Vermilion River (VR) Aquatic Ecosystem Health Assessment

Why Aquatic Ecosystem Health Matters

- Ecosystems should be able to function similarly to how they did before human alteration
- The Vermilion River watershed has been identified as one of the most altered of the greater North Saskatchewan River watersheds
- Alterations include wetland drainage, riparian degradation, organic pollution and management structures like dams and channels

Vermilion River WATERSHED ALLIANCE

Survey components

1 - AQUATIC HABITAT

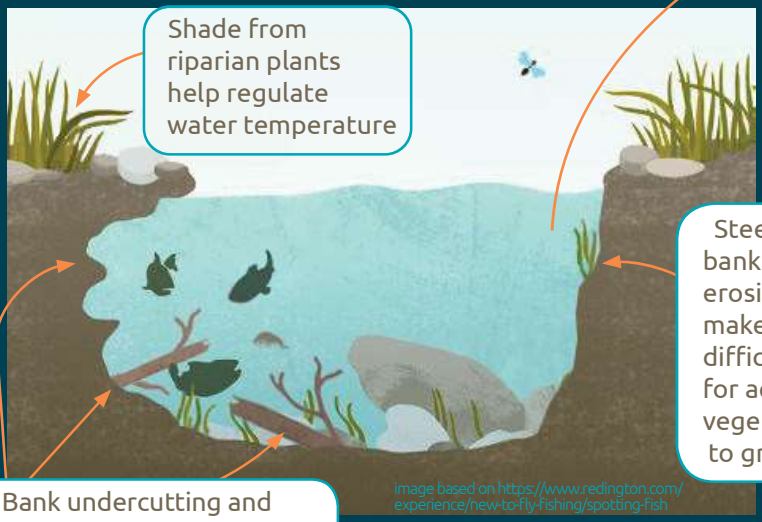
Measured by physical and chemical metrics

A. Physical:

- Shade cover
- Aquatic plant cover
- Diversity of habitat
- Bank undercutting
- Makeup of river bottom (substrate)

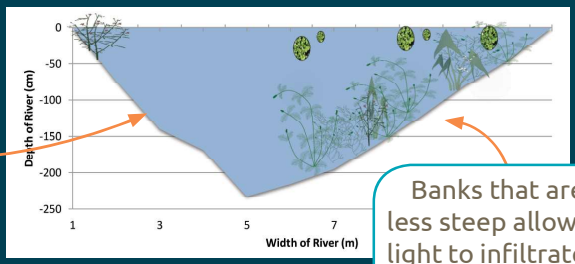
B. Chemical: Water is tested for the presence of:

- nitrogen (N)
- phosphorus (P)
- dissolved oxygen (DO)



2 - RIVER SIZE AND SHAPE + AQUATIC VEGETATION

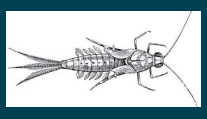
These components strongly influence the presence or absence of aquatic organisms



Banks that are less steep allow for light to infiltrate and encourages aquatic plant growth.

3 - MACROINVERTEBRATE SURVEYS

The presence or absence and combination of specific species indicate both past and present water quality. Macroinvertebrates (MI) are intermediaries between plant and fish life in the food web.



Mayfly larva are an example of MI species intolerant to pollution.

Scuds are an example of MI species moderately tolerant to pollution.

Leeches are an example of a MI species that can indicate low dissolved oxygen.

4- FISH SURVEYS

The presence or absence and combination of specific fish species can indicate water quality.

21% of fish captures had visible lesions, parasites, tumours, etc. which reflects stress

7/9 fish species known to exist in this area were captured during the surveys

71% of fish captured are species with tolerance to pollution or low oxygen levels

The final station at the mouth of the Vermilion River was the only station that had fish species which can't tolerate pollution like this Longnose Dace.

7 Sampling Stations along the Vermilion River

- Were surveyed in late summer of 2015, a time of low flow
- 5 transects were surveyed at each station to represent a 200 metre reach

Station Results

LEGEND & TERMS

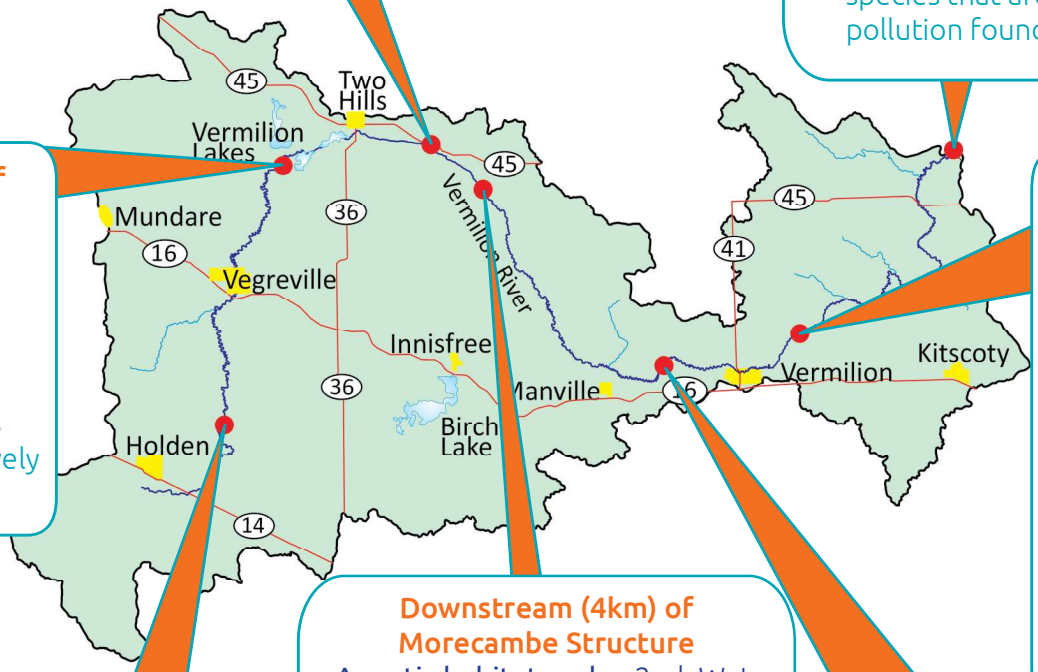
- Aquatic habitat rank
- Aquatic plants
- Other info about stations
- DO = dissolved oxygen: needed for aquatic life to survive

Middle of Vermilion Lakes chain

- **Aquatic habitat** score = 6th: low habitat diversity, lack of shade
- **Aquatic plants** overabundant, low diversity
- Important corridor for wildlife & migratory birds

Mouth of the VR joins the North Saskatchewan River

- **Aquatic habitat rank** = 1st: most diverse habitat & good water quality
- **Aquatic plants**: most species present here
- Only station with flow present in late summer and highest DO levels
- Greatest fish diversity and species that are sensitive to pollution found here



Downstream of Vegreville

- **Aquatic habitat rank** = 4th
- **Aquatic plants** = not many due steep banks and too much debris
- DO levels relatively good

Downstream (10 km) of Vermilion Dam & reservoir

- **Aquatic habitat rank**= 7th
- **Aquatic plants** overabundant due to shallow depth & waste water
- DO too low here for aquatic life
- No natural flow in late Summer

Downstream (4km) of Morecambe Structure

- **Aquatic habitat rank** = 2nd: Water quality improved after Vermilion River Lakes chain (nutrient sinks) and Morecambe Structure (aeration)
- **Aquatic plants** = moderate diversity and health
- Best fish diversity of first 4 upstream reaches
- Good DO levels
- MIs indicate less pollution than 3 upstream reaches

Headwaters of the VR

- **Aquatic habitat rank** = 5th: fragmented due to crossings and erosion
- **Aquatic plants** = least amount of plants due to turbidity & pollution in water
- Highly visible algal production due to nutrients and low DO levels

Upstream (15km) of the Vermilion Reservoir

- **Aquatic habitat rank** = 3rd
- **Aquatic plant: highest diversity**
- Good water quality, but low DO
- Good potential for Northern pike & for migrating fish here
- Healthy Riparian area on south river bank

Macroinvertebrate (MI) Surveys at all 7 stations indicated that water quality ranged from fairly poor to very poor. The first 3 upstream stations in particular indicated very poor water quality.

To read the full report, please go to: https://www.nswa.ab.ca/resource/vermilion-river-aquatic-ecosystem-assessment/

Vermilion River WATERSHED ALLIANCE