2021 319 Application Form

General Information

Project Name: Middle Fork West Fork Gallatin River Restoration - Projects 3, 5, and 5

Sponsor Name: Gallatin River Task Force

Registered with the Secretary of State? Y

Registered with SAM? Y

Duns # 010769366

Does your organization have liability insurance? Y

Primary Contact: Emily O'Connor

Title: Conservation Project Manager

Address: PO Box 160513

City: Big Sky State: MT Zip Code: 59716

Phone Number: 406-993-2519

Email Address: emily@gallatinrivertaskforce.org

Signature: Emily OConnor Digitally signed by Emily OConnor Date: 2020.11.13 14:43:16 -07'00'

Signatory: Kristin Gardner

Title: Executive Director

Address: PO Box 160513

City: Big Sky State: MT Zip Code: 59716

Phone Number: 406-993-2519

Email Address: kristin@gallatinrivertaskforce.org

Signature: Digitally signed by Kristin Gardner Date: 2020.11.13 12:43:17 -07'00'

Technical and Administrative Qualifications

Technical and administrative support for this project will be provided by the Gallatin River Task Force (Task Force), Trout Unlimited, and RESPEC Company LLC (RESPEC). Task Force staff supporting this project includes Executive Director Kristin Gardner, PhD, Director of Development, Ryan Newcomb, Conservation Project Manager, Emily O'Connor, and Communications Manager, David Tucker. Trout Unlimited (TU) staff supporting this project includes Upper Missouri and Yellowstone Project Manager Jeff Dunn, who provided support during the Upper Gallatin TMDL assessments conducted between 2005 and 2010 and managed the recently completed Upper West Fork Nitrogen & Sediment Reduction Project. RESPEC staff supporting this project includes Mike Rotar and Matt Johnson, both of whom are professional water resources engineers and certified floodplain managers.

Past Projects

Project Name	Grant or Contract Amount	Funding Entity *(entity name/program, contact person, phone, email)*	Completion Date
Upper West Fork Nitrogen & Sediment Reduction Project	$ 130,000.00	Montana Department of Environmental Quality 319 Nonpoint Source Funding Mark Ockey, 406-444-5351, mockey@mt.gov	December 2017
Moose Creek Flat River Access Improvement Project	$ 220,000.00	Custer Gallatin National Forest Recreation Program Wendi Urie, 406-587-6757, wendi.urie@usda.gov	May 2018
Upper Deer Creek River Access Improvement Project	$ 350,000.00	Custer Gallatin National Forest Recreation Program Wendi Urie, 406-587-6757, wendi.urie@usda.gov	Construction - October 2020 Revegetation - May 2021

Budget Summary*

		Other Funding	Federal Match	Non-Federal Match	319 Funding Request	Total Cost
	Education and Outreach	$ 0	$ 0	$ 2,500	$ 2,500	$ 5,000
	Project Administration	$ 0	$ 0	$ 5,000	$ 5,000	$ 10,000
	Total	$ 0	$ 0	$ 7,500	$ 7,500	$ 15,000
	Project 1 Name	Middle Fork West Fork Projects 3, 4, and 5				
	Project Planning	$ 15,000	$ 0	$ 12,500	$ 12,500	$ 40,000
	Landowner Agreements, O & M	$ 0	$ 0	$ 750	$ 750	$ 1,500
Project 1	Project Implementation	$ 0	$ 0	$ 44,000	$ 37,000	$ 81,000
	Other Activities	$ 0	$ 0	$ 0	$ 0	$ 0
	Project Effectiveness Monitoring	$ 0	$ 0	$ 2,000	$ 2,000	$ 4,000
	Total	$ 15,000	$ 0	$ 59,250	$ 52,250	$ 126,500
	Project 2 Name					
	Project Planning					$ 0
	Landowner Agreements, O & M					$ 0
Project 2	Project Implementation					$ 0
	Other Activities					$ 0
	Project Effectiveness Monitoring					$ 0
	Total	$ 0	$ 0	$ 0	$ 0	$ 0
	Project 3 Name					
	Project Planning					$ 0
	Landowner Agreements, O & M					$ 0
Project 3	Project Implementation					$ 0
	Other Activities					$ 0
	Project Effectiveness Monitoring					$ 0
	Total	$ 0	$ 0	$ 0	$ 0	$ 0
	Total	$ 15,000	$ 59,750	$ 66,750	$ 59,750	$ 141,500

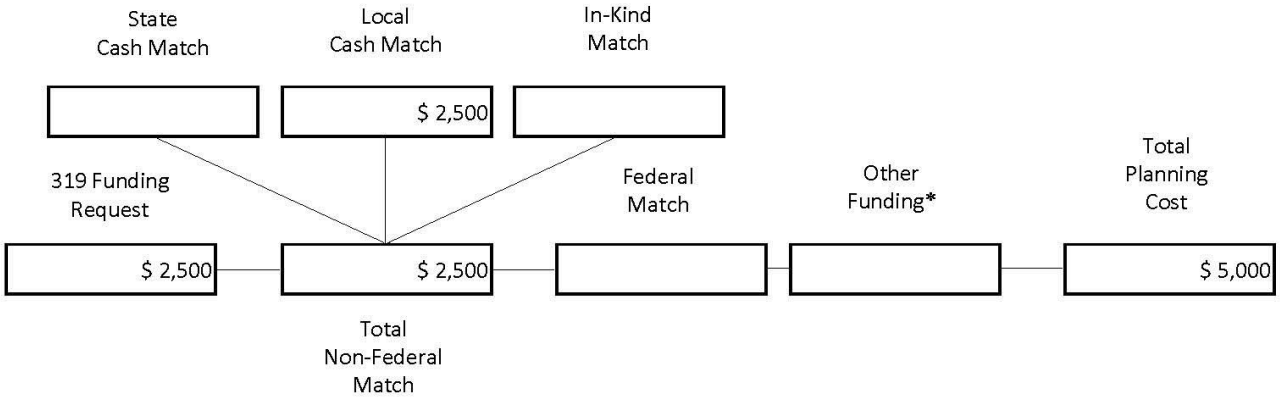
Fields outlined in black **on this page will auto-populate from other sections of the application form. Fields outlined in red **on this page** will not auto-populate. You must manually transfer the information for fields outlined in red.*

Education and Outreach

DEQ recognizes that developing good projects often requires a considerable amount of time and effort up front to build relationships and trust with individual landowners and stakeholder groups. To promote the development of future projects, DEQ is encouraging project sponsors to use up to $5,000 in 319 funding for education and outreach to develop and capitalize on these critical relationships. DEQ encourages applicants to incorporate on-the-ground projects into education and outreach efforts through on-site demonstrations and project tours. 319 funding may not be used to pay for food and beverages, or for honorariums and gifts. Education and outreach activities funded by 319 or used as match for 319 funding must adhere to all of the eligibility requirements outlined in the annual Call for Applications document.

Education and Outreach Deliverables *(Identify the education and outreach activities you will engage in and methods you will use to document their completion.)*

Education and outreach activities will target Big Sky residents, businesses, visitors, land developers, and community stakeholders. We will highlight project implementation while also building knowledge of local water quality issues, sources of nitrogen and sediment, the importance of streamside vegetation, and actions individuals and businesses can take to prevent non-point source pollution including septic maintenance and Trout-Friendly Landscape Certification. In addition to safe in-person education, the Task Force will plan and implement traditional and digital media campaigns to capture a broad audience. Activities will include (methods used to document):
1) Signs/Displays - Photo/informational displays at Big Sky Resort and/or Lone Mountain Ranch (visible to local residents & state, national, and international visitors). On-site signs placed at restoration sites (photo documentation).
2) Digital/Print Media - Paid social media posts, Water Wisdom column in Explore Big Sky newspaper; press release to media contact list, website project page, blog posts, Task Force and community e-newsletters (copies of print and web material, tags on social media).
3) Volunteer Engagement Opportunities - All projects have opportunities for volunteers to get involved in project implementation and maintenance. We anticipate hosting 50-100 volunteers total (photo documentation, report).
4) Site Tours - Site tours hosted upon project completion. The initial site tour will be widely publicized with additional site tours as requested and/or when relevant to other restoration efforts (event invites and photo documentation).



Match Source	Spanish Peaks Community Foundation (application due April 2021)	Secured	☐
Match Source		Secured	☐
Match Source		Secured	☐
Match Source		Secured	☐

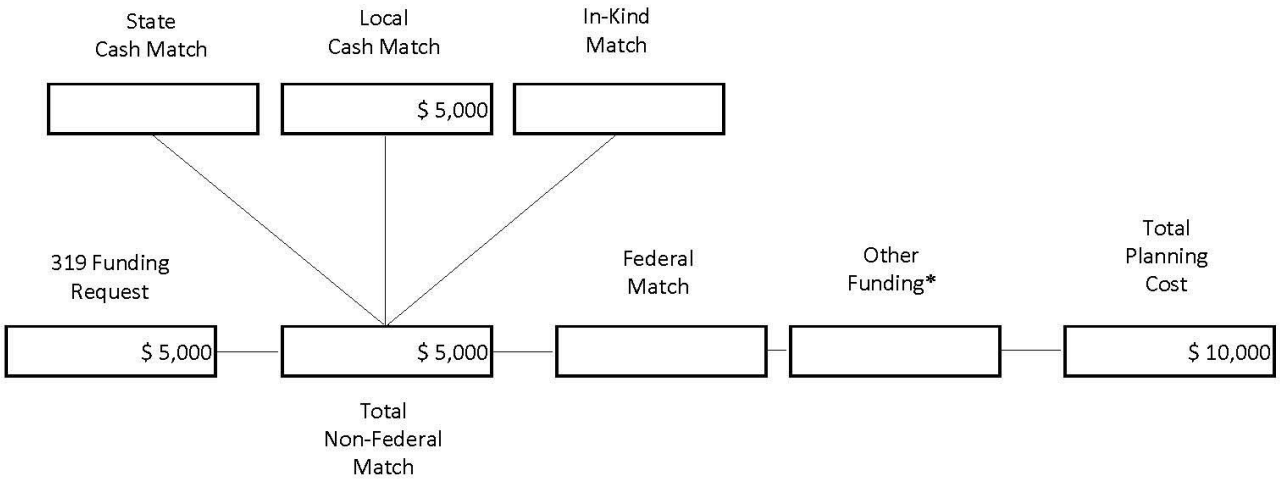
**Use this space to record any funding that will be used to support creation of the task deliverables, but will not be reported as match. The purpose of this information is to give application reviewers a clearer understanding of the total amount of funding required to complete a task.*

Project Administration

Project administration includes book keeping, invoicing, interim/annual/final report preparation, office supplies, rent, communications, etc. Up to 10% of the total requested 319 funds for your entire application can be used to pay for project administration. However, like all other tasks, payment is by reimbursement for actual expenses incurred.

Project Administration Deliverables *(Include interim/mid-year, annual, and final reports, as well as invoicing and office necessities.)*

The Task Force will oversee and be accountable for the completion of all tasks with project management support from Trout Unlimited. The Task Force will prepare and submit billing statements, status reports, annual reports, and a final report. The Task Force shall maintain regular contact as defined by DEQ project manager.



Match Source	Big Sky Resort Tax (FY22 Funding Cycle, Application Due Spring 2021)	Secured	☐
Match Source		Secured	☐
Match Source		Secured	☐
Match Source		Secured	☐

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Project Form

A separate Project Form ***(including providing separate attachments)*** must be submitted for each project included in your application. Use the following examples to help determine when to lump and when to split projects. For additional assistance, contact Mark Ockey at mockey@mt.gov.

Splitting Examples (fill out multiple Project Forms)

- Stream restoration work occurring on two separate streams, on parcels owned by two separate individuals
- Two projects with significantly different sets of project partners
- Two projects that address substantially different pollution sources (e.g., one project that moves a corral off of a stream, and another to remove mine tailings, with both projects being on the same 800-acre recreational property)

Lumping Examples

- Contiguous stream restoration work spanning multiple land parcels
- 3 projects that address similar sources of pollution on a single land parcel (e.g., moving a corral off a stream, implementing a grazing management plan, and relocating a manure storage facility out of the floodplain, all on the same ranch)
- A mini-grant program designed to address numerous failing septic systems scattered throughout a watershed

Project Name Middle Fork West Fork Gallatin River Restoration - Projects 3, 5, and 5

Project Location

Latitude 45.28729 Longitude -111.39264

Latitude 45.27927 Longitude -111.36258

Latitude 45.26795 Longitude -111.33333

12-digit HUC(s) # 100200080202

☑ **Project site map** attached, showing the location of all proposed on-the-ground restoration

Project Planning and Purpose

Select the Watershed Restoration Plan that your project will help implement.

Upper Gallatin River - Gallatin River Task Force

N Letter of support from author entity attached? *(if no, explain why below.)*

The Gallatin River Task Force authored the Upper Gallatin Watershed Plan (2012) under it's previous name as the Blue Water Task Force.

Waterbody name from the 2018 List of Impaired Waters Middle Fork West Fork Gallatin River

Probable causes of impairment to be addressed sedimentation/siltation, nitrate+nitrite, E. coli

Waterbody name from the 2018 List of Impaired Waters

Probable causes of impairment to be addressed

or*

Name of healthy waterbody to be protected

Description of identified threat to non-impairment status

Name of healthy waterbody to be protected

Description of identified threat to non-impairment status

**While the majority of the available 319 project funding is dedicated to addressing known impairments, EPA is allowing states to use a limited amount of funding to protect non-impaired waters (healthy waters) from becoming impaired.*

Community Participation and Support

Landowner	Contributions to Project	Letter of Support Attached?
Big Sky Resort	in-kind donations of time and resources; host interpretive display	☑
Middle Fork Properties	cash contribution; in-kind donation of time and resources	☑
Antler Ridge HOA	in-kind donation of time and resources (i.e. logs from fuels reduction work)	☑
Aspen Groves HOA	in-kind donation of time	☑

Partner	Role	Letter of Support Attached?
Madison-Gallatin Chapter Trout Unlimited	project management, construction oversight, and monitoring; possible funding source	☑
Big Sky Community Organization	in-kind donation of time and resources	☑
Lone Mountain Ranch	host interpretive display; support nutrient reduction work in the West Fork Middle Fork via horse manure waste removal and solids handling efforts	☐
Dr. Caroline Nash, CK Blueshift	Beaver Dam Analog installation expertise	☐

Other Community/Stakeholder Support

Lone Moose Meadows HOA (Landowner) - Letter of Support Attached. Yellowstone Club Community and Moonlight Community Foundations have both expressed interest in funding project planning & design work for the West Fork Middle Fork Restoration. Spanish Peaks Community Foundation regularly funds our education and outreach activities.

The projects align with the Big Sky Resort Tax's "Our Big Sky Community Vision & Strategy" in which residents, business owners, workers, visitors, and others shared their view for the future of the Big Sky community. Specifically, the projects align with initiatives to protect and enhance our water resources. Resort Tax prioritizes funding based on strategies and initiatives identified in the Community Vision & Strategy document.

Project Description

Describe the nature and extent of the nonpoint source problem you are trying to address, the root causes of the problem, and your proposed solution.

Nature and Extent of the Problem: The Middle Fork West Fork Gallatin River is a tributary to the West Fork Gallatin River flowing approximately 6 miles from its headwaters on Lone Mountain to its confluence with the North Fork West Fork Gallatin River. In 2010, The West Fork Gallatin River Watershed Total Maximum Daily Loads (TMDLs) and Framework Watershed Water Quality Improvement Plan (DEQ 2010) provided TMDLs for sediment, nitrate+nitrite (NO^3 +NO^2) and E. coli in the Middle Fork West Fork Gallatin River.

Root Causes of the Problem: Excess sediment is contributed from streambank erosion, roads, resort development, recreation, and historic riparian vegetation removal. Sediment impairments, including the non-pollutant "alteration in stream-side or littoral vegetation covers" impairment, are described in the TMDL document as decreased pool and large woody debris frequency downstream of Lake Levinsky.

Proposed Solution: To reduce sediment loading, increase the pool and LWD frequency, and address alterations to stream-side vegetation cover, a suite of 3 projects have been developed:

Project 3 addresses sediment impairments, including "alteration in stream-side or littoral vegetation covers" by reconnnecting the floodplain and improving in-stream habitat in a channelized reach downstream of Lake Levinsky using Beaver Dam Analogs (BDA's), Post-Assisted Log Structures (PALS) and LWD placement.

Project 4 addresses sediment impairments, including "alteration in stream-side or littoral vegetation cover" by reducing streambank erosion, enhancing the riparian buffer, and improving in-stream habitat through the addition of LWD within a historically logged reach.

Project 5 addresses sediment impairments, including "alteration in stream-side or littoral vegetation covers", by reducing streambank erosion, enhancing the riparian buffer, reconnecting the floodplain, and improving in-stream habitat. Eliminating sediment loading from the large eroding streambank in Project 5 will effectively address the single largest eroding streambank along the Middle Fork West Fork Gallatin River.

In addition, riparian buffer enhancements included in Projects 4 and 5 will help reduced nitrate+nitrate and E. coli contributions from surface runoff and shallow groundwater.

Is this project a continuation of a previous project? If so, please explain the connection.

Yes, Projects 3, 4 and 5 were identified in the Big Sky Area Wetland and Riparian Mapping: Restoration and Conservation Opportunities report completed in 2018 and were further developed in the Middle Fork West Fork Gallatin River Restoration Plan (2019) to provide a holistic approach for addressing water quality impairments within the Middle Fork West Fork Gallatin River watershed within five discreet project areas. Projects 1 and 2 (above Lake Levinsky) address sediment, nutrient and pathogen inputs from the road network and residential and resort land management. We are currently seeking funding from sources outside of DEQ to implement Projects 1 & 2.

Projects 3, 4, and 5 also implement recommendations provided in the Big Sky Area Sustainable Watershed Stewardship Plan completed in 2018, specifically the action items for watershed conservation and restoration and for providing shallow groundwater recharge by slowing the flow of water within the watershed.

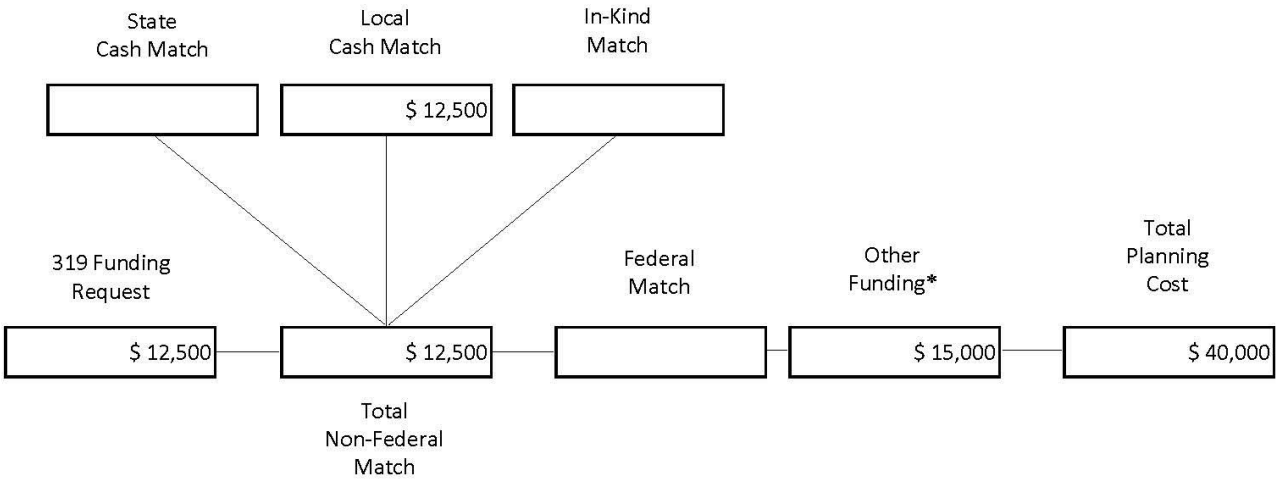
Tasks and Budget

DEQ uses a standard template to develop scopes of work for 319 contracts. The tasks below match up with DEQ standard scope of work template. Some tasks might not be applicable to your project. Please leave the non-applicable tasks blank. If your project doesn't fit the task outline, use the task labeled "Other" to describe your project.

Task 1 - Project Planning Deliverables *(Include such things as completing project designs, conducting site evaluations, obtaining permits, organizing volunteers, conducting scoping meetings, etc. Identify specific deliverables that will be submitted.)*

Project Planning completed to date: Development of Middle Fork West Fork Gallatin River Restoration Plan (June 2019), Conceptual designs for Projects 3 and 5 (June 2019), Wetland Delineation Report for Projects 3 and 5 (June 2020), Site evaluation/scoping meeting with project consultants Caroline Nash, CK Blueshift and Jeff Dunn, Trout Unlimited, Landowner and partners meetings (September/October 2019 and again in October/November 2020).

Project Planning to be completed (deliverables): 1) Wetland Delineation for project 4 (Wetland Delineation Report)
2) Project Designs – An engineering design set for Projects 3, 4 and 5. Site walks with landowners to review designs. (draft and final design plans completed by RESPEC).
3) Permitting - Joint Application for Proposed Work in Montana's Stream, Wetlands, Floodplains, and other Water Bodies will be prepared (permit applications prepared by TU; executed permit documents from permit agencies).
4) Volunteer Coordination –The Task Force will direct coordination with landowners, outreach to volunteers, volunteer day preparation, on-site coordination and oversight (summary of volunteer engagement/evaluation report).



Match Source	Big Sky Resort Tax (FY 19)	Secured	☑
Match Source	Yellowstone Club Community Foundation (application submitted 11/15/20)	Secured	☐
Match Source	Moonlight Community Foundation (application submitted 11/15/20)	Secured	☐
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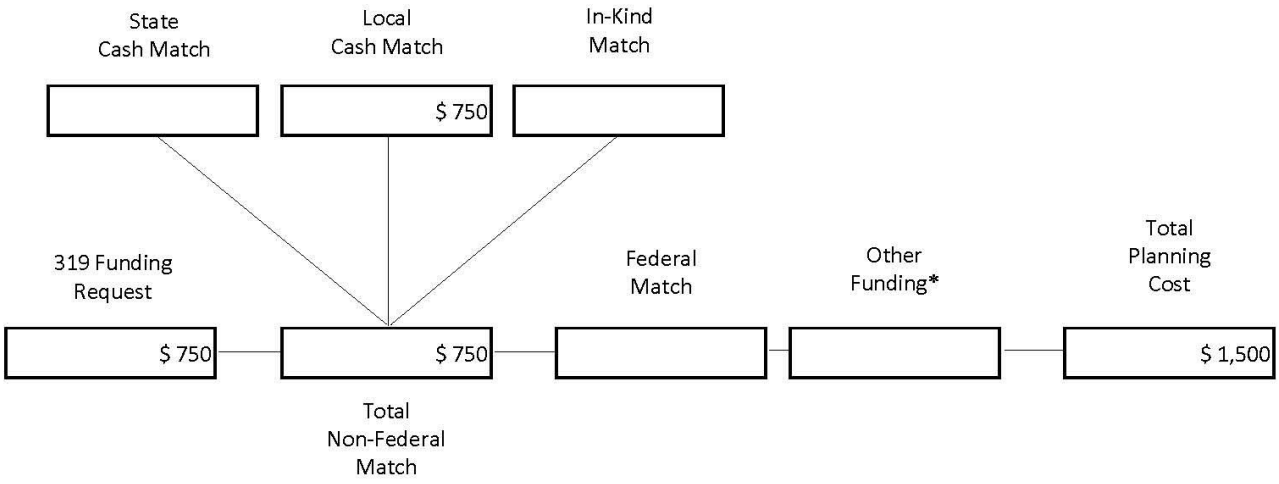
Landowner Agreements, Operation and Maintenance
This task only applies to projects involving on-the-ground activities. DEQ periodically evaluates the effectiveness of each on-the-ground project. To accomplish this, DEQ requires a process be in place to allow periodic access to the project site. The landowner agreement should also specify the roles of each project partner in the design, implementation and continued operation of on-the-ground pollution prevention practices. DEQ does not require the use of a specific landowner agreement template. In some situations, existing agreements between the project sponsor and the landowner may be sufficient.

Task 2 - Landowner Agreements, Operation and Maintenance Deliverables *(Include such things as landowner/sponsor communication, and draft and final agreements.*

The Task Force has a standard agreement template including (but not limited to): project purpose, term of agreement, identification of project liaisons, laws governing the agreement, project design (facilitated by the Task Force, approved by landowner), revegetation of disturbed areas (Task Force responsible), operation & maintenance (Task Force responsible for project; landowner responsible to ensure their own land activities do not negatively impact the project/water quality benefits), land access provided to Task Force, contractors, DEQ, volunteers with prior notice. Landowner communication has already occurred on several occasions and will be ongoing throughout the project planning and implementation process. During a site walk with the landowner, we will review design plans and a draft landowner agreement. The landowners will have the opportunity to provide feedback during the site walk and follow-up conversations. Once the parties agree to the project design and agreement terms we will executed a final agreement. Deliverables will include 6 separate landowner agreement documents.



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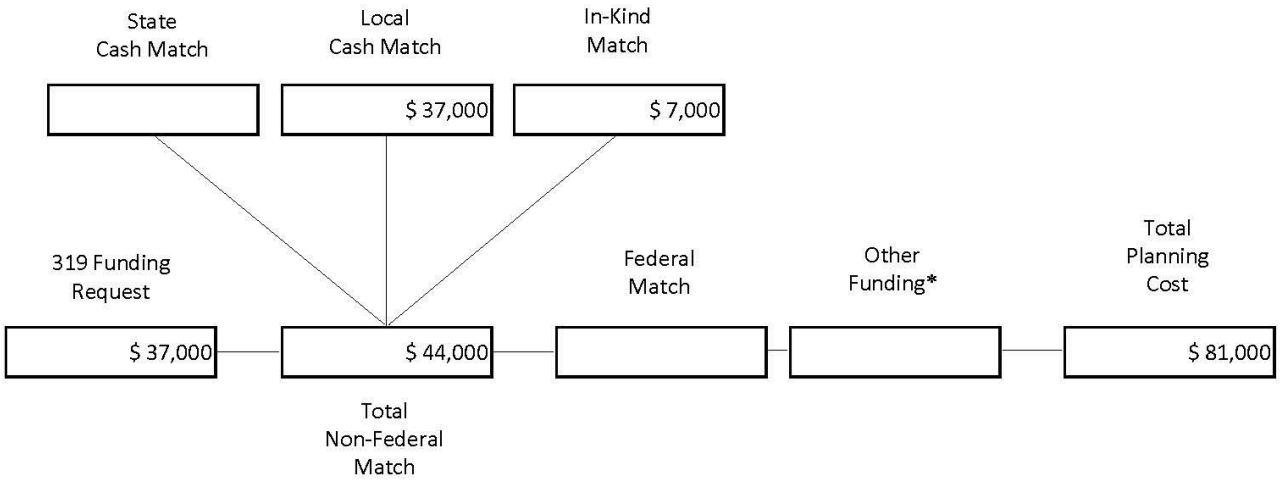
Project Implementation

Task 3 - Project Implementation Deliverables *(Include such things as construction oversight, implementation of on-the-ground restoration practices, preparation and submittal of as-built drawings, etc.)*

All three projects utilize woody materials (BDAs, PALS, LWD) and riparian plantings to reconnect the floodplain, enhance the riparian buffer, improve in-stream habitat, and redirect the stream away from large eroding streambanks.

Restoration practices implemented include:
Project 3: a mix of BDAs and PALS/LWD to increase floodplain connectivity and instigate a natural meandering riffle-pool sequence within the currently channelized reach.
Project 4: riparian buffer enhancement w/in 50 ft of the channel and large woody debris jams placed at approximately 6 sites, with additional woody debris placement throughout the reach.
Project 5: Approximately 540 ft of stream restored by redirecting the stream into a historic channel situated away from a large eroding streambank; riparian buffer enhancements within 50 ft of the channel.

Construction oversight will be provided by Trout Unlimited and the Task Force. Implementation of restoration practices will be completed by a mix of contractor(s) and volunteers. Preparation of as-built drawings will be completed by the project engineer (RESPEC) and will be submitted to DEQ by the Task Force.



Match Source	Big Sky Resort Tax (FY22 Funding Cycle, Application Due Spring 2021)	Secured	☐
Match Source	Private Funders -landowners/community members have expressed interest	Secured	☐
Match Source	Madison-Gallatin Chapter of Trout Unlimited has expressed interest	Secured	☐
Match Source		Secured	☐

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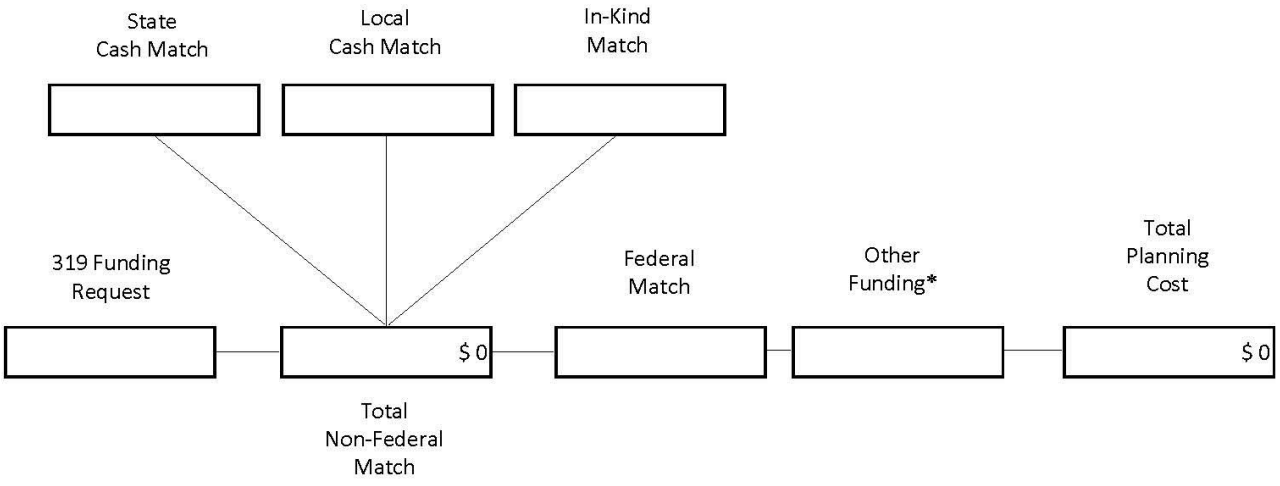
Other Activities

Use this task if the activities you are proposing are outside the scope of the typical design/implement/monitor process. Provide sufficient details to enable application reviewers to successfully compare the nonpoint source pollution reduction benefits of your project to those of other projects in the applicant pool.

Task 4 - Project Deliverables *(Include activities you will complete and the products you will submit to demonstrate completion.)*

N/A



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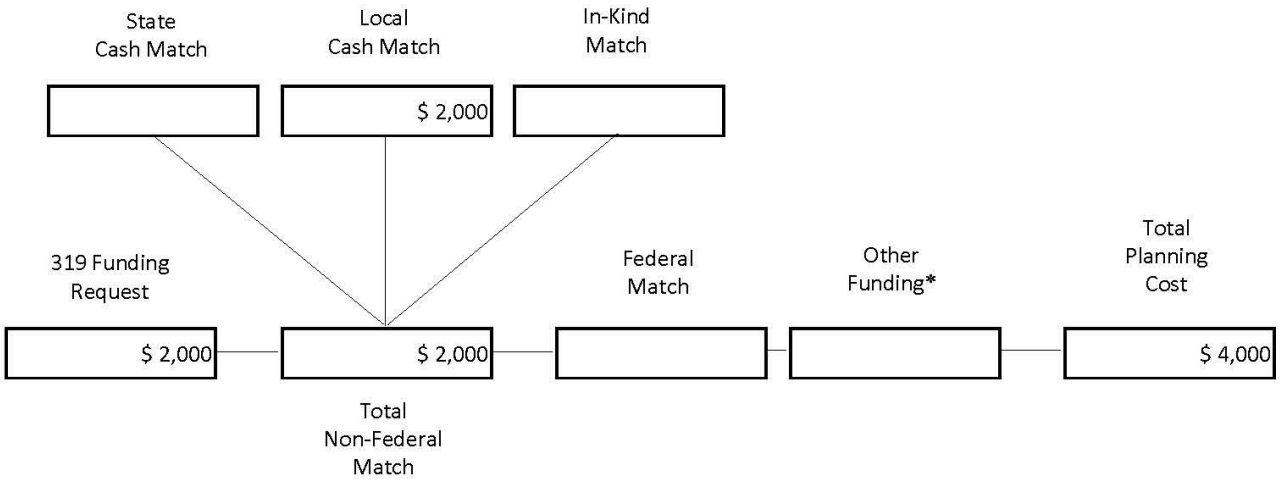
Project Effectiveness Monitoring

The short duration (1-3 years) and limited spatial extent (often just a few hundred yards) of most 319-funded projects frequently precludes the use of traditional water chemistry monitoring as a means of evaluating project effectiveness. Instead, DEQ encourages project sponsors to use simpler, more qualitative tools. Typically, this will include pre- and post-construction photo point monitoring, vegetation mortality measurements, and perhaps modeling to estimate pollution load reductions. Please contact one of the DEQ Nonpoint Source Program staff for guidance relative to your specific project.

Task 5 - Project Effectiveness Monitoring Deliverables *(Identify the specific tools and products you will use to evaluate and demonstrate the effectiveness of your project in reducing nonpoint source pollution.)*

Project effectiveness evaluation will include as written summary and photo documentation of monitoring results including: photo-point monitoring with before and after photos, pollutant load reduction estimates, and vegetation mortality monitoring for riparian buffer enhancements. Monitoring will be conducted primarily by Trout Unlimited with support from the Task Force (Deliverables = Monitoring Report Document).



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Water Quality Benefits and Sustainability

Explain why the project is an appropriate next step for making progress towards removing a pollutant/waterbody combination from Montana's 2018 Impaired Waters List or preventing a healthy waterbody from becoming impaired?

Pollutants identified in the 2010 TMDL document leading to water quality impairments in the Middle Fork West Fork Gallatin River include sediment, nutrients, and pathogens. Projects 3, 4, and 5 primarily address sediment impairments, including the non-pollutant "alteration in stream-side or littoral vegetation covers" impairment. Project implementation will enhance pool and large woody debris frequency in all three project areas, while also eliminating sediment loading from a large eroding streambank in Project 5. In addition, riparian buffer enhancements will benefit nitrate+nitrite and E. coli impairments by filtering surface water runoff and shallow groundwater. Collectively, Projects 3, 4, 5 are an appropriate next step for making progress towards removing a pollutant/waterbody combination from Montana's 2018 Impaired Waters List.

Will your project address a major local source of nonpoint source pollution? Explain.

Yes, this project will address sediment inputs from streambank erosion and upland erosion by enhancing pool and large woody debris frequency and eliminating sediment loading from a large eroding streambank. The project will also address residential/commercial vegetation clearing and residential/commercial landscape maintenance by enhancing the riparian buffer to aid in filtering surface water runnoff and shallow groundwater. Additionally, the project provides an opportunity to ask landowners adjacent to the MFWFGR to certify their landscapes as Trout-Friendly which requires implementing landscaping practices that protect water quality such controlling erosion and limiting chemical use.

Describe the long-term, sustainable benefits your project will have on water quality.

Projects 3, 4 and 5 will contribute to the long-term, sustainable reductions in nonpoint source pollution by addressing historic environmental impacts incurred during logging activities and resort development. Floodplain reconnection, large woody debris placement, and riparian buffer enhancements are intended to recreate a naturally functioning stream system with a sufficient riparian buffer that will be resilient to future development activities and climate variability.

Explain how your project will promote self-maintaining natural, ecological, and social processes that protect water quality.

Floodplain reconnection, large woody debris placement, and riparian buffer enhancements in Projects 3, 4, and 5 are intended to recreate a naturally functioning stream system with a sufficient riparian buffer in which natural ecological processes lead to woody debris inputs and pool formation, which creates diverse habitat conditions for fish and aquatic life. Specifically, Project 3 will promote self-maintaining natural processes that protect water quality by reconnecting the floodplain and restoring a natural riffle-pool sequence to the stream which is currently in a channelized condition. Project 4 will promote self-maintaining natural processes that protect water quality by creating a riparian buffer using native vegetation and increasing the amount of large woody debris in the stream channel, which will encourage pool formation. Project 5 will promote self-maintaining natural processes that protect water quality by creating a riparian buffer using native vegetation and removing a large streambank erosion sediment source.

Nonpoint Source Goals and Success Metrics

Nonpoint source pollution goal	Action that will be taken to reach the goal	Metric used to measure success
29% reduction in sediment	Floodplain reconnection, large woody debris placement, relocation of channel away from large eroding streambank in Project 5	Elimination of sediment loading from large eroding streambank in Project 5. Measured using the Bank Erosion Hazard Index (BEHI).
33% reduction in nitrate + nitrite	Floodplain reconnection, riparian buffer enhancements	Measured using length (ft) and width (ft) of riparian buffer enhancement.

Project Education and Outreach

Describe the educational benefits of your project. Will the project inspire additional nonpoint source pollution prevention work within the watershed?

We will utilize these projects as a platform to inform the Big Sky community about the threats facing the watershed and ways people can incorporate watershed stewardship actions in their homes and businesses. Although our digital and print outreach will be broad reaching, we will take this opportunity to focus our outreach on landowners and businesses directly adjacent to the MFWFGR and its tributaries. We envision letter writing and phone campaigns to inform adjacent landowners about the impairment status, what we are doing as a local watershed group, and ask them to personally invest in protecting the river by engaging in stewardship practices that address nonpoint source pollution. We would like to utilize this method of using restoration projects to highlight watershed threats followed by a call to action to inspire pollution prevent work throughout the watershed.

Bigger Picture Benefits

Describe your project's benefits to each of the items below. If there are no associated benefits, type "NA" for "not applicable".

Benefit to additional natural resources (e.g. native fisheries, threatened and endangered species, wetlands, etc).

While currently a wild trout fishery, there is an opportunity to restore westslope cutthrout trout through the construction of a barrier on the West Fork Gallatin River. LWD additions, increased pool frequencys, and enhanced riparian buffers will positively benefit water temperatures and fish habitat and support future re-introduction efforts of westslope cutthroat trout.

Wetlands will be enhanced in all three project areas through floodplain reconnection actions.

Addressing climate resiliency and hazard mitigation.

Projects 3, 4 and 5 address climate change resiliency and adaptation by reconnecting the Middle Fork West Fork Gallatin River with it's floodplain, expanding the potential for natural water storage in high-elevation meadows in the headwaters of the Missouri River system, and slowing the flow of water through the system.

Provides direct public recreational access or aesthetic benefit.

All of the projects are located within areas adjacent to public recreational access and offer aesthetic benefits to adjacent properties and recreational users. Project 3 is located adjacent the "Big Sky Resort to Town Center" trail route that is currently in the process of being developed by the Big Sky Community Organization which will offer a family friendly trail connection from the resort to the commercial and residential center of Big Sky. Project 4 is located adjacent to Big Sky Resort's Lone Moose ski access lift. Project 5 is located in an area of "designated parklands" and adjacent to a trail that provides access for horseback riding, hiking, fishing, and cross country skiing in the winter.

Reduces pollutant loading above a permitted point source in a manner that could contribute to future economic benefit for a downstream Montana community.

With the ongoing growth in the Big Sky area, the Big Sky Sustainable Water Solutions Forum (Water Forum) was conducted from 2016-2018 to develop a unified vision for water resources management in the Big Sky area that maintains and enhances ecologically healthy river systems in the community and downstream, while also identifying sustainable solutions for community water supply and wastewater treatment challenges. There is currently no direct discharge of effluent into the Gallatin River and recommendations from the Water Forum outlines several wastewater reuse alternatives intended to keep direct discharges of treated wastewater effluent out of the Gallatin River.

Directly helps protect a drinking water source.

The primary drinking water source for the Big Sky County Water and Sewer District (BSCWSD) is the shallow alluvial Meadow Village Aquifer located under the West Fork Gallatin River, to which the Middle Fork West Fork Gallatin River is a major tributary. The Meadow Village Aquifer is recharged from surface water and groundwater interactions and is hydrologically connected to the West Fork Gallatin River. Thus, improving surface water quality in the Middle Fork West Fork Gallatin River provides improved water quality in surface water contributions recharging the Meadow Village aquifer.

Benefit to socially disadvantaged populations.

NA

Additional Attachments

Attach additional items that could help reviewers better understand your project. Items could include site photos, design drawings, site evaluations, permits, etc. Please be conscious of reviewers' time, as they may not have time to read lengthy studies and reports. List all additional attachments below.

- [x] Middle Fork West Fork Restoration Plan
- [x] Water Wisdom Articles
- [x] Trout-Friendly Landscaping Certification
- [x] Education & Outreach Map
- [x] Septic Maintenance Brochure
- [ ] _____
- [ ] _____
- [ ] _____

Letters of Support

BIG SKY RESORT
P.O. Box 160001
Big Sky, Montana
59716

(406) 995-5000
Fax (406) 995-5001

National Reservations
(800) 548-4486

Group/Convention Sales
(800) 548-4487
Fax (406) 995-5003

www.bigskyresort.com

November 3, 2020

319 Application Agency Review Panel
Montana Department of Environmental Quality
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

RE: Gallatin River Task Force 319 Grant Application Support Letter

Dear 319 Review Panel:

I am writing on behalf of Big Sky Resort to express support for the Gallatin River Task Force 319 application, "*Middle Fork West Fork Gallatin River Sediment, Nutrient and Pathogen Reduction*". These projects will improve and protect water quality in the Middle Fork and prevent further degradation of downstream waters in the West Fork and Gallatin mainstem.

We are excited for the opportunity to partner with the Task Force and provide assistance with this project through in-kind donations of time and resources.

I strongly urge you to fund the Gallatin River Task Force 319 application. Thank you for your consideration.

Sincerely,

Taylor Middleton
COO Big Sky Resort

BOYNE USA RESORTS
Big Sky, MT
Boyne Mountain, MI
Boyne Highlands, MI
Bay Harbor Golf Club, MI
Brighton, UT
Crystal Mountain, WA
Gatlinburg, TN
Cypress Mountain, BC
The Inn at Bay Harbor, MI
Loon Mountain, NH
Sugarloaf/USA, ME
Sunday River Resort, ME
The Summit at Snoqualmie, WA

www.boyneusaresorts.com

Michael J. Schreiner
Middle Fork Properties, LLC
PO Box 370
Bozeman, MT 59771

November 3, 2020

319 Application Agency Review Panel
Montana Department of Environmental Quality
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

RE: Gallatin River Task Force 319 Grant Application Support Letter

Dear 319 Review Panel:

I am writing on behalf of Middle Fork Properties to express support for the Gallatin River Task Force 319 application, "*Middle Fork West Fork Gallatin River Sediment, Nutrient and Pathogen Reduction*". These projects will improve and protect water quality in the Middle Fork and prevent further degradation of downstream waters in the West Fork and Gallatin mainstem.

Since 1989, three generations of our family have lived and worked in Big Sky and the surrounding area. One of the reasons we chose Big Sky and continue to choose Big Sky are the natural resources. Like Lone Mountain, the Middle West Fork of the Gallatin is a core component of those resources. Keeping the river healthy is critical to maintaining the delicate ecosystem, providing habitat for wildlife, opportunities for recreation, and ensuring that Big Sky continues to attract visitors and residents and remain economically vibrant for years to come.

As a landowner, steward of the river, and supporter of this project, our team and I look forward to playing an appropriate role. We have discussed with the GRTF a number of tangible ways to offer support and will continue the conversation as the project moves forward.

I strongly urge you to fund the Gallatin River Task Force 319 application. Thank you for your consideration.

Sincerely,

DocuSigned by:
Michael J Schreiner III
E84A9D52E507494...

Michael J. Schreiner
Managing Member

Chris Leonard
Middle Fork Properties, LLC
PO Box 370
Bozeman, MT 59771

November 3, 2020

319 Application Agency Review Panel
Montana Department of Environmental Quality
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

RE: Gallatin River Task Force 319 Grant Application Support Letter

Dear 319 Review Panel:

I am writing on behalf of Middle Fork Properties to express support for the Gallatin River Task Force 319 application, "*Middle Fork West Fork Gallatin River Sediment, Nutrient and Pathogen Reduction*". These projects will improve and protect water quality in the Middle Fork and prevent further degradation of downstream waters in the West Fork and Gallatin mainstem.

The Middle Fork of the Gallatin is a critical part of the natural ecosystem in Big Sky. Its canyon provides habitat for wildlife, opportunities for recreation, and water to support vegetation, animals and humans. Like any core natural resource, its health is critical to the survival of all inhabitants and is a fundamental reason Big Sky is the spectacular place that it is. We need to care for this river.

As a landowner's representative, steward of the river, and supporter of this project, our team and I look forward to playing an appropriate role. We have discussed with the GRTF a number of tangible ways to offer support and will continue the conversation as the project moves forward.

I strongly urge you to fund the Gallatin River Task Force 319 application. Thank you for your consideration.

Sincerely,

DocuSigned by:
Chris Leonard
F67455453B58451...

Chris Leonard
Owner's Representative

November 1, 2020

319 Application Agency Review Panel
Montana Department of Environmental Quality
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

RE: Gallatin River Task Force 319 Grant Application Support Letter

Dear 319 Review Panel:

This letter is sent by the Board of Directors of the Lone Moose Meadows Unit Owners Association, which is a complex of 28 units on the Middle Fork of the West Fork of the Gallatin River. Our community would like to express our support for the Gallatin River Task Force 319 application, "*Middle Fork West Fork Gallatin River Sediment, Nutrient and Pathogen Reduction.*" We believe these projects will improve and protect water quality in the Middle Fork and protect degradation of downstream waters in the West Fork and Gallatin mainstem. We further believe that this initiative will have long-term, favorable impacts on the recreational, ecologic and economic value of our property and for our friends and neighbors in the local community and the state.

We respectfully request funding for the Gallatin River Task Force 319 application. Thank you for your consideration.

Sincerely,

Lone Moose Meadows Unit Owners Association Board of Directors

Alan Johnson, Secretary
Aspen Groves Owners Association
P O Box 161473
Big Sky, MT 59716

November 3, 2020

319 Application Agency Review Panel
Montana Department of Environmental Quality
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

RE: Gallatin River Task Force 319 Grant Application Support Letter

Dear 319 Review Panel:

I am writing on behalf of the Aspen Groves Owners Association to express support for the Gallatin River Task Force 319 application, "*Middle Fork West Fork Gallatin River Sediment, Nutrient and Pathogen Reduction*". This project will improve and protect water quality in the Middle Fork and prevent further degradation of downstream waters in the West Fork and Gallatin River.

As residents of Big Sky we are keenly aware of the critical importance our rivers and streams have for quality of life in Montana. The Middle Fork project will help improve and sustain clean water quality in this beautiful stream that runs through our neighborhood on its way to the Gallatin River. The health of the Middle Fork is important to all of us and to all those who live downstream.

A number of property owners in our neighborhood are donors to the Gallatin River Task Force and have volunteered to help on their projects. We have high confidence in their skills and ability to manage the proposed project effectively to achieve the intended results.

I strongly urge you to fund the Gallatin River Task Force 319 application. Thank you for your consideration.

Sincerely,

Alan Johnson

Secretary, Aspen Groves Owners Association

ANTLER RIDGE

PO Box 160251, Big Sky, Montana 59716-0251

Antler Ridge
Home Owners Association Board of Directors

November 1, 2020

319 Application Agency Review Panel
Montana Department of Environmental Quality
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

RE: Gallatin River Task Force 319 Grant Application Support Letter

Dear 319 Review Panel:

The Antler Ridge Home Owners Association Board of Directors is writing to express support for the Gallatin River Task Force 319 application, "*Middle Fork West Fork Gallatin River Sediment, Nutrient and Pathogen Reduction*". We believe that these projects can improve and protect water quality in the Middle Fork and prevent further degradation of downstream waters in the West Fork and Gallatin mainstream.

We have had productive discussions with the Gallatin River Task Force specifically on Project #5 of the proposal which runs across Antler Ridge park space. We are particularly interested in looking at ways that wetland restoration could be further increased, possibly by utilizing all existing channels within the Antler Ridge and Aspen Grove park areas to produce not only sediment control but improved water quality treatment.

As Antler Ridge builds out, the Board have been focusing on how we can best steward, maintain and protect Antler Ridge's extensive open spaces and parkland while also meeting homeowner needs. We are working on management within our community to minimize unauthorized bicycle and pedestrian traffic along the river except for passive recreational uses which should help further the effort of minimizing sediment transport. We are reinforcing our architectural guidelines to require implementation of best management practices. For the past three years we have worked with the Gallatin Invasive Species Alliance putting weed management controls in place (with a plan to expand that activity to the park space) and are also working with the fire department on wildfire mitigation actions that need to be taken by homeowners and in the open areas/park space.

In terms of support, while a financial commitment would be difficult, we can commit to a significant number of volunteers (boots on the ground) to help implement Project #5. We also have a lot of fallen trees close to the old logging trail that leads down to the project area that can be used as needed to create dams, etc.

The Antler Ridge Board of Directors strongly urge you to fund the Gallatin River Task Force 319 application. Thank you for your consideration.

Sincerely and on behalf of the Antler Ridge Board of Directors,

Michelle Kristula-Green

Communications Director, Antler Ridge Board of Directors

Jeff Dunn
Project Manager, Upper Missouri and Yellowstone
Western Water & Habitat Project

November 12, 2020

Mr. Mark Oakey
Watershed Protection Section
Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

RE: Middle Fork West Fork Gallatin River Restoration – Projects 3, 4 and 5

Dear Mr. Oakey,

Trout Unlimited supports the Gallatin River Task Force's proposal for restoration of the Middle Fork West Fork Gallatin River. Over the past 15 years, I have spent an extensive amount of time on-the-ground in the Middle Fork West Fork Gallatin River extending back to the TMDL assessments conducted between 2005 and 2010, along with more recent efforts to develop the Middle Fork West Fork Restoration Project Plan in 2019. Based on this on-the-ground experience, I believe that Projects 3, 4, and 5 represent a holistic approach to addressing the stream degradation that has occurred due to both historic logging and more recent resort development. Projects 3 and 4 are in the highly visible Big Sky Ski Resort base area, which showcases Montana's natural amenities to residents from throughout our state, along with national and international travelers. In addition to recreationists, Big Sky Resort regularly hosts large conferences attracting national and international attendees, making this an ideal location for showcasing community-driven water quality enhancement efforts. Project 5 is in an area of designated parklands in the Big Sky area which is publicly accessible and visible to hikers, bikers and cross-country skiers. In combination, these three projects will be a significant step towards restoring the aquatic life and cold-water fishery beneficial uses in the Middle Fork West Fork Gallatin River and will help set the stage for achieving our aspiration of restoring native Westslope Cutthroat Trout to the West Fork Gallatin River headwaters.

Thank you for considering this request for funding.

Sincerely,

Jeff Dunn

Trout Unlimited: America's Leading Coldwater Fisheries Conservation Organization
321 East Main Street, Suite 411, Bozeman, MT 59715
cell: (406) 579-0516 • email: jdunn@tu.org • www.tu.org

BIG SKY
COMMUNITY ORGANIZATION

Adam Johnson, Parks and Trails Director
Big Sky Community Organization
P.O. Box 161404
Big Sky, MT 59716

November 11, 2020

319 Application Agency Review Panel
Montana Department of Environmental Quality
1520 E. Sixth Avenue
P.O. Box 200901
Helena, MT 59620-0901

RE: Gallatin River Task Force 319 Grant Application Support Letter

Dear 319 Review Panel:

I am writing the Big Sky Community Organization (BSCO) to express support for the Gallatin River Task Force 319 application, "*Middle Fork West Fork Gallatin River Sediment, Nutrient and Pathogen Reduction*". These projects will improve and protect water quality in the Middle Fork and prevent further degradation of downstream waters in the West Fork and Gallatin mainstem.

The Big Sky Community Organization is a non-profit that builds and maintains the parks and trails system for the unincorporated community of Big Sky. Our parks and trails system is located along the Middle Fork West Fork Gallatin River, with the river running through our Community Park and alongside many of our community trails. The Middle Fork of the West Fork runs directly through the Big Sky Community and is a treasured corridor for recreation and wildlife and is a frequent location for the BSCO's summer kids camp to visit while learning about our terrestrial, riparian, and riverine ecosystems.

The Big Sky Community Organization is currently working on a trail project reaching from the Big Sky Resort down the Big Sky Town Center and parallels segments of the river on which this project is occurring. We are working in collaboration with the Gallatin River Task to provide large woody debris derived from timber we remove from our trail project for use by the Task Force in their rehabilitation efforts described in the project. The trail project will also provide a way for the important work of the Gallatin River Task Force to be viewed by the community and foster a better understanding of the fragile nature of our areas riparian vegetation.

BIG SKY
COMMUNITY ORGANIZATION

I strongly urge you to fund the Gallatin River Task Force 319 application. Thank you for your consideration.

Sincerely,

Adam Johnson

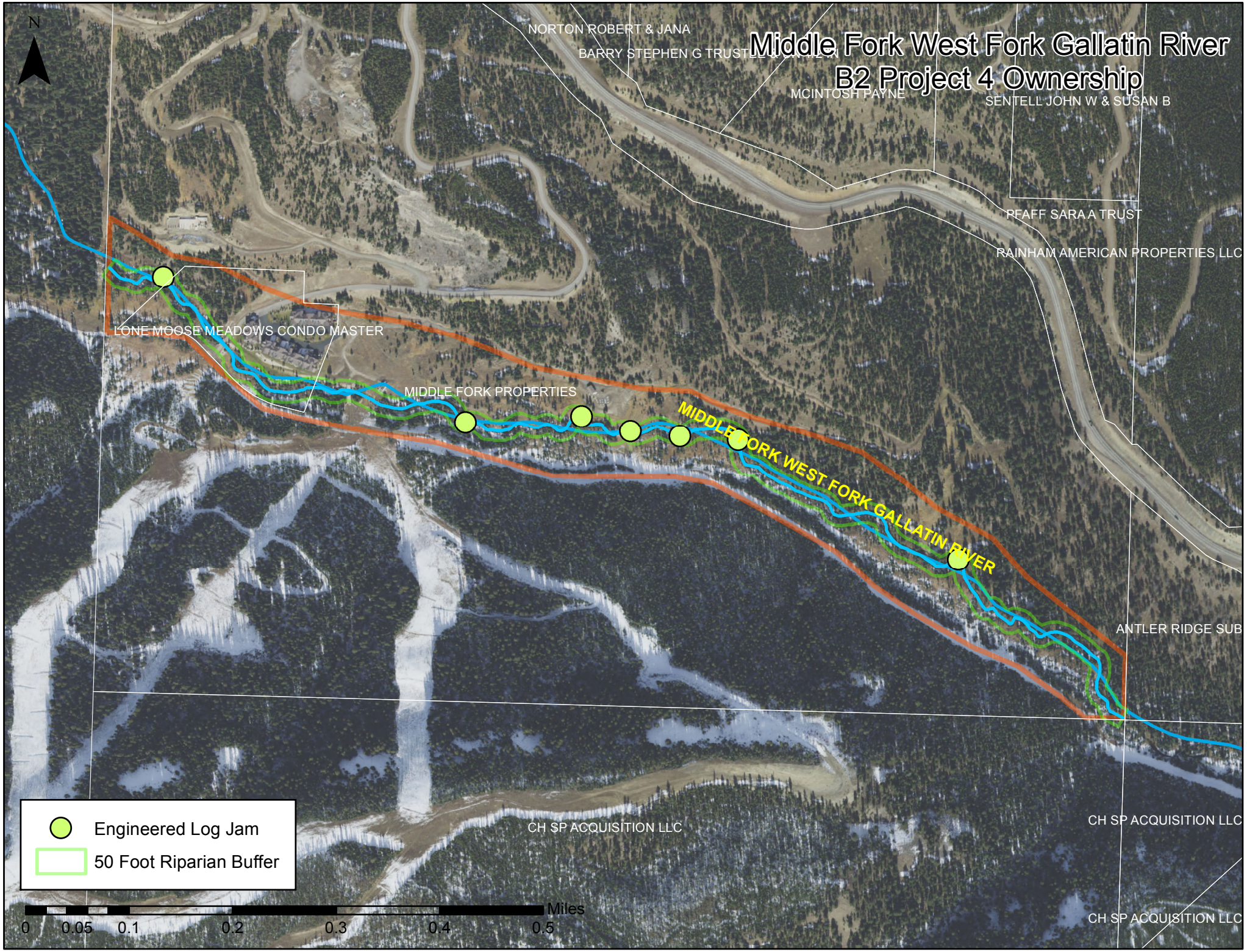
Park & Trails Director

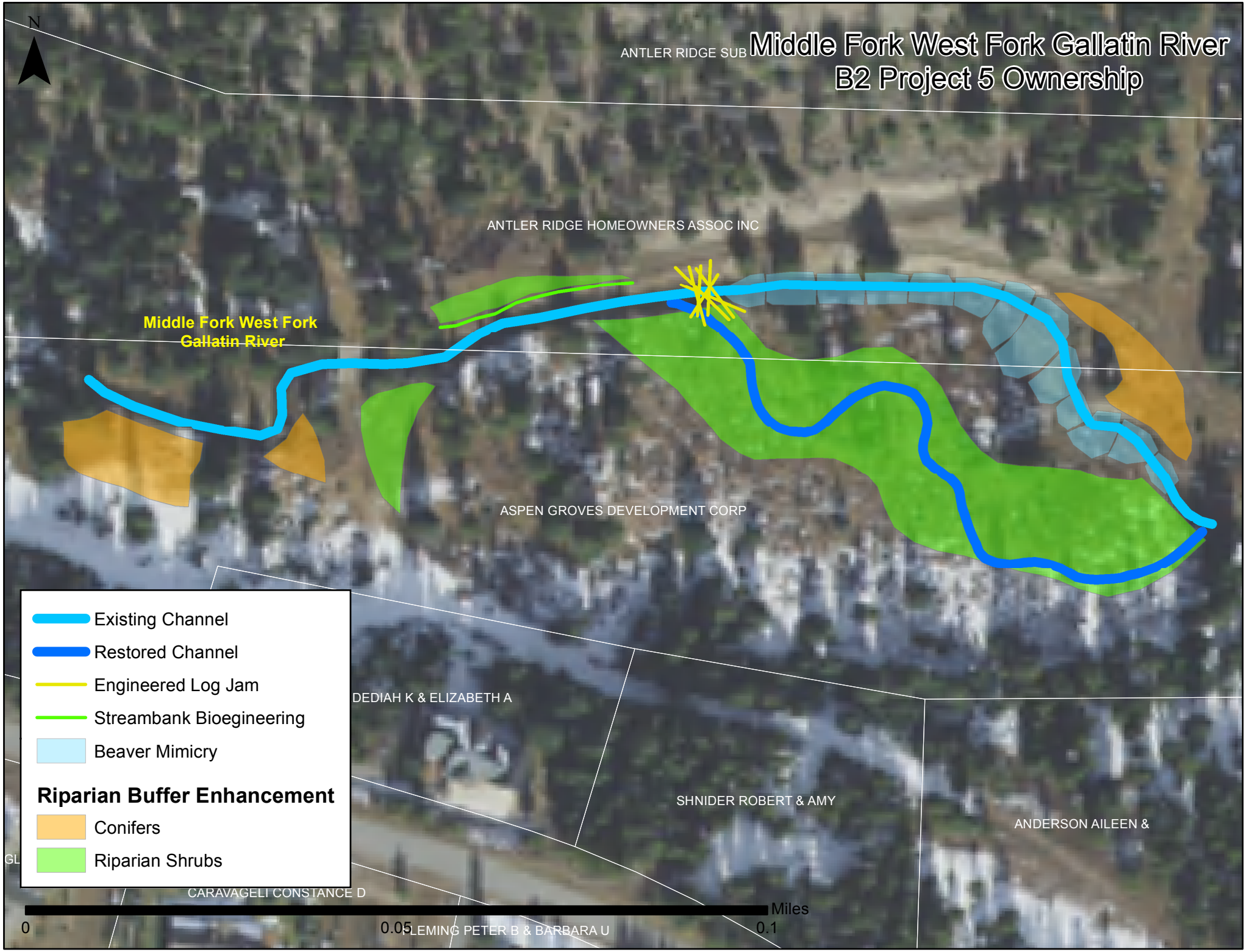
Big Sky Community Organization

Supplemental Attachments


N
Middle Fork West Fork Gallatin River
B2 Projects 3, 4 & 5 Overview
Project 3: 45.28729, -111.39264
Project 4: 45.27927, -111.36258
Project 5: 45.26795, -111.33333
Project 3
Middle Fork West Fork
Gallatin River
Project 4
Project 5
Miles
0 0.05 0.1 0.2 0.3 0.4 0.5


N
Middle Fork West Fork Gallatin River
Project 3 Ownership
BIG SKY RESORT LLC
BIG SKY RESORT LLC
CLIFFHANGER #9 LLC
BEHM'S BIG DOG LODGE LLC
Large Woody Debris
Beaver Dam Analog
Existing Channel
0
0.025
0.05
0.1
Miles
BIG SKY RESO LLC
WESTLAND ENTERPRISES
RIZZO RICHARD COSMO &
RIZZO RICHARD COSMO &


Middle Fork West Fork Gallatin River
B2 Project 4 Ownership
N
NORTON ROBERT & JANA
BARRY STEPHEN G TRUSTEE
MCINTOSH PAYNE
SENTELL JOHN W & SUSAN B
PFAFF SARA A TRUST
RAINHAM AMERICAN PROPERTIES LLC
LONE MOOSE MEADOWS CONDO MASTER
MIDDLE FORK PROPERTIES
MIDDLE FORK WEST FORK GALLATIN RIVER
ANTLER RIDGE SUB
CH SP ACQUISITION LLC
CH SP ACQUISITION LLC
CH SP ACQUISITION LLC
Engineered Log Jam
50 Foot Riparian Buffer
Miles
0
0.05
0.1
0.2
0.3
0.4
0.5


N
Middle Fork West Fork Gallatin River
B2 Project 5 Ownership
ANTLER RIDGE SUB
ANTLER RIDGE HOMEOWNERS ASSOC INC
Middle Fork West Fork Gallatin River
ASPEN GROVES DEVELOPMENT CORP
DEDIAH K & ELIZABETH A
SHNIDER ROBERT & AMY
ANDERSON AILEEN &
CARAVAGELI CONSTANCE D
FLEMING PETER B & BARBARA U
Existing Channel
Restored Channel
Engineered Log Jam
Streambank Bioegineering
Beaver Mimicry
Riparian Buffer Enhancement
Conifers
Riparian Shrubs
Miles
0
0.05
0.1

Middle Fork West Fork Gallatin River Restoration Project Plan

June 28, 2019

MIDDLE FORK WEST FORK GALLATIN RIVER RESTORATION PROJECT PLAN

by

Jeff Dunn, Upper Missouri / Yellowstone Project Manager
321 E. Main Street, Suite 411
Bozeman, Montana 59715

Prepared in partnership with

32 Market Place, Suite 6 | PO Box 160513
Big Sky, MT 59716

June 28, 2019

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ATTACHMENTS

INTRODUCTION

The *Middle Fork West Fork Gallatin River Restoration Plan* examines water quality improvement projects for the Middle Fork West Fork Gallatin River in five discreet project areas extending from the headwaters on Lone Mountain downstream to the confluence with the North Fork West Fork Gallatin River. Projects include:

- Project 1 - Upper Middle Fork West Fork Road Sediment BMPs
- Project 2 - Upper Middle Fork West Fork Riparian Buffer Enhancement around Lake Levinsky
- Project 3 - Middle Fork West Fork Restoration downstream of Lake Levinsky
- Project 4 - Middle Fork West Fork Restoration in Lone Moose Meadows
- Project 5 - Middle Fork West Fork Restoration in Aspen Groves/Antler Ridge

The *Middle Fork West Fork Gallatin River Restoration Plan* provides a foundation for an application to the Montana Department of Environmental Quality's (DEQ) 319 grant program to address identified water quality impairments and improve conditions so that the Middle Fork West Fork Gallatin River meets water quality standards and fully supports the aquatic life and primary contact recreation beneficial uses, which are currently only partially supported. The *Middle Fork West Fork Gallatin River Restoration Plan* provides a holistic approach for addressing water quality impairments within the Middle Fork West Fork Gallatin River watershed, while also promoting natural stream and riparian processes. Additional opportunities for watershed improvements are discussed within the "future opportunities" section at the end of this report.

PROBLEM DESCRIPTION

The Middle Fork West Fork Gallatin River is a tributary to the West Fork Gallatin River flowing approximately 6 miles from its headwaters on Lone Mountain to its confluence with the North Fork West Fork Gallatin River. The Middle Fork West Fork Gallatin River watershed is effectively divided into "upper" and "lower" segments by Lake Levinsky, which is a man-made impoundment in the Mountain Village that provides water storage for snowmaking at Big Sky Resort. The 2008 303(d) List of Impaired Waterbodies identified solids (suspended/bedload), alteration in stream-side or littoral vegetation covers, nitrate/nitrite, and fecal coliform as causes for impairment in the Middle Fork West Fork Gallatin River, which impact the aquatic life, cold water fishery, and primary contact recreation beneficial uses (DEQ 2010). In 2010, *The West Fork Gallatin River Watershed Total Maximum Daily Loads (TMDLs) and Framework Watershed Water Quality Improvement Plan* (DEQ 2010) provided TMDLs for sediment, nitrate+nitrite (NO^3+NO^2) and *E. coli* in the Middle Fork West Fork Gallatin River.

Pollutants identified in the 2010 TMDL document leading to water quality impairments in the Middle Fork West Fork Gallatin River include sediment, nutrients, and pathogens. Excess sediment is contributed from roads, resort development, recreation, and historic riparian vegetation removal. Sediment impairments, including the non-pollutant "alteration in stream-side or littoral vegetation covers" impairment, are described in the TMDL document as excess fine sediment in riffles and pool tails and low residual pool depths upstream of Lake Levinsky and decreased pool and large woody debris frequency downstream of Lake Levinsky. Excess nutrients (nitrate+nitrite) are identified in the TMDL document as derived from residential and resort land and vegetation clearing, residential and commercial landscape and maintenance and management, and sewer or service line failures or leaks.

The TMDL document indicates that controlling and limiting nitrate+nitrite from lands in the developed and residential areas upstream of Lake Levinsky are the focus of nutrient load reductions. Excess pathogens *(E. coli*) are identified in the TMDL document as derived from domestic pets, geese and waterfowl, wildlife, and refuse and runoff from streets, parking lots and other impervious surfaces in the developed area, along with sewer line failures or leaks, particularly downstream of Lake Levinsky. Percent reductions in pollutant loading necessary to meet water quality standards and restore full support of beneficial uses are presented in **Table 1**.

Table 1. Middle Fork West Fork Gallatin River TMDL Percent Reductions

Pollutant	Stream Segment	Percent Reduction	Anthropogenic Source Categories
Sediment	entire length	29%	road crossings, traction sand, streambank erosion, upland erosion, point sources
Nitrate+nitrite	upper	33%	residential and resort landscape management and maintenance, on-site septic systems
	lower	0%	
E. coli	entire length	55%	wastewater, residential and recreational land uses

In 2012, the Blue Water Task Force, which is now the Gallatin River Task Force (Task Force), prepared the *Upper Gallatin Watershed Restoration Plan* (BWTF 2012), which outlines a restoration strategy for addressing the identified water quality impairments in the West Fork Gallatin River watershed. In 2018, the Task Force, in partnership with a diverse group of stakeholders comprising the Big Sky Sustainable Water Solutions Forum, completed the *Big Sky Area Sustainable Watershed Stewardship Plan* (Dunn et al. 2018). The Watershed Stewardship Plan identifies action items for sustaining the ecological health of the river systems, water supply and availability, and wastewater treatment and reuse. The Task Force also recently completed the *Big Sky Area Wetland and Riparian Mapping* (Dunn and Pettit 2018) report, which identifies wetland and riparian restoration and conservation priorities based on natural resource and conservation values, along with wetland and riparian areas with a high potential for impacts from infrastructure and development.

PROJECT LOCATION AND IMPAIRMENT CAUSE ADDRESSED

The five proposed projects on the Middle Fork West Fork Gallatin River are within the West Fork Gallatin River HUC12 (100200080202) in the Upper Gallatin TMDL Planning Area in Madison (Projects 1, 2 and 3) and Gallatin (Projects 4 and 5) counties. Projects address sediment, nutrient and pathogen inputs, with specific project areas presented in **Figure 1** and the water quality impairment cause addressed presented in **Table 2**. In addition, Projects 1, 2, 3 and 5 are located within wetland and riparian priority areas identified in the 2018 *Big Sky Area Wetland and Riparian Mapping* report (**Figure 1**).

Table 2. Middle Fork West Fork Gallatin River Project Impairment Addressed

Project	Impairment Cause Addressed	Latitude	Longitude
1	Sediment, (*E. coli*, nitrate+nitrite)	45.29192	-111.40438
2	Nitrate+nitrite, (sediment, *E. coli*)	45.28904	-111.39657
3	Sediment, alteration in stream-side or littoral vegetation covers	45.28729	-111.39264
4	Sediment, alteration in stream-side or littoral vegetation covers	45.27927	-111.36258
5	Sediment, alteration in stream-side or littoral vegetation covers	45.26795	-111.33333

Parentheses indicate secondary benefits of the project

Figure 1. Project Area Overview

PROJECT 1 - UPPER MIDDLE FORK WEST FORK ROAD SEDIMENT BMPS

Project 1 Description:

Project 1 addresses sediment inputs from the road network within the headwaters of the Middle Fork West Fork Gallatin River watershed, with additional potential to reduce nutrient and pathogen inputs. Sediment contributions addressed in Project 1 include runoff from unpaved roads, along with traction sand inputs from both paved and unpaved roads. Project 1 sites include road crossings and near-stream road segments on the Middle Fork West Fork Gallatin River and its tributary streams in the headwaters of the Middle Fork West Fork Gallatin River watershed upstream of Lake Levinsky in the Big Sky Resort base area. Project 1 involves implementation of Best Management Practices (BMPs) by installation of barriers to sediment contributions and recontouring road shoulders where possible. A summary of Project 1 sites is provided in **Table 3** and **Figure 2**, with photographs of each site presented in **Attachment A – Road Sediment Reduction Sites**.

Project 1 Goal and Objectives:

The goal of Project 1 is to reduce sediment loading to streams at road crossings and near-stream road segments in the headwaters of the Middle Fork West Fork Gallatin River watershed upstream of Lake Levinsky. To attain this goal, the following objectives will be accomplished: 1) install and maintain BMPs at 16 road crossings and near-stream road segments on the Middle Fork West Fork Gallatin River (4 sites) and its tributaries (12 sites) upstream of Lake Levinsky (**Table 3** and **Figure 2**).

Project 1 Partners:

Potential Project 1 partners include the Gallatin River Task Force, Trout Unlimited, Big Sky Resort, Moonlight Basin, Montana Department of Transportation, Madison County, and private landowners.

Project 1 Methods:

To address sediment inputs at road crossings, coir wattles will be installed, and the road shoulder will be recontoured where possible. Sites will be maintained annually, and long-term solutions will be developed where possible to reduce the risk of sediment inputs due to culvert failures, enhance fish passage, and improve connectivity within the upper Middle Fork West Fork Gallatin River watershed.

Project 1 Ownership and Access:

Ownership is primarily Big Sky Resort LLC / Boyne Resorts Inc. and Moonlight Basin, along with the Montana Department of Transportation and private landowners (Quam Jay M, Harbaugh Darla L Trust). (**Table 3**). Access is provided by adjacent roadways.

Table 3. Project 1 Road Crossings

Site	Stream	Road Name	Road Surface	Ownership / Responsibility	Latitude	Longitude
MFX-01	tributary	Turkey Leg Road	Gravel	Big Sky Resort LLC	45.29021	-111.39948
MFX-02	Middle Fork	Sitting Bull Road	Paved	Big Sky Resort LLC	45.29211	-111.39796
MFX-03	tributary	Sitting Bull Road	Gravel	Big Sky Resort LLC	45.29030	-111.40294
MFX-04	tributary	Rising Bull Road	Paved	Big Sky Resort LLC / Boyne Properties Inc	45.29176	-111.40469
MFX-05	tributary	unnamed	Gravel	Big Sky Resort LLC	45.29011	-111.40097
MFX-06	tributary	Lone Mountain Trail (HWY64)	Paved	Montana Department of Transportation	45.29224	-111.39460
MFX-07	tributary	White Otter Road	Paved	Quam Jay M / Harbaugh Darla L Trust	45.29474	-111.40415
MFX-08	Middle Fork	White Otter Chair Lift Access	Gravel	Big Sky Resort LLC	45.29405	-111.40513
MFX-09	tributary	Rising Bull Road	Gravel	Big Sky Resort LLC	45.29745	-111.41301
MFX-10	Middle Fork	Rising Bull Road	Gravel	Boyne Properties Inc	45.29400	-111.41309
MFX-11	tributary	Mountain Loop Road	Paved	MB MT Acquisition LLC	45.29918	-111.41557
MFX-12	tributary	Mountain Loop Road	Paved	MB MT Acquisition LLC	45.29707	-111.41735
MFX-13	Middle Fork	Mountain Loop Road	Paved	MB MT Acquisition LLC	45.29408	-111.41632
MFX-14	tributary	Big Sky Resort Road	Paved	Big Sky Resort LLC	45.28449	-111.39906
MFX-15	tributary	parking lot	Gravel	Big Sky Resort LLC	45.29021	-111.39700
MFX-16	tributary	Lone Mountain Trail (HWY64)	Paved	Montana Department of Transportation	45.29580	-111.40402

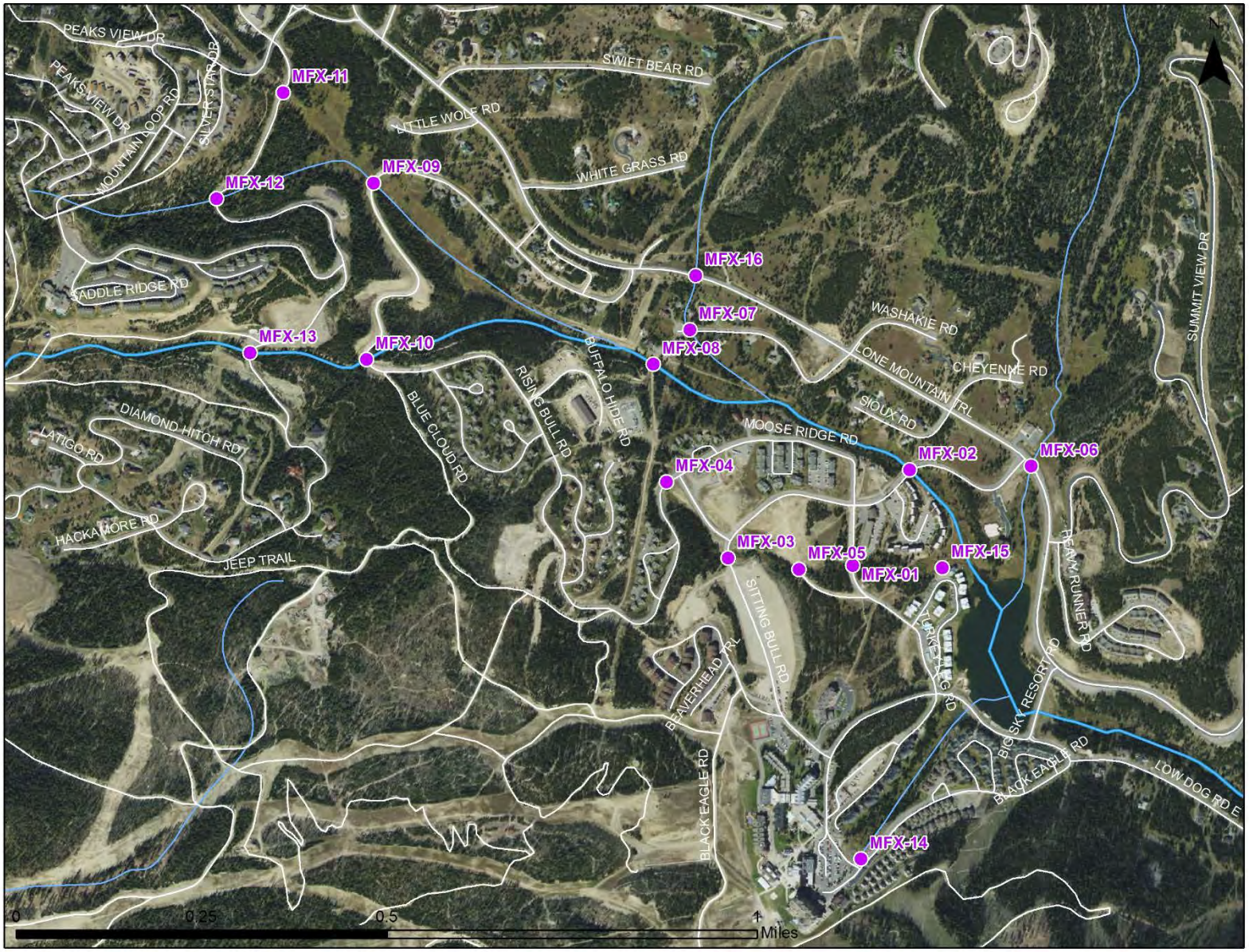


Figure 2. Project 1 Road Crossings

PROJECT 2 - UPPER MIDDLE FORK WEST FORK RIPARIAN BUFFER

Project 2 Description:

Project 2 addresses nutrient inputs along the margin of Lake Levinsky, with additional potential to reduce sediment and pathogen inputs. Project 2 entails planting riparian shrubs and conifers to enhance the riparian buffer along Lake Levinsky, which is an impoundment on the Middle Fork West Fork Gallatin River. Riparian buffer enhancement will filter surface and subsurface runoff from adjacent areas. Project 2 specifies 0.43 acres of riparian buffer enhancement along Lake Levinsky at five sites (**Figures 3** and **4**).

Project 2 Goal and Objectives:

The goal of Project 2 is to reduce nutrient loading to Lake Levinsky, which is an impoundment on the Middle Fork West Fork Gallatin River. To attain this goal, the following objectives will be accomplished: 1) install riparian shrubs and conifers at five sites totaling 0.43 acres.

Project 2 Partners:

Potential project partners include the Gallatin River Task Force, Trout Unlimited, Big Sky Resort, and Montana Department of Transportation, along with homeowners in the Lake Condominiums.

Project 2 Methods:

To address nutrient inputs, riparian shrubs and conifers will be planted to enhance the riparian buffer.

Project 2 Ownership and Access:

Ownership is primarily Big Sky Resort LLC and Big Sky Montana Inc. and access is provided by adjacent roadways.

Figure 3. Project 2 Existing Conditions along Lake Levinsky

Figure 4. Project 2 Riparian Buffer Enhancement Areas

PROJECT 3 - MIDDLE FORK WEST FORK RESTORATION DOWNSTREAM OF LAKE LEVINSKY

Project 3 Description:

Project 3 addresses sediment impairments, including "alteration in stream-side or littoral vegetation covers", in the Middle Fork West Fork Gallatin River by improving in-stream habitat in a channelized reach downstream of Lake Levinsky. Project 3 entails stream channel restoration and floodplain reconnection along approximately 420 feet of stream channel as depicted in **Figures 5** through **8** and **Attachment B – Projects 3 and 5 Conceptual Design Drawings**.

Project 3 Goal and Objectives:

The goal of Project 3 is to address sediment impairments by improving in-stream habitat within a channelized reach downstream of Lake Levinsky. To attain this goal, the following objectives will be accomplished: 1) approximately 420 feet of stream will be restored to a natural meandering riffle-pool sequence with increased floodplain connectivity and 2) develop wetland features and natural water storage within the existing channel.

Project 3 Partners:

Potential project partners include the Gallatin River Task Force, Trout Unlimited, and Big Sky Resort.

Project 3 Methods:

To address sediment and "alteration in stream-side or littoral vegetation covers" impairments, bioengineering techniques will be used to restore a natural meandering riffle-pool sequence with increased floodplain connectivity, including wetland creation and natural water storage features. Restoration will utilize native materials harvested on-site and appropriate to the landscape setting. Channel data collected within the project reach at monitoring site MFWF04-01 during the 2008 sediment and habitat assessment conducted by DEQ and the Task Force as presented in the *Upper Gallatin Base Parameter Report* (PBS&J 2009a) will provide a starting point for channel design (**Table 4**).

Table 4. 2008 Stream Channel Survey Data Summary for Monitoring Site MFWF04-01

Reach ID	Bankfull Channel Width (Feet)	Cross-Sectional Area (Square Feet)	Bankfull Mean Depth (Feet)	Width / Depth Ratio	Field Slope (Percent)	GIS Calculated Sinuosity	Riffle Pebble Count D50 (mm)	Mean Residual Pool Depth (Feet)	Number of Pools per 1000 Feet	Total Number of LWD per 1000 Feet
MFWF04-01	17.8	20.1	1.1	15.7	3.5	1.14	61	1.1	15	100
MFWF04-01	16.0	21.0	1.3	12.2	3.5	1.14	27			
MFWF04-01	21.2	19.8	0.9	22.7	3.5	1.14	55			

Project 3 Ownership and Access:

Ownership is primarily Big Sky Resort LLC, along with private landowners (Cliffhanger #9 LLC, Behm's Big Dog Lodge LLC). The site can be accessed from the downstream side of the dam at Lake Levinsky.

Figure 5. Project 3 Existing Channel Conditions within Project Reach

Figure 6. Project 3 Existing Conditions within Restored Channel Location

Figure 7. Project 3 Potential Natural Conditions Observed Downstream of Project Reach

Figure 8. Project 3 Channel Restoration Conceptual Design

PROJECT 4 - MIDDLE FORK WEST FORK RESTORATION IN LONE MOOSE MEADOWS

Project 4 Description:

Project 4 addresses sediment impairments, including "alteration in stream-side or littoral vegetation cover", in the Middle Fork West Fork Gallatin River by reducing streambank erosion, enhancing the riparian buffer, and improving in-stream habitat through the addition of large woody debris along approximately 1.3 miles of a historically logged reach. Project 4 entails riparian shrub and conifer plantings in historically logged areas along the channel, along with large woody debris placement as depicted in **Figures 9** through **12**.

Project 4 Goal and Objectives:

The goal of Project 4 is to address sediment impairments by enhancing the riparian buffer and improving in-stream habitat within a historically logged reach of the Middle Fork West Fork Gallatin River. To attain this goal, the following objectives will be accomplished: 1) riparian shrub and conifer plantings in historically logged areas within 50 feet of the channel margin and 2) large woody debris additions, including approximately six large woody debris clusters, along with the addition of individual trees. Riparian shrubs and conifers will be planted in open areas within 50 feet of the channel margin to reduce streambank erosion, increase streamside shading, and restore natural rates of large woody debris recruitment. Approximately 1.3 miles of stream will be addressed by Project 4.

Project 4 Partners:

Potential Project 4 partners include the Gallatin River Task Force, Trout Unlimited, and the Lone Moose Meadow Home Owners Association (HOA).

Project 4 Methods:

To address sediment and "alteration in stream-side or littoral vegetation covers" impairments, riparian shrubs and conifers will be planted along the channel margin and adjacent areas and large woody debris will be added along approximately 1.3 miles of stream, including large woody debris clusters and the addition of individual trees. Large woody debris will be obtained from development-related clearing the Big Sky area and from on-site as opportunities arise. Large woody debris targets presented in the 2010 TMDL document, along with data and observations from reference reaches in the North Fork West Fork Gallatin River (**Figure 11**), will provide a starting point for project design. Riparian plantings will include shrubs along the channel margin and conifers within 50 feet of the channel margin and will be targeted to enhance areas currently lacking natural regeneration post-logging.

Project 4 Ownership and Access:

Ownership is primarily Lone Moose Meadows and access is provided by adjacent roadways.

Figure 9. Project 4 Degraded Riparian Conditions in Monitoring Reach MFWF07-02

Figure 10. Project 4 Degraded Riparian Conditions in Monitoring Reach MFWF08-01

Figure 11. Project 4 Potential Natural Conditions Observed in the North Fork West Fork Gallatin River

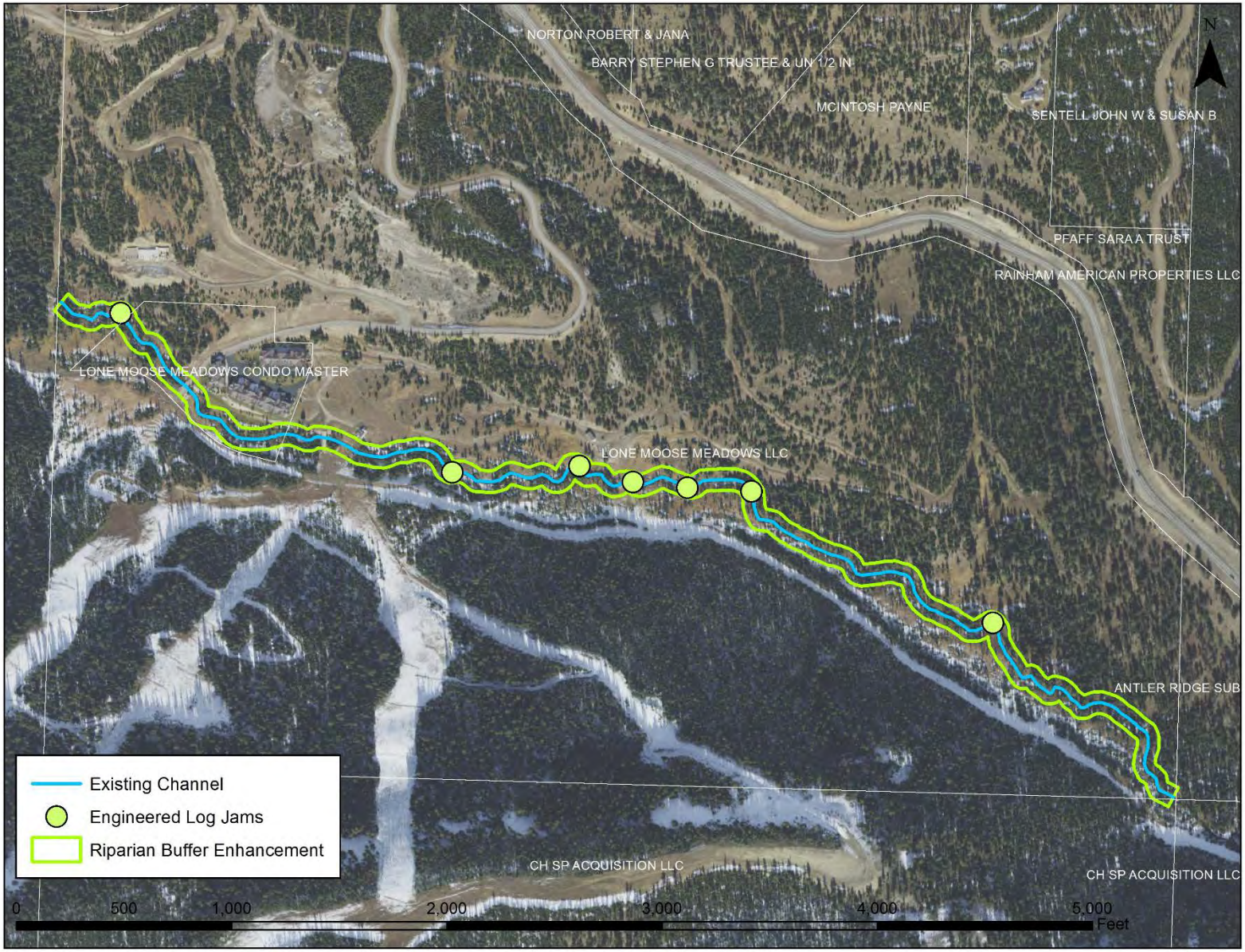


Figure 12. Project 4 Riparian Buffer Enhancement and Large Woody Debris Placement Conceptual Design

PROJECT 5 - MIDDLE FORK WEST FORK RESTORATION IN ASPEN GROVES/ANTLER RIDGE

Project 5 Description:

Project 5 addresses sediment impairments, including "alteration in stream-side or littoral vegetation covers", in the Middle Fork West Fork Gallatin River by reducing streambank erosion and improving in-stream habitat. Project 5 entails channel relocation away from a large eroding streambank and restoration into a historic channel within the center of the meadow. Within the project reach, a large streambank is eroding along the toe of an abandoned logging road that has been converted to a hiking and biking trail that is located within designated parkland in the Big Sky Area. There is silt fence hanging from the top of the streambank into the channel, indicating previous efforts to reduce sediment contributions at the site. The project reach was evaluated during the 2008 sediment and habitat assessment conducted by DEQ and the Task Force and streambank erosion was determined to contribute 26.2 tons/year (PBS&J 2009b). In addition, the channel along the eroding streambank is a continuous riffle lacking diverse in-stream habitat. Project 5 will restore approximately 540 feet of channel into the center of the meadow and will be accompanied by riparian plantings, wetland creation, and side channel-reconnection as depicted in **Figures 13** through **16**. This project is anticipated to increase the water level within the meadow through floodplain reconnection and wetland creation, which will enhance the potential for natural water storage. In addition, improvements to the trail and bridge crossing could be performed, which will enhance user safety and reduce long-term impacts to the stream channel and riparian corridor.

Project 5 Goal and Objectives:

The goal of Project 5 is to address sediment impairments by reducing sediment loading from streambank erosion and improving in-stream habitat. To attain this goal, the following objectives will be accomplished: 1) relocate the channel away from a large eroding streambank and restore the channel into a historic channel in the center of the meadow, totaling approximately 540 feet of restored channel, 2) enhance the riparian buffer, totaling approximately 1 acre, and 3) develop wetland features and natural water storage within existing channel.

Project 5 Partners:

Potential Project 5 partners include the Gallatin River Task Force, Trout Unlimited, Antler Ridge HOA, and Aspen Groves HOA.

Project 5 Methods:

To address sediment and "alteration in stream-side or littoral vegetation covers" impairments, bioengineering techniques will be used to restore a natural meandering riffle-pool sequence with increased floodplain connectivity. Restoration will utilize native materials appropriate to the landscape setting. Channel data collected within the project reach at monitoring site MFWF09-01 and immediately downstream in MFWF09-02 during the 2008 sediment and habitat assessment conducted by DEQ and the Task Force as presented in the *Upper Gallatin Base Parameter Report* (PBS&J 2009a) will provide a starting point for restoration design (**Table 5**).

Table 5. 2008 Stream Channel Survey Data Summary for Monitoring Sites MFWF09-01 and 02

Reach ID	Bankfull Channel Width (Feet)	Cross-Sectional Area (Square Feet)	Bankfull Mean Depth (Feet)	Width / Depth Ratio	Field Slope (Percent)	GIS Calculated Sinuosity	Riffle Pebble Count D50 (mm)	Mean Residual Pool Depth (Feet)	Number of Pools per 1000 Feet	Total Number of LWD per 1000 Feet
MFWF09-02	25.7	32.0	1.2	20.7	1.2	1.29	28	1.9	9	15
MFWF09-02	20.2	29.8	1.5	13.7	1.2	1.29				
MFWF09-02	28.5	36.4	1.3	22.3	1.2	1.29	69			
MFWF09-02	20.8	30.7	1.5	14.1	1.2	1.29				
MFWF09-02	31.8	40.8	1.3	24.8	1.2	1.29	51			
MFWF09-01	18.6	24.9	1.3	13.9	2.3	1.24	73	1.3	4	34
MFWF09-01	19.1	28.1	1.5	13.0	2.3	1.24				
MFWF09-01	24.3	34.3	1.4	17.2	2.3	1.24	47			
MFWF09-01	28.4	29.6	1.0	27.3	2.3	1.24				
MFWF09-01	22.9	30.3	1.3	17.3	2.3	1.24	76			

Project 5 Ownership and Access:

Ownership is Aspen Groves Development Corp and Antler Ridge Homeowners Assoc Inc, with access on abandoned logging roads that have been converted to a trail system that includes several private landowners (Olson John L and Marilyn J, Anderson Aileen &, Shnider Robert and Amy, and Hogan Jedediah K and Elizabeth A). The project is located within designated parklands in the Big Sky area.

Figure 13. Streambank Erosion along Former Logging Road and Current Trail

Figure 14. Streambank Erosion and Culvert along Former Logging Road and Current Trail

Figure 15. Project 5 Reach Overview and Historic Channel Location to be Restored

Figure 16. Project 5 Channel Restoration and Riparian Buffer Enhancement Conceptual Design

FUTURE OPPORTUNITIES IN THE MIDDLE FORK WEST FORK GALLATIN RIVER WATERSHED

1) Identify road crossing sites in Project 1 that may benefit from culvert removal and replacement with structures that facilitate fish passage to enhance connectivity.
2) Map and evaluate unassessed road and trail crossings on Big Sky Resort ski runs.
3) Address Low Dog Road (aka "Poop Chute") crossing at the base of Thunder Wolf chair lift.
4) Identify areas for wetland and riparian enhancement and the creation of natural water storage features on Big Sky Resort ski runs.
5) Evaluate opportunity to restore native Westslope Cutthroat Trout in the upper Middle Fork West Fork Gallatin River upstream of Lake Levinsky.
6) Improve stormwater management during construction activities and post-construction
7) Convert to making snow with treated wastewater effluent instead of water from the Middle Fork West Fork Gallatin River.
8) Examine the potential to convert Lake Levinsky into a lined storage pond to store treated wastewater effluent for use during snowmaking and restore the Middle Fork West Fork to a naturally flowing stream around the storage pond.
9) Identify additional opportunities for wetland and riparian conservation and restoration for priority sites and priority areas identified in the 2018 *Big Sky Area Wetland and Riparian Mapping* report.

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Montana Department of Environmental Quality, 2010. *The West Fork Gallatin River Watershed Total Maximum Daily Loads (TMDLs) and Framework Watershed Water Quality Improvement Plan*, prepared by the Montana Department of Environmental Quality, MO5-TMDL-01A-F.

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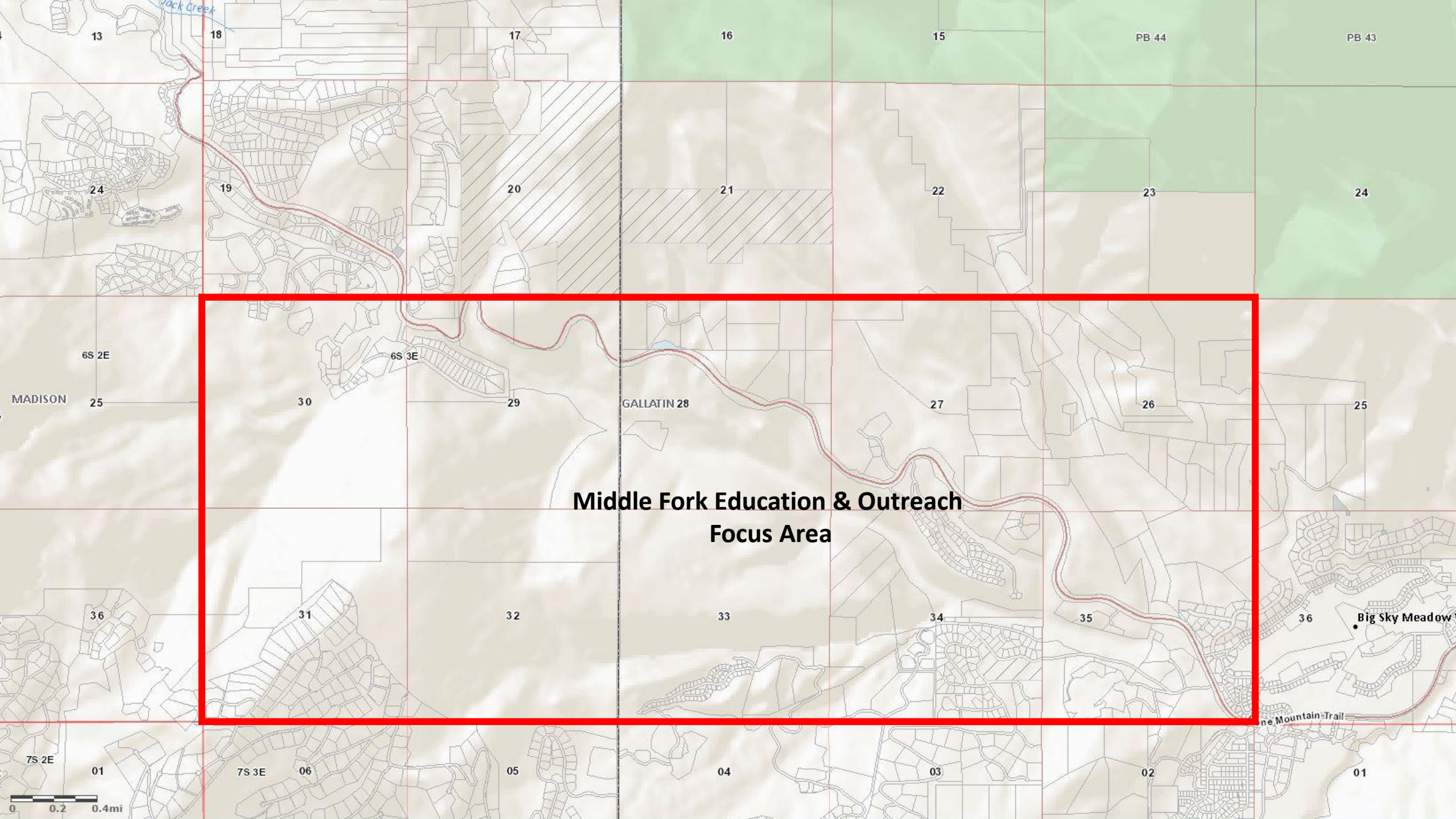
Middle Fork Education & Outreach
Focus Area
Jack Creek
13
18
17
16
15
PB 44
PB 43
24
19
20
21
22
23
24
6S 2E
6S 3E
MADISON
25
30
29
GALLATIN 28
27
26
25
36
31
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33
34
35
36
Big Sky Meadow
ne Mountain Trail
7S 2E
01
7S 3E
06
05
04
03
02
01
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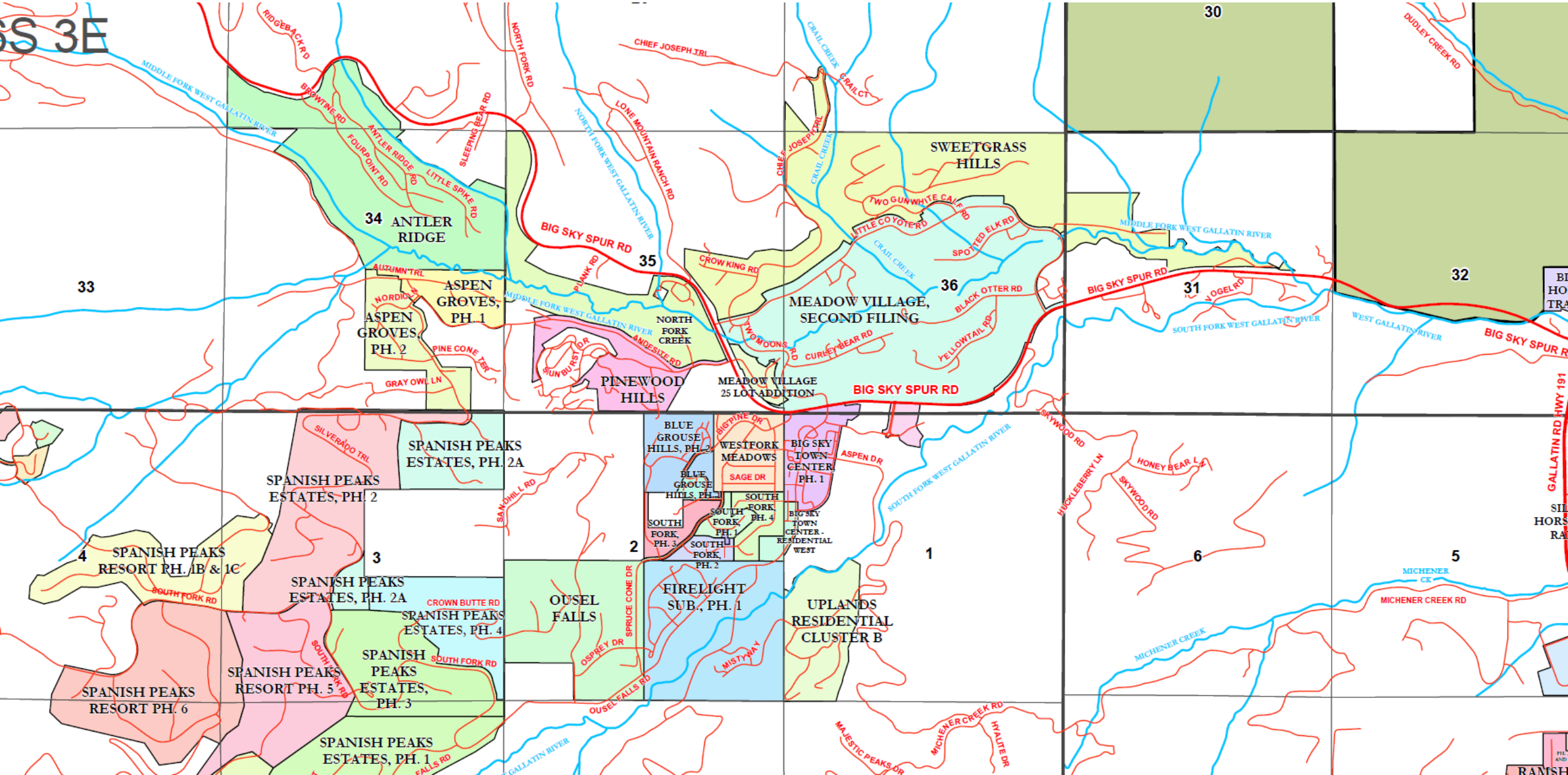
0.2
0.4mi

Major Subdivisions in Big Sky, MT (Gallatin County)



KEEP OUR RIVER HEALTHY

A healthy Gallatin River begins in your home

During its journey to the Gallatin River, water from rain and snowmelt flows across and through the landscape. This runoff picks up and carries natural and human made pollutants, known collectively as **nonpoint source pollution.**

Excess nitrate is the most pressing nonpoint source pollution issue in the Big Sky area. In a natural system, nitrate stimulates aquatic plant growth. However, excess nitrate feeds algal blooms, which can cause a cascade of negative effects in aquatic ecosystems.

Malfunctioning septic systems are one of the leading causes of excess nitrate in our watershed.

CARING FOR YOUR SEPTIC SYSTEM

Three reasons to maintain your septic system

1 **Clean rivers begin in your home.** Wastewater from malfunctioning septic systems is one of the leading causes of elevated nitrate in streams in the Big Sky area. Excess nitrate negatively impacts recreation and aquatic life.

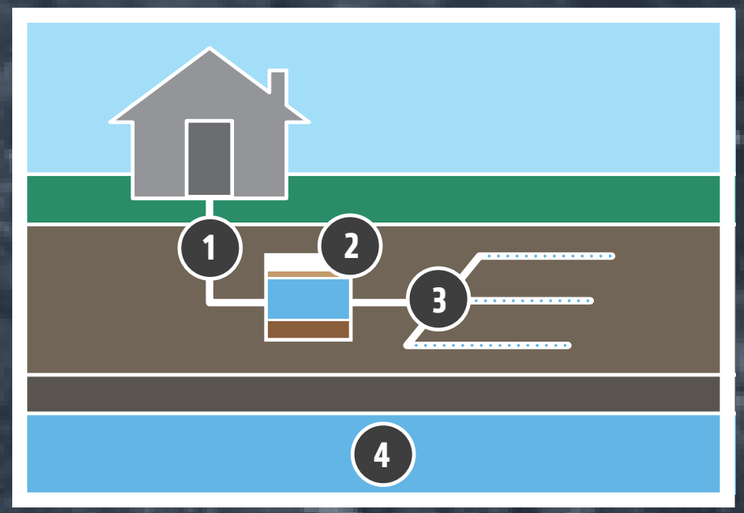
2 **Contaminated groundwater may end up in your well.** Overloaded septic systems leak bacteria, nutrients, and pharmaceuticals into groundwater. Wells pump water directly from the ground for household use. Contaminated well water can cause health problems for members of your family or community.

3 **Regular maintenance saves you money.** In Big Sky, replacing a malfunctioning system can cost $8,000 to $12,000. On the other hand, regular maintenance costs about $200 to $400 every three to five years. Malfunctioning septic systems can reduce property values, hamper the sale of your home, and pose a legal liability.

HOW DOES A SEPTIC SYSTEM WORK?

1 Wastewater is produced when you flush the toilet, take a shower, wash your clothes, or do the dishes. Wastewater flows out of your house and down one main **sewer line** to a septic tank.

2 The **septic tank** stores raw waste long enough for the solids to settle out. Oil, grease, and soap suds float to the top (scum) while organic waste and other heavy solids settle to the bottom (sludge). Bacteria partially digest both scum and sludge. However, undigested solid waste must be regularly pumped from the septic tank to avoid overloading the system.



3 Next, liquid waste flows to the **drain field** for treatment. Wastewater gradually seeps from the drain lines into the ground where soil naturally filters out the remaining solids and organic matter. Tiny microbes living in the soil break down harmful bacteria and pathogens. Excess water delivered over a short period of time can flood a drain field.

4 Finally, treated wastewater percolates into a **groundwater aquifer.** This water may be pumped out of the aquifer by a well or flow to recharge nearby rivers and streams.

SEPTIC SMART

Dispose of waste properly

Septic systems are delicate ecosystems that rely on living organisms to treat wastewater

Flushable does not mean septic safe

- Only human waste and toilet paper are septic safe
- Flushing non-biodegradable products, such as tampons or condoms, can overload your septic system

Disposable means it belongs in the trash

- Pouring chemicals, such as bleach or paint, down the drain can kill microbes
- Garbage disposals contribute additional solid waste that could overload your septic system

Perform regular maintenance

- Clean the effluent filter every 6 months
- Inspect solids in your system annually
- Pump the tank when indicated by annual inspections, generally every 3-5 years

Protect your investment

- Don't park cars or drive over the drain field
- Don't plant trees or deep-rooted plants near your septic system
- Keep roof drains, sump pumps, and other rainwater drainage systems away from the drain field

Conserve water where possible

Excess water can flood your drain field

- Install water saving fixtures and appliances
- Turn off the tap while brushing your teeth or doing the dishes
- Check for toilet and shower head leaks
- Run dishwasher and washing machine only when full

MALFUNCTIONING SEPTIC SYSTEMS

What are warning signs that my system may be overloaded?

Slow draining or gurgling sinks and toilets*

Bacteria in well water

Strong odors

Green grass over the drain field

Soft ground or effluent pooling on your lawn

*In this situation, consult a plumber. Clogged sewer lines can also cause slow draining sinks and toilets.

GALLATIN RIVER TASK FORCE

DEQ MONTANA

SOIL & WATER CONSERVATION DISTRICTS of MONTANA

For more information, visit gallatinrivertaskforce.org/septicsmart

GALLATIN RIVER TASK FORCE

GETTING TO KNOW YOUR SEPTIC SYSTEM

A simple guide to the proper care and maintenence of your septic system

CULTURE

Water Wisdom: The Bloom is Back

Published 2 months ago on September 1, 2020
Posted By **Admin**

Wide-spread algae growth in Wapiti Creek, Taylor Fork drainage. PHOTO COURTESY OF GALLATIN RIVER TASK FORCE

By David Tucker *EBS Contributor*

As you've likely noticed, a wide-spread, bright green algae bloom has taken over our backyard waterway. From the upper reaches of the Taylor Fork to downstream of Portal Creek, filamentous vegetation covers the river-bottom rocks.

At first glance, the algae is almost beautiful, looking more like a tropical coral than an aquatic agitator. But in this case, looks are deceiving and its presence is anything but welcoming.

Cladophora, the primary algae of concern in the upper Gallatin watershed, is naturally occurring. Its growth is driven by several factors, including nitrogen and phosphorus levels, water clarity, water temperature, available sunlight, pH, water velocity and water hardness. What the Gallatin River Task Force is working to better understand is why these growth drivers are suddenly leading to more wide-spread blooms, how much these blooms are being caused by human land use and what we need to do as a community to solve the problem.

"We're seeing an imbalance on multiple fronts," said Chace Bell, water quality monitoring and assessment specialist with the Montana Department of Environmental Quality. "We're in the so-called Goldilocks zone," he continued, where conditions are just right for wide-spread, nuisance growth.

"So far, in high-gradient, fast-moving rivers [like the Gallatin], the blooms aren't severe enough to affect fish populations in one summer, but we could start to see a macroinvertebrate shift over time," Bell said. To avoid that and other negative outcomes, "we need to be creative in building resiliency," he continued. "There's a tremendous amount of complexity when trying to come up with management plans and solutions because of non-point sources."

Non-point sources are pollutants that originate not where the effect is seen in the river, but elsewhere in the watershed. For example, stormwater tainted with chemicals from fertilizer flows from a driveway in a Big Sky housing development to our underground aquifers before resurfacing somewhere downstream—say near the Deer Creek fishing access. When this polluted groundwater re-enters surface waters like the Gallatin River, it could still contain high enough levels of nutrients like nitrogen or phosphorus to negatively impact water quality.

One of the manifestations of this impact be could the algae bloom we're currently witnessing. As Bell said, determining the exact reason for the bloom is difficult, but we do know that steps must be taken to curtail excess nutrient loads entering the river.

River-side restoration projects, like the West Fork willow planting GRTF has done or the river-access improvements GRTF made at Moose Creek, are steps in the right direction, but we'll also need a community-wide commitment to improving water-resource management based on data collection and water-quality monitoring. GRTF has already identified sources of excess nutrients, such as stormwater runoff, irrigation for landscaping and antiquated, poorly maintained septic systems. An upgraded wastewater treatment plant, which has been approved by Big Sky voters, will also help.

As individuals, we can update, upgrade and regularly maintain our septic systems. We can plant trout-friendly lawns that use less fertilizer and less water. We can restore any streamside vegetation on our properties and be sure to always pick up after our pets.

All of these steps are efforts to reduce the concentration of pollutants entering our water resources, and they're outlined and prioritized in GRTF's forthcoming Nutrient Reduction Plan. GRTF's ongoing algae monitoring study will further refine future action steps and add useful data.

For now, it's important for our community to acknowledge that current nutrient levels are too high and major, Big Sky-wide steps must be taken to repair and restore our water resources. If we fail to act, algae blooms will become the norm and more than just a nuisance.

David Tucker is the communications manager for the Gallatin River Task Force.

RELATED TOPICS: #ALGAE BLOOM #DAVID TUCKER #GALLATIN RIVER TASK FORCE #GALLATIN RIVER TASKFORCE #PORTAL CREEK #TAYLOR FORK #WAPATI CREEK

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UPCOMING EVENTS

NOVEMBER, 2020

FILTER EVENTS

No Events

WEATHER

Big Sky, MT

23°F
CLEAR SKY
TODAY
07:20 AM - 04:58 PM
Wind 16 kt - 170°
Cloudiness 1 %

08 PM	11 PM	02 AM	05 AM
12°F	13°F	11°F	14°F

OPINION

Water Wisdom: Fall into Water Savings

Published 2 months ago on September 22, 2020
Posted By **Admin**

By David Tucker *EBS Contributor*

Walking, biking, or driving around Big Sky this time of year, one thing always stands out: bright green Kentucky bluegrass lawns. While meadows and hillsides go from brown to browner, residential and commercial lots in the Meadow and Mountain villages and the Town Center remain lush, vibrant and attention-grabbing.

To the untrained eye, these lawns look healthy. In reality, they're anything but. They are ecological food deserts and a scourge for local water quality.

Historically, Big Sky residents use the most water in the late-summer months of August and September, even though until recently winter visitation and occupancy far out-spaced summer. The primary reason: landscaping irrigation. As more native flora have been displaced due to land development for houses, condos and commercial buildings, the problem has gone from bad to worse.

These water-intensive lawns are a problem for a variety of reasons, most notably because they require so much water to stay green and because they require fertilizers packed with harmful pollutants to thrive. The pollutants—primarily phosphorous and nitrogen—are flushed into surface waters and seep into groundwater, leading to chemical imbalances in our streams, creeks and rivers, and potentially tainting our drinking water. These chemicals are also drivers of the wide-spread algae growth we saw earlier this summer on the main stem of the Gallatin and throughout the upper watershed.

In addition to the pollutant problem, these lawns also *use* a lot of fresh groundwater during the irrigation process. Most is lost to plant uptake or evaporation, and little returns to the groundwater.

So, what's the solution? No one wants to live in a house surrounded by dirt and rocks. Luckily, native plants and wildflowers offer an attractive alternative, and now is the time to start prepping for spring.

By landscaping with regional grasses, flowers, bushes and trees, you can still have a beautiful backyard, but now you won't be contributing to Big Sky's ongoing water-quality problems and future water-quantity issues issues. Native plants have evolved to succeed in our semi-arid climate, a climate that the Montana Climate Assessment predicts will likely get drier and hotter. They need little watering once established, and never need to be mowed or fertilized. Added bonus: pollinators, birds and native wildlife love them, so you'll also be restoring habitat while you're at it.

In addition to improving local water quality and building water-supply resiliency, a native lawn will also save a bundle of dough. In a couple weeks you'll likely receive your water bill, if your home is serviced by the Big Sky Water and Sewer District. Because the district has implemented a new tiered billing system based on usage, if you irrigate your lawn, you might be in for a surprise. Get ready for some staggering numbers.

Once you've regathered your wits, head to your local lawn-care company and ask about prepping your lawn for spring. Fall is the time to get started to ensure water—and cash—savings next season. If you're unsure where to start, check out the Gallatin River Task Force's Trout-Friendly Landscaping certification, part of the Big Sky Water Conservation program. Certification is a big step toward reducing your personal nutrient footprint, and it will save you a bundle on next fall's water bill.

David Tucker is the communications manager for the Gallatin River Task Force.

RELATED TOPICS: #BIG SKY WATER AND SEWER DISTRICT #DAVID TUCKER #GALLATIN RIVER TASK FORCE #MONTANA CLIMATE ASSESSMENT #WATER CONSERVATION #WATER WISDOM

DON'T MISS
Why don't more local businesses have the courage to emulate Patagonia?

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Yours in Health: Ways to gently transition into this fall

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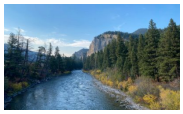
Water Wisdom: A right to conserve


After pausing new Big Sky subdivision approval, DEQ reviews plant capacity


Water Wisdom: Toward a nutrient deficit

UPCOMING EVENTS

NOVEMBER, 2020

FILTER EVENTS

No Events

WEATHER

Big Sky, MT

23°F
CLEAR SKY
TODAY
07:20 AM - 04:58 PM
Wind 16 kt - 170°
Cloudiness 1 %

08 PM	11 PM	02 AM	05 AM
12°F	13°F	11°F	14°F

Trout-Friendly Landscapes:

- Are beautiful and easy to maintain
- Save time and money
- Protect water resources

Take the pledge to achieve a Basic or Gold level Trout-Friendly landscape. For more information and trout-friendly resources visit www.gallatinrivertaskforce.org/trout-friendly/ or call the Gallatin River Task Force at 406-993-2519.

☐ My landscape is trout-friendly

☐ I want to create a trout-friendly landscape

Pledge Level: ☐ Basic ☐ Gold

Property Type: ☐ Residential ☐ Commercial

Name: _____

Date: _____

Physical Address: _____

City/State: _____

Zip: _____

Phone: _____

Email: _____

Are you interested in placing a Trout-Friendly sign in your landscape to show your commitment to watershed stewardship? ☐ Yes ☐ No

If you hire a professional landscaping or lawn care company to care for your property, please provide their business name _____

Return to: Gallatin River Task Force
P.O Box 160513, Big Sky, MT 59716
Email: emily@gallatinrivertaskforce.org
Certify online at: gallatinrivertaskforce.org

Basic Level: (Select all boxes)

Landscape Design & Plant Selection

☐ Choose plants that are suitable for Big Sky. Prioritize native, drought-tolerant, fire-resistant, and cold-hardy species.

Soil Improvement

☐ Add 3” of mulch to garden beds (stone or rock mulch is preferred for fire defense) to retain moisture, minimize evaporation, eliminate weed growth, and moderate soil temperature.

Practical Lawn Areas

☐ Regularly mow lawns and set the mower blade to three inches to decrease water, fertilizer, and pesticide needs.

Efficient Irrigation

☐ Water between 4:00 am and 8:00 am to reduce water loss from wind and heat. Adjust watering routines seasonally and don't water when its raining.

Chemical Reduction

☐ Utilize a variety of non-chemical techniques (mowing, hand pulling, native vegetation) to manage weeds. For help identifying and treating noxious weeds, schedule a free site assessment with the Gallatin Invasive Species Alliance.

Erosion Control

☐ Ensure your property has proper drainage and correct erosion problems. Observe what happens during irrigation, a rain storm or strong winds. Muddy water flowing off the property or dust clouds indicate an erosion problem.

Streamside Buffers

☐ Not Applicable - I do not have a stream, river, or wetland on my property.

☐ Maintain a 5ft buffer of unmanicured landscaping and native plants, shrubs, and trees around water.

Gold Level: (Select a minimum of 3 boxes from each category)

Landscape Design & Plant Selection

- ☐ Identify the microclimates on your property (i.e. moisture, sun, shade, wind, heat) and select plants that can survive and thrive in these zones without much watering.
- ☐ Reduce the amount of plant material needed by incorporating permeable pavers, rock terraces, and large boulders, which also minimize erosion, and improve fire defensible space.
- ☐ Create "islands" of vegetation surrounded by mulch or permeable hardscape such as pebble, rock, or gravel pathways.
- ☐ Invest in a consultation with a local landscape architect or landscaper specializing in trout-friendly landscaping practices and follow the recommendations.
- ☐ Other:_____

Soil Improvement

- ☐ Test your soil to determine how much and what proportion of nutrients your landscape actually needs.
- ☐ Add soil amendments as recommend by the soil test.
- ☐ Spade, plow, or rototill to break up compacted soil and allow root systems to grow deeper.
- ☐ Add organic matter such as compost or shredded leaves to improve water storage.
- ☐ Other:_____

Practical Lawn Areas

- ☐ Plant turfgrass with a purpose in mind (i.e play area) and keep the lawn size practical for that use.
- ☐ Cut back turf areas that don't get much use and replace with groundcover, flower gardens, or permeable hardscape.
- ☐ Plant turfgrass close to structures and on level ground for maximum water absorption and fire defensible space.
- ☐ Establish or convert lawns from Kentucky blue grass to drought-tolerant, native grass species, or fire-resistant ground cover.
- ☐ Other:_____

Efficient Irrigation

- ☐ Pick up a free rain gauge from the Task Force and place it in your yard. If you get ¾ to 1 inch of rain in a week, you can skip your next watering.
- ☐ Invest in an irrigation audit and follow the recommendations.
- ☐ Install drip irrigation for flower beds, shrubs, and trees to reduce evaporation and weeds.
- ☐ Install a rain sensor or moisture sensor shutoff device for automatic sprinkler systems.
- ☐ Observe outdoor irrigation restrictions in effect.
- ☐ Other:_____

Chemical Reduction

- ☐ Use natural pesticides only (i.e. Burn Out, clove oil, 20% vinegar solutions, Adios).
- ☐ If synthetic pesticide is warranted - only apply for state and county listed noxious weeds, using spot spraying or mechanical removal techniques (no broadcast applications) AND only when it is the most effective way to control weeds.
- ☐ Use only organic fertilizers such as compost, compost tea, etc.
- ☐ If synthetic fertilizer is warranted – fertilize turf twice a year applying only the correct amount, so excess fertilizer does not leach through the soil or run off and contaminate water.
- ☐ Never water after application of fertilizer or pesticides and do not apply before rainstorms.
- ☐ Other:_____

Erosion Control

- ☐ Keep existing native plants, shrubs and trees on site. If removal is necessary for defensible space – replace with fire defensible plants, mulch or permeable hardscape features.
- ☐ Revegetate areas of bare, disturbed soil to prevent erosion or weed infestation using a mixture of non-turf grasses, perennial flowers and shrubs.
- ☐ Stabilize steep slopes with vegetation and structures (i.e. retaining walls, terraces, etc.).
- ☐ Collect and direct runoff to shallow infiltration systems (i.e. rain gardens) where water can soak into the ground.
- ☐ Other:_____

Streamside Buffers

- ☐ Not Applicable - I do not have a stream, river, or wetland on my property.
- ☐ Maintain a 10-20ft buffer of unmanicured landscaping and native plants, shrubs, and trees around water. Plant native species that are suitable for riparian areas to improve habitat and protect streams and wetlands.
- ☐ Avoid destroying vegetation to gain access to a stream or pond.
- ☐ Plan for minimum impact and never dig, cut native vegetation, or build within streamside or wetland areas.
- ☐ Do not apply pesticides, fertilizers, or herbicides within 20 feet of water.
- ☐ Other:_____

GALLATIN RIVER
TASK FORCE