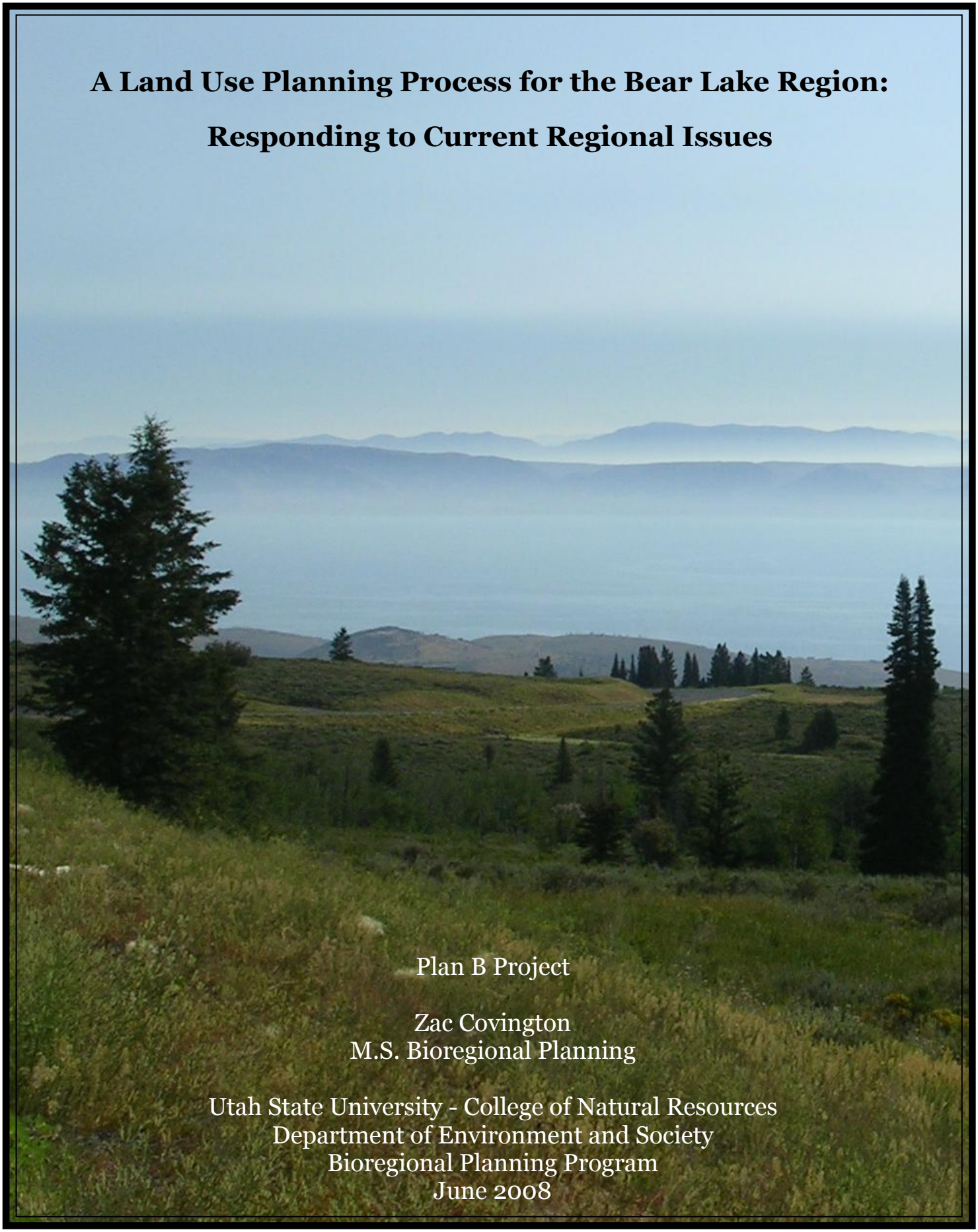
A Land Use Planning Process for the Bear Lake Region: Responding to Current Regional Issues



Plan B Project

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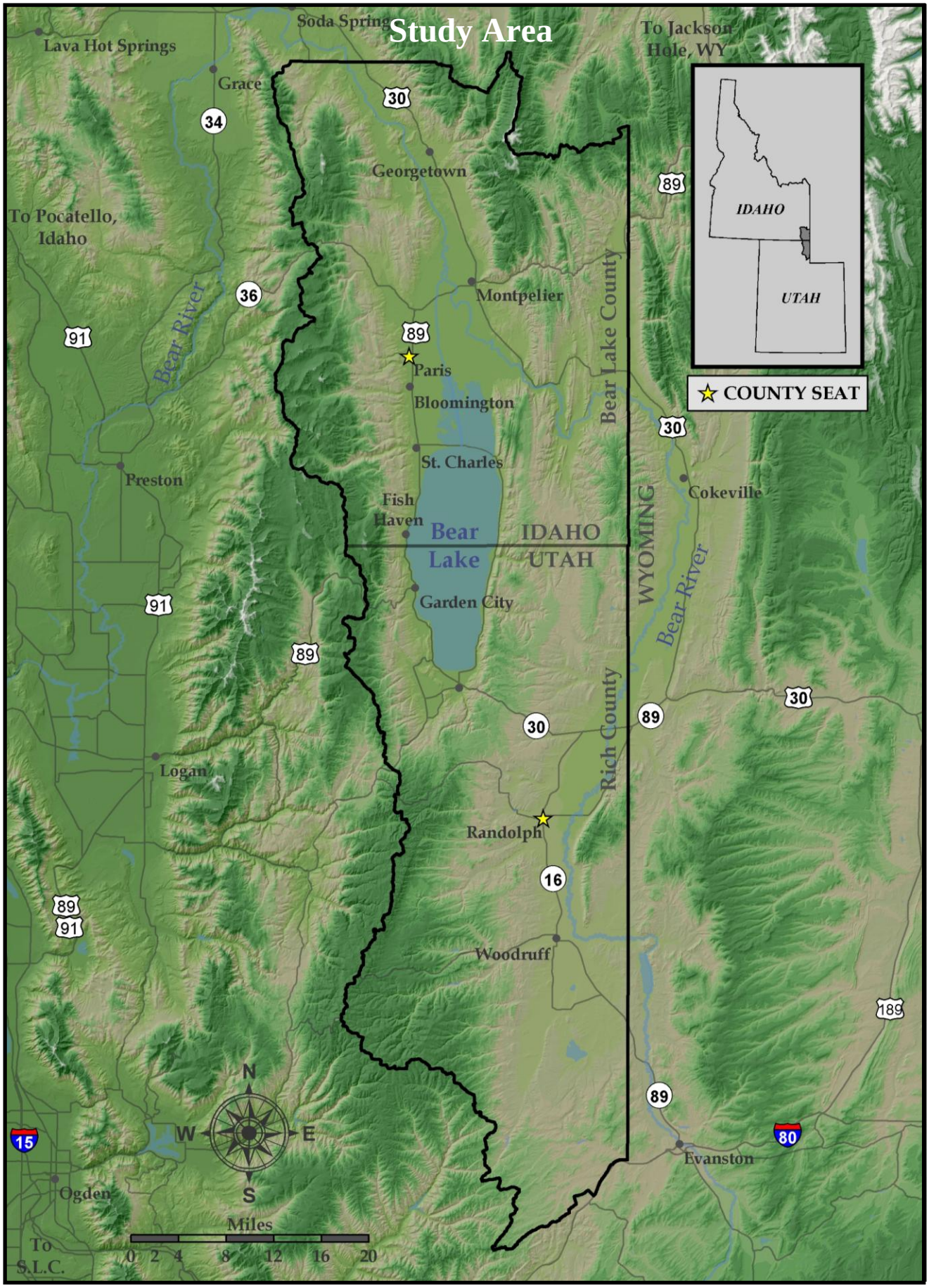
June 2008



Vector data was provided by the INSIDE Idaho website, the Utah GIS Portal, and the USGS National Hydrography Dataset. Raster data was generated using 10 meter Digital Elevation Models.

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Committee Members: David Bell and Steven W. Burr

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Cover Photo: Bear Lake by Zac Covington

This project would not have been possible without the support of the many university faculty and professionals who gave of their time and energy. Richard E. Toth, committee chair and professor in the Department of Environment and Society, College of Natural Resources at Utah State University, gave priceless advice and support. Without his patience and mentoring, this project would not have been the great learning experience and tool it has become for me.

Committee members were Associate Professor David Bell from the Department of Landscape Architecture and Environmental Planning, and Associate Professor Steven W. Burr from the Department of Environment and Society. They have also added crucial insight to the project through their sharing of expertise in rural community planning and outdoor recreation. Many important components of the project would have been missed if not for their willingness to give assistance.

There is also a great appreciation for Cindy Bilskie, Department of Community and Economic Development director, and Brian Carver, regional planner at Bear River Association of Governments, who offered their professional advice and mentoring throughout the entire process.

The Bear Lake Regional Commission has also been instrumental in the creation of this document. Al Harrison, Executive Director, and Mitch Poulson, Deputy Director, gave their assistance frequently in the compilation of the information needed for a complete project. The commission as a whole has also been supportive throughout the process, giving professional insight on planning needs in the region and in giving practical advice regarding the various analyses needed.

County Commissioners Montain Kunz, Dwight L. Cochran, and Vaughn Rasmussen of Bear Lake County, Idaho, and Commissioners Norman Weston, Bill Cox, and Thomas Weston of Rich County, Utah also gave insight and support during the process.

Many other professionals gave of their time and energy to help ensure a successful project and should be recognized with gratitude for their assistance. They include the following: Mike Allred, Environmental Scientist, Division of Water Quality, Utah Department of Environmental Quality; Connie Carling, Secretary, Bear Lake Regional Commission; Dave and Claudia Cottle, Executive Directors of Bear Lake Watch; Warren Colyer, former President of Cache Anglers, Trout Unlimited Chapter; Michael Domeier, Utah State Soil Scientist, NRCS; Richard Droesbeke, Park Manager, Bear Lake State Park, Utah; Jeff Gilbert, Transportation Planner, Cache Metropolitan Planning Organization; Judy Holbrook, Director of the Bear Lake Visitors Bureau; Rick Fawcett, Owner and President of Whisper Mountain Professional Services, Inc.; Howard Horton, Rangeland Scientist, USDA, ARS, Forage and Range Research Laboratory; Stephanie Jones, current President, Cache Anglers, Trout Unlimited; Kevin Kilpatrick, Environmental Lead, Utah Department of Transportation Environmental Services; Nancy Mesner, Associate Dean, College of Natural Resources, Utah State University, and Water Quality Specialist; Jeffrey L. Patlovich, AICP, Administrator, Planning and Building Department, Fremont County, Idaho; Michael Peel, Research Geneticist, USDA, ARS, Forage and Range Research Laboratory; Chris Peirsol, Transportation Planner, District 5, Idaho Transportation Department; and Lynn Van Every, Water Quality Manager, Pocatello Region, Idaho Department of Environmental Quality.

I also would like to thank my wife and children for the support and patience they have had throughout this project and throughout my education in general. Without their love and support, it would not have even been possible to begin the process, let alone complete it.

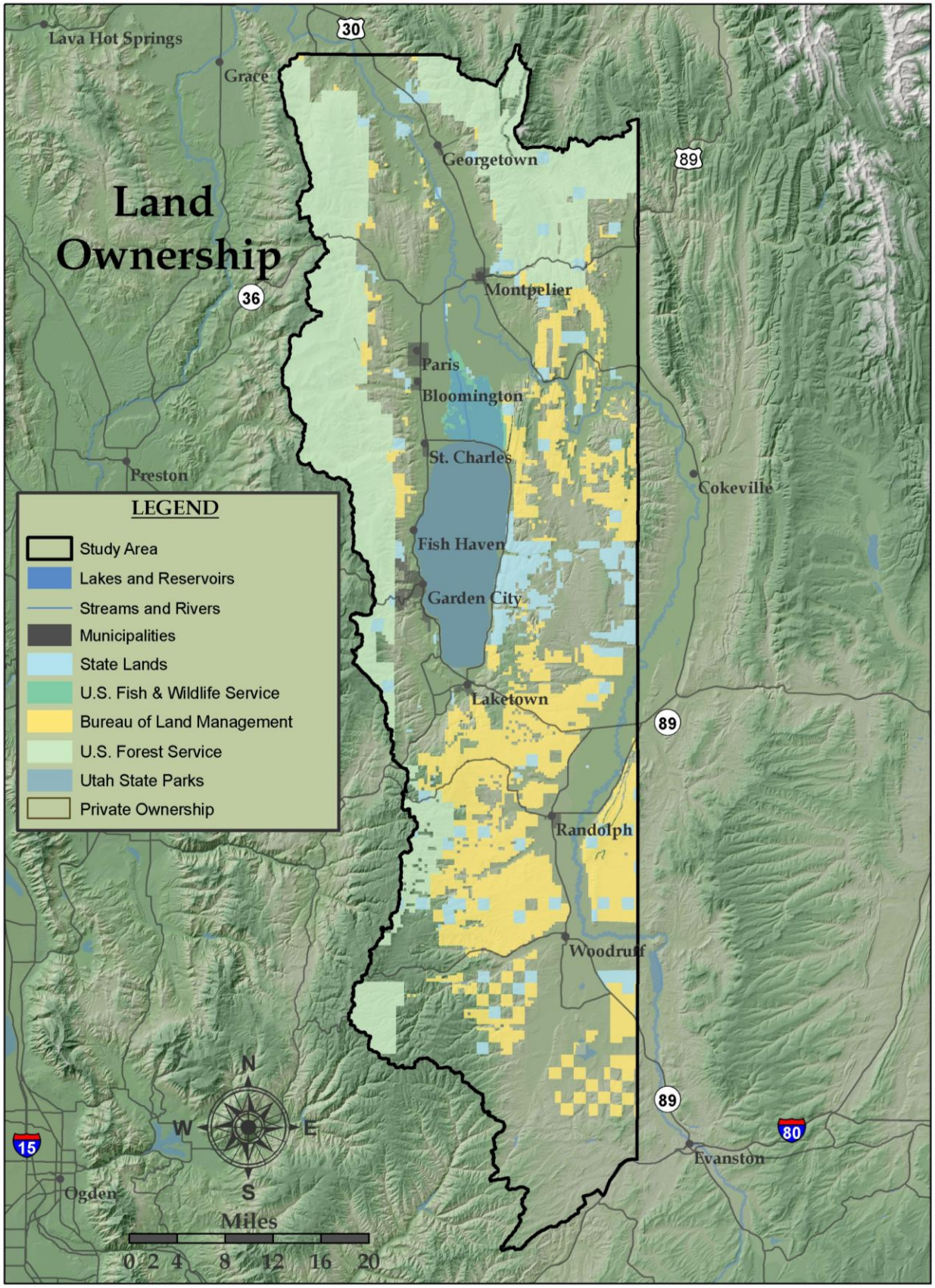
Lastly, thanks are also necessary for the overall financial contribution to the project from the Bear River Association of Governments and for printing resources provided by the Bear Lake Regional Commission.

Early in the 1970s, residents of the Bear Lake area found themselves being pressured to protect the natural and cultural treasures they knew in the Bear Lake region. Developers discovered the value of the beauties in the region, and began building cabin and summer-home communities on large tracts of land. Today, the pressure has only increased, with people finding the Bear Lake area to be a vacation destination, adding much larger and expensive homes to the landscape. Thus, economic pressures are weighing heavily in the lives of local farmers and ranchers to sell property that is immediately adjacent, or relatively close, to Bear Lake. Zoning and town planning for the local communities have become increasingly more complicated. Communities have also struggled for consistent economic stability and have tried to find ways to capitalize on the region's recreational amenities, while creating long-term economic stability through the winter months. While there are many land planning needs in the bi-county region of Bear Lake, many of these issues have been addressed by local and regional planners.

In 1973, the Bear Lake Regional Commission was formed to address planning needs of the Bear Lake region associated with land, water, and air. The purpose of the Bear Lake Regional Commission is, "…to provide long-term direction and guidance in addressing the needs and problems of the Bear Lake area, and to preserve and promote Bear Lake's environment and the Bear Lake Basin resources" (BLRCW, 2007).

Several of the communities in the Bear Lake region have also recently asked the Bear River Association of Governments for assistance in addressing local municipal planning issues. The purpose of this project was to provide the towns and counties in the Bear Lake region with more planning tools that can be utilized in guiding land use decisions. It was also done with the hope that these ideas may be useful in developing more regional planning processes that help manage growth in a way that provides for the needs of current and forth-coming residents. Care was taken to help identify sensitive or "critical" landscape components of the region to be avoided with forthcoming urban development and growth.

Much like other rural areas in the western U.S., the Bear Lake area is becoming one of the great "discoveries" for recreation, tourism, natural beauty, and other amenities. As pressure to sell and develop valuable land continues to become more evident in the near future, it is crucial that the region has as many tools as possible to mitigate potential impacts on natural, cultural, and socio-economic amenities. If these amenities are not properly cared for, potential negative consequences for the public's health, safety, and welfare could ensue. While growth in such a beautiful place is certain, it is believed that it can be done in a way that preserves the landscape and the irreplaceable natural services it provides, stimulates economic growth, and embraces the unique regional heritage and culture of the Bear Lake region.


Land Ownership
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Preston
Cokeville
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
30
89
36
15
80
LEGEND
Study Area
Lakes and Reservoirs
Streams and Rivers
Municipalities
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
Private Ownership
N
W
E
S
Miles
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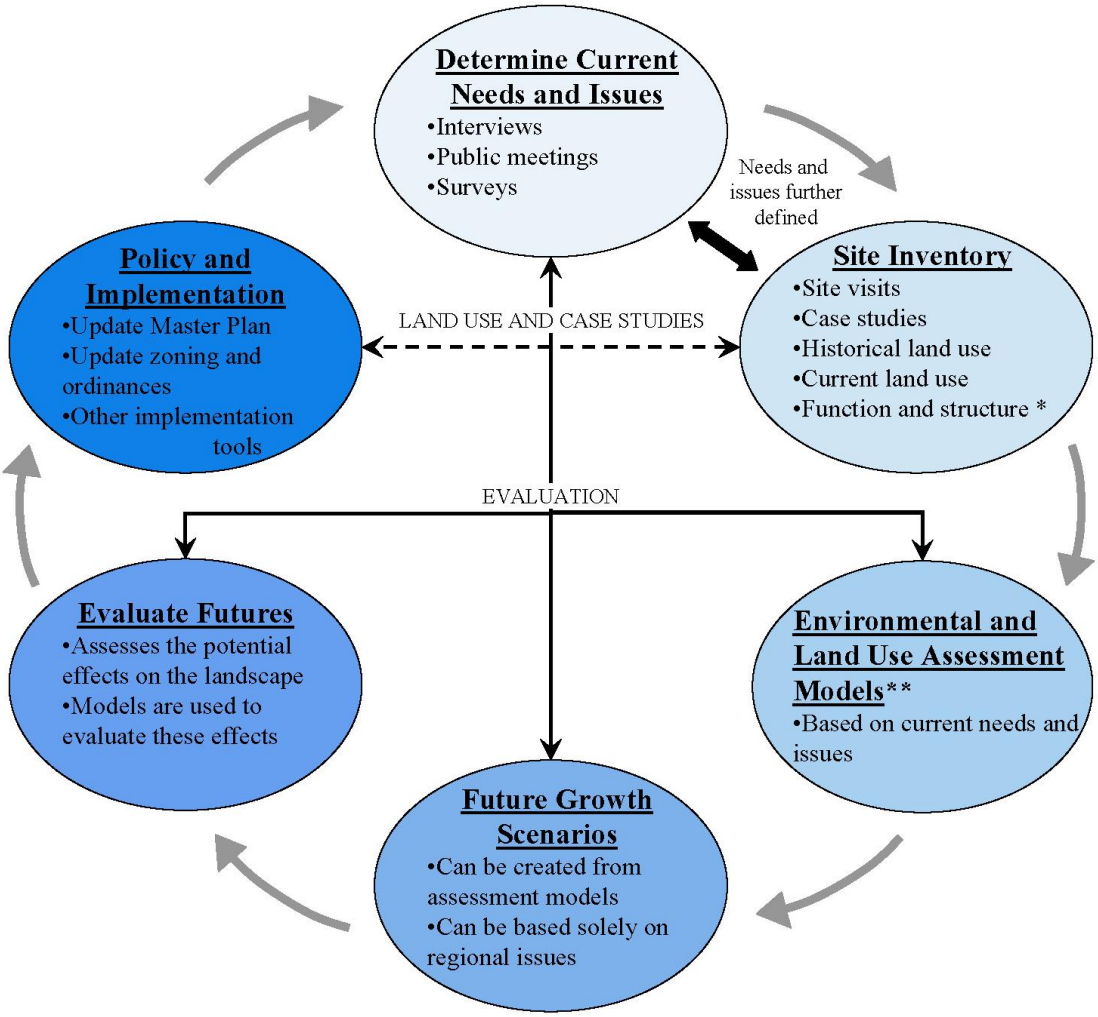
This project is comprised of several key components: 1) To update current decision making strategies for land use planning in the region based on recent technological improvements and methods; 2) To identify and/or update regional planning needs and issues; and 3) To provide several future growth scenarios based on those needs and issues. The diagram below shows a basic decision making strategy for the Bear Lake region and for this project (Toth et al., 2006-1; 2007). See Appendix A for a more detailed methodology.



*** Function and Structure Elements:** The biophysical and cultural elements of the landscape that affect the current land use of the region. These include Climate, Hydrology, Soils, Geology, Vegetation, Wildlife, Recreation, Agriculture, Transportation, History, Culture, Economics, and Demographics.

**** Environmental and Land Use Assessment Models:** The mapped environment and land uses that compose the landscape. Environmental Assessment Models can include Critical Lands (public health, safety, and welfare), Groundwater, Surface Water, Vegetation, Wildlife Habitat, Views and Vistas, and Cultural/Historical Areas. Land Use Assessment Models can include Recreational Lands, Agriculture, Transportation, Residential Lands, Commercial Lands, and Industrial Lands.

While existing processes for land use planning in the region are currently well organized, the methods suggested in this project are meant to contribute to current practices. These are intended to further enhance the decision making process, creating a basic approach to planning that can be utilized by planners in the future. The methodology as illustrated in the previous diagram, and as discussed above, is given in more detail below:

1. Determine current needs and issues in the region via meetings with regional planning organizations and other stakeholders.
2. Site inventory through literature research and previous land use planning documents.
3. Create pertinent land use and activity models using Geographic Information Systems (GIS) mapping.
4. Create issue-based future growth scenarios through GIS mapping.
5. Evaluate the futures with assessment models.
6. Address policy and implementation strategies.
7. Return to number one and refine or adjust aspects of the previous steps based on new information or understanding.

Determining Current Needs and Issues

Perhaps one of the most crucial aspects of this project was to identify and define current planning needs and issues for the region. The approach took into account current organizations that are involved in planning for the region. Each of these groups had previously contributed to various planning activities, directly or indirectly. These included, but were not limited to, Bear Lake County, Idaho, Rich County, Utah, The Bear Lake Regional Commission, Bear River Association of Governments, and other organizations associated with the area. Each of the groups and individuals mentioned in the acknowledgments section of this document helped with the determination of current needs and issues for the Bear Lake region. Relevant past studies that contributed to planning for the region from academia were also studied and referenced (Toth et al., 2001; 2005). Throughout the entire process, there was a determination made of the most current needs and issues to be addressed in the project. These are the following:

- Groundwater and Surface Water Quality
- Agricultural Land Preservation
- Transportation Planning (specifically a Highway 89 bypass west of Bear Lake)
- Quality of Life
- Critical Lands
- Recreation and Tourism Planning

A more detailed outline of needs and issues and how they were determined is also included in Appendix B.

Site Inventory

- Research of relevant case studies including previous planning for the region.
- Documentation of historical and current land use and development, including second home and cabin low-density patterns.
- Research of functional and structural components of the landscape which affect the current land use of the region and which, in turn, can affect development patterns. These can include climate, hydrology, soils, geology, vegetation, wildlife, recreation, agriculture, transportation, history, culture, economics and demographics.

Environmental and Land Use Assessment Models

These models consist of mapping the environmental components and land uses that make up a region. Environmental Assessment Models can include groundwater, surface water, vegetation, cultural/historical areas, wildlife habitat, and views and vistas. Land Use Assessment Models can include recreation and tourism, agriculture, transportation, residential lands, commercial lands, and industrial lands. There were specific models selected and created for this project, based on current regional planning issues. They were created using Geographic Information Systems (GIS) and are shown in the "Assessment Models" section of this document.

Criteria for mapping each of the assessment models in this project were based on the needs of the area and data availability. These models were "tiered" in a format that allows for several gradients to be mapped, in accordance with previous studies (Toth et al., 2007). These are created this way to give regional planners and planning commission's flexibility in creating future growth scenarios. These tiers range in the level of complexity from the most essential attributes, to the most extensive attributes associated with an assessment model. For example, if one of the land use assessment models was agriculture, the first tier would include a map of the most essential attributes, the second tier would include the first tier and add several more attributes, and the third tier would include tiers one and two and add additional agricultural attributes.

Future Growth Scenarios

After the evaluation models were completed, future growth scenarios were created, suggesting potential growth patterns for the region. These futures were determined based on regional planning needs. For example, if the most prevalent concern for an area was water quality, a future would be centered on protecting water quality and would suggest which lands should be avoided with residential, commercial, or industrial development.

Policy and Implementation

After these futures were created, several feasible policy and implementation ideas and strategies applicable to the study were given. These implementation strategies are tools that have been developed by various state or local agencies or non-governmental organizations, for the purpose of assisting communities and counties with land use planning strategies. These tools mostly deal with housing density options, land preservation, and zoning and ordinances.

INTRODUCTION

Before any analysis is done regarding land use planning in a region, planners should understand as much as possible about the existing landscape. Without this understanding, sensitive areas could be abused and/or lost to other types of land use. For example, suppose, as is often the case in the western U.S., that one landscape component of a region was sensitive wildlife habitat. Also suppose that those individuals involved with land use planning in an area did not have a general understanding of what sensitive wildlife habitat in the area was or where it was located.

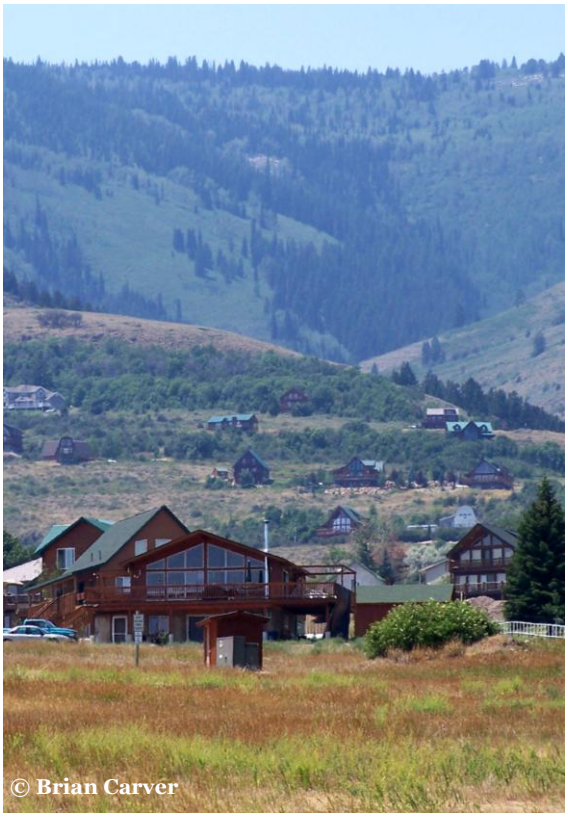
Under these conditions, development could be allowed to be constructed in places that could compromise federally or state listed threatened or endangered species habitat, or other species of importance that contribute to recreation, tourism, and the economics of an area. Especially in areas like the Bear Lake region, there are certain amenities, such as wildlife, that help to define a place and its character.

These landscape components are not only comprised of physical or natural systems, but also the social and cultural fabric that helps to determine how a region is defined by residents and visitors. They include the following:

- History and Culture
- Population and Economics
- Land Use
- Climate
- Hydrology
- Soils and Geology
- Agriculture
- Vegetation
- Wildlife
- Recreation
- Transportation

Each of these landscape components were researched through literature searches and documented as a regional inventory. The intention of this research was to provide information that could be easily accessed in one document regarding past and present resource conditions. While there is an endless amount of information that could have been included in this inventory, only that which seemed necessary for land use planners to know regarding the previously listed components was included.

Not only is Bear Lake considered to be an important reason for increased development in the region, but there are other amenities nearby such as the beautiful mountains surrounding the lake. While living in these foothills poses little problems in some areas, development in other areas can create concerns for public health, safety, and welfare if not understood and accordingly planned for.



HISTORY AND CULTURE

Settlement

In 1824, trapper Daniel H. Potts, who traveled with Captain John H. Weber, wrote this of their arrival in the Bear Lake Valley, "We first approached Bear River at a small sweet lake about 120 miles in circumference, with beautiful, clear water, and when the wind blows, has a splendid appearance" (Alter, 1973, p. 58). Several other accounts tell of the beauty and majesty of the valley, including this excerpt from John C. Fremont in 1843:

> Crossing, in the afternoon, the point of a narrow spur, we descended into a beautiful bottom, formed by a lateral valley, which presented a picture of home beauty that went directly to our hearts. The edge of the wood, for several miles along the river, was dotted with the white covers of emigrant wagons, collected in groups at different camps, where the smoke was rising lazily from the fires, around which the women were occupied in preparing the evening meal, and the children playing in the grass; and herds of cattle, grazing about in the bottom. (Passey, 2003, p. 2)

At this time, Bear Lake Valley was occupied by several Native American tribes, including the Shoshone and Bannock. These tribes would use the valley for hunting, feeding their horses, and trading with each other, other tribes, and with the white settlers. When these tribes, and the Ute Tribe, would travel to and from Bear Lake valley, they would go via Right Hand Fork, above Temple Fork, and eventually into the area known today as Meadowville (Alter, 1973).

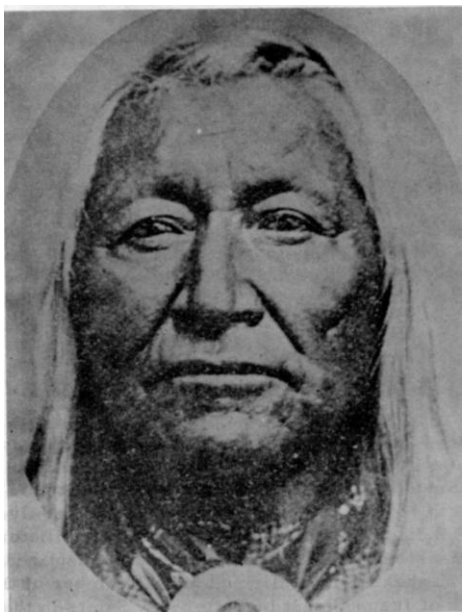
The Indians were mostly peaceful to the trappers and the few explorers that came through the valley. Such trappers, traders, and explorers included Jedediah Smith, Jim Bridger, Captain Benjamin Bonneville, and John C. Fremont. Bear Lake was referred to as "the Little Lake of Bear River" (Alter, 1973, p. 89) by these early trappers, to distinguish it from the Great Salt Lake. It was also named "Black Bear Lake" by trapper Donald "Fatts" McKenzie because of the many black bears in the area (BLCI, 2007).

In 1841, the Oregon Trail came near the current town of Montpelier, Idaho. This trail brought with it many travelers on their

Historical and cultural icons, such as the Paris Tabernacle in Paris, Idaho, are important components of the Bear Lake region. These treasures help to define a sense of place for the area, provide for orientation in the landscape, and give residents an appreciation for those who originally settled in the valley.

way to Oregon, but not many stayed to live year-round. The winters were long and cold, and farming was not considered to be a very feasible way to live in the valley. However, when the early members of The Church of Jesus Christ of Latter Day Saints (LDS) began to inquire about the valley, Jim Bridger told them that there was a man named Thomas L. "Peg Leg" Smith farming in the valley, "Where the soil is good and likely to produce grain were it not for the excessive cold nights" (Rich, 1963, p. 14).

Chief Washakie, chief of the Shoshone, was a friend to the early Mormons in the region (Rich, 1963). Prior to the settlers coming to the valley, Brigham Young, president of the LDS Church, met with Chief Washakie and Chief Taghee of the Bannock tribe to discuss the possibility for the white men to settle the valley. The chiefs gave permission, with the exception that they must leave the south end of the valley for the Indians to gather and trade, as they had done historically.



Chief Washakie, chief of the Shoshone Indian tribe who lived in the Bear Lake region when early settlers came (Photo from Rich, page 60).

In 1863, the first Mormon settlers entered the valley and began to settle near Paris, Idaho. These settlers set up their towns to be at a density of one house per acre. They were instructed by President Young to build houses on the inside blocks of the town first and were told not to spread out because of the possible dangers from Indians. There was always one block in the middle of town preserved for open space to be used for gatherings, dances, meetings, and other community functions (Passey, 2003). Eventually, the Shoshone were given the Wind River Indian Reservation in Wyoming where many currently reside. The Indians visited the Bear Lake valley annually to hunt and trade after moving to the reservation.

Throughout the end of the 19th and 20th centuries, the region was mostly inhabited by farmers and ranchers, with several mainstay businesses. These businesses included the Paris co-operative institution, cheese production businesses, leather goods, and dairy operations (Onderdonk, 1885).

Heritage

The Bear Lake region has a rich and intriguing history and culture. With Native American tribes, mountain men, and Mormon pioneers, there is an endless amount of opportunity to learn about and experience the heritage that exists. The Bear River Heritage Area was created to preserve and promote historical and cultural amenities in the Bear River watershed and to increase economic opportunities associated with these amenities. These heritage components also provide opportunities for rural community preservation and emphasizes the "sense of place" that communities value (BRHAC).

Some of these heritage types include hiking/biking/horse riding trails, wildlife viewing areas, regional eateries and businesses, historical places, cemeteries, historical structures, et cetera. More of these heritage components will be discussed in further sections.

Section Summary

- The region was originally inhabited by several Native American tribes, namely the Shoshone and Bannock tribes.
- Paris, Idaho was the first settlement in the region.
- A very specific town layout was suggested by President Brigham Young, which provided for protection and encouraged community involvement.
- Early economics, after the Native Americans were moved to the Wind River Indian Reservation, consisted mostly of farming and ranching and local businesses.
- There are an endless amount of cultural heritage amenities which contribute to the quality of life for residents and visitors in the region.

POPULATION AND ECONOMICS

Population and Growth

In 1863, 32 men were chosen to colonize the Bear Lake valley, and by the next year there were already over 700 people (Passey, 2003). This has steadily increased over the last 143 years to 8,207 residents for Bear Lake County, Idaho and Rich County, Utah combined, as of 2006 (U.S. Census Bureau, 2007). With the increased demands of the region as a recreation and tourist destination, these numbers are expected to rise, especially in the form of second homes and other seasonal residents. However, this growth has not been at a steady rate in the past. The 1910 U.S. Census reported that in that year, there were 7,729 people in Bear Lake County, Idaho. The population of Bear Lake County has had several fluctuations since the 1970s, including a large one in 1980 (BLCBC, 2002). Rich County has also had several population fluctuations that resulted in highs during 1940, 1970, and 2006.

As seen by the population charts from the U.S. Census Bureau statistics on the next page, both of the counties in the Bear Lake region have had interesting fluctuations in population for the past century. There has been concern in many of the communities in the region about the periodic decreases in population related to the loss of permanent residents.

While the area has had an explosion of summer population and tourism over the past few decades, the long-term resident numbers are not growing as rapidly. However, year-round resident numbers are still increasing. There are also concerns about the younger generations moving away from the area to find work. Fluctuations have been seen in the number of students in all levels of school in both counties. Since 1995, there has been a decrease in the number of grade school student enrollments in the region (Marlene Wilson, Rich School District staff, personal communication, October 23, 2007; BLCBC, 2002; School Matters, 2007).

Bear Lake County, Idaho

Year	Census Period	Area	Source	Population
1910	Annual	Bear Lake County	US Census	7,729
1970	Annual	Bear Lake County	US Census	5,801
1980	Annual	Bear Lake County	US Census	6,931
1990	Annual	Bear Lake County	US Census	6,084
2000	Annual	Bear Lake County	US Census	6,411
2006	Annual	Bear Lake County	US Census	6,167

Rich County, Utah

Year	Census Period	Area	Source	Population
1900	Annual	Rich County	U.S. Census	1,946
1910	Annual	Rich County	U.S. Census	1,883
1920	Annual	Rich County	U.S. Census	1,890
1930	Annual	Rich County	U.S. Census	1,873
1940	Annual	Rich County	U.S. Census	2,028
1950	Annual	Rich County	U.S. Census	1,673
1960	Annual	Rich County	U.S. Census	1,685
1970	Annual	Rich County	U.S. Census	1,615
1980	Annual	Rich County	U.S. Census	2,100
1990	Annual	Rich County	U.S. Census	1,725
2000	Annual	Rich County	U.S. Census	1,961
2006	Annual	Rich County	U.S. Census	2,040

Employment

Employment in the Bear Lake area generally consists of agriculture, hunting and fishing, mining, forestry, tourism, private business, construction, manufacturing, retail, education, health, and social services (U.S. Census Bureau, 2000). While these communities have traditionally been economically rooted in farming and ranching, tourism and retail/services is increasingly becoming a major source of

Farming and ranching is a crucial economic component and cultural amenity in the Bear Lake region.

seasonal income for the region (BLCBC, 2002). Some of the activities that provide economic opportunities include water sports, beach activities, fishing, hunting, snowmobiling, mountain man rendezvous', hiking, eateries, winter sports, et cetera. While the economics in the region are centered in the tourism and development sector of Bear Lake, regional history and heritage has also been creating jobs in the area and provide for future opportunities as well.

Economics

While the economics of the Bear Lake region have historically been founded in agriculture, tourism and recreation are quickly finding their way into the market by way of retail and services. This change has mostly occurred over the past decade, as Bear Lake and the surrounding towns have been discovered by people throughout the two states and other areas. Currently, the median household income for Bear Lake County, Idaho is $32,162. The county also has 68.3 percent of its residents working private wage and salary jobs. The current median household income for Rich County, Utah is $39,766. Rich County has 64.4 percent of its residents working private wage and salary jobs (all figures are from the U.S. Census Bureau, 2000).

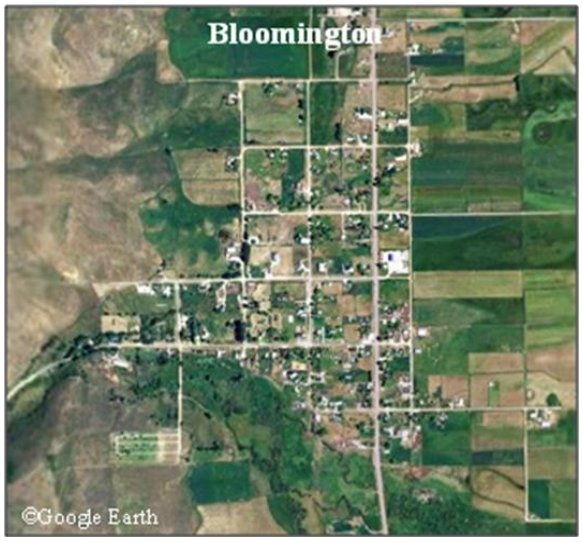
Section Summary

- Much of the economy in the Bear Lake region consists of agriculture, historically and even today. Agricultural lands should be seen not only as cultural/historical amenities, but also as economic contributors.
- Tourism is becoming more prominent, creating seasonal income for people in the region. Much of the new residential and commercial growth will probably develop near areas of economic growth.
- Transportation and infrastructure costs should be considered for future seasonal home developments. Proximity to existing infrastructure will be more economical for counties and municipalities to maintain.

LAND USE

Development Patterns

The towns in the Bear Lake region, and other towns in Utah and Idaho settled by members of the Church of Jesus Christ of Latter Day Saints, were historically laid out in a grid pattern that consisted of blocks that were 10 acres each. These blocks, also 660 feet on each side, consisted of a system that had a central community block(s) for town activities (Parera, 2007). President of the LDS church at the time, Brigham Young taught residents of the Bear Lake valley that they should build in the inner town blocks first for protection from the Indians (Rich, 1963).



Notice the original grid pattern in the layout of both of these towns. Little has changed over the years for these communities, but if not protected, this unique settlement pattern could be a thing of the past. Both pictures taken from Google Earth, 2007

This plan worked quite well for the settlers, as there were never any serious Indian attacks. One of the positive aspects of the "Plat of the City of Zion," was that the higher density city blocks were surrounded by gardens and farmland on the outside. This system allowed for the conservation of open lands that were used for the sustenance of the residents. These patterns can still be seen in several of the communities surrounding Bear Lake. Some of the towns that seem almost untouched in regard to this general development pattern include Paris, Bloomington, and St. Charles, Idaho, and Randolph and Woodruff in Utah. The preceding images show two of these towns today.

Each of the towns described earlier has retained the original grid system laid out by early Mormon leaders for the past ~130-140 years, excluding the lack of historic central park areas. Although there have been developments in other areas near Bear Lake, these few towns have managed to preserve their original layout. There is little doubt that these towns will eventually receive pressures to grow, leaving them to face the decision of whether to expand in a historical pattern, or to participate in urban sprawl across the landscape. This type of growth has been experienced in many parts of Utah, including the Park City area, Utah Valley, Salt Lake Valley, and the St. George area, where cities have expanded at unprecedented rates, creating new challenges for surrounding rural communities.

Some towns have had immense pressures to grow recently, mostly in the form of cabins and second homes. In many instances, these new growth patches have been placed in random parcels of land surrounding the towns on county lands. They tend to spread over highly visible areas near Bear Lake at relatively low densities. The bulk of this growth has occurred mostly on the hillsides west of Bear Lake, affording the new home owners views of the valley and the lake. Following are some aerial photos of high growth hillsides:

Current County and Municipal Goals

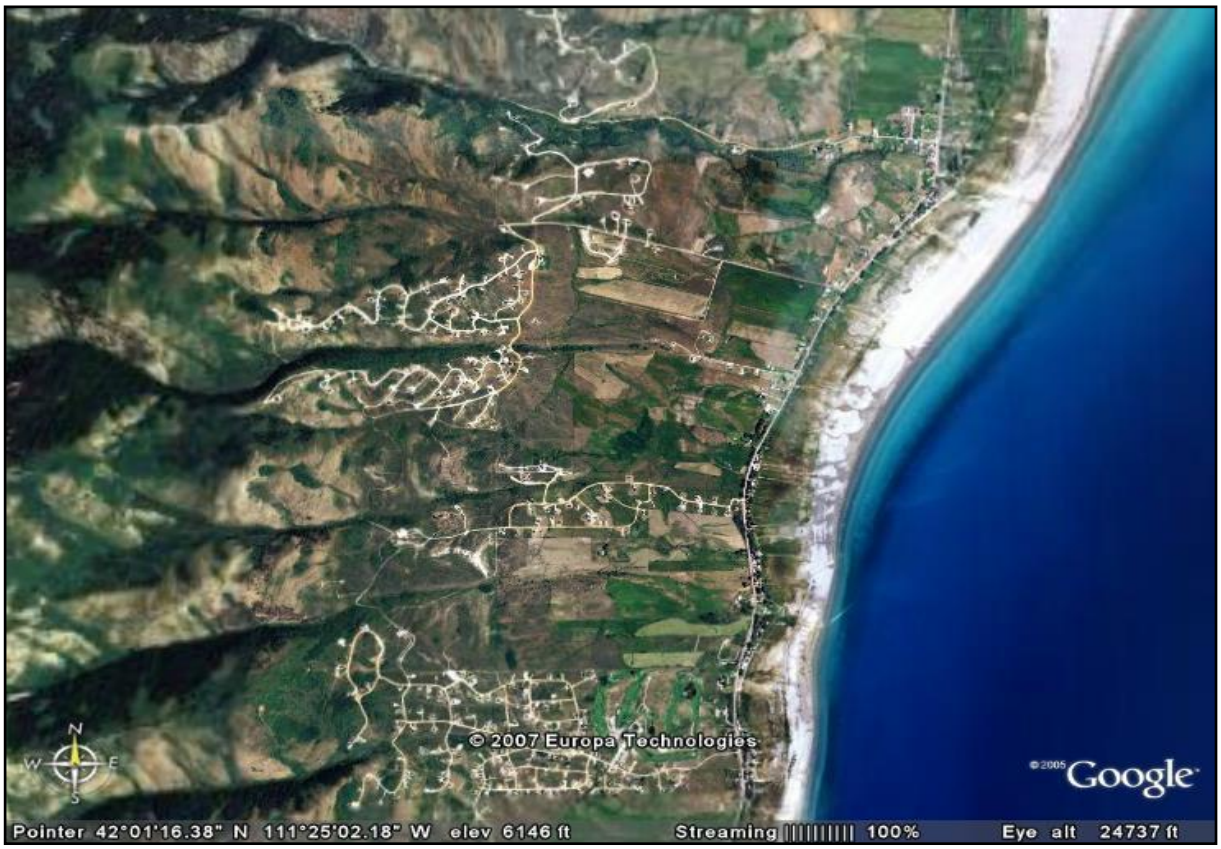
Community growth regulation is controlled by the municipalities' zoning and ordinances if inside the municipal boundaries, or by the county's zoning and ordinances if in the unincorporated county. These zoning designations and ordinances are legal documents that have the potential to control growth in a region and to promote the city or county values regarding development and land use.

These development regulations for an area are required by law in most cases, and tend to reflect the values of the community or county officials and planning commissions. Included in these regulations are usually references regarding the promotion of public health, safety, and welfare for the residents of the area. Increasingly, however, there seems to be a growing trend in the goals and regulations that reflect values such as community identity, quality of life, views and vistas, agriculture, and natural amenities.

In general, there are some interesting themes in the master plans for the two counties in the Bear Lake region. These common themes are:

- Public Health, Safety, and Welfare
- Use and Preservation of Natural Resources
- Quality of Life Issues
- Proper Land Development and/or Uses

(BLCBC, 2002; Rich County, 1985)



This development pattern is indicative of the prevailing patterns on the west side of Bear Lake. As seen above, these growth patterns are random and spread across the landscape. Picture taken from Google Earth, 2007

In regard to the issues for the two counties, several communities in the region have similar goals and missions. The 1992 mission statement for the city of Randolph, Utah is a good example of the values for the town and the region. It states that: "*The mission of Randolph City is to retain our youth, attract new people with new ideas, to maintain and improve the quality of life and to provide quality employment opportunities for now and the future"* (PPUP, 1992, p. 4).

While other communities in the Bear Lake region are similarly interested in a viable economy and sustainability as a town, quality of life issues seem to surface in most of their concerns and priorities. This "quality of life" is often closely tied to rural character and culture. Rural character for areas such as these, as outlined in the Governor's Office of Planning and Budget "Utah's Rural Character" planning tool, is defined "…by the unique characteristics of a place and its inhabitants. Rural character includes both the physical and social environment" (UGOPBa, 2007, p. 2). Aspects of the physical and social environment can include many things including housing density and type, open space and agriculture, views and vistas of surrounding lands, and historical/cultural amenities. Below are some examples of the values the towns in the region have regarding land use and development issues:

- In the introduction of Garden City's 2004 Master Plan, the planning and zoning commission state that *"This Master Plan should direct the town to improve its physical environment as a setting for human activities through a balance of health, safety, beauty, function and efficiency"* (TGCPZC, 2004, p. 1).
- Montpelier, which is the largest city in the Bear Lake region and in this study, also has an interesting observation about development in the region and some people's views toward that development.

  "The challenge for today's community leaders is to promote growth, improve services, increase progressiveness, and encourage vigor while guarding the city as a quiet, comfortable place to live" (Montpelier Comprehensive Plan, 2002, p. v).

  The challenge for many of these small communities is to plan for the growth that will eventually come, while maintaining the rural character and small-town feel that so many of the long-term residents enjoy.

  While much of the development pressure in the region is based on tourism and recreation, some towns have also noticed other economic opportunities that could benefit the region in the future.
- In the Bloomington City Comprehensive Plan, it states, *"The city still maintains its small, quiet rural community character...There is now an increase in pressure from the recreation element on Bear Lake; and with the possibility of*

It's not difficult to see how the rural character in an area can be compromised with random or sprawling development. This photo was taken near the southwest shore of Bear Lake.

new mining and mineral developments in the area, this rural feeling will be hard to maintain" (Bloomington City Comprehensive Plan, p. 13). These other potential economic amenities could still be very beneficial to the region and could eventually become utilized as the area grows.

Section Summary

- Maintaining the rural character of the towns in the region is crucial to most of the communities.
- Historical town grid patterns could easily become a thing of the past if growth is not controlled in a way appropriate for each town or city.
- Random development patterns are becoming commonplace in the unincorporated areas of the Bear Lake region. If not controlled, sprawl will become even more noticeable and may compromise the rural character of the region.
- Municipal and county master/comprehensive plans should be reviewed and used for insight into the existing values and future goals regarding growth and development in the region.
- Municipal and county ordinances must be revised to enforce the values and goals of the master plans.

CLIMATE

Regional Climate

Climate in the Bear Lake Valley was a significant factor in the development, or non-development, of the region. Although there were historically, and are today, many advantages to living in the region, cold winter temperatures are not one of them. For example, in Randolph, Utah, temperatures below 0° F average 29 days per year. In 1961 and 1962, the ground in Woodruff, Utah and Evanston, Wyoming froze to a depth of 6 feet (BLRCC, 1975). As stated in 1885 by James L. Onderdonk,

> The climate is mild and salubrious in the summer; the spring and fall seasons are short; the winter is generally severe, although some winters are very moderate and even mild. The severe weather usually sets in about the first of December, and winter usually breaks up about the latter end of April; some winters last till May, but this is exceptional. (p. 77)

While there can be many potential severe climatic factors that may affect a region, there are several that are particularly applicable to the area surrounding Bear Lake. These include wind, drought, lightning, downbursts, hail storms, heavy snowstorms, and blizzards (BRAG, 2004).

Winters can be harsh in the Bear Lake region, specifically in the Randolph and Woodruff areas. The cold temperatures and crop debilitating frosts, however, are offset by the beautiful summer days that attract so many people for lake activities. Winter sports are also becoming a critical recreational activity, where the region boasts some of the best snowmobiling in Utah and Idaho, along with skiing and ice fishing.

Montpelier, Idaho Climate Summary From 1/ 1/1931 to 6/30/1991 (Western Regional Climate Center, 2007).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ave. Max. Temp. (F)	29.5	33.6	40.3	52.9	64.7	74.3	85.0	83.4	73.1	60.6	42.5	32.4	56.0
Ave. Min. Temp. (F)	6.3	8.6	16.1	26.7	34.7	41.3	47.2	45.0	36.2	27.8	18.4	10.5	26.6
Ave. Total Precip. (in.)	1.20	1.15	1.28	1.32	1.42	1.48	0.76	0.91	1.15	1.14	1.09	1.19	14.09
Ave. Total Snow. (in.)	13.4	11.8	9.4	3.9	0.8	0.1	0.0	0.0	0.2	1.6	7.1	13.3	61.6
Ave. Snow Depth (in.)	10	12	6	0	0	0	0	0	0	0	1	5	3

Randolph, Utah Climate Summary From 7/ 1/1982 to 4/30/2007 (Western Regional Climate Center, 2007).

	JanFeb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Aver. Max. Temp. (F)	27.6	31.1	42.1	53.8	63.5	73.3	81.6	80.2	69.6	57.9	40.1	27.9	54.1
Ave. Min. Temp. (F)	1.4	3.7	14.7	23.2	30.3	37.3	42.5	40.1	31.3	22.2	13.5	2.6	21.9
Ave.Total Precip. (in.)	0.84	0.96	0.88	1.32	1.66	1.16	0.97	1.20	1.53	1.13	1.15	0.85	13.66
Ave. Total Snow. (in.)	10.3	10.5	7.2	4.8	1.7	0.1	0.0	0.0	1.4	2.2	8.4	10.3	56.8
Ave. Snow Depth (in.)	5	6	3	0	0	0	0	0	0	0	1	3	2

Climate statistics are difficult to gather for the whole Bear Lake region, so two towns in particular will be referenced. Montpelier, Idaho and Randolph, Utah both have fairly accurate and extensive climate records, and represent both spectrums of the region.

As seen in both sets of records, summers tend to be mild, and winters can be quite harsh, which has generally affected the development patterns of the region. For example, second homes and cabins are becoming commonplace, as seasonal residents are coming for the summers and leave for the winter. While the temperature and precipitation do have effects on the region, they are not the only aspects of climate affecting development and/or public health, safety, and welfare. Winds have also been a dynamic part the region, and storms in the Bear Lake region have been known to be quite severe at times. Winds in the area average 8-12 miles per hour, and come mostly from the southwest. The most severe storms come from the northwest, bringing in rain and snow during the cooler months. There are also canyon winds that come downhill from the mouths of the many canyons surrounding the basin (BLRCC, 1975).

Regardless of the harsh winters in the Bear Lake region, there are many activities that take advantage of the wonderful snow in Utah and Idaho.

Several minor tornadoes have also been documented in the region, each of which was fairly benign. They were reported in Bear Lake County, Idaho, Woodruff, Utah and Laketown, Utah (The Tornado Project, 2007; Pope and Brough, 1996). While none of these were reported to be large enough to take any lives, they should not be ignored as potential threats.

One aspect that has been important for the region as an agricultural area is the amount of frost-free days throughout the year. Laketown, Utah has an average of 84 freeze-free days per year, with the average last spring freeze about June 16th, and an average first fall freeze about September 7th (Pope and Brough, 1996). Randolph, on the other hand, has only 46 freeze-free days per year, with the average last spring freeze about July 2nd, and an average first fall freeze of about August 17th (Pope and Brough, 1996).

Historically, Bear Lake has frozen over every four out of five years. Because of winds blowing ice across the lake, the west shores are vulnerable to impacts from the ice. It has been speculated that these strong winds create the potential for waves on the lake to reach 2.5 meters in height. These waves could also be quite detrimental to development that is too near the shores of the lake (Kaliser, 1969).

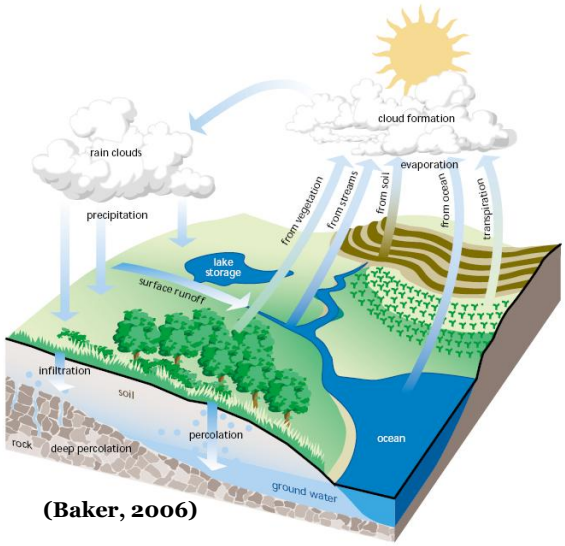
Section Summary

- While the climate can pose interesting challenges for the region, winters should not be ruled out as "non-recreational." Winter sports are gaining popularity in the region, such as snowmobiling.
- Considerations should be made when development is approved in some areas to take into account wind, snow, and aspect (the direction a mountain slope faces). These considerations could include ease of snow removal, utility maintenance, soil properties, or other potential structural damage.

HYDROLOGY

When examining the hydrology of any area, it is essential to understand the basic principles that affect both surface and groundwater for a region. The hydrologic cycle illustrates this process and gives insight into the effects that development can have on water quality and quantity. After precipitation hits the earth's surface, unused water is sent back to the atmosphere through two processes: evaporation and evapotransporation. Evapotransporation is where plants lose excess water by secretion through the leaf, and evaporation off of the plant surfaces. Excess water is also taken back to the atmosphere through evaporation of water vapor from the ground surface or from water bodies (Wikipedia, 2007).

Any water that is not lost through these processes either runs over the surface to be collected in drainage areas and eventually into water bodies, or percolates the ground surface into a groundwater system. The rate of this water movement is all determined by the type and density of the



(Baker, 2006)

This picture shows the basic hydrologic cycle. It is important to know the ways in which water flows and is either taken back to the atmosphere or put back into the streams, lakes, or groundwater reserves. Knowing this can help planners understand the need for surface and source water management and quality.

soils. Small soil particles are more difficult for water to percolate through, whereas larger particles, such as sand and gravel, are much more conducive to water flow. Rock is considered to be a consolidated deposit, whereas smaller rocks, gravel, sand, silt, clay, or a mixture of these is considered to be unconsolidated (USGS, 2003). Depending on where these various particle types exist, and the surrounding geography of an area, this excess water is then either filtered back into streams and lakes, or stored in groundwater reserves (Baker, 2006).

As large rain events or seasonal runoff activity increase the amount of water that is flowing over an area, geology, soils, slope, and vegetation types and quantity affect the path of the water. As a system takes in enough water to saturate the surrounding soil, and with accommodating hillside slopes, water begins to move downhill at various ground or surface levels. Groundwater flow, shallow subsurface water flow, and overland water flow can all contribute to this accumulation (Baker, 2006).

Hydrologic catchments, or drainage basins, are those areas that drain the water to a particular area (Wikipedia, 2007). Catchment drainage is determined by slope, shape, geology and soils, and ground cover types and quantities.

The water that is not emptied into stream systems or water bodies percolates into the groundwater where it can either contribute to perched, confined, or unconfined aquifers. The upper catchment water quality of an area has been identified as greatly affecting the downstream water quality of a system. Referring to the susceptibility of stream water in northern Utah, George E. Hart and his associates wrote that headwater areas should be studied further because there is more pressure to develop on, or harvest vegetation from, those lands (Hart et al., 1973).

As these areas receive pressures for growth, care should be taken to ensure that these upper catchments are managed and protected to better ensure good water quality for future users.

Perched aquifers are water reserves that are above the general water table. These aquifers can produce springs and seeps, where the water exits the hillside. Confined aquifers are those that are divided from the main aquifer by some type of substrate and are usually found below unconfined aquifers. These aquifers are usually very deep in the ground and are not normally the major aquifer used for water needs.

Unconfined aquifers are generally the same as perched aquifers, but they are the largest and most commonly utilized aquifers for source water. These aquifers have underground soil types that are saturated with water where, if wells are drilled, water can be extracted.

Unique Hydrological Components of the Bear Lake region

The Bear Lake region is filled with surface water. There are about 4,056 miles of streams and rivers, and 160 square miles of water bodies in Bear Lake County, Idaho and Rich County, Utah combined (USGS, 2007). The study area is comprised of portions of several sub-watersheds within the Bear River Watershed. These sub-watersheds are the Bear Lake Watershed, the Upper Bear Watershed, and the Central Bear Watershed. These sub-watersheds empty into the Bear River, which has its headwaters in northeastern Utah and flows through western Wyoming, and into southern Idaho and northern Utah. The Bear River eventually ends its journey at the Great Salt Lake (BRWIS, 2007).

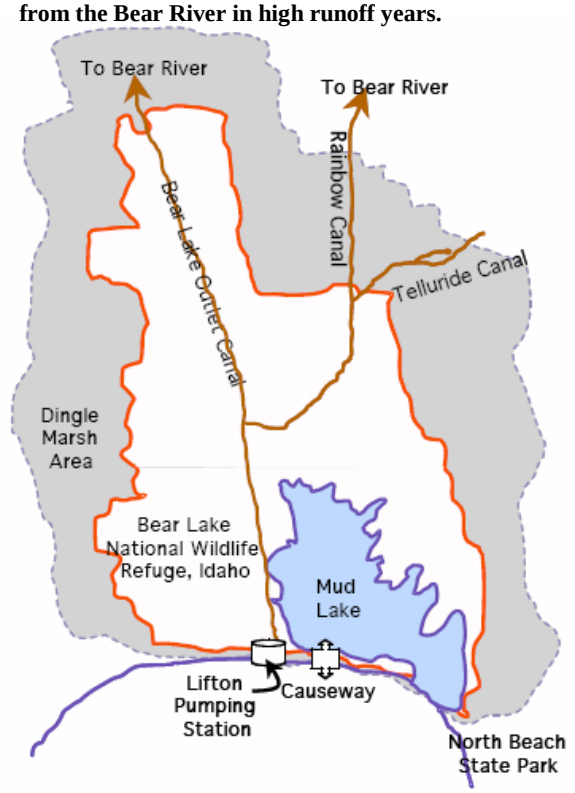
Historically, it is thought that Bear Lake filled the whole Bear Lake Basin. The Bear River eventually departed from the lake and does not naturally enter the lake. However, canals and other introduced water management and energy systems have connected the two, regulating flows into and out of Bear Lake. The lake historically overflowed and spilled over into Mud Lake and eventually into the Bear River. While canals and other irrigation methods have prevented the lake from overflowing today, they have also been utilized to take flow out of the Bear River and into Bear Lake in high water events to prevent the river from flooding (BLRCH).

The fluctuation of the lake levels in the past was probably about 5 feet of drop annually before the canal systems were put in place (Stauffer and Miller). These flows are now heavily regulated, and this annual flooding is reduced and stabilized. In 1934, Bear Lake was almost completely drained for power and irrigation purposes. These and other issues led to the Bear River Compact, which gives guidance and legal structure for the use of water from Bear Lake and the Bear River (BLRCH). The lake is now highly regulated and is not allowed to have any water taken for power generation after it drops to 5,912.91 feet in elevation, in order to maintain legal statutes. Apparently, this water can still be used for irrigation (Utah State Legislature, 2007).

Surface Water

While there are many concerns for water quality in the region, steps are being made toward improving the quality of Bear Lake and nearby streams and rivers. Currently, some of the most basic issues along the Bear River involve contamination from phosphorus, nitrogen, and

Several canals connect to Bear Lake at the north end. These canals are mostly for power generation using lake water, and for taking water to Bear Lake from the Bear River in high runoff years.



(Palacios et al, 2006)

Thomas Fork, shown above, is one of the many streams that have been identified as streams of concern in the area. The Bear Lake Regional Commission, however, has been working to improve water quality in Thomas Fork and other streams. After restoration efforts, these streams can function more efficiently and can filter debris and sustain wildlife much more naturally.

sedimentation (BRWIS, 2007). Most of these contaminants are thought to originate from farming and ranching practices, over-grazing of stream bank vegetation, urban disturbance (second home development), and other non-point or general sources.

The main streams of concern are the following:

- The Bear River going into Bear Lake (canal system, et cetera.)
- Sulpher Creek
- Twin Creek
- Bridger Creek
- Saleratus Creek
- Smith's Fork
- Salt Creek
- Thomas Fork drainage (BRWIS, 2007)

These streams have been identified as areas of concern, either for their affect on downstream water quality, or the quality of trout habitat in the streams. Recently, work has begun on some of these streams to improve water quality under the direction of the Bear Lake Regional Commission. For example, Thomas Fork Creek has had extensive Best Management Practices (BMP's) applied for bank stability and other techniques intended to reduce sedimentation in the creek. These efforts have been ongoing for the past eight years, and long-term monitoring has shown substantial decreases in sedimentation in the creek, resulting in better water quality (BLRCW, 2007).

The Environmental Protection Agency (EPA) currently has information regarding impaired water bodies for 2004 in the Bear Lake region. There are a total of 36 water bodies in the region (streams, lakes, and reservoirs) that are in violation of EPA and/or state standards and have been approved for TMDL reports and further study (EPA, 2007). Including some of the above mentioned streams, these water bodies are being studied in depth to provide water quality information that will assist the states in improving water quality. The following is a list of the impaired water bodies in Bear Lake County, Idaho and Rich County, Utah according to the EPA as of 2004:

<u>Idaho:</u> Alexander Reservoir (Bear River), Bear River - Railroad Bridge (X 3), Co-Op

Creek - source to mouth, Eightmile Creek, Indian Creek, Liberty Creek, Little Beaver Creek, Lower Georgetown Creek, Lower Pearl Creek, Lower Soda Creek, Meadow Creek, Middle Mill Creek, Montpelier Creek - source to mouth, North Creek - source to mouth, Ovid Creek - confluence of North and Mill Creek to mouth, Right Hand Fork Georgetown Creek, Skinner Creek - source to mouth, Sleight Canyon, Snowslide Creek - source to mouth, South Wilson Creek, Spring Creek - source to mouth, Sulpher Canyon, Upper Georgetown Creek, Upper Paris Creek, Whiskey Creek, Bear River - Idaho/Wyoming border to Railroad Bridge, Dry Creek - source to mouth, Pegram Creek - source to mouth, Preuss Creek - source to mouth, Sheep Creek - source to mouth, Thomas Fork - Idaho/Wyoming border to mouth.

Utah: Bear River (X 2), Saleratus Creek.

Flooding is considered to be an issue in the basin, particularly in the drainage areas. In *Geology of the Bear Lake Region*, professionals had this to say regarding flooding potential in these drainage areas:

> No serious flood hazard exists in the flat-lands around Bear Lake, because of the natural and artificially created stabilizing influence of the lake itself. However, there will be a serious danger to life and property if development proceeds in the canyon bottoms on either side of the lake, or on the undissected alluvial fans on the east side. These canyons and fans are floored by torrential deposits laid down by flash floods, and particularly on the east side of the lake, there are great accumulations of loose weathered material on the flanks of the canyons. Very rare concentrated rainstorms in the mountains are a possibility here, although flash floods may be separated by intervals of time up to a hundred years or more. (BLRCG, p. 21)

Groundwater

In reference to the groundwater in the Bear Lake region, the Bear Lake regional Commission references Kaliser with this statement:

> ...there are many good aquifers in the Bear Lake region, but they nearly all suffer from too great a permeability due to rapid flow through fractures, subterranial solution channels, or large pore spaces. This means that if infiltrating water is polluted in any way at the surface, the capacity of the aquifer to filter out the pollution is very low. Pollution can move from aquifer to aquifer because of the extent of normal and reverse faults and unconformities in the area. (BLRCH, p. 18)

While there seems to be adequate groundwater potential for the Bear Lake region, the susceptibility that the groundwater system has to contamination and cross-contamination from above ground and from nearby aquifers should not be ignored. Further study and monitoring should be done in order to prevent serious groundwater quality problems in the future for the region.

Generally, the best sources for groundwater in the region include Swan Creek Spring near Garden City, which produces about 300 cubic feet per second (cfs), and wells that are drilled into Lacustrine Sediment Aquifers (BLRCH).

Town	Water Source	Water Source Location	Unique Characteristics
Laketown	Spring	1.7 miles south of Laketown in Laketown Canyon	
Pickleville Area	Spring	?	Wasatch Formation Aquifer
Garden City	Swan Creek Spring	3 miles northwest of Garden City	One of two of the potentially largest springs in Utah (est. 300 cfs), used for development from Garden City north to Idaho border. Used also for irrigation.
Fish Haven	Creek	West of Fish Haven	
St. Charles	Spring	3 miles west of St. Charles in St. Charles Canyon	
Bloomington	Fred's Spring and Underground Reservoir	3 miles west of Bloomington up the canyon.	The underground reservoir has a 30,000 gallon capacity, and is 0.5 miles west of Bloomington.

*Data Taken from *Hydrology of the Bear Lake Region*, Bear Lake Regional Commission.

These aquifers, mostly in the form of perched aquifers, are the most likely source for groundwater in the basin for domestic purposes. Other springs and types of groundwater sources also have potential for residential use but should be studied in depth for determination (Kaliser, 1969). See the Geology section for more specific information on geology and groundwater potential.

Section Summary

- Water quality should continue to be an integral part of the land use planning for the region. Upper catchments have specifically been noted as having a great effect on water quality downstream.
- Current stream restoration efforts have been found to be effective on streams that were suffering from low water quality.
- Canyon bottoms are considered dangerous to build on because of potential flood threats. Both sides of Bear Lake, particularly the east side, are also considered to be unsafe to build on, specifically where past flooding events have left sediment loads near the lake.
- Groundwater systems (aquifers) in the region are noted as being susceptible to cross-contamination from nearby aquifers. Care should be taken to avoid any groundwater contamination.

SOILS AND GEOLOGY

The earth's crust is composed of many different layers found in a geologic column, which is a cross-cut of the vertical layers of the earth's crust in an area. There are generally two layers in a geologic column which are the regolith and bedrock components. Regolith is non-consolidated (not rock) and is soft enough to be excavated with a shovel (Fanning and Fanning, 1989). Bedrock is consolidated rock and is found below the regolith. The various vertical levels of regolith are divided into several major designations. The layers from top to bottom are the following: surface soil, subsurface soil, subsoil, substratum, lithic contact (the point where soil and bedrock meet) and bedrock.

Soils

Within these regolith layers are many different soil types which are distributed across the world. There are 12 of these soil orders: alfisols, andisols, aridisols, entisols, gelisols, histosols, inceptisols, mollisols, oxisols, spodosols, ultisols, and vertisols. The types that are found in the Bear Lake region are mollisols, inceptisols, entisols, aridisols, alfisols, and gelisols (USDA NRCS, 1999). The following diagram shows the dispersal of these soil types in the Bear Lake region, and each soil type is described below in more detail.

- Alfisols - Soils of high native fertility and moderately leached forest soils. Contain clays and are found in sub-humid and temperate humid areas. Good agricultural soils because of high fertility.
- Aridisols - Arid region soils that are dry most of the time. Not used for irrigation, but good for wildlife habitat, range, recreation, et cetera. Made up of calcium carbonate, clay, silica, gypsum, and salts.
- Entisols – Any soil that does not fit into the other 11 orders are designated as Entisols. This group has a very broad range of soils and are found on rock areas that are steep. Entisols can be used for cropland as well.
- Gelisols – Soils that are mostly found in arctic regions and high elevations. These soils have a lot of carbon, and organic decomposition is very slow because of the cold temperatures associated with them.
- Inceptisols – These soils are used mostly for recreation and forestry uses. They are found on resistant plant materials, young geomorphic surfaces, and steep slopes.
- Mollisols – Mollisols are a very rich, dark and organic soil type. They are found in many grasslands and prairies and are used extensively for agriculture.

(UI, 2007; Toth et al., 2006-1; USDA NRCS, 1999)

Soil texture is a crucial component for determining soils that are appropriate for certain vegetation and/or agricultural purposes. It is also a key determinant for classifying what drainage properties a soil has in an area, which affects not only plant growth and health, but soil stability. If a soil has mostly sand (large particle size and pore space), then drainage is very efficient, and the soils dry faster. If a soil is on the clay side of the spectrum (small particle size and pore space), drainage is difficult, and the soil is saturated for long periods of time.

The basic soil textures are sand, loamy sand, sandy loam, loam, sandy clay

loam, sandy clay, clay loam, clay, silty clay, silty clay loam, silt loam, and silt. Some examples of how these may be specified by texture and percentage are the following: clay loam consists of 35% sand, 30% clay, and 35% silt; loamy sand consists of 75% sand, 15% silt, and 10% clay; clay consists of 75% clay, 15% silt, and 10% sand; and silty clay loam consists of 60% silt, 30% clay, and 10% sand (Courtney and Trudgill, 1984).

Slope and Stability (Landslides, Falls and Flows)

Slope and stability of soils is a crucial factor to consider in developing land and building structures in a region. The above mentioned soil textures, combined with certain slopes and hydrology, can alter the landscape and provide for unstable building conditions. As certain components of the landscape come together, including slope, soil type, and hydrology, mass soil movements can occur in the general forms of slides, falls, and flows. These mass movements often take on several forms for an event, and can be quite destructive to existing structures and land uses.

Landslides are common in the west and can be especially destructive on steep slopes and canyon bottoms. Landslides are triggered when there is a lateral weakness between several soil types that give way either by gravity, water infiltration, or a combination of both. Yang H. Huang of the University of Kentucky states that "...it is well known that one of the most favorable settings for landslides is the presence of permeable or soluble beds overlying or interbedded with relatively impervious beds" (Huang, 1983, p. 3). After these slides occur in an area, the disturbed soils become more susceptible to future slides. Water can now percolate into the soil quicker and can have deeper infiltration, causing instability under the soil mass, often in the form of a mudslide (Bromhead, 1986).

Landslides can cause considerable damage to property, as was the case with this landslide in Layton, Utah on April 15, 2006. Detailed studies of landslide areas should be identified before development is allowed. This may prevent harm to residents and unnecessary economic loss.

Falls are also a common event in the steeper mountains and cliffs of the Rocky Mountains. These are defined generally as rock or debris that is dislodged from a mountainside, caused by progressive weakening of joints in the rock from gravity, temperature, water, or a combination of some of each (Bromhead, 1986). If rock is not dislodged merely from temperature change or gravity, water can weaken the joints, or water can freeze in the cracks and expand them, resulting in instability.

Flows can be some of the most destructive mass soil movements in the west. These are characterized as a fluid-like movement that has no real definable lateral plane or cohesive moving layer. They can be either dry or wet material and are noted as being a mixing pot of sediment. Clay soils that are saturated with water are a common flow combination, but dry silt or sand soils can also behave as a flow (Bromhead, 1986). There are connections between any type of mass soil movement,

Debris flows take on more fluid characteristics than other types of mass movements. They can be very destructive and expensive events, such as this flow in Santaquin, Utah in 2002. This flow came after fires cleared vegetation from uphill slopes in 2001.

where these three types can merge or emerge from each other. For example, a fall could trigger a landslide, which could turn into a flow with added moisture and velocity.

In the Bear Lake region, there are several general recommendations for mass soil movements and slope issues. In the Bear Lake Regional Commission's publication "Geology of the Bear Lake Region," several recommendations have been made. They state that the east side of the lake is at great risk for landslides, especially in the steeply sloped areas, and especially during or after an earthquake (Kaliser, 1969). Road blockage is considered an issue, as well as structural damage.

The west side of the lake is not noted as having many historical landslides, but in areas of certain soil types and slope, there could be potential problems. Erosion is also considered a general concern, especially on steep slopes (BLRCG). When considering slope and stability, several slope ranges are suggested as being generally unstable and range from 20-30% (Toth et al., 2007). The state of Utah has a general slope restriction of 30%, the NRCS has been cited as suggesting against building on slopes greater than 25% (USU LAEP, 1992), while a steep slope is generally considered to be 20% and greater by other sources (UGOPB, 2005). Although a much greater slope, geologists have also specifically suggested against building on any slopes greater than 30° or 57.7%, stating that, "this angle is the approximate angle of repose of dry granular material, and such areas are thus susceptible to movement when disturbed by human or natural causes. If cuts are made which destroy the cohesion of the soil and open up bedrock fractures to inflow of surface water, these slopes may fail" (BLRCG, p. 17).

Shrink-Swell

Shrink-swell activity in soils is any change of the pore size (air pocket) between soil particles. This results in soil volume either expanding or condensing, causing potential damage to structures or instability in soils. This change can come through many different processes and can be quite complex in nature. It can be characterized by three general factors: soil characteristics, environmental factors, and state of stress (Nelson and Miller, 1992).

Infrastructure or housing that is built on unstable soils can have detrimental effects, such as this dislocated sidewalk.

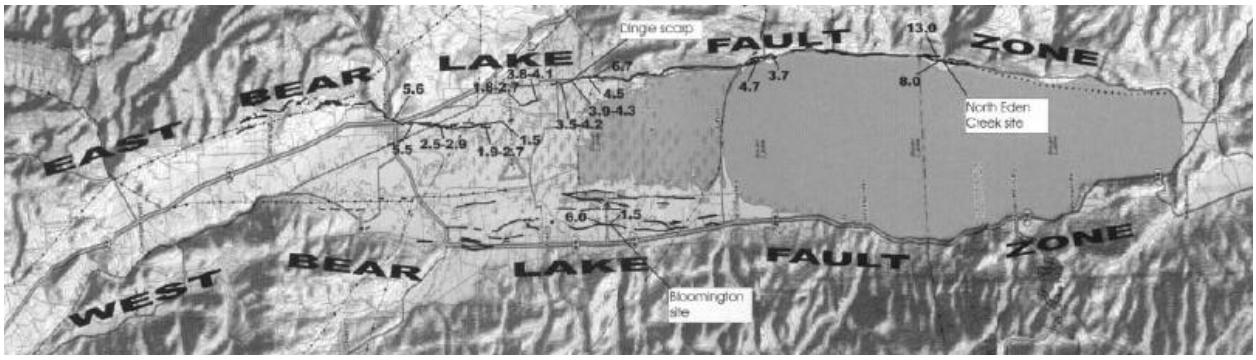
Soil characteristics are categorized by mineralogical, chemical, and engineering properties that affect soil composition, chemical reactions, and soil structure. Environmental factors consist of anything outside of the actual soil (environment) that attributes change to the soil composition. Examples include moisture conditions and variations including climate, groundwater, drainage, man-made water sources, vegetation, permeability, and temperature. Stress conditions are the last of the general factors affecting shrink-swell potential. An example of these conditions is the change of the ground level with soil excavation. Previously compacted soils under the weight of existing soil is left exposed and without weight, creating pressure. The soil tends to heave upward with moisture gain and disfigures the ground level. Stress conditions are made up of several components worthy of investigation including stress history, in situ conditions, loading, and soil profile (Nelson and Miller, 1992; USDASCS, 1976).

Geology

The geology of the Bear Lake region is diverse and complex. Major rocks and landforms include 9 types, which are the following (Chugg et al., 1968):

1. Mixed alluvium on alluvial fans, stream terraces, pediments, and glacial till (nearly level to sloping)
2. Mixed alluvium on stream bottoms and alluvial fans (mostly nearly level to very gently sloping with inclusions of areas that are gently sloping to sloping)
3. Mixed alluvium on alluvial fans, pediments, and loess-covered limestone hills (gently sloping to sloping)
4. Mixed sedimentary rocks in the hills and mountains (mostly steep to very steep)
5. Lacustrine sediments on lake bottoms (relatively flat)
6. Loess-covered alluvial fans, lava plains, and mixed alluvium on alluvial fans (nearly level to very steep)
7. Loess-covered lake terraces (nearly level to very steep)
8. Loess-covered alluvial fans (gently sloping to steep)
9. Loess-covered limestone hills, basalt hills, and alluvial fans (gently sloping to steep)

These several geological elements define the Bear Lake region and provide the soils that are utilized in the various systems of agriculture, wildlife, recreation, economics, and other uses. By



This figure shows the East and West Bear Lake Fault zones (McCalpin, 2003)

understanding the basic distribution of these various rock and landform types, planners can more thoroughly investigate development patterns, current and future.

The Bear Lake region and the study area for this project lie between several mountain ranges and one major plateau. On the west is the Bear River Range, to the north is the Aspen Range, to the northeast is the Preuss Range, to the east is the Bear Lake Plateau, and to the southwest is the Wasatch Range. The basin is considered an east-tilted half graben (a graben is a block of depressed land bordered by faults) situated between all of these ranges, with two major faults on the east and west side of the basin (McCalpin, 2003).

Faults, Earthquakes, and Liquefaction

The two major fault zones on the east and west of Bear Lake are referred to as the master East Bear Lake normal fault zone (EBF) on the east, and the hinge-type West Bear Lake fault zone (WBF) on the west. Both of these faults are divided into three sections each that are about 20 to <32 km (12.4 to <19.8 miles) long. Both faults are considered active and should be studied with great care when considering growth and development in the region (BLRCG; McCalpin, 2003). While both faults have been described as active, the EBF seems to create more concern, giving these hazards for that area if an earthquake were to occur (BLRCG):

1) Destruction of buildings.
2) Breakage of utility lines.
3) Interruption of communication lines.
4) Occurrence of landslides.
5) Occurrence of seiches (tidal waves) on the lake.
6) Permanent changes in lake level.
7) Damage to septic tanks, holding tanks, and lagoons.

While there is not any way to determine exactly when or how intense an earthquake in the area could be, looking at the past could give some insight as to the destruction or magnitude these quakes could cause. On November 10, 1884, there was the largest recorded earthquake in the region. The epicenter was southeast of St. Charles, and it reached a magnitude of 6.3 (McCalpin, 2003). This earthquake originated on the WBF and is considered to be an indication of possible future earthquakes in the basin (Evans et al., 2002).

In November of 1988, there was also an earthquake near Beaver Mountain Ski Resort that was a magnitude of 4.8. These recent earthquakes, and those from the past, have serious implications regarding the safety of the residents of the Bear Lake region. Setback recommendations have been suggested at 30–50 feet from the "...fault traces with evidence of displacement in the past 11,000 years" (McCalpin, 2003, p. 35).

McCalpin also states that, "future large (M > 6.5) earthquakes in Bear Lake Valley will be accompanied by surface fault rupture, as they have been in the past. The exact amount of displacement cannot be predicted, and could range from minor surface faulting of centimeters to displacements as large as 6 meters" (2003, p. 35). Both the EBF and WBF have been active within that time frame, and setbacks should be created for the region before there is too much growth along fault zones.

Liquefaction is another potential natural event connected to earthquakes in the Bear Lake region. It is defined as an occurrence where "...shaking of ground may cause a loss of strength or stiffness that results in the settlement of buildings,

landslides, the failure of earth dams, or other hazards...It is a phenomenon associated primarily, but not exclusively, with saturated cohesionless soils" (Committee on Earthquake Engineering, 1985, p. 1). Liquefaction has been noted to be a problem in almost every major earthquake throughout history. It occurs when the ground shakes and causes instability in the soils, and the ground becomes disfigured and deformed. It can ripple, flow, slump, drop, or rise, causing major structural problems to buildings or landforms. The most common soil types to liquefy during an earthquake are recent geologic deposits and sandy soils. There is also good evidence to suggest that once a soil type fails in an earthquake to liquefaction, it will probably fail again in a future event (Committee on Earthquake Engineering, 1985).

Regional Geological/Hydrological Implications

The Paleozoic limestone formations on the west side of the Bear Lake region are considered to be the best aquifer in the region for extracting water, except for the Brigham Quartzite types. The Wasatch and Salt Lake formations are not good options for water, because they are very susceptible to groundwater pollution. Lucastrine sediments probably hold a lot of water, but water should only be extracted after groundwater quality studies have been done, because of the potential for heavy mineralization with hydrogen-sulfide from fault zones (BLRCG).

Section Summary

- Soils can affect the structural integrity of buildings and infrastructure in the Bear Lake region if the wrong types are allowed to be developed on.
- The Bear Lake region has had earthquakes and other natural disasters involving geology and soils in the past. These past events are indicative of potential future events and should be planned for accordingly.
- Economic loss and public harm can come to residents or jurisdictions in the event of mass movements such as landslides, debris flows, and rock falls.

AGRICULTURE

Agriculture is a crucial part of the history, culture, livelihood, and identity for the Bear Lake region. In recent years, there has been a concern for the agricultural lands and heritage in the region, and how to best protect the way of life that has existed for so long. When entering the Bear Lake region, one cannot help but see the agricultural lands on the west side of the lake being sold for second home and cabin sites. Small towns in the region are struggling with decisions regarding the selling of family-owned and farmed agricultural land in exchange for financial rewards that are hard to pass up.

Agricultural grazing lands in Round Valley, just southwest of Bear Lake. These cultural and economic commodities are under pressure by sprawling residential development.

Farmers and ranchers struggle in the economy to make a living solely on farming and ranching, but in many cases they do not want to give up the agricultural heritage they have had for generations. The scenic views of these lands are also important for the residents of the Bear Lake region and are quickly being compromised with residential growth on the viewable hillsides of the area.

Agriculture and Soils

Soils are arguably one of the most important components of successful agriculture and provide the nutrients, structure, and moisture needed to grow many types of agricultural crops. There are two basic ways that soils are formed: in place and by water. Those that are formed in place consist of biological remnants such as plants and animals and a variety of climatic components. Soils that were formed by water are referred to as alluvial soils and are considered quite productive. There are several characteristics associated with soils that should be considered, especially when determining which soils are adequate for what purposes. They are drainage, depth, slope, texture, erosion, chemistry, structure, and permeability (Christensen and Hutchings, 1974).
The following are several important observations regarding soils and their use for various agricultural purposes:

- Clay soils are difficult to cultivate and are probably best for grazing.
- Loamy soils are good for most crops and are easily managed.
- Sandy loams are good soils for agriculture as well, but lose water rapidly and should be watered in short, frequent runs.
- Sands are also good soils and can be planted fairly early in the spring. Seedlings do not usually become easily established, however, because of low water holding capacity. These soils are particularly difficult to manage on steep slopes.
- Gravelly soils are hard to farm because of rocks and gravel, but are ideal for orchards or vineyards. They also lose water rapidly.
- Slopes over 8% are generally considered unsuitable for irrigation, with several exceptions including orchards, vineyards, and special irrigation techniques.

(Christensen and Hutchings, 1974)

History

In 1863, the first Mormon settlers began to inhabit the Bear Lake Valley. These new residents farmed and ranched the fertile valleys and benches, letting their cattle and horses graze on the wild grasses. By 1885, farmers began to grow more grains including wheat, oats, barley, rye, cereals, as well as vegetables, and potatoes. They also

Early agriculture in the Bear Lake area could have looked similar to this farm northwest of Bear Lake. Cultural-historical amenities such as these can add to the quality of life for a region and help to define what Bear Lake has been, and could continue to be, with proper planning.

began to grow alfalfa, getting up to three cuttings per season. There are also reports in the same year of apple and plum trees doing well and several types of berries including raspberries, gooseberries, and currants. This is no surprise, considering the fame that Bear Lake raspberries have gained over the decades. Reports of early livestock in the region include cattle, horses, and sheep, which were typical of western valleys and ranges at the time (Onderdonk, 1885).

Growing seasons in the Bear Lake region are less than hospitable, with long winters, early and late frosts, and deep ground freezing. In Randolph, there is only an average of 46 freeze-free days, with the average last spring freeze on July 2nd, and the average first fall freeze on August 17th (Pope and Brough, 1996). The average growing season for the Bear Lake region, however, ranges from 44-100 days. Low temperatures average below zero for 29 days of the year, December through March. Woodruff recorded frozen ground depths of six feet in 1961 and 1962 (BLRCC, 1975).

Livelihood

As of 2002, the total number of farms in Bear Lake County, Idaho was 424. The total acres of farmland in the county were 211,530 acres, with an average farm size of 499 acres. There were also 23,657 head of cattle and calves in 2002. Rich County, Utah also enjoys a large amount of land in agricultural use. There were 135 farms in the county in 2002. They had 509,279 acres in farms and ranches, with the average acreage being 3,772 acres per establishment. There were also about 38,413 head of cattle and calves for the same year (Godfrey et al., 2005; USDA NASS, 2002).

Economics for the region are largely based on agriculture and consist of the following data: Bear Lake County, Idaho is approximately 671,944.9 acres in size, with 211,530 acres in farmland. This accounts for about 31% of the county in agricultural land. Rich County, Utah is approximately 694,758.4 acres in size, with 509,279 acres in farmland. This accounts for about 73% of the county in agricultural land. The Bear Lake region as a whole, consisting of both counties, is approximately 1,366,703.3 acres in size and has about 720,809 acres in farmland, being about 53% agricultural land (Godfrey et al., 2005; USDA NASS, 2002).

Various types of agriculture are the livelihood for many Bear Lake region residents. This working ranch northwest of Georgetown, Idaho is an example of how ranching is still an integral part of the economy for the region.

According to the U.S. Census Bureau, Rich County, Utah made $3,184,000 in farm earnings for 2005, which accounted for 13.2% of the total earnings in the county. Bear Lake County, Idaho made $6,561,000 in farm earnings for 2005, which accounted for 10.5% of the total earnings in the county. During 2005, Rich County, Utah had 135 farms which were an average size of 3,772 acres. 51.9% of the farms in the county were 500 or more acres in size. In Bear Lake County, Idaho during 2005, there were 424 farms, which had an average size of 499 acres. 22.9% of the farms in this

county were 500 acres or larger (U.S. Census Bureau, 2007).

This is a large portion of the landscape in the region. The future of these lands should be considered heavily regarding current economic, cultural, and historic land use, the existing rural character of the region, and in considering future implications of agricultural land preservation.

Identity

There are several ways to quantify agricultural lands, depending on the values of a region. One is through soil properties and qualities; the other is through views and vistas of the agricultural lands - or a combination of both. The SSURGO soils data from the Natural Resource Conservation Service (NRCS) provides "Prime and other Important Farmlands" that can be extracted from their GIS data. This consists of "prime farmland, unique farmland, and farmland of statewide or local importance" (USDA NRCSb, 2006). The farmland designations for Rich County, Utah are "Farmland of statewide importance" and "Prime farmland if irrigated" designations. The NRCS definitions of prime farmland and farmland of statewide importance are contained in the following:

> "Prime farmland" as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but is not urban or built-up land or water areas...In some areas, land that does not meet the criteria for prime or unique farmland is considered to be "farmland of statewide importance" for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. (USDA NRCSb, 2006, p. 2)

Section Summary

- Agriculture has historically been a major economic and cultural asset in the Bear Lake region. Grazing and farming is still, and should continue to be considered as, an integral source of employment in the area.
- Many existing farms and ranches are historical landmarks, with rustic barns and stables, and working lands that add to the cultural experience of the region.
- Although there are great pressures for land owners to sell to developers, areas should be studied in depth to determine prioritized lands for agricultural land preservation. Without this type of planning, some of the most scenic and historically significant properties will be developed. A great example to consider regarding critical agricultural land preservation is the "White Barn" along-side SR-224 near Park City, Utah.

VEGETATION

Historical

Upon considering the inhabitance of Bear Lake valley, the early Mormon pioneers inquired of mountain man Jim Bridger about the area. They had not yet been to the valley but met Bridger on the Bear River near what is now called Fort Bridger, where they stopped for the night. He mentioned to them, regarding vegetation in the Bear Lake area, that there was "...oak timber, sugar trees, cottonwood, pine and maple" (Rich, 1963, p. 14). Another account of early vegetation in the valley was given in 1885 by James L. Onderdonk. He visited the area to inquire concerning the Idaho portion and its existing amenities. He stated the following:

> We have no forest timber in the valleys; our mountain sides and ravines are covered with a thick growth of pine, balsam, aspen, mahogany, and cedar. The pines are red, white, yellow, and pinion. The cedars are chiefly white. The mahogany is properly mountain-box. The pines furnish us an excellent article of lumber; the balsams are manufactured into a fine article of shingles; the aspen (quaking asp) and mahogany make excellent fuel, and also the cedars – the latter are also used in manufacturing furniture. (Onderdonk, 1885, p. 77)

Many of the species that James Onderdonk describes above can be seen in this photo which was taken west of Garden City. It is no wonder why people are finding these hillsides desirable to build cabins and second homes on.

There are also several accounts that mention the grasses of the region. John C. Fremont, an early explorer of the Bear River and its surrounding amenities, wrote that the region was covered in bunch grasses which the Indians would feed their cattle on. These bunch grasses seemed unique to this region (Rich, 1963).

It is apparent from comparing today's vegetation with these historical views, that the vegetation in the Bear Lake region has remained relatively similar to how it was when the early settlers came into the valley. However, several aspects of the native flora scheme that have evolved over the generations are areas of agricultural use and developed areas in the valleys and on the lower hillsides.

Current

With the exception of agriculture and development, current vegetation in the Bear Lake region has probably not changed extensively, based off of observations from history and the present. According to the Environmental Protection Agency, the Bear Lake region lies in five of the Level IV ecoregions. These ecoregions "...denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources" (Woods et al., 2001; McGrath et al., 2002, poster front). They take into consideration wildlife, hydrology, land use, geology, soils,

All around Bear Lake, vegetation types are changing in subtle and sometimes unnoticeable ways. As this photo shows, the building of homes, golf courses, and other amenities in the region are changing the face of the landscape. This photo was taken directly west of Bear Lake.

vegetation, climate, and physiography. They were developed mostly for U.S. government interagency use and analysis, but can be a tool in understanding current vegetation in a region. The five ecoregions for Rich County, Utah and Bear Lake County, Idaho consist of the following:

Partly Forested Mountains- about 6,000-9,000 ft. in elevation, 16-30" precipitation/year, 30-75 frost free days/year. Consists mostly of Douglas-fir forest and Sagebrush Steppe ecosystems. Basic vegetation includes douglas fir, aspen, lodgepole pine, mountain mahogany, mountain big sagebrush, mountain brush, and fescue.

Wet Valleys- about 5,900-6,600 ft. in elevation, 10-16" precipitation/year, 55-110 frost free days/year. Consists mostly of Sagebrush Steppe ecosystem. Basic vegetation includes sedges, rushes, cattails, bluegrass, clover, mountain big sagebrush, bluebunch wheatgrass, slender wheatgrass, and Idaho fescue.

Semiarid Bear Hills- about 6,000-7,400 ft. in elevation, 12-20" precipitation/year, 65-100 frost free days/year. Consists mostly of Sagebrush Steppe ecosystem. Basic vegetation includes bluebunch wheatgrass, bluegrass, mountain big sagebrush, service berry, snowberry, low sagebrush, black sagebrush, Utah juniper, and curleaf mountain mahogany.

Wasatch Montane Zone- about 7,000-9,600 ft. in elevation, 11-25" precipitation/year, 10-90 frost free days/year. Consists mostly of Douglas-fir Forest and Western Spruce-fir Forest ecosystems. Basic vegetation includes douglas fir, aspen, mountain big sagebrush, snowberry, Idaho fescue, mountain brome grass, needlegrass, englemann spruce, and subalpine fir.

Semiarid Foothills- about 5,500-8,200 ft. in elevation, 12-18" precipitation/year, 60-100 frost free days/year. Consists mostly of Sagebrush Steppe ecosystem. Basic vegetation includes mountain big sagebrush, bluebunch wheatgrass, and Utah juniper.

Sagebrush Steppe Valleys- about 4,600-6,500 ft. in elevation, 8-25" precipitation/year, 80-135 frost free days/year. Consists mostly of Sagebrush Steppe ecosystem. Basic vegetation includes mountain big sagebrush, bluebunch wheatgrass, streambank wheatgrass, Idaho fescue, cheatgrass, bluegrass, and aspen. (Woods et al., 2001; McGrath et al., 2002)

Regional Issues

One of the main threats to the vegetation in the Bear Lake region is the problem associated with invasive weeds. As with any rural area, the creation of breeding grounds for invasive vegetative species, which can move in after previous

Riparian areas, such as this one created through restoration efforts on Thomas Fork, provide many essential services to both residents and wildlife. These services include natural surface and groundwater filtration, bank stabilization, flood protection, wildlife habitat, and scenic beauty.

agricultural lands are not cared for, or hillsides are cleared of vegetation for development, can be a real issue. Rich County has designated three invasive weed species as particular concerns to the county: Black Henbane, Dalmatian Toadflax, and Poison Hemlock. Other invasive species that have either been noticed in the region or are expected to come to the area soon and could pose future problems, are Tamarisk, Leafy Spurge, and Canada Thistle (Palacios et al., 2006).

Wetland and riparian areas are also important to consider for the region. They are not only important for sustaining and improving water quality and quantity, providing wildlife habitat, natural hazard prevention, and scenic value, but they also have legal standards associated with them.

The Clean Water Act (1977), The National Environmental Policy Act (1969), the Endangered Species Act (1973), the Stream Alteration Act (1953), the Rivers and Harbors Appropriation Act (1899), Executive Order 11988: Floodplain Management (1977), Executive Order 11990: Protection of Wetlands (1977), and the Emergency Wetlands Resource Act (1986) are the primary federal acts and regulations that contain some of the legalities associated with the protection of clean water, endangered species, and the environment (US EPA, 2007; Lock, 1994).

These acts, combined with state, county, and city codes and ordinances, should also be researched and understood before these amenities are potentially affected. While legality is an important issue in the protection of these essential natural systems, basic understanding of the regional benefits of wetlands and riparian areas to the Bear Lake region can assist leaders in creating sensible policy. According to the Utah Division of Wildlife Resources, wetland and riparian areas provide the following functions:

- Water quality
- Flood control and storage
- Wildlife habitat
- Food chain support
- Cultural value
- Economic value

(Lock, 1994)

The Bear Lake National Wildlife Refuge, shown above, is located just north of Bear Lake. This is a regional treasure that is the largest wetland in the area, which not only provides habitat for many types of bird species, but scenic beauty as well.

These wetland and riparian areas comprise a large portion of the two counties in the Bear Lake region. In Bear Lake County, Idaho, there are about 41,500 acres of wetland areas (IDCL). In Rich County, Utah, there are about 36,547 acres of wetland areas (Lee and Melcher, 2000). The largest wetland in the region is the Bear Lake National Wildlife Refuge north of Bear Lake. This refuge is 19,000 acres and houses a plethora of wildlife including bird species such as redhead ducks, white-faced ibis, canada geese, greater sandhill cranes, ducks, and various shorebird species (USFWS, 2007).

Areas designated as essential wetland sites on the Utah side of the lake, as determined by Lee and Melcher of the Utah Division of Wildlife Resources (UDWR) in 2000, are riparian areas along UDWR priority streams, the wetland complex associated with the Bear River (including wet meadow/emergent marshes along 57 miles of the Bear River), and the wet meadow areas in Round Valley (2,000 acres of wet meadow). One particular note of interest for the wetlands in this region, also noted by UDWR, is that, "The vast wet meadow habitats along the Bear River in Rich County are unique in that distributions of animals and plants typically found in two different ecosystems (Rocky Mountain and High Desert) intersect and abound here" (Lee and Melcher, 2000, p. 13). These wetland areas, and other important vegetation communities that support wildlife in the region, should be enhanced and/or protected to provide economical, hydrological, ecological, and cultural benefits for the Bear Lake region.

Section Summary

- Vegetation in the region has had a significant effect on land use and the economy. The grasses and other vegetation have provided a prime environment for the establishment of grazing.
- Weed invasion should be considered for allowing development when vegetation is either cleared for housing or previously farmed fields are sold and no longer managed for weed control.
- Some vegetation types are crucial for providing both community and environmental benefits. Such areas include riparian areas and wetlands, which provide natural services including source and surface water filtration, stream bank stability, flood protection, wildlife habitat, and scenic quality.
- Vegetative preservation areas, such as riparian areas and wetlands, should be considered as tourism and recreation amenities. Canoeing, hunting, fishing, hiking, biking, bird watching, photography, and other activities are things that many people like to do near riparian areas and wetlands.

WILDLIFE

Historical

In the Bear Lake region, historical accounts tell of wildlife similar to other areas in the west. Remains of Bison have been found in the Mud Lake area to the north of Bear Lake (USFWS, 2007). Stories of Native Americans utilizing the valley for its abundant wild grasses to feed their horses are also common, as are the accounts of the early settlers feeding their livestock on the same "wild hay." In 1885, James Onderdonk made the observation that there were bear, elk, prairie chickens, rabbits, deer, pheasants, hares, sage hens, geese, swans, pelicans, gulls, skypokes, and ducks.

Dr. Russell R. Rich, in telling the story of the settlement of the Bear Lake Valley, mentions wolves, badgers, foxes, ground squirrels, wolverines, wild cats, and bears living in the area (1963).

The cutthroat trout was also important to, and used by, the early settlers in the Bear Lake region. After a long and arduous trip from Cache Valley through Mink Creek Canyon, a large company of men, including President Brigham Young, traveled to Bear Lake to see how the new settlements were coming along. They struggled through mud and water the whole way up and were exhausted after their travels. Solomon F. Kimball wrote this of the dinner after the long trip: "The Bear Lakers had caught a wagon load of beautiful trout in honor of the occasion, and had plenty of good fresh butter to fry them in; and what a feast the brethren did have after living on hope and mud for twenty-four hours" (Rich, 1963, p. 35)!

Current

The wildlife in the Bear Lake region has probably not changed as extensively as some more populated regions in the US. With the exception of the American Bison,

Elk, deer, moose, and a plethora of other wildlife species inhabit the foothills and mountains of the Bear Lake region.

A Bear Lake Bonneville Cutthroat Trout taken from Bear Lake.

Grey Wolf, Grizzly Bear, and the Black-footed Ferret, most of the wildlife in the region is probably similar to what it was when the region was settled. While there are probably too many types of wildlife species to accurately list in the Bear Lake area, wildlife species can be categorized by one of three categories: aquatic, terrestrial, and avian. These basic environments, along with the various wildlife types that inhabit them, in the Bear Lake region are the following:

Aquatic:

Aquatic habitat (water), is classified in both Utah and Idaho based on water quality and should be suitable for one of the following, regarding wildlife protection: cold water game fish, warm water game fish, non-game fish, other aquatic life (birds, waterfowl, et cetera), general wildlife habitat, or a combination of several of these (UDEQ, 2004; IDEQ, 2007).

Aquatic species in the area include, but are not limited to, various types of trout including the Bear Lake Bonneville Cutthroat Trout (Bonneville Cutthroat), Lake Trout, Mountain Whitefish, Kokanee Salmon, Channel Catfish, Black Crappie,

Bass, Yellow Perch, Walleye, Bullhead Catfish, Carp, Utah Chub, Utah Sucker, Mountain Sucker, Dace, Minnows, Bonneville Cisco, Bonneville Whitefish, Bear Lake Whitefish, Bear Lake Sculpin, Mollusks, and various micro-invertebrate species. Of these aquatic wildlife types, several of them are endemic only to Bear Lake. They are the Bear Lake Whitefish, Bear Lake Sculpin, Bonneville Cisco, and Bonneville Whitefish (UDNR-DWR, 1992). These species are not only local treasures but state and national amenities, and they should be protected through maintaining and improving water quality in Bear Lake and the surrounding lakes and streams.

Terrestrial:

Terrestrial habitat is what most of us think about when it comes to wildlife habitat. This habitat is inhabited by any species that use the land for all or a portion of its life cycle. It provides living amenities for mammals, amphibians, reptiles, and avian species (birds). Each of these types are found in the Bear Lake region, and are the following:

Mammals: Mule Deer, Elk, Moose, Pronghorn Antelope, Coyotes, Bobcat, Mountain Lion, Fox, Badger, Mink, Weasel, Beaver, Muskrat, several Bat Species, Cottontail Rabbit, Black-Tailed Jackrabbit, Chipmunks, Squirrels, Ground Squirrels, and others.

Amphibians: Columbia Spotted Frog, Great Basin Spadefoot, Northern Leopold Frog, Tiger Salamander, Weston (Boreal) Toad, Western Chorus Frog, Woodhouse's Frog and others.

Reptiles: Common Garter Snake, Common Sagebrush Lizard, Gophersnake, Great Basin Rattlesnake, Striped Whipsnake, Terrestrial Garter Snake, Western Skink, Eastern Racer, and others.

Avian:

Raptors and game birds: Bald Eagle, Golden Eagle, Hawks, Falcons, Owls, Ruffed Grouse, Sharp-Tailed Grouse, Sage Grouse, Gray Partridge, Pheasant, Blue Grouse, Chucker, Hungarian Partridge, Doves, Wild Turkey, and others.
Wetland species: Canada Goose, Red Head, Canvas Back, Mallard, Gadwall, Cinnamon Teal, Northern Shoveler, White-Faced Ibis, Snowy Egret, Black-Crowned Night Heron, Great Blue Heron, Double Crested Cormorant, California Gull, Franklins Gull, Caspian Tern, Forester's Tern, Black Tern, Western Grebe, Eared Grebe, and others. (All species information provided by Utah Division of Wildlife Resources, Idaho Fish and Game, Utah Division of Water Resources, and US Fish and Wildlife Service)

Regional and Legal Issues

While the health of these organisms and populations are important for the health of ecosystems in the Bear Lake area and for aesthetic, recreational and economic vitality, some of these species are protected either by state or federal law. The federal threatened or endangered species and the states species of concern for the region must be protected and/or carefully managed. There are two federally listed species and one candidate species on the threatened and endangered species list for Bear Lake County, Idaho and Rich County, Utah. The listed species are the Black-footed Ferret and Canada Lynx in Utah, and the Canada Lynx in Idaho. The candidate species in Idaho is the Columbia Spotted Frog.

The Greater Sage Grouse is one of Utah's state listed sensitive species in the Bear Lake area. This species lives in the sagebrush covered habitat that makes up much of the regions landscape.

The state of Idaho legally manages and protects all wildlife except for the Starling and English Sparrows. Utah also manages and protects the wildlife in Utah but also lists state species of concern. They are the Bald Eagle, *Bear Lake Sculpin*, Bear Lake Springsnail, *Bear Lake Whitefish*, Black-Footed Ferret, Boblink, *Bonneville Cisco*, Bonneville Cutthroat Trout, Burrowing Owl, California Floater, Ferruginous Hawk, Greater Sage-Grouse, Lewis's Woodpecker, Lyrate Mountainsnail, Northern Goshawk, Pygmy Rabbit, Southwestern Willow Flycatcher, Three-Toed Woodpecker, Western Pearlshell, Western Toad, and White-tailed Prairie Dog (italicized species are three of the previously mentioned endemic species to Bear Lake) (Idaho Fish & Game, 2007; Utah Division of Wildlife Resources, 2007)

The Bear Lake Bonneville Cutthroat Trout is also an important species for the region. This species is enjoyed and appreciated as being a strain of the only native trout in the region. One of the most effective ways for biologists and interested parties to preserve the health and non-threatened federal status of the Bear Lake Bonneville Cutthroat Trout is to protect or enhance its spawning habitat. Currently, the streams in the Bear Lake area that are being used by, or being restored for, spawning use are the following: Swan Creek, St. Charles Creek, Big St. Charles Creek, Little St. Charles Creek, Big Spring Creek (Spring Creek near Laketown), Fish Haven Creek, and North Eden Creek (Nielson and Tolentino, 2002; Warren Colyer, Past President, Cache Anglers, personal communication, December 19, 2007). As these streams remain or become more suitable for Bear Lake Bonneville Cutthroat Trout spawning, this species could continue to thrive in the area.

Section Summary

- Wildlife in the Bear Lake region is highly valued by residents, both states, and the federal government. Most of the habitat for well-known species has remained mostly unchanged. However, there are species that are endangered, threatened, or have other designations on the state and federal level. These species should be carefully considered when decisions are made regarding regional planning.
- Bear Lake has several endemic aquatic species (native only to Bear Lake). These include the Bear Lake Whitefish, Bear Lake Sculpin, Bonneville Cisco, and Bonneville Whitefish (UDNR-DWR, 1992). They should all be protected as some of the region's most valued species.
- Some state or federally listed species, such as the Greater Sage Grouse, require vast areas of land to sustain them. State wildlife officials should be involved on the local and regional level, when considering development in the region.

RECREATION

Historical

In the mid to late 1800s, while the early settlers were very busy overcoming the challenging climatic and agricultural barriers to comfortable living, there were several things that the people did for recreational purposes. Swimming in Bear Lake and utilizing hot springs in the region were common. These natural and clean water amenities were used by many of the residents and visitors of the region (Onderdonk, 1885). There was also encouragement from local town and church leaders such as President Brigham Young, to have dances often, at least several times a month. These dances were held in the town centers that were originally planned for open space and use by the community for such activities. Reports indicate that these dances were important social activities in the communities.

Another form of early entertainment, which was mostly utilized for economical gain, was the "historic rendezvous." Rendezvous were used for trade and for the selling or buying of goods. Mountain men and Native Americans attended these and had some among their own people as well. The Native American tribes in the region valued the south end of Bear Lake for such trading with other tribes such as the Utes.

In referring to the growth around, and recreational use of, the lake in the late 1880s, James Onderdonk made an observation about the region that has already come to pass and is increasingly becoming more apparent as time goes by:

> The shores of the lake are sandy and gravelly, and afford a clean and easy approach...It is a splendid bathing resort, and the inhabitants living on its shores delight in this exercise, as well as others who visit the lake in the summer from distant localities. No doubt can exist in the mind of anyone who has visited this beautiful lake, but in the near future this will be a favorite summer resort for the tourist and pleasure seeker, and good hotels and accommodations will be provided and the lake decked with sails. (1885, p. 78)

Anyone who has visited or lived in the Bear Lake region understands the implications of these observations. Bear Lake is visited by many people from many different areas, and more people want to move to the region, both seasonally and permanently. As the area builds more year-long accommodations, more people will most likely decide to make the Bear Lake region their permanent home.

Existing

The Bear Lake area has always been fairly well known for its recreational amenities, especially regarding the lake itself. In 2002, there were 310,175 visitors to Utah State Parks at Bear Lake, which is a

Recreational amenities, such as the Minnetonka Cave seen here, afford a great variety of activities in the Bear Lake region.

The main marina for Bear Lake, located near Garden City, Utah has been used so extensively that another marina has been proposed nearby. Visitors also enjoy using both private and public beaches in the region.

ninety-four percent increase from 1990. Eighty percent of visitation occurs between the months of July and September (UDNR, 2005). In a visitor survey given in 2002 on the Utah side of Bear Lake, the Utah Department of Natural Resources Division of Parks and Recreation indicated some interesting observations:

- 70% stated that Bear Lake State Park was their main destination.
- 72% visited the Marina area.
- 35% visited Rendezvous Beach.
- 67.5% stayed more than one full day at the State Park.
- 59% of visitors stated they were part of a group of 6 or more people.
- Activities included 59% swimming, 57% boating, 55% sunbathing, 46% water-skiing, 37% camping, and 35% picnicking.
- 80% of those surveyed were from Utah, and 8% were from Idaho.

(UDNR, 2005)

On the Idaho side of the lake, Idaho Department of Parks and Recreation reported the following figures for visitation in 2002:

- There were 73,405 visitors to the Idaho State Parks on Bear Lake in 2002.
- These visitors contributed about $64,991 to the economy of the region in 2002.

When looking at the recreational amenities that the Bear Lake region has to offer, there are several key activities that are available to residents and visitors of the region. Although there are endless activities in any area, the Bear Lake area offers some unique and diverse activities. Some of these activities, according to the Bear Lake Convention and Visitor's Bureau and Bear River Heritage Area Council, are the following:

- Snowmobiling
- Ice Fishing
- Photography
- Rodeos
- Historic Rendezvous'
- Hot Springs
- Museums and Visitor's Centers
- ATV's and Jeeping
- Rock Hunting
- Shopping
- Eating at local restaurants
- Entertainment
- Water Sports
- Trails
- Camping and Picnics
- Hunting and Fishing
- Golfing
- Horseback Riding
- Wildlife and Bird Watching
- Cave Exploring
- Raspberry Days
- Cross Country Skiing
- Downhill Skiing

(BLCVB, 2007; BRHAC)

Section Summary

- The Bear Lake region affords some of the best recreation in both Idaho and Utah, and is being "discovered" as a recreational paradise.
- This "discovery" can be very positive for the region if the health, safety, and welfare of the residents are protected by planning strategies.
- While good for the economy, the large numbers of recreational visitors in the summers puts more stress on local and regional resources such as transportation routes (including emergency services), parking, and law enforcement.
- As the Bear Lake area grows, more recreation and tourism planning and design at the local and regional level will become critical.
- Although lake activities are commonly mentioned as the main recreation activities near Bear Lake, the region should continue to be portrayed as one that has a full range of recreational potential.

TRANSPORTATION

Transportation in the Bear Lake region consists of many different types of federal, state, county, and local transport types. In general, these types can be classified into several categories, each with its own purpose and restrictions: Interstates (50-80 mph), freeways or expressways (45-70 mph), principle or minor arterials (30-60 mph), major or minor collectors (25-35 mph), bus transit (follow any of the previous), bike, and pedestrian.

There is also a small airport located four miles east of Paris, Idaho. In the Bear Lake region, each of these transportation types is being utilized with the exception of the interstate highway (Wikipedia, 2007; CMPO, 2005). While not included in either Bear Lake or Rich counties, two major interstate highways connect to these regions. They are I-15 to the northwest, which connects in McCammon, Idaho to US Highway 30, and I-80 to the east, which connects to Utah State Highway 16/89 to the south of Rich County.

Major roadways in the region starting in the south end of Rich County are Utah State Highway 16 through Woodruff and Randolph; Utah State Highway 30 through Laketown and Garden City; U.S. Highway 89 from Logan Canyon through Fish Haven, Montpelier, and east to Wyoming; Idaho State Highway 36 going west from Ovid to Riverdale; and U.S. Highway 30 from Montpelier north to Soda Springs. These major roads in the region provide connections across city, county, and state borders and influence development patterns for the area from the tendency of development to generally follow existing infrastructure.

Regional Uses and Patterns – Idaho

The following are interesting transportation uses and patterns for Bear Lake County, Idaho:

- U.S. Highway 30 has 29% of its traffic as semi-trucks travel from I-80 near Little America Hotel east to McCammon, Idaho to intercept I-15.
- U.S. Highway 89 from the Utah State line, through Bear Lake County to Wyoming serves many people going to Bear Lake, Yellowstone National Park, and Grand Teton National Park. A section of this highway is also designated as the Oregon Trail-Bear Lake National Scenic Byway. At Montpelier, Idaho, the scenic byway

continues northwest to McCammon, Idaho on U.S. Highway 30.
- There are about 100 miles of federal and state highways in Bear Lake County.
- The U.S. Forest Service lands in Bear Lake County house 1.8 miles of primitive roads, 63.3 miles of unimproved roads, 2.8 miles of graded and drained roads, 231.7 miles of graded, drained, and gravel roads, and 82.1 miles of paved roads.
- Bear Lake County owns an airport 4 miles east of Paris, Idaho that does not accommodate commercial planes, but does have 400-450 general aviation aircrafts that use the airport every year.

(BLCBC, 2002)

Regional Uses and Patterns – Utah

The following are interesting transportation uses and patterns for Rich County, Utah:

- In 2007, Highway 89 just north of Garden City averaged 7,355 vehicles per day, which was 12.5% higher than the same time in 2006 (UDOT, 2007).
- On the same stretch of road, the following are daily traffic numbers for several previous years: 2002: 5,705, 2005: 6,561, 2006: 6,697 (UDOT, 2007).
- Highway 89 is also used in Utah as a regional roadway, which leads from Garden City to Idaho, and eventually connects Utah drivers to places such as Yellowstone National Park and Jackson Hole, Wyoming.
- Highway 30 leaves Highway 89 at Garden City and heads south towards Laketown. State Highway 16 then turns to the south and leads to Randolph and Woodruff. It is also one of the best ways to get to Evanston, Wyoming from the Bear Lake area.

Riparian areas and sandy beaches along Bear Lake can be accessed from the Bear Lake Scenic Byways in Utah and Idaho.

Scenic Byways

According to the National Scenic Byway Program, the following explains the reasons for scenic byways and the economic benefits that can accompany this designation:

> As humanity spreads across the globe, the untouched and protected places become increasingly precious. John Muir, one of America's conservation pioneers, understood the need to escape the civilized world from time to time, and enjoy nature at its wildest. Ecological tourism, or eco-tourism, is a growing movement by travelers seeking to explore the natural world with minimum impact. But you don't need to travel to the rainforests of Costa Rica or join an African safari to encounter ecological marvels. America's Byways deliver you to wild scenery, wildlife rich areas, and a leave-no-trace ethic of outdoor adventure right here in the U.S.

(National Scenic Byways Program, 2007)

There are currently three scenic byways in the Bear Lake region. These are the Logan Canyon Scenic Byway and Bear Lake Scenic Byway in Utah, and the Oregon Trail–Bear Lake Scenic Byway in Idaho.

The **Logan Canyon Scenic Byway** goes from Logan City along the Logan River, up to Bear Lake Summit, down to Garden City, Utah, and north to the Idaho border. It passes through beautiful limestone cliff canyons, travels next to wild trout streams, through mule deer, elk, and moose habitat, and along side beautiful Bear Lake. This byway is considered to be a National, State, and U.S. Forest Service designated scenic byway. It is about 47 miles long and takes about one hour to drive.

Bear Lake Scenic Byway in Utah goes from Garden City, Utah to Laketown, Utah, along the west shores of Bear Lake. This byway passes alongside beautiful Bear Lake to the east and has views of the Wasatch-Cache National Forest to the west. This byway is a Utah State Scenic Byway. It is about 15 miles long and takes about 20 minutes to drive.

Oregon Trail–Bear Lake Scenic Byway in Idaho goes from Fish Haven, Idaho west of Bear Lake, north to Montpelier, Idaho, north to Soda Springs, Idaho, and west to McCammon, Idaho. It passes along the north side of Bear Lake, through farmland, and historic Idaho towns. This byway is an Idaho State Scenic Byway. It is about 111.3 miles long and takes about 2.5 hours to drive (all Scenic Byway information taken from the National Scenic Byways Program, 2007).

This is a view of Bear Lake from Highway 89 coming out of Logan Canyon. This particular roadway is a National, State, and U.S. Forest Service designated Scenic Byway.

Regional Issues

While increasing recreational visitors and seasonal residents can be good for the region in many ways, several issues are becoming key. Even though towns surrounding Bear Lake are usually not crowded in the winter, summers can create crowded conditions on the roads and in parking areas. Particularly surrounding Garden City, on both Highway 89 and Highway 30, summer traffic has become an issue. Safety concerns regarding emergency vehicle access are evident, and parking is less than adequate. Other towns will probably also experience this type of problem in the future as more people decide to make the Bear Lake area their home.

Coinciding with this issue is also the over-use of Highway 89, where on summer days, crowded roads create safety problems and inconvenience. The first solution to this would be to widen the highway, and to add turning lanes, providing better access to surrounding communities. However, properties and sensitive wetlands surround both sides of the roadway, which would make any major widening a substantial

undertaking. A major solution that has been considered for mitigating these problems is the creation of a bypass for Highway 89. Some issues could arise from such a project, especially involving private property rights. However, the longer the issue is avoided, the more options for a financially feasible bypass will probably decrease. This is due to the fact that new developments are being built on the foothills west of Bear Lake, and property ownership is changing near the highway.

Section Summary

- Since increased seasonal and permanent residents and recreational users will most likely continue to come to the Bear Lake area, transportation should be a major subject in regional and local planning.
- Safety concerns regarding mostly summer traffic exist for many people in the region. Roadway bypasses, emergency access, and parking capacity have all been identified as major issues in the area surrounding Bear Lake.
- There are three Scenic Byways in the Bear Lake region that provide recreational opportunities for visitors and residents, and potential income for the area.

Modeling, for the purpose of this project, consists of attempting to map or diagram certain aspects of the landscape to better understand or to analyze potential land use and effects. For example, if one wanted to map all of the landscape components in the Bear Lake region that could affect groundwater quality or quantity, research would need to be done to verify that those components affected groundwater, and then data would need to be gathered and displayed. The models in this project were created by using GIS software.

The research that goes into deciding what is adequate or not necessary to map for a particular landscape component is just as important as the mapping itself. Without this research, the model lacks the realism that is desired. While all models are inevitably imperfect, they can be very helpful in land use planning applications, especially in determining landscapes that are critical for public health, safety, and welfare, or environmentally sensitive lands.

These models were generally created by overlaying various components in the landscape divided by resource type. By placing all of the layers for one assessment model on one map, areas of susceptibility or potential risk can be better determined (See Figure 1). In 1979, the Bear Lake Regional Commission completed a series of comprehensive maps consisting of both models and composites of sensitive lands for the entire Bear Lake region. These maps were created by hand, through an overlay process that took many man hours to complete. Included in the models produced were wildlife, geology and soils, hydrology, archeology and history, existing land ownership, vegetation, visual management, slope, and scenic quality.

It is not the intention of this project to minimize the importance of the studies produced by the Bear Lake Regional Commission; the purpose is to build upon what has already been done. These models, being produced in 2007 and 2008, will help to show some of the changes that may have taken place in the last 25+/- years. These may also contain some data that were not available when the earlier models were created that may be useful to land use planners in the region.

The models that were created for this project were the following:

- Agriculture
- Groundwater
- Public Safety
- Recreation and Tourism
- Surface Water
- Highway 89 Bypass Options
- Viewsheds
- Wildlife

After models are created, they can be used to determine how certain future development patterns in a region could affect the natural and cultural/historical environment. For example, if one wanted to show how development under current land use planning strategies may eventually affect prime agricultural lands, one could overlay that future over an agricultural model. For this reason, these models are also referred to as assessment models (Toth et al., 2006-1). A diagram of the model creation process is included on the following page:

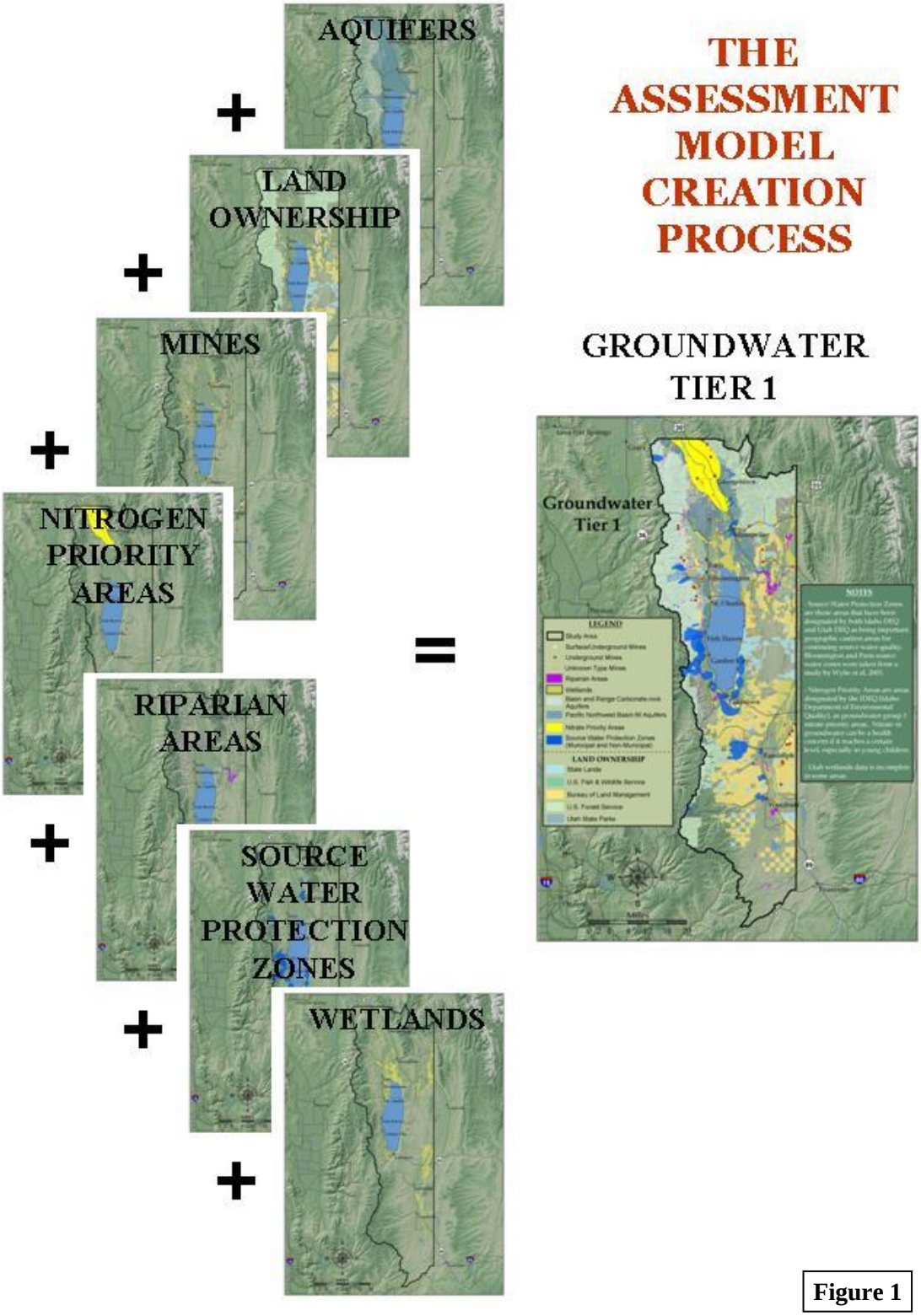

AQUIFERS
+
LAND OWNERSHIP
+
MINES
+
NITROGEN PRIORITY AREAS
RIPARIAN AREAS
+
SOURCE WATER PROTECTION ZONES
+
WETLANDS
+
=
THE ASSESSMENT MODEL CREATION PROCESS
GROUNDWATER TIER 1
Groundwater Tier 1
LEGEND
LAND OWNERSHIP
NOTES

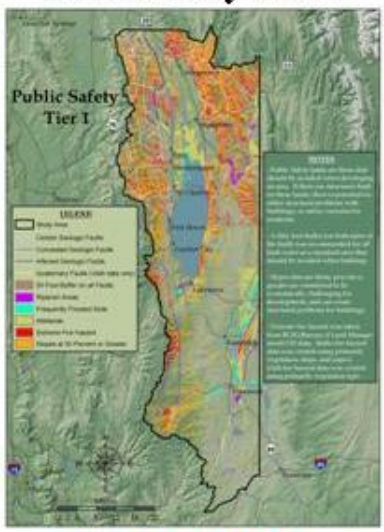
Figure 1

One of the latest innovations in the modeling process for regional land use planning is that of tiered models (2002-03 Bioregional Planning Studio - Toth et al., 2006-2). This tiering method takes the above described models and divides them each into various complexities that range from essential, to moderate, and to extensive. In this project, these will be labeled as Tier 1, Tier 2, and Tier 3, respectively. This tiering process is intended to give land use planners and policy makers more flexibility in determining new planning directions.

For example, if one component of a Surface Water Tier 3 assessment model was soils with high runoff potential, and planners did not think that those soils required restricting residential development, they could choose a Tier 2 model instead, because the model did not include those soils. The Tier 2 model may be more representative of what the planners feel is adequate for protecting surface water quality in the region.

It should be noted that some models were not tiered because there was no reason to tier the model, or the data did not exist. The models that were not tiered are Recreation and Tourism, Highway 89 Bypass Options, Viewsheds, and Wildlife. For those models that are tiered, only the most extensive models are shown as a full-page map, because this tier includes the components of every tier in the model. Below is a diagram of tiers using an example from this project (Note: The olive-green box in the legend contains components that have been added to the previous tier to create the current tier):

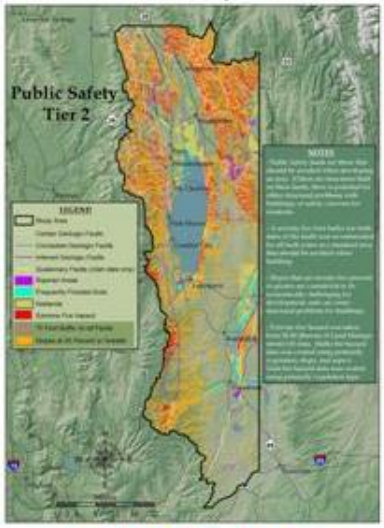
Public Safety Tier 1



ESSENTIAL

These are the most crucial components of the model.

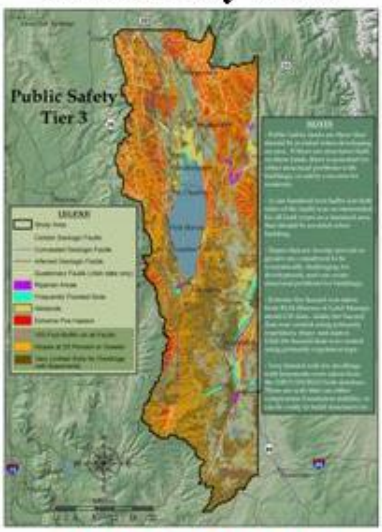
Public Safety Tier 2



MODERATE

These represent a "middle-ground" approach to the model.

Public Safety Tier 3



EXTENSIVE

These are the most detailed and complex components of the model.

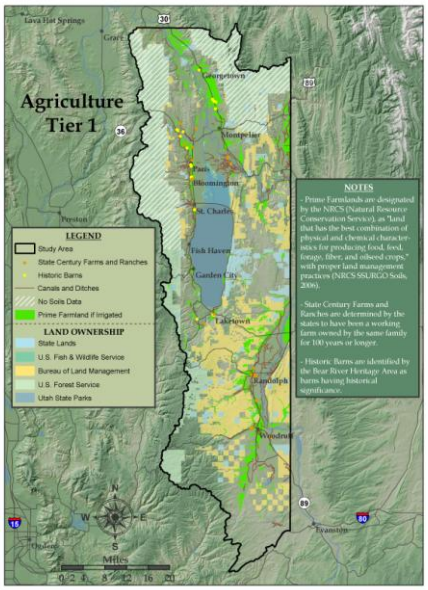
Figure 2

Agriculture is one of the most crucial components of the Bear Lake landscape. As was discussed in the previous regional inventory section, agriculture not only provides much of the area's economy, but the cultural, historical, recreational, and scenic quality of these lands is unparalleled. As is common in most rural areas of the U.S., the owners of these lands are constantly being pressured to sell properties that have been in families for generations, used for either farming or ranching.

As these lands are sold, there are several issues that can arise if not properly addressed. As lands are converted from cultivated farmland into residential lots, soils are compacted from heavy equipment used to build housing, or top soil is completely removed, which decrease the probability of these lands ever being used for agriculture again. As agricultural lands are sold and not immediately developed, they can also become breeding grounds for noxious weeds, because farmers are no longer responsible for weed control on those lots.

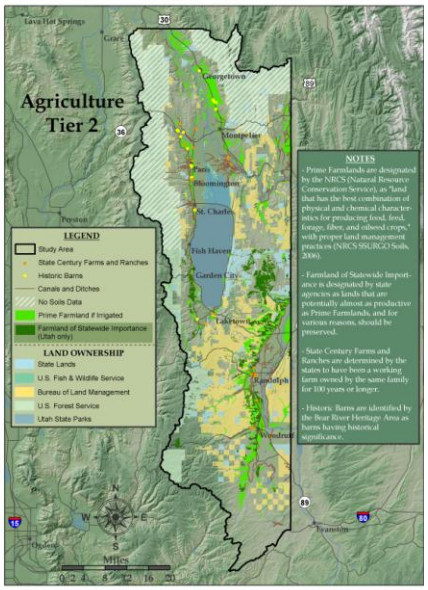
As this model was developed, there were several key components that were important: First, prioritization of high production agricultural lands, which are crucial for preservation in the future. Second, historical and cultural amenities that should be preserved in order to keep the current quality of life intact. The components of the Agricultural Model are shown on the next page, followed by notes on the model, and then with the Tier 3 model being shown as a large map with several details.

This is a picture of wild grass fields used for grazing in Round Valley, southwest of Bear Lake. This particular valley was historically used by Native Americans and early settlers. Currently, development surrounds this valley, which benefits from the views that the fields provide for residents and tourists.



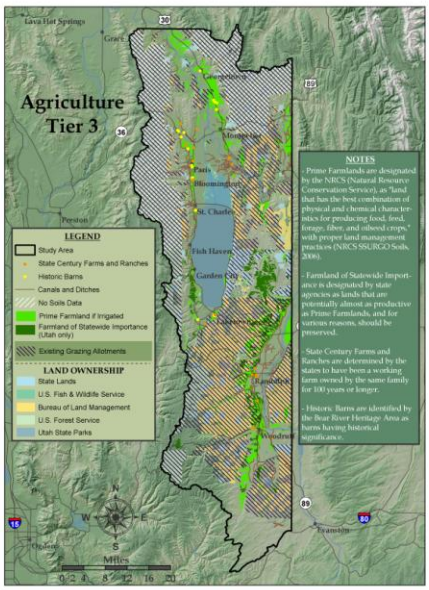
Tier 1:

- State Century Farms and Ranches
- Historic Barns
- Canals and Ditches
- Prime Farmland if Irrigated
- Public Land Ownership



Tier 2:

- <u>Tier 1 plus the following:</u>
- Farmland of Statewide Importance (Utah Only)



Tier 3:

- <u>Tier 2 plus the following:</u>
- Existing Grazing Allotments

Figure 3

Model Notes:

- Prime Farmland and Farmland of Statewide Importance are based on SSURGO soils described by the NRCS (Natural Resource Conservation Service) as high productivity soils for agricultural production. They can be used to determine which lands may be regionally significant in agricultural land preservation. As there is growing pressure to develop these lands, efforts should be made to identify areas of agricultural importance.
- Existing Grazing Allotments were obtained from the U.S. Forest Service, Bureau of Land Management, and State Agencies. These lands should be considered when looking at lands for preservation purposes. These are lands that are currently used for grazing purposes, and greatly contribute to the ranching and livestock economy of the region (USDA NASS, 2002).
- State Century Farms and Historic Barns are important cultural amenities and add to the region's sense of place and rural character (BRHAa, 2007 and BRHAb, 2007). These structures and farming lands hold great value for the region and can be threatened from residential development pressure. They should be considered when looking at regional rural landscapes to preserve.

General Notes:

- When looking at the conservation of agricultural lands, an important item to consider is longevity. While vegetation maps can determine where current agriculture is taking place, soils can be a better indicator of long-term producing lands. Soils tend to be more stable than vegetation. Vegetation can have species succession, high temperature wildfires, noxious weed invasion, and other problems (Howard Horton, Rangeland Scientist, USDA ARS, personal communication, November, 2007).

Agricultural Land Preservation Tools:

- The LESA (Land Evaluation and Site Assessment) model developed by the NRCS (Natural Resource Conservation Service) can provide tools for determining agricultural lands that should be preserved in a region (http://www.nrcs.usda.gov/programs/lesa/lesa_sysdes_uses.html).
- The USDA (United States Department of Agriculture) also has many resources for agricultural land preservation. They give a list of preservation methods, and groups and agencies that can assist (http://www.csrees.usda.gov/nea/nre/in_focus/ere_if_preserve_programs.html). These include the Farm and Ranch Lands Protection Program, Forest Legacy Program, state and local government programs including agricultural conservation easements, University assistance, and non-government organization assistance.
- The Cache County Agricultural Advisory Board prepared a document with many suggestions on how to preserve agricultural lands: *Agricultural Land Preservation Tool Box; Recommendations to the Cache County Planning Commission and County Council.* The Cache County Agricultural Advisory Board. Adopted by the Agricultural Advisory Board on December 2, 2003 (www.brag.utah.gov/pdf/Ag/AgriculturalLandPreservationToolBox.pdf).

Agricultural Land Preservation Ordinances:

- Kanab City gateway and view preservation ordinance (Utah Land Use Ordinance Library online at http://www.governor.state.ut.us/planning/library.htm).
- Cumberland County, Pennsylvania model agricultural land preservation ordinance (http://www.ccpa.net/cumberland/cwp/view.asp?A=1751&Q=481960).
- Jones County, Iowa agricultural land preservation ordinance (www.co.jones.ia.us/vi%20ch3%20cod03.pdf).

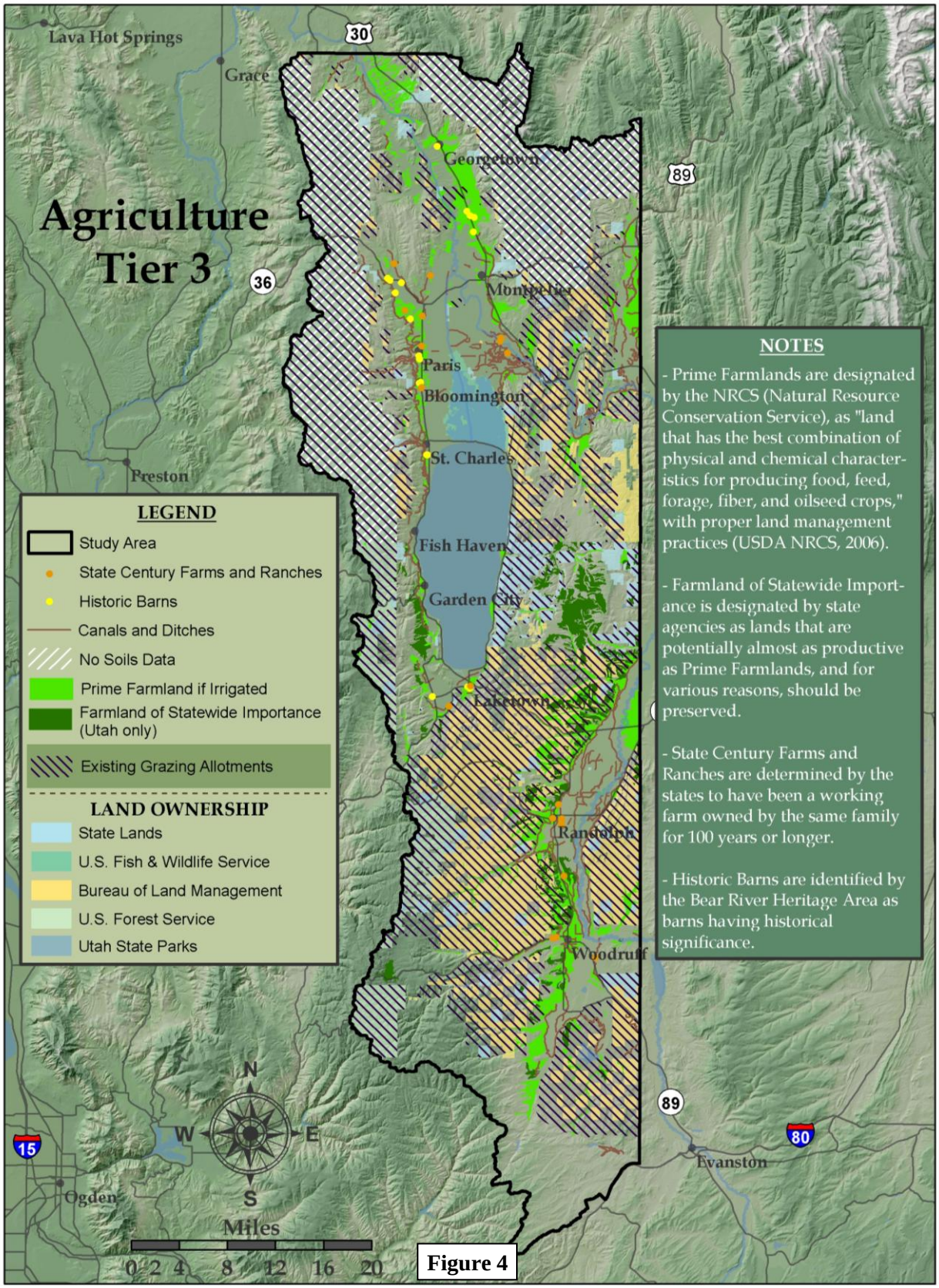

Agriculture
Tier 3
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Preston
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
30
36
89
15
80
LEGEND
Study Area
State Century Farms and Ranches
Historic Barns
Canals and Ditches
No Soils Data
Prime Farmland if Irrigated
Farmland of Statewide Importance (Utah only)
Existing Grazing Allotments
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
NOTES
- Prime Farmlands are designated by the NRCS (Natural Resource Conservation Service), as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops," with proper land management practices (USDA NRCS, 2006).
- Farmland of Statewide Importance is designated by state agencies as lands that are potentially almost as productive as Prime Farmlands, and for various reasons, should be preserved.
- State Century Farms and Ranches are determined by the states to have been a working farm owned by the same family for 100 years or longer.
- Historic Barns are identified by the Bear River Heritage Area as barns having historical significance.
N
W
E
S
Miles
0 2 4 8 12 16 20

Figure 4

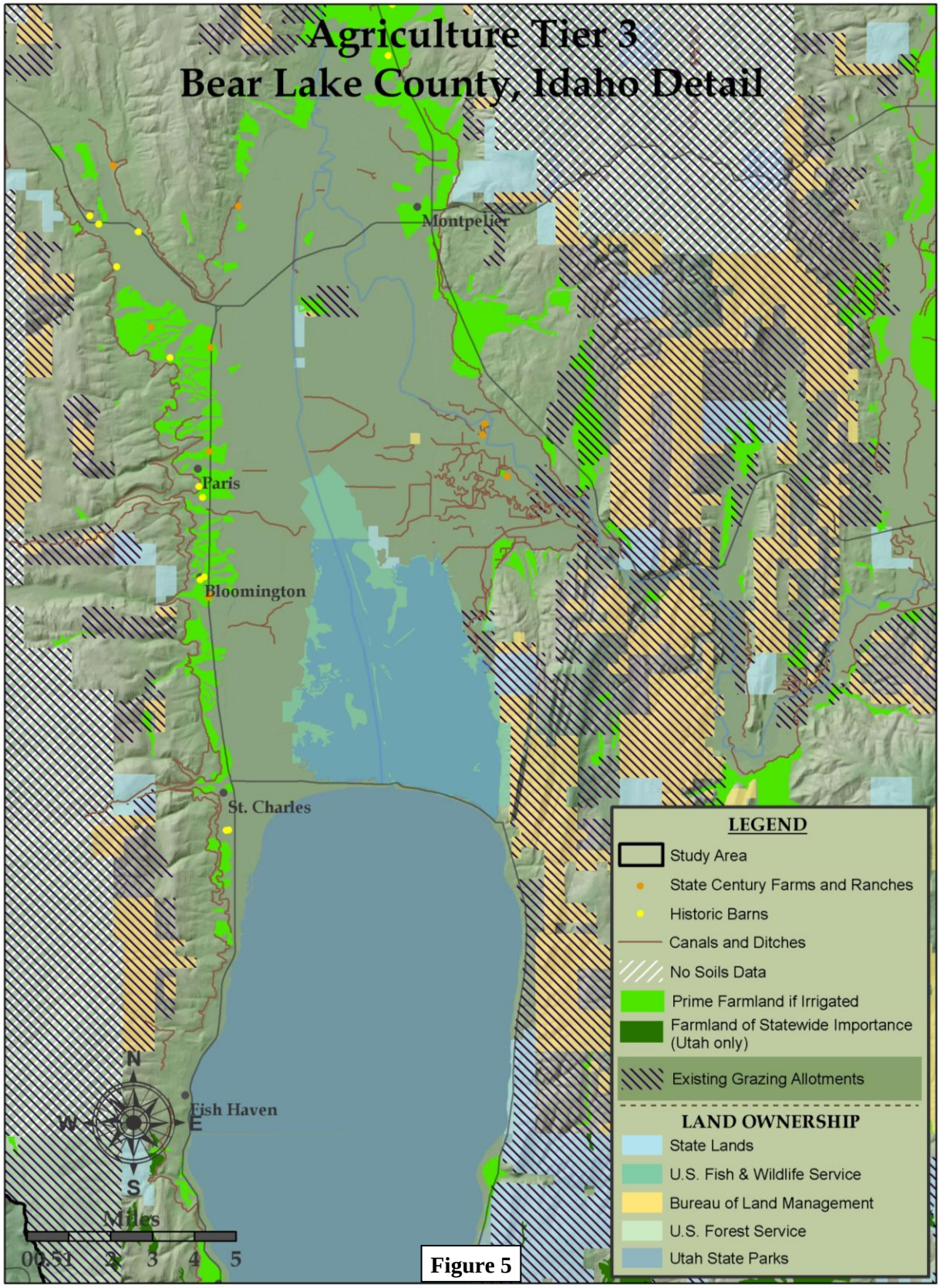

Agriculture Tier 3
Bear Lake County, Idaho Detail
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
State Century Farms and Ranches
Historic Barns
Canals and Ditches
No Soils Data
Prime Farmland if Irrigated
Farmland of Statewide Importance (Utah only)
Existing Grazing Allotments
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks

Figure 5

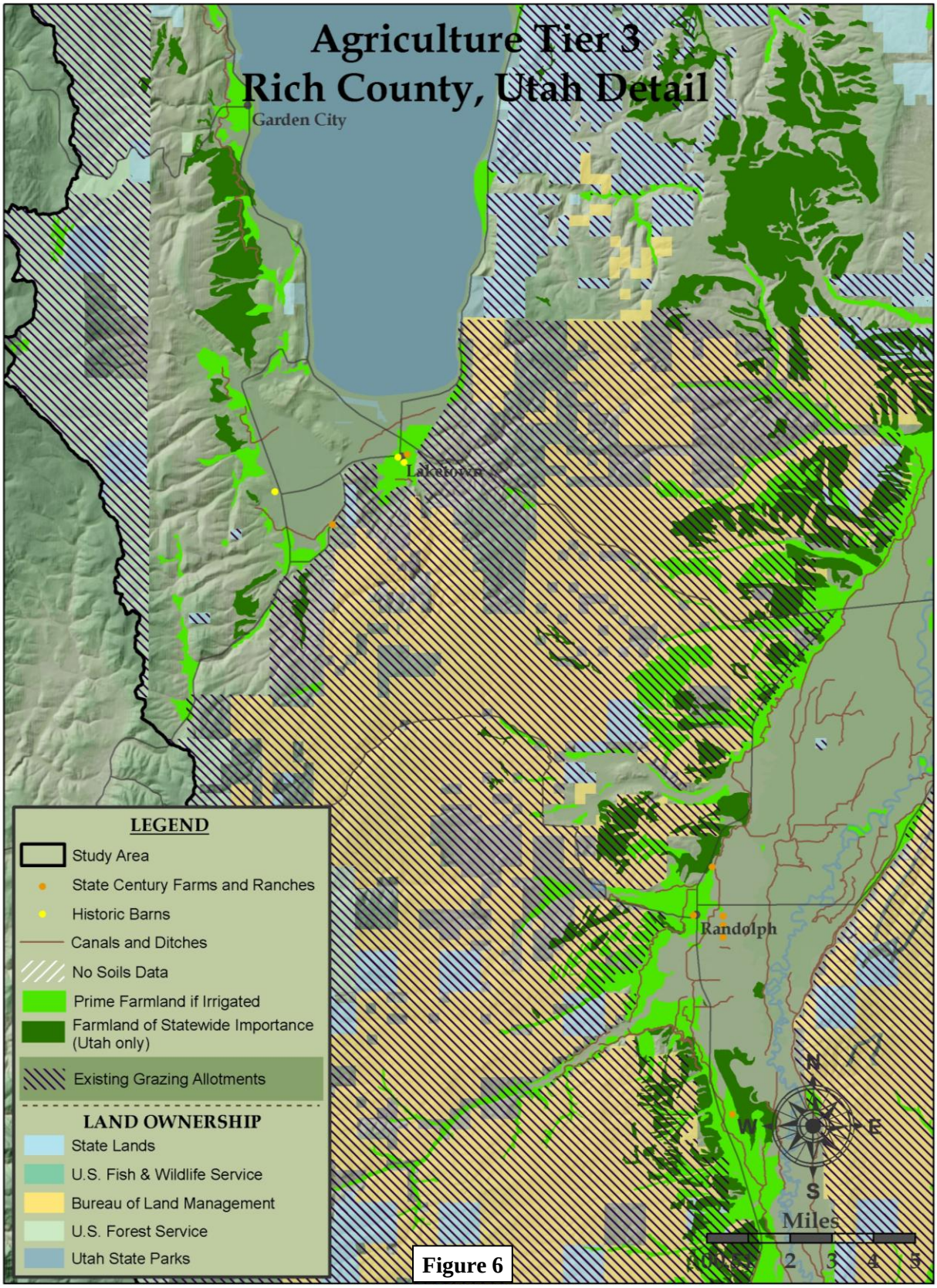
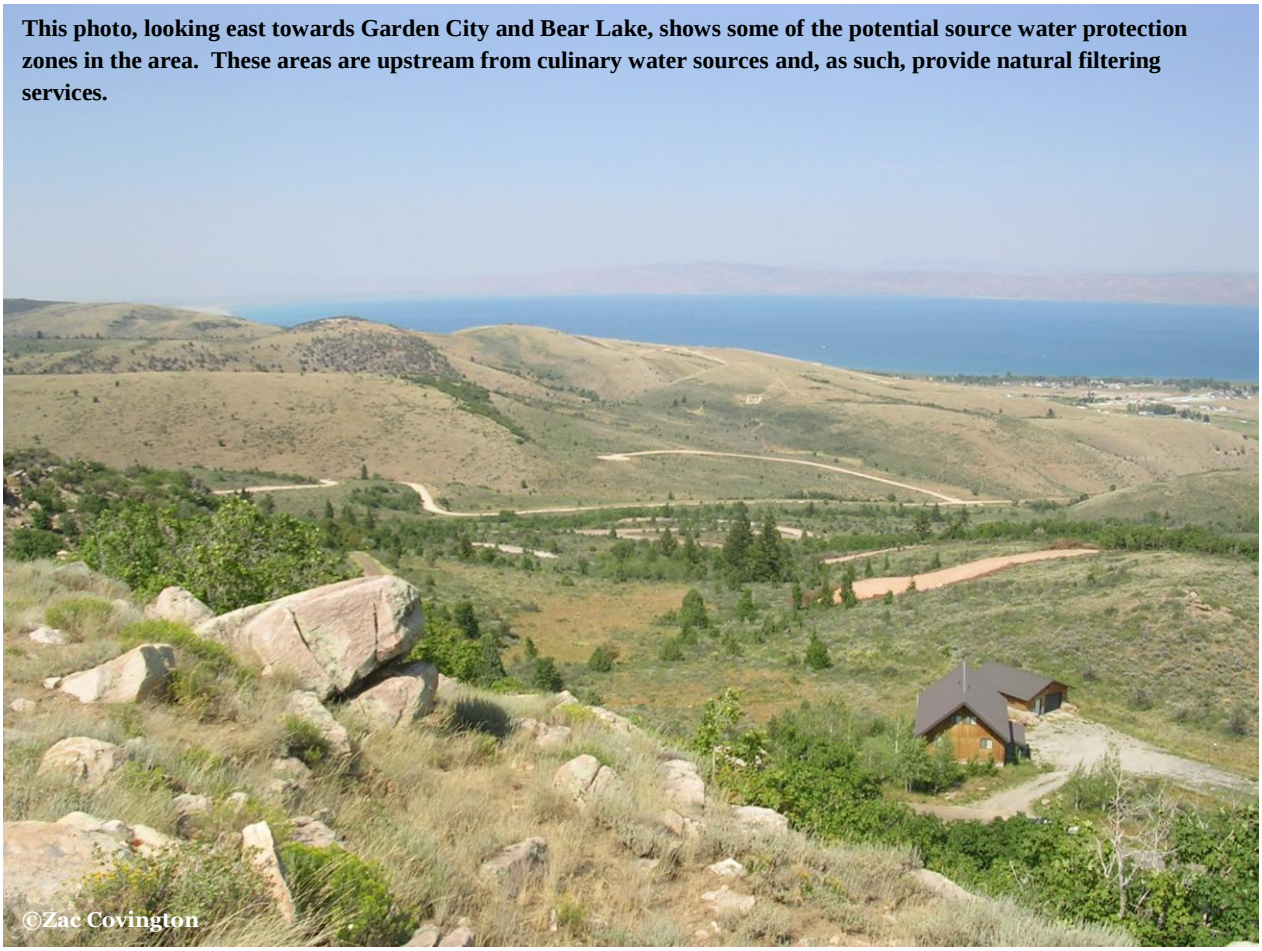

Agriculture Tier 3
Rich County, Utah Detail
Garden City
Lakeview
Randolph
LEGEND
Study Area
State Century Farms and Ranches
Historic Barns
Canals and Ditches
No Soils Data
Prime Farmland if Irrigated
Farmland of Statewide Importance (Utah only)
Existing Grazing Allotments
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
N
W
E
S
Miles
2
3
4
5

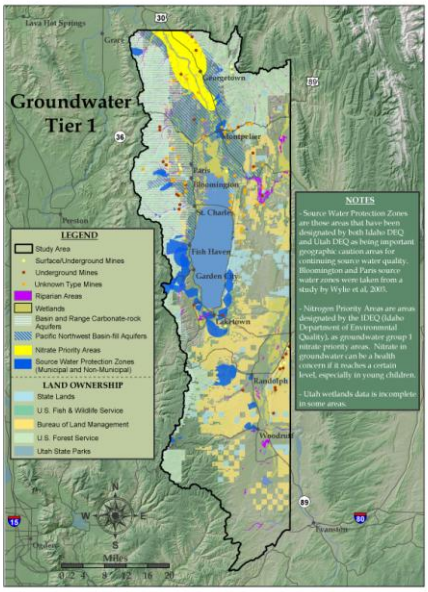
Figure 6

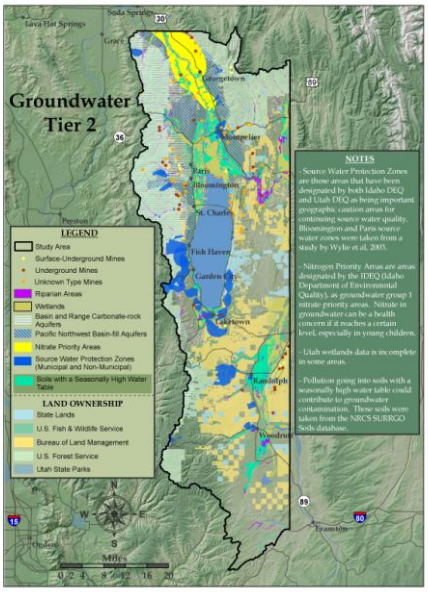
Groundwater resources, sometimes referred to as source water, are contained in aquifers and are accessed primarily through wells or springs. People often assume that this source for their culinary water will forever be clean and untouched by land uses. While much has been done in the U.S. regarding groundwater protection, rural development areas, such as the Bear Lake region, can adequately plan growth in ways that will protect culinary water sources for the future.

In the development of this model, water quality specialists in the region were consulted and research was done to identify landscape components that may protect groundwater quality. As development occurs, these critical areas should be considered as groundwater protection zones where there should be limited, if any, development. As has been noted in the groundwater section of the regional inventory in this report, the aquifers near Bear Lake are susceptible to cross-contamination from other aquifers. This implies that if one aquifer is contaminated, they all could be at risk. The following pages comprise the groundwater assessment model.



This photo, looking east towards Garden City and Bear Lake, shows some of the potential source water protection zones in the area. These areas are upstream from culinary water sources and, as such, provide natural filtering services.





Tier 1:

- Surface-underground, underground, and unknown vertical location labeled mines
- Referenced and known groundwater recharge zones for Paris Spring and Bloomington City Spring
- Wetland/riparian areas
- IDEQ groundwater group 1 nitrate priority areas
- Principle Aquifers (BRWIS, National Atlas)
- Source Water Protection Zones

Tier 2:

- <u>Tier 1 plus the following:</u>
- Soils with a seasonal high water table

Figure 7

Model Notes:

- Groundwater recharge zone information and GIS layers for Paris Spring and Bloomington City Spring were derived from the following study and website: Wylie, Allan, Otto, Bruce, and Martin, Michael. *Hydrologic Analysis of Water Supplies for the Communities of Bloomington and Paris, Bear Lake County, Idaho. Preliminary Draft.* Idaho Water Resources Research Institute. University of Idaho. Technical Assistance for Rural Ground Water Development within Idaho. January 20, 2003. <http://www.webs.uidaho.edu/gwemo/

site_project_data.htm>.

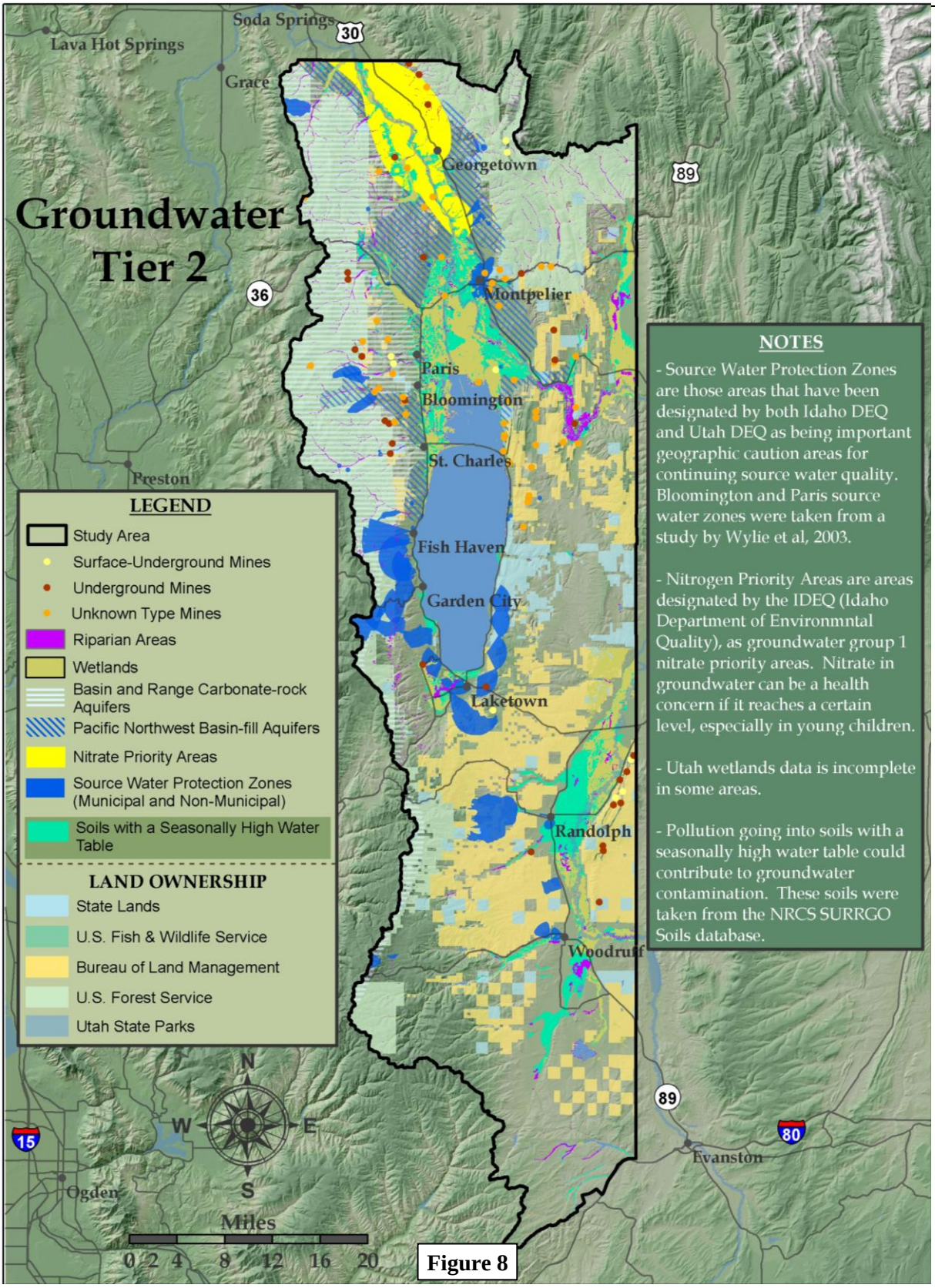
- Other source water protection zones were obtained from Idaho Department of Environmental Quality and Utah Department of Environmental Quality. There are both municipal source water areas and non-municipal source water areas included in the data sets.
- Soils with a seasonal high water table were used to suggest potential groundwater contamination areas (Michael Domeier, Utah State Soil Scientist, personal communication, November 26, 2007).

General Notes:

- Long range planning for water and wastewater facilities is crucial in protecting groundwater quality.
- Septic and other waste storage systems and their proximity to water sources (wells, springs, etc.), should be studied further.
- Uncapped wells should also be identified and properly capped in order to prevent contamination of water sources.
- Cross-contamination between aquifers in the Bear Lake region is considered a viable threat to water quality. If one becomes contaminated, there is a potential for others to become contaminated.
- Any new communities that will be using septic tanks for houses should consider using, or be required to use, a community septic system. These systems should also have proper maintenance and monitoring to ensure groundwater and surface water protection.
- If not already in place for the region in both states, a Source Water Protection Plan is recommended which would designate immediate and extended actions for protecting source water amenities.

Reference Studies:

- Wylie, Allan, Otto, Bruce, and Martin, Michael. *Hydrologic Analysis of Water Supplies for the Communities of Bloomington and Paris, Bear Lake County, Idaho. Preliminary Draft.* Idaho Water Resources Research Institute. University of Idaho. Technical Assistance for Rural Ground Water Development within Idaho. January 20, 2003. <http://www.webs.uidaho.edu/gwemo/site_project_data.htm>.


Groundwater
Tier 2
Soda Springs
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Preston
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
30
36
89
15
80
LEGEND
Study Area
Surface-Underground Mines
Underground Mines
Unknown Type Mines
Riparian Areas
Wetlands
Basin and Range Carbonate-rock Aquifers
Pacific Northwest Basin-fill Aquifers
Nitrate Priority Areas
Source Water Protection Zones (Municipal and Non-Municipal)
Soils with a Seasonally High Water Table
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
N
W
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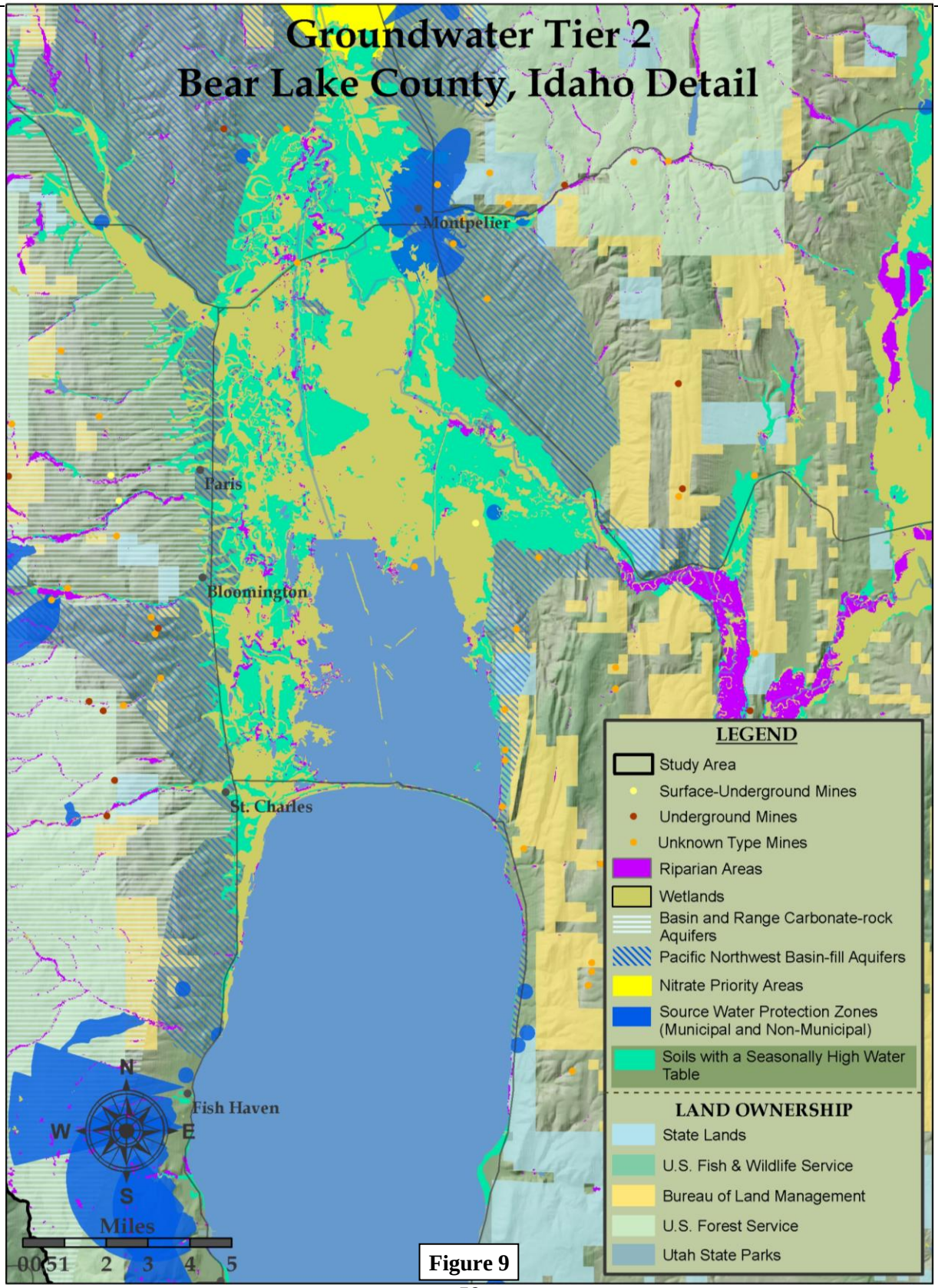
Miles
0 2 4 8 12 16 20
NOTES
- Source Water Protection Zones are those areas that have been designated by both Idaho DEQ and Utah DEQ as being important geographic caution areas for continuing source water quality. Bloomington and Paris source water zones were taken from a study by Wylie et al, 2003.
- Nitrogen Priority Areas are areas designated by the IDEQ (Idaho Department of Environmntal Quality), as groundwater group 1 nitrate priority areas. Nitrate in groundwater can be a health concern if it reaches a certain level, especially in young children.
- Utah wetlands data is incomplete in some areas.
- Pollution going into soils with a seasonally high water table could contribute to groundwater contamination. These soils were taken from the NRCS SURRGO Soils database.

Figure 8


Groundwater Tier 2
Bear Lake County, Idaho Detail
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
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Miles
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LEGEND
Study Area
Surface-Underground Mines
Underground Mines
Unknown Type Mines
Riparian Areas
Wetlands
Basin and Range Carbonate-rock Aquifers
Pacific Northwest Basin-fill Aquifers
Nitrate Priority Areas
Source Water Protection Zones (Municipal and Non-Municipal)
Soils with a Seasonally High Water Table
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks

Figure 9

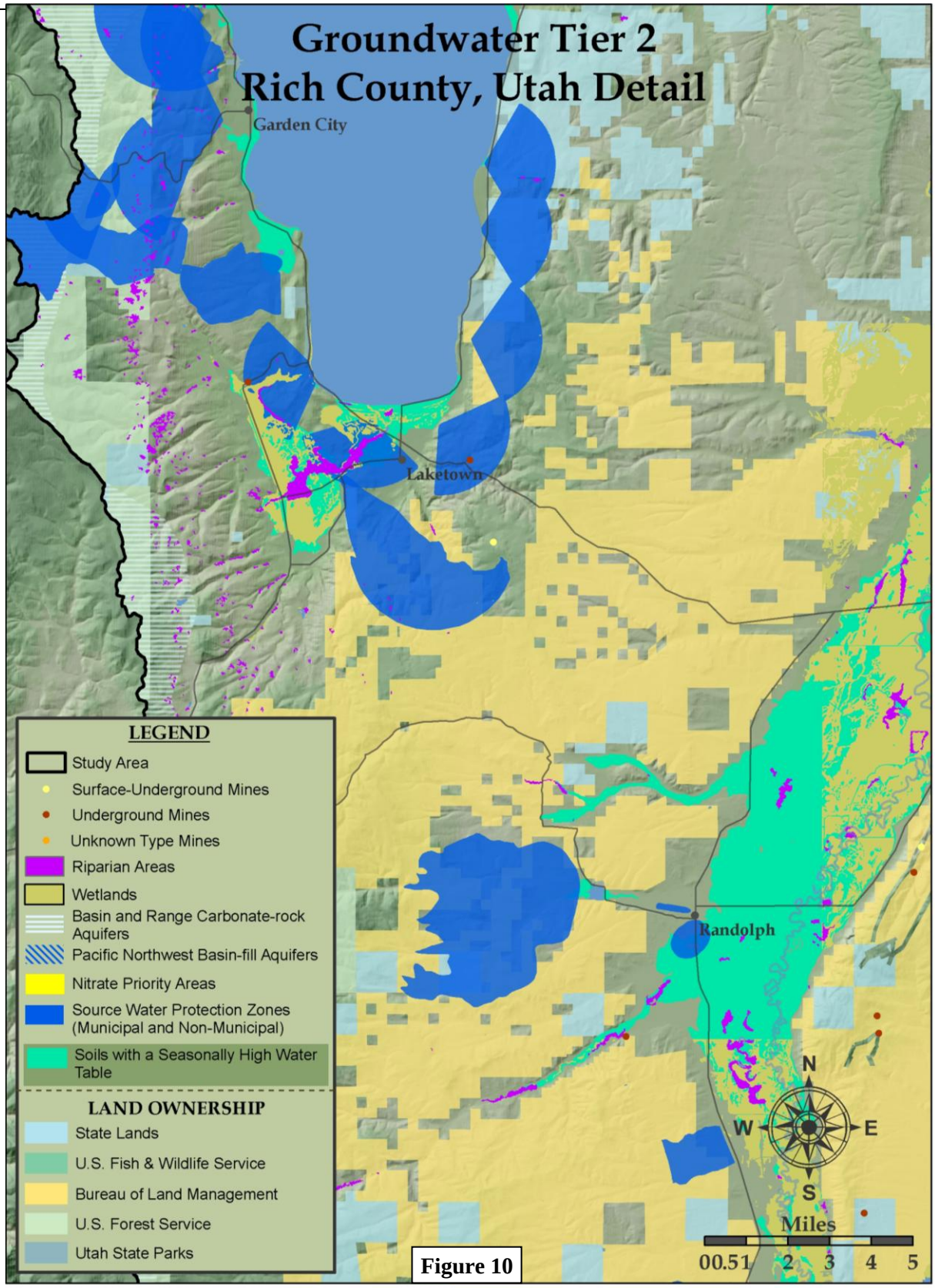
Groundwater Tier 2
Rich County, Utah Detail
Garden City
Laketown
Randolph
LEGEND
Study Area
Surface-Underground Mines
Underground Mines
Unknown Type Mines
Riparian Areas
Wetlands
Basin and Range Carbonate-rock Aquifers
Pacific Northwest Basin-fill Aquifers
Nitrate Priority Areas
Source Water Protection Zones (Municipal and Non-Municipal)
Soils with a Seasonally High Water Table
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
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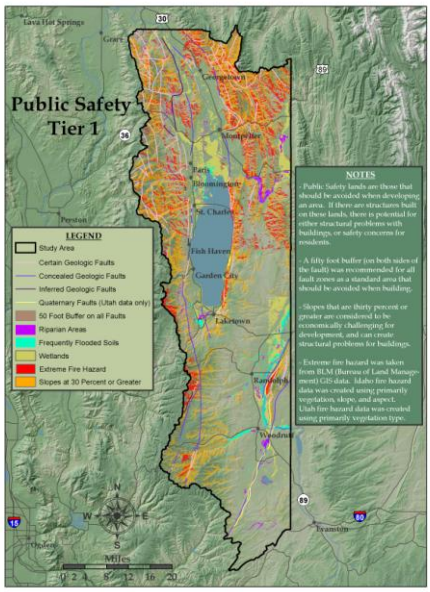
Figure 10

While there are a number of considerations regarding land use planning in the Bear Lake region, one of the most important subjects to include is that of public safety. This model identifies landscape components that, if developed, could place residents at risk for natural hazards. Building in these areas can pose potential threats to both people and property. If development is allowed by jurisdictions in these areas, not only could residents and their property be harmed, but the infrastructure necessary to sustain those properties could be very costly to replace or maintain in the event of a natural disaster (BRAG, 2004).

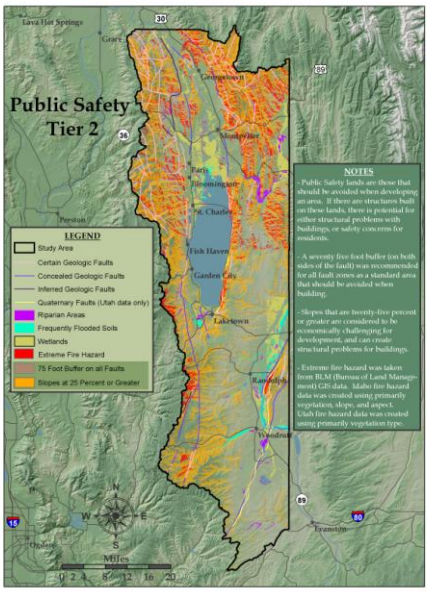
The Bear Lake region has many areas that may not be suitable for development. It is understood that modern engineering solutions can compensate for some structural problems associated with these lands. However, natural disaster events are unpredictable in nature, which is why jurisdictions should mitigate as much as possible before they happen. In fact, there have been earthquakes, floods, and other events in the past in the Bear Lake region that indicate the potential for future events (BRAG, 2004). With proper planning for potential hazard areas, lives can be saved and property protected.

This is a photo of fires near Neola in northeastern Utah in 2007. These fires not only took three lives but also destroyed many acres of land near several other small towns.



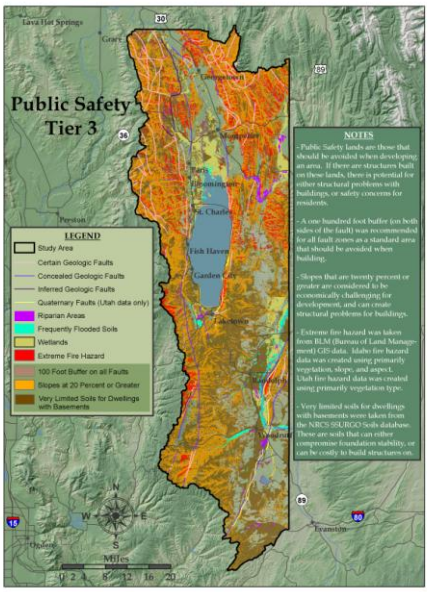
Tier 1:

- Slopes greater than 30%
- 50 foot buffer on all geological faults
- Potentially extreme fire hazard lands
- Frequently flooded soils
- Wetlands and riparian areas



Tier 2:

- <u>Tier 1 plus the following</u>:
- Slopes greater than 25%
- 75 foot buffer on all geological faults



Tier 3:

- <u>Tier 2 plus the following:</u>
- Slopes greater than 20%
- 100 foot buffer on all geological faults
- Very limited soils for dwellings with basements

Figure 11

Model Notes:

- Slopes of between 20 and 30 percent are generally considered to be unstable for building on, and are considered in this model in various percentages to give options for further determination by the region (Toth et al., 2007).
- Geologic faults were assigned a range of buffers for each tier. It has been suggested that there should be a 30 to 50 foot buffer on "...fault traces with evidence of displacement in the past 11,000 years" (McCalpin, 2003). Fault setbacks were increased for Tier two and three to 75 and 100 feet, respectively. This was done to show that 50 feet may not be adequate if fault locations are not as specifically known as may be needed for planning (Pleasanton City, California, 2006). Faults for this model consist of all geologic faults in the region to suggest that further study should be conducted before allowing structures to be built on top of them. General geological fault layers were used for both counties, and there was a layer found for Rich county that consists of only quaternary faults, which are faults that were more recently active (Toth et al., 2007).
- Potentially extreme fire hazard lands were taken from data sets created by

the Idaho and Utah BLM (Bureau of Land Management), respectively. These were generally created by the BLM using slope, aspect, vegetation type, and other aspects to determine areas of fire hazard potential.
- Frequently flooded soils were taken from the NRCS (Natural Resource Conservation Service) SSURGO Soils database.
- Wetlands data was taken from the federally delineated wetland areas created by the U.S. Fish and Wildlife Service.
- Riparian areas were taken from GAP vegetation data (USGS, 1998; USGS, 2004).
- Very limited soils for dwellings with basements were taken from the NRCS SSURGO soils database and were selected from three choices which were "Not Limited," "Somewhat Limited," and "Very Limited." These soils were created by the NRCS by considering the soil's ability to support a structure to a depth of seven feet. Construction and/or excavation cost and safety are the key aspects considered in these layers (USDA NRCSa, 2006; USDA NRCS 2007).

Missing Data:

Other data that could be considered for this model are not currently available. However, they would be helpful in creating a more comprehensive Public Safety model. They include the following:

- Digital FEMA (Federal Emergency Management Agency) Floodplain delineation for the whole region
- Liquefaction potential delineation
- Complete soils data in Bear Lake County, Idaho (however, the non-data areas are mostly federal lands)
- Complete Wetlands data in Rich County, Utah
- Quaternary or more recently active fault designations
- The new Landslide Susceptibility Map of Utah (Giraud and Shaw, 2007) could be used in the future for landslide data. Bear Lake county data would be needed to complete a landslide susceptibility map.

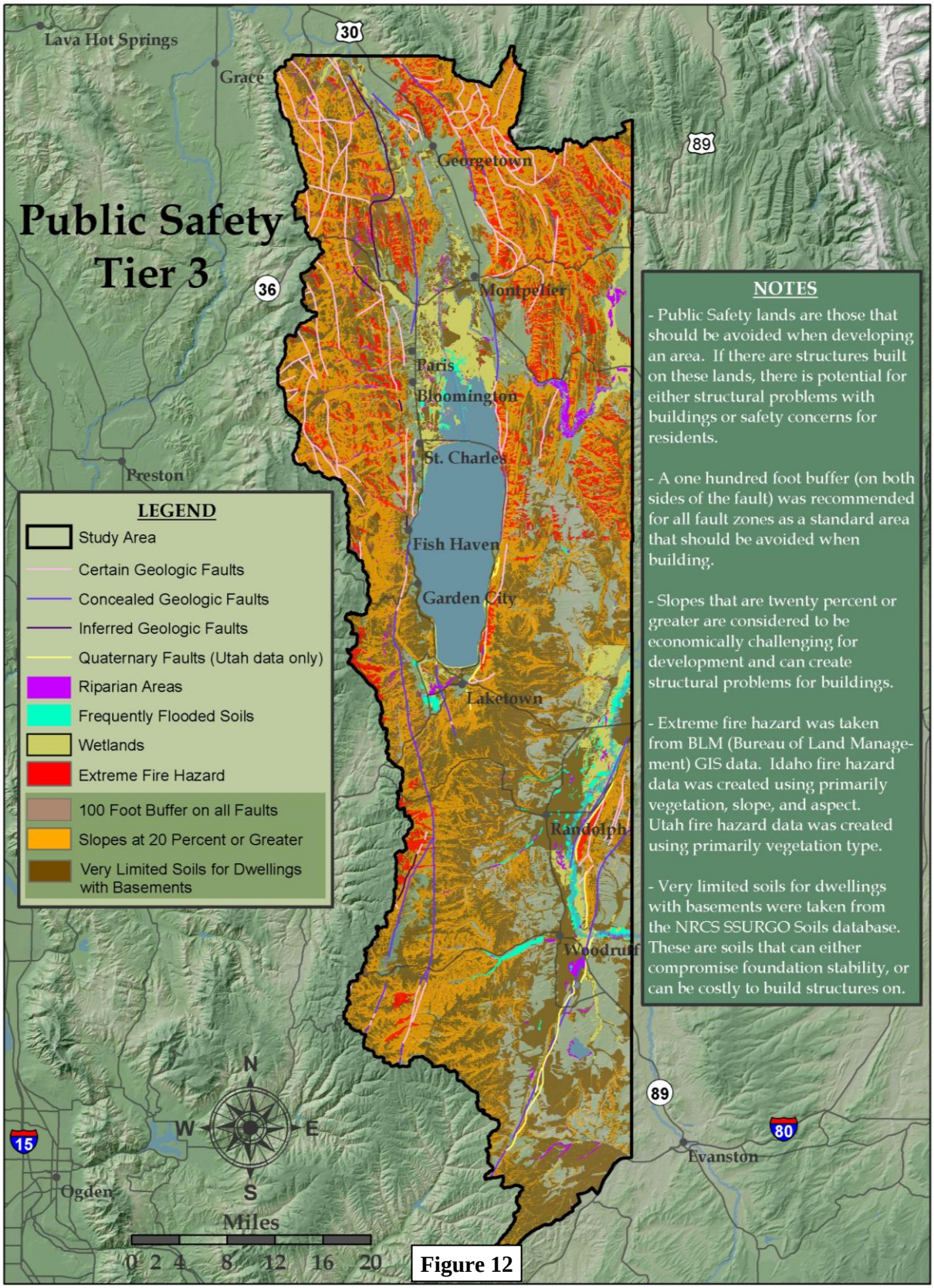

Public Safety
Tier 3
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Preston
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
30
89
36
15
80
LEGEND
Study Area
Certain Geologic Faults
Concealed Geologic Faults
Inferred Geologic Faults
Quaternary Faults (Utah data only)
Riparian Areas
Frequently Flooded Soils
Wetlands
Extreme Fire Hazard
100 Foot Buffer on all Faults
Slopes at 20 Percent or Greater
Very Limited Soils for Dwellings with Basements
NOTES
- Public Safety lands are those that should be avoided when developing an area. If there are structures built on these lands, there is potential for either structural problems with buildings or safety concerns for residents.
- A one hundred foot buffer (on both sides of the fault) was recommended for all fault zones as a standard area that should be avoided when building.
- Slopes that are twenty percent or greater are considered to be economically challenging for development and can create structural problems for buildings.
- Extreme fire hazard was taken from BLM (Bureau of Land Management) GIS data. Idaho fire hazard data was created using primarily vegetation, slope, and aspect. Utah fire hazard data was created using primarily vegetation type.
- Very limited soils for dwellings with basements were taken from the NRCS SSURGO Soils database. These are soils that can either compromise foundation stability, or can be costly to build structures on.
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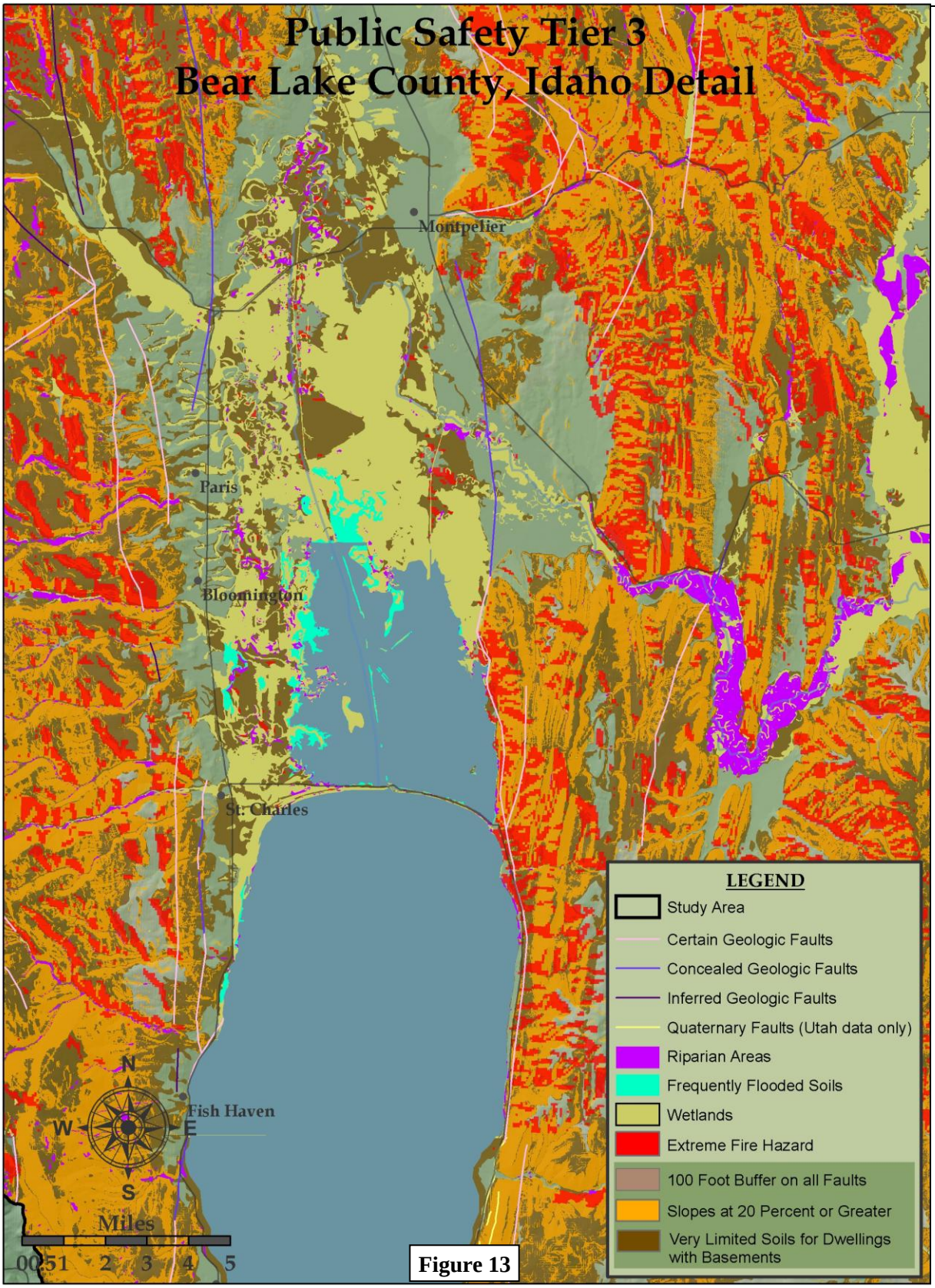
Figure 12


Public Safety Tier 3
Bear Lake County, Idaho Detail
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
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Miles
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LEGEND
Study Area
Certain Geologic Faults
Concealed Geologic Faults
Inferred Geologic Faults
Quaternary Faults (Utah data only)
Riparian Areas
Frequently Flooded Soils
Wetlands
Extreme Fire Hazard
100 Foot Buffer on all Faults
Slopes at 20 Percent or Greater
Very Limited Soils for Dwellings with Basements

Figure 13

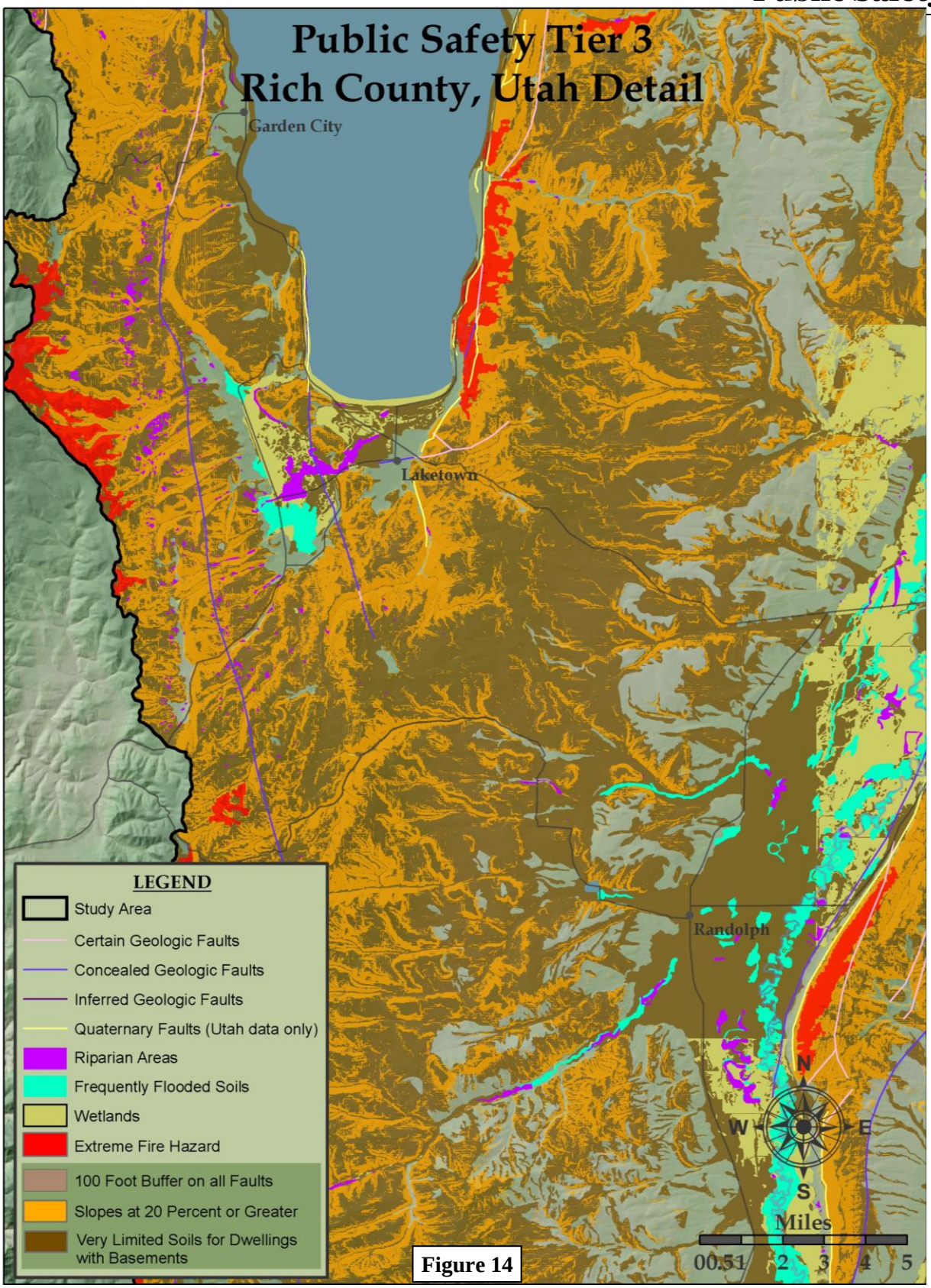
Public Safety Tier 3
Rich County, Utah Detail
Garden City
Laketown
Randolph
LEGEND
Study Area
Certain Geologic Faults
Concealed Geologic Faults
Inferred Geologic Faults
Quaternary Faults (Utah data only)
Riparian Areas
Frequently Flooded Soils
Wetlands
Extreme Fire Hazard
100 Foot Buffer on all Faults
Slopes at 20 Percent or Greater
Very Limited Soils for Dwellings with Basements
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Figure 14

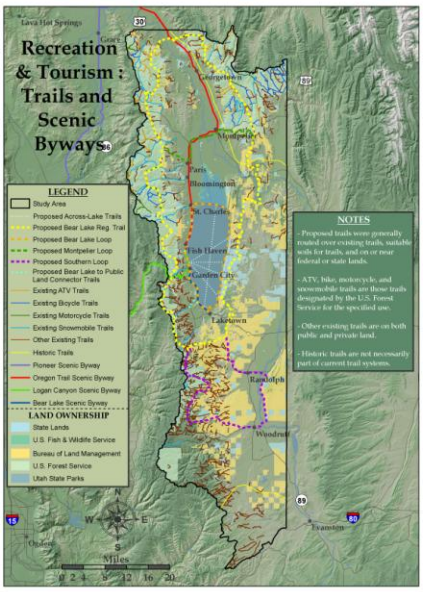
Over the past few decades, the Bear Lake region has been "discovered" as a recreational mecca. This discovery is comparable to the same type of experience that other areas in the western U.S. have had including places like Park City, Utah, Jackson Hole, Wyoming, Lake Tahoe, California, and others.

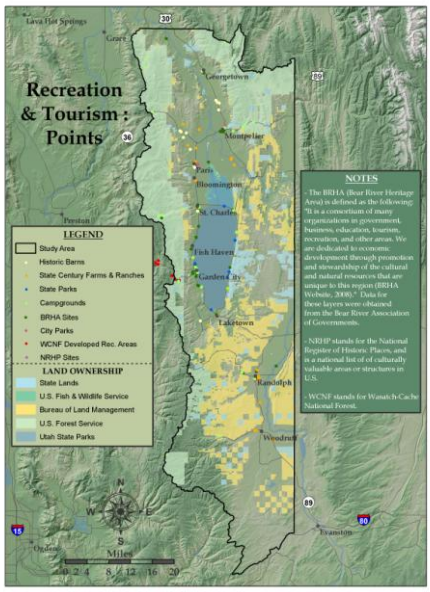
The Bear Lake region could eventually develop in a magnitude similar to these areas. However, the area has one important advantage over others that are being heavily developed. There is still a chance to plan for the growth that is inevitable and protect the quality of life that is unique to the Bear Lake region. This quality of life is often centered in recreation and tourism activities. Without regional planning for recreation and tourism, an area can lose the recreational amenities that people enjoy and value.

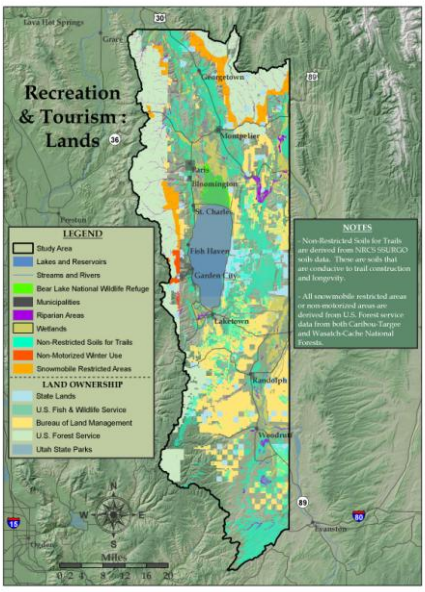
This model is intended to provide regional recreation and tourism planning ideas for the Bear Lake region. As the region grows, it may be more difficult to attain access through private land for trails and other types of recreation. Planners should begin the process of identifying potential recreational access areas as soon as possible.

This model is not organized into tiers. It is meant to serve as a recreation and tourism planning tool on a regional scale. It is divided into trails and scenic byways, recreational points, and recreational lands.

Scenes such as this on the west side of Bear Lake can be priceless commodities that not only add to the quality of life for residents and tourists, but add to property value. Integrating recreation and tourism planning regionally can be a great benefit to all in the long run. Imagine how different the experience a tourist or recreationist would have if this scene was full of housing and commercial development. Protecting these areas can actually increase the quality of the Bear Lake experience for all who enjoy it.







Trails and Scenic Byways:

- Proposed Across-Lake Trails
- Proposed Bear Lake Regional Trail
- Proposed Bear Lake Loop
- Proposed Montpelier Loop
- Proposed Southern Loop
- Existing ATV Trails
- Existing Bicycle Trails
- Existing Motorcycle Trails
- Existing Snowmobile Trails
- Other Existing Trails
- Historic Trails
- Pioneer Scenic Byway
- Oregon Trail Scenic Byway
- Logan Canyon Scenic Byway
- Bear Lake Scenic Byway
- Public Land Ownership

Points:

- Historic Barns (Product of the Bear River Heritage Area)
- State Century Farms and Ranches
- State Parks
- Campgrounds
- Bear River Heritage Area Sites
- City Parks
- Wasatch-Cache National Forest Developed Recreation Areas
- National Register of Historic Places Sites
- Public Land Ownership

Lands:

- Bear Lake National Wildlife Refuge
- Municipal Boundaries
- Wetlands
- Riparian Areas
- Non-Restricted Soils for Trails
- Non-Motorized Winter Use Areas (U.S. Forest Service Lands)
- Snowmobile Restricted Areas (U.S. Forest Service Lands)
- Public Land Ownership

Figure 15

Model Notes:

- A trail along existing roads is shown around Bear Lake. There have been comments regarding a trail system that would connect to the existing trail in Garden City, going all the way around the lake (Judy Holbrook, Bear Lake Regional Commission, personal communication, November 28, 2007).
- Other potential regional trails, such as the proposed Bear Lake Regional Trail, with spurs that go through Montpelier, Idaho and Randolph, Utah, were recommended. These trail systems were placed over existing multi-use Forest Service trails (ATV use included), existing trails on BLM lands, through Utah and Idaho State lands, or over existing trails on private land. Soils that are generally good for trail construction were also included in the model.
- Proposed Across-Lake Trails were included to explore recreation and tourism opportunities in a way that more fully utilizes Bear Lake. These connections could be utilized through destination shuttles, ferry or boat rides, or tourism and educational experiences. There have also been comments regarding a need for lake users to more fully enjoy the lake on the east side. The east side tends to have a calmer lake surface, and the west side of the lake can become crowded. This can give rise to safety concerns and potential conflict between lake users (Richard Droesbeke, Utah Bear Lake State Park, personal communication, 2008).
- Proposed Bear Lake to Public Land Connector Trails are included to show the need for access both to the lake, to the nearby public lands, and between the two. These connections will become more vital to create as the area continues to develop.
- Scenic Byways were included in this model to show connections that the region has with scenic roadways. These byways provide economic potential for the region by showcasing Bear Lake and the surrounding landscapes that make the region unique. They also provide an opportunity for economic growth along roads and in towns where people may need to purchase goods associated with travel.

General Notes:

- These recreation and tourism model tiers can be used for various planning needs. These include potential trailheads, new trail connections from the current Bear Lake trail system to public lands, regional trail systems, and potential areas for recreation and tourism development.
- If regional trail systems are to be economically feasible, lands may need to be researched for access as soon as reasonable. This could save the Bear Lake area future problems in acquiring either land to build trails on, or access for trails on private and public lands.

Case Study:

- Jordan River Parkway – This parkway is a regional trail system that spans from Salt Lake City to Utah Lake. The system has been difficult for planners to complete on some sections because of various access problems and socioeconomic reasons. This may

have been prevented if planning would have been done earlier. See http://planning.utah.gov/JRNAF/TrailReport/jrnafTrailReport_sectionA.htm for details. Trail planning should be done as early as possible in order to avoid private property access and infrastructure issues.

Ordinances:

- Mapleton City, Utah trail standards (UGOPBb, 2007)
- Moab City, Utah (UGOPBb, 2007).
- Wasatch County, transportation corridors used for trail connectivity (UGOPBb, 2007)
- Hailey City, Idaho connectivity of trails (Hailey Planning and Zoning Commission, 2007)
- Bannock County, Idaho parks and recreation planning (Bannock County, 1995)

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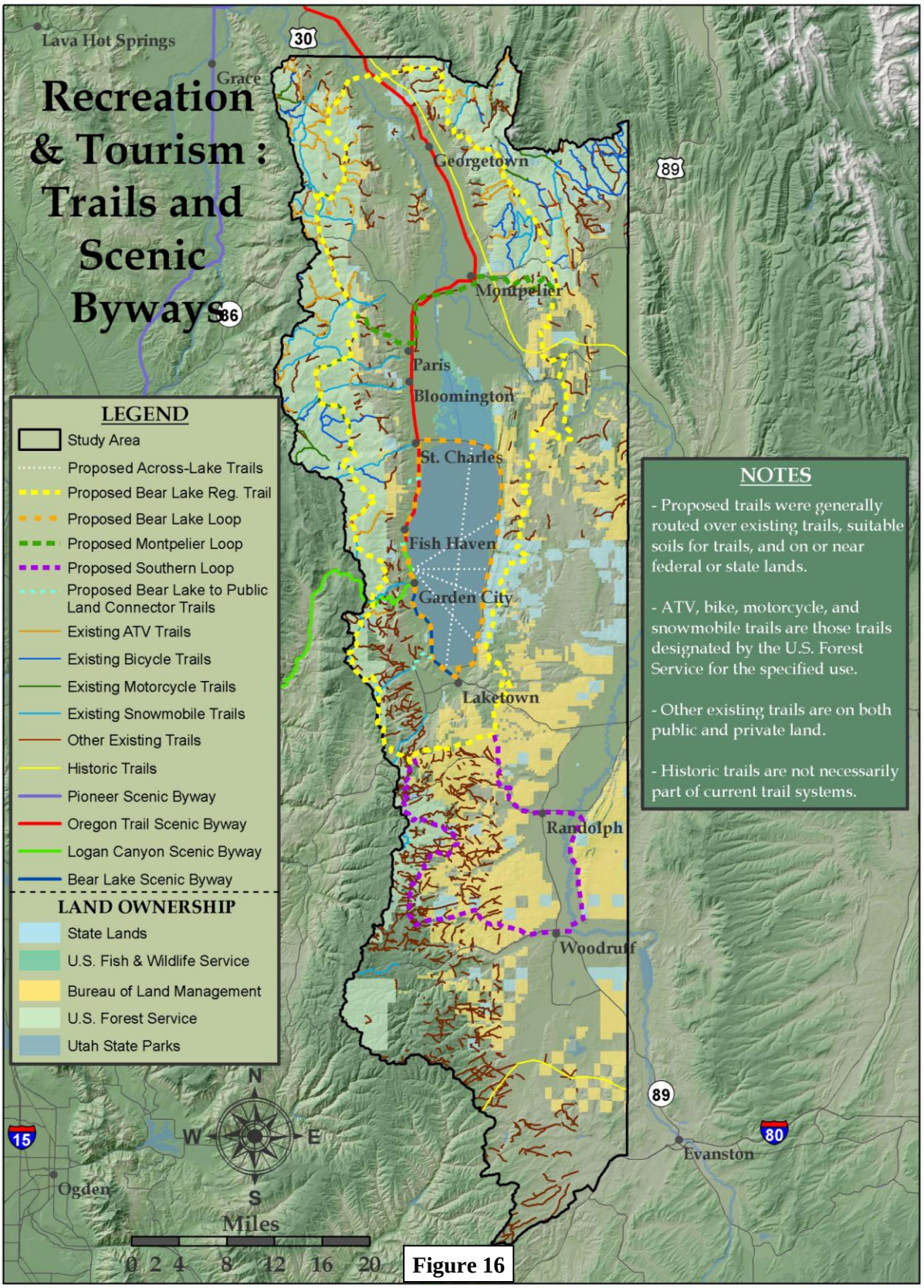
Recreation & Tourism : Trails and Scenic Byways
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
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86
15
80
LEGEND
Study Area
Proposed Across-Lake Trails
Proposed Bear Lake Reg. Trail
Proposed Bear Lake Loop
Proposed Montpelier Loop
Proposed Southern Loop
Proposed Bear Lake to Public Land Connector Trails
Existing ATV Trails
Existing Bicycle Trails
Existing Motorcycle Trails
Existing Snowmobile Trails
Other Existing Trails
Historic Trails
Pioneer Scenic Byway
Oregon Trail Scenic Byway
Logan Canyon Scenic Byway
Bear Lake Scenic Byway
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
NOTES
- Proposed trails were generally routed over existing trails, suitable soils for trails, and on or near federal or state lands.
- ATV, bike, motorcycle, and snowmobile trails are those trails designated by the U.S. Forest Service for the specified use.
- Other existing trails are on both public and private land.
- Historic trails are not necessarily part of current trail systems.
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0 2 4 8 12 16 20

Figure 16

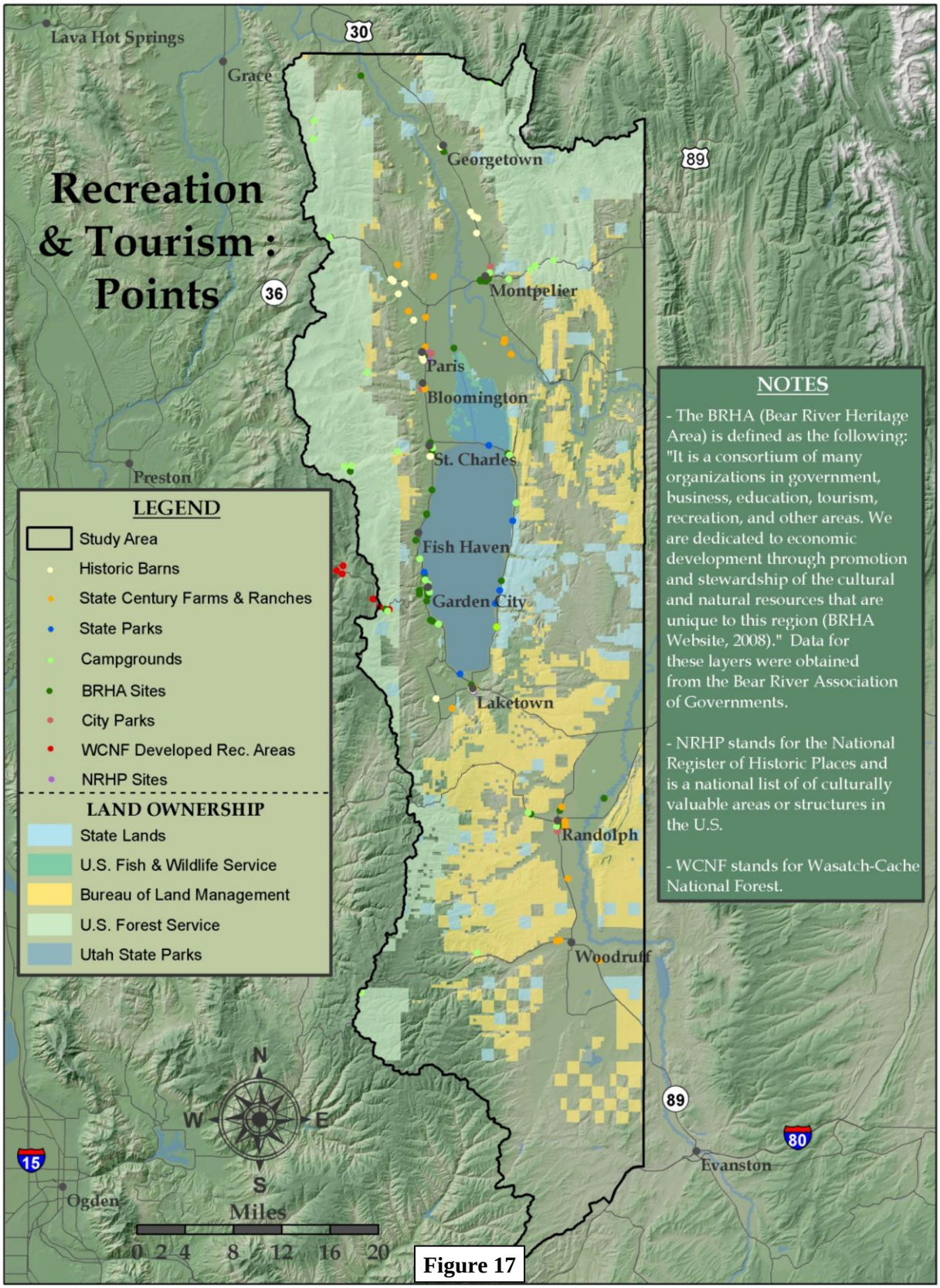
Recreation & Tourism : Points
Lava Hot Springs
Grace
Preston
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
30
36
89
15
80
LEGEND
Study Area
Historic Barns
State Century Farms & Ranches
State Parks
Campgrounds
BRHA Sites
City Parks
WCNF Developed Rec. Areas
NRHP Sites
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
NOTES
- The BRHA (Bear River Heritage Area) is defined as the following: "It is a consortium of many organizations in government, business, education, tourism, recreation, and other areas. We are dedicated to economic development through promotion and stewardship of the cultural and natural resources that are unique to this region (BRHA Website, 2008)." Data for these layers were obtained from the Bear River Association of Governments.
- NRHP stands for the National Register of Historic Places and is a national list of of culturally valuable areas or structures in the U.S.
- WCNF stands for Wasatch-Cache National Forest.
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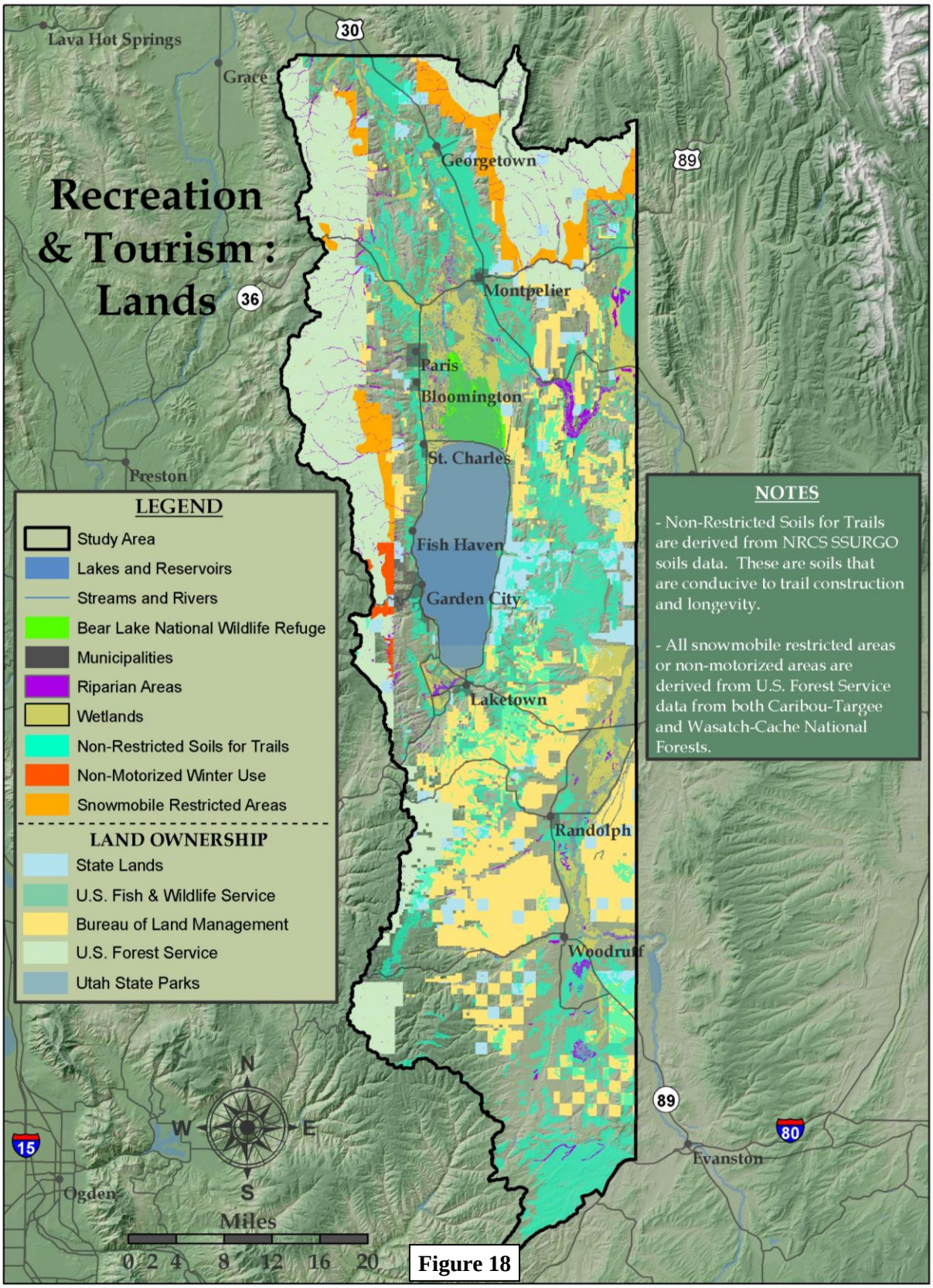
Figure 17


Recreation & Tourism : Lands
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Preston
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
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15
80
LEGEND
Study Area
Lakes and Reservoirs
Streams and Rivers
Bear Lake National Wildlife Refuge
Municipalities
Riparian Areas
Wetlands
Non-Restricted Soils for Trails
Non-Motorized Winter Use
Snowmobile Restricted Areas
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
NOTES
- Non-Restricted Soils for Trails are derived from NRCS SSURGO soils data. These are soils that are conducive to trail construction and longevity.
- All snowmobile restricted areas or non-motorized areas are derived from U.S. Forest Service data from both Caribou-Targee and Wasatch-Cache National Forests.
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0 2 4 8 12 16 20

Figure 18

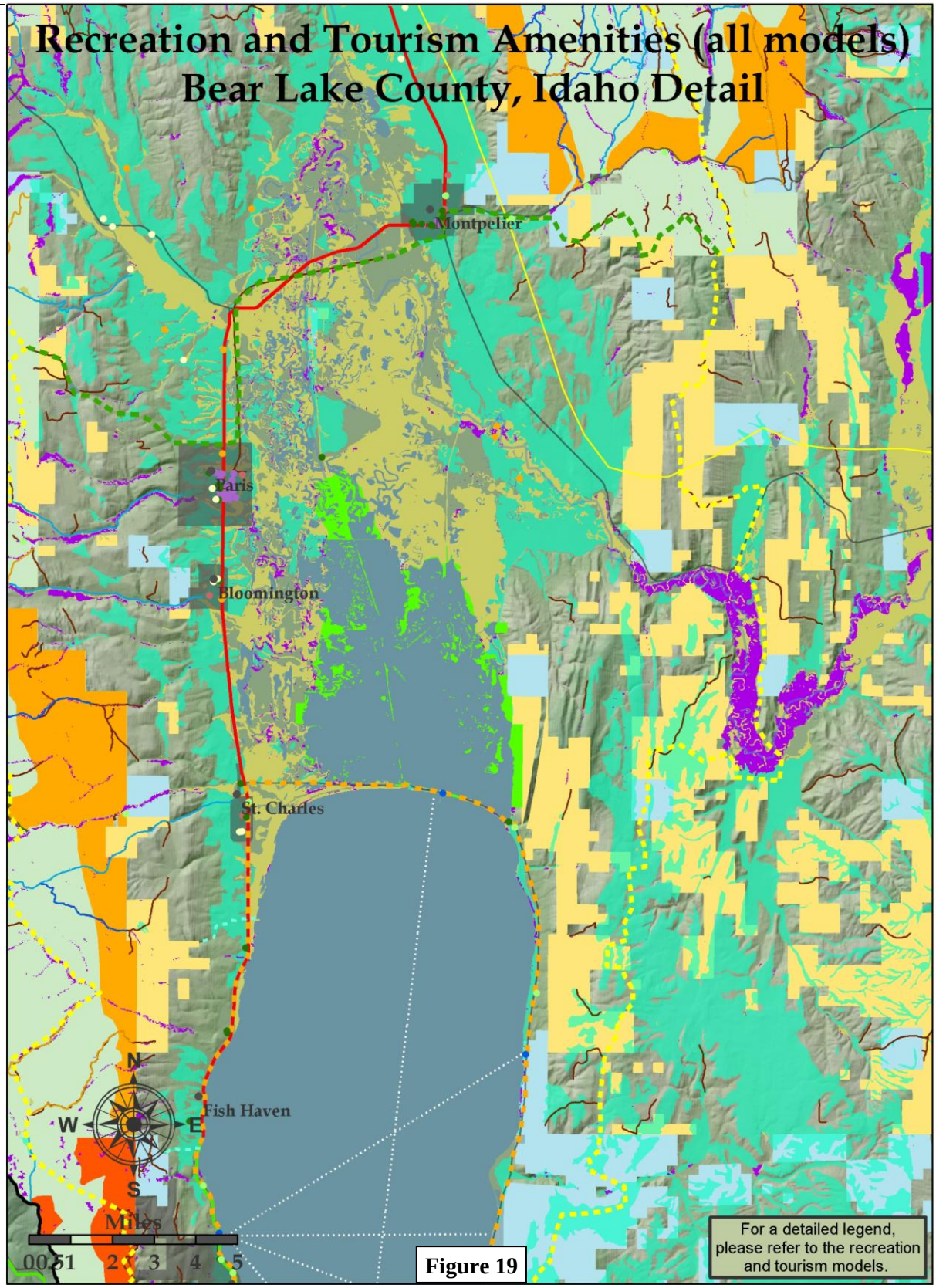
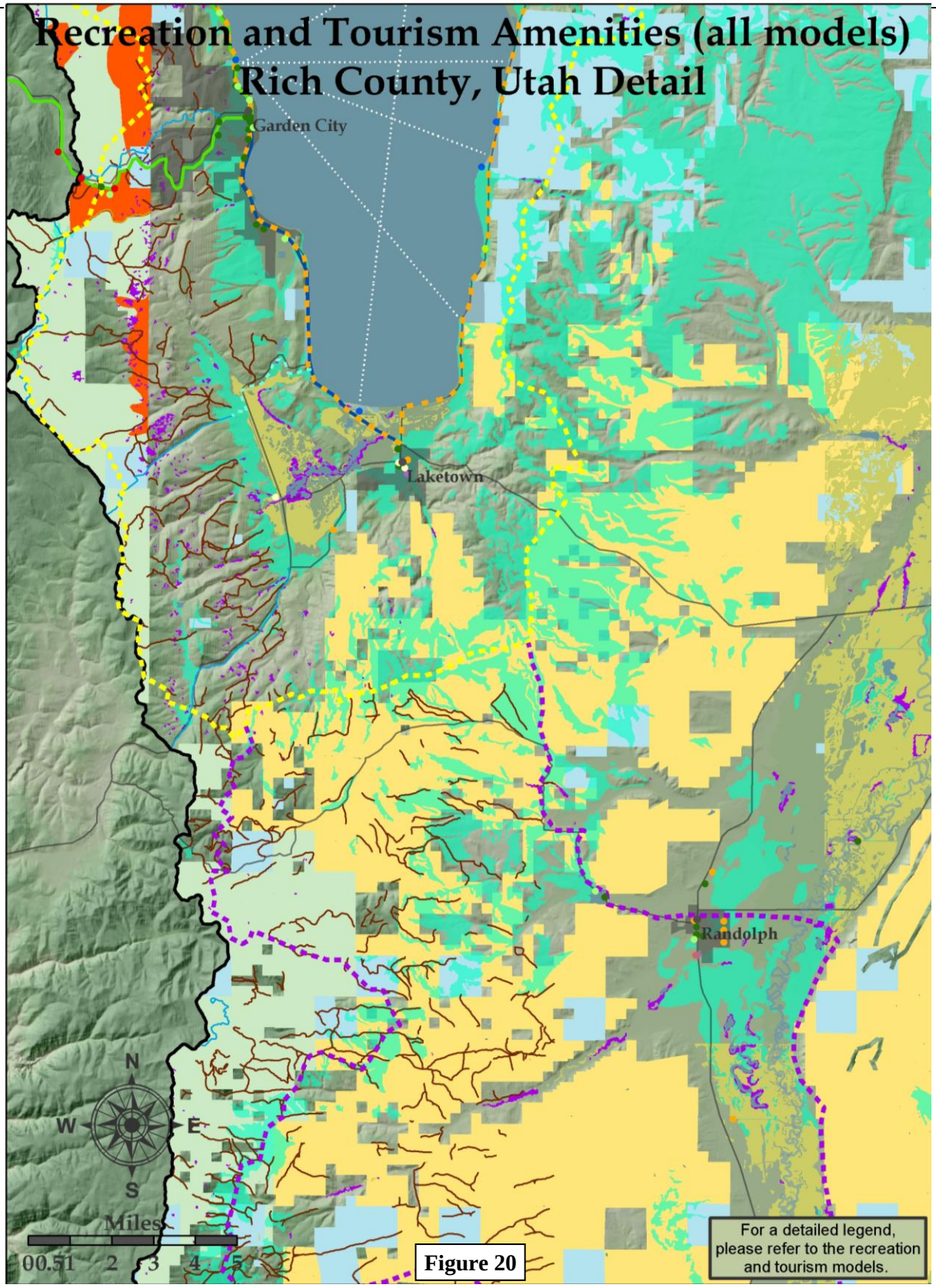

Recreation and Tourism Amenities (all models)
Bear Lake County, Idaho Detail
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
N
W
E
S
Miles
0 0.5 1 2 3 4 5
For a detailed legend, please refer to the recreation and tourism models.

Figure 19


Recreation and Tourism Amenities (all models)
Rich County, Utah Detail
Garden City
Laketown
Randolph
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Miles
0 0.5 1 2 3 4 5
For a detailed legend, please refer to the recreation and tourism models.

Figure 20

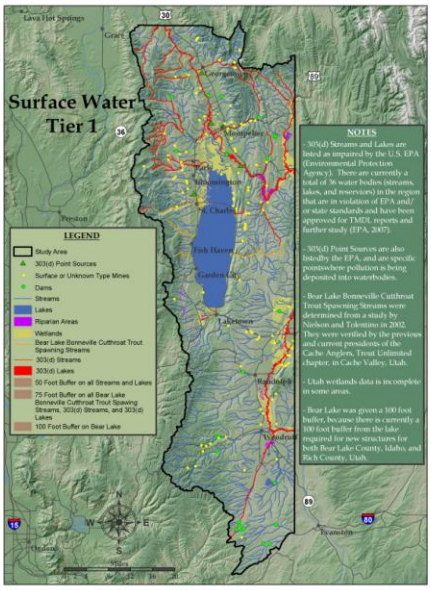
Perhaps one of the most critical environmental components of the Bear Lake region is surface water. Bear Lake is by far one of the most important water bodies in the region for recreation, tourism, wildlife habitat, fisheries, flood control, irrigation, and views. The Bear River is also important in terms of providing irrigation, fisheries, viewsheds, wildlife habitat, and flood control. Most of the water bodies in the Bear Lake region drain into Bear Lake, the Bear River, or both. If streams and lakes upstream of Bear Lake or the Bear River become polluted, they will also become polluted, compromising their beauty and critical environmental functions.

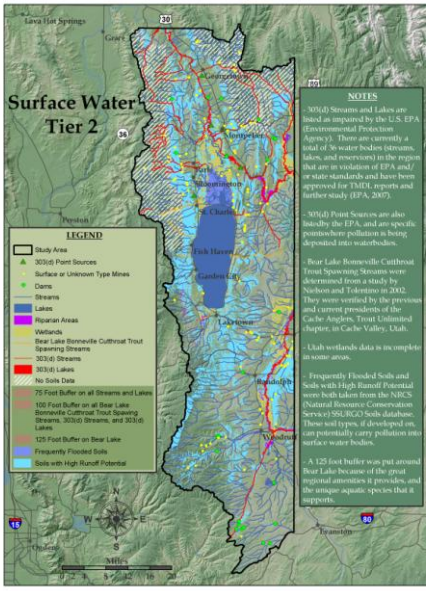
Another consideration is that of sensitive streams and lakes, with respect to cutthroat spawning tributaries and streams and lakes listed by the EPA as impaired. These streams and lakes should be considered as high priority for maintaining or improving water quality.

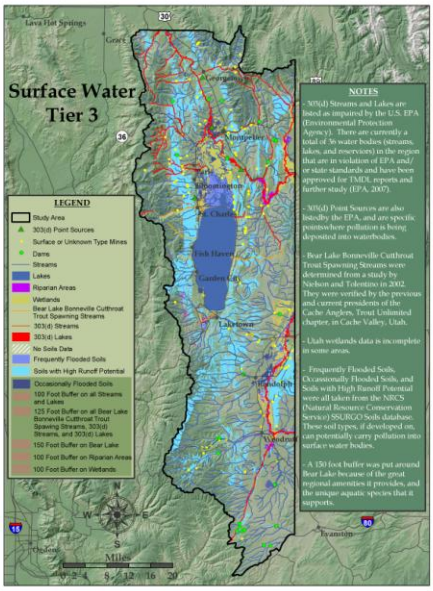
While much has been done in the Bear Lake region that has improved surface water quality, continued efforts are needed. Restoration efforts not only improve fisheries and scenic quality, but can affect the economics of the region. Many of the lakes and streams in the area are already utilized as sport fisheries, and will continue to be so, as long as they continue to have good water quality.

Water quality studies, current surface water ordinances, buffer width studies, and interviews from several specialists were utilized in the creation of this model. Surface water quality should continue to be at the forefront of land use planning in the Bear Lake region.

Streams such as Big Spring Creek near Laketown, Utah (shown here in 2003), have had, or will soon have, restoration work done. This is crucial for streams like this that provide many services for the region, including Bear Lake Bonneville Cutthroat Trout spawning habitat. These photos show eroded stream banks, stagnant water, and loss of vegetative cover, all of which can be greatly improved with restoration techniques.







Tier 1:

- National Hydrography Dataset streams and lakes, 1:100,000 resolution (used for graphical purposes)
- 303d listed streams and lakes for both Idaho and Utah
- Identified stream pollution point sources
- 50 foot setback/buffer on all streams and lakes
- 75 foot setback/buffer on state listed streams and lakes (303d list) (Temporary)
- 75 foot setback/buffer on Bear Lake Bonneville Cutthroat Trout spawning streams
- 100 foot setback/buffer on Bear Lake
- Dams
- Surface, ground-surface, or unknown vertical location labeled mines
- Wetlands/riparian areas

Tier 2:

- <u>Tier 1 plus the following</u>:
- 75 foot setback/buffer on all streams and lakes
- 100 foot setback/buffer on state listed streams and lakes (303d list) (This buffer width could be used until the streams or lakes become unlisted, then could become uniform to the standard stream buffer)
- 100 foot setback/buffer on Bear Lake Bonneville Cutthroat Trout spawning streams
- 125 foot setback/buffer on Bear Lake
- Frequently flooded soils
- Soils with high runoff potential

Tier 3:

- <u>Tier 2 plus the following</u>:
- 100 foot setback/buffer on all streams and lakes
- 125 foot setback/buffer on state listed streams and lakes (303d list) (This buffer width could be used until the streams or lakes become unlisted, then could become uniform to the standard stream buffer)
- 125 foot setback/buffer on Bear Lake Bonneville Cutthroat Trout spawning streams
- 150 foot setback/buffer on Bear Lake
- Occasionally flooded soils
- 100 foot setback/buffer on wetlands/riparian areas

Figure 21

Model Notes:

- Buffers are recommended on both sides of the stream.
- Bear Lake was not given a larger buffer than regular lakes and streams because it does not have extensive water quality problems (Palacios et al., 2006).
- Bear Lake Bonneville Cutthroat Trout spawning streams were given a larger buffer to provide for the best possible water quality. Tier 2 suggests a 100 foot buffer on these streams, which is fairly standard for adequate water quality purposes on any stream (IDEQ, 2008; Bannock County, Idaho, 2007)
- High runoff potential soils were taken from NRCS SSURGO soils data. These soils, if there is pollution on the surface, can act as a route for the pollution to travel downhill and into streams and rivers (Michael Domeier, Utah state soil scientist, personal communication, November 26, 2007; Nancy Mesner, Associate Dean, USU CNR, personal communication, December 4, 2007). Development on or near these soils could add pollution to the downhill streams and lakes. Things such as automobile lubricants or fluids, nitrogen and phosphorus from lawn fertilization, and other common household chemicals or fluids can be a problem when a home is located on these soils.
- Frequently flooded soils were also taken from NRCS SSURGO soils data. These soils can also prove to be problematic for water quality (Michael Domeier, Utah state soil scientist, personal communication, November 26, 2007; Nancy Mesner, Associate Dean, USU CNR, personal communication, December 4, 2007). Homes located on these soils not only are in danger of structural instability and flooding, but pollutants from home sites in these areas can be carried downstream into streams and lakes as well.

General Notes and Ordinances:

- Low lake levels can potentially inhibit cutthroat trout spawning habitat (Nielson and Tolentino, 2002).
- Stream setbacks could be required to be natural or native vegetation for water quality maintenance and improvement. This could be done the same as in Springville City, Utah, where there is a 20 foot natural buffer required on all streams, and a 50 foot setback required from the edge of the buffer for any structures, fences, et cetera (Springville City, Utah Ordinance, 2008).
- "Natural Vegetation" should be well defined in ordinances regarding buffers (Napa City, California Ordinance, 2008).
- Septic system setback distance could be greater than the average stream setback for water quality purposes (Cache County, Utah Ordinance, 2008).
- The average annual high water mark of the stream could be the setback starting point; not the midpoint of the stream (Wasatch County, Utah Ordinance, 2008).
- Road density could be considered regarding sediment loading in streams and lakes, particularly where development is occurring upstream of sensitive areas.

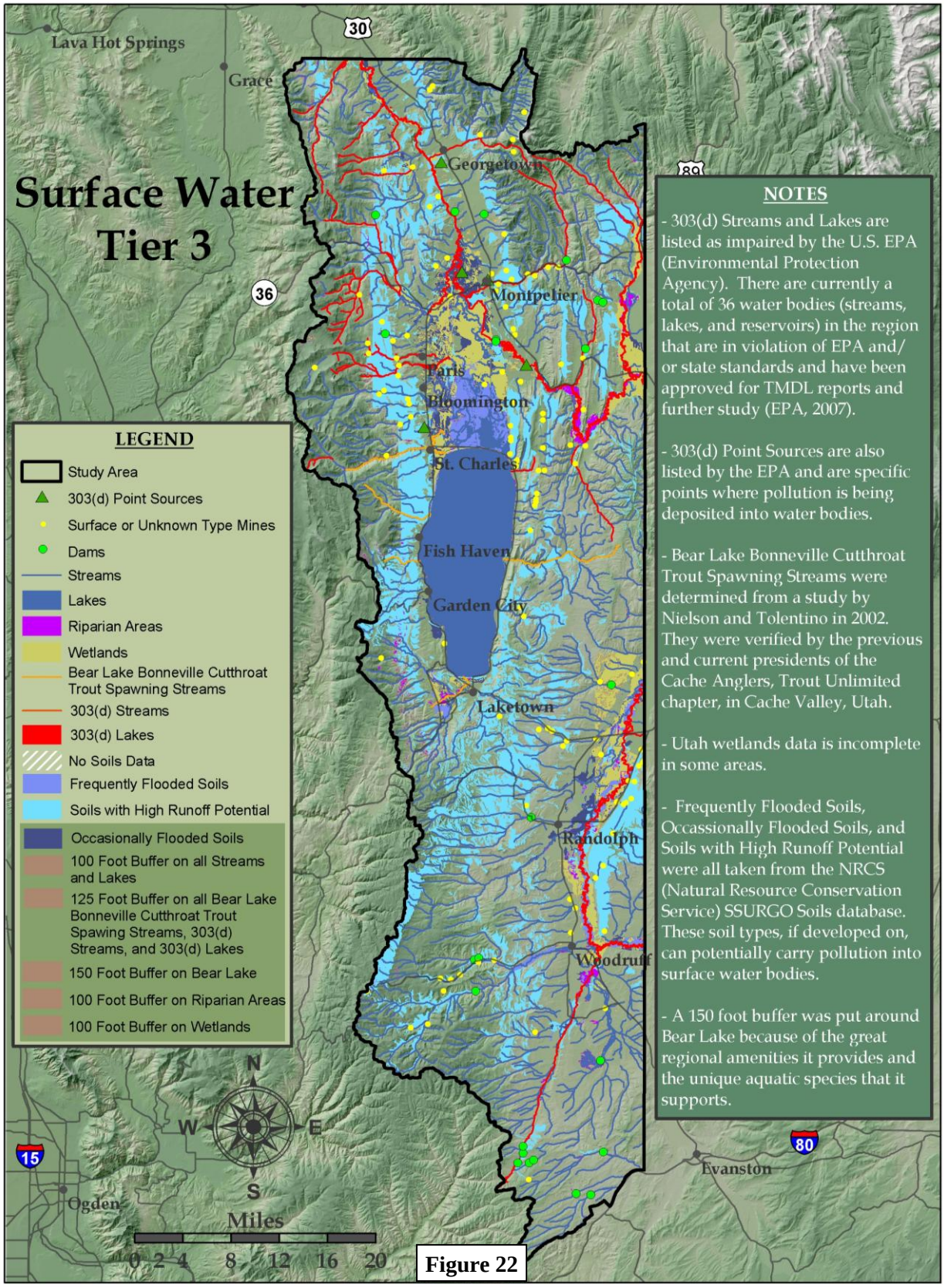
- Lakes should have at least the same setback/buffer requirements as streams and could be considered as a separate environmental issue. Bear Lake could require even more of a buffer than the surrounding streams, considering its importance as a major economical, cultural, natural, and aesthetic amenity (Vermont State, Agency of Natural Resources, 2008).
- Perennial and intermittent (or ephemeral) streams could have different setback/buffer widths required as in Weber County ordinances, where a 100 foot setback is required on the Ogden River, 75 foot on all perennial streams, and 50 foot on all ephemeral streams (Weber County, Utah Ordinance, 2008).
- IDEQ suggests standards that maintain a minimum total of 100 foot buffers required for water quality protection. They also suggest that this three-zone buffer system would consist of the following: an inner zone (25 foot min.), middle zone (50 foot min.), and an outer zone (25 foot min.). These zones provide flexibility with vegetation/ground cover types for each zone (IDEQ, 2008).
- Stream identification and classification should be well defined by having standards or standard maps. For example, an ordinance could designate that all streams are defined by using USGS National Hydrography Dataset High Resolution (1:24,000) Stream sets.
- Buffers are also mentioned in several ordinances as being in addition to 100 year flood plain boundaries (Johnson and Toth, 2004).

Reference Studies:

- DeMeo, Terry A., Christy, Don R., and Kundell, James E. *Trout Stream Buffer Program Assessment.* Carl Vinson Institute of Government. University of Georgia. 2005. This document discusses buffer widths for Georgia trout streams. 100 foot buffer widths on "state streams" were controversial, so they were changed to 50 foot with the recommendation that local municipalities require larger buffers if needed.
- Jones, K. L., G. C. Poole, J. L. Meyer, W. Bumback, and E. A. Kramer. 2006. *Quantifying expected ecological response to natural resource legislation: a case study of riparian buffers, aquatic habitat, and trout populations*. Ecology and Society **11**(2): 15. [online] URL: http://www.ecologyandsociety.org/vol11/iss2/art15/ (This study compared Georgia State's previous minimum buffer width of 100 feet, to the post-2001 Georgia State Legislature legal requirement change to a minimum buffer width of 50 feet. The authors found that 50 foot buffers were not adequate for protecting healthy trout populations, while 100 foot buffers were.
- Idaho Department of Environmental Quality. *Storm Water Best Management Practices Catalog, Aquatic Buffers, BMP 6*. These standards suggest that a minimum of 100 foot buffers are required for water quality protection. They also suggest using a three-zone buffer system, being an inner zone (25 foot minimum), middle zone (50 foot minimum), and an outer zone (25 foot

minimum). These zones provide flexibility with vegetation/ground cover types for each zone.

- Stream Ecosystem Function in Urbanizing Landscapes. Meyer et al, 2005. This paper discusses effects of urbanization on streams in Georgia.
- Paul, Michael J., and Meyer, Judy L. *Streams in the Urban Landscape.* Annu. Rev. Ecol. Syst. 2001. 32:333-65. 2001. This is a paper discussing problems with stream water quality in urban areas.
- Two Rivers-Ottauquechee Regional Commission riparian buffer zone benefits and information (http://www.trorc.org/wq_briparian.html).


Surface Water
Tier 3
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
30
36
89
80
15
LEGEND
Study Area
303(d) Point Sources
Surface or Unknown Type Mines
Dams
Streams
Lakes
Riparian Areas
Wetlands
Bear Lake Bonneville Cutthroat Trout Spawning Streams
303(d) Streams
303(d) Lakes
No Soils Data
Frequently Flooded Soils
Soils with High Runoff Potential
Occasionally Flooded Soils
100 Foot Buffer on all Streams and Lakes
125 Foot Buffer on all Bear Lake Bonneville Cutthroat Trout Spawing Streams, 303(d) Streams, and 303(d) Lakes
150 Foot Buffer on Bear Lake
100 Foot Buffer on Riparian Areas
100 Foot Buffer on Wetlands
N
W
E
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Miles
0 2 4 8 12 16 20
NOTES
- 303(d) Streams and Lakes are listed as impaired by the U.S. EPA (Environmental Protection Agency). There are currently a total of 36 water bodies (streams, lakes, and reservoirs) in the region that are in violation of EPA and/ or state standards and have been approved for TMDL reports and further study (EPA, 2007).
- 303(d) Point Sources are also listed by the EPA and are specific points where pollution is being deposited into water bodies.
- Bear Lake Bonneville Cutthroat Trout Spawning Streams were determined from a study by Nielson and Tolentino in 2002. They were verified by the previous and current presidents of the Cache Anglers, Trout Unlimited chapter, in Cache Valley, Utah.
- Utah wetlands data is incomplete in some areas.
- Frequently Flooded Soils, Occassionally Flooded Soils, and Soils with High Runoff Potential were all taken from the NRCS (Natural Resource Conservation Service) SSURGO Soils database. These soil types, if developed on, can potentially carry pollution into surface water bodies.
- A 150 foot buffer was put around Bear Lake because of the great regional amenities it provides and the unique aquatic species that it supports.

Figure 22

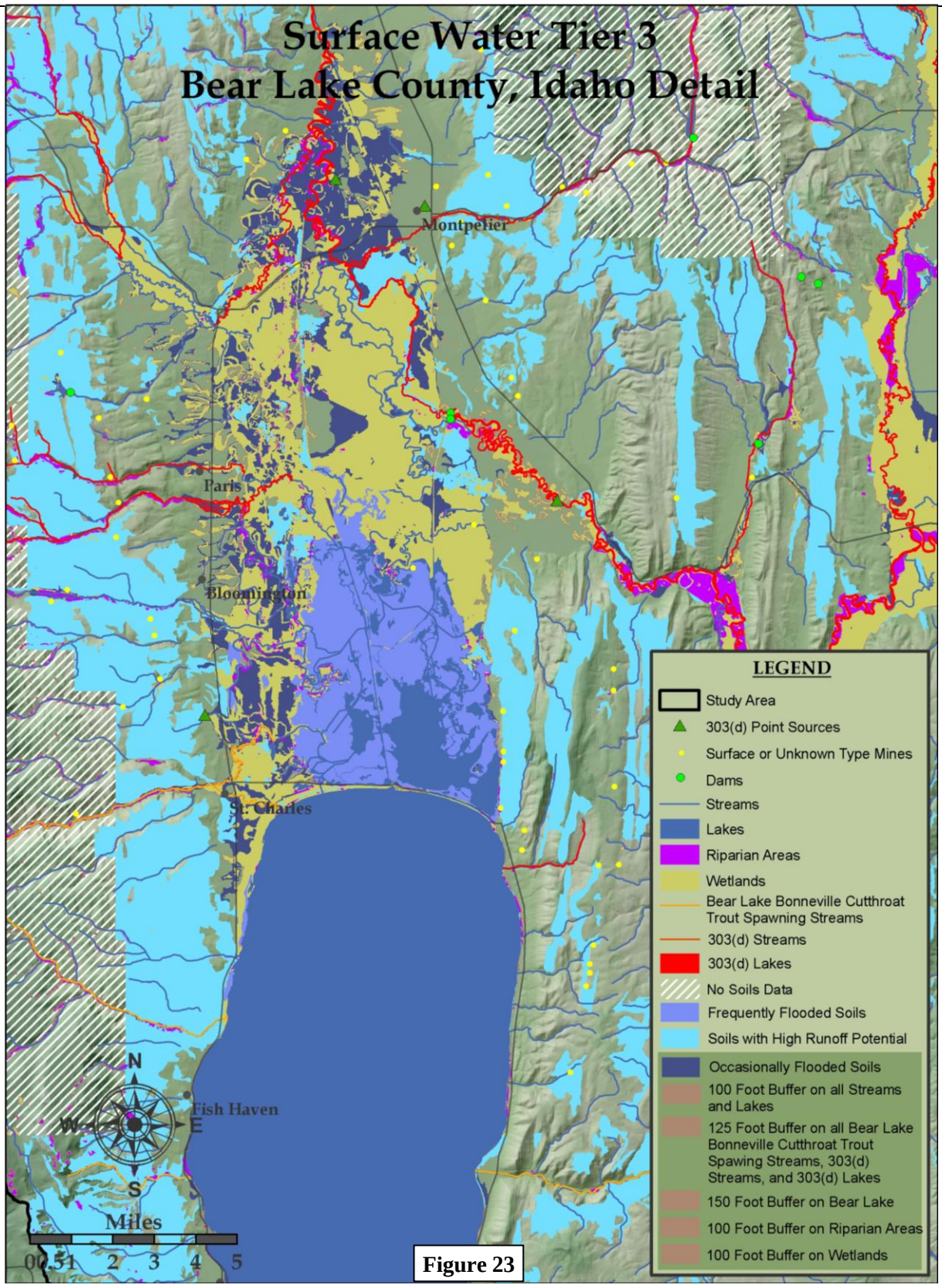

Surface Water Tier 3
Bear Lake County, Idaho Detail
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
303(d) Point Sources
Surface or Unknown Type Mines
Dams
Streams
Lakes
Riparian Areas
Wetlands
Bear Lake Bonneville Cutthroat Trout Spawning Streams
303(d) Streams
303(d) Lakes
No Soils Data
Frequently Flooded Soils
Soils with High Runoff Potential
Occasionally Flooded Soils
100 Foot Buffer on all Streams and Lakes
125 Foot Buffer on all Bear Lake Bonneville Cutthroat Trout Spawing Streams, 303(d) Streams, and 303(d) Lakes
150 Foot Buffer on Bear Lake
100 Foot Buffer on Riparian Areas
100 Foot Buffer on Wetlands

Figure 23

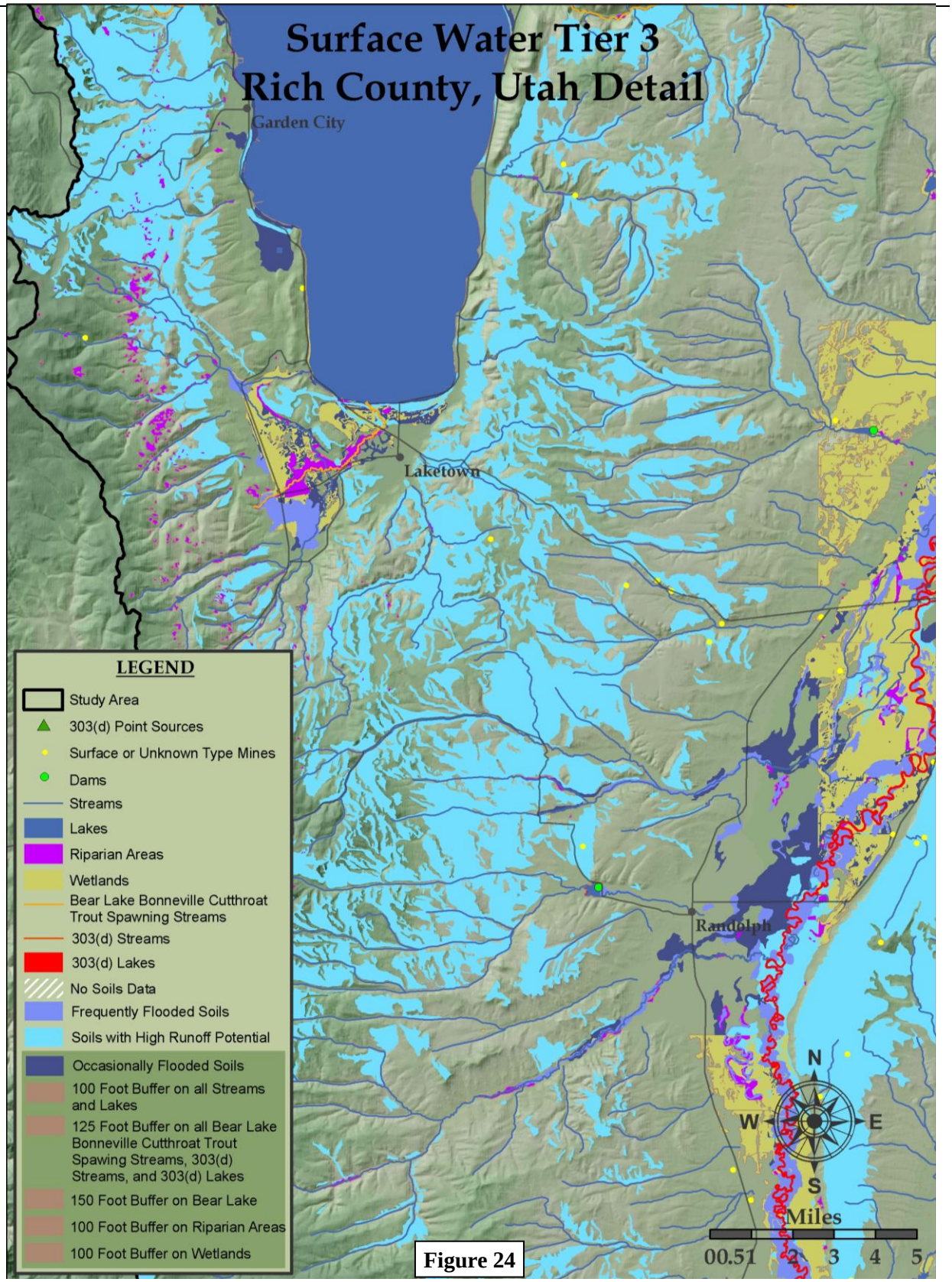

Surface Water Tier 3
Rich County, Utah Detail
Garden City
Laketown
Randolph
LEGEND
Study Area
303(d) Point Sources
Surface or Unknown Type Mines
Dams
Streams
Lakes
Riparian Areas
Wetlands
Bear Lake Bonneville Cutthroat Trout Spawning Streams
303(d) Streams
303(d) Lakes
No Soils Data
Frequently Flooded Soils
Soils with High Runoff Potential
Occasionally Flooded Soils
100 Foot Buffer on all Streams and Lakes
125 Foot Buffer on all Bear Lake Bonneville Cutthroat Trout Spawing Streams, 303(d) Streams, and 303(d) Lakes
150 Foot Buffer on Bear Lake
100 Foot Buffer on Riparian Areas
100 Foot Buffer on Wetlands
N
W
E
S
Miles
0 0.5 1 2 3 4 5

Figure 24

Perhaps one of the most critical planning issues in the Bear Lake region is that of transportation. While the roads are not very busy in the winter months, summer creates a crowded, and oftentimes dangerous, situation. There are several main highways that funnel traffic in the summer months mostly toward Garden City, Utah, including Highway 89 and State Road 30. This city is not only used as a tourist haven for Bear Lake users, providing food, gas, and other amenities, but it also serves as a major connection to Cache Valley, Utah, Jackson Hole, Wyoming, Soda Springs, Idaho, and Evanston, Wyoming.

Garden City and the west side of Bear Lake are feeling the pressures of increased traffic and safety hazards associated with that traffic. While turn lanes for new communities and other road design standards are being implemented, the community and county leaders have been discussing the idea of creating a bypass for Highway 89, on the west side of Bear Lake.

This model was created to provide ideas for regional Highway 89 bypass planning, giving several options that may give planners a visual perspective of what some potential scenarios would look like. Included is a low-elevation bypass west of the existing highway, a mid-elevation bypass higher on the hillside, a high-elevation bypass on the Rich County side of the Wasatch-Cache National Forest, a Forest Service Road Bypass that goes from St. Charles following existing Forest Service Roads to Beaver Mountain Ski Resort through Wasatch-Cache National Forest, and a small town bypass through Garden City. The Garden City bypass is something that the city has already been developing plans for. This model shows a possible direction for the road. There is also some across-lake connections suggested for emergency and tourist-oriented options.

This is an aerial photograph of Garden City, Utah. The highway coming from the west (bottom left) into town is Highway 89, which turns north (up) to Idaho. State Road 30 comes in to town from the south (bottom). This creates a bottle-neck situation in town during the summer months, where emergency vehicles cannot easily navigate. Similar problems will most likely be faced by other communities near Bear Lake as development continues to expand, and recreation and tourism demands in the region continue to grow.

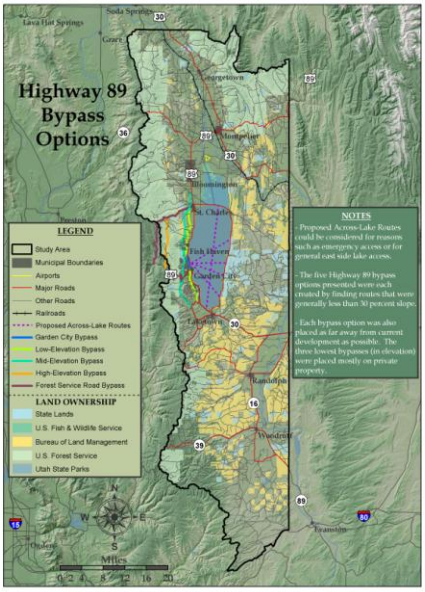


Figure 25

Model Components:

- Airports
- Major Roads
- Other Roads
- Railroads
- Proposed Across-Lake Routes
- Garden City Bypass
- Low-Elevation Bypass
- Mid-Elevation Bypass
- High-Elevation Bypass
- Forest Service Road Bypass

Model Notes:

- Proposed Across-Lake Routes were suggested in this model as a way of mitigating various transportation problems associated with busy summer days around Bear Lake on Highway 89. They were also shown as suggestions for tourism routes that could be used for shuttles across the lake to destinations on the south, east, or north side of the lake. These routes could also be useful in emergency situations, where people could be shuttled to Garden City to receive emergency assistance.
- All bypasses were created by using a slope map of the region, avoiding any slopes that were greater than 25-30%, and could be costly regarding cut and fill.
- Private lands were used for the Garden City and Low-Elevation Bypass options. The Mid-Elevation Bypass has a small amount of BLM land that the road crosses between Fish Haven and St. Charles, Idaho. The High-Elevation and Forest Service Road Bypasses are on federal land.
- It was suggested by those involved in transportation planning that routing a bypass through federal lands would be more time consuming and expensive than routing through private land because of the NEPA process and other environmental considerations (Jeff Gilbert, CMPO, personal communication, December 12, 2007; Kevin Kilpatrick, UDOT, personal communication, December 28, 2007).
- The Garden City Bypass was created based on the current plans that the city has to construct a bypass around the center of town during busy summer months.

General Notes:

- Widening of Highway 89 was suggested as a potential problem because of existing wetlands and right-of-way acquisition costs (Judy

Holbrook, Bear Lake Regional Commission, personal communication, November 28, 2007; Kevin Kilpatrick, UDOT, personal communication, December 28, 2007).

- Funding is considered to be a concern for a bypass of this scope. Where population and average daily vehicle use is relatively low compared to other areas in Idaho and Utah, funding may need to come from other sources such as federal or private sources (Kevin Kilpatrick, UDOT, personal communication, December 28, 2007).
- When laying out the bypass, other features that should be avoided are recreation areas in the counties, city parks, wildlife refuges, and national historic resources (Kevin Kilpatrick, UDOT, personal communication, December 28, 2007).
- The following are some suggestions for how to get a Highway 89 bypass process started, as suggested by Kevin Kilpatrick, Environmental Lead for the UDOT (Utah Department of Transportation):

    1. Find private funding sources if on private land.
    2. Try to get the project on STIP or the Long Range Plan for UDOT. This involves a preliminary report with environmental impacts including wildlife, soils, et cetera, and using existing infrastructure and current right-of-ways.
    3. Plan for a total road width of at least 45 to 50 feet for a three-lane road.
    4. Consider aspects like cut and fill, slope, number of land parcels potentially affected, and acres of wildlife habitat potentially affected.

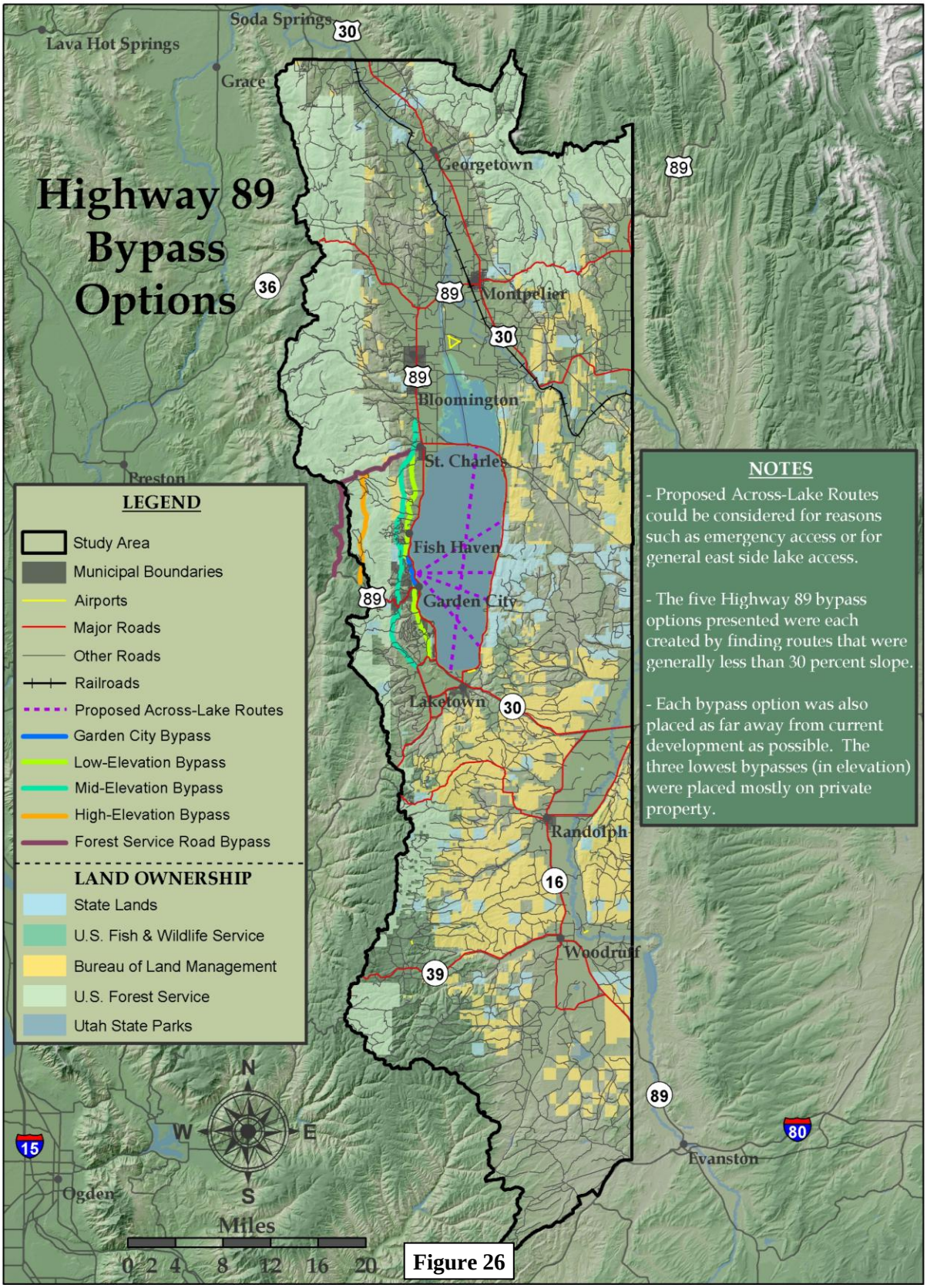

Highway 89 Bypass Options
Soda Springs
Lava Hot Springs
Grace
Georgetown
Montpelier
Bloomington
St. Charles
Preston
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
LEGEND
Study Area
Municipal Boundaries
Airports
Major Roads
Other Roads
Railroads
Proposed Across-Lake Routes
Garden City Bypass
Low-Elevation Bypass
Mid-Elevation Bypass
High-Elevation Bypass
Forest Service Road Bypass
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
NOTES
- Proposed Across-Lake Routes could be considered for reasons such as emergency access or for general east side lake access.
- The five Highway 89 bypass options presented were each created by finding routes that were generally less than 30 percent slope.
- Each bypass option was also placed as far away from current development as possible. The three lowest bypasses (in elevation) were placed mostly on private property.
N
W
E
S
Miles
0 2 4 8 12 16 20

Figure 26

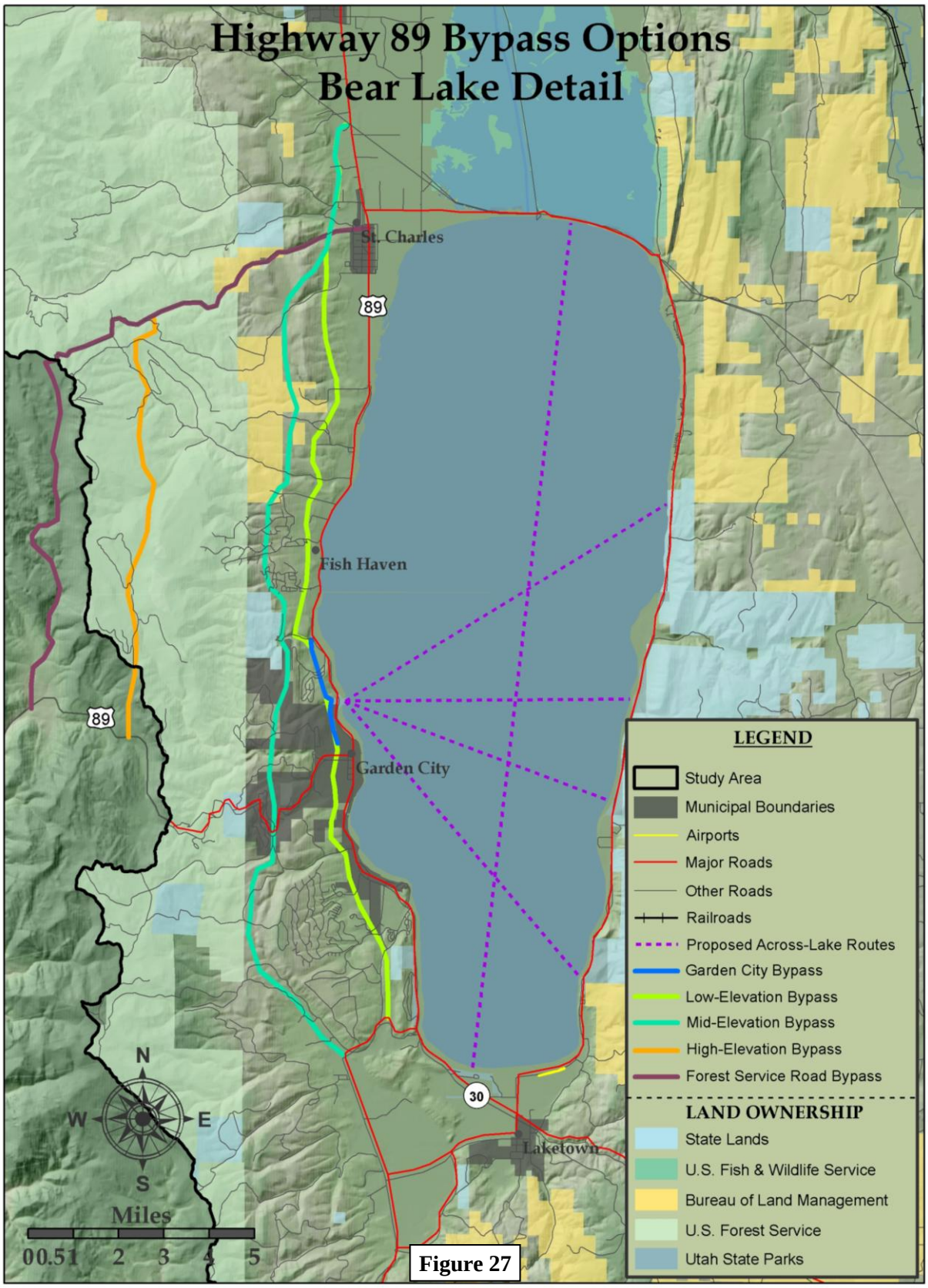

Highway 89 Bypass Options
Bear Lake Detail
St. Charles
89
Fish Haven
89
Garden City
30
Laketown
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
Municipal Boundaries
Airports
Major Roads
Other Roads
Railroads
Proposed Across-Lake Routes
Garden City Bypass
Low-Elevation Bypass
Mid-Elevation Bypass
High-Elevation Bypass
Forest Service Road Bypass
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks

Figure 27

Views and vistas, although important to most people, can be difficult to define or describe. Opinions differ from person to person regarding whether a view is good or not. However, most people value views and vistas, and consider them important for preservation. The all too common scenario in the western U.S. is where people live in a particular place for reasons such as rural culture, recreational proximity, wildlife enjoyment, and good views. However, although views are one of the main reasons people enjoy living in the western U.S., rarely is viewshed protection incorporated into land use planning.

Some have suggested that there are developers in the western U.S. that build anywhere there is not already housing. This type of growth can compromise the "sense of place" for an area, affecting views and vistas (Goetz et al., 2005)

Bear Lake has not been exempt from this type of loss regarding rural atmosphere and views. Along the west, east, and south shores of the lake, development has taken many forms with condos, cabins, second homes, and year-round housing. Compromised natural views not only affect the individual, but can also affect economics. People will pay much more for unobstructed views of prominent landscape features.

Views also are strongly correlated to "sense of place," which is the way one

This view of Bear Lake is enjoyed by many as they drive east on the Logan Canyon Scenic Byway. As seen in this photo, roads and housing will eventually fill much of this view.

perceives and orients oneself in a landscape.

In this model, viewsheds were mapped as areas that can be seen from a certain point or group of points. The points were chosen on the most likely places that people would be found in the region; namely towns, roads, and on Bear Lake. These were considered as areas where the landscape would be seen by the most people. Since the Bear Lake Basin and the Randolph/Woodruff area cannot really be seen by each other, separate viewsheds were done for each of these areas and are shown in different color gradients.

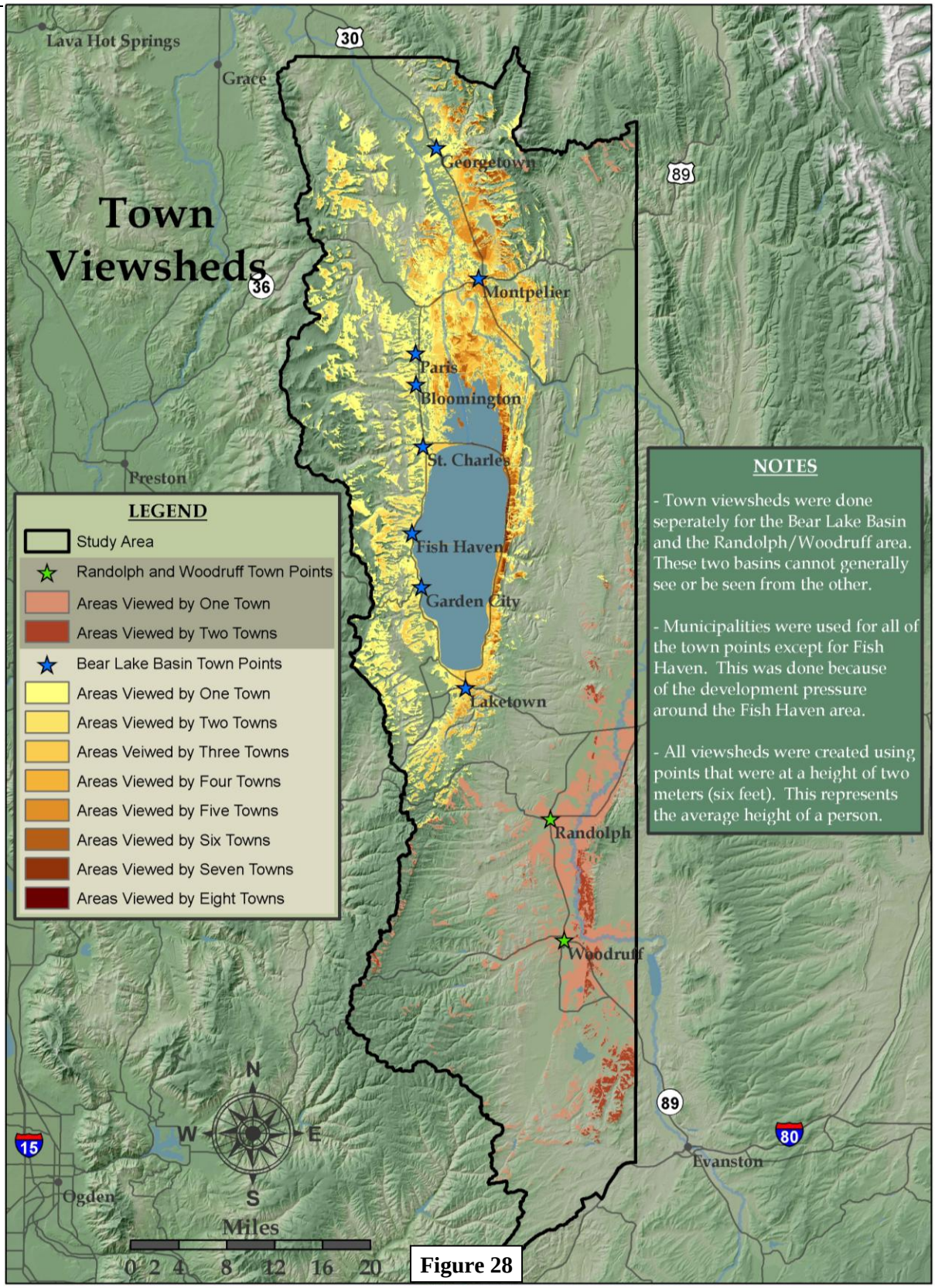

Town Viewsheds
Lava Hot Springs
Grace
Preston
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
30
36
89
15
80
LEGEND
Study Area
Randolph and Woodruff Town Points
Areas Viewed by One Town
Areas Viewed by Two Towns
Bear Lake Basin Town Points
Areas Viewed by One Town
Areas Viewed by Two Towns
Areas Veiwed by Three Towns
Areas Viewed by Four Towns
Areas Viewed by Five Towns
Areas Viewed by Six Towns
Areas Viewed by Seven Towns
Areas Viewed by Eight Towns
NOTES
- Town viewsheds were done seperately for the Bear Lake Basin and the Randolph/Woodruff area. These two basins cannot generally see or be seen from the other.
- Municipalities were used for all of the town points except for Fish Haven. This was done because of the development pressure around the Fish Haven area.
- All viewsheds were created using points that were at a height of two meters (six feet). This represents the average height of a person.
N
W
E
S
Miles
0 2 4 8 12 16 20

Figure 28

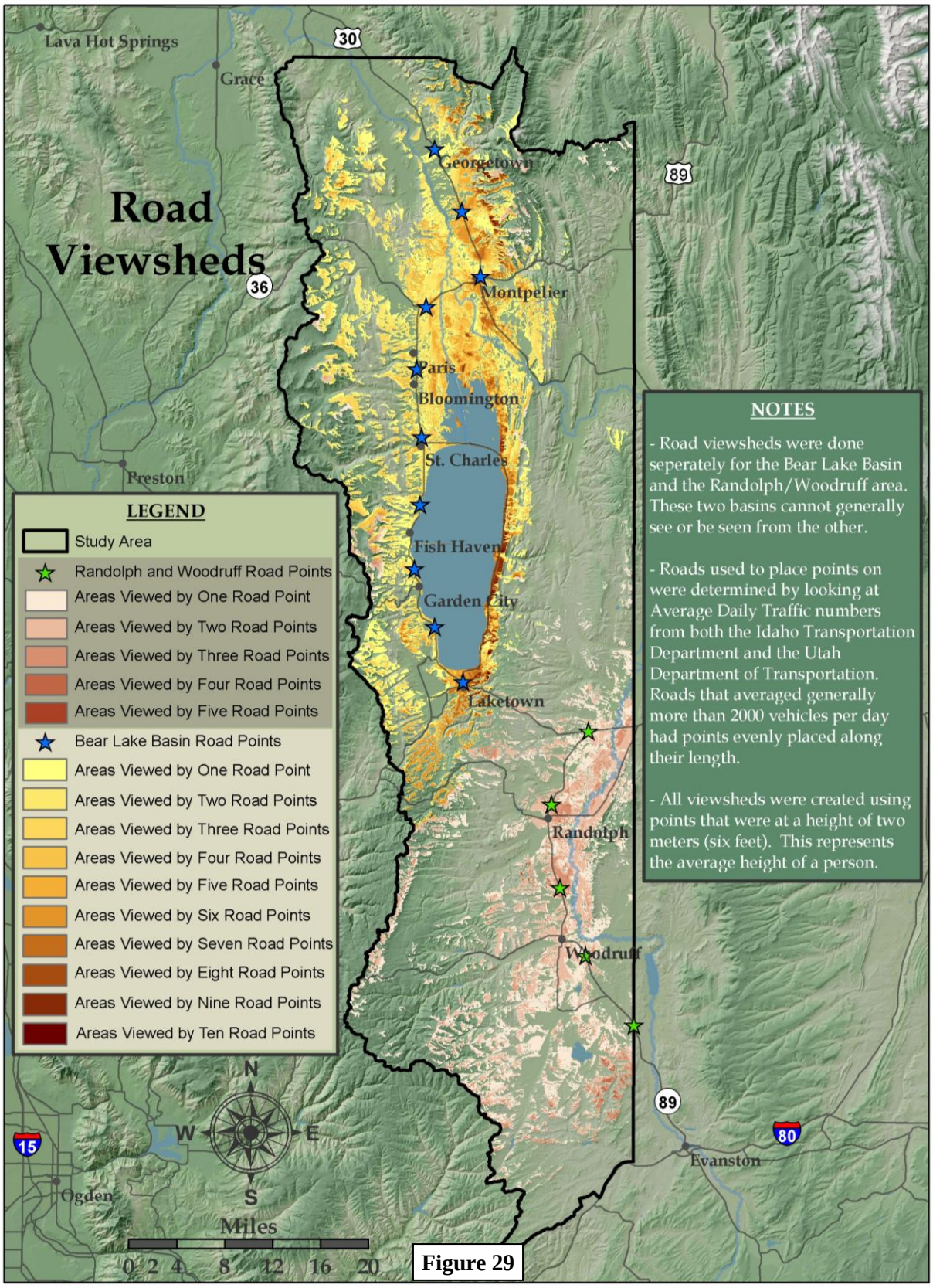

Road Viewsheds
Lava Hot Springs
Grace
Preston
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
30
36
89
15
80
LEGEND
Study Area
Randolph and Woodruff Road Points
Areas Viewed by One Road Point
Areas Viewed by Two Road Points
Areas Viewed by Three Road Points
Areas Viewed by Four Road Points
Areas Viewed by Five Road Points
Bear Lake Basin Road Points
Areas Viewed by One Road Point
Areas Viewed by Two Road Points
Areas Viewed by Three Road Points
Areas Viewed by Four Road Points
Areas Viewed by Five Road Points
Areas Viewed by Six Road Points
Areas Viewed by Seven Road Points
Areas Viewed by Eight Road Points
Areas Viewed by Nine Road Points
Areas Viewed by Ten Road Points
NOTES
- Road viewsheds were done seperately for the Bear Lake Basin and the Randolph/Woodruff area. These two basins cannot generally see or be seen from the other.
- Roads used to place points on were determined by looking at Average Daily Traffic numbers from both the Idaho Transportation Department and the Utah Department of Transportation. Roads that averaged generally more than 2000 vehicles per day had points evenly placed along their length.
- All viewsheds were created using points that were at a height of two meters (six feet). This represents the average height of a person.
N
W
E
S
Miles
0 2 4 8 12 16 20

Figure 29

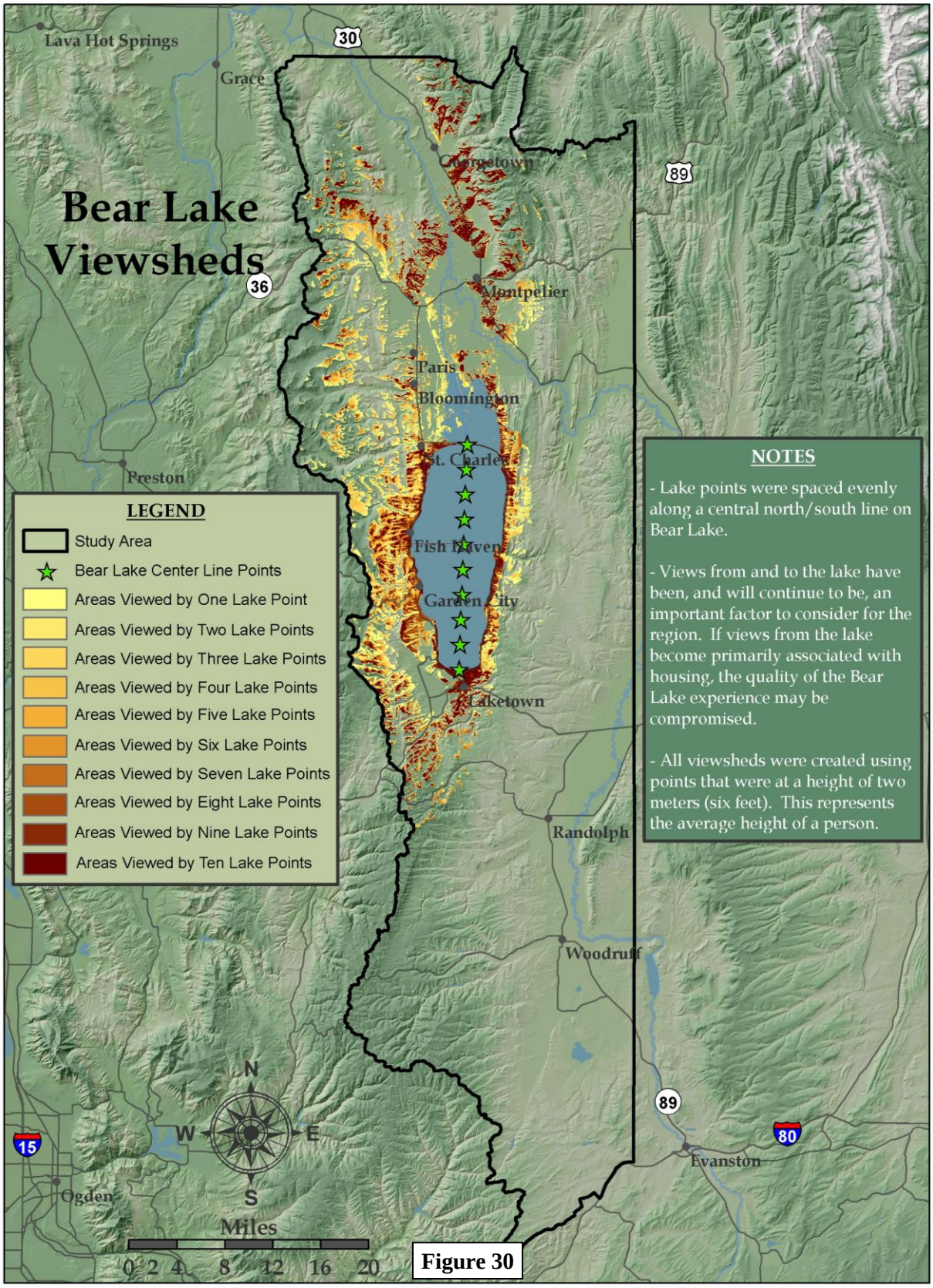

Bear Lake Viewsheds
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Preston
Ogden
30
89
36
15
80
LEGEND
Study Area
Bear Lake Center Line Points
Areas Viewed by One Lake Point
Areas Viewed by Two Lake Points
Areas Viewed by Three Lake Points
Areas Viewed by Four Lake Points
Areas Viewed by Five Lake Points
Areas Viewed by Six Lake Points
Areas Viewed by Seven Lake Points
Areas Viewed by Eight Lake Points
Areas Viewed by Nine Lake Points
Areas Viewed by Ten Lake Points
NOTES
- Lake points were spaced evenly along a central north/south line on Bear Lake.
- Views from and to the lake have been, and will continue to be, an important factor to consider for the region. If views from the lake become primarily associated with housing, the quality of the Bear Lake experience may be compromised.
- All viewsheds were created using points that were at a height of two meters (six feet). This represents the average height of a person.
N
W
E
S
Miles
0 2 4 8 12 16 20

Figure 30

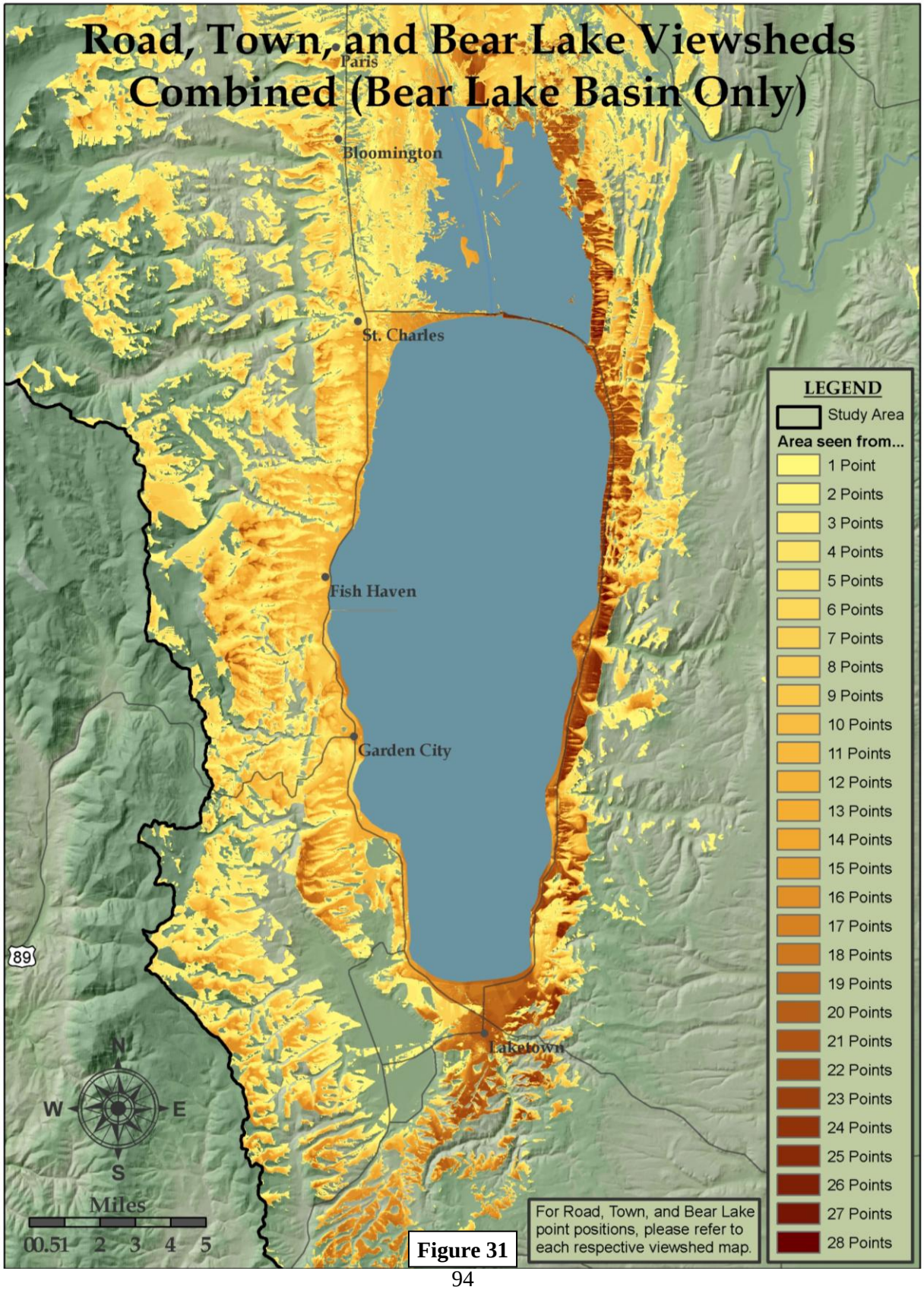
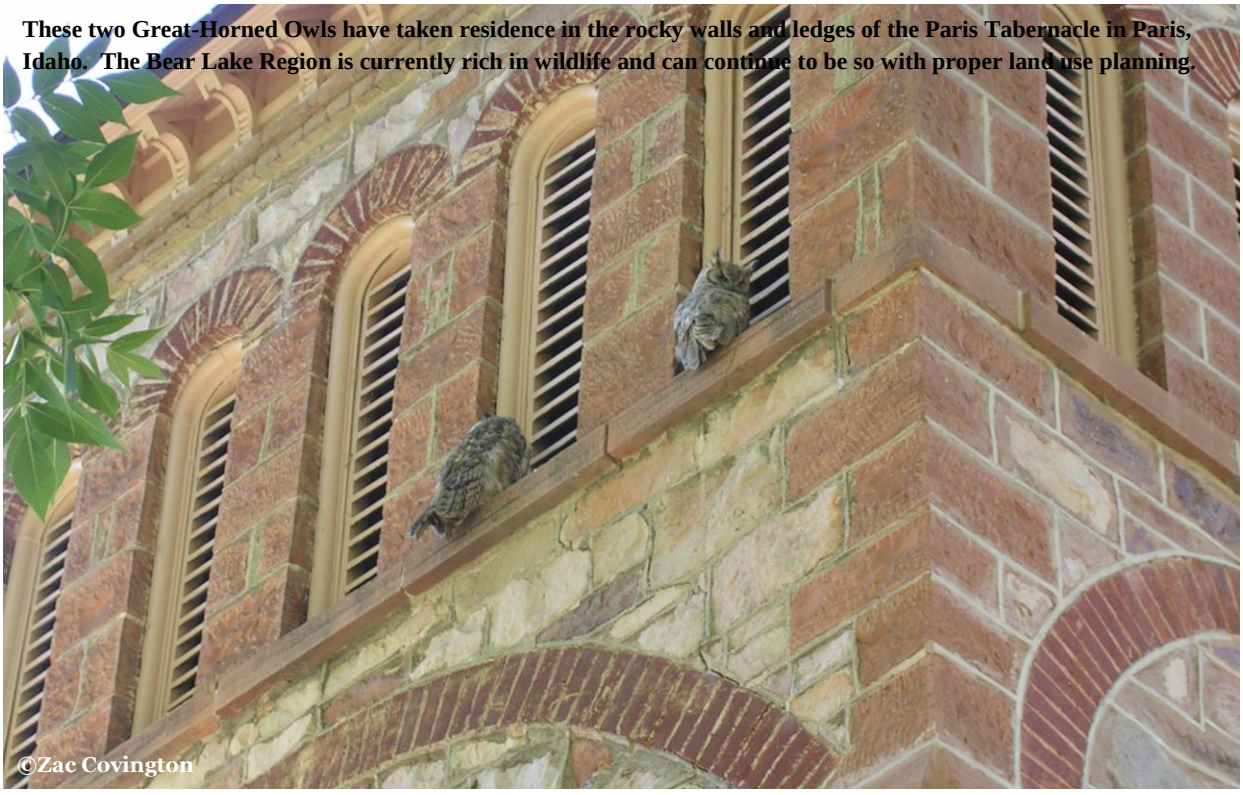

Road, Town, and Bear Lake Viewsheds Combined (Bear Lake Basin Only)
Paris
Bloomington
St. Charles
Fish Haven
Garden City
Laketown
89
N
W
E
S
Miles
0 0.5 1 2 3 4 5
For Road, Town, and Bear Lake point positions, please refer to each respective viewshed map.
LEGEND
Study Area
Area seen from...
1 Point
2 Points
3 Points
4 Points
5 Points
6 Points
7 Points
8 Points
9 Points
10 Points
11 Points
12 Points
13 Points
14 Points
15 Points
16 Points
17 Points
18 Points
19 Points
20 Points
21 Points
22 Points
23 Points
24 Points
25 Points
26 Points
27 Points
28 Points

Figure 31

Wildlife in the Bear Lake region is plentiful, unique, and beautiful. Deer, moose, and elk winter in the foothills of both states. Various types of fish inhabit the many streams and lakes, and upland birds also claim the region as their home. Current wildlife habitat in Bear Lake supports many types of terrestrial, aquatic, and avian species. The state wildlife agencies for Utah and Idaho have both given approximations of where "critical wildlife habitat" is located. It provides calving and wintering grounds for big game, brooding habitat for grouse and other upland bird species, and spawning habitat for sensitive fish species.

The wildlife habitat data for this model was taken from two main sources. The Idaho data was digitized from current sensitive wildlife habitat maps that were created for the Bear Lake Regional Commission with assistance from the Idaho Fish and Game. The Utah data was obtained from the critical wildlife habitat maps created by the Utah Division of Wildlife Resources from their 2005 Utah Wildlife Action Plan.

These habitat overlays are shown as one layer containing sensitive wildlife habitat. In order for a more detailed wildlife model creation, and for potential implementation into zoning and ordinances for the region, more detailed critical wildlife areas need to be mapped. State agencies are encouraged to provide these maps so that critical wildlife areas can be more fully considered in future land use planning and analysis.



These two Great-Horned Owls have taken residence in the rocky walls and ledges of the Paris Tabernacle in Paris, Idaho. The Bear Lake Region is currently rich in wildlife and can continue to be so with proper land use planning.

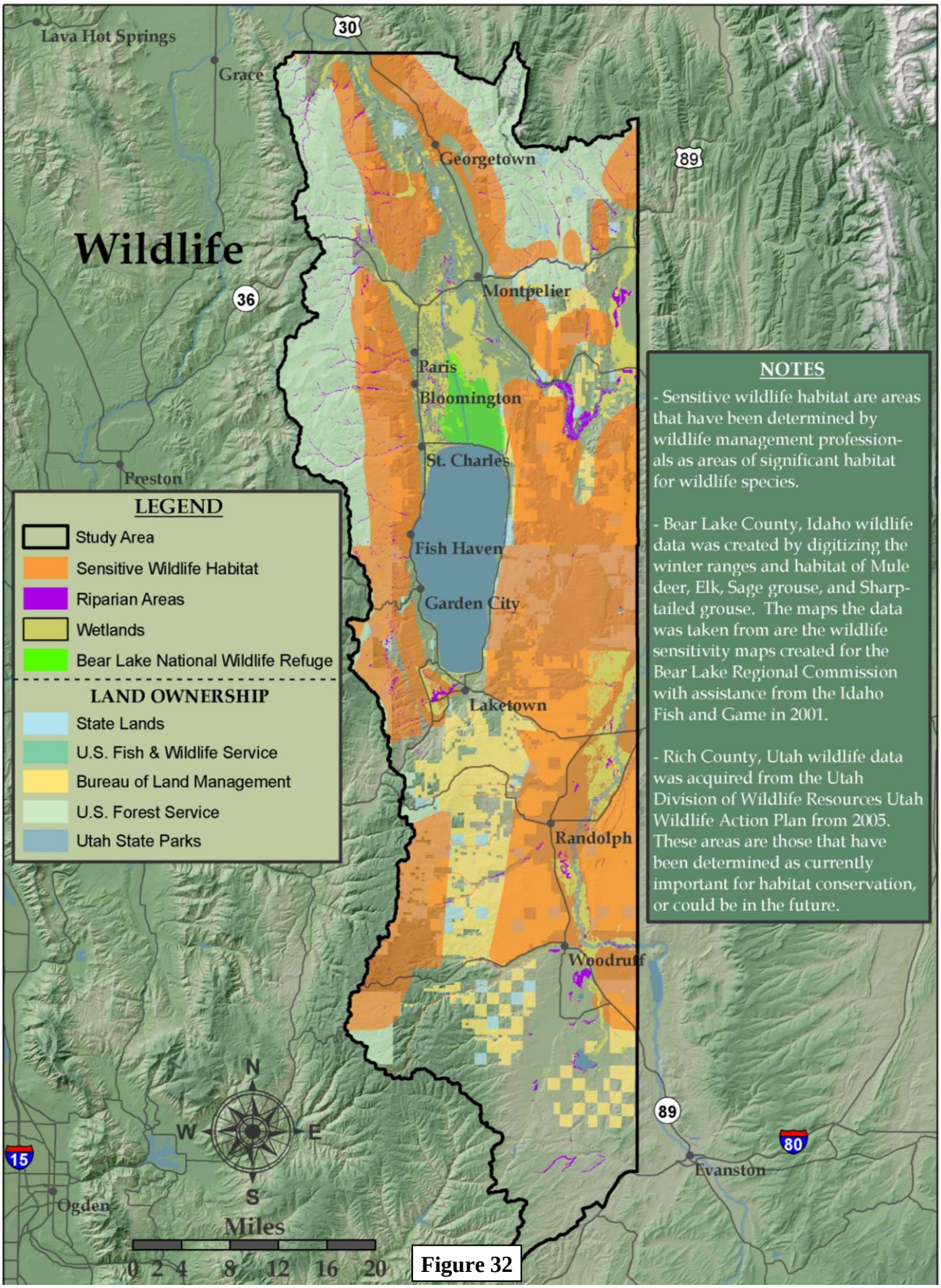

Wildlife
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Preston
Fish Haven
Garden City
Laketown
Randolph
Woodruff
Evanston
Ogden
30
89
36
15
80
LEGEND
Study Area
Sensitive Wildlife Habitat
Riparian Areas
Wetlands
Bear Lake National Wildlife Refuge
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
N
W
E
S
Miles
0 2 4 8 12 16 20
NOTES
- Sensitive wildlife habitat are areas that have been determined by wildlife management professionals as areas of significant habitat for wildlife species.
- Bear Lake County, Idaho wildlife data was created by digitizing the winter ranges and habitat of Mule deer, Elk, Sage grouse, and Sharp-tailed grouse. The maps the data was taken from are the wildlife sensitivity maps created for the Bear Lake Regional Commission with assistance from the Idaho Fish and Game in 2001.
- Rich County, Utah wildlife data was acquired from the Utah Division of Wildlife Resources Utah Wildlife Action Plan from 2005. These areas are those that have been determined as currently important for habitat conservation, or could be in the future.

Figure 32

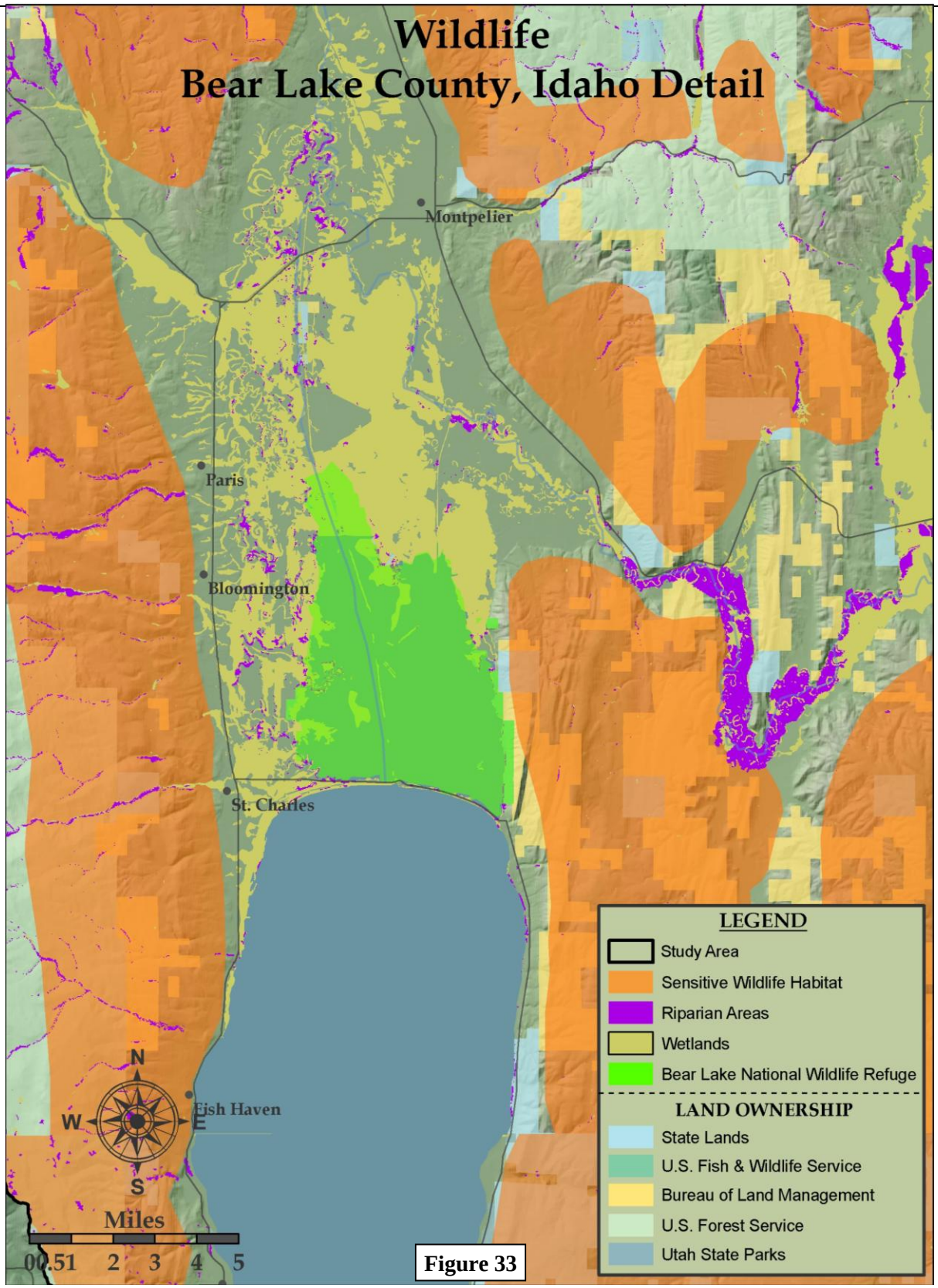

Wildlife
Bear Lake County, Idaho Detail
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
Sensitive Wildlife Habitat
Riparian Areas
Wetlands
Bear Lake National Wildlife Refuge
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks

Figure 33

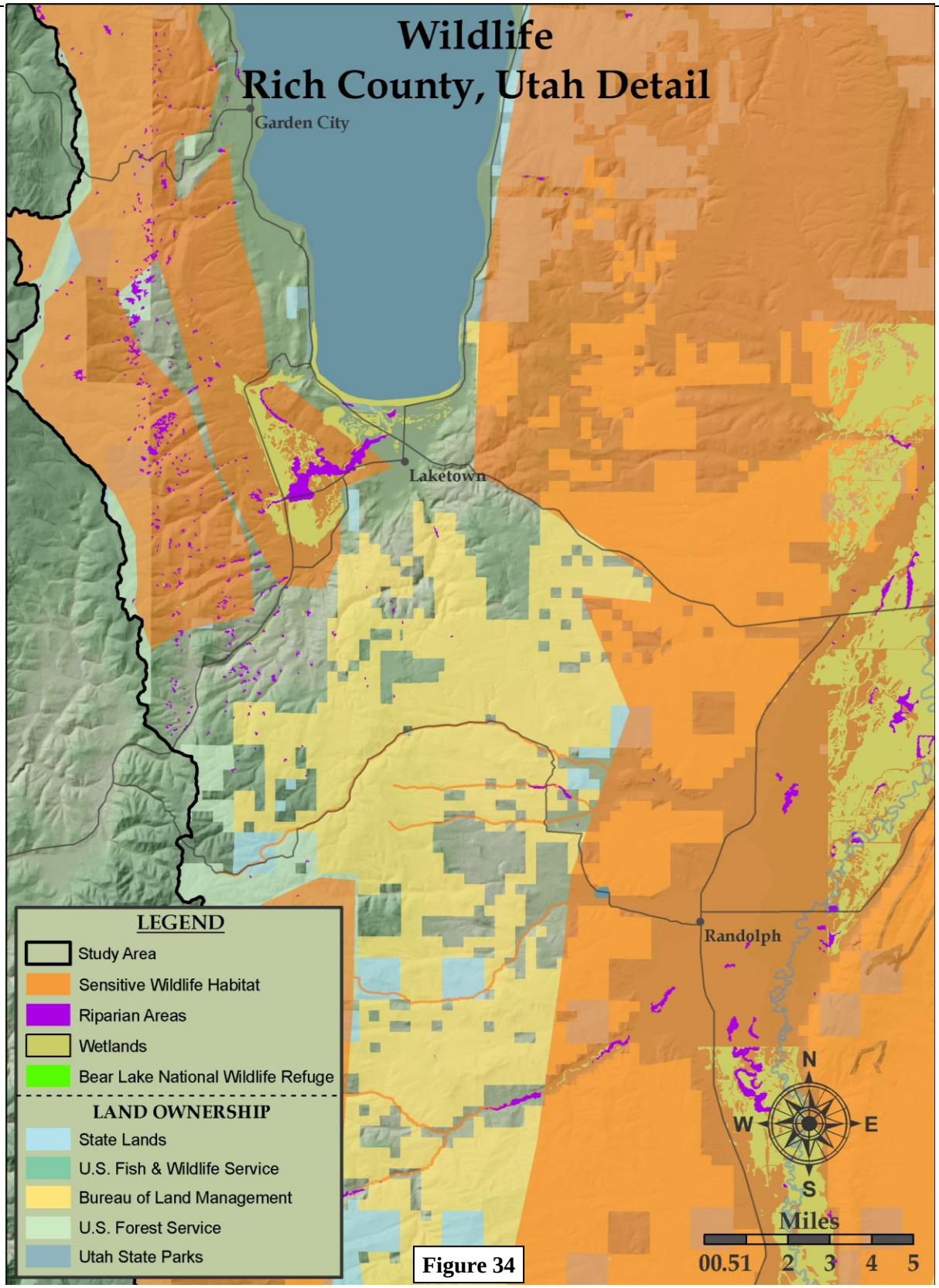

Wildlife
Rich County, Utah Detail
Garden City
Laketown
Randolph
LEGEND
Study Area
Sensitive Wildlife Habitat
Riparian Areas
Wetlands
Bear Lake National Wildlife Refuge
LAND OWNERSHIP
State Lands
U.S. Fish & Wildlife Service
Bureau of Land Management
U.S. Forest Service
Utah State Parks
N
W
E
S
Miles
0 0.5 1 2 3 4 5

Figure 34

While there are many ways to create potential future development patterns for a region, those that are recommended should, at least, provide a useful perspective of what alternative futures are possible. Traditionally, landscape architects and regional planners have used overlay techniques to determine areas of landscape sensitivity, or to discover areas appropriate for development. Alternative futures can also be created in a more speculative and creative way, where themes carry through a future growth strategy. Both of these techniques have been utilized in this study (Toth et al., 2007).

Various case studies show how unrestricted growth versus pro-actively managed growth could look on the landscape (Steinitz et al., 2006).

For the Bear Lake area, and for this project, it was determined that future growth scenarios based on current needs and issues would be created.

Several themes seemed to emanate from meetings and discussions with the various stakeholders in the region. These themes included comments regarding quality of life, agricultural lands, water quality, protection of public safety, transportation planning, and sense of place. These themes were generally synthesized to create three major future growth scenarios: Plan Trend, Critical Lands, and Quality of Life. Highway 89 bypass options were also overlaid on several of these futures, viewsheds, and slopes to show the potential problems and benefits for the bypass locations. The following is a diagram of the process for creating the three main futures found in this project:

Figure 35

Many areas of the Bear Lake region have been slowly expanding at an unnoticeable rate. Areas like Woodruff, Utah, and Paris, Idaho, have not changed much over the past few centuries. Most developers have focused on areas close to Bear Lake with views of the lake, wildlife, and open space having high priority. To some it may seem as though the area is not worth worrying about, if development continues as usual. However, regional planners, political leaders, and many residents have seen the pressures that are surrounding the area regarding development. Housing is becoming more expensive, and large planned developments and sporadic seasonal cabin lots are springing up all around the lake.

While the Bear Lake area currently has a lot of open land remaining, it may not always be that way in the future. While current planners, leaders, and the public have been working hard to control this influx of growth as much as possible, pressures are beginning to surface to develop every exposed hillside.

Much of the land near Bear Lake is generally conducive for development and could be developed without serious impacts. However, some of the region is surrounded by very sensitive landscape features that, if altered, could cause problems for residents and local leaders. These landscape features include surface water, groundwater, public safety lands, critical wildlife habitat, and views and vistas.

This Plan Trend future is a simple representation of lands that could be developed at the current zoning density. Unless there is aggressive protection of critical resources that benefit residents, these lands may eventually be developed, and natural processes will be disrupted. This future was created with the following criteria, which are noted as being economically feasible attributes for developers to build:

This is a good example of the types of pressure that the Bear Lake area is facing with development. Much of this land is fine for development, but some lands could prove to be problematic regarding safety and economics.

- 30% or less slope
- ½ mile proximity to existing roads
- Privately owned land
- Wetland and riparian areas were not considered buildable in this model, and were removed

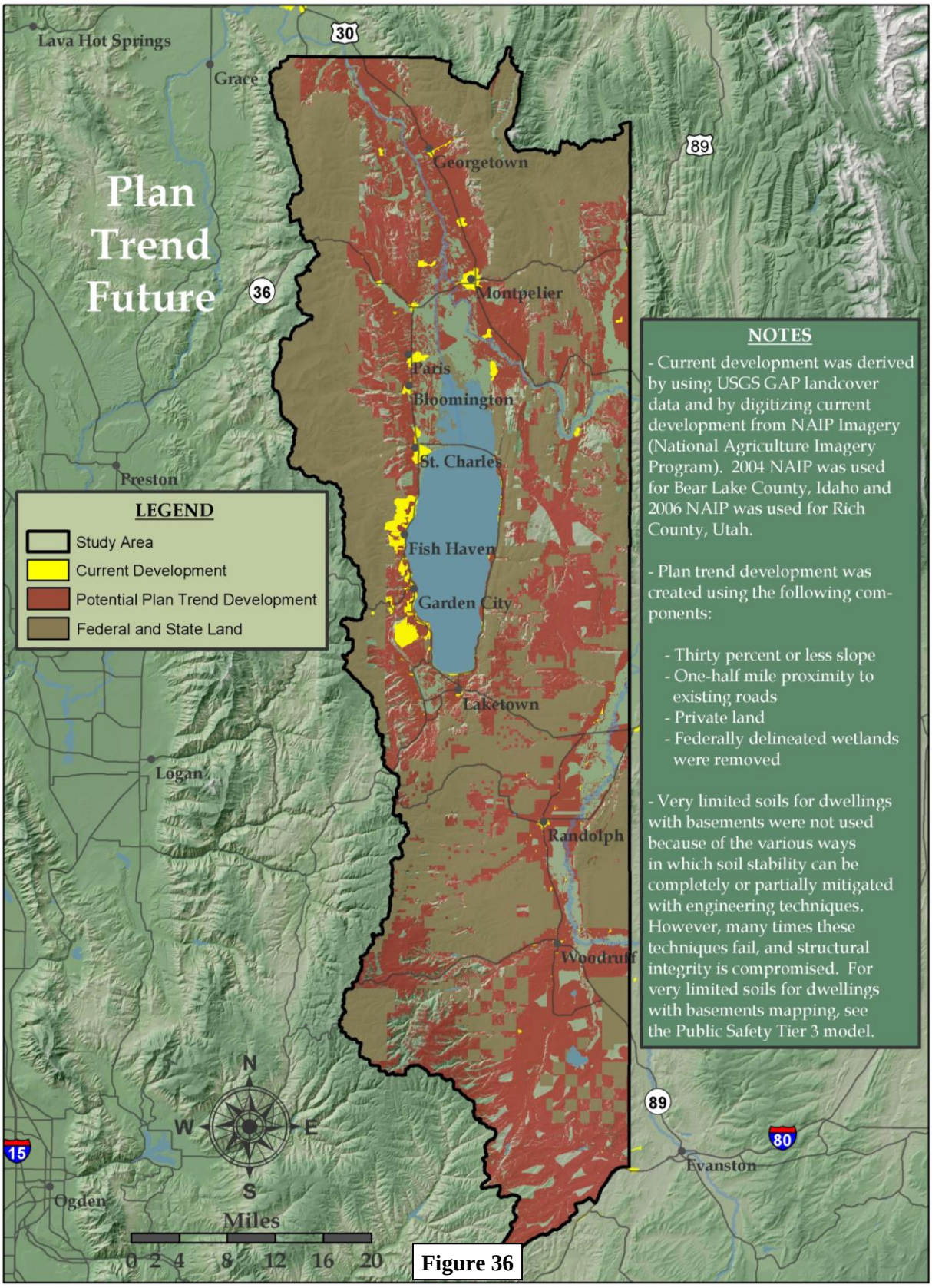

Plan
Trend
Future
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Preston
Fish Haven
Garden City
Laketown
Logan
Randolph
Woodruff
Evanston
Ogden
30
89
36
15
80
LEGEND
Study Area
Current Development
Potential Plan Trend Development
Federal and State Land
NOTES
- Current development was derived by using USGS GAP landcover data and by digitizing current development from NAIP Imagery (National Agriculture Imagery Program). 2004 NAIP was used for Bear Lake County, Idaho and 2006 NAIP was used for Rich County, Utah.
- Plan trend development was created using the following components:
- Thirty percent or less slope
- One-half mile proximity to existing roads
- Private land
- Federally delineated wetlands were removed
- Very limited soils for dwellings with basements were not used because of the various ways in which soil stability can be completely or partially mitigated with engineering techniques. However, many times these techniques fail, and structural integrity is compromised. For very limited soils for dwellings with basements mapping, see the Public Safety Tier 3 model.
N
W
E
S
Miles
0 2 4 8 12 16 20

Figure 36

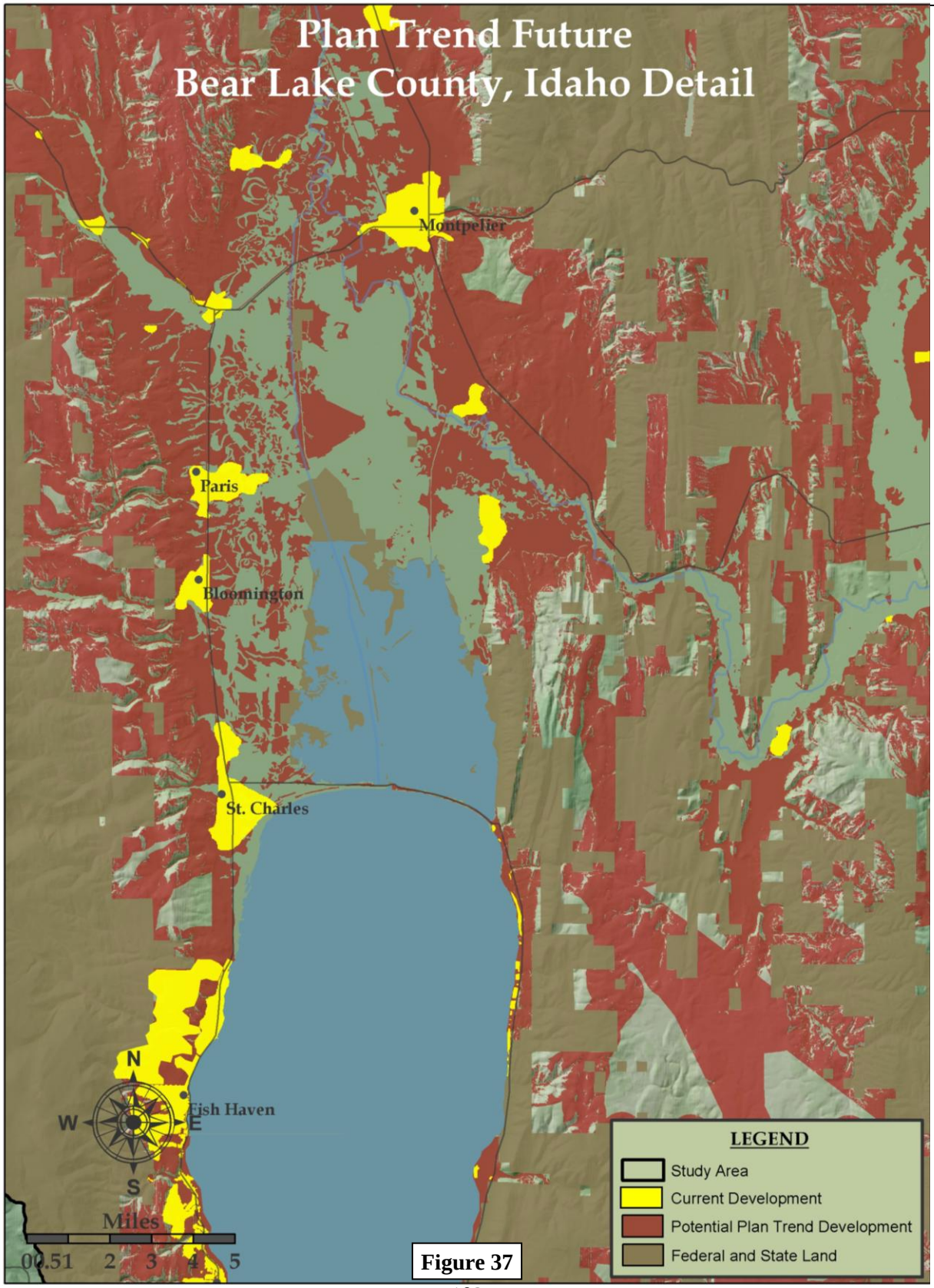

Plan Trend Future
Bear Lake County, Idaho Detail
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
Current Development
Potential Plan Trend Development
Federal and State Land

Figure 37

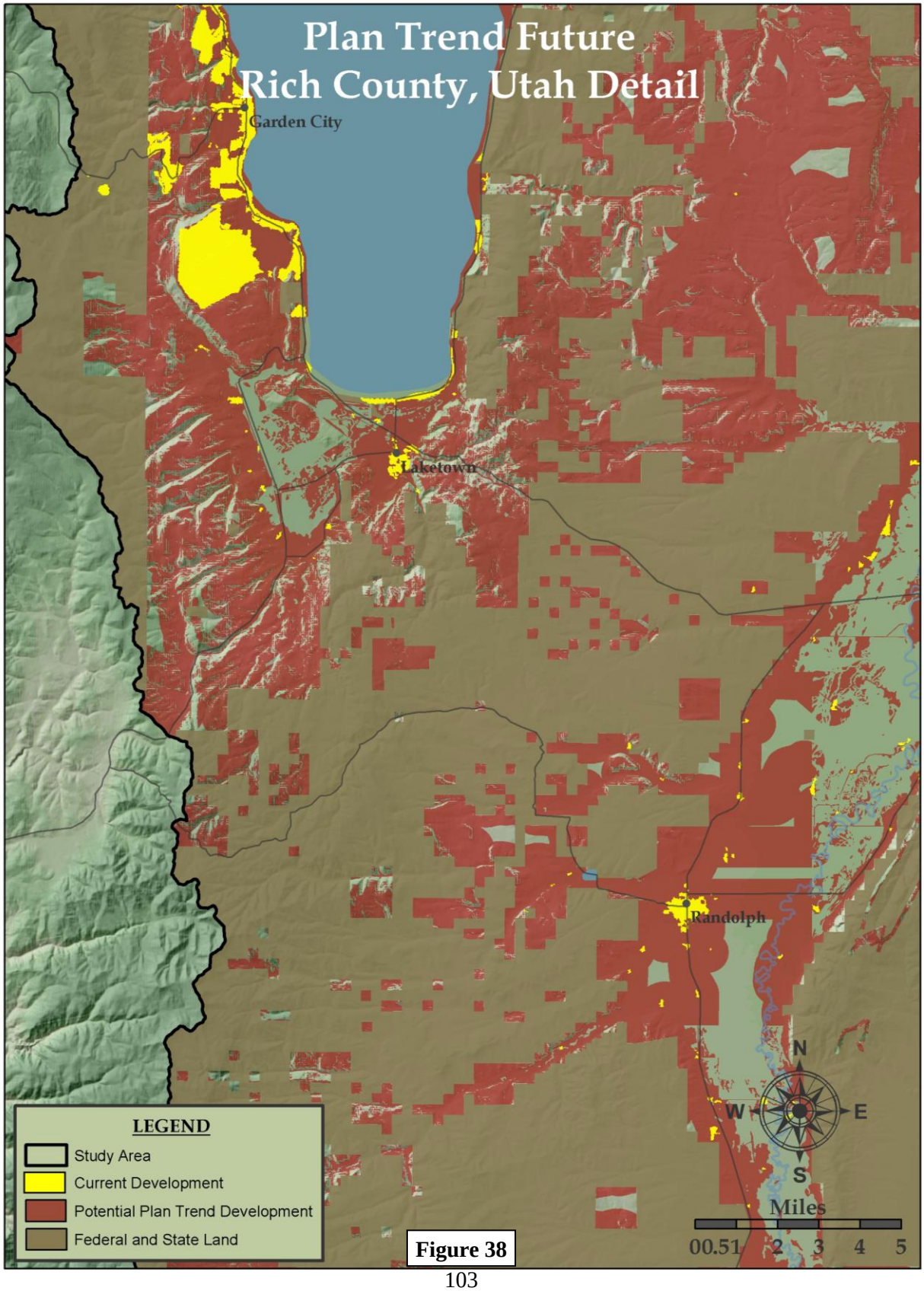

Plan Trend Future
Rich County, Utah Detail
Garden City
Laketown
Randolph
LEGEND
Study Area
Current Development
Potential Plan Trend Development
Federal and State Land
N
W
E
S
Miles
0 0.5 1 2 3 4 5

Figure 38

Some would say that, traditionally, most residential and commercial/industrial growth in the U.S. has occurred according to financial benefit, showing little regard for public health, safety, and welfare. The Bear Lake region, however, has been innovative and environmentally responsible in the past several decades. Planners have been considering biophysical and socio-cultural elements in the landscape since the late 1970s when the Bear Lake Regional Commission was formed. This planning effort accounts for much of the protection of critical resources in the region, where the public health, safety, and welfare of residents in the region, related to land use, has been well protected. But, as pressures grow to develop remaining lands, this past protection could be compromised.

"Critical lands" is a concept that has become more prevalent in the past few years. These lands include what could be termed as crucial for protection against land use change. They are lands that protect the health, safety, and welfare of residents (UGOPB, 2005). The Utah Governor's Office of Planning and Budget has also recently created a "Critical Lands Toolkit," where any community can begin the process of identifying and implementing their own areas of "Critical Lands" (UGOPB, 2005).

For this model, crucial components of the landscape were combined and designated as "Critical Lands" that should not be developed if the most basic public health, safety, and welfare of residents were to be maintained. There were also designated areas where development could be directed, avoiding "Critical Lands." The following components were used to create this future:

- Public Safety Tier 1
- Agriculture Tier 3
- Groundwater Tier 2
- Surface Water Tier 1
- Private Land

Many different landscape attributes can be included in "Critical Lands" for an area, such as these agriculturally significant lands northwest of Bear Lake. "Critical Lands" can also include places of historical, cultural, or biophysical significance.

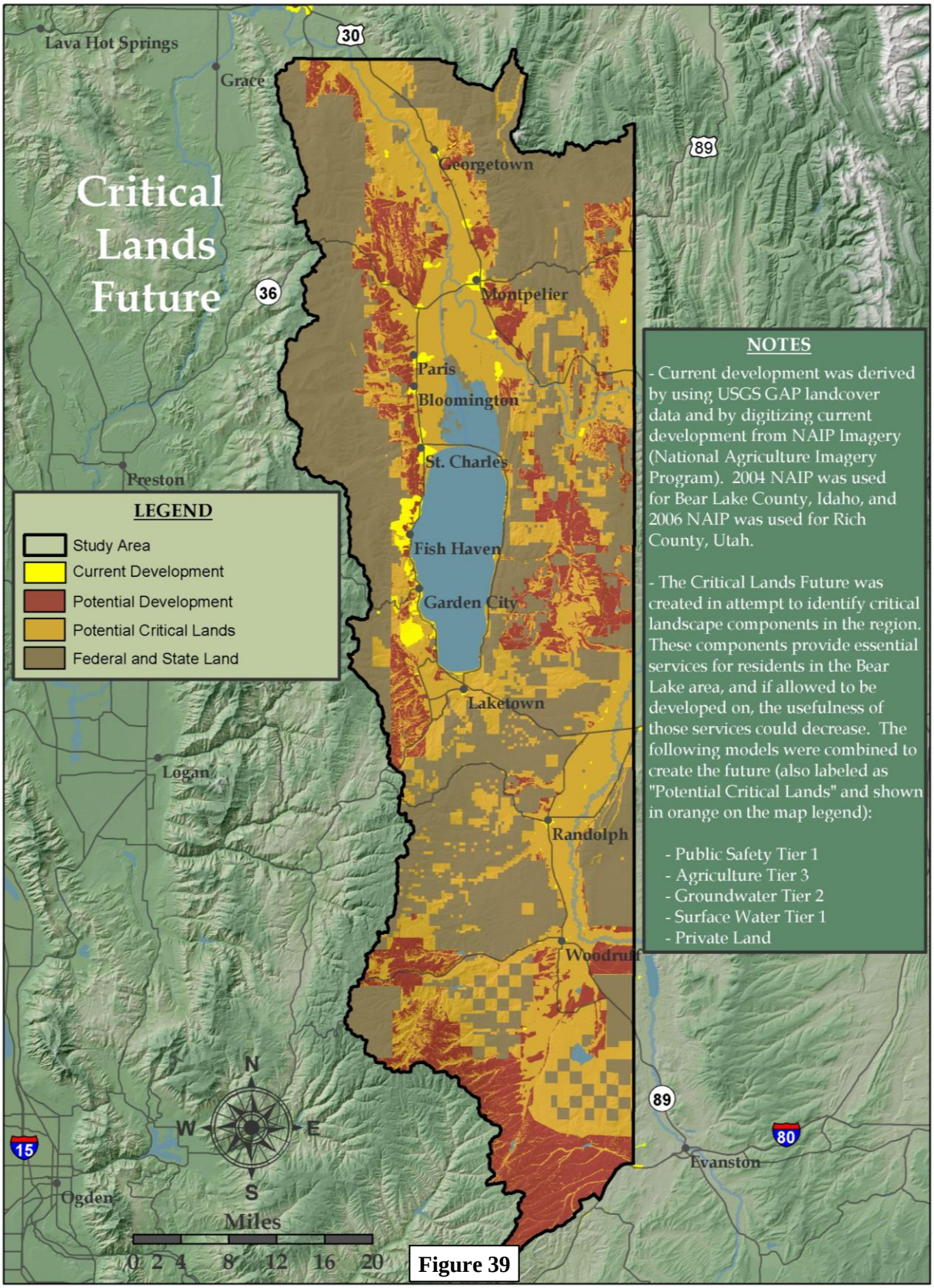

Critical Lands Future
LEGEND
Study Area
Current Development
Potential Development
Potential Critical Lands
Federal and State Land
NOTES
- Current development was derived by using USGS GAP landcover data and by digitizing current development from NAIP Imagery (National Agriculture Imagery Program). 2004 NAIP was used for Bear Lake County, Idaho, and 2006 NAIP was used for Rich County, Utah.
- The Critical Lands Future was created in attempt to identify critical landscape components in the region. These components provide essential services for residents in the Bear Lake area, and if allowed to be developed on, the usefulness of those services could decrease. The following models were combined to create the future (also labeled as "Potential Critical Lands" and shown in orange on the map legend):
- Public Safety Tier 1
- Agriculture Tier 3
- Groundwater Tier 2
- Surface Water Tier 1
- Private Land
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Preston
Fish Haven
Garden City
Laketown
Logan
Randolph
Woodruff
Evanston
Ogden
30
89
36
15
80
N
W
E
S
Miles
0 2 4 8 12 16 20

Figure 39

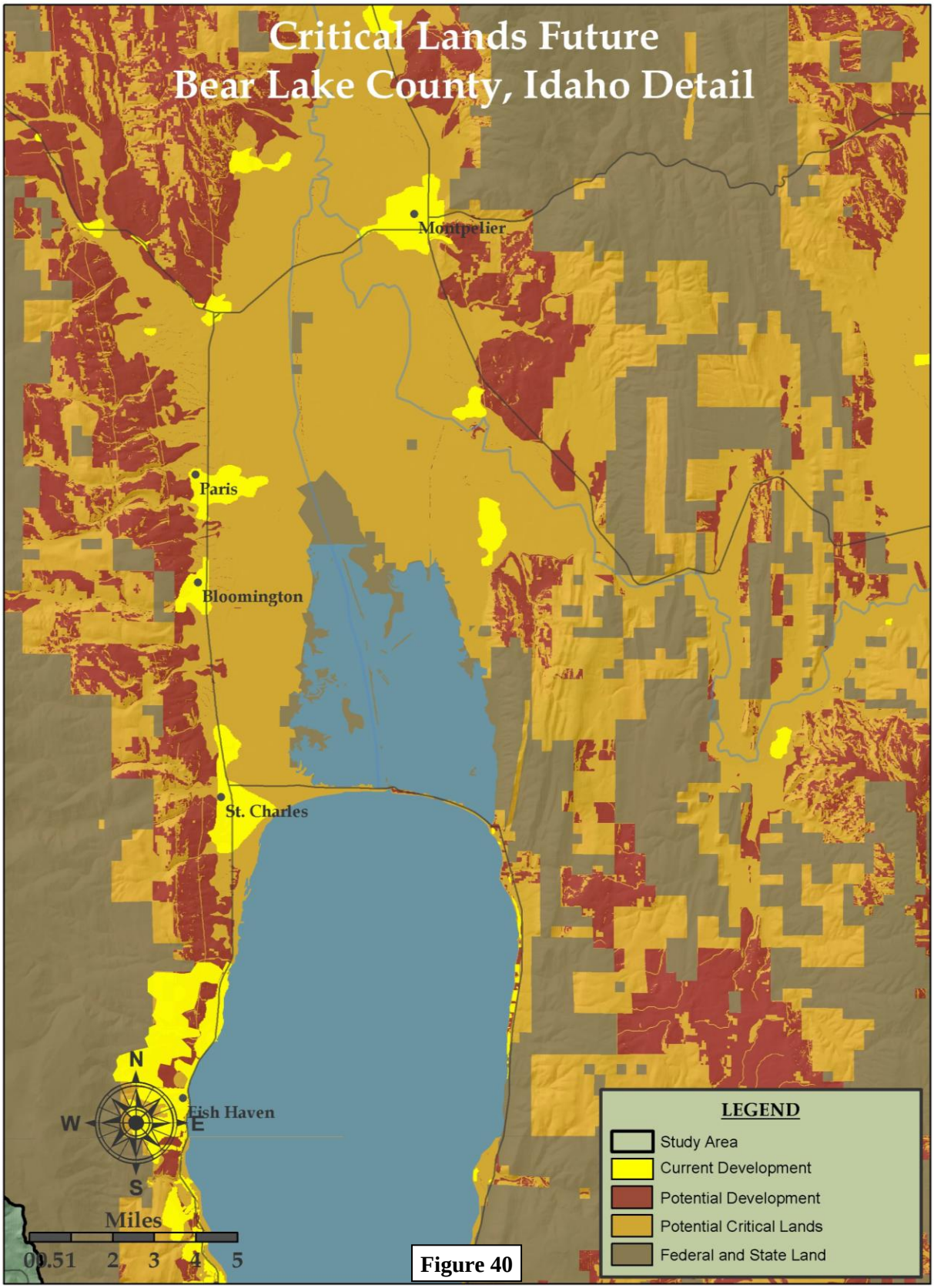

Critical Lands Future
Bear Lake County, Idaho Detail
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
Current Development
Potential Development
Potential Critical Lands
Federal and State Land

Figure 40

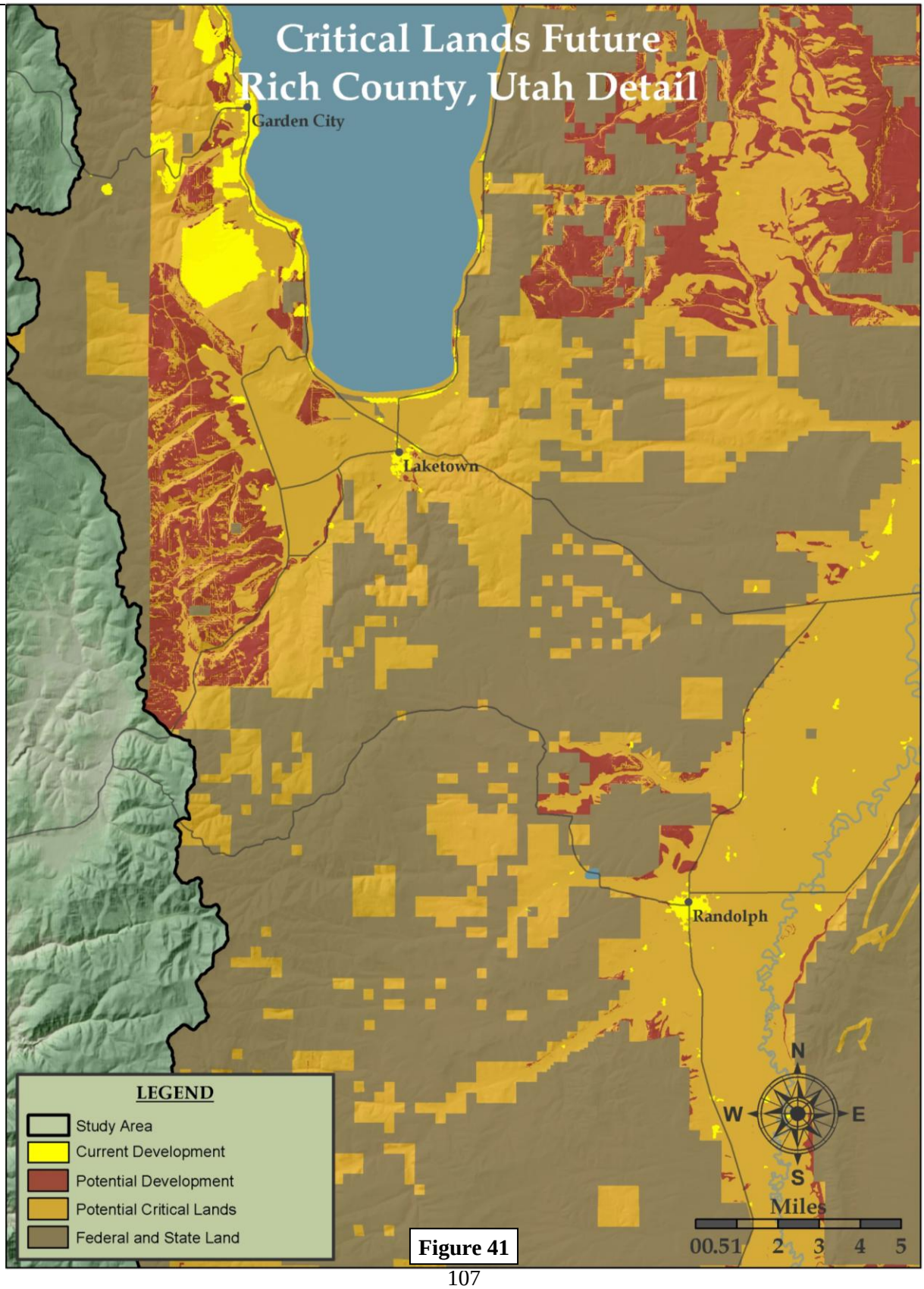

Critical Lands Future
Rich County, Utah Detail
Garden City
Laketown
Randolph
LEGEND
Study Area
Current Development
Potential Development
Potential Critical Lands
Federal and State Land
N
W
E
S
Miles
0 0.5 1 2 3 4 5

Figure 41

"Quality of life" is probably one of the hardest terms to define in land use planning. It has infinite definitions and multiple applications relating to cultural-historic, recreational, economical, and environmental issues. However, there are certain values that can be identified in a particular region or among a particular group of people. Bear Lake region residents tend to value some of the same quality of life elements. These include agricultural land preservation, water quality protection and enhancement, rural character, and public health, safety, and welfare.

Currently, the Bear Lake area has a very high quality of life for residents who value these things. The land has remained fairly contiguous, and has a minimum of landscape fragmentation. Cumulative effects of large developments all across the landscape could create major changes in water quality, air quality, critical wildlife habitat, and naturalistic views. Not only will this impact the landscape, but land prices could drop if Bear Lake were to become murky and unsafe for people and wildlife.

This model attempts to show how development could occur, if the current quality of life is to be maintained. The models used in this future are:

- Public Safety Tier 2
- Agriculture Tier 3
- Groundwater Tier 2
- Surface Water Tier 2
- Private Land

The lands seen below, on the west side of Bear Lake, are not only beautiful but provide other ecological services such as wildlife habitat and groundwater protection.

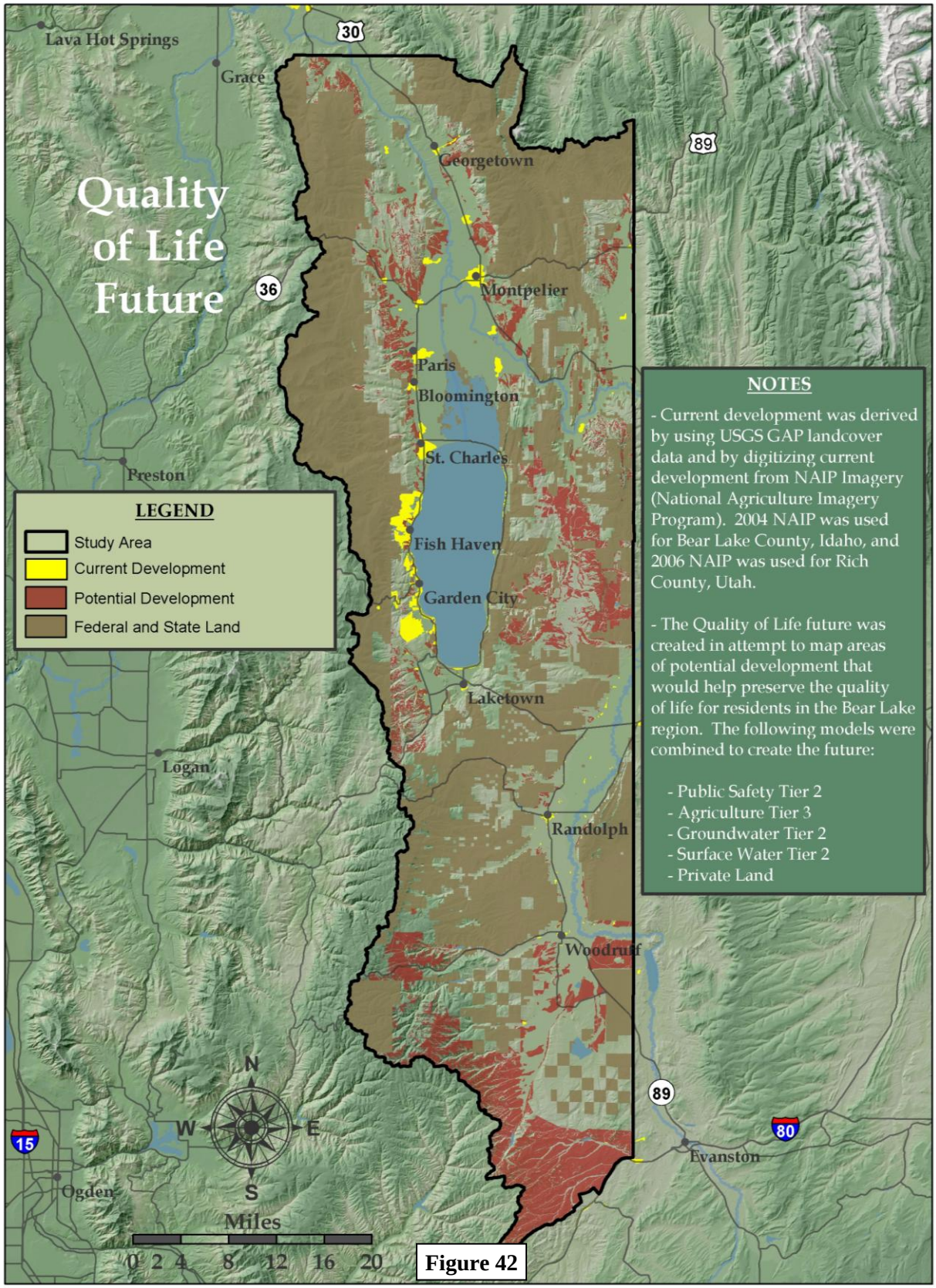

Quality of Life Future
LEGEND
Study Area
Current Development
Potential Development
Federal and State Land
NOTES
- Current development was derived by using USGS GAP landcover data and by digitizing current development from NAIP Imagery (National Agriculture Imagery Program). 2004 NAIP was used for Bear Lake County, Idaho, and 2006 NAIP was used for Rich County, Utah.
- The Quality of Life future was created in attempt to map areas of potential development that would help preserve the quality of life for residents in the Bear Lake region. The following models were combined to create the future:
- Public Safety Tier 2
- Agriculture Tier 3
- Groundwater Tier 2
- Surface Water Tier 2
- Private Land
Lava Hot Springs
Grace
Georgetown
Montpelier
Paris
Bloomington
St. Charles
Preston
Fish Haven
Garden City
Laketown
Logan
Randolph
Woodruff
Evanston
Ogden
N
W
E
S
Miles
0 2 4 8 12 16 20
30
36
89
15
80

Figure 42

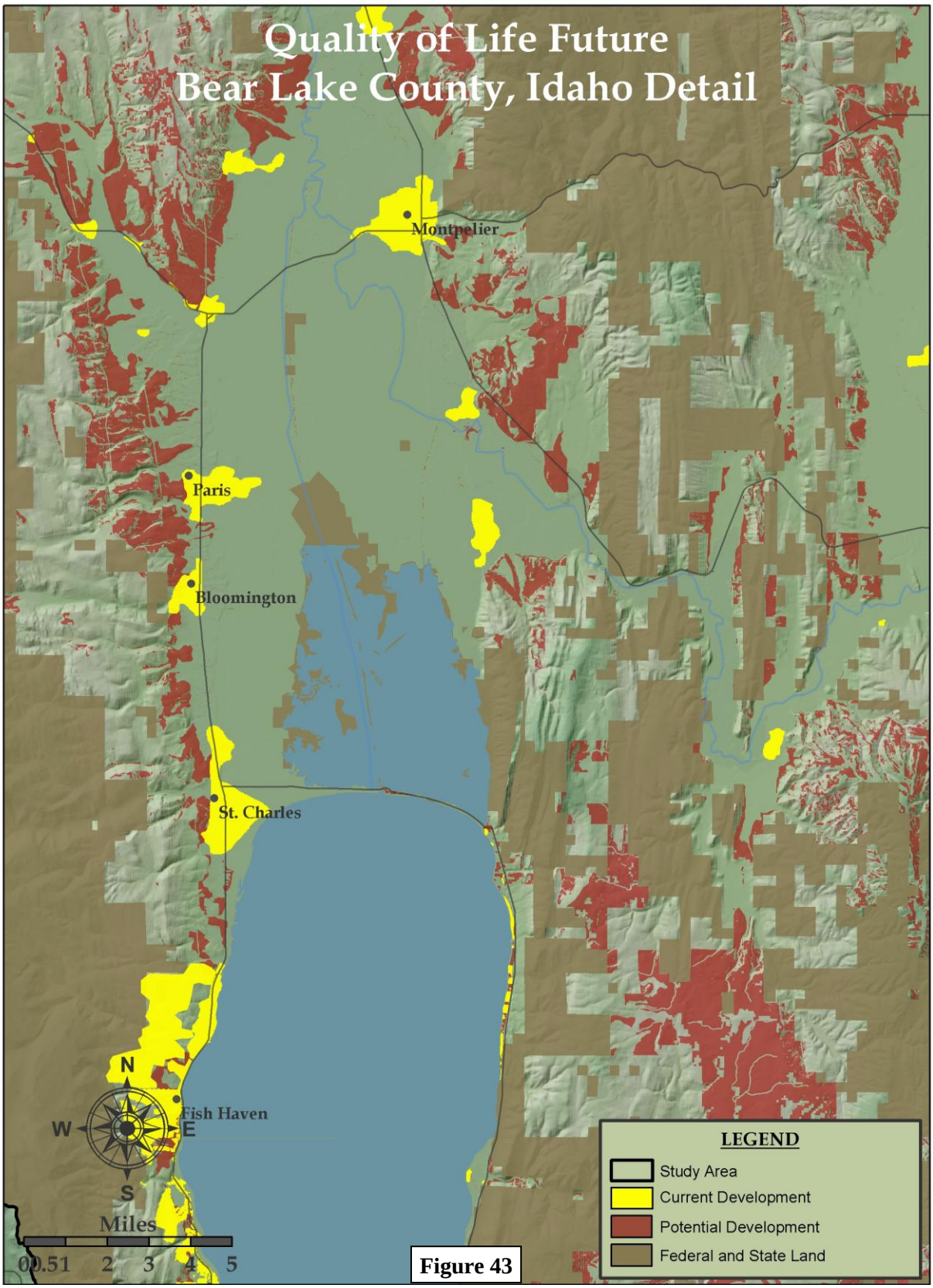

Quality of Life Future
Bear Lake County, Idaho Detail
Montpelier
Paris
Bloomington
St. Charles
Fish Haven
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
Current Development
Potential Development
Federal and State Land

Figure 43

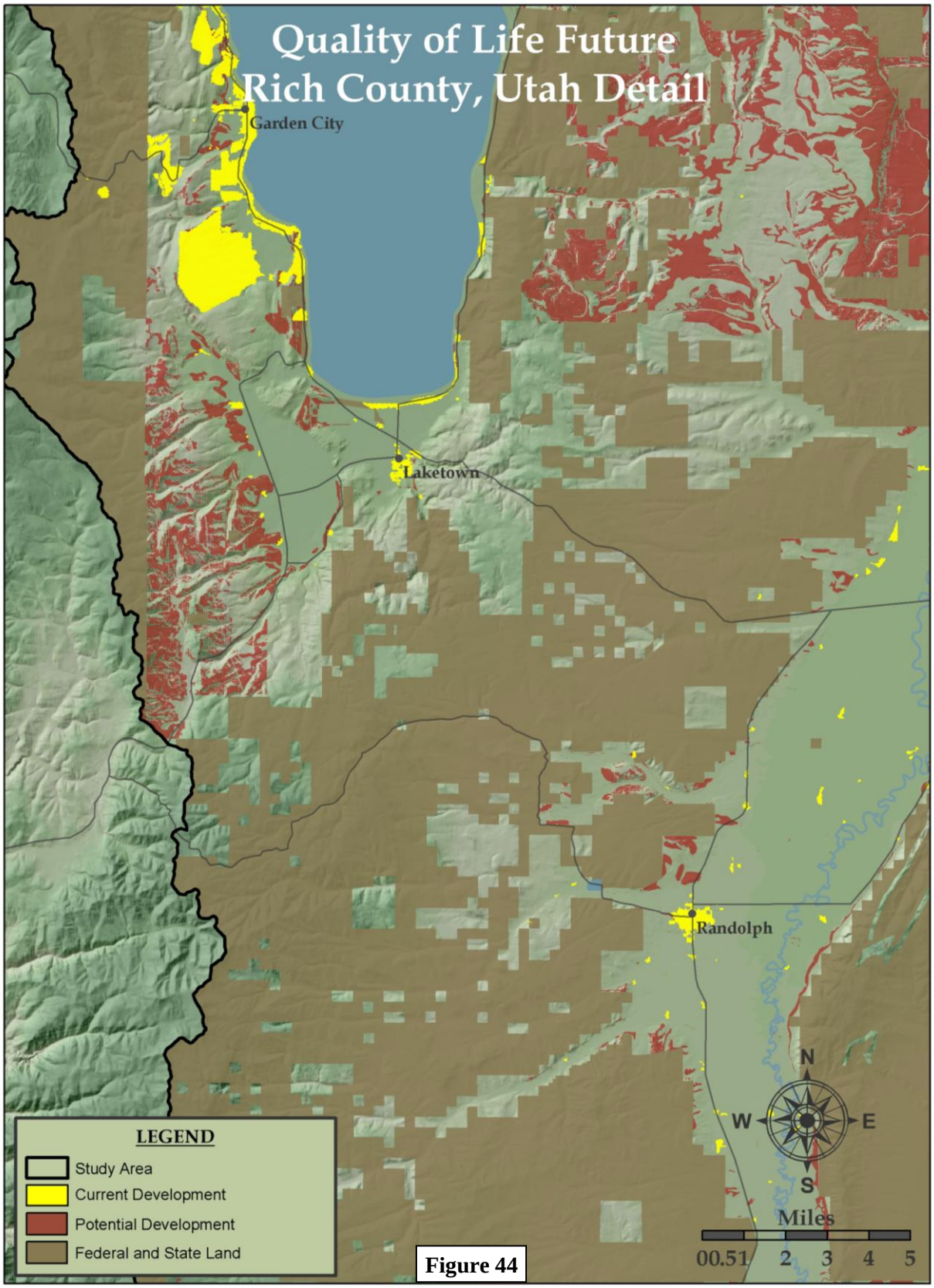
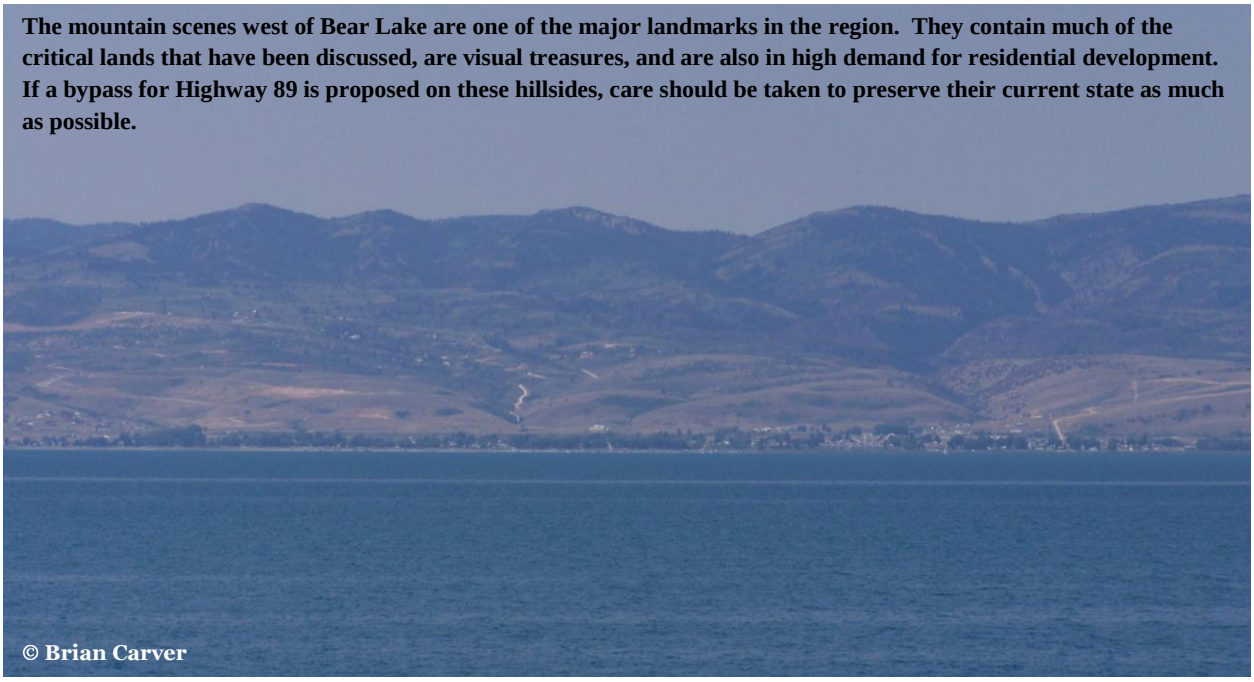

Quality of Life Future
Rich County, Utah Detail
Garden City
Laketown
Randolph
LEGEND
Study Area
Current Development
Potential Development
Federal and State Land
N
W
E
S
Miles
00.51 2 3 4 5

Figure 44

One of the most important needs in the region is the consideration of a bypass for Highway 89 that runs west of Bear Lake. During the summer months, Highway 89 north of Garden City and Highway 30 south of Garden City become congested near the town center. This creates a dangerous situation, where emergency vehicles have no alternative routes through Garden City during an emergency. Other towns along the west side of Bear Lake may eventually have similar problems in the future as well. If a bypass is not considered, the only other realistic option is to widen the existing roadway.

Several issues could arise with the improvement of the existing highway. If the road is widened and/or turning lanes added for new developments, the impact that the widened road has on existing wetlands, riparian areas, and critical fishery habitat may be problematic. Also, lakeside properties are some of the most valuable properties in the region and this potential widening could become quite costly. The land needed for expansion could be taken from current land owners by condemnation. Property condemnation, by eminent domain, is where land is legally taken at a determined value by a jurisdiction for the public good.

These issues should be considered when looking at Highway 89 bypass options for the region. Planning should be done with cooperation between both states and counties, with state and local transportation planning professionals as soon as possible. This planning effort may save time and money for counties and communities in the long run. While the next few maps are not technically "futures," they show how the five bypass options presented in the assessment models section of this document look when overlaid on the Critical Lands Future, Quality of Life Future, Bear Lake Viewsheds, and slope.



The mountain scenes west of Bear Lake are one of the major landmarks in the region. They contain much of the critical lands that have been discussed, are visual treasures, and are also in high demand for residential development. If a bypass for Highway 89 is proposed on these hillsides, care should be taken to preserve their current state as much as possible.

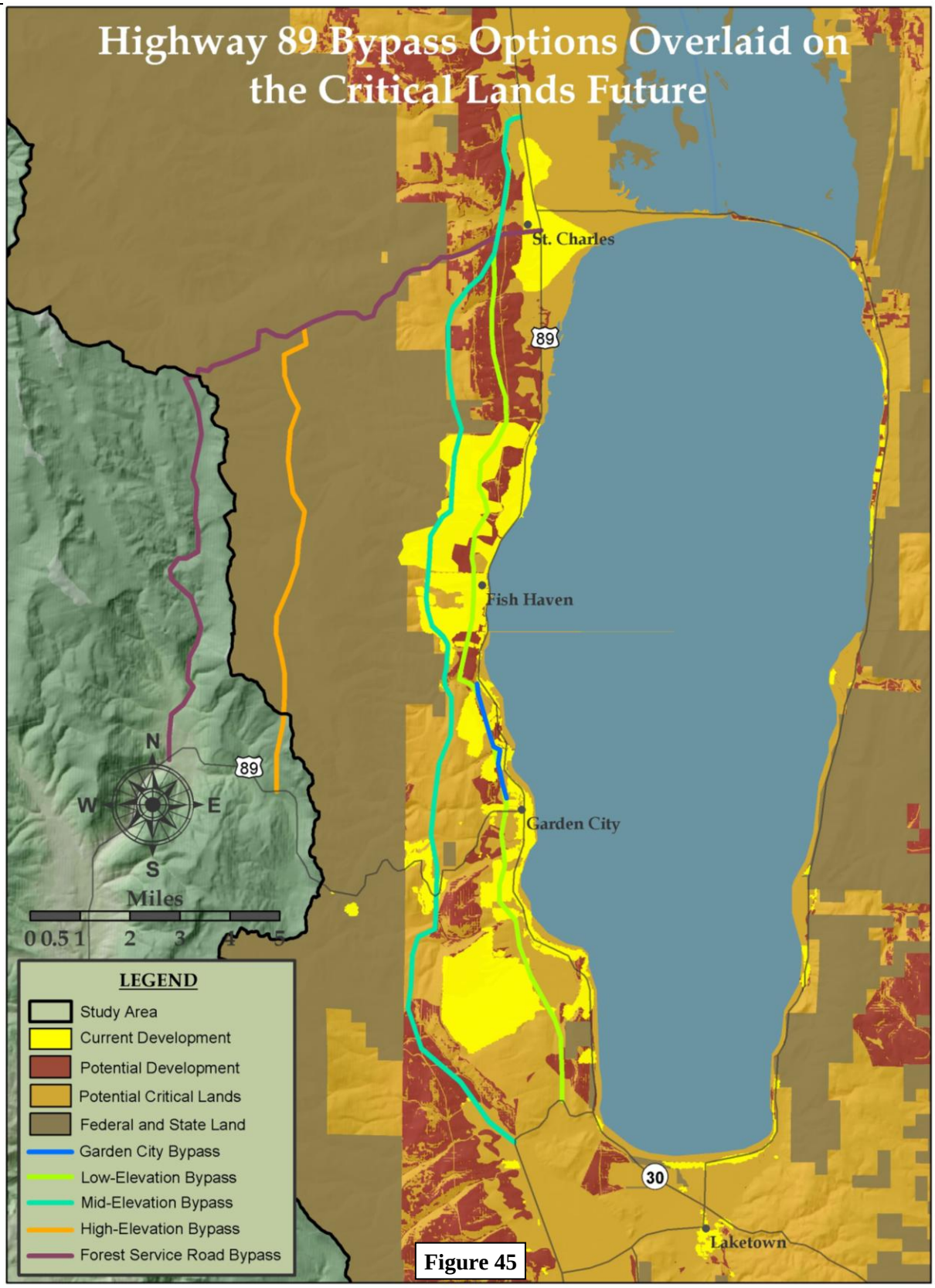

Highway 89 Bypass Options Overlaid on the Critical Lands Future
St. Charles
89
Fish Haven
Garden City
30
Laketown
N
W
E
S
89
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
Current Development
Potential Development
Potential Critical Lands
Federal and State Land
Garden City Bypass
Low-Elevation Bypass
Mid-Elevation Bypass
High-Elevation Bypass
Forest Service Road Bypass

Figure 45

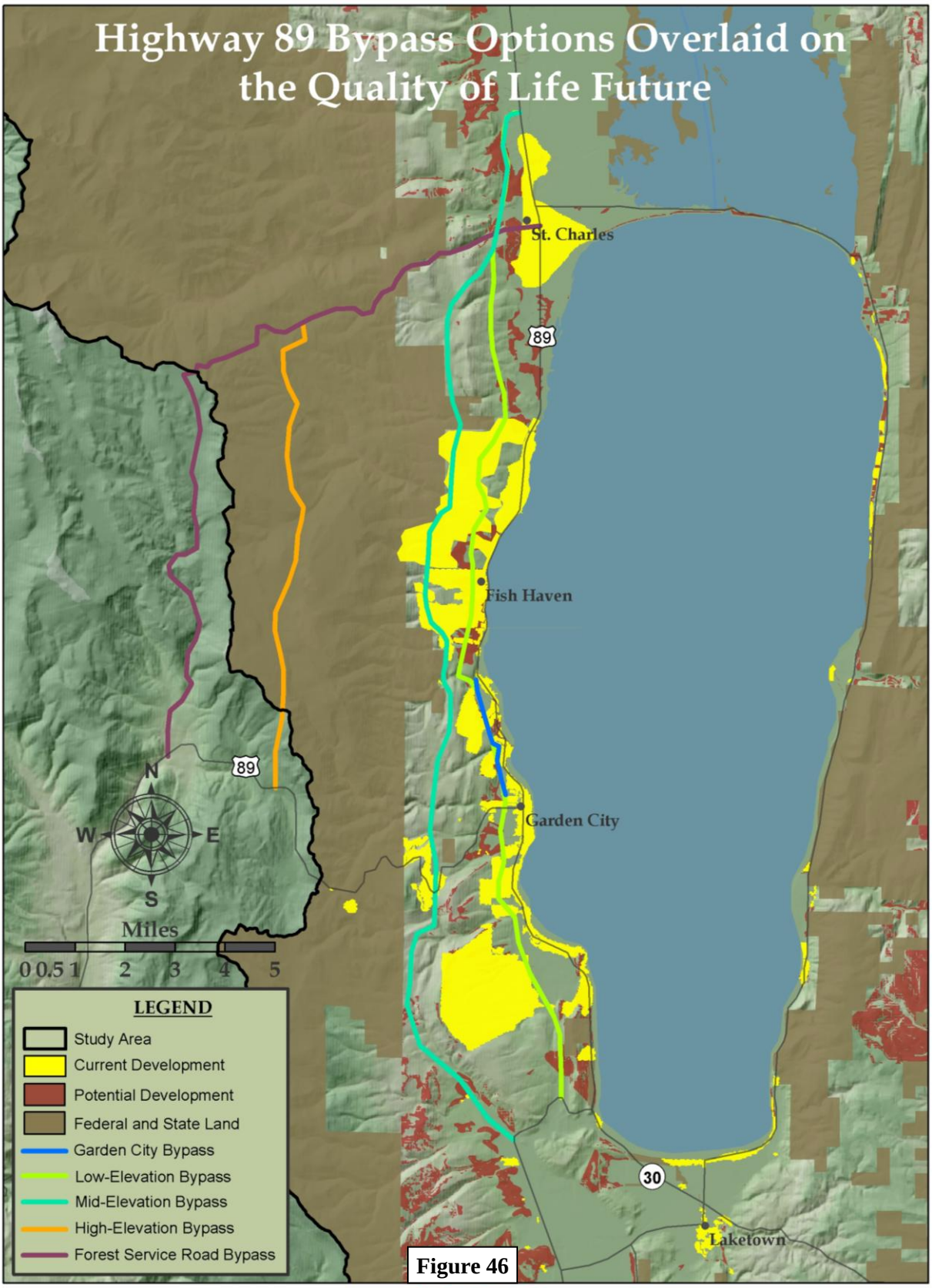

Highway 89 Bypass Options Overlaid on the Quality of Life Future
St. Charles
89
Fish Haven
89
Garden City
30
Laketown
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
Current Development
Potential Development
Federal and State Land
Garden City Bypass
Low-Elevation Bypass
Mid-Elevation Bypass
High-Elevation Bypass
Forest Service Road Bypass

Figure 46

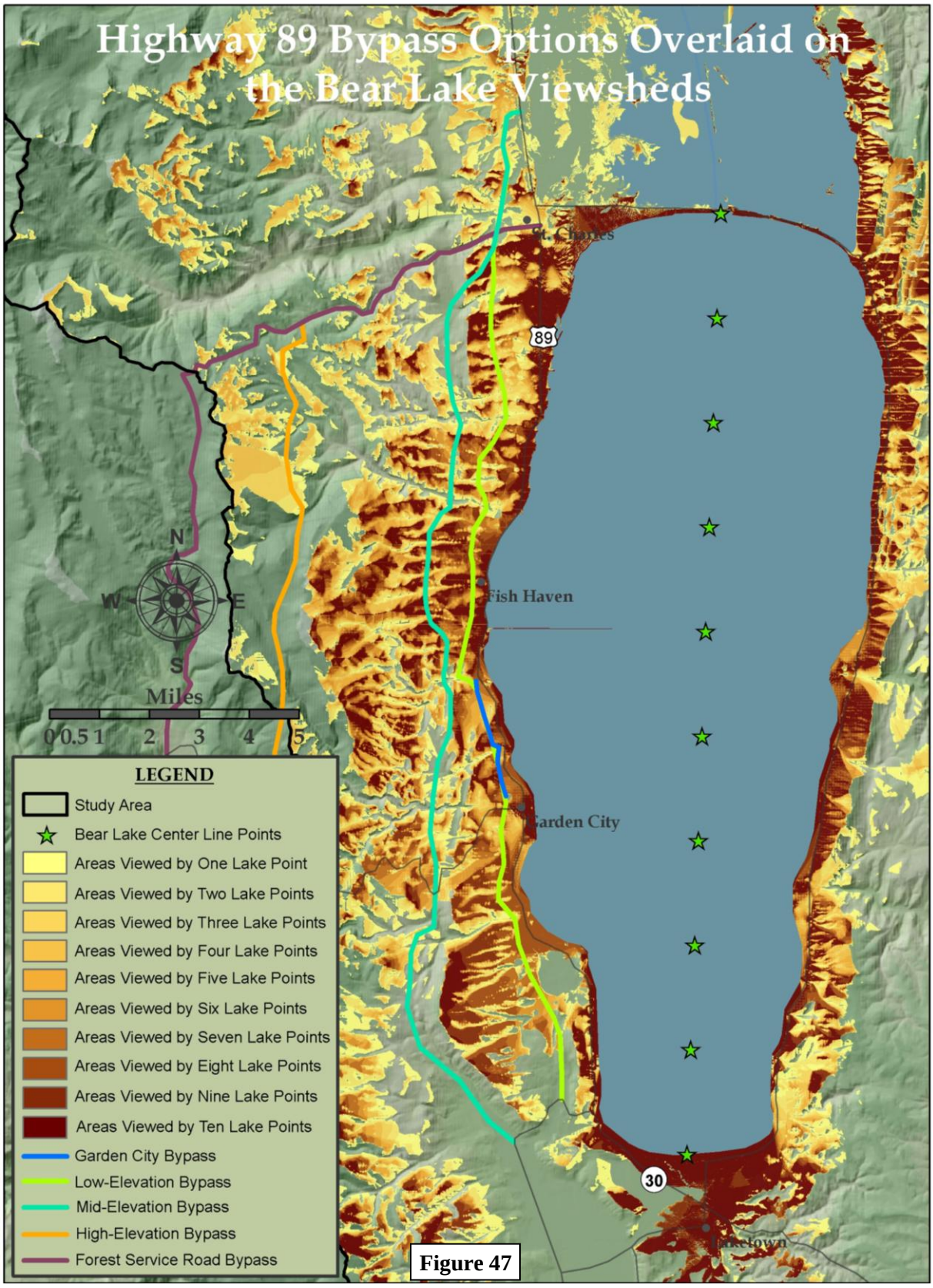

Highway 89 Bypass Options Overlaid on the Bear Lake Viewsheds
89
Fish Haven
Garden City
30
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
Bear Lake Center Line Points
Areas Viewed by One Lake Point
Areas Viewed by Two Lake Points
Areas Viewed by Three Lake Points
Areas Viewed by Four Lake Points
Areas Viewed by Five Lake Points
Areas Viewed by Six Lake Points
Areas Viewed by Seven Lake Points
Areas Viewed by Eight Lake Points
Areas Viewed by Nine Lake Points
Areas Viewed by Ten Lake Points
Garden City Bypass
Low-Elevation Bypass
Mid-Elevation Bypass
High-Elevation Bypass
Forest Service Road Bypass

Figure 47

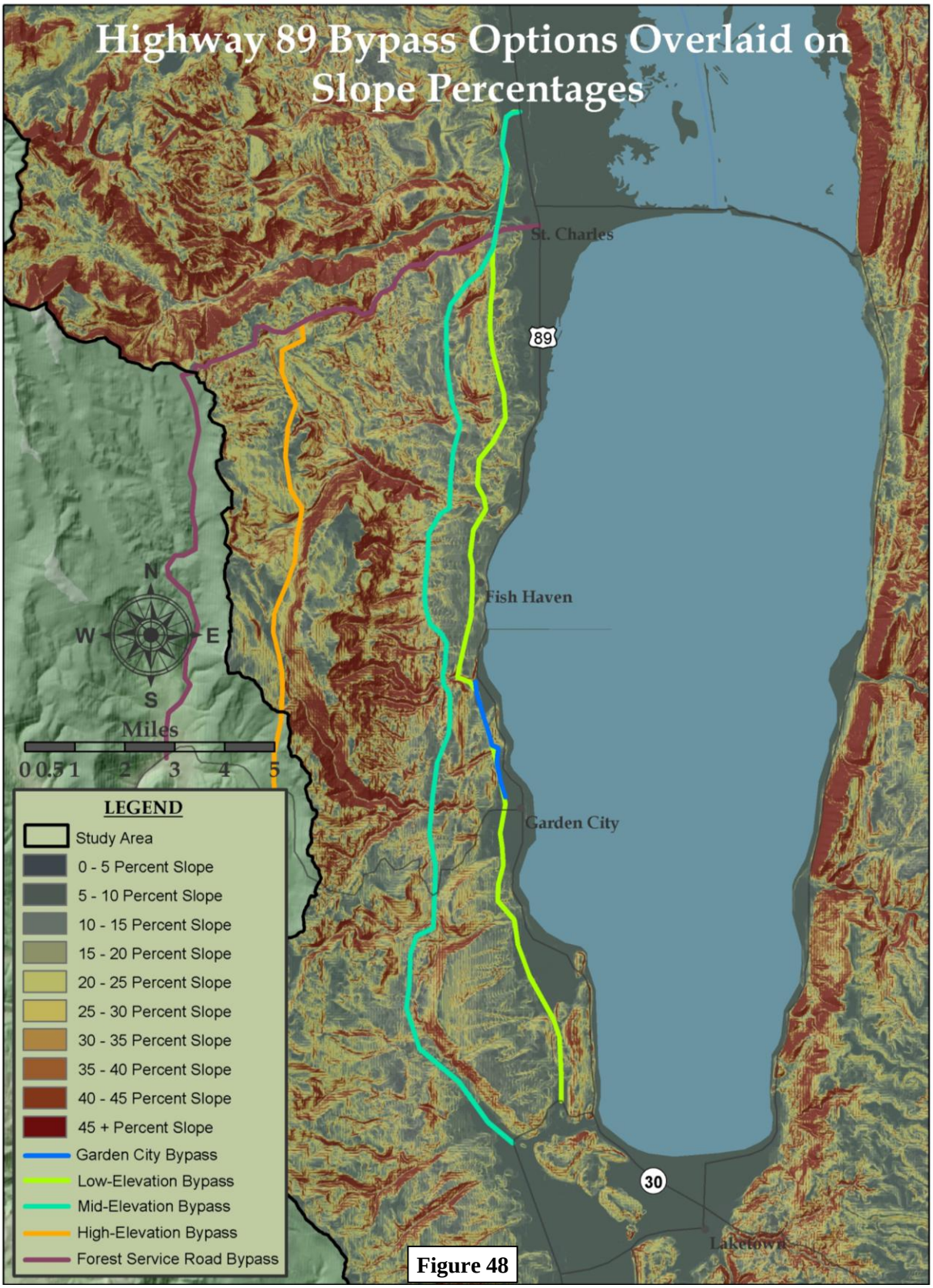

Highway 89 Bypass Options Overlaid on Slope Percentages
St. Charles
89
Fish Haven
Garden City
30
Laketown
N
W
E
S
Miles
0 0.5 1 2 3 4 5
LEGEND
Study Area
0 - 5 Percent Slope
5 - 10 Percent Slope
10 - 15 Percent Slope
15 - 20 Percent Slope
20 - 25 Percent Slope
25 - 30 Percent Slope
30 - 35 Percent Slope
35 - 40 Percent Slope
40 - 45 Percent Slope
45 + Percent Slope
Garden City Bypass
Low-Elevation Bypass
Mid-Elevation Bypass
High-Elevation Bypass
Forest Service Road Bypass

Figure 48

Few statements about the Bear Lake region capture the essence of the issues presented in this report better than the following stated by James Onderdonk in 1885:

> No doubt can exist in the mind of anyone who has visited this beautiful lake, but in the near future this will be a favorite summer resort for the tourist and pleasure seeker, and good hotels and accommodations will be provided and the lake decked with sails. (p. 78)

This statement has become even more evident in recent years where elected officials, land use planners, land managers, concerned citizens, and seasonal recreationists have seen this quiet and beautiful region becoming "discovered" as a recreational mecca. As stated in many ways in this report, this growth can happen in a positive way that enhances the Bear Lake experience, if it is guided in the right way.

However, there are places and resources in the region that, if abused, could prove to be irreplaceable. Source water protection, surface water quality, agricultural land preservation, public safety, and sensitive wildlife habitat are all critical to the current quality of life that exists in the region.

Places such as Park City, Utah, Lake Tahoe, California, Jackson Hole, Wyoming, and others in the western U.S. have already been changed by growth in many ways. These places afford some of the best recreational, cultural, natural, and economic amenities in the country. Many people visit and move to these areas each year, which poses new problems for local and regional governments and planners. The Bear Lake region could very well experience similar growth in the near future, which will pose similar problems.

Residential growth in the region has taken on many forms. However, the most prevalent is the low density growth on the foothills surrounding Bear Lake. Planned developments have been grouped in places where there are views of the lake, and natural amenities are nearby, such as U.S. Forest Service lands. Many of these developments also have private access to the beaches surrounding the lake. While these developments are required to furnish much of the infrastructure used by residents during the construction process, municipalities and counties are ultimately charged with maintenance of roads, sewer, water, power, and other infrastructure.

One of the most useful approaches to come from the research surrounding this project is the development of the Critical Lands Future. "Critical Lands," as has been discussed, refer to landscape components that protect the public's health, safety and welfare in the region. The state of Utah has been promoting the Critical Lands Toolkit over the past several years and has provided a list of planning strategies for implementing such a plan. These are noted in the implementation section following this summary.

The three futures and Highway 89 bypass analyses presented are just a few approaches that one can use for land use planning in the Bear Lake region. There are many other possibilities, where various combinations of biophysical and socio-cultural data can be constructed by stakeholders to identify sensitive or threatened landscape components. Future growth scenarios can be customized in a way that reflects the values of residents in the area.

While many issues can arise in considering future land use change policies and strategies, it should be stated that there are many examples in the U.S. where policy

has been adjusted by governing bodies to protect sensitive or threatened landscape components. This project, particularly in the models section, has listed many resources for, and examples of, land use ordinances that protect resources. These resources are often not renewable, especially in the case of groundwater and surface water quality, viewsheds, and prime agricultural lands.

Implementation strategies, like those outlined below, can include a broad spectrum of regulations and can be written to allow for existing land uses, as long as those existing uses don't negatively affect a resource. For example, if source water protection zones were designated as critical lands, an ordinance could state very specifically that land uses before the ordinance was adopted would be allowed, if they did not adversely affect source water quality. This protects current private property rights in sensitive areas and maintains what is essential for public health. Another example is regarding stream buffers. Stream buffer ordinances may specify that if the existing land use is not negatively impacting water quality, the land owner could continue current activities. The main change may be that there are setbacks, for all structures built after the ordinance was adopted, from the stream of seventy-five feet, for example.

One other aspect of this project that should be noted is that of missing or inadequate data. While there is a great amount of available GIS (Geographic Information Systems) data, much of which has been used in this project, there are a few layers that would be essential for creating more accurate models and futures. A few key layers that would help with complete data sets would include Bear Lake County, Idaho landslides, completed Rich County, Utah wetlands, FEMA floodplains for both counties, liquefaction potential for both counties, geological faults of high concern, and more specific critical wildlife habitat areas for both counties.

Although much of this data would be helpful in creating a more complete analysis, the existing data presented in this project is adequate to begin the process. Most of the models were also created by using the tiered approach, which provides stakeholders more flexibility in choosing which models may most accurately reflect regional values and needs. The methodology presented at the beginning of this document was also intended to be a tool to assist stakeholders as well, providing a simple structure and process for land use planning according to current regional needs and issues.

By making use of the information presented in this project, it is hoped that local and regional elected officials and planners will be more able to plan for growth in the region in a way that will preserve important landscape attributes. It is also intended to serve as a template for future planning efforts. The Bear Lake region is one of the countries most unique natural, agricultural, and recreational places.

As development pressures continue to increase, it is essential that those involved in future planning continue to administer existing planning strategies that are effective. It is also essential that they adopt new and innovative strategies such as the identification and implementation of "Critical Lands." If this planning is done in a timely manner, the Bear Lake region can continue its legacy as one of the jewels of the west.

While there are many studies that focus on the need for regional land use planning, perhaps the most difficult aspect is the actual implementation of the plans. Elected officials and land use planners should be aware of the many options available for the protection of designated lands. Probably the most common strategy currently used for this purpose consists of planning and zoning ordinances.

In several of the notes sections for the assessment models in this document, model ordinances or existing ordinances from cities or counties in Utah, Idaho, and other states have been listed that apply specifically to that model. They can be effective in controlling land use and in protecting critical environmental and socio-cultural resources. They need to written in plain language, and should be as detailed as possible so that they are not abused or misinterpreted. Another important consideration to make is regarding the continuity of zoning and ordinances across jurisdictional boundaries. Counties and municipalities need to work collectively to create zoning and ordinances for land protection areas that remain consistent from town to town and in unincorporated areas. Without this type of communication, a regional plan will have inconsistencies and will be more difficult to implement.

While ordinances and zoning can be effective, there are many other ways to protect important landscape attributes. These alternative strategies include Transfer of Development Rights, Cluster or Planned Urban Development Zoning, Conservation Easements, and many others. The following is a list that was created by the Utah Governor's Office of Planning and Budget for use in implementing "Critical Lands." This list can be used, however, for the implementation of any desired land use or regional planning strategy. By utilizing one or several of these strategies, Bear Lake area residents and visitors can safely continue to enjoy the natural, social, cultural, and scenic amenities that this region offers.

OPTION	**DEFINITION**	**PROS**	**CONS**
LAND ACQUISITION			
Fee Simple Acquisition	Outright purchase of land	Most complete means of effecting control and preserving land; compensates landowners completely	Most expensive approach; managed and maintained by government; takes land off of tax rolls; future administrations may sell land
Easement	Agreement restricting land use in order to protect certain characteristics	Local governments can initiate purchase of development rights; government has only partial rights and interest in land; income tax	Program is affordable only when development pressures are low and consequently prices are low; does not provide for the complete control of

		deductions for landowners	land
OPTION	**DEFINITION**	**PROS**	**CONS**
Private Land Trust	Nonprofit organization which assists landowners & agencies with preservation techniques; purchases and holds conservation easements	Land is owned and managed by a non-profit organization; tax benefits for landowners; can buy and hold property for future government acquisition; cost savings for government	Public planning objectives must coincide with private land trust objectives to be realized
Purchase and Sellback or Leaseback	Agency buys land, leases to agricultural users	Enables government to recover a portion of its acquisition costs; government can exercise direct control over development activity	Higher burden on government to enforce restrictions; does not necessarily provide for public access
Purchase Option	Allows agency the first opportunity to buy land when it goes up for sale	Gives government flexibility, security while taking time to make purchase decision	Cost to government; option may expire before sale of land; "ties up" property; government is responsible for exercising the option
Purchase Right of First Refusal	Government agency has right to purchase first; expires only after agency has had option to purchase	Gives government flexibility and stability, time to raise funds for a specific project	Cost to government; "ties up" a property; government is responsible for exercising the option
Land Banking	Purchase and reservation of land for future development	Can lease for immediate use (e.g. agricultural) to recoup part of cost	Cost prohibitive
ADMINISTRATIVE			

OPTION	DEFINITION	PROS	CONS
Exactions, Dedications, and Impact Fees	Fees and mandates placed on developers to pay for infrastructure and amenities	Removes costs of growth from existing residents	Complicated to establish; high litigation potential
Transfer of Development Rights	Shifts development from sensitive lands, allows higher density development in "off-site" receiving areas	Focuses development more appropriately; allows use of existing infrastructure	It is necessary to have another developable area with a strong demand for growth; substantial administrative commitments to address land valuation and transfer
Agricultural Protection Area	Owners of contiguous land form voluntary association establishing agriculture as primary use of the land	Protects farmland; relieves farmers from nuisance complaints from surrounding development; landowner-initiated	Only for agricultural lands; non-binding--landowner can pull out at any time
Agricultural Land / Open Space Zoning	Variety of local zoning laws designed to protect certain land characteristics or specific places	Zoning tool is readily available to local govts.; reduce conflict between agricultural and residential uses	Large-lot zoning can promote urban sprawl; can stifle economic growth
Quality Development Standards	Regulations protecting certain natural or visual characteristics of a community	Community has control over the "look" of development; can target specific aspects to preserve/ highlight	Can raise property rights issues; overregulation
Urban Growth Boundary	Boundary determined by local government beyond which development is discouraged	Concentrates development where infrastructure already exists; protects rural character of outlying land	Can be restrictive; raises property rights issues; can promote "leapfrog" development

OPTION	DEFINITION	PROS	CONS
Performance Zoning	Developer agrees to meet certain impact requirements, such as leaving a specified amount of land in open space	Can target either single or multiple impacts; can supplement or replace traditional zoning regulations	Limits development impacts rather than densities or uses; developers must meet a level of performance
Cluster or PUD Zoning	Allows high-density construction on part of a parcel in exchange for leaving other parts in open space	Allows for open space; minimizes needed roads and infrastructure; provides flexibility for developers to cluster buildings while maintaining overall average density restrictions	Does not provide for complete control or protection of land
Sensitive Lands Overlay	Superimposes additional layers of regulation upon underlying zoning districts; imposes restrictions on special resources, hazards, or sensitive lands	Identifies sensitive lands; provides guidelines for development site planning	Does not provide for complete control or protection of land
Building Moratorium	Local government stops reviewing new building permits for a specified time period	Gives local officials time to catch up or change policies/visions in times of heavy development pressure; future permits are evaluated with clearer criteria	State law's 6-month moratorium limit may not be enough time; can hurt local economy; does not decrease the number of building permit applications requiring review

(http://www.planning.utah.gov/CriticalLandsImplementationMatrix.htm, 2008)

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Abbreviations: NRCS (U.S. Natural Resource Conservation Service); BLM (Bureau of Land Management); NAIP (National Agriculture Imagery Program); BRAG (Bear River Association of Governments); USFWS (U.S. Fish and Wildlife Service); INSIDE Idaho (Interactive Numeric and Spatial Information Data Engine Idaho); IRDIAC (Intermountain Region Digital Image Archive Center); USGS (U.S. Geological Survey); NHD (USGS National Hydrography Dataset); AGRC (Utah Automated Geographic Reference Center); BRWIS (Bear River Watershed Information System); USFS (U.S. Forest Service); BLRC (Bear Lake Regional Commission); UDWR (Utah Division of Wildlife Resources); Idaho DWR (Idaho Department of Water Resources); Idaho DEQ (Idaho Department of Environmental Quality); GAP (USGS Gap Analysis Program); and UDOT (Utah Department of Transportation).

shp = GIS Shapefile; raster = grid format; coverage = GIS data format; sid = image format

IDAHO

Description	Source	Type	Scale (1:___)
SSURGO Soils (Draft)	NRCS	shp	24k
Fire Hazard	BLM	raster	?
Airport	Digitized from 2004 NAIP Imagery	shp	?
Campgrounds	BRAG	shp	?
Bear Lake National Wildlife Refuge	Extracted from BLM Landownership	shp	?
Wetlands	USFWS	shp	24k
DEM (Digital Elevation Model)	INSIDE Idaho	raster	10m
GAP Vegetation	IRDIAC	raster	30m
BRHA points	BRAG	shp	?
Roads	USGS	shp	24k
Roads	USGS	shp	100k
Bear Lake County boundary	Idaho DWR	shp	?
Dams	Idaho DWR	shp	24k
Faults	USGS	shp	500k
Streams	Idaho DWR	shp	2 million
Aquifer	USGS	shp	2.5 million
Place names	USGS	shp	?
Land ownership	BLM	shp	?
Major cities	Idaho DWR	shp	?
Major roads	Idaho DWR	shp	500k?
Municipalities	Idaho DWR	shp	?
Nitrogen groundwater areas	Idaho DEQ	shp	250k
Railroads	USGS	shp	100k
State Boundary	Idaho DWR	shp	?
Streets	Idaho DWR	shp	?
City parks	INSIDE Idaho	shp	?
Historic trails	INSIDE Idaho	gdb	1.25 million
Snowmobile Trails	INSIDE Idaho	shp	?
USFS trails	INSIDE Idaho	shp	?

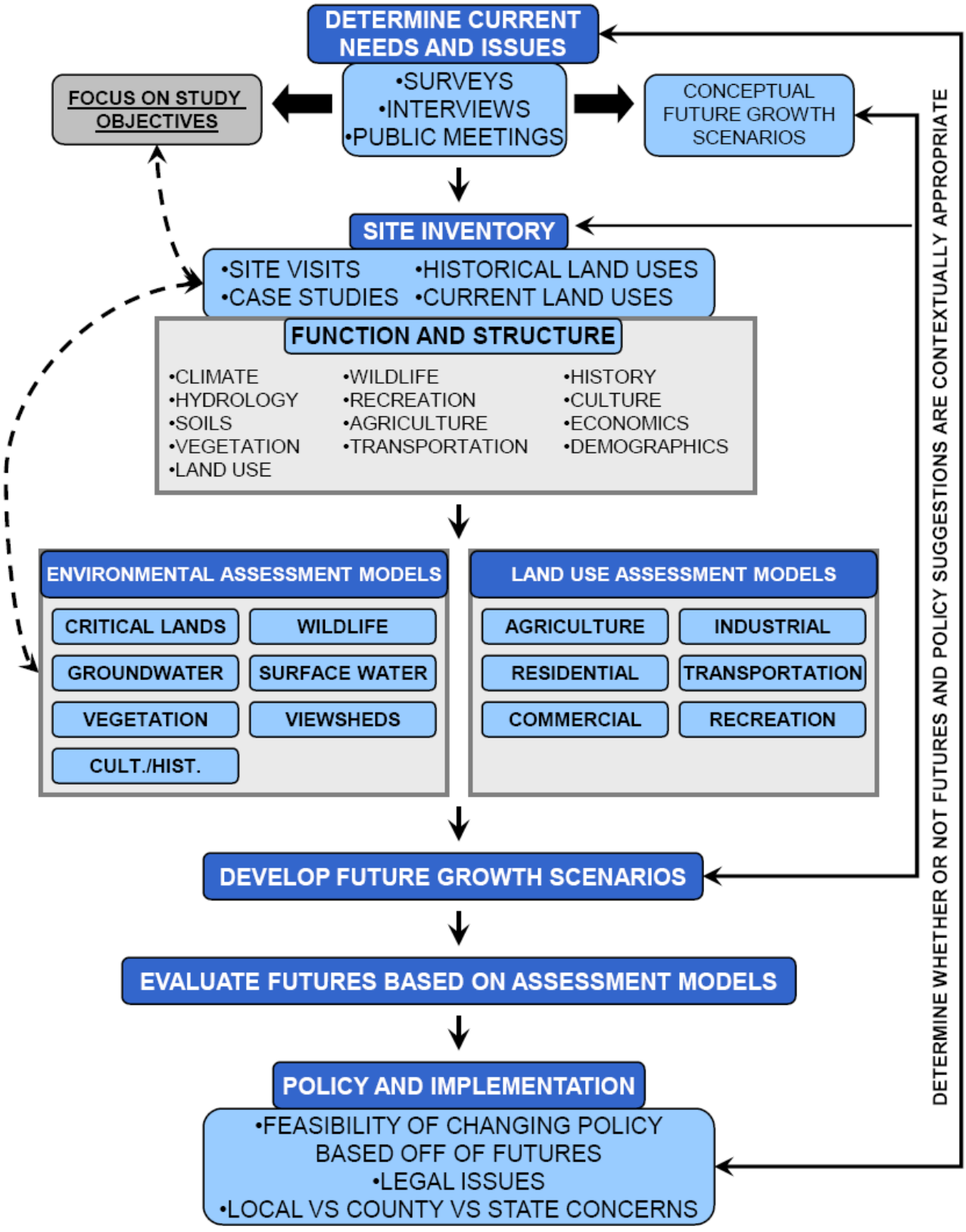
UTAH

Description	Source	Type	Scale (1:___)
Airports	AGRC	shp	24k
State boundary	AGRC	shp	24k
Fire hazard	BLM	shp/coverage	?
Wetlands	USFWS	shp	24k
DEM (Digital Elevation Model)	AGRC	raster	10m
GAP Vegetation	IRDIAC	raster	30m
BRHA points	BRAG	shp	?
Recreation areas	AGRC	shp	500k
SSURGO soils	NRCS	shp	24k
Rich County boundary	AGRC	shp	24k
Historic sites	AGRC	shp	24k
Land ownership	AGRC	shp	24k
Municipalities	AGRC	shp	24k
Railroads	AGRC	shp	24k
Parks	AGRC	shp	100k
Place names	AGRC	shp	100k
Quaternary faults/folds	AGRC	shp	100k
Roads	AGRC	shp	100k
Streams	AGRC	shp	500k
Geologic faults	AGRC	shp	500k
Historic trails	AGRC	shp	500k
Major roads	AGRC	shp	500k
UDOT major roads	AGRC	shp	500k
Point sources (303d)	BRWIS	shp	24k
Impaired lakes (303d)	BRWIS	shp	24k
Impaired streams (303d)	BRWIS	shp	24k
Dams	AGRC	shp	100k
Statewide streets	AGRC	shp	24k
Developed recreation areas	Wasatch-Cache National Forest	shp	?

BOTH STATES

Description	Source	Type	Scale (1:___)
Lakes/reservoirs/ponds, streams, canals, ditches	NHD website	shp	24k
Lakes/reservoirs/ponds, streams, canals, ditches	NHD website	shp	100k
Aquifers	BRWIS	shp	2.5 million
Mines	BRWIS	shp	?
Dams	BRWIS	shp	?
Century farms and ranches, and historic barns	BRAG	shp	?

Description	Source	Type	Scale (1:___)
Grazing allotments	Idaho and Utah USFS, BLM, State, and Trust Lands	shp and coverages	varies
Source water protection zones	Idaho and Utah DEQ's, and Wiley et al., 2003	shp	varies
NAIP (National Agricultural Imagery Program) 04 Idaho & 06 Utah	INSIDE Idaho, and AGRC	.sid	1 meter
Trails and Scenic Byways	USFS, BLM, AGRC, BRAG and existing roads layers	shp	varies
Campgrounds	AGRC, USFS, and BRAG	shp	?
Forest Service restricted winter use rec. areas	USFS	shp	varies
Sensitive wildlife habitat	Digitized from BLRC maps - Idaho, UDWR - Utah	shp	varies



(Adapted from Toth et al., 2006-1, p. 7)

Determining Current Issues

Organizations, individuals, studies, and meetings used to determine current planning needs and issues:

Organizations:

- Utah State University
- Bear River Association of Governments
- Bear Lake Regional Commission
- Bear Lake County
- Rich County

Individual correspondence either in person, by telephone, or via e-mail:

- Judy Holbrook, Director, Bear Lake Visitors Bureau
- Rick Fawcett, Owner and President, Whisper Mountain Professional Services, Inc.
- Dave and Claudia Cottle, Executive Directors, Bear Lake Watch
- Richard Droesbeke, Park Manager, Bear Lake State Park, Utah
- Howard Horton, Rangeland Scientist, USDA, ARS, FRRL
- Mike Peel, Research Geneticist, USDA, ARS, FRRL
- Lynn Van Every, Water Quality Manager, Pocatello Region, Idaho Department of Environmental Quality
- Mike Allred, Environmental Scientist, Division of Water Quality, Utah Department of Environmental Quality
- Warren Colyer, Former President, Cache Anglers, Trout Unlimited
- Jeff Gilbert, Transportation Planner, CMPO
- Chris Peirsol, Transportation Planner, District 5, Idaho Transportation Department
- Jeffrey L. Patlovich, AICP, Administrator, Planning and Building Department, Fremont County, Idaho
- Kevin Kilpatrick, NEPA Oversight Manager, UDOT Environmental Services
- Nancy Mesner, Associate Dean, College of Natural Resources, USU (Water Quality)
- Stefanie Jones, Current President, Cache Anglers, Trout Unlimited

Meetings:

- Bear Lake Regional Commission meeting and questionnaire given on July 25th, 2007.
- Bear Lake Regional Commission Meeting and PowerPoint Presentation, given on September 26, 2007.
- The State of Bear Lake Conference, Fish Haven, Idaho, August 31, 2007.
- Bear Lake County Commissioner Meeting presentation on July 9, 2007, Paris, Idaho.
- Rich County Commissioner Meeting presentation on June 6, 2007, Randolph, Utah.

Issue Related Surveys/Documents:

- Bear Lake County Survey given by Whisper Mountain Professional Services, Inc.
- Bear Lake State Park, Resource Management Plan, October 2005.
- Bear River Association of Governments Survey, Preliminary Longitudinal Results, Dan Jones and Associates, 2007.

- Garden City Community Survey, Stan Guy, 1997.
- Alternative Futures for the Bear River Watershed, Toth et al, 2005.
- Bear Lake County, Idaho Adopted Comprehensive Plan 2025.
- The Collective Investigations into the Bear Lake Basin, Palacios et al, 2006.
- Henry's Fork Agricultural Corridor Wildlife Habitat Conservation Case Study, Johnson and Toth, 2004.
- Upper Bear TMDL Water Quality Study, Utah DEQ, Division of Water Quality, 2006.
- Water Quality in the Bear River Basin of Utah, Idaho, and Wyoming Prior to and Following Snowmelt Runoff in 2001, U.S. Geological Survey, 2006-5292.

Current land use planning issues identified during this process:

The issues that were addressed in this project were judged to be the most applicable to the majority of the people and organizations noted above. They included the following:

- Groundwater and Surface Water Quality
- Agricultural Land Preservation
- Transportation Planning (specifically a Highway 89 bypass west of Bear Lake)
- Rural Landscapes or Quality of Life
- Critical Lands
- Recreation and Tourism Planning

Other issues that surfaced throughout the research process are listed below and should be further explored by local and regional organizations for more detailed planning purposes:

- Living wage jobs
- Open space
- Bear Lake access for general public
- Affordable housing
- Sense of place
- Focused and managed growth
- Economic growth
- Ordinance revisions
- Lakeshore/development interface
- Private property rights
- Higher density near existing infrastructure
- ATV use near Bear Lake
- Enforcement of ordinances

Questionnaire Description

A questionnaire was created by Zac Covington under the direction and advice of Brian Carver, Regional Planner and Cindy Bilskie, Director of the Department of Community and Economic Development at Bear River Association of Governments. It was created for and given to members of the Bear Lake Regional Commission for the purpose of determining planning needs and issues in the Bear Lake Region. This planning needs assessment is in response to requests for planning assistance from BRAG from several organizations in the Bear Lake Region, including Garden City and Bear Lake Rendezvous Chamber of Commerce. These two organizations came to BRAG with specific requests for planning assistance regarding community level and Bear Lake Basin level planning (including services, transportation, law enforcement, and year-long economics), beginning in November of 2006. The questionnaire was given on July 25th, 2007 to members of the Bear Lake Regional Commission in the Bear Lake Regional Commission office in Fish Haven, Idaho.

This planning needs questionnaire was organized as a list of issues previously discussed with planning professionals (including the Bear Lake Regional Commission) and concerned residents, and given as planning subject options to choose from and/or prioritize in the region. These issues, once determined, create a basis for addressing some of the realistic planning issues for the region. The planning portion of the project is also being done as a Master's Plan B project by Zac Covington in the Bioregional Planning Program in the Department of Environment and Society at Utah State University.

Eleven questionnaires were given, and eleven were returned with comments. The names of the Bear Lake Regional Commission members in attendance at the meeting on July 25th, 2007 were:

Norm Weston, Rich County Commissioner
Dwight Cochran, Bear Lake County Commissioner
McKay Willis, Mayor of Laketown
Ken Brown, Randolph area at large
Lee Ream, representing Irrigators
Ron Jensen, representing Recreation
David Matthews, Mayor of Paris
Reed Peterson, Mayor of Montpelier
Judy Holbrook, Tourism Director
Al Harrison, Executive Director
Mitch Poulsen, Deputy Director.

The following is a list of both the original comments from the questionnaires, and some perceived groupings of those comments:

Planning Needs (Original Comments)	Tally
Agricultural Lands	4
Water Quality	4
Public Safety	3
Transportation	3
Wildlife Habitat	3
Sense of Place	2
Water Quantity and Management	2

Defining Critical Lands	2
Living Wage Jobs	2
Bike Paths	2
Open Space	2
Protect Private Property Rights	1
Recreation and Existing way of Life Co-exist	1
Affordable Housing	1
Focus Growth Around Infrastructure (Rural Community)	1
Managed Growth (Contiguous Agricultural Lands)	1
Economic Growth	1
Regional Trails	1
Ordinance Review/Redo	1
Lakeshore Interface w/ Development (Access and Use)	1

A Land Use Planning Process for the Bear Lake Basin: Responding to Current Regional Issues

This is a survey for Bear Lake Regional Commission members that will assist in the development of a land use planning process for the Bear Lake area. The project is intended to have several key components: 1) To identify regional planning needs and issues. 2) To provide a potential planning process for the region. 3) To provide several future growth scenarios using the process based on current regional needs and issues.

Determining Planning Needs for the Bear Lake Region

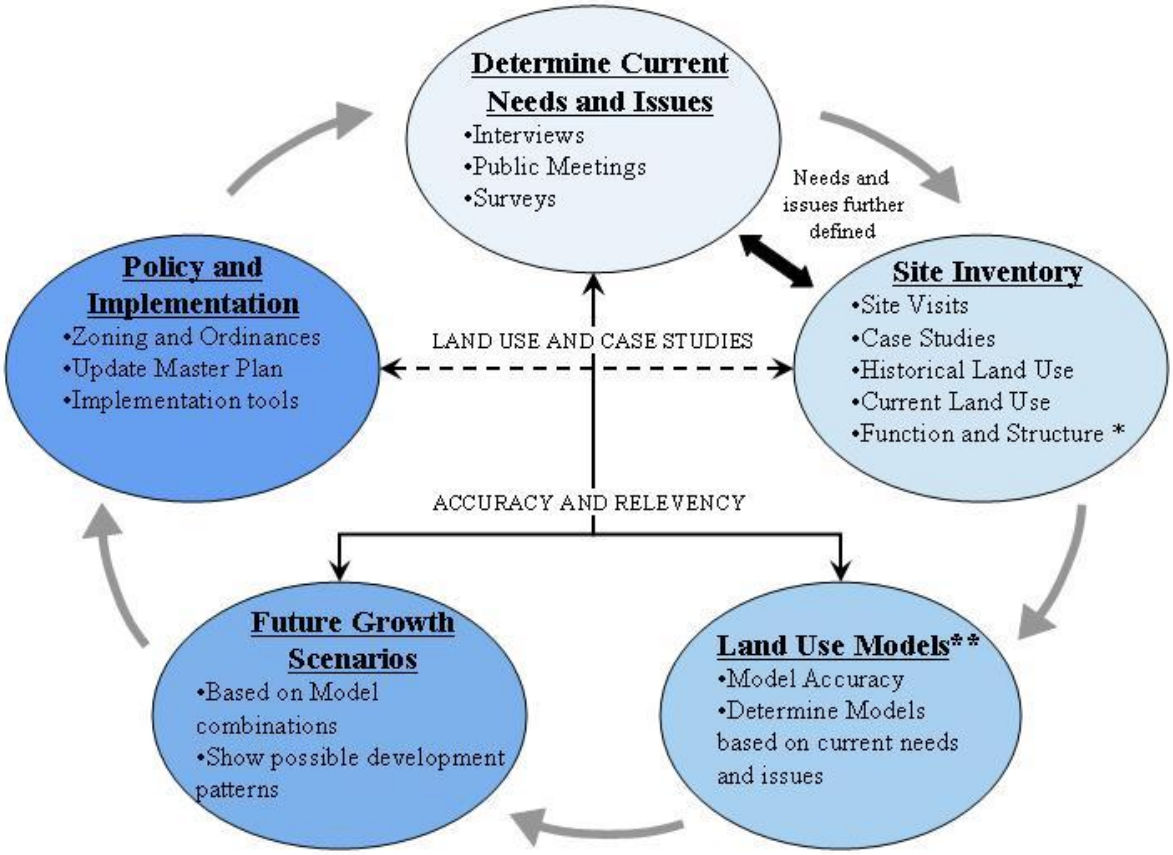
While many issues could be addressed in this project, time and other restrictions allow for only several to be addressed. Below is a list of issues that have been previously discussed with some of the residents and planners in the area. Please write issues or needs not listed on the lines provided below. Please circle any of the 3 issues that you feel are most crucial for land use planning in the Bear Lake region (your additional issues included):

- Connecting recreation and tourism areas through a regional trail system
- Defining Critical Lands
    - Public Safety
    - Sense of Place (Including historic/cultural areas, rural quality of life, views and vistas)
    - Water Quality
    - Wildlife Habitat
    - Agricultural Lands
- Transportation
- Others _____
  _____
  _____

Bear Lake Region Planning Process

On the next page is a chart that illustrates a potential issue-based planning process for the Bear Lake area. This process can be modified to best suit the needs of the region. As this diagram becomes more refined, it can be used as a basic outline for regional planning based on current issues and needs. Please look over the process on the next page and write any comments you may have:

A LAND USE PLANNING PROCESS FOR THE BEAR LAKE BASIN: RESPONDING TO CURRENT REGIONAL ISSUES (DRAFT)



*** Function and Structure Elements:** Those elements of the landscape that affect the current land use of the region. They include Climate, Hydrology, Soils, Geology, Vegetation, Wildlife, Recreation, Agriculture, Transportation, History, Culture, Economics, and Demographics.

**** Land Use Models:** The mapping of existing and potential land use based on the needs and values of the region. These can include Critical Lands (Public health, safety and welfare), Ground Water, Surface Water, Vegetation, Cultural/Historical Areas, Wildlife Habitat, Views and Vistas, Recreation and Tourism, Agriculture, Transportation, Residential Lands, Commercial Lands, and Industrial Lands.

Comments:

Bear Lake Regional Commission meeting notes:

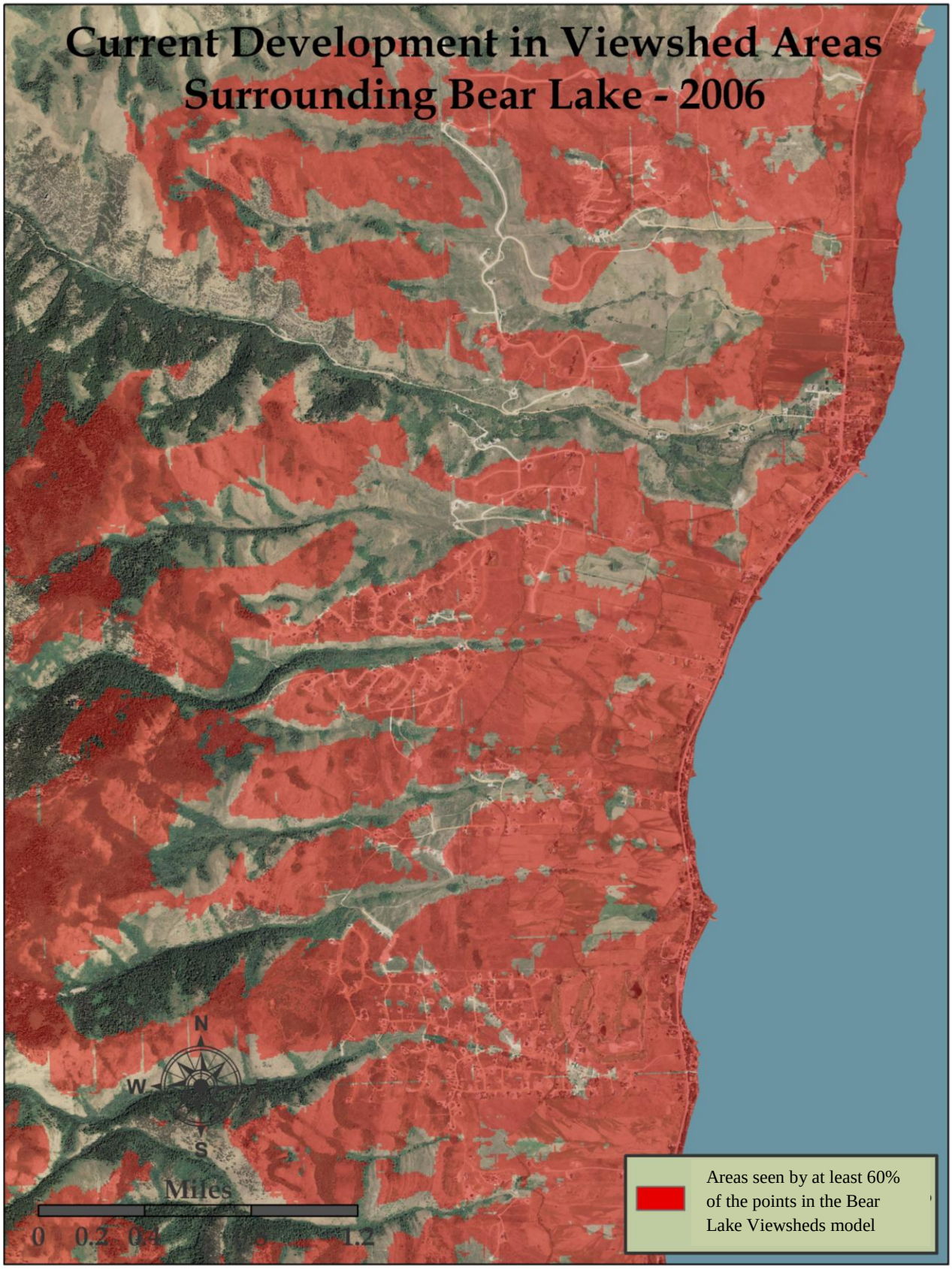
(September 26, 2007 at the BLRC office in Fish Haven, Idaho)
- "( )" indicate my ideas or Brian Carver's ideas

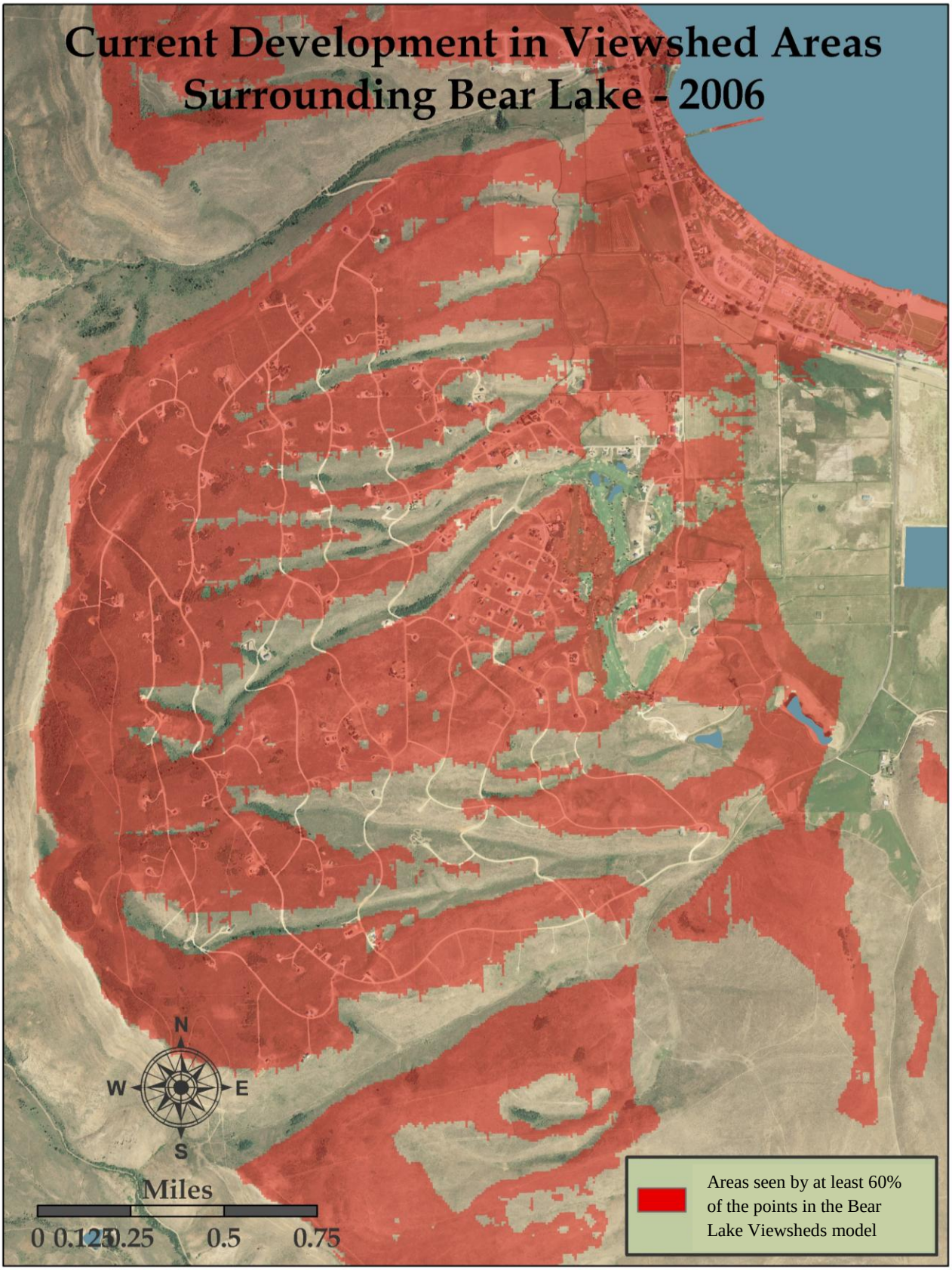
Model & Future ideas/refinement:

- Water Quality
- Water Quantity
  - Maintain Flow
  - How much goes to agriculture, development, lake?
  - Irrigation districts supply
  - Mitigation
  - Could affect wet meadows and grassland health or existence if irrigation is reduced on agricultural lands.
- Recreation Opportunities
  - Motorized Trails (ATV)
  - Recreation and Tourism as a future or model (key economic component of region - Richard Droesbeke, BL State Park Ranger in Utah).
- Conservation Possibilities (discussed recreational species vs. ecological species mapping etc.)
- Transportation - include in models and futures
  - Lakeside alternatives
  - North/South Connectivity
  - Hwy 89 Alternatives
  - UDOT's opinion?
  - (Beaver Mountain to St. Charles?)
  - (Fawcett's F.S. line idea?)
  - (Viewshed analysis from lake and communities etc.?)
  - (Connection to Garden City's street bypass?)
  - (Development following transportation scenarios?)
- Viewsheds
  - From main roads, towns and houses combined or separately
  - From each residence as points?
  - (From the lake?)
  - (From points on the hwys around the lake taken w/ GPS unit looking for areas that can see the lake from the road – Claudia Cottle [Bear Lake Watch])
- Rural Landscapes and/or Agriculture

General Comments and Observations:

- Further define contents of possible futures (to help BLR commission better understand).
- Keep property rights prominent.
- Critical Lands definition may not be as crucial to the BLRC (maybe some important updates, but not seen as being as essential as previously thought).
- Rural Landscapes and Agriculture should be models or futures.
- Could do an analysis of previously designated sensitive lands and current development to see which sensitive lands have been and have not been preserved under current ordinances/zoning/regulations


Current Development in Viewshed Areas
Surrounding Bear Lake - 2006
N
W
S
Miles
0 0.2 0.4 1.2
Areas seen by at least 60% of the points in the Bear Lake Viewsheds model


Current Development in Viewshed Areas
Surrounding Bear Lake - 2006
N
W
E
S
Miles
0 0.125 0.25 0.5 0.75
Areas seen by at least 60% of the points in the Bear Lake Viewsheds model

BEAR LAKE GUIDE

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SEP 24 2007
BRAG

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September 14, 2007 Serving Garden City, Laketown, Randolph, Woodruff and Fish Hav

State of Bear Lake Conference

August 31, 2007
Fish Haven, Idaho
REPORTED BY ANITA WESTON

A day-long conference was held in Fish Haven, Idaho, on Friday, August 31, for people living in the Bear Lake Area-Rich and Bear Lake Counties. There were approximately 150 people in attendance. Alan Matheson, Executive Director of Envision Utah, was the keynote speaker. He used his experience in working with several areas in Utah and told the audience that the Bear Lake area needs to stop or slow growth or this beautiful place will become unappealing. People will come and this growth needs to be controlled. If people living here care about the future at all, they need to become involved. He encouraged the two counties to look for ways to cooperate and gain an overall view of the situation, not just a city or county approach.

Rick Fawcett, a consultant, shared information with the group that had been obtained through a survey that had been taken. The most important concern voiced by those participating in the survey was the need for more jobs in this area so that the children, as they grow up, can stay in the valley and still earn a living. There also was a strong desire to preserve the rural life style that currently exists.

Dr. Fawcett was the facilitator for the next three parts of the agenda. A panel was made up of the commissioners from Rich and Bear Lake Counties. Norm Weston and Bill Cox were representing Rich County while Vaughn Rasmussen was there from Montpelier. These men shared how counties obtain the revenues for County projects. In Utah all monies are handled at the state level with the exception of property taxes. Taxes are really the only funds that the commissioners can somewhat control. Rich County indicated that there had been no tax raise in the last 12 years and that the lack of funds is really becoming a serious issue in the county. Rich County Commissioners indicated that the biggest infrastructure need in the county was work on roads and bridges. The second most pressing problem is the lack of needed enforcement ability. There are approximately 2,000 full-time residents in the county, but there are 60,000 - 70,000 in the county during the summer months. They indicated how difficult it was to hire full-time employees because of being unable to pay a competitive wage. Gas and diesel prices have also risen and made balancing the budget even more difficult. Montpelier Commissioner Rasmussen indicated that Bear Lake County had similar problems. They, however, also need to obtain a new landfill area and a jail.

The next panel was made up of mayors from the two counties. McKay Willis of Laketown, Ken Hansen of Garden City, and Reed Peterson from Montpelier were present. Many of the problems discussed were similar among the cities. It was noted that Montpelier has a dwindling school age population where just the opposite is true in Garden City. It was noted that Laketown only has one business year-round and that more industry would be good. Affordable housing, appropriate ordinances, and enforcement seemed to be common problems. Bear Lake County indicated that a building inspector was needed.

The third panel was made up of developers. There were four-one from each of the four major growth areas. Bruce Barrett of Black Bear Mountain being built in the St. Charles and Bloomington area; Bryce Nielson representing Shundahai being built in Garden City; Brian Wood. the developer of the South Shore Estates, in Laketown; and Doug Johnson who is building the Reserve in Fish Haven area; were the panel members. Each of the developers indicated what they thought was the one outstanding and unique feature of their developments. Among these four developments, there are approximately 4,000 new housing units to be built and this included only phase One (91 lots) of the Shundahai development which will, when completed, encompass over 1,000 acres.

The next part on the program was called the three-minute ticker where various individuals in the audience were given an opportunity to express their concerns and what they see as current problems. Some of the problems dealt with protection of drinking water, protection of the lake itself, traffic, 4-wheelers along the lake shore, noise pollution on the beaches and in town, beach access, preserving the rural lifestyle, law enforcement problems, communication problems-particularly dealing with cell phones, affordable housing, developments closing public forest access, lack of public understanding that forest lands are multiple-use, lack of things teenagers can do, beach clean-up, and so on.

The last part of the agenda allowed people to choose two of four different break out sessions. The four topics for the break out sessions were Natural Resources, Economic Stability, Essential Services, and Public Safety. Each session went for about 30 - 45 minutes and allowed the individuals to discuss and try and come up different solutions to these various issues.

The conference was a good forum where people from the Bear Lake Area had an opportunity to see that many of the issues and problems are common to the entire area and not limited to individual towns and counties. It also gave those present an opportunity to share ideas and possible solutions. Hopefully, more communication, planning, and dialog will continue among all the levels of government, various agencies, and individual citizens for the betterment of the Bear Lake Area.

SUNDAY

THE OTHER AGGIES
Stew's guys find a rhythm
— B1

RETAIL SCENE
New tenants moving into old Macey's center
— A3

The Herald Journal

. 308 Sunday, November 4, 2007 Bridgerland's Daily Newspaper Logan, Utah © 2007 $1.25

High: 56
Low: 24
Sunny
— Page A16

Townsfolk priced out of town

Getaway-home boom robs Garden City of affordable housing

By Karen Lambert
staff writer

Garden City's new state park manager will be commuting an hour to work from Logan because he says he can't afford the housing there. That's despite the fact that for years, the rule was that a park manager had to live within a 30-minute response time from work.

That situation, for Park Manager Richard Droesbeke, is indicative of how the Garden City area as a whole is struggling with how to allow ordinary people to buy homes as land and property values skyrocket.

"Being able to afford a house like the one we'd have in Providence would probably be $350,000 or more up here," Droesbeke said.

Droesbeke is part of a growing number of teachers, police officers, and other service workers who find purchasing a home in Garden City a challenge. Many find that a threat to the community's tightknit feel, as more and more second home owners function as absentee owners. Without families and full-time workers, there are not enough volunteers or people to build up a sense of community.

Sunday spotlight

Mark Hislop, a realtor with Bear Lake Realty, said an average newly constructed home in Garden City would cost $350,000. Many homes now are worth more than a million dollars.

Summer worker shortage

Gene Cook, whose family owns Hometown Drive-In, tells stories of 200-300 people lined up last July to get services. Short-staffed, his employees were hard pressed to meet the customers' needs.

"We had to shorten up the hours considerably in order that we didn't work the existing crew to death, and therefore we lost a lot of business and it caused a lot of problems with people to get served," he said.

He's now considering building his own housing.

He said every business he knows had similar problems finding employees.

Hislop says he also sees a need for year-round rental property for construction workers moving up to the area. It's a challenge because people can make more renting their home

See GARDEN CITY on A9

In our schools

County to bill resort for outside consulting

ed to Mountain Standard
m. today. Did you
o set your clocks back

Conservation Easements

10 steps to protect fly fishing's future

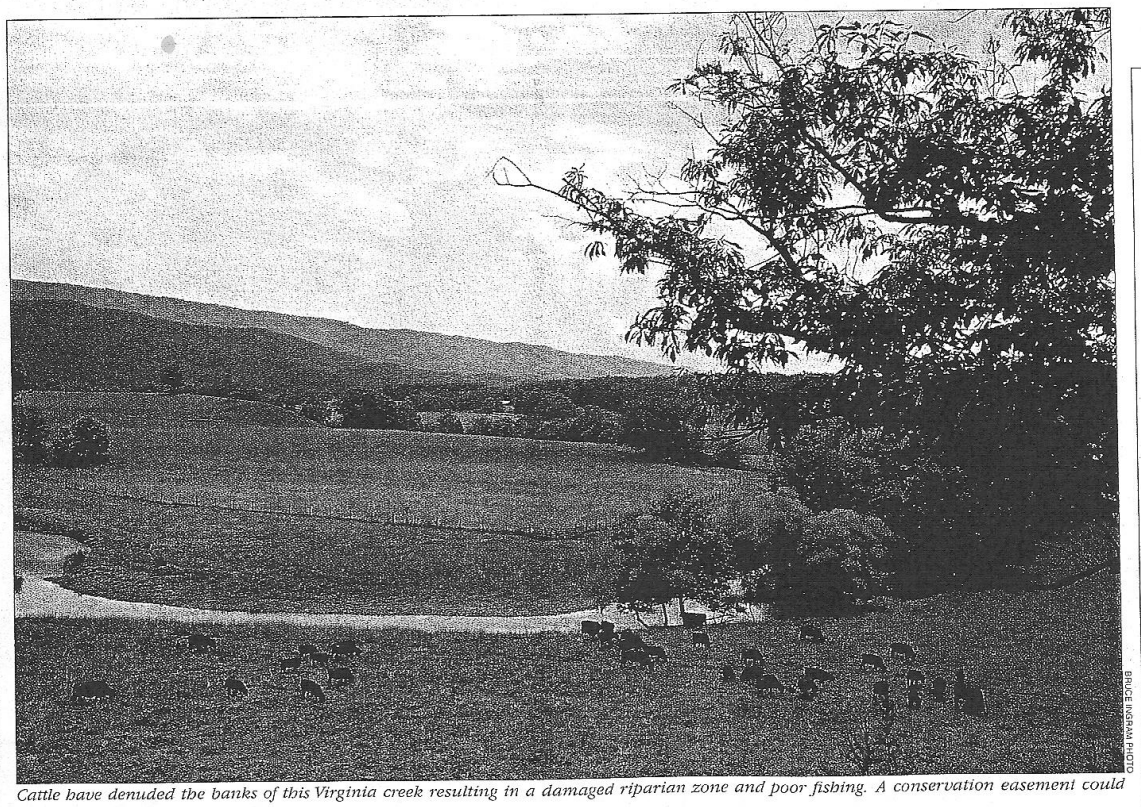
BRUCE INGRAM

AS THE REAL ESTATE AGENT WALKED ME around the Craig County, Virginia, property last April, I became more and more enthralled with it. At its highest point, the mountainous land bordered both George Washington and Jefferson national forests, and as we ambled up a hollow we successively spooked turkeys and deer.

But what ultimately spiked my interest was when the agent showed me a spring bubbling up from the forest floor.

"This is where Sinking Creek begins," the agent said. "If you buy this land, you'll not only own a headwater spring of the New River, but also the first couple hundred yards of the creek."

"I'll buy it," I blurted out. Indeed, as soon as we returned to the agent's vehicle, I signed the contract. And a few weeks after the contract became final, I contacted the Virginia Outdoors Foundation (VOF) and began the process to place the entire 120-acre property under a conservation easement.



BRUCE INGRAM PHOTO

Cattle have denuded the banks of this Virginia creek resulting in a damaged riparian zone and poor fishing. A conservation easement could restore and protect this area.

The conservation easement ensures that the land will never be subdivided, the property will forever remain rural, and, most important, neither I nor any future owner can conduct activities negatively impacting the spring and creek on the property.

In return, the IRS sent me a refund check for $14,012. In a small but important way, I'm helping to protect wildlife habitat and the future of fishing in the New River watershed—and I received a financial reward for it.

What are They?

WHAT ARE CONSERVATION EASEMENTS, HOW does an individual or group go about instituting them, and why should readers of this magazine consider them?

Conservation easements are voluntary, deeded agreements that forever protect land from subdivisions and commercial development. An easement preserves certain values (such as scenic, agricultural, natural, and historical qualities) of a landowner's property while improving the owner's financial security through tax benefits and tax credit sales.

To be accepted, a proposed easement must preserve and protect in perpetuity the open space values of the individual property. The values are described in the easement deed and in property documentation that a land trust conducts.

Under the authority of the VOF, I have placed conservation easements on three different properties. The VOF land trust follows a 10-step process, typical of what transpires in many states.

The easement process can take anywhere from a few months to more than a year. When completed, it exists for the property regardless of whether the initiator, heirs, or anyone else owns it.

Here, in an abbreviated form, is that 10-step process:

Step 1: Consideration of easement. After consulting with family members—and perhaps tax and legal advisers—a landowner contacts a land trust to request information and to discuss general easement guidelines and possibilities. The land trust representative and the landowner discuss easement stipulations that the landowner desires. The more restrictions a landowner places on the easement, the greater the tax benefits are likely to be.

Step 2: Site visit. The land trust and landowner look over the property, discussing long-term objectives and open space values.

Step 3: Preliminary agreement. The landowner reaches a preliminary agreement with the land trust on the proposed terms of the easement and property description. The landowner's lawyer and land trust develop a draft easement for both parties to review.

Step 4: Title report and letter of intent. The landowner provides a preliminary 20-year title report, usually prepared by an attorney. The landowner also submits a letter to the land trust stating a desire to have an easement.

Step 5: Staff research. The land trust completes research on the property, including matters of zoning classification, highway plans, and maps.

Continued on page 16

Continued from page 15

Step 6: Board approval. The land trust board accepts, rejects, or requests to modify the proposed easement.

Step 7: Follow-up site visit. The land trust makes a return visit for documentation of the property if necessary.

Step 8: Baseline documentation report. The land trust obtains official documents, such as county tax maps, detailing property features. The landowner acknowledges the accuracy of the documents.

Step 9: Finalizing easement draft. A lawyer sends the final easement, including the full legal property description, to the land trust for review. The land trust may suggest edits. After revisions, the landowner signs the easement.

Step 10: Recordation. The land trust records the easement in the local court.

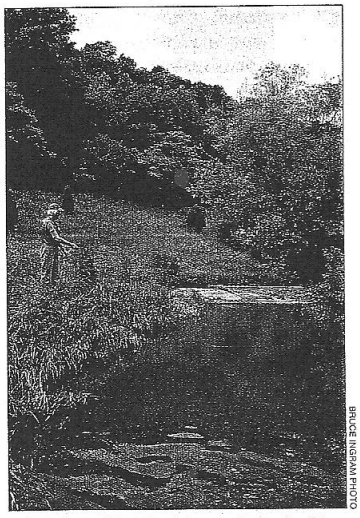


PHOTO BY BRUCE INGRAM

Above: Janet Yost fly fishes a Roanoke River tributary that she and her husband have placed under a conservation easement. The couple has planted trees and shrubs along the stream.

A copy of the recorded easement is sent to the landowner or his attorney.

My Experience

THIS MAY SOUND COMPLICATED AND TIME-consuming, but your local land trust is there to help throughout. After a landowner has completed the process, the future of the property is assured.

After the legalities were completed, I contacted a certified assessor to conduct a legal assessment of land value lost after placement under the conservation easement. Developable land is worth more than land that will remain "unimproved" forever, because land under easement cannot be turned into subdivisions, strip malls, or parking lots. (Although if you tell that to a fly fisher wading a pristine stream, he or she may disagree.) Since the landowner now owns devalued property, he can receive a tax refund, as I did, from the government.

The legal process involves lawyers and assessors and has run me between $5,500 and $6,000, but I have always received grants from the VOF to pay those legal fees.

It should be emphasized that you make the final decisions on what can be done to your property. For example, my 120-acre tract on Sinking Creek can never be subdivided, nor can the 150-acre tract that I own on Potts Mountain. However, a 122-acre parcel that is adjacent to the 150-acre tract can be subdivided in half. On all these properties, I have had clauses inserted that protect the riparian zones and the scenic vistas of the ridgetops.

Roger Holnback, executive director of the Western Virginia Land Trust (WVLT), emphasizes that all fly fishers should understand easements.

"Protecting headwater springs and streams is absolutely critical in assuring the future of fly fishing," Holnback says. "Certainly one of the best ways to protect a headwater stream is to place a conservation easement on it. What's more, we're learning that when one landowner in a watershed protects his stream through an easement, others often want to do the same.

"For example, in Botetourt County [Virginia], a landowner, Ray Hundley, asked the WVLT to draw up an easement so that his headwater stream of the James River would come under strict protection, which often means safeguarding a 100-foot-wide riparian zone on both sides of a stream. Then Hunley's downstream neighbor, Tom Kirlin, who is an avid fly fisherman, decided to do the same thing. The result is that now a long section of an important James River tributary has its riparian zone permanently protected. That can't help but be a good thing for anglers downstream."

Individual Goals

EVEN IF A STREAM DOESN'T HAVE MUCH OF A riparian zone, conservation easements help begin the process of restoring or creating swaths of native vegetation along a waterway.

"Land trust agents know the importance of a stream that is in unspoiled condition with wild trout or bass and aquatic insects," Holnback adds, "especially as compared to a stream that flows through a barren pasture with high water temperatures and turbidity. We typically know who to contact at a state fisheries department who can help assist a landowner with stream improvement projects that create a vibrant riparian zone."

In the past year or so, I've spoken with a number of southwest Virginia landowners on how and why they have implemented conservation easements on their respective properties. Each one of these individuals has different goals. For example, Montgomery County landowner Ed Yost wanted to catch trout on his spring creek, which is part of the Roanoke River watershed in Virginia.

Part of the foundation for Yost's conservation easement was restricting what types of activities could be done within the riparian zone, which he wanted to protect permanently. Yost is now improving streamside habitat by planting native trees and grasses. He sees the stream as a future haunt of bruiser browns.

A second contact desired to restore riparian zone denuded by dairy cattle, so he focused on fencing the animals out of a headwater stream of the Roanoke River.

Another individual, who is a dedicated smallmouth fan, owns land that borders the James River. He placed an easement on his riverfront property and is now working to restore the riparian zone so smallmouth have more places to hold.

A fourth landowner has purchased 60 acres as a fixer-upper project—his goals are to protect spring seeps that drain into a James tributary, and to plant native grasses that draw game animals.

On my three properties under easements, I have protected headwater springs/streams in both the James and New River watersheds, as well as—through judicious timber cutting—improved wildlife habitat and made money through timber sales. Fishing, hunting, farming, and logging remain "values" under conservation easements.

Making a Difference

FOR THE PAST 24 YEARS, I HAVE HELD FULL-TIME jobs as a high-school English teacher and outdoor writer. During that time, I have sold more than 1,800 magazine articles and written three books. My wife has been kind enough to let me have all my

NATIONAL LAND CONSERVATION ORGANIZATIONS

- American Farmland Trust, farmland.org
- Land Trust Alliance, lta.org
- National Trust for Historic Preservation, nationaltrust.org
- The Conservation Fund, conservationfund.org
- Trust for Public Land, tpl.org

writing income (provided I turn over my entire teaching check to her every month; she gives me $200 per month for expenses). With that writing income, I have bought 486 acres of rural land and have placed 392 of those acres under conservation easements. With those easements, in a small but important way, I have helped protect our outdoor heritage.

You can do the same. Many of you have the ability (through personal income or fly-fishing clubs and organizations) to place headwater springs, streams, and portions of trout and bass waterways under conservation easements.

Please consider doing this, either on land you own or that your club owns or leases. Also consider contacting rural landowners on whose property you fly-fish. Remember, you'll be doing a service not only for present-day sportsmen but also to those who follow us in the decades and centuries to come.

A National Movement

ALTHOUGH MY EXPERIENCE WITH CONSERVATION easements is limited to Virginia, land trusts are a national phenomenon.

"All 50 states have enabling legislation that allows land trusts and conservation easements," says Holnback. "Sometimes, the trusts are statewide entities; sometimes they cover one region or one county, or even just one valley. More and more, citizens are starting land trusts if they see a need for them in their particular locales."

Here are some examples:

- The Lancaster Farmland Trust works to preserve farmland in Lancaster County, Pennsylvania.
- The San Diego Land Conservancy works to preserve the remaining farms in that area of California.
- Connecticut has three statewide land trusts and 109 local ones.
- The Blue Ridge Rural Land Trust is a regional group focused on protecting land in northwest North Carolina.

To locate land trusts in your home state, Google the name of the state and the words "land trust." The Land Trust Alliance web site (see sidebar) also offers links to trusts in every state.

Tax Breaks

THE FEDERAL GOVERNMENT AND IRS RECOGNIZE that individual property owners who place their land under conservation easements are giving up development potential (read: losing money) and therefore qualify for a tax break or refund.

As noted earlier, I received a refund check for $14,012 from the IRS on land that I bought for $165,000. Next year, I am slated to receive another refund. The exact amount depends on a host of factors, such as how much money I earn from my other job and how many years I want the refunds spread over.

Everyone's tax situation is different, and I pay a tax consultant to help me. State and local tax benefits also commonly exist throughout the country. But many people, myself included, would institute a conservation easement with or without the tax benefits.

State Resources

MANY STATES HAVE LOCAL AND STATE-WIDE LAND trust organizations. For example, the Virginia Outdoors Foundation (virginiaoutdoorsfoundation.org) is the umbrella group for dozens of regional land trusts. The New River Land Trust (newriverlandtrust.org) and the Western Virginia Land Trust (westernvirginialandtrust.org) are two examples.

BRUCE INGRAM is a high-school teacher and outdoor writer. His latest books are *Fly and Spin Fishing for River Smallmouths* (Ecopress, 2008) and *The New River Guide* (Ecopress, 2008).

[The opinions expressed in Forum are those of the authors who appear here and do not necessarily reflect the editorial policies or views of FLY FISHERMAN. *We welcome polite reader responses to the issues presented here.* THE EDITOR.]

Source: Fly-fisherman Magazine