The people and culture of New Orleans, Louisiana have made the city unique among and distinct from other cities in the United States. Approximately one-fifth of New Orleans’ urban area is in a historic district listed on the National Register of Historic Places. In 2005, Hurricane Katrina damaged tens of thousands of historic homes throughout the city, resulting in the single largest disaster for cultural resources in the United States since the National Historic Preservation Act of 1966 (NHPA) was enacted.

In response to the enormity of the disaster and the need to resolve immediate threats to human health and safety, one of the many programs the Federal Emergency Management Agency (FEMA) funded was the removal of damaged homes in support of the City of New Orleans. However, FEMA’s Historic Preservation department immediately recognized that this effort could have potentially affected many historic properties, and under NHPA were required to consider the effects of the removal on historic resources, despite the potential health and safety issues. As a result, FEMA faced the difficult challenge of assisting in rebuilding New Orleans as quickly as possible while fulfilling its obligations to consider the effects of its projects on the country’s historic resources.

Meeting NHPA Requirements

The NHPA established a national historic preservation program and is the major law defining historic preservation policy, establishing State/Tribal Historic Preservation offices and determining the independent roles of all parties involved in historic preservation efforts. Section 106 of the Act stipulates that a federal agency must consider the effects of projects on historic properties when taxpayer dollars are spent on activities such as building a new highway or rebuilding a neighborhood following a disaster. It mandates a review process ensuring that the federal agency, in consultation with applicable state, tribal, and local parties, is aware of any adverse effects on historic resources and mitigates against such effects. Meeting Section 106 requirements entails identifying and reviewing all cultural resources eligible for inclusion on the National Register of Historic Places, which is often an extremely time-consuming process.

“A formal survey or cultural resource assessment is a requirement in so many construction projects because Section 106 applies to any place, site or structure whether it is actually listed on the Register or simply qualifies for listing,” said Deidre McCarthy, Historian for National Park Service (NPS) Heritage Documentation Programs, Cultural Resource Geographic Information System (GIS) Facility.

The site assessments are often called Section 106 surveys.

A city rich in history and culture, New Orleans had thousands of houses, monuments, and neighborhoods listed on or eligible for the National Register of Historic Places. In the aftermath of Hurricane Katrina, there simply was not time for standard Section 106 surveys. FEMA had to develop a methodology for assessing all of the damaged resources quickly in order to improve the safety of New Orleans’ citizens.

Developing an Assessment Methodology

To accelerate the Section 106 assessment process in support of their disaster response, FEMA turned to the NPS Cultural Resource GIS Facility for help in taking advantage of the capabilities of GIS and Global Positioning Systems (GPS) to speed up the Section 106 process. The NPS was tasked with designing a digital Section 106 process, and they took the opportunity to field test their draft cultural resource data.
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transfer standards in storing, managing, and sharing GIS data for the New Orleans project.

The NPS had developed the cultural resource data transfer standards to help facilitate data sharing between organizations. The NPS-designed methodology assisted FEMA in taking advantage of GPS for data collection to speed the survey and evaluation process. In addition, it allowed FEMA to use GIS to consolidate and share data and speed the concurrence process between FEMA and State/Tribal Historic Preservation offices.

With time considered a scarce commodity, post-Katrina New Orleans was an ideal test bed for applying the data transfer standards. Working together, the NPS and FEMA developed a methodology that implemented the draft standards for the first time in New Orleans. The result was the successful utilization of GPS and GIS technologies to assess more than 40,000 structures in a fraction of the time that might have been required had traditional data collection methods been used.

McCarthy explained that the need for developing data transfer standards for cultural resource assessments arose from the desire to utilize geospatial technology to a greater extent as part of the overall preservation process. “GIS holds the key to integrating our cultural resource data sources and allowing cultural resource managers to explore new approaches to using the data, resulting in better resource protection,” she said.

The methodology developed by NPS focused on gathering locational data to establish a baseline of inventory information, and ultimately to utilize that data within a GIS to speed the assessment and concurrence processes involved in Section 106 compliance. The NPS methodology called for each resource that might be eligible to receive FEMA funding (and thus part of the FEMA Section 106 requirements) to be mapped as a point, line, or polygon. This form of data collection enabled various expert historians to record features and attribute data in a GIS with geospatial location as the common element, making it possible to share the data among many different systems.

“These are data transfer standards that relate to documenting through feature-level metadata how the information was collected and what is known about it,” said McCarthy. “When that cultural data is shared, [the user] knows exactly what they can do with it, whether it can be used in a legal context or whether more information is needed.”

Preparing for Field Data Collection

While the City of New Orleans created a list of condemned structures that had to be demolished to remove safety hazards, the FEMA Historic Preservation group met with representatives of the NPS to develop a systematic methodology for conducting the required assessments.

At the time Katrina struck, New Orleans had a significant database of local surveys, but there was little detail on individual buildings, and most of the data were paper based. Moreover, the neighborhoods hardest hit by Katrina/Rita tended to be those with the least existing documentation. “[Historic preservation] data tended to be fragmented, paper-based and not in a format that was easily shareable,” said Gail Lazaras, FEMA Historic Preservation Specialist.

An important step in developing the methodology was creating the data dictionary that would be used in the field data collection devices as well as the basis of the structure of the GIS repository. The NPS and FEMA, in consultation with the Louisiana State Historic Preservation Office (SHPO), which plays a key role in administering the national historic
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The NPS assisted the local New Orleans FEMA office in obtaining 20 Trimble® GeoExplorer® 2005 series GeoXM™ GPS handhelds with built-in GIS data collection capabilities. The data dictionary was created in the Trimble GPS Pathfinder® Office software on a desktop computer, and then downloaded onto the Trimble GeoXM handhelds to serve as the form-driven application within the Trimble TerraSync™ software. An Environmental Systems Research Institute (ESRI) ArcGIS Geodatabase was also built around this structure, giving every organization access to the data required to make an accurate assessment via the GIS of a resource’s historic integrity and potential National Register eligibility.

Development of the data dictionary was the key factor in streamlining the cultural resource data collection process, according to Lazaras, stressing that considerable time had to be dedicated up front to ensure the dictionary was precisely tailored to the task at hand. In the case of post-Katrina New Orleans, that meant creating a menu that allowed data collectors to describe the structure’s architectural style using local terms while also assessing its structural integrity relating to flood damage.

“We worked with all consulting parties, including SHPO and the City’s Historic District Landmarks Commission, to ensure the correct architectural terms specific to New Orleans were used in the data dictionary,” said Lazaras. “If FEMA had been surveying fire-damaged buildings in another part of the country, the data dictionary would have been different.”

After working through the process of creating a data dictionary structure, Lazaras believes that a similar process built around a field tested data dictionary and corresponding geodatabase can be rescaled to fit a wide variety of disaster situations.

Creating an Efficient Workflow

Within months after Katrina hit the Gulf Coast, the City of New Orleans and other applicants had submitted to FEMA the first of many lists of buildings slated for demolition—all needing Section 106 surveys and subsequent evaluation. By the time the FEMA-funded demolition was completed in spring 2009, FEMA crews had visited more than 40,000 properties in six parishes in and around the city.

In order to achieve this level of efficiency, FEMA managed up to 20 crews at a time, and each crew included a Secretary of Interior-qualified architectural historian and a photographer in order to meet the requirements of NHPA’s Section 106. Each team typically required less than a day’s training to learn how to use the Trimble GeoXM handhelds for GPS location and feature attribute collection.

In a normal day of data collection, each team set out on foot with a list of specific properties to assess in a given neighborhood. Because FEMA personnel did not have the right to enter private properties without permission (as well as the potentially dangerous conditions in most of the buildings), each crew performed its assessment standing on the sidewalk outside the front door. As the integrated Trimble GPS handheld device collected a location point, the onscreen menu guided the assessor through a predominantly point-and-click process of describing more than 40 architectural details of the roof, exterior, windows and foundation. In addition, the crews...
assessed the building on five aspects of structural integrity.

As the survey menu was filled out, the data dictionary script attached relevant metadata to the data fields as required by the NPS data transfer standards. Relating to the location point, the metadata recorded the type of GPS equipment used, accuracy range, and user name so that others using that data in the future would know precisely how accurate and trustworthy it is.

While the surveyor filled out the data collection menu, the photographer used a digital camera to snap photos looking head-on at the building and obliquely at each side from the front sidewalk. One other picture was usually taken from a perspective chosen by the photographer. Photo identification numbers were assigned to each image and entered into the data collection menu as attributes permanently attached to that property.

At the end of each day, the field crews either hand delivered or emailed their data and photo files to the New Orleans FEMA office. The data was first transferred into the Trimble GPS Pathfinder Office software where it was quality checked and converted into shapefiles before being uploaded directly into the project GIS. The data collection script created paths to the digital photos so they could be easily linked to the property in the GIS, which was integral to both the actual assessment and the development of the inventory of historic places.

Speaking to the efficiency provided by the methodology implemented by FEMA and NPS, FEMA’s Lazaras said, “We definitely had economies of scale. FEMA could conduct on screen assessment with SHPO for hundreds of individual properties in a day, which put less stress on the agencies involved and allowed our personnel resources to be used more effectively.”

A Methodology for Future NHPA Assessments

Looking back on the New Orleans experience, Lazaras believes that FEMA and NPS have put in place a methodology that can easily be used as a framework for other organizations to efficiently assess cultural resources and meet Section 106 requirements. At the heart of this methodology is a focus on field data collection of geospatial data that is easily shared through GIS technology, resulting in an asset for future response and recovery efforts at the local, state, and federal levels.

The development of this methodology also provides a template for other organizations to proactively develop their inventory of historic places. The NPS is already thinking along those lines, encouraging state and local preservation offices to accurately map their cultural resource inventory sites with GPS technology and capture the information in a GIS as soon as possible, using cultural resource data transfer standards as a guide.