

# Town of Millinocket Trails Concept Plan

**Millinocket, ME**

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Prepared For:



Prepared By:



# Town of Millinocket: Trails Concept Plan



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## About IMBA

The International Mountain Bicycling Association (IMBA) is a 501(c)(3) nonprofit educational association whose mission is to create, enhance, and protect great places to ride mountain bikes. Since 1988, IMBA has been bringing out the best in mountain bicyclists by encouraging conservation-minded riding, volunteer trail work, cooperation among different trail user groups, grassroots advocacy, and innovative trail management solutions. Based in Boulder, Colorado, and with staff distributed across the country and the world, IMBA meets its goal to create great mountain bike experiences through its Trail Solutions program. Trail Solutions is the international leader in singletrack development. Our wealth of expertise has allowed us to develop guidelines for the creation of sustainable, enjoyable trails and bike parks that have influenced land management agencies around the world and are frequently adopted as best practices.

## 1. Project Background

This trails concept plan provides guidance and recommendations for development of natural surface multiuse and mountain bike trails, as well as bike park facilities, within and surrounding the community of Millinocket, Maine. This improved trail system will capitalize on the growing demand in the region for trails, and specifically those that are optimized for mountain biking. It will serve the needs of the community by providing opportunities for a wide range of users to experience the outdoors.

### About the Town of Millinocket

The town of Millinocket is home to over 4,500 residents. The community is located an hour north of Bangor, the next largest city in the area, with a population of 32,000. Millinocket has a rich history of outdoor recreation as the gateway to Baxter State Park and the Maine North Woods. Maine's highest peak, nearby Mount Katahdin, is also the northern terminus of the Appalachian Trail. The sporting public has long been visiting the Maine North Woods for hunting and fishing trips. Motorized recreation is a popular pastime, with extensive all-terrain vehicle (ATV) and snow machine trail systems throughout the state. Many of the outdoor public recreation opportunities occur on private timber management land, creating a uniquely Maine opportunity to experience the outdoors. While Baxter State Park boasts an extensive hiking trail system, and the previously mentioned motorized trails connect the town to the backcountry; mountain biking is a relative newcomer.



The town of Millinocket, like many rural Maine towns, is experiencing a shift in their primary economy. In 2008, the paper mill, the long-time economic engine and foundation of the town, closed for good, causing a municipal identity crisis and raising questions about the future of the region. The community of Millinocket and the Katahdin region have been working hard to answer those questions and continue to make Millinocket a high-quality place to live and visit.

### About Katahdin Area Trails

A recent non-profit to the Millinocket scene, Katahdin Area Trails (KAT) began in 2014. KAT has been primarily focused on the Hammond Ridge and Grindstone properties, developing multiuse trails for the public. Hiking, mountain biking, and cross country ski trails are currently under construction across the Katahdin region. KAT has employed a local workforce and continues to develop quality trail builders. The Outdoor Sports Institute (OSI), a state-wide

non-profit, chose Millinocket as its inaugural Community Partnership in 2017. One of the first items identified was mountain bike trails and trails close to the community.

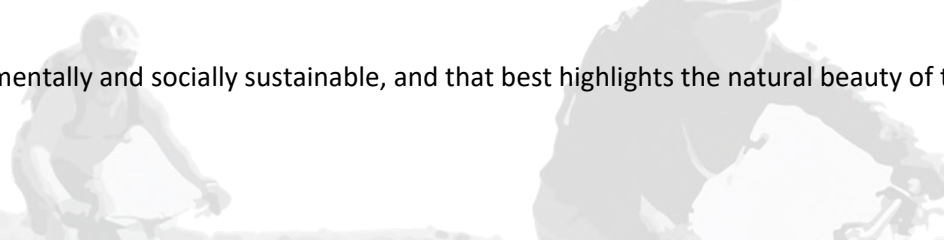
## 2. Goals and Objectives

The goal of the following plan is to develop a progressive trail network that offers beginner to advanced level mountain biking as well as pedestrian opportunities, including multiuse paths, bike-optimized trails, and bike-specific skills development areas. As trails are developed and mileage increases, visitation from residents, visitors, and regional trail users will increase. The majority of new trails will be bike-optimized with careful consideration for hikers and runners to be sure their needs will also be met. Additionally, singletrack trails are planned to double as snowshoe and fatbike routes during winter months.

This trails concept plan is crafted to ensure trails and features will be designed and built in a sustainable manner and meet recreation, conservation, and education objectives. The trail system will create a progression of experiences and challenges as trail users explore the system in more depth with each visit. Individual segments will provide consistent and expected experiences. The design of the system will be similar to that of a well-planned ski trail system, with a collection of easier/green, more challenging/blue, and most challenging/black trails, appealing to a broad cross section of off-road bicyclists, from family-oriented entry-level riders to highly skilled enthusiasts. Providing progressive riding opportunities will help showcase modern trail design and construction, provide a wider variety of trail types within the region, and allow for responsible recreational use with minimal natural and historical resource impacts. The network should be enhanced by efficient way-finding signage and a variety of recreational amenities.

The objectives of the high-quality trails concept plan are:

- Increase the availability of mountain bike-optimized trails in the region.
- Ensure a wide variety of difficulty levels are represented (beginner/green, intermediate/blue, and advanced/black).
- Lay the groundwork a successful trail system that appeals to a wide spectrum of visitors.
- Develop amenities that help riders build mountain bike skills and provide opportunities for progressive challenge and growth.
- Connect the trail system to the heart of downtown Millinocket, the surrounding neighborhoods, and the local schools.
- Provide the quality and quantity of experiences in the system to create a regionally significant trail destination that merits a half- to full-day drive to the area.
- Create a trail system that is environmentally and socially sustainable, and that best highlights the natural beauty of the Maine woods.



## 3. Present Day Mountain Bicycling

The sport of mountain biking has evolved radically since its recognized birth in the mid 1980s. Bicyclists began tinkering with fat tires to hybridize bicycles so that they could leave the paved roads to explore dirt roads and singletrack trails. Lower gearing, powerful brakes, and lightweight frames allowed riders to get further in a single backcountry outing than hikers or runners.

Mountain bikes and riders continue to evolve, with dozens of types of mountain bicycling alternatives. Purpose-built trails, bike parks, and amenities have improved to accommodate any skill level from beginner to expert. Until recently, mountain biking in Maine occurred on fairly traditional singletrack or dirt roads.

Today's riders are sophisticated, desiring every possible choice from taking young children on gently groomed trails to seeking intense experiences with higher consequences.

Not only has the pastime grown in popularity to meet the needs of enthusiast riders, but, it has widened in diversity to accommodate a wide variety of trail experiences. When the sport began, there was a strong emphasis on advanced riding. Trails were very difficult, and bikes were not kid friendly. Both issues have now been solved with the development of progressive, modern trail systems and bike park facilities.

In Maine, consumer spending on outdoor recreation contributes \$8.2 billion annually to the state economy. The Maine outdoor recreation economy also:

- Supports more than 76,000 direct jobs across the state.
- Generates more than \$2.2 billion in wages and salaries.
- Generates \$548 million in state and local taxes.

60 million adult Americans ride a bike each year, and bicycling creates major economic growth in the United States:

- Contributes \$133 billion annual contribution to the U.S. economy.
- Supports nearly 1.1 million jobs across the U.S.
- Produces \$53.1 billion annually in retail sales and services.

A [2018 economic impact study](#) released by the Walton Family Foundation describes in detail the \$137 million benefit from trails in Northwest Arkansas to the Arkansas economy in 2017, of which \$27 million came from tourism dollars.

## Singletrack Trails

Singletrack trails are the bedrock of mountain biking. Singletrack differs from dirt roads and doubletrack mostly by trail width. Whereas the latter two routes allow users to travel side by side, singletrack is narrow enough to allow users to travel only in single file. Trails take on a wide variety of flavors from smooth and rolling to rough and rowdy. Trails are designed and constructed to meet certain experience goals, with some of the most important factors being intended user groups, directionality, and difficulty level.

### *Traditional Singletrack*

These natural surface trails are most often multiuse, and typify what most people envision when they hear the word trail. Traditional singletrack trails should be constructed and maintained using techniques that minimize user conflict and maximize a natural surface texture and trail corridor, the area above and to the sides of the trail. This type of trail should be narrower than a flow trail, to reduce speed. These trails will see both bike and foot traffic, so care should be taken to avoid obstacles or features such as jumps, rollers, or water bars that might exclude some user types. Turns will be constructed sustainably but will not be cambered or bermed to optimize cornering traction for bikes.



### *Mountain Bike Trails*

Mountain bike trails are optimized for mountain bike use while still providing an enjoyable experience for other user groups. Typically, pedestrians are the most common shared visitor type. Entire trails may be optimized for bike use, or particular segments, most often downhill portions, may be geared to riders and limited to travel in one direction. Bike-optimized features enrich the riding experience by adding fun and providing opportunities for riders to build their skills. Obstacles such as berms, rollers, wide turn radii, bridges, rock gardens, jumps, and drops are characteristic bike features. The feature density for mountain bike-optimized trails is higher than traditional singletrack but not quite as high as flow trails. The conceptual plan calls for nearly 7 miles of bidirectional multiuse mountain bike-optimized trails.



# Town of Millinocket: Trails Concept Plan

## **Flow Trails**

Flow trails are purpose-built or modified singletrack trails, the majority of which contain a high density of specific features to enhance the riding experience and provide challenge. They harness gravity so that riders feel as though they are flowing through a succession of exhilarating features from top to bottom. These trails are directional, in order to promote optimal circulation patterns, maximize the visitor experience, and minimize user conflict. Flow trails do not have to compromise their downhill design by having to consider riders traveling in both directions. City and Quarry Parks could potentially play host to three flow trails, providing skill progression from beginner to intermediate.

These descending trails are designed to provide a “roller coaster” sensation to users by maximizing the efficiencies afforded by a bicycle and by counteracting forces that direct a user off of the trail. Berms and cambered tread surfaces, for example, promote traction, safety, sustainability, and enjoyment. These trails are never extreme, dangerous, or steep; challenge is provided by rewarding progressive skill development and incorporating features that can always be rolled but may be jumped. While a flow trail is singletrack, the tread surface itself should be wider in areas where it is anticipated that less-experienced visitors may need a greater margin of error.

The climbing trails that access flow trails are designed to provide a variety of optional technical climbing challenges while maximizing elevation gain and minimizing user exertion to allow riders to conserve energy for the descent. Typically, the maximum density of bike-optimized singletrack is 1 mile per 10 acres of suitable terrain.



## Community Bike Park Facilities

Community bike parks are more intensely designed than singletrack trails. They offer a small area where users can practice their skills, progress, and have fun in a relatively well managed manner. Bike parks are typically located in an existing park or similar area.

### ***Tot Track***

A tot track is designed for smaller bicycles and users. It features reduced-sized rollers as well as low-angle bermed turns. It has features that can accommodate balance bicycles as well as regular bikes with short wheelbases. The tot track is designed for the least skilled of riders. This facility is recommended near the existing recreational facilities in City Park, directly next to the playground. Tot tracks are essentially smaller versions of pump parks, and like pump parks can be dirt or a hardened surface. Asphalt is the recommended surface material for this tot track. Asphalt is more expensive to install but greatly reduces maintenance costs and importantly, provides a consistent high-quality experience for the users.



### ***Pump Park***

A pump park (also known as pump track) is designed to help cyclists of all skill levels to improve their riding skills. Pump parks are multidirectional and allow users to create their own routes through the rollers, berms, and jump features. A pump park will foster more organic and creative riding that stimulates both novice and skilled riders. Riding a pump park is an extremely anaerobic activity, so it is recommended that suitable seating and shade structures be installed for users to rest between sessions. The pump park site is proposed near the jump line and parking lot one in Quarry Park. The pump park, like the tot track, is recommended to have an asphalt surface

## **Skills Area**

Users looking to practice beginner to intermediate technical riding skills in a low- consequence environment can learn in a skills area. This trail zone can include numerous optional stations where users can practice on features designed to teach specific skills. Features may include skinny bridges, drops, rollers, and more. Typically, features are man-made, sometimes prefabricated. Locating a skills area along the proposed Terrapin Skin bike path could provide over 1,000 linear feet of skills development trail to



Alpine Bike Parks

all riders.

## **Dirt Jumps**

Dirt jumps consist of tabletops ranging in height from 3 to 6 feet, spaced to maximize a rider's ability to flow from one jump to the next without having to pedal. Dirt jump areas are designed so that the start hill is the highest elevation point and provides sufficient gravity to propel riders into the jump lines. Dirt jumps are incredibly fun, a great workout, and an excellent practice area for building solid bike jumping skills. These areas are designed to be ridden in one direction, eliminating potential conflicts. Dirt jumps require soil with a high percentage of clay (60-70%) that compacts very hard, minimizing rolling resistance and standing up to heavy use and high shearing forces.

Installing engineered structures for the jump takeoffs substantially minimizes maintenance and improves the consistency of the user experience. Structures, such as ramps with lips, can be fabricated with steel and wood or hardened with asphalt and at times with concrete.



## **Technical Challenge Loop**

Users looking to practice intermediate to advanced level technical riding skills in a low-consequence environment can utilize the technical challenge loop. This type of trail can feature numerous optional skill stations such as drops, jumps, rock gardens, and rollovers that directly challenge technical riding skills. Users can practice on natural and man-made features designed to teach advanced mountain bicycling skills. Typically, these features mimic the skills areas features but to a higher degree of difficulty. Aesthetics can be important, as is matching natural trail conditions, therefore dirt, wood, and rocks are the most commonly used materials. A rock skills loop is proposed surrounding the pump park in Quarry Park.



## **Lifted and Tilted Tread Type**

Traditional rolling contour trails run along the side of a slope, perpendicular to the fall line. They are constructed with an outslope tread to allow cross-slope drainage of runoff. However, not all proposed trail locations have enough sideslope for drainage, and frequent trail use may eradicate an outslope within a short time.

A new trail construction method, “lift and tilt,” is a way of raising the tread above the existing grade while simultaneously lowering the grade of areas off the trail that act as natural drains. This enhances tread drainage while increasing the fun factor for mountain bikers. Borrow basins are dug to harvest suitable mineral soil to lift and tilt the tread. Woody debris is used to replace the soil taken from the borrow basins, which are then masked and blended with organics to create natural-looking low points for drainage. This technique holds the rider on the trail while directing water off the tread into the basins.

This method can be implemented on any scale, using smaller machines to provide a singletrack feel or larger machines to create wide trails with a true bike park flow. Visitor numbers, rainfall, and soil type may require the use of culverts and sumps to keep trails rideable while providing drainage. The trail can have an increased emphasis on fun, flow, and airtime depending on the designated trail user.

For shared-use trails, which generally cater to beginning riders, the dial can be turned down with mellower grades, less undulation, and feature frequency. For advanced trails, the dirt features can be more dynamic with larger rollers and jumps, bigger drops, and steeper banked turns, giving riders play in the vertical plane.



Flatter areas that may have been avoided in the past can now be designed to provide an exciting riding experience. The lift and tilt method is often used for pump tracks, flow trails, jump trails, and other bike-optimized amenities.

## 4. Existing Conditions

Maine has a varied mountain biking history. While mountain biking opportunities stretch across the state, the majority of the trails are similar in experience. Traditionally, much of the mountain biking in Maine occurs on forest roads and singletrack that was established by pedestrians. Few bike-optimized trails exist. These conventional routes usually demand higher skills, both aerobically and technically, because they may have very steep grades and obstacles that are difficult to pass on a bike.

Maine is experiencing increased interest in high-quality recreational opportunities, and Millinocket shares this enthusiasm. Trail development is a natural pillar of improving and expanding recreation. Millinocket currently has no purpose-built mountain bike trails. The majority of the riding takes place on ATV trails, old roads, and hiking trails. The town now has the opportunity to create high-quality neighborhood and destination mountain bike trails. The terrain surrounding Millinocket has minimal elevation, plentiful rocks, and gentle slopes; like much of northern Maine. For the most part, soils are sandy loams, which means most trails will drain well, but creating large earthen features will be more difficult.



The majority of the land identified during the stakeholder meetings and first evaluation consists of active timber land owned by Katahdin Forest Management (KFM). Some of this land is currently used for recreational purposes; other parcels are not. The small remainder is owned by the town of Millinocket, Our Katahdin (a local community non-profit), the local school system, and private land owners.

The existing recreational opportunities include the Michaud Trail, a paved bikeway downtown; the Northern Timber Cruisers (NTC) clubhouse trails; and the Bait Hole trails. The latter two zones are primarily used in the winter as cross-country skiing trail systems. Additionally, the zone west of Jerry Pond contains many user-made social trails.

Most of the zones are similar to one another and typical of the forested region. Generally, slopes are under 30%, with localized steeper slopes usually indicating a greater presence of rock. Many areas are flatter though not always wet. The soils are

sandy loams, with gravel, cobble, and boulders mixed throughout. Large glacial erratics are common, as is bedrock. Beech trees typify recently managed upland forests, while maples and oaks are found in older hardwood forests. Coniferous trees such as white pine and eastern hemlock are very common, the latter especially in wetter areas.

## Zone 1: West of Jerry Pond

### Existing Conditions

- User-made hiking and ATV trails.
- 310 acres.
- 150 feet of useable elevation.

### Opportunities

- Connections to high school, neighborhood, and downtown.
- Small gravity zone.

### Constraints

- Wetlands.
- Community pressure/past use.

### Current Trail Distances

- Approximately 5 miles.

### Current Uses

- Hiking.
- Snowshoeing.

### Current Trail Types

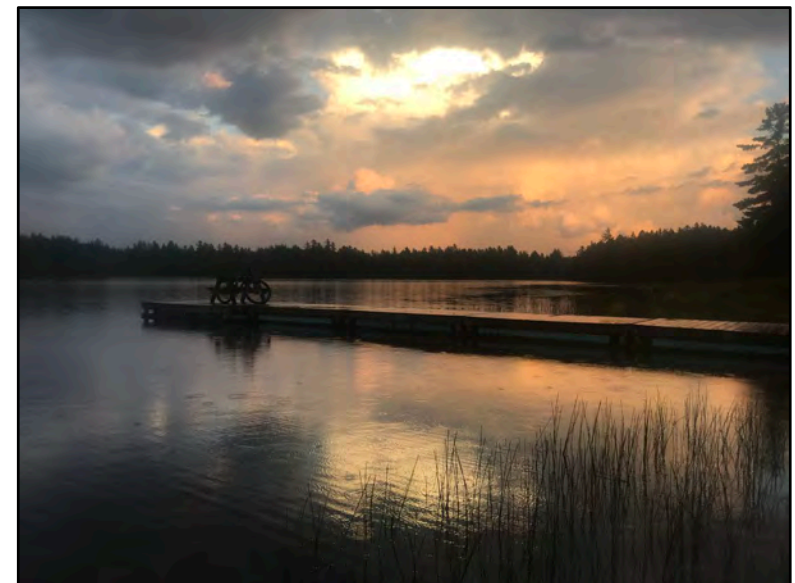
- ATV.
- User made hiking.

## **Zone 1: West of Jerry Pond**

This area is located to the northeast of downtown. It includes portions of the Hillcrest Country Club, KFM timberland, and two Millinocket public schools. Zone 1 stretches from the existing recreation area at Jerry Pond off New Jersey Street to Millinocket Middle School and Stearns High School, where it connects to the Katahdin Pride Park located in the middle and high school recreation complex. The complex has three baseball/softball fields and two soccer fields.

The majority of the zone is KFM timberland. The zone's high point is near the water tower off Connecticut and Alpine avenues. The zone curves to the southwest, encircling the neighborhood on the ridge top. There are many existing trails within this zone. While there are no official ATV trails within the zone, ATV use is common. A main route connects Millinocket stream and the outdoor complex to the Jerry Pond beach. Another main ATV route is the hill climb, a short fall line doubletrack that is currently eroding significantly. The hill climb rises from an old gravel pit near Millinocket stream up to the end of Alpine Avenue. There are several smaller hill climbs that rise to the east behind the schools, towards the golf course. Other user-made trails in the area appear to be used mainly by local hikers during the summer months, and as informal snowshoe and cross-country skiing trails during winter. The Michaud Trail ends at the southern boundary of Zone 1, where the trail connects to the parking lots at the schools.

The slopes are generally under 30% grades and in some places very flat. There are many rocks, though no unusually rocky areas or large boulders were noted. Some wetland terracing and large broad drainages also exist.



## Zone 2: Bait Hole

Zone 2 is about 350 acres of mostly flat terrain. The property is owned by KFM and has been a traditional recreation area for 40 years. The summer and winter trails are maintained by the NTC club. Access to the trails is provided from the trailhead off Route 11, about 4 miles west of downtown. The trails can also be accessed by using the NTC ATV trail heading west from town, towards Soboeis Lake.

Currently about 4.2 miles of summer trails and 6.9 miles of winter trails are maintained at the Bait Hole area. The summer trails are located on the drier, more upland, winter trails. Many of the trails are a typical cross-country ski width, greater than 12 feet. In the winter, additional shortcuts are groomed and used to traverse lower, wet areas of the zone.

While the terrain is generally very flat, with slopes under 20% common, localized topographic



relief and slopes around 30% dot the area. The upland soils are consistent with much of the region, sandy loams with abundant rocks. The forest is typical for the region, with many coniferous trees in the wetter areas and hardwoods such as beech, maple, and oak forming the more upland forest.

## Zone 2: Bait Hole

### Existing Conditions

- Established hiking (4.2 miles), snowshoeing, and cross-country skiing (6.9 miles) trails.
- 350 acres.
- <50 feet of useable elevation.

### Opportunities

- Views and nature.
- Existing infrastructure.
- Connection to downtown.

### Constraints

- Wetlands and flat terrain.
- Distance to downtown.

### Current Trail Distances

- 6.9 miles.

### Current Uses

- Mountain biking.
- Hiking.
- Trail running.
- Snowshoeing.
- Cross-country skiing.

### Current Trail Types

- Forest road and cross-country ski

## Zone 3: Anderson Hill

### Existing Conditions

- 215 acres.
- 200 feet of useable elevation.

### Opportunities

- Connections to neighborhoods and downtown.
- Small gravity zone trails.

### Constraints

- Boundaries.
- Wetlands.

### Current Trail Distances

- 0 miles.

### Current Uses

- None.

### Current Trail Types

- None.

throughout. A small area directly to the north of the helipad has many large erratics. Otherwise the landscape has typical rocky areas spread across the zone.

## **Zone 3: Anderson Hill**

During preliminary stakeholder meetings with KAT, OSI, and KFM, a small knoll to the northwest of the Millinocket Regional Hospital was identified for conceptual trails planning. The small hill is about 200 feet above the lowest point of the zone, the wetlands that surround its easterly edge. The railroad runs along a brook to the north. The ATV trail and powerline form the western boundary.

The terrain was recently logged and is currently not scheduled for active timber harvest in the near future. One main logging road remains, which goes from Golden Road to nearly the top of the knoll. At the high point, the foundation of an old fire watchtower is visible. Some of the townsfolk interviewed during the site visit recall the standing fire tower from their childhoods.

The forest is fairly young, with many upland tree species throughout. One broad drainage, near the south, contains many eastern hemlocks and wet areas. Many of the slopes range from 10-30% grades, though steeper slopes are found





## Zone 4: Northern Timber Cruisers Clubhouse

The existing NTC Clubhouse on Millinocket Road is the de facto trailhead for the Katahdin Region Multi-Use Trail (KRMUT). KRMUT is the bulk of the ATV trail surrounding Millinocket and is maintained by the NTC. This trail system is open to nonmotorized travel, including bicycle use. Zone 4 comprises the generally north trending ridge from the NTC clubhouse to Huber Road. The zone is the largest of all the conceptually planned areas. It stretches from wetlands in the west, at the base of the ridge, to Millinocket Stream and Stacyville Road in the east.

This area is actively groomed by NTC during the winter for snowshoe and cross-country ski use. The trails are not as popular during the summer months though some hiking occurs. In general, many of the cross-country ski trails are found in the wetlands, to the west of Zone 4. An old logging road connects the clubhouse to the Stacyville-Huber Road intersection in the far northeast corner. Much of this land is managed by KFM, and some of it is currently planted for upcoming harvest. There are numerous low lying areas dominated by eastern hemlocks. Access from Stacyville Road has allowed some of the former gravel and sand pits to be used currently as informal shooting ranges. The section along Millinocket Stream is very scenic and shows minimal fishing use.



### Zone 4: NTC Clubhouse

#### Existing Conditions

- 1700 acres.
- 250 feet of useable elevation.

#### Opportunities

- Connections to neighborhoods and downtown.
- Existing infrastructure and recreation use.
- Large scale and diversity.
- Remote feel.
- Connection to existing campground.

#### Constraints

- Boundaries.
- Wetlands.

#### Current Trail Distances

- Approximately 10.5 miles.

#### Current Uses

- Snowshoeing.
- Cross-country skiing.

#### Current Trail Types

- Forest road and cross-country ski trails.

## Zone 5: Shack Hill

*Note: This site was not field reviewed during the site visit. Descriptions and recommendations are based on interviews and desktop analysis.*

Shack Hill is the low rise behind the former Great Northern Paper mill. It is a peninsula surrounded on three sides by the West Branch of the Penobscot River. The area has a rich history as the cornerstone of economic development, the very reason for Millinocket's existence as a town. Following the mill closure, the site went through different hands, and is now owned and managed by Our Katahdin, a local nonprofit.

The site is the focal point of the town, with almost all roads leading to the former mill. This zone was formerly used as active timber land but has not been harvested since its days as a mill site. With the West Branch of the Penobscot River flowing around the entire zone, river access and views are plentiful. The elevation differences provide suitable slopes for trail construction.



Photo courtesy of Our Katahdin

### Zone 5: Shack Hill

#### Existing Conditions

- 1100 acres.
- 275 feet of useable elevation.

#### Opportunities

- Connections to neighborhoods and downtown.
- Large scale and diversity.
- Revitalization of former mill site.
- Community bike park facilities.

#### Constraints

- Former industrial paper mill site.

#### Current Trail Distances

- 0 miles.

#### Current Uses

- None.

#### Current Trail Types

- None.

## Zone 6: Downtown

### Existing Conditions

- Various small sites.
- Existing paved bike path.

### Opportunities

- Connections to neighborhoods and downtown.
- Community bike park facilities.
- Small-scale bike amenities.

### Constraints

- Multiple land owners.
- Current and future development,

### Current Trail Distances

- 0 miles.

### Current Uses

- None.

### Current Trail Types

- None.

## **Zone 6: Downtown**

Zone 6 is not one localized zone similar to the first five zones. Zone 6 is the general downtown area, connecting directly to zones 1, 3, and 5. The existing KRMUT trail system connects the downtown to zones 2 and 4. The Michaud Trail, the paved pathway which runs along Millinocket Stream, is the backbone of the zone. The Granite Street School property (the local elementary school), areas in front of the middle and high schools, and the downtown corridor make up the bulk of the remainder of the zone's potential developable areas.



Photo courtesy of Maine Trail Finder and Evan Watson



Photo courtesy of Maine Trail Finder and Evan Watson

## 5. Trails Concept Plan

The recommendations within this report are the culmination of desktop analysis, field work, stakeholder meetings, and professional expertise. The recommendations within are focused on:

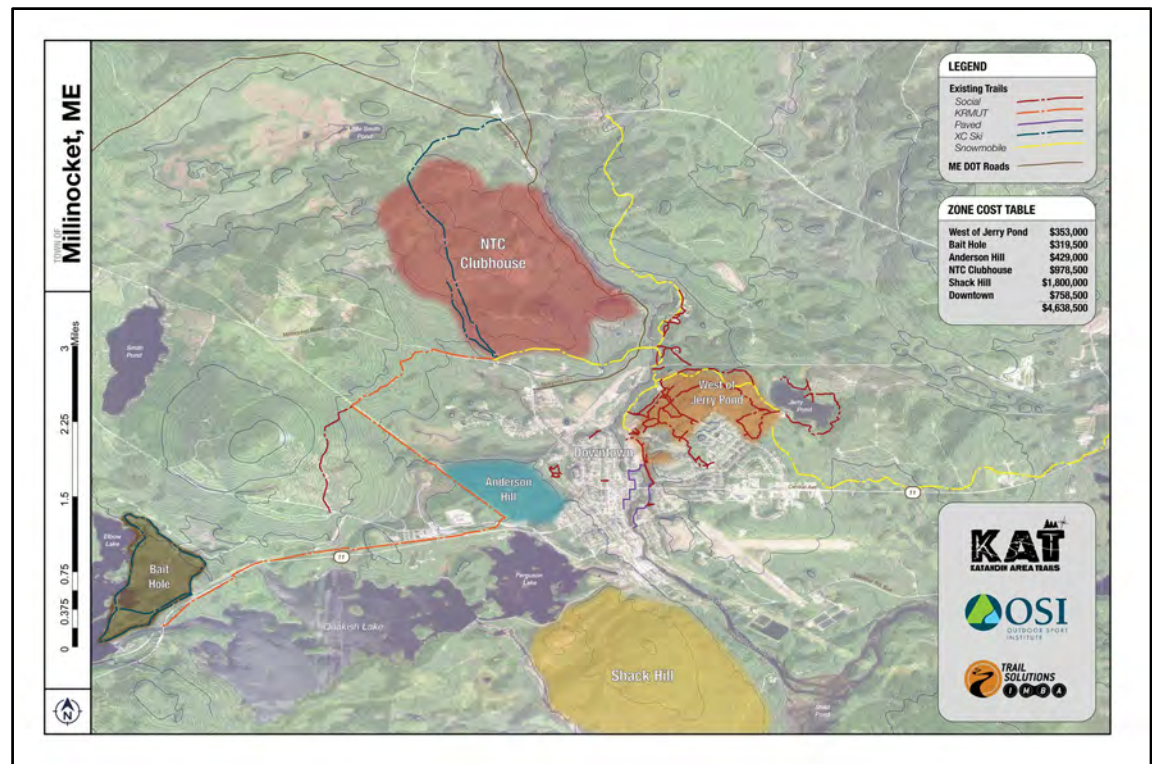
1. Providing progressive mountain bike opportunities to the local population.
2. Allowing for the effective development of the area as a mountain bike tourist destination.
3. Ensuring trail access for pedestrians and other user groups.

The recommendations and cost opinions are conceptual in nature and do not contain design level details. This plan is not suitable for construction.

It is recommended that the design and construction be completed in phases, both to reduce financial burden and to increase the appeal of the trail system by providing new additions over time.

The recommended phases include development in multiple zones. Getting formal permission from all landowners and developing a design, then construction plan is the next critical step. Because many of the zones contain land owned and managed by KFM, more meetings will be required to ensure the multiple goals of timber management are balanced with the proposed goal of providing abundant high-quality recreation to residents and visitors.

Development cost opinions can be found in Appendix A.



## Zone 1: West of Jerry Pond

### Experience Goals

- Immediate presence in downtown and neighborhood accessibility.
- “Sessionable” progressive gravity trails.

### Estimated Trail Distances

- 4-8 miles.

### Recommended Uses

- Mountain biking.
- Hiking.
- Trail running.
- Fatbiking.
- Snowshoeing.

### Suggested Trail Types

- Traditional singletrack.
- Bike-optimized.
- Flow.

### Appropriate Skill Levels

- Easier.
- More difficult.

## **Zone 1: West of Jerry Pond**

The first zone is an excellent property for many mountain bike and trail amenities. The existing recreation areas, schools, and neighborhood connections make an ideal surrounding for trail development. Because of informal use by ATVs and pedestrians, trail development will require extensive community input and support.

A large number of the existing trails may require decommissioning, to provide the highest quality trail experiences for all users. While the majority of anticipated users for this zone are residential neighbors, this zone would also provide excellent opportunities for out-of-town visitors. The entire zone could provide up to 8 miles of progressive easier and more difficult trails.

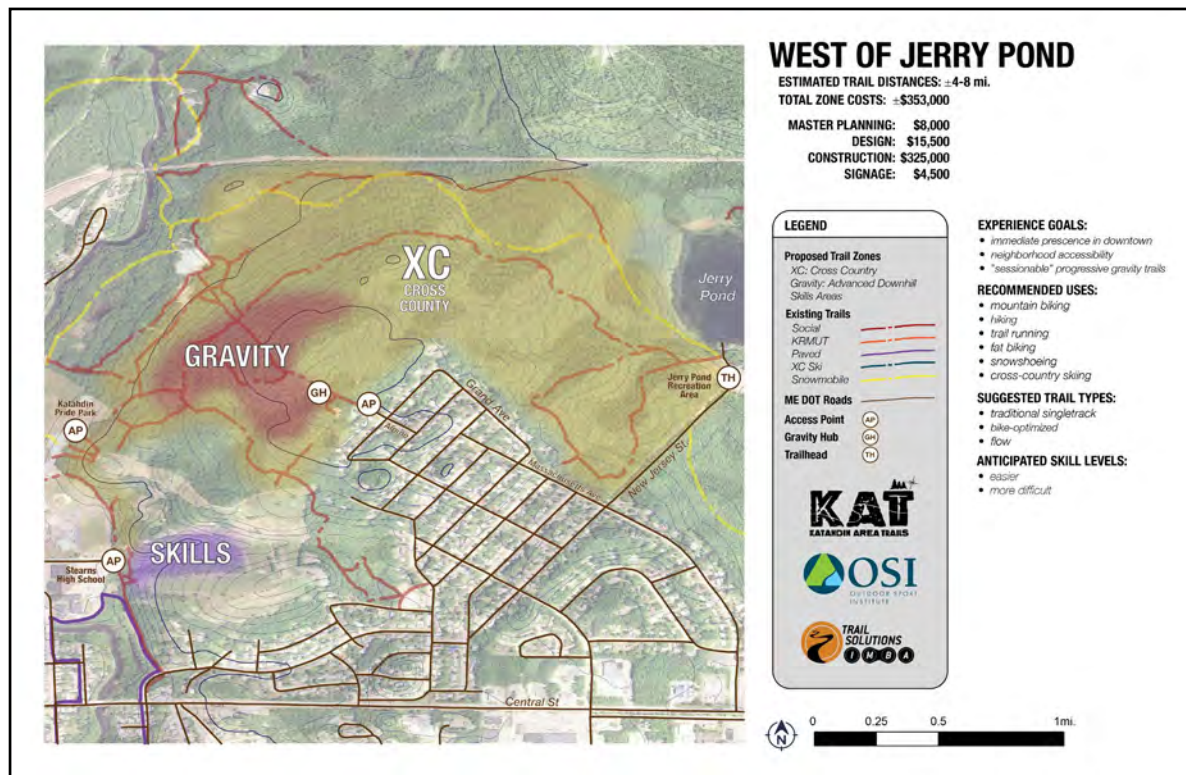
One of the first identified subzones is a small wooded drainage within the Hillcrest Country Club, just east of Stearns High School. This small 10-acre area immediately abuts the end of the Michaud Trail and the track and field complex. This area is ideal for a short, possibly half-mile, skills trail. The trail should be easiest, with optional more and most difficult alternate lines. It is recommended that these features be primarily rock and soil, to avoid costly maintenance and undue risk associated with wooden features. A talented and qualified professional mountain bike trail builder could readily use natural on-site materials to create a diverse and progressive skills loop right out the backdoor of the local schools, giving kids easy access to outdoor recreation and encouraging active lifestyles.

The other two subzones within Zone 1 are a traditional multiuse trail zone and a small gravity zone. The traditional multiuse area could provide up to 6 miles of cross-country trails. These trails would provide connectivity between the Jerry Pond beach, Katahdin Pride Park and schools, and the new development neighborhood. It is recommended that at least one perimeter trail be developed; it should be designed and constructed as an easier trail. This trail should connect to all the key control points mentioned above. An additional more difficult singletrack connection could be developed to provide progression and dispersion.

The last subzone is the gravity zone. With almost 100 feet of elevation relief across this zone, gravity trails of up to 1 mile are possible. It is recommended that an easier and a more difficult gravity trail are developed. This will provide variety and progression. The idea of gravity trails beginning in a neighborhood and ending at the schools is extremely exciting. This type of dynamic, free, playful riding is sure to appeal to the local children, as well as many adults.

# Town of Millinocket: Trails Concept Plan

In combination, all of these trails would provide excellent opportunities for programming, such as classes and clinics, within both the school system and town recreation departments, as well as nonprofits such as KAT and OSI. This type of facility would provide the features needed to develop aerobic fitness, technical skills, and jumping skills. Additionally, the connectivity means trail users can avoid popular roads and interact in natural surroundings. The zone does appear to provide local ATV access, and therefore consideration for one main motorized trail should be included in stakeholder meetings and design development.



## Zone 2: Bait Hole

Existing recreational uses make the Bait Hole zone another ideal candidate for quick trail development. The major constraints are the extremely flat terrain and the distance from downtown. While the area is actively used during the winter months for groomed cross-country skiing, the access is restrictive compared to zones closer to town where residents and children could directly access trails from their homes, offices, and schools.

The Bait Hole trails would be a short, approximately 4-mile, ride from downtown along the KRMUT toward Seboeis Lake, however, the trail is not singletrack and would likely dissuade many new and enthusiast riders. If recommendations are followed, it is possible to add 4-6 miles of summer use singletrack trails to the existing 4.2 miles of cross-country ski trails open during warmer months.

The first recommendation would be to harden the existing summer use trails where appropriate. Boardwalks and bridges should be avoided as the maintenance cost is far greater over time than the upfront investment in a durable tread surface. In wet areas, the trails should have gravel and stone added and compacted. This surface will be far more durable and allow for greater riding opportunities.

The majority of the existing trails are appropriate for intermediate mountain bikers and, with slight modifications, would likely be good for beginners too. A trail connection is proposed between the larger Bait Hole loop, which would create three smaller loops and a diverse array of loop opportunities. This connector trail should be more difficult in nature.

There are abundant slopes and appealing trail terrain along the existing corridors. Instead of focusing on completely new trail alignments, it may be advantageous and cost effective to create short singletrack options close to the existing cross-country ski trails. Some of these singletrack options may veer and venture further from the ski trails, depending on the ideal terrain for trail construction.

### Zone 2: Bait Hole

#### Experience Goals

- Highlight views and nature.
- Create a more remote connection to downtown.
- Develop a stacked loop cross-country system.
- Provide progressive optional lines.

#### Estimated Trail Distances

- 6-10 total miles.

#### Recommended Uses

- Mountain biking.
- Hiking.
- Trail running.
- Fatbiking.
- Snowshoeing.
- Cross-country skiing.

#### Suggested Trail Types

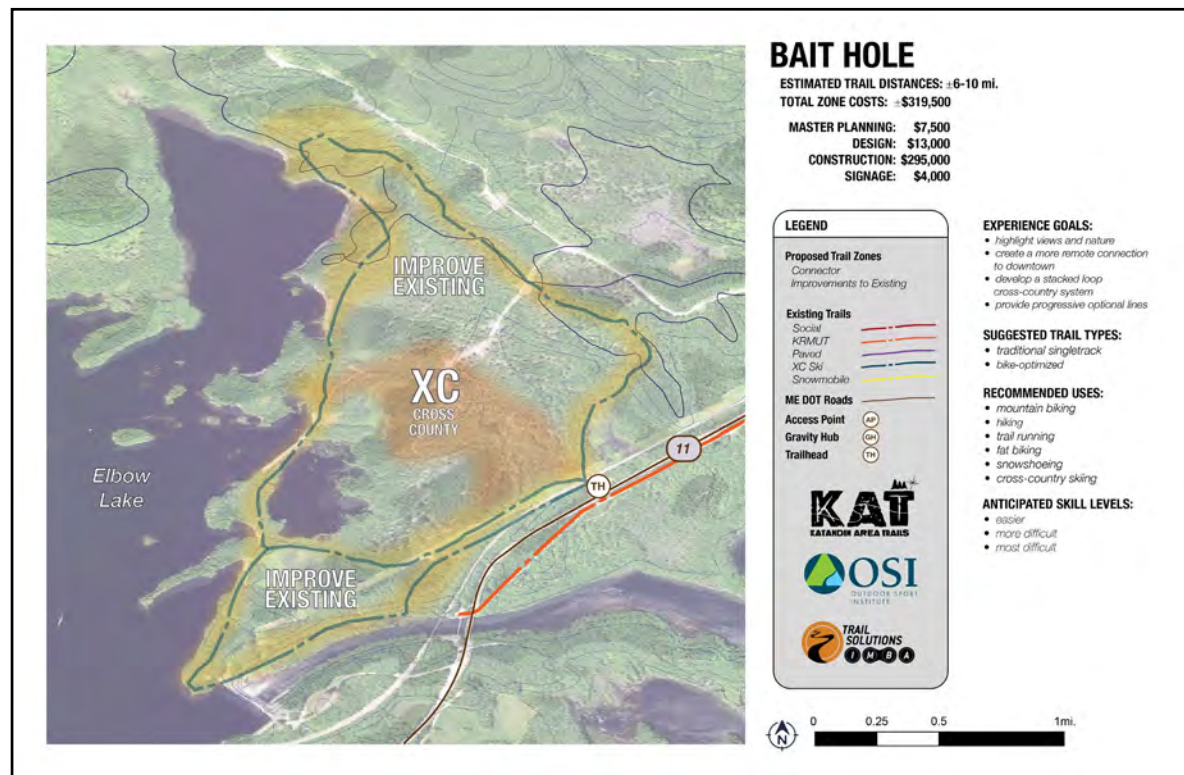
- Traditional singletrack.
- Bike-optimized.

#### Appropriate Skill Levels

- Easier.
- More difficult.
- Most difficult.

# Town of Millinocket: Trails Concept Plan

In general, most of the existing trail alignments could have secondary singletrack options, which would make up the majority of the summer trail system. These singletrack alignments should vary in difficulty level, with more and most advanced options becoming more plentiful as a user gets further from the trailhead. Multiple optional lines could be constructed, which would provide a playful and progressive distances environment for skill development. These traditional singletrack trails would appeal to a wide range of trail users, including hikers and trail runners. The natural beauty of the surrounding lakes would attract many residents seeking to get away and enjoy the forest. Lastly, with the KRMUT connection, the Bait Hole trails could easily be looped into a longer ride if all zones were developed, providing enthusiast visitors with plenty of riding to keep them busy for a full day or more.





## Zone 3: Anderson Hill

### Experience Goals

- Immediate presence in downtown and neighborhood accessibility.
- “Sessionable” progressive gravity trails.
- Stacked loop cross-country trails.

### Estimated Trail Distances

- 6-10 total miles.

### Recommended Uses

- Mountain biking.
- Hiking.
- Trail running.
- Fatbiking.
- Snowshoeing.

### Suggested Trail Types

- Traditional singletrack.
- Bike-optimized.
- Flow.

### Appropriate Skill Levels

- More difficult.
- Most difficult.

## **Zone 3: Anderson Hill**

The Anderson Hill zone is much like zones 1, 5, and 6: very close to downtown and neighborhoods. Zone 3 would provide trail access to the western residents of town, unlike Zone 1, which is directly adjacent to the new development. This zone is much like Zone 1 in that it could offer both traditional singletrack trails and a small gravity zone. In addition, directly behind the helipad are many large erratics and boulders, creating a very unique landscape close to downtown.

The boulder field could provide a one-of-a-kind freeride type experience, where riders can truly challenge themselves on expert level trails. The downhill zone could provide one or two short runs. The proximity to the hospital is a benefit to risk management, albeit ironic.

A perimeter stacked loop cross-country trail system would provide up to 6 miles of more and most difficult singletrack. This singletrack would provide access to the gravity trail hub and circulate riders back to the top of the hill after downhill runs. In addition, the stacked loop would appeal to hikers, trail runners, and pedestrians just looking to walk the dog. Along with the main loop, a technical singletrack should be incorporated. This would provide progression and challenge, whereas the other zones close to downtown cater more to novice and intermediate level riders.

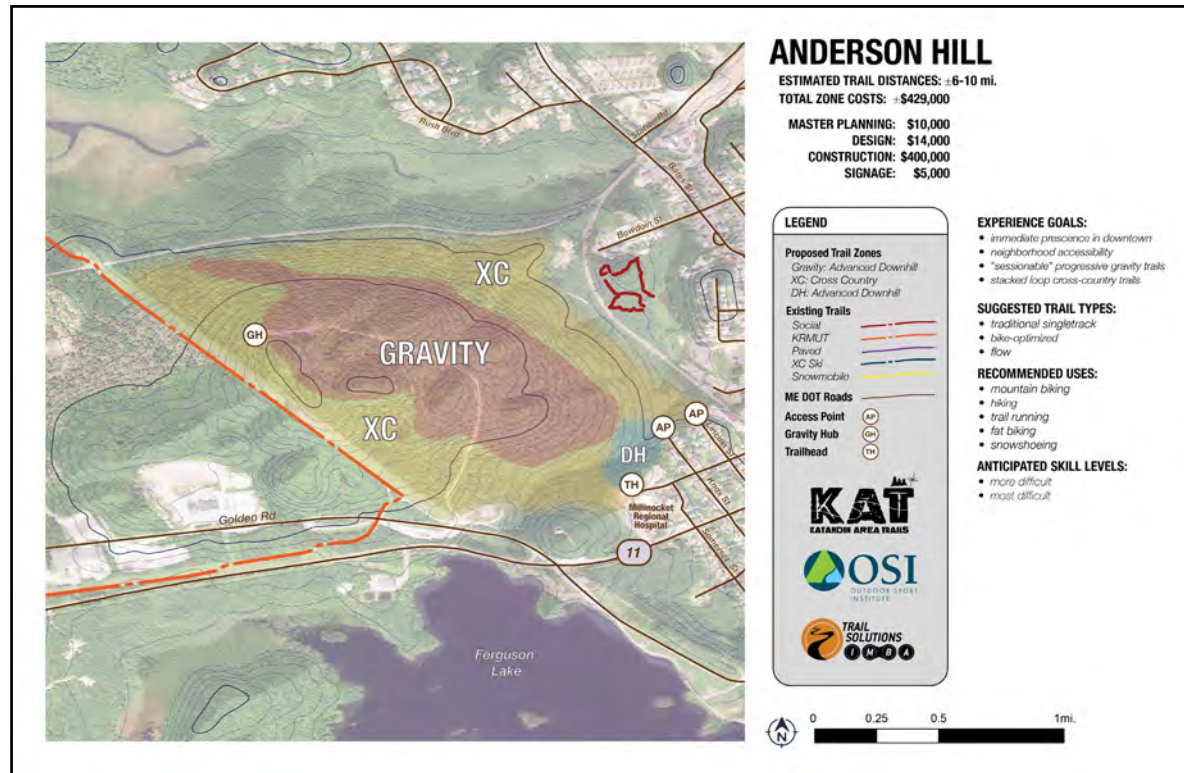
The small gravity zone would align with this zone’s bent toward intermediate and advanced riders. Space allows for one to three gravity runs, which should be designed and built as more and most difficult level trails. These gravity trails would be a step up in skill level from the small gravity hub in Zone 1, providing easy, measured progression. The vicinity of this zone and Zone 1 to the majority of Millinocket residents creates an ideal situation for riders to quickly develop skills. Furthermore, these gravity zones would provide simple and efficient access to visitors seeking modern bike-optimized descents, directly from downtown.

The foundation of the former fire lookout tower provides a unique interpretive site, as well as the starting point for the gravity trails. The resurrection of this fire tower would be a distinctive recreational

addition to downtown Millinocket. Even a small tower would provide fantastic views of both the downtown corridor and Mount Katahdin. A lookout tower at the top of the gravity trails would increase pedestrian use of the singletrack loop and offer an exceptional view of the modern gravity runs.

In general, this zone would provide quick access to a diverse mix of trails less than a five-minute ride from Penobscot Avenue. Zone 3 would deliver much needed progression directly from downtown and a major community amenity, the hospital.

# Town of Millinocket: Trails Concept Plan



## Zone 4: Northern Timber Cruisers Clubhouse

As the largest conceptual trails zone in Millinocket, the NTC Clubhouse has the potential to offer a wide range of trail experiences and lengths. This zone could easily contain up to 30 miles of trails, which would provide most fit riders with a complete day of pedaling. The existing NTC Clubhouse supplies an excellent established trailhead. With slight trailhead improvements, this zone would be the main riding venue for many locals and visitors.

In addition to the riding potential within the zone, the KRMUT system connects this area to zones 2 and 3 directly, via a 2.5-mile segment to the Anderson Hill zone, and via a 6-mile segment to the Bait Hole zone. The NTC Clubhouse trailhead is also a short 0.5 miles on the KRMUT system to the nearest neighborhood and an easy 1.5 miles from downtown.

# Town of Millinocket: Trails Concept Plan



Despite the closeness to much of Millinocket and its population, this zone has the potential to offer the most remote, backcountry experience of the conceptually planned areas. This is an important experience goal for many riders, especially those who may travel to ride. In the future, as the Katahdin region develops more trails, it will be zones like NTC Clubhouse which will bridge the gap from front country, in-town riding to true backcountry epics. This is an important progression to longer, more remote rides, which differs from strictly skill development.

Zone 4 is also directly adjacent to the existing Wilderness Edge Campground. A high-quality trail system tying into this campground would likely increase visitation in the warmer months and provide great access for visiting riders.

The small hill behind the campground and clubhouse would make an ideal small gravity zone. This would fit nicely with the campground and trailhead access, as gravity riders typically do not like to pedal long distances to reach their intended experience. There is potential for anywhere from 2-6 gravity runs, which could offer beginner to expert options. This would afford excellent progression opportunity and jive well with the small gravity subzones in zones 1 and 3.

The size of this zone means a less dense, more remote, stacked loop cross-country system is possible. This system should include easier to most difficult singletrack. It is anticipated that this system could easily be 16 miles, with nearly 4 miles of trail along Millinocket Stream providing great views, nature experiences, and other recreational opportunities such as fishing.

Lastly, the larger hill in the center of the zone could be utilized as another gravity hub or for more cross-country trails. This area would add up to 4 miles of trails. The terrain within Zone 4 would allow for longer, technical singletrack options, appealing to a wide range of visitors including hikers and trail runners. The existing cross-country ski trails are not recommended for use, as many are in very wet areas or do not provide the intended experience. Careful design and construction will be required as this zone has many small wet areas, typical of many northern Maine landscapes.

## Zone 4: NTC Clubhouse

### Experience Goals

- Immediate presence in downtown and neighborhood accessibility
- Create a more remote connection to downtown.
- “Sessionable” progressive gravity trails.
- Stacked loop cross-country system.

### Estimated Trail Distances

- 15-30 miles.

### Recommended Uses

- Mountain biking.
- Hiking
- Trail Running
- Fatbiking
- Snowshoeing
- Cross-country skiing.

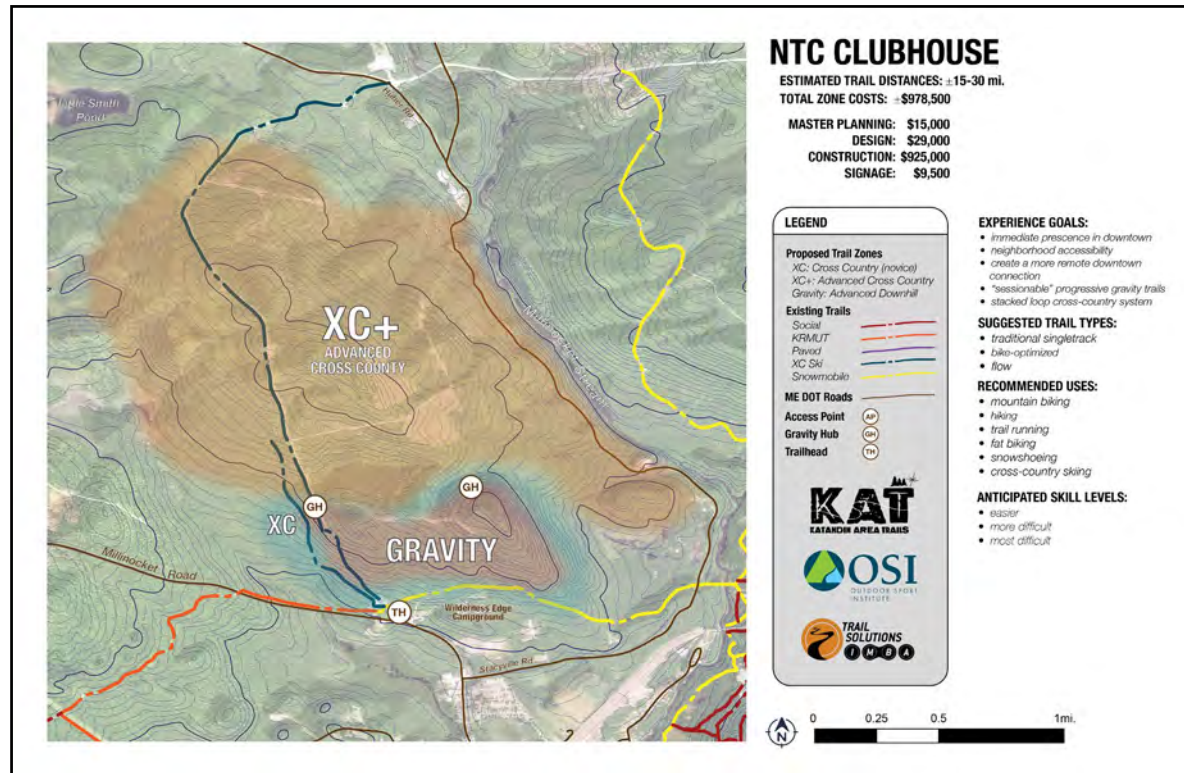
### Suggested Trail Types

- Traditional singletrack.
- Bike-optimized
- Flow

### Appropriate Skill Levels

- Easier.
- More difficult
- Most difficult

# Town of Millinocket: Trails Concept Plan



## Zone 5: Shack Hill

*Note: This site was not field reviewed during the site visit. Descriptions and recommendations are based on interviews and desktop analysis.*

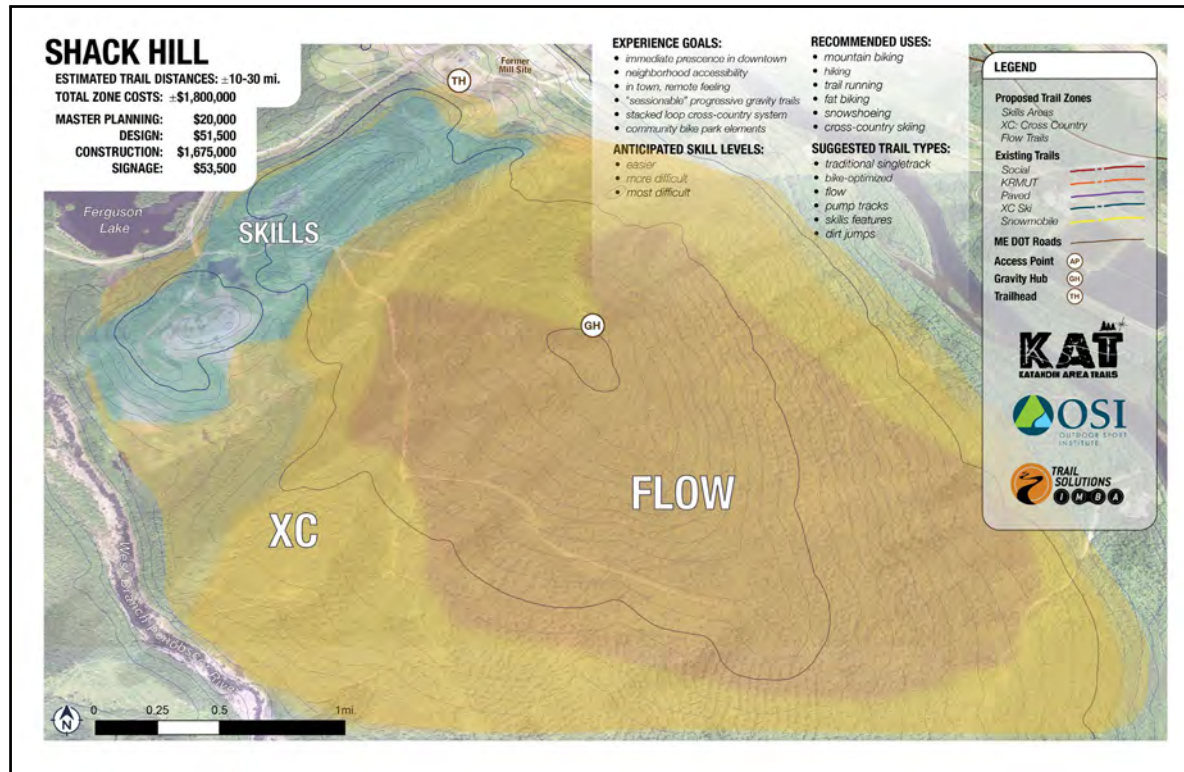
Shack Hill represents one of the most interesting and unique zones within this plan. Developing trails and community bike park elements on the former mill site is an exciting prospect with potential to transform this zone into a natural and modern park that would invigorate the community. By highlighting the former mill and the anticipated industrial redevelopment, along with the picturesque natural environment; Millinocket could show the world it is rebranding itself and investing in high quality long-term outdoor recreation infrastructure.

The large wooded hill could provide everything from gravity to flow to slopestyle trails. The area is large, and not all of it would need to be reserved for gravity trails, but if it were to be fully designed as a gravity hub, it would offer the potential for up to 8 full runs, with the longest continuous downhill at nearly 1.5 miles. The lower slopes, closer to the river, would be ideal for traditional cross-country trails. The large area would also allow for short hiking-only or nature trails, which would appeal to a different visitor group.

# Town of Millinocket: Trails Concept Plan

The infrastructure, including roads and paved areas, would help create a model trailhead. The direct connections to the Little Italy neighborhood, downtown, and Michaud Trail would help cement Shack Hill as one of Millinocket’s premier town parks. This would create an economic incentive for businesses and industries whose employees and patrons could enjoy the park.

Shack Hill could be the site for future bike park development in Millinocket. Community bike parks are becoming increasingly popular recreational offerings and help introduce more people to riding than the standard mountain biking crowd. The potential for a skate park, paved pump tracks, skills features, and dirt jumps is high; and in combination, would open up new experiences for residents and visitors alike. While the current riding community may not be ready or asking for these types of bike amenities, interest is growing rapidly, and it would be judicious to save space for possible future demands. Shack Hill has these opportunities, and they should be given weight in development plans.



## Zone 5: Shack Hill

### Experience Goals

- Immediate presence in downtown and neighborhood accessibility.
- In-town, remote feeling.
- “Sessionable” progressive gravity trails.
- Stacked loop cross-country system.
- Community bike park elements.

### Estimated Trail Distances

- 10-30 miles.

### Recommended Uses

- Mountain biking.
- Hiking.
- Trail running.
- Fatbiking.
- Snowshoeing.
- Cross-country skiing.

### Suggested Trail Types

- Traditional singletrack.
- Bike-optimized.
- Flow.
- Pump tracks.
- Skills features.
- Dirt jumps.

### Appropriate Skill Levels

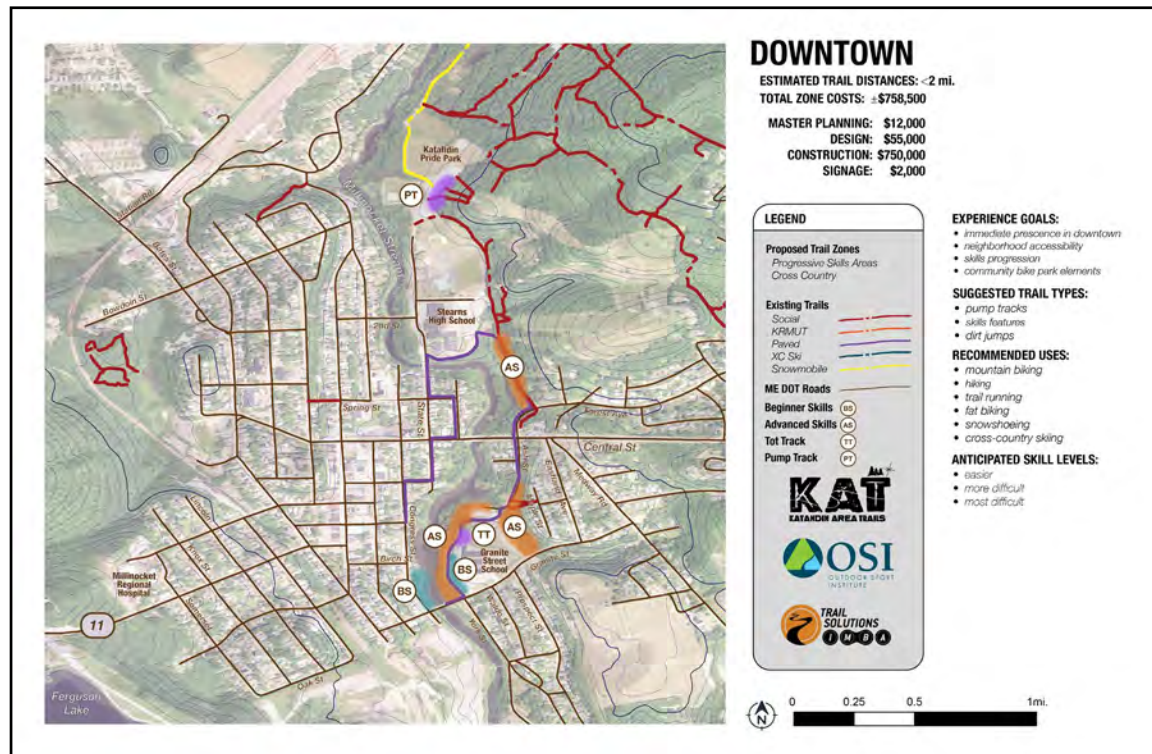
- Easier.
- More difficult.
- Most difficult.

# Town of Millinocket: Trails Concept Plan

## Zone 6: Downtown

This zone represents the immediate possibilities for bike infrastructure in town. A few key areas identified during the site visit would be ideal for developing mountain bike facilities for skill progression. The Michaud Trail is an excellent example. Near the community boat launch on Millinocket Stream is Kermit Crandall Park. This is a prime location for small, nonintrusive, bike features. A short natural surface singletrack with prefabricated skills features would be one option.

On the eastern side of Millinocket Stream, where the Michaud Trail runs behind the Granite Street School, are many small open spaces ideal for pocket bike park installations. Small prefabricated or natural rock skills features which could be placed as small bike amenities. These sort of simple bike elements would help build enthusiasm for mountain biking within the community and offer outstanding opportunities for folks to gain and maintain skills. In addition, the location along a paved pathway connecting three schools is the epitome of great placement.



## Zone 6: Downtown

### Experience Goals

- Immediate presence in downtown and neighborhood accessibility.
- Skills progression.
- Community bike park elements.

### Estimated Trail Distances

- <2 miles.

### Recommended Uses

- Mountain biking.
- Hiking.
- Trail running.
- Fatbiking.
- Snowshoeing.
- Cross-country skiing.

### Suggested Trail Types

- Pump tracks.
- Skills features.
- Dirt jumps.

### Appropriate Skill Levels

- Easier.
- More difficult.
- Most difficult.

Some of the open spaces along the Michaud Trail, on the eastern side, would also be ideal for a small pump track. A tot track, or small pump track meant for little children, is an amazing way to gain support and ridership within a community. This tot track would average 2500-5000 square feet. To ensure proper progression and to give enthusiasts a feature to maintain their skills, a larger parcel should be identified for an advanced pump track. Advanced pump tracks can reach sizes of 25,000 square feet. Locating this facility where visitors can see it, near downtown, would instill a sense of bike community and display Millinocket's dedication to mountain biking. Pump tracks should be paved. While this is a larger upfront capital cost, it greatly reduces long-term maintenance costs. Paved pump tracks also allow for all wheeled activities, such as skateboarding, scootering, and balance biking.

## Notes on Winter Use

While not explicitly discussed in this concept plan, many of the trails and zones would be appropriate for winter use. Millinocket has a rich history of outdoor recreation during the winter, with a heavy snow machine presence. There are also many cross-country ski venues and residents often ski places that are not groomed.

Singletrack trails are not typically desirable for cross-country skiers. The narrow corridors, tight turn radii, and grades do not fully meet their intended experience. However, singletrack is often ideal for groomed fatbiking and snowshoeing. Even the suggested gravity zones could potentially be groomed for winter bike use. While not all trails would be appropriate for groomed fatbiking, many are likely to be. Mechanical grooming, like in cross-country skiing, allows for a more consistent surface and enjoyable experience. Grooming would open trails for more year-round use by residents, encourage more skill development and play, allow for positive interactions with nature during a different season, and likely attract riders to travel to Millinocket for winter fatbiking opportunities.

## Notes on Destination Goals

KAT repeatedly expressed a desire to development destination riding. Destination riding is loosely defined, but traditionally means riders will travel some distance from home, stay at lodging catering to visitors, and spend multiple days riding their bikes on a local offering of trails. The more trails are developed across Maine, New England, and the country the more quality is an important factor when riders choose to travel. High quality construction performed by qualified mountain bike trail builders who follow the planning and design guidelines with oversight to ensure quality, is the surest way of creating a destination.

Informal interviews with Maine riders suggest 20-30 miles (or 1-2 days) of quality riding is necessary to draw most in-state riders. Carrabassett Valley Maine boasts some of the best quality singletrack and most of the travelers are from within Maine. This suggests Millinocket will have to develop 50-100 miles of high quality, purposeful singletrack to attract riders from outside the state and region. The Hammond Ridge project provides some of the best opportunity for a modern mountains bike trail system of nearly 45 miles, but without qualified builders or oversight could likely miss the mark.

## Notes on IMBA Ride Center™ Potential

KAT has expressed interest in an IMBA Ride Center™ designation, part of the IMBA Model Trails program. The IMBA website describes the program as: *“The Ride Centers™ designation recognizes the pinnacle of mountain biking communities. These are large-scale facilities with something for every rider, from a variety of riding experiences to a variety of ways to have fun off the bike.”* There are currently zero IMBA Ride Centers™ in the northeast.

Millinocket has great opportunity to become the first designated IMBA Ride Center™ in New England, and could potentially be given the status of Bronze or Silver. Though Gold should not be ignored, especially if trail development extends to some of the prime backcountry opportunities mentioned in this report. As the program evolves to match the quickly changing needs and wants of the riding community and what classifies as a destination, it is important to remember the overarching goal is quality.

While Millinocket has the potential, it will need to develop high quality trails in order to obtain IMBA Ride Center™ status. The current development at Hammond Ridge would be a key component of a Millinocket IMBA Ride Center™ application, especially if a Silver designation was the goal. The largest criteria during the review process for IMBA Ride Centers™ designation is the site review for “Quality Trail Experience”, where knowledgeable and trained individuals ride and assess the trails to see if they meet the strict criteria.

Another important aspect of the IMBA Ride Center™ designation beyond quality is diversity. This report lays out a path towards creating varied trail experiences throughout Millinocket, which would tie directly into IMBA Ride Center™ qualifications. The Hammond Ridge project could also offer much of the progression and differing experiences needed to obtain higher designations, such as Silver.

Minimum trail mileages for each designation are important, but alone will not secure IMBA Ride Center™ status. Mileage minimums are: Bronze – 50 miles, Silver – 75 miles, and Gold – 100 miles. Important to note is the minimum radius, all trails within the application for review must be within a 30 minute radius of a central location. If Millinocket/KAT follows the recommendations in this plan and the construction is done by qualified mountain bike trail builders, they could easily meet the minimums for Bronze. With the addition of high quality trail construction by experienced mountain bike trail builders at Hammond Ridge Silver would be highly likely.

## Future Trail Development

Millinocket and the greater Katahdin region are ripe for mountain bike trail development. The New England Outdoor Center’s (NEOC) Hammond Ridge project represents one piece of the plan currently unfolding in the region. The Hammond Ridge property has exceptional views, a large area, and nearly 600 feet of useable elevation, along with existing infrastructure such as parking, lodging, a restaurant, and a beach front. Due to its distance from town, a nearly 15-minute drive, NEOC is unlikely to stir a huge shift in the outdoor culture of Millinocket. With the development of some of the proposed zones described in this report, it is anticipated that the riding community in Millinocket will quickly grow. As the community grows and word spreads, places like Hammond Ridge are recommended for development. The sheer size and elevation would allow for a regionally significant trail system of 30-40 miles, with many of the longest purpose-built downhill runs in Maine (and awe-inspiring views of Mount Katahdin!).



Beyond Hammond Ridge, the Katahdin region is home to the Katahdin Woods and Waters National Monument (KWW). This huge swath of federally protected public land offers some existing trails and old logging roads, along with stunning views and a very intimate connection to the Maine north woods. Developing a conceptual and master plan for this property is high on the list of next recommended actions. Working with the National Park Service and user groups to ensure a truly Maine backcountry experience, while providing high-quality sustainable trails, should be a top priority. This sort of trail development, while very long term, is what will help set the stage for New England's largest mountain biking destination.

Along with KWW, the Seboeis Lake Public Reserved Land is a state managed parcel of over 20,000 acres. Much like KWW, this area could provide an extremely unique Maine backcountry riding experience. Additionally, the Seboeis Lake Public Reserved Land is connected to downtown Millinocket by the KRMUT system. Mountain bikers can already access this wildland via bicycle. Lastly, this property is quite close to Brownville Junction, another small town in the Katahdin region. Providing high-quality sustainable trail development within this property would help both Millinocket and Brownville Junction in many ways. Additional conceptual and master planning will help uncover the full potential of the Seboeis Lake property.

Finally, many other public lands are scattered throughout the region. KAT should continue to develop relationships with groups such as the Maine North Woods, the Maine Bureau of Public Lands, The Nature Conservancy, and the Appalachian Mountain Club. These partners are likely to be strong stakeholders in developing first-rate trails that help to showcase Millinocket and the Katahdin region as the most modern and viable outdoor recreation hub in the northeast.

## Recommended Phasing

*Note: Cost opinion tables are for natural surface trail and mountain bike zone development only. They do not include parking lots, roads, bike paths, trailhead improvements, etc.*

To allow for long-term financial health, as well as match the community's growing mountain bike needs, the Millinocket trail development in town should be phased. Design and construction should occur as needed, and design should predate construction by no more than one year. Design and construction can be done in conjunction where the specific zone would benefit from a design-build style development due to site limitations and the high-quality product needed to provide the intended experiences, such as a gravity zone. Below are the cost opinion tables for each phase. An entire cost opinion can be found in Appendix A.

The next step, prior to design and construction should be securing recreational trails permission from the applicable landowners and managers. Many of the proposed zones are on active timberlands, and the development of trail systems may be a new concept for the owners and managers. High-quality trail systems require significant investment but, more importantly, have the potential to positively impact the health, well-being, and economy of the community.

# Town of Millinocket: Trails Concept Plan



Master planning for each zone will help reduce design costs and deliver a more complete plan. Master planning will help determine permitting and regulatory needs, as well as flush out a more complete plan of development and therefore construction cost opinion. Master planning is broken down by zone, and should be completed prior to further design and construction.

Millinocket Zone Master Planning Cost Opinion Table							
Zone	1 - West of Jerry Pond	2 - Bait Hole	3 - Hospital	4 - NTC Clubhouse	5 - Shack Hill	6 - Downtown	Totals
Master Planning	\$8,000	\$7,500	\$10,000	\$15,000	\$20,000	\$12,000	<b>\$72,500</b>

\*Costs are conceptual in nature and should be used for planning purposes only. Construction cost opinions can vary 25-50% due to limited specific data.

## Phase 1: 2019-2020

Phase 1 will set the stage for the continued development of a robust mountain bike community in Millinocket. Phase 1 should focus on zones 1 and 6. Zone 1, due to the current informal use, will require a higher degree of community input. Current use and location suggest that this property is not a principal candidate for further intense timber harvesting. Conversion to a recreation area would be a natural step. The master planning and stakeholder meetings will inform the final design. It is recommended that the cross-country trails and skills loop be the first subzones developed, with gravity trails coming later. Zone 6, downtown, is suitable for a few small bike park elements. A paved tot track or skills features along the Michaud Trail near Granite Street School would be ideal for Phase 1 development. These types of facilities will help grow the riding community, especially among the youth of Millinocket. This type of progressive, gauged growth will help spur the development of future phases.

Millinocket Trails: Phase 1 Conceptual Cost Opinion Table									
Zone	Subzone	Phase	Area (acres)	Estimated Lengths (miles)	Design	Construction	Signage	Total Subzone Costs	Total Zone Costs
1 - West of Jerry Pond	XC	1	250	4 to 6	\$10,000	\$175,000	\$3,000	\$188,000	\$241,000
	Skills	1	10	0.5 to 1	\$2,500	\$50,000	\$500	\$53,000	
Totals	N/A	N/A	260	5 to 7	\$12,500	\$225,000	\$3,500	\$241,000	\$241,000

# Town of Millinocket: Trails Concept Plan



## Phase 2: 2020-2021

Phase 2 should build upon the success of Phase 1 by introducing the next level of both zone and skill development. This includes the gravity subzone of Zone 1 (if not completed in Phase 1), continued development of Zone 6 with larger more advanced features, and initial development of zones 2 and 3. Zone 2, Bait Hole, is a natural next step as it is a current recreational area. Also, the type of the trails recommended at Bait Hole are traditional cross-country trails, which work well with the current community’s needs and skillsets. The Anderson Hill, Zone 3, should be undergoing master planning and stakeholder meetings during this phase. Like Zone 1, Zone 3 should begin with implementation of the cross-country subzone prior to the gravity zones.

Phase 2 should also include the training and development of the local community. Continued education for the KAT trail crew should ensure skill development. The hype and excitement around the development may bring more qualified riders, and therefore builders, to the area as well. Maintenance needs will begin immediately but by Phase 2 should be adequately handled by volunteers and KAT staff. All local partners in trail development should begin to consider hiring more professional staff to continue trail design and building, as well as maintenance.

Lastly, the Hammond Ridge development should be continued during this phase. By this point, the KAT trail crew should have qualified trained professionals who ride at a high level and can effectively and efficiently build high-quality trails. Hammond Ridge development should continue in a slow and thoughtful process, constructing one or two gravity trails a year to minimize financial burden, keep community excitement high, and balance trail implementation around Millinocket.

Millinocket Trails: Phase 2 Conceptual Cost Opinion Table									
Zone	Subzone	Phase	Area (acres)	Estimated Lengths (miles)	Design	Construction	Signage	Total Subzone Costs	Total Zone Costs
1 - West of Jerry Pond	Gravity	2	30	1 to 2.5	\$3,000	\$100,000	\$1,000	\$104,000	\$104,000
	Existing	2	100	4 to 6	\$10,000	\$175,000	\$3,000	\$188,000	
2 - Bait Hole	Connection	2	45	2 to 4	\$3,000	\$120,000	\$1,000	\$124,000	\$312,000
Totals	N/A	N/A	175	7 to 12	\$16,000	\$395,000	\$5,000	\$416,000	\$416,000

# Town of Millinocket: Trails Concept Plan



## Phase 3: 2021-2022

Phase 3 should seek to complete the trail and bike facilities in town. Zones 1, 2, and 3 should be finished and fully developed by Phase 3. Zone 5, Shack Hill, should be in the process of stakeholder meetings and master planning. It is anticipated that the industrial and business development of the former mill site will take precedence, but the hope is that recreational development will be considered and planned for during the entire process. Zone 4, NTC Clubhouse, should begin development by Phase 3. This large zone requires more thoughtful design and construction as it is likely to become one of the most popular riding venues around Millinocket. Additionally, when work on this phase is underway, nearly 4 years after this concept plan is completed, discussions surrounding future trail implementation should begin with partners such as the National Park Service, the Appalachian Mountain Club, The Nature Conservancy, and the Bureau of Public Lands.

By Phase 3, the local volunteer force should be in full swing and able to maintain many of the trails constructed. The KAT trail crew should be large enough, and skilled enough, to continue development within Millinocket and at Hammond Ridge. The Hammond Ridge trail system should be large enough to attract riders within a day's drive and to begin offering events. The Millinocket trail system should be large enough to host events also.

Community programming should be in full swing by this phase. Weekly rides, children's programs, skill development sessions, and more are all a sign of a healthy and active cycling community. Middle and high school racing is quickly gaining popularity across the country, and it is anticipated that a team could develop at the local Millinocket schools as the trail systems are implemented.

Millinocket Trails: Phase 3 Conceptual Cost Opinion Table									
Zone	Subzone	Phase	Area (acres)	Estimated Lengths (miles)	Design	Construction	Signage	Total Subzone Costs	Total Zone Costs
3 - Hospital	XC	3	100	4 to 6	\$10,000	\$175,000	\$3,000	\$188,000	\$342,000
	Gravity	3	100	2 to 4	\$3,000	\$150,000	\$1,000	\$154,000	
4 - NTC Clubhouse	XC - BEG	3	90	3 to 5	\$5,000	\$150,000	\$2,500	\$157,500	\$157,500
5 - Shack Hill	XC	3	415	8 to 15	\$5,000	\$500,000	\$50,000	\$555,000	\$555,000
6 - Downtown	Tot Track	3	0.1	N/A	\$15,000	\$125,000	\$500	\$140,500	\$201,000
	Skills - BEG	3	1	0.5 to 1	\$10,000	\$50,000	\$500	\$60,500	
Totals	N/A	N/A	706	18 to 30	\$48,000	\$1,150,000	\$57,500	\$1,255,500	\$1,255,500

# Town of Millinocket: Trails Concept Plan



## Phase 4: 2022+

Phase 4 represents the fulfillment of this concept plan and the beginning of planning work in the surrounding areas. Zone 4 should be nearing 75% completion, with room to add trails over a few more years to keep interest and excitement high. Zones 1, 2, and 3 should be fully developed, and a trained professional staff should be employed to maintain both the Millinocket and Hammond Ridge trails. Hammond Ridge should be nearing 75% development during this phase, with small additional trail offerings added over time to keep the hype high.

Millinocket Trails: Phase 4 Conceptual Cost Opinion Table									
Zone	Subzone	Phase	Area (acres)	Estimated Lengths (miles)	Design	Construction	Signage	Total Subzone Costs	Total Zone Costs
3 - Hospital	DH	4	5	0.1 to 0.5	\$1,000	\$75,000	\$1,000	\$77,000	\$77,000
4 - NTC Clubhouse	XC - ADV	4	1000	12 to 18	\$16,000	\$600,000	\$6,000	\$622,000	\$806,000
	Gravity	4	160	3 to 6	\$8,000	\$175,000	\$1,000	\$184,000	
5 - Shack Hill	Tot Track	4	0.1	N/A	\$15,000	\$125,000	\$500	\$140,500	\$1,225,000
	Pumptrack	4	0.4	N/A	\$20,000	\$500,000	\$500	\$520,500	
	Skills	4	120	0.5 to 1	\$10,000	\$50,000	\$500	\$60,500	
	Flow	4	460	6 to 12	\$1,500	\$500,000	\$2,000	\$503,500	
6 - Downtown	Pumptrack	4	0.4	N/A	\$20,000	\$500,000	\$500	\$520,500	\$606,000
	Skills - ADV	4	6	0.5 to 1	\$10,000	\$75,000	\$500	\$85,500	
<b>Totals</b>	<b>N/A</b>	<b>N/A</b>	<b>1752</b>	<b>20 to 38</b>	<b>\$101,500</b>	<b>\$2,600,000</b>	<b>\$12,500</b>	<b>\$2,714,000</b>	<b>\$2,714,000</b>

## 6. Summary

Millinocket has a very high potential to create an active and engaged mountain bike community. In addition, Millinocket stands ready to develop the premier mountain bike destination in the northeast. These goals rest on the ability to implement high-quality trails. This concept plan is the foundation for that high-quality work. The proximity of appealing and unique terrain to downtown is astounding and would support Millinocket's having more trails close to home in a huge way. Connections to almost every neighborhood, with riding distances of less than five minutes from most homes to trails, is almost unheard of. In addition, not only could Millinocket residents have access to trails in town, but current and future connectivity would allow direct access from residential areas to the rugged Maine woods backcountry.

Millinocket has the potential to offer a wide array of trail experiences. The landscape is conducive to everything from traditional shared-use cross-country trails to modern gravity lines. Progression would be widely available, and this concept plan spells out a thoughtful approach to implementation that encourages the growth of riders and the community. Having trails that directly link to every school in town, the Penobscot Avenue corridor, the hospital, and existing recreational areas is a tremendous opportunity.

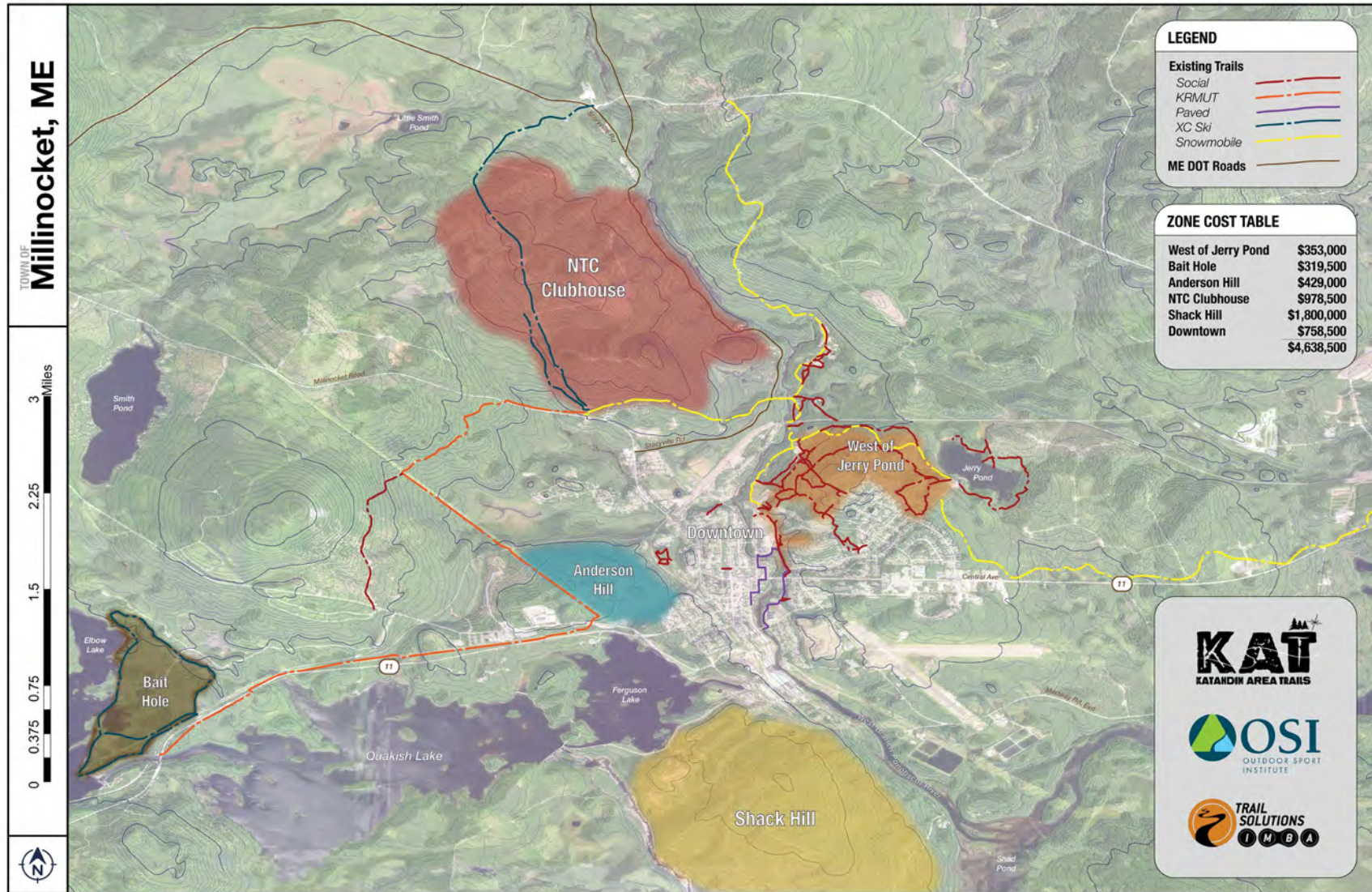
The development of places like Shack Hill and areas along the Michaud Trail will help paint Millinocket as a modern outdoor recreation hub. The Shack Hill potential is both distinctive and exciting. Redeveloping the former bedrock of town and ensuring it remains the cornerstone of the community could invigorate the economy, beautify the area, and help residents live healthy, active lifestyles. It would surely show the region, and world, that Millinocket is reinventing itself in a sustainable and forward-thinking way, and prove its commitment to offering its citizens and visitors exceptional places to play in nature.

Millinocket has a rich history of outdoor recreation. Baxter State Park draws many hikers and visitors from across the world, the Appalachian Trail's northern terminus marks the end of a saga for many, and the motorized and hunting and fishing community has long cherished Millinocket as a gateway to adventure. Mountain biking is a logical and exciting next step. With continued professional assistance, the community could easily draw new residents who seek a place they can work and play close to home. Tourism is sure to increase with high-quality trail construction.

There are many thrilling opportunities in and around Millinocket. With continued dedication by groups like KAT and OSI, Millinocket is sure to grow into a marquee destination and shining example of outstanding, modern mountain biking.

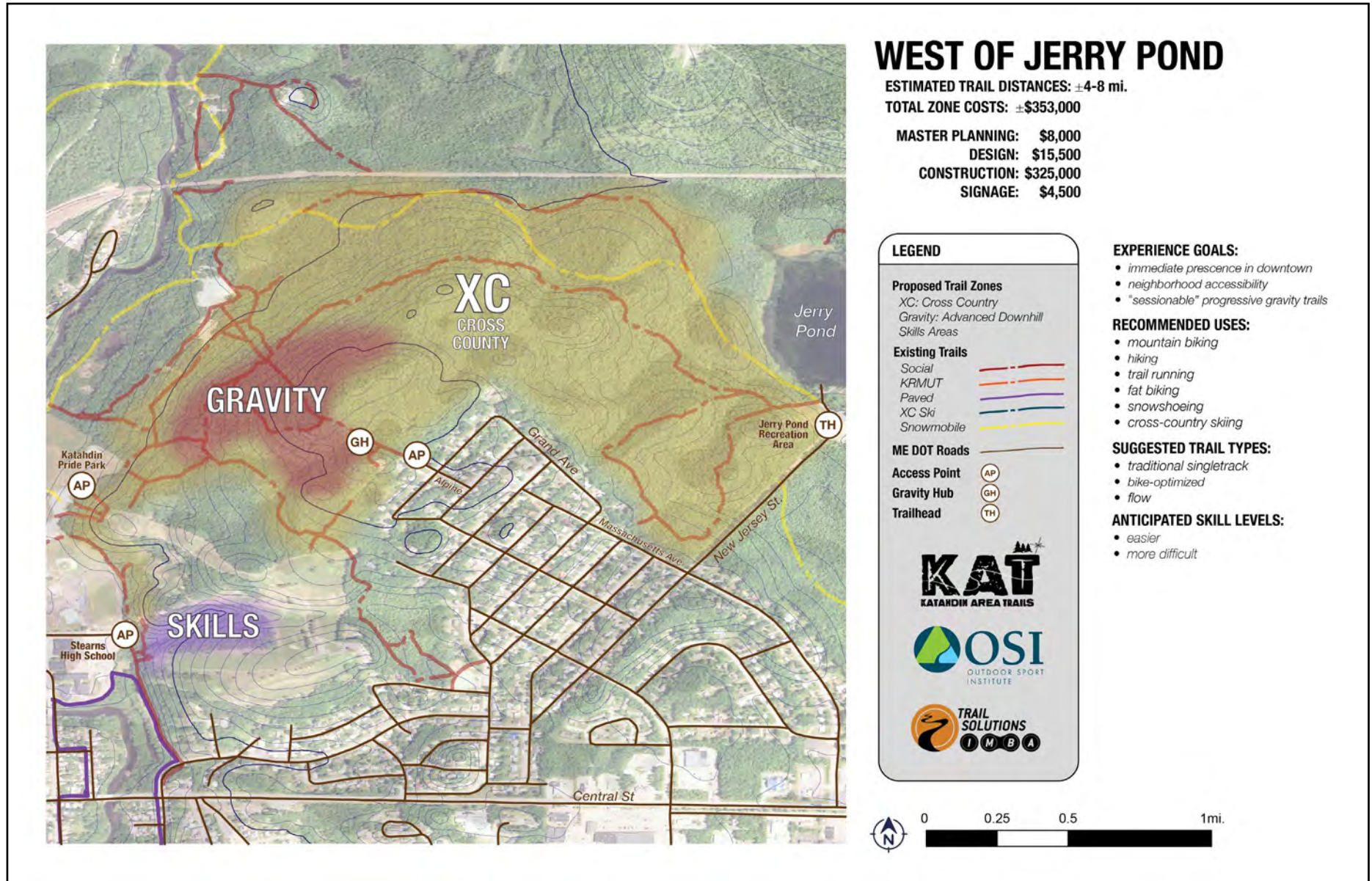
# Town of Millinocket: Trails Concept Plan

Figure 1: Overall Trails Concept Plan Graphic



# Town of Millinocket: Trails Concept Plan

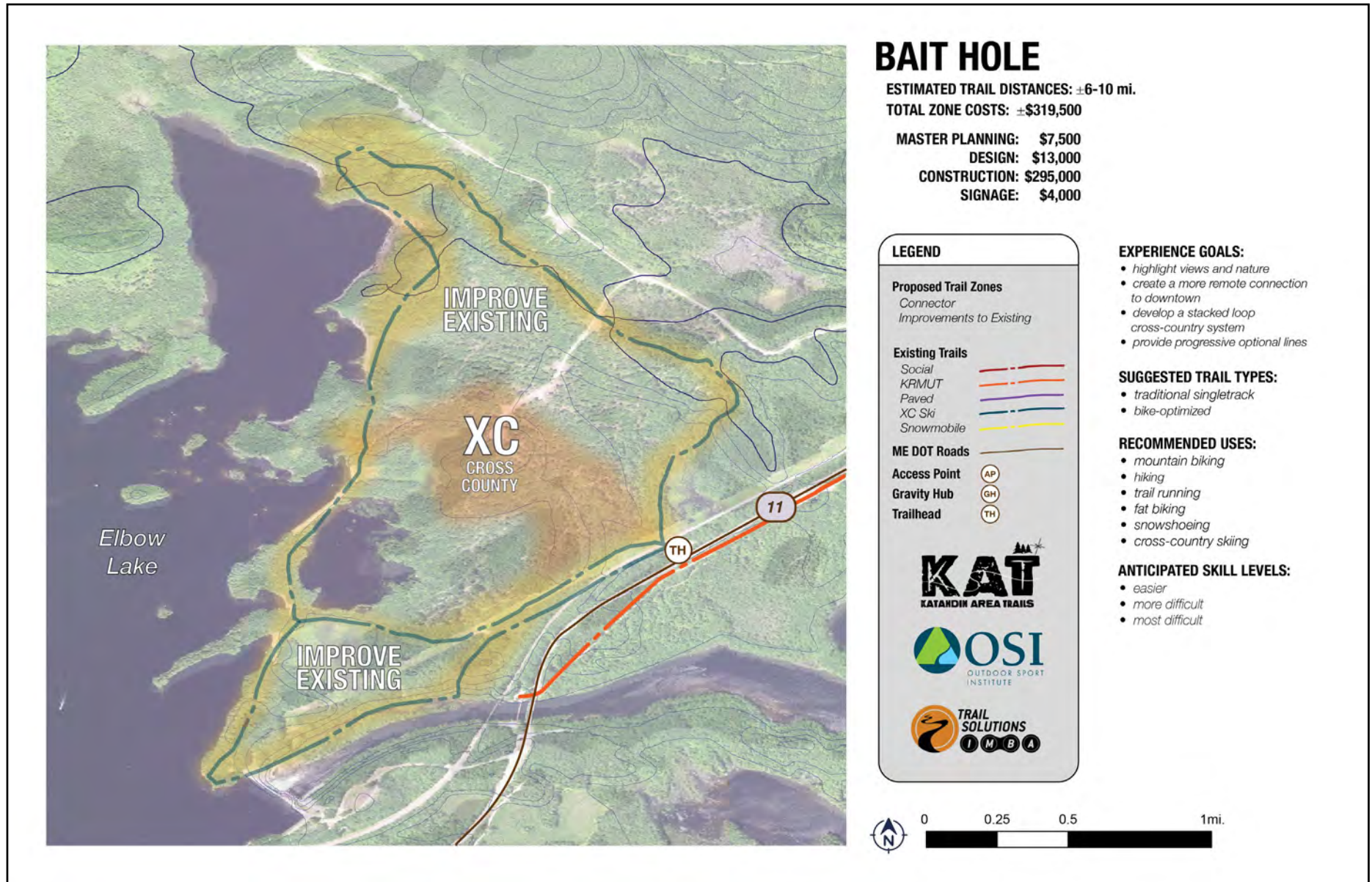
Figure 2: Zone 1 Detailed Concept Graphic





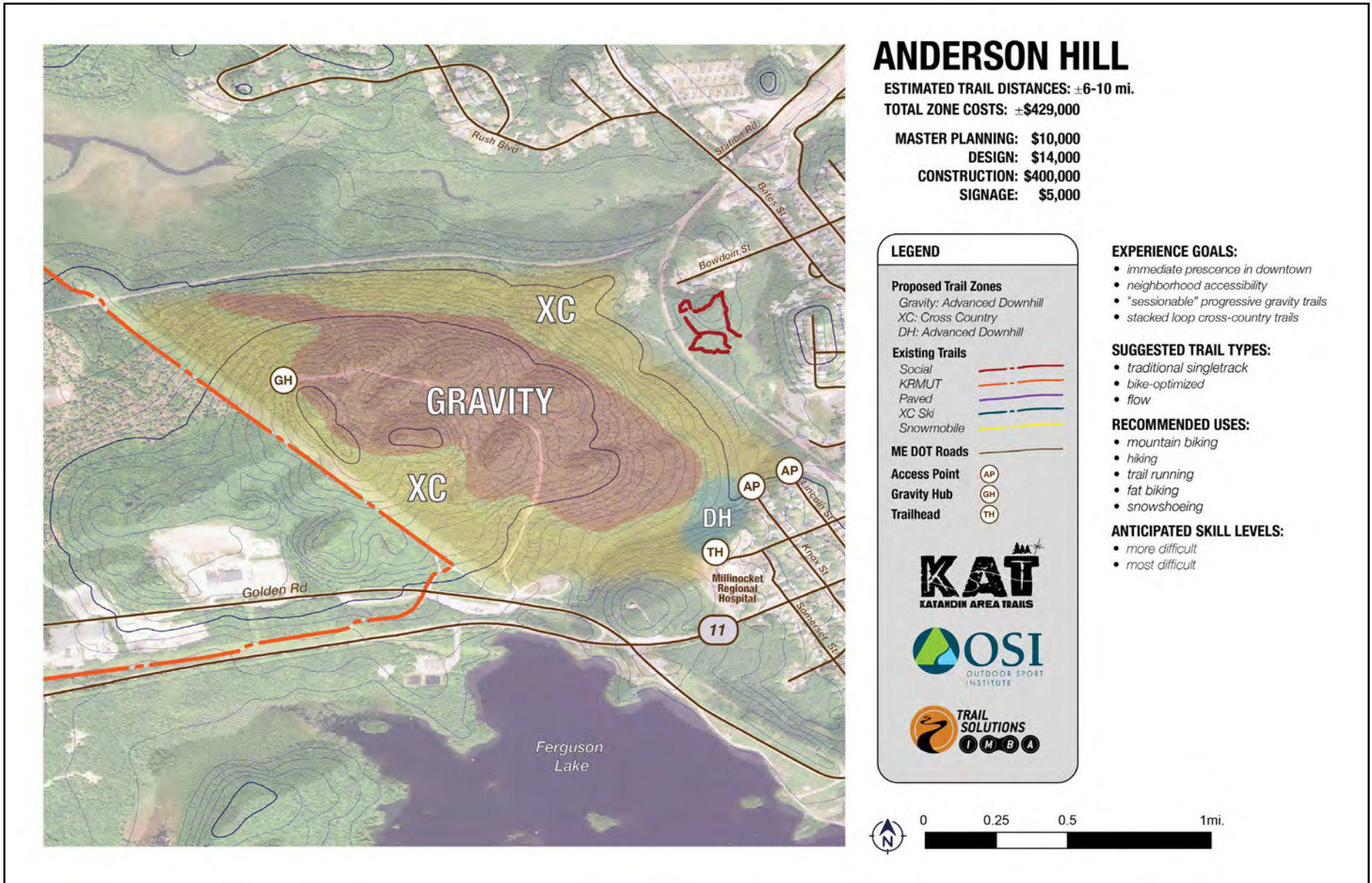
# Town of Millinocket: Trails Concept Plan

Figure 3: Zone 2 Detailed Concept Graphic



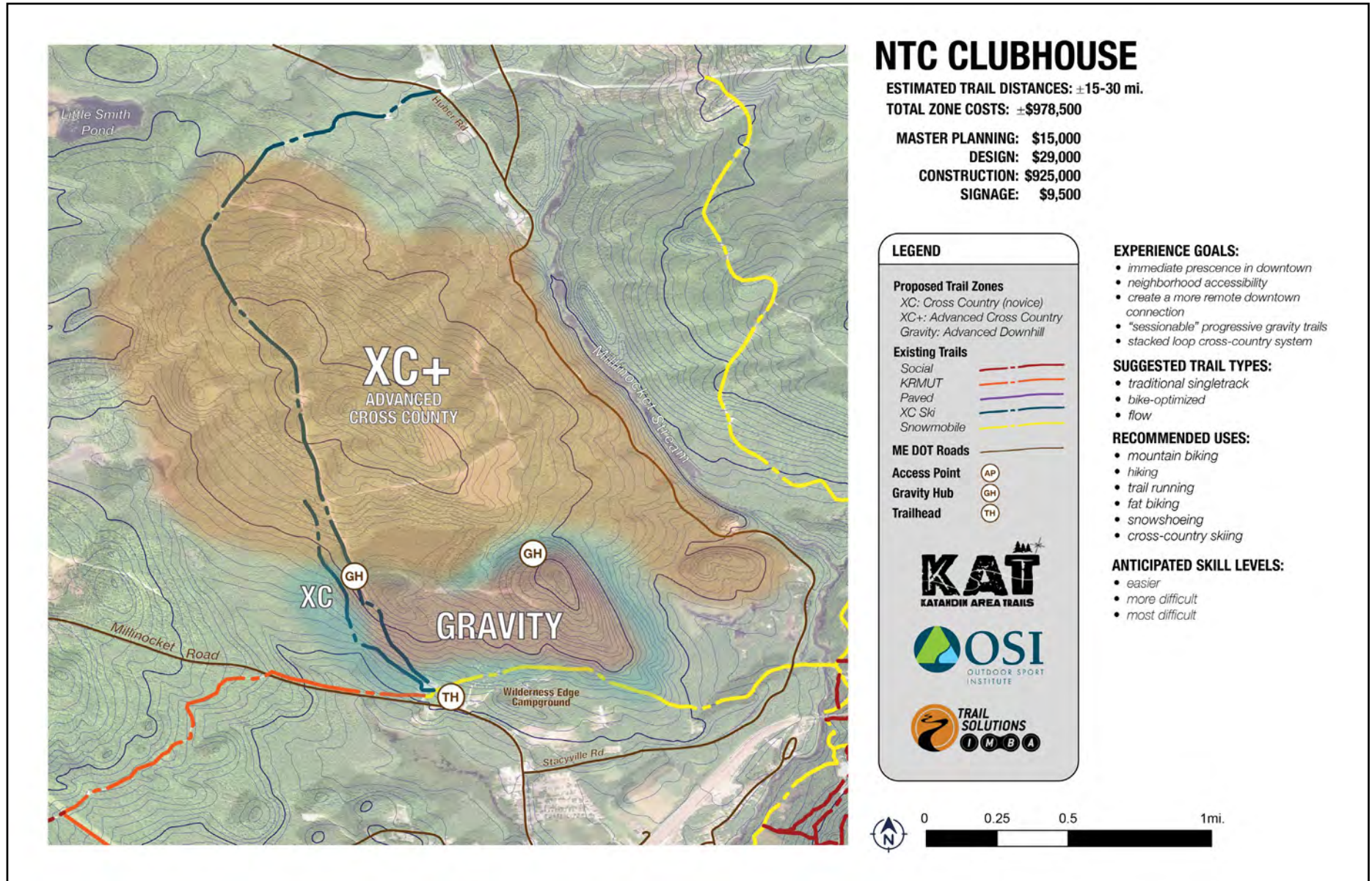
# Town of Millinocket: Trails Concept Plan

Figure 4: Zone 3 Detailed Concept Graphic



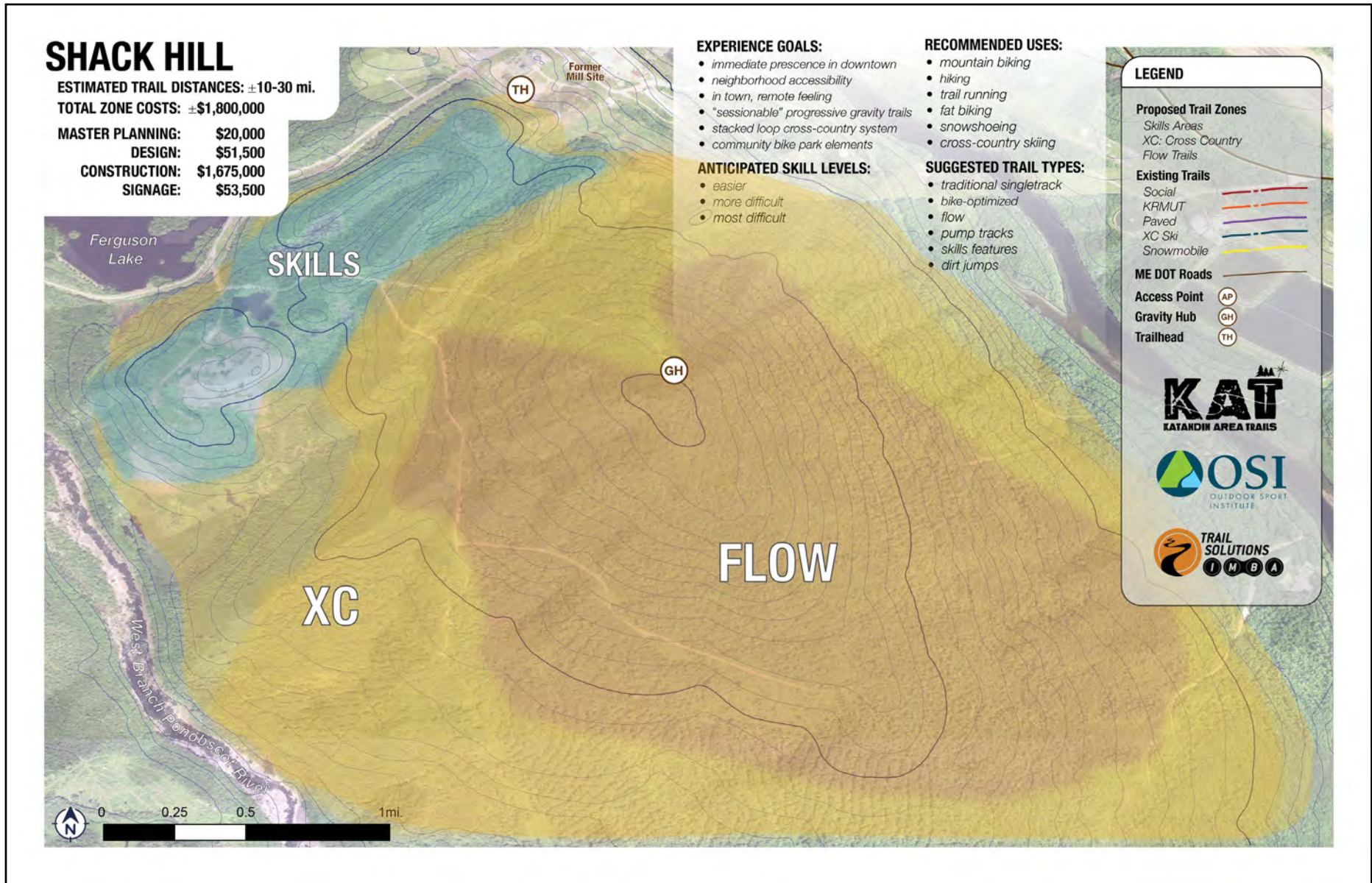
# Town of Millinocket: Trails Concept Plan

Figure 5: Zone 4 Detailed Concept Graphic



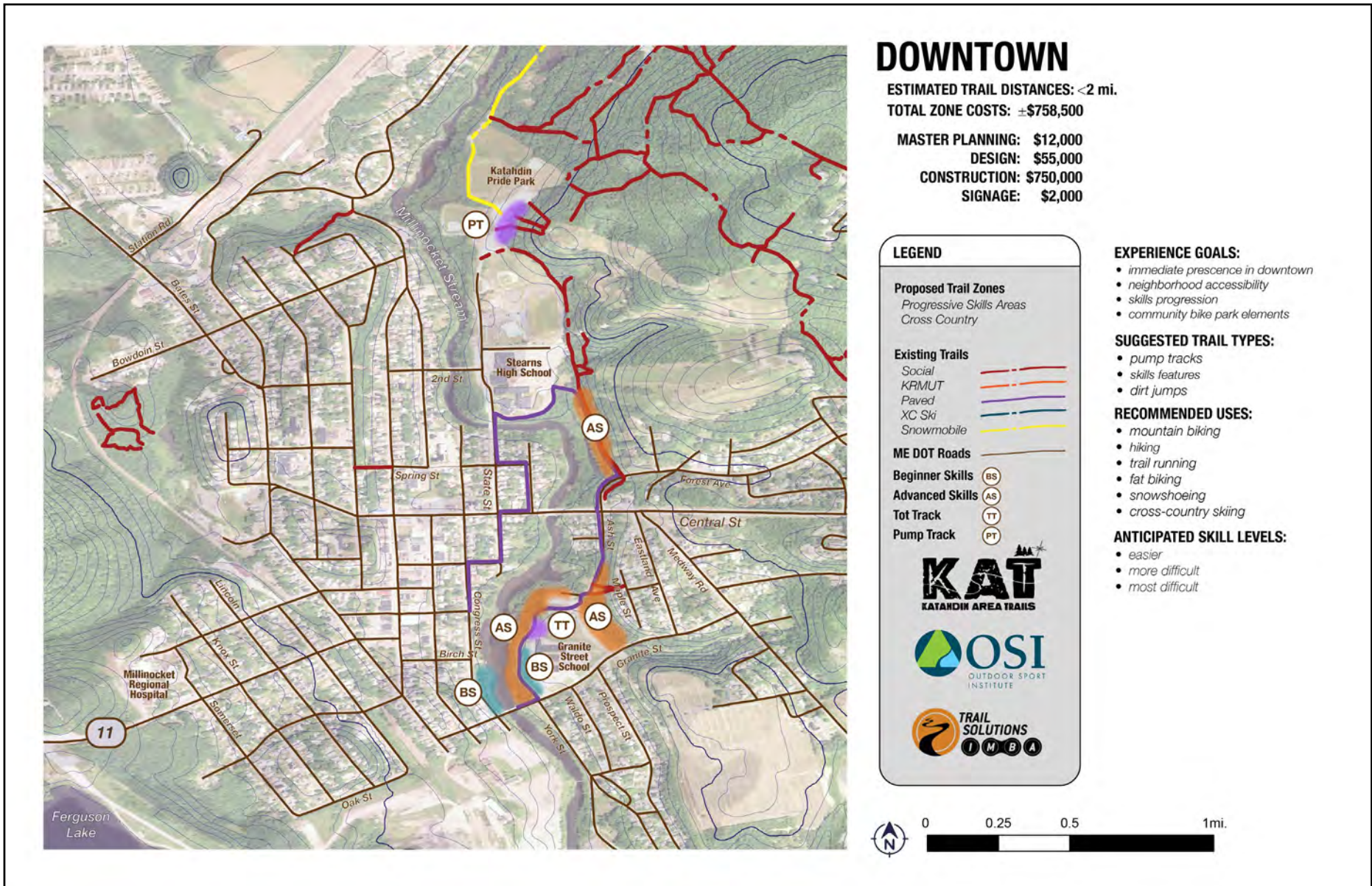
# Town of Millinocket: Trails Concept Plan

Figure 6: Zone 5 Detailed Concept Graphic



# Town of Millinocket: Trails Concept Plan

Figure 7: Zone 6 Detailed Concept Graphic



# Town of Millinocket: Trails Concept Plan



## Appendix A: Cost Opinion Tables

Appendix A: Millinocket Complete Conceptual Cost Opinion Table										
Zone	Subzone	Phase	Area (acres)	Estimated Lengths (miles)	Master Planning	Design	Construction	Signage	Total Subzone Costs	Total Zone Costs
1 - West of Jerry Pond	XC	1	250	4 to 6	\$8,000	\$10,000	\$175,000	\$3,000	\$188,000	\$353,000
	Gravity	2	30	1 to 2.5		\$3,000	\$100,000	\$1,000	\$104,000	
	Skills	1	10	0.5 to 1		\$2,500	\$50,000	\$500	\$53,000	
2 - Bait Hole	Existing	2	100	4 to 6	\$7,500	\$10,000	\$175,000	\$3,000	\$188,000	\$319,500
	Connection	2	45	2 to 4		\$3,000	\$120,000	\$1,000	\$124,000	
3 - Hospital	XC	3	100	4 to 6	\$10,000	\$10,000	\$175,000	\$3,000	\$188,000	\$429,000
	Gravity	3	100	2 to 4		\$3,000	\$150,000	\$1,000	\$154,000	
	DH	4	5	0.1 to 0.5		\$1,000	\$75,000	\$1,000	\$77,000	
4 - NTC Clubhouse	XC - BEG	3	90	3 to 5	\$15,000	\$5,000	\$150,000	\$2,500	\$157,500	\$978,500
	XC - ADV	4	1000	12 to 18		\$16,000	\$600,000	\$6,000	\$622,000	
	Gravity	4	160	3 to 6		\$8,000	\$175,000	\$1,000	\$184,000	
5 - Shack Hill	XC	3	415	8 to 15	\$20,000	\$5,000	\$500,000	\$50,000	\$555,000	\$1,800,000
	Tot Track	4	0.1	N/A		\$15,000	\$125,000	\$500	\$140,500	
	Pumptrack	4	0.4	N/A		\$20,000	\$500,000	\$500	\$520,500	
	Skills	4	120	0.5 to 1		\$10,000	\$50,000	\$500	\$60,500	
	Flow	4	460	6 to 12		\$1,500	\$500,000	\$2,000	\$503,500	
6 - Downtown	Tot Track	3	0.1	N/A	\$12,000	\$15,000	\$125,000	\$500	\$140,500	\$758,500
	Pumptrack	4	0.4	N/A		\$20,000	\$500,000	\$500	\$520,500	
	Skills - BEG	3	1	0.5 to 1		\$10,000	\$50,000	\$500	\$60,500	
	Skills - ADV	4	6	0.5 to 1		\$10,000	\$75,000	\$500	\$85,500	
<b>Totals</b>	<b>N/A</b>	<b>N/A</b>	<b>2893</b>	<b>50 to 90</b>	<b>\$72,500</b>	<b>\$178,000</b>	<b>\$4,370,000</b>	<b>\$78,500</b>	<b>\$4,626,500</b>	<b>\$4,638,500</b>

## Appendix B: Benefits of Mountain Bicycling Trails

### Promoting Active and Healthy Lifestyles

The benefits of mountain biking may start on the trails, but they don't end there. Learning to ride a bike is a rite of passage. Bikes and the sport of mountain biking provide a multitude of opportunities to teach children valuable lessons that will carry into adulthood.

Obesity is at a high, while activity levels among Americans are plummeting. With its progressive nature and way of stimulating the senses, mountain biking is appealing, especially to youth, and provides an excellent form of recreation for reversing the trend toward poor health. Since riding a bike provides excellent cardio conditioning, improves strength and coordination, and burns several hundred calories an hour, it is an activity as appealing to parents as it is to kids.

The unstructured play that mountain biking provides inspires people to explore and appreciate the natural world, leading to positive associations with outdoor activities and exercise.

Mountain biking allows individuals to advance at their own pace, so kids looking for a challenge can have just as much fun as children who are more interested in exploring the scenery. Riding in nature provides an environment where children can work on their skills, have fun, and pedal their bikes without parents having to worry. Mountain biking is a cross-generational endeavor, accessible to all ages and levels of physical fitness. Going for a trail ride is an excellent way for parents to do more than support their children's activities, it's a way to share the experience. Every ride is an opportunity to create a healthy lifestyle and pass on lessons that are best learned through experience.

Several studies on physical activity have indicated that proximity to recreational facilities, such as trails, is a predictor for physical activity. Simply put, if there are walking and biking trails nearby then residents are more likely to use them and therefore be healthier. Physical health and exposure to nature also benefit



mental health, reducing stress and increasing happiness. In addition, individual and community health translate to economic benefits by decreasing health care costs

## Contributing to Economic Growth

A well-designed trail system can stimulate economic growth by increasing activity within the local population as well as attracting visitors from outside. Trails can generate business in retail sales and services, support jobs, provide sustainable growth in rural communities, and produce tax revenue. Access to trails also correlates to a higher quality of life, thus making the community more desirable and capable of attracting new businesses and workers to an area.

IMBA assists local communities in increasing mountain bicycling tourism as a sustainable, renewable source of economic development. A mountain biking destination is one that attracts tourists to an area for the benefits of the mountain biking experience; provides visitors with all of the amenities needed to compliment, ease, and enhance their visit; and in turn creates word of mouth about the community that will draw new and repeat visits.

According to the Outdoor Industry Alliance, mountain bicyclists represent approximately 3.4% of the U.S. population, or nearly 10.6 million participants. IMBA's own research indicates that enthusiasts, who represent a portion of this overall number, travel extensively within a four-hour range and will typically devote one week per year specifically to travel to reach mountain bicycling destinations. Same-day visitors spend approximately \$35 per day in local communities while destination visitors spend closer to \$193 per day (due in part to lodging and increased meal purchases).

While mountain bicyclists are certainly willing to travel to ride, they will only do so if their destination contains a key ingredient: high-quality trails. These trails must be of a sufficient length and contain a variety of experiences, such as traditional singletrack, bike-optimized singletrack, bike parks, and shuttle options. The competition for these destination-quality locations is slowly increasing over time

A case study in Cable, Wisconsin, clearly illustrates how a community can benefit from offering a world-class bicycling experience. Construction of new bicycle trails in Cable resulted in:

- Increased property values.
- Increased spending on bicycle related goods.
- 35 jobs created annually, adding \$523,000 to total employee compensation.
- Nearly \$1.3 million impact related to spending from mountain bicyclists.



## Fostering Community Pride and Identity

Involving community members in the planning, building, and maintaining of trails fosters community pride. In order to maintain sustainable trails, care of the trail system should be managed by local enthusiasts and rely on an organized membership base. Volunteering to help with trails provides an opportunity for area residents to connect with each other and with the terrain and land that surround them. IMBA members donate nearly one million volunteer hours to trails throughout North America every year, making volunteerism a large part of mountain bike culture.

Trails and parks also provide informal opportunities for people to meet and interact with others in a natural setting. Connection to nature is paramount to maintaining the health of the environment and making the outdoors relevant and accessible to all. Trails serve a diverse population and cultivate unity and stewardship in the community. Trails can even revitalize blighted areas, for example, turning landfills into bike parks or gravel pits into trailheads.



## Preserving Open Space

Trails make communities better places to live by preserving and creating open spaces for recreation. Greenways function as hands-on environmental classrooms for people of all ages, providing opportunities to enjoy nature close up. With its abundant plant life, open spaces can decrease pollution, protect water quality, and reduce soil erosion. Economic growth and property values are also tied to open space as buyers are generally willing to pay more for property located close to parks and open space. The recreation, health, economic, and environmental benefits of trails can contribute to an overall enhanced quality of life in nearby communities.

## Appendix C: General Trail Planning and Design Guidelines

The following are guidelines for the construction and maintenance of future trails. The natural environment is dynamic and unpredictable. The nature of recreational trails and roads, the desired user experience, and the constant forces acting on natural surface trails and roads make strict standards untenable and undesirable. As such, the guidelines below are simply that: best management practices that should be followed within environmental constraints.

### Mountain Bike-Optimized Trails and Preferred Direction Trails

Mountain bike-optimized singletrack trails are designed and constructed to enhance trail experiences specifically for mountain bikers. Mountain bike-optimized trails might differ from traditional trails in several ways: enhanced tread shaping, directional or one-way travel, and the addition of man-made technical trail features (TTFs). Bicycles move differently along a trail than other modes of transportation. The movement of the wheel, the use of gravity and friction, the transfer of energy from the rider to the wheel – these offer both opportunities and constraints for trails and trail features that may differ from those of other users.

Mountain bike-optimized and one-way trails that harness gravity are a growing area of interest for mountain bikers. These trails can be designed and built at any level, from beginner friendly flow trails to extremely difficult race-oriented downhill trails. Riders cherish the feeling of flight that a bicycle provides while coasting through a succession of bike-optimized features from top to bottom. A consistent trail is not necessarily a boring or easy trail (though it can be), it's one that is designed such that a preceding section of trail prepares users for the subsequent sections. This is a hallmark of flow trails and can be particularly important for beginner trails, as well as for higher speed trails with gravity features, such as jumps and drops.

As trail systems grow and become congested, one-way trails help to take the pressure off popular shared-use trails. Riders looking for speed, thrill, and challenge will have their own designated areas, and users travelling at slower speeds will have their own trails. Well-designed mountain bike-optimized singletrack and gravity singletrack are exciting for mountain bikers but are also designed to help manage risk and minimize user conflict.



## Purpose-Built Singletrack Trails

Singletrack is defined as a dirt path narrower than double-track or fire road, usually 12 to 36 inches wide. Singletrack trails are not typically accessible by ATVs or other four-wheeled vehicles. Singletrack may be smooth or rocky, flat or steep, among many other attributes and building techniques.

Trails with grades that average between 3 – 10% and do not exceed half of the grade of the sideslope, or fall line, are easier to maintain. Keeping trail grades within certain ranges ensures both a positive trail experience for users and proper stormwater drainage with minimized erosion. Mountain bikers have become sophisticated, seeking purpose-built trails that offer a wide range of difficulty levels, terrain diversity, and genre types. Purpose-built trails are constructed with specific users in mind in order to optimize their experience with features and design.

Looking to the future, understanding what users may want and meeting their demands increases the sustainability of the trails and the overall trail system.

- Easier/Beginner (Green) trails have a smoother and wider tread, lower trail grades, and less exposure.
- More Difficult/Intermediate (Blue) trails can be steeper, more technically difficult, or longer.
- Most Difficult/Advanced (Black) trails offer a combination of difficult trail tread, technical features, and long distances for those looking for challenge and endurance-oriented experiences.
- Expert (Red) trails will be the most difficult and challenging in skill level.

The ridership within each category can be divided into the following groups: novice, intermediate, and advanced. Using a basic bell curve distribution, it can be assumed the majority of mountain bicyclists in any category and as a whole are intermediate riders. Beginner riders correspond with (Green) rated trails, intermediate riders with (Blue) rated trails, and Advanced riders with (Black) rated trails. More Advanced trails (Double Black) are typically required by a relatively small but very passionate contingent of ridership. A reasonable percentage of Double Black should be built as demand increases.

## Stacked Loops

Stacked loops enable users to share many different levels of trail. In a stacked-loop system, the loops that are closest to the trailheads are more inviting to children, beginners, or families and the loops further out cater to more advanced riders. This creates a progression of experiences and challenges as users explore the trails in more depth. The loop construction also allows users of all levels to ride the trails and improve their fitness and skill while enjoying the natural world.

Bidirectional trails can be ridden in either direction, thereby essentially doubling the trail options and allowing users to complete a loop and avoid an out-and-back route. Loops vastly increase the trail opportunities for beginner to expert mountain bikers, including families and groups.

## Progressive Hubs and Clusters

All shared-use trails are created with skill level progression in mind. With progressive trail features, a mountain biker may become a better rider by gradually moving up in trail difficulty. It is proposed that this trail system offers features of varying skill levels so that riders may find a trail that matches their skills and progress.

Hubs and clusters give users more trail options for varying skill levels at each hub, allowing for skill level diversity. A trailhead or major trail intersection is usually a hub. A rider may start out on a beginner trail and then graduate on to a more difficult trail at the next hub. At many intersections, there is the option to change the trail difficulty or continue on the same difficulty level.

This practice spreads out visitors and helps reduce trail user conflict. Signage includes difficulty levels at every hub and wherever necessary in the trail system to help users choose trails based on their skill levels and desired experience. A cluster is a concentration of trails with all levels of difficulty.

Providing consistent climbs and extended descents is a design priority. In most cases, the trails contour gently up or down for consistent lengths to maximize climbs and descents. This is known as rolling contour design. All shared-use trails should be of rolling contour design to minimize impact and sedimentation in the watershed.

The most challenging trails and terrain will be further away from the proposed parking hubs, rewarding those willing to travel longer distances. This is also a proven risk management tool. Putting the difficult segments further out of reach of beginners, and giving riders time and distance to warm up before reaching those technical segments, provides a level of safety in the system.

## Trailheads

Well-placed trailheads and parking lots contribute to a successful trail system. Trailheads should be located in areas of lower elevation, as most trail users prefer outbound climbs with inbound descents back to the parking area. This also helps mitigate risk by allowing fatigued riders an easier route back to their starting point. This is especially true for mountain bikers, and necessary for families and beginners. Trailheads should offer information useful for the trail users, including trail maps, location information, emergency contact details, and volunteer information.

## Sustainable Trails

A sustainable trail balances many elements. It has little impact on the environment; resists erosion through proper design, construction, and maintenance; and blends with the surrounding area. A sustainable trail also appeals to and serves a variety of users. It is designed to provide enjoyable and challenging experiences for visitors by managing their expectations effectively. Following sustainable trail design and construction guidelines allows for high-quality trail

and education experiences for users while protecting the land's sensitive resources. For additional trail design, construction, and maintenance techniques, refer to *Trail Solutions: IMBA's Guide to Building Sweet Singletrack*. These guidelines are appropriate for any hike, bike, or equestrian trail.

## Signage

The development of a mountain bike trail network requires the development of a comprehensive system of signs. Signs are the most important communication tool between land managers and trail users. A well-implemented and maintained signage system enhances the user experience by helping visitors navigate the trail network and providing information about the area. Signage also plays a critical role in managing risk and deploying emergency services.

Recommended signage for the trails should be simple, uncluttered, and obvious; with a sign at every major intersection to help users stay on track. Signs should meet the needs of all users, from the daily trail user to someone who is experiencing the trails for the first time. In order to serve the variety of visitors, sign placement should be strategic and frequent. Because signs can intrude on the natural outdoor experience, balancing competing interests is key to developing a successful signage program.

### **Sign Types**

A variety of signs can be created to help users identify trails and their location, select routes, remain confident in their trail choices, guide users to destinations and key points of interest, and provide information on regulations and allowed uses. Signage can also be interpretative; helping visitors learn about responsible recreation and trail etiquette, learn about resource protection, and reduce risk and hazards.

**Informational signs:** Usually positioned at the trailhead and major intersections. Provide details such as trail length and difficulty. These include trailhead identification signs (from a road); signs at a trailhead kiosk with a complete map and description of all the nearby trails and facilities, local regulations, emergency contact information, and educational messages; trail intersection signs; waymarks; difficulty rating signs; and trail length or elevation gain and loss signs.

**Regulatory signs:** Delineate rules, such as prohibited activities, direction of travel, or other restrictions.

**Directional signs:** Provide navigational information.

**Warning signs:** Warn trail users of upcoming hazards or risks. These include visitor rules and regulations signs, allowed activities, road and trail intersections, and emergency signs.

**Educational signs:** Provide guidelines for responsible recreation and trail etiquette.

**Interpretive signs:** Describe natural or cultural resources. These include educational and responsible use signs.

## **Design Flagging**

It is optimal to flag corridors just before the permitting review team is available to physically tour the flag line, so as not to lose flags from sunlight, wind, animals, humans, and other elements. Design and flagging costs will depend on conditions, accessibility, terrain, time of year, and other factors. For the Millinocket town trails, it is recommended a professional mountain bike trail designer be contracted to provide design as needed. Typically, a professional trail builder can complete 5-10 miles in a build season in the Millinocket area. Flagging should not outpace anticipated construction. Design should include design development documents to ensure the construction team creates the experience intended and does not ruin future opportunities.

## **Construction**

Creating the proposed trail network of traditional singletrack trails, mountain bike-optimized trails, gravity trails, and bike park elements will guarantee a unique destination drawing riders from afar while giving local residents an exhilarating outdoor activity close to home. Construction should be provided by a combination of professionals and volunteers. Skilled mountain bike trail builders should work on the mountain bike-optimized and gravity trails. Volunteers can provide much of the preparation and finishing work between machine operators on the traditional singletrack trails, though volunteer involvement should occur during all construction. A phased plan of action will ensure continued enthusiasm for the Millinocket trails. Machines applicable to the landscape and style of trails include: mini-excavators, mini-skid steers, tracked haulers, and plate compactors. Currently, the KAT trail construction crew has the capability to build the traditional singletrack trails proposed within Millinocket. A qualified mountain bike trail builder is required to manage the work and ensure a high-quality riding experience. A good rule of thumb is: A builder can only build to their riding ability; if you can't ride it, you shouldn't build it.