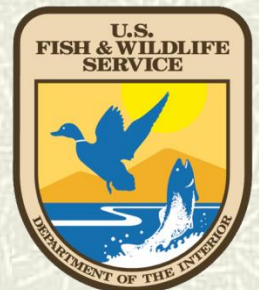


# The Lake Erie Water Snake

Blending Research, Management,  
Outreach, and Policy to Recover a  
Federally Listed Species

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Megan M. Seymour





# LIFE HISTORY

# Lake Erie Watersnake (LEWS)

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- # *Nerodia sipedon insularum*
- # Subspecies of the Northern Watersnake
- # LEWS: Absent or reduced banding pattern; rocky substrates; different diet; larger adult body size; lower growth rates; and shorter tails

(Conant 1951; Hamilton 1951; Langlois 1964; Drummond 1983; King 1986, 1989, 1993, King and Lawson 1995)

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# Appearance

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- # Often uniform gray or brown
  - # Some with dark bands or intermediate bands
  - # Keeled scales
  - # 1 ½ to 4 feet long
  - # Non-venomous
-



West Siste



Catawba Peninsula



# Summer Habitat



- # Rocky shoreline of islands, 75% within 13 m of shoreline
- # 75% of individuals used 437 m or less shoreline
- # Water/Vegetation interface
- # Lake Erie
- # Exhibit site fidelity to summer habitat

(King 2003)

# Summer Habitat





# Hibernation



- # Hibernate from October through May
- # Variety of different locations
- # Natural and artificial
- # 75% within 69 m of shoreline

(King 2003)



# Reproduction



- # Breed upon emergence from hibernaculum
- # Form “mating balls” of 1 female, multiple males
- # Viviparous—females give birth to average of 23 live young per litter in Aug/Sept.
- # Reach sexual maturity from age 2-3

(King 1986)

# Population Status & Distribution

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- French explorers referred to “the snake islands” (McDermott 1947; Langlois 1964). Other accounts by early travelers indicate, “myriads of watersnakes basking in the sun,” and watersnakes “sunning themselves in heaps, knots and snarls” (Ballou 1878; Hatcher 1945; McDermott 1947; Wright and Wright 1957; Parker 1976).
  - At time of listing (1999), U.S. adult population was estimated to be 1,530-2,030, and snakes had been extirpated from 2 U.S. islands and 2 Canadian islands (King 1998).
-



# Threats

## # Human Persecution!

- Intentional
- Accidental

## # Habitat loss

- Shoreline development
- Inland development
- Habitat fragmentation
- Improper habitat management



# Theory of Island Biogeography

MacArthur & Wilson (1967)

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- # Island species more likely to become extinct
  - # Smaller islands more likely to have extinctions
  - # Island species less able to adapt to changing environments
  - # Restricted to finite amount of habitat/resources
  - # Limited immigration/emigration
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# Limitation of Small Populations

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- # More susceptible to catastrophic events, demographic variation, negative genetic effects, environmental stresses
- # More likely to fluctuate below minimum viable pop threshold for long-term survival
- # Chance variation in age/sex ratios=death rates exceed birth rates
- # Decreasing genetic variability=inbreeding depression, genetic drift

(Dodd 1993; Gilpin and Soulé 1986; King 1987b, 1998b; King and others 1997; Nunney and Campbell 1993; Shaffer 1981; Soulé 1987)

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## ENDANGERED SPECIES ACT OF 1973

As Amended through the

100th Congress



U.S. Fish and Wildlife Service  
U.S. Department of the Interior  
Washington, D.C. 20240  
1992

# ENDANGERED SPECIES ACT



# Endangered Species Act of 1973 (ESA)

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## # Purposes:

- Provide a means whereby ecosystems of Threatened and Endangered species may be conserved
- Provide a program for the conservation of Threatened and Endangered species
- Take steps to achieve purposes of relevant treaties and conventions

## # Goal: To restore listed species to a point where they are secure, self-sustaining components of their ecosystem, so that the protections of the ESA are no longer necessary.

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# Relevant Sections of ESA

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- # Sect. 4—Listing and Recovery
- # Sect. 6—Cooperation with States
- # Sect. 7—Cooperation with other Federal Agencies
- # Sect. 9—Prohibited Acts
- # Sect. 10—Permits







## **SECT. 4—LISTING AND RECOVERY PLANNING**

# Rationale for Federal Listing

- # Significant population declines due to
  - \*Habitat loss
  - \*Human persecution
- # Limited range and insular distribution





# Listing



- # Federal “threatened” designation applied on August 30, 1999 by U.S. Fish and Wildlife Service (USFWS)
  - Likely to become endangered in the foreseeable future in all or a significant portion of its range
- # State “endangered” designation applied on May 3, 2000 by Ohio Department of Natural Resources, Division of Wildlife (DOW)
- # Canadian “endangered” designation applied in 1977 by Ontario Ministry of Natural Resources

# Protections Afforded by ESA

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- # Sect. 9- Prohibition of “Take”—to pursue, harm, harass, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to do any of these.
    - “Harm”—Significant **habitat modification** or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering
    - “Take” can be permitted in some instances, if it will not jeopardize the continued existence of the species.
  - # Sect. 7- Federal agencies shall utilize their authorities...by carrying out programs for the conservation of endangered and threatened species.
-



# Recovering the LEWS



- # Recovery is the process by which the decline of species is arrested or reversed, and threats to its survival are neutralized so that its long-term survival in nature can be ensured.
- # A blend of policy, research, land management, partnerships, education and outreach framed in the context of the Endangered Species Act

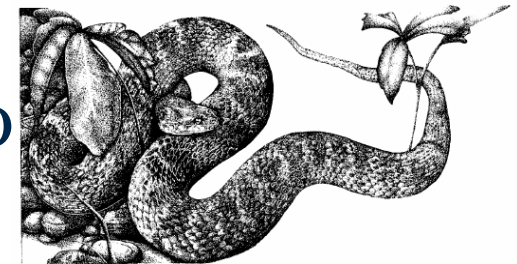
# Recovery Plan

- # Outlines management actions to help species recover
- # Required for each species
- # Identifies measurable criteria to determine when recovery has been met
- # Estimates time frame for recovery
- # Estimates cost of recovery

U.S. Fish & Wildlife Service

## Lake Erie Watersnake Recovery Plan

*(Nerodia sipedon insularum)*



September 2003



Department of the Interior  
U. S. Fish and Wildlife Service  
Great Lakes-Big Rivers Region (Region 3)  
Fort Snelling, MN





# Recovery Plan Criteria

- # Stable, persistent subpopulations on each of 4 largest islands (Bass Islands and Kelleys) with population goals overall and per island for 5 consecutive years.
- # Persistence on small islands.

	Four Largest U.S. Islands with Lake Erie Watersnake Populations				Combined U.S. Islands
	Kelleys	South Bass	Middle Bass	North Bass	
<b>Recovery Goal</b>	<b>900</b>	<b>850</b>	<b>620</b>	<b>410</b>	<b>5555</b>

# Recovery Plan Criteria

- # Maintain enough suitable habitat to support subpopulations in perpetuity, with habitat goals overall and per large island

Island	Length of shoreline	Land within 69 m of shore
	(mi)	(ac)
Kelleys	0.75	20.5
South Bass	0.7	19.3
Middle Bass	0.51	14.1
North Bass	0.34	9.1
<b>TOTAL</b>	<b>4.6</b>	<b>126</b>



# Recovery Plan Criteria

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- # Reduce human-caused mortality such that it is not a significant threat to population





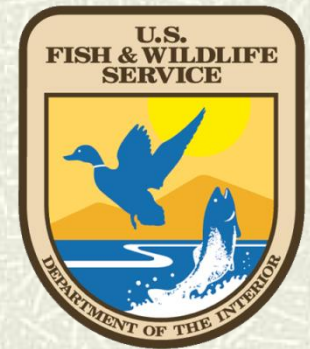
Western Reserve Land Conservancy  
OUR LAND. OUR LEGACY.



NORTHERN ILLINOIS  
UNIVERSITY



# SECT. 6—COOPERATION WITH THE STATES AND RECOVERY IMPLEMENTATION





# Section 6

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- # USFWS shall cooperate with the States to carry out the ESA
    - Management agreements
    - Cooperative agreements
    - Funding
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# Sect. 6 Funding



- # USFWS provides “Traditional” Section 6 funding to DOW (all state Wildlife Agencies) every year for, “conservation of E/T species or...monitoring the status of candidate species.”
- # USFWS “Non-traditional” Section 6 funds are available through a competitive grant process nationwide.



# Research

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# Many aspects of LEWS ecology were not fully understood at time of listing

- Hibernation
- Habitat usage & home range
- Threats
- Population size/distribution
- Diet
- Annual survivorship



# Telemetry Study

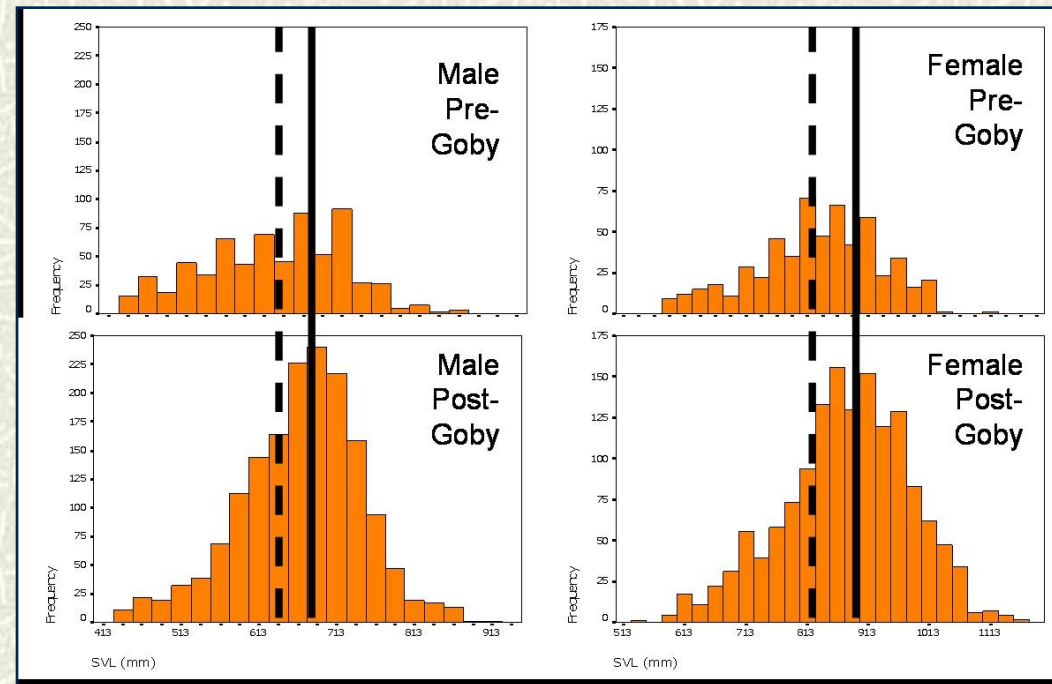




# Diet Study

■ More than 90%  
nonnative, invasive  
round goby (*Neogobius  
melanostomus*)

(Jones et al. 2009; King et al. 2006)



# “Nerodeo”—Annual Census

- # Mark-recapture study
- # 2 weeks in May/June
- # Provides data for population estimates per island and overall
- # Many contributing partners
- # Over 16,000 captures of over 10,000 individuals!





# Additional Studies

- # Contaminants
- # High-incident road-kill locations
- # Public opinion surveys
- # Neonate survivorship



# Education & Outreach Campaign

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- # To minimize human persecution
- # Targets both residents and visitors
- # Variety of methods
- # Highly visible
- # Engage island kids
- # Community involvement





# Education & Outreach Campaign

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- # Understand island communities' snake “problems”
- # Be honest and upfront
- # Address individual concerns
- # Have a regular presence

