



2022 Putnam County Wild Turkey Research Update

University of Missouri Columbia
Anheuser-Busch Natural Resources Building
Columbia, MO, 65211

Missouri Department of Conservation
3500 East Gans Road
Columbia, MO, 65201



Project Overview

Field work for the 2022 field season, our second overall field season, concluded on August 19th. The field work for the overall project is now 50% complete! We would like to thank the 125 landowners who granted us permission to access 52,296 acres of private property in Putnam County over the course of the project. This work would not be possible without their assistance!

We are excited to announce that Jacob Newton and William Harris, field technicians who worked on the project in 2022, will be returning to work on the project again in 2023. Our third field seasons will begin on January 9, 2023.

Throughout the fall, Alisha and CJ will be working on logistics for next season, compiling data from the 2022 field season, and completing preliminary analyses.

Wild Turkey Capture and Tracking

We captured wild turkeys throughout Putnam County from January-March 2022. We targeted our capture efforts toward flocks of hens. A mild winter with little snowfall made for a difficult hen capture season. We spent 1,249 hours locating hens to trap, baiting turkey flocks, and sitting in blinds waiting to capture. We captured 24 wild turkeys: 18 adult hens, 6 subadult (juvenile) hens. All captured birds were banded. Twenty-three hens (17 adults, 6 subadult) were fitted with GPS backpack transmitters. We also continued to track 38 hens captured in the 2021 season, resulting in a total of 62 hens that were monitored for the 2022 field season. The transmitters collect GPS locations and emit a UHF radio signal which allows researchers to locate hens and download GPS data remotely. Data from the transmitters is downloaded at least once a week, but up to once every day, depending on the time of year. As of fall 2022, our transmitters have collected over 2 million GPS locations. This data will be used to track movements and investigate habitat use.

Hen Survival

Overall hen survival was lower this year compared to last year. Three hens tagged in 2021 died in fall 2021. We recorded 23 mortalities during the 2022 field season. Of those mortalities, 11 were hens caught in the 2021 field season and 12 were caught in the 2022 field season. Fourteen mortalities were attributed to predation, nine had an unknown cause of death. We assign a hen an unknown cause of death when there is not enough evidence to determine cause of death, for example a severely decayed carcass. There were no known mortalities due to harvest.



Flocks of turkey hens are baited with cracked corn and then captured using rocket nets.

2022 Highlights from the Field

- We captured 23 hens
- 85.12% of tagged hens incubated a nest
- 20% of nests hatched
- Median Incubation Start Date: 5/21/2022
 - 6 days later than 2021
- Individual poults had a ~54% chance of surviving to 28 days old
- 50% of hens that hatched a brood had at least 1 poult survive to 28 days old
- We trapped nest predators for 33 nights
- We collected >600,000 game camera photos during the brood rearing period
- We conducted 374 vegetation and arthropod surveys during the field season



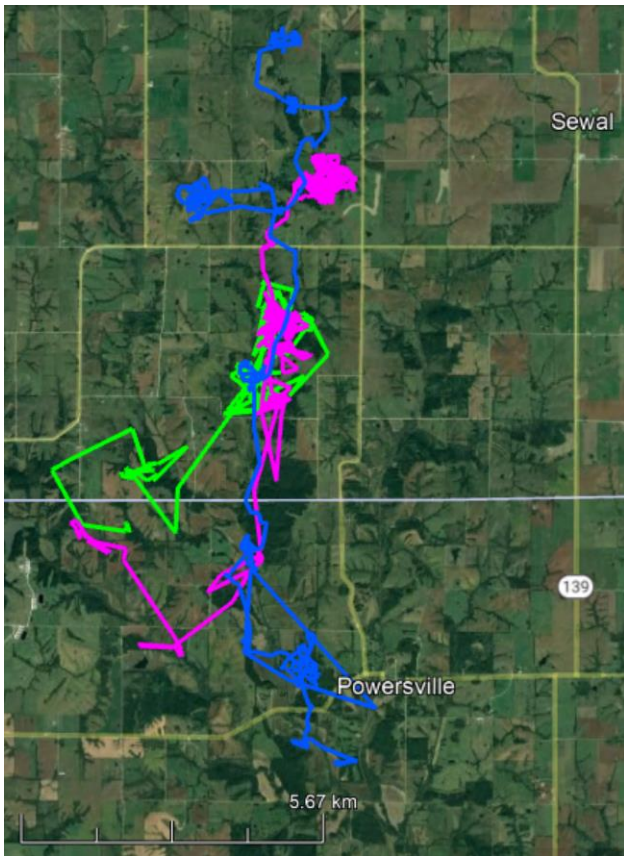
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Interesting Fact: Three hens captured in 2021 dispersed approximately 8 miles from their point of capture into Iowa in the spring of 2021. During the fall/winter of 2021, they returned to Putnam County, only to travel back to Iowa in the spring of 2022. Unfortunately, all 3 hens met their demise not long after returning to Iowa.



Hen 9129 was captured in February 2021 as a subadult southwest of Powersville. Between 3/27/2021 and 4/14/2021, she traveled approximately 9 miles north (blue line). She began incubating a nest west of Sewal, IA on 5/12/2021. Unfortunately, her nest failed. Between 7/22/2021 and 12/1/2021, she returned to MO (purple line). She spent the winter on the MO/IA border before returning to IA between 2/25/2022 and 4/20/2022 (green line). She died on 5/11/2022 in Iowa.

Nest Predator Captures

To understand the influence of potential turkey nest predators (raccoons, opossums, and skunks) on nest success, we live trapped and tagged nest predators in April. We can estimate population sizes of nest predators using a technique known as capture-mark-recapture which relies on recapture rates of tagged and released animals. We will relate predator population estimates to nest success and identify possible relationships between the amount of potential nest predators in Putnam County and nest success. We live-trapped 4 areas in Putnam County for 10 days each, using 39-43 cage traps per area. Each captured mammal was ear tagged and microchipped the first time they were captured. These tags were then used to identify individuals if they were recaptured. Preliminary estimates of raccoon and opossum population density in the four trap areas are presented below. Unfortunately, 0 skunks were captured in 2021 and very few were captured in 2022, as a result an abundance estimation may be difficult for skunks.



E. Feth holds the crews first skunk capture with J. Newton, L. Lauriston, C. Yocom-Russell, and A. Mosloff.

Trap Site	Estimated Raccoons per acre	Difference from 2021	Estimated Opossums per acre	Difference from 2021
1	0.50	+0.68%	0.18	+0.67%
2	0.09	-1.22%	0.27	+0.59%
3	0.40	+0.45	0.25	+0.48%
4	0.07	NA	0.03	NA



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Nest Survival

47 of the 58 GPS tagged hens (35 captured in 2021 and 23 captured in 2022) were alive at the beginning of the nesting season. Of those 47 hens, 40 reached nest incubation (two were subadults, the remaining were adults). Nine of the 40 initial nest attempts hatched. Nine hens whose initial nest failed initiated a second nest (renest) attempt, of which 1 hatched. One hen attempted to nest three times, unsuccessfully. Note that because wild turkeys do not start continuously incubating nests until the entire clutch is laid, it can be difficult to identify nest attempts that fail prior to incubation. Thus, it is possible that some nest attempts may have gone undetected if the nest failed during the laying stage.

Of 50 total nest attempts, 20% were successful, an decrease of 4.5% from 2021. Nest initiation rates were up 6.5% from 2021. Renest rates (initiation of a second nest following the failure of their first nest) were also up 3%. Success of first nest attempts was up 9% from last year, but only 1 in 9 (11.1%) second nests were successful in 2022 vs 1 in 4 (25%) in 2021. Median data at which hens began incubating initial nesting attempts was 6 days later than in 2021.



An unsuccessful turkey nest which was located in a forest and depredated 10 days into incubation.

Nest Site Selection

24 nests were located in forest cover while 26 nests were located in open fields. Given these early findings, it is difficult to say if there are meaningful differences in nest success between forested and open habitat types.

Habitat Type	Total Nests		% Successful Nests	
	2021	2022	2021	2022
Forest	17	24	41%	21%
Open Fields	26	26	12%	19%

Brood Predator Camera Trapping

Camera trapping for brood predators began June 1st and ended August 8th. 100 cameras were deployed in 6 areas across Putnam County. We collected 686,492 photos, bringing the total number of photos for the project to 1,119,014. In Fall of 2022, photos will begin to be logged and the data processed.



A red-shouldered hawk investigates a camera trap.

Interesting Fact: We lost contact with a tagged poult 25 days after it hatched. On day 26, the poult was re-located but with a different brood. The new hen was untagged, and we lost contact with the poult again on day 27. The poult was adopted into another brood, outside of our monitoring abilities.



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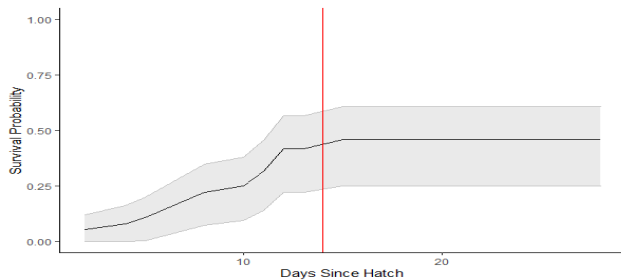
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Brood Survival

To assess poult survival, poults from each successful nest were captured within 48-72 hours of hatching. Poults were captured by hand at dawn and a subset of the brood were fitted with radio transmitters, allowing us to track them. One poult from each brood was left with the hen during the process to prevent her from abandoning the brood. Poults were tracked daily for 28 days post-hatch because previous studies suggest that poult mortality drops dramatically after 28 days when they are nearly full size.

We captured 38 poults from 10 broods. Of those 38 poults, 10 survived the 28-day monitoring period and 13 were lost to predators. The ultimate fates of the remaining poults were unknown either because we lost contact with the transmitter before the end of the 28-day period or the tag was recovered separated from the poult but there was no evidence of predation.



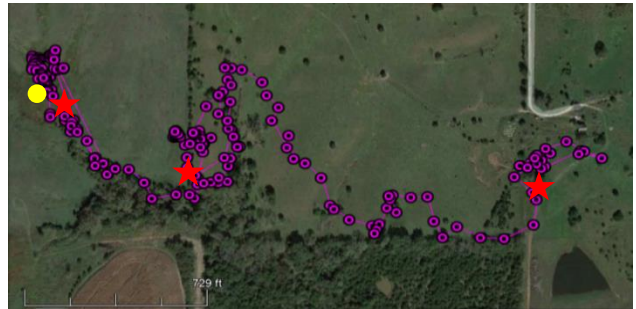
Preliminary poult survival estimates plotted as a function of days since hatch. Notice survival stabilized at day 14 (horizontal red line), indicating few mortalities occurred after poults could roost off the ground. Overall probability of a poult surviving to day 28 was ~54%.



Tagged poults are released together after processing for the best chance for all to reunite with the hen. No poults caught in the 2022 season were abandoned by the hen.

Vegetation and Arthropod Surveys

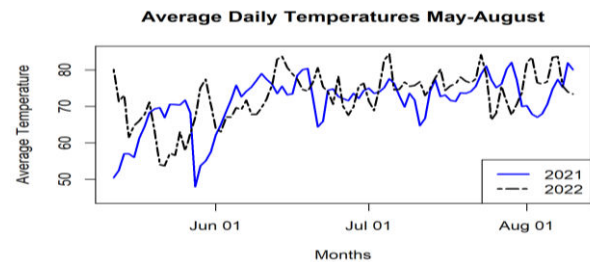
We surveyed fifty plots for vegetation and arthropods biweekly during June and July. These plots were in 4 core areas across Putnam County. In addition to the fifty static plots, we sampled 110 additional locations used by our tagged hens based on their GPS locations, as well as random locations in hen home ranges. This data will be used to help us understand the habitat needs of broods.



Movements of a hen and her brood for the first 72 hours after hatching. The yellow circle is the location of the nest and red stars are roost sites. Locations are taken every 10 minutes during the day.

Weather Stations

Past studies have suggested nest and poult survival can be influenced by temperature and amount of precipitation. To study this we deployed ten weather stations throughout Putnam County during the months of May-August. These stations recorded the air temperature every 10 minutes and the amount of rainfall at 0.2mm intervals. This data will be used to examine the relationships between weather and nest and brood survival.



Average daily temperatures from May to August in Putnam County.



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Questions?

Please contact Alisha Mosloff of Cara (CJ) Yocom-Russell with questions regarding field work or to become involved:

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Questions regarding wild turkey management in Missouri may be directed to:

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A. Mosloff restrains a hen while C. Yocom-Russell attaches transmitter (top left). Thermal imaging view of a hen roosting on the ground immediately prior to brood capture (top middle). E. Feth, L. Lauritson, W. Harris, and J. Newton practice vegetation survey techniques (top right). Virginia opossum pups in a female's pouch (bottom left). C. Yocom-Russell measures a poults tarsus (bottom middle). A. Mosloff scans the RFID chip of a recaptured raccoon (bottom right).