Conservation of the Blanding’s Turtle within the Chiwaukee – Illinois Beach Lake Plain

Gary Glowacki - Lake County Forest Preserve District

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Blanding’s Turtle Conservation

Blanding’s Turtle

Description

• Medium-sized, freshwater turtle
  – Adults 15-25 cm (~6-10 inches), 1200-1800 g

• Long-lived (80+ years)
  – Reach maturity 14-20 yo

• Domed, Mottled carapace

• Yellow chin

• Hinged plastron
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Status and Range

- Upper Midwest/Great Lakes distribution
- Declining throughout range
  - Threatened (Iowa, Massachusetts, Minnesota, New York, Wisconsin, Ontario and Quebec)
  - Endangered (Indiana, Illinois, Maine, Missouri and Nova Scotia)
  - IUCN Redlist: Globally Endangered A2cde+4ce
  - USFWS petitioned by Center for Biological Diversity
    - under federal status review
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Threats

• Habitat destruction
  o Wetland and upland habitat
    o Large home range 1-2 km
    o Long distance nesting forays

• Life history
  o Long-lived; geriatric populations
    o Generation: 36–47 years
    o Delayed sexual maturity

• Poaching/collection

• Nest/hatchling Predation
  – Human-subsidized predators
    o Up to 1500% (Ohio Division of Wildlife) in last 20 years

Nest predation

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www.LCFPD.org
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Lake County Forest Preserve District

- Unique to Illinois, FPDs are designed to protect large natural areas and provide passive recreation.

- LCFPD
  - 60+ Forest Preserves
  - 31,000+ Acres
  - 14 Dedicated State Nature Preserves
  - Home to more endangered and threatened species than any other county in Illinois
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Chiwaukee Illinois Beach Lake Plain

- Extends from Kenosha WI to Waukegan IL
- >4,200 acres high-quality coastal dune and swale habitat
  - Illinois Beach State Park
  - Spring Bluff Nature Preserve
  - Chiwaukee Prairie State Natural Area

- Lake Plain Partnership (9)
  - LCFPD, IDNR, WIDNR, WI TNC, Village of Pleasant Prairie, Waukegan PD, Zion PD, University of Wisconsin Parkside, Village of Winthrop Harbor
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Spring Bluff Nature Preserve Population

- ~530 acres of contiguous habitat
- Investment in habitat restoration
  - Restore hydrology, control invasives
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INHS Initial Study

• 2004-2010 Intensive trapping and radio-telemetry study
  • Determined age class structure, home range, age specific survival estimates, predation rates, nest locations, population estimates/trajectories, etc.
  • Prepare management plan

• 2010 Population estimated at > 165 individuals (SBNP + Chiwaukee)
  • The largest known population in the state!
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Population in Decline

Despite significant population size, population still in decline!

• Population Viability Analysis (PVA, Vortex, 50 y) to determine population trajectory.
  – 94.9% chance of extinction, 3 individuals remain
  • Low juvenile recruitment (< 1%), low annual adult survivorship (88%)

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<th>Scenario</th>
<th>Reduce Adult Mort</th>
<th># HS</th>
<th>HS sex ratio</th>
<th>Duration (yrs)</th>
<th>SGR</th>
<th>sd (SGR)</th>
<th>Extinction Probability</th>
<th>N extant</th>
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Use PVA (Vortex) to test conservation strategies:

1. Increase recruitment to compensate for loss of adults
2. Reduce adult mortality to compensate for low recruitment

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Conservation of Blanding’s Turtles will require long-term commitment to BOTH a reduction in adult mortality and an increase in juvenile survivorship.
Established in 2010

**Goal:** to ensure long-term Blanding’s Turtle persistence in Lake County through the management, conservation and/or re-establishment of viable, free-ranging populations of Blanding’s Turtles at a minimum of 3 focal conservation areas.

**Immediate goal:** Secure the Blanding’s Turtle population within the Lake Plain, the largest and most significant!

1. **Juvenile Recruitment**
   - Head-starting program
   - Increase Nest Success (Predator Control)
     - High nest predation rates (92.3% natural; 88% artificial)
     - High juvenile survivorship (66–86%)

2. **Adult Survivorship**
   - Habitat restoration
     - Keep turtles off roads/rails
   - Increasing awareness
     - Reduce vehicle strikes
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Meso-predator Control

Started in 2013...

Goals:

1. Estimate population density and remove raccoons
2. Locate and determine the fate of natural, unprotected Blanding’s turtle nests following removal
3. Determine efficacy of control activities on increasing juvenile recruitment by comparing before and after predation rates

Goal to reduce nest predation rate to <50%
Nest Monitoring

Nest Fates

• **Depredated Nest**
  - clearly excavated with only shell fragments remaining (usually outside of the nest chamber) prior to typical nest emergence

• **Partially Depredated Nest**
  - nest was clearly excavated but some seemingly viable eggs or hatchlings remained intact within the nest chamber

• **Successful Nest**
  - indicated by the presence of an emergence hole with no sign of excavation and shell fragments or hatchlings inside the nest chamber
  - # of eggs estimated based on shell fragments
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Nest Monitoring

Lyda Jane
Nest success from 7.7% to 66.7%

- **2013** – 85.7% (6/7)
  - 1 partial depredation (Skunk)
- **2014** – 40% (6/15)
  - 1 partial depredation (Skunk)
- **2015** – 92.3% (12/13)
  - 1 partial depredation (13GS)
- **2016** – 54.5% (6/11)
- **2017** – 55.5% (5/9)
- **2018** – 100% (6/6)

- ~85% predation events 1st 48 hours
- ~15% occurred near time of emergence
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Head-Starting Program

- Concept…
  - Raise hatchlings in a safe environment to avoid most dangerous life stage
    - Only ~7% eggs successfully hatch & < 1% of hatchling make it 1 year
- Steps…

1. Find adult females
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Head-Starting Program

2. Track adult females
3. Collect eggs from gravid females

- Gravid females brought to McHenry Country Conservation District
- Injected with prostaglandin (1.5 mg/kg) then oxytocin (7.5 units/kg)
- Incubate eggs (50-50 sex ratio)
  - <25 c = males : >30 c = females
- Goal = 100 hatchling per year
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Head-Starting Program

4. Hatch eggs

Stats:
- Mean clutch size = **13.2**
- Hatch rate = **81.3%**
  (87.2% excluding infertile clutches)

Since 2010
- **92** Clutches
- **1213 eggs, 986**
  Turtles hatched over 8 years!!
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Head-Starting Program

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www.LCFPD.org
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Head-Starting Program
Blanding’s Turtle Conservation

Head-Starting Program

- Release after > 40 grams
  - Typically $\frac{1}{2}$ spring, $\frac{1}{2}$ fall (1 yo)

- Mark-recapture to evaluate success of different release strategies
  - Notched
  - PIT tag
  - Plastron photo
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Head-Starting Program

- Monitoring
  - Baited hoop traps
  - Visual encounter surveys
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Results

- 328 recaptured headstarts!
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Results
Blanding’s Turtle Conservation

Results
Blanding’s Turtle Conservation

Results
Blanding’s Turtle Conservation

Results

- **37.3%** (328/879) recaptured following brumation
- Survival estimates:
  - **59.25%** 1 year old
  - **84.57%** 2+ year old
- 1 yo HS = 3-4 yo Wild
- 2 yo HS = 5-6 yo Wild

**Figure 1. Growth curves for HS1yo (green) and wild-born (yellow) turtles.**
Results

Increase in young turtles
• 164 (2010) to 494 (2018); increase largely head-starts
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Results

Increase in capture rates
• Largely young turtles (mostly head-starts - 0.091 CPUE) alone (0.069 wild)
Results

Data suggests population (all age classes) is growing...
• 92 adults in 2010 to 123 in 2018 (Schnabel); 147 adults last seen alive
• 244 in 2010 to 522 in 2018 (Schnabel); 633 turtle of all age classes last seen alive
What does all this mean?

Re-run PVA (Vortex 50 year) with new data

- Initial population size (244 to 522)
- Adult survivorship (88%) and nest success (17%) same

Reduced probability of extinction (94.9% to 82%) but NOT viable

R = -0.117, Probability of Extinction = 82%
Re-run PVA (Vortex 50 year) with new data

- Initial population size (244 to 522); Adult survivorship (88 to 94.7)

**Need Recruitment to Maintain Population!**

\[
R = -0.089, \text{ Probability of Extinction } = 0.29\%
\]
Re-run PVA (Vortex 50 year) with new data

- initial population size (244 to 522); nest success (17 to 64%); Adult survivorship (88 to 94.7%)

**POPULATION VIABLE / RAPIDLY GROWING!!!**

\[
R = 0.039, \text{ Probability of Extinction } = 0\%
\]
The Future

- Expand to Illinois Beach State Park (530 acres to >4200)
  - 2017 GLFWRA grant to fund 3-year study in partnership with NIU
  - Looks similar to SB prior to conservation efforts

Size and Demography of Illinois’ Largest Blanding’s Turtle Population

Callie Klett Golia, Gary Glowacki, Richard B. King
Department of Biological Sciences, Northern Illinois University; Lake County Forest Preserve District

Introduction
The Chesaqua Illinois Beach (Lake Plain) consists of 1,700 ha of protected wetland and splash habitat. The Lake County Forest Preserve District and partners have monitored Blanding’s Turtle within the 210 ha Spring Buffalo (SB) and 490 ha Blanding’s Turtle Conservation Park (BSCP) since 2013. This work has yielded information regarding their status, distribution, habitat use, and demography of the Blanding’s Turtle within the adjacent Illinois Beach State Park (IBSP).

Objectives
1. Determine the status of Blanding’s Turtles at IBSP and compare size distributions between IBSP and BSCP.
2. Assess whether headstarting and predator control at BSCP has increased juvenile recruitment.
3. Provide an initial estimate of adult Blanding’s Turtle population size throughout the Lake Plain.

Results
1. Trapping and incident captures of Blanding’s Turtles occurred throughout IBSP and BSCP from May through August 2017. In IBSP, 81 unique Blanding’s Turtles (34 young and 47 adults) were captured. In comparison, at BSCP, 146 unique Blanding’s Turtles (134 young and 32 adult) were captured. Size distributions were skewed towards smaller individuals at BSCP (Kolmogorov-Smirnov Test, p = 0.001).

Graphs and charts showing size distribution and demographic data for IBSP and BSCP.

Conclusions
We demonstrated the widespread occurrence of Blanding’s Turtles throughout the Lake Plain, provide evidence of a successful headstarting program and predator control at BSCP, and suggest that the Lake Plain is home to Illinois’ largest Blanding’s Turtle population. Information obtained by this study incorporates a development of a conservation plan for the Lake Plain and provides an assessment of the conservation efforts at BSCP.

Acknowledgments
Funding was provided by the Lake County Forest Preserve District and a grant from the Illinois Natural Heritage Survey (INHS).
Blanding’s Turtle Conservation

The Future

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Difference in size distribution of Blanding’s Turtles captured at IBSP and at SBCP in 2017; vertical lines distinguish juveniles from subadults (250g) and subadults from adults (750g).

Percentage of juvenile, subadult, and adult Blanding’s Turtles captured in hoop traps that were head-started (pink) or not (blue) at IBSP in 2017 & 2018, SBCP 2017 & 2018, and SBCP prior to 2010.
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Thank You

Field Crew: Callie Golba, Andrew Rutter, Joey Zigler, John Winter, Veronica Anadon, Lauren Mumm, Tim Pignato, Kirsten Andersson, Cecilia Grisolia, Maria Weston, Emma Buckardt, Matt Allender, Sam Hannabass, Elizabeth Mullen, Katherine Waguespack, Courtney Klatt, Ed McDonald, Lindsey Barnes, Megan Petersohn, Hanna Vorrie, Alyse Olson, Michelle Minton, Meghan Jedloe, Kevin Cassel, Jon Sammons
Thank You

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Thank You

- LCFPD Adopt-A-Turtle Program
  https://www.lcfpd.org/preservation-foundation/adopt-a-turtle/

As a Turtle Champion you can:
- Name your turtle
- Join Forest Preserve wildlife biologists for a behind-the-scenes tour of the turtle facility
- Receive a picture of your turtle’s plastron (their unique underside)
- Receive updates when your turtle is located and measured during population monitoring.

Raised so far: $13,878
Fundraising goal: $12,000

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