Bellevue Land Use Analysis

Produced Using Geographic Information Systems

By Katie Becker

December 12th, 2013

Table of Contents

Introduction

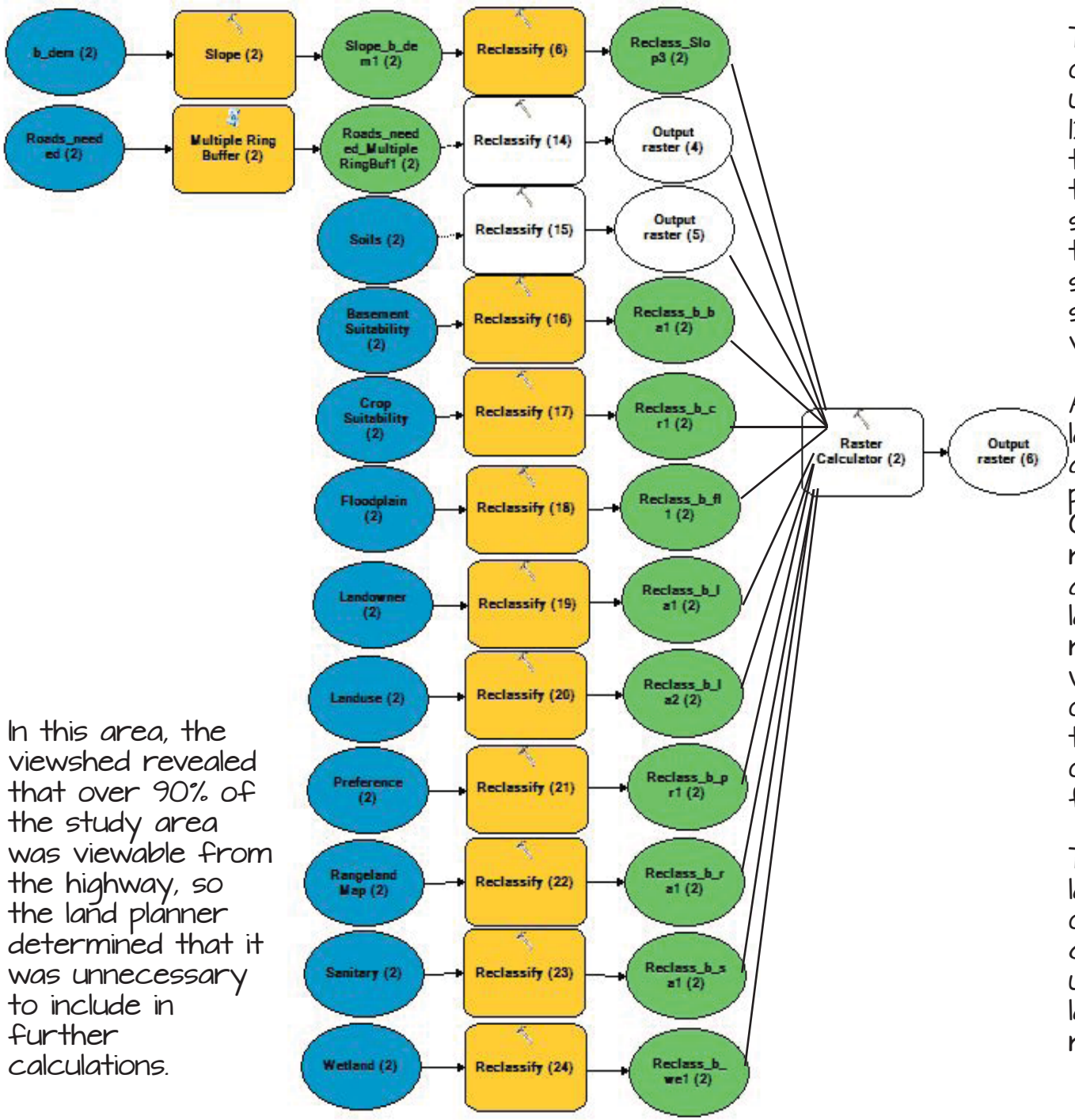
http://www.maps.google.com

Bellevue, Idaho is located in Blaine County. It has a population of 2,281 and boasts of over 150 businesses(City-data). Bellevue is, "Idaho's only Chartered City; A Silver City with a Golden Heart" (City of Bellevue.) It offers a variety of activities for people of all ages and family types. Bellevue prides itself on being the "Gateway to the Sawtooth Mountains"(City of Bellevue).

Bellevue is teaming up with Blaine County to study the land areas of the mountain community to accomodate future growth and to preserve the scenic beauty of the surrounding regions. The main factors focused on in this study are proximity to highways, soil types, and topography.

There are seven main different land use types: residential, agricultural, industrial, commercial, recreational, institutional, and transportation (Ari Ochuba). In this study, the factors previously discussed will be evaluated among four of these land use types: residential, agricultural (and rangeland), commercial, and recreational (and conservation).

Process



This is an example of the process used to evaluate 12 factors. First, the dem file gets trimmed to the study area. Using this file, the next step is to create slope and viewshed layers.

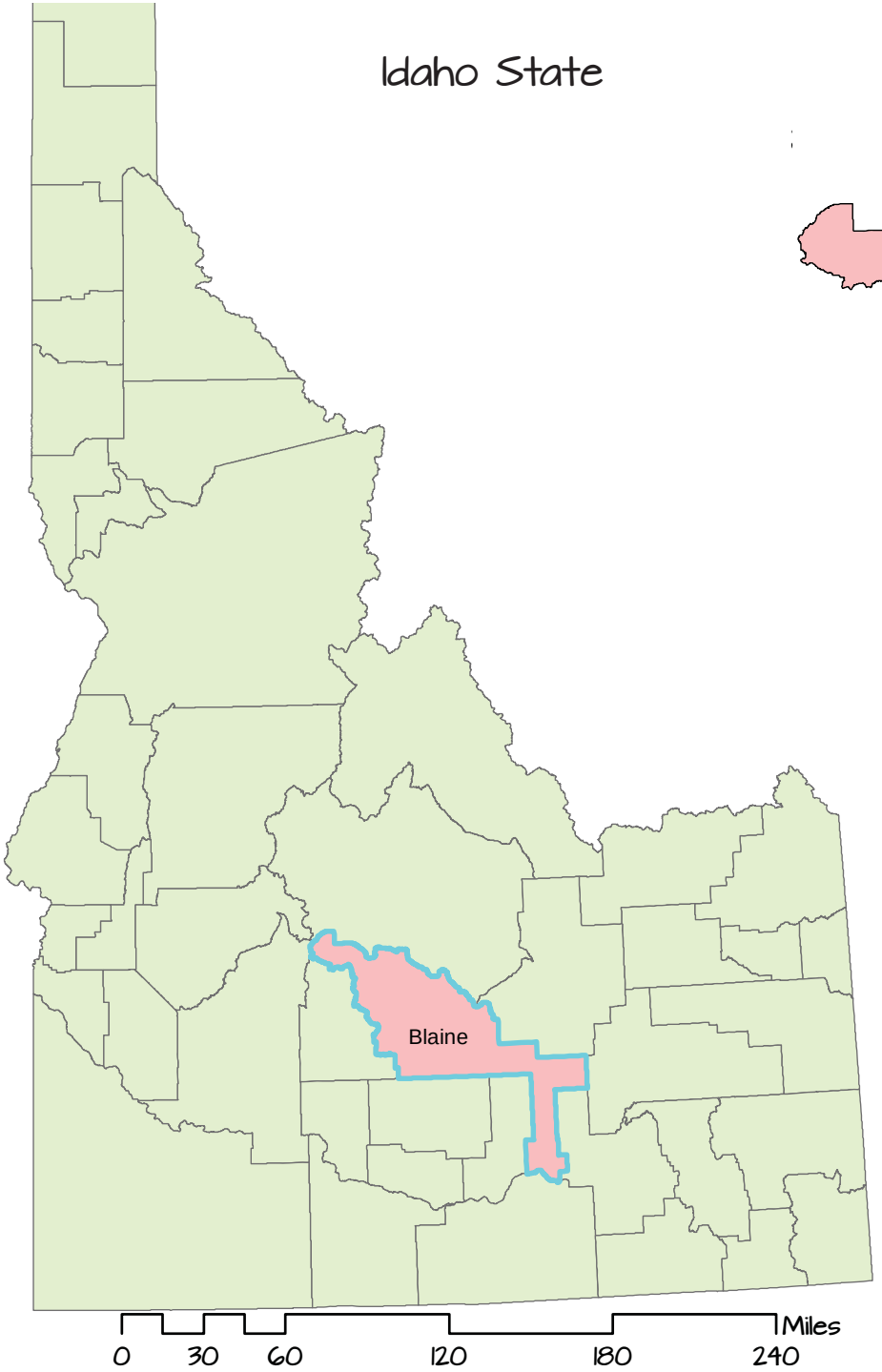
After the layers were added (many were provided by Toru Otawa) they were reclassified according to each land use. These reclassified layers were then overlayed together to come up with one master layer for each land use.

The four master layers were then overlayed and re-classified to come up with the end land use recommendations. .

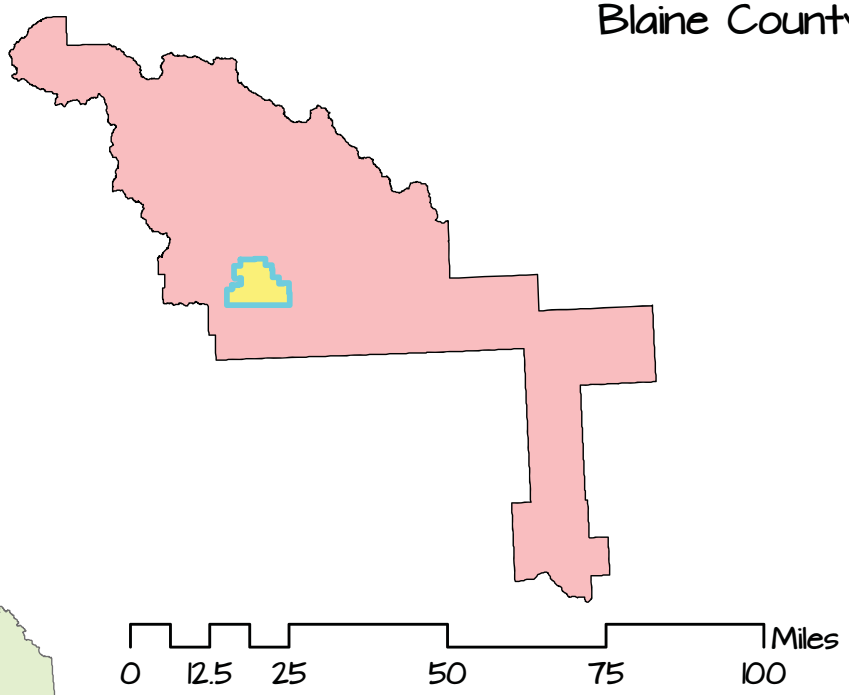
In this area, the viewshed revealed that over 90% of the study area was viewable from the highway, so the land planner determined that it was unnecessary to include in further calculations.

Context Maps

Idaho State



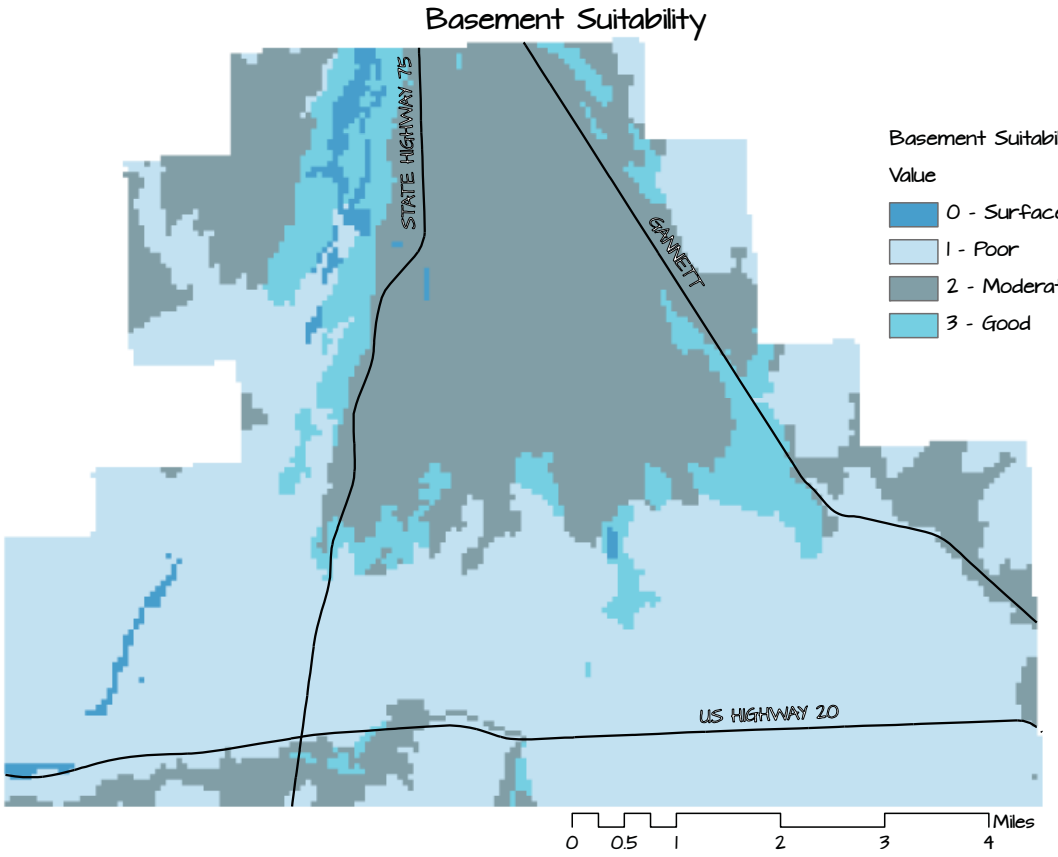
Blaine County



The study area is located in Bellevue, Idaho. It is in the southwestern part of Blaine County. This area is very close to the Sawtooth Mountains making it a great location for a variety of outdoor recreational activities.

Basement Suitability Map

Basements		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Surface Water	0	0	0	0	100
Poor	1	0	0	0	10
Moderate	2	10	10	10	10
Good	3	100	100	100	10

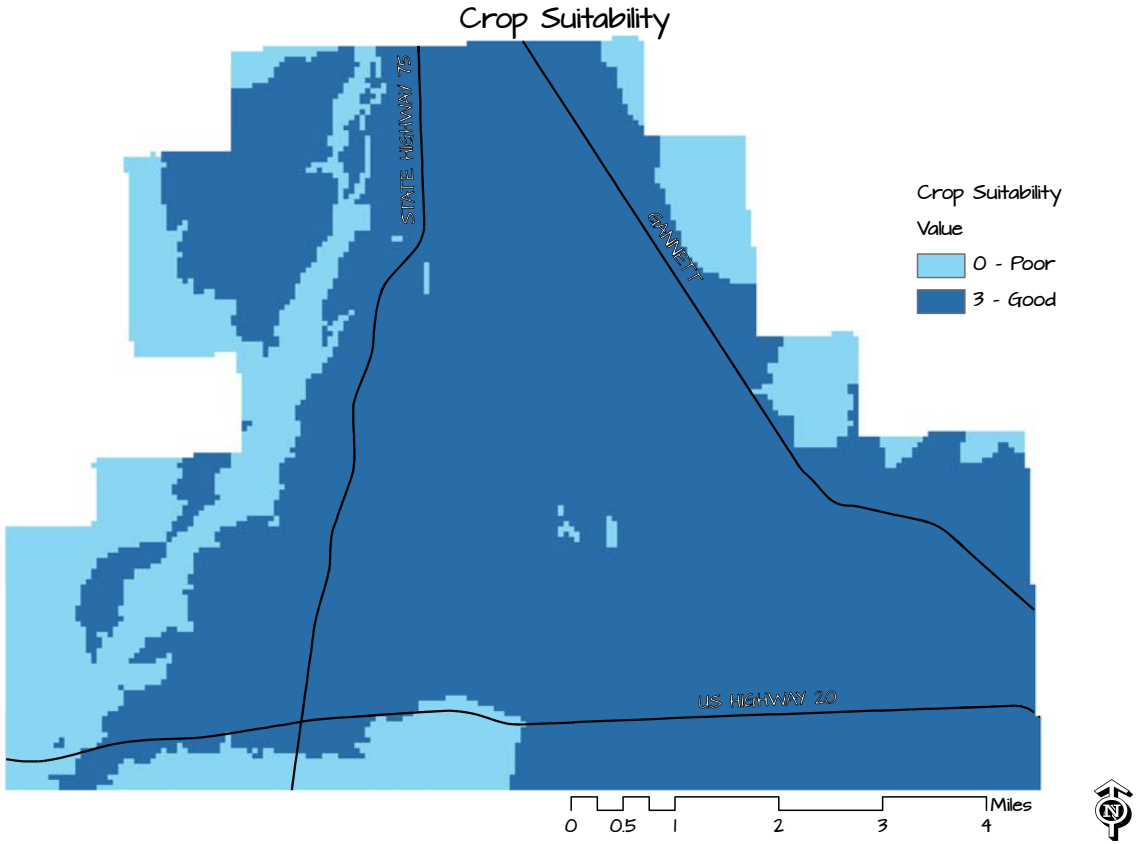


This map shows the suitability of various locations for basements. The matrix above shows the values the planner assigned to each category. 0 is classified as non desirable while 100 is classified as highly desirable. Basements need to be in areas that are well-drained. The planner decided that these well-drained areas are excellent areas to use for commercial, residential, and agricultural land uses. As recreation and conservation land uses cover a wide variety of activities, the land planner decided that there was no area of low desire, but a high emphasis should be placed on areas with surface water as they are excellent for water-based opportunities.

Crop Suitability Map

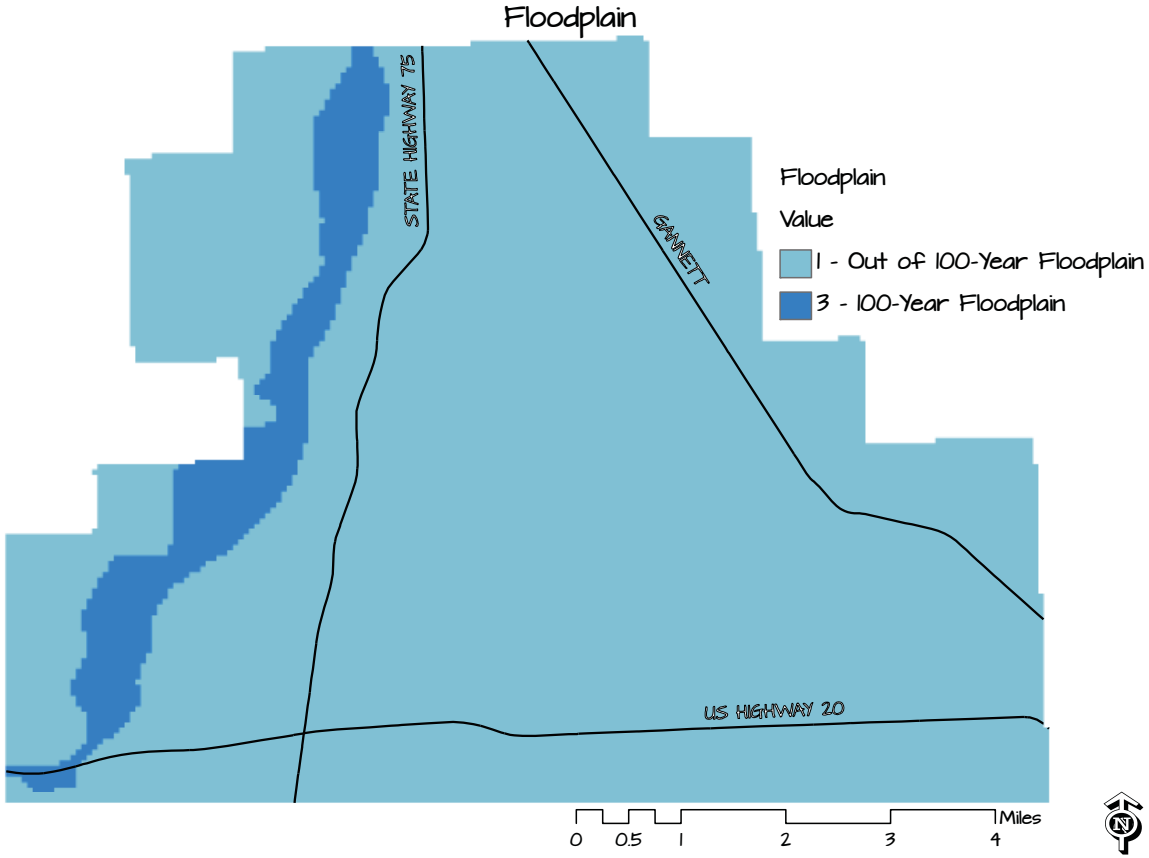
Crops		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Poor	0	0	0	0	100
Good	3	100	100	100	10

This map focuses on areas that are suitable for cropland. These areas are suited for agriculture, commercial, and residential land uses. As conservation is nearly impossible once the land has been developed, the land planner determined that the recreation/conservation land use should not place emphasis on potential crop land.



Floodplain Map

Floodplains		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Out of 100-Year Floodplain	1	100	100	100	10
100-Year Floodplain	3	0	0	0	100

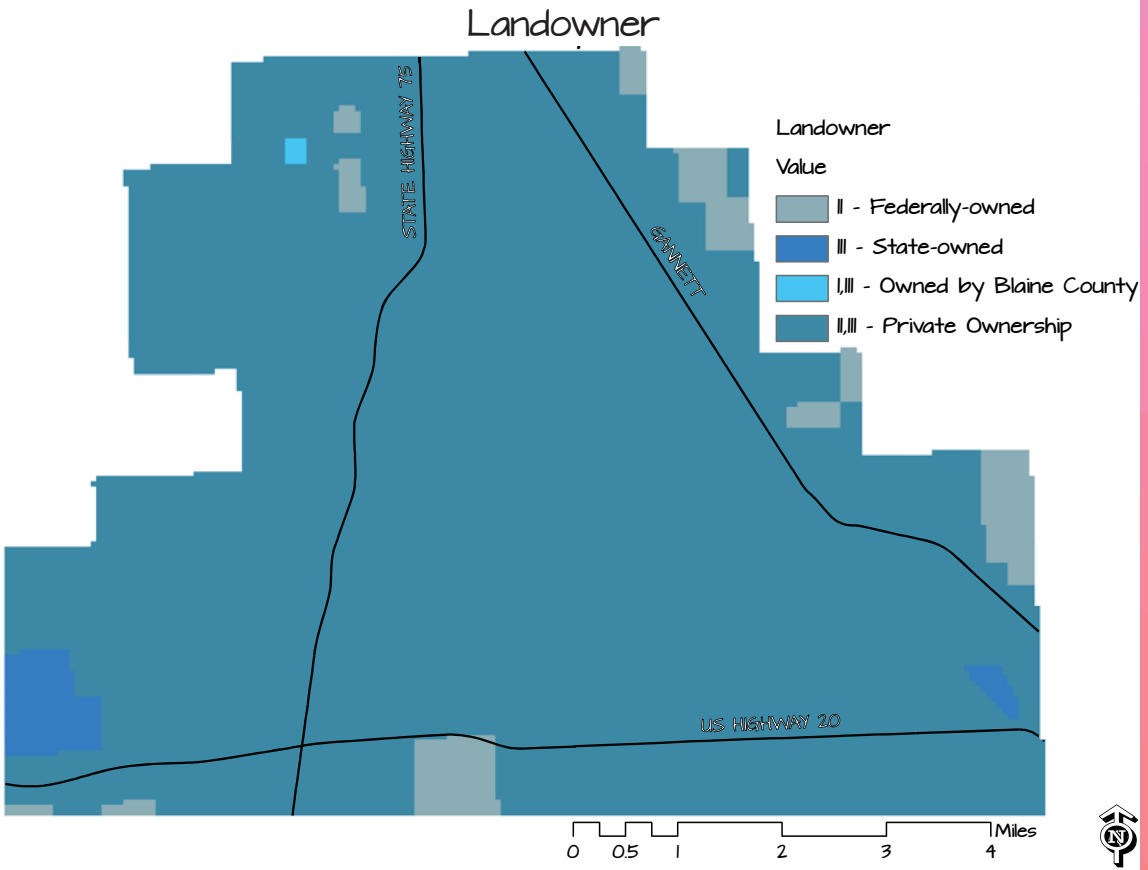


This map shows where the 100-Year floodplain is in the study area. The areas outside of the floodplain are ideal for agricultural, commercial, and residential land uses. Again, the land planner decided that the conservation and recreation category is the best land use for this area.

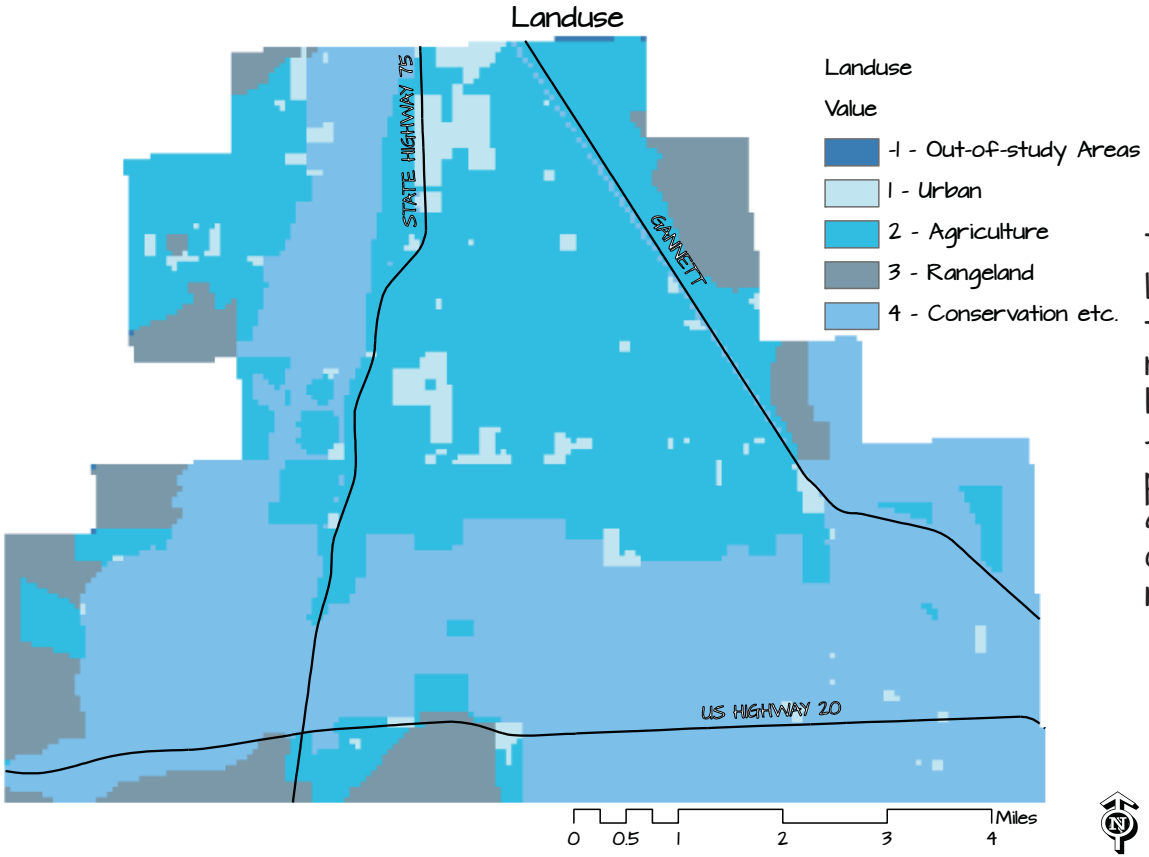
Landowner Map

Landowner		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Federally-owned	II	0	0	0	100
State-owned	III	0	10	0	100
Owned by Blaine County	IIII	10	10	10	10
Private Ownership	IIIII	100	100	100	10

This map looks at who owns the land in the study area. The land planner decided that the federally and state owned lands are best suited for conservation because they will be most eligable for federal protection and grants. The county and state could be involved in commercial venues; while the county is likely to invest in subsidized housing. Agriculture and rangeland will most likely be supported by private landowners and the county to provide services that are crucial to the local economy.



Landuse		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Out-of-Study Areas	-1	0	0	0	0
Urban	1	10	10	100	0
Agriculture	2	100	100	100	0
Rangeland	3	100	10	10	10
Conservation/Floodplain/etc.	4	0	0	0	100

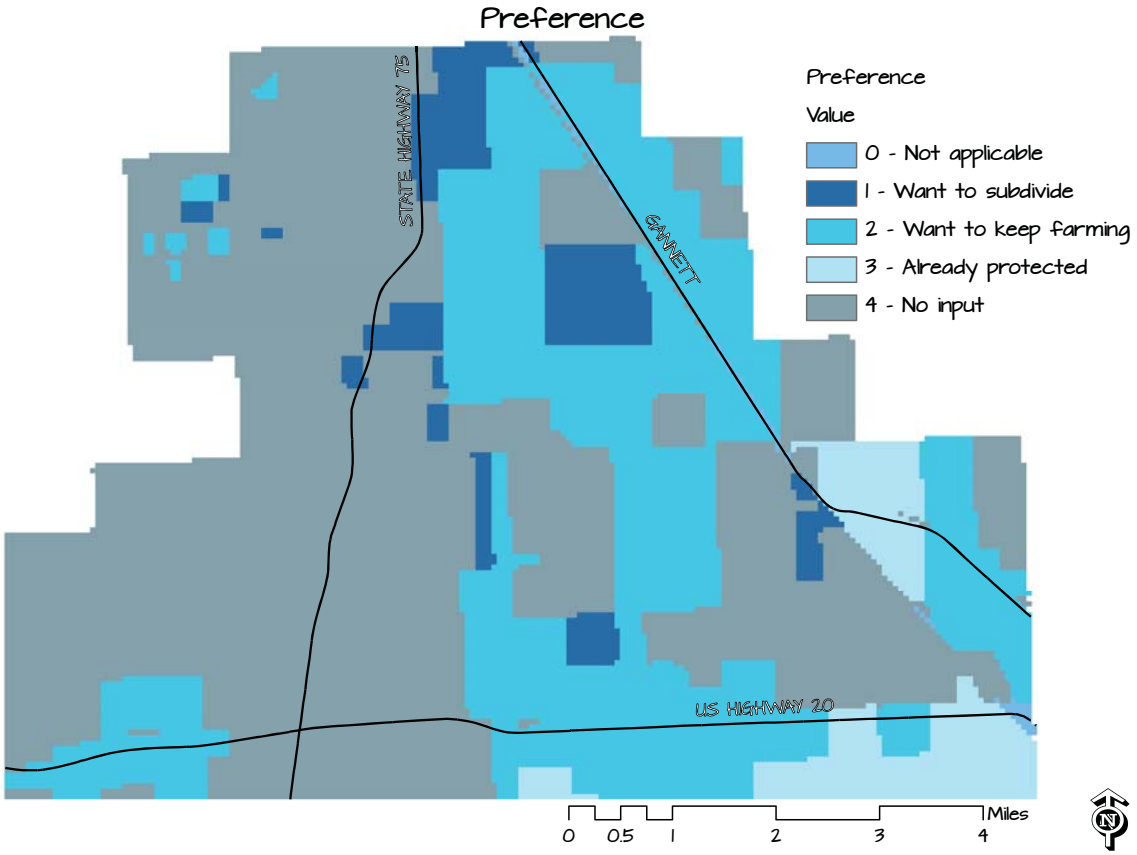


This map shows the current land use patterns that are in the study area. The land planner chose to classify the area by putting the highest values for the areas that match the proposed land uses. The planner also took into account the ease of conversion from the current land use to the proposed.

Preference Map

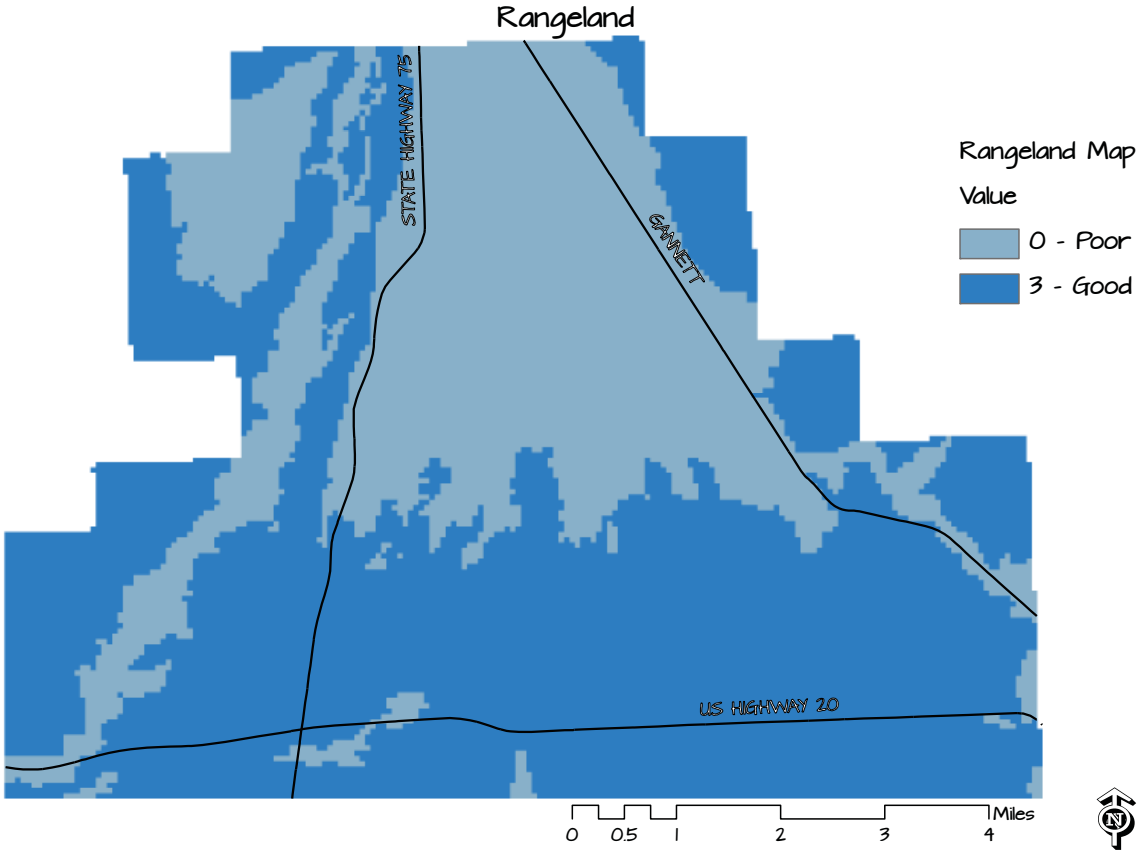
Preference		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Not applicable	0	0	0	0	0
Want to subdivide	1	0	100	100	10
Want to keep farming	2	100	10	0	0
Already protected	3	10	0	0	100
No Input	4	10	10	10	10

This map depicts the preference of the current residents as to what land use they would want in the area. In the matrix above, you can see that the land planner put heavy emphasis on the resident's wishes when reclassifying the area.



Rangeland Suitability Map

Rangeland		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Poor	0	0	0	0	10
Good	3	100	100	100	100

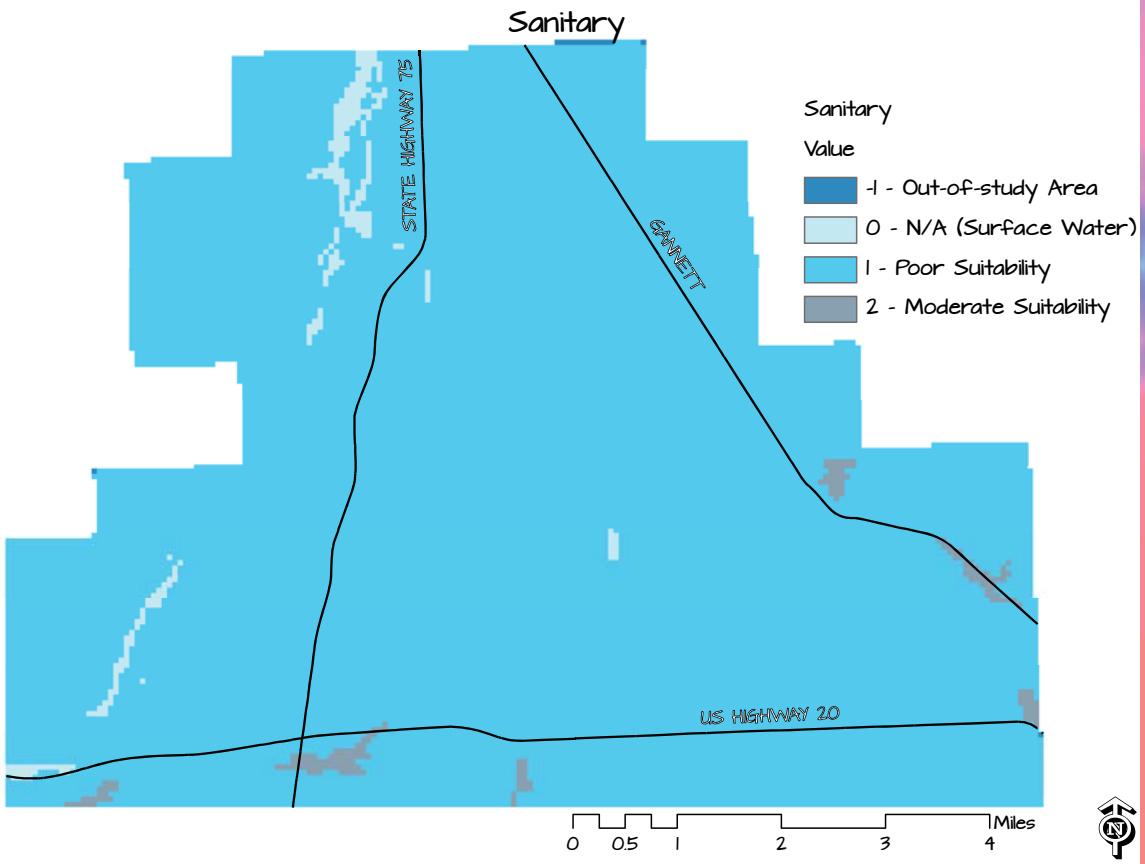


This map shows the suitability of the land to become rangeland. From the land planner's perspective, areas that are good for rangeland are good for the other land uses as most of it can be converted.

Sanitation Suitability Map

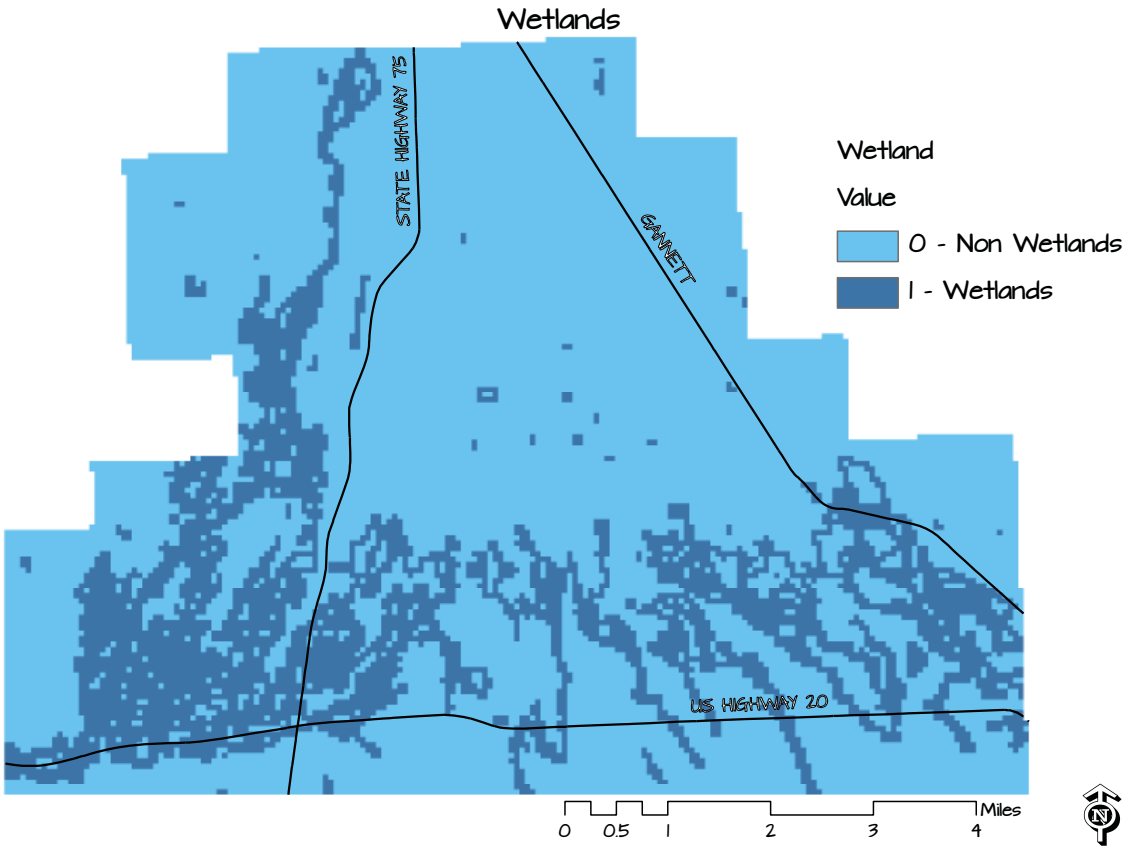
Sanitary		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Out-of-study Areas	-1	0	0	0	0
Not Applicable (Surface Water)	0	0	0	0	100
Poor Suitability	1	10	10	10	10
Moderate	2	100	100	100	0

The sanitary map shows the areas that would be fit to install underground sewage systems. There are no perfect locations, but the land planner was able to classify the areas amongst the proposed land use areas. This is another example where the recreation and conservation land use scored differently than the others because the land planner put a high emphasis on surface water for that land use.



Wetlands Map

Wetland		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Non Wetlands	0	100	100	100	10
Wetlands	1	0	0	0	100

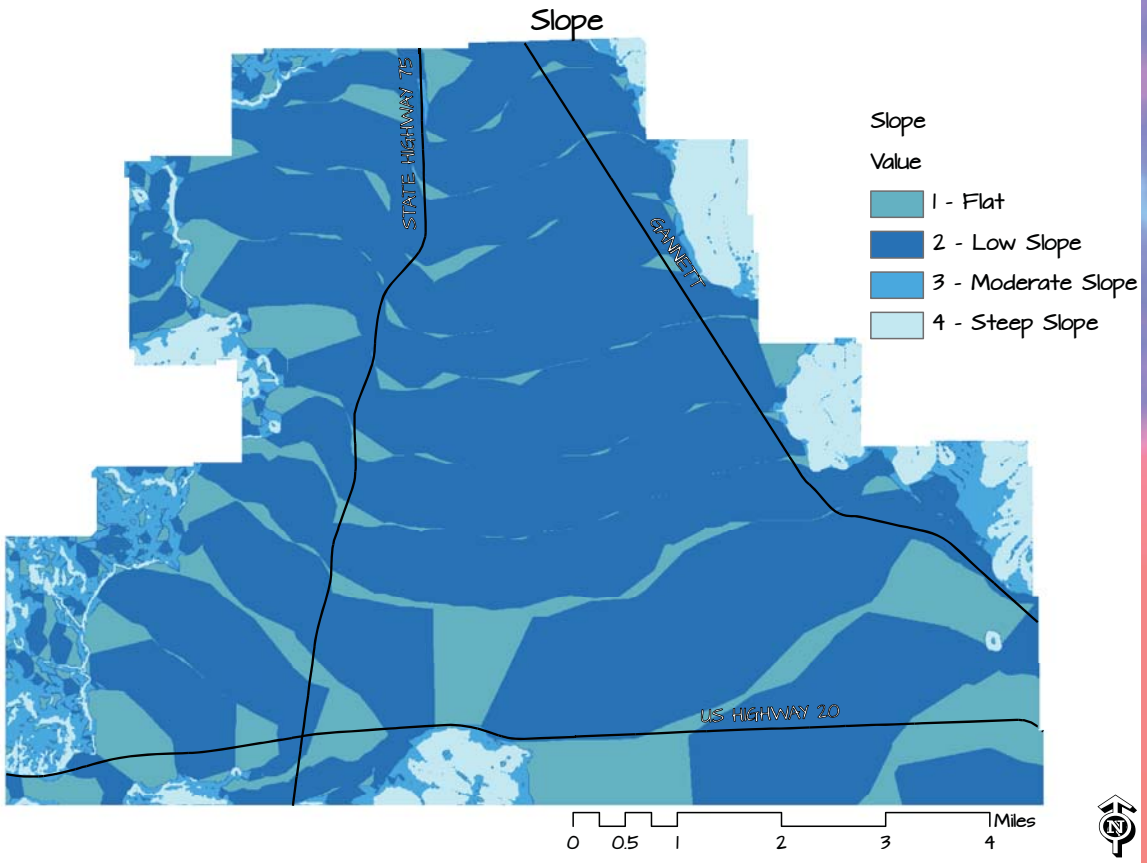


This map shows which areas are wetlands and which are not wetlands. The recreation and conservation land use is the most versatile in this regard, as there are many activities that can take place both on and off wetlands. The other three land uses would ideally be located on areas that are not wetlands for extra stability and productivity.

Slope Map

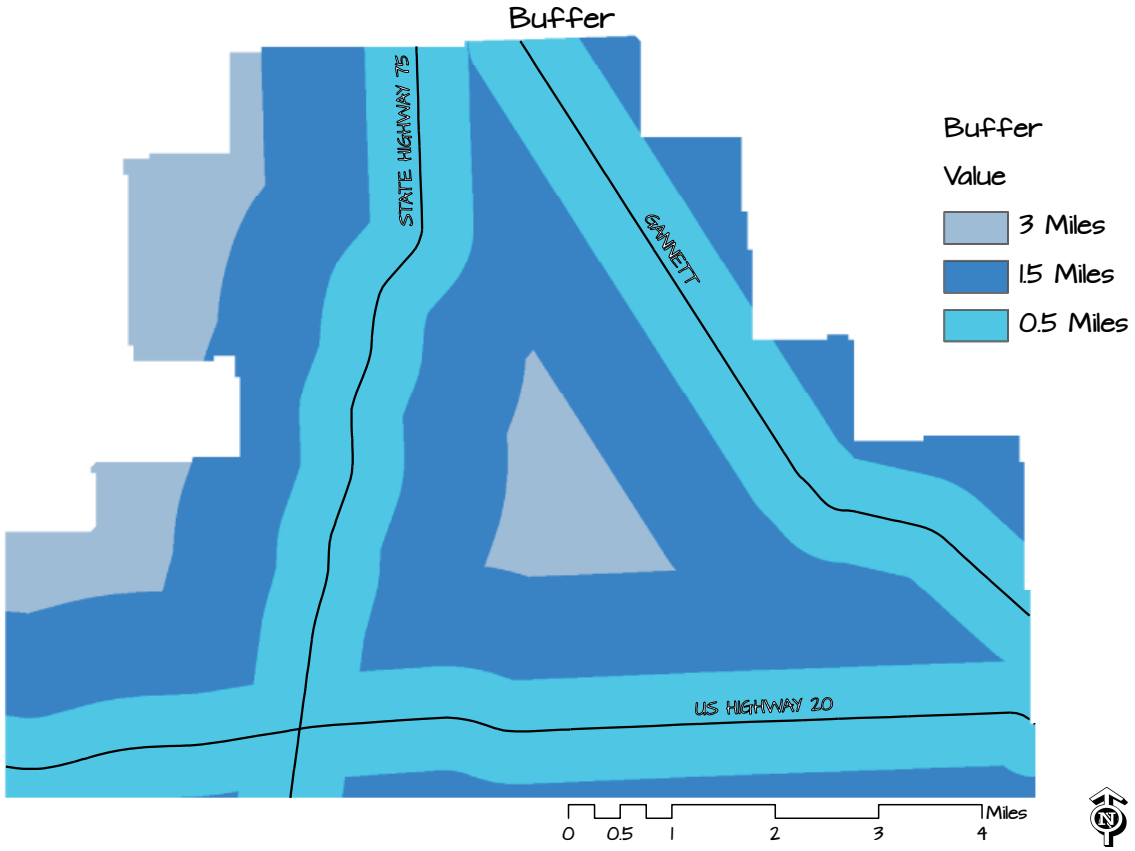
Slope		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Flat (up to 0%)	1	10	100	100	100
Low Slope (0%-5%)	2	100	100	100	100
Moderate Slope (5%-15%)	3	100	10	10	100
Steep Slope (15% +)	4	0	0	0	100

This map shows the variety of the slope on the site. It is broken into four categories: Flat (0% slope), Low Slope (0-5% slope), Moderate Slope (5-15% slope), and Steep Slope (15%+). Recreation and conservation can take place on a variety of slopes, so the land planner saw no need to distinguish between them all. Agricultural land works in low to moderate slopes, and residential and commercial do the best in flat areas. Each scenario was given a bit of overlap because of the wide variety of uses that fall within each potential land use.



Buffer Map

Buffer		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
0-0.5 Miles	0.5	10	100	100	0
0.5-1.5 Miles	1.5	100	10	100	10
1.5-3 Miles	3	10	0	10	100



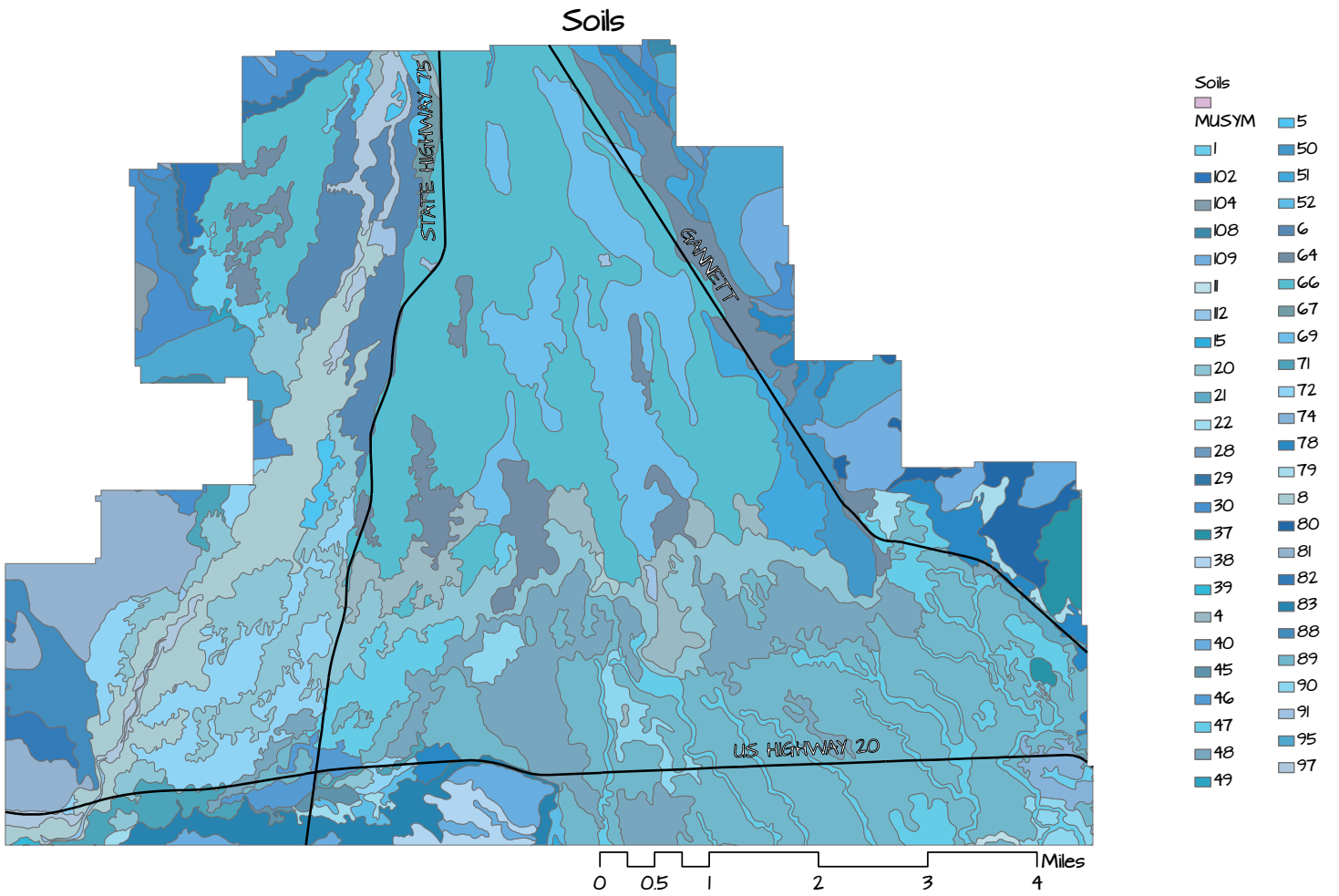
This map shows the buffer zones that the land planner created for the site. There are three areas, the first is within 0.5 miles of the major roads, the second is within 1.5 miles, and the third is within 3 miles. The land planner chose these distances because of the relative smallness of the site, and they felt that these distances adequately covered the area of interest. Recreation and conservation are generally reserved for the outlying areas, the agricultural and residential are somewhat in the middle, and the commercial is as close to the highways as possible to boost business.

Soils Matrix

Soils		Reclassified Values			
Original Values		Agriculture/Rangeland	Commercial	Residential	Recreation/Conservation
Water	112	100	100	100	100
Vitale-Povey association	109	100	10	10	100
Vitale-Milliqan complex	108	100	0	0	100
Simon-n-Bauscher complex	104	100	100	100	10
Simon-n loam	102	10	0	0	0
Riverwash	97	10	0	0	100
Povey-Vitale association	95	100	100	100	100
Pits	91	10	10	10	0
Picabo gravelly loam	90	100	100	100	0
Picabo silt loam	89	100	100	100	100
Peevywell-Simon-n complex	88	100	100	100	100
Muldoon-Peevywell loams	83	10	10	10	10
Moons-ne-Earcree association	82	10	10	10	100
Moons-ne-Bauscher complex	81	0	0	0	10
Molyneux loam, cool	80	0	0	0	10
Molyneux loam	79	0	0	0	0
Molyneux loam	78	0	0	0	0
McCarey-Justesen loams	74	0	100	100	0
Marshdale-Bruneel loams	72	10	0	0	100
Marshdale loam	71	10	0	0	100
Little Wood-Balaam complex	69	10	0	0	10
Little Wood very gravelly loam	67	100	10	10	10
Little Wood very gravelly loam	66	100	0	0	10
Little Wood gravelly loam	64	100	100	100	0
Justesen loam	52	100	100	100	0
Isknat gravelly clay loam	51	100	100	100	0
Hut-n variant clay loam	50	10	10	10	10
Hut-n clay loam	49	10	10	10	10
Hapur-Picabo silt loams	48	10	10	10	10
Hapur-Bickett complex	47	10	0	0	10
Hapur silt loam	46	10	0	0	10
Gooding-n-Manard complex	45	10	100	100	0
Friedman-Elksel-Winridge complex	40	10	100	100	100
Elksel-Starhope-Rock outcrop complex	39	100	100	100	100
Elksel-Peevywell-Furshur complex	38	0	100	100	100
Elksel-Friedman-Starhope complex	37	0	10	10	100
Drage gravelly loam	30	0	0	0	10
Drage gravelly loam	29	0	100	100	10
Drage gravelly loam	28	0	0	0	0
Carey Lake loam	22	0	0	0	0
Carey Lake loam	21	100	100	100	0
Bruneel loam	20	0	0	0	10
Brinqmee loam	15	0	0	0	0
Bickett mucky peat	11	0	0	0	100
Balaam-Adamson-Riverwash complex	8	100	100	100	10
Balaam-Adamson complex	6	0	10	10	0
Balaam very gravelly sandy loam	5	0	0	0	10
Balaam gravelly sandy loam	4	0	0	0	0
Adamson loam	1	0	0	0	0

This matrix is based on the soil survey completed for this site by the land planner on the USGS Web Soil Survey (Web Soil Survey). The planner evaluated the soils based on their hydrologic soil groups (USDA) and land capability classes and subclasses (Soil Science Society of America, 2008). The land planner also considered whether or not the soil type was labeled Prime Farmland, Not Prime Farmland, or Farmland of Statewide Importance (Web Soil Survey) This matrix shows the end result of the classification.

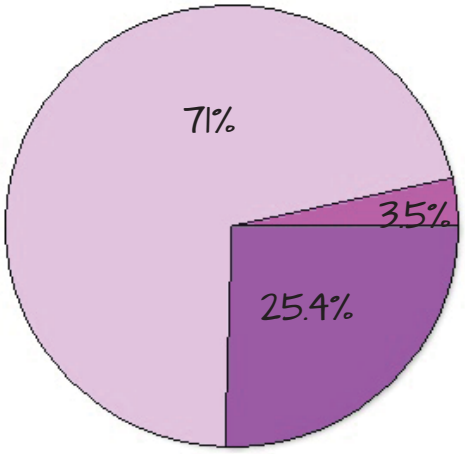
Soils Map



This map shows the different soil types found in the study area and where they are located. There are 49 different soils found on this site and all have different characteristics. Using the matrix and methods found on the previous page, the land planner was able to reclassify this map to suit each proposed land use.

Agriculture and Rangeland Suitability Map

This map shows the suitability of each area to fit the agricultural land use or the rangeland land use. This was made by compiling all of the previous maps after they had been classified according to what was best for this land use. This map has been classified into three categories, low suitability (value of 1), moderate suitability (value of 2), and high suitability (value of 3).

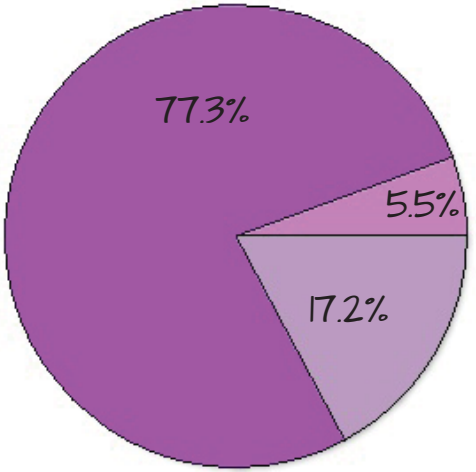


This graph shows the percentage of each value group. The low suitability has a percentage of about 3.5% of the total area. Moderate suitability covers about 71% of the land. High suitability has a percentage of about 25.4% of the total land mass.

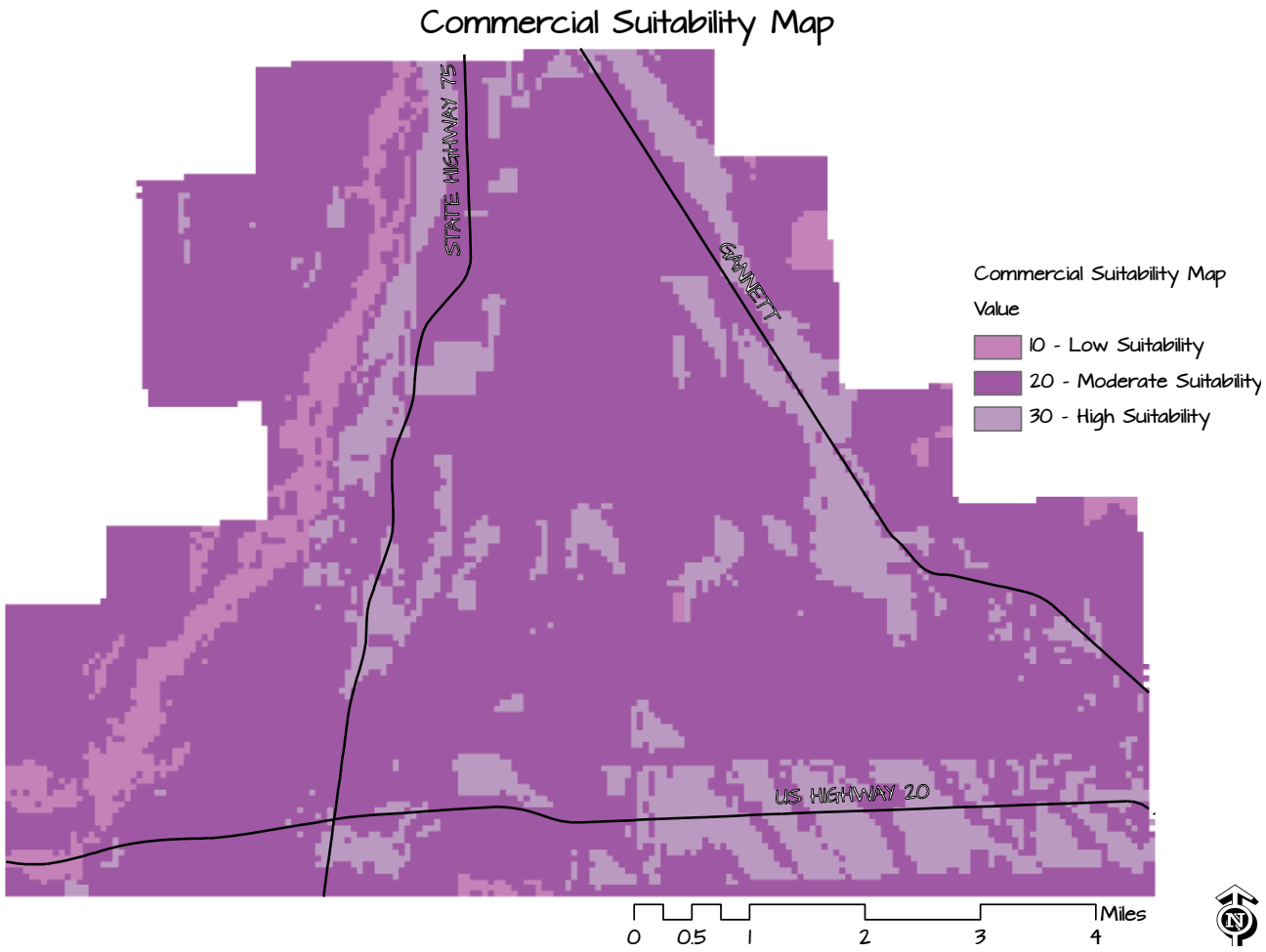
Agriculture and Rangeland Suitability Map

Commercial Suitability Map

This map shows the suitability of each area to fit the commercial land use. This was made by compiling all of the previous maps after they had been classified according to what was best for this land use. This map has been classified into three categories, low suitability (value of 10), moderate suitability (value of 20), and high suitability (value of 30).

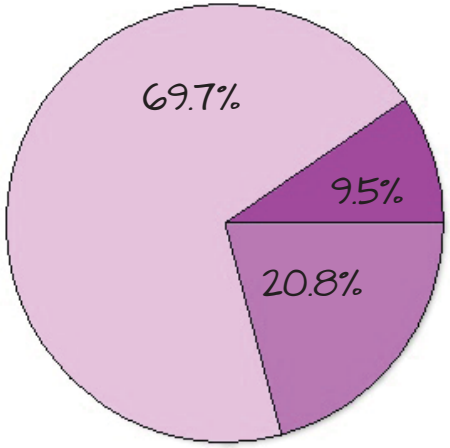


This graph shows the percentage of each value group. The low suitability has a percentage of about 3.5% of the total area. Moderate suitability covers about 71% of the land. High suitability has a percentage of about 25.4% of the total land mass.



Residential Suitability Map

This map shows the suitability of each area to fit the residential land use. This was made by compiling all of the previous maps after they had been classified according to what was best for this land use. This map has been classified into three categories, low suitability (value of 100), moderate suitability (value of 200), and high suitability (value of 300).

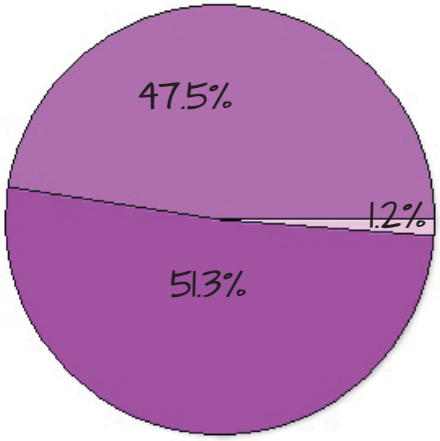


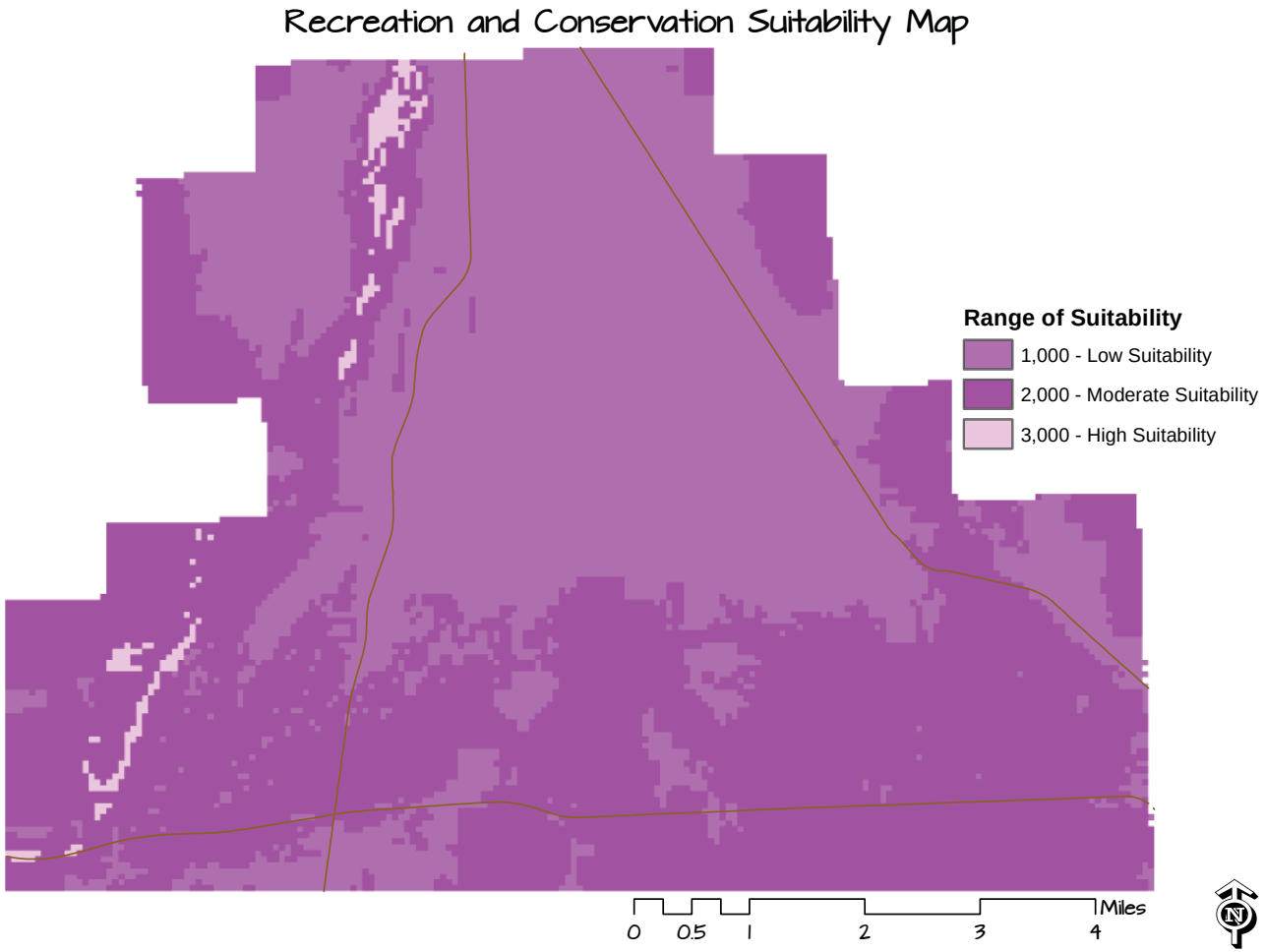
This graph shows the percentage of each value group. The low suitability has a percentage of about 9.5% of the total area. Moderate suitability covers about 69.7% of the land. High suitability has a percentage of about 20.8% of the total land mass.

Residential Suitability Map

Recreation and Conservation Suitability Map

This map shows the suitability of each area to fit the agricultural land use or the rangeland land use. This was made by compiling all of the previous maps after they had been classified according to what was best for this land use. This map has been classified into three categories, low suitability (value of 1000), moderate suitability (value of 2000), and high suitability (value of 3000).





This graph shows the percentage of each value group. The low suitability has a percentage of about 1.2% of the total area. Moderate suitability covers about 51.3% of the land. High suitability has a percentage of about 47.5% of the total land mass.

Masterplan Matrix

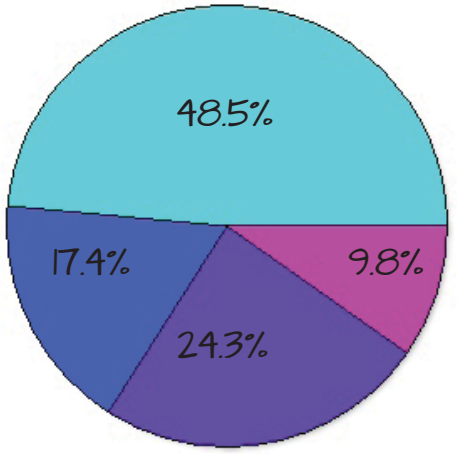
1111	2111	3111
1112	2112	3112
1113	2113	3113
1121	2121	3121
1122	2122	3122
1123	2123	3123
1131	2131	3131
1132	2132	3132
1133	2133	3133
1211	2211	3211
1212	2212	3212
1213	2213	3213
1221	2221	3221
1222	2222	3222
1223	2223	3223
1231	2231	3231
1232	2232	3232
1233	2233	3233
1311	2311	3311
1312	2312	3312
1313	2313	3313
1321	2321	3321
1322	2322	3322
1323	2323	3323
1331	2331	3331
1332	2332	3332
1333	2333	3333

Agriculture/Rangeland
Commercial
Residential
Recreation/Conservation
Not Used

This matrix is the result of combining all of the values from the four master maps of the land use areas. All possible number combinations are present, and the cells are color coded according to the suitability of the area to the land use.
Agriculture is represented in purple, and manifests in the single didget place. 3 is highly suitable, 2 moderately suitable, and 1 has low suitability.
Commercial is represented in blue, and manifests in the double didget place. 30 is highly suitable, 20 moderately suitable, and 10 has low suitability.
Residential is represented in green, and manifests in the triple didget place. 300 is highly suitable, 200 moderately suitable, and 100 has low suitability.
Recreation is represented in red, and manifests in the fourth didget place. 3000 is highly suitable, 2000 moderately suitable, and 1000 has low suitability.
Yellow cells are the number combinations that were possible, but did not occur when the land planner added the maps together.
Cells that have multiple suitability numbers (ex, 3333) are classified according to the land planner's preference. In most cases, the land planner looked at how much area was covered and what conditions occurred in the area.
Example: a number of 3212 would automatically be classified as recreation. 2211 would be classified as either recreation or residential depending on the conditions of the parcel.

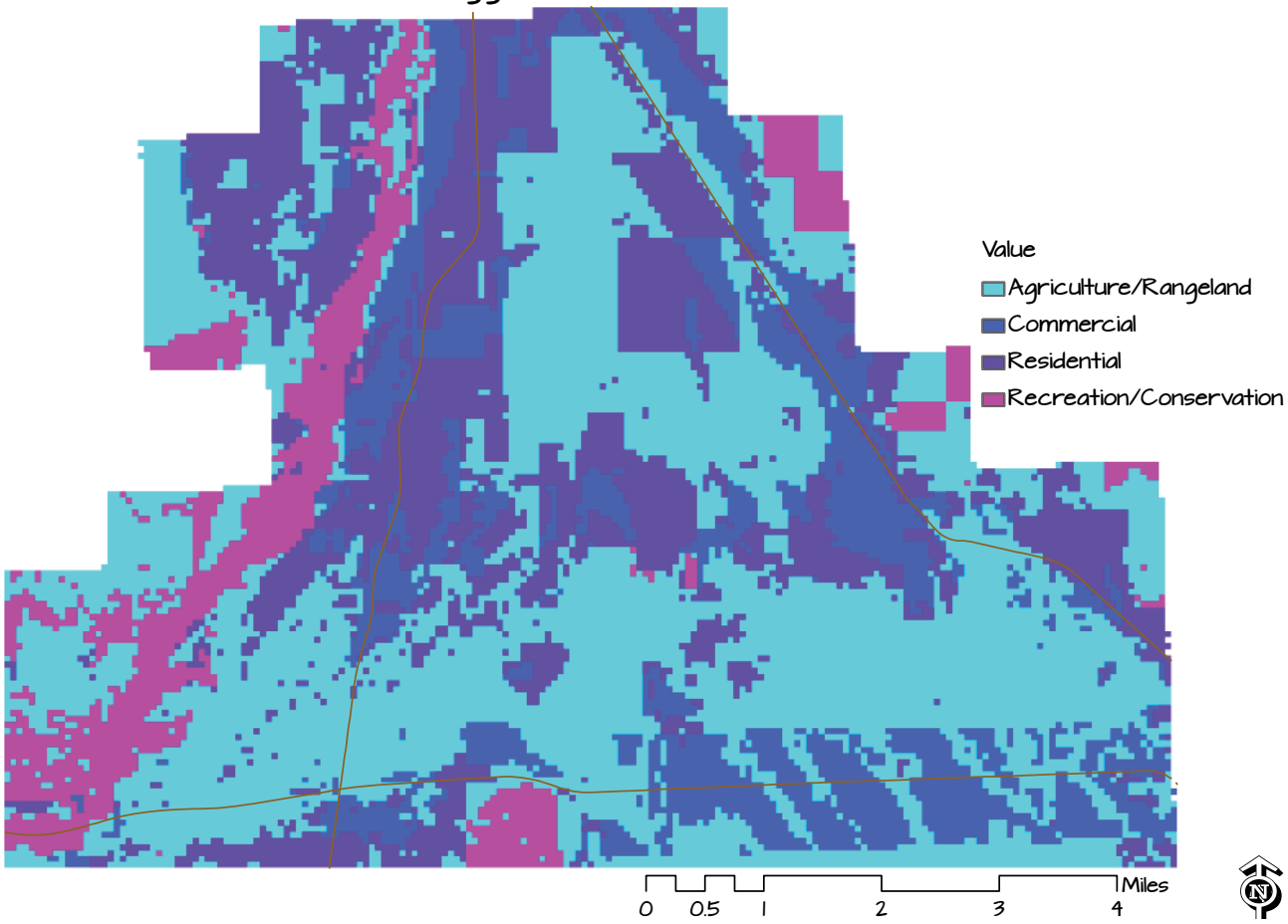
Recommended Land Use Map

This map shows the suitability of each land use to the areas within the site. It was made by using the overlay process to combine the four master maps, then by reclassifying it using the matrix on the previous page. This shows a large preference toward agriculture, as it is an industry that is bringing money and food to the area. Much of the land is currently used for agriculture, and in many cases there is no reason to change it. There is also a lot of opportunity to increase residential land use to allow the population to grow. Commercial land use is also a large factor, bringing in more revenue for the county and the citizens of Bellevue and Blaine county. Conservation and recreation are a prominant part of these suggestions--not only using lands that are unfit for the other uses, but also protecting important conservation areas.



This graph shows the percentage of each land use area. The agriculture and rangeland area has a percentage of about 48.5% of the total area. Commercial covers about 17.4% of the land. Residential has a percentage of about 24.3% of the total land mass. Recreation and conservation cover about 9.8% of the total study area.

Suggested Land Use Areas



Sources

City-data.com, Retrieved on 12/1/13.
http://www.city-data.com/city/Bellevue-Idaho.html

City of Bellevue, ID. Retrieved on 12/2/13.
http://www.bellevueidaho.us/

Google Maps, 2013. Retrieved on 12/10/13.
http://maps.google.com

Ochuba, Ari. "The Seven Types of Land Use." Retrieved on 12/2/13
http://prezi.com/zjcwcfqgljfc/the-seven-types-of-land-use/

Soil Science Society of America, Inc. 2008. Glossary of Soil Science Terms 2008. Retrieved on 12/6/13
http://books.google.com/books?id=TQCYxEXfgMUC&pg=PA36&dq=soil+land+capability&hl=en&sa=X&ei=N3GjUqeDGIH80ASzv4HACg&ved=0CEMQ6AEwBA#v=onepage&q=soil%20land%20capability&f=false

USDA, 2007. "Hydrologic Soil Groups". Retrieved on 12/6/13
http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba

Web Soil Survey. USDA 2012. Retrieved on 12/6/13.
http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx