Neuse River Basin Interactive Groundwater GIS Database

Supporting Ongoing Nonpoint Source and Source Water Protection Projects

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The objective of this project is to develop an interactive ground-water GIS database that will provide basic ground-water information at the watershed level (10-digit hydrologic unit), and to distribute the GIS information in an integrated, easy-to-use, watershed level format. This project is a pilot providing information for watersheds in the Neuse River Basin. The database is a tool for people working at the watershed level.

The Ground-water GIS Database was originally conceived in 1999. Over the previous several years, the Groundwater Section had been investigating ground-water recharge and vulnerability, the ground-water contribution to streamflow, and the carrying capacity of the Coastal Plain ground-water system. The problem was how to provide the results of these investigations in an integrated manner. There was also a need to consolidate GIS operations onto a single computer network to reduce operating costs and improve access to GIS information.

The foundation of this database is the 10-digit Hydrologic Unit (HU). The Watershed Boundary Dataset (WBD) is being developed under the leadership of the Federal Geographic Data Committee (FGDC) Subcommittee on Spatial Water Data, and the Advisory Committee on Water Information (ACWI). The USDA Natural Resources Conservation Service (NRCS), along with many other federal agencies and national associations, have representatives on the Subcommittee on Spatial Water Data. Sherm Biggerstaff, Planning Engineer with the USDA/NRCS North Carolina office, has been leading this effort in North Carolina, and has provided guidance and data for the new HU boundaries. Since this grant was originally written in 1999, hydrologic boundary methodology has been refined, and the coding has been changed. Thus, while the grant called for project organization at the 11-digit sub-watershed (5^{th} order) level, it has been carried out using the more up-to-date 10-digit watershed (5^{th} order) level, in keeping with the progress of the science.

Included in this database are 39 watershed maps, each representing the data available for the geographic area of an individual 10-digit watershed in the Neuse River Basin. Each map is in it's own folder which includes all respective data. The data has been clipped to the watershed boundary, except where processing was too complex or where the data reflects political rather than physical boundaries. There is also a general (NC) folder with locator maps and associated data; a map of statewide datasets best visualized at the state level; and documentation.

Each watershed map potentially has 41 map layers, both groundwater specific and general in subject, which may be helpful in planning, permitting, and other activities. Each layer represents data available in a given watershed. These include data such as topography, geology, land use/land cover, flood hazard zones, wetlands, soils, hydrogeology, land parcels, roads, pipelines, water and sewer, public water supply,

streams, and various boundaries (e.g. county, hydrologic unit, indexes to quads, etc). Not all forms of data are available in every watershed. For example, the Division of Coastal Management has delineated wetlands, but only in certain coastal counties, so this layer will not be available in inland areas.

The legends for these layers are consistent from map area to map area, so the user can become familiar with data type representation. Legends are also consistent with the display found in other applications of the same data type. For example, the layer "Potential Contaminant Sources" uses a legend supplied by the Source Water Assessment Program (SWAP), consistent with that program's internet map display, and "Contour" layers use brown and red lines similar to the contour lines on USGS topographic maps. An attempt was made to create legends that work together, so that layers can be displayed independently or in concert. Layers can be turned on and off, the order can be altered, and symbology (legends) changed, so that the user can portray the area in question according to specific needs. The user can create printable maps.

Documentation includes basic use instructions, a data dictionary describing each layer, metadata when available, and more detailed resource information for selected layers. Information concerning portability and data alteration issues is also included. An example of a portability issue is the raster catalog. This is a .dbf table created in order to display a series of raster files, for example DRGs. These tables occasionally become corrupt and must be recreated. They must also be recreated whenever the data is moved to a new directory. Hyperlinks, another example of portability, may need to be edited when data is moved. Data alteration occurs whenever a dataset is clipped to a new boundary. In shapefiles, there are attribute fields for line lengths, polygon perimeters, and polygon areas. These fields are not updated to reflect the new boundaries resulting from the clipping process. For those who need corrected measurement information (line lengths, polygon perimeters, and polygon areas), instructions are included in the document "Update calculated fields".

The Groundwater GIS Database is intended to be a tool for environmental professionals, such as those who are reviewing permits, responding to pollution incidents, planning well locations, and other groundwater related activities. There are currently other efforts underway within NCDENR to collect GIS data for use by various workgroups, such as Surface Water Quality and Public Water Supply. This database in not intended to compete with these, as it is a first step in the process of supplying groundwater related data in a uniform, easy-to-use manner. The next step is to consider how this database can be coordinated with other efforts both in the DWQ and in the NCDENR to best provide comprehensive maps and groundwater data.