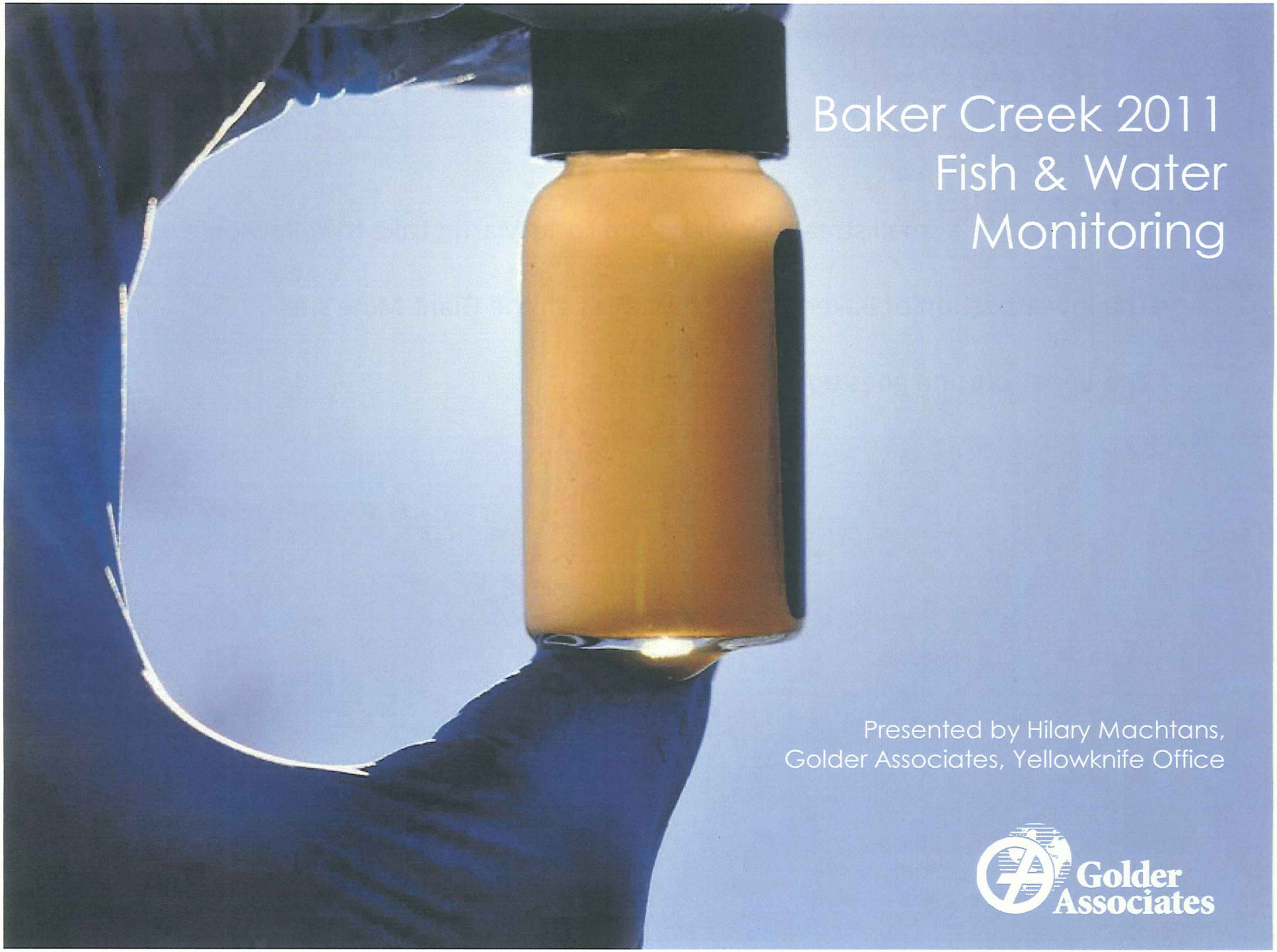


Baker Creek 2011 Fish & Water Monitoring

Presented by Hilary Machtans,
Golder Associates, Yellowknife Office

Golder Associates

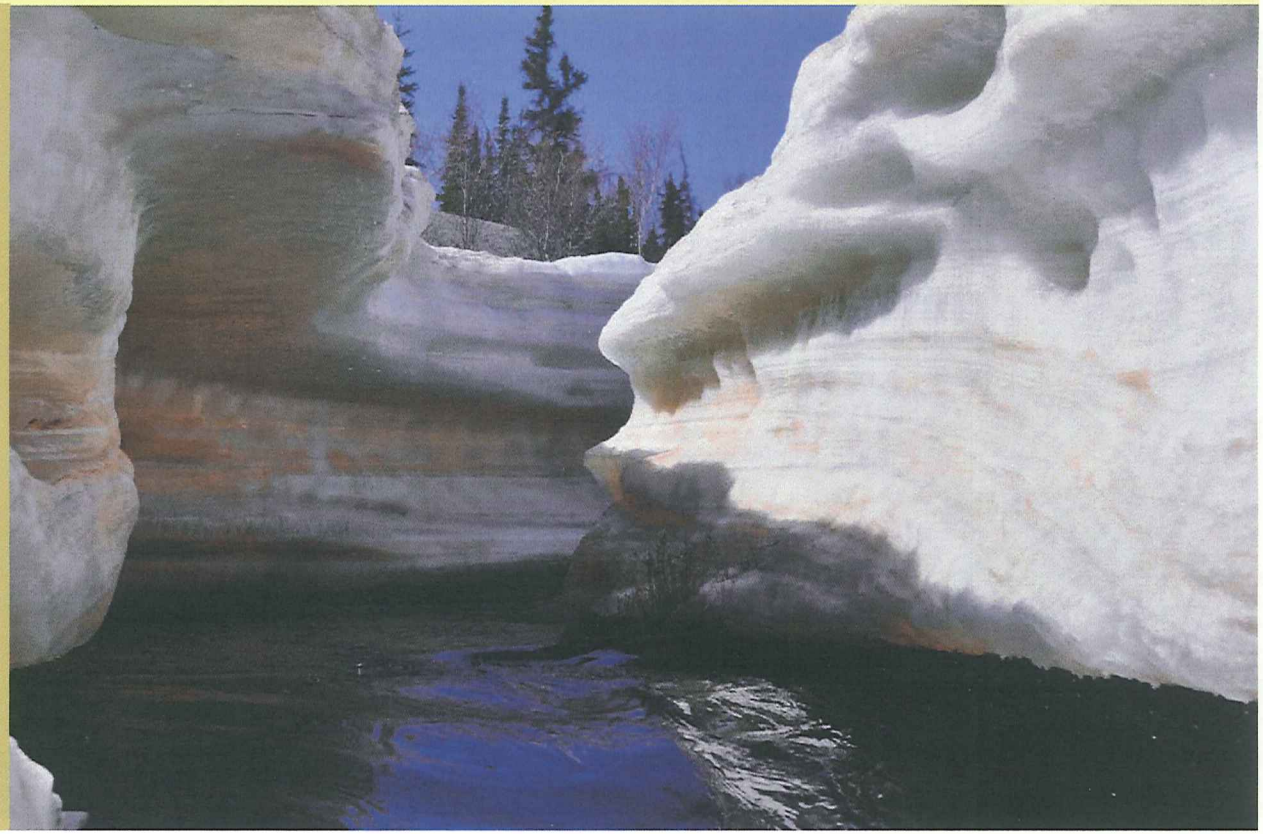
Introduction

- Baker Creek is a small stream flowing from Little Martin Lake to Yellowknife Bay
- The lower portion of Baker Creek flows through the Giant Mine site
- The upper portion goes up to Duckfish Lake

Baker Creek mid-way between its source and the Mine site

Introduction

- In fall 2010, rain prevented areas of the ground from freezing & this allowed the creek to flow beneath the snow all winter
- The flow of water froze in layers for weeks as flowed towards the Mine site



Massive ice build-up in Baker Creek

Introduction

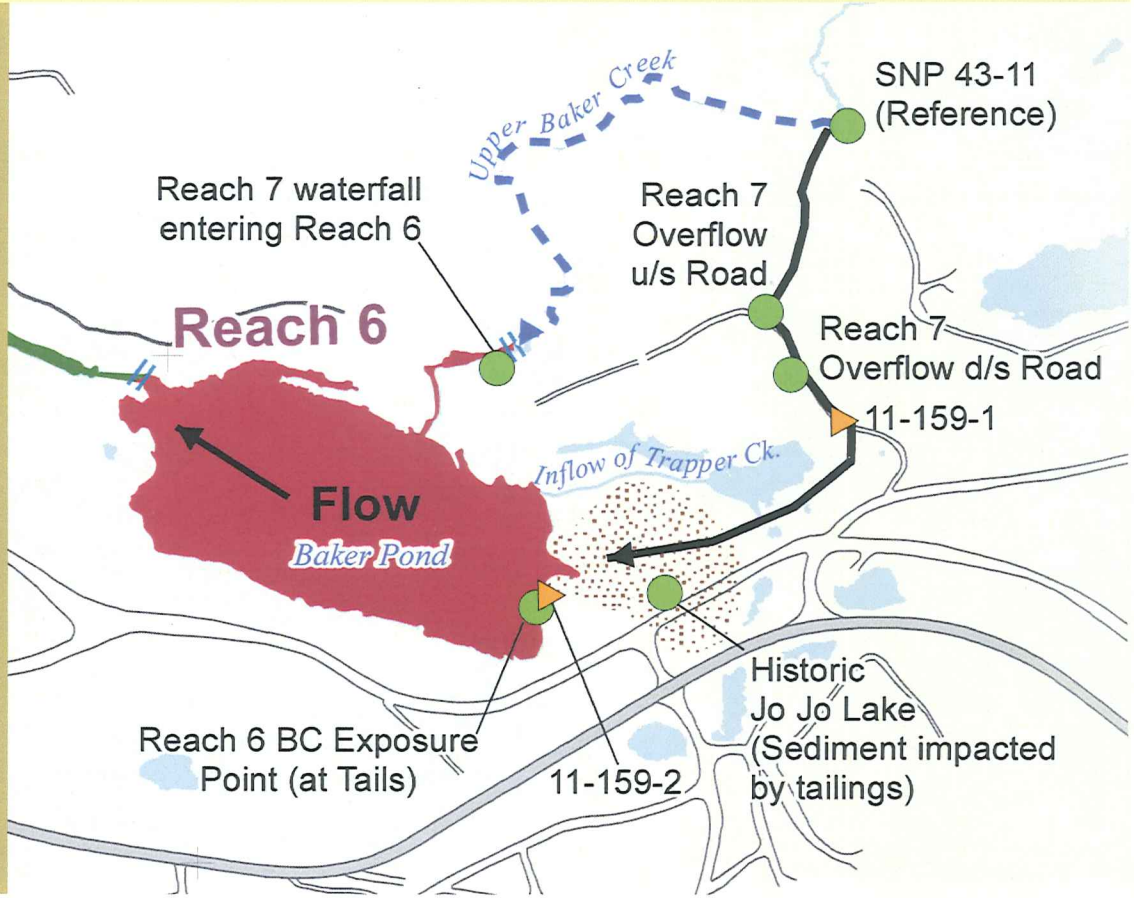
- During 2011 spring freshet, an ice-dam created throughout the winter, caused the creek to leave its channel and flow over some new areas

The tailings submerged by overflow, viewed from the air

Introduction

- This new creek channel passed over the old tailings near Vee Lake road before entering Baker Pond

For several days, Baker Creek flow was diverted due to the massive ice build-up



Introduction

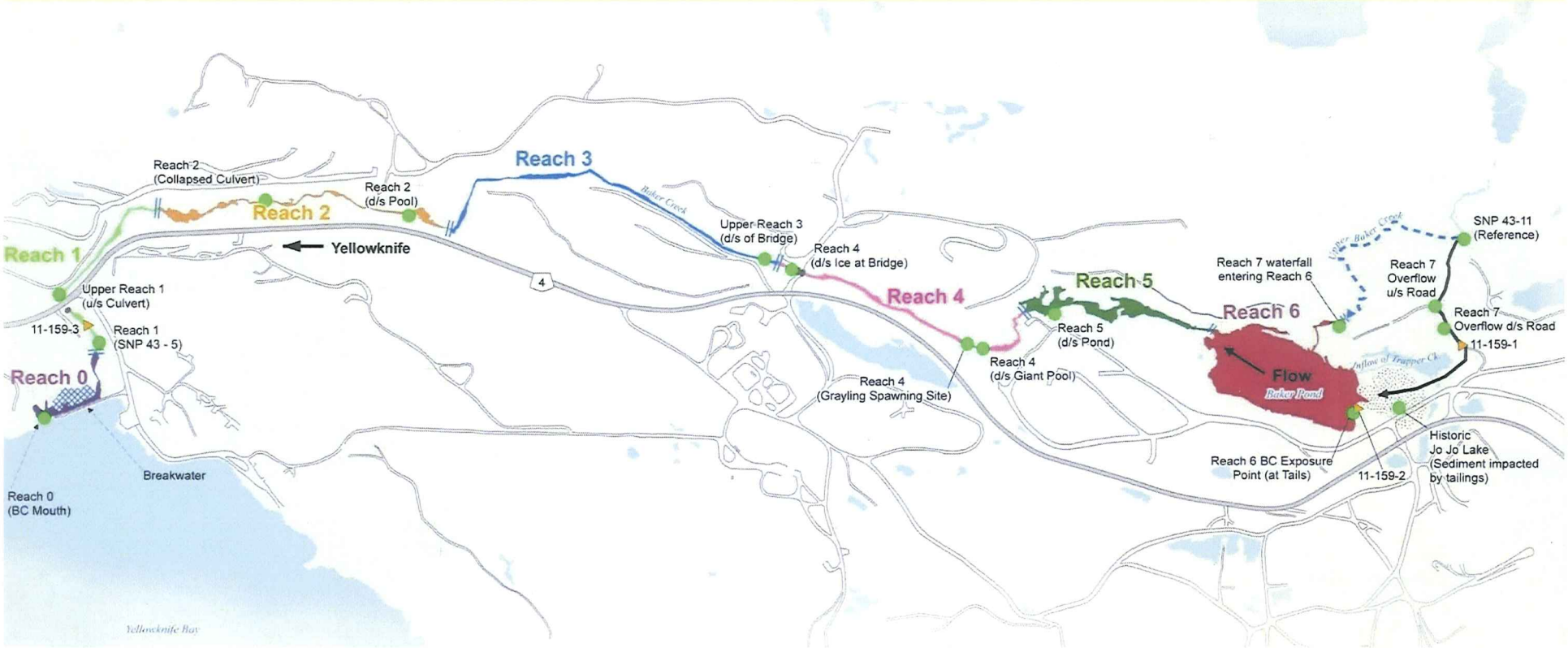
- Large amounts of contaminated tailings were seen to flush into Baker Pond

The tailings viewed from Vee Lake road, looking towards Baker Pond

Methods

Sampling plan made:

- We established multiple monitoring stations throughout Baker Creek
- Stations were above, at and downstream of the tailings inflow



Methods

- We also established sampling stations throughout the possibly affected areas in Yellowknife Bay

Methods

Monitoring toxicity

Immediately on May 16, field crew collected water for acute toxicity

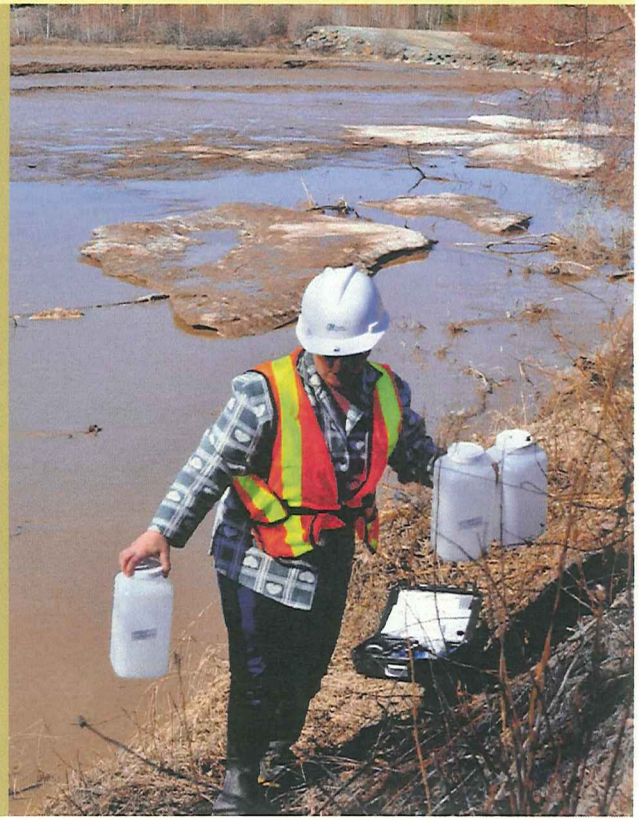
- Water samples were sent to laboratory in Calgary

Daily field work for taking water samples and on-site readings

Methods

Monitoring water quality

- Field crew took weekly samples of water from several stations in Baker Creek
- Water samples were labeled and brought to ALS laboratories for testing



Water samples ready to be taken directly downstream of the tailings at Baker pond

Methods

Monitoring water turbidity

- Turbidity (NTU) of Baker Creek water was taken daily throughout the stream at established stations using a portable turbidity meter

- Periodic water samples sent for lab analysis were also tested for turbidity

Turbidity meter and sampling

Methods

Monitoring fish

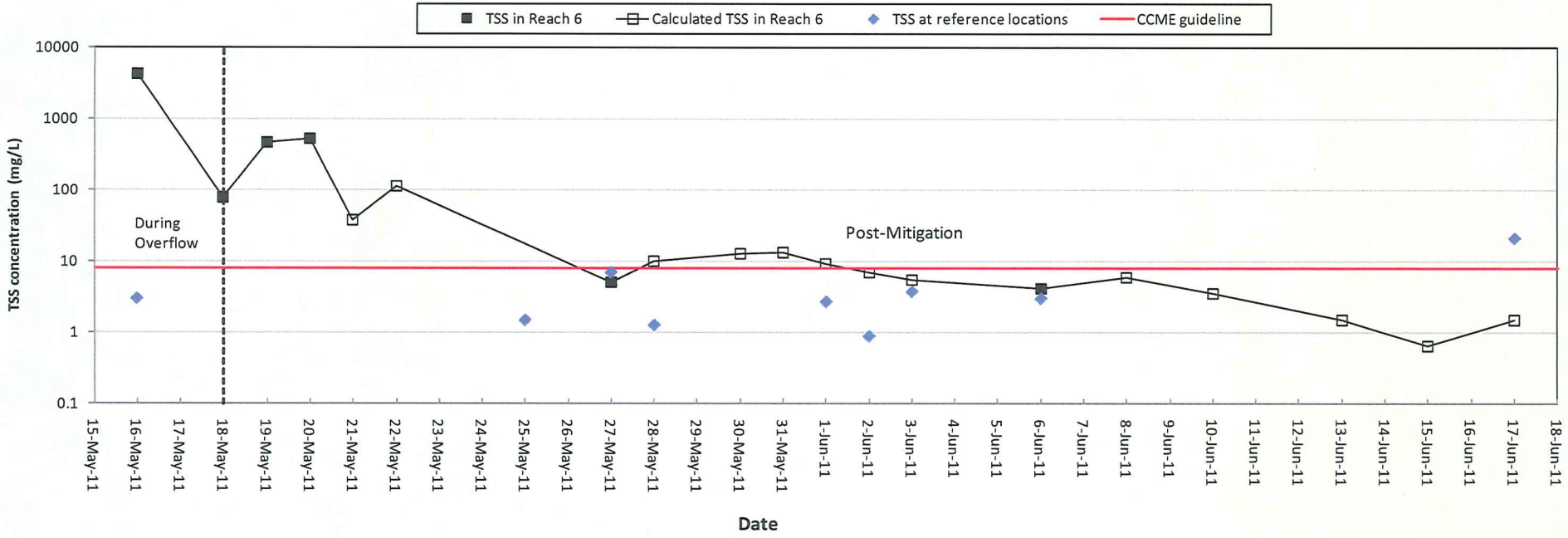
- Adults were observed entering Baker Creek and spawning was observed
- Eggs were collected, photographed, measured and put back
- Young-of-year were observed, captured, identified to species, and released

A Sucker captured below the culvert in Reach 1

Results

Monitoring water quality and toxicity

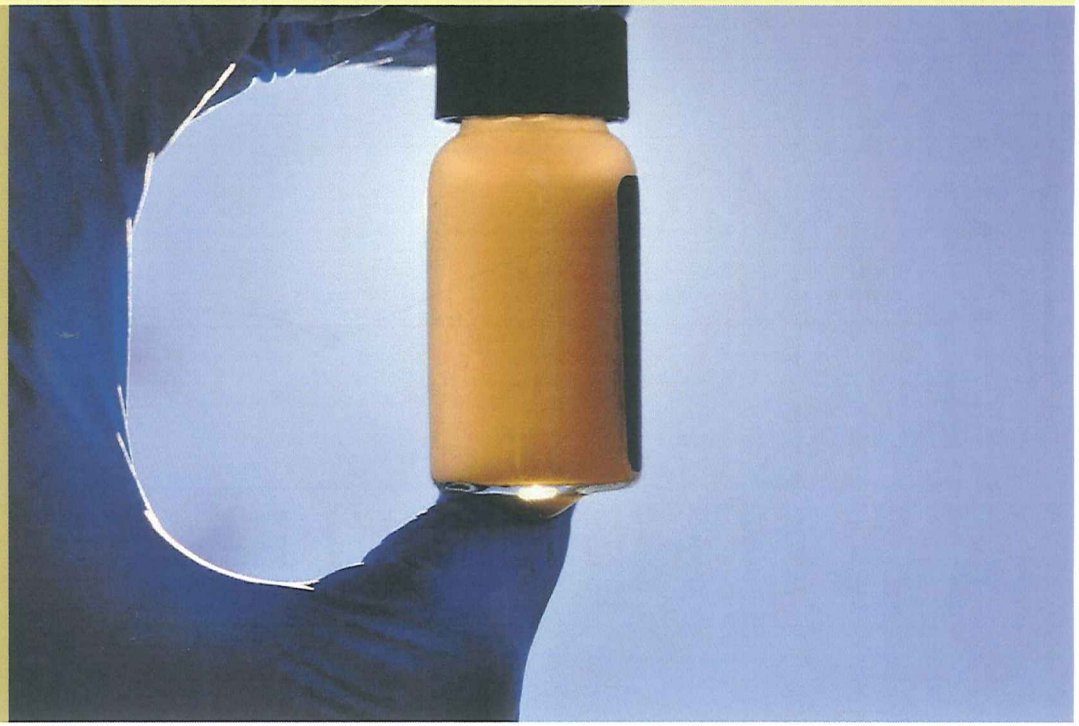
- Water was not toxic to fish or the bugs that fish eat (plankton)
- Sediment levels in the water were very high at the beginning but declined within 2 weeks



Results

Monitoring water turbidity

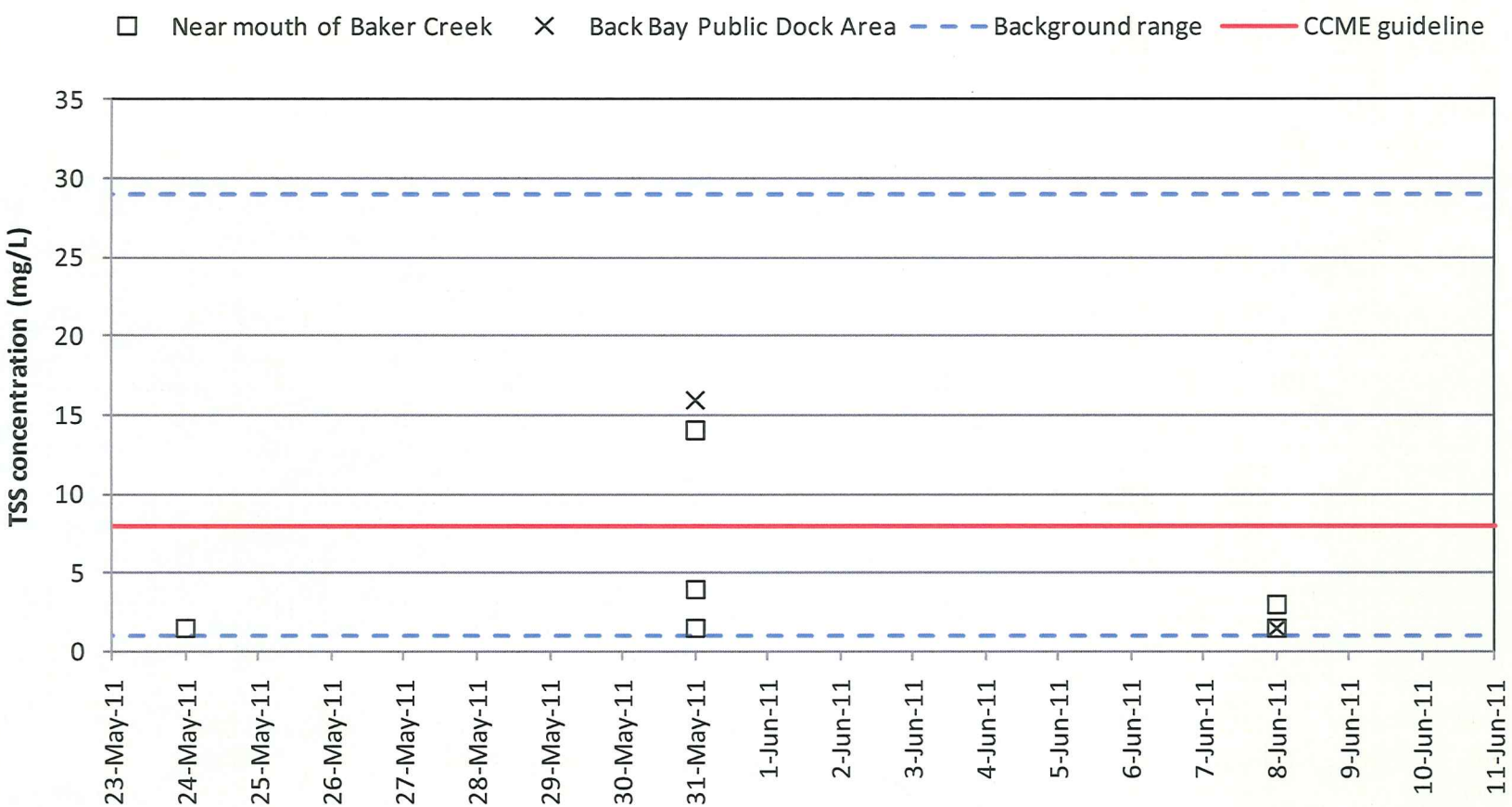
- Early water samples should high levels of turbidity
- This was due to the high amount of silt (fine particles) washed into Baker Creek
- High turbidity levels lasted approximately two weeks



A water sample from Baker Pond shows high turbidity levels in mid May

Results

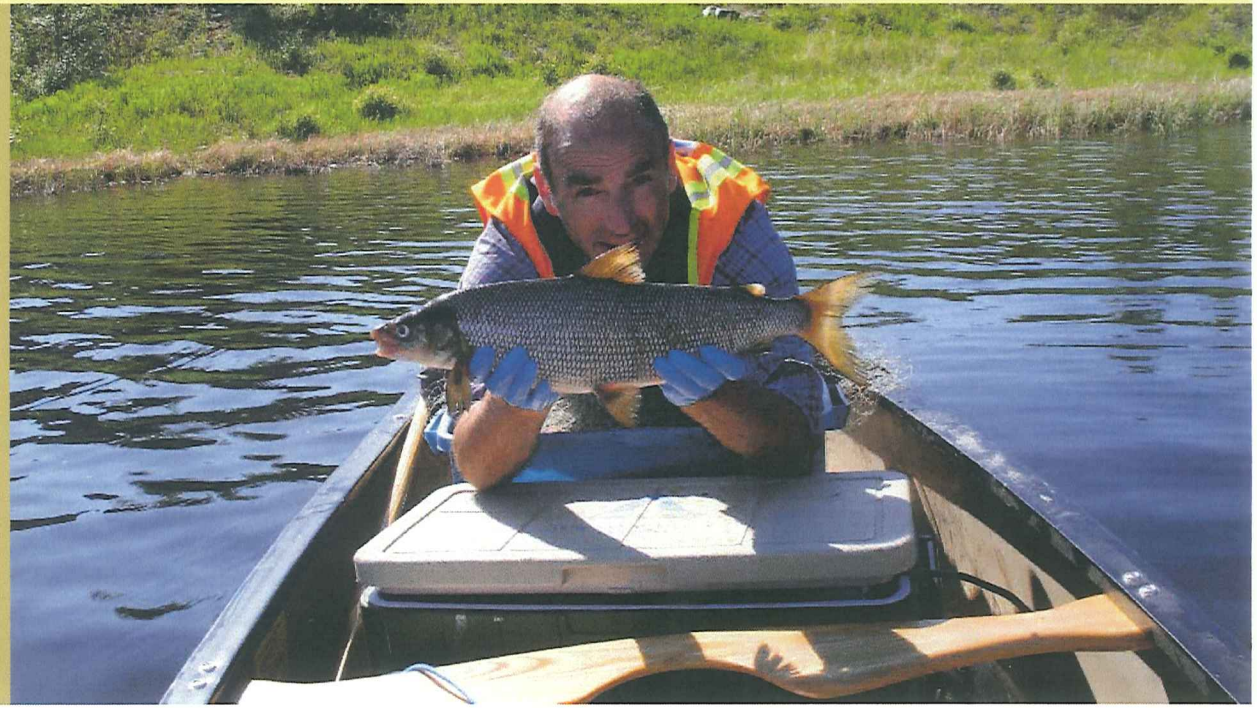
Sediment levels in water in Back Bay



Results

Monitoring adult fish

- When fish began migrating into Baker Creek, the water was still silty
- Turbidity dropped quickly and before spawning took place, Baker Creek "cleared up"
- Grayling, Suckers and Pike were seen spawning in many areas
- Whitefish and Pike were collected from Baker Pond to be analyzed for metals



A large Whitefish captured in Baker Pond in early summer

Results

Monitoring fish eggs

- We found lots of Grayling and Sucker eggs in lower Baker Creek on the mine site
- Eggs appeared healthy and hatched within two weeks after spawning took place

A smaller Sucker egg alongside two Grayling eggs. Note developing embryo.

Results

Monitoring young-of-year fish

- Large numbers of "baby" fish were seen throughout Baker Creek
- No mortalities appeared to occur after fish hatched
- They have plenty of food and are growing fast

A tiny Grayling, days after hatching, begins its search for food in Reach 4

Conclusion

The creek improved over time

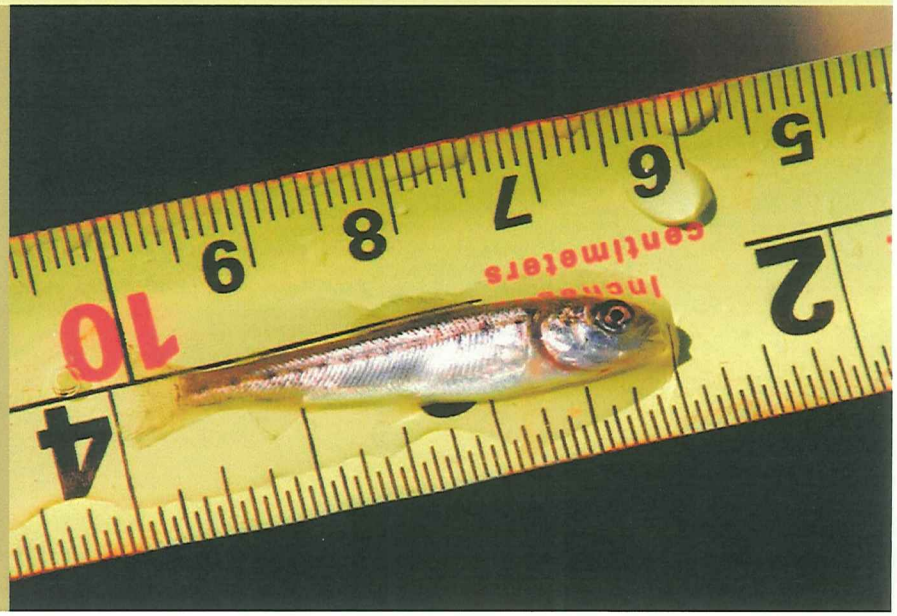
- Baker Creek received an influx of contaminated sediment but went to background levels within two weeks
- Some remained in parts of the creek, some was washed out into Back Bay
- Fish used Baker Creek like usual, though slightly later

Monitoring the recent hatch of Grayling in lower Baker Creek near the Vent Plant

Conclusion

From bad to good

- Fish returned and they spawned in many places downstream of Baker Pond
- The eggs incubated successfully and hatched
- Lots of baby fish were seen everywhere in the creek
- Out-migration of the juvenile fish is currently underway



A small Grayling, 3 weeks old, captured during its out-migration journey.