

The Effects of a River Otter Augmentation on Muskrat and Mussel Population in Mammoth Cave National Park

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USGS
science for a changing world

Introduction

Kim Asmus M.S. 2002

Predator-prey relationship between muskrats and mussels

- Stable isotope analysis / muskrats consume mussels
- Mussels increase muskrat carrying capacity
- Sm, transient population of river otters
- Muskrat density estimate

Freshwater Mussels in Green River Drainage

- 72 species
- 53 today
- 14 T & E

River Otter (*Lontra canadensis*)

Semi-aquatic mustelid
1-6 pups/year
Relies on other animals
boroughs for dens
Valued furbearer
Delayed implantation
Historic Range
Reintroductions



Justification

Mussels are in decline

Anecdotal observations suggest that muskrats decline after river otter reintroductions



Project Outline

- Continue muskrat density estimate
- Capture, release otters
- Capture muskrats
- Monitor muskrat middens
- Use of study area
- Scat analysis

= Interaction ?

Objectives

I. Determine the effects of river otter augmentation on muskrat and mussel populations

II. Determine the success of augmentation



Study Area

Mammoth Cave National Park



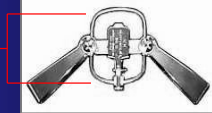
- 52 km of waterways: Green and Nolin Rivers (32.2 mi)
- 21,450 ha forested ecosystem (53,004 ac.)
- Worlds Largest Cave system
- World Heritage Site in 1981
- International Biosphere Reserve in 1990

Methods



- Modified #11 foot hold traps

4 in



Methods

- Transported to Vet
- Anesthetized
- Intraperitoneal radio-transmitter implanted



Methods

- Spotlight surveys
- Relative index of muskrat density
- Control area



Methods

- Muskrat Colony traps



Methods

- Anesthetized
- Intraperitoneal radio-transmitter implanted
- Telemetry simultaneously on both species for comparison of locations





Methods

- Tennessee Cooperative Fishery Research Unit
- Predation rates



Methods

- Scent stations: 1 m²
- Multiple lures
- Resident otter trap sites were used as stations
- Telemetry





Methods

- Muskrat hair presence or absence

 A 2x2 grid of images. Top-right: A close-up of muskrat hair, showing its characteristic structure. Bottom-left: A crayfish on a sandy surface. Bottom-right: A muskrat swimming in water, with its head and front legs visible.

Methods

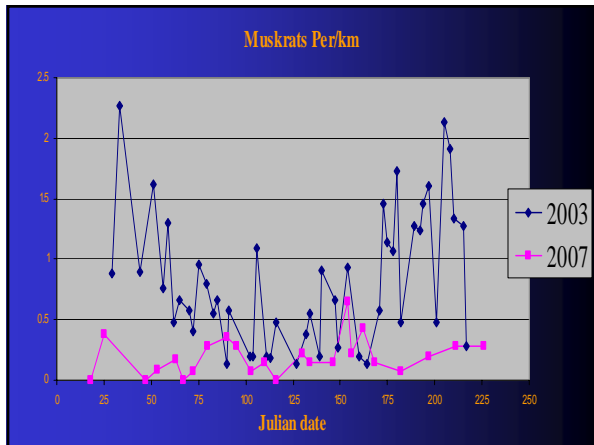
Estimate survival, reproduction, movement, and home range

Radio telemetry and sign/track identification

 A 2x2 grid of images. Left: A blue radio transmitter on a wooden surface, with a date stamp '06/23/2005'. Right: A close-up of muskrat tracks in a sandy surface, with a date stamp '06/23/2005'.

Preliminary Results

- Spotlight surveys are indicating a reduction in muskrat population
- Scent station surveys show that otters are using the area
- 16 otters tagged and relocated



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Questions?