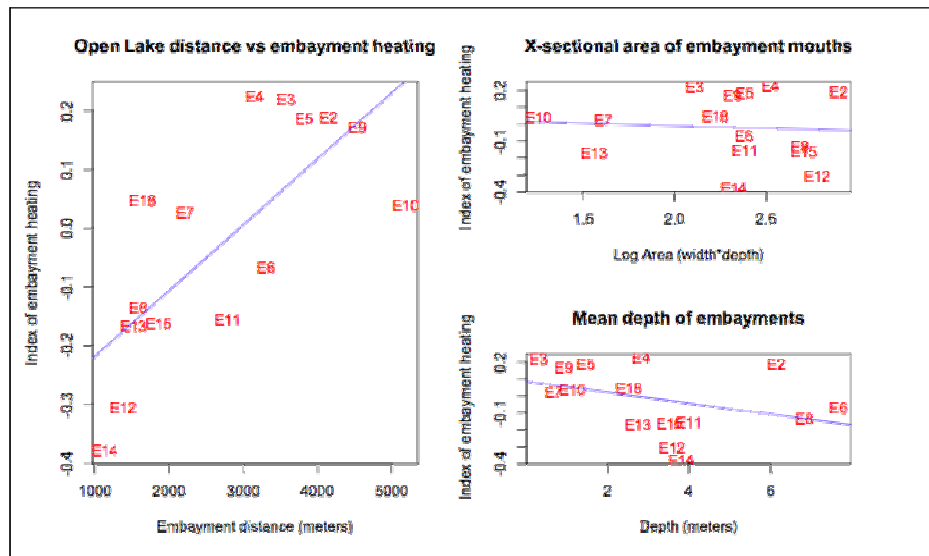
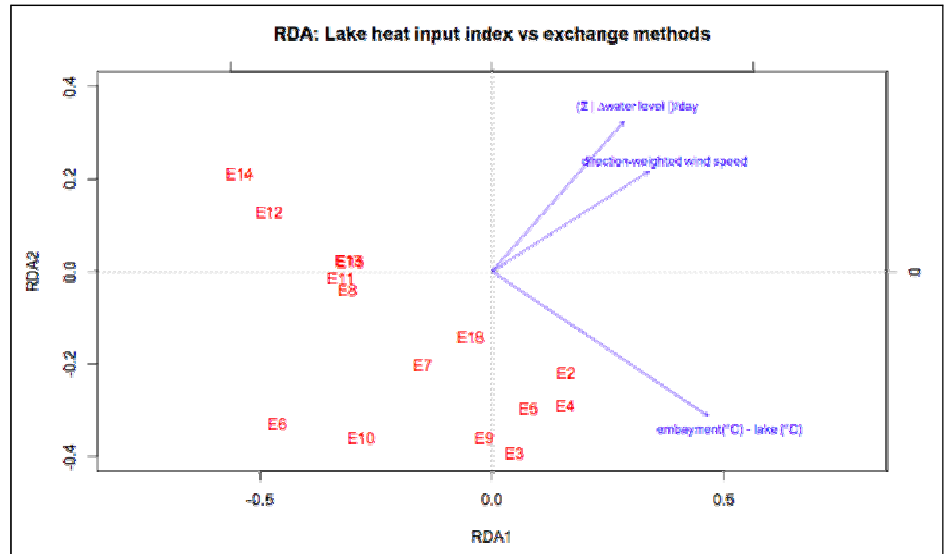
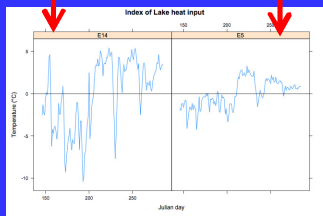
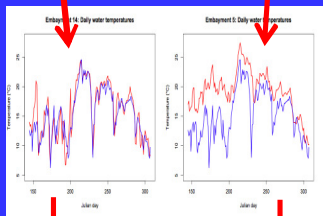




AQUATIC HABITAT TORONTO

Variation in Thermal Habitat Characteristics in 18 Small Coastal Embayments in Lake Ontario



ABSTRACT

Introduction:

Warmwater embayments that the Toronto and Region Conservation Authority have recently built or rehabilitated have permanent connections with Lake Ontario that allow for a continual exchange of waters and aquatic organisms. A critical function for these embayments is to provide nursery habitat for warmwater fish early in the summer season. However, this function may be impaired, (and growth potentially reduced), if the embayments are continually flooded with colder lake waters.

Purpose:

1. To determine the degree of lake-embayment exchange for a wide variety of embayments and,
2. To determine whether early summer coldwater intrusions in embayments might be controlled by various design characteristics of embayments.

Method:

- Temperature regimes of 18 embayments with differing bathymetric characteristics were monitored with temperature loggers in 2007.
- To evaluate which mixing processes dominated lake-embayment exchange weather-adjusted lake heat input to each embayment was related in a redundancy analysis to indices of lake exchange mechanisms.
- Indices of the temperature difference between the lake and each embayment were regressed against embayment characteristics to determine which embayment design characteristics most contribute to warmwater habitat.

Results:

1. Embayments are cooled by lake exchange early in the season and warmed by it later in the season (Fig B).
2. Embayments distribute themselves along a gradient of lake-embayment temperature difference (Fig 1).
3. The distance between the embayment mouth and open lake waters is the constructible characteristic most important in restricting lake-embayment exchange early in the season (Fig 2C). Neighboring embayments with very different bathymetry can have very high exchange with the lake, suggesting that shoreline currents (and perhaps multiple connections with the lake) may be powerful enhancers of exchange with the lake (Fig 2D).

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