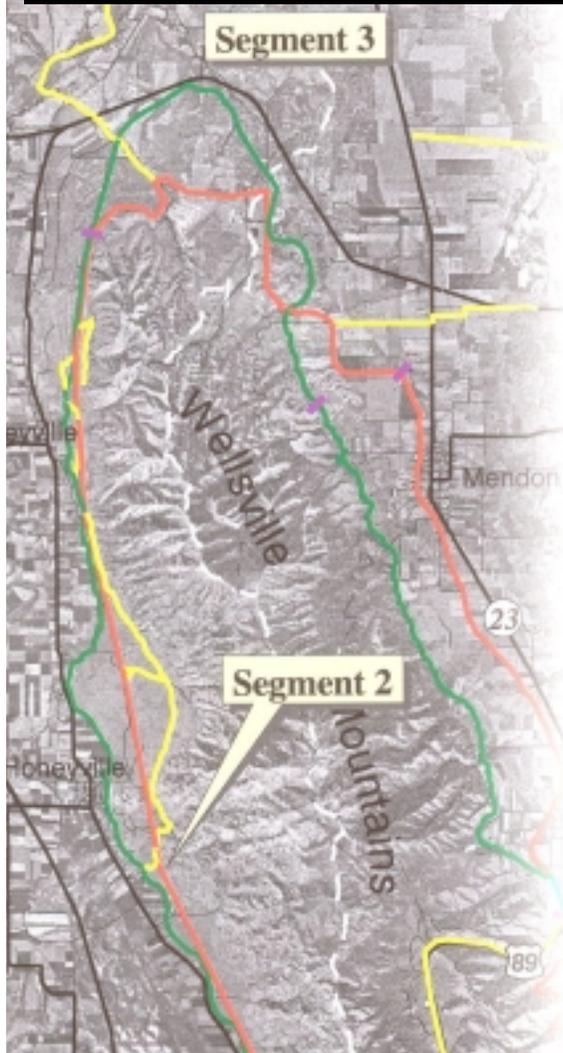


# Northern Bonneville Shoreline Trail Master Plan

August 2002



*Funded by the Federal Transportation  
Enhancement Program*

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# INTRODUCTION

The Northern Bonneville Shoreline Trail (NBST) Master Plan (Master Plan) document is designed to provide a foundation for foothill communities in Box Elder and Cache Counties to use in moving forward to planning and developing a northern extension of the Wasatch Front’s most popular public recreation amenity. The Master Plan presents a viable strategy for creating nine contiguous segments of the Bonneville Shoreline Trail (BST), that together will:

- ❖ more than double the length of the BST as originally envisioned,
- ❖ allow for more equestrian use than the original or “southern” portion of the BST,
- ❖ meet the values of the BST in terms of public land access preservation and delineate developed community boundaries below the foothills along most of its length.

The Master Plan has benefitted from extensive contributions by area trail users, trail builders, public officials, resource organizations, and interested residents. As this participation shifts from the Master Plan to the segment planning level in the coming years, rapid implementation of the BST on the ground is a reasonable expectation. More than adequate interest, expertise, and opportunity exists for this impressive community amenity that will benefit residents and visitors for many generations to come.

Specifically, to be an effective resource for communities and residents, this Master Plan must meet the following objectives, as adopted by the Bear River Association of Governments (BRAG):

1. Demonstrate the viability of an extensive multi-use valley-foothill interface trail,
2. Describe practical alternatives, planning issues, and implementation opportunities for discrete segments of the trail,
3. Produce compelling documentation for fund raising from public and private sources,
4. Mobilize community support for trail implementation.

Adopting this Master Plan indicates that BRAG believes that Objective’s 1-3 have been met. While preliminary indications are encouraging, the next several years will show whether if community interest has been sustained and mobilization of support envisioned in Objective 4 has indeed been adequate.



# Goals for the Northern Bonneville Shoreline Trail (NBST)

It is recommended that communities interested in developing NBST segments adopt the Memorandum of Understanding (MOU) proposed by the BST Coalition and then actively participate in the BST Coalition. The BST Coalition, a cooperative group of representatives of all communities hosting a segment of the BST, has set guidance for the BST and offers expertise and problem solving support to participating communities. Adherence to the guidance in this MOU has helped participating communities create Utah's most important and well known shared recreation facility. The following criteria, laid out in the MOU, have been accepted by over 98 percent of Box Elder and Cache County residents that participated in the Master Plan development process.

1. The trail will be built on or near the foothill bench generally considered to be the eastern shoreline of ancient Lake Bonneville.
2. The purpose of the trail is to provide a place where walkers, runners, cyclists, and equestrians can experience their recreational pursuits at a distance from automobiles that is both safe and aesthetically pleasing.
3. The trail will provide access to public lands and the resources associated with those lands.
4. The trail will be for nonmotorized use only. Walkers, runners, cross-country skiers, bicyclists, snowshoers, and horseback riders are identified as potential users, although all segments may not be appropriate for all of these uses.
5. The trail will be separate from the developed urban area, but trailheads will provide access that is convenient for residents of urbanized areas.
6. The trail should be designed to provide access and rapid deployment of fire fighting and other emergency resources to the urban/foothills interface, where feasible.
7. The trail will contribute to the preservation of aesthetic, wildlife, historic, and educational values of the area.

Interpreting these BST-wide criteria, it is recommended that the following goal statements be adopted by BRAG and used to guide the individual segment planning and implementation efforts of communities and the two counties covered under this Master Plan.

1. Develop a safe and enjoyable trail that accommodates multiple nonmotorized trail users.
2. Provide public access to the foothills and mountains.
3. Link existing and proposed trails to create a regional nonmotorized trail system in northern Utah.



4. Provide environmental education opportunity focusing on foothill ecology and ancient Lake Bonneville geology.
5. Involve residents in trail planning, construction, and maintenance.
6. Link the northern segment to the BST along the Wasatch Mountains in Weber County.
7. Connect with local and regional recreational facilities.
8. Develop a firebreak to help protect residential and mountain areas from wildfire.
9. Provide unprecedented opportunities for horseback riding in foothill areas.

## Process

The Master Plan process was conducted during the period of September 2001 and February 2002, and is recommended for immediate adoption by BRAG to guide NBST planning and construction efforts beginning in Spring 2002. It is recommended that a formal evaluation of Trail development progress and status report be conducted in fall 2007 by an outside contractor with annual monitoring and review activities conducted by BRAG staff.

## How to Use This Master Plan

“Implementation of this trail system and associated amenities lies solely in the hands of the citizens and elected officials...”

This document is intended for use by the cities and counties of Box Elder and Cache County as they undertake their own efforts at trail development. We expect that the document will be useful to public and private users towards that end. This document is packed with resources that should be used by local governments and grass roots citizen committees to direct their efforts in a cost effective and coordinated manner.

The document is made up of four chapters: (1) Infrastructure, Analysis, and Inventory, (2) Northern Bonneville Shoreline Trail Analysis by segment, (3) Trail Design Standards and Costs, and (4) Implementation Tools.

The four chapters are followed by appendices that include maps and detailed resources used in developing the Master Plan and intended for use in local projects.

Implementation of this trail system and associated amenities lies solely in the hands of the citizens and elected officials of each city or county who has jurisdiction over a given trail segment. Some communities

have progressed beyond certain aspects of this document while others will be greatly aided in their efforts through the use of the Master Plan. Each community can judge for itself how to best use the elements of this document and at what pace in which to do so. At the very least this master plan can be used as a coordinating guide to catalyze future trail development and improvement. Each community and the region as a whole should monitor the status of the NBST annually and make a public report of ongoing progress.

This project can, if properly implemented, become one of the great legacies we can leave to this region and its inhabitants. If an unobstructed trail system is completed it would be truly unique and valuable asset to all the people of northern Utah.

# CHAPTER 1

## Southern Bonneville Shoreline Trail (SBST) Case Study

Until the initiation of this Master Plan process, the SBST was seen as conceptually stretching ultimately from Brigham City, Utah, to Nephi, Utah, a length referred to on the BST website as “90 miles” (<http://www.bonneville-trail.org/>). Currently, 82 miles of a planned 180 miles of BST trail have been constructed in several large and many small segments and connecting pathways (see Table 1 and Figure 1). Government officials and community NBST supporters in Cache and Box Elder Counties want to learn from those already engaged in this effort.

Table 1. Summary of existing and planned Southern Bonneville Shoreline Trail (SBST) segments.

BONNEVILLE SHORELINE TRAIL MILEAGE <sup>a</sup>		
County	Existing Trail Miles	Planned Trail Miles
Davis	15	28
Weber	10	23
Salt Lake	30	55
Utah	27	74
Totals	82	180

<sup>a</sup>Reported by the BST Coalition, March 2002.

Lead individuals were contacted in the City of Ogden, Weber County, Davis County, Salt Lake City, Sandy City, Draper City, Salt Lake County, and Utah County to gather lessons learned from their SBST development efforts and standards that they have used in constructing trail segments and trail heads. In all cases, individuals were supportive of the northern extension of the BST and expressed a willingness to assist communities new to trail development efforts in minimizing mistakes. The case study outline is shown in Appendix A. Key individuals who have responded to this request for information include:

- ❖ Jim Price, Mountainlands Association of Governments, Utah County Segments
- ❖ Don Davis, Salt Lake County Recreation, Salt Lake County Segments
- ❖ Aric Jensen, Davis County Parks and Recreation, Davis County Segments
- ❖ Geoff Ellis, Weber Pathways, Weber County Segments





- ❖ Greg Montgomery, Ogden Trails Network, Ogden City Segments
- ❖ Tony Botello, Wasatch - Cache National Forest, U.S. Forest Service (USFS) Standards
- ❖ Rick Reese, Bonneville Shoreline Trail Committee, Regional System and SLC Segments

## **History of the Bonneville Shoreline Trail (BST)**

The Bonneville Shoreline Trail concept began in 1990 as an effort to preserve a heavily used mountain biking, jogging, and walking pathway along a corridor between Emigration Canyon and Dry Canyon on the east side of Salt Lake City. The southern part of this segment went along a natural gas pipeline and into This is the Place State Park. The Park wanted to fence off its growing area of historic buildings and charge fees for admission. Recreationists did not want to be fenced out of their traditional use area or pay fees. A solution was reached that created a fenceline below the recreation corridor. Similarly, to the north of the Park, the University of Utah's Research Park and Red Butte Garden and Arboretum were growing, with the Garden concerned about fencing to protect its horticultural collections, a fee area, and Research Park management considering new development that might terminate the recreation corridor. By 1992 the University of Utah agreed to an unspecified recreation corridor to connect through Research Park and the University Medical Center area to Dry Creek Canyon to the North.

At about the same time, Salt Lake City policy, promoted through unanimous support of the Mayor, City Council and Planning Commission staff, adopted the BST as a formal trail system throughout the foothills east and north of the City. In 1991, the Bonneville Shoreline Trail Committee was formed as a 501(c)(3) nonprofit corporation to promote regional development of the BST and focus on implementation in Salt Lake County. Challenges from developers and a minority of residents were met with overwhelming public support for this public policy. At this point, the City of Ogden, the Mountainlands Association of Government, and Davis County adopted the identity of the BST for foothill trails, plans, and segments already in place. In 1994 representatives of entities in the four-county area (Utah, Salt Lake, Davis, and Weber) agreed with the BST Committee that there should be one continuous foothill shoreline trail along the foothills of ancient Lake Bonneville with uniform values and defining characteristics. By 1995 a BST logo and signs were finalized to tie the BST together as the backbone of a regional trail network.

In 1997, the Bonneville Shoreline Trail Coalition was established to share expertise and resolve common problems along the full length of the BST. A Memorandum of Understanding, which defined trail objectives and criteria, was created for each municipality and county implementing segments of the BST to sign and support. The MOU is a statement of consent and accountability to follow the common values established by the BST Coalition. The MOU promotes agreement on what the BST is and sets criteria for use of the BST Logo.



## **Standards**

Using the ancient Lake Bonneville shoreline (approximately 5,100 feet in elevation) as a target, an effort has been made to establish SBST segments on that bench where possible. Specifically, the SBST has been located behind housing and below USFS land at the visual “toe-of-the-slope” along the western foothills of the Wasatch Mountains along Utah’s urbanized corridor. The USFS guidelines have been traditionally followed in BST construction, featuring a 2- to 4-foot wide cleared dirt trail surface laying within a 10-foot easement or right-of-way whenever possible. In most cases, the trail is on public land (e.g., city, county, or USFS).

Trail heads along existing BST segments consist primarily of a wooden kiosk or wooden trail sign. Trail heads range from roughed-in dirt parking areas to paved trail heads with lined parking spaces and restrooms. Many trail heads are at the end of city streets with no improved parking. There is a standard BST logo that is used on most signs, and a standard signpost that is used on most trail segments (see Chapter 3). Equestrian use is formally supported by Draper City and for several miles along existing trail segments in Utah County. At this point, there are no horse uses supported on segments in Salt Lake City, Davis County, or Weber County. Trail head standards for full size horse trailer parking and loading/unloading areas have not been established.

## **Responsibility**

Existing BST segments have been planned, adopted, and implemented piecemeal within each political jurisdiction, usually by a city or a county. There is no entire trail-wide organization at this point, although a BST Committee, headquartered in Salt Lake City, was established in 1991 to promote construction along the entire length of the trail. The BST Committee’s financial and labor resources were concentrated on the successful development of the 15-mile-long Salt Lake City Segment, largely completed in 1999.

The BST Coalition, a voluntary working group of representatives of communities actively implementing and managing segments of the BST, meets most months and endeavors to establish, promote, and maintain standards; share expertise; and identify and resolve critical issues in trail development. Each community that chooses to construct a portion of the BST is encouraged to sign a Memorandum of Understanding (MOU) (shown in Appendix B) that indicates a community’s acceptance of values and standards for the BST. The BST Coalition is currently working with the Utah State Automated Geographic Reference Center to digitize all known physical attributes of the constructed and planned trail segments in Weber, Davis, Salt Lake, and Utah Counties.

Each community organizes resources differently in creating individual segments of the BST, in the way that works best for them. In Davis County, unincorporated Salt Lake County, and the Cities of Sandy and Draper, lead responsibility for planning and implementation lies with government. In Utah County and in Ogden City, informal but influential committees of city-designated citizen representatives and government staff work together on key segments. In Weber County and Salt Lake City, private nonprofit organizations have taken the lead with cooperation from government organizations.



## **Funding**

Funding for construction has come from a variety of public and private sources. State-awarded funds have been used in each totaling \$797,005 to date. Individual communities have contributed resources to trail construction. In many cases, existing roads and pathways were designated and improved. Where new pathways were needed, construction has largely been implemented by crews of volunteers trained to follow USFS hand tool methods. In some places, National Guard resources were used as part of their exercise activities.

Two significant private family foundation grants were received to cover costs associated with the Salt Lake City Segment and the Parley's Crossing Trail Connection at the north end of unincorporated Salt Lake County. Several million dollars have been made available through the Federal Land and Water Conservation Fund for land acquisition by the USFS to facilitate BST construction. To date, some of these funds have been spent on projects in Salt Lake and Weber Counties, but most of the funds remain unspent. The USFS and Congress have acknowledged the importance of the BST as a regional system.

## **Maintenance and Management**

Maintenance has not been a substantial expense because of the short time that most segments have been operational and, it is hoped, because of the quality of construction. Sign replacement has been significant in some segments, especially until usage builds up, promoting a "self-policing" effect that discourages would-be vandals. In general, increased use seems to also minimize crime against persons and adjacent private property, as reported second hand from law enforcement staff in several counties. In most cases, city and county governments have agreed to maintain trail surfaces and trail heads. There has been some limited success in recruiting service groups to adopt and maintain parts of the BST, thereby relieving the burden on government resources.

## **Lessons Learned along the Bonneville Shoreline Trail (BST): 1991 to 2001**

For the past 10 years, local governments, trail user groups, and interested citizens have worked hard to plan and implement the BST. Here are 10 lessons learned from their combined efforts.

1. Each community builds its own piece; put the BST in your community plan as soon as possible.
2. Create a partnership between advocates and government officials; use what structure works.
3. Reach out to a broad range of stakeholders in planning, implementation, and maintenance.
4. Make contact early with impacted landowners; respect, involve, and accommodate them.
5. Start where it is easy and build confidence to deal with difficulties.

6. Be flexible; strive for standards but do what is possible rather than nothing at all.
7. Use available expertise; others have done what you are trying to do and want to help you.
8. Do not be put off by barriers; plan for what is needed and build support for what is possible.
9. Share the burden of advocacy; do not burn out leaders and lose opportunities when they arise.
10. Keep the vision strong; patience and persistence pay off.

## Corridor Context Analysis

The NBST is proposed to generally follow the ancient Lake Bonneville terraces through Box Elder and Cache Counties. It will go through private and public lands, and near or through many communities as it winds its way to the Idaho border. The following sections provide general context information for the trail corridor area.

### Lake Bonneville Shoreline Geology

Lake Bonneville, one of the great pluvial lakes of North America, existed from about 32 to 14 thousand years ago. The lake was 325-miles long, 135-miles wide, and over 1,000 feet deep. Remnants of this huge lake include the Great Salt Lake, Utah Lake, and Sevier Lake (see Figure 2).

Lake Bonneville was a terminal lake in a closed basin. The water levels of the lake were effected by precipitation and evaporation. The lowest point of the basin that controlled the maximum height of the lake was Red Rock Pass, which had an elevation of 5,090 feet. Approximately 14,500 radiocarbon years ago, the Red Rock Pass threshold (in the north end of Cache Valley in Idaho) failed and a catastrophic flood occurred, causing the lake to drain through the pass into the Snake River. Three major shorelines were left by Lake Bonneville and one by the Great Salt Lake. The Provo and Bonneville Shorelines of Lake Bonneville are very prevalent today as terraces or benches along the Wasatch Front's foothills. The Stansbury Shoreline of Lake Bonneville and the Gilbert Shoreline of the Great Salt Lake are less obvious and found lower in the valleys.

Cache Valley was filled with the northeastern arm of Lake Bonneville, referred to as the Cache Bay, whose inlet/outlet was Cutler Canyon near the Cache and Box Elder County border. The lake occupied Cache Valley from about 25,000 to 13,000 years ago. Utah State University and the Church of Jesus Christ of Latter-day Saints Logan Temple are both built on a delta of soil and rock that was washed into Lake Bonneville by the Logan River. The unconsolidated sands and silts deposited on the floor of Lake Bonneville form the surface of Cache Valley, and, when irrigated, make excellent agricultural soil. The Bonneville Shoreline in Cache Valley is less prevalent than the shoreline along the Wasatch Front. Generally, the Cache Valley Shoreline is represented by distinct segments that are separated by large gaps.



For the purposes of planning the NBST, the Lake Bonneville Shoreline in Box Elder and Cache Counties is identified to be at approximately 5,100 feet elevation. Although in many areas it will not be possible or feasible to follow the true shoreline, it is still a goal of the overall Master Plan process. See Figure 2 for an illustration of historic Lake Bonneville.

## **Existing Trail Planning Efforts**

### ***City***

#### **Brigham City**

The Brigham City Recreation and Parks Department has developed a small city trail system and a trail development plan for future trail projects. It has identified two key areas on the south and north sides of Highway 89 for new trailheads. The areas are planned to provide parking, restrooms, and informational kiosks. One of the areas is next to Box Elder Creek and incorporates donated land from the Parson Gravel Pit. The other possible trail head is part of the Shoshone Trail Complex. These areas are identified as trailheads for the NBST in Brigham City. The city has planned linkages with surrounding communities at the Ogden Brigham Canal and a cattle crossing under Interstate-15 (I-15) for a trail to the Bear River Migratory Bird Refuge.

#### **Honeyville**

Honeyville currently has no trail system plan or policy, but the community is very interested in developing trails.

#### **Hyrum**

Hyrum City is in the process of developing a trail plan. No official trail information is available at this time.

#### **Hyde Park**

A trail system has been proposed in Hyde Park, but it has run into stiff opposition from property owners that live along the community's canals. Hyde Park City currently has no trail plan or policy.



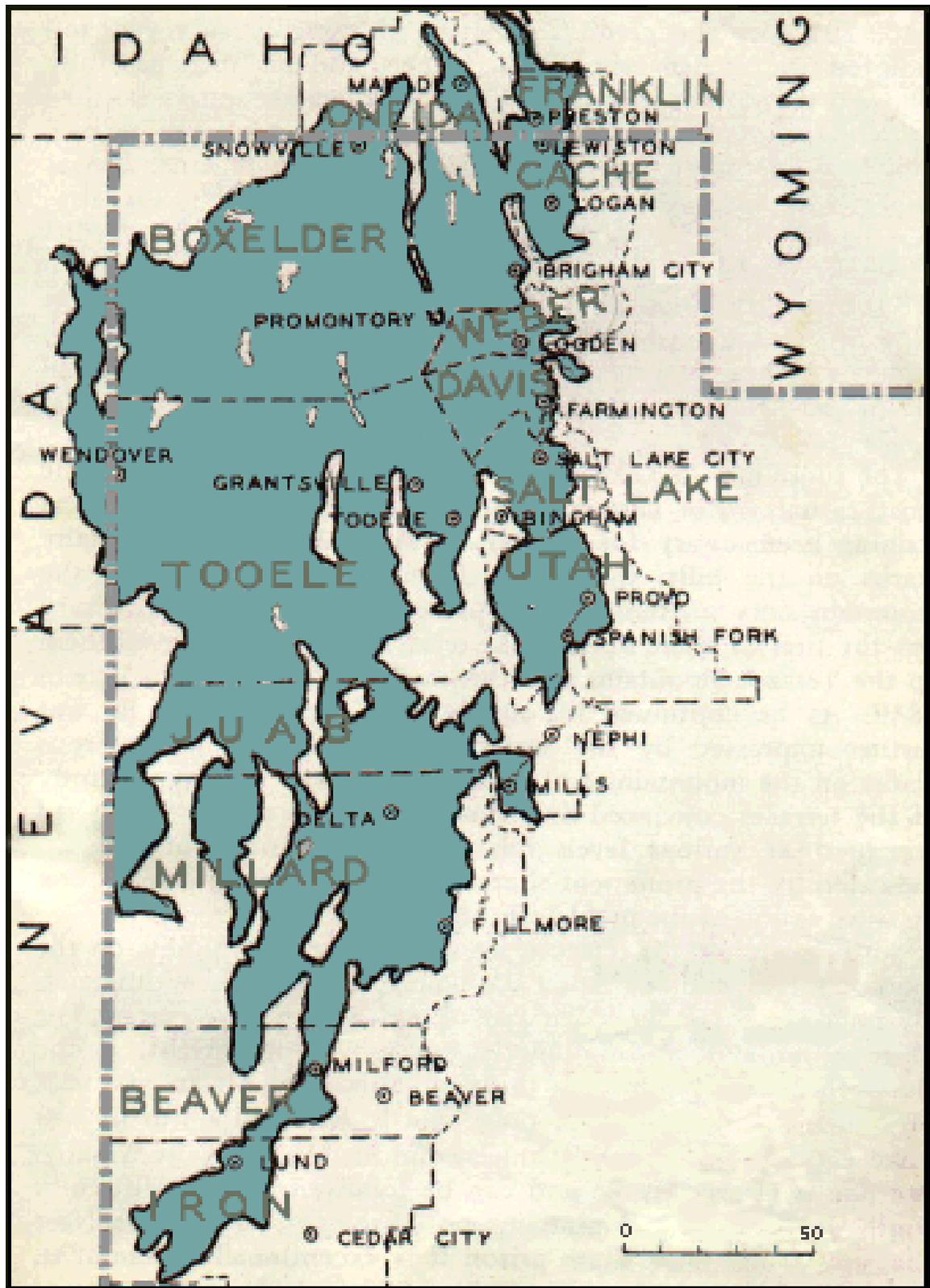


Figure 2. Historic Lake Bonneville.



## **Logan**

The City of Logan has an extensive recreational trail system with plans for new trails that will be constructed in the near future. One of these future trails is the first segment of the NBST that will be constructed between Logan Canyon and Green Canyon. The northern portion of this trail is in North Logan City. The cities plan to construct this segment (approximately 2 miles) during summer 2002. See the alignment analysis section, Segment 8 - Logan to Smithfield, for more detailed information.

## **Mantua**

Mantua has a master plan that includes trail development policy. There are some established trails and unimproved roads in and around the town that have great potential for trail system development.

## **Mendon**

Mendon has plans for a future trail system that will be looped around the community. The trail will connect parks and open spaces to neighborhoods and the business district.

## **Newton**

A trail system has been discussed through development of the city's general plan, but no official information is available. The planning commissioner is interested in hearing any possible ideas regarding links to the NBST from Newton.

## **Nibley**

The city council is actively pursuing the acquisition of open land along the Blacksmith Fork River for the purpose of creating a park system that would be linked to a trail system.

## **North Logan**

The *North Logan Parks and Trails Plan* provides direction for the future acquisition of property for public use, including property for recreational trails. This includes a linear park trail system proposed along existing drainages, the Hyde Park and Smithfield Canal, and the Utah Power and Light (UP&L) powerline corridors. The UP&L powerline corridor trail could function as a segment of the NBST. Trails planned within the foothill area will be designated for a variety of uses, such as hiking, bicycling, equestrian, and cross country skiing. North Logan City also protects existing footpaths and corridors planned for future trail development in their Subdivision Development Code. Developers are required to leave the corridors undeveloped and grant the city a trail easement for public trail development.

## **Pleasant View**

The *Northview Trails Master Plan* (Northview Trails Committee 1991), details trail development for North Ogden City and Pleasant View City. This plan was never implemented, and the Northview Trails Committee has disbanded.

## **Paradise**

Paradise currently has no plans for a trail system but is interested in trail development.



## **Perry**

Perry currently has an active trails committee working on specific projects within the city.

## **Providence**

Providence is in the process of developing a recreational trails plan that links parks and existing trails.

## **Richmond**

The *Richmond City General Plan* (Richmond City 1999) states recreational paths and trails will be developed and linked to existing and proposed opportunities within the community and adjacent public lands. The general plan illustrates proposed trails along the Cherry Creek Ditch and the Upper High Creek Canal that could function as a portion of the NBST. The proposed City Creek and the Cherry Creek trails could link to the NBST.

## **Smithfield**

Smithfield is currently working with the State of Utah to develop a trail between Forrester Avenue and 1000 East.

## **Wellsville**

Wellsville City is in the process of developing a recreational trail system plan. The city has expressed a great interest in the NBST.

## **Willard**

There is public interest in establishing a trail system in Willard, but there is currently no trail system plan or policy.

## **County**

### **Box Elder County**

Box Elder County has recently published a Box Elder County/Interagency Travel and Recreation Map illustrating the location of existing motorized and nonmotorized recreational travel corridors. Along the Wasatch and Wellsville Mountain foothills, the plan shows the location of public access roads. The only nonmotorized trails illustrated in this area are on Federal and State lands. Some motorized corridors illustrated in the plan above Perry may be possible locations for the NBST.

### **Cache County**

The *Cache County Countywide Comprehensive Plan* (Cache County Corporation 1998) transportation element goals include development of convenient alternative modes of transportation. The plan's strategies for creating this include development of parkways for pedestrians, bike paths, and walking paths. This portion of the Comprehensive Plan has yet to be implemented. Cache County does not currently have a parks and recreation department nor any recreational trail policies.



## **State**

### **State of Utah**

Governor Leavitt has initiated the Utah Statewide Trail Initiative (Appendix C) in an effort to create a statewide trails plan. This project will develop a framework for the future funding process, planning, development, networking, and maintenance for motorized and nonmotorized trails. The State of Utah considers the BST system the highest development priority.

## **Federal**

### **U.S. Forest Service (USFS) North Ogden to Pleasant View Trail Report**

The *North Ogden to Pleasant View Trail Report* (Barry 2000) identifies alternative locations for the SBST from North Ogden to Pleasant View. The plan identifies trail corridors along the Ogden-Brigham canal road, power line corridors, old four-wheel drive roads, and game trails. The plan says the biggest challenge for creating a trail route in this area is finding a way north through the Pole Patch subdivision. Two alternative locations in this area identified by the plan include: (1) following the powerline corridor, with the trail ending where the corridor intersects Pole Patch Road, and (2) following the Ogden-Brigham Canal road to the Weber/Box Elder County border.

## **Other**

### **PacifiCorp - Cutler Reservoir Resource Management Plan**

The *Cutler Reservoir Resource Management Plan*, which includes plans for recreational walking trails in the reservoir area, is currently being implemented and scheduled for completion in late 2001. The walking trails, generally unmarked routes that get recreationists into the wetland areas, include:

- ❖ the Railroad Walking Trail, a loop trail that follows an abandoned railroad corridor and bridge crossing south of Benson Marina,
- ❖ the Bud Phelps Wildlife Management Area Walking Trail, and
- ❖ the Little Bear River Walking Trail.

### **Utah State University - Recreation Planning Course Project**

In 1999 a recreation planning class at Utah State University (USU) conducted a feasibility assessment (Busch et al. 1999) of the NBST in Cache Valley. The study specifically addressed the route the trail might follow, a biophysical assessment of the trail route, public attitudes toward the proposed trail, an interpretation of amenities along the proposed route, possible conflicts with the construction of the trail, and a case study specifically looking at Green Canyon along the NBST.

The routing section of the document details important nodes along the proposed trail. Blacksmith Fork Canyon, Millville Canyon, Providence Canyon, Logan Dry Canyon, Logan Canyon, Green Canyon, and Green Canyon North were noted as having significance along the proposed trail. During the biophysical assessment the geology and geography of the shoreline; the impacts of recreational users of the trail might

have on the wildlife; the impacts the trail users would have on the plant life; and the threatened, endangered, and sensitive species were examined along the trail.

Public attitudes of the county, surrounding cities, business community, local landowners, neighborhood organizations, and environmental groups were recorded to catalog any support or objection to the proposed trail system. The majority of the objections were from the private land owners not wanting to sacrifice privacy and safety.

The plan also discusses trail interpretation, safety, and user conflicts. A community information packet that contains information on organizing a neighborhood trails group, supporting and maintaining a trail in your community, and community and city official contact information was also included in the document.

## **Population**

As of the 2000 census, there were 42,745 persons in Box Elder County and 91,391 persons estimated in Cache County. This equates to 78 persons per square mile in Cache County and only 7 persons per square mile in Box Elder County. The majority of persons in Box Elder County live along the foothills in the NBST corridor area, making this figure somewhat irrelevant. In general, the highest density of population along the NBST corridor is in Cache County, specifically in the Logan Urbanized Area. This higher density translates into a higher density of trail usage in the urban area.

## **Trail Advocacy Groups**

Table 2 is a list of persons who are actively involved in trail development or activities related to trail development. They have had direct contact with consultants in terms of providing input on the plan and its process, promoted participation by their constituents, and indicated interest in being further involved in the development of the NBST.

## **Northern Bonneville Shoreline Trail (NBST) Planning Activities**

### ***Northern Bonneville Shoreline Trail (NBST) Public Involvement Activities***

Public involvement was solicited throughout the project, focusing primarily on two series of public meetings at the beginning and end of the project. These two input opportunities are referred to as Scoping, taking place in late October through November 2001 and Implementation, taking place later in January through February 2002. In the Scoping phase, information was solicited on prioritizing trail segments, confirming values for the trail system and gauging general support and interest in further involvement. In the Implementation phase, information was sought regarding feedback to draft plan recommendations on segment alignment alternatives, usefulness of the plan document, and general comments on the planning process. In both phases, an estimated total of 182 individuals attended four public meetings and 150 submitted project input forms or letters (Appendix D).



**Table 2. Individuals interested in participating in Northern Bonneville Shoreline Trail (NBST) development.**

INTEREST	INDIVIDUAL	GROUP
Equestrian	Blake Pulsipher	Back Country Horsemen of Utah, Cache
	Dave Harris	Back Country Horsemen of Utah, Cache
	Paul Keeler	Rider, Brigham City
	Cindy Summerhill	Rider, Willard
	Bruce Kartchner	Back Country Horsemen of Utah
	Doug West	Back Country Horsemen of Utah
	Dave Howells	Back Country Horsemen of Utah
	Tony Cross	Cross Western Wear, Ogden
	Cheryl Hurley	Rider, Ogden
Cycling	Greg Beveridge	Mountain Biking Group
	Marc Yap	Logan Race Club
	Hal Cain	Cache Veloists Touring Club
Trail Planning and Construction	Michael Berry	U.S. Forest Service, Statewide BST leader
	Tony Botello	U.S. Forest Service, Trails Coordinator (Ogden and Logan)
	Rick Vallegos	U.S. Forest Service, Ogden Ranger District
	Craig Pettigrew	Utah State Lands, Fire, and Forestry
	Bill Farrand	National Park Service, Rivers & Trails Conservation Assistance Program
	Doug Muir	U.S. Forest Service, Wasatch Cache National Forest
	Jim Price	Mountainland Association of Governments, Utah County BST
	Shawn Seager	Mountainland Association of Governments, Utah County BST
	Trish Murphy	Mountainland Association of Governments, Utah County BST
	Wendy Fisher	Utah Open Lands, Conservation Easements
	Terry Green	State of Utah Parks and Recreation, Governor's Trail Initiative
	Janine Jarva	State of Utah Automated Geographic Referencing Center, BST Geographic Information System Mapping Coordinator
	Barbara Kuhnel	BST North Webmaster
	Sean Damitz	Utah Conservation Corps, Trail Construction
	Steve Burr	Utah State University, Institute for Recreation and Tourism



INTEREST	INDIVIDUAL	GROUP
<b>Trail Advocates</b>	Jay Aguilar	Cache Metropolitan Planning Organization
	Bobbie Coray	Cache Chamber of Commerce
	Lisa Leischman	USU Transportation Director
	Brent Windley	USU Planning Director
	Jeff Gilbert	Bear River Association of Governments
	Cindy Hall	Bear River Association of Governments
	Ron Vance	U.S. Forest Service, Logan Ranger District
	Dan Johnson	Mount Logan Middle School
	Keith Shaw	VCC Contact
	Eve Davies	PacifiCorp
	Claudia Conder	PacifiCorp
	Roger Rigby	Citizen
	Kelly Pitcher	Fire Chief, City of Logan
	Maridene Hancock	Bridgerland Travel Region
	Terrel Huppi	Citizen
	Tim Jorgensen	North Logan Fire Department
	Curt Gordon	Hyde Park City
	Tom LaBau	Hyrum City Zoning
	Russ Akina	Parks and Recreation Director, City of Logan
	Jen Negus	Secretary
	Paul Morgan	Geographical Information System Manager, City of Logan
	Kris Kvarfordt	Logan City Intern
	Nathan Peterson	Logan City Intern
Rachel Fawcett	Logan Transportation Department Transportation Coordinator	
Michelle Mechem	Planning, City of Logan	
Dale Huffaker	USU Vice President of Administration Services	



INTEREST	INDIVIDUAL	GROUP
<b>Trail Advocates (cont.)</b>	Scott Butler	Mantua City Council
	Rob Rasmussen	Thiokol Mountain Sports Club
	Adam Packer	Northern Utah Off-Highway Vehicles Association
	Allen Keller	Box Elder Trails Committee
	Jerry Mason	Box Elder Trails Committee
	Carol Billings	Perry City Council
	Ben Boyce	Brigham Parks and Recreation
	Shirley Scofield	Tremonton City Council
	Tami Coleman	Utah Native Plant Society, Cache
	Lance Loveland	Loveland's Cyclery in Brigham City
	Bryan Dixon	Audubon Cache Chapter
	Samantha Macfarlane	Common Ground, Accessibility
	Jim Sinclair	Cache Hikers
	Rene Tanner	Hiker, Pleasant View
	Bob Davis	U.S. Forest Service, Pleasant View City Council
	Marilyn O'Dell	BST Coalition
	Rob MacLeod	BST Committee (Salt Lake City)
	Rick Reese	BST Committee (Salt Lake City)
	Jim Byrne	BST Committee (Salt Lake City)
	Scott Earl	Sandy City Parks and Recreation
	Don Davis	Salt Lake County, Parks and Recreation
	Greg Montgomery	Ogden Trails Network
	Geoff Ellis	Weber Pathways
	Aric Jensen	Davis County Parks and Recreation
Tony Varilone	Soda Springs, Economic Development Director	
Joel Lundstrom	Logan City Parks and Recreation	



INTEREST	INDIVIDUAL	GROUP
Private Land Issues	Arthur Douglas	Farmer's Union
	Sterling Brown	Utah Farm Bureau, Northern Utah Representative
	Sylvia Talbot	Utah Association of Conservation Districts
	Georgia Sullivan	White Orchard Family Representative

### Scoping Phase

Two public meetings and two elected official focus groups were held early in the planning process, one on October 24, 2001, in Brigham City and another on October 29, 2001, in Logan. Print articles and public notices promoting these meetings appeared in the *Box Elder News Journal*, the *USU Statesman*, and the *Logan Herald Journal*. Articles covering the public meetings appeared in these publications, in the *Salt Lake Tribune*, and in the *Ogden Standard Examiner*. Public service announcements in advance of the meetings were placed on three radio stations, and interviews with project team members occurred on three different stations. The project was also promoted with an online open house and input form at the BST website. Over 100 individual telephone contacts were made to promote these meetings and 500 flyers were circulated, primarily in Brigham City and Logan. Special outreach was made to equestrian, bicycle, and hiking organizations.

### Project Input Forms

The BRAG staff estimated an attendance of 45 at the two meetings in Brigham City, with 36 submitting a project input questionnaire form (Appendix D), and an attendance of 85 to the two meetings in North Logan with 69 submitting a form. Of these two groups, 13 government officials attended the Box Elder Focus Group and 17 attended the North Logan Focus Group. In all, 111 forms were received, including 4 sent online and 2 mailed in to BRAG offices.

### Respondents' Affiliation

- 43 Nonaffiliated
- 30 Listed an organization they were involved with, with the largest number associated with recreation, environmental issues, and land ownership
- 38 Government officials, including elected officials, candidates for public office, and staff of local, State, and Federal agencies

### Response Distinctions Resulting from Affiliation and Place of Residence

For the most part, large differences cannot be detected in responses as a result of affiliation. For the purposes of this summary, all respondents are added together, giving them each equal weight. Distinctions can be viewed by an examination of the tabulations presented below. Since more respondents reside in Cache County than in Box Elder County, more interest in input was generally provided for Cache County, and recommendations for priorities were in developing Cache County trail segments and links with some exceptions that can be seen in the summary below.



## Overview of Public Input

There is significant support for trail development from government officials and the citizens representing the involved communities of both Box Elder and Cache Counties. The values of the existing BST are supported by residents who would extend this trail to the north into Idaho. There is adequate interest in joining trail organizations and working for implementation of trail segments.

Highlights from the response form include [number of questionnaire items providing further response detail shown in parentheses ( )]:

- ❖ Strong support of trail benefits of access to foothills and recreational opportunities (1)
- ❖ Concern about how implementation is accomplished with the existing BST (2)
- ❖ Proposed goals for trail strongly supported (3)
- ❖ Trail should connect to mountain recreation opportunities, city recreation facilities, existing trails (6)
- ❖ Canals and utility corridors, as well as existing roads and trails, all could support trail (7)
- ❖ Construction, use of private land, and public safety are implementation priorities (8)
- ❖ Significant involvement interest expressed for planning, construction, and promotion (14)

A detailed summary of the January/February questionnaire is provided in Appendix D.

## Implementation Phase

Two public meetings were held at the end of the planning process. One on January 29 in Brigham City and another on February 4 in Logan. Print articles and public notices promoting these meetings appeared in the Box Elder News Journal and the USU Statesman. Notices of a public comment period concluding February 21 appeared in the Logan Herald Journal. Articles covering the public meetings appeared in the Ogden Standard Examiner, the Box Elder News Journal, and the USU Statesman. E-mail and posted letters were sent to approximately 800 individuals to announce the meetings and inviting review of the draft plan document on the BST website, at BRAG offices, and at the Logan Public Library. Because of a 100-year storm on January 28, the Logan meeting was postponed for a week, and three area radio stations aired PSAs indicating the time change.

## *Trail Builders and Users Focus Group*

A meeting was held on November 13, 2001, in Logan for individuals representing groups of users, organizations, and government agencies that have been involved in trail development in Cache and Box Elder Counties. There were 17 individuals in attendance. The meeting focused primarily on construction and design issues, with some attention given to assessing community capability to organize and follow through with implementation once the Master Plan is adopted. The output of this meeting was used in the construction standards information shown in Chapter 3 and implementation discussion in Chapter 4. Minutes from the discussion are shown in Appendix E.



## **Future Public Involvement Opportunities**

The Master Plan creates a foundation from which interested communities can launch development of discrete BST segments within their political jurisdiction. Much more extensive public involvement will be required for the thoughtful consideration of implementation concerns “on-the-ground” in neighborhoods where the BST is actually planned, adopted, constructed, and maintained. Initial steps that interested communities can take in further consideration of individual segments of the NBST are shown in Chapter 4. To establish momentum in implementation, BRAG staff will schedule a set of meetings in 2002 to assist communities in moving forward with their individual segment planning efforts.

## **Natural Resource Analysis**

### ***Soils***

#### **Cache County East Bench**

The soils in this area of the NBST alignment consist of well-drained soils of the medium- and high-lake terraces. These soils are predominately well drained and have a loam to silty clay subsoil. These soils are nearly level to very steep and occupy lake terraces, alluvial fans, deltas, and escarpments. The Mendon, Avon, Wheelon, and Collinston soils formed in material derived from the Salt Lake Formation and contain an appreciable amount of volcanic ash. The Ricks, Timpanogos, Parleys, and McMurdie soils formed in the mixed alluvium and lake sediment derived mainly from limestone, quartzite, and sandstone. Elevations range from about 4,500 to 5,300 feet. The average annual precipitation is 15 to 20 inches, the mean annual air temperature is 45 to 50 degrees Fahrenheit, and the frost-free season is 110 to 160 days.

#### **Cache County West Bench**

The soils on the west side of the Cache Valley NBST alignment consist of well-drained soils to somewhat excessively drained soils. The well-drained soil associations are similar in drainage and general location, but they are contrasting in soil characteristics and vary somewhat in position and climate. The Nebeker-Hendrick Association consists of well-drained soils that have a silty clay loam and clay sub-soil. The soils are mainly strongly sloping to moderately steep and are on broad alluvial fans above the upper lake terraces. These soils formed in alluvium and colluvium derived chiefly from sandstone and quartzite rocks. Richmond-Sterling-Picayune Association consists of somewhat excessively drained, very gravelly and stoney loams and sandy loams. These soil are on very steep terraces escarpments, deltas, and foot slopes of mountains. The somewhat excessively drained soils are very gravelly. These soils formed in residuum, colluvium, and alluvium derived mainly from sandstone or quartzite and some limestone and shale rock.

#### **Box Elder County**

The soils along this portion of the NBST alignment consist of moderately well-drained to somewhat excessively drained soils of the high, medium, and low lake terraces and fans. They are silt, loams, and sandy loams that are cobbly or gravelly. The soils formed mostly in alluvium and colluvium derived from sandstone, quartzite, limestone, and some gneiss, schist, and lake sediments. A few soils formed in residuum derived from sandstone, quartzite, and limestone. The two most prevalent associations are Hupp-

Sterling-Abela and Fielding-Kilburn-Kidman. The Hupp-Sterling-Abela Association is characterized as well drained and somewhat excessively drained, gently sloping to very steep gravelly silt loams and gravelly loams on alluvial fans, lake terraces, escarpments and mountain foot slopes. The Fielding-Kilburn-Kidman Association is characterized as well-drained and somewhat excessively drained, nearly level to very steep silt loams, gravelly sandy loams, and fine sandy loams on lake terraces, benches, alluvial fans, and broad valley plains.

### ***Vegetation***

Native vegetation in the NBST corridor consists primarily of sagebrush and juniper grasslands, and oak and maple woodlands (Edwards et al. 1995). The southern Box Elder County portion of the NBST may contain small communities of oak woodlands, but is generally dominated by sagebrush and juniper grasslands. The northern section of trail in Box Elder County primarily contains sagebrush and juniper grasslands. In Cache County on the east side of the Wellsville Mountains, the NBST area includes maple woodland, grassland, and mountain riparian plant communities. Plant communities on the eastern side of Cache Valley include sagebrush and juniper grasslands interspersed with occasional maple woodlands and mountain and lowland riparian areas. The riparian areas are located in places where canyons drain into the foothills. The Cutler Reservoir area along Highway 30 contains extensive wetland plant communities.

### ***Wildlife***

Users of the trail will encounter a variety of mammals, birds, reptiles, and amphibians. The most abundant animals include: mule deer, elk, coyote, badger, skunks, and other small rodents, waterfowl, songbirds, ring-necked pheasant, sharp-tailed grouse, sage grouse, shorebirds, ducks, raptors (such as the bald eagle, falcons, hawks, and kites), snakes and frogs.

The proposed NBST connects Utah Department of Wildlife Resources (UDWR) wildlife management areas in numerous places in both Box Elder County and Cache County. This draft data set represents at-risk essential wildlife habitat areas in October 2000 as determined by Utah Division of Wildlife Resources biologists. For purposes of this effort, essential wildlife habitat has been defined as the habitat that Utah must maintain to meet the management objectives and the habitat conservation needs of all species of protected wildlife in the state. The Utah Division of Wildlife Resources welcomes the input of County Commissions, City Councils, and others on this draft data set.

The contact the route has with these sensitive habitats was minimized to protect wildlife from disturbance. The wildlife management areas the trail will come within 0.25 mile from include: the Bear River Bay waterfowl marshes, critical and normal deer and elk winter ranges, Cutler Marsh, Bear River Migratory Bird Refuge, riparian corridors of the Malad and Bear rivers, Conservation Reserve Program lands, and wetlands at the Harold Crane Wildlife Management Area and Willard Bay.

### ***Wildfire / Firebreaks***

The NBST corridor generally follows the mountain foothills along the urban and wildland interface, the place where the urban area meets and mingles with the natural landscape. This area is at high risk for unnatural wildfires because of the concentration of persons, activities, and infrastructure adjacent to this natural, undeveloped landscape. Although wildfire does play an important role in the ecology of the landscape, wildfire in the urban/wildland interface does require specific attention because of the area's

density of property and infrastructure. The primary concerns are protecting both property from fire coming down the mountain and protecting the wildlands from fire generated in the urban environment.

The NBST corridor has the potential to assist in the control of wildfires in the urban/wildland interface. The NBST corridor can be constructed to function as a firebreak. Forestry personnel with the State of Utah recommend that a firebreak consist of a 30-foot wide corridor in which existing vegetation is augmented with fire resistant native plant species (see Appendix F for plant list). Some large stands of existing fire-prone species may be removed. The NBST can be placed within this firebreak corridor, thus providing emergency access for small fire engines. The NBST could be developed as a firebreak along the urban, densely populated portions of the trail. The first NBST segment from Logan Canyon to Green Canyon will be constructed by Logan City using the above firebreak corridor plans with a 10-foot wide trail.



# CHAPTER 2

## Trail Alignment Analysis by Segment

An analysis of the various trail alignment alternatives is presented below for each segment. For planning purposes, the NBST has been divided into nine discrete segments (see Table 3 and Figure 3). A general description of each segment is presented first, followed by an environmental description that highlights resources such as slope, hydrology, wildlife, and geology. Detailed descriptions of alternative trail alignments and links are also provided, which highlight ownership, development opportunities and constraints, and trail head locations.

**Table 3. Summary of proposed Northern Bonneville Shoreline Trail (NBST) segments.**

SEGMENT	INCORPORATED	UNINCORPORATED	TOTAL MILEAGE
<b>1 - Pleasant View to Brigham City</b>			
Alternative A	8.2	6.0	<b>14.2</b>
Alternative B	8.7	6.2	<b>14.9</b>
<b>2 - Brigham City to North of Deweyville</b>			
Alternative A	7.7	11.2	<b>18.9</b>
Alternative B	10.4	10.0	<b>20.4</b>
<b>3 - Linkage from Box Elder County to Cache County</b>			
Alternative A	0.0	8.1	<b>8.1</b>
Alternative B	0.0	9.2	<b>9.2</b>
<b>4 - Mendon to Wellsville</b>			
Alternative A	2.2	7.2	<b>9.4</b>
Alternative B	0.4	9.8	<b>10.2</b>
<b>5 - Wellsville to Avon</b>			
Alternative A	0.0	13.3	<b>13.3</b>
<b>6 - Avon to Blacksmith Fork Canyon</b>			
Alternative A	0.2	8.3	<b>8.5</b>
Alternative B	0.4	7.8	<b>8.2</b>
<b>7 - Blacksmith Fork Canyon to Logan</b>			
Alternative A	2.1	6.4	<b>8.5</b>
<b>8 - Logan to Smithfield</b>			
Alternative A	3.1	4.4	<b>7.5</b>
Alternative B	3.7	5.8	<b>9.5</b>
<b>9 - Smithfield to Idaho Border</b>			
Alternative A	1.6	8.9	<b>10.5</b>
Alternative B	0.2	14.1	<b>14.3</b>



Figure 3. Northern Bonneville Shoreline Trail (NBST) segments.

(11x17)



## **Segment 1 - Pleasant View to Brigham City**

### ***General Description***

The Pleasant View to Brigham City Segment extends from the Box Elder County and Weber County border to the eastern side of Brigham City (see maps 1 and 2 in Appendix G). The southern end of the segment will link to the planned endpoint of the SBST in Weber County as detailed in the USFS North Ogden to Pleasant View Trail Report. As of this publication, there are currently two alternative alignments in Weber County. The most likely alternative follows the PacifiCorp powerline corridor and ends where this corridor intersects Pole Patch Road. The other alignment alternative follows the Ogden-Brigham Canal. The NBST in this section will contour the foothills above Utah State Highway 126 through the communities of Willard, Perry, and Brigham City. Land ownership along this segment is generally private. The Wasatch-Cache National Forest is on the east side of the corridor, and there is a small section of U.S. Department of the Interior, Bureau of Land Management (BLM) land at the mouth of Perry Canyon.

### ***Environmental Description***

#### **Slope**

The foothill area along this segment is narrow with a mountainous, rocky scarp beginning at approximately 4,500 feet elevation. The foothill area below this is a moderate slope that varies in width but is very narrow adjacent to community-developed areas.

#### **Hydrology**

The Ogden-Brigham Canal traverses the foothills along the entire segment between 4,600 and 4,500 feet elevation. The canal enters Brigham City on the east side, where it then enters the Box Elder Canal at 6<sup>th</sup> Street. The Perry Canal also follows the foothills, beginning at the northeast side of Perry and ending in the same area as the Ogden-Brigham Canal. Four perennial streams cross the foothills along this segment. Willard Creek comes out of Willard Canyon northeast of the town of Willard. Facer Creek comes into the valley approximately 1.5 miles north of Willard Creek. Three-mile Creeks drains out of Perry Canyon south of the town of Perry. Box Elder Creek drains Box Elder Canyon, coming into the valley at Brigham City. There are several springs in the area, according to U.S. Geological Survey maps. The primary spring of interest is the Willard City Spring in Willard Canyon. No wetlands, other than perennial stream riparian corridors, have been identified.

#### **Wildlife**

The UDWR show no critical wildlife habitat along this segment. Primarily, the wildlife habitat and wetland areas are to the west of Highway 69.

#### ***Geology***

Several faults follow the edge of the Wasatch Mountains along this segment, the largest of which is the Wasatch Fault. There is a large landslide area east of Brigham City that bisects the trail corridor.



## ***Alignment Alternative A - PacifiCorp Powerline Corridor (14.2 Miles)***

The PacifiCorp powerline corridor follows the entire length of this segment of the NBST. The preferred ending location for the SBST in Weber County is the intersection of the powerline corridor and Pole Patch Road. The NBST will link to the SBST at this point and then head north, contouring the foothills and following the powerline easement. Just south of Perry, the powerline corridor veers to the northeast and heads into steep terrain. At this point the trail alignment leaves the powerline corridor and contours the foothills along the Ogden-Brigham Canal above Perry. On the north side of Perry the trail rejoins the powerline corridor to its intersection with Highway 89. At this point the trail will follow (not cross) Highway 89 to its intersection with Highway 90. Here, it is necessary that the trail cross the highway (this obstacle is discussed in greater detail below). The trail will then contour the foothills out of the canyon where it rejoins the powerline corridor and continues north of Brigham City.

### **Ownership**

Ownership along this segment is private, except for a small area at the mouth of Perry Canyon that is owned by the BLM. Ownership along the PacifiCorp powerline corridor is assumed to be private, with PacifiCorp owning an easement for the powerline to cross these private lands. It is possible that there are places where PacifiCorp has ownership of the powerline corridor lands. Research into PacifiCorp easement and ownership issues along this segment will need to be conducted (see the Working with Utilities section in Chapter 4). The small section that follows the Ogden-Brigham Canal is under private ownership with the canal company owning an easement for canal operation.

### **Trail Development Opportunities**

- ❖ The PacifiCorp powerline corridor easement may facilitate easier trail development because of the ability for easement access and reduced property ownership issues.
- ❖ Approximately 2 miles of this alignment will cross public lands (USFS and BLM), thus reducing ownership issues.

### **Trail Development Constraints**

- ❖ Private property issues that include the Pole Patch area at the southern most portion of the trail.
- ❖ Crossing canyons at Willard Canyon, Facer Creek, and Perry Canyon.
- ❖ The Box Elder Canyon and Highway 89 crossing poses a major trail obstacle because it is a heavily traveled four lane highway. Crossing options at the mouth of the canyon include a pedestrian bridge overpass or a tunnel underpass east of the Highway 89 / State Route (SR) 90 interchange. The Utah Department of Transportation (UDOT) is the agency that would assist in planning this road crossing. A similar overpass, crossing four lanes and including all ramps and associated retaining walls, was constructed on the SBST at Parley's Canyon and Interstate 80. The total costs for this project were \$2,400,000. An alternative would be to cross using the existing deer tunnel crossing just west of Mantua. This would require the trail to go up Box Elder Canyon approximately 2 miles and then back down to the mouth of the canyon. However, the UDWR does not support this suggestion (see UDWR letter in Appendix D).



## Trailheads

- ❖ Mountain View Park east of Perry, Utah - There is a park at the edge of the foothills adjacent to the Ogden-Brigham Canal. This would provide a useful trailhead for the town of Perry. Approximately 0.25 mile of trail that links the trailhead to the powerline corridor would need to be constructed.
- ❖ Willow Creek Park east of Willard, Utah - A park near the two water tanks in Willard, at the base of the foothills, could provide trail access. Approximately 0.25 mile of trail that links the trailhead to the powerline corridor would need to be constructed.
- ❖ Knudson Property Trailhead- This is located on the south east side of the interchange of Highway 89 and SR 90 at the mouth of Box Elder Canyon. Brigham City has acquired this property for future trailhead development.

### ***Alignment Alternative B - Ogden-Brigham Canal (14.9 Miles)***

The Ogden-Brigham Canal corridor follows the entire length of this segment of the NBST. This is a secondary alternative alignment for the SBST ending at the Box Elder County/ Weber County line. The NBST will link to the SBST at this point and then head north, contouring the foothills while following the canal corridor to Highway 89. At the highway, the trail will head east to the Knudson Trailhead. Here, it is necessary that the trail cross Highway 89 (this obstacle is discussed in greater detail below).

## Ownership

Ownership along this segment is private, except for a 0.25-mile segment at the mouth Cook Canyon that is owned by the USFS. Ownership along the Ogden-Brigham Canal corridor is assumed to be private, with the canal company owning an easement for the canal to cross these private lands.

## Trail Development Opportunities

- ❖ The Ogden-Brigham canal corridor easement may facilitate easier trail development because there is a small road adjacent to the canal the entire length that would function as a trail. This existing corridor would require very little, if any, trail construction.

## Trail Development Constraints

- ❖ Possible opposition from the Ogden-Brigham Canal Company because of liability issues.
- ❖ Possible opposition from private property owners along the canal.
- ❖ Box Elder Canyon and Highway 89 crossing (see discussion under Alternative A).

## Trailheads

See the trailheads section of Alternative A.



### ***Other Trail Alignment Opportunities***

Other trail route alternative considerations that are possible along this segment consist of existing jeep roads and established trails that are located along the foothills and east of the alignments described above. The “high road” and the White Rock Trail that start just north of Willard are possible alternative routes, as are several other trails and unimproved roads that skirt the eastern foothills.

### ***Potential Trail Linkages***

There are several potential trail links that can be made along this segment. These include:

- ❖ the existing trail around Willard Bay;
- ❖ links to existing recreation facilities in Willard, Perry, and Brigham City;
- ❖ and linking to the trails planned for Brigham City at the mouth of Box Elder Canyon.

## **Segment 2 - Brigham City to Deweyville**

### ***General Description***

The trail segment from Brigham City to Deweyville starts at the mouth of Box Elder Canyon and travels north along the western foothills of the Wellsville Mountains and past Deweyville approximately 3 miles (see maps 2, 3, and 4 in Appendix G). The primary views along this segment will consist of the Bear River Valley and the Cache National Forest. The trail has the opportunity to follow a number of existing rights-of-way, including the PacifiCorp powerline corridor. The existing trail system policy that Brigham City and Box Elder county have developed will maximize links to the proposed NBST. The potential of having the trail connect recreational users to the Bear River Migratory Bird Refuge and visitors center is a real possibility. The land ownership along this segment is a mixture of public and private lands, with the majority of this trail segment following existing rights-of-way.

### ***Environmental Description***

#### **Slope**

The foothill area along this segment is narrow with a mountainous, rocky scarp beginning at approximately 4,400 feet elevation. The foothill area below this is a moderate slope that varies in width but is very narrow adjacent to community-developed areas and has a western aspect. The Wellsville Mountain Range has the steepest rise to run ratio in North America.

#### **Hydrology**

The NBST crosses Box Elder Creek and a water pipeline at the mouth of Kotter Canyon. The Hammond East Branch Canal is the most prevalent canal along this segment and starts near the mouth of Antimony Canyon traveling north through Honeyville. A smaller North String Canal ditch originating from Rees Spring is located to the west of the proposed trail alignment. A dozen intermittent streams that drain the Wellsville Mountains traverse this segment. There are also a number of water tanks, springs, and ponds



that are adjacent to the proposed trail. The Acme and Honeyville culinary drinking water sources are both springs located east of Honeyville.

### **Wildlife**

One mile past Crystal Hot Springs, the corridor enters the Malad/Bear River Riparian Corridor area as mapped by the UDWR. The proposed trail follows this feature for approximately 4.5 miles.

### **Geology**

The Wasatch Fault runs parallel to the foothills along the entire segment. The trail will need to cross a landslide area north of Box Elder Canyon that is approximately 0.25-mile wide.

### ***Alternative A - PacifiCorp Powerline Corridor (18.9 Miles)***

This alternative will follow the PacifiCorp powerline corridor the entire length of the segment to Honeyville. It will connect to the southern segment of the trail at the Highway 89 road crossing near the area planned for a Brigham City trailhead. It will follow the toe of the slope east of development in Brigham City, because of the area's steep topography, for approximately 1.5 miles. The trail then intersects the powerline east of Rees Springs and follows the powerline for the remainder of the segment past Honeyville (approximately 14 miles).

### **Ownership**

Land ownership along this trail alternative is generally private, with short crossings of public lands. A small parcel at the mouth of Box Elder Canyon is owned by Brigham City and is planned for a future trailhead. A 0.5-mile segment crosses the Wasatch-Cache National Forest directly east of Honeyville. Ownership along the PacifiCorp powerline corridor is assumed to be private, with PacifiCorp owning an easement for the powerline to cross these private lands. It is possible that there are places where PacifiCorp has ownership of the powerline corridor lands. Research into PacifiCorp's easement and ownership issues along this segment will need to be conducted (see the Working with Utilities section in Chapter 4).

### **Trail Development Opportunities**

- ❖ The PacifiCorp powerline corridor easement may facilitate easier trail development because of the ability for easement access and reduced property ownership issues.
- ❖ The topography of the area contains few obstacles and is generally very good for trail development.

### **Trail Development Constraints**

- ❖ Property issues include the ability to use the powerline corridor easements for trail development

### **Trailheads**

- ❖ Brigham City is planning a trailhead on the east side of Box Elder Canyon on a piece of donated land that is now a gravel pit.
- ❖ Honeyville City Park located on the east side of Honeyville, Utah.
- ❖ Deweyville City Park located on the east bench of Deweyville, Utah.

### ***Alignment Alternative B - Hammond East Branch Canal (20.4 Miles)***

This trail alternative primarily follows the Hammond East Branch Canal with short portions following the powerline corridor. It will connect to the southern segment of the trail at the Highway 89 road crossing near the area planned for a Brigham City trailhead. It will follow the toe of the slope east of development in Brigham City, because of the area's steep topography, for approximately 1.5 miles. The trail will then intersect the powerline east of Rees Springs and follow the powerline to its intersection with the Hammond East Branch Canal at Antimony Canyon. The trail would then follow the canal corridor to Deweyville. From Deweyville, the trail follows a jeep road for approximately 1.5 miles to the intersection of the powerline corridor. The trail follows the powerline corridor to the end of the segment (approximately 2 miles).

### **Ownership**

Land ownership along this trail alternative is generally private. A small parcel at the mouth of Box Elder Canyon is owned by Brigham City and is planned for a future trailhead. Ownership along the canal corridor is private, with the canal company owning an easement for the canal to cross these private lands.

### **Trail Development Opportunities**

- ❖ The canal corridor has a road that would readily function as a trail with very little trail construction required.
- ❖ The canal corridor contours the foothills relatively close to the communities along the trail, thus providing easy trail access for residents.
- ❖ The topography provides for a relatively flat trail that would be easily negotiated by many trail users.
- ❖ No crossing of roads or major landscape features is required.

### **Trail Development Constraints**

- ❖ Possible opposition from the Hammond East Branch Canal Company resulting from liability issues.
- ❖ Possible opposition from private property owners along the canal.

### **Trailheads**

See Alternative A for trailhead descriptions.

### ***Other Trail Alignment Opportunities***

Other trail route alternative opportunities that are possible along this segment consist of existing fire/four-wheel drive roads that contour the foothills above Honeyville and Deweyville. These established roads could be used to connect various segments of both Alternatives A and B to the north and south. These roads cross the Wasatch-Cache National Forest for approximately 0.5 mile and also cross the Wellsville

Wilderness Area at three points. The wilderness sections are approximately 0.2 mile total and could easily be avoided by constructing a link trail outside of the wilderness boundary.

### ***Potential Trail Linkages***

There are several potential trail links that could be made along this segment. These include:

- ❖ the Coldwater Canyon Trail that crosses the Wellsville Mountains (this trail is in the Wellsville Wilderness Area and is not open to bicycles),
- ❖ the Crystal Hot Springs recreation area,
- ❖ the Bear River area,
- ❖ the Fort Call Historical Monument, and
- ❖ linking to the trails planned for Brigham City at the mouth of Box Elder Canyon.

## **Segment 3 - North Wellsville Mountain Connection**

### ***General Description***

The trail segment around the north end of the Wellsville Mountains begins approximately 3 miles north of Deweyville (see maps 5, 6, and 7 in Appendix G). It contours around the north end of the Wellsville Mountains near the Bonneville Shoreline terrace south of Highway 30. This is the primary NBST connection between Box Elder and Cache Counties, which may be responsible for trail development. Land ownership along this segment is entirely private. Alternatives consist of existing corridors and newly constructed trail.

### ***Environmental Description***

#### **Slope**

The foothill area along this segment has a north to northeast aspect. The topography is rolling with elevations approximately 5,000 feet. There are two prominent knolls in the corridor that can provide scenic views.

#### **Hydrology**

The trail crosses Cottonwood Creek, Sleepy Hollow Creek, Willow Creek, and Three-mile Creek. There are eight springs located in the trail corridor near the community of Mendon, including Yonk Spring, Coldwater Spring, and Deep Gorge Spring. There are no wetlands along the route.

#### **Wildlife**

A majority of this segment is in the Malad/Bear River riparian corridor area as mapped by the UDWR. The segment follows this corridor for approximately 5 miles.



## Geology

The West Cache (Wellsville) fault runs parallel to the foothills on the east side of the Wellsville Mountains near the historic Lake Bonneville Shoreline.

### ***Alignment Alternative A - Four-Wheel Drive Road Corridor (8.1 Miles)***

This alternative begins at the PacifiCorp powerline corridor and the four-wheel drive road just east of Collinston. The trail then follows the four-wheel drive road east to the Cache County line. At this point the trail turns south, following the road down Three-mile Canyon and continuing on the road to its intersection with the Wellsville Mendon Lower Canal.

## Ownership

Land ownership along this trail alternative is both private and public. The powerline corridor is private, with PacifiCorp owning easements for the powerline. The four-wheel drive road between the powerline corridor and Cottonwood Canyon is a private road. Beyond Cottonwood Canyon, the alignment follows the Dairy Valley Road, which is a county road.

## Trail Development Opportunities

- ❖ The use of the four-wheel drive road allows for trail construction in an existing developed and disturbed road corridor.
- ❖ The topography lends itself to trail development, and the hilly nature of the area adds visual interest and some buffering from the nearby highways.
- ❖ The topography of the area contains few obstacles and is generally very good for trail development.

## Trail Development Constraints

- ❖ The NBST is required to be nonmotorized, thus requiring separation of motorized and nonmotorized uses along the road corridor.
- ❖ The road/trail corridor is adjacent to several springs that may be impacted by trail development.
- ❖ Private landowners may be reluctant to accommodate a trail across their land and agricultural areas.

## Trailheads

No trailheads are proposed along this segment.

### ***Alignment Alternative B - Old Railroad Bed Corridor (9.2 Miles)***

The old railroad bed option allows the trail to follow the powerline corridor for 1.5 miles before merging with the railroad bed at the point of Cottonwood Canyon. The trail then bends around the northern extent of the Wellsville Mountains, passing outside of the knolls and continuing along the historic Lake Bonneville Shoreline. The trail passes over Three-mile Creek and ends northwest of Mendon.



## Ownership

Land ownership along this trail alternative is generally private. This alternative crosses a considerable amount of private agricultural lands as it follows the old railroad bed. Ownership along the powerline corridor is private, with PacifiCorp owning an easement for the corridor to cross these private lands.

## Trail Development Opportunities

- ❖ The old railroad bed provides an existing clear grade to build the trail.
- ❖ The topography provides for a relatively flat trail that would be easily negotiated by many trail users.
- ❖ No crossing of roads or major landscape features is required.

## Trail Development Constraints

- ❖ Possible opposition from the agricultural land owners if the trail follows the old railroad bed.
- ❖ The construction costs for this alternative are increased by the necessity of a longer route around the northern extent of the mountain range.

## Trailheads

No trailheads are proposed along this segment.

## *Other Trail Alignment Opportunities*

Other trail route alternative opportunities that are possible along this segment consist of existing fire/four-wheel drive roads that contour the foothills north of Deweyville. These established roads could be used to connect various segments of both Alternatives A and B to the north and south. These roads would act as short cuts between the two alternatives.

## *Potential Trail Linkages*

There is an important trail linkage that can be made along this segment. This includes:

- ❖ Access from the west side of the Wellsville Mountains to the east, connecting two major segments of trail. This link is the most straight forward in terms of Cache County trails linking with Box Elder County trails.

## Segment 4 - Mendon to Wellsville

### *General Description*

This segment of the BST links two towns, Mendon and Wellsville, located on the eastern Wellsville Mountains (see maps 7, 8, and 9 in Appendix G). The trail would extend from northwest of Mendon to Highway 89 south of Wellsville in a north/south orientation. The trail route would follow existing canal

roads or foothill contours between the cultivated agricultural lands and the Wasatch Cache National Forest. The land ownership where the trail routes occurs is completely private. The trail segment between these two towns, where there are no facilities to accommodate recreational use now, will encourage pedestrian traffic within and through these two communities.

### ***Environmental Description***

#### **Slope**

The slope aspect for this segment of trail is to the east. The terrain is relatively flat to rolling hills and has an average elevation of 4,800 feet.

#### **Hydrology**

The trail crosses a number of perennial and intermittent streams as well as irrigation canals. The Wellsville Mendon Lower Canal and the Wellsville Mendon Upper Canal present two possible corridors for the trail route. Pole Canyon, Deep Canyon, Gibson Canyon, Coldwater Canyon, Shumway Canyon, Brushy Canyon, Pine Canyon, and Wide Canyon all produce seasonal streams that would impact the trail along this segment. Bird Canyon stream is the only perennial stream that would come in contact with the trail, and the possibility of having to bridge this stream exists.

#### **Wildlife**

The trail does not impact any critical wildlife range along the foothills of the Wellsville Mountains.

#### **Geology**

The trail segment parallels many fault lines along the foothills of the Wellsville Mountains. The largest fault in Cache Valley, the Western Cache Fault, is along this segment of the trail. There are a number of land slide areas along the trail, the largest of which is at the mouth of Brushy Canyon.

#### ***Alternative A- Wellsville Mendon Lower Canal (9.4 Miles)***

The trail will follow existing canal roads and pedestrian paths that parallel the Wellsville Mendon Lower Canal. The trail begins 1 mile northwest of Mendon and continues south passing the town of Wellsville to the west and ending at Highway 89.

#### **Ownership**

Land along this segment is private with the canal company having an easement through the land for the canal.

#### **Trail Development Opportunities**

- ❖ The trail route follows existing corridors allowing the construction cost to be minimal.
- ❖ The trail is relatively close to the two towns and encourages pedestrian use.
- ❖ The linkage of Wellsville and Mendon by the trail provides economic and social benefits.
- ❖ Two communities will be able to share in the trail responsibilities.

### **Trail Development Constraints**

- ❖ The trail passes through private land and land use issues may arise.
- ❖ The trail is relatively close to the two towns causing privacy concerns.

### **Trailheads**

Trailhead possibilities along this segment include:

- ❖ Pioneer Park on the west bench of Mendon,
- ❖ the northwest trailhead located on the Wellsville Mendon Lower Canal,
- ❖ bottom of Pine Canyon as the trail crosses the gravel road, and
- ❖ the trailhead at Highway 89 near Wellsville that will need to be constructed.

### ***Alternative B- Eastern Foothills of the Wellsville Mountains (10.2 Miles)***

The trail begins near the mouth of Pole Canyon at an elevation of 5,100 feet. The trail then follows the toe of the slope south, contouring between the agricultural land to the east and the Wasatch Cache National Forest to the west. This segment between the two communities is considerably further west from the population centers than Alternative A. The trail segment ends as it meets Highway 89 near 1600 South (Mount Sterling Road).

### **Ownership**

The land along this alternative route borders both public and private properties. The private land is mostly in agricultural use. The trail parallels USFS land and wilderness areas.

### **Trail Development Opportunities**

- ❖ The trail route would provide the most rural setting between Mendon and Wellsville.
- ❖ The trail topography is relatively uniform, which aids in construction of the trail.

### **Trail Development Constraints**

- ❖ The trail route does not follow any existing corridors.
- ❖ The trail would border and pass through private land, which might become a land use issue.

### **Trailheads**

The trailhead for the north and south side of this trail segment includes:

- ❖ the mouth of Pole Canyon, and
- ❖ a constructed location near Mount Sterling and Highway 89.

### ***Other Trail Alignment Opportunities***

There are no other easily defined alternatives.

### ***Potential Trail Linkages***

There are several potential trail links that can be made along this segment. These include:

- ❖ the town of Mendon to the town of Wellsville,
- ❖ Deep Canyon and Stewart's Pass, and
- ❖ Coldwater Pond.

## **Segment 5 - Wellsville to Avon**

### ***General Description***

This segment of the BST travels from the southwest foothills of the Wellsville Mountains within Cache Valley to the eastern foothills above Avon, Utah (see maps 9, 10, 11, and 12 in Appendix G). The trail winds its way from Highway 89 and Mount Sterling east, following the 5,100-foot contour, through some of the most diverse back country and agricultural lands in Cache Valley. The terrain can be characterized as rolling hills to steep slopes. This segment intersects with the Little Bear River near Avon. The route ends to the southeast of Avon at the mouth of East Canyon.

### ***Environmental Description***

#### **Slope**

The slope aspect for this segment of the trail varies considerably but is primarily northern. The terrain is characterized as rolling to steep but has long stretches of flat segments, especially as the trail parallels the Little Bear River.

#### **Hydrology**

The Little Bear River will be paralleled by the trail and then crossed at an existing bridge leading into Avon. The proposed route has little contact with any other streams or springs.

#### **Wildlife**

The trail intersects the Little Bear River, which includes wildlife habitat.

#### **Geology**

The trail comes in contact with the Western Cache Fault (Wellsville Fault) within the first 2 miles of the trail as it crosses Highway 89. The trail crosses the Eastern Cache Fault (Logan Fault) as the trail intersects the Little Bear River. There are a number of remote land slide areas near the middle of this trail segment.

### ***Alternative A - 5,100-Foot Elevation (13.3 Miles)***



This southern route is the major link between the western segment of the NBST to the eastside of Cache Valley. The trail is completely rural and traverses some of the most visually interesting portions of Cache Valley. The trail will cross agricultural lands, rolling hills, forested riparian areas, and a river corridor. Jeep trails will be utilized where necessary. The land the trail crosses is mostly private.

### **Ownership**

The property along this alignment is privately owned agricultural land.

### **Trail Development Opportunities**

- ❖ a link between the west side of Cache Valley to the east side of Cache Valley,
- ❖ the trail provides a visually interesting route through rural Utah, and
- ❖ the trail offers a number of self contained loops beneficial to equestrian and bicycle use.

### **Trail Development Constraints**

- ❖ the trail does not follow any existing pedestrian paths and would need to be constructed from scratch,
- ❖ the trail is relatively remote, and
- ❖ population levels in the surrounding area are low and trail use might not be adequate to justify construction.

### **Trailheads**

Trailheads along this segment would include:

- ❖ the mouth of East Canyon,
- ❖ the public park in Avon, and
- ❖ and a constructed trailhead near Mount Sterling.

### ***Other Trail Alignment Opportunities***

Other routes along this segment include following the true 5,100-foot contour elevation completely through to Avon. The corridor along the Little Bear River could be accessed for a longer portion of trail leading up and into the mouth of East Canyon. The jeep trails in this area could also support pedestrian traffic.

### ***Potential Trail Linkages***

The links along this portion of the trail include:

- ❖ East Canyon,



- ❖ Avon,
- ❖ the Little Bear River,
- ❖ the Great Western Trail,
- ❖ Liberty,
- ❖ Hyrum Reservoir State Park, and
- ❖ the jeep trail linking Mantua to Avon.

## **Segment 6 - Avon to Hyrum**

### ***General Description***

The trail route for this segment of the NBST will begin at a trailhead just north of McKenzie Flat at the mouth of East Canyon and continue along the 5,100-foot contour elevation into Hyrum at the mouth of Blacksmith Fork Canyon (see maps 12 and 13 in Appendix G). The trail would be located in the foothills west of the Wasatch Cache National Forest.

### ***Environmental Description***

#### **Slope**

The slope aspect for this section of trail is west and can be described as rolling hills to steep escarpments.

#### **Hydrology**

The trail along the historic Lake Bonneville Shoreline will intersect several intermittent streams, a perennial stream at the base of East Canyon, and the Blacksmith Fork River east of Hyrum City.

#### **Wildlife**

The Blacksmith Fork Canyon Trailhead is located in Utah State Wildlife Reserve land, but the remainder of the trail does not contact any critical wildlife areas.

#### **Geology**

The trail parallels the Eastern Cache Fault on both sides along its entire length. The route does not contact any landslide areas.

### ***Alternative A - 5,100-Foot Contour (8.5 Miles)***

This alternative route will follow existing jeep roads east and north of Avon at the 5,100-foot elevation before crossing the mouth of Hyrum Canyon. The trail then continues north along the 5,100-foot contour into the Blacksmith Fork Canyon. The terrain along this segment of trail is relatively flat and offers excellent opportunities for a trail. The existing trails on the eastern foothills in this area are favorites to recreational users.



## Ownership

The land along this section of trail is privately owned.

## Trail Development Opportunities

- ❖ The trail will follow the 5,100-foot contour, which will minimize construction costs.
- ❖ The trail links Avon and Hyrum.

## Trail Development Constraints

- ❖ The trail crosses private land, which raises the question of land use possibilities.
- ❖ In some sections the trail follows roads that allow motorized vehicles.

## Trailheads

An established UDWR Trailhead is located near the mouth of Blacksmith Fork Canyon. This large parking area is easily accessed by trail users from the south and north.

- ❖ There are three trailhead possibilities along this stretch of trail. The trailhead at the opening of East Canyon will serve Avon and trail users coming from Highway 165. The Paradise City Park would be a possible link for the town to the NBST, and the trailhead located at the base of Blacksmith Fork Canyon will offer the ability to stop or start the trail system for residents of Hyrum.

## ***Alternative B- PacifiCorp Powerline Corridor (8.2 Miles)***

This alternative follows the powerline corridor easement that starts in the town of Paradise and continues north to the entrance to Blacksmith Fork Canyon. The wide corridor easement allows the trail to meander through the foothills instead of taking a bee-line from point A to point B. The powerline corridor is located high on the bench at or above the 5,000-foot contour. The route offers trail users a rolling hill terrain and great views of the southern end of Cache Valley.

## Ownership

The property along this section of trail is privately owned.

## Trail Development Opportunities

- ❖ The corridor easement and trail already exist and would not require extensive construction, and
- ❖ this segment of trail would link more urbanized areas to more natural areas including State lands.

## Trail Development Constraints

- ❖ The powerline corridor is not contiguous through the entire segment limiting connections, and
- ❖ the trail is considerably high on the foothills and might be difficult to access.

## Trailheads

The trailheads would be the same as described for Alternative A.

### ***Other Trail Alignment Opportunities***

Other opportunities include the jeep trails and unimproved roads leading out of Avon and Paradise east and into the eastern foothills. The Paradise and Hyrum Canals offer direct links into the towns and the possibility of intersecting the NBST.

### ***Potential Trail Linkages***

The links along this segment of trail consist of:

- ❖ the town of Avon,
- ❖ East Canyon,
- ❖ the Little Bear River,
- ❖ the town of Paradise,
- ❖ Paradise Dry Canyon,
- ❖ the City of Hyrum, and
- ❖ Blacksmith Fork Canyon and River.

## **Segment 7 - Blacksmith Fork Canyon to Logan**

### ***General Description***

The trail segment linking Hyrum to Logan will utilize the existing deer fence trail, the PacifiCorp powerline corridor, and the Blacksmith Fork River corridor, all of which are located between private land to the west and public, state, and USFS land to the east (see maps 13 and 14 in Appendix G). The trail crosses rolling hills to steep slopes and existing smaller canyons as it moves south to north. This trail segment will connect State wildlife reserve lands and Federal lands in a number of locations.

### ***Environmental Description***

#### **Slope**

The slope aspect along this segment of the NBST is to the west. The terrain is characterized by rolling hills to steep inclines as the trail meets canyons and drainages along the route.

#### **Hydrology**

The trail comes in contact with several intermittent and perennial streams, as well as the Logan River, as the route travels north. The largest of the streams to be crossed is Spring Creek, which follows Providence Canyon down and into the valley.



## Wildlife

The trail crosses UDWR wildlife habitat land at several points along this segment. State wildlife reserve lands are intersected for 0.5 mile, and normal to critical winter range for deer and elk are traversed for 3 miles.

## Geology

The Eastern Cache fault is paralleled as the trail travels from Hyrum to Logan. The trail crosses several land slide areas along this segment.

### ***Alternative A - PacifiCorp Powerline Corridor and Deer Fence Corridor (8.5 Miles)***

The trail alignment will use established powerline and pedestrian trail corridors to travel from Hyrum to Logan. From the trailhead at the mouth of Blacksmith Fork Canyon, the trail will drop down into the Blacksmith Fork River corridor and head west for 0.25 mile before intersecting the deer fence trail road. The trail then travels north for 0.75 mile before joining the powerline corridor. The route will then continue north using both the deer fence trail road and the PacifiCorp powerline corridor.

## Ownership

The land crossed by the trail is both publically and privately owned.

## Trail Development Opportunities

- ❖ All of the sections along this segment of the NBST are following existing corridors, thereby minimizing the construction costs;
- ❖ two of Cache Valley's largest cities are linked by a travel corridor that promotes pedestrian use; and
- ❖ the trail location is relatively close to urbanized areas providing easy access to residents.

## Trail Development Constraints

- ❖ Much of the trail crosses wildlife reserve lands,
- ❖ Some of the corridors suggested for use allow motorized traffic, and
- ❖ There is a busy road crossing at the bottom of Blacksmith Fork Canyon.

## Trailheads

The following areas have been identified as possible trailhead locations:

- ❖ Two possible locations at the mouth of Blacksmith Fork Canyon on both the north and south side of SR 101,
- ❖ Harris Park at the entrance of Logan Dry Canyon,



- ❖ Providence Canyon entrance,
- ❖ Millville Canyon entrance, and
- ❖ First Dam Park at Logan Canyon entrance.

### ***Other Trail Alignment Opportunities***

An alternative trail route opportunity along this segment includes the Millville-Providence Canal. The canal is paralleled by an established service road that could accommodate pedestrian traffic. This canal trail could link the communities of Millville, Nibley, and Hyrum to the NBST. This alternative would follow the Millville-Providence Canal for 4 miles before linking into the Segment 7 at the mouth of Blacksmith Fork Canyon.

### ***Potential Trail Linkages***

Trail links along this segment include:

- ❖ Linking cities and their parks and trail systems along the trail, including Hyrum, Millville, Providence, Nibley, and Logan;
- ❖ Hyrum Reservoir State Park;
- ❖ Trails and recreation amenities in Blacksmith Fork, Millville, Providence, Logan Dry and Logan Canyons;
- ❖ Logan City Trail System;
- ❖ Logan River Trail; and
- ❖ A possible link from First Dam to the canal to the Dugway, down to Canyon Road and to Merlin Olsen Park.

## **Segment 8 - Logan to Smithfield**

### ***General Description***

This segment has a section of trail, Logan Canyon to Green Canyon, that will be the first portion of the NBST built in Cache Valley. The complete trail route travels north from the mouth of Logan Canyon into the City of Smithfield (see maps 14 and 15 in Appendix G). This section has a number of possible routes including the existing powerline corridor, the Logan Hyde Park Smithfield canal, and the foothills between the agricultural lands and the Wasatch Cache National Forest. The trail will link the largest populated area in Cache Valley and its existing recreational trail systems to the NBST network. The trail skirts the Mount Naomi Wilderness Area between Logan Canyon and Green Canyon.

## ***Environmental Description***

### **Slope**

The slope aspect of this section is to the west. The terrain along this section is a mixture of rolling hills, agricultural lands, and steep slopes at the many drainages and canyon crossings.

### **Hydrology**

The trail will intersect many intermittent and perennial streams along the route, the largest of which is Birch Creek. The Logan Hyde Park Smithfield canal will also be paralleled and crossed in this segment.

### **Wildlife**

The trail will be near the Mount Naomi Wilderness Area boundary but will not directly cross any normal or critical wildlife range.

### **Geology**

The trail parallels the Eastern Cache (Logan) Fault along the entire segment. The trail will come into direct contact with land slide areas in five locations along the route.

### ***Alternative A- PacifiCorp Powerline Corridor (7.5 Miles)***

This segment of trail will start at the mouth of Logan Canyon and follow the Logan Hyde Park Smithfield canal for 0.75 mile before intersecting the powerline corridor just above Lundstrom Park. The trail then continues along the powerline easement north, ending at a trailhead at the mouth of Smithfield Canyon.

### **Ownership**

The land the trail crosses is along easements granted to the powerline and canal companies. The easements are surrounded by private land.

### **Trail Development Opportunities**

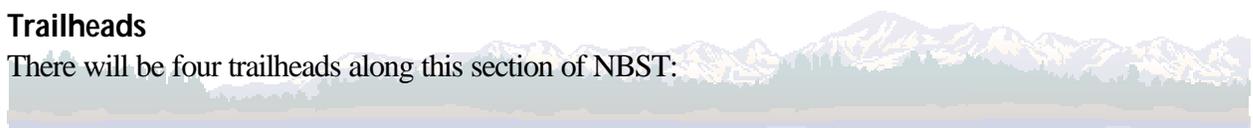
- ❖ The trail will utilize existing corridors, which will minimize construction costs;
- ❖ The first section of NBST will be built during the spring of 2002 and will add motivation for the surrounding communities to build their sections; and
- ❖ This trail segment links the most populated communities in Cache Valley to a trail system that encourages pedestrian use.

### **Trail Development Constraints**

- ❖ The existing powerline corridor is rather straight and does not offer much in the way of diverse alignment opportunities, and
- ❖ Mendon private land/ privacy issues.

### **Trailheads**

There will be four trailheads along this section of NBST:



- ❖ The southern most trailhead will be located on the north side of Highway 89 at the mouth of Logan Canyon.
- ❖ The Lundstrom Park Trailhead will be an easy access point for the neighborhood above Utah State University.
- ❖ Green Canyon, which is an established and popular destination for recreational users in all seasons, will provide the third trailhead along this segment.
- ❖ Smithfield Canyon marks the end of this segment to the north and will have a trailhead located along Summit Creek for the residents of Smithfield to access.

***Alternative B- Foothill Alignment (9.5 Miles)***

This route would follow the Logan Hyde Park Smithfield canal for 0.75 mile before intersecting the PacifiCorp powerline corridor. The trail would follow the powerline for 2 miles before picking up the 5,100-foot elevation contour. The trail would follow this elevation for a little less than 4 miles, ending at the trailhead in Smithfield Canyon. The trail would be located between agricultural lands and the Wasatch Cache National Forest.

**Ownership**

The land the trail crosses is a mixture of both public and private lands. The trail will use powerline and canal easements for the first 3 miles and then cross private land as it heads north.

**Trail Development Opportunities**

- ❖ This alignment offers a diverse route that would mimic the existing foothill contours, and
- ❖ The route allows users to be as far away from the populated areas as possible.

**Trail Development Constraints**

- ❖ The route does not follow any established trail and would need to be constructed, and
- ❖ The trail alignment in some places is located 1 mile from the populated area, thus creating the need for extensive links.

**Trailheads**

The trailheads proposed for Alternative B would be the same as described for Alternative A.

***Other Trail Alignment Opportunities***

The Logan Hyde Park Smithfield Canal offers another routing possibility. The trail alignment would intersect the canal above North Logan City and follow the canal easement to the trailhead in Smithfield Canyon. Another possibility would include the small segment of powerline corridor located just north of Smithfield. This corridor extends from the Cutler Marsh Area east and into the foothills north of the Smithfield Canyon mouth.

### ***Potential Trail Linkages***

- ❖ Logan City,
- ❖ Utah State University,
- ❖ Lundstrom Park,
- ❖ Green Canyon,
- ❖ North Logan City,
- ❖ Hyde Park City,
- ❖ Smithfield City, and
- ❖ Smithfield Canyon.

## **Segment 9 - Smithfield to Idaho**

### ***General Description***

This trail segment connects the NBST to Idaho along a route that starts in Smithfield (see maps 15, 16, and 17 in Appendix G). The trail has several possible alternative routes including a powerline corridor, a foothills trail, and the Upper High Creek Canal. The trail will become a link between Smithfield and Richmond with possible future links to Idaho towns as well. The trail crosses variable terrain and land uses as it heads north. The predominant trail characteristic is rolling hills across agricultural lands. The trail is easily accessible from both Smithfield and Richmond.

### ***Environmental Description***

#### **Slope**

The trail along this section has a western aspect. The terrain is a mixture of rolling hills, agricultural land, and steep slopes around the entrances to the canyons.

#### **Hydrology**

The trail comes into contact with several intermittent streams and two perennial streams. The intermittent streams are crossed close to the opening of the canyons along this segment. Several of these are Nebo Creek, City Creek, and Cherry Creek. Cherry Creek and High Creek are the two perennial streams crossed by the trail.

#### **Wildlife**

The trail crosses approximately 5 miles of critical deer and elk winter range.



## Geology

The trail crosses a number of land slide areas between Smithfield and Richmond. The Eastern Cache (Logan) Fault is paralleled along the entire segment of trail.

### ***Alternative A- the PacifiCorp Powerline Corridor (10.5 Miles)***

This trail alternative will start at the trailhead located in Smithfield Canyon and proceed north along the powerline corridor until it reaches the Ballentine Springs area. This powerline corridor may continue into Idaho, but the information can not be verified at this time.

## Ownership

The land the trail would cross would be within the PacifiCorp powerline corridor easement.

## Trail Development Opportunities

- ❖ The corridor the trail would follow already exists and would not require extensive construction, and
- ❖ The trail would provide a diverse section of terrain.

## Trail Development Constraints

- ❖ The trail corridor does not pay respect to the topography of the land it crosses, and
- ❖ The powerline corridor may not reach the border of Idaho.

## Trailheads

- ❖ Smithfield Canyon,
- ❖ Cherry Creek, and
- ❖ High Creek.

### ***Alternative B- the 5,100-Foot Elevation Contour (14.3 Miles)***

This trail alternative would begin at the trailhead located in Smithfield Canyon and proceed north along the 5,100-foot contour. The contour would wind the trail through both public and private lands. Private agricultural lands and State Wildlife Reserve Lands are the two most prevalent land uses the trail would contact. This route would be the most rural setting along this narrow section as the populated areas the trail passes are close to the mountains. The trail terrain is predominantly flat as the route stays relatively close to the 5,100-foot contour.

## Ownership

The land along this segment is both publically held and privately owned.

## Trail Development Opportunities

- ❖ The route would follow relatively flat terrain and would allow a trail, and
- ❖ The trail would stay away from the populated areas and provide a rural setting.

## Trail Development Constraints

- ❖ The trail does not follow an existing corridor so construction would be more involved, and
- ❖ The trail does not meet up with an existing trailhead in Idaho.

## Trailheads

The trailheads proposed for Alternative B would be the same as described for Alternative A.

## *Other Trail Alignment Opportunities*

The extensive canal systems and the roads and paths that follow them would present good opportunities for possible routes. Upper High Creek Canal could be accessed from Richmond and then connect to the NBST at High Creek. Lower High Creek Canal could also be used as a western trail route that might tie into the Cutler Marsh trail system.

## *Potential Trail Linkages*

The links along this segment that can be made include:

- ❖ Smithfield and Smithfield Canyon,
- ❖ Richmond,
- ❖ Wasatch Cache National Forest, and
- ❖ Cherry Creek and High Creek.

## Other Potential Trail Linkages

### *Highway 89 / Wellsville Canyon*

This link from Brigham City into Cache Valley would provide a 12.7-mile recreational route along the existing highway. The trail would be separated from the road and most likely be a paved surface. The link would intersect the NBST east of Brigham City at the proposed Knudson Trailhead and west of Wellsville at the proposed trailhead for segment five. This link would provide a more direct route from Box Elder County to Cache County. The community of Mantua would be connected to the NBST by this link.

### *Mantua to Avon*

This 10.6-mile link would utilize existing jeep roads to cross from Mantua to Avon. The corridor would access more back country than many segments of the NBST. The distance from Avon to Brigham City using this suggested link and the link from Brigham City to Wellsville would be approximately 13 miles. Within the town of Mantua, there is a high level of interest and support from citizens and elected officials for this potential trail linkage. Mantua's general plan includes a trail system component and an ordinance establishing this trail linkage component is presently under development.



### ***Mount Pisgah Road***

This link to the NBST starts off of Highway 89 just south of the Dry Lake Area in Wellsville Canyon. The link would then continue east following the Mount Pisgah jeep road for 6.1 miles before intersecting with segment five of the NBST at Baxter Ridge. This access to the backcountry, Avon, Paradise, and the NBST would create ideal trails for both equestrian and mountain bike trail users.

### ***Northern Bonneville Shoreline Trail (NBST) to Malad, Idaho***

This link would continue the NBST from trail segment 3 north to the Idaho border. The trail would follow the Bear River corridor north to the power line station just east of the Cutler Reservoir. The trail would then use the land easements near the power line corridor to the Idaho State line.

### ***Cutler Reservoir Lands***

PacifiCorp is committed to further development of trails around Cutler Reservoir. This trail system will allow recreationists to access reservoir lands that contain some of Cache Valley's most important wetland ecosystems. The Cutler Reservoir Trail system can potentially be accessed from the NBST by three alternative trail corridors. These corridors do not intersect the NBST directly, but they do link to communities that are on the NBST Trail system (see Figure 2).

- ❖ The 8.0-mile Railroad Walking Trail, which follows an abandoned railroad corridor and bridge crossing south of Benson Marina, would link Logan City's trail system with the Cutler Reservoir.
- ❖ The 3.3-mile Bud Phelps Wildlife Management Area Walking Trail would link Logan City's trail system to Cutler Reservoir.
- ❖ The 3.4-mile Little Bear River Walking Trail would link Alternative A along Segment 3 of the NBST to the Little Bear River and Cutler Reservoir.



# CHAPTER 3

## Trail Design and Construction Standards

The purpose of this section is to outline general construction standards for recreational trail building. Standards are basic guidelines that illustrate typical trail dimensions and construction practices. They are intended to be used as suggested practices for constructing a trail system and may not apply to every situation. The site conditions for a proposed trail route will be variable along every segment of the NBST, so these standards will provide ideas on how best to proceed with construction.

### Trail Construction Standards

Trail construction standards for the NBST are defined for both urban and rural trail cross-sections that are designed for use by pedestrians, bicyclists, and equestrians. The urban cross-section (Figure 4) can be constructed in the more densely populated urban regions of the trail, with the rural cross-section (Figure 5) applied in the more remote, rural areas. Some of the NBST alternative alignments follow existing motorized four-wheel drive roads. The NBST is a nonmotorized trail and can be constructed adjacent to a motorized corridor as illustrated in Figure 6. Table 4 outlines trail construction standards for the urban and rural cross-sections. Appendix H shows several sample trail bridge designs.

### Accessibility

An important part of trail design is designing for accessibility that will allow everyone to enjoy a trail experience. Communities planning and constructing the NBST have an opportunity to develop segments of the trail that are accessible. Accessible segments could be located anywhere along the trail, but locating them in more urban areas that are using the urban trail cross-section standards would best serve most users. Much of the following guidance on how to make the NBST accessible comes from the *Americans with Disabilities Act Accessibility Guidelines* (1991) and *Designing Sidewalks and Trails for Access* (1999). For more specific information about accessibility, reference those materials.

Accessible trails should be free of debris and avoid motorized roadway crossings. Crushed rock or a road-base material with a high clay content that has been rolled and compacted may be used for wheelchair access. Trail grades should be generally flat (5 percent maximum grades for short distances) and regular rest stops provided. The cross-slope should not be greater than 2 to 6 percent. Bridges should have handrails, and their decks must be flush with the trail surface. Position decking boards perpendicular to the trail path with gaps between boards not exceeding .375 inch. Visually impaired persons can use natural trail treads with guide ropes or definite edges such as logs or railroad ties.



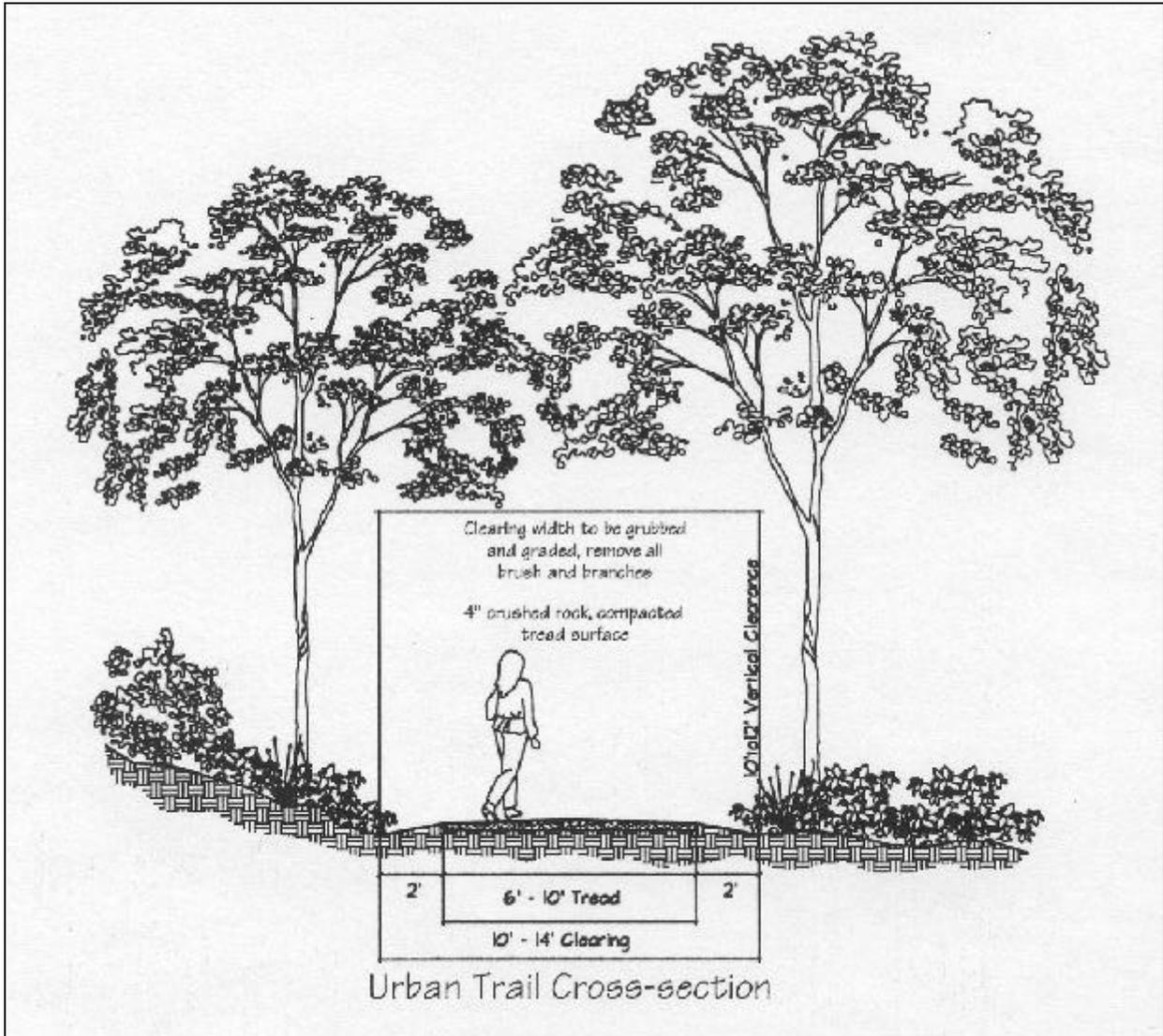


Figure 4. Urban cross-section trail construction standards.



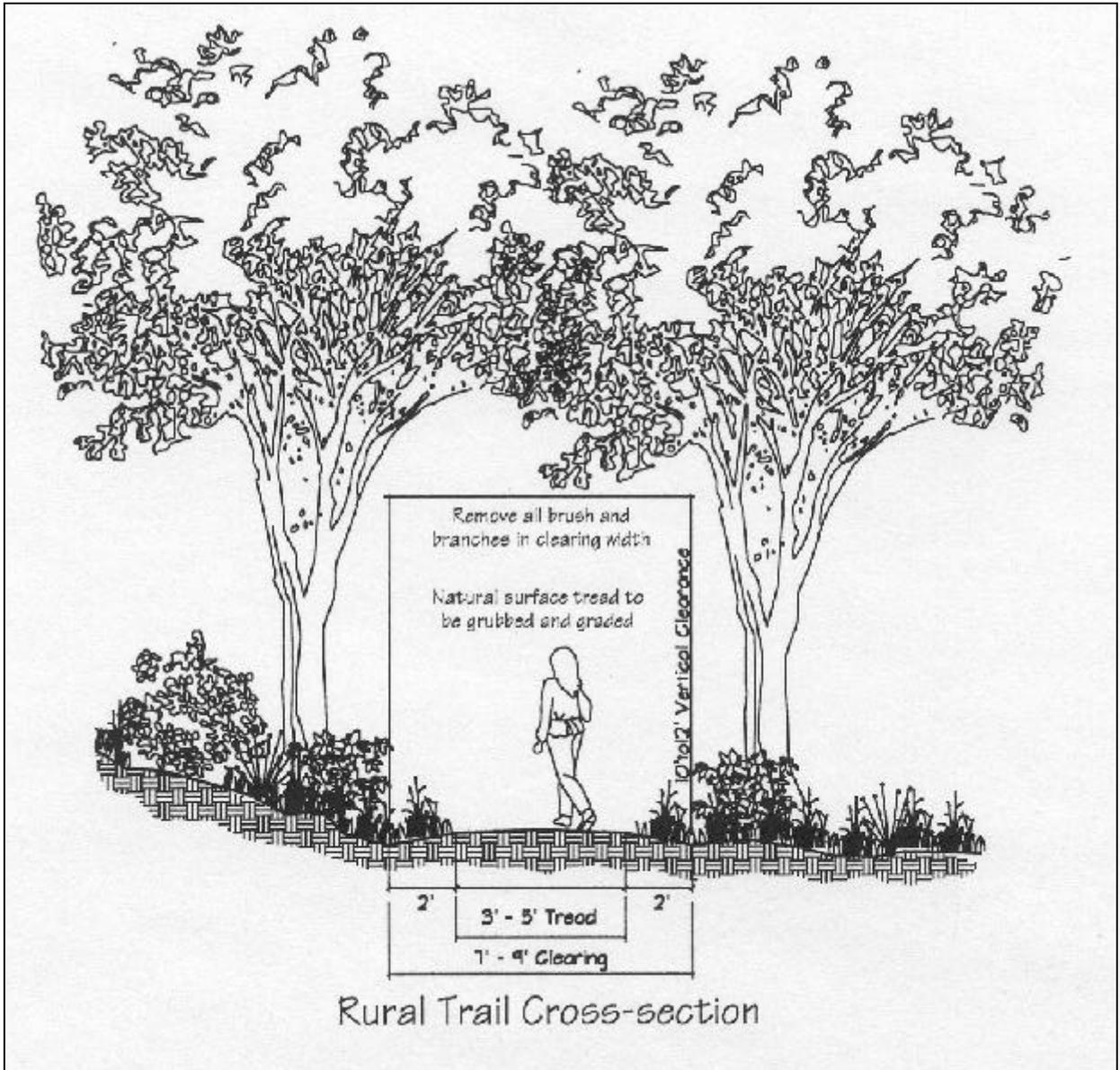


Figure 5. Rural cross-section trail construction standards.



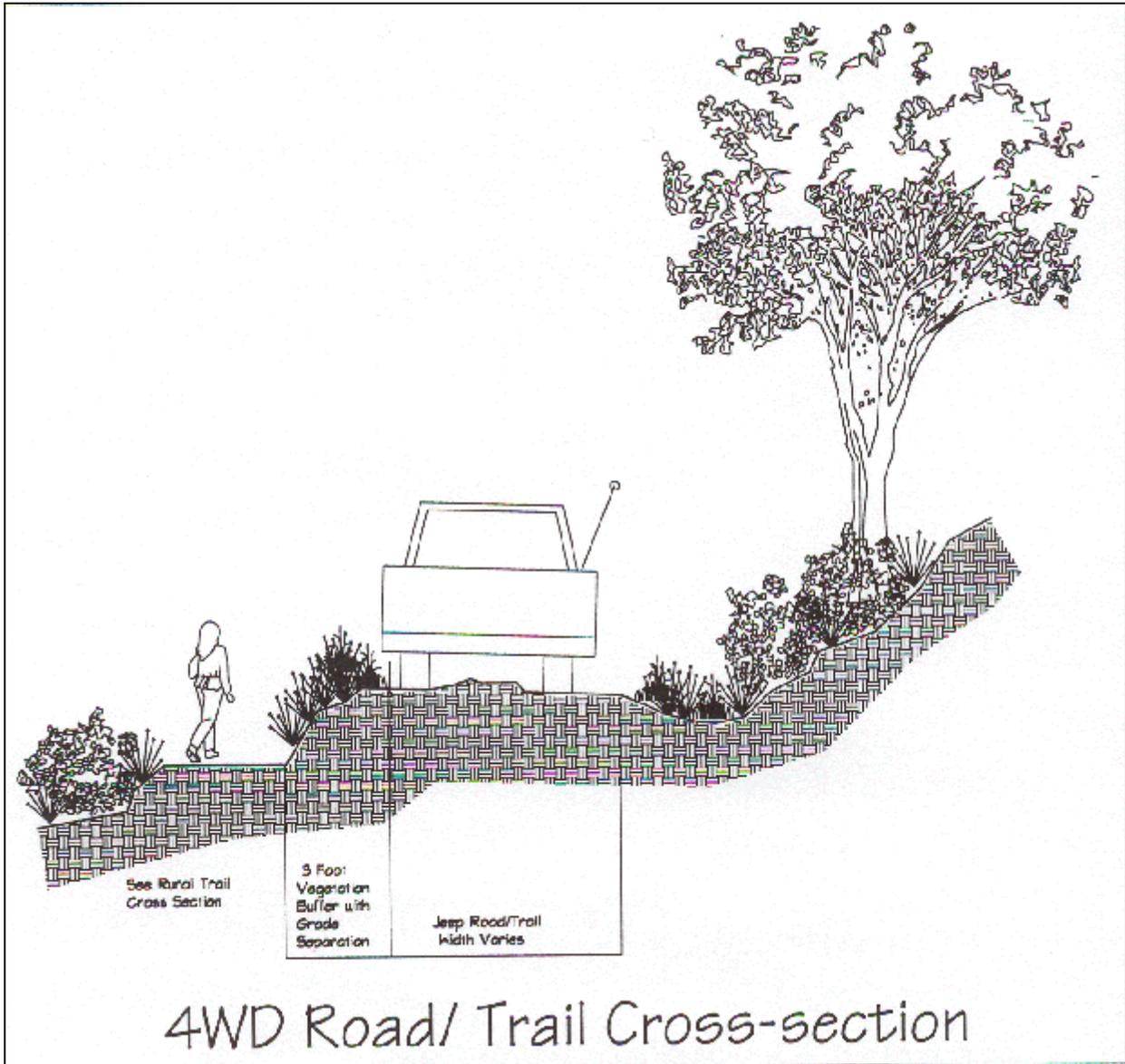


Figure 6. Cross-section of nonmotorized trail adjacent to road.



**Table 4. Trail construction standards for urban and rural trail cross-sections.**

DESIGN ELEMENT	URBAN TRAIL CROSS-SECTION	RURAL TRAIL CROSS-SECTION
<b>Clearing Width</b>	10 - 14 feet	7 - 9 feet
<b>Tread Width</b>	6 - 10 feet	3 - 5 feet
<b>Tread Surface</b>	4-inch crushed rock base that has been compacted	Natural / native soil
<b>Firebreak (optional)</b>	10 feet of fire resistant native vegetation on each side of trail. Total corridor width should equal 30 feet. (See Appendix F for plant list).	N/A <sup>a</sup>
DESIGN ELEMENT	URBAN AND RURAL CROSS-SECTIONS	
<b>Percent Grade</b>	Grades should not exceed 10 percent because they become difficult for trail users to sustain and lead to trail erosion problems. <b>Desired Grade:</b> 0 to 5 percent <b>Maximum Grade:</b> 5-10 percent (sustained), 15 percent (shorter than 50 yards) <b>Outslope Grade:</b> 4 percent (maximum)	
<b>Clearing Height</b>	10 - 12 feet to allow for horseback riding. Additional clearance may be needed to compensate for branches drooping with heavy rain or snow.	
<b>Trail Layout</b>	Wet areas and steep slopes pose extreme difficulties to trail maintenance and should be avoided. Keep water and motorized road crossings to a minimum. Frequently occurring curves and grade changes will add interest.	
<b>Turning Radius</b>	Wide, gentle curves with good forward sight distances are critical for safety, aesthetically pleasing, and easier to maintain. Avoid sharp-angled turns, turns on steep slopes, or turns at the base of a hill.	
<b>Sight Distance</b>	Forward sight distances of 100 feet (50 feet minimum) are important because the trail will be shared between hikers, equestrians, and bicyclists. Although curves should be carefully designed to maintain good sight distances, turns and bends tend to help reduce travel speeds and add variety to the trail experience.	
<b>Road Crossings</b>	Motorized road crossings must be carefully located, designed, and signed 100 to 200 feet in advance to insure that trail users and vehicle drivers have good sight distances in all directions.	



DESIGN ELEMENT	URBAN AND RURAL CROSS-SECTIONS
<p><b>Water Crossings</b></p>	<p>Some water crossings along the NBST may require bridges. See Appendix H for a standard bridge design. Bridges should be used in areas of perennial and intermittent stream crossings; however, slow-moving water less than 24 inches deep may be forded. Bridge design should meet the following requirements:</p> <ul style="list-style-type: none"> <li>❖ meet the needs and weight of horse travel;</li> <li>❖ orient planking at a 45- to 90-degree angle to the direction of travel, gaps between planking oriented in the direction of travel may trap bicycle tires and endanger trail users;</li> <li>❖ make approaches straight, level, and when possible, at least 100 feet long;</li> <li>❖ must be located above ordinary high water mark;</li> <li>❖ have railings or log barriers on both sides (see Appendix H);</li> <li>❖ have an 8-foot minimum width for horses; and</li> <li>❖ weight capacity varies depending on maintenance equipment and length of bridge</li> </ul>
<p><b>Other Facilities</b></p>	<p>Parking area with space for trailers, picnic area, resting areas, overlooks, campsites, water, information board, signs, hitching post or tether line, campsite with corral, sanitation facilities, and restrooms.</p>
<p><b>Signage</b></p>	<ul style="list-style-type: none"> <li>❖ Helps with orientation</li> <li>❖ Helps with safety issues such as road crossings</li> <li>❖ Shows etiquette for all users</li> <li>❖ Gives mileage</li> </ul>

<sup>a</sup> NA=Not applicable.

Place an accessible trail information sign that describes the length and difficulty of the trail, location of rest stops, and potential trail hazards at the trail entrance. Design rest rooms, parking lots, and ramps carefully to ensure access.

## Trail Construction Techniques

After a particular trail segment for the NBST has been planned, located, and negotiated, actual construction of the trail is the next step. This can be accomplished in a variety of ways including: (1) hiring a professional contractor that specializes in trail construction, (2) hiring the Utah Conservation Corps Americorps trail construction crew, (3) bringing together a group of trail construction volunteers, or (4) integrating all of the above options. The following sections describe the general guidelines for trail construction and maintenance, and general trail construction costs.



### ***Guidelines for Sustainable and Aesthetic Trail Construction***

A sustainable trail surface can be created with minimal disturbance and maximum variety and interest if the following goals are met:

- ❖ Minimize soil disturbance in order to allow plants and animals the best chance for survival; aesthetic appeal will be correspondingly high.
- ❖ Eliminate the potential for erosion.
- ❖ Use arboriculturally correct and aesthetic pruning or removal of tree limbs and shrubs.
- ❖ Minimize drainage problems by removing water at the first opportunity.
- ❖ Do not allow water to stand on trail.
- ❖ Maintain existing drainage patterns; do not force nature.
- ❖ Outslope the trail to dispose of sheet drainage; accurately shape backslope to prevent erosion.
- ❖ Coordinate excavation with vegetation and drainage considerations.
- ❖ Use select borrow or retaining walls to improve less than adequate trail surface areas.
- ❖ Attain proper slope and compaction through a detailed analysis of on site conditions during wet and dry periods.
- ❖ Make decisions to benefit the trail user; remove sharp plants from close proximity to the trail.
- ❖ Consider the physical and visual relationship of vegetation to the trail.
- ❖ Where appropriate, narrow the clearing width by leaving brush close to the trails edge; excessive clearing allows bicycles to travel faster and leave the tread when cornering.
- ❖ Retain dead standing trees (commonly known as snags) when safety permits because wildlife use trails and snags offer homes and feeding locations for many bird and mammal species. Consider erecting nest boxes or creating artificial snags in woodlands near the trail route.



## ***Steps to Trail Construction***

There will be a variety of ways to accomplish construction of the NBST, ranging from building the trail completely with hand tools and volunteers to having the trail constructed by professionals with trail building machinery. The Utah Conservation Corps is a group of Americorps Volunteers, based in Logan, that has expertise in trail construction. The Utah Conservation Corps has expressed interest in being involved with construction of the NBST (a fee is charged for services). The USFS has also played a large roll in construction of the SBST in Salt Lake and Weber Counties. It is another resource that may be available to assist in construction of the NBST.

After the final route has been determined (see the Trail Development Process section in Chapter 4), the actual construction of the trail is ready to begin. The following is a general guide to trail construction for both the rural and urban trail cross-sections (Figures 4 and 5) that describes individual steps for construction within a trail corridor that has no existing trail.

### **Rural Trail Cross-Section Construction**

#### **Step One - Stake the Route**

- ❖ Stake the trail route from start to finish, stake the center-line or both sides of the trail, place the stakes to define the trail bed and clearing limits.
- ❖ Begin construction by removing trees, brush, and rocks from the tread.
- ❖ Site characteristics will determine what tools are needed. Hand tools, such as axes, loppers, bow saws, weed whips, and chain saws will be sufficient in most cases.
- ❖ The trail can be cleared much faster with motorized equipment. Motorized equipment is not recommended for trail less than 4 feet wide.

#### **Step Two - Grade the Trail Bed**

- ❖ Grade the trail bed on slopes as required.
- ❖ On slopes, remove leaf litter and topsoil material from the cut-and-fill areas and save for later use.
- ❖ Select an angle for cut-and-fill slopes based on site soil conditions, amount of rainfall, and plant cover. Ideally, retain cut and fill slopes at less than 1:1.
- ❖ Spread topsoil and organic material on large embankments susceptible to erosion to encourage vegetation regeneration.
- ❖ On very steep slopes use netting material, such as jute mesh or chicken wire held in place with stakes, to hold the topsoil and mulch in place. Round out the top of embankment shoulders to prevent soil from sliding onto the trail.
- ❖ Remove boulders, logs, and other debris that may fall onto the trail.

- ❖ Avoid disturbing plants at the top of the cut slopes and at the base of embankments.
- ❖ Pitch the trail tread at 1.5-3.0 percent toward the outside edge to allow for drainage. Make the tread slightly wider in areas where sloughing of the trail edge is likely to occur.
- ❖ On talus or rubble where little or no soil is present, construct the outside part of the trail with hand placed rocks, 50 percent of which are 12 inches in diameter or greater. Build the outside bench from rock other than those forming the inside bench. Fill in all voids and under the trail bed surface with rock and mineral soil deep enough to provide a firm tread.

#### Step Three - Remove and Clear Vegetation

- ❖ Cut shrubs and small trees flush with the ground to prevent tripping and to reduce stump sprouting. Avoid cutting healthy trees larger than 7 inches in stem diameter. Some trees, such as box elder, elm, and cottonwood, may require chemical stump treatments to prevent resprouting.
- ❖ Prune overhanging branches cleanly at the branch collar on the tree trunk or where a branch forks. To avoid rapid regrowth, it may be better to remove small trees than to cut off their tops.
- ❖ Trim exposed roots flush with the soil surface.
- ❖ Remove large rocks and fallen logs from the trail, unless they are to be kept as obstacles to prevent motorized use.
- ❖ Scatter branches and other debris off the trail or pile for wildlife cover.

#### Step Four - Finish Tread

- ❖ For the rural NBST segments, the ideal surface is natural soil free of large stones, stumps, and protruding roots.
- ❖ Natural trails often become easily distinguishable and comfortable to walk on after a month of regular traffic.
- ❖ Always avoid unnecessary disruptions of the ground surface. If leveling is required, use a shovel, small caterpillar (D-2 or equivalent) or Sweco 480 trail dozer to sheer off a thin layer of topsoil, level humps, and fill holes. Gravel or other fill materials may be used to elevate the trail in wet areas.



## Urban Trail Cross-Section Construction

The urban trail cross-section (Figure 4) is most likely to be constructed using trail construction professionals and a mixture of hand and mechanized trail construction equipment. The two trail construction machines used are the small caterpillar (D-2 or equivalent) or the Sweco 480 trail dozer. These machines clear and grade the trail after the necessary vegetation has been removed from the staked trail corridor. Handwork includes grading the side slopes, removing vegetation, construction in trail obstacle areas, and placing/removing waste vegetation. After the trail has been graded, the crushed rock fill is placed in the tread area and compacted using the trail dozer.

## Trail Signage

Once constructed, the trail should be marked so that its route is clear. A standard trail marker for the NBST needs to be developed. A recommended marker option, used on other regional trails, is a plastic (carsonite) stake marked with the NBST logo. These stakes are placed at regular intervals and at junctions along the trail. Keep the number of signs to a minimum as they detract from the user's outdoor experience and are frequent targets for vandalism and theft.

Entrance signs should be placed at the NBST trailheads. These signs should include maps, trail distances, potential hazards, places of interest, and the types of trail uses permitted. Examples of NBST entrance and trail signs are provided as Figures 7 and 8.

## Trail Construction Obstacles

Along the trail route you may encounter an obstacle that requires special attention. Recognizing and protecting such areas during construction will help reduce later maintenance costs and potential environmental damage. Some methods are relatively simple and inexpensive; others can be extremely difficult and expensive.

## Subsurface Drainage

Water tends to pool on trails that are located on low-lying, level terrain. Raising the tread way 3 to 6 inches (or more) above the surrounding terrain will allow water to drain away, reduce maintenance costs, and ensure comfortable trail use. Use gravel, flat stones, or other fill material to elevate the trail surface. A less-expensive technique for moving water off the trail is center crowning. Fill materials can be obtained from gutters cut on both sides of the trail to facilitate drainage.

## Surface Drainage

On steep slopes, poorly designed and constructed tread ways allow water to accumulate, gain downhill velocity, and erode the trail. Flowing water must be diverted off the trail. One effective method is to outslope the trail surface at a 2 to 3 percent grade toward the downhill side. Grade dips or water bars also may be used. Grade dips are short trail sections cut at a grade opposite that of the prevailing trail surface. Grade dips typically are established at natural drainage ways or ditches with intermittent flows.





Figure 7. Example of Bonneville Shoreline Trail (BST) entrance sign.

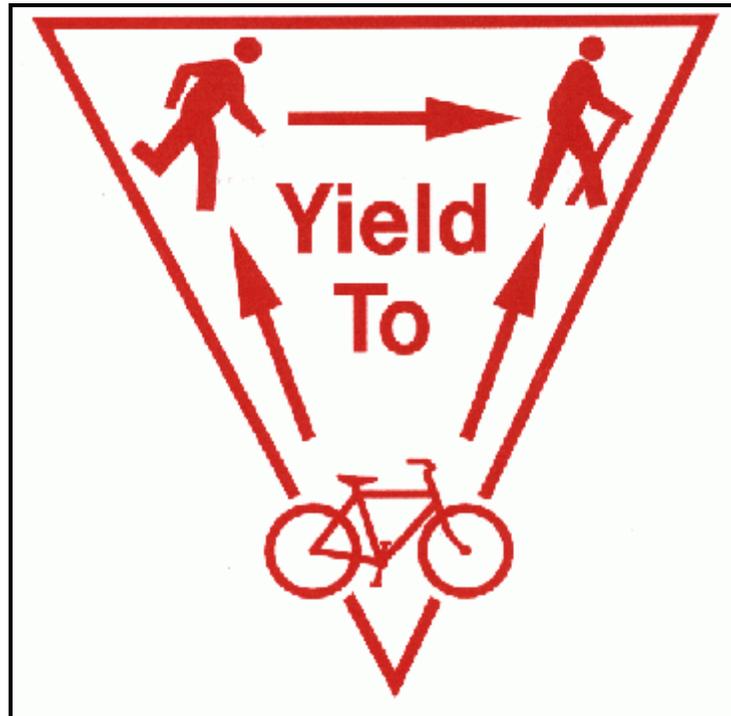


Figure 8. Example of Bonneville Shoreline Trail (BST) etiquette sign.

Water bars are obstructions on the trail surface designed to divert water off the trail (Table 5). They usually are constructed with logs or stones placed at a 30-degree angle from the trail's edge. Such water bars must extend well beyond both sides of the trail to prevent water or people going around them. Logs must be at least 6 to 8 inches in diameter. Rubber water bars are another option that reduces potential hazards to bicyclists. Increase the number of water bars as the trail's grade increases.

**Table 5. Water-bar spacing for various trail slopes.**

PERCENT GRADE	SPACING BETWEEN WATER BARS (FEET)
2	250
5	130
10	80
15	50
25+	40

### Stream Crossings

Many trails eventually cross a drainage ditch or small stream. Before initiating any project, contact your local department of natural resources hydrologist to determine if the trail crosses a protected water or wetland. State jurisdiction over the use of protected waters and wetlands generally begins at a point known as the ordinary high water mark. Permits from the U.S. Army Corps of Engineers and/or your local department of natural resources may be required before constructing any crossing, including stream fords. Some local governments impose additional restrictions. In Utah, any project constructed below the ordinary high water mark that alters the course, current, or cross-section of protected waters or wetlands is subject to regulatory jurisdiction of the Utah Department of Natural Resources (statute 105.42).

Fords (or natural crossings) often can be used to traverse slow moving streams less than 24 inches deep. Favor locations with gently sloping, stable banks and gravel or sand bottoms. Most hikers can safely negotiate a crossing on flat stones placed at convenient intervals.

Culverts can be used to cross deep streams or ditches. Professional assistance is required for design and installation of a culvert stream crossing.

Bridge designs vary depending on the length and height of the crossing, type and amount of trail use, and size of maintenance equipment. On hiking trails, a simple log bridge may be used for stream crossings less than 10 feet wide. Professional assistance should be sought to assist in designing and installing a bridge crossing.



## **Fence Crossings**

A self-closing gate or stile will reduce fence damage and permit safe crossing. Stile designs vary depending on the size of the livestock and the availability of building materials.

## **Trail Construction Costs**

Trail construction costs for building segments of the NBST will vary depending on the type of trail constructed and the construction mechanism. Options for construction include hiring a professional trail building contractor to build the trail using mechanized equipment, working with volunteers and community construction crews, or a mixture of both. Trail construction costs do not need to be prohibitively expensive. Most of the BST trail construction costs to date have been for signage, trail heads and, on occasion, surmounting major obstacles (e.g., steep drainages, highway crossings).

Construction costs for individual trail segments will also vary depending on whether the proposed trail corridor contains an existing trail. If so, the trail construction costs could be very minimal. Professional assistance in planning, whether from public or private sources, is recommended for all segments to insure minimal maintenance, longevity of the trail, identification of cost-boosting factors, and realistic cost estimates vital for fund raising. The following sections describe trail construction costs for the above-mentioned construction techniques.

### ***Professional Construction Assistance***

Four recreational trail building contractors belonging to the Western Trail Builders Association were contacted for construction cost estimates relating to constructing the NBST. These companies are Alpine Trails located in Park City, Utah; Arrowhead Trails located in Salida, Colorado; ASI Trails located in Sagle, Idaho; and Trio Construction located in Priest River, Idaho.

The least-expensive width for a mechanically constructed recreational trail is between 4 to 6 feet because all contractors mentioned earlier use a Sweco 480 trail dozer, which has the capacity for clearing and grubbing a 4- to 6-foot trail. Trails any smaller than 4-feet wide would be entirely hand built. All the contractors contacted agreed that a hand-built trail constructed with professional labor would quadruple the price. Contractors price trail construction in linear feet. The pricing for the 4- to 6-foot mechanically constructed trail ranged from \$1.75 to \$3.75 a linear foot, depending on the type of existing vegetation and rock outcrops (Table 6). This pricing is just for the clearing and grubbing of the trail surface. If construction required a large amount of chain saw work and/or the vegetation cut needed to be hauled off instead of scattered along the trail, the price would increase.

Some contractors may be willing to work with volunteer groups and offered a rough cut for the trail with the volunteers doing the finish work. This arrangement dropped the price per linear foot to between \$1.00 and \$2.75.



**Table 6. General professional trail construction cost estimate<sup>a</sup>.**

TRAIL WIDTH	TRAIL SURFACING	OBSTACLES	COST PER MILE
3- to 4-Foot Trail	natural	❖ soft soil and light to no vegetation	❖ \$8,000
		❖ large rocks or heavy vegetation	❖ 13,200
10-Foot Trail	crushed aggregate, 4-inch depth	❖ soft soil and light to no vegetation	❖ \$37,000
		❖ large rocks or heavy vegetation	❖ \$48,000
10-Foot Trail	asphalt	❖ soft soil and light to no vegetation	❖ \$125,000
		❖ large rocks, heavy vegetation, or wet soils	❖ \$300,000
10-Foot Trail	concrete	❖ soft soil and light to no vegetation	❖ \$ 188,000
		❖ large rocks and heavy vegetation	❖ \$600,000
5-Foot Trail with Grade Separation from Off-road Vehicle Road	crushed aggregate	❖ soft soil and light to no vegetation	❖ \$42,250
		❖ large rocks and heavy vegetation	❖ \$58,100

Note: Construction costs made available from Troy Duffin, owner of Alpine Trails, 435-655-0779.

<sup>a</sup>Work from contractor includes: field flagging trail route, brushing and clearing, trail cutting with erosion controls installed, off slope berm removal, major root removal, base preparation, base material laid and spread, and final smoothing, raking or finishing. Hauling any refuse off the trail will be extra.

Materials used by the contractors for the trail surface range from bark mulch to crushed rock to road base. In terms of accessibility, the professionals agreed that crushed rock and road base provide a surface that can be immediately used by wheelchair trail users. The bark mulch is less favorable for accessibility but could possibly be used a season after construction, as it needs time and recreational use to harden. The cost for trail surfaces range from \$2.00 a linear foot for bark mulch spread 4 feet wide at a depth of 4 inches to crushed rock at \$4.00 per linear foot spread 4 feet wide and 4 inches deep. This pricing will increase if dumping the material requires excessive trips back to the stock pile.



## ***Volunteer Trail Construction***

A feasible trail construction technique, particularly for implementing the typical rural trail cross-section, is construction via volunteer labor. This technique has been implemented for constructing a majority of the SBST. The cost of trail construction using volunteer labor varies, depending upon: (1) the conditions within the corridor, (2) the need for minimal professional assistance, (3) the need for volunteer supervision, and (4) city/county/other personnel involvement. Costs may range from nothing to approximately \$5,000 per mile.

## **Trail User Conflicts**

The NBST invites several trail user groups to use the trail for a variety of purposes. Hikers, walkers, joggers, cyclists, mountain bikers, and horseback riders, in addition to other groups including families and school and environmental education groups, will be using the trail together. This broad spectrum of trail users has the potential for conflict because of their varying trail needs and styles of recreation. Education of the various trail users will help in reducing trail conflicts (Appendix I).

A lack of communication between different trail users is the root of many clashes and collisions on trails. Users must realize that communication is a two-way interaction and make an effort to warn others of their needs and intentions. Bicycle speeds could likely be the source of a majority of user conflicts. If trail users are educated in a basic and universal system of communication, such as what ringing a bike bell means, chances for conflict and crashes are minimized. Signs, speed limits, and good user etiquette along the NBST can minimize conflicts between trail user groups.

Promoting responsible behavior on the NBST can minimize user conflict. Trail etiquette standards can be publicized on trail signs and in existing educational materials. For example, a particular sign that should be used on the trail is a yield sign showing bicycles yielding to pedestrians, and pedestrians and bicycles yielding to horses. Trail users might be less likely to become offended at the actions of other people once they understand how each group is supposed to act. Trail users also might be less likely to violate an established code of behavior if they believe the rules will be enforced.

## **Damage**

A certain amount of vandalism, as well as accidental damage, can be expected on heavily used trails that are open to the public. Damaged and vandalized items, if not promptly removed or repaired, stimulate more damage. Regular inspection of trails with early identification of damaged areas will help reduce vandalism.

Proper trail design methods can also reduce damage. Select trail routes that avoid sensitive environments. Use brush piles, drainage ditches, or vegetation to keep people on the trail. These methods, unfortunately, detract from the outdoor experience and can increase the amount of accidental damage when users leave the trail to examine attractive sights. If accidental damage is occurring, it may be wise to route the trail closer to the site and thus eliminate the need to leave the trail. Trail signs also can be used to encourage



compliance. However, it is important to avoid the use of negatively worded signs. When space permits, explain the reasons for protecting the area. For example, "Prevent erosion, please stay on trail."

## **Dog Waste**

Dogs are allowed on the BST. Dog waste tends to be a problem on heavily used trail that are used by persons walking their dogs. This waste needs to be removed because it is unsightly and can pose a health risk to dogs and trail users. The two options for controlling dog waste are: (1) the provision of dog waste bags and receptacles at trailheads, and (2) educating and requiring dog owners to remove and dispose of their dog's waste. The provision of dog waste receptacles and bags at trailheads requires regular maintenance to facilitate waste removal and bag restocking for the program to be successful. Educating trail users in dog waste removal requires interpretive signs at trailheads. This approach is more difficult for users because they may be required to take the dog waste into their automobiles, which is not pleasant. Either approach should be implemented along the NBST.

## **Trail Maintenance Program**

A maintenance program helps ensure the safety of the trail user and the preservation of the trail environment. A high maintenance standard implies quick response to trail deterioration. Programs such as "Adopt a Trail" encourage local volunteers to maintain a section of trail as a service for all the recreational users of the trail.

### ***General Trail Maintenance Guidelines***

- ❖ Practice environmentally sound maintenance and use techniques appropriate for the type of trail. For example, avoid the use of chemicals to retard vegetation growth.
- ❖ Prepare an annual Trail Maintenance Plan.
- ❖ Assess the type and volume of use with trail register records and by counting the type and volume of vehicles at the trailhead.
- ❖ Repair heavily used trails in the spring, and maintain them throughout the season on an as-needed basis.
- ❖ Prioritization of trail maintenance tasks are: 1) to correct unsafe trail conditions, 2) to repair environmental damage, and 3) to restore the trail to the desired conditions.

### ***Annual Spring and Early Summer Tasks***

- ❖ Clear windfalls and dangerous trees from the trail bed for safety and to prevent detouring.
- ❖ Remove loose rocks and debris from the tread surface.
- ❖ Repair trail wash-outs.

- ❖ Remove new plant growth on the trail annually. Clear in the spring and early summer when the new growth is soft.
- ❖ Level the trail tread as necessary and restore the tread grade to the original slopes. Use local material to fill ruts, holes, low spots, or muddy areas.
- ❖ Repair erosion-damaged facilities promptly to prevent further damage. Check for erosion effects after spring runoff. Check and repair water bars, drainage ditches, culverts, and drainage dips. Construct additional drainage structures if needed.
- ❖ Check and repair all structures after spring runoff and after severe summer storms.
- ❖ Check, repair, or replace signs and trail markers prior to the major use season.

***Weekly or Monthly Tasks (As Trail Use Warrants)***

- ❖ Maintain trailhead facilities such as toilets or waste containers.
- ❖ Resupply trailhead information kiosks with route or safety brochures.



# CHAPTER 4

## Implementation Plan

The NBST Master Plan will be implemented on an individual county, city, and town basis. Each community will be responsible for using the Master Plan as a guideline for planning the exact route, securing funding, building, and maintaining their segment(s) of trail. The counties, cities, and towns will also need to cooperate across jurisdictional lines, working with their neighbors to assure a continuous trail from segment to segment. A trails plan or policy should be part of a community's process of building the NBST.

Individual communities are responsible for working on the segment(s) within their respective jurisdictions and connecting effectively to segments outside their boundary to create a fully functional trail system. The BRAG will provide ongoing technical support in terms of trail implementation tools communities will need in establishing their trail action plans. The BRAG will maintain an NBST website containing implementation tools such as sample ordinances, action plans, calendar of segment planning, construction activities, a copy of the Mater Plan, etc.

## Community Action Plan

The very first thing communities can do to get started with the NBST is to adopt an official plan or policy regarding trails and a trail system. Three immediate responses are detailed below.

### General Plan Incorporation

Counties, cities, and towns should incorporate recreational trail system policy into their general plan. The reason for doing so is simple: this prepares a community for future growth and how it is managed in respect to its recreational opportunities. Recreation is vitally important to a large segment of any population. If a community fosters a well-planned trail system and knows the steps it will take to achieve this, then the implementation is that much easier.

### Trail Easement Ordinance

A trail easement ordinance is adopted by a city or town to protect and ensure that the trail system that has been planned for a community will be able to proceed unencumbered by future development. For example, if a city has an ordinance that spells out the requirements for a trail easement through a particular piece of property, then as a developer builds a new subdivision on this property it is the developer's responsibility to comply and provide a trail through the subdivision. All the time, effort, and money that was put into creating the trail system will not be undermined by future development because everyone will be required to yield to the trail easement ordinance. Read more about this Subdivision Development Ordinance on the BRAG NBST website.



## **Formation of a Trails Committee**

Communities are encouraged to develop an advisory board, that includes a balanced cross section of trail stakeholders. This group would be made up of local citizens, trail users, utility managers, recreation retailers, health professionals, land owners, public safety professionals, large employers, canal companies, volunteers, ORV users, environmental organizations, and any other person or group interested in trail implementation. The members of the Trails Committee will be responsible for working within the community and with the community's neighbors to plan and construct the segment(s) of the NBST in their surrounding area.

## **Trail Development Time Line and Action Plan**

The NBST development time line and action plan details and ranks trail segments by looking at existing characteristics associated with each segment. Population centers, trail corridors, estimated construction costs, and the likelihood of trail construction are some of the qualifying features used to assign priority levels. A Level One priority for a trail segment means construction of this segment is extremely likely or already underway. A Level Four priority indicates the trail segment may encounter difficult obstacles. The priority levels associated with each trail segment are detailed below in Table 7.

## **Trail Development Process**

Communities wanting to proceed with their trail segments after receiving support from their citizens should follow these guidelines for a successful trail building project.

1. Determine the primary alignment for the segment(s) of trail from the NBST Master Plan.

The Master Plan presents alternatives for different alignments of each segment of trail. Using the alternatives as suggestions, take the time and effort to verify which route or combination of routes is best suited for your community's needs.

2. Get professional help from BRAG, the National Park Service, the USFS, private consultants, or any other organization that can provide guidance on planning and creating a trail system.



**Table 7. Bonneville Shoreline Trail (BST) priorities by segment.**

PRIORITY LEVEL	CACHE COUNTY	BOX ELDER COUNTY	PRIORITY DETAIL
Level One	Segment 8	Segment 1	<ul style="list-style-type: none"> <li>❖ Trail segment is planned for construction or is already underway.</li> <li>❖ Trail segment contacts completed SBST.</li> <li>❖ Trail segment follows existing corridors with minimal construction costs.</li> <li>❖ Trail segment is near large population centers.</li> </ul>
Level Two	Segment 7 Segment 4	Segment 2	<ul style="list-style-type: none"> <li>❖ Trail segment follows established corridors.</li> <li>❖ Trail segment is near medium population centers.</li> </ul>
Level Three	Segment 6 Segment 9	Segment 3	<ul style="list-style-type: none"> <li>❖ Trail segment is near small or no population center.</li> <li>❖ Trail corridor is not well established.</li> <li>❖ Construction costs may be high.</li> </ul>
Level Four	Segment 5	N/A	<ul style="list-style-type: none"> <li>❖ Trail segment is not easily placed in a city or town jurisdiction.</li> <li>❖ Trail segment is not near any population center.</li> <li>❖ Trail segment follows mostly motorized corridors.</li> <li>❖ Construction costs may be high.</li> </ul>

3. Identify possible funding sources that can be used to build your community’s trail system; trails cost money to construct and maintain. Many Federal and State grants are available for trail planning and construction. Local support from volunteers, trail committees, or citizens who would like to sponsor a segment of trail will be valuable resources.
  
4. Meet with property owners. If the proposed trail alignment crosses or passes near private property, simply discuss the possibilities and intentions of the trail with the owners before the trail is finalized. Open discussion about the trail will give all concerned individuals a time to express support or apprehension about the trail’s impacts. If an owner will not allow access to the property, other alternatives can be addressed before the trail plans are finalized and construction starts.



5. Identify major obstacles and opportunities along the trail route. The trail alignment must be inventoried in the planning process. In doing so, many aspects of the trail route, both positive and negative, will become apparent. The easiest and most cost efficient way to construct a trail is to work for maximizing the opportunities and avoiding the obstacles. If the obstacle is too great or creates too much of a problem, then perhaps the trail alignment should be reconsidered.
6. Work through legal/property/obstacle issues before trail construction starts. Issues that are not resolved before the trail has been finalized and construction starts can create problems that derail the entire trail building effort. Make sure everything is in place and all the private property owners have signed on to the project before construction starts.
7. Determine the specific trail location and trail design. After all the inventory and analysis of the trail have been completed and all the legal/property/obstacle issues have been resolved, it is time to finalize the trail route and design. The trail will be ideally continuous, the route interesting and diverse, and the connections functional and accessible. The design will utilize the opportunities along the trail, while minimizing costly over design. If the trail segment will have only occasional use, why design a 10-foot-wide trail tread? Common sense dictates much of this process.
8. Begin trail construction. The question with construction is who will your community have build the trail, contractors, volunteers, or a combination of both? The budget for trail construction will decide much of this as will the time table for completion.

## Myths Verses Facts of Trail Development

There are many myths associated with trail development, especially when the proposed trail is near a populated area. These misnomers must be corrected before realistic trail development discussions can be made with the public. A Myths and Facts sheet discussing the most prevalent myths and the actual truth about trail development is in Appendix J of this document.

### Private Property Issues

The most well intentioned trail plans can quickly turn awry if the owners of the private property that the proposed trail intersects have not been involved in the planning process. The appropriate approach is not informing the property owner of what your community is going to do but rather asking the owner what they think of the trail system idea. Listening to the property owner can not be emphasized enough. Many private property owners will not want anything to do with trails, and some will embrace the idea. Trail planners should expect this and adjust accordingly. Community meetings allow all the parties involved to get together for focused discussions and future planning ideas.

There are many incentives communities can use to help property owners agree to a trail system. Tax breaks, recognition along the trail, and transferable property rights are just a few measures that can be



used. Trail design can also aid in minimizing the disturbance to property owners, such as plant material used as screens between the trail and the private property. The solutions are many.

## **Liability Issues**

As public agencies and communities in Cache and Box Elder Counties consider building the segments of the NBST that will ultimately link together and create the NBST, concerns about trail user injury and liability are issues that need to be addressed. Private land owners who own land adjacent to a segment of trail may worry about trail users wandering off the trail onto their land and injuring themselves or causing property damage. Or landowners may like to open up their land for recreational use but are apprehensive about the liability they may incur in doing so.

Fortunately, Utah has laws that substantially limits public and private landowner liability. Recreational Use Statutes protect private and public landowners who want to open their land to the public for recreation free of charge. Public entities are also protected by governmental immunities or possess limited liability under the State Tort Claims Act. Private landowners who have land adjacent to a trail are protected by trespassing laws.

While concerns about liability are understandable, real-world experience shows that neither public or private landowners have suffered from trail development. Adjacent landowners are not at risk as long as they abstain from “willful and wanton misconduct” against trespassers such as recklessly or intentionally creating a hazard. Trail managers minimize liability exposure provided they design and manage the trail in a responsible manner and do not charge for trail access. More concise law that is pertinent to Utah is found in Appendix K.

## **Motorized Access Issues**

Motorized vehicle access is not allowed on NBST system. Obviously, signs warning against motorized use will be used to mark trailheads and access. Physical barriers, such as boulders, bollards, tree trunks, and chains, will be used along segments identified as potential problem areas. Recreational trail users will also aid as deterrents for the motorized use. Reports to local authorities about motorized violators can discourage further illegal trail use.

The needs of responsible off-road vehicle users should be accommodated in City and County recreational planning. Efforts should be made to accommodate separate ORV trails where possible, such as allowing crossings and public land access where authorized by the Forest Service, the county(s), etc. It may be appropriate to share trail heads in selected situations.



## **Working with Utilities**

The general process communities follow in working with utilities is to first make contact with the company and explain what your community is proposing. Persistence is the name of the game. Next, set up meetings to show the utility company's representative(s) exactly what the trail would impact in regard to the utility's easements. Be prepared to answer any questions in terms of the right-of-way, construction, and time lines required to build your trail. Ask the representative for specific requests, and be as detailed as possible. Outline the benefits the utilities will receive in return for their services for your community's trail system, and then follow through on agreements.

## **Revenue Sources**

Funding for the BST construction to date has come from a variety of public and private sources (see Table 8). Local governments have made substantial contributions in terms of shouldering complete costs of construction or in matching funds, sometimes 50 percent, from State and Federal sources. Most State and Federal sources require matching for large amounts of grant funding.

Donations of labor, equipment, and expertise should not be overlooked as large expanses of trail can be built with these low cost resources. Major sources that communities can begin with to acquire needed funds are listed below.

## **Technical Assistance with Special Circumstances**

While not a source of hard dollars directly, communities are encouraged to use the substantial expertise available in northern Utah. Peers in local government along the BST in Weber, Davis, Salt Lake, and Utah Counties are able and willing to assist with the NBST. Design and construction standards largely follow the experience and policy of the USFS, whether for trails, trailheads, or signs. While special funding sources exist for special circumstances (see following three paragraphs), it is the expertise related to these funding sources that enable large amounts of funds and special financial considerations, such as tax benefits, to be used.

Larger barriers, such as multi-lane highways in the mouths of Brigham and Logan Canyons, will require hundreds of thousands of dollars each to address and likely involve State or Federal funding sources. The UDOT Enhancement Program is the best source for large amounts of matching funds where the State and Federal road system interfaces with a nonmotorized trail.



**Table 8. Summary of Bonneville Shoreline Trail (BST) funding sources from 1994 to 2001.**

STATE NON-MOTORIZED TRAIL FUND AWARDS 1994-2001 FROM UTAH DIVISION OF PARKS AND RECREATION			
Amount	Year	Sponsor	Project Description
\$50,000	1994	Provo City	Rock Canyon Trail Head
20,450	1995	Ogden Ranger Dist.	Trail Segment
100,000	1996	Salt Lake County	Parley's Canyon Crossing Bridges
24,000	1997	Ogden City	Jump off Canyon Trail Head
22,500	1997	Provo City	Trail Segment
54,200	1997	Salt Lake County	Parley's Canyon Crossing Bridges
100,000	1998	Salt Lake County	Parley's Canyon Tunnel
63,500	1999	Orem City	Orem Trail Segment
8,500	1999	Draper City	Little Willow Creek Bridge
25,000	1999	Ogden City	Ogden Canyon Trail Head
71,500	1999	Salt Lake County	Parley's Canyon Crossing Trail Head
25,000	1999	Provo City	Trail Segment and Trail Head
6,500	1999	Davis County	Adams Canyon Trail Segment Fence
100,000	2000	Salt Lake City	Parley's Canyon Crossing Tunnel
46,500	2001	Logan City	Green Canyon to Logan Canyon Segment
8,000	2001	Davis County	Farmington Canyon Bridge
\$725,850	Subtotal		
FEDERAL RECREATIONAL TRAIL PROGRAM AWARDS 1996-2001 FROM UTAH DIVISION OF PARKS AND RECREATION			
\$71,155	1999	Centerville City	Centerville Trail Segment
\$797,005	TOTAL for both state administered funding sources		

Land acquisition, through trading or purchase, frequently will involve the USFS and municipalities or counties. The Federal Land and Water Conservation fund is set up to assist local USFS jurisdictions with resources to facilitate priority exchanges to expand USFS boundaries where appropriate. It is recommended that communities work with local USFS managers on identifying parcels adjacent to current USFS boundaries and support them in their consideration of viability of exchanges and purchases.



Easements and related agreements are tools whereby private land is left private while the public is allowed to use a trail on a specified corridor through a private land parcel. Utah Open Lands staff (801-463-6156) are an excellent resource to use in initiating dialogue with private land owners on consideration of conservation easements that facilitate trail development.

## **Local Funding Sources**

Local family foundations and corporations have financed either trail/trailhead construction or maintenance. Information available on the hundreds of private foundations in Utah indicates none that place trail development explicitly as a priority. Frequently, foundations prefer to fund 501 (c)(3) nonprofit organizations rather than units of government. Communities are encouraged to contact foundation staff or members of decision making committees, when available, to determine a funding sources interest in supporting BST projects. As the BST is new to northern Utah, it is likely that foundations serving the area would entertain applications to fund trail development projects. As mentioned, local governments have contributed greatly to the BST to date, frequently in matching larger State sources. Partnership, cost-sharing, and private funding participation (even if small) have proven the most successful strategy in funding the more expensive BST projects.

## **Utah State Sources**

### ***Nonmotorized Trails Fiscal Assistance Program***

c/o John Knudson - Trails Coordinator  
Utah Division of Parks and Recreation  
1594 West North Temple, Suite 116, Box 146001  
Salt Lake City, Utah 84114-6001  
phone: (801)538-7344, fax: (801)538-7378  
nrdpr.jknudson@state.ut.us  
<http://www.stateparks.utah.gov/parks/trails/trails.htm>

**Amounts Available:** \$5,000 to \$200,000 on a 50 percent matching basis. Cash, volunteer hours, private and nonprofit donations, or in kind services may be used by the applicant for their match. One-half of the awarded amount is advanced when the project begins, the other half is reimbursed upon successful review of expenditures after project completion.

**Who Can Apply:** Counties, incorporated cities and towns, Federal agencies, and special improvement or service districts.



Type of Project: Planning, property acquisition, and development of nonmotorized trails. New trail/trailhead construction, major trail/trailhead rehabilitation, roadway overpass or underpass, river or stream crossing.

Applications Due: May 1 - Applications available in March. Successful projects awarded in the Fall.

***Riverway Enhancement Fiscal Assistance Program***

c/o Lyle Bennett - Grants Coordinator  
Utah Division of Parks and Recreation  
1594 West North Temple, Suite 116, Box 146001  
Salt Lake City, Utah 84114-6001  
phone: (801) 538-7344, fax: (801) 538-7378  
nrdpr.lbennett@state.ut.us  
<http://parks.state.ut.us/parks/trails/trails.htm>

Amounts Available: \$10,000 to \$100,000 on a 50 percent matching basis. Cash, volunteer hours, private and nonprofit donations, and in-kind services may be used by the applicant for their match. One-half of the awarded amount is advanced when the project begins, the other half is reimbursed upon successful review of expenditures after project completion.

Who Can Apply: Counties, incorporated cities and towns, special improvement or service districts on rivers and streams prone to flooding and/or impacted by high density population.

Type of Project: General recreational development along a river or stream corridor (greenways), which could include trails, landscaping, stream bank/channel stabilization, wetlands creation/restoration.

Applications Due: May 1. Successful projects awarded in the fall.

***Federal Recreational Trails Program***

Contact John Knudson  
State Trails Coordinator  
(see above)

Amounts Available: \$10,000 to \$100,000 on a 50 percent matching basis. Fifty percent of total project cost from applicant. This can be a combination of sponsor cash expenditures, in-kind services, or value of volunteers and donations. At least 5 percent of the total project cost must come from nonfederal sources if the project sponsor is a Federal agency.

Who can apply: Cities, counties, special service districts, and State and Federal agencies.

Type of Project: Motorized and nonmotorized trail development and maintenance projects, educational programs to promote trail safety and trail-related environmental protection projects.

Applications Due: Contact State Trails Coordinator

***Utah Department of Transportation Enhancement Program***

c/o George Thompson

Local Government Programs Engineer

UDOT Program Development

4501 South 2700 West

Box 143600

Salt Lake City, Utah 84114-3600

phone: (801) 965-4366, fax: (801) 965-4551

email: gthompso@dot.state.ut

<http://www.dot.utah.gov/progdev/enhance/>[.dot.utah.gov/progdev/enhance/](http://www.dot.utah.gov/progdev/enhance/)

Sandy Weinrauch

Bicycle and Pedestrian Planner

UDOT Program Development

(801) 965-3897

(801) 965-4551

sweinrauch@dot.state.ut.us

<http://www.dot.state.ut.us/progdev/bike/>

Amounts Available: \$50,000 to \$500,000 on an 80/20 match. Applicant's 20 percent match must be a hard match (cash or real estate that is integral to the proposed project), and must be nonfederal monies.

Who Can Apply: Public agencies only, such as Federal, tribal, State, county, and city governments. Private groups, such as nonprofit organizations, user groups, or private companies are encouraged to participate by applying through the appropriate public agency.

Type of Project: Bicycle/pedestrian paths and associated facilities (bridges, roadway overpasses and underpasses, staging areas, etc.), preservation of abandoned railway corridors (including the conversion and use thereof for pedestrians or bicycle trails).

Applications Due: Usually in February or March with awards in May or June. New applications will be taken in 2003.



## **National Sources**

### ***National Park Service Challenge Cost-Share Program***

Rivers and Trails

Bill Farrand

324 South State, Room 218

Salt Lake City, Utah 84145-0155

phone: (801)539-4253, fax: (801) 539-4250

bill\_farrand@nps.gov

www.ncrc.nps.gov/rtca

**Amounts Available:** Up to \$40,000 on a 50 percent matching basis. Matches may be in cash, volunteer hours, or in-kind services

**Who Can Apply:** Nonfederal government entities (e.g., State or local, private individual/organization, business, or philanthropic or charitable group). An organization that receives Federal funding is eligible, providing their contribution is not derived from Federal monies.

**Type of Project:** Projects that are intended to increase awareness and participation by neighboring communities and the public in the preservation and improvement of National Park Service (NPS) cultural, natural, and recreation resources. The program applies to all NPS units and NPS outreach programs. The program applies to projects of regional significance and is currently being used for planning purposes on the existing BST.

**Applications Due:** Fall/winter - check with program managers.

### ***The Conservation Alliance***

<http://www.conservationalliance.com/grants.html>

**Amounts Available:** Varies, averages \$20-35,000, no official limit for proposals.

**Who Can Apply:** Nonprofit organizations, who receive sponsorship by one of the Alliance members (listed on the website).

**Type of Project:** The project should be focused primarily on direct citizen action to protect and enhance our natural resources for recreation, have quantifiable, with specific goals, objectives and action plans and should include a measure for evaluating success; have a good chance for closure or significant measurable results over a fairly short term (1 to 2 years); not emphasize general operating expenses or staff payroll.

**Applications Due:** Varies, but awards are usually made twice yearly, in January and August.

**Recreation and Conservation Grants**

Grants Administrator - REI  
PO Box 1938  
Sumner, Washington 98390-0800  
(253) 395-7100

Amounts Available: Average Grant - \$3,000

Who Can Apply: Local REI store employees nominate projects and accepted proposals are invited from nonprofit organizations, cities, counties, and State agencies (excluding research and educational institutions).

Type of Project: Great Outdoors Grants - identify and protect specific places for climbing, camping/hiking, bicycling, and cross-country skiing, connected regionally to REI's Salt Lake City store.

Greenways - urban trail resource encouragement.

Mediation - projects that will address user conflicts in the muscle- powered recreation arena.

General Grants - assisting conservation and outdoor user groups with membership drives, constituency building, improving communication technology for grassroots organizing purposes. None of these grants will be for staff salaries or general support.

Applications Due: Accepted throughout the year.

**Recreation Equipment Inc.**

Public Affairs Dept.  
PO Box 1938  
Sumner, Washington 98390-0800  
(253) 395-7100

Amounts Available: \$250 to \$2,500

Who Can Apply: Local REI store employees nominate projects and accepted proposals are invited from nonprofit organizations, cities, counties, State agencies (excluding research or educational institutions).



Type of Project: Community Recreation Grants - Outdoor programs that increase access to outdoor activities, encourage involvement in muscle-powered sports for all people; education-based programs that address specific safety issues and proper care for outdoor resources relating to activities in climbing, camping/hiking, cycling, skiing and paddling; community parks and recreation projects that involve local REI stores in a partnership effort; support of community organizations working on outdoor recreation public policy initiatives; supports programs that offer outdoor opportunities for children ages 5-18 who would not otherwise have an opportunity to gain experience or skills in the outdoors.

Applications Due: Accepted throughout the year.

***Kodak American Greenways Awards Program***

The Conservation Fund  
c/o Leigh Anne McDonald  
1800 North Kent Street, Suite 1120  
Arlington, Virginia 22209  
(703) 525-6300  
lmcdonald@conservationfund.org  
www.conservationfund.org

Amounts Available: Maximum grant \$2,500, most range from \$500 to \$1,000.

Who Can Apply: Local regional or statewide nonprofit organizations. Although individuals and public agencies may also apply, community organizations will receive preference.

Type of Project: Mapping, ecological assessments, surveying, conferences, and design activities; developing brochures, interpretive displays, audio-visual productions or public opinion surveys; hiring consultants, incorporating land trusts, building a foot bridge, planning a hiking path, or other creative projects. In general, grants can be used for all appropriate expenses to complete a greenway project including planning, technical assistance, legal, and other costs. Grants may not be used for academic research, general institutional support, lobbying, or political activities.

Applications Due: June 1. Announcement of awards by October 1.



**International Mountain Bicycling Association (IMBA) Club Assistance Fund**

Judd de Vall  
PO Box 7578  
Boulder, Colorado 80306-7578  
judd@imba.com  
www.imba.com  
(888) 4442-4622

- Amounts Available: Maximum grant \$500
- Who Can Apply: IMBA-affiliated clubs
- Type of Project: Funds to purchase trail maintenance equipment, mountain bike patrol supplies (uniforms, radios, first aid kits), and/or education materials such as IMBA’s multiple use trail signs or *Rules of the Trail* booklets. Can be used to support coalition building efforts that maintain or enhance mountain bicycling opportunities.
- Applications Due: August 1 with August 15 decision announcement. October 1 with October 15 decision announcement.

**Bikes Belong**

368 Beacon Street, Suite 102  
Brookline, MA 02446-2800  
(617) 734-2800  
EMail: Mail@Bikesbelong.org  
Website: www.bikesbelong.org

- Amounts Available: Up to \$10,000
- Who Can Apply: Local organizations, agencies, and citizens
- Type of Project: Bicycle facilities projects that will be funded by TEA-21, the Transportation Equity Act for the 21st Century. Successor grants for continuing projects will be considered.
- Applications Due: Funding decisions are made on a rolling basis.

**Healthy People 2010 Community Implementation Grants Program**

Ms. Sally Jones, Administrative Officer  
Office of Disease Prevention and Health Promotion  
Hubert H. Humphrey Building Room 738-G  
200 Independence Avenue, SW.  
Washington, DC 20201  
(202) 260-7654.  
[www.health.gov/healthypeople/Implementation](http://www.health.gov/healthypeople/Implementation)  
Amounts Available: Up to \$2,000

Who Can Apply: Community nonsectarian and faith-base organizations

Type of Project: Prevention efforts to promote health education, quality care, access to care and other projects that support the far-reaching national healthgoals ofHealthy People 2010.

Applications Due: Ongoing

**PowerBar's Direct Impact on Rivers and Trails Program (D.I.R.T.)**

Powerfood, Inc.  
Attn: DIRT Program  
2150 Shattuck Avenue  
Berkeley, CA 94710  
<http://www.powerbar.com/whoweare/>

Amounts Available: \$2,000 to \$5,000

Who Can Apply: Unrestricted

Type of Project: Efforts to protect, preserve and restore recreational lands and waterways.

Applications Due: Ongoing

**National Trails Endowment Awards**

American Hiking Society  
1422 Fenwick Lane  
Silver Spring, Maryland 20910  
Liz Dooley, Alliance Programs Manger  
(301)-565-6704 x 212  
EMAIL: [Ldooley@AmericanHiking.org](mailto:Ldooley@AmericanHiking.org)  
[www.AmericanHiking.org](http://www.AmericanHiking.org)

Amounts Available: \$500 to \$10,000



Who Can Apply: Trail clubs

Type of Project: Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements; building and maintaining trails that will result in visible and substantial ease of access, improved hiker safety, and/or avoid environmental damage; and constituency building surrounding specific trail projects – including volunteer recruitment and support.

Applications Due: November 30. Decisions announced May 1.

## **Bear River Association of Governments (BRAG) Trail Implementation Assistance Activities**

The following is a list of items that are on BRAG's agenda for the NBST.

1. The BRAG will present the NBST Master Plan to all the communities along the trail. Primarily this will be done at city council meetings.
2. The BRAG will meet with utility companies to discuss their role in providing trail corridors in their land easements.
3. The BRAG will meet with the Farm Bureau to present the NBST Master Plan. Landowner issues and concerns will also be addressed during these meetings.
4. The BRAG will be an integral part in assisting communities with information about forming trail committees. These trail committees will be the back bone behind the trail implementation.
5. The BRAG will provide technical trail implementation assistance to Cache and Box Elder Counties as well as to all communities along the trail system's route.



# APPENDIX A: CASE STUDY APPROACH





# Northern Utah Bonneville Shoreline Trail Planning Project Case Study Approach

September 28, 2001

Purpose: To provide insight, context, resources to the planning and implementation process

To provide advice in forming a support organization for the Trail

Process: Focus group and individual BST segment leader interviews

Review of documents provided by segment leaders

Segments: Utah County

Salt Lake County: County Parks and Recreation, Draper and Sandy

Salt Lake City (BST Committee)

Davis County (County trails planner)

Weber County (Weber County Pathways and Ogden Trails Network)

Data Sought: Status of segment (miles operational and miles planned)

Management and maintenance structure, process - what is working, not working

Major challenges/obstacles and how they were successfully met

What major challenges remain and how they could possibly be met

What trail design and construction standards have been used?

What are the costs per mile for the various trail design types used?

What types of signage have been implemented and at what locations?

What type of trailheads have been used and their cost?

Resources (funding sources, technical assistance, volunteers, etc.)



Major stakeholder network and coordination process

Advice in forming a support organization(s)

Lessons learned: the big Do's and Don'ts



**APPENDIX B: BONNEVILLE  
SHORELINE TRAIL (BST)  
MEMORANDUM OF  
UNDERSTANDING**





# Memorandum of Understanding

## Bonneville Shoreline Trail

The Bonneville Shoreline Trail has been designated as Utah's Millennium Legacy Trail, as part of a White House initiative on the basis of our Governor's recommendation. The Utah Legislature has recognized the trail during the 1999 General Session, and appropriated funds for its construction, as outlined in the following excerpts from Utah Code 63-11a-504. Utah Code Annotated 1953, Bonneville Shoreline Trail Program:

There is created the Bonneville Shoreline Trail Program. The Bonneville Shoreline Trail is intended to follow on or near the old Lake Bonneville shoreline terrace near the foot of the Wasatch Mountains from Juab County to Cache County including Juab, Utah, Salt lake, Davis Weber, Box Elder and Cache Counties; to provide continuous and safe routes, paths, or trails for pedestrians, bicyclists, and equestrian riders, where appropriate.

Citizens and visitors to Utah should expect to know that any trail bearing the BST name and designation meets certain criteria. Therefore, a coalition of trail building organizations under the title, Bonneville Shoreline Trail Coalition, has agreed to the following criteria. Other organizations are welcome to use the name providing they first agree to these criteria.

We, the undersigned, agree to the following criteria for the Bonneville Shoreline Trail:

1. The trail will be built on or near the foothill bench generally considered to be the eastern shoreline of ancient Lake Bonneville.
2. The purpose of the trail is to provide a place where walkers, runners, cyclists and equestrians can experience their recreational pursuits at a distance from automobiles that is both safe and aesthetically pleasing.
3. The trail will provide access to public lands and the resources associated with those lands.
4. The trail will be for nonmotorized use only. Walkers, runners, bicyclists and horseback riders are identified as potential users, although all segments may not be appropriate for all of these uses.
5. The trail will be separate from the developed urban area, but trailheads will provide access that is convenient for residents of urbanized areas
6. The trail should be designed to provide access and rapid deployment of fire fighting and other emergency resources to the urban/foothills interface, where feasible.
7. The trail will contribute to the preservation of aesthetic, wildlife, historic and educational values of the area.



8. The Bonneville Shoreline Trail logo as depicted within this document is copyrighted, which right is held by the Bonneville Shoreline Trail Committee. Permission to use this copyrighted material is given by the copyright holder to signatories of this document. The logo may be used for appropriate trail signage, related communications and advertising, but may not be used for commercial purposes nor financial gain without the express written permission of the copyright holder.

Information about the Bonneville Shoreline Trail Committee can be found at <http://www.bonneville-trail.org>  
[www.bonneville-trail.org](http://www.bonneville-trail.org).

In areas where the trail cannot be built to these criteria, especially where the trail allows motorized travel, a segment may use the title "Bonneville Shoreline Trail Connector" to lead users from one segment to another.



# APPENDIX C: UTAH STATEWIDE TRAIL INITIATIVE





# **Governor's Trails Initiative**

## **Bear River Planning District Strategic Planning Meeting**

Date: November 28, 2001

Time: 6:00 - 9:00 p.m.

Location: Logan City Hall, 225 North Main, Logan, Utah

Number of Meeting Participants: 19

Group 1:       Facilitator: Bill Thompson  
                  Scribe: Lee Gyllenskog

Group 2:       Facilitator: Floyd Powell  
                  Scribe: Robin Watson-Hullinger

Group 3:       Facilitator: Russ Akina  
                  Scribe: Brandon Pratt

Note: In recent months several public meetings have been held regarding the Bonneville Shoreline Trail. One such meeting was held in Logan a few weeks prior to this meeting.



## PRIORITY TRAILS

As identified by meeting participants

GROUP 1	
Votes	Trail
11	Bonneville Shoreline Trail (connect north-end of Wellsville to Idaho, mostly non-motorized but provisions for some motorized use)
7	Willard Canyon Loop Trail (motorized/non-motorized)
7	Cold Water Canyon Trail (non-motorized, Wellsville wilderness)
6	Great Western Trail
4	Cutler Reservoir Trail (Logan River Trail to Bonneville Shoreline Trail in Box Elder County)
1	Mt. Naomi Trail System
1	Northern Utah Trail Complex (team currently working on this)
1	Fire Break Road (use by landowner discretion, most is part of Bonneville Shoreline Trail, has \$40,000 to open)

GROUP 2	
Votes	Trail
9	Bonneville Shoreline Trail (From north end of Wellsville to Logan railroad, Cutler Marsh, Benson Marina)
6	Logan River (Logan Canyon to Bud Phelps Wildlife Management Area to Bonneville Shoreline Trail)
6	Loop Trail from Clear Creek Trail Campground to Raft River Mountains in Western Box Elder County)
6	Perry Canyon Trail in Box Elder County
4	Highway 89 (road bike lane)
2	Shoshone Trail (Box Elder County, connector to Great Western Trail)
0	Nothing in western part of Box Elder county all horseback and hiking trails)
0	Gunsight Peak Trail (Box Elder County to Cache County)

GROUP 3	
Votes	Trail
6	Bonneville Shoreline Trail
5	Bear River Trail
5	Logan River Trail
4	Malad River Trail
2	Golden Spike to Corrine
2	Skyline to Great Western Trail
2	Cutler Reservoir Trail Network
2	Interface Green, Smithfield and High Creeks
2	Weber River Trail
1	Bonneville Shoreline Trail to Willard Bay
1	Cold Water Canyon to Mendon
1	Malad to Bear River to Bonneville (connection trail)
1	Great Western Trail
1	Avon to Liberty
1	Logan River Trail (does not need financial resources in comparison to other trails)
1	Little Bear to Cutler Reservoir
0	Weber to Willard connection
0	West Canal (ties to Bonneville Shoreline Trail)
0	Golden Spike to Monument Point
0	Mantua to Avon
0	Right Hand fork to Blacksmith

## TOP THREE TRAILS

1. Bonneville Shoreline Trail
2. Logan River Trail
3. Cold Water Canyon



**PRIORITY TRAILS**  
(combined votes)

Votes	Trail
27	Bonneville Shoreline Trail
12	Logan River Trail
8	Cold Water Canyon
7	Great Western Trail
7	Willard Canyon Loop Trail (motorized/non-motorized)
6	Cutler Reservoir Trail Network
6	Loop Trail from Clear Creek Trail Campground to Raft River Mtns in Western Box Elder County)
6	Perry Canyon Trail in Box Elder County
5	Bear River Trail
4	Highway 89 (road bike lane)
4	Malad River Trail
2	Golden Spike to Corrine
2	Interface Green, Smithfield and High Creeks
2	Shoshone Trail (Box Elder County, connector to Great Western Trail)
2	Skyline to Great Western Trail
2	Weber River Trail
1	Avon to Liberty
1	Fire Break Road (use by landowner discretion, most is part of Bonneville Shoreline Trail, has \$40,000 to open)
1	Little Bear to Cutler Reservoir
1	Malad to Bear River to Bonneville (connection trail)
1	Mt. Naomi Trail System
1	Northern Utah Trail Complex (team currently working on this)
0	Golden Spike to Monument
0	Gunsight Peak Trail (Box Elder County to Cache County)
0	Mantua to Avon
0	Nothing in western part of Box Elder county all horseback and hiking trails)
0	Right Hand fork to Blacksmith
0	Weber to Willard connection



## KEY ISSUES

As identified by meeting participants

GROUP 1	
Votes	Issue
8	Funding in general
8	Technical assistance to local jurisdictions for trail plan implementation
6	Access through private land (purchase access)
2	Support from land managers to coordinate volunteer efforts
1	Signage
1	Landowner and public education about impacts of trails (motorized and non-motorized)
1	Use of state crews (prison crews)
1	Protect city and other facilities (wells, etc.)
0	Need for additional manpower
0	Increase/implement volunteer efforts
0	Increase law enforcement on trails
0	Maintenance programs
0	Urban connects
0	Need for tools (shovels, etc)
0	Education private land owners (liability)
0	Safety—minimize trail conflicts
0	Minimize user conflict by a comprehensive plan (user dialogue)
0	Eminent domain for trails

GROUP 2	
Votes	Issue
4	Additional funding
4	Land/easement acquisition
3	Federal/State land exchange
3	Funded maintenance program; possible endowment
2	Increase public awareness through trails promotion, websites, signage, interpretation, correlated maps, trail etiquette
1	Land conservancy district coordination
1	Increase use of volunteers
1	Intra-agency cooperation
1	Good design standards
0	Initiate/charge a user fee or pass
0	Insure trails for all types of users
0	Increase law enforcement on trails
0	Compensation for private land owners
0	Charge a facility fee (trailhead parking, restroom)
0	Design "expert" available at state level
0	Optional tax

GROUP 3	
Votes	Issue
6	Motorized Use (increase public education, awareness and enforcement of regulations)
4	Public access points to Naomi Wilderness: Hyde Park Canyon Dry, Smithfield Canyon Dry, Birch Canyon Dry
4	Fragmentation of habitat
2	Private land owner issues
2	County access management team (or AOG Management team)
1	Funding
1	Connectivity: Linking trails, communities, special points of interest
0	Air quality
0	Public safety (mixing use on trails – motorized- vs. -non-motorized)
0	Design standards
0	Restroom facilities
0	Control dog and horse waste and behavior
0	Have trails of different development levels (color-code, different maintenance standards)
0	Restroom facilities
0	Control dog and horse waste and behavior
0	Have trails of different development levels (color-code, different maintenance standards)
0	Steep terrain
0	Signage (western side of Wellsville)
0	Connection between Box Elder and Cache counties (Gunsight peak; access on eastern side)
0	Cutler Gorge Access at south side of reservoir (private land issues, existing railroad in use,

## KEY ISSUES

Compiled votes

Votes	Issue
13	Funding in general
8	Technical assistance to local jurisdictions for trail plan implementation
6	Access through private land (purchase access)
6	Motorized Use (increase public education, awareness and enforcement of regulations)
4	Land/easement acquisition
4	Public access points to Naomi Wilderness: Hyde Park Canyon Dry, Smithfield Canyon Dry, Birch Canyon Dry
4	Fragmentation of habitat
3	Federal/State land exchange
3	Funded maintenance program; possible endowment
2	Support from land managers to coordinate volunteer efforts
2	Increase public awareness through trails promotion, websites, signage, interpretation, correlated maps, trail etiquette
2	Private land owner issues
2	County access management team (or AOG Management team)
1	Signage
1	Landowner and public education about impacts of trails (motorized and non-motorized)
1	Use of state crews (prison crews)
1	Protect city and other facilities (wells, etc.)
1	Land conservancy district coordination
1	Increase use of volunteers
1	Intra-agency cooperation
1	Good design standards
1	Connectivity: Linking trails, communities, special points of interest
0	Need for additional manpower
0	Increase/implement volunteer efforts
0	Increase law enforcement on trails



Votes	Issue
0	Maintenance programs
0	Urban connects
0	Need for tools (shovels, etc)
0	Education private land owners (liability)
0	Safety—minimize trail conflicts
0	Minimize user conflict by a comprehensive plan (user dialogue)
0	Eminent domain for trails
0	Initiate/charge a user fee or pass
0	Insure trails for all types of users
0	Increase law enforcement on trails
0	Compensation for private land owners
0	Charge a facility fee (trailhead parking, restroom)
0	Design "expert" available at state level
0	Optional tax
0	Air quality
0	Public safety (mixing use on trails – motorized-vs. -non-motorized)
0	Design standards
0	Restroom facilities
0	Control dog and horse waste and behavior
0	Have trails of different development levels (color-code, different maintenance standards)
0	Restroom facilities
0	Control dog and horse waste and behavior
0	Have trails of different development levels (color-code, different maintenance standards)
0	Steep terrain
0	Signage (western side of Wellsville)



**APPENDIX D: NORTHERN  
BONNEVILLE  
SHORELINE TRAIL  
(NBST) SCOPING:  
PUBLIC WORKSHOP  
QUESTIONNAIRE,  
SUMMARY, AND  
RESPONSE LETTERS**





# OCTOBER QUESTIONNAIRE RESPONSE SUMMARY

## Question 1. What Benefits of the Trail Appeal to You the Most?

*Respondents were given a choice between High, Moderate, and Low. High scores are listed.*

- 85 Preserves foothill access and open space
- 72 Promotes family-oriented recreation
- 70 Enhances the value of connected recreation facilities (e.g., parks, other trails)
- 68 Links urban/residential areas to mountains
- 63 Promotes physical activity and disease reduction
- 47 Provides a firebreak with unvegetated trail and fire-resistant native planting
- 44 Provides safe alternative transportation
- 29 Provides tourist attraction
- 28 Increases adjacent property values
- 27 Reduces property owner's liability
- 22 Decreases crime
- 13 Other

## Question 2. What Else Do You Want to Know About the Existing (Southern) BST?

*Responses have been grouped, number of like comments is shown.*

- 13 Implementation: how private land is used, land owners dealt with, and liability and use managed
- 7 Where the segments are and how the trail can be accessed
- 5 Where has funding for construction and maintenance come from
- 4 When segments have been or will be completed
- 4 Who guides development and maintains the trail
- 2 Construction standards for material and width
- 1 Other

## Question 3. How Do You Rank the Preliminary Goals of the NBST?

*Respondents were given a choice between Very Important (VI), Important (I) and Not Important (NI). Both Very Important only and Very Important combined with Important scores are shown.*

- | <b>VI Only</b> | <b>VI + I</b> |   |
|----------------|---------------|---|
| 92             | 106           | Develop a safe and enjoyable trail that accommodates multiple nonmotorized trail users            |
| 83             | 100           | Provide public access to the foothills and mountains  |
| 77             | 102           | Link existing and proposed trails to create a regional nonmotorized trail system in northern Utah |
- 

66	96	Provide an environmental education opportunity focusing on foothill ecology and ancient Lake Bonneville geology
51	101	Facilitate citizen involvement in trail planning, construction, and maintenance
50	96	Link to the BST along the Wasatch Mountains in Weber County
43	99	Connect with local and regional recreational facilities
42	94	Develop a firebreak to protect residential and mountain areas from wildfire
26	75	Provide unprecedented opportunities for horseback riding in foothills
10	10	Other

**Question 4. What priority should be placed in developing north/south BST segments?**

*Respondents were given a choice between High, Moderate, and Low. High scores are listed.*

72	Avon to Logan
71	Logan to Idaho Border
43	Mendon to Wellsville
42	Pleasant View to Brigham City
39	Wellsville to Avon
34	Brigham City to Deweyville

*Scores higher than previous item when High and Moderate scores are combined.*

**Question 5. What priority should be placed in developing north/south trail links?**

*Respondents were given a choice between High, Moderate, and Low.*

<b>High Only</b>	<b>High + Moderate</b>	
51	75	Mantua to Avon
50	74	Highway 89 - Brigham City to Wellsville
39	71	North Wellsville Mountains
36	72	Highway 30 to Logan Canyon

*When High and Moderate scores are combined, no clear priority emerges.*



### **Question 6. What recreational facilities should the BST connect to?**

- 37 Canyons, canyon mouths, canyon trails, public lands, mountains, scenic views
- 29 Parks, zoos, swimming pools, golf courses, equestrian parks, nature centers
- 29 Existing trails, city trails, trail heads
- 16 Water (dams, rivers, wetlands, lakes/bays, reservoirs, canal paths)
- 9 Cities, roadways, paved bike paths, bus stops
- 5 Campgrounds/camping, existing rough parking lots
- 3 Heritage and education centers

*Many specific facilities were listed and are referenced in Chapter 2.*

### **Question 7. Do you know of any existing corridors that could function as a segment of the NBST?**

- 20 Canals
- 15 Existing trails, nine along the deer fence on the east side of Cache Valley
- 15 Roads
- 14 Utility corridors, primarily around power lines
- 2 Along a stream
- 1 Toe-of-slope in general

*Most comments were very specific and useful, and are reflected in Chapter 2.*

### **Question 8. Which (implementation) issues are you most concerned about?**

*Respondents were given a choice between High, Moderate, and Low.*

<b>High Only</b>	<b>High + Moderate</b>	
75	94	Construction and maintenance
52	84	Use of private land
46	78	Safety
23	58	Liability
13	43	Property values

### **Question 9. What would you like to see addressed in the January workshops?**

- 16 Private land: easement, acquisition, liability
- 14 Construction standards: design, grade, sight lines, contours, materials, alignment, signs
- 12 Off-road vehicles: keeping off, relocating, accommodating, noise reduction
- 11 Negative impacts: on traffic generation, vegetation, wildlife, water source, crime, funding
- 7 Funding: who will pay for construction and maintenance

- 6 Segment prioritization and feasibility
- 5 Implementation: ordinances, planning, building, coordination
- 4 Canal companies: how to involve, build support, coordinate management
- 4 Connections: with city roads, other trails
- 4 Maintenance
- 4 Other access: handicapped (1), dogs (1), hunters (1), bicycle commuter (1)
- 3 Horse access to trail and trail heads
- 3 Other positive: general benefits, education opportunity, get going
- 2 How volunteers will be involved

**Question 10. What other general comments do you have on the BST Master Plan process?**

- 18 Positive and supportive of process
- 14 Move faster
- 8 Miscellaneous
- 7 Address construction-specific construction issues: who, width, etc.
- 3 Insure connections to existing trails
- 4 Address negative issues better

**Question 11. How would you describe your interest in the BST?**

*Respondents could select more than one designation.*

- 88 Potential BST user
- 31 Public official
- 7 Off-road vehicle user
- 7 Other
- 6 Land owner or right of way holder
- 4 Private citizen who would not be using the BST

**Question 12. If you were to use the BST, what would be your most likely mode of use?**

*Respondents were asked to designate primary and secondary modes.*

<b>Total</b>	<b>1<sup>st</sup></b>	<b>2<sup>nd</sup></b>	
99	80	19	Foot
80	60	20	Bicycle
25	14	11	Horse
8	1	7	Wheelchair
6	1	5	Other, primarily cross country skiing and snowshoeing

### **Question 13. Who else should be informed and invited to participate in this Master Plan process?**

- 13 Government: specific individuals, offices, agencies
- 12 Trail users: runners, bikers, walkers
- 9 Builders: people with resources to contribute towards construction and maintenance
- 8 Land owners: specific individuals
- 3 Utilities: canal company staff
- 3 Other assorted individuals without stated affiliation

*Most suggestions were from specific individuals with contact information. These individuals will be notified of the January recommendation review workshops.*

### **Question 14. Would you like to be involved in developing segments of the BST?**

- 46 Logan to Idaho Border
- 30 Avon to Logan
- 26 Brigham City to Deweyville
- 25 Pleasant View to Brigham City
- 17 Wellsville to Avon
- 15 Mendon to Wellsville
- 1 Other (Deweyville to Malad, Idaho)

### **If so, what links are you interested in?**

- 25 Mantua to Avon
- 17 Highway 89 - Brigham City to Wellsville
- 10 No preference
- 9 North Wellsville Mountains
- 8 Highway 30 to Logan Canyon
- 2 Other (Providence to Dog Creek, Plymouth to Malad)

### **How would you like to be involved?**

- 49 Segment planning
- 34 Construction and maintenance
- 31 Promotion
- 22 Obtaining resources (including fund raising)
- 13 Citizen safety patrol
- 2 Other (education)



**Question 15. Are you interested in participating in a trail planning committee in your area?**

71 Yes  
14 No  
5 Maybe



# JANUARY/FEBRUARY QUESTIONNAIRE SUMMARY OF RESPONSES TO QUESTION 4

## Question 4. What other comments would you like to make about the Master Plan document information, the planning process to date or about the NBST?

### ***Quality of Process and Project***

- 9 Great plan, good project.
- 2 Good effort but too fast for enough public input.
- 1 Pleased with website.
- 1 Like openness of process.
- 1 The more segments, the better.
- 1 The process is B.S.

### ***Landowners***

- 3 Concerned about crossing private property and existing developments.
- 1 Need to honor landowner rights but continue to move ahead.
- 1 Landowners not adequately involved at this point.
- 1 Most farmers won't change.
- 1 Check land ownership in Perry area, involve Wildlife Resources if appropriate.

### ***Government and Public Involvement***

- 2 Continue to develop plan with as much public input as possible.
- 2 Keep up involvement of city and county governments.
- 1 Need public meetings/hearings to exchange ideas.
- 1 Good luck working with small towns.

### ***Off Road Vehicles***

- 1 Concerned about ATV use.
- 1 How will existing motorized "seep trails" be handled, closed off?
- 1 Need diagrams on motorized vehicle control methods.
- 1 Don't agree that deer fence segment should be closed to motorized vehicles.

### ***Document Improvements***

- 2 Make colors consistent from index to detailed maps.
- 2 Need to show cross sections for all 5 trail-width options on Table 4 in Chapter 3.
- 1 Add status of utility mapping.

### ***Plantings***

- 2 Improve plant lists, take out non-native plants.
- 1 How will invasive non-native plant species be handled?



**Miscellaneous**

- 2 Project may not move fast enough to be completed.
- 2 Interpretive signs along trail would be good.
- 2 Want to help with implementation efforts.
- 1 Avoid cost, negative impact of constructing picnic areas or campgrounds at trail heads.
- 1 Has ballpark time schedule been mentioned?



# APPENDIX E: TRAIL USERS' MEETING MINUTES





# Trail Users' Meeting Notes

November 13, 2001  
Logan Recreation Center

## **Will there be separated paths for horses?**

We would rather have a trail that can accommodate all users, but, if necessary, we will consider a separated horse path adjacent to the pedestrian/bike trail.

Parking / trailhead / and beginning of trail should be separated from horses because of manure. The horse users do not clean up their horses manure.

## **Why does the Logan/Green Canyon BST segment have a 10' wide tread and 30' wide corridor?**

This is because it is planned as a firebreak and trail. The 30' area will not be cleared. The vegetation will be augmented with fire resistant native vegetation. The trail is also to function as a utility corridor that can accommodate firefighting vehicles.

## **A 10' tread of crushed aggregate is too wide. This is not the experience that people want when hiking/walking/biking in the foothills. It will also cause more conflicts because of increased bicycle speeds on a wide trail.**

It was decided that the master plan will show a firebreak/trail cross-section that mimics the Logan/Green Canyon plans (Jill will check with Craig Pettigrew about the necessity of the 10' tread for the firebreak). The other recommended cross-section for a trail only will be a 4' wide trail with 3' shoulders. We will also add a cross-section with a 2' tread and 2' shoulders. Recommendations on designing for slower bicycle speeds (i.e., equalize grades, narrow trail) will also be included in the plan.

## **Crushed aggregate is not an accessible surface. It is not good for wheelchairs and persons with unstable footing.**

Different surface options that promote accessibility will be explored and included in the master plan. The plan will also recommend some urban segments provide accessibility. It was noted that a crushed aggregate that has a high clay content will compact more solidly and facilitate access better.

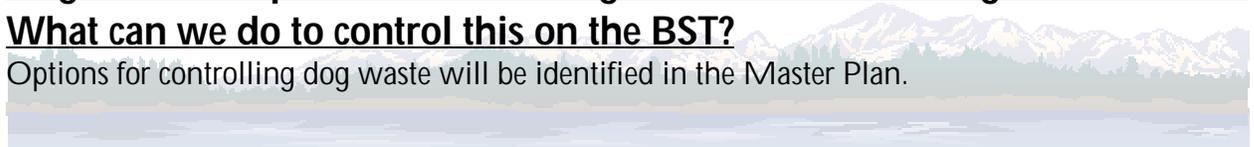
## **How is trailhead access established and maintained?**

Optimal trailheads will be identified in the Master Plan. These will likely include both construction of new trailheads and the identification of existing facilities (i.e., parks) that can function as trailheads.

## **Dog waste is a problem on existing trails such as the Logan River Trail.**

### **What can we do to control this on the BST?**

Options for controlling dog waste will be identified in the Master Plan.



### **How can we control erosion on the trail?**

Trail erosion can be minimized through construction practices that include alignment on appropriate grades and erosion control features such as water bars etc. This will be included in the construction and maintenance section of the master plan.

### **Who maintains the segments?**

Maintenance may be done by a particular jurisdiction that implemented the trail or through volunteers. Generally, because of the nature of the BST contouring the foothills, maintenance will be minimal.

### **How are decisions on alignments made?**

Identification of opportunities and constraints (i.e., existing corridors, property ownership, environmental constraints, Lake Bonneville levels) will be used to determine the best locations for the trail on various segments.

### **How do you keep ATVs off of the trail?**

Through a variety of design techniques. For example, using landscape features, gates, bars. This will be covered in the master plan.

### **What are the Wilderness boundary / encroachment issues?**

A small segment of the Logan/Green Canyon Trail crosses into Mount Naomi. It appears that there could be a problem on the Box Elder County side of the Wellsville Mountains. Jill will look into this at more detail and get the information to Michael Barry. It was suggested that the best approach would be to avoid placing the alignment in Wilderness to the greatest extent possible. If this is not possible then explore a separated path for that section for bicycles.

### **Can we show the trail from Collinston to Malad?**

To do this, we will probably use our existing mapping and show an arrow heading in that direction. No detailed mapping or analysis of this area will be conducted because of budget constraints.



**APPENDIX F: NORTHERN  
BONNEVILLE  
SHORELINE TRAIL  
(NBST) FIRE BREAK  
PLANT LIST**





# NORTHERN UTAH BONNEVILLE SHORELINE TRAIL FIRE-RESISTANT VEGETATION PLAN

Prepared by the Cache Chapter of the Utah Native Plant Society

## Introduction

Construction standards in the Bonneville Shoreline Trail (BST) Master Plan specify an optional firebreak of "fire resistant native vegetation." This section provides guidelines to help accomplish this goal. Utah Native Plant Society (UNPS) and USU Extension personnel are available for advice, training, and technical support of this activity.

## Background

In recent years, wildfires in Logan's foothills have threatened to spread into city and private property. Plants growing on the dry foothills will never be "fireproof," but this fire hazard is reduced where "fire resistant" native vegetation grows. Healthy stands of native perennial bunchgrasses, flowers, and shrubs tend to exclude annual grass weeds, the main fuel source for foothill fires.

A firebreak along the proposed path of the BST could reduce this wildfire risk. The trail's firebreak properties are improved by encouraging the growth of desirable native plants, along with activity to control weeds. Trail construction, however, has the potential to aggravate this fire hazard. Soil disturbed by construction is ideal for the growth of annual weeds and the trail could act as a corridor to accelerate the spread of weeds to new locations if precautions are not taken.

## Trail Construction

Trail construction activity should be conducted in a manner that discourages weeds:

- ❖ Soil should be disturbed as little as possible, since this disturbance destroys native vegetation and promotes the spread and growth of annual weeds.
- ❖ Do not remove topsoil.
- ❖ Do not allow construction equipment to compress off-trail soil.
- ❖ Avoid bringing fill or material from other locations to reduce the chances of introducing weeds. Any fill brought onto the site should be as free as possible of weed seeds.
- ❖ Construction equipment should be cleaned before it is brought to the site.



## Revegetation

Similarly, revegetation activities in firebreaks or trail areas should follow these basic guidelines:

- ❖ Revegetation activity should disturb the soil as little as possible to inhibit weeds. Areas along the trail can be over-seeded with desirable plant species without disturbing existing native perennial vegetation. Container plants can be transplanted along the trail in a similar fashion.
- ❖ Planting should be done at an appropriate time, usually in fall or late winter, using established protocols under the supervision of experienced planters.
- ❖ Planted areas should be monitored for plant survival and weed growth during the first growing season. Spot replanting or weeding may be necessary.

## Recommended Plant Species

An inventory of existing native vegetation will be used to identify locally native perennial bunchgrasses, flowers and shrubs with "fire resistant" qualities. This list will be developed by UNPS volunteers and maintained on the website of the Intermountain Herbarium at USU, <http://herbarium.usu.edu>.

The BST plant list has not yet been fully developed. However, the following list is provided as an initial example of recommended plant species for revegetation:

- ❖ Thickspike Wheatgrass (*Agropyron dasystachyum*)
- ❖ Western Wheatgrass (*Agropyron smithii*)
- ❖ Bluebunch Wheatgrass (*Agropyron spicatum*)
- ❖ Mountain Big Sagebrush (*Artemisia tridentata vaseyana*)
- ❖ Arrowleaf Balsamroot (*Balsamorhiza sagittata*)
- ❖ Basin Wildrye (*Elymus cinereus*)
- ❖ Utah Sweetvetch (*Hedysarum boreale*)
- ❖ Lewis Flax (*Linum lewisii*)
- ❖ Wasatch Penstemon (*Penstemon cyananthus*)
- ❖ Antelope Bitterbrush (*Purshia tridentata*)
- ❖ Squawbush Sumac (*Rhus trilobata*)



This list is based on UNPS work with the BST near Provo. These plants should also be appropriate for northern BST locations. Please refer to the list at <http://herbarium.usu.edu> for final recommendations. Factors of soil type and aspect (sun exposure) also should be considered when choosing plant species for revegetation.

## **Weed Control**

The most critical time to control weeds, annual or other, is during the first three years after revegetation. Native perennials expend much effort at this time to develop extensive root systems and cannot establish themselves if weeds are allowed to compete for scarce resources. Plans for regular weed control should be built into BST/firebreak construction activities.

Weed control should consist of spot control for weeds of concern that are identified during the inventory. This can consist of weed-whipping or mowing to reduce seed set, hand-pulling or grubbing, mechanical treatment (e.g., tillage) and/or herbicide treatment, depending on weeds present.

## **Plant Sources**

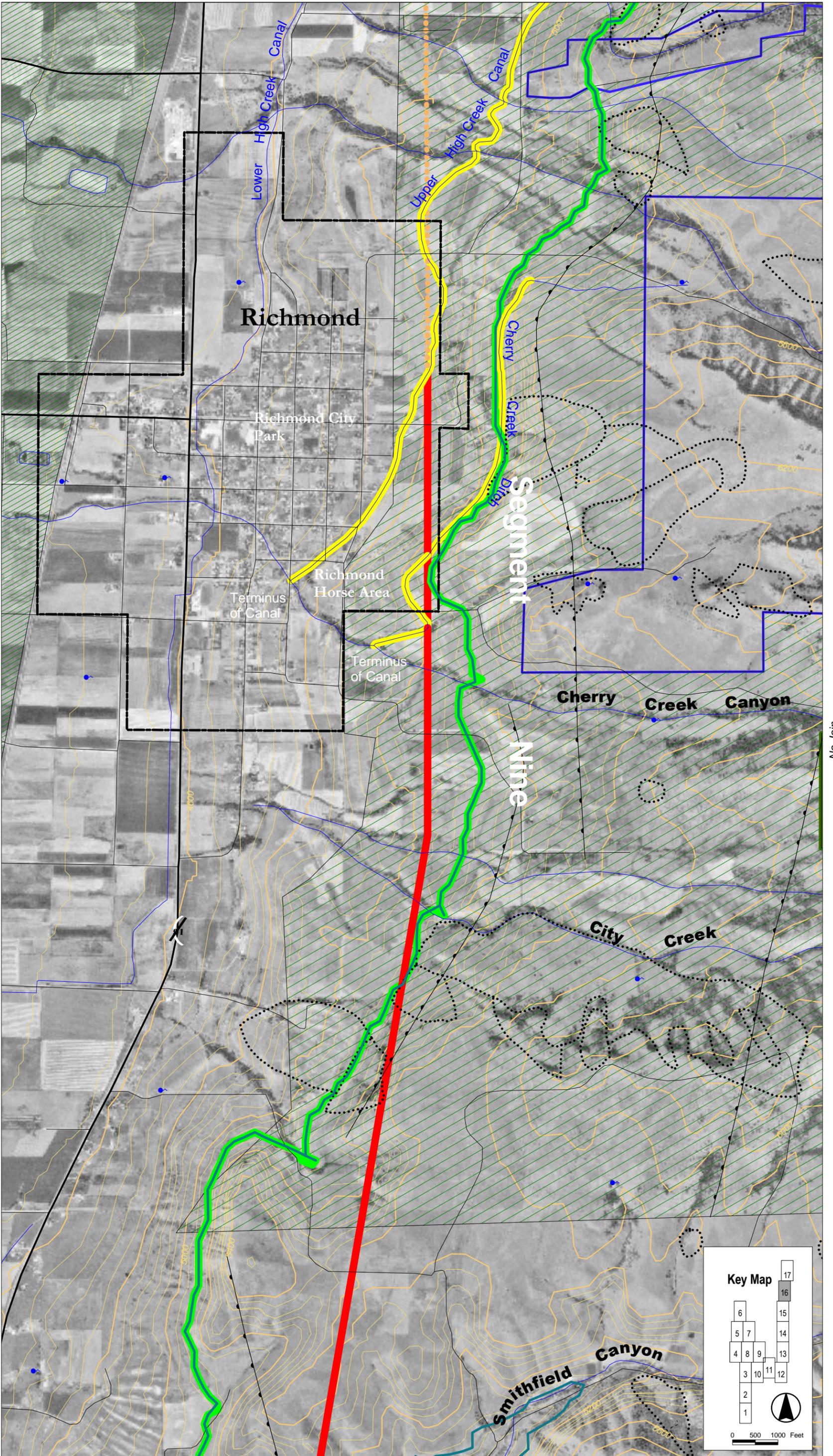
Many Utah native plants and seeds are available commercially. Care must be taken to obtain revegetation materials from reliable sources which do not add annual grass seeds or other fillers to their seed mixes. Many wholesale seed companies are also willing to mix custom blends at no extra charge, thus giving the project managers a fine degree of control over what species are planted. The UNPS maintains a partial list of local suppliers of Utah native plants and seeds on its website, <http://www.unps.org>.

The best seed source, however, is existing local vegetation. These endemic plants are already adapted to the site and produce seeds which will have more successful germination. Using seeds from local sources also maintains the genetic diversity of the plant populations. Seeds can be collected from desirable trailside plants for direct planting or for propagation and subsequent transplanting from containers.

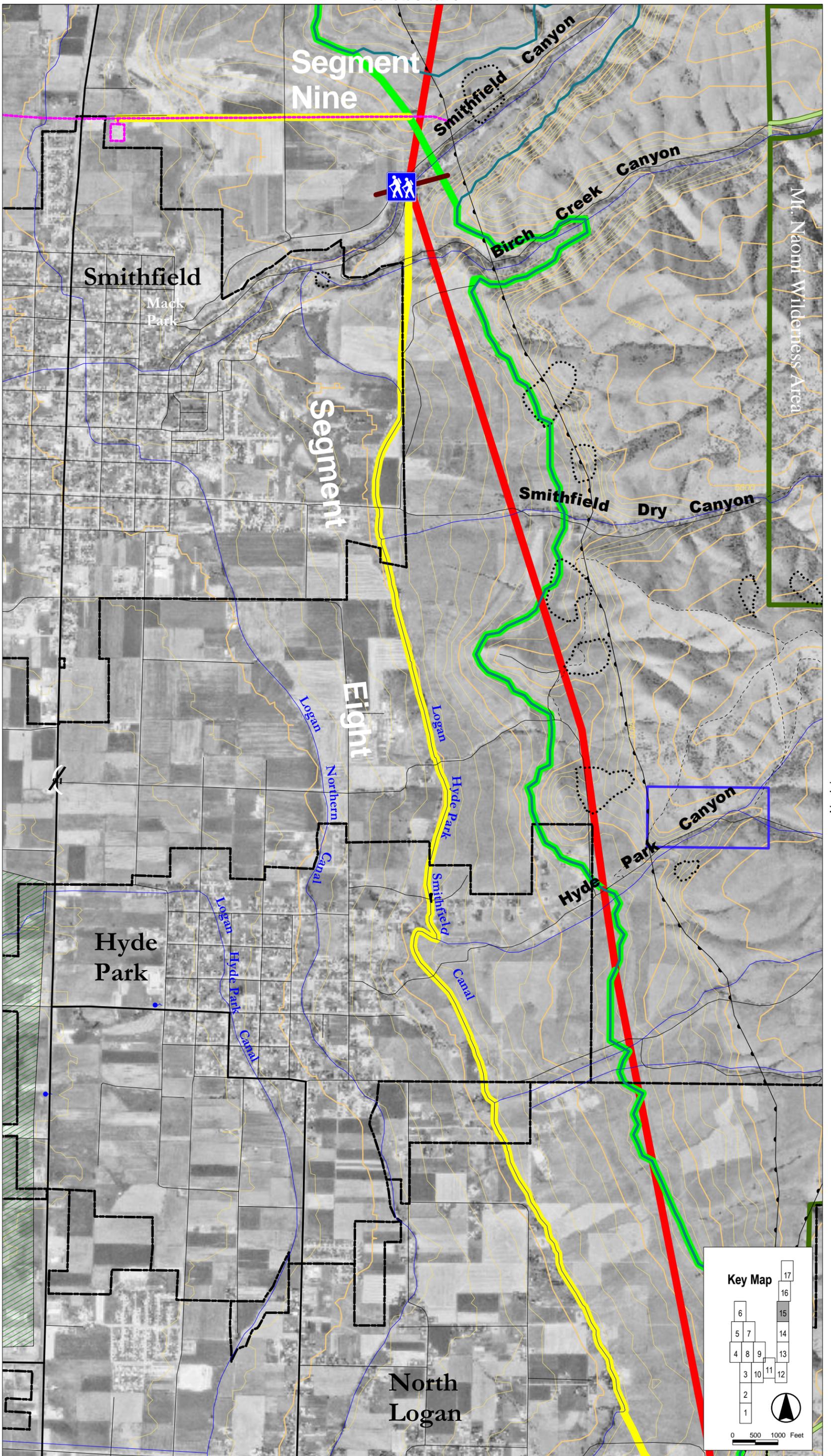
Should container plant propagation be considered for trail revegetation, there are local resources available. The UNPS Cache Chapter and USU Cache County Extension sponsor an annual workshop which has already trained dozens of community members in Utah native plant propagation techniques. These workshops, given suitable resources, could be expanded to provide plants for the BST in an affordable, community-based effort.



No Join

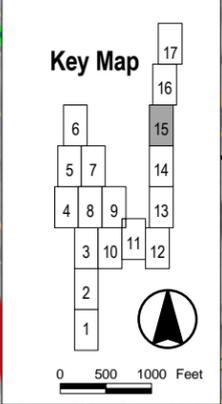


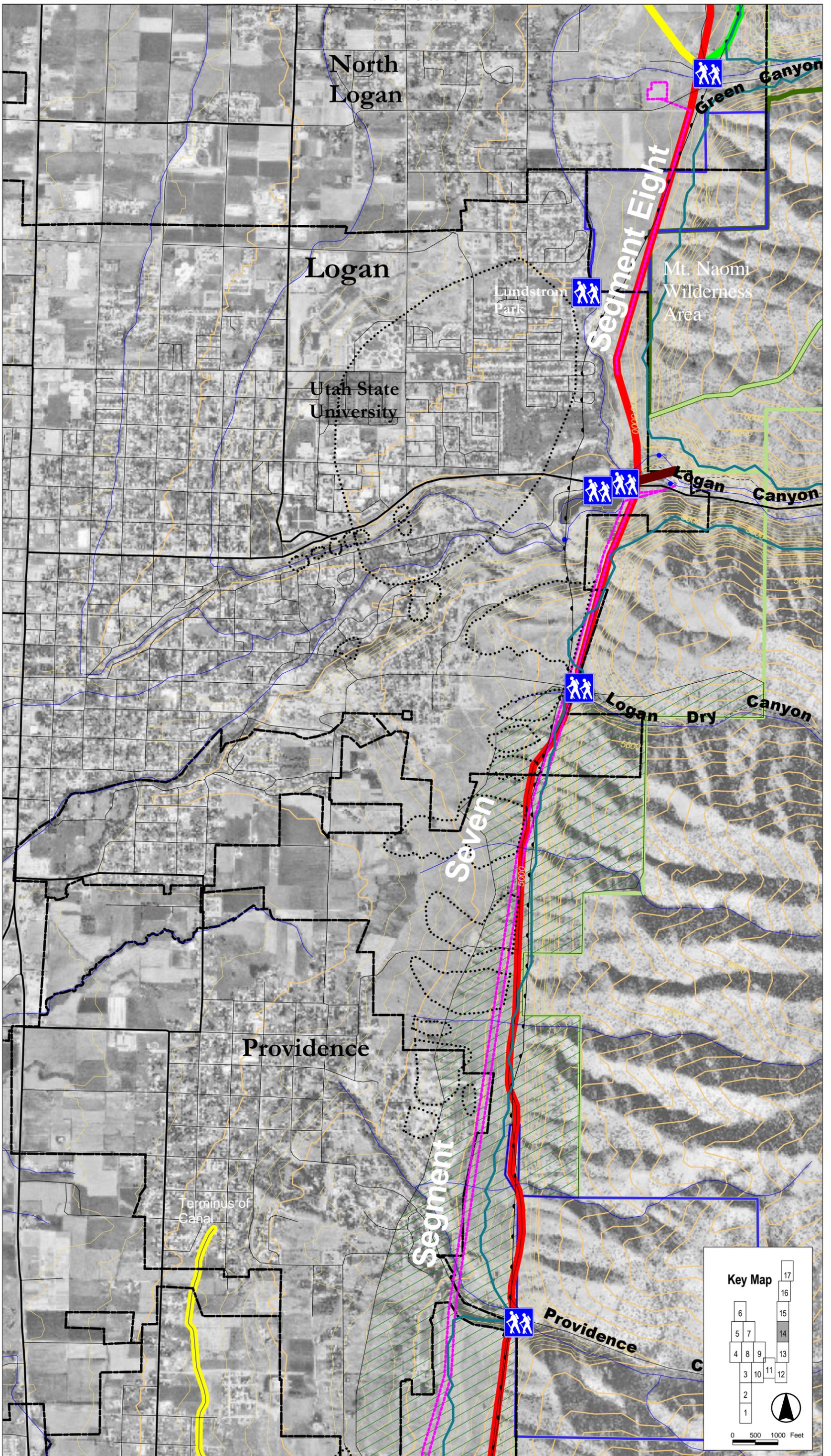
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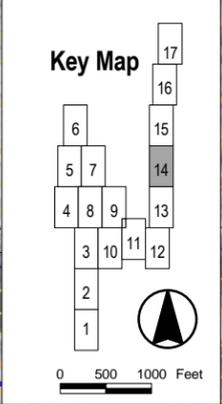
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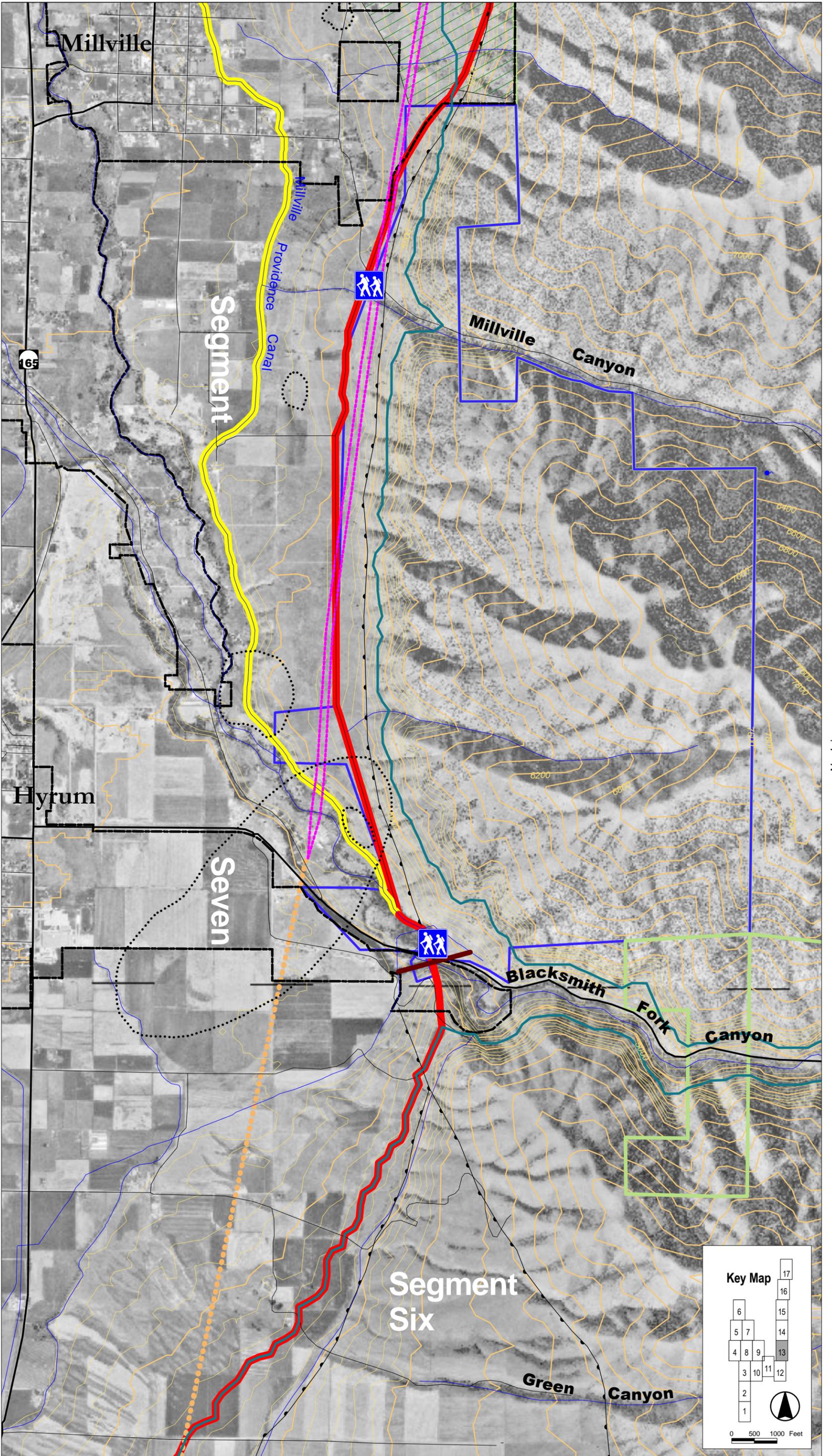




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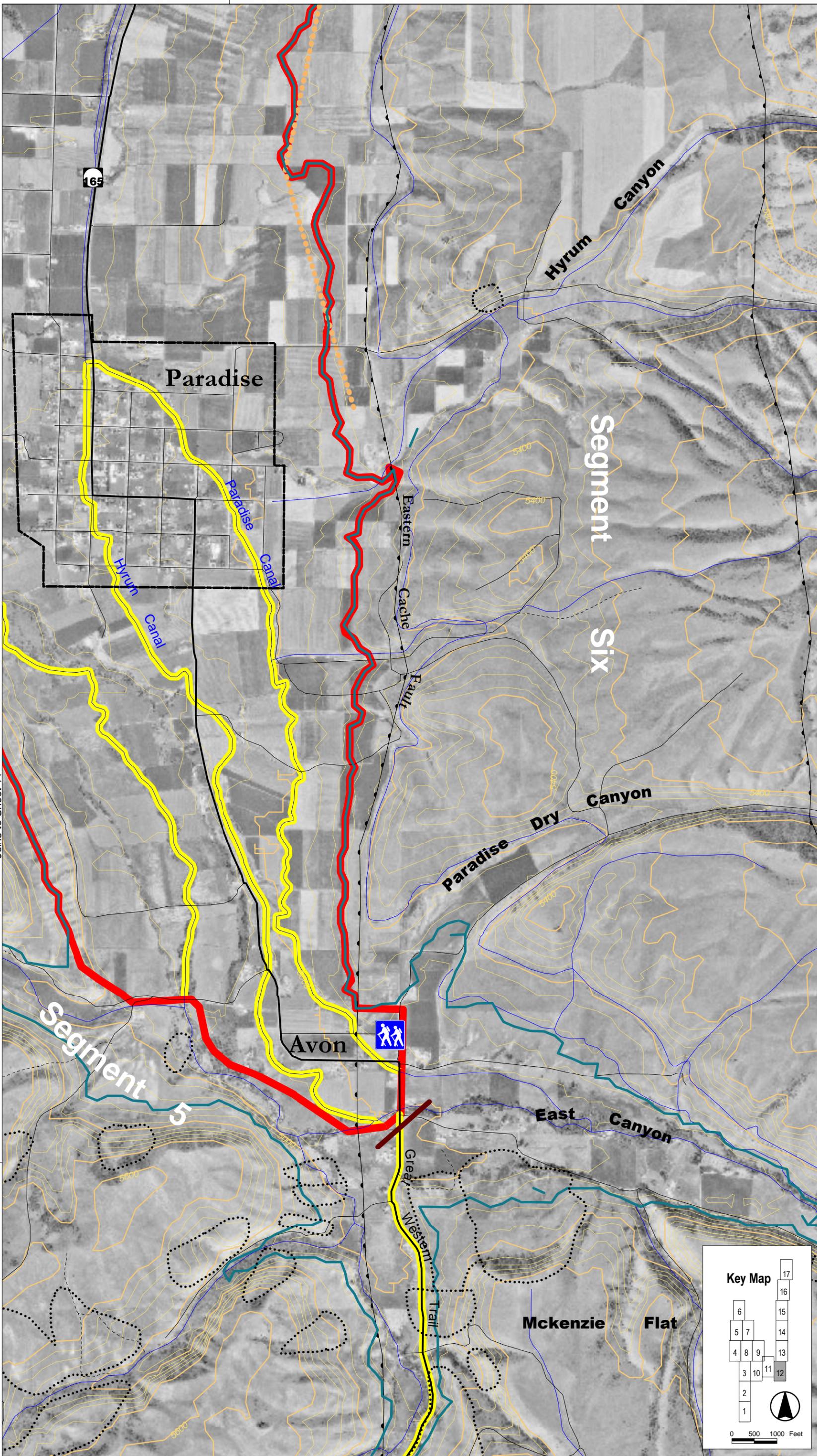
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No Join

No Join



Joins to Sheet 11

No Join

No Join

No Join

Joins to Sheet 9

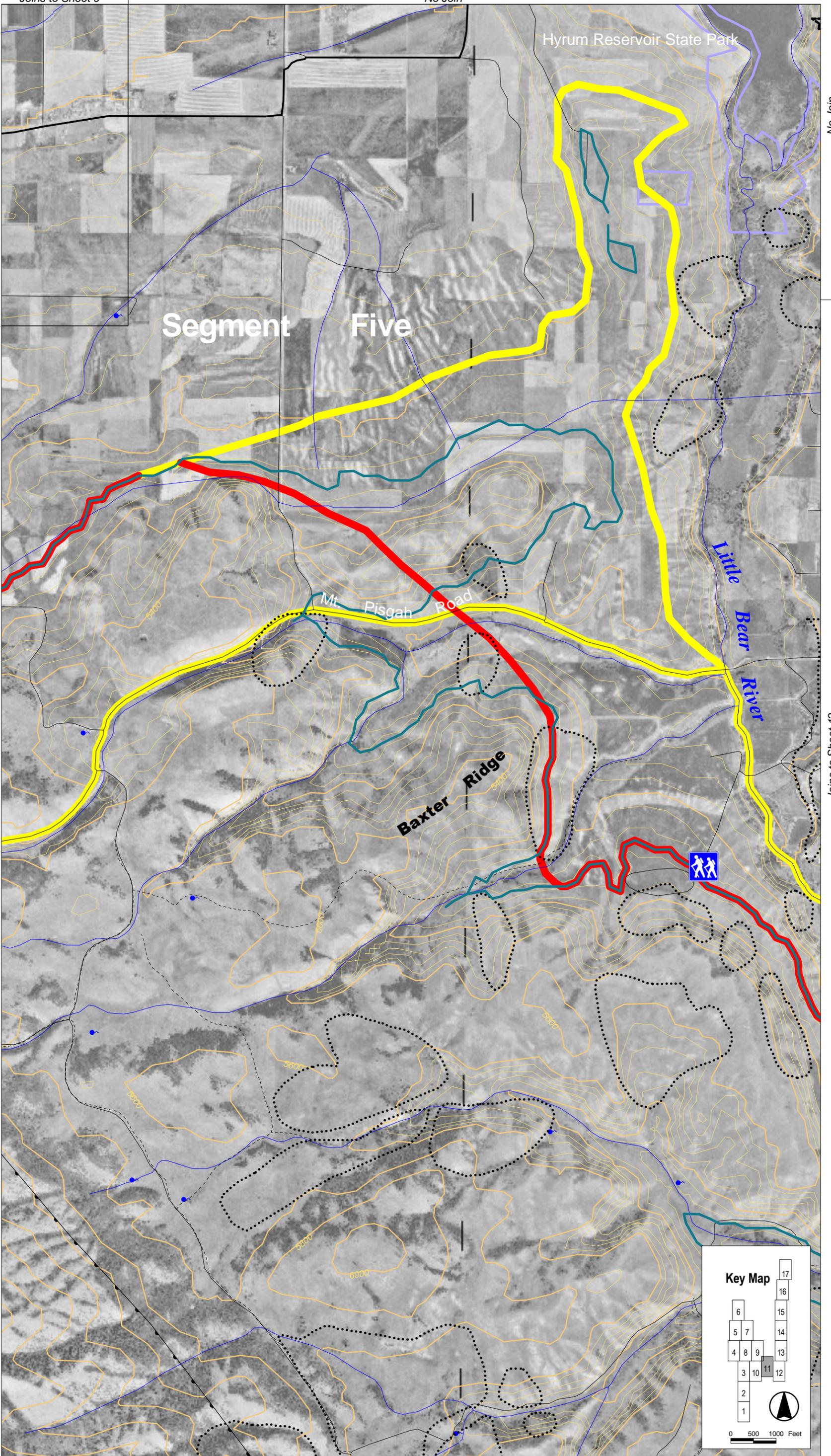
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Joins to Sheet 9

Joins to Sheet 10

No Join

Joins to Sheet 12



Hyrum Reservoir State Park

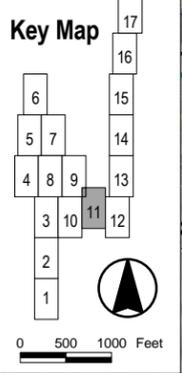
Segment Five

Mt. Pisgah Road

Baxter Ridge

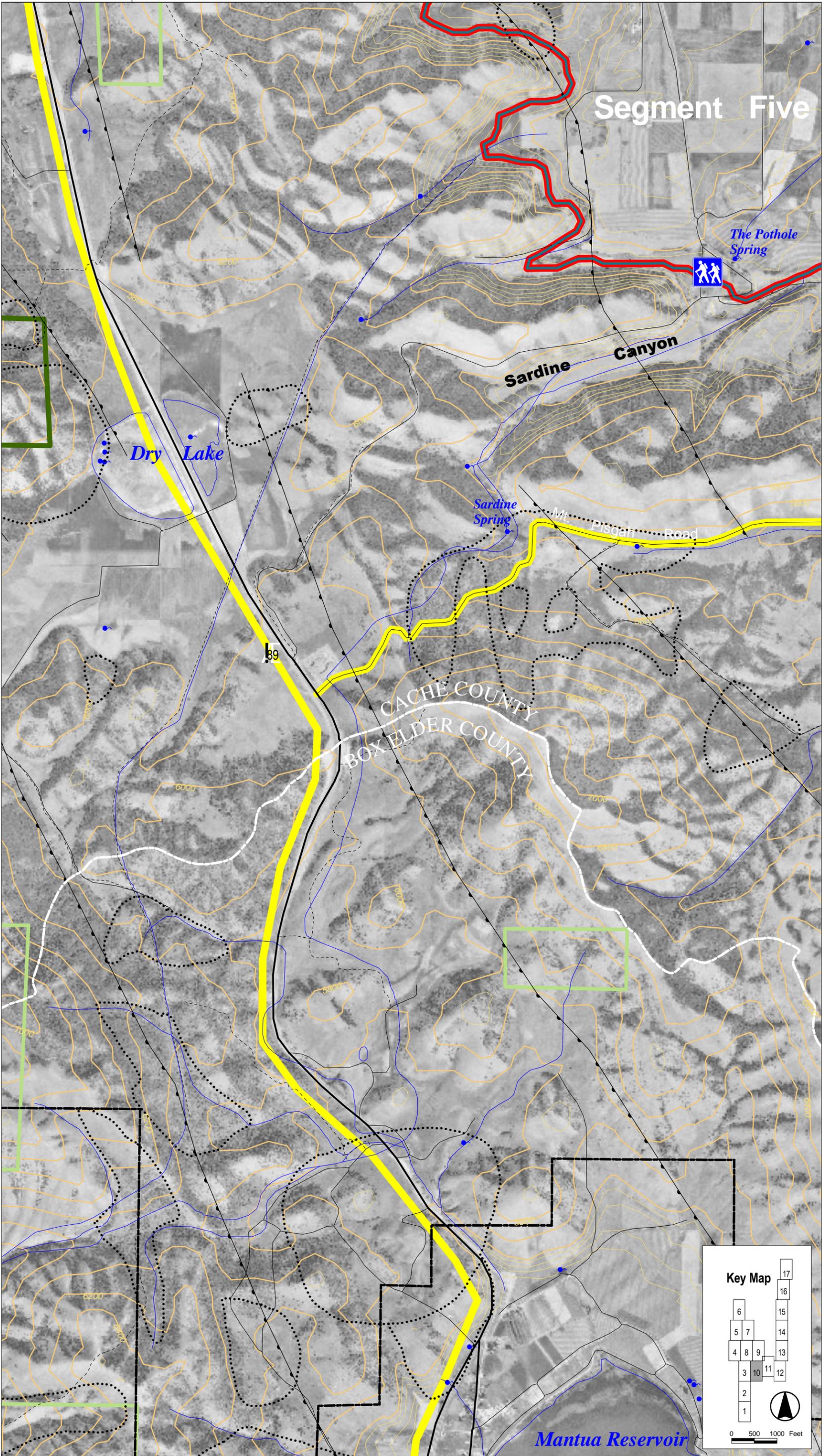
Little Bear River

Key Map



No Join

# Segment Five



Joins to Sheet 3

Joins to Sheet 11

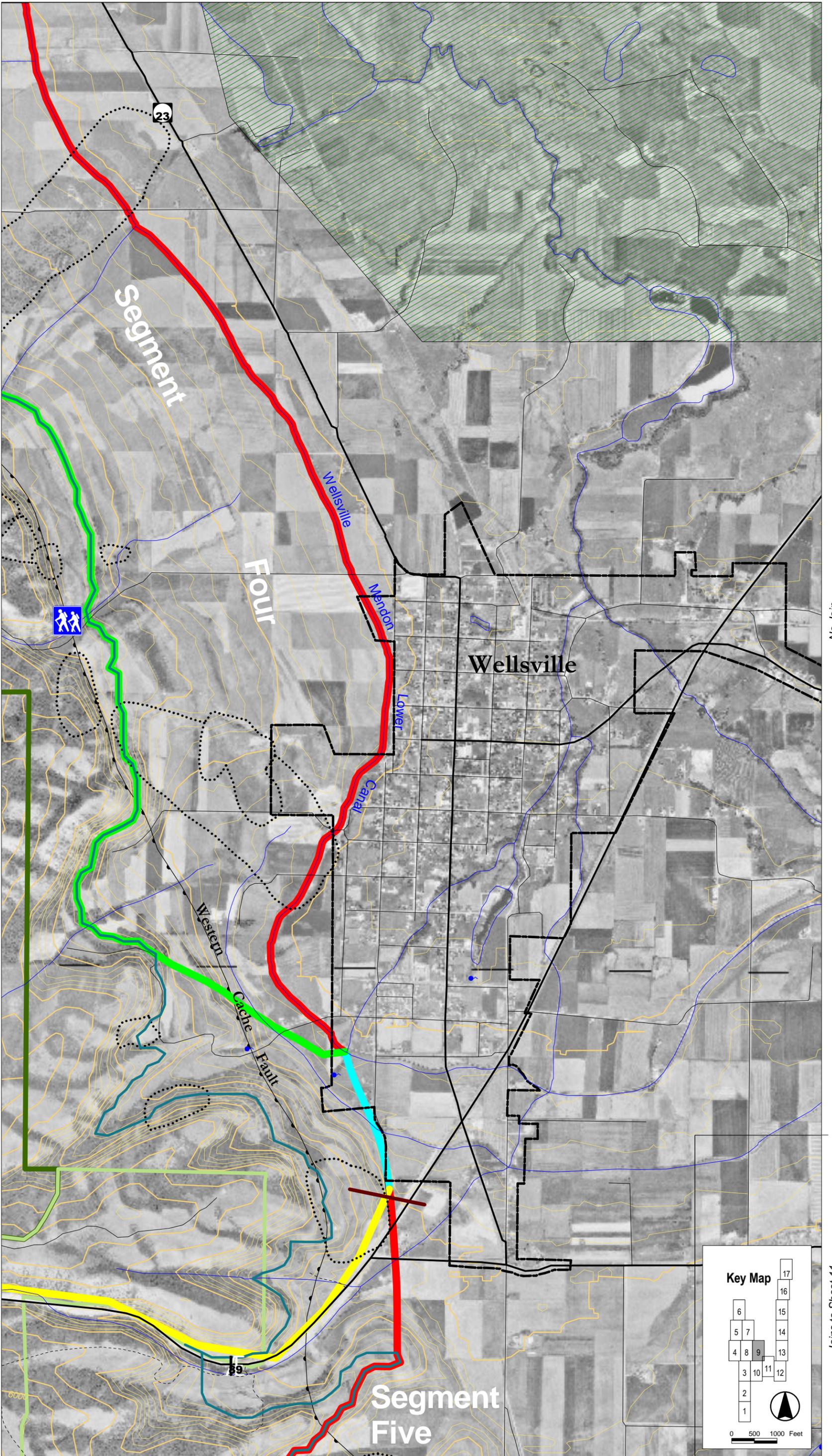
**Key Map**

				17
				16
6				15
5	7			14
4	8	9		13
	3	10	11	12
2				
1				

0 500 1000 Feet

No Join

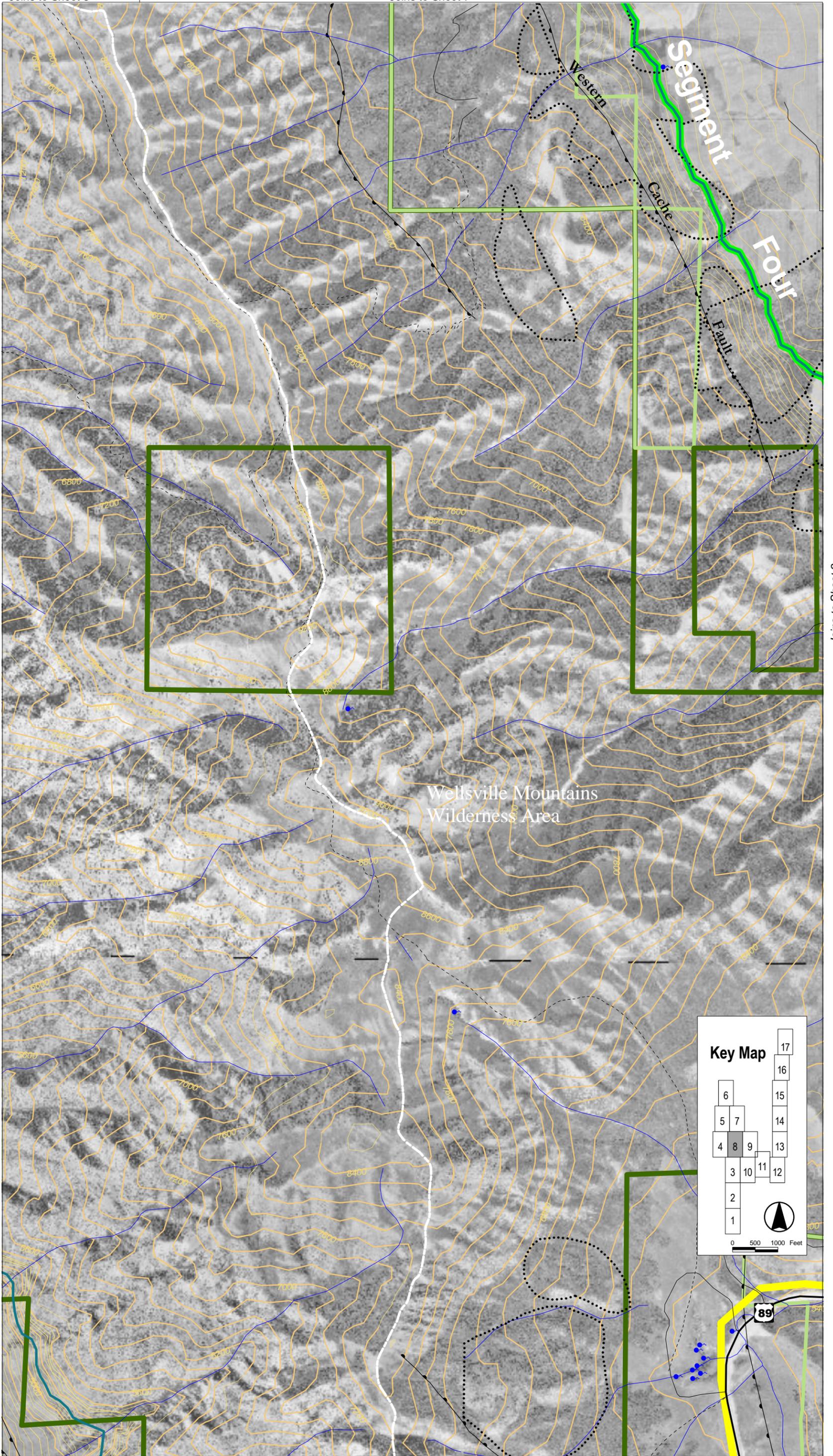
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Joins to Sheet 8

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Joins to Sheet 11

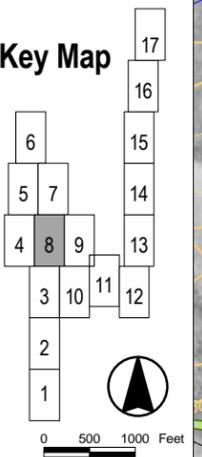


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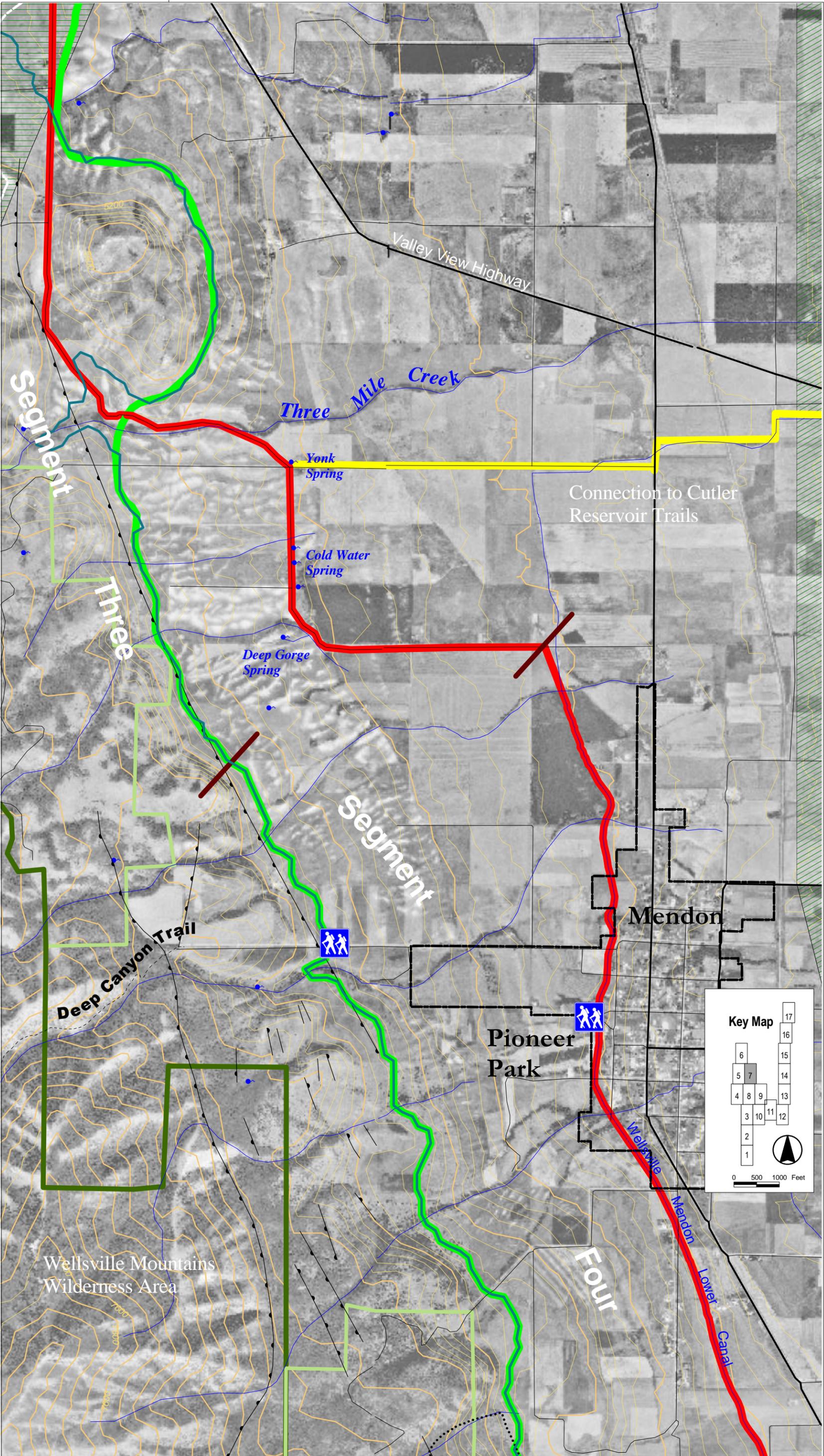
Joins to Sheet 9

Wellsville Mountains  
Wilderness Area

Key Map



89



Segment

Three

Three Mile Creek

Yonk Spring

Cold Water Spring

Deep Gorge Spring

Segment

Deep Canyon Trail

Pioneer Park

Mendon

Wellsville Mountains Wilderness Area

Four

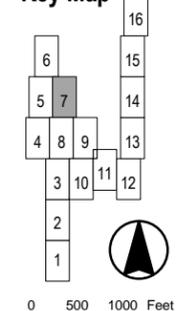
Wellsville Lower Canal

Mendon Lower Canal

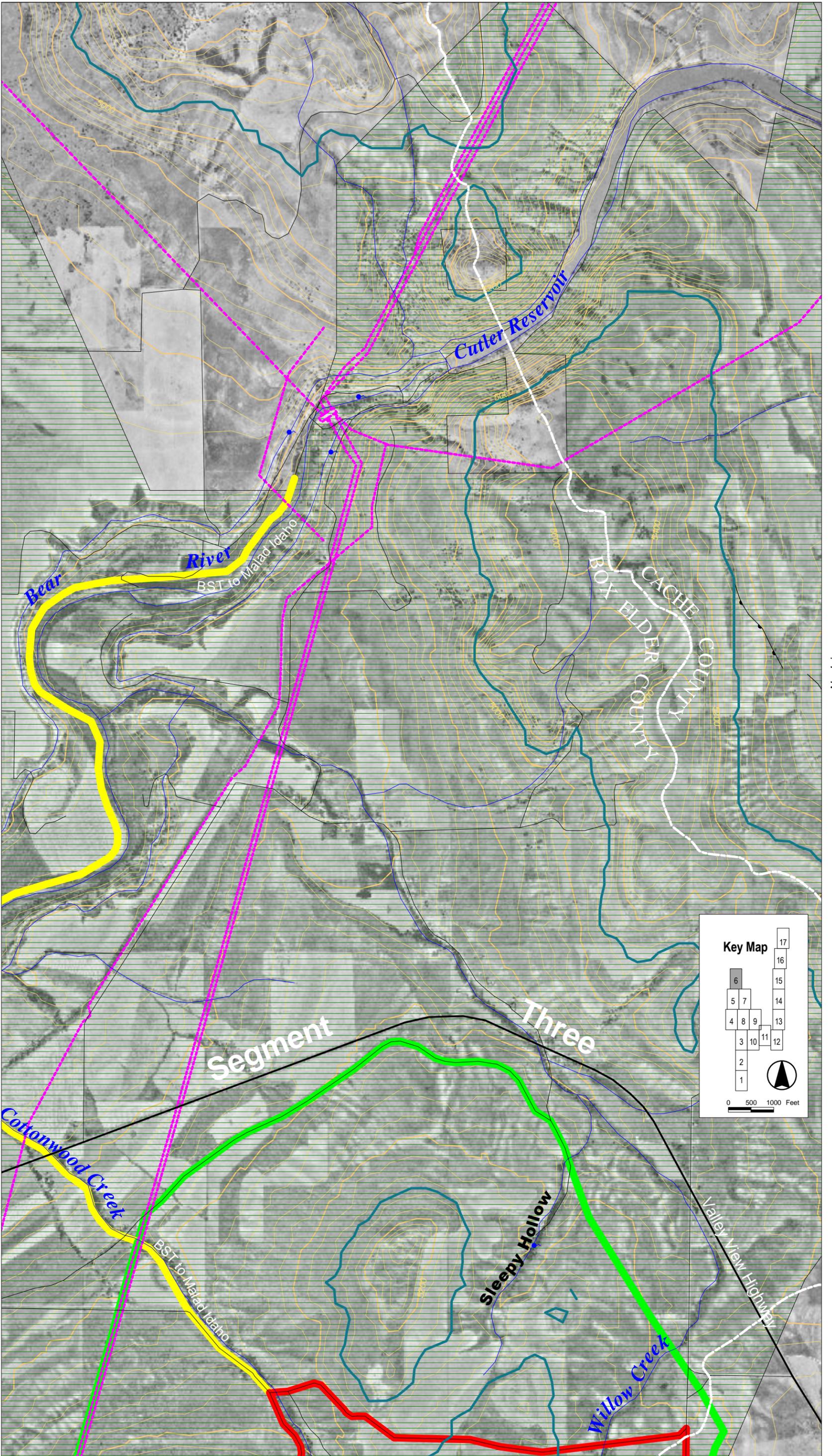
Valley View Highway

Connection to Cutler Reservoir Trails

Key Map



0 500 1000 Feet



Segment

Three

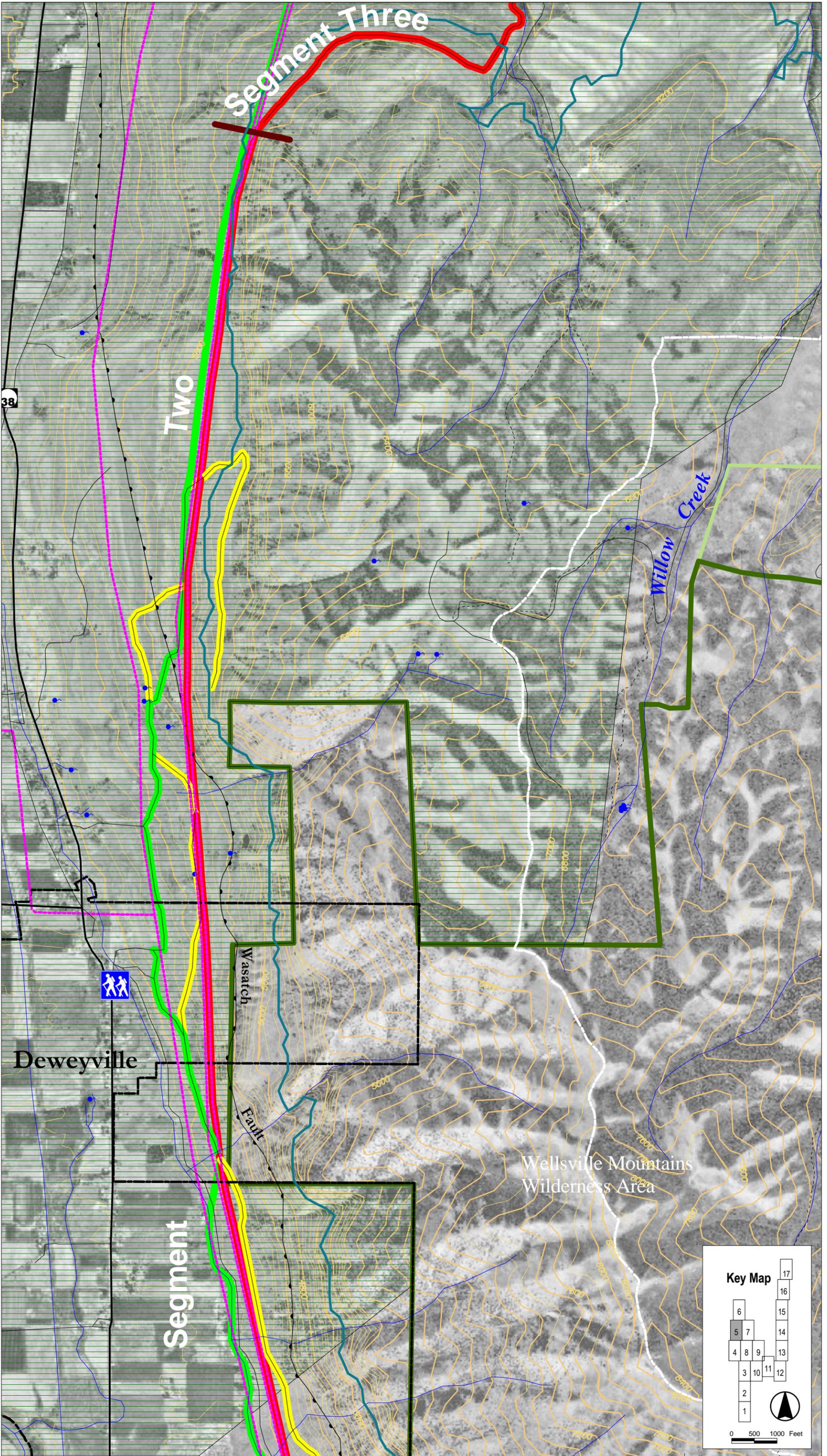
**Key Map**

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				16
6				15
5	7			14
4	8	9		13
	3	10	11	12
	2			
	1			

0 500 1000 Feet

No Joins

Joins to Sheet 7



Segment Three

Two

Segment

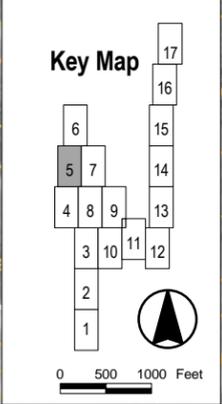
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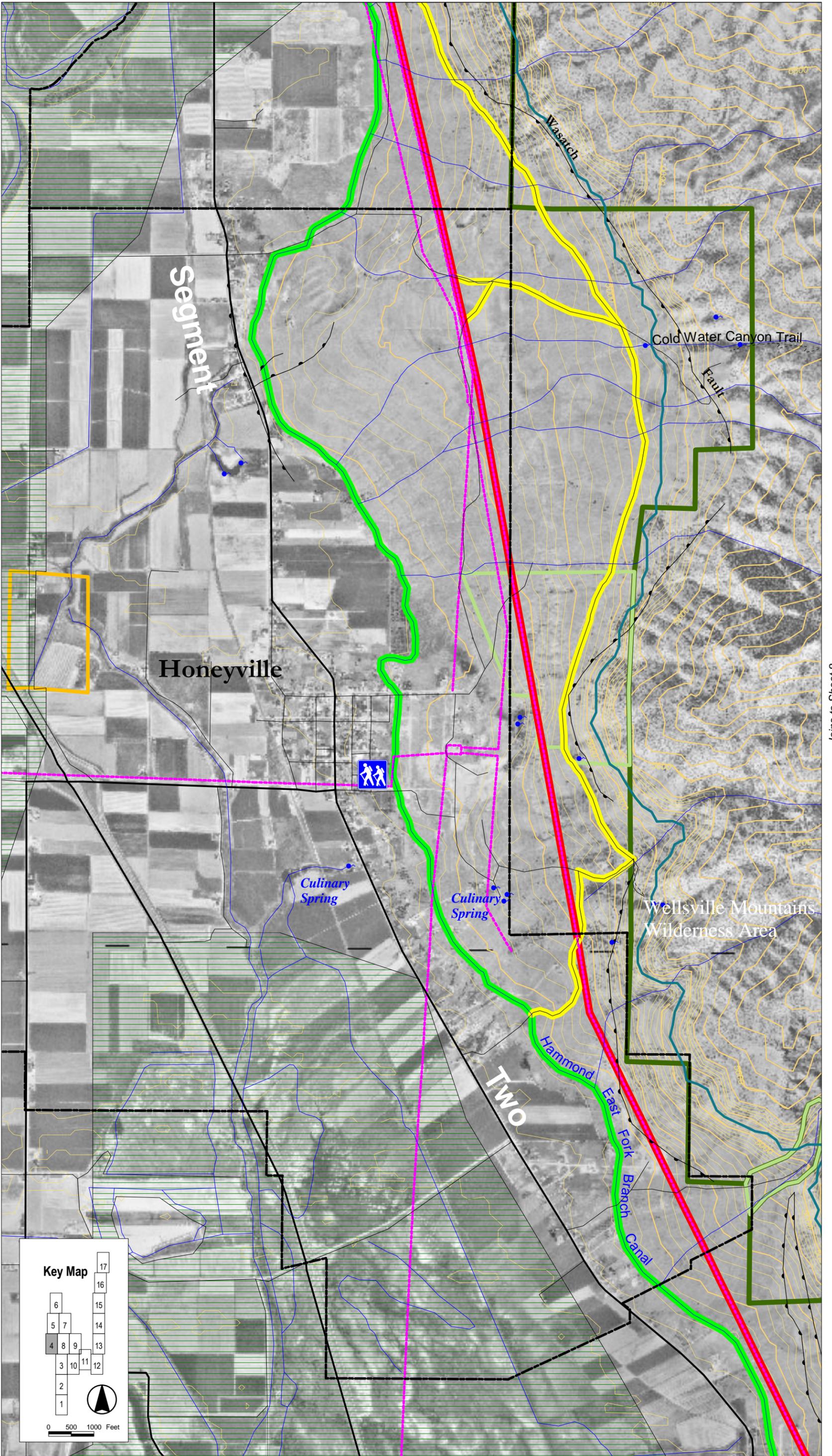
Deweyville

Wasatch  
Fault

Willow  
Creek

Wellsville Mountains  
Wilderness Area



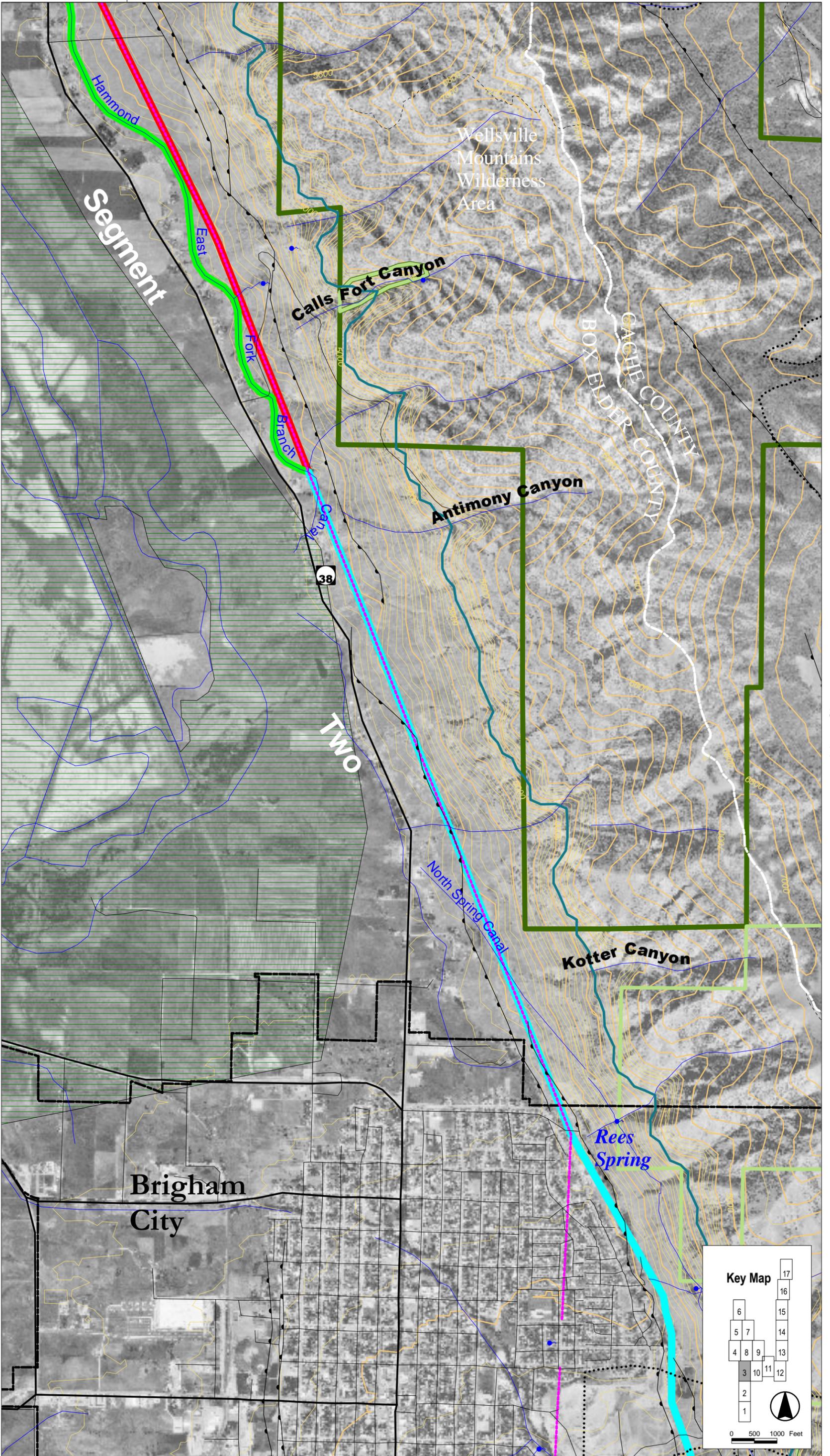


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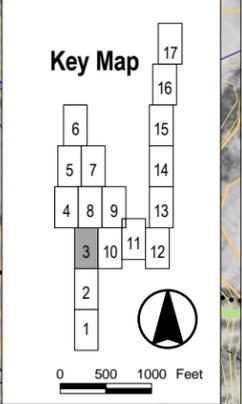
Joins to Sheet 3

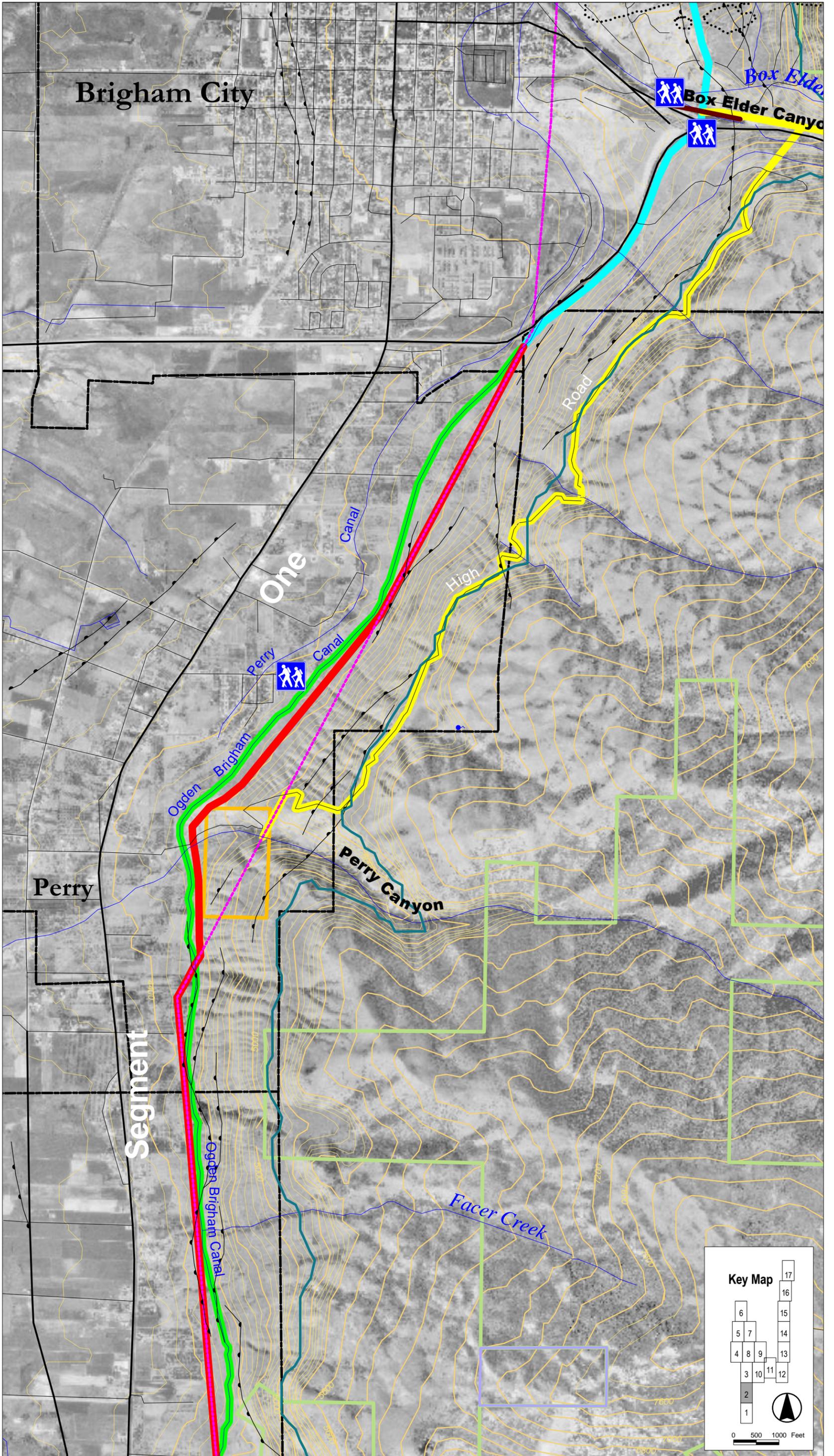
Joins to Sheet 8



No Join

Joins to Sheet 10





No Join

No Join

Brigham City

Box Elder Canyon

One

High

Road

Ogden Brigham Canal

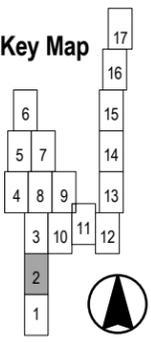
Perry Canyon

Perry

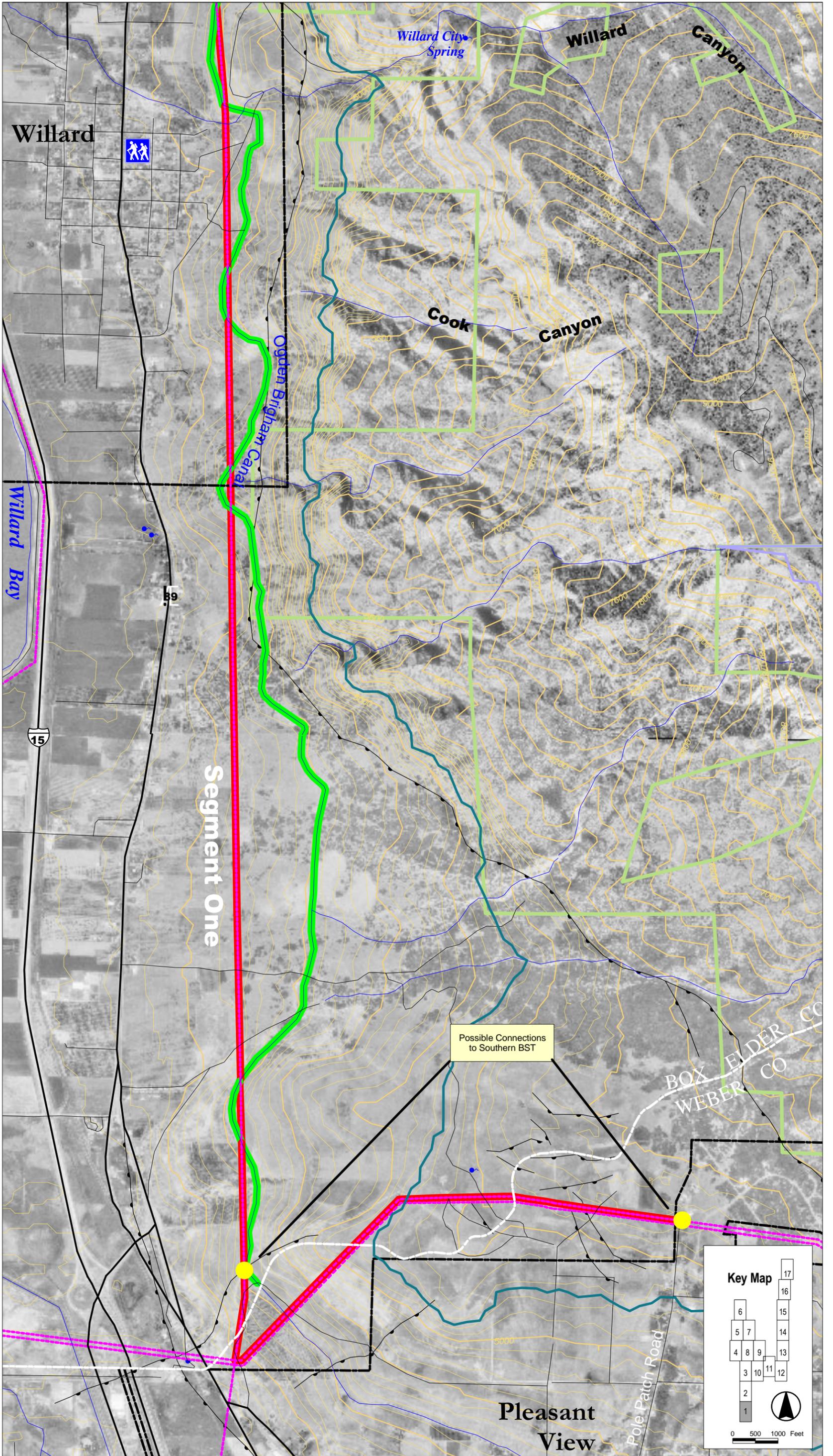
Segment

Facer Creek

Key Map



0 500 1000 Feet

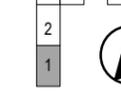
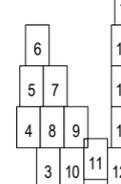


No Join

No Join

No Join

Key Map



0 500 1000 Feet

# Northern Bonneville Shoreline Trail Atlas

## Map Symbols

### Route Classification

-  Primary Highway
-  Secondary Road
-  Trail

### Route Marker

-  Interstate
-  State
-  US

-  Trailheads

-  County Boundaries
-  5100 Foot Contour Interval

-  Trail Segment Divider

-  Faults

-  City Boundaries

-  Streams and Canals

-  Utility Lines

-  Landslide Areas

-  Springs

## Legend

### Alternative Segment Alignments

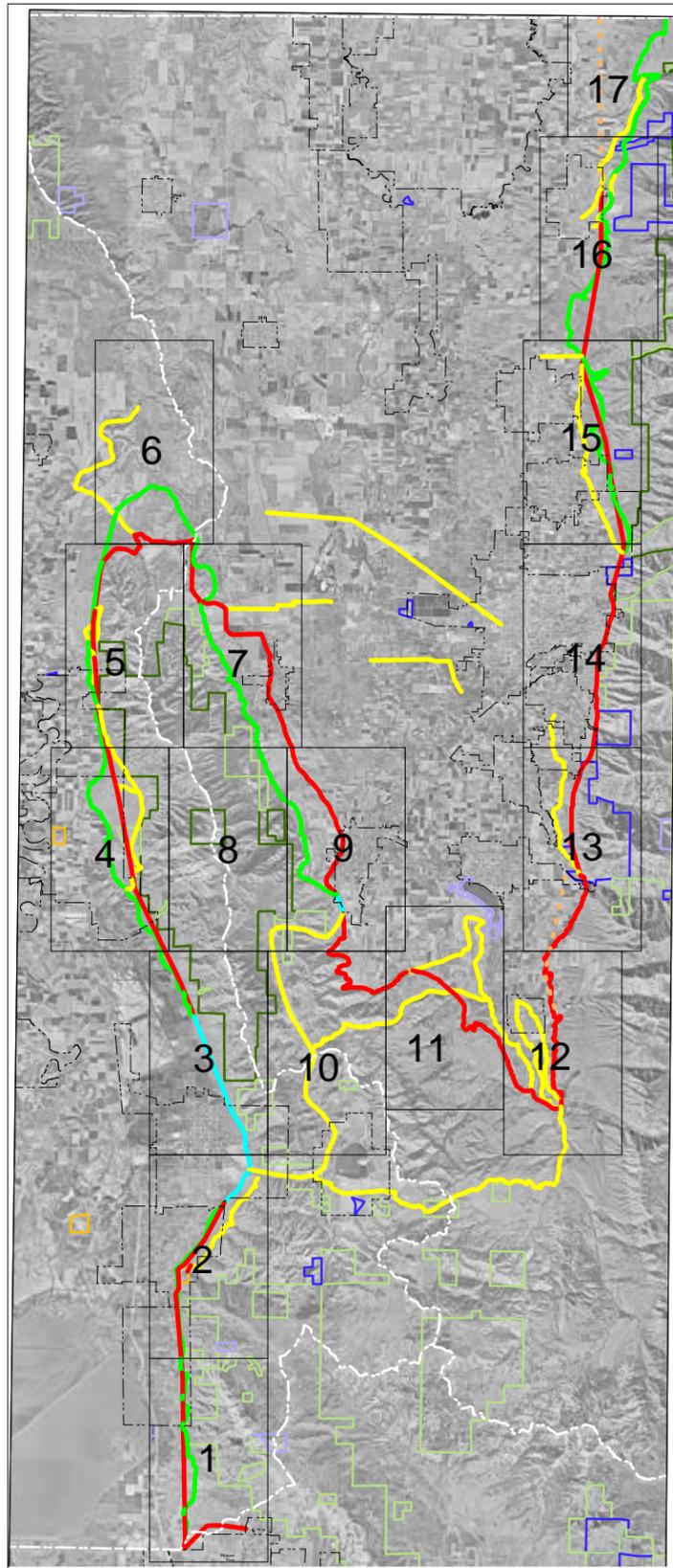
-  A
-  A & B
-  B
-  Approximate
-  Other

### Land Ownership Status

-  BLM
-  FOREST SERVICE
-  FS/ACQUIRED LAND
-  FS/BUREAU OF RECLAMATION
-  FS/PROTECTIVE WITHDRAWAL
-  STATE
-  STATE PARK/RECREATION AREA
-  STATE WILDLIFE RESERVES
-  STATE/FS
-  WILDERNESS AREA/FS

### Wildlife Habitat

-  Bear River Bay waterfowl marshes.
-  Critical deer and elk winter ranges. Surrounds Middle Fork WMA and Green Hills Conservation Easement. Rio Grande turkeys.
-  Cutler Marsh area and surrounding farmlands - important for waterbirds, songbirds, cranes, pheasants, and raptor migration.
-  Deer and elk normal and critical winter range.
-  Deer and elk normal and critical winter ranges. Surrounds Richmond WMA.
-  Duck clubs adjacent to Bear River Migratory Bird Refuge. Valuable wetland habitat for waterfowl and shorebirds.
-  Riparian corridors of the Malad River and the Bear River.
-  Sharp-tailed grouse, pheasants, and sage grouse; CRP lands. Limited entry deer unit.
-  Wetlands - waterfowl and shorebird habitat surrounding Harold Crane WMA and Willard Bay. Upland game areas. Pheasant habitat.



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Metadata:

Compiled in conjunction with BIO/WEST Inc.  
from AGRC 1:24,000 digital GIS data  
Atlas completed 1/15/02  
Projection: Universal Transverse Mercator  
Zone: 12  
Units: Meters  
Spheroid: Clarke 1866

No Join

