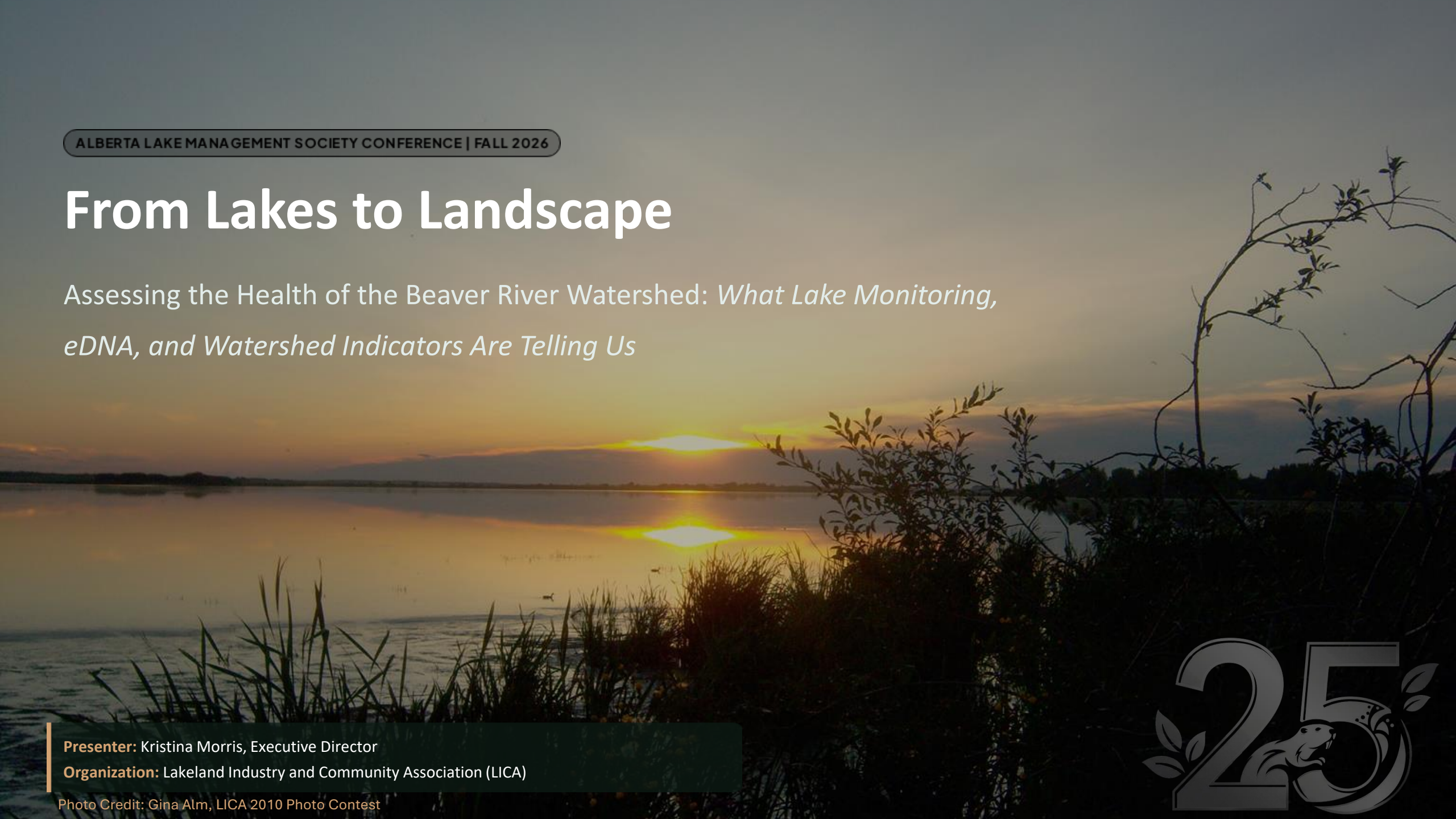
ALBERTA LAKE MANAGEMENT SOCIETY CONFERENCE | FALL 2026

From Lakes to Landscape

Assessing the Health of the Beaver River Watershed: *What Lake Monitoring, eDNA, and Watershed Indicators Are Telling Us*

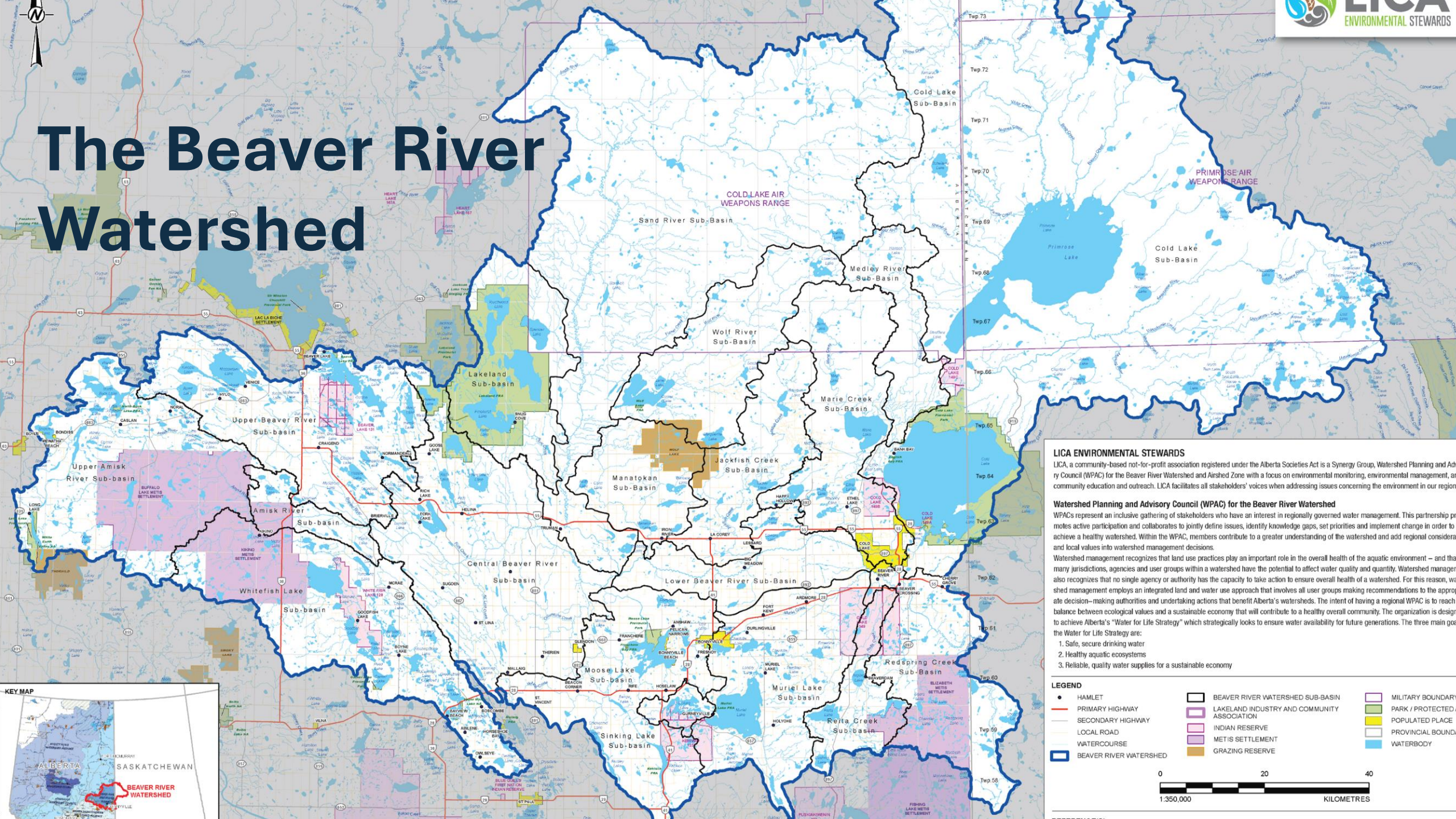


Presenter: Kristina Morris, Executive Director
Organization: Lakeland Industry and Community Association (LICA)

Photo Credit: Gina Alm, LICA 2010 Photo Contest

Watershed Planning Advisory Council (WPAC) Governance Model

The Beaver River Watershed



LICA ENVIRONMENTAL STEWARDS

LICA, a community-based not-for-profit association registered under the Alberta Societies Act is a Synergy Group, Watershed Planning and Ad
ry Council (WPAC) for the Beaver River Watershed and Airshed Zone with a focus on environmental monitoring, environmental management, ar
community education and outreach. LICA facilitates all stakeholders' voices when addressing issues concerning the environment in our region

Watershed Planning and Advisory Council (WPAC) for the Beaver River Watershed

WPACs represent an inclusive gathering of stakeholders who have an interest in regionally governed water management. This partnership pr
motes active participation and collaborates to jointly define issues, identify knowledge gaps, set priorities and implement change in order to
achieve a healthy watershed. Within the WPAC, members contribute to a greater understanding of the watershed and add regional considera
and local values into watershed management decisions.

Watershed management recognizes that land use practices play an important role in the overall health of the aquatic environment – and tha
many jurisdictions, agencies and user groups within a watershed have the potential to affect water quality and quantity. Watershed manager
also recognizes that no single agency or authority has the capacity to take action to ensure overall health of a watershed. For this reason, wa
shed management employs an integrated land and water use approach that involves all user groups making recommendations to the appro
ate decision–making authorities and undertaking actions that benefit Alberta's watersheds. The intent of having a regional WPAC is to reach
balance between ecological values and a sustainable economy that will contribute to a healthy overall community. The organization is desig
to achieve Alberta's "Water for Life Strategy" which strategically looks to ensure water availability for future generations. The three main goa
the Water for Life Strategy are:

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

LEGEND

- HAMLET
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- BEAVER RIVER WATERSHED
- BEAVER RIVER WATERSHED SUB-BASIN
- LAKELAND INDUSTRY AND COMMUNITY ASSOCIATION
- INDIAN RESERVE
- METIS SETTLEMENT
- GRAZING RESERVE
- MILITARY BOUNDARY
- PARK / PROTECTED
- POPULATED PLACE
- PROVINCIAL BOUNDA
- WATERBODY

0 20 40

1:350,000 KILOMETRES

How Healthy is Our Watershed?

Central Question: What do we Mean by “Watershed Health”?

SCALE 1: FOCAL POINTS

LAKES & WATERBODIES

- Water quality
- Water availability
- Aquatic invasive species

SCALE 2: CONNECTORS

LANDSCAPE

- Wetlands
- Riparian intactness
- Native cover
- Wildlife

SCALE 3: WHOLE SYSTEM

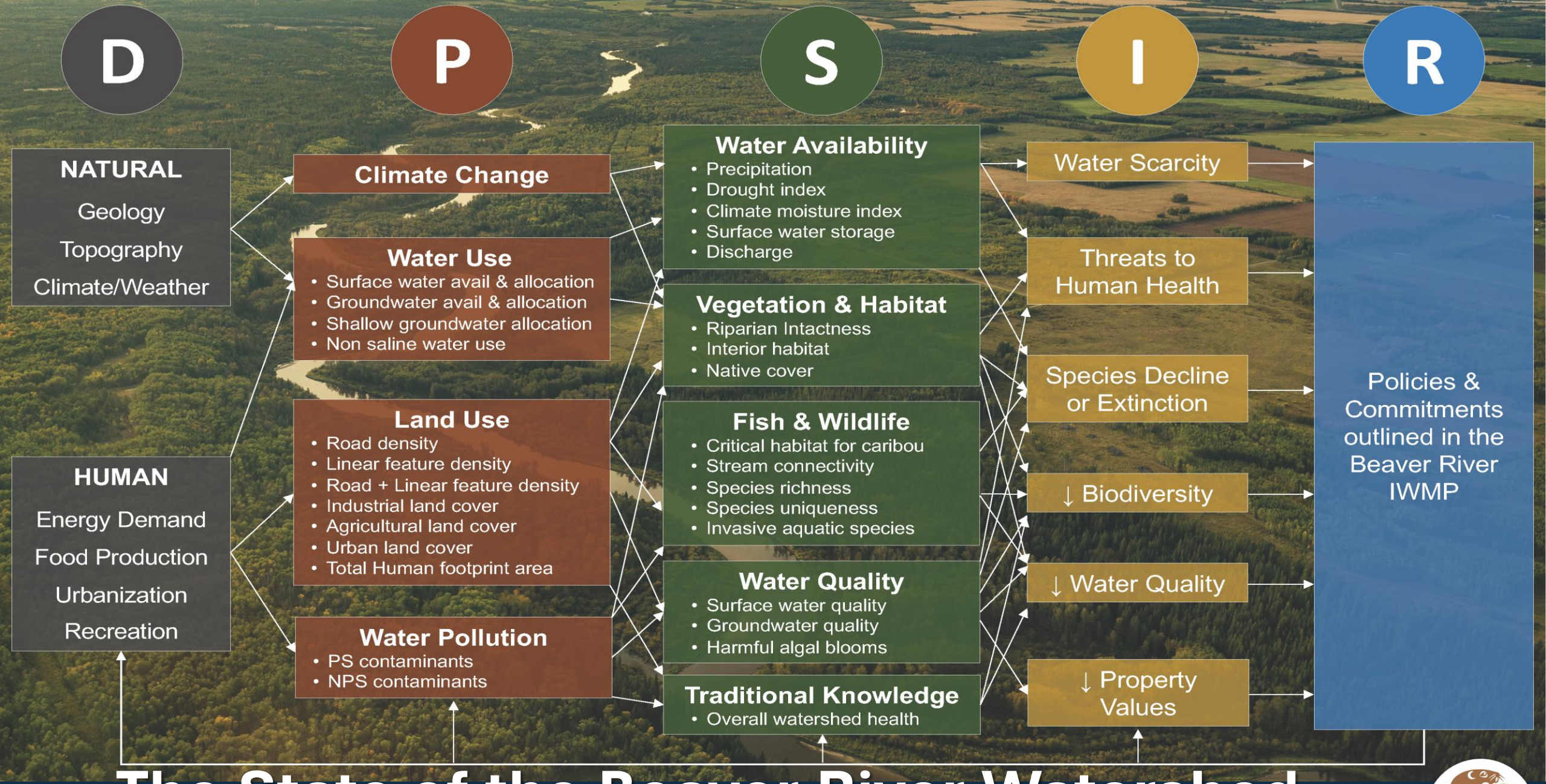
WATERSHED

Ecological Condition

- Aquatic ecosystems
- Habitat
- Biodiversity

Natural & Human Pressures

- Climate change
- Water use
- Land use
- Contamination



The State of the Beaver River Watershed

11 indicators • 39 overarching metrics • Indigenous Knowledge

What Are Our Lakes Telling Us?

Water Quality Monitoring

2025 LAKEWATCH WATER CHEMISTRY FINDINGS

Lake Name	Total Phosphorus (µg/L)	Total Kjeldahl Nitrogen (mg/L)	Chlorophyll-*a* (µg/L)	Microcystin (µg/L)	Euphotic Depth (m)
Elinor	47	1.75	23.4	1.51	3.1
Hilda	11.3	1.4	4.6	0.1	5.5
Lac Bellevue	22.5	1.27	7.4	0.25	6.8
Lower Mann	285	7.32	158.9	13.38	1.2
Marie	9.4	0.59	3.4	<0.1	8.3
Moose	39.8	1.7	25.9	1.26	3.3
Skeleton North	115.5	3.53	56.1	17.7	0.6
Skeleton South	50.2	1.5	30.8	1.04	2.4
Upper Mann	104.2	4.45	47.5	1.07	3.1
Whitefish	20.2	1.09	6.2	0.1	5.4

What Are Our Lakes Telling Us?

Aquatic Invasive Species (AIS) Monitoring

LICA ENVIRONMENTAL STEWARDS

2025 & 2026 Waterbodies Tested

- Moose Lake
- Marie Lake
- Kehewin Lake
- Long Lake
- Crane Lake
- Cold Lake
- Fork Lake
- Floating Stone Lake
- Whitefish Lake
- Skeleton Lake
- Pinehurst Lake
- Garner Lake
- North Buck Lake
- Buffalo Lake
- Beaver Lake
- Sand River
- Beaver River

Species Tested

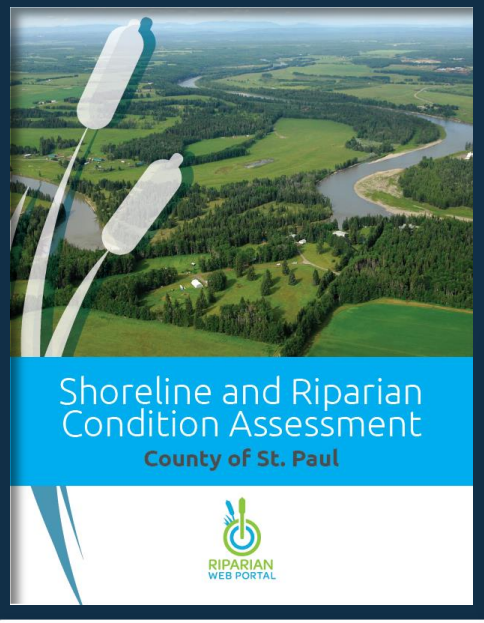
- Zebra Mussels
- Quagga Mussels
- Whirling Disease
- Proliferative Kidney Disease
- Bryozoan
- Prussian/ Common Carp
- Goldfish
- Northern Crayfish
- Rusty Crayfish
- Red Swamp Crayfish

A Hazen Company
waterSMART
Water Management Solutions

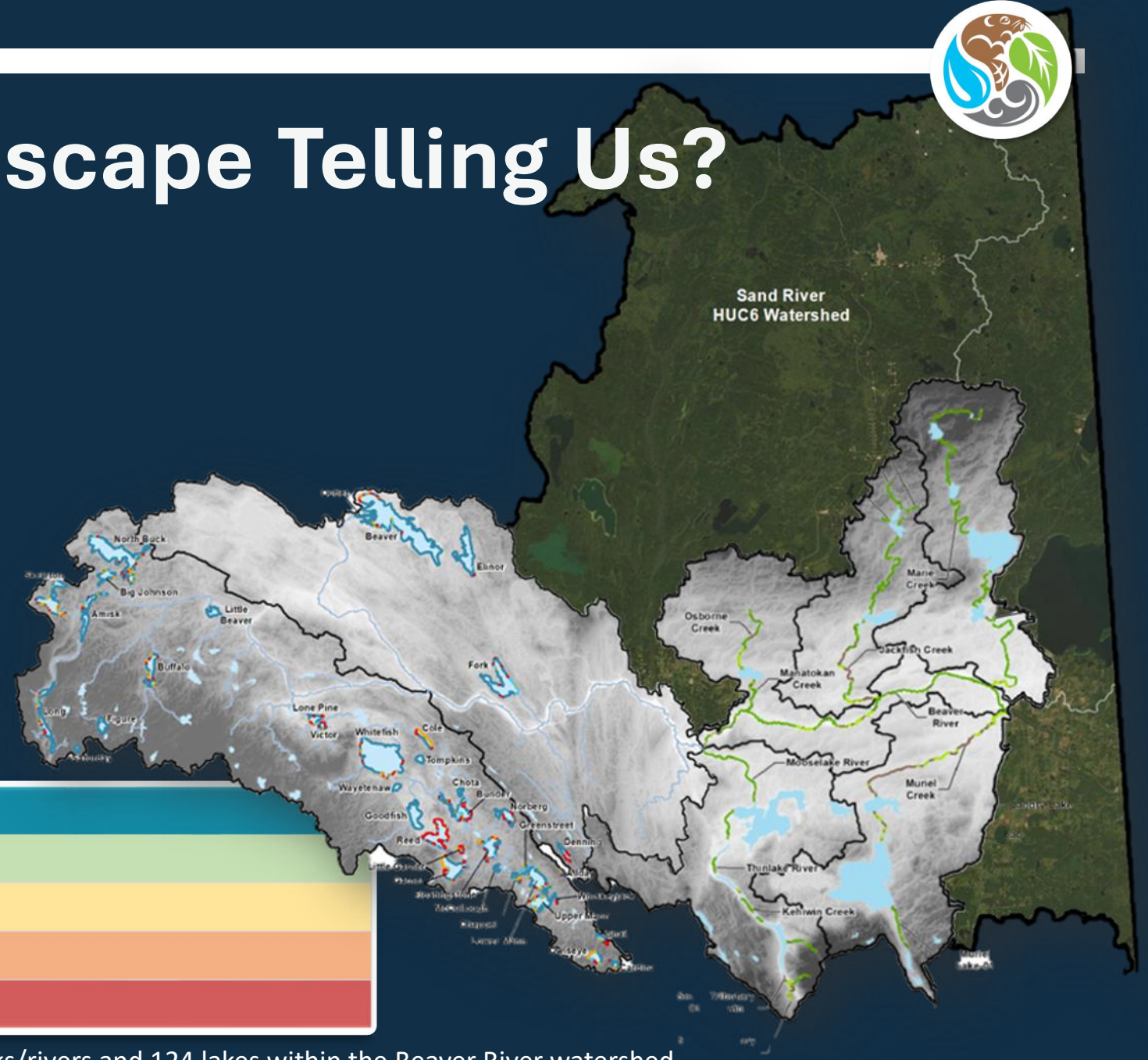
UNIVERSITY OF ALBERTA

What Is Our Landscape Telling Us?

Riparian Health



Distance of Riparian Area Assessed	Intactness Level
2,630 km	High
326 km	Moderate
205 km	Low
331 km	Very Low



Two large-scale riparian intactness assessments, including 60 creeks/rivers and 124 lakes within the Beaver River watershed

TWO-EYED SEEING (ETUAPTMUMK)

BLENDING INDIGENOUS KNOWLEDGE AND WESTERN SCIENCE.

INDIGENOUS KNOWLEDGE & WAYS OF KNOWING (LEFT EYE)

HOLISTIC VIEW:
Interconnectedness of all things; mind, body, spirit, and land.

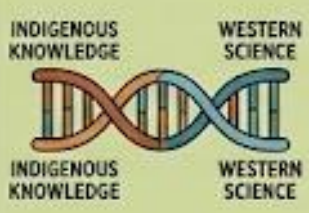
ORAL TRADITION & STORYTELLING:
Knowledge passed down through generations; embedded in culture.

RELATIONSHIP-BASED:
Focus on reciprocal relationships with nature and all beings.

EXPERIENTIAL & PLACE-BASED:
Knowledge gained through long-term observation and living in a specific environment.

CO-LEARNING ZONE

TOGETHER FOR THE BENEFIT OF ALL

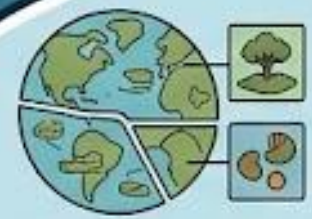


WEAVING KNOWLEDGES:
Recognizing strengths; not assimilation, but collaboration.

CULTURAL SAFETY & RESPECT:
Building trust; validating all ways of knowing.

ENHANCED UNDERSTANDING & SOLUTIONS:
Complex, integrated solutions for climate change and health. A clearer, deeper understanding of the world; innovative outcomes.

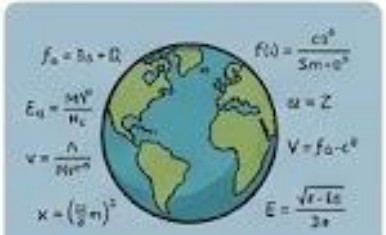
WESTERN SCIENCE (RIGHT EYE)



REDUCTIONIST VIEW:
Breaking complex systems into smaller, testable parts.

EMPIRICAL EVIDENCE:
Based on experimentation, measurement, and data.

QUANTITATIVE ANALYSIS:
Focus on mathematical models and replicable results.



UNIVERSAL LAWS:
Seeking general principles that apply everywhere.

INTRODUCED BY ELDER ALBERT MARSHALL
(MI'KMAW FIRST NATION)

RESPECT RELEVANCE RECIPROCITY RESPONSIBILITY

What Indigenous Knowledge and Data Are Telling Us Together

1 WATER LEVELS

Observed declines in lake, river and creek levels over time, alongside recognition of flooding events.

2 FISH POPULATIONS & HEALTH

Concerns about declines in fish size, abundance and quality.

3 RIPARIAN AREAS & MEDICINES

Riparian areas identified as essential to ecosystem health; rat root increasingly difficult to find in some locations.

4 HARVESTING & WILDLIFE

Changes in the availability and distribution of berries, medicines and wildlife, including concerns about moose.

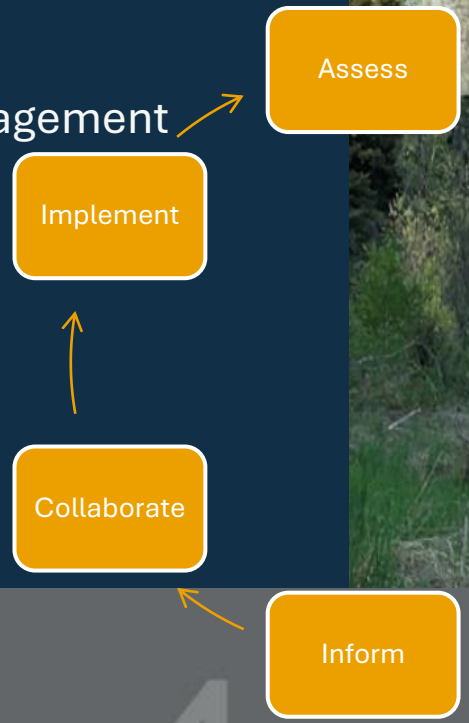
5 WATER QUALITY

Changes in water colour and smell, increased algal blooms in some areas, and concerns about drinking water directly from lakes and rivers as was done historically.

Together, these perspectives provide a more complete picture of what is changing and what those changes mean on the land.

From Data Collection to Action

Connecting Monitoring to Watershed Management



PRIORITIES

1

Long-term Surface Water Monitoring

Develop and implement a long-term surface water quality monitoring program in collaboration with all stakeholders to leverage resources and achieve mutual goals.

2

Protecting Water Quality and Riparian Areas

Collaborate to implement BMPs and land use strategies to protect water quality and riparian health, particularly where riparian intactness scores are below the target and threshold and water quality is a concern.

3

Riparian Restoration

Seek opportunities to support riparian restoration where assessments indicated health condition does not achieve targets and/or thresholds.

4

Fisheries Monitoring

Collaborate with stakeholders to prioritize and develop a fishery monitoring program, including key habitat. Update fisheries management objectives prior to tourism and recreation planning (proposed in the Cold Lake Sub-Regional Plan).

5

Floodplain Mapping

Prioritize the completion of floodplain maps for watercourses and high-water marks for lakes to support implementation and enforcement of urban development setbacks through policy and planning.

What do we Mean by “Watershed Health”?

Is the Beaver River Watershed Healthy?

1. Monitor what we can measure.

2. Learn from what the data tell us.

3. Work together on what comes next.

"The value of monitoring isn't simply the data we collect. It's what we do with that information that will serve our future generations."

LICA ENVIRONMENTAL STEWARDS

Thank You!

Kristina Morris, LICA Executive Director

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