Benthic Invertebrate Initiatives in Northern Alberta

Presentation by the Athabasca Watershed Council and Lesser Slave Watershed Council

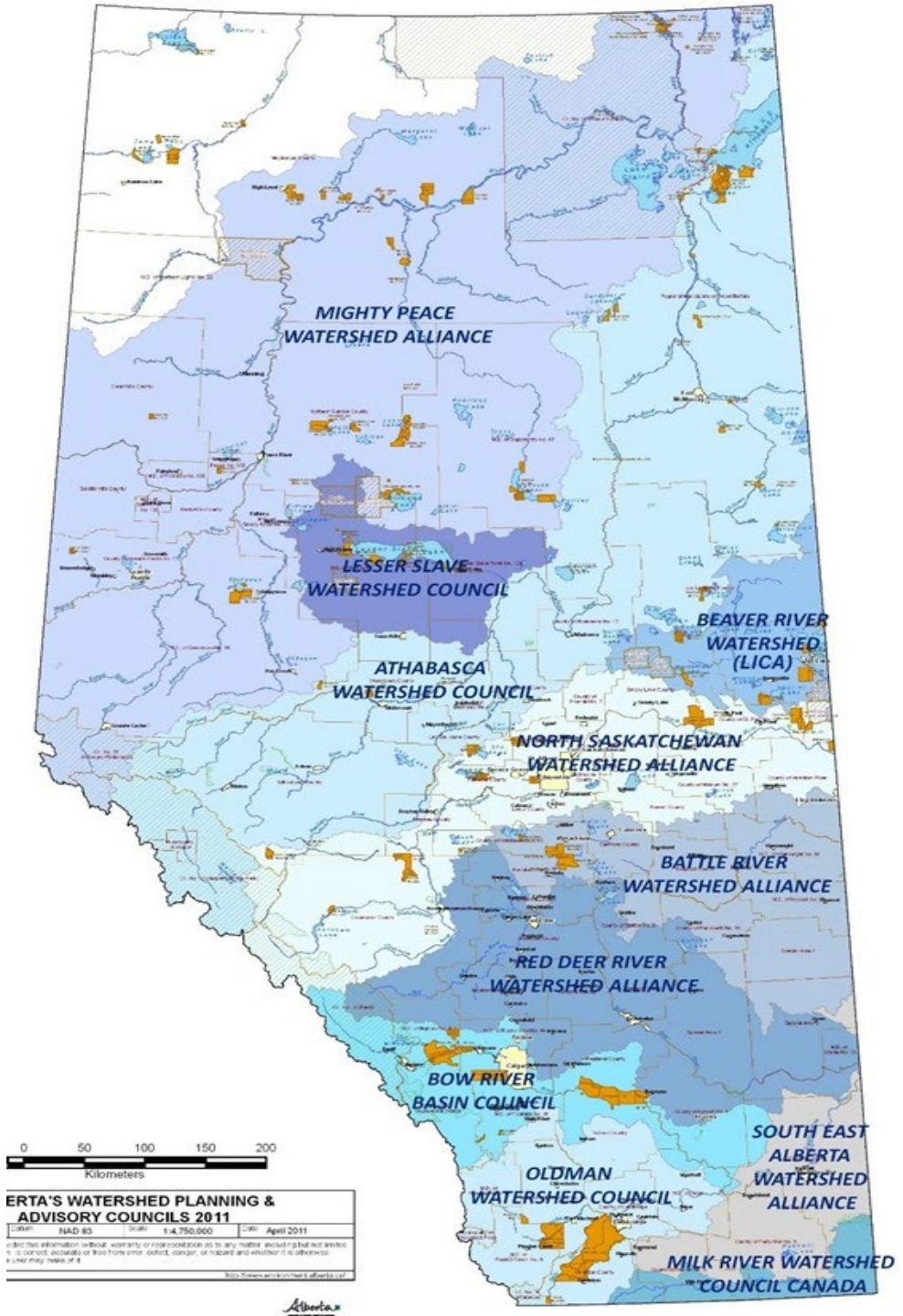
Outline

- WPACs
- Water Quality Monitoring
- Benthic Invertebrate Initiative
- Environmental Stewardship

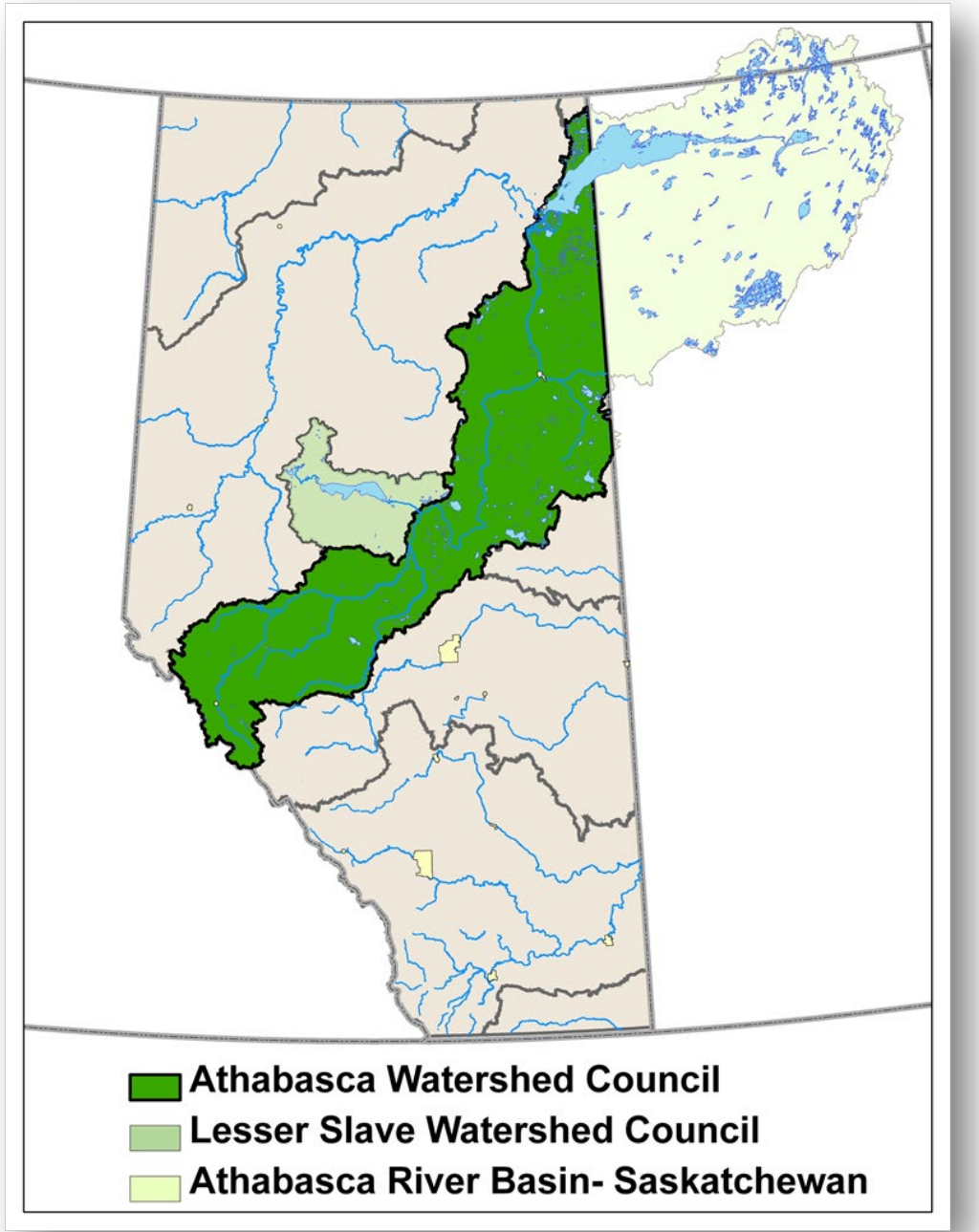
Watershed Planning and Advisory Councils

11 Watershed Planning and Advisory Councils (WPACs) based their work on the ***Water for Life*** strategy (2003) for their Watershed:

1. Safe, secure drinking water,
2. Healthy aquatic ecosystems,
3. Reliable quality water supplies for a sustainable economy.



Athabasca Watershed Council & Lesser Slave Watershed Council



- AWC - founded in 2009
- LSWC - founded in 2007

Undertake four foundational roles in various levels under the *Water for Life* Strategy:

- Convener and Collaboration
- Monitoring and Reporting
- Policy and Planning
- Education and Literacy

LSWC & AWC Key Monitoring Projects

Watershed Resiliency Program

State of the Watershed

Riparian Area Assessments

Water Quality Monitoring

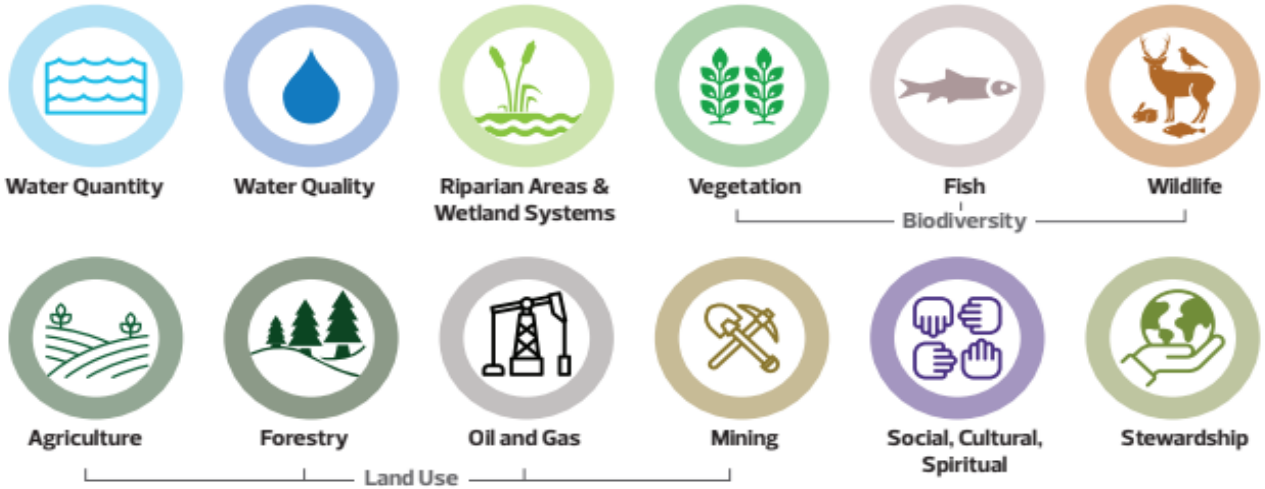
LSWC & AWC Key Monitoring Projects

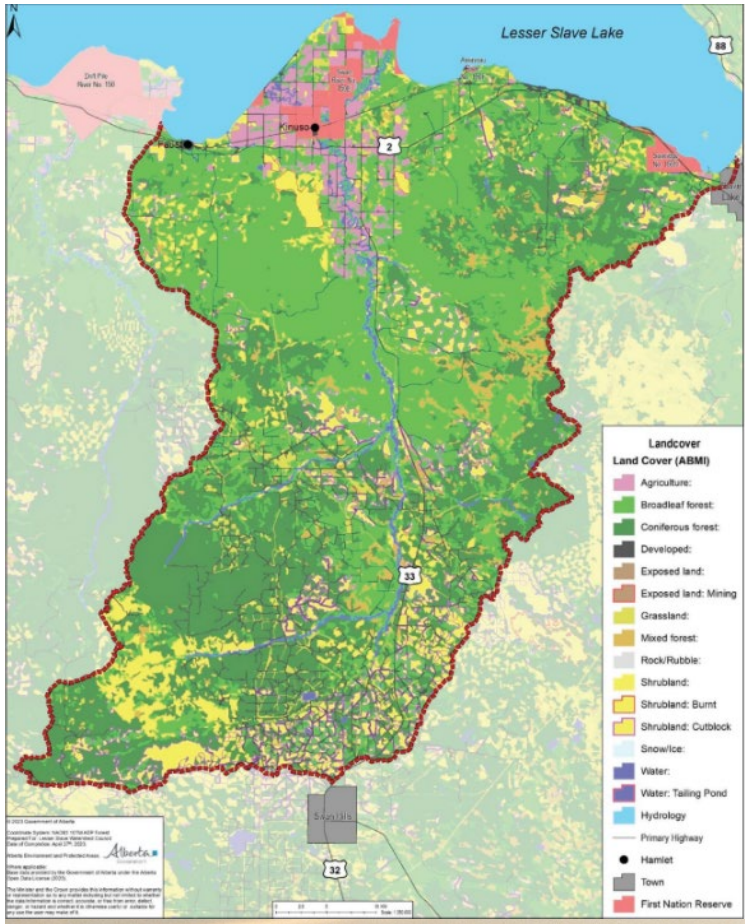
Watershed Resiliency Program

State of the Watershed

Riparian Area Assessments

Water Quality Monitoring





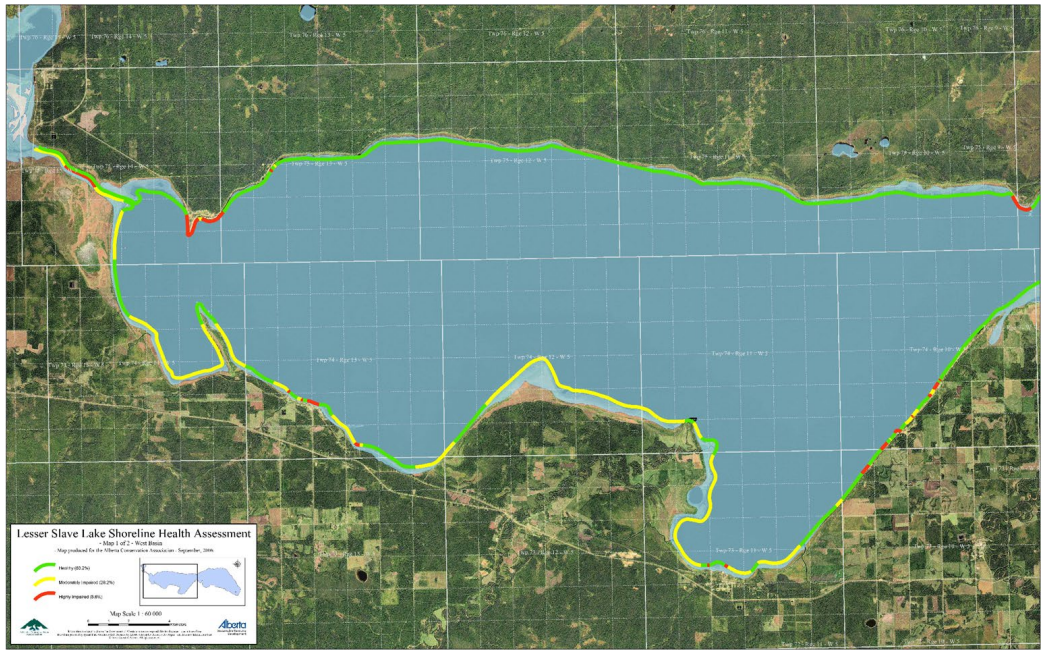
LSWC & AWC Key Monitoring Projects

Watershed Resiliency Program

State of the Watershed

Riparian Area Assessments

Water Quality Monitoring



LSWC & AWC Key Monitoring Projects

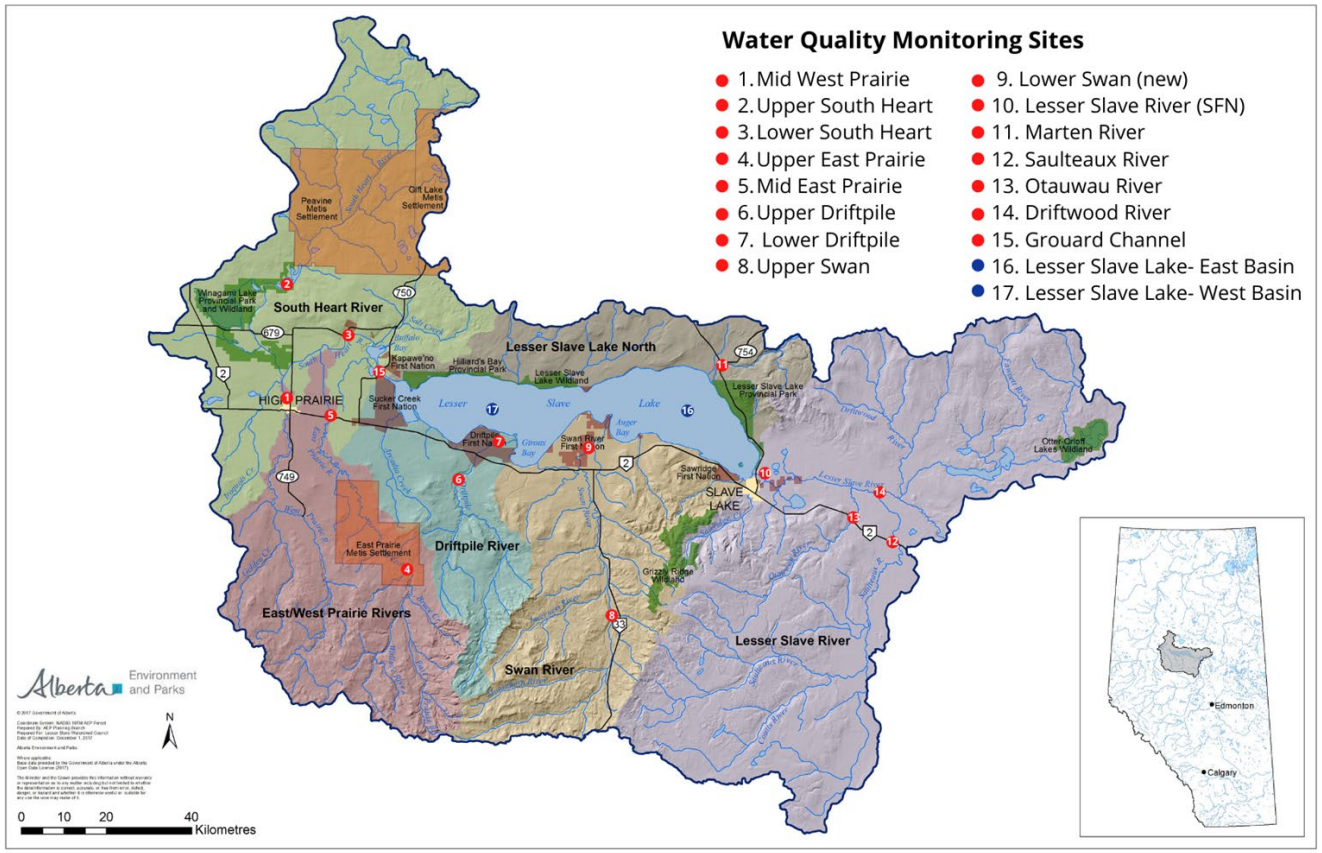
Watershed Resiliency Program

State of the Watershed

Riparian Area Assessments

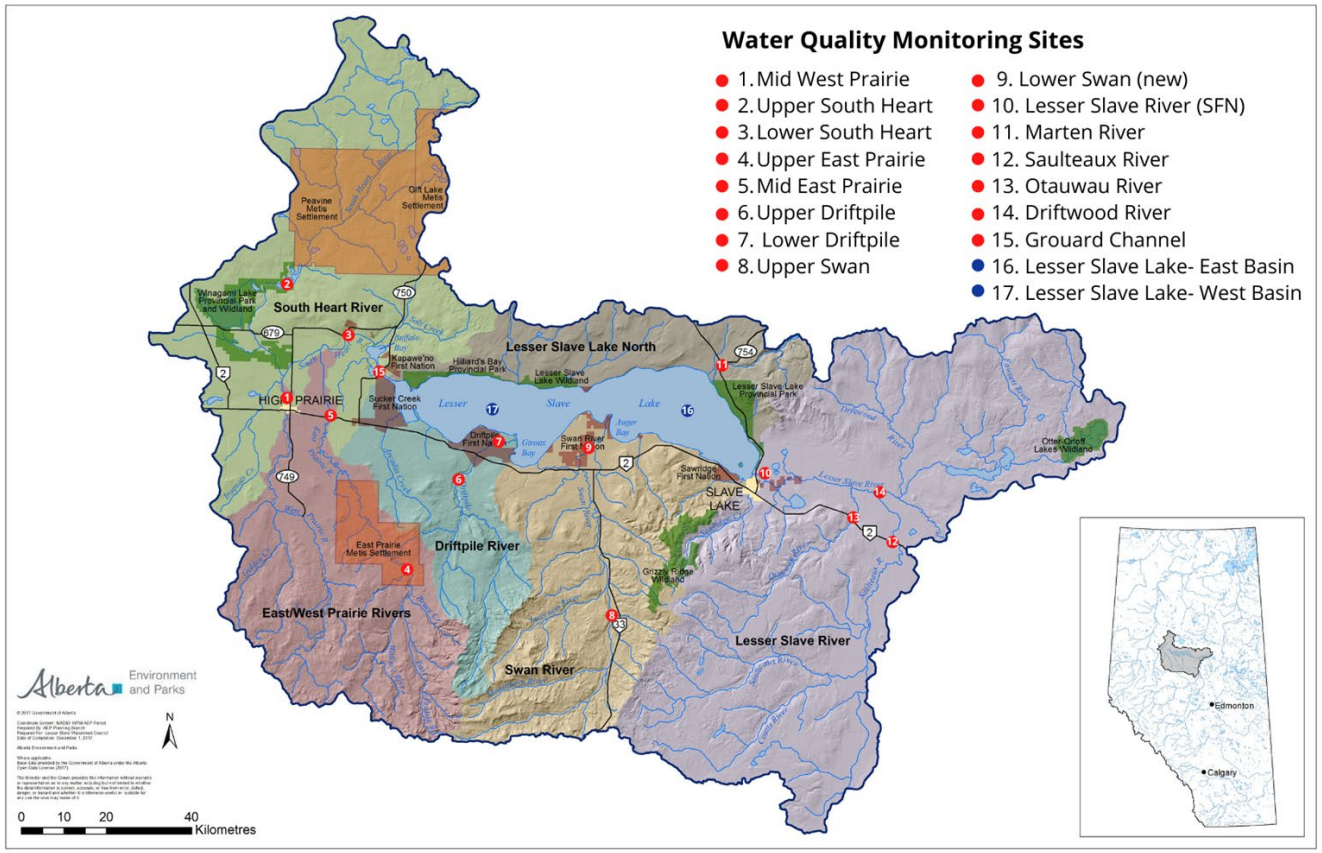
Water Quality Monitoring

Water Quality Monitoring



- Tributary monitoring program initiated in 2017
  - 5 rivers
- 15 sites in 2024
  - 12 rivers

Water Quality Monitoring



Lesser Slave Watershed Council

Lesser Slave Watershed
2021 Water Monitoring Report and
Five-Year Trend Assessment

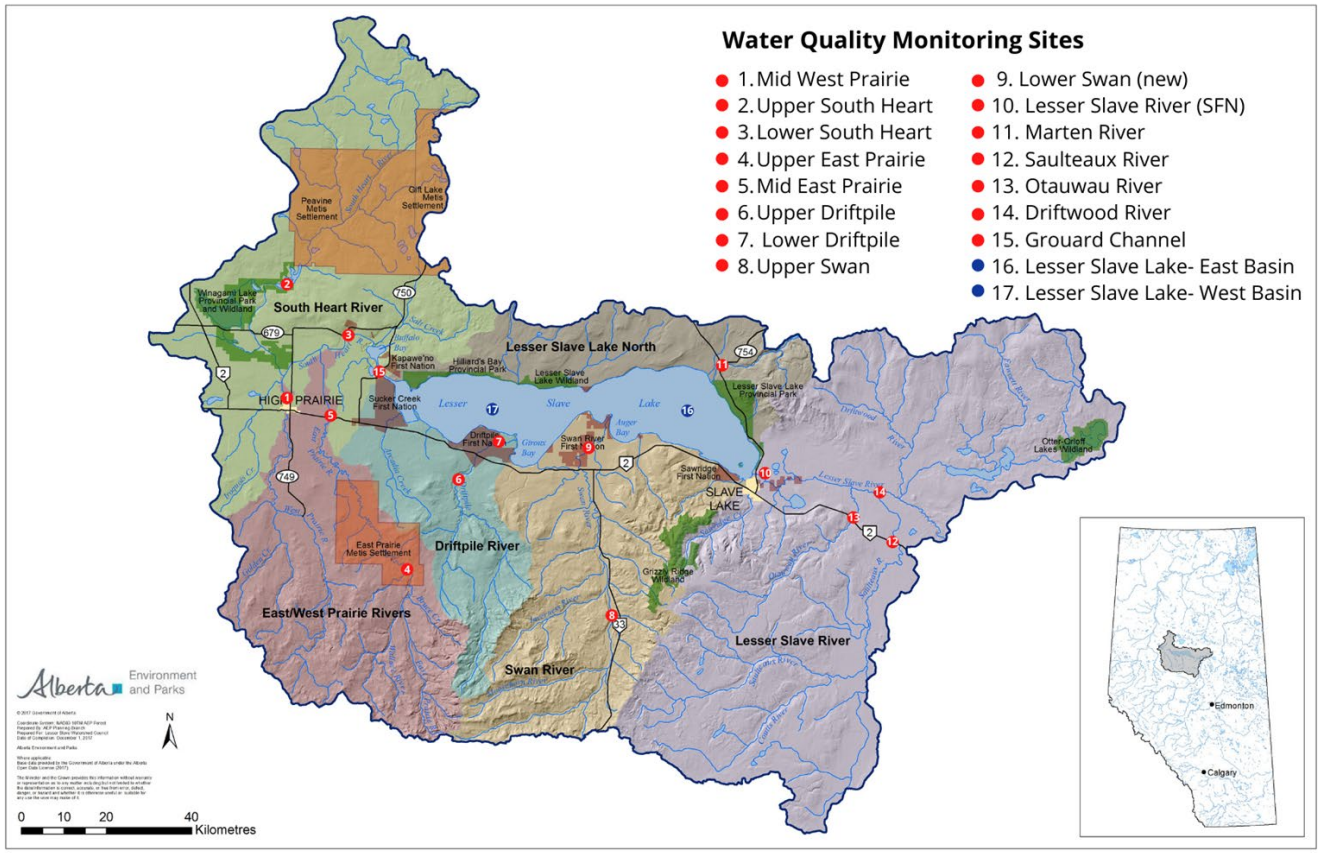
Prepared for: Lesser Slave Watershed Council

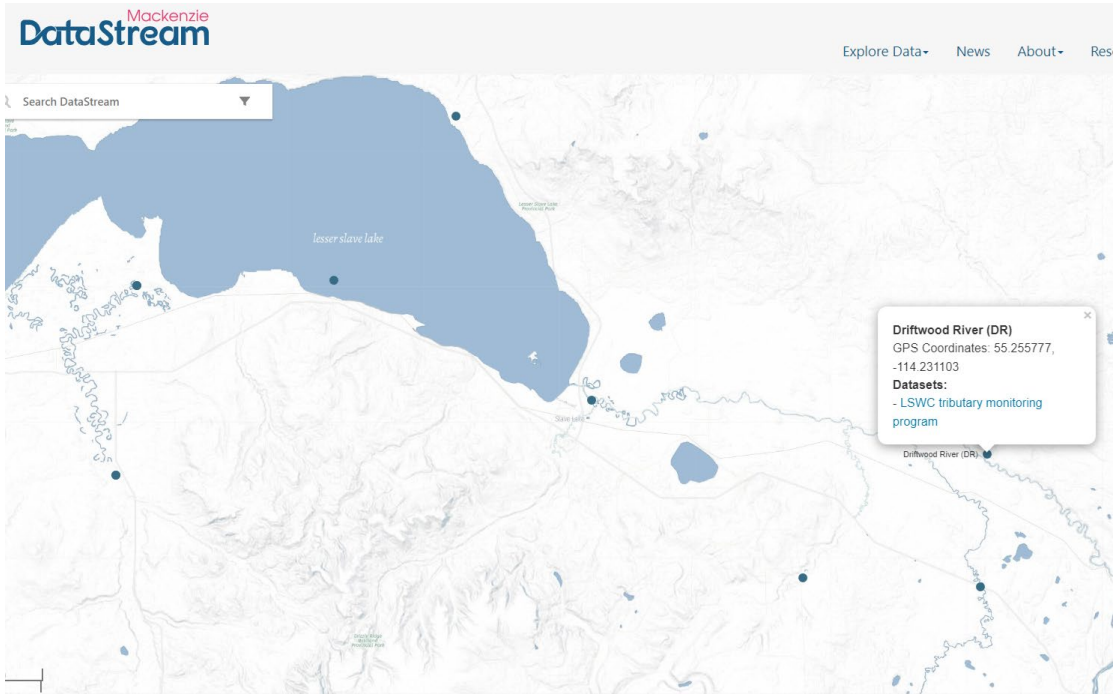
Prepared by: Palliser Environmental Services Ltd.

May 2, 2022

Lesser Slave Watershed Council

Water Quality Monitoring

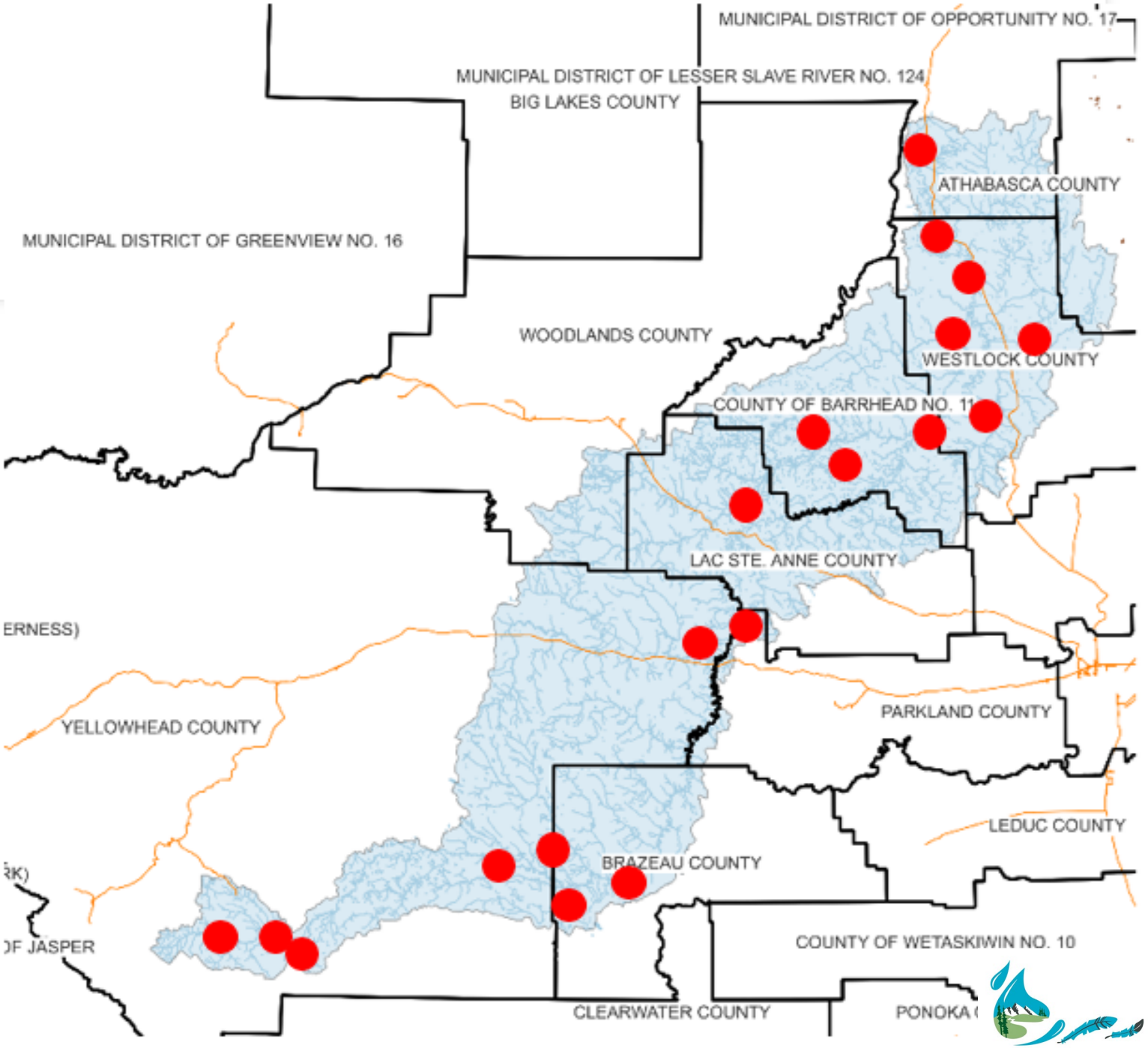




Lesser Slave Watershed Council

Water Quality Monitoring in the Pembina River watershed

- Data is uploaded to Mackenzie DataStream



Bioindicators

Benthic Invertebrates

- Small aquatic animals
- Benthic means “bottom-dwelling”
- Invertebrates = lack a backbone
- Environment and Climate Change Canada developed standardized protocols for river sampling
  - CABIN

Why are they great bioindicators?

- Easy to collect
- Easy to identify
- Cost effective
- Limited mobility
- Different functional groups and tolerances
- Snapshot of benthic assemblages

What can they tell us?

- Compliment other monitoring efforts
- Impact assessments
- Long-term trends
- **No such thing as a bad bug!**
- Diversity indices
  - Shannon & Simpson
- Abundance/Richness
- %EPT

%EPT

- EPT =
  - Ephemeroptera
  - Plecoptera
  - Trichoptera
- Sensitive to pollutants
- Commonly used metric to indicate water quality health

Eastern Slopes Aquatic Monitoring Collaborative

- 22 partner organizations complete necessary training in CABIN sampling protocol and share information

Athabasca Watershed Council

Red Deer River Watershed Alliance

Mighty Peace Watershed Alliance

Canada

COWS & FISH Riparian Management Society

fRI Research
informing land and resource management

Environment and Climate Change Canada

NSWA North Saskatchewan Watershed Alliance

Alberta

Living Lakes Canada

Lesser Slave Watershed Council

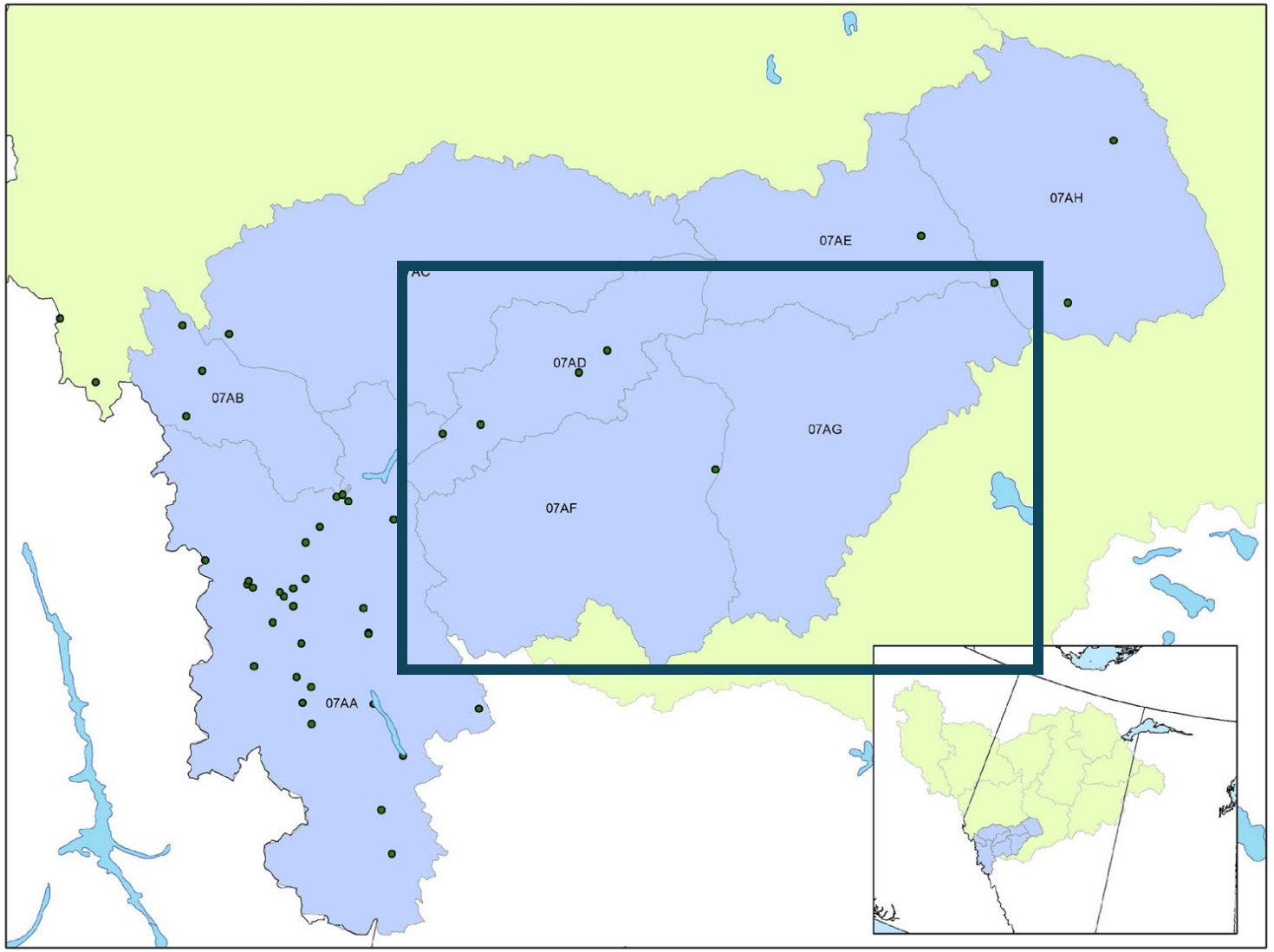
Oldman Watershed Council
oldmanwatershed.ca

Upper Athabasca watershed Biomonitoring Project

- Following the Canadian Aquatic Monitoring Network (CABIN) protocol
- CABIN training in Crowsnest Pass September 2020, Rocky Mountain House July 2021, Pincher Creek July 2022 (3 staff trained)
- Collection of samples started in October 2021 in the Upper McLeod River watershed
- 4-years of sampling from October 2021 to October 2024
- Working to contribute to the larger Eastern Slopes Aquatic Monitoring Collaborative on building a reference model for the Eastern Slopes

Background of Project

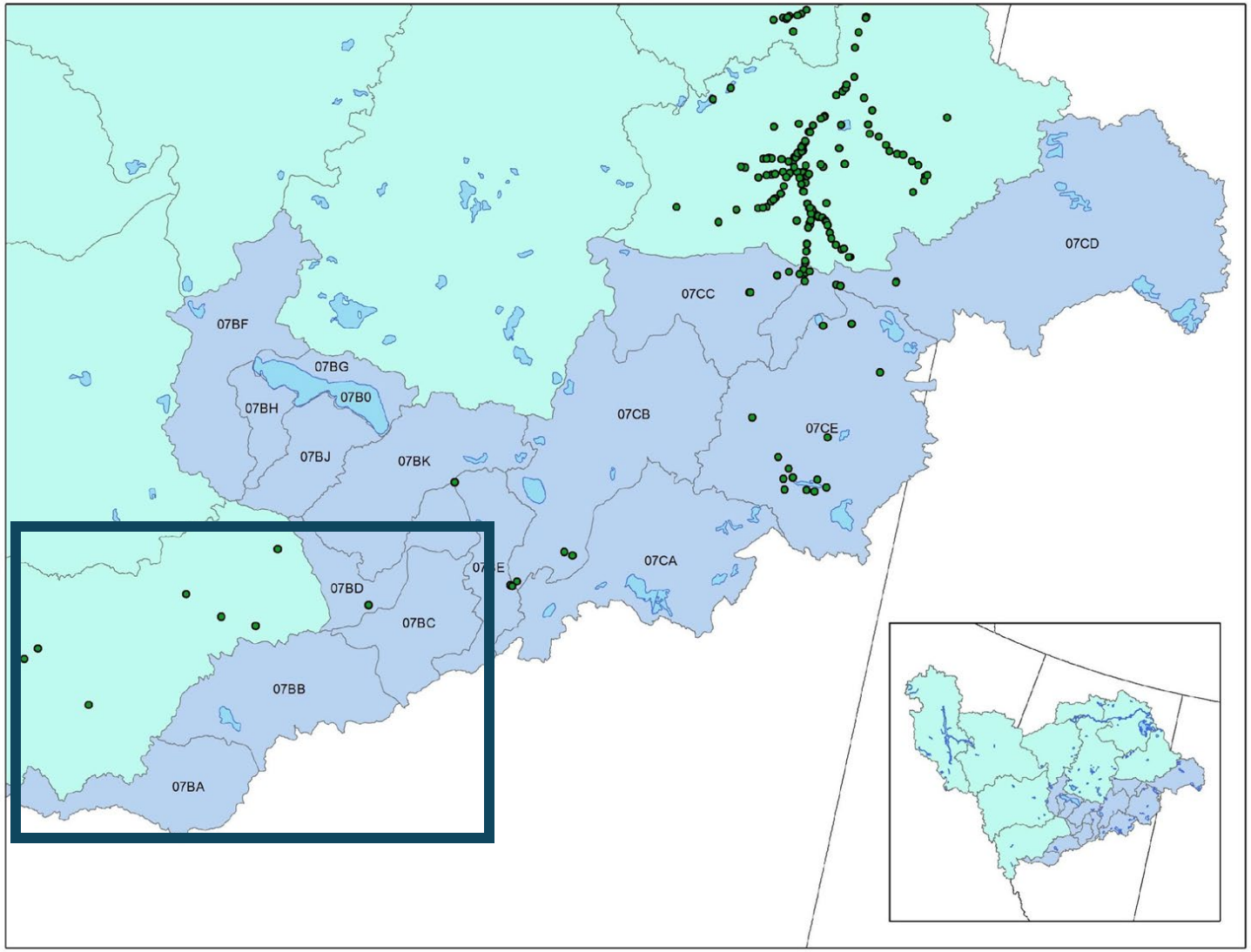
- Identified data gaps in the McLeod River watershed and Hardisty Creek watershed
- Only one sample collected in the McLeod River watershed
- No samples collected in the Hardisty Creek watershed



Source: World Wildlife Fund (2021)

Background of Project

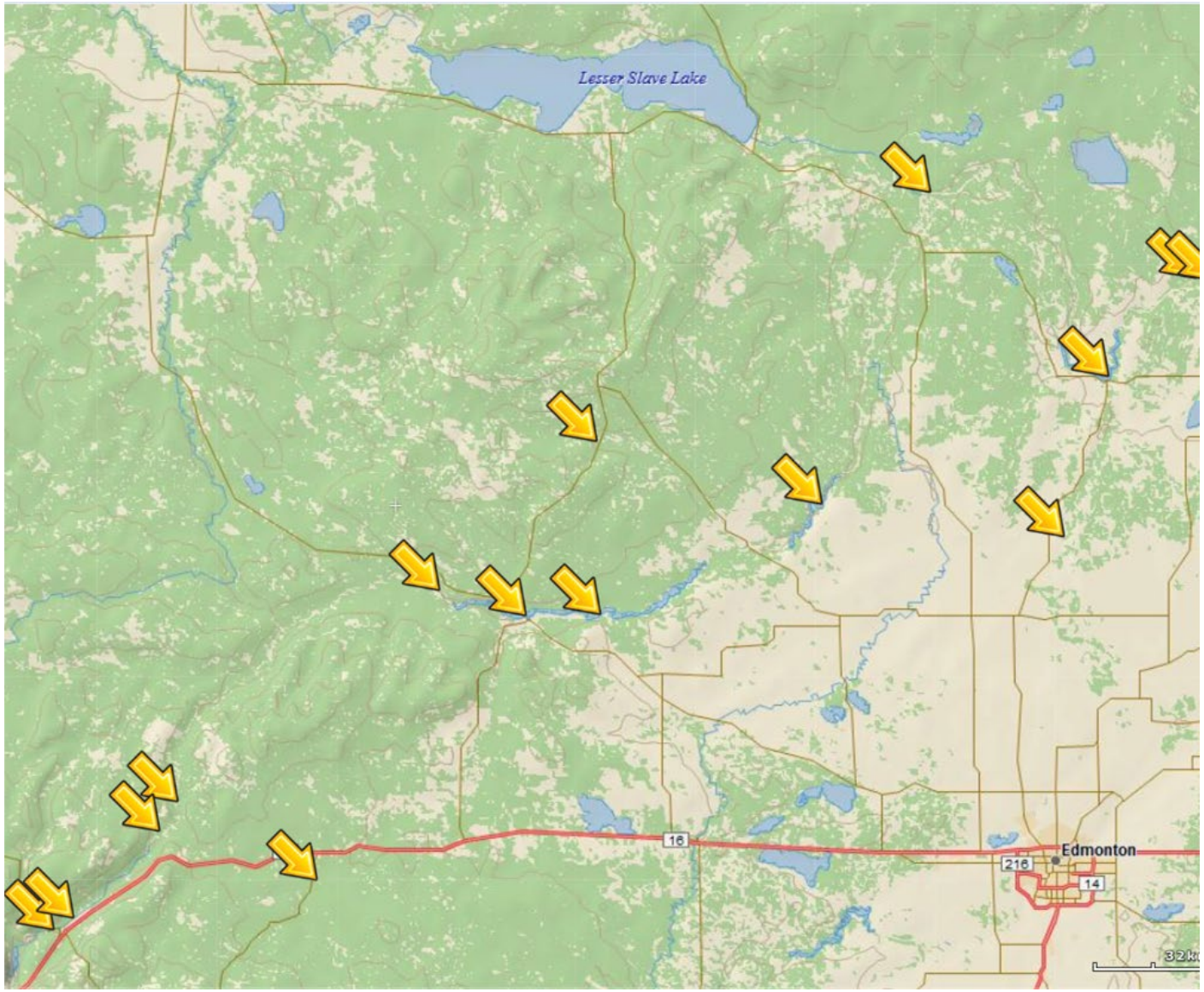
- Identified data gaps in the Pembina River watershed
- Samples were collected in the Pembina River sub-watershed in 2024



Source: World Wildlife Fund (2021)

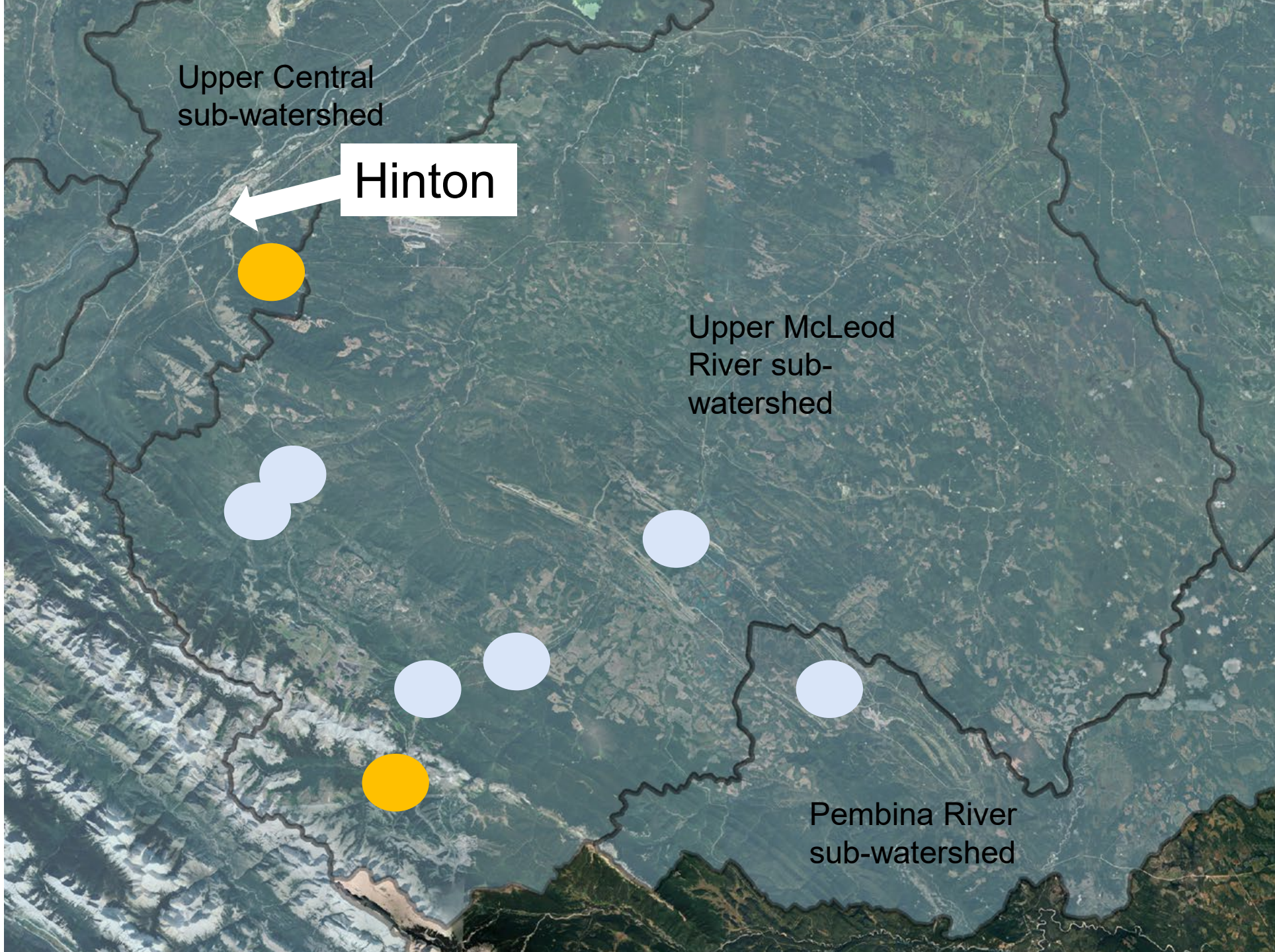
Upper Athabasca Community Based Monitoring

- This project occurred in 2015 and 2016
- Collected benthic invertebrate data, sediment quality data, and water quality data.
- They also did an assessment of heavy metals of the sediment and water quality



AWC staff and volunteers in the field

Current Sampling Sites



Legend

- Reference Sites
- Test Sites

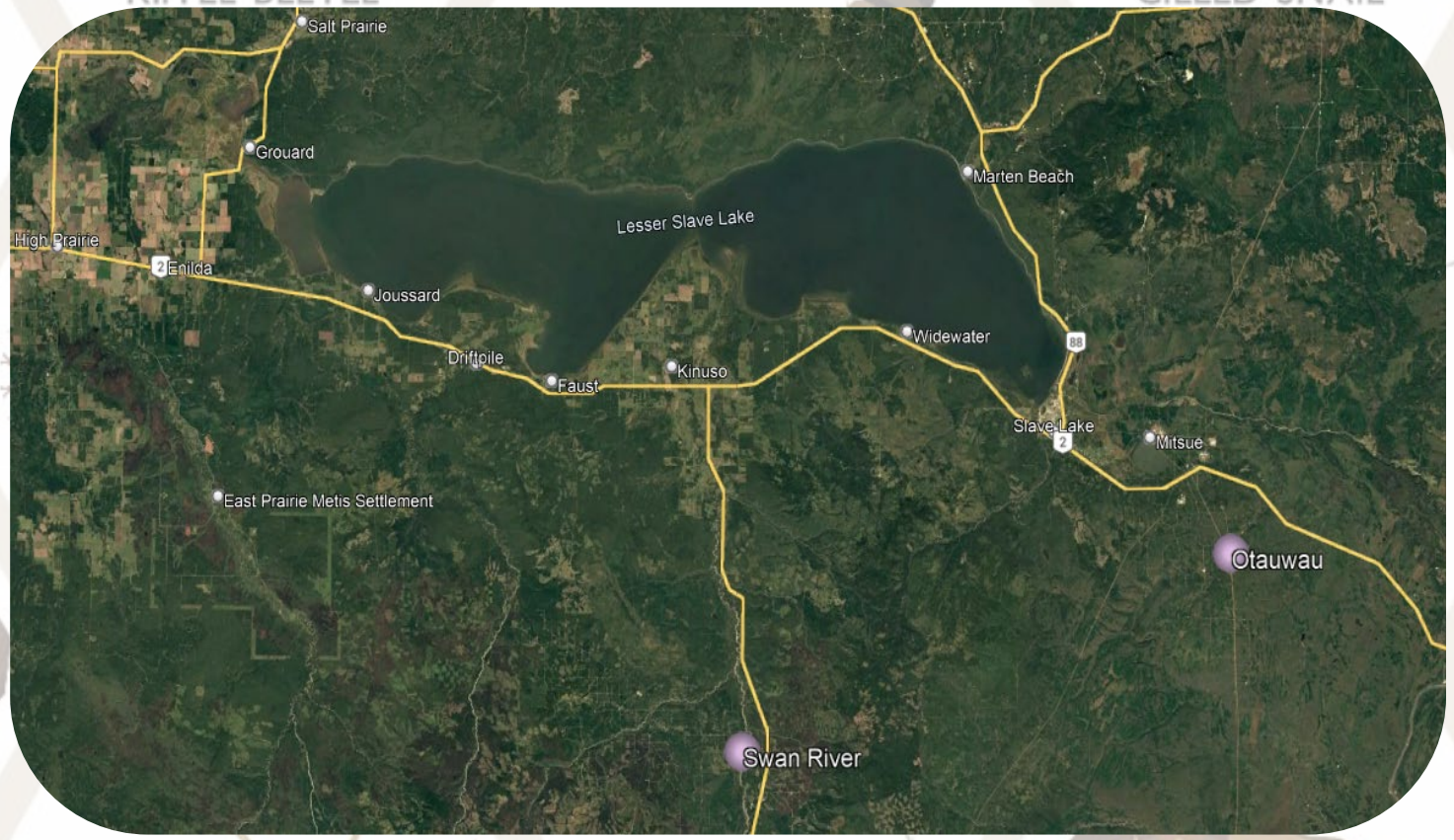
Results to Date

ABI Environmental Taxonomists have noted that there are more benthic invertebrates in our samples each year

Further analysis will be complete in 2026 after 5-years of data collected and analyzed

LSWC & Benthics

- Program began in 2024
- 2 sites last year
  - Additional sites to added in 2025
- Compliment the water quality program at established locations



2024 Results

Swan River Site

Maccaffertium

Total abundance: 1184

Total richness: 31

Otauwau River Site

Taeniopteryx

Total abundance: 8400

Total richness: 25

2024 Results

Swan River Site

Maccaffertium

%EPT: 52%

Otauwau River Site

Taeniopteryx

%EPT: 5%

Stewardship in Action

- X-Stream science program
  - Developed by the Battle River Watershed Alliance
  - LSWC began delivery in 2022 Athabasca began in 2023
  - Hands on experience for Grade 8 & 10 – 12 students
  - Explore water quality using biotic and abiotic factors

Stewardship in Action

Step 1

Step 2

Stewardship in Action

Step 3

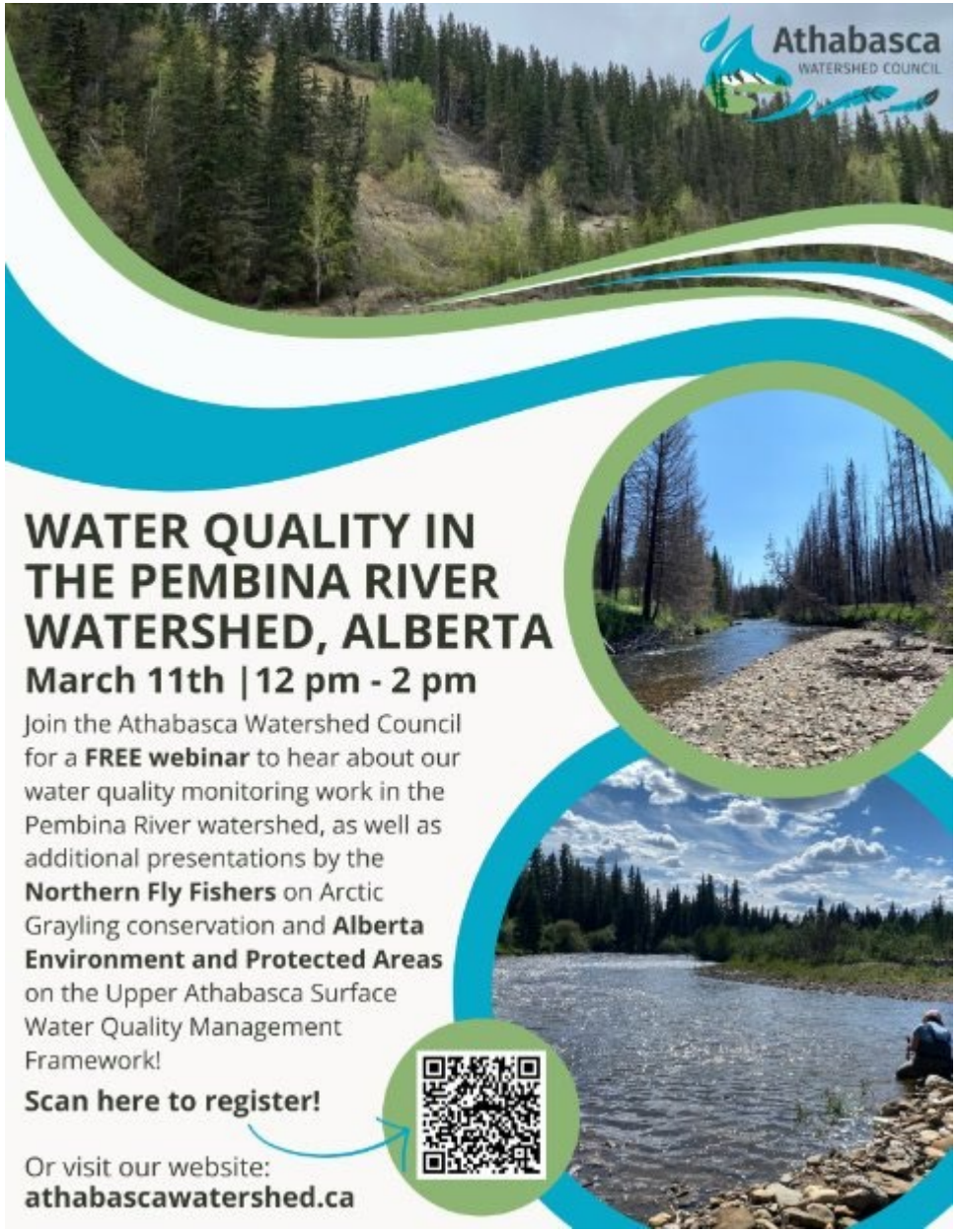
Stewardship in Action

- Importance of healthy riparian areas
- How human land use affects water quality
- Understand chemical water quality parameters
- Understanding pollution tolerance in benthic macroinvertebrates

Upcoming webinar: Water Quality in the Pembina River watershed, Alberta

Register on our website:

athabascawatershed.ca



Thank you!

Sarah Shortt

Watershed Science Program Manager

Athabasca Watershed Council

(780) 213-4550

sarah@athabascawatershed.ca

Jess Lario

Science and Outreach Coordinator

Lesser Slave Watershed Council

(780) 523-9800

coordinator@lswc.ca