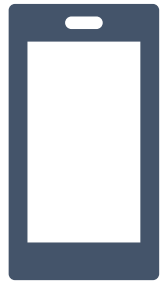


GWML2-Harmonization of Disparate Water-Well Data in the United States

Dave Blodgett, U.S. Geological Survey

WDFN Next Generation



Mobile-First

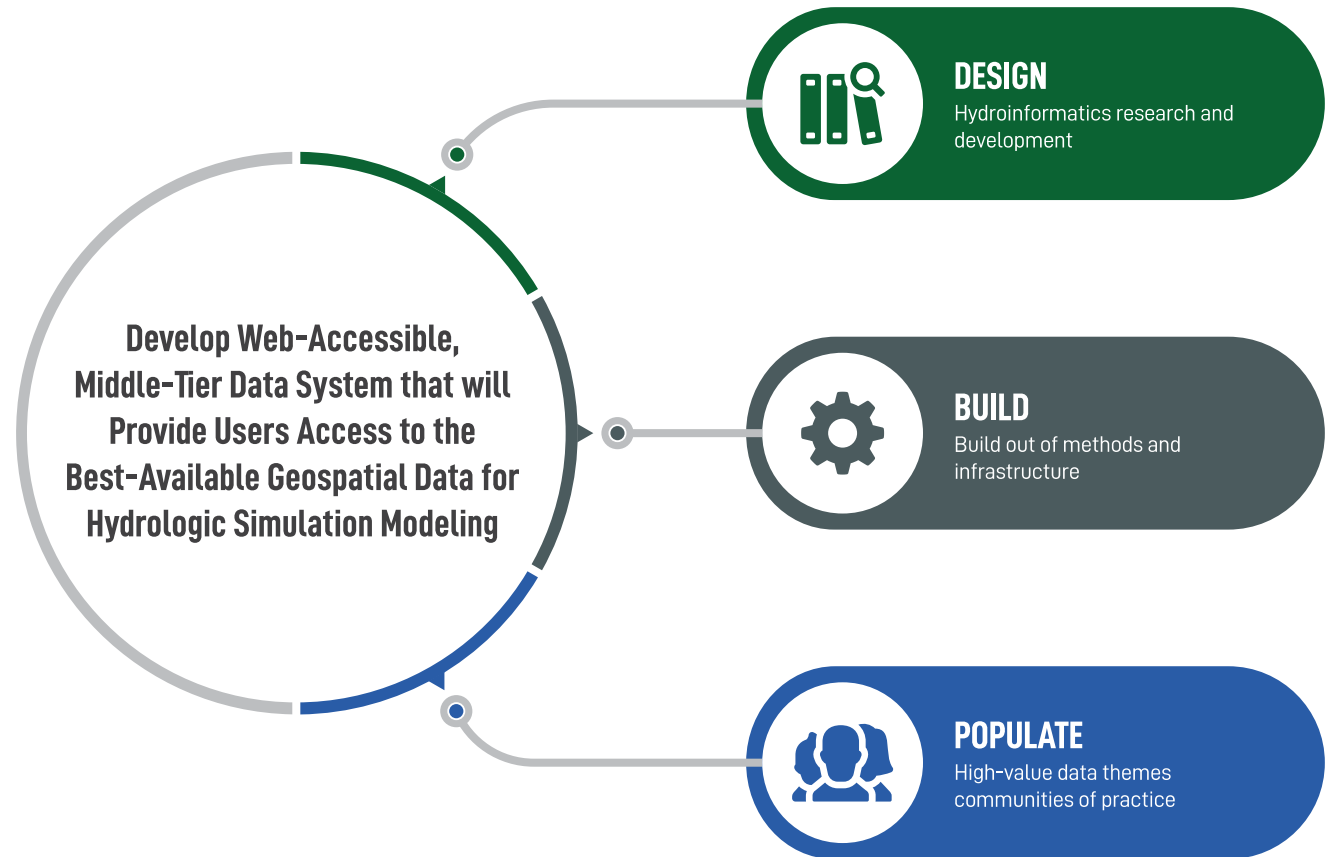


Intuitive



Data-First

National Hydrologic Geospatial Fabric and

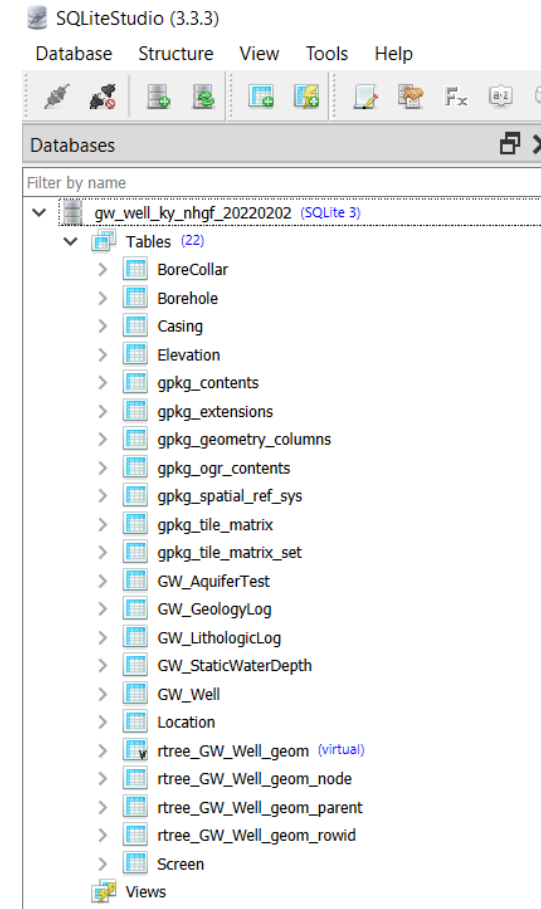


National Water Well Database (NWWDB)

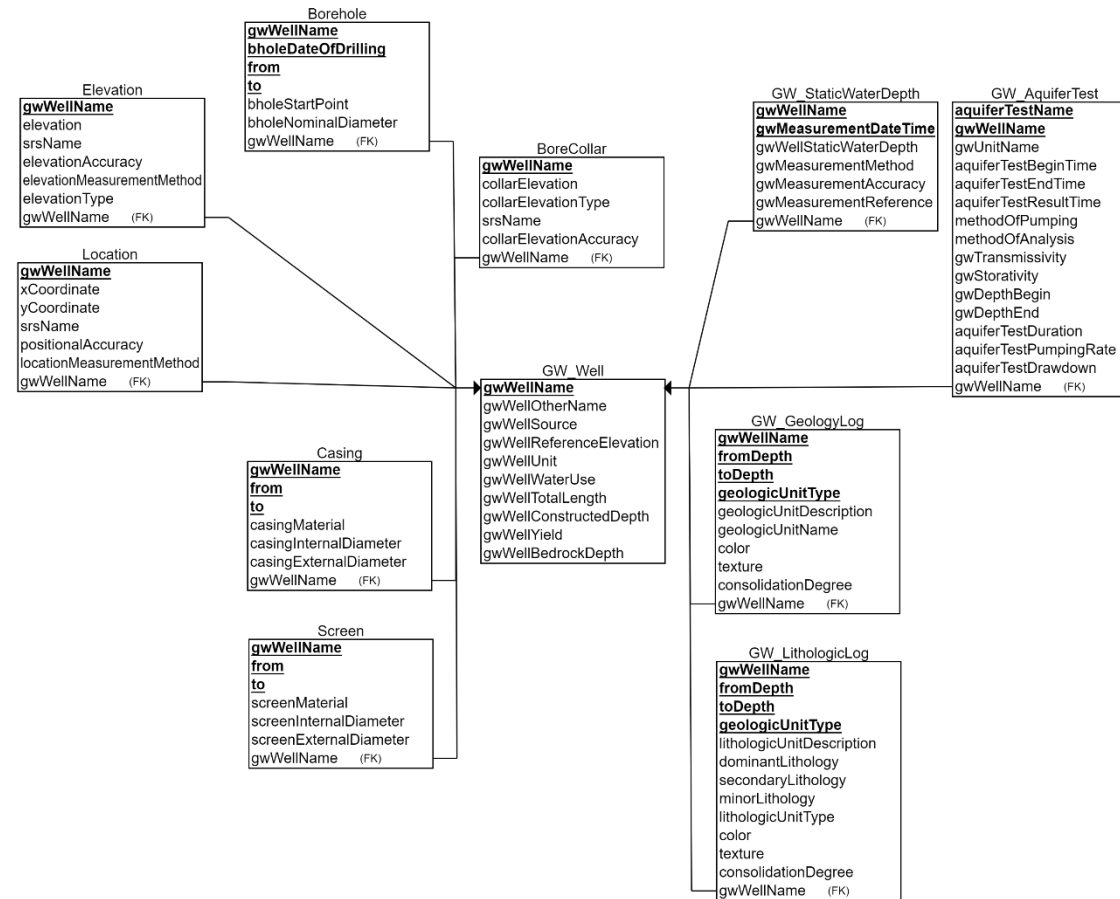
- State-managed water-well databases shared with the USGS by agencies throughout the conterminous United States
- Content and structure of original data harmonized/standardized to a USGS implementation of GWML2
- Only a subset of entities/attributes relating to water wells in the GWML2 conceptual model were used in the design of the National Water-Well Database (NWWDB)
- Extension of the GWML2 conceptual model through the addition of entities/attributes was necessary in order to meet specific design requirements

OGC GeoPackage Encoding

- Relational database needed for efficient storage of many (millions of) water-well records
- Adopted semantics and nomenclature of GWML2 conceptual model in GeoPackage encoding
- Data stored in relational database could be converted to an XML encoding



Relational Schema



Summary of USGS-GWML2 Extension

- Created “Location” class to store attributes relating to the horizontal location of a water well, e.g., location method and accuracy.
- Created class “GW_StaticWaterDepth” to store many water levels per well.
- Created “GW_LithologicLog” class as a specialization of the “GW_GeologyLog” class to formally encode a set of attributes that relate specifically to lithology, e.g., dominant lithology, secondary lithology, consolidation degree, etc.
- Created a set of attributes under the "GW_AquiferTest" class that map to features, parameters, observations, etc. in OGC Observations & Measurements (O&M), e.g., "aquiferTestPumpingRate" >> sam:parameter

WDFN & NGWMN

Next Steps for Modernized USGS Data Delivery

- **Water Data for the Nation (WDFN)** : in the process of full-stack modernization, back-end to front-end
 - Current UI: <https://waterdata.usgs.gov/nwis>
 - Current Groundwater Level API: <https://waterservices.usgs.gov/rest/GW-Levels-Test-Tool.html>
 - Blog on Development: <https://waterdata.usgs.gov/blog/>
- **National Groundwater Monitoring Network (NGMWN)**: entering technical maturation phase
 - Current UI: <https://cida.usgs.gov/ngwmn/index.jsp>



A close-up photograph of clear water cascading over dark, wet rocks. The water is in motion, creating white foam and splashes. The background is slightly blurred, showing more rocks and some greenery.

Thank you!



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