



Resource Management and Research Division: Geographic Information Systems Program, 2014

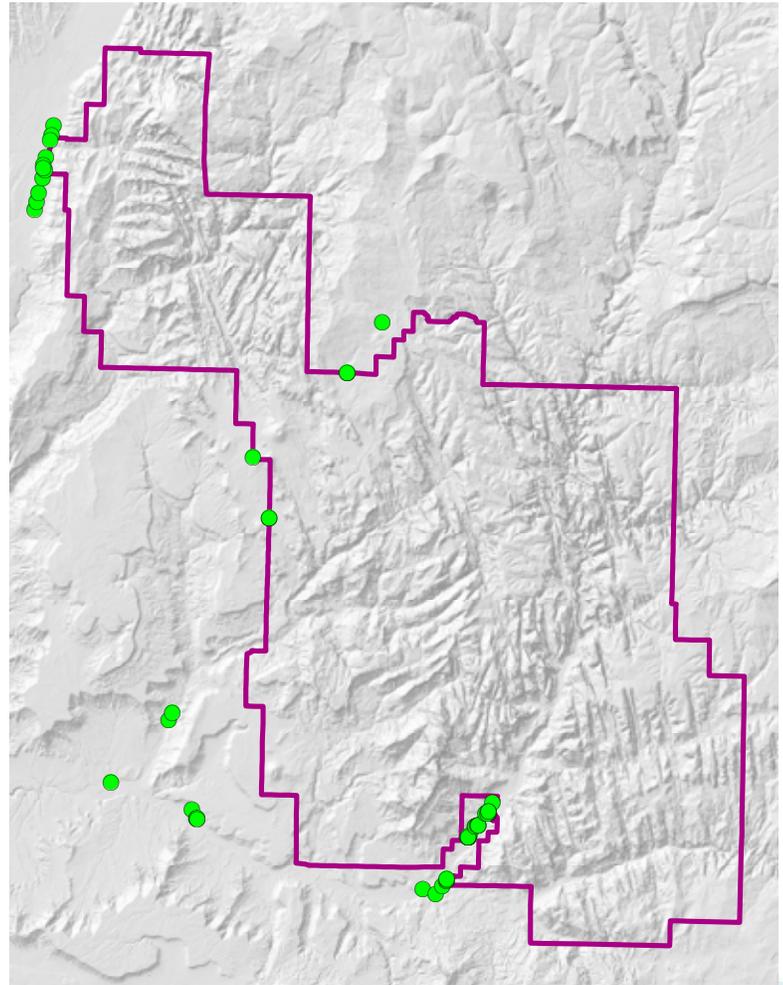
Introduction

The Resource Management and Research Division oversees both natural and cultural resources in Zion National Park, Cedar Breaks National Monument, and Pipe Spring National Monument. The division includes seven programs: Wildlife Management, Vegetation Management, Physical Sciences, Cultural Resource Management, Environmental Planning, Geographic Information Systems, and Museum and Curatorials Services. The resource programs administer numerous research activities that are conducted by outside universities and other agencies. Additionally, we receive support for long-term monitoring by the Northern Colorado Plateau Network. (Visit <http://science.nature.nps.gov/im/units/ncpn/> for more information about what this program is doing in each park.) The resource programs are involved with various outreach projects, including Zion Canyon Field Institute courses. This handout describes the Geographic Information Systems (GIS) Program and the ongoing projects in 2014.

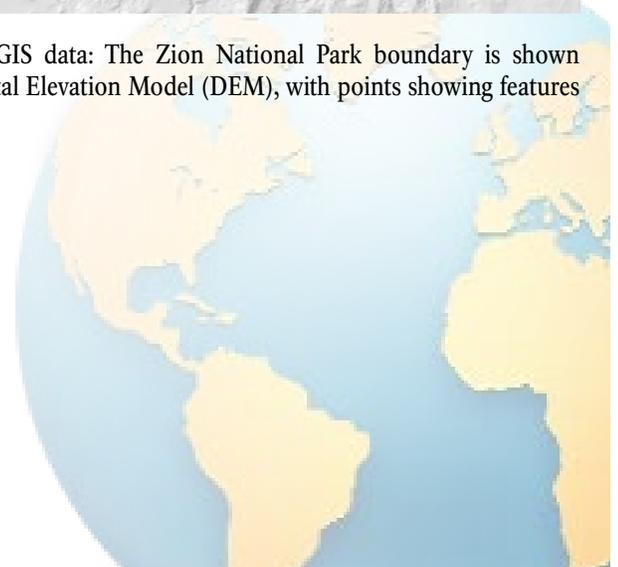
Geographic Information Systems Overview

Geographic Information Sciences (or Systems), or GIS, is a powerful tool that was developed to create digital, computer-generated methodologies to assist in better understanding spatial relationships. GIS has become an integral part of resource management in the national parks, and its use is necessary for helping to uphold the national park's mandate of preserving the parks for future generations.

GIS uses a variety of spatial data, including information collected from GPS as well as information digitized from paper maps or aerial photographs. GIS is an integral part of park operations that is being continually revised. The Zion GIS Program provides data development and technical support and training services to all divisions in the park as well as Cedar Breaks and Pipe Spring National Monument and Bryce Canyon National Park.



Example of raw GIS data: The Zion National Park boundary is shown overlaid on a Digital Elevation Model (DEM), with points showing features around the park.





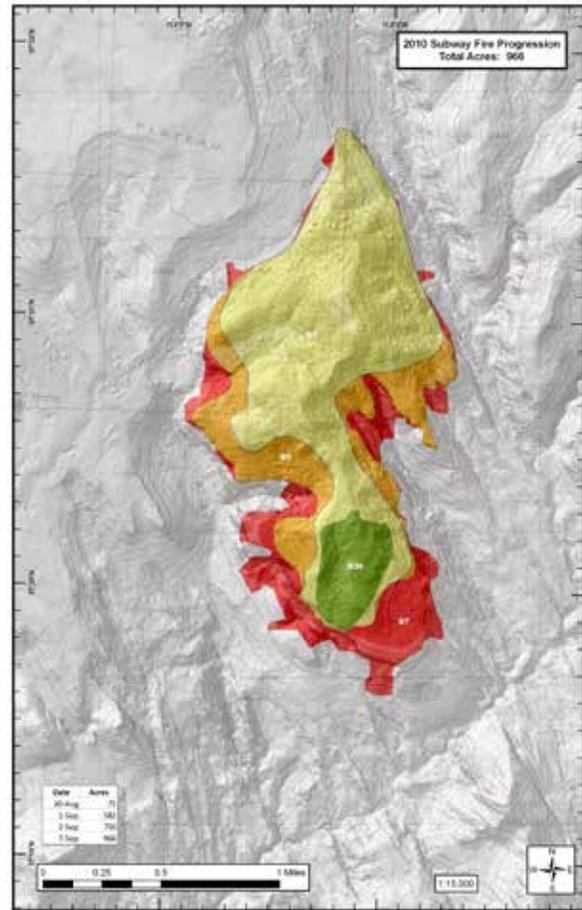
Examples of GIS Supported Projects

Wildland Fire:

GIS is an essential wildland fire tool. When fires occur, personnel map the progression and intensity of a fire so that park managers can make better decisions to protect resources and firefighters can better plan firefighting tactics. Fire maps are necessary for managing all aspects of fire from operations and logistics to transportation. Maps assist emergency planners in making decisions for fire management and mitigation.

In 2012, Zion National Park had 20 fire starts within the National Park boundary, most of these less than an acre. The last large fire in Zion was the Subway Fire in 2010 which was 966 acres.

Currently, Zion GIS is working with the Intermountain Regional Office to assist in the creation of a comprehensive fire database containing information on all fires occurring on NPS land within the Intermountain Region.



Facilities Management:

In the last few years, Zion GIS has been working to collect geospatial data on utilities such as water and sewer. This type of information is crucial for the management of park facilities. Currently, the GIS staff is working on a methodology to better link the NPS Facilities Management System Software (FMSS) to GIS in order to better map park assets.

In addition to utilities, Zion GIS has also been collecting information on park signs, both in and out of the park. The signs geodatabase records the sign material, height, width, and other pertinent information such as general condition. This information has been used to assess which signs to replace in the park.

Zion also maintains a database of all the buildings in the park. The buildings geodatabase is managed at a regional level at the Denver Service Center; updates are conducted locally and then merged

with the database in Denver. This allows for regional asset accountability, as well as establishing a data standard for recording and mapping NPS property.





Vegetation and Wildlife Habitat Modeling

Spatial modeling is a powerful tool that can be utilized for a variety of resource management projects, and provides valuable information for park scientists, researchers, and decision makers.

GIS data can be used to model (predict) where a natural resource might be found based upon certain known parameters.

Most recently, Zion GIS has continued work on modeling rare and exotic plants within the park. This model utilizes elevation, slope, soil type, and geology to predict the locations of rare plants based upon their specific habitat. This enables the Zion Vegetation team to more accurately/quickly locate plants within the park.

Zion GIS has also assisted our wildlife crew in creating predictive models of animal locations including big-horn sheep, desert tortoise, and Mexican spotted owl.



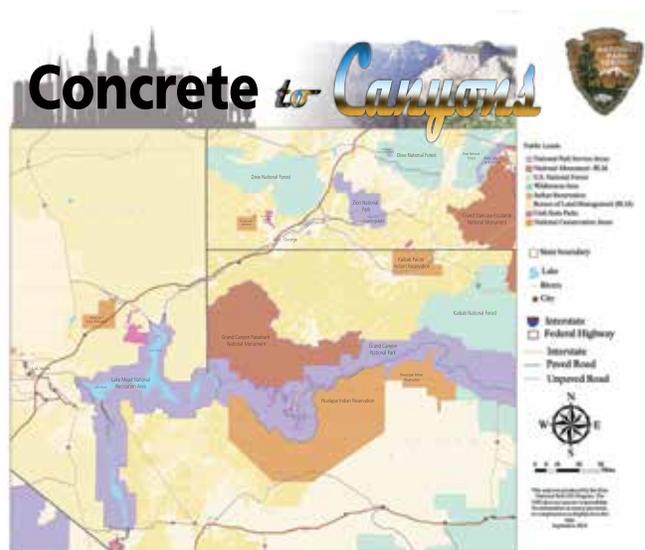
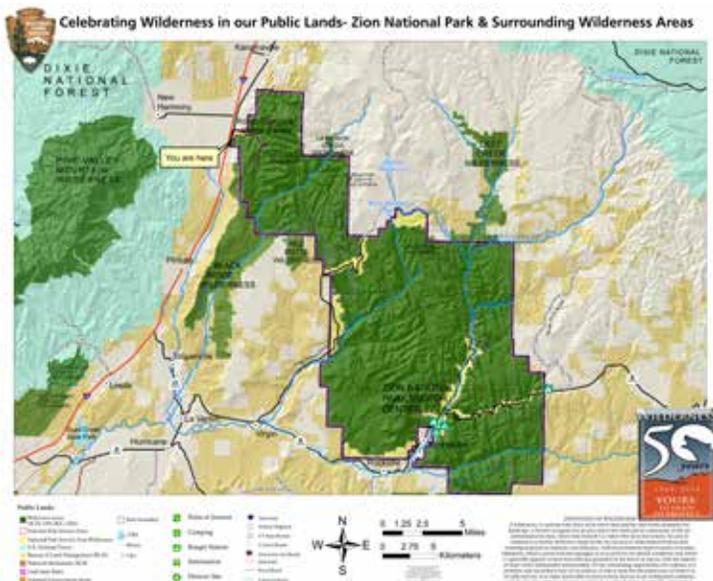
3D Modeling

For the past 3 summers, GIS interns have been working on creating 3-dimensional models of Zion National Park, Cedar Breaks National Monument, and Pipe Spring National Monument. Google Sketch Up was used to create 3D building models of park facilities, which can then be displayed using Google Earth.

This project utilizes mainstream software to introduce spatial technology to park visitors as well as provide an easy to use platform for park staff to employ during presentations and planning.

Cartography

The GIS division also assists in supplying other divisions with maps as they request. This year GIS has created new trailhead maps to be placed at trailhead bulletin boards, interpretive maps for various interpretive and educational programs, regional maps of Southern Utah for display at the Pipe Spring visitor center and Kolob Canyons visitor center, and wilderness maps for the 50th Anniversary of the 1964 Wilderness Act.





GIS/GPS Training and Field Support

The GIS division operates as support for other park personnel. The staff provides technical support and in-depth training courses to other park employees as well as visiting researchers. Training topics include GPS use and orienteering as well as introductory GIS map making. Additionally, the GIS staff provides GPS field support for various programs.

This past year Zion GIS assisted in supporting and supervising an intern from the Trails Division in mapping park trail assets. A database and field inventory methodology was established so that the intern could collect data in accordance with NPS trails asset data specifications. This same intern also assisted in continuing an effort to digitize historic trails data from a cultural resources project. This information, as well as the new data collected this year, will be very important in establishing a baseline by which GIS, Trails, and Cultural Resources can work together to gather and map important park facilities data.

This past year, Zion GIS also assisted some visiting researchers in GPS use to map the Historic Oak Creek housing area in the park. These structures are listed in the National Historic Registry and are a part of the LCS (List of Classified Structures) database. Zion GIS provided a GPS unit, a data collection template, and a tutorial on how to utilize the GPS unit.

Other training projects include updating 'how-to' manuals for park employees to utilize so they can work on their personal GIS/GPS skills on their own time as well as cross training interested employees on GIS.



Zion GIS and International Intern Program

The GIS program at Zion has established a partnership with an Italian bank foundation that supports Italian students to work abroad in specific fields of study, including the natural resources.

The bank, Fondazione CRT, hosts students from the University of Turin to study in the United States in various career sectors. This program initially contacted Yellowstone National Park asking them if they would host a student. From Yellowstone, the program expanded to Zion National Park. To date, Zion has hosted 5 interns.

The interns assist in the day to day operations in GIS including general map and data requests as well as focusing on a project that works with their specific skill set.

Over the last few years the interns have worked on creating the 3D building models, social trails and graffiti monitoring, and have continued work on our rare plants model.