Maps on the Hill

Map Book 2014

UGIC
Utah Geographic
Information Council

Maps
on the
Hill

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The pages in this book were created by the map authors using google docs as a collaborative editing platform. Page authors are responsible for their own content.

Private Sector and Non-profits

3D Anaglyphic Maps

At 2i3D Stereo Imaging we create interesting and useful three-dimensional maps by using computers to combine various kinds of map data.

For the most part, the joys of exploring the world using 3D aerial photographs have been restricted to geologists, the military, and the class of map maker known as photogrammetrists.

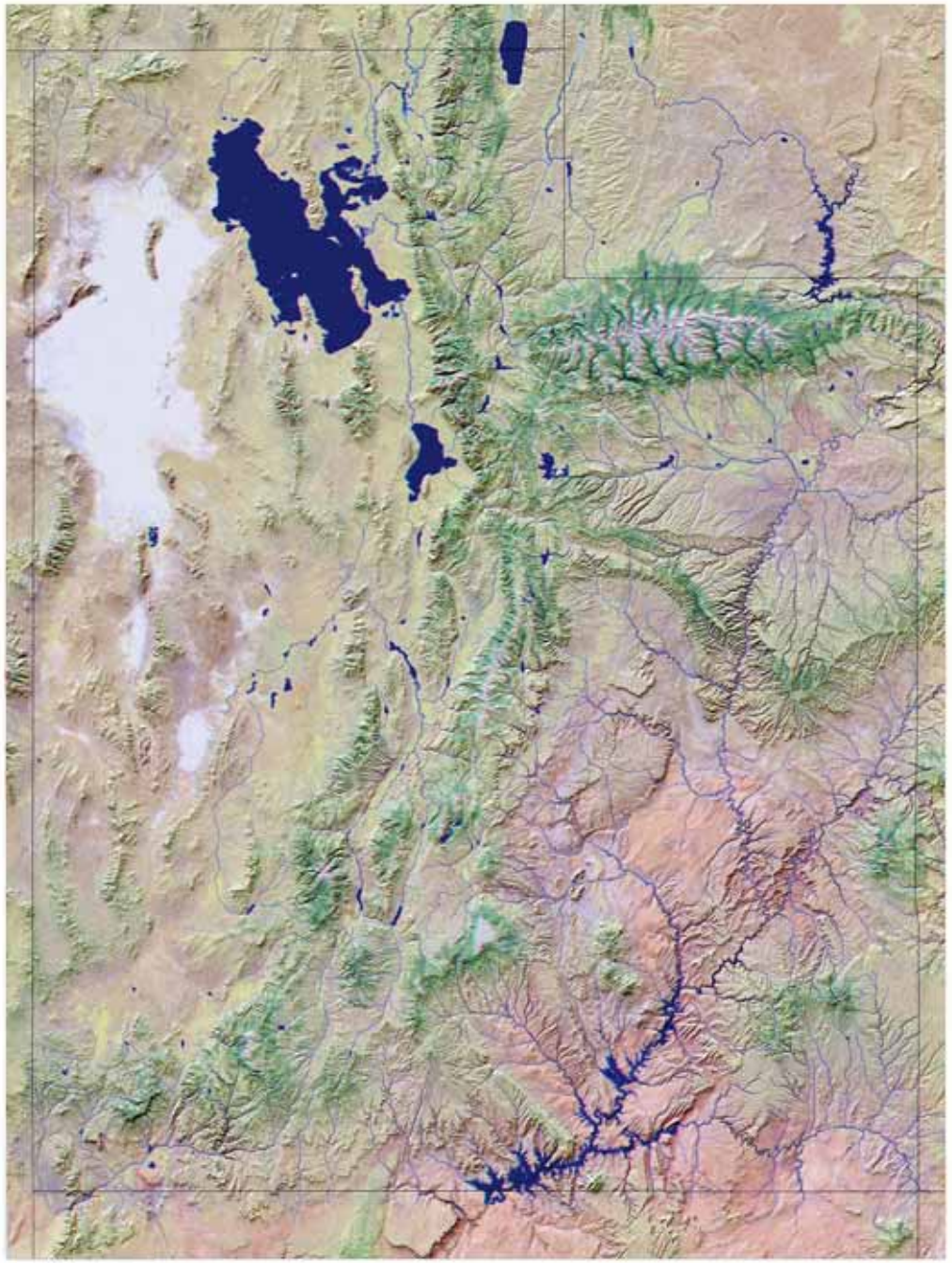
When compared to a topographic map of the same area, you can easily see how the symbolic features of the map relate to the actual details that can be seen on the 3D color satellite photograph.

Anyone with the ability to view stereo images can now see and appreciate the map's mountains and canyons, especially since they are no longer flat images confined to the surface of the paper.

The map at right shows the entire state of Utah in shaded relief and 3D, while the map on the following page is a 3D satellite image of part of the Wasatch Front.

To view these maps in 3D you will need a pair of red/cyan glasses, available at our table with other map examples.

2i3D.steve@gmail.com
www.2i3D.com



2i3D STEREO IMAGING

N

L R

Satellite image of the Wasatch Front. Ogden is at left, Spanish Fork at right.

Utah-BYU Rivalry

Loyalty by City

Every autumn, fans all along the Wasatch Front declare their loyalty between BYU and Utah. Even if you don't follow football, it seems everyone expects you to pick a side.

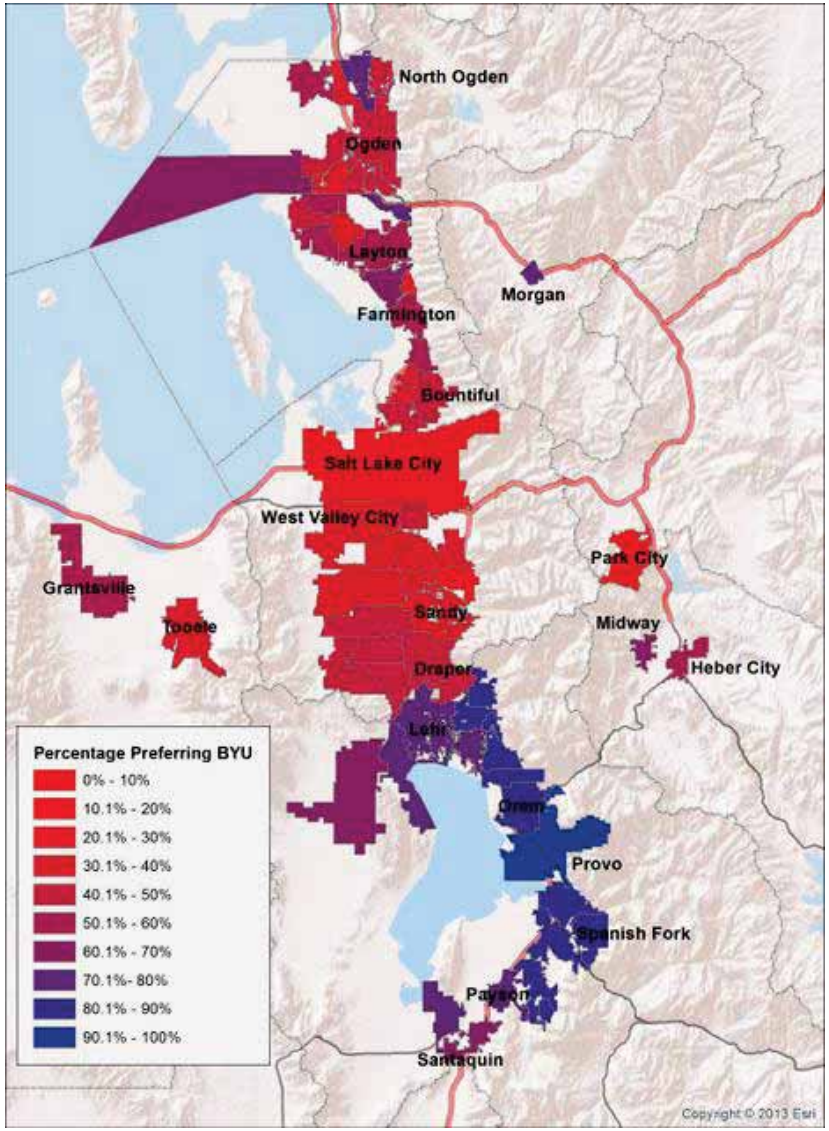
However, if you're unsure about a side, and don't want to be ostracized by your neighbors, this map makes it easy for you to pick a team.

Looking at Facebook likes for the two teams, Aero-Graphics has compiled the data and has mapped the neighborhoods — all for you as the fan, who can't stand to be next to the opposing fan in September.

That data will come in handy for you if you're leaning for the Cougars and are looking to buy a house in Cottonwood Heights, which predominantly has Utah fans. Of the residents living in Cottonwood Heights, 72.7 percent of residents are fans of Utah.

If you're leaning toward Utah, you probably want to stay clear of Highland, which has 85.5 percent of residents favoring the Cougars. Who knows, though, maybe you want to cause some problems and be the one who aggravates your BYU neighbors.

If there is one thing about the data, though, BYU fans in Provo (92.2 percent) are bigger fans of the Cougars than Utah fans in Salt Lake City (71 percent) are of the Utes — simple facts based on Facebook.



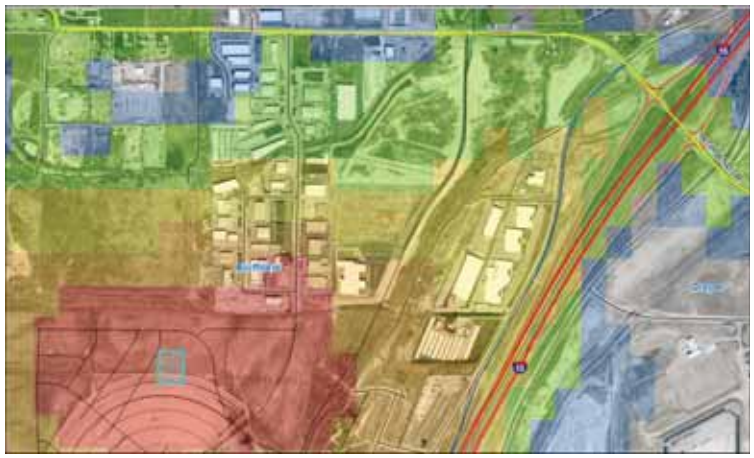
Kelly Francis
Aero-Graphics, Inc.

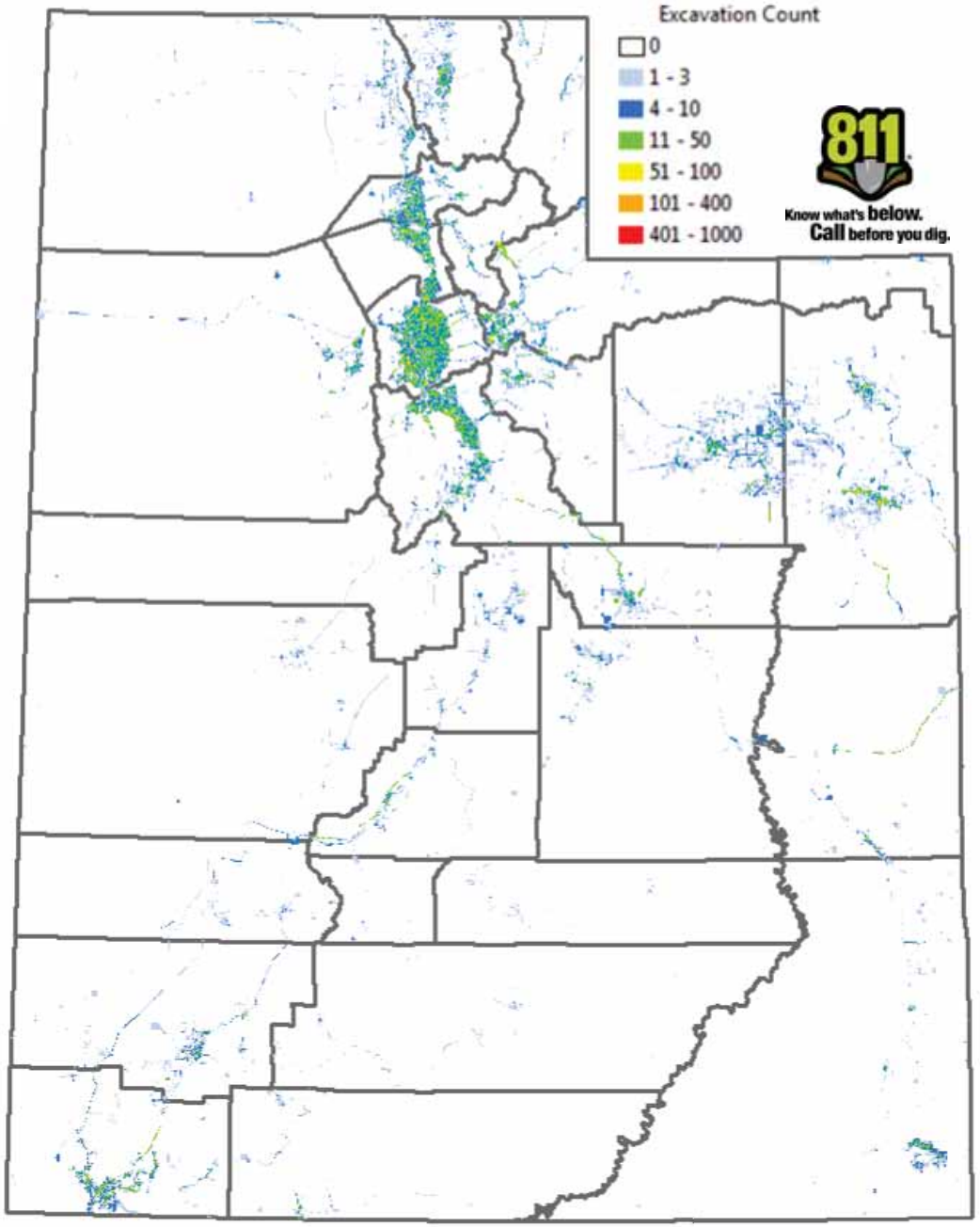
Excavation Activity in Utah 2013

Blue Stakes of Utah is the "Call 811 Before You Dig" utility notification center for Utah. In 2013, Blue Stakes received almost 300,000 requests to have utility lines located and marked throughout the state. Excavation activity was reported on less than 4% of Utah's land area; the vast majority took place in populated urban areas, with the notable exception of the oil and gas fields in Uintah, Duchesne and San Juan Counties.

Please visit the Blue Stakes display table to view an interactive density map. See how much excavation took place in your area of interest!

Top Hot Spot 2013 - new subdivision in Bluffdale (turquoise area)





James Wingate
Blue Stakes of Utah

Utah Ski Resort Maps

GIS based maps enable off network use with your GPS ready smartphone

We have always looked at things and said how can we make that better? The artist rendition of ski resort maps looks great as an image but what about seeing the mountain as is actually sits? Mapsynergy has released this new product that includes the real life locations of lifts with capacities, runs by level of difficulty, resort amenities and contour lines among many other additions.

They are available in large format prints ready to hang on your wall or in waterproof media to take with you. Printed with UV based inks for longevity along with high end photo based paper for a true depth of color. Our Utah Ski Resort Maps are also available digitally in GeoPDF format. Download our GPS enabled PDF versions to your phone and use them on the mountain to see where you want to go next with no data connection required.

Or check out the resorts in 3D with our Google Earth overlays shown next.

Mapsynergy

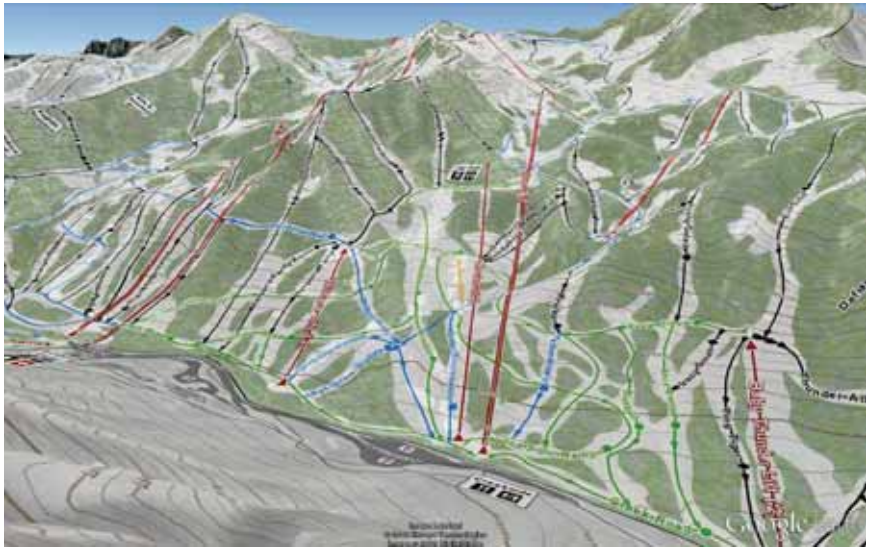
Utah Ski Resort Maps

GIS based maps enables overlays on to Google Earth for 3D viewing

Flying around your favorite resort in Google Earth really gives you a new perspective on the resorts you already know. Accurately seeing the mountain really give you a real world feel you can't get from an artist rendition.

We show Ski Lifts with name, capacity, speed and directionality. Resort Boundaries with separate tree filled areas and open slope. The actual names resort runs in the famous Green Circles, Blue Squares and Black Diamonds along with directionality. Amenities like food, ski school, snacks, restrooms and first aid. Roads to get to the base parking lots and any base lodging information. Most importantly elevation characteristics like a background hill shade with 50' contour lines. Add to that some resort stats like terrain type of beginner, advanced and expert. Resort stats of average snowfall, number of lifts and runs, elevation, drop and terrain parks/pipes.

Thanks for checking out our Utah Ski Resort Maps. We hope you enjoyed them.



Mapsynergy

OpenStreetMap

The free and open map of Utah - and the World!

Meeting regularly, members of the local chapter of the OpenStreetMap community socialize, discuss their work for inputting data into the world wide database and encourage local uses for these data.

Such as:

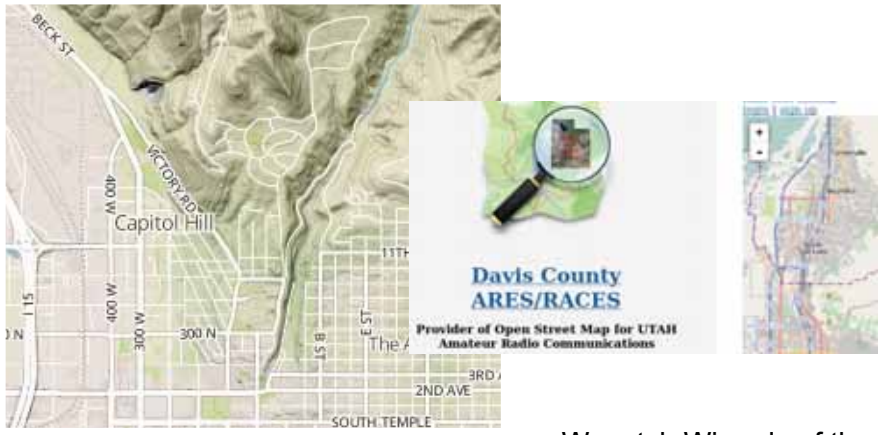
- *Corrections* to existing data.
- *Promoting* it's incorporation into other products.
- *Creating* specialized GIS servers for local needs.
- *Encouraging* it's use within the *GIS community*.

Rather than the map itself, the data generated by the OpenStreetMap project are considered its primary output. These data are then available for use in both traditional applications, like their usage by Craigslist, Geocaching, MapQuest Open, JMP statistical software, and Foursquare to replace Google Maps, and more unusual roles, like replacing default data included with GPS receivers.

During the 2010 Haiti earthquake, OpenStreetMap and Crisis Commons volunteers used available satellite imagery to map the roads, buildings and refugee camps of Port-au-Prince in just two days, building "the most complete digital map of Haiti's roads".

The resulting data and maps have been used by several organisations providing relief aid, such as the World Bank, the European Commission Joint Research Centre, the Office for the Coordination of Humanitarian Affairs, UNOSAT and others.

NGOs like the Humanitarian OpenStreetMap Team and others have worked with donors like USAID to map other parts of Haiti and parts of many other countries, both to create map data for places that formerly were blank, and to engage and build capacity of local people.



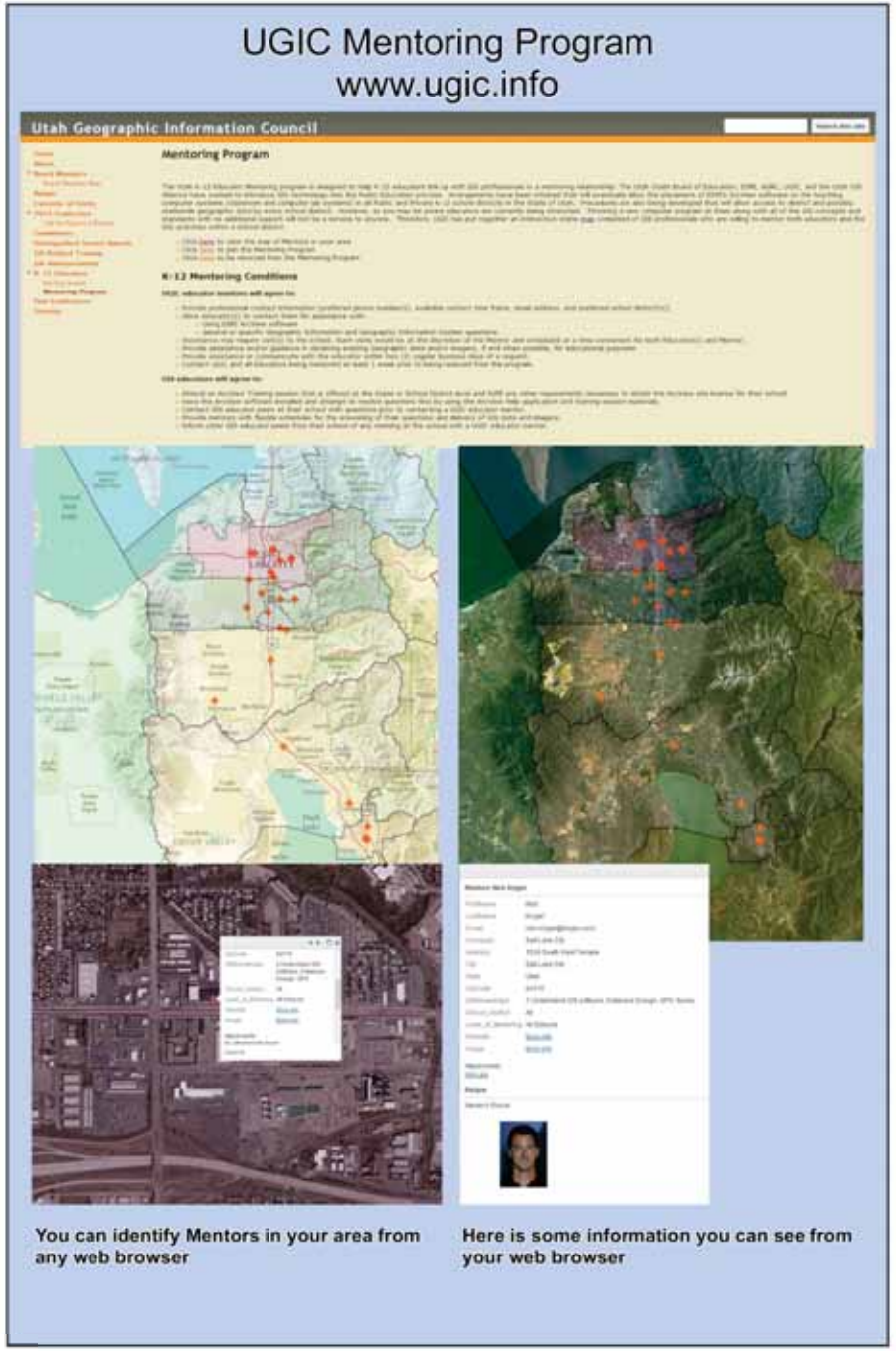
Wasatch Wizards of the OpenStreetMap

UGIC's Mentoring Program

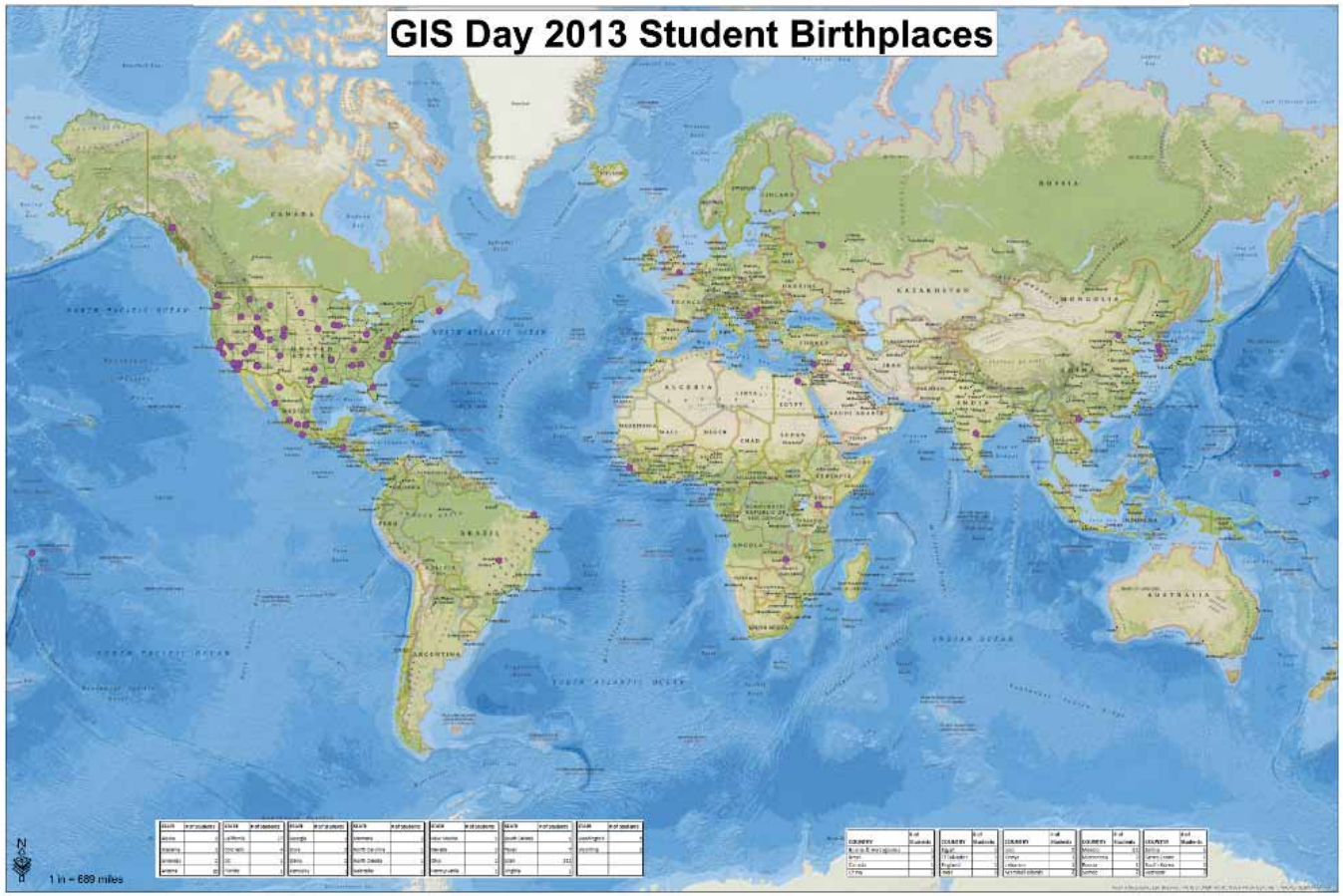
The Utah Geographic Information Council (UGIC) is the organization for GIS professionals in the State of Utah. UGIC's purpose is to promote and help coordinate the use of geographic and other spatial data within the State of Utah. One of UGIC's initiatives is to assist educators in the use of geo-spatial data and tools in the K-12 classroom. Several years ago UGIC developed one of the Nation's first Educator GIS Mentoring programs where volunteer GIS professionals were made available to assist interested Educators. This program received a lot of interest from the GIS community but it was found that interest in the Education community was not quite there, yet.

Over the past several years through GIS Education opportunities provided by the UEN, UGIC and other organizations we now have hundreds of Educators who are now starting to look at and use geo-spatial tools and data in the classroom. UGIC has revived the Educator GIS Mentoring program and is in fact expanding it to include services to assist higher education students in the pursuit of their career goals.

This poster shows the new website for this Educator GIS Mentoring program.



Salt Lake County GIS Day 2013



For GIS Day this year we had over 800 students come to the Miller Campus of Salt Lake Community College to learn about mapping and GIS during four - 30 minute sessions. This year we focused on 4th, 5th, and 6th graders. Before GIS Day began we requested the places of birth for each student participating in the event. We used this information to create a map of the world showing a dot for each place of birth and displayed the map in the lobby of the conference center.

Tricia Cannon
Sponsored by UGIC, UGA, ASPRS, ESRI

Higher Education

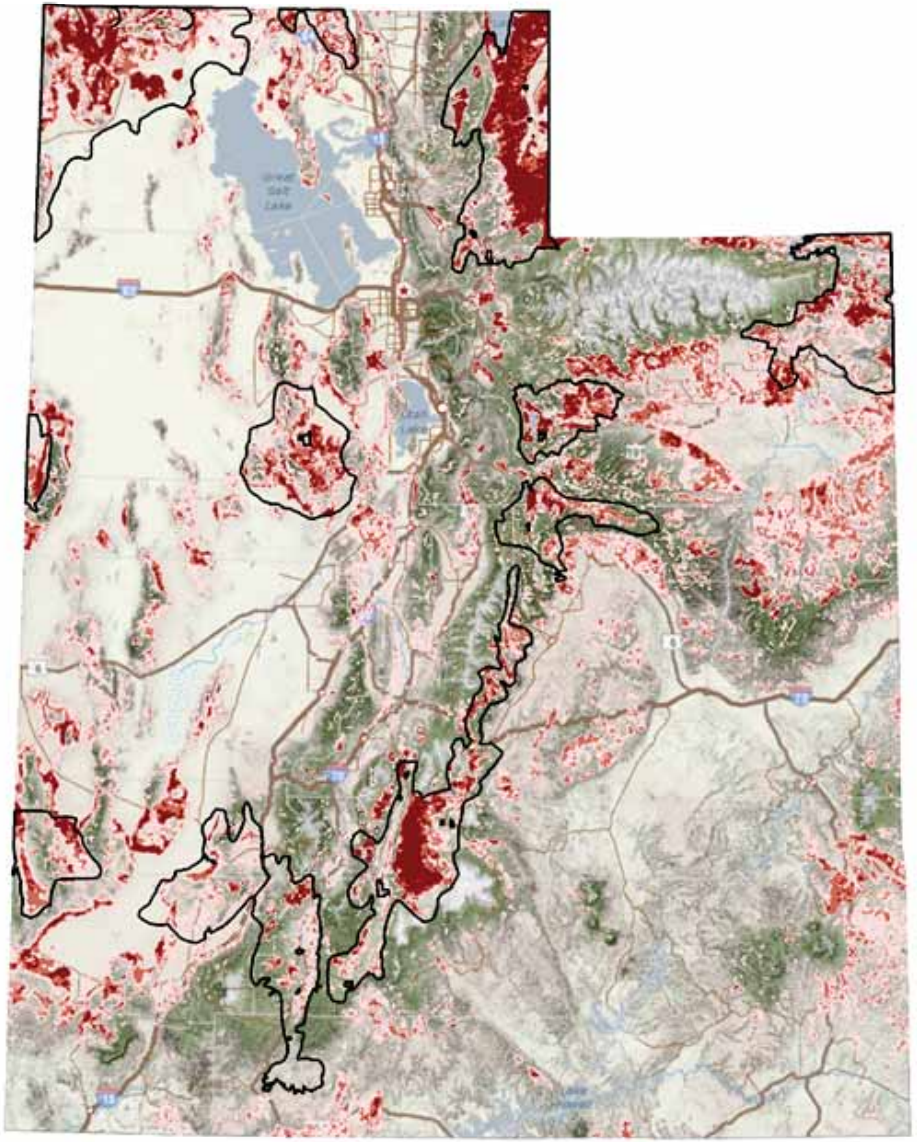
Sage-grouse brood-rearing habitat in Utah

And Utah's Sage-Grouse Management Areas

Conservation of wide-ranging sage-grouse populations requires an understanding of how and where birds move within and between seasonal habitats to complete their life cycle. Sage grouse require vast tracts of intact sagebrush, and exhibit varied movement strategies across their range in response to the spatial composition of available habitats and presence of human activities. In places where particular habitat pathways facilitate movement, managers may need to extend conservation actions to maintain these habitats as linkages between seasonal ranges.

This map shows the spatial distribution and quality of sage-grouse brood rearing habitat in Utah. After their chicks hatch in the spring, sage-grouse mothers stay with their mobile broods throughout the summer months. Summer habitat is shown on the map. A database of thousands of sage-grouse brood locations collected by researchers at USU, BYU, and the University of Utah was used in combination with vegetation and topographic data layers derived from satellite imagery to identify suitable habitat areas.

The map also shows the locations of Sage-Grouse Management Areas identified by the State of Utah. Hopefully effective management in these areas will prevent the sage-grouse from being named to the Endangered Species List. Such a federal classification would invoke limitations on development, natural resource extraction, and grazing.

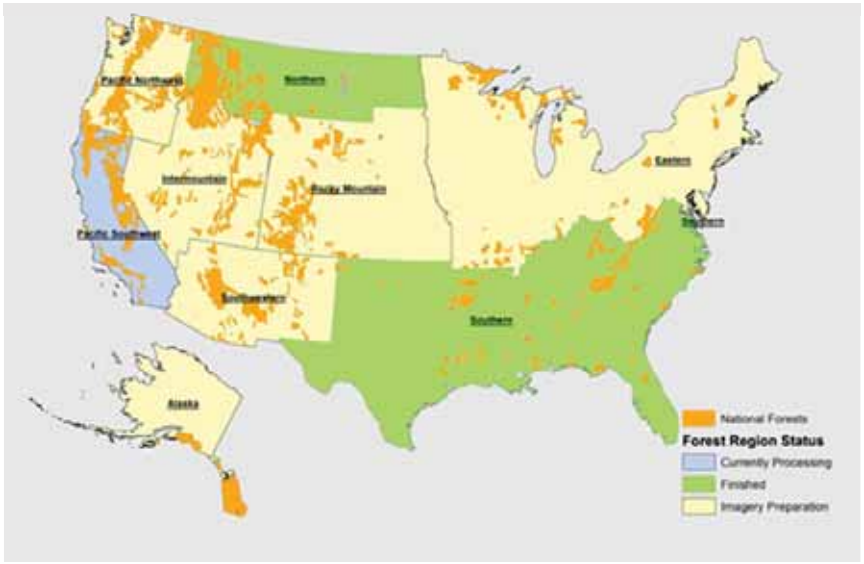


S.J. & JESSIE E. QUINNEY COLLEGE of NATURAL RESOURCES
UtahStateUniversity
REMOTE SENSING/GIS LABORATORY

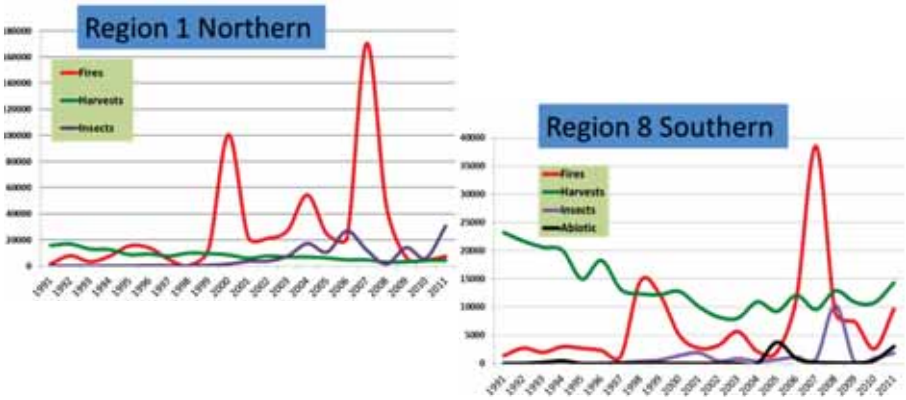
Ben Crabb
Utah State University Remote Sensing/GIS Laboratory

Mapping of Forest Disturbance Magnitudes Across the United States National Forest System

A component of the US National Forest System (NFS) comprehensive plan for carbon monitoring includes accounting for mapped disturbances, such as fires, harvests, and insect activity. A long-term time series of maps that show the timing, extent, type, and magnitude of disturbances going back to 1990 has been prepared for the United States Forest Service (USFS) Northern and Southern Regions, and is currently under preparation for the rest of the NFS regions covering more than 77 million hectares.



The Remote Sensing/GIS Laboratory, in partnership with the United States Forest Service (USFS), has developed a disturbance mapping approach. Forest disturbance mapping is initiated using an automated detection of annual disturbances using imagery captured within the growing season from the Landsat archive. Through a meticulous process, the initial detections are then visually inspected, manually corrected and labeled using various USFS ancillary datasets and Google Earth high-resolution historic imagery. We then prepare multi-temporal models of percent canopy cover and live tree carbon (T/ha) that are calibrated with extensive (in excess of 2000 locations) field data from the USFS Forest Inventory and Analysis (FIA) program. The models are then applied to all years of the radiometrically corrected and normalized Landsat time series imagery in order to provide annual spatially explicit estimates of the magnitude of change.



Total forest area distributed through time (hectares)

S.J. & JESSIE E. QUINNEY COLLEGE of NATURAL RESOURCES
UtahStateUniversity
REMOTE SENSING/GIS LABORATORY

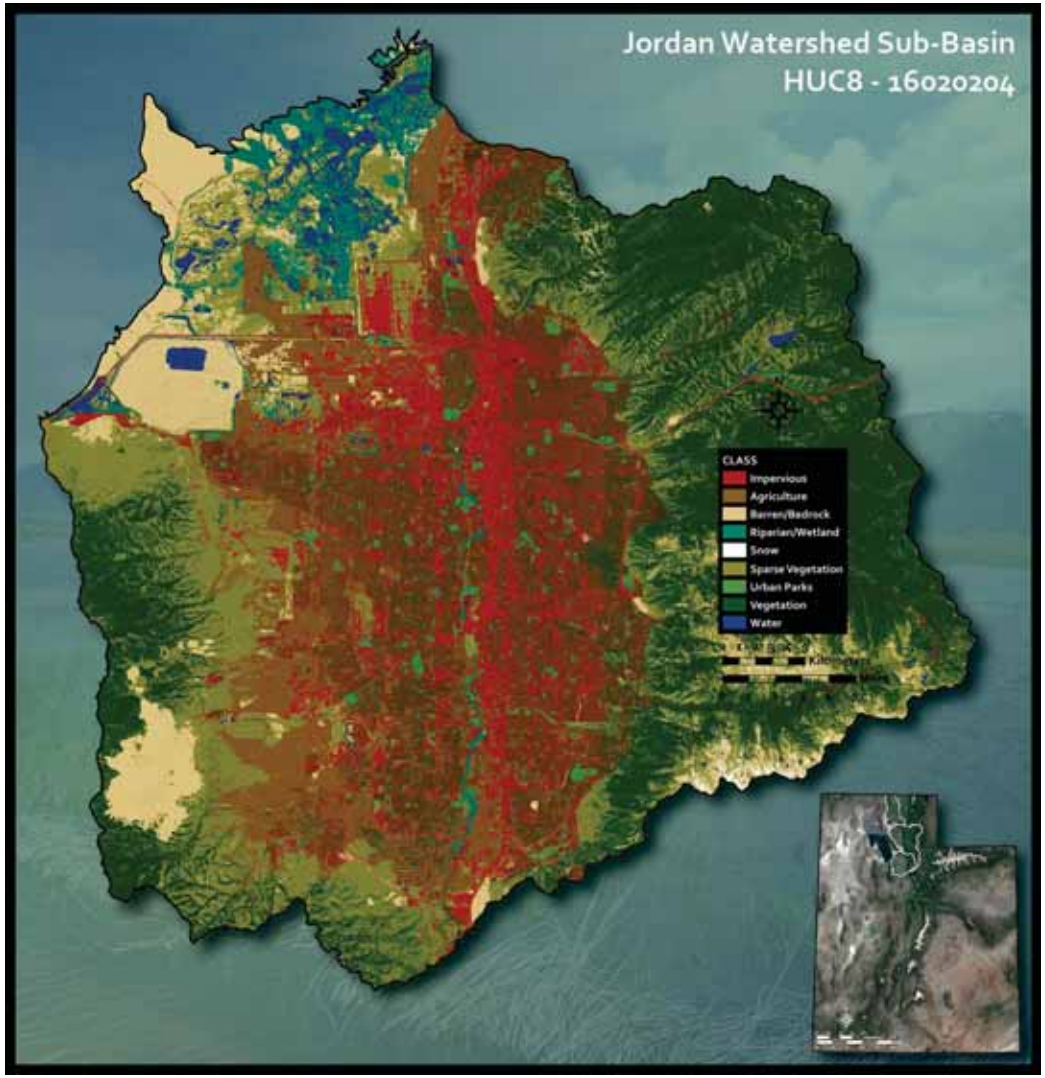
Alexander Hernandez, Sean Healy, R. Douglas Ramsey, Huang Chenquan, Nathan Payne, Christopher McGinty, Christine Garrard, Lu Ning
Utah State University Remote Sensing/GIS Laboratory

Impervious Surface Mapping for the Wasatch Front

An Object-Based Image Analysis Approach to Identifying an Indicator for Wetland Stress

The U.S. Environmental Protection Agency has provided funding for the Remote Sensing/GIS Laboratory to map and quantify impervious surfaces for three watershed sub-basins spanning the Wasatch Front – Lower Bear-Malad, Lower Weber, and Jordan. The objectives of the project are: to develop a high-resolution, spatially accurate impervious surface layer; to provide watershed-scale quantifications of impervious surface area; and to support Utah's Wetland Program Plan (WPP), as managed by the Utah Geological Survey and Utah Division of Water Quality.

Impervious surfaces are being mapped using Trimble eCognition, an object-based image analysis software program that uses a combination of both geospatial and image processing techniques to extract information from high-resolution imagery. Four-band NAIP imagery from 2011 was used to develop the initial models for the Jordan watershed sub-basin in eCognition; however, digital elevation data, Water-Related Land Use data, road centerline data, and soils data were incorporated into the models to improve accuracy. The ancillary datasets supported model accuracy and enabled the classification of other land use/land cover classes, yielding a wall-to-wall classification with nine classes.



S.J. & JESSIE E. QUINNEY COLLEGE of NATURAL RESOURCES
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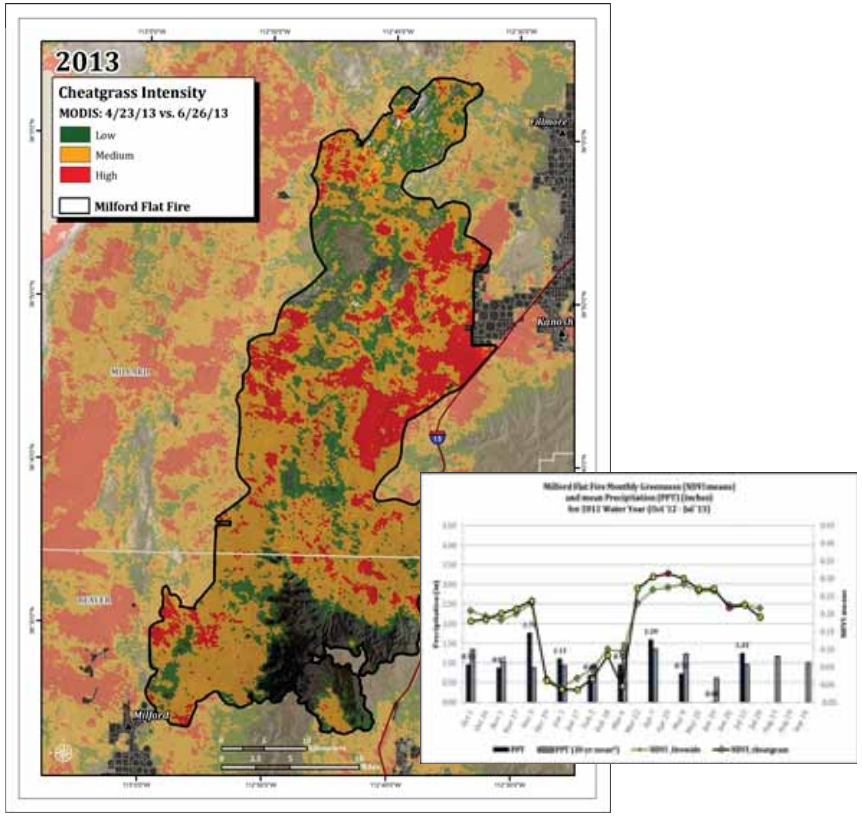
Ellie I. Leydsman McGinty
Utah State University Remote Sensing/GIS Laboratory

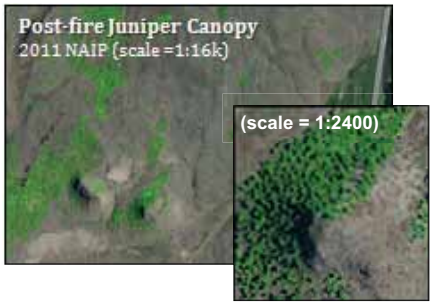
Post-Fire Revegetation Monitoring

Milford Flat Fire, Utah

In July 2007, the lightning ignited Milford Flat Fire (MFF) burned 363,000 acres of Utah rangeland in less than eight days. The fire event was the largest recorded wildland fire in the history of the state of Utah, reaching across Beaver and Milford counties. Pre-fire land cover included salt desert scrub, sagebrush, juniper, native forbs, and an abundance of annual weeds, including cheatgrass (*Bromus tectorum*). Substantial investments have been directed toward fire rehabilitation, including revegetation and post-fire land cover monitoring.

The Remote Sensing/GIS Laboratory at Utah State University, in partnership with the Utah Bureau of Land Management, developed a remote sensing-based monitoring program to monitor vegetation trends across the MFF complex. Vegetation growth has been tracked using phenological profiles created from bi-monthly MODIS imagery of Normalized Differenced Vegetation Index (NDVI) data in addition to climatic data. Annual cheatgrass intensity maps have been generated by differencing two MODIS images corresponding to seasonal cheatgrass green-up and senescence. These maps show areas of high, medium, low, or no cheatgrass intensity. Additionally, due to the loss of large tracts of juniper woodlands, a high-resolution map of remnant juniper canopy was delineated using 2011 NAIP imagery and object-based image analysis. BLM managers will utilize these data and monitoring tools to evaluate land cover trends and for prioritizing land management activities.





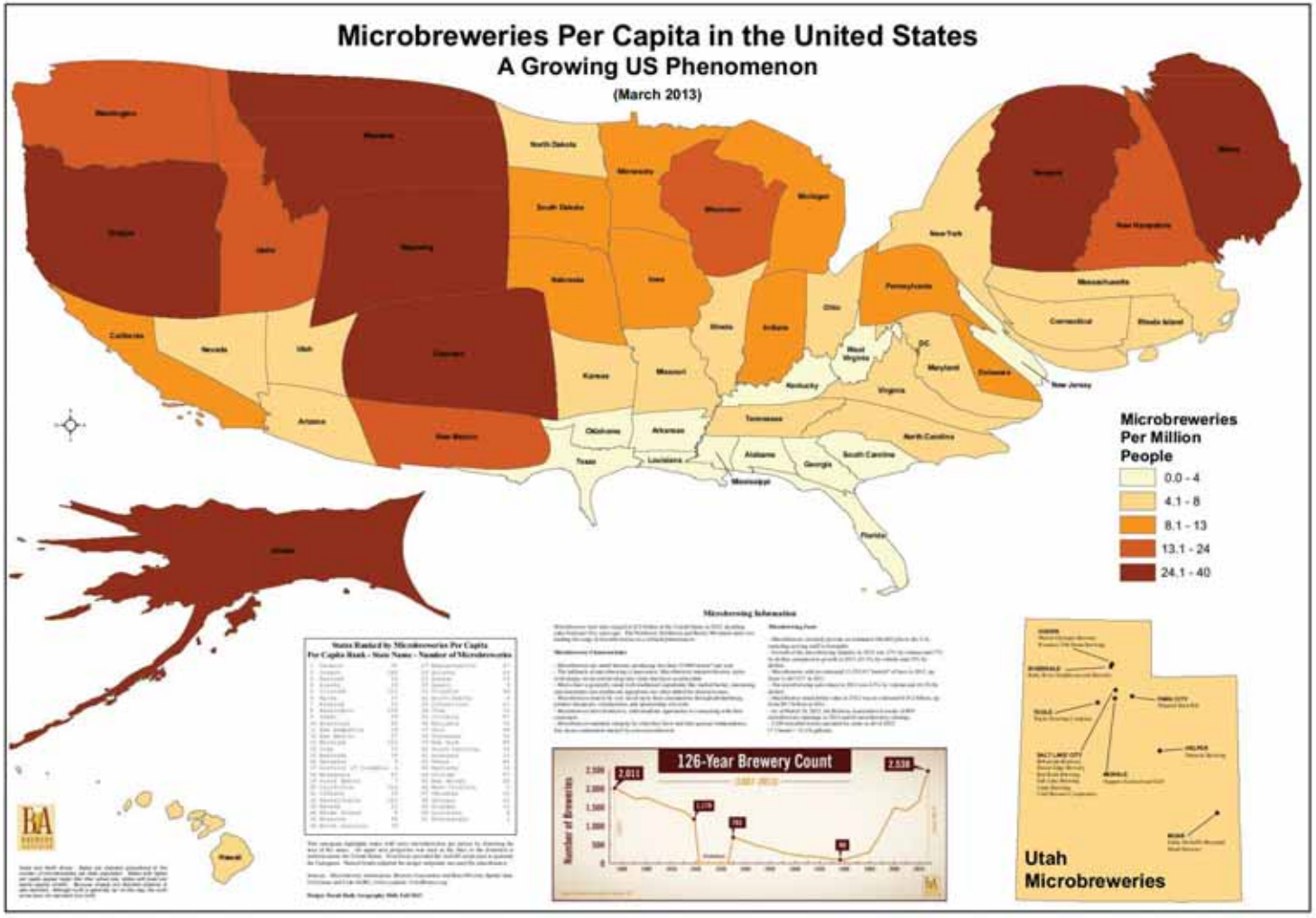
S.J. & Jessie E. Quinney College of Natural Resources
UtahStateUniversity
REMOTE SENSING/GIS LABORATORY

Lisa Langs Stoner, Christopher McGinty, R. Douglas Ramsey
Utah State University Remote Sensing/GIS Laboratory

U. of Utah, Geography Dept.

Undergraduate Cartography Student Projects

As part of the geography undergraduate curriculum, students participate in a cartography course. The course culminates in a final project, whereby students demonstrate cartographic skills and abilities gained in the course using a topic of interest to the student. A few of the student projects are shared from fall semester 2013, taught by Ingrid Weinbauer and lab instructor, Kaila McDonald.



Student: Dave Huth

U. of Utah, Geography Dept.

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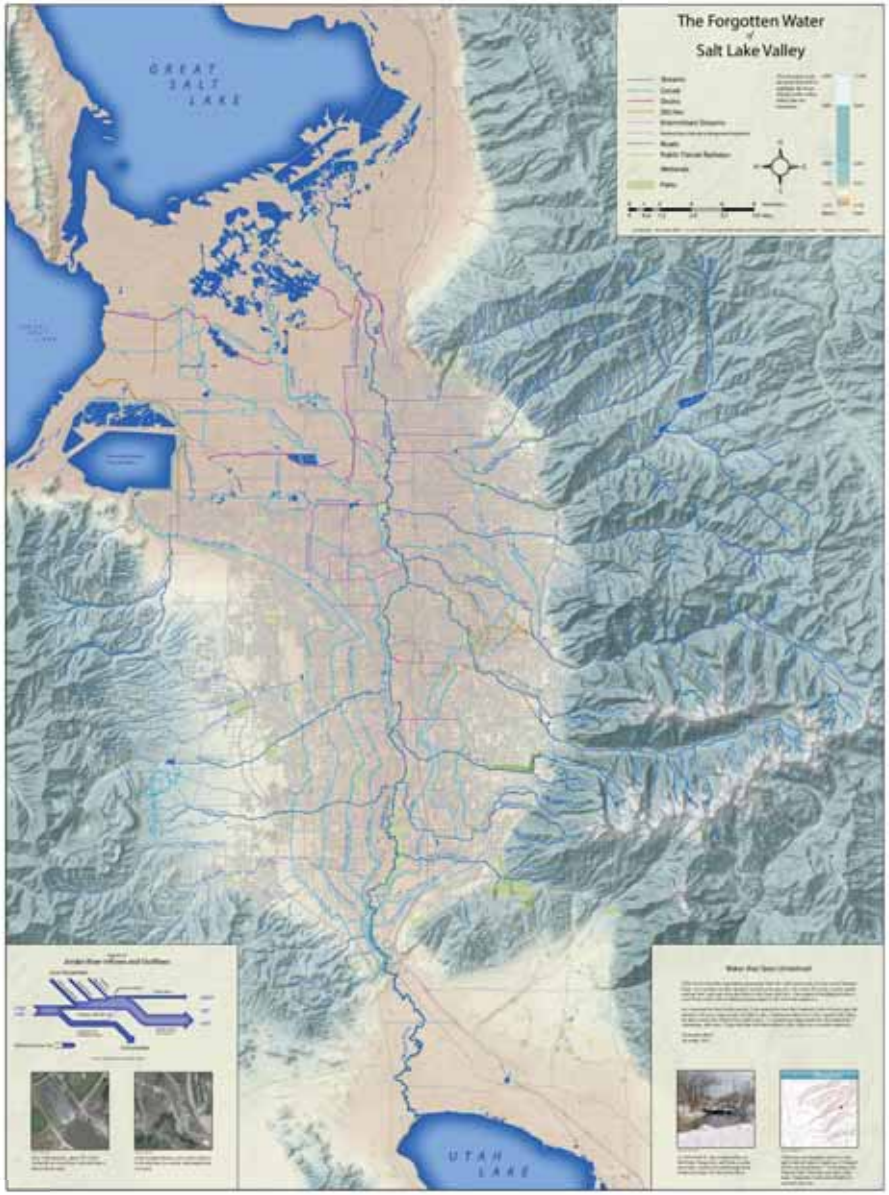
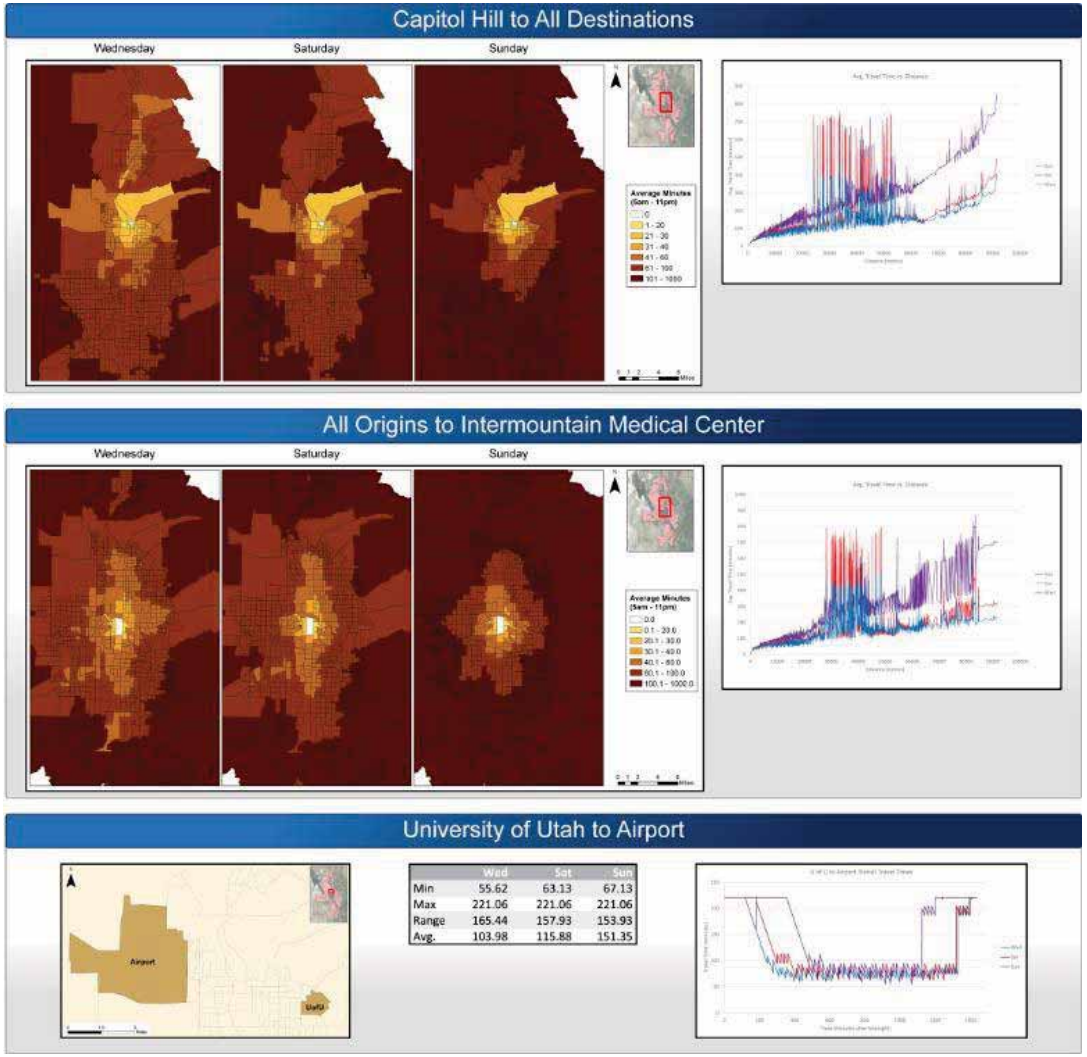


Student: Christopher Ward

Temporal Analysis of UTA's Public Transit Network

Public Transit is a vital mode of transportation for expanding cities, such as Salt Lake City. However, unlike some public transit systems, the Utah Transit Authority's transit network does not operate continuously. In addition, as with most systems, the travel time of a trip using the network varies based on the trip departure time. While several previous studies examined trip travel times, they were restricted to rush hour only. As a result, the purpose of this research was to design a method for calculating the trip travel times from all origins to all destinations for every minute of a weekday, Saturday, and Sunday.

This research is a small subset of my Masters Thesis. While this preliminary research examines the overall fluctuations of the transit network, further research will be conducted that analyzes the social equality of the network based on the demographics of the origins and destinations, as well as the individual trips made by travelers as part of the 2012 Utah Household Travel Survey.



Benjamin J. Ritter
The University of Utah

U. of Utah, Geography Dept.

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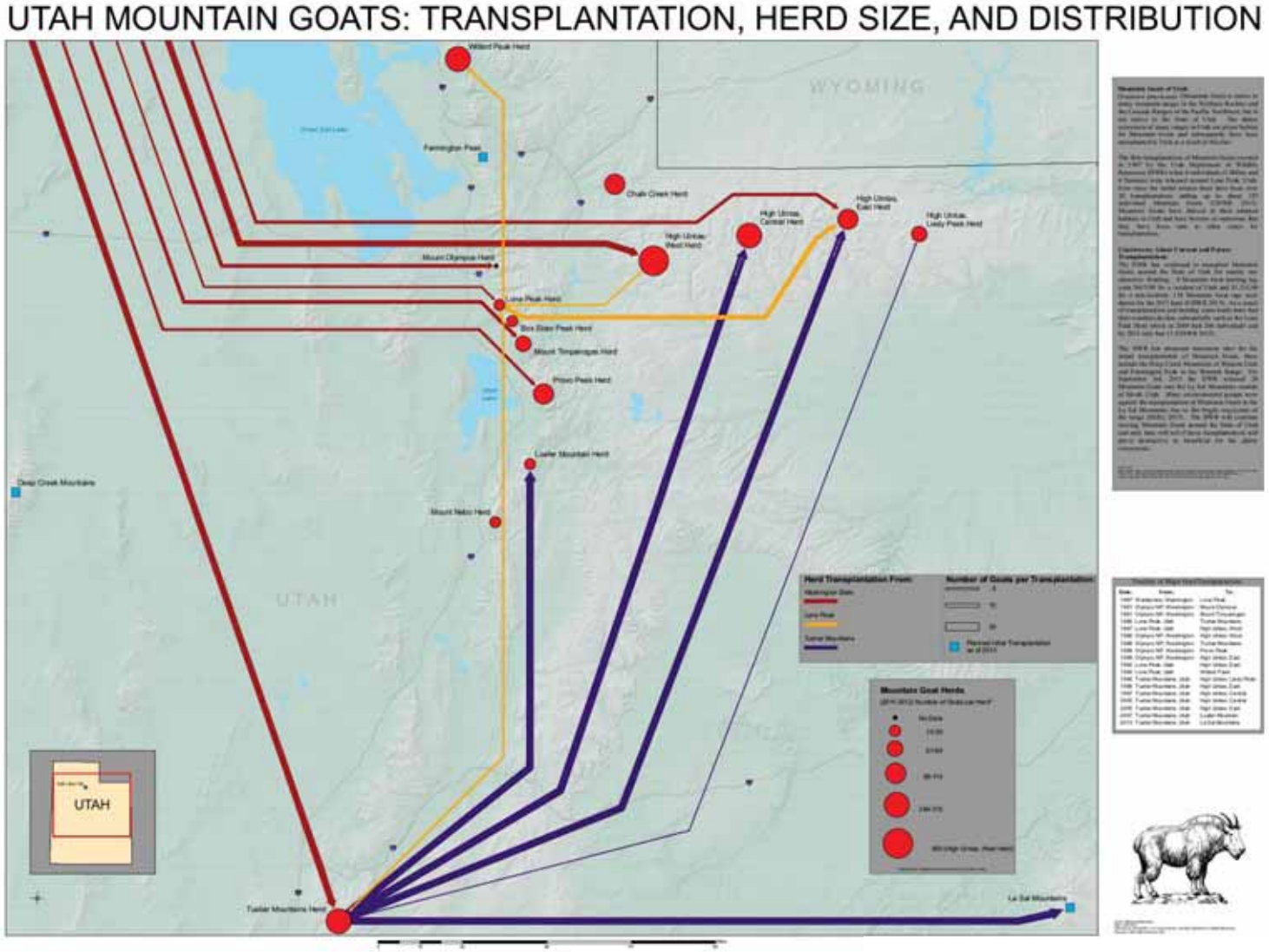
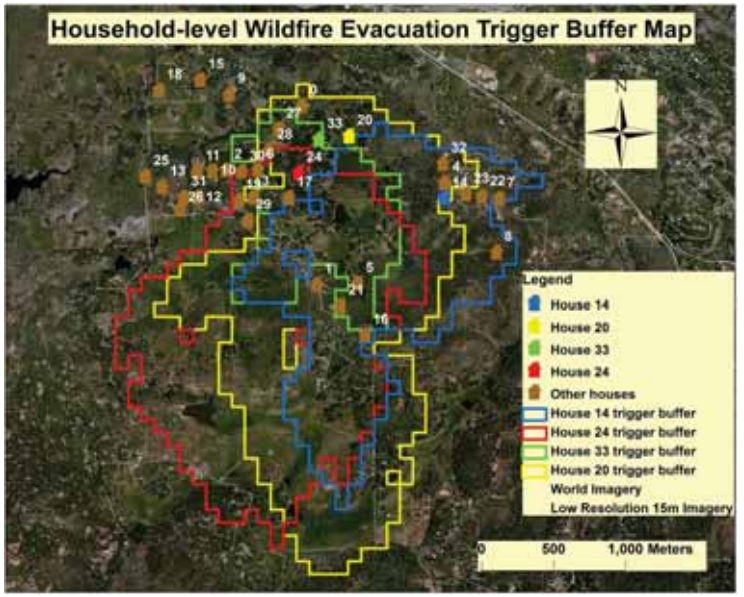


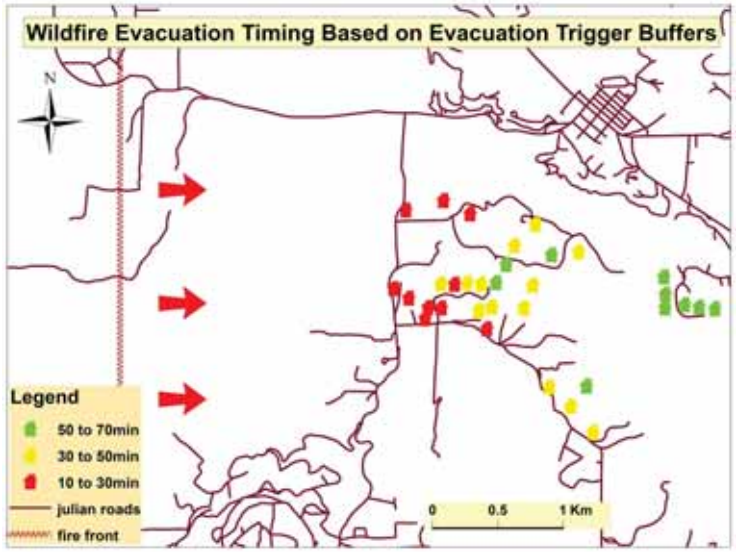
Student: Matthew Weilenmann

Household-level Wildfire Evacuation Trigger Modeling

Wildfire evacuation trigger points are prominent geographic features (eg., ridges, roads, and rivers) utilized in wildfire evacuation and suppression practices, and when the fire crosses these features, an evacuation will be recommended for the communities or firefighters in the path of the fire. Recent studies of wildfire evacuation triggers have used Geographic Information Systems (GIS) and wildfire spread modeling to calculate evacuation trigger buffers around a location (*P*) with a given time (*T*) as the input. This process has been formulated into a Wildland Urban Interface Evacuation (WUIVAC) model.

This work examines the use of household-level trigger modeling in staged evacuation planning. When trigger buffers are available for each home and a fire spread scenario is given, the homes can be ranked by their evacuation times, which will enable the emergency managers to do staged evacuation planning for these homes. In the case study, households near Julian, California were used as the input for the WUIVAC model and a series of trigger buffers were calculated around these homes. In the next step, an assumed fire spreading from the west to the east was used, and all the homes were grouped into three zones based on their evacuation times. The bottom map shows the evacuation timing map based on the household-level trigger modeling.





Dapeng Li, Thomas J. Cova, Philip E. Dennison
Department of Geography,University of Utah

Channel & Riparian Vegetation Change on the Jordan River, Utah

[1]Jonathan Hilbert, [2]Brandon Davis, & [3]Suzanne Walther
Utah Valley University, Earth Science Dept 800 West University Pkwy, Orem, UT 84058
[1]hilbertjon@gmail.com, [2]brandondavi@gmail.com,[3] swalther@uvu.edu

Motivation

- To quantify land cover changes in riparian zone vegetation, urban or built-up land, barren earth & agriculture using GIS.
- To identify overall trends in land cover changes along the river.

Introduction

The Jordan River in Utah has been highly regulated for many years. Human interaction on the individual and commercial scale influences the river through development and urbanization. From aerial imagery and field observations, we noted alterations in the vegetation within the riparian zone. In this study we quantify ~20 years of land cover changes in the riparian zone of the Jordan River, which flows from Utah Lake north to the Great Salt Lake.

Study Site

Methods

We used GIS and aerial imagery from 1992, 2003, and 2011, to evaluate land cover using Anderson's classification system (Vegetation, Urban or Built-up Land, Barren Earth, & Agriculture) within a 100 meter buffer zone of river channel.

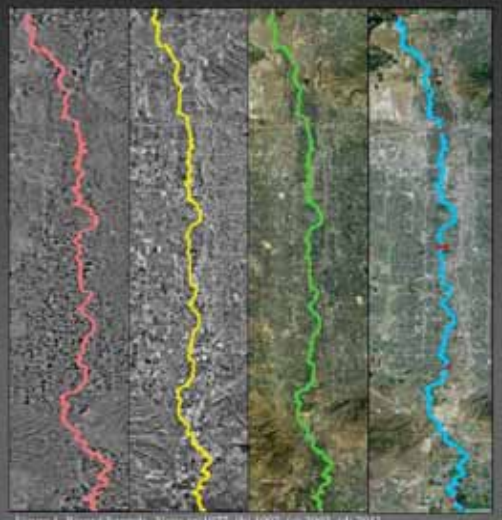


Figure 1. River Channels - Years (a)1977, (b) 1992, (c) 2003, (d) 2011

Figure 2. Examples of greater sinuosity

Figure 3. Examples of low sinuosity

Figure 4. Example of Land Cover at this site in (a)1992, (b) 2003, (c) 2011

Results

Land cover	1992	2003	2011	92-'11 overall change
Vegetation	57%	53%	49%	-8%
Barren Earth	2%	2%	4%	2%
Agriculture	8%	9%	7%	-1%
Urban or Built-up Land	34%	35%	41%	7%

Table 1. Percent Change in Land Cover along the length of the river

- Increase in Urban/Built-up Land and Barren Earth, proportional decrease in Vegetation and Agriculture.
- Values reflect urbanization throughout the greater Salt Lake area between Utah Lake and the Great Salt Lake.

Years	Section	Vegetation	Agriculture	Urban	Barren Earth
92-03	A	3	12	-24	-2
	B	5	23	-19	32
	C	-20	-24	19	27
	D	-26	26	18	22
03-11	A	-17	-26	41	54
	B	-21	-31	27	30
	C	-8	-9	5	34
	D	10	-48	-8	53
92-11	A	-13	-11	26	53
	B	-15	0	13	53
	C	-30	-35	23	52
	D	-13	-9	12	63

Table 2. Percent Change in Land Cover in each section.

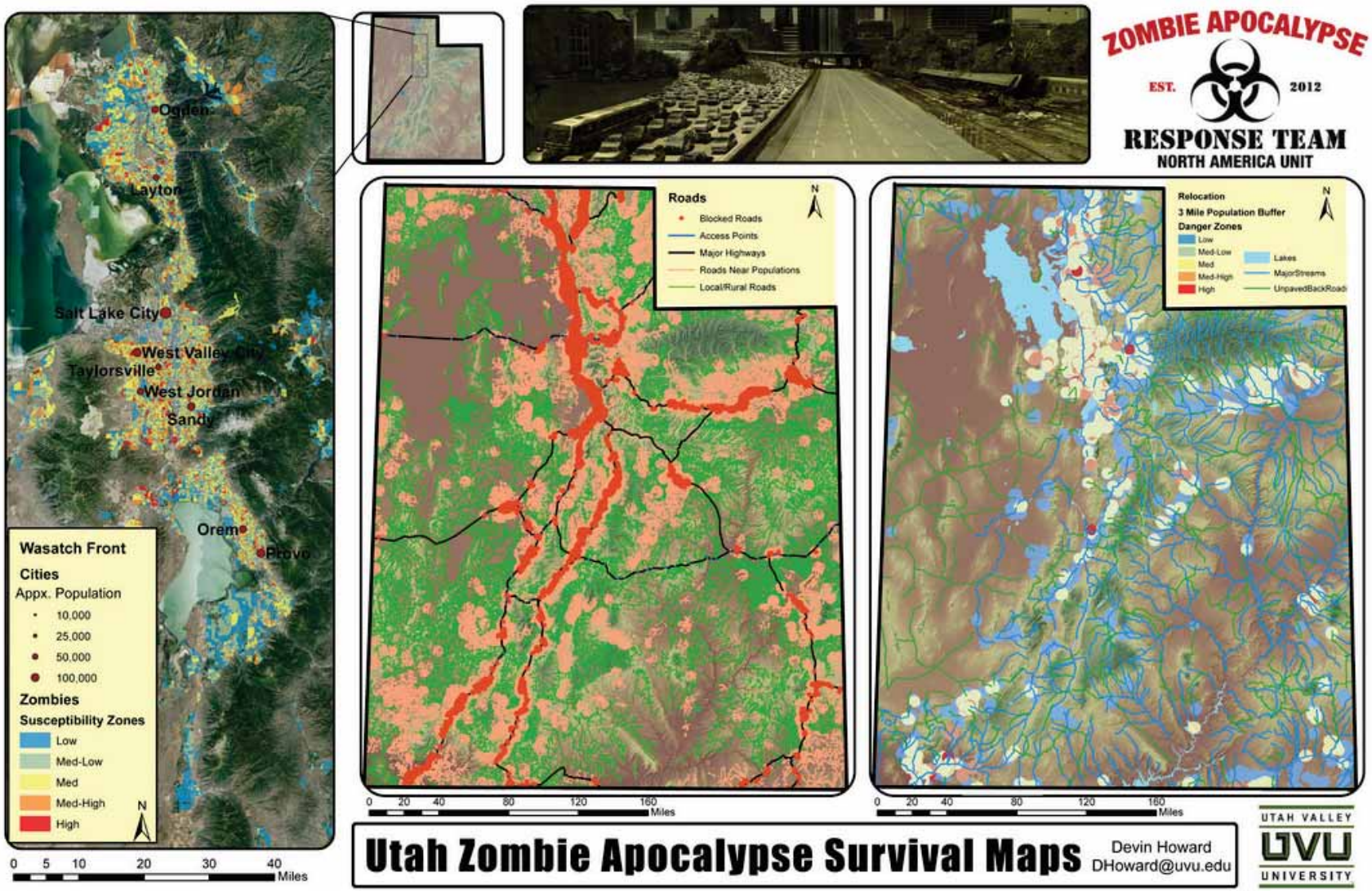
- Vegetation loss values were lowest in Utah Valley (A) and the Salt Lake wetlands (D).
- Urban growth seen in all sections, mainly Utah Valley (A) and the growing suburbs of Salt Lake City (C).

Conclusion

- Overall, evaluated land cover increased in Urban or Built-up Land and Barren Earth, as Vegetation and Agriculture proportionally decrease from 1992 to 2011.
- Utah Valley (upper 1/3) land cover change values were lower than the overall changes observed. This suggests that the majority of development has occurred in the Salt Lake Valley.

Utah Zombie Apocalypse Survival Maps

As a result of the widespread popularity of zombies, I produced these maps that show where to avoid, where to go, and how to get there for the many people in need of a plan of action for the event of a zombie apocalypse. This information may be valuable in other cases of disaster where mass evacuation and panic occur.



(Left to right) Map 1 highlights the Wasatch front, showing the severity of zombie virus spread based on population density, Map 2 illustrates grid-locked roads in the advent of evacuation based on proximity to population zones, and Map 3 identifies relocation zones based on safe distances from populations, accessibility, elevation, bodies of water, and access to drinking water.

Devin Howard
Utah Valley University

USING LIDAR DEMS FOR GEOMORPHIC ASSESSMENT OF LAKE BONNEVILLE WAVE-CUT TERRACES AND POST-BONNEVILLE DISPLACEMENT ALONG THE WASATCH FAULT

UVU Department of EARTH SCIENCE

Lawrence T. Kellum
(B.S. in Geology - May 2014)
and Dr. Nathan A. Toké

Contact Larry via email: pedras86@gmail.com

The Wasatch Mountains are a product of normal displacement across the Wasatch Fault (WF). During the Late Pleistocene the Mountains were the eastern shore of Lake Bonneville. At the Lake's highstand and during periods of stability as it receded, wave-cut terraces were formed. Since that time, multiple surface rupturing earthquakes along the Salt Lake City segment of the WF have crisscrossed these terrace surfaces recording approximately 18,500 years of slip along the fault. In addition to discrete fault displacements, isostatic rebound has uplifted the terraces following the removal of the Lake's mass. In 2008, LiDAR was acquired for the Salt Lake City region. This dataset presents the opportunity to estimate the elevations of these displaced terraces across the entire region, providing a high frequency sample of the relative displacements due to faulting along this segment. Understanding slip distribution over multiple earthquake cycles has the potential to improve our understanding of fault structure, segmentation and earthquake hazard. Initially, we used a GIS approach to determine the elevations of the Bonneville terraces. Using preexisting geomorphic mapping we created 3-meter wide symmetrical buffer along ~100 meter sections of the mapped Bonneville polylines and extracted descriptive statistics for each of these areas based upon the 2008 LiDAR. This extraction suggested that variability in surface slip over the last 18.5 ka corresponds to mapped steps in the surface trace of the WF. However, the statistics also revealed that some of the sample polygons have large standard deviations in surface elevation (up to ± 12 meters). Geomorphic mapping using the LiDAR leads to two explanations for these deviations. Firstly, some of the polylines from pre-existing mapping are inaccurately positioned within the landscape. Secondly, significant geomorphic modification has occurred on these surfaces. This has led to inflation of the surface at the mapped wave-cut edge, but the amounts of inflation depend upon whether inflation is due to colluvium or fan deposition. This initial GIS method has been useful for identifying mapping inaccuracies and sites of geomorphic change. We are now expanding our analysis with a selective profile extraction method in order to interpolate the inner edge of these wave-cut terraces.

Mapping ~18,000 Years of Landscape Modification reveals few geomorphically-simple surfaces for inner-edge profile extractions.

Figure A - Since the retreat of Lake Bonneville, erosional processes have continued to modify these geomorphic-markers. Careful mapping shows that multiple fan surfaces as well as channels are prevalent which inflate or deflate the actual terrace elevation as can be seen in the variability of terrace inner-edge elevations

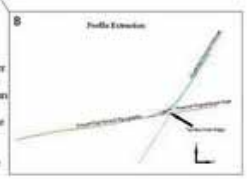
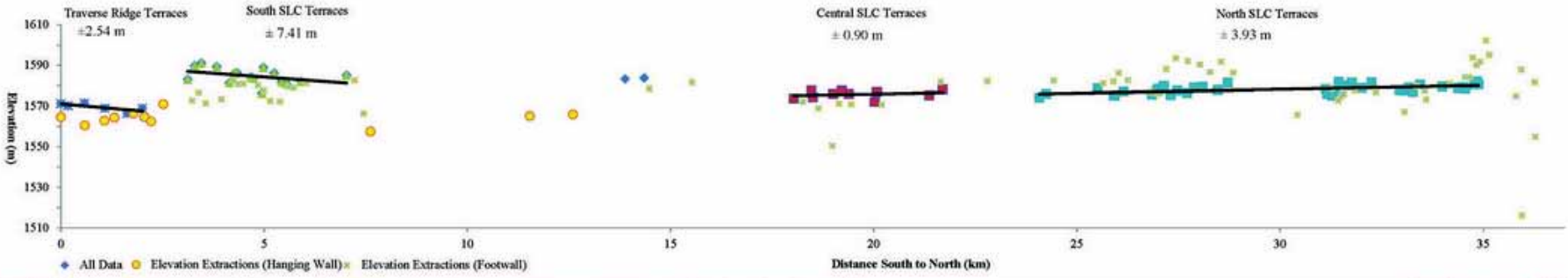
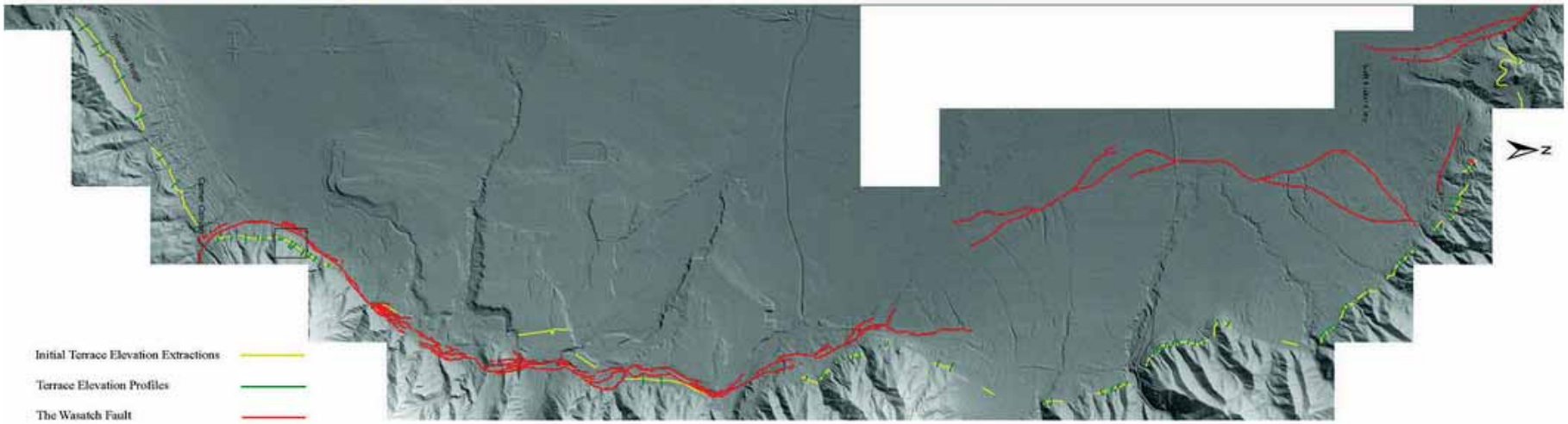


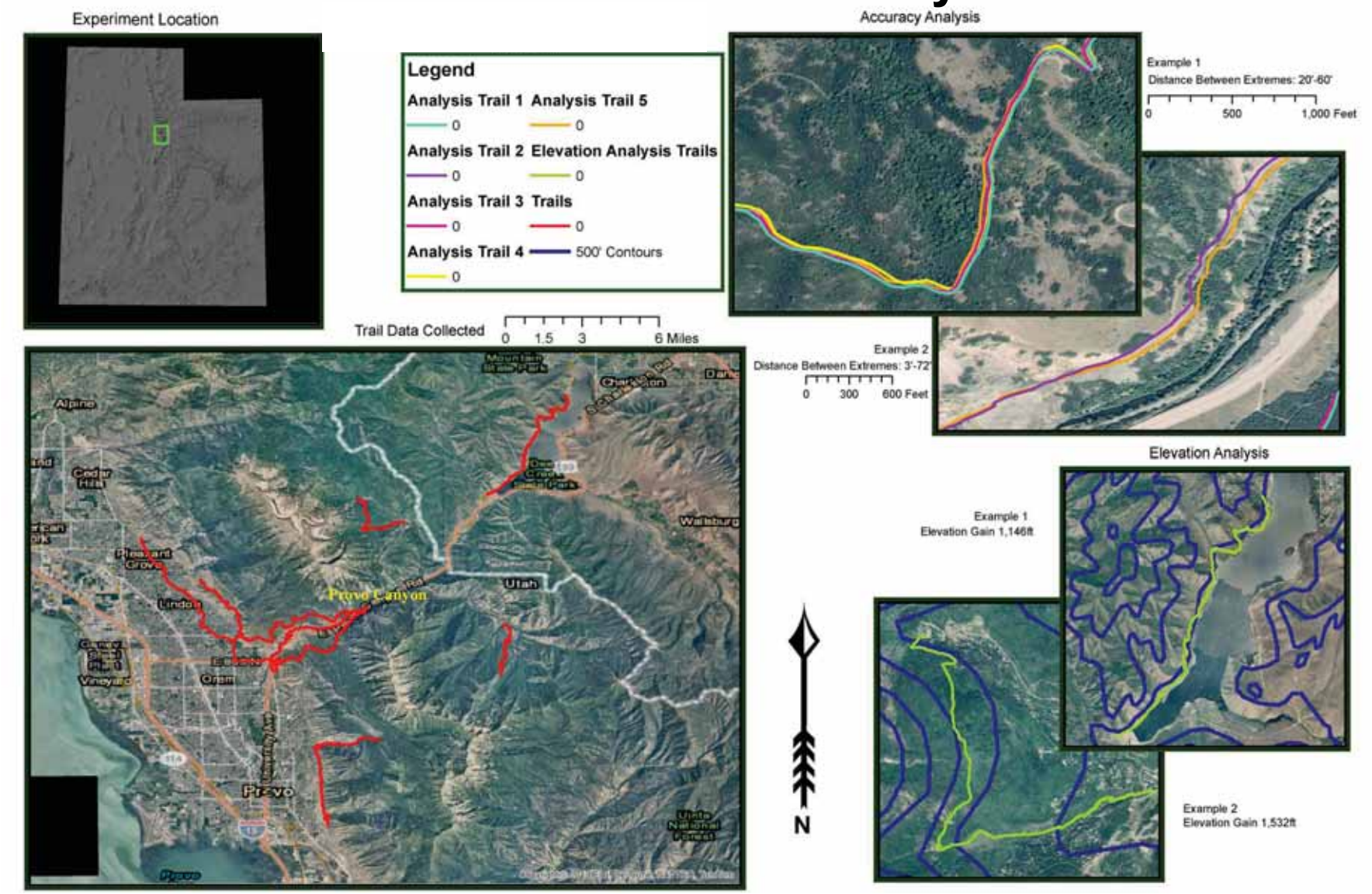
Figure B - A cross-sectional profile looking down the strike(NE) of the profile extraction line which is marked green in Figure H. Once an ideal site (minimal modification other than colluvial draping) is located, an approximate original surface form can be determined by finding the part of the surface with constant slope on the present day terraces and hillslopes. These are then projected to an intersection point which we presume represents the approximate original elevation of the terrace's inner-edge.

Bonneville Shoreline Elevations along the Salt Lake Valley





Trail and GPS Watch Analysis



For my GIS project, I decided to analyze some of the trails in Provo Canyon that my team, the UVU cross country team, run regularly. To identify difficulty of the trail, I determined how often a trail crosses a given contour line and compare that to the elevation gain of that trail. Next, I determined how accurate each reading on my GPS watch was for a given trail. I used Google Earth and data from my GPS watch to map the trails.

Nelson Orton
Utah Valley University

Water waste on UVU campus?

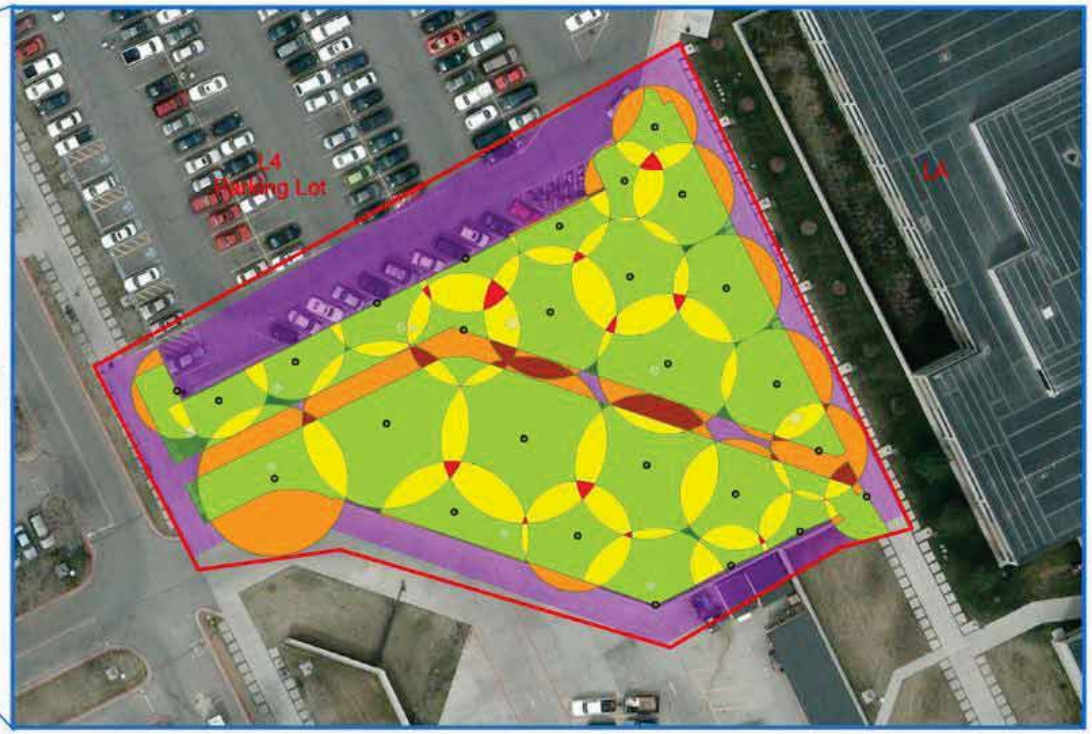
Mapping sprinkler overlap and sidewalk cover

Motivation:

I noticed that many sprinklers are watering sidewalks on campus making it near impossible to travel on without being sprayed with water. Because Utah is a semiarid State, this caused me to think about the water waste and cost.

UVU Campus in Orem

Study Site: North of UCCU Center



Total Area of Sprinkler Arcs (m^2)	3435.98
Total Area of Overlap in Sprinkler Arcs (m^2)	849.69
Percentage of Overlap	24.73%
Percentage of Single Overlap on Grass	23.95%
[illegible]	[illegible]
[illegible]	[illegible]
Percentage of Arcs on Sidewalks	16.10%
Percentage of Single Arc on Sidewalks	14.00%
[illegible]	[illegible]
Percentage of Arcs with no Overlap	59.17%
Total Water Wastage (% Total Area of Coverage) from Sprinkler Arcs	40.83%

- ~25% of water spray is overlapping
- 16% of water spray is watering the sidewalks
- Convenient use of the sidewalks in addition to long term water and cost savings can be achieved using GIS through planning and mapping

Garrett Turner
Utah Valley University

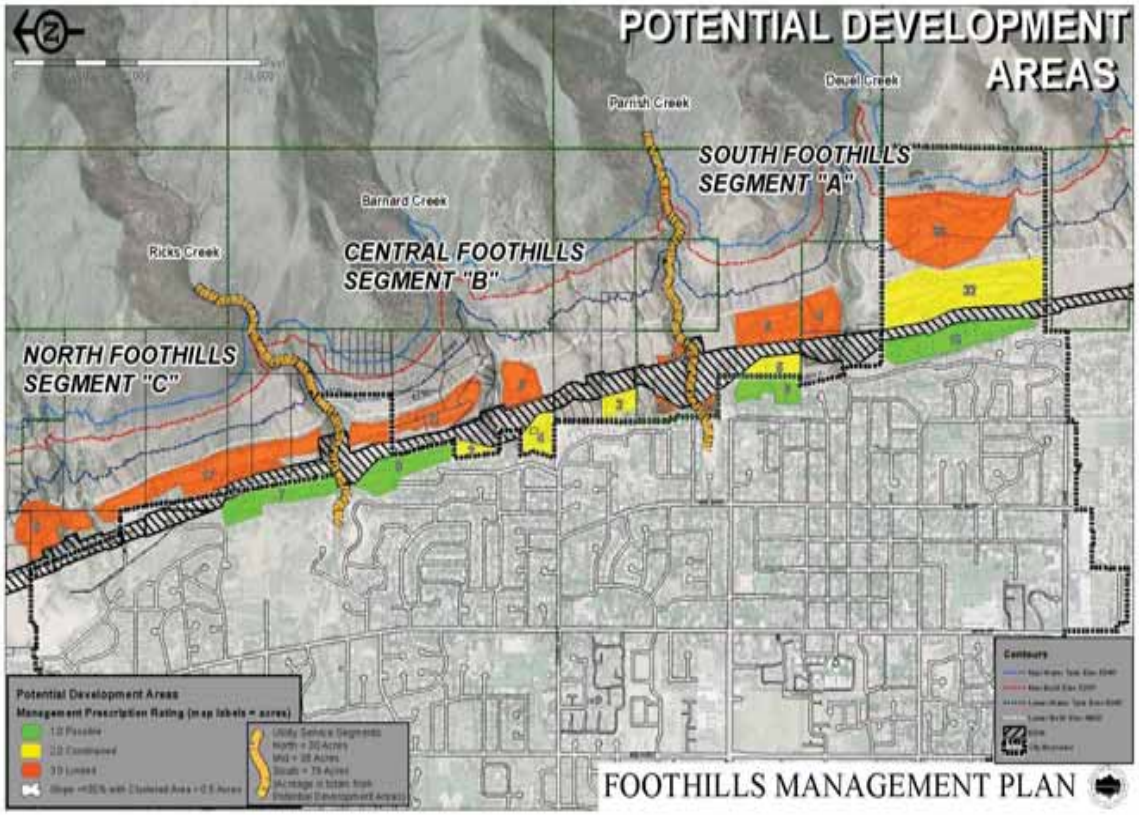
Local Government

Centerville City
Hillside Development Potential

Centerville City is tightly centered between the Great Salt Lake wetlands and the foothills of the Wasatch Range. As growth extends towards these sensitive areas, questions of possible and appropriate development must be considered. To address these issues, Centerville's GIS and Planning Departments, along with an oversight committee, conducted a study that produced a 27 page document to guide policy for potential development on the hillside.

GIS was utilized to first determine where potential development could even be considered due to slope and elevation constraints. Anything under 30% and under 5200' was considered developable. The combination of LIDAR data and surface analysis tools in GIS software allowed us to produce a dataset of slope suitability. This became the master dataset to allow further analysis in limiting suitable areas to clusters greater than 0.5 acres, identifying land ownership, and removing areas of utility easements from potential sites. The remaining areas then received a ranking of development suitability.

This map illustrates the results of our initial analysis. This relatively basic GIS analysis was also instrumental in producing maps of hypothetical scenarios such as recreation maps, water distribution maps, site access maps, annexation maps, known geologic hazards and feature proximity.



Cottonwood Heights Emergency Response

The Salt Lake Valley is due for a 7.0 magnitude earthquake. This quake will produce extensive damage around the valley, altering the city,county, and state Emergency Operation Centers (EOC).

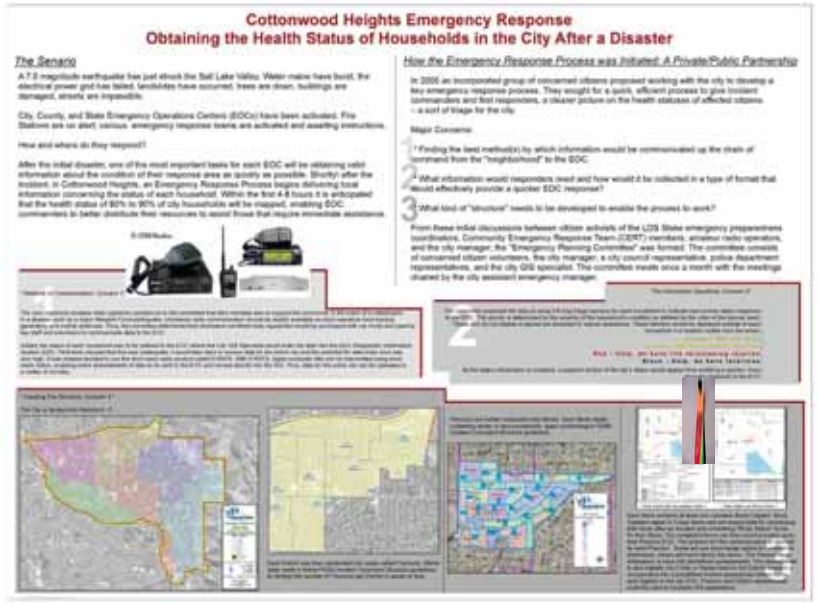
Cottonwood Heights has developed a citywide Emergency Response program to enable a quicker, more accurate response from the EOC. Each household uses 3-foot triage banners that define the severity of the household's condition.

Green - We are ok *Yellow - Minor injuries*
Red - Major injuries *Black - Fatalities*

The banners are displayed outside the home in a visible location. Homes not displaying a banner are assumed to require assistance.

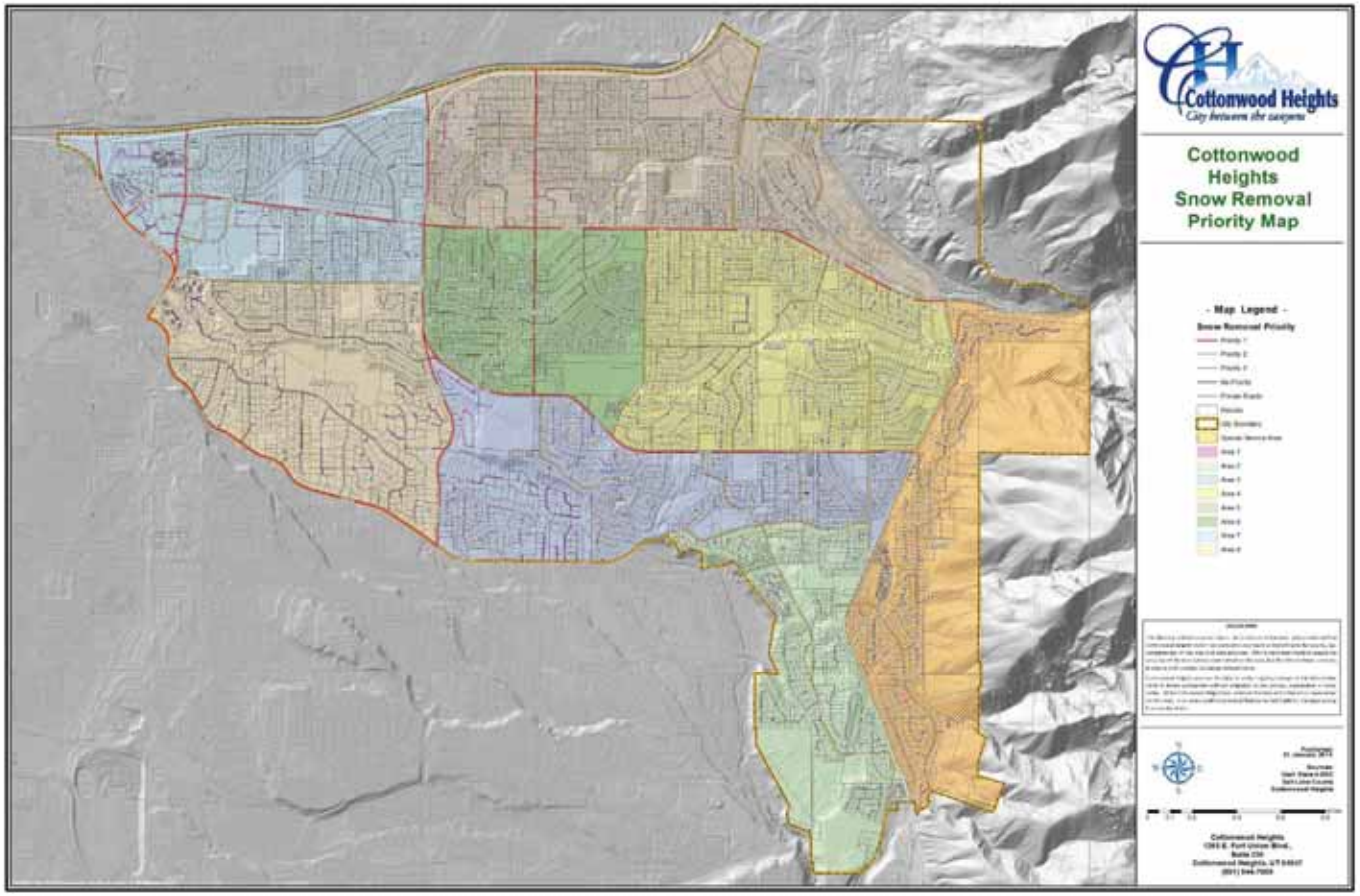
For gathering this information, Cottonwood Heights has been divided into smaller entities. A volunteer gathers the banner information on a block level, which is then reported to the precinct level, then to their district, and finally to the Cottonwood Heights EOC.

Shortwave radio was determined as the most reliable source for communication. Using a product called D-RATS, digital computer files are transmitted via shortwave radios, enabling entire spreadsheets of data to be sent to the EOC and directly into the GIS in a matter of minutes!



Kevin Sato & Lynzie Tilley
Cottonwood Heights

Cottonwood Heights Snow Removal Priority



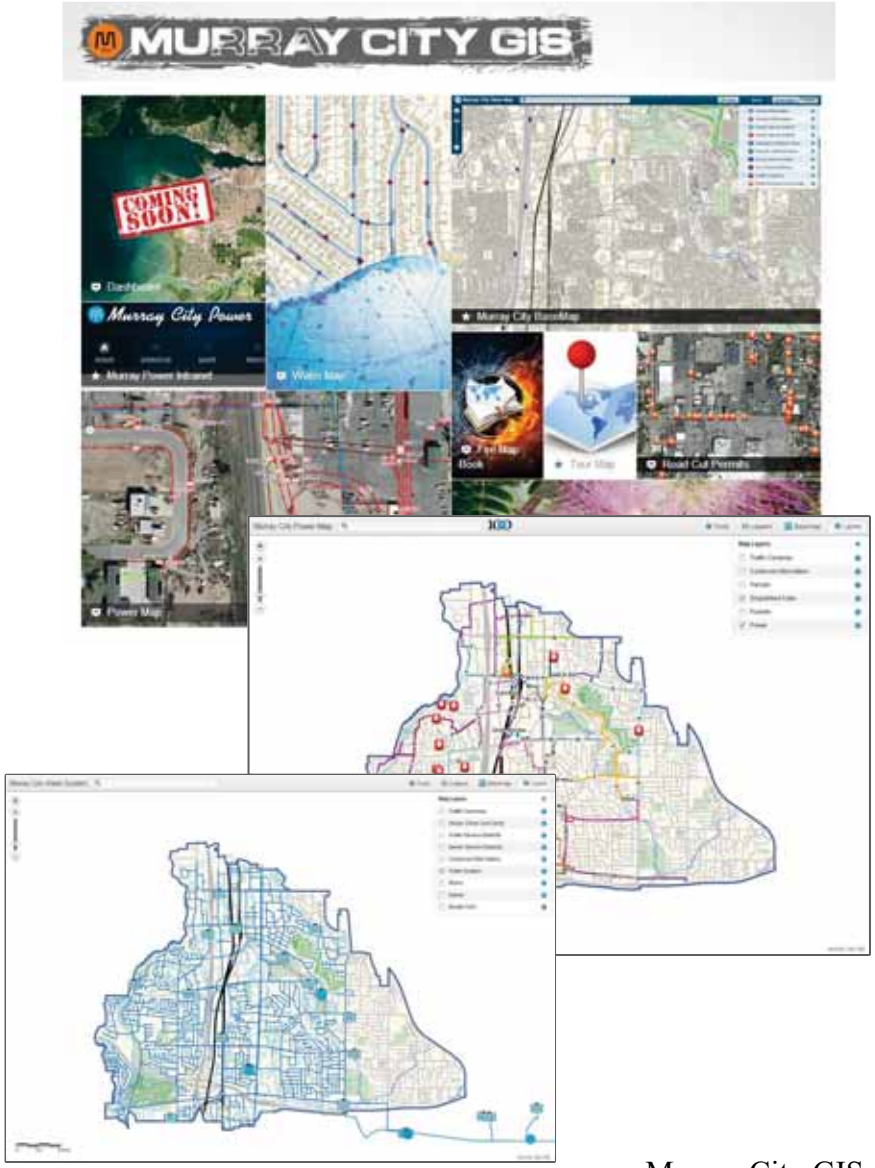
The City of Cottonwood Heights recently made the decision to enter into a contract with a private contractor for snow removal services. The city was divided into seven (7) snow plow zones and a priority was assigned to the roads within the city. This priority was assigned by the contractor with approval of the city after the contractor had acquainted itself with the city by driving the streets in good conditions and recognizing traffic flows and local topography. The first storm of the season was one of the biggest the city has experienced and the roads were not cleared satisfactorily. Part of the problem was the severity of the storm and part was the priority assignment. After reviewing the response and analyzing the priority assignment process the roads were re-evaluated based on the initial observations and analysis of other data with a GIS. This map is the result of this re-evaluation process. Individual area maps have been created and are carried in each individual truck.

Kevin Sato
Cottonwood Heights

Murray City Web Maps

Since the mid 1980's, Murray has invested in GIS and understood its value in mapping and tracking local infrastructure. However like many cities, Murray City has struggled with the rapid advancement of technology. Getting the GIS data in the hands of the employees that need it has always been a challenge. We have always been able to provide paper maps which have been invaluable, but paper still lacks the ability to interact with data such as identifying features.

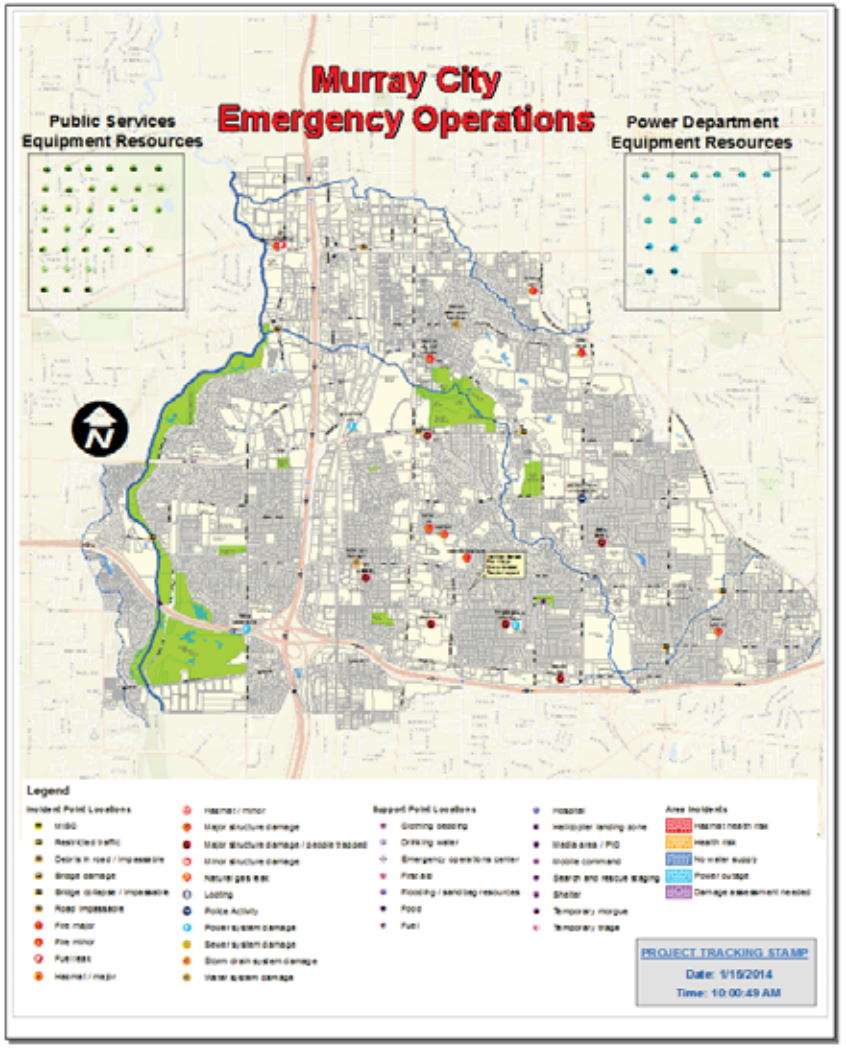
We started about a year ago taking some of our paper processes and make them digital so that we could capture that information and pipe it into our maps. At the same time we wanted to provide a web based viewer that employees can use to view our real time GIS data such as: parcels, customer information, building footprints, & service areas, to name a few. We were able to accomplish this by using the ArcGIS Server 10.1 and the JavaScript API to develop three custom web maps (so far) that serve a good portion of the city employees. These maps include the BaseMap – which serves as a simple viewer displaying our custom cache and imagery, parcels, and customer information. Next are the Power Map – that shows real time power outages and service orders as they are called in, also our Power utility infrastructure, and then the Water Map - which displays our Water, Sewer, & Storm systems all on one web map.



Murray City GIS

Emergency Preparedness for Murray City

Murray City is actively engaged in preparations for responding to a large scale emergency. This is a working map which has been prepared for use in the EOC during an emergency. Standardized features represent likely hazard incidents, which may be placed at the locations where they are occurring and attributed with details of the incident. Also available for placement are support point features, to be placed as those locations are designated. Department equipment resource "garages" contain features representing the specific heavy equipment the City has available, which will be moved to the locations each piece is dispatched to. This enables the decision makers in the EOC to see where the needs are at any given time, as well as available equipment, and allocate the resources appropriately. This map is constantly updated and displayed digitally in the EOC for the incident command leaders to be able to make real-time decisions based on the overall location of incidents, support and equipment resources. This working map has been used during earthquake drills, and is ready to deploy in an actual event.



Utah Mapping Emergency Technical Team (UMETT)
/Murray City GIS

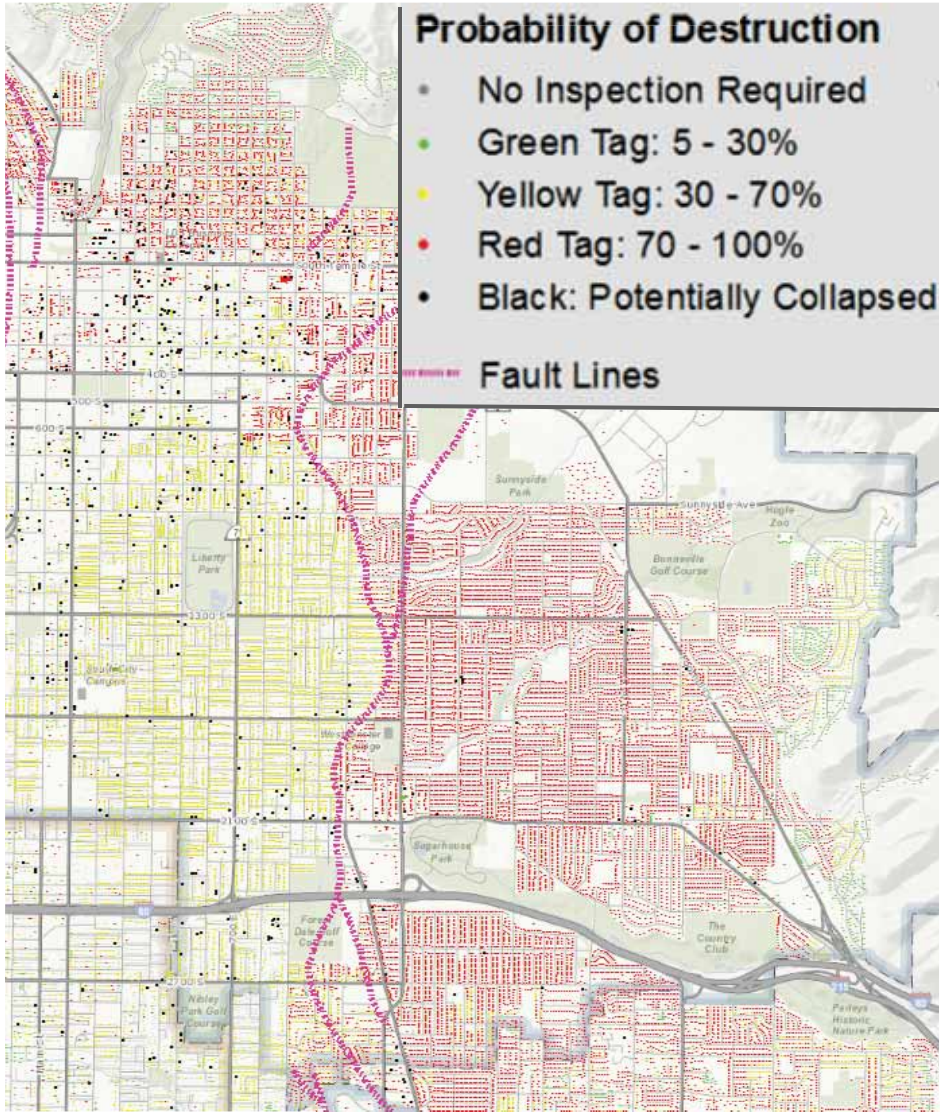
Building Damage Estimate for 7.0 Earthquake

(Prepared for Simulation Purposes only)

The Federal Emergency Management Agency (FEMA) developed Hazus and released the first earthquake loss estimation version in 1997. Since then they have added flood loss and hurricane loss capabilities while continuing to improve the earthquake model. For more than a decade, a broad range of applications have emerged including the development of mitigation strategies, scenario driven catastrophic planning, exercise support, recovery and preparedness planning.

The Utah application incorporated 20 ShakeMap scenario models http://www.shakeout.org/utah/scenarios from the University of Utah Seismograph Stations, liquefaction and landslide data from the Utah Geological Survey, as well as extensive updates to the Hazus inventory. The Hazus modeling analyses were updated with the 2010 census information, a site specific FEMA 154 vulnerable building inventory, a hospital inventory, Salt Lake County assessor data, and a detailed database of buildings on the University of Utah campus.

The Great Utah ShakeOut, ShakeMap and Hazus Applications
Douglas B. Bausch and Jesse Rozelle, FEMA Region VIII;
Kristine Pankow, University of Utah

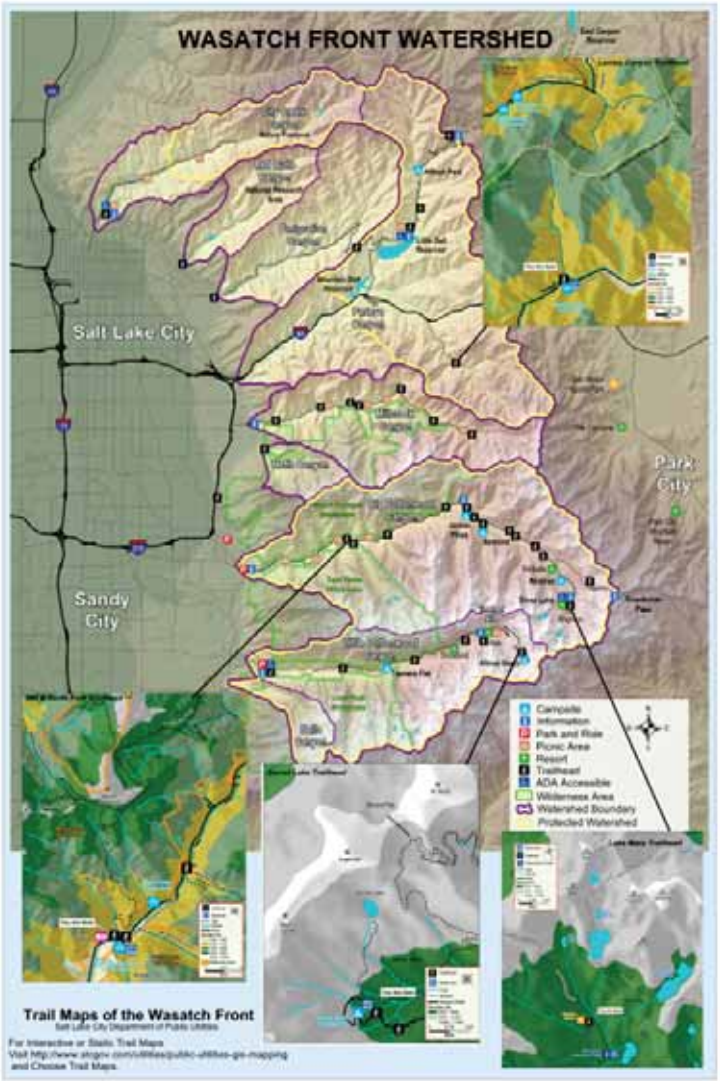


Kevin Bell
Salt Lake City Emergency Management

Maps on the Web
Salt Lake City Department of Public Utilities

On our website there is a link to trail maps and Project maps we have created. Some of these maps are static maps and are the same as are found at the trailhead in the canyons. We also have some interactive maps. These allow you to zoom in and out in order to help find the trails or to see projects in your neighborhood. If you are using a mobile device you can also use the GPS locator on that device to help place your location on that map. If you are interested in the interactive maps please visit: http://www.slcgov.com/utilities/public-utilities-gis-mapping.

From there you can choose the map you are interested in.



GIS Division
Salt Lake City Department of Public Utilities

Mapping Applications at Salt Lake City Department of Public Utilities

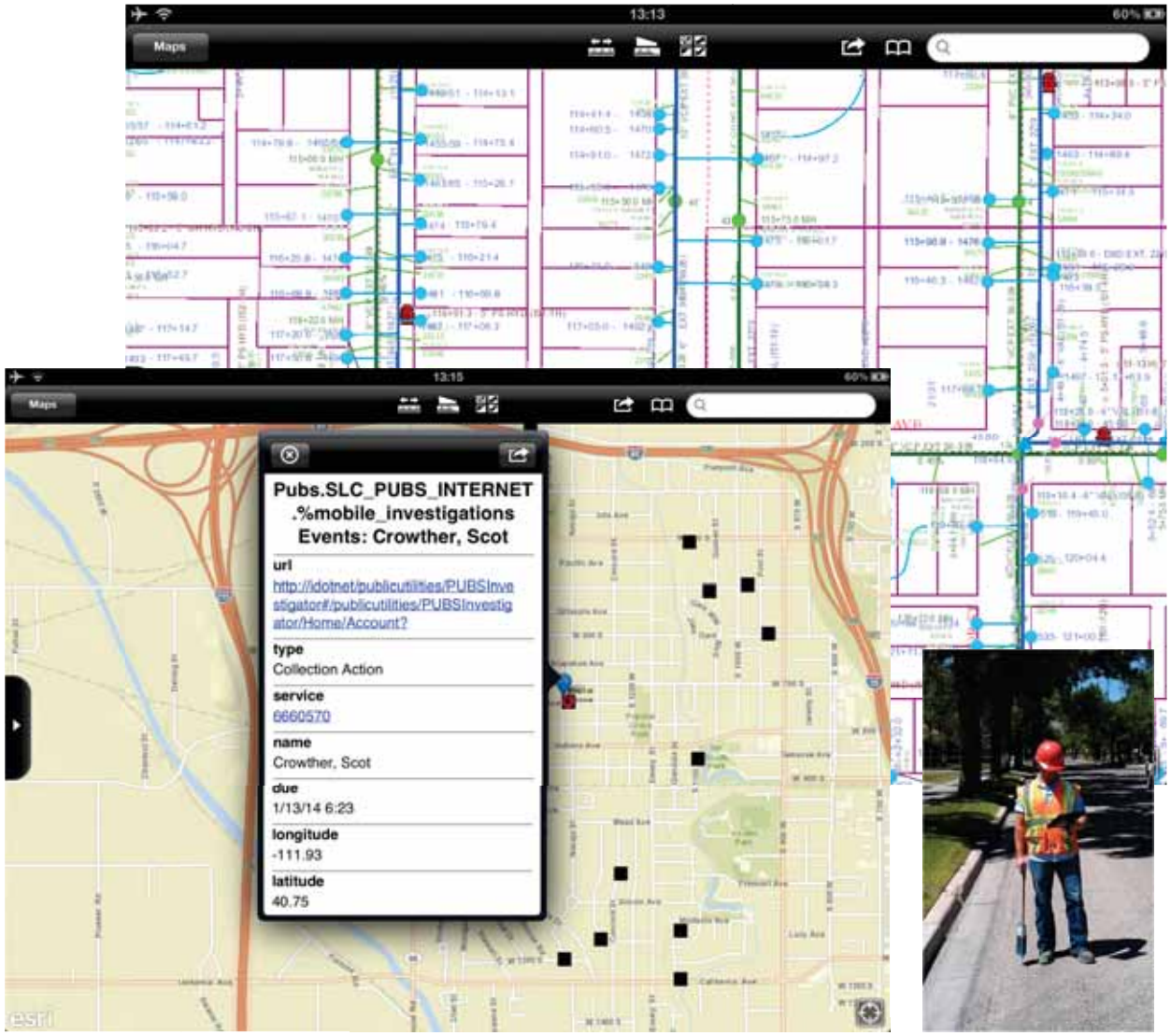
At Salt Lake City Public Utilities we map more than water, sewer and storm drain utilities. We recently took over the street lighting utility in Salt Lake City and have a mobile application for inspecting the poles and lights. The map below shows the ipad application used by our crews and contractors to determine future projects.

We also map new wellbore projects in order to decide if they will affect our clean drinking water supply. The map above shows a proposed geothermal wellbore location compared to the water recharge zones in Salt Lake City.

GIS Division
Salt Lake City Department of Public Utilities

iPad Apps for
Salt Lake City Department of Public Utilities

There are many jobs within Salt Lake City Department of Public Utilities (Public Utilities) that require access to maps and infrastructure system details in the field every day. But we don't use just any map. These maps are "live," and include location and information details about underground utilities, work areas, billing collections/investigations, and Blue Stake Requests, which average over 3,000 each month. This year we have added more mobile applications including for our new street lighting utility and for all utility inspections. This has reduced our use of paper because the forms are now filled out online. We have also reduced our fuel usage because employees don't need to come back to the office for different maps and forms.



GIS Division
Salt Lake City Department of Public Utilities

The Purpose Of Using GIS Addressing Data In Salt Lake County

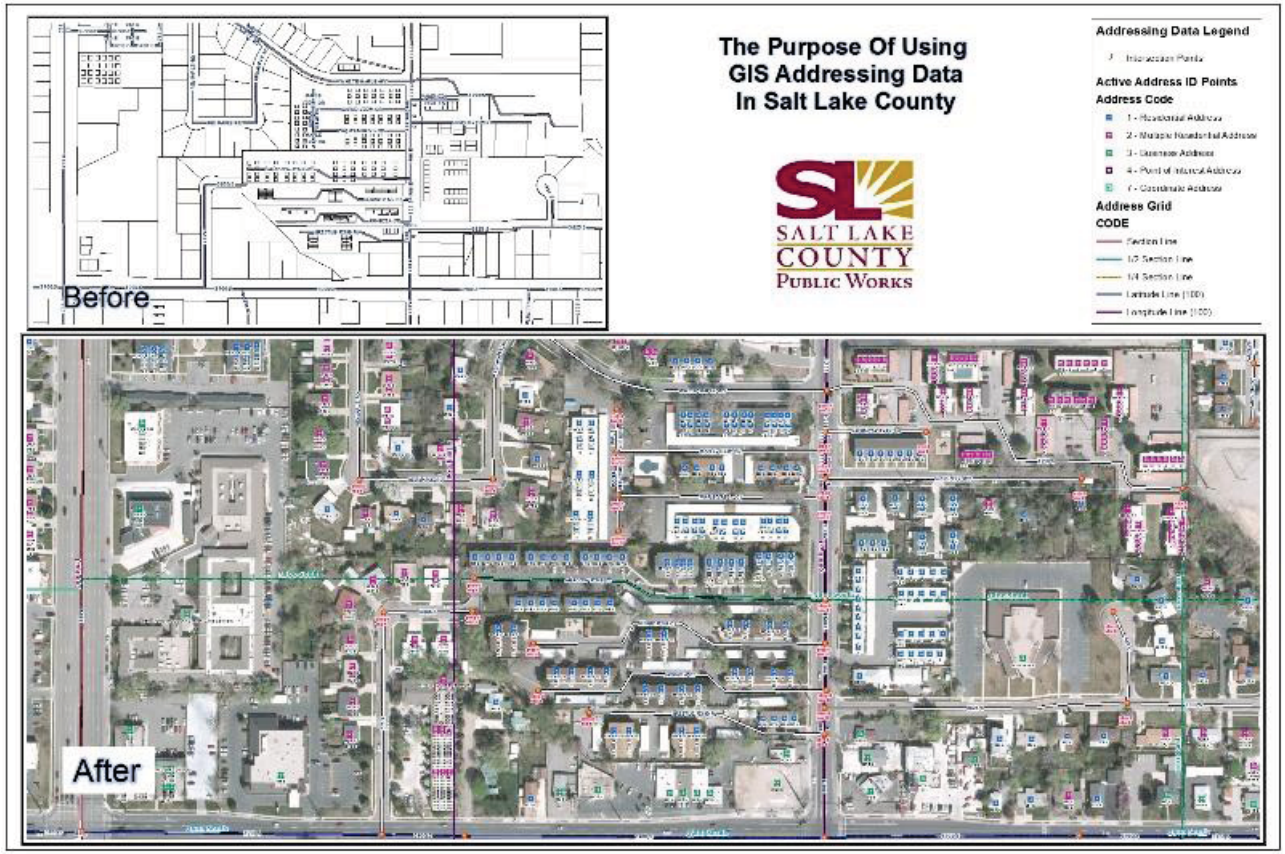
The dataset contains spatial locations and attributes of the Address ID points created as a part of the Salt Lake County Addressing Office. The data is intended to be used for the planning and management of Unincorporated areas of Salt Lake County as well as the coordination of addresses from local government agencies that meet the Salt Lake County addressing standard.

A very big advantage of using Address ID Points is to have a spatial representation and a one to one relationship of multiple addresses such as apartments, mobile home parks, duplexes, businesses and commercial developments.

Address ID points allows for a more precise geocoding, down to the address point and not an interpolation from a range.

Intersection points give a spatial representation of the North/South East/West coordinates of street segments.

The Address Grid represents the coordinate value of section lines used to calculate addresses as well as give a spatial representation of sequencing issues.



Barbi Rollins
Salt Lake County Addressing Office

Leveraging the Power of Partnerships

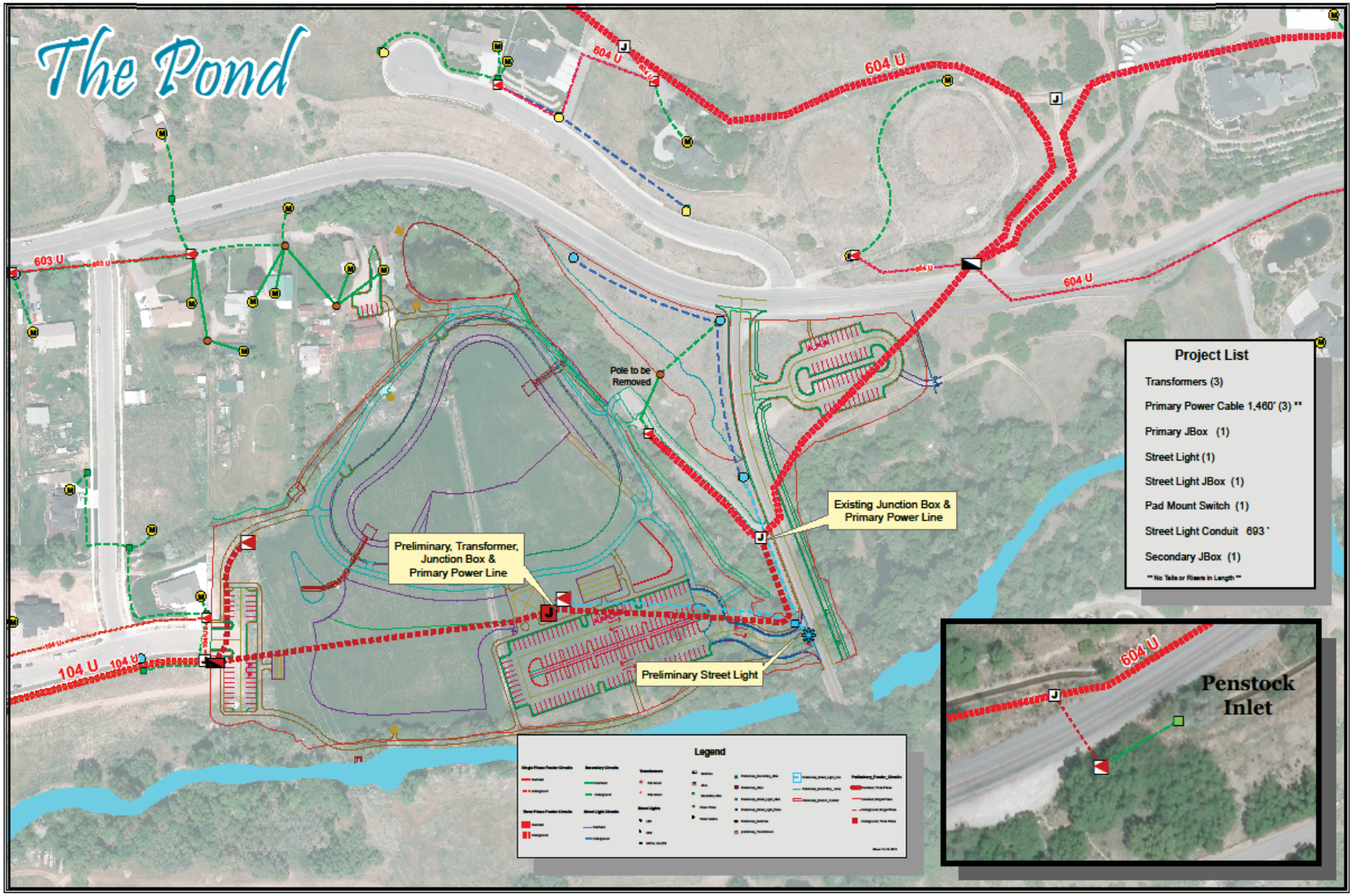
Jordan River Zoning

"Build it once use it a bunch" is a fantastic philosophy, but sadly it has its shortcomings. If your organization is structured in "silos" instead of being open it fails due to the lack of communication and sharing. Reid Demman the Salt Lake County Surveyor has made it his mission to break down data "silos". This map is an example of what can be accomplished by developing partnerships. The data depicted was gathered from State, County, and Municipal partners allowing the Jordan River Commission to develop an updated inventory of the properties along the river corridor. Partnerships such as this make the process of Government more effective.

Salt Lake County Surveyor's Office

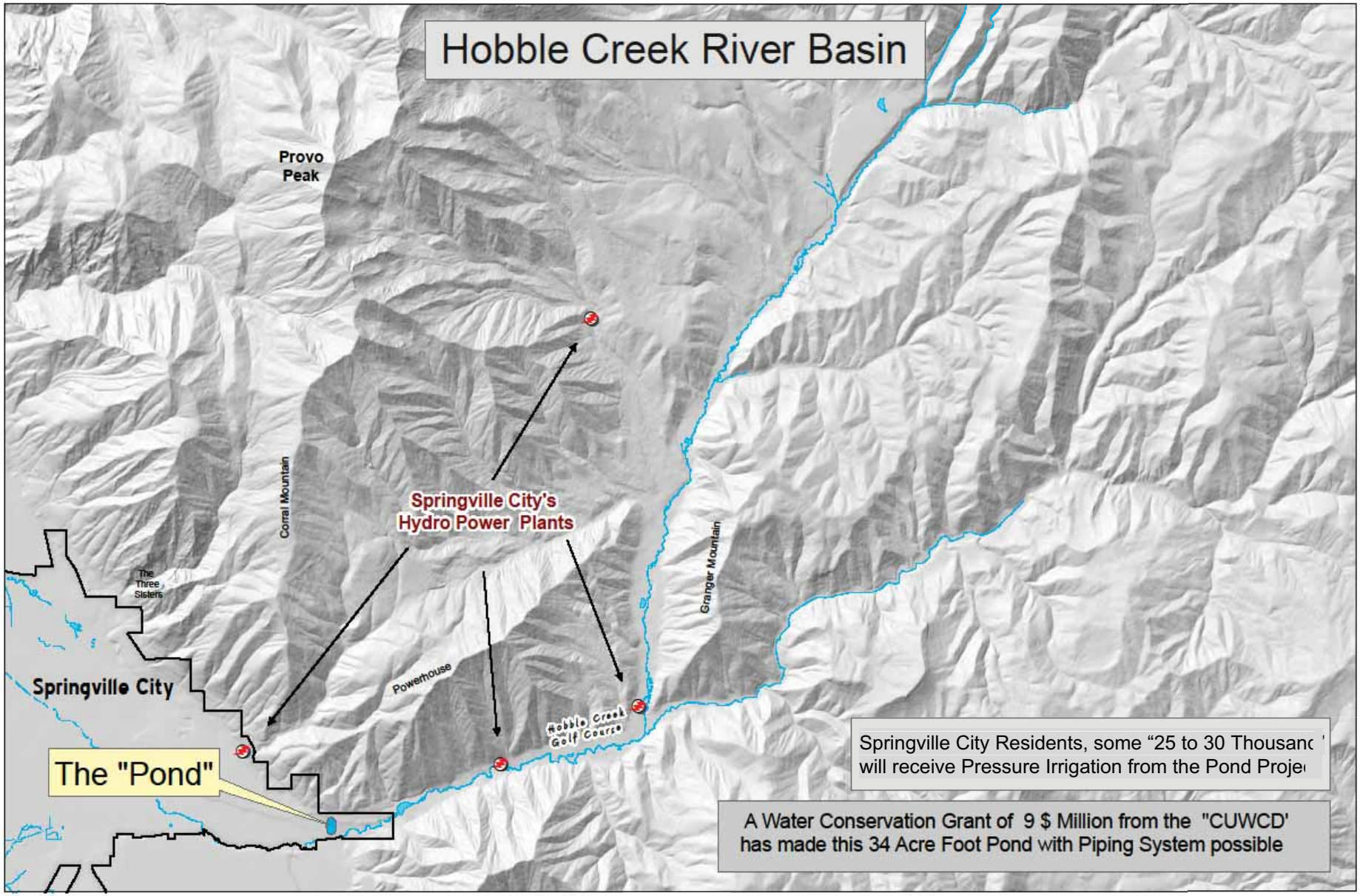
The “Pond”

on Canvas



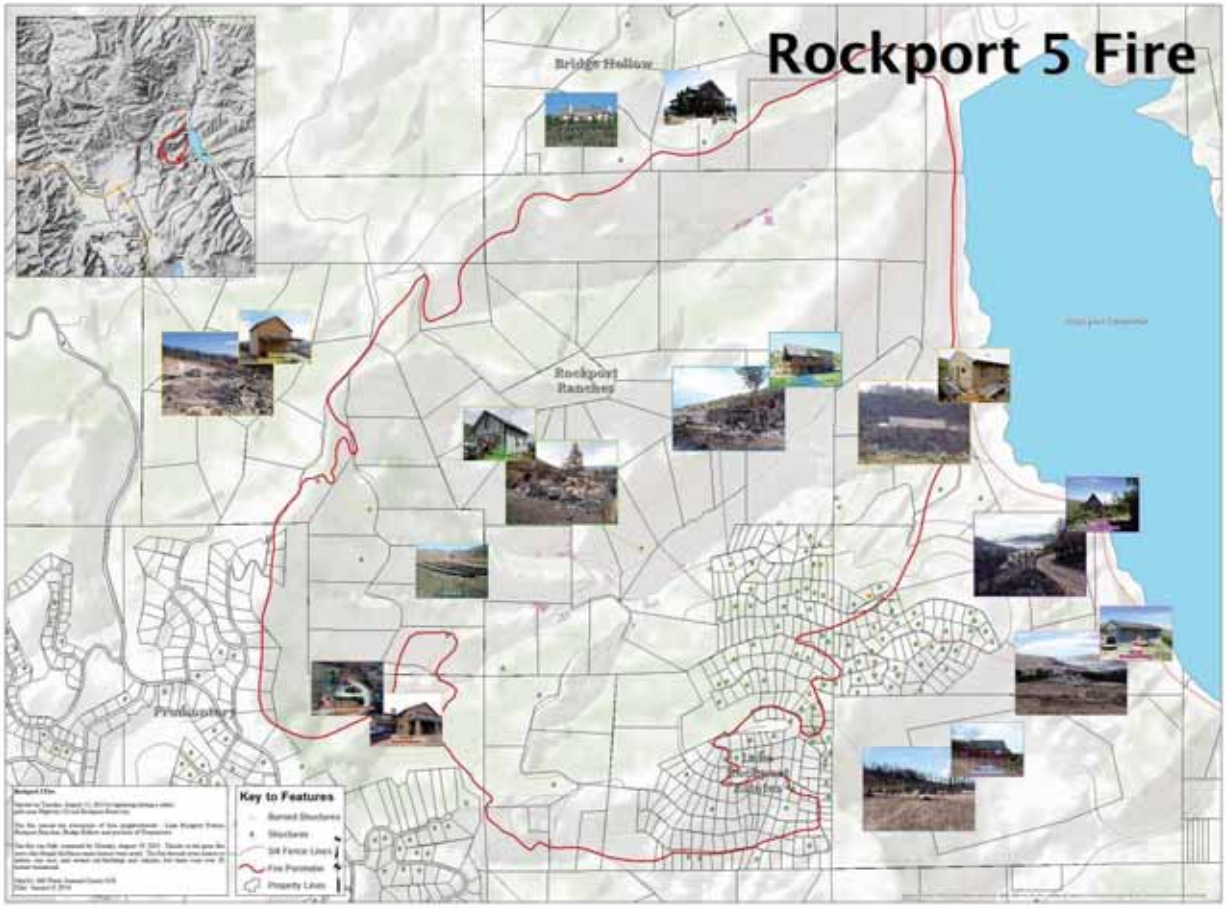
Pond Info

Hobble Creek River Basin



Rockport 5 Fire

On August 13, 2013, lightning struck a utility pole near SR 32 and Rockport State Park sparking a destructive wildfire that burned 7 homes and several more out-buildings and vehicles over the next six days. The fire had the potential to destroy many more homes causing millions of dollars in property damage. This map shows the perimeter of the fire, the location of the homes that were destroyed, before and after pictures of the homes as well as their assessed values. The map also shows the threatened properties and the potential for more property damage. Summit County would like to thank the brave fire crews and other agencies that mitigated the threat to life, quickly evacuated threatened areas, and helped contain this fire and limit the damage that it caused.



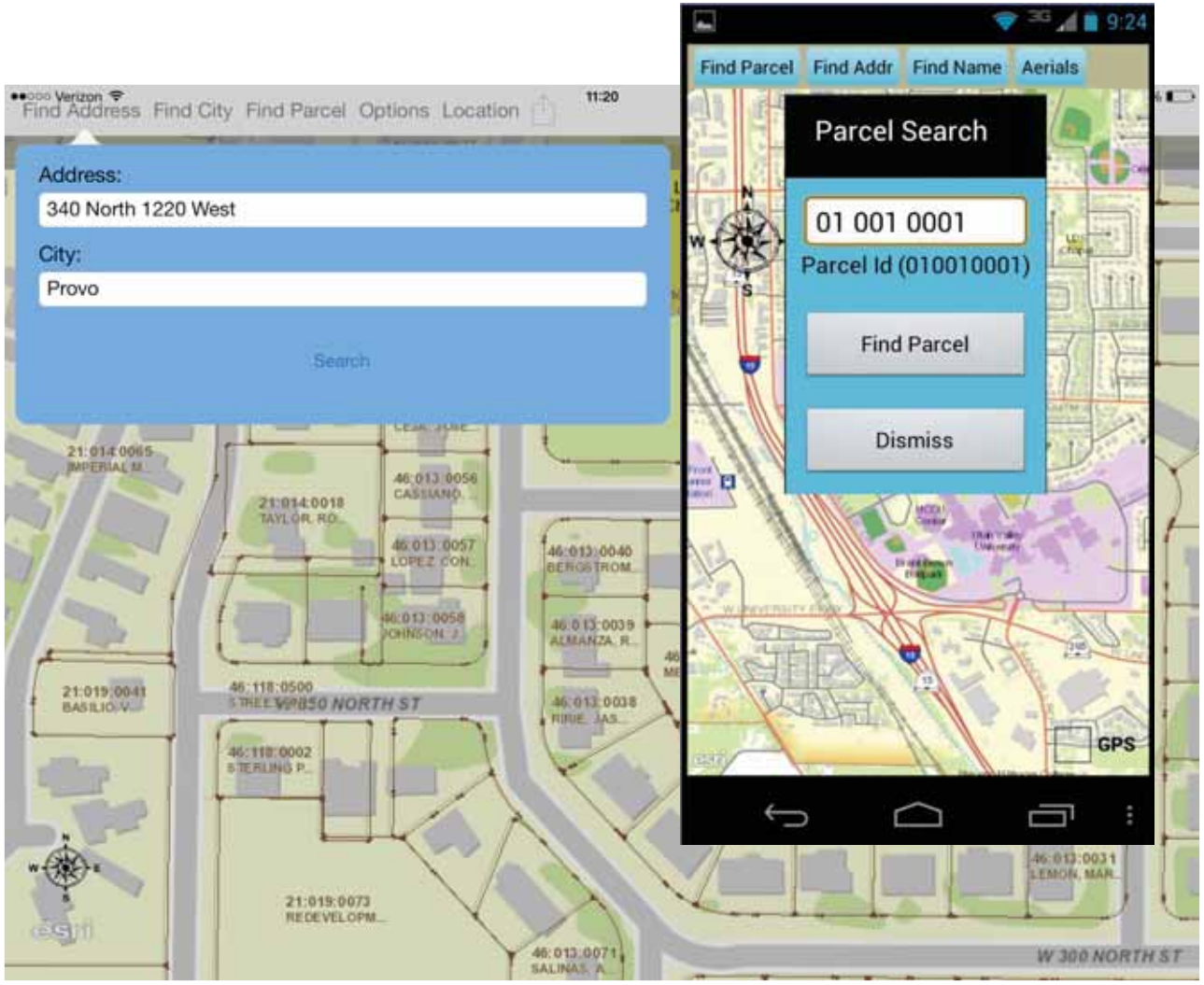
Jeff Ward
Summit County

Utah County Mobile Apps

Utah County Parcel Map

At Utah County we have developed two flagship GIS based Mobile Apps. These are available on Google Play and the App Store.

Utah County Parcel Map provides simple easy to use tools to assist you in understanding parcels and parcel ownership in Utah County. You will find an easy to use address search that will zoom the focus of the map to the corresponding address. There is also a parcel identification number search that allows the user to search for parcels by their serial number.



Utah County GIS

Utah County Mobile Apps

Utah County Trail Guide

Utah County has developed a convenient and easy to use trail guide that works on iPhones & iPads and Android phones & tablets. Using the device's built in GPS, the app gives the user feedback as to their current position along the trail and their proximity to facilities.

- Browse through a list of featured trails.
- Verify the length, difficulty, and permitted activities.
- Immediately zoom to your selected trail.
- Functions without cell service.

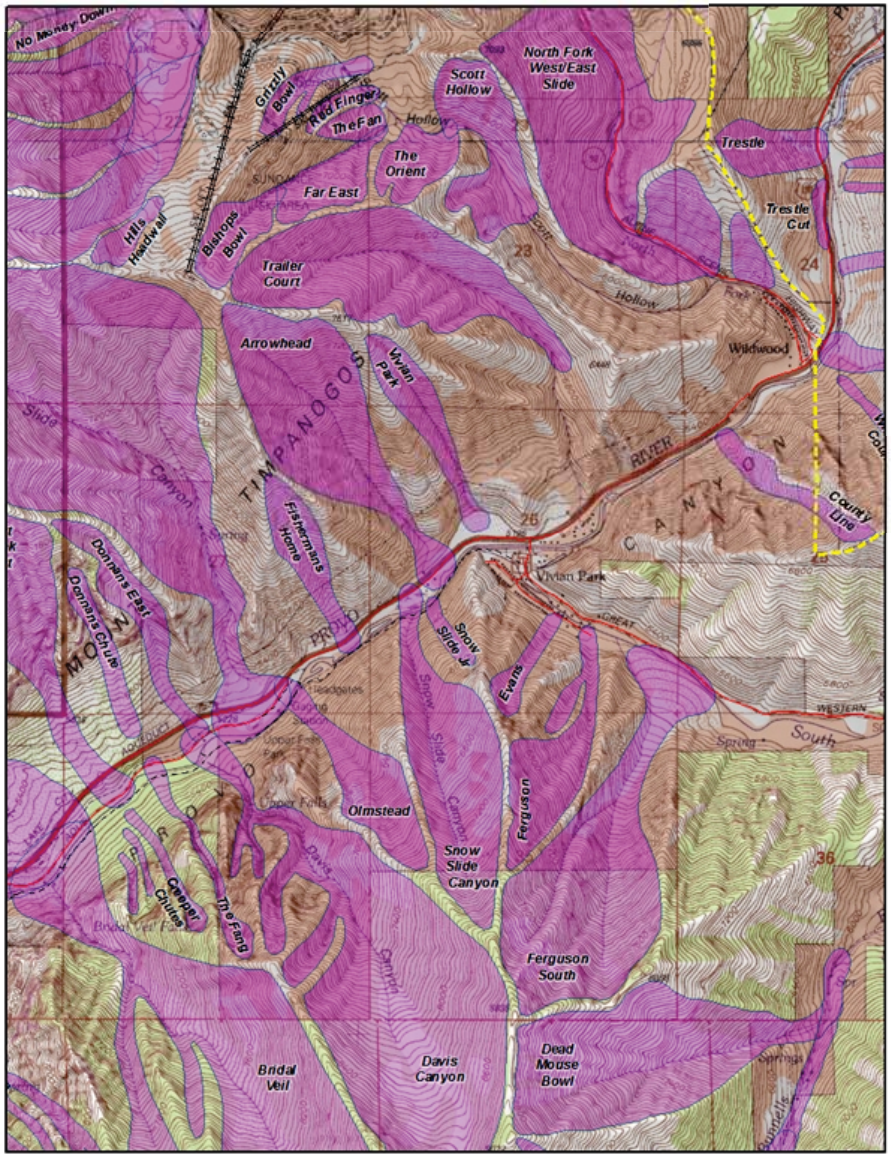
Avalanche Map Series

Northern Utah Valley

The canyons and mountains in northern Utah Valley are popular for winter recreation use even in areas with considerable avalanche risk.

Utah County GIS has worked jointly with UDOT Region 3 to produce an avalanche path map series. These maps are intended to increase awareness of the avalanche risk and aid in safe search and rescue efforts. In fact one of the main purposes of the maps is to give a standard name to the avalanche paths. This helps reduce confusion among the many agencies that work in this area including the U.S. National Forest, UDOT, Utah County, Sundance Resort, North Fork Fire District and many others.

The avalanche paths were determined through field research of the terrain and vegetation. In addition USGS topographic maps and GIS digital elevation models (DEM) were used to aid in plotting the paths. For the final map series the avalanche data was overlaid on the familiar USGS topographic maps. The mountainous terrain was then highlighted using hillshade and elevation curvature techniques



Utah County GIS - Curtis Wursten

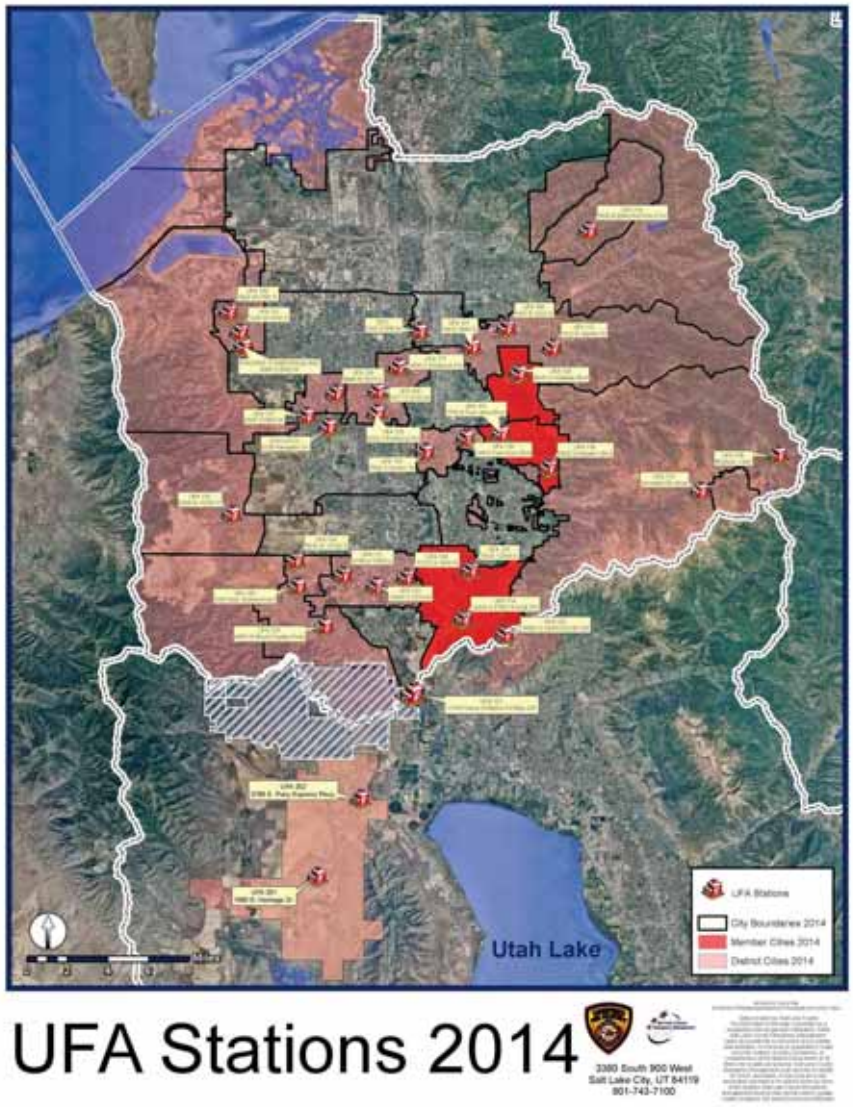
Unified Fire Authority

Unified Fire Authority is Utah's largest fire agency, serving over 425,000 residents in unincorporated Salt Lake County, five district cities, four member cities, and Camp Williams. UFA also operates the Salt Lake County Emergency Operations Center which is responsible for emergency planning, preparedness and mitigation of technological and biological hazards and natural disasters.

Formerly the Salt Lake County Fire Department, UFA was organized in 2004. Today, it includes 28 Fire Stations, 600 sworn and civilian employees, and covers over 600 square miles.

UFA is a co-sponsor of Utah Task Force 1, the Salt Lake County All-Hazards Incident Management Team, has a bomb and arson investigations unit, Wildland Fire Division, Heavy Rescue and Hazardous Materials response, swift water rescue, dive team, fire prevention and suppression, and a public education/community assistance unit.

Maps on display will show the growth of Unified Fire Authority through the years, as well as response efforts during the Pinyon Fire, and various types of map books created for use during emergency response throughout the valley, its canyons, and other target hazards.



Lindsy Bentley
Unified Fire Authority

State Government

Utah GIS: Preparing for Next Generation 9-1-1

Coordinated state and local government GIS efforts are helping to position Utah as a lead state in adopting Next Generation (NG) 9-1-1 service. The NG platform replaces telephone-address tables, some from the 1970's, with modern GIS location services.

GIS data will verify and determine the location of calls, route calls to the correct 9-1-1 Center (PSAP), and provide call-takers with map views. GIS data quality, completeness, and updates (ideally daily), will become even more critical to public safety.

Likely Required*

Road Centerlines with Address Ranges: All landline telephone addresses must be locatable using geocoding algorithms that rely on road centerlines and their associated street name, aliases, type, directionals and address ranges for both sides of the street.

9-1-1 Center (PSAP) Service Areas: Since NG call routing will use a "point-in-polygon" search to determine the appropriate PSAP to assign incoming calls, boundaries for the primary PSAPs are needed. In NG, these can be adjusted in real time to dynamically route calls for load balancing or emergencies.

Statewide or Regional NG 9-1-1 Authority Areas: Each NG system will have an exclusive service area. It is expected that these areas will consist of entire states or large regions. These service areas will define the extent of the GIS data that must come together into a single resource.

Strongly Recommended*

Address Points for Buildings & Landmarks: Address points store x,y coordinates for each addressed structure or entrance location. They provide more specificity for validating addresses and more precision for emergency responders than interpolated results from road centerlines.

Municipal, Neighborhood, and Address System Boundaries: As addresses are only guaranteed to be unique within a single address assignment area, NG will need a full complement of "placename" areas so its address finding tools can focus their search on the proper community within the State.

Cell Sites & Antenna Sectors: The location and direction of cell tower antennas (sectors) is important for resolving the location of wireless 9-1-1 calls and for analyzing and tuning the default routing of calls for cases when GPS coordinates are not transmitted from the caller's device.

* The GIS digital mapping layers shown will support the Location Validation Function (LVF) and the Emergency Call Routing Function (ECRF) as described in NG 9-1-1 technical documents published by the National Emergency Numbering Association (NENA.org).

UTAH AGRC
Automated Geographic Reference Center

2013-2014 Wasatch Front LiDAR

LiDAR stands for Light Detecting and Ranging. LiDAR data is collected using an airplane-mounted laser and a sensor that records the laser pulse reflections from surfaces on/near the ground. The timing of the pulse returns provide a surrogate for measuring distance. When the distance measurements are combined with the precise instantaneous position of the aircraft from its onboard GPS, the elevation and position of the surface of the earth, structures, and vegetation can be measured with high precision. The primary uses for the new LiDAR data include but are not limited to:

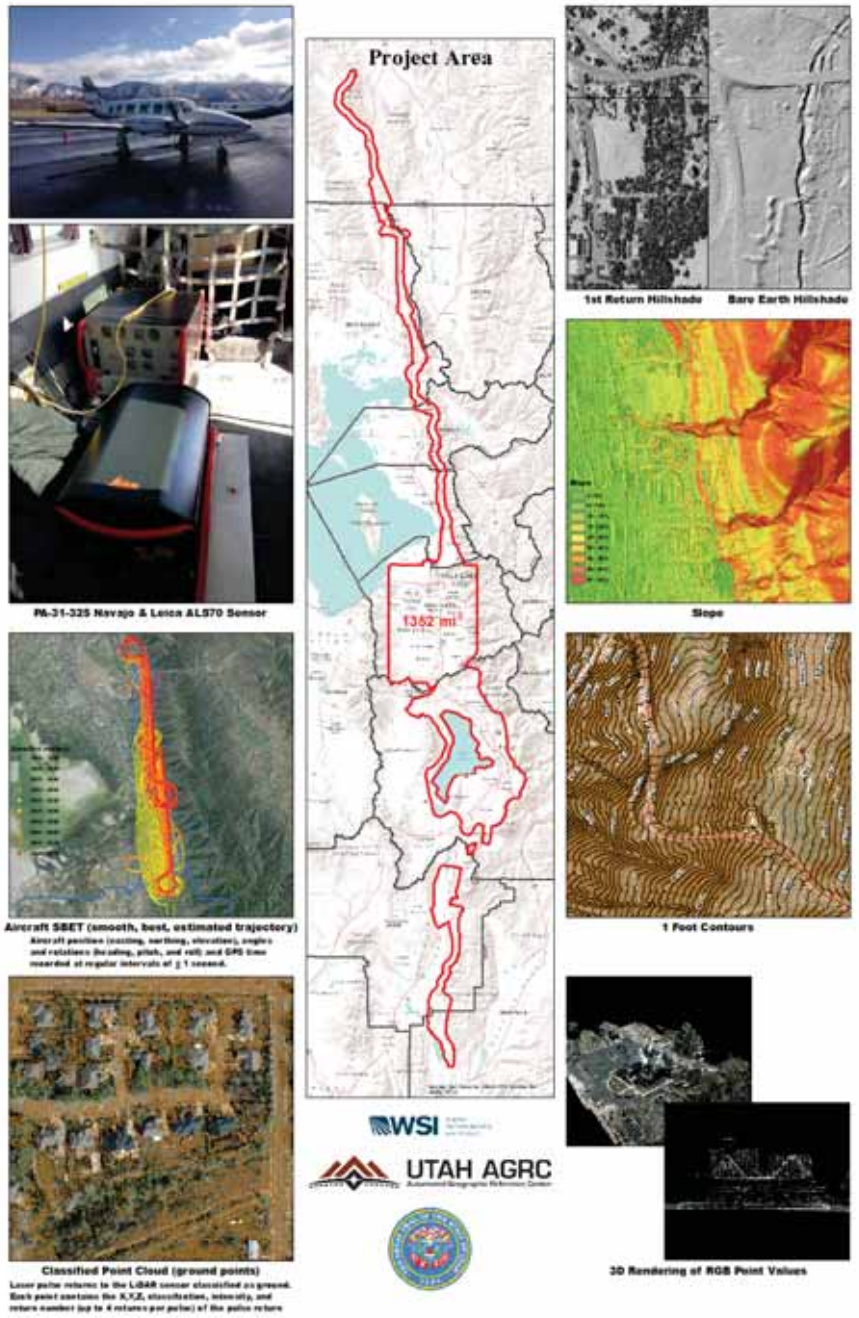
* Planning, preparing and mitigating flooding hazards through FEMA's Risk Map modernization program
* Detailed detection of earthquake faults, geologic hazard modeling and vulnerability studies
* Delineation of building and structure footprints for general purpose mapping
* Qualifying solar energy potential on rooftops and other surfaces

USGS Quality Level 1 Deliverables:

* Raw Point Cloud
* Classified Point Cloud (8 points per square meter with 9.25cm vertical RMSE)
* Bare-Earth Digital Elevation Model (DEM)(0.5 meter cell size with 9.25 cm vertical RMSE and Hydro-Flattening)
* First Return Surface Model (0.5 meter cell size)
* Intensity Images (0.5 meter resolution GeoTIFFs)
* FGDC Metadata

Project Partners:

Utah Geological Survey
U.S. Geological Survey
Salt Lake County Surveyor's Office
Utah Division of Emergency Management
Automated Geographic Reference Center

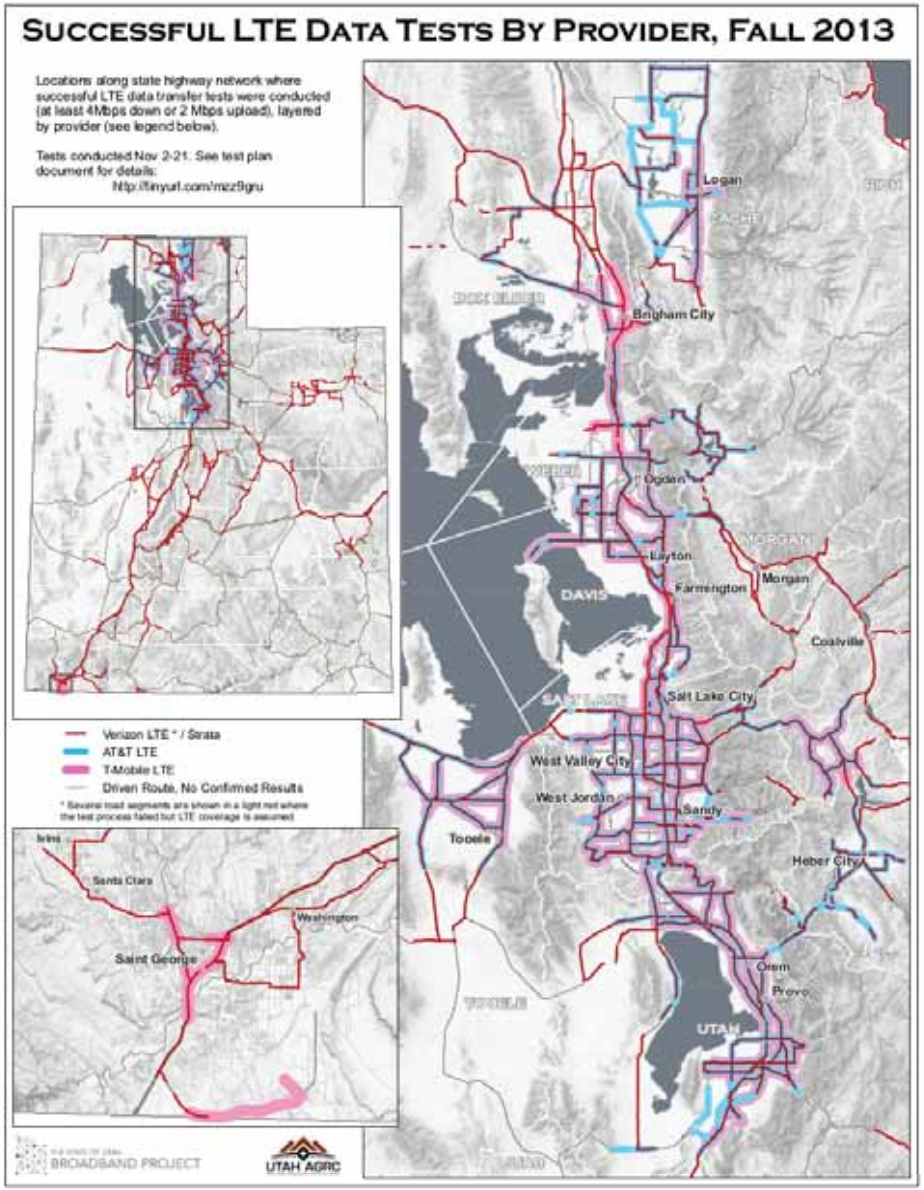


LTE Coverage in Utah Fall 2013

In November 2013, the Utah Broadband Project contracted with Isotrope, LCC, to conduct a mobile drive test on 6,000 miles of roads in Utah. The mobile drive test collected signal strength and speed test information on all technologies used by mobile broadband, including LTE.

LTE, often marketed as 4G LTE, is a form of higher capacity wireless technology used for high-speed mobile data transfers. This map shows the locations of over 300,000 successful LTE data transfer files (defined as having an average speed of 4 Mbps download or 2 Mbps upload) for the State's current LTE providers: AT&T, T-Mobile, Verizon, and Uintah Basin-based Strata Networks (which partners with Verizon to deliver a similar coverage).

The Utah Broadband Project is a joint effort between the Governor's Office of Economic Development (GOED), the Public Service Commission (PSC), and the Department of Technology Services' Automated Geographic Reference Center (AGRC). The Broadband Project maintains a statewide map (broadband.utah.gov/map) of available broadband services and also works to increase broadband adoption and deployment in the state.



Utah Broadband Project
Governor's Office of Economic Development &
Automated Geographic Reference Center

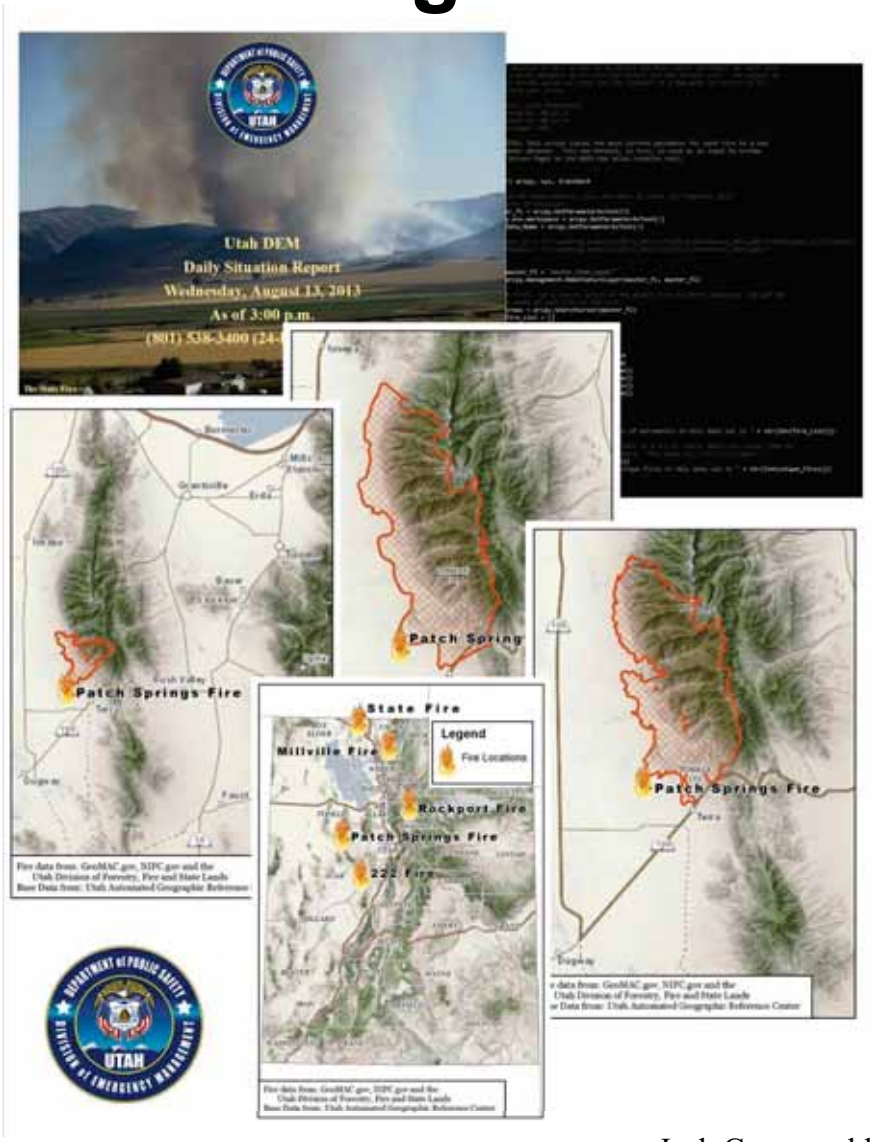
THE STATE OF UTAH
BROADBAND PROJECT
BROADBAND.UTAH.GOV

Mapping Incident Progression Through Interagency Data Sharing

As part of the significant incident response process, the Utah Division of Emergency Management produces Daily Situation Reports outlining incident status and actions taken by responding agencies to achieve incident objectives. The Daily Situation Reports are distributed to city and county emergency managers as well as the State Emergency Response Team, the Governor's Office, the Lieutenant Governor's Office and the Federal Emergency Management Agency.

During previous wildfire seasons, multiple state agencies collected wildfire perimeter data independently. This led to different databases and uncertainty over which database to use as the official database of fire perimeters. In 2013, the Division of Emergency Management actively collaborated with the Division of Forestry, Fire and State Lands as well as the School and Institutional Trust Lands Administration (SITLA) to produce and distribute one database with perimeter data gathered by members of each agency. Additionally, members of each agency contributed Python code that updates the current version of the perimeter database with each subsequent perimeter and calculates the acreage of land burned based on the SITLA land ownership database.

This poster shows a series of maps that used the perimeter data collected by this interagency partnership that appeared in the Daily Situation Reports. These maps show the progression of wildfires over time as the perimeter size increases from one map to the next.



Josh Groeneveld
Utah Division of Emergency Management

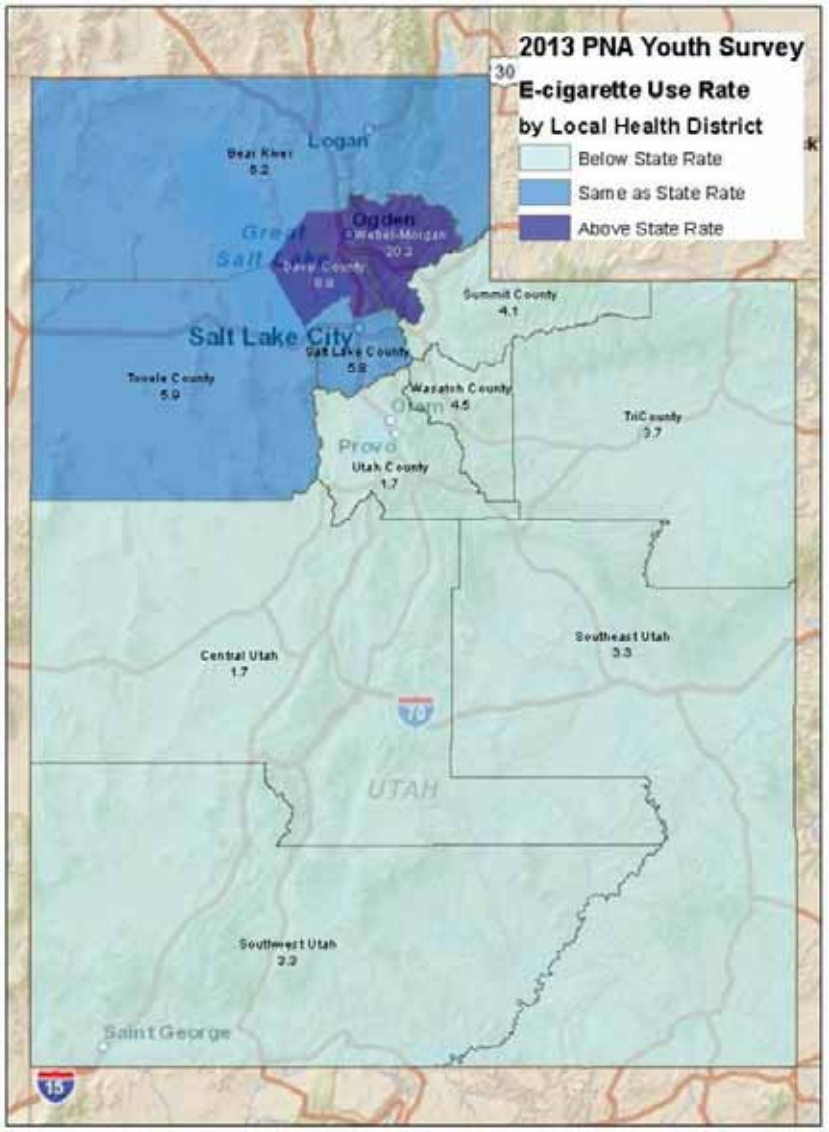
E-cigarette Use Among Utah Youth

Grades 8, 10 & 12 by Local Health District, 2013

As cigarette smoking has seen a general decline, a variety of new tobacco and nicotine products have been introduced in U.S. markets. Among these new products are electronic cigarettes (or e-cigarettes), battery-powered devices that deliver doses of nicotine and other additives to the user as an aerosol to be inhaled. Although the industry claims that e-cigarettes are a safe alternative to conventional smoking, the contents of e-cigarettes have not been properly tested and the contents and sales are unregulated.

It is particularly alarming to see that the use of e-cigarettes among youth in Utah has more than doubled from 2011 to 2013 and that despite having no legal access to e-cigarettes, Utah youth are three times more likely to report current use than adults. (Utah Health Status Update, December 2013).

Although rates are rising statewide, GIS maps visualize the data in a way that draws focus to the alarmingly high rates in the Davis County and Weber-Morgan health department areas. The areas' rates are around two times and four times the state rate, respectively. Although a direct cause of the higher than average rates is unknown, GIS is being used to analyze a possible link with the density of e-cigarette or "vaping" shops in the areas of interest.



UTAH DEPARTMENT OF HEALTH

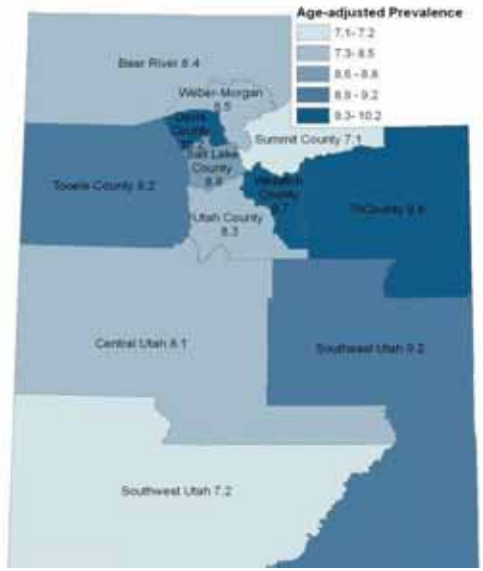
Camille Roundy, Utah Tobacco Prevention & Control Program

Examining Asthma-Related Issues Using Geographic Information System (GIS) Mapping

By Holly Uphold, PhD
Utah Asthma Program Epidemiologist

Prevalence of Current Asthma by Small Area, Utah Adults, 2006-2010

Prevalence of Current Asthma by Local Health District, Utah Adults, 2011



In Utah, asthma prevalence increased from 7.1% in 2003 to 8.9% in 2012. This growing trend in asthma makes communication tools that are clear and meaningful extremely important to addressing asthma-related issues.

Geographic information system (GIS) mapping is a helpful tool for communicating health-related data. There are two methods that the Utah Asthma Program uses to create the color coding scheme for maps.

- Natural breaks in the data
- Fixed effects test of significance

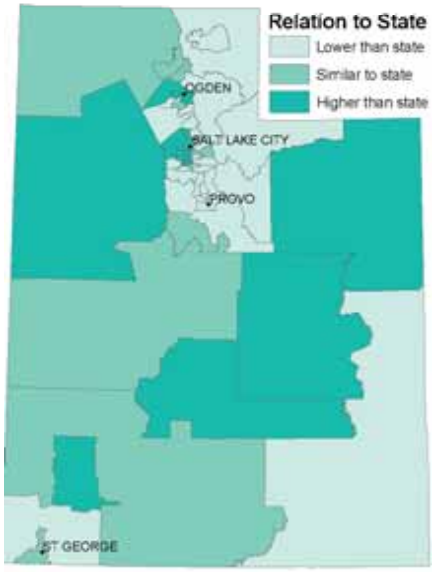
Maps are built using different geographic boundaries. Decisions about boundaries are based on:

- Level of detail needed to make important program decisions
- What is most useful for the audience

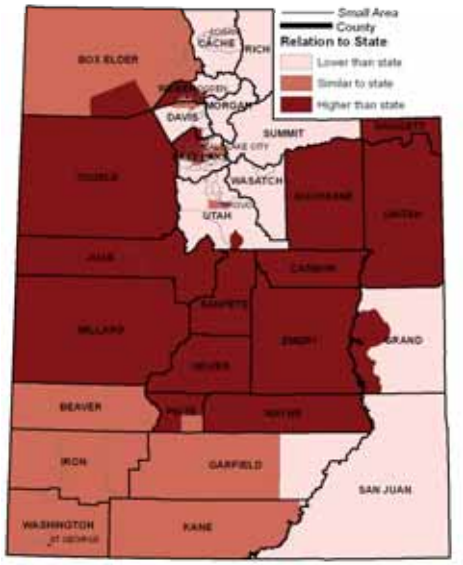
Maps are used to help identify patterns in data that otherwise might be difficult to see. Notice the orange and green maps regarding the relationship between asthma prevalence and emergency department visit rates.

UTAH DEPARTMENT OF HEALTH
Utah Asthma Program

Asthma Emergency Department Visit Rates by Small Area, Utah Adults, 2005-2009



Asthma Emergency Department Visit Age-Adjusted Rates by Small Area and County, Utah Adults, 2009-2010



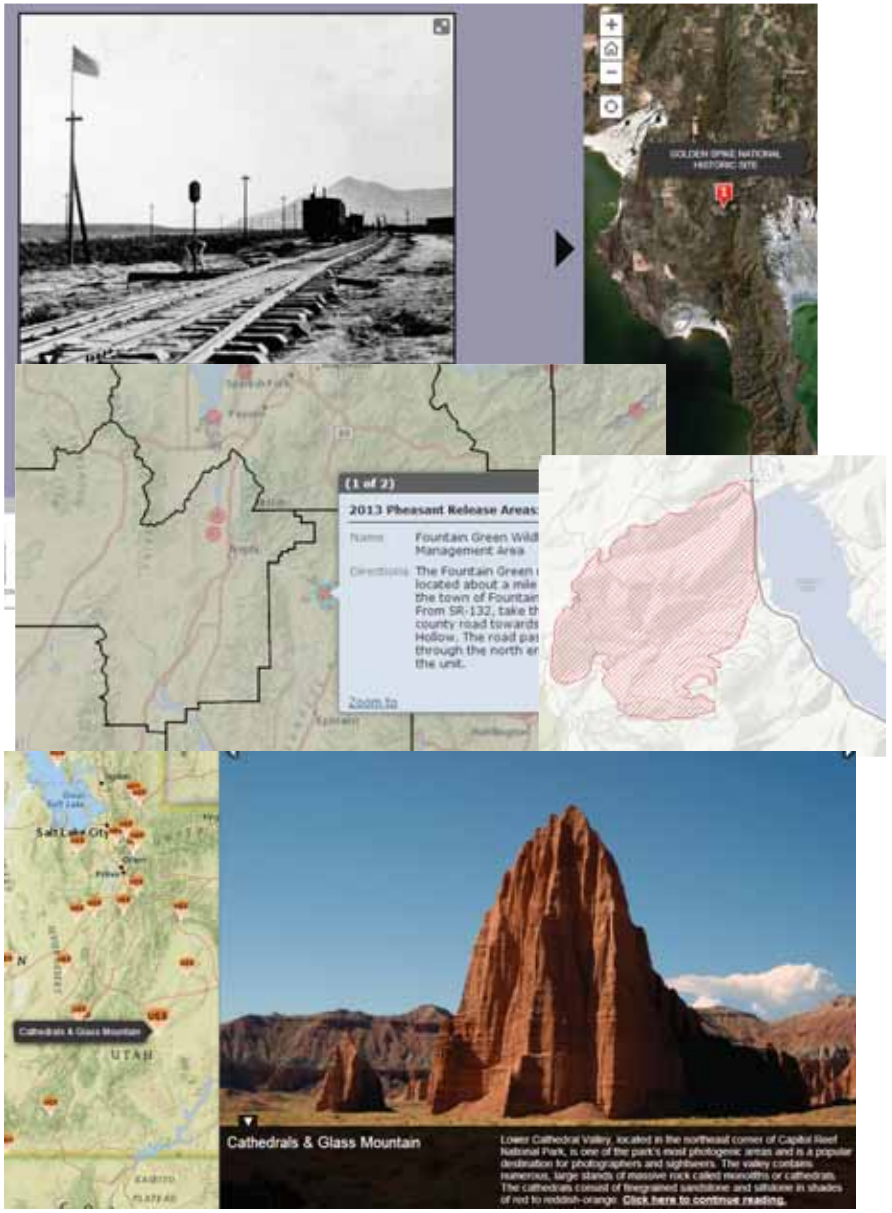
Web Maps and Portals at Utah DNR

The Utah Department of Natural Resources has many great web maps and information portals available to the public. These maps provide new and valuable information about the state's natural resources in an interactive map format.

Over the last few years, DNR leadership has been fostering a new culture of information sharing and efficiency. GIS and web maps are at the forefront of this new initiative. Divisions at DNR are now providing information and transparency to the public that was not available through any of our websites before. We have also "map-ified" existing information on our websites that was very difficult to access and understand.

DNR staff will be showcasing many of these web maps, including:

- 2013 Wildfires Map
- Utah Sage Grouse Management Areas
- GeoSites of Utah
- Tree City USA Communities
- Snowmobile Trails
- Communities at Risk to Wildfire
- Utah Lake Access Map
- 2013 Utah Pheasant Release Areas
- Walk-in Access Areas
- Utah's Mining Heritage and Tourism
- Urban Tree Canopy Cover
- Uinta Basin Information Collaborative portal

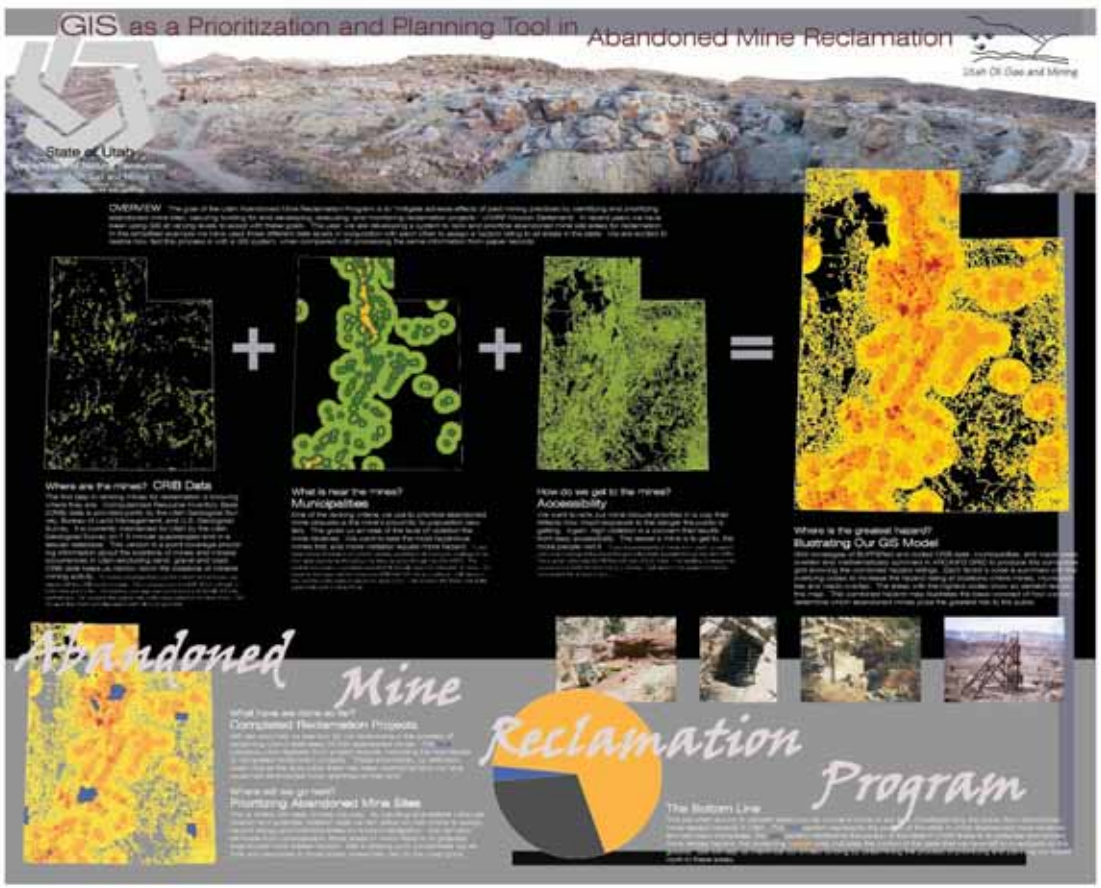


Buck Ehler
Utah Department of Natural Resources

Prioritizing Abandoned Mine Reclamation

The goal of the Utah Abandoned Mine Reclamation Program is to "mitigate adverse effects of past mining practices by identifying and prioritizing abandoned mine sites, securing funding for and developing, executing, and monitoring reclamation projects" (AMRP Mission Statement). When the program was implemented in 1982, we identified three factors that affect the hazard an abandoned mine poses to the public. These are density of abandoned mine features, proximity to population centers, and condition of access roads. At first, GIS-type operations, such as scoring the population within a specified radius of a site, were done manually, by placing a template over a map and consulting census tables. Besides being crude and slow, this necessitated breaking data types into coarse categories or ranges. Nuances in the data were lost and the scoring became a "point in time" snapshot that was not easily updated as conditions changed.

In 2000, we developed a system to rank and prioritize abandoned mine areas for reclamation. We use the same three factors, captured in data provided by AGRC, to assign a hazard rating to all areas in the state. We were excited to realize how fast this process is with a GIS system, when compared with processing the same information from paper records.



Jan Morse
Utah Department of Natural Resources
Division of Oil, Gas & Mining

Sanpete Front Fire Risk

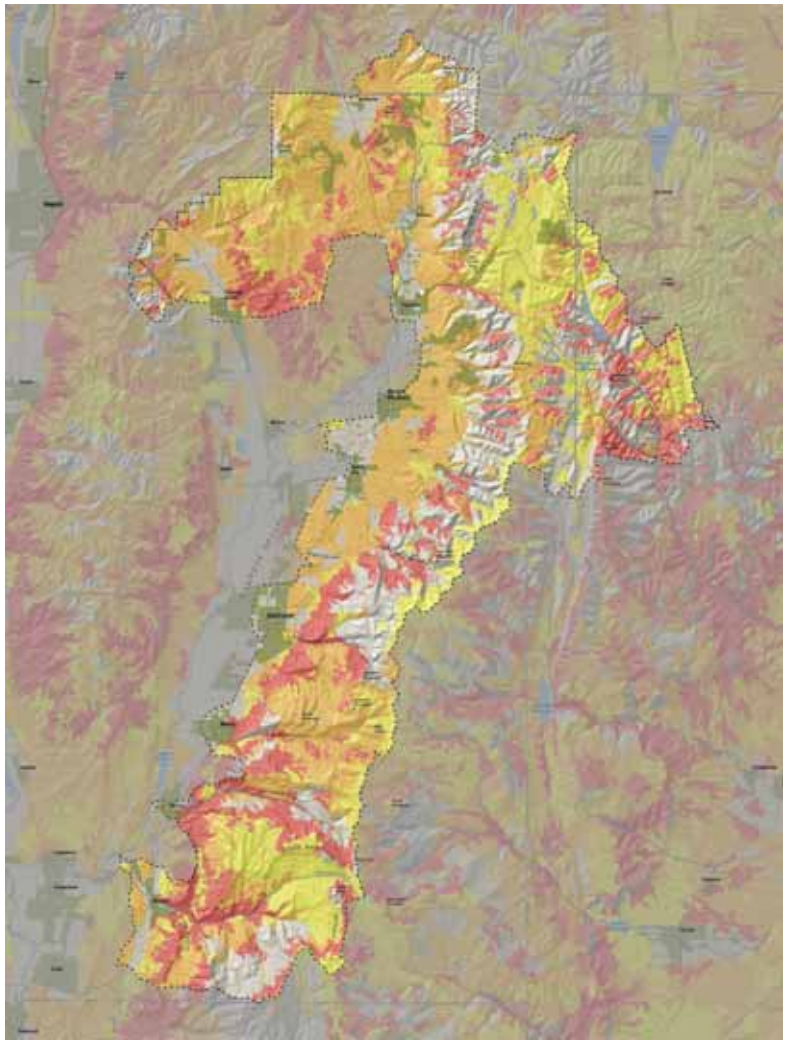
Populated Areas at Risk

Following the devastating 2012 fire season, Governor Herbert charged Commissioner of Agriculture Leonard Blackham with the task of developing a comprehensive and cooperative strategy to reduce the size, intensity and frequency of catastrophic wildland fires in Utah. To meet this goal, the Catastrophic Wildfire Reduction Steering Committee was formed.

While recognizing that fire can play an important ecosystem service role, the outcome of this strategy is to identify and implement solutions to abate those fires whose size and intensity prove damaging to landscapes, economies and human safety. These fires are termed "catastrophic" because they are large in size and cause harm to, rather than help, ecosystem and community health and resilience.

The Central Regional Working Group of the committee, headed by Ron Torgerson of SITLA, selected the Sanpete Front for its pilot projects, which include public education and awareness efforts, fire breaks and fuels reduction projects.

This map shows the populated areas of the front and their relationship to areas of moderate to extreme wildfire burn probability. Also shown are the proposed fire breaks and fuels reduction projects.



Barry Biediger
School & Institutional Trust Lands Administration (SITLA)

Mobile Maps, Apps and Online Mapping Solutions

State of Utah School and Institutional Trust Lands Administration

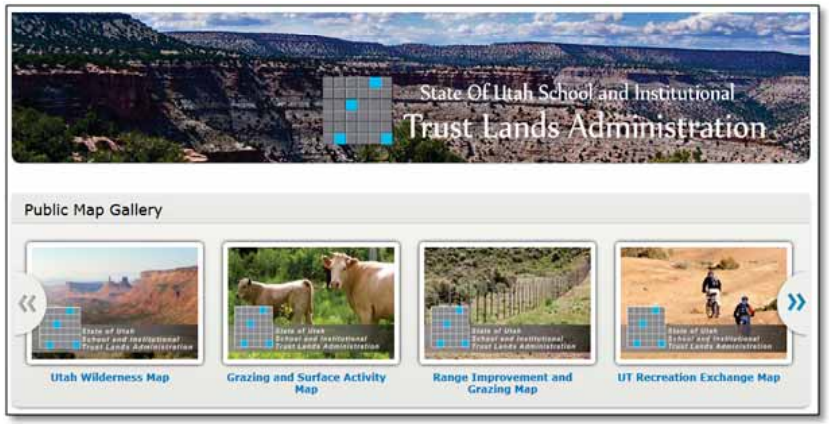
The GIS group at the School and Institutional Trust Lands Administration (SITLA) provides mapping services, spatial analysis and digital project management for IT- GIS related needs for Trust Lands and our Beneficiaries. We work closely with each of our 4 business groups, with other state and federal agencies and with the public to provide powerful tools that add leverage to planning and decision making.

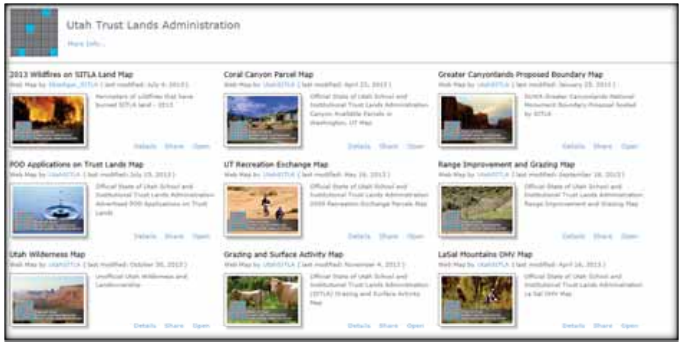
Explore the STILA- GIS Data and Maps at your figure tips: Data, Plat Maps and special projects can be viewed online, on your mobile device (IOS, Android and Windows) or by requesting a printed map.

Digital Plat Map: *http://platmap.trustlands.utah.gov/*
This visual plat map interface that allows the user to explore SITLA land and lease records, historical plat maps and land ownership on an online browser.

Mobile Apps: *http://doc.arcgis.com/en/arcgis-app/*
Our GIS team provides the agency and the public with mobile mapping applications through the use of the ESRI app. Public maps require no login, while internal maps require a login. Download the ESRI mapping app from your app store and search for SITLA maps.

Desktop Maps: *http://sitla.maps.arcgis.com/explorer/*
Users can access SITLA maps from any desktop web browser. All SITLA online maps will be "branded" with our logo to ensure the users that they are looking at the authoritative source





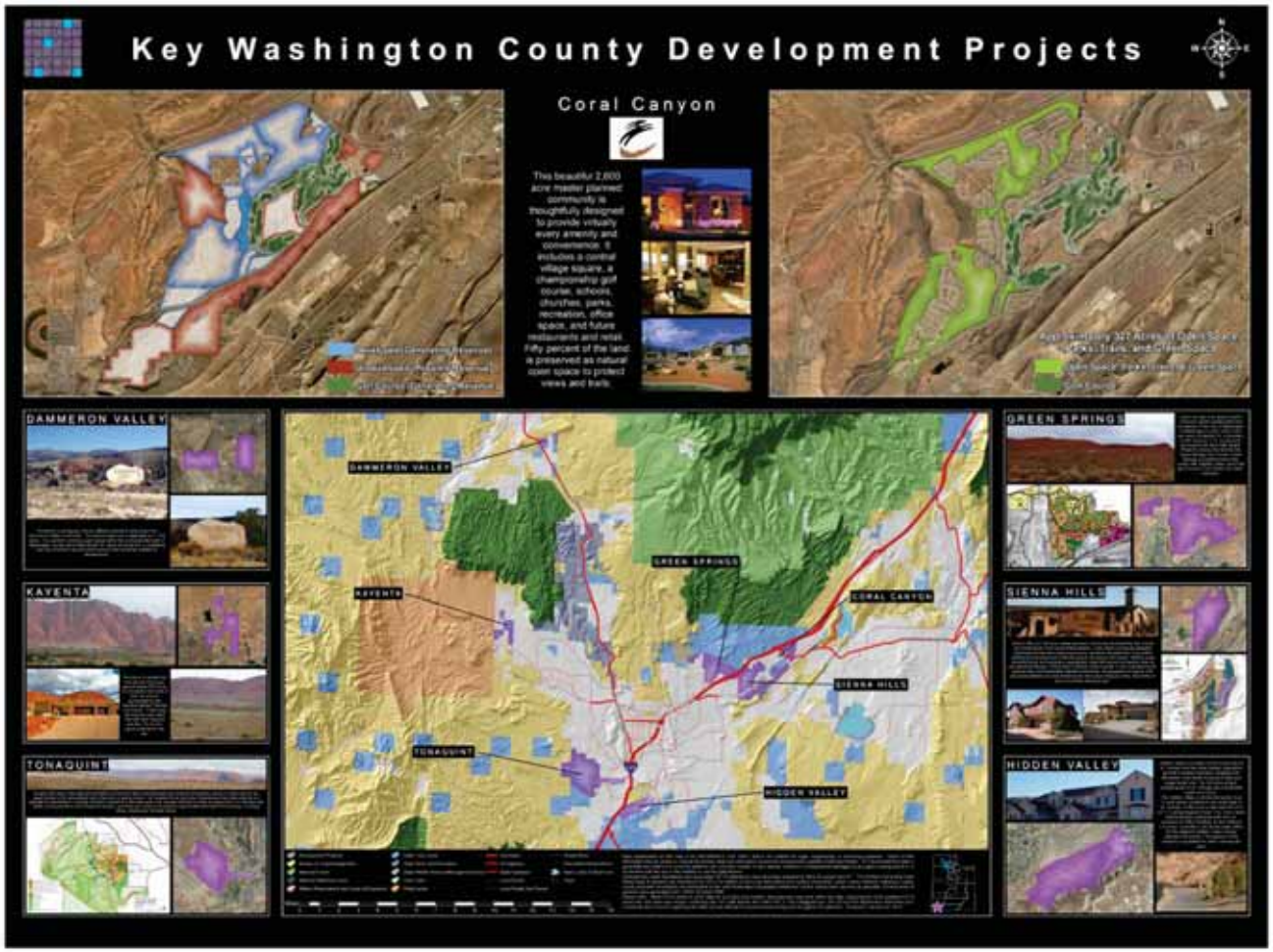
Web: *www.trustlands.utah.gov*
Email: jessicakirby@utah.gov
Phone: 801-538-5141
Rest end point: *tlamap.trustlands.utah.gov*

Jessica Kirby
School & Institutional Trust Lands Administration (SITLA)

Trust Lands Development

Key Washington County Development Projects

While many development projects exist across state trust lands, the bulk of the development projects for the development group are in Washington County, Utah, including: Coral Canyon, Green Springs, Sienna Hills, Hidden Valley, Tonaquint, Kayenta, and Dammeron Valley. Each of these parcels are at different stages in the development process, as some are approaching build out while others are still in initial planning. The development group carefully applies real estate development, land planning, land conservation, legal and finance disciplines in its management of these special properties. Value is created by carefully working with the private sector, governmental groups and other interested parties on the tracts of land we manage. We capture this value by leading these lands into well structured, creative transactions with the private sector, always with an eye toward quality planning, preserving open space and meeting larger community needs.

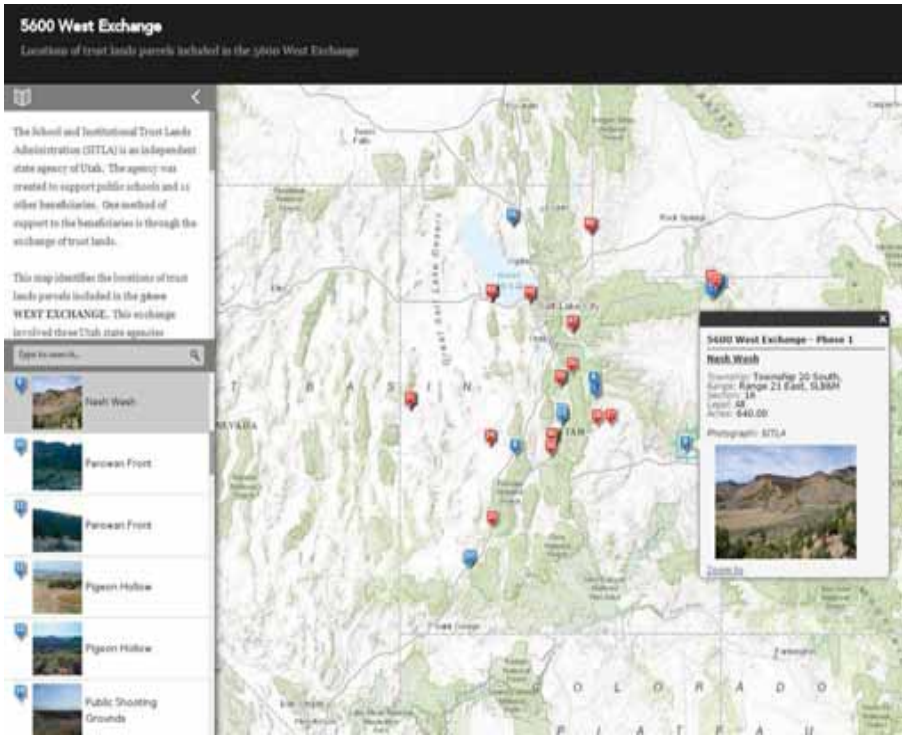


John Mathias
School & Institutional Trust Lands Administration (SITLA)

5600 West Exchange

SITLA, DWR & UDOT

The School and Institutional Trust Lands Administration (SITLA) is an independent state agency of Utah. The agency was created to support public schools and 11 other beneficiaries. One method of support to the beneficiaries is through the exchange of trust lands.



An online map was created to identify the locations of trust lands parcels included in the **5600 WEST EXCHANGE** that involved SITLA, the Division of Wildlife Resources (DWR) and the Utah Department of Transportation (UDOT).

The 5600 West exchange is comprised of two phases; Phase 1 and Phase 2. Phase 1 involved trust lands parcels (with wildlife potential) and a parcel of land owned by DWR near 2100 South and 5600 West located in Salt Lake County. The trust lands parcels were exchanged by SITLA to DWR for the management of wildlife. In return, SITLA received a parcel of land near 5600 West and sold it to UDOT for the future expansion of the Mountain View Corridor. The money received by SITLA from UDOT was deposited into the school fund for the benefit of the public school children. Phase 2 involves the exchange of trust lands parcels to DWR. In return, SITLA will receive another piece of DWR property located near 5600 West.

The goal of the online map is to visually engage the user for easy identification of trust lands parcels exchanged to DWR. The online map allows for pop-ups and photographs that include detailed information regarding the parcels.

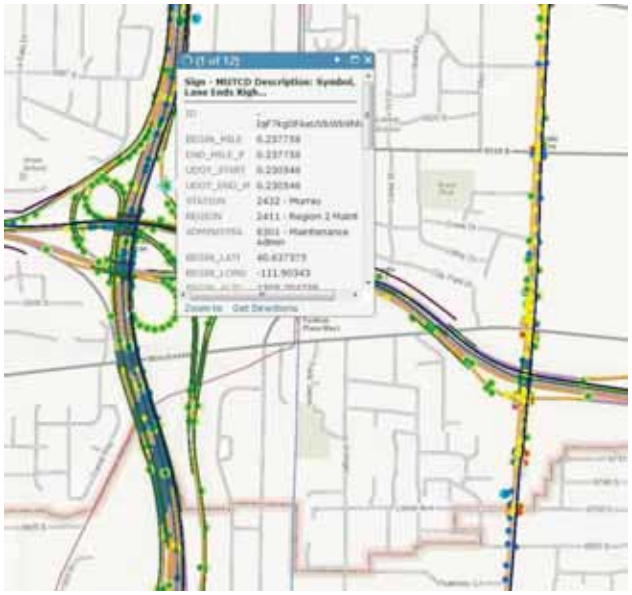
The online map can be found here:
http://tlamap.trustlands.utah.gov/5600WExchange/deploy/

Kate Staley
School & Institutional Trust Lands Administration (SITLA)

Utilizing LiDAR Technology for Asset Management

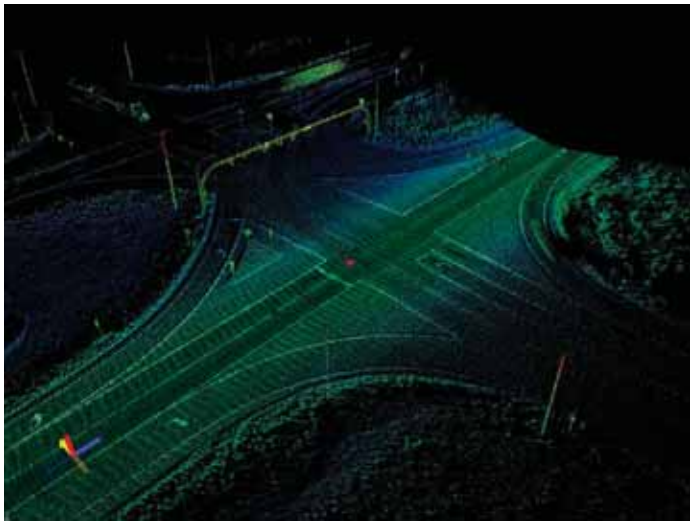
Utah Department of Transportation

Asset management at the Utah Department of Transportation (UDOT) primarily focuses on preserving our infrastructure to meet our strategic goals and manage costs. A significant goal of the Asset Management group is to extend the life of our transportation assets so that we can preserve our infrastructure, optimize mobility, keep our roadway systems safe, and strengthen our economy. In order to achieve those objectives we must first understand where those assets are, how many of them we have, and also understand their condition.



During the summer of 2012 UDOT embarked on an extensive LiDAR collection effort to facilitate those questions about its assets that, quite frankly, have been extremely difficult to answer. This project utilized state of the art laser LiDAR technology contracted with Mandli Communications, for collecting an inventory of our roadway assets such as:

- Pavement Data
- Signs
- Guard Rails
- Structures
- Medians
- Lanes
- Paint Striping and Messaging
- High Resolution Imagery



Now that we have the location and condition of these assets we can begin to understand how we can better manage them by improving our maintenance plans of action. This forward thinking, and incredibly innovative project has been recognized nationally as UDOT continues to be ahead of the curve for managing its assets. In the end, having this level of information will allow UDOT to improve our efficiency and also deliver better projects.

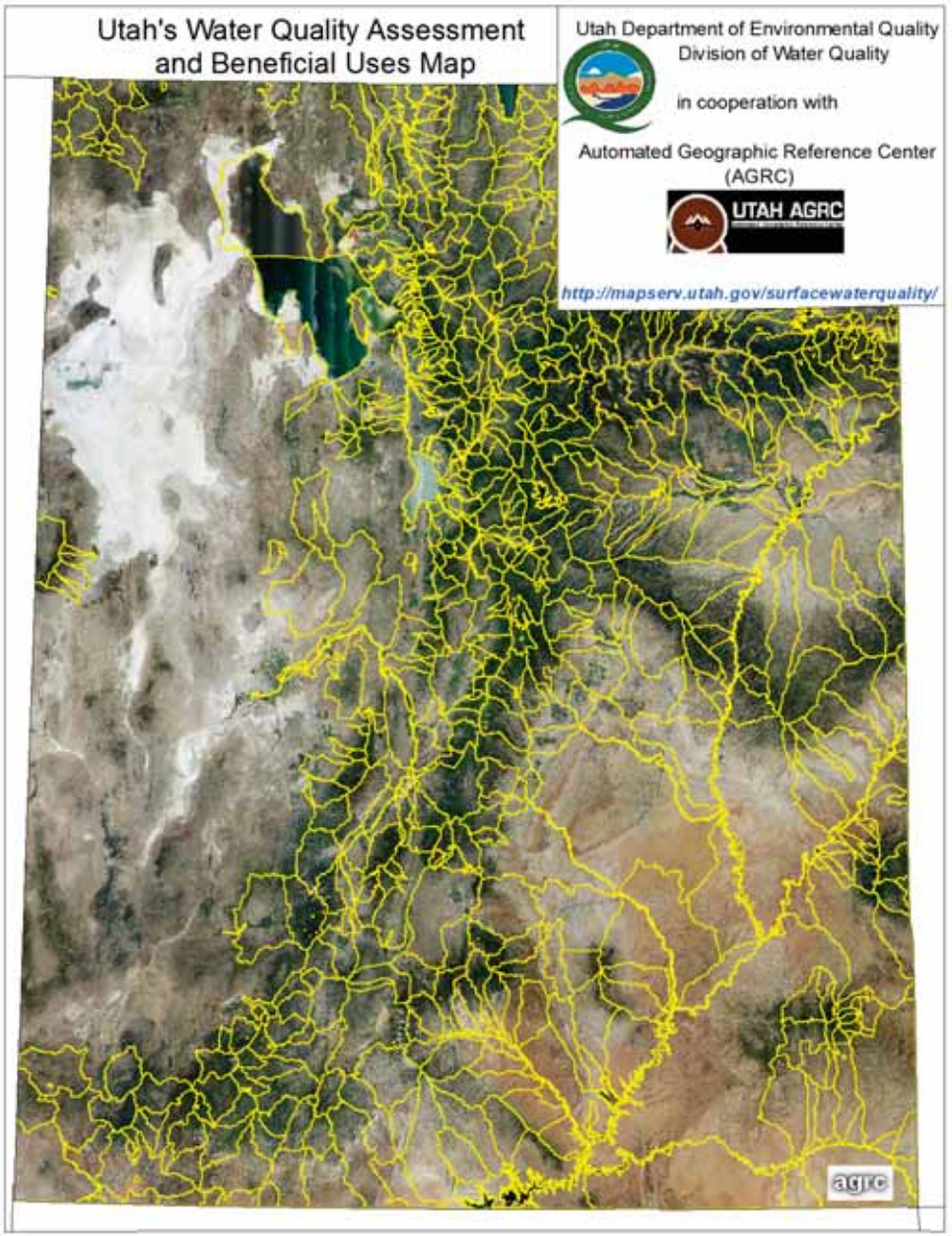
Nick Kenczka
UDOT

Utah's Surface Water Quality and Beneficial Uses

The Utah Department of Environmental Quality and Division of Water Quality, in cooperation with the Utah Automated Geographic Reference Center, developed an online application which provides you with statewide water quality assessment information.

Results of water samples collected throughout most of the State of Utah are analyzed and compared with established water quality standards. The water quality assessment results are available online through this interactive web-based mapping application. For waters **not meeting water quality standards**, causes for water quality impairment are also listed.

Major river basins within the state were subdivided into smaller hydrologic units to provide a means to assess water quality parameters according to state standards. The assessment units, or AUs, are shown on the interactive map. Additionally, lakes and streams throughout Utah are assigned specific beneficial uses which, in turn, determine the specific water quality standards as applied to surface waters. The beneficial uses and antidegradation categories of surface waters are also available in this web application.



Mark Stanger
Utah Division of Water Quality
Department of Environmental Quality

Utah's Water-Related Land Use

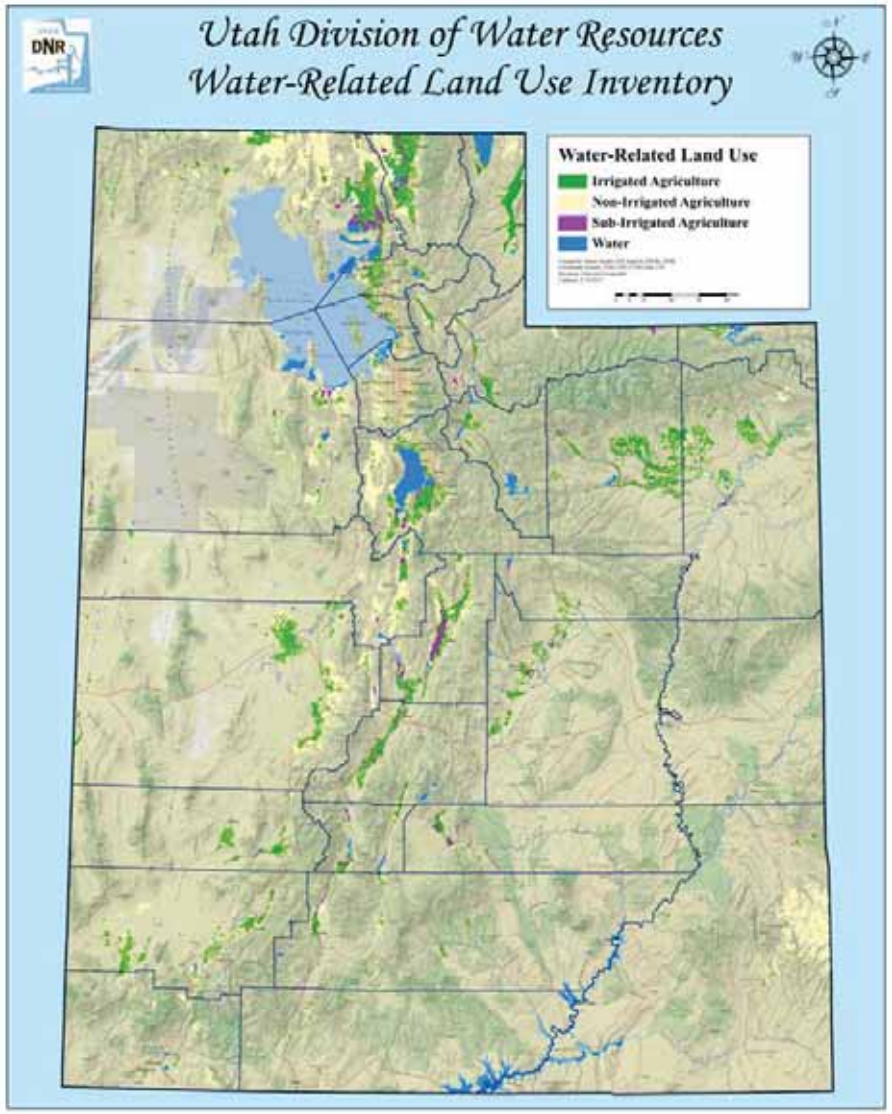
Utah Division of Water Resources

The Utah Division Water Resources develops a State Water Plan to coordinate and direct the activities of state and federal agencies concerned with Utah's water resources. As a part of this objective, the Division of Water Resources collects water-related land use data for the entire state. This data includes the types and extent of irrigated crops as well as information concerning dry land agriculture and urban areas.

The data are used for various planning purposes which include: determining cropland water use, evaluating irrigated land losses and conversion to urban uses, planning for new water development, estimating irrigated acreages for specific areas and developing water budgets. Additionally, the data are utilized by many other local, state and federal agencies.

All boundaries of individual agricultural fields and urban areas are precisely digitized. The division uses NAIP imagery and other digital images in a heads-up digitizing mode for this process. Field crews are then sent to label and field-check the data. Each crew uses a GPS unit and a Tablet PC to track the crew's location and digitally edit the data during the field labeling process. Once processed and checked, the data is filed in the SGID maintained by the Utah AGRC.

The division uses 11 hydrologic basins as the basic collection areas. County data is obtained from the basin data. The data collected statewide covers more than 2,700,000 acres of dry and irrigated agricultural land. This represents about 5% of the total land area in the state.



Aaron Austin
Division of Water Resources

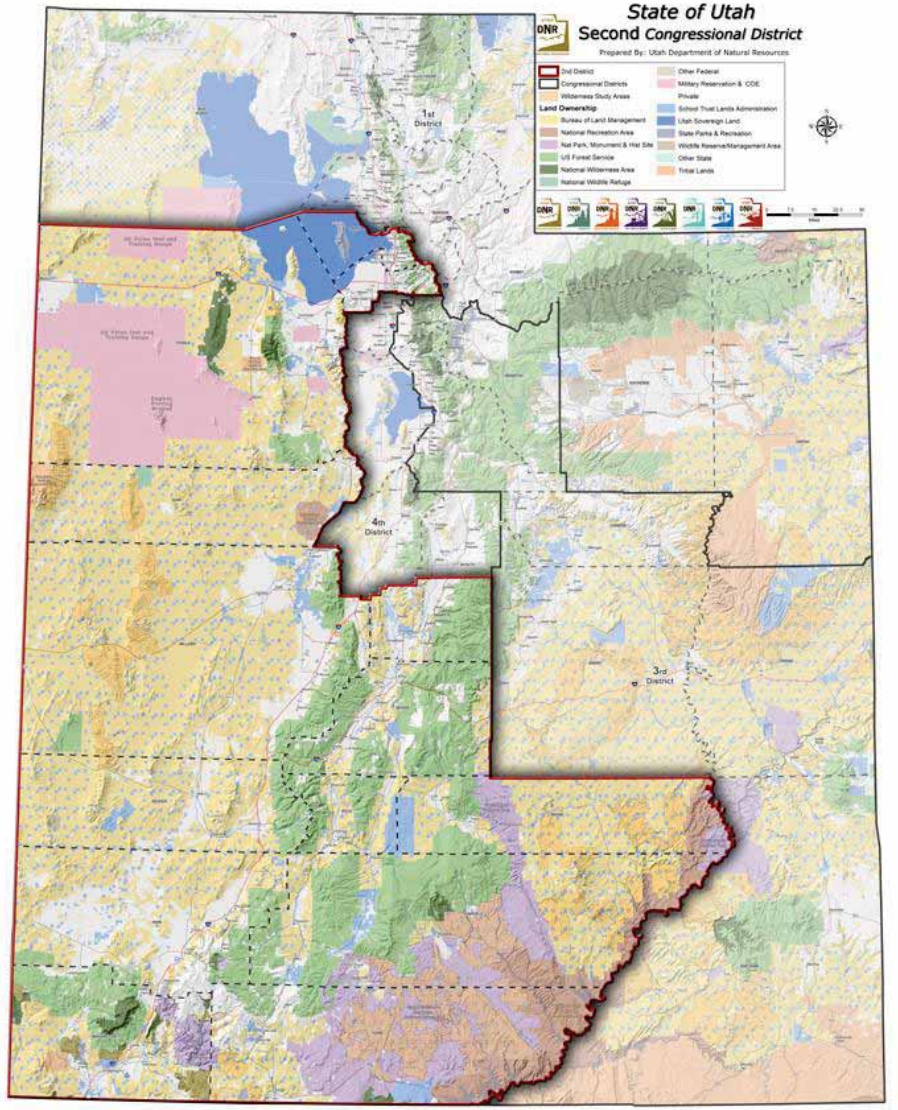
Congressional District Maps

Utah Division of Water Resources

While the Utah Division of Water Resources typically works with water-related data, the opportunity to perform analyses and produce maps on other subjects presents itself on occasion.

This map is one of a series of maps depicting each of Utah's congressional districts. Based on the results of the 2010 U.S. Census and due to a sufficient population increase in Utah, a fourth congressional district was created and new boundaries were delineated for the entire state.

This map highlights Utah's Second Congressional District and also gives an overview of all of Utah's new district boundaries. The focus of the content of this map is on land ownership, administrative boundaries, and prominent locations.



Adam Clark
Division of Water Resources

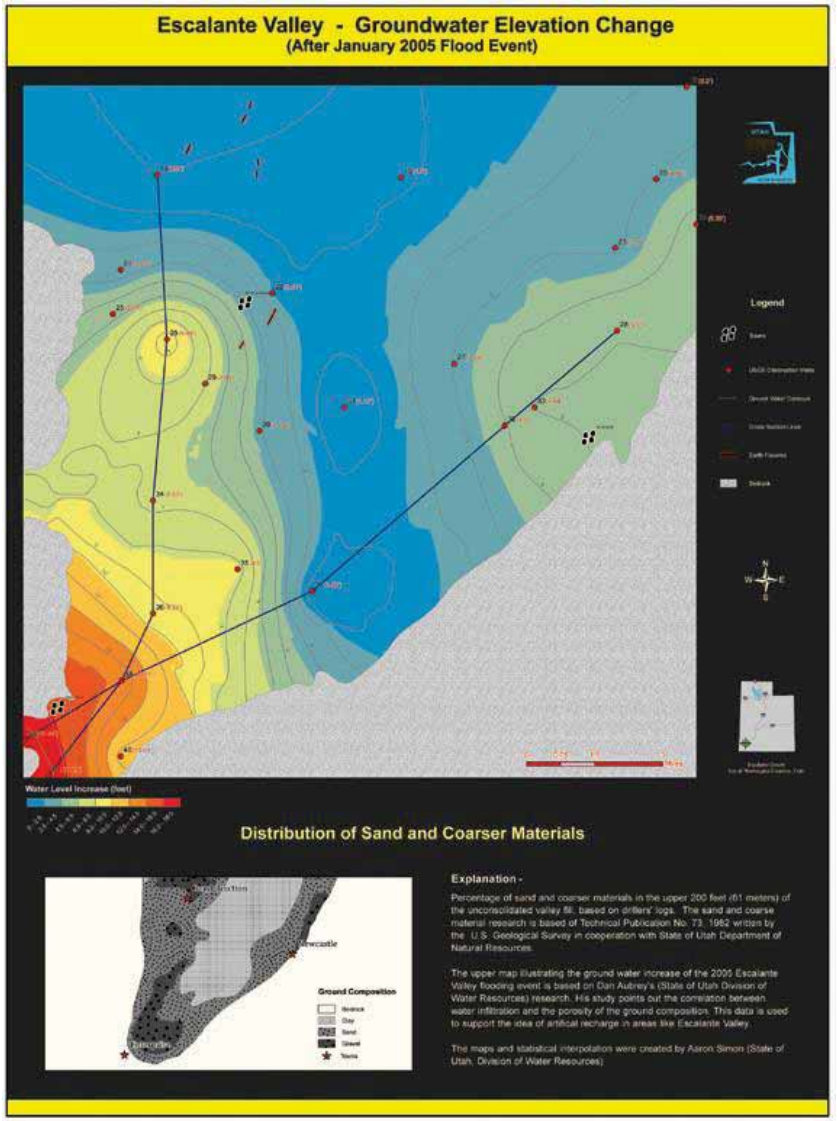
Modeling Groundwater Recharge

Utah Division of Water Resources

The Utah Division of Water Resources is involved in performing groundwater recharge feasibility studies. These studies are used to provide water managers with analysis and options used in mitigating problems associated with groundwater mining. These studies entail researching historical well logs, charting ground composition, and modeling groundwater behavior. These studies can also help to determine the most efficient sites to implement artificial groundwater recharge projects.

In 2005 a major flood occurred in the Escalante Valley, this event created a unique set of conditions that resulted in some monitoring wells reporting an increase of over 17 feet in the underground water level. Dan Aubrey, of Utah's Division of Water Resources, has studied this event and has pointed out the correlation between groundwater infiltration and the porosity of the groundwater composition. His study can be used to help understand the effects groundwater recharge have in areas such as Escalante Valley.

This map represents some of Dan's work and was created to help illustrate the effects of the 2005 Escalante flooding event. Using a geographic information system, statistical interpolation was performed over a study area and used to provide a picture of underground water movement. Through the digitizing and georeferencing of older maps a comparison between water flow and ground composition can also be seen.



Aaron Simon
Division of Water Resources

Ecological Niche Modeling

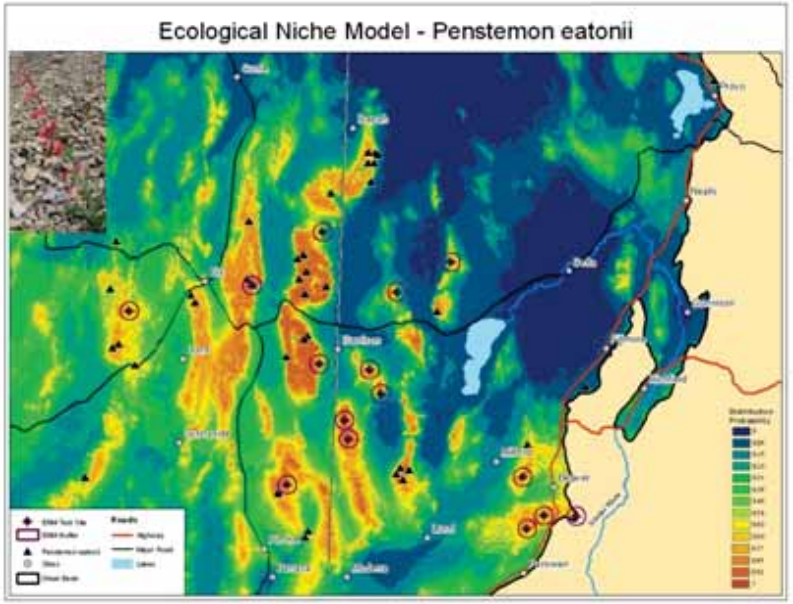
A tool for prioritizing germplasm sources of native plants

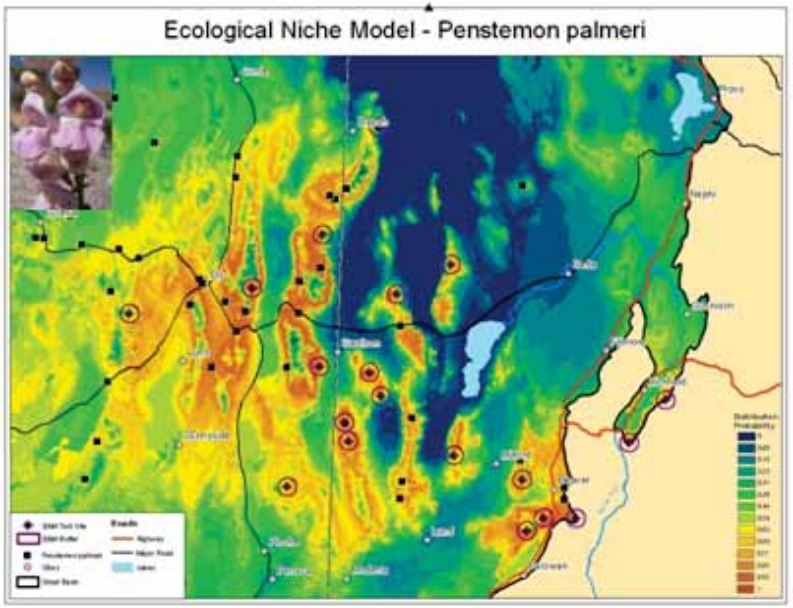
The Great Basin Native Plant Selection and Increase Project was initiated by the BLM to increase the availability of native grass and forb seed used in restoration and fire rehabilitation. The Utah Division of Wildlife Resources has partnered with the BLM and the US Forest Service for research and native plant materials development.

A common difficulty with native plant materials development is identifying sufficient germplasm sources to be used in species evaluation trials. Diverse germplasm from numerous sources throughout the species' range is needed to identify sources or lineages adapted to restoration site conditions. The current method for identifying new potential germplasm sources is to use historic records obtained through herbarium searches and online databases. These may have questionable location information, or be too old (+30 yrs) to be useful. A novel approach to identify germplasm sources is the use of ecological niche models (ENM).

These models use climatic and elevation data, and known species distribution data (historic record location data). Probabilities are created through the climatic and elevational commonalities of know locations.

We developed ENM for two native wildflower species, Firecracker beardtongue (*Penstemon eatonii*) and Palmer's beardtongue *(P. palmeri*). Test sites were then identified and field tested in locations that met a 65% probability minimum in each of the models. The model developed for Palmer's beardtongue was most accurate with plants being present in 15 out of 19 test sites visited. Firecracker beardtongue was present in 7 out of 16 test sites visited.





Jason M Stettler
Utah Division of Wildlife Resources
Funding provided by the Great Basin Native Plant Selection and Increase Project

Federal & Tribal Government

NAIP Imagery Land Use Change

U.S. Department of Agriculture

NAIP imagery from 2004 and 2011 covering the Daybreak community and surrounding area.

NAIP is a valuable tool to monitor land use change for many different purposes. NAIP is currently used by many different Federal, State and Local Agencies.

NAIP is entering its 12th year of collection in 2014. Utah is a planned acquisition state.

Aerial Photography Field Office
Farm Service Agency

NAIP Imagery Land Use Change

U.S. Department of Agriculture

NAIP imagery from 2004 and 2011 covering the new St. George airport and surrounding area.

NAIP is a valuable tool to monitor land use change for many different purposes. NAIP is currently used by many different Federal, State and Local Agencies.

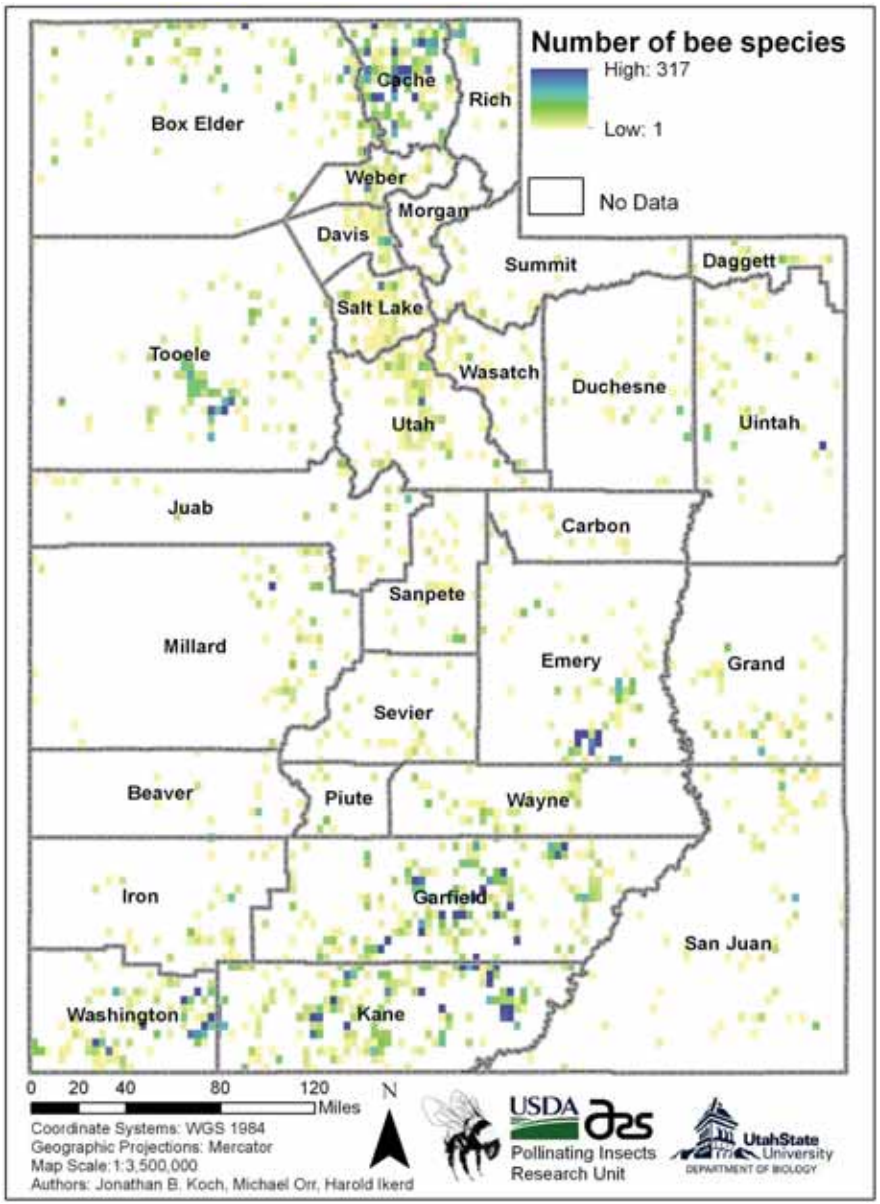
NAIP is entering its 12th year of collection in 2014. Utah is a planned acquisition state.

Aerial Photography Field Office
Farm Service Agency

Distribution of Bee Biodiversity in Utah

Bees are critically important pollinators of cultivated and wildland plants. In the past several decades, several bee species have declined in abundance and geographic range at an alarming rate, most notably the European Honey Bee and the bumble bees. As bees endure the impacts of global change, there is still much unknown about the status of numerous other bee species on our planet. In response to concerns on bee declines, multiple universities, non-government organizations, and state and federal governments have begun examining patterns of bee biodiversity and distribution. Although bees are well-sampled in Utah, no rigorous efforts at mapping their biodiversity in Utah have previously been made.

Utah is a state of high habitat diversity, and it is possible to compare a number of different habitat types within the state. Bees happen to be the most diverse in both form and function in arid environments like much of Utah. To investigate bee biodiversity, we generated 16 km^2 grids over the state of Utah. We plotted the number of species present in each grid cell as a first step toward a better understanding of bee biodiversity patterns in Utah. In the future, we hope to refine our methodology by using rarefaction to generate estimations of bee species richness based on the data and measures of collector effort.



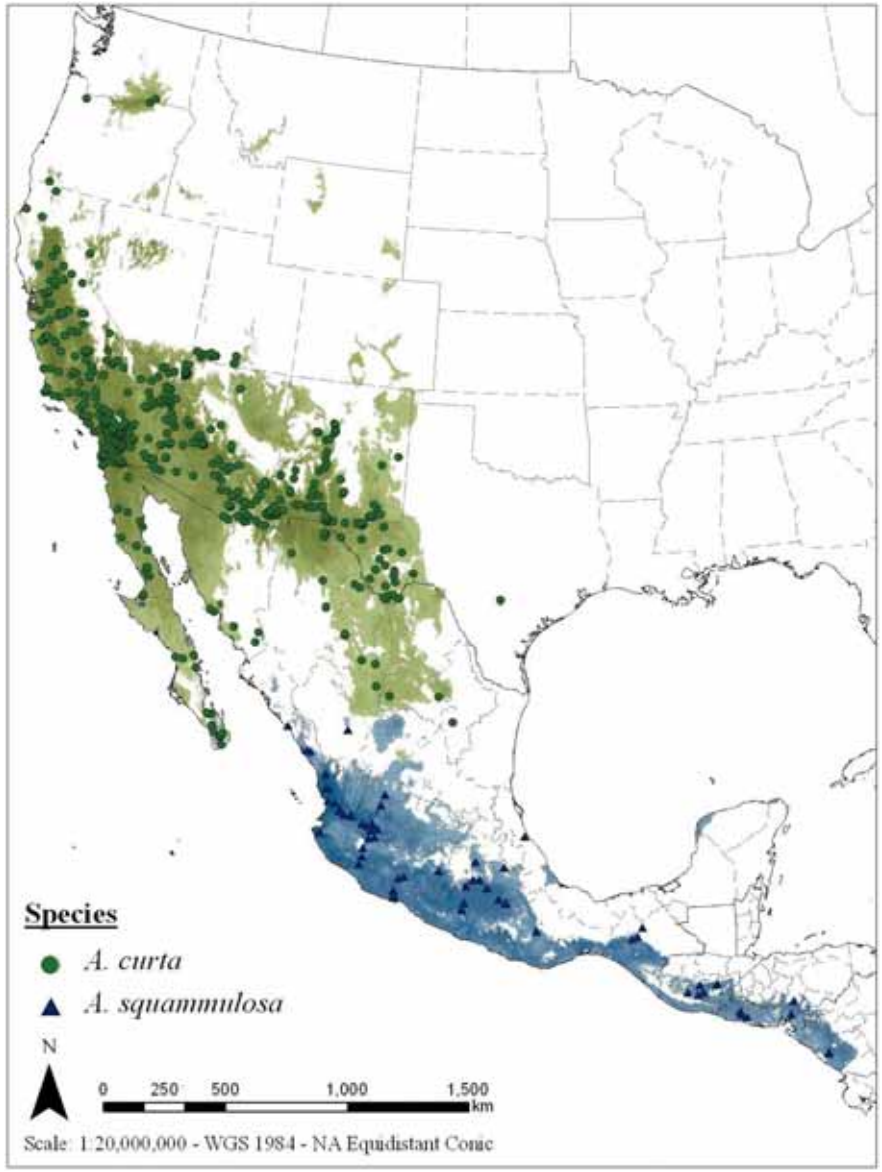
J. Koch, M. Orr, & H. Ikerd
USDA-ARS National Pollinating Insect Collection

Environmental Niche Mapping as a Taxonomic Tool in Bees

One of the primary goals of taxonomy, the naming and organizing of species, is differentiating species from each other. This becomes more difficult when species are very similar, as is often the case in bees. The primary methods for resolving such problems are physical characters, called morphological characters, and molecular data gleaned from DNA sequence data of specimens. Environmental niche mapping has recently become an additional tool for solving these problems.

We have used environmental niche mapping here to address the question of whether or not *Anthophora squammulosa* (Order Hymenoptera: Family Apidae) is two species or one. It was previously considered two species, *Anthophora curta* and *Anthophora squammulosa*.

MaxEnt was used to generate climate suitability models based on georeferenced museum specimens and the BIOCLIM dataset. Less than 1% overlap in the suitablility models occurred. The two entities appear to have distinct, different climatic habitats. In combination with morphology data, our models strongly suggest that *Anthophora squammulosa* is actually two species, *Anthophora curta* and *Anthophora squammulosa*.



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A Brief History of the Ute Tribal Lands

U.S. Bureau of Indian Affairs

The Uintah and Ouray Indian Agency, within the U.S. Bureau of Indian Affairs, is situated at Fort Duchesne, Utah. The primary task of our office is to assist the Ute Tribe in their trust land ownership and leasing activities.

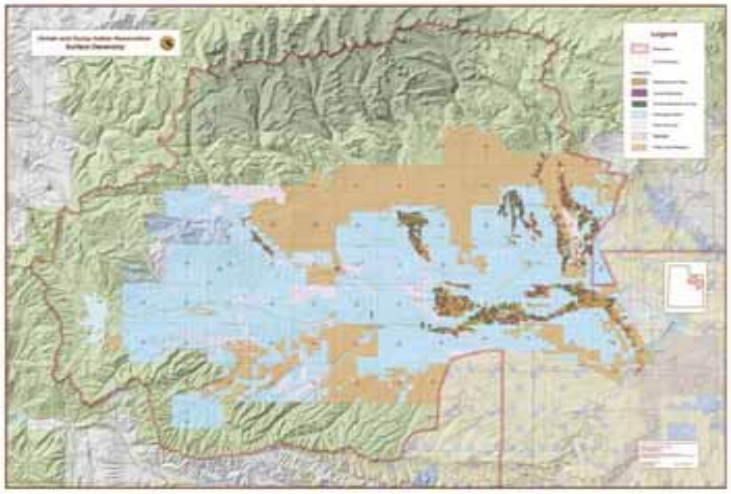
Much of what goes on in the Uintah Basin stems from the original acts of congress and how the land has been divided up over the years.

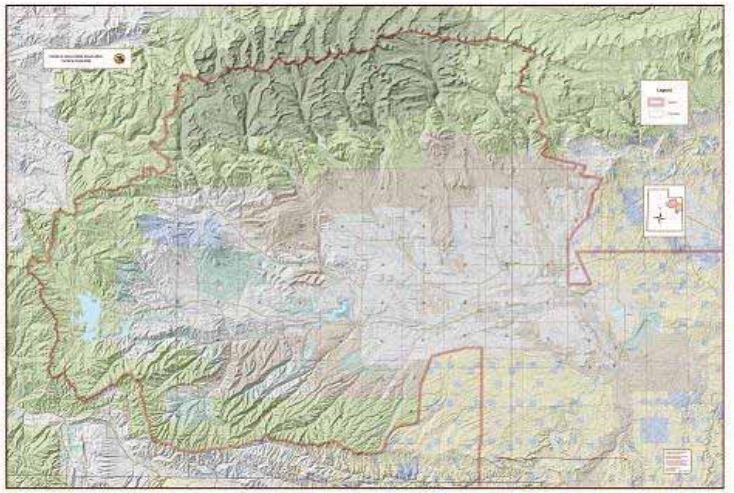
This has resulted in a checkerboard of scattered ownership; sorted by various land use categories. Over the years, the questionable verification of archived documents has necessitated our investigation of these original deeds and leases.

The end result of our research is a geodatabase with accurate feature locations and a myriad of new fields updated in our attribute tables.

The maps displayed are within the Uintah & Ouray Indian Reservation. There is a succession of land transfers, with various ownership over the years.

What is displayed includes the original surface tracts and ownership status. We also have the categories of land status; including trust and fee. We have included SITLA, BLM, and Forest Service lands as well.





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U.S. Bureau of Indian Affairs

For information and resources about Geographic Information Systems (GIS) and other digital mapping technologies, visit: http://gis.utah.gov.