

**2018 NASCIO Award Submission
Category:**

Cross-Boundary Collaboration and Partnerships

**Project Title:
Tennessee Wildfires: A Coordinated GIS Response**

**Sevier County, Tennessee
State of Tennessee, Emergency Management Agency (TEMA)
State of Tennessee, Department of Agriculture, Division of Forestry
State of Tennessee, Department of Finance and Administration, Strategic
Technology Solutions, GIS Services**

**Contact:
Suzanne White
(615)253-4799
SuzanneWhite@tn.gov**

**State:
Tennessee**

**Project Initiation:
November 28, 2016**

**Project Completion:
May 15, 2017**

Executive Summary

In Tennessee, the State has made a significant investment into developing and maintaining a multi-agency enterprise Geographic Information System (GIS) branded as the "Tennessee Map" (TNMap). One of the main objectives of the TNMap enterprise GIS is to 'build it once, use it many' and eliminate or help minimize GIS data duplication efforts, saving time and money. This concept was put into action during the tragic events of the Smoky Mountain wildfires beginning in November 2016.

In late November 2016, wildfires killed 14 people and destroyed many homes and property in Gatlinburg and Pigeon Forge, Tennessee. First responders were deployed from numerous states to help with the disaster and aid in recovery efforts. Maps and GIS data proved to be critical resources that first responders needed to effectively carry out their mission. Strategic Technology Solutions Geographic Information System Services (STS GIS Services) staff were able to provide valuable guidance, coordination, and GIS data to a variety of agencies. STS GIS Services conducted regular meetings to facilitate communication between responders requesting various types of GIS data and maps. Participants in these meetings included the Sevier County Planning Department, the Sevier County Sheriff's Office, the National Park Service, FEMA, Tennessee Emergency Management Agency (TEMA), the Tennessee Fire Marshal's Office, the Tennessee Division of Forestry, and Esri. Meetings were hosted through audio conferencing sessions which streamlined data collection and dissemination efforts and ultimately reduced duplication of effort among all agencies.

STS GIS Services had the required software, hardware, and expertise to quickly provide access to pertinent GIS data to assist with damage assessment. Aerial photography and other GIS data layers were shared through online GIS data services. Post-fire satellite imagery, pre-fire aerial photography, Light Detection and Ranging (LiDAR) digital elevation models (slope, aspect, elevation, and hillshade), LiDAR intensity images, LiDAR derived building footprints, and hydrography were shared.

Ultimately, the collaborative efforts of all these agencies, leveraging GIS technology, proved to be an extremely valuable resource during these tragic events.

Project Narrative

The City of Gatlinburg in Sevier County, TN is mostly surrounded by the Great Smoky Mountains National Park. It is a tourist destination with vacation homes scattered along hilly winding roads. The wildfires started in the Chimney Tops region close to Gatlinburg in November 23, 2016. That year was a particularly active wildfire season throughout Tennessee. The weather forecast promised rain that was hoped to reduce the fires. Instead, high winds fueled the fires that quickly spread from ridge top to surrounding areas. By November 29, Gatlinburg was in the midst of an emergency situation and being evacuated. The fires went on to spread into the adjacent Pigeon Forge, TN and other areas in the vicinity.

STS GIS Services, located in Nashville, TN, built and maintains a multi-agency enterprise GIS branded as "TNMap". Data within the TNMap is provided to the public and internally through online services providing quick access to view and query the current geospatial data without requiring onsite data storage. TNMap also provides options for data download. While developing the various geospatial framework layers for TNMap, STS GIS Services has simultaneously built relationships with colleagues in local, state, federal, and private organizations that proved to be vital for the GIS coordination efforts surrounding the Gatlinburg wildfires. STS GIS Services also plays an active role in the state's GIS professional organization, TNGIC (Tennessee Geographic Information Council).

The key components enabling STS GIS Services to be in a position of assistance include existing relationships with local, state, and federal organizations through ongoing projects and TNGIC participation; technical expertise; state-of-the-art hardware/software; and resourcefulness to identify and respond to the wildfire disaster. STS GIS Services worked remotely to provide data coordination, data hosting, and data distribution enabling first responders to have up-to-date information for "on the ground" disaster response.

As the concern of the wildfires seemed imminent, STS GIS Services was corresponding with the Tennessee Division of Forestry, TEMA, Sevier County GIS, Esri, and Division of Forestry experts. STS GIS Services took the initiative to request and host the Digital Globe satellite post-fire imagery for the area. Using STS GIS Services hosted imagery, Sevier County officials and TEMA were developing their own web applications for internal situational response as well as public notifications. The responders immediately used the post-fire imagery to remotely flag the locations of destroyed structures without complicating the on-the-ground rescue efforts along winding smoke filled roads with falling trees.

STS GIS Services quickly responded to further inquiries about data access by coordinating audio conferences with the Sevier County officials, TEMA, and Esri. Additional organizations participating in these meetings included the Tennessee

Division of Forestry, FEMA, Sevier County Sheriff office, Great Smoky Mountain National Park, the Tennessee Fire Marshal's Office, and others as necessary. These multi-agency collaboration meetings were scheduled 2-3 times per week immediately following the disaster. Topics included geospatial data available, data updates, data requested, and data collection efforts. STS GIS Services distributed a document containing the links to the data available through services and download options.

Concept

Pre- and post-fire imagery, LiDAR surface models, and LiDAR building footprints were critically important in web applications that were distributed to the first responders, damage assessment, and public information.

As responders began deployments, it became evident that there was an immediate need to educate responding organizations of the existing geospatial data and reduce data collection duplication saving time and effort. Therefore, STS GIS Services began the data coordination conference calls between participating organizations.

Since the areas affected by the wildfires had been evacuated, there were restrictions to incoming traffic. The public were desperate for knowledge of the status of their properties. Using the STS GIS Services map and image web services, Sevier County officials developed a public facing web application displaying the pre- and post-fire imagery along with initial damage assessment status of buildings.

Significance

STS GIS Services web services and data distribution, managed remotely, supported the efforts of those in the midst of the disaster situation. The local government utilized citizens with local knowledge to work round the clock using the post-fire imagery to initially tag addresses with a damage assessment help focus field efforts. First responders and damage assessment teams from beyond Sevier County joined in the deployment on the ground using our services along with the initial online assessments within their data collection devices. The use of our web map and imagery services was critically important to the ground field coordination. Pre and post fire imagery can be seen by clicking on the links below.

WorldView 3 – VNIR 3 Swaths: 12/1/2016 capture

http://tnmap.tn.gov/arcgis/rest/services/PUBLIC_SAFETY/IMAGERY_VNIR_2016_EAST/MapServer

TNMap/TDOT Pre-Production Sevier County: 3/7/2015-11/14/2015

http://tnmap.tn.gov/arcgis/rest/services/PUBLIC_SAFETY/IMAGERY_SEVIER_TDOT_PREPROD_2015/MapServer

Impact

The TNMap datasets were developed statewide following rigid data collection standards. Therefore, the TNMap data is useful beyond local jurisdictions. Natural disasters, such as the wildfire events, cross jurisdictional boundaries. Therefore, having standardized data beyond Sevier County and through the Great Smoky Mountains National Park was critical to the success of the data sharing effort. STS GIS Services coordination and data services provided much needed assistance during a natural disaster that affected many lives and property. As a result of our efforts, data duplication was reduced and data sharing was promoted, which resulted in time and costs savings. STS GIS Services was recognized as a reliable resource in a time of need providing helpful data and support when needed.

In a letter from Sevier County Sheriff, Ronald L. Seals, he stated “I want you to know the impact you made cooperating and working alongside of the Sevier County Sheriff’s GIS and Criminal investigative Division regarding the Wildfire Disaster that began to spread on November 28, 2016 in Sevier County.” Furthermore, “I would like to convey my deepest and sincerest appreciation for the incredibly supportive assistance that you gave last year when our county experienced the devastation of the wildfires.”

Highlights of the GIS data leveraged to support the disaster response, as well as some of the TNMap services can be found on the following “story map” developed by STS GIS Services: <http://arcg.is/0fvLyP>.

Since the disaster, several State agencies have taken proactive measures to integrate GIS technology with their emergency management function. TEMA is actively training their staff on GIS field collection software to improve accuracy and timeliness of data collection. The Division of Forestry is leveraging GIS training services provided by STS GIS and is in the process of procuring GIS based software to support field activities, and TNGIC has a new disaster response committee focused on multi-agency GIS coordination efforts. Overall, the GIS coordination efforts, technical expertise, and timely GIS data services provided by STS GIS Services staff proved to be extremely valuable during the Gatlinburg wildfire disaster.



Westgate Smoky Mountain Resort and Spa
Pre-fire Aerial Photo
2015 State of TN



Westgate Smoky Mountain Resort and Spa
Post-fire Satellite Photo
2016 Digital Globe



Westgate Smoky Mountain Resort and Spa
Photo: Associated Press