

Clarissa Starbuck
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EDUCATION

- July 2014–May 2019 Northern Arizona University Flagstaff, AZ
Ph.D. in Forest Science
Dissertation: “Using echolocation to predict bat habitat in northern Arizona”
Degree awarded: May 2019
- January 2011–May 2013 University of Missouri Columbia, MO
M.S. in Fisheries and Wildlife Sciences
Thesis: “Bat occupancy of forests and managed savannas and woodlands in the Missouri Ozark Region”
Degree awarded: May 2013
- August 2006–May 2010 University of Missouri Columbia, MO
B.S. in Fisheries and Wildlife Sciences with minors in Captive Wild Animal Management, Animal Sciences, and Biological Sciences
Degree awarded: May 2010

POSITIONS

- September 2020–Present Champaign, IL
University of Illinois
Postdoctoral Research Associate
Supervisor: Joy O’Keefe, Ph.D.
- Oversee technicians and graduate students during summer field work in northeastern Missouri
 - Capture surveys of bats in northeastern Missouri using mist nets
 - Assist the Missouri Department of Conservation with fall swarm surveys of bats in southern Missouri using harp traps
 - Tracking Indiana bats to roost trees using radio telemetry
 - Emergence counts at Indiana bat roost trees
 - Data management and analysis
 - Writing reports and manuscripts
 - Hire technicians to work on the project in the field
 - Deploy Anabat Swifts with M.S. student
 - Organize volunteers to help with roost emergence counts

May 2019–September 2020 Terre Haute, IN
Indiana State University

Postdoctoral Research Associate

Supervisor: Joy O'Keefe, Ph.D.

- Oversaw technicians and graduate students during summer field work in northeastern Missouri
- Capture surveys of bats in northeastern Missouri using mist nets
- Assisted the Missouri Department of Conservation with fall swarm surveys of bats in southern Missouri using harp traps
- Tracked Indiana bats to roost trees using radio telemetry
- Emergence counts at Indiana bat roost trees
- Data management and analysis
- Wrote reports and manuscripts
- Mentored an undergraduate student in a research project
- Hired technicians to work on the project in the field
- Deployed Anabat Swifts with M.S. student
- Organized volunteers to help with roost emergence counts

October 2018–March 2019

Flagstaff, AZ

Northern Arizona University

Instructor

Supervisor: James Allen, Ph.D.

- Prepared presentations, quizzes, and exams for Forestry 250-Arizona Forests and Wildlife, an online course for undergraduate students
- Graded assignments and exams

June 2014–July 2018

Flagstaff, AZ

Northern Arizona University

Graduate Research Assistant

Supervisor: Carol Chambers, Ph.D.

- Designed a research study and developed hypotheses
- Wrote a project proposal that was approved by my dissertation committee before beginning field work
- Generated maps in ArcGIS for placement of equipment
- Hired and managed four field technicians for the research project
- Installed Wildlife Acoustics SM3Bat detectors and identified bat calls using Sonobat 3 and Analoow
- Analyzed landscape data in ArcMap version 10
- Organized and identified hundreds of thousands of bat call data files for analysis
- Built and analyzed landscape models in program R
- Prepared three manuscripts for publication
- Studied hundreds of papers for a literature review to be published
- Completed qualifying exams in the following subjects: bat ecology and evolution, statistics, bat conservation
- Relevant coursework: Research Methods, Statistical Methods I and II, Map Design and GIS, Introduction to R, Wildlife Habitat Relationships, Applied Sampling

January 2017–May 2017 Flagstaff, AZ
Northern Arizona University

Teaching Assistant

Supervisor: James Allen, Ph.D.

- Graded exams for undergraduate Forestry classes
- Attended undergraduate GIS labs and answered questions from students about using ArcMap version 10

May 2013–June 2014 Columbia, MO
University of Missouri

Senior Research/Lab Technician

Supervisor: Sybill Amelon, Ph.D.

- Compiled and analyzed data for bat home range by day study using program R and ArcGIS
- Helped with White Nose Syndrome treatment trials project on captive gray bats in hibernation chambers
- Compiled data on roost trees of bats in northern Missouri
- Installed Anabat II and SD1 bat detectors
- Conducted vegetation surveys using prism plots
- Captured bats at locations in Missouri using mist nets and harp traps
- Collected and identified bat call data using Anabat and AnalookW
- Data management
- Published a manuscript in the Wildlife Society Bulletin

January 2011–May 2013 Columbia, MO
University of Missouri

Graduate Research Assistant

Supervisors: Frank Thompson, III, Ph.D. and Sybill Amelon, Ph.D.

- Designed a research study and developed hypotheses
- Wrote a project proposal that was approved by my thesis committee before beginning field work
- Generated maps in ArcGIS for placement of equipment
- Installed Anabat II and SD1 bat detectors and identified bat calls with AnalookW
- Conducted vegetation surveys prism plots and fixed radius plots
- Entered vegetation data using Microsoft Excel
- Used ArcMap and Fragstats to analyze landscape data
- Analyzed data using SAS and single-season occupancy modeling in program Presence
- Hired and managed two technicians to help with field work
- Wrote and defended my thesis
- Relevant coursework: Conservation Biology, Introduction to GIS, Design of Ecological Experiments, Applied Statistical Models, Landscape Ecology and GIS Analysis, Practice of Silviculture

January 2012–May 2012

University of Missouri Columbia, MO

Teaching Assistant

Supervisor: Matthew Gompper, Ph.D.

- Taught Fisheries and Wildlife 3660: Mammalogy laboratory to junior and senior undergraduates
- Led review sessions for students in Mammalogy lab
- Set up, proctored, and graded Mammalogy laboratory exams

May 2007–August 2007 and June 2008–January 2011

University of Missouri Columbia, MO

Field Research Technician

Supervisors: Sybill Amelon, Ph.D. and Kathryn Bulliner, Ph.D.

- Transported, installed, maintained, and operated telemetry, acoustic, and insect trap equipment
- Captured and identified bats at several locations in Missouri using mist nets and harp traps
- Tracked Indiana bats at night for resource selection and during the day to roost trees using radio telemetry
- Set up Anabat II and Anabat SD1 bat detectors
- Entered telemetry and prism plot data using Microsoft Excel and Microsoft Access
- Identified bat calls using AnalookW
- Conducted vegetation surveys using prism plots
- Extracted DNA from bat wing punch samples
- Ran polymerase chain reaction (PCR) on extracted DNA
- Ran agarose gel for electrophoresis

August 2007–May 2010

MU Student Recreation Center Columbia, MO

Climbing Wall Technician

September 2006–May 2007

MU Veterinary Teaching Hospital Columbia, MO

After Hours Clinic Crew in the ICU

May 2003–June 2006

The Centre and SplashZone Rolla, MO

Lifeguard

PERMITS

I have a U.S. Fish and Wildlife Service permit (TE63118D-0) to run my own site for the capture of Indiana bats (*Myotis sodalis*), northern long-eared bats (*Myotis septentrionalis*), and gray bats (*Myotis grisescens*) across the species' ranges.

I have a 2020 Missouri State Wildlife Collector's Permit (#18773) to capture bats in six counties in northeast Missouri.

WORKSHOPS/TRAINING

Acoustic Data Management Workshop with
Bat Conservation and Management
Alton, IL

March 7–9, 2015

- Theory of recording and analyzing bat acoustic calls
- Management of acoustic files
- Used auto-classification software programs (BCID, EchoClass, Sonobat, Kaleidoscope Pro) and learned to interpret outputs from these programs

Acoustic Analysis Workshop with Cori Lausen
Phoenix, AZ

April 24–26, 2014

- Used AnalookW to identify species and species groups from acoustic files
- Learned how to create identifying filters in AnalookW

Wildlife Acoustics Techniques and Hardware Workshop
Phoenix, AZ

April 21–23, 2014

- Basic introduction to bat acoustics and bat detector technology
- Management of raw acoustic files
- Used Kaleidoscope Pro to identify species and species groups from acoustic files
- Learned techniques and gained hands-on experience with techniques for passive and active bat detector use

PUBLICATIONS

Starbuck, C. A., Considine, E. H., and Chambers, C. L. 2020. Water and elevation are more important than burn severity in predicting bat activity at multiple scales in a post-wildfire landscape. *PLoS ONE*. 15(4): e0231170.

Starbuck, C. A. 2019. Using echolocation to predict bat habitat in northern Arizona. Dissertation, Northern Arizona University, Flagstaff, USA.

Starbuck, C. A., Amelon, S. K., and Thompson, F. R. 2015. Relationships between bat occupancy and habitat and landscape structure along a savanna, woodland, forest gradient in the Missouri Ozarks. *Wildlife Society Bulletin* 39(1): 20–30.

Starbuck, C. A. 2013. Bat occupancy of forests and managed savanna and woodland in the Missouri Ozark region. Thesis, University of Missouri, Columbia, USA.

POSTERS/PRESENTATIONS

DeSchepper, L., C. A. Starbuck, and J. M. O’Keefe. A quantitative comparison of AudioMoth and Anabat Swift ultrasonic recording units [poster]. In: Indiana State University Exposium, April 15, 2020; Terre Haute, IN.

Starbuck, C. A., N. J. Castaneda, M. Jorgensen, M. L. Hoggatt, D. K. Hews, and J. M. O’Keefe. How do Indiana bat populations respond to forest management? [poster]. In: 49th North American Symposium on Bat Research, October 23–26, 2019; Kalamazoo, MI.

Starbuck, C. A. and C. L. Chambers. "Predicting habitat use by bats to protect bats and inform wind energy development," Oral presentation at the 48th North American Symposium on Bat Research, October 24–27, 2018; Puerto Vallarta, Jal., Mexico.

Starbuck, C. A. and C. L. Chambers. "Predicting habitat use by bats to protect bats and inform wind energy development," Oral presentation at the Wildlife Society 25th Annual Conference, October 7–11, 2018; Cleveland, OH.

Starbuck, C. A., E. H. Considine, and C. L. Chambers. "Morphology predicts bat activity at multiple scales in a post wildfire landscape," Oral presentation at the 47th North American Symposium on Bat Research, October 18–21, 2017; Knoxville, TN.

Starbuck, C. A., and C. L. Chambers. Predicting habitat use by bats to protect bats and inform wind energy development [poster]. In: The Wildlife Society 24th Annual Conference; September 23–27, 2017; Albuquerque, NM.

Starbuck, C. A. and C. L. Chambers. "Predicting habitat use by bats to protect bats and inform wind energy development," Oral presentation at the 14th Biennial Conference of Science and Management on the Colorado Plateau and Southwest Region; September 11–14, 2017; Flagstaff, AZ.

Starbuck, C. A. and C. L. Chambers. "Predicting habitat use by bats to protect bats and inform wind energy development," Oral presentation at the 2nd International Symposium on Bat Echolocation Research, March 26–April 1, 2017; Tucson, AZ.

Starbuck, C. A. and C. L. Chambers. "A review of echolocation detection studies," Oral presentation at the 2nd International Symposium on Bat Echolocation Research, March 26–April 1, 2017; Tucson, AZ.

Starbuck, C. A. and C. L. Chambers. "Predicting habitat use by bats to protect bats and inform wind energy development," Oral presentation at the 50th Joint Annual Meeting of the Arizona and New Mexico Chapters of the Wildlife Society and Arizona/New Mexico Chapter of The American Fisheries Society, February 9–11, 2016; Farmington, NM.

Starbuck, C. A. and C. L. Chambers. Predicting habitat use by bats to protect bats and inform wind energy development [poster]. In: Wind Wildlife Research Meeting XI; November 29–December 2, 2016; Broomfield, CO.

Starbuck, C. A. and C. L. Chambers. Predicting habitat use by bats to protect bats and inform wind energy development [poster]. In: The Wildlife Society 23rd Annual Conference; October 15–19, 2016; Raleigh, NC.

Starbuck, C. A. and C. L. Chambers. Predicting habitat use by bats to protect bats and inform wind energy development [poster]. In: 46th North American Symposium on Bat Research; October 12–15, 2016; San Antonio, TX.

Starbuck, C. A. and C. L. Chambers. "A review of echolocation detection studies," Oral presentation at the 49th Joint Annual Meeting of the Arizona and New Mexico Chapters of the Wildlife Society

and Arizona/New Mexico Chapter of The American Fisheries Society; February 4–6, 2016; Flagstaff, AZ.

Starbuck, C. A. and C. L. Chambers. A review of echolocation detection studies [poster]. In: 45th North American Symposium on Bat Research; October 28–31, 2015; Monterey, CA.

Amelon, S. K., C. A. Starbuck, K. M. Womack, and F. R. Thompson. A decade of bat monitoring in the Missouri Ozarks [poster]. In: 45th North American Symposium on Bat Research; October 28–31, 2015; Monterey, CA.

Womack, K. M., C. A. Starbuck, S. K. Amelon, and F. R. Thompson. “Roost tree selection by Indiana bats in an agricultural landscape,” Oral presentation at the 45th North American Symposium on Bat Research; October 28–31, 2015; Monterey, CA.

Starbuck, C. A., E. H. Saunders, and C. L. Chambers. “Bat occupancy in a patchy post-fire landscape,” Oral presentation at the 13th Biennial Conference of Science and Management on the Colorado Plateau and Southwest Region; October 4–6, 2015; Flagstaff, AZ.

Starbuck, C. A., C. L. Chambers, and S. A. Cushman. “Bat activity in a post-wildfire landscape,” Oral presentation at the North American Joint Bat Working Group Meeting, March 3–6, 2015; St. Louis, MO.

Starbuck, C. A., S. K. Amelon, and F. R. Thompson. Bat occupancy of forests and managed savanna and woodland in the Missouri Ozark region [poster]. In: 74th Midwest Fish & Wildlife Conference; January 26–29, 2014; Kansas City, MO.

Starbuck, C.A., K.M. Womack, and S.K. Amelon. Are we seeing the “Big Picture”? A look at home range size by day for two species [poster]. In: 16th International Bat Research Conference and 43rd North American Symposium on Bat Research; August 11–15, 2013; San Jose, Costa Rica.

Starbuck, C.A., S.K. Amelon and F.R. Thompson. “Bat occupancy of forest and managed savanna and woodland in the Missouri Ozark Region,” Oral presentation at the 42nd North American Society for Bat Research meeting. San Juan, Puerto Rico, October 27, 2012.

Starbuck, C.A., S.K. Amelon, and F. R. Thompson. Bat occupancy of forest and managed savanna and woodland in the Missouri Ozarks [poster]. In: 17th Annual Meeting of the Southeastern Bat Diversity Network and 22nd Colloquium on Conservation of Mammals in the Southeastern United States; February 23–25, 2012; Louisville, KY.

Starbuck, C.A., S.K. Amelon, and F.R. Thompson. Bat occupancy of forest and managed savanna and woodland in the Missouri Ozarks [poster]. In: 41st Annual North American Symposium on Bat Research; October 26–29, 2011; Toronto, ON, Canada.

VOLUNTEER EXPERIENCE

Indiana State University Night at the Museum Outreach Event
Terre Haute, IN

March 11, 2020

- Communicated to the public about bats and bat boxes

U.S. Forest Service bat capture

October 19, 2019

Shawnee National Forest - Illinois

- Assisted U.S.F.S. in capturing bats exiting a gated cave using a harp trap

13th Annual Bat Festival

September 21, 2019

Terre Haute, IN

- Gave talk on bats of Arizona and my dissertation work
- Supervised children in craft room

Arizona Game and Fish Watchable Wildlife Events

Summer 2018

Multiple sites in Arizona

- Volunteered with bat netting events with AZ Game and Fish for public

Led mist netting for bats with the USGS during Grand Canyon

July 12–20, 2017

Youth river trip

Colorado River, AZ

Invited to speak to 5th and 6th graders at Heritage Elementary School about bats

March 3, 2017

Williams, AZ

Northern Arizona School of Forestry Centennial Campout

September 10, 2016

Flagstaff, AZ

- Spoke to incoming undergraduates about wildlife research.

Arizona Bat Blitz 2016

June 27–July 1, 2016

Apache-Sitgreaves National Forest

Invited to speak to children at Early Learning Adventures about bats

October 26, 2015

Flagstaff, AZ

Northern Arizona School of Forestry Centennial Campout

September 12, 2015

Flagstaff, AZ

- Spoke to incoming undergraduates about wildlife research.

Arizona Bat Blitz 2014

June 23–28, 2014

Apache-Sitgreaves National Forest

Bat World Ozarks

Aug 2008–June 2014

Ashland, MO

- Helped feed and care for orphaned or injured bats brought to the facility.

Trapped bats in Costa Rica

August 15–17, 2013

North American Society for Bat Research Field Trip

Tirimбина Biological Reserve and La Selva Biological Station

Invited to speak to Girl Scouts about bats at Women of Wildlife day

July 20, 2013

Columbia, MO

Arizona Bat Blitz 2013 July 8–12, 2013
Apache-Sitgreaves National Forest

- Captured bats in eastern Arizona with mist nets
- Tracked some individuals to their day roosts using radiotelemetry

Invited to speak about bats at a Boy Scout meeting January 22, 2013
Columbia, MO

Invited to speak to Girl Scouts about bats at Women of Wildlife day June 16, 2012
Columbia, MO

Invited to speak to Claymont Elementary School 3rd graders about bats March 19, 2012
Ballwin, MO

Costa Rica Christmas Bat Count December 13–23, 2011
Tirimbina Biological Reserve

10th Annual Southeastern Bat Diversity Network Bat Blitz July 31–August 4, 2011
Pisgah National Forest and Vicinity
Western North Carolina

Bat World Sanctuary June 18–July 5, 2009
217 N. Oak Avenue
Mineral Wells, TX 76067

Rolla Animal Hospital Summers '04, '05, '06
1011 Stoltz Dr.
Rolla, MO 65401

Tri-County Humane Society Summer 2003
705 E. Springfield
St. James, MO 65559

HONORS/ACTIVITIES

The Wildlife Society – Member September 2014–Present

Missouri Chapter of The Wildlife Society – Member October 2019–Present

Arizona Chapter of The Wildlife Society – Member September 2014–Present

Webmaster February 2017–May 2019

North American Society for Bat Research – Member Oct. 2009–Present

NAU Forestry Graduate Student Association – Member September 2014–May 2019

Vice President January–December 2015

President January–December 2016

High Altitude Roller Derby – Member August 2014–May 2019

Athletic Director January 2015–December 2018

MU Wildlife and Fisheries Graduate Student Organization (WAFGSO) – Member Jan. 2011–May

2013

Graduate Student Association – WAFGSO Representative Fall 2011–May 2013

Mizzou Climbing Club – Member Fall '06–Spring '14, Treasurer '07–'08, President '08–'09

Fisheries and Aquatic Sciences Society – Member Spring '08–Fall '09, Historian Fall 2008

Mizzou Chapter of the Wildlife Society – Member Spring '08–Fall '09

Mizzou Pre-Veterinary Medical Club – Member '06–'07

AWARDS

Indiana State University Research Project Support for Undergraduates (\$300) 2019

Wally Covington Travel Award (\$500) 2017

K.R. & Irene Hafen Forestry Scholarship (\$3,000) 2016

ARCS Award (\$7,500) 2016

Forestry Graduate Student Association Travel Grant (\$100) 2015

NAU Graduate Student Government Travel Award (\$100) 2015

STUDY ABROAD

University of Queensland in Australia

June 8, 2008 to July 5, 2008