

# **Bozeman Creek Enhancement Plan**



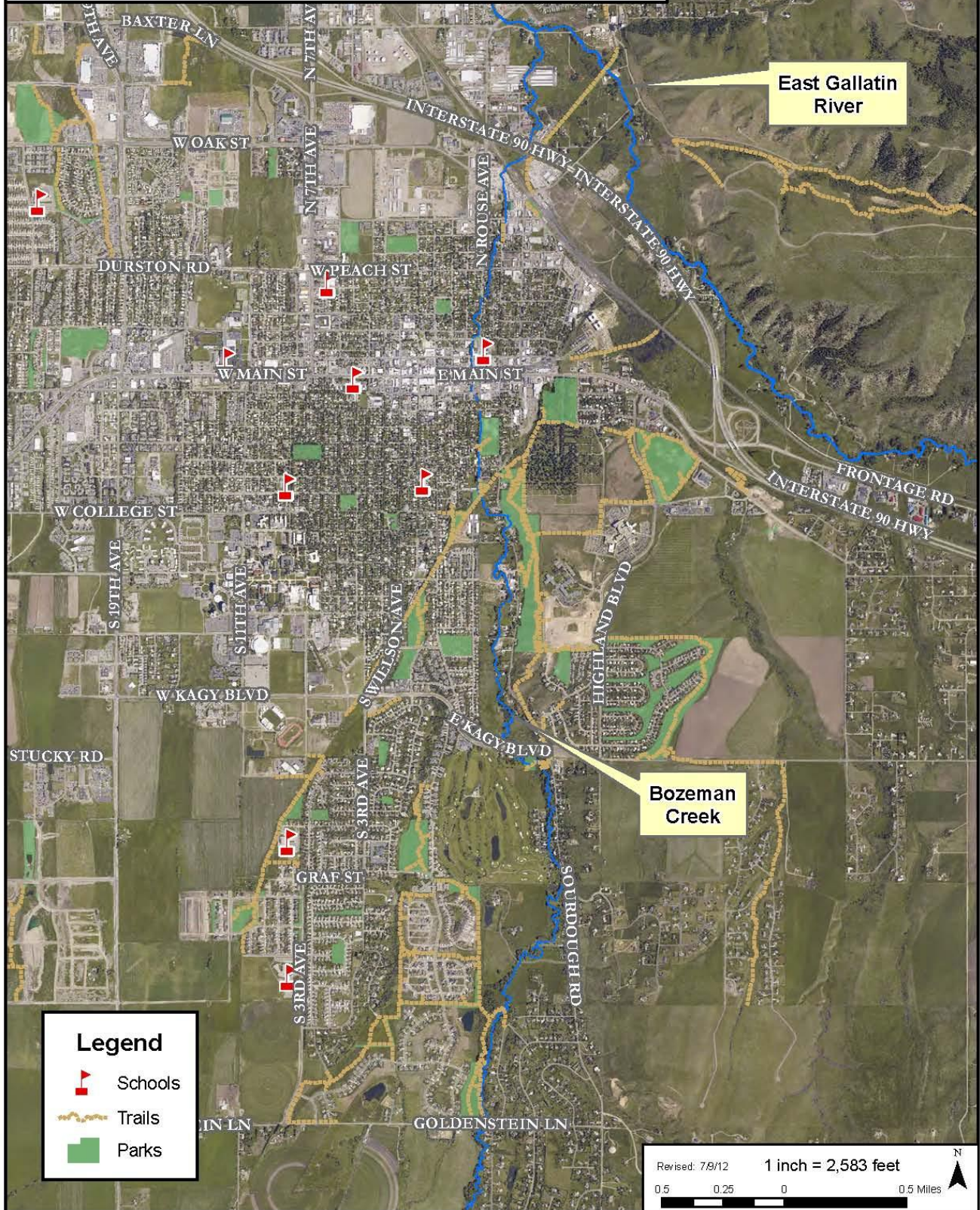
**July 9, 2012  
Bozeman Creek Enhancement Committee**

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# Bozeman Creek Enhancement Project



# Introduction

This document is intended to help guide the protection and enhancement of the reach of Bozeman Creek within the city limits of Bozeman. A long-range vision for Bozeman Creek is articulated, along with a set of goals, objectives and strategies to realize that vision. A number of potential creek enhancement projects are identified that would help to accomplish plan goals.

This plan documents the work over the past two years of the Bozeman Creek Enhancement Committee (BCEC), a group of concerned citizens that began meeting to find ways to improve the value of Bozeman Creek as a community amenity. In order to create a plan likely to enjoy strong public support, the BCEC made significant efforts throughout the planning process to understand public sentiment about the creek. One message that emerged clearly early on was that people strongly support management of the creek as a valuable community asset. Community input on issues, concerns, desires and ideas regarding the creek served to guide development of this plan's vision, goals and objectives. See Appendix D for a summary of community input.

Bozeman Creek through the city is ecologically impaired, limited in its value for community recreation and aesthetic enjoyment, and in places essentially nonfunctional. Yet the creek holds tremendous promise to become a highly valued community centerpiece. This plan provides guidance for restoration of many of the functions of a healthy stream corridor. True ecological restoration, in the sense of a return to the natural condition that existed prior to human disturbance, is neither possible nor desirable through the heart of Bozeman. Rather, the goal of this plan is to provide value to the community by encouraging and guiding enhancement of the creek's structure and ecological function.

This plan can be used to develop project priorities for the protection and enhancement of Bozeman Creek. Yet it must be recognized that future actions are likely to be some combination of implementing planned priorities and seizing timely opportunities. In either case, this plan provides guidance for beneficial action. Given that the vision for the creek is long-term, it is expected that this plan will be revisited and updated periodically.

## **Current Condition**

From its headwaters in the Gallatin National Forest to the jurisdictional boundary with Gallatin County, Bozeman Creek is in relatively good condition. The Sourdough Creek Watershed Assessment<sup>1</sup>, completed in April 2004 by the Bozeman Creek Watershed Council, describes some impacts to the creek in this upper reach from roads, past logging, and recreational use. The current potential for a large wildfire in the headwaters followed by heavy rains on erodible soils that could severely impact the City of Bozeman's Water Treatment Facility has prompted plans by the US Forest Service for forest management, scheduled to begin in the near future.

Bozeman Creek flows for 2 ½ miles through an agricultural landscape between the national forest and the City of Bozeman's jurisdictional boundary just south of Goldenstein Road. Primarily used for pasture and dryland crops with wide areas of riparian vegetation, impacts to the creek in this reach are limited to occasional bank erosion and some diminishment of flows from irrigation.

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<sup>1</sup> This document provides considerable background information on the natural resources of Bozeman Creek and the Sourdough Watershed.

Significant impacts to Bozeman Creek begin to occur as the creek enters dense residential housing, then the commercial and industrial areas of the city. Bozeman Creek was channelized through the center of town back in the early days of the area's settlement, as evidenced by Sanborn maps dating from 1891. The most highly impaired reach of Bozeman Creek is the one-mile reach extending on either side of downtown, from Story Street to Peach Street. Here, Bozeman Creek has been narrowed and straightened, its banks armored with rock, concrete and other waste materials, its riparian vegetation removed or reduced to a thin green line. Downtown, the creek runs underground beneath streets and buildings. Elsewhere in the urban core, the creek is confined by parking lots and other development. These alterations severely impact the creek's ability to filter runoff, pass flood flows, provide fish and wildlife habitat, and provide citizens with a community asset in the heart of town.

From the confluence with Limestone Creek to the East Gallatin River, the Montana DEQ has placed Bozeman Creek on the State's 2010 303(d) list of impaired streams for excess nutrients (total phosphorus, total Kjeldahl nitrogen), sedimentation/siltation and E. coli bacteria. North of Interstate 90, although water quality is still impaired, the creek regains some of its natural character, associated habitat, and other resource values and recreational potential.

### **Planning Efforts**

A citizen's group called the Bozeman Watershed Council formed in 1991 primarily to address issues on the national forest in the creek's headwaters, and completed the Sourdough Watershed Assessment in 2004. (Bozeman Creek runs through Sourdough Canyon in the national forest; the creek generally is referred to as Bozeman Creek within the city limits and as Sourdough Creek upstream of Bozeman). This document provided a comprehensive analysis of the watershed with management suggestions for the future, including recommendations for restoration of the creek where possible in its lower reaches through the City of Bozeman.

A number of other plans have been developed over the years that to some extent have addressed Bozeman Creek's value as a resource to the city, including:

- *Bozeman 2020 Community Plan (2001)*
- *Bozeman Creek Neighborhood Plan (2004)*
- *City Stormwater Facilities Plan (2008)*
- *Northeast Urban Renewal District plans (2008)*
- *Downtown Bozeman Improvement Plan (2009)*
- *Bogert Park Master Plan (2010)*
- *Gallatin Watershed Restoration Plan (2010)*

In the fall of 2010, a group of community organizations, city and agency staff, consulting professionals, and creekside landowners began meeting to discuss how to improve Bozeman Creek through Bogert Park. The City of Bozeman applied for and was granted assistance from the National Park Service's Rivers and Trails Program to provide technical expertise and to coordinate the group's efforts. The group quickly determined that the scope of the problem was far larger than Bogert Park, and turned their attention to the entire 6-mile reach through the city, from Goldenstein Road to the confluence with the East Gallatin River. The Bozeman Creek Enhancement Project was inaugurated with the overall goal to improve the condition of Bozeman Creek and its value to the community wherever possible throughout the city.

The Bozeman Creek Enhancement Committee (BCEC)<sup>2</sup> has been working to develop this long-range enhancement plan for Bozeman Creek while simultaneously identifying and working on high-priority early-action projects. The BCEC's work has been guided by an intensive process of substantive community involvement. The project's vision, goals and objectives were developed through public input received through numerous venues. These have included a well-attended public workshop in February, 2011, presentations to community groups including neighborhood associations, conservation groups and service clubs, a public opinion survey, and several public events.

As of June 2012, the BCEC has been involved in the following projects: (see Appendix A for more detail)

- A preliminary design has been developed and fundraising begun for an enhancement project at Bogert Park.
- An hydraulic model has been developed for Bozeman Creek from Story Street to Peach Street to guide future planning and design.
- A conceptual design has been developed to reconfigure the city's parking lot at Rouse Avenue and Babcock Street, including enhancement of Bozeman Creek and creation of a creekside park.
- A streambank stabilization pilot project was completed on two properties in the northeast neighborhood.
- An annual creek cleanup event was inaugurated in 2011
- Two members of the BCEC – the Greater Gallatin Watershed Council and the Gallatin Local Water Quality District - have implemented a citizen stream monitoring program that has collected water quality data at two locations on Bozeman Creek in the impaired reach since 2008.

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<sup>2</sup> The Bozeman Creek Enhancement Committee is a partnership of community groups, city and agency staff, consulting professionals, creekside landowners and other individuals. The partnership includes the Bozeman Parks and Recreation Department, Downtown Bozeman Partnership, Friends of Bogert Park, Gallatin Local Water Quality District, Gallatin Valley Land Trust, Greater Gallatin Watershed Council, Interactive Water Use and Resource Conservation Center, MT Fish, Wildlife and Parks, and Trout Unlimited's Madison-Gallatin Chapter. The Bozeman Creek Enhancement Committee meets regularly, and receives planning and technical assistance from the National Park Service's Rivers and Trails Program.

# Goals and Objectives

The following vision and goals for the Bozeman Creek Enhancement Project were developed by the BCEC through a 1 ½-year process of review and refinement with substantive community involvement.

**Vision:** Bozeman Creek is a focal point of our quality of life, with a healthy and continuous stream corridor. We are a community with a culture of stewardship and awareness of the creek and its values, and we support:

- A naturally functioning and connected creek corridor with healthy riparian areas and floodplains;
- An aquatic environment that supports a vigorous plant and animal community;
- Clean water for people and wildlife;
- A safe and beautiful recreational corridor with ample public access, and;
- Integrating this valued asset into community planning and design, contributing to a vibrant downtown.

**Goal 1:** Foster broad awareness of and appreciation for Bozeman Creek, leading to a strong community stewardship ethic.

**Objective 1.1:** Inform residents about the natural resource values of the creek corridor, the ecological services it provides, its past and present importance to the Bozeman community, and current enhancement efforts.

## **Strategies:**

**1.1.1** Provide educational opportunities for Bozeman School District and MSU students and faculty (outdoor classrooms, monitoring and restoration work, research opportunities)

***Relevant Projects:*** L1, L5, L7, L9, S7, S8, S10, S11

**1.1.2** Create thematic interpretive exhibits at strategic locations along the corridor (perhaps arranged as an interpretive trail): natural, recreational, social, historical perspectives.

***Relevant Projects:*** L1-7, L9, S2, S5, S7-11

**1.1.3** Publicize the ongoing progress of the Bozeman Creek Enhancement Project through a range of venues:

- Produce and distribute a semi-annual “project update”
- Maintain a website to inform the public about initiatives and progress, solicit comment, and display data collected by professionals, students, and volunteers.
- Make periodic presentations to interested groups and organizations
- Submit a “Voices of the River” periodic column to the Bozeman Chronicle.

**Objective 1.2:** Create opportunities for stewardship engagement by community members.

## **Strategies:**

**1.2.1** Implement an adopt-a-stream-reach stewardship program at schools, businesses, and organizations

**1.2.2** Engage volunteers in projects: systematic water quality and resource monitoring, annual creek cleanups, restoration events, etc

**1.2.3** Provide creekside landowners with information about the ecological and economic value of the creek and best practices, and support them in making stream improvements.

*Relevant Projects:* L2, L4, S7

## **Goal 2: Restore the natural processes necessary for a functioning stream ecosystem**

### **Objective 2.1: Improve channel, floodplain, and riparian structure and function.**

#### **Strategies:**

**2.1.1** Improve the natural character, ecological function, and recreational value of Bozeman Creek while reducing flood potential in the very visible but highly degraded one-mile corridor through downtown, from Mill Ditch diversion above Story Street to Peach Street.

*Relevant Projects:* L1-7

**2.1.2** Plan, design, fund, and implement creek enhancement projects on public properties to improve ecological and recreational value.

*Relevant Projects:* L1-3, L5-7, S2, S11

**2.1.3** Work in partnership with owners of creekside properties in the downtown core to explore redevelopment opportunities that recognize the creek as an asset and that may include creek enhancements.

*Relevant Projects:* L2, L4

**2.1.4** Daylight the creek where culverted to restore continuity.

*Relevant Project:* L2, L10

**2.1.5** Collaborate with MDT on road improvement projects that have the potential to include creek enhancements.

*Relevant Projects:* L7, S3

**2.1.6** Explore opportunities with north side commercial/industrial property owners to provide creek enhancements.

*Relevant Projects:* S7-10

**2.1.7** Provide creekside landowners with expertise, manpower and/or funding assistance to improve riparian vegetation and to replace armored revetments with bioengineered treatments.

*Relevant Projects:* S7

**2.1.8** Enlarge undersized box culverts or replace them with bridges for enhanced flood conveyance and wildlife passage. Consider requiring that all new culverts/bridges pass the 100-year flood flow.

*Relevant Projects:* L6

**Objective 2.2: Enhance habitat for fish and wildlife.**

**Strategies:**

**2.2.1** Improve habitat continuity by extending riparian habitat through current gaps in the riparian corridor and enhancing riparian width where possible.

**Relevant Projects:** L1-5, L10, S7,

**2.2.2** Provide appropriate instream habitat for all life stages of desired aquatic organisms and adequate corridor space to provide for dynamic stream processes that sustain habitat.

**Relevant Projects:** L1-5, L7, L10, S7,

**2.2.3** Manage large woody debris in the channel to balance habitat benefits with infrastructure risk and human safety.

**Relevant Projects:** L1-5, L7, L10, S7

**2.2.4** Provide wildlife enhancements, such as dipper boxes under bridges.

**2.2.5** Establish a long-term monitoring program to determine baseline water quality conditions and limiting factors for fish populations.

**2.2.6** Manage upland and aquatic invasives that can negatively impact aquatic ecological health.

**Objective 2.3: Maintain instream flows to sustain ecological function.**

**Strategies:**

**2.3.1** Encourage the use of best management practices to retain stormwater runoff to maintain natural streamflow levels and for groundwater recharge.

**2.3.2** Consider the potential effects of future water supply alternatives upon instream flows, aquatic habitat, and channel maintenance and encourage alternatives that minimize impacts.

**2.3.3** Work with owners of diversions to ensure summer flows sufficient for fish survival

**2.3.4** Promote community water conservation programs that increase base flow conditions in the summer months

**Objective 2.4: Maintain reaches of the creek that are currently in good condition.**

**Strategies:**

**2.4.1** Provide creekside landowners with tools, information, and assistance to maintain and improve stream function and riparian health.

**Relevant Projects:** S8-10

2.4.2 Consider strengthening the stream setback ordinance to limit removal of riparian vegetation and other practices that may impact the creek.

2.4.3 Explore interest in conservation easements to maintain stream corridor integrity

### **Goal 3: Improve water quality to support aquatic life and primary contact recreation**

#### **Objective 3.1: Minimize pollution of surface and ground water from sediment, biological pathogens, excess nutrients, urban pollutants and hazardous wastes**

##### **Strategies:**

3.1.1 Implement stormwater best management practices, such as on-site retention/detention basins, low-impact development techniques, constructed wetlands, filtration structures at outfalls, and stormwater grate stenciling/decals.

*Relevant Projects:* L9, S12

3.1.2 Identify and address impacts from pipes discharging into the channel

3.1.3 Mitigate nutrient loading of upstream tributaries and upper mainstem.

3.1.4 Facilitate the replacement of failed/leaking septic systems in residential areas

3.1.5 Host an annual creek cleanup event

#### **Objective 3.2: Establish and sustain a robust water quality monitoring program to determine baseline conditions and document changes**

##### **Strategies:**

3.2.1 Expand the existing efforts of the Gallatin Local Water Quality District and the Greater Gallatin Watershed Council to include additional sampling sites along the length of Bozeman Creek through the city.

3.2.2 Provide opportunities for students, service clubs, and others to be involved in monitoring.

### **Goal 4: Provide ample public access and appropriate recreational opportunities along the creek corridor, while ensuring resource protection.**

#### **Objective 4.1: Provide additional open space, greenways, public parks and trails along the creek**

##### **Strategies:**

4.1.1 Seek opportunities to purchase creekside properties for new parks along Bozeman Creek.

*Relevant Projects:* L2, L4, L5, L7, L9, L10, S5, S8, S10

**4.1.2** Include a trail corridor and/or public access site as part of creek enhancement projects, as appropriate.

*Relevant Projects:* L1-5, L7-10, S5, S7

**4.1.3** Develop a continuous trail generally following the creek corridor through the city core to connect neighborhoods to the north and south with downtown and to the Main Street to the Mountains trail network.

*Relevant Projects:* L1-5, L7-10, S4-10

**4.1.4** Develop a continuous creek greenway through the north-side industrial area between Tamarack and the East Gallatin River.

*Relevant Projects:* S7 – S10

**4.1.5** Design trails, stream access sites, and other recreational amenities to be consistent with resource protection.

**4.1.6** Collaborate with the Gallatin Valley Land Trust, the city, neighborhood associations, and other stakeholders to accomplish mutual trails goals.

**Objective 4.2: Foster a recreational fishery emphasizing opportunities for kids**

**Strategies:**

**4.2.1** Improve aquatic habitat and recreational access

*Relevant Projects:* L1-7, L9-10, S7

**4.2.2** Encourage Montana Fish, Wildlife, and Parks to actively manage Bozeman Creek’s fish populations and species composition to optimize recreational value.

**4.2.3** Provide access improvements such as handicap fishing platforms, kid-friendly fishing areas, and educational signage.

*Relevant Projects:* L1, L3, L5, L7, S5,

**4.2.4** Provide public access to creek reaches that currently have good aquatic habitat and healthy populations of large trout, e.g. the reach between I-90 and the East Gallatin River.

*Relevant Projects:* S9-10

**Objective 4.3: Provide/improve desirable amenities at existing and new creekside parks.**

**Strategies:**

**4.3.1** Emphasize amenities for passive enjoyment of the creek environment

**4.3.2** Ensure natural resources are protected from recreational impacts

**4.3.3** Harden or re-design eroded high-use areas

4.3.4 Consider natural resource-based educational/interpretive signage

**Objective 4.4: Encourage the development of businesses along the creek corridor that cater to park and trail users, and/or enhance people’s opportunity to enjoy the creek.**

**Strategies:**

4.4.1 Design outdoor gathering and event space(s) along the creek corridor downtown.

*Relevant Projects:* L1-5, L10

4.4.2 Consider business opportunities in developing site design plans for downtown creek enhancement projects

*Relevant Projects:* L2-4, L10

4.4.3 Facilitate new stream-centric business opportunities beyond the urban area, such as through the northside industrial areas.

*Relevant Projects:* S9-10

# Potential Creek Enhancement Projects

## Acronyms:

DBP - Downtown Bozeman Partnership

FWP – Montana Fish, Wildlife and Parks

GLWQD - Gallatin Local Water Quality District

GVLT - Gallatin Valley Land Trust

GGWC - Greater Gallatin Watershed Council

IWURCC - Interactive Water Use and Resource Conservation Center

TU - Trout Unlimited Madison-Gallatin Chapter

## **Longer-term/more complex projects**

**L1.** Enhance the ecological function and recreational value of Bozeman Creek through Bogert Park.

**Potential Partners:** City of Bozeman, GVLT, FWP, TU

**Progress to Date:** 30% design development. Est. project cost is \$525,000. Fundraising in progress.

**L2.** Daylight Bozeman Creek between Olive and Babcock Streets either by abandoning Rouse Avenue, or by working with landowners to redevelop the property at the southwest corner of Rouse and Babcock.

**Potential Partners:** DBP, landowners, City of Bozeman

**L3.** Reconstruct the city parking lot at Rouse and Babcock to enhance Bozeman Creek and create a creekside park, reconfigure public parking, and mitigate site stormwater impacts to the creek.

**Potential Partners:** DBP, Bozeman Parking Commission, City of Bozeman

**Progress to Date:** A conceptual design has been selected. Fundraising in progress.

**L4.** Work with owners of the parking lots between Main Street and City Hall to improve channel morphology, augment riparian vegetation, and provide a trail corridor.

**Potential Partners:** DBP, landowners, City of Bozeman

**Progress to Date:** Two landowners have expressed interest in exploring this idea.

**L5.** Work with the city to realign Bozeman Creek through the City Hall parking lot and Creekside Park to improve channel, floodplain, and riparian conditions, to expand the park, and to address the problem of repetitive local flooding. Consider purchasing the adjacent property(ies) to the north from willing sellers for park expansion.

**Potential Partners:** City of Bozeman, DBP, landowners

**Progress to Date:** Adjacent landowners to the north who frequently experience flooding would like their properties to be acquired and included in an expanded Creekside Park.

**L6.** Replace existing undersized box culverts at Lamme and Mendenhall Streets with larger culverts or bridges for improved flood conveyance.

**Potential Partners:** City of Bozeman, GGWC

**Progress to Date:** HEC-RAS analysis of Bozeman Creek between Story and Peach Streets completed May, 2012 quantifying hydraulic constriction

**L7.** Work with MDT and the city to improve creek structure and function and to create creekside public parks between Lamme and Peach Streets as part of the Rouse Avenue road improvement project.

**Potential Partners:** MDT, City of Bozeman, FWP, GVLT

**Progress to Date:** BCEC and MT FWP have informed MDT of the opportunity for, and community interest in, stream enhancements. A city commissioner has expressed interest to MDT in converting a specific parcel to a creekside park.

**L8.** Develop trails through the Bozeman Creek Neighborhood paralleling and crossing the creek between Kagy and Ice Pond Road/Gallagator Trail, as per the preferred alternative in the Bozeman Creek Neighborhood Plan

**Potential Partners:** GVLT, Bozeman Creek Neighborhood Association

**L9.** Construct a wetland to intercept and treat effluent from the stormwater pipe across from the Northwest Energy substation on Church St. Include educational and recreational components in the site design, and connect this new park site by footbridge and trails with Burke Park and Christie Fields.

**Potential Partners:** GVLT, City of Bozeman, adjacent landowners, Northwest Energy

**Progress to Date:**

**L10.** Remain open to possibilities to daylight the creek through Main Street.

**Potential Partners:** DBP, City of Bozeman, GVLT

### **Shorter-term/less-complex projects**

**S1.** Work with the USGS to establish a gaging station on Bozeman Creek

**Potential Partners:** IWURCC, GLWQD

**S2.** Improve Ice Pond Park with weed removal, native plantings, more park amenities such as benches and tables, wildlife enhancements, and creek access site improvements. Possible need for purchase/use-agreement of a 12'-wide strip of private land along the east bank of the creek.

**Potential Partners:** City of Bozeman, GVLT

**S3.** Detain runoff from MDT's Rouse Ave street paint operation

**Potential Partners:** MDT, GLWQD

**S4.** Provide a bridge crossing the creek at Aspen Street in the northeast neighborhood.

**Potential Partners:** Northeast Neighborhood Association, GVLT

**Progress to Date:** NENA has applied for funding from the Recreational Trails Program

**S5.** Acquire the property at 905 S Church, demolish the house, replace the footbridge, and create a creekside park connecting by trail to Burke Park and the Gallagator, and by sidewalk to downtown.

**Potential Partners:** City of Bozeman, GVLT

**Progress to Date:** Property purchased by private party in February, 2012.

**S6.** Develop a trail connecting Gardner Park to Burke Park. Route could follow the south and east sides of the golf course to a new trailhead at Candy Lane, then connecting with the conservation easement and Hausser Park at Kagy and Sourdough Road.

**Potential Partners:** GVLT

***Progress to Date:*** Landowner adjacent the north end of Candy Lane is interested in conserving the stream corridor and allowing a trail.

**S7.** Work with owners of the “Bozeman Brick” and truck repair properties at Rouse and Oak to improve creek bank condition and riparian vegetation and to provide a creekside trail connecting Oak Street with Tamarack St to the south.

***Potential Partners:*** GVLT, GGWC, City of Bozeman, Northeast Neighborhood Association

**S8.** Investigate the potential for a creekside park or greenway at the triangle-shaped property between I-90 and rail line.

***Potential Partners:*** City of Bozeman, GVLT

**S9.** Investigate the potential for a creekside trail through the commercial property immediately north of I-90 and east of Bozeman Creek.

***Potential Partners:*** GVLT, City of Bozeman

**S10.** Investigate the potential for a creekside park or greenway at the confluence with the East Gallatin River.

***Potential Partners:*** GVLT, City of Bozeman

**S11.** Reduce impacts of dog waste on the creek near the national forest trailhead at Sourdough Canyon with better stewardship, improved buffer vegetation, and/or realigning creek or trail for separation (may be a complex project).

***Potential Partners:*** USDA Forest Service, GVLT, GGWC, GLWQD

***Progress to Date:*** Signage, dog waste removal contractor

**S12.** Install one or more stormwater treatment systems as a demonstration/pilot project.

***Potential Partners:*** City of Bozeman, IWURCC

***Progress to Date:*** City has acquired a TSEP grant for this purpose for use on public property.

# Appendices

## Appendix A Current and Completed Projects

**Bozeman Creek Enhancement at Bogert Park** - A creek enhancement project at Bogert Park was identified as a very high priority project by the BCEC due to: the reach's impaired condition and location at the upstream end of the most-impacted part of Bozeman Creek; public ownership and use of the site as a popular city park; high visibility and proximity to the center of town; value as a demonstration project and site for environmental education; and very strong public support. A creek enhancement project at Bogert Park will assist in attaining all of the stated goals of the Bozeman Creek Enhancement Project.

Thomas, Dean and Hoskins Engineering completed two survey and mapping projects at Bogert Park in 2011: one of topography and infrastructure, and a second of the property boundaries for parcels along the west side of the park.

In July of 2011, the BCEC contracted with Confluence Consulting and Applied Geomorphology to conduct a site analysis, develop a range of alternative conceptual designs for the creek through Bogert Park, and assess the benefits, risks, limitations, and relative costs of each. The BCEC hosted a well-attended city-wide open house in November, 2011 to present this work to the community and hear people's comments, ideas, and preferences regarding the alternatives. Additional comment was solicited by posting the alternative designs along with explanatory material on the city's website.

After analyzing public comment, a preferred conceptual plan was developed that combined the best-supported elements of several of the alternatives, avoided expensive infrastructure alterations, and minimized conflicts with adjacent landowners. This preferred concept plan has guided subsequent detailed design of the project.

After the enhancement project was formally supported by the Bozeman Parks and Recreation Advisory Board, \$20,000 was raised from a combination of city Parkland Improvement Grant funds and a matching grant from the Friends of Bogert Park. The City issued a Request For Proposals in February 2012 to produce a preliminary design (30% design) for the project. A consulting team was selected from among three local companies that submitted proposals. The consulting team consisted of Confluence Consulting, TD&H Engineering, Intrinsik Architecture, Nishkian Monks Engineering, and Design 5 Landscape Architecture. This team had a breadth and depth of expertise in stream restoration design, aquatic and riparian enhancement, wetland assessment, hydraulic, civil and structural engineering, stormwater management, landscape architecture and park design, as well as local knowledge of the creek. The team has developed a preliminary design along with an estimate of construction costs and phasing options, and has documented their work with a report finalized on June 15, 2012.

Once additional funds for the project have been secured, the design will be completed, necessary permits secured, bid documents prepared and a construction contractor selected to build the project.

**Hydraulic Modeling** – Allied Engineering Services was contracted by GLWQD and the City of Bozeman to develop a hydraulic model of Bozeman Creek from Story Street to Peach Street, the approximately one-mile reach through downtown Bozeman where the creek has been most heavily impacted. Allied completed this work in May 2012 and produced a report documenting the effort. The hydraulic model will serve as a planning, design and permitting tool for considering opportunities and

constraints for channel and habitat enhancement projects in the modeled reach. The model was used to assist in developing the preliminary design for the creek channel, floodplain and footbridge at Bogert Park, and will guide final design of these elements. This work was funded by grants from the Montana Department of Natural Resources and Conservation and the Montana Trout Foundation.

### **Downtown Bozeman Creek Park(ing) Project**

The BCEC has been assisting project sponsors - the Downtown Bozeman Partnership and Bozeman Parking Commission – in redesigning the public parking lot and adjacent reach of Bozeman Creek northwest of the intersection of South Rouse Avenue and East Babcock Street in Downtown Bozeman. The project's objectives are to: 1) enhance Bozeman Creek and create a creek side park; 2) maximize public parking function and capacity; and 3) mitigate storm water issues. A design team led by Intrinsic Architecture was selected in September 2011, produced a number of alternative conceptual designs for public review, and produced a report in May 2012 with a recommended conceptual plan that balances the three project goals and transforms the parking lot from a dysfunctional downtown eyesore into a community asset. The next steps are to secure funding, develop final designs, secure permits and construct the project.

### **Streambank Stabilization**

In December 2011, the BCEC assisted two neighboring landowners in the northeast neighborhood to stabilize their creek banks. The project involved removing slabs of concrete, reshaping bank contours, installing erosion control fabric and seeding the disturbed site with native grasses. The project will be completed in Spring 2012 by installing native riparian shrubs and trees. Project costs were defrayed by a grant from the Northern Rocky Mountain RC&D, equipment donations and volunteer laborers. Similar assistance is available in 2012 to other landowners interested in this kind of assistance.

### **North Rouse Avenue Reconstruction**

MDT's Rouse Avenue reconstruction project, currently planned for 2015, presents a significant opportunity to improve the natural function, recreational value, and aesthetic appeal of a 650'-1000' reach of Bozeman Creek located at the front gate to downtown Bozeman. MDT's current plans do nothing to improve the existing armored and channelized condition of the creek. BCEC sent formal comments to MDT requesting that creek enhancements be included in this project; a supporting letter was sent to MDT by MT Fish, Wildlife and Parks. At a minimum, properties already planned to be acquired for the project should be dedicated as public creekside parks, with channel and riparian restoration. Pending the outcome of MDT's right-of-way negotiations, there may be additional opportunities for a longer greenway, and to move the creek out of its current position against the roadway surface. BCEC will continue to monitor this project as it evolves and advocate for creek enhancement.

### **Bozeman Creek Cleanup**

The BCEC has instituted an annual creek cleanup and held the inaugural event on Saturday, October 1st, 2011. Volunteers met at the Bogert Pavillion, spent the morning removing trash in and along the creek between Ice Pond Road and City Hall, then returned to the park for lunch. The cleanup netted half a ton of metal, which was taken to Pacific Steel for recycling, and many bags of trash. The event was financed by grants from the Montana Watercourse and local businesses associated with the Interactive Water Use and Resource Conservation Center.

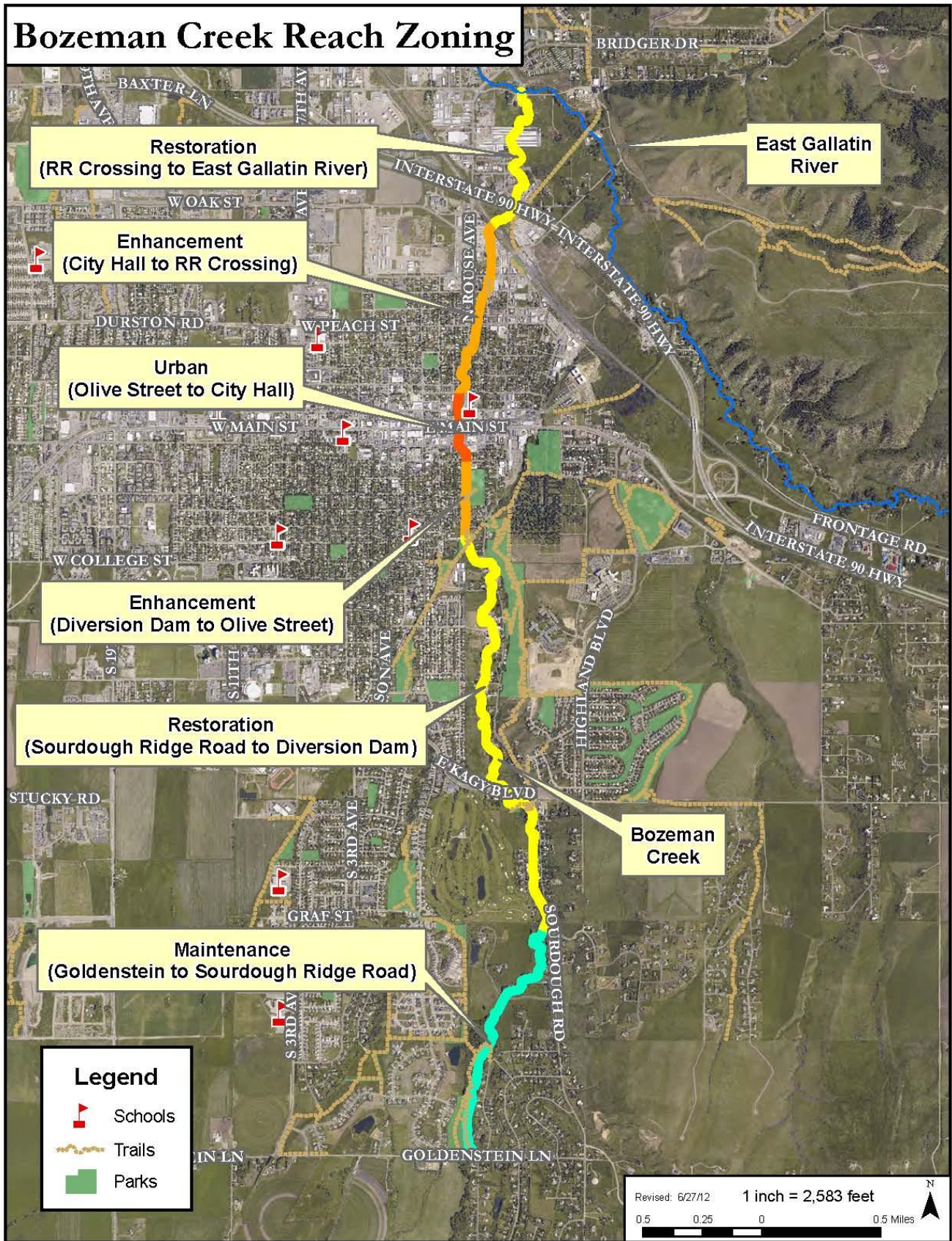


## Appendix B Management Emphasis by Creek Reach

	<b>Existing condition</b>	<b>Creek structure and function</b>	<b>Access</b>
<b>Maintenance Reach</b>	Channel and riparian vegetation largely intact	Maintain natural processes and riparian corridor.	Recreation is secondary to ecologic integrity.
<b>Restoration Reach</b>	Some channelization, bank armoring, and riparian degradation	Restore natural processes to greatest extent possible.	Provide additional access opportunities while protecting ecological function
<b>Enhancement Reach</b>	Channel severely constrained by buildings and other infrastructure.	Enhance creek reaches through public lands. Provide channel and riparian enhancements wherever landowners are willing.	Increase public access, especially at public parks, while protecting ecological function
<b>Urban Reach</b>	Culverted and channelized between buildings and parking lots downtown	Improve channel morphology and riparian vegetation to add value as an urban community asset. Daylight culverted reaches as possible.	Increase public access to creek through design of creekside trails, parks and community spaces.

<b>Creek Reach</b>	<b>Management Emphasis</b>
Goldenstein to Sourdough Ridge Rd	Maintenance
Sourdough Ridge Road to diversion dam	Restoration
Diversion dam to Olive	Enhancement
Olive to City Hall at Lamme	Urban
Lamme to RR crossing	Enhancement
RR crossing to East Gallatin River	Restoration

# Bozeman Creek Reach Zoning



## Appendix C

# Project Prioritization Worksheet

This Project Evaluation form is intended to provide a measure of objective consistency to the evaluation and prioritization of stream enhancement project proposals.

### A. Implementation Considerations

This section is used to help understand a project proposal’s “real world” issues, opportunities and constraints which have bearing on the ability of a project proposal to be implemented.

#### Instructions:

An attached narrative should address each of the following considerations, accompanied by supporting documentation/evidence.

- 1) Has a funding source been identified? Has funding, matching funds, and/or in-kind donations (land, labor, equipment) been pledged or secured?
- 2) Can the project be implemented on existing public lands? If not, can necessary easements/rights-of-way or agreements be acquired at reasonable cost from willing landowners?
- 3) Does the project represent a judicious use of limited financial resources?
- 4) Describe any construction challenges. Do the benefits justify the anticipated expense?

### B. Project Function

This section is used to comparatively rank the value of specific stream enhancement project proposals against the goals and objectives of the Bozeman Creek Enhancement Framework. When considering support for a proposed project, priority should be given to those projects scoring higher.

#### Instructions

The 12 criteria are weighted to reflect the relative importance of a project proposal to the Bozeman Creek Enhancement Framework. Each reviewer should 1) assign a “Value (0-4) to each criteria, 2) determine the “Score” for each criteria by multiplying the “Weight” by the “Value”, and 3) add all criteria scores to determine “Reviewer Total Score”. The scores of all reviewers will then be averaged to arrive at a final score for the project.

Proposed projects should be categorized as one of the following:

- longer-term/more-complex projects
- shorter-term, less-complex projects

This will allow proposals to be comparatively rated against projects of similar scope..

Project	Weight (1-3)	Value (0-4)	Score
1. Informs residents about creek values and the BCEP			
2. Creates opportunities for community stewardship			
3. Improves channel, floodplain, and riparian structure and function			

4. Enhances habitat for fish and wildlife			
5. Restores or maintains natural flow conditions			
6. Helps to maintain reaches currently in good condition			
7. Reduces point or non-point sources of pollution			
8. Provides additional open space, greenways or parks along the creek			
9. Connects creek corridor to community trail system			
10. Fosters a recreational fishery			
11. Provides/improves amenities at creekside parks			
12. Encourages development of appropriate businesses along the creek corridor			
13. Prevents imminent loss or degradation of natural resources, or loss of public access			
<b>Reviewer total score</b>			

**Appendix D**  
**Summary of Community Input**

# Summary of Flipchart and Questionnaire responses<sup>3</sup>

## Bozeman Creek Enhancement Project

### Public workshop, February 9, 2011

#### **Most valued aspects of Bozeman Creek**

- Public access to water/greenway
- Community asset, quality-of-life
- Intrinsic value, symbol of connection to ecosystem/watershed, vein of life
- Downtown location
- Aesthetics, natural attraction to sights/sounds/smells of water, tranquility
- Trail corridor and spurs, transportation pathway, connectivity
- Recreational opportunities
- Year-round flows
- Water quality
- Wildlife and wildlife habitat, connectivity
- Fish and aquatic habitat
- Floodplain/flood abatement
- Social opportunities
- Opportunities with dogs
- Educational opportunities for kids and general public
- Thread of history, memories
- Potential for enhancement
- Undeveloped corridor preserves options for the future

#### **Best-liked places**

- Bogert Park
- Tuckerman Park
- Sourdough trail and greenway
- City Hall and rain garden
- Creekside Park
- Gallagator trail near Ice House

#### **Detractions**

- Downtown loss of continuity and connectivity, entombment, unsafe; most marginalized in the urban area where it has most potential to reach the most people
- Constrained corridor: channelized, riprapped, steep banks, pavement/buildings along banks
- North Rouse encroachment on creek
- Commercial property constrictions north on Rouse – storage units, Kenyon Noble)
- Limited access: private lands/physically inaccessible
- Poor trail connectivity
- Run-down public amenities/lack of amenities/dangerous access
- Bank erosion
- Lack of riparian vegetation/buffer/ wildlife habitat
- Missing wildlife, eg beaver

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<sup>3</sup> Comments from both sources are included, with similar responses grouped together

- Poor fishery habitat
- Flooding: localized and potential for catastrophic
- De-watering for irrigation and personal pumps (sometimes w/o a water right)
- Poor water quality: Pollution/stormdrains/littering/MDT spray paint runoff/septic systems (S Church, valley)
- Bogert Park: overuse, loss of trees, bank erosion
- Invasive plants
- Little public awareness/respect/understanding of importance; lack of signage; two-name issue
- Setbacks not enforced; inconsistent site plan review

## **Desired improvements**

### **Geomorphology and human infrastructure**

- Daylight the creek
- Restore natural creek morphology: Restore proper width/depth ratio, create riffle-pool profile, increase sinuosity, reduce entrenchment, remove riprap and stabilize banks with vegetation.
- Widen the creek corridor to allow for natural channel process
- Replace creekside parking lots with an expanded creek corridor
- Reduce/eliminate flooding issues by adjusting morphology, providing a floodplain accessible to creek, and/or purchasing floodprone properties.
- Evaluate bridge abutments for potential impacts

### **Habitat and greenway corridor**

- Preserve existing areas that are in good shape
- Widen creek corridor wherever possible
- Create more creek greenway. Many respondents called for a continuous greenway corridor from Sourdough trailhead to E Gallatin. Also, see “site specific suggestions”.
- Improve/expand riparian vegetation and function
- Restore a full spectrum of native plants and animals (incl. beaver)
- Provide wildlife enhancements, e.g. dipper boxes under bridges
- Improve fishery
- Manage large woody debris in channel to balance habitat benefits with infrastructure risk and human safety
- Reduce upland and aquatic invasives
- Beautify the corridor

### **Water quality and flows**

- Improve water quality; to sustain healthy fish, wildlife and vegetation; highest quality
- Take a watershed approach to improving water quality (e.g. consider impacts from golf course, agriculture)
- Improve some of the drainages that enter Bozeman Creek (e.g. Matthew Bird Creek)
- Reduce effects of stormwater w/filtration, infiltration, constructed wetland treatment, low impact development, ‘stormceptor’, grate painting/signs/decals
- Remove illicit discharge pipes; address mystery pipes
- Reduce/treat parking lot runoff; install a rain garden behind Eagles
- Stop runoff from MDT street paint operation
- Address septic failures in residential areas/upgrade systems; provide city sewer to properties between Kagy and Ice Pond
- Improve dog waste pickup near the Sourdough trailhead

- Remove trash
- Conduct a water quality pilot project for community awareness
- Address leaks in city water system
- Reduce dewatering by enforcing water rights
- Address flooding issues

## **Access and recreation**

- Increase public access to the creek; increase opportunities to hear/see/touch the water
- Build more trails along the creek corridor. Numerous respondents called for a continuous trail generally paralleling the creek corridor from Sourdough trailhead to the E Gallatin. Also, see “site specific suggestions” below.
- Create more creekside parks
- Build more bridges
- Restore trout fishing areas and access; good fishing all the way through
- Make the creek boatable
- Provide a tubing reach
- Create a swimming hole
- Make creek a part of the neighborhood
- Provide seating areas
- Provide handicap access
- Improve safety for kids, people of all ages, animals; identify potential hazardous points

## **Education and interpretation, landowner support**

- Conduct a community education and awareness campaign: Value of riparian corridors, wetlands, fish and wildlife and connectivity; importance to the human community; water quality, runoff and pollutants; restoration; stewardship.
- Create interpretive exhibits: creekside interpretive trail; place displays in high traffic areas such as parks and downtown
- Research and interpret a history of creek use from Native Americans to now
- Implement an adopt-a-stream-reach stewardship program: schools, businesses, organizations
- Create opportunities for all levels of engagement by community members.
- Provide educational opportunities for Bozeman School District, MSU
- Provide a detailed creek corridor map
- Create a Bozeman Creek Enhancement Project website: fun for kids, but sophisticated enough to house data collected by students, volunteers and researchers.
- Provide creekside landowners with information about ecological/economic value of creek and best practices. Support them in conducting cleanup efforts w/manpower and equipment. Encourage them to provide educational/research access. Explore interest in easements/land swaps.

## **Economic development**

- Provide opportunities for creek-centered commercial development
- Encourage more restaurant creekside patios
- Increase foot traffic along the creek and to downtown businesses
- Use downtown daylighting to generate economic development opportunities
- Convert downtown parking to commercial opportunities w/creek amenities
- Make the creek a focal point of downtown

## **Site-specific suggestions**

### ***Bogert Park***

- Widen creek corridor, foster a more robust vegetative community, allow meandering, stabilize banks, improve instream habitat, accommodate flood flows, and improve safety.
- Provide a rain garden to filter parking lot runoff and educate the public
- Provide a boardwalk in erosion-prone areas
- Provide handicap access
- Numerous people want creek improvements at Bogert.

### ***North Rouse Ave***

- Take advantage of the MDT/Rouse Ave highway project to improve the creek.
- Widen creek corridor, provide natural channel morphology, create/expand riparian zone
- Acquire parkland from MDT
- Elevate Rouse Ave over a creek greenway
- Remove Rouse and replace with a creek greenway
- Use a different road for the state highway.

### ***Downtown***

- Daylight the creek: Numerous people called for daylighting the creek throughout downtown, or parts of it.
- Restore natural characteristics to the visible parts of the creek to improve downtown quality of life
- Improve the creek through downtown parking lots, especially the City lot behind Eagles
- Create more parks and greenway with public access, and link to creek corridor greenway/trail system
- Make creek improvements at existing city properties: city parking lot, City Hall, Rouse Ave
- Make the creek a central amenity/focal point downtown

### ***Creekside Park and City Hall***

- Fix flooding problem at Creekside Park by modifying channel form
- Buy and remove the house that floods
- Explore potential for MDT help in conjunction w/Rouse project
- Make creek improvements at Creekside Park
- Make improvements at City Hall property

### ***North side***

- Provide trail improvements along creek in industrial areas (mini-warehouses, Kenyon Noble brickyard)
- Provide bridge crossings in the NE neighborhood (Aspen St, other)
- Provide trails to connect downtown to the E Gallatin through the NE neighborhood
- Rehab creek at Kenyon Noble, and provide a trail
- Enhance creek near Stockyard Cafe

### ***South side***

- Implement the Bozeman Creek Neighborhood Plan; work with landowners to create a greenway between the Gallagator Trail and Kagy
- Protect land/create park from Kagy to Sourdough trailhead
- Make Sourdough trail access on Kagy obvious
- Remove fences along the Gallagator near climbing boulder
- Acquire park land and trail connection at the north end of Candy Lane.

- Conduct a stormwater improvement pilot project for Christie fields pipe adjacent the Manion property
- Install a footbridge near Christie Park on an easement

## **Planning, fundraising, priorities**

### ***Planning/implementation strategies***

- Link existing creek-related plans, incorporate into city's Capital Improvement Plan
- Implement Bozeman Creek Neighborhood Plan
- Look for comparable example to replicate
- Recognize that conditions, resources, funding can be dynamic and change over time
- Manage halfway between controlled and natural
- Use Matthew Bird Creek as a model (steep bank mitigated, safety improved).
- Manage the creek to afford resilience to change (drought, flood, climate change)
- Buy land/create a publicly owned corridor
- Need a mission statement to inspire action
- Come up with 'catchy' simple short slogan
- Potential partners: Trust for Public Land, MT Conservation Corps
- Conduct cost-benefit analyses to evaluate specific projects
- Implement enhancement measures using a watershed approach, and involve everyone
- Ensure that dogs don't detract from this community resource (feces, menacing, chasing fish and wildlife)
- Far too complex to talk about the entire stretch at once; break into groups and tackle specific issues.
- Use rapid assessment protocols to monitor water chemistry, aquatic macroinvertebrates and riparian function (e.g. Wild Utah Project RSRA)

### ***Fundraising***

- Raise funds with a creekside art competition
- Look for economic development grants for daylighting
- Use land banking to raise money for conservation purchases
- Issue a city parks/Bozeman Creek license plate
- Apply for NRCS programs such as WHIP and EQIP

### ***Project priorities***

- Make a project at Bogert the first demonstration project to get public attention and support
- Create quick, easy projects to generate community buy-in, show capacity to make change
- Since space is limited, focus on parks and parking lots – buy parking spaces
- Work on where we can see the creek, not where it is buried

## **Vision statement**

Most respondents said the preliminary vision statement reflects their values and concerns.

### **Suggested additions**

- Add "access" to the recreation bullet
- The creek contributes to a vibrant economy downtown
- The creek fosters community
- Acknowledge respect for private property rights
- State need for vigilance, maintenance and sustainability

- More emphasis on educational aspects
- “Native animals/wildlife”
- “Place-based public education”

### **Questions/concerns**

- Meaning of “animals”
- Define “quality of life”
- Subjectivity of some terms, e.g. naturally functioning and beautiful. How will these be measured?
- The creek corridor extends to Mystic Lake and beyond; planned large reservoir is worrisome
- Address goals, measurability, sustainability
- Today, Bozeman Creek does not look like we are a community of stewardship
- Bozeman Creek could be a focal point . . .and we support the improvements needed to . . . Add action.

# Bozeman Creek Enhancement Project

## *Discussion Questions for public workshop, February 9, 2011*

The Bozeman Creek Enhancement Committee is assessing the current condition and identifying opportunities for making community-supported improvements to the Bozeman Creek corridor through the city of Bozeman. To help the committee understand public sentiment about the creek, please answer the following questions. Note that “Bozeman Creek corridor” means the creek and its associated vegetation between Goldenstein Road and the East Gallatin River.

- 1) What is most important to you about the Bozeman Creek corridor?
- 2) What do you like best about the creek?
- 3) What detracts from the existing or potential value of Bozeman Creek?
- 4) What improvements to the Bozeman Creek corridor would you like to see in the future, and which is your top priority? (For now, disregard any real-world constraints.)
- 5) What *specific, place-based* opportunities do you see to improve the Bozeman Creek Corridor or provide access to it?
- 6) The Bozeman Creek Enhancement Steering Committee has written a preliminary vision statement, describing a desired condition to strive for by the year 2030:

“Bozeman Creek is a focal point of our quality of life, with a healthy and continuous stream corridor. We are a community with a culture of stewardship and awareness of the creek and its values, and we support:

- A naturally functioning and connected creek corridor with healthy riparian areas and floodplains;
- An aquatic environment that supports a vigorous plant and animal community;
- Clean water for people and animals;
- A safe and beautiful recreational corridor enjoyed by a variety of users; and
- Integrating this valued asset into community planning and design, and providing opportunities for public education and interpretation.”

Does this vision reflect your values and concerns?

# Bozeman Creek Enhancement Project

## *Survey Summary<sup>4</sup>*

The Bozeman Creek Enhancement Committee is assessing the current condition and identifying opportunities for making community-supported improvements to the Bozeman Creek corridor through the city of Bozeman. “Bozeman Creek corridor” means the creek and its associated vegetation between Goldenstein Road and the East Gallatin River. To help the committee understand public sentiment about the creek, please answer the following questions.

### **1. Which of the following do you value most about the Bozeman Creek corridor? Please mark your top three (3).**

- 103 Opportunity to enjoy the sights, sounds, & smells of a creek in town
- 45 Symbol/evidence of our connection to the ecosystem/watershed
- 56 Location for creekside parks
- 57 Location for creekside trails
- 34 Location downtown
- 13 Instream recreational opportunities such as wading, floating, swimming
- 23 Opportunity to watch wildlife
- 17 Opportunity to fish
- 19 Educational and stewardship opportunities
- 12 Reminder of the thread of history

### **2. How important is improving the Bozeman Creek corridor to Bozeman’s quality of life?**

- 69 Very important
- 52 Important
- 3 Not important
- 5 Waste of time and money
- 1 Don’t know

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<sup>4</sup> Summary of 130 respondents. Note that not all respondents answered every question.

**3. How would you rate the current condition of the following aspects of the Bozeman Creek corridor?**

	<i>Very Good</i>	<i>Adequate</i>	<i>Inadequate</i>	<i>Very Poor</i>	<i>Don't know</i>
Channel character (width, depth, meanders, etc)	6	29	27	45	11
Creekside vegetation and upland habitat	5	28	32	35	15
Aquatic habitat and fishery	3	13	44	30	26
Capacity to convey floodwaters	3	26	34	40	15
Summer flows	5	62	19	12	16
Water quality	8	20	35	23	28
Number of creekside parks	4	34	49	19	9
Quality of creekside parks and amenities	6	40	44	19	3
Availability of trails in the corridor	9	36	44	23	4
Character of the creek downtown	4	16	29	68	3
Public awareness of the creek and its value	2	12	47	48	6
Overall asset to the community	35	19	43	15	2

**4. Which of the following improvements to the Bozeman Creek corridor would you support, if they were feasible?**

	<i>Strongly support</i>	<i>Support</i>	<i>Neutral</i>	<i>Oppose</i>	<i>Strongly oppose</i>
Restore natural channel geometry	54	30	21	23	14
Uncover some or all of the underground creek segments downtown	54	38	12	8	1
Increase the extent, diversity, and continuity of creekside vegetation	61	38	12	3	1
Improve aquatic habitat, restore fish populations and fishing opportunities	49	42	19	2	1
Reduce localized flooding and the potential for a catastrophic flood	57	41	14	1	2
Ensure adequate instream flows in the summer	50	52	19	1	1
Improve water quality	68	35	11	1	0
Improve the quality/amenities of existing creekside parks	41	40	26	4	1
Provide additional public creekside parks	36	36	26	5	2
Construct more trails along creek corridor, while ensuring resource protection	48	37	22	4	2
Remove invasive plants	57	47	9	1	0
Provide education and stewardship opportunities	40	49	21	1	0

**5. Specifically where along the Bozeman Creek corridor would you like to see enhancements, and what would they be?**

(See separate compilation of comments)

**6. Do you have any other thoughts regarding enhancements to the Bozeman Creek corridor?**

(See separate compilation of comments)

**7. Please tell us about yourself**

12 I own property on Bozeman Creek

8 I live adjacent Bozeman Creek

40 I live within a couple blocks of the creek but not adjacent to it

47 I live more than a couple blocks from the creek but within Bozeman city limits

17 I live outside Bozeman city limits in Gallatin County

**8. If you would like to receive periodic project updates, please provide your name and email address:**

