

National Geospatial Advisory Committee

Geospatial Technology and Information Use Case:

NORTH CAROLINA FLOOD MAPPING PROGRAM



Introduction

In 1999, Hurricane Floyd flooded thousands of square miles of eastern North Carolina and left thousands homeless. This disaster highlighted the state's vulnerability to natural disasters and the need for accurate, up-to-date floodplain maps.

In 2000, the Federal Emergency Management Agency (FEMA) designated North Carolina as the first Cooperating Technical State (CTS) in conjunction with the federal flood map modernization program. As a result, the North Carolina Floodplain Mapping Program began updating North Carolina's flood hazard data to create new Flood Insurance Studies (FIS) and Digital Flood Insurance Rate Maps (DFIRM) to identify areas of the state at risk of flooding.

Description

To support the North Carolina Floodplain Mapping Program:

- Professional engineers performed hydrologic (study of water) and hydraulic (fluids in motion) analyses and coastal storm surge analyses to develop 1-percent annual chance of flood boundaries and elevations for approximately 28,000 miles of streams and 6,300 miles of open-coast and estuarine shoreline.
- Professional land surveyors performed surveys to collect statewide elevation data using highly accurate Light Detection and Ranging (LiDAR) technology and field surveys to support hydrologic and hydraulic engineering analyses. Elevation data was collected statewide in 2001-2005 and again in 2014-2017.

DFIRMs can be viewed in a variety of formats, including digitally on a computer within a geographic information system (GIS), as raster images in PDF format, or as paper maps. Digital flood maps are composites of base data (e.g. imagery, political boundaries), topographic data, and flood layers that can be viewed in combination with local parcel information or other data. Such maps can help to more easily determine if a house or other property is, or will be, located in a Special Flood Hazard Area or floodway.

In 2012, North Carolina enhanced the DFIRM database design to further support and enhance FEMA's Risk MAP initiative. The Flood Risk Information System (FRIS) includes advanced tools that allow users to quickly assess their flood hazard vulnerabilities and consider mitigation options associated with known risk. More importantly, it clearly communicates the overall risk communities may face and subsequent impacts.

Benefits of NC Floodplain Mapping Program & Geospatial Technology and Information

- **Protecting people and property.** Floodplain management is about planning and building wisely. If we know where high-risk flood areas are located, citizens can make informed decisions to help protect families, homes, and businesses.
- **Ensuring federal flood insurance and disaster assistance are available.** Failure by the community to administer wise floodplain management consistent with the minimum National Flood Insurance Program (NFIP) requirements will jeopardize the ability to purchase and be covered under NFIP. To illustrate the severity of this situation, if a home or business is in the floodplain and federal flood insurance is not available, an owner cannot receive some types of federal financial assistance. Furthermore, home mortgages will be hard to find, and certain types of state and federal loans and grants will be unavailable.

- **Saving tax dollars.** Every flood disaster impacts a community's budget. If we build resiliently in and near floodplains, communities will have fewer problems the next time the water rises. Federal disaster assistance is not available for all floods. Even with presidential declaration of a disaster, communities typically pay a portion of the costs of evacuation, temporary housing, repair, and clean-up. Careful local management of development in the floodplains linked to sound construction practices can reduce flood losses and the high costs associated with flood disasters for all levels of government.
- **Taking Responsibility.** If we know an area is mapped as a high-risk flood area where people and structures could be in danger, it makes sense to take reasonable protective steps as we develop and build. As noted previously, if a local governing body chooses not to enforce sound floodplain management regulations or participate in NFIP, their actions may deny the ability of its citizens to purchase flood insurance, to take positive steps to reduce the exposure of life and property, and may permit unwise development that aggravates flooding.
- **Reducing future flood losses in North Carolina.** A benefit that comes from a community's participation and administration of the NFIP minimum floodplain requirements is that those communities are eligible to apply for pre- or post-disaster hazard mitigation grants that can help reduce the flood risk to structures in the floodplain through projects that involve elevating, moving, and/or purchasing and demolishing structures.



Example View of Flood Risk Information System (<https://fris.nc.gov/fris/>)

Challenges

One of the challenges is the inconsistent availability of base data required to develop digital flood maps. The types of base data needed include imagery, political boundaries, topographic data, and flood layers that can be viewed in combination with local parcel information or other data to more easily determine if a house, property, or critical infrastructure is, or will be, located in a Special Flood Hazard Area or floodway.