Aquatic Resources Information Sharing and Hydrography Acquisition

The Alaska Geographic Data Committee (AGDC) is a regional subgroup of the Federal Geographic Data Committee, and, is made up of local, state, and Federal agencies interested in setting standards for the creation and use of spatial data in Alaska. The **AGDC Hydrography Subcommittee** was initiated in response to the acquisition of a digital hydrography layer for the state. It was formed to take advantage of a unique opportunity to develop the capability for the sharing of aquatic resources information in Alaska using hydrography, and, to set some standards for use of the data. There are thirteen state and Federal agencies involved with this subcommittee.

The **purpose** of the Hydrography Subcommittee is to design a way to integrate tabular data systems with spatial data systems for aquatic resources, and, design a way to make possible the sharing of aquatic resources data between information systems in Alaska. The committee's **product** will be a model representing a standard technical approach using a common key to link systems and to integrate digital line data representing water (hydrography) with tabular data, there by creating a capability to share aquatic resources information within and between agencies in Alaska.

For this effort to be a success the model must be accepted as a state standard, be simple, not require major changes in existing systems, and, allow freedom to develop systems designed to meet agency and area specific needs.

Hydrography Acquisition Projects: Funding for hydrography data acquisition was established through two projects. A total of 2779 quads are authorized and funded through 1997. 1998 funding will complete the Digital Line Graph Three (DLG3) hydrography and Digital Elevation Models at 1-63,360 scale for the entire state.

1. **The Alaska Revised DLG3 Hydrography Project** is jointly funded by the BLM, Park Service, USFWS, and USGS. It will produce DLG3 hydrography from approximately 1178 quads at 1-63,660 scale in various parts of Alaska which are important to the funding agencies.

2. **The DOI High Priority Lands Initiative (A16) Project** is funded by the A16 Mapping Program of the DOI. Funding authorized through 1997 and 1998 will produce DLG3 hydrography, DEMs and Transportation at 1-63,360 scale for the rest of the state.

Proposed Standards: Each GIS or database within the state must conform to some common key in order to make information sharing a reality, and, simplicity is required to make it feasible. Statewide standards are proposed for a common feature, a common feature identifier, and a standard watershed unit.

Standard Feature

It is proposed that the standard or base feature in digital hydrography for Alaska be a single discrete waterbody definable at the 1-63,360 scale. The Hydrography Subcommittee conducted an abbreviated modeling process and took a detailed look at aquatic information types and how they are used. It was determined that the feature most commonly related to during generation and use of aquatic resources information is the waterbody.

A short list of applications of aquatic resources information was created to document ways aquatic resources information is used within the state and how it relates to spatial entities in hydrography coverages. Some obvious examples are:

a. documenting anadromous waters (waterbody, user defined reach).
b. navigability determinations (waterbody, user defined reach).
c. environmental monitoring (site and waterbody).
d. fish habitat monitoring (waterbody and user defined reach).
e. water quality designations (waterbody).

Information is normally compiled for this abbreviated list of uses by waterbody, user defined reach, and/or user defined site. These are patterns which hold true and can be reflected in an information model which is a logical representation of the information.

Reaches (or segments of waterbodies) and sites along waterbodies need to be arbitrarily defined as to location and length by the user for various purposes and may change over time. Reaches and sites should not be standardized and should be based on individual user needs and defined by location coordinates, date, and purpose.

Standard Feature ID (Waterbody ID)

It is proposed that a common identifier representing a single discrete waterbody be used as a standard key in aquatic resources data systems in Alaska. In other words, each named or unnamed lake or stream definable in the 1-63,360 scale hydrography would receive a unique identifier (ID) which would serve as a standard or common ID or key for use in spatial and tabular data systems within the State.

The nature of this ID is still being researched. Some examples that have been tested are:

a. a randomly selected alpha numeric code like a license plate
b. a number originally selected from the Longitude and Latitude of the mouth of a stream or the northern most point of a lake
c. numbering systems based on other identifiers such as administrative units etc
d. Sequentially based numbering systems attempting to stratify stream networks

It has been determined that an identifier that is free of intelligent information would the simplest to manage and present the fewest potential problems in the future. Complex numbering systems should not be used to do what a data base and GIS can do better. In other words, complexity and instability result from embedding attribute information into an into a key or ID. Serious integrity problems occur if any of the embedded information changes.

Standard Watershed Units

It is proposed that the USGS Hydrologic Unit structure be used to separate watershed networks. The Hydrologic Units are separated into four scales or orders. The smallest or 4th order watershed (Catalog Unit) would be the standard watershed unit for connecting hydrography data into manageable tiles. The basic organization of the hydrography by catalog unit(USGS hydrologic unit) is logical and makes sense. Creating a 5th order standard was discussed but at this time it is felt that this should be left up to the individual agencies. It was also felt that requiring any kind of standardization for storage such as creating tiles by watershed was unnecessary.

National Hydrographic Data Base: The USGS DLG3 standard for hydrography line data is being replaced by a new standard feature attributing system call ed the National Hydrographic Data Base (NHD). The NHD consists of digital line data representing water and relational tables containing water feature attributes. The specifications for the NHD are not completed at this time. However the system is based on three separate dynamically segmented route systems. One route system includes line features such as intermittent stream segments, shorelines etc. The second route system is based on the EPA Reach File system where each route represents a stream segment between source or confluence nodes. The third route system is called the compound feature route system where each route represents a stream named in the Geographic Names Information System (GNIS). The unnamed streams are not routed and this process will be left up to each state to complete for themselves.

The NHD allows the states to establish their own waterbody (compound feature) ID codes. It may be two to four years before we see significant amounts of additional NHD coverage showing up for use in Alaska. Funding is available from USGS to convert much of the existing and future DLG3 coverage to the NHD standard.

Continued Research: The AGDC Hydrography Subcommittee is researching the NHD and ARC/Info Dynamic Segmentation. We are exploring different options for assigning IDs to waterbodies. We are also researching and modifying existing AML tools for automating the creation of single line coverage from double bank stream data and the routing of the compound features in the line data.