CULTIVATING IDENTITY AMID CHANGE

A REGIONAL FRAMEWORK FOR UNDERSTANDING AND PLANNING FOR GROWTH IN SOUTHERN UTAH COUNTY, UTAH

EXTENSION
UtahStateUniversity
UtahState University
LANDSCAPE ARCHITECTURE & ENVIRONMENTAL PLANNING

INTRODUCTION

During the spring of 2020, the Utah State University Landscape Architecture and Environmental Planning Regional Analysis and Planning studio (LAEP6100) worked with USU Extension to provide an assessment of the regional context and provide a vision for the area as well as broad, progressive planning and design recommendations.

The LAEP 6100 class exposes students to the principles of analysis and planning at a regional scale. At this scale, broad patterns are observed, internal and external forces on a region are explored, and long term, big picture strategies are encouraged.

The class starts with establishing an “area of study” that is appropriate in scale and respects both natural, social, and political boundaries. In the case of Southern Utah County, the interconnected nature of the communities made establishing the area of study challenging. For the purposes of the course, the boundary was established using watershed boundaries but modified to follow some municipal boundaries. This area of study boundary is shown on the maps throughout the document. It must be acknowledged that the area of study boundary is not impermeable in reality as well as with respect to the flow of people, energy, and commerce. The area of study was established to contain the data, assumptions, and limits of the student work.

The students were then asked to analyze specific topics within the region that they felt were particularly relevant or important. The analysis phase is intended to dissect the region and see it through differing perspectives to better understand issues not usually apparent or perhaps openly discussed.

These topics of study became the basis for the reasons and relevance of the students planning recommendations. These recommendations are intended to be provocative, visionary, and challenge the status quo in the region.

This document is intended to be a conversation starter. The document is not regulatory, sanctioned by any entity, or binding in any way. It does however, provide a perspective on an area informed by the curious inquiry of students looking at data, talking with community leaders, and using systems and design thinking. This document represents and estimated 600 hours of time invested by students and USU Extension Faculty.

The students developed a framework of three principles to organize the analysis and planning phases: Growth, Connections, and Identity. This framework of understanding guided the exploration of the “status” section of each topic as well as the subsequent visioning process detailed in the “opportunities” section of each chapter.

Understanding the importance and relevance of each of these principles and working to enhance them will help Southern Utah County cultivate what makes it unique in the face of growth and inevitable change.

TABLE OF CONTENTS

GROWTH

CONNECTION

IDENTITY

Image Source: Mountain Luxury Real Estate

GROWTH

Many internal and external pressures are affecting or will affect the Southern Utah County region. Perhaps the most immediate looming pressure is that of explosive growth in the area.

Rapid suburbanization, sprawl, housing affordability, infrastructure, community taxing implications, as well as social and biophysical changes must be understood and addressed in order to plan for, and deal with the future growth in the area.

The implications of how the study area deal with growth threaten both the connections and identity of the study area.

DEMOGRAPHICS

WORKFORCE & EMPLOYMENT

One often major concern of a rural communities is job security and the strength of the local economy. To explore this in more depth, an analysis of workforce demographics and area jobs was done to determine who are workers, what industry to they work in, how much money do they make, and where do they work.

Through exploring the workers and employment, Figure 1.1 highlights the race and ethnicity demographics of the workforce in our area of study. The majority of workers in Santaquin are white, with the second race making up less than 10%, which are Hispanic and Latino workers.

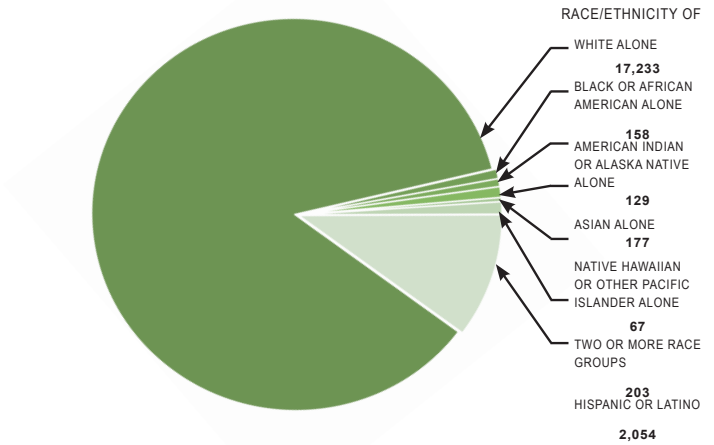


Figure 1.1 Race & ethnicity of Working Residents in Study Area. Data from US Census and OnTheMap.

Figure 1.2 shows a hierarchal layout of the employment sectors where each worker in the region is employed. Overall, the most common employment sector is retail trade, followed closely by manufacturing, healthcare and social assistance, construction, educational services and accommodation and food services. Mining, which accounted for the majority of the jobs in the area when the cities were established, now accounts for less than 100 jobs. It is important to note as stated in the next section on “Commuting to Work”, 87% of these jobs are being performed outside of the area of study.

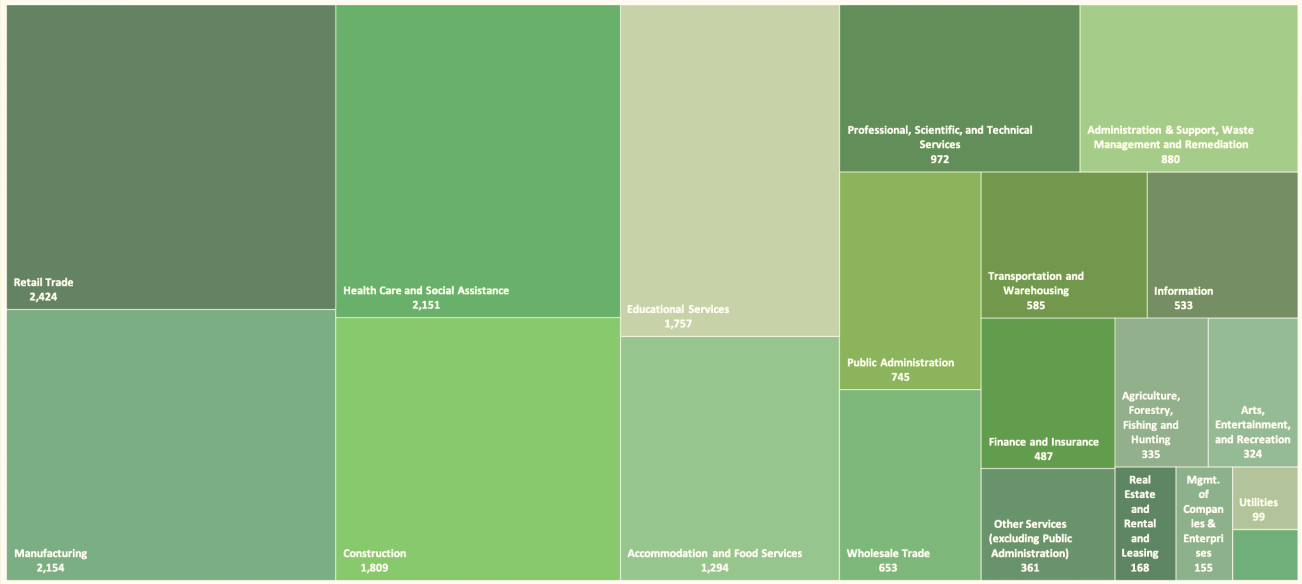


Figure 1.2 Employment Sectors

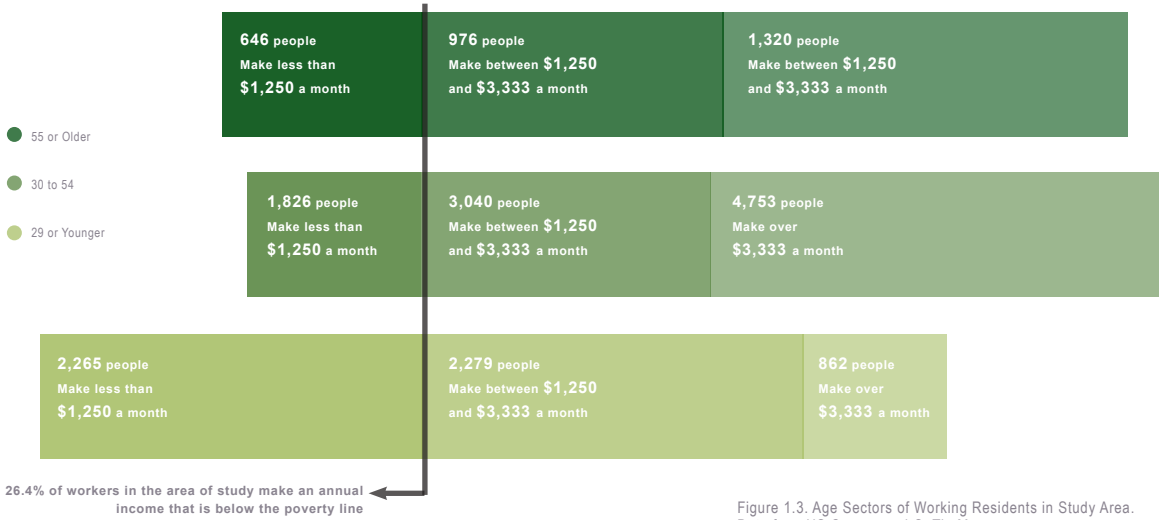


Figure 1.3. Age Sectors of Working Residents in Study Area. Data from US Census and OnTheMap.

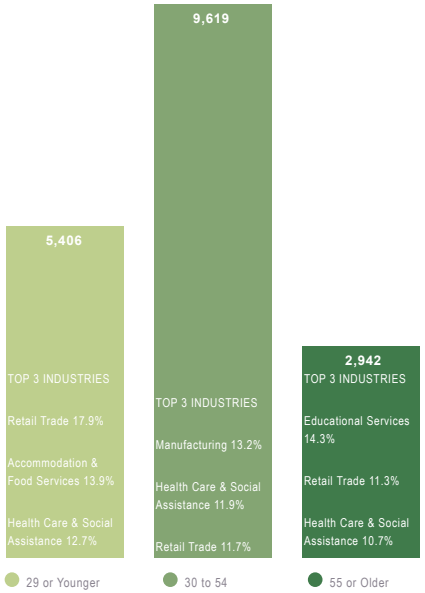


Figure 1.4. Age Sectors of Working Residents in Study Area. Data from US Census and OnTheMap.

Figure 1.3 illustrates the monthly income of workers, separated into three defined age sectors; 29 and younger, 30 to 54 years old, and 55 and older. Monthly incomes are separated into three levels; less than $1,250, between $1,250 and $3,333 a month, and more than $3,333 a month. This figure shows that 4,737 workers, over 1/4 of the working population, make less than $1,250 a month.

Figure 1.4 shows that the top industry in each age sector is different, which could mean that the skill set or job preference of each age sector is different. This is something to keep in mind when considering the types of jobs and activities for each age group. It also highlights that manufacturing and educational services are not among the highest industries of 29 and younger workers, which may have a direct correlation to the percentage of workers in this sector working lower-paying jobs.

DEMOGRAPHICS

COMMUTING TO WORK

Many of the things that attract people to live in the area of study are directly related to the rural lifestyle of the area. This rural character may be made up of attributes such as a high percentage of open space and farms, tranquility and affordability. When it comes to population density, according to the University of Utah Ken C. Gardener Institute, the area's towns have an estimated 36,525 residents. Yet, the area only employs roughly 3,000 people (figure 8.a).

The results of this kind of density to job availability means that the majority of residents are commuting to work. This requirement to travel to work opportunities puts stress on their cars, the local roads, their bodies, their families, and the environment.

EMPLOYMENT LOCATIONS

PROVO	2,326	12.9%
PAYSON	2,254	12.5%
SPANISH FORK	1,675	9.3%
OREM	1,430	8.0%
SALT LAKE CITY	1,126	6.3%
SPRINGVILLE	1,119	6.2%
LEHI	627	3.5%
SANTAQUIN	459	2.6%
WEST VALLEY CITY	431	2.4%
AMERICAN FORK	401	2.2%
OTHER LOCATIONS	6,119	34.1%

Figure 1.12. Where Residents in the Study Area Work

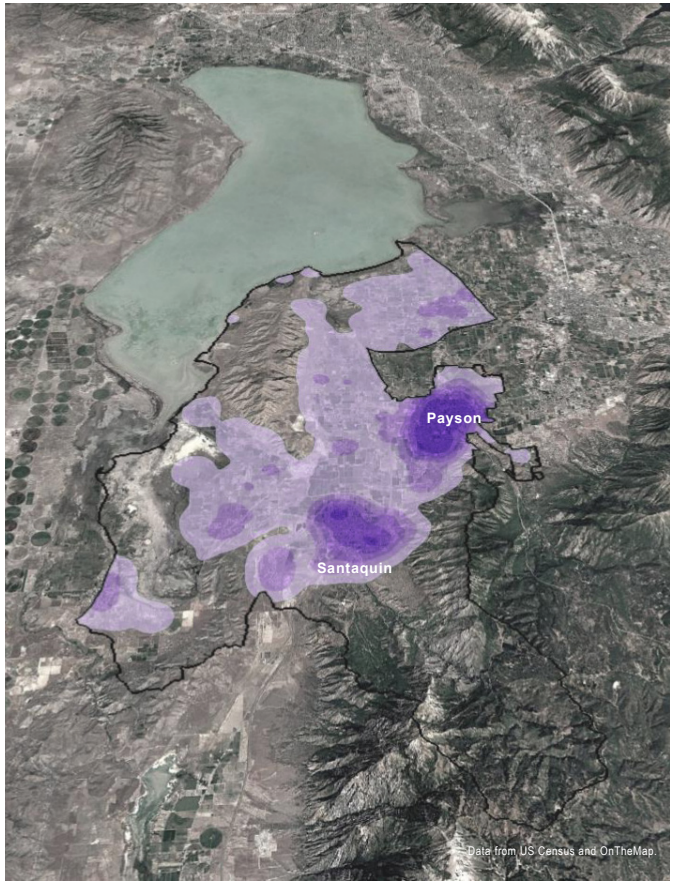


Figure 1.13. Where Residents Work Within the Study Area

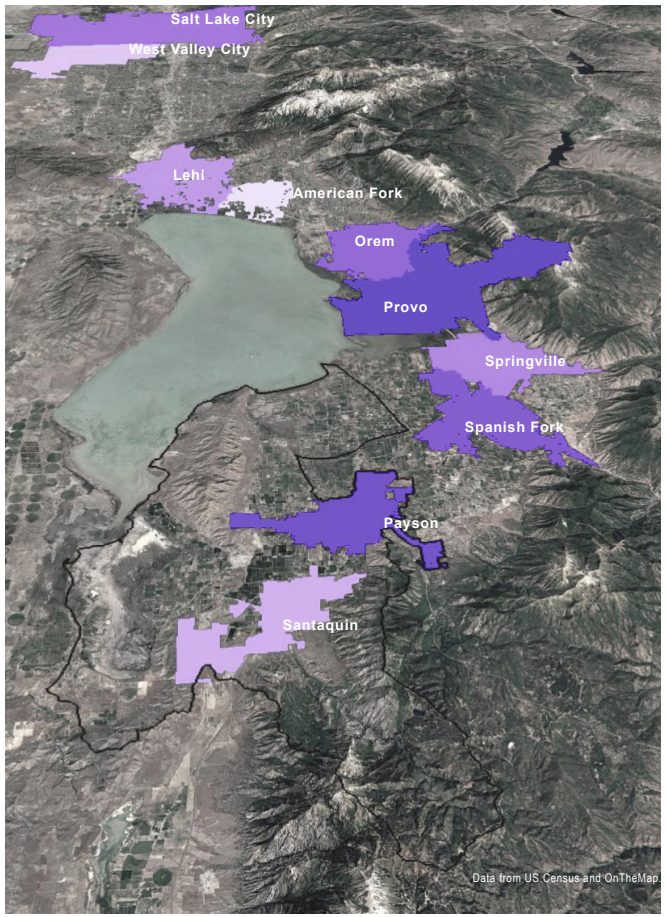


Figure 1.14. Where Residents Work Outside of the Study Area

Figure 1.12 lists the employment locations of workers within our area of study, with Provo and Payson accounting for about a quarter of the employment of residents in the area.

Of the employment locations, figures 1.13 and 1.14 illustrate where the densities of jobs are the highest. This is the location where local workers are spending many of their waking hours. When considering breaks, overtime and commutes, employment hours often greatly exceed the assumed 40 hours in a week.

DEMOGRAPHICS

COMMUTING TO WORK

Figure 1.15. Workers Flowing in and out of the Study Area for Employment

Figure 1.15 illustrates how 4,790 people are commuting to the area for work, while over three times as many workers (15,033) are leaving the area for work. What this means is that there are not enough jobs or high enough paying jobs in the area to retain residents for employment. Cities in the area are losing a tax base to other cities outside the site, and becoming “sleeper” communities, with many of its workforce (83.7%) leaving the area every day.

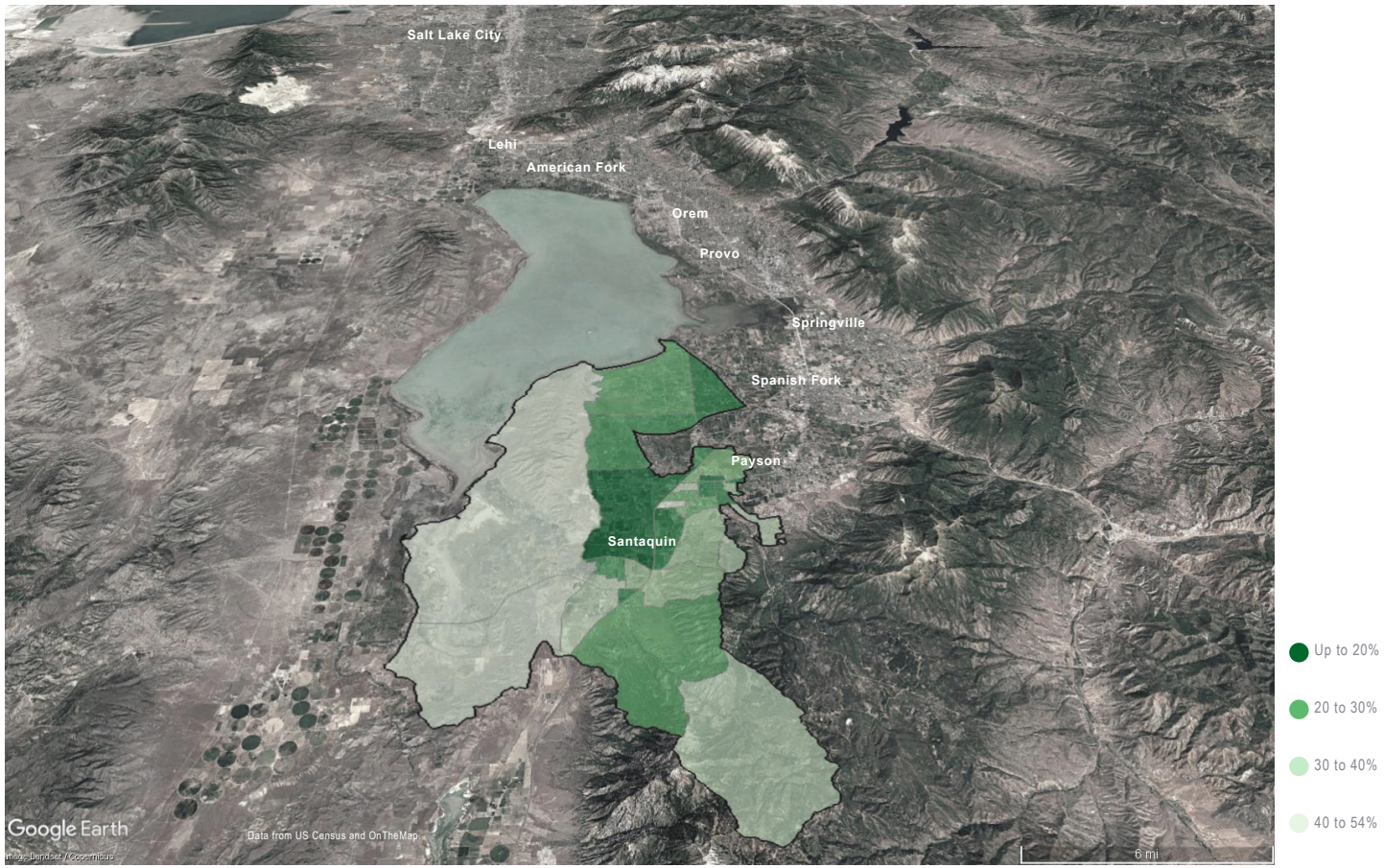


Figure 1.16. Percentage of Residents Who Commute More Than 30 Minutes for Work

Figure 1.16 depicts the percentage of workers within each Census block who commute more than 30 minutes to work. A 30-minute commute is from our area of study to Provo or Lehi, depending on the starting location within the area of study. These employment locations account for close to 5,000 commuters a day, and 27% of the commuters from our area of study. Based on projected commute times, a 30-minute commute by car can be an upwards of 2 hours by public transportation, if available from start point to destination.

BUSINESS

SUITABILITY ANALYSIS

In Frederick Steiner's book , The Living Landscape, the types of businesses are separated into three categories: primary, secondary and tertiary.

> Primary sector businesses encompass industries that generate or use raw materials. Examples: are farming, mining, fishing, and logging.
>
> Secondary sector businesses are industries that create products out of the raw materials produced by the primary sector. Example- manufacturing.
>
> Tertiary sector businesses contain industries and services that are directly dependent on the population of a region. Example- barbershops and grocery stores.

The figures show a preference analysis for each of the types of businesses. Primary and secondary businesses were analyze together because their parameters are extremely similar.

The suitability analysis uses rules about the features in the study area. Rules are created to show whether the site is suitable, capable, or not appropriate.

Parameters used for this analysis were the proximity to main streets, I-15, faults, and population.

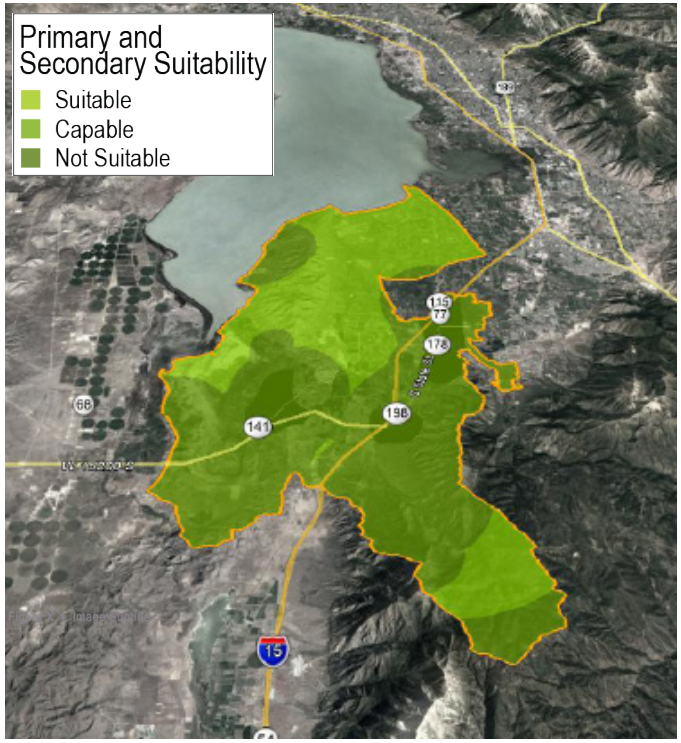


Figure1.17. Primary and Secondary Buisness Suitablity Map

Main street:	Suitable- 1-10 miles Capable- >10 miles N/A- <1 miles
I-15:	Suitable- 0-10 miles Capable- >10 miles
Faults:	Suitable- >2 miles Capable- 1-2 miles N/A- <1 miles

These business types are better suited in lower populated areas.

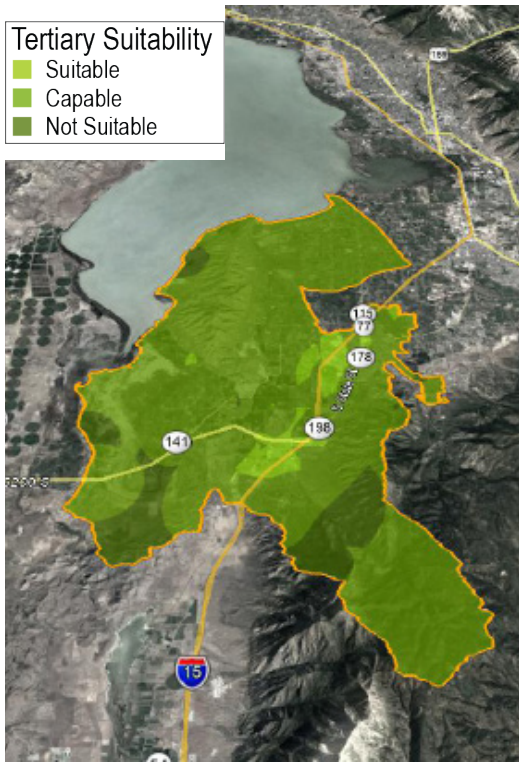


Figure1.16. Tertiary Buisness Suitablity Map

Main street: Suitable- <0.25 miles
Capable- 0.25-2 miles
N/A- <2 miles

I-15: Suitable- <3 miles
Capable- 3-10 miles
N/A- >10 miles

Faults: Suitable- >2 miles
Capable- 1-2 miles
N/A- <1 miles

These business types are better suited in close proximity to higher populations.

There are no laws about building close to fault lines but in this analysis the recommendation is to keep businesses away from them. This is to prevent future damage to the infrastructure in the case of an earthquake.

I-15 is the gateway to the rest of the state and beyond. The freeway is the best way to ship the commodities that come out of this region. Also, resources being shipped to the region will use the freeway.

Having tertiary businesses on or close to main street can create a vitalized urban core. This also promotes accessibility to previsions.

LAND USE

FARMLAND IN THE STUDY AREA

With its rich, loamy soils and temperate climate, southern Utah County has been known for agriculture since first human settlement in the area. In 2007, the State Legislature recognized the area as the Utah Farming Heritage District.

As populations grow and development sprawls out from the cities that were first established by homesteaders, farmland is often the first land to be sold and converted to another use. Due to its lower price per acre and continuous land, farmland is extremely attractive to developers and investors.

For example, Santaquin City, a core communit within the study area, city website boasts “The fertile land that attracted the early pioneers to the area has held true to its promise. Today the Santaquin area is the second largest producer of tart cherries in the nation, and a provider of fresh produce to many local grocers in the region.” Their “smart growth” techniques aim to create economic stability for farmers and all residents, while preserving agricultural resources in the process.

Through exploring multiple layers of land use, parcels with the greatest potential for future private development pressure can be identified.These parcels represent areas where the region’s agricultural legacy will begin to tranistion. Through analyzing general plans and overlaying zoning data, the interplay between agricultural preservation intent and implementation can be observed. Figure1.5 highlights the parcels that are currently in agricultural production.

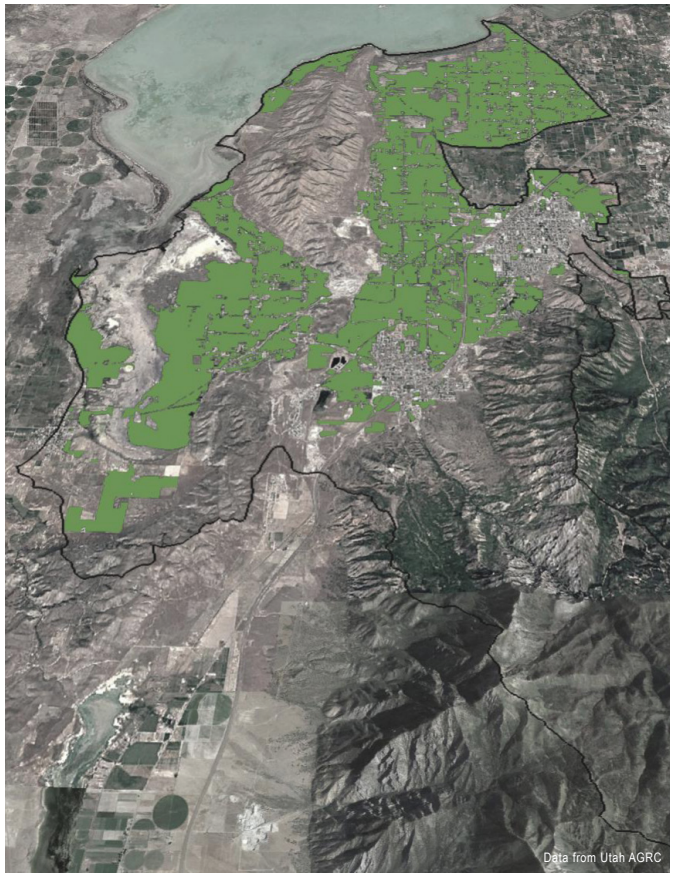


Figure 1.5. Water-Related Land Use Parcels, Defined as Agriculture

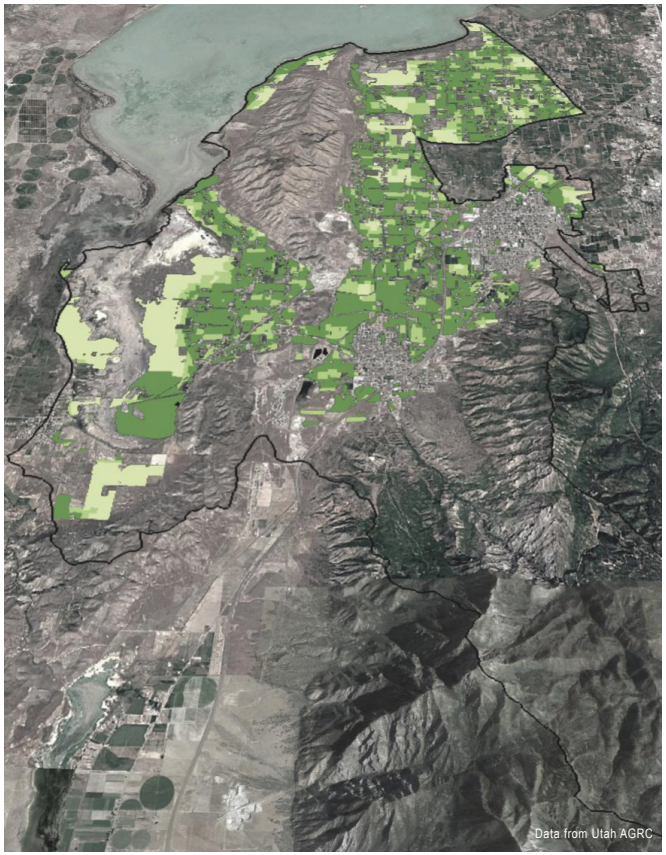


Figure 1.6. Agriculture Parcels' Distance to Main Roads and Infrastructure

Figure 1.6 shows a potential development pressure scale of farmland based on the parcels' proximity to main roads and infrastructure, current zoning, and adjacent land uses. Looking at the agriculture parcels throughout our area of study, the assumption was made that farmland adjacent to existing utilities and near existing deveolopment will be the most cost-effective and attractive investment for development in terms of utility and infrastructure installations.

Through GIS software, a multi-ring buffer tool was used to create three distances away from existing main roads. The distances chosen were 0.01 miles for adjacent roads, 0.011 - 0.25 miles for moderate proximity to roads, and 0.025 - over for least proximity to roads.

One limitation of this analysis includes future road planning. Transportation is explored throughout this document, covering long range planning efforts by UDOT and MAG. While these plans support with the future planning and projections in the area, this analysis was done using existing data from Utah AGRC to assess the current value of land using data and plans that have been adopted by the county and cities as of today.

Agriculture parcels overlapping these distances were then selected and categorized into three values for development; high, medium and low. While this analysis explores the costs of building and installing utilities, other areas needed consideration to create a more robust suitability analysis.

Zoning parcel layers were chosen as the second layer of analysis, based on a curiosity of whether the city and county zoning decisions align with actions for agriculture preservation and smart growth.

LAND USE

DEVELOPMENT

General plans and zoning maps were explored at the county and city level, to see where development has happened and to look for patterns of where development may be headed.

Based on the Santaquin Re-zoning Map published in February of 2019, 6 areas were identified for “Planned Residential Developments” and “Future Communities”. Recently annexed land and areas zoned either residential or commercial uses were then explored at both the city and county level. It was found that most of the agriculture parcels on the county level were already zoned residential. Though these parcels are not currently annexed into a city, the county zoning laws would allow for this agricultural land to be developed into residential properties.

Since the orchards account for a large amount of specialty crops that are unique to the micro-climate of the area, agriculture parcels with orchards were separated from the other agriculture parcels for further analysis. Figure 1.7 highlights which parcels have orchards in light green. The dark purple represents areas that have been re-zoned for the “smart growth” of Santaquin.

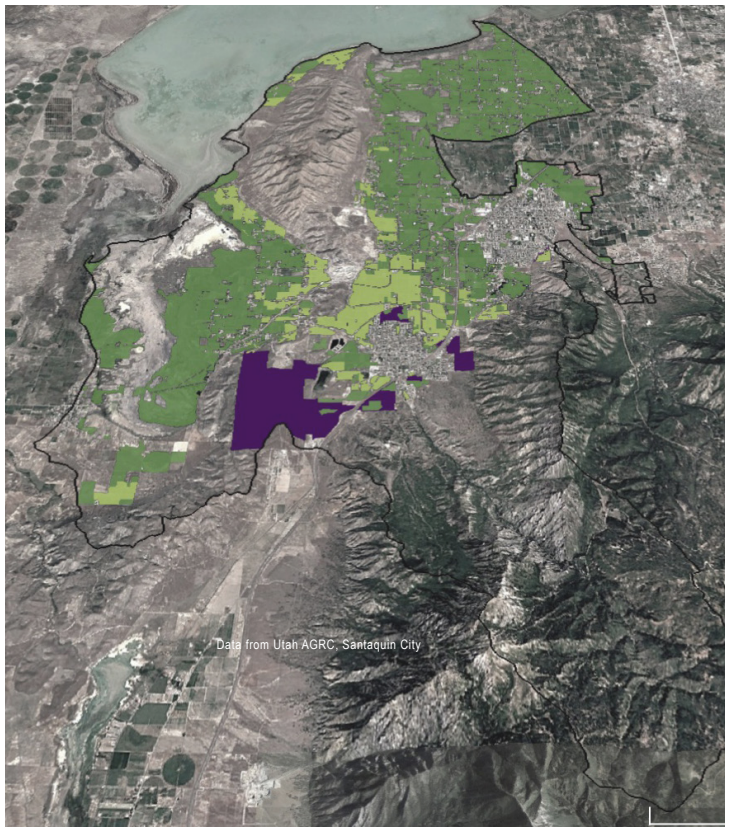


Figure 1.7. Areas Zoned for Planned Development & Future Communities

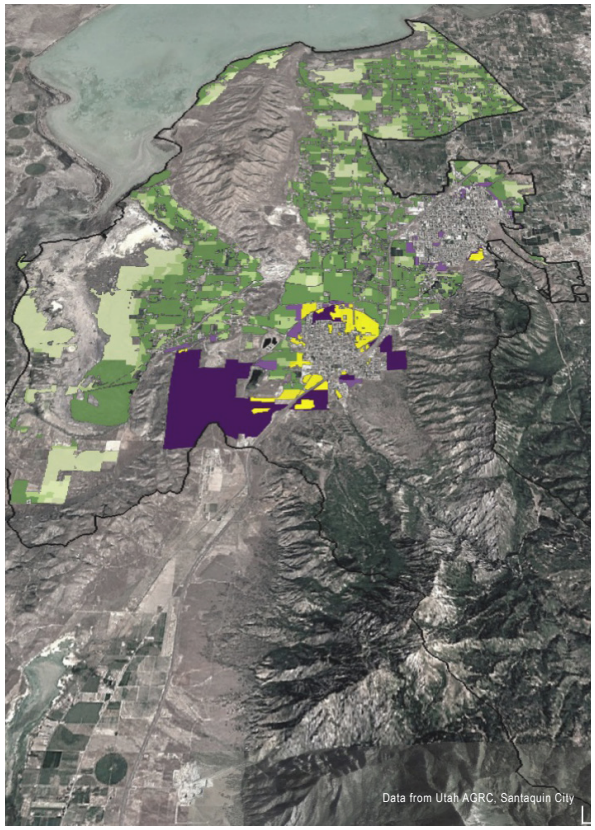


Figure 1.8. Farmland Zoned for Development

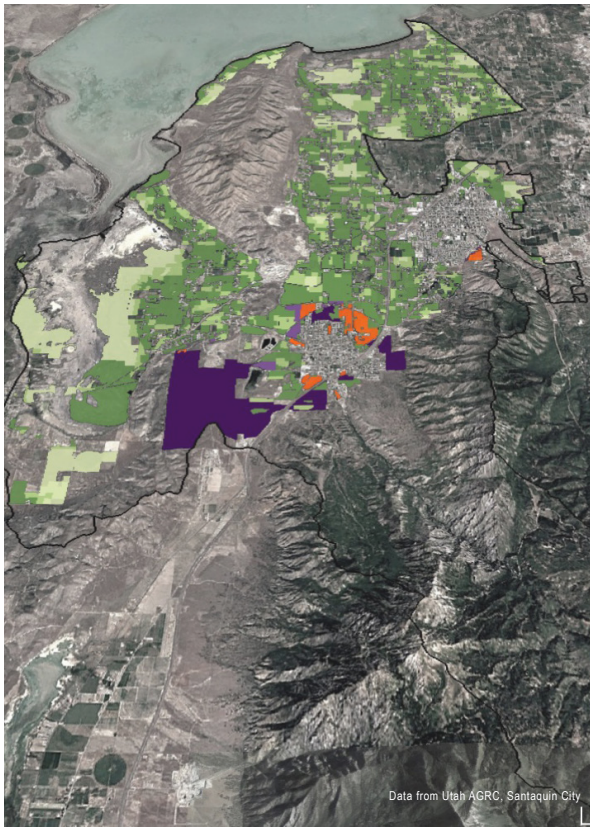


Figure 1.9. Orchards Zoned for Development

- Agriculture Parcels Adjacent to Main Roads
- Agriculture Parcels Off Main Roads and within 1/4 mile
- Agriculture Parcels More Than 1/4 mile Off Main Roads
- Areas Zoned for Planned Developments & Future Communities
- Agriculture Parcels Adjacent to Areas Zoned for Planned Development & Future Communities
- Agriculture Parcels Within Areas Zoned for Residential or Commercial Use
- Orchard Parcels Within Areas Zoned for Residential or Commercial Use

Figure 1.8. shows all the agriculture parcels that are within areas zoned for residential or commercial use in yellow. Five parcels overlap with areas that are in the dark purple areas re-zoned for planned residential developments and future communities. Figure 1.9 highlights the agriculture parcels that are also orchards within areas zoned for residential or commercial use. These parcels are considered highly threatened and extremely vulnerable to development pressure.

LAND USE

VULNERABLE FARMLAND

The final development pressure study mapped in figures 1.10 and 1.11 represent a value scale of the most vulnerable farmland that is at risk of being developed. Figure 1.10 specifically looks at orchards located within our area of study. Figure 1.11 takes into account all agriculture parcels within the study area.

The bright green colored parcels illustrate parcels in areas that have been zoned for agriculture by the city of Santaquin. These have been listed as lowest concern due to their current zoning designation. The chartreuse green illustrates parcels that are of the lowest concern in the county, based on their distance to infrastructure and current zoning and development rules.

Accounting for proximity to main roads and infrastructure, as well as future development and zoning plans, a high, medium and low concern scale of county parcels have been identified within orchard parcels and across all agriculture parcels.

The red and yellow illustrate orchard and agriculture parcels that are in areas that conflict with current zoning. This enforces the idea that on a regional scale, preserving unique agricultural lands is not being translated from desire to policy and practice. This lack of protection threatens the identity of the study area.

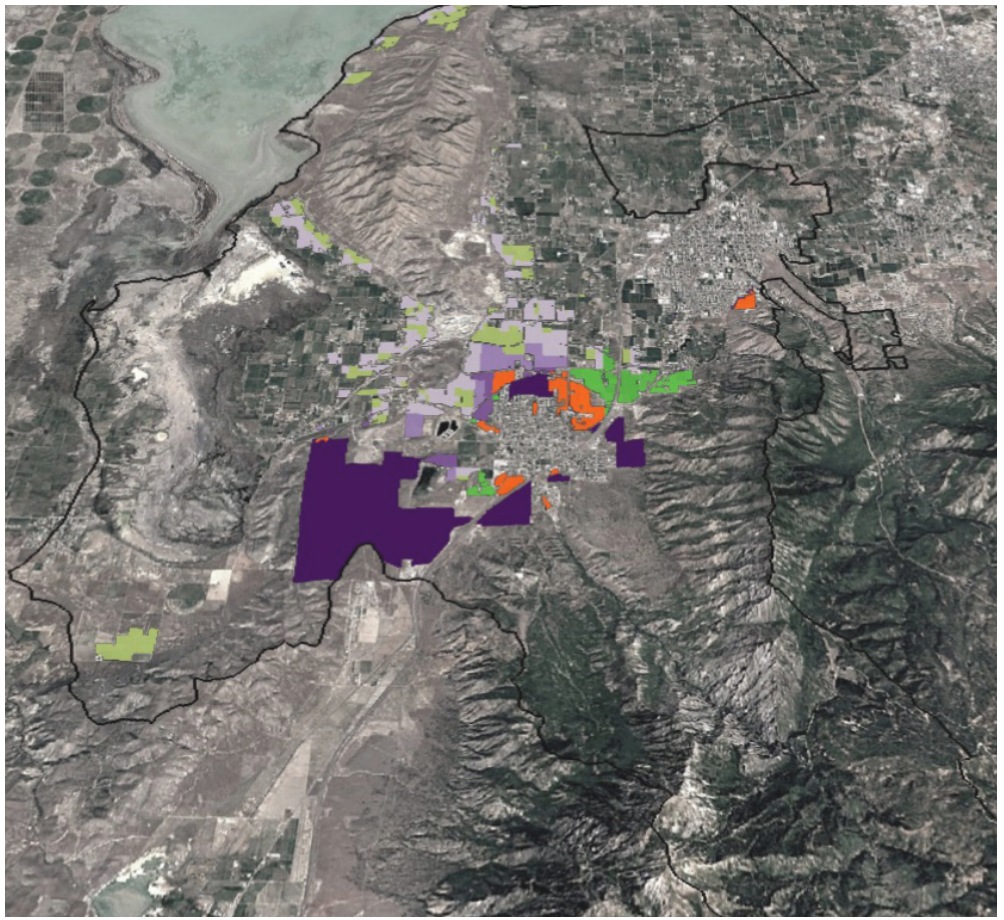


Figure1.10 Suitability Study of Orchards in Area: Level of Concern for Development

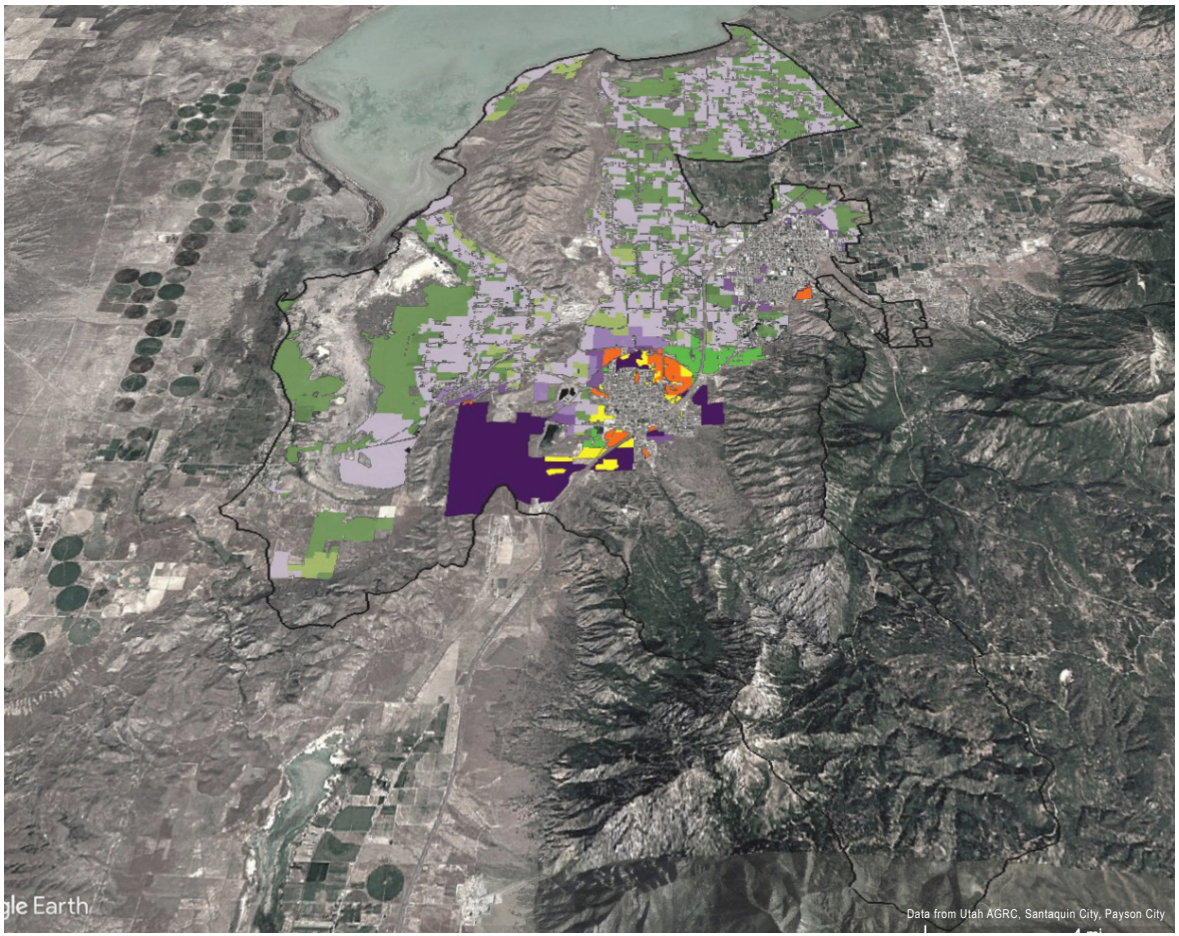


Figure 1.11. Suitability Study of Farmland in Area: Level of Concern for Development

- Orchards in Areas Zoned Residential & Commercial
- Agriculture Land in Areas Zoned Residential & Commercial
- Zoned for Planned Development & Future Communities
- High Concern for Future Development
- Medium Concern for Future
- Lower Concern for Future
- Lowest Concern Parcels in City: Zoned Agriculture
- Lowest Concern Orchards in County
- Lowest Concern Agriculture Land in County

POPULATION AND AGRICULTURE

INTRODUCTION

Within our study area, the population is projected to more than triple by 2050. Currently, the population is around 32,850 and the projected population by 2050 is around 118,000.

The following planning scenarios are to first, test and see if the current zoning or proposed zoning accommodates for this expected growth. And second, to calculate how much agriculture, including orchards, will be potentially lost or possibly preserved. Calculating total agricultural acreage per scenario is important since it is a major factor in the cultural identity of this region. In the city vision statements, agriculture and the rural environment are desired identity characteristics.

The three following scenarios will explore agricultural options mainly for identity purposes while accommodating for new growth.

There are five municipalities (purple) within the study area and the rest is county land. The municipalities are where the much of the growth is expected to occur by 2050 since they are already populated and have developed infrastructure. There are about 30,888 acres of existing agriculture (green).

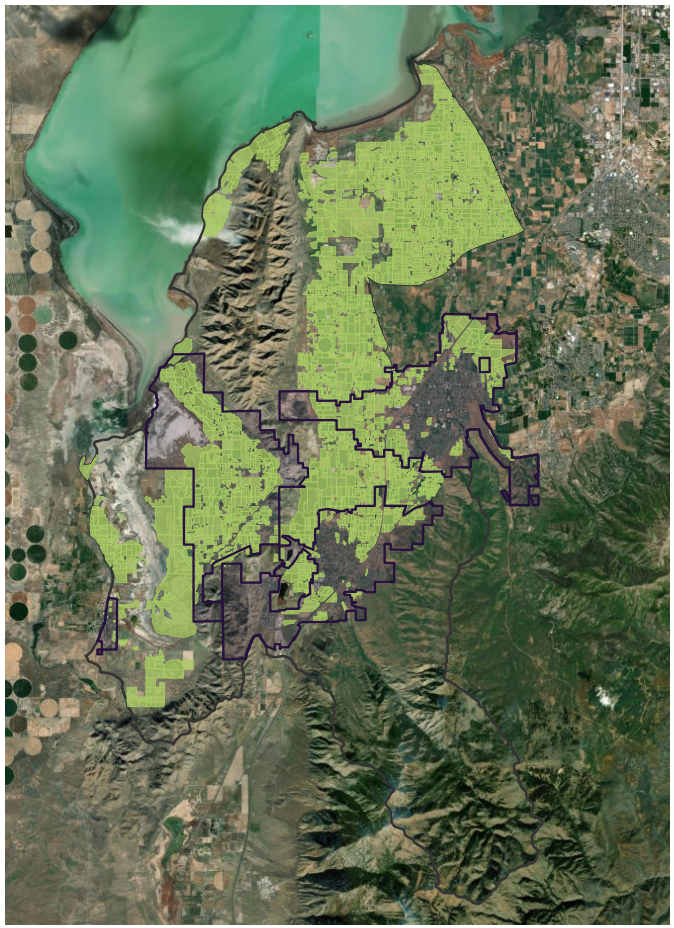


Figure 1.17. Existing Agriculture and Municipalities within Study Area

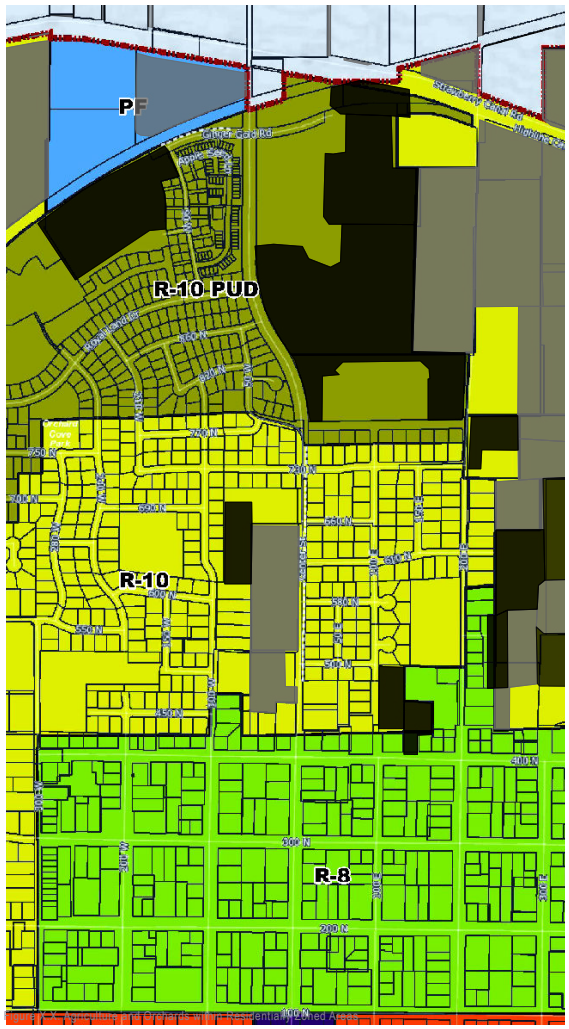


Figure 1.18. Existing Agriculture Zoning Overlay

Agriculture

Orchards

PROCESS

Utilizing the data generated by the students in the land use analysis section, low-concern, medium-concern, and high-concern developable agricultural lands were identified. High and medium concerned developable agricultural lands were all located within a municipality or in county land right on the boarder of a municipality.

After identifying the concerned developable agricultural lands, the rating titles were changed to less-feasible, feasible, and most feasible.

Next, all of the developable agricultural land located within residential zoning areas were identified and quantified by acres (See Figure 1.17).

After residential zones were identified, city zoning regulations were analyzed to calculate density of planned units per acre.

It was decided to separated orchard land from the rest of the agriculture land for a more in-depth analysis.

After the units were calculated, the number of units per acre were multiplied by the average amount of people per household within our study area (3.48) in order to calculate projected population.

All calculations will be displayed in each of the following scenarios as an excel table.

POPULATION AND AGRICULTURE

SCENARIO A - BEDROOM COMMUNITY

SCENARIO A - Residential Acreage (Bedroom Community)											
Totals	**City**	**Zoning**	**Units/ac**	**Total Acres**	**Orchard Acres**	**Ag Acres**	**Non-Ag/Orchard Acres**	**Ag/Orchard Units**	**Non-Ag Units**	**Total Units**	**Population**
R-8 Total	Santaquin	R-8	5.4	418.21	0	5.7	412.51	30.78	2227.554	2258.334	7859.00232
R-10 Total	Santaquin	R-10	4.5	1176.3	321.9	80.6	773.8	1811.25	3482.1	5293.35	18420.858
PUD R-10 Total	Santaquin	PUD R-10	12.4	283.2	0	70.6	212.6	875.44	2636.24	3511.68	12220.6464
R-12 Total	Santaquin	R-12	3.6	14.98	0	0	14.98	0	53.928	53.928	187.66944
PUD R-12 Total	Santaquin	PUD R-12	10.6	111.1	0	0	111.1	0	1177.66	1177.66	4098.2568
PUD R-15 Total	Santaquin	PUD R-15	8.7	159.56	0	43.3	116.26	376.71	1011.462	1388.172	4830.83856
R-15 Total	Santaquin	R-15	2.9	96.1	45.5	0	50.6	131.95	146.74	278.69	969.8412
R-20 Total	Santaquin	R-20	2	45.13	9.6	0	35.53	19.2	71.06	90.26	314.1048
R-AG Total	Santaquin	R-Ag	0.2	946.2	0	0	946.2	0	189.24	189.24	658.5552
R-43 Total	Santaquin	R-43	1	55.89	0	0	55.89	0	55.89	55.89	194.4972
RC Total	Santaquin	RC	5.4	64.56	17.5	0	47.06	94.5	254.124	348.624	1213.21152
PC Total	Santaquin	PC	4.5	2,250.16	0	53.9	2,196.26	242.55	9883.17	10125.72	35237.5056
FD AG Total	Santaquin	R-10	4.5	703.50	370	333.5	0.00	3165.75	0	3165.75	11016.81
A-5-H Total	Payson	A-5-H	0.1	1,451.81	0	49.5	1,402.31	4.95	140.231	145.181	505.22988
P-C Total	Payson	P-C	4.5	774.01	0	31.3	742.71	140.85	3342.195	3483.045	12120.9966
R-1-A Total	Payson	R-1-A	0.1	690.02	0	53.6	636.42	5.36	63.642	69.002	240.12696
R-1-7.5 Total	Payson	R-1-7.5	5.8	333.81	0	33.2	300.61	192.56	1743.538	1936.098	6737.62104
R-2-7.5 Total	Payson	R-2-7.5	5.8	445.90	0	3.8	442.10	22.04	2564.18	2586.22	9000.0456
R-1-9 Total	Payson	R-1-9	4.8	909.81	8.3	20.5	881.01	138.24	4228.848	4367.088	15197.46624
R-1-10 Total	Payson	R-1-10	4.5	516.16	0	5.5	510.66	24.75	2297.97	2322.72	8083.0656
R-1-12 Total	Payson	R-1-12	3.6	227.97	17.7	22.9	187.37	146.16	674.532	820.692	2856.00816
FD AG Total	Payson	R-1-10	4.5	2,370.00	182.6	2187.4	0.00	10665	0	10665	37114.2
LFD AG Total	Genola	R-1	0.4	2,259.50	615	1644.5	0.00	903.8	0	903.8	3145.224
R-1 Total	Genola	R-1	0.4	3,318.00	487	1439	1392	770.4	556.8	1327.2	4618.656
LFD AG Total	Goshen	R	2	54.70	0	54.7	0	109.4	0	109.4	380.712
R Total	Goshen	R	2	257.40	0	0	257.40	0	514.8	514.8	1791.504
LFD AG Total	County	R	0.2	36,742.00	2555	15159	19,028.00	3542.8	3805.6	7348.4	25572.432
Res Total				56,675.98	4630.1	21292.5	30753.38	23414.44	41121.504	64535.944	224585.0851

Figure 1.19. Scenario A - Residential Acreage Table

*Each scenario will display an excel table that was used to calculate outcomes. The text and numbers highlighted in red are educated guesses based on zoning regulations outlined in each municipality and county zoning documents.

POPULATION CAPACITY

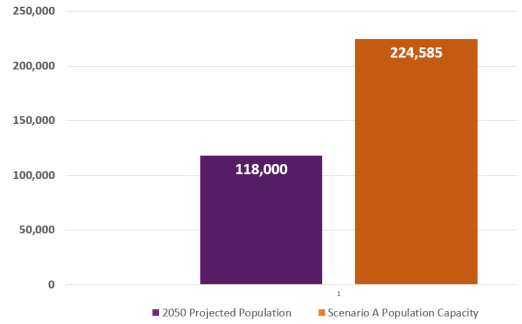
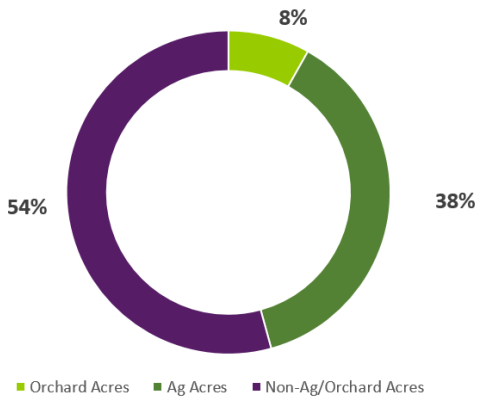


Figure 1.20. Scenario A Population Capacity Estimates

SCENARIO A

TOTAL DEVELOPABLE ACRES



TOTAL DEVELOPABLE UNITS

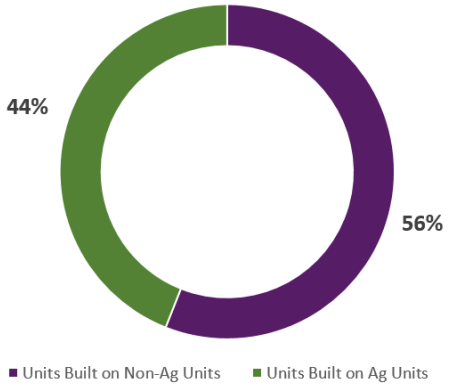


Figure 1.21. Scenario A Unit Calculations

This scenario is based off of the idea that the zoning and development trends within the study area remain the same through 2050. This would be considered the “bedroom community” scenario. A “bedroom community” is “...a residential area in which a large number of people live but do not work.”

After calculating the total acreage and developable residential units, the conclusion is that there will be plenty of space to meet the projected population growth by 2050. This provides opportunity for exploration in other scenarios to calculate exactly how much agriculture and orchard lands could potentially be preserved.

Although the population growth projection is met by this scenario, the cultural agricultural identity of the region would be non-existent.

This scenario shows the probable future for the agricultural lands in the study area unless planning and policy changes are enacted. It is anticipated that the growth pressures from Northern Utah County will encourage traditional style suburban development of current agricultural lands and the rural character and identity of the region will be lost.

POPULATION AND AGRICULTURE

SCENARIO B - ORCHARD PRESERVATION

SCENARIO B - Residential Acreage (Orchard Preservation)												
Totals	**City**	**Zoning**	**Units/ac**	**Acres**	**Acres w/o Orchards**	**Orchard Acres**	**Ag Acres**	**Non-Ag/Orchard Acres**	**Ag Units**	**Non-Ag Units**	**Total Units**	**Population**
R-8 Total	Santaquin	R-8	5.4	418.21	418.21	0	5.7	412.51	30.78	2227.554	2258.334	7859.00232
R-10 Total	Santaquin	R-10	4.5	1176.3	854.4	321.9	80.6	773.8	362.7	3482.1	3844.8	13379.904
PUD R-10 Total	Santaquin	PUD R-10	12.4	283.2	283.2	0	70.6	212.6	875.44	2636.24	3511.68	12220.6464
R-12 Total	Santaquin	R-12	3.6	14.98	14.98	0	0	14.98	0	53.928	53.928	187.66944
PUD R-12 Total	Santaquin	PUD R-12	10.6	111.1	111.1	0	0	111.1	0	1177.66	1177.66	4098.2568
PUD R-15 Total	Santaquin	PUD R-15	8.7	159.56	159.56	0	43.3	116.26	376.71	1011.462	1388.172	4830.83856
R-15 Total	Santaquin	R-15	2.9	96.1	50.6	45.5	0	50.6	0	146.74	146.74	510.6552
R-20 Total	Santaquin	R-20	2	45.13	35.53	9.6	0	35.53	0	71.06	71.06	247.2888
R-AG Total	Santaquin	R-Ag	0.2	946.2	946.2	0	0	946.2	0	189.24	189.24	658.5552
R-43 Total	Santaquin	R-43	1	55.89	55.89	0	0	55.89	0	55.89	55.89	194.4972
RC Total	Santaquin	RC	5.4	64.56	47.06	17.5	0	47.06	0	254.124	254.124	884.35152
PC Total	Santaquin	PC	4.5	2,250.16	2250.16	0	53.9	2,196.26	242.55	9883.17	10125.72	35237.5056
FD AG Total	Santaquin	R-10	4.5	703.50	333.5	370	333.5	0.00	1500.75	0	1500.75	5222.61
A-5-H Total	Payson	A-5-H	0.1	1,451.81	1451.81	0	49.5	1,402.31	4.95	140.231	145.181	505.22988
P-C Total	Payson	P-C	4.5	774.01	774.01	0	31.3	742.71	140.85	3342.195	3483.045	12120.9966
R-1-A Total	Payson	R-1-A	0.1	690.02	690.02	0	53.6	636.42	5.36	63.642	69.002	240.12696
R-1-7.5 Total	Payson	R-1-7.5	5.8	333.81	333.81	0	33.2	300.61	192.56	1743.538	1936.098	6737.62104
R-2-7.5 Total	Payson	R-2-7.5	5.8	445.90	445.9	0	3.8	442.10	22.04	2564.18	2586.22	9000.0456
R-1-9 Total	Payson	R-1-9	4.8	909.81	901.51	8.3	20.5	881.01	98.4	4228.848	4327.248	15058.82304
R-1-10 Total	Payson	R-1-10	4.5	516.16	516.16	0	5.5	510.66	24.75	2297.97	2322.72	8083.0656
R-1-12 Total	Payson	R-1-12	3.6	227.97	210.27	17.7	22.9	187.37	82.44	674.532	756.972	2634.26256
FD AG Total	Payson	R-1-10	4.5	2,370.00	2187.4	182.6	2187.4	0.00	9843.3	0	9843.3	34254.684
FD AG Total	Genola	R-1	0.4	2,259.50	1644.5	615	1644.5	0.00	657.8	0	657.8	2289.144
R-1 Total	Genola	R-1	0.4	3,318.00	2,831.00	487	1439	1392	575.6	556.8	1132.4	3940.752
FD AG Total	Goshen	R	2	54.70	54.7	0	54.7	0	109.4	0	109.4	380.712
R Total	Goshen	R	2	257.40	257.4	0	0	257.40	0	514.8	514.8	1791.504
FD AG Total	County	R	0.2	36,742.00	34,187.00	2555	15159	19,028.00	3031.8	3805.6	6837.4	23794.152
Res Total				56,675.98	52,045.88	4630.1	21292.5	30753.38	18178.18	41121.504	59299.684	206362.9003

Figure 1.22. Scenario B - Residential Acreage Table

*Each scenario will display an excel table that was used to calculate outcomes. The text and numbers highlighted in red are educated guesses based on zoning regulations outlined in each municipality and county zoning documents.

POPULATION CAPACITY

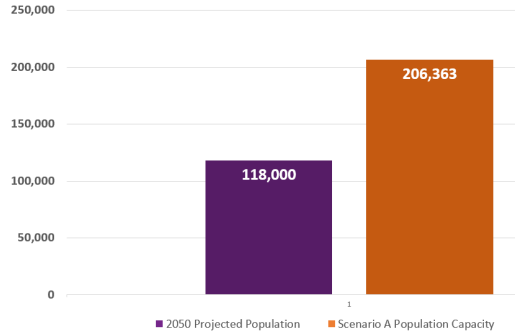
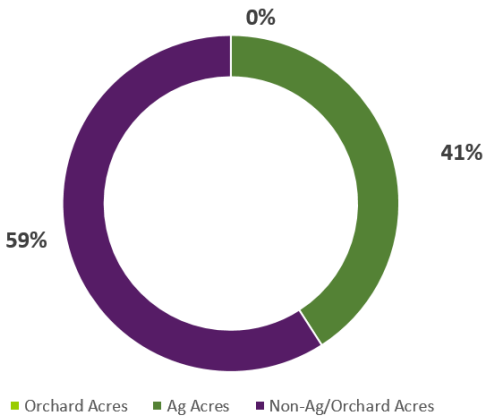


Figure 1.23. Scenario A Population Capacity Estimates

SCENARIO B

TOTAL DEVELOPABLE ACRES



TOTAL DEVELOPABLE UNITS

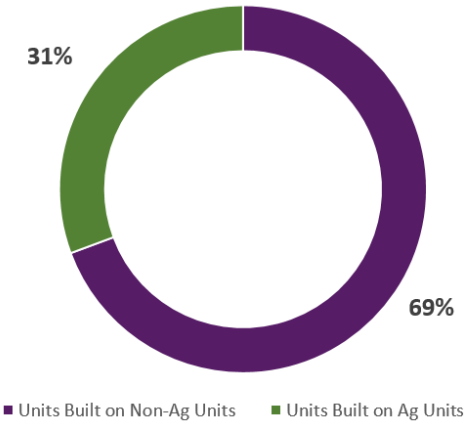


Figure 1.24. Scenario B Unit Calculations

This scenario assumes the preservation of all orchard lands. The second largest tart cherry industry in the nation is located within the study area. There are also many other major fruit production industries located within the study area. Therefore, orchards were chosen as the first type of agricultural land to preserve in this scenario.

After calculating the total acreage and developable residential units, the conclusion is that there will be plenty of space to meet the projected population growth by 2050. This provides opportunity for exploration in other scenarios to calculate exactly how many more agriculture lands could potentially be preserved.

Although the population growth projection is met by this scenario, the larger agricultural identity of the region could still be in jeopardy.

POPULATION AND AGRICULTURE

SCENARIO C - PRESERVATION OF ALL AGRICULTURAL LANDS

SCENARIO C - Residential Acreage (Preservation of All Agriculture land)												
Totals	City	Zoning	Units/ac	Acres	Acres w/o Ag & Orchard	Orchard Acres	Ag Acres	Non-Ag/Orchard Acres	Ag/Orchard Units	Non-Ag Units	Total Units	Population
R-8 Total	Santaquin	R-8	5.4	418.21	412.51	0	5.7	412.51	0	2227.554	2227.554	7751.88792
R-10 Total	Santaquin	R-10	4.5	1176.3	773.8	321.9	80.6	773.8	0	3482.1	3482.1	12117.708
PUD R-10 Total	Santaquin	PUD R-10	12.4	283.2	212.6	0	70.6	212.6	0	2636.24	2636.24	9174.1152
R-12 Total	Santaquin	R-12	3.6	14.98	14.98	0	0	14.98	0	53.928	53.928	187.66944
PUD R-12 Total	Santaquin	PUD R-12	10.6	111.1	111.1	0	0	111.1	0	1177.66	1177.66	4098.2568
PUD R-15 Total	Santaquin	PUD R-15	8.7	159.56	116.26	0	43.3	116.26	0	1011.462	1011.462	3519.88776
R-15 Total	Santaquin	R-15	2.9	96.1	50.6	45.5	0	50.6	0	146.74	146.74	510.6552
R-20 Total	Santaquin	R-20	2	45.13	35.53	9.6	0	35.53	0	71.06	71.06	247.2888
R-AG Total	Santaquin	R-Ag	0.2	946.2	946.2	0	0	946.2	0	189.24	189.24	658.5552
R-43 Total	Santaquin	R-43	1	55.89	55.89	0	0	55.89	0	55.89	55.89	194.4972
RC Total	Santaquin	RC	5.4	64.56	47.06	17.5	0	47.06	0	254.124	254.124	884.35152
PC Total	Santaquin	PC	4.5	2,250.16	2196.26	0	53.9	2,196.26	0	9883.17	9883.17	34393.4316
FD AG Total	Santaquin	R-10	4.5	703.50	0	370	333.5	0.00	0	0	0	0
A-5-H Total	Payson	A-5-H	0.1	1,451.81	1402.31	0	49.5	1,402.31	0	140.231	140.231	488.00388
P-C Total	Payson	P-C	4.5	774.01	742.71	0	31.3	742.71	0	3342.195	3342.195	11630.8386
R-1-A Total	Payson	R-1-A	0.1	690.02	636.42	0	53.6	636.42	0	63.642	63.642	221.47416
R-1-7.5 Total	Payson	R-1-7.5	5.8	333.81	300.61	0	33.2	300.61	0	1743.538	1743.538	6067.51224
R-2-7.5 Total	Payson	R-2-7.5	5.8	445.90	442.1	0	3.8	442.10	0	2564.18	2564.18	8923.3464
R-1-9 Total	Payson	R-1-9	4.8	909.81	881.01	8.3	20.5	881.01	0	4228.848	4228.848	14716.39104
R-1-10 Total	Payson	R-1-10	4.5	516.16	510.66	0	5.5	510.66	0	2297.97	2297.97	7996.9356
R-1-12 Total	Payson	R-1-12	3.6	227.97	187.37	17.7	22.9	187.37	0	674.532	674.532	2347.37136
FD AG Total	Payson	R-1-10	4.5	2,370.00	0	182.6	2187.4	0.00	0	0	0	0
FD AG Total	Genola	R-1	0.4	2,259.50	0	615	1644.5	0.00	0	0	0	0
R-1 Total	Genola	R-1	0.4	3,318.00	1392	487	1439	1392	0	556.8	556.8	1937.664
FD AG Total	Goshen	R	2	54.70	0	0	54.7	0	0	0	0	0
R Total	Goshen	R	2	257.40	257.4	0	0	257.40	0	514.8	514.8	1791.504
FD AG Total	County	R	0.2	36,742.00	19028	2555	15159	19,028.00	0	3805.6	3805.6	13243.488
Res Total				56,675.98	30,753.38	4,630.10	21,292.50	30,753.38	0.00	41,121.50	41,121.50	143,102.83

Figure 1.25.Scenario B - Residential Acreage Table

*Each scenario will display an excel table that was used to calculate outcomes. The text and numbers highlighted in red are educated guesses based on zoning regulations outlined in each municipality and county zoning documents.

POPULATION CAPACITY

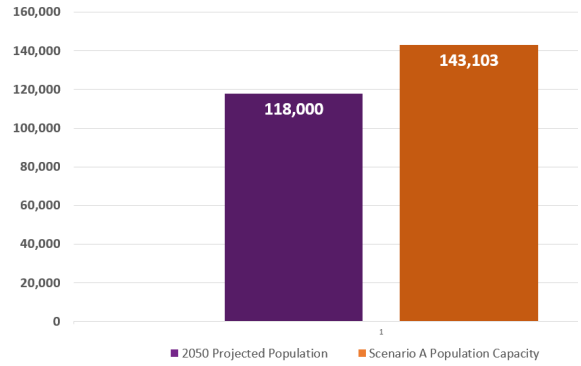


Figure 1.26. Scenario A Population Capacity Estimates

SCENARIO C

This scenario implemented complete preservation of agriculture land, including orchards.

After calculating the total acreage and developable residential units, the conclusion is that there will be plenty of space to meet the projected population growth by 2050.

Although the population growth projection is met by this scenario, preserving all of the agricultural lands could potentially limit or restrict current “free market” growth.

TOTAL DEVELOPABLE UNITS

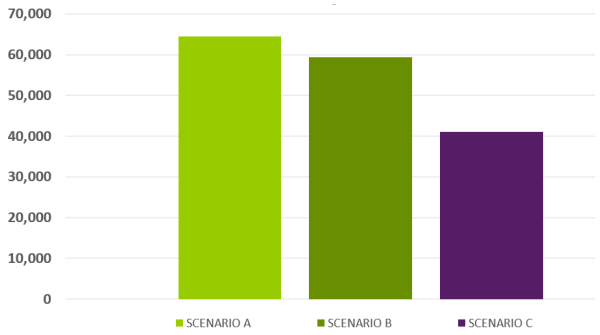


Figure 1.27. Total Developable Units Estimates

CONCLUSIONS

Each scenario provided enough residential acreage to accommodate for the projections of population growth in 2050. However, there are many factors that could change those population growth projections such as a highway across Utah Lake that leads to more growth than projected in the Eagle Mountain area.

It is important to keep the cultural identity of the region in mind when planning. Planning that occurs now should not be a reaction to valuable things lost. It should be based on a thoughtful analysis of the region’s desired lifestyle.

POPULATION AND AGRICULTURE

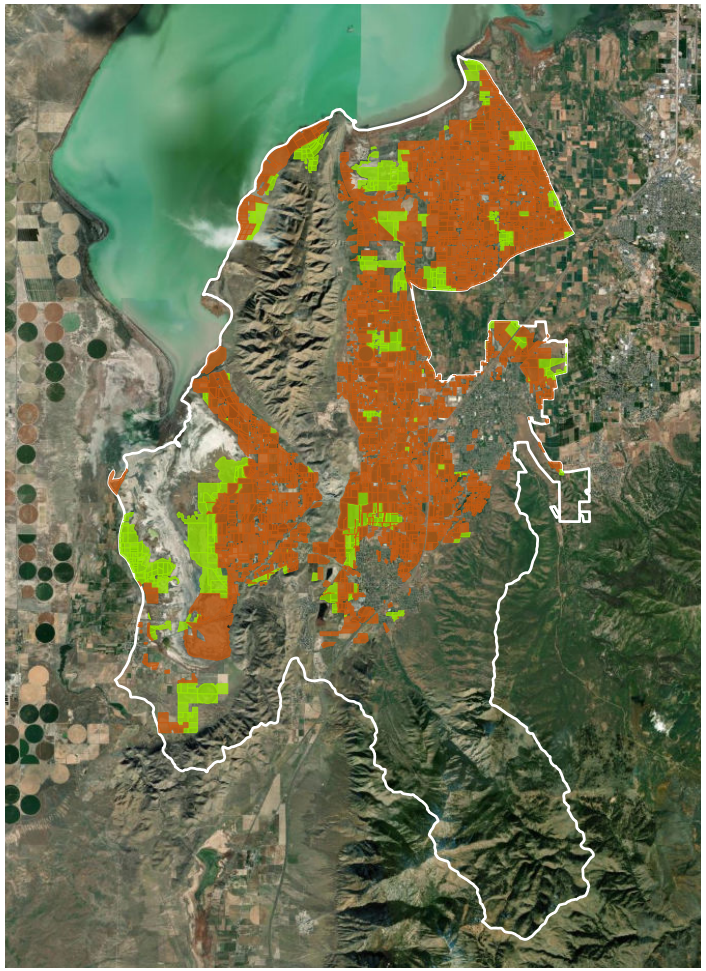


Figure 1.28. SCENARIO A - REMAINING AGRICULTURE LAND

- Remaining/Non-Feasible Agriculture Land
- Developable Agriculture Land

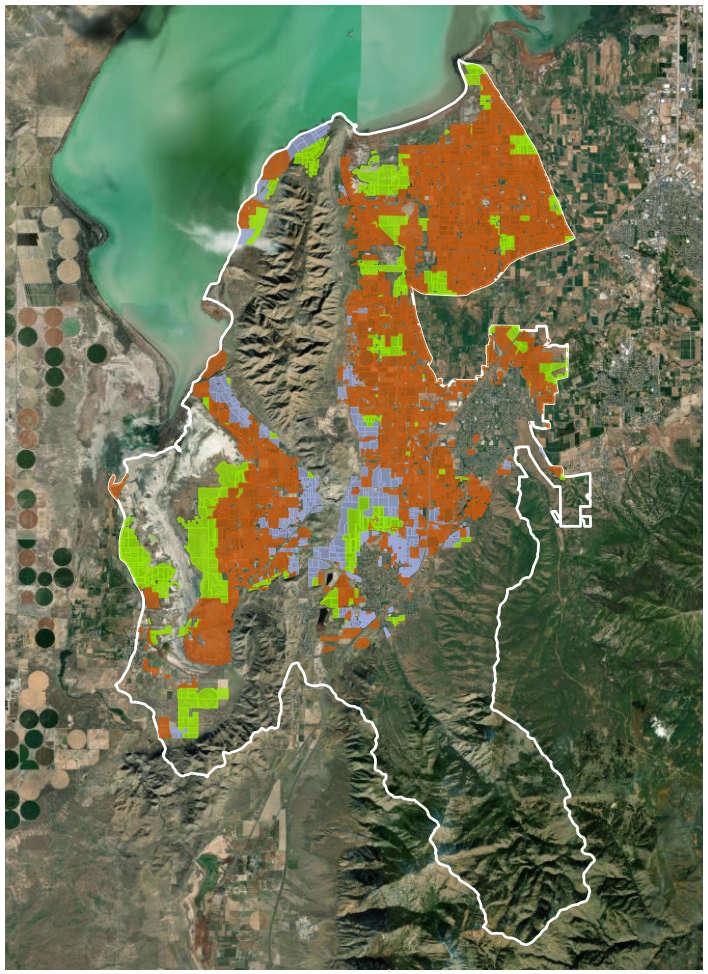
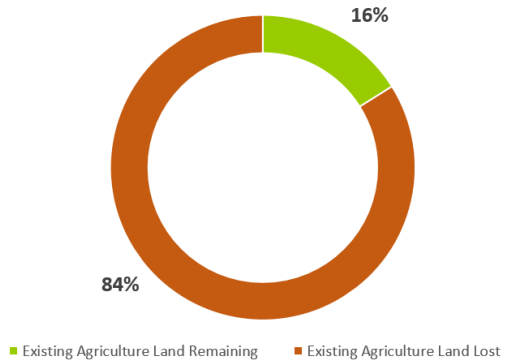


Figure 1.29. SCENARIO B - REMAINING AGRICULTURE/ORCHARD LAND

- Remaining/Non-Feasible Agriculture Land
- Preserved Orchard Land
- Developable Agriculture Land

AGRICULTURE PROJECTIONS

SCENARIO A AGRICULTURE LAND LOSS



SCENARIO B AGRICULTURE LAND LOSS

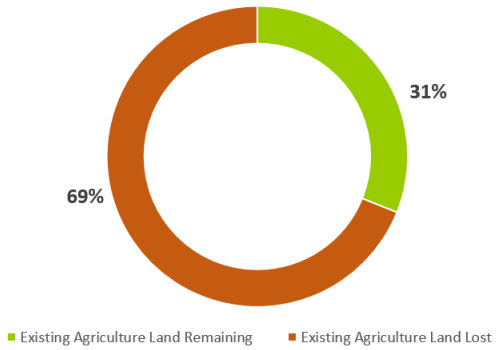


Figure 1.30. Summary Agricultural Land Loss Estimates

As shown in Figure 1.28,1.29, a large portion of agricultural lands are projected to be developed. These charts are just calculating for residentially zoned and low-feasibility areas.

Each municipality that has a vision statement or vision document has expressed the important roles that agriculture and agricultural environments play in their identity as a community.

Reconsidering zoning and agricultural protection/preservation laws are necessary to securing agricultural community identity.

Image Source: https://farm4.staticflickr.com/3947/15511678490_1a4ba45d28_o.jpg

CONNECTION

The connections within Southern Utah County are physical as well as social. These connections are manifest in the biophysical connections and physical infrastructure within and surrounding the region.

The social connections are the seen and unseen threads that weave the social fabric that makes a vibrant community.

Understanding the state of these connections and planning for their enhancement is critical to the viability and livability of the region. Connections knit together individual people and elements into a cohesive whole.

HYDROLOGY

WATERSHEDS

Water evaporates from the surface of the earth, rises into the atmosphere, cools and condenses into rain or snow in clouds, and falls again to the surface as precipitation. Water is a renewable resource that is provided naturally through the earth's water cycle, in the form of precipitation, either, rain or snow. The water then runs into Utah Lake or soaks into the ground, which feeds the underground aquifers. The water system is all interconnected, actions upstream directly or indirectly affects someone or something else down river. All water will eventually end up in Utah Lake or in the groundwater.

There are several potential sources of contaminations. Utah's population and economic growth carry the potential for significant impacts to the state's water quality and quantity. With the growing population, the amount of wastewater is also increasing. It is treated but still contains high levels of nitrogen and phosphorus, resulting in algal blooms. Nutrient pollution poses a significant threat to Utah's economic growth and quality of life, leading to substantial costs to the state and taxpayers if left unaddressed. Groundwater is protected through Federal Underground Injection Control Program, and the State Ground Water Quality Protection Program. An integrated water resource management approach will be use to coordinate development and management of water and related resources to maximize economic social impacts without compromising the quality of the water (Division of Water Quality 2017 State of the Environment Report, 2017).

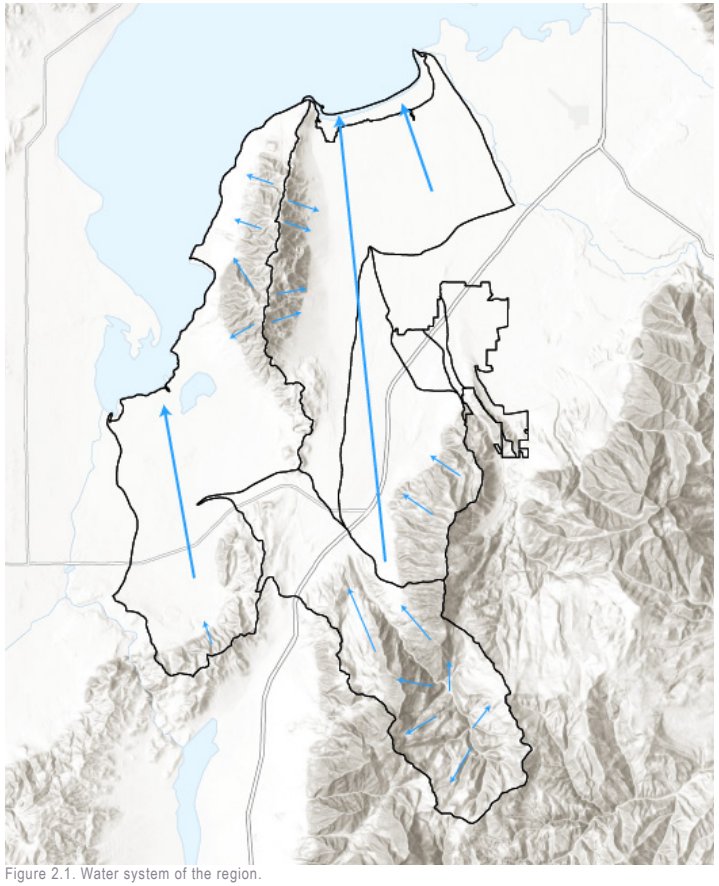


Figure 2.1. Water system of the region.

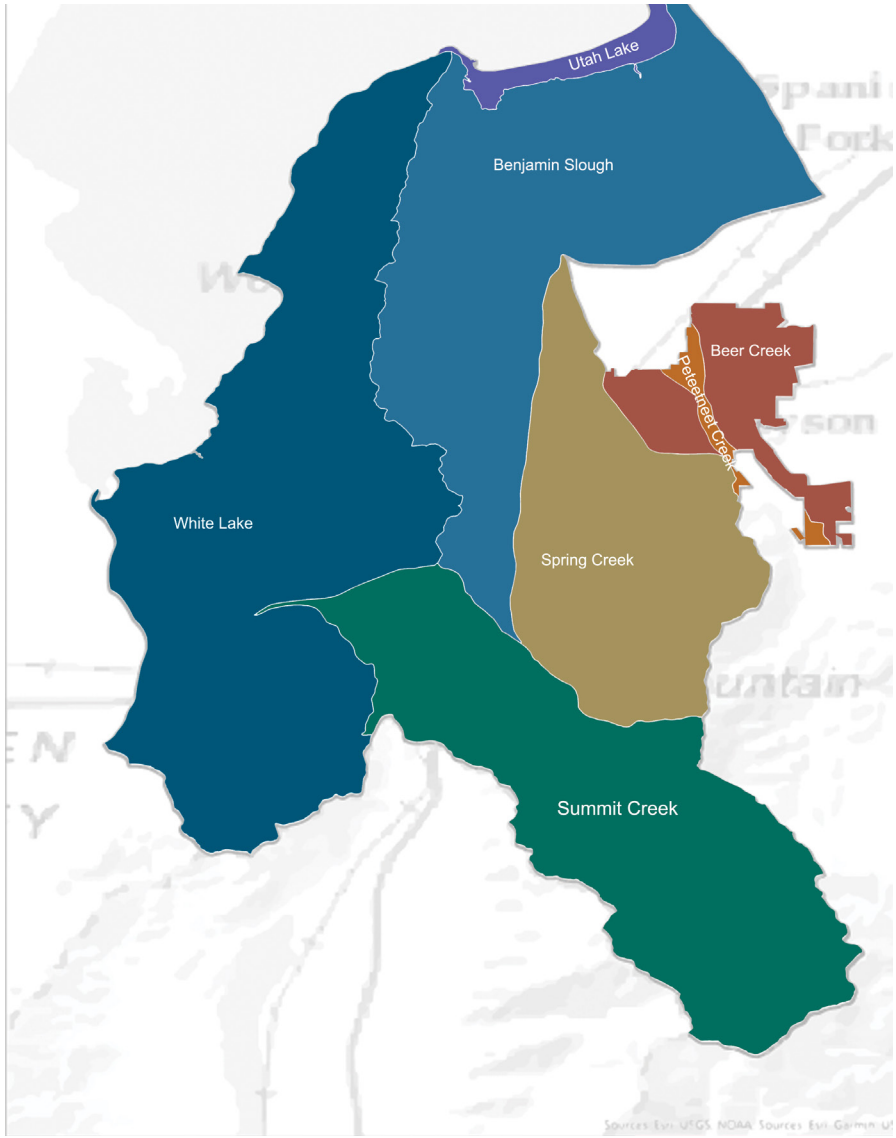


Figure 2.2. Watersheds.

HYDROLOGY

IRRIGATION TRENDS

The agricultural landscape of the region will play a role in meeting the water quantity demands of the future.

Drip irrigation has the potential to achieve the highest uniformity (90%) in water applied to each plant. Drip irrigation can reduce a farm's water consumption by as much as 60% and increase crop yield by 90%. Drip systems have an application efficiency of 97% compared to furrow irrigation's application efficiency percentage is 60%. Application efficiency is defined as the ratio of the average water depth applied and the target water depth during an irrigation event. Furrow irrigation requires nearly three times the amount of water to be applied on a 1-inch crop root zone as compared to drip irrigation. These systems are expensive (cost farmers more than $3,000 per acre to install), as well as other educational and maintenance costs have deterred drip systems from taking off (Neibling, 1997). Advanced irrigation technologies are best suited to crops with high water needs or in arid areas, like the West. Investing in a new irrigation system is expensive and complex process with several factors that need to be considered. (Amosson et al., 2011).

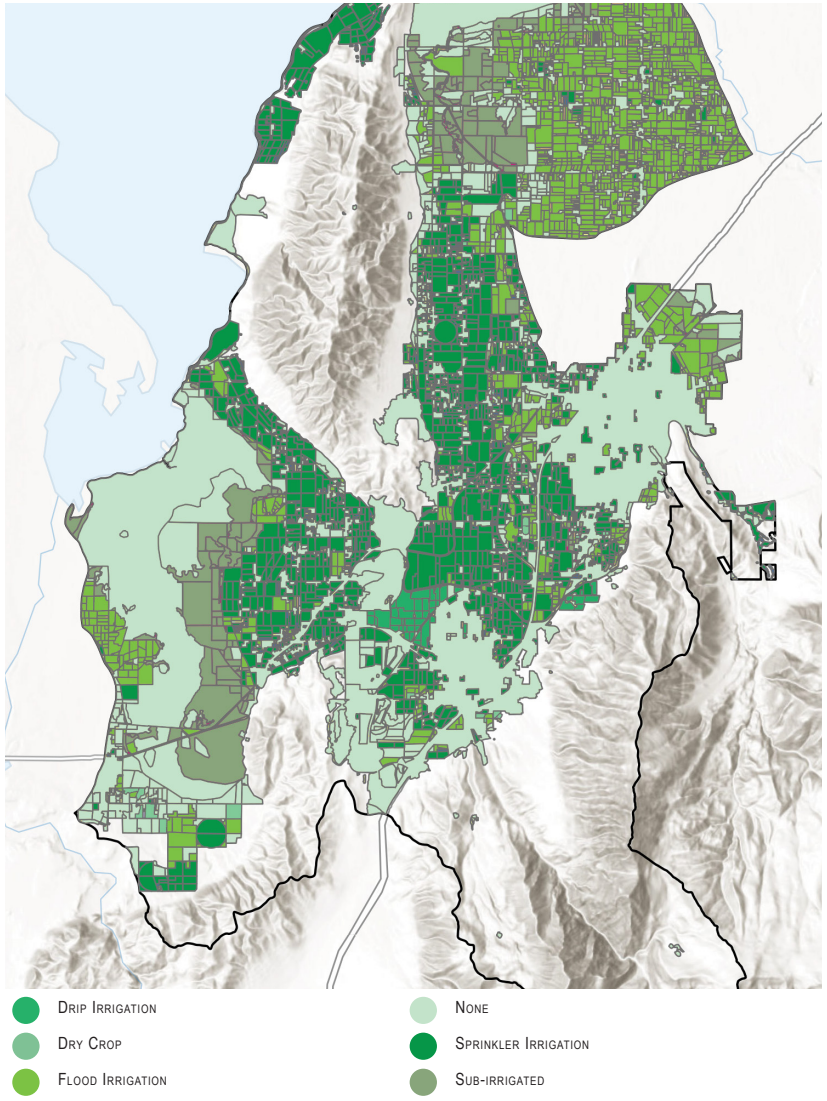


Figure 2.3. Irrigation methods among water-related land use

WATER USAGE

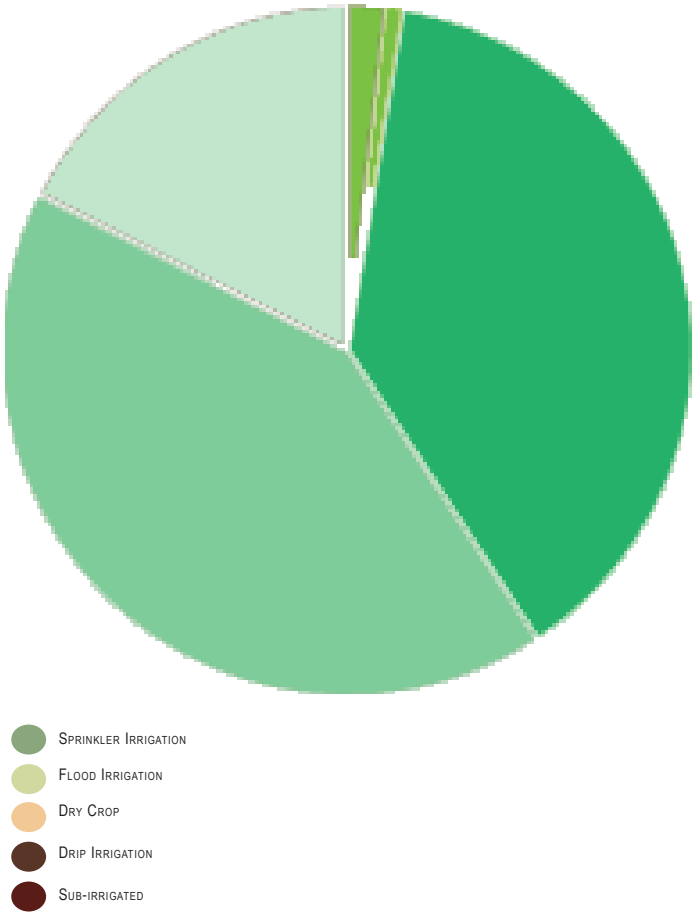


Figure 2.4. Irrigation Methods Distribution

Within the region, flood and sprinkler irrigation are still the most common forms of irrigation, accounting for almost 80% of all irrigation methods. Flood irrigation systems are not as efficient as newer drip systems and follow national irrigation trends.

According to Hrozencik (2019), fewer than 10 percent of irrigators make use of soil- or plant-moisture sensing devices or commercial irrigation scheduling services. Fewer than 2 percent make use of computer-based simulation models to determine irrigation requirements based on consumptive-use needs by crop-growth stage under local weather conditions.

The efficiency of irrigation systems is particularly important in the arid Western States where water demand for agriculture is greatest, and where increases in competing demands and climate change impacts are expected to affect future water supplies for agriculture.

WILDLIFE HABITAT

MULE DEER

Mule deer habitat within the study area is represented in figure 2.4 In this region the main deer habitat is located in the southern portion of the study area where residential development is still minimal.

The mule deer do not stay in the same location all year long and must migrate to satisfy thier needs. The different habitat types are broken down into five different sections:

- Spring/Fall: Crucial
- Summer/Fall: Substantial
- Winter: Crucial
- Winter/Spring: Crucial
- Winter/Spring: Substantial

Mule deer follow a migration pattern of moving to lower areas in winter. This is to get out of the deep snow and to find food. The range widens in the spring when the snow melts and deer then migrate to higher elevations until the cycle starts again. This migration pattern has existed unhindered for thousands of years.

The migration habitat for mule deer is fragmented in multiple places in the region of study. This fragmentation creates patches, or islands of habitat. Patches that are not connected can inhibit the migration pattern of the animals. Most patches in the study area are created by roadways. These roadways create hazardous environments for both the migrating deer and drivers on the road.

The primary pinch point in habitat types occurs in between Santaquin and Mona where deer are forced to cross over or under 1-15 to move from winter to spring habitat patches.

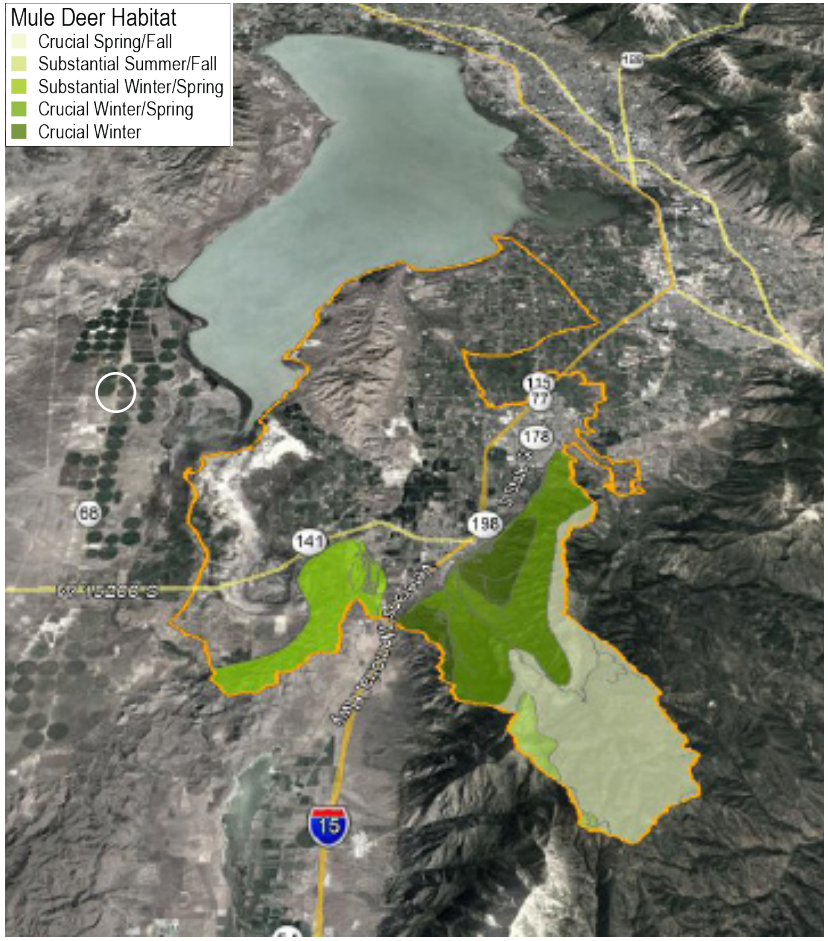


Figure 2.4.Mule Deer Habitat Types

Above, a large gap between the crucial winter habitat and substantial winter/spring habitat. This gap is created by I-15 making a dangerous corridor between the patches.

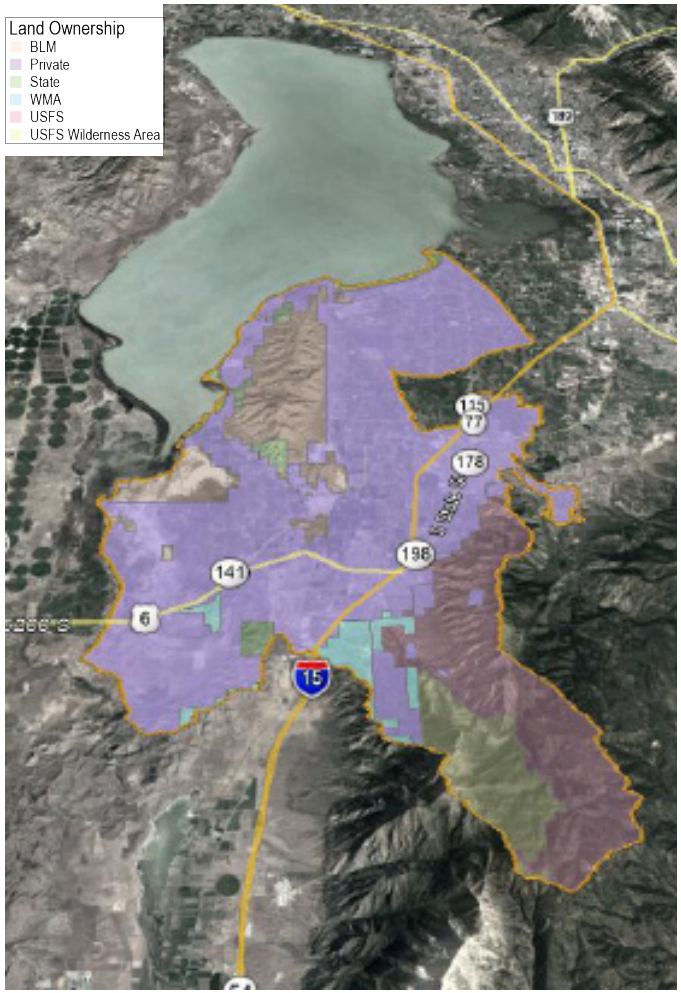


Figure 2.5. Landownership

As seen in Figure 2.4, 2.5, there are overlaps between private land ownership and mule deer habitat. Without preservation of the private lands that create the corridors that link habitat patches together, mule deer migration patterns will be cut off and they will be unable to access the habitat they need.

The privately owned land on the west side of I-15 is currently being developed. That land is substantial winter/spring habitat for the deer. After the development consumes the habitat the deer will still migrate into the area. Migration patterns will not change if this habitat is not restored else where. The deer will become unwelcome pest in to the new residential areas.

The statistical software Fragstats was used to calculate the affects of the divided habitat.

Number of Patches: 130

Patch Density: 1.24

Shape Index: 1.64

The data shows that the habitat in this relatively small region has been significantly fragmented already.

Patch density is the average patch number within a sqare mile. This means, on average, there are 1.24 patches within a square mile of habitat.

Shape index compares the shape of a patch to a square of the same area size. As the number gets larger the patch gets more misshapen. 1.64 starting to a high shape index. This results in the total edges being 51,948, which is very high.

WILDLIFE HABITAT

RING-NECK PHEASANT

The ring-neck pheasant's habitat spreads throughout the entire study region. Pheasant were a once common site on many local farms. Agricultural lands are vital to the survival of these native birds.

The fragmentation of the habitat caused by roads cutting though creates patches. Habitat patches effect the pheasants by making it difficult for the birds to migrate, creating a dangerous environment when they try to migrate, and bottle-necks the gene pool.

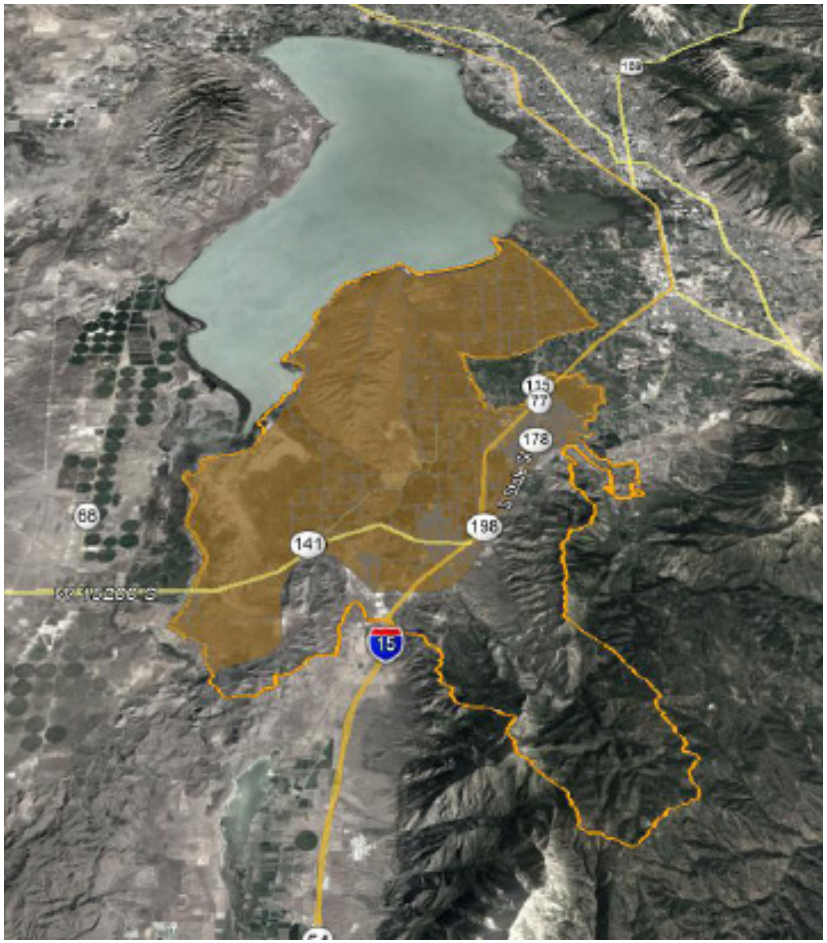
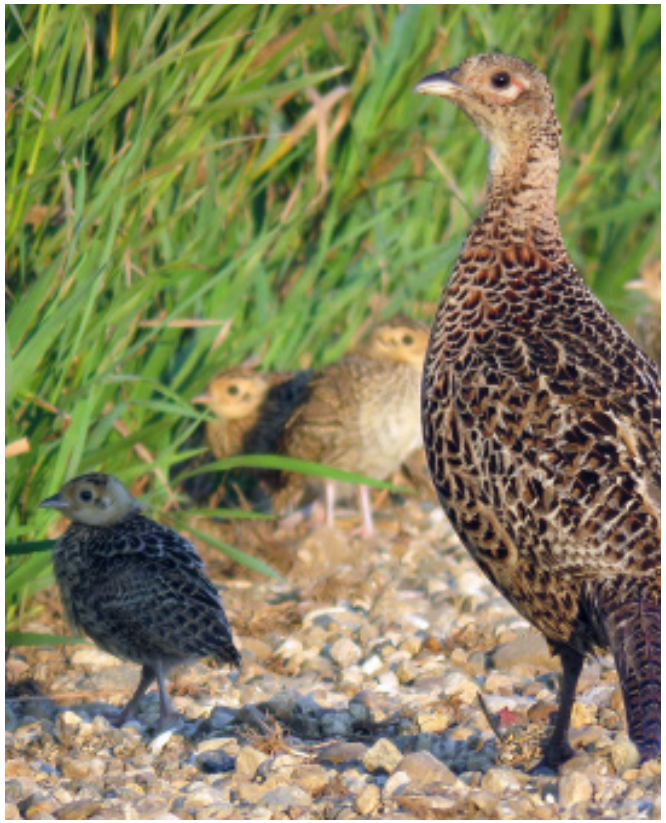


Figure 2.6. Ring-neck Pheasant Habitat

The above figure shows the habitat in the study area. Fragmentation of the habitat can be seen in the map. Two of the largest gaps are created by I-15 and by Highway 141. Since pheasants spend most their time on the ground, the roadway are extremely hazardous.



The statistical software Fragstats was used to calculate the affects of the divided habitat.

Number of Patches: 738

Patch Density: 2.83

Shape Index: 1.42

The data shows that the habitat in this relatively small region has been fragmented greatly.

Patch density is the average patches in a mile. This means, on average, there are 2.83 patches within a mile of habitat.

Shape index compares the shape of a patch to a square of the same area size. As the number gets larger the patch gets more misshapen. 1.42 is not a bad number. The lower number can be attributed to the fragmentations being caused by roadways.

Preservation of the agricultural land is crutial for the pheasants to survive in this area. The agricultural open space is a prime environment when the hen's lay their eggs. The crop residue is a choice location for pheasants because they nest on the ground.

GOVERNMENT AND PUBLIC AGENCIES

INTRODUCTION

Utah's Wasatch Front is the 3rd fastest growing region in the United States with a 47% population increase from 2010 to 2018. It is also largely unique as this metropolitan area boasts world-class skiing and hiking, and is flanked by the Great Basin and the Colorado Plateau. This draw, combined with a high birthrate and high immigration from other parts of the United States, has put the population of the Wasatch Front on track to double by 2050 (Perlich et al., 2017).

This growth will present opportunities for the people but also challenges, straining the valley's ability to provide a rural lifestyle for its citizens.

The purpose of this analysis is to determine the regional forces that influence the city of Santaquin and to create a plan that upholds region's ethos as "a community prospering in country living" while effectively managing the increasing needs to support future growth and preserve the historical agriculture character.

Figure 2.7. January Photo Contest Winner, Clay Craig

While the majority of the economy is clustered within city centers, interactions and economy occur outside of the cities, which is important to the success of the regions economy. To achieve success for the region, the cities and county must work together, to create a cohesive plan that supports the character of the region and preserves the important attributes to the region. Through proper planning, good design can support and preserve the character and attributes of the region.

CITY-CITY RELATIONSHIP

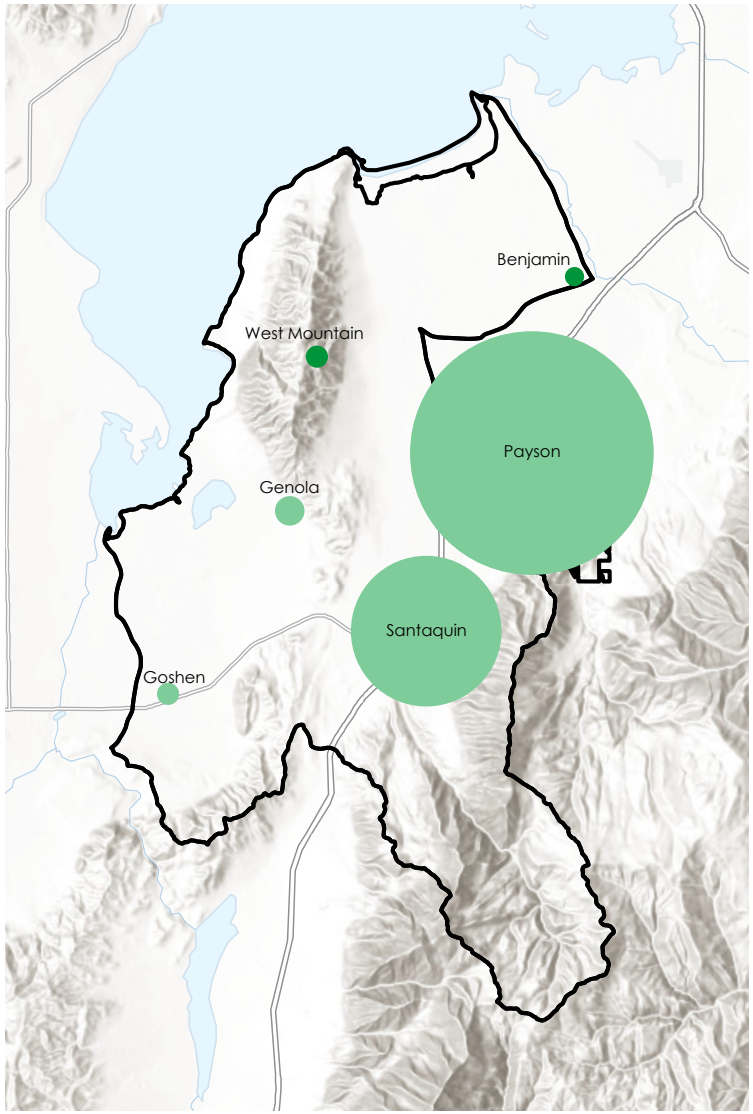


Figure 2.8 Population graphic with city government structures

Within the region there are four cities, and two un-incorporated towns; the region is located in Utah County and borders Utah Lake. According to Utah Code, Payson and Santaquin are fourth class cities. According to Sanataquin's website, they are a fourth class city. Genola and Goshen are fifth class cities. Understanding the government structure and who makes the planning decisions can inform us as to which direction the cities and unincorporated counties will go.

Cities and counties set local development priorities and allocate public funds to support future needs of the region. Effective local governments shape their development strategies in explicit response to market conditions. Understanding the relationship between cities and the government structures also allows us to determine what is important to the city and if those are similar among other cities in the region, as they should work together.

Power follows the largest cities because they have the largest economy, and most jobs. This results in smaller cities not having the power needed to influence the future. Payson and Santaquin have the economic power because these cities own most of the desired goods or services.

INCORPORATED CITY, MAYOR, CITY COUNCIL

UN-INCORPORATED CITY

*SIZE OF THE DOT REPRESENTS SIZE OF CITY BY POPULATION AS COMPARED TO THE POPULATION OF REGION

GOVERNMENT AND PUBLIC AGENCIES

SCHOOLS

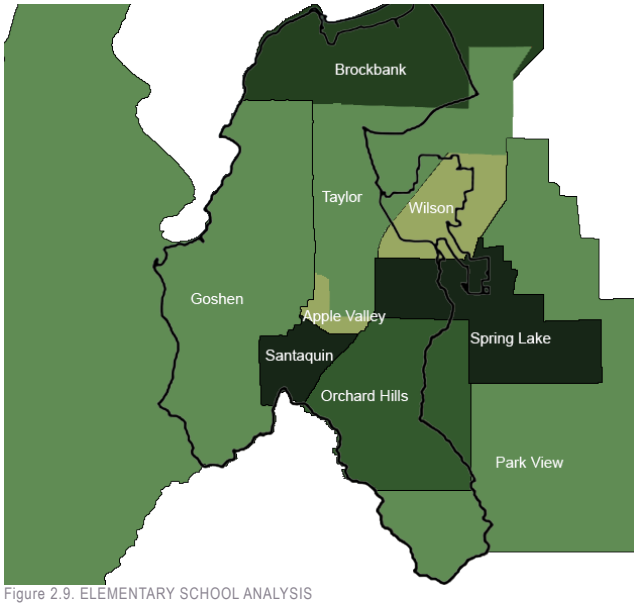


Figure 2.9. ELEMENTARY SCHOOL ANALYSIS

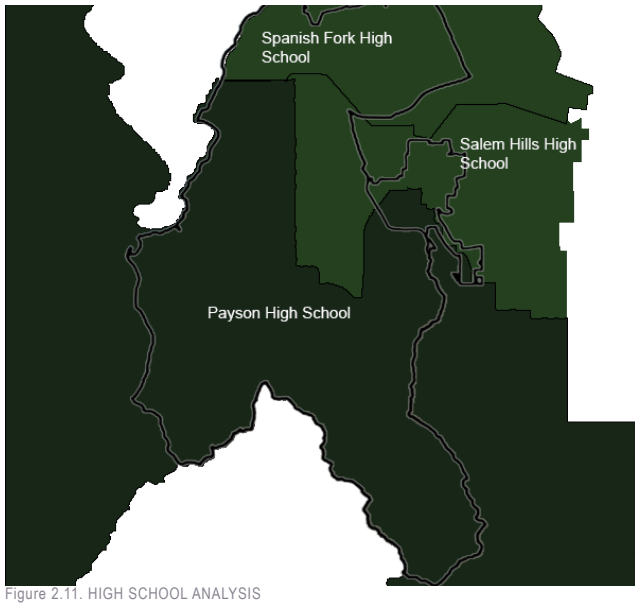


Figure 2.11. HIGH SCHOOL ANALYSIS

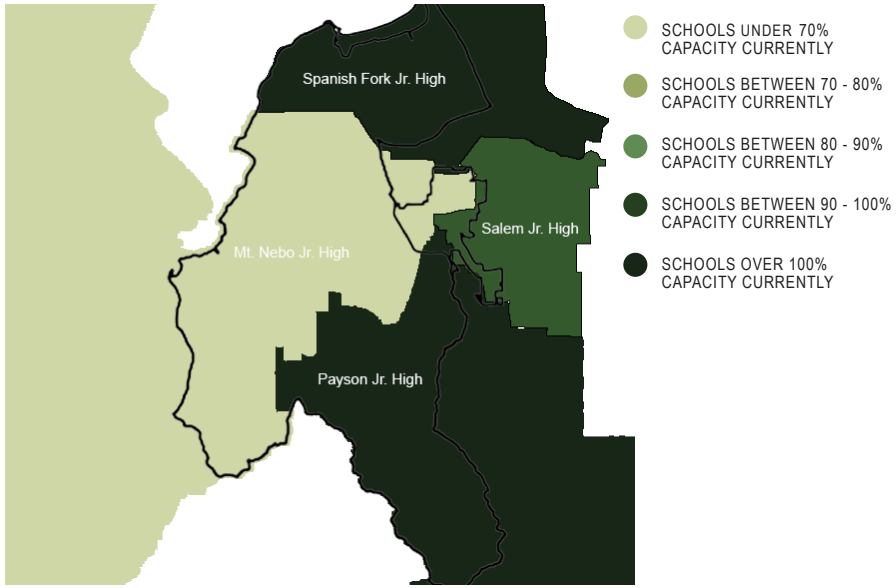


Figure 2.10 JUNIOR HIGH SCHOOL ANALYSIS

Several of the schools in the region are currently over capacity, while there are schools that are well short of capacity (Nebo School District Enrollment Capacity by School/Program, 2017). Schools are built as the population increases and as the population decrease the schools are left under capacity. Goshen Elementary School covers a large area and is currently under capacity. New children could be sent to this school. School boundaries could also be re-drawn to equal out population in the schools. If there are more people moving into the area (more children) and if there are not enough schools in the area, then the quality of the children's education will decrease. Nelson Mandela once said, "Children of today are the leaders of tomorrow and education is a very important weapon to prepare children for their future roles as leaders of the community."

SCHOOLS - NUMBER OF CHILDREN PER ACRE OF BOUNDARY

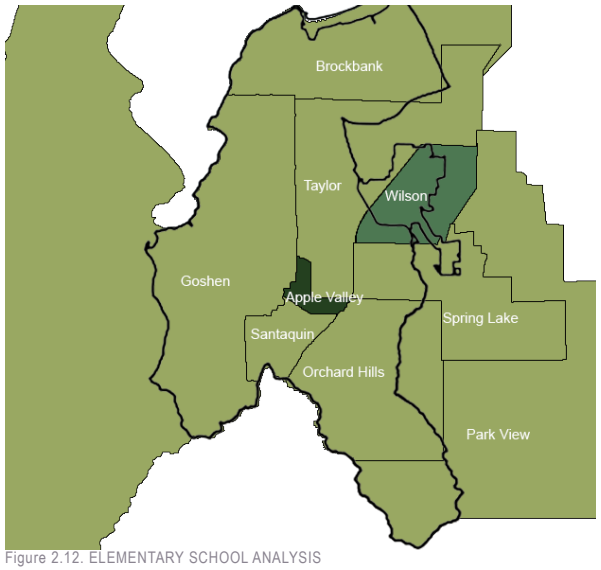


Figure 2.12. ELEMENTARY SCHOOL ANALYSIS

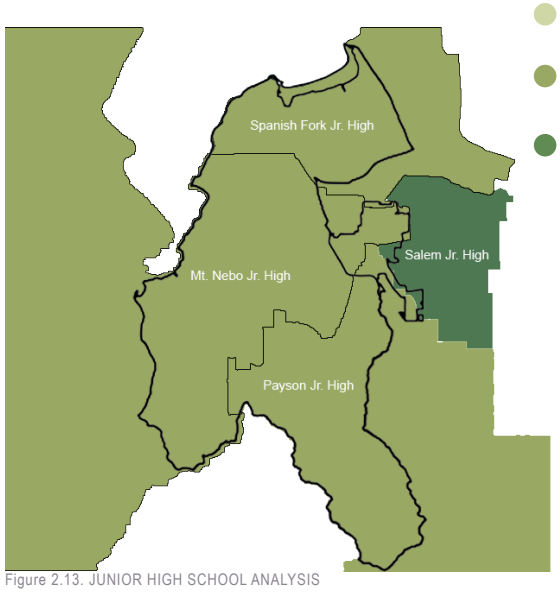


Figure 2.13. JUNIOR HIGH SCHOOL ANALYSIS

0.01 - 0.05 CHILDREN PER ACRE WITHIN SCHOOL BOUNDARY

0.05 - 0.5 CHILDREN PER ACRE WITHIN SCHOOL BOUNDARY

0.5+ CHILDREN PER ACRE WITHIN SCHOOL BOUNDARY

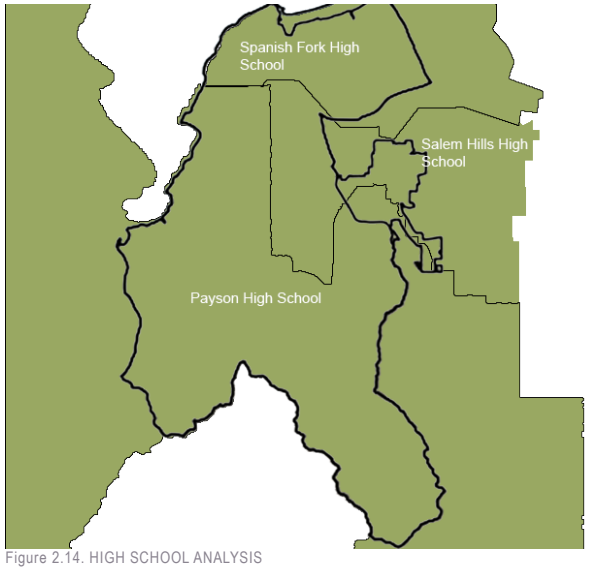


Figure 2.14. HIGH SCHOOL ANALYSIS

Although acreage is related to size of school enrollments, many authorities say that the minimum land area requirement for elementary schools is five acres, with an additional acre for each one hundred children of ultimate enrollment. Secondary schools should have a minimum of ten acres, plus an additional acre for each one hundred children of ultimate enrollment (Schrader, 1963). A further analysis looked at the amount of land these schools cover and compared it to the amount of children in the boundary (Nebo School District Enrollment Capacity by School/Program, 2017). Results show that the schools encompass large amounts of land with few children in the boundaries, indicating there is still land to develop for future population growth as the number of children per acre is low.

INFRASTRUCTURE/UTILITIES

WATER, STORM DRAINAGE

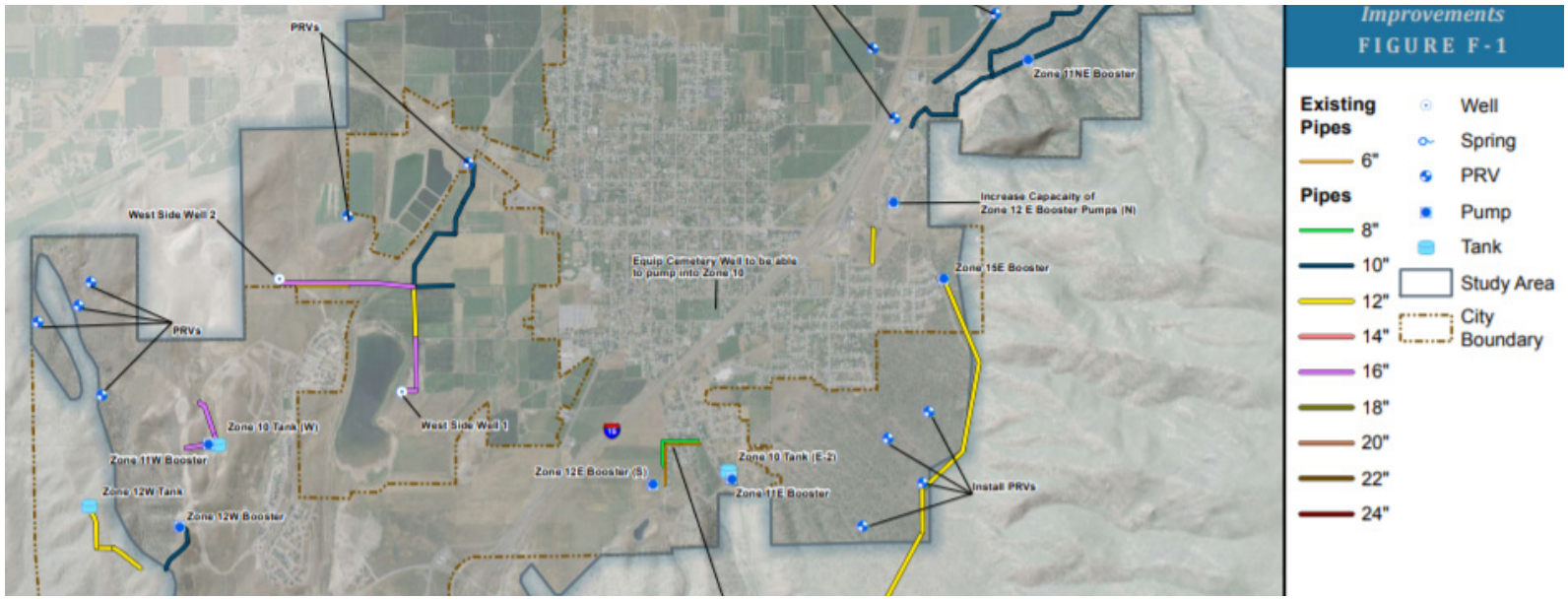


Figure 2.15. Santaquin's Culinary Water System improvements (J-U-B Engineers INC., 2013)

According to Utah County's general plan, they have two major concerns of water which are sufficiency and quality. Population growth in the region will be dependent on water from additional wells since little additional water can be obtained from existing captured spring flows. Unincorporated county property owners should be encouraged to switch from surface flood irrigation to pressurized pipeline irrigation systems, to conserve irrigation water. As for storm drainage, Utah County has a provision to not require curb, gutter and sidewalks, and use drainage swales in many situations. It seems that Utah County and Santaquin City may not be on the same page for water. As the global population grows, there is an increasing need to balance all of the competing commercial demands on water resources so that communities have enough for their needs (Water, 2015).

According to Santaquin city, they are not currently concerned with water right now. Strawberry reservoir is the backup plan (J. Bond, personal communication, February 5, 2020). They have implemented water saving measures to help, such as a water treatment plant. It is the first of its kind in Utah that stores and reuses 100 percent of its treated water for a residential secondary irrigation system, with no discharge to nearby lakes. The use of reclaimed water for irrigation purposes allows the city to conserve higher quality groundwater for drinking, while establishing a model for sustainable water resource development in Utah and the Intermountain West ("Santaquin Water Reclamation Facility," n.d.). The Water Masterplan provides direction for future growth, while other plans provide plans for construction of culinary water system improvements (J-U-B Engineers INC., 2013). Santaquin will need two additional wells, four additional water tanks, and many booster pumps and pressure reducing valves. Storm drainage, they have a plan for correcting existing storm water deficiencies, and a plan for the needed infrastructure for future development.

GARBAGE/SEWER/RECYCLING

Figure 2.17. Santaquin curbside recycling: Republic Services

Santaquin's Sewer Masterplan includes a discussion of system modeling and evaluation efforts and summary results as well as capital facilities planning for the City's sanitary sewer system to an anticipated buildout in 2060. The area of consideration includes the current sewer system extent and those areas anticipated to be developed by 2060 (Santaquin City, 2017).

According to Utah County's general plan, proposed development should be discouraged where a jurisdictional sewer or water system does not exist. To encourage annexation, water, sewer, and other services should not be provided by municipal governments to property owners in the unincorporated area (Utah County General Plan, 2014).

According to the Payson City Landfill, all garbage in the region is transported to the Payson City Landfill, which is expected to reach capacity in 20 years or 2040 (Payson City Landfill). Both Utah County and Santaquin City have curbside recycling programs. In Santaquin's curbside recycling program, residents do not have to sort recyclables. All of the recyclables go to the South Utah Valley Solid Waste District Landfill Transfer Station.

FIRE/EMS

Figure 2.18. Santaquin Fire and EMS Trucks: Santaquin City

According to Santaquin's website, they have a Fire and EMT department that services city. Santaquin is dedicated to protecting and serving the community through prevention, planning, and response with professionalism and performance excellence. The Ambulance Volunteers (EMT's) participate in continuous training so they can provide expedient and efficient emergency medical treatment (Fire & EMS Department - Santaquin City, Utah, n.d.).

According to Utah County's general plan, undeveloped land or agricultural enterprises can operate satisfactorily with seasonal unpaved roads, but year-round subdivision occupancy needs paved all-weather roads for their own access and for access by public safety and fire vehicles.

State adopted and county mandated building codes and fire safety codes limit the type of structures and uses available in the unincorporated county industrial zones when no water supply system is available for the required fire flow. Existing and new industrial zones have not developed in the county due to this lack of infrastructure to meet minimum code requirements. (Utah County General Plan, 2014).

INFRASTRUCTURE/UTILITIES

TRANSPORTATION

Part of the Southern Utah County Active Transportation Plan was a demand analysis. A demand analysis was conducted to assess the probable demand for active transportation infrastructure in the study area. Probable demand was based on destinations and origins of trips for which people might choose to bike or walk if infrastructure conditions were adequate and desirable. Demand factors such as population and employment density, trails and on-street bike routes, transit facilities, and pedestrian network density were included in this analysis.

The image to the right is the result of the demand analysis. The areas with the highest demand are shown in yellow. The highest demand was concentrated east of US-89 in Springville, in southern Springville where it connects with Mapleton, in Payson's downtown core near Main Street and 100 North, in Spanish Fork between Main Street and 100 North, and near Canyon Road in Spanish Fork. It appears that there is an opportunity for more active transportation in larger metropolitan areas of our region. Apparently, there is no demand for a connection between cities or in the smaller cities. According to Rural Communities: A Two Pronged Approach for Improving Walking and Bicycling, "almost nine out of 10 rural Americans see pedestrian friendly communities as important, and want to see their communities support walking more."

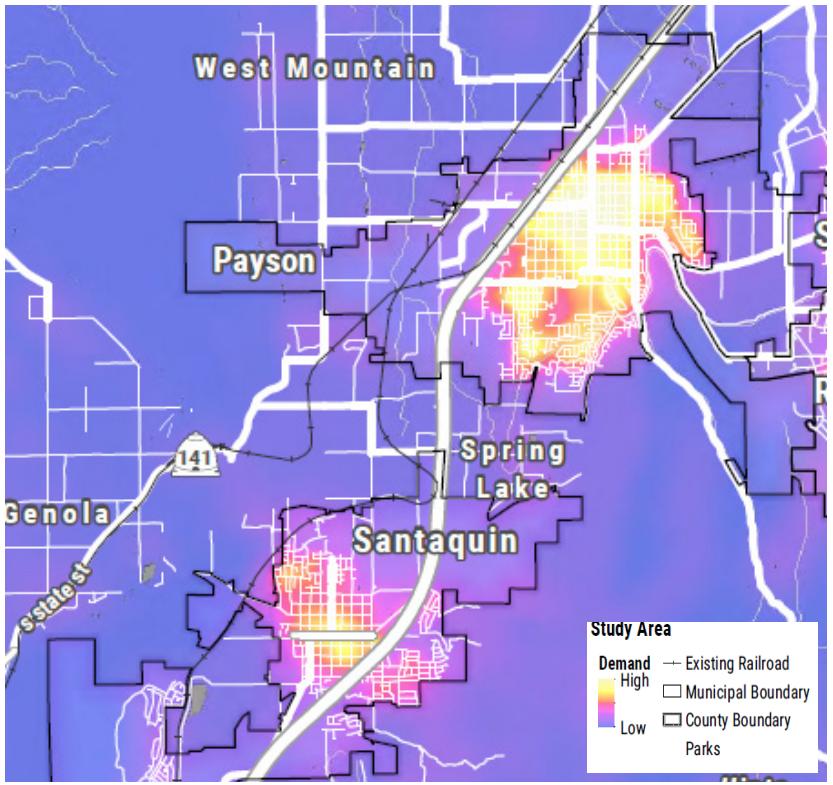


Figure 2.19. Active Transportation Demand analysis (Mountainland Association of Governments, 2016)

There is only one route that currently services Santaquin, running only on specific days and times. There are two buses running from Payson to Santaquin in the morning (6:11am, 7:41am) and two going from Santaquin to Payson in the evening (3:14pm, 4:54pm). Better connection is needed and to surrounding communities to increase the residents quality of life.

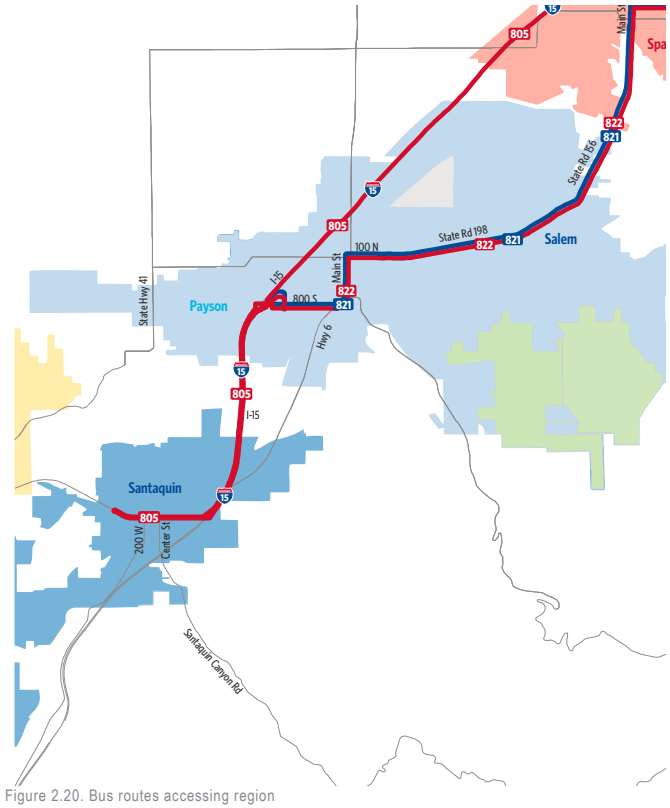


Figure 2.20. Bus routes accessing region

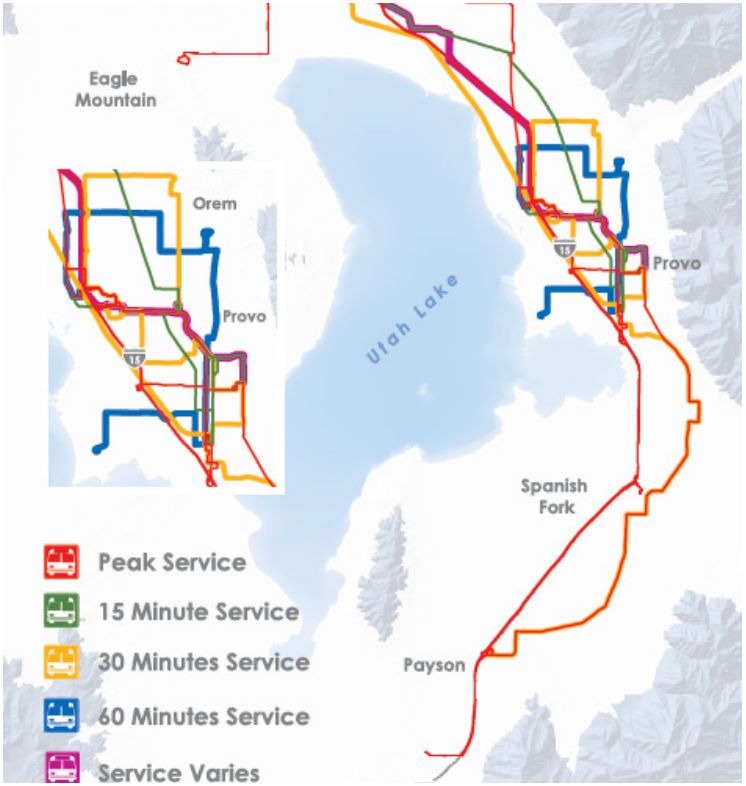


Figure2.21. Larger regional mass transportation system

The above image depicts the UTA Transit routes. Most of the transit is servicing the greater Provo region. It currently takes 59 minutes for a passenger to commute from Santaquin to Payson. People may utilized a better and more efficient transit system if it was provided to them and was a better option than driving a car. Better connection is needed to our region and to surrounding communities (Schedules and Maps, n.d.).

INFRASTRUCTURE/UTILITIES

TRANSPORTATION

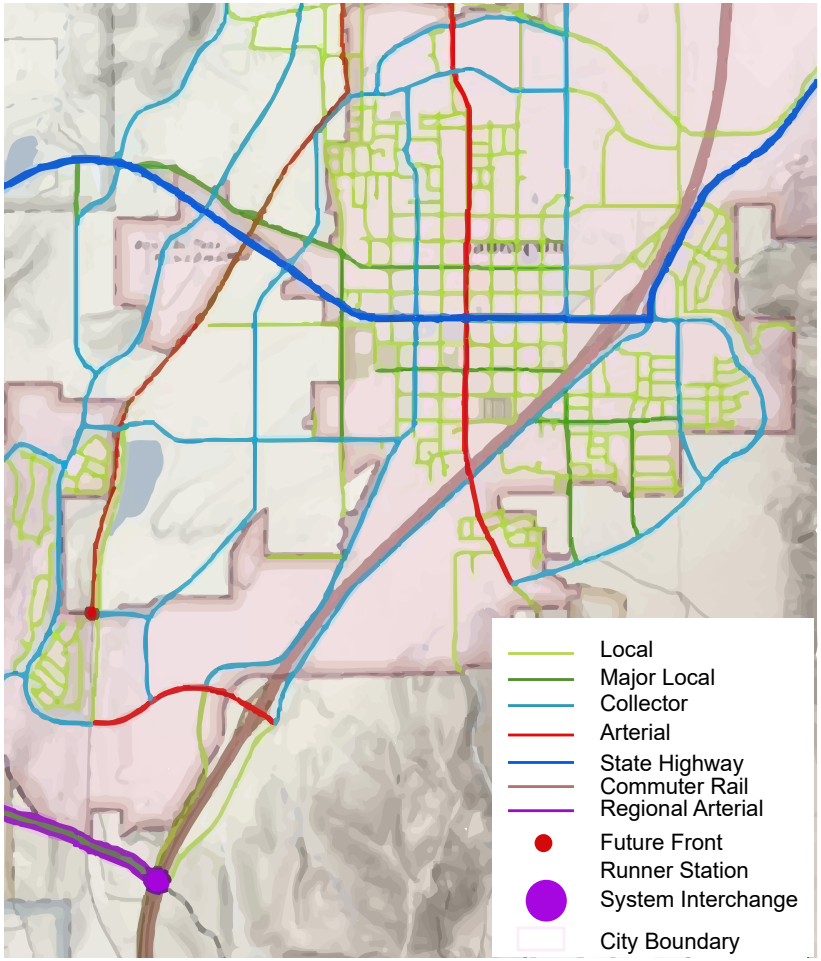
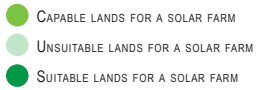


Figure 2.21. Santaquin's transportation map of future network by classification

The MAG TransPlan40 plan shows projects and programs proposed within the plan area are a coordinated system of capital-intensive roadway projects, transit improvements, and pedestrian/ bicycle facilities needed over the next thirty years (see right). Major infrastructure improvements include major arterials and highways bypassing Santaquin on the west. Several other major infrastructure investments are planned to provide transportation for future growth. Regionally, the freeway will be widened by two lanes in each direction, aging asphalt will be replaced with new 40-year concrete pavement, 63 bridges and 10 freeway interchanges will be rebuilt, and extend the express lane from Orem to Spanish Fork (Mountainland Association of Governements, n.d.).

POWER

These are suitability maps for each one of the categories of a solar farm suitability analysis. Using this information, we could propose new infrastructure and a solar farm to be net-zero. Certain areas individually are suitable for a solar farm, but when results are combined, a different result is yielded. With current conditions, there are no suitable places for a solar farm, however building new infrastructure may support a solar farm in certain areas.



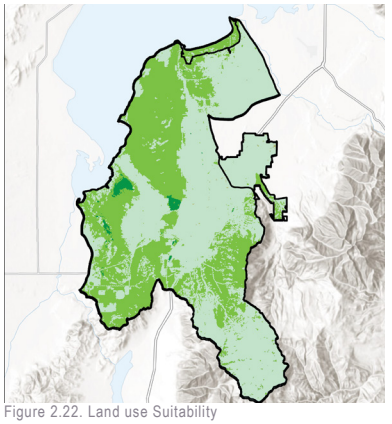


Figure 2.22. Land use Suitability

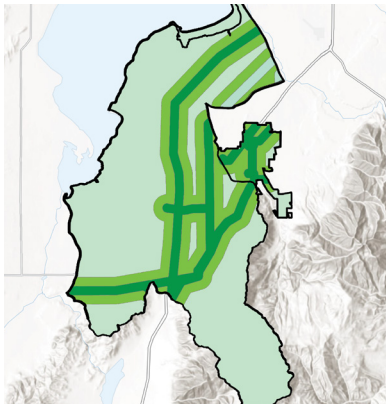


Figure 2.23. Power Lines Suitability

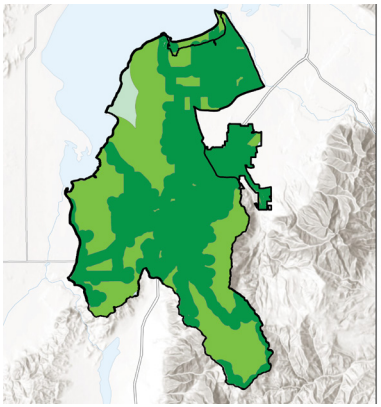


Figure 2.24. Proximity to Developed Lands Suitability

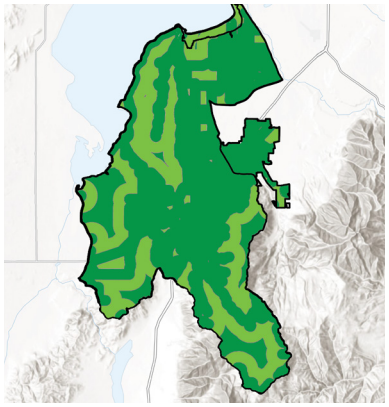


Figure 2.25. Roads Suitability

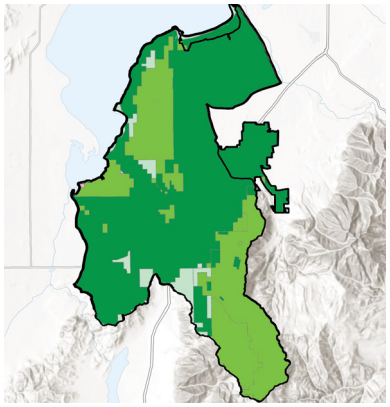


Figure 2.26. Landownership Suitability

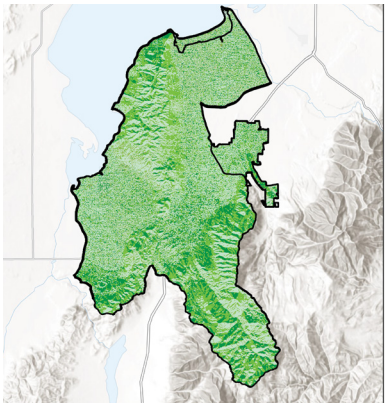


Figure 2.27. Aspect Suitability

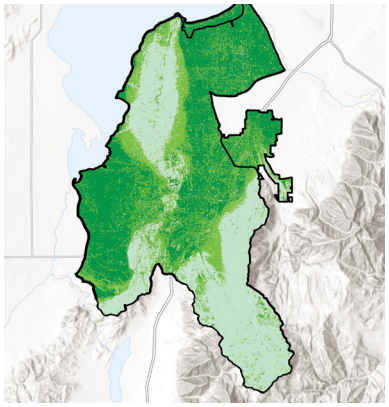


Figure 2.28. Slope Suitability

INFRASTRUCTURE/UTILITIES

POWER

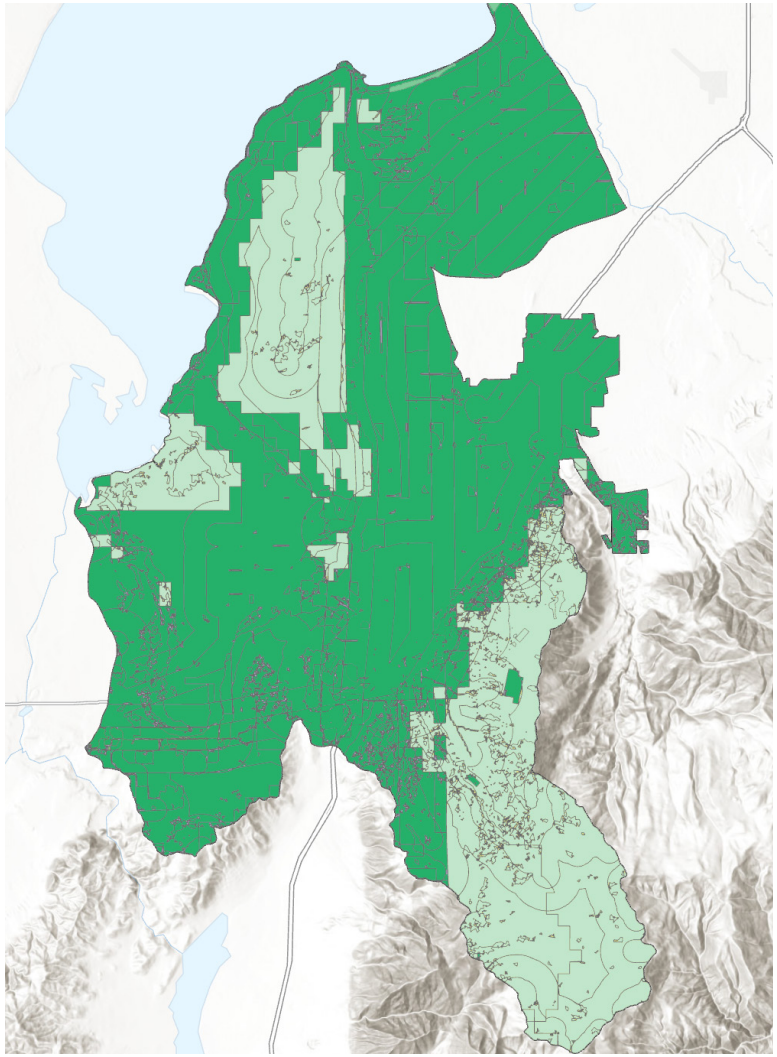


Figure 2.29. Solar Farm Suitability Analysis

A suitability analysis was performed to determine if there are any suitable locations in the region to place a solar farm in an attempt to also become net-zero. Solar is the only option, as the the region does not have enough wind for wind turbines or sources for hydro power or geothermal.

For a solar farm to be successful, several variables were considered. Suitable lands were considered as aspect should be south, southeast, southwest or flat, the slope should be under 4%, proximity to built up areas should be greater than 3000m, prolixity to roads should be under 500m. landuse should be barren land, the distance from existing power lines should be under 500m, and should be located on public land for best opportunity for success (Doorga et al., 2019; Mierzwiak & Calka, 2017). This is not the best solution as it would require solar farms to be placed on already developed land, current agriculture land or unsuitable land. There may be locations further east that are more suitable for a solar farm if the infrastructure is built.

Rocky Mountain Power (PacificCorps) services Santaquin and Utah County. Park City, Summit County and Salt Lake City made commitments to be net zero by 2030.

CABLE/PHONE/INTERNET/GAS

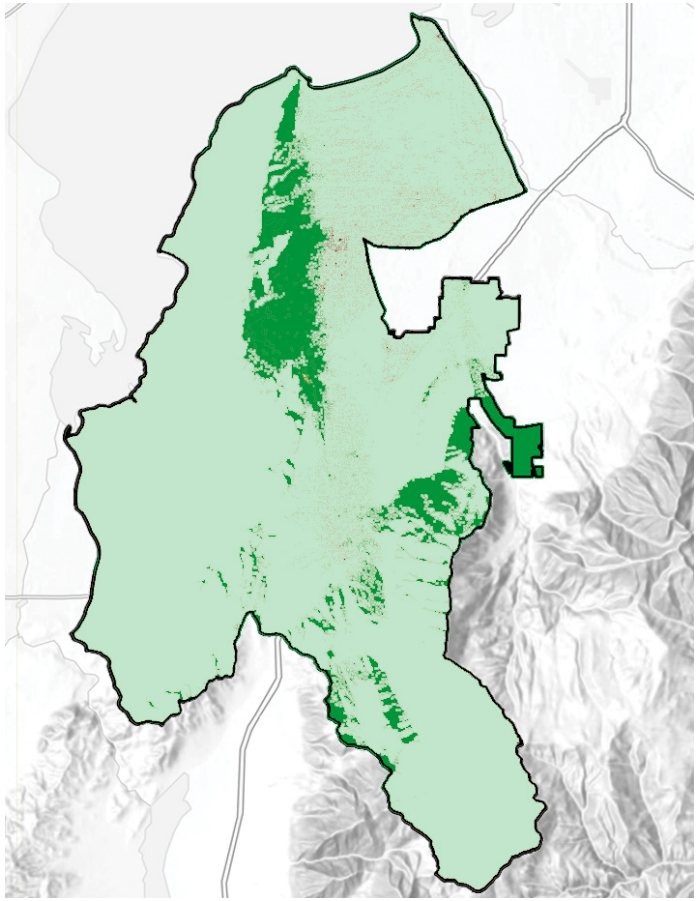


Figure 2.30. Cell Tower Suitablity

AREAS SUITABLE FOR CELL TOWERS

AREAS UNSUITABLE FOR CELL TOWERS

According to Utah County, the utilities within the county are to be located underground. Santaquin residents have options for cable and Internet as there are 7 of 13 companies in the region that service residential homes (Utah County General Plan, 2014).

Santaquin and Utah county natual gas provided by Questar. Utah county also has Wendover Gas company, not sure why they do not service Santaquin.

Phone services are provided by CenturyLink, ATT, Verizon, T-Mobile and Sprint.

A suitability analysis was performed to determine locations for future cell towers as more people are going to have cell phones instead of landlines. The best locations for new cell towers are also places that people will not want them, as they should be located in areas with a good viewshed, where the tower can be located on the top of a hill with no obstructions. If population grows as predicted, the region may need more cell phone towers but will have to give up viewsheds.

INFRASTRUCTURE/UTILITIES

ACTIVE TRANSPORTATION

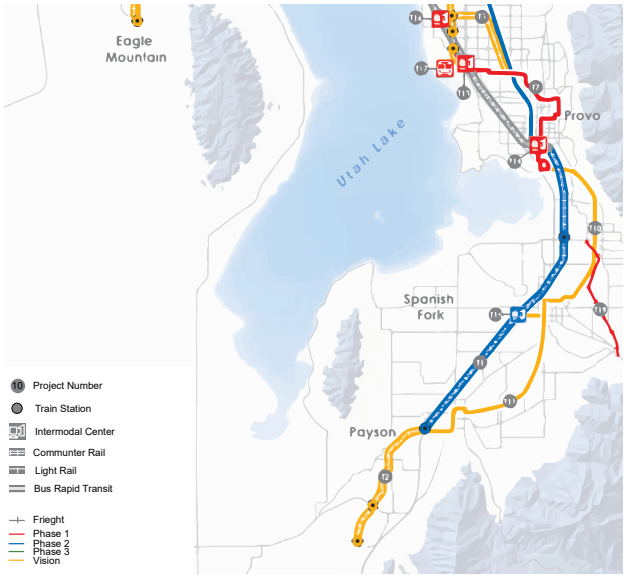


Figure 2.31. Proposed Metro and Train Routes

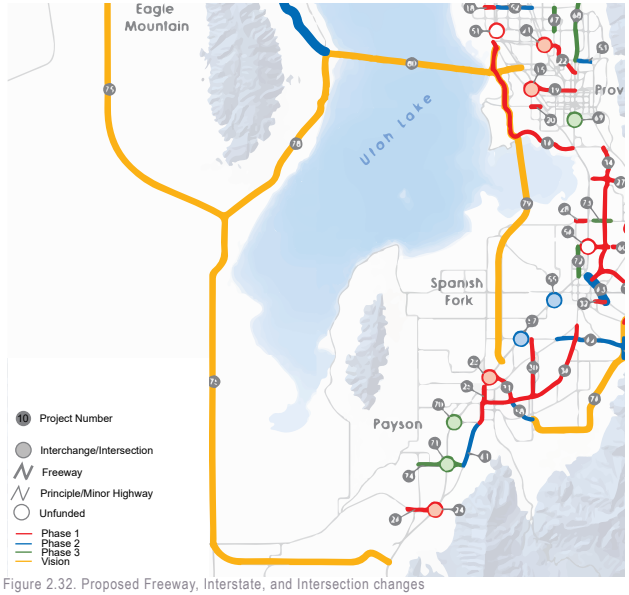


Figure 2.32. Proposed Freeway, Interstate, and Intersection changes

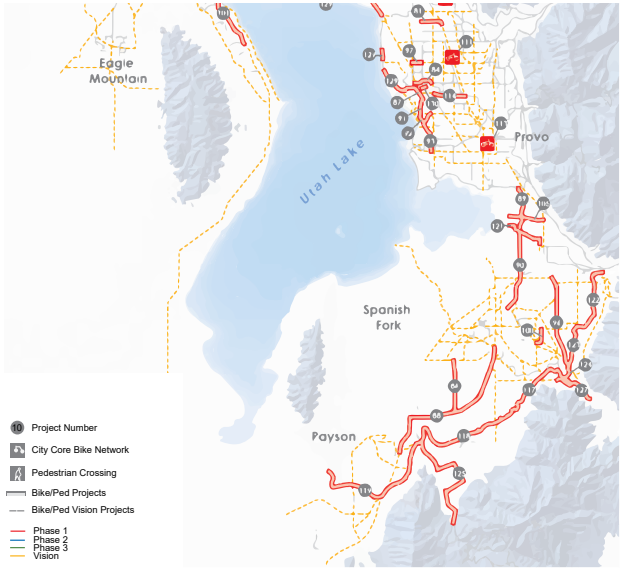


Figure 2.33. Proposed Bike Paths, and Pedestrian Crossings

The TransPlan40 has proposed several updates to the region to promote more active transportation (TransPlan40). Within the region, proposed active transportation plans are lacking, which could connect smaller cities to other cities. There is not a connection to Utah Lake south of Spanish Fork. An active transportation route to the lake and other towns in the region is needed to enhance the city-city relationship and the residents' quality of life through access to the lake and other natural recourses (Mountainland Association of Governments, n.d.).

ACTIVE TRANSPORTATION

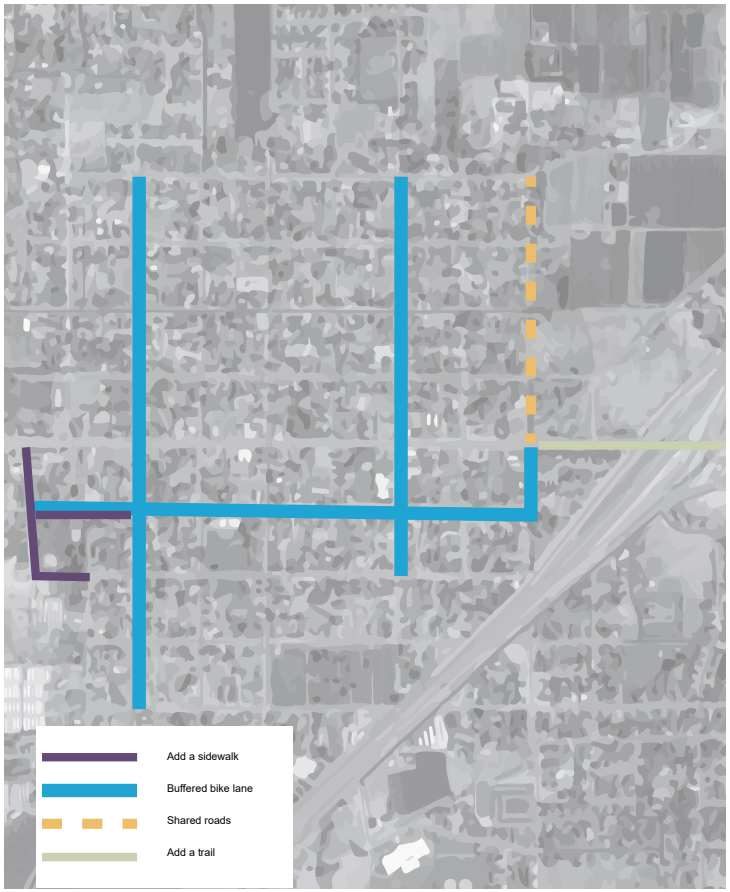


Figure 2.34. Active Transportation Plan for Santaquin

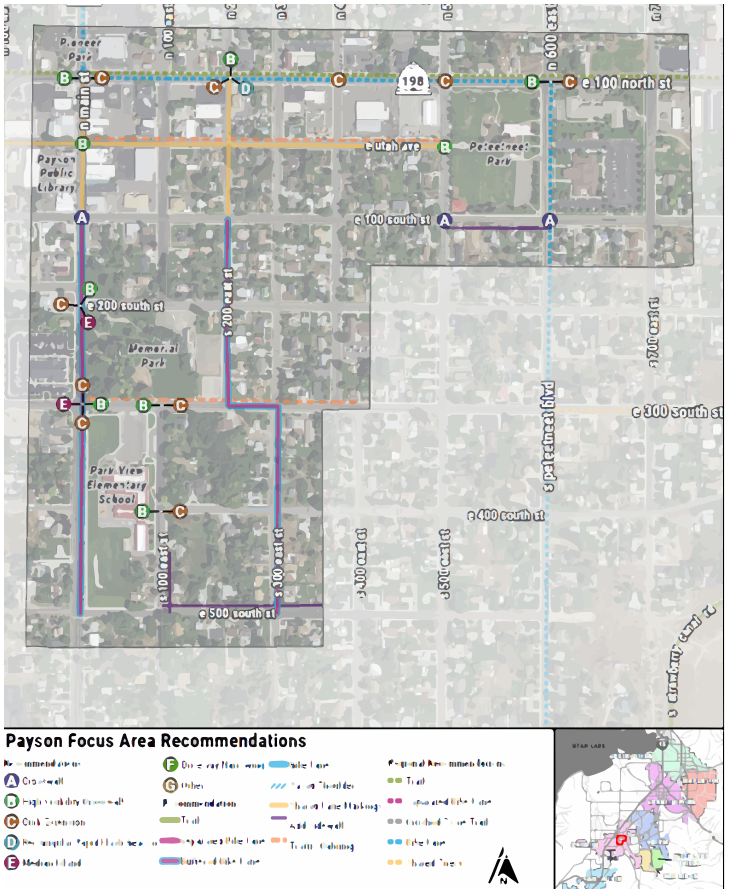


Figure 2.35. Active Transportation Plan for Payson

The Southern Utah County Active Transportation Plan created an active transportation plan for Santaquin, Payson, and other cities in southern Utah county. It includes faculties along the four major streets in town. Providing facilities for the rest of the population and a connection for Sataquin to other communities by active transportation would be a basic necessity and would increase the quality of life for the people of Santaquin and propmote cleaner transportation options (Mountainland Association of Governments, 2016).

ACTIVE TRANSPORTATION

OVERVIEW

Active transportation often has different meanings, but here active transportation includes travel by foot, bicycle and other non-motorized means. A number of studies emphasize the importance of active transportation from many perspectives including health, economic, social, environmental and traffic management. These specifically highlight the environmental interventions that would facilitate a shift from car-dependent suburbs to communities accessible by modes of active transportation, supported by high quality public transportation (Giles-Corti et al., 2010). Active transportation route systems have the potential to provide a unique combination of ecological and social benefits to the region.

The relationship between the natural environment and recreation is not a simple one, particularly in those systems that include trails through natural (and naturalized) areas, as local residents may have concerns for safety and clear sight lines that may compromise the ecological integrity of these systems (Luymes & Tamminga, 1995). For this planning intervention, attention was focused on results of the analysis. This planning effort was intended to establish a regional active transportation plan that connects all the communities and natural resources to each other and promotes personal and environmental health and well-being. This plan builds upon the support and enthusiasm for developing a strong network of active transportation systems to connect communities in the region. A desire for active transportation is reflected in many of the current adopted plans for cities within the study area. This planning intervention represents a comprehensive effort to address gaps in the region's key transportation corridors with regard to bicycle, pedestrian, and hiking travel.

Figure 2.36. Active Transportation graphic

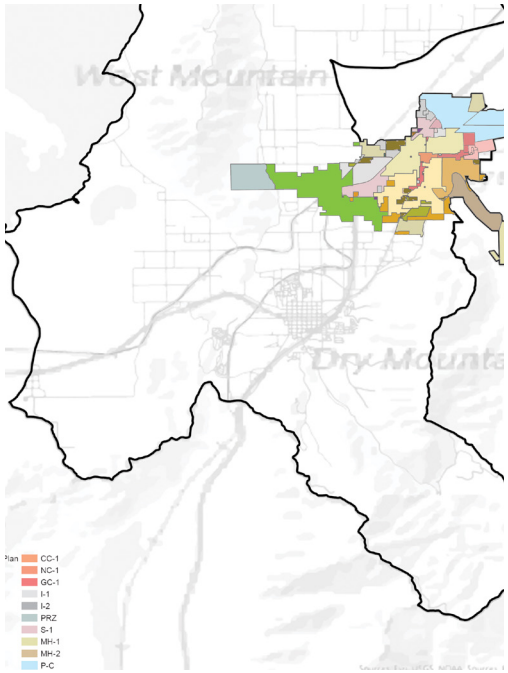


Figure 2.37. Payson City Zoning

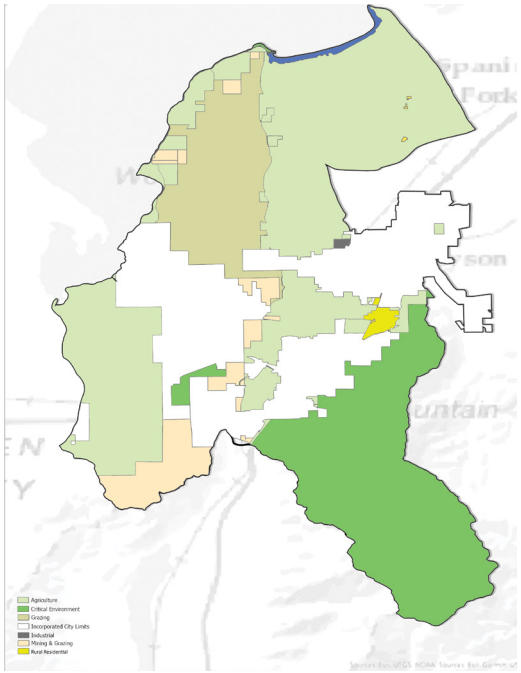


Figure 2.38. Utah County Zoning

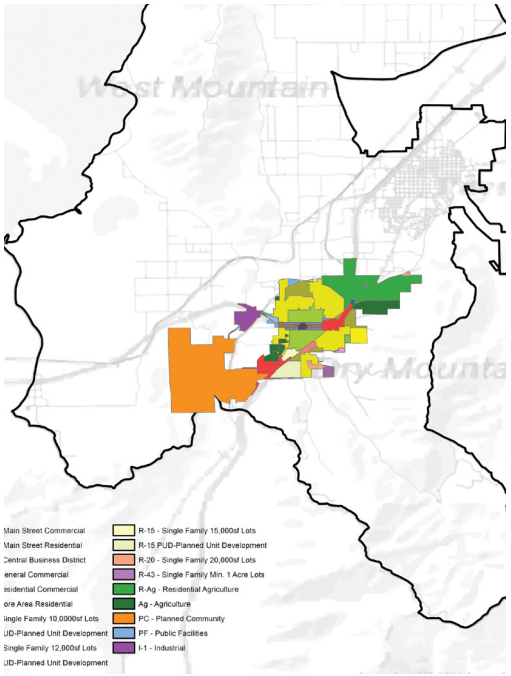


Figure 2.39. Santaquin City Zoning

These maps were used as a guide for planning these systems and to understand future land use patterns within the region. Planning for active transportation systems was focused on future zoning to understand where people will live and work. Routes were not placed in areas zoned as agriculture or environmental protection zones as to protect the agriculture and environment.

ACTIVE TRANSPORTATION

PROCESS

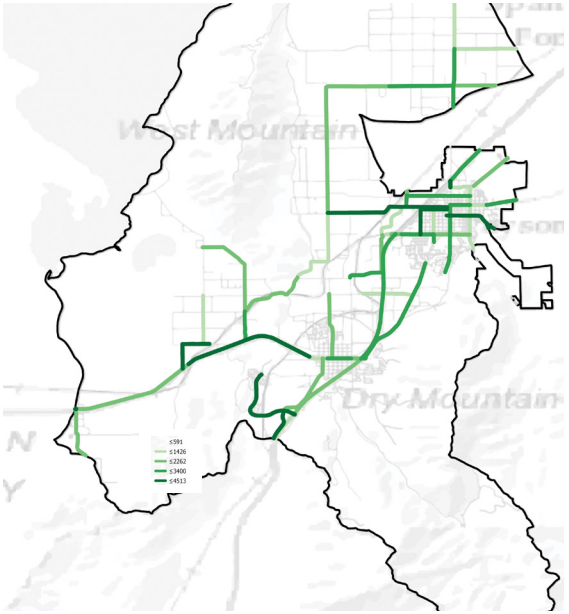


Figure 2.40. Annual average daily traffic values for major roads within region

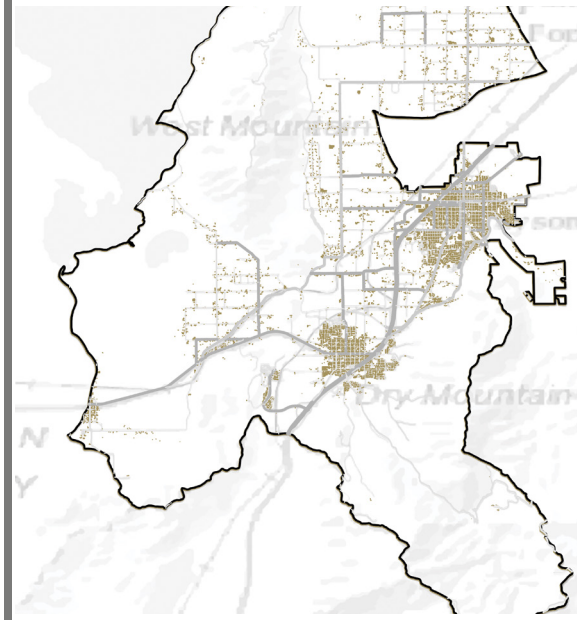


Figure 2.41. Roads with buildings, showing major areas of development and population

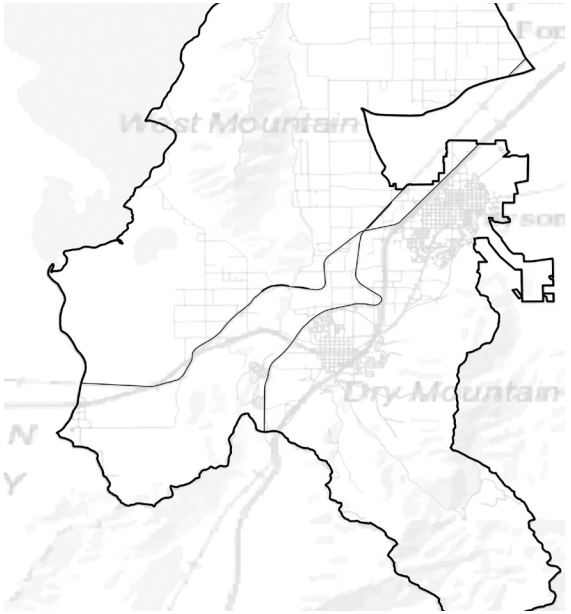


Figure 2.42. Railroad corridors

Planning interventions focused on moving people through systems that already exist. Annual Average Daily Traffic (AADT) is often used as a proxy for demand along the bike/pedestrian route. In active transportation planning, the AADT value should not exceed 30,000 vehicles per day (Rose & Choe, 2015). These are the roads people are already using. Rail corridors are great places for conversion into recreational trails because the land is well prepared and drained, there are mild slopes that make the trail usable for people of all ages and abilities, the existing infrastructure provides opportunities for historic conservation and interpretation, and the connection of communities over hundreds of miles provides a continuous recreational network (Mundet & Coenders, 2010).

PROCESS

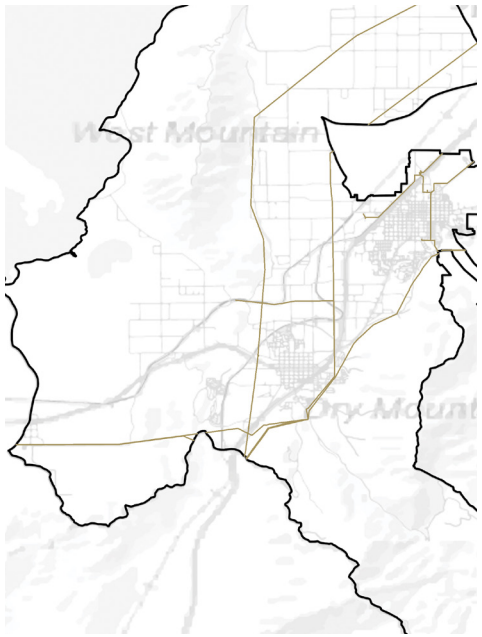


Figure 2.43. Power lines

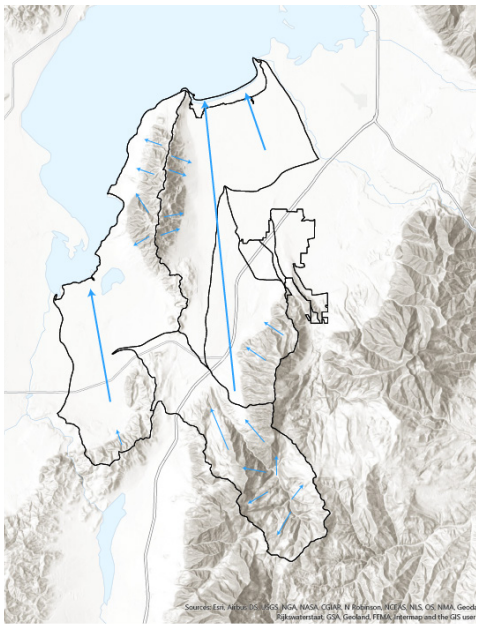


Figure 2.44. Watersheds

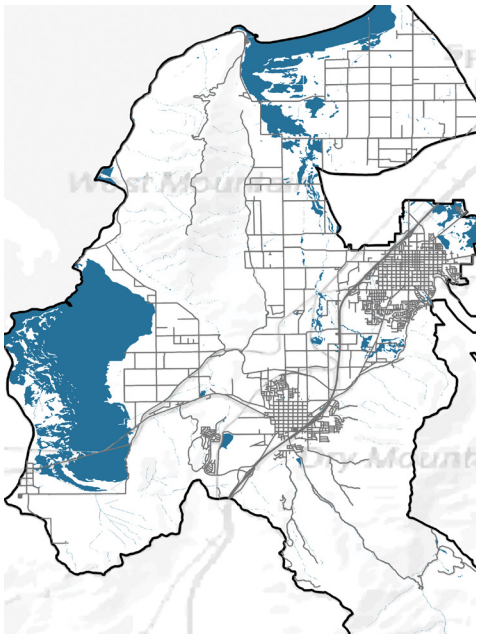


Figure 2.45. Wetlands with roads

Trails are often built in utility corridors of all kinds, from underground pipelines to electric power lines overhead. In urbanized areas, utility corridors are often connectors as they are wide swaths through built-up areas. Many of the power lines run through agriculture fields or near development to make it not worth planning paths and trails there. Planning trails and paths focused on preserving the environment, so proposed paths and trails go around the wetlands. Watershed was used to better understand where water flows downstream.

ACTIVE TRANSPORTATION

PROCESS

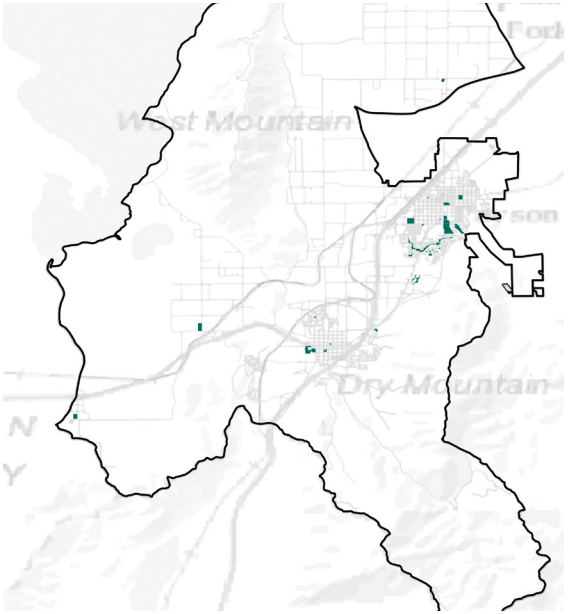


Figure 2.46. Local Parks

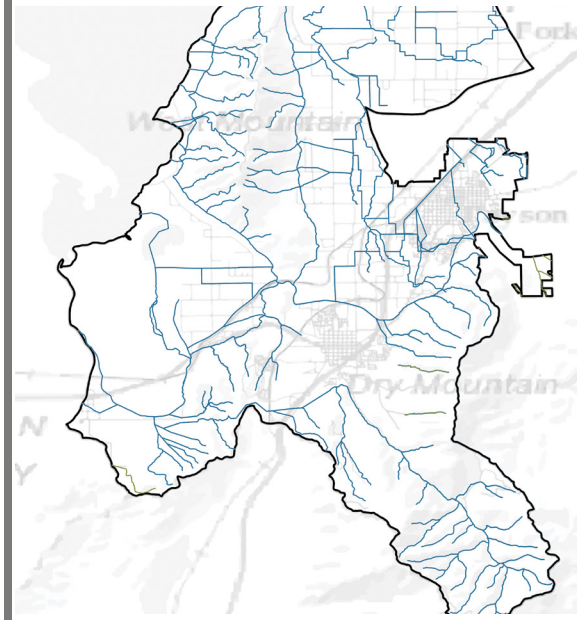


Figure 2.47. Local streams, waterways, and canals

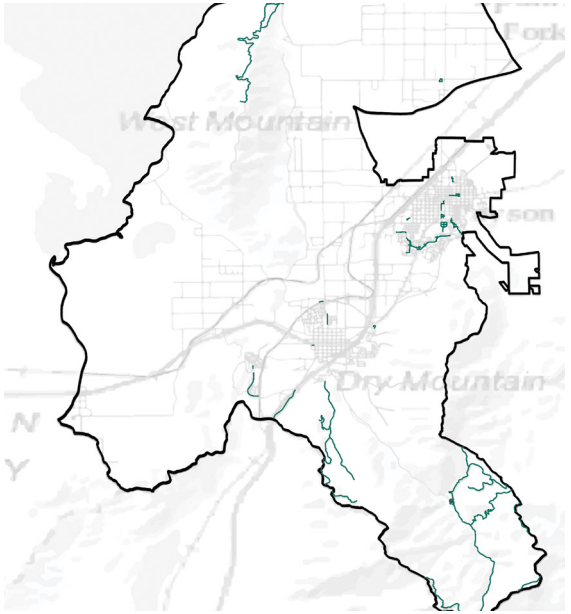


Figure 2.48 Trails

The systems were created to better connect the existing trails and parks. People enjoy walking along water because of the immeasurable sense of peace that people feel around water. It provides them with a chance to escape their hyper-connected, over-stimulated lives and enjoy a moment of solitude and peace. "What people make of their places is closely connected to what they make of themselves as members of society and inhabitants of the earth" (Basso, 1996, p. 7). Momaday (1947) talks about historical values in Hill Jr. (1999), stating, "From the time the Indian first set foot upon this continent, he centered his life in the natural world. He is deeply invested in the earth, committed to it both in his consciousness and in his instinct. The sense of place is paramount. Only in reference to the earth can he persist in his identity" (p. 1947).

RESULT/SYSTEMS

This active transportation system connects all communities in the region to each other, as well as to the natural amenities of the region. It is broken down into three systems (regional, natural, and city) to better understand how each operates.

The regional system connects all the communities together and to the larger network of transportation systems.

The natural system is an 85-mile-plus loop that utilizes existing plans, roads, and rails to connect people to nature and its amenities. There are multiple loops and options for people to choose.

Finally, the city system is a system focused on the transportation system within each city and connecting it to the larger system and region. This system builds upon the support and enthusiasm for developing a strong network of active transportation facilities.

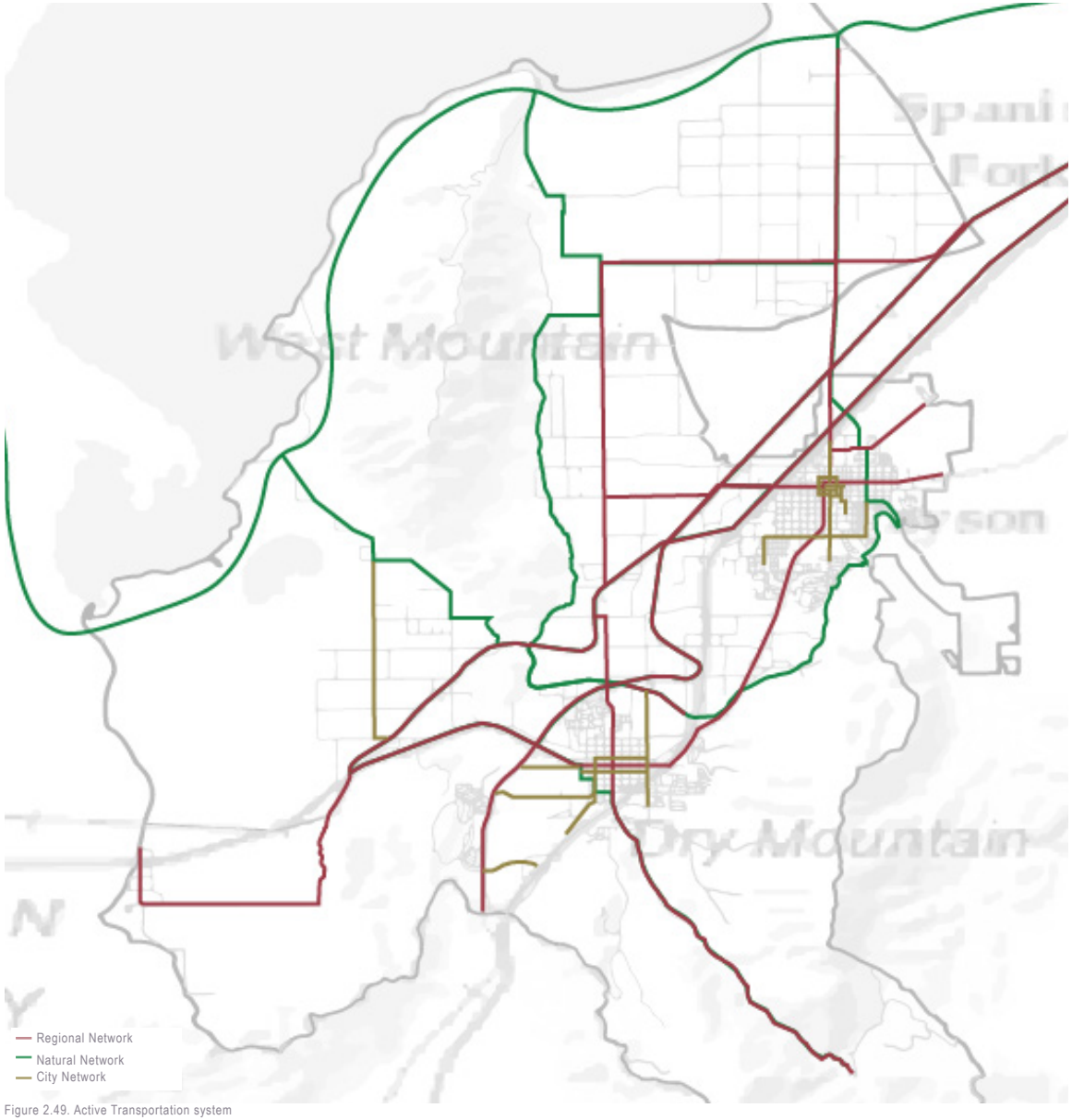


Figure 2.49. Active Transportation system

ACTIVE TRANSPORTATION

RESULT/SYSTEMS

Each one of the systems is broken down for better understanding. These systems were designed to intersect each other, creating a well interconnected system of paths and routes for active transportation. Several factors were considered when planning these routes:

- Paths that do not pass through wetlands
- Accessing and connecting communities and regions
- Focusing on existing facilities to enhance

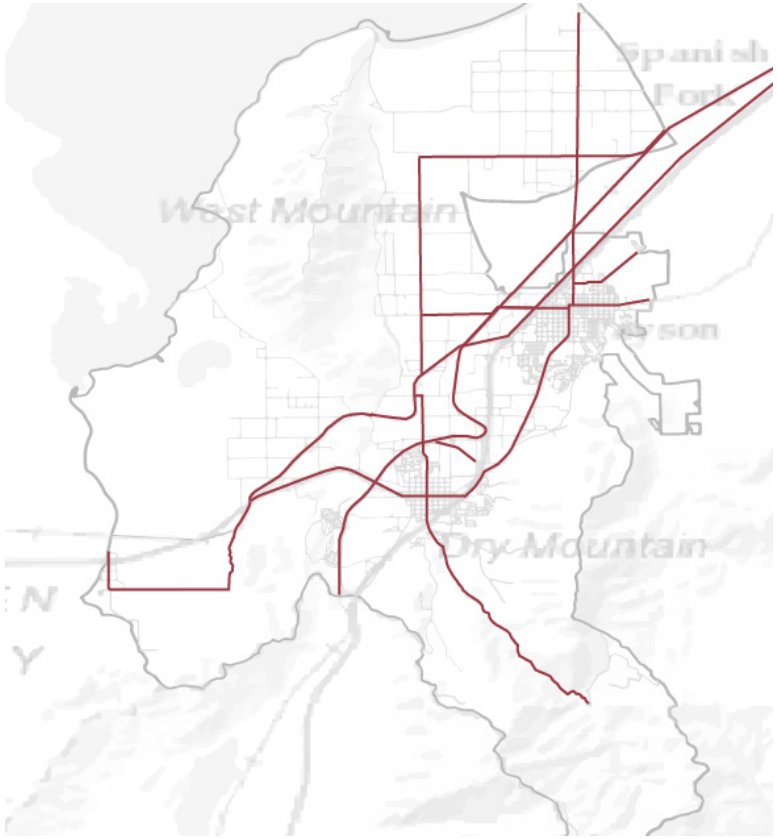


Figure 2.50 Regional System Network

RESULT/SYSTEMS

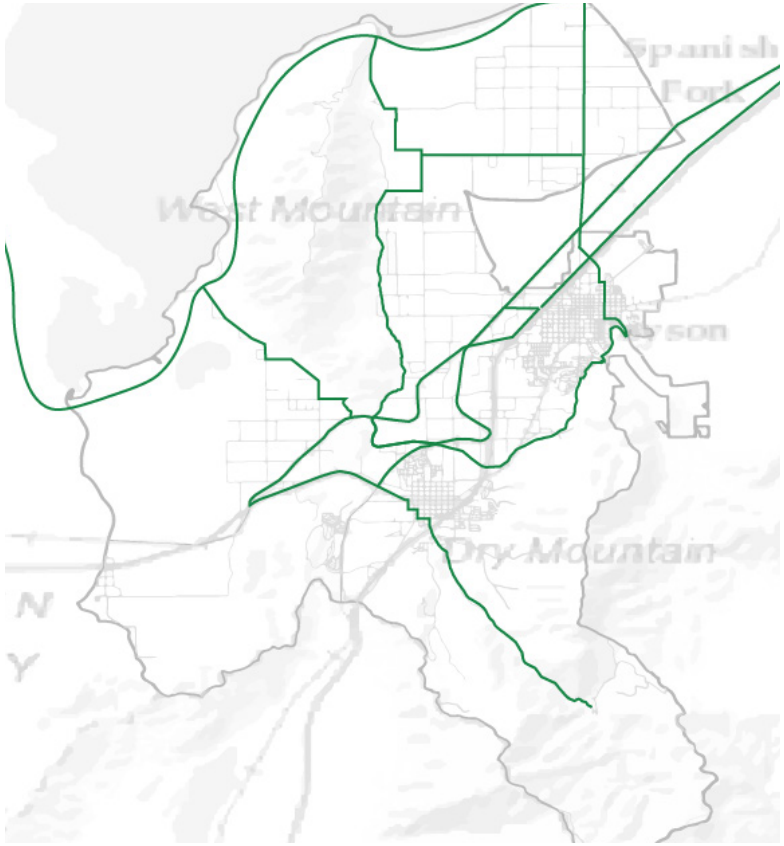


Figure 2.51. Natural Resources System Network

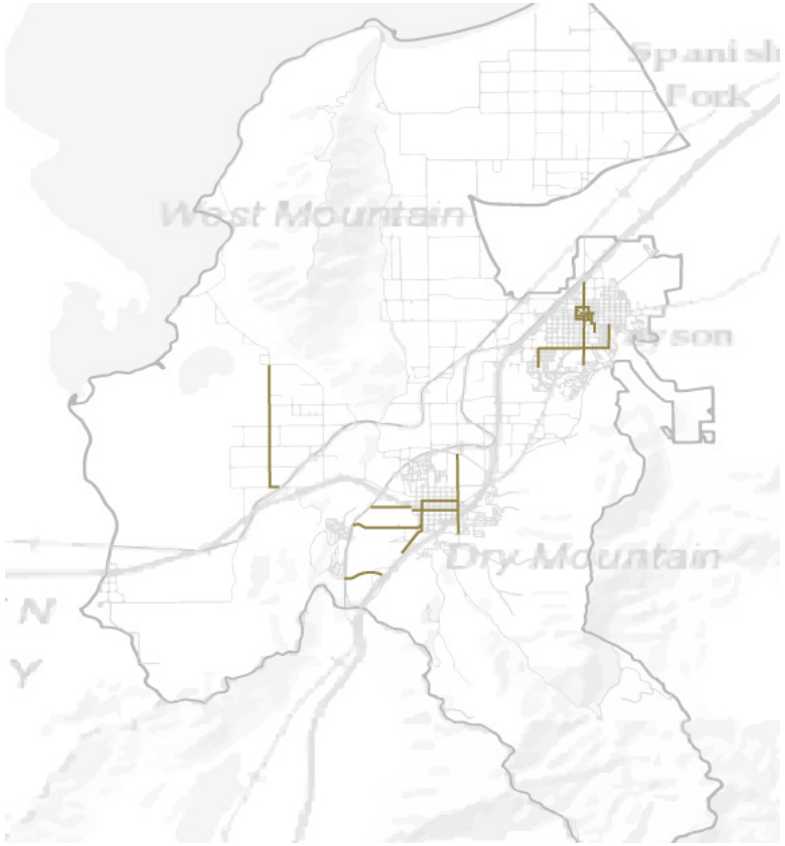


Figure 2.52. City System Network

ACTIVE TRANSPORTATION

NODES TO HIGHLIGHT

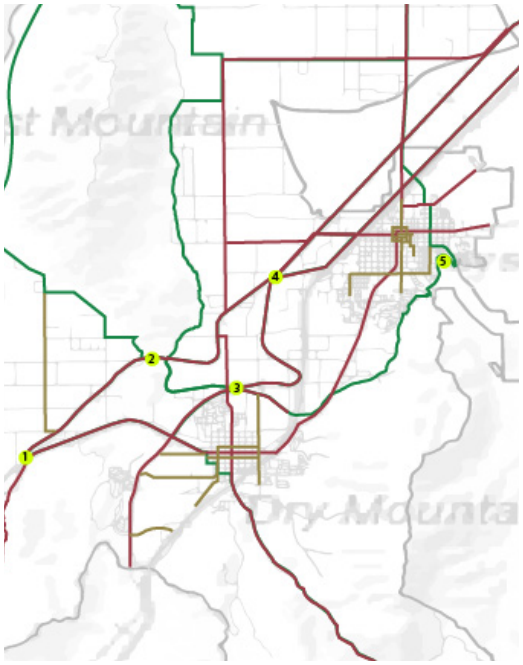


Figure 2.52. Node 2

Figure 2.53. Node 2

Figure 2.54. Node 1

Node one (left) is located in the southwest part of the region. It is located at the intersection of three active transportation routes. Also, a major highway intersects these pathways. This node borders wetlands, a mountain, development, and an area of barren land. This could be a good place for a gathering, rest area, or educational area in the future.

Node two (above) is located at the intersection of two active transportation systems. One runs along the existing road, while the other is along the railroad tracks. It is just south of West Mountain and could be a gateway for recreational opportunities on the mountain.

Figure 2.55. Node 3

Node three (above) is located at the intersection of two paths on the same natural resources system. It is also the intersection of a railroad track and a canal that runs along the road. To the south is Santaquin and land that is being developed for the anticipated future growth, while to the north is agriculture and orchards. Node three is the transitional area between the two, creating a unique location for gatherings, rest area, or educational area in the future.

Node four (below) is located at the intersection of the two railroad tracks. A small river bisects the proposed path in the area. To the east is land being developed for the anticipated growth. There is a road that dead-ends about a block east of this node. By planning now for future growth, this important node can be preserved as a park or ecosystem/watershed restoration area to help protect the health of the environment.

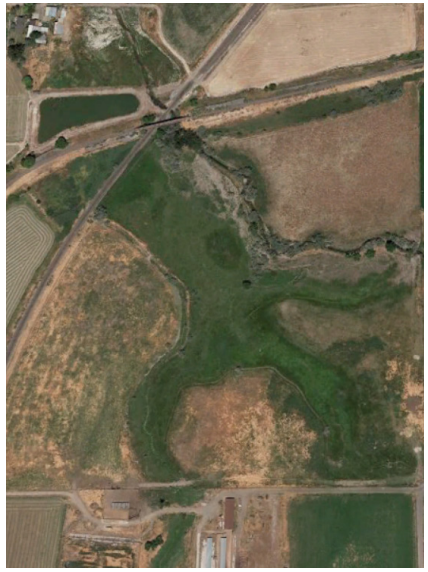


Figure 2.56. Node 4

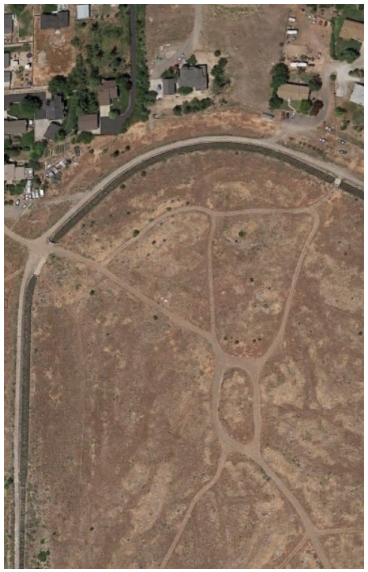


Figure 2.57. Node 5

Node five (above) is located in the northeast section of the region. It borders residential homes on the north and west. To the south and east are hills with natural recreational opportunities. This could be a place for a gateway into the hidden paradise.

ACTIVE TRANSPORTATION

PATHS

Each one of the systems was further broken down to describe the type of paths.

Multi-use paths are the safest facilities for pedestrians and bicyclists, providing mobility options away from the roadway. Often accommodating both pedestrians and bicyclers, multi-use paths usually range in widths from eight to 12 feet, can be either paved or unpaved, and are used for both recreation and transportation purposes (Bushell et al., 2013).

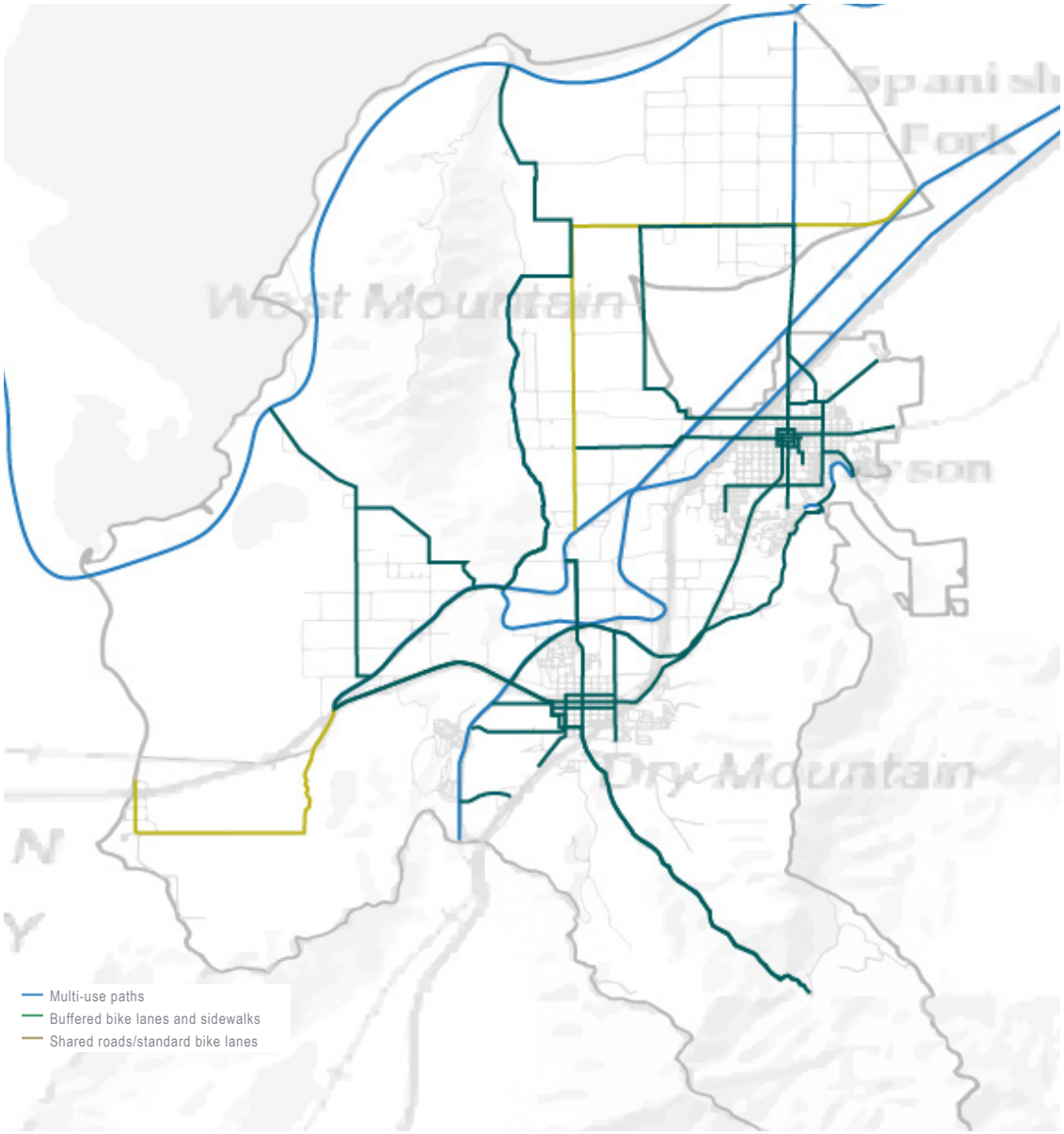


Figure 2.58. Active transportation system, with paving breakdowns

MULTI-USE PATHS

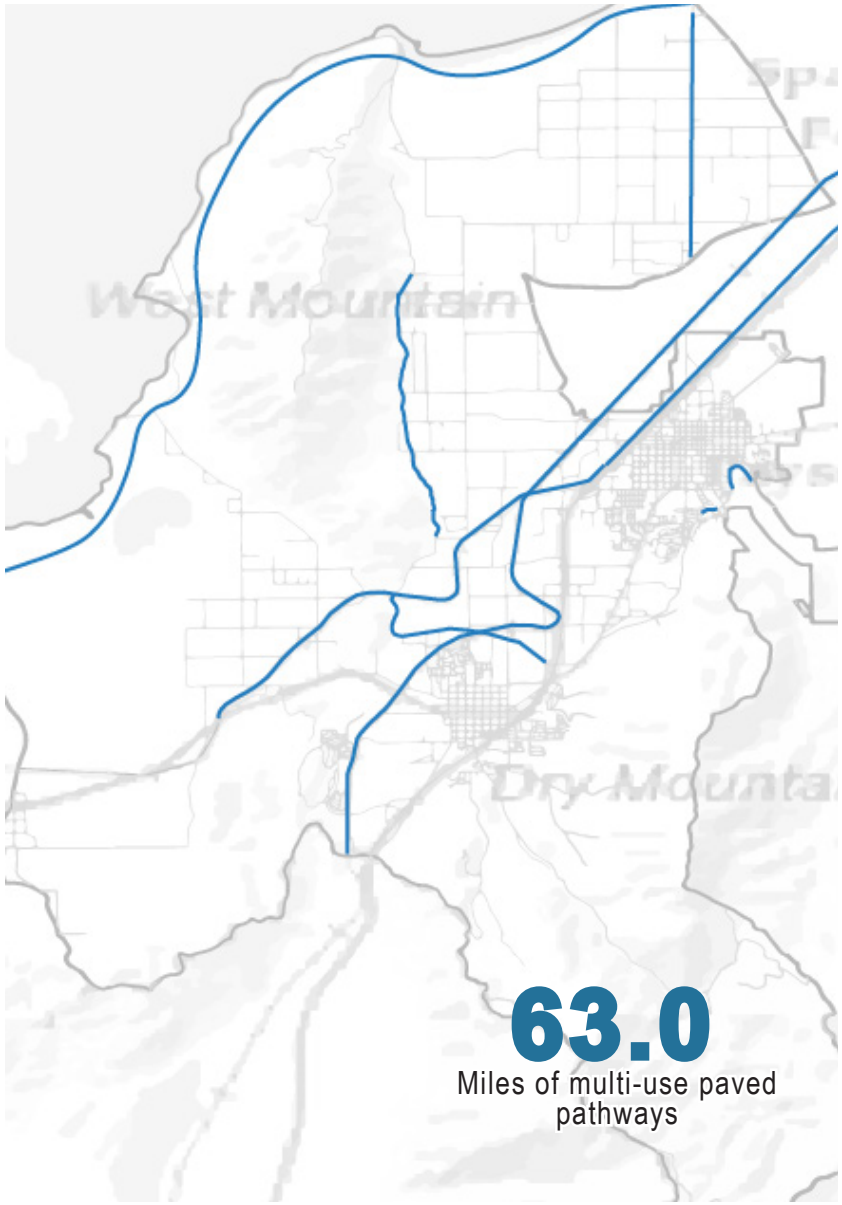


Figure 2.59. Multi-use paths

Multi-use paths are paved, off-street travelways designed to serve non-motorized travelers. Across the United States, bicyclists are typically the most common users of multi-use paths, but in many places, multi-use paths are also used by pedestrians, hikers, skaters, skateboarders, and wheelchair users, among other users.

They are constructed to provide recreational opportunities (Federal Highway Administration, 2006). These paths are primarily planned for the natural system.

ACTIVE TRANSPORTATION

MULTI-USE PATHS

Figure 2.60. Multi-use path perspective

This is one option for converting the railroad track to a mutli-use path. The idea here is to have a multi-use path that allows people access to nature, but no access to the local agriculture. The popularity of multi-use paths has shown that large volumes of pathway traffic with diverse user groups can create congested and conflictive path conditions similar to that on urban highways. The planning and design of multi–use paths must be done with the same care and attention to recognized guidelines and user needs as the design of on–roadway bikeways and other transportation facilities.

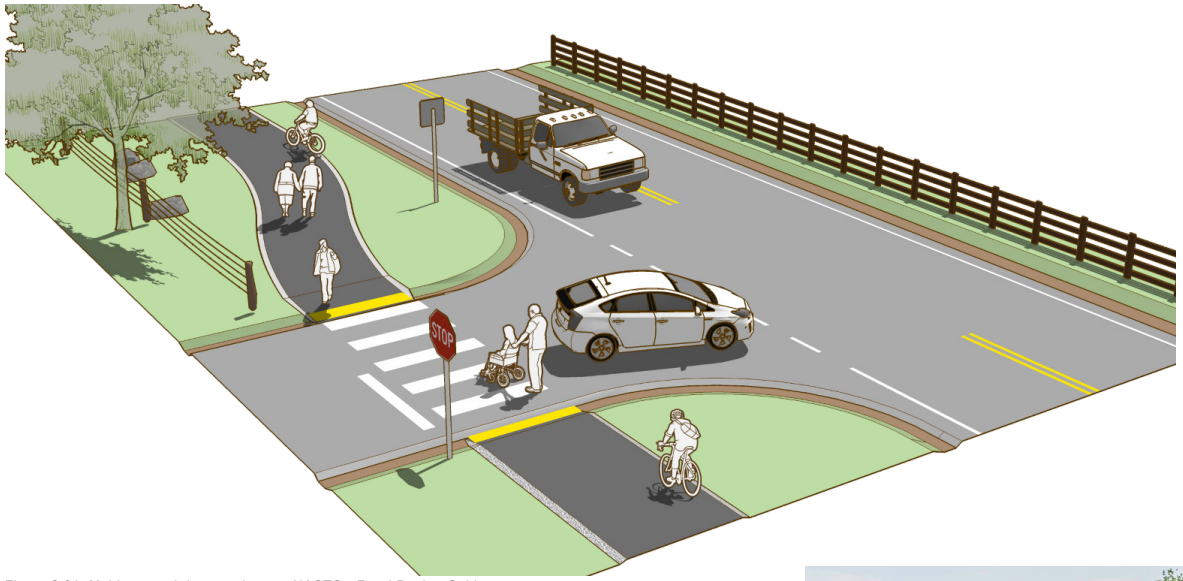


Figure 2.61. Multi-use path in a rural area: NACTO - Rural Design Guide

Rural communities can increase the health of their citizens by promoting walking and bicycling. To do so, rural areas need to prioritize their transportation investments very strategically. Studying areas that lack safe connections where people are living or would be comunting to and from is a good start, such as focusing on main streets.

At the regional level, local communities and cities can consider how to create regional connection for bicycling and transit, but need to avoid building major infrastructure to new sprawling developments when existing roads are not being maintained or made safe for walking and bicycling (“Rural Communities: A Two Pronged Approach for Improving Walking and Bicycling,” n.d.).

Figure 2.62. Multi-use path, in this case used for bicyclisits: Ridgeland, MS. Biking and Walking Trail

ACTIVE TRANSPORTATION

MULTI-USE PATHS COMPONENTS - LIGHTING

The primary purpose of lighting may be nighttime visibility for security and safety, but successful street lighting takes into account the human users of the street, not simply the requirements set by local laws, ordinances, and agencies. Studies show that the spatial design of parks, levels of use, communication, lighting and surveillance contribute to the safety of urban parks (Egan, 1991).

One physical attribute of open spaces that may inhibit safety is the lack of route choice for users, resulting in movement patterns that are predictable (Luymes & Tamminga, 1995). This is why this system is well interconnected with many opportunities for people to choose the route. A system of well-used, safe, active transportation routes has been identified as an important component of healthy, sustainable urban communities (Waterfront (Canada), 1992).

Figure 2.63. In ground lighting: Xena LEDS-C4

Figure 2.64. Solar powered lighting: Sol by Carmanah

$18,970,000

Is the estimated cost for lighting on the entire system

Figure 2.65. Lights along a path: East Boston Greenway

MULTI-USE PATHS COMPONENTS - BICYCLE PARKING

Figure 2.66. Bicycle Rack from Costs for Pedestrian and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public

Figure 2.67. Bicycle parking: HELIOS Arredo Urbano

$33,000

Is the estimated cost for bike racks throughout all systems

There are many other components that go into creating a full active transportation system. One of these is bicycle parking. Bicycle racks are fixed objects, usually constructed from metal, to which bicycles can be securely locked. Bicycle lockers are used to securely enclose and store bicycles. Depending on bicycle parking design, materials, and location, costs will vary (Bushell et al., 2013). Bicycle parking should be well designed, easy to find, simple to use and park a bike, attractive and safe.

Figure 2.68. Bicycle Parking: Knowhow Shop

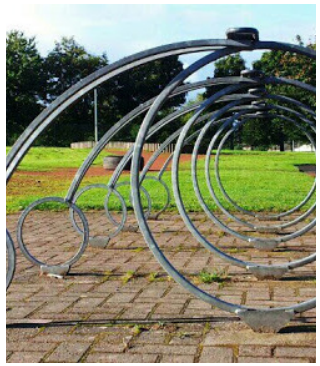


Figure 6.69. Bicycle Parking: Black and Blues - Paula must try harder

Figure 2.70. Covered Bicycle Parking: Public Bicylcle Racks Bike Parking Solutions for Cities

Figure 2.71. Bicycle Parking: Friday Favorites DIY Bike Rack

ACTIVE TRANSPORTATION

BUFFERED BICYCLE LANES

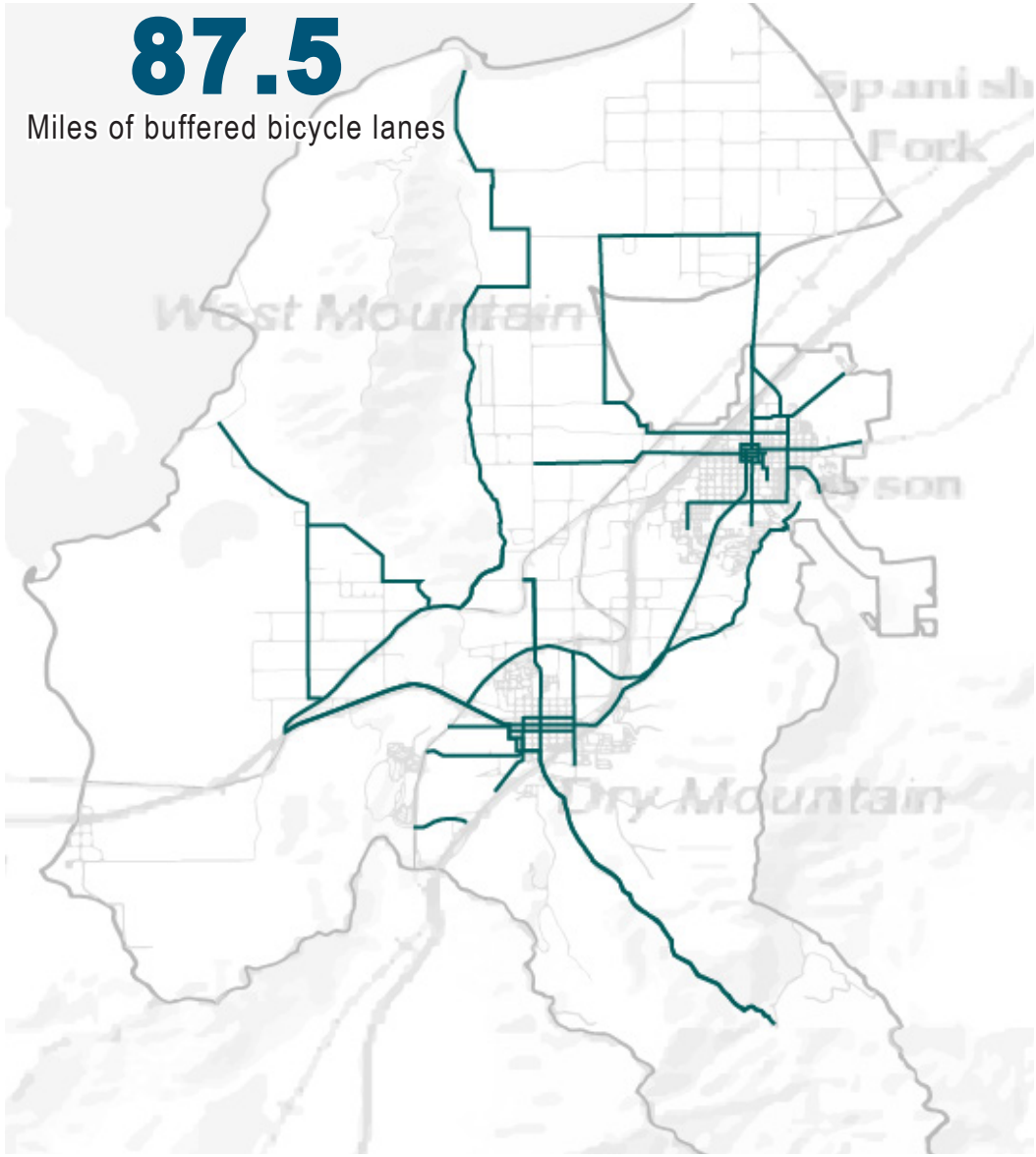


Figure 2.72. Buffered bike lanes and sidewalks

Buffered bicycle lanes are conventional bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. (Urban Street Design Guide, 2015).

Buffered bicycle lanes provide a greater distance between motor vehicles and bicyclists, provide a greater space for bicycling without making the bike lane appear so wide that it might be mistaken for a travel lane or a parking lane, and appeal to a wide range of bicycle users.

Figure 2.73. Buffered bicycle lanes and sidewalks in downtown Santaquin, Utah

This is one example of how Main Street in Santaquin could become a more active and vital section of the town. There is a two-way buffered bicycle lane that creates the active transportation system and, in combination with the sidewalk, creates a larger network of greenways, pathways, and active transportation routes. Dimensions follow all National Association of City Transportation Officials (NACTO) guidelines.

ACTIVE TRANSPORTATION

BUFFERED BICYCLE LANES

Figure 2.74. Transit-walk-and-bike-friendly street design: NACTO
Sections highlight transit as the centerpiece of transformative street projects, integrating transit-walk-and-bike-friendly design elements like boarding islands with best-practice strategies - like multi-door boarding and transit-friendly signals - that can speed up an entire system.

Figure 2.76. 2-way bike lanes buffered with bollards: NACTO

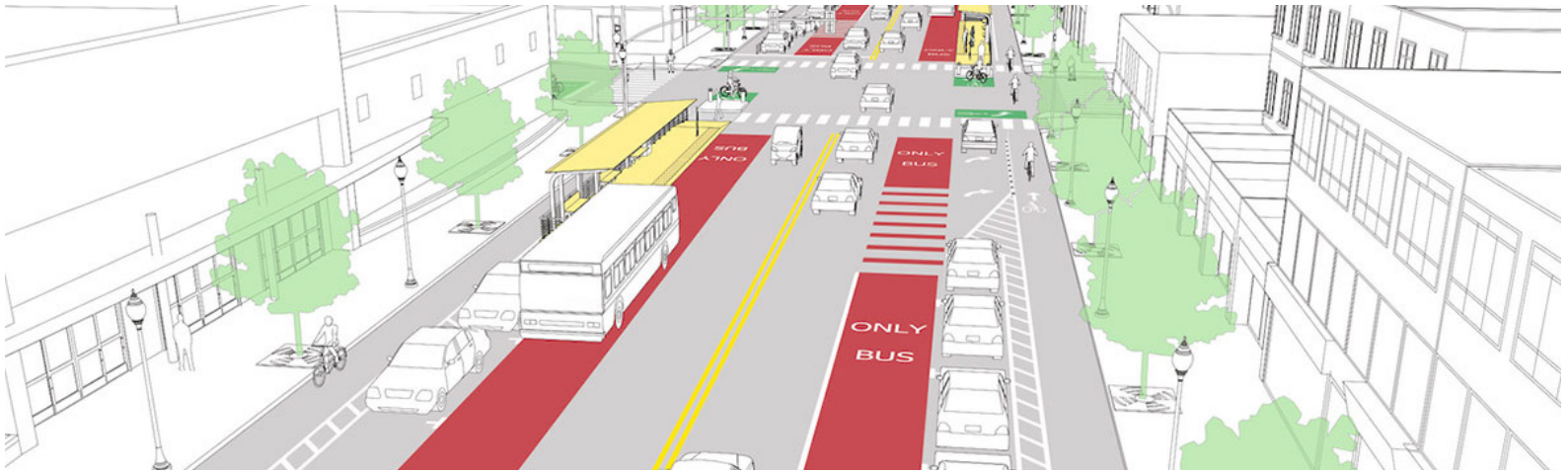


Figure 2.75. Rendering of a street re-design focusing on safe, active, and mass transportation: NACTO

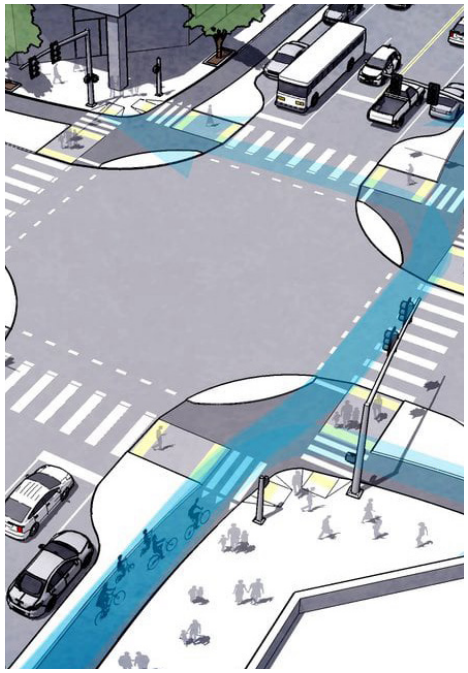


Figure 2.77. Protected bikelanes with bulb-outs and curb extensions, reducing the distance pedestrians and bicyclists have to cross traffic: NACTO

Figure 2.78. NACTO - Transit corridor: NACTO
When redesigning streets for high-quality transit service, designers should assess how transit service is impacted not only by the geometry of the corridor, but also its existing signal timing, signal phasing, turns, and other operations that may jeopardize the quality of service.

Figure 2.79. Urban Bikeway Design: NACTO
Dedicated Median Bus Lanes. Dedicated median bus lanes are typically applied on major routes with frequent headways or where traffic congestion may significantly affect reliability. Median bus lanes are applied along the centerline of a multi-lane roadway and should be paired with accessible transit stops in the roadway median where needed.

ACTIVE TRANSPORTATION

BUFFERED BICYCLE LANES COMPONENTS - FLASHING BEACONS

Active warning beacons are flashing lights that supplement warning signs at unsignalized intersections or mid-block crosswalks. Beacons can be actuated either manually by a push-button or passively through detection. Rectangular Rapid Flashing Beacons (RRFB) use an irregular flash pattern similar to emergency flashers on police vehicles and can be installed on either two-lane or multi-lane roadways. Active warning beacons should be used to alert drivers to yield to bicyclists who have the right-of-way when crossing a road (Urban Street Design Guide, 2015).

Figure 2.80. Flashing Beacons/RRFB: NACTO

$155,000

Is the estimated cost for Flashing Beacons on all systems

$283,200

Is the estimated cost for Rectangular Rapid Flashing Beacons on all systems

Figure 2.81. RRFB: US Department of Transportation FHWA Safety

Figure 2.82. RRFB: Bike Portland

Figure 2.83. RRFB: MUTCD US Department of Transportation

BUFFERED BICYCLE LANES COMPONENTS - DETECTORS

Figure 2.84. Pedestrian/Bike Detector and push button: NACTO

$28,700

Is the estimated cost for pedestrian/bicycle detectors and push buttons on all systems

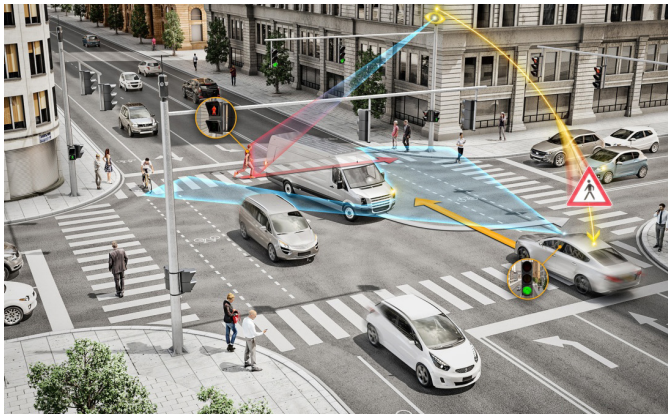


Figure 2.85. Pedestrian/Bike Detector System: Smart Cities World

Bicycle/pedestrian detection is used at actuated signals to alert the signal controller of bicycle crossing demand on a particular approach. Bicycle detection occurs either through the use of push-buttons or by automated means, such as in-pavement loops and videos (Urban Street Design Guide, 2015). They improve efficiency and reduce the delay for bicycle travel, increase convenience and safety for bicyclers, help establish bicycling as a legitimate mode of transportation, and discourage bicyclists from running red lights without causing excessive delay to motorists.

Figure 2.86. Pedestrian/Bike Detector and Push Button: Semantic Scholar

ACTIVE TRANSPORTATION

BUFFERED BICYCLE LANES COMPONENTS - BOLLARDS

Figure 2.87. Boolards: Costs for Pedestrian and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public

Figure 2.88. Bollards: The Constructor

Figure 2.89. Bollards: AASHTO Journal

Figure 2.90. Bollards: SF Chronicle

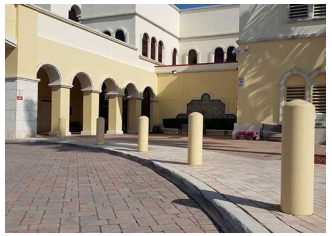


Figure 2.91. Bollards: The Park Catalog

Bollards are metal posts rooted in the ground to block vehicle access. Traffic bollards are posts embedded in the ground, which are used to keep pedestrians safe by slowing vehicle speeds and separating pedestrians from vehicle traffic, and/or limiting vehicle access either temporarily or permanently. There are many types of bollards, including fixed, rising, security, removable, breakaway, decorative, and flexible (Bushell et al., 2013). Between 2006 and 2011, downtown Chicago's Dearborn Avenue witnessed 1,140 crashes with pedestrians and bicyclists. In 2012, a two-way bike lane was developed, protected by a parking lane and bollards. After the project was completed, there were no reports of crashes through 2013, illustrating that safer, active infrastructure can indeed prevent accidents (National Recreation and Parks Association, n.d.).

$20,200,000

Is the estimated cost for bollards on all systems

BUFFERED BICYCLE LANES COMPONENTS

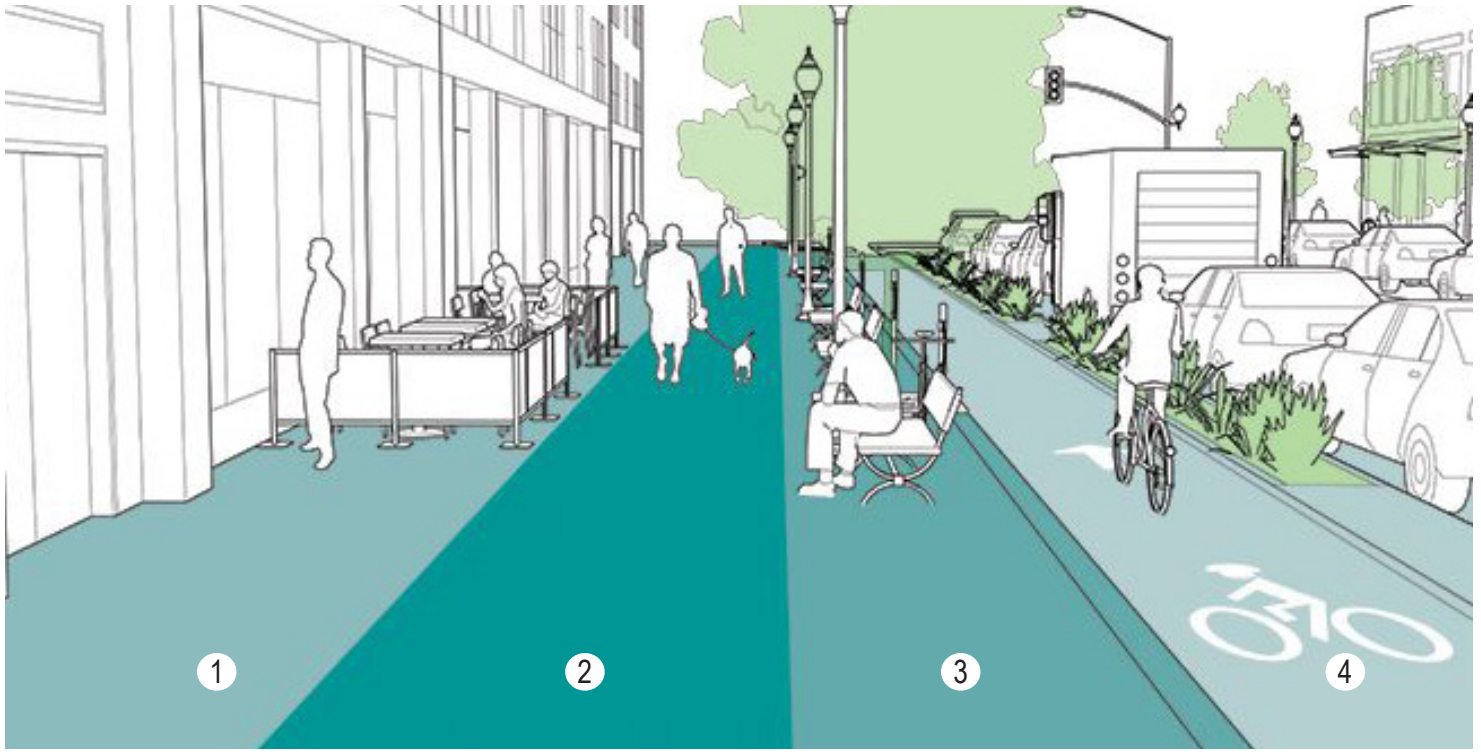


Figure 2.92. Zones for street design with an active transportation emphasis: Urban Street Design Guide, 2015

The frontage zone (1) consists of both the structure and the facade of the building fronting the street, as well as the space immediately adjacent to the building. The pedestrian-through zone (2) is the primary, accessible pathway that runs parallel to the street. The through zone ensures that pedestrians have a safe and adequate place to walk. The planting/furniture zone (3) is the section of the sidewalk between the curb and the through zone in which street furniture and amenities, such as lighting, benches, newspaper kiosks, utility poles, tree pits, and bicycle parking are provided, as well as plant material and other green infrastructure elements. The buffer zone (4) is the space immediately next to the sidewalk that may consist of a variety of different elements (Urban Street Design Guide, 2015).

ACTIVE TRANSPORTATION

BUFFERED BICYCLE LANES COMPONENTS - STREET TREES

Figure 2.93 Street Trees: Stantec

Recent research has shown that trees planted within rights of way of urban treets can contribute to the walkability of communities by decreasing vehicle speeds and helping reduce pedestrian-vehicle crashes. Variations in streetscape features and road traffic volumes along street corridors may impact pedestrians' feelings of safety and their use of built pedestrian infrastructure. Street trees positively impact pedestrian safety. Generally, trees did not appear to pose an impact on pedestrian vision or sightlines, but streets with more mature trees could pose a lateral visual obstruction, or streets with newly planted trees could block sight lines until they have reached a certain maturity and height (Baker et al., 2018).

$2,400,000

Is the estimated cost for street trees throughout all systems

Figure 2.94. Street trees: Conversion magazine

Figure 2.95. Street Trees: Strong Towns

Figure 2.96. Street Trees: Governement Technology

Figure 2.97. Cycle path with street trees in Paris: Pinterest

$28,700

Is the estimated cost for pedestrian/bicycle detectors and push buttons on all systems

$7,200,000

Is the estimated cost for lighting on the buffered bicycle lanes system

$127,000

Is the estimated cost for crosswalks on all systems

ACTIVE TRANSPORTATION

SHARED ROADS

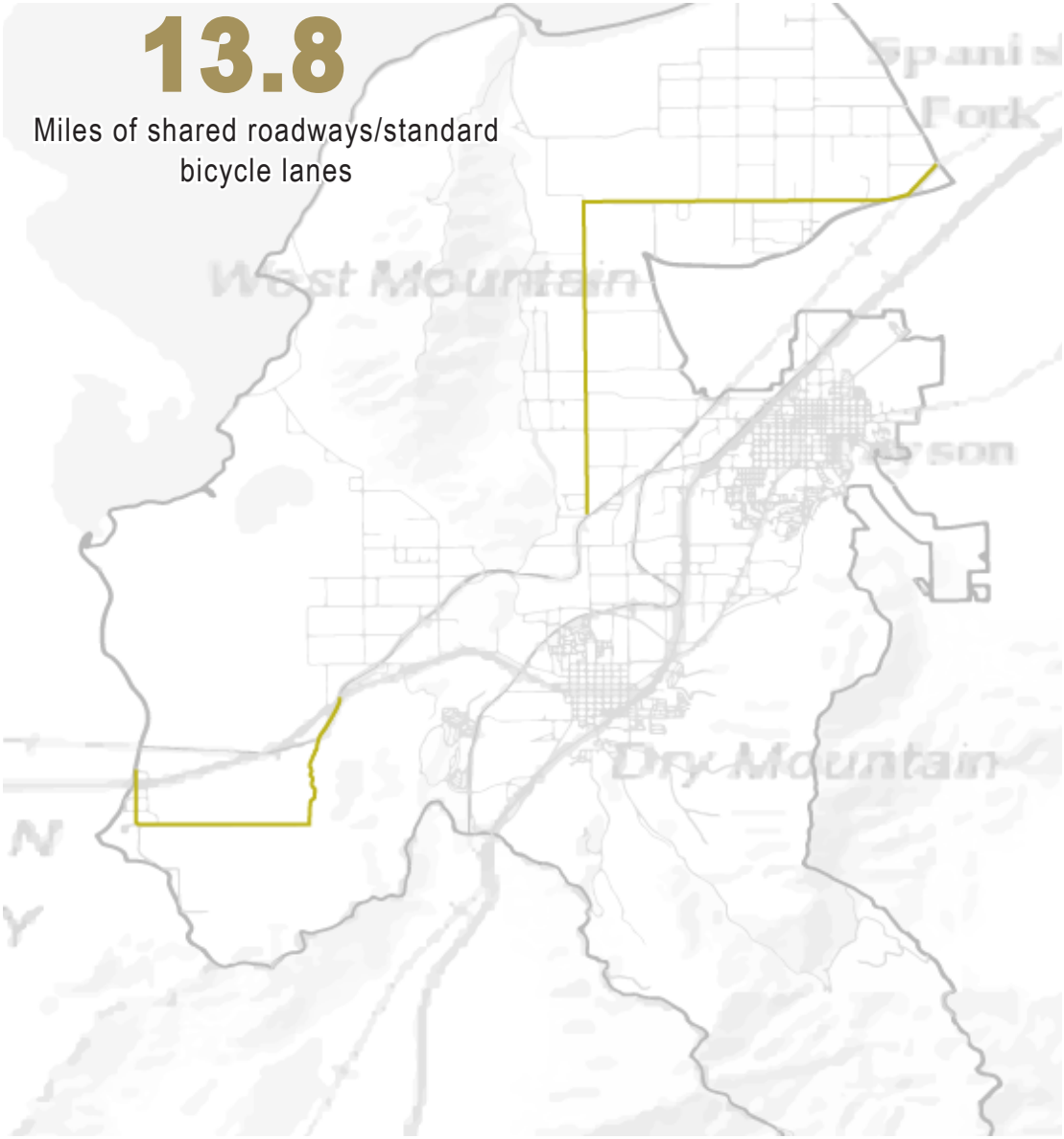


Figure 2.98. Shared roads/standard bike lanes

Standard bicycle lanes are an exclusive space for bicyclists through the use of pavement markings and signage. The bicycle lane is located adjacent to motor vehicle travel lanes and flows in the same direction as motor vehicle traffic (Urban Street Design Guide, 2015).

Many states, cities, counties, and towns have built many miles of streets and roads that are safe and comfortable only for travel one way, in a car.

These roadways often lack sidewalks, have lanes too narrow to share safely with bicyclists, and feature few, poorly marked, or dangerous pedestrian crossings.

Figure 2.99. Shared roadways

These shared roadways in more agricultural/ rural areas maintain the agriculture presence and history. There are no curb and gutter sidewalks, but a designated unpaved pathway for bicycles on one side. On the other side, an unpaved path separated by the irrigation canal should be used as a walking path. The irrigation canal that separates the pedestrians from the traffic creates a safe place while maintaining the agricultural presence.

ACTIVE TRANSPORTATION

SHARED ROADS IN RURAL AREAS

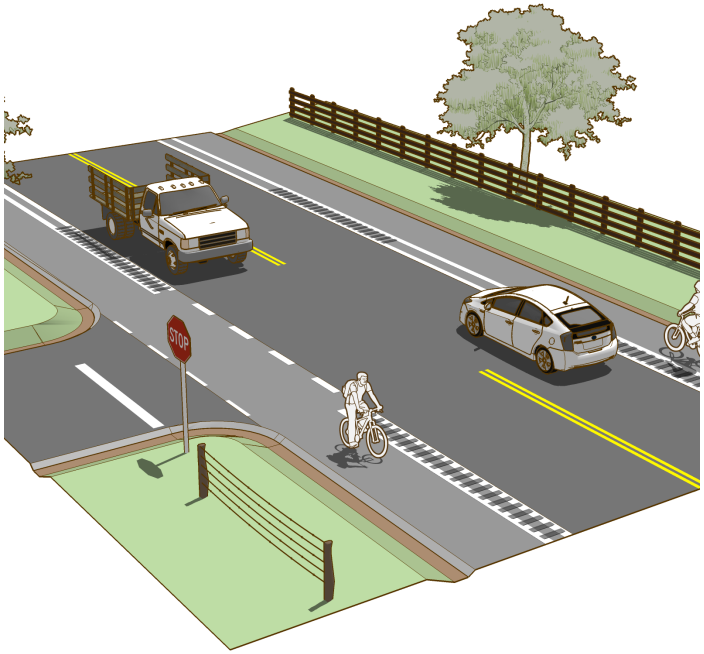


Figure 2.100. Bike lanes/active transportation in a rural setting: Rural Design Guide

Figure 2.101. Bike lanes/active transportation in a rural setting: Rural Design Guide

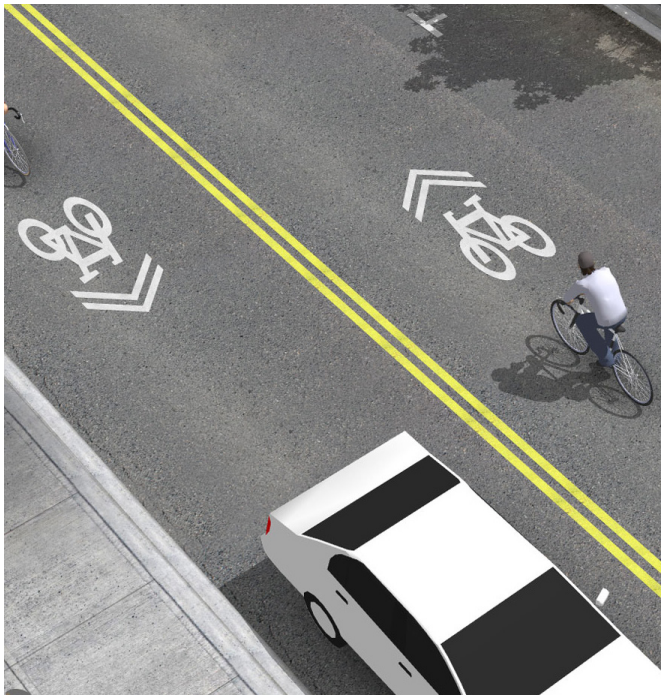


Figure 2.102 Sharrow: NACTO

A sharrow is a double-chevron road marking indicating a shared cycle/vehicle lane. It lets motorists know that this is an important cycle route, and there could be cyclists on the roadway. It encourages cyclists to use the lane when there is potential danger, but there is not enough room for a dedicated cycle lane.

Shared lane markings, “sharrows,” are road markings used to indicate a shared lane environment for bicycles and automobiles. They reinforce the legitimacy of bicycle traffic on the street, recommend proper bicyclist positioning, and may be configured to offer directional and way finding guidance (Urban Street Design Guide, 2015).

Figure 2.103. Sharrow: Streetsblog USA

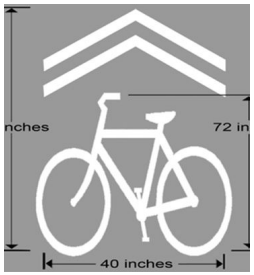


Figure 2.104. Sharrow: Bicycling.com

Figure 2.105. Sharrow: BikeSD

$271,200

Is the estimated cost for sharrows on all systems

ACTIVE TRANSPORTATION

WAY FINDING

Figure 2.106 Way finding signage as an entrance to a new city, county, or watershed

Welcome signs greet visitors to attractions, cities, towns and rural areas. Way finding is about creating pleasant visual cues that can be understood and followed well by all people. When it is done effectively, way finding systems can benefit a community in many ways (Koo, n.d.). The one on the left is an example of an entrance/ welcome sign with the top being a planter with a tree. It focuses on celebrating the agriculture heritage alive in the region.

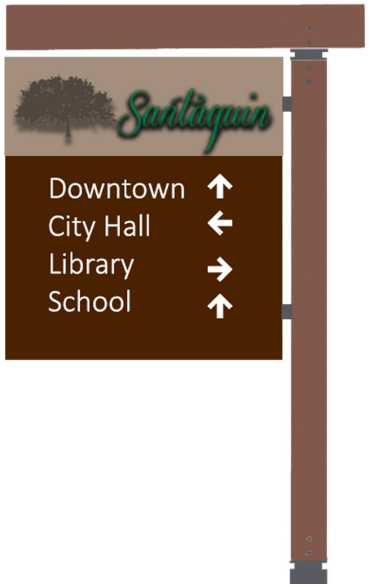


Figure 2.107. Way finding option for within town focusing on the orchard and agriculture heritage history

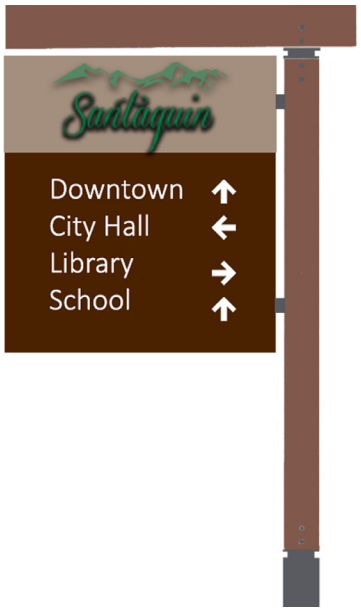


Figure 2.108 Way finding option for within town focusing on the mountains and recreational emphasis of the area

These way finding signs (above and left) are simple signs that can be installed throughout the region to inform people where specific sites are located. It is simple enough for people to be oriented and informed as they are moving through the region. Way finding is the ability to orient oneself based on repeated cues from the physical environment (Koo, n.d.). These signs use icons to the left of the city name as cues of the physical environment.

Figure 2.109. Smaller way finding signs to show destination point

This sign (above) is an even simpler and smaller (approximately four feet tall) sign designed mainly as a welcome to specific locations, such as trail heads, or public parking. A well-designed way finding system can convey information effectively and will have a positive impact on the people and the community. When environmental cues are effectively reinforced and restated, an individual's ability and skill to navigate and experience the community environment will be enhanced, creating better character in the region (Koo, n.d.).

$839,900

Is the estimated cost for way finding on all systems

These signs (below) were designed to be simple and to inform the people which "district" or their location within the region. One also uses an image specific to the area to help reinforce the idea of way finding based on the physical environment. A lack of way finding signs can present an uninviting atmosphere and lack of character for visitors and residents. Aging infrastructure can present disorganized and uncoordinated signs that detract from the environment, and can cause potential confusion for all people (Koo, n.d.).

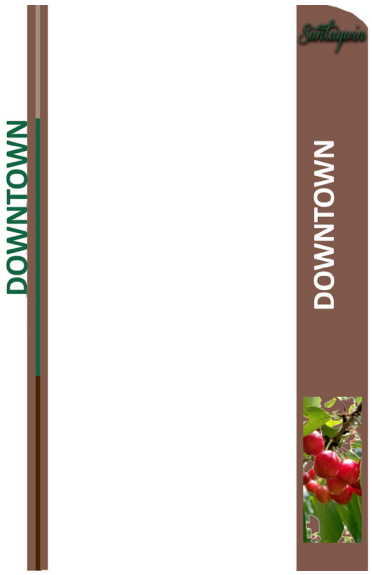


Figure 2.110. Way finding signs to show major districts such as downtown

ACTIVE TRANSPORTATION

PERCEPTIONS/CONCLUSION

Several studies focus on the perceptions of owners, agents and buyers of homes near trails. Among perceptions of value, most owners and agents believe that trails either increase or do not affect home values. A study of 90,000 recent home sales in 15 markets showed an increase of up to $30,000 for residences that have a high degree of walkability (Cortright, 2009).

In Denver, one survey of homeowners showed that urban trails are regarded as an amenity that attracts buyers and helps sell properties. For residents of single-family homes adjacent to a trail, 29% believed that the existence of the trail would increase the selling price of their home. For the real estate agents surveyed, 73% believed that a home adjacent to a trail would be easier to sell. 82% of the agents used the trail as a selling point and 100% believed trails are an amenity to the community around it (Alexander et al., 1995). "The effect on property values of a location near a park or open space has been the subject of several studies. Many studies have revealed increases in property values in instances where the property is located near or adjacent to open spaces. A 1978 study of property values in Boulder, Colorado noted that housing prices declined an average of $4.20 for each foot of distance from a greenbelt up to 3,200 feet. In one neighborhood, this figure was $10.20 for each foot of distance. The same study determined that, other variables being equal, the average value of property adjacent to the greenbelt would be 32% higher than those 3,200 feet away" (Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors: A Resource Book, 1995).

This active transportation system promotes healthy living and outdoor recreation. Trails and greenway systems provide people with a safe, inexpensive avenue for regular physical activity (Gobster, 2005). They also provide people with alternative options for transportation. People who travel along trails or on this system save money, increase mobility, and reduce their carbon footprint (Clarke, 1996). Active transportation systems like this one also have economic benefits. Users spend money locally, which boosts the local economy, (Cope et al., 1998) and systems like this increase private property values (Nicholls & Crompton, 2005). Active transportation and greenway systems protect important habitat from land development and provide corridors for people and wildlife; they do less damage on air and water quality than other forms of tourism (Moore & Ross, 1998). Finally, they create a sense of place and character (Clarke, 1996). They provide people with friendly places to meet and socialize with neighbors and, therefore, create neighborhood, community and regional pride (Moore & Ross, 1998).

REGIONAL RECREATION ACCESS

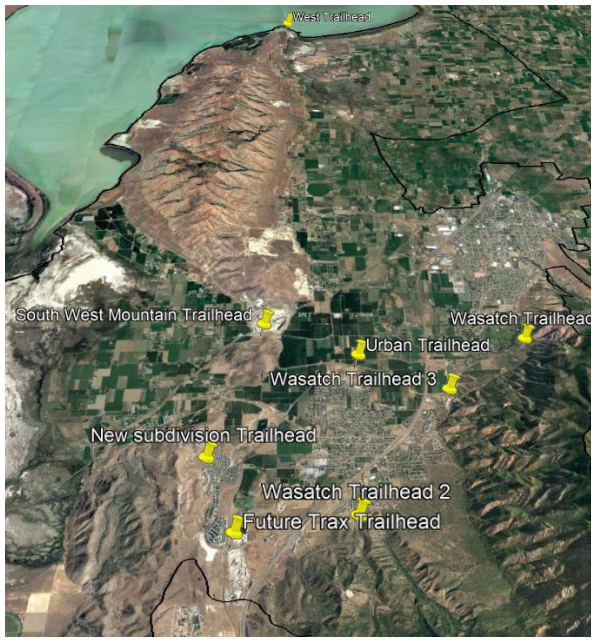


Figure 2.111 This map shows all the potential locations for trail-heads.

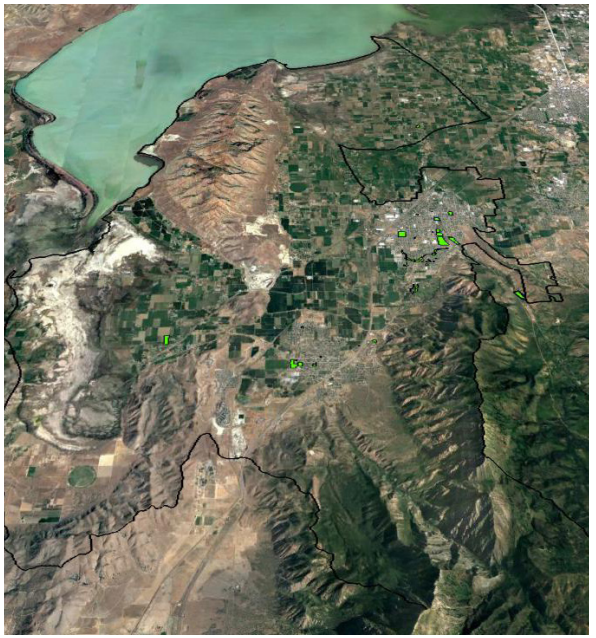


Figure 2.112 Features all the local parks in the region.

Regional Scale Recreation planning provides an opportunity to connect communities to the unique natural environment within and surrounding the study area. The study area has unparalleled proximity to Utah Lake to the west as well as the Wasatch Mountains to the east. Connecting these amenities through access and interrelated recreational assets will enhance not only the physical health and wellbeing of the residents of the region, but reinforce and make good on the promise of a lifestyle often marketed in developing rural areas.

Regional recreation planning should be sensitive to, and reinforce the environmental systems as a foundational framework. The figures above locate existing as well as potential regional trail heads and existing parks. These form a series of nodes that can be connected through active transportation planning.

REGIONAL RECREATION

RECREATION ACCESS

Being outdoors has many benefits like improving mental and physical health.

In the active transporation pages connections were made throughout the region. Connections to recreation opportunities require well planned and designed access points. Trail-heads could be placed to access the amenities. Different typologies were created for use in different areas. Also, different sizes of trail-heads can be used for the type of recreation that will happen in the area.

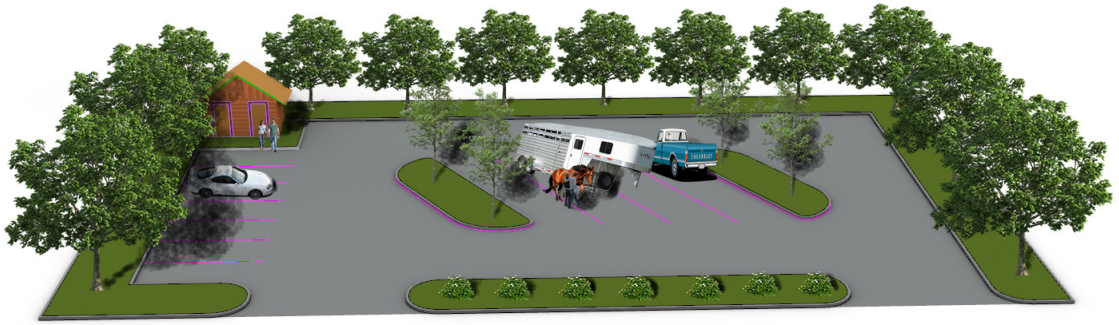


Figure 2.113. Urban Trail-head

Urban trail-heads or those near residential areas were designed with less parking due to users proximity to their own homes. The farther from urban areas the more parking the trail-head will require. This will also depend on the activities that go along with each trail-head. Being an agricultural area horse riding is a staple. The trail-heads will need to allow for people to be able to drive their trailers in and out without any trouble. Wider angled stalls help ease the process of parking the trailer and create a more manageable space to drive out also.

Figure 2.114 Showing the larger trail-head.

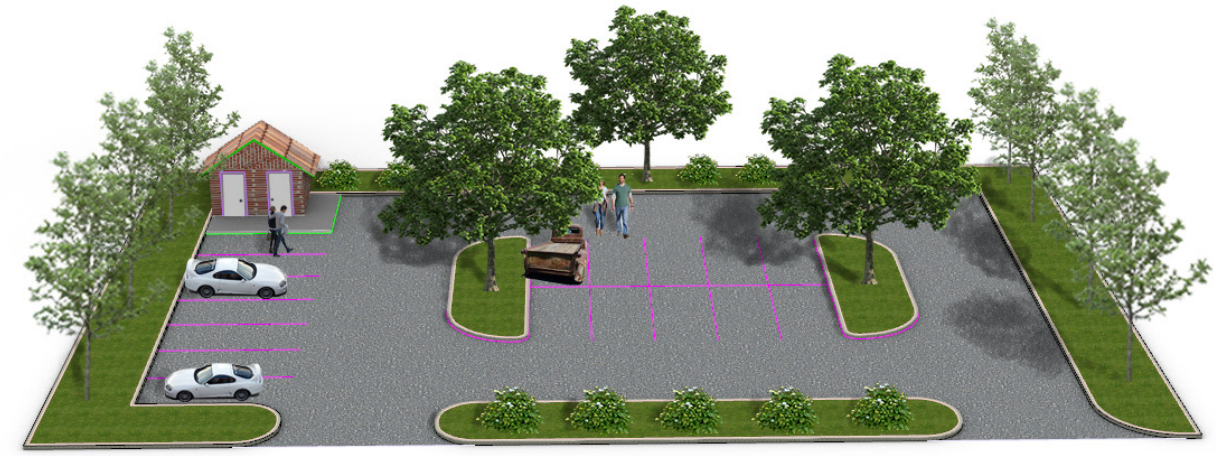


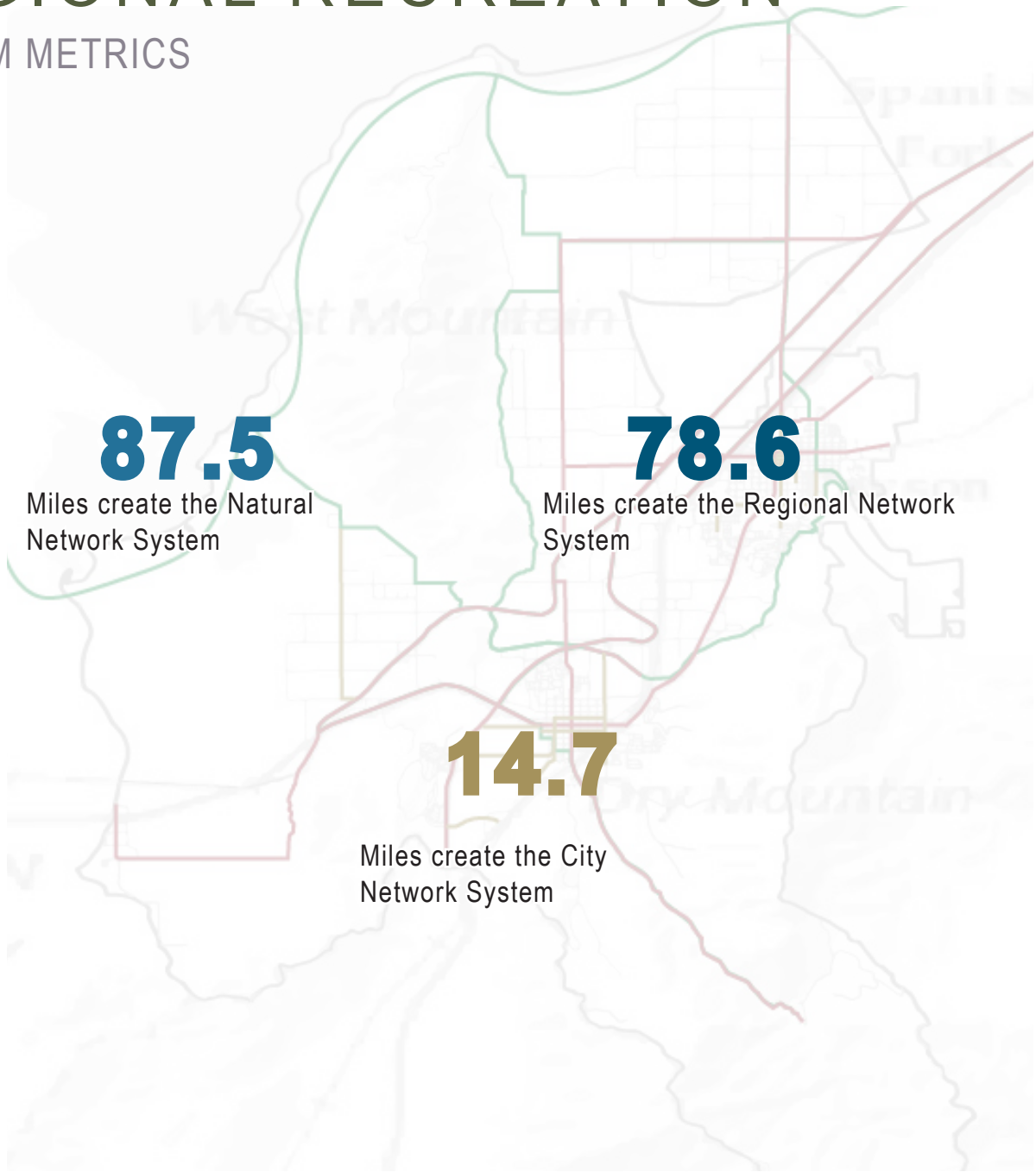
Figure 2.115 Urban Trail-head

West Mountain has the potential to be a future draw for mountain bike trails. There are already a couple trails on it but it is not being utilized to it's full potential. The north side of West Mountain gives access to the lake also. The lake can be used for many different recreational activities such as fishing, boating, and jet-skiing. This is a major asset for the region and has to potential to bring residence and visitors much joy.

Currently there is a lack of parks in the northern section of the region. This is understandable since the majority of the land is currently agricultural land. As the populations grow in this area, the opportunity for well planned accessable parks and green-ways grows with it. As development spreads across the region parks can and should be planned for in the beginning phases.

REGIONAL RECREATION

SYSTEM METRICS

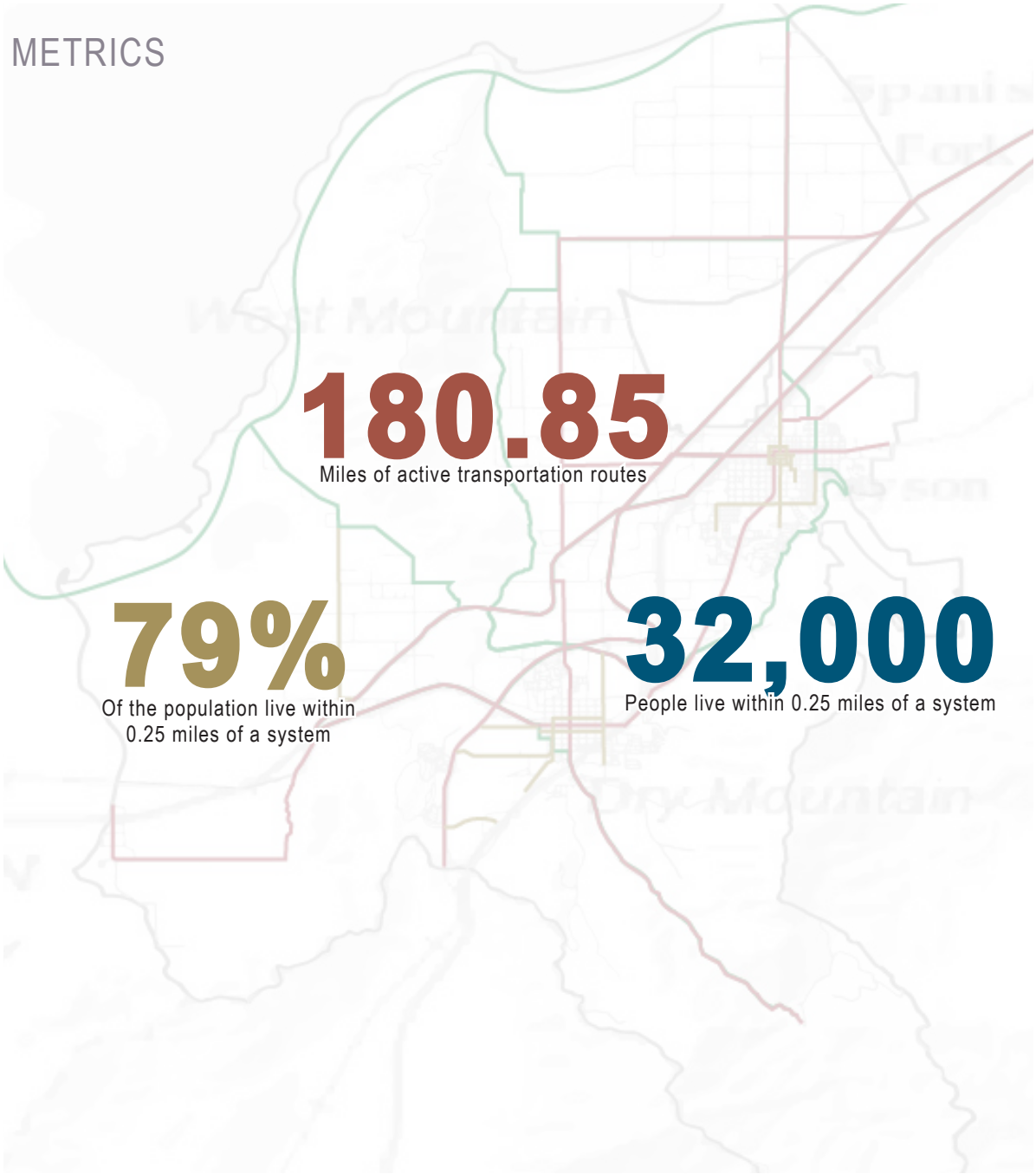


87.5
Miles create the Natural Network System

78.6
Miles create the Regional Network System

14.7
Miles create the City Network System

SYSTEM METRICS



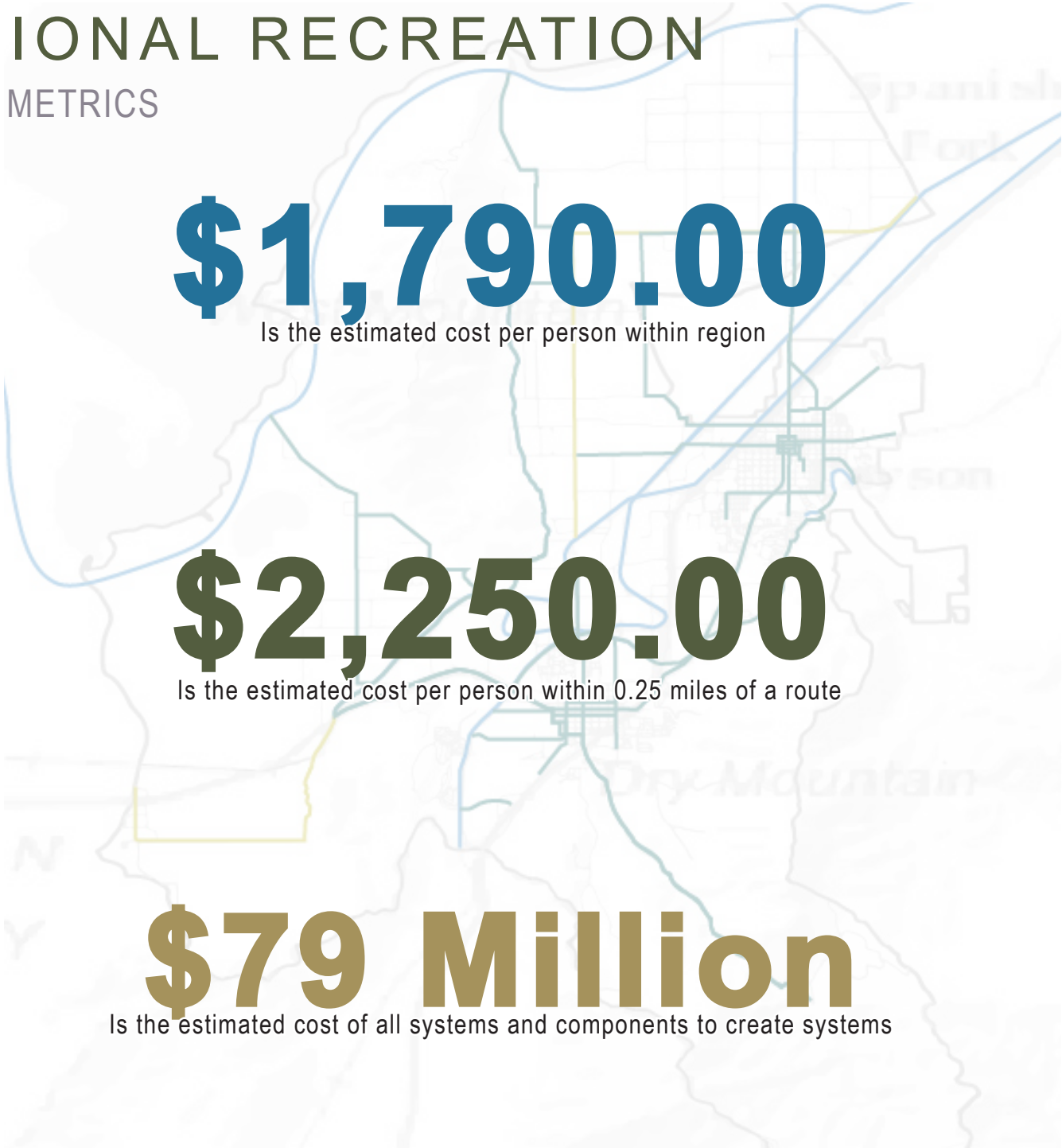
180.85
Miles of active transportation routes

79%
Of the population live within 0.25 miles of a system

32,000
People live within 0.25 miles of a system

REGIONAL RECREATION

SYSTEM METRICS



$1,790.00

Is the estimated cost per person within region

$2,250.00

Is the estimated cost per person within 0.25 miles of a route

$79 Million

Is the estimated cost of all systems and components to create systems

CONNECTIONS
OPPORTUNITIES

WILDLIFE CROSSING

UNDERPASS

As spoken about earlier in the document, critical mule deer habitat corridors exist at the southern edge of the study area. The habitat has been heavily segregated by I-15, other roads and housing developments.

At the southern most stretch of the area there is a wildlife underpass. The underpass tunnels underneath I-15 but it funnels the animals right onto the frontage road. This is a sub-optimal solution to the animal crossing problem. The animals miss the freeway just to encounter another road. In figure 2.116 the circle shows where the animals are funneled out to.

Figure 2.116 Wildlife underpass funneling onto the frontage road.

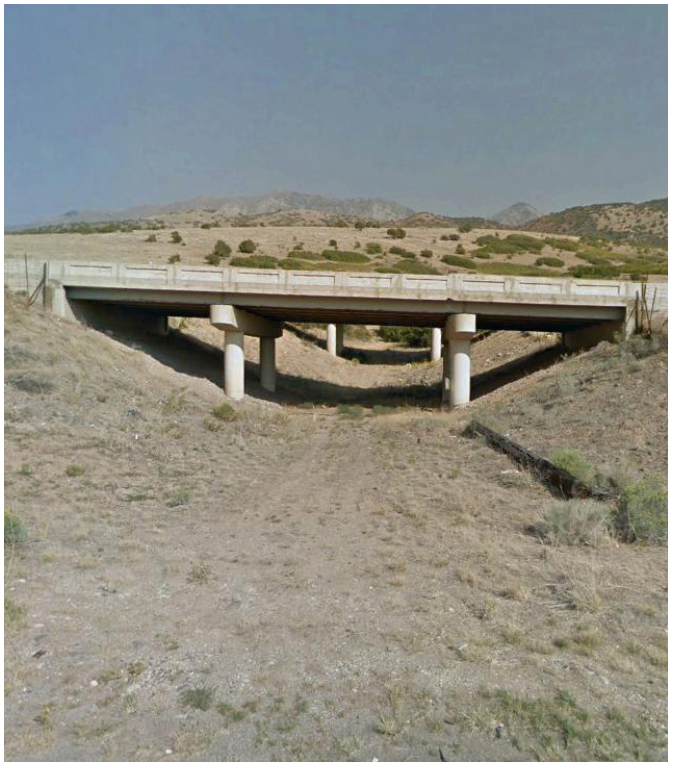


Figure 2.117 Wildlife underpass

I followed recommendations for the wildlife crossing from ARC and Contech. ARC—Animal Road Crossing—is an interdisciplinary partnership working to facilitate new thinking, new methods, new materials and new solutions for wildlife crossing structures.

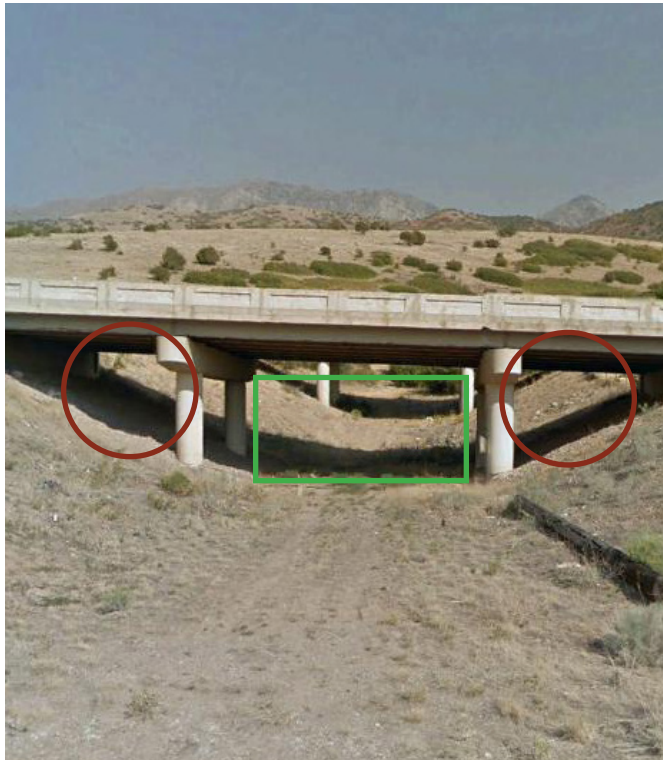


Figure 2.118 Wildlife underpass recommendations. Green box showing the area complying with recommendations. Red circles showing areas that need improvement.

Contech is an engineering firm that has focused on creating design considerations for wildlife crossings. They use many of the principles from ARC in their design considerations.

Underpasses can be easily implemented when a road is being built. They are similar to a vehicle underpass but with zero infrastructure. Animals could be deterred from them for a few different reasons. Underpasses can reach extremely high decibels due to traffic traveling passes. Some species are skeptical of new objects and environments. Wildlife can get use to these challenges over time.

There recommendations for easing wildlife into coping with the new changes.

1. Greater than 40 feet wide
2. At least 15 feet in height
3. Larger openings for longer underpasses

The current wildlife underpass meets the minimum requirements but not well. The flat walking area is not large enough. About 30' of the space follows the recommendations but then the sides slope up which creates a problem with the height of the underpass. See Figure 2.118

Enhancing the existing underpass and addressing the issue of the frontage road is important to make this critical wildlife corridor more functional.

WILDLIFE CROSSING

OVERPASS

ARC and Conteches also discuss wildlife overpasses. Overpasses work well for established roadways like the what is in the study area. Because our study area is land locked by housing developments, the spot chosen for the wildlife overpass is a quarter mile south of the border of the study area.

This area was chosen because there was natural elevation to help the construction process. A recommendation for the width of an overpass is 165 to 230 feet. The shown overpass is 200 ft across. Regulating noise is not as large of an issue for an overpass but regulating light is. At night the lights from cars is the biggest issue.

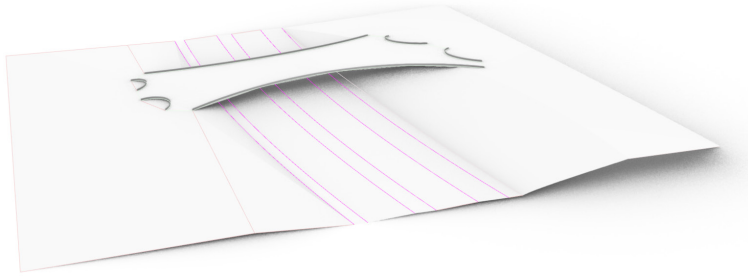


Figure 2.119 Wildlife Overpass Model

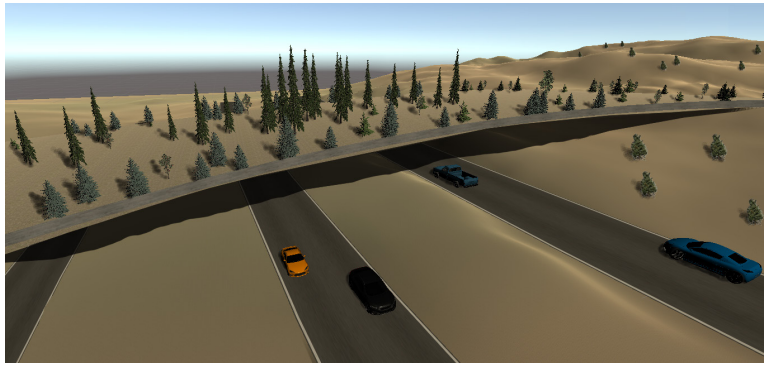


Figure 2.120 Wildlife Overpass

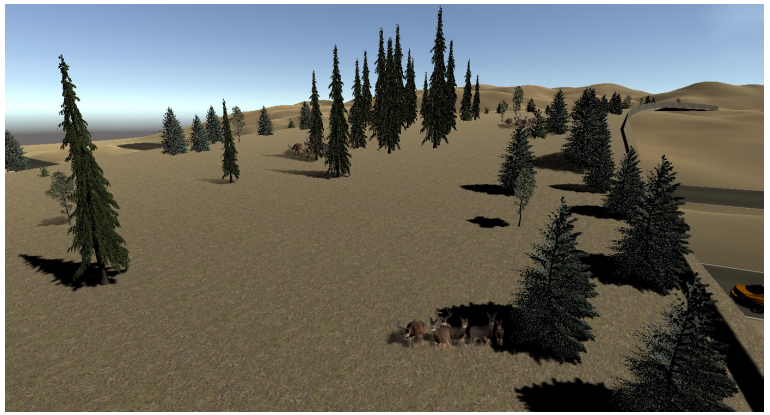


Figure 2.120 Wildlife Overpass looking over the bridge

This overpass would be able to reach over both directions of the freeway and the frontage road. This avoids the issues facing the current underpass. The wall on the side of the bridge will help block the light pollution from traffic.

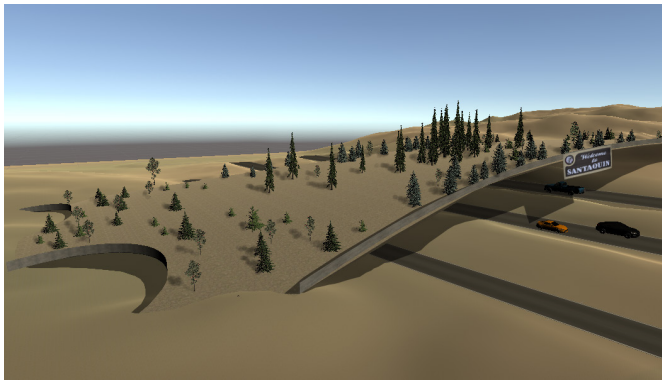


Figure 2.121 Showing the potential to show that this region is forward thinking and taking care of the natural system close by.

Figure 2.122 Shows the top view of the overpass.

Plants would be selected to filter the light pollution and to give the animals cover from predators. Native plants will be able to handle the harsh conditions and will give the bridge a great aesthetic value.

Building any wildlife crossing will be a waste if the lands to the north west are not protected. There are 150 acres to the north west that have not been developed yet. This land is crucial for the mule deer migration pattern.

Figure 2.123 Landownership in the migration cooridor

Figure 2.124 Indication of where the acreage that should be protected in-order to create the corridor for the deer to get to their spring habitat is located

Image Source: Santaquin City

IDENTITY

People connect to places with a strong, cohesive identity. Understanding the assets that help create a regional and localized identity is an important step in fostering an identity residents and visitors to the area connect with.

Identity is the “special sauce” that makes southern Utah County a special play to live, work, and play for both residents and visitors alike.

REGIONAL CHARACTER

HISTORY & CULTURE

About an hour south of Salt Lake City, the area of study is located within southern Utah County. With views of Utah Lake and Mount Timpanogos to the north, the area is home to approximately 36,525 residents. The southern town of Santaquin was originally called Summit City because of its proximity to the summit dividing the Utah and Juab valleys. It was settled while pioneers were also settling Payson, to the northern edge of the region.

The region's first known inhabitants were the Ute tribe. The leader of the Utes was Wakara, called Walker by the Mormon settlers. What was first recorded as a peaceful settlement, later erupted and the conflict became known as the Walker War. Settlers relocated north to Provo for a few years. The abundant water, fertile land, and stands of trees couldn't keep settlers away. After a treaty was made, settlers returned to the area.

Early farming was mostly wheat and pasture. This led to the opening or a flour mill. Abundant timber made opportunities for sawmills and a furniture shop. Mulberry trees were planted to start a silk industry.

In 1875, the Utah Southern Railroad completed a line to the area. Iron ore was discovered around the same time in the Tintic area. Several mines were discovered with various minerals such as copper, lead, silver, and zinc.

Around the time the Geneva Steel plant was constructed in Provo, many fruit farmers relocated to the south. Large orchards were planted in what were once pastures. Some of these orchards still exist (Salmon, 1994).

Figure 3.1: Fruit Blossoms in Sunset Source: Mcmullinorchards.com

TOURISM

Visitors are drawn to Utah's natural, cultural, and historical assets. Utah's travel and tourism industry generates jobs and income for residents and produces tax revenue for state and local governments. With 10 ski resorts in the greater Salt Lake area and the most National Parks and public land than any state, Utah's tourism industry generated 1.25 billion dollars in tax revenue in 2016. Throughout the year, Utah hosts several arts events and festivals. As well as athletic events, meetings, conventions, and trade shows. While traveling in and around Utah, travelers spend their money on a variety of goods and services (Leaver, 2018).

Figure 3.3 Fruit Orchards: Source: Mcmullinorchards.com

A community supported museum hosts a historic library, blacksmith shop, military room and an old-fashioned Main Street area, complete with a dress shop, saloon, police station and doctor's office. The museum is open daily during the Santaquin Days celebration in August.

Information of the historical mining ghost towns can be found on the Santaquin website. Names of mining towns like Silver City, Diamond City, Ironton, Mammoth and Eureka provide a glimpse into what was harvested from the hills. Today only Eureka survives as. A town, while the area use to be home to thousands (Santaquin City, 2020).

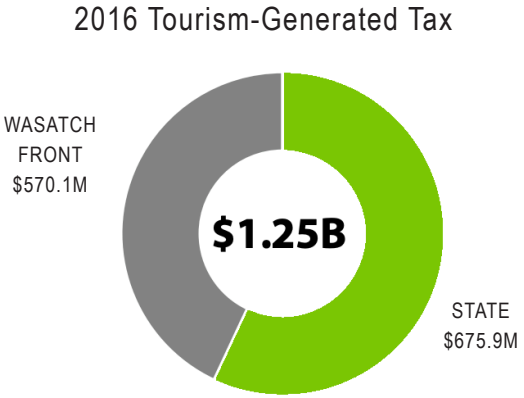


Figure 3.2: Total Tourism-Generated Tax Revenue from 2018 The State of Utah's Travel and Tourism Industry Report

REGIONAL CHARACTER

AGRITOURISM

Figure 3.4: Source: extension.usu.edu/marketing/photos

Farm owners are using innovative strategies to turn their businesses into experiences through modern and educational forms of tourism. The Santaquin website offers a promotional video titled “Santaquin: A Breath of Fresh Air”. Featuring the agricultural character and natural features of the region.

In an effort to promote agritourism, the site boasts, “You can experience the beauty of the area by simply driving down the country lanes, stopping at many of the local fruit and produce stands, taking a tour of the Mountainland Apples packing sheds or picking up some ice cream and chocolate covered cherries from the Red Barn”. Other agricultural activities and entertainment include the Nephi Ute Stampede and Rodeo, and Orchard Days at the end of July.

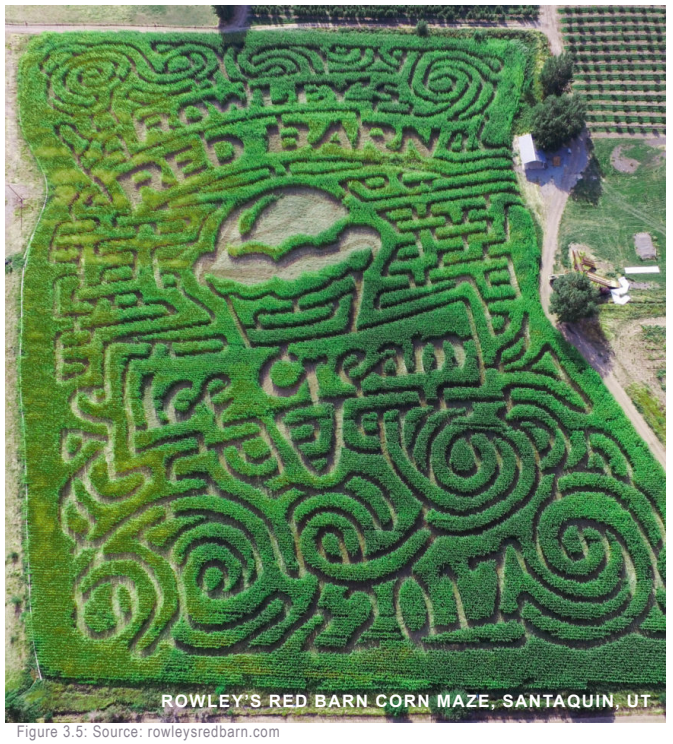


Figure 3.5: Source: rowleysredbarn.com

For many farmers, making a profit can depend on diversifying goods and farm operations to include services and products designed for visitors. Farm stands, u-pick operations, and farm stays are examples of this growing trend towards agritourism.

Agritourism combines agriculture with one of Utah’s largest industries — tourism. Agritourism works to expand existing businesses, create new festivals and farm markets, and ties this all together regionally to attract visitors.

RECREATIONAL OPPORTUNITIES

Figure 3.6: Source: Mcmullinorchards.com

Figure 3.7: Source: utahvalley.com

The area of study borders Utah Lake, providing access to water sports. The Payson Lakes Recreation Area is 12 miles south of Payson and has paved trails, picnic areas, camping and fishing. Nearby mountains and ski resorts host skiers, in the winter and mountain bikers and hikers in the summer.

The Nebo byway offers access to many recreational opportunities in the area. It crosses the Uinta National Forest between Nephi and Payson. Climbing over 9,000 feet, it provides views and backcountry access to the Utah valley, the Wasatch Mountains and Mount Nebo – which is the tallest mountain in the Wasatch Range at 11,928 feet. The byway is also the site of the Devil's Kitchen Geologic Interest Site, which includes picnic facilities, a paved trail, and views of a red rock amphitheater and spires, said to be reminiscent of Bryce Canyon.

Photography, "leaf peeping" and wildlife viewing are the main attractions for passive recreationalists. There are several campgrounds, trail systems and horseback riding areas as well. There are five golf courses within 30 minutes of the region.

The region is also a stop-over for visitors traveling to Utah's many National Parks. Located at an important turning point, travelers continuing south can access St. George and Zion National Park, while travelers turning east will reach Moab, Arches and Canyonlands.

REGIONAL CHARACTER

ORCHARDS: HISTORY

The fruit industry began as soon as early pioneers came to Utah in the late 1840s. Rapid expansion of commercial orchards (see figure 3.10) started in 1903 after a Utah Agricultural Experiment Station started in 1890 at Utah State University. They oversaw many different types of experimental orchards; the first was located on what is now known as “the quad” on USU’s campus. USU educated farmers on new techinques for better and more efficient production. By 1914, there was an overproduction in the industry that caused a general depression. By 1945, the industry stabilized. However, there was much less orchards and fruit production.

In Utah County, a large portion of the east benches in cities such as Alpine, Pleasant Grove, Orem, and Mapleton were made up of orchards. Starting around 1960, orchards started being bought up and developed. Many developers were willing to pay high prices for the land. Between 1960 and 1990 almost all of the orchard land in these areas was sold for development.

There were other factors that motivated specifically cherry farmers to sell their orchards for development. In the late 1960’s, mechanical shake harvesting of tart cherries was introduced. In order to justify the cost of a shaker and other necessary equipment, an orchard would need to have a large amount of acreage and be planted in long rows. This created conflict because most orchards were mostly small with small blocks of trees. Many cherry orchards were negatively impacted by a disease which naturally decreased acreage. Another reason orchards in general started to decline was due to irrigation and pest managment conflicts with neighbors.

Beginning in 1970s, the Strawberry Resiviour was expanded and water was able to be piped to southern Utah County. Land in Payson and Santaquin was reasonably cheap and farmers could by large amounts of land. The land had an excellent climate for fruit production so families that wanted to continue in the orchard business sold their land for a high price in north and central Utah County and began growing in southern Utah County. Orchard land continues to decrease. However, over 90% of total orchard acreage in Utah County is located within our site boundaries (See Figure 3.10).

Figure 3.8. Orchard

ORCHARDS: MICROCLIMATE

In order to produce the best fruit, fruit trees need to be located where they will thrive. There are several climate factors which make a location suitable for fruit trees to thrive:

- Full Sunlight
- Fertile Loam Soils (or soil that has good internal drainage)
- Gently Sloped Land (Less than 10%)
- Appropriate Amount of Land (Varies with type of fruit tree)
- Clean abundant water sources

Orchards are typically located along the east benches of Utah Valley on gentle slopes. They are placed on gentle slopes because cold air can move down and settle into the bottoms of valleys to create frost pockets. It is important to avoid intense cold and frost because frost can damage buds and flowers. If the buds and flowers are damaged, they will not produce fruit. Within the Santaquin area and our site boundaries, the valley is typically warmer than other parts of the valley within Utah County. The warmth provides a special micro-climate that can aid in the production of orchards.

Another factor that makes Santaquin and other parts of our site boundary unique are the soils. Santaquin is made up of loam soil

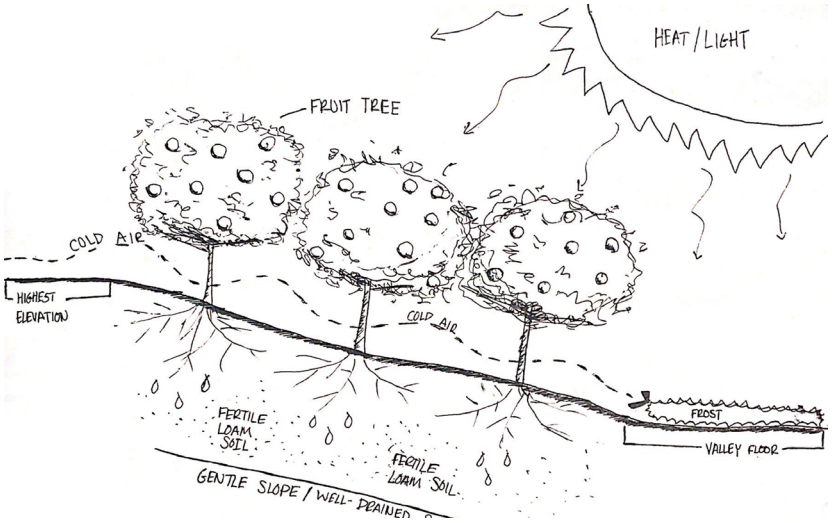


Figure 3.9. Fruit Tree Ideal Climate

that is rich in minerals because it is founded on an alluvial fan. Fruit trees can grow in any soil that has good internal water drainage. However, loam is the most preferred because it allows the trees to thrive. A healthier tree means more quality fruit.

Water delivered from Strawberry Reservoir provides high quality water to the region's fruit trees.

REGIONAL CHARACTER

ORCHARDS: A DISAPPEARING REGIONAL IDENTITY

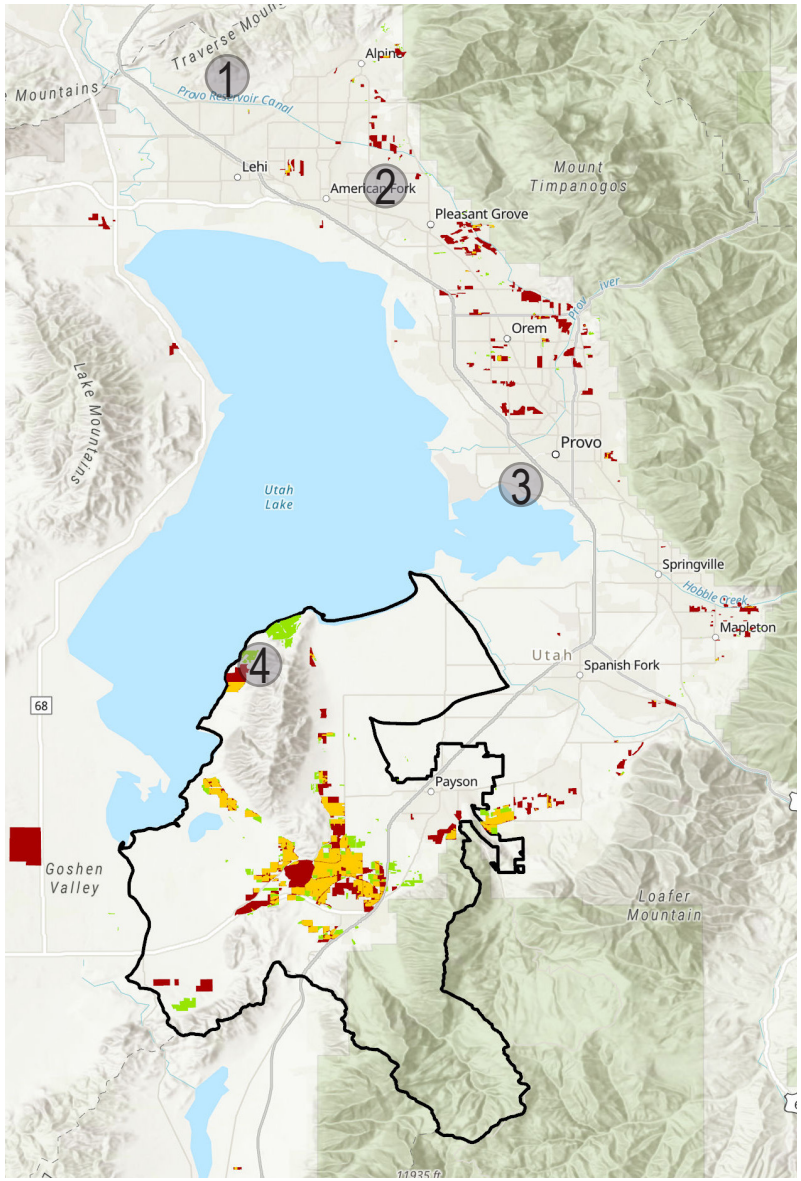


Figure 3.10. Orchard Land History 1988-2017

Orchards Lost Since 1988
Orchards Retains Since 1988
Orchards Aquired/Started Since 1988

Orchards Remaining Since 1988
Orchards Aquired/Started Since 1988

Orchards Developed Since 1988

UTAH COUNTY ORCHARD ACREAGE STATISTICS

Total Acreage in 1988 - 42,725

Total Acreage in 2017 - 37,011

*Total Acreage Lost Since 1988 - 5,714

Lost Acreage From 1988 - 9,620

Remaing Acreage From 1988 - 33,105

Developed Acreage Since 1988 - 3,906

*This was the difference between the lost acreage and newly developed acreage since 1988.

Figure 3.11. Alpine, Lehi, American Fork Orchards

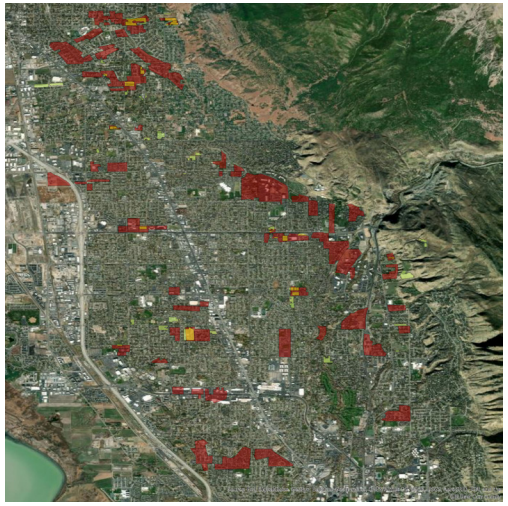


Figure 3.12: Pleasant Grove and Orem Orchards

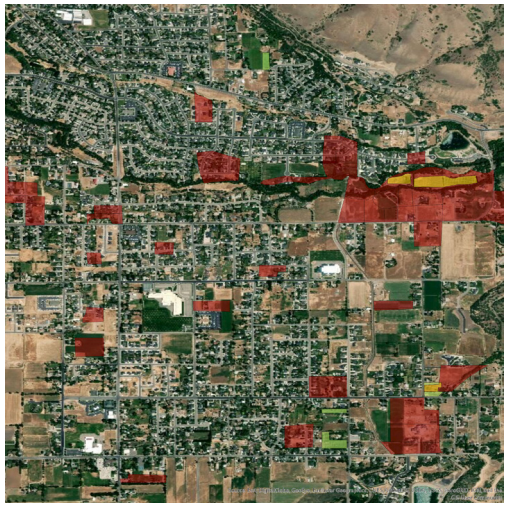


Figure 3.13. Mapleton Orchards

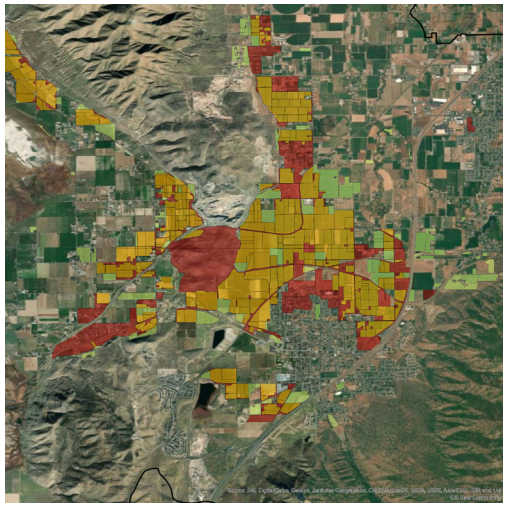


Figure 3.14. Santaquin Orchards

REGIONAL CHARACTER

ORCHARDS: A DISAPPEARING REGIONAL IDENTITY

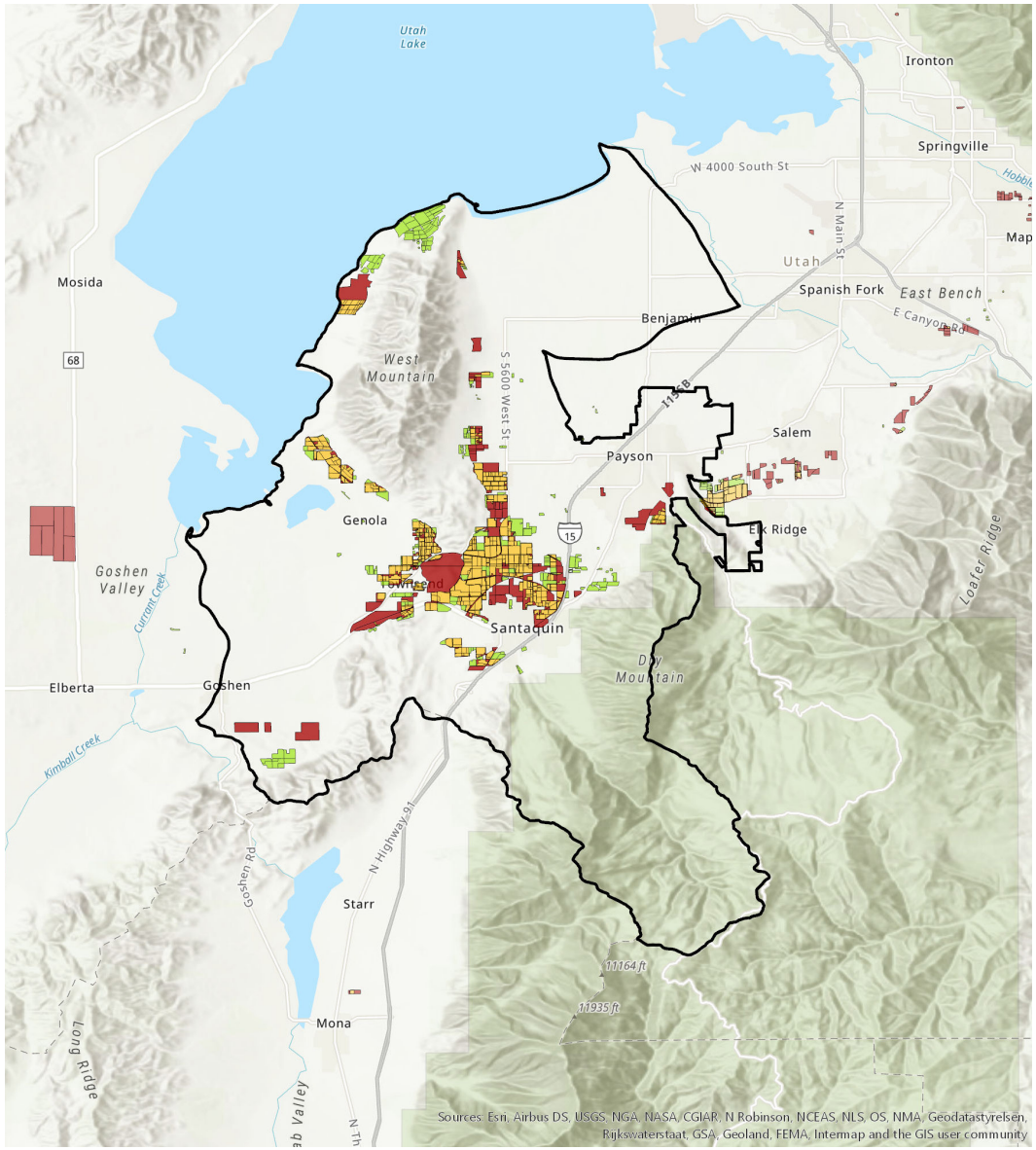


Figure 3.15. Orchard Land History 1988-2017

Orchards Lost Since 1988
Orchards Retains Since 1988
Orchards Aquired/Started Since 1988

Orchards Remaining Since 1988
Orchards Aquired/Started Since 1988

Orchards Developed Since 1988

ORCHARD ACREAGE STATISTICS WITHIN BOUNDARY

Total Acreage in 1988 - 35,558

Total Acreage in 2017 - 33,255

*Total Acreage Lost Since 1988 - 2,303

Lost Acreage From 1988 - 5,656

Remaing Acreage From 1988 - 33,105

Developed Acreage Since 1988 - 3,353

*This was the difference between the lost acreage and newly developed acreage since 1988.

As shown in figures 3.15, since 1988, Santaquin and other areas within our boundary have been the largest impact on fruit production within Utah County. And according to the U.S. Agricultural Census, the largest impact in Utah. This is important to understand because it illustrates that if orchard land within this boundary is developed, it is irreplaceable. This is the last place in Utah that has prime orchard land for commercial production. This is a historical and cultural treasure that should be protected.

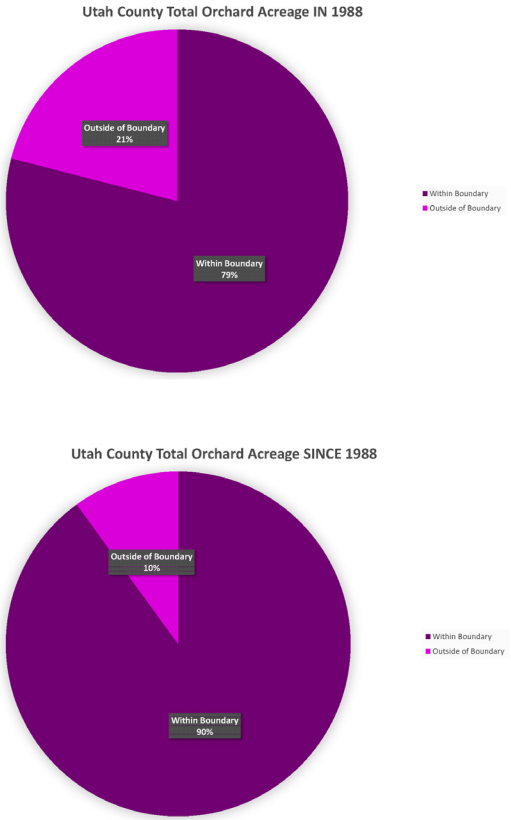


Figure 3.16. Orchard Land History Charts 1988-2017

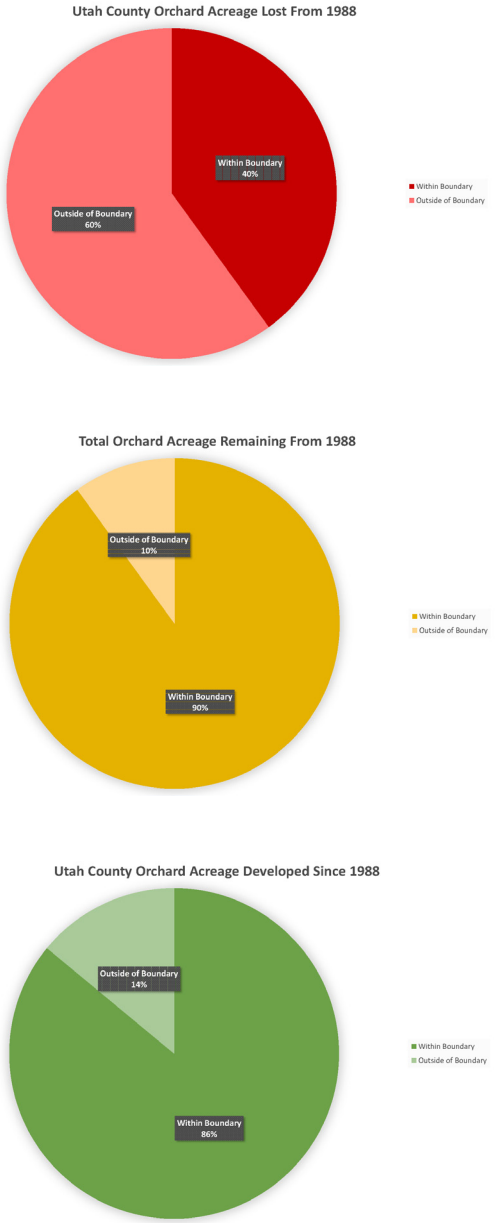


Figure 3.17. Orchard Land History Charts 1988-2017

REGIONAL CHARACTER

DESTINATION DEVELOPMENT

Figure 3.18: Source: youngliving.com

The region has many assets highlighted in this chapter. Its distinct cultural history, agricultural heritage and local food, and recreational opportunities create a strong regional character.

There is an all too common story of rural towns selling off agricultural land for new development and losing local businesses to corporate chains. Both of these phenomena contribute to the loss of identity and character of a place. In its efforts to grow, the region is at threat of losing what makes it unique. Through land preservation, systematic, concentrated land development and local business development, the area has the potential to capitalize on its character and become a destination.

The following pages provide case studies of regional rural communities across the US, that have harnessed their assets to become destinations.

HOW TO PROMOTE A RURAL COMMUNITY AS A DESTINATION

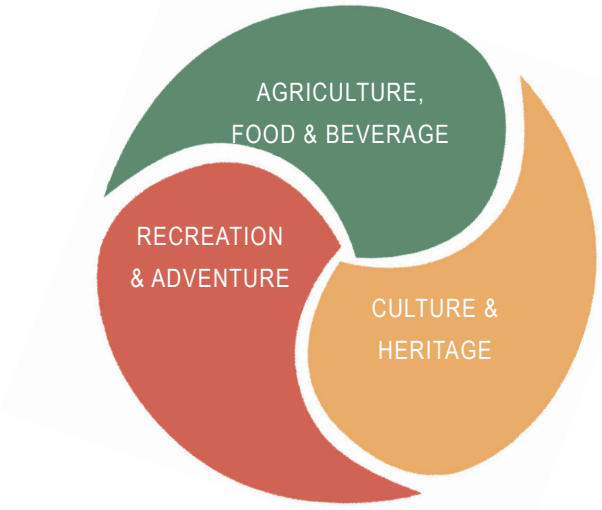
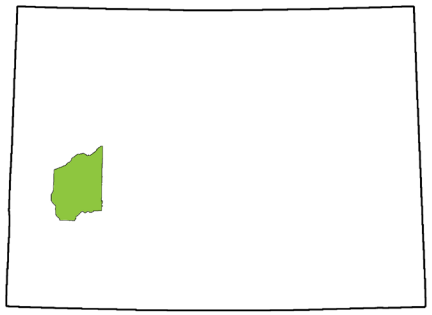


Figure 3.19: Adapted from: industry.colorado.com/destination-



WESTERN SLOPE, CO

While most of western Colorado can be hot and arid, the central Western Slope has pockets of micro-climates that are great for farms and orchards – which makes it home to some of the state's largest vineyards and cideries.

First known residents included the Ute Tribe. The area is on the old Spanish Trail and home to Fort Uncompahgre. After early fur traders, settlers came for mining, farming and to build the Denver and Rio Grande railroads. Due to early surveyors' courage and ingenuity, the area is now irrigated through a tunnel connecting the valley to the Gunnison River.

Near the Black Canyon of the Gunnison National Park and Crested Butte, recreationalists enjoy hiking, water sports, and skiing. Somewhat out of the way, visitors are often passing through from Denver to many of the public lands in the desert Southwest region.

Figure 3.20:Source: vogaco.org

REGIONAL CHARACTER

REGIONAL CHARACTER: CASE STUDIES

Figure 3.21 Source: appalachian.org/hogeye-bottomlands-88-acres/

SOUTHERN APPALACHIA, NC

The mountains of North Carolina are filled with a rich cultural history. Home to the Cherokee's advanced early civilization and today's Eastern Band. Early European and African settlers lived isolated, preserving traditions – such as crafts, music and agriculture. Coal mining, cotton and tobacco brought many to the area, and is also known for early civil war battles and operates quite a few historical sites.

Many of the farms in the area practice homesteading – raising food and animals for self-sufficiency. Seeds and crops are often of heirloom varieties, having been passed down for generations. Farming techniques and practices are often passed down as well, making this region rich in agricultural history.

Today these traditions are celebrated and employ many artists and makers, drawing tourists to the region for festivals, museums, and local food.

Located near the Smokey Mountain National Park along the Blue Ridge mountains and Appalachian trail, recreationalists are drawn to the hills for sightseeing, hiking, mountain biking and fishing.

NIAGARA PENINSULA,

The Niagara Peninsula is situated between Lake Erie and Lake Ontario, near Buffalo, NY and Toronto, ON. When early French settlers arrived to the area, they were welcomed by the tribe then known as the “Atiquandaronk”. Niagara later became home to refugees of the revolutionary war and liberated slaves of the Underground Railroad.

Settlers farmed the rich soil, with a slope and climate that provided the perfect combination for orchards and later vineyards. The area is along what is known as the fruit belt.

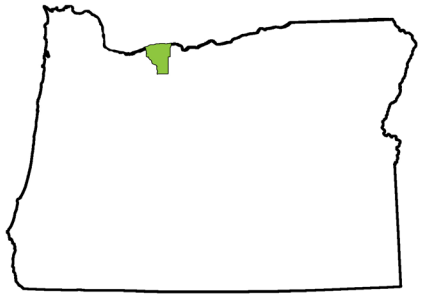
The Escarpment is a UNESCO World Biosphere Reserve and has the oldest forest ecosystem and trees in eastern North America. The edge of the Escarpment sits atop Niagara Falls, which draws many annual tourists.

Recreationalists engage in water sports along the lakes as well as hiking, biking and skiing in the nearby Adirondack mountains.

Figure 3.22. Source: niagarafallstourism.com/play/wineries-breweries/

REGIONAL CHARACTER

REGIONAL CHARACTER: CASE STUDIES



HOOD RIVER VALLEY, OR

Located along the Columbia River Gorge, the Hood River Valley attracts visitors from nearby Portland, Oregon. Panoramic views, lush landscape and remarkable geography make this destination a sight to see.

This area was once the largest trading post in the nation for native tribes and home to the Wascoes. With its rivers rich with salmon, steel head and beaver, early European settlers were often fur trappers and fishermen. Hood River is along the route of the famous Lewis and Clark expedition. Hydroelectric dams have submerged the nearby falls and now supply much of the area with electricity.

The Hood River Valley produces much of Oregon's fruit, attracting wine and cider connoisseurs. The temperate valley also hosts many family operated vegetable farms.

Recreationalists are attracted to Hood River as a destination for wind sports, skiing, mountain biking, and kayaking. It is also located near the Pacific Crest Trail and sees many through-hikers and travelers continuing on to Mt. Hood.

Figure 3.23. Source: hoodriverfruitloop.com

SIERRA FOOTHILLS, CA

The Sierra Foothills are filled with quintessential gold rush towns. Many of these small towns are still thriving due to gas and hydroelectric power as well as a resurgence of back-to-the-land hippies and farmers who relocated to the area in the late seventies. The area draws visitors from all over, including the more populated neighboring California cities.

Recreationalists are drawn to Sierra Mountains, which host the nearby El Dorado and Tahoe National Forests. Not far from Lake Tahoe, Yosemite National Park and the Pacific Crest Trail, the area draws people for hiking, skiing, climbing, fishing and boating. The American River runs through the site, and is the second most rafted river in the US.

Its temperate climate and mineral-rich soils make this region known for its farms and vineyards. There are many family farms and local food initiatives.

Figure 3.24. Source: boavista.com

REGIONAL CHARACTER

ASSETS & OPPORTUNITIES

Figure 3.25: Source: extension.usu.edu/marketing/photos

Like the communities showcased in this document, the area of study offers a wealth of assets and a scenic backdrop for short-term and long-term residents.

With its smaller population size, close proximity to a large city and airport, and accessibility to recreational opportunities, southern Utah County is poised to become a destination town.

An undeveloped area for opportunity is highlighted in the chart, which includes fruit production for alcoholic beverages. While the state of Utah has strict laws for alcohol production and consumption, it has the potential to draw many visitors and revenue. It is one distinguishing area that separates the region from the ares in the case studies.

CASE STUDY COMPARISON

	Western Slope	Niagara Peninsula	Southern Appalachia	Sierra Foothills	Hood River Valley	Southern Utah County
REGIONAL POPULATION						
Small: Up to 100,000	■				■	■
Medium: 100,001 – 500,000 people		■				
Large: 500,001 – 850,000			■	■		
PROXIMITY TO LARGE CITY						
Close: 1-hour drive		■		■	■	■
Medium: 2 to 4-hour drive			■			
Far: More than 4-hour drive	■					
ACCESSIBILITY TO RECREATION						
High: Many options within 15 minutes			■	■	■	
Medium: Many options within 45 minutes	■	■				■
Low: Few options within 45 minutes						
FARM PRODUCTS						
Bakery & baked goods	■	■	■	■	■	■
Brewery & beer making	■		■	■	■	
Dairy	■	■	■	■	■	■
Grain	■		■	■	■	■
Maple		■	■			
Orchards	■	■	■	■	■	■
Cideries	■	■	■	■	■	
Pasture raised meats	■	■	■	■	■	■
Animals for fibers	■	■	■	■	■	■
Fishing & hunting	■	■	■	■	■	■
Vegetables and fruits	■	■	■	■	■	■
Winery and vineyard	■	■	■	■	■	
Beekeeping	■	■	■	■	■	■
Flowers and nursery	■	■	■	■	■	■
CUTURAL EVENTS						
Festivals & fairs	■	■	■	■	■	■
Field trips & day camps	■	■	■	■	■	■
Horseback riding	■	■	■	■	■	■
Hayrides & tractor rides	■	■	■	■	■	■
Mazes	■	■	■	■	■	■
Museum	■	■	■	■	■	■
Private parties & weddings	■	■	■	■	■	■
Workshops & lifestyle retreats	■	■	■	■	■	■

Figure 3.26. Case Study data collected from: calagtour.org,agritourismworld.com,vogaco.org, niagarafallsinfo.com, wncvitalityindex.org, hoodriverfruitloop.com, visitpalisade.com, www.ncdcr.gov

RECOMMENDATIONS

The following recommendations were selected and compiled from various agritourism business development resources. For more information, see resources at the end of this chapter. .

CREATE A THEME

A theme is the concept or idea that unifies the resources and attractions of a region. Themes create a clear sense of what is important about a community and unifies marketing and promotional materials.

Some questions that should be considered when developing a theme are:

1. What concept unifies the attractions and resources listed on the inventory of the region (e.g., the diversity of crops grown, the history behind local farms)?

2. Are there any important factors that influence the agricultural resources and attractions of the region or have influenced them in the past (e.g., cultures, climate, geology)?

Combining the answers to these questions into a single sentence will help to provide a tagline, logo and continuity. A logo and tagline will support in branding the theme and can be used on directional signs for visitors as well as publications. Here are a couple examples of marketing materials for tours from the Olympic Peninsula in Washington and Baltimore, Maryland.

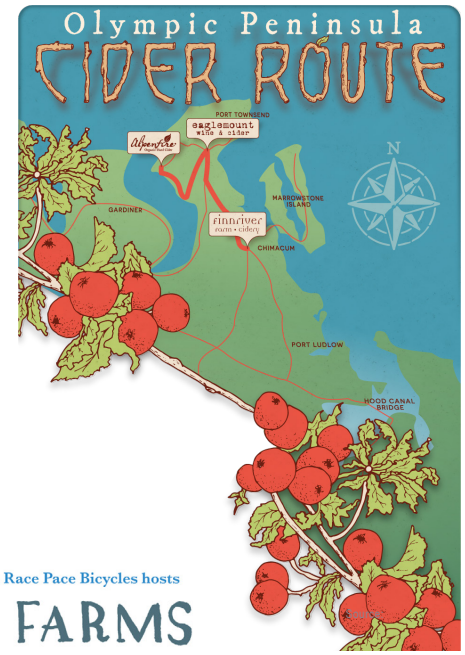


Figure 3.27. Source: artifactcoffee.com

REGIONAL CHARACTER

RECOMMENDATIONS (CONT.)

FORM A STEERING COMMITTEE
Select a diverse group of 5-10 people with various knowledge and expertise in agriculture, tourism and marketing.

CREATE AN INVENTORY OF REGIONAL FARMS AND AMENITIES
Identify case studies of other regional Agritourism programs

DEVELOP GOALS, OBJECTIVES AND AN ACTION PLAN
Listing out measurable goals and achievable objectives will support with task management and proposals.

CREATE STRATEGIES AND RESOURCES FOR INDIVIDUAL FARMS AND BUSINESSES
Marketing Plan
Subsidies/Incentives
Group Insurance
Local & State Policies
Food Hub/Distribution

Figure 3.28. Source: rowleysredbarn.com

CONCLUSION

These recommendations serve as suggestions for developing a robust regional brand to make the area become a destination. Forming a committee of various stakeholders ensures community voices are heard and are a part of the planning process.

An inventory of farms generates data that can be visualized through maps and promotional materials, and provides a resource for new businesses to identify opportunities and gaps. Setting goals and an action plan supports the visionary direction and longevity of regional planning into the future. Resources for indivduals makes for a stronger community as a whole.

Together, these recommendations can support Southern Utah County in achieving a regional identity that may attract visitors not only in the short-term, but may also keep them staying.

Figure 3.29. Source: Mcmullinorchards.com

Figure 3.30. Source: extension.usu.edu/marketing/photos

ADDITIONAL RESOURCES

https://agritourismworld.com/

http://www.utahagriculture.org/

http://www.calagtour.org/region_search/sierra_foothills/

http://hoodriverfruitloop.com/

https://industry.colorado.com/destination-development-program

https://www.colorado.gov/pacific/agmarkets/agritourism-resources

https://vogaco.org/

https://appalachian.org/

https://asapconnections.org/about-us/

http://senecacountycce.org/resources/considerations-for-agri-tourism-development

REFERENCES

Alexander, L. T., Conservation Fund (Colo.), & Colorado. (1995). The effect of greenways on property values and public safety: A joint study. Division of Parks and Outdoor Recreation? https://catalog.hathitrust.org/Record/010831866

Amosson, S., Almas, L., Girase, J., Kenny, N., Guerrero, B., Vimlesh, K., & Marek, T. (2011). Economics of Irrigation Systems. Texas A&M AgriLife Extension Service, B-6113.

Baker, C. D., Polito, K. E., & Pollack, S. (2018). The Role of Street Trees for Pedestrian Safety.

Basso, K. H. (1996). Wisdom Sits in Places: Landscape and Language Among the Western Apache. UNM Press.

Bond, J. (2020, February 5). Confrence Call with Jason Bond [Personal communication].

Bushell, M., Poole, B., Zegeer, C., & Rodriguez, D. (2013). Costs for Pedestrian and Bicyclist Infrastructure Improvements: A Resource for Researchers, Engineers, Planners, and the General Public (p. 46). http://www.pedbikeinfo.org/cms/downloads/Countermeasure%20Costs_Report_Nov2013.pdf

City of Denver Standards for Street Light Spacing. (n.d.). https://www.codot.gov/content/projects/US6BridgesFinalRFP/Book%203%20Applicable%20Stnds,%20Data,%20Rpts/CCD%20Standards/Street%20Lighting%20Specs.pdf

Clarke, A. (1996). Beyond recreation: Trails for transportation and livable communities. Trends, 33(2).

Cope, M., Doxford, D., & Hill, T. (1998). Monitoring Tourism on the UK's First Long-Distance Cycle Route. Journal of Sustainable Tourism, 6(3).

Cortright, J. (2009). Walking the Walk: How Walkability Raises Home Values in U.S. Cities. (August 2009).

Division of Water Quality 2017 State of the Environment Report. (2017). Utah Department of Environmental Quality. https://deq.utah.gov/communication/state-of-the-environment-report/division-water-quality2017-state-environment-report

Doorga, J. R. S., Rughooputh, S. D. D. V., & Boojhawon, R. (2019). Multi-criteria GIS-based modelling technique for identifying potential solar farm sites: A case study in Mauritius. Renewable Energy, 133, 1201–1219. https://doi.org/10.1016/j.renene.2018.08.105

Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors: A Resource Book (4th ed.). (1995).

Egan, J. (1991). Breaking through the myth of public safety. Landscape Architectural Review. https://ci.nii.ac.jp/naid/10021022791/

Federal Highway Administration, U. D. of T. (2006). Evaluation of Safety, Design, and Operation of Shared-use Paths: Final Report.

Fire & EMS Department—Santaquin City, Utah. (n.d.). Retrieved April 24, 2020, from https://www.santaquin.org/cms/one.aspx?pageId=6485560

Giles-Corti, B., Foster, S., Shilton, T., & Falconer, R. (2010). The co-benefits for health of investing in active transportation. New South Wales Public Health Bulletin, 21(6), 122–127. https://doi.org/10.1071/NB10027

Gobster, P. H. (2005). Recreation and Leisure Research from an Active Living Perspective: Taking a Second Look at Urban Trail Use Data. Leisure Sciences, 27(5), 367–383. https://doi.org/10.1080/01490400500225674

Hill Jr, N. (1999). Words of Power: Voices from Indian America. Fulcrum Publishing.

Hough, M. (1983). City form and natural process. Croom Helm, London.

Hrozencik, A. (2019, September). USDA ERS - Irrigation & Water Use. https://www.ers.usda.gov/topics/farm-practices-management/irrigation-water-use/

J-U-B Engineers INC. (2013). SANTAQUIN CITY CULINARY WATER SYSTEM MASTER PLAN and CAPITAL FACILITIES PLAN.

Koo, J. (n.d.). Effective Navigation through Your Community: Wayfinding and Signage Systems for Communities. 3.

Luymes, D. T., & Tamminga, K. (1995). Integrating public safety and use into planning urban greenways. Landscape and Urban Planning, 33(1–3), 391–400. https://doi.org/10.1016/0169-2046(94)02030-J

Mierzwiak, M., & Calka, B. (2017). Multi-Criteria Analysis for Solar Farm Location Suitability. Reports on Geodesy and Geoinformatics, 104. https://doi.org/10.1515/rgg-2017-0012

Moore, R. L., & Ross, D. T. (1998). Trails and recreational greenways: Corridors of benefits. Parks & Recreation (Ashburn), 33(1), 68–79.

Mountainland Association of Governements. (n.d.). TransPlan40: Regional Transportation Plan.

Mountainland Association of Governments. (2016). South Utah County Active Transportation Plan. https://mountainland.org/img/transportation/Trails/South%20Utah%20County%20Trail%20Plan.pdf

Mundet, L., & Coenders, G. (2010). Greenways: A sustainable leisure experience concept for both communities and tourists. Journal of Sustainable Tourism, 18(5), 657–674. https://doi.org/10.1080/09669581003668524

REFERENCES

Nebo School District Enrollment Capacity by School/Program. (2017). http://www.nebo.edu/sites/nebo.edu/files/Capacity%20Report%202017-11-09.pdf

Neibling, H. (1997). Irrigation Systems for Idaho Agriculture. 8. Nicholls, S., & Crompton, J. L. (2005). The Impact of Greenways on Property Values: Evidence from Austin, Texas. Journal of Leisure Research, 37(3), 321–341. https://doi.org/10.1080/00222216.2005.11950056

Perlich, P., Hollingshaus, M., Harris, E., Tennett, J., & Hogue, M. (2017). Utah's Long-Term Demographic and Economic Projections Summary. The University of Utah Policy Insitiute.

Reynolds, K. D., Wolch, J., Byrne, J., Chou, C.-P., Feng, G., Weaver, S., & Jerrett, M. (2007). Trail characteristics as correlates of urban trail use. American Journal of Health Promotion: AJHP, 21(4 Suppl), 335–345. https://doi.org/10.4278/0890-1171-21.4s.335

Rose, E., & Choe, J. (2015). Methodology for assessing the benefits of activebtransportation projects: Executive Summary.

Rural Communities: A Two Pronged Approach for Improving Walking and Bicycling. (n.d.). Safe Routes to School National Partnership.

Santaquin City, J.-U.-B. E. INC. (2017). SANTAQUIN CITY 2016 SANITARY SEWER SYSTEM MASTER PLAN and CAPITAL FACILITIES PLAN. https://www.santaquin.org/UserFiles/Servers/Server_5893718/File/Department%20&%20Services/Community%20Development/Development%20Services/Sanitary%20Sewer%20Master%20Plan%202016.pdf

Santaquin Water Reclamation Facility. (n.d.). Flatiron. Retrieved April 24, 2020, from https://www.flatironcorp.com/project/santaquin-water-reclamation-facility/

Schedules and Maps. (n.d.). Retrieved April 24, 2020, from https://www.rideuta.com/rider-tools/schedules-and-maps

Schrader, J. G. (1963). School Site Selection. American Planning Association, 175. https://www.planning.org/pas/reports/report175.htm

Urban Street Design Guide. (2015, April 8). National Association of City Transportation Officials. https://nacto.org/publication/urban-street-design-guide/

Utah County General Plan. (2014). 30.

Water. (2015, December 21). United Nations. https://www.un.org/en/sections/issues-depth/water/

Waterfront (Canada),(1992). Regeneration: Toronto's waterfront and the sustainable city: final report : https://www.torontopubliclibrary.ca/detail.jsp?Entt=RDM322633&R=322633

Weigand, L., McNeil, N., & Dill, J. (2013). Cost Analysis of Bicycle Facilities: Cases from cities in the Portland, OR region. https://activelivingresearch.org/sites/activelivingresearch.org/files/Dill_Bicycle_Facility_Cost_June2013.pdf

Utah State University
LANDSCAPE ARCHITECTURE &
ENVIRONMENTAL PLANNING

EXTENSION
Utah State University