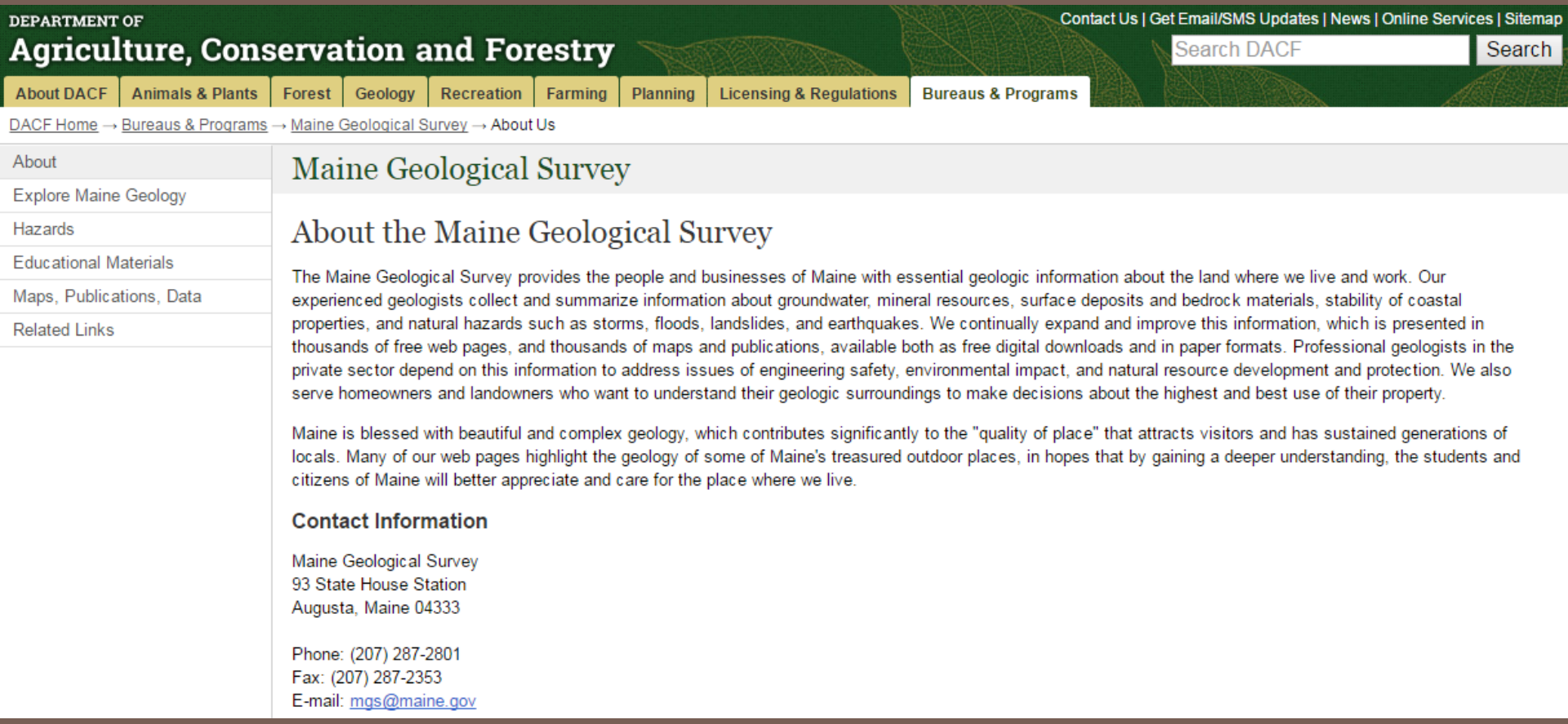
MAINE GROUNDWATER LEVEL MONITORING NETWORK: NEW DATA PROVIDER

Ryan Gordon, Maine Geological Survey

NGWMN Data Providers Meeting, Dec. 7, 2016

Maine Geological Survey

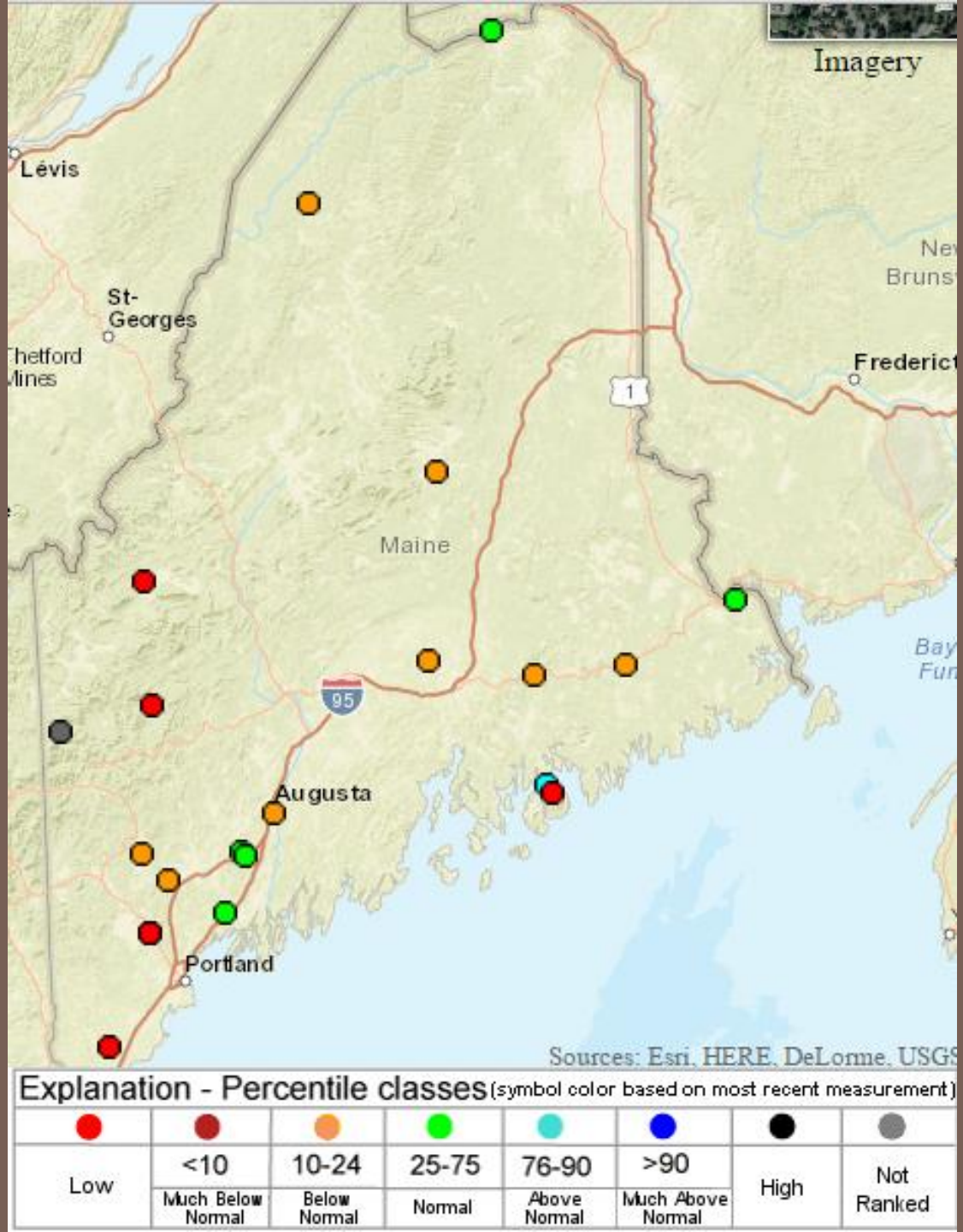


Maine Geological Survey

- Collect and analyze geologic information for the State of Maine (bedrock, surficial, coastal geology)
- Map and characterize aquifers and GW resources
- Collect snowpack information, and monitor hydrologic cycle, including flood and drought.
- Undertake groundwater studies in critical watersheds and areas
- Modeling studies address local groundwater flow and extraction issues, statewide aquifer recharge, and agricultural water demand

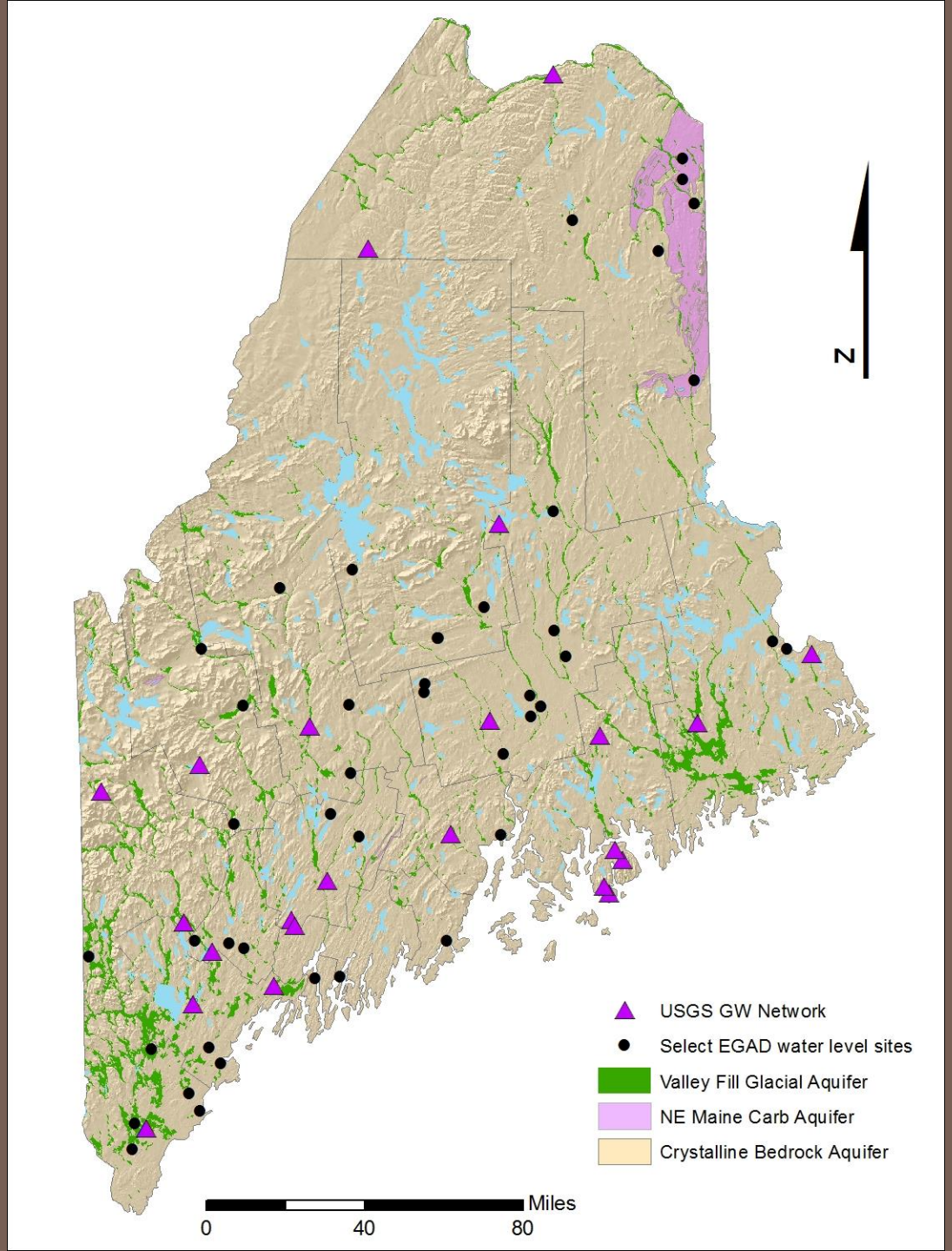
Maine Geological Survey

- Not a permitting agency
- Most groundwater withdrawals are unregulated
  - "absolute dominion"
- Not a lot of information about groundwater use or levels in the state



USGS Network:

- 19 wells
- In crystalline rock and glacial aquifers
- No well in carbonate rock aquifer



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Maine Groundwater Level Monitoring Network

- We do not have a network!
- New project in beginning stages
- Existing monitoring wells are used for purposes other than GW-level monitoring by a sister agency, the Maine DEP

Existing Database: EGAD

Environmental and Geographic Analysis Database

Environmental and Geographic Analysis Database

- EGAD is a database created by the Maine Department of Environmental Protection (DEP)
- Originally stored site information and water quality data for contamination sites
- Now includes biological and surface water sampling sites, with many data types (59 million records)
- Goal of EGAD is to support permitting and remediation of pollution by the DEP
  - NOT specifically background groundwater monitoring

Environmental and Geographic Analysis Database

- Best source of groundwater level data in the state
- Background wells at most sites are used as indicators of “natural” ambient groundwater qualities
- Select background wells can be used for groundwater monitoring
- Most background wells are sampled for levels quarterly, by consultants using DEP protocols

Goals in building a network

- Drought monitoring
- Modeling studies
  - Calibrate watershed-scale groundwater flow models
  - State-wide recharge model
  - Saltwater intrusion
- Demonstrate lack of influence from extraction

USGS
science for a changing world

Prepared in cooperation with the Maine Geological Survey

Simulation of Groundwater Flow and Streamflow Depletion in the Branch Brook, Merriland River, and Parts of the Mousam River Watersheds in Southern Maine

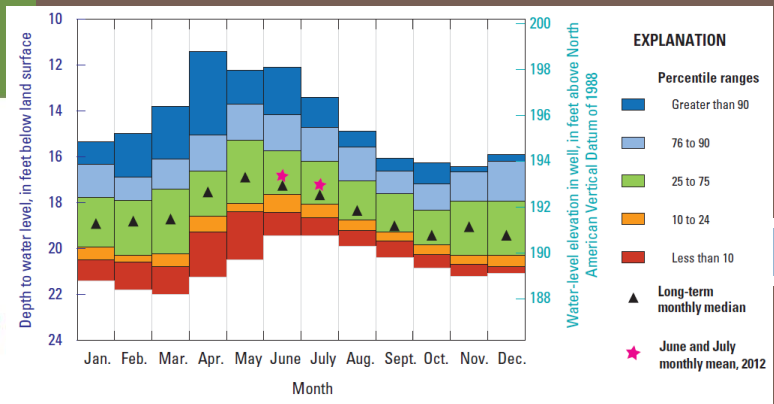
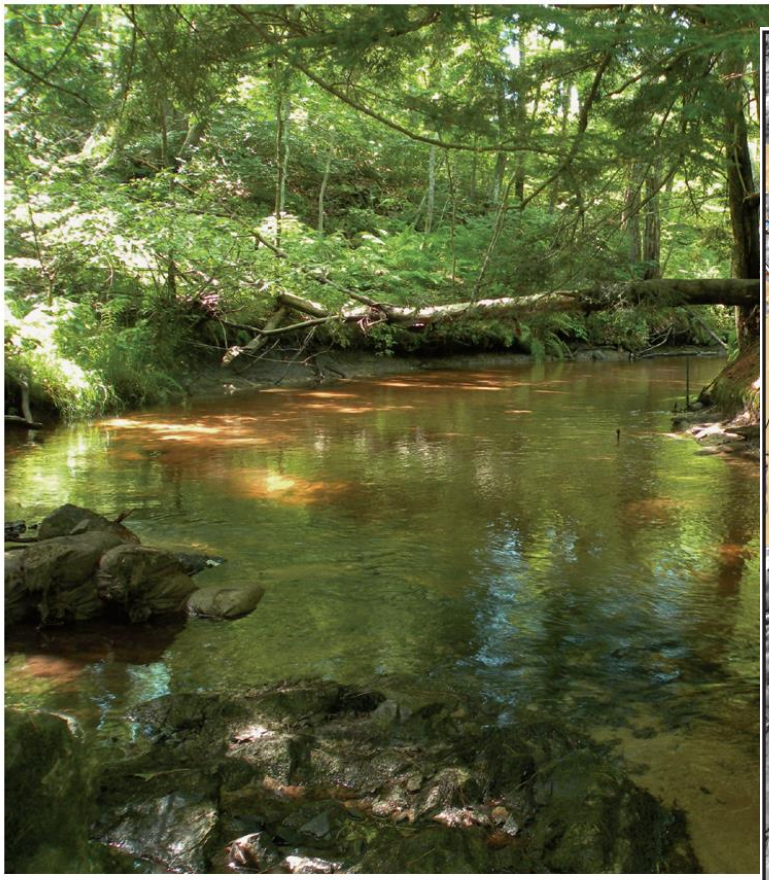
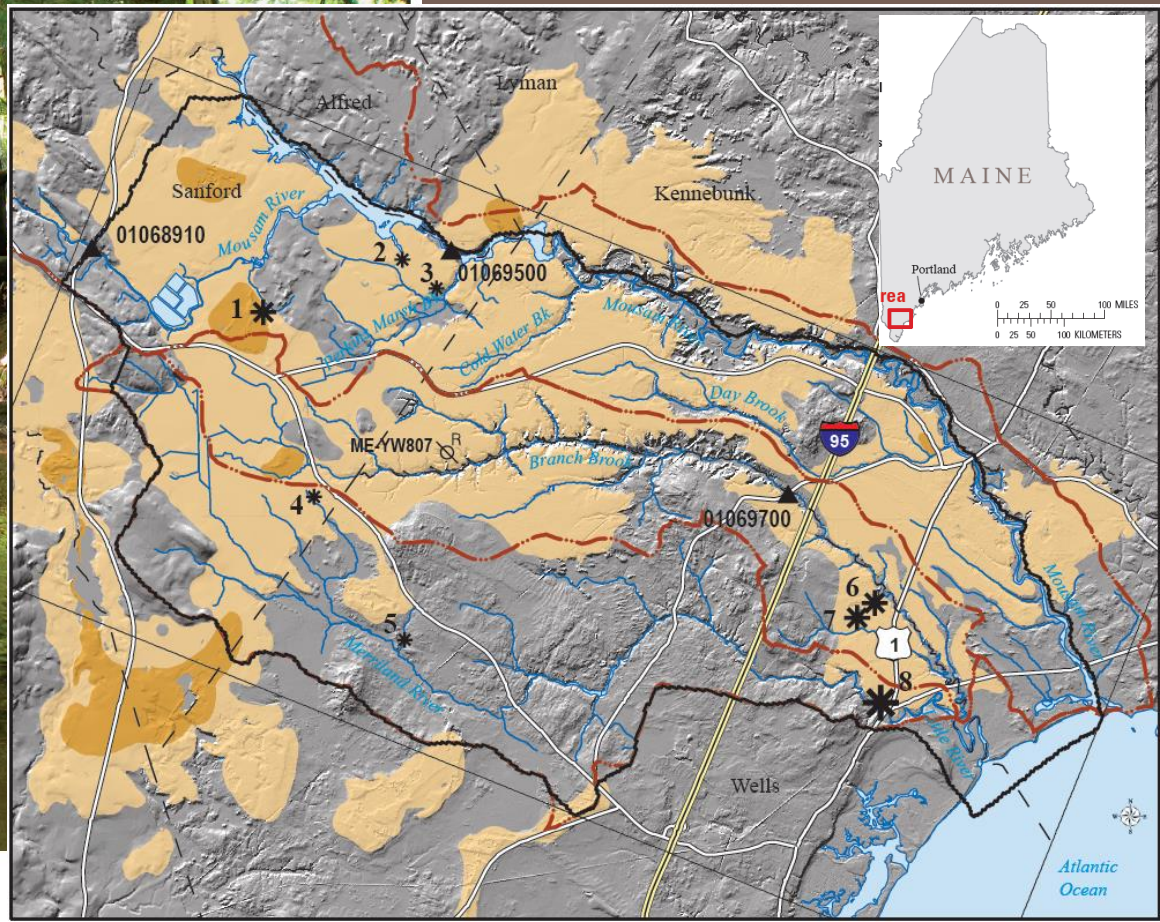


Figure 5. Long-term monthly water-level statistics for the U.S. Geological Survey groundwater monitoring well ME–YW 807 in Sanford, Maine.





Scientific Investigations Report 2014–5235

Trans-Boundary Issues

- Maine shares borders with Quebec, New Brunswick, and New Hampshire
- Most trans-boundary issues have involved surface watersheds on the New Hampshire border
  - Salmon Falls River
  - Saco River
- Some large stratified drift aquifers do span the border in these watersheds

Current NGWMN Project

to become a New Data Provider

Current Status

- Just beginning!

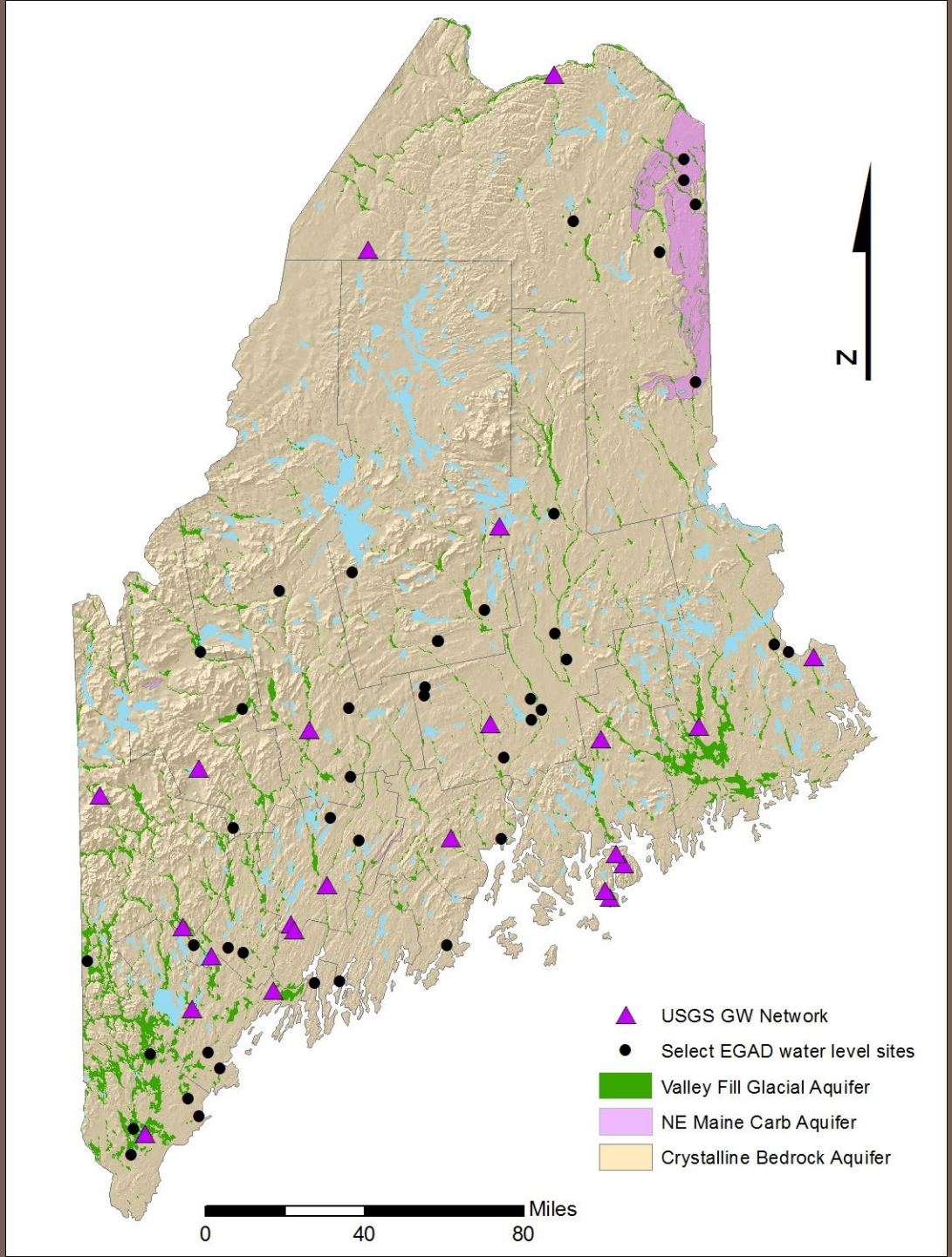
We are:

- Evaluating and selecting monitoring points
- Documenting required elements of wells

- Research into paper documents and DEP staff knowledge
  - Expected to be the majority of our staff time

Current Status

- We have selected 44 sites with over 900 wells
  - out of 138 sites and over 1900 wells that have records of at least 10 years
- Aquifer representation of sites
  - Valley-fill Glacial Aquifer: 9
  - Carbonate Rock Aquifer: 4
  - New England Crystalline Rock Aquifer: 31
    - (a minority might be in surficial materials)
- Hope to have enough paired wells to add 50-60 total
  - ~1.5 wells per 1000 square miles


N
USGS GW Network
Select EGAD water level sites
Valley Fill Glacial Aquifer
NE Maine Carb Aquifer
Crystalline Bedrock Aquifer
Miles
0
40
80

Site selection and classification

- Currently looking at frequency, spatial distribution, and quality (hydrographs)
- No water quality, at this time
- Most wells are measured quarterly
  - appropriate for Trend category
- Local anthropogenic effects avoided
  - Not difficult in Maine, even at contaminated sites
  - all wells in Background subnetwork

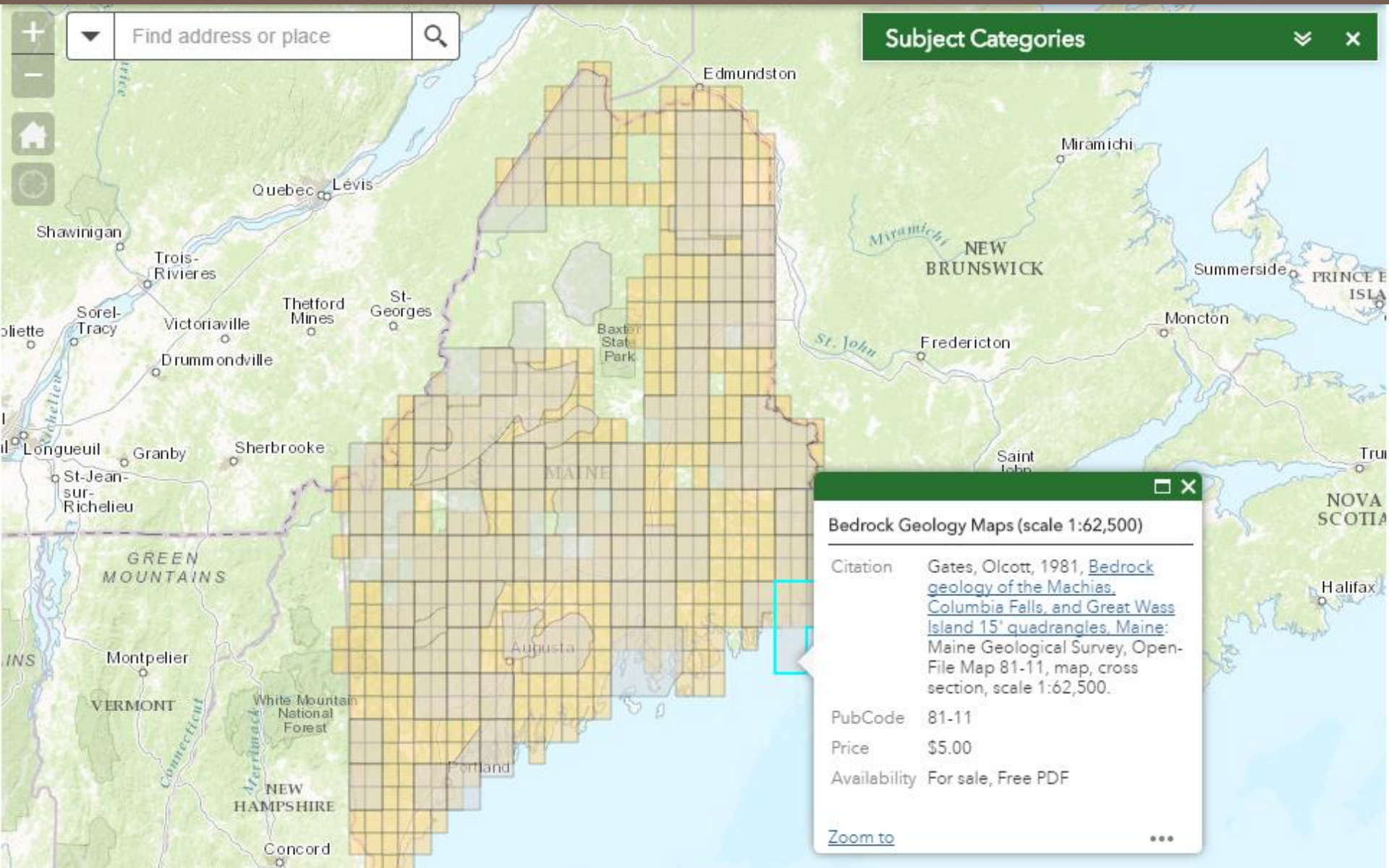
Differences between protocols

- Construction details and lithology may not be known for all
- Frequency may decrease for some sites
  - prioritize network wells
  - take over winter monitoring

Future projects to enhance the network

- Survey-grade GPS locations
- Tie in local elevation datums
- Assume “ownership” and monitoring of wells as frequency decreases, or sites exit their remediation plans
- Add wells as records become sufficient, or other wells are removed

Other data at MGS



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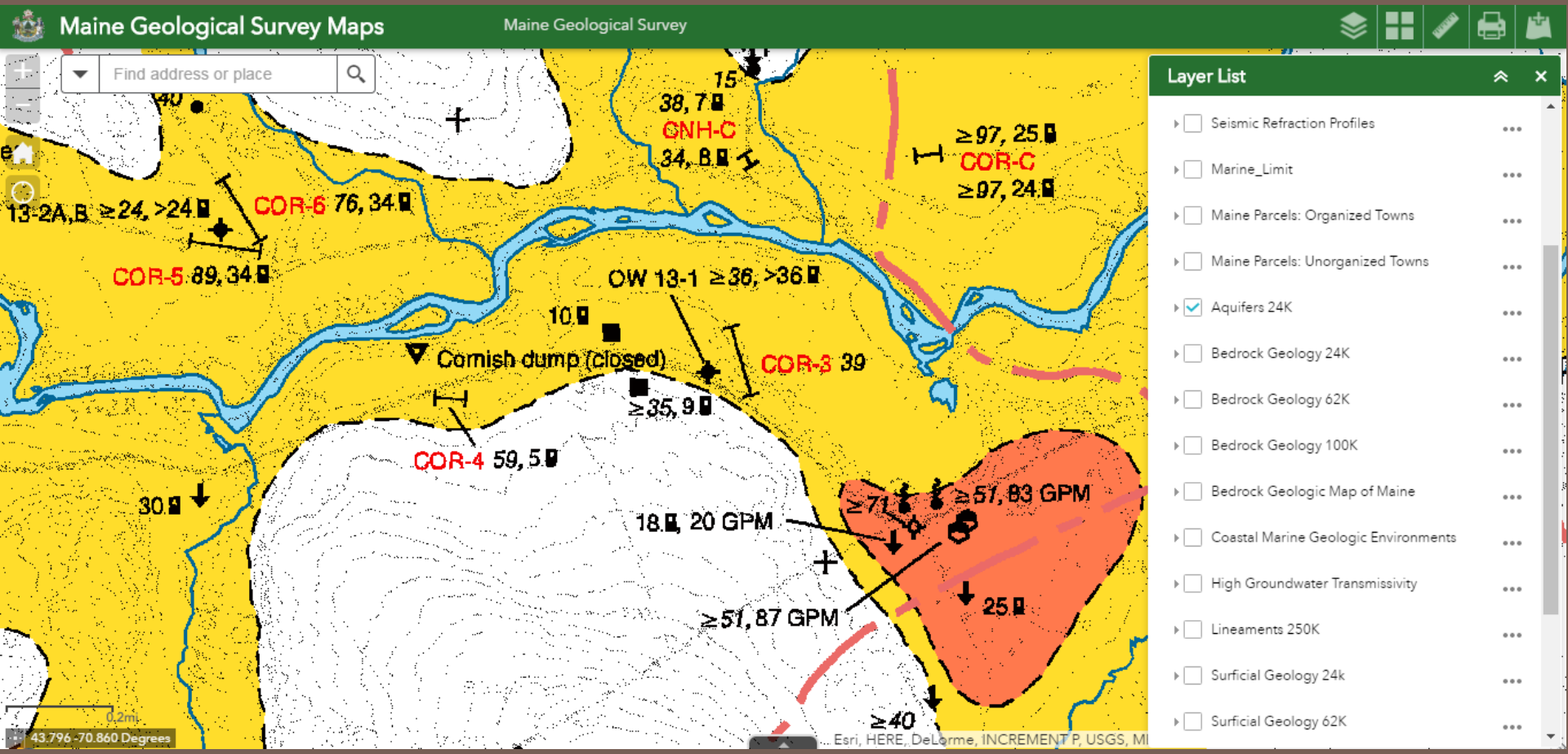

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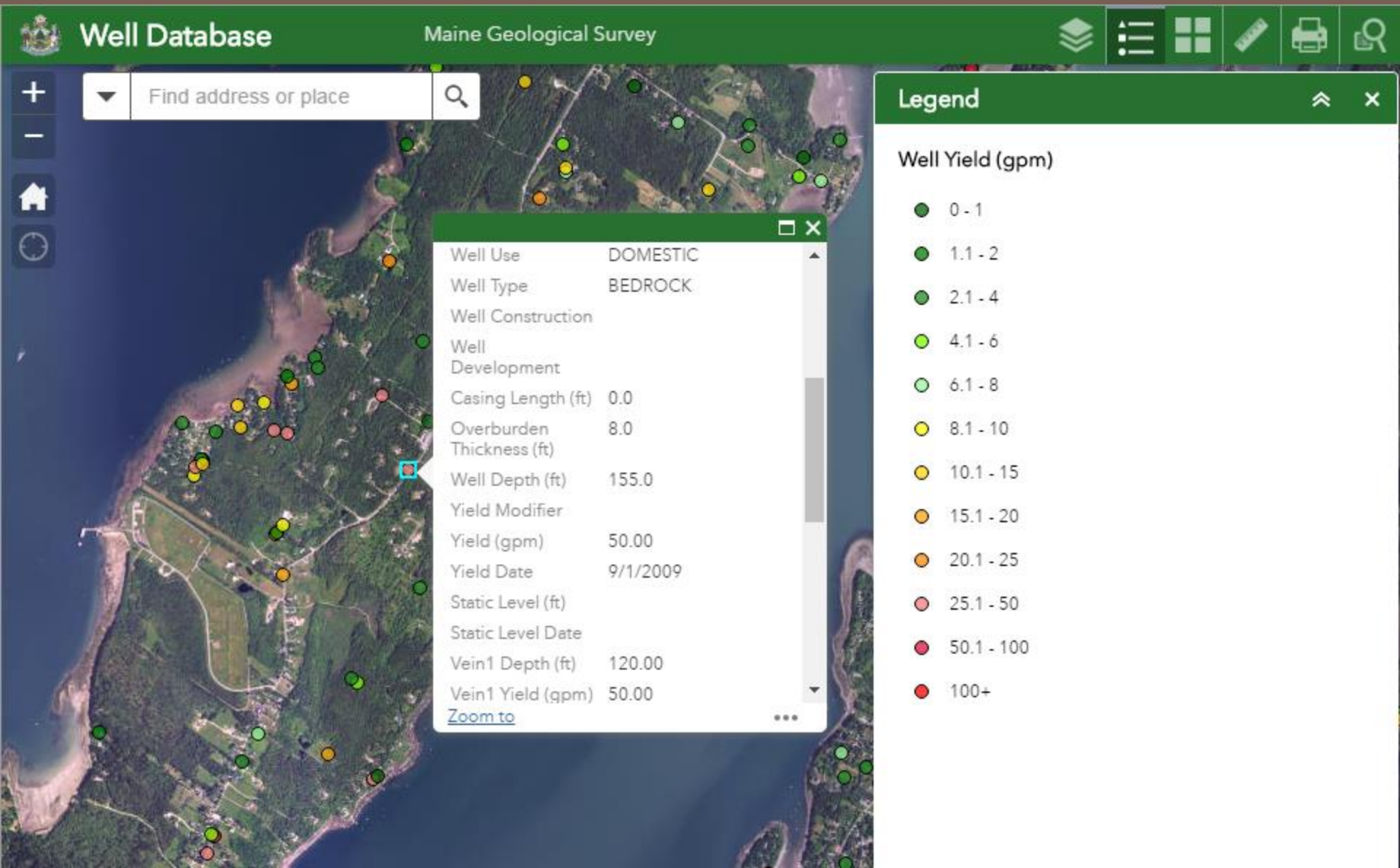

Questions?

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