

# Gallatin River Restoration Strategy



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# 1. STRATEGY OVERVIEW

## 1.1 Introduction

While every river is essential, few rivers are as ecologically, socially, economically, and culturally significant as the Gallatin. From its headwaters in Yellowstone National Park to the Three Forks confluence, the Gallatin winds its way through the heart of the Greater Yellowstone Ecosystem, providing vital services to a vast array of wildlife, tens of thousands of people, and countless industries big and small.

In recent years, those who have a stake in the river's future have felt a sense of urgency to protect this liquid treasure. The Gallatin is being pressured from all directions, from climate change to urban development, and this pressure includes the recreational access the river is famous for.

As the once-sleepy Gallatin Canyon has transformed into a heavily visited tourist destination, damage to the river corridor's natural resources has increased. In their quest to find the best fishing holes, anglers have trampled native vegetation with their vehicles. Boaters have caused damaging erosion at informal put-ins and take-outs, and visitor-created roads and trails are common up and down the canyon.

To limit the damaging impacts of this unmanaged recreation, the non-profit organization, Gallatin River Task Force (Task Force), and the Custer Gallatin National Forest (CGNF) have entered into a long-term agreement to restore the riverside's ecological integrity. By developing a strategy around which river access can be restored and enhanced, recreation can continue to be a staple of the river's vibrant economy, without contributing negatively to the Gallatin's overall health.

The *Gallatin River Restoration Strategy (Restoration Strategy)*, provides a holistic approach to recreation management along the Gallatin Canyon corridor and a framework for prioritizing the ecological restoration of highly damaged areas.

## 1.2 Purpose and Need

The Gallatin River is a world-renowned destination for all types of water-based recreation. The portions of the river within the Custer Gallatin National Forest provide tremendous opportunity for wade fishing, recreational boating, picnicking, camping, wildlife viewing, and photography. The river corridor is home to campgrounds, organization camps, recreation residences, picnic areas and trailheads all of which rely on the river corridor for the unique recreation opportunity they provide.

The Gallatin River is known to host one of the premier whitewater runs in the Greater Yellowstone Area, a class IV section called the "Mad Mile." This section is over a mile long and

contains continuous stretches of challenging whitewater. This type of opportunity is relatively rare and unique within the Greater Yellowstone Area. The river is also considered a fly-fishing destination within the Greater Yellowstone Area and beyond, drawing recreationists from the local area, nationally and internationally.

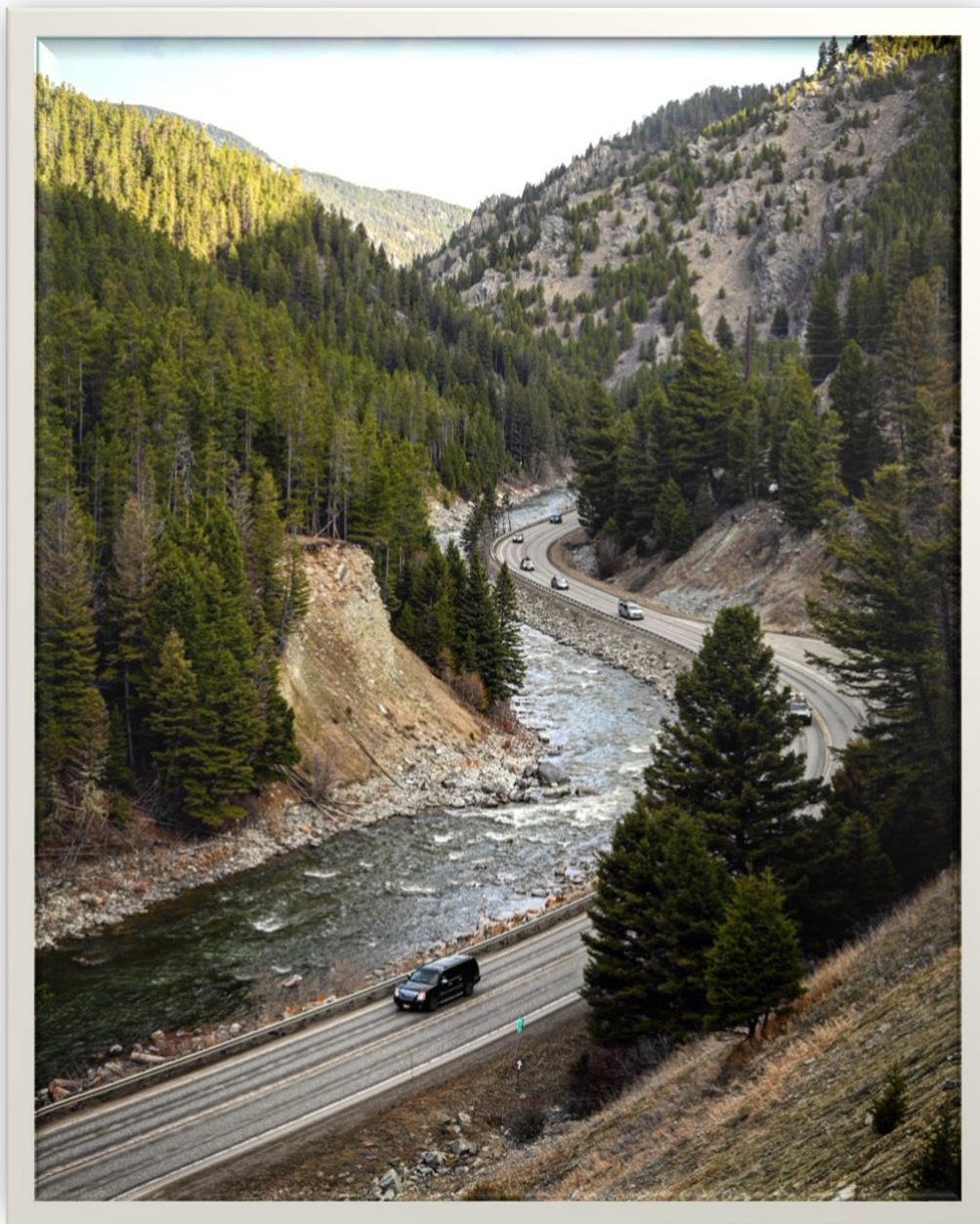
These outstanding recreational values influenced the *Custer Gallatin National Forest Plan* to recommend the Gallatin River as eligible for inclusion in the National Wild and Scenic Rivers System, as well as for the outstanding scenery and historic value of the Civilian Conservation Corps built Shenango Ranger Station and associated bridge. The inclusion illustrates the Gallatin's unique and highly valued recreational experiences.

Until a few decades ago, the land and resources of the forest and river corridor seemed capable of handling the variety of uses enjoyed by the public. In recent decades however, impacts from unmanaged recreation have become noticeable. Gallatin County has been, and continues to be, one of Montana's fastest growing counties. Its population was 118,960 at the 2020 Census, up from 89,513 in 2010 – an increase of 33.78%. Population projections predict an annual growth rate ranging from one to three percent going forward. This explosive growth has led to an increased number of people recreating along the river corridor. As a result, environmental and social impacts, ranging from soil compaction, sediment erosion to the River and its tributaries, to visitor conflicts associated with river access have increased.

Along with population growth, traffic along Highway 191, which parallels the river, has noticeably increased. Montana Department of Transportation (MDT) completed the *US 191 Corridor Study* in October 2020, providing important information on recreation access, traffic volumes, and population growth trends. Forty recreational approaches were identified along the corridor, some of which are unpermitted. Parking in undesignated areas and substandard turnouts was identified as a safety concern. Corridor traffic volumes are highest in the summer and winter months which can be attributed to heavy recreational and touristic use of the corridor. Traffic volumes are projected to grow at a rate of 2.4 percent per year through 2040 based on historic growth trends.

In 2015, the Task Force, spearheaded the *Gallatin Canyon River Access Site Assessment* which examined 39.6 miles of the Gallatin River and mapped 111 developed and undeveloped public river access points between the Yellowstone National Park boundary and Spanish Creek to identify sites for future restoration work.

The Task Force and CGNF subsequently entered into a Challenge Cost Share Agreement to collaborate on restoration activities. In 2018, the first project was completed at the Moose Creek Flat Recreation Area, a heavily trafficked public day-use area and campground with severe erosion and streamside vegetation damage. Success of the Moose Creek Project prompted the Forest Service and Task Force to pursue additional restoration opportunities along the Gallatin River, resulting in selection of the Upper Deer Creek (Beatis Alley) site for restoration due to the broad range and volume of use as well as the severe natural resource damage documented during the site assessment.



**Photo:** Highway 191 is directly adjacent to the Gallatin River

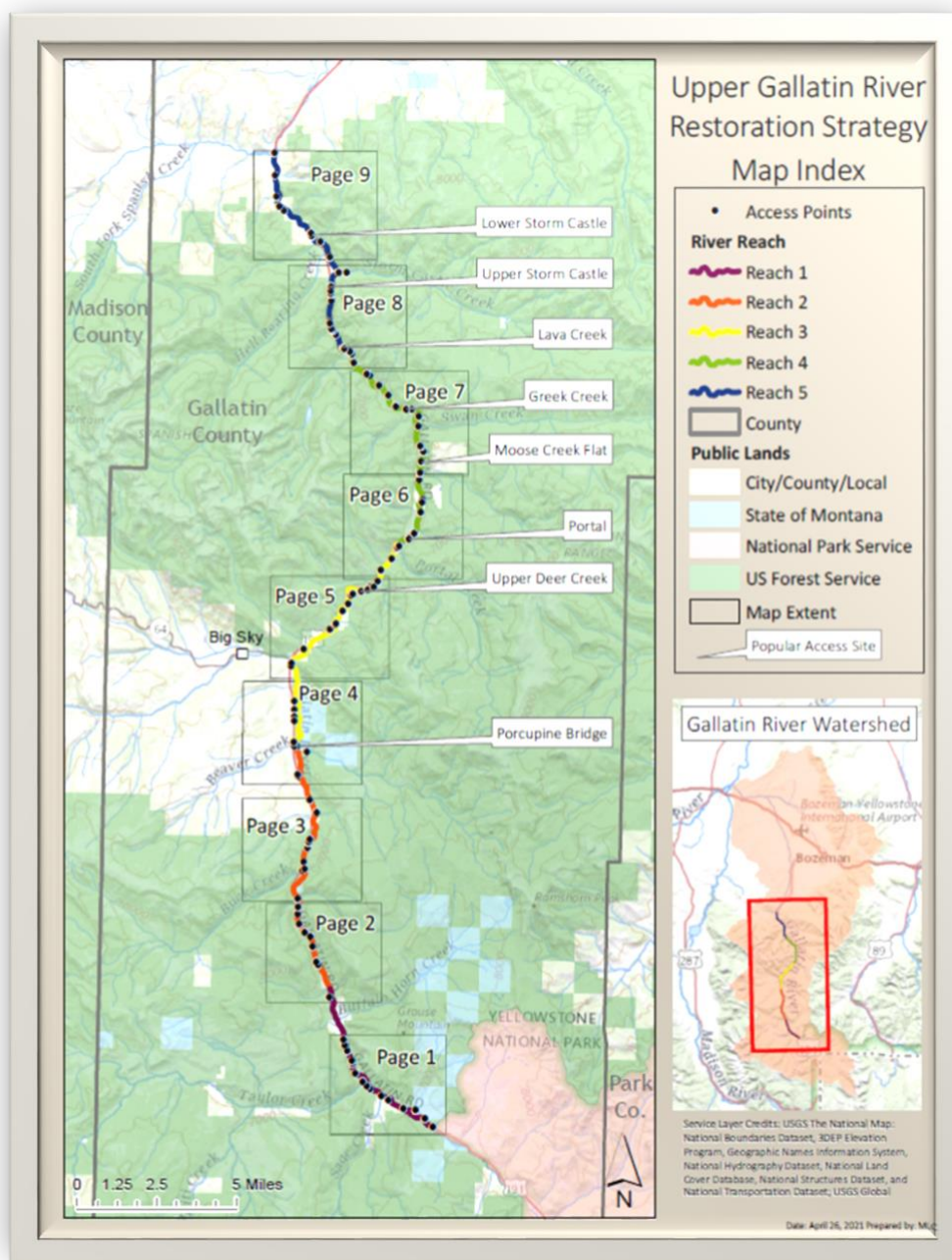
The purpose of the *Gallatin River Restoration Strategy* is to identify short-term, mid-term, and long-term actions to guide Forest Service implementation of river access improvements and ecological restoration projects over the next 10-15 years. Minimizing the environmental degradation associated with tourism and recreation will require a combination of providing sustainable access opportunities, direct physical protection and restoration of particular areas, education, and strategic partnerships.



### 1.3 Restoration Strategy Area of Focus

The geographic area of focus for the *Restoration Strategy* is the public land under the jurisdiction of the Forest Service between the Yellowstone National Park boundary and Spanish Creek. An overview map of the strategy area is shown in **Figure 1**. Detailed maps, Page 1 through 9, can be found in **Appendix A – Map Index**.

**Figure 1: Map of Restoration Strategy Area**



## 2. MANGEMENT DIRECTION

Within the Custer Gallatin National Forest Boundary, land use policy and regulations are dictated by the *Custer Gallatin National Forest Land Management Plan (Land Management Plan)*. Additional Forest Service direction is provided in the *Gallatin National Forest Travel Plan (Travel Plan)*.

### 2.1 2020 Land Management Plan Custer Gallatin National Forest

The purpose of the *Land Management Plan* is to have an integrated set of plan direction to provide for social, economic, and ecological sustainability and multiple uses of the Custer Gallatin National Forest lands and resources. The land management plan sets the overall context for informed decision making by evaluating and integrating social, economic, and ecological considerations relevant to management of the national forest. Desired conditions describe the vision for the Custer Gallatin National Forest, while other plan components (such as objectives, standards, and guidelines) and management approaches give guidance on how to achieve the vision. The *Restoration Strategy* is an opportunity to meet some of the desired conditions outlined in the *Land Management Plan*.

Project or activity decisions brought forward from the *Restoration Strategy* will need to be reviewed in accordance with the *Land Management Plan* components. It is important to note that the *Land Management Plan* does not authorize site-specific prohibitions or activities; rather it provides overarching direction. Site-specific analysis, in compliance with the National Environmental Policy Act (NEPA) regulations, will need to be conducted for activities to comply with the broader direction of the *Land Management Plan*.

The *Land Management Plan* lists the Gallatin River as eligible for inclusion as part of the National Wild and Scenic River System. As such, the Forest Service must maintain the eligibility of the river and protect its outstandingly remarkable values – recreation, scenery, and heritage.

### 2.2 Gallatin National Forest Travel Management Plan

The purpose of the *Travel Plan* is to establish a plan for managing public access and travel within the Gallatin National Forest. In the Travel Plan, goals, objectives, standards and guidelines have been established at two scales; the Forest-wide scale which includes management direction that would generally apply to the Forest as a whole, and the Travel Planning Area scale which includes direction unique to a specific area. The Restoration Strategy supports the following Travel Plan goals:

- Forest Wide Direction, Goal D: Manage the road and trail system in a manner that protects and maintains water quality, wildlife habitat, fish habitat, and other resources. Support efforts to close and rehabilitate excess roads and trails and keep undesignated routes closed to motorized use.



- Forest Wide Direction, Goal E: Attain a road and trail system that fully supports the protection of water quality, and habitat for fish, riparian dependent species and other aquatic organisms with the intent to have all streams supporting westslope cutthroat trout or blue-ribbon fisheries. Support future efforts to close and rehabilitate excess roads and trails and to prevent unacceptable sedimentation and stream impairment, and protect floodplains and wetlands.
- Gallatin River Canyon Travel Planning Area: Designate the go-down access routes (i.e. river access locations) to the Gallatin River and cliff areas and improve the condition of facilities to prevent the pioneering of user-built parking areas.

### **3. ECOLOGICAL OVERVIEW**

The Gallatin River supports ecologically important resources, providing habitat and water for fish, plants, and wildlife. This ecological overview provides a summary of existing and desired conditions of ecological resources in the strategy area.

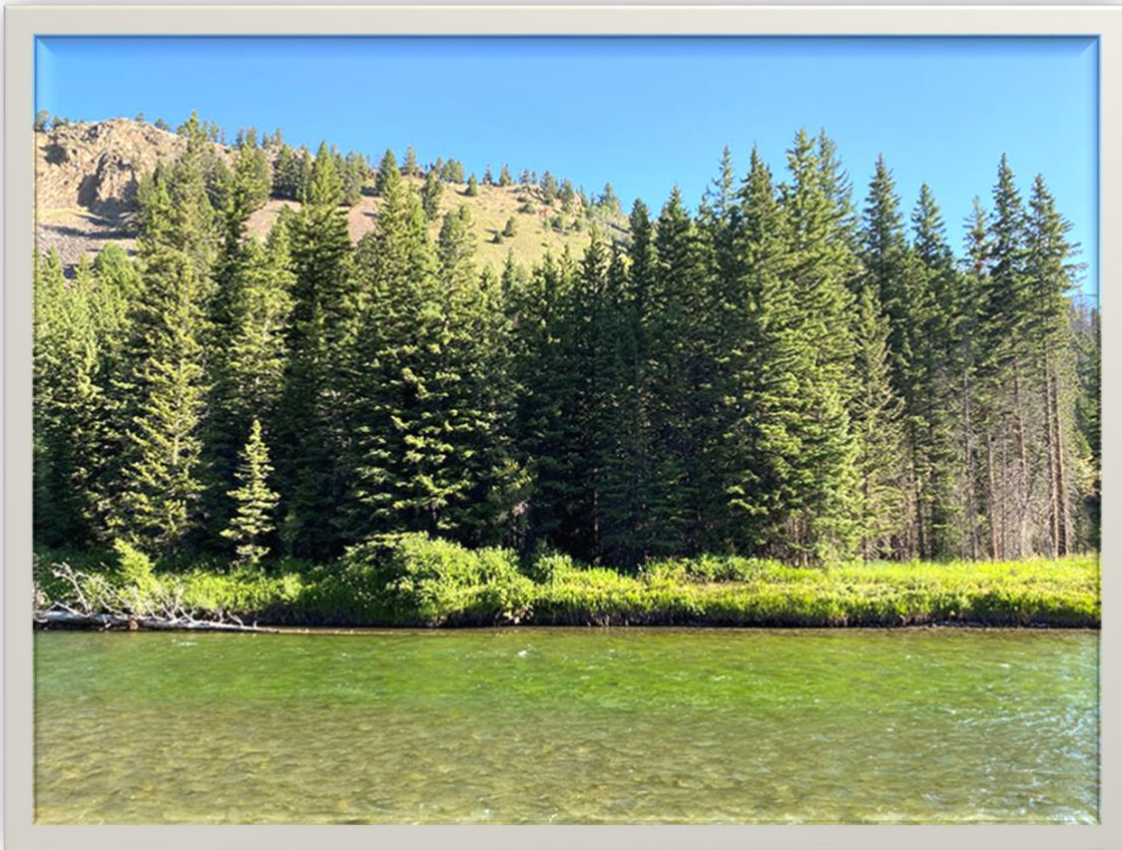
#### **3.1 Watershed, Aquatic Life, and Riparian Habitat**

##### **Existing Conditions**

The Gallatin River originates from Gallatin Lake at 9950 feet above sea level in Yellowstone National Park. It then meanders for about 20 miles through mountain meadows before entering the Gallatin Canyon. At the Taylor Fork confluence, the valley floor narrows and the river increases in gradient and velocity with large-sized streambed materials. The Gallatin retains this character of deep pools separated by high velocity riffles and runs, with an abundance of boulder formed pocket water for about 35 miles. After this, the river leaves the Forest and enters the Gallatin Valley, where it flows north through private land toward the Three Forks of the Missouri River.

The Gallatin River exhibits a snowmelt dominated hydrograph with peak flows typically occurring between May 1 and June 30. Generally, water quality in the mainstem Gallatin is good; however, recently in 2018 and 2020, unprecedented algae blooms have been recorded. Algae blooms alter aquatic invertebrate habitat, which may increase the rate of some invertebrate hatches while decreasing others. In addition, algae blooms are unsightly and can be a nuisance when swimming or fishing. Severe algae blooms can result in increased plant biomass that must be broken down by microorganisms. The Task Force, in partnership with the Montana Department of Environmental Quality (MT DEQ), is currently collecting and analyzing nutrient and algae data on the Gallatin River and several tributaries to further investigate algae drivers in the watershed. These analyses will help quantify the extent of algae growth, determine whether it is a threat to river health, and determine factors that have contributed to the excess growth.

Several tributaries to the mainstem Gallatin in the focus area are listed as impaired on Montana's 303(d) list including Storm Castle Creek, Taylor Fork, and West Fork of the Gallatin River (West Fork). The Taylor Fork, which is a large tributary that enters the Gallatin River about three miles downstream of the Yellowstone National Park boundary, is impaired for physical substrate habitat alterations and sedimentation/siltation. During spring runoff or localized thunderstorm events, erosion of fine sediment in the Taylor Fork often discolors the Gallatin. The West Fork, drains the Big Sky Community and is impaired for total nitrogen, E. coli and fine sediment. Storm Castle Creek, which is further downstream is impaired for alteration in stream-side or littoral vegetative covers and total phosphorus, which has been found to be from natural sources.



**Photo:** Algae bloom, summer 2020 near Upper Deer Creek (Beatis Alley)

Freshwater emergent wetlands and freshwater forested/shrub wetlands occur along the Gallatin River. Riparian areas are dominated by black cottonwood, snowberry, Wood's rose, white spirea, red-osier dogwood, pacific willow, sandbar willow, reed canary grass, and smooth scouring rush.

The *Big Sky Area Wetland and Riparian Mapping* assessment completed in 2018 identified existing riparian corridors and wetland resources within the Big Sky Resort Area District boundary. The report provides a foundation for implementing wetland and riparian restoration

projects with a focus on improving degraded wetland and riparian conditions, improving water quality, and enhancing natural water storage. The Gallatin River mainstem was included in the mapping assessment between Mile Post (MP)42 and MP55 (Corral to Karst). The assessment indicated that Gallatin River's riparian health is approximately 5% good (mature vegetation along entire reach, averaging 100 feet in width), 55% fair (mature vegetation along at least half of reach, buffer not less than 30 feet), and 40% moderate-fair (mature vegetation along 20% or less of reach, buffer generally 10 feet or less).

The Gallatin River and its tributaries comprise an important recreational fishery. The Gallatin River contains both wild and native fish species including: rainbow, brown, brook, and westslope cutthroat trout, mountain whitefish, and a few arctic grayling. Westslope cutthroat trout and arctic grayling are the only salmonids native to the drainage. Westslope cutthroat trout are designated a "Species of Concern" by Montana Department of Fish, Wildlife and Parks (FWP).

Cold water temperatures and harsh overwintering conditions limit fish production in the upper Gallatin River. Rainbow trout are the most common trout species in the river. Fish densities are highest downstream of the West Fork of the Gallatin, which enters the main river near the Big Sky exit on US 191. Data on fish species distribution are collected, maintained and provided by FWP.

The Task Force routinely collects macroinvertebrate samples in the Upper Gallatin Watershed. A macroinvertebrate survey downstream from Moose Creek, at Baetis Alley, downstream of Deer Creek, and across from Doe Creek Rd suggested populations were impacted by nutrient enrichment, fine sediment, and damage to instream and/or riparian habitat (Kerans and Bollman, 2016). Macroinvertebrates collected in 2020 at the Yellowstone National Park boundary just downstream of Porcupine bridge and at Baetis Alley suggested populations were likely impacted by nutrient pollution and fine sediment deposition downstream of Porcupine bridge (Kerans and Bollman, 2020).

### **Desired Conditions**

#### **Riparian Management Zones:**

- Riparian management zones have native assemblages of flora and fauna; well distributed physical, chemical, and biological conditions resilient to disturbance regimes; and species composition and structural diversity of native plant communities. Riparian management zones provide adequate summer and winter thermal regulation and provide bank stability moderating the rate of surface erosion, bank erosion, and channel avulsion. Riparian management zones maintain and contribute to water quality and nutrient cycling processes, organic matter processing, and ecosystem metabolism.

#### **Watershed and Aquatics:**

- Watershed features, including natural disturbance regimes and aquatic or riparian habitats, are well distributed, diverse, and complex. Watersheds and associated aquatic

ecosystems retain their inherent resilience to respond and adjust to disturbances, including climate change, without long-term, adverse changes to their physical or biological integrity.

- Habitat and ecological conditions support the persistence of native aquatic and riparian associated plant and animal species.
- Aquatic systems and riparian habitats express physical integrity, including physical integrity of shorelines, banks, and substrata, within their aquatic natural range of variation.
- Riparian vegetation provides breeding, feeding and sheltering opportunities, as well as habitat connectivity and movement corridors for a wide range of terrestrial, semi-aquatic and avian wildlife species.
- Water quality, including groundwater, meets or exceeds applicable state water quality standards, fully supports designated beneficial uses and are of sufficient quality to support surrounding communities, municipal water supplies, and natural resources. The national forest has no documented lands or areas that are delivering water, sediment, nutrients, or chemical pollutants that would result in conditions that violate the Montana states water quality standards (such as total maximum daily loads) or is permanently above natural or background levels.

## 3.2 Wildlife

### Existing Conditions

Terrestrial wildlife species on the Custer-Gallatin includes birds, mammals, reptiles, and invertebrates.

The Gallatin River corridor provides suitable habitat for resident elk, moose, mountain goats, and bighorn sheep and plays a role in maintaining habitat connectivity for wide-ranging wildlife species such as wolverine, lynx, grizzly bear, mountain lion, and wolf. The Canada lynx, grizzly bear, and wolverine are listed or proposed for listing in the Endangered Species Act.

More than 200 species of birds have been documented in Gallatin County, with potential to occur or reside in the Gallatin Canyon corridor. These species include a wide variety of songbirds, birds of prey, waterfowl, owls, and shorebirds, including several listed as species of concern. Many of the bird species are protected under or included in the USFWS *Migratory Bird Treaty Act*, *Birds of Conservation Concern 2008*, or *Bald and Golden Eagle Protection Act of 1940* listings.

Amphibian and reptile species include but are not limited to the western toad, northern leopard frog, western milksnake, greater short-horned lizard, and snapping turtle including nearly 30 invertebrate species, many of them listed as a Montana species of concern.

### **Desired Conditions**

- Habitat conditions provide security and refuge for wildlife to escape from stresses and threats, while still meeting basic needs such as feeding, breeding, sheltering and movement.
- Human-related foods and attractants are unavailable to wildlife. Natural wildlife foraging patterns are the norm, while food conditioning and habituation of animals, and associated wildlife conflicts with humans do not occur.

## **3.3 Invasive Species**

### **Existing Conditions**

Invasive species are non-native plants, animals, and other organisms that cause ecological or economic harm. Terrestrial invasive species (noxious weeds) are land-dwelling and aquatic invasive species (AIS) are water-dwelling. Invasive species are known as “habitat transformers” because they change the physical structure and forage availability in habitats, eventually pushing resident wildlife out. Invasive species can reproduce quickly and spread rapidly because there are no natural predators or competitors to keep them in check. Natural resource managers recognize that invasive non-native species are one of the biggest threats to the integrity and function of terrestrial and aquatic environments.

The presence of invasive species in the Gallatin Canyon is a growing concern and is directly attributed to human activity, such as construction, recreation, and travel. Invasive species can displace native species, clog waterways, impact irrigation and power systems, degrade ecosystems, threaten recreational fishing opportunities, and can cause wildlife and public health problems.

State listed invasive plant species in the Gallatin Canyon are Canada thistle, hoary alyssum, yellow toadflax, houndstongue, oxeye daisy, common tansy, sulfur cinquefoil, St. Johnsort, spotted knapweed, field bindweed and leafy spurge. Scotch thistle, musk thistle, poison hemlock and field scabious are prioritized for management by the Gallatin County Weed District and also found in the Gallatin Canyon.

There are currently no known AIS in the Upper Gallatin River. In the Lower Gallatin River, the predominate AIS is curly leaf pondweed. It is distributed throughout the Gallatin Valley including the East Gallatin River and Glens Lake. Eurasian watermilfoil is throughout the Jefferson River below Whitehall and also in the Lower Madison and Upper Missouri Rivers.

The Gallatin Invasive Species Alliance (Alliance) is working closely with the Custer Gallatin National Forest (CGNF) through a cooperative effort called, Conserve Our Canyon, to protect the Gallatin Canyon from the threats of invasive species. The Alliance secures and provides funding to Custer Gallatin National Forest to hire the Montana Conservation Corps Wildlands



Restoration Team, who are trained in noxious weed management. In coordination, the Alliance and CGNF identify and select areas for noxious weed management on heavily used public lands, such as trailheads, fishing access sites, campgrounds, forest service roads, and river restoration sites.

Education and outreach efforts are a critical important component in managing the spread of invasive species. The Custer Gallatin National Forest has adopted the CleanDrainDry and PlayCleanGo outreach campaigns to educate recreational users on simple actions that can prevent the spread of invasive species.

### **Desired Conditions**

- Non-infested areas remain free of invasive species. Where invasive species occur, their range is reduced where possible, or at a minimum, they do not expand. Desired nonnative species occur where they do not conflict with native species, and are supported by healthy, functioning ecosystems.

## **4. RECREATIONAL OVERVIEW**

The Custer Gallatin provides a wide range of recreation opportunities. Year-round opportunities range from highly developed sites to more primitive and dispersed recreation opportunities. The Custer Gallatin is renowned for hunting, fishing, and wildlife watching. Outfitter and guides provide additional access to unique backcountry, hunting, and floating opportunities along the Gallatin River. Furthermore, the forest's recreation program contributes to the economic sustainability of local communities.

The recreational overview provides a summary of existing recreational use data, types of recreational use and use trends, the environmental and social impacts of unmanaged recreation use, and desired conditions.

### **4.1 Recreational Use Data**

Recognizing the need for a basic understanding of the type and level of recreational use on the Upper Gallatin River, the Forest Service has begun collecting baseline information to better understand user expectations, user experiences, and the role recreation plays in the watershed.

During summer 2018, Montana State University, the Forest Service, and the Gallatin River Task Force worked collaboratively to update a 1999 recreational use study on the Gallatin River in order to determine the preferred activities and perceptions of both Gallatin and Madison County locals and tourists from around the world. 76 surveys were conducted in person and 67 surveys were submitted online, totaling 143 responses. A summary of notable survey results is outlined below.

#### Notable Survey Results:

- Primary reported activity: 48% angling, 20% kayaking, 12% other (i.e. hiking, etc.), 7% whitewater rafting.
- Results of angling location indicated a larger number of anglers utilizing locations closer to Big Sky than those fishing either near the park boundary or near the northern mouth of the Gallatin Canyon.
- Put in location of whitewater rafters and kayakers: 38% Lava Lake, 18% Moose Creek, 14% Greek Creek and Deer Creek.
- Take out location of whitewater rafters and kayakers: 73% Upper Storm Castle.
- Crowding perceptions of anglers: 41% listed the amount of time in sight of other groups as important and 21% listed very important.
- Crowding perceptions of whitewater rafting/kayaking: 40% listed the amount of time in sight of other groups as important and 14% listed very important.
- Top requested amenities: 32% lavatories, 27% parking, 17% access ramps/stairs.
- Preferred locations for improved amenities: 23% Lava Lake, 15% Upper Storm Castle, 13% Deer Creek (green bridge).

## 4.2 Recreational Use & Use Trends

The Forest Service has funded a seasonal River Steward position during the 2019, 2020, and 2021 field seasons. The primary role of the river steward is site maintenance, monitoring, engaging with the public, and maintaining relationships with partner groups. The River Steward is responsible for delivering a written report at the end of the season that summarizes projects/maintenance activities completed, interactions with visitors, photo documentation of river and recreation site conditions, and recommendations for future recreation management projects. The baseline recreation uses and use trends summarized below are based on observations documented in the River Steward's end of season report in addition to the 2018 Gallatin River Use Survey.

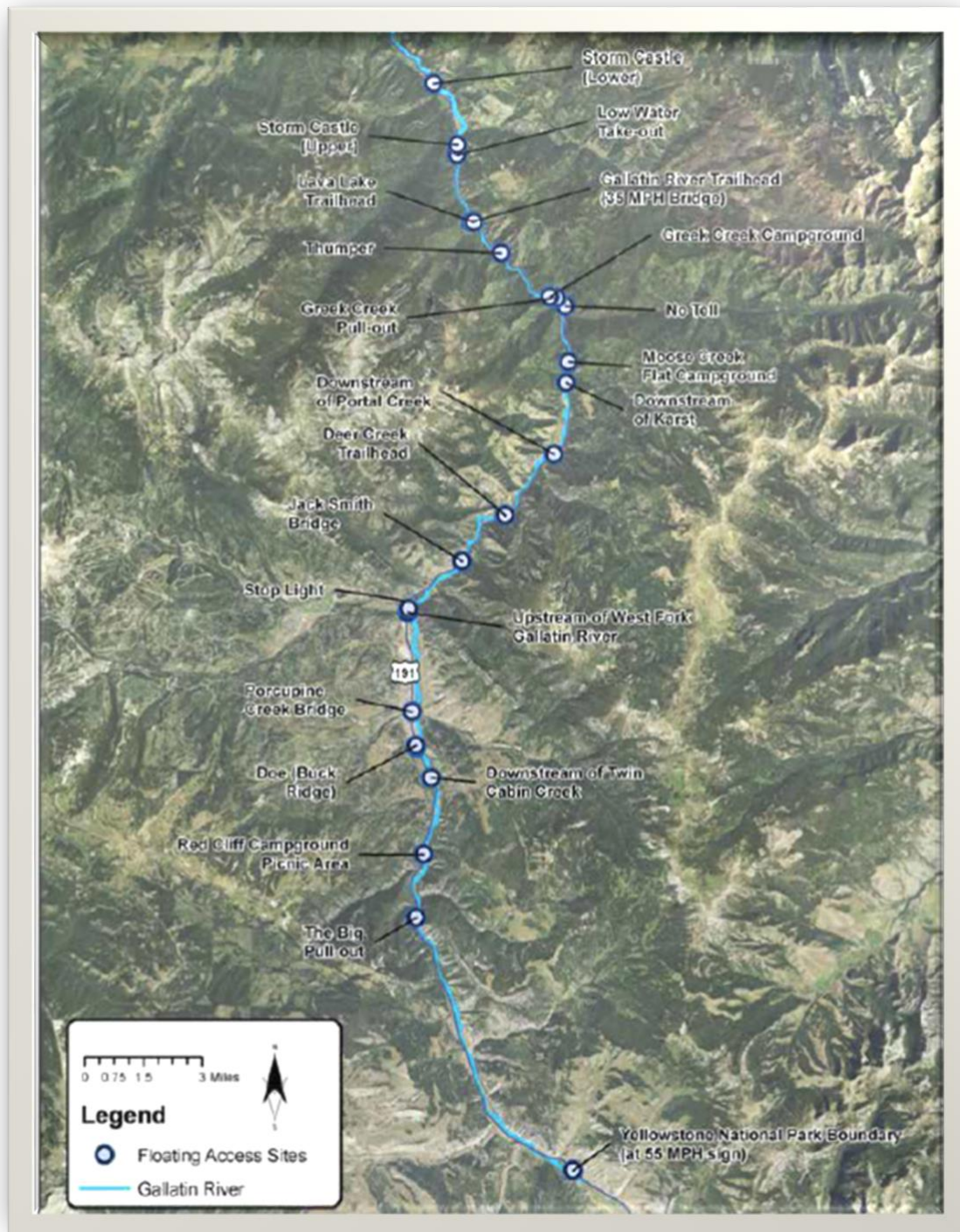
### 4.2.1 Whitewater Boating

The Gallatin River offers unique scenery and a variety of whitewater rapids of different classes. A popular stretch of whitewater, between Moose Creek Flat and Storm Castle Bridge, attracts recreational and commercial floating. Boating the Gallatin River, including inflatable rafts and kayaks, is popular in the Spring, Summer and Fall seasons, and the type and level of use varies with water level. Compared to other nearby boating rivers like the large, non-rocky lower portion of the Madison and Yellowstone Rivers, the Upper Gallatin Canyon Corridor offers rocky whitewater conditions that draw experienced rafters and kayakers during the high runoff season, and more casual or beginner users as water levels drop.

Out of the 111 access points to the Gallatin River, 22 sites are regularly used to access the river for boating (**Table 1 and Figure 2**). The only official river access points are at Storm Castle (Upper), Moose Creek Flat, and Upper Deer Creek. Lava Lake and Storm Castle (lower) are all

common points of access for boaters. Several other sites are commonly used based on streamflow and watercraft, including the Big Pull-Out, Doe, Porcupine Bridge, West Fork, No Tell, Greek Creek, Portal Creek, Thumper, and the Low Water Take-Out.

**Figure 2: Gallatin River Boating Access Sites**



**Table 1: Boating Reach Lengths**

Floating Reach	Length (Miles)
55 MPH sign for YNP to The Big Pull-out	8.6
The Big Pull-out to Red Cliff	1.9
Red Cliff to Twin Cabin Creek	2.2
Twin Cabin Creek to Doe	0.9
Doe to Porcupine Creek	1.0
Porcupine Creek to Upstream of the West Fork	2.9
Upstream of the West Fork to Stop Light	0.1
Stop Light to Jack Smith Bridge	2.0
Jack Smith Bridge to Deer Creek	2.1
Deer Creek to Portal Creek	2.2
Portal Creek to Karst	2.0
Karst to Moose Creek Flat	0.6
Moose Creek Flat to No Tell	1.6
No Tell to Greek Creek Pull-out	0.4
Greek Creek Pull-out to Greek Creek Campground	0.2
Greek Creek Campground to Thumper	1.9
Thumper to Lava Lake	1.2
Lava Lake to Low Water Take-out	1.9
Low Water Take-out to Storm Castle (Upper)	0.2
Storm Castle (Upper) to Storm Castle (Lower)	2.1

### Unguided Whitewater Rafting

Rafting is particularly active during peak runoff from May into June, although a pro-longed runoff or rainy summer can extend this active period of use. Experienced, dedicated rafters frequent the river often during the run-off season. Usage increases in the weekday evenings and throughout the weekend. During the summer season, the number of rafters reduces and typically includes casual boaters more interested in a scenic float, as well as anglers and other river vessels, like inflatable whitewater canoes. Although fishing is not allowed from boats on the Gallatin, some anglers prefer to travel via boat and stop along banks to increase access.

Type and frequency of raft use can also vary at different locations along the river. More experienced users have a strong focus on the lower stretch of rapids downstream from the Lava Lake Trailhead referred to as “The Mad Mile”. Upstream from the Mad Mile, between Moose Creek Flats Campground and Lava Lake Trailhead, the river is typically calmer and boaters use this section for a leisurely ride, as an introduction to whitewater conditions, or as a warm-up area for more technically difficult sections. Others choose to boat both sections for a prolonged trip down the river.

## Guided Whitewater Rafting

After peak runoff, when high water levels subside around June or July, private boater use begins to decrease, and raft companies guiding a tourist-oriented clientele become the primary boating activity on the river.

The two main whitewater raft outfitters permitted with the CGNF are Montana Whitewater and Geyser Whitewater Expeditions. Each outfitter is allowed a set amount of “user-days” from National Forest boat access points, with each user-day being equivalent to one customer. These companies can also have the option of using private access points that do not count towards their “user-day” limit. Because of the frequency of trips, size of trips (tours can at times range from 1 or 2 to over 7 or more boats per group) and simultaneous activity from both companies, raft tours have a highly visible presence along the Gallatin during mid-late summer. Guide companies are required to report their trips to the CGNF recreation department. A summary of the raft company use for the 2018 and 2019 season is shown in **Table 2**.

**Table 2. Raft Outfitter Use Summary**

<b>Geyser Whitewater Expeditions</b>			
2018 Launches	Moose	65 of 99 days	4077 guests
	Portal	46 of 99 days	2138 guests
	Jack Smith	28 of 99 days	916 guests
	No Tell	21 of 99 days	1446 people
<u>2018 Take Outs</u>	Lava	80 of 99 days	3415 people
	Upper Storm	66 of 99 days	4951 people
	Lower Storm	28 of 99 days	834 people
<b>Montana Whitewater</b>			
<u>2018 Launches</u>	No Tell	54 of 132 days	3256 guests
	Deer Creek	41 of 132 days	2077 guests
	Jack Smith	36 of 132 days	1157 guests
<u>2019 Launches</u>	Jack Smith	41 of 122 days	1182 guests
	Upper Deer	38 of 132 days	2868 guests
	Rosebud/Portal	36 of 122 days	2941 guests
	No Tell	25 of 122 days	1758 guests
<u>2018 Main Take Outs</u>	Lava	101 of 132 days	4470 guests
	Lower Storm	49 of 132 days	1228 guests
<u>2019 Main Take Outs</u>	Lava	93 of 122 days	6706 guests



## **Kayaking**

Kayaking accounts for a significant portion of boating use on the Gallatin. The kayaking season typically lasts longer than the whitewater rafting season largely because kayaks remain more maneuverable in low water. Numerous users kayak as long as the season allows, which is commonly up until snow begins to settle in the canyon.

Kayakers travel both solo and in groups. Social groups often meet at the river in the evenings or during the weekend. The 2018 Recreation Survey, noted that individual kayakers typically make 21 or more trips per year.

Another use trend worth noting is that due to the portability of kayaks there are more river access locations to choose from. In addition to the popular put-in locations at Deer Creek, Moose Creek and Lava Lake, Kayakers also commonly use the “Thumper” put-in, as well as other highway pullouts and places where boats can be carried down. Similarly, many kayakers completing the Mad Mile choose to take-out before the popular “Upper Storm Castle” site, instead choosing a small roadside pullout simply called “Kayaker Pullout”. Hitchhiking is common for both kayakers and rafters with single vehicles who do not have a way of returning to their put-in location.

### **4.2.2 Fishing**

The Gallatin River is a world-renowned fly-fishing river due to its scenery, wading conditions, unprecedented level of access offered by the river’s proximity to the highway, and the diversity of habitat present from its headwaters in Yellowstone National Park to the rivers lower section in the Gallatin Valley. Fishing occurs year-round with a lull during periods of high run-off. Some sections of the Gallatin River are subject to special regulations—fishing from a boat is not permitted and fishing in Yellowstone National Park requires a special fishing permit. A universally accessible fishing platform is available at the Upper Deer Creek (Beatis Alley) Access Site.

According to the 2018 survey results, the majority of anglers were 50 to 64 years old, with the second largest group being between 30 and 49, and the third largest group 65 or older. A majority of respondents claimed to live in Gallatin County and frequent the river often. Most anglers considered the amount of time in sight of other groups to be very important and disliked long wait times to access fishing spots. Top fishing locations include Porcupine Bridge to Deer Creek, Deer Creek to Greek Creek campground, and Greek Creek to Storm Castle Bridge. A large majority of anglers responded that they practice the catch and release methodology of fishing.

Anglers often prefer feeling isolated on the river, or at least in a moderate distance to other recreationists. Anglers who are older in age may prioritize easier or safer access opportunities. The most important factors for maintaining recreational standards for fishing will involve

scenery impacts and maintaining diverse access opportunities to minimize crowding and protect scenic views.

### **Guided Fishing**

Seventeen outfitter guide companies, listed in **Table 3**, are permitted for fishing on the Gallatin River between the Park boundary and Forest boundary near Spanish Creek. Each permit authorizes a different number of service days and allows for guiding on multiple rivers, creeks and lakes. For example, one permit may allow for use on the Gallatin, Yellowstone and Madison Rivers. Parsing out specific use numbers on the Gallatin is difficult because guiding is not limited to just the Gallatin. Rarely does an outfitter use the Gallatin River exclusively; depending on variables like business location, fishing conditions, seasonality or client desires, outfitters move freely between the areas authorized on their permit or, in some cases, stick to their local river. The 2018 recreational use study failed to adequately target and represent the guided fishing clientele; therefore, their preferences were not identified.

There are four outfitters with high numbers of user days who primarily fish the Gallatin River: Lone Mountain Ranch, Wild Trout Outfitters, Gallatin River Guides, and East Slope Outdoors. This use totals 1,551 days. While not every single day ends up being used on the Gallatin, the vast majority does. The remaining thirteen outfitters, if they utilized all of their allocated days on the Gallatin (which they don't) would accumulate to an additional 1,065 days.

**Table 3. Gallatin River Angler Outfitters**

<b>Outfitter</b>	<b>Total Service Days</b>	<b>Primary Area of Use</b>
Lone Mountain Ranch	451	Gallatin
Wild Trout Outfitters	441	Gallatin
GRG	389	Gallatin
Super, Inc	270	Gallatin
Big Sky Trout	45	Gallatin
Kumlien	69	Gall/Yellowstone
River's Edge	60	Gall/Yellowstone
Angler's West	172	Yellowstone
Arrick's Fly Shop	90	Madison/Lakes
Galloups' Slide Inn	25	Madison
Jacklin's Fly Shop	100	Madison
Firehole	60	Madison/Lakes
Blue Ribbon Flies	195	Madison/Lakes
Madison River Outfitters	120	Madison
Nine Quarter Circle	50	mix
Yellowstone Mtn Guides	50	mix
Big Sky Anglers	29	mix

### 4.2.3 Camping

Overnight camping at developed sites can be found along the river corridor at Red Cliff, Spire Rock, Greek Creek, Swan Creek and Moose Creek Flat Campgrounds. Dispersed camping on national forest lands outside of developed campgrounds is prohibited within ½ mile of US 191. Despite dispersed camping restrictions, unauthorized campsites are often observed along the river in more isolated areas with limited visibility from the highway. Camping is more common along the visitor-created access roads found in areas where the highway is not immediately along the river. These access roads currently see extensive fishing access use as well, which has resulted in well-worn pullouts and turn-around points that have the appearance of dispersed sites.

### 4.2.4 Day-Use/Guided Horseback Riding

Other popular activities within the Gallatin River corridor include hiking, mountain biking, climbing, wildlife viewing, bird watching, photography, horseback riding, etc. Day use horseback rides constitute the highest outfitted use in Gallatin Canyon outside of rafting. Several horse outfitters are permitted with the CGNF, and similar to the raft outfitters, each one is allowed a set amount of “service days”, as described in **Table 4**. Each outfitter is authorized for a large permit area, so use patterns can vary depending on outfitter location, trail conditions, client interest, etc. Consequently, the number of user days represented does not all occur within the Gallatin corridor.

Horseback day rides typically range from 1-3 hours. These rides utilize both National Forest system trails as well as specifically authorized “user-created” trails outlined in each outfitter’s permit. Most of this use is not concentrated on the Gallatin River itself but is focused instead along river tributaries. Popular horseback riding areas in Gallatin Canyon include Porcupine Creek, Buffalo Horn Creek and Taylor Fork. Resource impacts from repeated stock use can include erosion and sedimentation into the Gallatin and its tributaries. Some trails in the canyon have seasonal spring stock closures to help alleviate this impact.

**Table 4: Gallatin Canyon Day Use Horseback Outfitters**

<b>Outfitter</b>	<b>Total Service Days</b>
320 Ranch	2917
Broken Hart Adventures	713
Canyon Adventures	505
Covered Wagon	1100
Elkhorn Ranch	3464
Jake’s Horses	3200
Lone Mountain Ranch	1007
Medicine Lake Outfitters	195
Nine Quarter Circle	3000
Yellowstone Mountain Guides	167

### 4.3 Impacts of Recreational Use

Without adequate management and infrastructure, increasing levels of recreation and tourism pressure within the Gallatin Canyon produce environmental impacts such as soil erosion and compaction, damage to vegetation, disturbance to wildlife, water pollution, increased fire frequency, vandalism, and noise.

Some of the most notable environmental impacts are directly related to river access points which include visitor created trails, parking areas, and two track roads. Unsurfaced road and trail treads are susceptible to a variety of impacts including vegetation loss and compositional changes, soil compaction, erosion, and muddiness, exposure of plant roots, widening, and the proliferation of visitor-created trails (Hammitt & Cole 1998, Leung & Marion 1996, Tyser & Worley 1992). Soil erosion exposes rocks and plant roots, creating a rutted and uneven tread surface. Eroded soils may find their way into water bodies, increasing water turbidity and sedimentation impacts to aquatic organisms (Fritz 1993). Similarly, excessive muddiness aggravates tread widening and associated vegetation loss as visitors seek to circumvent mud-holes and wet soils (Marion 1994). Trail widening and the creation of parallel treads and side-trails unnecessarily increase the area of land disturbance (Liddle & Greig-Smith 1975). Trails, and the presence of visitors, can also impact wildlife, fragment wildlife habitat and cause avoidance behavior in some animals and attraction behavior in others seeking to obtain human food (Hellmund 1998, Knight & Cole 1991).

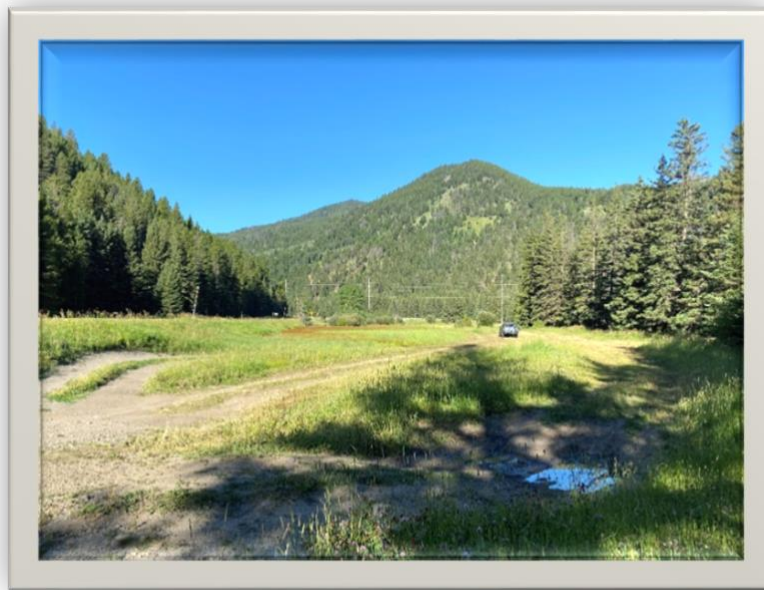


Photo: Example of a visitor created access road.

Inadequate, poorly designed, and visitor created stream crossings have two major potential problems: they can be major environmental problems and they can have poor trafficability. A

good trail design will minimize the number of stream crossings and carefully plan the locations where crossings are necessary. Several viable design options exist to minimize impacts, including bridges, low water crossings, culverts, and fords (Aust, et al. 2005).



Photo: example of a visitor created stream crossing

In addition to ecological impacts, social impacts include increased travel difficulty, degraded aesthetics, safety concerns, and evidence of human disturbance. Impacts such as severe soil erosion and exposed roots are visually offensive and can degrade the aesthetics and functional value of recreational settings. Recent studies have found that resource impacts are noticed by visitors and that they can degrade the quality of recreation experiences (Roggenbuck et al. 1993, Vaske et al. 1993). Impacts such as deep ruts and excessive muddiness increase the difficulty of travel and threaten visitor safety.

## **5. STRATEGY & FRAMEWORK**

### **5.1 Assumptions**

1. Public use of the Gallatin River for recreational pursuits will continue to increase.
2. Increased public use will raise the potential for increased adverse impacts on other resources and conflicts between users.
3. Prioritizing and implementing river access improvements and ecological restoration projects will address problems involving ongoing resource damage.
4. Informing, educating, and directing users provides an opportunity to reduce or mitigate potential conflicts and resource damage.



5. Project implementation will require strategic partnerships and a commitment of agency direction, support, and funding.

## 5.2 Strategies & Actions

The assumptions form the basis for the strategies and actions needed to restore and adapt recreation settings and provide quality recreation experiences where unmanaged use has led to localized impacts to ecosystem health.

### Strategies:

- **Sustainable Recreation & Restoration:** Provide sustainable recreation opportunities while protecting and restoring the ecological integrity of the Gallatin River corridor.
- **Education & Outreach:** Deliver stewardship services and seek partners and volunteers to assist with educating river corridor users about the river environment, safety, recreation opportunities, leave no trace ethics, and how to avoid negative environmental impacts.
- **Strategic Partnerships:** Establish strategic partnerships to support funding and capacity building.

### Actions:

- Continue to implement recreation improvement and ecological restoration projects at river access points, trailheads, and other National Forest points of interest as outlined in section 5.3.2.
- Continue to hire a seasonal River Steward.
- Continue to work with the Task Force on a consistent signage program for identifying river access points, establishing use guidelines, natural interpretation, and invasive species messaging.
- Work with the University of Montana, Institute for Tourism and Recreation Research to update the Gallatin River Use Survey.
- Coordinate with Montana Department of Transportation to achieve the recommended improvement options outlined in Section 3.3 and 5.3.2.
- Continue annual Cost Share Agreement with the Task Force to support project implementation.
- Continue to partner with the Gallatin Invasive Species Alliance on invasive species management.
- Continue to partner with Montana Fish, Wildlife and Parks on fisheries protection.
- Consider opportunities to develop additional public/private partnerships to support project funding and outreach efforts (i.e. outfitter guides, local businesses, etc.)

## 5.3 Project Framework

*The Gallatin Canyon River Access Site Assessment*, completed in 2015, provided a framework for identifying sites along the Gallatin River corridor where ecological restoration actions are

needed and where development may be appropriate to improve access and safety for visitors. The *Restoration Strategy* further develops the framework by assigning recommend improvement actions. A description of recommend improvement actions are outlined below and visually represented in **Appendix A – Map Index**.

#### **Revegetation**

- Manage/reestablish native vegetation to maintain and enhance the vegetative cover, with an emphasis on enhancing the riparian buffer width immediately adjacent to the stream corridor.
- Install temporary fencing and other barriers, surrounding newly planted areas, to limit trampling of vegetation, promote streambank stabilization, and improve fisheries habitat.
- Rehabilitate 2-track user created road networks in riparian and upland areas.

#### **Improve Streambank**

- Restore eroding streambanks using native materials appropriate to the landscape and enhance riparian buffer with vegetation plantings.

#### **Delineate Parking**

- Delineate parking areas utilizing boulders, gravel, etc. to reduce footprint of existing visitor created routes and parking areas.

#### **Develop Parking**

- Develop parking areas at key river access sites to protect riparian areas and minimize detrimental impacts to water quality. (may include more intensive development i.e. paving).

#### **Raft Access Mitigation**

- Consolidate and improve boat (raft and kayak) access at key recreation sites.

#### **Address Steep Access**

- Install BMP's to stabilize steep slopes in high use areas.

#### **Improve Trail**

- Maintain/improve existing river trail access in a way that minimizes detrimental impacts to water quality and riparian/wetland areas.

#### **Improve Safety**

- Provide for safe access to the river from the highway and safe access to the highway when leaving the river.

#### **Traction Sand Management**

- Install traction sand BMP's to control non-point pollution and protect beneficial uses.
- Improve frequency of removal of traction sand from the roadside.

#### Close

- Decommission and/or consolidate recreation pull-outs that are not warranted or unsafe.

## 5.4 Planning Considerations

Within the Custer Gallatin National Forest Boundary, land use policy and regulations are dictated by the *Custer Gallatin National Forest Land Management Plan (Forest Plan)*. Additional Forest Service direction is provided in the *Gallatin National Forest Travel Plan (Travel Plan)*. Due to the Gallatin Rivers close proximity to US 191, the *US 191 Corridor Study* completed by MDT also provides relevant information and context for the restoration strategy.

The Montana Department of Transportation (MDT), in partnership with the Federal Highway Administration (FHWA) and Gallatin County, completed the *US 191 Corridor Study (Corridor Study)* in October 2020 to assess the US 191 corridor between Four Corners and Beaver Creek Road south of Montana Highway 64 (MT 64).

#### Improvement Options:

Recommended improvement options for US 191 were identified to meet the highway corridor needs and objectives identified in the *Corridor Study*. The *Corridor Study* recognizes that implementation of improvements may require cooperation and effort from multiple entities with the resources, funds, jurisdiction, or special expertise necessary to accomplish the improvement options. Implementation agencies and partners playing a role in recommend improvement options include the United States Forest Service (USFS), Gallatin River Task Force (GRTF), and Montana Fish, Wildlife and Parks (FWP). Recommended improvement options that overlap with the Restoration Strategy are described below:

- **Lava Lake:** The Lava Lake Trailhead is located on a sharp, substandard s-curve on US 191. A large turnout located on the south of the curve is used as overflow parking for the trailhead. Users who wish to access the trailhead from the turnout must walk along the narrow US 191 bridge to the access road. The recommendation is to reconfigure access to Lava Lake trailhead; flatten horizontal curve; and reconstruct the bridge.
- **Recreational Access:** In some cases, informal pullouts are starting to become established through sustained public use at Gallatin River access points. The recommendation is to consult with FWP, USFS, and GRTF to determine appropriate locations for new, formalized, or clouded/consolidated recreational access.
- **Highway Maintenance:** Potential areas for maintenance improvement include reducing sediment loading in the Gallatin River, vegetation management, and additional winter maintenance. Sedimentation and siltation sources include erosion from borrow ditches and fill slopes, bridge deck drainage, and traction sand applied to road surfaces during winter months. Elevated temperatures are often caused by vegetation removal along

riverbanks and loss of riparian habitat. By implementing MDT's *Erosion and Sediment Control Best Management Practices Manual* and *Permanent Erosion and Sediment Control Design Guidelines* these negative effects can be minimized. The recommendation is to address highway maintenance issues and continue to research and implement best practices.

- **Vegetation Management:** The recommendation is to develop and implement a Vegetation Management Plan to achieve improved sight distance for driver detection of animals in the clear zone, maintenance of quality wildlife habitat along the corridor, cover for animal movements across the highway in appropriate locations, maintenance of riparian zone integrity and wetland function, improved winter maintenance and snow removal activities, and sediment/runoff control along the Gallatin River and its tributaries adjacent to the highway.

## 5.5 Project Implementation

**Appendix B – Project Implementation Table**, groups the access points into project categories, assigns costs estimates, and an anticipated timeframe for implementation including: short-term (0-5 years), mid-term (5-10 years), and long-term (10-15 years). The project categories are based on the type and scale of recommended improvement actions. Grouping sites into project categories will assist the planning team with stakeholder coordination, environmental analysis/permitting, and consider how to address multiple sites at once for efficiency and economy of scale.

### Project Categories

- Access Management and Revegetation: Projects in this category will focus on delineating parking to reduce the footprint of unmanaged dispersed recreation, closing and/or consolidating unauthorized access points, and revegetating degraded areas.
- Access Improvements and Ecological Restoration: Projects in this category will focus on improving existing recreation access points via a combination of parking, trail, and boat (raft and kayak) improvements. These projects will also incorporate targeted ecological restoration of the river corridor including streambank/channel restoration and riparian buffer enhancements.
- Traction Sand Management: Projects in this category will focus on coordinating with MDT to pilot and install traction sand Best Management Practices.

Successful implementation of recreation improvement and ecological restoration projects may require cooperation and effort from multiple entities and ultimately depends on funding availability. Additionally, project-level environmental analysis will be required for most improvements implemented from the strategy. Cost estimates include engineering, permitting, construction, and indirect costs. Estimates are preliminary and designed for planning-level purposes. Actual costs may vary due to changed conditions at the time of construction.

**Table 5. Project Implementation Summary**

Completed Projects		
Project Category	# of Sites	Cost
Access Management	1	\$
Access Improvements	4	\$700,000
<b>Total</b>	<b>5</b>	<b>\$700,000</b>
Short-Term		
Project Category	# of Sites	Cost Estimate
Access Management	13	\$432,720
Access Improvements	3	\$447,840
<b>Total</b>	<b>16</b>	<b>\$880,560</b>
Mid-Term		
Project Category	# of Sites	Cost Estimate
Access Management	8	\$1,236,240
Access Improvements	12	\$545,040
Traction Sand Management	2	\$5,760
<b>Total</b>	<b>22</b>	<b>\$1,787,040</b>
Long-Term		
Project Category	# of Sites	Cost Estimate
Access Management	20	\$439,200
Access Improvements	5	\$315,360
Traction Sand Management	23	\$370,080
<b>Total</b>	<b>48</b>	<b>\$1,124,640</b>

**Total Sites Restored = 91**

**Total Costs = \$3,792,240**

## 5.6 Potential Funding Sources

Implementation of recreation improvement and ecological restoration projects ultimately depends on funding availability. Potential funding for projects includes federal, state, local, and private sources.

### Federal

[Great American Outdoors Act](#): This landmark conservation legislation utilizes revenue from energy development to provide needed maintenance for critical facilities and infrastructure in our national parks, forests, wildlife refuges, recreation areas, and American Indian Schools.

[Capital Improvement and Maintenance Funds](#): The National Forest Service annual budgets include funding to improve, maintain, and operate the multimillion-dollar infrastructure related to recreation and other facilities, including site components such as utilities, sidewalks, associated roads and parking lots.

## **Federal Funding for Projects Completed in Partnership with MDT**

**National Highway Performance Program (NH):** Funding for highway and bridge projects to rehabilitate, restore, resurface, and reconstruct National Highway System routes; allocated by the Montana Transportation Commission.

**Transportation Alternatives Program (TA):** Funding for smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, and environmental mitigation related to stormwater and habitat connectivity; awards granted to projects through a competitive process.

**Highway Safety Improvement Program (HSIP):** Funding for highway safety improvement projects on any public road, bicycle/pedestrian pathway, or trail; project applications from local governments prioritized by MDT and approved by the Montana Transportation Commission.

**Federal Lands Access Program (FLAP):** Funding to improve access to federal lands through improvements to non-federal infrastructure (including state highways and local roadways); project selection determined by Program Decisions Committee.

**Transit Programs:** Funding to support transit operations and public transportation projects, including specific programs for rural areas and mobility for seniors and individuals with disabilities; allocated by MDT to local governments and private organizations.

## **State**

[Recreation Trails Program Grant](#): Montana State Parks administers the Recreational Trails Program (RTP), a federally funded grants program that supports Montana's trails. RTP applicants can include federal, tribal, state, county or city agencies, private associations and clubs. Examples of eligible projects include: urban trail development, basic front and backcountry trail maintenance, restoration of areas damaged by trail use, development of trailside facilities, and educational and safety projects related to trails.

[Trail Stewardship Grants](#): Eligible funding areas include: New trail and shared-use path construction; Rehabilitation and maintenance of existing trails and shared-use paths, including grooming of trails for motorized and nonmotorized winter recreation; and Construction and maintenance of trailside and trailhead facilities, including but not limited to bridges, fencing, parking, bathrooms, latrines, picnic shelters, interpretation, trail signs, and trailside weed management.

## **Local**



[Big Sky Resort Tax](#): Projects located within the boundaries of the Big Sky Resort Area District that provide for the public health, safety, and welfare of the greater Big Sky community are eligible for funding. Restoration Strategy projects align with the *Our Big Sky Community Vision and Strategy* goals related to recreation and natural environment.

[National Forest Foundation](#): The National Forest Foundation supports action-oriented projects that directly enhance the health and well-being of America's National Forests. Nonprofit organizations dedicated to addressing natural resource issues on National Forests and Grasslands can apply for support. The Matching Awards Program (MAP) provides funding for on-the-ground conservation and restoration projects that improve forest health and outdoor experiences. MAP funding was awarded to the Task Force for implementation of the Upper Deer Creek Restoration Project.

Private Funding: As a nonprofit organization, the Task Force has the ability to raise private funding from memberships, donations, capital campaigns and grants from private foundations to support implementation of Restoration Strategy projects.

## 5.7 Monitoring and Tracking Impact

Riparian health from a 2005 assessment, using aeriels from 1999 provided the following insight into the condition of riparian areas within the Upper Gallatin river corridor:

Excellent Riparian Health = 11.2 miles

Fair Riparian Health = 26.7 miles

Poor Riparian Health = 6.7 miles

Not surprisingly, the “poor” reaches coincide with riprap (rock) areas used to stabilize the highway adjacent to the river (approximately 6.3 miles). Riprap eliminates riparian restoration opportunities, which places a higher emphasis on restoring areas where restoration is possible. The riprap occurs primarily between Deer Creek to Portal Creek and Greek Creek to Storm Castle, leaving 26.7 miles of “fair” riparian areas with the potential for restoration. The total reach assessed was 44.6 miles extending from Specimen Creek to Spanish Creek.

Primary Objective: Reduce unmanaged dispersed recreation and restore riparian areas to improve ecological health while supporting sustainable river access within the Upper Gallatin River corridor.

The primary objective will be measured by:

- Number of miles of user routes closed
- Square feet/acres of riparian areas restored

Additional measurable benefits include (will vary by project):

- Number of recreational improvements
- Number, types, miles/acres of restoration actions
- Number of Aquatic Organism Passages (AOP)
- Number of acres of invasive species treated
- Number of outreach or interpretive actions
- Number of removed or modified recreation facilities to improve riparian conditions

Measurable outcomes will vary by project and will be tracked and monitored during the project development, implementation, and monitoring phases.

A GIS exercise to draw lines or create polygons for where riparian restoration work is possible could be undertaken. Additionally, a larger scale endeavor tying riparian buffer enhancements to shading and algae could be worthwhile.

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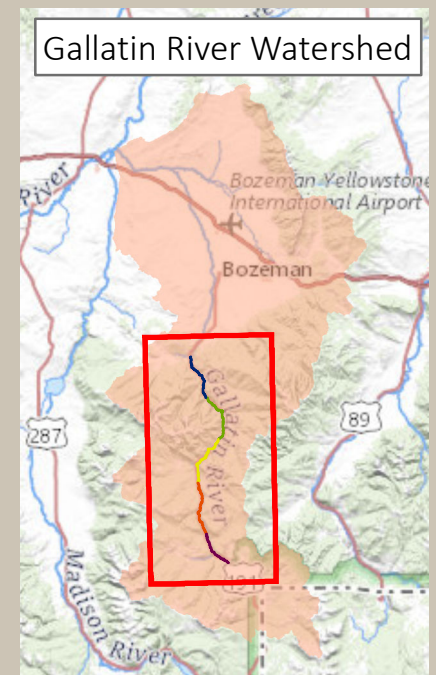
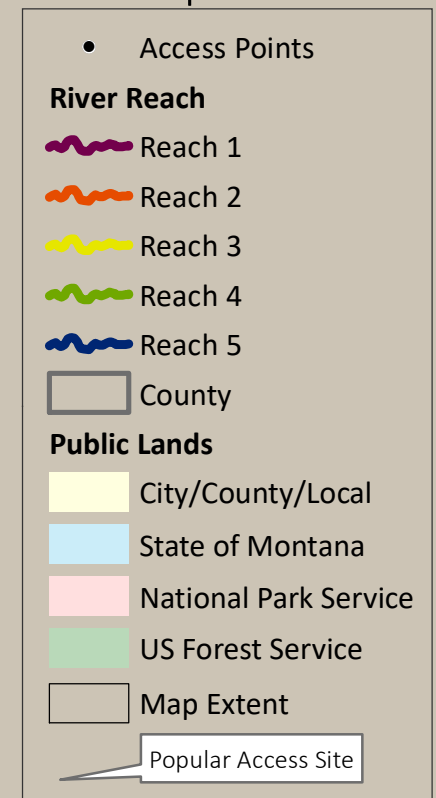
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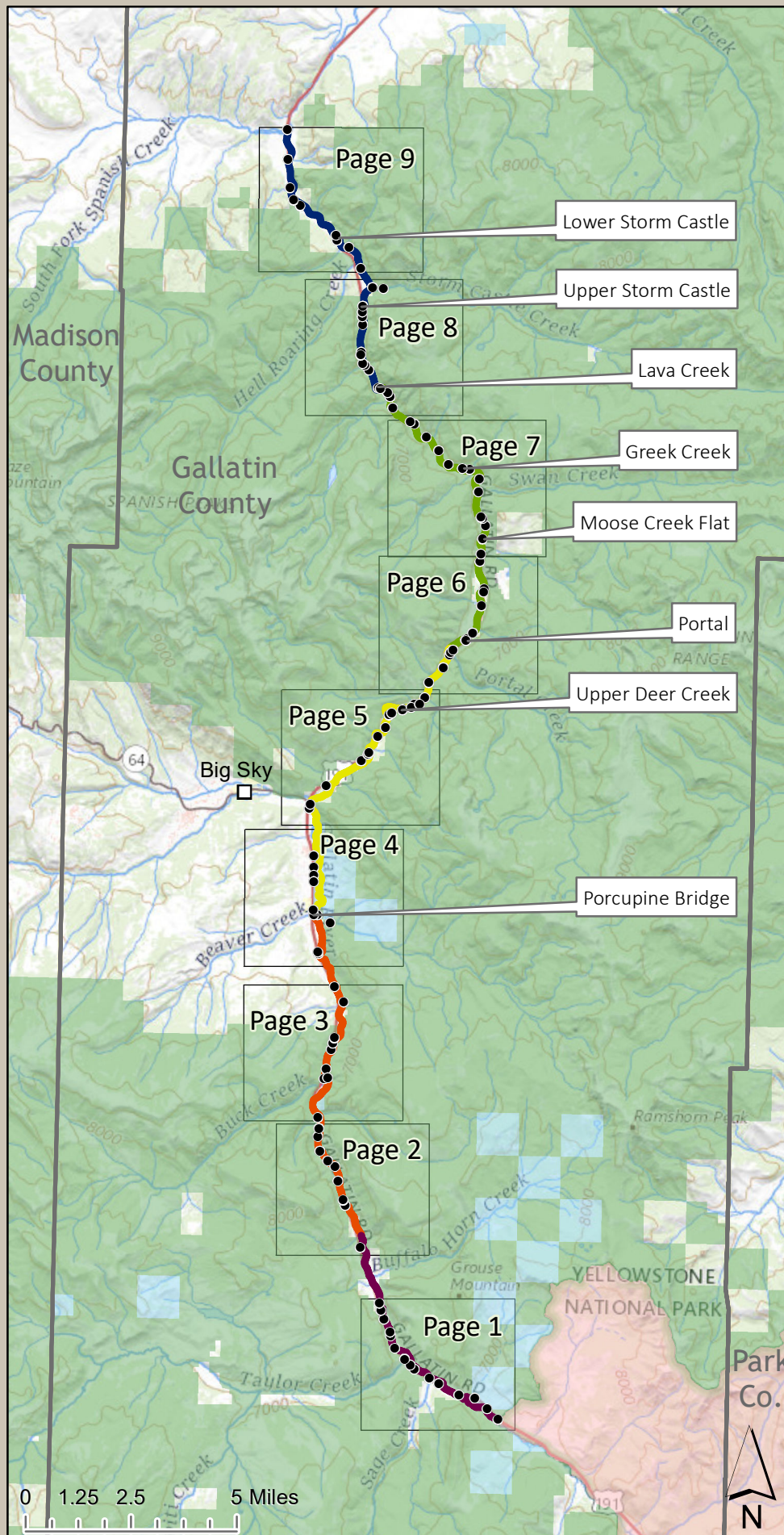
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# Upper Gallatin River Restoration Strategy Map Index

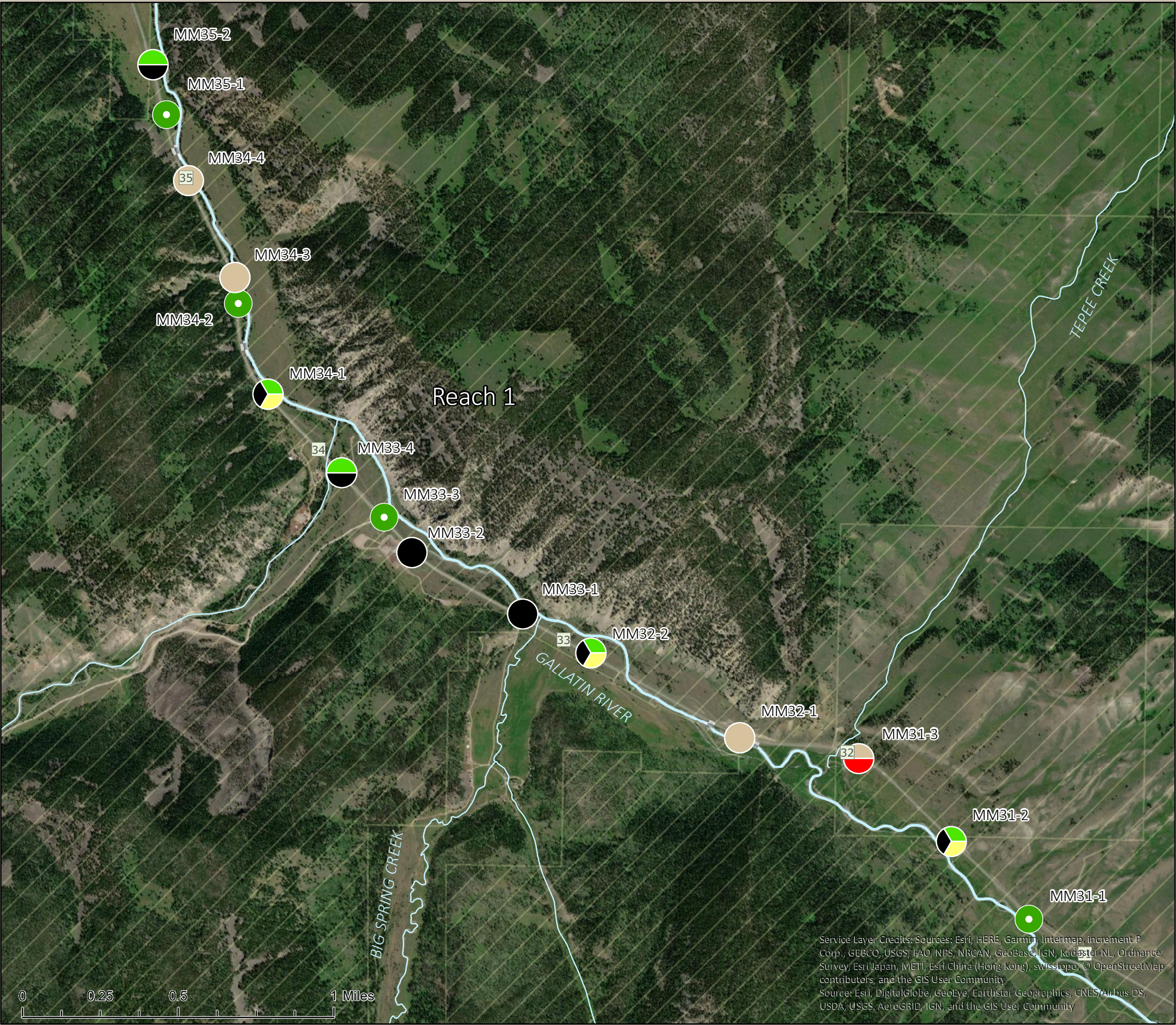


Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global





# Upper Gallatin River Restoration Strategy



Gallatin Canyon Access Points

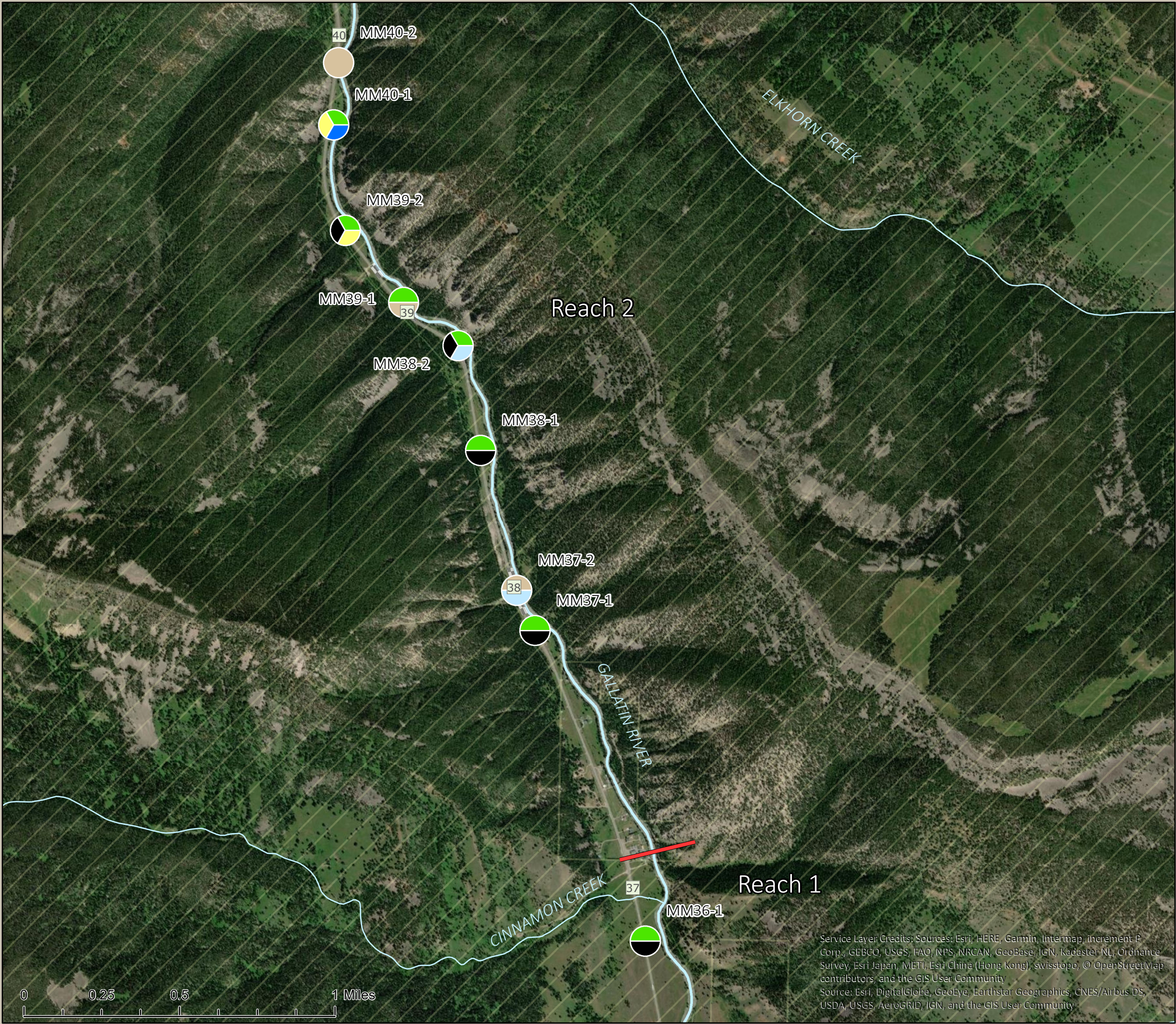
Actions (MM is MDT Mile Marker)

- Revegetation
- Delineate Parking to Reduce Footprint
- Improve Safety
- Traction Sand Management
- Improve Trail
- Improve Streambank
- Raft Access Mitigation
- Address Steep Access
- Develop Parking and Reduce Footprint
- Close
- Complete
- No Action
- MDT Mile Markers
- Stream
- Riprap
- Public Lands



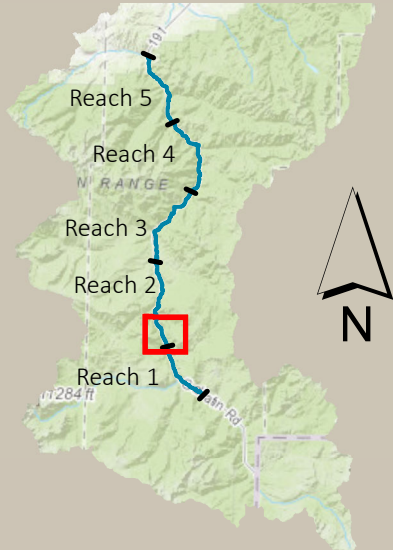


# Upper Gallatin River Restoration Strategy



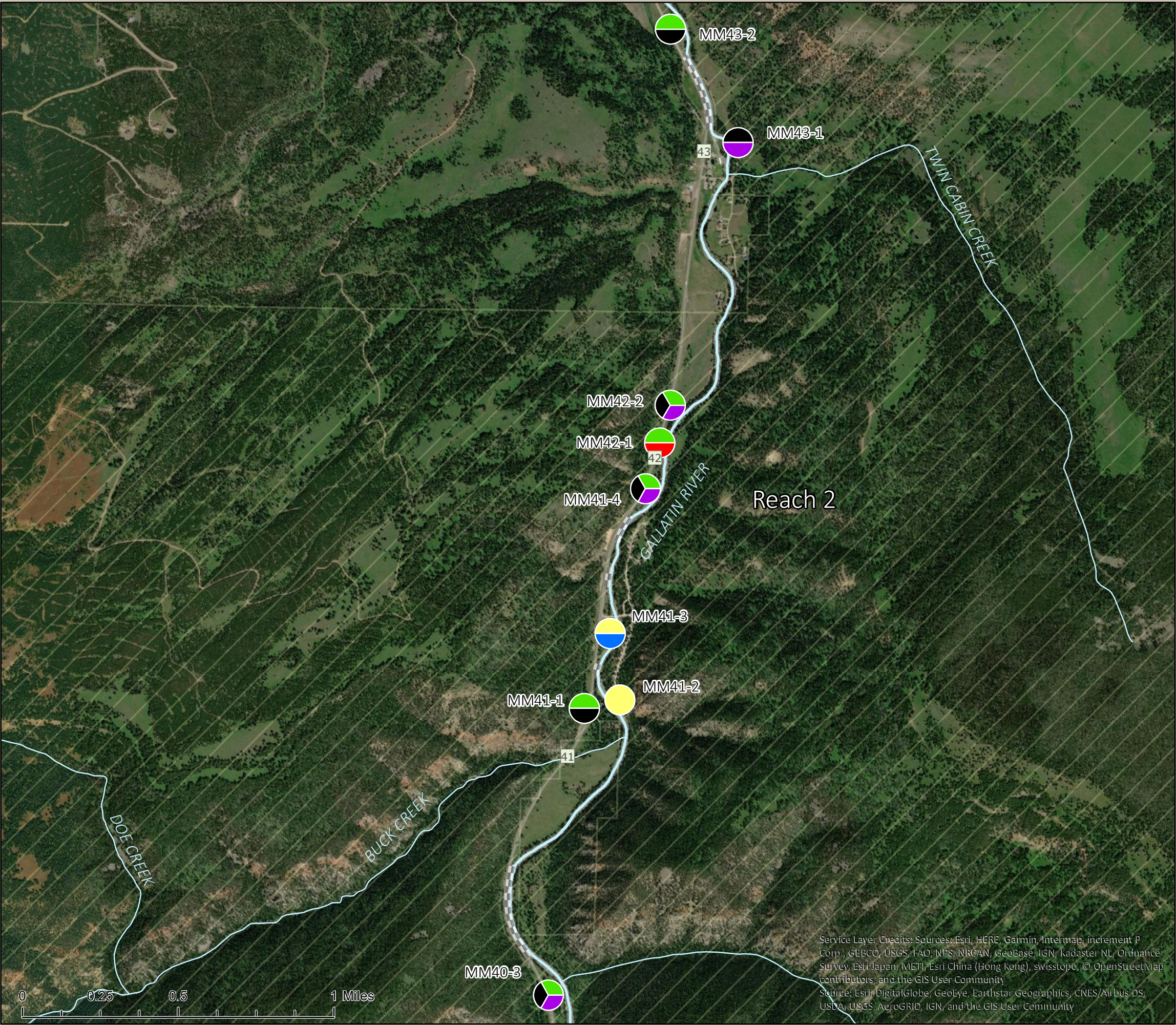
## Gallatin Canyon Access Points

- Actions (MM is MDT Mile Marker)
- Revegetation
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- Improve Trail
- Improve Streambank
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- Address Steep Access
- Develop Parking and Reduce Footprint
- Close
- Complete
- No Action
- MDT Mile Markers
- Stream
- Riprap
- Public Lands






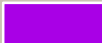

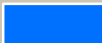
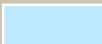












# Upper Gallatin River Restoration Strategy



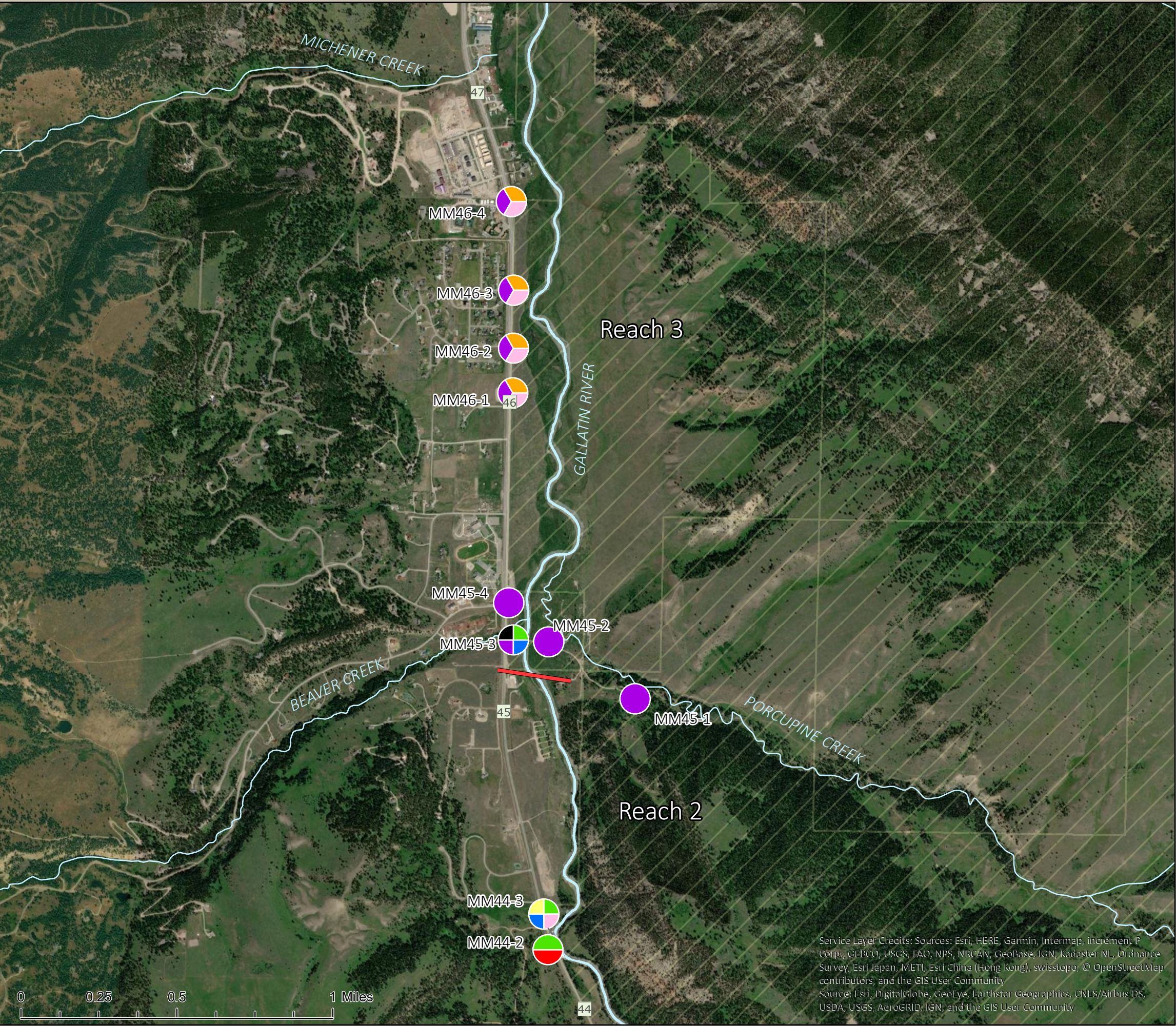
## Gallatin Canyon Access Points

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-  Improve Safety
-  Traction Sand Management
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-  Improve Streambank
-  Raft Access Mitigation
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













# Upper Gallatin River Restoration Strategy



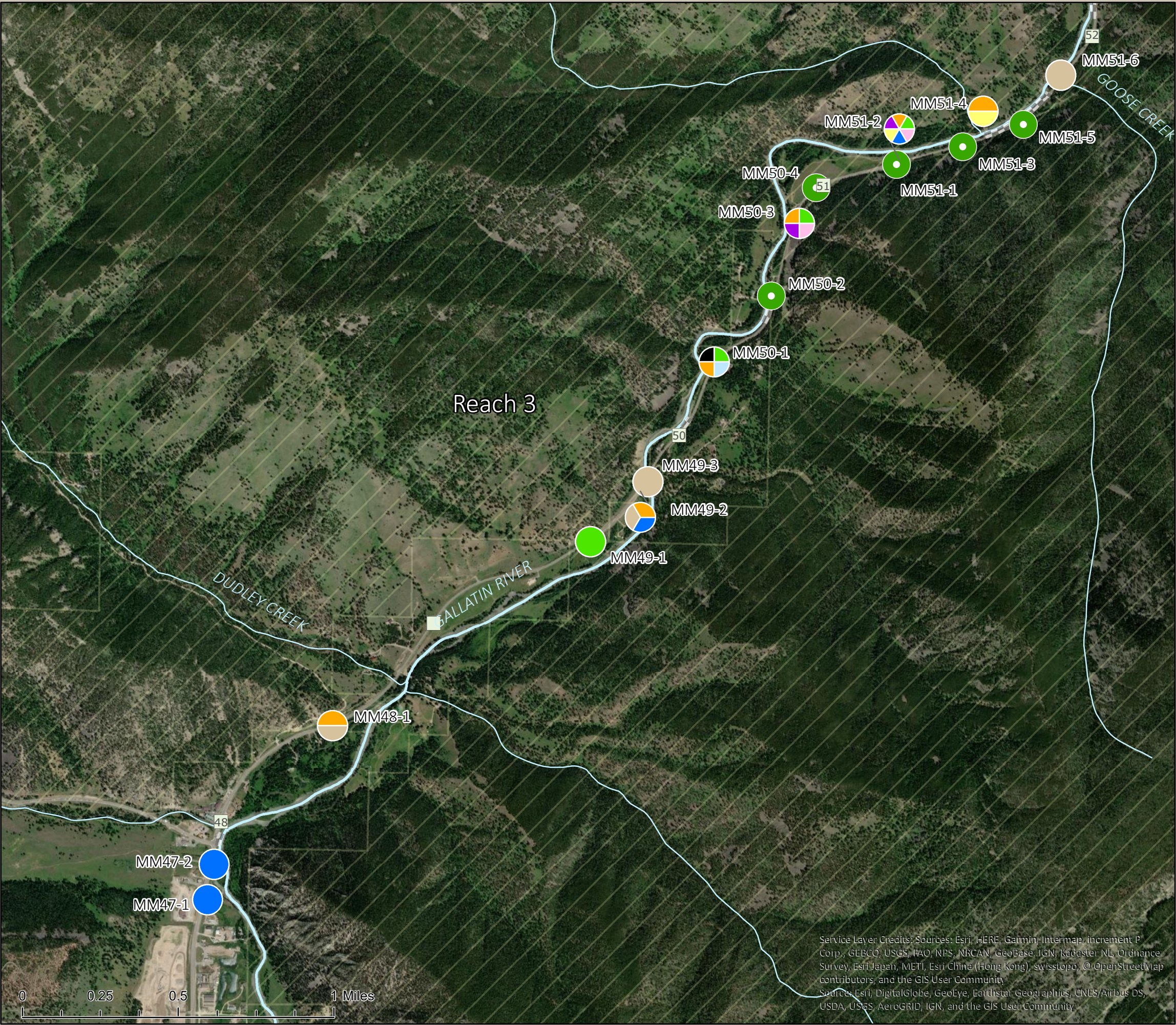
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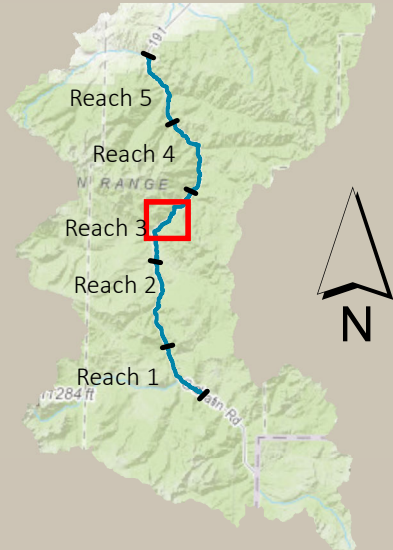
# Upper Gallatin River Restoration Strategy



Gallatin Canyon Access Points

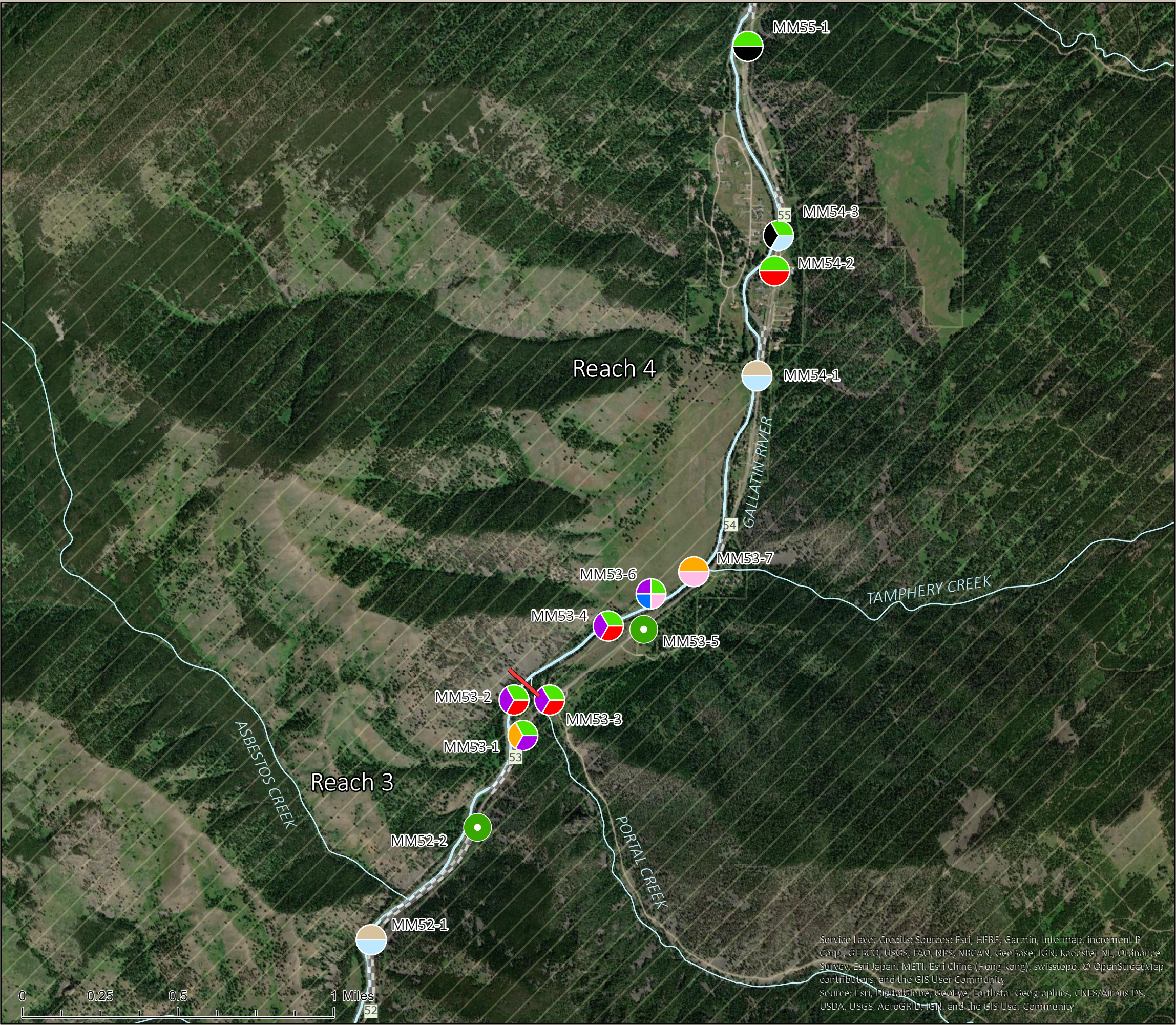
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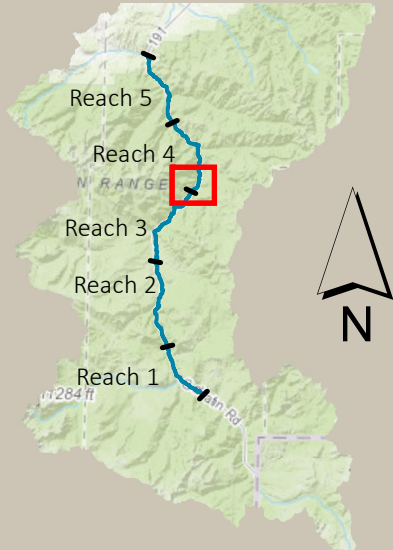


# Upper Gallatin River Restoration Strategy



## Gallatin Canyon Access Points

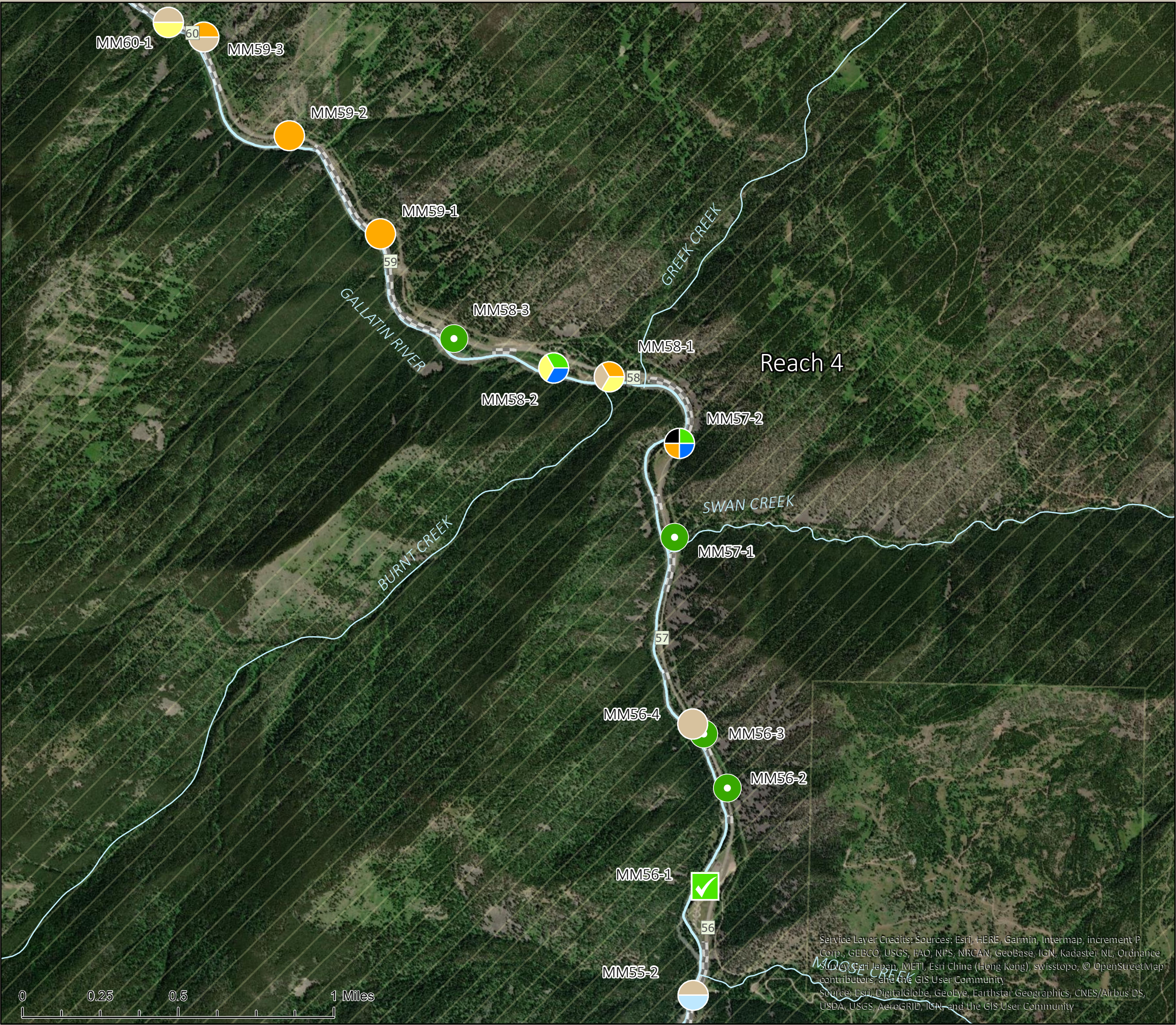
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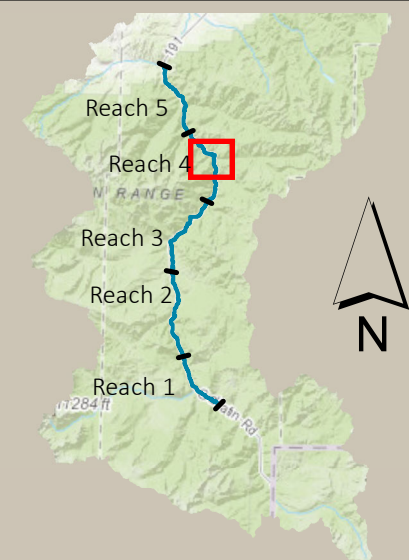


# Upper Gallatin River Restoration Strategy



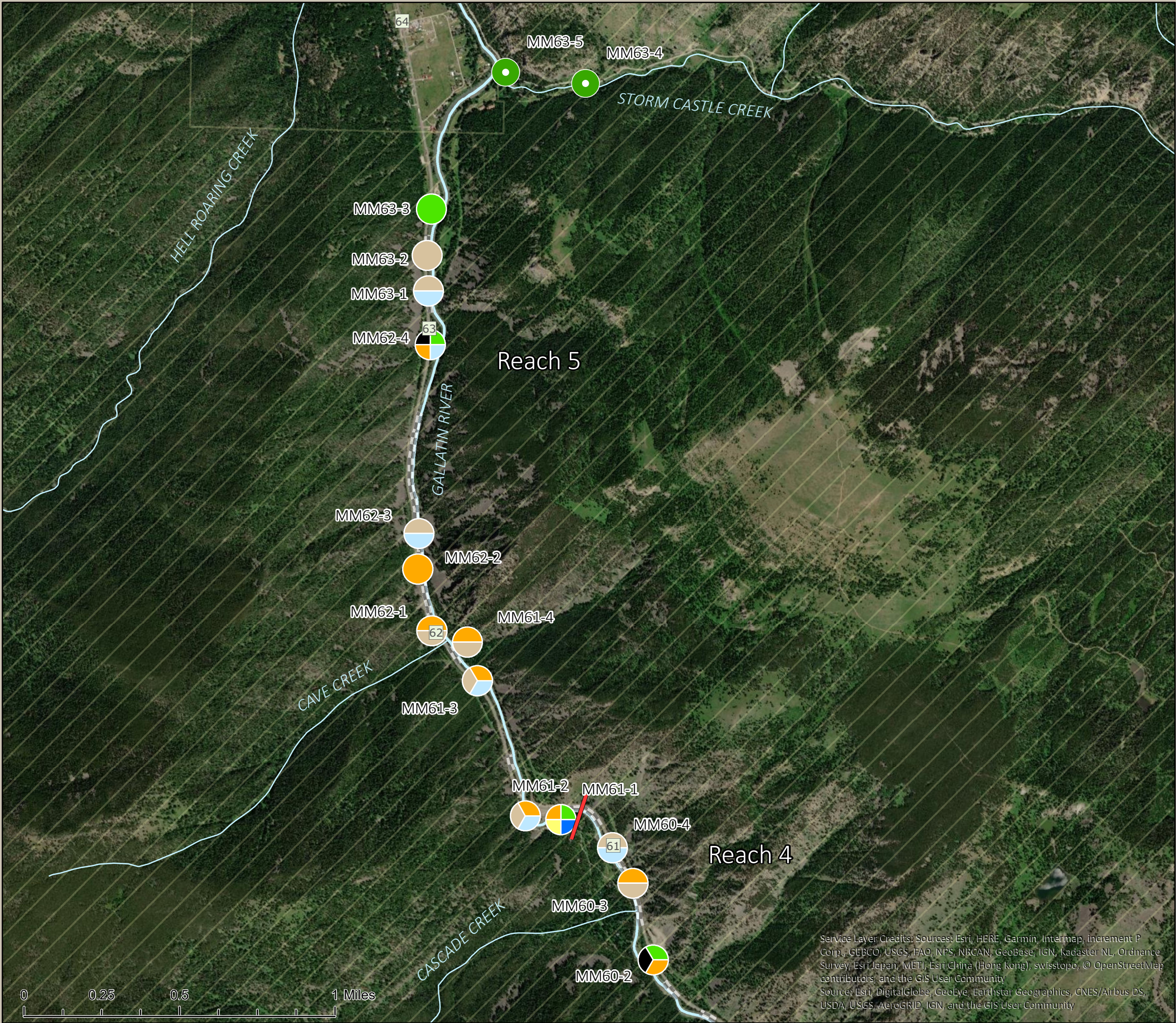
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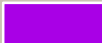

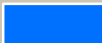
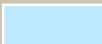










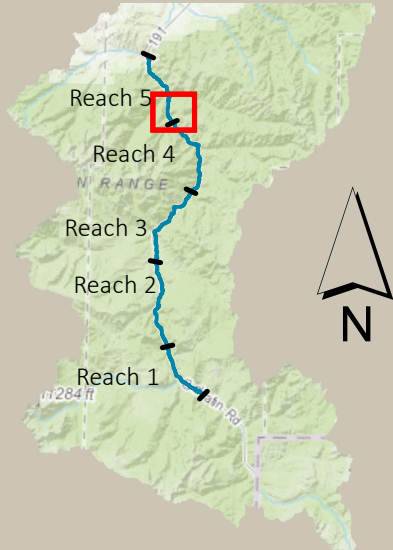


# Upper Gallatin River Restoration Strategy



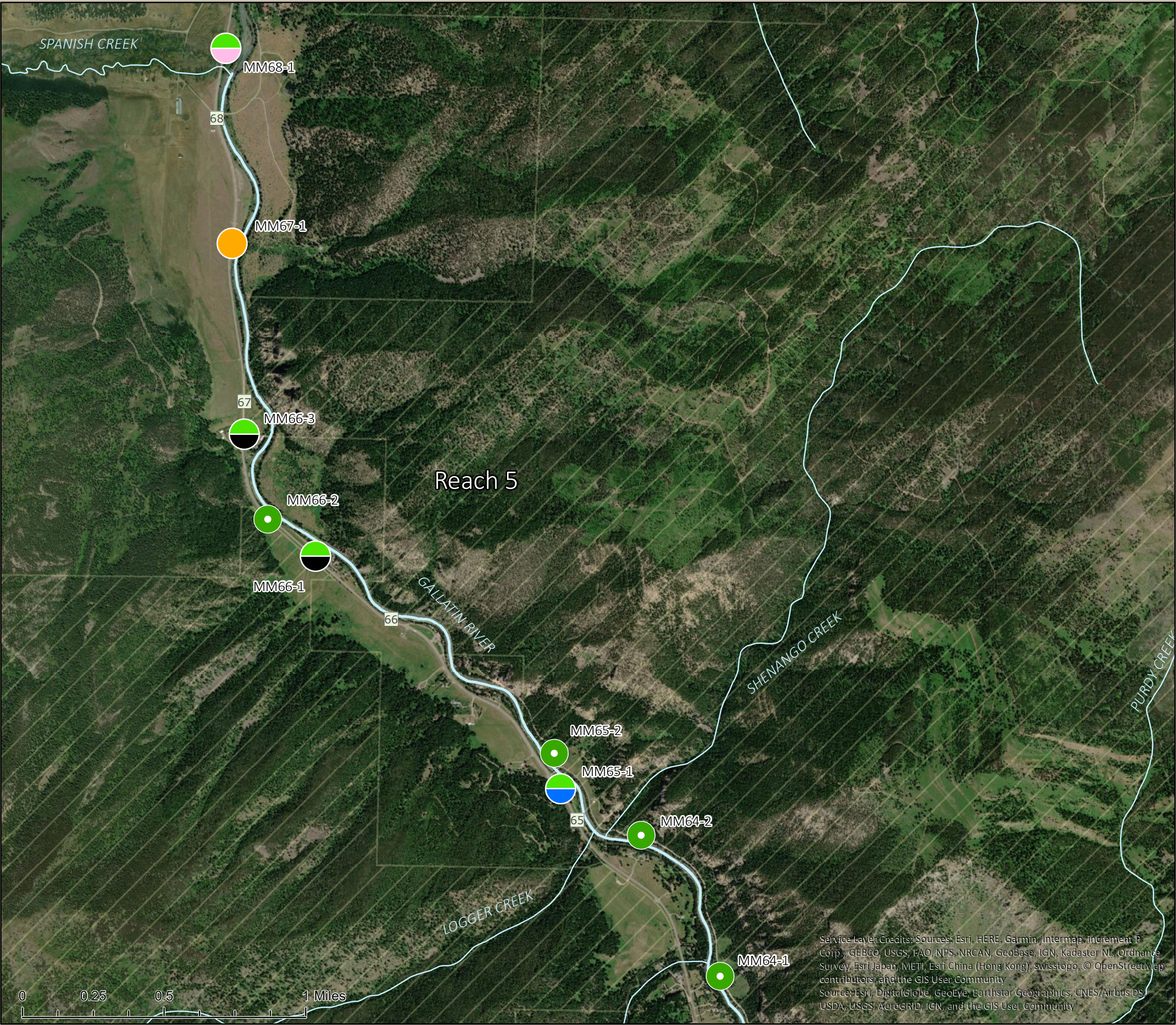
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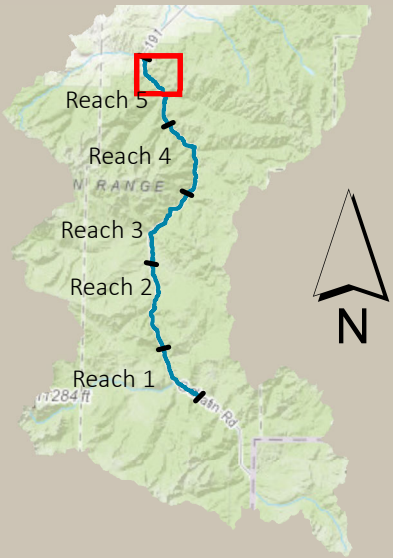


# Upper Gallatin River Restoration Strategy



Gallatin Canyon Access Points

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## Project Implementation Table

MilePost	Site Name/Description	Action	Cost
<b>Completed</b>			
MM49-1	Beau Camp (Downstream of Dudley Creek)		
Access Improvements & Ecological Restoration (Project: Moose Creek)			
MM56-1	Moose Creek Flat Campground	Completed in 2018 -	\$300,000
Access Improvements & Ecological Restoration (Project: Upper Deer Creek)			
MM50-3	Beatis Alley		\$350,000
MM50-4	Beatis Alley		
MM51-2	Beatis Alley		
<b>Short Term</b>			
Access Management & Revegetation (Project: Designated Parking Phase 1)			
MM31-2	at 55 MPH sign for YNP	Delineate Parking, Improve streambank, Revegetation	\$46,080
MM31-3	Snowflake Springs Elk Exlosure	Close (boarding boulders)	\$2,160
MM32-2	Upstream of Sage Creek	Delineate Parking, Improve streambank, Revegetation	\$46,080
MM33-1	Downstream of Sage Creek	Delineate Parking (bordering boulders)	\$1,440
MM33-2	Across from Sage Creek Trailhead	Delineate Parking	\$43,200
MM33-4	Upstream of Taylor Fork	Delineation Parking, Revegetation	\$17,280
MM34-1	Downstream of Taylor Fork	Delineate Parking, Improve streambank, Revegetation	\$46,080
Access Management & Revegetation (Project: Designated Parking Phase 2)			
MM35-2	Upstream of Buffalo Horn Creek	Delineate Parking, Revegetation	\$44,640
MM36-1	Upstream of Cinnamon Creek	Delineate Parking, Revegetation	\$44,640
MM37-1	Downstream of Cinnamon Creek	Delineate Parking, Revegetation	\$44,640
MM38-1	Downstream of Cinnamon Creek	Delineate Parking, Revegetation	\$44,640
MM38-2	Downstream of Cinnamon Creek	Delineate Parking, Revegetation, Address Steep Access (bordering boulders)	\$5,760
MM39-2	Downstream of Cinnamon Creek	Delineate Parking, Improve streambank, Revegetation	\$46,080
Access Improvements & Ecological Restoration (Project: Porcupine/Beaver Creek)			
MM45-3	Porcupine Creek Bridge	Delineate Parking, Improve Trail, Raft Access, Revegetation	\$302,400
MM45-1	Porcupine Creek Trailhead	Improve Trail	\$144,000
MM45-2	Porcupine Creek Bridge	Improve Trail	\$1,440
		<b>Sub Total</b>	<b>\$880,560</b>
<b>Mid-Term</b>			
Traction Sand Management (Pilot Project)			
<b>MM37-2</b>	Downstream of Cinnamon Creek	Traction Sand Management, Address Steep Access	\$2,880
<b>MM39-1</b>	Downstream of Cinnamon Creek	Traction Sand Management, Revegetation	\$2,880
Access Management & Revegetation (Project: Designated Parking Phase 3)			
MM40-3	Across from Elkhorn Creek	Delineate Parking, Revegetation, Improve Trail	\$82,080
MM41-1	Downstream of Buck Creek	Delineate Parking, Revegetation	\$44,640
MM41-4	Downstream of Red Cliff Campground	Delineate Parking, Improve Trail, Revegetation	\$47,520
MM42-1	Downstream of Red Cliff Campground	Close, Revegetation (bordering boulders)	\$3,600
MM42-2	Upstream of Twin Cabin Creek	Delineate Parking, Improve Trail, Revegetation	\$47,520
MM43-2	Downstream of Twin Cabin Creek	Delineate Parking, Revegetation	\$44,640
Access Improvements & Ecological Restoration (Project: Doe Creek)			
MM44-2	Doe (Buck Ridge)	Close	\$2,160
MM44-3	Doe (Buck Ridge)	Future Hardened Access	\$230,400
Access Improvements & Ecological Restoration (Project: Lower Deer Creek)			
MM51-4	Deer Creek Trailhead	Improve streambank, Improve safety	\$316,800
Access Management & Revegetation (Project: Designated Parking Phase 4)			
MM53-1	Upstream of Portal Creek	Improve Trail, Improve Safety, Revegetation	\$12,960
MM55-1	Downstream of Karst	Delineate Parking, Revegetation	\$44,640
MM57-2	No Tell	Delineate Parking, Raft Access Mitigation, Improve Safety, Revegetation	\$77,760
MM62-4	Downstream of the Mad Mile	Delineate Parking, Address Steep Access, Improve Safety, Revegetation	\$50,400
MM66-1		Delineate Parking, Revegetation	\$44,640
MM66-3	Sheep Rock	Delineate Parking, Revegetation	\$44,640
Access Improvements & Ecological Restoration (Project: Portal Creek)			
MM53-3	Downstream of Portal Creek	Close Access, Improve Trail, Revegetation	\$15,840
MM53-4	Downstream of Portal Creek	Close Access, Improve Trail, Revegetation	\$15,840
MM53-6	Downstream of Portal Creek	Raft Access Mitigation, Improve Trail, Develop Parking, Revegetation	\$230,400
Access Improvements & Ecological Restoration (Project: Greek Creek)			
MM58-2	Greek Creek Campground	Improve Safety, Improve Streambank, Traction Sand Management	\$158,400
Access Improvements & Ecological Restoration (Project: Lava Lake)			
MM61-1	Lava Lake Trailhead	Raft Access Mitigation, Improve Streambank, Improve Safety, Revegetation	\$266,400
		<b>Sub Total</b>	<b>\$1,787,040</b>



Long-Term			
Traction Sand Management			
MM32-1	Snowflake Springs	Traction Sand Management	\$1,440
MM34-3	Downstream of Taylor Fork	Traction Sand Management	\$1,440
MM34-4	Downstream of Taylor Fork	Traction Sand Management	\$1,440
MM40-2	Upstream of Elkhorn Creek	Traction Sand Management	\$1,440
MM48-1	Upstream of Dudley Creek	Traction Sand Mangement, Improve Safety	\$146,880
<b>MM49-2</b>	Jack Smith Bridge	Traction Sand Management, Improve Safety, Raft Access Mitigation	\$31,680
MM49-3	Jack Smith Bridge	Traction Sand Management	\$14,400
MM51-6	Goose Creek	Traction Sand Management	\$1,440
MM52-1	Upstream of Asbestos Creek	Traction Sand Traction Sand Management, Address Steep Access	\$4,320
MM54-1	Downstream of Durnam Meadow	Traction Sand Management, Address Steep Access	\$4,320
MM55-2	Upstream of Moose Creek	Traction Sand Management, Address Steep Access	\$4,320
MM56-4		Traction Sand Management	\$1,440
MM58-1	Greek Creek Pull-out	Traction Sand Management, Improve Safety, Improve Streambank	\$40,320
MM59-3	Above Thumper at RM60	Traction Sand Management, Improve Safety	\$4,320
MM60-1	Thumper	Traction Sand Management, Improve Streambank	\$5,760
MM60-3	Straight Away	Traction Sand Management, Improve Safety	\$4,320
<b>MM60-4</b>	Upstream of Lava Lake	Traction Sand Management, Address Steep Access	\$2,880
MM61-3	Lave Lake Turn Around	Traction Sand Management, Address Steep Access	\$47,520
MM61-4	House Rock	Traction Sand Management, Improve Safety	\$31,680
MM62-1	Cave Creek (Across from House Rock)	Traction Sand Management, Improve Safety	\$5,760
MM62-3	Mad Mile	Traction Sand Management, Address Steep Access	\$8,640
MM63-1	Low Water Take-out	Traction Sand Management, Address Steep Access	\$2,880
MM63-2		Traction Sand Management	\$1,440
Access Management & Revegetation			
MM40-1	The Big Pull-out (potential rest area)	Future Hardened Access (potential rest area)	\$17,280
MM41-2	Elkhorn Creek Trailhead	Improve Streambank (small-scale)	\$4,320
MM41-3	Red Cliff Campground Picnic Area	Raft Access Mitigation, Improve Streambank	\$8,640
MM43-1	Twin Cabin Creek Trailhead	Delineate Parking, Improve Trail	\$115,200
MM45-4	Gallatin WMA/CGNF	Improve Trail	\$7,200
MM46-1	Gallatin WMA	Develop Parking, Improve Trail, Improve Safety	\$24,480
MM46-2	Across from Riverview Lane	Develop Parking, Improve Trail, Improve Safety	\$24,480
MM46-3	Across from Anaconda Drive	Develop Parking, Improve Trail, Improve Safety	\$24,480
MM46-4	Across from Buck's T-4	Develop Parking, Improve Trail, Improve Safety	\$24,480
MM50-1	Upstream of Dudley Creek	Delineate Parking, Improve Safety, Address Steep Access, Revegetation	\$8,640
MM53-2	Upstream of Portal Creek	Close, Improve Trail, Revegetation	\$11,520
MM53-7	Durnam Meadow	Develop Parking, Improve Safety	\$31,680
MM54-2	Karst	Close Access, Improve Trail, Revegetation	\$2,880
MM54-3	Karst	Delineate Parking, Address Steep Access, Revegetation	\$47,520
MM59-1		Improve Safety	\$2,880
MM59-2	Screaming Left	Improve Safety	\$14,400
MM60-2	Upstream of Cascade Creek	Delineate Parking, Improve Safety, Revegetation	\$47,520
MM62-2	Gallatin Tower	Improve Safety (Climbing Access)	\$2,880
MM68-1	Downstream of Spanish Creek	Develop Parking, Revegetation	\$15,840
MM67-1		Improve Safety	\$2,880
Access Improvements & Ecological Restoration			
MM47-1	Upstream of West Fork Gallatin River	Future Hardened Access	\$1,440
MM47-2	Stop Light	Future Hardened Access	\$14,400
<b>MM61-2</b>	Gallatin River Trailhead	Traction Sand Management, Address Steep Access, Improve Safety (Future Raft Access Mitigation)	\$217,440
MM63-3	Storm Castle (Upper)	Future Hardened Access	\$7,200
MM65-1	Storm Castle (Lower)	Raft Access Mitigation, Revegetation	\$74,880
		<b>Sub Total</b>	<b>\$1,124,640</b>
		<b>Total</b>	<b>\$3,792,240</b>