

Matthew E. Boone

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Education

M.S in Wildlife Ecology, *May 2016* (GPA - 3.90)

University of Delaware *Department of Entomology and Wildlife Ecology*

Dr. Jeffrey J. Buler

B.S in Biology - Ecology, Evolution, and Behavior *May 2009* (GPA - 3.48)

University of Texas, Austin, TX

Data Experience

Data Manager and Biologist *August 9, 2018 - Present*

University of Florida Research and Education Center - Ft. Lauderdale, FL > • Manage multiple spatial PostgreSQL databases in lab including database creation, sql query building, and analysis using PostGIS extensions • Analyze data sets and create high-quality publication quality maps and graphics using R and QGIS for lab projects • Creation, consulting, and managing of multiple software packages in R (detailed below) • Manage IT workload for multiple computers running Ubuntu and lab server running Debian builds.

Data Analyst and Database Manager *April 15, 2016 – April 13, 2017*

Kauai Endangered Seabird Recovery Project, HI

> • Analyzed field data and created maps using R and ArcGis. Interfaced with and analyzed data from a myriad of technologies including Audio Recording Units, satellite and geolocator tags, Reconyx Field Cameras, and LiDAR. Fixed, maintained, and expanded two current databases using Microsoft Access and SQL. Maintained integrity and QA/QC of databases.

- Prepared 12 annual scientific reports, helped write manuscripts, and lead outreach events for public.
- Managed nine technicians in office, monitored their data entry, and created projects tailored to each technician's strengths. Helped with field logistics, helicopter flights, and schedules.
- Created a habitat model for the endangered Band-rumped Storm-Petrel using ten years of auditory survey and Audio Recorded Unit data using boosted regression trees in R. Collected covariate data on topographic variables from publicly available sources (Elevation, Slope, Aspect, Soil type, NDVI, etc). Wrote methods, analysis, and results page for manuscript.
- Created an algorithm to calculate exposure height of powerline wires across the island of Kauai using LiDAR and Photogrammetry data in R. Required dynamically creating 100,000 geospatial polygons tailored to individual vectors analyzed entirely in an R environment. • Analyzed movement and wintering range of 12 satellite tagged juvenile Newell's Shearwaters using dynamic Brownian Bridge Movement Model in R.

Software Packages

sftraj

Boone, M., Joo, R., Calenge, C., Pebesma, E., Basille, M. *sftraj - A movement class for analyzing and visualizing spatial movement data that incorporates the sf package* **R** (created 2019)

– Currently in development – > • Funded by a grant from the RConsortium

nestR

Picardi, S., Smith, B., Boone, M. *NestR - Estimation of Bird Nesting from Tracking Data* **R** (created 2018)

github.com/picardis/nestR

- > • Helped build spatial site selection algorithm that selects recursive site visits and chooses most likely nest sites.
- Helped write Shiny interface to visualize recursive site visits.

refsplitr

Fournier, A.M.V., Boone, M.E., Stevens, F.R., Bruna, E.E. *Refsplitr - an R package for processing Web of Science Records and mapping georeferenced coauthorship networks* **R** (created 2018)

github.com/embruna/refsplitr

– Currently in Peer-Review at rOpenSci –

- > • Wrote code to split reference files into perspective parts as well as partition out author and address information.
- Created algorithm to group author name based on similar name participles, address proximity, and assorted information.
- Helped write code to map network analysis and spatial plotting of global author/co-author connections.

radaR

Boone, M.E., Smolinsky, J.A., Buler, J.J. *radaR - A package to analyze Level II WSR-88D Weather Data for avian stop-over mapping* **R** (created 2016)

github.com/birderboone/radar

– Now deprecated. Contact Dr. Jeff Buler (jbuler@udel.edu) for an updated version –

- > • Translated and updated pre-existing SAS code to R then built code into a package framework with a workable interface.
- Created novel nightly sampling method that fit flexible non-linear curves to temporal radar densities to calculate approximate sampling moment for stop-over mapping.

Computer Skills

R/RStudio *Expert* - Programming, data analysis, spatial analysis, and package creation.

ArcGIS/QGIS *Expert* - Spatial analysis and map making

SQL - POSTGRES/MYSQL/Access *Expert* - Creating and maintaining databases, building complex queries, creating workable forms for users, maintaining data integrity via standardized QA/QC.

Microsoft Office *Expert* - Writing reports, entering data, analyzing data, making graphs

Linux/UNIX language *Intermediate* - Administrative duties on Debian based server. Troubleshooting user issues in Ubuntu. Writing bin/bash script and scripting commands.

Markdown/Latek *Intermediate* - Typesetting and creating reports

Academic Work

Graduate Researcher *November 2013 - May 2016*
University of Delaware, DE

- > • Assessing the effects of Hurricane Sandy on fall migration in the North East United States using Weather Surveillance Radar.
- Created stopover maps of passerines in the Northeast United States using Level II weather radar to assess the change in stopover distribution of migrants after Hurricane Sandy. Modeled changes in bird density before and after the storm to changes in wind fields, storm surge, and NDVI at 6 radar stations across the Atlantic coast.
- Ground truthed radar returns by sky sampling for birds taking off at six sites across New Jersey and Delaware. Created methodology for determining when birds take off at night and when they can be sampled on the radar in R.
- Wrote laboratory protocols and methods for processing Level II WSR-88D data in R and calculating exodus timing of migrants via radar that is still being used at the University of Delaware and Patuxent Wildlife Research Center. Created a Package in R summarizing these methods with over 20 different functions.

Peer-Reviewed Publications

- (In review) Picardi, S., Smith, B.J., Boone, M.E., Frederick, P.C., Cecere, J.G., Rubolini, D., Lorenzo, S., Pirrello, S., Borkhataria, R.R., Basille, M. *A data-driven method to locate nest sites and estimate reproductive outcome from avian telemetry data* (2019). 10.1101/562025v2
- Joo, R., Boone, M., Clay, T., Patrick, S., Clusella-Trullas, S., Basille, M. *Navigating through the R packages for movement*. **Journal of Animal Ecology** (2019). arXiv:1901.05935
- McLaren, J.D., Buler, J.J., Schreckengost, T.D., Smolinsky, J.A., Boone, M.E., Dawson, D.K., Walters, E.L. *Artificial light confounds broad-scale habitat selection by migrating birds*. **Ecology Letters** 21 (2018): 356-364. 10.1111/ele.12902
- Raine, A.F., Boone, M., Mckown, M., Holmes, N. *The breeding phenology and distribution of the Band-rumped Storm-petrel *Oceanodroma castro* on Kaua'i and Lehua Islet, Hawaiian Islands*. **Marine Ornithology** 45 (2017): 73-82
- Raine, A.F., McFarland, B., Banfield, N., Boone, M. *An Updated Avifauna of Moku'ae'ae Rock Islet, Kaua'i*. **Pacific Science** 71.1 (2017): 67-76. 10.2984/71.1.6

Book Chapters

- Buler, J., Barrow, C., Boone, M., Dawson, D., Diehl, R., Moore, F., Randall, L., Schreckengost, T., Smolinsky, J. (2018). *Linking Animals Aloft with the Terrestrial Landscape*. In **Aeroecology** (P. Chilson, F. Winifred, J. Kelly, F. Liechti, Editors). Springer Press. 10.1007/978-3-319-68576-2_14

Technical Publications

- Buler, J.J., Boone, M.E., McLaren, J.E., Dawson, D.K. (2016) *Hurricane Sandy's impact on migrating landbirds: insight via radar, field observations and modeling*. Final Report. USGS

Posters

- Boone, M.E., Hochmair, H., Basille, M. *Evaluating Citizen Science Data for Biodiversity Research* Greater Everglades Ecosystem Restoration Conference - Ft. Lauderdale, FL, US (2019)
Florida chapter of The Wildlife Society - Melbourne, FL, US (2019)
- Boone, M.E., Buler, J.J., Dawson, D.K. *Using Weather Surveillance Radar to assess the impacts of Hurricane Sandy on migratory birds*.

The Delaware Wetlands Conference - Wilmington, DE, US (2015)
The Wildlife Society National Conference - Pittsburgh, PA, US (2014)

Presentations

Boone, M.E., Hochmair, H., Basille, M. *Evaluating Citizen Science Data for Biodiversity Research*
University of Florida Biodiversity Institute Seminar - Gainesville, FL, US (2019)

Boone, M.E., Buler, J.J., Dawson, D.K., *Assessing the effects of Hurricane Sandy on migratory bird stopover using weather surveillance radar.*

AFO/SCO/WOS Joint Annual Meeting - Wolfville, NS, CA (2015)

> • AFO Travel Award \$850

AOU/COS Joint Meeting - Norman, OK, US (2015)

> • AOU Travel Award \$400

Teaching

2019 Instructor ‘Data Management with SQL for Ecologists’ **Workshop at Tropical REC - UF** (Homestead, FL)

2019 Instructor ‘Intro to R for Ecologists’ **Workshop at Florida Atlantic University** (Boca Raton, FL)

2018 Instructor ‘Taking the Next Step with R: Data Management, Publication Quality Graphics and Function Building’ **Workshop AOS meeting** (Tucson, AZ)

2017 Instructor ‘Graphing and Programming in R’ **Workshop at AOSSCO meeting** (East Lansing, MI)

2015 Instructor ‘Taking R to the Next Level’ **Workshop at AOU/COS meeting** (Norman, OK)

2015 Guest Lecturer ‘Programming and Data Processing in R’ (University of Delaware)

2014 Guest Lecturer Wetland policy and management in the United States **Habitat Management class** (University of Delaware)

Volunteer/Service

2014 - Present eBird Regional Editor *eBird.org* – Comal and Guadalupe TX counties

2015 Co-leader and Founder *R Club University of Delaware* – Setting up agenda for weekly meetings, solving graduate student problems in R, creating/teaching lessons.

2015 Department Seminar Coordinator *University of Delaware* – Contact potential speakers, coordinate weekly seminar series, and organize refreshments.

Awards/Honors

2009 University Honors University of Texas

2008 University Honors University of Texas

2007 Deans List University of Texas

Memberships (since)

2013 The Wildlife Society

2015 Association of Field Ornithologists

2015 Wilson Ornithological Society

2015 American Ornithologists Society

Field Experience

Woodpecker Crew Leader *May 1, 2018 – August 9, 2018*

Rocky Mountain Research Station - USFS, ID

- > • Supervised three technicians, created schedules, and managed logistics for project site.
- Conducted breeding transect surveys, searched for nests, and monitored nest success for White-headed Woodpecker population in the Winema-Fremont National Forest.

Avian Crew Leader *May 1, 2017 – September 30, 2017*

National Council for Air and Stream Improvement, OR

Intensive Forest Management

- > • Supervised two technicians including planning daily logistics and data management
- Trained technicians on identifying 80+ birds of the Pacific Northwest by sight and sound
- Conducted breeding point counts in cut timber stands in the Coast Range of Oregon

Retained Structures Project

- > • Trapped and ear tagged small mammals of the Cascades using Sherman and Tomahawk traps.
- Marked and measured created tree plots by measuring DBH and height of trees.

Marshbird Field Technician *May 1 – August 15, 2014*

University of Delaware, DE

- > • Performed playback surveys for secretive marsh birds under the National Marsh Bird Protocol.

Migratory Rail Field Technician *August 7 - October 21, 2012/2013*

Arkansas Cooperative Fish and Wildlife Research Unit, AR

- > • Performed nightly distance sampling of migratory rails on ATVs in managed wetlands throughout Missouri. Captured and banded secretive birds using a hand-held net.

Willow Flycatcher Field Technician *May 7 – August 15, 2013*

SWCA Consulting, NV

- > • Territory and nest searching for the endangered Southwestern Willow Flycatcher in the Lower Colorado River drainage basin. Drove ATV's across desert and river corridors.

Yellow Rail Field Technician *December 7, 2012 - March 31, 2013*

Mississippi State University, MS

- > • Surveyed for Yellow Rails using drag-lining in Pine Savannas of coastal Mississippi and Alabama. Captured, banded, and tracked Yellow Rails using radio telemetry.

Yellow-billed Cuckoo Field Surveyor *July 7 - August 21, 2012*

Great Basin Bird Observatory, NV

- > • Conducted playback surveys for the federally endangered Southwestern Yellow-Billed Cuckoo.

Avian Field Research Assistant *February 1 - June 30, 2012*

Maui Forest Bird Recovery Project, HI

- > • Nest searching, band re-sighting, and territory mapping of the federally endangered Maui Parrotbill. Included backcountry camping and living in close quarters with other technicians for 10 days at a time.

Field Technician *July 14 - October 21, 2011*

Curry and Kerlinger, LLC, NY

- > • Performed daily bird and bat mortality searches at 48 wind turbines in Western New York.

Golden-winged Warbler Field Technician *April 21- July 7, 2011*

University of Tennessee, TN

- > • Conduct Nest searched, band resighted, and performed presence absence play back surveys for the declining Golden-Winged Warbler in the Cumberland Mountains.

Field Investigator *January 3 - March 21, 2011*

Louisiana State University, LA

- > • Conducted mortality searches for waterfowl along ocean transects in the Mississippi River Delta and Gulf

of Mexico after the Deep Water Horizon oil spill. Lived on a remote island camp with one other technician. Drove mud-motor and small skiffs in marsh and open water habitat.

Freshwater Mussel Field Technician *July 7 - September 14, 2010*

Texas Agrilife Extensions Service, TX

> • Performed presence absence surveys for freshwater mussels in tributaries of the Colorado River in central Texas.

Golden-cheeked Warbler Field Technician *March 14 - July 7, 2010*

Texas A&M University, TX

> • Territory mapped and performed point counts for the federally endangered Black-capped Vireo and Golden-Cheeked Warbler in Live Fire ranges on Fort Hood Military Base.

Professional Licenses and Certifications

Rabies Vaccine (8/2018)

Wilderness First Aid/CPR NOLS (5/2017)

B3 Helicopter/Airplane Safety *Interagency Aviation Training* (5/2016)

NSC Defensive Driving II *National Safety Council* (8/2013)

ATV Rider Certification *Safety Institute* (6/2013)

Open Water Scuba Diver Certification *PADI* (3/2012)

24hr HAZWOPER *Occupational Safety and Health Administration* (1/2011)

Louisiana Boaters License *Louisiana DOTD* (1/2011)

Field Skills

Banding (Birds) - Experience setting up mist nests, extracting birds, measuring, and banding passerines, rails, owls, and seabirds. Extracted approximately 350 birds and banded approximately 100.

Tagging (Mammals) - Ear tagged approximately 50 small mammals from the Cascades Mountains.

Biological Surveys - Conduct biological surveys targeted to monitor wildlife populations including: point counts, line transects, territory mapping, nest searching, and drag lining for a variety of bird species in woodland and marsh habitat.

Navigation - Can navigate to field points using a GPS or map and compass.

Driving Off-road Vehicles - Experience driving in off-road, muddy, and rocky regions using cars, ATVs, and OHVs. Can effectively troubleshoot and maintain small motors.

Boating - Loading/unloading boats from trailers and navigating open water and narrow marsh waterways using small skiffs and kayaks.

General Animal Identification - Proficient in identifying all wildlife of the United States including birds, mammals, reptiles, and amphibians by sight and sound.