# UNDERSTANDING AND PREDICTING FISH MERCURY IN THE DEHCHO

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# MAHSI CHO!


NWT
CIMP


Aboriginal Affairs and
Northern Development Canada
Affaires autochtones et
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# OUTLINE

- Why are we doing this project
- How does mercury get to the North?
- Why is Hg high in some fish but not in others?
- Project methods
- Interim Results
- TK, Management
- Take-Home Messages

# QUESTIONS FROM COMMUNITIES

- Why do some lakes have high mercury and other lakes have low mercury?
- Why are levels increasing in some lakes but decreasing in other lakes?
- How will climate change and development affect fish mercury levels?

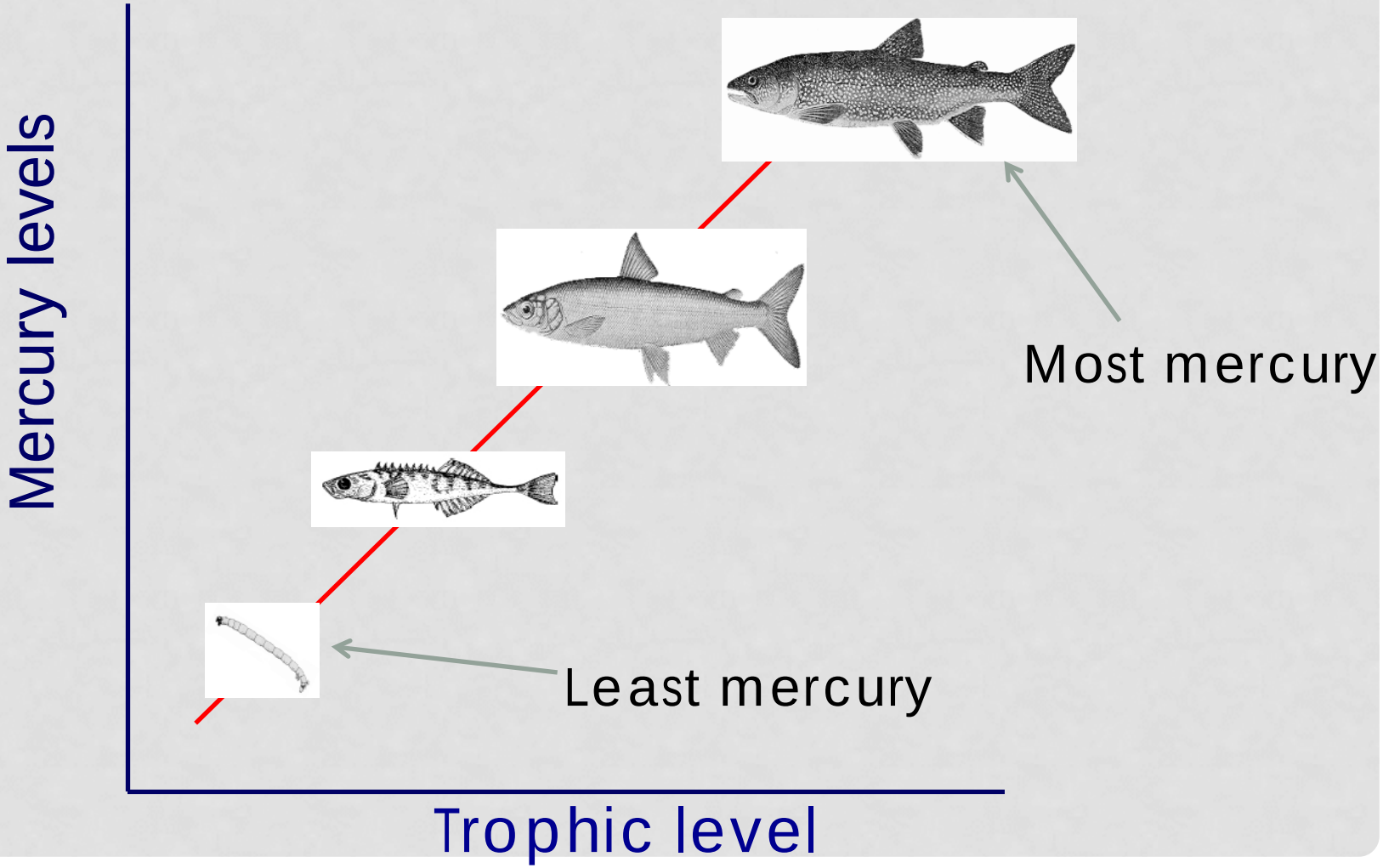
# QUESTIONS AND CONCERNS

- We want to feel safe eating the fish, and we want the same for our grandchildren
- If mercury levels are high, is there something we can do about it?

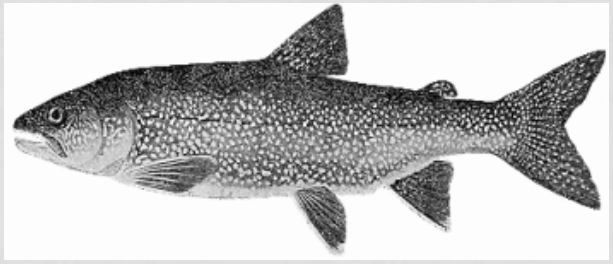
# MERCURY IN THE ENVIRONMENT

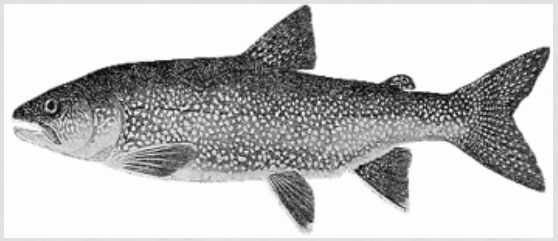
- Mercury is natural
- We don't make more mercury, but we move it around
- First, only nature moved it around
- Since about 1850, we have released mercury trapped in coal into the air

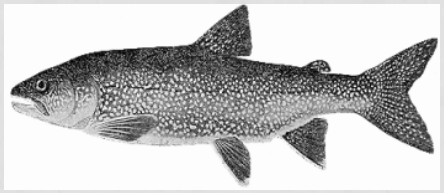
# PREDICTING FISH MERCURY LEVELS



# Highest mercury

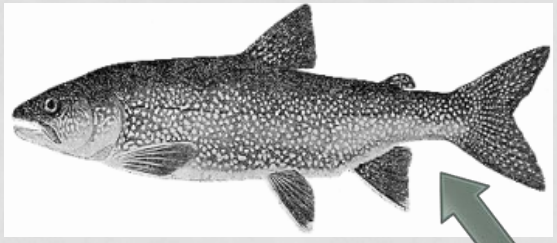




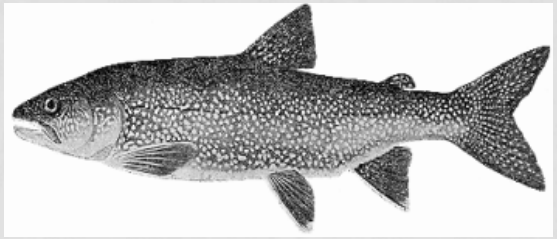


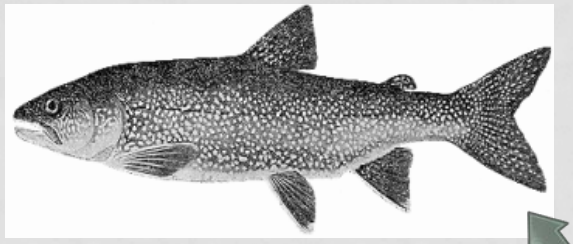
Biggest fish

Smallest fish



Oldest fish





Youngest fish

# Lowest mercury

# How much mercury in this fish?

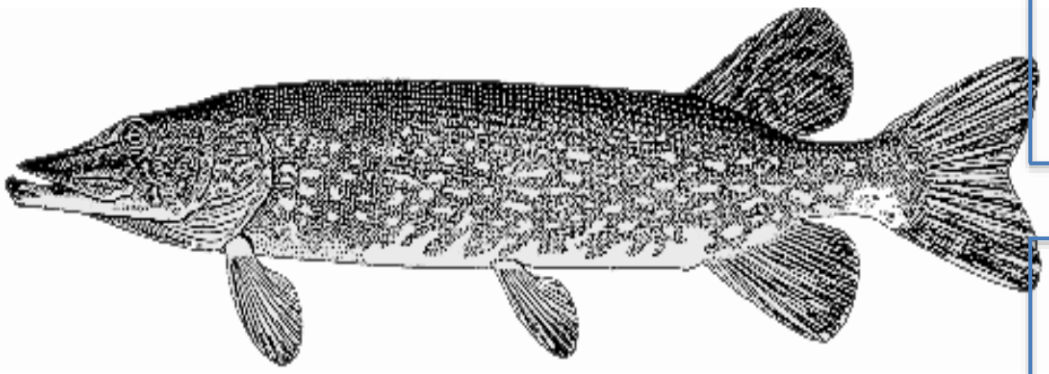
Lake acidity?

Lake tea-colored or clear?

Lake temperature?

What other fish are in my lake? (food chain length)

How much oxygen?



What do I eat? (trophic level)

Water clarity

Age

Growth rate

Where do I eat it?

Size

Lake nutrient levels

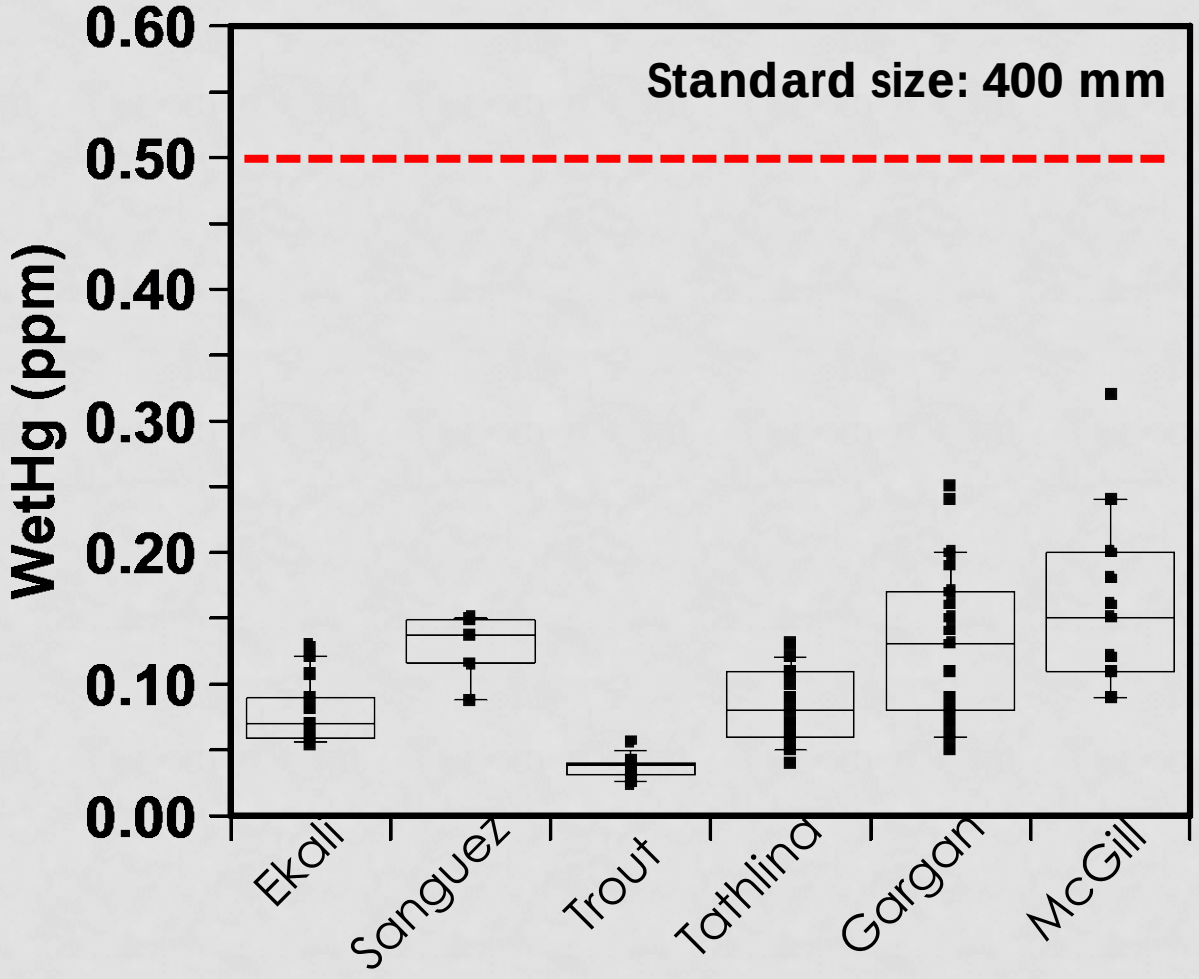
# WHAT HAVE WE BEEN DOING?

- Lakes: Sanguez, Ekali, Tathlina, Kakisa, Mustard, McGill, Gargan, Trout
- Community monitors and fishers chose fishing spots and collected fish
- Also collected bugs, water, sediment

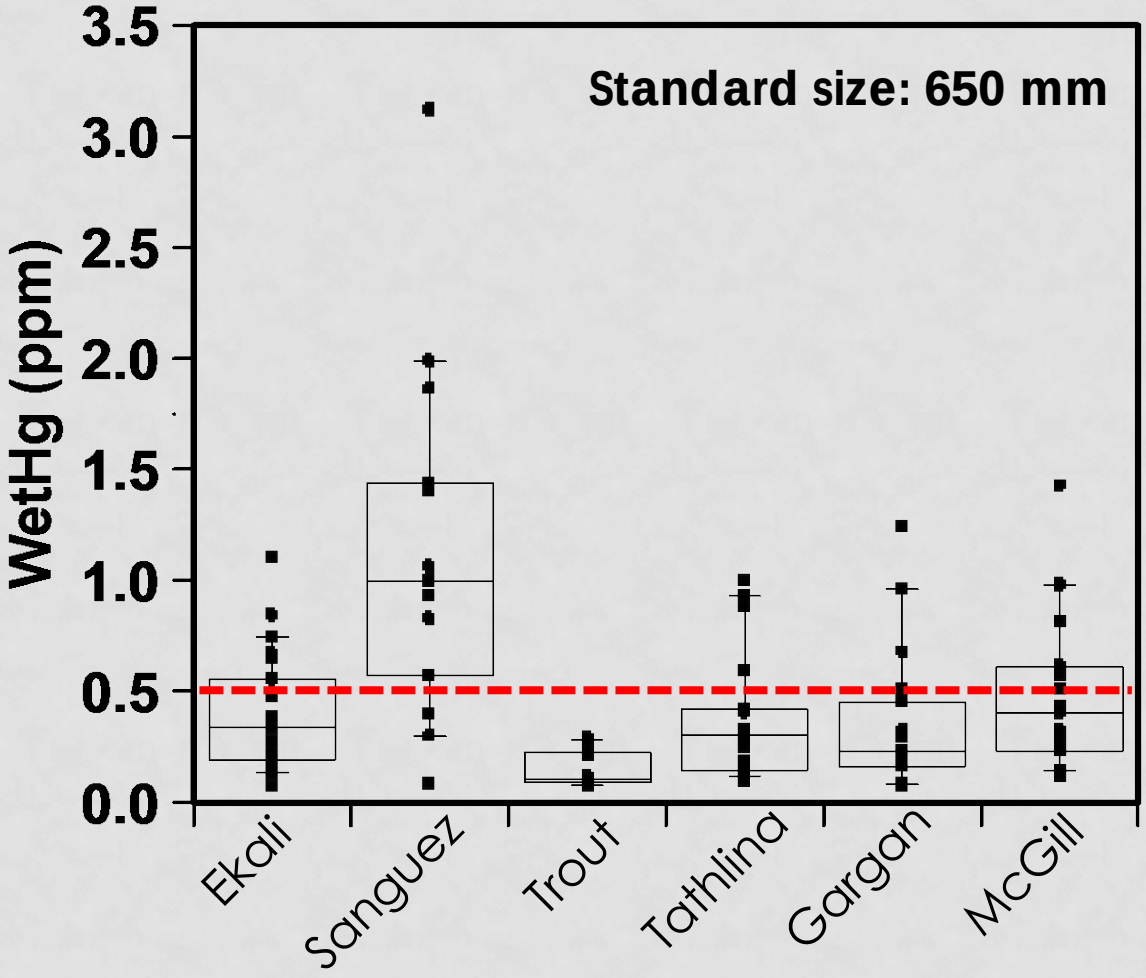
# WHAT HAVE WE BEEN DOING?

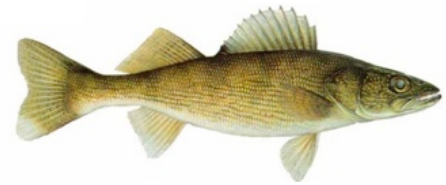
- Take flesh sample, sort invertebrates
- Measure fish mercury level, fish size, age, trophic level, chemistry and mercury in water

# LAKE WHITEFISH

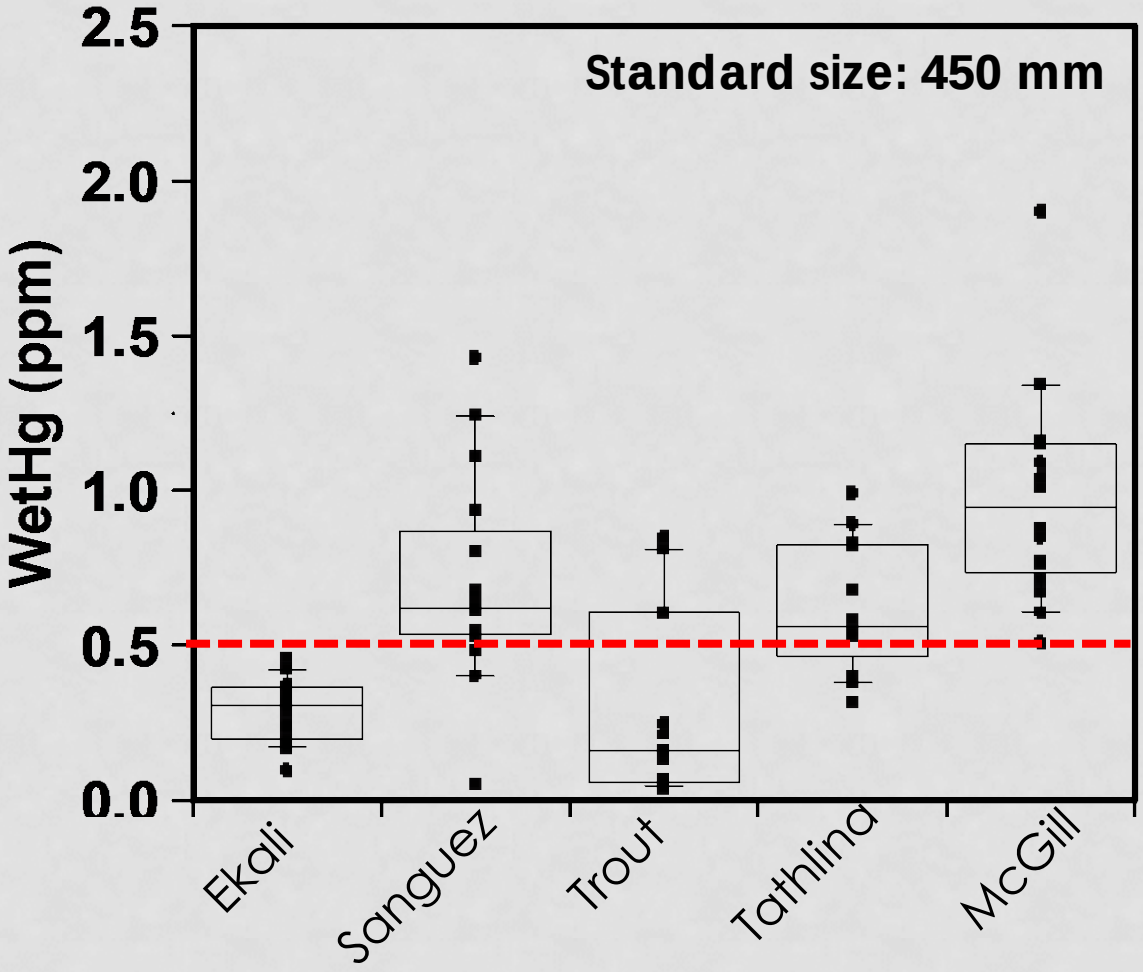


# NORTHERN PIKE





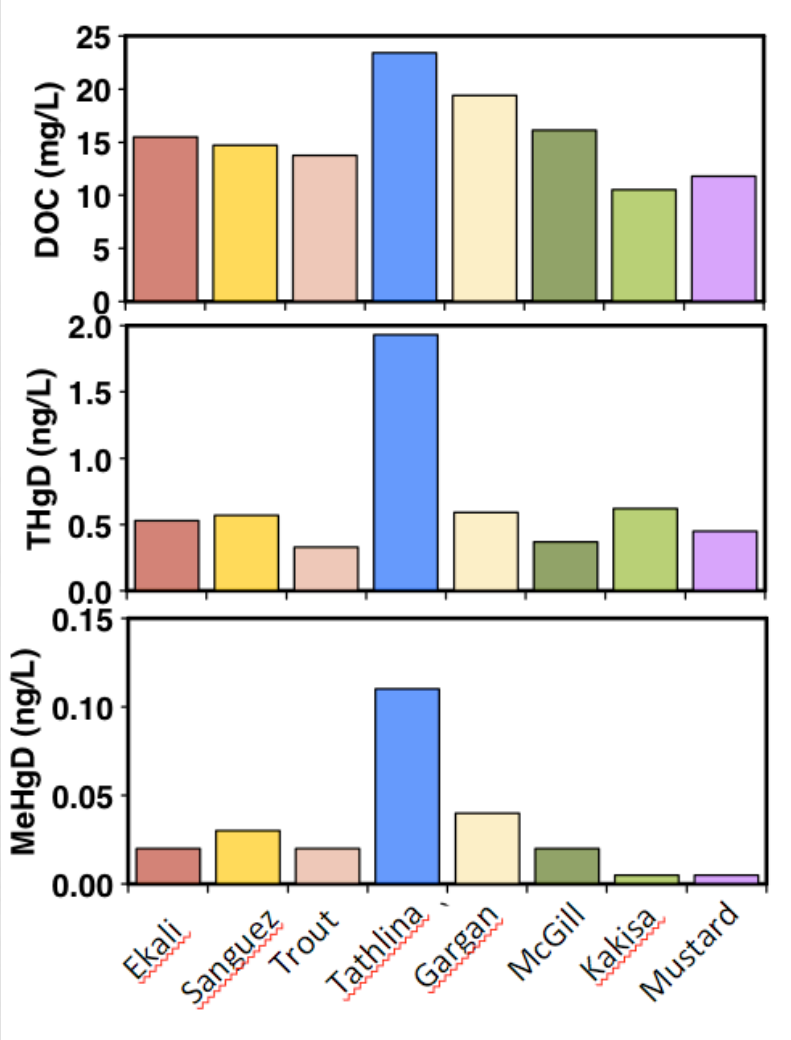
# WALLEYE


Standard size: 450 mm
WetHg (ppm)
2.5
2.0
1.5
1.0
0.5
0.0
Ekali
Sanguez
Trout
Tathlina
McGill

# MERCURY TO DATE?


- All Lake Whitefish below 0.5 ppm commercial sale guideline
  - Most also below 0.2 ppm subsistence guideline
- Northern Pike higher: Sanguez, McGill, Ekali but most below 0.5 ppm, (except Sanguez)
- Walleye highest: higher in Sanguez, McGill, Tathlina, lower in Ekali and Trout

# EXPLAINING FISH HG (INTERIM)




- Fish Hg related to
  - Size, age, trophic position
  - This explains differences among *species*
- Differences among lakes
  - Not explained by these factors
  - Not explained by Hg in water or lake tea colour

# How much mercury in this fish?

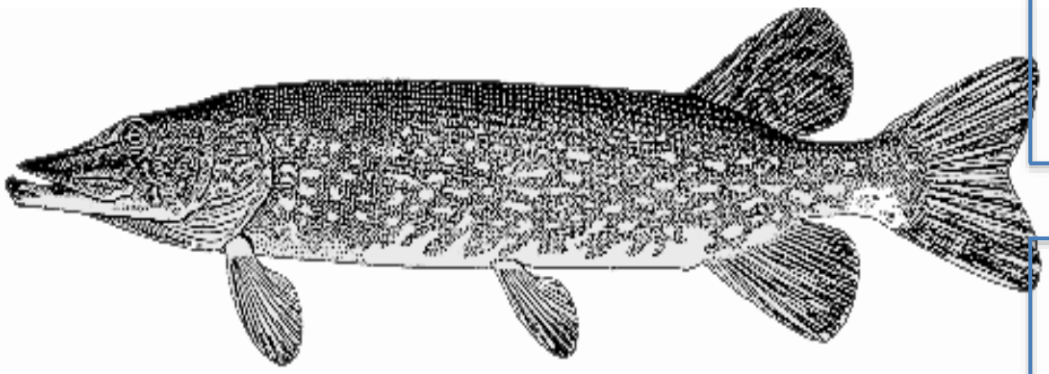
Lake acidity?

Lake temperature?

Lake tea-colored or clear?

What other fish are in my lake? (food chain length)

How much oxygen?



What do I eat? (trophic level)

Water clarity

Age

Growth rate

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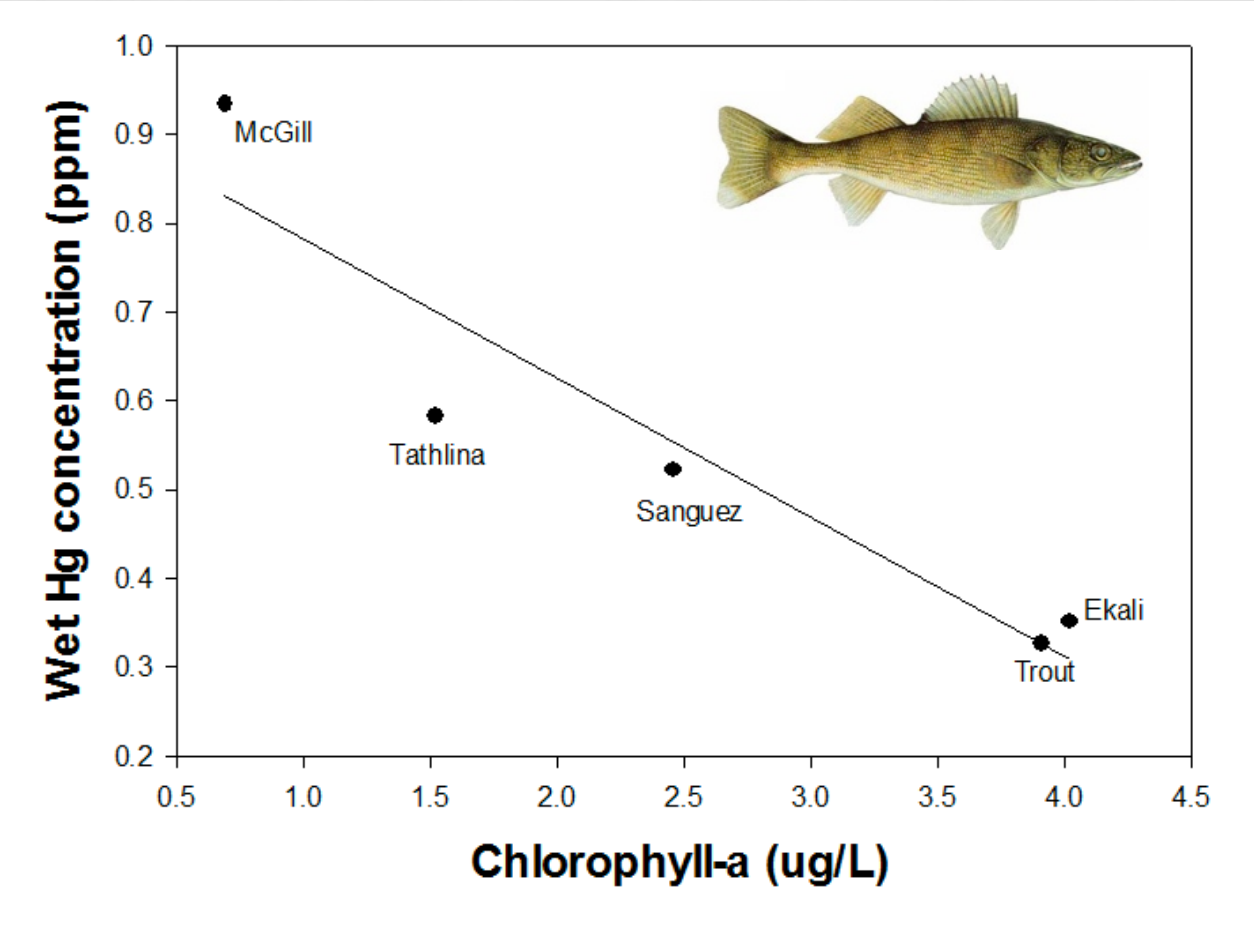
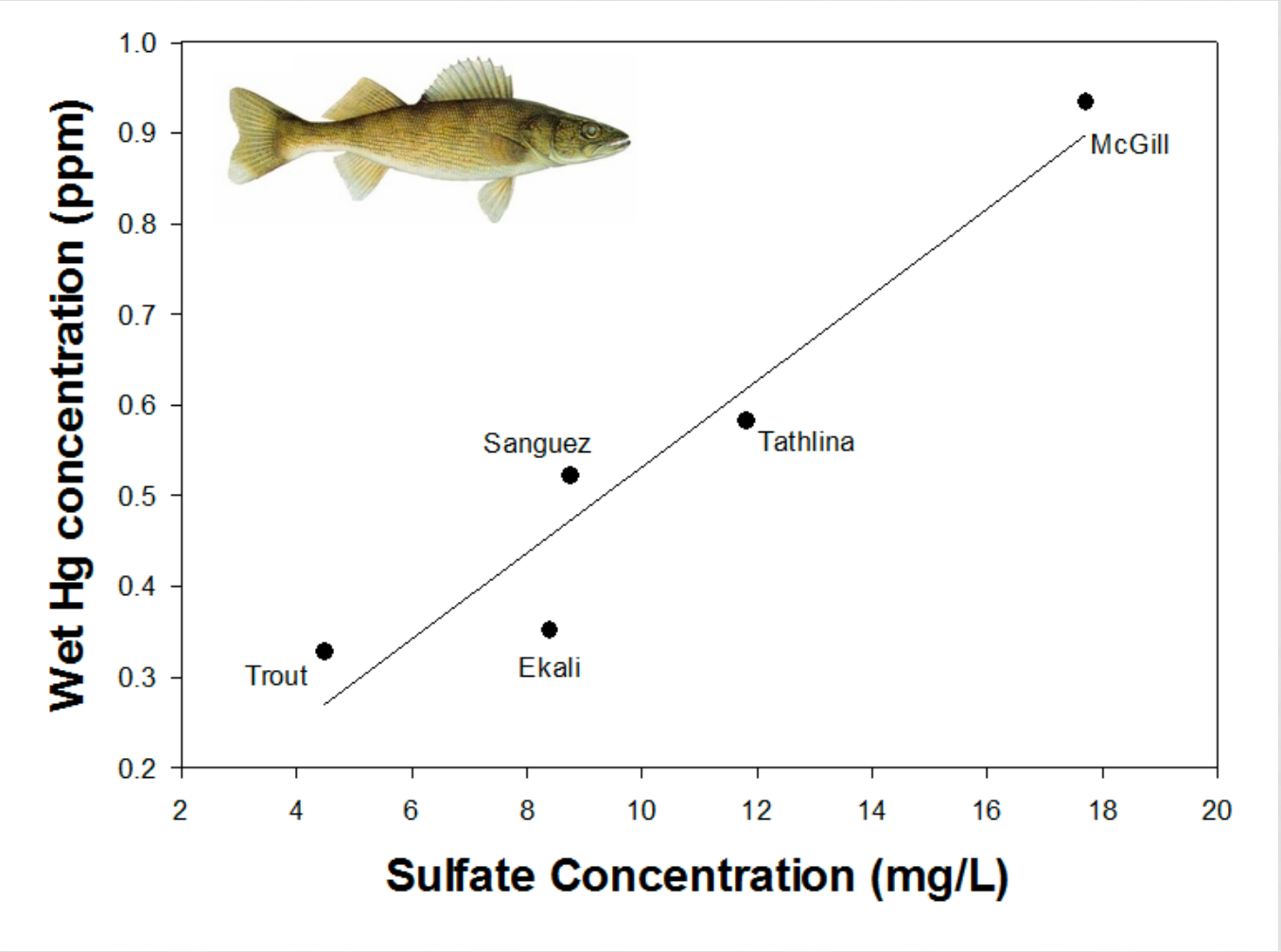
Size

Lake nutrient levels

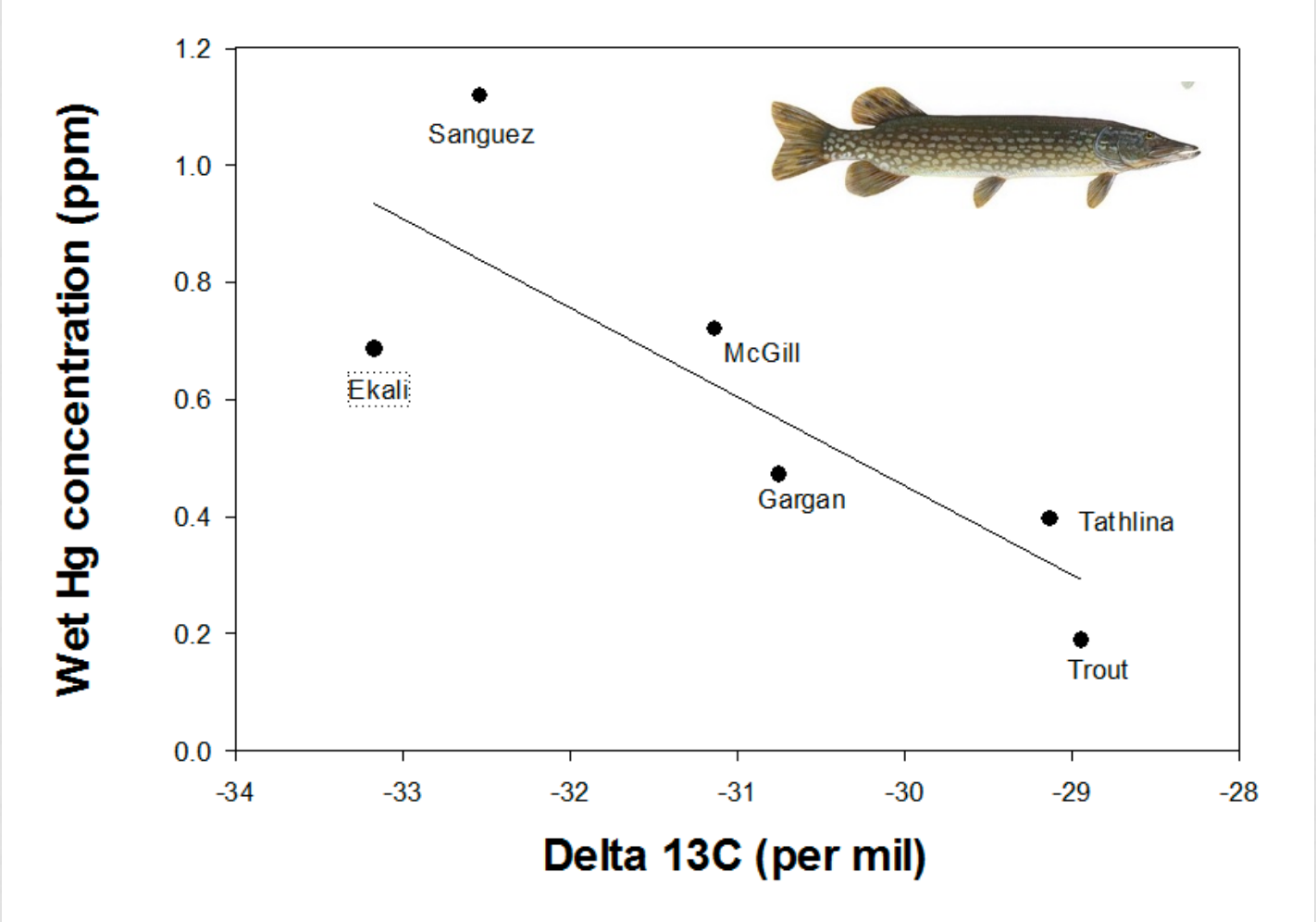
# EXPLAINING AND PREDICTING FISH HG: WALLEYE (INTERIM)



# EXPLAINING AND PREDICTING FISH HG: WALLEYE (INTERIM)



# EXPLAINING AND PREDICTING FISH HG: PIKE (INTERIM)



# TK AND MANAGEMENT

- McGill and Sanguez lakes not fished as much as they used to
  - Fish likely growing more slowly (still finishing age and growth analysis)
  - Fish-down to reduce Hg levels – pilot project in Sanguez Lake
- Beaver dam removals?

# YOUTH ENGAGEMENT

# TAKE HOME MESSAGES

- Hg low in Whitefish, higher in Pike, highest in Walleye
  - Pike: highest in Sanguez Lake
  - Walleye: highest in Sanguez, McGill, Tathlina Lakes
- Lake differences
  - Partly explained by lake chemistry (sulfate and chl-a) for walleye
  - Partly explained by where they are feeding for Northern Pike
- Monitor water chemistry! (Climate change)
- More results to come
- Management: explore potential for fish-downs
  - More investigation: beaver dam removal