNITIES TO IMPROVE FISH PASSAGE:

Fryingpan River and Crystal River, Cattle Creek and East and West Sopris Creek watersheds.

- c. Improve fish passage in the Fryingpan, Crystal, Cattle and East and West Sopris watersheds. (P)
- d. Improve education regarding methods to reduce whirling disease transmission. (P)
- e. Address the problem of illegal introduction of fish in the watershed (which increases disease, such as whirling disease, and poses hybridization issues) through education and regulatory initiatives. (P&L)

5. Summary of Action Required: Assess key amphibian populations (boreal toads, chorus frogs, tiger salamanders, and Northern leopard frogs); restore or increase key amphibian populations.

- **Priority: Medium**
- **Lead Entity(ies): CDOW**
- **Responsible Party(ies): USFS**

- a. Monitor key amphibian populations to determine their status. (P)
- b. Restore important amphibian habitats and pursue opportunities for the reintroduction of species. (P)
- c. Study the potential impact of climate change on amphibian populations. (S)
- d. Survey potential boreal toad habitats to determine if additional populations exist in the watershed. (S)
- e. Increase awareness of the dangers to toad populations associated with *Chytridiomycosis* fungus transmission. (P)

C. Objective: Minimize the impact of development and other activities in riparian and instream areas.

As discussed in the *State of the Roaring Fork Watershed Report 2008*, development, including roads, recreational trails and campsites, agriculture and mining can have severe and enduring impacts on riparian and instream areas. For example, beaver populations in the watershed are much diminished from historic levels due to loss of riparian habitat and trapping. Reductions in beaver populations results in a loss of the benefits to riparian and instream habitat that result from beaver activity. Beavers modify stream channels, thereby slowing flooding flows and increasing out-of-bank flows, water storage and groundwater recharge. Beaver activity results in the entrapment of sediment and nutrients - improving water quality and nutrient cycling. By enhancing the environmental conditions necessary for the establishment and maintenance of riparian vegetation, beavers create the habitat necessary for numerous aquatic and semi-aquatic species to thrive.

1. Summary of Action Required: Address the impacts of development and other activities on riparian and instream areas.

- **Priority: High**
- **Lead Entity(ies): Local jurisdictions**
- **Responsible Party(ies): BLM, CDOT, CDOW, CDRM&S, CSU, CTU, MSCD, NRCS, private landowners, RFAS, RFC, RWAPA, SHI, USFS**

a. Determine the impacts of riparian alteration/disturbance on the native wildlife community, including breeding bird and small mammal reproductive success, community assemblage and diversity, and migration patterns of birds and mammals. Include an assessment of the effects of acute and chronic sediment pulses on aquatic ecosystems, differentiating between natural and human-influenced sources of sediment. (S)

b. Mitigate the riparian and instream impacts from roads, including reducing sediment input from runoff and minimizing the use of magnesium chloride on roads located in or adjacent to riparian areas. (P)

c. Develop and enforce consistent stream setbacks to protect riparian areas throughout the watershed. (L)

d. Inventory developed and dispersed recreation sites, trails and access points and assess their impacts on riparian and instream areas; work to reduce impacts through relocation, removal, or mitigation. Minimize the impact of new recreational sites, access points and trails on riparian and instream areas (S&P)

e. Mitigate riparian and instream impacts associated with cattle by fencing riparian areas and providing stock water (P)

f. Minimize instream impacts and improve fish habitat by reengineering instream structures intended to move water into headgates (e.g., Lower Crystal River, Home Supply Ditch). (P)

g. Restore riparian and instream areas impacted by historical mining activities and ensure that future oil and gas development in does not adversely impact riparian and instream areas. (P&L)

h. Work with the Colorado Dept. of Transportation, counties, and USFS to minimize/mitigate the effects of bridges on riparian and instream habitat (P)

SOURCES OF SEDIMENT ISSUES IN WATERSHED INCLUDE:

Coal, Thompson, and Brush creeks; and Lower Fryingpan and Crystal rivers.

SEDIMENT ISSUES FROM ROADS INCLUDE:

Castle Creek, Lime Creek/Lime Park, North Fork of Crystal at Paul's cabin, Middle Thompson-abandoned timber road system, and Coal Creek.

IMPACTS FROM ROADS INCLUDE:

Roaring Fork, Fryingpan, and Crystal rivers, Thompson and Lost Trail creeks.

OPPORTUNITIES TO EXPLORE MITIGATION OF GRAZING IMPACTS INCLUDE:

Roaring Fork River, USFS Tree Farm, Crystal River, and Lower North Thompson, Middle Thompson, and Coal creeks.

OPPORTUNITIES TO EXPLORE:

Mitigation of Mining Impacts

Coal and Thompson creek watersheds.

Prevent Impacts from Oil and Gas Development

Thompson, Coal, and Fourmile creek watersheds.

Minimize/Mitigate Effects for Bridges

Roaring Fork River at Basalt Bypass Bridge, Coal and Thompson creeks, and Crystal River).

D. Objective: Improve understanding of the importance of riparian/instream areas.

1. Summary of Action Required: Increase education/outreach programs on the importance of riparian and instream areas.

- **Priority: High**
- **Lead Entity(ies): RFC**
- **Responsible Party(ies): ACES, BLM, CDOW, CTU, local jurisdictions, MSCD, NRCS, private landowners, RFAS, USFS**

a. Provide education to the public, particularly streamside landowners; local decision makers; realtors; and developers). Incorporate site-specific information from the Stream Health Initiative’s riparian and instream assessments. Educational opportunities include:

- Institution of a volunteer program partnering streamside property owners and birders to identify bird species occurring on the property;
- Site visits with streamside property owners to discuss current conditions and ideas for improvements.
- A brochure for new streamside property owners, providing guidance on the “dos” and “don’ts” of living near rivers;
- Increasing realtor involvement (e.g., a “Realtors for Rivers” organization);
- Increasing opportunities for watershed explorations and programs);
- Education materials such as newspaper inserts illustrating the impact of invasive species in riparian and instream areas. (P)

EDUCATION MESSAGES INCLUDE:

- important functions of riparian areas,
- development and other threats to riparian areas,
- what can be done to protect and restore riparian areas, and
- potential sources of funding for riparian projects.

EDUCATIONAL FORUMS INCLUDE
RFC floats; ACES and WW Naturalist Nights and Potbelly Perspectives.

b. Develop the RFC’s River Center, with its exhibits on the importance of riparian and instream areas to the watershed. (P)

c. Provide publicity, tours, and interpretation of riparian and instream restoration projects. (P)

d. Involve the public in restoration projects (e.g. weed pulls, plantings). (P)

E. Objective: Eradicate/control invasive species in riparian and instream areas.

Noxious weeds, zebra and quagga mussels and New Zealand mud snails, and other invasive species threaten the health of riparian and instream areas, and climate change stands to increase the likelihood of invasions. Some invasive species, like New Zealand mud snails, are almost impossible to contain once they have entered an area. Even native species can take on “invasive” aspects and become problematic; for example, the *Didymosphenia geminata* (Didymo) algae forms extensive masses that can cover almost all of the organisms that live on or in the bottom of a stream, preventing the growth of other algae that are an important food for aquatic invertebrates. Some species also have the potential to do substantial economic damage when they appear (e.g., zebra and quagga mussels can fasten themselves to almost any surface - coating and damaging docks, boats and structures).

1. Summary of Action Required: Create an invasive plant species task force for the watershed to coordinate efforts to control weeds, reestablish native species, and provide education about invasive species.

- **Priority: Medium-High**
- **Lead Entity(ies): Local jurisdictions**
- **Responsible Party(ies): BLM, ditch companies, MSCD, NRCS, USFS**

a. Convene an Invasive Plant Species Task Force to:

- Identify the invasive plant species of greatest concern in riparian areas in the Roaring Fork Watershed, including vegetation that has not been designated as “noxious” that are a problem in riparian zones because they prohibit cottonwood and willow seedlings from becoming established on bare soils;
- Identify and prioritize locations to address invasive plant species in the watershed;
- Identify and disseminate information on the least harmful method(s) of eradication/control;
- Develop a plan to eradicate/control invasive plant species in the Roaring Fork Watershed (including an education component and the organization of community events to remove invasive species); and
- Study the potential impact of climate change on invasive plant species. (P&S)

INVASIVE PLANT SPECIES OF GREATEST CONCERN IN RIPARIAN AREAS:

Listed Noxious Weeds

Canada thistle, tamarisk, leafy spurge, oxeye daisy, purple loosestrife, and

Other Problem Weeds

reed canary grass and pasture grasses

b. Work with local jurisdictions’ weed boards (or other appropriate contact(s)), the USFS, BLM, NRCS, MSCD, and private land owners to eradicate/control invasive plant species that are a significant concern, particularly adjacent to riparian areas and along roads. Eradicate tamarisk in the watershed and ensure that any new infestations are removed (e.g., Threemile Creek). Where possible, revive more natural flow regimes (small and large floods) to help control weeds. (P)

2. Summary of Action Required: Prevent the New Zealand mudsnail, Didymo algae, and quagga and zebra mussels from establishing in the watershed.

- **Priority: High**
- **Lead Entity(ies): CDOW, RWAPA**
- **Responsible Party(ies): BOR, USFS, USGS**

a. Research the Didymo algae to determine the cause of its rapid spread, the ecological implications, and possible methods of control. (S)

b. Study the potential impacts of climate change on the New Zealand mudsnail, Didymo algae, and quagga and zebra mussels. (S)

c. Implement invasive species inspection/monitoring programs (P)

d. Improve knowledge of the economic and ecological consequences of invasion by these exotic species and methods of preventing their spread. (P)

EXAMPLE INSPECTION/MONITORING PROGRAMS:

funding/staffing boat cleaning for non-native mussels and participating in the USGS ‘s efforts to create a Didymo algae monitoring program.

Recommended Actions to Achieve Riparian and Instream Goals and Objectives

Goal: To protect and restore the functions of riparian and instream areas.

Riparian areas have the highest species richness of all major ecosystems in Colorado, but they cover only one to two percent of the land area. In addition to providing high quality wildlife habitat and supporting biological diversity, these ecosystems perform numerous other critical natural functions. Riparian areas remove nutrients and other constituents that can impair water quality, enhance the structural diversity of aquatic habitat, and support hydrologic processes and patterns by stabilizing stream channels and maintaining sustainable instream flows (by facilitating the infiltration of flooding flows). Finally, riparian areas provide aesthetically and naturally rich places for human use.

The Roaring Fork Watershed is dominated by montane cold headwater streams that provide high quality water for downstream habitats supporting a wide array of aquatic and terrestrial species. Streams serve as important conduits for natural materials - transporting water, nutrients, sediments, and other substances. They provide recreational opportunities, such as boating, fishing and wildlife viewing, and support hydropower production and consumptive water uses like agricultural irrigation and the provision of municipal drinking water.

A. Objective: Assess the condition of riparian/instream habitat for all major streams in the watershed.

A monitoring program is needed to determine the status of riparian and instream areas (including associated wildlife populations), as well as trends impacting their overall condition. Ongoing monitoring would allow identification of areas where conditions are improving, as well as areas where protection and restoration efforts should be focused.

1. Summary of Action Required: Develop and implement a riparian/instream monitoring program.

- **Priority: High**
- **Lead Entity(ies): TBD**
- **Responsible Party(ies): BLM, CDOW, CNHP, CSU, Local jurisdictions, MSCD, NRCS, RFAS, RFC, SHI, TNC, USFS**

a. Convene a Riparian/Instream Working Group to develop a riparian/instream monitoring program for the watershed. Charge the Working Group with the following tasks:

- Identify parameters (indicators), sampling locations, sampling protocols, and resurveying intervals to adequately assess riparian/instream status and trends.
 - Include species distribution information and population status and trends for breeding, resident and wintering birds, as well as for small, medium, and large mammals. Identify important migratory stopover sites. Develop a Bird Index of Biotic Integrity specifically tailored to the watershed.
 - Identify desirable fish (including non-game fish), fish habitat, and macroinvertebrates. Work with the Water Quality Working Group to ensure that adequate stream temperature and dissolved oxygen data are collected across the watershed to monitor

impacts on aquatic wildlife from changes in land use, etc., and to help inform studies on the impact of climate change on aquatic organisms.

- Include an assessment of upland habitat conditions (including soil disturbance/erosion, vegetative ground cover/deforestation, browse level), that influence stream health. (S &P)

- Collect and analyze riparian/ instream data on stream reaches where assessments have not been performed. (P)
- Review and provide recommendations for the modification/consolidation of existing riparian/instream data collection programs. (S)
- Identify sources of ongoing funding for the riparian/instream monitoring program and make strategic recommendations for securing funding. (S&P)
- Develop a mechanism to analyze and report the results of the riparian/instream monitoring program and to address areas of concern. (P)
- Design a companion monitoring strategy for more intensive, site-specific assessments of riparian and instream management impacts, restoration efforts, and adaptive management actions. (P)

RIPARIAN AND INSTREAM HABITAT ASSESSMENT NEEDS INCLUDE:

Hunter, Woody, Lincoln, Capitol, Sopris, Coal, Prince, Thompson, and Threemile creeks; and the Upper Fryingpan River Watershed.

B. Objective: Enhance and preserve native riparian and instream flora and fauna (including wild, naturally reproducing fish communities).

As discussed in the *State of the Roaring Fork Watershed Report 2008*, healthy riparian areas provide the diverse natural resources necessary to support a rich community of wildlife. The functions and values of riparian areas fall into five categories: protecting water quality, maintaining sustainable instream flows, maintaining the natural shape of the stream channel, maintaining biodiversity, and providing sustainable wildlife habitat.

Sustainable and functional riparian ecosystems require native vegetation with high quality, vigor, good cover, even distribution of all age-classes of woody plant species, and no noxious weeds. Where woody species are an important component of the historic plant community, an even distribution of all age-classes of woody plant species provides ecosystem resilience and is essential to site maintenance and recovery from disturbance.

Wildlife species can be used to indicate habitat condition and to monitor and assess the effects of land uses and management strategies. They integrate and respond to environmental characteristics, selecting habitat based on the presence and quality of those characteristics. Mammalian indicators of good quality riparian habitat include mink, Western jumping mouse, and water shrew. In the Roaring Fork Watershed, depending on elevation, the presence of disturbance-intolerant, riparian-dependent songbirds such as Lincoln's sparrow, Wilson's warbler, the willow flycatcher, MacGillivray's warbler, the red-naped sapsucker, Swainson's thrush, and Lewis's woodpecker are good indicators of intact riparian habitat. The American dipper is a good indicator of the quality of stream habitat. Today, the decline of native Colorado River cutthroat trout (CRCT) and boreal toad populations are of particular concern in the watershed

CRCT historically occupied 34,500 km of Colorado’s streams. Today, unhybridized populations of CRCT, or those of particular ecological significance, occupy less than 10 percent of their historical range. As discussed in the *State of the Roaring Fork Watershed Report 2008*, hybridization with rainbow trout, competition with non-native trout, and whirling disease, have all impacted CRCT populations. The USFS has designated the CRCT a sensitive species, the BLM has provided the CRCT with a similar status, and in the State of Colorado they are a species of special concern. In addition to the economic benefit derived from the Roaring Fork Watershed’s thriving trout populations in its Gold Medal streams, trout are an important aquatic species in mountain stream ecosystems. Trout are dependent on clear and cold water – both at risk from global warming; the cumulative effects of alterations to streams’ thermal regimes and flow patterns will likely affect trout spawning in the future.

Since 1970, there has been a dramatic decline in boreal toad and other amphibian populations. Reasons for the decline have not been definitively identified, but may include the presence of toxins or a habitat disturbance that suppresses the immune system, making the toad more susceptible to a fungus - *Chytridiomycosis* (which also kills chorus frogs). Already, one breeding population of boreal toads in the Roaring Fork Watershed is believed to have been extirpated by *Chytridiomycosis* and the fungus has been documented in another population. The boreal toad is listed by the State of Colorado as an endangered species.

1. Summary of Action Required: Maintain/increase the extent and continuity of native riparian plant communities so that riparian and aquatic systems are functionally connected.

- **Priority:** High
- **Lead Entity(ies):** TBD
- **Responsible Party(ies):** AVL T, BLM, CDOW, CNHP, CTU, Local jurisdictions, MSCD, NRCS, private landowners, RFAS, RFC, SHI, TNC, USFS

a. Pursue opportunities for riparian/instream protection and restoration where:

- Small changes in land management or small projects will yield significant riparian/instream improvements
- Significant ecological benefit will be derived from changes in land management or a project;
- Program support exists and access to the riparian/instream area is relatively uncomplicated;
- Partnerships can be developed for example using the Wyden Amendment for USFS involvement. (S&P)

b. On an ongoing basis, reassess the Colorado Natural Heritage Program’s Potential Conservation Areas for changes in resource conditions or management needs. (S)

EXAMPLE RIPARIAN/INSTREAM LAND MANAGEMENT CHANGES AND PROJECT TYPES AND LOCATIONS:

- Riparian plantings and restoration,
- Mitigating effects of channel incision by reducing bank slope,
- Using large unanchored wood and boulders to improve fish habitat, and
- Exploring options to minimize livestock impacts.
- Managing weeds

Upper Roaring Fork River, Roaring Fork River near Emma, mainstem Fryingspan River below Ruedi Reservoir, Crystal River at Placita, North and Middle Thompson creeks, and Fourmile Creek.

LOCATIONS WHERE SIGNIFICANT ECOLOGICAL BENEFIT MAY BE DERIVED INCLUDE:

Large alluvial areas such as Northstar, Cattle Creek confluences with the Roaring Fork River, Roaring Fork River near Emma, USFS Tree Farm, Thompson Creek confluences with the Crystal River, the Crystal River at Placita, and ????.

LOCATIONS WHERE PROGRAM SUPPORT MAY EXIST INCLUDE:

Public open space and conservation easements such as the Cattle Creek, Burry, Filoha, Blue Creek, Grange, Emma, North Star, USFS Tree Farm, Cold Mountain Ranch, Thompson Creek confluence, Redstone Boulders; and AVL T and Pitkin County Open Space and Trails properties.

c. Assess greenways as an effective tool for protecting riparian areas in the watershed and pursue greenways, as appropriate. (S&P)

d. Research wetland mitigation banks and work to develop such a program, if warranted. (S&P)

e. Working with landowners, resource experts, and other interested parties, plan and implement riparian/ instream protection and restoration projects, including:

- Working with willing landowners on conservation easements or acquisitions;
- Revitalizing historic wetlands and reconnecting stream channels to the historic floodplain;
- Working with the USFS and BLM to protect or restore high quality and priority riparian areas on lands they manage;
- Introducing beavers to create dams and wetland areas in appropriate stream reaches;
- Working on ways to manage the timing of available streamflows (high and low), their duration, rise and fall rate, and inter-annual variation to maintain or restore riparian/instream health; and
- Addressing the reclamation of Coal Basin from a “whole watershed” perspective. (P)

OPPORTUNITIES FOR PROTECTION RESTORATION INCLUDE:

- Crystal River-Janeway,
- Redstone/Coal Creek confluence,
- Coal Basin,
- Thompson Creek confluence,
- Upper Roaring Fork River-Northstar, and
- Roaring Fork near Emma area.

f. Investigate regional planning mechanisms available for protection of riparian areas (e.g., a special district crossing jurisdictional boundaries) and funding available to support such a regional effort. (S)

g. Support state and federal tax credits for donations of conservation easements. Investigate additional tax incentives for such donations; work with interested parties on adoption of new incentives. (P)

2. Summary of Action Required: Maintain or increase the population size and distribution of all riparian-dependent wildlife species, particularly indicator species.

- **Priority: High**
- **Lead Entity(ies): CDOW**
- **Responsible Party(ies): BLM, CNHP, CTU, private landowners, RFAS, USFS**

a. Using the results of the watershed-specific Bird Index of Biotic Integrity, implement habitat improvement projects. (P)

b. Determine the potential impact of climate change on riparian-dependent wildlife. (S)

c. Implement projects that promote beaver activity. (P)

d. In conjunction with local land use approvals, require the design and execution of site-specific adaptive management plans to evaluate and minimize the impacts of development on riparian areas. (L)

e. Inventory and maintain or increase the population size and range, of all federally listed plant species such as Ute ladies' tresses. (S&P)

3. Summary of Action Required: Maintain or increase the population size, range, and purity of all existing Colorado River cutthroat trout populations.

- **Priority: High**
- **Lead Entity(ies): CDOW**
- **Responsible Party(ies): BLM, CTU, USFS**

a. Determine the optimum number of CRCT populations and implement projects that work toward this goal, including projects that:

- Reduce whirling disease transmission to CRCT populations;
- Protect CRCT spawning areas;
- Create barriers for non-native fish
- Improve CRCT passage by replacing culverts;
- Reduce land use impacts (e.g., sedimentation, chemicals in stormwater runoff from roads, low flows, and stream channelization) affecting CRCT populations;
- Stop the put and take of rainbow trout and encourage CRCT, including exploring the possibility of CDOW releasing CRCT; and
- Reflect the 2006 *Conservation Strategy for Colorado River Cutthroat Trout* and any subsequent agreements. (P, S, &L)

COLORADO RIVER CUTTHROAT PROTECTION/RESTORATION OPPORTUNITIES INCLUDE:

Spawning Area Protection

Middle and North Thompson, Cattle, Hunter, and Avalanche creeks; and Upper Crystal, Upper Fryingpan, and Upper Roaring Fork Watersheds.

Barriers Creation

Cunningham, Park, Middle and North Thompson, and the North Fork of Lost Trail creeks.

Culvert Replacement

Fryingpan, Crystal, Cattle and East and West Sopris watersheds.

Reduction of Land Use Impacts

Mid Thompson, North Thompson, and North Fork of Lost Trail creeks.

b. Conduct fish surveys above natural and man-made barriers to determine if there are additional populations of CRCT in the watershed. Increase/institute monitoring of all identified CRCT populations. (S&P)

c. Study the potential effects of climate change on CRCT populations. (S)

4. Summary of Action Required: Assess the condition of wild, naturally-reproducing fish communities; improve existing communities.

- **Priority: Medium**
- **Lead Entity(ies): CDOW**
- **Responsible Party(ies): BLM, CTU, USFS**

a. Determine the optimum population size for native suckers (e.g., bluehead, flannelmouth) and implement a management plan to achieve the target populations. (S &P)

b. Determine the effect of stream temperature on wild, naturally-reproducing fish species distribution and initiate actions to ensure that maximum temperatures are not exceeded. Study the potential effects of climate change on wild, naturally-reproducing fish communities. (S)

EXAMPLE OPPORTUNITIES TO IMPROVE FISH PASSAGE:

Fryingpan River and Crystal River, Cattle Creek and East and West Sopris Creek watersheds.

- c. Improve fish passage in the Fryingpan, Crystal, Cattle and East and West Sopris watersheds. (P)
- d. Improve education regarding methods to reduce whirling disease transmission. (P)
- e. Address the problem of illegal introduction of fish in the watershed (which increases disease, such as whirling disease, and poses hybridization issues) through education and regulatory initiatives. (P&L)

5. Summary of Action Required: Assess key amphibian populations (boreal toads, chorus frogs, tiger salamanders, and Northern leopard frogs); restore or increase key amphibian populations.

- **Priority: Medium**
- **Lead Entity(ies): CDOW**
- **Responsible Party(ies): USFS**

- a. Monitor key amphibian populations to determine their status. (P)
- b. Restore important amphibian habitats and pursue opportunities for the reintroduction of species. (P)
- c. Study the potential impact of climate change on amphibian populations. (S)
- d. Survey potential boreal toad habitats to determine if additional populations exist in the watershed. (S)
- e. Increase awareness of the dangers to toad populations associated with *Chytridiomycosis* fungus transmission. (P)

C. Objective: Minimize the impact of development and other activities in riparian and instream areas.

As discussed in the *State of the Roaring Fork Watershed Report 2008*, development, including roads, recreational trails and campsites, agriculture and mining can have severe and enduring impacts on riparian and instream areas. For example, beaver populations in the watershed are much diminished from historic levels due to loss of riparian habitat and trapping. Reductions in beaver populations results in a loss of the benefits to riparian and instream habitat that result from beaver activity. Beavers modify stream channels, thereby slowing flooding flows and increasing out-of-bank flows, water storage and groundwater recharge. Beaver activity results in the entrapment of sediment and nutrients - improving water quality and nutrient cycling. By enhancing the environmental conditions necessary for the establishment and maintenance of riparian vegetation, beavers create the habitat necessary for numerous aquatic and semi-aquatic species to thrive.

1. Summary of Action Required: Address the impacts of development and other activities on riparian and instream areas.

- **Priority: High**
- **Lead Entity(ies): Local jurisdictions**
- **Responsible Party(ies): BLM, CDOT, CDOW, CDRM&S, CSU, CTU, MSCD, NRCS, private landowners, RFAS, RFC, RWAPA, SHI, USFS**

a. Determine the impacts of riparian alteration/disturbance on the native wildlife community, including breeding bird and small mammal reproductive success, community assemblage and diversity, and migration patterns of birds and mammals. Include an assessment of the effects of acute and chronic sediment pulses on aquatic ecosystems, differentiating between natural and human-influenced sources of sediment. (S)

b. Mitigate the riparian and instream impacts from roads, including reducing sediment input from runoff and minimizing the use of magnesium chloride on roads located in or adjacent to riparian areas. (P)

c. Develop and enforce consistent stream setbacks to protect riparian areas throughout the watershed. (L)

d. Inventory developed and dispersed recreation sites, trails and access points and assess their impacts on riparian and instream areas; work to reduce impacts through relocation, removal, or mitigation. Minimize the impact of new recreational sites, access points and trails on riparian and instream areas (S&P)

e. Mitigate riparian and instream impacts associated with cattle by fencing riparian areas and providing stock water (P)

f. Minimize instream impacts and improve fish habitat by reengineering instream structures intended to move water into headgates (e.g., Lower Crystal River, Home Supply Ditch). (P)

g. Restore riparian and instream areas impacted by historical mining activities and ensure that future oil and gas development in does not adversely impact riparian and instream areas. (P&L)

h. Work with the Colorado Dept. of Transportation, counties, and USFS to minimize/mitigate the effects of bridges on riparian and instream habitat (P)

SOURCES OF SEDIMENT ISSUES IN WATERSHED INCLUDE:

Coal, Thompson, and Brush creeks; and Lower Fryingpan and Crystal rivers.

SEDIMENT ISSUES FROM ROADS INCLUDE:

Castle Creek, Lime Creek/Lime Park, North Fork of Crystal at Paul's cabin, Middle Thompson-abandoned timber road system, and Coal Creek.

IMPACTS FROM ROADS INCLUDE:

Roaring Fork, Fryingpan, and Crystal rivers, Thompson and Lost Trail creeks.

OPPORTUNITIES TO EXPLORE MITIGATION OF GRAZING IMPACTS INCLUDE:

Roaring Fork River, USFS Tree Farm, Crystal River, and Lower North Thompson, Middle Thompson, and Coal creeks.

OPPORTUNITIES TO EXPLORE:

Mitigation of Mining Impacts

Coal and Thompson creek watersheds.

Prevent Impacts from Oil and Gas Development
Thompson, Coal, and Fourmile creek watersheds.

Minimize/Mitigate Effects for Bridges

Roaring Fork River at Basalt Bypass Bridge, Coal and Thompson creeks, and Crystal River).

D. Objective: Improve understanding of the importance of riparian/instream areas.

1. Summary of Action Required: Increase education/outreach programs on the importance of riparian and instream areas.

- **Priority:** High
- **Lead Entity(ies):** RFC
- **Responsible Party(ies):** ACES, BLM, CDOW, CTU, local jurisdictions, MSCD, NRCS, private landowners, RFAS, USFS

a. Provide education to the public, particularly streamside landowners; local decision makers; realtors; and developers). Incorporate site-specific information from the Stream Health Initiative’s riparian and instream assessments. Educational opportunities include:

- Institution of a volunteer program partnering streamside property owners and birders to identify bird species occurring on the property;
- Site visits with streamside property owners to discuss current conditions and ideas for improvements.
- A brochure for new streamside property owners, providing guidance on the “dos” and “don’ts” of living near rivers;
- Increasing realtor involvement (e.g., a “Realtors for Rivers” organization);
- Increasing opportunities for watershed explorations and programs);
- Education materials such as newspaper inserts illustrating the impact of invasive species in riparian and instream areas. (P)

EDUCATION MESSAGES INCLUDE:

- important functions of riparian areas,
- development and other threats to riparian areas,
- what can be done to protect and restore riparian areas, and
- potential sources of funding for riparian projects.

EDUCATIONAL FORUMS INCLUDE

RFC floats; ACES and WW Naturalist Nights and Potbelly Perspectives.

b. Develop the RFC’s River Center, with its exhibits on the importance of riparian and instream areas to the watershed. (P)

c. Provide publicity, tours, and interpretation of riparian and instream restoration projects. (P)

d. Involve the public in restoration projects (e.g. weed pulls, plantings). (P)

E. Objective: Eradicate/control invasive species in riparian and instream areas.

Noxious weeds, zebra and quagga mussels and New Zealand mud snails, and other invasive species threaten the health of riparian and instream areas, and climate change stands to increase the likelihood of invasions. Some invasive species, like New Zealand mud snails, are almost impossible to contain once they have entered an area. Even native species can take on “invasive” aspects and become problematic; for example, the *Didymosphenia geminata* (Didymo) algae forms extensive masses that can cover almost all of the organisms that live on or in the bottom of a stream, preventing the growth of other algae that are an important food for aquatic invertebrates. Some species also have the potential to do substantial economic damage when they appear (e.g., zebra and quagga mussels can fasten themselves to almost any surface - coating and damaging docks, boats and structures).

1. Summary of Action Required: Create an invasive plant species task force for the watershed to coordinate efforts to control weeds, reestablish native species, and provide education about invasive species.

- **Priority: Medium-High**
- **Lead Entity(ies): Local jurisdictions**
- **Responsible Party(ies): BLM, ditch companies, MSCD, NRCS, USFS**

a. Convene an Invasive Plant Species Task Force to:

- Identify the invasive plant species of greatest concern in riparian areas in the Roaring Fork Watershed, including vegetation that has not been designated as “noxious” that are a problem in riparian zones because they prohibit cottonwood and willow seedlings from becoming established on bare soils;
- Identify and prioritize locations to address invasive plant species in the watershed;
- Identify and disseminate information on the least harmful method(s) of eradication/control;
- Develop a plan to eradicate/control invasive plant species in the Roaring Fork Watershed (including an education component and the organization of community events to remove invasive species); and
- Study the potential impact of climate change on invasive plant species. (P&S)

INVASIVE PLANT SPECIES OF GREATEST CONCERN IN RIPARIAN AREAS:

Listed Noxious Weeds

Canada thistle, tamarisk, leafy spurge, oxeye daisy, purple loosestrife, and

Other Problem Weeds

reed canary grass and pasture grasses

b. Work with local jurisdictions’ weed boards (or other appropriate contact(s)), the USFS, BLM, NRCS, MSCD, and private land owners to eradicate/control invasive plant species that are a significant concern, particularly adjacent to riparian areas and along roads. Eradicate tamarisk in the watershed and ensure that any new infestations are removed (e.g., Threemile Creek). Where possible, revive more natural flow regimes (small and large floods) to help control weeds. (P)

2. Summary of Action Required: Prevent the New Zealand mudsnail, Didymo algae, and quagga and zebra mussels from establishing in the watershed.

- **Priority: High**
- **Lead Entity(ies): CDOW, RWAPA**
- **Responsible Party(ies): BOR, USFS, USGS**

a. Research the Didymo algae to determine the cause of its rapid spread, the ecological implications, and possible methods of control. (S)

b. Study the potential impacts of climate change on the New Zealand mudsnail, Didymo algae, and quagga and zebra mussels. (S)

c. Implement invasive species inspection/monitoring programs (P)

d. Improve knowledge of the economic and ecological consequences of invasion by these exotic species and methods of preventing their spread. (P)

EXAMPLE INSPECTION/MONITORING PROGRAMS:

funding/staffing boat cleaning for non-native mussels and participating in the USGS ‘s efforts to create a Didymo algae monitoring program.

Recommended Actions to Achieve Surface Water Management Goals and Objectives

Goal: To protect the availability and sustainability of surface waters.

Healthy rivers are defined by adequate and consistent flows which follow the natural hydrograph. The consequences of inadequate flows are often highly visible, such as unmet calls, a dewatered stream reach, or in extreme cases, dying fish. Flood flows that exceed streambed capacity can also have serious consequences, such as threatening human safety and causing property damage. However, these high flows also have benefits. They maintain healthy streams and riparian areas and recharge the groundwater that contributes to stream base flow and well production.

Snowpack in Colorado provides approximately 75 percent of streamflow, with most of Colorado's snow falling on its western mountain ranges. Snowmelt-driven systems, including the upper basin tributaries of the Colorado River such as the Roaring Fork River and its tributaries, are particularly prone to disruption in the historical pattern of spring runoff. One of the consequences of the increasing temperatures associated with climate change is change to historic runoff timing and amounts.

Changes in historic patterns of snowmelt and runoff will influence local and regional surface water supply and demand. Although most of Colorado's water supply is on the West Slope, most of the state's population and agricultural production occurs on the East Slope, where low precipitation results in semi-arid climate conditions. Many headwater streams on the west side of the Continental Divide, including the Roaring Fork and Frypan rivers, have been partially diverted to the East Slope to support Front Range agriculture and development, impacting the ability of West Slope streams to sustain aquatic wildlife and provide other benefits.

A. Objective: Identify flows needed to meet non-consumptive needs.

Examples of important non-consumptive water uses and values include:

- Maintenance or restoration of high quality habitat for fish and aquatic life,
- Sufficient flows for channel and riparian area maintenance,
- Flushing flows to remove sediment deposition that may smother fish spawning beds,
- Groundwater recharge,
- Adequate flows to maintain high water quality,
- Support of water-based recreation, including rafting, kayaking, and angling, and
- Adequate flows to support hydropower generation.

Understanding and defining the non-consumptive uses of water in the watershed is a complicated endeavor. It requires evaluation of a broad set of hydrologic parameters influencing biological and geomorphological processes, including the magnitude, timing, and duration of flows, the rate of change in flows, and the frequency of flow events. However, environmental flow needs must consistently be met for other non-consumptive uses to be accommodated in the Roaring Fork Watershed.

Assessment of environmental flow needs requires good, hard science – not guesswork. However, scientific analysis is often hampered by spatially and temporally limited stream gage and flow data, a lack of adequate ecological and geomorphological data, and a limited understanding of the specific relationships among biological and geomorphological processes and flows. For example, what are the relationships between sediment, flows, fish and macroinvertebrates? Similarly, flow needs for rafting

and kayaking activities are based on judgments from the recreational community about the level of flows necessary to sustain a quality recreational experience. Adequate flows for angling need to correlate with levels needed to maintain a healthy fishery and, in the case of fly fishing, flow levels suitable for angler access to the stream (sometimes called “wadeability”). Sometimes the needs of one group conflict with those of another (e.g., the high waters sought by rafters and the calmer waters sought by anglers).

Summary of Action Required: Identify environmental flow needs, including an assessment of historical flow alterations and their ecological consequences.

- **Priority: High**
- **Lead Entity(ies): TBD**
- **Responsible Party(ies): CBRT, CDOW, CSU, CTU, CWCB, local jurisdictions, NWCCOG Q/Q, RFC, RWAPA, TNC, USFS**

a. At the state and local level, support the funding of research projects designed to address the non-consumptive needs knowledge gap. (L&S)

b. Work with the CBRT Non-Consumptive Needs Assessment (NCNA) Working Group and the designated NCNA contractor(s) to assess the utility and limitations of the Watershed Flow Evaluation Tool. (S)

c. Evaluate the suitability of other tools/methods developed to quantify and obtain environmental flows and implement the most suitable approach. (S)

d. Ensure that the Colorado River Basin Water Availability Study adequately assesses and addresses the Roaring Fork Watershed's non-consumptive needs, including projected needs with climate alteration. (S)

e. Create and maintain an adequate network of stream gages in the watershed. (P)

f. Assess flow alteration in stream reaches where stream gage or modeled data are lacking. (S)

g. Conduct site-specific studies of environmental and recreational flows needed for stream reaches that are currently significantly flow altered or threatened by significant flow alteration. Include an analysis of how often these flows are not met. (S)

h. Assess the direct and indirect economic consequences associated with non-optimal flows. (S)

EXAMPLES OF TOOLS/METHODS TO QUANTIFY ENVIRONMENTAL FLOWS:

- Clipperton *et al.* 2003. Instream Flow needs determinations for the South Saskatchewan River Basin, Alberta, Canada.
- Richter *et al.* 2003. Ecologically Sustainable Water Management (ESWM) methodology.
- Poff *et al.* 2010. The Ecological Limits of Hydrologic Alteration (ELOHA): a new framework for developing regional environmental flow standards.

IMMEDIATE STREAM GAGE NEEDS:
 Highest priorities for stream gages in the watershed are: (1) Hunter creek (ensure gage retained and possibly move downstream), (2) Maroon creek, (3) Snowmass creek, and (4) the Lower Crystal River (year-round gaging). Second order and higher streams in the watershed with significant diversions and no active stream gage or no gage located below the major diversion structures include: Brush, Fourmile, Threemile, Cattle, Hunter, Woody, Sopris, Snowmass, Capitol, Maroon, Owl, Landis, and Thompson creeks. Gages at Cattle, Fourmile, Maroon, Thompson, and Castle creeks are no longer operating.

FLOW-ALTERED STREAM REACHES:
 Roaring Fork, Fryingpan and Crystal rivers; Hunter, Lincoln, Maroon, Castle, West Willow, Woody, Snowmass, Capitol, Collins, Sopris, Nettle, Thompson, Cattle, Fourmile, and Threemile creeks.

i. Ensure that local land use policies and regulations adequately assess all of the costs and benefits associated with hydropower development and mitigate the impact of hydropower development on other non-consumptive water uses. (L)

j. Ensure that hydropower development is considered and addressed in Master Plans. (L)

RECREATIONAL IN-CHANNEL DIVERSIONS SITES UNDER CONSIDERATION:
Roaring Fork River in Basalt and Carbondale

k. Assess the local and regional benefits of water rights associated with Recreational In-Channel Diversions (RICDs) in the watershed. Work to obtain RICDs, as appropriate. (S&P)

B. Objective: Ensure that Colorado Water Conservation Board instream flow rights are adequate to protect the environment to a reasonable degree and are consistently being met.

The Colorado Water Conservation Board (CWCB) Instream Flow Program is designed to address environmental non-consumptive needs. Generally, these needs are based on biological recommendations provided to the CWCB by various state and federal agencies and follow the premise that the amount of water necessary to preserve an aquatic indicator species (e.g., a trout species) is also adequate to preserve the entire natural environment. The program has several limitations: (i) instream flow rights are not always met because all new appropriations are dated post-1973 and administered within the state's prior appropriation system, (ii) the ability of the Colorado Division of Water Resources to place calls to meet instream flows is hampered where stream gages are not present to provide an accurate real-time measurement of flow conditions, and (iii) instream flow amounts do not address the entire annual hydrograph (including peak flows) and all components of the stream environment, such as riparian flora and fauna. Completion of the Recommended Actions under Objective A will help determine the flows needed to meet non-consumptive needs and where additional CWCB instream flow rights are needed, and where existing rights are inadequate.

Summary of Action Required: Identify the cause(s) of flow alterations and potential solutions.

- **Priority:** High
- **Lead Entity(ies):** TBD
- **Responsible Party(ies):** CDOW, CSU, CTU, CWCB, local jurisdictions, RFC, RWAPA, TNC

a. Based on assessments of flow alteration and ecological consequences, quantify instream flow needs in streams with and without instream flow rights. Pursue instream flow rights for streams with inadequate or no instream flow rights. (S&P)

b. Investigate why CWCB instream flows are not being met (e.g., junior water rights, inadequate flow monitoring) and institute appropriate projects to remedy the problems identified (e.g., acquire water rights, enhance stream gaging). (S&P)

TOOLS AVAILABLE TO IMPROVE INSTREAM FLOWS INCLUDE:

- 3-in-10 year lease program,
- Longer-term lease or loan arrangements, and
- Tax credits for donating water.

c. Increase the utilization of tools and funding available to improve instream flows. (P)

d. Identify stream reaches where irrigation return flows and groundwater recharge provide late summer and fall flows and use local land use planning to maintain these important sources of supplemental stream flows whenever possible. (S&L)

OPPORTUNITIES TO IMPROVE WATER STORAGE INCLUDE:

- Introduction of beavers,
- Constructed wetlands,
- Healthy forest coverage, and
- Private ponds.

e. Identify and pursue opportunities for improving natural and artificial water storage to improve low stream flows. (S&P)

f. Investigate how water that is saved through conservation can be put to beneficial use for enhancement of the environment under Colorado water law. Pursue opportunities for beneficial environmental use of “saved water.” (S&L)

g. Quantify the role of snow making in flow alteration and, where warranted, pursue opportunities for decreasing the environmental impact of snowmaking. (S&P)

C. Objective: Identify stream reaches that are vulnerable to increased flow alteration and pursue opportunities to prevent additional impacts on flows.

As discussed in the *State of the Roaring Fork Watershed Report 2008*, changes in water policy and management, the creation of new water rights, more calls on rivers and streams to meet the demands of existing water rights, new or enlarged structural storage and diversion projects, additional out-of-basin water demands, and climate change all have the potential to affect the quantity of water in the Roaring Fork Watershed’s rivers and streams. Additionally, local land use changes will continue to affect water quantity. Throughout the watershed, the flow regime is being altered by urbanization, road development, and developed recreation activities. The replacement of soil and vegetation with impervious (i.e. paved) surfaces changes stream dynamics and the hydrologic cycle.

1. Summary of Action Required: Factor in water quantity needs when making land use decisions.

- **Priority:** High
- **Lead Entity(ies):** Local jurisdictions
- **Responsible Party(ies):** CDWR

HB 08-1141 requires that an **adequate supply of water** must be demonstrated before a local government can issue a development permit for projects that include new water use in an amount greater than that used by 50 single-family equivalents, or fewer, as determined by the local government.

a. Ensure that local land use planning requires an adequate technical assessment and legal review of the availability, sustainability and (as applicable) potability of an adequate water supply for a proposed use prior to the grant of a development approval. (L)

b. Quantify the direct and cumulative effects of changes in land use (e.g., increases in impervious surfaces, changes from agricultural to developed land uses) on surface flows (both increases and decreases to flows). Incorporate the results in the review of local land use applications. (S&L)

c. Enhance communication and collaboration between local land use planners and Water Commissioners (e.g., reduce the number of illegal ponds/diversions by having land use planners notify and obtain the input of CDWR Water Commissioners when ponds are being permitted/approved). (L)

CONDITIONAL WATER RIGHTS

Streams with significant direct flow or storage flow conditional water rights in the watershed (not associated with transmountain diversions) include: the Roaring Fork, Fryingpan and Crystal rivers; and Maroon, Sopris, Snowmass, Brush, Threemile, and Thompson creeks.

d. Ensure that local land use planning considers the effect on surface flows when reviewing development requiring an augmentation plan, particularly where augmentation will occur further downstream. (L).

2. Summary of Action Required: Investigate the potential impacts of the perfection of conditional water rights on stream flows.

- **Priority: High**
- **Lead Entity(ies): RWAPA**
- **Responsible Party(ies): Local jurisdictions**

Investigate existing conditional water rights and determine if the exercise of these water rights would pose a threat to stream flows. Assess and pursue opportunities for securing or modifying the exercise of such rights within the confines of Colorado water law. (S&P)

3. Summary of Action Required: Investigate the potential impacts of climate change.

- **Priority: High**
- **Lead Entity(ies): AGCI**
- **Responsible Party(ies): CSU, local jurisdictions**

Complete a comprehensive climate impacts assessment on stream flows for the Roaring Fork Watershed. (S)

D. Objective: Improve our community's understanding of the importance of maintaining adequate stream flows for the environment.

The *State of the Roaring Fork Watershed Report 2008* summarizes the primary issues related to depletions in water quantity, including the prospect of insufficient water for consumptive uses (including high quality drinking water), and alteration to the timing, frequency, duration, magnitude, and rate of change of flows, which can harm stream ecosystems, affect water-based recreation activities, and/or decrease the supply of water for hydropower generation. The major factors that lead to reduced water availability and flow alteration in the watershed are: (i) transmountain and in-basin diversions, (ii) downstream water calls, (iii) reservoir operations, and (iv) changes in land use. Improved public education and outreach on these matters will allow our community to be better prepared to prevent or mitigate their impacts on stream flows.

Summary of Action Required: Implement outreach and education programs that address the importance of streams flows, the causes of flow alterations, and what can be done to improve stream flows.

- **Priority: Medium-High**
- **Lead Entity(ies): RFC**
- **Responsible Party(ies): ACES, CFWE, CRWCD, CTU, RWAPA**

a. Support and distribute films, videos, powerpoints, etc. illustrating local water conditions and issues. (P)

b. Develop projects such as RFC's River Center, with exhibits to enhance public awareness of the importance of maintaining adequate streams flows in the watershed and the consequences of drought. (P)

c. Support projects such as the Univ. of Michigan Master's Project. Utilize the Univ. of Michigan Master's Project's recommendations for improving public education and outreach, as appropriate. (P)

d. Improve education/outreach on the connection between water availability and sustainability and land use planning and design strategies. (P)

e. Improve education/outreach and opportunities for involvement in mitigating the effects of drought. (P)

f. Improve education/outreach on the connection between high flows and healthy riparian and instream areas. (P)

g. Increase awareness of water conservation techniques and the importance of conservation. (P)

h. Implement the most strategic water conservation measures. (S&P)

i. Improve education on the basis for obtaining and perfecting conditional water rights under Colorado water law. (P)

E. Objective: Reduce the negative impacts of drought and floods.

Water conservation and drought are topics of continuing interest, given the arid climate and landscapes of the Roaring Fork Watershed and the Upper Colorado River Basin. In 2004, the CWCB's Office of Water Conservation and Drought Planning produced a statewide *Drought and Water Supply Assessment* based on results of an opinion survey administered to water managers and planners. Major needs identified for future water supply planning and potential drought mitigation projects included:

- Funding to support water development and infrastructure projects (including capital, repair and maintenance).
- Development of new water supplies.
- Improvement of the ability to predict the weather (as it relates to predicting drought).
- Development of new infrastructure (including surface water and groundwater storage, transmission and distribution systems, large-scale multi-basin projects, and water reuse projects).
- Repair and rehabilitation of existing infrastructure (including lining ditches and canals, dredging and repairing existing reservoirs and dams, repairing existing diversion structures, and upgrading water transmission and distribution systems).
- Improvement of water conservation measures and programs, as well as measurement techniques.

SAMPLE WATER CONSERVATION MEASURES:

- Lawn and garden watering restrictions,
- Fines and tiered rates for high water use,
- Metering of water usage,
- Distribution/transmission system leak detection,
- Water conservation cooperative agreements/operating agreements,
- Alternative irrigation practices,
- Xeric landscaping,
- Lining of ditches and canals,
- Conjunctive use of surface and groundwater, and
- Use of recycled water.

- Additional public education and involvement programs.
- Provision of technical assistance in water supply, water conservation and drought planning.

High flows are desirable to support numerous ecosystem services within river systems. A functioning flood plain attenuates flood flows and contributes to base flows. However, development in flood plains and controlled flows related to operation of dams and diversions, in combination with large storm events, can lead to flooding issues. Climate-driven changes to the hydrological system will likely increase the frequency, magnitude, and financial costs of extreme weather events. Snowmelt-driven basins like the Roaring Fork Watershed are at especially high risk. High flows associated with spring melt of the snowpack, particularly if it is above average, is tied to spring temperature fluctuations. A rapid spring warm-up and sustained high temperatures pose a serious risk of flooding. Another important consideration is rain on snow events that can cause flooding by rapidly melting the snowpack.

1. Summary of Action Required: Plan for drought to reduce its impacts.

- **Priority:** Medium-High
- **Lead Entity(ies):** Local jurisdictions
- **Responsible Party(ies):** CWCB

a. Utilize the CWCB’s 2010 Drought Mitigation and Response Plan and Drought Planning Toolbox. (P)

While **small storage ponds** may be useful for **drought mitigation** they could provide a breeding opportunity for whirling disease and a home for mosquitoes that carry West Nile Virus.

b. Work with the CWCB’s Office of Water Conservation and Drought Planning to obtain technical assistance and grants to help develop local drought mitigation plans. (P)

c. Create “shovel-ready” drought-mitigation projects that can be quickly implemented. (P)

d. Investigate the potential benefits and disadvantages of acquiring small storage water rights that can be delivered for municipal uses in times of need and used to mitigate low stream flows. Pursue a streamlined approval process for landowners, if warranted. (S&L)

AREAS PRONE TO FLOODING INCLUDE:

- Pan-Fork Mobile Home Park,
- Roaring Fork Mobile Home Park
- Redstone,
- Lazy Glen, and
- Lower Roaring Fork

2. Summary of Action Required: Develop plans that address the public health and safety issues associated with high flows while recognizing and retaining their environmental benefits.

- **Priority:** Medium-High
- **Lead Entity(ies):** Local jurisdictions
- **Responsible Party(ies):**

FEMA defines a **floodplain** as “any land area susceptible to being inundated by water from any source.”

a. Develop and implement plans to mitigate the potential for harmful flooding in developed floodplains. (S&P)

b. Where feasible, restore the natural function of floodplains. (S&P)

b. Ensure that the Federal Emergency Management Act (FEMA) floodplain maps for the watershed used by local jurisdictions are up to date and available digitally for public access. (P)

- c. Develop and enforce local regulations that minimize development in the flood plain. (L)
- d. Create “shovel-ready” flood mitigation projects that can be quickly implemented. (P)
- e. Maintain decision makers’ and the public’s interest in flooding issues after flood events have passed. (P)

DRAFT

Objective	Summary of Action Required	Recommended Action	BLM	CDOT	CDOW	CDRM&S	CNHP	CSU	CTU	Counties	MSCD	Municipalities	NRCS	Private Landowner	RFAAS	RFC	RWAPA	SHI	TNC	USFS	Other
		<p>c. Study the potential effects of climate change on C&CT populations.</p> <p>4. Assess the condition of wild, naturally-reproducing fish communities; improve existing communities.</p> <p>a. Determine the optimum population size for native suckers (e.g., bluehead, flanne-mouth) and implement a management plan to achieve the target populations.</p> <p>b. Determine the effect of stream temperature on wild, naturally-reproducing fish species distribution and initiate actions to ensure that maximum temperatures are not exceeded. Study the potential effects of climate change on wild, naturally-reproducing fish communities.</p> <p>c. Improve fish passage.</p> <p>d. Improve education regarding methods to reduce whirling disease transmission.</p> <p>e. Address the problem of illegal introduction of fish in the watershed (which increases disease, such as whirling disease, and poses hybridization issues) through public education and regulatory initiatives.</p>	X		X		X													X	
		<p>5. Assess key amphibian populations (boreal toads, chorus frogs, tiger salamanders, and Northern leopard frogs); restore or increase key amphibian populations.</p> <p>a. Monitor key amphibian populations to determine their status.</p> <p>b. Restore important amphibian habitats and pursue opportunities for the reintroduction of species.</p> <p>c. Study the potential impact of climate change on amphibian populations.</p> <p>d. Survey potential boreal load habitats to determine if additional populations exist in the watershed.</p> <p>e. Increase public awareness of the dangers to toad populations associated with Chytridiomycosis fungus transmission.</p>			X															X	
		<p>C. Minimize the impact of development and other activities in riparian and instream areas.</p> <p>1. Address the impacts of development and other activities on riparian and instream areas.</p> <p>a. Determine the impacts of riparian alteration/disturbance on the native wildlife community, including breeding bird and small mammal reproductive success, community assemblage and diversity, and migration patterns of birds and mammals. Include an assessment of the effects of acute and chronic sediment pulses on aquatic ecosystems, differentiating between natural and human-influenced sources of sediment.</p> <p>b. Mitigate the riparian and instream impacts from roads, including reducing sediment input from runoff and minimizing the use of magnesium chloride on roads located in or adjacent to riparian areas.</p> <p>c. Develop and enforce consistent stream setbacks to protect riparian areas throughout the watershed.</p> <p>d. Inventory developed and dispersed recreation sites, trails and access points and assess their impacts on riparian and instream areas; work to reduce impacts through relocation, removal, or mitigation. Minimize the impact of new recreational sites, access points and trails on riparian and instream areas.</p>	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	



John Ely
Healthy Rivers and Streams Fund
Pitkin County Attorney's Office; Courthouse Plaza
530 E. Main St. 3rd Floor
Aspen, CO 81611

October 18, 2010

VIA E-MAIL

Dear John,

Being involved with a natural resource management and development, you know the value of good hydrological data. We do too. That's why over the years we have invested a great deal of resources cooperating with the United States Geological Survey (USGS) helping to build and maintain a high quality stream gage network in Western Colorado. In fact, we are the largest financial cooperator with the USGS in the entire State of Colorado. In 2010, the total investment was close to \$760,000; in 2011 it will cost even more to maintain this monitoring network.

As with all of our programs and expenditures, we review our hydrological data collection efforts every year. Doing so helps us determine the relative priorities of these data collection points by considering the uses, costs and benefits of the data to determine if continued funding is warranted. As a result, we have identified some gages and data collection points in your area that require additional funding support to avoid elimination from our program.

Specifically, we'd like to avoid the elimination to the following streamflow gages:

Roaring Fork River Near Aspen (period of record: 1964- present)

Hunter Creek Near Aspen (period of record: 1950-56; 1969 – present)

We recognize the importance of these gages and have provided funding for years to help defray a large portion of the total annual costs (now approximately \$16,200 per year) for operation and maintenance. To help us further defray these costs and to ensure that these gages continue operating, *we would like you to consider partnering with us by contributing up to 50% of the annual costs.* We believe it would be a very worthwhile investment for Pitkin County's Healthy River Fund.

Thank you for your prompt attention to this matter. If you need any additional information please contact me via e-mail (dkanzer@crwcd.org) or phone at our office.

Sincerely,
/s/

Dave Kanzer, P.E.
Senior Water Resources Engineer

201 Centennial Street / PO Box 1120 * Glenwood Springs, CO 81602
(970) 945-8522 *(970) 945-8799 Fax
www.ColoradoRiverDistrict.org

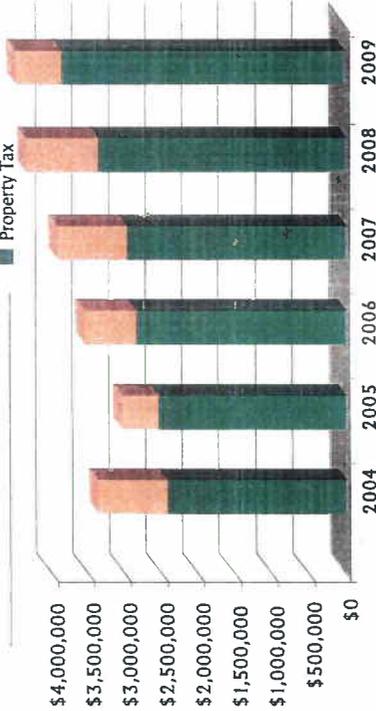
General Fund Report

The Colorado River District conducts business through two budgets: one for General Operations and one for the Enterprise Fund. The General Budget is funded primarily by a property tax collected in the District's 15 counties.

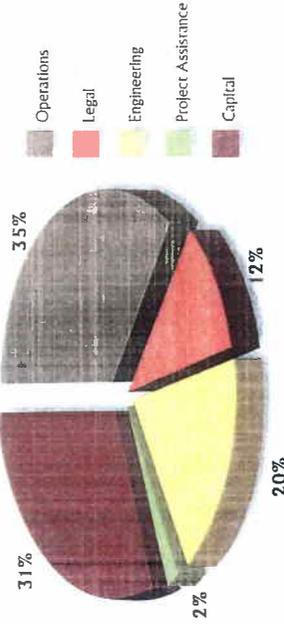
The tax is currently 0.165 mills. It goes down as the District's total assessed value base grows, a function of the revenue-limiting Taxpayers Bill of Rights (TABOR) amendment to the state constitution.

General Fund Revenue

Other Revenue
Property Tax



2009 General Fund Expenditures

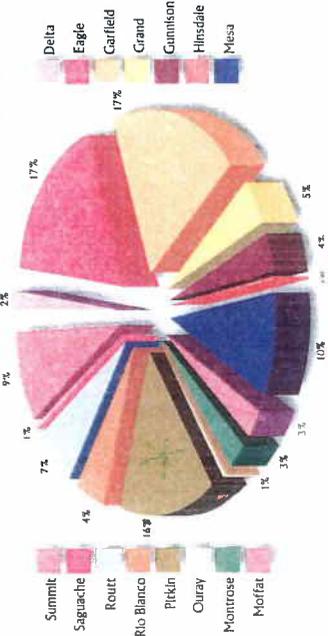


Expenditures	2005	2006	2007	2008	2009
Operations	39%	45%	40%	43%	35%
Legal	22%	14%	17%	20%	12%
Engineering	29%	30%	34%	27%	20%
Project Assistance	5%	7%	5%	5%	2%
Capital	5%	4%	4%	5%	31%
Total Expenditures	100%	100%	100%	100%	100%

2009 Gross Taxes Remitted by County

County	2009	1999	Ten Year Change
Delta	\$55,516	\$40,175	2%
Eagle	\$628,790	\$409,943	21%
Carfield	\$649,424	\$152,792	8%
Grand	\$169,074	\$88,468	5%
Gunnison	\$154,379	\$83,308	4%
Hinsdale	\$9,024	\$7,324	1%
Mesa	\$368,071	\$207,158	11%
Montrose	\$86,068	\$99,333	5%
Ouray	\$101,125	\$75,155	3%
Pitkin	\$38,691	\$25,212	1%
Rio Blanco	\$647,426	\$338,687	17%
Roan	\$163,111	\$84,182	4%
Saguache	\$224,953	\$129,104	7%
Summit	\$312,095	\$199,641	1%
TOTAL	\$3,510,312	\$1,945,698	100%

Note: Percentages are rounded and do not add up to exactly 100.

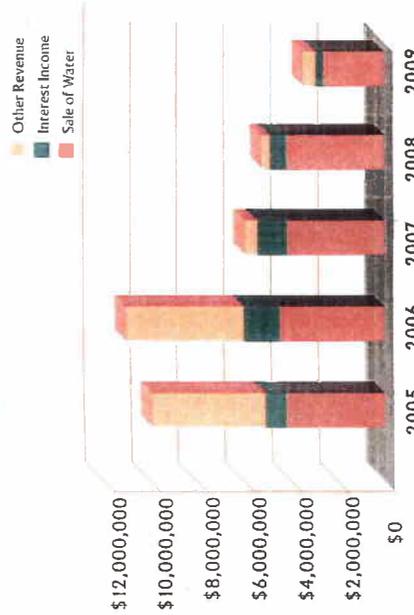


Wolford Mountain Reservoir outflow.

Enterprise Fund Report

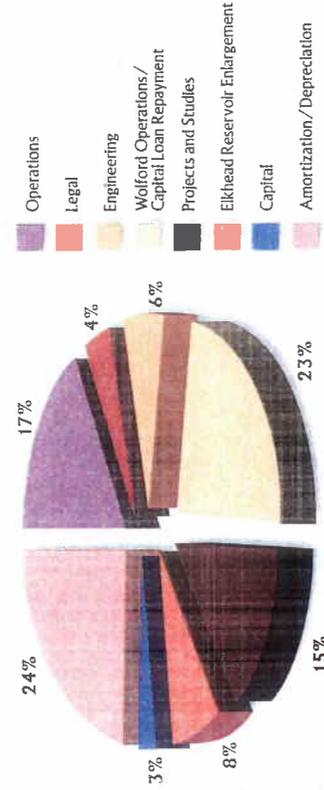
The District's Enterprise Fund is employed to build and operate reservoirs and to conduct water leasing and marketing programs. Enterprise Fund Income is derived from water leasing and marketing activities.

2009 Enterprise Revenue

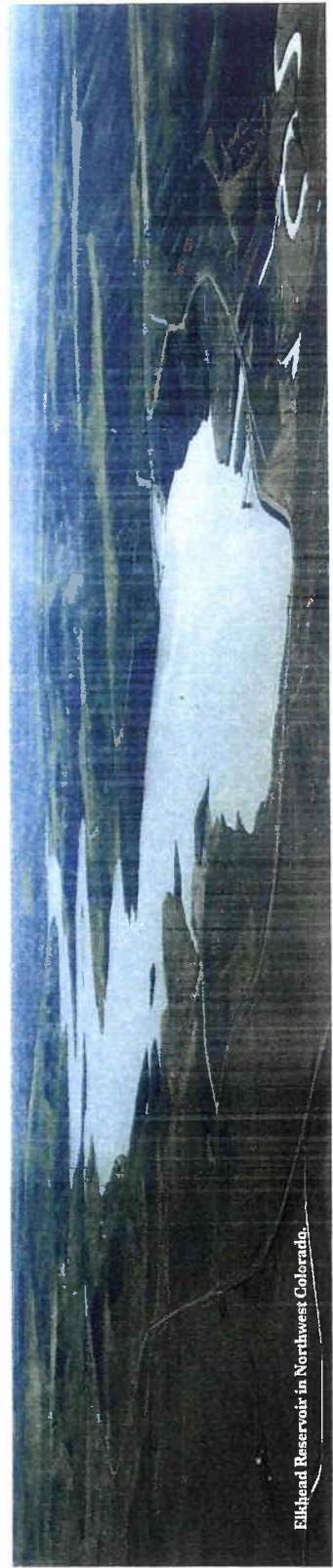


Revenue	2005	2006	2007	2008	2009
Sale of Water	\$3,737,643	\$3,782,440	\$3,825,631	\$3,719,347	\$2,298,026
Interest Income	\$657,307	\$1,404,929	\$1,405,166	\$704,606	\$264,919
Other Income	\$5,551,049	\$7,294,864	\$642,484	\$436,270	\$662,370
Total Revenues	\$9,945,999	\$12,482,233	\$5,873,281	\$4,860,223	\$3,225,315

2009 Enterprise Expenditures



Expenditures	2005	2005	2006	2007	2008	2009
Operations	13%	5%	4%	12%	11%	17%
Legal	7%	1%	1%	3%	3%	4%
Engineering	17%	3%	2%	7%	4%	6%
Wolford Operations/Capital/Loan Repayment	33%	5%	6%	25%	33%	23%
Projects and Studies	18%	1%	1%	7%	18%	15%
Elkhead Reservoir Enlargement	11%	81%	82%	25%	18%	8%
Capital	1%	0%	1%	7%	1%	3%
Amortization/Depreciation	13%	4%	3%	14%	12%	24%
Total Expenditures	100%	100%	100%	100%	100%	100%



Elkhead Reservoir in Northwest Colorado.