This report card summarizes the results from the first five years of benthic invertebrate sampling conducted in the East Interlake Conservation District (EICD) at sites within 8 streams:

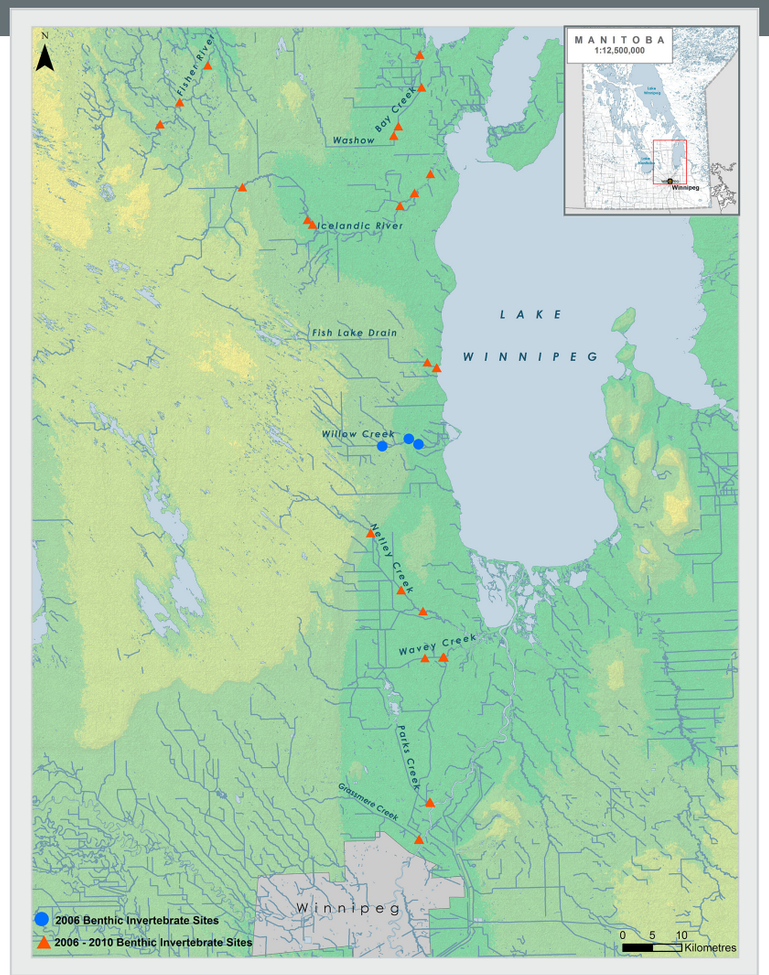
- Grassmere Creek
- Parks Creek
- Wavey Creek
- Netley Creek
- Fish Lake Drain
- Icelandic River
- Washow Bay Creek
- Fisher River

Next steps:

The EICD and its partners are going to work with land owners or other people interested in completing some of the options within this pamphlet, or within the Integrated Watershed Management Plans (IWMP) of these watersheds.

Bioassessment of streams in the EICD using benthic invertebrates will be an ongoing practice. By 2015, a similar report card will be produced which will display whether changes have occurred.

For more information on what you can do to help, or to see the full report, go to www.eicd.ca or call 204.642.7578.



BIOASSESSMENT OF STREAMS IN THE EAST INTERLAKE CONSERVATION DISTRICT USING BENTHIC INVERTEBRATES 2006-2010

EICD Bioassessment Report Card

eicd East Interlake Conservation District

Manitoba

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LAKE WINNIPEG FOUNDATION

eicd East Interlake Conservation District

OBJECTIVE:

To characterize the benthic invertebrate fauna to assess the biological condition in streams located in the EICD. This information can be used as a tool for continued watershed management and water quality improvements.

Why bugs?

Benthic invertebrates are small animals without backbones that live in stream or lake sediments. Invertebrates are an important food source for fish and for describing the quality of fish habitat. Benthic invertebrates are valuable indicators of biological condition because they are easy to sample and relatively stationary, reflecting the local habitat conditions.

In addition to benthic invertebrate sampling, supporting habitat variables and stationary water quality measurements were recorded at all sites.

Benthic invertebrate communities were described using these metrics:

- Total invertebrate abundance
- Proportion of major invertebrate groups (%)
- Taxa richness (number of different invertebrate families)
- EPT taxa richness (number of different E = mayfly P = stonefly T = caddisfly families)
- Effective richness (number of different families that make up the majority of the community)
- EPT:Chironomidae ratio (compares the number of mayflies, stoneflies, caddisflies to the number of midges);
- Indices of taxonomic diversity and evenness
- Family biotic index (FBI; organic pollution tolerance value)

RESULTS

Supporting Habitat Variables

Channelized section at Grassmere Creek

Substrate from Fish Lake Drain

- Land use type for the majority of the stream sites was agricultural, and included farmsteads, livestock pasture/ grazing land, crop land, and hayland; a few sites were located in mixed forest (Wavey Creek) or residential/ commercial areas (Grassmere Creek and Fish Lake Drain).
- Aquatic habitat diversity was relatively low at most sites; channel shape was straight with few to no meanders (channelized).
- Canopy cover (amount of shade provided by trees and shrubs) was minimal and the riparian corridor was narrow and non-diverse (mainly consisting of reed canary grass along the banks).
- Substrate types varied at many sites but generally where channels were straight, the substrate was also non-diverse (mainly clay). Wavey Creek had artificial riffle sections.

Water Quality

Sampling at Netley Creek

- Most sites were relatively well-oxygenated and above the most stringent water quality objectives for the protection of cool-water aquatic life during all sampling events.
- pH of the streams was somewhat alkaline and was consistently within the Manitoba water quality guideline for the protection of aquatic life.
- Turbidity varied between years and some exhibited spatial differences across sites during the same sampling event, which is typical for stream environments.
- Specific conductance was similar across sites, though notably higher in the Icelandic and Fisher rivers and in Washow Bay Creek (2010); the reverse was observed in 2009.

Benthic Invertebrate Community

- **Composition and abundance were similar at most streams.**
  - Except at Netley Creek and Fish Lake Drain (relatively low).
- **Insects dominated the community at most streams.**
  - Except at Grassmere, Parks and Wavey creeks where non-insect taxa were most numerous.
- **Twenty-two invertebrate families were identified; only 3 families were notable at all stream sites.**
  - Insects mainly consisted of mayflies and midges.
  - Non-insects mainly consisted of amphipods.
- **Diversity of EPT was low at most sites.**
  - Dominated by mayflies, in particular small minnow mayfly: a wide-spread mayfly group with general habitat requirements and in the mid-range of organic pollution tolerance.
- **EPT and midge community was fairly balanced at most streams.**
  - Except at Fisher River.
- **Diversity and evenness values were the same at all streams.**
  - Low diversity
  - Taxa were intermediately distributed amongst the invertebrate groups.
- **FBI values ranged from fair to fairly poor with an overall rating of fairly poor for all streams.**
  - Icelandic River had the best FBI score and Parks Creek had the worst FBI score.

Midges (Chironomidae)

Small minnow mayfly (Baetidae: Ephemeroptera)

Amphipod

What Does This Mean?

Adjacent land use at Washow Bay Creek

- With a few exceptions, the majority of the EICD streams are similar to one another.
- There are lots of bugs in the EICD streams, but diversity is low and most belong to the same few groups.
- Many of the invertebrates collected in the EICD streams are in the mid- to highly tolerant range for organic pollution, which means substantial organic pollution is likely.
- The bioassessment indicated that EICD streams are under stress (e.g., land use distant from and immediately adjacent to the streams).

Potential Options for Enhancements:

- The biological condition of the EICD streams can be enhanced further with continued watershed management and water quality improvements.
- Water quality within streams would improve through the combined implementation of sustainable land and water management.

  For example:

  - Retention of the region's remaining wetlands and small permanent lakes to function as natural water storage basins. Wetlands store water that is slowly released to the receiving streams and lakes; this slows and reduces the accumulation of dissolved nutrients/pesticides and their eventual transport into connected watercourses.
  - Land use practices that support the use of perennial vegetation. Perennial vegetation functions to improve soil pore structure, thereby improving water infiltration and plant utilization, and also reduces soil erosion. Perennial vegetation requires less nutrient/ pesticide application compared to greater application levels used for crop production.
  - Enhance the stream bank vegetation by allowing a longer growing period before disturbance (e.g., control the timing and duration of grazing), by establishing additional species to increase vegetation diversity (with appropriate species), and by widening the vegetated corridor (e.g., with seeds or seedlings). Riparian vegetation provides a physical filter to sediment-borne nutrients/pesticides from overland runoff; provides structure for good water infiltration; and stabilizes banks to control erosion.
  - Construction of riffles within long, straight hydraulic 'runs' in order to diversify the existing hydraulic habitat and improve the aquatic environment for resident species (e.g., bugs and fish).

Artificial riffle at Wavey Creek