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## Alternative Futures for Dalton Wells

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# ALTERNATIVE FUTURES FOR DALTON WELLS



MASTER OF SCIENCE BIOREGIONAL PLANNING THESIS

BY MARY OLIVER

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APRIL 2018

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## INTRODUCTION

Visitation to the Moab region has increased significantly in recent years, causing campgrounds near town to be consistently full, especially during peak season. The Dalton Wells area, (*figure 1.1*), a recreation area off Highway 191, 15 miles north of Moab, Utah has become an especially popular place for dispersed camping.

Dalton Wells is also attractive to visitors for many other reasons. The area is centrally located, and is in close proximity to Arches and Canyonlands National Parks, Dead Horse Point State Park, and the city of Moab. This makes it an appealing base camp as it is accessible to many area attractions. It is also easy to get to, with some campsites less than half a mile off of the main highway. Another appealing aspect of Dalton Wells is its incredible scenery, with views into Arches National Park, the La Sal Mountains, and the Colorado River Canyon. As an additional draw, the area hosts an extensive singletrack trail network, bringing OHV riders and mountain bikers out to set up large group base camps, or to simply recreate in the area for the day, adding day-use visitors to the crowds at the site.

Yet, all of the qualities that make Dalton Wells an ideal recreation area are making it inappropriate for dispersed camping. Dispersed camping typically occurs in remote areas that are isolated and difficult to reach. The effort involved in reaching such places thins out crowds of campers, which reduces impacts to the

environment that dispersed camping can cause. In contrast, Dalton Wells is very accessible and frequently experiences levels of high use. Dalton Wells does not have the infrastructure or management necessary to support the current number of visitors, straining the site's fragile desert ecosystem. The area also has important cultural features which are under pressure from both intentional and unintentional visitor abuse. The Dalton Wells Dinosaur Quarry and the foundations of a historic CCC camp are resources which are unmaintained and at risk of pillaging and decay.

Dalton Wells and the adjacent Willow Springs Road are owned respectively by State Sovereign Lands, of The Division of Forestry, Fire and State Lands, and the State Institutional Trust Lands Administration (SITLA). Because neither SITLA nor State Sovereign Lands are in the business of campground management, the area has seen only enough management and infrastructure to keep it minimally intact. Both agencies recognize that something needs to be done before these valuable landscapes are lost to overuse, litter, and erosion.

# DALTON WELLS CONTEXT MAP

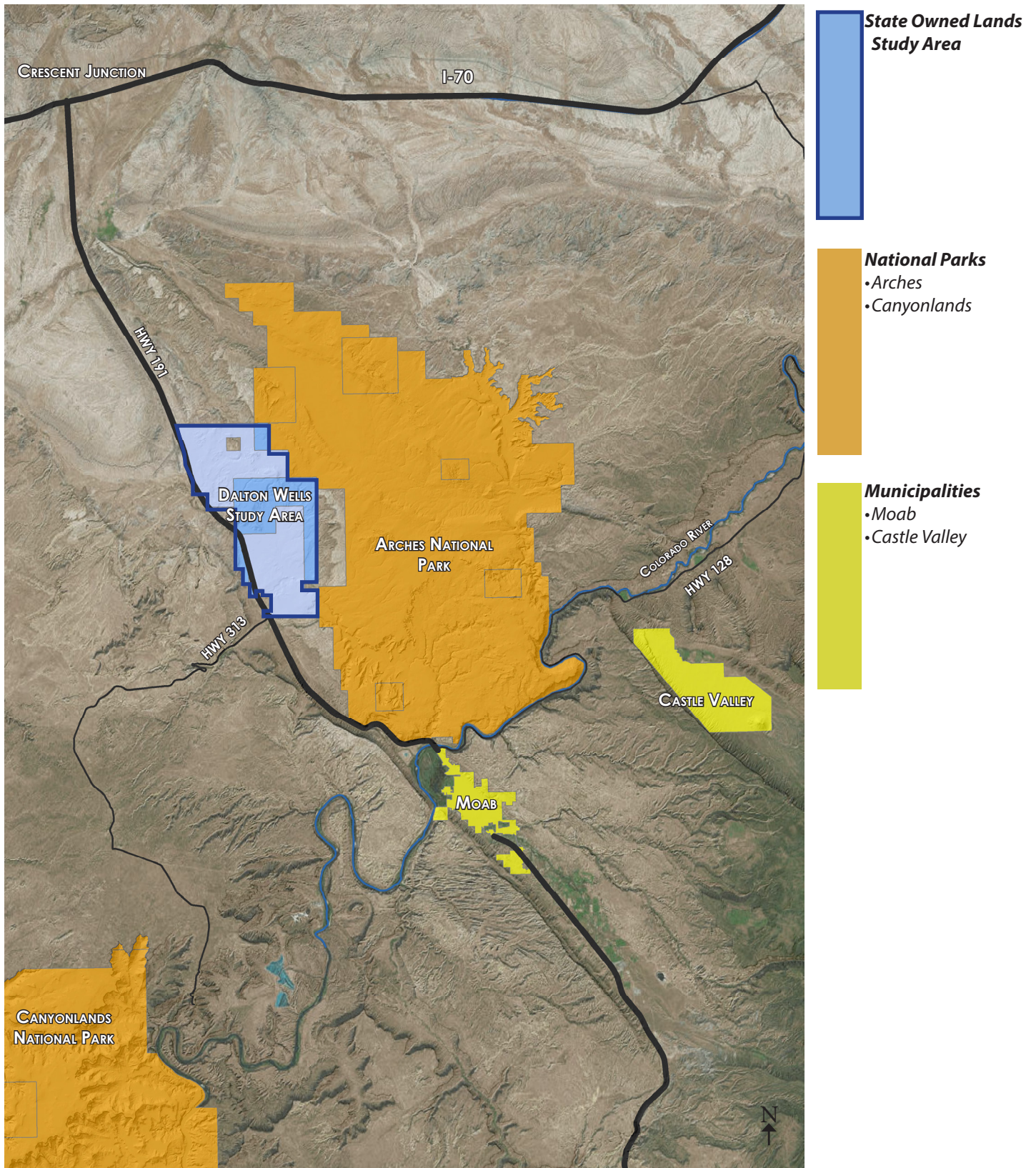
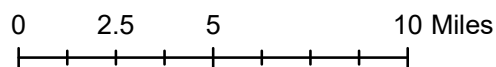


Figure 1.1 Dalton Wells Study Area Within the Region.



### PROJECT OBJECTIVES

State Sovereign Lands approached the Department of Landscape Architecture and Environmental Planning seeking to find solutions to this issue. State Sovereign Lands would like to develop a plan that would provide public access for campers and other recreationalists who use the area's trail systems, while protecting the cultural and natural resources of the site. The objectives of this thesis are: 1) to address State Sovereign Land's needs in accordance with their mandates, 2) identify and resolve the issues caused by dispersed camping at Dalton Wells, and 3) develop a conceptual master plan and documentation. This plan will examine systems in the landscape, model the best places for land uses, explore impacts and patterns of use, and establish a system of roads, campsites, and infrastructure that would better support the current use of the area.

# DALTON WELLS STUDY AREA

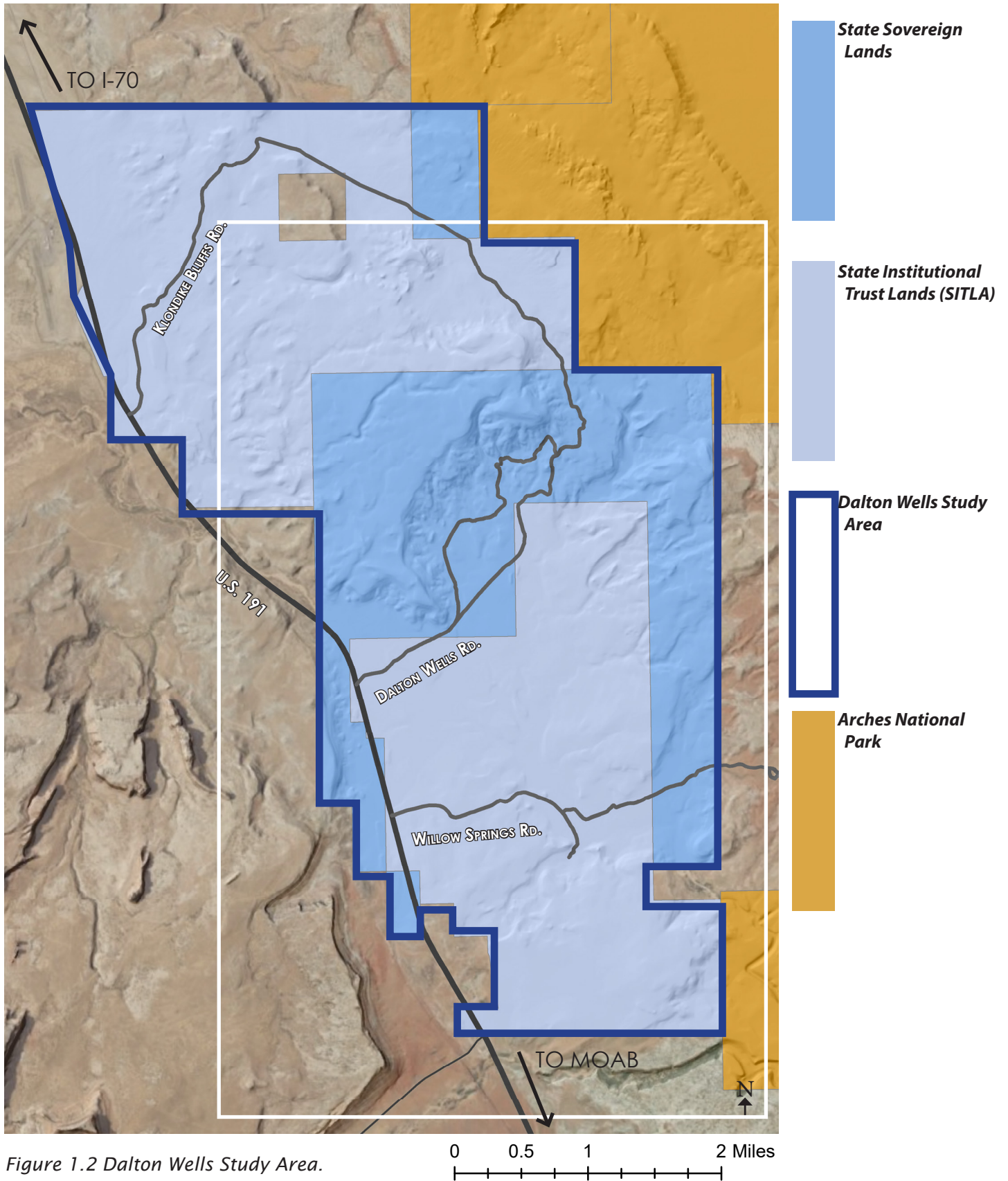


Figure 1.2 Dalton Wells Study Area.



## STUDY SCALES

This study examines the Dalton Wells area at a range of different scales: the study area context of the Highway 191 corridor (*figure 1.2, 1.3*) and the focus area of Dalton Wells Road and Willow Springs Road (*figure 1.4*). This allows for a broad understanding of the landscape and its surrounding context, as well as a detailed view of the dispersed camping areas.

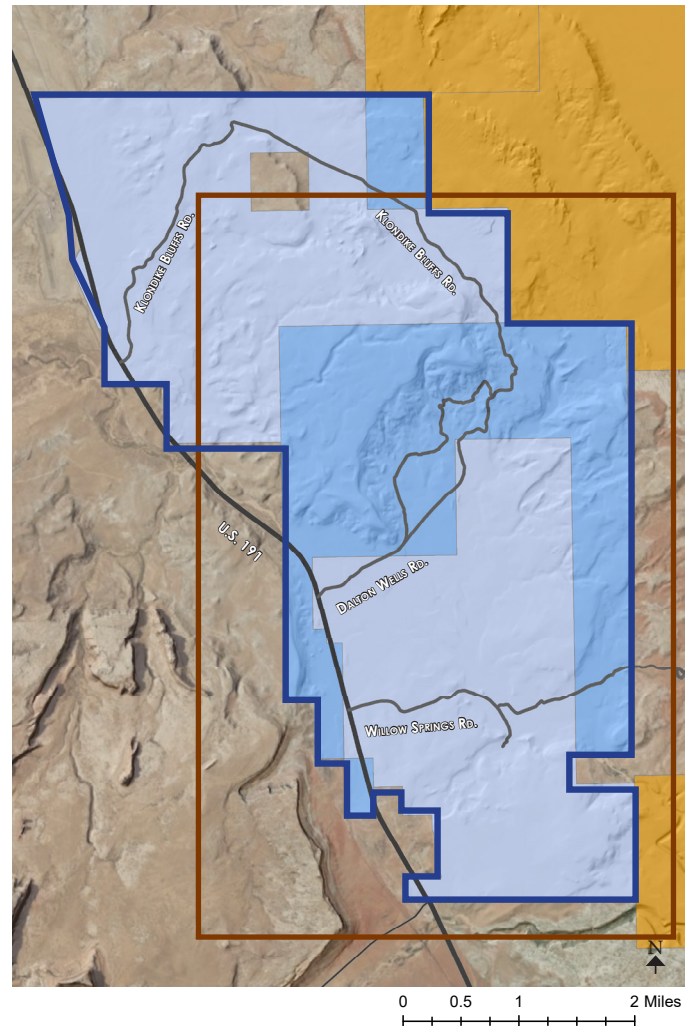


Figure 1.3 Dalton Wells study area.

# DISPERSED CAMPING STUDY AREA

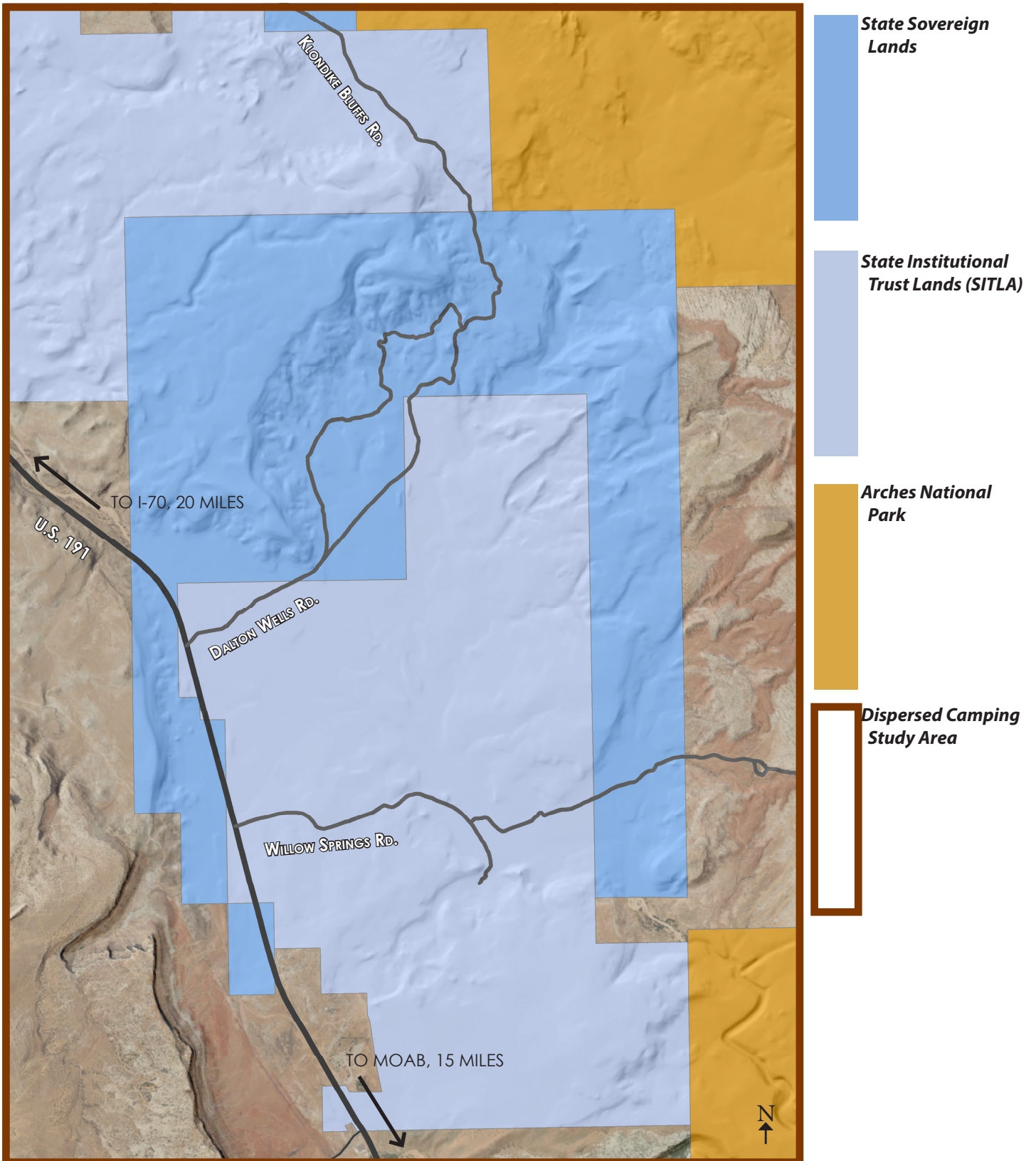
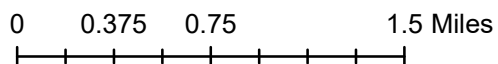


Figure 1.4 Dalton Wells dispersed camping study area.



## PRE-ANALYSIS: BACKGROUND & ISSUES

### THE ISSUES

#### *Regional Tourism*

The Moab area is a scenic wonderland for recreation. The area hosts Arches and Canyonlands National Parks, Dead Horse Point State Park, and millions of acres of scenic BLM land. Recreational opportunities abound with world famous mountain biking and climbing, miles of hiking trails, river rafting, and OHV trails. The area also holds annual events which draw tens of thousands of visitors such as the Moab Marathon, the Easter Jeep Safari, and the Moab Music Festival.

Due to its recreational popularity, visitation to the Moab region has increased significantly in recent years. Arches National Park visitation has steadily increased, climbing to over 1.5 million visitors in 2017, and nearby Canyonlands hosted 742,271 visitors in 2017 (National Park Service, 2018). The Utah Department of Transportation has recorded traffic through Moab at a monthly average of 108,847 vehicles (Moab Chamber of Commerce, 2018).

The influx of visitors has caused campgrounds near town to be consistently full, especially during peak season. The Bureau of Land Management (BLM) maintains 24 campgrounds in the area on a first-come/first-served basis, and all other BLM lands near Moab are restricted from camping. Combined, the parks add only an additional three campgrounds that are in proximity to Moab. This leaves many visitors

looking for additional spaces to camp out during their stay.

#### *Dispersed Camping*

Dalton Wells has absorbed many of the campers who can't find other locations to spend the night. Unlike the BLM, which has restricted dispersed camping, State Sovereign Lands and State Institutional Trust Lands, have placed few limitations on camping. Current rules in place only restrict camping to 14 consecutive overnight stays. This limit is almost impossible to enforce, as there is no on-site management. Because of this, visitors take advantage of the free and open access, sometimes crowding into the site by the hundreds. Traffic counts during the spring peak season have been recorded as high as 153 vehicles within a few hours.

Dalton Wells is an especially popular place for dispersed camping, as it is free and in close proximity to town. The location is central to nearby attractions, with Moab and the Arches National Park nearby, and the intersection to Dead Horse Point State Park and Canyonlands National Park just one mile away.

Camping frequency increased when the Arches campground was closed for construction March through October of 2017. This brought the number of campers in the Park from 46,704 in 2016 down to 2,252 in 2017 (National Park Service, 2018). With 44,452 or more potential campers displaced, many of these visitors chose to camp at Dalton Wells, putting even more pressure on the site. In addition to camping, the area also hosts an extensive trail network, adding day-use visitors to the crowds at the site. The site

provides access to many OHV and mountain biking trailheads, and hosts portions of major events such as the Moab Jeep Safari and Mountain bike races.

Dalton Wells does not have the infrastructure, funding or management necessary to support the current number of visitors, straining the site's fragile desert ecosystem. As visitation has increased, erosion at the site has expanded unchecked. The topsoil is eroded by multiple vehicle pull outs, and patches of barren soil are compacted to serve as makeshift campsites. Over time these compacted areas bleed together, destroying vegetation and sprawling into the landscape with no reasonable pattern or plan. Employees from State Lands occasionally visit the site to monitor the landscape, and have noted campsites littered with toilet paper, trash bags left out on the road, and the excessive formation of new fire rings and makeshift campsites.

## THE SITE

Dalton Wells is located 15 miles north of Moab, and 20 miles south of Interstate 70. Highway 191 passes through the site, which lies between BLM land and the western border of Arches National Park. Dalton Wells is an open, flat valley surrounded by hills, bluffs, and sandstone cliffs. Its location is central to views of iconic landforms such as the red rock cliffs above Moab Canyon, and the scenic Klondike Bluffs. Colorful green and purple soils of the Morrison Formation can be seen on many of the surrounding hills, and the views open into the windows section of Arches and the La Sal Mountains in the distance.

## STAKEHOLDERS

Currently, the Dalton Wells area is owned by two divisions of State Lands. State Institutional Trust Lands (SITLA) owns the Willow Springs Area to the south, and State Sovereign Lands, owns the Dalton Wells Area to the north. Neither SITLA nor State Sovereign Lands are in the business of campground management. These agencies are landowners with other mandates, who have inherited a dispersed camping situation on their lands.

Dispersed camping has evolved in the area, because State Lands does not restrict access to the site. Yet, because the area was never intended to be a campground, no funding has been set aside to maintain the area or employ managers. Dalton Wells has seen only enough management and infrastructure to keep it minimally intact. Both agencies recognize that something needs to be done before these valuable landscapes are lost to overuse, litter, and erosion.

### *State Sovereign Lands*

State Sovereign Lands is a sector of the Utah Division of Forestry, Fire and State Lands. They are the state agency that owns and manages all land that lies beneath navigable bodies of water. It is an anomaly that they own Dalton Wells, as the only water on site consists of intermittent streams in the washes.

State Sovereign Lands received their parcel at Dalton Wells, also known as the Moab Sovereign Exchange Lands, in 1965 during the creation of Canyonlands National Park.

This site was given to State Sovereign Lands by the National Park Service in exchange for the land beneath the Colorado River within the Canyonlands National Park boundary. The Moab Sovereign Exchange Lands were selected “for their wildlife, scenic, recreational and pale-ontological values” (Utah Division of Forestry, Fire, and State Lands, 2015).

These lands are now considered public trust lands, places with a value system centered on public access, recreation, conservation and preservation. The Utah Administrative Code R652-2 establishes State Sovereign Land’s public trust management objectives, stating “It is also recognized that the public health, interest, safety, and welfare require that all uses on, beneath or above the beds of navigable lakes and streams of the state be regulated, so that the protection of navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality will be given due consideration and balanced against the navigational or economic necessity or justification for, or benefit to be derived from, any proposed use” (Utah Administrative Code R-652-2).

While the public trust values for Sovereign Lands were created with the intent of managing navigable waterways, the values and mandates are also applied to Dalton Wells. The Division of Forestry, Fire and State Lands completed the Moab Exchange Lands Comprehensive Management Plan (CMP), in order to facilitate the management of the exchange lands under multiple-use, sustained yield principles, and to accommodate public and private uses to the extent that the uses do not substantially impair the public trust resources” (Division of State Lands and Forestry, 2015).

The State Lands website explains that “In 2015, the Division of Forestry, Fire and State Lands completed the Moab Exchange Lands Comprehensive Management Plan (CMP). The CMP was designed to facilitate the management of the exchange lands under multiple-use, sustained yield principles and accommodating public and private uses to the extent that the uses do not substantially impair the public trust resources” (Division of State Lands and Forestry, 2015).

Yet recently managers believe that these resources are at a tipping point, impairing the natural and recreational resources for future public use. In order to fulfill the mission of public trust lands, State Sovereign Lands would like to develop a plan that would provide public access for campers and other recreationalists who use the area’s trail systems, while conserving the cultural and natural resources of the site. This plan would establish a system of roads, campsites, and infrastructure that would better support the current use of the area. Yet, if a plan is developed only for Sovereign Land’s Dalton Wells portion of the area, then Willow Springs will most likely see even more concentrated use and degradation.

### *SITLA*

SITLA owns the Willow Springs area, but the property does not contribute to fulfilling its mandates. SITLA’s mandate is to sell or lease land to provide funding for the state public school system. Because camping at the site is dispersed and there are no amenities, it is not feasible to charge camping fees. SITLA’s transactions also typically consist of larger sales or leases to developers or the extractive industry, not small fee collection.

For this reason, they have considered leasing the land to State Parks or State Sovereign Lands, to be managed as a camping area. Yet, under the site's present conditions, neither State Parks or State Sovereign Lands would be able to generate enough in recreation fees to pay the leasing fees required by SITLA.

Willow Springs has recently become even more problematic for SITLA, with increased visitation. Rather than profiting from the land, they have had to invest in infrastructure to mitigate the impacts of mass dispersed camping. The site has been experiencing so much degradation, that SITLA with the help of the non-profit Ride with Respect, installed post and wire fencing to try to contain the spreading erosion and loss of vegetation. A pit toilet and a few portable toilets were also placed on the site out of necessity.

While these measures have contained the spreading of impacts, they are only containing activity in the most highly used areas. Visitor use is still spilling over these barriers as the area of use is much greater than the places where infrastructure has been installed. SITLA has also had to deter employees from their original duties, sending them out to monitor impacts, visitor numbers, and behavior.

### *Land Exchange*

To address the issues of Dalton Wells and Willow Springs, SITLA and Sovereign Lands could discuss how the land might be better managed to gain mutual benefits. A land trade between the two agencies could consolidate the land with similar uses, while better meeting the needs of each agency's mandates. One term that could be explored for the land exchange could

include SITLA trading the Willow Springs area for Sovereign Land's developable lands off Highway 191 and the Prairie Dog Haven unit near I-70, which has extractive potential. This would give SITLA potentially profitable land, meeting their mandate of funding schools, while consolidating all of the camping areas for Sovereign Lands, meeting their mandate of public access.



*Figure 1.5 An empty sign at the entrance to Willow Springs Road is an example of the need for a management plan and new infrastructure at the site*

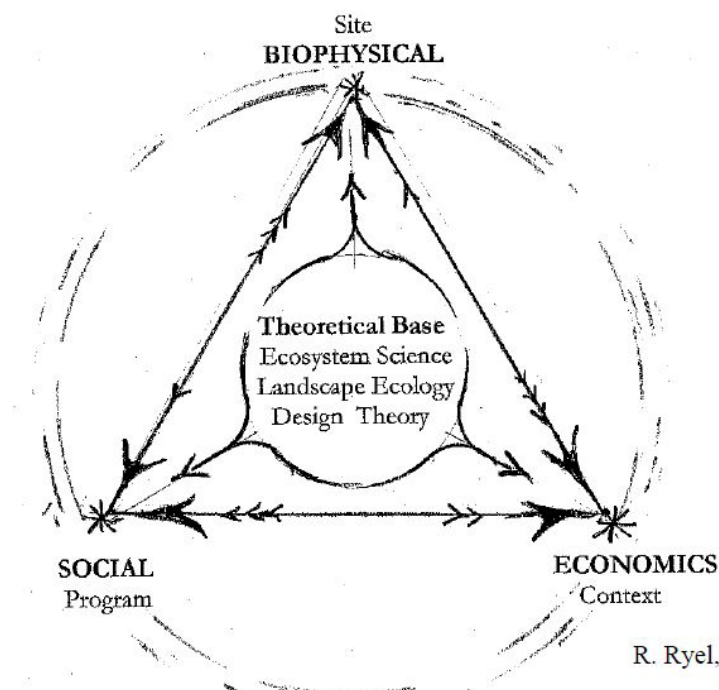
**METHODOLOGY- BIOREGIONAL PLANNING**

This project utilized the Bioregional Planning Process, a system of planning developed by Richard Toth, which considers how bio-physical, socio-cultural, and economic land use patterns influence each other and can be used to inform future plans and development (see figure 2.1). “The Bioregional Planning Program investigates how biophysical systems influence settlement and culture, and, inversely, how settlement and culture shape biophysical systems” (Toth, 1974).

Bioregional planning emerged from the concepts of landscape-level planning found in Ian Mc Harg’s “Design with Nature” (McHarg, 1969). It merges theories of ecosystem science, landscape ecology, and design theory, to create a holistic planning practice that can

address complex land-use issues. This process provided a way to assess, not only the suitability of site conditions, but also how human development and ecological systems overlap and interact. Balancing these systems is especially crucial at Dalton Wells, as the site is important to both commerce and recreation, which depend on the local natural resources. Dalton Wells also shares an ecosystem and viewshed with the adjacent Arches National Park, which “preserves unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations” (National Park Service, 2018). Understanding how human and natural systems operate remains crucial in planning a landscape that can support this mandate.

PROCESS



R. Ryel, T. Sharik, & R. Toth  
26 July 2011

Figure 2.1 Bioregional Planning Theory diagram by Richard Toth

The bioregional planning process also provides an approach for landscape assessment at a range of scales. A larger, landscape-level analysis was conducted which informed the design, development, and programming of the site-scale master plan. Toth (1974) describes the bio-regional process, explaining that the design approach follows common land planning protocols such as determining a site inventory, performing site analysis and mapping using GIS data, and determining future development scenarios. The planning process for Dalton Wells includes several steps which reflect those found in the bioregional process: 1) pre-analysis, 2) inventory structure and function, 3) site analysis, 4) modeling future land use alternatives, and 5) master plan design and recommendations. This process is highlighted in the figure 2.2.

PRE-ANALYSIS - PHASE 1

During the pre-analysis phase of this project, activities included background research, stakeholder meetings, and site visits. The purpose of this phase was to understand the issues and context of the project, establish objectives, and determine the appropriate process.

*Background research-Previous Studies*

This project utilized prior research by USU’s 2016–2017 bioregional planning graduate studio (LAEP 6200/6210). The studio conducted a year-long analysis of the Moab region using the bioregional planning process. Meetings with stakeholders as well as a community

Geodesign workshop facilitated by Carl Steinitz, helped define which issues were important to people living in the region. Regional land use and natural systems were modeled and tiered to create four alternative futures for the region. This process was documented in a report titled, “Moab Futures: A Bioregional Planning Analysis” (Douglas, Oliver, & Witt, 2018).

Their report of the Moab area contributed a broad background knowledge of the region and its issues to this project. Some of the maps and models from the Moab regional study were utilized for the Dalton Wells project, as the systems that were mapped in this study include the Dalton Wells area, and help to inform the issues at the site-scale.

The models that identified areas suitable for recreation identified Dalton Wells as a high-use area which was in need of additional recreational resources. The models substantiate the importance of State Sovereign Land’s request for solutions and planning in the Dalton Wells area.

Other research has also explored the issues at Dalton Wells. USU’s ENVS 4500 class, taught by Dr. Steven Burr, conducted a study in May of both 2016 and 2017, which examined user preferences and activity at the site. This research was an important factor in understanding site impacts and planning for future programming and infrastructure.

Other relevant planning documents



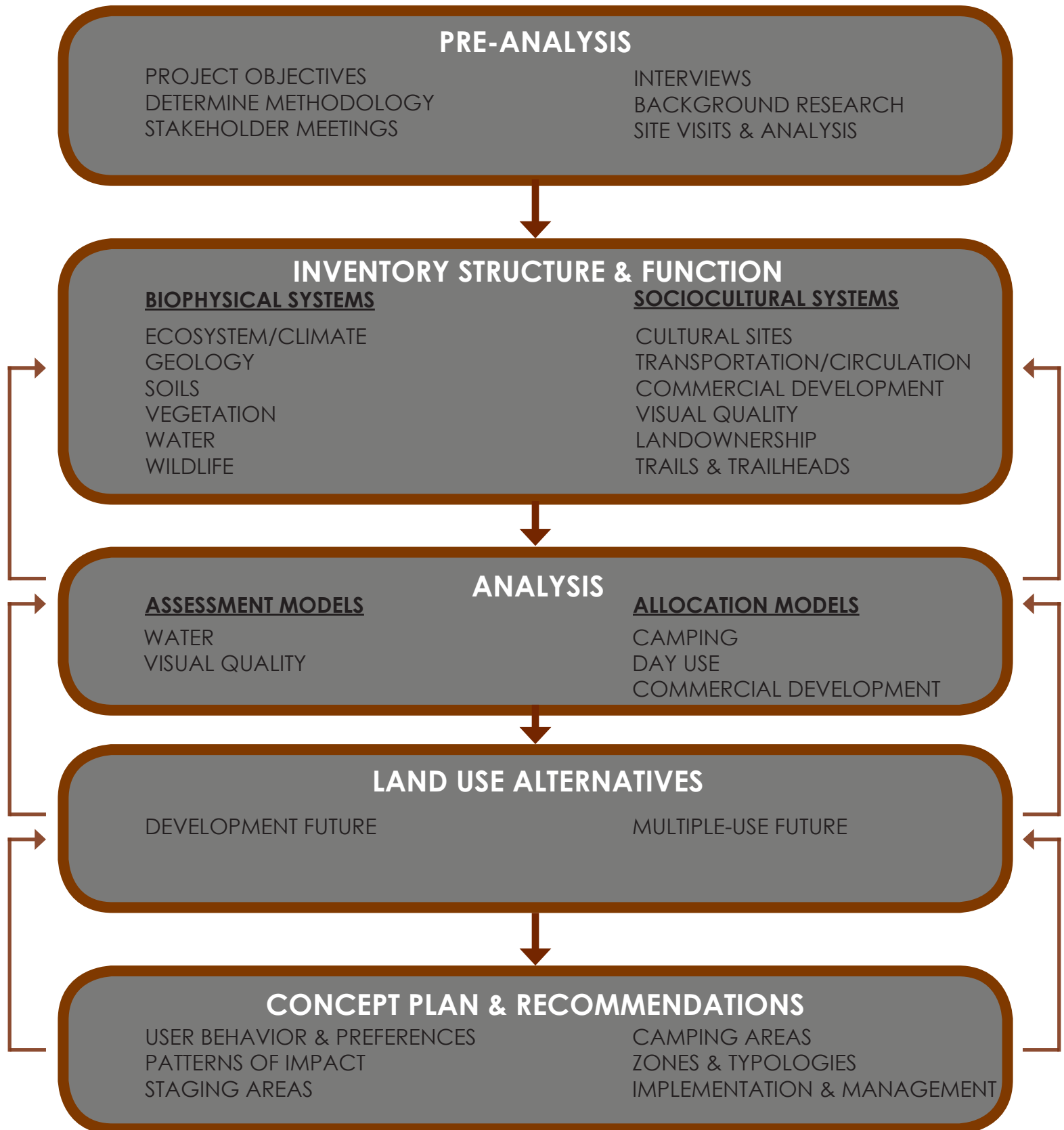


Figure 2.2 A process diagram of the Dalton Wells project

which were consulted for background research include the Grand County General Plan (Grand County, 2012) and the Moab Exchange Lands Comprehensive Management Plan (Division of Forestry, Fire, and State Lands, 2015). News articles, historical accounts, and other literature provided historic context on the site's archaeological value, CCC-era use, and historic significance.

#### *Initial Stakeholder Meeting & Site Visit, 09-14-17*

The research process began by meeting with representatives from SITLA and State Sovereign Lands. These groups met to identify areas of land at Dalton Wells and Willow Springs Road which could be exchanged to meet each group's objectives. This meeting included a site visit to areas which were under consideration for a trade. Lands which were significant to the discussion included areas close to Highway 191 which could be useful to SITLA for commercial purposes, and lands with dense dispersed camping sites near Dalton Wells Road and Willow Springs road which could be consolidated and turned over to State Sovereign Lands to be improved as an official camping area.

#### *Second Site Visit, 10-13-17*

The next site visit included a more detailed assessment of the Dalton Wells area. This site visit encompassed a tour of the area led by Tony Mancuso of State Sovereign Lands and Clif Koontz of Ride with Respect. The tour provided the opportunity to take a visual inventory of

the dispersed campsites, trails and road systems in the area. A rough sketch of the site's features was created to identify existing activity zones, geographic districts, and uses. Photographs were taken to document important scenic viewsheds, pull outs and camping areas with excessive amounts of erosion, and grouped areas of dispersed camping.

The site visit also offered observational insight into site usage and strategies which had been implemented to manage visitor impacts. Detailed notes were taken of current maintenance and management practices of the trail system.

#### *Secondary Stakeholder Interviews*

Important stakeholders at Dalton Wells were interviewed to garner local knowledge about the issues in the area and to understand the possibilities for site programming. Dr. James Kirkland, the Utah State Paleontologist of the Utah Geological Survey, provided information about the Dalton Wells Quarry and the potential it holds for both research and visitor activities. McKenna Drew, a landscape architect with the Bureau of Land Management, shared plans for the BLM land surrounding the site. Clif Koontz, the director of Ride with Respect, a non-profit that manages the on-site Sovereign Trail System, provided information about user behavior and site maintenance. These interviews contributed to important background knowledge of the site's cultural features, history, and current uses.

Planning for future implementation was

important to understand as well. Tony Mancuso, the State Sovereign Lands Coordinator and Megan Blackwelder, Southeast Region Manager of Utah State Parks, provided insight into potential management decisions, costs and funding associated with managing a recreation area of this size.

## INVENTORY STRUCTURE & FUNCTION— PHASE 2

In this phase of the process, a site inventory was conducted of regional biophysical and sociocultural features. The purpose of this phase is to understand and document the structure and function of systems that make up the landscape. These systems were researched and then mapped in GIS. Systems were categorized as either natural (biophysical) or human (sociocultural) in order to later understand how they interact and influence each other. This step informs what makes up the landscape structure, and how those systems contribute to a functioning holistic system.

Biophysical systems included geology, soil, water, climate, vegetation, wildlife and visual quality. These systems are important to understand, as they make up the ecology of the area. Sociocultural systems included history, commercial development, land ownership, agriculture, and recreation. These systems help to inform what areas are important for human use and cultural preservation.

## ANALYSIS – PHASE 3

Using information from the biophysical and sociocultural inventory, models were built using GIS, to analyze which areas are vulnerable to development, and which areas are suitable for different land uses such as recreation or commercial development. The assessment models looked at systems, including water and visual quality, which are vulnerable and critical to preserve. The allocation models analyzed which areas would be most suitable for the land uses of camping, day use areas, and commercial development.

Figure 2.3 shows how the models were built in GIS. The steps to model systems were: 1) collect data from Utah AGRC, 2) prepare data, i.e. trim to study area, rasterize data, and so on, 3) determine a numeric value for each raster cell based on the importance of landscape characteristics within each cell, 4) add cell layers together to identify areas of higher value, and 5) reclassify layers to show a range of landscape values. This range displays areas that are least to most important for either protection or development.

## LAND-USE ALTERNATIVES – PHASE 4

Using the allocation models as building blocks, future land use alternatives were created to represent the objectives of both stakeholders, SITLA and State Sovereign Lands. Each future prioritizes different land uses in order to achieve that alternative future's goals and preferred outcomes. Futures are built by overlaying the land use allocation models (commercial, day use, and camping) that are deemed most important to shape that

# ANALYSIS MODELING PROCESS DIAGRAM

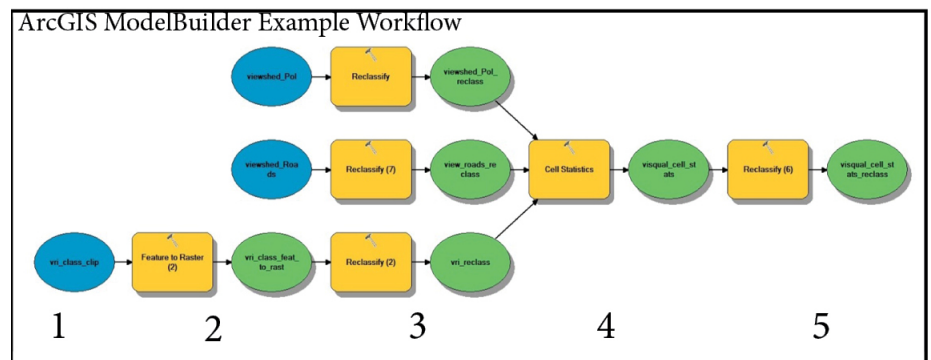
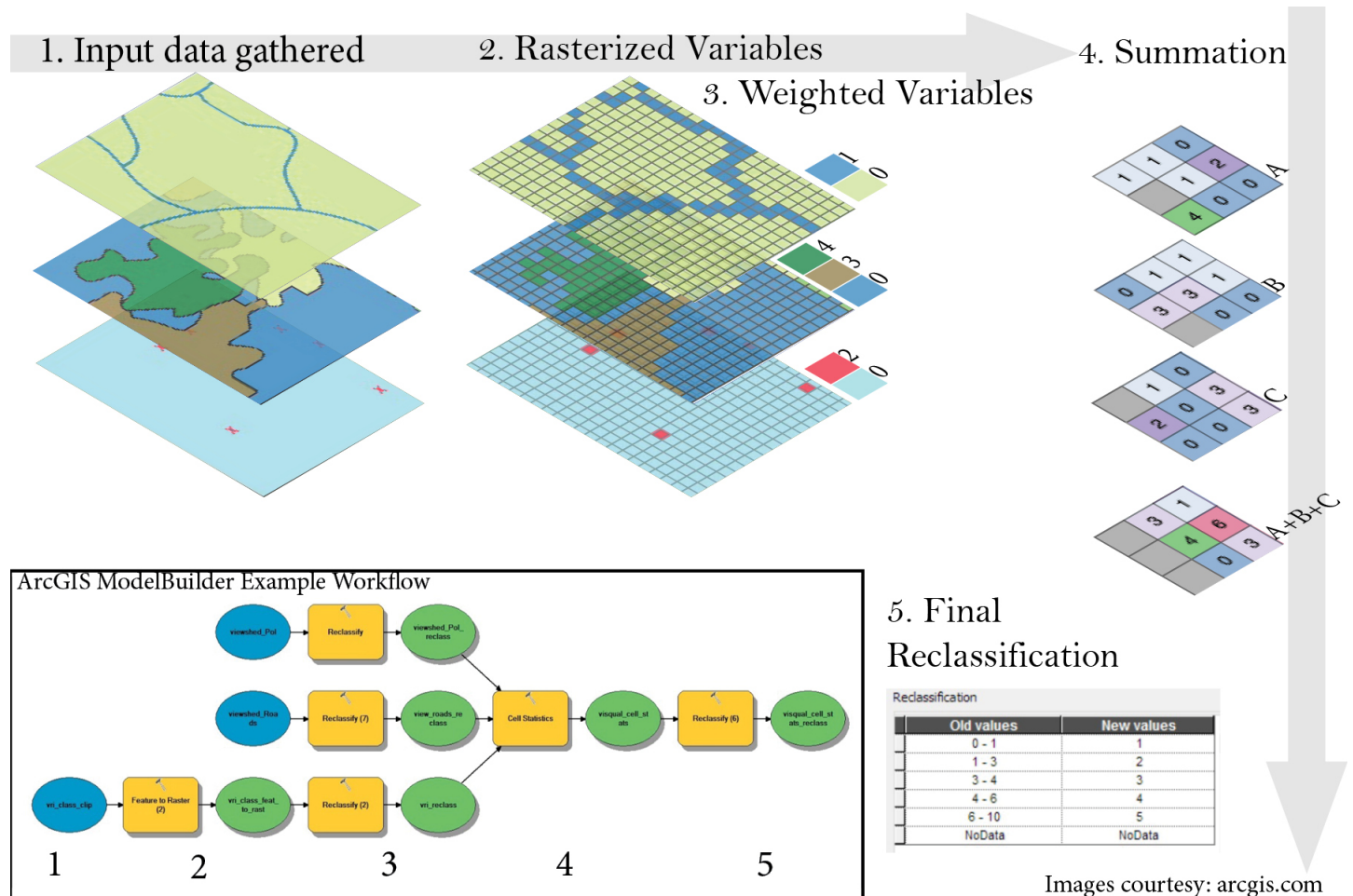


Figure 2.3 Diagram shows how the models are built using ArcMap GIS

future.

One future prioritized commercial development to meet SITLA objectives, while the other future prioritized recreation to meet the objectives of State Sovereign Lands. While the actual future alternative will likely consist of a compromise between the two futures presented, different futures create an understanding of priorities of the land use possibilities at the site.

In order to create the futures, the

allocation models were divided into tiers, which identify the most important places to locate commercial activity, camping, and day use. These tiers were then prioritized according to each stakeholder's objectives. Figure 2.3 shows how the tiers are created.

Tier one represents the most suitable land for a particular land use, or the area that should have priority to be developed. Tier two includes the lands of tier one and expands to encompass the next best area for that particular land use. Tier

three is the most inclusive, and includes all lands that could possibly be used for the land use. Areas that are not suitable for land uses are not included as a tier to be used in the alternative future.

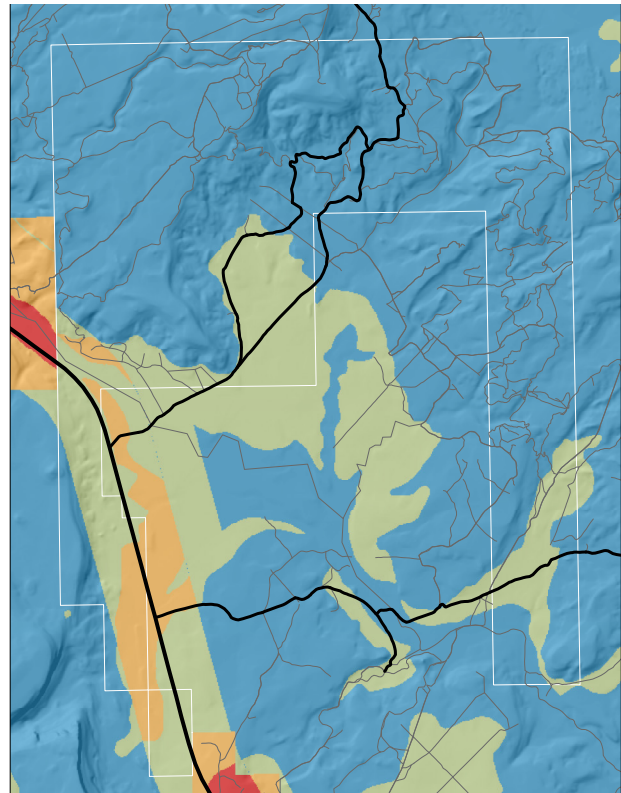
While the actual future land use will likely consist of a compromise between the objectives of each stakeholder, alternate futures show a range of land use possibilities that are available for stakeholders to negotiate.

After the commercial development, camping, and day-use futures were created, they were compared to the assessment models to determine if future land-use development would impact the water or visual quality of the site. This informed the next step, the design of a conceptual master plan, by showing which areas may be prime for development, but may impact water or visual quality.

#### MASTER PLAN & RECOMMENDATIONS – PHASE 5

In the final phase of the process, areas were identified that would be most appropriate for recreation and commercial activity at the site. Design decisions were also informed by examining patterns of impact and user activities and preferences. These considerations helped to develop activity zones, programming, and recreation typologies.

Design decisions were also informed by traditional design principles of landscape architecture such as connectivity and circulation, the formation of districts



*Figure 2.4 The commercial model (above) is tiered into 3 sections (see Figure 2.5)*

(or activity zones) and nodes, and by examining opportunities and constraints for recreation activity and infrastructure at the site. Recommendations were presented to State Sovereign Lands to explore ways to manage, fund, and implement the master plan over time.

TIERING THE COMMERCIAL MODEL

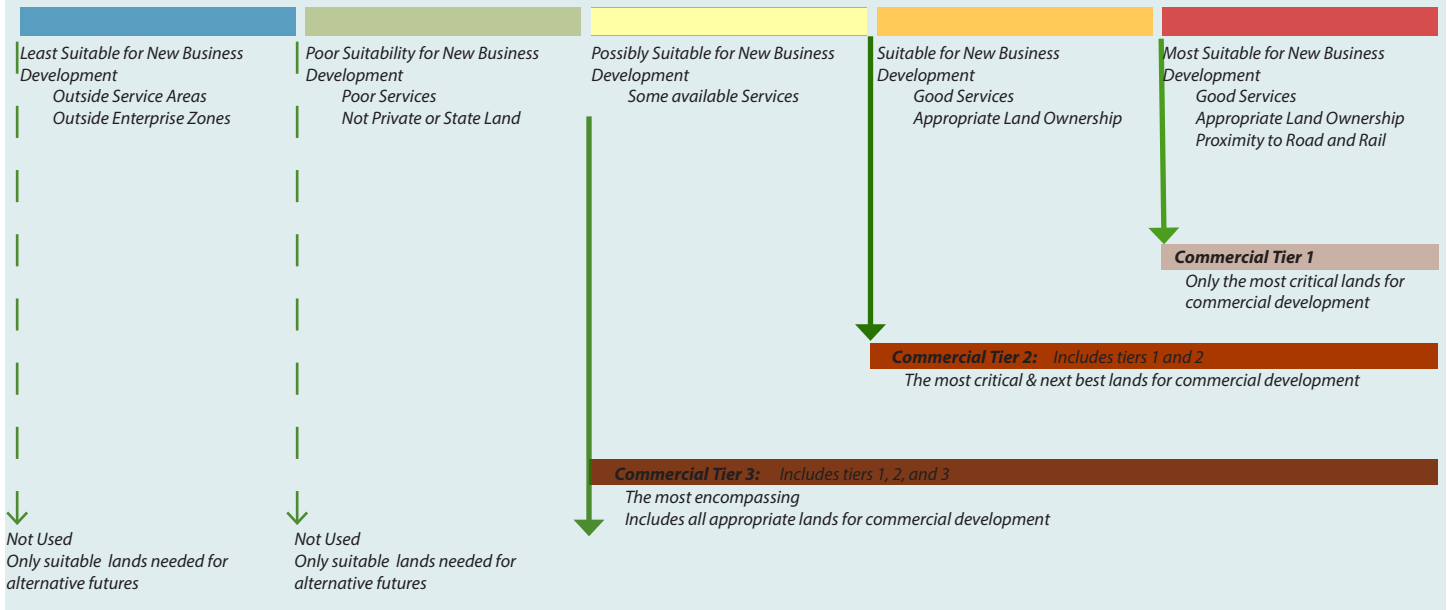


Figure 2.5 This diagram highlights how the 3 tiers are created from 5 levels of suitability.

ALLOCATION MODEL TIERING FOR ALTERNATIVE FUTURES

	No Resources Present	1 Resource Present	2 Resources Present	3 Resources Present	4 Resources Present
<b>Camping Tiering</b>	Not used	Not Used	Not Used	Tier 2	Tier 1
<b>Camping</b>	Lowest Potential for Future Camping Infrastructure	Minor Potential for Future Camping Infrastructure	Average Potential for Future Camping Infrastructure	Some Potential for Future Camping Infrastructure	Highest Potential for Future Camping Infrastructure
<b>Day Use Tiering</b>	Not used	Not used	Not used	Not Used	Tier 1
<b>Day Use</b>	Least Suitable for Day Use Development	Limited Suitability for Day Use Development	Suitable for Day Use Development	More Suitable for Day Use Development	Most Suitable for Day Use Development
<b>Comm. Tiering</b>	Not used	Not used	Not Used	Tier 2	Tier 1
<b>Commercial</b>	Areas Least Suitable to Commercial Uses	Areas Less Suitable to Commercial Uses	Areas Somewhat Suitable to Commercial Uses	Areas More Suitable to Commercial Uses	Areas Most Suitable to Commercial Uses

Figure 2.6 This chart shows which levels of suitability were used to build allocation model tiers.

## STRUCTURE & FUNCTION

An inventory of the site's natural (biophysical) and human (sociocultural) systems was researched and mapped in order to understand what makes up the landscape, or its structure, and how those systems contribute to a functioning holistic system.

Biophysical systems of the study area include geology, soil, water, climate, vegetation, wildlife and visual quality. Sociocultural systems include history, commercial development, land ownership, agriculture, and recreation. The research about these systems helps to inform the project and the modeling of these systems. Below each system is described, providing context for the assessment/allocation modeling, and each system's role in the landscape.

### BIOPHYSICAL SYSTEMS

The biophysical systems described here include the natural elements that form the landscape.

#### *Ecosystem/Climate*

The site lies within a high desert, dry-land ecosystem on the Colorado Plateau. With an annual 9.49 inches of rain, the climate is arid, and is made up of drought conditions. The temperatures vary greatly, often over the course of a day. Hot summers produce average highs of 99 degrees farenheight, and cold winters bring the temperature as low as an average of 20 degrees farenheight. (Your Weather Service, 2018).

#### *Geology*

Dalton Wells is located between

approximately 4,300– 4,900 feet in elevation. An arid climate, combined with high elevation, has created habitat with sparse vegetation, subjecting the substrate to strong erosive forces such as wind, water, and large diurnal temperature fluxes. These factors have produced some of the most iconic landforms in the region, including Delicate Arch, the Colorado River corridor, and Balanced Rock.

The most prominent rock types in the study area stem from the Jurassic Period and are responsible for most of the geologic wonders of Arches National Park. During the early Jurassic Period (205–140 mya), most of southern Utah was covered in deep sand dunes which gave rise to this sandstone formation. The area has been covered multiple times in shallow oceans and sand dunes. In southeastern Utah, the relative thickness of the sandstone is less than other parts of the state, mostly due to prolonged exposure to the elements. (Slick Rock Trail belongs to this rock formation.)

The major structures comprising the region are broad flexures, vertical faults, and large igneous intrusions (La Sal Mountains). One prominent feature specific to the region are Paradox Valleys, where the major river flows atypically perpendicular through the valley instead of parallel. This feature stems from the valleys being formed from salt dome anticlines versus erosion. The salt dome slowly rises since it is less dense than the surrounding stone and any salt that is removed allows the upper layers to collapse, which creates valleys. Because the valleys are sinking, there are many fault lines throughout the study area; most are reverse faults. They can move at any time but do not pose a major public safety risk since they cannot cause high strength earthquakes.

### Soils

Soils at the site consist largely of aridosols and entisols. Aridosols form in arid climates and cover most deserts and xeric habitats, comprising almost one third of the Earth's land surface. Aridosols soils contain very little organic matter due to its water deficiency. Entisols are defined as soils with no development deeper than the initial soil horizon. Most are unaltered from when they were initially deposited.

Overall, in the Dalton Wells area, bedrock is very close to the surface. Most of the region offers only several feet of soil before hitting the hard sandstone bedrock. Therefore, many surfaces are impermeable to water and susceptible to erosion. Biological soil crusts (*figure 3.1*) play a large role in preventing this erosion and providing places where plant life can take root.

### Vegetation

The vegetation at the site is sparse. Much of the site consists of exposed rock, and is inhospitable to plant life. The dominant plant species in the area is Blackbrush (*Coleogyne ramosissima*), followed by Galleta Grass (*Hilaria jamesii*). Utah Juniper (*Juniperus osteosperma*) is also very common. In most sections of the site, this Juniper is the most effective screen between camping areas. Because of this, campers tend to congregate in patches of old-growth Juniper. While this may be desirable to the public, too much trampling from recreation could damage the lateral root systems of the trees.

Cottonwoods grow naturally along sections of Courthouse Wash, and were also planted near the entrance to Dalton Wells Road by members of the historic Civilian Conservation Corp (CCC) camp. These



*Figure 3.1 Biological soil crusts at Dalton Wells are a crucial yet fragile part of the ecosystem*



provide subtle relief from the otherwise sparsely vegetated landscape. Tamarisk, a non-native plant, has also grown in Courthouse Wash. These invasive plants are being managed by State Sovereign Lands, which treats them in sections to prevent further spreading.

### *Water*

There is little water at the site. As the soil is impermeable in many places, the landscape is shaped by washes which begin as small runoff points higher up in the hills. Courthouse Wash is the largest feature, which hosts only an intermittent stream of water during periods of seasonal runoff and storm events. This watershed, however, is important as it flows into Arches National Park and is included in an Arches Water Protection Zone, an agreement to not alter or contaminate the water which flows into nearby Arches National Park.

The only other water on site is contained within Dalton Well, the well that the area is named for. This water right is owned by SITLA and has previously been used to irrigate a small parcel of farmland at the site. SITLA wants to maintain this water right, as it could prove useful to making the land near Highway 191 more valuable.

### *Wildlife*

The Comprehensive Management Plan states that Dalton Wells contains areas of important habitat to bighorn sheep. According to the plan, “The bighorn sheep using the DWU belong to the Potash herd, one of two native herds of bighorn sheep in the entire state” (Division of State Lands and Forestry, pg. 36). Habitat areas near steep cliffs and slopes should be managed to be as free of human impacts as possible. “Other desert fauna including lizards, ravens, turkey

vultures, jackrabbits, snakes, pack rats and mice are also present on DWU” (Division of State Lands and Forestry, 2015, p. 36).



Figure 3.2 Vegetation at Dalton Wells: Rabbitbrush, Big Sage, and Oak



## SOCIOCULTURAL SYSTEMS

The sociocultural systems described here include the systems of human use that form the landscape.

*Cultural Resources*

In addition to natural and recreational resources, the Dalton Wells study area is rich in cultural resources. Both the Dalton Wells dinosaur quarry, the most diverse Late Cretaceous quarry in North America (Eberth, Britt, Scheetz, Stadtman, & Brinkman, 2006) and the foundations of a historic CCC Camp later used as a Japanese internment camp, are located on site. Both of these cultural treasures are at risk of damage and decay. The CCC/Internment Camp is unmaintained and the quarry sits unattended, at risk of pillaging. Sites of this character and quality should be accessible and maintained in order to be appreciated by researchers and the public.

*Civilian Conservation Corp Camp*

Dalton Wells, seen in figure 3.3, was the site of a Civilian Conservation Corp (CCC) camp, later used as a Japanese American isolation camp. The site is recognized on the National Register of Historic Places (National Register #94000366), and is currently marked by a plaque explaining the dual history of the site.

The CCC was formed as part of President Roosevelt's New Deal in order to help improve the economy of the country and help bolster employment during the Great Depression. The camp at Dalton Wells was one of four established in the Moab area. It was the longest lasting of the four, established July 10, 1935 and closing

sometime in 1941. Also known as CCC Unit DG-32, the camp hosted about 200 young men between the ages of 18 and 25 who came out from the eastern states to earn a living during the harsh economic times. CCC workers earned around \$25 a month, \$20 of which was sent home to their families, leaving them \$5 a month to live on (Baldrige, 1971).

DG-32 was run by the Division of Grazing of the Department of the Interior (previously known as the General Land Office). The CCC workers helped mainly with flood control and range development, working on projects such as building flood control devices, rodent control, road and trail construction, and corral and fence construction.

The camp originally contained around ten barracks, three administration buildings, and two mess halls. The structures were made mostly of wood and tar paper, and few structures still stand. Some remains of the camp can still be seen such as old cottonwood trees planted for the camp, the concrete foundations of buildings, a water storage tank, and a gunpowder storage room. There is potential for these elements to be included as part of an interpretive display or trail. An interpretive element at the Dalton Wells Camp could also honor the other three Moab-area CCC camps, NP-7, PE-214, and F-20, as they played a role in developing roads and trails at Arches National Park, and flood control projects just outside Moab in nearby Millcreek Canyon. (The Living New Deal, 2015).

*WWII Isolation Camp*

The CCC camp at Dalton Wells was also a part of a darker side of American history. During World War II, after Japan attacked



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Figure 3.3 Historic Photos of the CCC Camp and Construction

Pearl Harbort, war hysteria and racism caused President Roosevelt to sign Executive Order 9066, allowing Japanese Americans to be incarcerated in internment camps. Japanese Americans were denied their rights and not allowed representation. Dismal camp conditions and abuse of power caused some to speak out against the War Relocation Authority (WRA). This created conflict between Japanese Americans who questioned this abuse of power, WRA bureaucrats, and Japanese American's Citizen's League, Japanese citizens trying to

work with the WRA. The Japanese American "troublemakers," who dared question the practices and unfair treatment experienced at the relocation camps, were sent to the Moab isolation camp as punishment, separating them from their families and the rest of the group (Baldrige, 1971).

The first round of inmates arrived at the Dalton Wells isolation center on January 11, 1943. Over the next few months, men were relocated from the internment camps in Manzanar, Tule Lake and Gila. By late

April, 1943, the camp held 49 men. Camp conditions were even worse than those at the relocation centers, as the camp had been abandoned for the 15 months between the CCC and internment periods. Disagreements and misunderstandings continued, at one point resulting in a riot which left two prisoners dead. Seven other prisoners ended up being sent to the Grand County Jail.

On April 27, 1943, the detainees were transferred to an abandoned Native American boarding school in Leupp, Arizona, ending all activity at the Dalton Wells camp. A new WRA director was appointed who recognized the injustices these prisoners had faced. On December 2, 1943, the director shut down the Leupp camp and the detainees were transferred to the Tule Lake relocation center (Burton, Farrell, Lord, F. & Lord, R., 2000).

### *Dalton Wells Dinosaur Quarry*

The Dalton Wells Dinosaur Quarry contains the most diverse collection of dinosaur bones in the Western Hemisphere, with over 4,200 bones representing 67 animals retrieved from the site. Fossils collected from the quarry date back to the late Cretaceous period (Eberth, et.al, 2006).

The quarry is a two-meter thick stack of four bone beds, occurring in a succession of debris flows. The mudflows, likely caused by heavy rainfall following drought periods, caused the bones to be crushed and mixed together as they were washed down to an alluvial plain at the base of a small lake. Figure 3.4 shows the location of fossil piles which were uncovered during excavations.

It remains unknown under what specific circumstances these animals died prior to

being moved by debris flows. However, evidence suggests that drought-related mortality events were probably common at the base of the Yellow Cat Member.

Dalton Wells Quarry was likely known to fossil collectors in the 1930's, yet did not become significant to paleontologists until the 1960's when local rock hound Lin Ottinger showed the layer to James Alvin Jensen aka 'Dinosaur Jim', a paleontologist from Brigham Young University. Since that time, more than eleven field seasons have taken place at the quarry.

The quarry holds many future discoveries as there are still several thousand bones that have yet to be excavated. As of 2014 only 215 of the estimated 4000 square meters had been uncovered. The quarry will be an active and ongoing research site as proper excavation, cataloging, and fossil research can take years to complete. As such studies move forward, each newly uncovered bone tells us more about how these ancient creatures behaved (Eberth, et.al, 2006).

According to Utah's State Paleontologist, James Kirkland, there is great interest in seeing the site invested in and used for research. The quarry has the potential to serve as both a research center for paleontologists and a visitor's center for guests. For example, the site could be modeled after the Cleveland Lloyd Quarry, where excavations can be viewed by the public. Furthermore, an interpretive trail or display at the base of the quarry hill could highlight the fossil and geological history of the area.

### *Transportation & Circulation: Roads, Railroad, Airport*

The main transportation corridor in the area

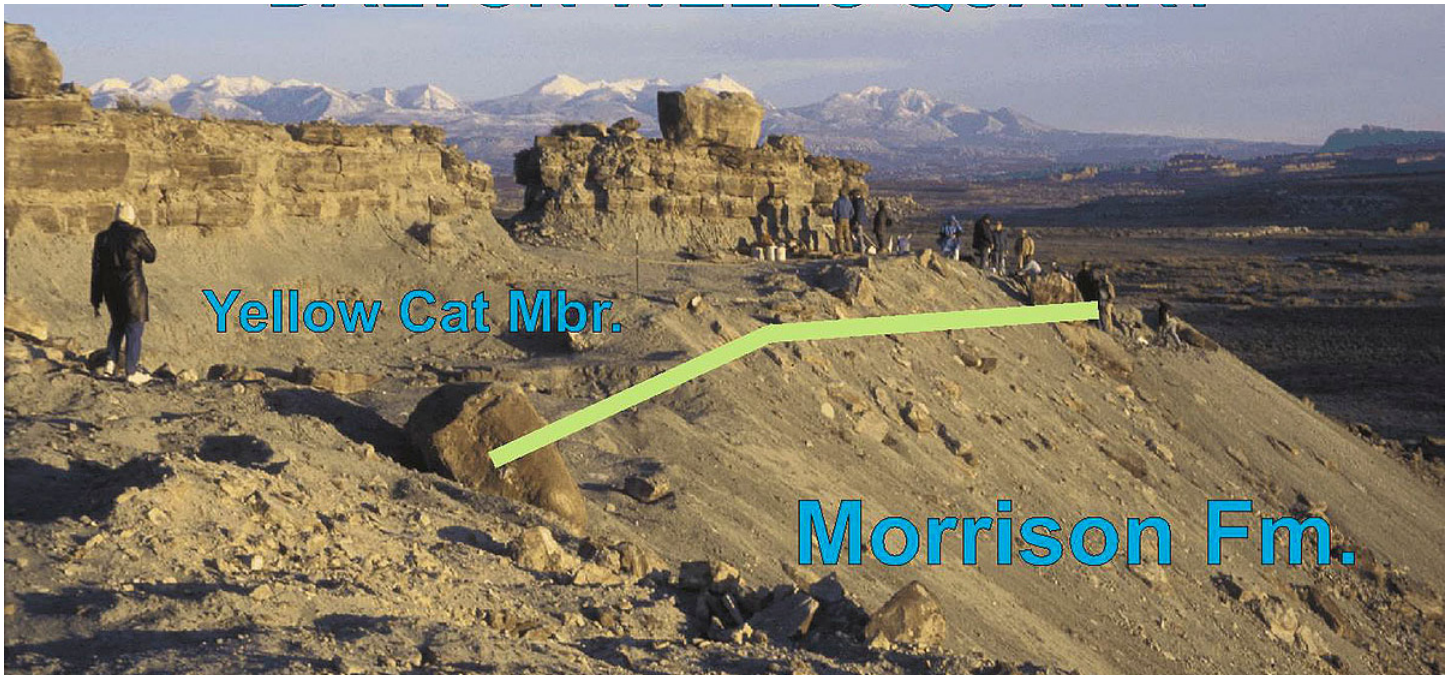


Figure 3.4 Dalton Wells Dinosaur Quarry Excavation

runs right through the Dalton Wells study area. Highway 191, which dissects the study area connects Moab to Interstate 70 and provides access to the site. The study area is also just north of the turn off to Highway 313, which leads out to Dead Horse Point and the Island in the Sky District of Canyonlands National Park.

Two graded dirt roads run east from Highway 191, Dalton Wells Road on the northern end of the site, and Willow Springs Road on the southern end. Dalton Wells loops north, connecting to Klondike Bluffs road via a rough, dirt road with terrain challenges. This north-eastern section of road creates a pinch-point, allowing only high-clearance vehicles through. Another barrier on Dalton Wells Road is Courthouse Wash. When the wash is wet, it can be impassible, and only 4WD vehicles can cross the deep sand when the wash is dry.

These roads are all connected by the

Sovereign Trail System, a network of trails used for OHVs, ATVs, dirt biking, mountain biking, hiking and horseback riding. The Sovereign Trail System is managed in partnership with the non-profit Ride with Respect, which provides educational signage to encourage users to ride responsibly and respect the surrounding environment. The network of ATV trails and single track is one of the main draws to the area, and brings a lot of day use to the site.

Other transportation elements in the surrounding area include the Moab Regional Airport, which is approximately 5 miles to the north, and the Union Pacific Railroad. The airport facilitates the potential for commercial activity, as it brings many goods and people through the area. The railroad, while currently being used to transport Potash and Uranium Tailings, could potentially haul commercial goods.

*Commercial Corridor*

The Moab area is dependent upon outdoor tourism to drive its economy. The Highway Corridor 191 north of town has been zoned as North Corridor Recreation in the Grand County General Plan. This zoning encourages nodal economic development in the form of tourist-oriented, resort commercial development.

Figure 3.5 shows existing commercial development, which is mostly centered near the intersection of Highway 191, and Highway 313. The businesses include Moab Under Canvas, a glamping resort, Archview RV Resort and Campground, and Moab Giants, a dinosaur museum.

Private lands and lands owned by SITLA are the most likely to be developed in the future.

The potential for commercial development on lands near the highway is of interest to SITLA, who could profit from parcels they own in this area to fulfill their mandate of raising money for public education.

*Visual Quality*

The Moab area is a visually stunning space, which is why millions of people annually flock to the region (Headwaters Economics, 2011). Since the regional economy is centered on a recreation and tourism focus, it is important to maintain visual quality for the region. Many agencies, including the National Park Service (NPS), BLM, U.S. Forest Service (USFS), state parks, State and Institutional Trust Land Administration (SITLA), and local municipalities among others, are working towards promoting the area and accommodating the influx of



Figure 3.5 Commercial activity off Highway 191, west of the Dalton Wells dispersed camping area. Moab Giants Dinosaur Museum and Archview RV Resort and gas station.



*Figure 3.6 Views from the Dalton Wells looking out to the Windows section of Arches National Park*

tourists, which occurs on a seasonal basis.

The BLM and NPS manage the largest portions of our study area. Our biggest asset in studying the regional visual quality has come in the form of a 2011 Visual Resource Inventory (VRI) for the area conducted by the BLM Moab Field Office and Logan Simpson Design, Inc. This report has classified lands as VRI Class 1, 2, 3, or 4. VRI Class 1 is the most visually sensitive areas and requires management to maintain them as such. Class 4 areas compose the least sensitive viewsheds, meaning the public is not sensitive to changes at that location. These areas (as well as Classes 2 and 3) are more likely to have visual disturbances if land or resource development is deemed economically viable in the area. (Douglas et.al, 2018).

The land at Dalton Wells is classified as VRI Class 2. Viewsheds into Arches National Park are the most sensitive to land surface disturbances, and should be protected from development in order to preserve the landscape character for the region (see figure 3.6). When developing land, what is visible within these zones should be taken into consideration to avoid another major visual disturbance.

The importance of this is reflected in the Grand County General Plan, which has designated this area a scenic corridor and states that “Scenic resources are protected in new developments along this corridor” (Grand County, p. 68). This zoning overlay recommends that design guidelines such as setbacks, building color, parking design and visual buffers be implemented in order to protect the scenic quality of the area.



Nodal development of both commercial and recreational infrastructure is another method of preserving scenic resources. Nodal development creates activity centers, which uses land and resources more efficiently, and preserves views into the park from being blocked by linear strip development along the highway. While harder to implement due to private property rights, nodal development preserves the value of the landscape for both commercial and recreational activity by protecting the scenic resources that attract visitors to the region.

### *Night Sky Ordinances*

Another important factor in protecting scenic resources will involve implementing night sky ordinances. Moab is one of the few places left on earth with a clear night sky. Protecting the sky from commercial light pollution will be of utmost importance for guests at camping areas, the private glamping resort, Moab Under Canvas, and other potential new resorts that could be built in the area. This is also part of the Grand County General Plan.

### *Landownership*

Currently, State Sovereign Lands Owns the Dalton Wells Unit, a 4,350 acre U shaped parcel of land at the northern edge of the site. An additional small parcel is located just to the north. SITLA owns the land at the south edge of the site, at Willow Springs Road, and the land to the North, at Klondike Bluffs Road. The BLM owns the land to the west of the site, as well as a small parcel directly to the east. Arches National park border the northeastern edge of the site. State Sovereign Lands and SITLA are currently negotiating a land trade which would consolidate the land into parcels with

similar uses to better meet each agency's mandate. Under the terms being explored for the land exchange, SITLA would trade the Willow Springs area for Sovereign Land's developable lands off Highway 191 and the Prairie Dog Haven unit near I-70, which has extractive potential. This would give SITLA potentially profitable land, meeting their mandate of funding schools, while consolidating all of the recreation areas at Dalton Wells and Willow Springs for Sovereign Lands, meeting their mandate of public access.

### *Trails and Trailheads*

As mentioned earlier, one of the main draws of Dalton Wells is the Sovereign Trail system that runs along its eastern edge. This network consists of the Sovereign Trail ATV Loop and the Sovereign Single Track. The trail system is maintained and managed by a local non-profit, Ride with Respect. The single track is utilized for both motorized dirt biking and non-motorized mountain biking.

The Copper Ridge Jeep Safari route also runs adjacent to the site. This is connected to a series of jeep roads, which lead into adjacent BLM land and Arches National Park. One of these connections, Willow Springs Road, was once the original entrance to Arches National Park. Recreationalists who want to get away from the crowds can drive this road through more remote sections of the park. The road also runs past dinosaur tracks, which are a fun side attraction.

Hiking, horseback riding, and wildlife viewing, are other activities which utilize the trails in the area. While these don't appear to be the prominent reason for visiting the site, they were noted in visitor surveys from a visitor use study conducted by USU's ENVS

# LANDOWNERSHIP MAP

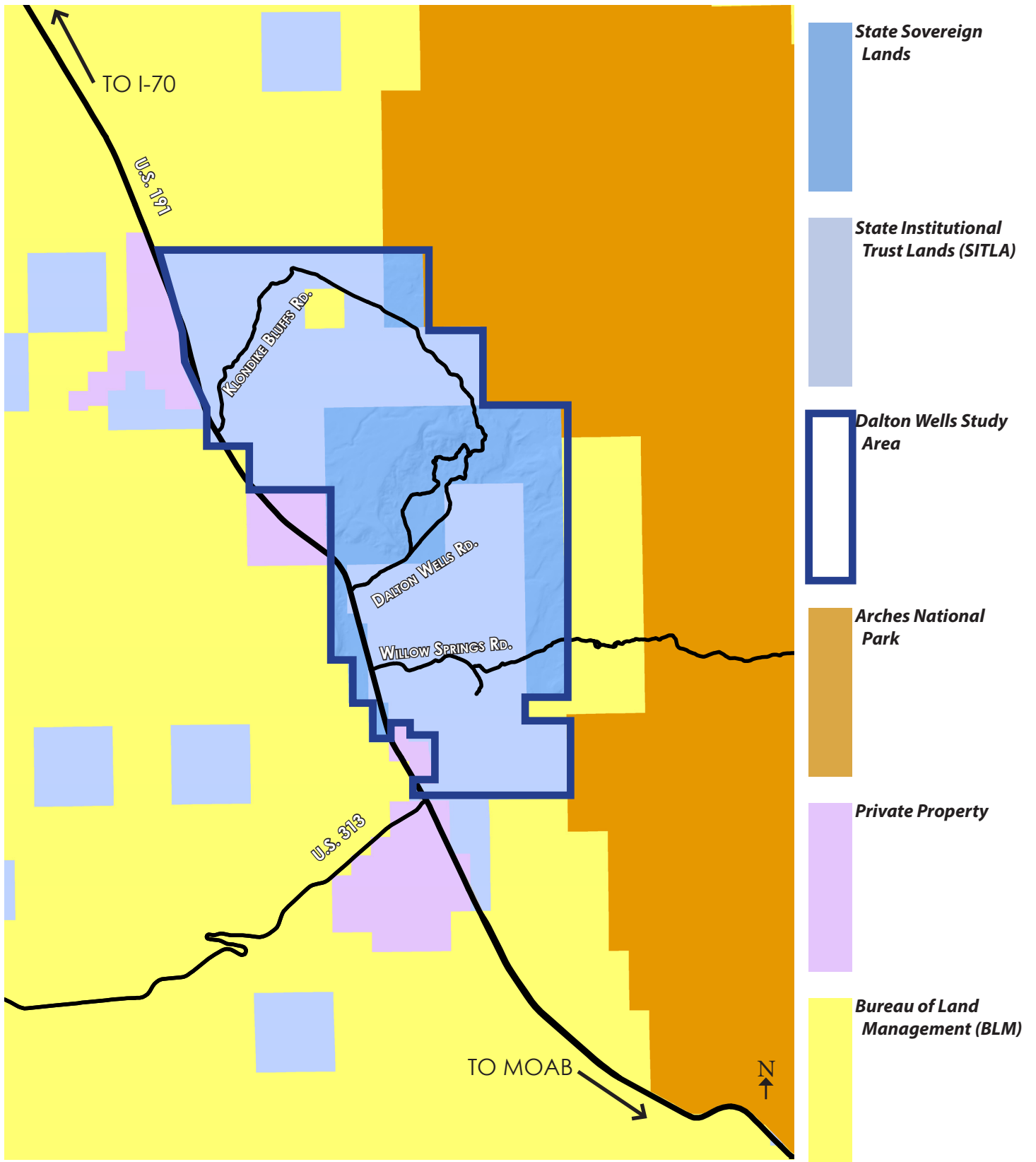


Figure 3.7 Landownership map of Dalton Wells study area and surrounding property

4550 class (Lamborn, et al., 2016).

connection back to Dalton Wells.

Connectivity with the surrounding land could aid the site in becoming a popular recreation destination for the area. To the west, on BLM land there are many jeep roads and OHV trails which could expand and strengthen motorized recreation possibilities if better connected to the Sovereign Trail system (see figure 3.8). The area could also better connect into the Klono and Bar M mountain bike trails on BLM lands to the east and south of the site.

Connectivity into town and to the northern part of the trail system near Fallen Peace Officer Trail are also essential. Currently, unofficial ATV tracks run alongside the highway in the right of way. Motorized recreationalists are using this connection when riding in from town, nearby staging areas, or the nearby service station. This could cause dangerous situations in the evening, when oncoming headlights from motorized recreation on the side of the road could be confusing to Highway traffic.

Also, the Fallen Peace Officer Trailhead is disconnected from the site. This is a well-developed trail and a great addition to the Sovereign Trail System, but is difficult to reach from Dalton Wells. Existing connections are currently unofficial and run through private property. Permission to use private property or an alternate route is needed to make access to this recreation opportunity an integrated part of the Dalton Wells area.

The site currently has two main trailheads, one at Dalton Wells and one at Willow Springs. The Klono mountain bike trailheads to the east are also accessed by traveling through the site on Willow Springs Road. Fallen Peace Officer trail is to the north west of the site and is in need of a direct



Figure 3.8 Motorized and Non-Motorized Use on the Sovereign Single Track

## **INTRODUCTION TO MODELS**

The previous section gave an overview of a regional inventory of the biophysical and sociocultural systems that comprise the area. Systems that are pertinent to the stakeholder objectives are modeled in GIS to analyze which areas are vulnerable to development, and which areas are suitable for activities such as recreation or commercial activity. The models focus on areas of dispersed camping activity along Dalton Wells Road and Willow Springs Road (figure 4.1) in order to understand how adjacent land uses will inform a plan for recreation in the area.

The assessment models assess which systems are vulnerable to development. In this case, water was modeled, as the watershed flowing into Arches is protected and water is a very limited resource at the site. Visual quality was also modeled as the scenic resources in the area are important to its identity and economy. The allocation models identify areas that are appropriate for development or specific activities. The land uses modeled were chosen based on objectives of SITLA and State Sovereign Lands. These allocation models include commercial development, camping and day use.

# DISPERSED CAMPING STUDY AREA

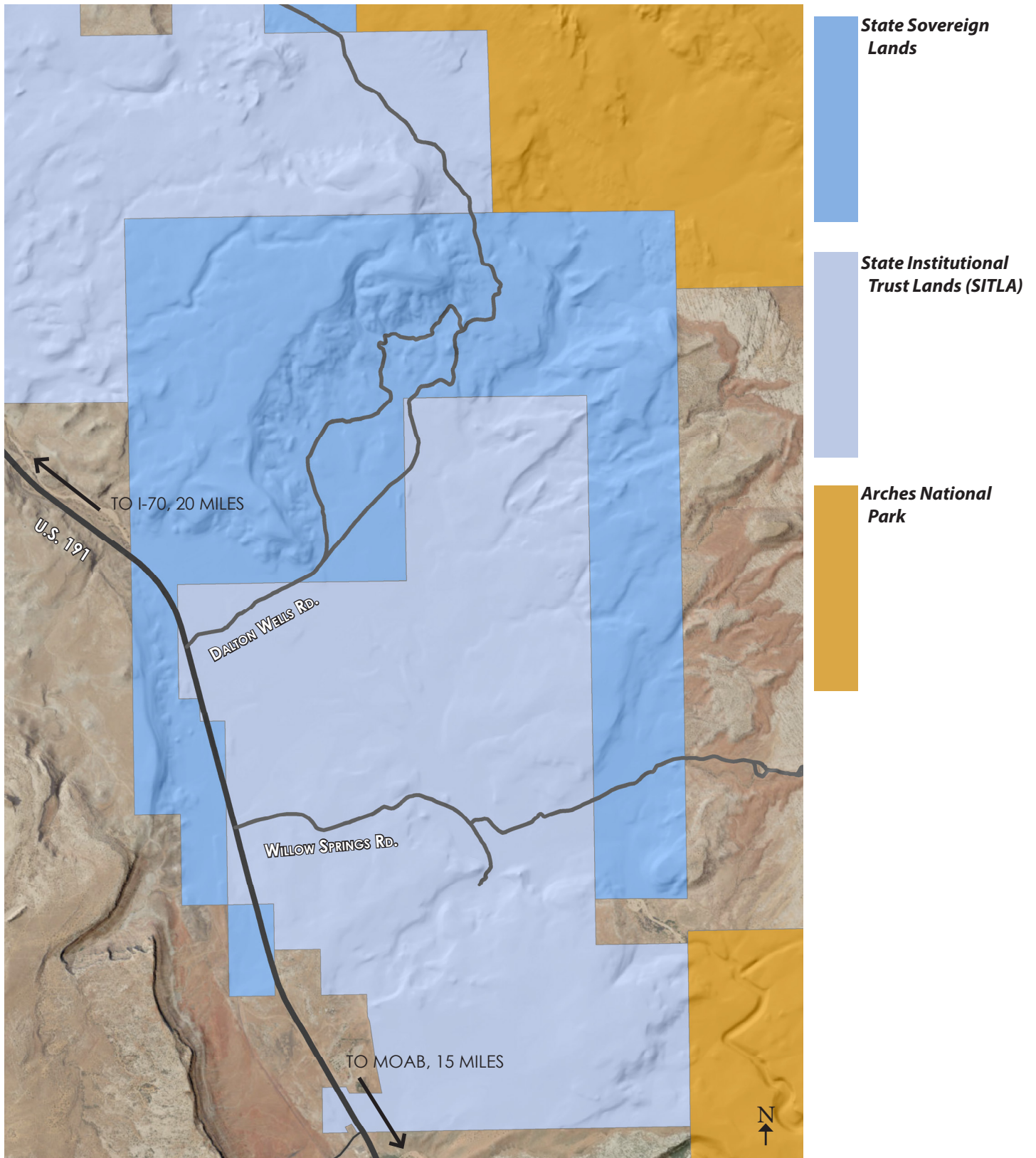
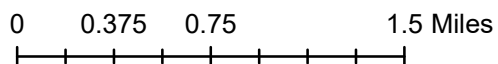


Figure 4.1 Dalton Wells dispersed camping study area






## WATER RESOURCES ASSESSMENT MODEL: OBJECTIVE

Water at the Dalton Wells is a vital resource to human activity and the environment. The site lies within an Arches Protection Zone, a designation that protects the flow and quality of water which travels into Arches National Park via washes and groundwater. Courthouse Wash and many other smaller washes that enter Arches National Park also flow through the site. These areas are critical to protect as they provide the only source of intermittent water for the surrounding area. This model identifies the most critical areas to protect from development or contamination. (See figure 4.2).

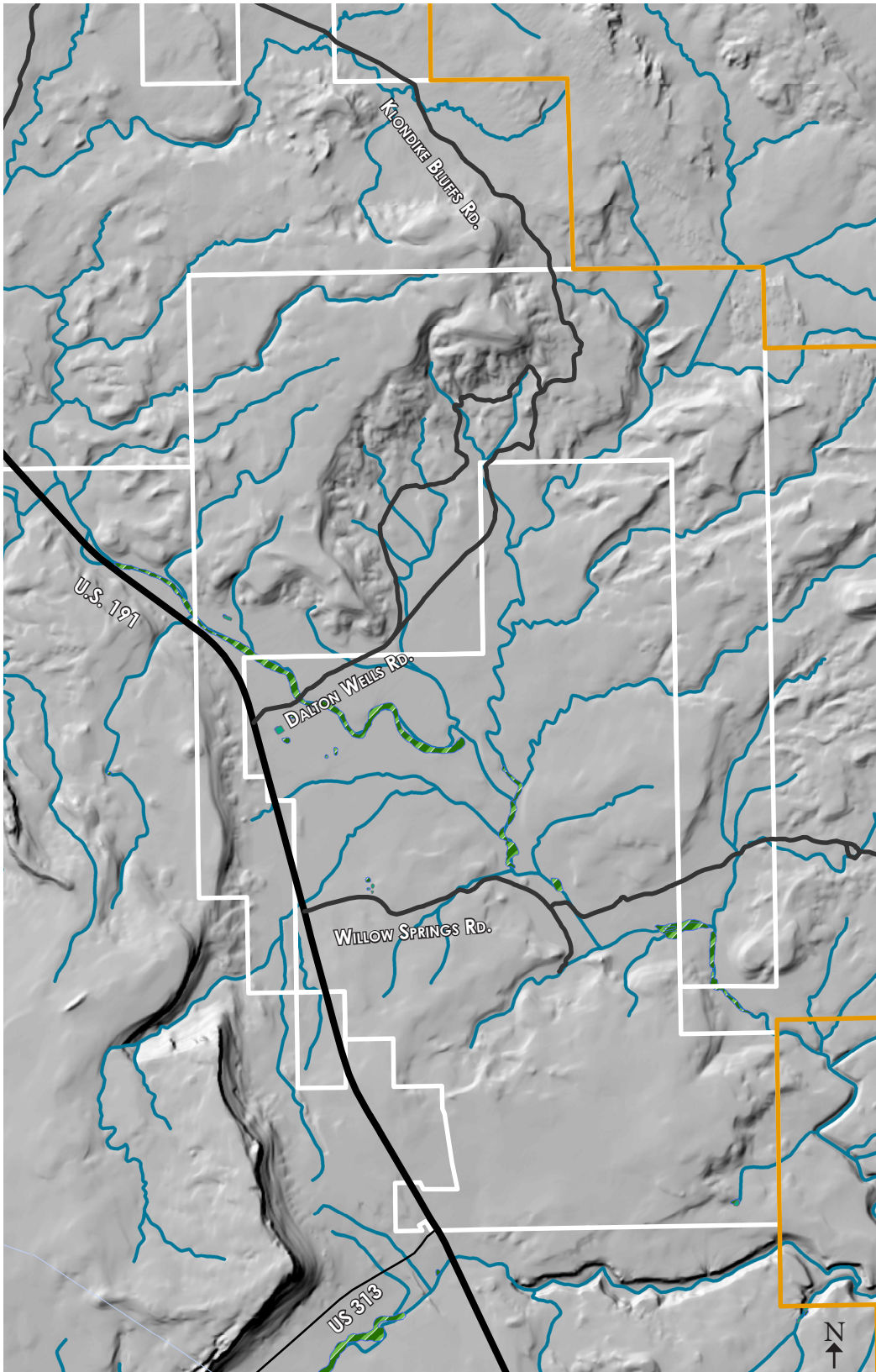
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## INPUTS: INVENTORY MAP LAYERS

### INVENTORY MAP LEGEND

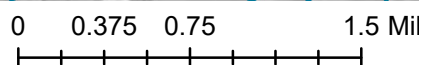
-  **Rivers Streams and Lakes**– This layer consists of Courthouse Wash and the smaller first and second order washes that feed into it. The layer also includes the Dalton Well, an important source of water for the alfalfa farm in the Dalton Wells study area.
  
-  **Wetlands and Riparian Areas**– An inventory of wetlands and riparian habitat. At the Dalton Wells study area, this includes the ephemeral stream in Courthouse Wash as well as depressions that retain seasonal snowmelt and stormwater runoff.
  
-  **Arches Protection Zone** - Groundwater and surface flow protection zone, based on the 2015 Arches Protection Zone Act. The act preserves the quality and amount of water allotted to Arches National Park in order to feed its streams and springs, and to plan for future visitor use. The entire Dalton Wells study area lies within the Arches Protection Zone.

# WATER RESOURCES INVENTORY MAP



- Rivers, Streams, Lakes**
  - Courthouse Wash
  - First and Second Order Washes
  - The Dalton Well
  
- Wetland and Riparian Areas**
  - Ephemeral streams
  - Riparian vegetation
  - Retained runoff
  
- Arches Protection Zone**
  - Groundwater and surface water protection
  - Flows unobstructed
  - Water quality preserved

Figure 4.2 Water resources inventory

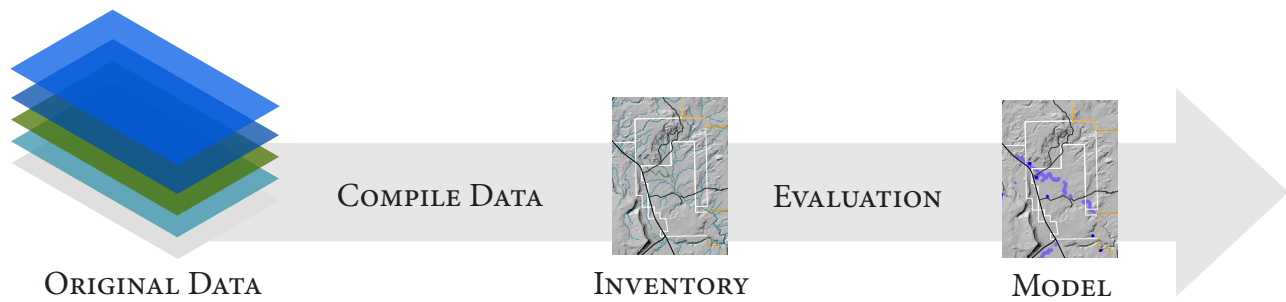




## WATER RESOURCES ASSESSMENT MODEL: EVALUATION

Results from the water resources model identify only a few areas of importance to water resource protection. (See figure 4.3). Courthouse Wash, while not a perennial water source, provides seasonal habitat and has certain areas classified as riparian habitat. These places are the most critical areas to avoid development of recreational or commercial infrastructure. Washes in the area are also important as they flow into the larger wash system. These washes should be allowed to flow as unimpeded as is possible, so as not to disrupt the hydrologic system. When building the futures, this model will be used as a layer to eliminate washes from development areas.

### PROCESS



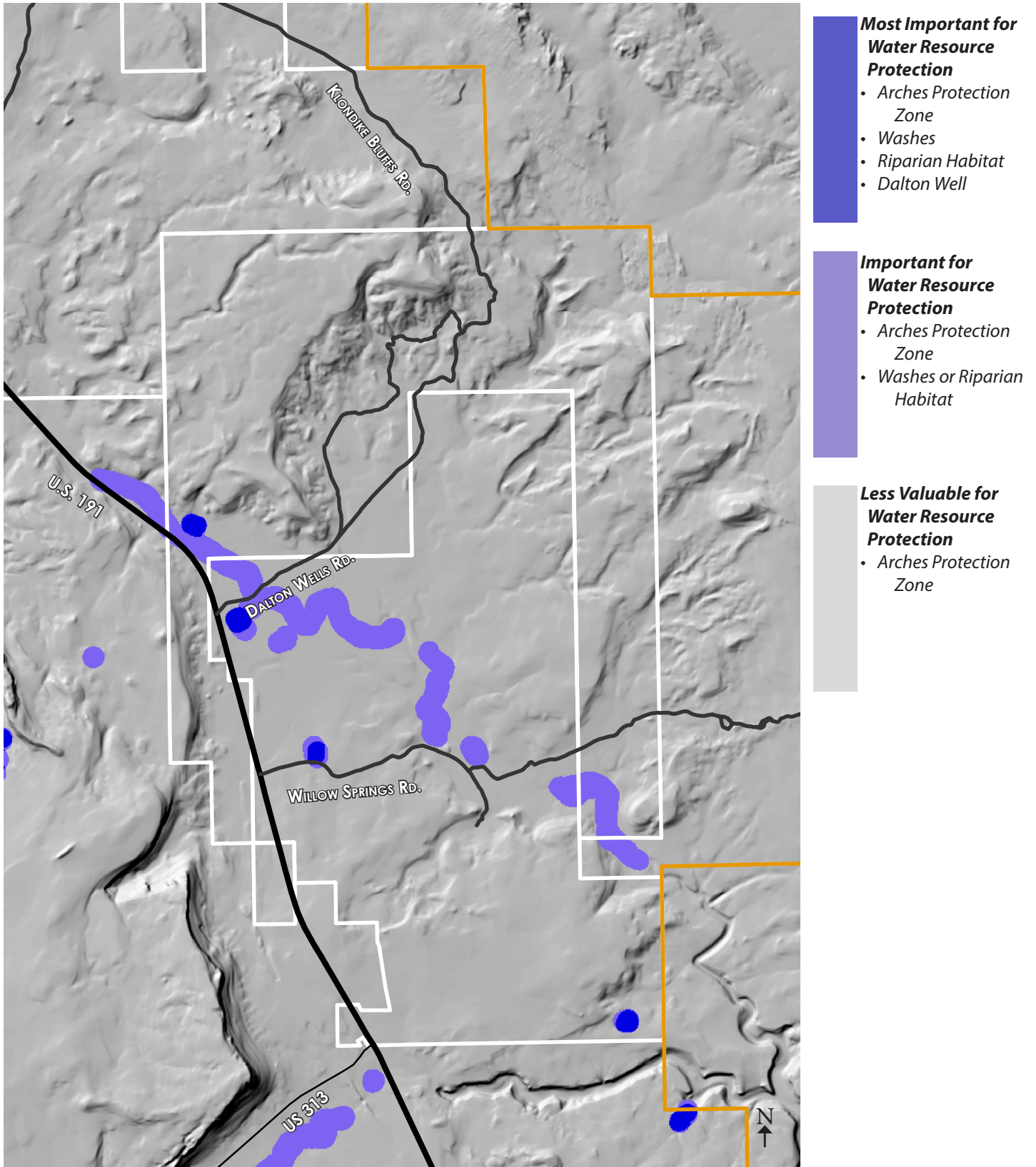
## WATER RESOURCES MODEL: OUTCOME

<div style="background-color: #4a7ebb; width: 20px; height: 20px; margin-bottom: 10px;"></div> <p><i>Most Important for Water Resource Protection</i></p>	<p>Areas that are in a wash, have riparian habitat, and lie within the Arches Protection Zone. Should not be developed</p>
<div style="background-color: #8e99c9; width: 20px; height: 20px; margin-bottom: 10px;"></div> <p><i>Important for Water Resource Protection</i></p>	<p>Areas that have two of three criteria: in a wash, have riparian habitat and/or lie within the Arches Protection Zone</p>
<div style="background-color: #d9d9d9; width: 20px; height: 20px; margin-bottom: 10px;"></div> <p><i>Less Important for Water Resource Protection</i></p>	<p>Arches Protection Zone. Still important to not alter or contaminate water flows, yet only has one of the criteria.</p>

## GIS DATA SOURCES

1. Rivers, Streams, Lakes: *Utah Automated Geographic Reference Center.*
2. Wetlands and Riparian Areas: *Utah Automated Geographic Reference Center. United States Fish and Wildlife Service.*
3. Arches Protection Zone: *Utah Department of Water Rights.*

# WATER RESOURCES ASSESSMENT MODEL



- Most Important for Water Resource Protection**
  - Arches Protection Zone
  - Washes
  - Riparian Habitat
  - Dalton Well
- Important for Water Resource Protection**
  - Arches Protection Zone
  - Washes or Riparian Habitat
- Less Valuable for Water Resource Protection**
  - Arches Protection Zone

Figure 4.3 Water resources assessment model

0 0.375 0.75 1.5 Miles

## VISUAL QUALITY MODEL: OBJECTIVE






All landowners within the area have a vested interest in preserving the scenic quality of the region. The stunning views drive the tourist economy, and are a major factor in the area's regional identity. This model highlights the most visually sensitive locations in the study area, using the Bureau of Land Management's Visual Resource Inventory classes.

---

## INPUTS: VISUAL RESOURCE INVENTORY MAP 1, VRI

Most of the site is classified as VRI Class II, just below the highest sensitivity in scenic quality. (See figure 4.4). This means that while portions of the study area can be developed, great care should be taken to preserve visual corridors and development should not detract from the landscape.

### INVENTORY MAP 1 LEGEND

-  **VRI Class I** - Views of highest sensitivity and quality
-  **VRI Class II** - Views of some sensitivity and quality
-  **VRI Class III** - Views of lower sensitivity and quality
-  **VRI Class IV** - Views of lowest sensitivity and quality
-  **Transmission Lines** - Power lines in the area; these can affect visual quality

# VISUAL QUALITY INVENTORY MAP 1

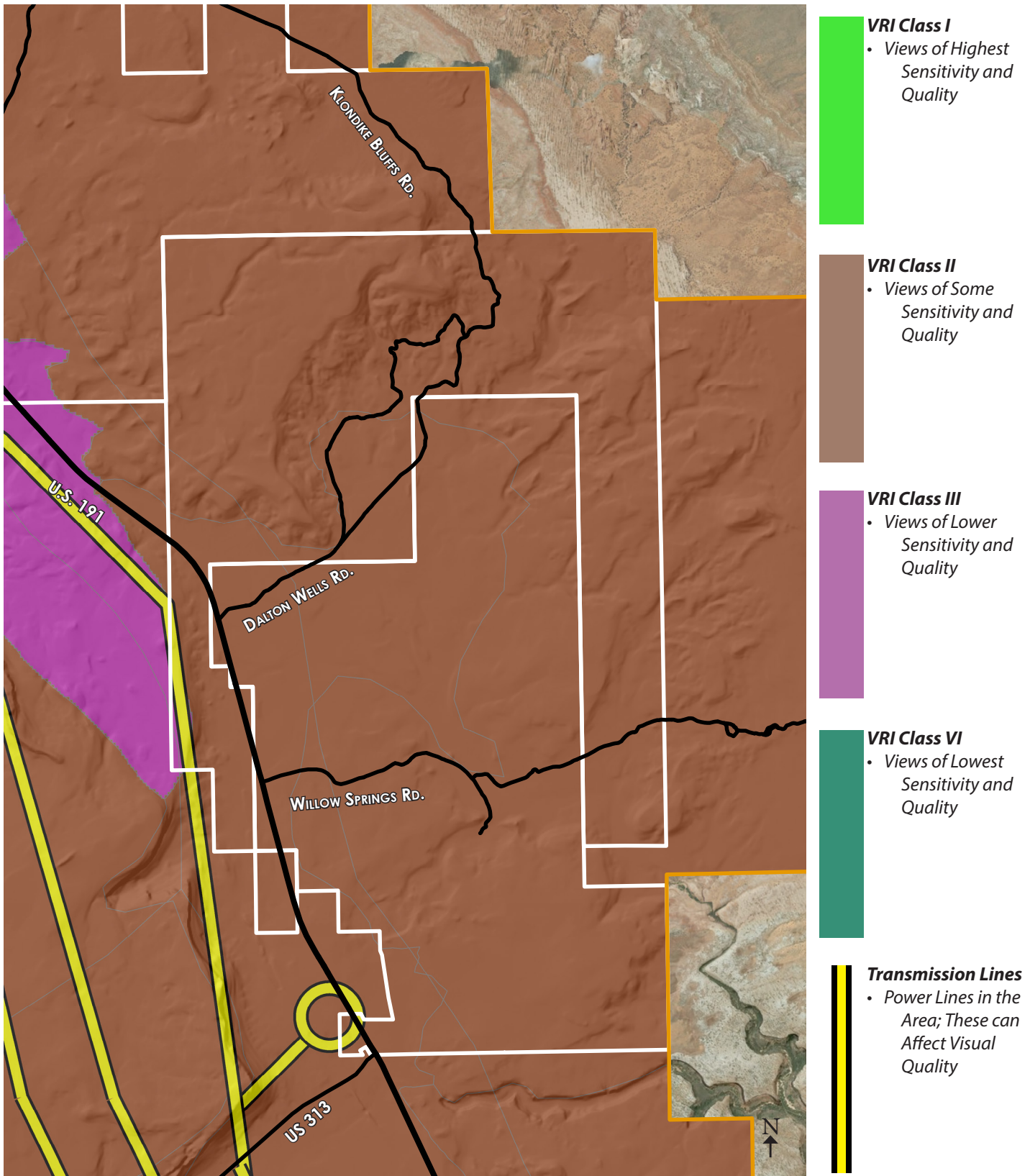


Figure 4.4 Map of BLM VRI classifications

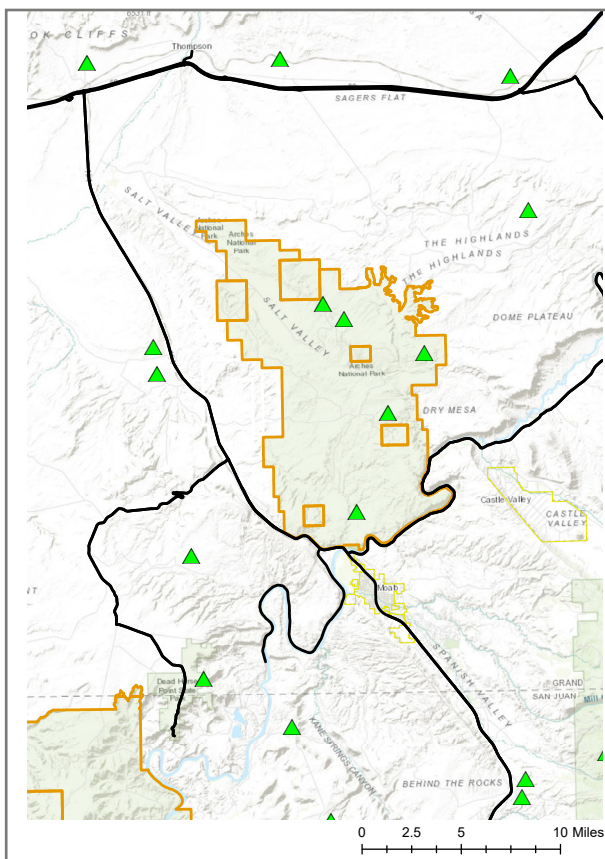
0 0.375 0.75 1.5 Miles

## INPUTS: VISUAL RESOURCE INVENTORY MAP 2, VIEWSHEDS

Highway 191 acts as a gateway to the Moab region, giving visitors their first impression of this scenic area. The Dalton Wells study area also offers one of the first glimpses of Arches National Park off in the distance. This inventory map in figure 4.5B shows areas that are visible from Highway 191, and from points of interest in Arches National Park.

### INVENTORY MAP 2 LEGEND

- Areas Visible from Highway 191**– Areas visible while driving through the Highway 191 corridor.
- Areas Visible from Points of Interest**– Areas visible from scenic attractions in the region, such as Balanced Rock and Delicate Arch.
- Major Roads** - Highly traveled roads in the study area.



- Points of Interest** - Scenic attractions in the area. Used to create the layer, “Areas Visible from Points of Interest.” (See figure 4.5A).
- National Parks** - Arches and Canyonlands National Parks.

Figure 4.5A Scenic Points of Interest within the Moab region.

# VISUAL QUALITY INVENTORY MAP 2 - VIEWSHEDS

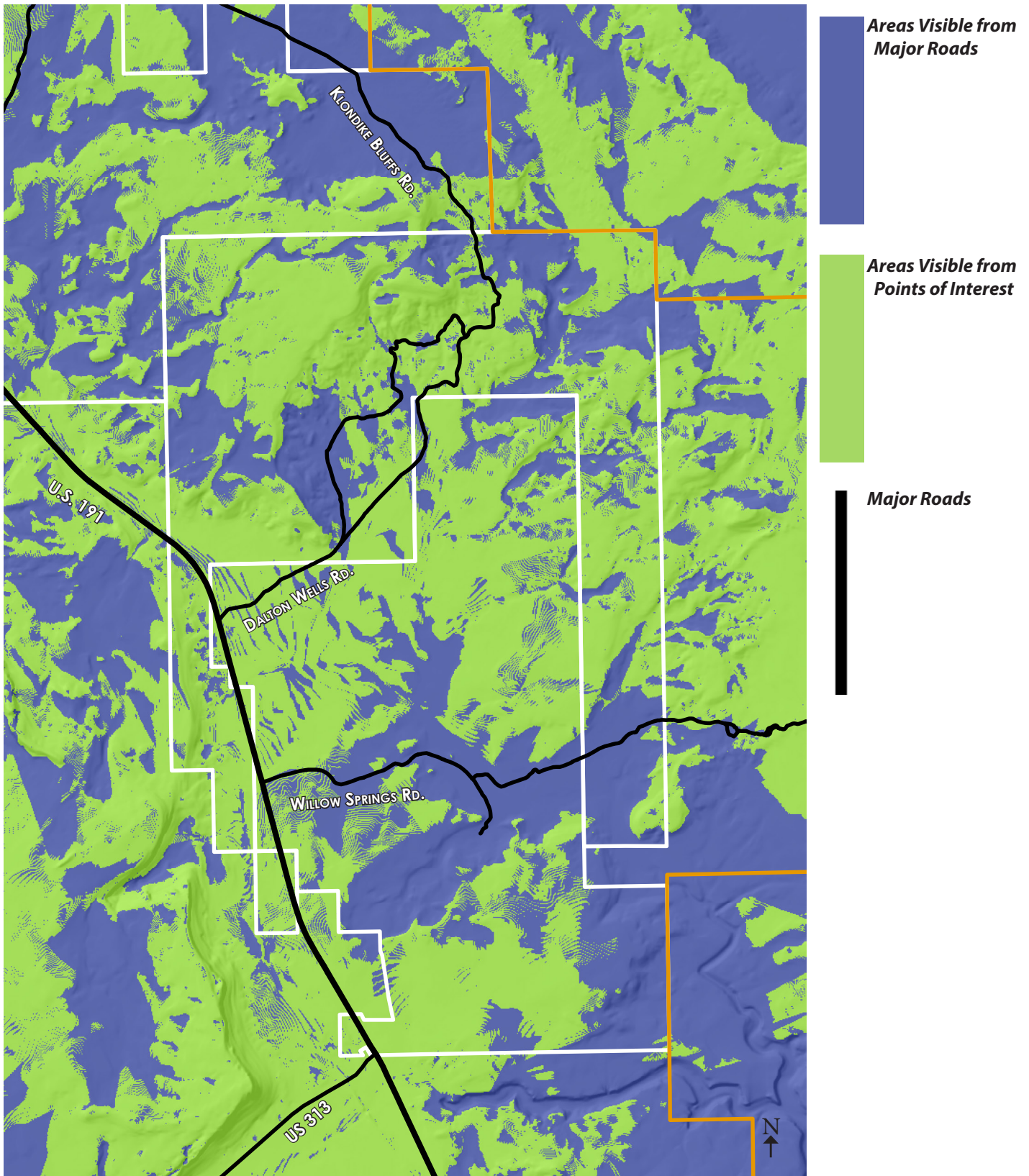


Figure 4.5B Map of Important Viewsheds

0 0.375 0.75 1.5 Miles

## VISUAL QUALITY MODEL: EVALUATION

Sections of land near Garden Point, the Dalton Wells Quarry, the Sovereign Trail System, and on the western bluff edges are the most visually sensitive places in the study area. Great care should be taken to be sure that any development in this section does not compete with the landscape.

Views looking west into Klondike Bluffs and the Windows sections of Arches are also visually sensitive. While these views are in the distance, and do not show within the extent of the map area, they can be seen with the human eye from the study area. For this reason, viewsheds from the highway and from within the site should remain open.

### PROCESS



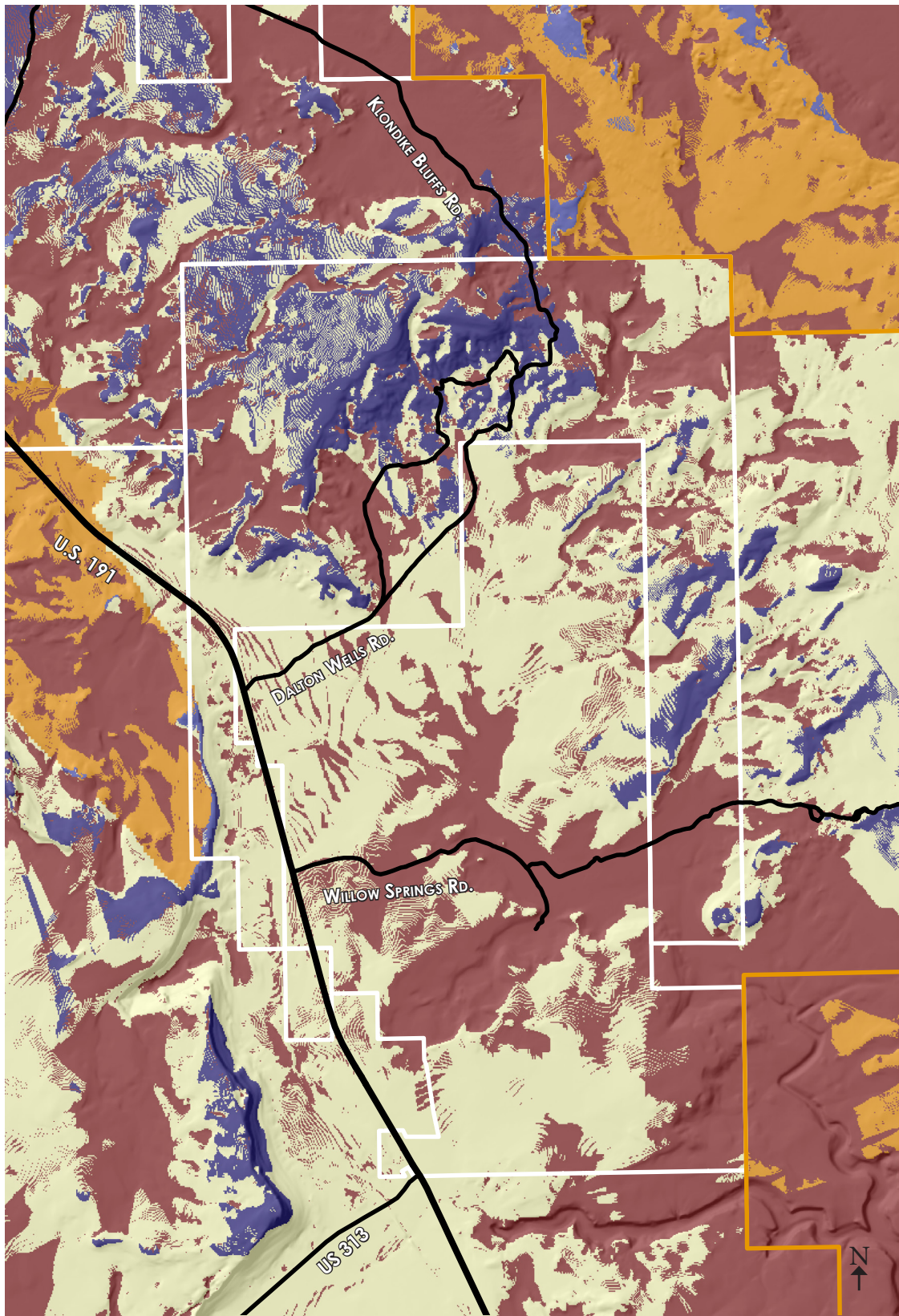
## VISUAL QUALITY MODEL: OUTCOME

	<i>Most Important for Visual Quality Protection</i>	These lands are highly visible from Highway 191 and scenic points of interest, and have a higher VRI classification of II.
	<i>Important for Visual Quality Protection</i>	These lands are visible from Highway 191 and scenic points of interest, and have a VRI class II.
	<i>Somewhat Important for Visual Quality Protection</i>	These lands are less visible from Highway 191, scenic points of interest, and are VRI class II.
	<i>Less Important for Visual Quality Protection</i>	These lands are less visible from Highway 191 and scenic points of interest, and have a VRI class of III.
	<i>Least Important for Visual Quality Protection</i>	These lands are the least visible from Highway 191 and scenic points of interest, yet are still have VRI class II.

## GIS DATA SOURCES

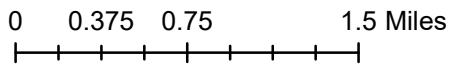
1. Visual Resource Inventory: *Bureau of Land Management.*
2. Transmission Lines: *Utah Automated Geographic Reference Center.*
3. Viewsheds: *Utah Automated Geographic Reference Center. USGS Digital Elevation Models.*
4. Major Roads: *Utah Automated Geographic Reference Center.*

# VISUAL QUALITY ASSESSMENT MODEL



- Most Important for Visual Quality Protection**
  - Visible from Hwy 191
  - Visible from Points of Interest
  - VRI Class II
- Important for Visual Quality Protection**
  - Visible from Hwy 191
  - Visible from Points of Interest
  - VRI Class II
- Somewhat Important for Visual Quality Protection**
  - Less Visible from Hwy 191
  - Less Visible from Points of Interest
  - VRI Class II
- Less Important for Visual Quality Protection**
  - Less Visible from Hwy 191
  - Less Visible from Points of Interest
  - VRI Class III
- Least Important for Visual Quality Protection**
  - Least Visible from Hwy 191
  - Least Visible from Points of Interest
  - VRI Class II

Figure 4.6 Map of Visually Sensitive Areas






## COMMERCIAL ALLOCATION MODEL: OBJECTIVE

The Moab area is dependent upon outdoor tourism to drive its economy. The Highway Corridor 191 north of town has been zoned as North Corridor Recreation in the Grand County General Plan. This zoning encourages nodal economic development in the form of tourist-oriented, resort commercial development. (See figure 4.7). This model identifies areas along the corridor that are best suited for such commercial development.

---

## INPUTS: COMMERCIAL INVENTORY MAP 1, ROADS AND ENTERPRISE ZONES

### INVENTORY MAP 1 LEGEND

 **Enterprise Zones**– Areas with tax break incentives to development projects. Created by the Utah Governors Office of Economic Development to encourage economic growth.

 **Main Roads**– Within 500 feet of main roads

# COMMERCIAL INVENTORY MAP 1

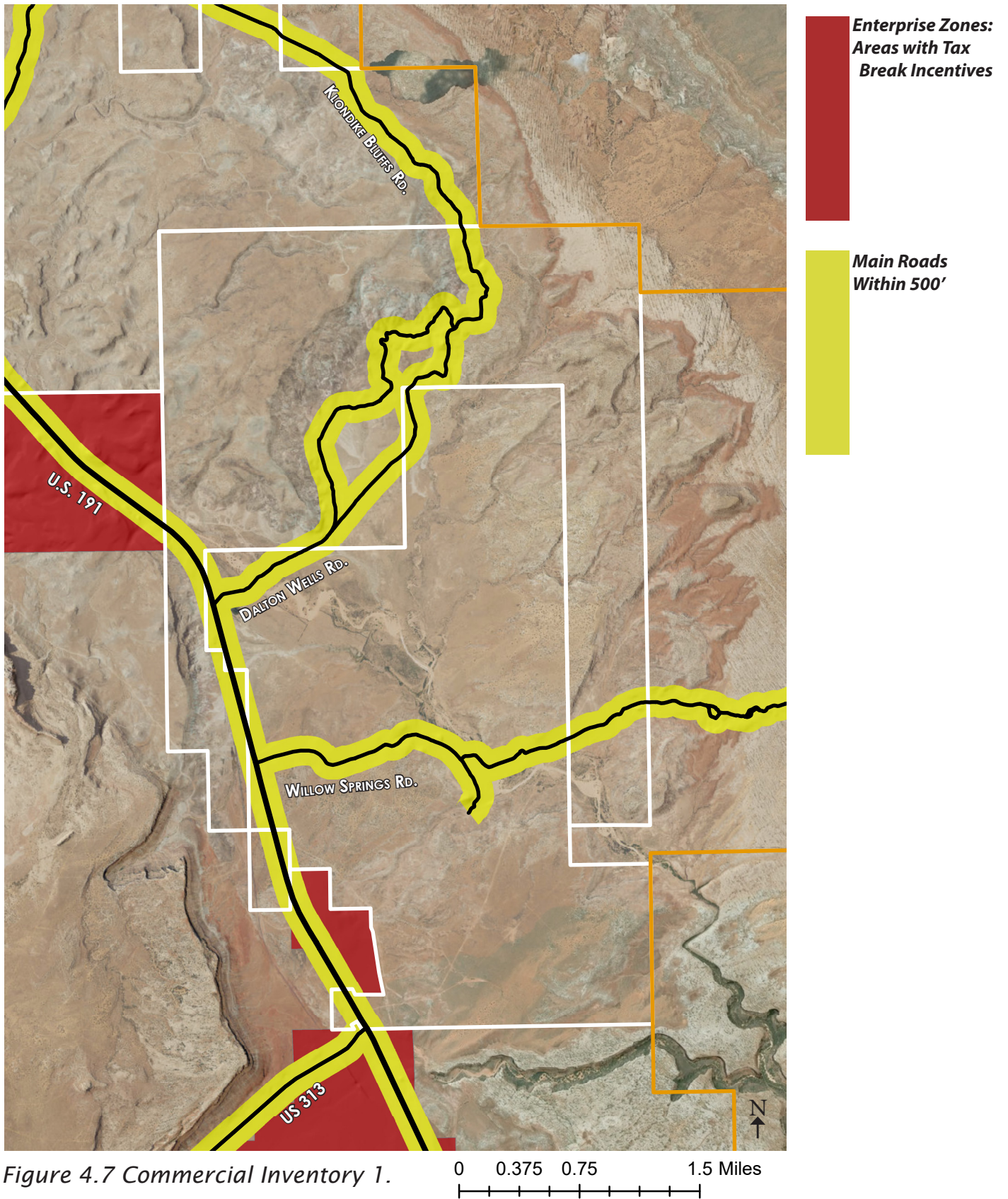






Figure 4.7 Commercial Inventory 1.

## INPUTS: INVENTORY MAP 2, SOIL SUITABILITY FOR COMMERCIAL DEVELOPMENT

This map (figure 4.8) shows which soils are suitable for building structures without basements. Build-able soils would make commercial development easier and more cost effective to install.

---

### INVENTORY MAP 2 LEGEND

-  **Soils Not Limited for Building**– Buildings without basements can be developed here.
-  **Not Rated Soils**– Soils have not been tested for building potential.
-  **Soils Somewhat Limited for Building**– Buildings can be developed, but will be less cost-effective to build.
-  **Soils Very Limited for Building**– Soils are inappropriate for building structures.

# COMMERCIAL INVENTORY MAP 2- SOILS SUITABILITY

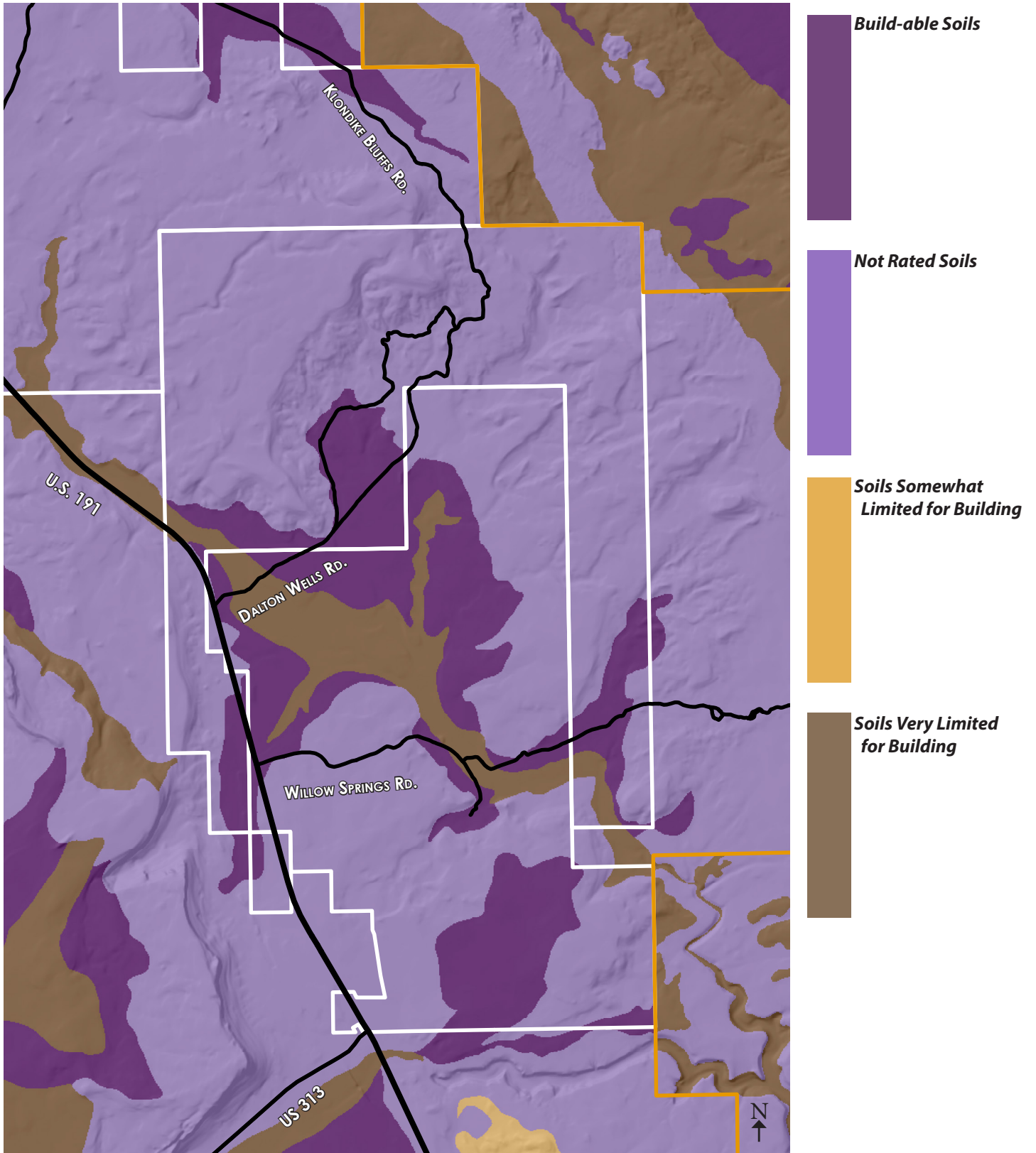


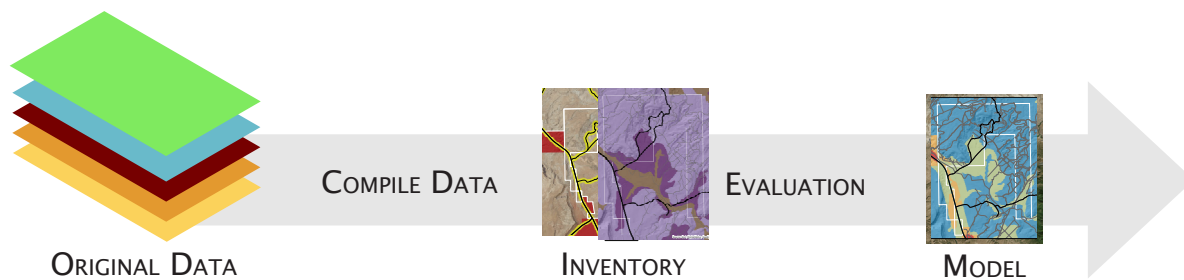
Figure 4.8 Map of Build-able Soils.

0 0.375 0.75 1.5 Miles  
|-----|-----|-----|-----|





## COMMERCIAL ALLOCATION MODEL: EVALUATION

This model identified areas best suited for economic expansion and business development. Lands with appropriate soils and highway access run along the Highway 191 Corridor. (See figure 4.9). While the length of the highway could be developed, commercial activity is particularly suitable near existing businesses on enterprise zones. If development is concentrated in these areas, the scenic quality of the area will be preserved and commercial property values will increase.

### PROCESS



## COMMERCIAL ALLOCATION MODEL: OUTCOME

 <p><i>Most Suitable for Commercial Development</i></p>	<p>Areas with all three criteria: within enterprise zones, near existing roads, and have build-able soils.</p>
 <p><i>Suitable for Commercial Development</i></p>	<p>Areas that meet two of three criteria: within enterprise zones, near existing roads, and have build-able soils.</p>
 <p><i>Somewhat Suitable for Commercial Development</i></p>	<p>Areas that meet one of the criteria: within enterprise zones, near existing roads, and have build-able soils.</p>
 <p><i>Least Suitable for Commercial Development</i></p>	<p>Not within enterprise zones, further from existing roads, are not on build-able soils.</p>

### GIS DATA SOURCES

1. Distance from Major Roads: *Utah Automated Geographic Reference Center.*
2. Soil Limits from Commercial Development: *Utah Automated Geographic Reference Center. United States Department of Agriculture-Natural Resource Conservation Service.*
3. Enterprise Zones: *Utah Automated Geographic Reference Center.*

# COMMERCIAL ALLOCATION MODEL

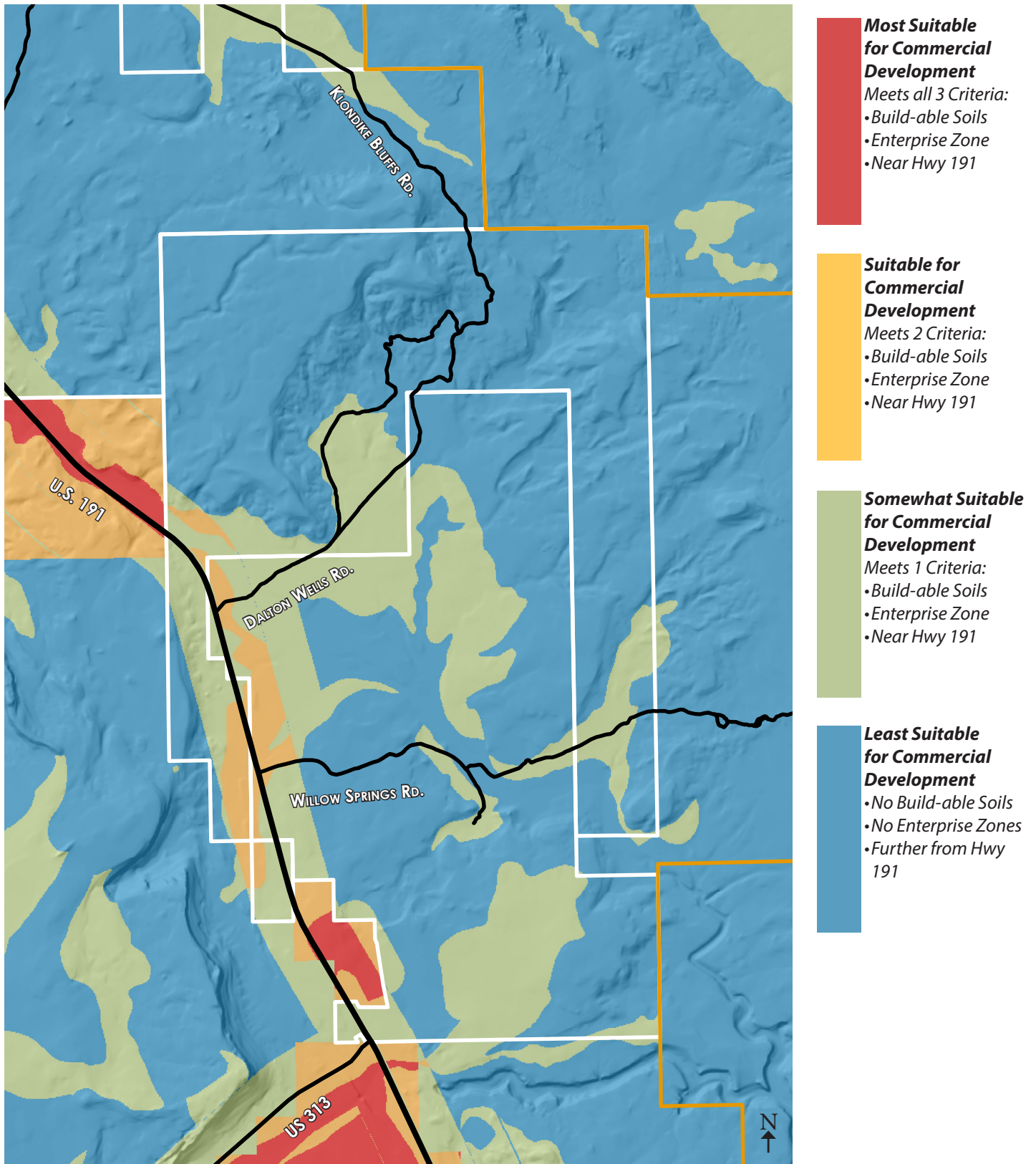


Figure 4.9 Commercial allocation model. Best areas for commercial.

0 0.375 0.75 1.5 Miles


## CAMPING ALLOCATION MODEL: OBJECTIVE

Camping in Dalton Wells is dispersed in nature, which provides for a wildland experience, but also spreads out impacts across the site. To reduce impacts, camping areas should be concentrated into zones which are accessible via existing roads. Due to sparse vegetation, campsites should be located next to topographic features. These features provide a sense of shelter, support concepts of prospect and refuge, and add to the scenic quality of the camping experience. This model identifies areas that are best suited for camping in the area. (See figure 4.10).

---

## INPUTS: INVENTORY MAP 1, UNIQUE FEATURES

### INVENTORY MAP 1 LEGEND

 **Proximity to Unique Geologic Features**– Within 200 Feet of landscape features. The study area has many interesting landscape formations, which offer screening and interest for campers. This layer was created to find areas that are adjacent to slopes that are above 20%, an indicator of these landscape features.

# CAMPING INVENTORY MAP 2- UNIQUE FEATURES



Figure 4.10 Unique Landscape Features.







## INPUTS: INVENTORY MAP 2

### SOIL SUITABILITY FOR CAMPSITE DEVELOPMENT

This map shows which soils are suitable for building structures without basements. Build-able soils would make road improvements and camping infrastructure easier and more cost effective to install. (See Figure 4.11).

---

#### INVENTORY MAP 2 LEGEND

-  **Soils Not Limited for Building**– Buildings without basements can be developed here.
-  **Not Rated Soils**– Soils have not been tested for building potential.
-  **Soils Somewhat Limited for Building**– Buildings can be developed, but will be less cost-effective to build.
-  **Soils Very Limited for Building**– Soils are inappropriate for building structures.

# CAMPING INVENTORY MAP 2- SOIL SUITABILITY

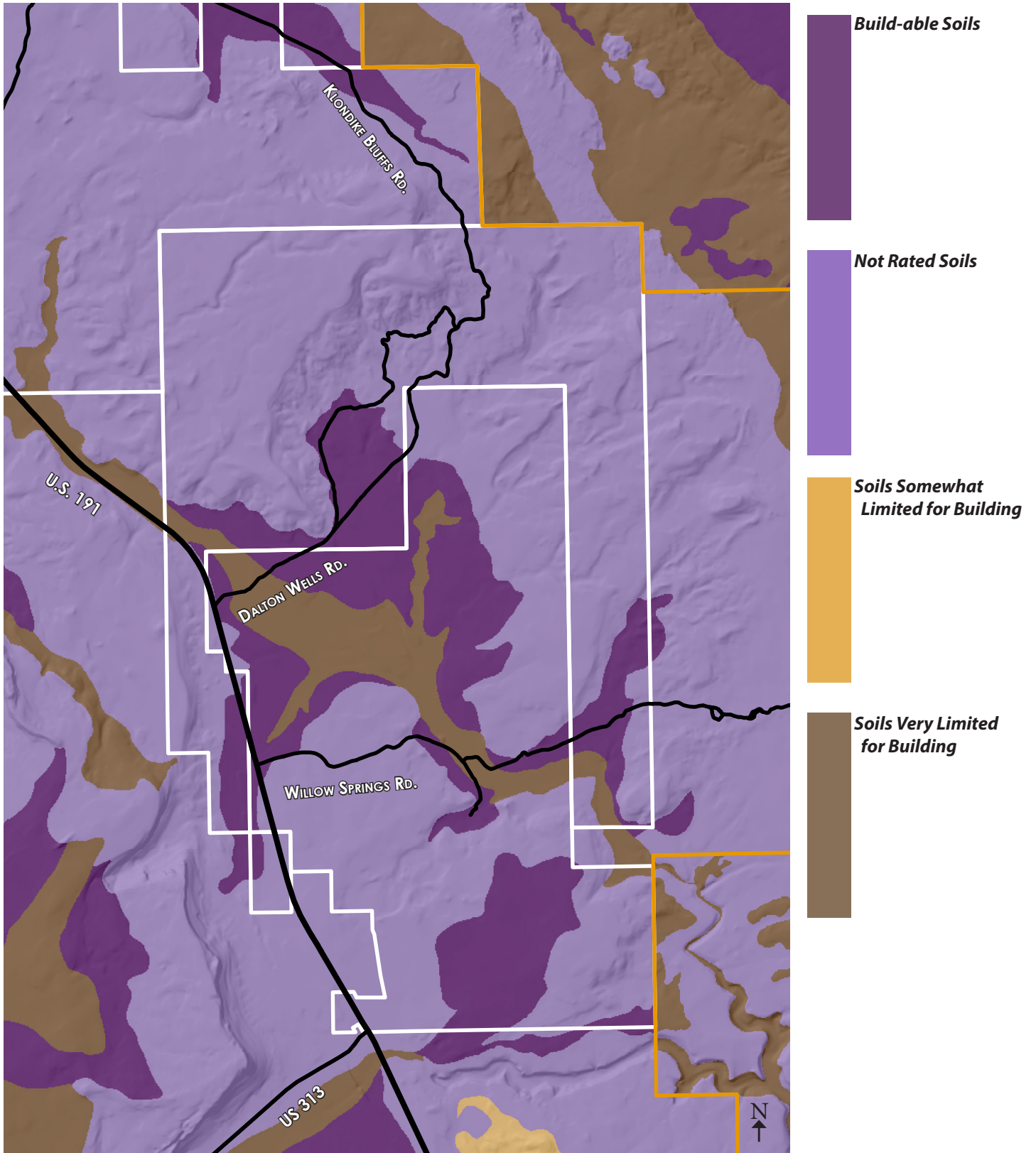


Figure 4.11 Map of Build-able Soils.








0 0.375 0.75 1.5 Miles

## INPUTS: INVENTORY MAP 3, PERCENT SLOPE

The best camping areas will be located on relatively flat land under 8% slope. (See figure 4.12). Slopes between 9% and 32% were also used in the model, as many flat camping sites are located next to steep slopes, yet do not read past the 30 meter resolution that the data layer uses. Though these steeper slopes were considered, they held less value in the model. Slopes above 33% were not considered to be good for campsite locations.

---

### INVENTORY MAP 3 LEGEND

-  **0 % Slope**- Best slope for campsites (flat).
-  **1-4% Slope**- Relatively flat areas good for campsites.
-  **5-8% Slope**- Areas could be graded to allow for campsites.
-  **9-12% Slope**- Areas could be graded to allow for campsites.
-  **13-20% Slope**- Some small areas could be appropriate for tent campsites. Difficult to reach.
-  **21-32% Slope**- Some small areas could be appropriate for tent campsites. Very Difficult to reach.
-  **33% Slope and Above**- Too steep for campsites.

# CAMPING INVENTORY MAP 3- PERCENT SLOPE

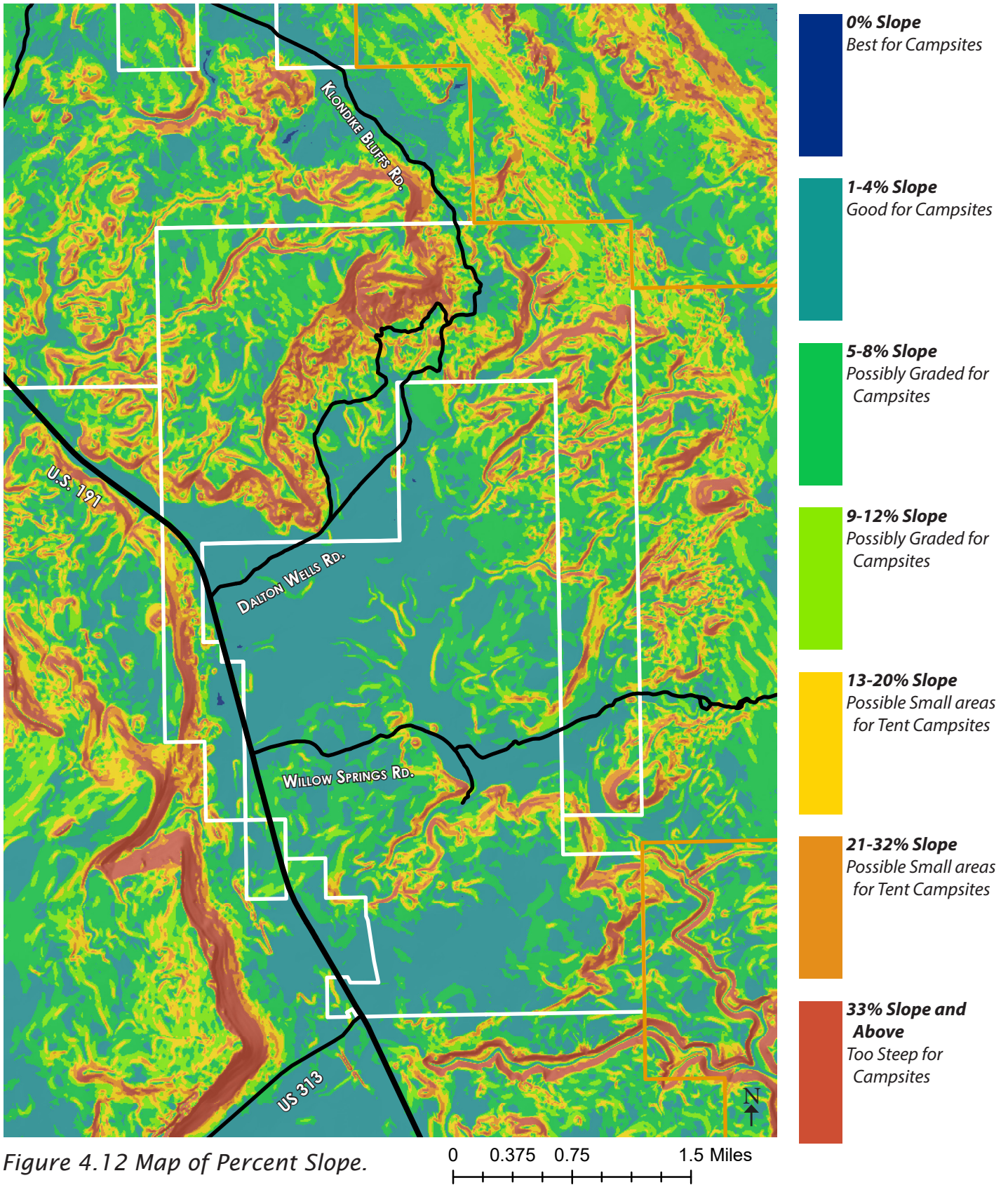
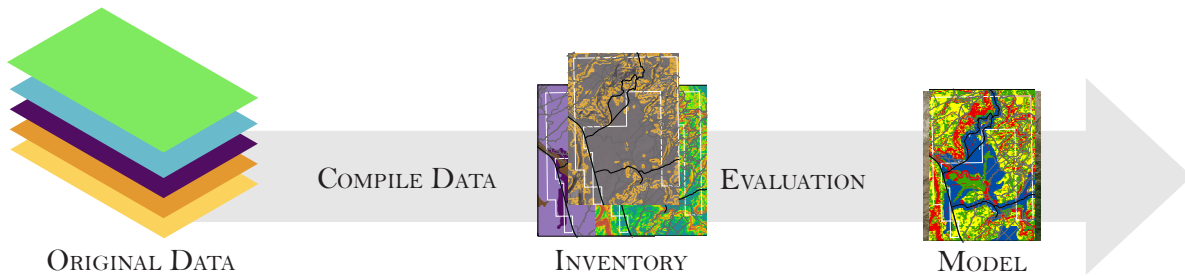


Figure 4.12 Map of Percent Slope.





## CAMPING ALLOCATION MODEL: EVALUATION

Due to user preferences, much of the camping already exists next to topographic features. Road development has also followed this pattern, leading to prime camping sites. This model highlights these areas, as well as large sections of flat land with build-able soils, where camping could potentially be expanded. Land that is not suitable for camping is also shown. These places would be difficult to access and build campsites on. (See figure 4.13).

### PROCESS



## CAMPING ALLOCATION MODEL: OUTCOME

	<i>Most Suitable for Campsites</i>	Areas on flat terrain, build-able soils, adjacent to roads, and next to unique geologic features.
	<i>Suitable for Campsites</i>	Areas on somewhat flat terrain and build-able soils.
	<i>Poor Suitability for Campsites</i>	Areas with steeper slopes, not rated soils, further from roads, and further from unique geologic features.
	<i>Not Suitable for Campsites</i>	Areas with steep slopes, unbuildable soils, further from roads, and further from unique geologic features.

## GIS DATA SOURCES

1. Distance from Dirt Roads: *Utah Automated Geographic Reference Center.*
2. Slope: *Utah Automated Geographic Reference Center. USGS Digital Elevation Models.*
3. Soil Limits for Buildings: *Utah Automated Geographic Reference Center. United States Department of Agriculture-Natural Resource Conservation Service.*
4. Unique Features: *Created by Mary Oliver Using Utah Automated Geographic Reference Center, USGS Digital Elevation Models.*

# CAMPING ALLOCATION MODEL

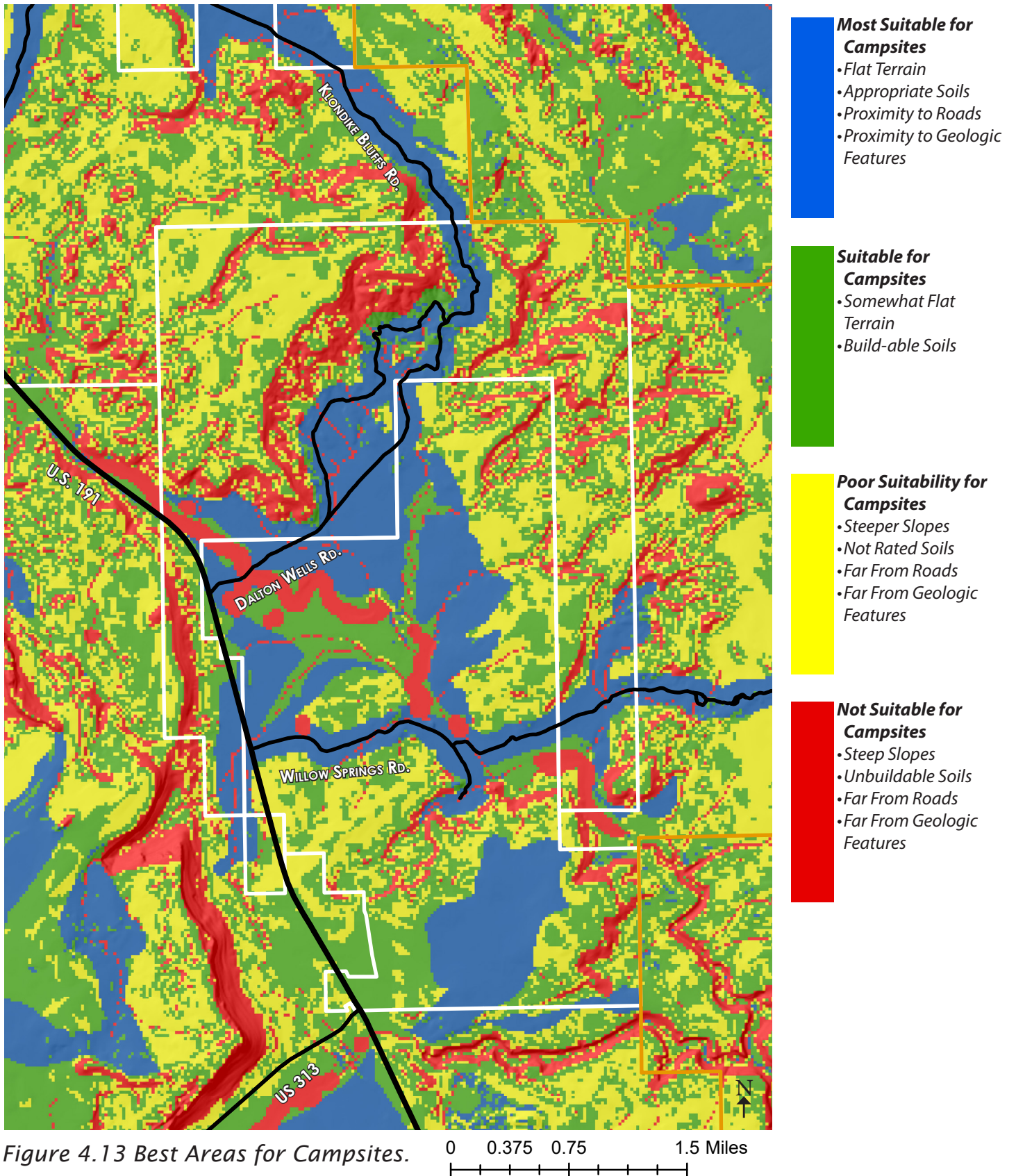


Figure 4.13 Best Areas for Campsites.

## DAY USE ALLOCATION MODEL: OBJECTIVE

Many visitors to the area come for the day to use the Sovereign Trail System. This requires large staging areas where users can meet, park and unload equipment. Ideal areas will be open, flat, and next to trailheads. The site also has potential for visitors to come learn about the CCC camp history or the Dalton Wells dinosaur quarry. This would require day use areas for parking, interpretive exhibits, or a visitor's center, and would be located near these cultural sites. (See figure 4.14).

---

## INPUTS: INVENTORY MAP 1, TRAILHEADS & CULTURAL FEATURES

### INVENTORY MAP 1 LEGEND



**Proximity to Trailheads**– Within 500 Feet of major trailheads.



**Proximity to Cultural Features**– Within 200 Feet of the CCC camp features or the Dalton Wells Dinosaur Quarry.

# DAY USE INVENTORY MAP 1- TRAILHEADS/CULTURAL

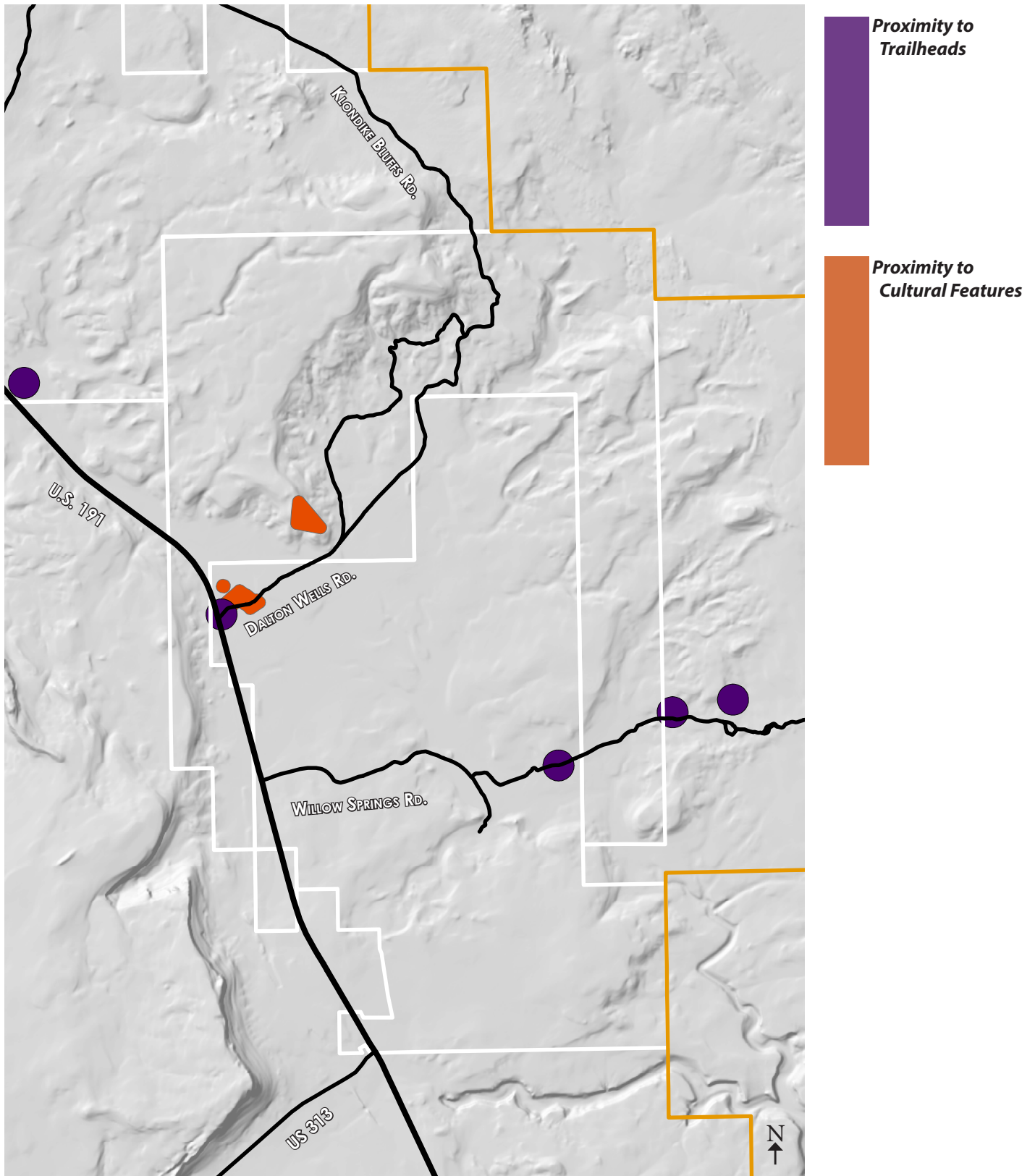


Figure 4.14 Trailheads / Cultural Features.

0 0.375 0.75 1.5 Miles







## INPUTS: INVENTORY MAP 2, SOIL SUITABILITY FOR CAMPSITE DEVELOPMENT

This map shows which soils are suitable for building structures without basements. Build-able soils would make road improvements, parking areas, and a visitor center easier and more cost effective to install. (See figure 4.15).

---

### INVENTORY MAP 2 LEGEND

-  **Soils Not Limited for Building**– Buildings without basements can be developed here.
-  **Not Rated Soils**– Soils have not been tested for building potential.
-  **Soils Somewhat Limited for Building**– Buildings can be developed, but will be less cost-effective to build.
-  **Soils Very Limited for Building**– Soils are inappropriate for building structures.

# DAY USE INVENTORY MAP 2- SOIL SUITABILITY

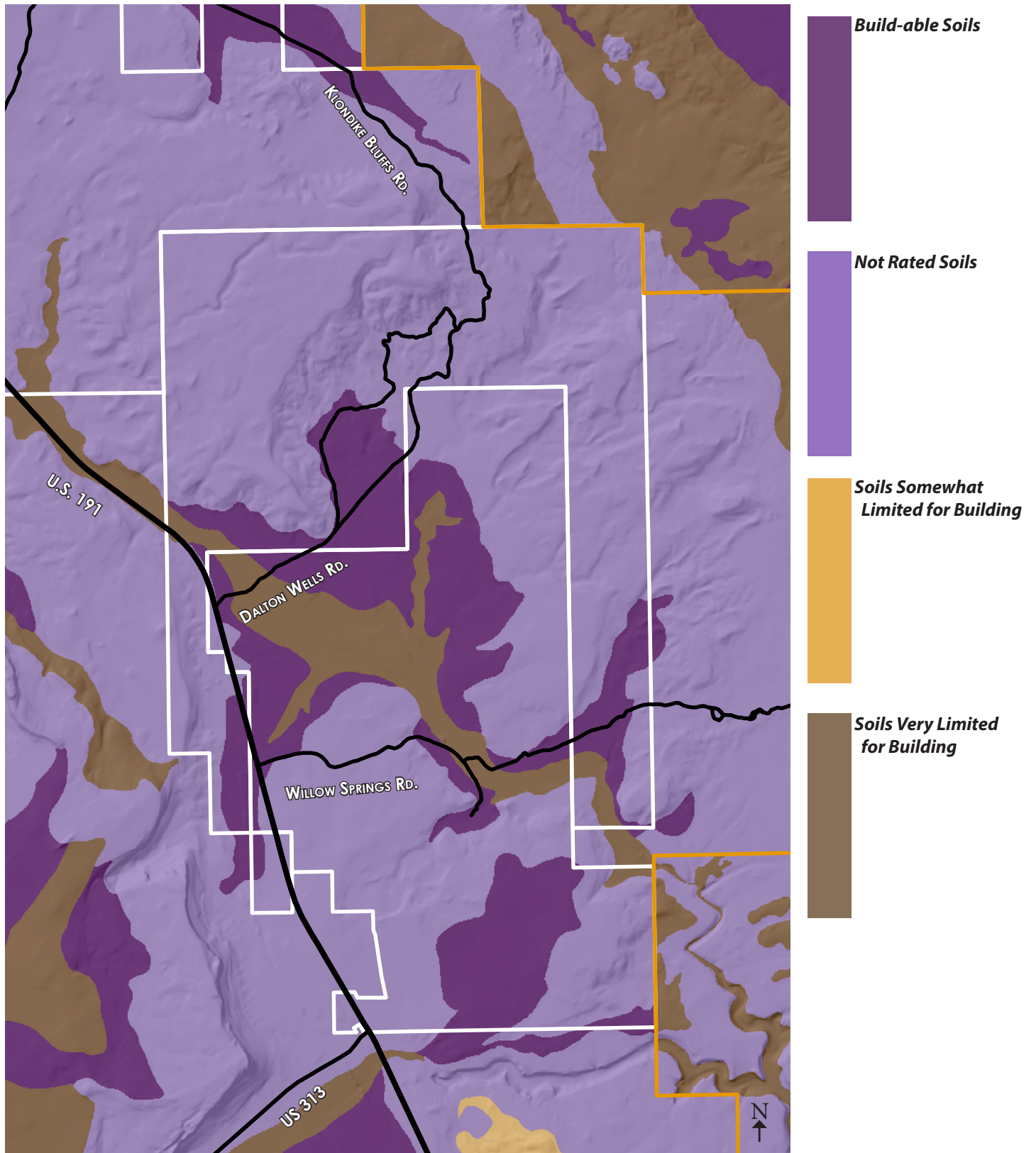


Figure 4.15 Map of Build-able Soils.


0 0.375 0.75 1.5 Miles

## INPUTS: INVENTORY MAP 3, PERCENT SLOPE

The best day use areas will be located on relatively flat land under 8% slope. (See figure 4.16). Slopes between 9% and 12% were also used in the model, as these areas could be graded or modified for day use. Though these steeper slopes were considered, they held less value in the model. Slopes between 13 and 32% are too steep for day use infrastructure, but could be utilized for some trail development. Slopes above 33% were not considered to be good for day use locations or most trails.

---

### INVENTORY MAP 3 LEGEND

-  **0 % Slope**- Best slope for day use infrastructure (flat).
-  **1-4% Slope**- Relatively flat areas, good for day use infrastructure.
-  **5-8% Slope**- Areas could be graded to allow for day use infrastructure.
-  **9-12% Slope**- Areas could be graded to allow for day use infrastructure.
-  **13-20% Slope**- Too steep for day use infrastructure. Could be appropriate for trail development.
-  **21-32% Slope**- Too steep for day use infrastructure. Could be appropriate for trail development.
-  **33% Slope and Above**- Too steep for day use infrastructure or most trails.

# DAY USE INVENTORY MAP 3- PERCENT SLOPE

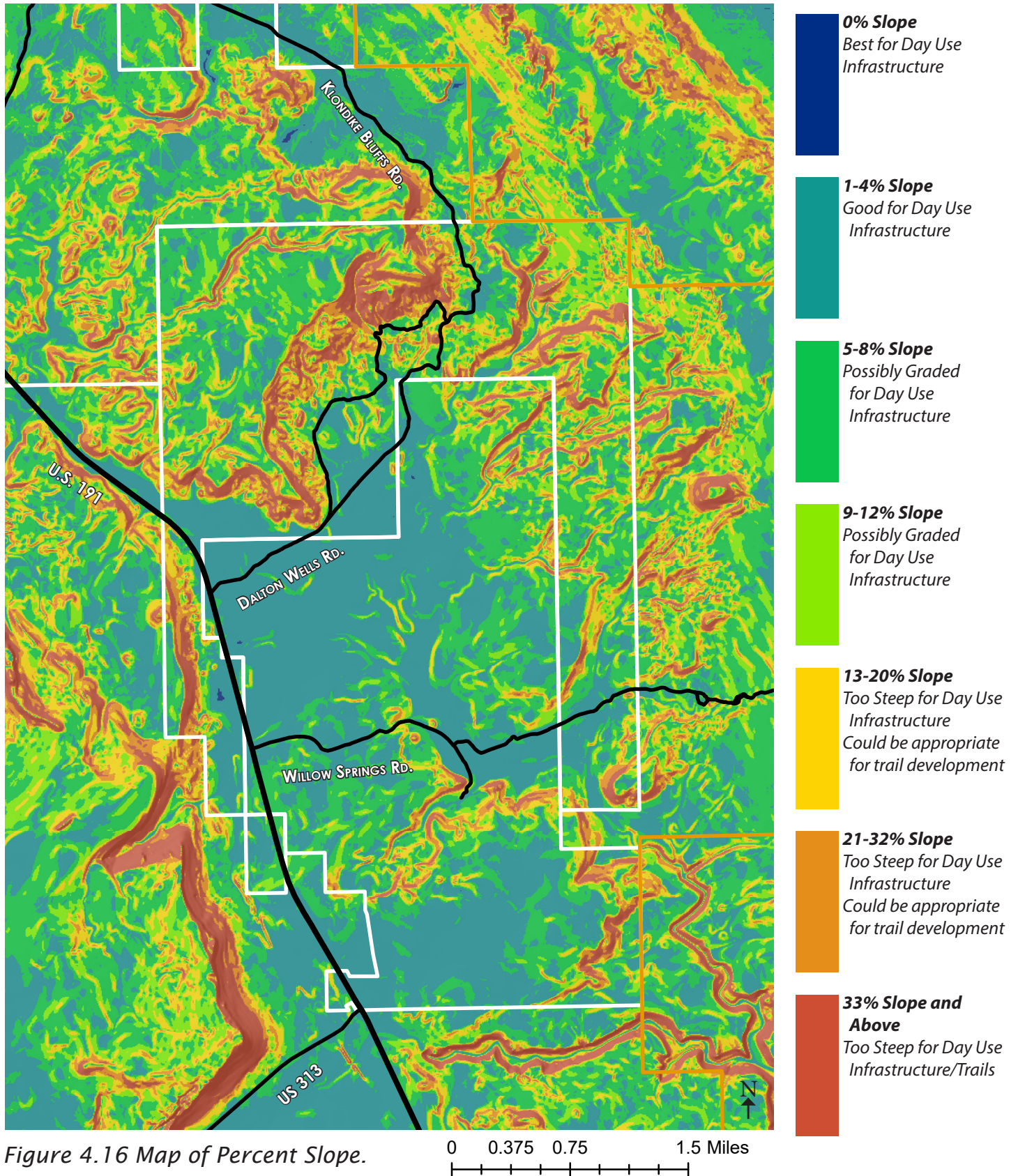
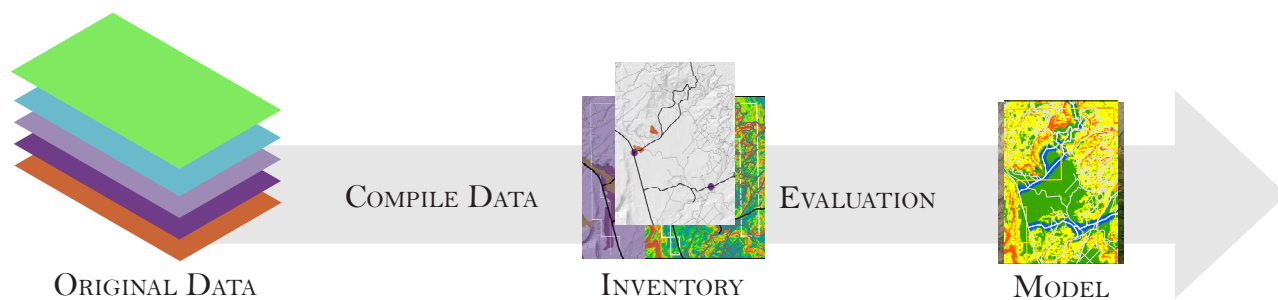


Figure 4.16 Map of Percent Slope.





## DAY USE ALLOCATION MODEL: EVALUATION

The most appropriate day use areas are located off the roads that run through the site. Parking areas will be most appropriate next to existing trailheads and near cultural sites. (See figure 4.17). The entrance to Dalton Wells Road could serve as a key day use area, as it would be an ideal location for a fee station, and the CCC and dinosaur quarry would provide an ideal destination for day use visitors.

### PROCESS



## DAY USE ALLOCATION MODEL: OUTCOME

	<i>Most Suitable for Day Use</i>	These areas have flat terrain, are on build-able soils, near roads, near trailheads, and near cultural features.
	<i>Suitable for Day Use</i>	These areas have flat terrain, are on build-able soils, and near roads.
	<i>Poor Suitability for Day Use</i>	These areas are far away from roads, trailheads and cultural features.
	<i>Not Suitable for Day Use</i>	These areas have steep slopes, and are far away from roads, trailheads, and cultural features.

## GIS DATA SOURCES

1. Distance from Dirt Roads: *Utah Automated Geographic Reference Center.*
2. Slope: *Utah Automated Geographic Reference Center. USGS Digital Elevation Models.*
3. Soil Limits for Camping Development: *Utah Automated Geographic Reference Center. United States Department of Agriculture-Natural Resource Conservation Service.*
4. Unique Features: *Utah Automated Geographic Reference Center. USGS Digital Elevation Models.*

# DAY USE ALLOCATION MODEL

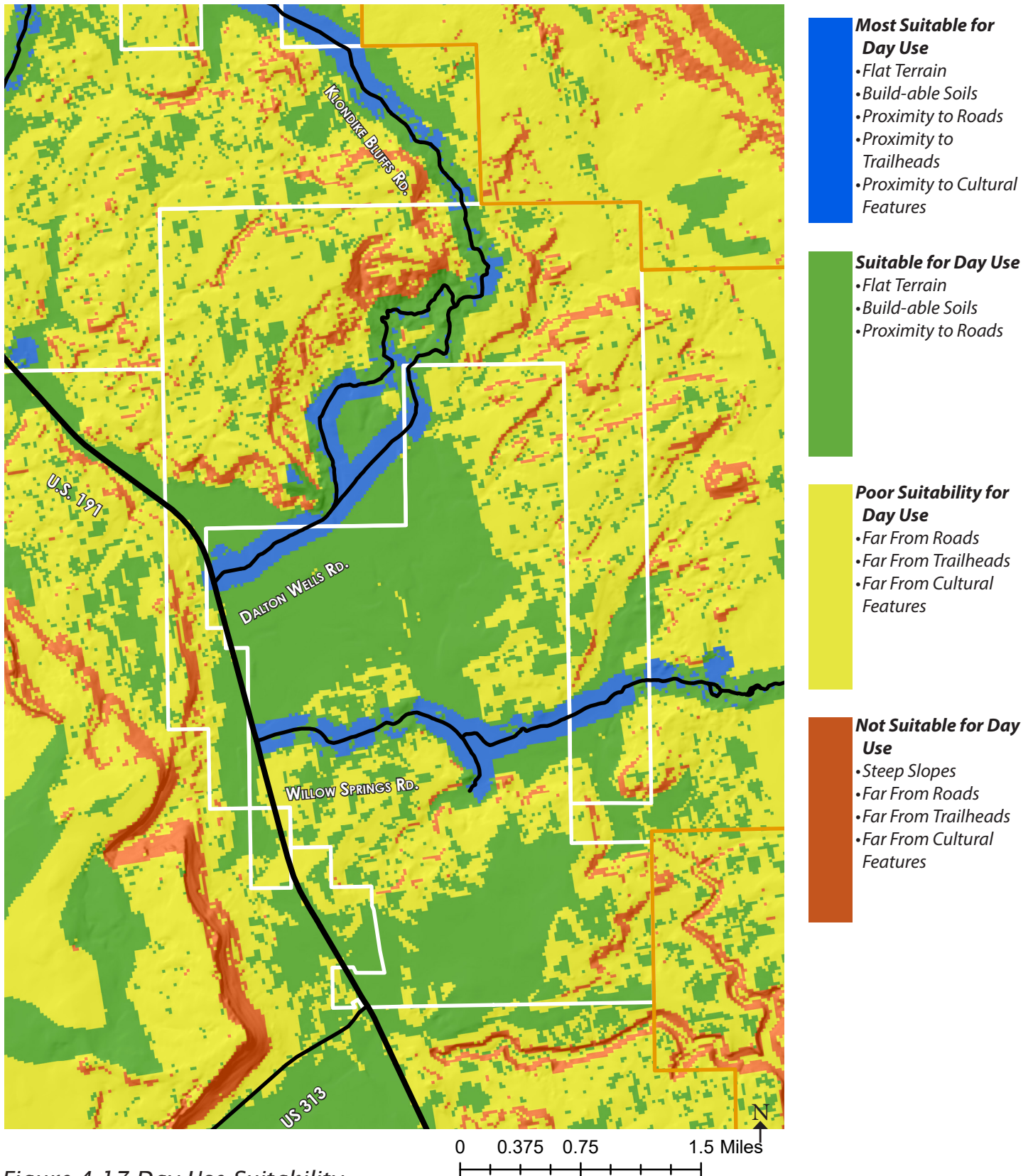


Figure 4.17 Day Use Suitability.

## ALTERNATIVE FUTURES

Two alternative futures were created based on different scenarios for future development, that respond to the different goals of two stakeholders, SITLA and State Sovereign Lands. Each future highlights how land use plans could meet the objectives and mandates of these groups.

Futures are examined within the study area in order to understand how a landuse plan would help to solve the issues caused by dispersed camping. Futures are also assessed at the scale of the Hwy 191 corridor (figure 5.2) in order to understand how surrounding land uses could affect a commercial or recreational master plan that capitalizes on the scenic qualities (shown in figure 5.1) of the study area.

The SITLA future prioritizes commercial areas, as they are the most effective way to profit from lands in the study area. The SITLA future also utilizes portions of both the camping model and the day use model, as attracting more people to the area through recreation could bolster the value of the surrounding commercial properties.

The State Sovereign Lands future prioritizes recreation in order to help fulfill their mandate of recreation and public access. Camping and day use were the main models utilized in order to dedicate as much land as possible to recreation. The top tier of the commercial model is also used in order to provide recreationists with some basic services.



*Figure 5.1 Views from the study area looking out towards Canyonlands National Park*

# STUDY AREA & HWY 191 CORRIDOR

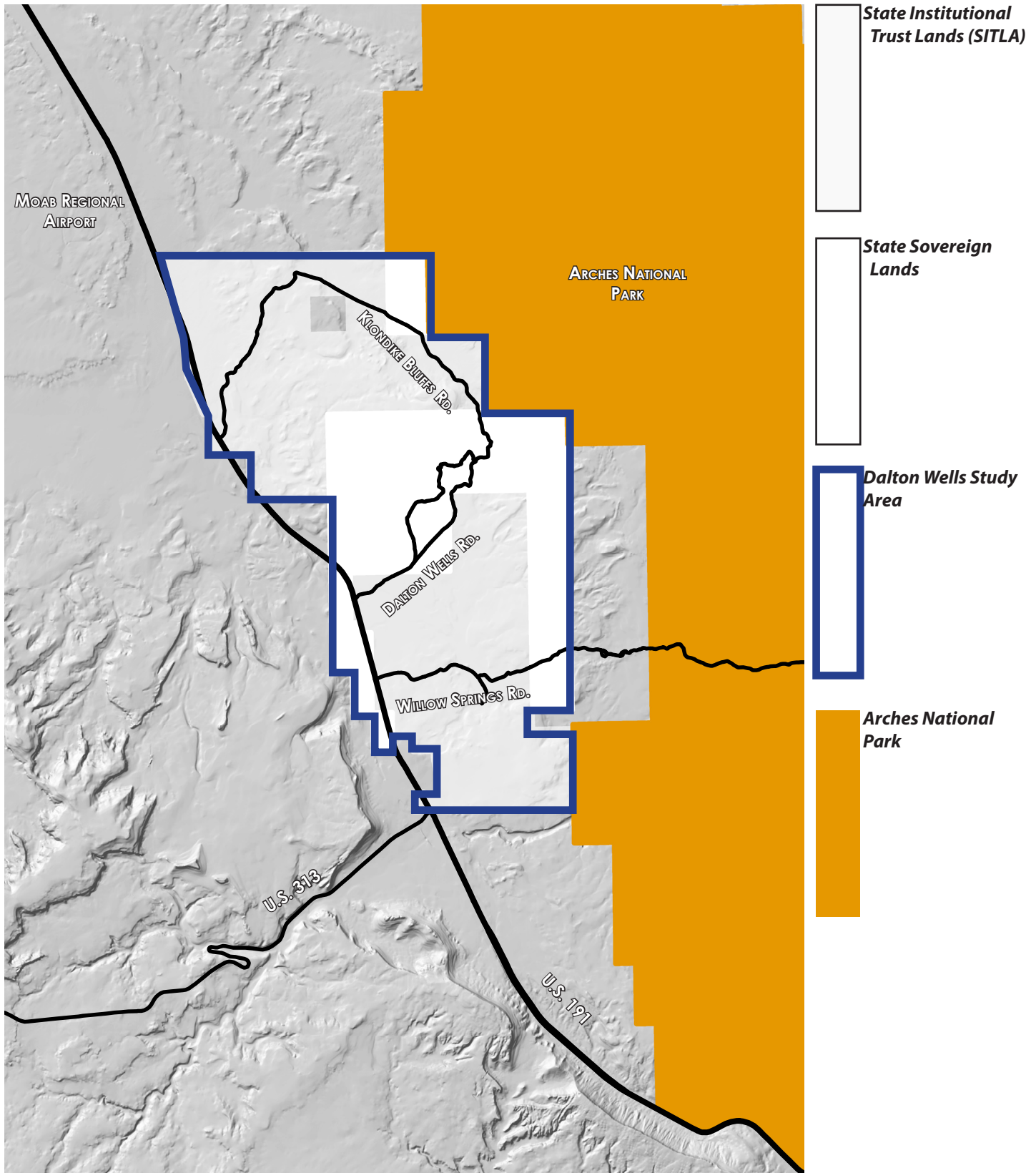
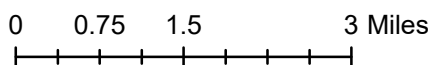


Figure 5.2 Study Area & Highway 191 Corridor

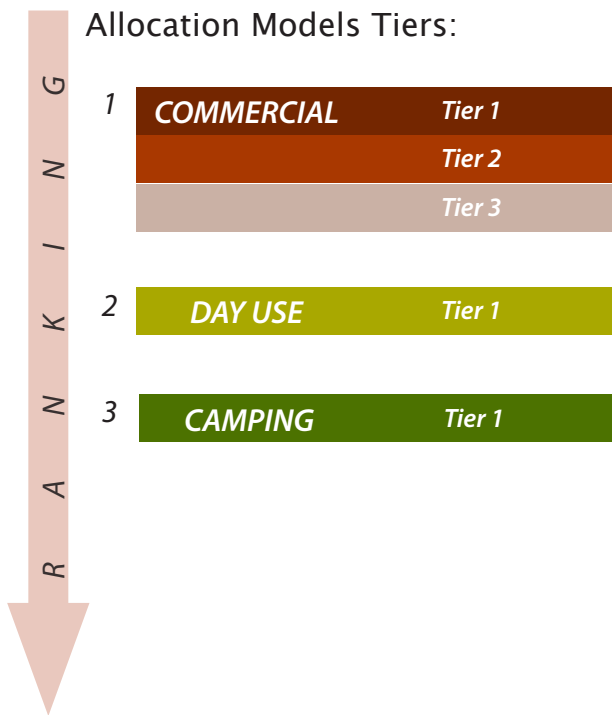




## SITLA ALTERNATIVE FUTURE OBJECTIVE

This future is built around the goals and mandates of SITLA, which raises funds for schools in Utah by selling and leasing parcels of land. This future prioritizes commercial or resort development along the highway, especially in areas which have build-able soils, are near existing commercial activity, or are near private and SITLA owned land. (See Figure 5.3).

### HOW THIS FUTURE IS BUILT



#### Commercial

The SITLA future uses all 3 tiers from the commercial allocation model. Tier 1 commercial areas are key locations to develop. The three Tier 1 commercial nodes on the map are near existing commercial properties and could become beneficial hubs for services and overnight accommodations. Tier 2 areas run along Highway 191 and are on build-able soils. Businesses in these areas could benefit from the many tourists passing through. Tier 3 commercial areas run down the length of Highway 191. While these areas could be developed, linear strip development should be avoided to preserve views in the area and bolster property values.

#### Day Use/Camping

The SITLA future also utilizes the first tier of both the camping model and the day use model, as attracting more people to the area through recreation could bolster the value of the surrounding commercial properties.

# SITLA ALTERNATIVE FUTURE

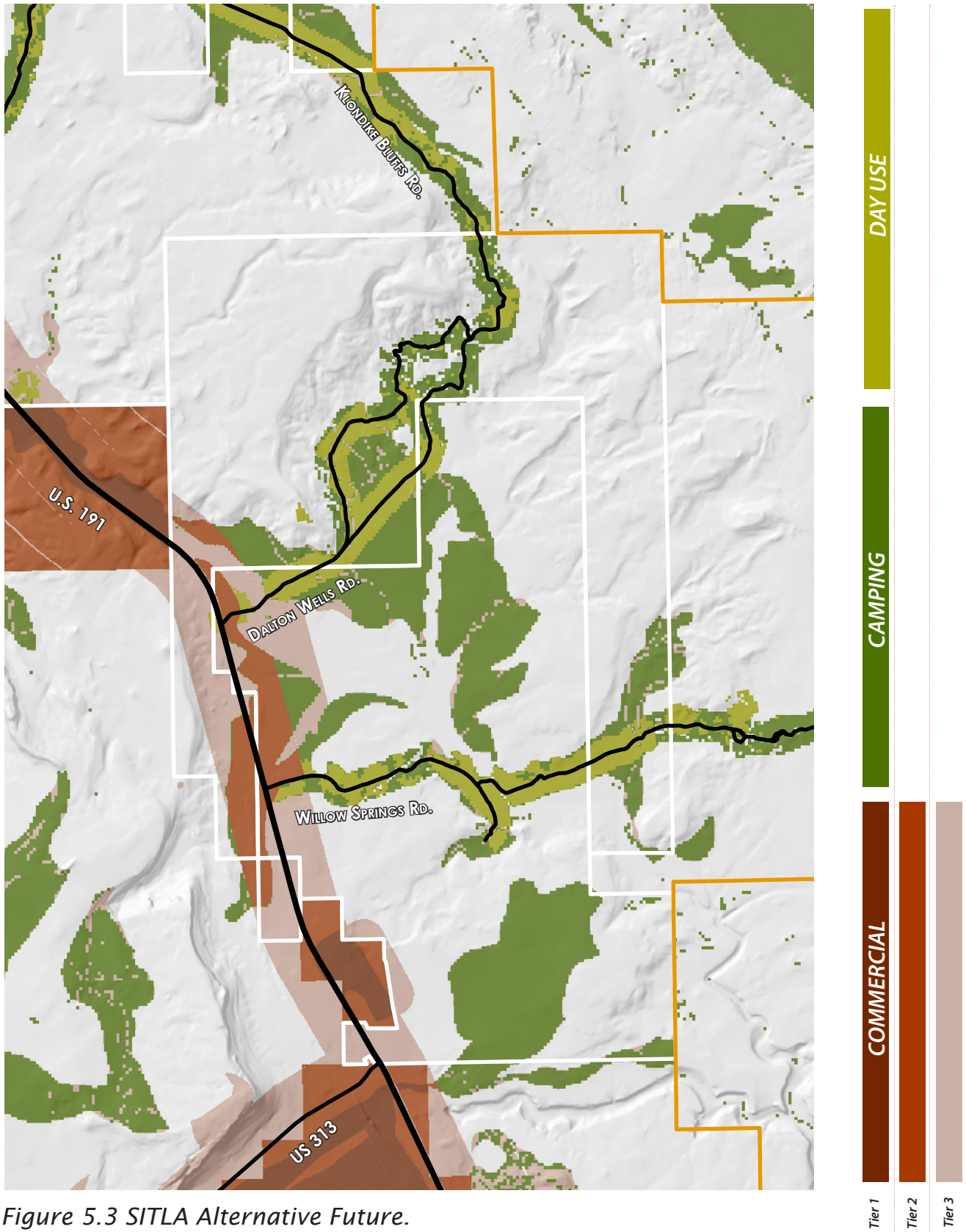


Figure 5.3 SITLA Alternative Future.

## WHAT THE SITLA ALTERNATIVE FUTURE LOOKS LIKE

There is potential for development all along Highway 191. Because the area is zoned as a scenic corridor in the Grand County plan, development should be well-planned and blend into the landscape. Nodal development would be preferable to strip development, as it will preserve the scenic quality of the area and the views into Arches. This would make commercial spaces prime for a specialty hotel or resort camp. Service stations or small markets would also be appropriate at intersections, as they could provide gas and supplies to both campers and visitors passing through on the highway. This futures map is centered on a larger view of the Highway 191 corridor, to show how commercial development will affect the Dalton Wells study area. (See Figure 5.4).

## SITLA FUTURE RECOMMENDATIONS



### A. AIRPORT COMMERCIAL CENTER / TRANSPORTATION HUB

The Moab regional airport is currently small, and does not have a lot of related activity or amenities nearby. Yet, as Moab and the tourist industry grow, there is a possibility for expansion of the airport and commercial activity could accommodate that growth. The airport also has the potential to bring additional goods and services into Moab, and become a major transportation hub for the area.



### B. DEVELOP PRIVATE LAND

Because most of the land in the area is public land, and cannot be built on, private parcels will be central to commercial activity in the area. While some landowners may not be willing to develop commercial activity on their property, others may find benefit in connecting to commercial opportunities. Vacation rentals, small resorts, or rural residential housing would be ideal developments on private properties.

### C. RV RESORT OR PAID CAMPING

Having access to water from Dalton Well would make this area a viable spot to have a high end air-stream or glamping resort. If the CCC camp and Dalton Wells Quarry were in operation, this would be an added nearby draw for guests.



# SITLA FUTURE RECOMMENDATIONS

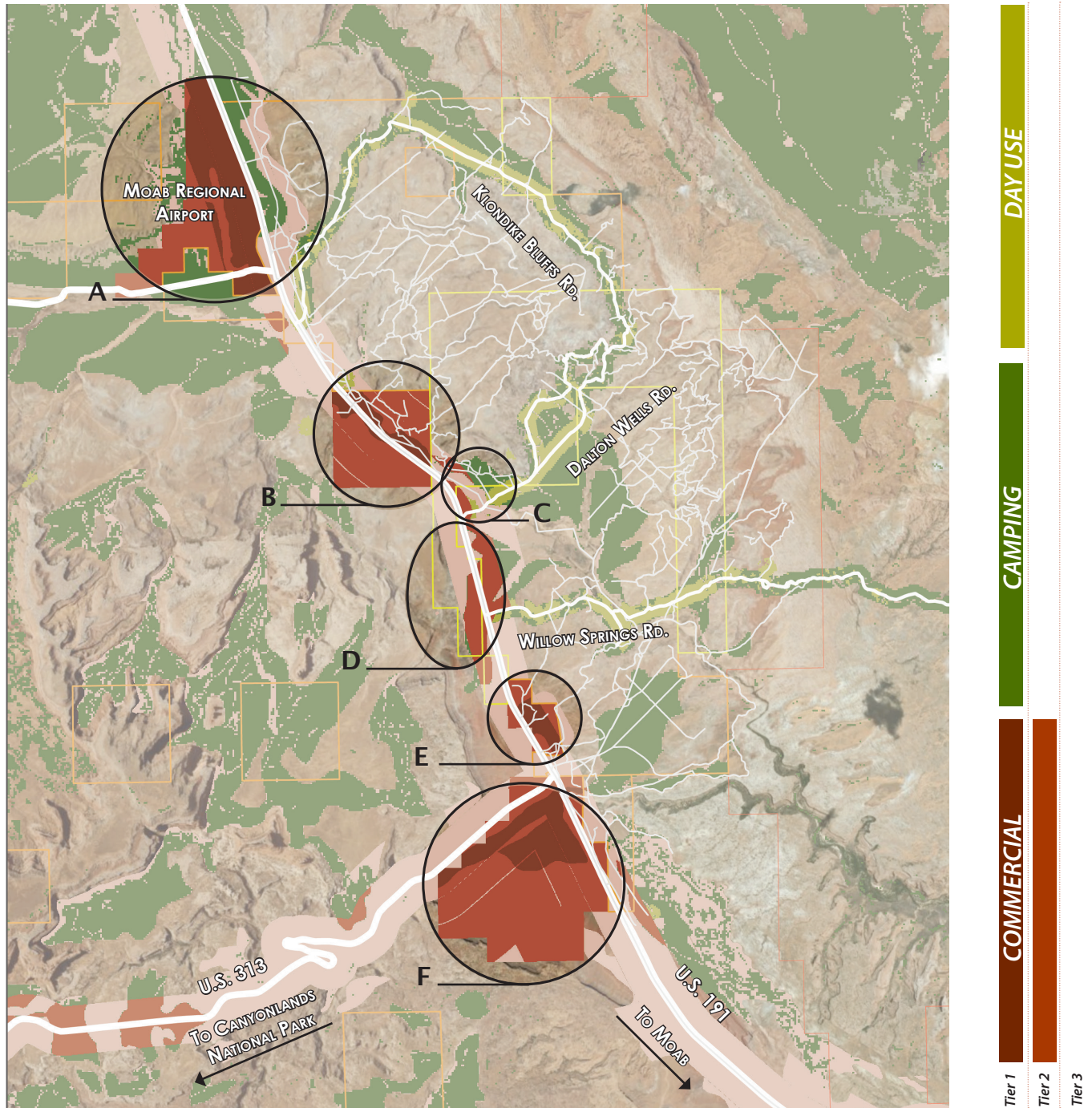


Figure 5.4 SITLA Alternative Future Recommendations.

- A. Airport Commercial Center/Transportation Hub
- B. Develop Private Land
- C. R.V. Resort or Paid Camping
- D. Cliff Side Resort West of Hwy 191
- E. Expand Services at Existing Commercial Areas
- F. Tourist Based Commercial Node at Intersection

## SITLA FUTURE RECOMMENDATIONS



### **D. CLIFF-SIDE RESORT WEST OF HWY 191**

Views from the cliff-top parcel west of Highway 191 make this place a prime location for luxury vacation rentals, a restaurant, or a small yurt resort. While the space is small, this could contribute to it becoming an exclusive and intimate place for visitors to stay.

### **E. EXPAND SERVICES AT EXISTING COMMERCIAL AREAS**

Services could be expanded at existing commercial nodes. For example, a growth in visitors due to new hotels, museums, or camping amenities would necessitate a service center or small market. Already, campers who need gas and supplies have to go all the way into town if the existing nearby gas station is closed.



### **F. TOURIST BASED COMMERCIAL NODE AT INTERSECTION**

The intersection of Highway 191 and Highway 313 provides an optimal location for additional visitor accommodations and services. This turnoff could serve as a major node, as it is the intersection which tourists take to reach Dead Horse Point State Park and Canyonlands National Park.



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## SITLA FUTURE PROS & CONS

### PROS:

- Expansion of airport and amenities
- Economic opportunities established for Grand County
- New visitor lodging and amenities
- Money raised for SITLA

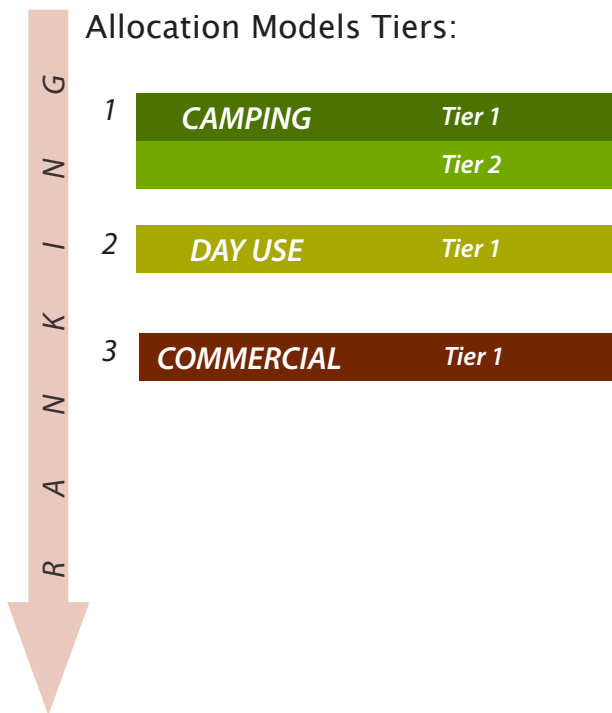
### CONS:

- Potential for strip development along Highway 191
- Potential for disruption of night sky quality
- Potential for obstruction of scenic quality
- CCC Camp not included in interpretive areas

## STATE SOVEREIGN LANDS ALTERNATIVE FUTURE OBJECTIVE

This future is built around the objectives and mandates of State Sovereign Lands, which is to provide access and support recreational activity at Dalton Wells. This future prioritizes day use and camping areas. It also seeks to preserve the scenic and environmental qualities at the site. For this reason, only Tier 1 of the commercial model was used in this future. (See figure 5.5).

### HOW THIS FUTURE IS BUILT



#### Camping

Camping is one of the main recreational activities at Dalton Wells, and is spread out in nature, requiring more space. Because of this, the top two tiers of the camping model were used in this future. While there is a lot of room to expand camping between Dalton Wells and Willow Springs Road, development of new campsites should be kept to a minimum. Existing Campsites within Tier 1 locations should be the first places to be considered for new campsite improvements.

#### Day Use

Because day use does not take up as much space as camping, only the top tier of the day use allocation model was used to build this future. Day use areas are adjacent to roads and trailheads.

#### Commercial

Commercial activity is kept to a minimum in this future, and only uses Tier 1 of the commercial allocation model. These areas are located next to existing commercial spaces and would only minimally disrupt the landscape, while providing services for recreationists at Dalton Wells.

# STATE SOVEREIGN LANDS ALTERNATIVE FUTURE

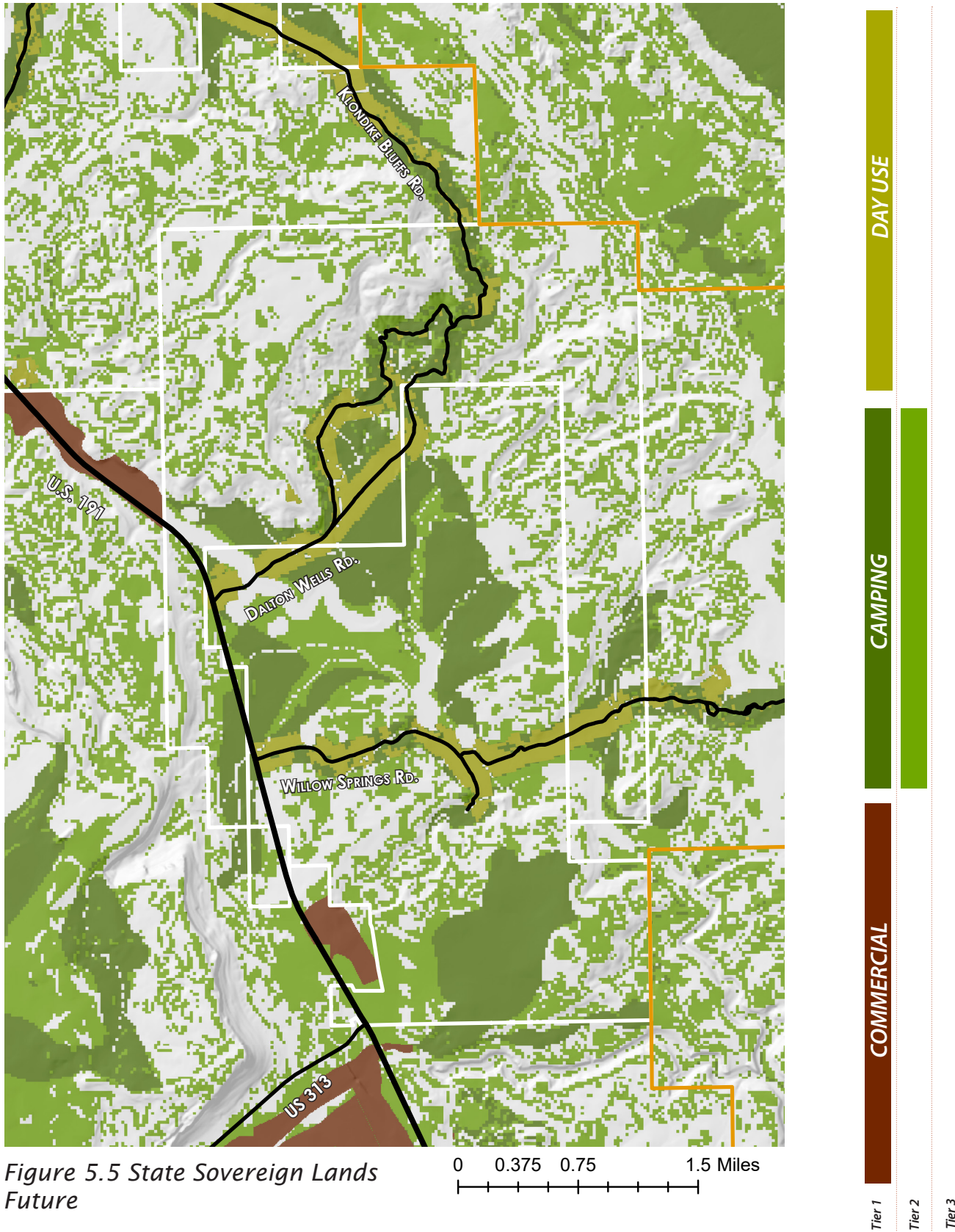


Figure 5.5 State Sovereign Lands Future



## WHAT THE SOVEREIGN LANDS ALTERNATIVE FUTURE LOOKS LIKE

While the future shows that camping could be spread across many areas of the site, camping should be kept closer to topographic features and day use areas. This will preserve the viewshed into Arches, by keeping the open space between Dalton Wells Road and Willow Springs Road unobstructed. Day use areas will be along roads next to trailheads and cultural features. This futures map is centered on a view of the Highway 191 corridor, to show how recreational development in the surrounding area will affect the Dalton Wells study area. (See Figure 5.6).

## SOVEREIGN LANDS FUTURE RECOMMENDATIONS



### **A. KEEP COMMERCIAL DEVELOPMENT NODAL**

Keep commercial development nodal, near existing commercial services such as Moab Under Canvas and Archview RV Resort. New commercial development should be centred around major business centers such as the Moab Regional Airport and the Moab Giants museum at the Intersection of Highway 191 and 313.



### **B. EXPAND CAMPSITES TO KLONDIKE BLUFFS ROAD**

Klondike Bluffs Road connects to Dalton Wells Road on the north eastern edge of the site. Klondike Bluffs Road is a popular spot for dispersed camping and offers scenic views of red sandstone spires in adjacent Arches National Park. If campsites at Willow Springs and Dalton Wells are constrained to control overuse, it is likely that Klondike Bluffs will receive the overflow of campers, and become the next popular dispersed, free camping area. Without some infrastructural support, this area could inherit many of the problems currently experienced at Dalton Wells.

### **C. PRIMITIVE / TENT CAMPING**

The section of land on the ridge near Klondike Bluffs Road, offers scenic views into adjacent Arches. As it is less accessible and has topographic constraints which make for smaller campsites, camping should be kept primitive. If the area sees higher use, the road could be improved and this section could include yurt or tent camping.



### **D. CCC & DINO QUARRY DAY USE AREA AND CAMPGROUND**

This area would provide a visitor's center or interpretive walk to celebrate the CCC Camp and the Dinosaur Quarry. This would be the main day-use node for the site and could include a structured campground or picnic area.

# SOVEREIGN LANDS FUTURE RECOMMENDATIONS

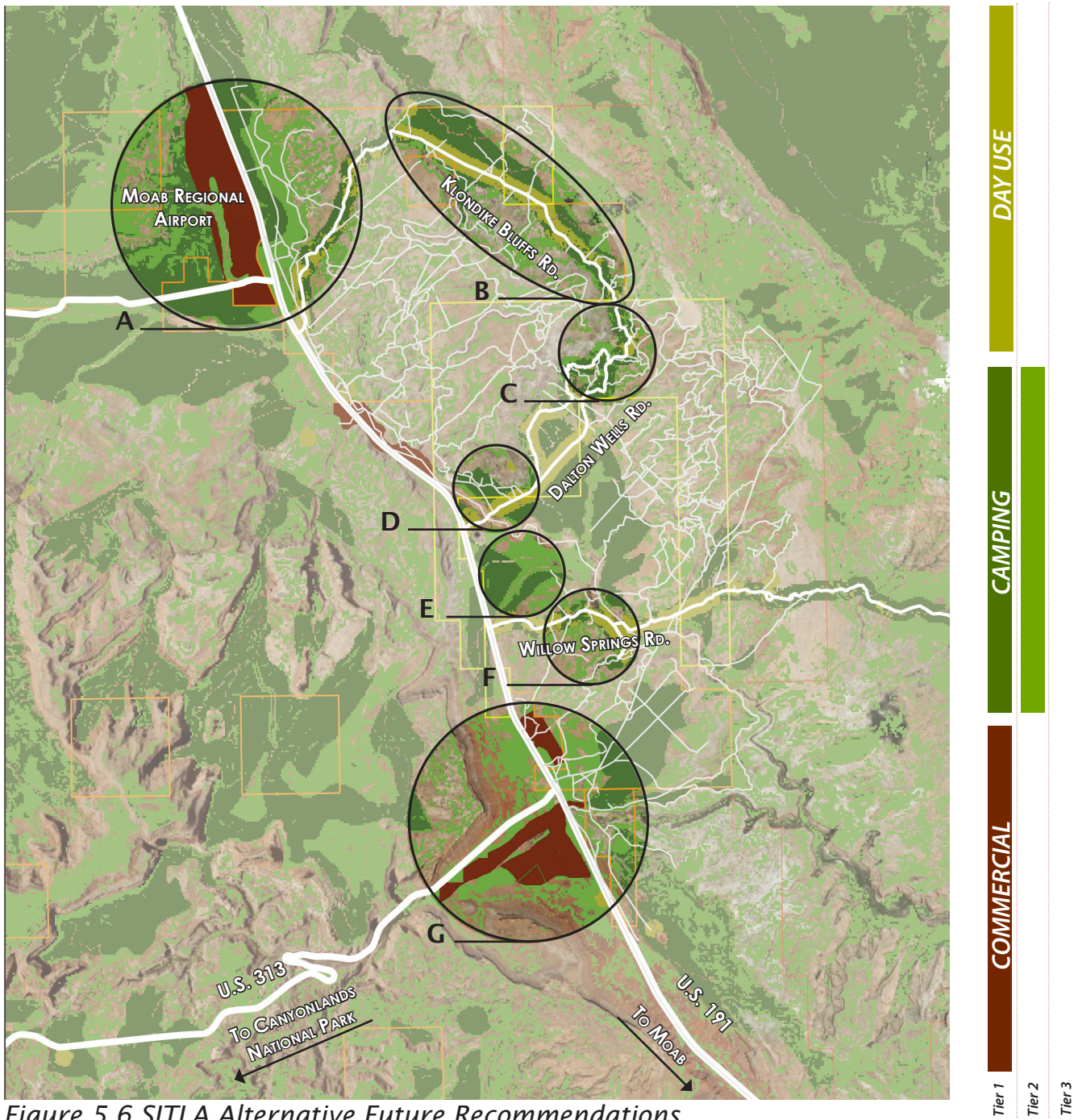


Figure 5.6 SITLA Alternative Future Recommendations.

- A. Keep Commercial Development Nodal (Airport & Hwy 313/191 Intersection)
- B. Expand Campistes to Klondike Bluffs Road
- C. Primitive / Tent Camping
- D. CCC/Dino Quarry Day Use Area & Camping
- E. Preserve Views into Arches National Park
- F. Rustic Camping/Daytime Staging Areas
- G. Tourist-based Services at Intersection
- H. Night Sky & Building Ordinances for Entire Area.

## SOVEREIGN LANDS FUTURE RECOMMENDATIONS



### **E. PRESERVE VIEWS INTO ARCHES NATIONAL PARK**

The open space between Dalton Wells Road and Willow Springs Road should be left open and free of structures. This will preserve views from Highway 191 into Arches, and also of the rest of the site. Structures should be tucked away into topographic features, so as not to detract from the landscape.

### **F. RUSTIC CAMPING / DAYTIME STAGING**

This area has larger, open spaces which could accommodate larger groups or RVs. This section would be an ideal location for rustic camping, as there is space to spread out and campers could still feel dispersed. A day use staging area would also be appropriate so that users could park and access the Sovereign Trail System.



### **G. RECREATIONAL SERVICES AT INTERSECTION**

Commercial activity at this node could support recreational activities. Services such as a specialty camping or general store could provide supplies for campers at Dalton Wells, Moab Under Canvas, Dead Horse State Park and Canyonlands National Park.

### **H. NIGHT SKY & BUILDING ORDINANCES FOR ENTIRE AREA**

Adopt building standards to blend structures into the landscape. Night sky ordinances should be observed so that visitors can camp out and stargaze. These measures will preserve the scenic views in the area and allow campers and visitors to enjoy the natural setting.



## SOVEREIGN LANDS FUTURE PROS & CONS

### PROS:

- Safeguarding the scenic views
- Variety of recreation opportunities
- Historic CCC celebrated
- Opportunities for paleontological research
- Mitigates impacts from dispersed camping

### CONS:

- Limited expansion for commercial development
- Camping infrastructure will attract more crowds
- Camping infrastructure will require day use and management
- Displaces some dispersed campers

## CONCEPTUAL PLAN & RECOMMENDATIONS

This project created futures, or land–use recommendations based on stakeholder objectives and the biophysical and sociocultural systems of the Dalton Wells area. This work laid the foundation for the overall structure and organization of the site. The last phase of this project develops a conceptual master plan based on information highlighted in the futures. In order to form detailed recommendations, it is important to first understand current user preferences, current and potential activities, patterns of impact within the study area, and previously researched management strategies for recreation areas.

### USER BEHAVIOR, DEMOGRAPHICS & PREFERENCES

Visitor preferences are important to consider, as site users are the reason that recreation opportunities within the site are maintained and exist. Because state land is considered public land, and State Sovereign Land’s mandate includes maintaining the public right of way and access, it is important to State Parks and State Sovereign Lands to make management decisions that have public support.

#### *Visitor Behavior, Motivations and Benefits*

During site visits, the visitors observed were camping in RVs and tents, and/or riding OHV’s, ATV’s, and mountain bikes on the nearby trail system. USU’s ENVS 4550 class conducted a study at the Willow Springs section, in which they asked visitors questions about their motivations for coming to the site (Lamborn, Burr, & Nelson, 2016). While this study was limited by being conducted over only two days, survey

responses from 2016 to 2017 had consistent results.

Most visitors who completed the survey stated that they came to the site for the trail system. Manning (2011) identifies the concept of specialization in recreation as outdoor activities that range from requiring general knowledge, to requiring skilled technical abilities and equipment. One important aspect of recreation specialization is setting preferences. While there are a variety of trails in the region, many of the trails in the Sovereign Trail system are rated as advanced and require a high level of technical riding skills. The setting provided by the Sovereign Trail system is appealing to skilled riders in that it offers a network of challenging, single track that is open for motorized use.

The next most popular response users gave for visiting Dalton Wells, was because it was a free camping area. There are many online forums dedicated to free camping and “boondocking,” a term for dispersed RV camping, which share information on the camping at Dalton Wells and Willow Springs Road. Without further research, it is difficult to discern if visitors like free camping for economic savings, a sense of freedom and adventure, or to find space and solitude.

The USU Visitor Preference Survey asked users what their camping preferences were, and how they felt about the conditions at the site. According to the survey, most visitors to the area regularly seek out dispersed camping areas, and prefer free camping to developed sites. Most people at the site preferred dispersed camping over staying in a campground because they wanted to get away from crowds of people. Visitors in online forums state that while many portions

of Willow Springs Road are crowded, they were able to find camping areas that were more spread out on the fringe areas of the site. Regular dispersed campers are seeking a sense of solitude and adventure. This would be important to consider in the design of a potential camping area at Dalton Wells. Visitors are trying to escape the experience of a condensed campground, and it is hard to manage a dispersed campground. This public input is one reason it could be advantageous to keep campground infrastructure as minimal as possible.

The Dalton Wells area is also important to visitors because it provides an experience that is less structured and contained. The Visitor Preference Survey asked users if they would support a use fee, and what they would want the funds to go toward. Many did not want to pay a fee, or would only pay a minimal \$5 fee, which they would prefer being spent on trails and small camping improvements. Support was highest for funds being allocated to trails and basic amenities such as pit toilets. There was opposition to funds being spent on campground improvements such as picnic tables or shade structures. Current users do not want to see this site overdeveloped, they would like it to remain a rugged experience.

While public input is important, site users don't view the area from a management perspective. Most users didn't recognize any problems of site degradation. For them, the site had not breached an environmental or social limit of acceptable change. Yet, they simultaneously reported that the site was increasingly experiencing higher usage and crowding.

Users also did not understand the management objectives for possibly

implementing a future fee structure. Users did not want to spend funds on information kiosks or camping improvements. Yet educational kiosks on how to camp with a light footprint could prevent negative impacts, and prevent campsites from being hardened and formalized. Also, small campground improvements such as numbered sites, could prevent campsite infrastructure such as tent pads or parking stalls.

#### *Place Attachment*

Place attachment refers to visitors feeling a sense of ownership of a place. It usually is formed when people have a particularly memorable experience at a site, or return to the same site multiple times. If campsites are numbered and formalized, it is likely that some sites which are special to users will be closed off and lost. If this happens, it is important to try to create new special places where people can possibly form a new place attachment.

#### *Substitutability*

Substitutability is "the extent to which one recreation activity might be a substitute for another" (Manning, 2011, p. 220). Because the use of the trail systems is sought out by a specialized group of users, the activity substitutability for the trail systems would be low. The place substitutability, however, is in question. A study of recreation preferences at Sumter National Forest in South Carolina found that crowding, poor maintenance, and a fee increase would cause visitors to choose one recreation area over another nearby (Marsinko, 1999). This could be the case at Dalton Wells, as many visitors have expressed that they would not want to pay a fee, and regularly seek out free camping.

Visitors have also expressed that the site is experiencing more crowding. While the trail system is unique, in terms of being a concentrated area of single track, there are many trail systems in the region. Also, if new fees deterred visitors, they could relocate down the road to Klondike Bluffs, which would provide similar access to the same trail system.

### PROGRAMMING & ACTIVITIES

The Recreation Opportunity Spectrum “is a conceptual framework for encouraging diversity in outdoor recreation” (Manning, p. 192). It divides recreational areas into classes, which provide different experience opportunities and settings. The Recreation Opportunity Spectrum considers an area’s environmental conditions from natural to unnatural, its social conditions from low-density to high-density, and its managerial conditions from undeveloped to developed.

There are many possibilities for how Dalton Wells could be developed, what types of programming could be included, and how it could be managed. This section explores those possibilities by suggesting concepts at each end of the spectrum. One concept is that management and programming stay similar to existing conditions. This would mean that Sovereign Lands would be managing the area, and little funding would be available for infrastructural improvements. The other concept explores the idea of Dalton Wells being managed as a State Park. In this scenario, there would be funding to facilitate improvements to the infrastructure, and provide additional programs. In reality, the actual concept will likely include aspects of both concepts, and be implemented incrementally.

### *Current Recreation Typology*

Dalton Wells is unique, as it is not easy to classify within the Recreation Opportunity Spectrum. When examining it within the framework of the BLM’s ROS class descriptions used for the Grand Staircase–Escalante National Monument (Hammit, Cole, & Monz, 2015), its physical and social setting range from semi-private motorized to rural, and its managerial setting is semi-private motorized. While it is a primarily unmodified environment with little management or infrastructure, the site can experience a high concentration of visitors at peak use times.

Dalton Wells may best fit Brown, Driver, and McConnel’s (1978) Recreation Opportunity Spectrum classification of rustic (P. Brown et.al, 1978), as there are highly concentrated areas of use in certain areas and lower densities of use in fringe areas. To fit this definition however, roads to accommodate “conventional” vehicles would have to be constructed. The existing roads are dirt roads, some of which are inaccessible to standard vehicles without four wheel drive or high clearance.

Because Dalton Wells is a unique blend of primitive camping and accessible front country camping, it is popular with visitors who prefer dispersed camping. The conditions are natural and undeveloped, yet the social conditions can be high-density. This is one of the main factors contributing to the overcrowding at the study area.

### *Current Activities*

Current outdoor activities are centered on single-track, ATV, and jeep trail use. The site has an extensive trail system that is

maintained and managed by a local non-profit, Ride with Respect. The single track is utilized for both motorized dirt biking and non-motorized mountain biking.

The Copper Ridge Jeep Safari route also runs past the site. This is connected to a series of jeep roads. Willow Springs gets quite rugged east of Courthouse Wash and once was the original entrance to Arches National Park. Recreationalists who want to get away from the crowds can drive this road through more remote sections of the park. The road also runs past dinosaur tracks, which are a fun side attraction.

Dispersed camping is also an activity in and of itself. While many people are just pulling over to find somewhere to spend the night, other groups of campers enjoy pulling out into the desert and feeling free of the confines of a campground.

Hiking, Horseback Riding, and Wildlife Viewing, are other activities that occur in the area. While these don't appear to be the prominent reason for visiting the area, they were noted in visitor surveys from a visitor use study conducted by USU's ENVS 4550 class (Lamborn, Burr, & Nelson, 2016). The land is also currently used for commercial hot air balloon rides, offered through a private company based in Moab.

During the site visits, most current users were either using the area's trail system, or RV camping. Surprisingly, there is no reported conflict between trail users in the area. While many management strategies seek to separate uses between motorized and non-motorized users, the existing shared trail system seems to be working well. This could be due to educational signage and management put out by Ride

with Respect, who encourages users to be aware and respectful of others and the environment.

This could also be due to the fact that mechanized activities which share space, such as mountain biking and OHV use, experience less conflict than space shared between non-mechanized and mechanized users (Manning, 2011). Conflict between non-mechanized and mechanized users could be one reason why I saw no hikers when I was in the area. As some of the users in USU's Visitor Preference Study indicated they liked to hike in the area, this could signal a need for a hiking trail system in some part of the site.

*Potential Recreation Typology*

If Dalton Wells continues to increase in popularity and visitor numbers, it has cultural, scenic, and programming features which would lend well to a State Park designation. In term of the Recreation Opportunity Spectrum, this would move the site closer to P. Brown's classification of Concentrated. This would mean that facilities for intensified use and multiple activities exist, human contact is likely, and facilities such as paved roads and parking are developed for intensified motorized use (P. Brown et. al, 1978). This would mean the site would offer more unnatural and developed settings, but would also accommodate more visitors, more activities, and harden off high-use areas to protect the environment.

*Potential Activities*

Potential future outdoor activities would depend on investment in the site's cultural features. If research and excavation is revived at the Dalton Wells Dinosaur



Quarry, the site could host an interpretive trail exploring both the geologic and paleontological features of the area. A similar interpretive trail could be built around the remains of the Historic CCC Camp.

Yurt camping could also be an activity which would be a potential solution to funding recreation at Dalton Wells. The overuse of camping at the site on peak days signals a need for more camping in the area, and the yurts at nearby Dead Horse Point State Park are a successful and popular attraction among visitors. The scenery is also a stunning place for yurt camping, as visitors are paying hundreds of dollars a night to stay at the adjacent glamping resort, Moab Under Canvas, where they can enjoy the views into Arches.

Additional trails could be put in to increase the variety of activities at Dalton Wells. While users reported hiking and horseback riding as some of the activities that occur, these activities were not apparent during site visits. Creating separate trails for non-motorized users could provide more opportunities for recreation, and attract different types of recreationalists. Connections could also be made to nearby trail systems and activity areas, such as the Klondike Bluffs section of Arches National Park, the Bar M mountain biking trails to the south, the Mill Canyon OHV trails to the west, and the Mill Canyon Dinosaur Tracks. This would solidify the state park as a centralized base camp to a variety of different activities.

#### *Resource Resistance and Resilience*

Dalton Wells is neither resistant nor resilient. It is a fragile high-desert ecosystem that is both easily changed by disturbance (non-

resistant) and takes decades to recover (non-resilient). The soil at the site mostly consists of highly erodible, sandy, shallow soils. As Hammitt et al. (2015) explains, shallow soils are susceptible to erosion and are not well suited to recreation activities. Because of this, the site at Dalton Wells has suffered from significant erosion and loss of plant cover. In areas where the soils are not sandy, they are made of clay, which is susceptible to compaction from trail use and camping.

The vegetation is also not resistant or resilient. The area is covered with brushes and grasses, which are resistant in that most are prickly, upright, and keep human trampling at bay. Yet, these plants rely on biological soil crusts to collect water, fix nitrogen, and provide initial rooting material. The soil crusts are very non-resistant as these are easily disturbed by recreationalists who pioneer off trail, and non-resilient, taking many decades to grow back. When the soil crusts are disturbed, the vegetation is affected and becomes less resilient, as it doesn't have the soil's necessary support for recovery.

#### *Resource Impacts*

Dispersed camping at the site is increasing the area of environmental degradation. Hammitt et al. (2015) describes how "Dispersed use, away from established trails, can result in networks of informal trails that have the potential to increase habitat and landscape fragmentation" (p. 99). Both the dispersed camping and the OHV use contribute to informal trails at Dalton Wells. Places where a four wheeler blazes a faint trail turn into truck pull outs, and later makeshift camping places when the more established camping areas are full.

The Dalton Wells site provides evidence that Hammitt et al. (2015) are correct when they propose that allowing increased visitors on trails doesn't greatly increase impacts, but allowing increased visitors to campsites does. The trail systems in the area are in pretty good shape, and don't suffer greatly from erosion. This is largely due to good management practices by the nonprofit Ride with Respect, which educates users about trail etiquette and reducing off-trail travel.

In the last few years, more visitors have come to camp in the area, many with larger parties. Large RV campers and trucks have created giant areas of compacted soils. These areas see repeated and high use, which could still be allowed, but as more people visit the area, the impacts are spreading. Dalton Wells is a prime example of node and linkage impact patterns that Hammitt et al. (2015) describes. The largest impacts occur near the roads, trailheads and restrooms, as every car, four wheeler and RV needs to access these at some point during their stay. These areas have become hardened, barren impact zones that contribute to increased water and wind erosion. The areas become hardened very quickly, as the desert topsoil is shallow and prone to erosion.

The eastern edge of the site is inaccessible to large RVs. This has caused an area of dispersed backcountry camping that is less concentrated, and has seen less trampling. This area will likely see an increase in area impacts, however, as the site becomes more well-known and attracts more visitors.

*IMPACT SOLUTIONS*

Solutions to impacts can come in the form

of indirect or direct management. Indirect management attempts to influence behavior through signage and education, while direct management involved modification of the environment or regulations which enforce behavior (Manning, 2011).

There is already some very effective indirect management provided by the nonprofit Ride with Respect. This group has signage that teaches informs visitors about the importance of protecting the desert ecosystem by staying on the trails. As studied by McCool and Christensen (1996), indirect management can be a preferred form of management, so that visitors don't feel that too many rules are imposed on them in an outdoor wildland setting. This is especially relevant at Dalton Wells, where many of the visitors don't want to see infrastructure or improvements. Visitors here appreciate a "wild" and unstructured environment. As Ride with Respect has noted, people typically don't intentionally harm environments. A little management through educational signage can greatly reduce impacts, by teaching visitors the impacts of negative activities.

Management changes at Dalton Wells will likely be incremental. Indirect management would be a recommended first step in mitigating site impacts. This would encourage better camping practices to help mitigate impacts until funding and a management plan are in place. Direct management strategies should focus first on the Willow Springs section, as it is the area which sees the most use.

STAGING IMPACT SOLUTIONS

One of the first direct management changes recommended would be to consolidate

group parking into a few concentrated areas. Currently, there are many smaller pullouts and parking areas spread throughout the site. Small pullouts over time, enlarge into bigger parking areas. These pullouts should be fenced off and re-vegetated. Larger parking lots that are strategically located next to trailheads and day use areas should replace the numerous pullouts. Group parking areas should be hardened, by treating the lots with a permeable paving or gravel and fencing off the perimeter of the parking lot.

### CAMPING IMPACT SOLUTIONS

Due to its fragile ecosystem, the Willow Springs camping area cannot wait long for some infrastructural support. While visitors do not want to see many improvements in campground amenities or a raise in fees, something must be done to prevent further erosion and degradation of the site. Without additional funding and management, indirect measures such as educational signage about camping with a light footprint could be put into place. However, charging a small \$5 fee would provide funding to help pay for basic amenities such as restrooms and trash collection. This would not change the character of the camping, but would provide necessary improvements to the environmental conditions at the site.

Also in line with visitor preferences, camping should be permitted in designated, but not improved sites. This would mean that campsites would be staked out and numbered as official sites, but amenities such as fire pits, picnic tables, and shade structures would not be installed. Sites would be located in many of the current existing campgrounds to prevent the spread of impacts, and users could rely on existing

fire rings. This would contain impacts to existing sites, while retaining the feel of dispersed camping as much as possible.

Highly used camping sites should be hardened by providing supporting infrastructure to prevent further degradation. These sites could be more established and fenced with low, unobtrusive fencing. Sites near these areas could accommodate large groups, as the area of impact has already spread. However, the number of campers at each site should be limited, so that the spillover of extra tents, RVs, and equipment doesn't allow the area of impact to spread into the surrounding area.

Another direct management strategy for Dalton Wells could center on the design and layout of the site. A study by M. Daniels and Marion (2006) redesigned camping areas along the Appalachian Scenic Trail by closing large, open, flat camping areas, and replacing them with smaller camping areas that have topographic constraints. This tactic could work well at Dalton Wells, especially in more primitive camping areas that are tucked away from the main camping area. As there is little vegetation at the site, topography could limit spreading while also providing barriers to give campsites seclusion.

The section north east of Garden Point has seen less degradation. Only small groups should be allowed at the campsites at this section of Dalton Wells. This would prevent further erosion and trampling of vegetation, and help mitigate the spread of area impacts. A study completed by Duncan and Frissell (1965) at the Boundary Waters Canoe Area would seem to contradict this decision. Duncan and Frissell discovered that lightly used sites are almost as heavily impacted

as heavily used sites, with 80% of vegetative cover loss at lightly used sites as compared to 87% at heavily used sites. Yet, they also note that “In fragile environments, cover loss increases rapidly with increases in use at the very lowest use levels” (Manning, p. 154).

This is a good reason to limit large groups at the backcountry sites at Dalton Wells. The landscape is very fragile and the less use seen in this area, the better. Hammitt et al. (2015) found that if use levels could be kept very low, then limiting group size could be effective. Cutting down on the number of campers in the backcountry equates to fewer tents outside of hardened areas and therefore less trampling of soils and vegetation.

Hammitt et al. (2015) also states, however that limiting use will only work if the use levels can be kept at a low level. They explain that “In popular areas, channeling and concentrating use will have to be practiced to counteract the tendency for increased use to enlarge the areal extent of impact.” (p. 156). For this reason, the dirt access road to the north-eastern sites should be kept narrow and difficult to access. This would act as a natural reinforcement to channel visitors to the more heavily used sites that are closer to the highway. This would also preserve an intimate camping experience for small groups at the backcountry sites. However, if camping continues to increase, the sites are accessible from the north via Klondike Bluffs Road. If campers begin to visit via this route, these campsites will need to be hardened as well.

## ZONING SOLUTIONS

Dalton Wells has the potential to be a

crowded, multi-use space, which causes environmental impacts, and is difficult to manage. Studies from the Great Barrier Reef Marine Park (Day, 2002) and Koh Chang National Marine Park (Roman et al., 2007) explored the zoning of park areas as recreation management solution. These studies successfully separated uses, reducing visitor conflicts and creating opportunities for conservation. Zoning could be one good solution to recreation management problems at Dalton Wells. Zones could include areas for motorized trails, non-motorized trails, cultural resources, primitive camping, established camping, and rustic camping. Variety in recreation settings and activities is important, as research has shown that designing for the “average” visitor does not provide for choice, and ultimately leaves most parties dissatisfied (Manning, 2011). Zoning would diversify and increase the recreation opportunities at Dalton Wells. For example, by segregating activities, such as OHV use, new opportunities such as hiking, could be introduced.

## RECREATION ZONES

The master plan (figure 6.1) is sectioned into three main activity zones in order to provide different levels of development and a variety of activities. While each zone will have options for both tent and RV camping, as well as day use areas, each zone is centered around one main type of use.



### ZONE 1

#### *Primitive Camping & Yurts*

- Primitive campsites with no improvements
- Keep access limited
- Campsites for tents and small trailers
- Yurts if the site becomes heavily used

### ZONE 2

#### *Visitor's Center / Day Use Group & Yurt Campsites*

- CCC interpretive trail/building replicas
- Dalton Wells dinosaur visitor's center and viewing deck
- Day use picnic area
- Yurts and group campsites

### ZONE 3

#### *Rustic RV & Tent Campsites*

- Rustic tent campsites
- Rustic RV campsites
- Group campsites
- Sovereign Trailhead Day Use Area

# DALTON WELLS CONCEPTUAL PLAN

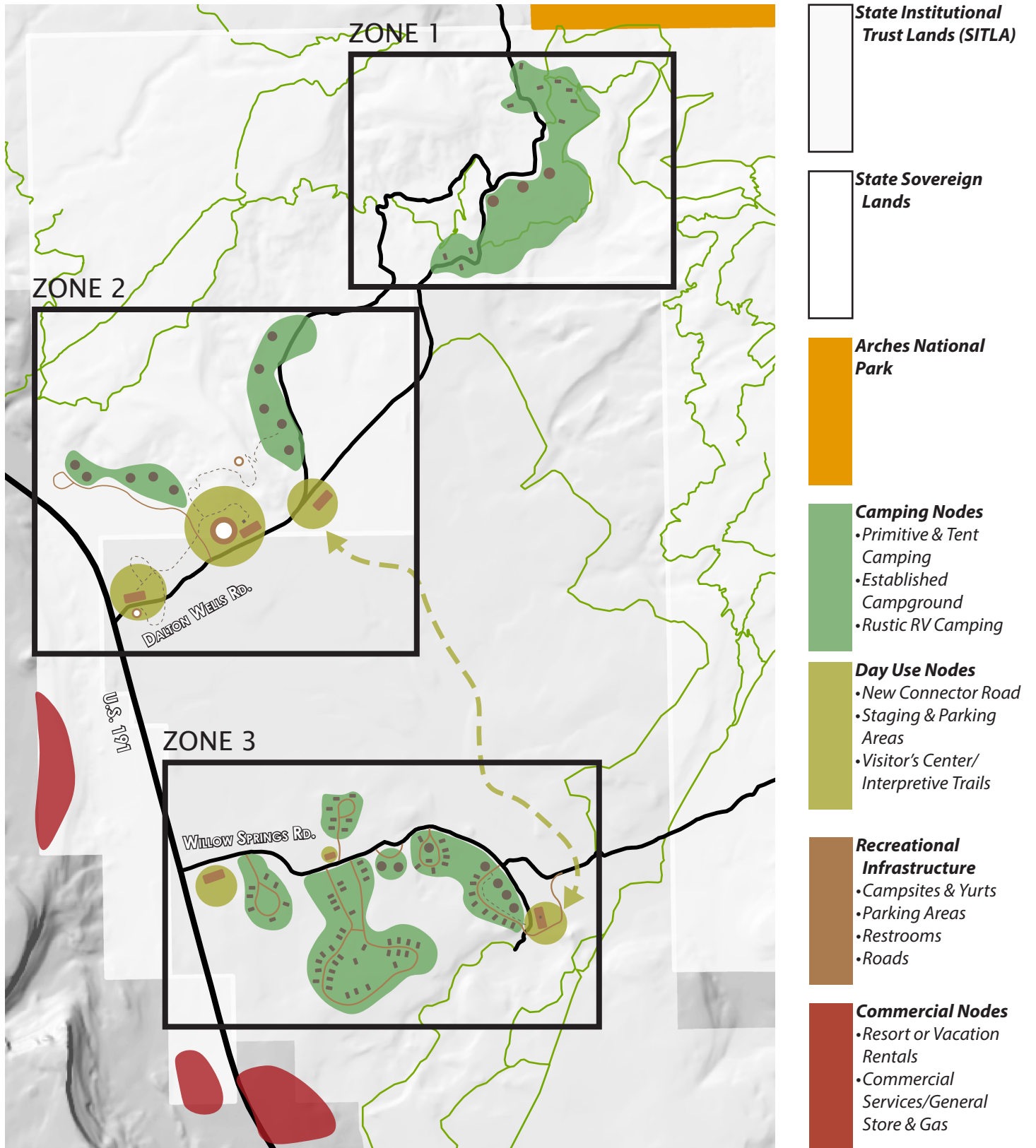
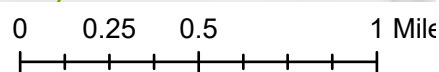


Figure 6.1 Conceptual Plan for Dalton Wells Study Area.



## RECREATION ZONE 1- PRIMITIVE & YURT CAMPING

The ridge at the north-eastern edge of Dalton Wells, (A in figure 6.4) offers stunning views into the Klondike Bluffs section of Arches. This area is currently difficult to reach without a high clearance vehicle due to a narrow, steep road. The site has old-growth juniper and many smaller, intimate campsites. Until crowds discover this site, it should be kept as a primitive camping area in order to offer a different recreation opportunity than the rest of Dalton Wells provides. If the site gains notoriety and is managed by State Parks, it may begin to see overuse. In this case the road to this section could be improved to provide access. Yurts and tent sites, similar to those shown in figures 6.2 and 6.3, could be established that would help to preserve an intimate camping experience, while keeping impacts to a



Figure 6.2



Figure 6.3

### ZONE 1

#### *Primitive Tent Camping*

- Primitive campsites with no improvements
- Keep access limited
- Campsites for tents and small trailers
- Yurts if the site becomes heavily used

**Figure 6.2 Existing tent camping in Zone 1 at Dalton Wells.**  
Camping could stay primitive in this area as long as crowds don't overwhelm the area.

**Figure 6.3 Yurts at Dead Horse Point State Park.**  
Yurts could be an amenity for visitor's using the Sovereign Trail system.

# ZONE 1 PRIMITIVE & YURT CAMPING

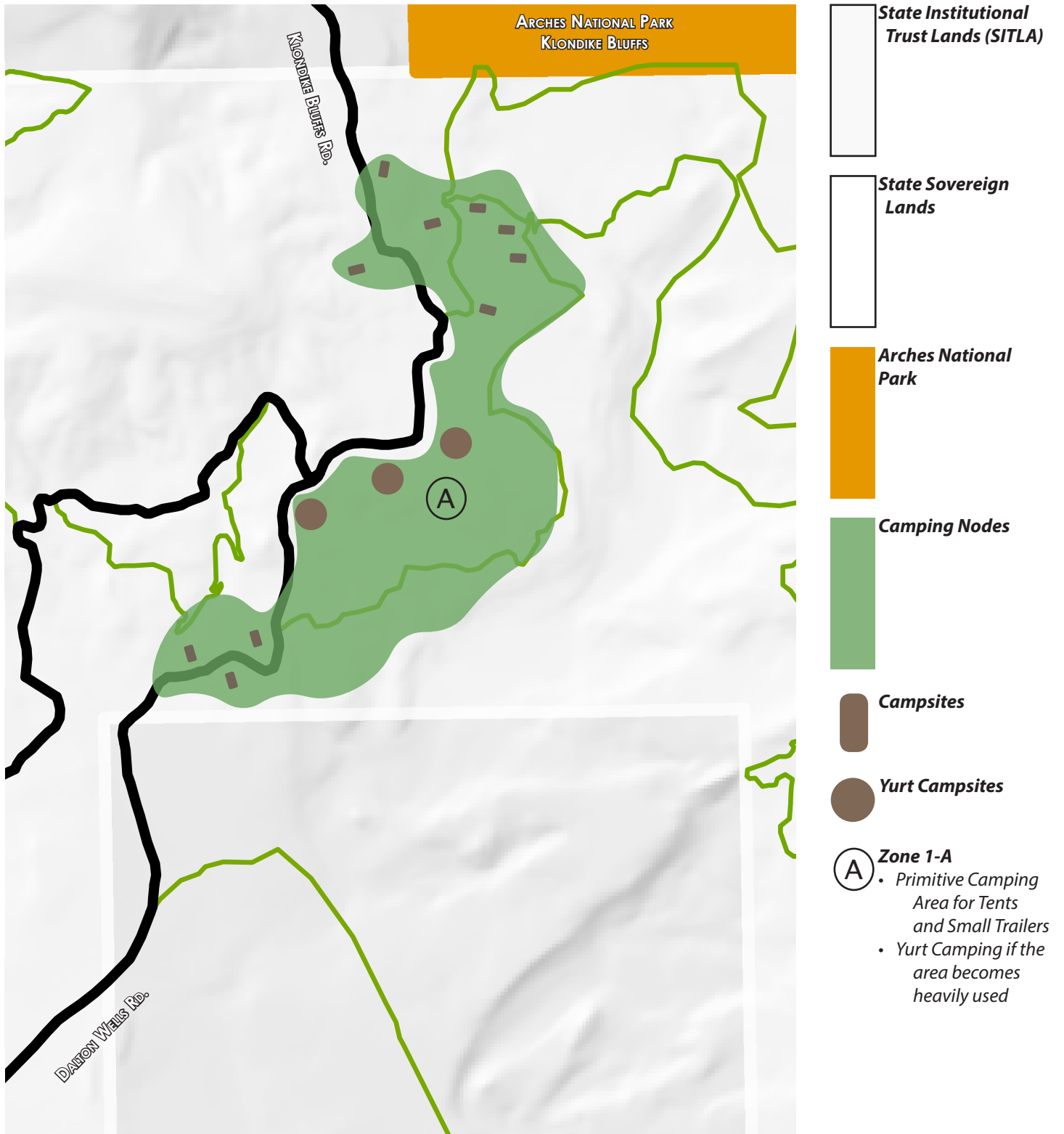
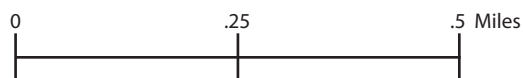


Figure 6.4 Zone 1: Primitive Camping Area near Klondike Bluffs Road





## RECREATION ZONE 2- VISITOR’S CENTER, YURTS & CAMPGROUND

This section would be the most developed of the Dalton Wells area. (See figure 6.7). Because of the CCC history and the Dalton Wells Dinosaur Quarry, this would be a prime location for a visitor’s center or interpretive trails. Visitor features could potentially be similar to the visitor features shown in figures 6.5 and 6.6. At a minimum, the area should include scenic hiking and interpretive trails. If Dalton Wells were to be managed as a state park, this zone could include a fee station and visitor’s center. Day use picnic areas, shade structures that blend in with the landscape, and structured camping areas would all be included in this zone. This zone would be geared toward day visitors and car camping. Group Sites would be available. Yurt camping could also be explored within this zone.

To allow all visitors to reach this section of the park, the road crossing at Courthouse Wash would need to be reinforced or bridged. Currently only high clearance or 4WD vehicles can cross the deep sand. Until funds are allocated to maintain this area, it may be advantageous to keep this natural barrier in place. Dalton Wells has seen less traffic from dispersed camping than Willow Springs because it is currently less accessible.

On the eastern side of the hillside, rustic campsites with limited services would be available for overflow camping. These would be numbered and staked out and pit toilets would be available in this section. Another staging area for the trails system would be located at the eastern section of this zone to provide access to the Sovereign Trail systems.



Figure 6.5



Figure 6.6

### ZONE 2

#### *Visitor’s Center / Day Use Developed Campground*

- CCC interpretive trail/building replicas
- Dalton Wells dinosaur visitor’s center and viewing deck
- Day use picnic area
- Yurts and group campsites

**Figure 6.5 Leeds CCC Camp.**

A Dalton Wells CCC visitor’s area could be similar to one in Leeds, Utah. A building replica with interpretive trails that follow the original Dalton Wells CCC Camp layout would tell about the history of the area.

**Figure 6.6 Cleveland Lloyd Dinosaur Quarry.**

A visitors center or interpretive trail could be similar to the Cleveland Lloyd Quarry in central Utah.

# ZONE 2 VISITOR'S CENTER, YURTS & CAMPGROUND

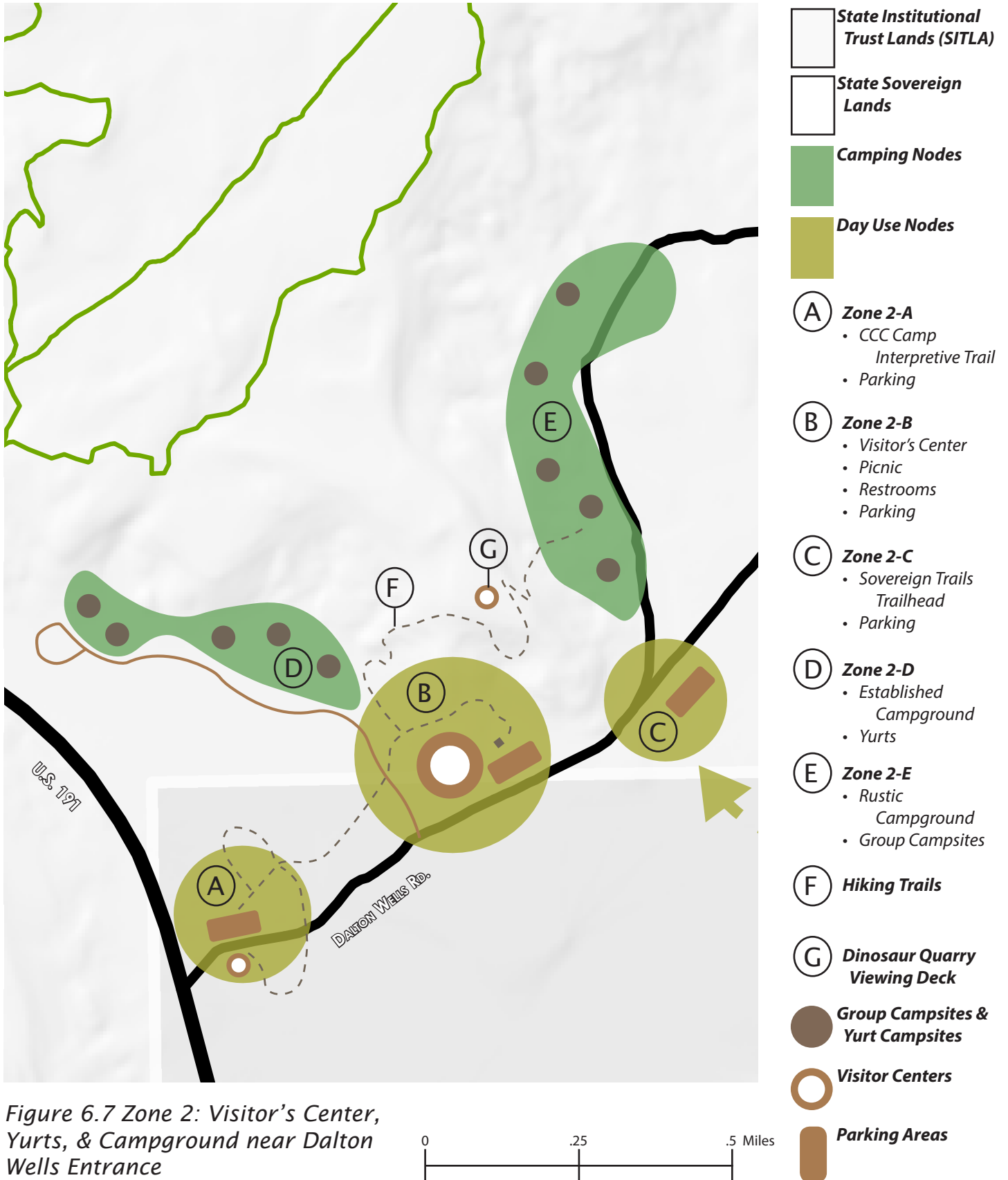
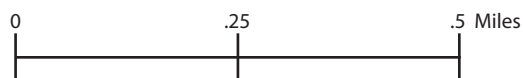


Figure 6.7 Zone 2: Visitor's Center, Yurts, & Campground near Dalton Wells Entrance



## ZONE 3 - RUSTIC RV CAMPING & TENT CAMPING

This zone would be geared toward larger campsites that could accommodate groups or RVs. (See figure 6.10). This section would be an ideal location for rustic camping, as there is space to spread out and campers could still feel dispersed, as shown in figure 6.8. In keeping with current user preferences, campsites would not be overly developed with amenities such as picnic tables, running water, or tent pads. Rather, campsites would be numbered and basic amenities such as pit toilets and garbage collection would be placed at key locations. Because campsites aren't developed and will require less monitoring, they can be spaced out more than a traditional structured campground. Campsites in this area would only be charged a small fee of approximately \$5 since there are no services or running water.

To prevent the spreading of further erosion, kiosks would display information about camping with a light footprint. The kiosks would also explain that to prevent further development and infrastructure, good camping etiquette is necessary. Campsites could also be spatially constrained by locating boulders or posts at key locations.

This section would also include two staging areas, one where Willow Springs Road and Courthouse Wash meet, and one at the Willow Springs Entrance. (See figure 6.9 for a staging area precedent). These areas would provide opportunities for kiosks, day use parking and restrooms. The parking area near Courthouse Wash will be especially large as it would serve as one of the main parking areas for the Sovereign Trail System.



Figure 6.8



Figure 6.9

### ZONE 3

#### *Rustic RV Camping*

- Rustic tent campsites
- Rustic RV campsites
- Group campsites
- Sovereign Trailhead Day Use Area

**Figure 6.8 RV Campsite**

RV Campsites with minimal improvements such as fire rings.

**Figure 6.9 Trailhead Near Moab**

A trailhead for the Sovereign Trail System would include restrooms, an information kiosk and large parking areas.

# ZONE 3 RUSTIC RV CAMPING & TENT CAMPING

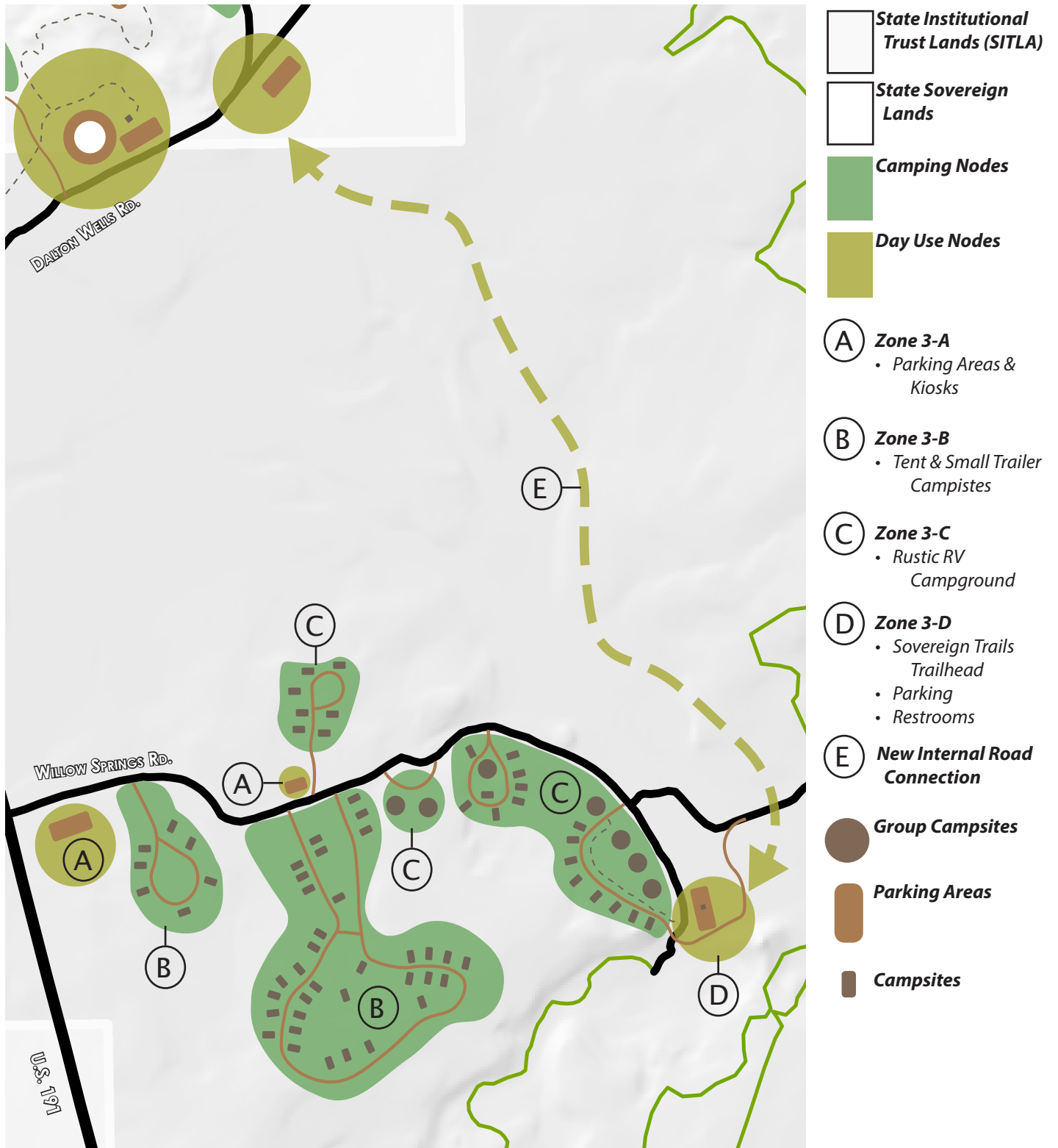
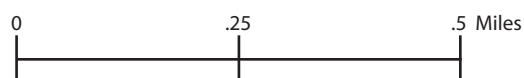


Figure 6.10 Zone 3: Rustic RV Camping and Tent Camping.



## COMMERCIAL NODES-RESORT & TOURIST AMENITIES

While the recommended commercial nodes would not be managed or owned by State Sovereign Lands, and out of their control, it would be preferable if these sites supported tourism by keeping the visual quality of the area intact. This particular plan shows a resort commercial area up on the hillside (figure 6.13), A), and a commercial node (B) near the existing Archview Resort and Moab Under Canvas (C).



Figure 6.11



Figure 6.12

### SITLA

#### *Resort Commercial*

- Airstream or glamping resort
- Market, Gas Station or Tourist-based Service Center

#### **Figure 6.11 Airstream Resort.**

An airstream or glamping resort could take advantage of the cliff-top views into Arches and the La Sal Mountains.

#### **Figure 6.12 General Store at the Grand Canyon**

A market or general store could serve as the last service stop before Canyonlands National Park and Deadhorse State Park, and could also be an amenity for campers at Dalton Wells.

# COMMERCIAL NODES-RESORT & TOURIST AMENITIES

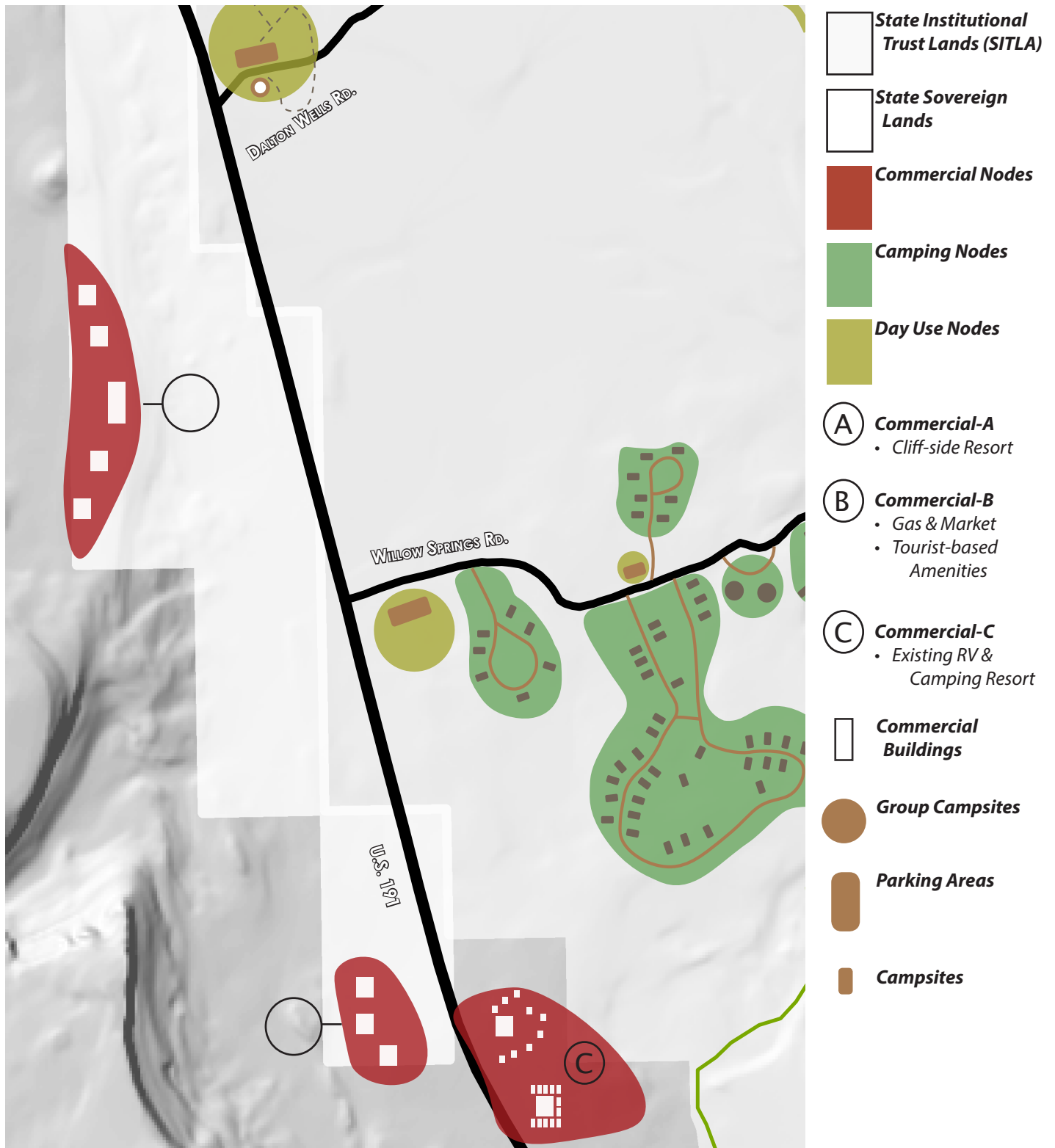
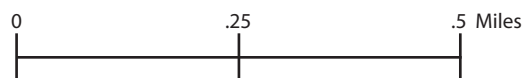


Figure 6.13 Commercial Nodes: Resort and Tourist-based Amenities.



## CONNECTIVITY-ROADS & TRAILS

If the site begins to see the amount of activity that would justify State Park management, an internal road should be constructed to connect Willow Springs and Dalton Wells. (See letter B in figure 6.16). This will create a loop system of access and will allow cars to circulate through the site without backtracking. This will facilitate better flow through the site, and will also prevent vehicles from backtracking through campsite areas when they are in search of a site.

The Dalton Wells and Willow Springs sections are currently linked by the Sovereign Trail System. This makes each sections an ideal base camp for visitors who come to use the trails.



*Figure 6.14*



*Figure 6.15*

## STATE SOVEREIGN LANDS

### *Connectivity*

- New internal connector road
- Trailheads at each end of Sovereign Trail System

### **Figure 6.14 Paved Road.**

A paved road could connect the study area internally if traffic levels increase, improving circulation and preventing excessive erosion.

### **Figure 6.15 Sovereign Trail**

Trailheads would serve as a staging area for parking at each end of the Sovereign Trail.

# CONNECTIVITY-ROADS & TRAILS

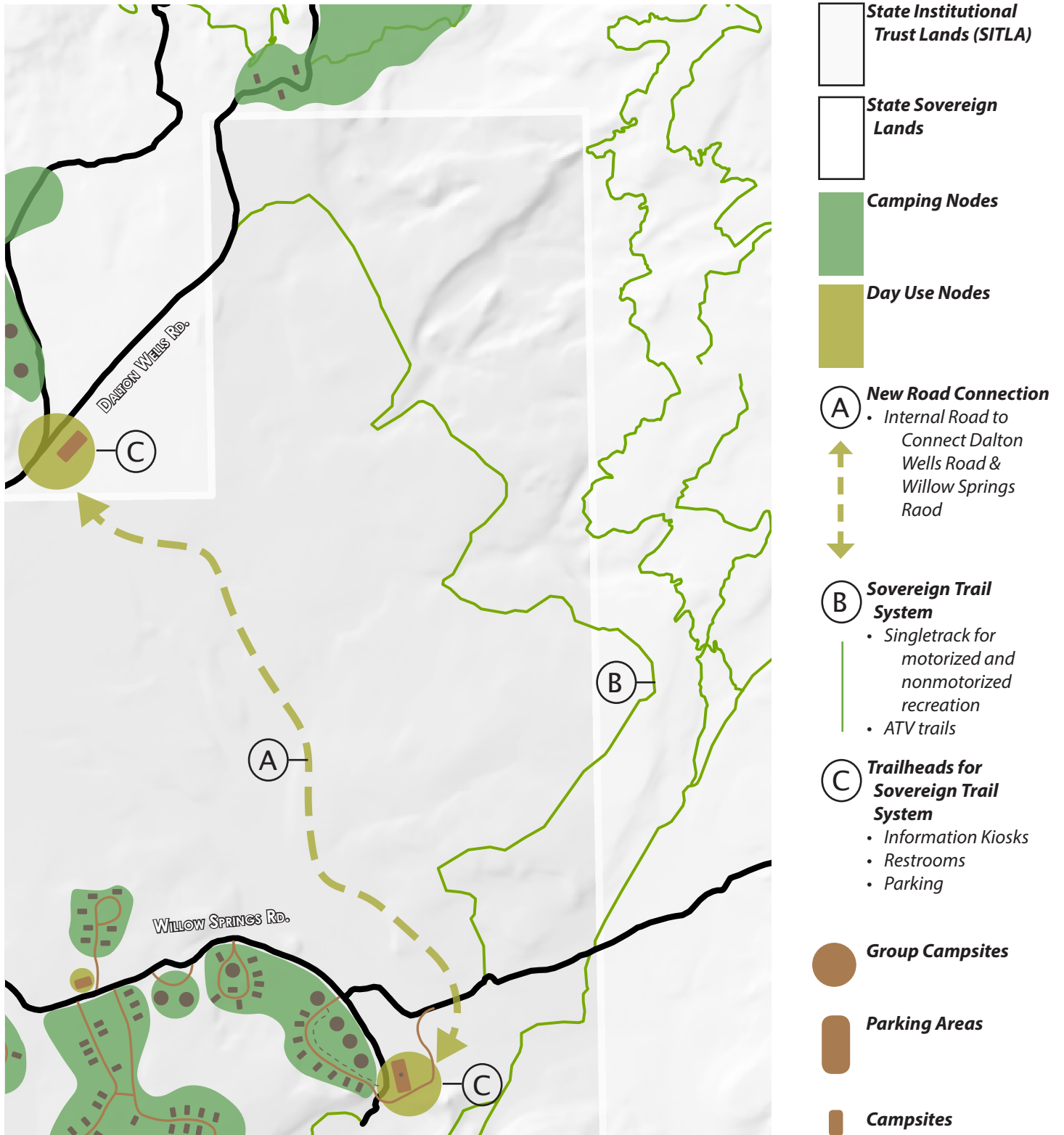
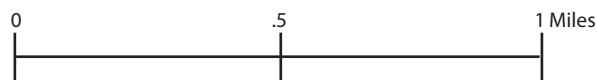


Figure 6.16 Connectivity, Roads, and Trails at Dalton Wells.





**CONCLUSIONS**

Implementation of this plan will ultimately depend on management, funding, and visitor use. In order for State Parks to manage Dalton Wells as a State Park, it will need to be financially self-sustaining. This could start out small with minimal improvements in key zones, and be similar in nature to Goosenecks State Park, which has limited amenities and no water on site. With the right stakeholder input, Dalton Wells has the potential to become a State Park that offers many activities and amenities. Partnerships with paleontology groups or historic societies could revive the cultural features of the area, turning them into a visitor attraction. Features such as yurts could also bring more visitors and user types to Dalton Wells and provide needed funding for a State Park.

If the land is not turned over to State Parks, an alternate management plan and funding needs to be put in place. Currently, State Sovereign Lands does not have the funds to facilitate fee collection, rule enforcement, or site improvements. Without the necessary management strategies in place, none of the changes in the proposed plan will be possible, and Dalton Wells will likely continue to experience the issues that have come with overcrowding and dispersed camping. Until a funding and management solution is reached, forms of indirect management and small infrastructural improvement should be made to mitigate the impacts in the study area. In the meantime, this plan could be implemented incrementally, both to garner the necessary support to funding necessary for improvements, and to gauge visitor response to changes at the site.



*Figure 6.17 Yucca at Dalton Wells.*

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