

Colonization of Tommy Thompson Park by Various Turtle Species

Importance of Wetlands

- 14% of Canada's habitat
- Fastest disappearing habitat in urbanized areas (50% are gone)
- Importance of Restoration Ecology
- Restored wetlands vs Reference Wetlands
 - Most restored wetlands are permanently altered and never recover to mirror Reference wetlands (Moreno-Mateos et al., 2012, 2015)
 - Restored wetlands 25% less functional

Ontario turtles

- Eight Native Species
- Only four commonly found in Lake Ontario
 - Painted, Snapping, Blanding's and Map
 - Set our expectations

Toronto & Region Conservation Authority (TRCA)

- Nine Watersheds
- Preserve, Protect, Restore, Create
- \$40 million annual budget
- 300+ employees
- Monitoring 4000+ sites
- Adaptive management- Assessing Progress



Study Site-Tommy Thompson Park

- <https://www.youtube.com/watch?v=YNrgGlqh5Tc>
- Artificial Wetland Complex: 500 hectares
- 5 km long into Lake Ontario
- Created between 1970-1991
- Over 4 million truckloads of construction fill
- “Accidental Wilderness”
 - Native and non-native colonizing plants
 - Large bird colonies



Master Plan for TTP

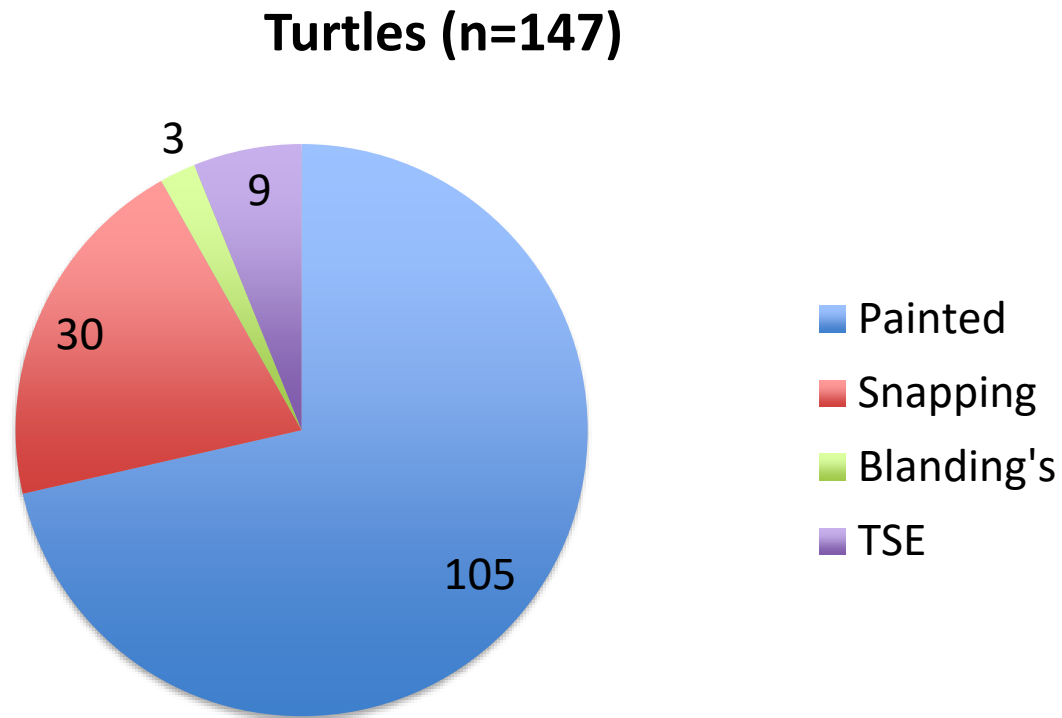
- Master Restoration Plan 1989
 - Enhance aquatic and terrestrial habitat
- Wetlands are a Combination of Embayments, Cells (hemi-marshes) and Ponds
- Ponds are isolated
- Cells are confined disposal facilities connected to the lake via a fish gate
- Embayments are generally open to the lake

Turtle Population Studies

- Mark Recapture Study- All Species
 - Demographics
 - Density
 - Assemblage
- VHF Movement Study- Blanding's and Snapping
 - Habitat use
 - Overwintering

Mark Recapture Study

- 20 hoop traps, 4 basking traps
- 25 days of trapping in 2016 and in 2017



Mark Recapture-Demographics

- Painted Sex Ratio 44:45
- Snapping Sex Ratio 12:14
- Remarkably EVEN sex ratios
- Contrasts with sex ratios at Heart Lake, Brampton

REMARKABLE MALE BIAS IN A POPULATION OF MIDLAND PAINTED TURTLES (*CHRYSEMYS PICTA MARGINATA*) IN ONTARIO, CANADA

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Abstract.—We report on male sex bias in a population of Midland Painted Turtle (*Chrysemys picta marginata*) at a wetland near Brampton, Ontario, Canada. The wetland is bisected by a major arterial road and characterized by high traffic volume and substantial wildlife-vehicle collisions. Road mortality surveys conducted in 2011, 2013, and 2015 documented 217 dead turtles, of which 118 could positively be identified as Midland Painted Turtle. From 2014–2015, we conducted a mark-recapture survey and captured 34 individual Midland Painted Turtles. The male:female sex ratio of 21:4 is one of the most skewed sex ratios for this species on record. We attribute this skew to sex-specific road mortality amongst other possible factors such as predation and nesting conditions. This study adds to the general body of work that has found a male sex ratio bias in areas of high road mortality.

Traffic Effect on Sex Ratio

TTP

- Limited traffic 500 a day
- Vehicular traffic limited between 8 – 4 (Mon-Fri)
- No traffic on weekends

Even sex ratio

1:1

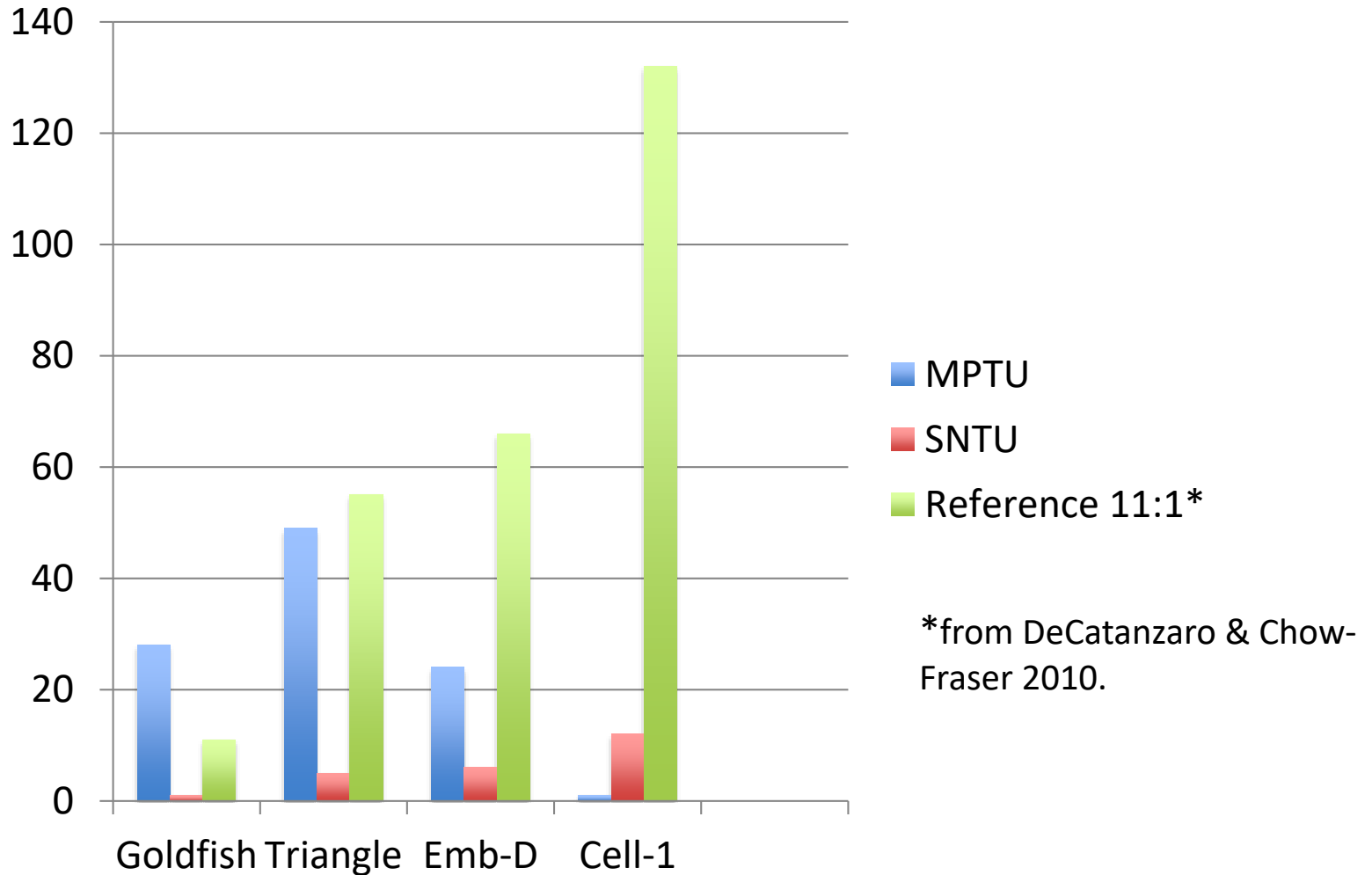
Heart Lake

- 5000- 7500 vehicles per day
- Similar nesting conditions
- Traffic is the X-Factor

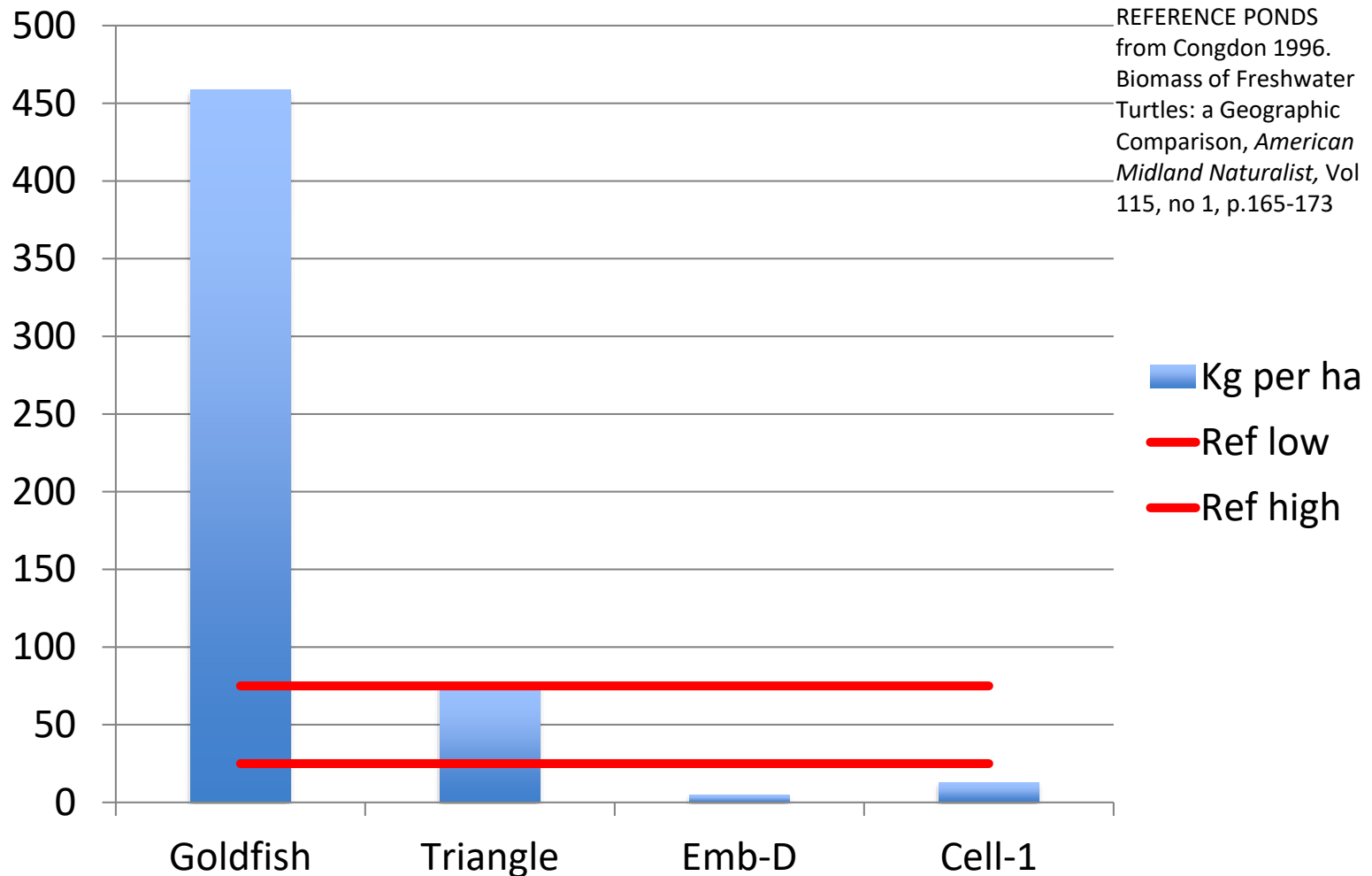
Male skewed sex ratio

5.25:1

Species Distribution vs. Reference



Biomass per hectare



What's going on in Cell-1 and Emb-D?

Cell-1

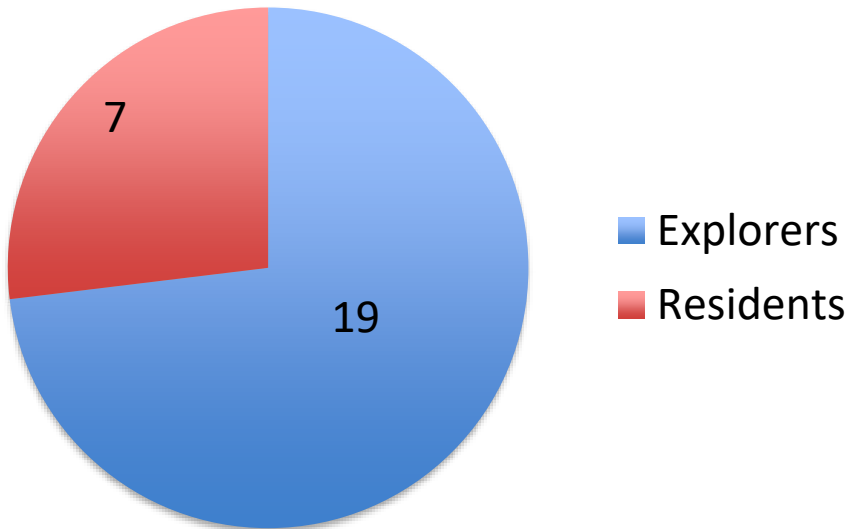
- Dominated by Snapping T.
- Visual surveys 2007 had Painted turtles in Cell-1
- Increase in common carp present
- Increase in invasive phragmite (5% to 90%)
- High water turbidity & less emergent vegetation

Emb-D

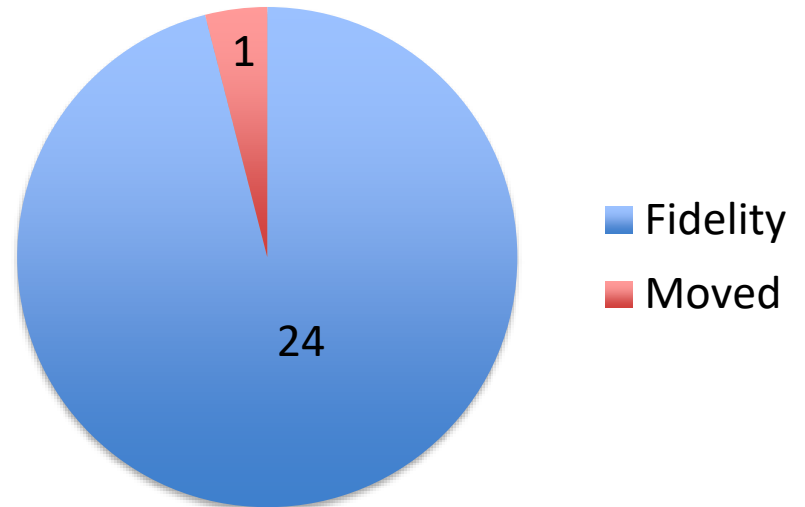
- Closer to reference
- No water turbidity
- Plenty of emergent vegetation
- Fewer carp
- Less phragmite cover but growing

VHF Study

Turtle Movement (n=26)

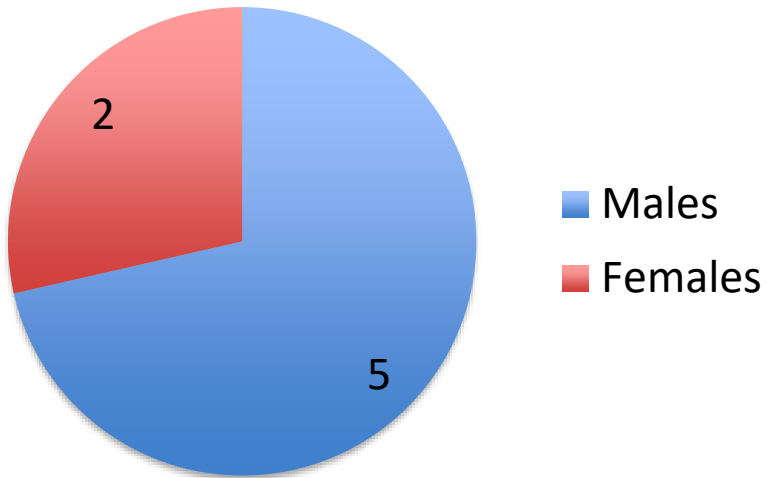


Overwintering Site Fidelity (n=25)

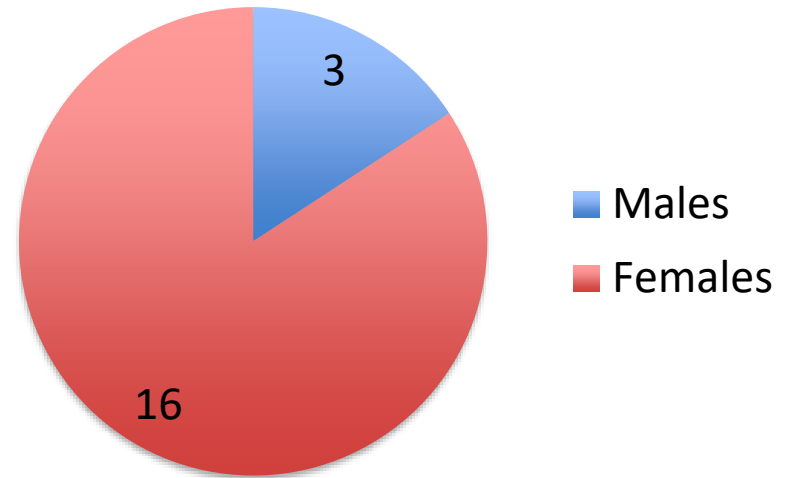


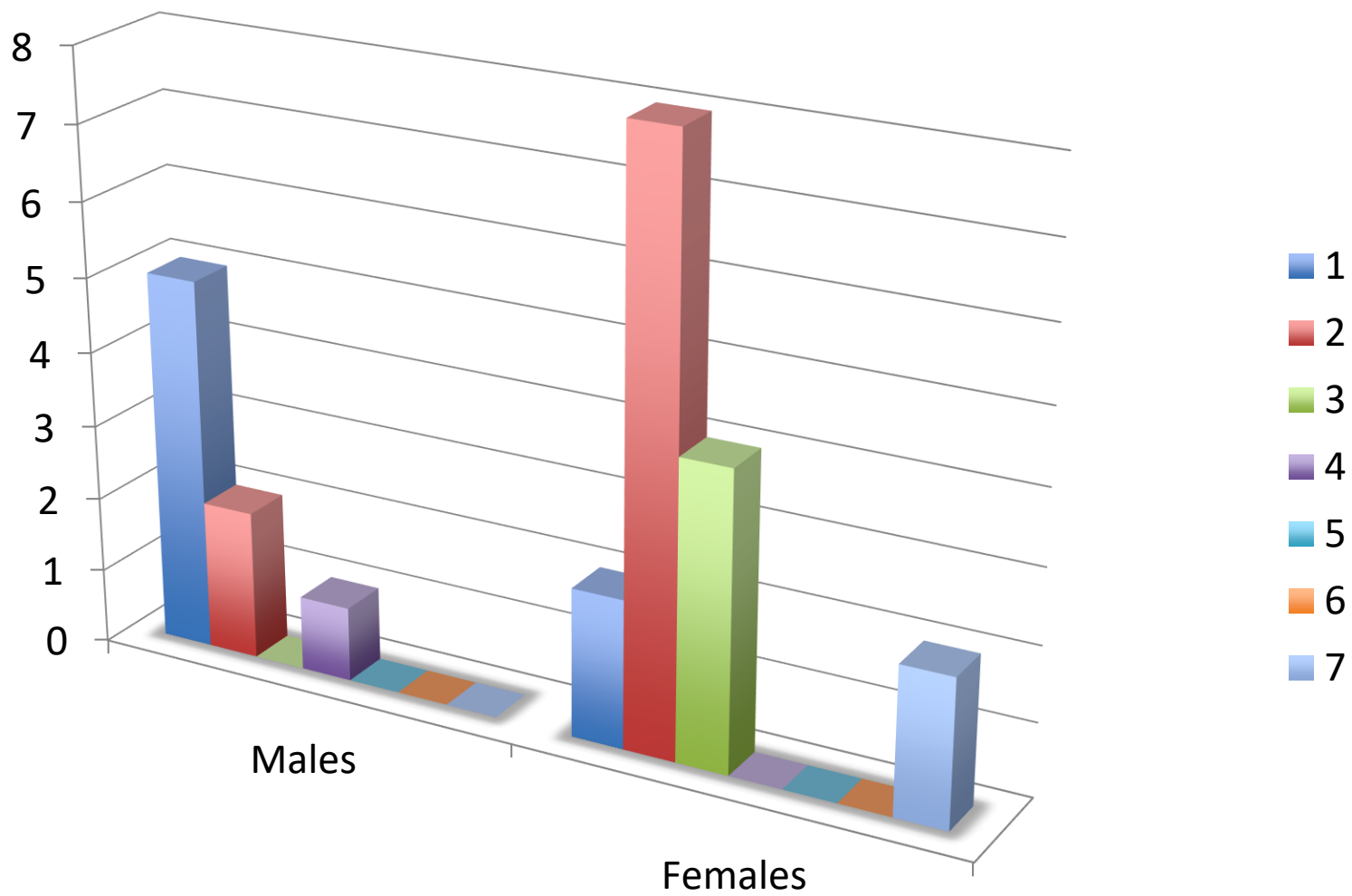
Exploring Sexes

Residents



Explorers





Nesting Sites



Conclusions-1

- Not all created wetlands are equally attractive
- Biotic and abiotic factors dictate turtle usage
 - Ecosystem engineers (Common carp)
 - Specialization to carp
 - Vegetation and Food availability
 - Predator fish (Northern Pike)
 - Turbidity
 - Invasive species

Conclusions-2

- Movement Study highlights the importance of the whole wetland complex
- Importance of safe connective land bridges
- Frequent movement from one water body to another
- Yet overwintering site fidelity

Conclusions-3

- Artificial wetland complex colonized at different rates
- Different assemblages than reference ponds
- Importance of varied nesting habitat to respond to climatic changes
 - Severe Drought of 2016- 50 year record
 - Floods of 2017- record rainfall and lake levels

Future Research Ideas

- Connectivity of the Lake Ontario Coastal Wetlands
- Meta-Population Analysis
- Colonization Vectors
- Population Relatedness
- Comparison of Restored versus Reference Wetlands

Thank You

