

## **NATHAN J. HOSTETTER**

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Wildlife Research Unit  
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## **EDUCATION**

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**Ph.D. Fisheries, Wildlife, and Conservation Biology**, 2016, North Carolina State University,  
Raleigh, North Carolina. Dr. Beth Gardner and Dr. Ted Simons, co-advisors

**M.S. Wildlife Science**, 2010, Oregon State University, Corvallis, Oregon. Dr. Daniel D. Roby,  
advisor

**B.S. Biology**, 2002, Gardner-Webb University, Boiling Springs, North Carolina.

## **POSITIONS HELD**

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<b>POSTDOCTORAL RESEARCH ASSOCIATE</b>	2018 – current
Washington Cooperative Fish and Wildlife Research Unit	Seattle, Washington
School of Aquatic and Fishery Sciences, University of Washington	

<b>POSTDOCTORAL RESEARCH ECOLOGIST</b>	2016 – 2018
USGS Patuxent Wildlife Research Center	Laurel, Maryland

<b>PH.D. GRADUATE RESEARCH ASSISTANT</b>	2013 – 2016
North Carolina State University	Raleigh, North Carolina

<b>ASSOCIATE BIOLOGIST</b>	2010 – 2012
Real Time Research Inc.	Bend, Oregon

<b>GRADUATE RESEARCH ASSISTANT</b>	2007 – 2009
Oregon State University	Corvallis, Oregon

**PUBLICATIONS (20 + 4 *in-review*)**

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***Peer-Reviewed Articles******In-review or In-revision***

**Hostetter NJ**, D Ryan, D Grosshuesch, T Catton, S Malick-Wahls, TA Smith, and B Gardner. Quantifying spatiotemporal occupancy dynamics and multi-year core use areas at a species range boundary. *Diversity and Distributions*. *In-revision*.

**Hostetter NJ**, and JA Royle. Movement-assisted localization from acoustic monitoring data. *Movement Ecology*. *In-revision* (online draft at: doi.org/10.1101/2019.12.31.890962).

Payton Q, AF Evans, **NJ Hostetter**, DD Roby, BM Cramer, and K Collis. Measuring the additive effects of predation on prey survival across multiple spatial scales. *Ecological Applications*. *In-revision*.

**Hostetter NJ**, NJ Lunn, ES Richardson, EV Regehr, and SJ Converse. Age-structured Jolly-Seber model expands inference and improves parameter estimation from capture-recapture data. *Ecology*. *In-review*.

***Published***

Kazyak DC, AM Flowers, **NJ Hostetter**, JA Madsen, M Breece, A Higgs, LM Brown, JA Royle, DA. Fox. Integrating side-scan sonar and acoustic telemetry to estimate the annual spawning run size of Atlantic sturgeon in the Hudson River. *Canadian Journal of Fisheries and Aquatic Sciences*. *In-press*.

Evans AF, Q Payton, BM Cramer, K Collis, **NJ Hostetter**, DD Roby, and C Dotson. 2019. Cumulative effects of avian predation on upper Columbia River steelhead. *Transactions of the American Fisheries Society* 148:896–913.

**Hostetter NJ**, B Gardner, TS Sillett, KH Pollock, and TR Simons. 2019. An integrated model decomposing the components of detection probability and abundance in unmarked populations. *Ecosphere*. 10:e02586.

Lloyd NA, **NJ Hostetter**, CL Jackson, SJ Converse, and A Moehrensclager. 2019. Optimizing release strategies: a stepping-stone approach to reintroduction. *Animal Conservation* 22:105–115.

Lloyd NA, **NJ Hostetter**, CL Jackson, SJ Converse, and A Moehrensclager. 2019. Future directions to escalate benefits of the stepping-stone approach for conservation translocations. *Animal Conservation* 22:122–123.

Payton Q, **NJ Hostetter**, and AF Evans. 2019. Jointly estimating survival and mortality: integrating recapture and recovery data from complex multiple predator systems. *Environmental and Ecological Statistics*. 26:107–125.

- Hostetter NJ**, B Gardner, AF Evans, BM Cramer, Q Payton, K Collis, and DD Roby. 2018. Wanted dead or alive: a state-space mark-recapture-recovery model incorporating multiple recovery types and state uncertainty. *Canadian Journal of Fisheries and Aquatic Sciences* 75:1117–1127.
- Link WA, SJ Converse, AA Yackel Adams, and **NJ Hostetter**. 2018. Analysis of population change and movement using removal data. *Journal of Agricultural, Biological, and Environmental Statistics*. 23:463–477.
- Regehr EV, **NJ Hostetter**, RR Wilson, KD Rode, M St. Martin, and SJ Converse. 2018. Integrated population modeling provides the first empirical estimates of vital rates and abundance for polar bears in the Chukchi Sea. *Scientific Reports*. 8:16780.
- Felton SK, **NJ Hostetter**, KH Pollock, and TR Simons. 2017. Managing American Oystercatcher (*Haematopus palliatus*) population growth by targeting nesting season vital rates. *Waterbirds* 40(sp1): 44–54.
- Hostetter NJ**, B Gardner, SH Schweitzer, R Boettcher, AL Wilke, L Addison, WR Swilling, KH Pollock, and TR Simons. 2015. Repeated count surveys help standardize multi-agency estimates of American Oystercatcher (*Haematopus palliatus*) abundance. *The Condor* 117:354–363.
- Hostetter NJ**, AF Evans, BM Cramer, K Collis, DE Lyons, and DD Roby. 2015. Quantifying avian predation on fish populations: integrating predator-specific deposition probabilities in tag recovery studies. *Transactions of the American Fisheries Society* 144:410–422.
- Hostetter NJ**, AF Evans, FJ Loge, RR O’Connor, BM Cramer, D Fryer, and K Collis. 2015. The influence of individual fish characteristics on survival and detection: similarities across two salmonid species. *North American Journal of Fisheries Management* 35:1034–1045.
- Adkins JY, DE Lyons, PJ Loschl, DD Roby, K Collis, AF Evans, and **NJ Hostetter**. 2014. Demographics of piscivorous colonial waterbirds and management implications for ESA-listed salmonids on the Columbia Plateau. *Northwest Science* 88:344–359.
- Evans AF, **NJ Hostetter**, K Collis, DD Roby, and FJ Loge. 2014. Relationship between juvenile fish condition and survival to adulthood in steelhead. *Transactions of the American Fisheries Society* 143:899–909.
- Hostetter NJ**, AF Evans, DD Roby, and K Collis. 2012. Susceptibility of juvenile steelhead to avian predation: the influence of individual fish characteristics and river conditions. *Transactions of the American Fisheries Society* 141: 1586-1599.
- Evans AF, **NJ Hostetter**, DD Roby, K Collis, DE Lyons, BP Sandford, RD Ledgerwood, and S Sebring. 2012. System-wide evaluation of avian predation on juvenile salmonids from the Columbia River based on recoveries of passive integrated transponder tags. *Transactions of the American Fisheries Society* 141: 975-989.

Connon RE, LS D'Abronzio, **NJ Hostetter**, A Javidmehr, DD Roby, AF Evans, FJ Loge, and I Werner. 2012. Transcription profiling in environmental diagnostics: health assessments in Columbia River basin steelhead (*Oncorhynchus mykiss*). *Environmental Science and Technology* 46: 6081-6087

Collis K, DD Roby, KW Larson, LJ Adrean, SK Nelson, AF Evans, **NJ Hostetter**, DS Battaglia, DE Lyons, TK Marcella, and A Patterson. 2012. Trends in Caspian tern nesting and diet in San Francisco Bay: conservation implications for terns and salmonids. *Waterbirds* 35: 25-34.

**Hostetter NJ**, AF Evans, DD Roby, K Collis, M Hawbecker, BP Sandford, DE Thompson, and FJ Loge. 2011. Relationship of external fish condition to pathogen prevalence and out-migration survival in juvenile steelhead. *Transactions of the American Fisheries Society* 140:1158-117.

## SELECTED PRESENTATIONS AND SEMINARS

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### *Presentations* († = Invited)

Evans AF, **NJ Hostetter**, Q Payton, DD Roby, and K Collis. 2020. Factors affecting the susceptibility of juvenile salmonids to avian predation. Oregon Chapter of the American Fisheries Society. Bend, Oregon. 2 – 6 March (*Accepted*).

†**Hostetter NJ**. 2020. Integrating side-scan sonar and acoustic telemetry to estimate the annual spawning run size of Atlantic sturgeon in the Hudson River – methods and modeling approaches. Gulf Sturgeon Workshop, Gainesville, Florida, 25 – 27 February.

Kazyak DC, AM Flowers, **NJ Hostetter**, JA Madsen, M Brece, A Higgs, LM Brown, JA Royle, DA. Fox. 2020. Integrating side-scan sonar and acoustic telemetry to estimate the annual spawning run size of Atlantic sturgeon in the Hudson River. Southern Division of the American Fisheries Society. Little Rock, Arkansas. 20 – 23 February.

**Hostetter NJ**, EV Regehr, RR Wilson, NJ Lunn, ES Richardson, JA Royle, and SJ Converse. 2020. Data integration approaches to estimate polar bear abundance, survival, movement, and recruitment. Alaska Marine Science Symposium, Anchorage, Alaska. 27 – 31 January.

Converse SJ, **NJ Hostetter**, WA Link, SM Amburgey, and AA Yackel Adams. 2020. Decision analysis for early detection and rapid response: modeling to advance identification of optimal management. 9<sup>th</sup> World Congress of Herpetology, Dunedin, New Zealand. 5 – 10 January.

Yackel Adams AA, SJ Converse, **NJ Hostetter**, and WA Link. 2020. Improving early detection and rapid response for cryptic species: a review of current analytical tools. 9<sup>th</sup> World Congress of Herpetology, Dunedin, New Zealand. 5 – 10 January.

**Hostetter NJ**, NJ Lunn, ES Richardson, EV Regehr, and SJ Converse. 2019. Integrating age data to improve estimation of polar bear abundance, survival, and recruitment in open-population Jolly-Seber models. The Wildlife Society Annual Conference, Reno, Nevada. 27 September – 4 October.

Evans A, K Collis, D Roby, D Lyons, **NJ Hostetter**, T Lawes, B Cramer, K Bixler, J Tennyson, and A Turecek. 2019. Avian predation synthesis report: progress update and preliminary results. Anadromous Fish Evaluation Program Annual Review. Richland, Washington. 3 – 4 December.

†**Hostetter NJ**, SJ Converse, EV Regehr, RR Wilson, and JA Royle. 2018. Integrating spatial capture-recapture and telemetry data to jointly estimate density and movement. The Wildlife Society Annual Conference, Cleveland, Ohio. 7 – 11 October.

†Royle JA, and **NJ Hostetter**. 2018. Movement-assisted localization from acoustic monitoring data. The Wildlife Society Annual Conference, Cleveland, Ohio. 7 – 11 October.

†Regehr EV, **NJ Hostetter**, R Wilson, KD Rode, A Von Dyke, G Pendelton, and SJ Converse. 2018. Methods to estimate vital rates and abundance from capture-recapture research in the U.S. U.S.–Russia Bilateral Polar Bear Agreement Scientific Working Group, Chukotka, Russia. 23 – 30 July.

Lloyd NA, **NJ Hostetter**, CL Jackson, SJ Converse, and A Moehrenschrager. 2018. Optimizing release strategies: a stepping-stone approach to reintroduction. 2<sup>nd</sup> International Wildlife Reintroduction Conference, Chicago, Illinois. 13 – 16 November.

†Regehr EV, **NJ Hostetter**, R Wilson, KD Rode, M St. Martin, A Von Dyke, G Pendelton, and SJ Converse. 2018. Estimating regional abundance and demographic parameters for polar bears (*Ursus maritimus*) in the Chukchi Sea using an integrated population model. 2018. Alaska Scientific Review Group to advise NOAA Fisheries and the U.S. Fish and Wildlife Service on the status of marine mammal stocks. Seattle, Washington. 27-28 February.

†**Hostetter NJ**, SJ Converse, EV Regehr, and JA Royle. 2017. Study design considerations for integrated population models: improving conservation and management of polar bears. Ecological Society of America, Portland, Oregon. 6 – 11 August.

†Gardner B, **NJ Hostetter**, TS Sillett, and TR Simons. 2017. Data integration to decompose detection probability and improve abundance estimation. Ecological Society of America, Portland, Oregon. 6 – 11 August.

**Hostetter NJ**, B Gardner, AT Gilbert, KA Williams, and RR Veit. 2016. Estimating abundance by integrating different sampling methods with varying spatial scales. International Statistical Ecology Conference, Seattle, Washington. 28 June – 1 July.

**Hostetter NJ**, B Gardner, HF Goyert, AT Gilbert, KA Williams, EE Connelly, M Duron, and RR Veit. 2015. Estimating marine bird abundance in offshore wind development areas: integrating boat and digital aerial surveys. Ecological Society of America, Baltimore, Maryland. August 9 – 14. *E.C. Pielou award for best statistical ecology talk by a student*

- Hostetter NJ**, AF Evans, FJ Loge, R. O'Connor, BM Cramer, D Fryer, and K Collis. 2015. The influence of individual fish characteristics on survival and detection: consistent trends across two Salmonid species. American Fisheries Society, Portland, Oregon. 16 – 21 August.
- Hostetter NJ**, TR Simons, B Gardner, SH Schweitzer, R Boettcher, AL Wilke, L Addison, WR Swilling, and KH Pollock. 2015. Repeated count surveys help standardize multi-agency estimates of American Oystercatcher abundance. Waterbirds, Maine. 11 – 15 August.
- Felton SK, **NJ Hostetter**, KH Pollock, and TR Simons. 2015. Managing American Oystercatcher population growth by targeting nesting season vital rates? Waterbirds, Bar Harbor, Maine. 11 – 15 August.
- Williams K and 18 co-authors. 2015. Avian densities, movements, and habitat use on the mid-Atlantic outer continental shelf. Waterbirds, Bar Harbor, Maine. 11 – 15 August.
- Hostetter NJ**, TR Simons, B Gardner, 12 additional co-authors. 2013. Estimating American Oystercatcher abundance: spatially and temporally replicated counts. American Oystercatcher Working Group Annual Meeting, Wrightsville Beach, North Carolina. 9 – 12 December.
- Evans AF, **NJ Hostetter**, DD Roby, and K Collis. 2013. Relationship between smolt condition and survival to adulthood in steelhead from the Columbia and Snake rivers: Do individual fish characteristics recorded at the time of out-migration matter? Western Division American Fisheries Society, Boise, Idaho. 15 – 18 April.
- Cramer B, **NJ Hostetter**, M Hawbecker, AF Evans, and K Collis. 2011. The use of digital imagery and mobile computer applications in PIT-Tagging studies. Pacific States Marine Fisheries Commission PIT Tag Workshop, Stevenson, Washington.
- Hostetter NJ**, DD Roby, AF Evans, K Collis, BM Cramer, and M Hawbecker. 2010. Susceptibility of juvenile steelhead to avian predation: are birds only taking the sick and injured? American Fisheries Society, Pittsburgh, Pennsylvania. 9 – 16 September.
- Hyun-Min H, H Baek, J Hobbs, D Thompson, P Green, F Loge, **NJ Hostetter**, DD Roby, and AF Evans. 2010. Decrease of PCBs in hatchery-reared steelhead after release into the Snake River, Oregon. Society of Environmental Toxicology and Chemistry – Northern California Regional Chapter, San Francisco, California. 4 November.
- Hostetter NJ**, DD Roby, AF Evans, K Collis, and M Hawbecker. 2009. Relative vulnerability of Snake River steelhead smolts to avian predation in the Columbia River. Pacific Seabird Group. Hakodate, Japan. 22 – 25 February. †*Runner-up for best student presentation*
- Hostetter NJ**, DD Roby, AF Evans, K Collis, M Hawbecker, and B Sandford. 2009. Relative vulnerability of threatened Snake River steelhead smolts to fish-eating birds nesting on the Columbia River. Western Division American Fisheries Society, Albuquerque, New Mexico. 3 – 7 May.

**Hostetter NJ**, DD Roby, AF Evans, K Collis, and M Hawbecker. 2008. Is avian predation on Snake River salmonid smolts additive or compensatory mortality? Pacific Seabird Group, Blaine, Washington. 27 February – 1 March.

### *Invited Seminars*

**Hostetter NJ**. 2019. Integrated modeling approaches to inform polar bear conservation and management. University of Washington, School of Aquatic and Fishery Sciences Seminar Series, Seattle Washington, 14 March.

**Hostetter NJ**, SJ Converse, EV Regehr, and JA Royle. 2018. Integrating spatial capture-recapture and telemetry data to improve estimation of polar bear abundance, movement, and space use. U.S. Geological Survey - Bureau of Ocean Energy Management webinar, 19 April.

Royle, JA, and **NJ Hostetter**. 2018. Applications of spatial capture-recapture to bioacoustic monitoring in marine systems. Bureau of Ocean Energy Management, Virginia, 19 June.

**Hostetter NJ**. 2017. Inference about density, temporary emigration, and the components of detection probability in unmarked populations. Smithsonian Conservation Biology Institute Seminar Series, Washington D.C., 31 March.

### **GRANTS (>\$315,000 as co-author or collaborator)**

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**Real Time Research Inc. (sub-contract from U.S. Army Corps of Engineers funded project)**. Title: Summarizing current knowledge of the factors influencing juvenile salmonid susceptibility to avian predation in the Columbia River basin. NJ Hostetter. 2019. \$12,512.

**University of Washington, College of the Environment Student/Postdoc Travel Fund**. Title: Integrating spatial capture-recapture and telemetry data to jointly estimate polar bear abundance and movement. NJ Hostetter. 2018. \$1,000.

**North Pacific Research Board**. Title: Integrating spatial capture-recapture and telemetry data to estimate abundance and movement of marine mammals. SJ Converse (PI). 2018-2020. \$283,781. (Assisted with concept development, study design, proposal writing, listed as collaborator).

**Grant County Public Utility District**. Title: Caspian tern predation on upper Columbia River steelhead: retrospective analysis of juvenile salmonid acoustic telemetry systems (JSATS) data from 2008–2010. Evans AF and K Collis (co-PIs). 2012. \$19,000. (Assisted with concept development, study design, proposal writing, co-author on final report).

### **PROFESSIONAL SERVICE**

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#### *Working Groups*

- Norwegian Workshop on Polar Bear Science and Monitoring, 2019
- Structured Decision Analysis for Island Scrub-Jay Conservation Management, 2017
- Columbia River Inland Avian Predation Management Working Group, 2012-13
- Columbia River Double-crested Cormorant Management Working Group, 2011-12

***Peer Reviewer***

Canadian Journal of Fisheries and Aquatic Sciences, The Condor: Ornithological Applications, Diversity and Distributions, Ecological Applications, Ecology of Freshwater Fish, Ecosphere, Methods in Ecology and Evolution, North American Journal of Fisheries Management, PLOS ONE, Proceedings of the Royal Society B, Transactions of the American Fisheries Society, Waterbirds, Wildlife Research

**PROFESSIONAL AFFILIATIONS**

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- American Association for the Advancement of Science
- American Fisheries Society
- Ecological Society of America (Statistical Ecology Section)
- The Wildlife Society (Biometrics Working Group)

**HONORS AND AWARDS**

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- Department of Interior STAR Award: for exemplary efforts in leading an analysis of the demography of the Chukchi Sea polar bear population, 2018
- Ecological Society of America - E.C. Pielou award best student statistical ecology talk, 2015
- Pacific Seabird Group - Best student presentation runner-up, 2009
- Cooper Ornithological Society student membership award, 2009
- Gardner-Webb Department of Natural Sciences Service Award, 2002

**TEACHING EXPERIENCE**

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***University – Teaching Assistant***

Principles of Wildlife Science (FW 453/553), North Carolina State University, Instructors: Dr. Beth Gardner and Dr. L. Scott Mills, 2015

Principles of Wildlife Science (FW 453/553), North Carolina State University, Instructor: Dr. Beth Gardner, 2014

***University – Guest Lecturer***

Introduction to occupancy models. North Carolina State University, Ornithology (AEC501). Instructor: Dr. Ted Simons, 2016.

Introduction to distance sampling. North Carolina State University, Sampling Animal Populations (ST506). Instructors: Dr. Ken Pollock and Dr. Beth Gardner, 2015.

Telemetry and resource selection. North Carolina State University, Principles of Wildlife Science (FW 453/553). Instructors: Dr. L. Scott Mills and Dr. Beth Gardner, 2015.

***Professional Workshops – Instructor***

Integrated Population Modeling Workshop, Patuxent Wildlife Research, 2017

***Elementary and Secondary Science Education***

Science Instructor, Los Angeles County Outdoor Science School, California. Principal: Shaun Hawke, 2006-2007

Instructor, Blue Ridge Outdoor Education Center, Georgia. Director: John DiDiego, 2004

Educator, Riverbend Environmental Education Center, Pennsylvania. Director: Stacy Carr, 2003