



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



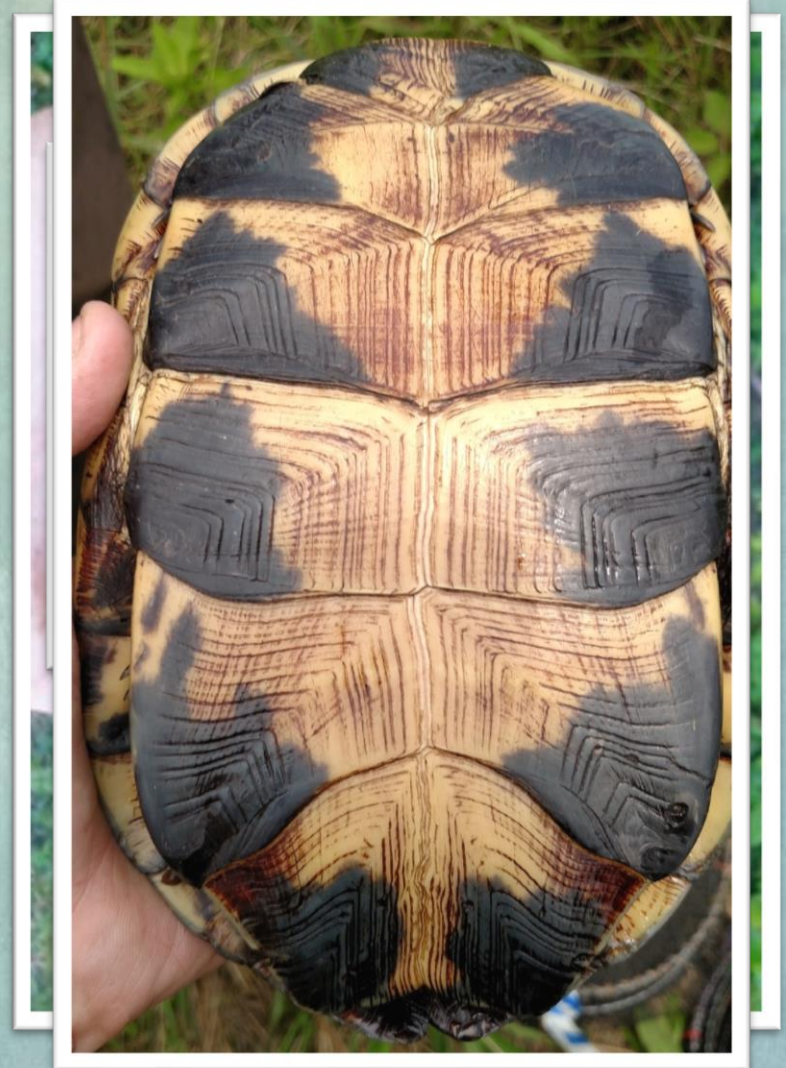
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Blanding's Turtle

Description

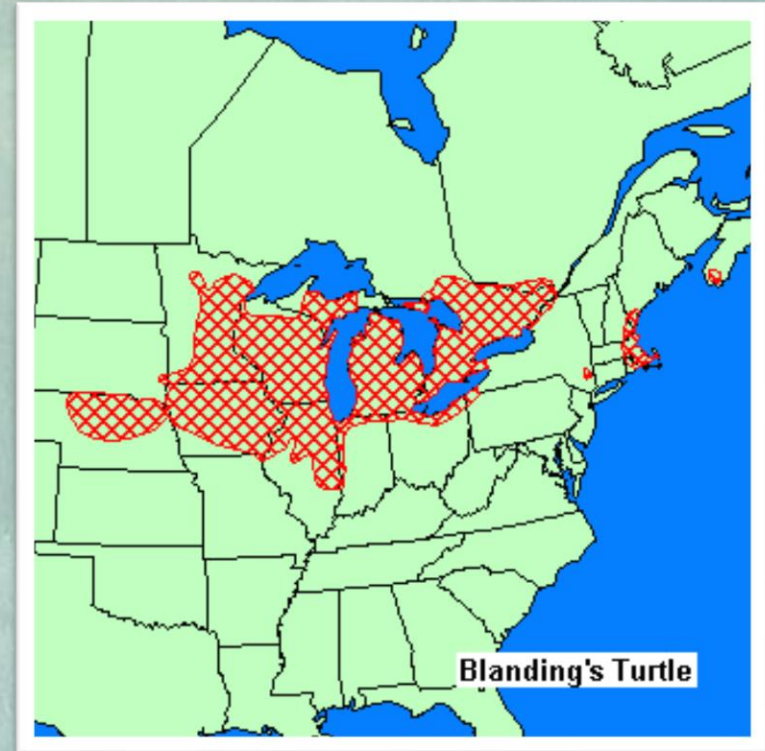
- Medium-sized, freshwater turtle
 - Adults 15-25 cm (~6-10 inches), 1200-1800 g
- Long-lived (80+ years)
 - Reach maturity 14-20 yo
- Domed, Mottled carapace
- Yellow chin
- Hinged plastron





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





Threats

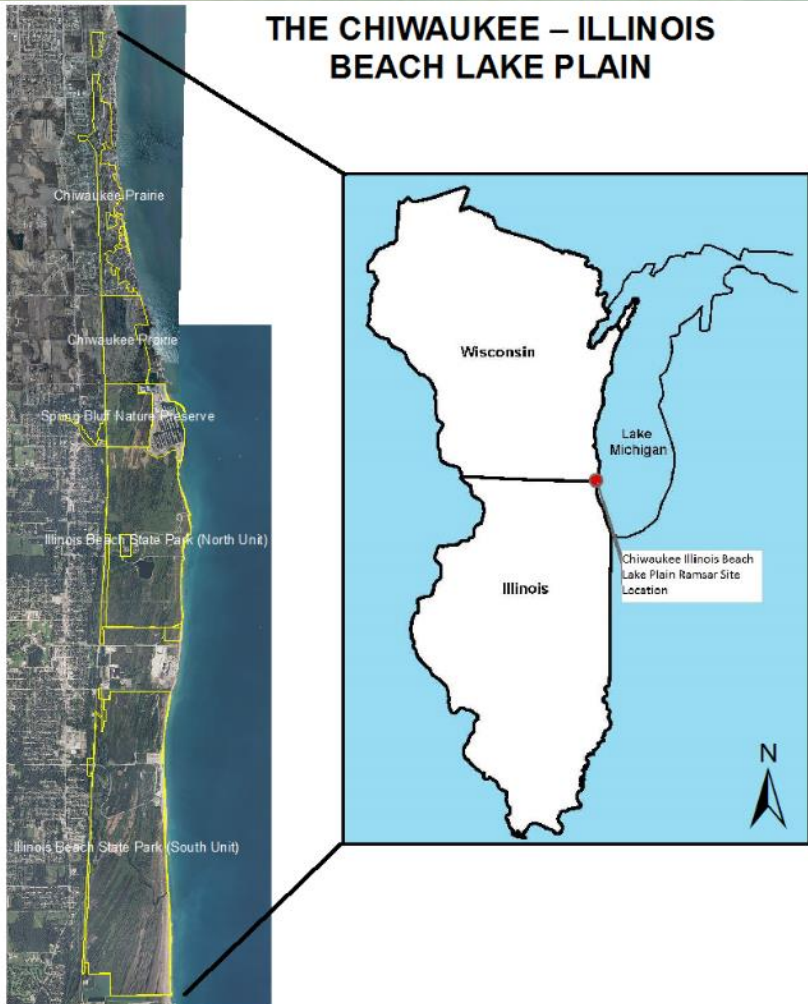
- **Habitat destruction**
 - Wetland and upland habitat
 - Large home range 1-2 km
 - Long distance nesting forays
- **Life history**
 - Long-lived; geriatric populations
 - Generation: 36–47 years
 - Delayed sexual maturity
- **Poaching/collection**
- **Nest/hatchling Predation**
 - **Human-subsidized predators**
 - Up to 1500% (Ohio Division of Wildlife) in last 20 years





Chiwaukee Illinois Beach Lake Plain

THE 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





Spring Bluff Nature Preserve Population

- ~530 acres of contiguous habitat
- > Investment in habitat restoration
 - Restore hydrology, control invasives





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!





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%)

Scenario	Reduce Adult Mort	# HS	HS sex ratio	Duration (yrs)	SGR	sd (SGR)	Extinction Probability	N extant	sd (N-ext)
No Management	0	0	---	---	-0.109	0.202	0.949	3	1.4



Management Plan

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

Scenario	Reduce Adult Mort	# HS	HS sex ratio	Duration (yrs)	SGR	sd (SGR)	Extinction Probability	N extant	sd (N-ext)
No Management	0	0	---	---	-0.109	0.202	0.949	3	1.4
50HS 1:1 10yrs	0	50	1:1	10	-0.078	0.176	0.547	5	2.7
50HS 1:1 30yrs	0	50	1:1	30	-0.032	0.095	0.000	34	8.5
100HS 1:1 10yrs	0	100	1:1	10	-0.068	0.175	0.241	7	3.6
100HS 1:1 30yrs	0	100	1:1	30	-0.032	0.095	0.000	70	12.8
Adult mortality reduced 50%	50%	0	---	---	-0.063	0.151	0.137	9	4.1
Adult mortality reduced 70%	70%	0	---	---	-0.041	0.107	0.000	23	6.9
Adult mort reduced 50% HS 50 1:1 10yrs	50%	50	1:1	10	-0.038	0.110	0.000	26	7.6
Adult mort reduced 50% HS 100 1:1 10yrs	50%	100	1:1	10	-0.026	0.122	0.000	45	10.8
Adult mort reduced 50% HS 100 1:1 20yrs	50%	100	1:1	20	-0.009	0.108	0.000	106	16.9
Adult mort reduced 50% HS 100 1:1 30yrs	50%	100	1:1	30	0.003	0.096	0.000	191	23.0
Adult mort reduced 50% HS 100 2:1 20yrs	50%	100	2:1	20	-0.006	0.108	0.000	122	18.1
Adult mort reduced 70% HS 100 1:1 15 yrs	70%	100	1:1	15	-0.002	0.104	0.000	149	20.5

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



Lake County BT Recovery Program

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



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





Nest Monitoring

Lyda Jane





Nest Monitoring Results

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)



Bushnell EMBLc1ose 68°F20°C

09-04-2013 22:30:22

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



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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of the Lake County Forest Preserves





Head-Starting Program

2. Track adult females





Head-Starting Program

3. Collect eggs from gravid females

- Gravid females brought to McHenry County 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





Head-Starting Program

4. Hatch eggs

Stats:

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

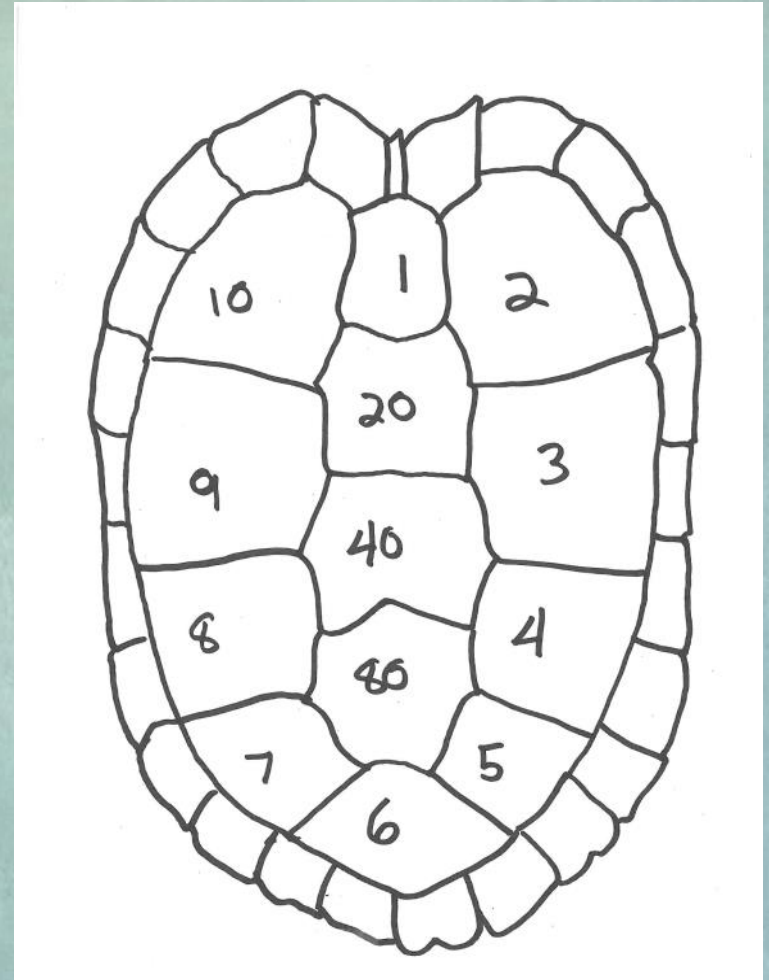
Since 2010

- **92** Clutches
- **1213** eggs, **986** Turtles hatched over 8 years!!





Head-Starting Program





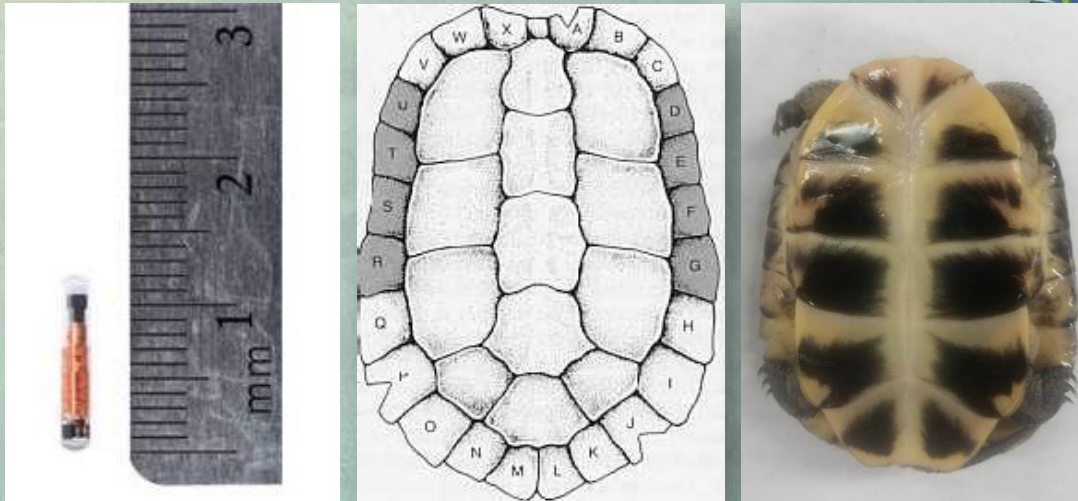
Head-Starting Program





Head-Starting Program

- Release after > 40 grams
 - Typically ½ spring, ½ fall (1 yo)
- Mark-recapture to evaluate success of different release strategies
 - Notched
 - PIT tag
 - Plastron photo





Head-Starting Program

- **Monitoring**
 - Baited hoop traps
 - Visual encounter surveys





Results

- 328 recaptured headstarts!





Results





Results





Results





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

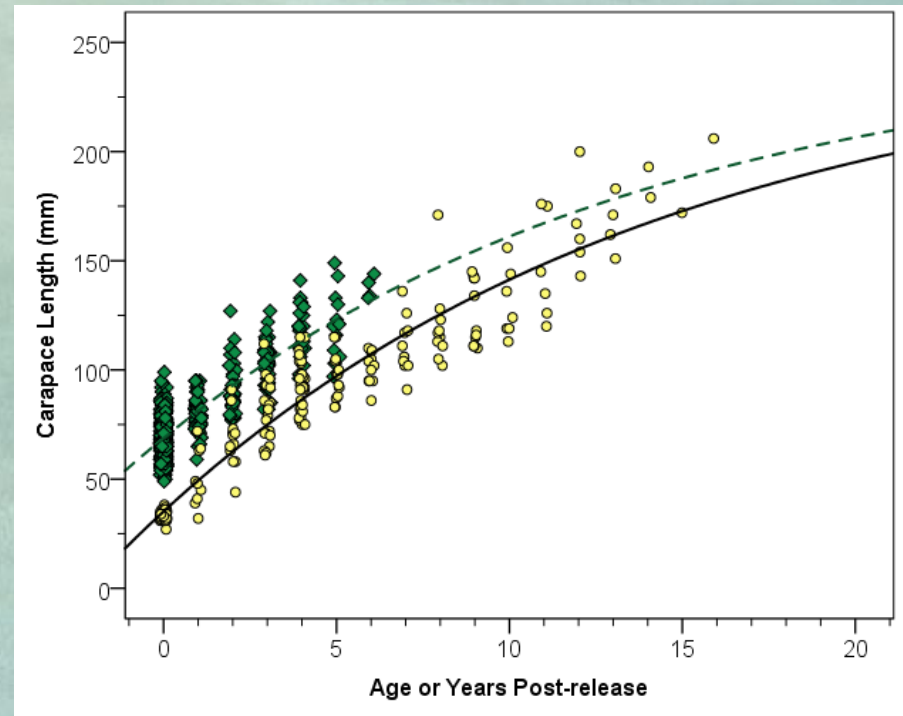


Figure 1. *Growth curves for HS1yo (green) and wild-born (yellow) turtles.*

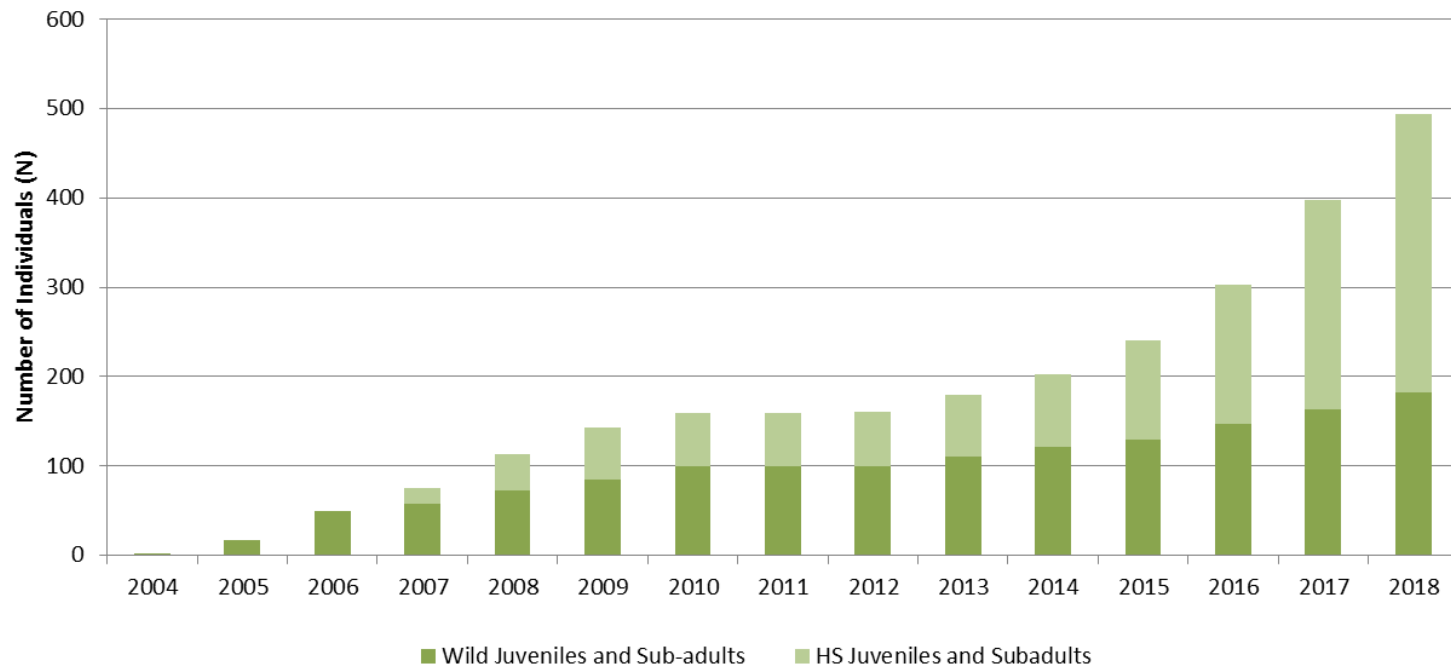


Results

Increase in young turtles

•164 (2010) to **494** (2018); increase largely head-starts

Number of Young Turtles (< 750g) 2005-2018



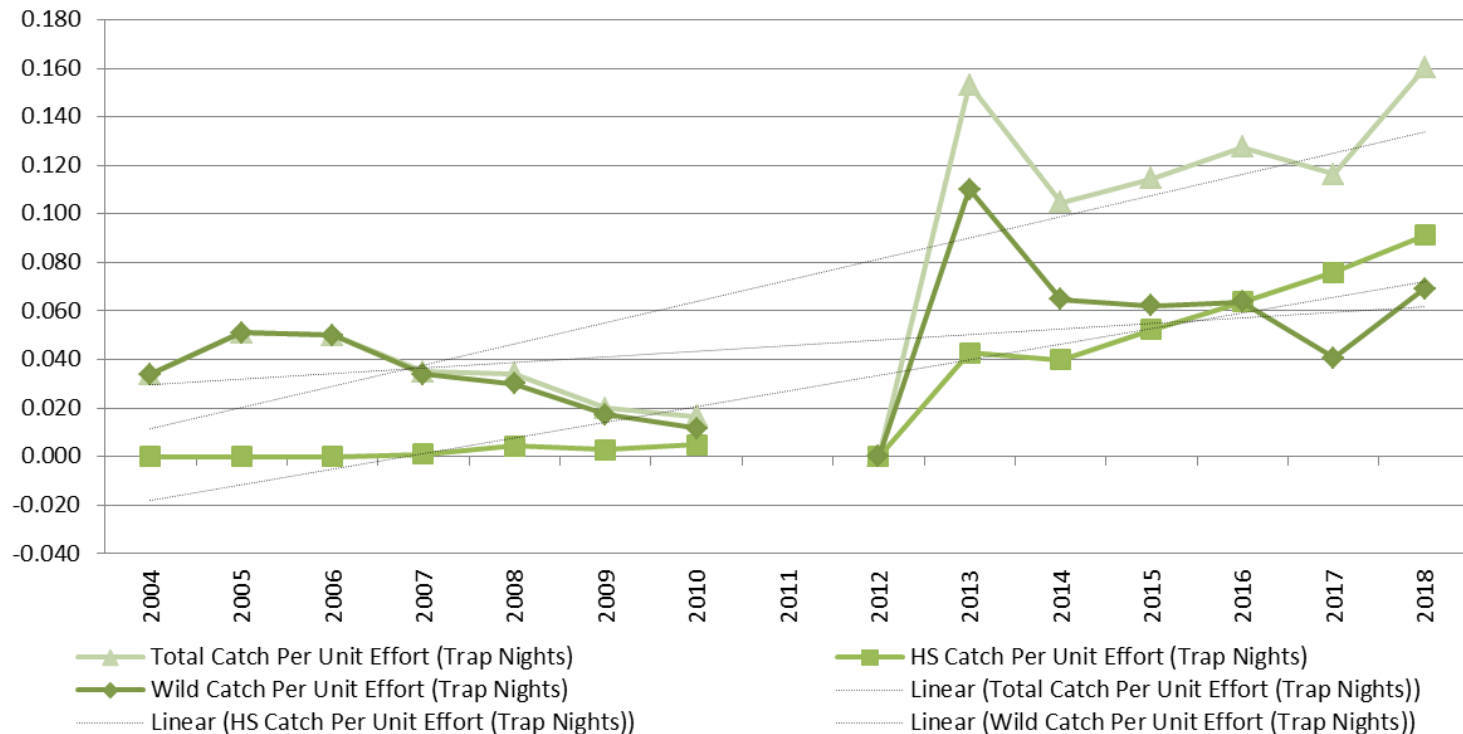


Results

Increase in capture rates

- Largely young turtles (mostly head-starts - 0.091 CPUE) alone (0.069 wild)

Blanding's Turtle Capture Rates by Origin (2004-2018)

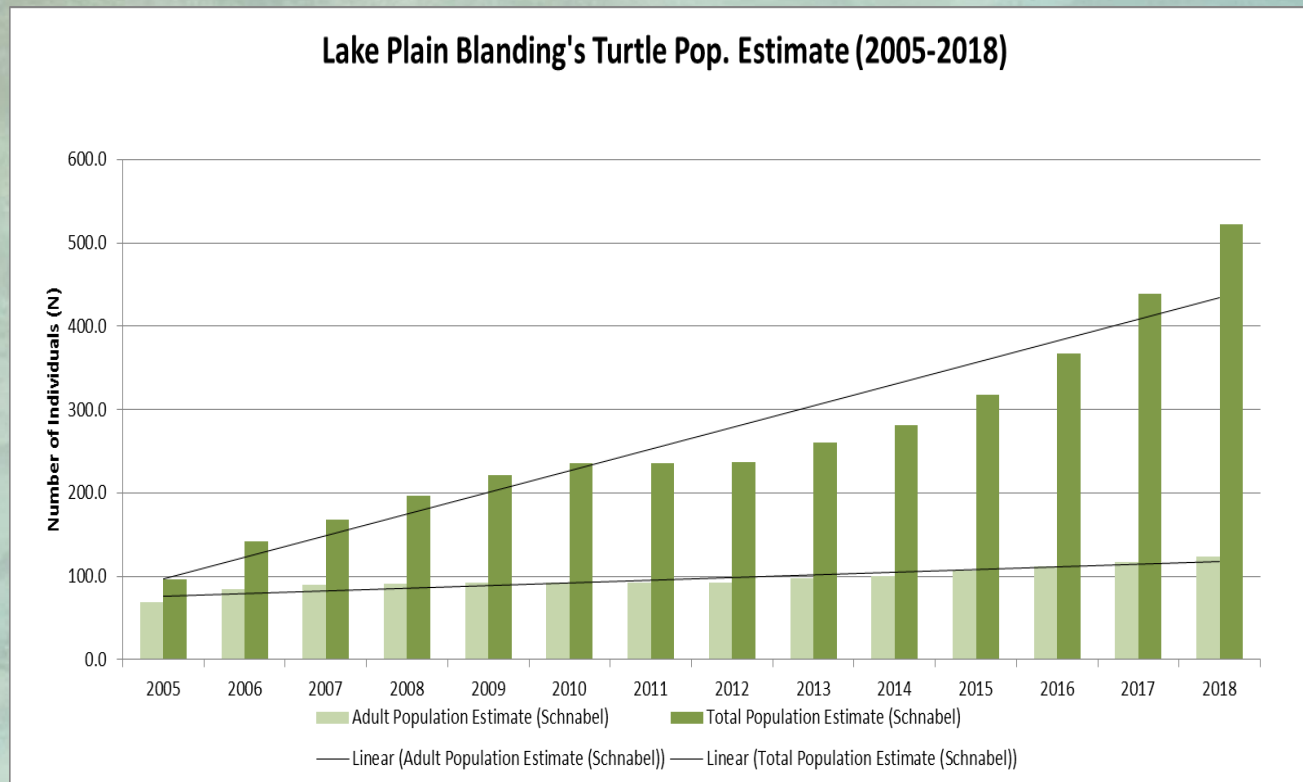




Results

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





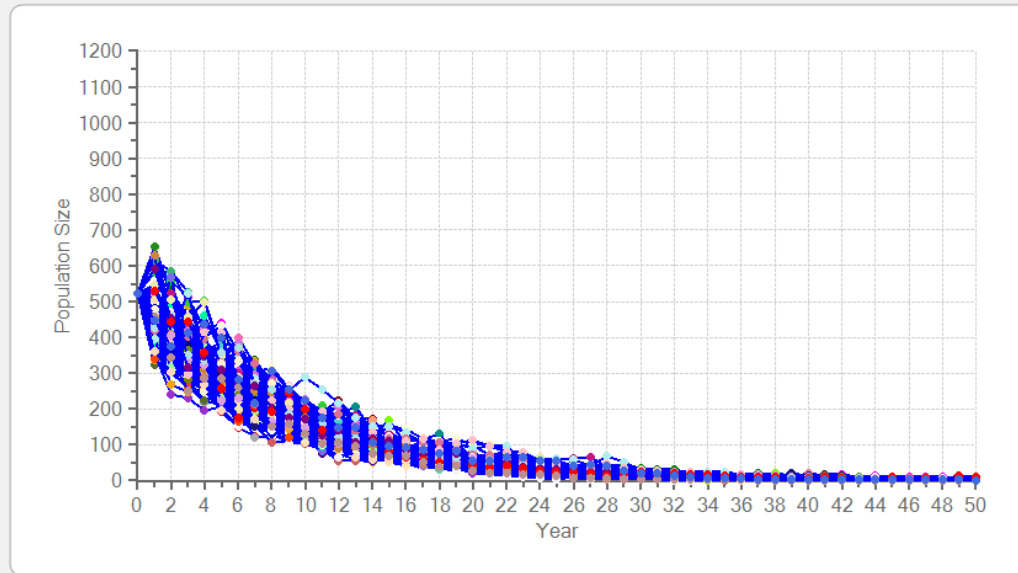
What does all this mean?

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

Original Model 2010 + 2018 Pop Size



$R = -0.117$, Probability of Extinction = 82%



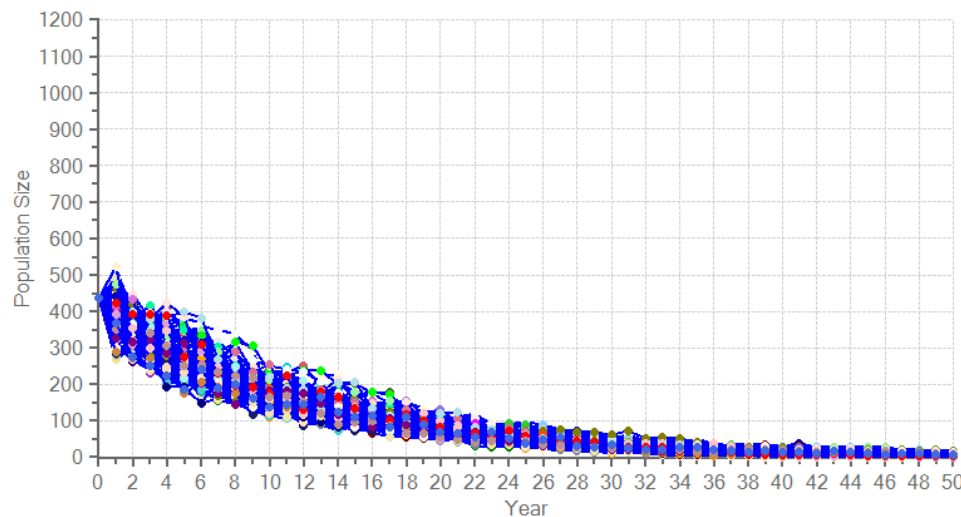
What does all this mean?

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!

Original Model + 2018 Adult Survivorship & Pop Size



$R = -0.089$, Probability of Extinction = 0.29%



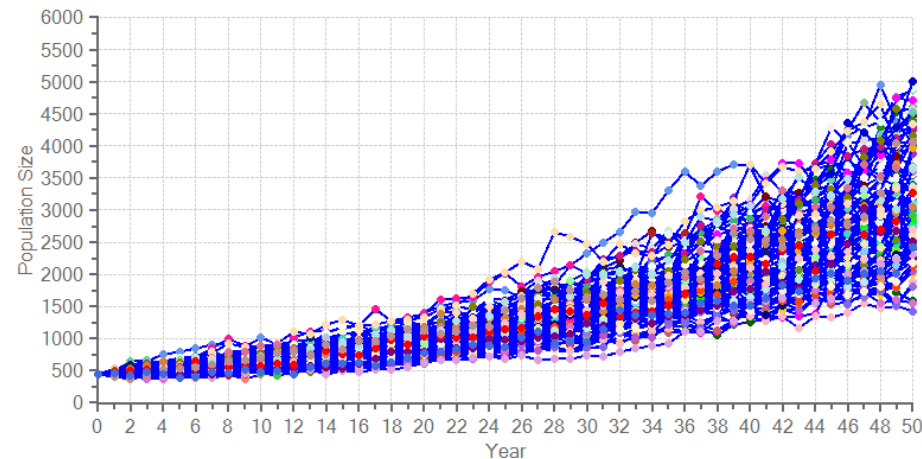
Adult Survivorship Key

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!!!

2018 Model (Updated Nest Success, Adult Survivorship & Pop Size)



$R = 0.039$, 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

Spring Bluff-Chiwaukee Prairie (SBCP) - 215 hectares

Illinois Beach State Park (IBSP) - 1,620 hectares

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

Callie Klatt Golba¹, Gary Glowacki², Richard B. King¹

¹Department of Biological Sciences, Northern Illinois University; ²Lake County Forest Preserve District

Northern Illinois University

Lake County Forest Preserves

Introduction

The Chiwaukee Illinois Beach Lake Plain (Lake Plain) consists of 1,700 ha of protected wetland and upland habitat. The Lake County Forest Preserve District and partners have monitored Blanding's Turtles within the 215 ha Spring Bluff-Chiwaukee Prairie (SBCP) unit since 2004; however, little is known regarding the 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 SBCP
2. Assess whether headstarting and predator control at SBCP has increased juvenile recruitment
3. Provide an initial estimate of adult Blanding's Turtle population size throughout the Lake Plain

Results

1. Trapping and incidental captures of Blanding's Turtles occurred throughout IBSP and SBCP from May through August 2017. In IBSP, 81 unique Blanding's Turtles (34 young and 47 adults) were captured. In comparison, at SBCP, 167 unique Blanding's Turtles (134 young and 53 adult) were captured. Size distributions were skewed towards smaller individuals at SBCP (Kolmogorov Smirnov Test, $p < 0.001$).

IBSP 2017

SBCP 2017

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).

Results

2. To promote juvenile recruitment, headstarting was initiated in 2010 and predator control was initiated in 2014 at SBCP. This has resulted in a higher proportion of juvenile Blanding's Turtles at SBCP in 2017 than at IBSP in 2017 or SBCP prior to 2010. Additionally, nine headstarted animals from SBCP were captured at IBSP.

Percentage of juvenile, subadult, and adult Blanding's Turtles captured in hoop traps that were headstarted (yellow) or not (blue) at IBSP 2017, SBCP 2017, and SBCP prior to 2010.

Results

3. Catch per unit effort for adults was similar between SBCP and IBSP (0.0235 and 0.0252 captures per trap night, respectively). This suggests that Blanding's Turtle density is similar between sites. The 2016 population estimate of 119 adults corresponds to a density of 0.56 adults per ha at SBCP. Extrapolating to the entire Lake Plain yields a ballpark estimate of ca. 800 adult Blanding's Turtles, which makes this the largest known population in Illinois.

Site	Trap Nights	Total Captures	Capture Per Unit Effort	Adult Captures	Adult Capture Per Unit Effort
SBCP	1237	133	0.107	31	0.025
IBSP	1292	83	0.064	33	0.025

Conclusions

We demonstrate the widespread occurrence of Blanding's Turtles throughout the Lake Plain, provide evidence of a positive impact of headstarting and predator control on Blanding's Turtle recruitment, and suggest that the Lake Plain is home to Illinois' largest Blanding's Turtle population. Information obtained as this study progresses will aid development of a conservation plan for the Lake Plain and provide an assessment of the conservation efforts at SBCP.

Acknowledgments

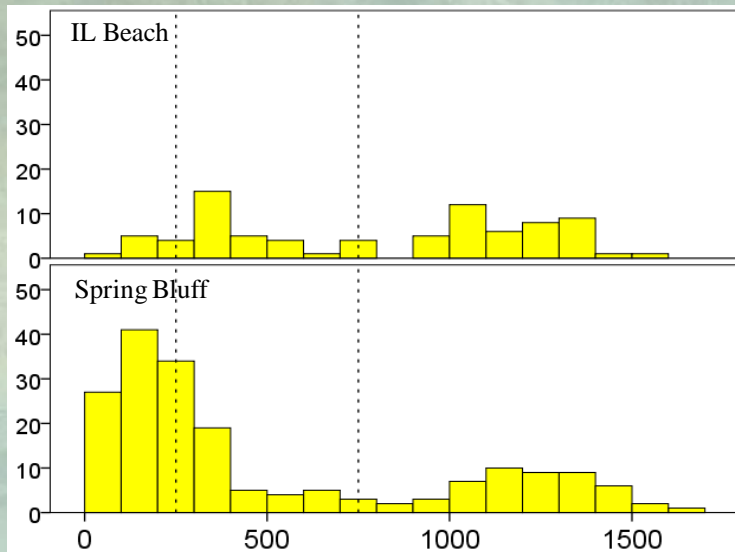
Funding was provided by a U.S. Fish and Wildlife GLFWRA grant; permits were provided by the Illinois DNR and Nature Preserve Commission; protocols were approved by the NU IACUC. We thank B. Sennel (IDNR Heritage Biologist), Veronica Ansdon, Sam Hannabuss, Courtney Klatt, Emma Suckardt & Ed McDonald (field techs), and Lauren Mumm & John Winter (vet students) for their assistance.



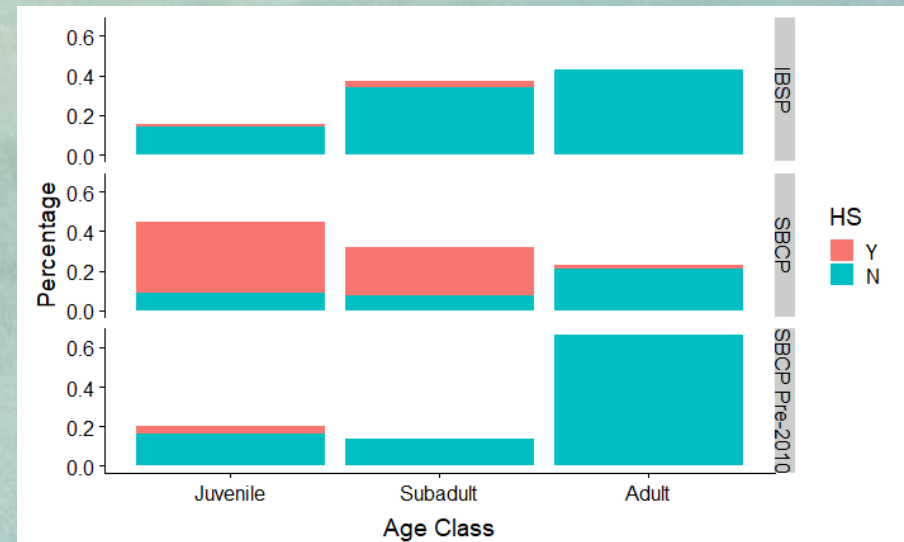


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Difference in size distribution of Blanding's Turtles captured at IBSP and at SBCP in 2017; vertical lines distinguish juveniles from subadults (250g) and subadults from adults (750g).



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.



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



Northern Illinois University



Southern Illinois University Carbondale



Preservation Foundation of the Lake County Forest Preserves

TOGETHER, ACHIEVING MORE FOR OUR FOREST PRESERVES.

Portions of this project were funded by Chicago Wilderness, an Anonymous Private Trust, US Fish and Wildlife Service, National Fish and Wildlife Foundation and the Sustain Our Great Lakes Great Lakes Stewardship Program.




Thank You

- LCFPD Adopt-A-Turtle Program

<https://www.lcpfd.org/preservation-foundation/adopt-a-turtle/>

Help keep Blanding's turtles healthy in Lake County


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ADOPT-A-TURTLE



Help keep Blanding's turtles healthy in Lake County

Thanks to your overwhelming support, we exceeded our goal of \$12,000 to help Blanding's turtles thrive in Lake County! These funds will allow the Forest Preserves to hire two seasonal field technicians to extend our [Blanding's Turtle Recovery Program](#) in 2017.

But we don't have to stop! You can still become a **Turtle Champion** or make a gift of any amount that will **directly support** our turtle program. Your gift will help buy new equipment, provide food and supplies for the turtle facility, or even help staff share our model with other conservation organizations working to save wildlife.

Join our Adopt-a-Turtle program using the form below. Any amount you can give will help a baby Blanding's turtle thrive. Or, you can become a **Turtle Champion** with a gift of \$120.

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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