Groundwater Modeling and Mapping in New Hampshire's Coastal Zone with a Vulnerability Assessment in Portsmouth NH

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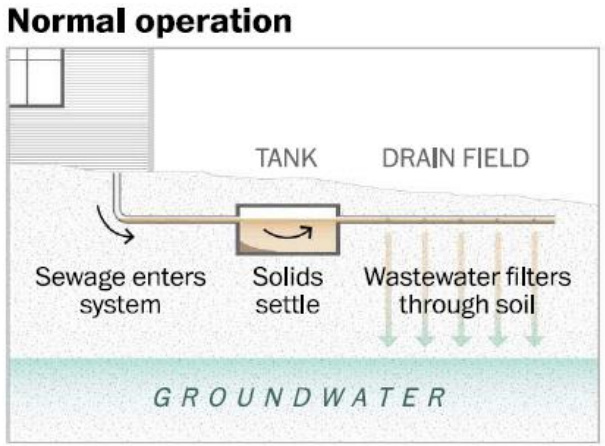
Hydro Predictions

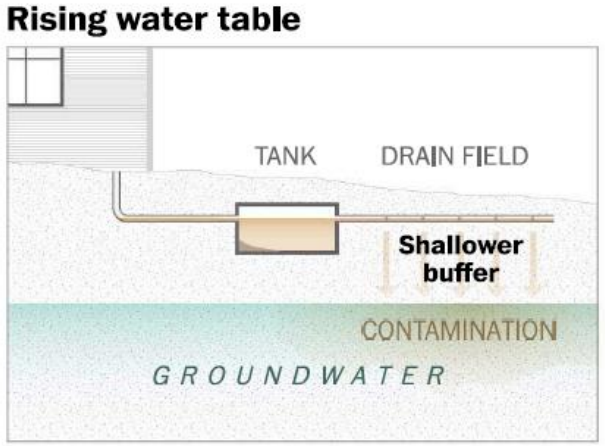
Purpose of this project –

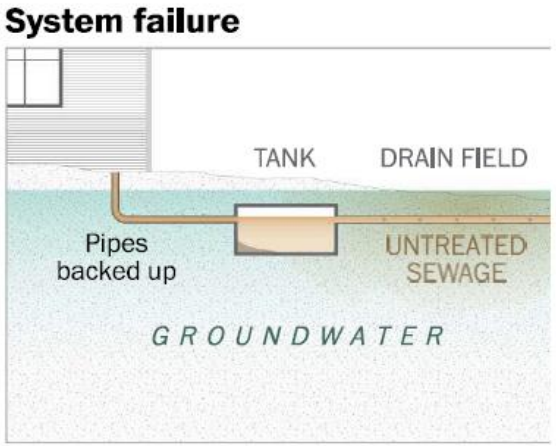
- Where will coastal groundwater rise with sea level rise?
- How deep is the water table now? What about in the future?
- Where will roads and underground infrastructure be impacted by rising groundwater in Portsmouth?
- Where might saltwater intrusion affect drinking water quality?
- Coastal groundwater monitoring implementation

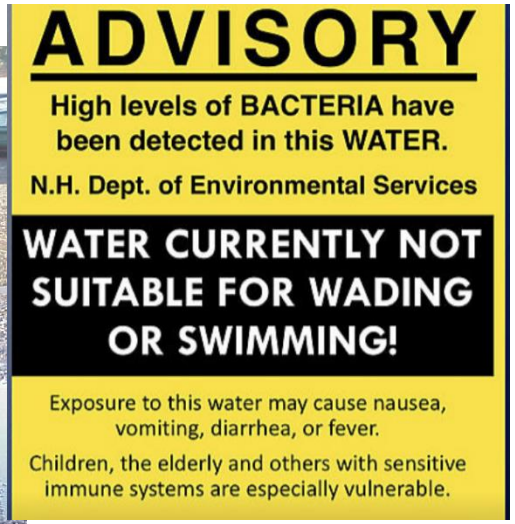
Hydro Predictions

Why do we care about rising groundwater?



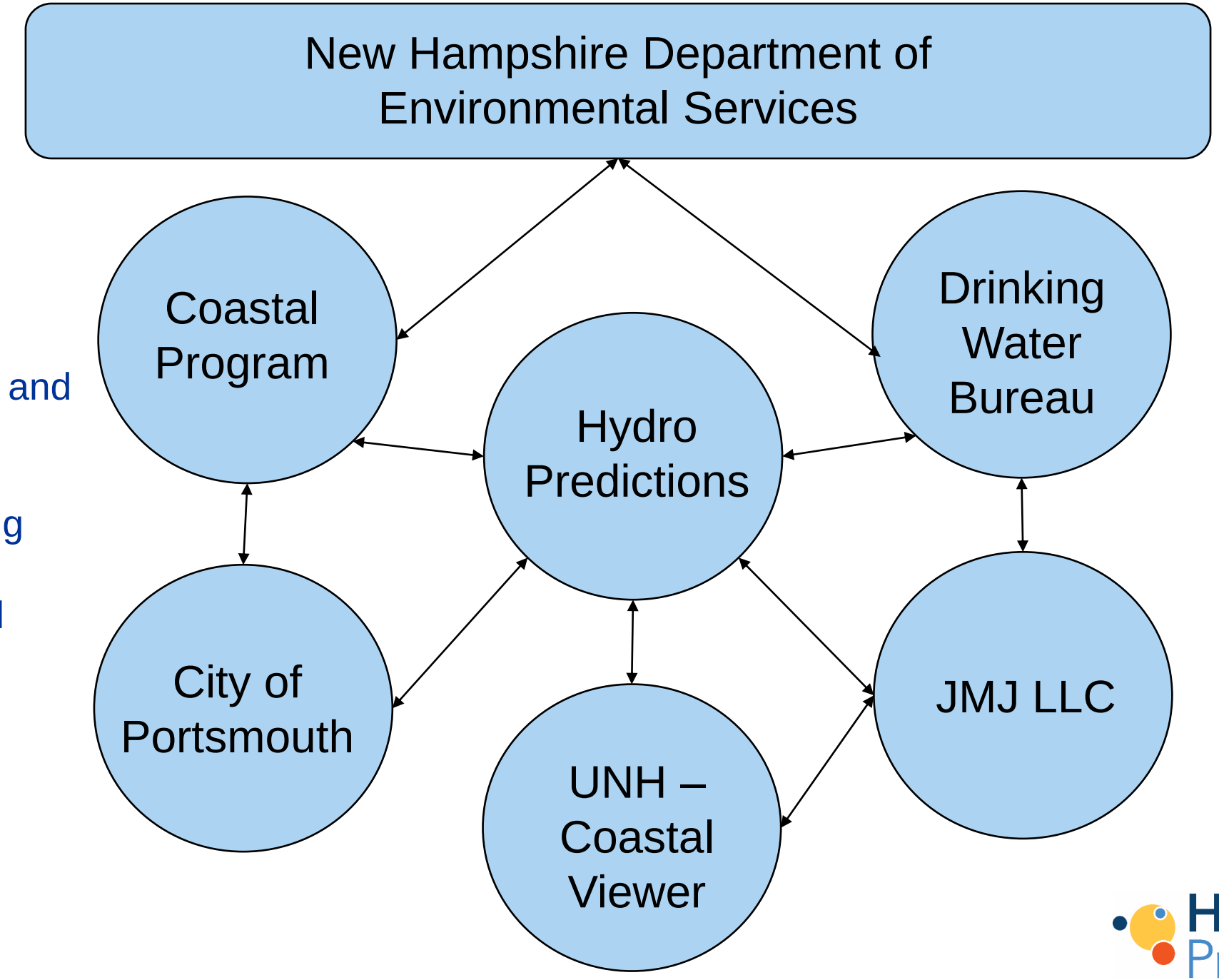






Hydro Predictions

A collaborative, and regional effort funded by the NHDES Drinking Water State Revolving Fund (DWSRF)



Hydro Predictions

NH Coastal Flood Risk Summary Part II: Guidance

STEP 5 TABLE. APPROACHES FOR CALCULATING DEPTH TO RSLR-ADJUSTED GROUNDWATER.

	PREFERRED APPROACH (MAPPED COASTAL COMMUNITY)	**ALTERNATE APPROACH** (UNMAPPED COASTAL COMMUNITY)
	IF PROJECT AREA IS LOCATED IN A MAPPED COASTAL COMMUNITY:	**IF PROJECT AREA IS LOCATED WITHIN 3 MILES OF TIDAL SHORELINE IN AN UNMAPPED COASTAL COMMUNITY:**
RSLR-INDUCED GROUNDWATER RISE =	Refer to Sea-Level Rise Mapper[38] to estimate RSLR-induced groundwater rise	Commit to manage = (RSLR) x (0.33) Be prepared to manage = (RSLR) x (0.66)
DEPTH TO RSLR-ADJUSTED GROUNDWATER =	(Present-day depth to groundwater) - (RSLR-induced groundwater rise)	

Mapped Communities: A portion of Exeter, Greenland, Hampton, Hampton Falls, Newington, North Hampton, Portsmouth, Rye, Seabrook and Stratham

Unmapped Communities:
Exeter (part), Dover, Durham, Madbury, New Castle, Newfields, Newmarket, and Rollinsford.

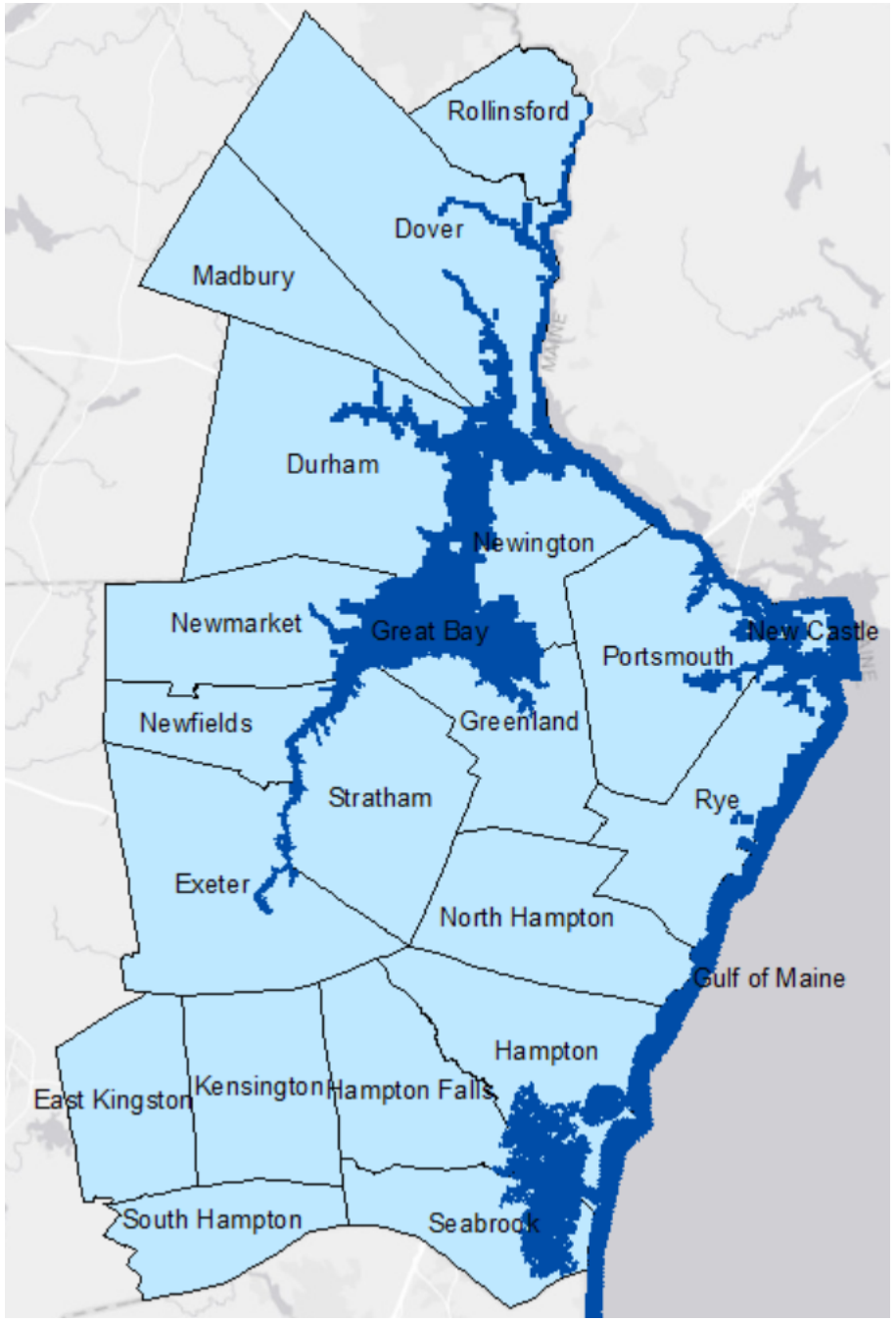
Hydro Predictions

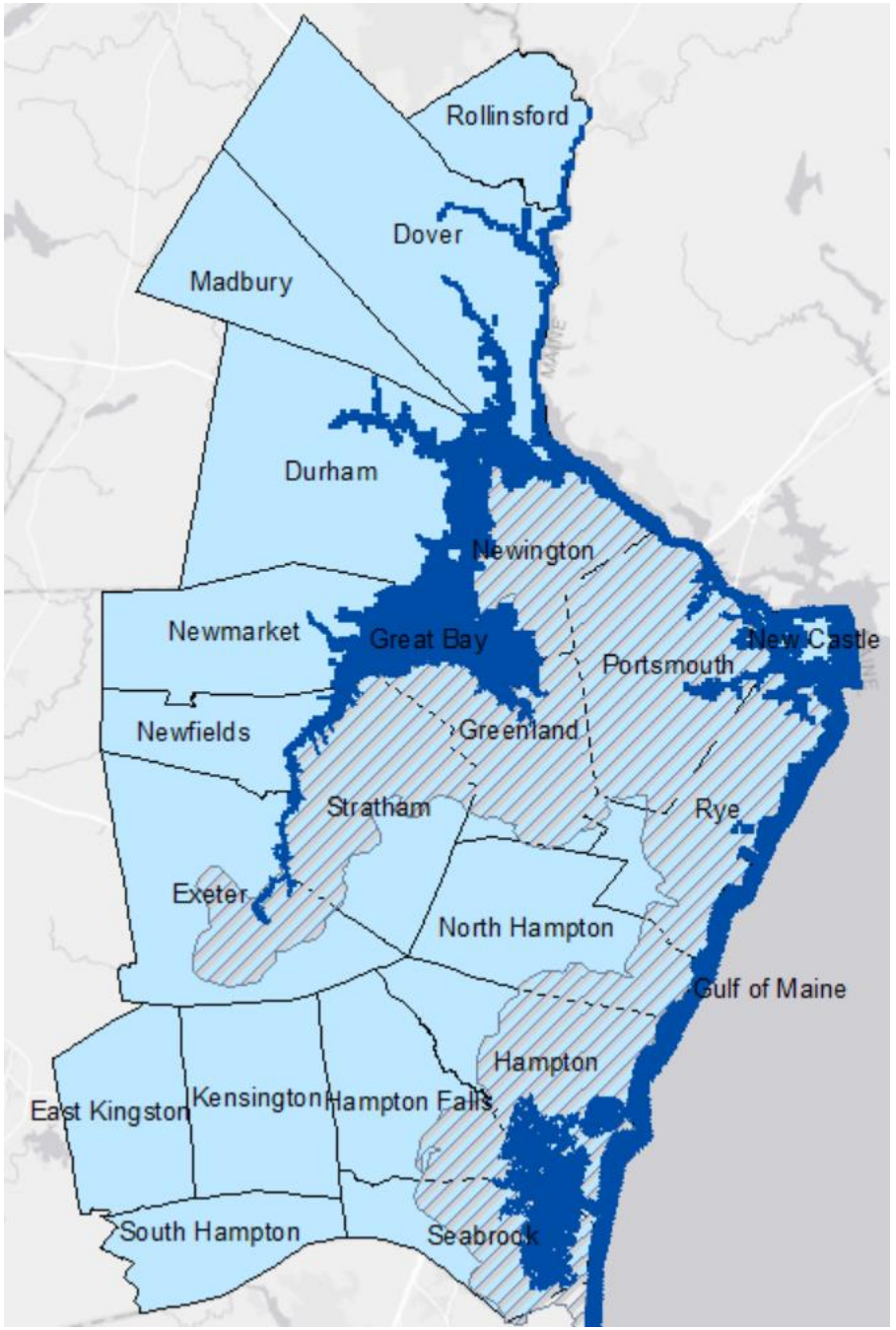
Study Area – NH Seacoast

Left - NH Seacoast communities

Right – First GW model

- Funded by NH Sea Grant
- USGS model by Thomas Mack was modified
- Investigated coastal road vulnerabilities from rising GW





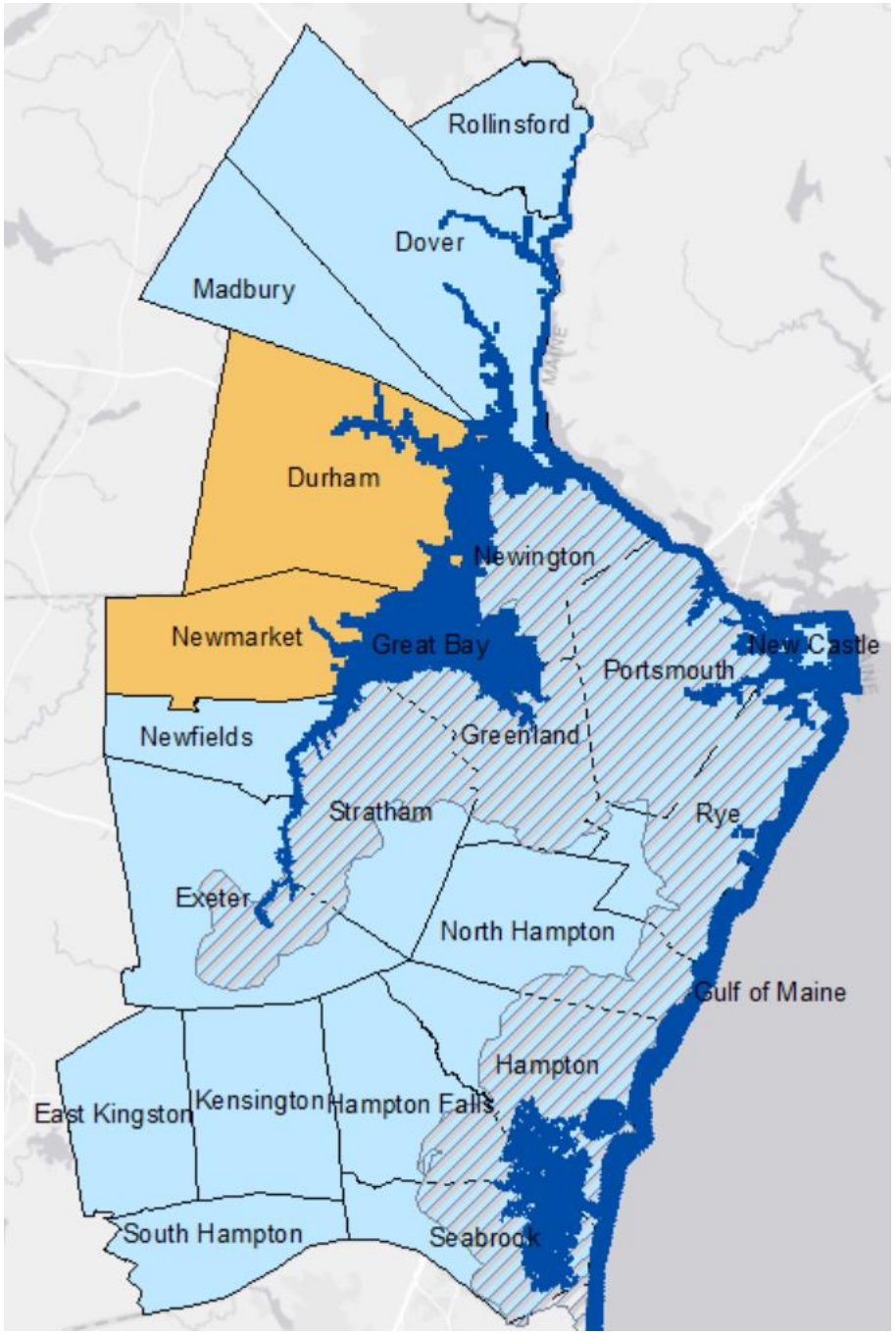
Hydro Predictions

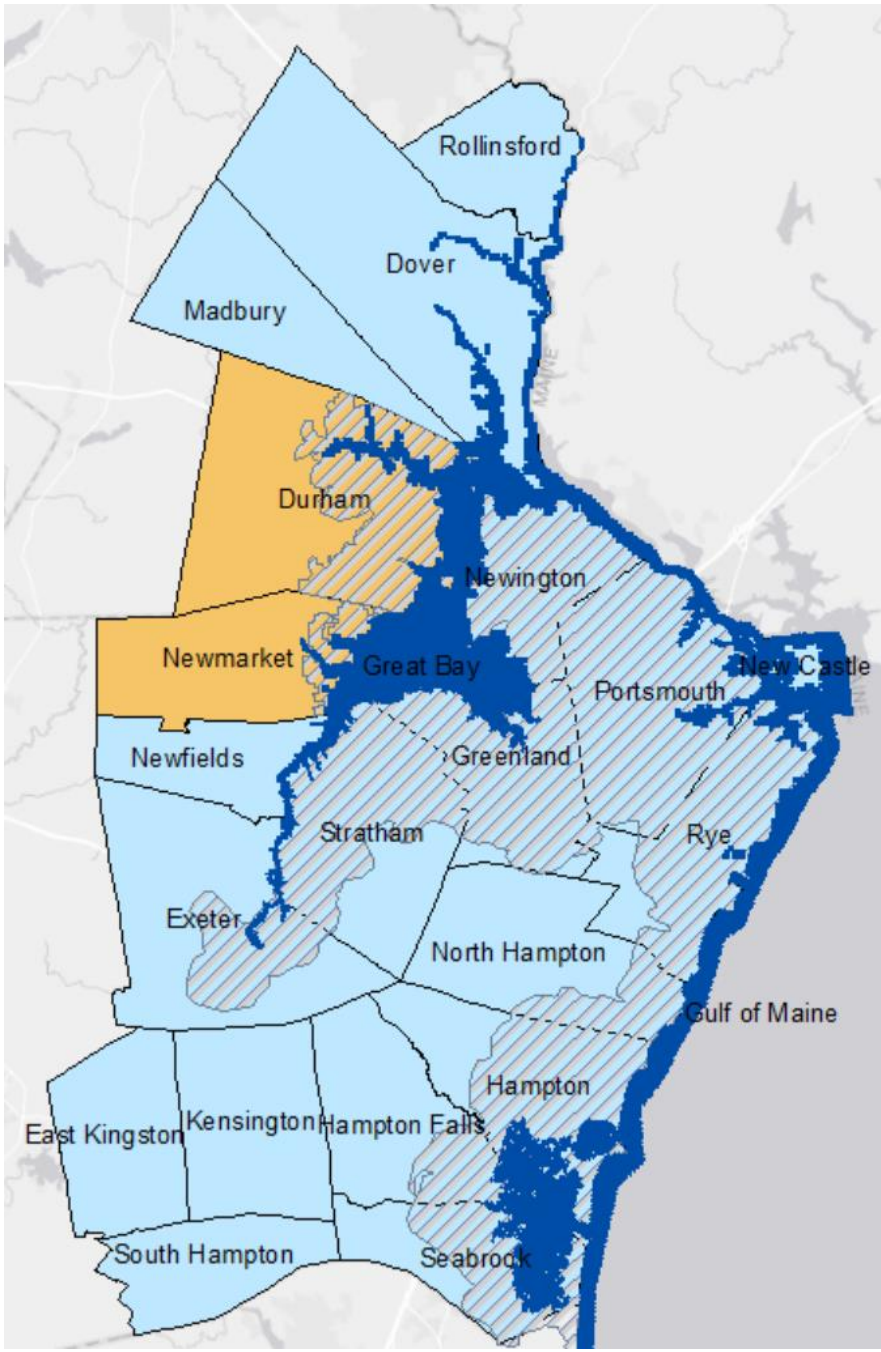
Newmarket Study

- SRPC, NHDES, and UNH (Knott and Jacobs)
- Saltwater intrusion study

Durham Study –

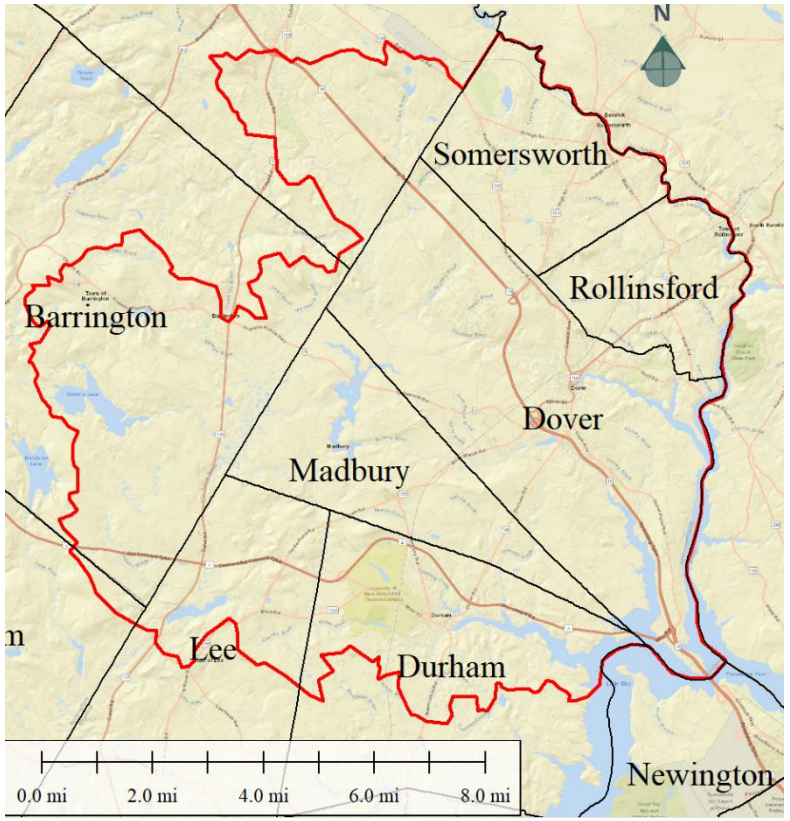
- SRPC, NHDES, Town of Durham, UNH (Jacobs), and HPs
- Water quality study – stormwater, septic systems, infrastructure



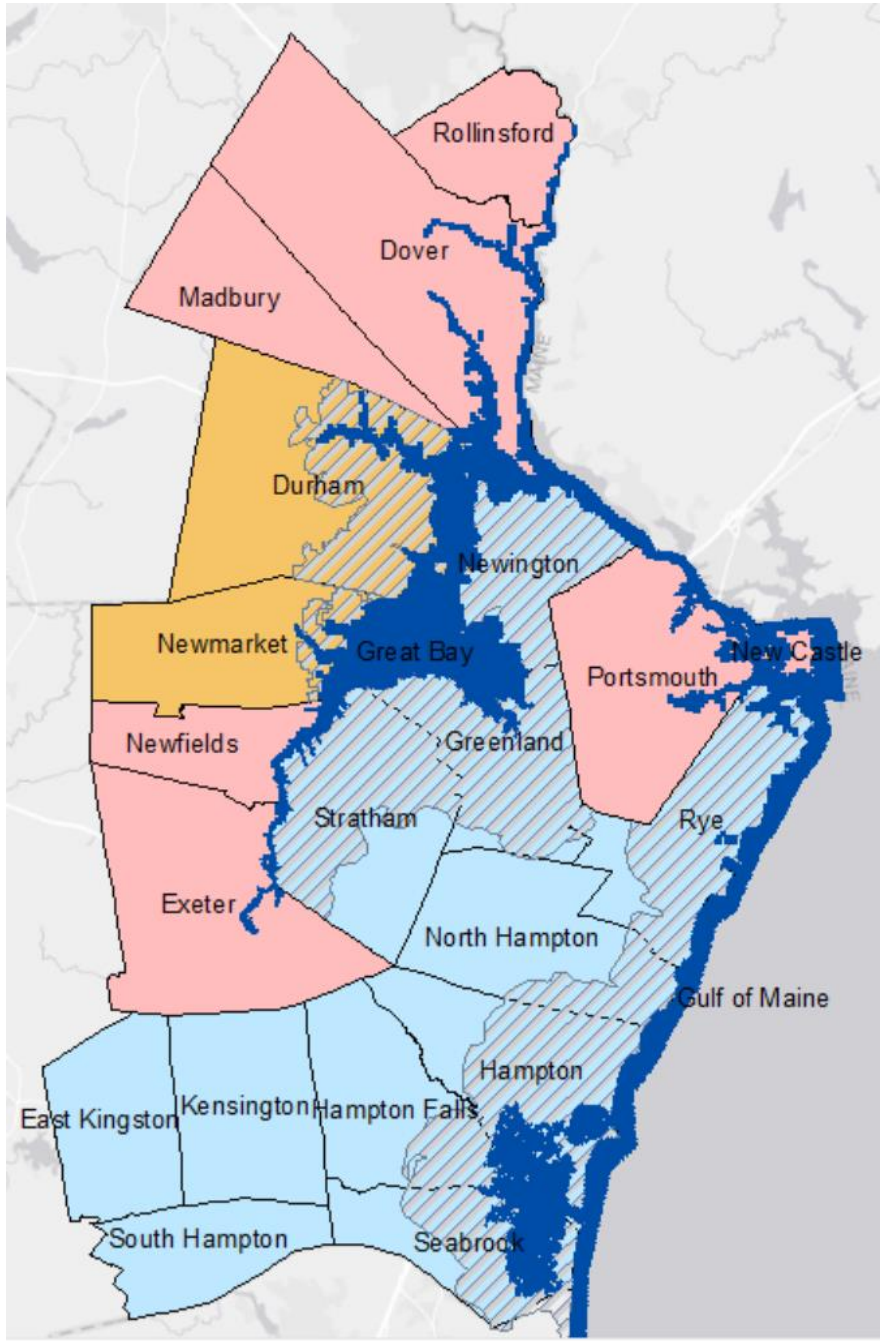


Hydro Predictions

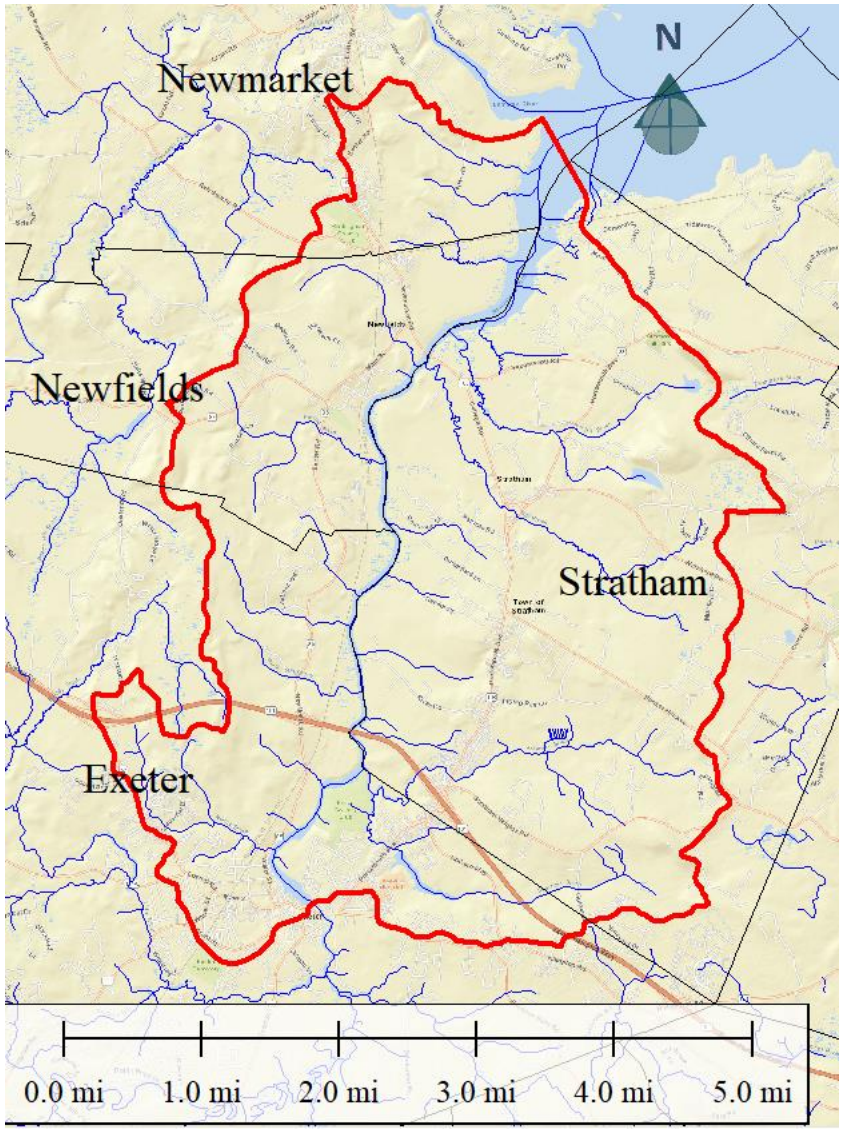
Three New GW Models



Madbury, Dover, and Rollinsford



Newfields, Exeter, and Stratham

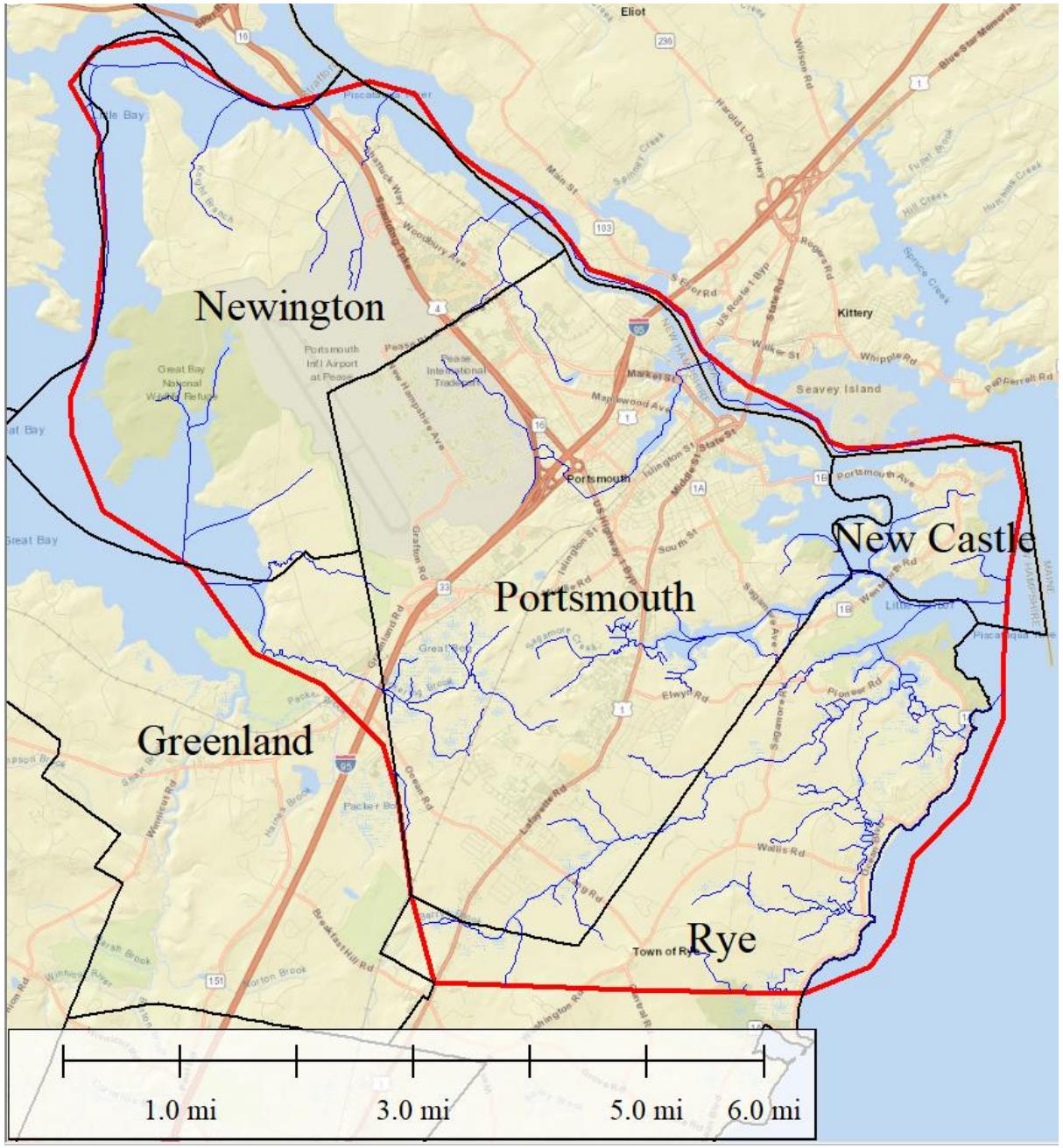


Hydro Predictions

And…..

Portsmouth and New Castle

- GW rise predictions
- Depth to Water Table
- Drinking water source vulnerabilities



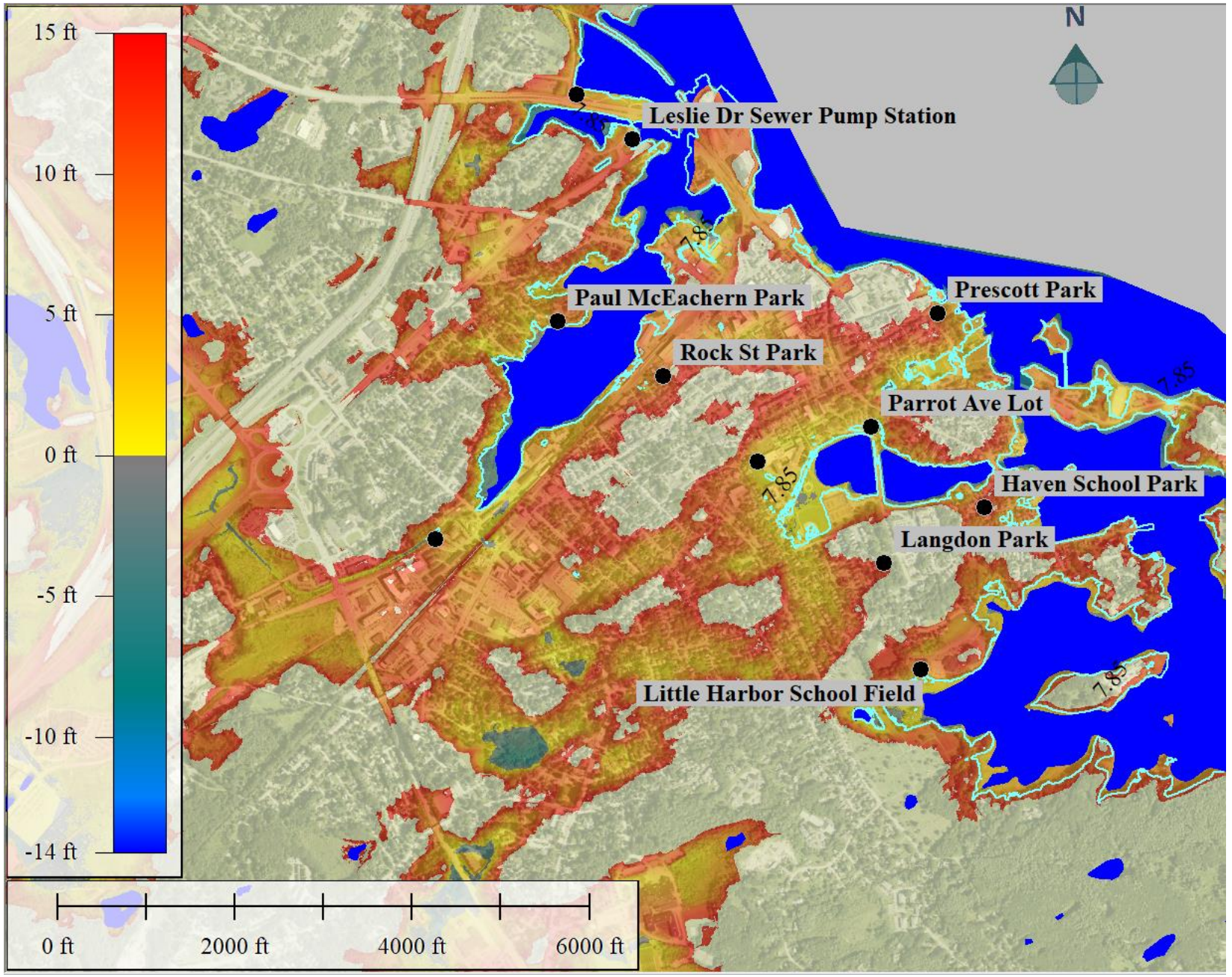
- Groundwater flow and saltwater intrusion modeling
- Vulnerability Study
  - Underground infrastructure
  - Coastal roads
  - Hazardous waste disposal areas

Hydro Predictions

Groundwater Monitoring System

Ten monitoring wells will be installed in the fall of 2024 with assistance from the City of Portsmouth's DPW

- Purpose – to measure GW rise and fluctuations
- Where – City land ~20 feet deep
- Long-term and real-time GW monitoring



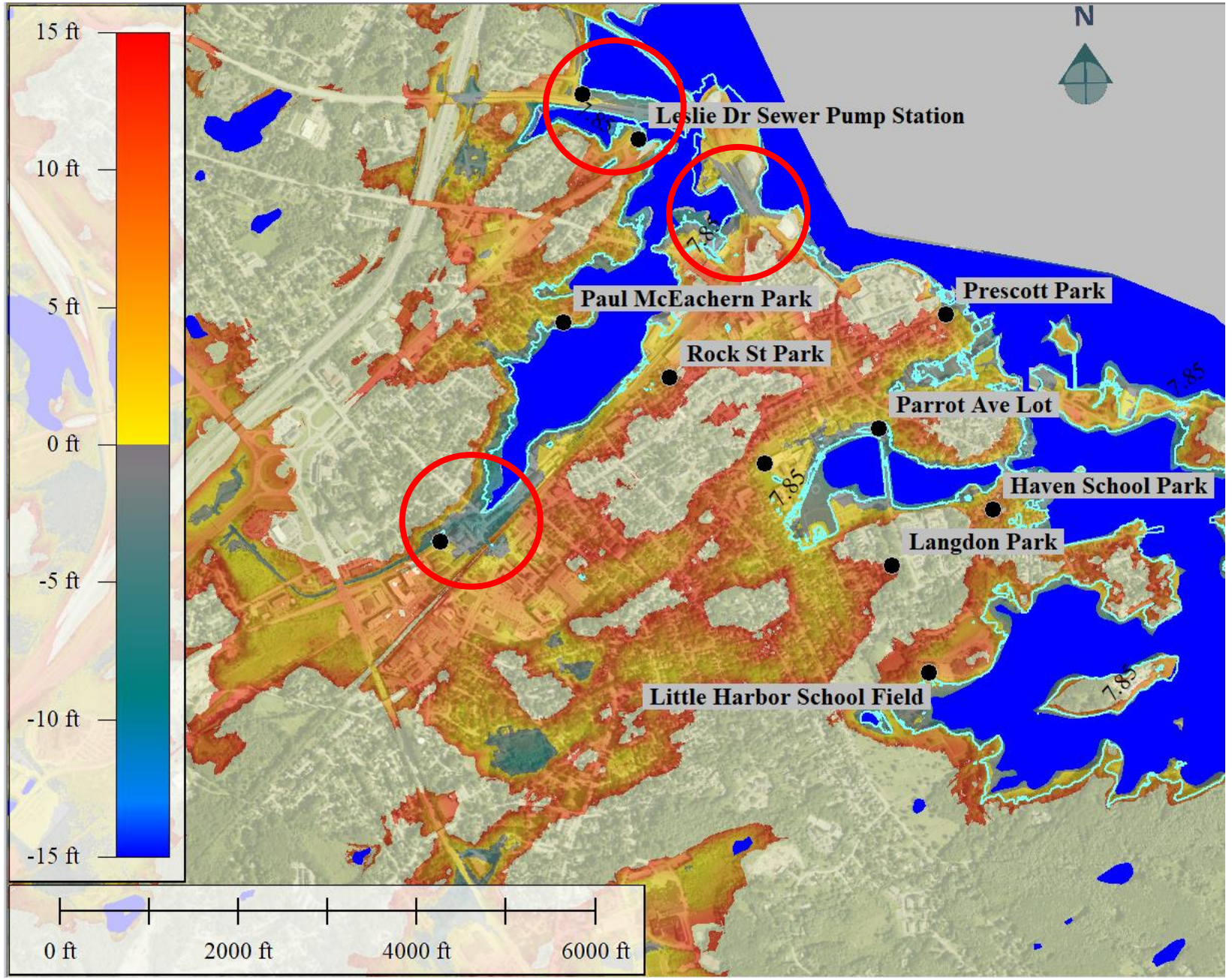
Hydro Predictions

Depth to Water Table

Yellow to Red – marks areas where the water table depth is less than 15 feet with 8 feet of SLR

Aquamarine line – marks inland migration of tidal waters at MSL with 8 feet of sea level rise.

Red circles - mark areas vulnerable to ground surface inundation from rising groundwater.



Hydro Predictions

Thank you!

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HydroPredictions

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