Ciresi Conlin LLP

Science and the Law

- Know the legal elements.
- Understand the statutes.
- Study facts.
- Become an expert – for the specific science at issue.
- Communicate the science clearly.
- Force an answer when everything's not black or white.
  - Opinion offered must be to a reasonable degree of scientific certainty.
- Same structure applies across technology subject matter.

What is MERA?
Minnesota Environmental Rights Act.

- Purpose (116B.01).
- Each person is entitled by right to the protection, preservation, and enhancement of air, water, land and other natural resources.
- Each person has the responsibility to protect, preserve, and enhance our NR.
- MN policy to have humans and nature exist in productive harmony now and for future generations.

Who can protect our natural resources? Everyone.

- 116B.03:
- Any person may maintain a civil action for declaratory or equitable relief against any other person for the protection of air, water, land, or other natural resource in the State from pollution, impairment, or destruction.
- Cannot sue someone who is acting pursuant to an environmental quality standard, rule, or permit.

Pollution, impairment, or destruction means…

- Any conduct by any person which violates, or is likely to violate, any environmental quality standard, rule, or permit (*violate laws*)

Or

- Any conduct that materially adversely affects or is likely to materially adversely affect the environment (*harm resources*)

The Agency loop…116B.10

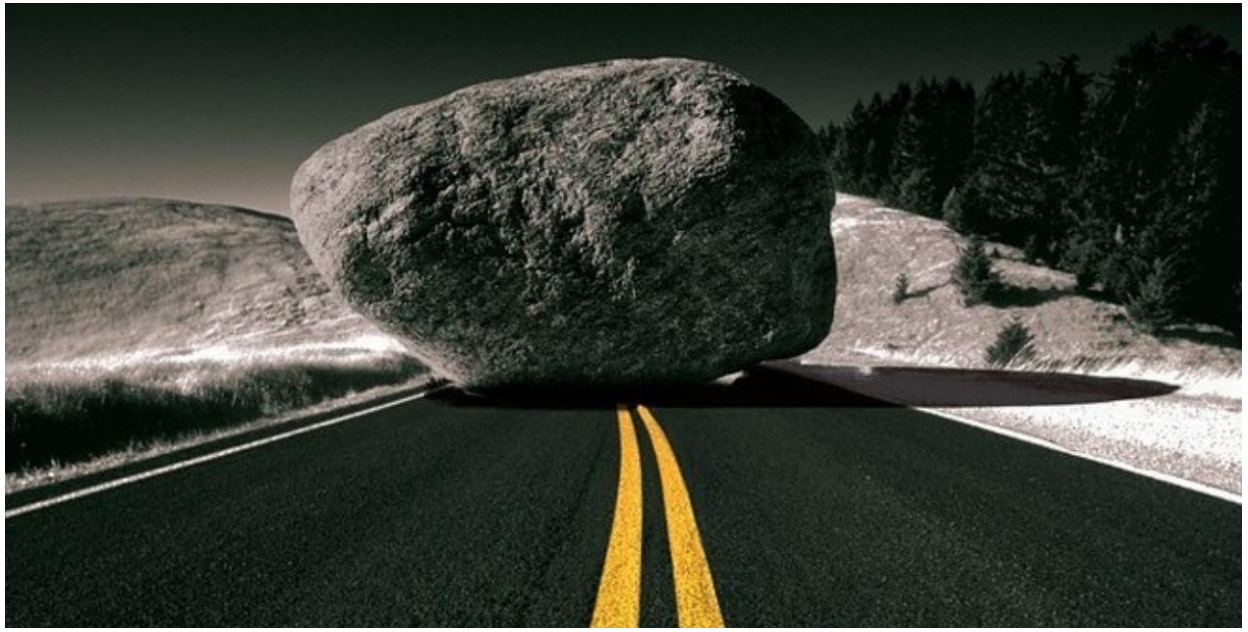
- Any person may bring an action for declaratory or equitable relief against the state when the action is a challenge to an environmental quality standard, rule, or permit.
- Court decides if Plaintiff meets burden.
- If so, tells agency to evaluate itself.
- Different than section .03.
  - Can’t get to State law violation.
  - Can only say law is not strong enough to protect our resources.

Why not more MERA challenges?

- $$
- Legislative risk.
- Legislature changed law mid-case.
- Passed law to stop Court ordered relief.
- Threat to exclude groundwater from MERA – ridiculous!

Obstacles to a Groundwater Case

- Motion to dismiss (failure to state a claim).
- Motion for summary judgment, for new trial (failure to show enough evidence).
- Motion to exclude key evidence, experts (failure to meet evidentiary standards).
- Not enough evidence.
- Wrong evidence, bad evidence.
- No empathy for client.
- No compelling story.
- Just doesn’t feel fair.



Keys to a groundwater case

- Facts, law, empathy all line up.
- Compelling story.
- Compelling evidence.
- Deal with bad facts.
- Legal claims and damages.
- Trigger emotional response.
- Show an avenue supported by law, science, feelings.

WBL case: Win, lose, then what?

- 4 week trial – March, 2017
- 140 page opinion by Judge Marrinan for WBLRA, WBLHA
- Appeal by DNR, City of White Bear Lake, White Bear Lake Township
- Reversed - using Agency Loop.
- MN Supreme Court will decide.
- Briefs by DNR, City, Town due today
- 10 days for us to file Reply briefs
- Oral argument and decision

WBL Trial: Everyone was an “expert”

WBLRA Experts

Megan Funke, PhD, EOR

- Liminologist.
- Modeled WBL changes at various water levels.
- Change in fish and plants.
- Historical precipitation and drought levels.
- Abnormal response to precipitation now.
- Lower lows and lower highs.

Stu Grub, EOR

- Geology.
- Why/How WBL connected to Aquifer.
- Surface water in wells.
- Confirmed USGS model.
- Groundwater budget model.
- GW pumping causes low lake levels.
- Lower lows and lower highs.

Cross Examination of DNR Experts

Matthew Tonkin, PhD, Papadopulos

- No model.
- GW pumping is a direct cause of WBL level declines.
- Agrees to the shift of hydrograph – – lowers lows and lower highs.
- Admits USGS accounted for precipitation and evaporation.
- Agrees study prior findings still true today.

Jim Solstad, DNR hydrologist

- No model.
- His charts support Dr. Funke's opinion. Dr. Jennings does too.
- WBL tracks precipitation pattern until 2010. Then failure to rebound.
- WBL same pattern as Lake Minnetonka historically, but not last 10 years.

More Cross Examination of DNR Experts…

Jim Berg, DNR Hydrogeologist

- Planned to use USGS model until learned it didn't support DNR opinion. Then DNR's position changed. Ignored it.
- Agreed pumping from wells "far" away has a "significant" effect based on pumping rate.
- Agrees with all DNR experts that pumping and climate influence WBL level.

Martin Jennings, PhD, DNR Fisheries

- Liminologist
- No model.
- No future opinion.
- If cause of WBL's decline is due to human conduct, that is a negative impact.
- Agrees with Funke that littoral losses are substantial.

Importance of Cross Examination

cross-examine [**kraws**-ig-**zam**-in, **kros**-]

verb (used with object), **cross-ex·am·ined, cross-ex·am·in·ing.**

1. to examine by questions intended to check a previous examination; examine closely or minutely.
2. *Law*. to examine (a witness called by the opposing side), as for the purpose of discrediting the witness's testimony.

Cross of DNR Expert Tonkin

A. **Good afternoon.**

Q. I want to clarify some of the things you did and didn't do as part of your opinions, okay?

A. **Sure.**

Q. You did not do any field tests at White Bear Lake, did you?

A. **No.**

Q. You did not go to White Bear Lake and observe it in 2013, did you?

A. **No.**

Q. Or any time since then?

A. **I was --visited the site yesterday.**

Q. Yesterday was the first time you saw it?

A. **Yes.**

Q. That was after all your opinions had been rendered in this

A. **Yes.**

Q. That's correct?

A. **Yes.**

Q. You didn't rely on the DNR's plans or ideas or analysis related to protective elevation?

A. **Right.**

Q. You didn't rely on the DNR's plans to implement an irrigation ban as a possible trigger for the protected elevation?

A. **Right.**

Q. You didn't do any analysis relating to seasonal water use, right?

A. **I did actually look at seasonal pumping and patterns over the seasons, but it's not included in my report.**

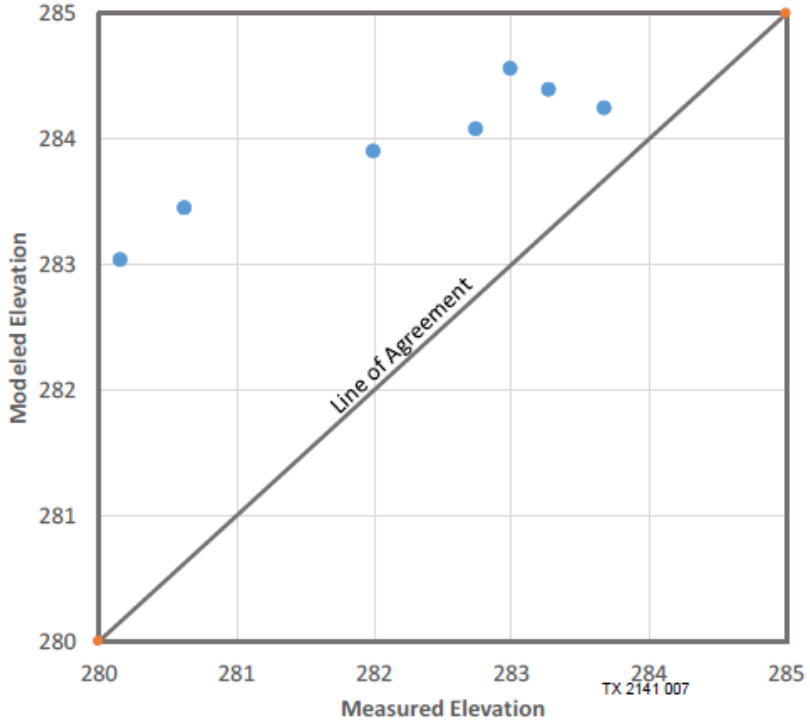
Q. You didn't issue an opinion on seasonal water use, did you?

A. **No.**

Tonkin's calibration analysis:

Calculations with the USGS Steady-State Model – Parameter Sensitivity

- The correspondence between measured and modeled groundwater levels at wells that straddle model layer 4 is generally poor
- In the example plot the measured span of water levels in a closely-spaced group of wells is 4 meters, but the modeled range is only 1.5 meters
- The model may show the shallow and deep layers as being "too connected"



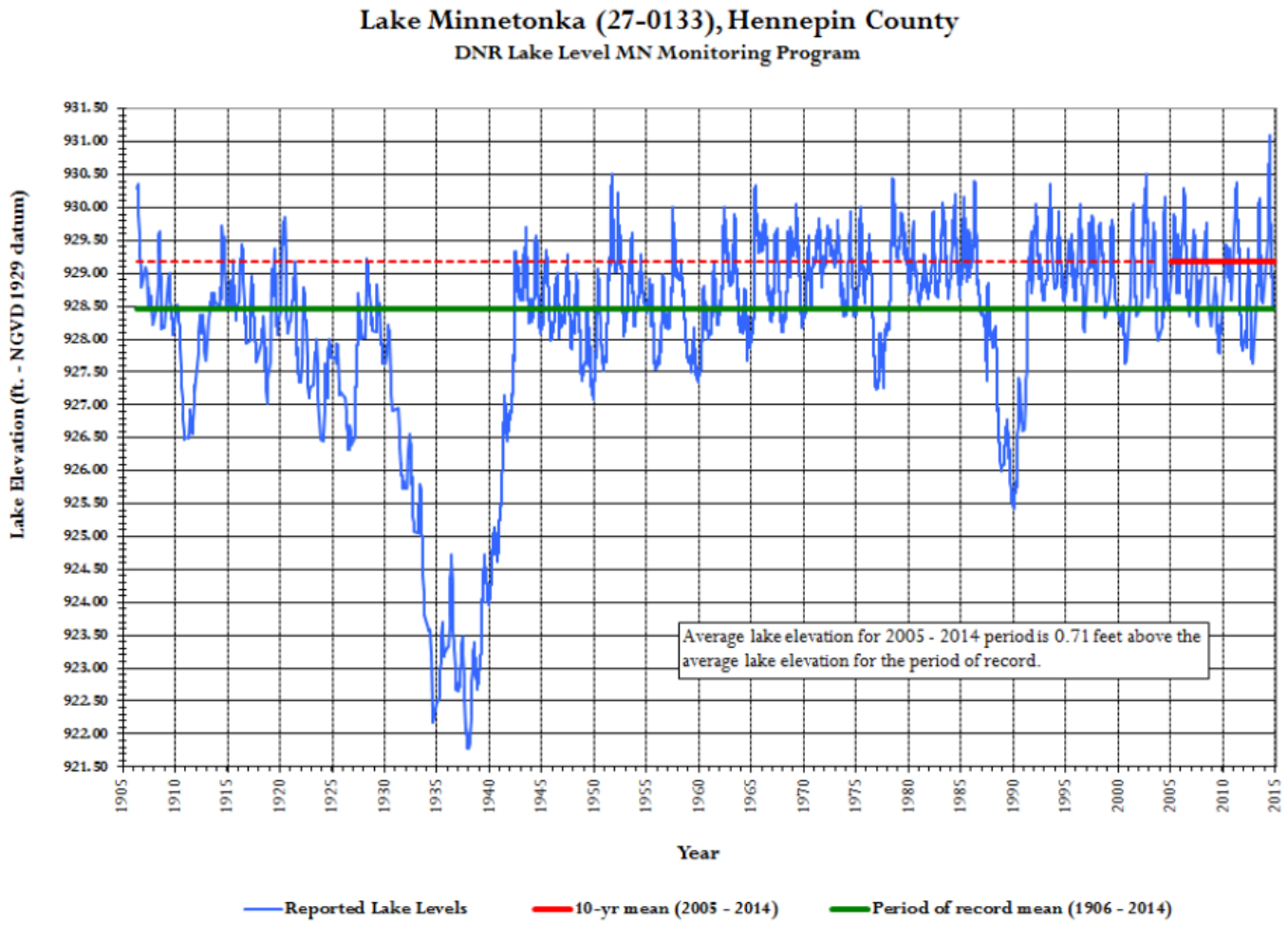
Court's response to Tonkin:

143. Analyzing the USGS model calibration, Dr. Tonkin concluded that the hydraulic connectivity used in the model was too high. He based this conclusion on a small sample of only seven out of 900 wells. Furthermore, despite the fact the USGS study found that White Bear Lake water is the likely source of surface water found in 11 wells *south and downgradient to the lake,* Dr. Tonkin chose to plot the calibration of wells that were *northeast of the lake*. He offered no meaningful explanation for his choice of either the limited number of wells or their locations.[197]

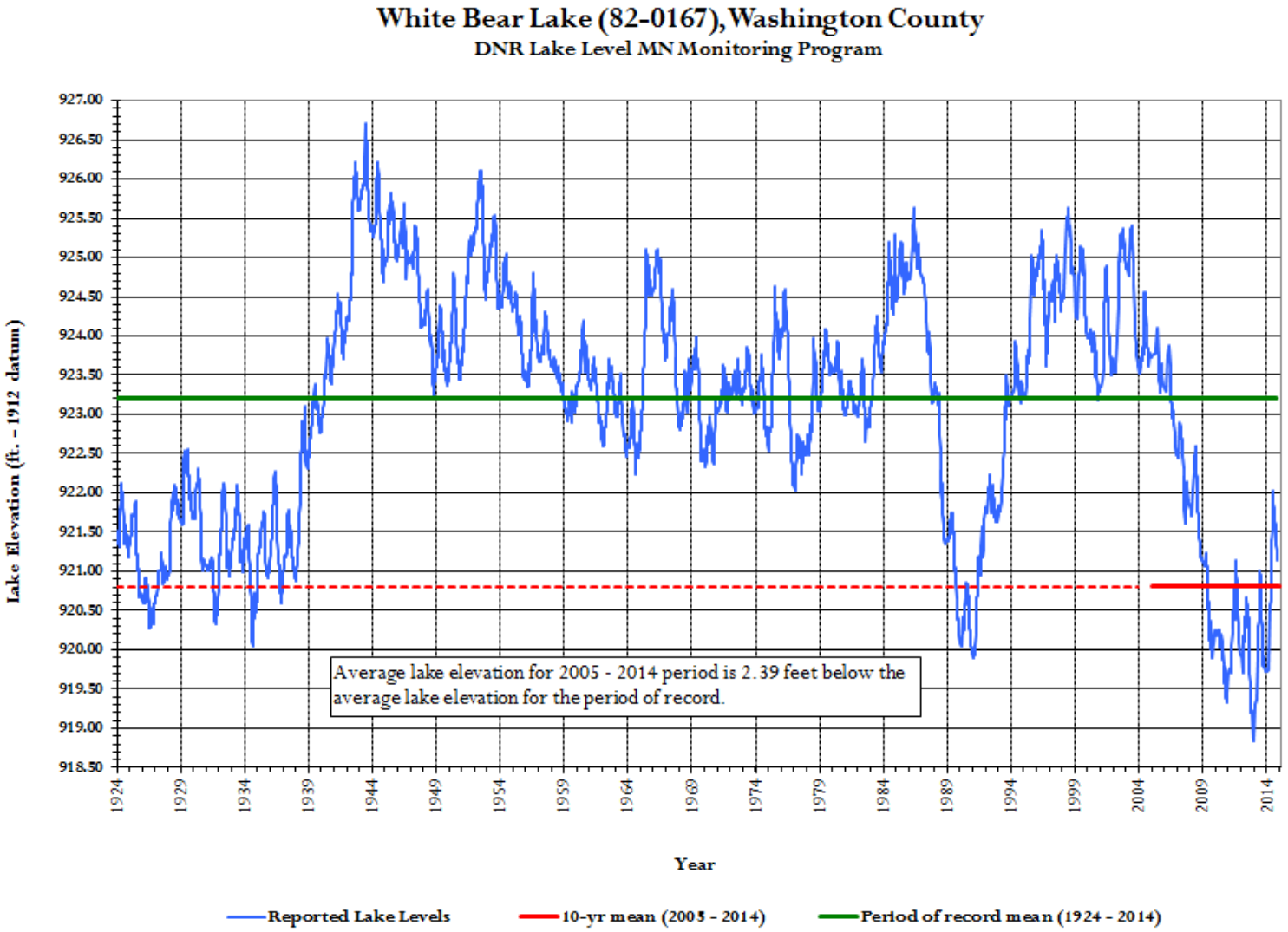
DNR Expert Solstad on Lake Minnetonka v. White Bear Lake

- Studied both.
- Both lakes had similar responses to dust bowl and 88/89 drought.
- Different response to climate over last 10 years.

DNR Expert Solstad: Lake Minnetonka



DNR Expert Solstad: White Bear Lake



Solstad admits:

Q. Here it says the: Average lake elevation for 2005 through 2014 period is 2.39 feet below the average lake elevation for the period of record. Do you see that?

A. **I have no reason to disagree, that's correct.**

Q. So, if we turn to the next page, we can see that during this 2005 to 2014 time, Lake Minnetonka is actually .71 feet above the average lake elevation for the period of record. Do you see that?

A. **Yes.**

. You agree with that?

. **Yes.**

. So, during this recent time period, there's been about a four-foot swing between Lake Minnetonka and White Bear Lake, correct?

A. **Yes.**

Q. So, now, in this recent timeframe, they're certainly not reacting the same way, correct?

A. **There's likely many causes.**

Q. In '88-'89, they reacted the same way to the drought?

A. **Correct.**

Q. Today they're not reacting the same way to climate, correct?

A. **Their lake level plots do not look the same.**

Court's response:

28. Between 2005 and 2014, the average lake elevation was 2.39 feet below the long-term average of 923.8. By comparison, during the same time period, Lake Minnetonka was .71 feet above the average lake elevation, for a net difference of more than 3 feet.

Metropolitan Council – Neutral Expert

- WBL is a bathtub with holes.
- Just look!
- Early tools to evaluate cumulative impact…
- Warned of inertia.
- Climate and pumping cause WBL decline.
- Pumping = humans.
- Detailed evidence by city on residential irrigation.
  - Annual GW more than doubled since 1980 – mainly due to summer water use.
  - Summer water use 2-6 times of winter use.

Lakes and Groundwater

Star Tribune

Star Tribune

METROPOLITAN COUNCIL

What does lake level decline look like?

These are pictures published in a recent article in the Star Tribune showing recent lake conditions

Dr. Elhassan of Metropolitan Council:

Q. What is it showing in these pictures?

A. **These pictures showing a receding lake level in White Bear Lake.**

Q. Are these examples of lake level decline, in your mind?

A. **They are.**

Q. Is it normal to mow the lake bed?

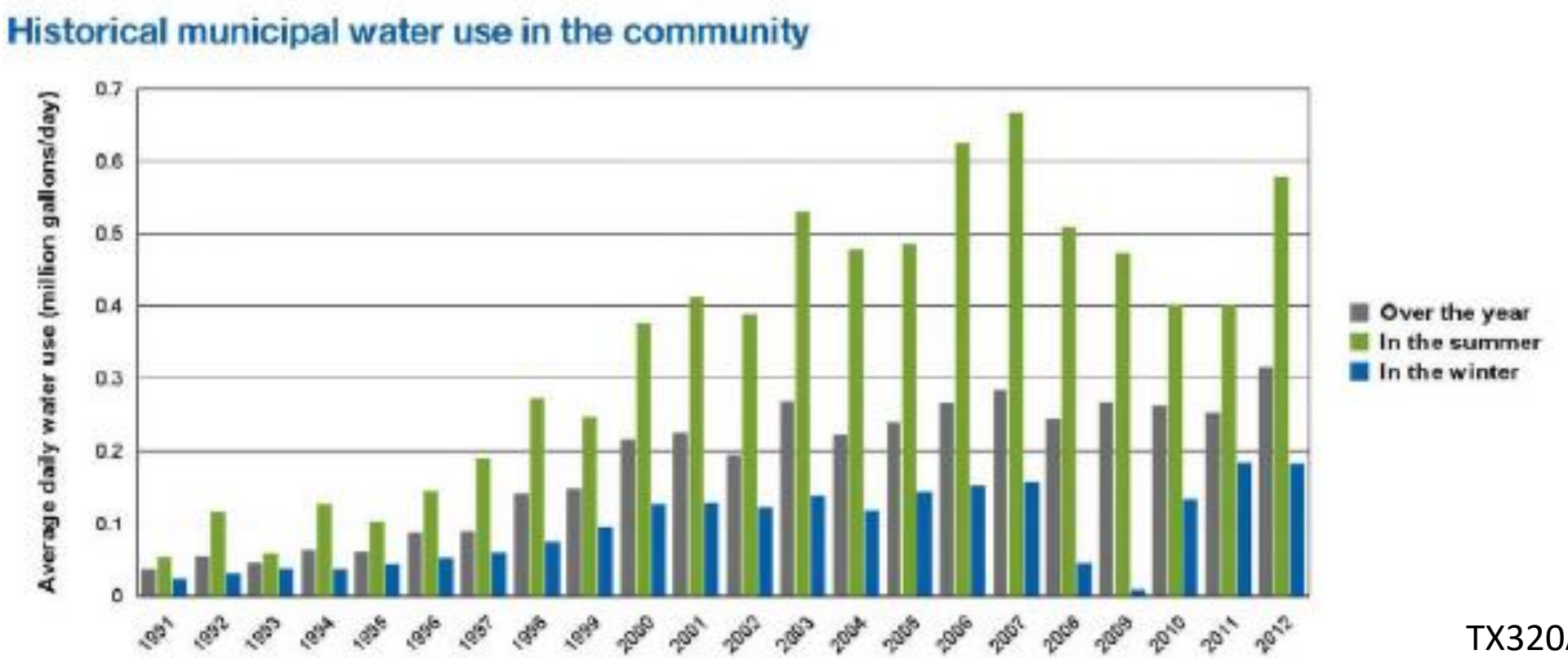
A. **It's not normal to mow a lake bed.**

Not a new issue:

While traditionally managed as separate systems, surface and groundwater resources are, in reality, dynamically linked. Management of surface water and stormwater can, therefore, impact groundwater resources. This is of particular concern in the southeastern metropolitan area, which is characterized by a karst landscape containing many sinkholes, caves, springs, and corresponding low filtration and fast response to runoff events. The impact of groundwater withdrawals on surface waters is also a concern. Most surface waters have some connection to groundwater. This is the reason streams keep flowing during very dry periods and in the winter. Many lakes and wetlands occur where the land surface intersects the water table. Groundwater withdrawals can reduce the amount of water that would have discharged to surface water features, or they can lower the water table which, in turn, lowers the levels in lakes and wetlands.

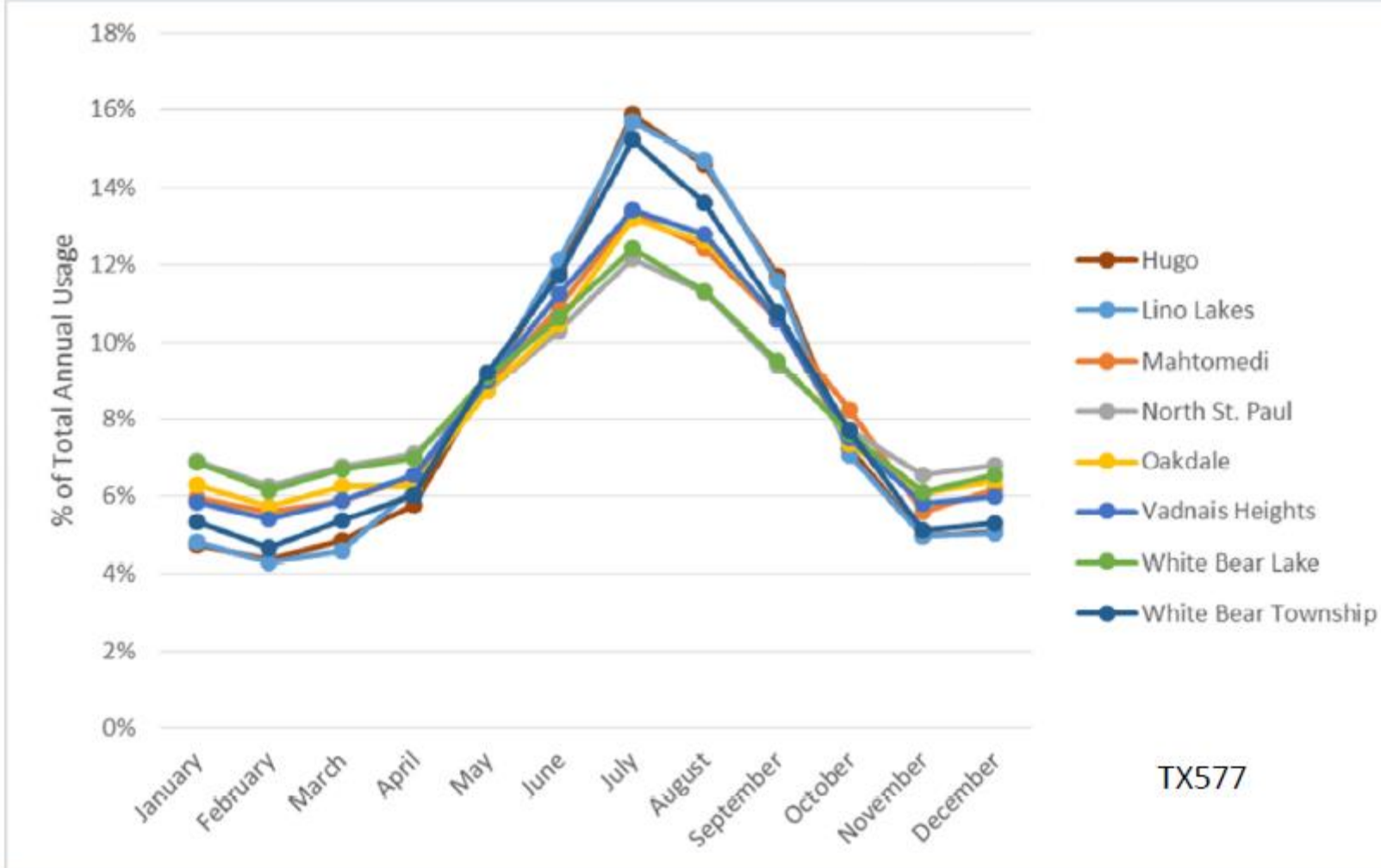
TX32-54, 2010 Plan by Council

Look at all that green grass!



TX320A-

MUNICIPAL WATER USE BY MONTH



TX577

Fact witnesses

Home and Business owners

- Long-time lake users.
- Long docks.
- Change in plants.
- Trees in lake bed.

DNR hydrologists, hydrogeologists

- Back door to enter more scientific evidence.
- Agency knows best.
- Long-term of WBL.
- Need to balance many interests.

Cross of DNR Moeckel:

Q. So, White Bear Lake is vulnerable to groundwater withdrawals, correct?

A. **Yes.**

Q. So, that's human activity making that, making those withdrawals; that doesn't happen naturally; that happens through permits and through people pumping the water out of the aquifer, correct?

A. **Yes.**

Q. And all of that human activity is authorized by the DNR, correct?

A. **Yes.**

Q. The DNR studies groundwater withdrawals because White Bear Lake is vulnerable to them, correct?

A. **Yes.**

Q. The groundwater withdrawals add stress to the aquifer, correct?

A. **Yes.**

Q. And the groundwater -- strike that.

And the aquifer is connected, hydraulically connected, to White Bear Lake, correct?

A. **Which aquifer?**

Q. The Prairie du Chien-Jordan aquifer is hydraulically connected to White Bear Lake?

A. **Yes.**

Q. That means that they rise and fall together, right?

A. **Yes.**

Q. So, a stress to the aquifer that results in lowering the aquifer level results in lowering the lake level?

A. **Yes.**

Q. White Bear Lake is a closed basin lake?

A. **Yes.**

Q. And closed basin lakes are more vulnerable to low and fluctuating lake levels, right?

A. **Yes.**

Q. So, we know White Bear Lake is vulnerable, and it's connected to the groundwater system. We also know it's vulnerable because it's a closed basin lake, right?

A. **Yes.**

Time to review permits on cumulative basis

259. The DNR has acknowledged that groundwater appropriation permits *should* be reviewed on a cumulative basis because *each* high capacity groundwater well affects the other wells around it.[385] Despite this knowledge, in 2013 it admitted that it *had not been* considering regional or cumulative impact when reviewing permit requests. Instead, it had been using the "water appropriation permitting process on a *case-by-case* basis" because this had "*worked in the past* ***before the growth of groundwater use in the metro*** and other 'pinch points' around the state".[386] (Emphasis supplied.)

Opinion, p. 83

Canary in the Coalmine

White Bear Lake (WBL) Low Water Issue: DNR Talking Points

October 9, 2012 Draft

1. WBL is an important and unique water resource, both to the communities of the northeast metro as well as to the state. The DNR is committed to helping stakeholders find long-term solutions that protect the region's groundwater and surface water for current and future generations.

2. WBL may be the 'canary in the coal mine' and be signaling the potential future impacts of metro area groundwater withdrawals on our lakes and rivers.

3. Current record low water levels in White Bear Lake are due primarily to a precipitation deficit since 2006, but the increase in groundwater pumping in the area is probably to blame for making the low lake levels worse.

DNR knew of problem, didn't fix it

265. Even while acknowledging that there is a serious problem with the overuse of groundwater, the DNR has continued to permit excessive groundwater pumping from the aquifer. This practice is not sustainable. It has a negative effect on these natural resources, and is an unreasonable and irresponsible approach to managing groundwater appropriations.[394]

Opinion, p. 85

Business as usual is no longer an option

Toward a sustainable future

Reliable water supplies are critical both for economic wellbeing and environmental health. Increasing demands on groundwater resources in the North and East Metro Area require new approaches to groundwater use and management. While conditions do not add up to a crisis yet, warning signs are becoming evident. "Business as usual" is no longer an option.

TX306-9

Undisputed facts: DNR Moeckel testified…

Q. Going on: Groundwater use may be having impacts to important surface water features in this area. That includes White Bear Lake, right?

A. **Yes.**

Q. And the DNR was telling everyone that there are concerns about the groundwater quality in this area as well, right?

A. **Yup.**

Q. And: All groundwater users within this place are hydro-geologically related - their use impacts the same aquifers; that's true, isn't it?

A. **Yes.**

Q. So, the entire northeast groundwater management area's use of groundwater impacts each other, right?

A. **Yup.**

Inertia drives water use

175. There is a built-in "inertia" in the system that operates to maintain the status quo when it comes to water use.[244] Municipalities "have generally made independent water system investments and have conducted autonomous resource evaluations without interjurisdictional cooperation and with little consideration for the regional implications of their decisions". [245] They naturally look out for their own interests and many are content to maintain the status quo and are resistant to change.[246] Many cities are content to maintain the status quo and are resistant to change. However, to ensure sustainability and continue providing these services, "they need to adapt to the new reality of . . . implement[ing] more options".[247]

Opinion, p. 56

USGS Model, Chapter B

United States Department of the Interior

U. S. GEOLOGICAL SURVEY
Minnesota Water Science Center
2280 Woodale Dr.
Mounds View, MN 55112
763-783-3230

December 29, 2016

Barb Naramore, Assistant Commissioner
Minnesota Department of Natural Resources
Box 37
500 Lafayette Rd.
St Paul, MN 55155-4037

Dear Barb,

Attached please find a copy of the draft
Assessment of Groundwater Flow and
Metropolitan Area, Minnesota, 2003 th
Surface-Water Exchanges in Lakes of
through 2015.

This draft is provided to the Minnesota
as a courtesy review copy. The report, a
effort among the USGS, the Metropolita
Health. Release of this report, for the De
outside organizations that are in partners
product, and/or have a stake in the result
Department because of the Department's
because Department staff have been involved, as technical advisors, in the project. We look forward to receiving technical comments from the Department's staff.

This is a complex and large model. Yesterday, we received the last of the technical colleague review comments. The reviewer expressed concern that one of the model's peripheral application sub-programs, the unsaturated-zone-flow package may not, in all cases, accurately simulate lake-level responses to pumping. This likely does not affect the direction of the changes in lake levels, but may affect the magnitude of pumping responses in some lakes. I plan to refer this issue to our modeling experts in Headquarters. We may be able to qualify the results, or they may require some additional testing with model simulations. That being said, the model results show that drawdown from pumping encroaches on many of the lakes, implying that groundwater pumping, as well as changes in precipitation, affect the lakes in the northeast metropolitan area. This simple conclusion is consistent with the findings published in the other two USGS reports. I will keep you informed as internal discussions and recommendations are finalized on the conclusions of the modeling effort.

EXHIBIT
294 A

MNDNR_NEML_draft_coutest_review_12292016.docx

TX294A-001

That being said, the model results show that drawdown from pumping encroaches on many of the lakes, implying that groundwater pumping, as well as changes in precipitation, affect the lakes in the northeast metropolitan area.

DNR tension with USGS models

- DNR Ass't Commissioner Naramore testified steady-state model not good enough until after DNR "saw the results" of the model.
- Before saw results, DNR expected a 3 inch or minimal impact due to pumping. Rejected model when it showed 1.5 foot drop due to 30% increase in pumping.
- DNR expert Tonkin testified model was "state of the art," and "a very good model."

DNR Moeckel on USGS model:

Q. Right now it's the most advanced scientifically available model for the northeast metro area and the DNR is choosing not to use it?

A. **Yes.**

Q. We can't control climate, can we?

A. **No.**

Q. We can control pumping, right?

A. **Yes.**

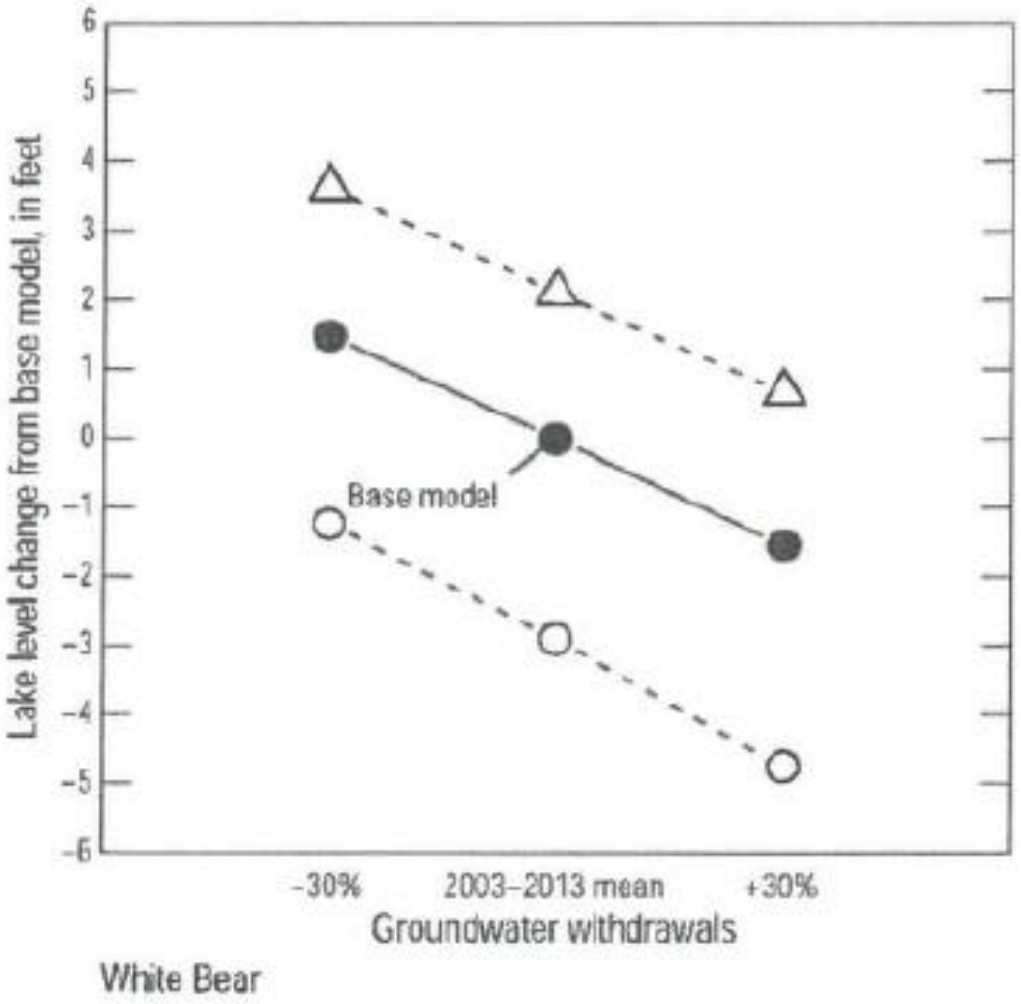
Q. It's the DNR's responsibility to control pumping?

A. **Yes.**

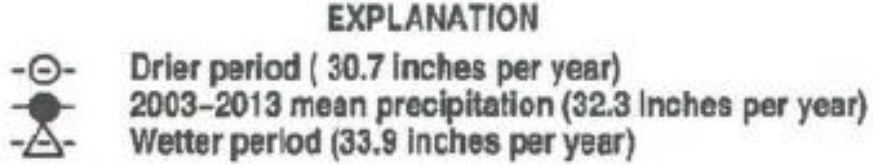
Q. It would be irresponsible not to?

A. **Yes.**

USGS, Chapter B



- 30% pumping increase = 1.5 ft. drop
- 30% increase plus low precip = 4.8 ft drop



District Court – DNR violated MERA

- DNR violates MERA by impairing (material adverse impact to) WBL and Prairie du Chien Aquifer.
- DNR violates MERA by violating multiple laws.
  - Draining WBL without following drainage law.
  - Issuing permits impacting surface water w/o following law.
  - Failing to follow law when surface water is impacted. No contingency plan, etc.
  - Approving GW appropriations when claiming to not have sufficient data.
- DNR violates public trust by taking away lakebed and impact public use of lake.

District Court ordered . . .

- No new permits in region.
- Review/revise all permits in region.
- Consider the cumulative impact of all pumping in 5 mile area to see if sustainable.
- Set pumping limits in 5 mile area.
- Work with Metropolitan Council on conservation.
- **Residential irrigation ban when lake below 923.5.**
- **Require a contingency plan for moving to surface water including schedule for planning, funding, construction, conversion to SW.**

Not so fast….

- MN legislature passed a law specifically addressing this case.
- New law stopped enforcement of order as it affects third parties.
  - DNR had to keep going in its internal review
  - No change in behavior for third parties.

Any reports on WBL? Lots.

1998

WHITE BEAR LAKE

LAKE-GROUND WATER INTERACTION STUDY

at White Bear Lake, Minnesota

WHITE BEAR LAKE

Minnesota DNR Waters

DNR ‘98 Study

- “Lake fluctuations are strongly correlated to aquifer fluctuations.” TX 2-11

- “The key to ensuring that WBL levels can continue to at least periodically exceed elevation of 924 or 925 is contingent on ensuring GW levels do not permanently drop to levels similar to those resulting from the drought of the late 1980s.” TX 2-84

Evaluation of Groundwater and Surface-Water Interaction: Guidance for Resource Assessment

Twin Cities Metropolitan Area, Minnesota

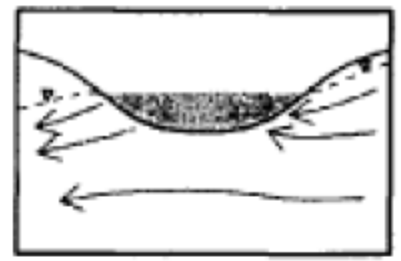
Prepared for
Metropolitan Council

June 2010

TX 25

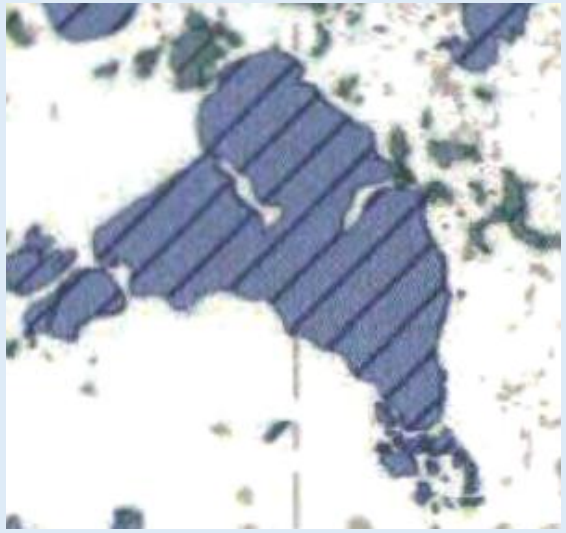
Met Council 2010 Study

- Groundwater-Surface Water Interaction Type for White Bear Lake

Flow-through lake/wetland	Groundwater flow both into and out of lake/ wetland		Connected to groundwater, surface water elevation above or equal to regional water table

TX 25-17

DNR calls WBL connected, vulnerable



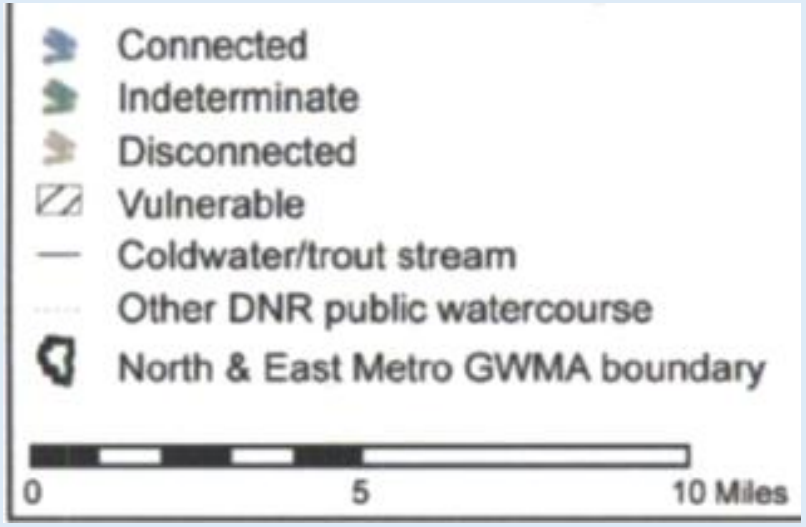
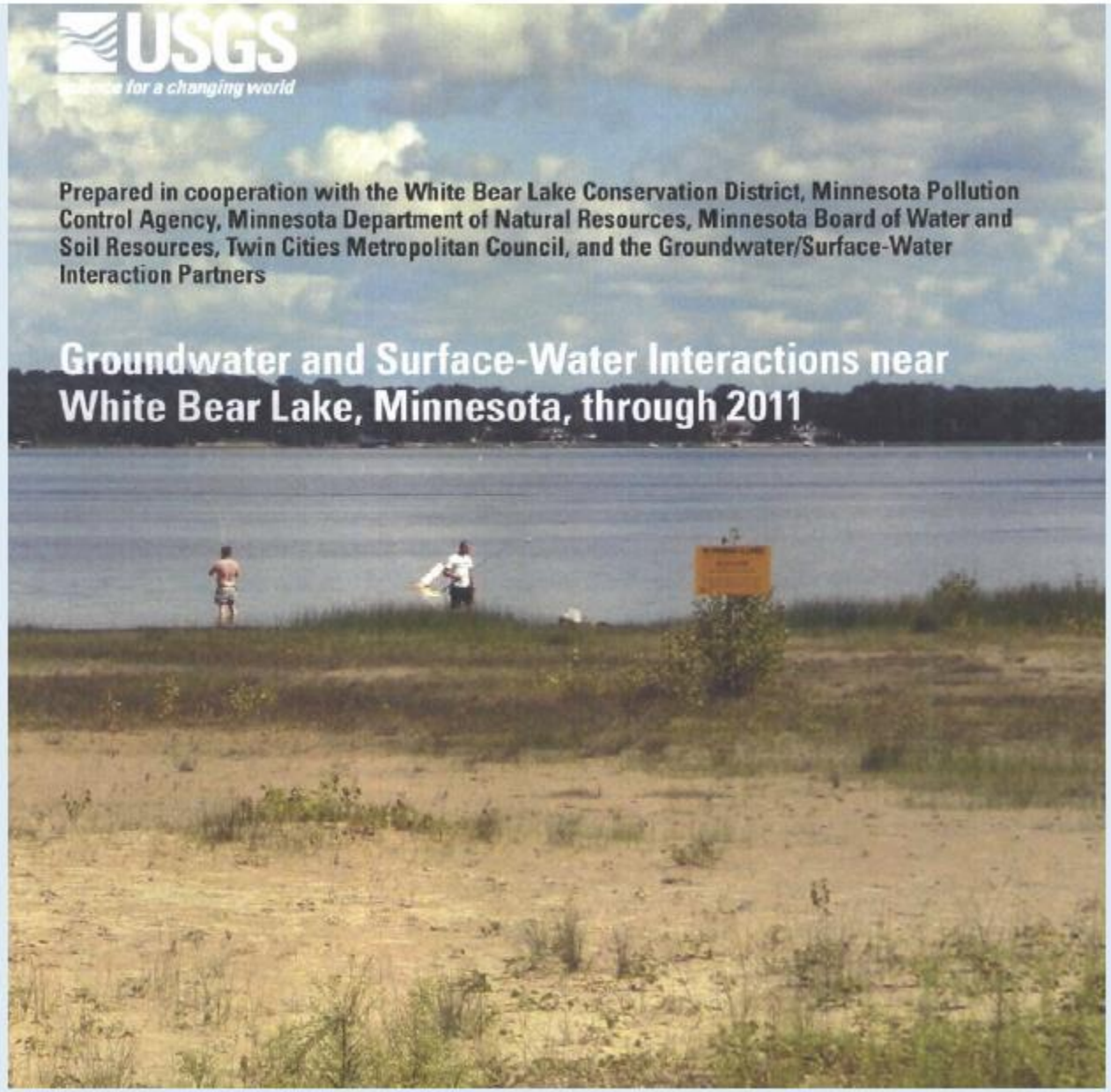
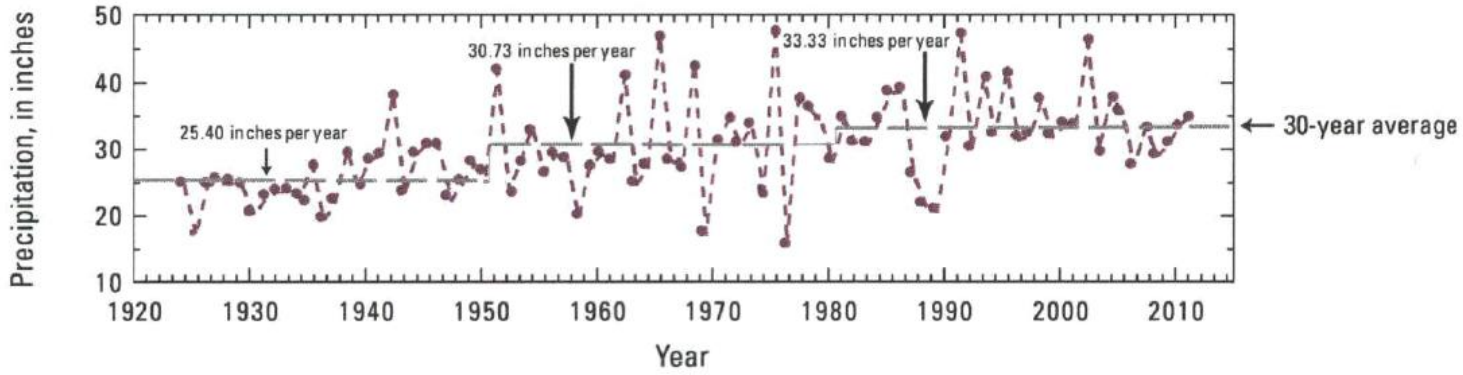


Figure 2-9 Lake and wetland connection to the regional groundwater system Classification by Barr for Metropolitan Council (2010)

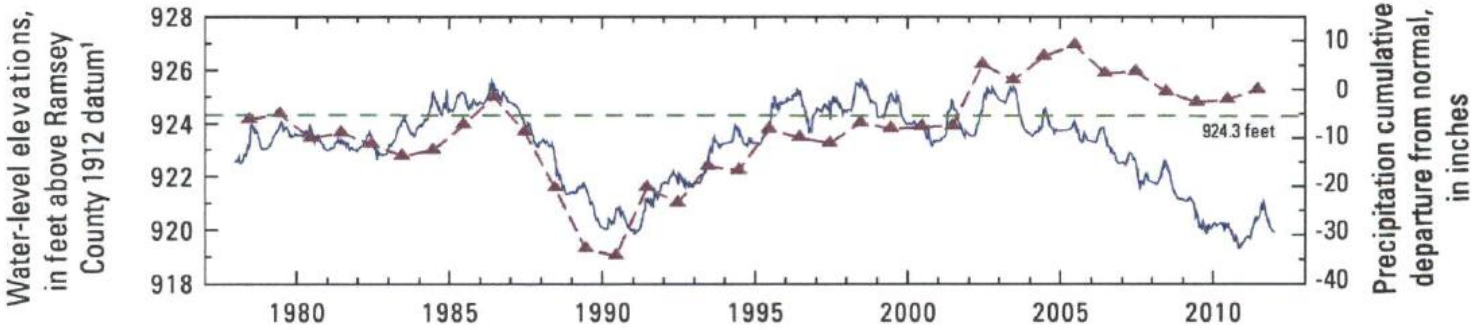

USGS
science for a changing world
Prepared in cooperation with the White Bear Lake Conservation District, Minnesota Pollution Control Agency, Minnesota Department of Natural Resources, Minnesota Board of Water and Soil Resources, Twin Cities Metropolitan Council, and the Groundwater/Surface-Water Interaction Partners
Groundwater and Surface-Water Interactions near White Bear Lake, Minnesota, through 2011

TX12A

B. Annual precipitation near White Bear Lake, 1924–2011

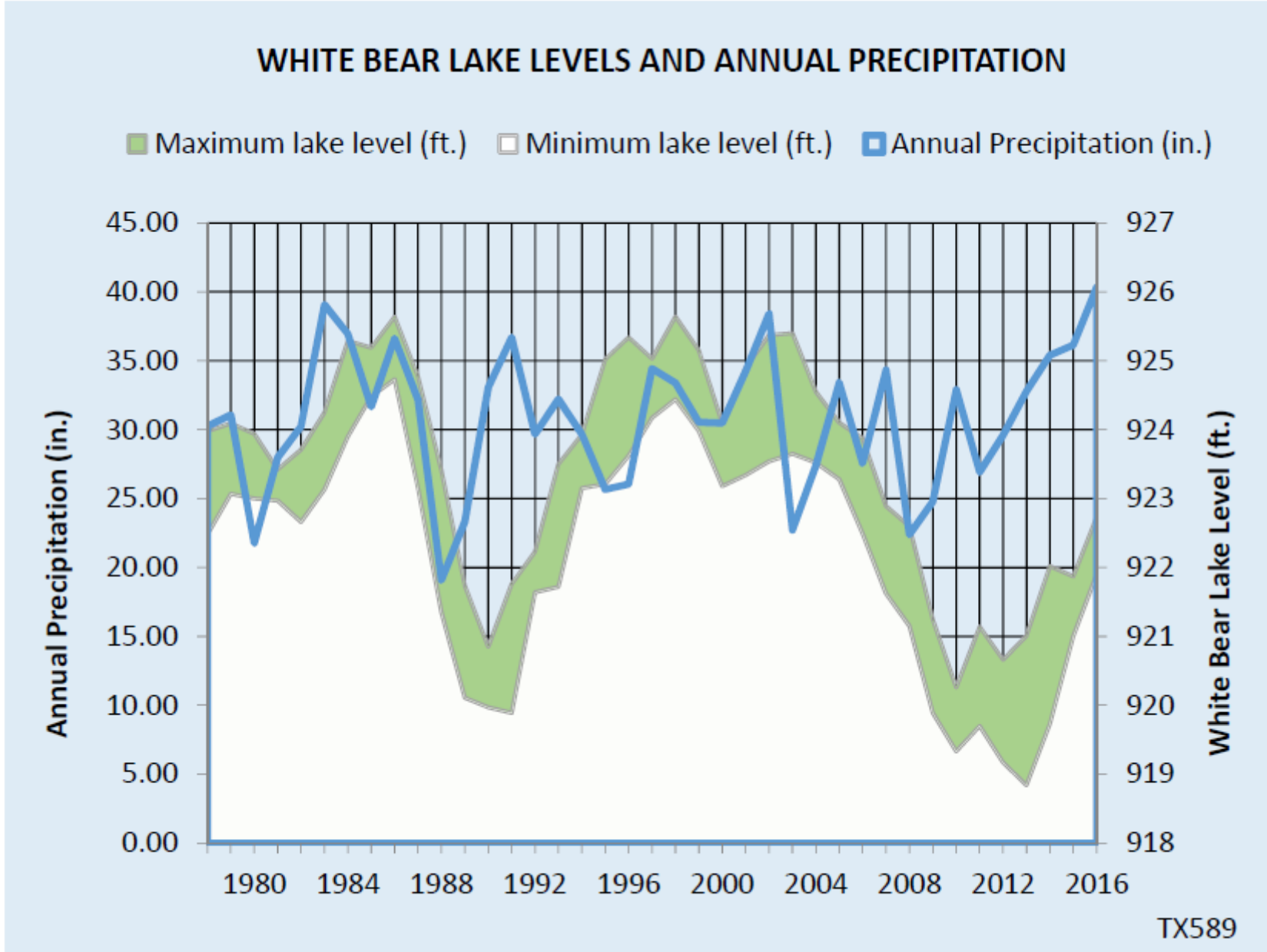


C. Water-level elevations for White Bear Lake, 1978–2011

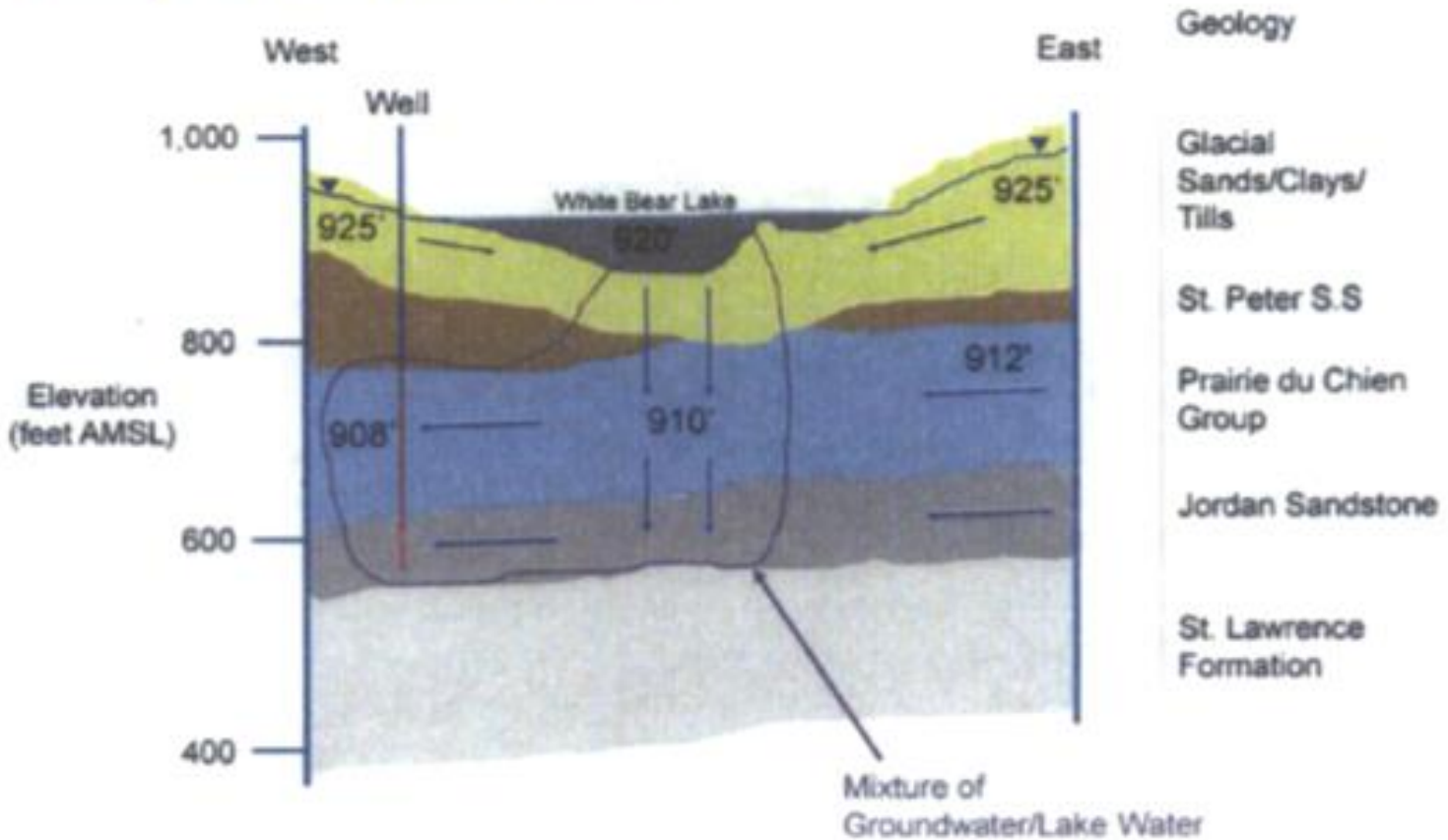


- 1977: Groundwater pumping for augmentation ends
- 1987-91: Drought
- 1991-95: Recovery
- 2003: WBL level divergence from precipitation

TX 12A-015


WHITE BEAR LAKE LEVELS AND ANNUAL PRECIPITATION
Maximum lake level (ft.)
Minimum lake level (ft.)
Annual Precipitation (in.)
Annual Precipitation (in.)
White Bear Lake Level (ft.)
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
927
926
925
924
923
922
921
920
919
918
1980
1984
1988
1992
1996
2000
2004
2008
2012
2016
TX589

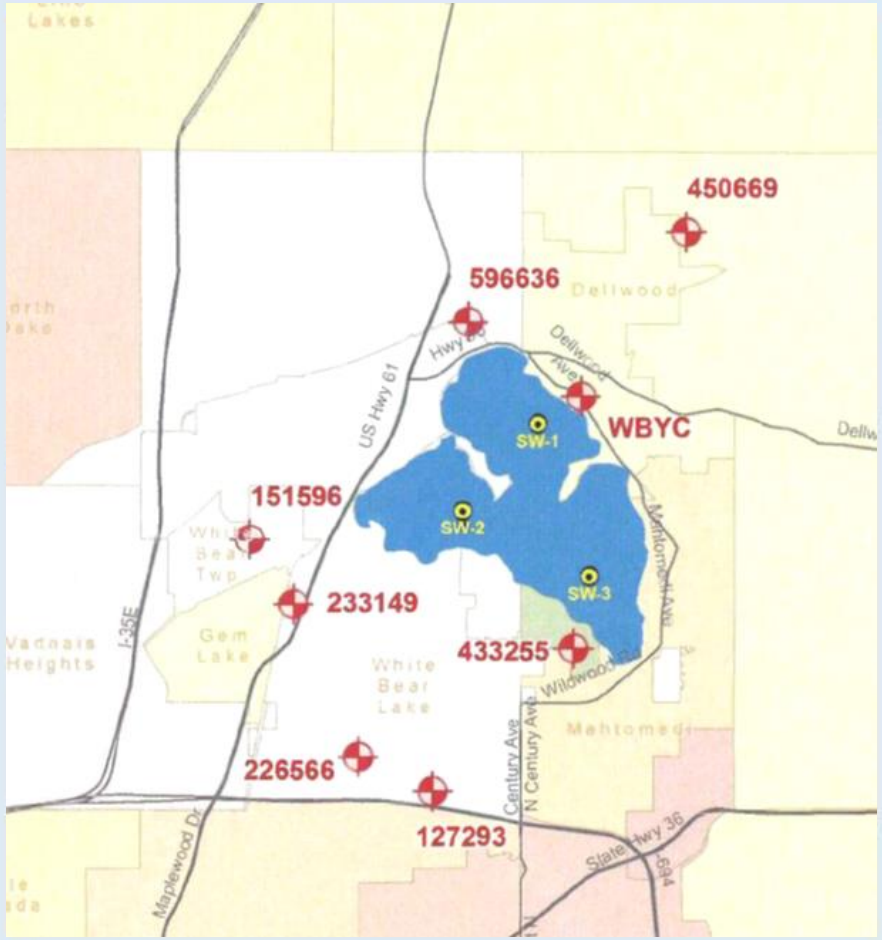
Lake Water Interaction with Groundwater/Wells -
Example: White Bear Lake



(modified from Mossler and Bloomgren, 1990)

TX 33-31

Water Chemistry



- Collected samples from locations on **Fig. 11**
- SW samples – deepest part of each bay
- GW samples – from high capacity wells in PdCJ aquifer.
- Analyzed by U of M
- **Lake water in wells, southwest of lake**

TX535

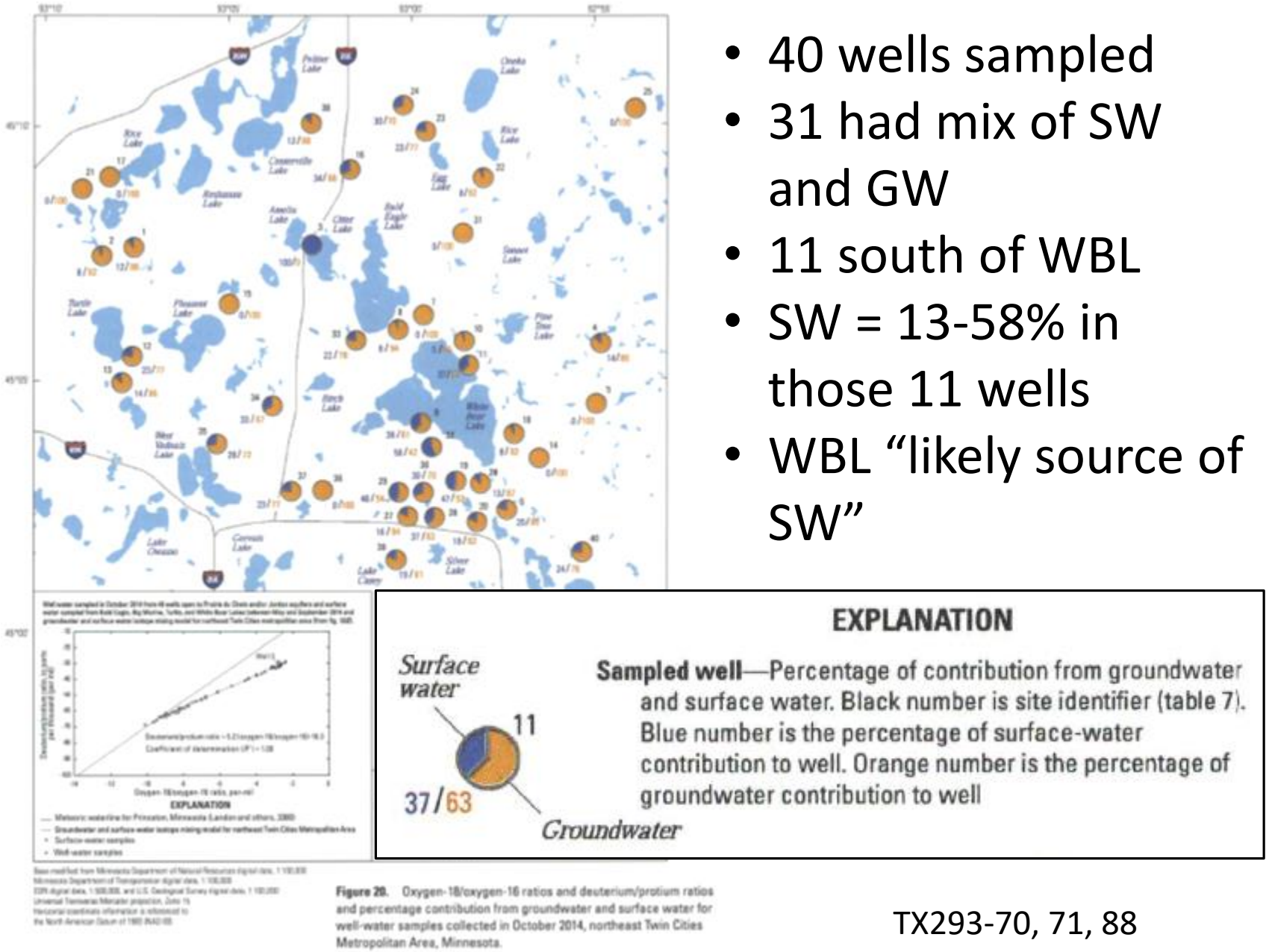


Figure 20. Oxygen-18/oxygen-16 ratios and deuterium/protium ratios and percentage contribution from groundwater and surface water for well-water samples collected in October 2014, northeast Twin Cities Metropolitan Area, Minnesota.

- 40 wells sampled
- 31 had mix of SW and GW
- 11 south of WBL
- SW = 13-58% in those 11 wells
- WBL “likely source of SW”

TX293-70, 71, 88

WBL - Seepage Meter, In-Lake Piezometers

- Why? Monitoring water flow between lake and lower aquifer
- In-lake piezometers – measured water levels in 2014
- Seepage meters – measure flow – March/August 2014

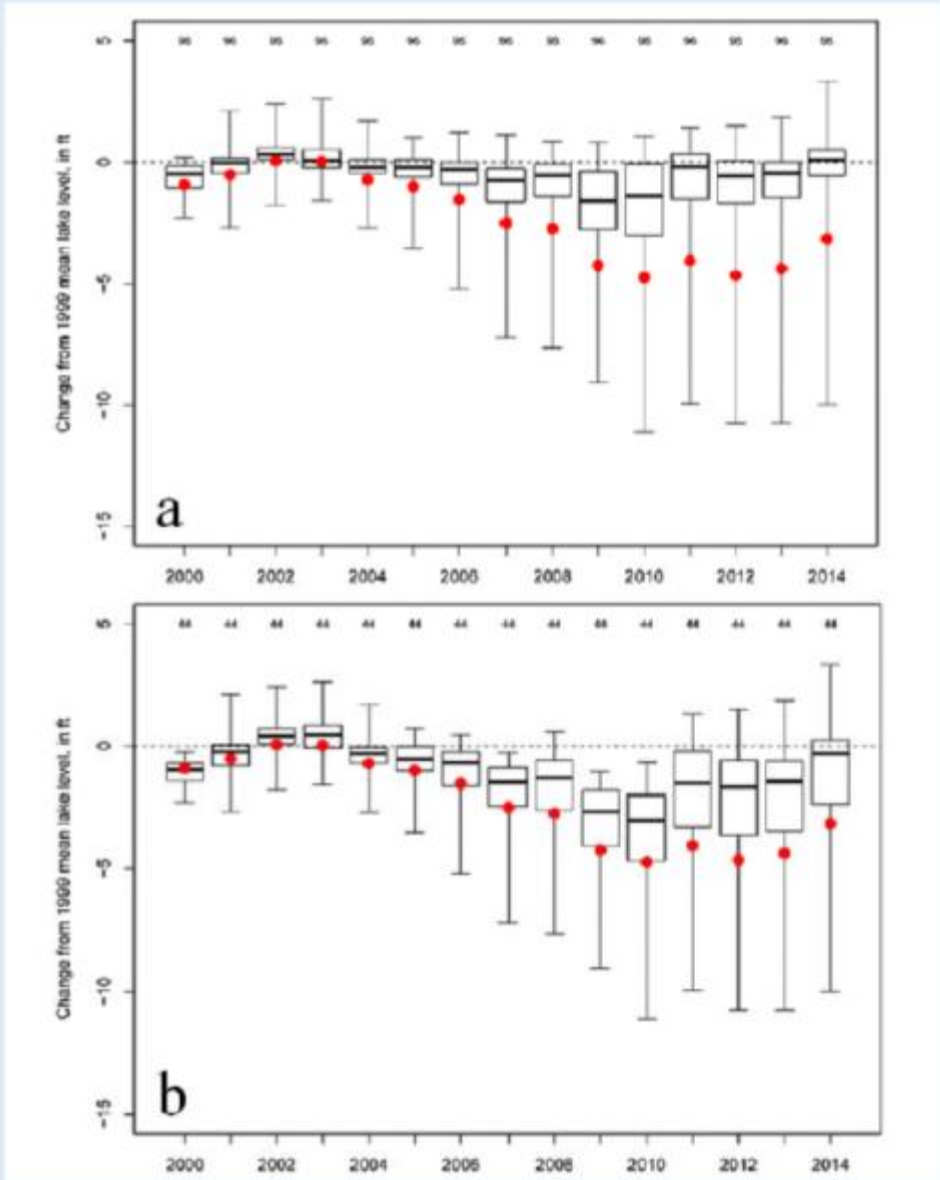
Seepage Meters

In-lake piezometers

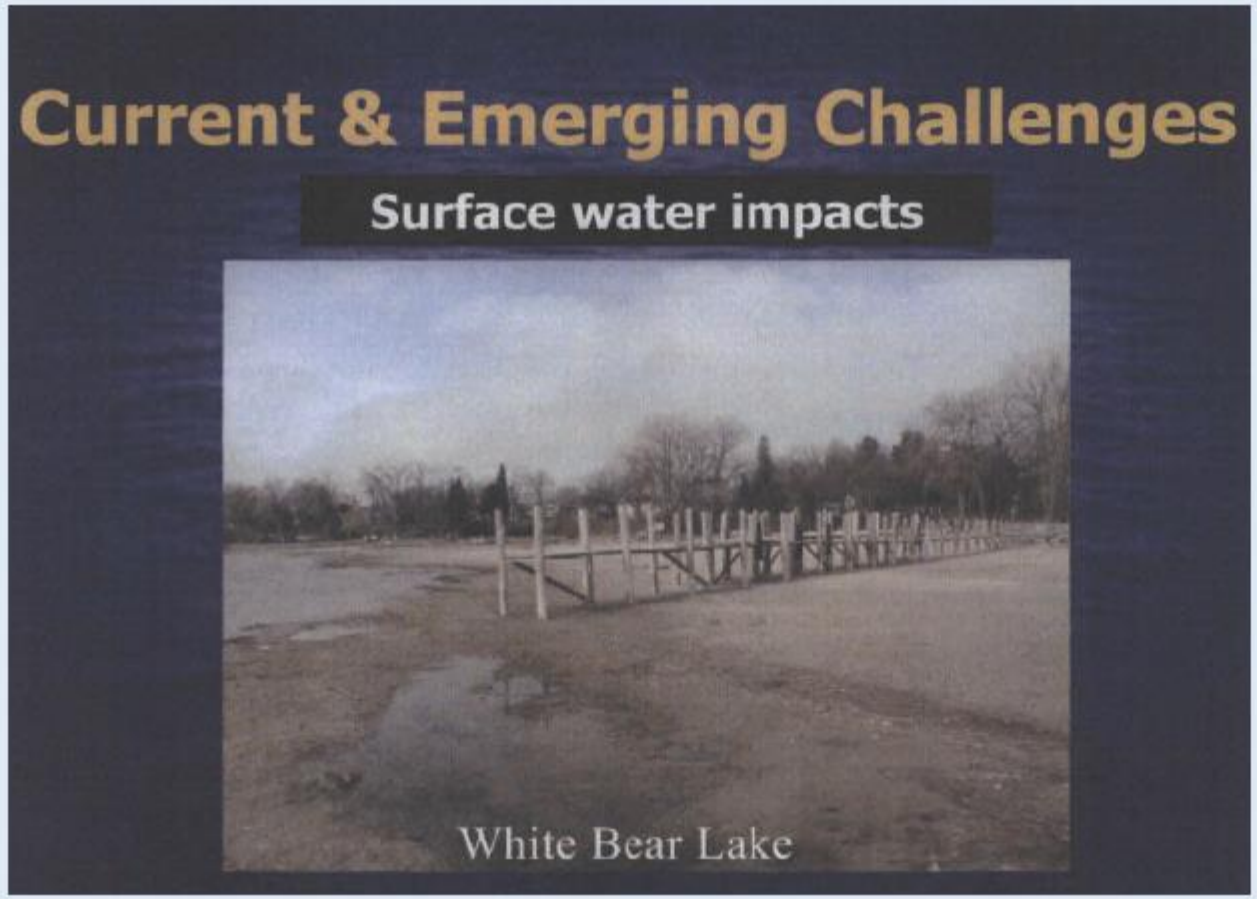
USGS

WHITE BEAR LAKE LEVELS COMPARED TO OTHER LAKES IN THE AREA (*96 lakes*)
(TX293-49) (USGS)

WHITE BEAR LAKE LEVELS COMPARED TO OTHER *CLOSED BASIN* LAKES IN THE AREA.
(TX2098-17)
(Tonkin).



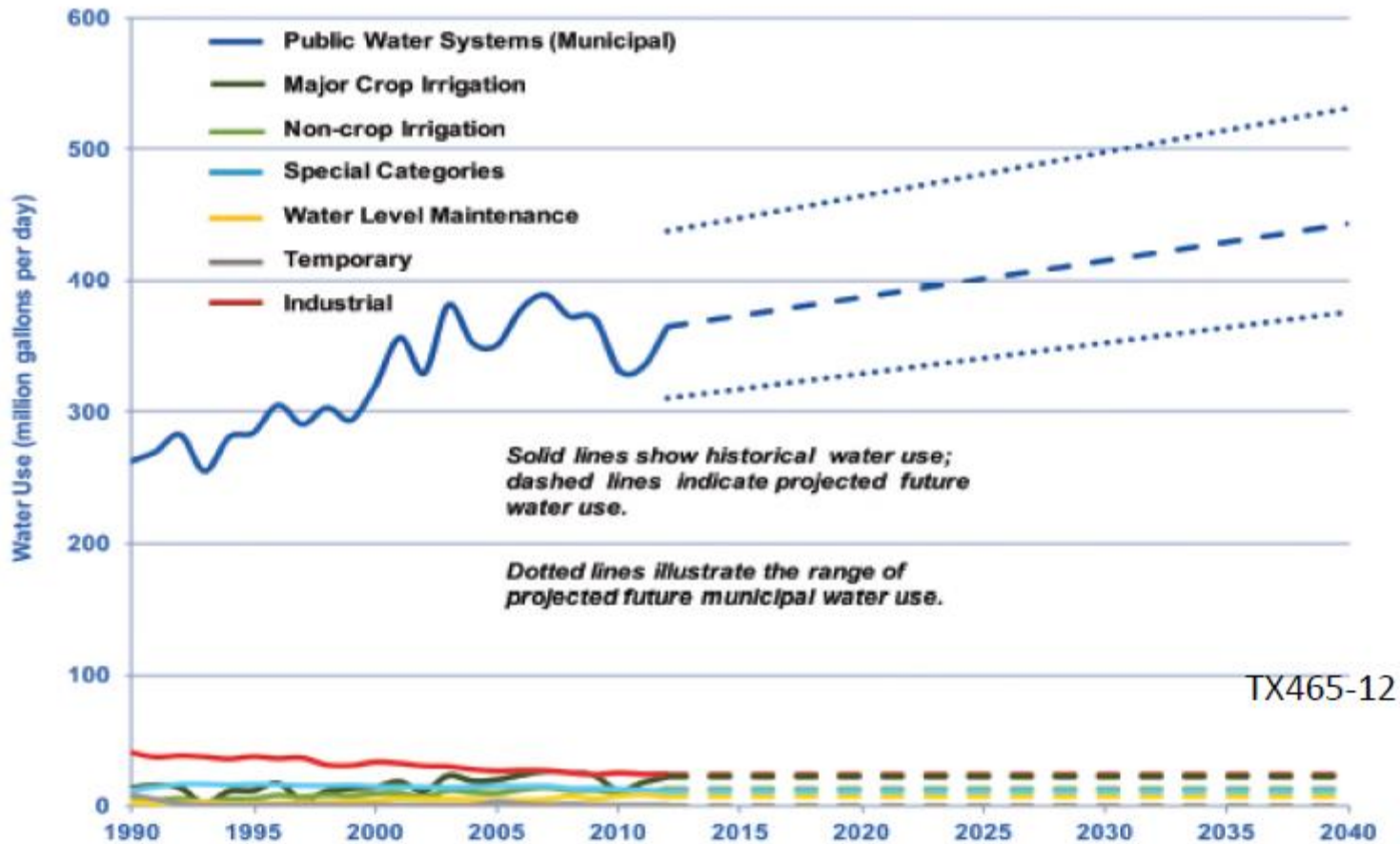
DNR's view of Surface Water Impacts



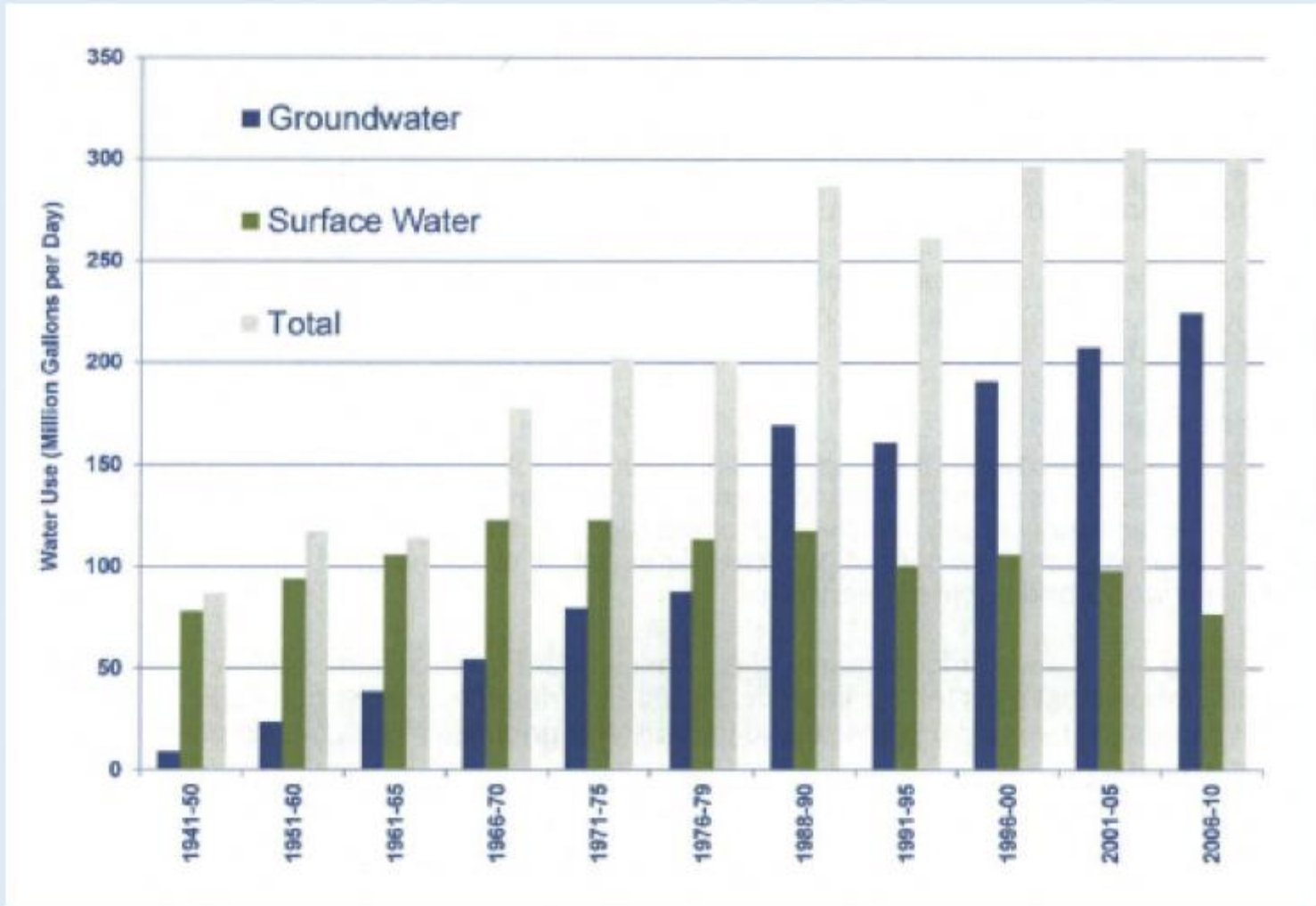
TX159-014

What’s coming in future?

PROJECTED GROUNDWATER USE – TWIN CITIES METRO AREA



TX465-12


Groundwater
Surface Water
Total
Water Use (Million Gallons per Day)
350
300
250
200
150
100
50
0
1941-50
1951-60
1961-65
1966-70
1971-75
1976-79
1980-90
1991-95
1996-00
2001-05
2006-10

TX320-028

North & East Metro Groundwater Management Area Plan

November 2015

"...where trends suggest groundwater use might be unsustainable." TX306-3

"Business as usual" is no longer an option.

TX 306-009

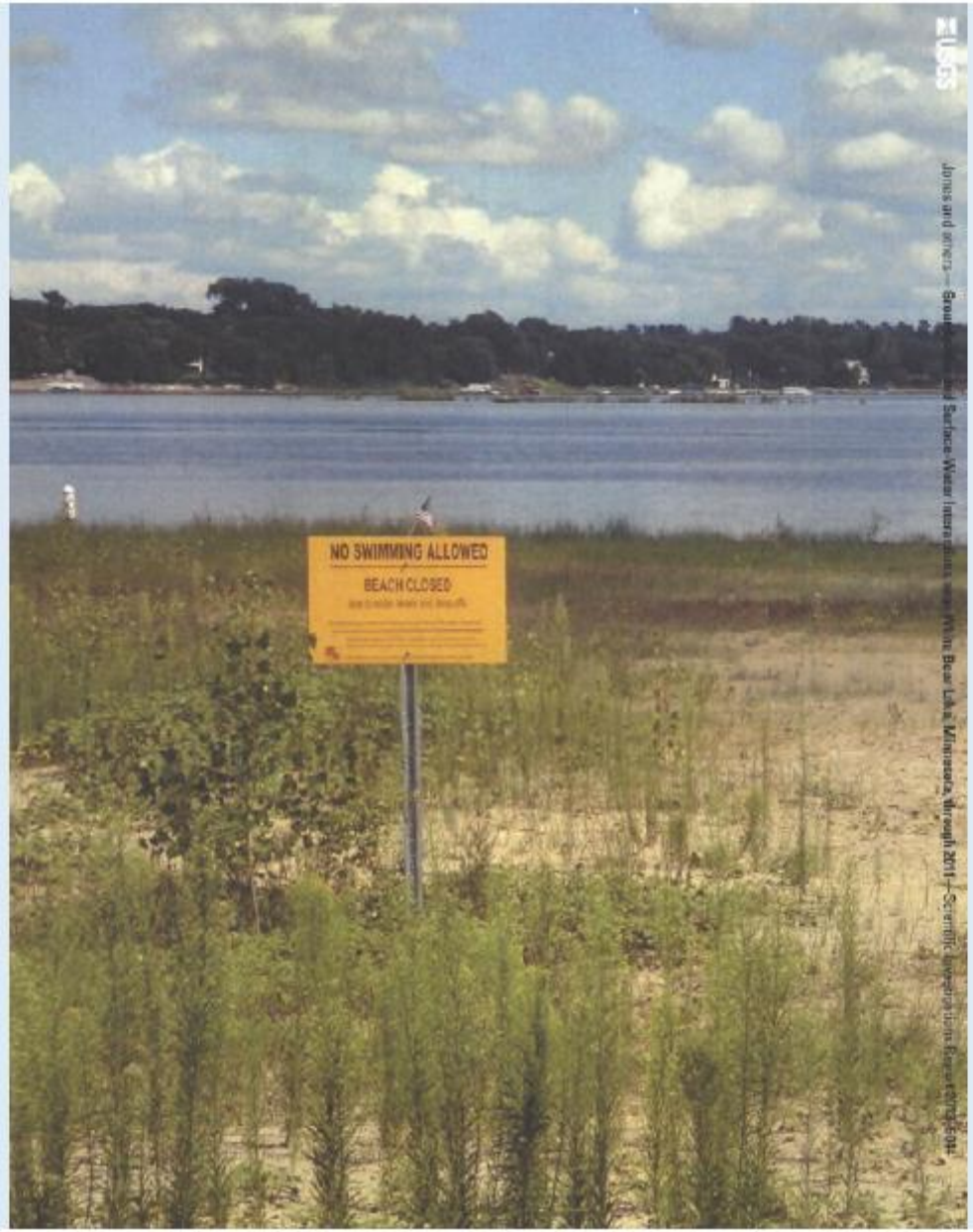
Ecosystems and Surface Waters

Groundwater pumping rates may result in negative impacts to some surface waters, recreational and other uses of those resources, and their ecological communities. **TX 306-053**

MNDNR

EXHIBIT
306

TX306-001



TX12A-086