



ZUNI MOUNTAINS TRAIL PARTNERSHIP

TRAILS & CONSERVATION MASTER PLAN



“Part of the shift in paradigm is to make the relationship with our visitors transformational, or to transform the relationship of the recreation program and its constituents to that of one of exchange of fees or taxes for services to that of partner and citizen steward.”

-Southwestern Region Sustainable Recreation Strategy, 2014

A Collaborative Planning Effort of the:
Zuni Mountains Trail Partnership,
US Forest Service,
National Park Service – Rivers, Trails, and Conservation Assistance Program
Northwest New Mexico Council of Governments

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Abbreviations

AGB – Adventure Gallup and Beyond.

ATV – All Terrain Vehicle.

CFLRP – Collaborative Forest Landscape Restoration Program.

EMNRD – Energy, Minerals, and Natural Resources Department of the State of New Mexico, and administrator of State Parks Division, Youth Conservation Corps Program, and formerly Recreational Trails Program.

FHWA – Federal Highway Administration, provides funding for Transportation Alternative Program and Recreational Trails Program.

IMBA – International Mountain Biking Association.

MAP-21 – Moving Ahead for Progress in the 21st Century Act, long-term highway authorization.

NEPA – National Environmental Policy Act, requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions.

RAC – Northern New Mexico Resource Advisory Committee, RAC provides Title II funding for projects.

Ride Center ® – IMBA’s designation that represents IMBA’s Model Trails recognition for large-scale mountain bike facilities that offer something for every rider. These are destination-worthy areas that offer riders everything from backcountry adventures to shuttle-served gravity trails, and from advanced to family-friendly.

RTCA – Rivers, Trails, and Conservation Assistance Program through National Parks Service.

RTP – Recreational Trails Program, grant funding for multi-use, non-motorized, and motorized trail systems.

TAP – Transportation Alternative Program, under MAP-21, the new Transportation and Highway Authorization, a consolidated grant program for alternative transportation programs, including scenic byway, trails, etc.

SRS – Secure Rural Schools and Community Self-Determination Act of 2008.

YCC – Youth Conservation Corps, funded under the New Mexico Energy, Minerals & Natural Resources Department.

ZMTP – Zuni Mountains Trail Partnership

Acknowledgements

Overall, the Zuni Mountains Trail Partnership (ZTMP) would like to thank the numerous volunteers and youth from our region who have invested in the Cibola National Forest Mt. Taylor Ranger District by:

- Improving, designing, developing, and maintaining the current trails and watersheds,
- Financing, constructing, and maintaining trail and trailhead improvements, and
- Coordinating the overall Master Plan development process and financing NEPA work for a non-motorized trail system.

Without their hard work, the wonderful opportunities on our lands to hike, run, ski, snowshoe, and ride would not be possible. The Rivers, Trails and Conservation Assistance Program of the National Park Service and especially Regional Outdoor Planner, Attila Bality have our gratitude for providing technical assistance in developing a planning framework, facilitating meetings, designing public input process, and helping in the creation of this Trails & Conservation Master Plan.

This planning process would not have been realized without dedicated input from federal, state, tribal, and local governmental entities; businesses; private industry; clubs; and citizen stakeholders including:

- Cibola County,
- McKinley County,
- Adventure Gallup & Beyond (AGB),
- Gallup Trails,
- Gallup and Grants Youth Conservation Corps,
- Future Foundations Family Center, Inc., Gallup Boys & Girls Club, and Connections, Inc.,
- Healthy Kids, New Mexico / Community Transformation Grantees (McKinley, Cibola, and Zuni)
- Plateau Sciences Society and Cibola County Historical Society,
- Navajo Nation,
- Pueblos of Acoma, Laguna, and Zuni,
- SWCA Environmental Consultants,
- NM Departments/Divisions of: Fish & Wildlife; Transportation; Health; Energy, Minerals, and Natural Resources; State Parks; and State Land Office,
- International Mountain Bicycling Association,
- Local businesses, Chambers of Commerce, Health Councils, user group representatives, citizens,
- National Park Service (NPS): RTCA Program, El Malpais, and El Morro National Monuments,
- Bureau of Land Management (BLM): El Malpais National Conservation Area,
- US Forest Service (USFS), and
- Northwest New Mexico Council of Governments (NWNMCOG)

The ZMTP Master Planning Team included: Matt Reidy, Arnold Wilson, Ruth Doyle, Attila Bality, Douglas Decker, Judy Horacek, Karl Lohmann, Larry Winn, Laura Jaramillo, Steve Owen, Mike Jaramillo, William Siebersma, Peter Tempest, Bob Rosebrough, Olin Clawson, Anna Larson, Aaron Lowden, Tom Mayer, Strider Brown, Mike Cernaway, and Evan Williams.

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Northwest NM Council of Governments



Executive Summary

The Zuni Mountains Trail & Conservation Master Plan is a living document, which will guide the sustainable development of trails, conservation, and recreation opportunities in the Zuni Mountains for the social and economic benefit of local communities and visiting public.

This Plan is a product of the Zuni Mountains Trail Partnership (ZMTP), a collaboration lead by the US Forest Service and made up of representatives from Cibola and McKinley County governments, non-profit youth-focused organizations, and area community members. The Zuni Mountains Trail System project will provide access to the mountains and forests for local youth who will learn stewardship, character and job skills necessary to adapt to the challenges of a changing world. The Plan, Partnership, and project are dedicated to serving as a tangible and visible specimen of the Southwestern Region Sustainable Recreation Strategy; building from a broad-based, strategic partnership into bold and sustainable action that is lead and directed by the US Forest Service.

Further, this Plan acts as a double-edged tool:

- Providing clear guidance for action that facilitates trail, conservation, and recreation development and management within the Zuni Mountains Division of the Mount Taylor Ranger District.
- Showcasing our local ability as a partnership to the US Forest Service and the capacity to support the work on the ground financially, physically, logistically, socially and career-wise -- while always working through US Forest Service's process, adhering to their oversight, and working within their constraints.

In addition to the existing non-motorized trails and trailheads, the desired trail system would add approximately 238 miles of singletrack trail organized largely into stacked loop trail systems with some connecting loops using joint use, motorized two-track routes to connect users back to trailheads. This new system is proposed based on the International Mountain Biking Association's recommended trail rating distribution of a 20/60/20. About 20% of the system is planned for advanced riders, 60% for intermediate, and 20% for beginners. Six new trailheads are proposed to serve this trail system. New stacked loop systems called "sections" would be designated by a trailhead and are prioritized for phased construction over the next several decades, based on usage, local capacity to maintain system, and availability of funding to expand. The highest priority system is the Quartz Hill/Bonita Canyon section followed by the Bluewater sections and expansion of McGaffey sections. Ultimately, the entire Zuni Mountains Trail system would interconnect and be accessible to non-motorized users from various communities surrounding the Zuni Mountains.

The communities of Cibola County and McKinley County have worked for several decades to develop multi-use, non-motorized trails in the area with special attention and desire for mountain bike trails. During that time, despite the lack of a designated trail system, cyclists have been using National Forest System lands including historic grazing and logging routes creating social trail through repeated use. Since 2006, community members have worked to organize a formal partnership with the US Forest Service to make this decades' old dream a reality.

The Zuni Mountains Trail System would become an economic driver through adventure tourism, with the end goal of catalyzing jobs and business opportunities. There is agreement that this project needs to be

systemically phased in, as capacity and resources grow to meet ongoing maintenance needs, as well as, to control promotion, growth, and use to avoid being overwhelmed by the visiting public.

It is also an outdoor classroom to introduce youth to nature, provide experiential learning, and teach work and life skills through programs such as the Youth Conservation Corps, Boys & Girls Club, Future Foundations Family Center, Cottonwood Gulch Foundation, and the National Indian Youth Leadership Project. These organizations and communities are eager to leverage funding sources above the limited resources of the US Forest Service to establish and maintain the Zuni Mountains Trail System.

Long-term goals for the Zuni Mountains Trail System are to develop a sustainable trail network that will earn recognition by the International Mountain Biking Association as a regional “Ride Center” that provides “Gateway Trails” and “Epic Rides” from local communities to the little-known, yet astounding land features and ecosystems of the area. ZMTP members envision the Zuni Mountains as being the backbone for regional and local community development, and that this Trail System matures into the crown jewel of singletrack trail systems in the Southwest.

This plan fits into the US Forest Service’s four “P’s” of the recreation management model: *Provide, Protect, Partner, and Perform*. Execution of this plan will only be completed by stakeholders with oversight and approval at planning, design, and implementation stages by the US Forest Service.

This Plan supports the desired outcome by providing a business case for how this Trail System can be developed and maintained using a combination of youth crews, volunteers, grant sources, and local funding commitments. Initial cost estimates reveal that the project will need to raise over \$4M in outside funding for trail and trailhead construction (over 15 years), while increasing an annual maintenance budget from its current level of about \$40,000 to \$150,000, as expansion occurs. ZMTP strongly believes that these numbers are achievable with minimal USFS in-kind personnel contributions.

This Plan is only the beginning of planning, coordination, and commitments needed for this undertaking, going forward if the Trail System is designated, the ZMTP recommends:

1. Development of a map and table of all **Trail Improvements by Segment** with actual cost estimates (see *Section 6.2*);
2. Development of an **Operations, Maintenance, & Replacement Plan** and **maintenance agreement** with USFS (either stand-alone or as part of an MOU update);
3. As part of the OM&R Plan, establishment of a maintenance **line-item and annual commitment** from both counties that is indexed to system expansion (above in-kind Road Crew support of Trailheads);
4. Securing commitments from regional **Youth Conservation Corps program** and incorporate projects outlined in “Trail Improvements by Segment” and Maintenance projects into annual Work Plans;
5. Establishment a **Project & Resource Strikeforce Team** to time projects with application and funding cycles, as well as, deploy youth crews and volunteer assistance activities as approved by USFS; and
6. Formalize how events and tour businesses will support trail maintenance needs, and although this Plan assumes that **USFS financial commitment** is limited to in-house personnel costs, there may be roles and expertise that USFS can bring to table that the ZMTP does not currently have.

“Renewing Body and Spirit, Inspiring Passion for the Land”

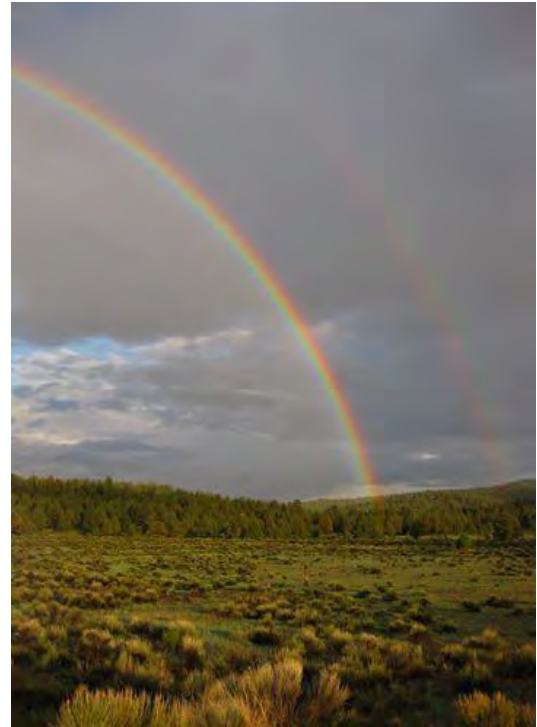
Chapter 1: A Vision of the Zuni Mountains Trail Partnership

This chapter helps to present the purpose and scope of the Zuni Mountains Trail & Conservation Master Plan, the vision for the trail system, key goals and objectives of the Plan, and an overview of the planning process.

1.1 Introduction

Tucked away in beautiful Northwest New Mexico is a charming mountain range called the Zuni Mountains. Mt. Sedgwick, the highest of these mountains, rises 9,256 feet over ponderosa pine forests, colorful aspen lined canyons, and green-topped red mesas. The Continental Divide runs through the middle and the Zuni Mountains have several flowing streams draining large, wet flowering meadows.

Native peoples, conquistadors, early land grant settlers, miners, loggers, and ranchers have come in contact with the land. In the early 1900's, much of the Zuni Mountains range was purchased for watershed protection and placed under the care of the US Forest Service. Forest and meadow conditions have gradually improved since then and Zuni Mountains are once again a jewel.



1.2 Purpose and Scope

The purpose of the Zuni Mountains Trail & Conservation Master Plan is to provide a long-term framework for trails and conservation planning, development, management, maintenance, and funding. This Plan aligns with the intent and goals of the 2014 Southwestern Region Sustainable Recreation Strategy. In that, while all improvements are governed and approved by the US Forest Service, success and sustainable are built on a strong and reliant partnership.

The Plan:

- Offers recommendations for design, development, management, and maintenance of the existing and proposed Zuni Mountains Trail System;
- Details recommendations based on Zuni Mountains Trail Partnership members, IMBA site visit and guidance, National Parks Service-Rivers, Trails, and Conservation Assistance input, and groundtruthing, mapping, and reconnaissance; and,
- Establishes a process for implementation of the Plan, including the specific resources and commitments of Partnership members in advancing and sustaining its goals and objectives.

1.3 Project Location

The **Cibola National Forest** is located in New Mexico and is part of the Southwestern Region of the National Forest System. The Cibola National Forest covers more than 1.6 million acres in New Mexico, with elevations ranging from 2,700 feet to over 11,300 feet.

The **Mount Taylor Ranger District** is comprised of two mountain ranges, Mt. Taylor and the Zuni Mountains, totaling nearly 520,000 acres of National Forest land. Elevations range from 6,500 to 11,301 feet. Mt. Taylor is an area of special religious and cultural significance to several American Indian Tribes and Pueblos. Mt. Taylor and the Zuni Mountains are rich in cultural resources including many historic sawmills and logging communities. The Gallup and Grants area, like much of New Mexico is rich in history.

The Zuni Mountains are located south of US Interstate 40 between Fort Wingate and Grants, and north of NM State Highway 53. This area is framed by the communities of Baahaali (Breadsprings) Chapter, Pueblo of Zuni, Ramah Village, Ramah Navajo Reservation, El Morro, Bluewater, Continental Divide, and preserved lands of Bluewater Lake State Park, El Malpais National Monument and National Conservation Area, El Morro National Monument. The Zuni Mountains are often referred to as the Eastern Zuni Mountains and Western Zuni Mountains, known by users due by predominant transportation access into the range. The range is shared by Cibola and McKinley counties, which has made partnership an important component of this project.

The Mt. Taylor Ranger District has played an important part in the areas' history. The District evolved from additions to the small forest reserves first set aside in 1906. The consolidation of the Grants Ranger District (headquartered in Grants) and the Gallup Ranger District (Ft. Wingate) resulted in the Mt. Taylor Ranger District in July 1974. Forest work has emphasized restoring areas that were heavily logged and grazed in the early 1900's.

Developed recreation areas are located on both the Mt. Taylor and Zuni Mountains of the District. Lobo Canyon and Ojo Redondo Campgrounds and Bluewater Parking Area can be visited free of charge. Quaking Aspen, McGaffey, and Coal Mine Campgrounds are fee areas.

Recreation

The District brought together history and recreation when they developed the Hilso Trailhead, which was named for the historic Hilso Sawmill. Visitors will catch glimpses of the remains of a once thriving sawmill community as they ride through parts of the 26-mile trail system. Hilso was dedicated in 2011 and quickly became a popular location for hiking and as a top-flight mountain biking destination.

The trailhead was developed following years of collaboration between the Mt. Taylor Ranger District and Gallup Trails 2010, county, state and other federal partners. Some of these same partners have joined forces to develop the Zuni Mountain Trail Partnership.

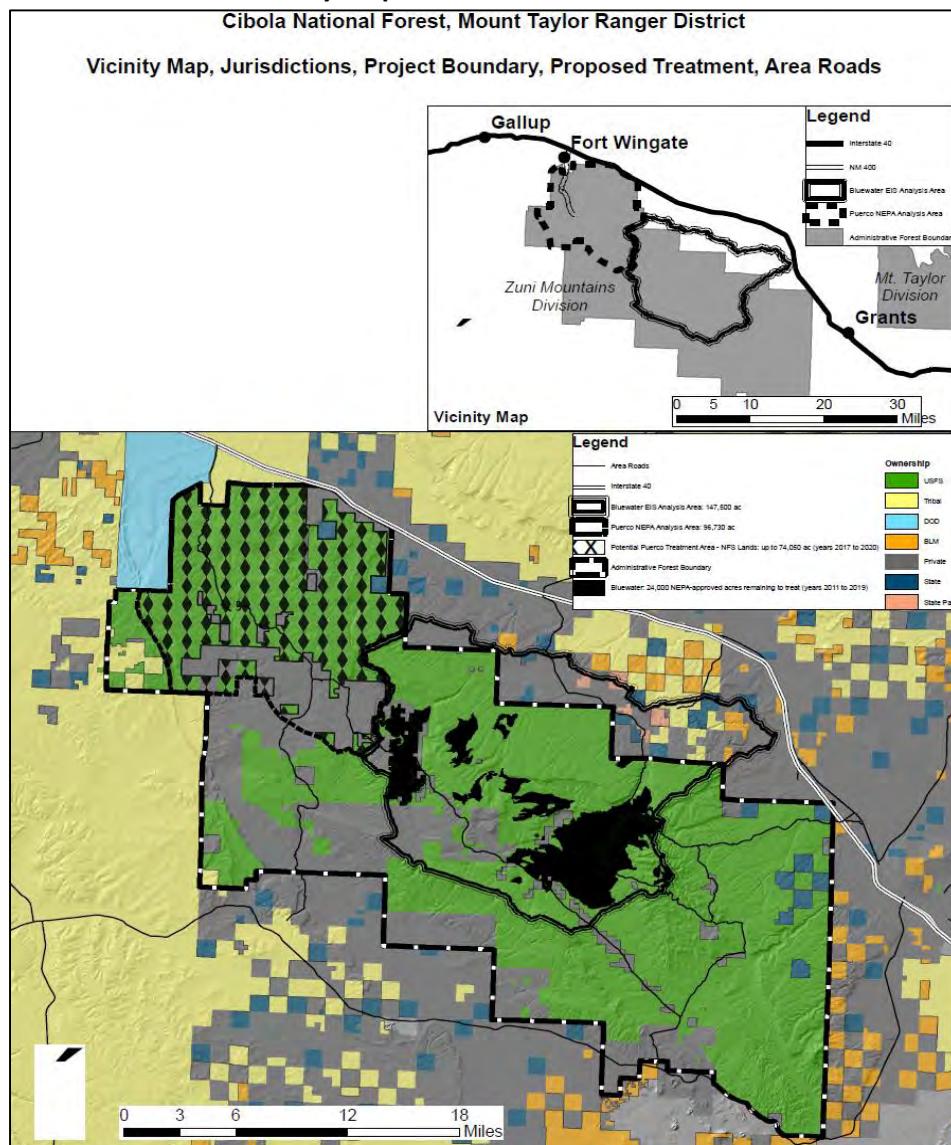


The Zuni Mountains are the focus and project location of Zuni Mountains Trail & Conservation Master Plan. The development of this plan goes back to efforts started in 1994 by recreation enthusiasts and advanced by economic development and forest planning. An asset-based and community driven process has been the key to success; showcased by a timeline of many key milestones.

1.4 Master Boundary Map

Zuni Mountains is comprised of approximately 210,000 acres, with large swaths of Forest lands for holistic land uses including recreation space, and large private land in-holdings used for grazing and agriculture mainly interspersed with family homesteads and several subdivisions (see **Figure 1-1**). This Plan only covers USFS lands and does not plan across any private or other jurisdiction. Further, trails are not planned that would dead-end at private or other land boundaries, to curb any attraction of local users to cross or connect trail experience across these land jurisdictions. If in the future, easements are acquired or landowners desire trail connections, then and only then will they be included into the Zuni Mountains Trail boundary and subject to the standards and guidelines set forth in this Plan.

Figure 1-1: Zuni Mountains Boundary Map



1.5 Vision

The Zuni Mountains are a premier year-round recreational destination with a system of connected non-motorized trails. The Zuni Mountains offer trail experiences for mountain bikers, hikers, and cross country ski / snowshoe users on narrow single-track and double-track routes. Families, novices and expert recreationists have plenty of places to play and enjoy the forest for a half-day or several days at a time. Visitors and near-by residents enjoy close-to home forest recreation through community gateway trailheads encompassing the Zuni Mountains.

This Vision is achieved by:

- A Partnership of Communities — Cibola National Forest, Cibola and McKinley counties, state, tribal and other federal governments, and affiliated interests wanting to improve the quality of life and sustainability of the Zuni Mountains dedicate local, state, federal and grant funding to projects & management.
- The Zuni Mountain Trail Partnership coordinates volunteers and youth corps members for trails and forest health projects.
- Outfitters who offer an array of services and guided tours with facilities which range from primitive forest campsites to full service resort facilities in adjacent communities.
- Surrounding gateway communities that have responded with increased recreation related businesses -- guide services, bike sales, repair and service, lodging, camping, and RV supplies.
- Initiatives by local organizations to plan, design, build and maintain specific trail systems.
- Designing trail experiences for specific user groups.

1.6 Goals and Objectives

With this Plan, the ZMTP seeks to provide for an outstanding and sustainable recreation experience through careful planning, development and implementation; and employ best management and maintenance practices keeping in mind safety, the environment, and historical and cultural resources.

The Goals of the ZMTP include:

- Creation of a multi-stakeholder partnership for sustainable development of the Zuni Mountains region which focuses on conservation and restoration,
- Coordination of public outreach and involvement including community events, public meetings and forums, GIS mapping events, etc.,
- Assistance with development of a public mapping process and on-the-ground information gathering and GIS information integration,
- Development of a Zuni Mountains Master Plan with trail connections and linkages to surrounding communities to provide access to area assets, and
- Identification, inventory, and prioritization of sensitive areas and potential restoration projects, such as closing or rehabilitating unneeded routes, throughout the project area.

The **Objectives** of the ZMTP include:

- Establish a non-motorized trail system for mountain biking and hiking trails throughout the Zuni Mountains that reduces resource impacts from user-created trails. This system would provide a variety of trailheads and associated facilities such as stacked-loop trails and experiences for beginner, intermediate, and advanced mountain bike riders.
- Create new gateway trails that provide close to home recreation opportunities for the public in the Zuni Mountains.
- Create and sustain strong and diverse partnerships that support increased recreational visitation, recreational tourism, economic development, and trail stewardship.
- Enhance forest and watershed health by adhering to best management practices for forest road management (road closures and decommissioning) and new trail development. Old logging road corridors may be utilized by mountain bicyclists and hikers if converted to sustainable single-track routes.
- Heritage resources (mining and historic railroad logging) are abundant and important in the Zuni Mountains. Trails shall be designed to protect heritage resources through routing and/or interpretive opportunities. A properly functioning system will reduce current impacts to historic resources. Establishing the proposed trail system will direct current users away from impacted areas and reduce resource damage. In time, heritage personnel may identify backcountry interpretive opportunities as trail use patterns develop.
- The trail system must address visitor risk and safety by appropriate trail location and design, minimizing road crossings, addressing potential user conflicts by separating non-compatible users, and locating and developing trailheads with user safety in mind.
- The trail system shall respect private property rights. Trails will not be designed to terminate at a private property boundary and trails crossing private property will require legal access.
- Consider and analyze trail routes identified in alternative development as additional corridors. Requiring field analysis (with data supplied for location) will include routes from Twin Springs to Ramah and Pasture Hollow.
- The Partnership must continue to outreach to local tribal governments for stronger relationships. The partnership will build new bridges through programs such as the National Indian Youth Leadership Program and develop communication strategies through tribal members who are interested in trail-related activities such as tribal member health and wellness, forest stewardship, running, bicycling, hunting or gathering forest products.
- Finally, although the Continental Divide National Scenic Trail does not currently traverse the Zuni Mountains, it may become desirable to CDT proponents and land managers to move the trail from the current route on state highways 53 and 117 to this area.

1.7 Project Milestones, a 20-year Legacy

The Zuni Mountains Trail Partnership has a rich and substantial history in terms of planning a non-motorized, multi-use trail system. Here is a timeline of events that have built to the reputation and enthusiasm of this project.

- In the **mi-90s**, local mountain bicyclists had a series of meetings with Mt. Taylor Ranger District staff to explore and propose a mountain bike trail system in the McGaffey area; opening communications and movement onto the USFS's Schedule of Proposed Action (SOPA) process.
- **2002–2004**: Americorps*VISTA arrive with a mission to develop sustainable adventure tourism in American Indian communities.
- **2003**: Mayor Bob Rosebrough invited Congressman Tom Udall to tour the McGaffey area trails, a letter to the Mt Taylor District Ranger requesting assistance in achieving the goals of Adventure Gallup & Beyond and Gallup Trails 2010.
- **2003–2005**: Trail development continued to progress with the efforts of Bill Siebersma and Arnold Wilson through the Mount Taylor Ranger District. A major stakeholder meeting was held at UNM-Gallup that provided momentum to elevate the priority of this project.
- **2006**: The initial Zuni Mountain Trail Partnership was formed as a result of an agreement between the USFS, McKinley County, Gallup Trails 2010, Youth Conservation Corps and AGB.
- **September 2007**: the USFS issued a decision notice and a finding of no significant impact (FONSI) on the proposed 26-miles of trails and a trailhead off NM400 to access these trails. The USFS designated the Hilso trailhead at old mile marker 3 and the first 26 miles of Zuni Mountain trails was authorized as non-motorized, multi-use trails.
- **March 2009**: the McKinley County Commission visited with the New Mexico Congressional Delegation requesting an appropriation to fund the construction of trail systems and supporting infrastructure improvements for the Zuni Mountains Trail System.
- **May 2009**: McKinley County submitted its application to RTP.
- **June 2009**: the award was made by the NM Energy, Minerals, & Natural Resources Department, State Parks, and RTP to McKinley County for \$227,894.00, 20% represented local labor donated by Gallup Trails 2010's 'Shovelman Crew', Expert Design Services of Strider Brown & Bill Siebersma, and McKinley County's staff and Road Crew.
- **August 2009**: ZMTP awarded a grant from National Park Service "Rivers, Trails, and Conservation Assistance" (RTCA) to reconnect outdoor recreation planner, Attila Bality, with the Zuni Mountains Trail Partnership (ZMTP) team to work on developing a master trails and conservation plan for the Zuni Mountains linking a system of trails and creating a world-class Ride Center and Gateway Trails systems.



- **January 2010:** Hilso Trail System, a contract was finalized with Gallup-McKinley County Youth Conservation Corps to complete – (1) improvement of 26-miles of trails, including erosion and drainage controls; (2) fencing the parking lot; (3) developing the trailhead and parking lot; (4) installing signage and way signs; (5) installing a gate and single track cattle guards; and (6) transporting and installing a CXT vault toilet.
- **May 2010:** McKinley County partnered with Ramah Land & Irrigation Company to submit a second RTP grant, which was funded at \$154,331 for construction of 6.1 miles of pristine hiking trail and a trailhead facility adjacent to Ramah Lake.
- **November 2010:** McKinley County joined with Cibola County to submit a grant to Northern NM Resource Advisory Committee for \$150,000 of Secure Rural Schools-Title II monies to provide for NEPA services needed on the proposed trail system.
- **2010-2011:** ZMTP including Cibola County representatives began working on master trail system plan, including kick-off meetings in July 2010, including the formation of ZMTP Master Planning Team, which met monthly to develop data, trail routes, and information for USFS.
- **May 23–May 25, 2011:** ZMTP and its partners contracted with International Mountain Biking Association (IMBA) to complete an area feasibility study and provide community training.
- **June 4, 2011:** Celebrating National Trails day, USFS, ZMTP and over 150 citizens dedicated the Hilso Trailhead/McGaffey Trail System and forged a new Memorandum of Understanding (MOU) to expand the partnership with Cibola County and several key organizations.



Hilso Trailhead

- **March/April 2012:** Executed MOU detailing the roles and responsibilities of the Zuni Mountains Trail Partnership (12-MAR-3723).
- **March 2012:** USA Cycling announced its award to hold the 2013 and 2014 Mountain Bicycling 24-Hour National Championships on the McGaffey Trail System.
- **October 2012:** ZMTP and its partners were selected to present our story at the IMBA World Summit in Santa Fe.
- **October- November 2012:** Zuni Mountains Trail Project Open House meetings held:
 - **Grants, October 29th, Gallup, Nov. 5th, Ramah, Nov. 7th**
- **2012-2013:** McKinley and Cibola Counties selected SWCA Environmental Consultants, working under the direction of USFS staff, to complete an Environmental Assessment for the Zuni Mountains Trail Project.

- **June 15, 2013:** Over 500 riders enjoyed and participated in the 24 Hours in the Enchanted Forest at the 24-Hour National Mountain Biking Championship on the Hilso Trail System.
- **September 21-22:** Gallup hosts Squash Blossom Classic and Levi Leipheimer, US Cyclist, opens the Gallup Brickyard Bike Park. This bike park was inspired by the 2011 IMBA Site Visit report.
- **November 21, 2013:** USFS and SWCA Environmental Consultants held a NEPA Progress Report to announce timeline for finalization Environmental Assessment and potential Decision document, and review draft Trail System alternatives and concerns to date.
- **June 7, 2014:** McKinley County dedicates the Ramah Mormon Pioneer Trail, a hiking trail that circumnavigates the old Ramah Lake.
- **June 14-15, 2014:** Close to 600 racers again duel it out in McGaffey for bragging rights, as again the US Forest Service and Zia Rides host the 24-Hour National Mtn. Biking Championship.



1.8 Planning Process

Momentum for the Zuni Mountains Trail system has been building for over a decade. The people who would later become the Zuni Mountains Trail Partnership worked to create a master trail system development and conservation plan for the Zuni Mountains Division of the Mt. Taylor District of the Cibola National Forest.

Starting in 2009, the ZMTP worked to create a Master Planning Team made up of stakeholders and agencies from the bi-county area. Attila Bality, NPS Outdoor Recreation Planner, assisted the team in developing a comprehensive vision, deliverables, and objectives. This Master Planning Team and ZMTP stakeholders met monthly to discuss and deliberate on topics detailed in this document. Since then the partnership has met 59 times. Early meetings reviewed grants and methods for funding the project. Most were straightforward meetings to sharing history, gather data, map existing use patterns and collectively visualize the desired outcome. About 19 meetings were held to reach out to the general public from the communities in the project area, such as Grants, Gallup and Ramah. Several meetings focused on crafting an intergovernmental memorandum of understanding between Cibola County and McKinley County and the Forest Service. Three of the meetings focused on bringing the International Mountain Biking Association to provide an expert review of the project.



The ZMTP Master Planning Team built and supported the partnership to conserve natural and cultural resources, provide recreational opportunities, and contribute to economic and social well-being of local communities.

The planning methodology and outreach goals led to the following actions:

- Development of communication tools, a website and a Facebook page to publish information and meeting notices, sign-up interested parties and facilitate forums for public input. www.zunimountaintrailpartnership.com
 - Creation of interactive map through Google Earth, to share and add existing and additional trail routes and possible trailheads.
 - Utilization of professional and knowledgeable GIS and trail cartographers (e.g. mappers) to map routes, provide GPS data, and prioritize routes.
- Identified stakeholder groups, perhaps not well represented in the Master Planning Team, and engaged in active recruitment of these important voices. An example was direct outreach and recruitment of representatives from the equestrian user group within the affected communities.
 - The equestrian group was interested in adding a trail system at the Continental Divide, south of Thoreau, but discarded this proposal during their field scoping. The group proposed no other route.
- Held monthly team meetings at public venues open and accessible to all citizens and user groups; also held meeting specifically for many area civic organizations.
- Organized several field trips and an interactive IMBA trail work session to educate area citizens and project team on project locations and trail design, construction, and maintenance practices.
- Worked with USFS staff to communicate and meet one-on-one with tribal entities and private landowners to explain project and document concerns and issues.

See **Appendix A: [Media and Meetings Listing](#)** for all media and ZMTP and public outreach meeting and events for more details on the overall planning and NEPA process.

Document Uses

The Zuni Mountains Trails & Conservation Master Plan is designed for several purposes, including:

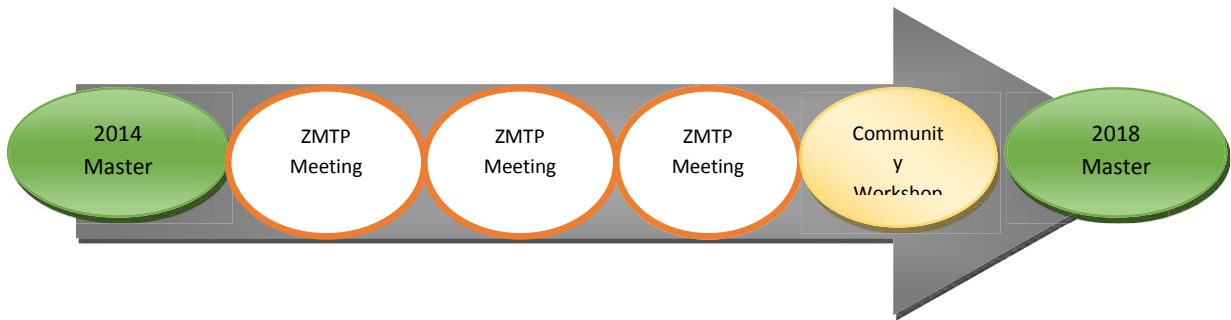
1. Support of the NEPA and Environmental Assessment being prepared by SWCA Environmental Consultants and in support of the USFS decision,
2. To demonstrate partnership efforts and capabilities in trail development and maintenance, financing improvements, volunteer support and manpower, and our project history including sophistication and abilities,
3. Act as stand-alone master plan that guides implementation of the USFS decision and organizes plans, procedures, and work programs for local ZMTP partners, and
4. An ever evolving document that incorporates new information and condition changes, including maintenance schedules and contracted work that is consistent with the USFS decision.

Periodic Updates

It is the responsibility of the partnership to accomplish its goals and vision by following through on strategic planning, identifying opportunities, complying with regulations and guidelines set forth by the US Forest Services and other partners, obtaining approval where necessary, seeking and identifying additional partners and funding sources, and lastly, keeping the public informed regarding the process and developments as well as seeking and utilizing public input throughout the process. The strategic plan will be re-visited periodically, to monitor results, evaluate outcomes, and make adjustments as needed.

The Zuni Mountains Master Trails & Conservation Master Plan will be updated every five years in order to remain current with the needs of the membership, accommodate increases in use, and to allow for adaptive management. The review process diagramed below illustrates how the ZMTP and public outreach meetings will interface with the update process.

Adaptive Management is a process of making minor adjustments to a system as needed to meet goals and objectives. Zuni Mountains Trail Partnership can utilize an adaptive system by engaging active trail users through a continuous process. Zuni Mountains Trail Partnership will meet several times a year, formally or informally, and work with land managers to discuss and resolve trail issues.



Chapter 2: Existing Plans, Capacity, and Resources

This chapter showcases the alignment between the ZMTP planning effort and other local and regional plans and efforts. It highlights key goals and recommendations from local City and County Comprehensive Plans, regional plans, and other planning efforts that have provided guidance and a foundation for the overall vision, goals, and objectives, as well as for planning, design, operation, and/or maintenance of the Zuni Mountains Trail System.

2.1 Local and Regional Plans

A 2001 feasibility study, conducted by Southwest Planning & Marketing, demonstrated that adventure tourism, such as mountain biking, could initially increase tourism spending in Gallup by \$5 million (conservatively estimated), create 120 new jobs and provide substantial opportunities for youth and community recreational and volunteer activity. The research design of this project resulted in significantly increased community support and participation.

The Northwest New Mexico economic development district's Comprehensive Economic Development Strategy Plan (CEDS) 2009-2014 outlines regional strategies to catalyze economic development, create jobs, and to advance sustainable communities throughout Cibola, McKinley and San Juan Counties. **CEDS objective 1.4, tourism**, states that the district will collaborate on regional tourism initiatives by expanding trails on Gallup's to save 250 jobs and create 50 jobs. The CEDS plan designates Adventure Gallup & Beyond as the organization to lead creation of additional adventure sports venues and related small businesses such as bike shops with the goal of creating 10 jobs. This private sector development may initially require public sector support and marketing assistance. The CEDS plan calls for the expansion of master planning for adventure tourism with a dialogue between the US Forest Service and community stakeholders to create the Zuni Mountains Trail System which connects and builds community trails in the Cibola National Forest.

McKinley and Cibola Counties both have developed Comprehensive Plans to guide land-use development and growth. Both plans focus on developing tourism as one key to healthy regional and local economies.

McKinley County's Comprehensive Plan Update or the '360/365' Plan, adopted by the County Commission in September 2012, lays out a Vision which in part calls for healthier people and communities. The Plan also suggests county leaders should promote the enjoyment of living in McKinley County. Specific goals, policies and strategies, listed below, clearly illustrate how the Zuni Mountains Trails System will support the McKinley County Comprehensive Plan.

McKinley County Land Use Goals and Policies

It shall be the goal of McKinley County to promote the wise and sustainable use of lands within the County, providing for an effective balance between preservation, open space, growth and development. The county will review the City's Trails & Open Space Plan and amend and expand, to include all County areas (e.g., the Zuni Mountain Trail System) and expand its role in establishing conservation easements, access agreements, and NEPA review work.

Tourism Goals, Policies & Strategies

It shall be the goal of McKinley County to collaborate with regional partners in the promotion and support of tourism as a major economic driver for the County community.

Economic Development Goals and Policies

It shall be the goal of McKinley County to promote and support the expansion of economic opportunity, an increase in the County tax base and the strengthening of the economic security of County citizens and families. Tourism development, especially in connection with Adventure Gallup & Beyond initiatives.

The Cibola County Comprehensive Plan (2003). This plan was written before the City of Grants and Village of Milan were invited to be stakeholders in the project, however interest can be judged by participation and the plans vision which is to build “a countywide community that appreciates and builds on its unique assets – its natural beauty and the cultural diversity and rich heritage of its citizens;” and one of the specific goals is “promoting Cibola County as a popular destination for regional, national, and international tourists and recreation enthusiasts through enhancing and marketing the County’s points of attraction.”

Specific goals, policies and strategies, listed below, clearly illustrate how the Zuni Mountain Trails System will support the Cibola County Comprehensive Plan.




Land Use Policy – 7, Support development that will enhance economic development, tourism potential, and Cibola County’s attractive, positive image.

Economic Development Policy – 2, Support preparedness for economic development through continuous development of excellent schools and healthcare, fast Internet service, airport services, outdoor recreation opportunities, and other “economic development infrastructure.”

Recommended Economic Development Actions and Strategies: 8) Promote appropriate recreational activities within the Range/Grasslands, Woodlands, Mountains, and Lakes/Rivers/Arroyos that highlight them as destinations along the Scenic Corridors.

The City of Gallup developed a **Gallup-McKinley County Trails & Open Space plan** in 2005 that has been updated and adopted as part of their [2009 Gallup Growth Master Plan](#). This plan says that single track trails for hiking and biking are a priority, especially in the McGaffey Area. It calls for local trails that link to regional trails such as the Zuni Mountain Trails System. Further, the 2010-2014 Statewide Comprehensive Outdoor Recreation also supports trail system expansion at the neighborhood, local, and regional levels.

Adventure Gallup & Beyond, became the organization to plan, develop and promote adventure trails and venues in the region surrounding Gallup. Over a decade of coordination and implementation resulted in some of the best trails and venues in the country and adventure tourism events such as:

	<p>Squash Blossom Classic (biking and running events), Started in 2005, Venue: High Desert Trail System mainly.</p>
	<p>Dawn Til Dusk (12-hour endurance mountain bicycling event), Started in 2005, Venue: High Desert Trail System.</p>
	<p>24 Hours in the Enchanted Forest (24-hour endurance mountain bicycling event), Started in 2010, Venue: McGaffey Area Trail System, of the Cibola National Forest.</p>

In 2013, Adventure Gallup & Beyond measured its progress and economic impact. They produced a 10-year economic impact [study](#) of Adventure Tourism in McKinley County. The highlights of this report include the following key findings that encompass the period of 2002 – 2013 for hikers, bikers, and climbers only. Tourism and outdoor recreation is big business in New Mexico.

<p>Trail Users: <u>289,965</u></p>
<p>Total Spending by Daily Use: <u>\$16,672,988</u></p>
<p>Total Spending by Events: <u>\$952,871</u></p>
<p>McKinley County Combined Spending (Using IMPLAN Multiplier): <u>\$25,592,747</u></p>

Outdoor recreation is big business in New Mexico. According to the Outdoor Industry Association’s 2013 Annual Report, outdoor recreation generates \$6.1 billion in consumer spending, created 68,000 direct New Mexico jobs, generated \$1.7 billion in wages and salaries, and provided \$458 million in state and local tax revenues. This revenue is generated from in-state residents and people coming from out-of-state. The following **Table 2-1** describes the recreation activities that people like to participate in.

TABLE 2-1: Outdoor Activity Participation

Outdoor Activity Participation			
<i>New Mexico Population</i>		<i>National Population</i>	
Trail - running, hiking, backpacking, climbing	41%	Running, Jogging, and Trail Running	19%
Camping - RV, tent and rustic lodging	31%	Freshwater, Saltwater, and Fly Fishing	16%
Wildlife Viewing	31%	Road Biking, Mountain Biking and BMX	15%
Bicycling - road and off-road	23%	Car, Backyard and RV Camping	13%
Fishing	13%	Hiking	12%
Hunting	7%		
Snow Sports - ski, snowboard, snowshoeing	7%		
Paddling	7%		

Source: Outdoor Industry Foundation

Chapter 3: Existing Conditions

This chapter describes the existing Zuni Mountains Trail System, including key destinations, trail types and conditions, signage and infrastructure improvements, and forest health.

3.1 Existing Trails

The following trails are the existing approved trails in the Zuni Mountains, as designated by US Forest Service. While there are historic and scattered users throughout the area that recreate on livestock and game trails and two-track trails, the following are approved use trails, trailheads, and systems.

Hilso Trailhead and McGaffey Area Trail System

Located directly off State Highway 400 South of Fort Wingate is the Hilso trailhead, which provides parking and access to 26 miles of non-motorized single track trails here. An interpretative kiosk at the trailhead provides information on the history of this area and a map of the trails.

Strawberry Canyon Trailhead and Trail

Located just east of the McGaffey Campground entrance where State Highway 400 becomes County Road 50 is the Strawberry Canyon Trailhead. The Strawberry Canyon trail is designed by the US Forest Service as a pedestrian trail with mountain biking, snowshoeing, and cross-country skiing as managed uses. A unique mix of plant life dependent on amounts of moisture found on different slopes, includes ponderosa pine, rocky mountain juniper, one-seeded juniper, and pinyon pine are found here, as well as various shrubs and seasonal flowering plants. This non-motorized, multi-use trail is enjoyed by hikers and bicyclists alike.

The following is a trail system that is just outside of US Forest Service Boundary and is owned by Ramah Land & Irrigation District. The Ramah Land & Irrigation District has provided an easement to McKinley County, which in turn received a Recreation Trails Program grant to construct the trail and trailhead. This Plan does incorporate an addition to this system through USFS land in Pasture Hollow.

Ramah Mormon Pioneer Trailhead and Trail System

Located just east of the Ramah Lake entrance (off Bloomfield Road) and north of State Highway 53 in the Village of Ramah is the Ramah Mormon Pioneer Trailhead. The Ramah Mormon Pioneer Trail designed by Strider Brown and the Gallup-McKinley County Youth Conservation Corps as a pedestrian and hiking trail, offers 6.1 miles of trail and tremendous overlooks of the Ramah Valley. The Ramah section was added after **Figure 6-1** and **Appendix B: [ZMTP Trail System Powerpoint](#)** produced by Tom Mayer. The Ramah Mormon Pioneer Trail portion of the Ramah section was completed June 2014.



3.2 Key Destinations

In total, the proposed trail system will provide access to a number of destinations within the Zuni Mountains, such as:

- ⊗ Quaking Aspen Campground
- ⊗ McGaffey Campground
- ⊗ McGaffey Lookout Tower
- ⊗ Bluewater Creek Picnic Area
- ⊗ Ojo Redondo Campground
- ⊗ Oso Ridge Lookout
- ⊗ Lookout Mountain
- ⊗ Rice Park and Dam
- ⊗ Post Office Flat
- ⊗ Mt. Sedgwick
- ⊗ Pine Tree Overlook
- ⊗ Continental Divide

There are also a number of key destinations, communities, and trail systems that eventually the ZMTP is hoping can be tied in including: Breadsprings (Baahali), Gallup, Grants, Milan, Fort Wingate, Bluewater, El Morro, and Ramah areas, as well as, nationally prominent trail systems, trade routes, monuments, and parks, such as the historic Zuni-Acoma Trail, the Chain of Craters, the Hogbacks, McGaffey Lake, El Malpais National Monument, El Morro National Monument, Mount Taylor, Mount Sedgwick, and the Continental Divide Trail System.




3.3 Trail Types and Conditions

Besides existing trails that are in good condition and meet USFS standards, we have several miles of trails that exist and are mapped in the Zuni Mountain Trail System proposal that were originally “user-created”. User-created trails are defined as social trails that follow historic or well-defined routes developed by repetitive use.

The user-created trails largely follow old access roads, old logging trails, livestock/game trails, and trail tread created through repeated use. On the user-created trails, some problematic trail conditions exist including erosion, flooding of trail segments, destruction of culturally and naturally sensitive areas, trails which cross private land, user conflicts, vegetation overgrowth, and fence crossings. The proposed action and alternatives being analyzed for the Zuni Mountain Trails System would mitigate all of these issues.

In recent years, ZMTP has sought to construct and maintain trails to United States Department of Agriculture Forest Service’s (US Forest Service’s) standards, while infusing the IMBA standards, best practices, and recommendations. We believe that a common-sense balance can both provide for sustainable trails that mountain bike riders will thoroughly enjoy. **Table 3-1** provides a short description of the US Forest Service trail class matrix for trail types 4 through 2, as modified for ZMTP trails. Local deviations from any Trail Class descriptor may be established based on trail-specific conditions, topography, erosion, or other factors, provided that the deviations do not undermine the general intent of the applicable Trail Class.

TABLE 3-1: Trail Class Matrix


Class	Trail Class 2 Moderately Developed	Trail Class 3 Developed	Trail Class 4 Highly Developed
Trail Attributes	<ul style="list-style-type: none"> • Tread continuous and discernible, but narrow and rough • Single lane with minor allowances constructed for passing • Typically native materials • Vegetation may encroach on trail • Obstacles common and substantial • Trail signs at junctions • Structures limited and adequate to protect trail infrastructure and resources 	<ul style="list-style-type: none"> • Tread continuous and obvious • Single lane, with allowances constructed for passing where required by traffic volumes in areas with no reasonable passing opportunities available • Native or imported materials • Vegetation cleared outside trailway • Obstacles common • Trail signs for assurance • Structures may be common 	<ul style="list-style-type: none"> • Tread wider and smoother • Single lane, with allowances constructed for passing where required by traffic volumes in areas with no reasonable passing opportunities available • Native or imported materials • Vegetation cleared outside trailway • Obstacles infrequent • Trail signs & structures common
Picture Examples			
Surface	<ul style="list-style-type: none"> • Native, limited grading • May be continuously rough • Sections of soft or unstable tread on grades < 5% may be common 	<ul style="list-style-type: none"> • Native with some onsite borrow or imported material where needed for stabilization, occasional grading • Intermittently rough • Sections of soft or unstable tread on grades < 5% may be present, but not common 	<ul style="list-style-type: none"> • Native, routine grading with improved sections of borrow or imported materials • Stable with minor roughness

3.4 Signage and Infrastructure Improvements

The ZMTP has worked closely with US Forest Service staff to develop trails, trailheads, and other improvements per USFS standards.

The following items are in place at the Hilso Trailhead and on the McGaffey Trail System, or are referenced from other Federal parks and amenities. The trail intersection signs were designed by Bill Siebersma of Gallup Trails. These improvements were funded by a Recreational Trails Program (RTP) grant.

TABLE 3-2: Signage and Information Specifications

<p>Boundary Fencing</p>	
<p>Toilet Double Vault (14'4"X11'11")</p>	
<p>Bike Cattle Guards</p>	
<p>Cattleguard</p>	

Trail Information Kiosks:

Information kiosks are recommended at all trailheads. These signs can provide the universe of information including a trail map, distances to destinations, trail conditions, trail difficulty rating, connection with area amenities, and regulatory and safety information (trail rules, etc.). Trail kiosks should display the trailhead name to allow users to better identify their location within the trail system. The kiosk will be made to USFS standard.



Interpretive Signs:

Interpretive signs communicate specific messages to visitors, such as information on cultural, environmental, or historical resources. They are most commonly used for self-guiding trails or for wayside exhibits at points of interest, such as viewing areas and resource management areas. The ultimate goal is to convey stewardship in the minds of the users. Potential interpretive signage locations include along the Nature Loop and at scenic vistas. The information provided at each interpretive installation should be based on the experiences, knowledge, and interests of its expected audience.



Bulletin Board:

USFS standard, two-sided Bulletin Board with trail and area information.



USFS Standard Recreation Information Signs:

USFS standard providing information on Trailhead location and prohibited use advisements.



Trail Identification Markers:

Carsonite signs, 5', brown with various decals

Information to be displayed could include the name and/or color designation for the trail, a jurisdictional branding element (such as ZMTP), and whether the trail is multi-use or a user-preferred trail.



ZMTP Trail Directional and Intersection Signs:

These are typically placed at trail junctions (also called decision points) to guide trail users toward a destination or experience. Directional signs are recommended where named trails intersect.



Trail Counters

ZMTP is looking at installing both infrared and bike counters near trailheads to get a sense of use and types to assist with maintenance and economic impact reporting. The system shown here is TRAFx G3.



3.5 Forest Health

This Plan also aims to track and report on progress with conservation efforts in the Forest, and coordinate with these activities to provide for overall forest health.

Zuni Mountains Collaborative Forest Landscape Restoration Program

Mt. Taylor Ranger District has sought collaborators to help manage other areas of the district. A mutual concern about high fire risks, the need to restore a culturally important landscape and watershed, and the desire to support local forest-based industries led to the development of the Zuni Mountain Collaborative Forest Landscape Restoration Program (CFLRP). This program has received several grants to restore the Zuni Mountain landscape to historic vegetation conditions using thinning and prescribed fire. The materials from the thinning will provide firewood for personal use and commercial contracts. When completed, the landscape will have fewer but larger trees and more open areas to allow grass and herbs to recover. This will increase resilience to climate change and may increase water availability. Overarching goals are to restore forests to increase their resiliency to wildfire, drought, insects and diseases, and climate change while maintaining biodiversity and ecosystem function.

Benefits of the Landscape Restoration Strategy:

- Reduce high fire risk and improve forest health on 56,000 acres
- Achieve over \$30 million in wildfire suppression cost savings
- grow local forest-based businesses and create and sustain over 90 jobs
- Protect wildlife habitat and threatened and endangered species populations

In terms of progress, the Bluewater Watershed CFLRP project area is probably 70% complete with 100% completion by 2018i-9. Initial controlled burns are underway and will continue through 2020. After that there will probably be a decade of maintenance burns to keep the restore forests in a resilient condition.

For the Rio Puerco project area, NEPA will formally begin in 2015 with an expected decision in early 2016. Implementation would then be from 2016-2026 depending on funding.

Travel Management Plan

In April 2011, the Travel Management Plan was approved and established a network of useable roadways for motorized travel. This plan will dramatically reduce damage in the forest and provide opportunities to reclaim decommissioned routes as potential non-motorized trails. New mountain bike trails would provide a high quality and challenging mountain biking opportunity to the public while improving watershed conditions. The associated facilities would also be designed and located to improve wildlife habitat, watershed conditions, and forest health. Unauthorized trails and unneeded roads in sensitive or impaired areas would be closed and rehabilitated. Over 160 miles of unauthorized routes that have not been designated for motorized travel could be closed or decommissioned.

Watershed Restoration and Protection

There have been several projects of note in terms of watershed restoration along the Rio Puerco and Bluewater Creek areas, and protection of the habitat of the National Endangered Species, the Zuni bluehead sucker fish.

Chapter 4: Zuni Mountains Needs Analysis

This chapter summarizes benefits of trails, Zuni Mountains trail user groups, and ZMTP membership input gained during the planning process. The Zuni Mountains trail system is multi-use which provides for all types of non-motorized users on all trails with the exception of equestrian. Equestrian interests were involved in the planning process, but it was decided that due to soil conditions having equestrian users on the proposed system would not be sustainable. This Plan recommends that the US Forest Service should consider facilitating a separate planning process to meet these needs and interests.

4.1 Background and Assessment

The Mount Taylor Ranger District provides recreational opportunities for mountain biking, hiking, backpacking, equestrian, hunting, and picnicking, winter sports, outdoor learning, interpretation, bird watching, and motorized trails. Despite the strong multi-use focus present, area community members indicate that there is a need for a trail system to accommodate increased local use and tourism. On the ground, the need is reflected by the development of user-created social trails; however, these trails have been constructed without any environmental analysis. Many miles of this user-created trail is considered sustainable, many are not. In the decade following approval, this project will systematically work to address those problems.

In 2011, IMBA Trail Solutions was contracted to review opportunities and needs in the Zuni Mountains. A full copy of their report and recommendations can be found in **Appendix C: [ZMTP Site Visit Report](#)**.

This report indicates the potential of the Zuni Mountains for attracting mountain bikers from the region and eventually internationally. This report documents the need for trails and a trailhead within a short commute of Grants and Gallup to establish an adventure tourism draw. This report provides the initial prioritization of trail possibilities on the east side, and was one of the catalysts to develop this Plan.

In 2014, the Southwestern Sustainable Recreation Strategy Team created a strategy (**see Appendix D: [Southwestern Region Sustainable Recreation Strategy](#)**) to help the region build a recreation program that is vital to the well-being of our visitors and communities and is essential to the future of the Forest Service and the National Forest and Grasslands. This strategy describes the large performance gap between forest use and population growth coupled with growing outdoor recreation demands. This Plan is an attempt to prove that the innovative strategy and partnership approach laid out in this strategy can be achieved. The ZMTP believes that our proposed Trail System can be model used throughout the Southwest region to achieve sustainable recreation goals of the US Forest Service and other State and Federal agencies.

4.2 Benefits of Trails

Benefits of Trails. A well-planned trail system benefits the surrounding communities in many tangible and intangible ways. US Forest Service succinctly details these benefits as:

- Conservation of the natural environment, native species and wildlife corridors;
- Alternative to motor vehicle travel by linking to other trail systems and open spaces;
- Access to remote areas;
- Increased opportunities for physical activity and outdoor recreation;

- Increased property values and benefits to the local economy

4.3 User Groups

The non-motorized trail user groups include foot travel users, mountain bikers, equestrians, and winter sport enthusiasts. The trails are primarily used in the spring, summer, and fall; however, there is an increasing number of winter time uses including snowshoeing and cross-country skiing depending on seasonal snowfall.

Foot Travel Users – hikers, runners, walkers – currently constitute the largest user group on the Zuni Mountains existing trails. Hikers are the most flexible trail users and adapt to the broadest range of trail designs. Traveling by foot allows hikers to adjust to varying trail conditions, travelling over trails that are extremely steep or barely evident. Hiking trails generally traverse all types of environments, grades, and surfaces. While people on foot can impact the trail and surrounding resources, upgrading or adding structures to manage impacts of a hiking-designated trail is less problematic than for equestrian or mountain bike trails.

Mountain Bikers

While Strawberry Canyon and Ramah Mormon Pioneer Trail systems were designed for hikers, the ZMTP has placed a large focus on accommodating and creating trails that are focused on their experience. Zuni Mountains mountain bikers can be characterized as cross country mountain bikers and trail riders. Cross country mountain bikers generally prefer riding point-to-point or in a loop that includes climbs and descents on a variety of terrain. Recreational mountain bikers prefer to bike on single-track trails. Several popular mountain biking routes exist on the western side of the Forest, including the Hilso Trailhead and McGaffey Trail System, which offered the backdrop for the 2013 and 2014 World Mountain Bike Championships (24-Hours).

Equestrians

There is a long history of equestrian use in the Zuni Mountains region. Most of the equestrian users have developed preferred areas away from other users, and there are several cross-country rides throughout the region. Equestrian trails have a more demanding set of requirements than hiking trails including a greater line of sight to give the animals a chance to react to objects and other trail users. Horse and rider also constitute the largest sized user on most trail systems. Metal horse shoes create additional pressure on the trail surface.

Cross Country Skiing, Snowshoeing, and Other Non-motorized Winter Users

Currently, there are not a large number of users due to inadequate amounts of snowfall and unpredictability of snowfall. There are pockets of users when conditions are favorable. There was some discussion about developing facilities for these users at ZMTP meeting.

4.4 Member Input

Throughout the planning process, members provided a strong case both economically and socially for developing additional singletrack, non-motorized trail designed for mountain bikers. Notes from these meetings can be made available, but overall members expressed a desire for more trails and trail connections for longer “Epic Rides” that would attract visitors and tourists. There are a number of sections in this plan that help to detail the input of the ZMTP members.

Chapter 5: Design Guidelines

This section summarizes the design guidelines that are recommended by the US Forest Service through its US Forest Service Trail Construction and Maintenance Notebook and by the International Mountain Biking Association.

5.1 USFS-IMBA Trail Standards

The Zuni Mountain Trail System would be designed in a way to meet the needs of the beginning, intermediate and advanced mountain bikers while meeting Forest Service requirements for sustainability designing, constructing and maintaining trails that provide important benefits to visitors and communities, protect natural, cultural and social resources, and minimize annual and deferred maintenance needs. For example, building trails with the contours so that the tread won't be eroded away by water and use; trails that won't affect water quality or the natural ecosystem; trails that meet the needs of the intended users and provide a positive user experience and; trails that do not harm the natural environment. To this end, Forest Service tools and techniques such as Trail Management Objectives and Trail Fundamentals would be used to meet the International Mountain Biking Association standards for enjoyable riding experiences. Publications such as recent editions of the Forest Service *Trail Construction and Maintenance Notebook (2007)* and *IMBA's Guide to Building Sweet Singletrack: Trail Solutions (2004)*.

TABLE 5-1: The Sustainable Solution

- ❖ Outsloted Tread
- ❖ Sustainable Grades
- ❖ Frequent Grade Reversals
- ❖ Erosion Resistance
- ❖ Path that traverses along the sideslope
- ❖ Provision for sheet flow of runoff
- ❖ Positive User Experiences
- ❖ Low maintenance

This equals = the Rolling Contour Trail

USFS Trail Construction & Maintenance Notebook 2007

Those standards are summarized in the surrounding tables.

TABLE 5-2: 11 Essential Elements of Sustainable Trails

- | | |
|--|---|
| 1. Trail Location: Sidehill trails are best | 2. Outslope: ensures good sheet flow |
| 3. Sustainable trail alignment: avoid the fall line | 4. Adapt trail design to soil conditions |
| 5. Half Rule: guides trail alignment | 6. Minimize user caused soil displacement |
| 7. Sustainable Grade: Follow the ten percent average guideline | 8. Prevent user-created trails |
| 9. Maximum sustainable grade | 10. Maintenance |
| 11. Grade Reversals: Gets water off the trail | |

Managing Mountain Biking; IMBA's Guide to Providing Great Riding

5.2 Trail and Trailhead Standards

The recommended trail types further refine the existing trail types, incorporating local conditions, topography, and user group needs. The trail types are roughly consistent with the High Desert Trail System outside Gallup, NM. The Plan recommends Type 3 USFS class trail type, but understands that in many places Type 2 and Type 4 may need to be constructed to accommodate safety, sustainable trail development, and trail connectivity. Rather than a multi-use trail design that offers either a wide double-track trail where users can pass or walk side by side, or wide singletrack trails with passing pull-outs, this trail will be classified as singletrack.


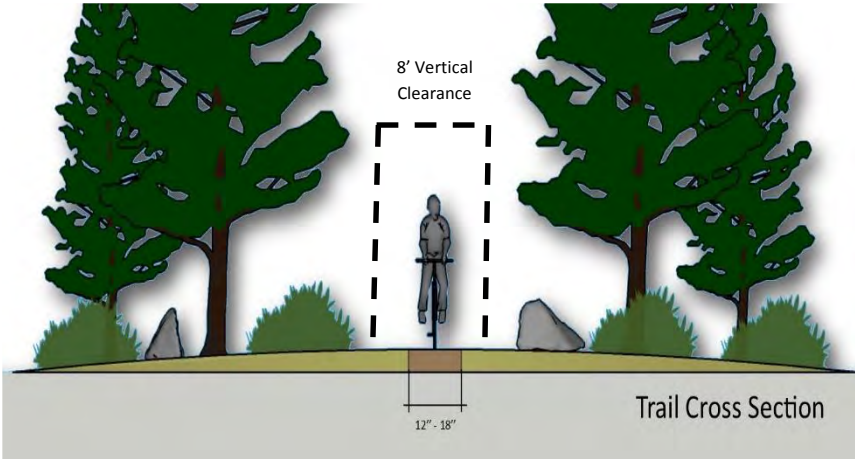
Type 3: Mountain Biker and Hiker Preferred. This narrow single-track trail type is designed to meet the needs of hikers and mountain bikers.

The trail types incorporate the following maintenance best practices for sustainable trails:

- **Trail Grade:** Grade is the elevation gain between two points divided by the linear distance between them. It is expressed as a percentage. The “Half Rule” is a general guide for trail grading such that a trail should not exceed half the grade of the hillside it traverses. The recommended average grade for recreational trails is between 5 and 10 percent. Trails with greater difficulty can reach grades of up to 15 percent with sufficient armoring and reinforcement. Trails over 25 percent are not recommended.
- **Outsloping:** Outsloping is a common practice used to increase drainage off trails whereby the downhill or outer edge of the trail tread is tilted slightly downwards away from the high side. Recommended outslopes vary from 3 to 8 percent.
- **Vertical Clearance:** Vertical clearance should be adequate to allow trail users to pass underneath trees. The recommended space from trail tread to vegetation should be 8 to 12 feet. If more than half of a tree must be pruned for clearance, then it should be removed.
- **Horizontal Clearance:** Along narrow trails, both the US Forest Service and IMBA trail standards recommend vegetation should be cleared approximately three feet either side of the center. On a heavier used trail the corridor can be up to 16 feet wide. On moderate to steep side slopes users traveling along the outer or lower edge of the trail can cause tread failure; therefore vegetation should be cut on the uphill side of the trail to encourage users to stay to the high side.
- **Sustainability of the natural environment:** The natural aesthetic is an important factor in designing and maintaining trails. The trail should “lie lightly on the land”, as if it had always been there. Trail builders must take advantage of features in the landscape for drainage.

For purposes of this Plan, the ZMTP has chosen to further describe and illustrate the Type 3: Mountain Biker and Hiker Preferred trail type as shown on next page in **Table 5-3**.

TABLE 5-3: Recommended Trail Type 3

Trail Type	Type 3: Mountain Biker and Hiker Preferred
Overview	User preferred trails are multi-use, but designed to meet the needs of one or multiple trail user groups. These standards would be implemented along with trail mapping and signage to communicate high use by one or more user groups. Wider passing spaces would be provided as determined needed.
Photo	
Cross Section	
Tread Width	12" to 18"
Horizontal Clearance	3' to 4'
Vertical Clearance	8'
Surface	Native soil and rock
Average Grade	</=10%
Max Grade	25%
Outslope	3 to 8 %
Climbing Turn Radius	>7'
Switchback Turn Radius	2' to 8'

ADA Considerations

ZMTP strives to meet the needs of a broad range of users, including those with physical and cognitive impairments. Oftentimes, constructing outdoor trails includes challenges that make meeting ADA guidelines difficult and sometimes prohibitive. Prohibitive impacts of meeting ADA standards include harm to significant cultural or natural resources, a significant change in the intended purpose of the trail, requirements of construction methods that are against federal, state or local regulations, or terrain characteristics that prevent compliance. The CXT vault buildings comply with the Architectural Barriers Act Accessibility Guidelines, Sweet Smelling Technology vault toilet buildings.

As stated in the ADA Guidelines, every effort should be made to install and maintain accessible trails. To this end, the Guidelines contain standards for accessible trails such as maximum running slopes, minimum width and frequency of resting spaces, maximum acceptable gaps in the trail surface, optimal clearances and signage requirements. The Guidelines further state that accessible trails should represent the most significant features and environmental experiences unique to the area.

Drainage and Erosion Control

Erosion control is necessary to maintain a stable trail surface. The goal is to outslope the trail so that water sheets across it, instead of down its tread. Grade reversals are the preferred way to mitigate trail erosion because they do not present barriers to users.

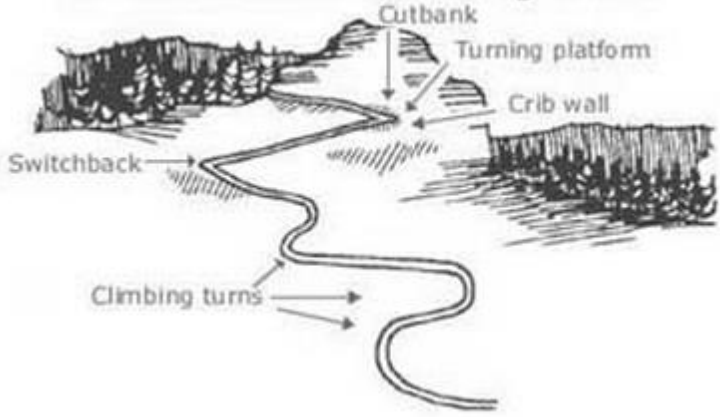

A grade reversal is an undulation within the trail tread: a short dip followed by a rise. This grade change in the tread catches water at the low point and diverts it off the trail. Grade reversals can be traversed by all users and require little maintenance once installed. When not incorporated into the original construction of the trail, there are two techniques available to retrofit them into the tread:

- **Knick:** In soils with a high displacement factor, a grade reversal should be accomplished by removing a wedge of soil to create a dip in the tread.
- **Rolling Grade Dip:** This technique uses the soil excavated from the low section of a trail to build up the entrance and exit to the dip. Ideally dips use natural features, such as trees or rocks, as landscape anchors.

Rolling grade and grade reversals are preferred to other mechanical methods of routing water off of trails such as water bars, check dams, and culverts because they do not present a barrier to users. The ZMTP advocates that original construction provide for proper drainage and erosion control features. Building proper trails at the offset will help reduce maintenance costs over the short and longer term, and thus we plan to utilize a formula (as appropriate and allowable) of 40% grade reversals, 40% rolling grade dips, and 20% knicks throughout development of the trail system.

Techniques for Gaining Elevation

Switchbacks and climbing turns are used to reverse the direction of travel on hillsides and to gain elevation in a limited distance. Trail designers should make every effort to minimize the use of these turns. Planning carefully to avoid impassable or very difficult terrain reduces the need for switchbacks and climbing turns. A climbing turn is a reversal in direction that maintains the existing grade going through the turn without a constructed landing. A switchback is also a reversal in direction, but has a relatively level constructed landing. Switchbacks usually involve special treatment of the approaches, barriers, and drainages. They are used on steeper terrain, usually steeper than 15 to 20 percent. Both of these turns take skill to locate and are relatively expensive to construct and maintain.

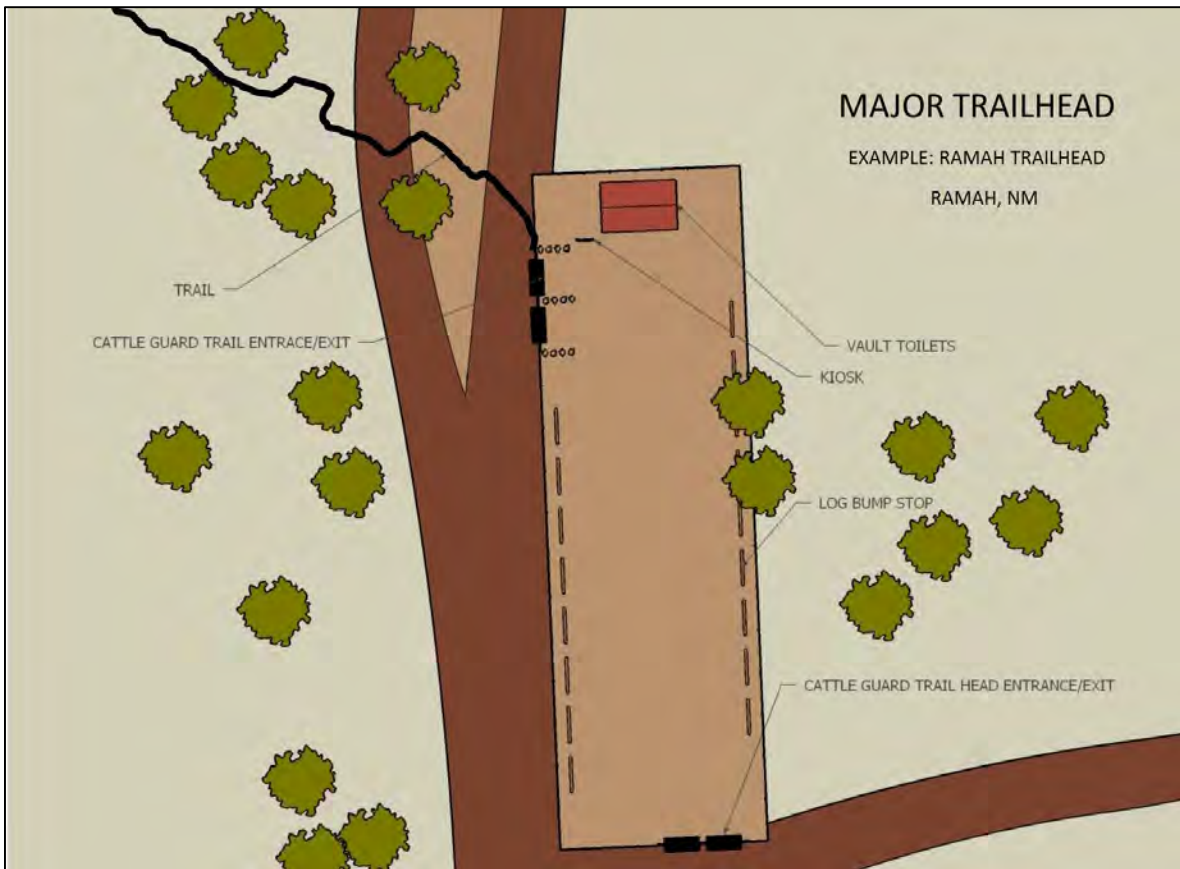
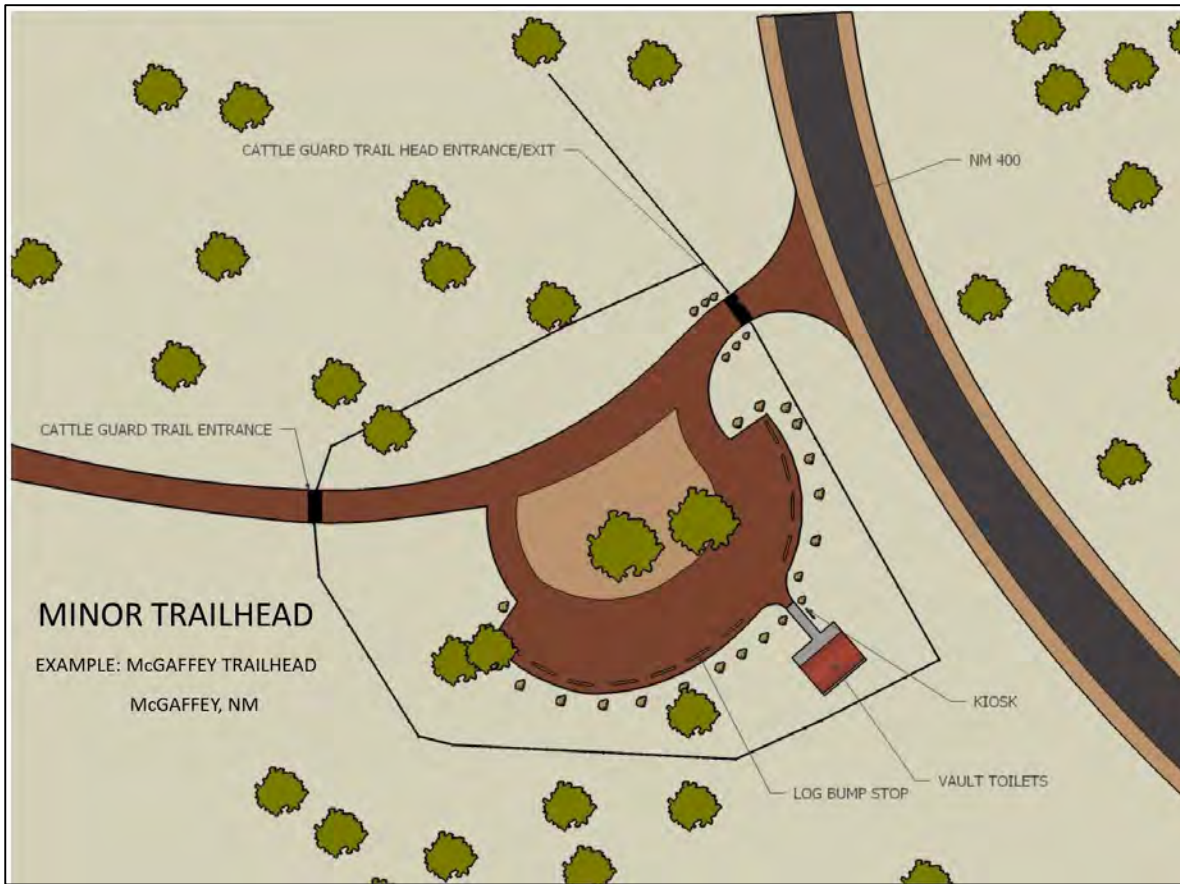
<p style="text-align: center;">Switchbacks and Climbing Turns</p> 	<p>Climbing turns can be built on gentler slopes whereas switchbacks are needed on steeper slopes.</p> <p>(Source: http://www.fhwa.dot.gov)</p>
	<p>Fewer, long switchbacks are preferable to frequent short switchbacks.</p> <p>(Source: http://www.fhwa.dot.gov)</p>

Trailheads

Good access to a trail system is a key element for its success. Trailheads serve trail users by car, transit, bicycle or other modes. Trailheads provide essential access to the trail system and include amenities such as off-street parking for vehicles, bike parking, a kiosk, signage, and interpretative and wayfinding bulletins. A user information area should be provided for any informational signs or other supporting facilities, backed with native vegetation, rocks and fencing if necessary.



The ZMTP plan to use two general types of trailheads designs that have been constructed and utilized successfully for the Hilso Trailhead, which we refer to as a minor trailhead, and the Ramah Trailhead, which we refer to as a major trailhead.



Signage and other infrastructure improvements are described in **Table 3-2** above.

Chapter 6: Recommendations

This chapter provides ZMTP recommendations for developing the Zuni Mountains Trail Systems, including improvements to existing user-created trails, proposed new trails, transforming de-commissioned motorized routes (closed under the Travel Management Plan) by re-purposing them for non-motorized trails, and joint use two-track trails. **Figure 6-1** was an initial map used to detail these types of trail improvements.

6.1 Overview of the Proposed Trail System

To realize the potential economic, social, and environmental benefits described above, the partnership recommends that approximately 238 miles of singletrack trail be added to the National Forest System in the Zuni Mountains. An additional 31 miles of connecting routes could be established and signed properly to loop back to trailheads via joint use routes, e.g. system road or two-track motorized trail.

The trail system would be modeled to reflect IMBA's recommended trail distribution by user class (beginner, intermediate, and advanced). Thus, a 20/60/20 spread designates 20 percent of system trails for advanced riders, 60 percent for intermediate riders and 20 percent for beginning riders. Development of the system would occur over the next several decades as the partnership attracts funding and investments, other partners, and can sustain maintenance responsibilities. Systems would be constructed in order of priority listed in *Section 8.3*.

<p>20/60/20 Trail Rating Distribution</p> <p>20%: Advanced riders</p> <p>60%: Intermediate riders</p> <p>20%: Beginner riders</p> <p>IMBA's formula provides for the best return on investment and use.</p>

Immediately following the Plan, there are nine maps that detail the desired Zuni Mountains Trail System and each section of the System. The first map, the Zuni Mountain Trail system map, features all of the trails. The Bluewater section and all trails to the East are considered and referred to as the eastside system trails and the Twin Springs section and all trails to the West are considered and referred as the westside system trails. **Figure 6-1** summarizes the entire system, including the 238 miles of new National Forest System trail, including an additional 31 miles of connecting loops which use National Forest System two-track roads or motorized trails.

Sustainable Trail Design

Sustainable trail design allows for a high-quality recreational experience for trail users and protects the natural beauty and environmental integrity of the region. These trails have little impact on the environment; resist erosion through proper design, construction, and maintenance; and blend with the surrounding area. Sustainable trails also appeal to and serve a variety of users. Further, the ZMTP philosophy encourages trail alignment to avoid heading users toward or near any historic or cultural site.

Multi-Use Trail Types

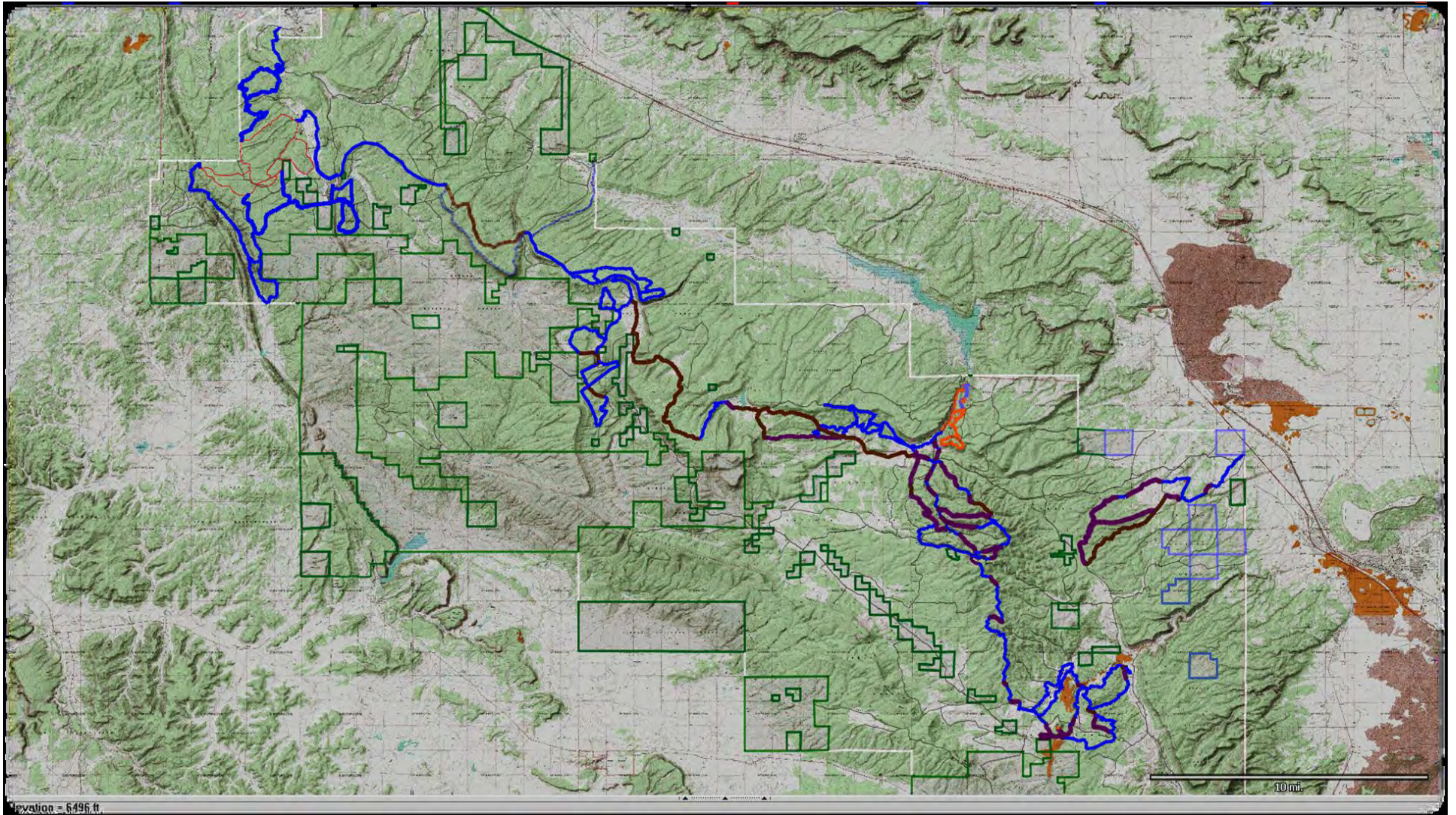
ZMTP is recommending Type 3 trail type that is designed for the primary use and enjoyment of mountain bikers and secondarily foot users. While the proposed system will cater to this experience, these trails

should remain multi-use for all users, except equestrian due to our soils, protection of trails, and sensitive resources. This fits with the current user base and aligns with US Forest Service management practices. Users will gravitate to trails that provide them with the experience that they are desiring.

Equestrian Trails

While equestrian trails are not part of the ZMTP's vision, the recommendation would be for the US Forest Service to separately plan and provide equestrian opportunities and backcountry loops in the future.

Figure 6-1: ZUNI MOUNTAIN TRAIL SYSTEM BREAKDOWN OF CONSTRUCTION TYPES



Color Key: Blue - new construction; Purple - on existing road or trail (non-designated); Brown - shared with designated motorized

6.2 Trail Improvements to the Zuni Mountains Trail System

This section provides an overview of the planning and recommended trail section improvements compiled by the ZMTP. Since the Environmental Assessment, specialty reports, and record of decision were not finalized at the time of this Master Plan, it is recommended that the ZMTP further breakdown and map all trail improvements by segment. This chart shown below will provide a much more detailed segment by segment description, actual designed on-the-ground improvements, and more exact costs for each segment within the overall Trail Sections.

Recommended Trail Improvements by Trail Segment

Trail Section	Trail Marker/GPS Coordinates	Length (LF)	Proposed Trail Type	Recommended Improvements	Additional Study Needed?	Design Needed?	USFS Approval?	Total Cost Estimate
					Y/N	Y/N	Y/N	

Existing Trails

This Plan recommends improvements to existing trails which would result in converting user-created trails into Type 3 trails. These user-created trails are not badly laid out, but in most cases are in need of re-routes, grade reversals, and drainage structures to become sustainable trails. The mileages of trails to be converted are shown in **Table 6-1**. Since the proposed action on the Trail System has not occurred these numbers are our best estimate based on initial planning, mapping, and NEPA work.

TABLE 6-1: Proposed Upgrade of Existing Trails, New Trails, and Reclaimed Trails

Trail Section	Total Miles	Existing Trail	New Trails	Reclaimed Trails
Quartz Hill/Bonita Canyon	30.1	0.0	20.1	10.0
Bluewater	45.6	9.1	15.7	20.8
McGaffey	25.7	20.5	5.2	0.0
Milk Ranch	21.4	16.2	2.5	2.7
Ramah/Pasture Hollow	13.7	6.1	5.5	2.1
Ojo Redondo	39.6	0.0	20.0	19.6
Twin Springs	43.0	8.6	30.4	4.0
Limekiln	19.5	0.0	12.2	7.3
Total	238.6	60.5	111.6	66.5

NOTE: The additional 31 miles on joint use routes is not included.

New System Trails

This Plan proposes building approximately 111.6 miles of new trails as identified in **Table 6-1**. Once the proposed action is determined, these trail sections will need to be thoroughly broken down by trail segment, mapped, and evaluated as to what trail type (2, 3, or 4) is needed at each segment.

Terrain Features

The Zuni Mountains Trail System sees and expects a great deal of mountain bike use. Every year banked turns and jump features appear on the trail system. This indicates an interest in freestyle mountain biking. While the character of Zuni Mountains does not support a freestyle bike park, there is a need for some further discussion.

One of the missing features required for an IMBA Ride Center designation is having a downhill course. Similar to a ski resort, downhill trails provide the user a lift service back to the top. Based on member input, one concept would be to upgrade several trails on the designated Hilso System, namely Berma and Stuck Truck trails, into gravity and flow trails with raised crossings to create downhill opportunities. Forest Road 481 provides a motorized opportunity to return riders to the top of these gravity trails for repeated use or “runs”.

Shared Two Track or Reclaimed Routes

Originally, the ZMTP wanted to build predominantly all new singletrack trails to connect across the Zuni Mountains. It has become apparent that in certain areas two-track roads offer the ability to access and connect to singletrack trails and key destinations, so they have been added into the mix. The other concept brought up by the US Forest Service was to take routes that have been closed due to the Travel Management Plan and convert those to singletrack, non-motorized trails, as part of the system shown in **Table 6-1**. Again once the proposed action is determined, these trail sections will need to be thoroughly broken down, mapped, and evaluated as to what trail type (2, 3, or 4) is needed at each segment.

Trail and Road Rehabilitation Standards

Trails and Roads would be rehabilitated to Forest Service standards, such as those described in Forest Service Manual 7700 and Forest Service Handbook 2309.18. Roads and user developed trails not designated for use will be rehabilitated. Rehabilitation would include but not be limited to lopping and scattering trees cut on site, ripping, re-contouring and reseeding, placing boulders or other physical barriers, fencing.

6.3 Trailhead Improvements to the Zuni Mountain Trail System

This Plan recommends that ten (10) trailheads (7 minor & 3 major) are needed throughout the Zuni Mountain Trail System initially. As we document use and demand at these trailheads and as funding becomes available, these trailhead can be improved, enlarged, or new ones can be designed, cleared, built, and added. Major trailheads, as defined in *Chapter 5: Design Guidelines*, may include vehicular and bicycle parking, bathrooms, fencing, a kiosk, signage, and interpretative and wayfinding bulletins. Minor trailheads would provide similar amenities, but involve less parking and a smaller footprint.

Currently, two minor trailheads exist at Hilso and Strawberry Canyon and two major trailhead exists at McGaffey Lake and Ramah Trailhead. This Plan proposes construction of six (6) new trailheads, as part of the Zuni Mountains Trail System proposal, as listed in **Table 6-2** and based on the trailhead design standards shown in *Section 5.1*.

TABLE 6-2: Proposed Trailheads

#	Trail Section	Trailhead
1	Strawberry Canyon	Minor Trailhead Exists (minor improvements needed: Bulletin Board and Parking Stops)
2	McGaffey Lake	Major Trailhead Exists
3	Hilso Trailhead	Minor Trailhead Exists
4	Quartz Hill/Bonita Canyon	Minor Trailhead Planned
5	Bluewater	Upgrade into a Major Trailhead Planned
	McGaffey	No Additional Trailhead Planned at this time
6	Milk Ranch	Upgrade into a Minor Trailhead Planned
7	Ramah\Pasture Hollow	Major Trailhead Exists
8	Ojo Redondo	Minor Trailhead Planned
9	Twin Springs	Minor Trailhead Planned
10	Limekiln	Minor Trailhead Planned

They are a couple additional trailheads that have been discussed that would provide community access to the Trail System adjacent but not on Federal lands. Although these are not being recommended at this time, they include Pinehaven Fire Station, Continental Divide, and Bluewater Lake State Park.

6.4 Signage and Wayfinding

Signage recommendations include kiosks with trail maps, directional/intersection signs, trail identification markers, and interpretive signs, as defined in *Section 3.5: Signage and Infrastructure Improvements*. Wayfinding could include a set of color-coded trails and identification of trail difficulty ratings. The partnership would create a sign plan which lists sign locations throughout the system. Reassurance markers such small rock cairns could be used only at places where the trail is not obvious. Trailhead Kiosks with informational signs such as share trails information/allowed uses, pack/in pack out, Leave No Trace ethics, Stay on Trails, and a local system map. Trail Intersection Signs and Trail/Motorized Route Intersection Signs are also needed.

Trail Maps

This Plan recommends that two types of maps be developed for the Zuni Mountains Trail.

- *Section Maps*: the first map is developed as each section of trail is completed; and
- *System Map Guides*: the second is a comprehensive guide completed similar to the guide that USFS is developing for the Zuni Mountains Motorized System.

Currently, members are marketing and providing online maps for approved trails in the System. Adventure Gallup & Beyond developed and distributed a nice mapguide. The Hilso/McGaffey Trail System panel is shown here. A similar map could be developed for each trailhead and trail section, as it is developed. USFS and ZMTP could provide this at various shops, hotels, and visitors center.



The following additional information is recommended for inclusion on the map:




- Trail distances and difficulty ratings. This would help users understand the length and difficulty of the trails.
- Trail and trailhead names.
- Trail rules.

Once the entire trail system is completed, the USFS and ZMTP should invest in developing and marketing a guide that could be sold in hard copy or online. Users of the online guide could program trails and tracks into GPS system to guide their ride or hike on a mobile device. Profits above breakeven costs should be used for expenses related to maintenance or annual trail events.

Trail Difficulty Rating

ZMTP members have expressed interest in a trail difficulty rating similar to that used in the ski industry to inform trail users of conditions to expect along the trail. **Table 6-3** presents general parameters to be considered when assigning trail difficulty ratings for Zuni Mountains Trail System. Trail difficulty ratings could be incorporated into trail maps and displayed at kiosks and online.

TABLE 6-3: Trail Difficulty Parameters

Symbol	Skill Level	Min Tread Width	Min. Horizontal Clearance	Average Grade	Max Grade	Outslope	Turn Radius	Obstacles
	Easy	18'	4'	</=5%	8%	2-5%	</=3'	Obstacles infrequent and insubstantial
	Moderate	14'	3'	</=10%	3-8%	3-8%	</=2'	Obstacles may be common, but not substantial
	Difficult	12'	3'	>10%	3-8%	3-8%	</=2'	Obstacles may be common, substantial, and intended to provide increased challenge

Chapter 7: Operation and Maintenance

This chapter provides guidance on the roles and responsibilities of the US Forest Service and ZMTP members, and details how operation and maintenance of the Zuni Mountains Trail System will be accomplished.

7.1 Roles and Responsibilities

Interested organizations and citizens can join the partnership at any time as interest develops in the partnership and its projects. The partnership has a history of seeking out and welcoming new members. Leadership roles have come about as key individuals in both Cibola and McKinley counties have stepped forward and volunteered to take the lead and be the contact in their prospective regions. Each partner brings passion, commitment, knowledge, expertise, coordination, resources, and in-kind donations to the entire process. Meetings occur on a regular basis and as deemed necessary by the members of the partnership. Dialogue and information sharing regularly occurs between the partnership and key entities such as the Health Councils, Chambers of Commerce, Economic Development organizations (EDOs), etc. as coordination among key stakeholders is viewed as critical. ZMTP members are leaders in local communities and continuously participate in the dialogue for community betterment. In the conducting its business, the partnership will remember the following 10 guidelines for great civic organizations.

1. Write Specific Agreements. Have a clear understanding of the role, rules, and the responsibilities of all the parties to an on-going partnership. Develop specific, concrete action agreements in writing.
2. Start Simple and build on the mutual successes.
3. Have Patience and understand land management decisions and processes take lots of time.
4. Respect Each Other's Viewpoints. Trail users often have diverse goals ranging from wanting smooth trails to technical challenges or solitude. Land managers often are challenged by political, regulatory and resource constraints. Understand and appreciate each partner's positions.
5. Be Civil. It's OK to disagree. Good partnerships stipulate how disagreements are handled and under what conditions an agreement can be terminated.
6. Maintain On-going Communication. Partnerships often require a great deal of meeting and negotiation as the partners formulate and maintain their agreement. Strive to have the agreement transcend the particular individuals who created it!
7. Adapt to Change. Include mechanisms for identifying changing needs and goals and adapting to them.
8. Upgrade Knowledge & Skills. Trail organizations have to meet the expectations set forth by land management professionals including clear communication, accountability, training and time management. Likewise, land management professionals should become familiar with trends in trail-based recreation and design.
9. Keep Your Eyes on the Prize. Always focus on the goal/vision. This will allow partners to move past rough patches or project setbacks.
10. Think Locally. Local knowledge is the key to solving local problems.

Managing Mountain Biking, IMBA's Guide to Providing Great Riding (2007)

In 2011, the US Forest and the Zuni Mountains Trail Partnership members updated its commitment to the Zuni Mountains Non-motorized Trail System Project through a Memorandum of Understanding (MOU). (See **Appendix E: Memorandum of Understanding: Zuni Mountains Non-motorized Trail System Project, 2011**)

This document spells the roles and responsibilities of the US Forest Service and the ZTMP, as follows:

ZMTP shall:

- A. Plan a non-motorized recreation trail system and coordinate the NEPA compliance for the trail system with the US Forest Service.
- B. Work with the US Forest Service to identify appropriate partnership and funding opportunities, and jointly pursue such projects in conjunction with the local communities and the US Forest Service.
- C. Provide technical assistance to land managers and communities involved with planning, trail projects, education activities, and non-motorized recreation activities.
- D. Identify training opportunities and work with the US Forest Service to conduct trail-building schools, Trail Care Crews, Rules of the Trail, Leave No Trace, Tread Lightly ethics, and the National Mountains Bike Patrol programs.
- E. Obtain US Forest Service approval prior to implementation of any construction, maintenance, educational or publication or distribution of any printed materials regarding non-motorized recreation uses on National Forest System lands.
- F. Review this agreement with the US Forest Service annually and modify as necessary.

US Forest Service shall:

- A. Work with ZMTP to identify non-motorized opportunities (trail projects, education, and assistance) and jointly pursue such projects with Cibola and McKinley County communities.
- B. Make National Forest System lands available for non-motorized recreation activities, subject to applicable Federal laws, regulations, policy, Forest Plan and other management direction.
- C. Include and utilize ZMTP technical expertise in developing US Forest Service programs as they relate to non-motorized recreation trail construction and maintenance.
- D. Provide to the public the appropriate rules and regulations pertaining to non-motorized recreation trail construction and maintenance.
- E. Coordinate all maintenance and construction activities providing the proper specifications and clearances.
- F. Review and concur with all publication or printed materials published by parties covered under this agreement intended for public distribution regarding non-motorized recreation on National Forest System lands.
- G. Coordinate and approve any special use or administrative activities within designated non-motorized trail corridors prior to the date of activity.
- H. Review this agreement with ZMTP and modify as necessary.

The ZMTP members have agreed to and are actively meeting the expectations outlined in this MOU. The next section showcases the capacity and resources that are brought to bear to accomplish and sustain this commitment.

7.2 Local Capacity and Resources

The Zuni Mountain Trail Partnership is made of several entities and organizations that can provide turnkey trail management, design, financing, construction, and maintenance services.

Cibola and McKinley Counties have an excellent track record of setting goals, acquiring grant and local funding, implementing actions, achieving results, and maintaining quality. Both have the capacity and capability to pull together workforce and volunteers leveraging multi-streams of funding to advance and maintain projects. If designated, the partnership will develop an Operation, Maintenance, and Replacement Plan (O&MR Plan) and ZMTP maintenance agreement for the Zuni Mountain Trail System. The OM&R Plan will identify and assign resources, prioritize maintenance needs, and outline an USFS-approval protocol for the trail maintenance. The maintenance agreement would commit entities to maintain the trail system with an understanding of minimal direct assistance from Forest Service.

Workforce

Youth Conservation Corps: Over the last 14 years, a crucial element for the design, construction, and maintenance of trails in Cibola and McKinley counties has been the New Mexico Youth Conservation Corps (YCC) program. The purpose of YCC is to provide a process to employ young persons in public projects that conserve New Mexico’s natural resources and provide community benefits of lasting value while learn job skills, develop work ethics and learn how to get along with others. New Mexico will benefit by having its natural and urban environments improved and enhanced and its youth instilled with an appropriation of natural resources, cooperation, hard work and accomplishment.

Both counties have active YCC programs with experienced crew, supervisors, and managers. In 2013 alone, the City of Gallup/Boys & Girls Club and Future Foundations Family Center/YCC were granted about \$160,000, which employed 43 youth workers. Karl Lohmann and Laura Malaj Jaramillo have operated these programs for nearly a decade with notably success, respectfully. A main component of the Gallup YCC is trail construction, maintenance, and improvements; overseen and quality assured by local trail designer Strider Brown.



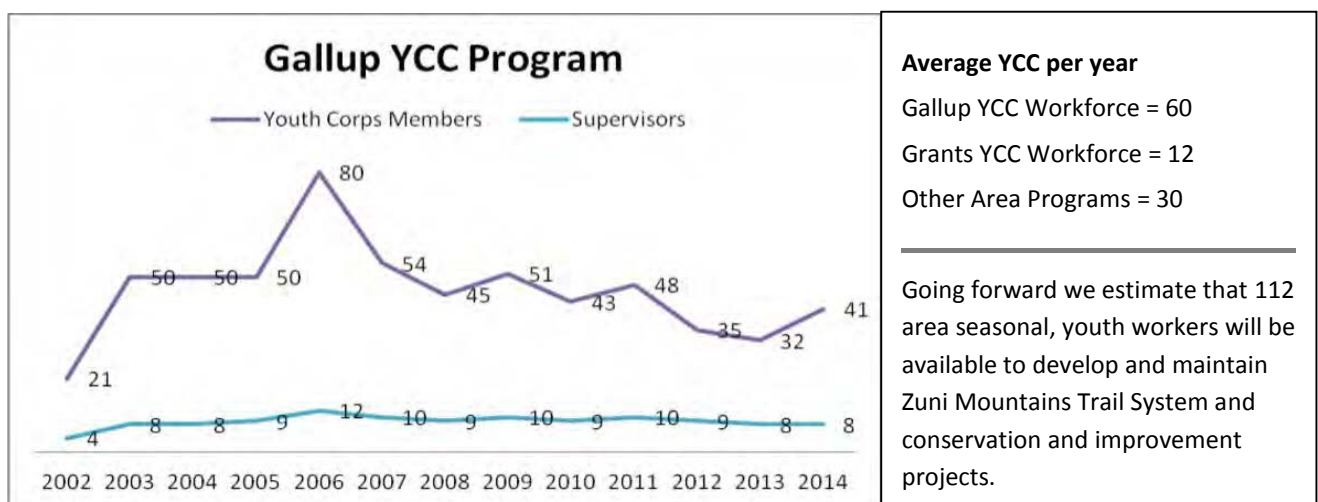
The Gallup YCC program track record is showcased below including satisfied clients/funding partners, including the USFS, National Parks Service, and Navajo Nation. The High Desert Trail System that was improved and is maintained by this crew received designation as a National Recreational Trail by the Department of the Interior. The partnership projects and plans to employ 70 area seasonal, youth workers to develop and maintain the Zuni Mountains Trail System and conservation related activities in the project area.

Leadership of other regional Youth Conservation Corps in Tohatchi, Acoma, and Zuni are collaborating to bring additional corps members (and their shared skills, resources, and budgets) to the Zuni Mountain Trail Project. This collaboration promises to expand the trailbuilding and conservation workforce in the region.

The Gallup YCC program track record is showcased below including satisfied clients/funding partners:

Year	YCC Grant	Matching Funds	Youth Corps Members	Supervisors	Partners/Clients
2014	\$200,000	\$200,000*	41*	8*	City of Gallup
2013	\$104,381	\$149,342	32	8	McKinley County
2012	\$150,000	\$150,000	35	9	Apache Sitgreaves National Forest
2011	\$150,000	\$150,000	48	10	Nature Conservancy
2010	\$150,000	\$150,000	43	9	National Park Service
2009	\$150,000	\$150,000	51	10	El Malpais NCA
2008	\$150,000	\$150,000	45	9	Quivira Coalition
2007	\$200,000	\$200,000	54	10	BLM
2006	\$200,000	\$200,000	80	12	USFS: Mt. Taylor Ranger District
2005	\$200,000	\$200,000	50	9	National Resource Cons. Service
2004	\$200,000	\$200,000	50	8	Ramah Land & Irrigation
2003	\$180,000	\$180,000	50	8	Gamerco, LLC.
2002	\$85,000	\$85,000	21	4	McKinley Soil & Water Cons. District
					Gallup-McKinley County Schools
TOTAL	\$2,119,381	\$2,164,342	600	114	Navajo Nation EPA

Gallup YCC: over 95% of YCC Grant funding was expended in Youth Wages, *2014 numbers are estimated.

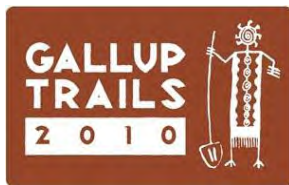


Volunteer Organizations & Groups

Adventure Gallup & Beyond | www.adventuregallup.org

Since 2002, AGB has advocated and provided the structure to develop adventure tourism as a regional economic driver. They currently provide “gatekeeper” services for many of the trails and venues in McKinley County including High Desert Trail System and Ramah Mormon Pioneer Trail System. Gatekeeper services are basically the operation, management, and maintenance services that US Forest Service is needed from the ZMTP. They have developed a web-based trail concern system to report issues and provide real time results - <http://www.adventuregallup.org/gatekeeper.html>

Gallup Trails 2010 | www.galluptrails.com



Gallup Trails is a membership-based non-profit organization that believes that accessible trails improve the quality of life for all citizens of Gallup and McKinley County. Launched in 2002, Gallup Trails has grown to over 100 local members and about 500 followers on Facebook. Gallup Trails has a dedicated board of local trail enthusiasts and users.

In 2009, Gallup Trails received the “Jessica R. Terrell” award from the NM State Parks for their leadership in the development of the High Desert Trail System, which become a National Recreation Trail in 2012. Gallup Trails and its membership provide hundreds of hours per year in trail development, maintenance, planning, awareness, and trail and trailhead cleanups. Through its “Shovelman Crew”, Gallup Trails work in concert with or alongside YCC workers in coordinated trail work days. Gallup Trails also held trail and trailhead cleanup days in April 2013, and also provided weekly work days to get Gallup’s new bike park opened. Gallup Trails provides a necessary workforce and volunteers that are ready for an expanded Zuni Mountain Trail System and will answer the call to arms to deliver the necessary sweat equity needed to maintain trails.



Cottonwood Gulch Foundation | www.cottonwoodgulch.org



The Cottonwood Gulch Foundation sponsors educational wilderness expeditions and outdoor programs in the American Southwest. The Foundation has built strong relationships throughout the Four Corners and treats this as our community. The Foundation places a high value on contributing work to make it better. Youth participating in their programs often work with the BLM, USFS, or Park Service to improve trails and campsites. In 2013, the Cottonwood Gulch provided workers for the 24-Hour Mountain Bike National Championship race. The Foundation’s base camp is at the foot of the Zuni Mountains, and workers have experience with riparian restoration work making them a great partner.



Other volunteer groups interested in the project include:

Boy and Girl Scouts, Tohatchi Youth Build, Americorps*VISTA, NCCC, Zuni Youth Empowerment Project, Boys & Girls Clubs, Plateau Sciences Society and Cibola County Historical Society, McKinley Citizens Recycling Council and Recycle Cibola!, Comcast Cares Day, CARE 66 Handymen, Civic Groups: Kiwanis, Rotary, Lions Club, etc., and Chambers of Commerce membership.

7.3 Operation and Maintenance Activities

Since the Mount Taylor Ranger District does not operate a seasonal trail crew, it is expected that the ZMTP and mainly the regional YCC workforce will complete trail maintenance on the system. All work will need to be approved via task order by the US Forest Service and the local funding source prior to starting work. (See: **Appendix F: [Task Order Example](#)**)

Annual maintenance activities include:

- **Trail maintenance.** This activity includes trail maintenance as defined by the USFS three levels of trail maintenance (FC-RONRW Management Plan, Appendix J), see **Table 7-1** on next page. Maintenance levels to trails will be based on criteria such as amount of use, potential to affect resources, safety considerations, etc. Once ZMTP establishes maintenance levels, they will be reviewed and updated annually. When assigning maintenance levels, ZMTP will give a higher priority to trails where use is significant. ZMTP plans to install trail counters to collect and record traffic volume data. This data collection should proceed on a continuing basis to provide needed information for planning, developing, monitoring, and confirming maintenance levels. A three-year schedule of maintenance will be developed and a trail maintenance log will be kept. Also, ZMTP is recommending that prior to and after major events that special maintenance or “grooming” is performed.
- **Vegetation control.** This activity includes removing fallen trees that block the trail and trimming back vegetation. In some cases, professional fallers with skill have been needed to remove trees. Brush and branches that encroach on the horizontal clearance and can make a trail less safe. In some areas machinery can be used but all singletrack trails must be cleared by hand. In the fall, this material is removed and chipped or burned in place if it cannot be removed.
- **Erosion control.** This activity includes repairing washed out water bars and drainage elements and inspecting and clearing drainage structures. The spring snowmelt will blow through water bars, change drainage patterns, and/or move rocks. It is a priority to keep water off the trails. The trail crew inspects drainage structures annually and clears all that are blocked with debris in the spring.
- **Bathroom maintenance.** This activity includes pumping out bathrooms at least two times during the season or more frequently with increased use, and seasonal cleaning these facilities.
- **Trail map distribution.** This activity includes refilling kiosks with trail maps seasonally. Trail maps are provided for each trailhead at the USFS Offices and Visitors Centers in the region.
- **Trail signage and kiosk placement and removal.** This activity includes seasonally inspection of trail signage and kiosks. Worn, Damaged, deteriorated, or destroyed will need to be replaced annually.

- **Situational maintenance.** This activity includes responses to vandalism, accidents, or special weather events. Situational maintenance can be difficult to anticipate and budget for. With a limited budget and season of operation, it can be difficult at times to perform the necessary trail maintenance.

TABLE 7-1: USFS Trail Maintenance Levels

	Level 1	Level 2	Level 3
Description	Trails maintained for primitive experience level. Custodial care only	Trails maintained for near-primitive experience level.	Trails maintained for an intermediate
Maintenance Objectives	Drainage functional and not likely to fail. Trail sides not brushed, but tread is kept passable. Small slides may remain except for erosion potential. Structures maintained as needed.	Treads maintained for public safety. Logs or similar rustic structures may be provided at stream crossings. Drainage same as Level 1.	Tread maintenance for public safety and user convenience. Drainage same as Level 1. Trail sides brushed out to pack stock standards. Structures maintained to original design standards.
Maintenance Frequency	Maintenance frequency of 1-5 years.	Maintenance frequency of 1-3 years.	Annually
Maintenance Activities Performed	Drainage is maintained to prevent damage to adjacent resources	(1) Limited brushing (2) Logging out (3) Tread maintenance (4) Slide removal and slump repair (5) Drainage structures maintained	All maintenance activities performed in Levels 1 and 2, plus, (1) Tread grading and grubbing of protruding rocks and stumps. (2) Rock removal (loose surface rock). (3) Spot surfacing. (4) Surface replacement. (5) Structure maintenance not deferred. (6) Back slopes maintained. (7) Slide removal and slump repair to design standards
Inspection Frequency	Condition surveys made every 1-5 years to check for resource damage. If no major resource damage is occurring, no further action is taken.	Condition surveys made once every 2 years to check for resource and trail damage. Unsafe conditions searched for annually.	Condition surveys performed once every 2 years. Maintenance frequency of 1-2 years. Logging out annually.
Estimated Costs *	\$500.00 per mile	\$1,000.00 per mile	\$1,500.00 per mile

*ZMTP based on costs to date and for trails that were properly constructed

7.4 Operation and Maintenance Budget

Trail System

Hilso Trail System was the only trail system that received trail maintenance this past season (April – September 2014) provided by the Gallup YCC, which accounted for approximately \$12,200 of Levels 1 and 2 maintenance work, \$15,000 in purchase and installation of bike cattleguards, and \$13,000 of specialized pre- and post-event maintenance for the 24 Hours National Mountain Bike Championships.

Funding for these costs came from YCC youth wages provided under a grant from the State and McKinley County from Secure Rural Schools RAC-Title II funding. For large special events, it is estimated that special race trail preparations and post-race maintenance is about \$500 a mile. The ZMTP would like consideration that race promoters provide funding for this specialized maintenance, especially if they're not based out of the region. Races seem to have a substantial impact to the trail system in a short period of time due to numbers of riders and their concentrated use. A similar concept might be suitable for large tour operators, as well.

This season the Gallup YCC built the Ramah Mormon Pioneer Trail, which is a portion of the Ramah Trail System, located on private land. This 6.1 mile trail and Strawberry Canyon Trail will need trail maintenance next season and ongoing. For next season, we are estimating the following trail maintenance costs.

Anticipated 2015 Trail Maintenance Schedule

	Cost Breakdown / Costs	Source of Funds
Ramah Mormon Pioneer Trail	6.1 miles of trail maintenance (Level 1) = \$3,050	YCC, Ramah Land & Irrigation District and McKinley County
Strawberry Canyon Trail	2.5 miles of trail maintenance (Level 1) = \$1,250	YCC and USFS
Hilso Trail System	26.0 miles of trail maintenance (Level 2) = \$26,000	YCC and McKinley County (Secure Rural Schools-Title II)
24 Hours in the Enchanted Forest Race	26.0 mile course (Special Race Maintenance Rate) = \$13,000	Race Promoter*, YCC, and McKinley County
Total	\$43,300.00	

*ZMTP are recommending that Race Promoter pay for specialized race maintenance on the trail system.

The current annual trail maintenance costs \$40,000 to \$50,000 dollars per season or approximately \$1,050 to \$1,350 per mile of trail per year. This amount will increase as new trail sections are built, and ZMTP members will need to develop a financing strategy to identify increased maintenance funding, prior to approval of new trail sections and segments.

While the State YCC program, can provide for the youth crews and their wages, other costs such as supervisors, trail foreman, trail engineering/design, vehicles, equipment and other operating supplies are

not covered. YCC does require a 1:1 local match, which will need to be used to cover the following examples of costs (which incorporate both maintenance and construction work) include:

- \$25,000 for management of the program
- \$115,000 for seasonal supervisors and trail foreman
- \$2,500 for yearly vehicle cost (per vehicle)
- \$2,500 for vehicle fuel (per vehicle)
- \$1,000 for vehicle maintenance (per vehicle)
- \$4,000 for equipment and supplies

Maintenance generally runs from mid-March through October; however, it can be shortened due to late springs or early winters.

Annual maintenance is expected including clearing debris from bike cattleguards and identifying trail signs and markers that needs replacement. Every five years, the trail intersection sign faces and trail markers will need to be replaced for user safety and to maintain a pristine system. These will need to be a special request to the counties or done through a grant as a maintenance component. For instance, ZMTP has used Secure Rural Schools – Title II program monies for this type of replacement project.

Trailheads and Infrastructure

The Strawberry Canyon Trailhead and McGaffey Lake Trailhead were built by and are the responsibility of the USFS, while the Hilso Trailhead and Ramah Trailhead were built by and are the responsibility of McKinley County. The annual expenses for trailhead include bathroom pumping services, bathroom cleaning, trash pickup, painting, bathroom supplies, trailhead cleanup, and situational maintenance that arises throughout the year. Again, the trail counters will be an important litmus test of when trailhead maintenance should be done and when level of maintenance needs to increase to offset use.

The CXT vault buildings comply with the Architectural Barriers Act Accessibility Guidelines, Sweet Smelling Technology vault toilet buildings. These vault buildings are designed to meet or exceed the effects of a seismic design category E earthquake, a 150-mph wind load and a 350-pound per square foot snow load, so maintenance cost is very minimal for this type of structure. Vandalism cost on developed facilities is estimated to approximately \$150 per year by the Mt. Taylor Ranger District. Replacement cost is generally related to toilet riser, door vent, or window damage. This cost varies depending on the type of damage and could easily escalate to \$600 for a steel door replacement. Vandalism is situational and hard to predict. For this Plan, we have assumed \$600 per year in additional costs to cover vandalism and other situational maintenance requirements.

For the trailheads being recommended in this Plan, the cost per trailhead is approximately \$2,000 each per year. Annual maintenance is expected including clearing debris from access cattleguards and identifying wheel stops, vehicle barriers, and trailhead signage that needs replacement. Every five years, maintenance to the trailhead itself will need to occur to keep the trailhead at pristine condition. This maintenance will be provided by the counties through their Road Crews, as in-kind.

Every ten years, a full overhaul will be needed to change out trail kiosk, bulletin boards, and signage, and wheel stops and vehicle barriers. Cattleguards can be evaluated every ten years. These will need to be a special request to the counties or done through a grant as a maintenance need.

Anticipated 2015 Trailhead Maintenance Schedule

Trailheads	Cost Breakdown / Costs	Source of Funds
Ramah Mormon Pioneer Trailhead	Bathroom Pumping Services* (\$400-600, depending on volume and issues) @ 2 times a year = \$1,000.00	McKinley County
	Bathroom Cleaning & Restocking Supplies = \$100 @ 4 times a year = \$400.00	
	Other Needs = \$500.00	
Hilso Trailhead	Bathroom Pumping Services* (\$400-600) @ 2 times a year = \$1,000.00	McKinley County
	Bathroom Cleaning & Restocking Supplies = \$100 @ 4 times a year = \$400.00	
	Other Needs = \$600.00	
Total	\$4,000.00	

*Price quoted by GS Septic Services

7.5 Recommendations

This section presents recommendations related to operation and maintenance of the trail system. Recommendations in section are focused on increasing and standardizing volunteer participation in upkeeping the system. These recommendations would assist in decreasing construction and maintenance costs, as well as, increasing outreach, engagement, and education. While the ZMTP, recognizes that volunteers are an important element to the sustainability of this project, these efforts are not factored into the overall construction and maintenance cost of the project. The Youth Conservation Corps programs are still the workforce for trail management short-term. All work on US Forest Service will need to be evaluated and approved by the District Ranger through a task order process. An example of a task order that is issued by McKinley County to Youth Conservation Corps with USFS consent and approval can be found in **Appendix F: Task Order Example**.

Trail Manager

While at this time, there is neither work enough nor budget enough, but one consideration would be to create a Trail Manager position. The Trail Manager would be responsible to manage the Zuni Mountains Trail System and act as liaison to user groups. The ZMTP should consider revisiting this consideration, if and when the project moves towards 50% build-out of the Plan. While funded by the ZMTP and

administratively attached to one of the members, this Trail Manager would be in day-to-day contact with the USFS, ZMTP entities, and volunteers. Potential responsibilities could include:

- Coordinate and setup YCC work schedules with the regional YCC programs.
- Coordinate the “Shovelhead” Trail Crew and Trail Ranger program.
- Serve as a liaison between the USFS and ZMTP entities in the planning, acquisition, development, and maintenance of the summer trail system.
- Act as the liaison between the users, race promoters, and tour businesses, keeping them informed about work activities and trail closures, as reported by USFS and ZMTP.
- As requested by landowners, work on potential easements or alignments to be incorporated into the trail system. The Trail Manager would communicate with the membership and neighbors to ensure there is appropriate dialog with all parties.
- As requested by adjacent communities, coordinate with them and the US Forest Service staff to plan future trail connections.
- Plan training activities which bring together volunteers who wish to help maintain the trail system. These meetings should be held at least annually.
- Coordinate and facilitate volunteer trail work days and keep a record of the number of volunteers and number of volunteer hours.
- Coordinate updates to the USFS and ZMTP websites concerning volunteer days and other trail activity days, including the project website.
- Keep track of ZMTP member recommendations regarding trail construction and maintenance needs and trail-related activities.
- Outreach to local businesses and entrepreneurs on market opportunities, tourism and trail information, and potential sponsorships.
- Manage maintenance trail logs, trail counters and data, economic impact statistics and reporting, and grantwriting functions.
- Create an annual summary of the year’s maintenance, promotional, and other trail-oriented activities to share with the USFS and ZMTP entities.

In the interim, these duties will need to be divvied out to ZMTP members and day-to-day management of the trails and facilities will need to be defined in a “gatekeeper” contract between the counties and with one of the appropriate ZMTP entities. Similar agreements exist on High Desert Trail System in Gallup between McKinley County and Adventure Gallup & Beyond, and one is being developed for the Ramah Mormon Pioneer Trail System.

Annual Trails Education Day

ZMTP could establish an annual trails education day providing lessons on open space subjects aimed at school aged children. The annual trails education day could include a short, guided hike, or utilizing Bike Mobile for a short trail rides, USFS talks, and a trail safety and courtesy workshop. The goal would be to instill a sense of stewardship at an early age. This could be a recruitment opportunity for the regional YCC programs.

Annual Trail Builders' Work Day

Similarly, ZMTP could partner with the IMBA Trail Care Crew to establish an annual trail builders' day providing best practices and techniques in terms of trail building and maintenance. The annual trail builders' day could include a section of trail or an actual project to make the event as experiential and productive as possible. The goal would be to educate locals and hopefully get them to sign up for other work days and volunteer programs.

'Shovelhead' Trail Work Days

Expanding on Gallup Trails program, which provides opportunities for volunteers to perform public service and gain a sense of accomplishment by maintaining the Zuni Mountain trails. These work days would help with to defer maintenance costs. Once a month, these work days could be arranged on smaller projects to differentiate them from the Annual Trailbuilders' Day.



Volunteer Trail Ranger Program

ZMTP could encourage clubs to establish a trail ranger program. The use of trained patrols of volunteer hikers, mountain bikers, and equestrian can provide opportunities for member involvement in trail management; and to enhance the safety and enjoyment of trail system users. The volunteer trail rangers could perform the following activities:

- Inform users of trail rules verbally and/or through distributing written trail rules
- Observe and report trail maintenance needs, physical hazards on trails, or potentially hazardous behavior by trail users
- Assist trail users who require first aid or other forms of help
- Pick-up trash on trails and refresh kiosks with maps

Mountain Bike Patrol Program

To help ensure that the project can be completed and maintained, programs such as IMBA's National Mountain Bike Patrol Program could be implemented. Patrol volunteers could perform the following activities:

- Assist in medical and mechanical emergencies and educate trail users of proper etiquette.
- Inform land managers, land owners and trail users of trail conditions through monitoring efforts.
- Work with land managers to maintain and/or gain trail access for mountain bikers.
- Offer volunteer services at outdoor races and events.
- Collaborate with local clubs on trail work days, clinics, group rides and Take a Kid Mountain Biking Day events (IMBA).

Establishing a Zuni Mountains area chapter of this organization in partnership with a local ride club will be the first step to address some of the identified concerns, such as:

- Engaging the smaller communities of the area in the project,
- Gathering information to establish capacity baselines,

- Documenting what is working and lessons learned on the trail,
- Working to establish good relations with other recreation user groups, forest products gatherers, area hunters and private land owners,
- Bring new partner members up to speed,
- Identify clear benchmarks for celebrating successes such as establishing a trail system with proper construction, maintenance and management, opening new trailheads and holding community events,
- Keep partners and the public engaged in the process,
- Identify erosional issues which threaten listed species upon development before becoming problematic.

Patrol volunteers could also assist in the designation of emergency evacuation routes and establishing a sign plan with mileage markers with information that could be relayed to emergency personnel.

Adopt-a-Trail Program

An adopt-a-trail program could encourage member participation in the on-going maintenance, realignment, and build-out of trails and related improvements through the “adoption” of specific trails, trailhead, or portions thereof, by an individual or group. Volunteer activities along adopted trails could include:

- Routine maintenance such as removing rocks, brush, tall grasses and litter.
- Work projects involving tasks that cannot be completed through routine maintenance. These tasks would be identified by the adopter or the USFS and ultimately approved by the USFS. Activities could include tread and drainage maintenance, non-native plant removal alongside trails, revegetation of non-system trails, and staining kiosks, sign posts or other furnishings.
- Supervised build-out of approved and permitted new trails requiring no use of power tools.
- Financing a particular project or trail maintenance need would be welcome. Financing could take the form of contribution of materials, fundraising events, matching funds, and/or direct donations to the ZMTP.

Awareness Events & Partnerships

Events such as the Kids Quad held in unison with the Mt. Taylor Winter Quadrathlon are great venues to build interest and leadership in future generations and to build a strong local trails constituency. Similarly, events such as 24 Hours in the Enchanted Forest have non-competitive or family oriented trails activities which occur during the main event and promote trail stewardship for future generations. The partnership will continue to seek opportunities to build a strong local trails constituency especially in the larger communities of Grants, Milan and Gallup; and continue to interact with community leaders and elected officials to perpetuate momentum and enthusiasm. The partnership will continue its outreach to native communities through organizations such as National Indian Youth Leadership Project.



8 Implementation and Funding

This section provides recommendations on implementation, project prioritization and phasing, and funding opportunities.

8.1 Preliminary Cost Estimates

Unit Costs and Contingencies

Table 8-1 presents planning level unit costs used for the purpose of programming for Zuni Mountain trail construction and capital improvements. These unit costs (and the cost estimates based on them) are intended for planning purposes only and actual construction costs can be determined after each project has undergone more detailed engineering design work and task order cost evaluation, as provided in the Trail Improvements by Trail Segment chart on page #35.

Trailhead facility and associate improvement costs are based on actual expenses that resulted from the recent Hilso and Ramah trailhead construction.

Trail construction are also based on previous work completed by Gallup Youth Conservation Corps (YCC) on Hilso trail system, and discussions with other YCC crews that have done work in the Southwestern region, including Rocky Mountain Youth Corps and Southwest Conservation Corps. As stated, construction costs of trailbuilding relates directly to the type of work being completed, whether it is:

- Tread or corridor trail enhancement – based on improving existing user-created trails into sustainable trail, including re-routes, drainage structures, rolling grade dips, grade reversals, and switchbacks.
- New singletrack construction
- Repurposing closed two-track roads into singletrack trails (e.g. Burma Trail on Hilso Trail System)
- Joint use, two-track routes (e.g. 31 miles) are not associated with construction costs at this time.

Building proper trails at the onset will help reduce maintenance costs over the short-, mid- and long-terms. Proper design and pin flagging of trails will be key to building trails that last. In line with USFS and IMBA trail standards, trail construction will include building proper drainage structures. Based on USFS and IMDA guidance, our modus operandi is to build 3-4 drainage features every 100 feet of trail. Further, the average mile section of trail should have the following drainage distribution: 40% grade reversals, 40% rolling grade dips, and 20% knicks.

40/40/20 Drainage Distribution

40%: Grade Reversals

40%: Rolling Grade Dips

20%: Knick points

This formula provides for best drainage and trail sustainability.

Table 8-1: Unit Costs

No.	Item	Unit*	Cost
Trails			
1	Trail construction (natural singletrack)	MI	\$3,000.00
2	Drainage (e.g. Grade Reversals, Rolling Grade Dips, & Knicks)	MI	\$4,000.00
3	Climbing turns / switchbacks	MI	\$7,000.00
4	Rebuild / Reroute	MI	\$4,000.00
5	Close and Restore Trail (Rip, recontour, seed trail; two regulatory signs/mi. of trail)	MI	\$5,000.00
6	Bike Cattleguard	EA	\$1,500.00
Trailheads			
7	Trailhead Construction – dirt and rock work	LF	\$10.41
8	Gravel	LF	\$12.41
9	Dual Vault Toilet/Restroom (Dual)	EA	\$40,000.00
10	Cattleguard	EA	\$5,500.00
11	Culvert (24"x24')	EA	\$478.80
12	Fencing	LF	\$15.00
13	Parking Bumpers	EA	\$75.00
Signage			
14	Kiosk	EA	\$550.00
15	Major Trailhead Construction – wayfinding and interpretative bulletin board (e.g. Ramah)	EA	\$3,000.00
16	Minor Trailhead Construction – wayfinding and interpretative bulletin board (e.g. Hilso)	EA	\$2,000.00
17	Signage (ZTMP Intersection Signs)	EA	\$200.00
18	On-Trail Carsonite Markers	EA	\$815.00
Misc.			
19	Construct Natural Drainage Swale w/ Rock check dams	LF	\$12.00
20	Erosion Control	MI	\$250.00
21	Trim Vegetation / Tree Limbs	MI	\$250.00

* LS = lump sum, EA = each, LF = linear foot, MI = mile

Once the ZMTP develops a detailed Trail Improvements by Trail Segment chart, map, and cost estimate as outlined in *Section 6.2*, all costs should include contingencies for construction projects to account for each stage of project implementation, based on factors of the construction cost, including:

- Design, flagging, and construction overhead (mobilization and general conditions) – **10 percent**
- Project administration during planning design, and construction – **5 percent**

The total contingency is estimated at **15 percent** of construction costs.

For the purposes of this Plan, the range of trail construction starts at \$7,000 a mile for building new, natural singletrack trail construction and drainage structures only (with contingencies \$8,050 per mile). On the higher side would be \$12,500 to repurpose a two-track route into a singletrack trail with drainage and a half a mile of switchback construction (with contingencies \$14,375 per mile).

8.2 Prioritization

The ZMTP convened over a series of meetings to discuss and establish trail corridors, systems, and trailheads, and prioritization of construction of these corridors and trail systems. **Appendix B: ZMTP Trail System Powerpoint** was a good tool for this process.

The intent of project prioritization was to identify achievable, priority projects for near-term implementation as well as projects for mid- and longer-term implementation. The evaluation criteria presented in the matrix below was used to give weight to those projects that best support the project goals and will therefore receive higher priority. These scores are then added together, with 30 being the highest possible score, thus the greatest priority for the Quartz Hill/Bonito Canyon trail system.

Section Attribute	Points
Provides an important aesthetic recreational experience	3
Project completes a significant gap in the overall network	3
Provides a strong recreational experience at a low cost	3
Provides recreational opportunities for a variety of users	3
Is not likely to have significant resource concerns	3
Provides easy access from communities to trails networks	3
Can generate community interest in development and long term stewardship	3
Generates broad business and tourism support	3
Provides year round access	3
Offers unique features	3
Affords the ability to phase or modify loops	3
Total	30

In 2012, the partnership utilized the above matrix which focused on ten aspects to rate each trail system for building priority on a thirty point scale, Quartz Hill (27 points), Bluewater (26), McGaffey expansion (26), Milk Ranch (23), Ramah (23), Ojo Redondo (21), Twin Springs (21), and Limekiln (18). Up to six trail access points (trail heads) would be built. In addition to a parking area, each trailhead would be considered for the same amenities as provided at the Hilso Trailhead, trailhead boundary fencing, vault toilets, large cattleguards, and bike-wide cattleguards to provide access across trailhead boundaries.

Trail System Sections	Miles	Priority*
Quartz Hill/Bonita Canyon	30.1	1
Bluewater	45.6	2
McGaffey	25.7	2
Milk Ranch	21.4	3
Ramah\Pasture Hollow	13.7	3
Ojo Redondo	39.6	4
Twin Springs	43.0	4
Limekiln	19.5	5
Total	238.6	

*Priorities were ultimately approved to coincide with USFS management needs

8.3 Phasing

This Plan distinguishes projects by near-term, mid-term, and long-term phases. If trail system is approved, ZMTP will develop a detailed Trail Improvements by Trail Segment chart, map, and cost estimate as outlined in *Section 6.2*. Trail construction phases are broken down into approximately 15-20 mile sections.

Phasing of trail system improvements is based on usage trends, project priority, and funding and crew availability. Near-term projects could be carried out within the next four years. Mid-term projects would be carried out in a period 4 to 8 years. Long-term project would be carried out in a period 8 to 15 years.

See **Maps** directly at the end of this Plan, to see these improvements on maps.

Near-Term (0 to 4 Years)

Recommended near-term trail improvement projects include:

- Design and construct Quartz Hill/Bonita Canyon trailhead facilities.
- Design and construct Quartz Hill/Bonita Canyon stacked loop trail system. (Phase I)
- Work with Bluewater Lake State Park to develop a joint plan building off their current facilities.
- Improve signage and trailhead at Strawberry Canyon to support expansion of McGaffey trail expansion.
- Design and construct the McGaffey Trails, expansion and connection into existing Hilso system.
- Design and construct Bluewater trailhead facilities.
- Design and construct Bluewater stacked loop trail system. (Phase I)
- Design and construct Quartz Hill/Bonita Canyon stacked loop trail system. (Phase II)
- Design and construct Bluewater stacked loop trail system. (Phase II)
- Design and construct Bluewater stacked loop trail system. (Phase III)

Mid-Term (4 to 8 years)

Recommended mid-term trail improvement projects include:

- Design and construct Milk Ranch trailhead facilities.
- Design and construct Milk Ranch stacked loop trail system (Phase I).
- Work with Ramah Land & Irrigation, Timberlake Subdivision association, and other local stakeholders to re-assess and plan out Ramah/Pasture Hollow Trail System,
- Design and construct Ojo Redondo trailhead facilities.
- Design and construct Ojo Redondo stacked loop trail system. (Phase I)
- Design and construct Twin Springs (McKenzie Ridge) trail connector. (Phase I)
- Design and construct Milk Ranch stacked loop trail system. (Phase II)
- Design and construct Ramah stacked loop trail system.
- Design and construct Ojo Redondo stacked loop trail system. (Phase II)
- Design and construct Ojo Redondo stacked loop trail system. (Phase III)

Long-Term (8 to 15 years)

Recommended long-term trail improvement projects include:

- Design and construct Twin Springs trailhead facilities.
- Design and construct Twin Springs trail system. (Phase II)
- Design and construct Limekiln trailhead facilities.
- Design and construct Limekiln trail system.

8.4 Trail and Trailhead Construction Costs

This section takes the priorities, phasing, and unit costs to provide an initial and phased project cost estimate of the Zuni Mountain Trail System.

Base Cost of Trail Construction

Table 8-2 Trail Construction Costs below shows estimated base trail construction costs, which only includes building trail and drainage features. Costs do not reflect re-routes, switchbacks, signage, or bike cattleguards that will be needed throughout the system.

TABLE 8-2: Trail Construction Costs

Trail Section	Existing Trail	New Trails	Reclaimed Trails	Total Miles
Quartz Hill/Bonita Canyon	0.0	20.1	10.0	30.1
Bluewater	9.1	15.7	20.8	45.6
McGaffey	20.5	5.2	0.0	25.7
Milk Ranch	16.2	2.5	2.7	21.4
Ramah\Pasture Hollow	6.1	5.5	2.1	13.7
Ojo Redondo	0.0	20.0	19.6	39.6
Twin Springs	8.6	30.4	4.0	43.0
Limekiln	0.0	12.2	7.3	19.5
Total Miles	60.5	111.6	66.5	238.6
Base Cost per Mile	\$9,200.00	\$8,050.00	\$10,350.00	
Basic Total Cost	\$556,600.00	\$898,380.00	\$688,275.00	\$2,143,255.00

Based on this analysis, the range for trail construction costs is estimated at **\$2,200,000 - \$2,500,000**. Although volunteer hours and sweat equity are not reflected in these costs; volunteers and programs could have a significant impact in the overall costs of building the trails. Overall a 15 year build-out period, the ZMTP could expect that it would need to generate, raise, and leverage \$150,000 - \$170,000 per year.

While this number seems daunting at first, one must remember that the ZMTP conservatively expect the State's Youth Conservation Corps program to invest at least \$300,000 annually for youth wages among the regional YCC programs (Gallup, Grants, Acoma, Zuni, and/or Tohatchi), based on the history showcased in *Section 7.2: Local Capacity and Resources*. The requirement for the State funding is that the local entity or program provide an equivalent dollar-to-dollar match, so ZMTP expects a total \$600,000 regionally going into YCC programs. YCC programs work on various community projects throughout their season, so conservatively we estimate that 25% of this funding will be invested into ZMTP trail construction projects or \$150,000.

Trail Construction At-A-Glance

Estimated Total Cost for 238 miles of Trail:
\$2.2 - \$2.5M

Cost per Year:
\$150,000 -170,000

YCC Investment Needed: **\$150,000 per year**

Potential Grant Sources:
RTP, TAP, and FLAP

Project Timeframe:
15 years

Further, the ZMTP feels confident that if approved the Zuni Mountain Trail System will be well positioned to acquire grant funding from programs such as Recreational Trails Program, Transportation Alternative Program, and Federal Lands Access Program for new trail construction.

Base Cost of Trailhead Construction

This cost includes building trailheads and infrastructure features only. Major trailheads are approximately 15,000 linear feet and minor trailheads are approximately 13,000 linear feet. Major trailheads require two culverts, while a minor trailhead requires one culvert. Every trailhead requires a cattleguard, parking bumpers, a kiosk, and bulletin board. It is expected that USFS will pay for the street signs.

TABLE 8-3: Trailhead Construction Costs

Trail Section	Trailhead	Dirt/Rock Work and Gravel	Other Features	Total Costs
Strawberry Canyon	Minor Trailhead Exists (minor improvements needed: Bulletin Board and Parking Stops)	N/A	Culvert: N/A Cattleguard: N/A Kiosk: \$550 Bulletin Board: \$2,000.00 Parking Bumpers: 20 bumpers @ \$75.00 = \$1,500.00 Total: \$4,050.00	\$4,050.00
McGaffey Lake	Major Trailhead Exists, and is in good condition			\$0.00
Hilso	Minor Trailhead Exists, and is in excellent condition			\$0.00
Quartz Hill/Bonita Canyon	Minor Trailhead Planned	Dirt/Rock Work: \$10.41 per LF @ 13,000 LF = \$135,330.00 Gravel: \$12.21 per LF @ 13,000 LF = \$158,730.00 Fencing: \$15.00 per LF @ 2,000 LF = \$30,000.00 Total: \$324,060.00	Culvert: \$478.80 Cattleguard: \$5,500.00 Kiosk: \$550 Bulletin Board: \$2,000.00 Parking Bumpers: 20 bumpers @ \$75.00 = \$1,500.00 Total: \$10,028.80	\$334,088.80
Bluewater	Upgrade into a Major Trailhead Planned	Dirt/Rock Work: \$10.41 per LF @ 15,000 LF = \$156,150.00 Gravel: \$12.21 per LF @ 15,000 LF = \$183,150.00 Fencing: \$15.00 per LF @ 3,000 LF = \$45,000.00 Total: \$384,250.00	Culverts: \$478.80 ea. @ 2 culverts = \$957.60 Cattleguard: \$5,500.00 Kiosk: \$550 Bulletin Board: \$3,000.00 Parking Bumpers: 30 bumpers @ \$75.00 = \$2,250.00 Total: \$11,257.60	\$396,507.60
McGaffey	No Additional Trailhead Planned			\$0.00

Milk Ranch	Upgrade into a Minor Trailhead Planned	Dirt/Rock Work: \$10.41 per LF @ 13,000 LF = \$135,330.00 Gravel: \$12.21 per LF @ 13,000 LF = \$158,730.00 Fencing: \$15.00 per LF @ 2,000 LF = \$30,000.00 Total: \$324,060.00	Culvert: \$478.80 Cattleguard: \$5,500.00 Kiosk: \$550 Bulletin Board: \$2,000.00 Parking Bumpers: 20 bumpers @ \$75.00 = \$1,500.00 Total: \$10,028.80	\$334,088.80
Ramah	Major Trailhead Exists, and is in excellent condition			\$0.00
Ojo Redondo	Minor Trailhead Planned	Dirt/Rock Work: \$10.41 per LF @ 13,000 LF = \$135,330.00 Gravel: \$12.21 per LF @ 13,000 LF = \$158,730.00 Fencing: \$15.00 per LF @ 2,000 LF = \$30,000.00 Total: \$324,060.00	Culvert: \$478.80 Cattleguard: \$5,500.00 Kiosk: \$550 Bulletin Board: \$2,000.00 Parking Bumpers: 20 bumpers @ \$75.00 = \$1,500.00 Total: \$10,028.80	\$334,088.80
Twin Springs	Minor Trailhead Planned	Dirt/Rock Work: \$10.41 per LF @ 13,000 LF = \$135,330.00 Gravel: \$12.21 per LF @ 13,000 LF = \$158,730.00 Fencing: \$15.00 per LF @ 2,000 LF = \$30,000.00 Total: \$324,060.00	Culvert: \$478.80 Cattleguard: \$5,500.00 Kiosk: \$550 Bulletin Board: \$2,000.00 Parking Bumpers: 20 bumpers @ \$75.00 = \$1,500.00 Total: \$10,028.80	\$334,088.80
Limekiln	Minor Trailhead Planned	Dirt/Rock Work: \$10.41 per LF @ 13,000 LF = \$135,330.00 Gravel: \$12.21 per LF @ 13,000 LF = \$158,730.00 Fencing: \$15.00 per LF @ 2,000 LF = \$30,000.00 Total: \$324,060.00	Culvert: \$478.80 Cattleguard: \$5,500.00 Kiosk: \$550 Bulletin Board: \$2,000.00 Parking Bumpers: 20 bumpers @ \$75.00 = \$1,500.00 Total: \$10,028.80	\$334,088.80
1 Minor Trailhead Upgrade 4 Minor Trailhead Constructed 2 Upgrades from Parking Lots to 1 Minor Trailhead & 1 Major Trailhead		\$2,004,550.00	\$65,451.60	\$2,071,001.60

Based on this analysis, trailhead construction costs are estimated at around **\$2,100,000.00**.

While this number seems daunting at first, one must remember that the ZMTP expects that the County Road crews will provide all of the dirt & work from their County force accounts, as in-kind. The McKinley County Road Crew provided this service at both the Hilso Trailhead and Ramah Trailhead. This measure alone reduces the estimated total cost by \$832,800.

The remaining \$1,267,200 for trailhead construction will need to be fully grant funded. Again, the ZMTP feels confident that if approved the Zuni Mountain Trail System will be well positioned to acquire grant funding from programs such as Recreational Trails Program, Transportation Alternative Program, and Federal Lands Access Program for trailhead improvements, upgrades, and construction. Both the Hilso and Ramah Trailheads were built with County in-kind support and Recreational Trails Program funding.

**Trailhead
Construction
At-A-Glance**

Estimated Total Cost
for 6 trailheads and 1
upgrade:
\$2.1M

County In-kind Dirt/Rock
Work:
\$832,800

Cost per Year:
\$84,480.00

Potential Grant Sources:
RTP, TAP, and FLAP

8.5 Phase Built-Out and Incremental Maintenance Costs

As detailed in *Section 8.3*, this Plan recommends that trails and trailheads be phased in and developed over time. This provides for more sustainable development, adaptive management, and community controlled tourism to the extent possible. Simply, it makes sure we “do not get over of our handle bars” by outpacing construction of trails and assets with maintenance budget and capacities. This section provides a baseline analysis of built-out and incremental maintenance costs. The section will be further refined as part of the Operations, Maintenance, and Replacement Plan.

Near-Term (0 to 4 Years) Construction Cost Analysis

Recommended near-term trail and trailhead construction projects, include:

Trail Section	Existing Trail	New Trails	Reclaimed Trails	Total Costs
Quartz Hill/Bonita Canyon	0.0	20.1	10.0	\$265,305.00
Bluewater	9.1	15.7	20.8	\$425,385.00
McGaffey	20.5	5.2	0.0	\$230,460.00
Base Cost per Mile	\$9,200.00	\$8,050.00	\$10,350.00	
Total Construction Costs	\$272,320.00	\$330,050.00	\$318,780.00	\$921,150.00

Trail Section	Trailhead	Dirt/Rock Work and Gravel	Other Features	Total Costs
Quartz Hill/Bonita Canyon	Minor Trailhead Planned	Total: \$324,060.00	Total: \$10,028.80	\$334,088.80
Bluewater	Upgrade into a Major Trailhead Planned	Total: \$384,250.00	Total: \$11,257.60	\$396,507.60
Total Construction Costs				\$730,596.40

Near-Term (0 to 4 Years) Construction Costs

For the purposes of this plan, trail section and trailhead construction will total **\$1,651,746.40**.

Near-Term (0 to 4 Years) Maintenance Cost Analysis

Maintenance Costs below do not have additional costs due to events, heavy use, vandalism, or natural disasters. In 2018, there will be additional items such as trail intersection sign face and trail markers replacement, as outlined in *Section 7.4*. Using **Table 8-1**, we estimate an additional maintenance cost of \$15,000.00 for signage, marker, and bike cattelguard replacements. This number will be refined in the Operations, Maintenance, and Replacement Plan.

Trail System

Section	2015	2016	2017	2018
Ramah Mormon Pioneer Trail	6.1 miles of trail maintenance (Level 1) = \$3,050	6.1 miles of trail maintenance (Level 1) = \$3,050	6.1 miles of trail maintenance (Level 1) = \$3,050	6.1 miles of trail maintenance (Level 1) = \$3,050
Strawberry Canyon Trail	2.5 miles of trail maintenance (Level 1) = \$1,250	2.5 miles of trail maintenance (Level 1) = \$1,250	2.5 miles of trail maintenance (Level 1) = \$1,250	2.5 miles of trail maintenance (Level 1) = \$1,250
Hilso Trail System	26.0 miles of trail maintenance (Level 2) = \$26,000	26.0 miles of trail maintenance (Level 1) = \$13,000	26.0 miles of trail maintenance (Level 1) = \$13,000	26.0 miles of trail maintenance (Level 1) = \$13,000
Quartz Hill/Bonita Canyon	Under Construction	Under Construction	31.1 miles of trail maintenance (Level 2) = \$31,100	31.1 miles of trail maintenance (Level 1) = \$15,550
Bluewater	Planning	Planning	Under Construction	Under Construction
Annual Total	\$30,300.00	\$17,300.00	\$48,400.00	\$32,800.00

Trailhead Maintenance

Trailhead	2015	2016	2017	2018
Ramah	Basic Maintenance: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Hilso	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
McGaffey Lake	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Strawberry Canyon	Basic: \$2,000 Section 8.4 Costs: \$4,050	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Quartz Hill/Bonita Canyon	Under Construction	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Bluewater	Planning	Planning	Under Construction	Basic: \$2,000
Annual Total	\$12,050.00	\$10,000.00	\$10,000.00	\$12,000.00

Near-Term (0 to 4 Years) Maintenance Costs

For the purposes of this plan, trail section and trailhead maintenance will total **\$187,850.00**. In 2018, according to *Section 7.4*, we will need the County Road crews to provide additional trailhead maintenance, since this will be in-kind; it is not reflected in cost above. This number will be added as part of the Operations, Maintenance, and Replacement Plan.

Mid-Term (4 to 8 years) Construction Cost Analysis

Recommended near-term trail and trailhead construction projects include those projects slated for implementation in 2019, including:

Trail Section	Existing Trail	New Trails	Reclaimed Trails	Total Costs
Milk Ranch	16.2	2.5	2.7	\$197,110.00
Ramah\Pasture Hollow	6.1	5.5	2.1	\$122,130.00
Ojo Redondo	0.0	20.0	19.6	\$363,860.00
Base Cost per Mile	\$9,200.00	\$8,050.00	\$10,350.00	
Total Construction Costs	\$205,160.00	\$225,400.00	\$252,540.00	\$683,100.00

Trail Section	Trailhead	Dirt/Rock Work and Gravel	Other Features	Total Costs
Milk Ranch	Minor Trailhead Planned	Total: \$324,060.00	Total: \$10,028.80	\$334,088.80
Ojo Redondo	Minor Trailhead Planned	Total: \$324,060.00	Total: \$10,028.80	\$334,088.80
Total Construction Costs				\$668,177.60

Mid-Term (4 to 8 years) Construction Costs

For the purposes of this plan, trail section and trailhead construction will total **\$1,351,277.60**.

Mid-Term (4 to 8 years) Maintenance Cost Analysis

Maintenance Costs below do not have additional costs due to events, heavy use, vandalism, natural disasters. In 2022, there will be additional items such as trail intersection sign face and trail markers replacement, as outlined in *Section 7.4*. Using **Table 8-1**, we estimate an additional maintenance cost of \$30,000.00 for signage, marker, and bike cattelguard replacements. This number will be refined in the Operations, Maintenance, and Replacement Plan.

Trail System

Section	2019	2020	2021	2022
Ramah Mormon Pioneer Trail	6.1 miles of trail maintenance (Level 1) = \$3,050	6.1 miles of trail maintenance (Level 1) = \$3,050	Added to Ramah System below	Added to Ramah System below
Strawberry Canyon Trail	2.5 miles of trail maintenance (Level 1) = \$1,250	2.5 miles of trail maintenance (Level 1) = \$1,250	2.5 miles of trail maintenance (Level 1) = \$1,250	2.5 miles of trail maintenance (Level 1) = \$1,250
Hilso Trail System	26.0 miles of trail maintenance (Level 1) = \$13,000	26.0 miles of trail maintenance (Level 1) = \$13,000	26.0 miles of trail maintenance (Level 1) = \$13,000	26.0 miles of trail maintenance (Level 1) = \$13,000
Quartz Hill/Bonita Canyon	31.1 miles of trail maintenance (Level 1) = \$15,550	31.1 miles of trail maintenance (Level 1) = \$15,550	31.1 miles of trail maintenance (Level 1) = \$15,550	31.1 miles of trail maintenance (Level 1) = \$15,550
Bluewater	45.6 miles of trail maintenance (Level 2) = \$45,600	45.6 miles of trail maintenance (Level 1) = \$22,800	45.6 miles of trail maintenance (Level 1) = \$22,800	45.6 miles of trail maintenance (Level 1) = \$22,800
Milk Ranch	Under Construction	25.7 miles of trail maintenance (Level 2) = \$25,700	25.7 miles of trail maintenance (Level 1) = \$12,850	25.7 miles of trail maintenance (Level 1) = \$12,850
Ramah\Pasture Hollow	Planning	Under Construction	13.7 miles of trail maintenance (Level 2) = \$13,700	13.7 miles of trail maintenance (Level 1) = \$6,850
Ojo Redondo	Planning	Planning	Under Construction	Under Construction
Annual Total	\$78,450.00	\$81,350.00	\$79,150.00	\$72,300.00

Trailhead Maintenance

Trailhead	2019	2020	2021	2022
Ramah	Basic Maintenance: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Hilso	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
McGaffey Lake	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Strawberry Canyon	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Quartz Hill/Bonita Canyon	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Bluewater	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Milk Ranch	Under Construction	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Ojo Redondo	Planning	Planning	Under Construction	Basic: \$2,000
Annual Total	\$12,000.00	\$14,000.00	\$14,000.00	\$16,000.00

Mid-Term (4 to 8 years) Maintenance Costs

For the purposes of this plan, trail section and trailhead maintenance will total **\$397,250.00**. In 2022, according to *Section 7.4*, we will need the County Road crews to provide additional trailhead maintenance, since this will be in-kind; it is not reflected in cost above. This number will be added as part of the Operations, Maintenance, and Replacement Plan.

Long-Term (8 to 15 years) Construction Cost Analysis

Recommended near-term trail and trailhead construction projects include those projects slated for implementation in 2023, including:

Trail Section	Existing Trail	New Trails	Reclaimed Trails	Total Costs
Twin Springs	8.6	30.4	4.0	\$365,240.00
Limekiln	0.0	12.2	7.3	\$173,765.00
Base Cost per Mile	\$9,200.00	\$8,050.00	\$10,350.00	
Total Construction Costs	\$205,160.00	\$225,400.00	\$252,540.00	\$539,005.00

Trail Section	Trailhead	Dirt/Rock Work and Gravel	Other Features	Total Costs
Twin Springs	Minor Trailhead Planned	Total: \$324,060.00	Total: \$10,028.80	\$334,088.80
Limekiln	Minor Trailhead Planned	Total: \$324,060.00	Total: \$10,028.80	\$334,088.80
Total Construction Costs				\$668,177.60

Long-Term (8 to 15 years) Construction Costs

For the purposes of this plan, trail section and trailhead construction will total **\$1,207,182.60**.

Long-Term (8 to 15 years) Maintenance Cost Analysis

Maintenance Costs below do not have additional costs due to events, heavy use, vandalism, natural disasters. In 2022, there will be additional items such as trail intersection sign face and trail markers replacement, as outlined in *Section 7.4*. Using **Table 8-1**, we estimate an additional maintenance cost of \$45,000.00 for signage, marker, and bike cattelguard replacements. This number will be refined in the Operations, Maintenance, and Replacement Plan.

Trail System

Section	2023	2024	2025	2026
Strawberry Canyon Trail	2.5 miles of trail maintenance (Level 1) = \$1,250	2.5 miles of trail maintenance (Level 1) = \$1,250	2.5 miles of trail maintenance (Level 1) = \$1,250	2.5 miles of trail maintenance (Level 1) = \$1,250
Hilso Trail System	26.0 miles of trail maintenance (Level 1) = \$13,000	26.0 miles of trail maintenance (Level 1) = \$13,000	26.0 miles of trail maintenance (Level 1) = \$13,000	26.0 miles of trail maintenance (Level 1) = \$13,000
Quartz Hill/Bonita Canyon	31.1 miles of trail maintenance (Level 1) = \$15,550	31.1 miles of trail maintenance (Level 1) = \$15,550	31.1 miles of trail maintenance (Level 1) = \$15,550	31.1 miles of trail maintenance (Level 1) = \$15,550
Bluewater	45.6 miles of trail maintenance (Level 1) = \$22,800	45.6 miles of trail maintenance (Level 1) = \$22,800	45.6 miles of trail maintenance (Level 1) = \$22,800	45.6 miles of trail maintenance (Level 1) = \$22,800
Milk Ranch	25.7 miles of trail maintenance (Level 1) = \$12,850	25.7 miles of trail maintenance (Level 1) = \$12,850	25.7 miles of trail maintenance (Level 1) = \$12,850	25.7 miles of trail maintenance (Level 1) = \$12,850
Ramah\Pasture Hollow	13.7 miles of trail maintenance (Level 1) = \$6,850	13.7 miles of trail maintenance (Level 1) = \$6,850	13.7 miles of trail maintenance (Level 1) = \$6,850	13.7 miles of trail maintenance (Level 1) = \$6,850
Ojo Redondo	39.6 miles of trail maintenance (Level 2) = \$39,600	39.6 miles of trail maintenance (Level 1) = \$19,800	39.6 miles of trail maintenance (Level 1) = \$19,800	39.6 miles of trail maintenance (Level 1) = \$19,800
Twin Springs	Under Construction	43.0 miles of trail maintenance (Level 2) = \$43,000	43.0 miles of trail maintenance (Level 1) = \$21,500	43.0 miles of trail maintenance (Level 1) = \$21,500
Limekiln	Planning	Under Construction	19.5 miles of trail maintenance (Level 2) = \$19,500	19.5 miles of trail maintenance (Level 2) = \$9,750
Annual Total	\$111,900.00	\$135,100.00	\$133,100.00	\$123,350.00

Trailhead Maintenance

Trailhead	2023	2024	2025	2026
Ramah	Basic Maintenance: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Hilso	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
McGaffey Lake	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Strawberry Canyon	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Quartz Hill/Bonita Canyon	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Bluewater	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Milk Ranch	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Ojo Redondo	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Twin Springs	Under Construction	Basic: \$2,000	Basic: \$2,000	Basic: \$2,000
Limekiln	Planning	Under Construction	Basic: \$2,000	Basic: \$2,000
Annual Total	\$14,000.00	\$18,000.00	\$20,000.00	\$20,000.00

Long-Term (8 to 15 years) Maintenance Costs

For the purposes of this plan, trail section and trailhead maintenance will total **\$620,450.00**. In 2026, according *Section 7.4*, we will need the County Road crews to provide additional trailhead maintenance, since this will be in-kind; it is not reflected in cost above. This number will be added as part of the Operations, Maintenance, and Replacement Plan. For the purposes of this Plan, the ZMTP estimated maintenance costs out until 2026, future updates and the Operations, Maintenance, & Replacement Plan will need to outline future costs. Estimating these costs now would give a false sense of the true maintenance cost, as costs change over time due to inflation, materials costs, etc.

Additionally during this period, cattleguards may need to be replaced, as well as trail kiosk, bulletin boards, and signage. These will need to be a special request to the counties or done through a grant as a maintenance need.

8.6 Overview of Annual Costs

Based on basic cost calculations from the previous Section, below are the annual costs to provide a quick snapshot over a 10-Year period.

- The reality is that this built-out is more likely over a 15-20 year period.
- For this analysis, we left in the trailhead gravel and dirt work cost even though we are confident County Road crews will provide this work, but it is a substantial that should be analyzed and understood.
- The trail and trailhead construction costs are divided evenly over a 4-year period to compare with the near-, mid-, and long-term phasing approach.
- These costs are very similar to those derived in *Section 8.4* above.

Items	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-Year Total
Trail Construction	\$230,287.50	\$230,287.50	\$230,287.50	\$230,287.50	\$170,775.00	\$170,775.00	\$170,775.00	\$170,775.00	\$134,751.30	\$134,751.30	\$134,751.30	\$134,751.30	\$2,143,255.20
Trailhead Construction	\$182,648.10	\$182,648.10	\$182,648.10	\$182,648.10	\$167,044.40	\$167,044.40	\$167,044.40	\$167,044.40	\$167,044.40	\$167,044.40	\$167,044.40	\$167,044.40	\$2,066,947.60
Trail Maintenance	\$30,300.00	\$17,300.00	\$48,400.00	\$32,800.00	\$78,450.00	\$81,350.00	\$79,150.00	\$72,300.00	\$111,900.00	\$135,100.00	\$133,100.00	\$123,350.00	\$943,500.00
Trailhead Maintenance	\$12,050.00	\$10,000.00	\$10,000.00	\$12,000.00	\$12,000.00	\$14,000.00	\$14,000.00	\$16,000.00	\$14,000.00	\$18,000.00	\$20,000.00	\$20,000.00	\$172,050.00
Total Cost per Year	\$455,285.60	\$440,235.60	\$471,335.60	\$457,735.60	\$428,269.40	\$433,169.40	\$430,969.40	\$426,119.40	\$427,695.70	\$454,895.70	\$454,895.70	\$445,145.70	\$5,325,752.80

Going forward if the Trail System is designated, the ZMTP recommends:

1. Development of a map and table of all **Trail Improvements by Segment** with actual cost estimates (see *Section 6.2*);
2. Development of an **Operations, Maintenance, & Replacement Plan** and **maintenance agreement** with USFS (either stand-alone or as part of an MOU update);
3. As part of the OM&R Plan, establishment of a maintenance **line-item and annual commitment** from both counties that is indexed to system expansion (above in-kind Road Crew support of Trailheads);
4. Securing commitments from regional **Youth Conservation Corps program** and incorporate projects in “Trail Improvements by Segment” and Maintenance projects into annual Work Plans;
5. Establishing a **Project & Resource Strikeforce Team** to time projects with application and funding cycles, as well as, deploy youth crews and volunteer assistance activities as approved by USFS; and
6. Formalizing how events and tour businesses will support trail maintenance needs, and although this Plan assumes that **USFS financial commitment** is limited to in-house personnel costs, there may be roles and expertise that USFS can bring to table that the ZMTP does not currently have.

8.7 Funding Opportunities

The Zuni Mountains Trail Partnership and its members have a strong history of locating and winning funding to support planning, design, construction, maintenance, and improvements for the trails and associated infrastructure. Not including YCC grant funding awards totaling over \$4M, the Northwest New Mexico Council of Governments (NWNMCOG), USFS, and Cibola and McKinley counties have led several successful grant applications. Adventure Gallup & Beyond, one of the region’s leading organizations for trails development, has a proven track record of financing and coordinating volunteers to develop adventure trails and venues including High Desert Trail System, Red Rock Trail System, Ramah Trail System, Mentmore Rock Climbing Area, Gallup Shooting Range, and Gallup ATV/Motorcross Park.

Secure Rural Schools Title II RAC Funding

Year	County	Project	Amount
2009	Cibola & McKinley	Zuni Mountains Trail System, planning and NEPA services	\$150,000
2010	Cibola & McKinley	Zuni Mountains Trail System Ph 2	\$75,000
2010	Cibola	Mt. Taylor Trail Maintenance Project	\$38,546
2011	Cibola	Zuni Mountains Trail System Ph 2B	\$75,000
2011	Cibola	Mt. Taylor ATV/UTV Trail Implementation	\$71,510
2011	Cibola	Mt. Taylor-Bluewater Creek Parking Area Pole Fence Project	\$27,900
2011	McKinley	McGaffey Area Trail Maintenance and Conservation Project	\$28,594
2012	McKinley	Zuni Mountains Trail System Project – Cattleguard & Signage	\$29,386
2012	Cibola	Mt. Taylor ATV/UTV Trail Implementation	\$40,000
2012	Cibola	Mt. Taylor Noxious Weed Project	\$9,795
2012	Cibola	Forest Road 180 Improvement	\$25,050
TOTAL			\$570,781

SRS Title II funding is administered by the Northern NM Resource Advisory Committee, and both counties have shown a high level of support in using Title II monies for trail system development, maintenance, and enhancements.

Recreational Trails Program

Year	County	Project	Amount
2009	McKinley	Hilso Trailhead & McGaffey Area Trail System	\$227,894
2010	McKinley	Ramah Trail System & Trailhead	\$154,331
TOTAL			\$382,225

RTP is now being administrated by the NM Department of Transportation and Aaron Detter is the interim program manager. The last cycle of RTP was in 2010, and will be offered again in 2014.

Other Grant Funding Opportunities being targeted

Type	Name	Description
Local	Local Trail Maintenance line-items or In-kind Contribution equivalents	Both counties realize that as trails are developed, a proportionate amount of maintenance funding will be needed on an annual and ongoing basis. McKinley County is considering a proposal to create a line-item of \$20,000 to start contracting with Youth Conservation Corps.
	Local Lodger's Tax	The City of Grants and the City of Gallup may be willing to add some lodgers' tax to help market and publicize the trail system in partnership with USFS. These funds could be leverage to apply to the NM Cooperative Tourism Marketing Program, which is how Adventure Gallup & Beyond (AGB) funded its mapguide, shown on Page #38.
	Local Quality of Life GRT	The State of New Mexico allows local counties and cities to pass a tax for quality of life initiatives. None have passed this special tax to date.
State	Transportation Alternative Program www.fhwa.dot.gov	MAP-21 establishes a new program to provide for a variety of alternative transportation projects, including many that were previously eligible activities under separately funded programs. The TAP replaces the funding from pre-MAP-21 programs including Transportation Enhancements, Recreational Trails, Safe Routes to School, and several other discretionary programs, wrapping them into a single funding source. Funding is prioritized by NWNM Regional Transportation Planning Organization.
	State Tourism Department & State Parks Division	The COG and local Chambers have applied for strategic tourism investments and infrastructure improvements, including improvements to Bluewater State Park that could augment the Zuni Mountains Trail System.
	Tribal Infrastructure Fund www.iad.state.nm.us	The State of NM offers capital outlay for Native American communities and critical infrastructure. Projects would have to be owned by tribes or pueblos, and would need to be applied for by a tribal community.
Federal	Federal Lands Access Program www.cflhd.gov	FLAP Provides funds for work on public highways, roads, bridges, trails, and transit systems that are located on, are adjacent to, or provide access to Federal Lands. These facilities must be owned or maintained by a state, county, town, township, tribe, municipal, or local government. This program is a new program, being created under Moving Ahead for Progress in the 21st Century (MAP-21). This program places emphasis on projects that provide access to high-use recreation sites or economic generators.
	TIGER Grant (FHWA) www.dot.gov/tiger	The Transportation Investment Generating Economic Recovery, or TIGER Discretionary Grant program, provides a unique opportunity for the US Department of Transportation to invest in road, rail, transit, trails, and port projects that promise to achieve critical national objectives.
	Tribal Transportation Program www.fhwa.dot.gov	BIA provides funding for tribal entities including all MAP-21 programs.
Private	McCune Foundation www.nmmccune.org	A NM foundation that funded AGB through its developmental phases, and invested in creating adventure tourism as an economic driver.
	Healthy People –Healthy Places www.conalma.org	Con Alma Health Foundation, several health providers in NM support improvements to the built environment.

Specialized Dealer Grant www.specialized.com	Gallup currently has a local retailer selling Specialized bikes.
IMBA Bikes Belong Grant www.imba.com	International Mountain Bike Association
People for Bikes www.peopleforbikes.org	
American Trails Library www.americantrails.org	A database of funding sources.

8.8 Additional Acknowledgements

Local Professional & Technical Consultants who have spent time on this project: **Strider Brown**, Trail Engineer and Land Restoration Specialist; **William Siebersma**, Artist and Trail Designer; **Lee Perlow**, Principal, Perlow Mapping & Design, LLC.; Tom Mayer, Trail Specialist; **Brian Leddy**, Photographer; **Karl Lohmann**, Youth Advocate & YCC Director; and **Chuck Van Drunen**, Trail Mapper and Media Arts & Publishing .

This document has been prepared with assistance from the Rivers, Trails and Conservation Assistance Program (RTCA) which helps carry out the National Park Service's conservation and outdoor recreation mission. As one of the agency's leading community assistance programs, RTCA is uniquely positioned to increase the value and benefits of the NPS by helping communities across the country conserve and restore waterways, preserve open spaces and parks, develop trails and greenways, and provide opportunities for outdoor recreation.

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8.9 System Maps

On the following pages are the system maps.

- Zuni Mountain Trail System, map creation scale 1:250,000
- Limekiln Trail System, map creation scale 1:30,000
- Ramah Trail System, map creation scale 1:30,000
- Quartz Hill Trail System, map creation scale 1:30,000
- Ojo Redondo Trail System, map creation scale 1:100,000
- Bluewater Trail System, map creation scale 1:100,000
- Twin Springs Trail System, map creation scale 1:100,000
- Milk Ranch Trail System, map creation scale 1:100,000
- McGaffey Trail System, map creation scale 1:100,000