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UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF IDAHO

ANNE HAUSRATH, JOHN WHEATON, JOANIE FAUCI, MEG FEREDAY, ROGER ROSENTRETER, KATHRYN RAILSBACK, DALE REYNOLDS, and GREAT OLD BROADS FOR WILDERNESS, Plaintiffs, v. UNITED STATES DEPARTMENT OF THE AIR FORCE, Defendant.	Case No. 1:19-CV-00103-CWD **DECLARATION OF DR. JESSE R. BARBER**

I, Dr. Jesse R. Barber, hereby declare as follows:

1. My name is Jesse R. Barber, and I reside in Boise, Idaho. If called as a witness I would and could truthfully testify to the matters stated herein.

2. I am providing this declaration to identify numerous deficiencies in the United States Air Force's environmental analysis of the "Urban Close Air Support Air and Ground Training Project" (Urban CAS project).

STATEMENT OF QUALIFICATIONS

3. The statements and professional judgments below are based on my scientific training, knowledge, and experience, including my 10+ years of professional research studying the impacts of anthropogenic noise.

4. I am an Associate Professor with the Department of Biological Sciences at Boise State University, and I currently lead a research team addressing behavioral, evolutionary and conservation-related questions by employing bioacoustics to quantify how animals process and react to sound. I am also a Research Affiliate with the University of Florida and Florida Museum of Natural History.

5. I received my B.S. in Psychology from the University of Wyoming in 1998, my M.S. in Zoology from the University of Wyoming in 2002, and my Ph.D. in Biology from Wake Forest University in 2007. I was a Postdoctoral Research Associate at Colorado State University and the Natural Sounds and Night Skies Division of the National Park Service from 2007–2010, and started my work at Boise State in 2011. Furthermore, I have received research grants from NASA, the National Science Foundation, and the National Park Service, among others, to study the effects of noise on wildlife.

6. As detailed further in my attached CV, I have written extensively on the consequences of noise exposure for wildlife and on the importance of natural soundscapes. I have published studies evaluating the effects of noise in natural spaces on humans of recreating in those spaces; studies evaluating the utility of sound mapping and modeling tools; and many studies on the effects of anthropogenic noise on migrating birds, bats, insects and ungulates. I have also published an edited book discussing the importance of natural quiet to both wildlife and human recreation and wellbeing. I teach courses on bioacoustics, sensory ecology, and

sensory pollution, and have given talks around the world about the costs of noise exposure for wildlife.

BASIS FOR TESTIMONY

7. I have been asked to review the Air Force's November 2018 "Final Environmental Assessment Addressing the Establishment of Urban Close Air Support (CAS) Air and Ground Training Spaces near Mountain Home Air Force Base, Idaho" (Air Force EA) and associated "Finding of No Significant Impact" (FONSI) to make a professional judgment regarding the depth and accuracy of the Air Force's acoustic environmental analysis.

8. In preparing this declaration, I have relied on the Air Force EA and FONSI, the studies in the record that the Air Force EA and FONSI relied upon, my personal knowledge of acoustics, and the extensive body of anthropogenic noise research with which I am familiar.

THE EA IS SCIENTIFICALLY INADEQUATE

9. The EA and FONSI rely upon inaccurate scientific measurements, and a near-complete dismissal of impacts to wildlife, to find there will be no significant impacts to this action. As discussed below, these flaws include reliance upon broadly generalized and unmeasured background noise levels and an omission of substantial scientific evidence on the effects of noise on wildlife. The discussion of background noise levels is incomplete and misleading and sound levels are unmeasured, calling into question the Air Force's conclusions based on acoustics.

10. To assess potential soundscape impacts, the Air Force estimated (i.e., did not measure) the cumulative impacts of aircraft noise on each urban center using the Day-Night Sound Level (DNL)—the average dBA level (i.e., A-weighted decibels, which measure noise impacts on human observers) in a 24-hour period, with a 10 dBA penalty added to noise between

10:00 p.m. and 7:00 a.m. *See* Air Force EA, Section 3.1.1 (AR00048-49). This DNL was then compared to an estimate of the background noise levels in the impacted areas. For this analysis, the EA grouped the targeted urban centers into three categories by size and estimated the background noise level, calculated as DNL, within each as follows: large, 57 dBA; medium, 52 dBA; and small, 40 dBA. *Id.* Sections 3.1.2 and 3.1.3 (AR00049-54).

11. This approach is gross and certainly underestimates the effects to many areas within these municipalities that are significantly quieter than these numbers assume. Further, this approach completely ignores an even greater area of less urbanized and natural habitat surrounding these urban centers. Many natural environments experience noise levels orders of magnitude below the estimated levels presented in the Air Force EA for urban centers. No effort was made to directly quantify these natural environments, nor urban environments. There is no substitution for sound level measurements.

12. Furthermore, the Air Force cited census statistics and a single noise study—*American National Standard Institute – Quantities and Procedures for Description and Measurement of Environmental Sound Part 3: Short-term measurements with an observer present* (ANSI 2013)—to estimate background noise levels in the urban areas affected by the Urban CAS Project. *See* Air Force EA Section 3.1.2 (AR00049-50). The cited Table C.1 of ANSI 2013 lists average DNLs for a range of population densities, and also includes a formula that estimates DNLs based on population density. *See* AR09851. Notably, this table and formula explicitly state they "should not be used" to predict DNLs that are under 50 dB, such as the estimates the Air Force used for Grandview, Bruneau, Glenns Ferry, Hammett, and Mountain Home AFB. *Id.* No other record documents besides data on airports were used to formulate the assumed DNLs. AR00050.

13. The Air Force EA thus relied on inadequate data in assessing soundscape impacts, and it misapplied the cited study without acknowledging its limitations. Again, relying on such gross estimates and misapplying the cited study is no substitute for obtaining actual baseline noise levels and then assessing potential noise impacts of the Urban Training project on the affected soundscapes. The EA and associated FONSI are thus not scientifically accurate because of these defects, in my opinion.

14. Moreover, the EA failed to discuss that the 15 nautical mile (nm) radius training areas over the affected urban centers cover wide swaths of unincorporated lands as well. This means the EA's DNL estimates are inapplicable to areas such as the Boise Foothills and other adjacent natural habitats – areas that are within the described training area, and areas that must be taken into account in any ecologically-relevant assessment process. This omission is significant given how close the Boise Foothills and other public lands with natural habitats are to the urban areas affected by the Urban CAS Training project, and further undermines the accuracy of the EA and FONSI, I believe.

15. The Air Force EA also summarily dismissed noise impacts to birds and wildlife, stating that noise levels "would that not be of sufficient magnitude to result in direct loss of individuals or reduce reproductive output." *See* EA p. 3-2 (AR00047). The EA referenced no studies or research articles in dismissing any impacts to birds or wildlife. *Id.* This dismissal of noise impacts to birds and wildlife ignores a substantial literature on the subject, and is scientifically unsupported and inaccurate in my opinion.

16. Again, estimated sound levels were calculated in DNL dBA—metrics unsuited for estimating wildlife impacts. Yet the larger Boise area, the Boise River, and the Snake River Plain are important habitat for wildlife and a major migratory flyway for birds. The 6 hours per day of

flights over important and limited riparian habitat could have significant impacts on birds and wildlife. Without knowing the actual noise exposure that wildlife will receive and the relevant background sound levels (see paragraphs 10 and 11 above), estimates of effects cannot be made. However, given that small changes in sound level (3 dB) can negatively affect birds and wildlife, it is certainly possible that the Air Force Urban CAS Training actions will negatively impact some animals and habitats.

17. The EA failed to address a rich literature in ecology that outlines substantial effects of anthropogenic noise on wildlife (Barber et al. 2010; Francis and Barber 2013). For example, in boreal forests in the tar sands region of Alberta, Canada, Bayne and colleagues (2008) found songbird densities to be 50% higher near quieter oil extraction facilities than near areas that produce substantial noise. Although some species, such as the ovenbird, appear not to avoid noise in their breeding habitat use (Bayne et al. 2008), lack of avoidance may not come without costs. Male ovenbirds in noisy areas were younger and had lower pairing success than those in quieter areas (Habib et al. 2007). Using a similar design in piñon-juniper woodlands in New Mexico, Francis and colleagues (2009) found a one-third decrease in breeding bird richness and a fundamentally different composition of species in noisy areas relative to quiet areas. Importantly, these noise-induced changes in the avifauna have broader reverberations for the ecosystem: noise alters plant-animal interactions (Francis et al. 2012) that will affect woodland composition for decades through reductions in the establishment of piñon pine, which is a foundational species. Other studies investigating indirect effects of noise are lacking; however, growing evidence suggests that indirect effects that result from changes to the composition of communities can be more important than direct effects from environmental stressors (e.g., Ockendon et al. 2014). Indeed, evidence that key predators, such as owls (Mason et al. 2016,

Senzaki et al. 2016), bats (Siemers and Schaub 2011, Bunkley et al. 2015, Bunkley and Barber 2015), and common nest predators (Francis et al. 2009) experience reduced hunting efficiency or avoid noisy areas suggests that cascading effects due to the disruption of top-down forcing may be common.

18. These examples suggest that noise can degrade ecological conditions for many species; however, whether altered acoustic conditions are as important as other aspects of variation in environmental characteristics has not been well studied. In one exception, Kleist et al. (2017) found that breeding habitat selection for two of three songbirds was better explained by variation in acoustic conditions due to gas compressor noise than variation in forest cover. Large-scale manipulative field experiments verify the strong influence of noise.

19. Of potentially great significance here, male greater sage-grouse experience elevated stress hormone levels (i.e., glucocorticoids) at noise-exposed leks relative to those at control leks (Blickley et al. 2012b a) and stress hormone dysfunction could explain, at least partially, observed declines in lek attendance with experimental exposure to natural gas drilling and traffic noise (Blickley et al. 2012a b). Greater sage-grouse occupy substantial habitat in southern Idaho landscapes over which the Air Force Urban CAS Training project activities will take place, including near the Mountain Home Air Force Base. Potential noise impacts on sage-grouse should have been given express consideration in the EA, but were not.

20. Manipulative experiments focused on roadway traffic noise also confirm that altered acoustics is a strong ecological force shaping behavior, ecology, and distributions of animals. In a series of studies that experimentally added and removed traffic noise from the landscape, McClure et al. (2013) and Ware et al. (2015) found migrating birds to decline in abundance during intervals of exposure to the “phantom road” at a migration stopover site. To

meet the incredible physiological demands of long migratory flights (Sillett and Holmes 2002), birds must maintain or increase body condition through increased foraging during stopover periods. However, for many species, individuals that remained in the areas exposed to the traffic noise playback did not improve in body condition at the same rate as individuals in control areas or those in the area exposed to the phantom road when it was "off" (Ware et al. 2015).

21. A recent study employed large-scale manipulation of the acoustic environment via speaker arrays to mimic the noise component of compressor stations in natural gas extraction fields during the songbird breeding season (Cinto Mejia et al. 2019). This work revealed a marked effect on songbird abundance. Under playback of broadband noise, the abundance of all birds combined, and Brewer's sparrow, decreased. This research demonstrates that noise alone can recreate similar patterns of songbird space use found in natural gas extraction fields.

22. Clearly, noise is a critical variable to consider in any environmental assessment of potential impacts to birds and wildlife, and the broader ecological systems in which they are found. In summarily dismissing any such impacts, without analysis or consideration of relevant science, the Air Force EA again is not scientifically supportable, in my opinion.

CONCLUSIONS

23. My professional analysis is that the Air Force EA did not present a scientifically credible analysis of the adverse impacts of aircraft noise exposure from the Urban CAS project. Among other flaws, the EA relied upon inaccurate estimates of background noise levels and omission of a vast body of literature on the effects of noise exposure on wildlife to find there will be no significant impacts to this action.

24. Because of these flaws, the Air Force EA and FONSI cannot be used to justify this training without revision. The Air Force should be required to re-analyze and fully disclose

the potential noise impacts of the Urban CAS project using scientifically-valid methods and sources.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct, to the best of my knowledge. Executed this ~~14th~~ 15th of January 2020 in Boise, Idaho.

/s/ _____
Dr. Jesse Barber

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EDUCATION

Ph.D.	Wake Forest University	Biology	2007
M.S.	University of Wyoming	Zoology & Physiology and Neuroscience	2002
B.S.	University of Wyoming	Psychology with honors	1998

PROFESSIONAL APPOINTMENTS

Associate Professor
Boise State University, Department of Biological Sciences. 2017 – present.
Research Affiliate. University of Florida, Florida Museum of Natural History. 2019 – present.
Assistant Professor
Boise State University, Department of Biological Sciences. 2011 – 2017.
Postdoctoral Research Associate
Colorado State University, Dept. of Fish, Wildlife and Conservation Biology in collaboration with the Natural Sounds and Night Skies Division of the National Park Service. 2007 – 2010.

TEACHING EXPERIENCE

Boise State University
Principles and Processes in Ecology, Evolution, and Behavior (EEB 601, PhD program cohort course, taught once).
Foundations in Ecology and Evolution (BIOL 304, lower-division undergraduate core course, Evolution half, taught twice).
Sensory Ecology and Evolution (BIOL 497/597, Graduate/Undergraduate course, Spring semester, taught 3 times).
Conservation Biology (BIOL 422, Upper-division Undergraduate course, taught once).
General Biology II (BIOL 192, Introductory course, second half - Animal Biodiversity, Spring Semester, ~200 students, taught 4 times).
Comparative Vertebrate Anatomy and Lab (ZOOL 301 and 301L, Undergraduate course with two labs per week, Fall Semester, taught 4 times).
Bioacoustics (BIOL 597, Graduate course, Spring Semester, taught 2 times, taught as needed).
Graduate Seminars (BIOL 598; Topics: Sensory Pollution, Trophic Cascades, Protected Areas in a Changing World, 1 credit each, Fall and Spring Semesters).
Sensory Worlds of Animals: Osher Lifelong Learning Institute. This course, targeted at the Osher Institute's population of learners over 55 years of age, consists of 4 meetings of 2 hours each. Approximately 60 students. Taught Fall 2017 and Spring 2012.

RESEARCH GRANTS

2019-2023	**National Science Foundation, Integrative Organismal Systems, Behavioral Systems (900K).** Collaborative Research: Acoustic deflection in bat-moth interactions: Revealing the mechanism and evolution of a sensory illusion, *PI*. Collaborative partner with linked independent award: A. Kawahara (UF; 600K).
2017-2020	**NASA (780K).** Using NASA resources to better inform wildlife conservation in the Anthropocene: Spatially predicting impacts of anthropogenic nightlight and noise on wildlife habitat integrity across the contiguous United States *Co-PI* with Clint Francis (Cal Poly) and PI Neil Carter (U Michigan).
2016-2020	**National Science Foundation, Division of Environmental Biology, Population and Community Ecology (500K)** Collaborative Research: Direct and indirect effects of natural sounds on the structure of vertebrate insectivore communities, *PI*. Collaborative partner with linked independent award: C. Francis (Cal Poly; 480K). Including 2018 supplement **(37K)** for collaborative work with Jodi Sedlock via the ROA mechanism (project: *Katydid chorus noise and bat activity*).
2016-2020	**National Park Service, Grand Teton National Park (275K).** Bats and anthropogenic infrastructure: how buildings and artificial light at night influence bat communities in Grand Teton National Park.
2016-2019	**National Geographic Society's Committee for Research and Exploration (28K)** How do moth tails divert bat attack? *PI*
2014-2019	**National Science Foundation, Dynamics of Coupled Natural and Human Systems (600K Total, *300K to Boise State*)** CNH: Soundscapes as an element in coupled human and natural systems. *PI* with Co-PIs: Peter Newman (Penn State), Chris Monz (Utah State) and Clint Francis (Cal Poly).
2014-2016	**National Park Service (95K)** The Phantom Natural Gas Field: Impacts of energy extraction noise on ecosystems, *PI*
2011–2015	**National Science Foundation, Integrative Organismal Systems, Behavioral Systems (269K)** Collaborative Research: Alternative strategies and evolutionary routes in the escalation of the bat-moth arms race: Ultrasonic stridulation in hawkmoths, *PI.* Collaborative partner with linked independent award: A. Kawahara (Florida).
2011-2015	**National Park Service (267K)** Roadway noise and foraging behavior in bats and birds: A phantom road experiment, *PI*
2014 / 2018	**French Guiana Nouragues Travel grants (30K each)** Bat-moth interactions at the Nouragues tropical research station*, PI* with Co-PI A. Kawahara.
2013	**NESCent NSF Catalysis grant (40K; travel and meeting costs for 25 participants, April 24-28 2014)** Anthropogenic Sensory Stimuli as Drivers of Evolution: A conceptual synthesis and roadmap for an integrated citizen-science research network, *Co-PI* with Caren Cooper (Cornell) and Clint Francis (Cal Poly).
2013	**Idaho EPSCoR, National Science Foundation (11K)** Cascading effects of noise pollution on ecosystems, *PI* (collaboration with Keith Reinhardt: Idaho State; plant physiologist).
2012	**Osher Faculty Research Grant, Boise State University (4K)** Monitoring forest owl migration, expanding community outreach and assessing the impacts of anthropogenic noise on owl hunting ability, *PI*.

2010	**American Philosophical Society (5K)** Bat-moth interactions in the Old World, *PI*
2008	**University of Wyoming-NPS Research Station (2.2K)** Background sound level and avian predator-prey interactions, *PI*
2007	**American Museum of Natural History (1.5K)** Biosonar jamming in the bat-moth arms race, *PI*
2005	**Richter Foundation (5K)** Biosonar jamming in the cloud forest, *PI*

PUBLICATIONS
(*Italics* indicate undergraduate or graduate student co-authors)

In press
Dominoni DM, Halfwerk W, Buxton RT, Fernandez-Juricic E, Fristrup KM, McKenna MF, Mennitt DJ, Seymoure BM, Francis CD, Carter NH, **Barber JR** (*in press*). Why and how conservation biology can benefit from sensory ecology. *Nature Ecology and Evolution*. Accepted.

2019
Cinto Mejia E, McClure CJW, **Barber JR** (2019) Large-scale manipulation of the acoustic environment can alter the abundance of breeding birds: Evidence from a phantom natural gas field. *Journal of Applied Ecology*. 56(8):2091-2101.

Kawahara AY, *Plotkin D*, Espeland M, Meuseman K, Toussaint EFA, Donath A, Gimnich F, Frandsen PB, Zwick A, dos Reis M, **Barber JR**, Peters RS, Liu S, Zhou X, Mayer C, Podsiadlowski L., Storer C., Yack JE, Misof B., Breinholt JW (2019). Phylogenomics reveals the evolutionary timing and pattern of butterflies and moths. *Proceedings of the National Academy of Sciences*. Oct. 21 issue online.

Le M, Garvin C, **Barber J**, Francis C (2019). Natural sounds alter California ground squirrel (*Otospermophilus beecheyi*) foraging, vigilance, and movement behaviors. *Animal Behavior*. 157:51-60.

Berger-Tal O, Wong BBM, Candolin U, **Barber J** (2019) What evidence exists on the effects of anthropogenic noise on acoustic communication in animals? A systematic map protocol. *Environmental Evidence*. 8. Article 18.

Pacioretty MT, Martinez P, Cinto Mejia E, Reinhard K*, **Barber JR***, de Graaff M-A, Kawahara AY, Aho K (2019) Experimental exclusion of insectivorous predators results in no responses across multiple trophic levels in a water-limited, sagebrush-steppe ecosystem. *Journal of Arid Environments*. 160:74-81. *Co-PIs

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McClure CJW, *Korte AC*, Heath JA, **Barber JR** (2015) Pavement and riparian forest shape the bird community along an urban river corridor. *Global Ecology and Conservation* 4:291-310.

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2013

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urgent conservation priority. *Frontiers in Ecology and the Environment.* doi:10.1890/120183
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2012 and earlier
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Barber JR, Conner WE (2007) Acoustic mimicry in a predator-prey interaction. *Proceedings of the National Academy of Sciences* 104(22): 9331-9334.

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BOOK

Manning R, Newman P, **Barber J**, Monz C, Hallo J, Lawson S (2018) *Natural Quiet and Natural Darkness. The "New" Resources of the National Parks*. University Press of New England.

BOOK CHAPTERS

Newman P, Taff D, **Barber JR**, Fristrup K (2015) Natural Soundscapes. In: *Wildland recreation: ecology and management*. Edited by Hammitt, WE, Cole DN, Monz, C. John Wiley & Sons.

Conner WE, Hristov NI**, Barber JR** (2008) Sound strategies: Acoustic aposematism, startle and sonar jamming. In: *Tiger Moths and Wooly Bears: Behavior, Ecology and Evolution of the Arctiidae*. Edited by W.E. Conner. Oxford University Press.

PRESENTATIONS

International Society for Behavioural Ecology, August 11-16, 2018, Minneapolis, MN, USA. Talk: *The soundscape as an important ecological niche axis.*

Animal Behavior Society, June 12-16, 2017, Toronto, ON, Canada. Talk: *Widespread anti-bat sound production in Lepidoptera*.

North American Society for Bat Research, Oct. 12-15, 2016, San Antonio, TX. Talk: *Multi-modal aposematism in the bat-moth arms race*.

American Society for Naturalists Meeting, Jan. 10-14 2016, Monterey, CA. Talk: *Widespread anti-bat sound production in Lepidoptera*.

Plenary Address at the International Ecology and Transportation Meetings in Malmo, Sweden, Sept. 16-19, 2014. Talk: *An experimental investigation into the effects of traffic noise on birds: The Phantom Road project*.

The Wildlife Society, Milwaukee WI, Oct. 5-10 2013. Talk: *An experimental investigation into the effects of traffic noise on distributions of birds: Avoiding the phantom road*.

Invited Panel Discussion: Bridging Research on the Responses of Terrestrial and Marine Animals to Anthropogenic Sound, The Wildlife Society Annual Conference, Milwaukee WI, Oct. 5-10 2013

Animal Behavior Society, Boulder CO, July 27-Aug. 1 2013. Talk: *The function and evolution of hawkmoth anti-bat sounds.* Part of the symposium

Lepidopterists Society Annual Meeting, Gainseville, FL, June 27-July 1 2013. Talk: *The function and evolution of hawkmoth anti-bat sounds.*

Society for Integrative and Comparative Biology, San Francisco, CA, Jan. 3-7, 2013. *Symposium*: When Predators Attack: Sensing and Motion in Predator-Prey Interactions, Talk: *Escalation of the bat-moth arms race.*

Idaho Chapter of the Wildlife Society, Boise, ID, March 5-8, 2012. Talk: *Anthropogenic noise exposure: estimating the scale of ecological consequences.*

Grand Teton Resource Symposium, Grand Teton National Park, UWNPS Research Station, Sept. 5-8, 2011, Talk: *The costs of anthropogenic noise exposure for wildlife*.

Federal Aviation Administration, Aviation Noise Impacts Roadmap Annual Meeting in Washington DC, April 19-20, 2011, Talk: *Anthropogenic noise exposure in protected natural areas: estimating the scale of ecological consequences.*

INVITED SEMINARS

Idaho State University, Colorado College, Texas Tech University, Purdue, University of Montana, College of Idaho, University of Colorado Boulder, University of California Riverside, University of Florida, University of Wyoming-National Park Service Research Station, University of Wyoming, Wake Forest University, University of Minnesota

PROFESSIONAL SERVICE

Reviewer for Conservation Biology, Biological Conservation, Journal of Mammalogy, Journal of Applied Ecology, Functional Ecology, Journal of Experimental Biology, PLoS One, Environmental Management, Frontiers in Physiology, Biodiversity and Conservation, Proceedings of the Royal Society of London Series B, Biology Letters, Animal Behavior, Frontiers in Ecology and Evolution, Acta Chiropterologica, Proceedings of the National Academy of Sciences, Behavioral Ecology and Sociobiology, Behavioral Ecology, American Naturalist, Current Biology, Science, PLoS Biology, and Nature

External reviewer for the Smithsonian Institution, Canada Foundation for Innovation, National Science Foundation, Biotechnology and Biological Sciences Research Council of the UK

Panel Member for the National Science Foundation

UNIVERSITY SERVICE

Member of the College of Arts and Science Tenure and Promotion Committee, 2018-present.
Member of the Environmental Studies Advisory Board, 2018-present.
Member of the Institutional Animal Care and Use Committee, 2011-2017.
Member of the Human-Environment Interactions Cluster Hiring Committee, 2014-2015.

DEPARTMENTAL SERVICE

Member of the Graduate Committee - PhD in Ecology, Evolution and Behavior, 2017-current.
Chair of hiring committee for an Evolutionary Biologist, 2016-2017.
Member of the Organizing Committee for PhD in Ecology, Evolution and Behavior, 2016-2017.
Member of the Undergraduate Curriculum Revision Committee, 2013-2016
Member of Hiring Committee, 2013-2014
Member of the Departmental Reorganizational Working Group, Summer 2013
Seminar series organizer 2012/2013 academic year

CURRENT MENTORING (2 PhD students, 3 MS, 9 undergraduates, 1 postdoc)

Dylan Gomes	Ph.D. Graduate Student
Juliette Rubin	Ph.D. Graduate Student
Carlos Linares	Ph.D. Graduarte Student
Kate Owens	M.S. Graduate Student

Hunter Cole	M.S. Graduate Student
Cory Toth	Postdoctoral Scholar

Undergraduate Researchers (9): Adam Keener, Krystie Miner, Melissa Eschenbrenner, Kelzie Hafen, Amanda Hardy, Brett Howell, Nate Azevedo, Michael Brownlee
Graduate Committee Member for 8 MS students and 2 PhD students at Boise State

Member of PhD Committee (and Research Affiliate at the Florida Museum of Natural History) for 4 PhD students.

PAST MENTORING (6 MS students, 13 undergraduates and 1 postdoc)

		Current post
Dr. Chris JW McClure	Postdoctoral Scholar	Director of Research at Peregrine Fund
Jessie Bunkley	M.S. Graduate Student	NGO
Heidi Ware	M.S. Graduate Student	Outreach Director Int. Bird Observatory
Tate Mason	M.S. Graduate Student	Outreach Director Peregrine Fund
Allison Korte	M.S. Graduate Student	Self-employed
Elizeth Cinto Meija	M.S. Graduate Student	PhD student Michigan State
Juliette Rubin	M.S. Graduate Student	PhD student Boise State
Mitch Levenhagen	M.S. Graduate Student	NGO

Undergraduate Researchers (13): Jacque Pena, Roy Olvera, Mackenzie Whyte, Adrianna Romero, Patrick Niedermeyer, Cydney Middleton, Leo Ohyama, Zoe Mroz, Taylor Parker, Annie Baxter, Jillian Greene, Bailee Riesberg, Kaisha Young, **Amanda Loftus** (Amanda was awarded Top 10 Undergraduates in the College of Arts and Sciences in 2017, for which I also received a Faculty Mentor Award).**

Graduate Committee Member for 5 MS students.

PROFESSIONAL ORGANIZATIONS

The Lepidopterists' Society
North American Society for Bat Research
Animal Behavior Society
American Society of Naturalists
Society for Conservation Biology

SELECT MEDIA and OUTREACH

Bats and Fireflies (Leavell et al. 2018, *Science Advances*). Covered by Science/AAAS, Science News, Associated Press, New Scientist, the Washington Post, among other news outlets. Radio Interview for BBC Radio: Science in Action. *Altmetric Attention Score: 386* – 0.002% of all articles tracked, ranked #176 from Science Advances.
Long-tailed moths vs. Bats (Rubin et al. 2018, *Science Advances*). Covered by Science/AAAS, Phys.org, Discover Magazine, National Geographic, Scientific American, among other news

outlets. Science magazine produced a short film about our work: http://www.sciencemag.org/news/2018/07/watch-how-battles-bats-give-moths-their-flashy-tails *Altmetric Attention Score: 506* – 0.001% of all articles tracked, ranked #123 from Science Advances.

PBS, Nature Series. Sex, Lies and Butterflies, featured our work on bat-moth interactions. Aired worldwide Summer 2018.

HHMI BioInteractive Short Film - Moth Mimicry: Using Ultrasound to Avoid Bats (http://www.hhmi.org/biointeractive/moth-mimicry-using-ultrasound-avoid-bats) featured my work on bat-moth interactions and won the 2016 Best Short Film at the Jackson Hole Science and Media Film Awards.

National Geographic Magazine, June 2016 issue, featured a 1-page summary of our work on bat-moth interactions. Also: http://www.nationalgeographic.com/magazine/2016/06/explore-animals-moths-bats-acoustic-warfare/

Traffic noise is an invisible source of habitat degradation (Ware et al. 2015, *PNAS*): covered by National Geographic, Atlantic magazine, NPR (radio interview), Scientific American, among other news outlets. 9-15. *Altmetric Attention Score: 293* – 0.003% of all articles tracked, ranked #834 from PNAS.

Hawkmoths jam bat sonar (Kawahara and Barber 2015, *PNAS*): covered by National Geographic, Nature, Science News, Phys.org and other news outlets. 5-15. *Altmetric Attention Score: 218* – 0.004% of all articles tracked, ranked #1,194 from PNAS.

Moth tails divert bat attack (Barber et al. 2015, *PNAS*): covered by Science, National Geographic magazine, Science News, Popular Science, Smithsonianmag.com, Phys.org and other news outlets. 2-15. *Altmetric Attention Score: 172* – 0.005% of all articles tracked, ranked #1,617 from PNAS.

David Attenborough's Conquest of the Skies featured an expedition to Borneo where we conducted bat-moth research – feature length film. 1-2015

Phantom Road paper (McClure et al. 2013, *Proc. B*): covered by Science News, BBC, NPR and other news outlets, 11-2013. *Altmetric Attention Score: 89* – 0.01% of all articles tracked, ranked #453 from Proc B.

Hawkmoth Anti-bat Ultrasound Discovery (Barber and Kawahara 2013, *Biology Letters*): covered by Science News, Nature, BBC, National Geographic, Natural History Magazine, LiveScience and other news outlets, 7-2013. *Altmetric Attention Score: 200* – 0.004% of all articles tracked, ranked #81 from Biology Letters.

New York Times Magazine, 'Whisper of the Wild', Covered our noise pollution work, 3-2012

NPR All Things Considered, Radio interview covering our discovery of anti-bat ultrasound production by hawkmoths, 2-2012

Idaho Watchable Wildlife Newsletter, Idaho Fish and Game, *A Louder World for Wildlife*, Summer 2012. Magazine article read by local wildlife managers and nature enthusiasts.

NPR Morning Edition, Radio interview on soundscapes research, 3-03-11

REFERENCES

William E. Conner (Ph.D. Mentor)
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