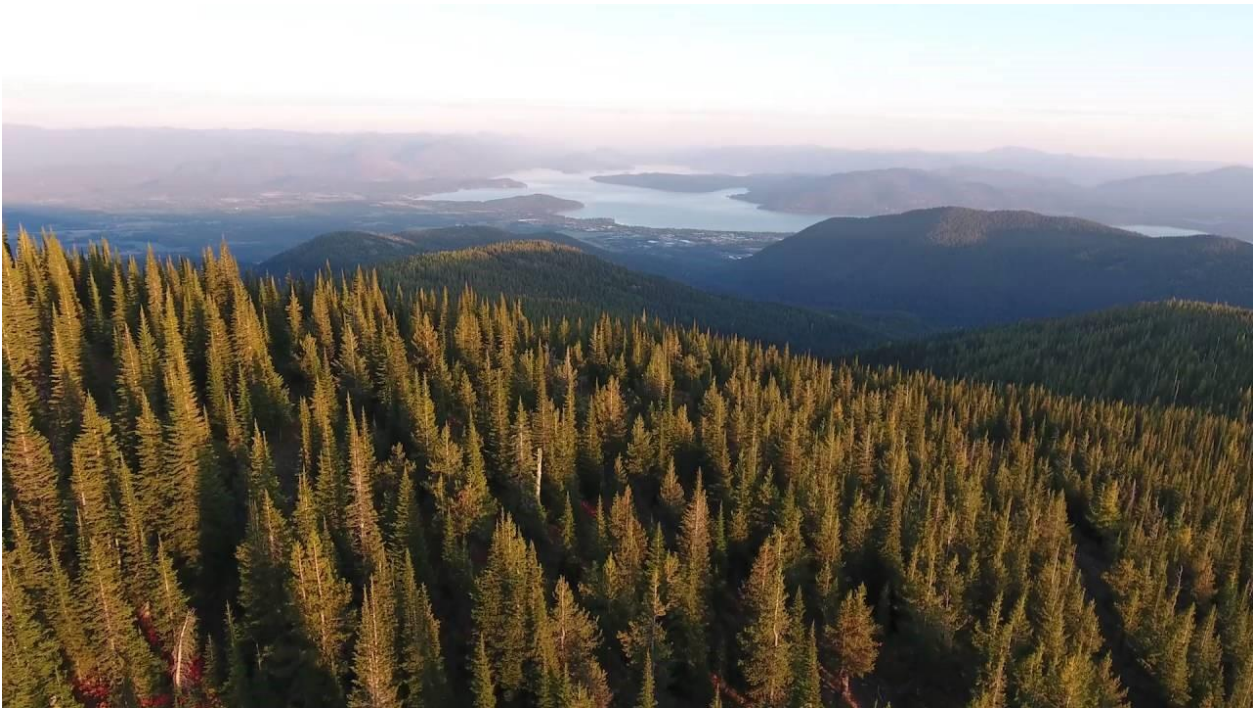


A Research Paper by



Best Practices for Watersheds & Recreation



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Best Practices for Watersheds & Recreation

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ABOUT HEADWATERS ECONOMICS

Headwaters Economics is an independent, nonprofit research group whose mission is to improve community development and land management decisions.

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Cover Photo: Schweitzer Mountain Resort overlooking Sandpoint, Idaho. Scott Rulander, Gem Vision Productions

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I. EXECUTIVE SUMMARY

Providing clean drinking water to rapidly growing communities in the West is an ongoing challenge. Residential development, wildfire risk, and variable rainfall are increasing at the same time as demand for places to exercise and recreate outdoors. With the rising role of outdoor recreation as an economic driver, balancing these needs in our municipal watersheds is challenging.

Information is needed by many communities that own their municipal watersheds to inform decisions about whether and how recreation could be permitted. This study provides information about the opportunities and challenges communities have addressed regarding recreational access in municipal watersheds. It was developed to help inform Sandpoint, Idaho's discussion of allowing recreational access in its municipal watershed.

In general, little data exist about the impacts of recreation on municipal watersheds, but the two primary concerns are sedimentation and erosion, and contamination from human and animal waste. Communities have found many of these concerns can be mitigated through sustainable trail construction and by providing adequate facilities for recreational users.

Not all communities in the West own the land that provides them with drinking water, but the places with ownership have a unique opportunity to creatively meet water quality standards and growing demands for recreation, aligning multiple community values. Communities apply a variety—and often a combination—of strategies, from prohibiting access in portions of the watershed, to allowing dispersed recreation, to permitting concentrated recreation at developed sites. Each strategy presents its own distinct opportunities and challenges. While prohibiting all forms of recreation is a strategy in some places, it is important to note that excluding recreation is not a passive alternative and requires capacity for enforcement, monitoring, and education.

This report profiles four communities that allow recreation on their municipal watersheds: Whitefish, Montana; Bozeman, Montana; Tacoma, Washington; and Salt Lake City, Utah. For each, we describe their collaborative management processes, identify the challenges they face, and offer key takeaways that may be applicable to Sandpoint and other communities.

Across these communities, common best practices that help drive success include:

- Build a robust public engagement process that incorporates early and ongoing feedback from the community;
- Design proactive, collaborative written management plans that use the best available data about the watershed's ecology and water quality and that apply best management practices in the design and maintenance of recreation infrastructure;
- Develop strong partnerships with land management agencies and nonprofit partners that build on existing expertise to inform management practices;
- Integrate public education into watershed management; and
- Gather and monitor baseline data to measure changes in water quality over time.

Providing recreation on municipal watershed lands is important for many communities economically and socially, helping to protect quality of life and a sense of community. Communities find added value in the public education, stewardship, and support that result from giving citizens recreational access to watershed lands.

II. INTRODUCTION

The peaks and forested lands around western communities provide multiple community amenities: timber products, jobs in forestry and land management, scenic viewsheds for residents and visitors, wildlife habitat, and outdoor recreational opportunities. Streams in nearby mountains also provide clean drinking water for many communities.

Where communities rely on surface watersheds for municipal water supply, managing watersheds for multiple community values can be complicated. Municipal utility organizations, state and national forest managers, fishery and habitat conservationists, private landowners, and recreational user groups share the resources in often diverse ways. Many communities own only small portions of the land, if any, where their water is sourced, and they rely on larger land management agencies to help control the resources. There is no typical model for watershed management, and little data and scientific literature exist that provide templates for how to manage multiple values in municipal watersheds.

Recreation can be a challenging topic for watershed managers. Protecting water quality, habitat, and forest health are always the primary objectives in municipal watersheds, but communities also value outdoor recreation for its contributions to local economies and quality of life. Protecting water quality for growing populations is critical; growing populations want to be able to recreate in the nearby mountains. Determining when, where, and how recreation is compatible with protecting resource values varies from community to community.

The City of Sandpoint, Idaho gets its drinking water primarily from the Little Sand Creek watershed (Figure 1). A recent Trail Plan¹ adopted by Bonner County identifies potential new trail connections through the city-owned land in the Little Sand Creek watershed, linking the City of Sandpoint with the nearby ski resort of Schweitzer Mountain. Unauthorized recreation such as hiking, biking, and skiing has been occurring in the watershed, and the City is already working with local user groups to make these unauthorized trails more sustainable.

Whether, where, and how trail access could be permitted through the city's watershed land is a complex question, but strategies executed in other communities can inform Sandpoint's plan should it decide to allow recreation.

The purpose of this study is to provide the residents and City of Sandpoint and other communities with information about the opportunities and challenges around recreational access in municipal watersheds. We provide a summary of background literature about the impacts of recreation on water quality and then provide case studies of four communities in the western United States that use a range of strategies to manage recreation compatibly with municipal watershed resources (Table 1). These case studies were selected because they provide examples of different management plans and different experiences that are instructive, despite different watershed and community sizes. This is not intended to be an exhaustive list of all municipalities that have considered allowing recreation.

We describe their collaborative management processes, identify the challenges they face, and offer key takeaways that may be applicable to Sandpoint and other communities.

Figure 1. Sandpoint's Little Sand Creek Watershed.



Table 1. Case Studies of Recreation in Municipal Watersheds

City	Approx. Water Customers	Recreation Permitted
Whitefish, Montana	7,000	Dispersed recreation and access to trails. Motorized vehicles permitted on access roads.
Bozeman, Montana	45,000	Developed trails, campgrounds, picnic areas; dispersed camping also allowed.
Tacoma, Washington	320,000	Dispersed hiking and camping in limited area of watershed.
Salt Lake City, Utah	350,000	Developed trails, campgrounds, picnic areas. No dogs permitted. No wading permitted.

¹ Bonner County Trail Plan. 2016. The Trust for Public Land.
https://www.tpl.org/sites/default/files/files_upload/Bonner%20County%20Trails%20Plan.pdf

III. MANAGING RECREATION & MULTIPLE WATERSHED VALUES

The potential impacts of recreation—both positive and negative—on a community watershed must be carefully weighed. This section summarizes existing literature about the potential benefits of recreation on economic development and quality of life, and the potential negative impacts of recreation on water quality.

The Potential Benefits to Economic Development and Quality of Life

Outdoor recreation directly benefits a community's economic growth. As western communities compete for new businesses, try to attract new residents, and draw in visitors, many cities and towns increasingly recognize the value of outdoor recreation for economies, health, and quality of life.

The economy of a region is boosted by outdoor recreation in three main ways: bringing in revenue through tourism, fostering growth in outdoor recreation industries, and helping to attract and retain businesses and workers. Community characteristics that improve quality of life such as scenic beauty, low crime, and recreation opportunities are particularly important for recruiting businesses and entrepreneurs to rural places and allowing them to capitalize on natural assets.¹

For example, the diverse and resilient economy of Sandpoint and Bonner County, Idaho is strengthened by the access to outdoors, natural amenities, and quality of life, which make it easier to attract and retain new businesses and employees.² In fact, a recent survey showed that outdoor recreation and access to lakes and rivers were among the top reasons residents choose to live in Bonner County.³ The survey also showed that 77 percent of respondents have used trails in the last year, and more than three-quarters of respondents strongly support the development of an expanded and better connected trail system.

While the need and demand for recreation exists, it is critical to balance the interest for expanded recreation with protection of resources. In exploring whether to allow recreation on Sandpoint-owned land in the Little Sand Creek watershed, compatibility of uses with maintaining clean drinking water will be paramount.

The Potential Impacts on Water Quality

Few studies quantify the impacts of recreation on municipal water quality.⁴ Two recent reports^{5,6} synthesize research findings about recreation impacts on general ecology, but do not focus on drinking water.

In general, the severity of impacts to water quality are tied to the proximity of activities to the water source. Concentrated recreation has a higher impact on water quality than dispersed recreation, particularly where it occurs close to water sources.⁷ Campgrounds, ski resorts, water recreation, and other forms of concentrated recreation can result in contamination from fuel residues and service facilities, and sedimentation from runoff of soil and construction materials. Direct contamination of water sources from fuel emissions and runoff are possible where roads or off-road-vehicle use is proximate to streams. However, degradation from such pollutants is typically not long-term.

Dispersed recreation, such as non-motorized trails for hiking and biking, tend to have more limited impacts on water quality, as they generally only affect small portions of the watershed,⁸ and impacts are especially limited when activities are located far from water sources. Impacts typically fall into two categories: sedimentation and erosion, and contamination from microorganisms. Because non-motorized trails are a primary question in Sandpoint, Idaho, these issues are explored further below.

Sedimentation and Erosion

Impacts of non-motorized recreation on sedimentation and erosion vary greatly with proximity to streams, soil types, climate, vegetation, and topography, but some patterns are consistent. Studies have found that rates of erosion from recreational trails tends to be similar to that of roads, but the total sediment load is lower because of the narrow trail surface area.⁹ Studies show that hiking and mountain biking contribute roughly the same soil erosion.¹⁰ Sedimentation and erosion from horseback riding are generally more than other forms of non-motorized recreation.¹¹ Soil loss during trail construction is expected, but can be minimized through good construction management. Erosion after trail construction can be minimized through sustainable trail construction. Today's best practices call for designing trails that have frequent grade reversals so that the trail frequently tilts toward the outer edge, allowing water to drain off the trail rather than flow on top of the trail tread.¹²

Sedimentation impacts on water quality are most pronounced near stream banks and at stream crossings. These impacts can be mitigated by separating trails from streams with distance and vegetative buffers and using sustainable water crossing designs that minimize erosion.¹³ Hardening banks where trail users are likely to access the water can further prevent soil loss.

Vegetation changes can also increase sedimentation and erosion. Where off-trail trampling of vegetation occurs, plant recovery can be very slow and can create a visible path that encourages other users, making rehabilitation more difficult. The resulting lack of vegetative cover can increase sedimentation and runoff. This type of vegetation damage can be minimized through good trail design that eliminates opportunities for users to cut switchbacks or develop other shortcuts. If a shortcut is created, it is best to restore and rehabilitate it as quickly as possible to avoid soil compaction and continued use.

Introduction of non-native plant species that outcompete native vegetation can also occur with trail access and can negatively impact water quality, but introduction tends to be most substantial from livestock along trail corridors.¹⁴ In general, hikers and bikers are less likely to transport non-native species, and one study found little difference between the introduction of invasive species between hiking and biking, and the impact was limited to a narrow width along the centerline of the trail.¹⁵ The risk of introduction of non-natives is also heightened during construction from equipment that has not been cleaned.

Human-caused wildfire ignitions are also a concern for sedimentation and erosion. Wildfire can remove the vegetation and expose the soil to runoff. Some fire conditions can cause chemical changes in the soil, resulting in water-repellent soils that don't absorb the water, causing sheet erosion across large expanses and causing significant water quality issues. Human-ignited wildfires, however, tend to be closest to populated areas and aligned with transportation networks. Prohibiting all fires and limiting overnight camping can mitigate the risk of ignition in recreation areas.

Contamination

A major concern of recreation within municipal watersheds is the transmission of pathogenic organisms from improperly managed human and animal waste. Contamination generally occurs when fecal matter containing microorganisms makes direct contact with water.

Little research quantifies the impacts of recreation on water contamination, and it is difficult to differentiate whether the source of contamination is wild animals, domesticated animals, or humans. In the few studies that have attempted to correlate the intensity of recreation with water contamination, the results are mixed,¹⁶ ranging from positive to negative to no correlation depending on the study. The variety of outcomes may be because the impacts of recreation are minimal in comparison to the impact of wildlife. In at least one study, bacterial contamination decreased in a watershed after it was opened to recreation¹⁷ – likely because wildlife that contributed contamination dispersed when recreationists started appearing.¹⁸

Strategies to mitigate possible contamination include providing adequate toilet facilities, limiting or prohibiting pets and pack animals, and educating visitors in proper waste disposal. Limiting access to day use can significantly reduce contamination.




Table 2. Water Quality Concerns & Mitigations Related to Non-Motorized Recreation		
Water Quality Concern	Possible Sources	Possible Mitigations
Sedimentation and Erosion	Trail Construction	Use best practices during construction to minimize erosion.
	Trail Tread	Design and build trail with sustainable practices that divert water off trail. Physically separate trails from streams. Consider restrictions on types of trail use that cause more sedimentation (e.g., horseback riding).
	Water Crossings	Construct sustainable crossings that minimize contact with water and discourage wading. Harden streambanks where trail users are likely to access the water.
	Vegetation Loss	Design trail to minimize user-generated shortcuts. Restore and reclaim trampled areas quickly.
	Introduction of Non-Native Species	Use clean construction equipment. Consider restrictions on types of use that tend to be more significant vectors for non-native species (e.g., pack animals and dogs). Educate users about the spread of non-native species.
	Wildfire	Prohibit or limit campfires. Consider closing areas to overnight camping.
Contamination	Human Waste	Provide adequate facilities at trailheads. Educate users about proper disposal of waste. Consider closing areas to camping and allowing day-use only.
	Animal Waste	Consider restrictions on pets and pack animals. Educate users about proper disposal of dog waste. Provide facilities for disposal of dog waste.

Community Strategies

Many communities do not own the land that sources their drinking water so they lack control over where and how recreation can take place. For communities that own the land supplying their drinking water, land management strategies have to be adaptive to community changes such as growing populations, increasing water demand, and changing recreational demands, as well as to external factors such as risks posed by wildfire and climate change. The economic and social importance of outdoor recreation is emerging at a different pace across communities and through time.

In general, communities employ three broad strategies to manage recreation in municipal watersheds (Figure 2, Figure 3). Many communities employ combinations of all three strategies in different portions of their watershed:

- Close the watershed (or highly sensitive portions of the watershed) to recreation.
- Permit dispersed recreation, such as non-motorized trail use and dispersed backcountry camping.
- Permit concentrated recreation at developed facilities such as campgrounds, picnic areas, and boat launches.

Figure 2. Examples of Community Strategies		
 Closed to Recreation	 Dispersed Recreation	 Concentrated Recreation
<p>Examples:</p> <ul style="list-style-type: none"> • Portland, Oregon • Boulder, Colorado • Santa Fe, New Mexico <p>Watershed closed to public access. Requires enforcement capacity, physical barriers, public education.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Whitefish, Montana* • Tacoma, Washington* • Bend, Oregon¹⁹ <p>Recreation permitted in some areas, but generally dispersed along trail corridors or backcountry. Other than trailheads, access is not concentrated at developed sites.</p>	<p>Examples:</p> <ul style="list-style-type: none"> • Salt Lake City, Utah* • Bozeman, Montana* • Medford, Oregon²⁰ <p>Recreation permitted in some areas and managed through developed access points such as trailheads, picnic areas, and campgrounds.</p>

**Detailed case study included in this report.*

Closed Watersheds

Some communities prohibit recreation in their municipal watersheds to avoid any possibility of water contamination, allowing access only to utility personnel and forest managers. Closure of watersheds is not a passive, no-action alternative. It often requires capacity in law enforcement, maintenance of physical barriers such as fences and gates, and excellent public outreach campaigns to enforce and explain closures. In these places, guided tours are sometimes available for educational purposes, but numbers are restricted. Litigation and public debate requesting the watershed be opened to recreation, logging, hydropower, and other activities are not uncommon.

In Portland, Oregon, the Bull Run Watershed has been closed to recreation, logging, and other activities since the late 1800s, except for a period from 1958 to 1977 when logging was allowed. A U.S. Forest Service proposal to open a portion of the watershed to recreation in the 1970s was met with wide criticism from Portlanders concerned about water quality. The U.S. Forest Service withdrew its proposal.²¹ Later, logging activities were halted following litigation from activists concerned about impacts of timber activities on water quality.

Figure 3. Locations of Community Strategy Examples



The City of Santa Fe, New Mexico has kept its Upper Santa Fe River Watershed closed to the public since 1923, largely to minimize risk of wildfire ignition. After decades of fire suppression in the Southwest forest, which historically burned with more frequent, low-intensity surface fires, the vegetation in the watershed is largely overstocked and at high risk to catastrophic wildfire. The City of Santa Fe is taking proactive steps to treat and restore the watershed's forest, including use of prescribed fire and thinning. Hikes within the watershed are permitted when guided by the utility or partner organizations such as the Santa Fe Watershed Association and The Nature Conservancy.²²

Boulder, Colorado owns land in the Silver Lake Watershed and keeps it closed to the public. The watershed supplies approximately 40 percent of the water for the City of Boulder, and is located in an alpine area fed by snowmelt and glacial runoff. The sensitive nature of the high-elevation watershed makes it particularly susceptible to damage from recreation. Other Boulder municipal water sources are open to public recreation.

Some communities limit access within highly sensitive portions of the watershed, allowing access in the balance of the area. For example, Tacoma, Washington and Medford, Oregon each have sensitive areas that remain closed while other portions of the watershed are open to recreation.

Watersheds with Managed Recreation

Some communities deploy strategies to prioritize water quality while still allowing for dispersed and/or concentrated recreation in portions of the watershed.

To minimize risk to water quality, most communities develop restrictions such as limits on:

- Temporal access, such as day-use only or closures during sensitive seasons;
- Types of access, such as prohibiting motorized recreation or restricting access to dogs and pack animals;
- Geographic access, such as concentrating users at managed, developed sites such as campgrounds and picnic areas and not allowing dispersed access throughout the watershed.

Many communities find that managed recreation provides an important opportunity for public engagement, leveraging recreational access into educational opportunities, generating new interest in watersheds, and helping develop a sense of ownership and stewardship over the resources. A public that feels committed to the watershed and acts as an advocate for watershed protection can help management agencies ensure that resources are not developed or compromised in other ways. Finding the balance between recreation and watershed protection is an ongoing, adaptive process.

To provide examples of how communities in the West strive to achieve this balance, four case studies follow.²³ They describe the tools and strategies municipalities use to manage recreation in their municipal watersheds.

¹ Johnson, JD and R Rasker. 1995. The role of economic and quality of life values in rural business location. *Journal of Rural Studies* 11(4): 405-416.

² Bonner County, Idaho's Resilient Economy. May 2015. Headwaters Economics.
https://headwaterseconomics.org/wp-content/uploads/Bonner_County_Report.pdf

³ Bonner County Trails. Final Survey Results. February 2016. Headwaters Economics.
http://headwaterseconomics.org/wp-content/uploads/Trail_Study_115-ID-Bonner-County-Trails.pdf

⁴ Dissmeyer, George E. 2000. *Drinking Water from Forests and Grasslands: A Synthesis of the Scientific Literature*. George E. Dissmeyer, Editor. USDA Forest Service Southern Research Station General Technical Report SRS-39.

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- ⁵ Marion, Jeff and Jeremy Wimpey. 2007. Environmental Impacts of Mountain Biking: Science Review and Best Practices. From *Managing Mountain Biking: IMBA's Guide to Providing Great Riding*. http://www.imbacanada.com/sites/default/files/Marion_Wimpey_Review%20and%20Best%20Practices.pdf
- ⁶ Pickering, Catherine Marina, Wendy Hill, and Yu-Fai Leung. 2010. Comparing hiking, mountain biking, and horse riding impacts on vegetation and soils in Australia and the United States of America. *Journal of Environmental Management* 91: 551-562.
- ⁷ Ibarra, Myriam and Wayne C. Zipperer. 2000. Chapter 7: Concentrated Recreation. In: *Drinking Water from Forests and Grasslands: A Synthesis of the Scientific Literature*. George E. Dissmeyer, Editor. USDA Forest Service Southern Research Station General Technical Report SRS-39.
- ⁸ Cole, David. 1981. Vegetational changes associated with recreational use and fire suppression in the Eagle Cap Wilderness Oregon: some management implications. *Biological Conservation* 20: 247-270.
- ⁹ Elliot, W. J. 2000. Chapter 9: Roads and Other Corridors. In: *Drinking Water from Forests and Grasslands: A Synthesis of the Scientific Literature*. George E. Dissmeyer, Editor. USDA Forest Service Southern Research Station General Technical Report SRS-39.
- ¹⁰ Pickering, Catherine Marina, Wendy Hill, and Yu-Fai Leung. 2010. Comparing hiking, mountain biking, and horse riding impacts on vegetation and soils in Australia and the United States of America. *Journal of Environmental Management* 91: 551-562.
- ¹¹ Ibid.
- ¹² Marion, Jeff and Jeremy Wimpey. 2007. Environmental Impacts of Mountain Biking: Science Review and Best Practices. From *Managing Mountain Biking: IMBA's Guide to Providing Great Riding*. http://www.imbacanada.com/sites/default/files/Marion_Wimpey_Review%20and%20Best%20Practices.pdf
- ¹³ Ibid.
- ¹⁴ Pickering, Catherine Marina, Wendy Hill, and Yu-Fai Leung. 2010. Comparing hiking, mountain biking, and horse riding impacts on vegetation and soils in Australia and the United States of America. *Journal of Environmental Management* 91: 551-562.
- ¹⁵ Thurston, E., and R. J. Reader. 2001. Impacts of experimentally applied mountain biking and hiking on vegetation and soil of a deciduous forest. *Environmental Management* 27(3): 397-409.
- ¹⁶ Cole, David. Chapter 8: Dispersed Recreation. In: *Drinking Water from Forests and Grasslands: A Synthesis of the Scientific Literature*. George E. Dissmeyer, Editor. USDA Forest Service Southern Research Station General Technical Report SRS-39.
- ¹⁷ Ibid.
- ¹⁸ This raises an important question about the impacts of recreation on wildlife populations, which is beyond the scope of this study. In general, however, existing research is substantial and finds that trails can fragment wildlife habitat, causing avoidance behavior by wildlife of all sizes. Studies find that most wildlife habituate quickly to the presence of trail users. Off-trail activity affects wildlife populations more and dogs have a larger area of influence than humans alone. Some studies have found that wildlife are more likely to flee from hikers than mountain bikers, possibly because bikers tend to be quieter, stay in an area for shorter durations, and stay on the trail. However, this can also raise concerns about safety with surprise encounters and conflicts between bicyclists and wildlife.
- ¹⁹ For more information, see: City of Bend, Oregon. 2011. Water Management and Conservation Plan. <http://www.bendoregon.gov/Home/ShowDocument?id=5972>
- ²⁰ Medford Water Commission. 2016. Water Management and Conservation Plan. [http://www.medfordwater.org/SIB/files/MWC_Water_Management_Conservation_Plan_Draft_Nov2016\(1\).pdf](http://www.medfordwater.org/SIB/files/MWC_Water_Management_Conservation_Plan_Draft_Nov2016(1).pdf)
- ²¹ Wilson, Roy R. 1992. Cooperation and conflict in a federal-municipal watershed: A case study of Portland, Oregon. *Environmental History Review* 16(3): 71-90.
- ²² City of Santa Fe Municipal Watershed Plan. http://www.santafenm.gov/municipal_watershed_plan
- ²³ In the East, the Lake Massabesic Watershed in Manchester, New Hampshire is a good example of a watershed with active timber management, recreation, and municipal water supply. <http://www.manchesternh.gov/Departments/Water-Works/Lake-Massabesic-Watershed>

IV. CASE STUDY 1: WHITEFISH, MONTANA – HASKILL BASIN

Whitefish, Montana is a lakeside town of 6,692 with high seasonal tourism in the winter associated with Whitefish Mountain Resort, and in the summer associated with nearby Glacier National Park.

Background

Haskill Basin (Figure 4) provides more than 90 percent of the City of Whitefish's municipal water supply. Water is diverted high in the drainage and piped in a gravity-fed system from two creeks to the water treatment facility near town. When flows decrease in summer months, the city also uses water from Whitefish Lake. Using lake water has a higher cost for the city because it requires additional treatment for water quality and must be pumped to the treatment facility.

In addition to supplying most of Whitefish's drinking water, Haskill Basin is also a working forest. More than 3,000 acres of land in Haskill Basin is owned by Stoltze Land and Lumber Company, a family-owned business and the oldest continuously operated integrated wood products company in Montana.

For more than 100 years, Stoltze Land and Lumber Company allowed the public to recreate on its working forest lands in Haskill Basin, and also allowed the City of Whitefish to access and maintain its water intakes on two streams. In 2012, the City of Whitefish, Montana Fish, Wildlife & Parks, and the nonprofit The Trust for Public Land became concerned about the security of the city's water supply given the rapid pace of growth and increasing development pressure in the region.

They approached Stoltze Land and Lumber Company to explore the idea of a conservation easement for the watershed that would limit future residential development, memorialize the city's access for municipal water supply, allow permanent public recreational access, and protect the productivity of the working forest under the private ownership of Stoltze Land and Lumber Company.

Stoltze Land and Lumber Company agreed to sell a conservation easement at a greatly reduced price, and the city, Montana Fish, Wildlife & Parks, and The Trust for Public Land raised funds through grants and a voter-approved local option sales tax increase.¹ The ballot measure passed with 84 percent voter approval in a special election in 2015²; the landslide victory confirmed the community's commitment to clean water and recreational lands. The conservation easement was purchased in 2016 by the Trust for Public Land from Stoltze Land and Lumber Company and transferred to Montana Fish, Wildlife & Parks and the City of Whitefish.³

Managing Multiple Watershed Values

The project prioritized multiple community values for protection, including water quality for the City of Whitefish, community aesthetics, habitat protection, public recreation, and sustainable timber harvest. Stoltze Land and Lumber Company, the City of Whitefish, and Montana Fish, Wildlife & Parks also entered into a Multi-Resource Management Plan to identify specific objectives and actions for managing and protecting soil, water, range, aesthetics, recreation, timber, fish, and wildlife resources in Haskill Basin.

Overview

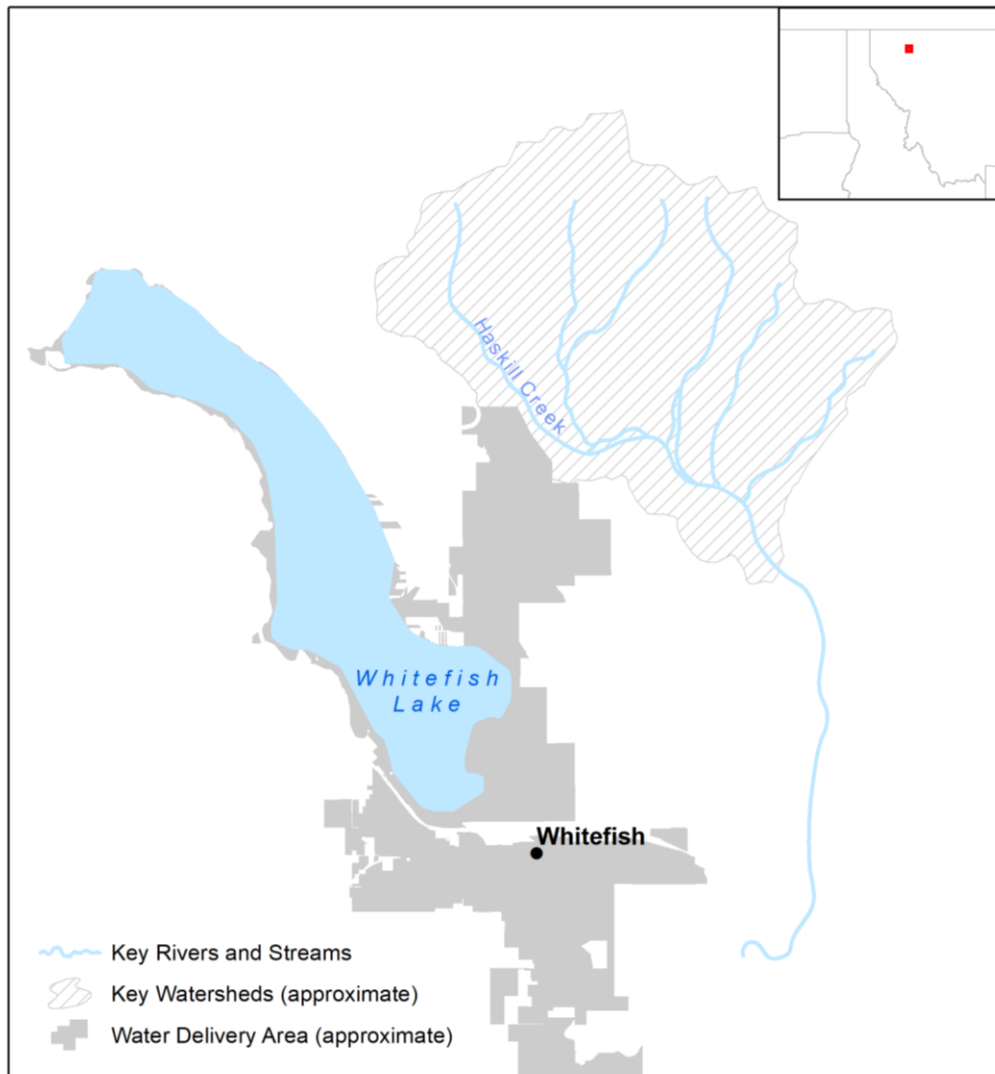
Whitefish is a lakeside town in northwestern Montana with a population of nearly 7,000. It is a summer and winter tourist destination.

Jurisdictions involved in watershed management include: City of Whitefish; Montana Fish, Wildlife & Parks; and private landowner Stoltze Land and Lumber Company.

Dispersed recreation permitted, including:

- Dispersed camping
- Non-motorized trails
- Motorized access on existing roads

Figure 4. Whitefish's Haskill Basin



Among the specific management objectives and tools are:

- Forest stewardship consistent with the state's recognized best management practices and silvicultural practices consistent with the American Tree Farm System. Active forest management also reduces wildfire risk and helps protect water quality from catastrophic wildfire.
- Habitat conservation including limitations of recreational use and forestry activities in streamside management zones.
- Non-motorized, dispersed public recreational access for hunting, fishing, trapping, hiking, and other passive activities over the entire conservation easement property. The landowner, the City

of Whitefish, and Montana Fish Wildlife and Parks maintain the right to restrict or suspend access as needed to ensure protection of the conservation values and public safety.

- Motorized recreational use is permitted only on established roads.
- Dedication and construction of a six-mile trail easement. This segment completes an important connection in the 56-mile Whitefish Trail system, linking pedestrian and bike paths in the City of Whitefish to the Whitefish Mountain Resort, a key link in the community's trail master plan. The trail was designed to minimize impacts to water quality, avoid stream crossings, and stay outside of the streamside management zone.

The conservation easement also establishes a Liaison Team consisting of representatives from Stoltze Land and Lumber Company, the City of Whitefish, and Montana Fish, Wildlife & Parks. The Liaison Team meets annually in a public forum to discuss and review management objectives, identify challenges and needs, listen to neighbors and recreational users, and modify the Multi-Resource Management Plan as needed.

Key Takeaways

- Formalizing public access adds security, but allow flexibility. Establishing clear lines of communication with the public and documenting management objectives helps set limits and establish control around where, when, and how the public can recreate. Craig Workman, Whitefish Public Works Director noted:
“The formalized agreement that states what types of recreation can and can't occur puts me at ease. Clearly identifying where different types of activities can occur goes a long way toward protecting the watershed.”⁴
Clear communication helps reduce potential conflicts between user groups and between managers and users. It also helps solidify partnerships with user groups and establish coalitions that can add value through fundraising, volunteer projects, and public education. However, in the case of Whitefish, it was critical to make access adaptable to changing conditions – especially timber harvest needs. Allowing access to be suspended to protect public safety and address resource management needs is critical.
- Design the project with all values in mind and with the right team. Whitefish was able to design watershed management systems and trail connections with all watershed values in mind. They designed recreation projects to minimize impact to water quality, and as much as possible develop water infrastructure to avoid recreation impacts. Sustainable trail design using current best practices reduces runoff, as well as helps users stay on the trail and reduces the likelihood of social trails being developed, further protecting the area from erosion. Whitefish also assembled a diverse, strong team, including water utility personnel, businesses, recreation groups, and forest managers, facilitating public input along the way.
- Consider investments in recreation as economic development decisions, just as investments in community infrastructure help support the economy. Developing public support for the project required an understanding of how no action might cost the community. Analyzing long-term impacts of the status-quo—including risks to water quality, costs of water treatment, community aesthetics, and public recreational opportunities—helped make the case for long-term protection of the watershed. Demonstrating the economic value of the Whitefish Trail⁵ can also help advance the community's interest and stewardship. Further, distributing the cost of the project equitably to tourists and residents helped pass the ballot measure to fund the project. As Whitefish Mayor John Muhlfeld put it:

“By investing in these types of projects, whether open space protection or managed recreation such as The Whitefish Trail, it’s how we can offer such a high quality of life, and why people are moving to Whitefish, setting up small businesses, and employing people. It’s a positive feedback loop, and I can’t imagine that by investing in recreation and access to public lands in other communities, you wouldn’t see the same response.”⁶

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¹ The conservation easement was purchased for \$17.2 million. The appraised value was over \$22 million; Stoltze Land and Lumber Company reduced the sale price and donated \$5 million in value. Grants to fund the purchase price included \$2 million from the U.S. Fish and Wildlife Service Habitat Conservation Program and \$7 million from the Forest Legacy Program administered by the U.S. Forest Service. The local option (resort) sales tax approved by voters increased an existing tax from two percent to three percent. The one percent sales tax increase is divided three ways: 70 percent went toward paying off the debt service for the purchase of the conservation easement; five percent goes back to merchants for collecting the tax; and 25 percent goes into property tax relief for the residents of Whitefish. This helped distribute the new tax burden to visitors and tourists alike, and helped the measure gain support from residents.

² The Trust for Public Land, LandVote®, 2016. www.landvote.org

³ Dated February 1, 2016 and recorded February 16, 2016 as Document No. 201600003054 in the records of the Clerk and Recorder of Flathead County, Montana.

⁴ C. Wortman, personal communication, April 21, 2017.

⁵ Headwaters Economics. April 2018. The Economic Impact of Outdoor Recreation and the Whitefish Trail in Whitefish, Montana. <https://headwaterseconomics.org/economic-development/trails-pathways/whitefish-trail-use/>

⁶ J. Muhlfeld, personal communication, April 19, 2017.

V. CASE STUDY 2: BOZEMAN, MONTANA – SOURDOUGH & HYALITE CREEKS

Bozeman, Montana is the largest community in Gallatin County and has a population of more than 45,000. It is a university town and gateway community to Yellowstone National Park and the largest community near several ski resorts, including Big Sky. It is growing rapidly, with more than a 45 percent increase in population since 2000.

Background

The City of Bozeman gets its water from some of the most heavily used recreational lands in Montana. The majority of its water comes from two sources: Hyalite Creek and Sourdough Creek (each contributes approximately 40 percent of the city's water), both located south of town in the Gallatin Range (Figure 5). The City of Bozeman owns several parcels of land in a checkerboard pattern with the U.S. Forest Service in the Sourdough Creek watershed, but the U.S. Forest Service owns the entirety of land in the Hyalite Creek drainage.

The water intakes for both drainages are located downstream from substantial recreational use. Water is diverted and piped to a water treatment facility near the mouth of Sourdough Canyon. The treatment plant was upgraded in 2014 and is designed to handle major fluctuations in water from high turbidity runoffs, wildfire, and other challenges.

Recreational use has been permitted in both drainages historically. Access is managed by the U.S. Forest Service in partnership with the City of Bozeman and Gallatin County (which manages the access roads).

The first source, Hyalite Canyon, is one of the most heavily visited recreation areas in Montana. It provides access for camping, hiking, boating, skiing, rock and ice climbing, snowmobiling, and OHV use. The main road into Hyalite Canyon is paved and terminates just past a reservoir, which acts as water storage for both the City of Bozeman and irrigators, as well as a major recreation amenity. U.S. Forest Service visitation surveys estimate more than 40,000 visitors per month in the summer and 20,000 visitors per month in the winter.¹

Until 2009, the access road in Hyalite wasn't plowed for winter use, but hearty recreationists still used the road to access skiing and ice climbing. It was not uncommon for vehicles to slide off the icy road into Hyalite Creek and potentially contaminate the water. With low water levels in the creek during winter months, such accidents were a significant water quality concern. In 2009, the U.S. Forest Service and City of Bozeman collaborated to install new guardrails along the main access road with the goal of enhancing watershed resiliency. Four miles of guardrails now provide a barrier, preventing vehicles from rolling off the road and directly into the creek. After guardrail installation, the City of Bozeman was supportive of plowing the road in winter and allowing more recreational access because they felt the water quality was better protected.

Developed recreation sites in Hyalite Canyon include three campgrounds totaling 59 sites, a boat launch, several picnic areas, and numerous trailheads. Ski and snowmobile trails are groomed for winter use. A nonprofit partnership organization, Friends of Hyalite, helps educate the public and fundraise for recreational improvements and ongoing operations and management in Hyalite.

Overview

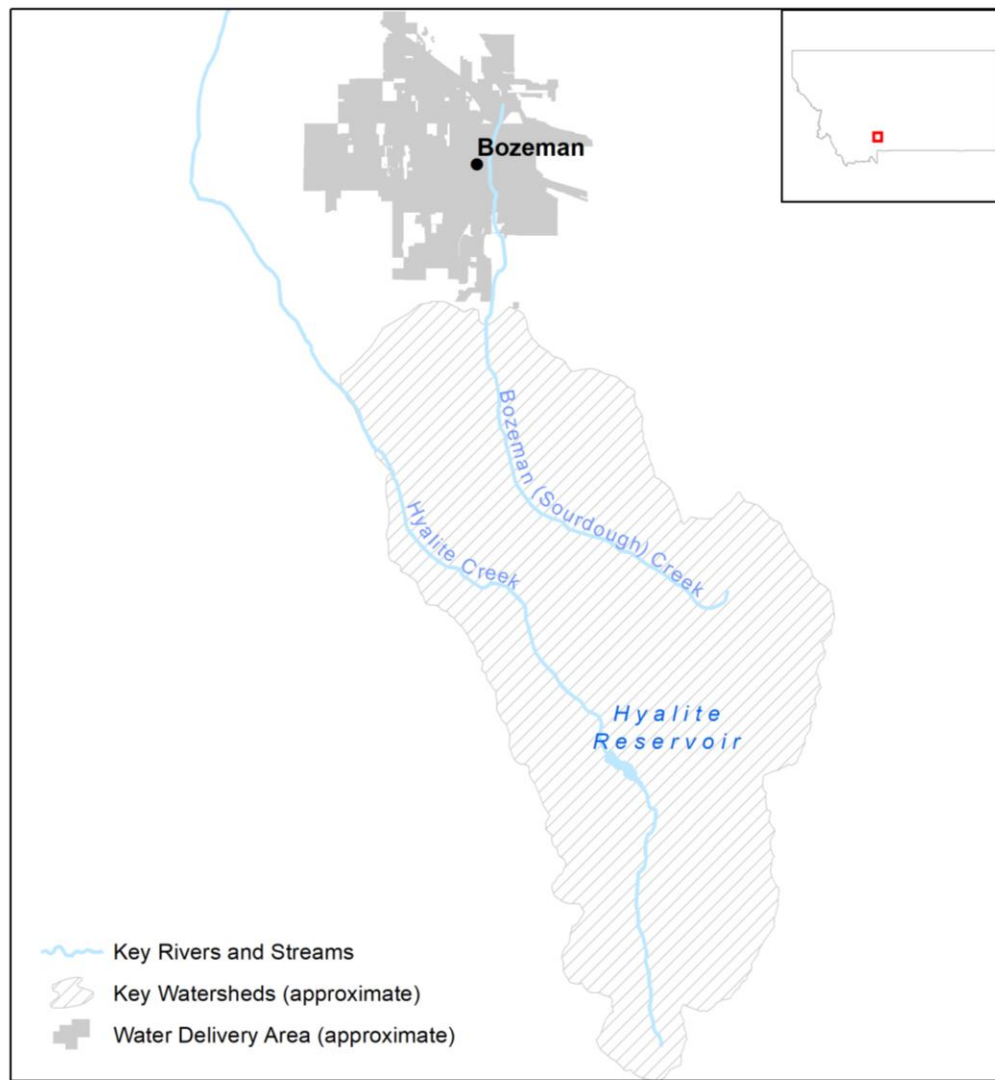
Bozeman is a university town and gateway to Yellowstone National Park with a population of approximately 45,000.

Jurisdictions involved in watershed management include: City of Bozeman; U.S. Forest Service; Gallatin County.

Bozeman's watersheds allow concentrated and dispersed recreation, including:

- Developed and dispersed camping
- Boating
- Hunting and fishing
- Non-motorized year-round trails
- Motorized year-round trails

Figure 5: Bozeman's Sourdough and Hyalite Watersheds



In the second source, Sourdough Canyon, dispersed recreation is permitted, including non-motorized, year-round trail access. Sourdough Canyon is an extremely popular year-round hiking, biking, and skiing trailhead less than ten minutes from downtown Bozeman. The trail begins at a gated portion of a dead-end gravel road. From there trail users can access hundreds of miles of trail in the Custer-Gallatin National Forest, connecting all the way to Yellowstone National Park. The City of Bozeman, U.S. Forest Service, and Gallatin County can open the gate and drive on the gravel road for several miles to maintain facilities and manage resources. The city's water intake is approximately one-quarter-mile above the trailhead gate.

Before 2012, the trailhead and access road to Sourdough Canyon were on private land and not managed for recreation, although thousands of visitors used the area for hiking, biking, and skiing. Consisting of a primitive parking lot at the end of a narrow, winding road with blind curves, the trailhead and access road were not buffered from the creek, causing sedimentation. With overflow parking exceeding 80 cars on peak days, the trailhead was dysfunctional, dangerous, and causing damage to the natural resources. In addition to a lack of parking capacity, frequent nuisance behaviors including bonfires raised concerns about wildfire risk. In 2012, the Gallatin Valley Land Trust partnered with the private owner of the

trailhead property, City of Bozeman, U.S. Forest Service, and Gallatin County to acquire the trailhead property, reroute the access road, and improve the conditions of the parking lot.

By consolidating public ownership and formalizing public access, management responsibilities were clarified and public expectations were improved. The beautification of the trailhead fostered better user behavior. The project also improved public safety and water quality in Sourdough Creek. The Gallatin Valley Land Trust also led and funded an educational campaign to ensure trail users know that Sourdough Canyon is the city's watershed and to help drive home—with compelling images—the significance of their actions on water quality (Figure 6). Today, Sourdough Canyon Trailhead enjoys few nuisance issues and, despite higher visitation, improved facilities have maintained water quality.

Figure 6. Educational Signage Used in Bozeman, Montana's Sourdough Canyon



Images courtesy [Gallatin Valley Land Trust](http://GallatinValleyLandTrust.org)

Managing Multiple Watershed Values

The City of Bozeman and the U.S. Forest Service have an ongoing Memorandum of Understanding to document shared management objectives related to water quality, timber management, and wildfire mitigation in both watersheds. The parties are planning a large timber management project to reduce wildfire risk, and they collaborate on public outreach and messaging around all forest management activities. Single points of contact from both organizations collaborate and communicate regularly. The partnership has successfully managed multiple watershed values in both Sourdough and Hyalite drainages for more than 100 years with support from nonprofit partners.

As of 2017, the water quality from both Sourdough and Hyalite creeks does not appear to be significantly impaired by recreation, and the water quality in both drainages is analogous to similar streams with fewer recreational impacts in the Gallatin Range. Downstream from the recreational access, Sourdough Creek becomes significantly impaired with concentrations of *E. coli*² as it moves through more developed suburban neighborhoods, suggesting that septic systems are much more detrimental to water quality than non-motorized recreation in Sourdough Canyon.

Key Takeaways

- Managed recreation facilitates behavior improvements. Although some feared that improving the parking area at Sourdough Canyon Trailhead would just attract more users and thus increase risk for fire, water contamination, and vandalism, the opposite was true. Physical improvements to the site made the trailhead look cared for, respected, and upscale. In turn, visitors behave more respectfully and care for the site with more diligence. Because the trailhead is more logical and ordered, the increased use is not overwhelming, and users spread out on the trail quickly. No negative impacts to water quality have been detected.
- Recreation is managed by the U.S. Forest Service. Instead of Bozeman officials managing recreation on their watershed lands in Sourdough Canyon, the strong partnership between the city and U.S. Forest Service enables the drainages to be incorporated into broader U.S. Forest Service recreation management plans for the region. The U.S. Forest Service has the capacity to manage recreation, and this ensures consistency, clear lines of communication with the public, and incorporation into watershed-level goals.
- Nimble partnerships add value. Partners like the Gallatin Valley Land Trust and Friends of Hyalite help raise funds, public support, and education and awareness for operations, maintenance, and improvements to the watershed. The link with water quality helps these organizations generate public support and financial momentum, creating a positive feedback loop for watershed protection.

Contacts

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¹ Wendi Urie, personal communication. June 1, 2018.

² Montana State University Extension. Bozeman Creek E.coli Project. <http://waterquality.montana.edu/vol-mon/ecoli/>

VI. CASE STUDY 3: TACOMA, WASHINGTON – GREEN RIVER WATERSHED

Tacoma, Washington is a metropolitan city with a population of close to 203,000. Tacoma Water serves drinking water to approximately 320,000 people.

Background

The City of Tacoma gets the majority of its water from the 150,000-acre Green River Watershed in the Cascade Mountain Range east of the city (Figure 7). Tacoma Water owns approximately 10 percent of the land in the watershed, primarily along the main stem of the river and its tributaries. Tacoma began acquiring land in the watershed in 1948, gradually but aggressively pursuing land acquisitions to expand and consolidate its ownership in the watershed. The remaining land is owned by several public and private organizations in a checkerboard pattern. Owners include the U.S. Forest Service, Washington Department of Natural Resources, private industrial timber companies, and the Muckleshoot Indian Tribe.

As part of their land acquisition strategy, the City of Tacoma and the U.S. Forest Service entered into an agreement in 1984 specifying that the U.S. Forest Service would relinquish public use rights to U.S. Forest Service roads in the western, more sensitive portion of the watershed. In exchange, the City of Tacoma accepted responsibility for road maintenance. In the upper, eastern portion of the watershed, public use rights were unchanged on U.S. Forest Service roads and this is where recreational activities occur in the watershed today.¹

Tacoma Water's intake is near the mouth of the watershed, approximately 30 miles east of Tacoma. Water is piped to the Green River treatment facilities. To ensure protection of the water supply, Tacoma Water has implemented a rigorous watershed control program governed by a comprehensive, written Watershed Management Plan.²

Managing Multiple Watershed Values

The landowning organizations and agencies in the Green River Watershed have written agreements to control access and activities within the watershed, all documented in the Watershed Management Plan. The agreements between landowning organizations helps document and prioritize watershed values. Tacoma Water is ensured protection of the watershed supply, and in exchange, Tacoma Water commits to patrolling the land for security and wildfire. Because much of the Green River Watershed is a working forest, management agreements include specific objectives around forestry practices. In most agreements, Tacoma Water reserves the right to monitor water quality on private land, review timber management plans, and request additional mitigation activities to protect water quality. If the cost of protective activities is beyond what would be required by basic forest practice rules, Tacoma Water pays for the difference. The parties meet annually to review management objectives and discuss plans for forest management activities.

Tacoma Water has a habitat conservation plan that prescribes forest management strategies for wildlife values. In addition, it has an agreement with the Muckleshoot Indian Tribe to maintain instream flows in the Green River below the diversion dam to protect fisheries.

Overview

Tacoma is a metropolitan city on Puget Sound providing water to approximately 320,000 customers.

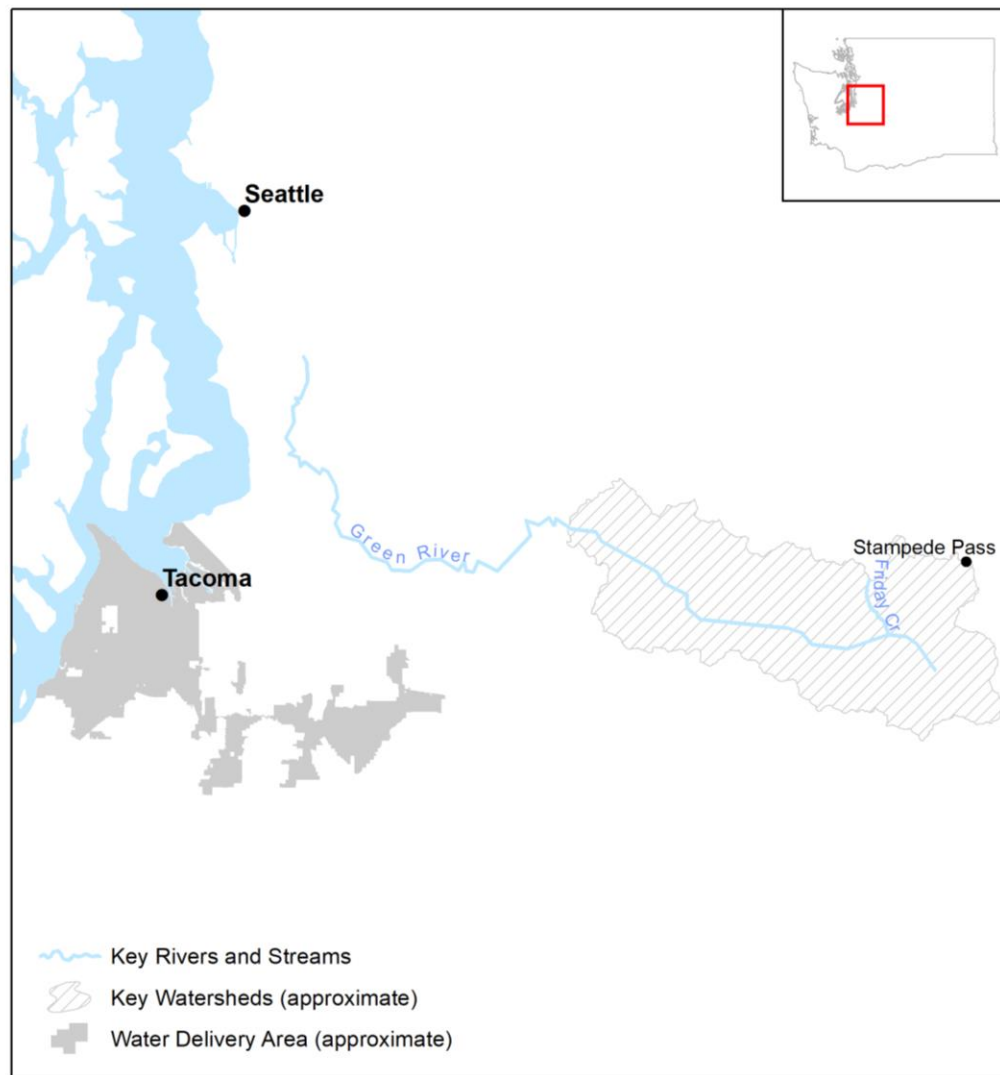
Jurisdictions involved in watershed management include: Tacoma Water, Washington Department of Natural Resources, U.S. Forest Service, multiple private industrial timber companies, and tribes.

Dispersed recreation is allowed only in upper reaches of the watershed, distant from intake and water storage facilities. Permitted uses include:

- Dispersed camping
- Hunting and fishing
- Non-motorized year-round trails

Approximately two-thirds of the watershed is closed to recreation. Other than a few annual special permit hunts and an agreement for hunting with the Muckleshoot Indian Tribe, no recreational activities are permitted on land owned by Tacoma Water in the lower reaches of the watershed. Access to closed portions of the watershed is controlled by gates – two in the lower portion of the watershed, which are staffed much of the year, and one in the upper portion at Friday Creek, which is locked and illuminated with a street light to discourage trespass and vandalism. Signage also helps clarify closure areas.

Figure 7: Tacoma's Green River Watershed



Recreation is permitted only in the watershed's upper reaches, in the eastern one-third of the watershed. This area is accessed from the east, over Stampede Pass, so visitors to the open portion of the watershed are never close to the intake facilities. In this portion of the watershed, the U.S. Forest Service is the majority landowner and manages the lands for multiple uses, similar to access in other portions of the Mt. Baker-Snoqualmie National Forest. Private landowners also own parcels that are open to dispersed recreation in this portion of the watershed.

There are no developed recreation sites in the watershed. Permitted, dispersed recreational activities include hiking, backpacking, fishing, hunting, snowmobiling, and skiing. The area is also heavily used for general sightseeing and pleasure driving. There is no off-road vehicle access.

Key Takeaways

- Written plans and agreements add clarity. Agreements between Tacoma Water and other landowning jurisdictions help prioritize goals and delineate responsibilities to ensure watershed protection. Tacoma Water's detailed watershed management plan provides a comprehensive overview of the watershed history, management objectives, and areas of concern.
- Closure of the most vulnerable portions of the watershed add protection. The geography of the Green River Watershed lends itself to closure of the lower reaches where the risk of direct contamination or damage to intake facilities is higher. Providing access from the top of the watershed through Stampede Pass allows the recreating public to enjoy portions of the watershed without presenting opportunities for direct contamination.

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¹ Greg Volkhardt, personal communication, June 20, 2018.

² Tacoma Water. 2006 Comprehensive Water Plan Update, Volume II: Watershed Management Plan.
https://www.mytpu.org/file_viewer.aspx?id=764

VII. CASE STUDY 4: SALT LAKE CITY, UTAH – JORDAN RIVER WATERSHED

Salt Lake City is a large metropolitan city with a population of 200,000. Its water supply serves 350,000 customers in Salt Lake City and surrounding communities.

Background

The Wasatch Mountains rise just east of Salt Lake City, providing an exceptional viewshed, recreational access, and high-quality water supply for residents. The primary source of water for the Salt Lake City metropolitan region are tributaries to the Jordan River flowing directly out of seven major canyons in the Wasatch Range into the Salt Lake Valley (Figure 8). The City has intakes on multiple streams in the Jordan River Watershed.

The U.S. Forest Service owns and manages the majority of land in the 195-square-mile mountain watershed as part of the Wasatch-Cache National Forest. Salt Lake City owns approximately 20 percent of the land and has worked to acquire more land for watershed protection. Around 20 percent of the watershed is in private ownership, including several ski resorts. Portions of the watershed are designated wilderness.¹

Recreational use of the watershed has a long history. The Uinta-Wasatch-Cache National Forest is among the top five most visited in the nation, and it sees more visitors on an annual basis than Yellowstone National Park.

Managing Multiple Watershed Values

The Jordan River Watershed provides critical recreational access to the National Forest for Salt Lake City residents. U.S. Forest Service, Salt Lake County Health Department, Salt Lake County Parks and Recreation, Salt Lake County Watershed Planning & Restoration, and other partners collaborate regularly on watershed management.

Portions of the watershed are designated as “protected,” and within these areas there are special limitations on recreation. Hiking and biking are permitted on trails throughout the watershed. Designated trails help focus impacts of recreation and keep people out of areas that could damage water quality.

Dogs are prohibited in nearly all parts of the watershed. (Residents who live on private property in the watershed are given special permits for pets.) Water quality data in the Jordan River watershed show that places without dogs have significantly less *E.coli* bacteria. The community has worked together to arrive at adapting management plans for less sensitive areas. For example, dogs are permitted every other day in the Millcreek subwatershed.

Camping is allowed in designated campgrounds managed by the U.S. Forest Service and Salt Lake City. Dispersed camping is not permitted. Fishing and other activities with direct contact to water are restricted.

Overview

Salt Lake City’s population is 200,000 and its water supply serves 350,000 customers in the larger metro area.

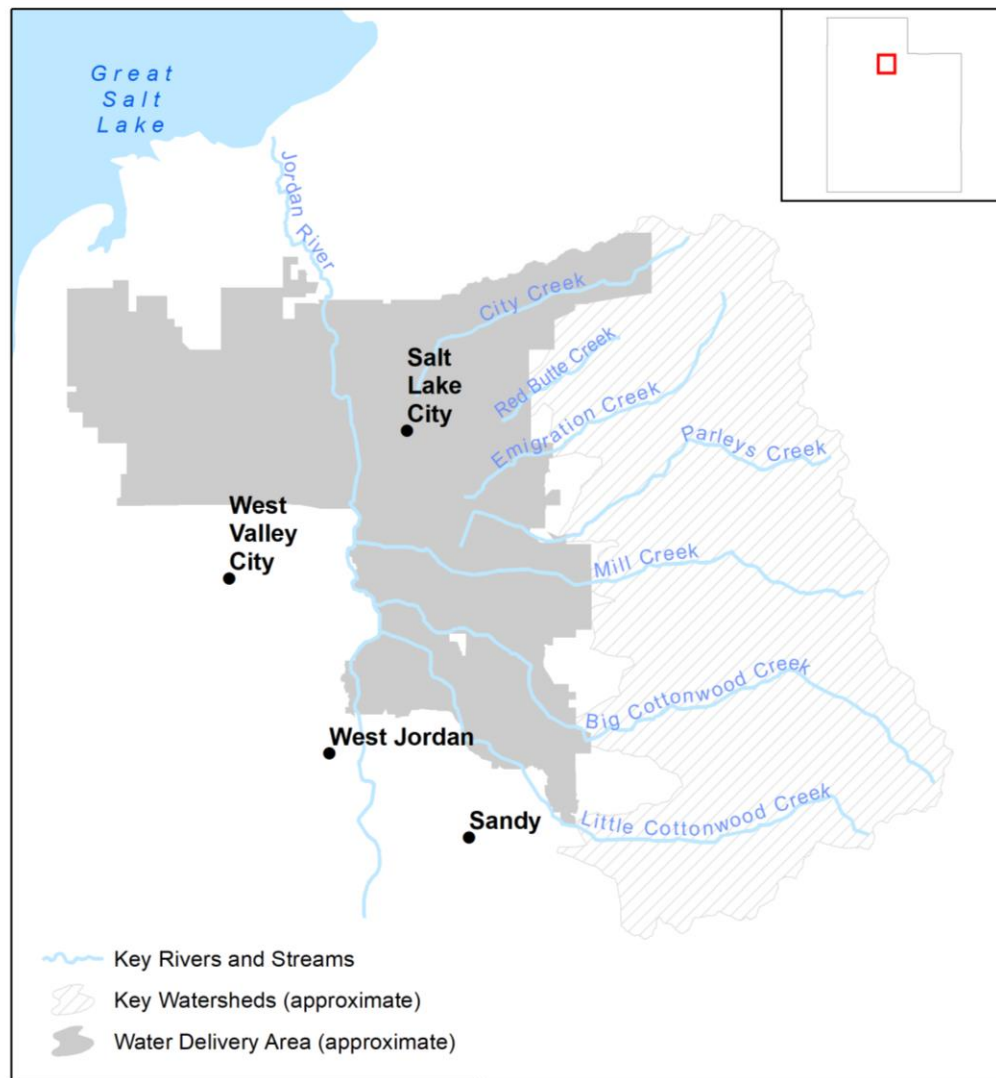
Jurisdictions involved in watershed management include Salt Lake City, U.S. Forest Service, several ski resorts, and private landowners.

Concentrated and dispersed recreation are allowed in nearly all of the watershed area, but some areas have special protections and limited access. Uses include:

- Year-round hiking and biking on designated trails
- Camping in developed, designated sites
- Dogs are prohibited in nearly all places
- Water contact such as wading is prohibited in some places.

Regular surveys help agencies understand public perception and needs and adjust management strategies accordingly.

Figure 8: Salt Lake City's Jordan River Watershed



Several documents help govern access, uses, and restrictions. A series of state, city, and county ordinances define water source protections, land use planning regulations, and restrictions on animals in the watershed.² The city and U.S. Forest Service have a Memorandum of Understanding and share management responsibilities for enforcement and maintenance of recreational infrastructure. Watershed management plans developed with substantial public input are held by Salt Lake City³ and Salt Lake County.⁴ The Forest Plan for the Uinta-Wasatch-Cache National Forest⁵ also describes forest management strategies for watershed protection. The Salt Lake City and Salt Lake County rely on the U.S. Forest Service to help manage wildfire risk.

While these multiple plans and ordinances clearly delineate roles and responsibilities for the jurisdictional agencies, the volume and breadth of documents and regulations can be confusing for the typical watershed recreational user. It is not always clear where to find information, or which agency has authority. To assist, Salt Lake City has permanent and temporary staff dedicated to watershed education and recreational infrastructure maintenance. In addition, both Salt Lake City and Salt Lake County spend considerable effort conducting public outreach with recreational users and residents.⁶

To help understand the public's perceptions and values, Salt Lake County regularly surveys residents. A 2015 survey⁷ found that what residents value most about watersheds is water quality – more so than recreational opportunities, scenery, wildlife habitat, and a strong economy combined. The survey also found that a large majority of residents (83 percent) use trails along the county's creeks and rivers on at least an annual basis with 52 percent using trails monthly. Ninety-five percent of survey respondents said that outdoor leisure and recreational activities are important to their overall quality of life.

Given the importance of outdoor recreation and the heavy visitation to canyons in the Jordan River Watershed, Salt Lake City and Salt Lake County view public access as a way to develop a sense of stewardship and ownership over the watershed. People get to know the area and then want to help protect it. Finding the balance so that the watershed is not “loved to death” is an ongoing, adaptive process.

Key Takeaways

- Develop a robust public engagement process in the creation of management plans and in active management projects. Salt Lake City and Salt Lake County's ongoing engagement with the public helps managers understand the public's concerns and collaborate on the creation of solutions that work for everyone. Expect the process to take time.
- Education is worth the effort. Incorporate public education into the management plan. Signage, mapping, pamphlets, and human interaction are all key components, and can help leverage human interest and commitment for the watershed that can support political, budgetary, and management decisions. Individual actions of landowners, recreationists, and residents also affect water quality, and having them engaged and educated is important.
- Geographic and temporal restrictions can help protect water quality but require enforcement capacity. The complex landscape of jurisdictions and regulations can be confusing for users. Ensuring that restrictions on dogs, human contact with the water, and other limitations are clear and enforced requires full-time personnel and excellent information campaigns.

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¹ See a map of the watershed here: <http://www.slcdocs.com/utilities/watershed/images/trailhead%20overview2.pdf>

² For example, see Utah Code Annotated [§19-4-113](#), Salt Lake County Ordinance [Chapter 9.25](#) and Chapter [19.72](#), Salt Lake City Ordinance [Chapter 17.04](#), Salt Lake Valley Health Department [Health Regulation #14](#), City of Sandy, Utah [Title 14](#)

³ Salt Lake City Watershed Management Plan. November 1999.

http://www.slcdocs.com/utilities/PDF%20Files/Salt_Lake_City_Watershed_Management_Plan_-_1999_final.pdf

⁴ 2015 Salt Lake County Integrated Watershed Management Plan. <http://www.slco.org/watershed/watershed-planning/2015-integrated-watershed-plan/>

⁵ Uinta-Wasatch-Cache National Forest. 2003 Revised Forest Plan and Final Environmental Impact Statement. <https://www.fs.usda.gov/detailfull/uwcnf/landmanagement/planning/?cid=stelprdb5076923&width=full>

⁶ For example, see Salt Lake County's Stream Care Guide:

http://www.slco.org/uploadedFiles/depot/publicWorks/fwatershed/resources/StreamCareGuide_2015.pdf.

⁷ Salt Lake County Watershed Public Opinion Survey. January 2015. Opinion Works.

http://www.slco.org/uploadedFiles/depot/publicWorks/fwatershed/2009_Water_Quality_Stewardship_Plan/2015publicsurvey_ful.pdf

VIII. CONCLUSION

Strategies for managing multiple community values in municipal watersheds are diverse, often requiring collaboration across jurisdictions and adaptive management to adjust to changing community needs, development trends, recreational demand, and ecological conditions. Communities like Sandpoint, Idaho that own or co-manage the land in their watersheds are unique, and because of their jurisdictional power they have a rare opportunity to shape and control the future of their water and recreational amenities.

Where recreation is permitted in municipal watersheds, the challenges posed to water quality are not always clear. Sedimentation, erosion, and contamination are possible but difficult to measure and correlate with recreational activity. None of the communities explored in this study has had significant problems related to recreation.

Unlike communities where recreation has always been a part of the municipal watershed landscape, Sandpoint has the advantage of being able to design and create a management plan that protects important resources and builds from lessons learned in other communities.

Common best practices that help drive success include:

- Build an early, robust public process to listen to and incorporate community values, ideas, and solutions into the watershed management plan. Understanding how outdoor recreation compares to other community values will help determine the importance of access in the watershed.
- Design a management plan proactively rather than reactively. Give thoughtful consideration to the design of where, when, and how recreation will be permitted. It is very advantageous to design and construct access in sustainable ways upfront rather than try to correct problems after an area is in use. Using the best available data, communities can identify areas with greater sensitivity or risk and their access can be restricted or limited to dispersed activities. Today's best practices in trail design, trailhead management, and construction techniques will aid in these efforts and help protect water quality. Communities in the position of Sandpoint, Idaho have the advantage of being able to take the time to consider these issues and get it right the first time.
- Partner with land management agencies and others. All of the communities profiled here have strong working relationships with the U.S. Forest Service, other land management agencies, and nonprofit partners like land trusts and watershed groups. Relying on partners' expertise in managing recreation and land can aid a community and help make the municipal land function seamlessly with adjoining recreational amenities.
- Integrate public education into the management plan. Leveraging watershed access into an opportunity for public education, stewardship, and sense of ownership pays dividends. Improving the behavior and actions of individuals through such education will help protect water quality, and educating the public will likely develop public support for watershed protection.
- Gather and monitor baseline data. Before any changes in management, take the opportunity to collect baseline data about water quality. These can be simple measurements and could be linked with public education and outreach, for example integrating school groups into the data collection. Once baseline data are established, set goals and metrics to see how management practices might affect water quality over time.

