

Limnological Characteristics of Glenmore Reservoir, Calgary, Alberta



**ALMS 18th Annual Workshop
Urban Lakes and Wetlands**

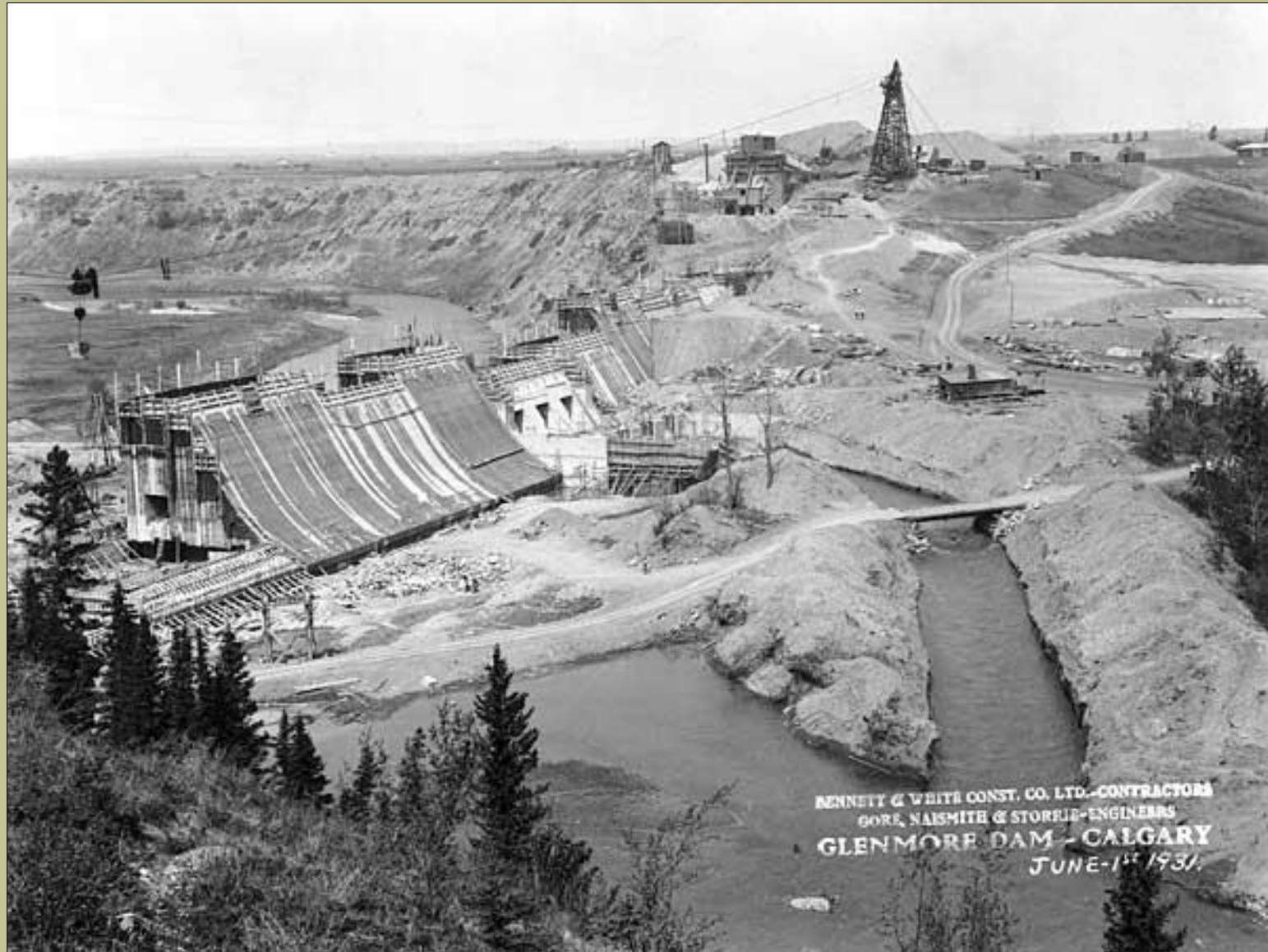
September 30, 2011

**Jamieson Dixon, M.Sc., P. Biol.
Senior Watershed Biologist**

Calgary Municipal Water Supply



Glenmore Water Treatment Plant



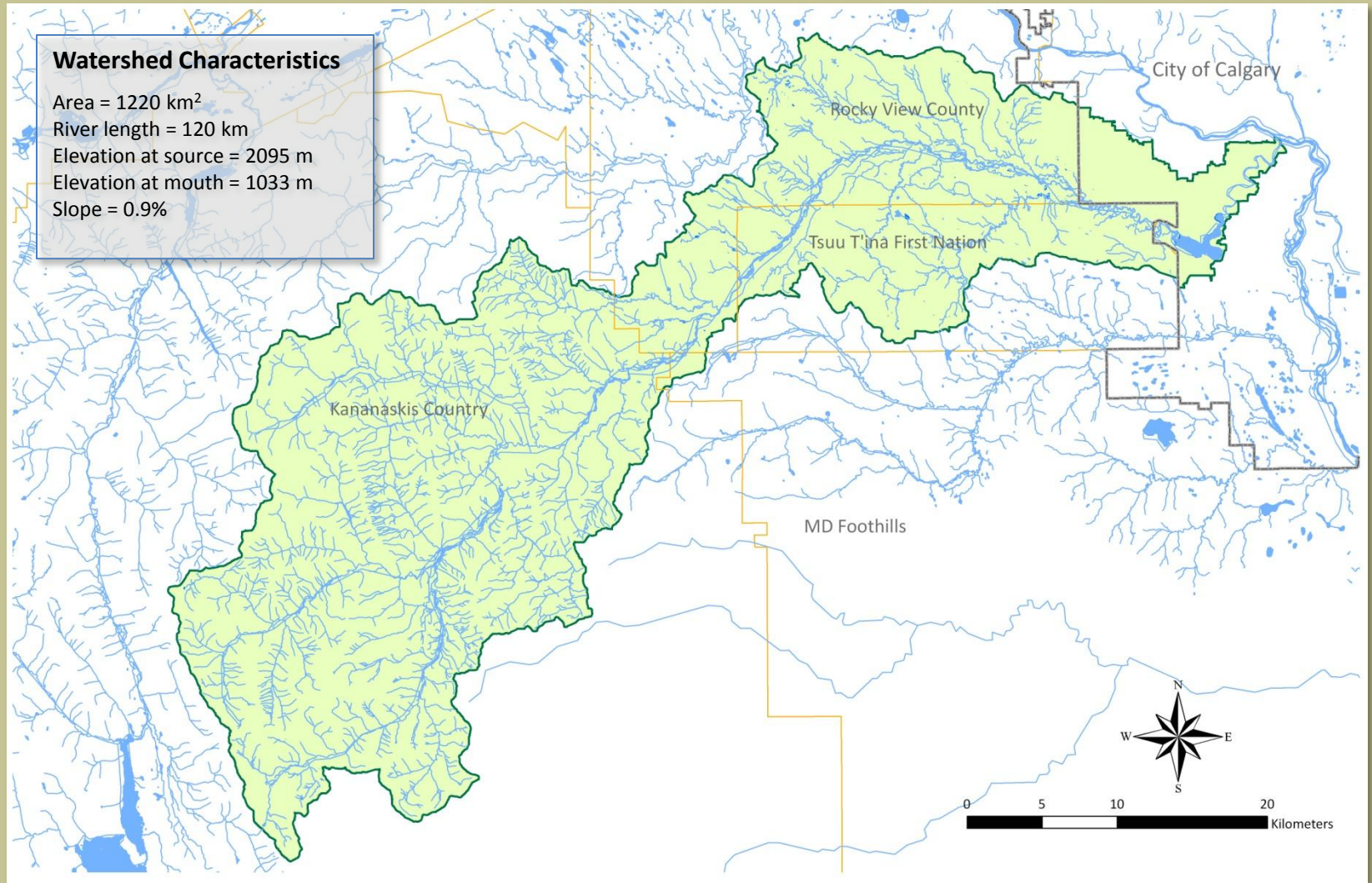
Glenmore Reservoir



Glenmore Reservoir

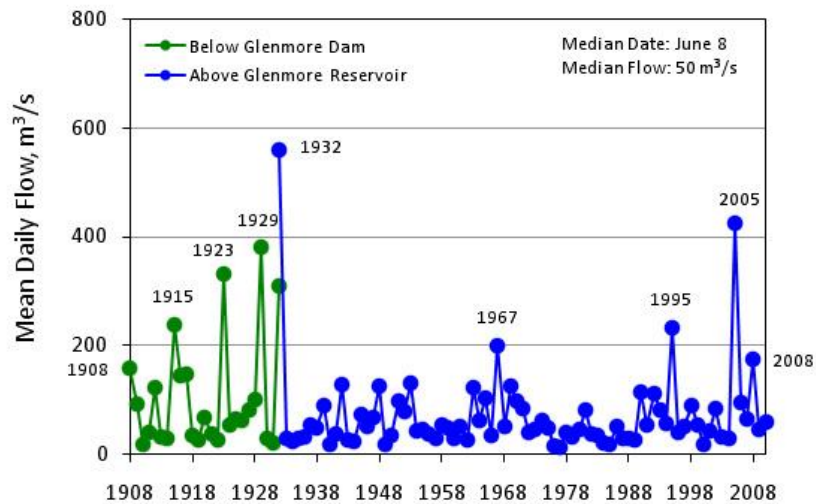
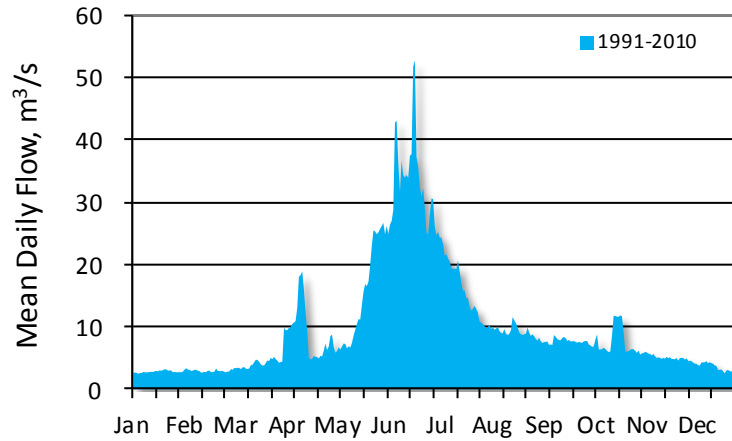


Elbow River Watershed

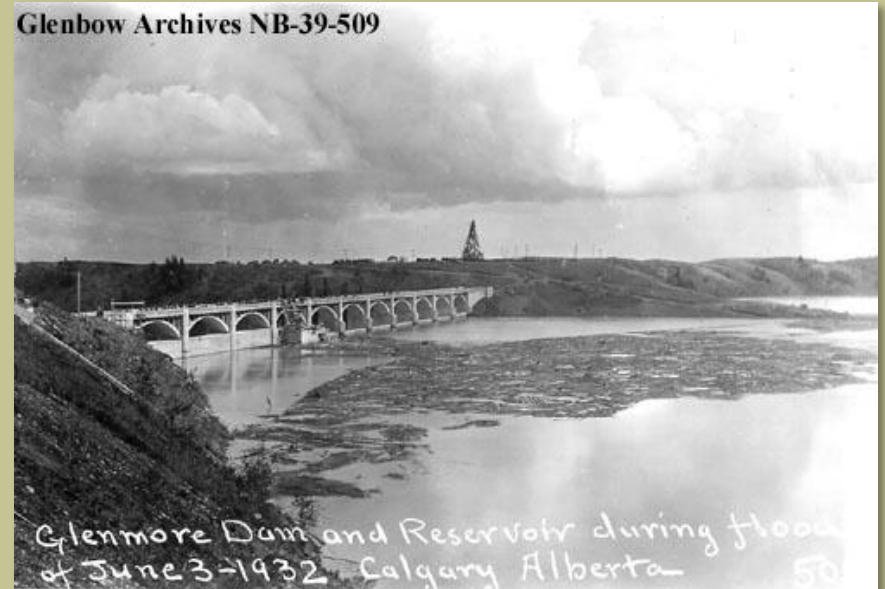
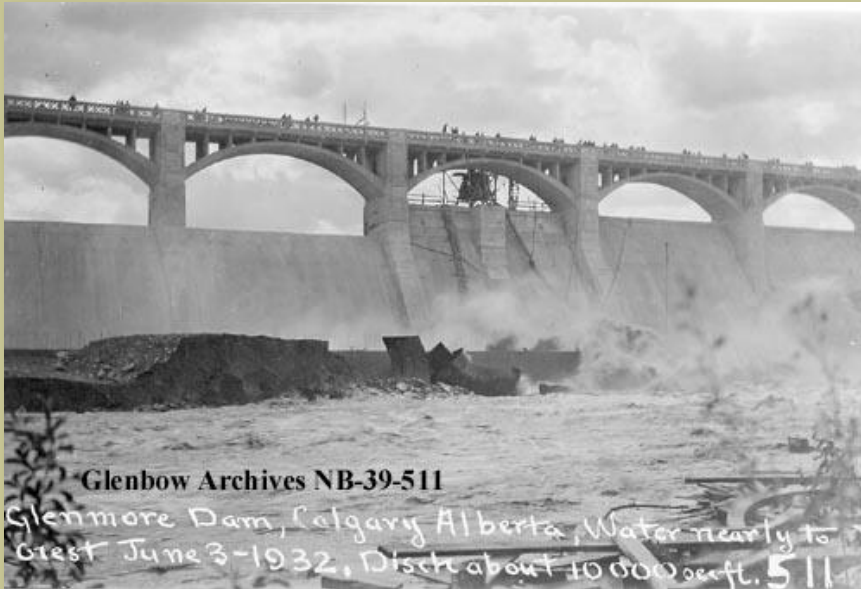


Elbow River Hydrology

Elbow River above Glenmore Reservoir



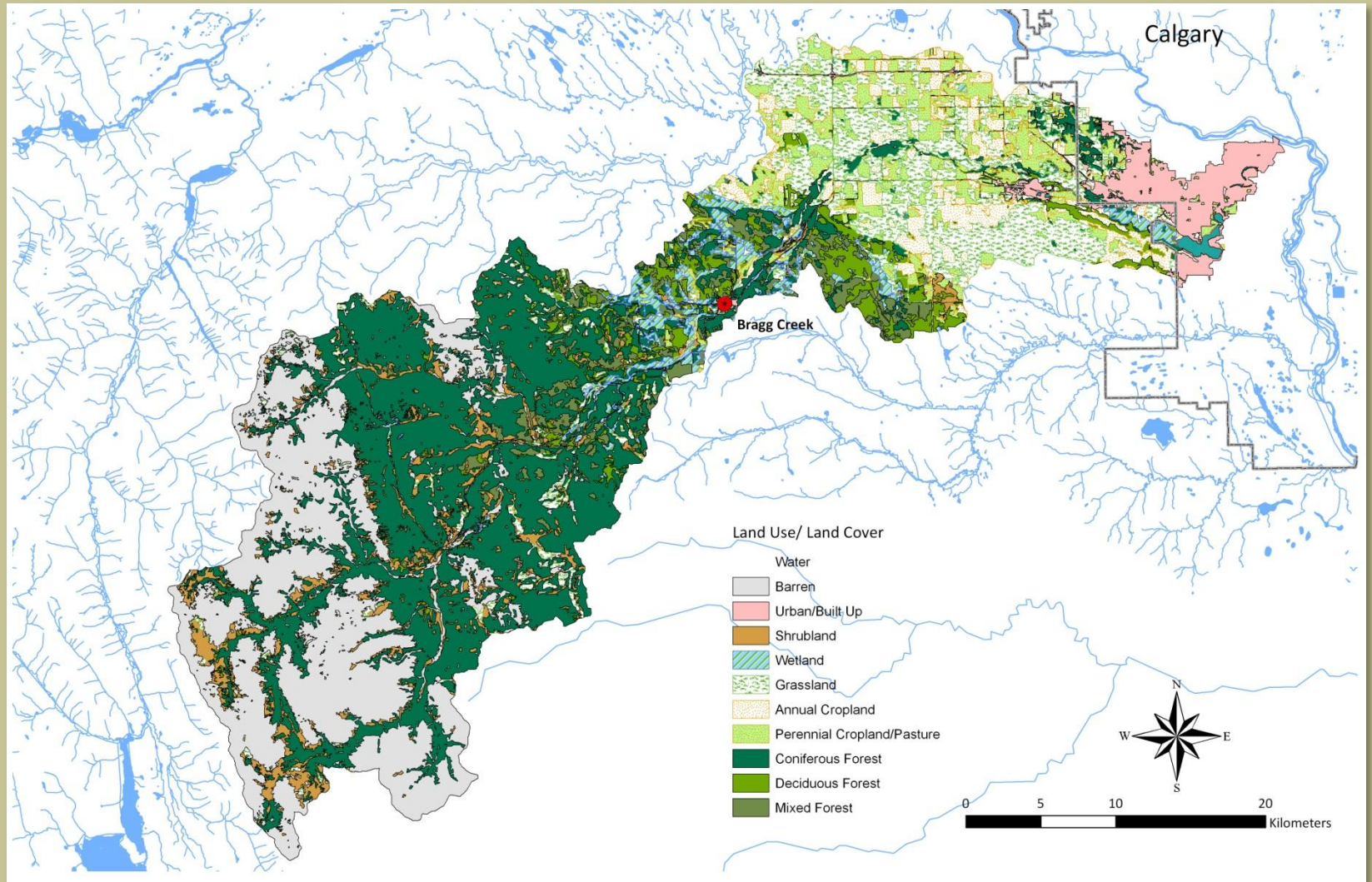
1932



2005



Elbow River Watershed



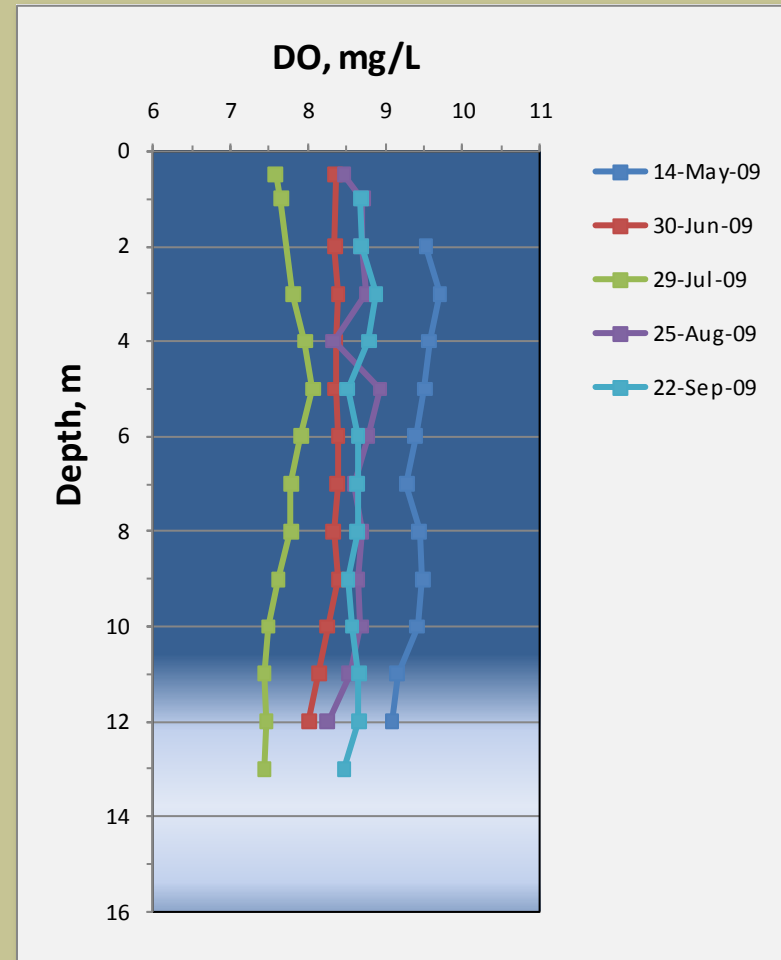
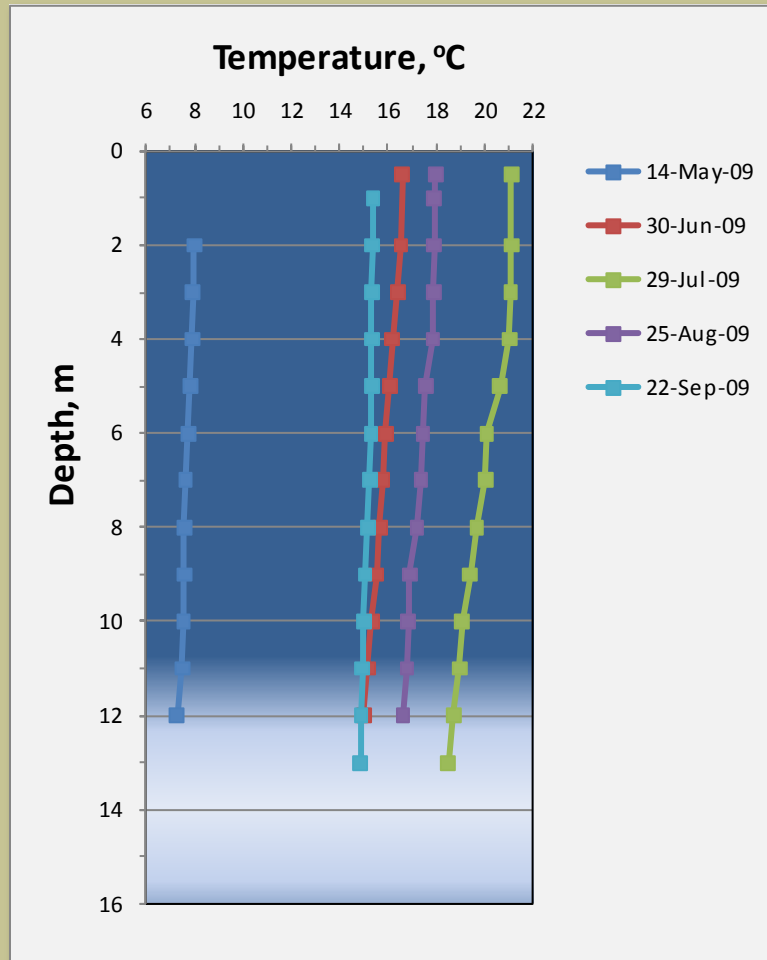
Glenmore Reservoir



Glenmore Reservoir Recreation



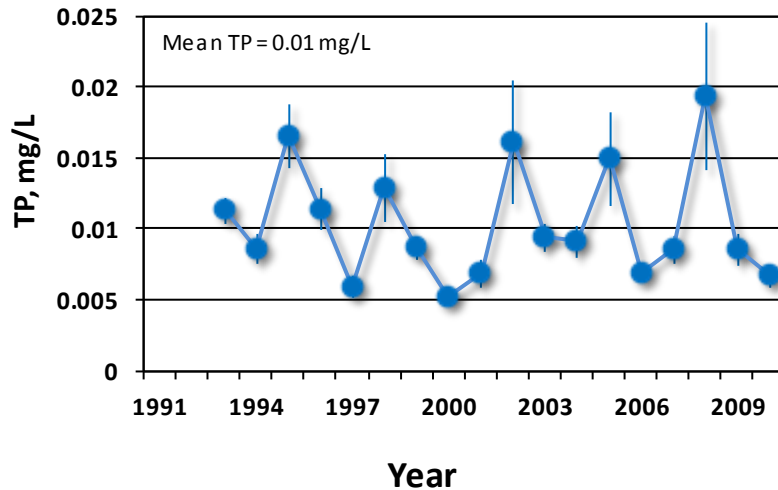
Glenmore Reservoir Temp/DO Profile



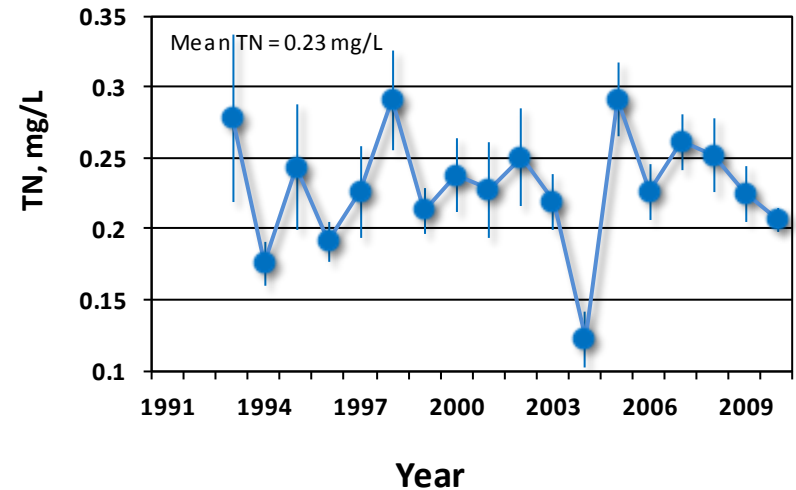
Glenmore Reservoir Water Quality

(summer means \pm SE)

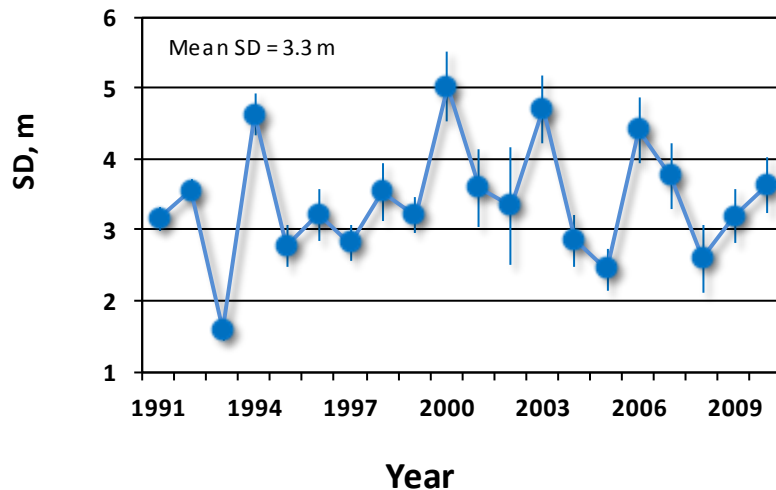
Total Phosphorus



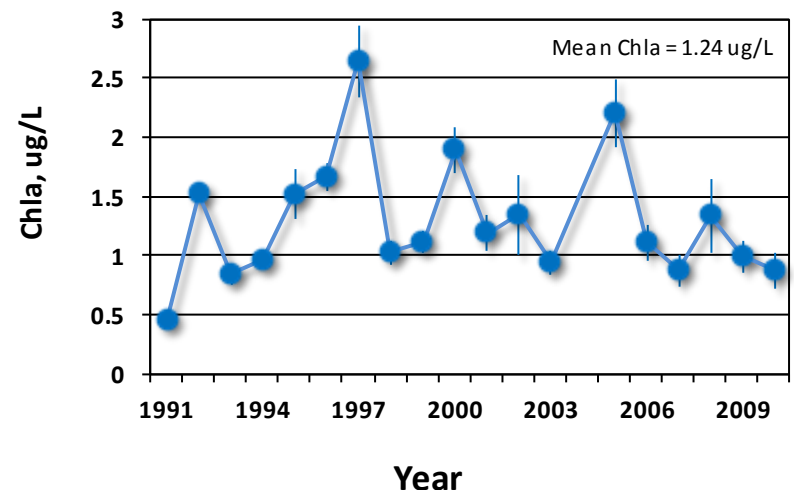
Total Nitrogen



Secchi Depth

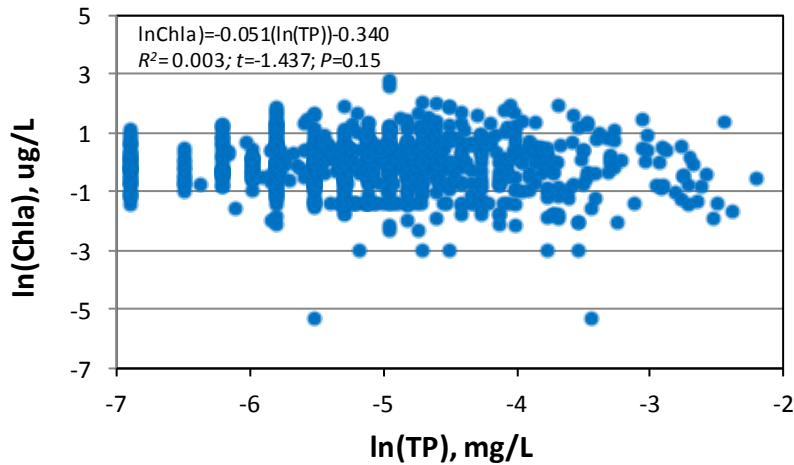


Chlorophyll a

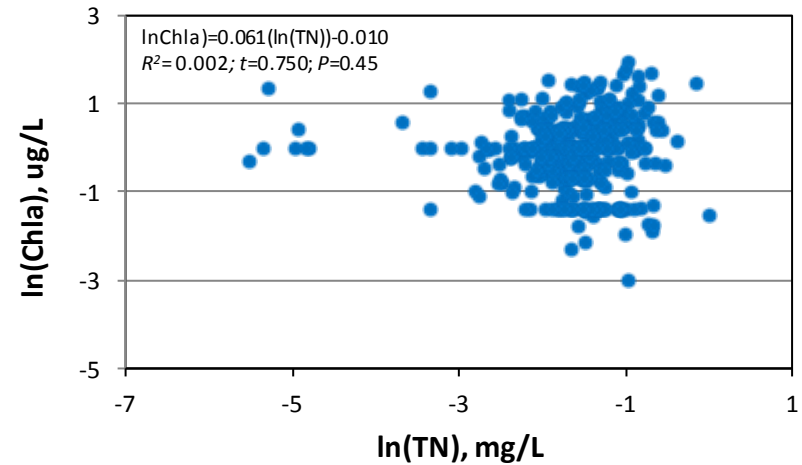


Glenmore Reservoir Chlorophyll *a* Relationships

Chlorophyll *a*, Total Phosphorus



Chlorophyll *a*, Total Nitrogen

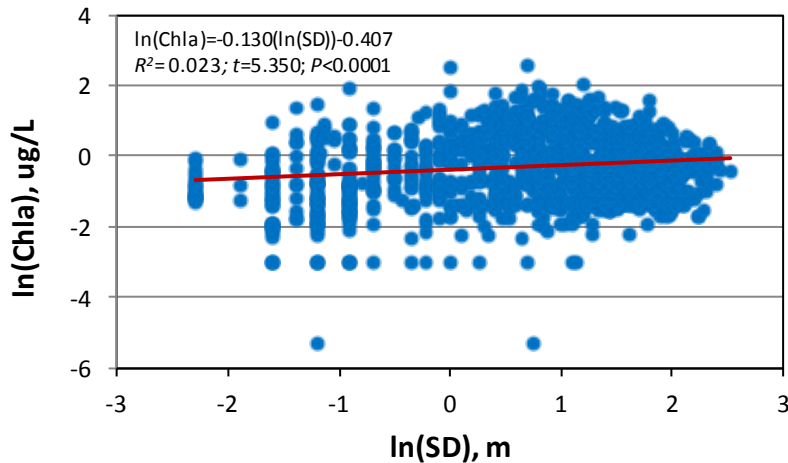


Chlorophyll *a*

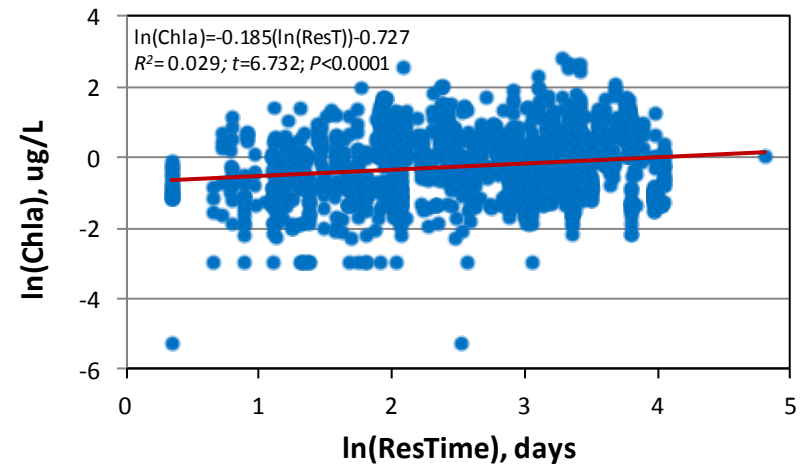
- No significant correlation with total phosphorus $P=0.15$
- No significant correlation with total nitrogen $P=0.45$

Glenmore Reservoir Chlorophyll *a* Relationships

Chlorophyll *a*, Secchi Depth



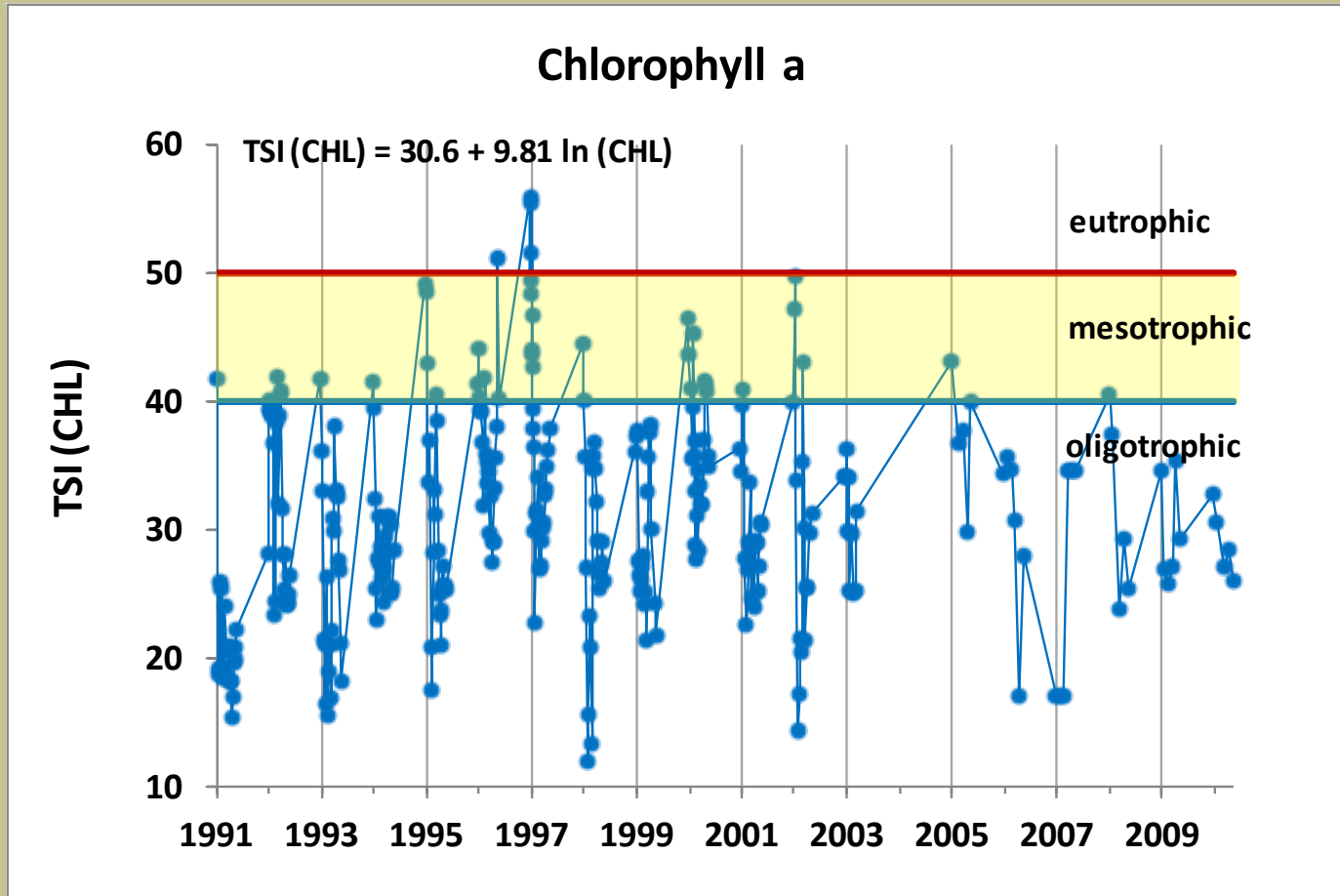
Chlorophyll *a*, Reservoir Residence Time



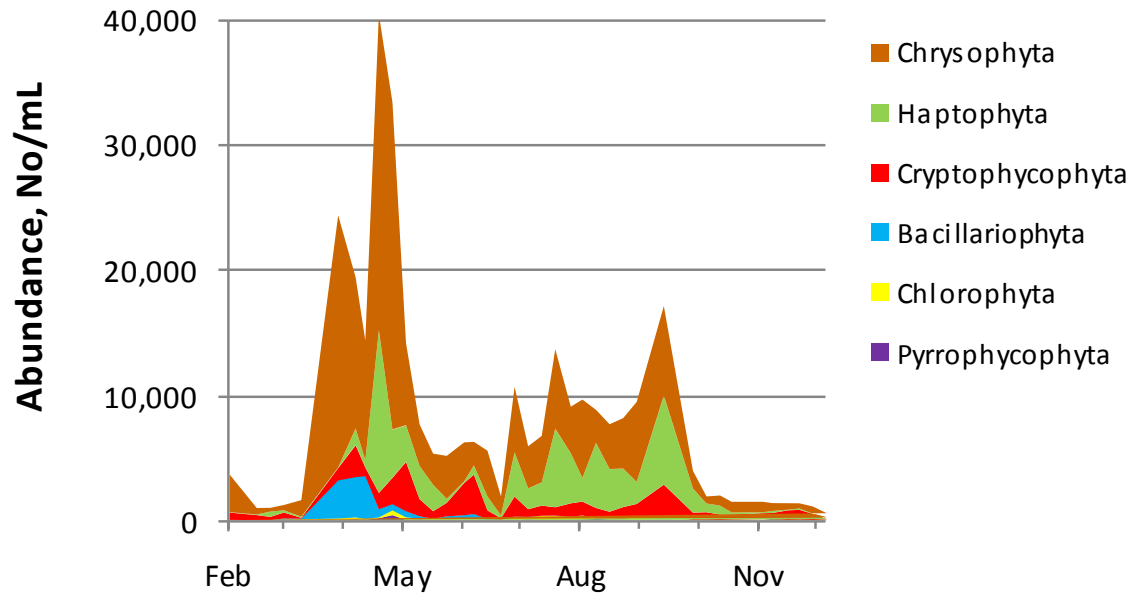
Chlorophyll *a*

- Significant positive correlation with secchi depth $P < 0.0001$
- Significant positive correlation with reservoir residence time $P < 0.0001$

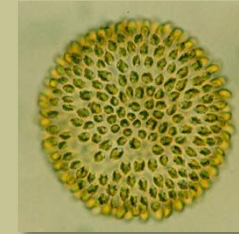
Trophic State Index



Glenmore Reservoir Phytoplankton



Chrysophyta



Uroglena

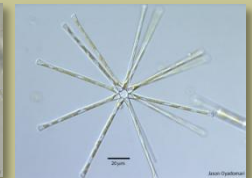


Dinobryon

Bacillariophyta



Stephanodiscus



Asterionella

Cryptophycophyta



Cryptomonas

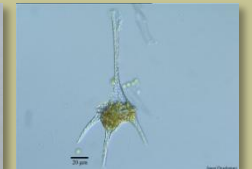


Rhodomonas

Haptophyta



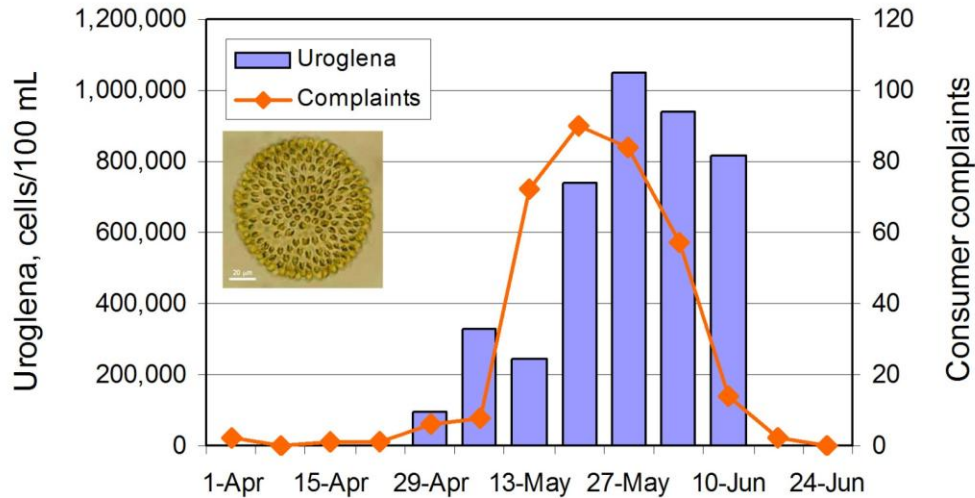
Chrysochromulina



Ceratium

Taste and Odour

Glenmore Reservoir 1992



Stinky dam water OK to drink

Glenmore Reservoir home to algae outbreak

SCOTT CROWSON
AND JEREMY HAINSWORTH
CALGARY HERALD

An algae outbreak in the Glenmore Reservoir is fouling the odour and taste of water in south Calgary, but city officials say it's safe to drink. "It poses no health threat," said Allyn Humber, acting general manager of waterworks.

Reports started flowing in Saturday from residents complaining of a metallic taste and fishy odour in their drinking water. Waterworks is monitoring the devel-

opment of the algae bloom and is adjusting the treatment process accordingly. Chlorine is added in the treatment process to destroy micro-organisms to make the water safe for consumption. "We did a number of tests on the water and it's perfectly safe to drink," said waterworks spokeswoman Pamela Reid. "In fact, it exceeds all Canadian drinking water guidelines."

This type of algae, *Uroglena americana*, is naturally occurring in lakes, ponds and reservoirs during warm weather. Unlike other algae, it's not a byproduct of agricultural practices, Reid said. "It's actually an indication of very clean water," she said.

Only the southern part of the city is affected because that's the area served by the Glenmore Water Treatment Plant. The source is the reservoir, created by damming the Elbow River. This time of year the facility produces up to 400 million litres of potable water daily.

The Bearspaw plant in the north-west serves the rest of the city, drawing water from the Bow River.

Not much can be done about the fishy odour, although Reid suggested using a filter.

Meanwhile, Rockyview Hospital officials are reviewing outpatient and staff medical files this week to pinpoint what caused six staff members to complain of gastro-intestinal problems. It was initially thought drinking water was the cause, but the hospital's water has since been given a clean bill of health by the city.

After the E-coli water contamination in Walkerton, and reports from Rockyview Hospital, several city water companies say they're enjoying a number of new business. "Between that Ontario thing and general concern about water, it's definitely jumped," said Scott Urquhart of The Pure Water Guys. Business has doubled, he said.

Smelly water safe

Officials confirm presence of algae growth in Glenmore reservoir

By NOVA PIERSON
Calgary Sun

Reaching for a glass of cool, clean water could leave some thirsty Calgarians with a bitter taste in their mouths this summer.

As algae growth in the Glenmore reservoir has already met with complaints from sippers struck by a fishy or metallic taste to the stinky, but safe water.

"It's a pretty striking taste," said Dr. Ross Seider, Waterworks laboratory superintendent with the city after the algae growth was confirmed Monday.

While some don't taste it at all, others are more perceptive to it, noticing a strong fishy or metallic taste.

"It may be an annoyance, but there is also toxicity no health ramifications to it," said Seider, who said the taste doesn't bother him.

Seider said a similar growth of the algae — *Uroglena americana* — in 1992 resulted in

a larger bloom and serious taste problems. He said "the worry" is that this year's growth could bloom as big as that.

That growth was about 15 times the normal algae level before a rainstorm halted it. "It turned the reservoir a golden brown," said Waterworks biologist Jamie Dixon.

While water scientists haven't discovered how prevalent this one is, Dixon said it's believed to be two to three times higher than normal. *Uroglena* doesn't create large green masses, like other algae, but instead gathers

in pinhead-sized colonies.

The city has increased the amount of homes receiving water just from the Bearspaw treatment plant, but much of south Calgary is still stuck with the smelly water.

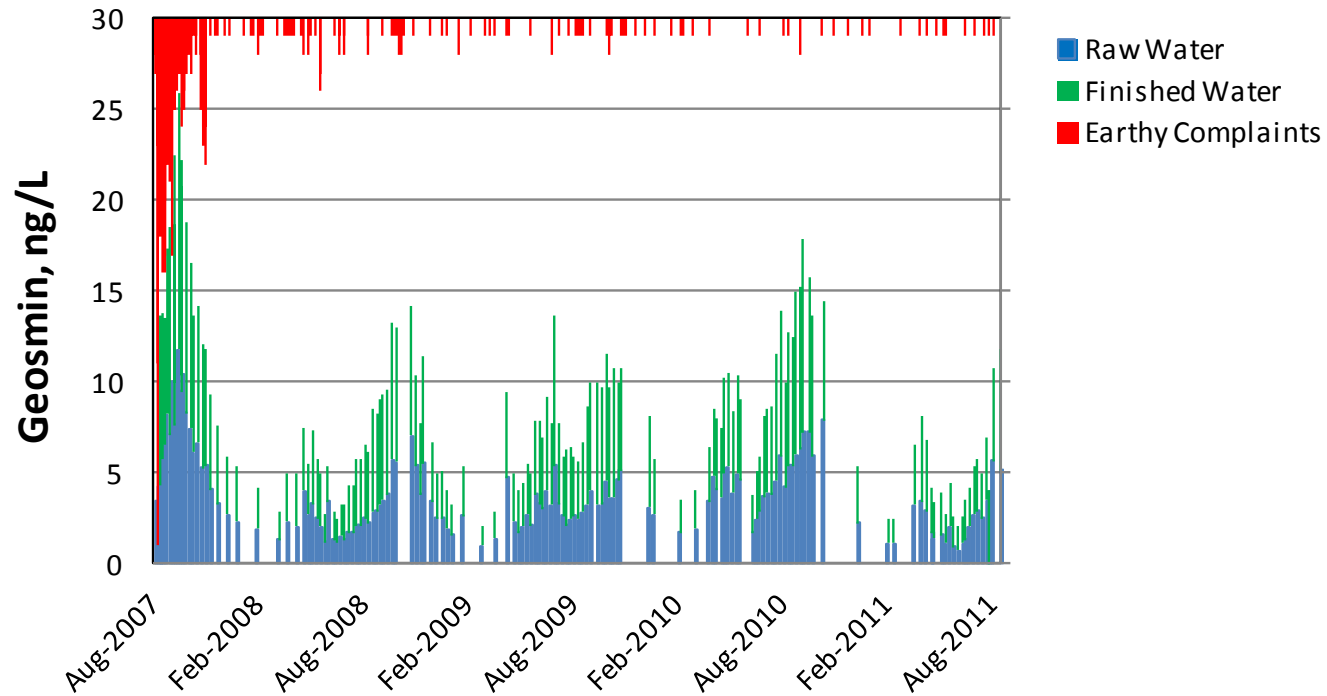
Instead of the normal 40% of Calgarians receiving Glenmore water, it has been dropped to 40% — most of the south.

Already several have phoned with complaints about the taste, which remains even after treatment kills the algae.

Reach Pearson at caweb@cal.suncor.com

Taste and Odour

Glenmore Water Treatment Plant



Thank you



Protecting what's precious.
Land. Air. Water.



THE CITY OF
CALGARY