

Thomas James Rodhouse

National Park Service
Upper Columbia Basin Network
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<https://www.nps.gov/im/ucbn/index.htm>
<http://osucascades.edu/HERS>

OVERVIEW

I direct monitoring and related scientific studies in National Park units across the west. I approach ecological questions from a biogeographical perspective and focus on the role of climate, fire, disease, and other forces on patterns of species distribution and abundance. I have a particular interest in the processes of range dynamics - persistence, contraction, and biological invasion - and apply statistical models to try and bridge the gap between the production of scientific information and evidence-based decision-making. I seek collaborative opportunities and use meta-replication of long-term studies among multiple park study areas. I have courtesy faculty appointments to Oregon State University and University of Idaho and work with graduate students to explore applied problems in protected-area conservation. I co-direct the Human & Ecosystem Resilience & Sustainability (HERS) Lab and the Lab's Northwestern Hub for Bat Population Research & Monitoring (the "NW Bat Hub") on the OSU-Cascades Campus.

EDUCATION

Ph.D. University of Idaho Department of Fish and Wildlife Resources, Moscow. 2011
Natural Resources (College of Natural Resources) Advisors: Kerri Vierling, Gerry Wright, Lee Vierling, Kathi Irvine
Dissertation: "Ecological monitoring in the age of spatial awareness: novel approaches to detecting status and trend in the presence of spatial complexity".

CURRENT POSITIONS

Ecologist, National Park Service Inventory and Monitoring Program	2005-present
Affiliate Faculty, Univ. Idaho. Dept. of Fish and Wildlife Resources	2014-present
Courtesy Faculty, Oregon State Univ. Dept. of Animal and Rangeland Sciences	2013-present

MAJOR PROJECTS & INITIATIVES

- National Park Service Vital Signs Monitoring Program 2002-Present. Designed and implement biological inventories and long-term monitoring and supporting ecological research in National Parks across the Western US in Upper Columbia Basin, Klamath, Mojave, and North Coast Cascades Networks. <https://www.nps.gov/im/ucbn/index.htm>.
- Human & Ecosystem Resilience and Sustainability Lab (HERS) and Northwestern Hub for Bat Population Research & Monitoring 2016-Present. Developed and co-direct the HERS Lab and Northwestern Bat Hub on

Oregon State University – Cascades campus. Conduct applied ecological research and monitoring; student and early-career professional mentoring; synthesis and translation of conservation science. <https://osucascades.edu/HERS>.

- North American Bat Monitoring Program (NABat) 2013-Present. Lead architect, ecological modeler, and technical advisor of the continent-wide collaborative NABat bat monitoring and research program; established NABat bat “hubs” concept and launched the Northwestern Bat Hub. <https://osucascades.edu/HERS/northwestern-bat-hub> and <https://www.nabatmonitoring.org/>.
- Conservation of Sagebrush Ecosystems of US National Parks 2009-Present. Directs conservation science initiative for decision-support in parks, including development of ecologically-based invasive plant management (EBIPM) prioritization and protection plan; long-term fire effects and weed invasion research; statistical methodology for trend modeling; focused condition assessments and geospatial database development for application of fire resilience and invasion resistance decision framework in parks and protected areas. <https://www.nps.gov/im/ucbn/sagebrush-steppe.htm>.
- Pikas in Peril 2010-2015. Developed and implemented American pika (*Ochotona princeps*) climate change vulnerability research, including production of climate change impacts forecasting in 8 US National Parks. <https://www.nps.gov/articles/pikas-in-peril.htm>.

RECENT PUBLICATIONS AND PRESENTATIONS (*DENOTES GRADUATE STUDENTS AND CAREER MENTOREES)

REFEREED JOURNAL ARTICLES

- Rodhouse, T.J.**, S. Rose*, T. Hawkins*, R.M. Rodriguez. *In press*. Audible bats present opportunities for citizen scientists. *Conservation Science and Practice*.
- Rodhouse, T.J.**, J. Lonneker, L. Bowersock*, D. Popp, and K.M. Irvine. *In review*. Resilience to fire and resistance to annual grass invasion in the sagebrush ecosystems of US National Parks. *Global Ecology and Conservation*.
- Rodhouse, T.J.**, K.M. Irvine, and L. Bowersock*. 2020. Post-fire response of native and non-native grasses in a repeatedly burned low-elevation sagebrush steppe protected area provides insights about resilience and invasion resistance. *Frontiers in Ecology and Evolution* 8:584726.
- Reichert, B., M. Bayless, T. Cheng, J. Coleman, ... **T.J. Rodhouse**, ... and others. 2021. NABat: a top-down, bottom-up solution to collaborative continental-scale monitoring. *Ambio* 50:901-913.
- Wright, W.J., K.M. Irvine, **T.J. Rodhouse**, A.R. Litt. *In press*. Spatial Gaussian processes improve multi-species occupancy models when range boundaries are uncertain and non-overlapping. *Ecology and Evolution*.
- Banner, K.M., K.M., Irvine, **T.J. Rodhouse**. 2020. The use of Bayesian priors in ecology: the good, the bad, and the not great. *Methods in Ecology and Evolution*: 882-889.
- Nicolli, M.*, T.J. Rodhouse, D.S. Stucki*, M Shinderman. 2020. Rapid invasion by the annual grass *Ventenata dubia* into protected-area low-elevation sagebrush steppe. *Western North American Naturalist* 80:243-252.
- Smith, A.B., E.A. Beever, A.E. Kessler, ..., **T.J. Rodhouse**, ..., and others. 2019. Alternatives to genetic affinity as a context for within-species response to climate. *Nature Climate Change* 9:787-794.

- Esposito, D.*, **T.J. Rodhouse**, R. Mata-Gonzalez, and M. Hovland*. 2019. Differential species responses to aspects of resistance to invasion in two Columbia Plateau protected areas. *Rangeland Ecology and Management* 72:773-782.
- Rodhouse, T.J.**, R.M. Rodriguez, K.M. Irvine, K.M. Banner, P.C. Ormsbee, J. Barnett. 2019. Evidence of region-wide bat population decline from long-term monitoring and Bayesian occupancy models with empirically-informed priors. *Ecology and Evolution* 9:11078-11088.
- Irvine, K.M., W.J. Wright, E.K. Shanahan, and **T.J. Rodhouse**. 2019. Comprehensive framework for modeling plant cover class data. *Methods in Ecology and Evolution* 10:1749-1760.
- Banner, K.M., K.M. Irvine, **T.J. Rodhouse**, D. Donner, A.R. Litt. 2019. Statistical power of dynamic occupancy models to identify temporal change: informing the North American Bat Monitoring Program. *Ecological Indicators* 105:166-176.
- Hovland, M.*, R. Mata-Gonzalez, R.P. Schreiner, **T.J. Rodhouse**. 2019. Fungal facilitation in rangelands: do arbuscular mycorrhizal fungi mediate resilience and resistance in sagebrush steppe. *Rangeland Ecology and Management* 72:678-691.

SELECTED TECHNICAL REPORTS AND MONITORING PROTOCOLS

- Rodriguez, R.M., **T.J. Rodhouse**, J. Barnett, K.M. Irvine, K.M. Banner, J. Lonneker, and P.C. Ormsbee. 2019. North American Bat Monitoring Program regional protocol for surveying with stationary deployments of echolocation recording devices: Version 1.0, Pacific Northwestern US. Natural Resource Report NPS/UCBN/NRR—2019/1975. National Park Service, Fort Collins, Colorado.
- T.J. Rodhouse**, D.S. Stucki, J.W. Lyon, M. Lonneker, J. Lonneker, and G.H. Dicus. 2018. Population monitoring protocol for Lemhi penstemon (*Penstemon lemhiensis*) and spotted knapweed (*Centaurea stoebe*) in Big Hole National Battlefield: Narrative version 1.0. Natural Resource Report NPS/UCBN/NRR—2018/1639. National Park Service, Fort Collins, Colorado.

SELECTED OTHER PUBLICATIONS

- Fraser et al., eds. 2020. Bat echolocation research: a handbook for planning and conducting acoustic studies. Second Edition. Bat Conservation International. Austin, Texas, USA.
- Shinderman, M., M. Hovland, C. Oedekerker, A. J. Lamet, and T. J. Rodhouse. 2020. Managing for resilience to fire and resistance to annual grass invasion in upland sagebrush steppe: John Day Fossil Beds National Monument. Natural Resource Report NPS/UCBN/NRR—2020/2144. National Park Service, Fort Collins, Colorado.

SELECTED ORAL PRESENTATIONS AND PANELS

- 2021 *Invited Paper*: Bats, forests, and fires in the Pacific Northwest: What do we know, what do we need to know, and how are we going to learn it? Special session entitled “Burning Science Questions: Wildfire and Wildlife”. Oregon Chapter, The Wildlife Society, 2021 webinar series (virtual delivery in lieu of annual meeting due to COVID-19 pandemic).

Invited Speaker: NABat monitoring and models for forest habitat management decision support in the Deschutes National Forest. Special session entitled “Applying NABat Data to Inform Species Conservation and Habitat Restoration Planning”, NABat webinar for Forest Service employees. USDA Forest Service 2021.

Contributed Paper: Audible bats present opportunities for citizen science. Western Bat Working Group 2021 annual meeting (virtual delivery in lieu of annual meeting due to COVID-19 pandemic).

2020 *Contributed Paper*: Regional hubs facilitate utility of big acoustic data for collaborative evidence-based conservation. The Ecological Society of America, Salt Lake City, UT (virtual delivery due to COVID-19 pandemic).

Invited Speaker: Perspectives from an embedded scientist in service of America's "best idea": the national park service ecologist. Early-career mentoring special session. Oregon Chapter The Wildlife Society, Eugene, OR.

2019 *Invited Speaker*. The North American Bat Monitoring Program and the role of bat "hubs" as a catalyst for collaboration, Association of Fish & Wildlife Agencies (AFWS), Denver, CO.

Contributed Paper: Collaborative monitoring to assess declines in Northwestern bat populations via Bat Grid and NABat monitoring, Oregon Chapter The Wildlife Society, Bend, OR.

GRANTS/HONORS/AWARDS

RESEARCH GRANTS AND COMPETITIVE FUNDING

2015-2021 National Park Service Biological Resources Division Wildlife Health Branch White-nose Syndrome Fund, *for* regional interagency bat research and monitoring hub development & implementation Combined awards \$913,983

2012 U.S. Fish and Wildlife Service, Landscape Conservation Cooperatives National Council, 2012-2013 *for* Development of a national bat monitoring program (Co-PI with S. Loeb, J. Coleman, L. Ellison, and T. Ingersoll) \$52,970

2010 National Park Service Climate Change Response Program *for* "Pikas in Peril" project (Co-PI) PMIS #16337 \$714,000

2009 USGS Park-oriented Biological Support (POBS), *for* American pika genetic diversity (supporting partner with PI Dr. Clint Epps) \$80,000

2003 Great Basin Cooperative Ecosystem Studies Unit *for* Bat roost study, John Day Fossil Beds National Monument (RA with PI Dr. Gerry Wright) \$10,000

HONORS AND AWARDS

2017 NPS Pacific West Region Regional Director's Award for Professional Excellence in Natural Resource Stewardship (recognition for collaborative bat monitoring capacity building), US Dept. Interior

2017 NPS Inventory & Monitoring Division Science and Management Partnership Award (recognition for collaborative multi-park American pika monitoring), US Dept. Interior

2016 Science Award, NPS Inventory & Monitoring Division – Employee Special Recognition for outstanding accomplishment integrating science with management, US Dept. Interior

TEACHING

Guest lecturer for Oregon State University Cascades Campus and Central Oregon Community College forestry, biology, and natural resources courses 2006-present

Teaching assistant for ecological biogeography and environmental science courses, Oregon State University Geosciences 1999-2002

SERVICE

Member WNS technical advisory committee for NPS Pacific West Region, 2016-present

Liaison (with 0.5 FTE detail in FY15) for NPS Washington Office Biological Resource Management Division & Inventory and Monitoring Division on White-Nose Syndrome and coordinated bat monitoring (North American Bat Monitoring Program) 2014-present

Graduate Committee Member for Matt Hovland, Oregon State University Dept. of Animal and Rangeland Sciences; Dan Esposito, Oregon State Univ. Dept. of Animal and Rangeland Sciences; Devin Stucki, Oregon State Univ. Dept. of Forest Ecosystems and Society; Claire Reed-Dustin, Oregon State Univ. Dept. of Animal and Rangeland Sciences; Heidi Becker, Univ. of Idaho Dept. of Fish and Wildlife

Science Representative for NPS to the Great Basin Landscape Conservation Cooperative 2012-2014

Liaison for NPS Pacific West Region on White-Nose Syndrome 2012-2016

Member population monitoring working group for the US Fish and Wildlife Service-coordinated National Response Strategy for White-Nose Syndrome, 2010-2016

Member North American Bat Monitoring Program (NABat) steering committee 2012-present

Manuscript reviewer Mammal Review, Biological Conservation, Ecological Applications, Global Change Biology, Diversity and Distributions, Journal of Vegetation Science, Rangeland Ecology & Management, Ecosphere, Wetland Ecology and Management, Journal of Wildlife Management, Wildlife Society Bulletin, Canadian Journal of Zoology, PLoS ONE, Ecology and Evolution, Western North American Naturalist, Northwestern Naturalist, Northeastern Naturalist

PROFESSIONAL MEMBERSHIPS AND CERTIFICATIONS

Ecological Society of America – Certified Ecologist
The George Wright Society
The Wildlife Society, Oregon Chapter
The Western Bat Working Group

MEDIA COVERAGE

October 22, 2020 Oregon Department of Fish and Wildlife *Beaver State Podcast Episode 32: Bats!*
<https://myodfw.com/articles/beaver-state-podcast-episode-32-bats>

September 13, 2019 The Wildlife Society *Rapid declines raise concerns about hoary bat's future*
<https://wildlife.org/rapid-declines-raise-concerns-about-hoary-bats-future/>

September 12, 2019 Nature World News. *Hoary bat numbers declining at rate that suggests species in jeopardy in Pacific Northwest* <https://www.natureworldnews.com/articles/42075/20190912/hoary-bat-numbers-declining-at-rate-that-suggests-species-in-jeopardy-in-pacific-northwest.htm>

September 23, 2019 PBS-WGBH Boston. *To save climate-sensitive pikas, conservation efforts need to get local* <https://www.pbs.org/wgbh/nova/article/american-pika-climate-change-ecoregion/>

March 3, 2017 PBS Newshour *Northwest scientists scramble to keep deadly bat syndrome at bay:*
<http://www.pbs.org/newshour/rundown/northwest-scientists-scramble-keep-deadly-bat-syndrome-bay/>