The Friends of Nachusa Grasslands
2022 Scientific Research Project Grant Report

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Research Project Topic: We seek to develop and implement management strategies for the Blanding's Turtle, an Illinois endangered species, at Nachusa Grasslands and elsewhere in north-central Illinois. Blanding's Turtle management at Nachusa Grasslands focuses on determining the number and location of adults and enhancing juvenile recruitment using nest cages and head-starting. This work is being conducted in parallel with similar efforts at Richardson Wildlife Foundation and at other sites in northern Illinois.

Research Project Purpose: During 2022, we seek to
(1) Conduct 10-12 days of intensive trapping for Blanding's Turtles on TNC and adjacent property, focusing on known ares occupied by Blanding's turtles and on head-start release sites.
(2) Track adult females using radio telemetry to monitor egg development and transport them to Willowbrook Wildlife Center for egg induction.
(3) Release and track head-starts produced from eggs collected in 2020 and 2021 to obtain data on survival, movements, and habitat use; releases and monitoring will occur at both Nachusa Grasslands and Richardson Wildife Foundation.

Research Project Outcomes to date:
(1) A total of 36 traps were deployed from May2-13, 2022 for a total of 368 trap days across three sites, Tellabs Savanna, Bivins Pond (including both TNC property and property owned by J. Bivins), and Walgreen Pond (a pond owned by C. Walgreen located southeast of Tellabs Savannah on the south side of Franklin Creek). This resulted in 153 turtle captures, including 94 painted turtle captures, 47 snapping turtle captures, 7 Blanding's turtle captures, 5 spiny softshell turtle captures, and 1 red-eared slider capture. In addition, visual encounter surveys resulted in 5 Blanding's turtle hand captures.
- Blanding's turtle captures included 3 adult females at Tellabs Savanna, two of which were each captured twice and one captured three times. All three had been marked and equipped with radio transmitters in previous years.
- Blanding's turtle captures included 5 juveniles at Bivins Pond, including 3 head-starts released in 2020, 1 juvenile from a 2028 nest cage, and 1 juvenile that hatched from an unknown 2016 nest. These 5 juveniles were equipped with radio transmitters prior to release.

- These captures provide evidence for multi-year survival of hatchlings from caged nests and of head-starts.

(2) Five transmitter-equipped adult females, three at Tellabs Savanna, one at Hay Road (property owned by the Meiners family), and one at Walgreen Pond, were monitored for nesting activity each afternoon or evening from 1-14 June 2022 by R. King, E. Bach, and Nachusa crew members. Females were observed until nests were completed and nests were then cages to prevent depredation. Plans to collect eggs for head-starting were abandoned because of a new fungal pathogen detected in some captive Blanding's turtles early in 2022. Caged nests were monitored for hatchlings daily from 1-12 September 2022 by R. King, E. Bach, and Nachusa crew members. Hatchlings were measured, marked and released at wetland margins shortly after hatching.
   - Three nests were caged, including one nest located in a cornfield adjacent to Walgreen Pond. This nest was excavated and relocated to Tellabs Savanna to avoid harm from agricultural equipment.
   - Caged nests contained 7, 8, and 16 eggs and produced 7, 6 and 14 hatchlings (27 hatchlings in total).
   - Results demonstrate the potential feasibility of translocation of at-risk nests.
   - One adult female died of unknown causes sometime after nesting.

(3) Juveniles that hatched from eggs collected at Nachusa and Richardson in 2020 and 2021 and had been were head-started at the Lake County Forest Preserve District turtle facility were released in June 2022. Of 23 released at each site, 20 Richardson turtles and 17 Nachusa turtles were equipped with radio transmitters and located twice weekly until October 2022. Six other juveniles (5 captured during trappin efforts in May 2022 and one 2020 head-start that had remained on air) were also monitored at Nachusa. Head-start releases coincided with raccoon trapping at both sites in an effort to increase turtle survival over that observed in 2020. Analyses of these data, together with data from five other sites from 2020-2023, demonstrate that:
   - Summer survival was greater with raccoon removal and for larger head starts, ranging from 55% for small head-starts without raccoon removal to 95% for large head-starts with raccoon removal (Fig. 1).
   - Winter survival was high during 2020/2021 (93%) and 2021/2022 (96%) but somewhat lower during 2022/2023 (77%). Over all three years, winter survival was 88%.

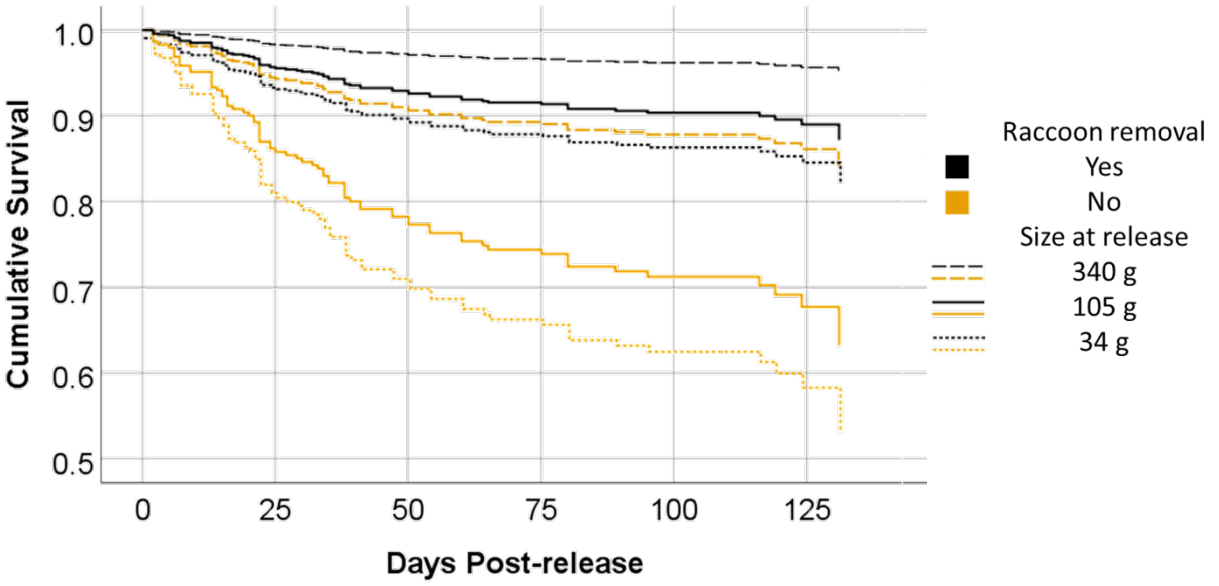

Figure 1. Survival analysis of head-started Blanding's turtles at seven sites in northern Illinois. Black lines show the cumulative summer survival of large (dashed), intermediate (solid) and small (dotted) head-starts with raccoon removal. Gold lines show the cumulative summer survival of large (dashed), intermediate (solid) and small (dotted) head-starts without raccoon removal.

Use of grant funds received from the Friends of Nachusa Grasslands:

D. Mauger – 14 days of trapping		$3250.00
T, Anton – 2 days trapping assistance		$ 500.00
R. King – 6 half days trapping assistance		$ 750.00
Supplies		$ 250.00
	total	$4750.00

Benefits to the work and goals of Nachusa Grasslands:

- Determination of the timing and location (habitat) of key Blanding's turtle life-history events (active season, nesting, hatching, overwintering)
- Collection of eggs, release of head-starts, assessment of Blanding's turtle head-start survival
- Contributions to regional and state-wide Blanding's Turtle management efforts

Application to management practices for restoration effectiveness and species of concern:

- This project has identified areas were encroachment by woody vegetation may reduce habitat quality for Blanding's turtles, areas where care should be exercised in the application of management practices to avoid negative impacts on Blanding's turtles, and areas adjacent to Nachusa Grasslands that are utilized by Blanding's turtles.

- This project has identified predation as a major risk factor to eggs, hatchlings, and head-started Blanding's turtles, and demonstrated the potential benefit of predator management for turtle conservation.

Presentations/posters:

Resiliency, Redundancy, and Representation of Blanding's Turtles in Illinois. RB King. Competitive State Wildlife Grant Blanding's Turtle Conference, Toledo Zoo, 1-2 November 2022.

What matters for the survival of head-started Blanding's turtles? RB King. Friends of Nachusa Grasslands Science Symposium, April 2023.

Manuscripts submitted to scientific journals:

Rutter AU, Vanek JP, Glowacki GA, Golba CK, King RB, Pullins CK, Smith WE. In review. *Raccoon abundance indexing and removal: implications for Blanding's turtle nest success*. Wildlife Research.

King RB, Anchor C, Jablonski C, Jaeger C, Ludwig D, Roloff A, Thompson D. In review. *An ad hoc assessment of Blanding's turtle translocation success*. Herpetological Review.

King RB. 2023. *PVA-based assessment of resiliency, redundancy, and representation in an imperiled freshwater turtle*. Global Ecology and Conservation. https://doi.org/10.1016/j.gecco.2023.e02419

Golba CK, Glowacki GA, King RB. 2022. *Growth and survival of wild and head-started Blanding's turtles (Emydoidea blandingii)*. Ichthyology & Herpetology 110:378-387.

Anticipated follow-up research:

- NIU researchers continue to monitor head-start survival at sites in Lake, Kane and Lee County.
- Results of this project will be used to develop best practices for Blanding's turtle head-starting.