Methods for characterization of freshwater turtle nesting beaches in an urban environment

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In Collaboration with the Toronto Zoo

The Plight of Urban Turtles

- Inflated predator population
- Humans
- Roads
- Dogs
- Pollution
- Habitat destruction/alteration
- Fragmentation

http://chicagowildernessmag.org/issues/fall2000/images.fall2000/A8693_4_8_K.jpg

http://www.conbio.org/resources/Tips/images/v18n3_turtleroad_lg.jpg

Unique Policy Opportunities for Toronto

- The Toronto Remedial Action Plan includes as a priority:

  - The protection of the remaining Great Lake wetlands

  - The rehabilitation of aquatic and riparian habitat

www.britannica.com/eb/art/print?id=13286&articleTypeId=1

Unique Policy Opportunities for Toronto

- The Canada-Ontario Agreement addresses lake and basin sustainability.

- "Conserve and protect aquatic ecosystems, species and genetic diversity of the Great Lakes Basin"

  – Let's make some beaches!

www.epa.gov/glnpo/lakeont/2002highlight/index.html

Unique Policy Opportunities for Toronto

- Rouge Park is the largest park in an urban area in North America

- Links Lake Ontario to the Oak Ridges Moraine
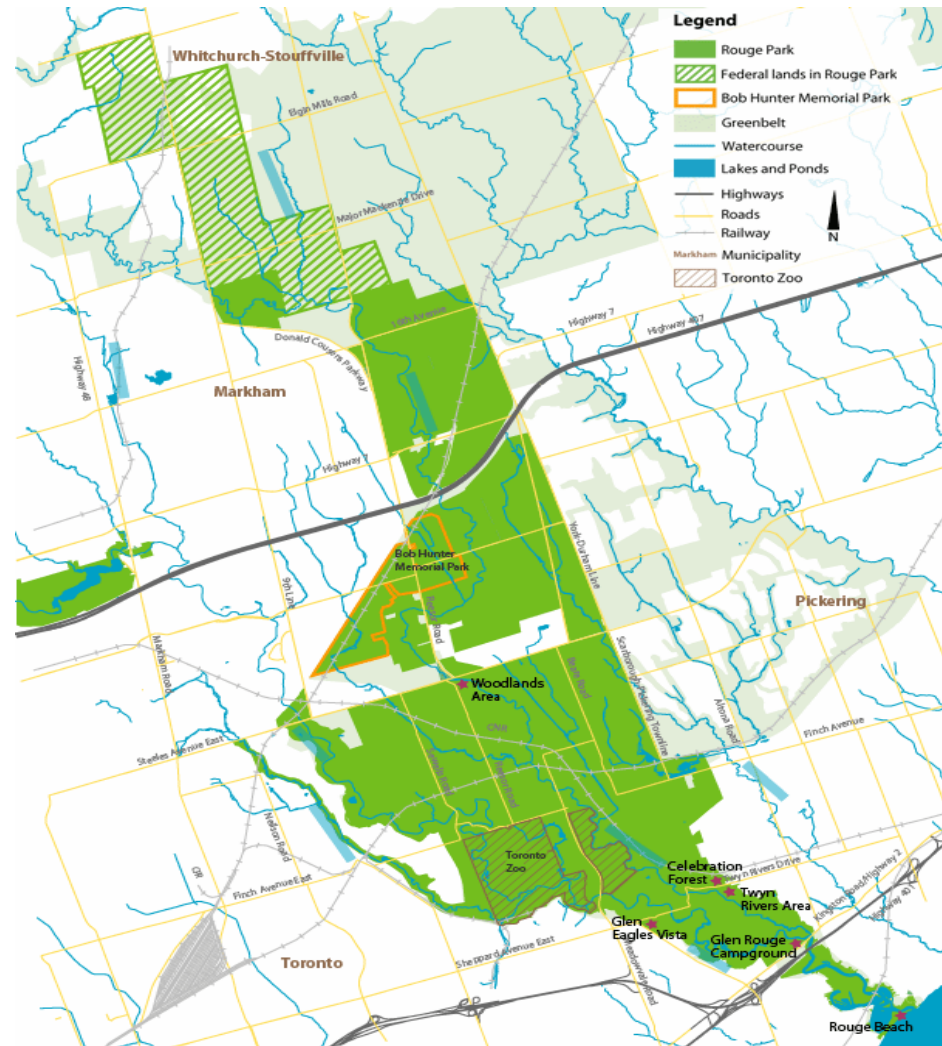
There is a favourable policy framework for wetland restoration within the region that can allow us to argue for turtle habitat rehabilitation

Artificial Nesting Habitat as a Management Option

- Artificial nest-beaches as a management option
  - Replace lost habitat
  - Increase predator search area
- Nesting beaches are currently being constructed but…
  - Fear of population sink

Turtle Nest-Beach Characterization in the Rouge River Valley

- Rouge watershed is the cleanest within the Toronto region
- Turtle population has been monitored in the lower Rouge Valley
- A small population with a limited nesting habitat
- The creation of a population sink could be catastrophic

Why Take the Risk?

- All management options in the region will have to include increased habitat

- Turtle nest-beaches are already being created

Minimizing the Risk

- By finding out as much as possible regarding what is required for a viable nest-beach we can minimize risks

www.adkscience.org/gallery/collections/babysnappers.htm

Research Challenges in an Urban Environment

- Increased human presence
  - Can create difficulties for data collection and monitoring

Research Focus 1

- Conduct gross beach analysis to determine general preference of nesting females

  – Compare known nesting beaches to beaches with no documented nesting activity

  – Examine a large number of factors to determine if a specific attribute of beach attracts females

Factors to Examine: Beaches

- Soil samples will be collected three different depths:
  - 0-10cm
  - 10-20cm
  - 20-30cm
- At each depth level will examine:
  - Temperature
  - Soil moisture
  - Organic matter
  - Particle size composition: >2mm (gravel) ---> <0.055mm (clay)
- Temperature of soil surface
- Inbound solar radiation and albedo
- Aspect
- Water potential
- Slope of the beach in 1m intervals from the water's edge to vegetation
- Water table levels at various sites on the beach

Research Focus 2

- Opportunistically monitor and characterize nests
  - Likely, not enough nests to perform a microhabitat analysis

Factors to Examine: Nests

- Temperature of soil surface
- Temperature of at the approximate depth of the nest with a data logger close to the nest in a random cardinal direction
- Inbound solar radiation and albedo of the surface of the nest and areas adjacent to the nest
- Aspect of nest
- Slope of beach leading to nest
- Water table levels of area adjacent to nest
- Percent vegetation surrounding nest
- Soil moisture, particle size composition, organic matter can only be measured after eggs have hatched or nests have been predated

Preliminary Data Analysis

- Invasive data collection must be minimized during nesting season

- Intra-beach variability of structure compared

- Two known nest beaches thoroughly examined for particle size composition, moisture, and organic matter

Preliminary Data Analysis
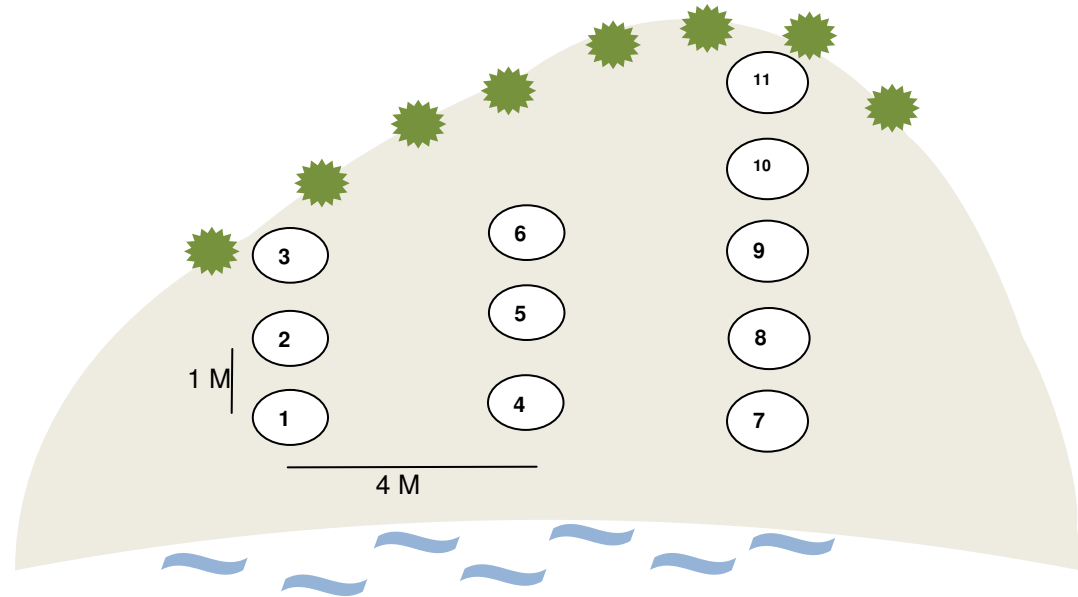## Nest Beach A

Large area, shallow slope

Preliminary Data Analysis
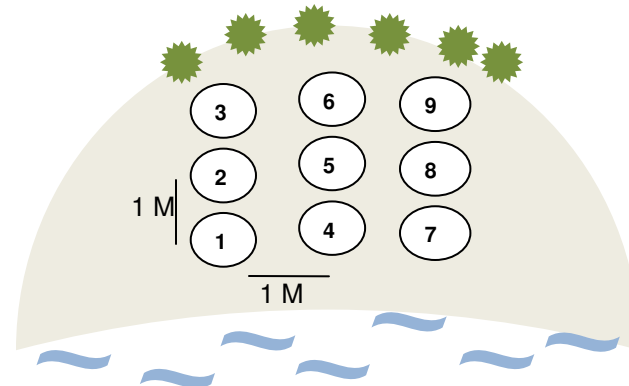## Nest Beach B

Small area, steep slope

Preliminary Data Analysis

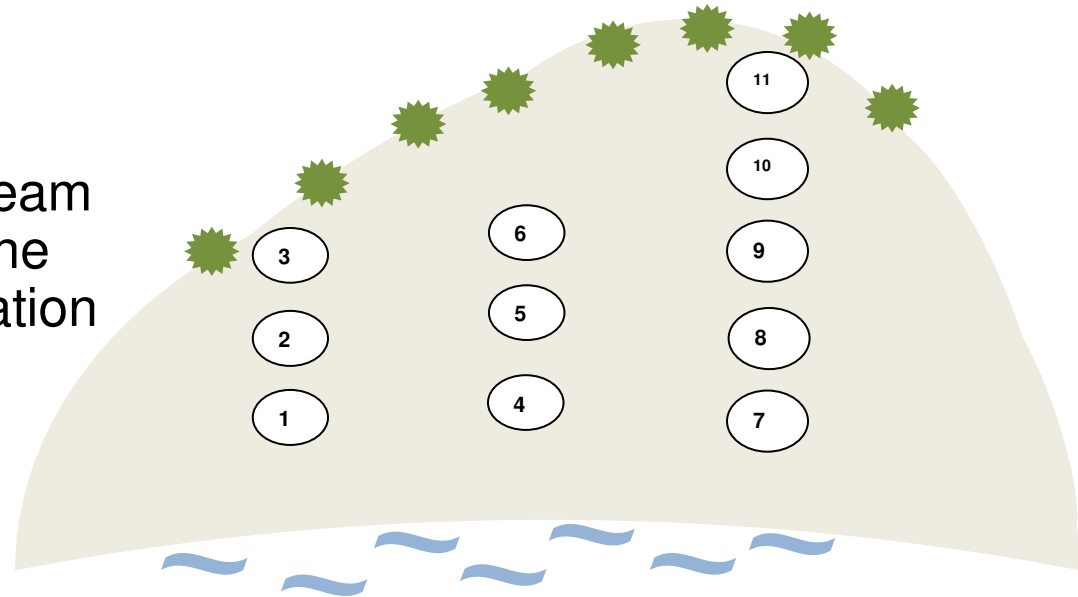**Nest-beach A demonstrating samples collected**

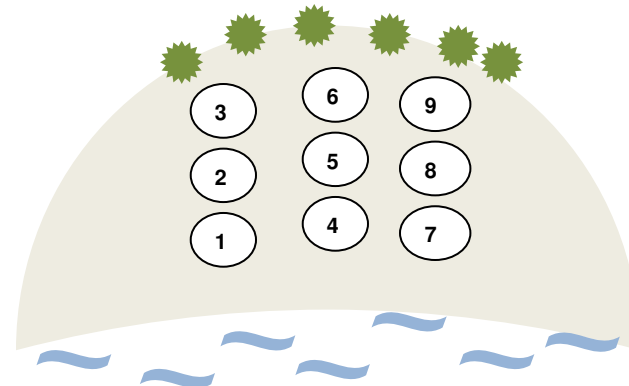**Nest-beach B demonstrating samples collected**

Preliminary Data Analysis

Nest-beach A:

Homogeneous from upstream to downstream and from the water's edge to the vegetation line

Nest-beach B:

Homogeneous from upstream to downstream and from the water's edge to the vegetation line

Implications

- This is not the first study of this kind, and so far it is generally inconclusive as to what is required for nest-site selection
- If there are no differences between nest-beaches and unused beaches we can feel more confident with the introduction of artificial beaches for this population
- If one or more factors are unique to nest-beaches or nest-sites than they will have to be included in created beaches

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- Rouge Park
- Environment Canada's Habitat Stewardship Program
- And of course…the turtles

Questions, Comments, Suggestions?