

An Applied Ontology of the National Hydrography Dataset and Watershed Boundary Database

An ontology of the National Hydrography Dataset (NHD) and the Watershed Boundary Database (WBD) was produced for modeling the semantics of relevant entities and data model counterparts. The objective of the ontology is to investigate ways of making data semantics easier for users to understand and use for specific applications. The ontology is composed of core modules of geographic object classes and properties and data classes and properties for instances. The instance module is referred to as a gazetteer that is closely related to the Geographic Names Information System (GNIS). Additional modules for metadata, hydrology, and mapping establish only the ontological base for relating the NHD and WBD to well-established standard models for metadata, hydrology, and mapping practices. Property restrictions were applied to reflect logical relations between features and qualities, and their locational geometries and geographic roles. Queries were designed for particular use cases. Preliminary results demonstrate the efficiency of the technical design, but not the semantic clarity for users. As a technical product, however, the specifications of hydrographic modeling using semantic technology provide an improvement over other available models because of the integration between water flow and terrain (NHD and WBD); the integration with a top-level ontology (Basic Formal Ontology); and the specification of process modeling (Measurement and Flow).

Keywords: Spatial water data; Ontology; Gazetteer