Effects of Barriers and Low Flow on Species At Risk Along the Upper Thames River

UPPER THAMES RIVER
CONSERVATION AUTHORITY

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This presentation was the result of questions from the City of London's Advisory Committee on the Environment. The questions included:

1) **What are the effects of barriers and impoundments on game fish and Species At Risk?**
2) **What are the effects of low flows on wildlife?**

The information provided in this brief presentation is, due to time constraints, only a short summary of a much larger body of knowledge on the effects of barriers on aquatic systems and the species that depend on a healthy river environment.

The topic of barriers (ie dams, weirs and associated impoundments) is also part of the current One River EA being addressed by the City of London. The UTRCA has been meeting with City of London staff in order to provide available information from our long-term studies on this topic.

Since this presentation is only a brief overview, the UTRCA is available to provide a more in-depth presentation on this topic if requested.

Wildlife Found Along The Thames River

The Thames River is one of Canada's most southern watercourses. The river and its many tributaries are rich in aquatic life, with approximately:

- **90 species of fish**
- **30 species of freshwater mussels and**
- **30 species of reptiles and amphibians**
- **Countless birds, mammals and invertebrates also depend on the existence and health of the Thames River**

Species At Risk

- **Many of the species that live along the Thames River Watershed are rare, and only occur in a few isolated areas in the province**

- **Since the Thames River is located on the northern edge of the heavily populated Carolinian Zone, is connected to the great lakes, has a moderate climate, and is situated in a highly developed part of southern Ontario, the river and the species within it face many pressures from urban and rural land uses and other increasingly harmful human-caused threats.**

Fishes At Risk and Game Fish

- **The Thames River is home to the most diverse fish fauna in Ontario, with more than 90 fish species recorded in the Thames River Watershed**
- **Ten species of fish found in the Thames are at-risk**
- **Generally, species that prefer clear, fast flowing water are declining, while more common species that favour turbid (less clear) conditions are increasing**

Threats to fish populations include:

- **pollution**
- **impoundments (dams, weirs)**
- **siltation/sedimentation**
- **habitat alteration and destruction**
- **invasive species (e.g., common carp)**
- **disease**

Freshwater Mussels At Risk

- **Historically, the Thames River supported one of the richest communities of freshwater mussels in Canada, though there has been a significant decline in freshwater mussel diversity in recent years**
- **The mussel species that have disappeared were characteristic of a healthy aquatic environment, so their loss is an indication that conditions in the river may be deteriorating.**

Threats to mussel populations include:

- **pollution, sedimentation and siltation**
- **impoundments (dams, weirs)**
- **invasive species (e.g., zebra mussels)**
- **channelization**
- **loss of larval host species (e.g., fish, mudpuppy)**
- **habitat loss, fragmentation and alteration**


ROUND PIGTOE
MUSSEL


WAVY-RAYED
LAMPMUSSEL


KIDNEY SHELL
MUSSEL


RAINBOW
MUSSEL

Reptiles At Risk

- **Globally, many reptiles are experiencing rapid declines.**
- **In Ontario, 7 of our 8 native turtles and 11 of our 18 native snakes are listed as at-risk both provincially and federally.**
- **Of Ontario's 26 snakes and turtles, 17 can be found along the Thames River Watershed, 12 of these are listed at-risk.**
- **In April 2016, COSEWIC up-listed the Spiny Softshell Turtle from Threatened to Endangered, due to significant declines across the species' limited range in Canada.**

Threats to reptile populations include:

- **habitat loss, fragmentation and alteration**
- **road mortality**
- **invasive species (e.g. European Reed, Zebra Mussel)**
- **impoundments (dams)**
- **pollution, siltation and sedimentation**
- **collection for food or as pets**
- **persecution**

Threats to Wildlife

- **Species at risk are sensitive to human-caused environmental changes. Aquatic species at risk require clean water and a healthy river to survive. River-adapted species are especially susceptible to change, including alteration of critical habitat features necessary for survival.**

- **If wildlife populations are declining, it is a red flag for the state of the river's health.**

- **Habitat loss, alteration and fragmentation are primary threats for most wildlife in this region, though many other threats also exist.**

Road Mortality

Persecution (intentional killing of wildlife)





Illegal Collection

Improper Farming Practices

Invasive Plants (same site in all photos)

Habitat Alteration and Loss


Plover Mills Rd
23
16
Nissouri Rd
Thorndale Rd
42
41
Medway Rd
4
56
28
Highbury Ave N
Sunningdale Rd E
Clarke Rd
© 2014 Google
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Imagery Date: 9/27/2013 43°05'33.07" N 81°14'55.86" W elev 293 m

Research and Recovery Efforts:

Populations, Movement, Reproduction, Habitat Selection, Threats and Behaviour

Barriers, Impoundments and Low Flow

- Not appropriate for many river-adapted species that occur along the Thames River
- Aquatic wildlife that migrate are either permanently blocked or seasonally blocked by barriers, which can result in decreased population viability and eventual extirpation
- Artificially raised water caused by dams can change the thermal properties of the water, can limit flushing of toxins and changes or destroys the aquatic and terrestrial habitats necessary for the survival of many species.

Barriers, Impoundments and Low Flow

Regulated waters (ie rivers with dams and impoundments) can undergo a significant reduction in productivity. Waterways without dams and impoundments maintain natural riffles and pools which produce an oxygenated substrate that supports abundant life, including microbes and invertebrates, which form the basis of the food chain.

Impoundments and dams can cause oxygen depletion in the substrate and often in the lower stream layer, greatly limiting productivity. A flowing system without a dam generally supports a healthy, diverse ecological community, including many of our Species At Risk and game fish.

Dams and impoundments often favour tolerant "common" species, including many invasive species such as Zebra Mussel and Eurasion Carp. Species adapted to a flowing river generally decline in impoundments due to changes in water temperature, depth and quality.

A flowing system without a dam can serve as a natural biological water filter, better able to metabolize pollutants and nutrients as it flows.

Barriers, Impoundments and Low Flow

Barriers tend to partition habitat (e.g limit access to important feeding, overwintering, spawning and nursery habitats), often eliminating species or reducing population levels.

Low water levels are common throughout much of the Upper Thames River, and it is the natural process of low water periods and relatively short high water periods, that the countless species that use the Thames River have evolved with and require to survive.

People often associate fish and other aquatic wildlife with deep water, though in reality areas of highest biodiversity are often more closely associated with shallow water systems. These areas have a mosaic of habitat types, and natural, seasonal fluctuations.

Barriers, Impoundments and Low Flow

The Thames River tends to have more consistent flows than many of our neighbouring watersheds. With contributions to flow from the Great Lakes (filtered through STPs), Thames flows are fairly resilient. Low seasonal water flows are normal for this river system.

Research has shown the increasing threat of dams to many wildlife species. In cases where dams have been taken out of service, at risk wildlife populations have increased in number due to more natural flows, decreased water depths, increased habitat availability and a system that is more consistent with the natural adaptations and requirements of species found in a given region.

Barriers, Impoundments and Low Flow

Creating artificial reservoirs along the river is contradictory to natural processes, which can result in significant disturbance and mortality to aquatic and semi-aquatic species that depend on the river for survival.

Fanshawe Dam is necessary, as it provides flood protection for the City of London, though even this barrier is not appropriate for river-adapted wildlife, especially species at risk within the watershed. Thus, it is important to limit the number of such barriers to only those that are deemed essential.

Questions?