

Geospatial Data for Regional Planning

Datasets and Sources in North Carolina

Issue Paper

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Geospatial Data for Regional Planning and Analysis

A. Background

From a regional planning perspective, typical objectives related to geospatial data are to (1) inform regional planning with geospatial datasets and analyses that are complete, consistent, current, and readily accessible by local, state, federal, nonprofit and private stakeholders, and (2) achieve improvements in local GIS datasets and capabilities to more readily and effectively support local and regional decision making. The purpose of this issue paper is to describe the most useful datasets in North Carolina that support achievement of these objectives.

B. Geospatial Data for Regional Planning

To address objective 1, the process begins with a review of county, state and federal GIS datasets, and, based on experience with service projects inside and outside of a region, the identification of the key datasets for regional planning and analysis. The geospatial datasets that are most valuable for regional planning and development may be organized by data custodian (produced and/or maintained by local governments, state, federal, and private organizations).

B.1. County and municipal datasets

The following geospatial datasets are particularly useful for planning and development, and in most cases are maintained by counties or municipalities on a regular basis.

- a. Tax parcels
- b. Roads (street centerlines)
- c. Municipal boundaries
- d. Extraterritorial jurisdiction (ETJ)
- e. Zoning districts
- f. Water and sewer infrastructure
- g. Districts for fire, public safety, emergency services, schools, voting
- h. Aerial imagery (current and historic)
- i. Address points (and/or structure outlines with associated addresses)

B.2. State datasets

The following datasets are useful for regional planning and development and are maintained by state agencies, typically with statewide coverage. Sources are indicated for each.

- a. Aerial imagery
 - i. Statewide 2010 orthoimagery -- NC OneMap Geospatial Portal (<http://data.nconemap.com>)
 - ii. Statewide National Agricultural Imagery Program 2010, including color infrared imagery: <http://ge-nt.ncmhtd.com/cgi-bin/naip2010ir.cgi?>
- b. Rivers and streams – NC OneMap
- c. Watersheds (river basins, hydrologic units, and water supply watersheds) – NC OneMap

- d. State and federal highways -- NC DOT
(<http://www.ncdot.org/it/gis/DataDistribution/DOTData/default.html>)
- e. Address points – NC OneMap
- f. Building footprints (<http://www.ncfloodmaps.com/>)
- g. Flood hazard areas (<http://www.ncfloodmaps.com/>)
- h. Railways – NC OneMap
- i. Geodetic control – NC OneMap
- j. Elevation – NC DOT
- k. Natural Heritage areas – NC OneMap
- l. Wildlife habitat NC GAP Analysis (<http://www.basic.ncsu.edu/ncgap/>)
- m. Conservation lands (easements and ownership) – NC OneMap
- n. Stormwater program jurisdictions– NC OneMap
- o. Drinking water assessment areas – NC OneMap
- p. County boundaries – NC OneMap
- q. Shoreline – NC OneMap
- r. Land cover (vegetation, impervious surfaces) – NC OneMap or USGS (below)
- s. Economic characteristics – EDIS (<https://edis.commerce.state.nc.us>)
- t. Population characteristics – NC OneMap and NC State Data Center
http://www.osbm.state.nc.us/ncosbm/facts_and_figures/state_data_center.shtm
- u. Water and sewer service areas – NC OneMap

B.3. Federal datasets

Several datasets maintained by federal agencies are applicable to regional planning and development. Most have statewide coverage, with the exception of detailed soil surveys that are developed and maintained on a county basis.

- a. Detailed soil surveys (currently 98 of 100 counties in NC:
<http://soildatamart.nrcs.usda.gov/>)
- b. Land cover classification (2006 National Land Cover Database:
<http://landcover.usgs.gov/>)
- c. Wetlands (National Wetlands Inventory <http://www.fws.gov/wetlands/>)
- d. Population, housing and economic statistics
<http://2010.census.gov/2010census/data/>
http://www.osbm.state.nc.us/ncosbm/facts_and_figures/state_data_center.shtm)
- e. Federal land ownership (including military installations and ranges) – NC OneMap

B.4. Private datasets

Several datasets maintained by private businesses are applicable to regional planning and development. Public access and cost varies.

- a. Power utilities / energy (commercial subscription)
- b. Telecommunications/broadband service (e-NC Authority: <http://www.e-nc.org/availability/mapping-and-tracking>; or commercial subscription)
- c. Business locations by type by employment (commercial subscription)
- d. Housing market information (commercial subscription)
- e. Demographic information customized for jurisdictions (commercial subscription)

B.5. Regionally Integrated datasets

From the local, state, and federal sources, the following datasets require processing to integrate into a regional compilation for planning and analysis.

- a. Tax parcels (geometry and selected attributes)
- b. Roads (primary, secondary and local)
- c. Municipal boundaries (from local sources; NC DOT has an annual compilation)
- d. ETJ (geometry)
- e. Zoning districts (reclassify districts into summary classes)
- f. Conservation lands (easements and ownership)
- g. Water and sewer infrastructure (geometry and selected attributes)

B.6. Derived datasets

Geospatial datasets derived from one or more of the source datasets are valuable for planning purposes, including transportation planning. Parcels and roads, in particular, require processing to derive additional datasets that are valuable in regional planning and analysis.

- a. From parcel datasets:
 - i. agricultural lands and voluntary agricultural districts
 - ii. dwelling units
 - iii. land use (commercial, industrial, residential, etc.)
 - iv. patterns of development (e.g., parcels with structures, year built)
 - v. parcel size classification
 - vi. dwelling unit density classification
 - vii. public lands, public schools, hospitals, and other institutions
- b. From roads (select by road type for some analyses)
 - i. Road density
 - ii. Driving distance or driving time

Concerning land use, the American Planning Association developed the Land Based Classification Standards (LBCS) model that refines land use categories into multiple dimensions, such as activities, functions, building types, site development character, and ownership constraints. County tax parcel information may not be maintained in those dimensions explicitly, but selected parcel data fields are useful in deriving land use information.

B.7. Data quality factors

Geospatial data quality for regional planning purposes relates to the following factors:

- Positional accuracy (how well a dataset represents actual features on the earth)
- Resolution (pixel size in imagery or mapping scale for points, lines and polygons)
- Currency (when captured and how often)
- Completeness (full geographic coverage, attributes (fields) all have values, and data are documented with metadata)
- Consistency (reliably collected, processed and maintained using consistent methods and formats, and using state standards or standard practices where applicable)

If all counties in a region were to have equally complete, current, and accurate geospatial datasets, a regional compilation could be developed using data integration techniques. The primary constraint is inconsistency in like datasets across counties.

All four values—“complete, consistent, current, and readily accessible”—are difficult to achieve when multiple data custodians are involved. With few if any exceptions, local GIS operations in North Carolina use current technology, have appropriate skills, use accepted practices, and apply good judgment. Nonetheless, the details of local geospatial data have evolved from a variety of origins, local operational preferences, and specific local business needs. The solutions to data integration are:

- (1) agreement on and application of detailed data standards, investment of time and resources in local data management practices, and provision of online access;
- (2) investment of time and resources to integrate local data into multi-county or statewide datasets, provision of online access, and probably acceptance of less data currency; or
- (3) a combination of applying standards, spending resources on regional and state compilations, and spending time on data sharing

North Carolina geospatial data users are fortunate to have access to a wide range of datasets that are useful for regional planning. The difficulties are in the details of specific files, particularly in representing how land is being used for residential, commercial, and public purposes and in analyzing potential for future land uses.

Note on Author: Jeff Brown has worked on numerous regional projects as an analyst and project manager, and now serves as Coordination Program Manager for the NC Center for Geographic Information and Analysis (CGIA), the lead state agency for geospatial information. CGIA is staff to the NC Geographic Information Coordinating Council, a volunteer board for policy, standards, and initiatives related to geospatial data and technology. CGIA manages the NC OneMap Geospatial Portal and related database, including statewide 2010 aerial imagery. CGIA also provides technical services under contract to a range of public and nonprofit organizations. Recent projects that support regional planning and analysis include a GIS assessment for The Fort Bragg Regional Alliance, land suitability mapping for the Conservation Fund for the Strategic Lands Inventory in eastern North Carolina, suitability mapping for Sustainable Sandhills, analysis for the state's Interagency Leadership Team, and web mapping for stormwater management and drinking water assessment.

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