

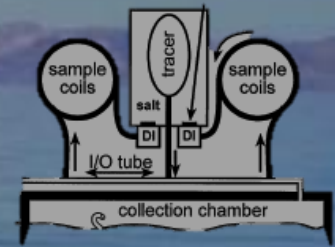
The pursuit of science at the groundwater/surface-water interface: Examples of societal relevance from the Midwest and beyond

2012 Midwest Groundwater Conference

Donald Rosenberry
USGS, Denver, CO, USA

Rapidly advancing research

- Water budgets, water management
- Estimates of GW recharge
- Constrain estimates of GW discharge for flow models (streambed, lakebed conductance)
- Spawning redds
- Constructed wetlands
- Augmentation lakes, reservoirs
- Sub-marine GW discharge and coral reefs
- Nutrient and chemical fluxes
- Hyporheic processes



GW-SW
sessions this
PM and
tomorrow

But how is this relevant to the public,
to the taxpayer?



Drought

White Bear forum draws big crowd; discusses drought

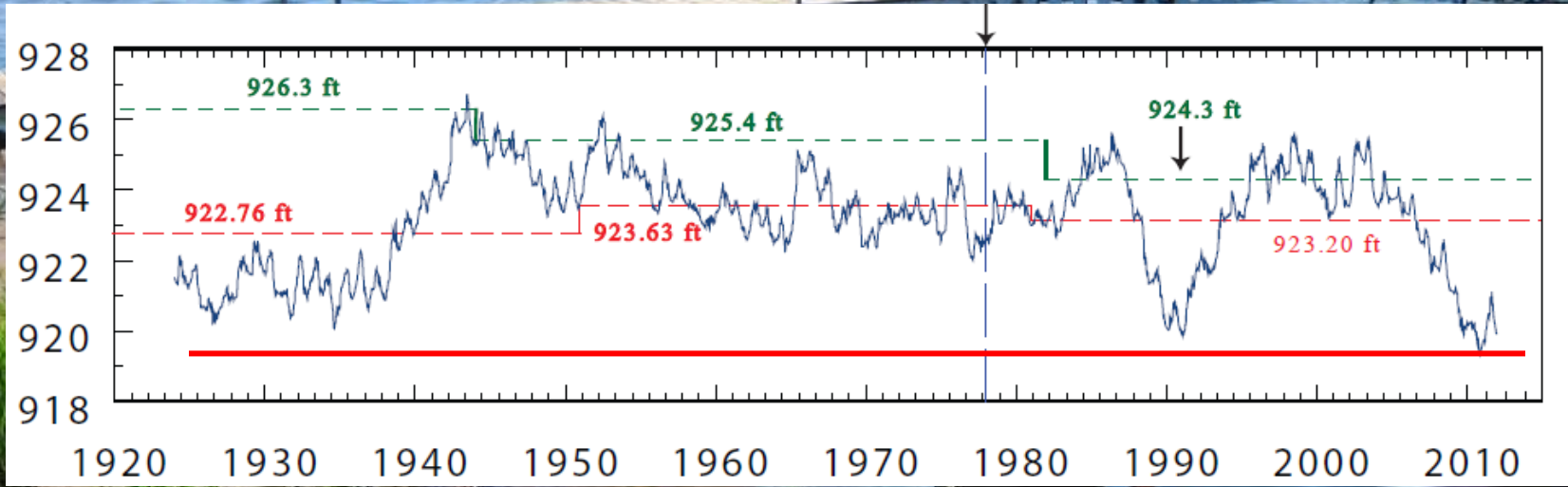
The lowdown on lake water levels

Public invited to special forum

by Mark Nicklawse
Regional Editor

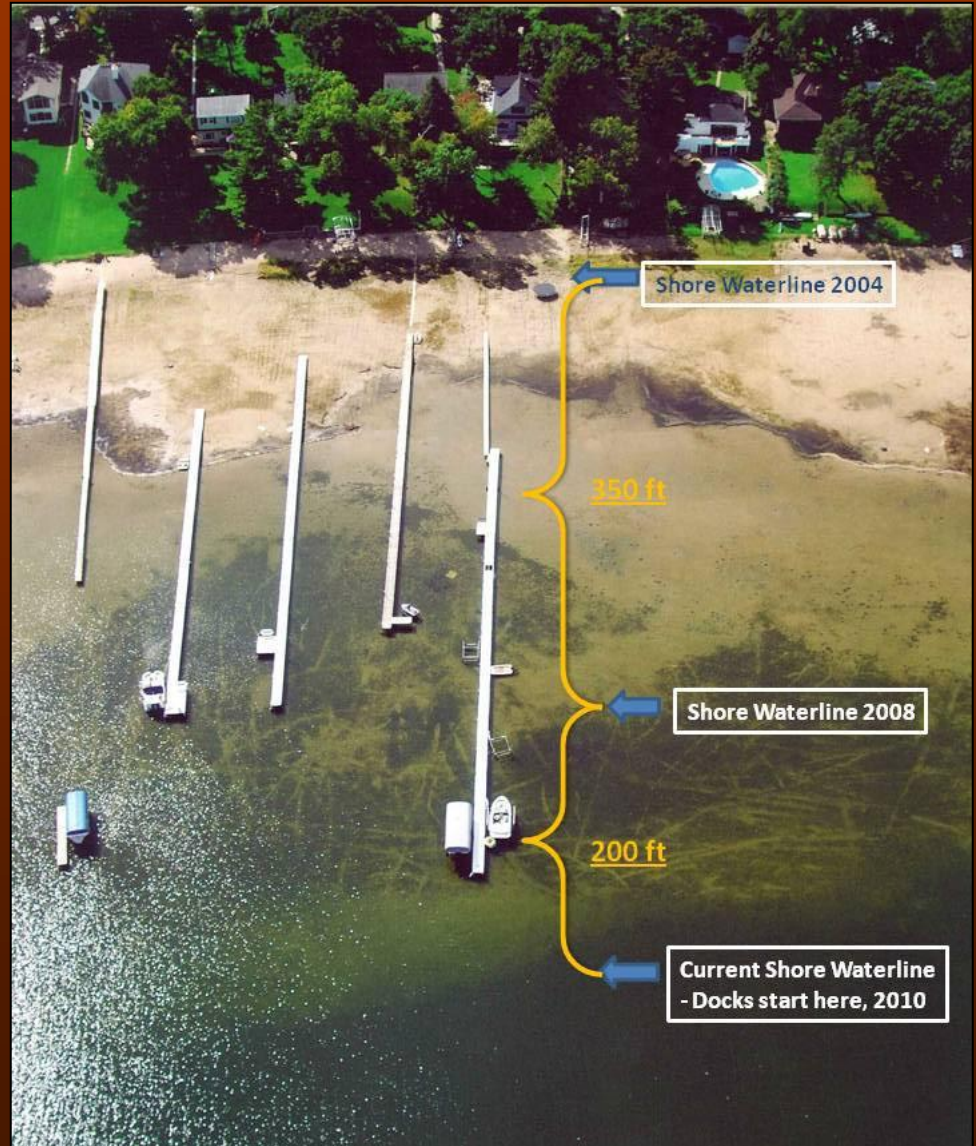
DNR inspects lake hole

by Mark Nicklawse
Regional Editor



Study proposes well pumping to raise lake level

Ever-expanding dock!



It could be even worse



Dale Bothwell, 8939 Waruf, walks in the former lakebed from the direction of Long Lake. He is standing approximately half way between the current shoreline and the former shoreline.

JERRY CAMPBELL / GAZETTE

3-6-00

Long Lake residents sink hopes in new well

Unit will pump two-plus million gallons of groundwater into lake daily.

BY TOM HAROLDSON
KALAMAZOO GAZETTE

A steel tower that could be ready to pump in a couple of weeks offers hope for hundreds of Long Lake residents living on the shrinking lake or trying to sell their homes there.

It's a deep water well with a pump that will run constantly, paid for by the lake property owners with help from Pavilion Township and the city of Portage. When fully operational, it will draw more than two million gallons of groundwater into the lake each day.

Now five feet lower than normal, the parched, muck-rimmed lake is a victim of years of dry conditions and the fact it's a bit higher than other area lakes so it cannot gain from their water runoff.

All that could change, but it may take some time.

Meanwhile, homes are selling for thousands of dollars less than when the lake level was normal.



JERRY CAMPBELL / GAZETTE

Long Lake's low water level is dramatically indicated in this aerial photo taken Friday from the south end of the lake. The lake is located in the city of Portage and Pavilion Township.

"We can maintain and improve it this year, and next year we may have it stabilized," said Julie Ellis, a Long Lake resident and head of

the Long Lake Board who has been working diligently on the lake-level dilemma for more than three years.

"We figure the pump takes 82 days to gain a foot, but that's not taking into consideration evaporation. It's up to evaporation and rainfall—and we're not expected to have a good rainfall year. It will probably be a year before it's close to normal. And that's just a guess," Ellis said.

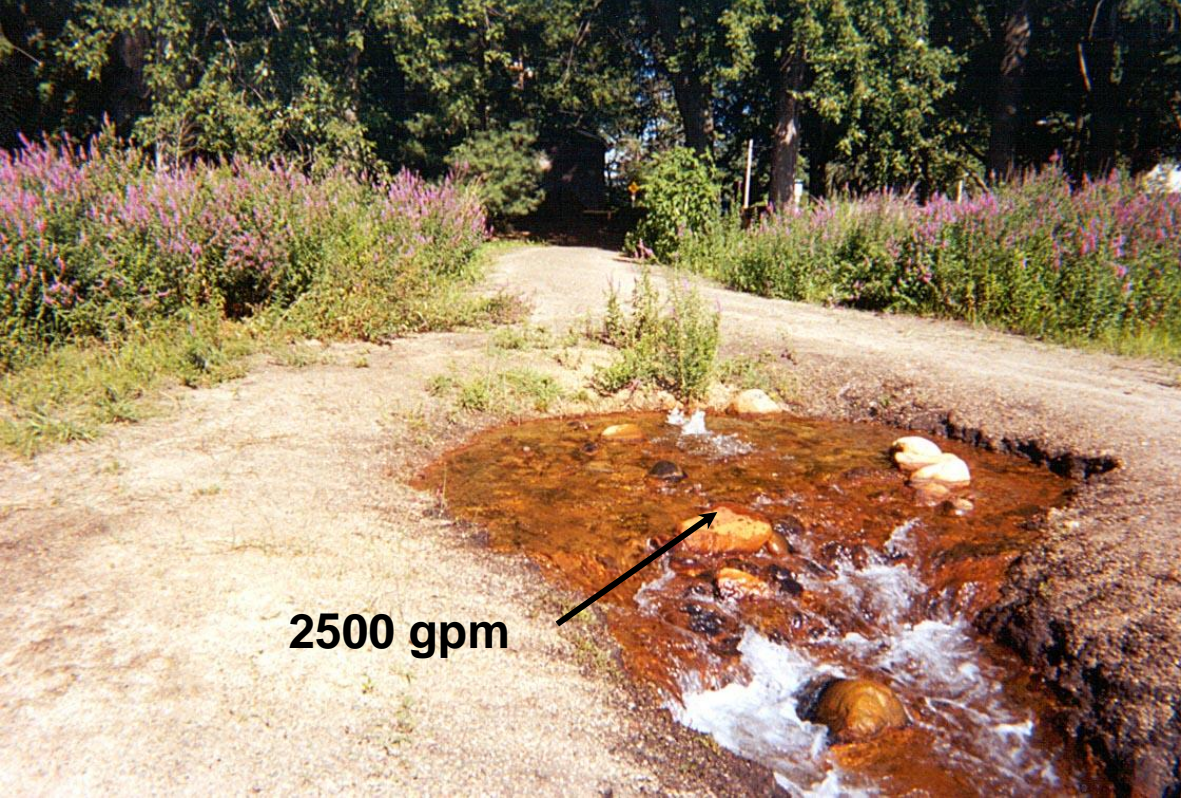
The water from a deep aquifer comes none too soon for residents who have dry docks or a lake that is hundreds of feet away from its normal shoreline. The pump is also pumping hope into anyone offering a home for sale that either goes unsold or sells at a lower-than-normal price.

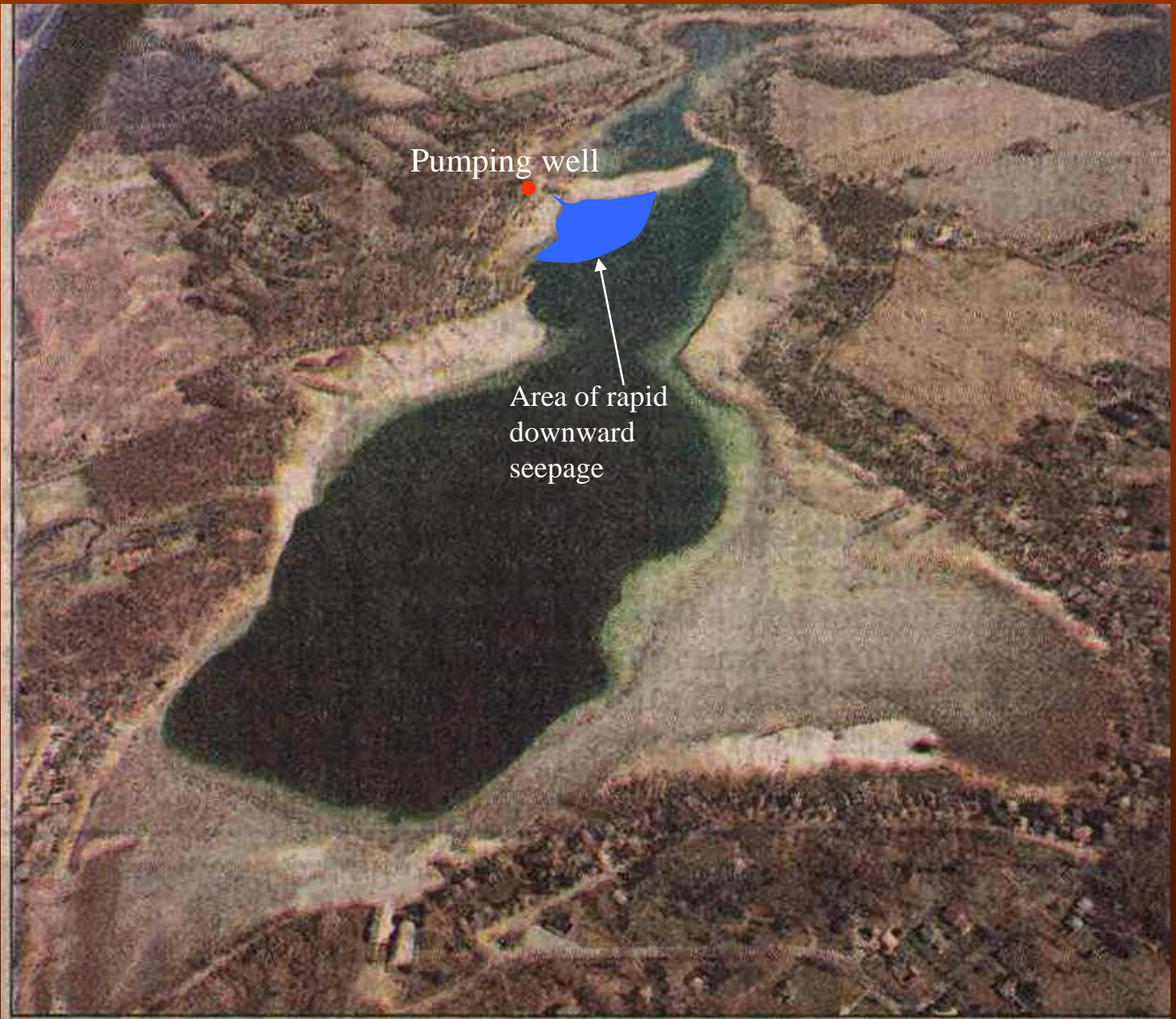
Todd Overbeek, a Long Lake resident and Realtor for ReMax, has studied home sales on Long Lake the past 10 years and finds a disturbing trend traced to the low lake level since 1997.

In 1997, when the lake level was about three feet below normal, the average size of a Long Lake home sold was about 1,137 square feet and its average sale price was \$121,000. In 1998, that same-size home sold for \$112,000.

In 1999, when the lake again was drained by a drought and a record

Please see **LAKE, A4**

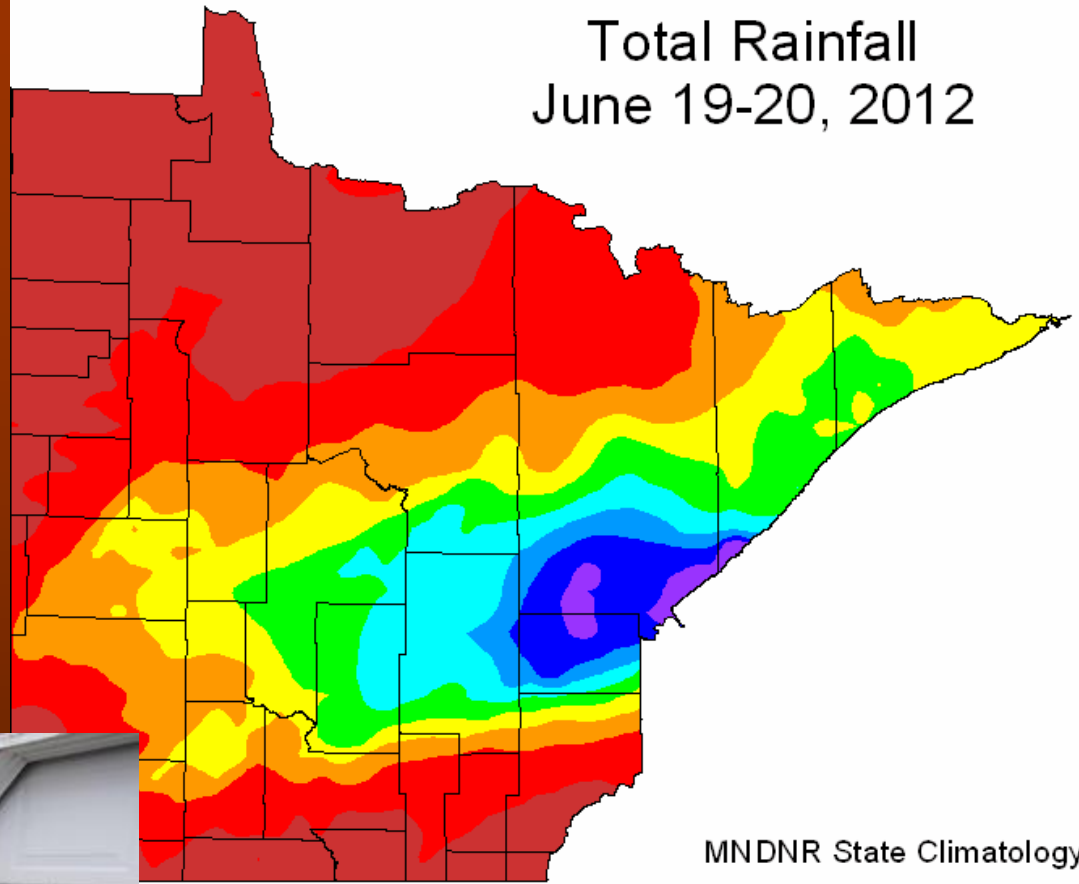




Pumping well

Area of rapid downward seepage

Flooding

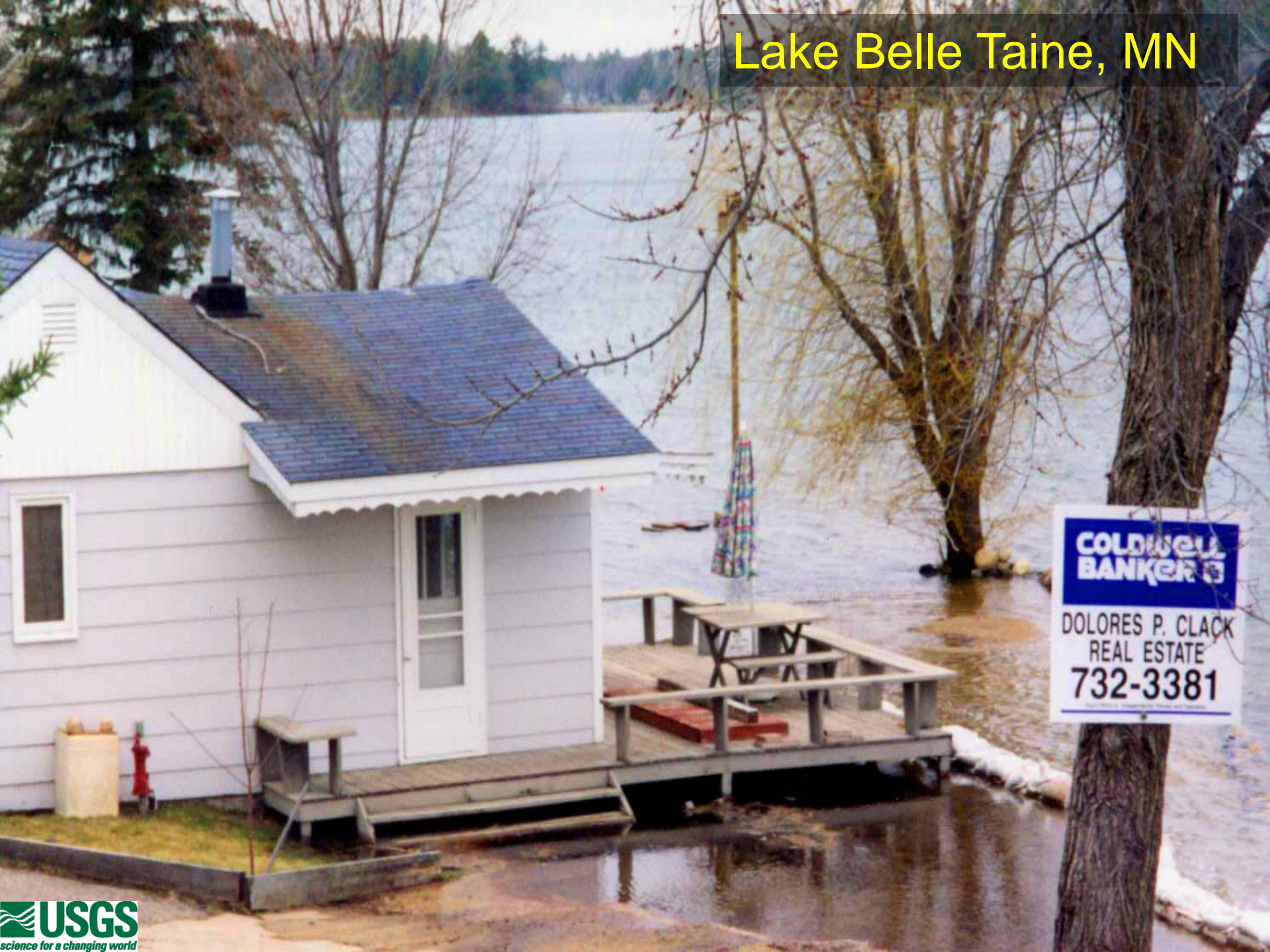


MNDNR State Climatology Office



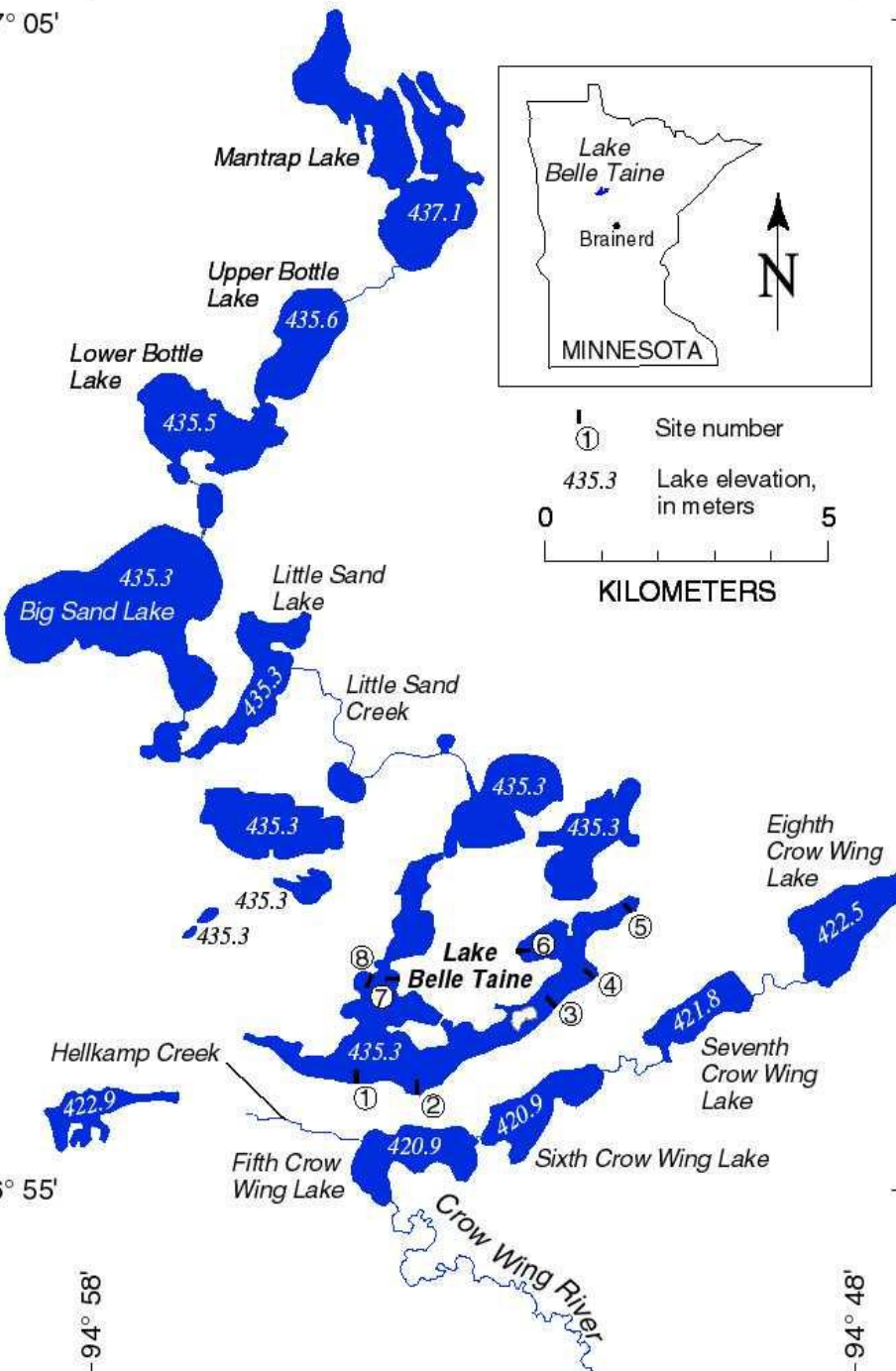
But how is groundwater relevant?

Lake Belle Taine, MN

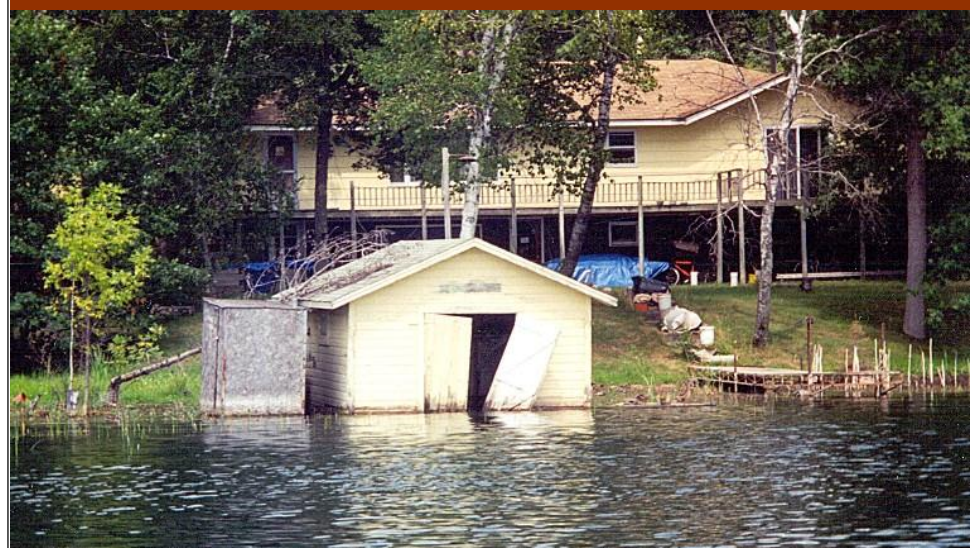


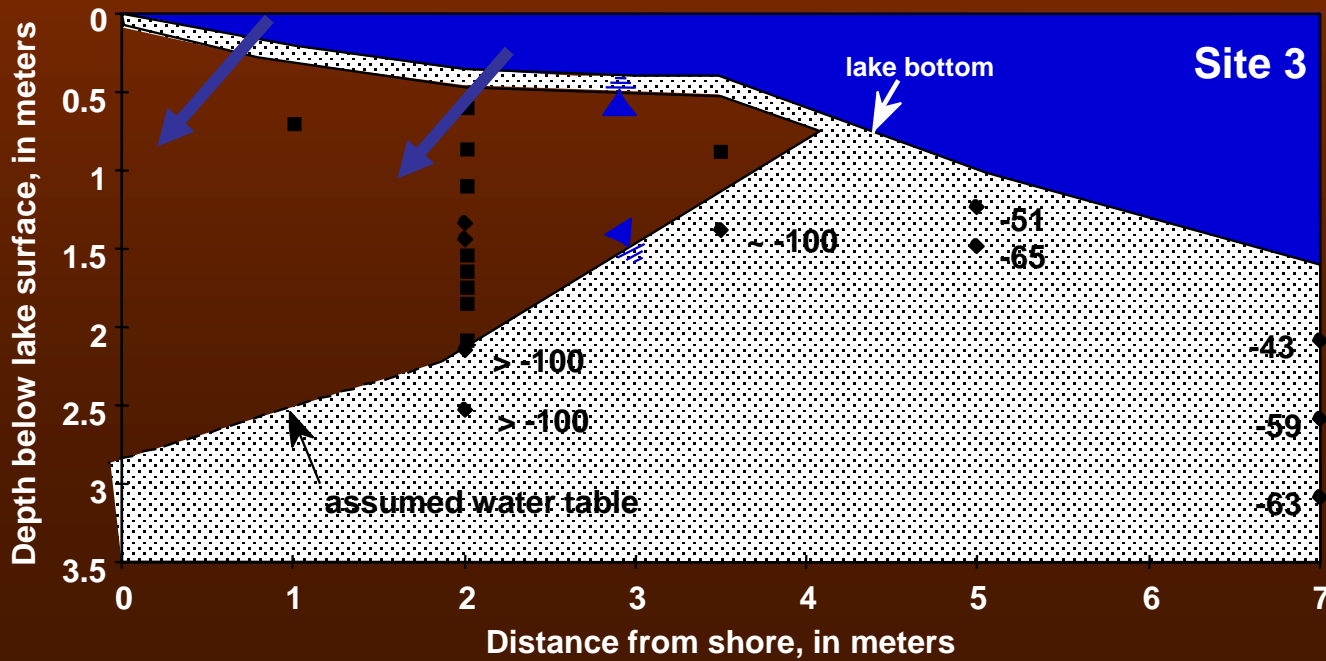
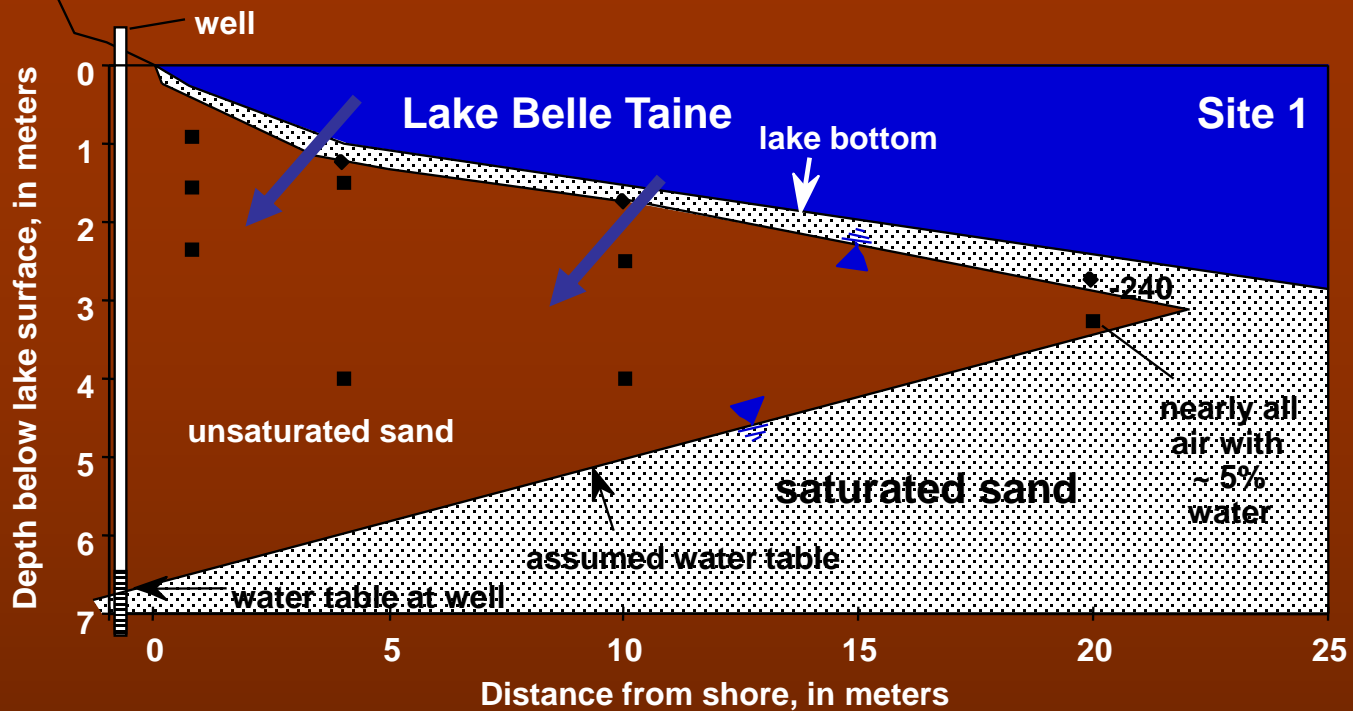
**COLDWELL
BANKER**
DOLORES P. CLACK
REAL ESTATE
732-3381

47° 05'



High water is countered by loss to ground water, but it's not enough



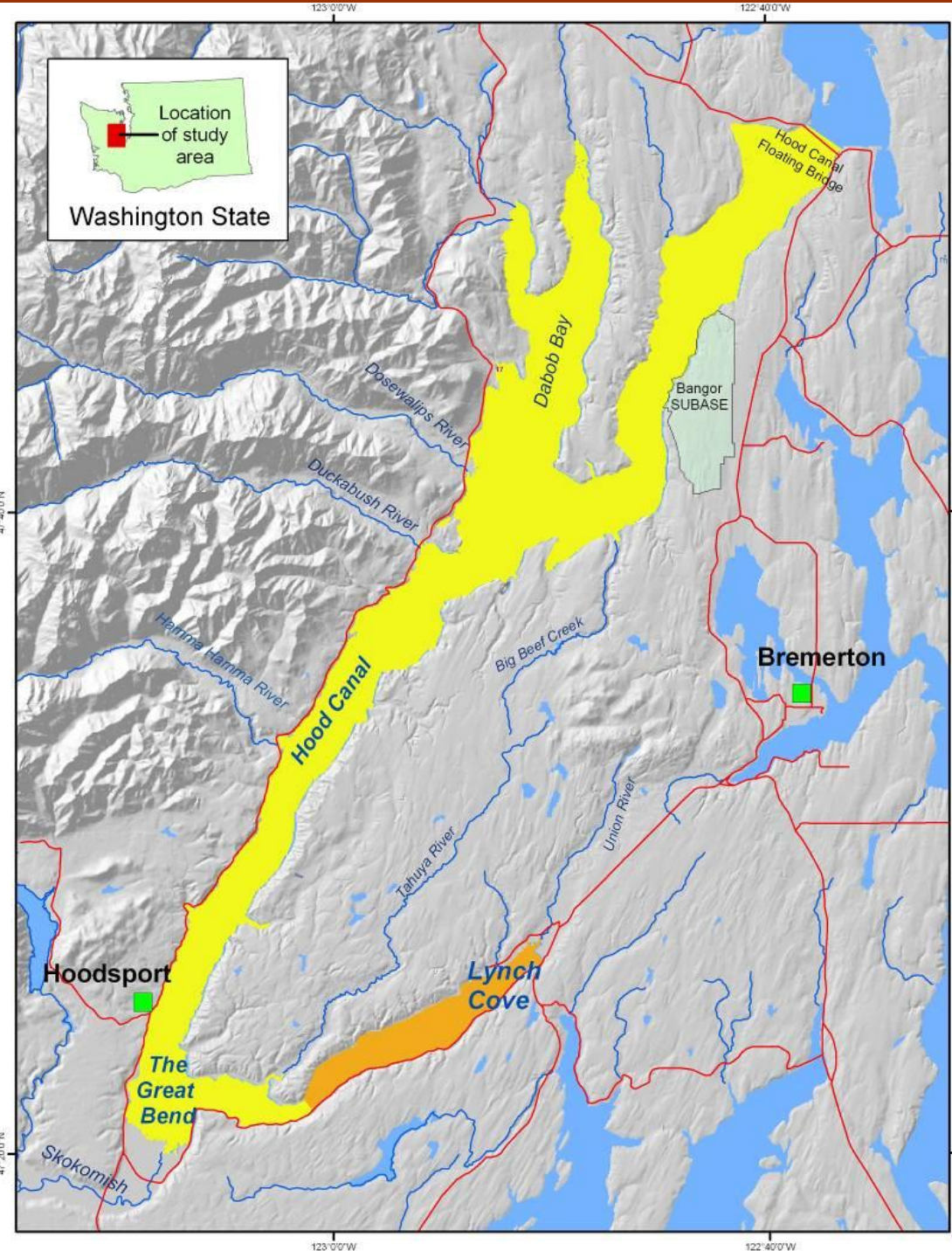


Rosenberry,
2000,
*Water
Resources
Research*

Water quality

Hood Canal

- 110 km long
- 2-4 km wide
- Up to 175 m deep
- Lynch Cove < 40 m deep



Trouble brewing in paradise



Christopher Dunagan, reporter for Kitsap Sun newspaper

Friday, September 17th, 2010

"I hate to be the voice of doom, but low-oxygen conditions in Hood Canal have never been worse."



Problem:
Lack of dissolved oxygen in the deeper waters of Hood Canal is stressing marine fauna

Groundwater brings in more nitrogen than surface water



Water quality

Great Salt Lake, UT



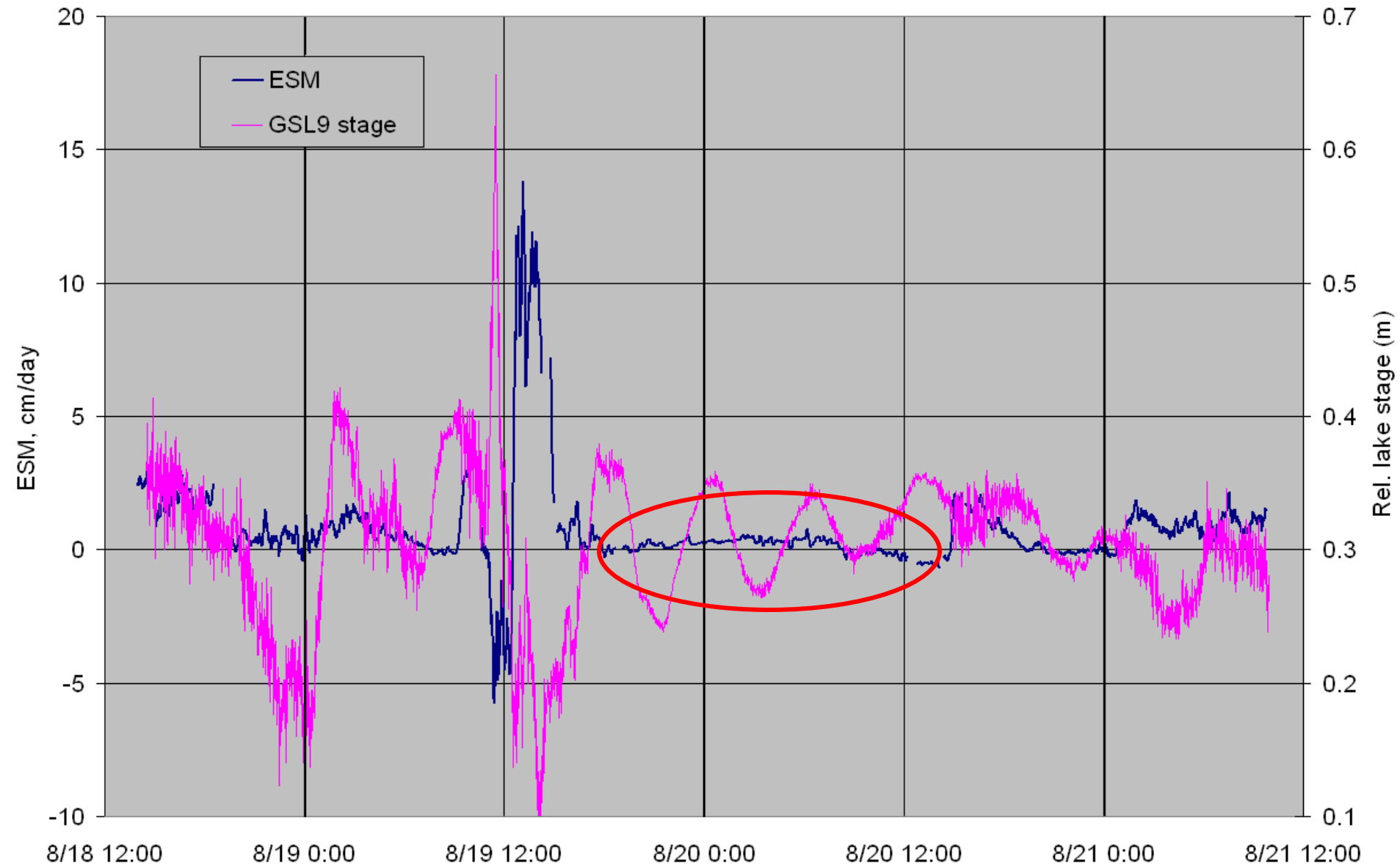
Selenium in the Great Salt Lake

“ . . . One of the Western Hemisphere’s most important migratory bird habitats.”

Utah DWQ

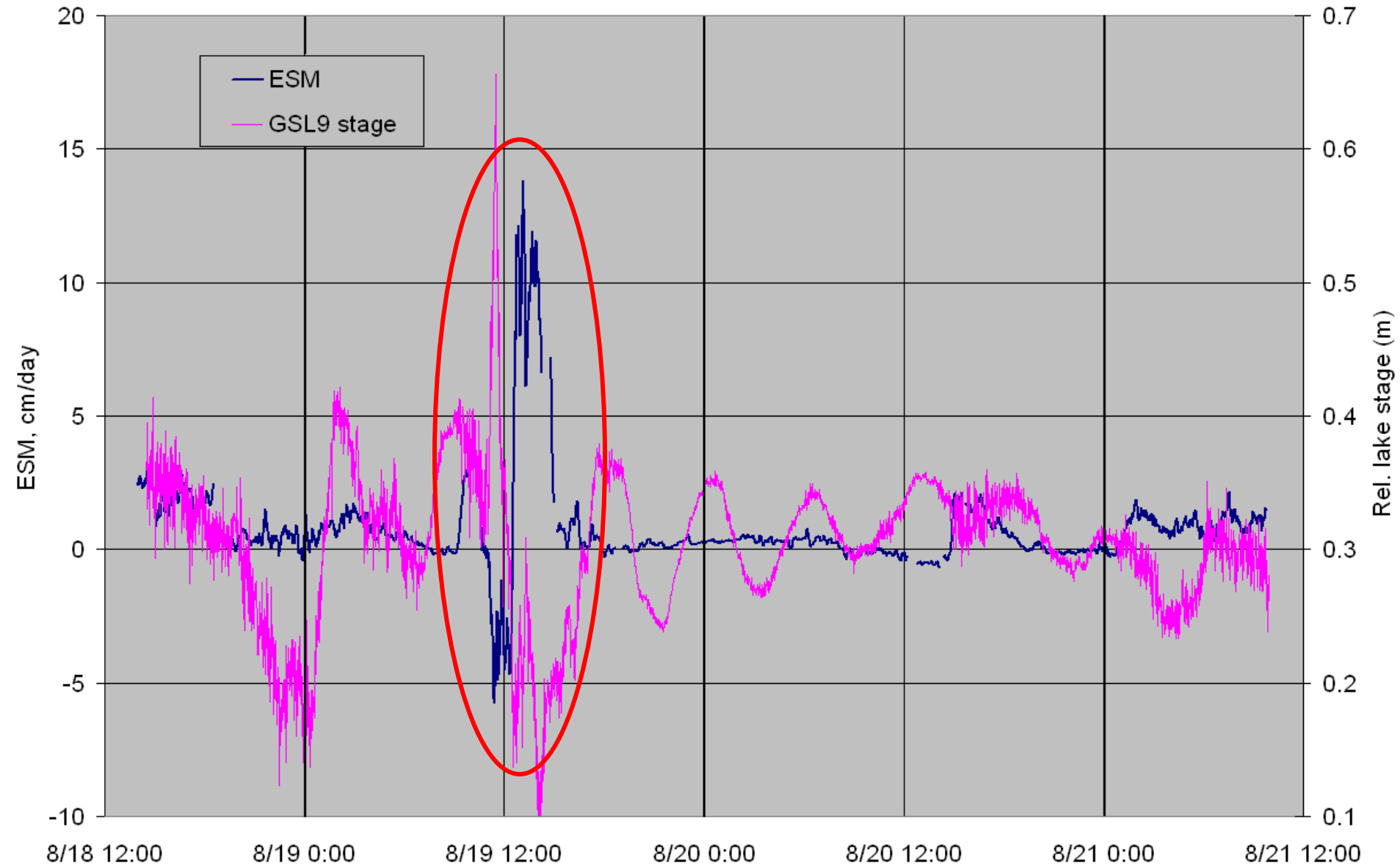


Very little groundwater discharge most of the time





Except perhaps when seiches occur and seepage increases by more than an order of magnitude



Endangered species

THE RIVER
REPORTER

YOUR AWARD-WINNING NEWS SOURCE

NEWS Groundwater study underway in Upper Delaware

By [Sandy Long](#)



"The concern is that as we use more groundwater to supply our homes and infrastructure, there may be less groundwater discharging to the river. So at times when the river temperature is very warm, the fish and the animals that live in the substrate may become stressed."

So who cares?

Plants

Benthic invertebrates

Endangered species

Fish

Ecologists

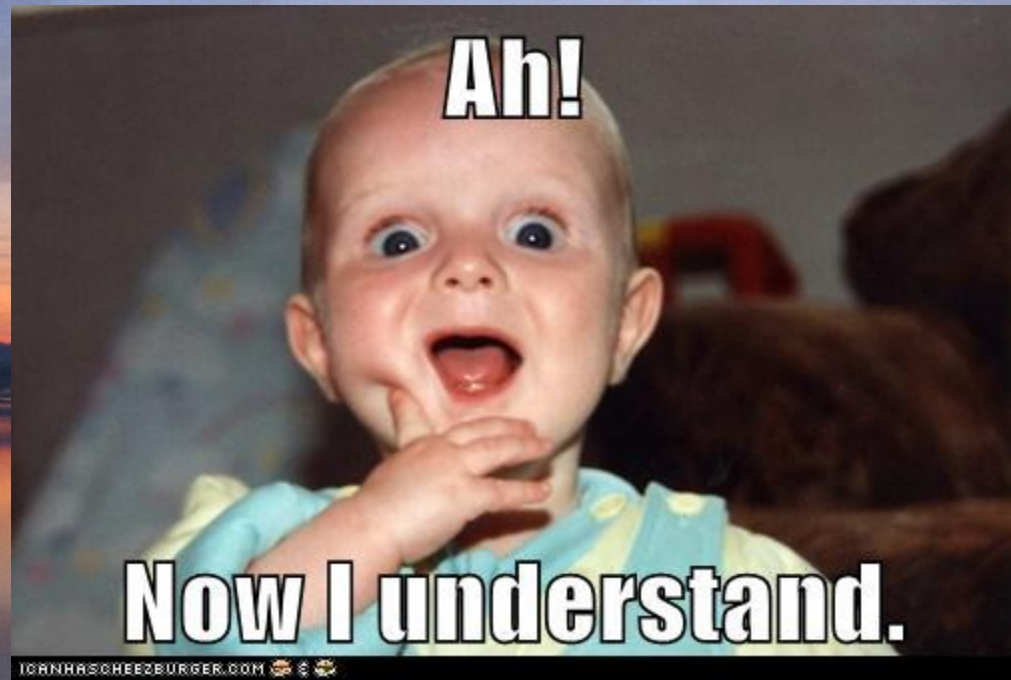
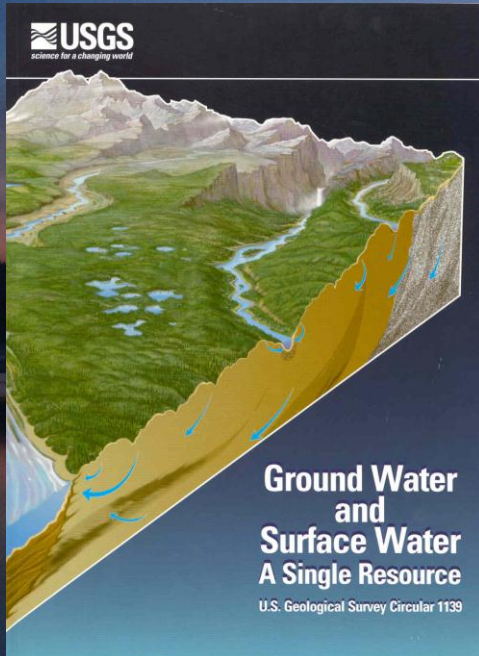
Geochemists

Geomorphologists

Hydrologists and hydrogeologists

Resource managers

The PUBLIC!



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