2011

Wasatch Back—Summit County Alternative Futures Study

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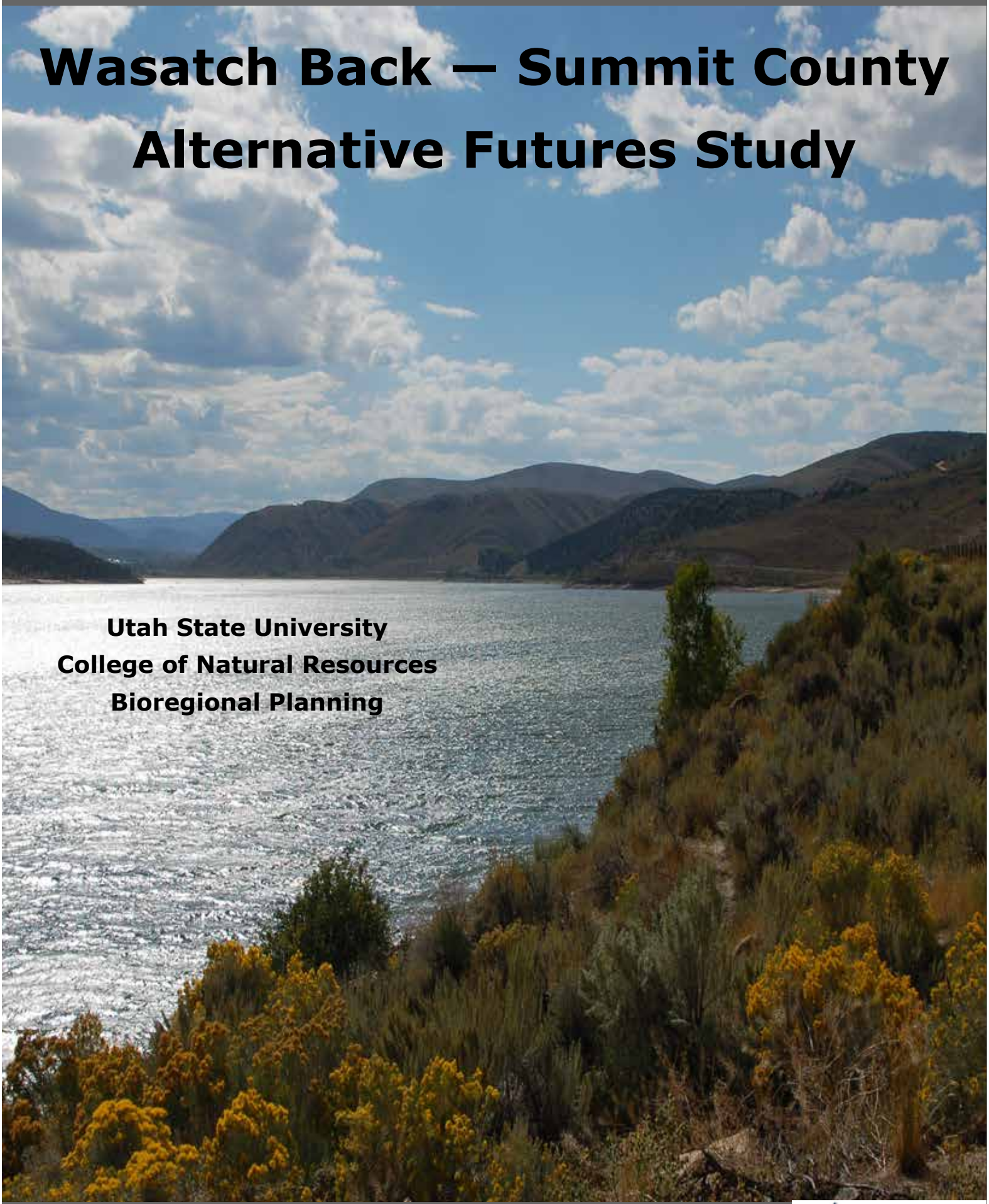

Utah State University
College of Natural Resources
Bioregional Planning

Title Page

Wasatch Back—Summit County Alternative Futures Study

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Cover Photo: Rockport Reservoir— © Martin Esplin

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The team would also like to give a special thanks to Robert Behunin, who was instrumental in obtaining the necessary financial support to carry out the project.

Jordanelle Reservoir

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Foreword

The Wasatch Back landscape is rapidly changing from one dominated by agricultural to one giving way to human development. This development is primarily residential in nature, including both permanent and seasonal housing. Over the past several years this rapid growth has caused concern among area residents as well as county officials with respect to its impact on quality-of-life issues for residents within the region.

The goal of the study was to explore a variety of alternative future scenarios for the region based upon the concerns and values of valley residents. The future scenarios and assessment models are recommended to local and regional stakeholders who will have the ultimate responsibility to determine the future cultural and ecological landscapes they desire.

The study had five major objectives: (1) to create a GIS database describing various biophysical characteristics of the study area. This database will consist of existing data sources from Summit County Planning staff, Utah AGRC, and other mapping units; (2) to carry out a series of stakeholder meetings in order to identify regionally-significant issues by valley residents. These issues help to prioritize the important landscape and development preferences in the future; (3) based on the issues identified in the second phase, various assessment models, scenarios, and alternative futures are considered to provide direction for future decision makers. These models represent various public values identified through stakeholder and prior public survey research (e.g., Envision Utah and Mountainland Association of Governments); (4) in concert with the alternative futures, the study team will also recommend various criteria to protect regionally significant critical lands, taking into account the general public health, welfare, and safety concerns of residents. It is anticipated that these lands will help to support the linkages between local and regional patterns of wildlife, agriculture, and wetland/river issues; (5) preparation of a final report summarizing the study to be presented in town meetings and other public forums in the region.

RET May, 2011

"The concept of the public welfare is broad and inclusive…the values it represents are spiritual as well as physical, aesthetic as well as monetary. It is within the power of the legislature to determine that the community should be beautiful as well as healthy, spacious as well as clean, well balanced as well as carefully patrolled."

Supreme Court Justice William O. Douglas (Berman vs. Parker *Power of Eminent Domain* 1954)

The study team used this statement as a guiding principle throughout the process. We believe that it is within the power of elected officials to determine what the "public welfare" is and to make applicable policy to maintain that welfare.

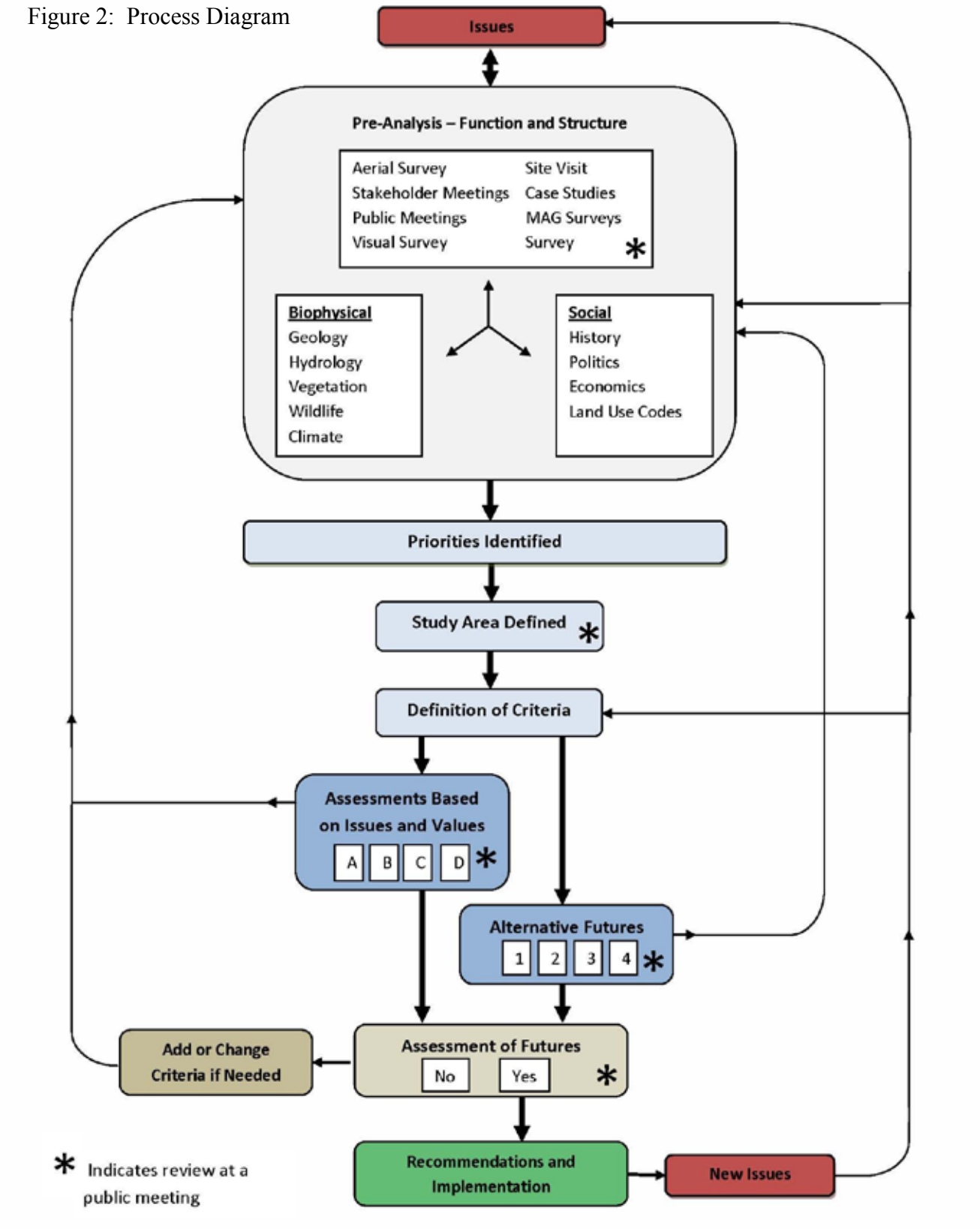
Study Team Aug, 2011

Study Area Map

Figure 1: Study Area Map

Methodology and Process

Figure 2: Process Diagram



Methodology

Planning issues which integrate human actions and the natural environment are dynamic and constantly changing. Information used in planning decisions must be current and able to undergo re-evaluation when new information is obtained, allowing decision makers to implement policy changes and make responsible informed decisions that secure the public health, safety, and general welfare of their region.

The methodology employed for this report captures the dynamics found within a complex system which integrates the interactions between human actions and the natural processes that sustain the environment. This method was adapted by the work of Richard E. Toth (1974). In this study, Toth "creates a system of evaluating potential planning decisions through a comprehensive biophysical, social, and economical framework, translated and analyzed spatially through mapping" (Toth, et al., pg. 6, 2006).

The process diagram in Figure 2 reflects the major and minor components of the methodology employed for this report. A strong understanding of this process is critical for decision makers to evaluate current goals and development pressures and re-evaluate future needs of their region. The process, at first glance, may seem to be linear; however, feedback loops are strategically placed to allow re-evaluation when new information brings new issues or goals to the surface. Furthermore, many of the steps in the diagram, although depicted in a linear fashion, are done concurrently. Six major phases within the method are as follows:

- Pre-analysis
- Function and Structure Research
- Study Area Inventory and Analysis
- Assessment Models and Alternative Futures
- Evaluation of Futures
- Recommendations and Conclusion

Each of these sections is briefly summarized here, but a more detailed discussion can be found throughout the report.

Pre-analysis

Pre-analysis of the project area included several field trips, including an aerial survey of the study area in a light aircraft, a review of case studies addressing the many issues found in regional planning and analysis at this scale, and stakeholder meetings to identify key issues in the study area.

Function and Structure Research

A critical element of the method is defining the key issues which impact the watershed and political boundaries of the area. Therefore, the study team underwent a function and structure analysis of the interactions between biological and physical elements found within the study area.

Study Area Inventory and Analysis

Given the political environment of the study area, the study team wanted to ensure the key issues defined were aligned and defined by the stakeholders. Therefore, the study team initiated both written and visual exercises with stakeholders. The results of these exercises proved to be critical in the identification of key issues and the driving factors behind these issues, defining the study area boundary, and defining the necessary criteria used to develop the models.

Methodology

Assessment Models and Alternative Futures

The study team used the Geographic Information Systems (GIS) computer program, Arc GIS, to develop assessment and alternative future models aligned with the key issues which were identified by stakeholders. "The assessment models serve two functions. They not only provide a foundation for developing alternative futures, but they are also useful in evaluating the potential impacts of each alternative future." (Toth, et al., pg. 30, 2006).

Alternative futures are spatial representations of what the study area may look like under different assumptions identified in stakeholder meetings and surveys.

Evaluation of Futures

Evaluation of the alternative future models from any source provides planners and policy makers tools to make informed decisions for future development within the study region. These evaluations can demonstrate which alternative futures sustain, improve, or degrade the study region.

Recommendations and Conclusions

In this section team members recommend key aspects that may assist policy makers to balance the needs of residents, which contribute to their general welfare. Implementation strategies may also be discussed in this section of the report.

Valley near Echo, UT

Pre-analysis

The initial steps of the 2010-2011 Bioregional Planning studio project included various pre-analysis activities to increase our knowledge and understanding of the Upper and Lower Weber River Basin Watershed region. This initial phase of the method was important as it provided our understanding of the issues the watershed is facing and the development impacts the area has had in the past.

The pre-analysis included four major components: field trips, project opinion papers, case studies, and guest lectures.

Field Trips

The first trip was a day trip, which included visits of western Summit County beginning with the Coalville courthouse, and major reservoirs like Echo, Jordanelle, Rockport, and Smith and Morehouse. In addition, the study team visited eastern Summit County. The sites visited included the Swaner Preserve, Jeremy Ranch, and a visit to historic Park City. While in Park City, we also met with representatives of the Park City planning office.

This trip was instrumental in providing a preliminary overview of the culture and history of the region. Land use and development patterns were also noted and photographed at this time from the ground.

An aerial survey trip followed after the first trip taken by the team. The flight enhanced the study team's understanding of landscape scale by providing an opportunity to see natural and human land-

Study team from left to right: Martin Esplin, Richard Toth, Tamara Wright, Temis Taylor and Kyle Young

Pre-analysis

scape patterns which could not be observed at ground level.

Stakeholder Meetings

The necessity to identify issues and concerns of stakeholders required a number of public meetings. These meetings were set up to communicate with stakeholders and residents about their concerns for the future. The meetings provided a feedback loop between the study team and the planning staff in the region.

Five other stakeholder meetings were held to communicate the progress and status of the work to stakeholders and residents. These meetings provided important information, which gave added direction to the study.

Case Studies

Case studies provide an introduction to other methodologies used in regional planning and analysis. The case studies reviewed are as follows:

Early Planning Projects:

- *The Plan and Program for the Brandywine* (Keene & Strong, 1968)
- *Design with Nature* (McHarg, 1969)
- *Honeyhill: A Systems Analysis for Planning the Multiple Use of Controlled Water Areas for U.S. Army Engineer* (Murray, et al., 1971)

Recent Planning Projects:

- *Biodiversity and Landscape Planning: Alternative Futures for the Region for Camp Pendleton, California* (Steinitz, et al, 1995)

Public meeting in Summit County © Richard E. Toth

Pre-analysis

- *Alternative Futures for Utah's Wasatch Front: Conservation of Open Space* (Toth, et al., 2002)
- *The Willamette River Basin Planning Atlas: Trajectories of Environmental and Ecological Change* (Hulse, et al., 2002)

Project Opinion Papers

Following the field trip, aerial survey, and review of the case studies, each team member was required to write a project opinion paper. This activity provided each team member an opportunity to discuss the 2010-2011 studio project from their own observations of the study area.

Guest Lectures

Guest lecturers were invited throughout the semester while working through the pre-analysis exercises. Selected experts and other noteworthy planning professionals were invited to discuss current planning issues and their various approaches to resolve them, as well as USU guest lecturers. In addition, a representative with Weber River Water Conservancy District spoke with us about the growing concerns of water quantity and quality within the region. Other experts gave valuable insight to the watershed issues within the study area. Dr. Carl Steinitz's work with visual preference studies was readily adopted by the study team and implemented into the study. His recent work with Telluride, Colorado was very similar to this study in relation to scale and scope. (Flaxman et al. 2010)

Guest lecture by Dr. Fee Busby © Richard E. Toth

Function and Structure

Hydrology

Weber River

The Weber River is a major contributor of surface water to the Great Salt Lake. This river is 125 miles long, and more than half of it lies within Summit County. "The Weber River begins in Summit County, Utah, near Reids Peak (11,708 ft), flows west to Oakley, Utah, and then turns and flows in a northwesterly direction to the Great Salt Lake" (University of Utah, 2004).

There are two major reservoirs on the Weber River: the Echo and Rockport Reservoirs. Two additional reservoirs which influence the study region are the Smith/Morehouse, and Jordanelle. The Weber River Basin's major tributaries are Echo Creek, Chalk Creek, Silver Creek, and Beaver Creek.

Rockport Reservoir

This reservoir lies halfway between two incorporated cities in Eastern Summit County: Kamas and Coalville. Rockport is 16,368 feet long and 4,000 feet wide. Its volume capacity is 75,730 acre-feet (Judd, 1997). Rockport provides recreation, irrigation, and culinary water needs. Currently the distribution of water is 75% irrigation and 25% culinary (Judd, 1997). This distribution has the potential to change when development pressure converts agriculture use to residential and/or commercial use.


Rockport Res. © Martin Esplin

Echo Reservoir

Echo Reservoir is located "south of Echo Junction on the Weber River (Judd, 1997). Echo is 4.28 miles long and .76 miles wide. It has a volume capacity of 156,000 acre-feet. Echo also provides recreation, irrigation, and culinary water needs. It is important to note that its primary use is irrigation.


Echo Res. © Martin Esplin

Smith and Morehouse Reservoir

Smith and Morehouse Reservoir is in the upper reaches of the Weber River drainage in the western High Uintas (Judd, 1997). In 1987, the reservoir capacity quintupled. It measures 3,199 feet in length and has a width of 810 feet. This brings the volume capacity to 1,360 acre/feet

Function and Structure


Smith and Morehouse Res. © Martin Esplin

(Judd, 1997). This reservoir also provides recreation, irrigation, and culinary water needs. Although in contrast to Echo and Rockport, a higher percentage of the water use is for culinary due to the increase of population in the Wasatch Front (Judd, 1997).

Jordanelle Reservoir

The Jordanelle Reservoir was recently constructed in 1993, and is "located on the Provo River about six miles north of Heber City" (Judd, 1997). This reservoir measures 10.8 miles in length, with a width of 1.0 miles. The carrying capacity of this impounded water is 360,500 acre/feet. The unique and easily accessible reservoir provides for heavy recreation use. Water demands range from culinary and irrigation use to flood control and municipal and industrial uses as well.


Jordanelle Res. © Martin Esplin

Rivers and Streams

Rivers and streams are characterized as being an open systems with a continuous flow in one direction. They have an ability to change volume and velocity depending on levels that fluctuate with the direct and indirect impacts of surface water. They exhibit little stratification, and maintain a continuous turbulence (Gutting, Houghten, & Snyder, 1979).

Wetlands

The National Park Service U.S. Department of the Interior define wetlands as "transitional areas between land and water bodies, where water periodically floods land and saturates the soil" (National Park Service U.S. Department of the Interior, 2003). The U.S. Fish and Wildlife Services also state they are **"**semi-aquatic lands saturated by water for varying periods of time during the growing season.

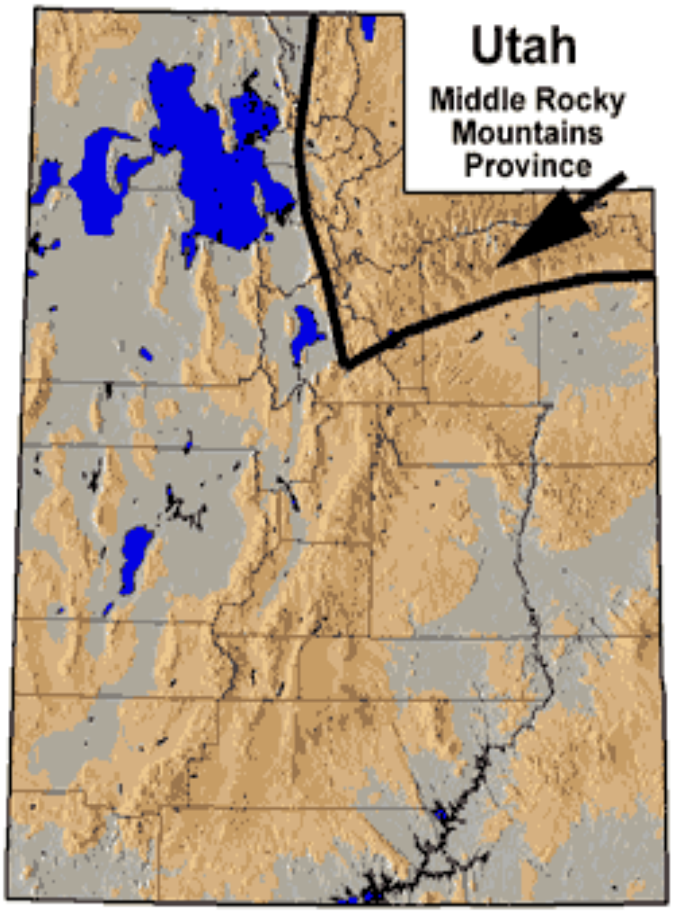
They are characterized by hydrophilic plants, and periodically saturated or flooded (hydric) soil." U.S. Fish and Wildlife Services further states four purposes for wetlands: first, they provide critical habitat for fish and wildlife; second, they shelter the destructive forces of floods and storms; third, they cleanse polluted waters; and finally, provide for a variety of recreational activities.

Geology

Figure 3 indicates the study region falls within the Middle Rocky Mountains Province. The characteristics of this province are "mountainous terrain, stream valleys, and alluvial basins" (Geology Prov-

ince, website). The Wasatch and Uinta mountain ranges lie within this province. "The Wasatch Range is a north/south running tilted fault block consisting of an unusual assemblage of sedimentary igneous, and metamorphic rocks (Stokes, 1986). The steep slopes, sharp ridges, and numerous rockslides indicate that the range is relatively young (Chronic, 1990). The Uinta Range, which runs east/west, in an anticline practically devoid of igneous rocks (Stokes, 1986). These two ranges intersect near Park City, making the geology of the area very complex" (Toth, et.al, 2004, pg. 12)

Figure 3: Middle Rocky Mountain Province

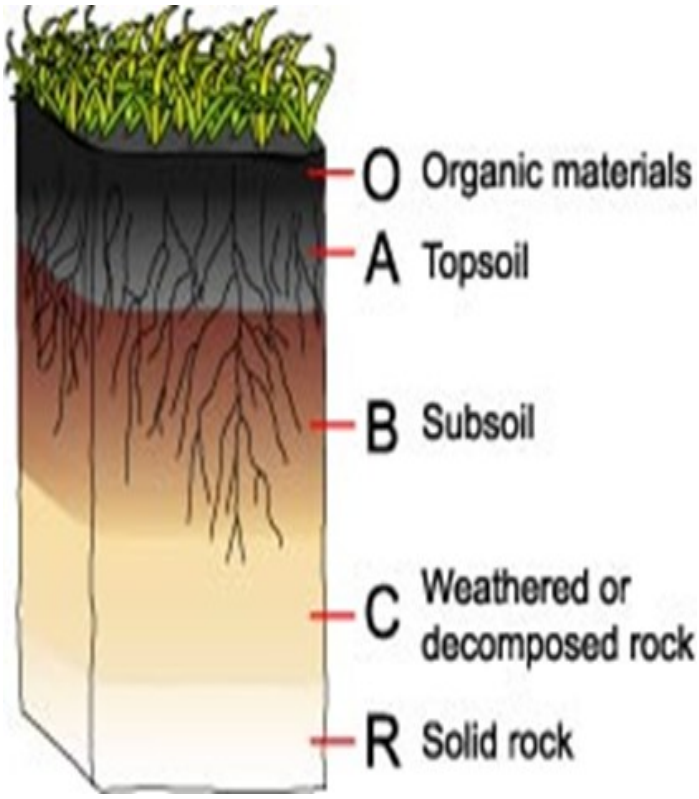


Soils

Soils are defined as the unconsolidated mineral and organic matter on the earth's surface that is the natural medium for the growth of land plants. Soil supports plants, filters water, and recycles waste. Soils contain distinct layers called horizons. Figure 5 depicts a soil profile with its five horizons.

Three dominant soil types were identified within the study region for crop production and development. The following discussion gives a brief overview of each type.

Figure 4: Soil profile (westone.wa.gov.au)



Function and Structure

Mollisols

Figure 5: Mollisols

This type of soil is the dominant soil order within the study region. "These are dark, soft soils with a high natural fertility. The major factor contributing to the formation of most mollisols is the accumulation of rich organic matter." (Kenczka, pg. 23-24, 2009).

They are considered to be productive soils within agricultural land uses. "Mollisols are also characterized by a soft to slightly hard granular structure which makes for good agriculture when combined with its fertile organic matter" (Toth et al., pg. 17, 2006)

Alfisols

Figure 6: Alfisols

Located within the study region, these "strongly weathered soils were formed in humid environments that led to their development under native deciduous forests. These forest soils have a clay-rich horizon resulting in a high natural fertility (Kenczka, pg. 22, 2009). "Alfisols are highly alkaline due to the nature of their creation and are predominantly vegetated by salt-tolerant shrubs and grasses" (Toth et al., pg. 17, 2006)

Inceptisols

Figure 7: Inceptisols

"Inceptisols have a wide range of characteristics and can occur in a wide range of areas, from semi-arid to humid environments. One common trait is that they are only moderately developed. They are often found on fairly steep slopes, young geomorphic surfaces, and on resistant parent materials" (Toth, pg. 17, 2006)

Function and Structure

Wildlife

Wildlife provides economic, aesthetic, and recreational benefits to residents and visitors of Summit County. This area has seen significant development which has contributed to the decline of native plant species and the introduction of invasive species within the region. (Sutter et al., 2005).

The Utah Division of Wildlife Resources has assessed the conservation need for declining species. They were identified by, "examining species biology and life history, populations, distribution, and threats" (NRCS, pg. 15, 2005). Within the study region, the following species are federally listed as endangered or threatened: Black-footed Ferret, Bald Eagle, Canada Lynx, and Brown (Grizzly) Bear. On the Utah State list for conservation efforts are the following species: Columbia Spotted Frog, Northern Goshawk, Bonnneville Cutthroat Trout, Colorado River Cutthroat Trout, and Bluehead Sucker. There are many other species within the study region that are classified as "species of concern" (NRCS, pg. 15, 2005).

Habitat

Habitat is defined as the "place where a plant or animal lives" (Smith & Smith, 2006) There are certain areas which are preferred by certain organisms or on a larger scale. Habitat selection is the "response of individuals of a species involving certain environmental cues used to choose a potentially suitable environment" (Smith and Smith, 2006). Some of the cues involved may be amount of precipitation, temperature, amount of available sunlight, soil type, elevation, and other factors depending on the organism's specific needs.

Fragmentation is the "reduction of a large habitat area into small, scattered remnants" (Smith & Smith, 2006). The process of fragmentation is augmented by development and division of land parcels. When this happens, it creates more "edge", which is described by Smith and Smith (2006) as being a "place where two or more vegetation types meet." Edges are important due to the usefulness of having perhaps an area for nesting or hiding near a vegetation type that is good for foraging or mating. This is called the edge effect, which is the "response of organisms, animals in particular, to environmental conditions created by the edge" (Smith & Smith, 2006). Large-scale examples of fragmentation in the Summit County area include the interstate highways that cut through the county.

Vegetation

Vegetation is directly linked to the geology, soils, and climate of the region. It provides for

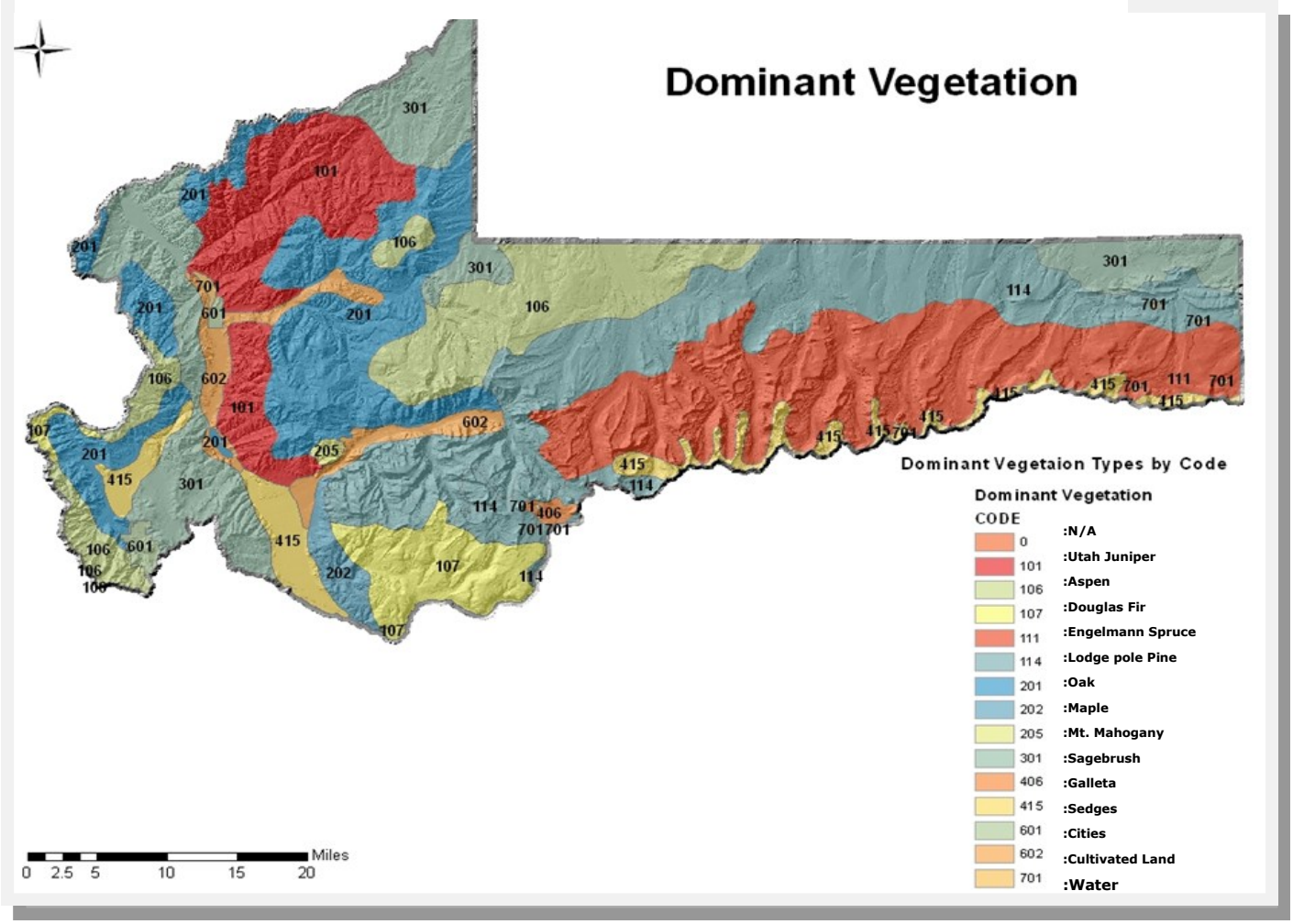
Function and Structure

the beauty of the landscape and survival of animals, providing their food and shelter.

Vegetation can affect climate by: (1) changing the amount of solar radiation either absorbed or reflected back into space; (2) changing temperature on a small microscopic level such as a tree shading a pool; (3) on a macroscopic level which can be seen in urban areas when plants are removed and man-made materials cause an increase in heat (Oke, 1982); and (4) plants can also affect climate by changing the amount of moisture in the air through transpiration. (Kabat, P., et al., 2004)

Figure 9 portrays the dominant vegetation cover within the study region. Most notable are the Utah Juniper (101), Aspen, (106), Oak (201), and Sagebrush (301), listed in dominant priority.

Figure 8: Dominant Vegetation types for Summit County (Utah AGRC, 2011)



Function and Structure

Utah Juniper

"Utah juniper is common on dry plains, plateaus, and the lower elevation of the mountains of the state. Its elevation ranges between 4,000 and 7,500 feet. It is common in elevations below pinyon pine, and above the sagebrush-grass zone" (Pratt et al., 2002).

Aspen

"Quaking aspen occurs on a wide variety of sites. It grows on moist uplands, dry mountainsides, high plateaus, mesas, avalanche chutes, talus, parklands, gentle slopes near valley bottoms, alluvial terraces, and along watercourses. It is most common at elevations between 6,000 and 10,000 feet" (Pratt et al., 2002).

Oak

"Oak is widespread at low elevations (4,000 to 8,000 feet) throughout central and southern Utah. It is a predominate tree on dry foothills and canyon walls where the rainfall averages between 12 and 25 inches each year. Better stands may be found on moist, rich, well-drained soils" (Pratt et al., 2002).

Sagebrush

"Occurs in valleys, basins, and mountain slopes, at elevations between 2,500 and 10,000 feet. Soils: Most abundant in dry, well-drained, gravelly or rocky soils" (Pratt, et al., 2002).

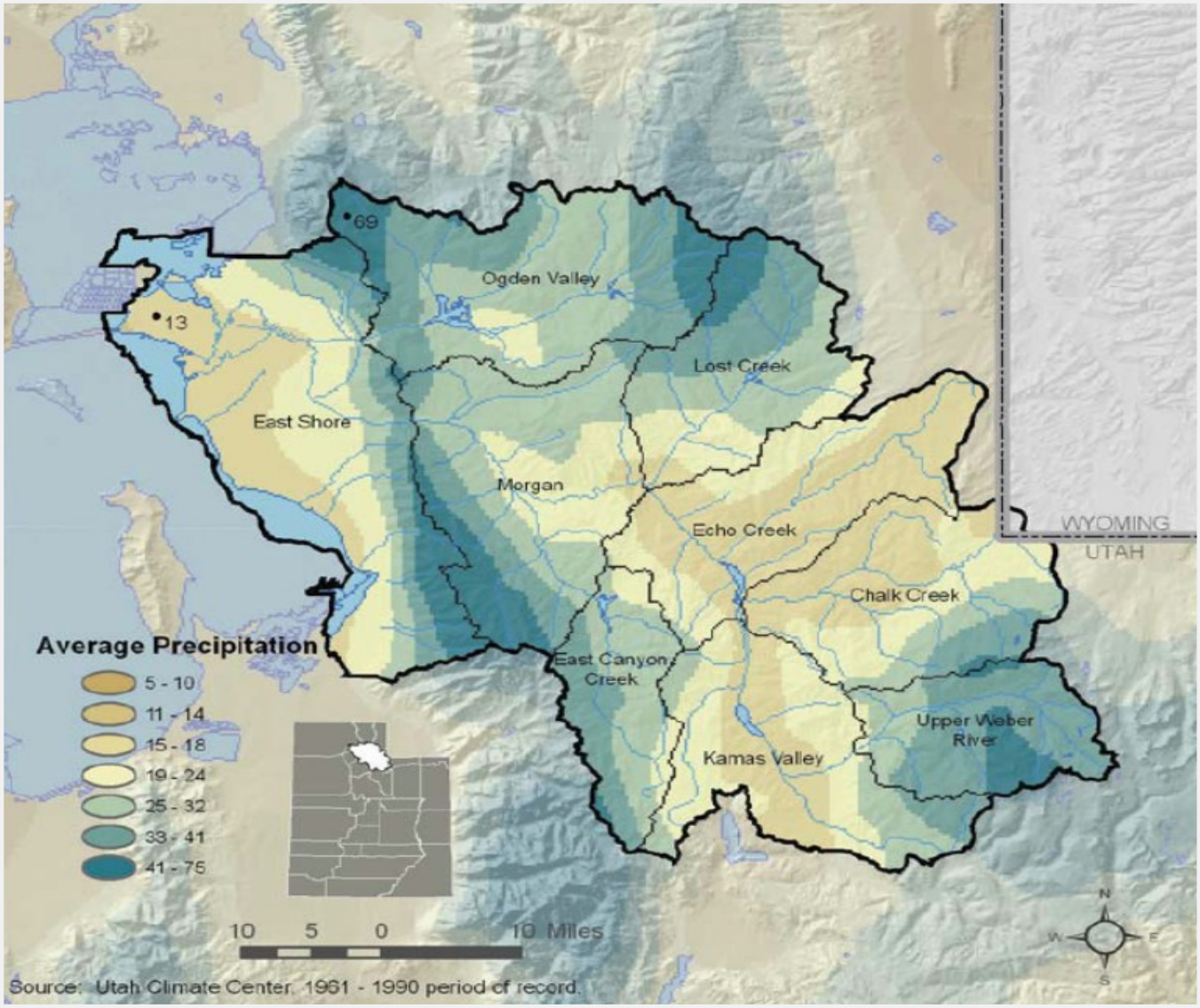
Figure 9: Examples of Vegetation Types within the study area: upper right; Juniper and sage, bottom left; Gamble Oak and Cottonwood.

Function and Structure

Climate

This area is classified as semiarid because evapotranspiration exceeds normal precipitation during most of the year, except the winter months. Figure 4 depicts that our study area receives on average between 15 inches and 24 inches of precipitation annually. In addition, the average annual temperature ranges from 43.1° F to 90° near Park City (Division of Natural Resources, 2009). The Weber River Basin Plan, dated 2009, states that more than 80 percent of land lies within mountain ranges greater than 5,000 feet. As a result of this, most of the precipitation is in the form of snow and is important to the water supply in the Weber River Basin. In addition, the Utah Climate Center reports that, during the period of 1971-2000, the average frost-free days for Summit County ranged from 75-97 days (Utah Division of Natural Resources, 2009).

Figure 10: Average Precipitation Map



Study Area Inventory and Analysis

Stakeholder Priorities

The team was provided two Mountainland Association of Government (MAG) surveys for Kamas, UT and Coalville, UT, which provided demographic, employment, and service related information for the two incorporated cities. In an effort to gain a broader understanding of the goals and values held by stakeholders and citizens of both Eastern and Snyderville Basin unincorporated Summit County, the team created both a written and visual exercise.

The results were encouraging. Conversations occurred, not only between stakeholders and the study team, but also among the stakeholders themselves. The photographs used in the survey gave the stakeholders different views of the area, and provided planners an insight to the impacts of human activities in the study region. This exercise was a valuable asset to policy and decision makers, and to the research team to identify goals and values toward future developments. The goals and values identified can assist decision makers as they evaluate land use options for development and conservation in the future.

Prior to the administration of both the written and visual exercise, the team presented a PowerPoint which illustrated the research they had undergone throughout the previous months, which included:

- Pre-analysis on Critical Lands within the study region (Appendix B)
- Population Projection and Density Analysis (Appendix C)

The Visual Exercise

The study team created five categories to focus the exercise on development concerns and not just aesthetic preferences toward the photographs. The categories are:

1. Density and Placement of Housing Preference
2. Housing Type Preference
3. Landscape Preference
4. Landmark Preference
5. Corridor (Involving Transportation / Roadways) Preference.

The study team selected approximately sixty photographs, obtained from earlier site visits by car and plane, which provided the team members both a ground and aerial view of the study region.

The participants were divided into five random groups consisting of two or three individuals in each group. The only exception to the random selection of groups was that the county planners were grouped together to provide a planner's "point of view" to keep them from influencing the opinions of other stakeholders.

The scale of the rating for each photograph was done numerically with one being the least preferred and five being the most preferred. The group had to agree upon the rating of each photograph before it was recorded. Initial response was preferable, in order to gain the most honest response in regards to aesthetic visual preference; therefore, each group was given between five and ten minutes at each category table.

During this exercise, stakeholders were able to freely express sentiments of development decision and conservation needs captured in the photographs without any political repercussions; it was merely an opinion of preference.

Identification of Key Issues

Results of the written and visual exercises were quickly analyzed in an effort to identify the key issues and values of the participants. A complete report of these results can be found in appendices C and D.

Figure 10 is a non-prioritized list of concerns and values derived from the written exercise. It is important to note that this activity was to guide the stakeholders into an open forum dis-

cussion on the issues and concerns they have within the study region, without feeling their opinions would have political repercussions. In addition, this activity facilitated the idea that team members research and analysis would be in line with the key issues and concerns of stakeholders, policy and decision makers of the study region.

An interesting result of the written survey shows that more than 79% of the participants felt public health, welfare, and safety should take precedence over individual property rights when policy and decisions are made for the study region. Also noteworthy is that participants of both the MAG surveys and the written exercise are willing to support a tax increase to maintain water quality.

Figure 11: Written Exercise Results

Written Exercise Results

The survey results represent at least 79% agreement among the total number of participants:

- Concerned About Impacts of Future Growth
- Availability of Culinary Water
- Surface Water Quality
- Air Quality
- Agrarian Character of the Region
- Visual Quality
- Alternative Modes of Transportation
- Protect Prime Wildlife Habitat
- Compensation for Conservation is Good
- 5-10 Acres for Large Animals Minimum Needed
- Public Health Is More Important Than Property Rights

Study Area Defined

The political dynamics within the study region are diverse and complex. This complexity became a major factor when the team began to spatially define the study area. The physical boundaries are largely defined by the watershed. The political variations were more difficult to delineate. This combination of physical and political boundaries made the definition of a study region difficult to summarize. It was also difficult to summarize the content of the county's future land use policies. Finally, the study team wanted to provide established five-mile buffer to take into account the surrounding communities outside the defined study area.

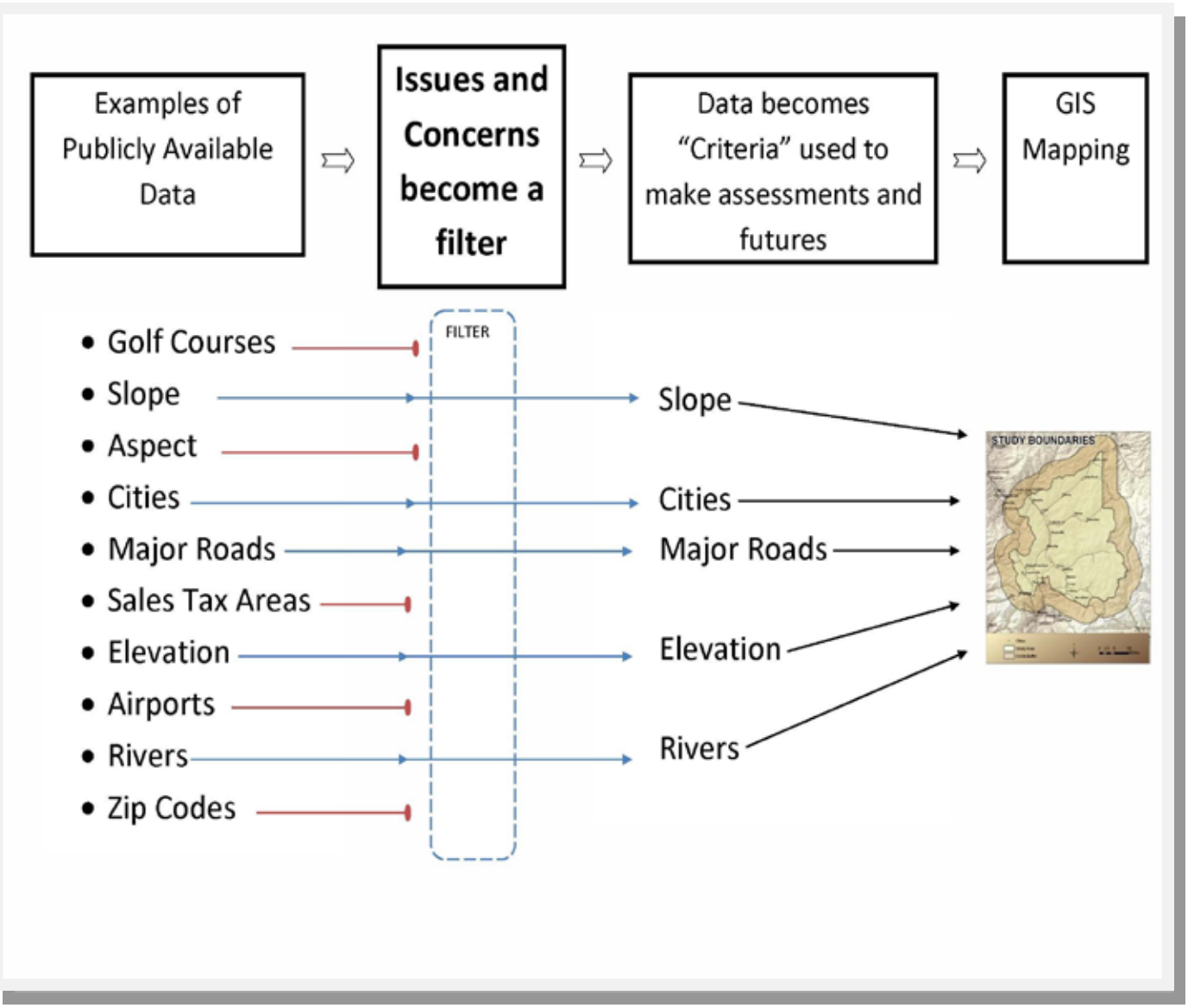
The data supporting those concerns became the criteria as the team developed assessment and future models.

Study Area Inventory and Analysis

Criteria Defined

The process to define criteria for assessment models is illustrated in Figure 11. Publicly available GIS data was filtered through the issues and concerns of the stakeholders previously identified.

Figure 12: Process Diagram to Define Criteria



Modeling Process

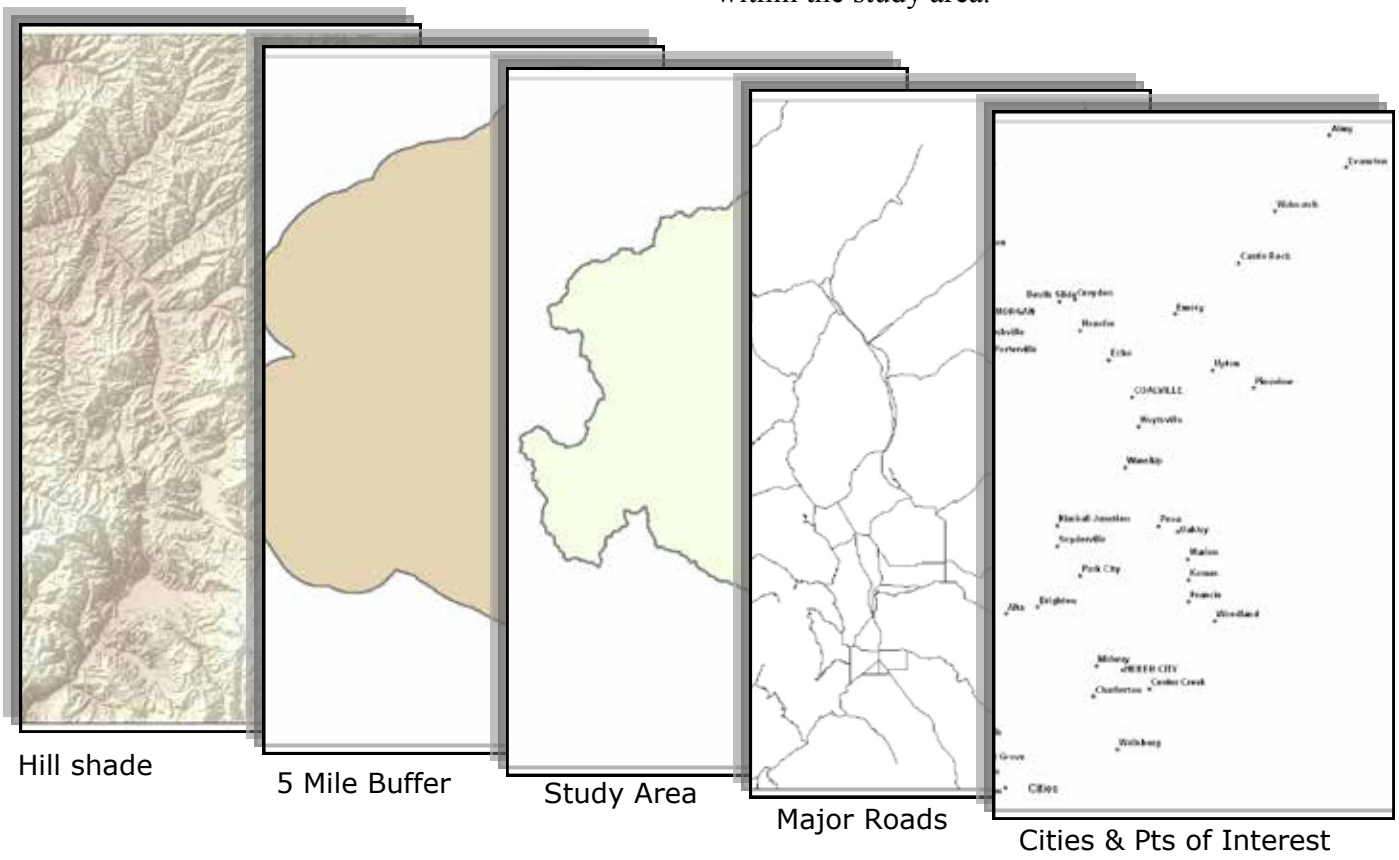
A model is a physical or visual representation of reality. Maps model the lay of the land and are useful in allowing a region to be seen as a whole versus how the same region would be seen in reality. This provides a valuable tool for decision makers and planners to analyze issues of the complex realities of the land. Models in this report were identified through the various stakeholder meetings and earlier research. After these issues were defined, assessment models and alternative futures were developed for the analysis of the study area.

The models are produced with Arc GIS software. This software uses spatial data, either vector or raster. Vector data contains the locations and area of attributes like wetlands, lakes, and rivers. Raster data, on the other hand, is continuous in numeric or categorical data. An example of continuous numeric data is elevation, and an example of continuous categorical data is vegetation types.

A powerful characteristic of this software is its capability to overlay. ArcGIS allows innumerable ways to overlay the many spatial components and attributes of a region. The overlay process dates back to Manning's use of hand overlays in 1912 and has proven to be an increasingly useful tool for land use planning with improvements in GIS technology (Steinitz et al., 1972). Figures 12 and 13 illustrate the overlay process for the template to which all models in the study conform.

Each of the assessment models and alternative futures developed will be presented in the following pages. The scale of data in the models is an important factor. Many of the data elements are not clearly portrayed at the larger scale. In an effort to display more detail in the models it was decided to provide a Coalville and a Kamas enlarged view within the study area.

Figure 12: Overlay Process



Modeling Process

Figure 13: Template of the Study Area

Assessment Models

In determining land use within Summit County, answers to the following question need to be explored. What is the present use of the land and does that use have the best fit to the land? Historically, mining was the major land use in Summit County. Mining practices are seldom permanent, as the resource is limited to the quantity and rate of material extraction. As a result, the major land use practices in Summit County have evolved to agriculture, ranching, and recreation.

Furthermore, the agrarian character of the land adds to its aesthetic appeal and sense of place. The working lands assessment model spatially portrays which areas of the study area serve agricultural activities. The map is categorized into the following land uses: prime agricultural land (non-irrigated), prime agricultural land (irrigated) (NRCS), rangeland (GAP), and national forests.

Prime Agricultural Lands

Areas with favorable soil types in the valley bottoms where water is naturally available are non-irrigated prime agricultural lands. In contrast, irrigated prime agricultural lands are those valley bottom areas with favorable soils where water can easily be made available to them. Collectively, prime agricultural lands are those areas which are more likely to sustain crops within the region's climate. Mollisols, the dominant soils in the region, are ideal for production crops such as alfalfa and grains. However, the high elevation of the region limits the growing season.

Rangeland

Rangelands are lands used for grazing animals, predominantly cattle, within the study region. Rangelands are not as limited by soil type and slope as are other prime agricultural lands.

The area of the map identified as rangeland includes terrain with steeper slopes, yet forage vegetation is still available.

Riparian areas have been excluded from the range land layer in the map. This was to maintain bank stability and water quality issues, despite the fact that they may be currently used in grazing practices. Rangeland overlaps with the other land use categories, particularly National Forest lands under permit.

National Forestland

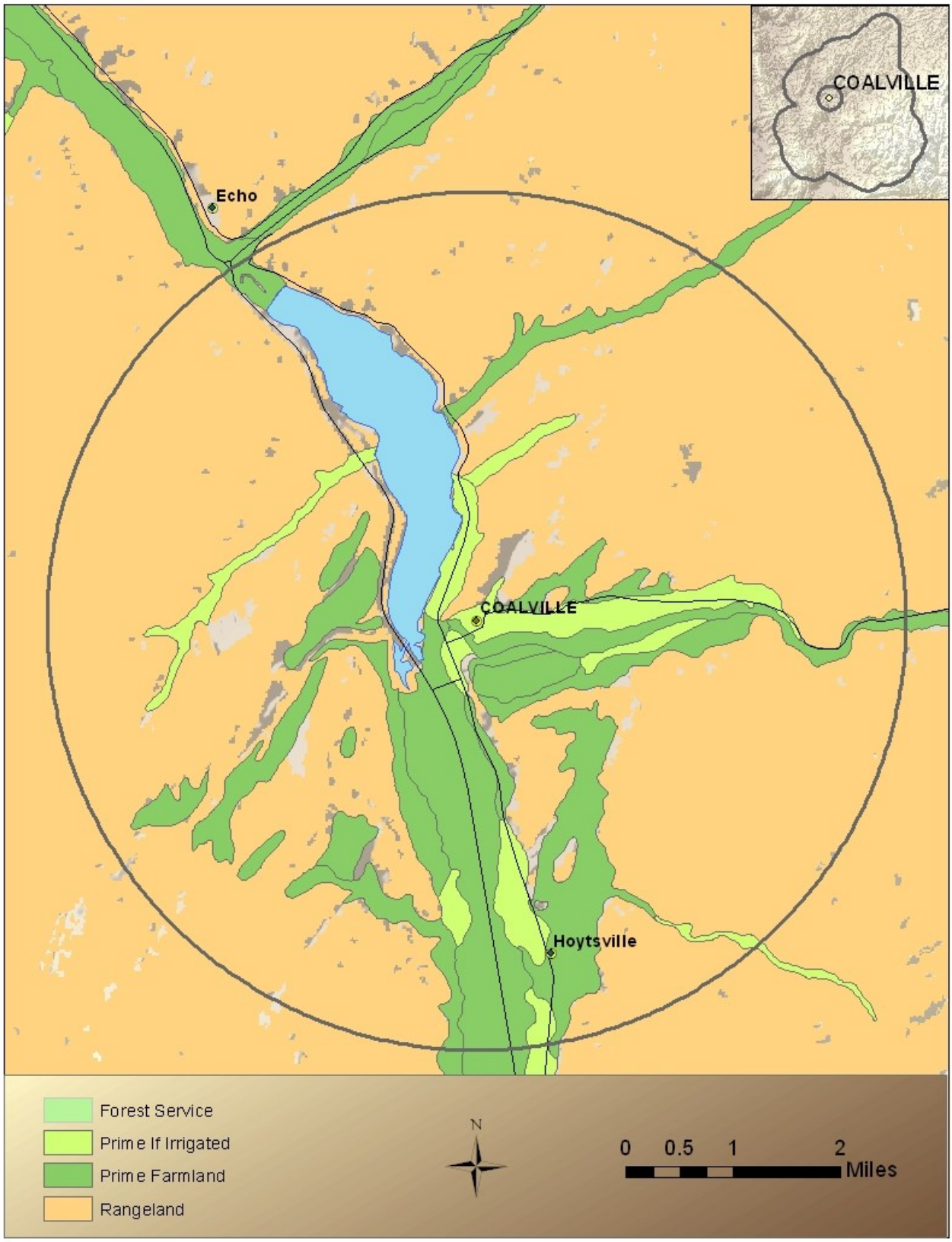
These lands are public lands and are set aside under the National Forest Service multiple use mandate. These areas are available to the public for limited recreation, grazing, and other commercial uses.

Model Criteria—Working Lands

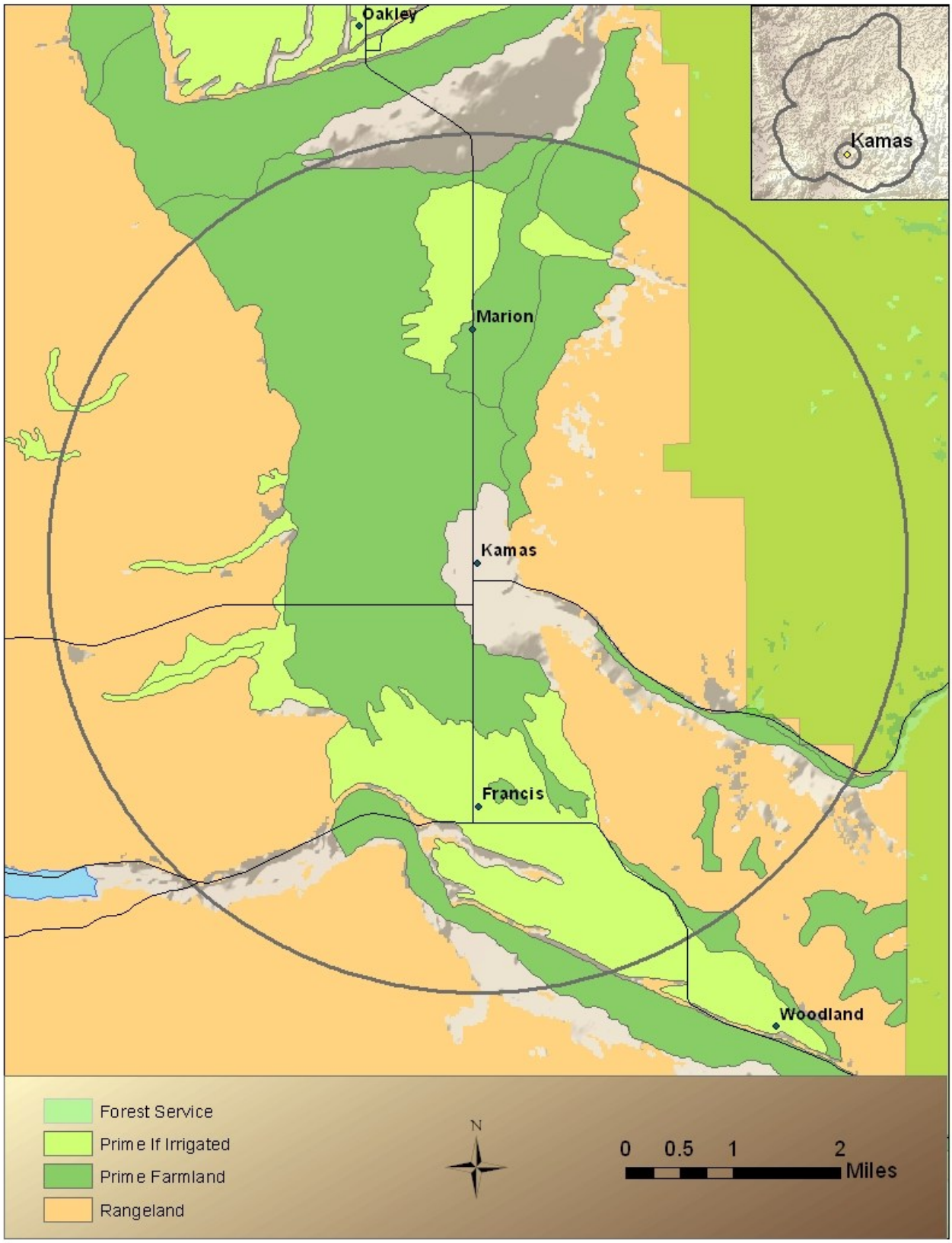
- Non-irrigated Prime Agricultural Land
- Irrigated Prime Agricultural Land
- Rangeland
- National Forests

Working Lands

Working Lands Coalville/North Zoom



Working Lands Kamas/South Zoom



Assessment Models

The view shed model was created to identify areas of high and low visibility from specific view points within the study area.

A view shed is the area visible in any direction from a given point. This information can allow for better decisions regarding where to plan or approve future development. Furthermore, it delineates areas which may be important to conserve the historic and agrarian character of the communities and landscape.

To create this map, sixteen data points were selected on major roads and intersections in populated areas at three-mile or five-mile intervals. Using GIS software, the view shed was projected. "A visibility assessment is accomplished through the creation of view sheds using Digital Elevation Models (DEM) and points of viewing locations. A DEM is a grid in which each cell contains a measure of elevation for the section of the landscape it covers. A view shed is the result of computations of which cells can be seen by other cells given their relative elevations" (Toth et al., 2006). Each of these points were computed separately and then added together anywhere there was overlap.

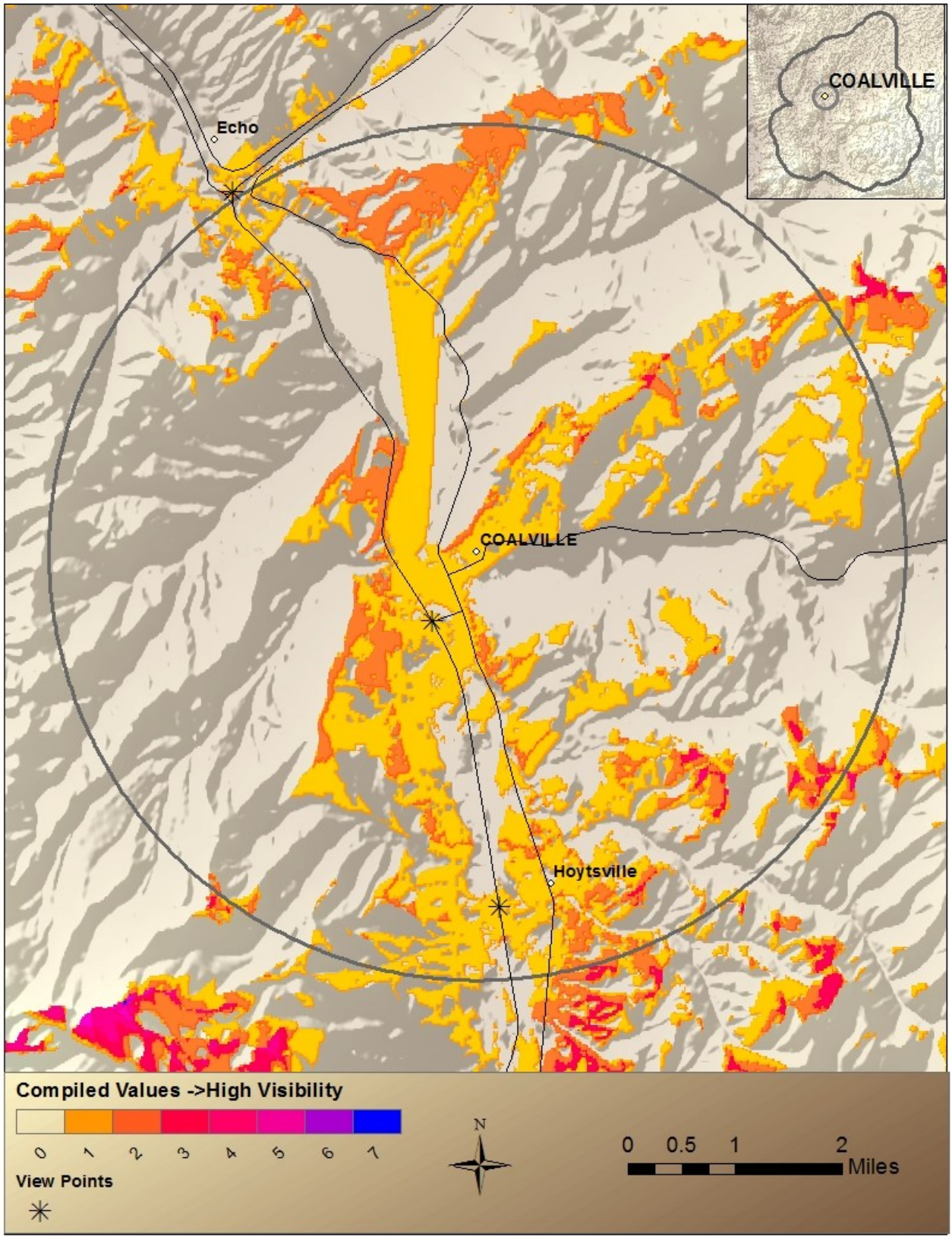
On the View Sheds map, areas that are more visible from the view points are darker.

Aerial view of Wasatch Back region

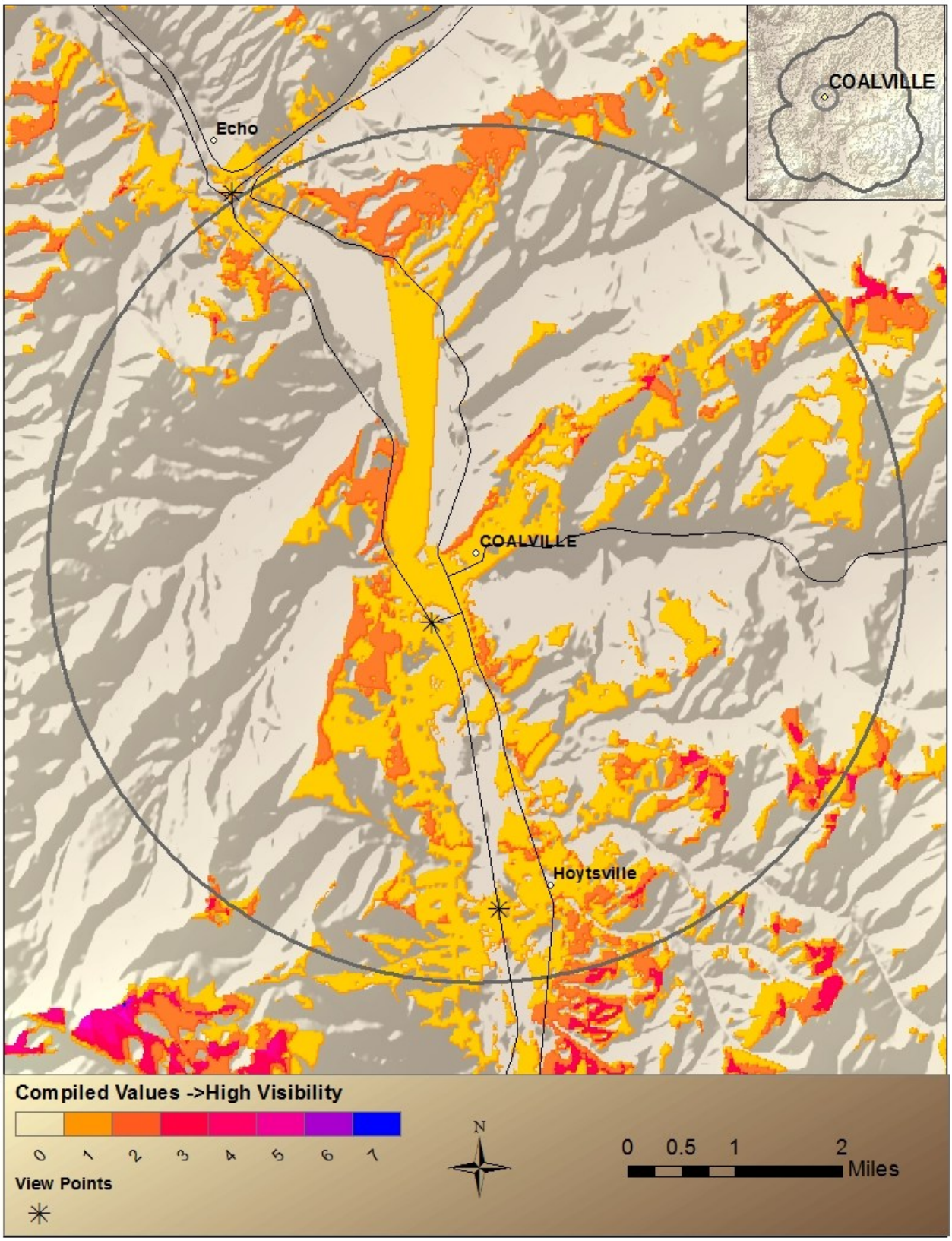
Model Criteria—View Shed

- Digital Elevation Models
- Sixteen Data Points
- Major Roads

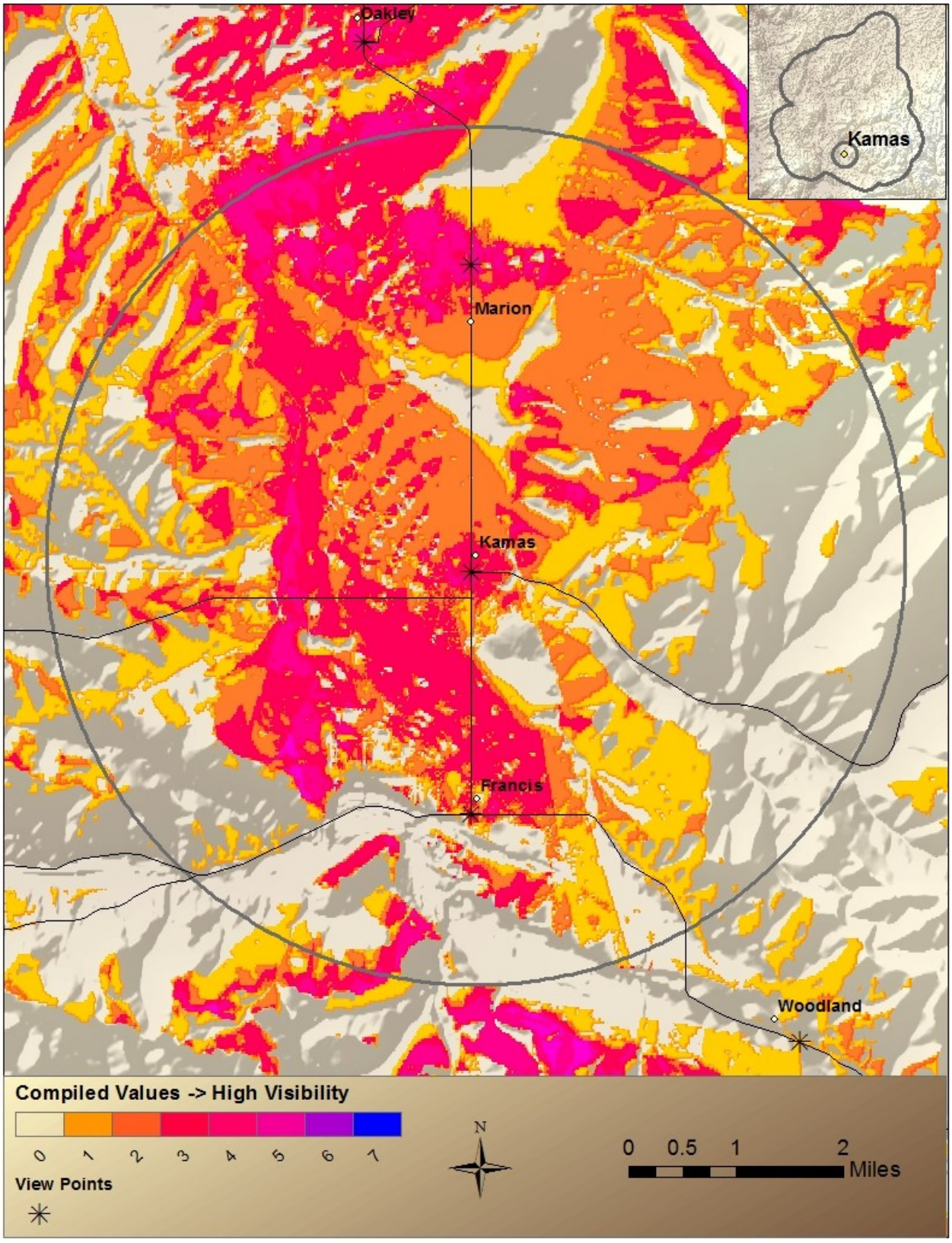
View Sheds


COALVILLE
Echo
COALVILLE
Hoytsville
Compiled Values ->High Visibility
0
1
2
3
4
5
6
7
View Points
N
0 0.5 1 2
Miles

View Sheds Coalville/North Zoom



View Sheds Kamas/South Zoom



Assessment Models

The building suitability model demonstrates prime locations for residential, commercial, or institutional structures. The primary factor for identifying these locations is least cost for development. The criteria selected are based on existing roads, infrastructure, and landscape characteristics such as slope, soil, and wetlands.

The distance to existing major roads will affect developable land due to costs of connecting roads and access. A .25 mile buffer along the major roads is shown and indicates the most serviceable distance to major roads. Additionally, a .5 mile buffer was used to model areas within a reasonable distance from major highways to provide appeal for residential development, both seasonal and year-round.

A major landscape characteristic considered for building suitability is percent of slope. Lower slopes require less grading and earth moving activity for structures and roads. Current zoning regulations within the study region limit development based on slope with the following land uses as shown in t\Table 1. In addition, areas that are identified as wetlands are less suitable for development.

Soil types and soil depth were also considered for the building suitability model. Mollisols, the primary soil type, alfisols, and inceptisols are found within the study region and are suitable soils for development. Furthermore, soil depth was found to be sufficient for building in most areas where the slope is less than 30%.

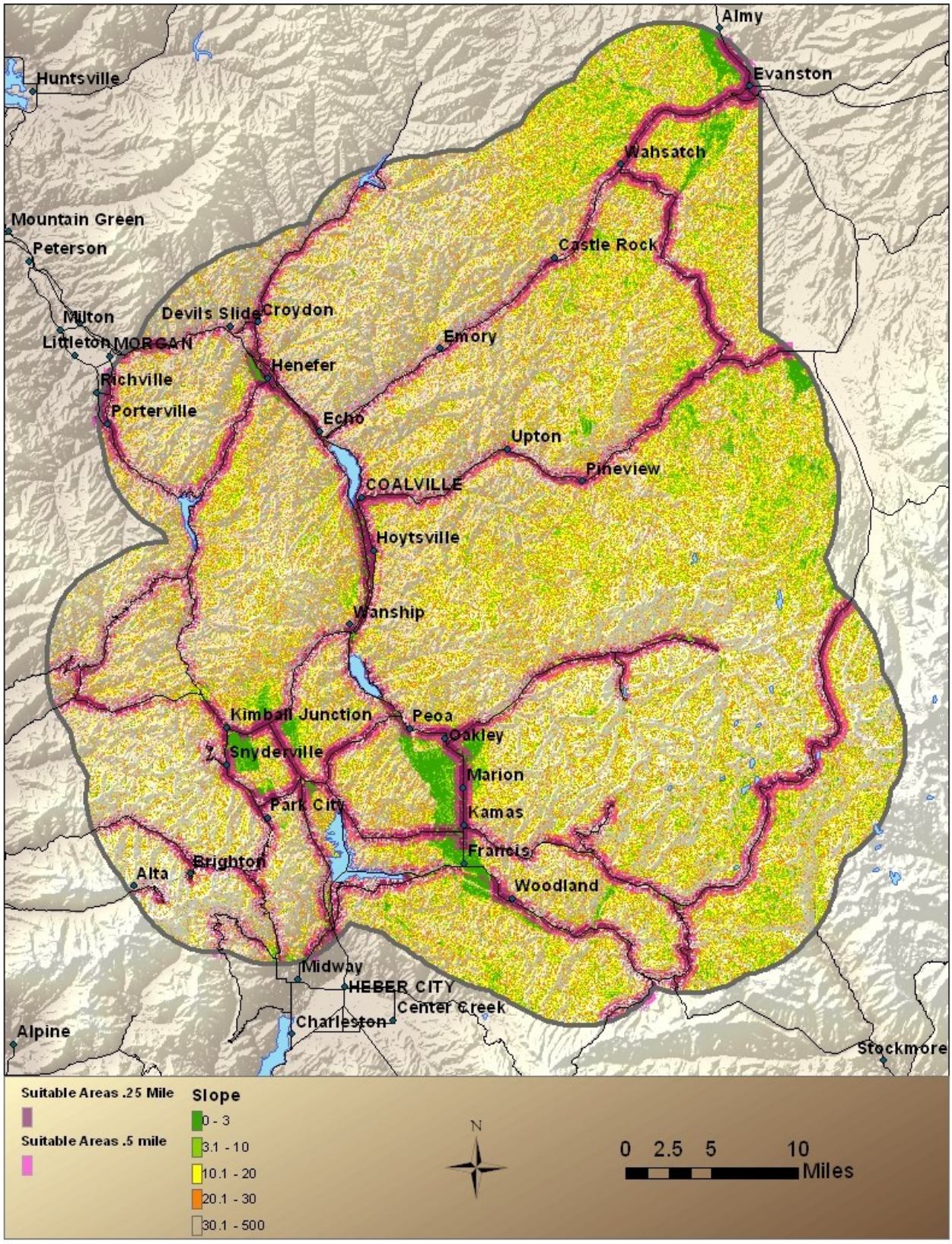
Figure: 15 Slope Suitability

0% - 3%	Ideal for Institutional Development
3% - 10%	Ideal for Residential and Some Institutional Development
10% - 20%	Moderately ideal for Residential; Cost Being Prohibitive
20% - 30%	Least Ideal; Permitted on Case-by-Case Basis

Model Criteria—
Building Suitability

- Slope
- Soil Type
- Distance to Major Roads
- Water Bodies
- Wetlands

Building Suitability



Assessment Models

The landscape resilience model was developed to portray important areas within the study region which contribute to the beauty of the landscape. It is also important to understand how the water regime supports the communities in the area.

Streams and rivers are characterized as being an open system with a continuous flow in one direction. The system has an ability to change in volume and velocity, with levels that fluctuate depending on the direct and indirect flows of surface water. These exhibit little stratification and maintain a continuous turbulence (Gutting, Houghten, & Snyder, 1979).

Lakes and ponds are characterized by being a closed system which exhibits little outflow (Gutting, Houghten, & Snyder, 1979). Their water source comes from "direct precipitation, overland runoff, streams and rivers, and ground water seepage" (Gutting, Houghten, & Snyder, 1979). Within Summit County, there are four reservoirs mainly used for residential irrigation needs. These reservoirs also contribute to wildlife habitat and provide for various recreational opportunities. The two major reservoirs which lie on the main stream of the Weber River are the Echo and Rockport Reservoirs. Smith and Morehouse also lies on a tributary to the Weber River. The Jordanelle Reservoir, also located in Summit County, comes from the upper section of the Provo River, which lies on Trail Lake.

Conserving the red areas on the Landscape Resilience map will aid the resilience of this landscape to recover from development and other human activities. A fifty meter buffer surrounding water bodies, streams, lakes, rivers, and wetlands is proposed . The biodiversity layer is a combination of raster data sets in which 238 animal's habitat needs were considered. Included in the habitat needs was the vegetation that supports those animals.

Model Criteria—
Landscape Resilience

- Water Bodies
- Streams
- Lakes
- Rivers
- Wetlands
- Biodiversity

Landscape Resilience

Assessment Models

The landscape limits model was created to identify areas which are potentially hazardous to people or property. This model describes areas in which development should be discouraged to maintain and protect public health, welfare, and safety.

Areas of low hazard potential are represented on the Landscape Limits map by the "1" category, which is shown in a cream color. As the number of occurrences of hazard criteria increases in one location, the area is shown in darker colors on the map.

The selection of potential hazards criteria was based on history, recurrence, and data availability. Hazards include landscape disturbances such as fire, avalanche, flooding, fault lines (earthquakes), and landslides. Only hazards explicitly identified have been included in the model.

Before implementing new policies or further development, this material should be field checked and validated by expert assessment. This map was based on the most current data available; however, conditions may change in the future.

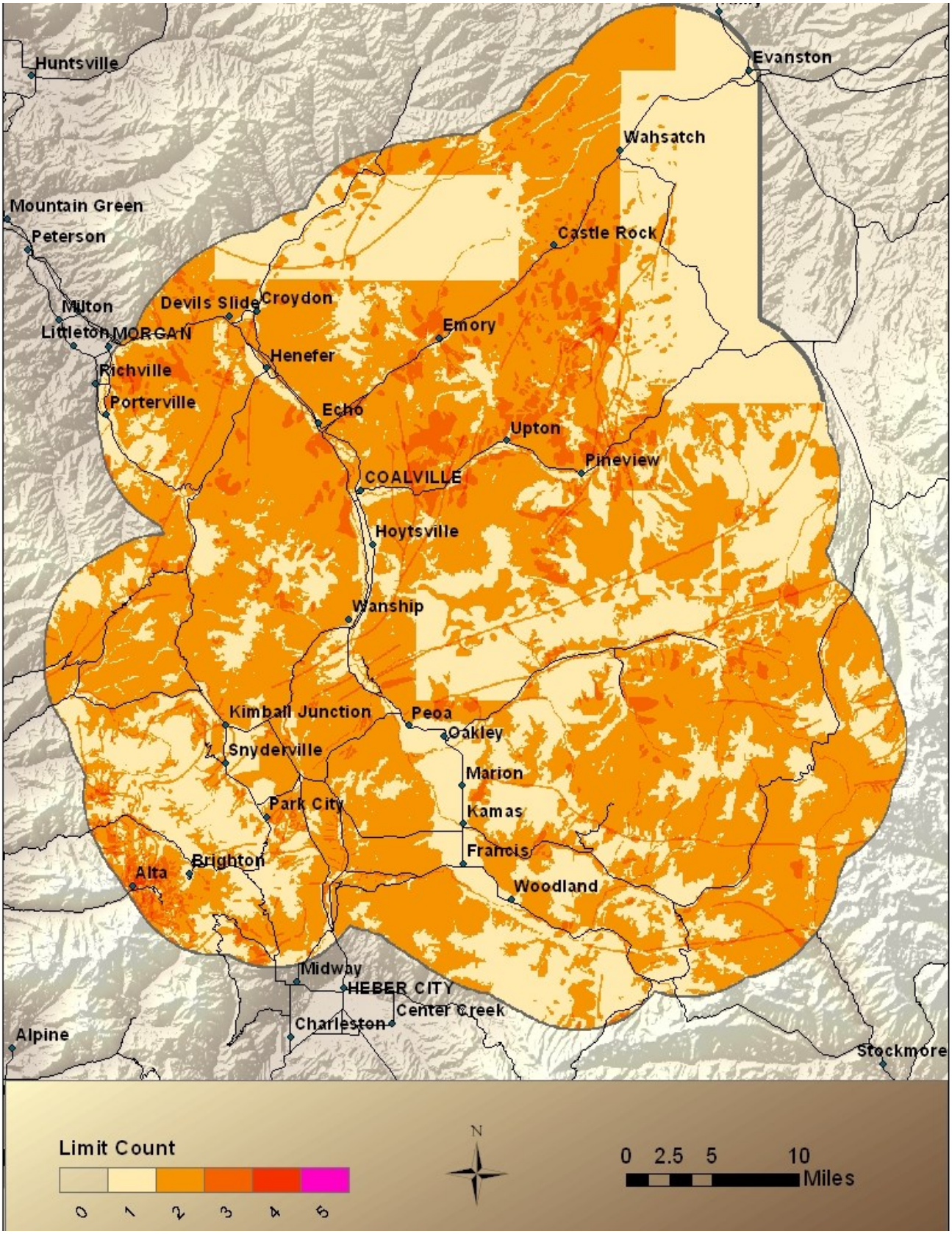
Flood potential area near Coalville, UT

Model Criteria—

Landscape Limits

- Fire Danger Potential
- Flood Plain
- Avalanche Paths
- Fault Lines
- Areas of Potential Landslides

Landscape Limits



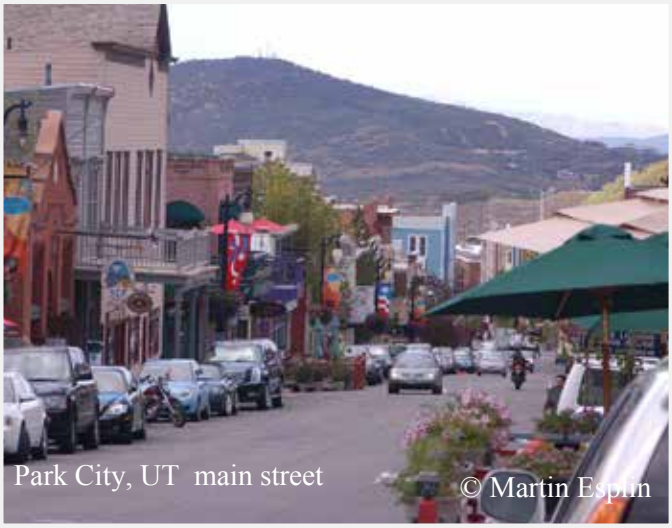
Assessment Models

The transportation model was developed in order to assess the current transportation networks in Summit County and to provide a guide for determining future alternatives. According to William Black (2010, pg. 10) "A sustainable transport system is one that provides transport and mobility with renewable fuels while minimizing emissions detrimental to the local and global environment, and preventing needless fatalities, injuries, and congestion."

A transportation system that only uses renewable fuels has not yet been realized; however, the minimization of harmful air emissions, motor vehicle accidents, and congestion are issues county stakeholders should address now. These issues are especially important for Summit County in light of the expected population increase for the area.

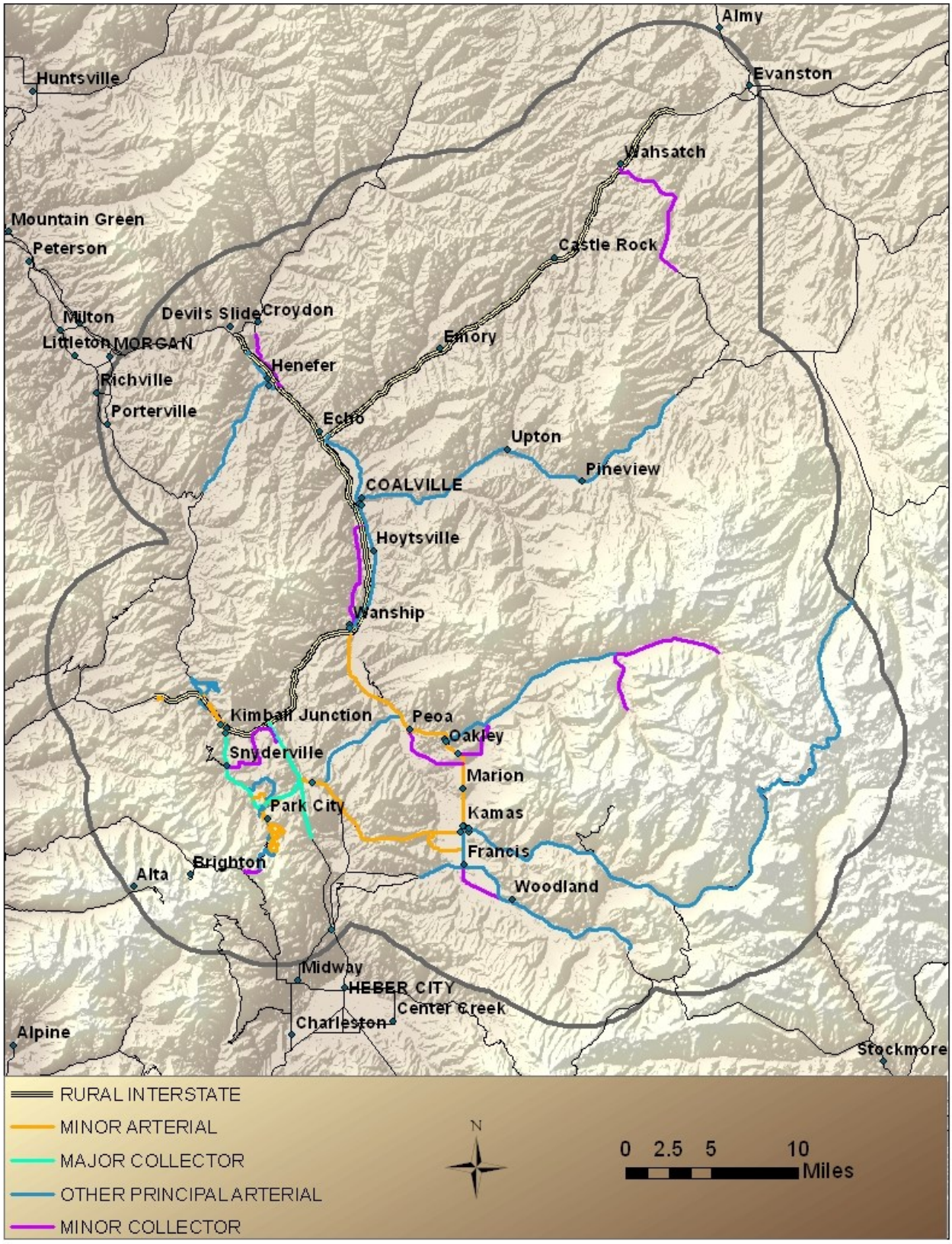
In terms of public transit, Park City is the only community in Summit County that has a municipal bus system. The Utah Department of Transportation (UDOT) has proposed park-and-ride bus stop locations that would connect Park City, Kimball Junction, Hideout, Kamas, and Oakley. Currently, it does not plan for service to the northern cities of Wanship, Henefer, and Coalville. UDOT also has a proposed connection between Park City and Salt Lake City.

This model proposes to follow the UDOT recommendations with additional services to the northern cities in Summit County, such as Echo and Henefer, as well as to Ogden.


Park City, UT main street © Martin Esplin

Model Criteria—Transportation
• Road Classifications as Defined by UDOT

Transportation



Alternative Future Models

This map portrays areas within the study region that have a high probability of development under the current zoning practices of Summit County.

One major consideration to probability of development was cost. The "Ag Protect 40" zone and the "Highway Corridor" zones were the focus of the map due to cost constraints. They were the most likely to be developed.

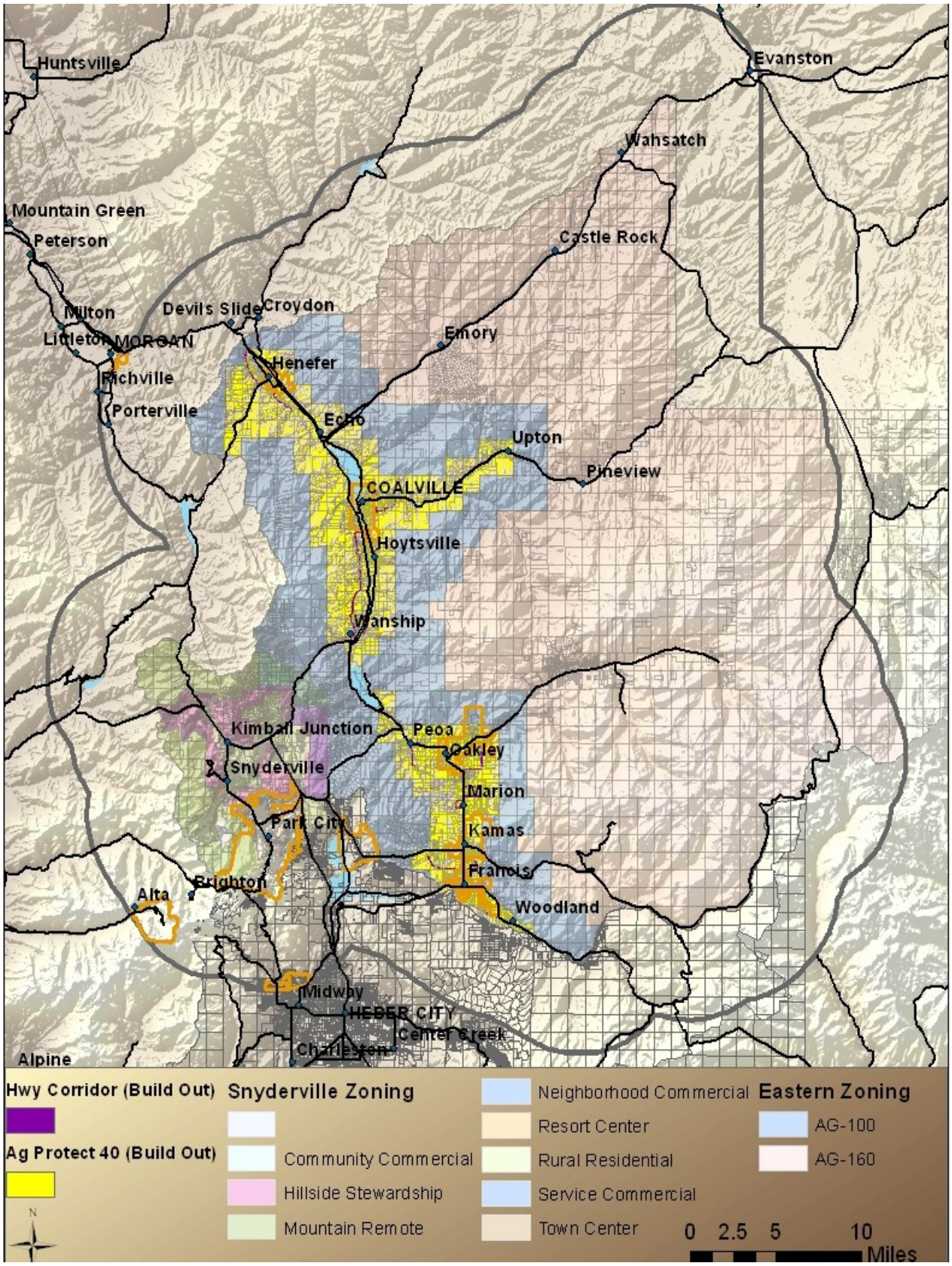
Under the current zoning there are minimum setbacks from water bodies and roads. There are also slope and minimum lot size requirements.

A significant aspect of this alternative future is that development of this nature reduces the agricultural landscape of the valley bottoms. From the visual preference surveys, the agricultural landscape is one of the appealing features for residents of the region.

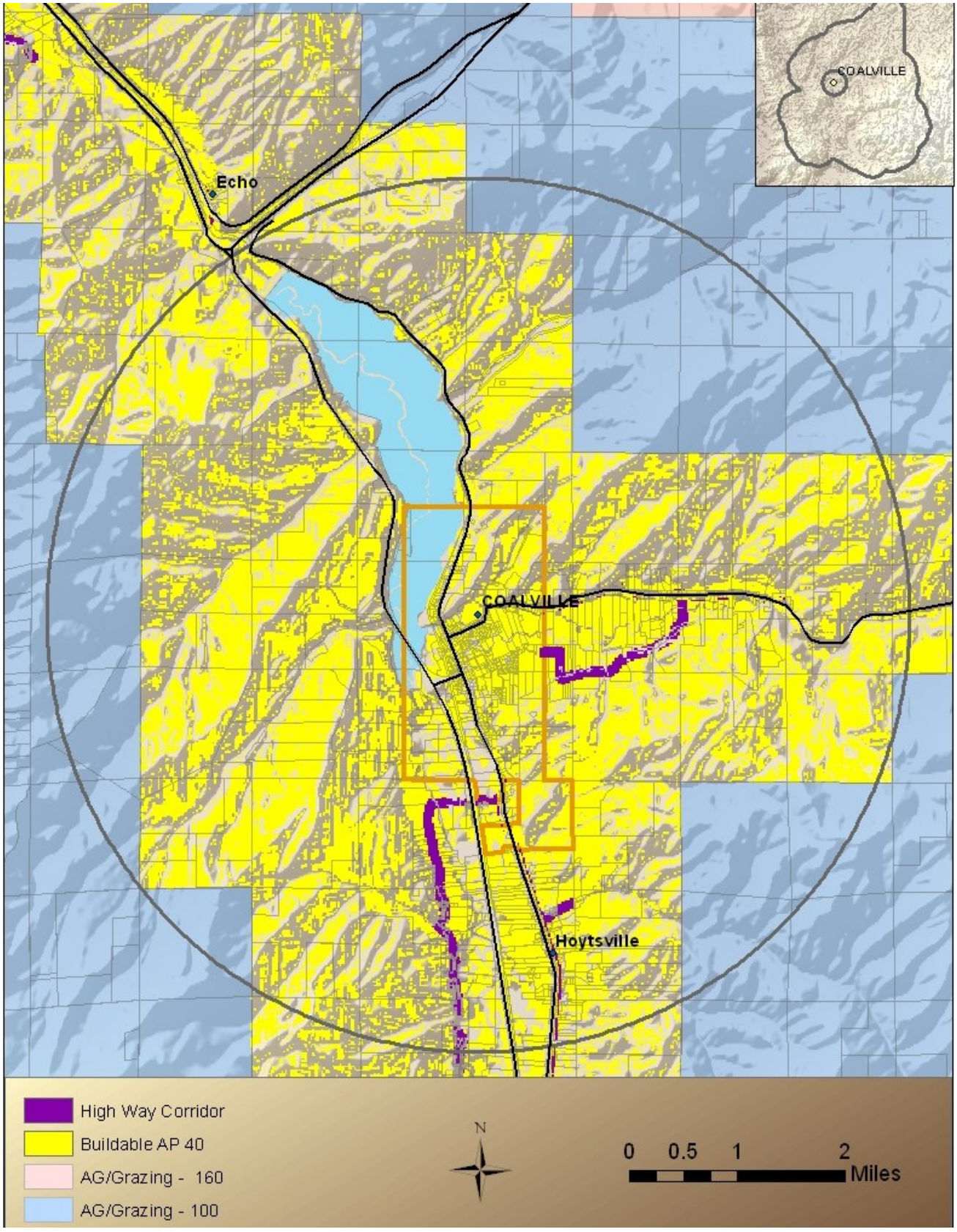
Model Criteria—Plan Trend

- Current Zoning Policy
- Summit and Wasatch Counties Parcel Data

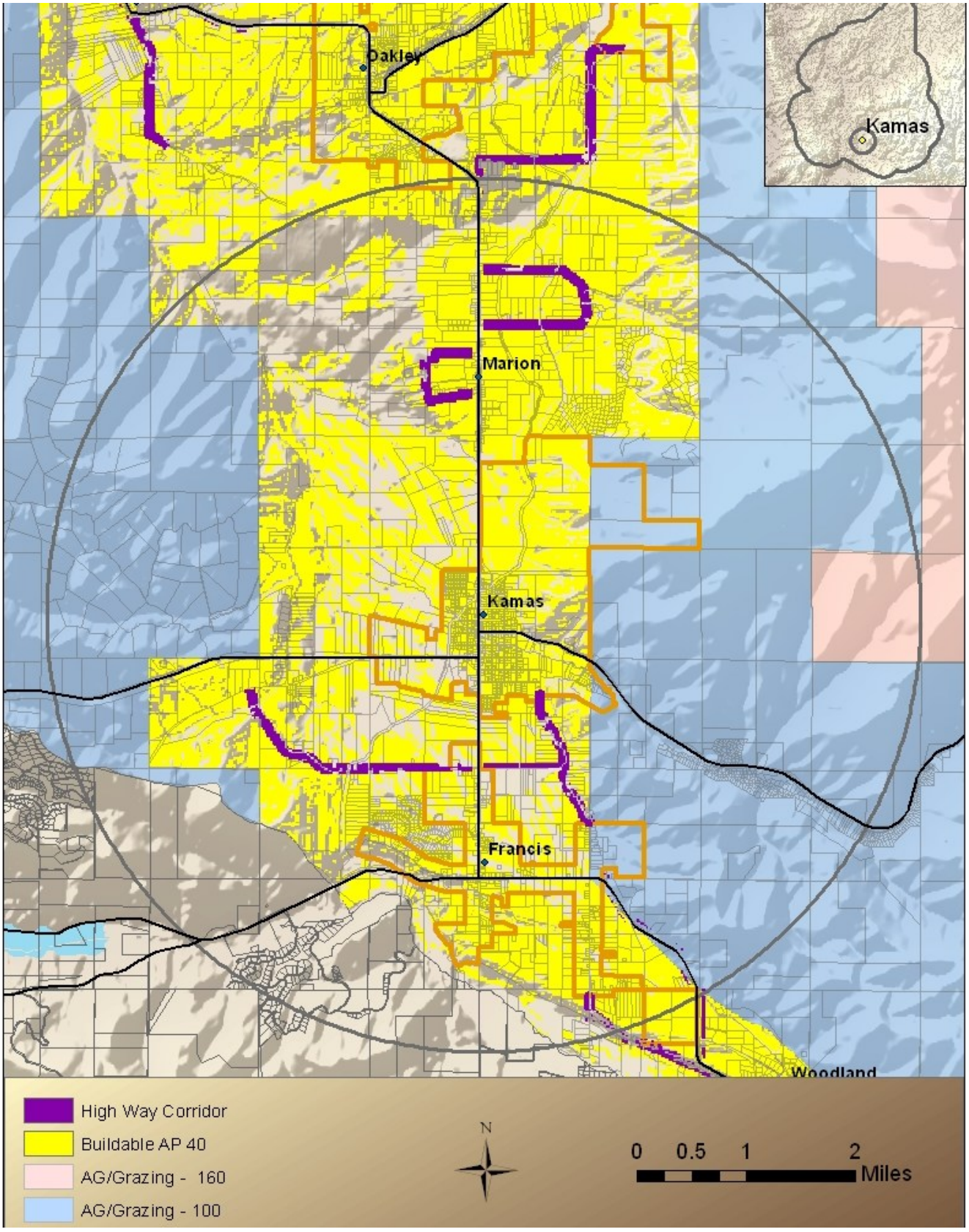
Plan Trend


Huntsville
Evanston
Wahsatch
Mountain Green
Peterson
Castle Rock
Milton
Devils Slide
Croydon
Littleton
MORGAN
Emory
Henefer
Richville
Porterville
Echo
Upton
Pineview
COALVILLE
Hoytsville
Wanship
Kimball Junction
Peoa
Oakley
Snyderville
Marion
Park City
Kamas
Francis
Brighton
Alta
Woodland
Midway
HEBER CITY
Center Creek
Charleston
Alpine
Hwy Corridor (Build Out)
Ag Protect 40 (Build Out)
Snyderville Zoning
Community Commercial
Hillside Stewardship
Mountain Remote
Neighborhood Commercial
Resort Center
Rural Residential
Service Commercial
Town Center
Eastern Zoning
AG-100
AG-160
0 2.5 5 10
Miles

Plan Trend Coalville/North Zoom



Plan Trend Kamas/South Zoom



Alternative Future Models

The Critical Lands model shows areas that are important for maintaining public health, welfare, and safety. While this map shows the location of critical lands, it does not reflect the intensity of potential hazards.

An example where this model can be used is in the review of land use applications for development. It is in the interest of public health, safety, and general welfare to direct land use development and other activities away from these areas.

This model was created using the Biodiversity and Working Lands layers as well as the Landscape Resilience and the Landscape Limits maps.

The biodiversity layer is a combination of raster data sets in which 238 animals' habitat needs were considered. Included in the habitat needs was the vegetation that could support that animal. For this model, only the highest third of the possible biodiversity areas were shown. This means that the areas in green on the Critical Lands map are only the best areas for biodiversity and thus the most important to maintain.

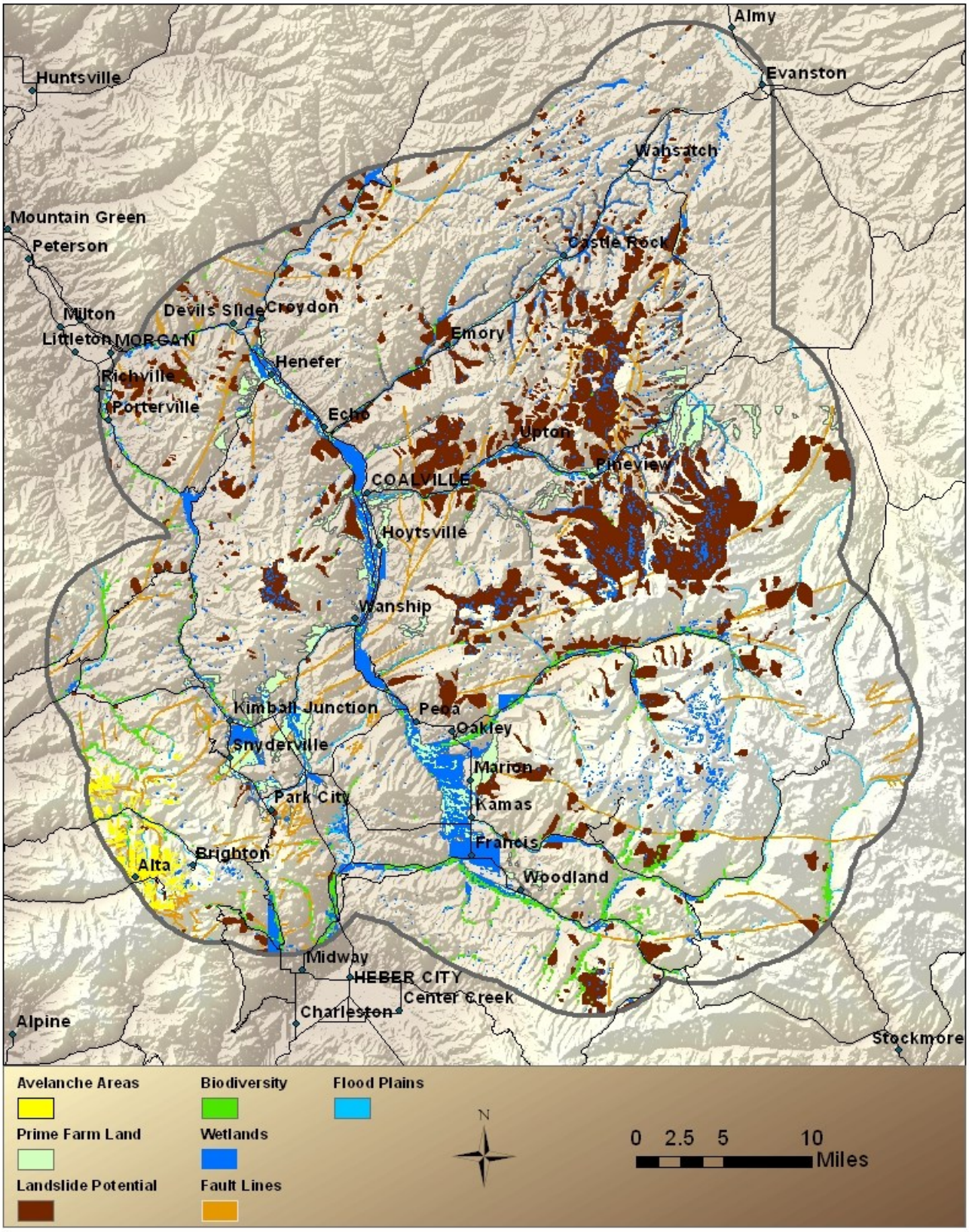
Only the "prime farmland" was taken from the Working Lands map and used in the Critical Lands map. This is the agricultural land that is most under pressure for development and also the most important to conserve food availability and the visual quality of the region.

All of the layers from the Landscape Limits map were used except fire danger. Since there is a danger of wildfires throughout the region, it is not as helpful in making land use decisions. Elements of the Landscape Resilience map that were included in the critical lands map was the Wetlands layer.

Model Criteria—Critical Lands

- Biodiversity
- Flood Plains
- Landslide Potential
- Avalanche Areas
- Fault Lines
- Wetlands
- Prime Farmland (irrigation is not necessary)

Critical Lands



Alternative Future Models

The Traditional Towns future promotes the idea of maintaining most development close to or within the existing city limits (municipal boundaries). This is to protect the individual character of the communities as well as the individual geographic boundaries. This type of future also helps maintain the "small town" feel that many people said was important to them in surveys and in the written exercises.

In Summit County the entire projected population (Appendix F) could be accommodated inside the city limits of existing towns at a modest density of one house per quarter acre.

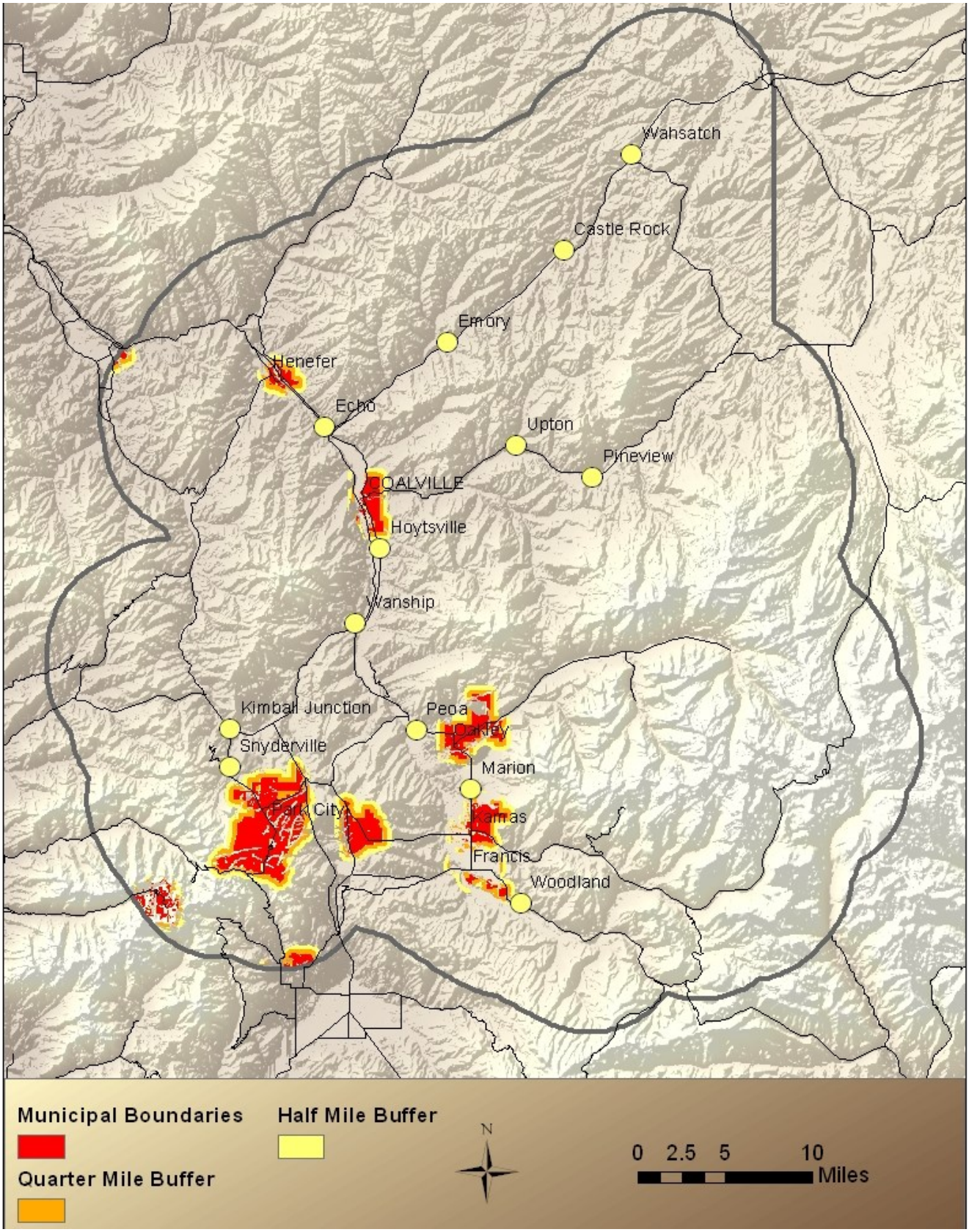
This future also explores the idea of a small expansion of the city limits by a half mile and then a full mile. This is to see how many people could be accommodated close to city centers, thus keeping taxes down while maintaining government services. Areas found to be unsuitable since they fell into the critical land categories (pg. 48) were also excluded from the areas before analysis. The result of this exercise shows that to accommodate all future projected growth within or near existing development can be done at densities normal to the region. It is also possible to allow for a range of densities, which we recommend.

The towns may be kept separate by maintaining agricultural areas in between towns or by creating green belts.

Model Criteria—Traditional Towns

- Municipal Boundaries
- Half Mile and Mile Buffers
- Critical Lands

Traditional Towns



Alternative Future Models

The concept of the Trade-offs model is to evaluate the land into different categories based on the land features and existing infrastructure. Two of the categories represent prime areas for opposing interests; one area is prime land for development, and the other is prime land for conservation.

The prime development land was selected using three categories: proximity to major roads, slope percentage of the land, and being located in the incorporated area.

The prime conservation land was determined by its proximity to water bodies or features, habitat for a higher number of wildlife species, and prime land for multiple agricultural uses.

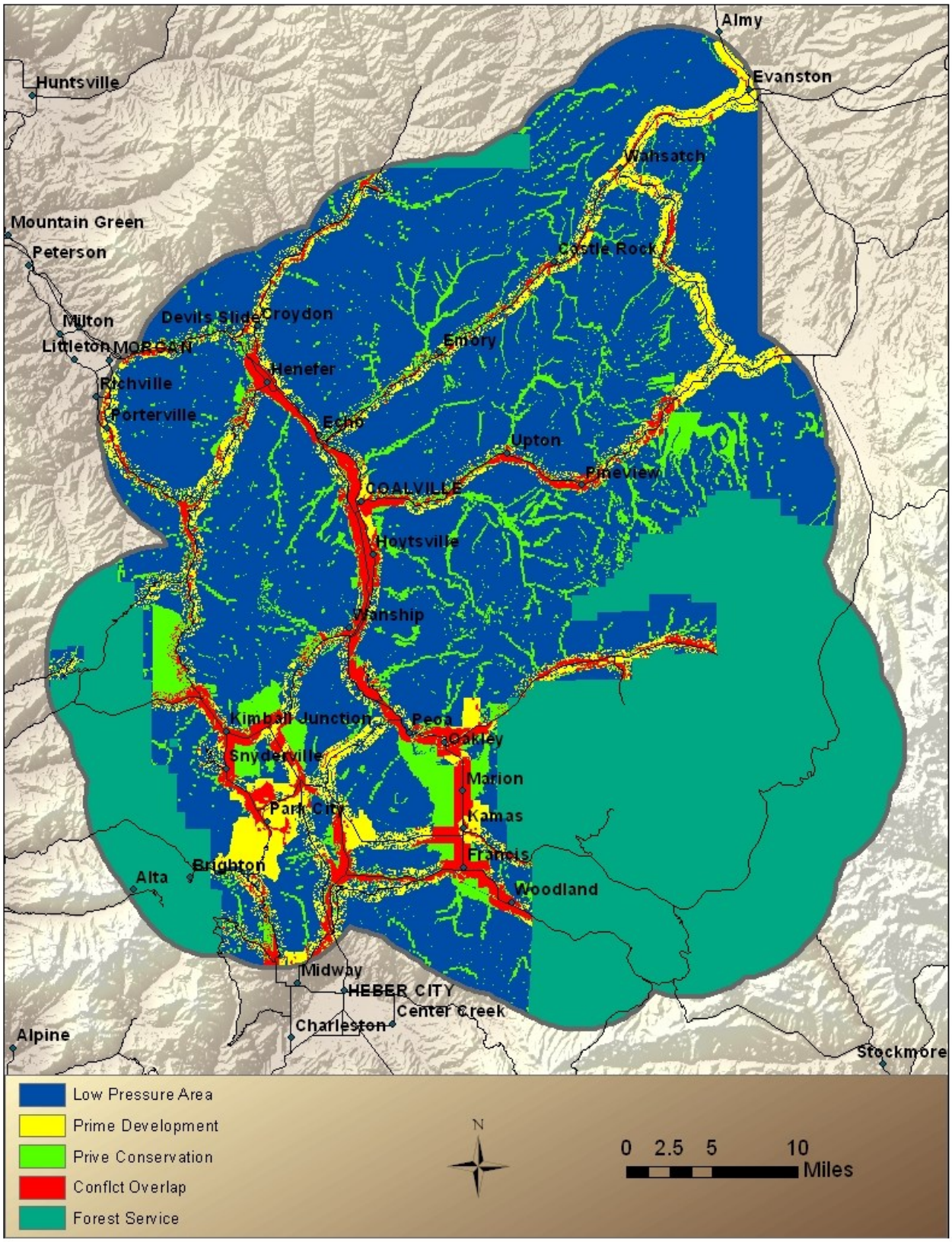
One key feature of this alternative future is the conflict areas, shown in red on the Trade-offs map, that are both prime for development and conservation. It is in these areas where the most difficult choices about development will have to be made by policy makers and land owners .

Example of area in the "red" conflict area near Coalville, UT © Martin Esplin

Model Criteria—Trade-offs

- Biodiversity—Only the Top 1/2 was Used
- Landscape Resilience
- Working Lands
- Building Suitability

Trade-offs


Almy
Evanston
Huntsville
Wahsatch
Mountain Green
Peterson
Castle Rock
Milton
Devils Slide
Croydon
Littleton
MORGAN
Emory
Henefer
Richville
Porterville
Echo
Upton
Pineview
COALVILLE
Hoytsville
Wanship
Kimball Junction
Peoa
Oakley
Snyderville
Marion
Park City
Kamas
Francis
Brighton
Alta
Woodland
Midway
HEBER CITY
Center Creek
Charleston
Alpine
Stockmore
Low Pressure Area
Prime Development
Prive Conservation
Conflct Overlap
Forest Service
N
0 2.5 5 10
Miles

Alternative Future Models

The Future Hubs model shows the proposed route by Utah Department of Transportation (UDOT), which services Snyderville Basin, Park City, Oakley, and the Kamas/Francis areas of Summit County. This route is the dark blue line.

In an effort to connect the cities within Summit County and provide transportation to the Ogden area as well, the team has proposed bus routes. To do this, nodes or hubs would also be established. These follow the proposed yellow line found on the Future Hubs map. Buses would run periodically between the hubs, providing connectivity without the requirement of a personal motorized vehicle. These future bus route hubs will help to reduce the number of cars on roads, thus reducing traffic congestion, air pollution, ecological impacts, and the probability of auto collisions. A county-wide public transit system would also provide accessibility and an affordable means of transportation for county residents, particularly seniors and children. With the future bus-route hub locations as the foundation, alternative bus routes are also proposed. These routes build upon a park-and-ride bus system already suggested by UDOT that would service the southern half of Summit County.

Another major benefit to the hubs system is that This provides the county and local communities a better idea of where to focus local infrastructure. Higher densities of housing units can go hand-in-had with commercial development to create communities that are walkable and connected to the rest of the county, region, and Salt Lake City.

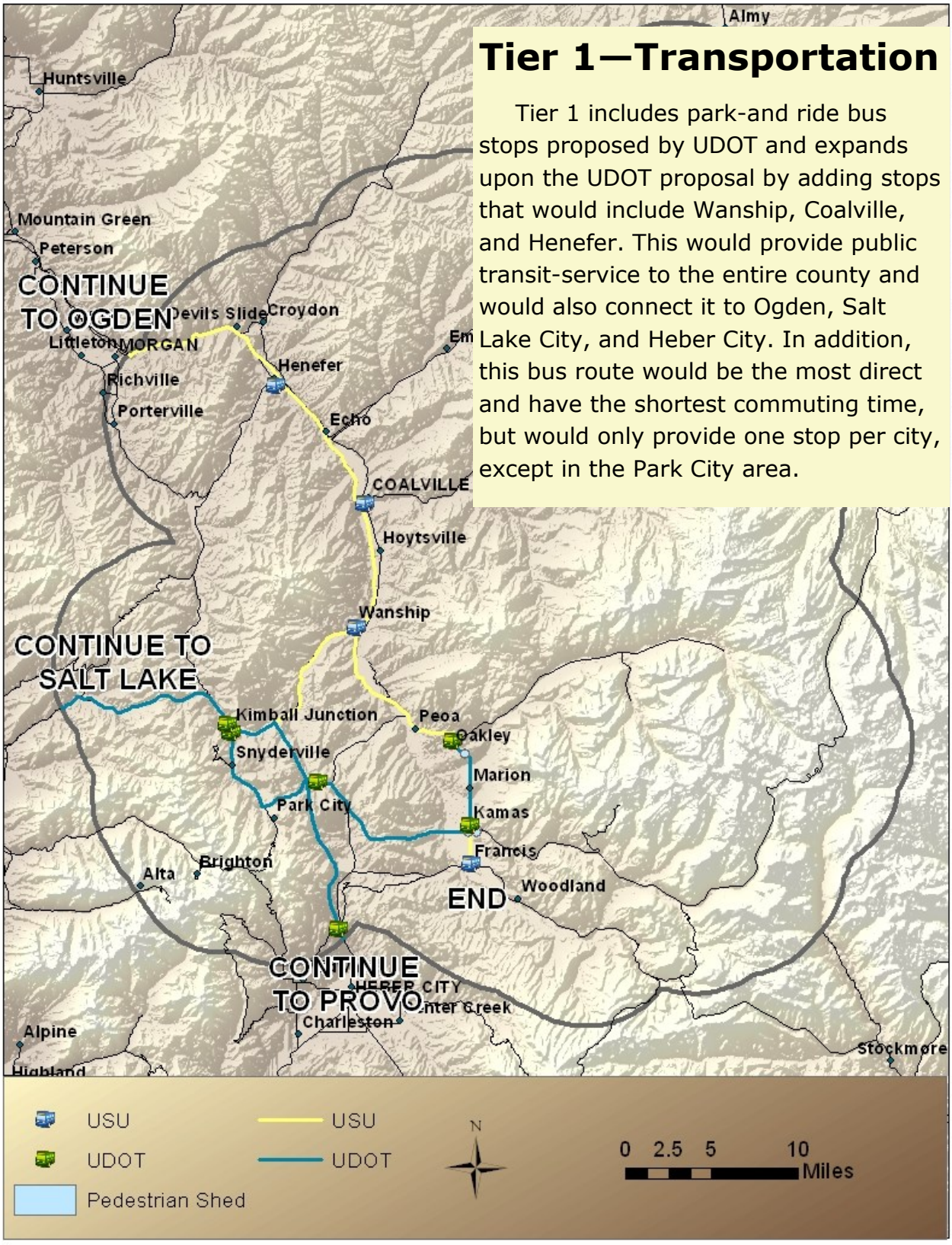
Model Criteria—Future Hubs

- Transportation Network
- UDOT Proposed Hubs
- USU Proposed Hubs

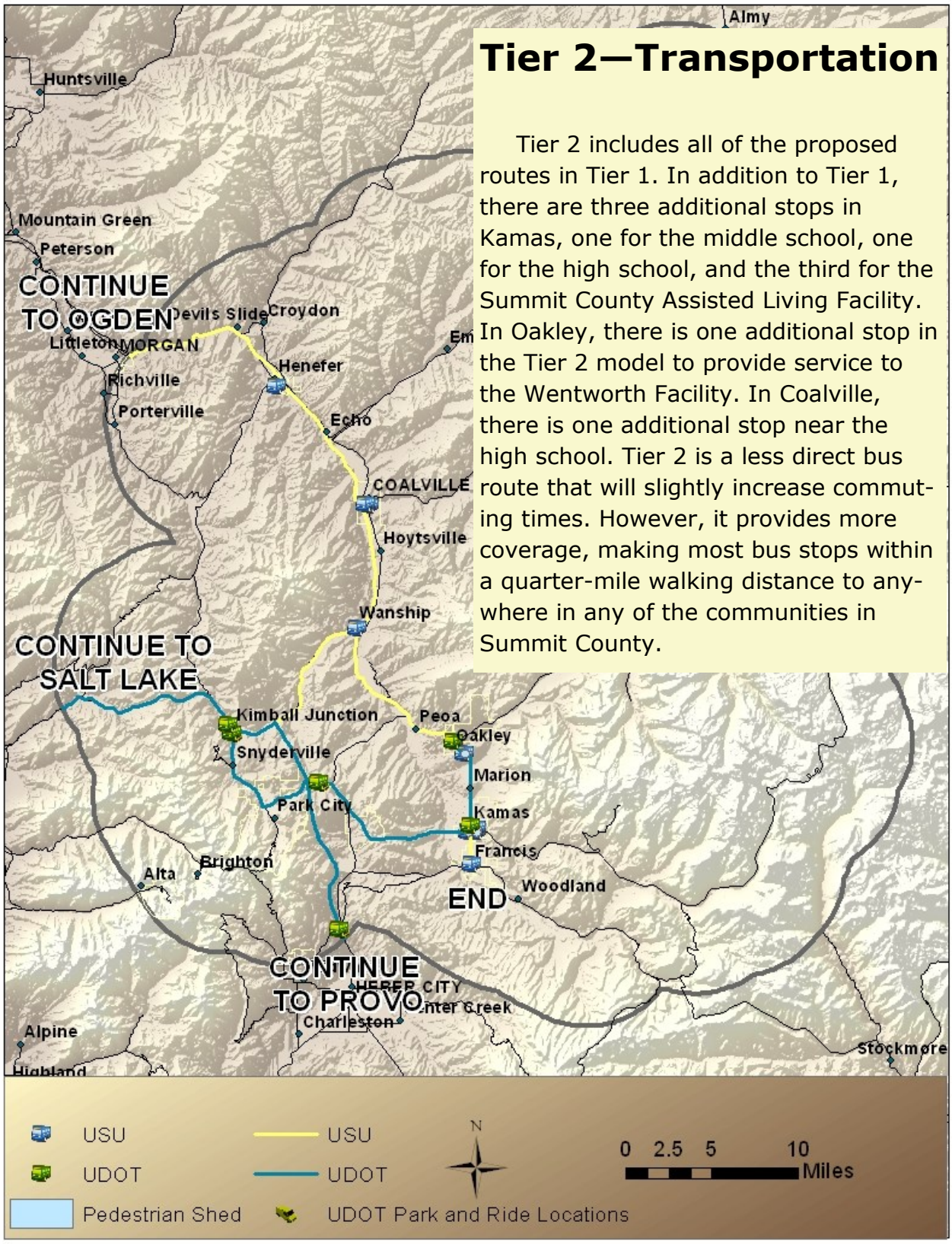
Future Hubs


Almy
Evanston
Huntsville
Wahsatch
Mountain Green
Peterson
Castle Rock
CONTINUE
TO OGDEN
Devils Slide
Croydon
Littleton
MORGAN
Emory
Henefer
Richville
Porterville
Echo
Upton
Pineview
COALVILLE
Hoytsville
Wanship
CONTINUE TO
SALT LAKE
Kimball Junction
Peoa
Oakley
Snyderville
Marion
Park City
Kamas
Francis
Brighton
Alta
Woodland
END
CONTINUE
TO PROVO
Charleston
Alpine
Stockmore
Highland
USU Proposed Route
UDOT Proposed Route
USU Proposed Hubs
UDOT Proposed Hubs
N
0 2.5 5 10
Miles

Public Transport Tier 1



Public Transport Tier 2



Tier 2—Transportation

Tier 2 includes all of the proposed routes in Tier 1. In addition to Tier 1, there are three additional stops in Kamas, one for the middle school, one for the high school, and the third for the Summit County Assisted Living Facility. In Oakley, there is one additional stop in the Tier 2 model to provide service to the Wentworth Facility. In Coalville, there is one additional stop near the high school. Tier 2 is a less direct bus route that will slightly increase commuting times. However, it provides more coverage, making most bus stops within a quarter-mile walking distance to anywhere in any of the communities in Summit County.

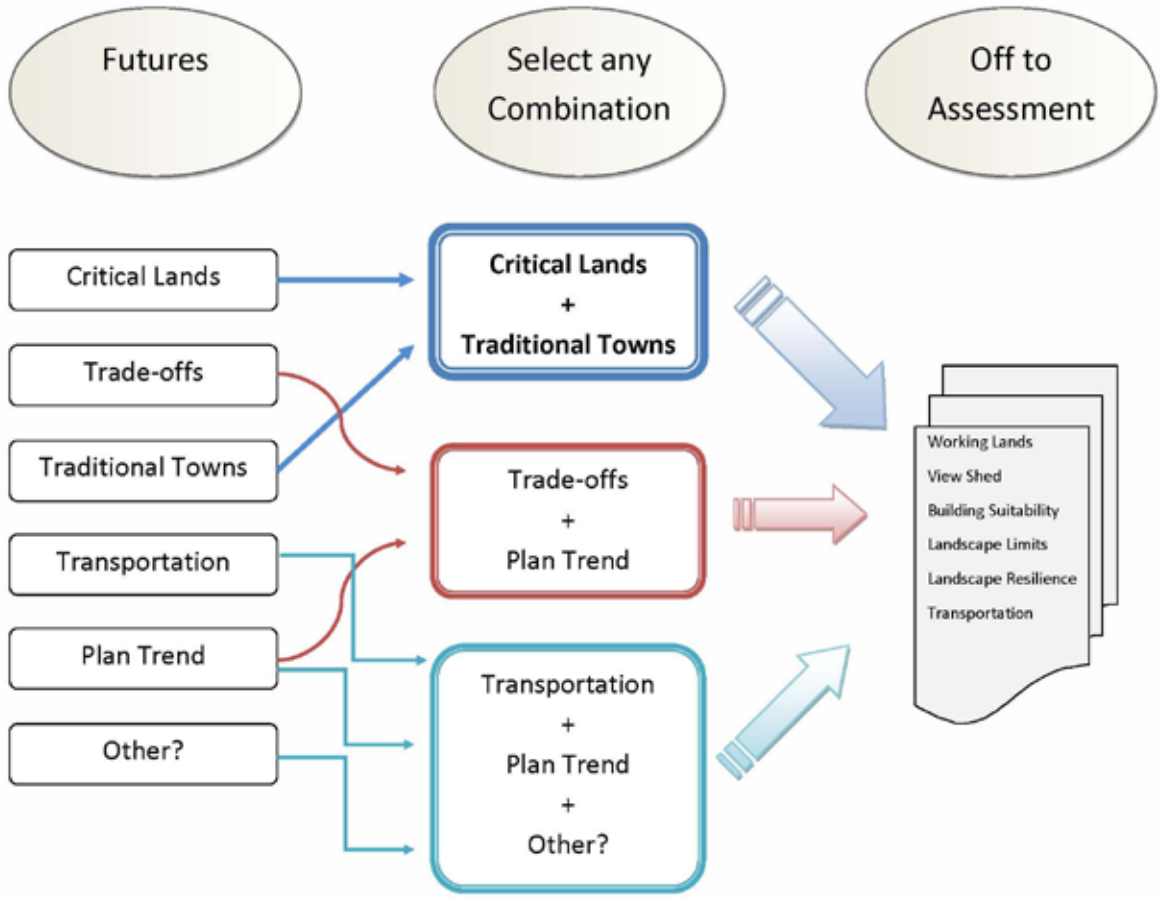
Futures Combination Example

The combination of alternative futures is outlined in Figure 16, illustrating three columns. The first column is a list of possible futures, the second column portrays three possible combinations of the futures from column one, and the third column shows the list of assessment models which were previously developed. Once the combination has been selected, then an assessment can be done by measuring how well the selected futures combination holds to the assessment models which were previously discussed in the report.

The example included in the report shows the two futures, critical lands, and traditional towns, as a combination. This is illustrated as the dark blue outline selection in Figure 16. Figure 17 shows the overlay process of this example, and Figure 18 depicts the overall recommendation map for the futures combination example.

Although an assessment for this example was not done, an assessment of the previously detailed alternative futures has been done and is discussed on the following pages.

Figure 16: Futures Combination Example Process Diagram



Futures Combination Example

Figure 17: Combination of Futures Process

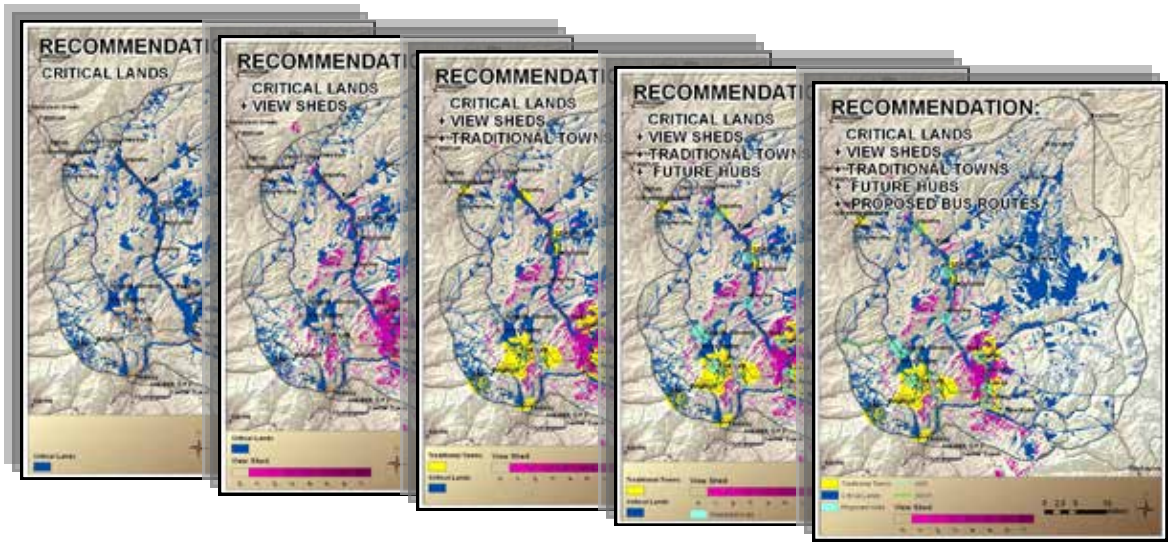
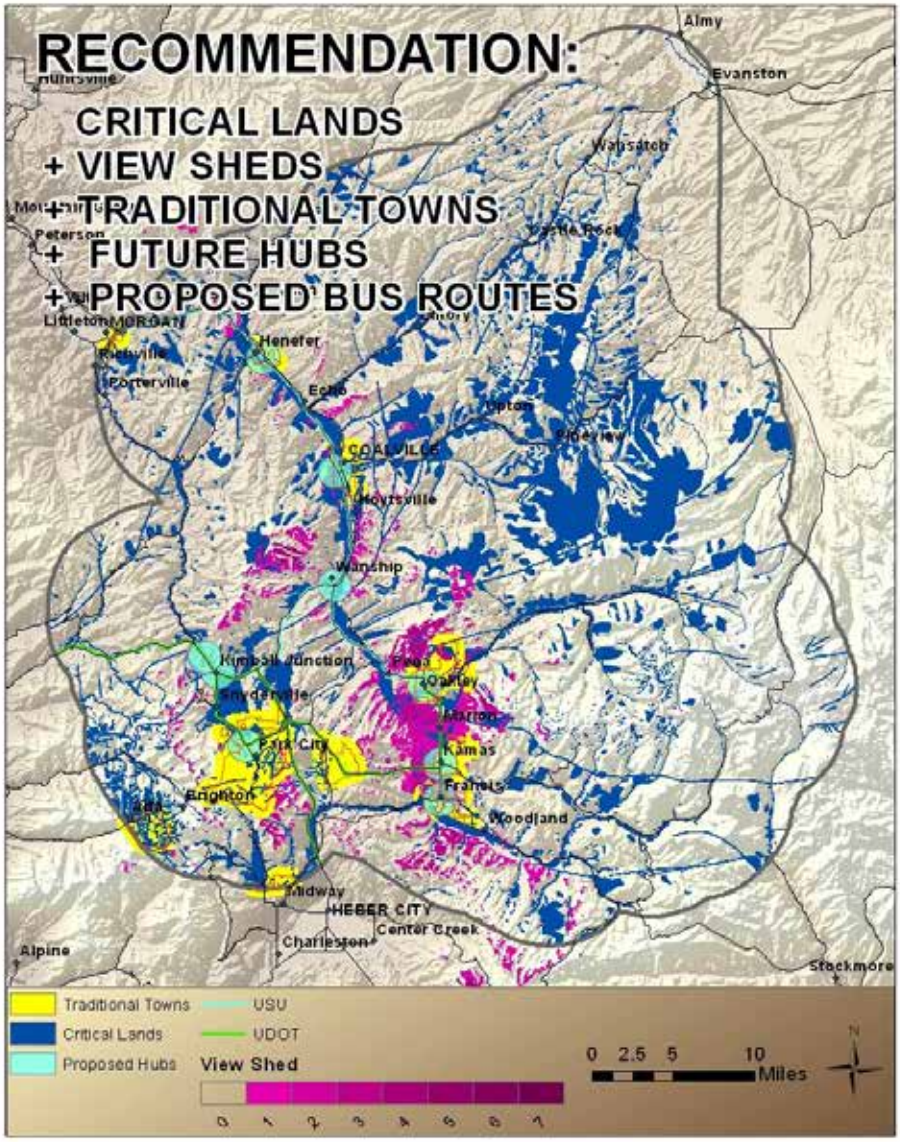


Figure 18: Recommendation Map for Futures Combination Example



Evaluation of Alternative Futures

An evaluation of how well the alternative futures perform on the assessment is a vital step in the planning process. This evaluation process reveals the impacts the chosen alternative futures may have on the issues and concerns identified for the region. This process is summarized in Figure 17 on the facing page. Furthermore, the evaluation provides planners and policy makers a process which helps them understand and predict the effects of potential impacts before development occurs or implementation of land use policies are enacted.

The evaluation is done by comparing the alternative future against the assessment model using ArcGIS. This comparison identifies the areas within the alternative futures that might be in conflict with the assessment models.

Where possible, distinct metrics were used to determine percentage of affected area. However, where this was not feasible, the team took a "best professional judgment" approach.

Critical Lands

Taking out critical lands leaves enough suitable area to build. As shown in the assessment model, the critical lands map was developed from landscape resilience, landscape limits, and the prime agriculture feature from the working lands model. In addition, it maintains the visual quality and supports the statement that no new infrastructure would be necessary for this future. This alternative future passed all assessment criteria.

Plan Trend

The plan trend alternative future does a preliminary job of ensuring people build in suitable areas and away from valuable water sources. As shown in Figure 18, two areas of concern evolve under landscape limits and the loss of working lands within the AP40 zone. Transportation (Function class map) fails because of the large amounts of roads needed to service new development. In addition, view shed fails because the agrarian character would be compromised in the AP40 zone.

Traditional Towns

The traditional towns alternative future performs well in maintaining landscape limits, transportation (Function Class map), building suitability, and view sheds due to the benefit of compact development. This aids in the reduction of taxes and provides for public health, safety, and general welfare.

However, landscape resilience fails because traditional settlement patterns have centered on or near water features. This means that expanding on existing municipal boundaries must be done only after taking into consideration those critical lands and water features near existing municipal boundaries.

As identified in the Water Supply Study for Selected Unincorporated Areas done for the Eastern Summit County Water Advisory Committee (EWAC) by Hansen, Allen and Luce, much of the study area contains shallow alluvial aquifers ranging from 50-160 feet. These shallow aquifers limit drinking water wells and identify septic tanks as a source of pollution that has the potential of limiting new locations for wells in future development.

Evaluation of Alternative Futures

Trade-offs

The alternative future, Trade-offs, performs well on most of the assessments because of the criteria the study team made for this future (see pg. 51). View sheds were less impacted in most areas, with the exception of the Kamas valley. Due to the elevation and terrain of this area, any development will compromise the views of the agrarian character.

Transportation—Future Hubs

The Transportation future, future hubs, does not compromise building suitability, landscape limits, function class, or view sheds.

However, there is concern within the landscape resilience and working lands areas because commercial and institutional development will occur in places where people gather and reside. As a result, new roads and road improvements will be needed as the area grows. Furthermore, in all probability, water will be converted from its agricultural use to residential and commercial uses.

Transportation—Bus Tier 1 and 2

The bus tiers 1 and 2 pass all criteria because there the only required construction is a bus stop.

Figure 18: Alternative Future Assessment Chart

Assessment Model	Critical Lands	Plan Trend	Traditional Towns	Trade-offs	Future Hubs	Bus Tier 1	Bus Tier 2
Building Suitability							
Landscape Limits							
Landscape Resilience							
Function Class Map							
Working Lands							
View Shed							

Pass
Concern
Fail

Recommendations

The recommendation is a combination of four alternative futures and one of the assessments. They are as follows:

- Critical Lands
- Traditional Towns
- Future Hubs
- View Sheds

It is important to remember the components of each of these alternative future maps as the layering process evolves. These components can be found by referring back to the original maps on pages 49, 51, 55, and 33 respectively.

The Critical Lands and View Shed maps represent regional values tied to public health, safety, and welfare. Adding to those, the Traditional Towns map portrays the best way to preserve additional values identified in public meetings. As a final recommendation, the Future Hubs and Bus Routes layers are added to provide a comprehensive transportation future for the residents of the region.

Conclusions

Clearly growth within the study area can be accommodated while still maintaining public health, safety, and welfare of its residents. Two of the alternative futures provide good evidence of this statement.

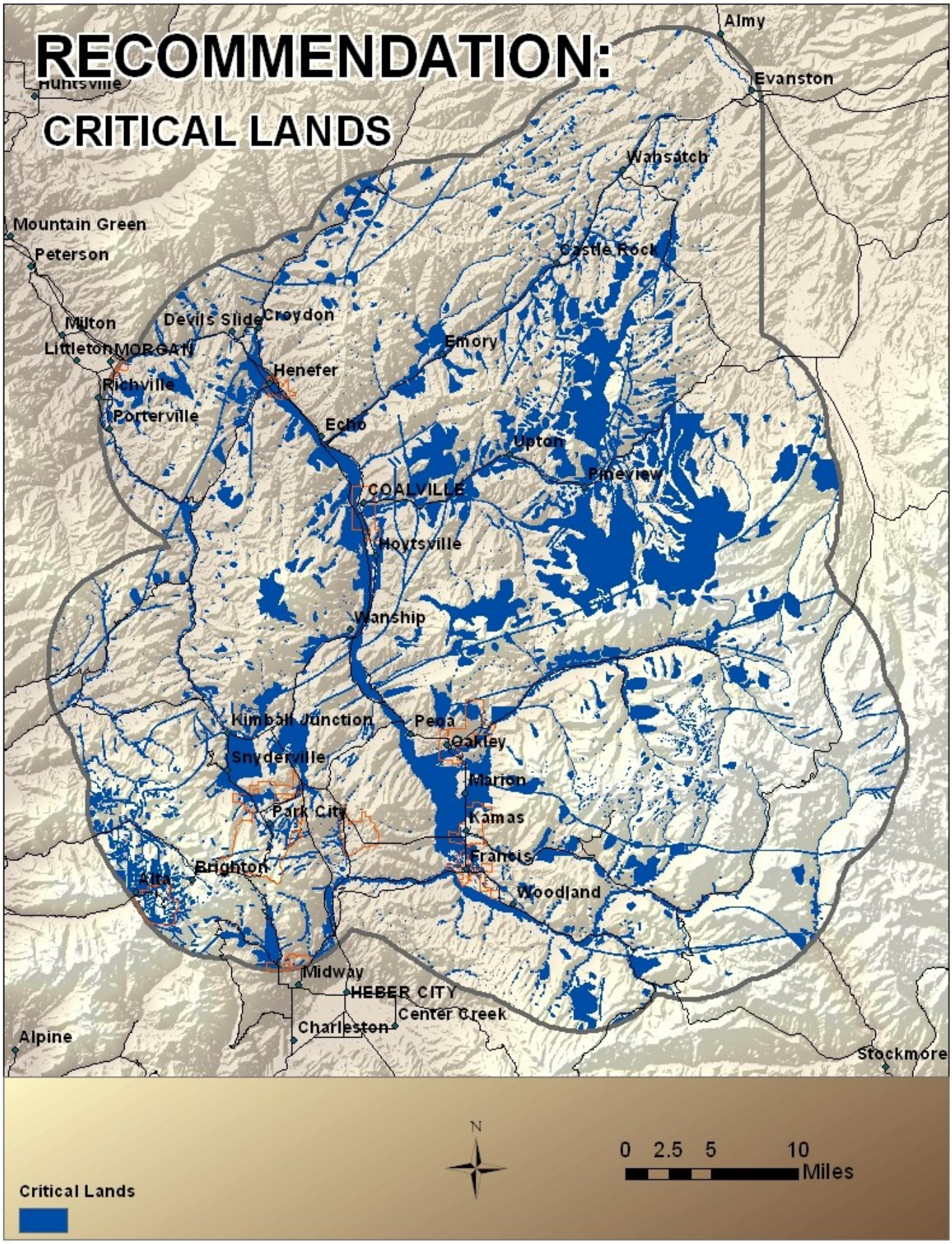
First, the Traditional Towns alternative future has many benefits such as enhancing public transportation, protecting water quality, and lowering taxes by encouraging compact development.

The Trade-offs future is a future that shows both growth and accommodation of community-wide values. This future is important for the utilization of transfer development rights, conservation easements, and McAllister funds which aid in conservation of valued land areas and reduces taxes.

Recommendations

1. Continue implementing the standards in the current land use policy.
    a. Protecting persons and property from floods and other harmful areas
    b. Utilize easements to protect water quality, farms, and visual quality
    c. Preserve and maintain agriculturally productive lands
2. Encourage compact development off the valley bottoms to preserve air and water quality while also helping to maintain the agrarian quality of the region.
3. Focus commercial, institutional, and residential development at regional "hubs" to allow for pedestrian accessible communities that can be connected by a regional transit system.
4. Focus on the Landscape Resilience and Landscape Limits maps because development on those lands impacts critical water issues immediately.

The highest recommendation is for decision-makers and policy makers is to adopt the Critical Lands map. To prevent placing people or structures in harm's way, decision makers are encouraged to develop appropriate policies which implement the critical lands map. For more information regarding critical lands see pg. 46.


RECOMMENDATION:
CRITICAL LANDS
Almy
Evanston
Huntsville
Wahsatch
Mountain Green
Peterson
Castle Rock
Milton
Devils Slide
Croydon
Littleton
MORGAN
Emory
Henefer
Richville
Porterville
Echo
Upton
Pineview
COALVILLE
Hoytsville
Wanship
Kimball Junction
Pena
Oakley
Snyderville
Marion
Park City
Kamas
Francis
Brighton
Alta
Woodland
Midway
HEBER CITY
Center Creek
Charleston
Alpine
Stockmore
N
0 2.5 5 10
Miles
Critical Lands

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GIS Data References

Map Projection Data

Projection: UTM Zone 12 North

Spheroid: WGS 84

Datum: North American Datum of 1983

Grid Data Resolution: 10 Meters

Primary Data Sources

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A-Culture and History

History and Settlement

Between the eastern Uinta Mountains and the western Wasatch Mountains lie high alpine valleys, known today as Summit County. Summit County contains twenty four (24) cities, towns, and census designated places. Figure 1 depicts Summit County and illustrates the location of the six (6) incorporated cities named Coalville, Francis, Henefer, Kamas, Oakley, and Park City. A few of the unincorporated towns in close proximity are Echo, Kimball Junction, Peoa, Snyderville, Hoytsville, and Wanship (Summit County UT - Cities, Towns, Neighborhoods, & Subdivisions, 2010).

Many historic events have enhanced the richness and diversity of this unique county. More recent history reminds us that Summit County was honored to host the celebrated 2002 Winter Olympics. Many diverse cultures attended the 2002 Winter Olympics and witnessed the beautiful open space and slower lifestyle of agriculture and ranching which Summit County provides. This opportunity set in motion the emerging economic growth and development concerns they face today.

The immeasurable history of Summit County is difficult to portray with words. This rich history begins with the settlement and "Natural pathway between the lush grass of Wyoming and the salt deserts to the west" (Summit County Historical Society, 2005). Echo Canyon history includes many historic events of westward expansion beginning with the bison, buffalo, and Native Americans. In the late 1840s, the Mormons would use this path to finish their trek to Salt Lake City. Pony Express riders also used this route on their way to California, later followed by the Union Pacific and the first transcontinental telegraph line in 1861. The Lincoln Highway, once known as "Main Street across America" (Lincoln Highway Association, 2009) was America's first paved road from coast-to-coast. Finally, we acknowledge the scenic route of Interstate 80 at the Echo Junction.

The following is a brief overview of historical events that lie within Summit County. It is highly encouraged for readers to experience the richness of this history by visiting Summit County.

Echo was settled in 1854, by James Bromley. This city is home to the Echo Church which served as a public school from 1880-1913 and a Mormon chapel until 1963 (County, Summit County Historical Society, 2005).

Henefer is an agricultural community along the Weber River. The first homes were built in Henefer around 1850 and were made to protect them from the Indians. The homes were constructed of "adobe brick, packed mud floors, dirt roofs, and windows with barred shutters" (Summit County Historical Society, 2005). During 1927-1930, the Bureau of Reclamation built the Echo Dam. This reservoir flooded 1,825 acres of farmland. As a result, a portion of the Lincoln Highway and the railroad track needed to be relocated.

Coalville was originally named Chalk Creek but was renamed when Thomas Rhodes discovered coal. Coalville is the county seat, and the Summit County Courthouse was constructed of native stone in 1903-1904. Thomas Rhodes had built his home in 1853 at Oakley (Summit County Historical Society, 2005).

Upton was originally a sawmill town and was settled in 1861. In the 1970's an oil field was discov-

ered. Its oil wells have been drilled to 18,000 feet (Summit County Historical Society, 2005).

Hoytsville was settled in 1859. Their homes were demolished to construct a fort against the Indians. This town is home of Hoyt Mansion, "one of Utah's most elegant 19th century homes" (Summit County Historical Society, 2005).

Wanship was settled in 1857. It was a hub for coal, timber, and silver from Coalville, Kamas, and Park City, respectively. Wanship was named after a Ute Chief.

Kamas was settled in 1857. A log fort was built here and housed 32 families during the Blackhawk Indian Wars from 1867-1870, when it was vacated. Kamas now employs flour mills, creameries, a bank, hotel, movie theatre, undertaker, and garages (Summit County Historical Society, 2005).

In close proximity to Snyderville, the Kimball Hotel was constructed in 1862 by William Kimball (Summit County Historical Society, 2005). Legendary visitors were Mark Twain, a "literary icon" (Solutions, 2006), Walt Whitman, an "American poet best known for *'Leaves of Grass'"* (Liukkonen, 2008), and Horace Greeley, a newspaper editor and politician (Nevins, 1999).

In 1869 ore was discovered in Park City. This discovery led to the outburst of development with "miners, saloons, brothels, and semetaries" (Summit County Historical Society, 2005). Initially the mining was very shallow and prosperous. However, as they began to mine deeper, they reached the water table and flooding destroyed the mines (Unknown). The mining companies joined together, and with their capital, they were able to build drainage canals. The United Park City Mines Company (Summit County Historical Society, 2005) also "built the first ski trails" (Summit County Historical Society, 2005). Today, Park City is thriving with a population of 8,127 in 2009 (Inc., 2003-2010). There are "three ski areas, shops, 100 restaurants, luxury homes" (Summit County Historical Society, 2005).

Today's expanding economic and population growth of Summit County has revealed land use problems between the eastern and Snyderville Basin areas. To mitigate land use concerns, Summit County has adopted two Development Codes, "*Eastern Summit County Development Code*," and "*Snyderville Basin Development Code*."

The development code for Eastern Summit states that, "the owners of property within Eastern Summit County recognize the importance of agricultural lands and operations and small rural business enterprises."

The Snyderville Basin development code states that, "the resort and mountain character of the basin is to be embraced and protected, while suburban development patterns, which erode the unique character of the basin, is discouraged and, to the extent possible, prohibited." How growth should be managed and controlled in Summit County is a constant debate by "the area's new residents on one side and the developers and large parcel landowners on the other" (Snyderville Basin General Plan, 2002).

Summit County provided a State and Locally Assessed District Total spreadsheet. Figure 2 is a pie chart based off the provided data. This graph illustrates most of the land is held within the FAA Agricultural Land. This designation indicates that 85% of Summit County land has been assessed and is taxed under the Farmland Assessment Act.

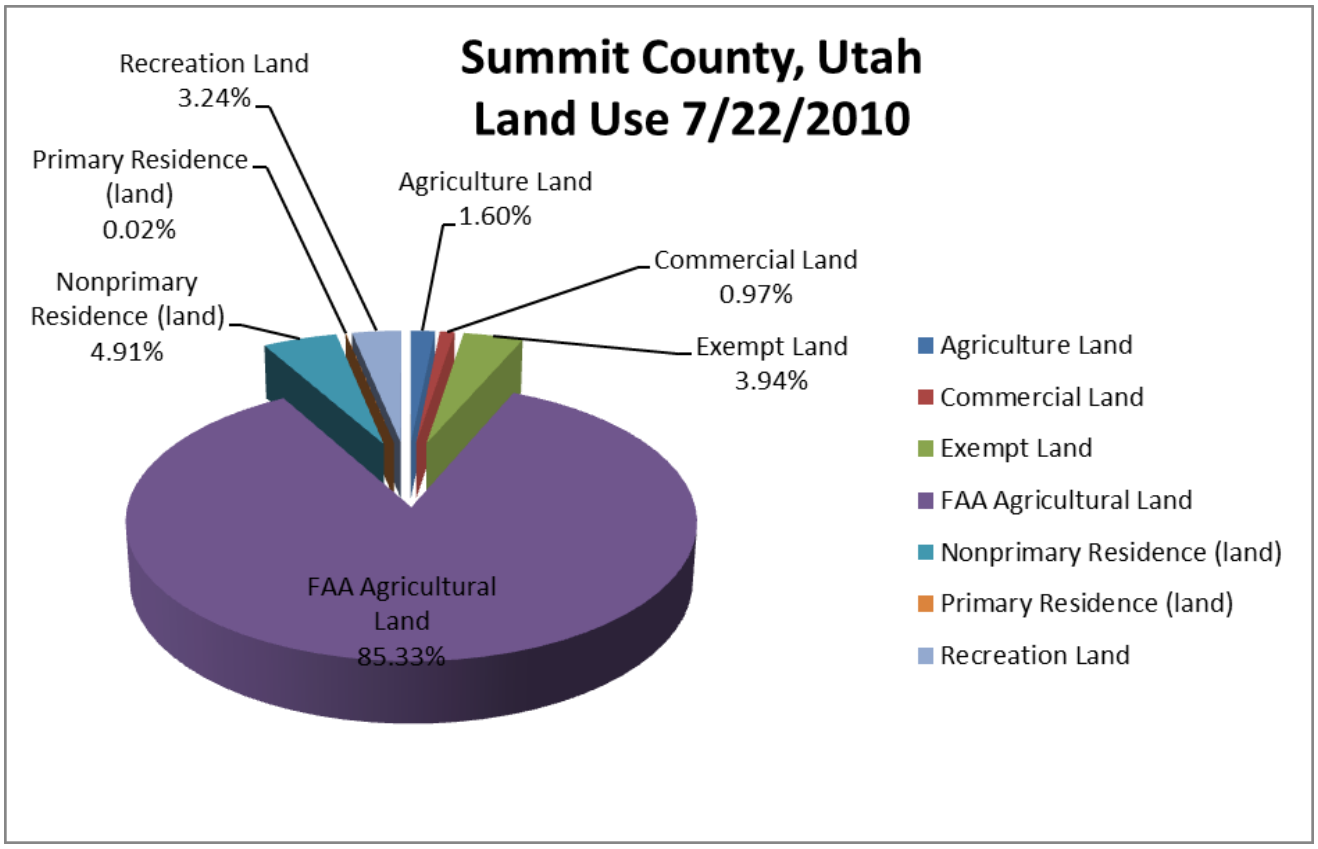
A-Culture and History

This act was initiated for agriculture lands near urban development.

The market value of land in urban areas is higher than suburban areas. Those lands used for the production of agricultural products, if taxed at market value, would make farming operations economically infeasible.

The major qualifiers for this tax credit are that the land has five (5) contiguous acres of land, is used solely for agricultural purposes and its operation is managed to the extent that a profit will be expected, the land has been devoted to agriculture use for the last two years, and meets average annual production. More than half of the land acreage is used for agricultural purposes in Summit County.

Another interesting outcome of this data is that most residences within Summit County are classified as non-primary residence land. This indicates that of the 4.93% residential land, 4.91% of the land is for non-primary (secondary) homes.



Summit County Utah – State and Locally Assessed District Totals as of July 22, 2010

A-Culture and History

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B-Population Projections

The Utah Governor's Office of Planning and Budget (Mower, 2009) estimates that the current population of 41,988 people in Summit County as of 2010 will raise to 68,474 people by 2030. From the year 2000 to 2030, the projected annual average rate of change for population increase in Summit County is the highest for any county in the state at 2.82%. Related to population increase, the average vehicle miles traveled per capita, according to the Governor's Office of Planning and Budget, will increase by 2.55% annually, the highest percentage of increase by any county in Utah.

B-Population Projections

Mountainland - Municipal Population Projections

Mountainland Association of Governments - April 2008

	Census		Short Range Projection			Long Range Projection		
	2000	2006	2010	2020	2030	2040	2050	2060
MOUNTAINLAND REGION	**413,487**	**531,872**	**627,571**	**828,311**	**1,038,686**	**1,261,701**	**1,479,640**	**1,717,239**
SUMMIT COUNTY	**29,736**	**35,469**	**42,320**	**64,738**	**83,252**	**104,620**	**131,594**	**165,029**
Coalville	1,382	1,419	1,587	2,031	**2,383**	2,400	2,500	2,600
Francis	698	889	1,077	1,919	**2,748**	4,300	6,000	8,300
Henefer	684	722	875	1,558	**2,729**	3,500	3,800	4,100
Kamas	1,274	1,493	1,810	2,779	**3,982**	4,100	4,500	4,900
Oakley	948	1,299	1,601	2,851	**4,993**	6,300	7,000	7,600
Park City	7,371	8,041	9,185	13,382	**15,838**	16,600	18,000	19,400
Unincorporated	17,397	21,606	26,185	40,217	**50,580**	67,420	89,794	118,129
UTAH COUNTY	**368,536**	**475,425**	**560,511**	**727,718**	**907,210**	**1,092,450**	**1,261,653**	**1,438,300**
Alpine	7,146	9,204	9,884	11,340	**12,105**	12,800	12,900	13,000
American Fork	21,941	25,596	29,434	36,139	**42,100**	46,600	48,200	48,300
Cedar Fort	341	396	416	2,485	**9,175**	15,900	23,600	35,000
Cedar Hills	3,094	8,410	11,737	12,295	**12,552**	12,600	12,700	12,800
Draper	X	774	2,400	4,856	**6,307**	8,100	9,600	10,100
Eagle Mountain	2,157	17,391	26,239	45,653	**76,376**	113,200	149,900	180,000
Elk Ridge	1,838	2,296	3,133	5,578	**6,963**	7,100	7,200	7,300
Fairfield	X	146	146	470	**1,585**	4,800	12,000	19,000
Genola	965	997	1,494	2,886	**5,078**	7,500	10,000	15,400
Goshen	874	911	937	1,294	**1,702**	1,800	2,900	6,000
Highland	8,172	13,889	18,107	21,735	**22,775**	23,900	24,400	24,500
Lehi	19,028	36,021	47,555	66,967	**82,487**	100,700	114,300	127,700
Lindon	8,363	9,758	11,318	13,722	**14,500**	14,700	14,800	14,900
Mapleton	5,809	7,157	8,764	11,644	**16,358**	17,500	17,600	17,700
Orem	84,324	90,857	94,725	98,732	**105,000**	109,500	114,000	115,000
Payson	12,716	16,748	19,221	30,234	**43,790**	55,300	63,100	71,900
Pleasant Grove	23,468	30,729	34,446	38,578	**42,877**	48,200	52,600	55,500
Provo	105,166	116,217	121,330	131,258	**138,450**	141,800	141,900	142,000
Salem	4,372	5,632	9,004	17,022	**28,651**	38,000	45,000	51,100
Santaquin	4,834	7,027	10,882	20,219	**29,113**	39,300	47,500	55,700
Saratoga Springs	1,003	10,750	17,936	38,325	**70,386**	94,200	115,200	122,000
Spanish Fork	20,246	27,717	34,173	46,042	**56,651**	66,300	69,400	72,700
Springville	20,424	25,998	30,536	44,438	**50,741**	58,000	58,700	59,200
Vineyard	150	148	1,955	10,526	**15,832**	22,000	23,100	24,000
Woodland Hills	941	1,269	1,461	1,558	**2,245**	2,900	3,000	3,000
Unincorporated	11,164	9,387	13,276	13,723	**13,412**	29,750	68,053	134,500
WASATCH COUNTY	**15,215**	**20,978**	**24,740**	**35,855**	**48,224**	**64,631**	**86,393**	**113,910**
Charleston	378	436	736	995	**1,240**	1,500	1,900	2,500
Daniel	na	726	913	1,152	**1,366**	1,700	2,000	2,600
Heber City	7,291	9,775	12,459	16,581	**20,244**	25,500	30,800	40,600
Midway	2,121	3,117	4,007	6,120	**8,773**	11,600	14,200	18,800
Wallsburg	274	298	557	864	**1,190**	1,700	2,000	2,600
Unincorporated	5,151	6,626	6,068	10,144	**15,411**	22,631	35,493	46,810

Higher numbers in unincorporated areas will most likely be absorbed into current municipalities or into new municipalities.

Explanation of C and D

On November 18, 2010, the study team met at the Wanship Fire Station for a stakeholder meeting where a written exercise (Appendix C), and visual survey (a copy of the complete results can be found in Appendix E) was given. There were approximately 23 stakeholders and citizens in attendance. Representation came in the form of interested and concerned citizens, as well as elected and appointed officials from Summit County and the surrounding communities.

C-Written Exercise

SUMMIT COUNTY STAKEHOLDER'S CONCERNS AND ISSUES

Please mark the appropriate reponse for each question.

1	The regions population is projected to double by 2030, from 40,000 to 80,000. I am concerned about the impact of population growth on future development.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
2	I am concerned about maintaining an adaquate supply of culinary (household) water.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
3	I believe the County should take an active role in protecting surface water quality.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4	I believe the County should take an active role in protecting air quality.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	I believe public health services are adequate in the region.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6	The current land use policy in the region is compatible with my values and "quality" of life.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7	The agrarian character of the region is an important feature or factor in defining my quality of life.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
8	The visual quality of the region is important to me.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
9	I feel I am part of the community.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
10	The current transportation networks are adequate for my needs.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
11	I think alternative modes of transporation should be considered for the region.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
12	There is sufficient access to the recreation amenities I enjoy .	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
13	There are adequate recreation amenities in the region.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
14	The recreation amenities within the Park City / Snyderville Basin are accessible.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
15	The County should take an active role in protecting agricultural lands?	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
16	I feel that prime wildlife habitat (deer, elk, moose, etc) should be protected.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
17	What is the preferred lot size for a single family residence in the region.	1/4 acre	0.5 acre	1/3 acre	1/8 acre	1 acre
18	What is the preferred lot size for a single family residence with animal rights.	1/4 acre	1 acre	2 acres	5 acres	10+ acres
19	I would be willing to support a small (.5%) increase in property tax to maintain water quality.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
20	I would be willing to support a small (.5%) increase in property tax to improve health services.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

C-Written Exercise

21	Landowners should be compensated for the protection of conservation easements.	Strongly Agree O	Agree O	Neutral O	Disagree O	Strongly Disagree O
22	Private property rights should take precedence over public health.	Strongly Agree O	Agree O	Neutral O	Disagree O	Strongly Disagree O
23	Private property rights should take precedence over public well being.	Strongly Agree O	Agree O	Neutral O	Disagree O	Strongly Disagree O
24	Private property rights should take precedence over public safety.	Strongly Agree O	Agree O	Neutral O	Disagree O	Strongly Disagree O
25	What is your gender?	Male O	Female O			
26	What city/town do you live in or closest to?	Kamas O	Park City O	Snydervill e O	Henefer O	Coalville O
		Francis O	Oakley O			
27	Which livelihood best describes you?	Medical O	Education al O	Agricultur al O	Business Professio nal O	Other O
28	How long do you expect to live in the region?	Less than 1 year O	1-5 years O	6-10 years O	11-15 years O	16-20 years O
		21-25 years O	26-30 years O	30+ years O		
29	What is your age range?	0-20 years O	20-29 years O	30-39 years O	40-49 years O	50+ years O

30 List any issues or concerns you may have, that were not asked on this survey

D-Written Exercise Results

WRITTEN EXERICSE IN WANSHIP - RESULTS									
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	No Response			
Question 01	64%	36%	0%	0%	0%				
Question 02	79%	7%	7%	7%	0%				
Question 03	50%	36%	14%	0%	0%				
Question 04	43%	50%	7%	0%	0%				
Question 05	14%	36%	29%	14%	7%				
Question 06	7%	36%	14%	29%	7%	7%			
Question 07	50%	29%	21%	0%	0%				
Question 08	71%	21%	0%	7%	0%				
Question 09	29%	50%	21%	0%	0%				
Question 10	7%	43%	7%	29%	14%				
Question 11	36%	50%	14%	0%	0%				
Question 12	21%	64%	7%	7%	0%				
Question 13	21%	64%	7%	7%	0%				
Question 14	36%	57%	7%	0%	0%				
Question 15	50%	21%	21%	0%	7%				
Question 16	50%	43%	0%	0%	7%				
Question 17	21%	14%	29%	0%	29%	7%			
Question 18	0%	7%	21%	57%	14%				
Question 19	36%	29%	21%	7%	7%				
Question 20	29%	7%	36%	21%	7%				
Question 21	29%	50%	7%	7%	0%	7%			
Question 22	0%	0%	21%	50%	21%	7%			
Question 23	0%	7%	14%	36%	36%	7%			
Question 24	0%	0%	7%	50%	36%	7%			

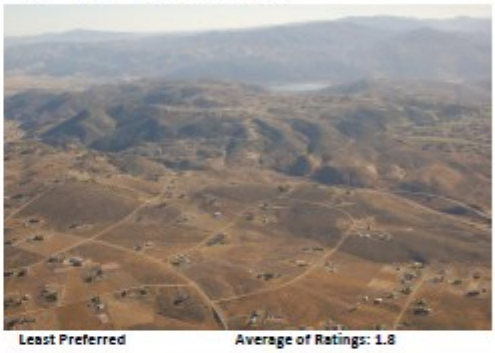
D-Written Exercise Results

WRITTEN EXERICSE IN WANSHIP - RESULTS									
	Male	Female	No Answer						
Question 25	71%	21%	7%						
	Kamas	Park City	Snyderville	Henefer	Coalville	Francis	Oakley		
Question 26	7%	14%	29%	14%	29%	7%	0%		
	Medical	Educational	Agricultural	Business Professional	Other				
Question 27	0%	0%	7%	64%	29%				
	No response	Less than 1 year	1-5 Years	6-10 Years	11-15 Years	16-20 Years	21-25 Years	26-30 Years	30+ Years
Question 28	7%	0%	21%	21%	14%	7%	7%	14%	7%
	No response	0-20 Years	20-29 Years	30-39 Years	40-49 Years	50+ Years			
Question 29	0%	0%	21%	14%	7%	57%			

E-Visual Exercise Results

DENSITY / PLACEMENT

Most Preferred Average of Ratings: 4.2



Least Preferred Average of Ratings: 1.8

Most Preferred Average of Ratings: 4.2

Least Preferred Average of Ratings: 1.2

HOUSING TYPES

Most Preferred Average of Ratings: 4.0

Least Preferred Average of Ratings: 2.0

Most Preferred Average of Ratings: 3.6

Least Preferred Average of Ratings: 1.8

E-Visual Exercise Results

LANDSCAPES

Most Preferred Average of Ratings: 4.8

Least Preferred Average of Ratings: 1.6

Most Preferred Average of Ratings: 4.0

Least Preferred Average of Ratings: 1.4

LANDMARKS

Most Preferred Average of Ratings: 5.0

Least Preferred Average of Ratings: 1.8

Most Preferred Average of Ratings: 4.6

Least Preferred Average of Ratings: 1.0

E-Visual Exercise Results

CORRIDORS

Most Preferred Average of Ratings: 4.8

Least Preferred Average of Ratings: 1.2

Most Preferred Average of Ratings: 4.0

Least Preferred Average of Ratings: 1.0