



# 2017 Bitterroot Strategy

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Clark Fork Coalition



## Strategy for the Bitterroot Watershed – 2017

**PURPOSE:** The purpose of this document is to explain and update the restoration strategy of the Clark Fork Coalition in the Bitterroot watershed. This document builds on an earlier version completed by CFC staff in 2012, and better defines the current activities and near-term priorities of the Coalition in the Bitterroot.

### BACKGROUND:

**Geography.** The Bitterroot River forms the southern-most tributary to the Clark Fork River, draining 2,889 square-miles in Ravalli and Missoula counties (Figures 1). The Bitterroot is the largest tributary in the middle Clark Fork Basin (larger in volume than the Blackfoot and upper Clark Fork Rivers) and its water resources are highly valued by agricultural and recreational users. This region of the state has attracted significant population growth in recent decades-- the population of Ravalli County doubled from 1980 to 2010. This trend towards suburbanization and overall population growth has increased municipal and ground water use and wastewater discharge in the Basin, putting new pressures on valley water resources.

From the confluence of the East Fork and West Fork south of Darby, the Bitterroot flows 84 river miles north to its confluence with the Clark Fork in Missoula. The river flows through a 95 mile long basin and range valley that averages 7-10 miles in width. The valley bottom is comprised of broad floodplains, shallow benches and rolling foothills. The Bitterroot is unique for western MT streams due to its low gradient; losing an average of only 12 feet of elevation per mile along the length of the river. The Bitterroot River also absorbs numerous tributaries along its course that provide important sources of water and contain hundreds of miles of aquatic habitat for trout.

The Bitterroot Mountains, including the Bitterroot and Lolo National Forests and the Selway-Bitterroot Wilderness Area, form the western boundary of the watershed. The Sapphire Mountains stretch to the east, including the Welcome Creek and Anaconda-Pintler Wilderness Areas. The Bitterroot Mountains are composed of granitic rocks associated with the Idaho Batholith and include peaks over 9,000 feet in elevation. The Bitterroots are dissected by numerous drainages that run parallel from west to east and form steep and narrow canyons. In comparison, the Sapphire Mountains are composed of metasedimentary rocks associated with the Belt Supergroup and contain peaks over 8,000 ft. in elevation. The Sapphires are less rugged and only moderately dissected, forming fewer perennial tributary streams to the river than the Bitterroots. Elevations in the Bitterroot Basin range from 10,157' at Trapper Peak to 3,092' at the confluence of the Bitterroot and Clark Fork Rivers near Missoula.

**Hydrology.** The Bitterroot River and its tributaries are snowmelt dominated systems that exhibit large interannual variations in streamflow (Figure 2). Snowpack accumulated during the winter is released in the spring and early summer during snowmelt runoff. Streamflows in the Bitterroot Basin typically begin rising in early April and peak in early June before receding to baseflow levels by the middle of July. Water supplies on the Bitterroot River and its tributaries are often most limited during the month of August, and Montana FWP has classified approximately 80 miles of streams in the Basin as chronically dewatered, including 17 miles of the mainstem (Figure 4). Streamflows on the mainstem of the Bitterroot River are greatly influenced by contributions from tributaries. Due largely to tributary inputs, average flows at the mouth of the Bitterroot

near Missoula are 2.5 times greater than flows at the confluence of the East and West Forks near Darby.

Flows on the river are also influenced by extensive irrigation withdrawals and upstream reservoir storage at Painted Rocks Reservoir. Ravalli County contains over 100,000 acres of irrigated farmland, much of which is flood irrigated. Due in large part to the prevalence of flood irrigation, return flows are an important part of the hydrology of the Bitterroot Basin. Groundwater levels on both sides of the Valley gradually rise during and just after the irrigation season before being discharged as surface water during the late summer and fall, comprising a significant portion of total flow during that period.

**Water Use.** The Bitterroot is a highly over-allocated system and flows on the mainstem of the River at the confluence with the Clark Fork near Missoula (a drainage area of nearly 3,000 square miles) have dropped as low as 400 cfs during periods of extreme summer drought. Although flows at the confluence may be depressed, the most severely dewatered section of the Bitterroot is the 12 miles of stream located between Woodside Crossing near Corvallis and Bell Crossing near Stevensville (Figure 3). Groundwater return flows downstream of Stevensville augment flows on the mainstem of the Bitterroot from Stevensville to Missoula.

Many of the Bitterroot River's tributaries also face chronic dewatering issues and lower portions of these streams become completely dry during the irrigation season (Figure 3). Bitterroot River tributaries are used to irrigate bench lands on both sides of the Bitterroot Valley with extensive irrigation infrastructures used to convey the water. Historically, many of the Bitterroot tributaries were completely utilized during the irrigation season with diversion structures that spanned the width of the streams and appropriated all of the available flow. Furthermore, suburban development in the lower elevations of several of the watersheds has increased groundwater demands and impacted surface flows. Lolo Creek, one of the Bitterroot's most important tributaries, faces pressure from both irrigation and rural water use. It was completely dewatered during four out of the past five summers in its lower 2 miles.

**Painted Rocks Reservoir.** A unique agreement between agricultural water users, government agencies and conservationists on Painted Rocks Reservoir (West Fork of the Bitterroot) allows MT FWP to reserve 15,000 acre-feet of water per year as instream flows for fisheries. Painted Rocks reservoir is owned by MT DNRC and operated by a local water users association. Agricultural rights total 10,000 acre-feet per year and MT DNRC lists both irrigation and fisheries as primary water uses for the reservoir. Costs for repair and maintenance are split between DNRC and the local water users association. As a portion of the operating agreement, MT FWP pays the salary of a water commissioner who manages the Painted Rocks Reservoir and assures water deliveries reach their targets. The DNRC releases flows for fisheries during late summer based on streamflow trigger points established downstream on the mainstem of the Bitterroot. The cooperative agreement has buffered water supplies and improved the fishery's economic resource value on one of Montana's most heavily fished streams. Over the last 15 year period of prolonged drought, portions of the Bitterroot have remained open to fishing despite FWP initiated closures on other regional rivers.

**CFC's Role.** As described above, the Bitterroot Basin is over-allocated, resulting in severe dewatering in parts of the mainstem and several tributaries. Part of the mainstem issues have been resolved by management of storage water rights from Painted Rocks

Reservoir; which has improved late season flows. The CFC believes key opportunities for improvements in flow regime and connectivity exist in the tributaries, which have been the focus of the organization's aquatic and streamflow restoration projects.

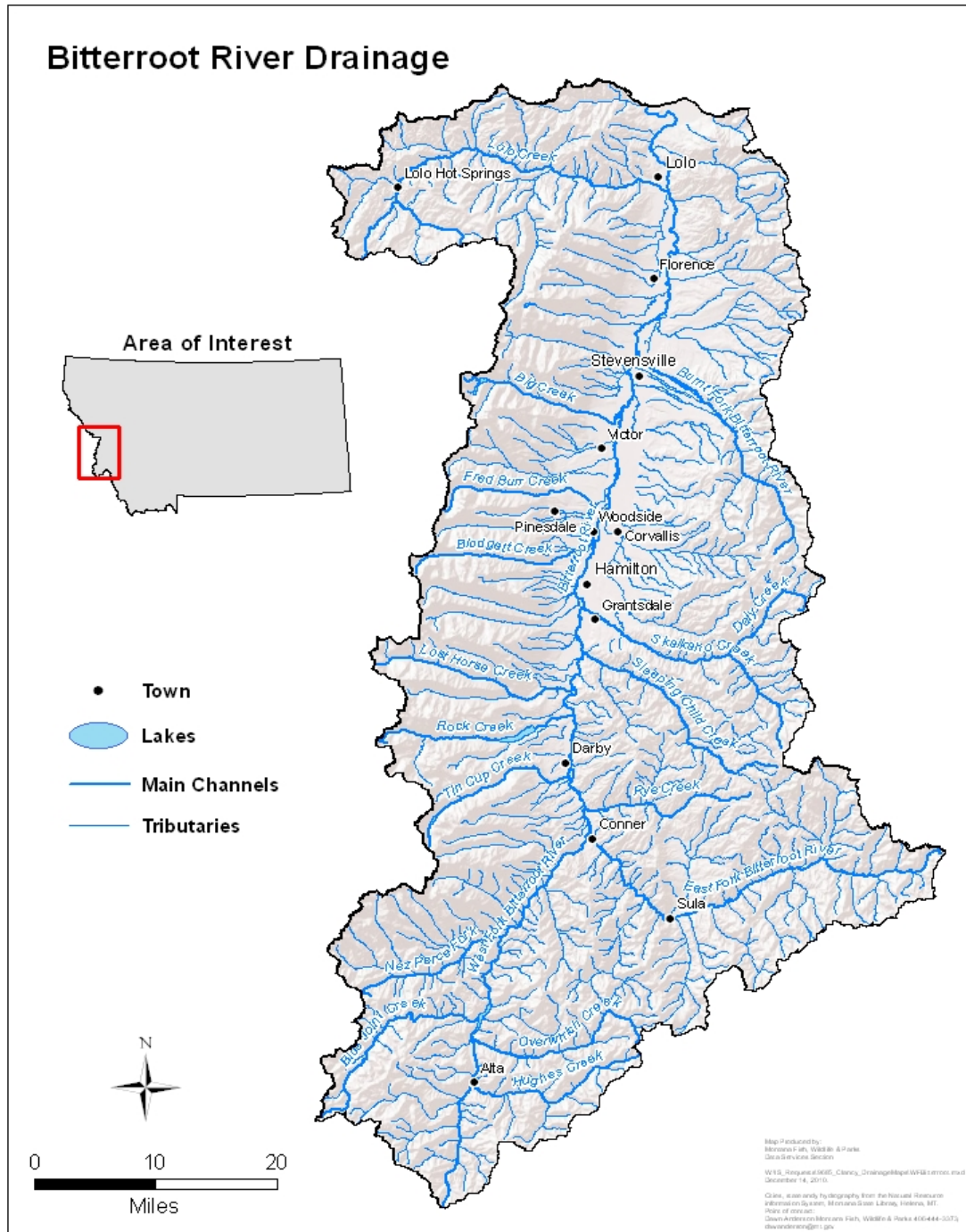


Figure 1: Map of the Bitterroot River Basin and its major tributaries.



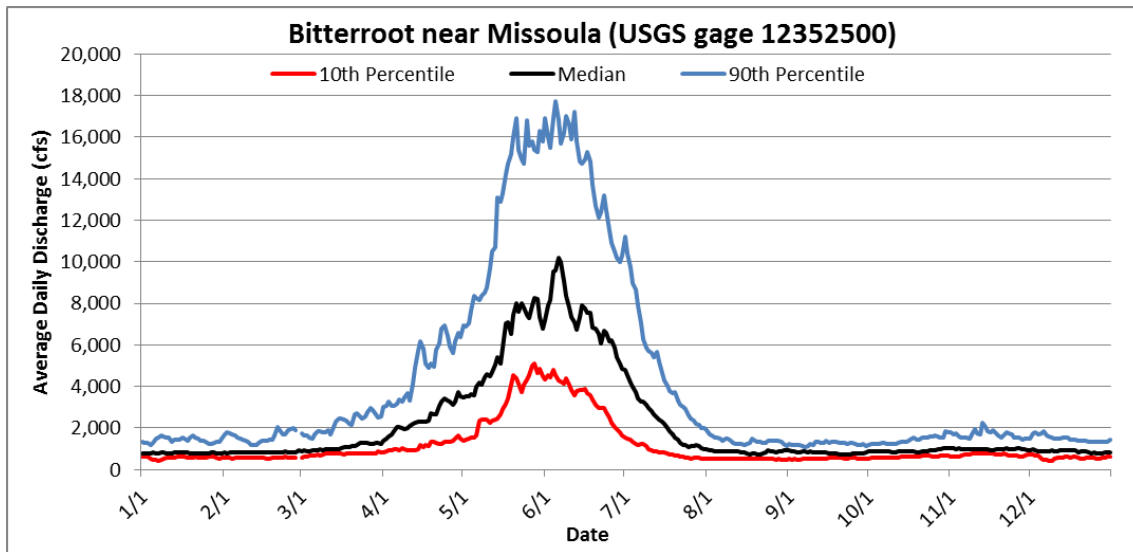


Figure 2: Average annual hydrographs for the Bitterroot River near Missoula.

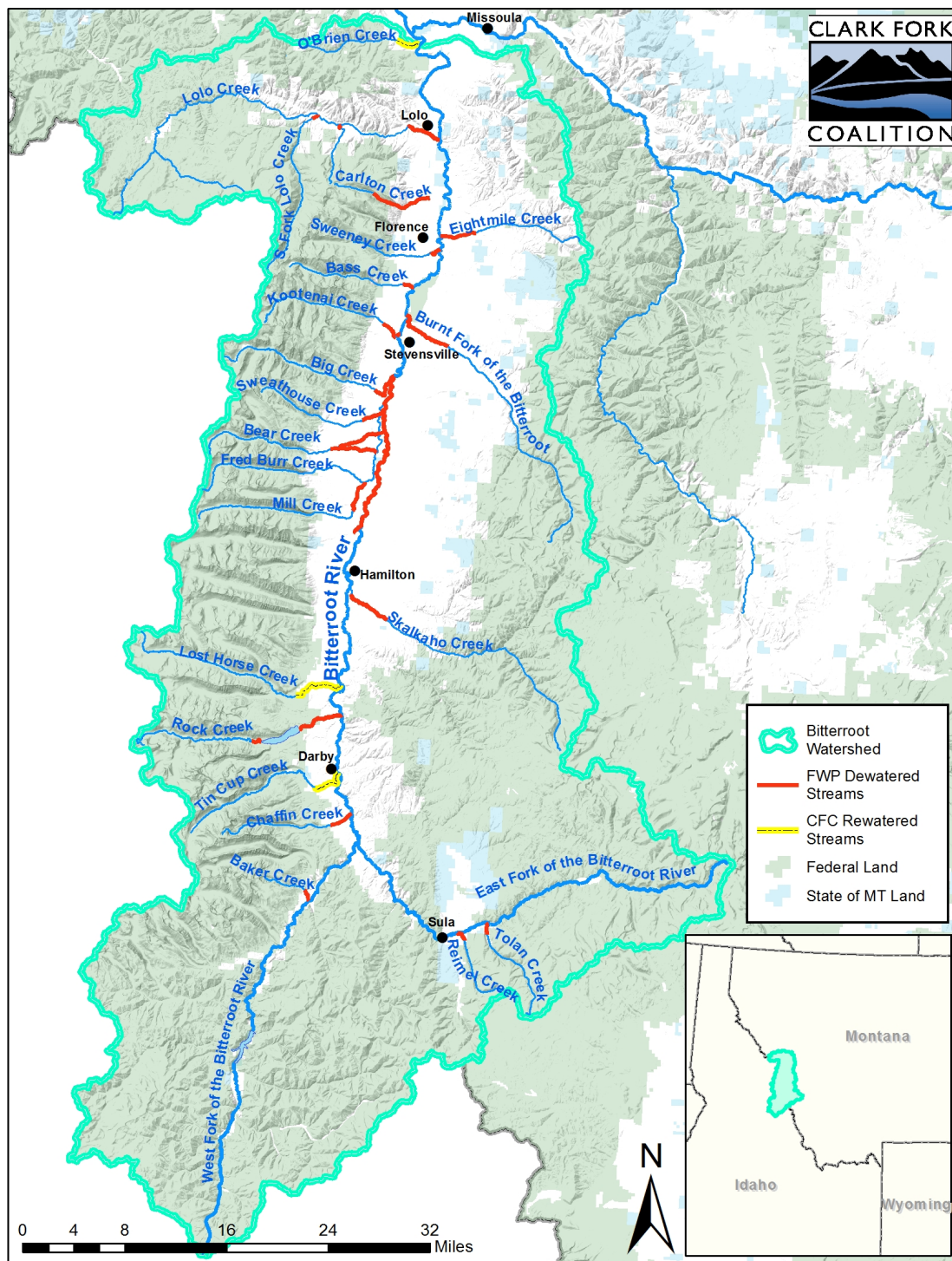


Figure 3: Map of Montana FWP chronically dewatered streams in west central Montana.

**Fishery.** The Bitterroot River supports a vibrant trout fishery, with rainbow, brown and westslope cutthroat sustaining a substantial sports fishing economy. In fact, the Bitterroot boasts one of the healthiest populations of native westslope cutthroat in Western Montana (Figure 5 & 6). Other important native fish include mountain whitefish, largescale and longnose suckers, and northern pikeminnow, with remnant populations of bull trout in the headwater reaches of several major tributaries. Other non-native fish exist including northern pike and largemouth bass.

The upper Bitterroot contains approximately 1,000 trout per mile, compared to around 500 trout per mile in the Blackfoot and 300 per mile in the upper Clark Fork. The Bitterroot supports one of the largest commercial sport fisheries in the state, with many commercial fishing guides and outfitters based in the Bitterroot valley. The Bitterroot is the third most fished river in Montana behind the Madison and Big Horn. In 2013 the Bitterroot supported approximately 90,000 angler days (50,000 MT residents and 40,000 non-residents). Economic impacts from recreational angling in the Bitterroot are substantial, contributing approximately \$28 million to the local economy in 2013 (Figure 4).

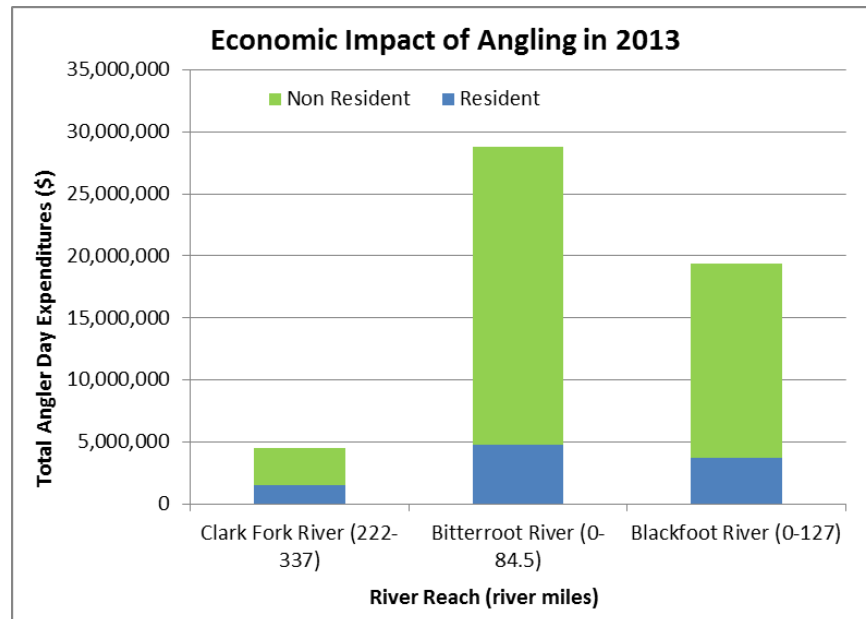


Figure 4: Economic impact of angling on select streams in Western Montana (values derived from a MT FWP study).

**Water quality issues.** Although the watershed supports abundant population of native fish and wildlife, degraded water quality has detrimentally impacted native trout species in the Basin. The top three water quality issues in the Bitterroot that limit native fish productivity are (1) dewatering, (2) high water temperature, and (3) sediment. These problems stem mainly from residential development and agricultural practices. The Bitterroot Valley is home to over 50,000 people scattered between several towns (i.e. Lolo, Florence, Stevensville, Hamilton & Darby) and areas of suburban development.

The impacts from this suburban sprawl and urban development include: pollution from septic systems and fertilizers, sediment from roads; habitat fragmentation; proliferation of weeds and invasive species; and loss of floodplain connections and river function due to channel modification and bank stabilization. The watershed is also one of the most heavily irrigated in Montana, including 300 miles of ditches and canals

supporting 100,000 acres of agricultural operations. Agricultural impacts on the watershed include dewatering, fish passage and entrainment, nutrient pollution, channel modifications, and degraded riparian areas.

**Local watershed groups.** The Bitter Root Water Forum (BRWF) was founded in 1993 as an educational and discussion forum for water users of all types. The organization has a small permanent staff and active board members. They are involved in a variety of activities, including restoration of priority stream corridors on private and USFS lands, water quality monitoring, and education projects with the community in Ravalli County. Clark Fork Coalition staff members have previously served on the board of the BRWF and remain in active contact with the group on potential for collaborating on restoration projects. Additionally, Trout Unlimited has two local chapters in the basin that the CFC collaborates with and utilizes for project funding. Bitterroot TU covers the watershed from Florence to the headwaters while Westslope TU covers from Florence downstream to the confluence with the Clark Fork. The CFC also work closely with the Lolo Watershed Group, which is a smaller landowner-led group working in the Lolo Creek drainage.



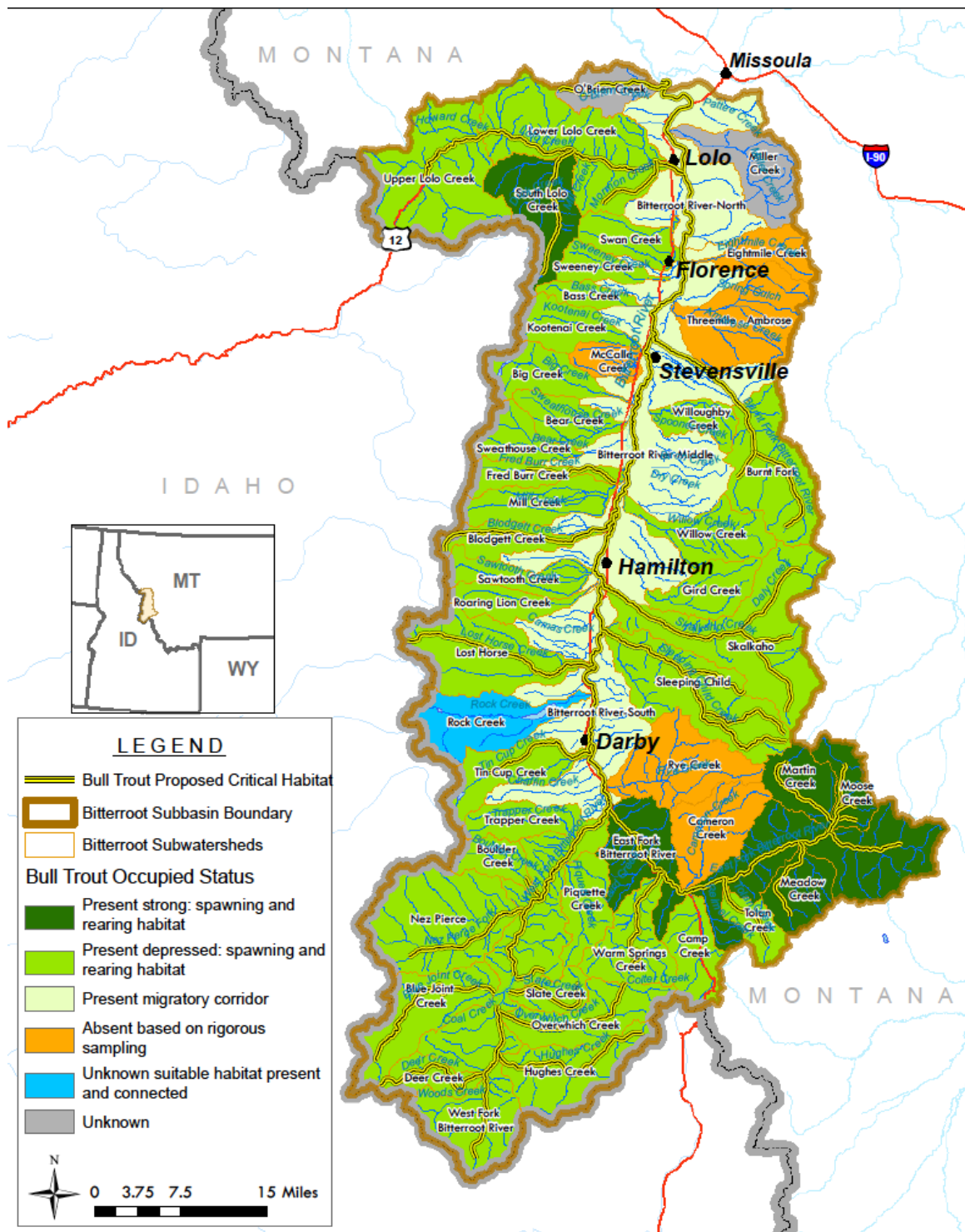


Figure 5: Bull trout habitat status by sub watershed.

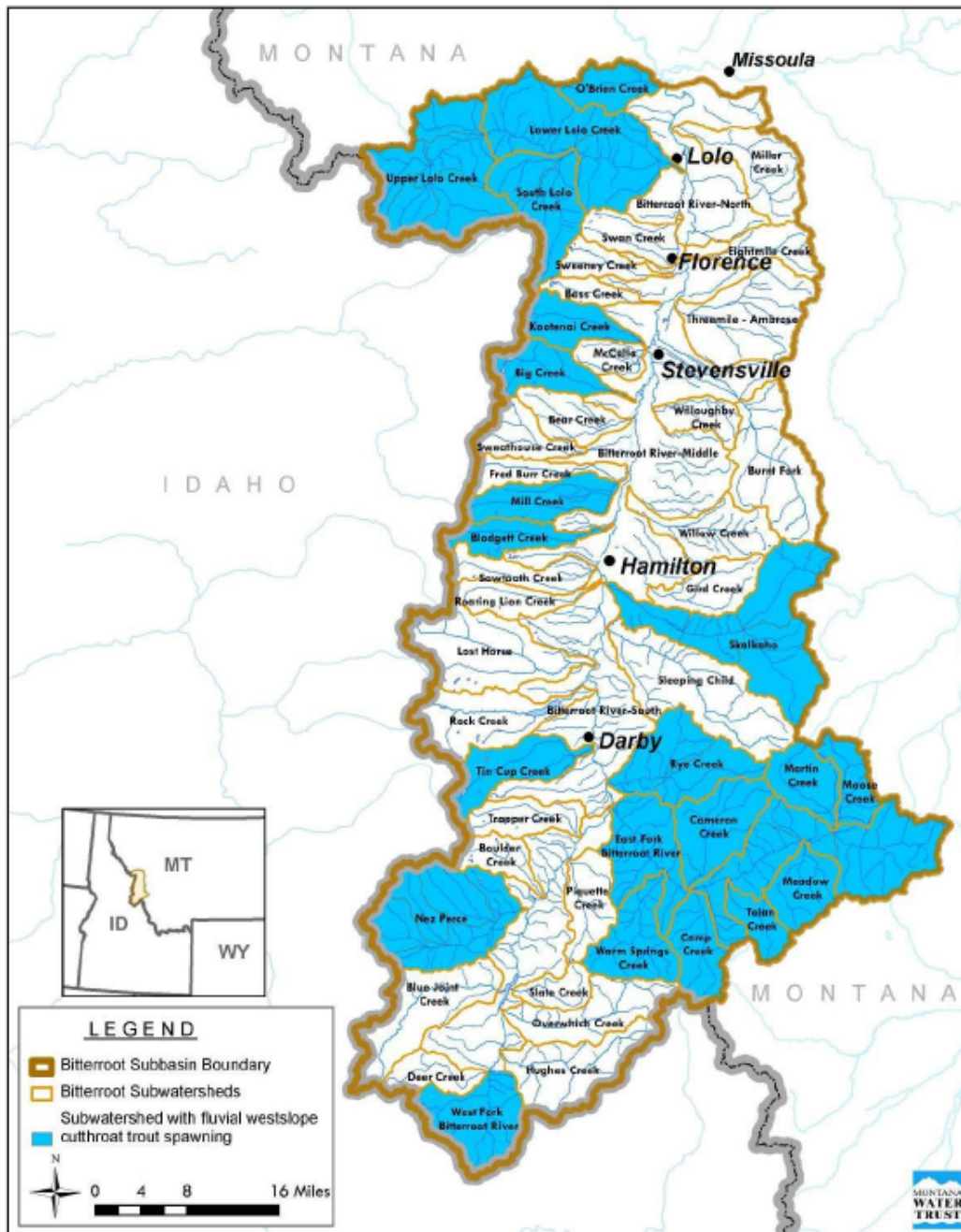


Figure 6: MT FWP distribution of fluvial westslope cutthroat trout spawning.

**Subbasin Plan and the “Bitterroot Partnership.”** In 2008 and 2009, the Montana Water Trust (and later CFC, post-acquisition) spearheaded an intensive planning effort and worked with a diverse group of stakeholders<sup>1</sup> to produce the *Bitterroot Subbasin Plan for Fish and Wildlife Conservation*. After two years of collaboration, the Northwest

<sup>1</sup> The stakeholders who prepared the Subbasin Plan included: Bitter Root Land Trust, Bitter Root Water Forum, Geum Consulting, Bitterroot National Forest, Clark Fork Coalition, Five Valleys Land Trust, Lolo National Forest, MT Department of Fish, Wildlife and Parks, MT Department of Natural Resources and Conservation, Montana Audubon, Bitterroot Audubon, Rocky Mountain Elk Foundation, Trout Unlimited, Trout Conservancy of Montana, Teller Wildlife Refuge, and Lolo Watershed Group.

Power and Conservation Council adopted the Subbasin Plan into the Fish and Wildlife Program in 2010. The Plan provides a framework to direct where and how conservation tools can benefit fish and wildlife in the Bitterroot. With the Plan, tributary watersheds within the Bitterroot Basin are divided into three categories based on the type of restoration activity recommended: 1) Conservation watersheds, or watersheds that have excellent aquatic habitat quality, and support a broad range and healthy populations of native aquatic species; in these watersheds habitat protection is recommended. 2) Active conservation watersheds, which have good to excellent potential habitat, but require investment in restoration to realize that potential due to degraded habitat, connectivity or water allocation issues; and 3) Deferred conservation watersheds, which have moderate to severe degradation issues, which may be very difficult and/or expensive to resolve through conservation actions.

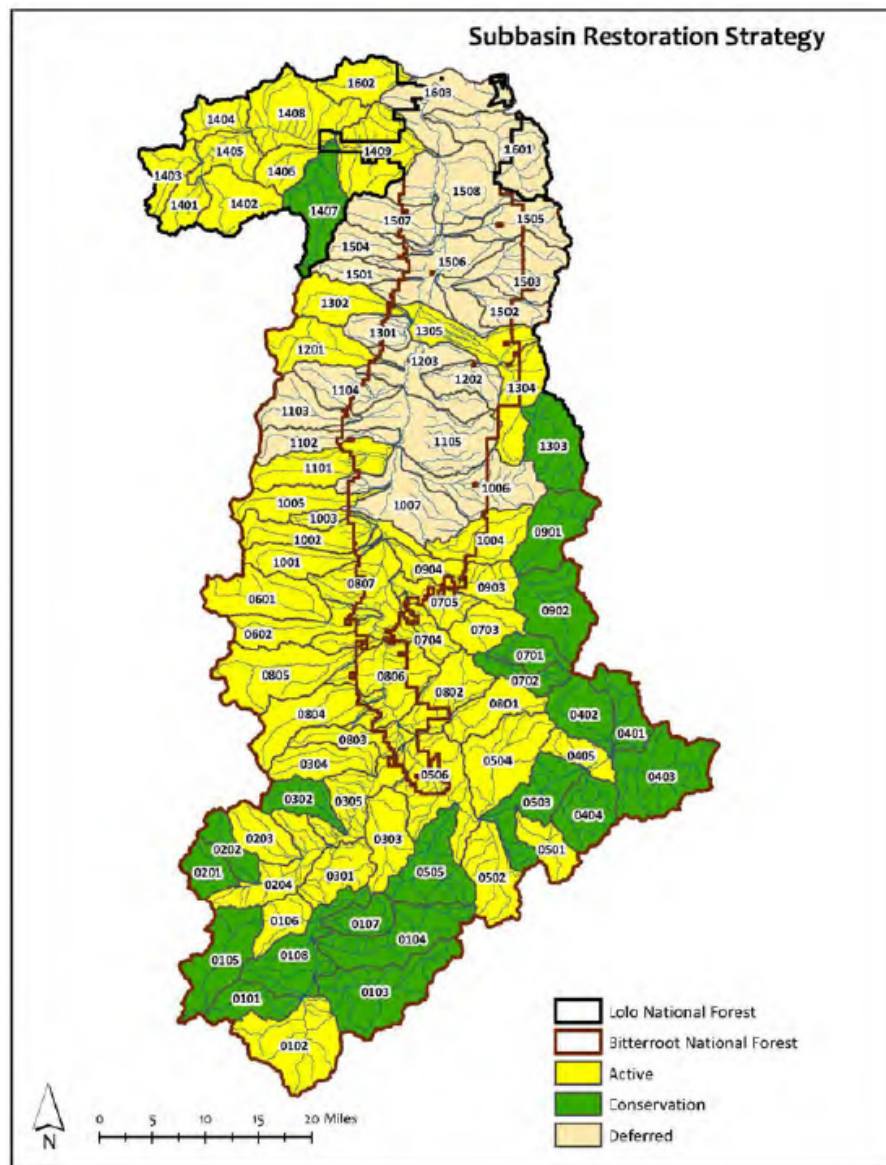


Figure 7: Conservation prioritization of Bitterroot Basin tributaries as described in the *Bitterroot Subbasin Plan for Fish and Wildlife Conservation*. See section above for a description of the prioritization categories.



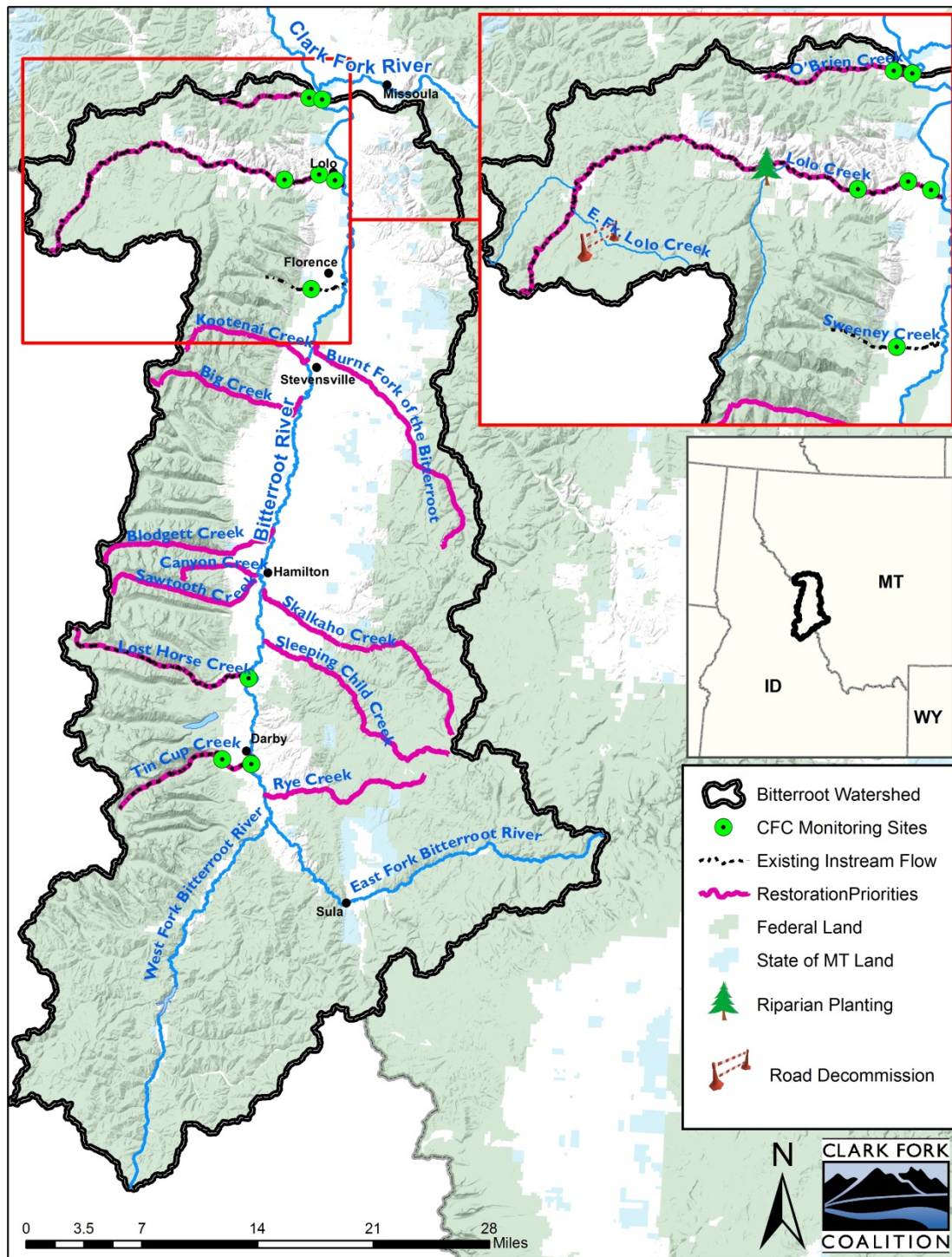


Figure 8- CFC existing and potential restoration projects in the Bitterroot Basin.



## CFC'S HISTORY IN THE BITTERROOT:

**Outreach and Advocacy.** CFC has played an advocacy role in the Bitterroot in an effort to involve citizens in actively caring for their waterways. This resource investment has taken the form of policy consulting, communications expertise, and education offerings. CFC accomplishments in the Bitterroot include:

- Worked with Bitter Root Water Forum on layout and design of *Taking Care of the Bitterroot Watershed: A Citizens Guide* in 2003.
- Partnered with the Bitterroot River Water Forum (BRWF), Montana Audubon and TU to attempt to pass a streamside setback ordinance from 2007-2009 (which failed).
- Distributed Stream Care Guides for riparian landowners, the CFC's report on climate change impacts (*Low Flows Hot Trout*), and other resources to local groups and agencies.
- Led the Subbasin Planning effort (as Montana Water Trust) and sub-contracted technical writing to Geum and BRWF (2008-2010).
- Attended and organized Bitterroot Partnership meetings, and co-wrote capacity grants for the Partnership in (2010-2012).
- Presented to numerous groups on a variety of watershed topics, including the Lolo Watershed Group, BRWF, Bitterroot Chapter TU, Community College in Hamilton, Rotary Club, irrigation companies, the local Conservation District..
- Taught 3 state-accredited training courses for real estate agents in 2012.
- Worked with volunteers and local school districts on a post-fire revegetation project on Lolo Creek (2016).

**Flow Restoration.** The CFC has worked on this issue for nearly a decade. Many of the important tributaries in the Bitterroot face chronic dewatering issues and may become completely dewatered (in sections) during periods of high irrigation demand. When the CFC acquired the Montana Water Trust (MWT) in 2010, it also acquired water leases and ongoing flow restoration projects in the Bitterroot. MWT's first water lease was signed in 2004 on Threemile Creek, a west-side tributary to the Bitterroot (and one of the first privately held water leases in the state of Montana), and the CFC inherited an ongoing project from MWT on Tin Cup Creek.

Using funds and resources from the Columbia Basin Water Transactions Program CFC has continued to develop flow projects on de-watered streams in the basin. In some instances, landowners and irrigation districts in the Bitterroot Basin have accepted and even welcomed these instream flow conservation tools.. The table below summarizes CFC's current flow restoration projects in the basin.

Flow Project	Key Partner	Status	Flow Restored	Lease Length
<b>Tin Cup:</b>				
Reservoir Dam Upgrade	TCCSWD	Monitoring & change app	3.3 CFS	Expires 99 years after change approved
Waddell	TCCSWD	monitoring	4.3 CFS	Right Acquired
<b>Lost Horse Creek:</b>				
Ward Irrigation Dist.	WID	monitoring	10 CFS	50 year lease, expires 2064
<b>Lolo Creek:</b>				
Beyer	CBWTP	Monitoring	2.37 CFS	Right Acquired
Kuney	CBWTP	Monitoring	1.12 CFS	Expires Aug. 2020
<b>O'Brien Creek:</b>				
O'Brien water users	CBWTP	Monitoring	1.19 CFS	10-year lease, expires 2025
Diddell	CBWTP	Monitoring	3.63 CFS	Right Acquired
<b>Sweeney Creek:</b>				
Priske	CBWTP	Monitoring	.71 CFS	Right Acquired

Table 1- Table of CFC instream flow projects in the Bitterroot.

The CFC has also received inquiries or pursued projects with water users in Blodgett Creek, Big Creek, Mill Creek, Rock Creek and Skalkaho Creek in the recent past. Some of these opportunities did not progress into projects because they didn't rank high enough using CFC's ranking metrics. In addition to the ongoing flow projects listed above, MWT held a short-term pilot lease on Willow Creek with the Teller Wildlife Refuge in 2005, and also received very small donated water rights from landowners along Skalkaho Creek and Threemile Creek.

**Habitat Restoration.** Riparian habitat restoration has not been an emphasis of the Clark Fork Coalition in the Bitterroot valley. However, in 2016 the CFC actively worked with stakeholders in the Lolo Creek watershed on two individual restoration projects aimed at improving water quality and aquatic habitat. The first project involved teaming with LWG in planting both streamside shrubs and woody trees along a riparian corridor that was severely burned during the 2013 Lolo Creek Complex Fire. The CFC utilized staff and volunteers to plant and water the vegetation during the summer of 2016, working in close communication with the private property owner. The second project involved the decommissioning of 17 miles of logging roads on the East Fork of Lolo Creek. To complete the project the CFC collaborated with the Lolo National Forest and received funding from the local Trout Unlimited chapter. The decommissioning will improve fish passage and reduce sediment loads in the East Fork of Lolo Creek and downstream locations.

#### **CFC's RESTORATION FRAMEWORK:**

Moving forward, the Clark Fork Coalition would like to continue and expand its stream restoration activities in the Bitterroot valley according to well-defined criteria and strategy. The Bitterroot Sub-basin plan provides clear recommendations for which sub-watersheds require restoration work. Partner organizations in the watershed, such as Montana Fish Wildlife and Parks, Bitter Root Water Forum, and Bitter Root chapter of

Trout Unlimited, and others, have valuable insights into good project opportunities. The Coalition would like to bring its technical and financial resources to work with these partners to select and execute high-impact aquatic restoration projects. The following section outlines our guidelines and goals for this work.

**Guidelines:**

- 1) Coordinate with existing partner efforts, recognizing the varied contributions that have led to the current restoration opportunities.
- 2) Communicate with and listen to local stakeholders, especially rural landowners, at all stages of the project.
- 3) Recognize and emphasize that the restoration of the river requires restoration of ecological linkages between tributaries and mainstem, and the restoration of social and economic linkages between rural and urban communities.
- 4) Invest in restoration work on private lands and with private business that helps create a lasting stewardship ethic in the communities of the Bitterroot Basin.
- 5) Foster long-term changes in the way resources are managed on both private and public lands, striving to see beyond the perspective of current projects.

**Goals:**

**Goal 1: Improve ecological function and economic value of Bitterroot tributaries through restoration of stream corridors and critical uplands.**

- Objective 1: Improve aquatic habitat for native fish including flow restoration and passage/connectivity.
- Objective 2: Improve irrigation water management to balance ranching needs with other water users, especially fish-friendly flows
- Objective 3: Improve water quality through watershed management activities on roads, timber, and grazing lands (e.g., reduce sediments, nutrients, and lower water temperatures).

Strategies for developing projects:

- 1) Work at a sub-watershed scale. Rather than pick and choose projects, work with partners to select priority tributaries, and concentrate activities in those priority tributaries.
- 2) Commit to long-term investment in those priority tributaries.
- 3) Work on integrated solutions that address multiple objectives.
- 4) Build from strength—ecological restoration works best as a natural process of repopulation from relatively intact, or at least less damaged areas.
- 5) Understand sub-watershed problems and potential, and develop a good baseline for monitoring change, before committing to projects.

**Goal 2: Amplify number, scope, and impact of high-quality restoration projects.**

- 1) Consolidate partnerships, including with landowner-based organizations, providing technical assistance to amplify their project outreach and implementation, especially on priority tributaries.
- 2) Develop formal partnerships with public resource management agencies, especially USFS, to execute stream corridor projects in priority tributaries.
- 3) Develop new projects with NGO partners to complement their conservation activities.

**Goal 3: Develop integrated, inter-agency monitoring of restoration results.**

- 1) Build support for combining results from existing monitoring initiatives to get an overall picture of restoration success
- 2) Make sure monitoring programs tell a story the public can understand, and produce publications that explain that story
- 3) Analyze existing monitoring programs, and look for ways to simplify, consolidate and strengthen monitoring of restoration, especially tributary restoration.
- 4) Take into account various restoration objectives in monitoring, including water quality, biological restoration, and economic sustainability of agriculture, forestry and other rural sectors.

**Restoration Need and Opportunity in the Bitterroot.** CFC focuses its efforts where need and opportunity are most clear, and where the organization has the resources to produce a significant impact on restoration. The Clark Fork Coalition brings unique experience in the field of instream flow to the Bitterroot basin. Positive results to date provides a platform to expand work in this field. Opportunities for instream flow work need to be carefully selected, because a tremendous amount of effort goes into successful project development, and successful deals, leases and water right acquisitions bring the eventual need to monitor and manage flows into the future.

Other organizations in the basin have or are developing strong capabilities in riparian restoration, road decommissioning, monitoring and education/outreach. The Coalition needs to find opportunities to use its unique skills and partner with other organizations to increase restoration impact.

From the biological point-of-view, the first criteria in ecological restoration is to “build from strength,” recognizing and conserving the relatively intact areas with healthy populations of native fish and wildlife. The presence and abundance of the two native trout, bull trout and westslope cutthroat, are indicators of which Bitterroot tributaries are still in relatively good condition—these intact tributaries can then provide stocks of native fish, bugs, and plants to re-colonize other streams in the basin.

From the economic potential point of view, a diverse and thriving mix of agriculture, recreation, and other economic sectors provide opportunities for improving quality of life in the basin.

**WHAT’S NEXT FOR CFC IN THE BITTERROOT?**

**Priorities for CFC Restoration Projects.** The Bitterroot sub-basin planning process devoted considerable effort to tributary prioritization, engaging USFS, FWP and USFWS fisheries biologists, restoration potential (see “Sub-basin Restoration Strategy Map below). The Sub-basin Restoration strategy highlights streams with strong native fish populations as “conservation” areas—colored green on the map---and streams with good potential but significant problems as “active restoration” tributaries. **CFC plans to focus its restoration activities in the streams categorized as “active restoration” areas.** These focus streams can be grouped geographically as follows:

- 1) **North:** Lolo, O’Brien and Miller Creek
- 2) **Eastside:** Burnt Fork, Skalkaho, Sleeping Child, Rye Creeks
- 3) **Northwest:** Kootenai and Big Creeks
- 4) **Westside:** Blodgett, Canyon, Goat, Sawtooth, Lost Horse, Tin Cup Creeks
- 5) **Headwaters\*:** *West Fork and East Fork creeks above Conner*



\* The West Fork and East Fork sub-watershed creeks are lightly used for irrigation—almost their entire watersheds are National Forest lands. National Forest land use management will determine the restoration processes there. Downstream in the northern reaches of the Valley (#1-4 above) are the streams most affected by irrigation, agricultural land uses, and development. These are the streams where the CFC can contribute most to improving aquatic resources.

**S.W.O.T. Analysis.** CFC staff agree that the best alternative in the Bitterroot is to strategically engage in more conservation efforts and restoration projects in prioritized tributary streams, while continuing to monitor existing projects and develop our education and outreach opportunities. Below is an analysis of the strengths, weaknesses, opportunities, and threats that will frame how to implement this goal over the next five years.

Strengths:

- Successful flow restoration projects underway in several priority watersheds: Lolo, O'Brien, Tin Cup, Lost Horse
- Good relationships with partners: Lolo NF, Bitterroot NF, BRWF, BRLT, TU, FWP, LWG
- Unique expertise and funding source in flow restoration, valued by partners and landowners.
- BWF has begun to successfully implement projects
- Ability to bring funding to the table for partners
- Growing reputation for providing quality education and outreach services
- Approved subbasin and watershed restoration plans

Weaknesses:

- Lack of state agency focus and resources
- DNRC change of use process
- Land ownership fragmented, few large land owners on Bitterroot mainstem and important tributaries
- Environment low on the political priority list
- Not as many funding opportunities as other watersheds in Clark Fork basin
- Some of the large irrigation districts are unwilling to participate in flow restoration projects

Opportunities:

- Increasing collaboration with partners, including irrigation districts and water users groups
- Local groups are growing capacity
- Lolo NF recently acquired a large area of Plum Creek land in Lolo Creek.
- Lolo NF fisheries and watershed staff are very interested in collaboration for restoration work.
- Lolo and O'Brien Creeks have Missoula Conservation District support.
- Land being acquired by out of state parties

Threats:

- Over appropriated streams
- Climate change; decreased snowpack, earlier runoff and higher summer temperatures

- Political turmoil in Ravalli County distracts from restoration work and may thwart support from the Conservation District or local leaders.
- Subdivision development
- Land being acquired by out of state parties
- Increased fishing pressure

**Recommendations.** Given this SWOT, staff believes that the Bitterroot continues to present an excellent opportunity to invest in restoration, particularly building on past success in flow restoration. Through CFC's last 10 years of monitoring efforts in the Bitterroot it has become apparent that dewatering and the associated high water temperatures are having the greatest negative impacts on the ecological health of the Bitterroot River and its tributaries. Due to climate change the potential for these impacts will only increase in the future. CFC can have the greatest positive impact working in the tributaries and flow restoration should be the number one priority. The best approach is to keep streams connected to the mainstem, mitigate high water temperatures and remove fish barriers that impede fish from utilizing the colder habitat in the headwaters for spawning and refugia. We should pursue habitat enhancement projects on streams where we have had past success or are actively engaged in flow restoration work. The areas where our past experience, sub-basin priorities, and current opportunities best align, appear to be (in order of priority):

**1) North Bitterroot: Lolo, O'Brien, and Miller Creek;**

Lolo Creek is the third largest drainage in the Bitterroot system and its upper tributaries are strongholds for bull trout and Westslope cutthroat trout. The stream is impacted by dewatering and high water temperatures in its lower reaches, fish entrainment at the major irrigation diversions and sediment/fish passage issues in the upper section (now nearly all controlled by Lolo National Forest). CFC currently owns and leases several junior water rights but needs significant senior instream rights to help with the chronic dewatering. The current efforts to work with irrigators on flow and entrainment and with the Lolo National Forest on sediment and fish passage should be continued. Other opportunities in the Lolo watershed include education in the schools and working with the municipal water district on well withdrawals and water meters. The Lolo Watershed Group continues to try to increase its capacity and was effective in facilitating major studies of Lolo Creeks surface and ground water. CFC has a staff member on the group's advisory board.

O'Brien Creek has a solid population of WCT and is an important recruitment stream for this species on the lower Bitterroot River. CFC has purchased 2/3 of the senior water rights on the stream and has entered into a 10-year lease for the remaining third. Due to habitat projects by FWP and road decommissioning by the Lolo NF the streams habitat and water quality are good. The main effort on O'Brien Creek for the next 10 years will be monitoring and making call on the existing instream rights.

Miller Creek needs to be investigated further for restoration potential. It has severe dewatering issues and impacts from agriculture in the lower reaches.

**2) Westside Bitterroot: Tin Cup, Lost Horse, Blodgett.**

Flow restoration on Tin Cup Creek has been a focus of CFC's for almost 10 years and the time and money invested are paying off. Senior water rights have been acquired near the confluence and 400 AF of water in the reservoir has been leased for 99 years. Approval of the change authorization on this leased water and

continuing to work closely with the Tin Cup County Sewer and Water District are the key to continuing to protect the restoration gains made on Tin Cup. The riparian habitat is in good shape and no habitat projects are foreseen at this time.

Lost Horse Creek has great potential for future flow restoration projects. Lost Horse is a large watershed and bull trout stronghold with a good population of resident fish. It is also home to a strong population of Westslope cutthroat. With the completion of the Ward siphon project a major migration barrier that was entraining large numbers of fish has been removed and up to 10cfs of instream water secured for 50 years through the subsequent diversion reduction agreement. Lost Horse needs more instream water secured from upstream irrigators now that this agreement has been secured. More flow monitoring is needed in the reaches above Hwy 93 in order to understand the streams flow dynamics better. In addition the impacts of sediment and nutrients from agriculture need to be assessed as well as the need for habitat projects in the reaches downstream of the Forest Service boundary.

Blodgett Creek is a key spawning stream for WCT and is home to resident bull trout as well. The stream is impacted by dewatering and fish passage issues due to irrigation diversions. At this time CFC has no active projects in the watershed but there is good potential for instream flow and fish passage projects to be carried out. Once Lost Horse is further along towards recovery Blodgett should be assessed closely for potential projects.

Other Westside tributaries including Big Creek, Kootenai and Chaffin Creek are lower priority at this time but have dewatering issues in their lower reaches that will need to be addressed at some point.

### **3) Eastside Bitterroot: Burnt Fork, Skalkaho, Sleeping Child, Rye;**

There are many streams on the eastside of the Bitterroot in need of restoration but at this time CFC does not have any flow or habitat projects to use as a foundation. Partners such as Bitter Root Water Forum are working to expand habitat and water quality projects in some of the key drainages, Rye and Sleeping Child in particular. While the above mentioned streams are well worth restoring, CFC should prioritize efforts in the Northern and Westside streams before committing resources to the Eastside, unless an exceptional opportunity for in-stream flow work is identified.

The Burnt Fork is a large, complex drainage and is extremely impaired by flow and high temperatures due to over appropriation. In addition sections are impacted by streamside grazing and major fish barriers and may have nutrient issues as well. The lower reach runs through the Lee Metcalf Wildlife Refuge and includes at least 2 major fish barriers. TU has undertaken initial steps to survey the barriers and the idea of relocating the confluence with the Bitterroot has been put forward. TU has also successfully completed riparian fencing and revegetation on a private ranch in the lower section of the stream.

FWP has undertaken quite a few fish passage and entrainment projects on Skalkaho Creek but has not seen a significant response in WCT populations. There are still flow issues on the creek to be addressed but CFC needs a better understanding of the system before pursuing instream flow projects.

FWP has installed fish screens on Sleeping Child, an important bull trout stream. CFC needs to learn more about the need for flow restoration before pursuing projects on this creek.

Rye Creek has a history of sediment impairment due to fire and logging activity in the headwaters and grazing practices in the lower reaches. The Bitter Root Water Forum is currently working with the Bitterroot NF on a large-scale road decommissioning project in the headwaters. Depending on the degree of flow impairment it could be a good opportunity for CFC to build on this project with instream flow work. While not known as an active bull trout stream it is important to WCT.

