Eric Keen Ezell

Sewanee: University of the South | ekezell@sewanee.edu | 931.598.1966

Associate Professor, Department of Earth & Environmental Systems

- Co-chair, Environment & Sustainability major
- Co-director, Island Ecology Program
- Co-director, New Zealand field course
- Pre-major and major advisor
- Campus liaison, National Morris K. Udall Scholarship for Environmental Leadership
- Watson Fellowship selection committee
- Research Grants committee
- Principle Investigator, Sewanee Ocean Lab

Education

PhD Biological Oceanography, Scripps Institution of Oceanography **2017**
Thesis: "Whales of the rainforest: habitat use strategies of sympatric rorqual whales within a fjord system"

MS Oceanography, Scripps Institution of Oceanography **2015**

Fulbright Scholar, Indonesia **2009**

BA Ecology & Biodiversity and **Religious Studies,** Sewanee: University of the South **2008**

- Phi Beta Kappa
- National Morris K. Udall Scholar for Environmental Leadership
- Class of 2008 Environmental Service Award

Publications

† *Indicates student co-authorship* | *Note:* my publications occur under two names: Ezell and Keen *(birth surname)*

In preparation

† [54] **Ezell, EK,** V Giglio, et al. Humpback whales breach more when it storms: implications for acoustic sensitivity to shipping. *Marine Mammal Science.*

[53] Bradford, AL, **EM Keen**, et al. Sub-group-based density estimation of false killer whales in Hawaiian waters.

In review

[52] Barlow, JP, L Ballance, **EM Keen**. Density and abundance of cetaceans in the eastern tropical Pacific based on a spatial/temporal analysis of line-transect surveys: 1986-2006. Submitted to *Marine Mammal Science.*

[51] **Keen, EM,** AL Bradford, J Barlow, KA Forney, JE Moore, EM Oleson. Estimating cetacean abundance from line-transect surveys in the Pacific using an open science approach. Submitted to *Marine Mammal Science.*

[50] **Ezell, EK.** The guano dimension of seabird predation halos: colony size, foraging range & nutrient redistribution. Submitted to *Marine Ecology Progress Series*.

[49] O'Mahony, EA, ML McCarthy, **EM Keen**, et al. Breath to genome: whole genome sequencing of large whales from blow sampling. Submitted to *Molecular Ecological Resources.*

2026

[48] Baer, G, **EM Keen**, et al. Drone-based assessment of humpback whale and fin whale ship-strike vulnerability. In Press at *Scientific Reports.*

[† 47] **Keen, EM,** M. M. Lemburg, C. Lively, E. Conger, V. Giglio, et al. Slow down, but level up: to address ship strikes, we need more than speed limits. *Journal of Cetacean Research and Management* 27: 47-48.

[46] Barlow, JP, F Archer, **EM Keen,** JE Moore, L Ballance. Evaluating the bias in line-transect estimates of cetacean density and abundance caused by Beaufort conditions. NOAA Technical Memorandum. NOAA-TM-NMFS-SWFSC-732.

[45] Liu, AD, …, **EM Keen**, et al. Biophysical and ecological overview of the Caamaño Sound and Douglas Fjord system network zones. Canadian Technical Report of Fisheries & Aquatic Sciences 3664: xviii + 374 p. https://doi.org/10.60825/nctj-n651

[44] O'Mahony, EA, et al., and **EM Keen**. The diffusion of cooperative and solo bubble net feeding in Canadian Pacific humpback whales. Submitted to *Proceedings of the Royal Society B, 293 (2063): 1–12.*

2025

[43] Thompson, K-L, **EM Keen,** et al..Gitga'at First Nation 2025 State of the Ocean Report. Gitga'at Oceans & Lands.

2024

[† 42] Calhoun, WR, and **EK Ezell**. (2024) Anthropogenic debris on a protected barrier island: St. Catherine's Island (Georgia, USA). *Coastal Research* 40(3): 485-498.

[41] O'Mahony, EA, AL Sremba, **EM Keen**, N Robinson, A Dundas, D Steel, J Wray, CS Baker, OE Gaggiotti. (2024) Collecting baleen whale blow samples by drone: a minimally intrusive tool for conservation genetics. *Molecular Ecological Research 00:e13957*.

2023

[40] **Keen, EM,** EA O'Mahony, LM Nichol, BM Wright, C Shine, B Hendricks, H Meuter, HA Alidina, J Wray (2023) Ship-strike forecast & mitigation for whales of the Gitga'at First Nation. *Endangered Species Research* 51:31-58.

[39] **Keen, EM** (2023) LTabundR. R package. *(Density and abundance estimation for NOAA cetacean line-transect surveys.)*

[38] **Keen, EM** (2023) shipstrike. R package. *(Utilities for assessing the impacts of marine traffic upon whale populations.)*

2022

[37] **Keen, EM**, B Hendricks, C Shine, J Wray, CR Picard, H Alidina (2022) A simulation-based tool for estimating whale-vessel encounter rates. *Ocean & Coastal Management* 224:106183.

[36] Falcone, EA, E Keene, **EM Keen**, …, G Schorr (2022) Movements and residency of fin whales (Balaenoptera physalus) in the California Current System. *Mammalian Biology.* 10.1007/s42991-022-00298-4.

[35] Schorr, GS, D Sweeney, …, **EM Keen** (2022) Long-term movements and dive behavior of Offshore Killer Whales. *Frontiers in Marine Science* 9:854893.

[34] **Keen, EM** (2022) suRvey. R package. *(Open-source, customizable data entry app for wildlife surveys)*

[32] Galvosas, M, JC Gabaldon-Figueira, **EM Keen**, et al. (2022) Performance evaluation of the smartphone-based AI cough monitoring app – Hyfe Cough Tracker against solicited respiratory sounds. *F1000Research* 11:730.

[31] Gabaldon-Figueira, JC, **EM Keen**, et al. (2022) Acoustic surveillance of cough for detecting respiratory disease using artificial intelligence. *ERJ Open Research* 8: 0053-2022.

[30] Gabaldon-Figueira, JC, **EM Keen**, et al. (2022) Longitudinal passive cough monitoring and its implications for detecting changes in clinical status. *ERJ Open Research* 8: 0001-2022.

† [29] **Keen, EM,** EJ True, AR Summers, EC Smith, J Brew, SG Lapierre (2022) High-throughput digital cough recording on a university campus: A SARS-CoV-2-negative curated open database and operational template for acoustic screening of respiratory diseases. *Digital Health* 8:1-6.

2021

[28] **Keen, EM**, J Pilkington, …, J Wray (2021) Fin whales of the Great Bear Rainforest: *Balaenoptera physalus velifera* in a Canadian Pacific fjord system. *PLOS ONE.* https://doi.org/10.1371/journal.pone.0256815

[27] Wray, J, E O'Mahony, **EM Keen** (2021) Social survival: social niche partitioning among humpback whales within a proposed critical feeding habitat. *PLOS ONE.* doi: 10.1371/journal.pone.0245409

[26] **Keen, EM** (2021) soundcheck. R package. *(Open-source, customizable app for annotating sound recordings.)*

† [25] **Keen, EM**, J Wren, E O'Mahony, J Wray (2021) catRlog: a photo-identification project management system based in R. *Mammalian Biology.* doi: 10.1007/s42991-021-00158-7

[24] **Keen, EM** (2021) hyfer. R package. *(Utilities for accessing and analyzing data collected by Hyfe cough recorders.)*

[23] Hendricks B, **EM Keen**, C Shine, J Wray, CR Picard, H Alidina (2021) Acoustic tracking of fin whales: habitat use and movement patterns in a Canadian Pacific fjord system. *Journal of the Acoustical Society of America* 149(6).

[22] **Keen EM,** J Brew, B Brew, M Rudd (2021) *Zero to Hero in R: An online book for data science.* www.datascience.pizza.

2020

[21] **Keen, EM**, J Wray, B Hendricks, E O'Mahony, C Picard, H Alidina (2020) Determining marine mammal detection functions for a stationary land-based survey site. *Wildlife Research.*

[20] Towers, JR, **EM Keen,** K Balcomb-Bartok, J Vonick, D Davis (2020) Live strandings of Bigg's killer whales (Orcinus orca) along the west coast of North America. *Aquatic Mammals Journal* 46(5).

[19] Wray, J, **EM Keen** (2020) Calving rate decline in humpback whales (*Megaptera novaeangliae*) in northern British Columbia. *Marine Mammal Science* 1-12.

[18] Qualls, KM, KS Bernard, **EM Keen** (2019) Drivers of *Euphausia pacifica* and *Thysanoessa spinifera* Abundances in the Kitimat Fjord System, BC Canada. Masters thesis, Oregon State University.

[17] Griffiths, ET, F Archer, …, **EM Keen**, J Barlow, JE Moore (2020) Detection and classification of narrow banded high frequency echolocation clicks from drifting recorders. *Journal of the Acoustical Society of America.*

2019

[16] Hendricks, B, JL Wray, **EM Keen**, HM Alidina, TA Gulliver, CR Picard (2019) Automated localization of whales in coastal fjords. *Journal of the Acoustical Society of America* 146: 4672.

[15] **Keen, EM**, K Scales, B Rone, E Hazen, E Falcone, G Schorr (2019) Night and day: diel differences in ship strike risk for fin whales along the US west coast. *Frontiers in Marine Science.* https://doi.org/10.3389/fmars.2019.00730

[14] **Keen, EM**, E Falcone, G Schorr (2019) Diel dive behavior of fin whales (*Balaenoptera physalus*) in Southern California Bight. *Aquatic Mammals Journal 45(2), 233-243.*

2018

[13] **Keen, EM**, Hendricks, B, JL Wray, HM Alidina, L McWhinnie, H Meuter, CR Picard (2018) Integrating passive acoustic and visual monitoring of cetaceans in coastal habitats. *Proceedings of Meetings on Acoustics* 35:010002.

[12] **Keen, EM**, J Wray, J Pilkington, KL Thompson, CR Picard (2018) Distinct habitat use strategies of sympatric rorqual whales within a fjord system. *Marine Environmental Research* 140: 180-189.

[11] **Keen, EM**, KM Qualls (2018) Respiratory behaviors in sympatric rorqual whales: the influence of prey depth and implications for temporal access to prey. *Journal of Mammalogy* 99(1):27-40.

[10] Hendricks, B, **EM Keen**, JL Wray, HM Alidina, TA Gulliver, H Meuter, CR Picard (2018) Localizing bioacoustic signals with long-baseline hydrophone arrays. *Journal of the Acoustical Society of America* 144(3).

[9] Hendricks, B, **EM Keen**, JL Wray, HM Alidina, L McWhinnie, H Meuter, CR Picard (2018) Automated monitoring and analysis of marine mammal vocalizations in coastal habitats. *IEEE Oceans 2018*.

2017 & prior

[8] **Keen, EM** *(*2017) Whales of the Rainforest: habitat use strategies of sympatric rorqual whales within a fjord system. Doctoral Thesis. University of California: San Diego.

[7] **Keen, EM** (2017) Aggregative and feeding thresholds of sympatric rorqual whales within a fjord system. *Ecosphere 8(3)*: 10.1002/ecs2.1702.

[6] **Keen, EM**, JL Wray, H Meuter, KL Thompson, JP Barlow, CR Picard (2017) "Whale wave": shifting strategies structure the complex use of critical fjord habitat by humpbacks. *Marine Ecology Progress Series.* 567: 211-233.

[5] **Keen, EM** (2016) bangarang. R package. *(Utilities for oceanographic analysis in the Kitimat Fjord System)*

[4] **Keen, EM**, KB Watson, KM Qualls, RM Keen (2016) A handheld rangefinder for seabird surveys in confined channels. *Marine Ornithology* 44: 137-144.

[3] **Keen, EM** (2015) Net savvy: a practical guide to zooplankton sampler design. *NOAA Tech Memo* NMFS-SWFSC-545.

[2] Evans, JP, **EM Keen** (2013) Regeneration failure in a remnant stand of pignut hickory (*Carya glabra*) on a protected barrier island in Georgia, USA. *Natural Areas Journal* 33(2):171-176.

[1] Bagulayan, A, JN Bartlett-Roa, …, **EM Keen**, …, AM Van Cise, PJS Franks (2012) Journey to the Center of the Gyre: The Fate of the Tohoku Tsunami Debris Field. *Oceanography* 25(2):200–207.

Research talks & posters

- **Keen, EM.** (2026) Speaker at "Collaborative Solutions for Reducing Ship Strikes: Uniting Insights from Science, Industry, and Policy". International Whaling Commission technical workshop. London.
- **Keen, EM,** J Wray, …, H Alidina (2022) Fin whales of the Great Bear Rainforest. Society of Marine Mammalogy Biennial Conference. West Palm Beach, FL.
- **Keen, EM,** J Wray, …, H Alidina (2019) Ship strike mitigation scenarios within a proposed shipping lane. World Marine Mammal Conference, Barcelona.
- **Keen, EM**, K Scales, …, G Schorr (2019) Night and day: diel differences in ship strike risk for fin whales along the US west coast. Southern California Marine Mammal Workshop, Newport Beach, CA.
- **Keen, EM**, B Hendricks, …, CR Picard (2018) Integrating passive acoustic and visual monitoring of cetaceans in coastal habitats. 176th Conference of the Acoustic Society of America. Victoria, BC, Canada.
- **Keen, EM,** B Hendricks, …, H Alidina (2017) SWAG: Ships, whales and acoustics in Gitga'at Territory. Oral presentation. Biennial Conference for Society of Marine Mammalogy, Halifax, CA.

- **Keen, EM,** KM Qualls, …, CR Picard (2017) Novel spatial analytics to identify candidate environmental cues for foraging whales. Association for the Sciences of Limnology and Oceanography, Honolulu, USA.
- **Keen, EM,** CR Picard (2017) Novel spatial analytics reveal influence of prey depth upon alcid distribution within a fjord system. Pacific Seabird Group meeting, Tacoma, WA, USA.
- **Keen, EM** (2017) Whales of the rainforest: habitat use strategies of sympatric rorqual whales within Kitimat Fjord System, BC. The Canadian Society of Environmental Biologists.
- **Keen, EM** (2016) Threshold feeding by rorqual whales in a fjord. Western Soc. of Naturalists. Monterey CA.
- **Keen, EM** (2016) Spatial scale and context dependence of whale-prey associations within a fjord system. American Cetacean Society. Monterey CA.

Popular science

- Pritchard, A, R Candler (**EM Keen**, illustrator). (2023) Birding Sewanee.
- **Keen, EM** (2020) Why are blue whales so gigantic? *Scientific American.* July 31, 2020.
- **Keen, EM** (2018) How to Lunge Feed. *Spyhopper* September 2018.
- **Keen, EM** (2017) The "whale wave" in British Columbia. *The Conversation*. May 22, 2017.
- **Keen, EM** (2016) Gitga'at Oceanographic Initiative in the *Gitga'at Guardian* Jan /Feb.
- **Keen, EM** (2014) *Bangarang* research in Gitga'at Territory in the *Gitga'at Guardian* Feb/Mar.
- **Keen, EM** (2011) "One young naturalist vs. Enbridge's Northern Gateway Pipeline." *The Ecologist.*
- **Keen, EM** (2011) "Bubble Net: Encounters with a feeding frenzy." American Cetacean Society *Spyhopper.*

Previous positions

Visiting Assistant Professor, Sewanee: University of the South **2018 - 2022**
- Taught in Env. Science/Studies, Biology, & First Year Program
- Pre-major and major advisor, with regular committee service
- Assistant director of Island Ecology Program and Sewanee Datalab

Data scientist, NOAA Cetacean Research Program **2021 - 2022**
- Developed new R package for open-source abundance estimation tools.

Science Co-director, North Coast Cetacean Society **2018 - present**
- Lead the analysis and publication of whale research for a British Columbia non-profit

Data scientist, Hyfe Inc. **2021**
- Served as chief scientist and R programmer in a public health start-up, which I helped grow from 8 to 30 employees in ten months.

Ecology Editor, *Aquatic Mammals Journal* **2018 - 2021**

Research Biologist, Marine Ecology & Telemetry Research **2017 - 2021**
- Published studies of whale dive behavior, tag analysis & shipping interactions

Post-doctoral research fellow, University of Victoria **2017 - 2020**
Created software to study whale-ship interactions in a proposed shipping lane.

Awards & funding

- Community-Engaged Learning Faculty Fellowship 2024-2025
- Sewanee DEI course development grant 2022-2023
- Mitacs Accelerate Internship / Post-Doctoral Fellowships 2017 - 2020
- Smith Fund for Experiential Learning and Southern Appalachian studies 2019

- Sewanee Faculty Research Grant 2019
- Course development stipend, Collaborative for Southern Appalachian Studies 2018
- Frieman Prize for best student paper, Scripps Institution of Oceanography 2017
- Best student presentation, American Cetacean Society (Monterey, CA) 2016
- Lewis and Clark Fund, American Philosophical Society 2015
- National Geographic Society – Waitt Grant Fellow 2013
- Mullin Fund, Scripps Institution of Oceanography 2013
- Edna Bailey Sussman Fellow at Cascadia Research Collective 2013
- Explorers Club Exploration Fund 2012
- Grant-in-Aid of Research, American Society of Mammalogists 2012
- National Science Foundation GK-12 Teaching Fellow 2012
- National Science Foundation Graduate Research Fellow 2011 - 2014

Service, leadership, & involvement

Sewanee: The University of the South *(as a professor & community member)*

- Pre-major & major advisor 2019 - present
- Watson Fellowship selection committee 2019 - present
- Research Grants committee 2025 - present
- Community-Engaged Learning Faculty Fellow 2024 - 2025
- First Year Experience Instructor (pilot program) 2025
- First Year Experience QEP Steering Committee 2024
- Board of Directors, South Cumberland Regional Land Trust 2020 - present
- Sewanee Environmental Institute Instructor 2024 & 2025
- Admissions tour representative for Snowden Hall/EES 2024
- Summer Seminar presenter 2024
- SUMMA Theological Debate Society seminar leader 2024
- Community Council representative 2019 - 2023
- Board of Directory, Housing Sewanee, Inc. 2021 - 2022
- Assistant director, Sewanee Datalab 2021
- Advisor to Sewanee Greenhouse & Sewanee Water Campaign 2019 - 2021
- Civic Engagement Fellow 2019 - 2020
- Working Group on Integrated Advising 2018 - 2019
- Regular participant in Center for Teaching programming, faculty meetings, and faculty retreats.

Scripps Institution of Oceanography *(as a graduate student)*

- Scripps Editorial & Publications Committee
- Co-Coordinator, Scripps Ecology Seminar Series
- Co-Director, Scripps Natural History Society
- Volunteer naturalist, Birch Aquarium at Scripps Whale Watching
- Founder & Chair, Scripps Cohort Seminar Series
- Student representative, UCSD Graduate Student Association

Sewanee: The University of the South *(as an undergraduate)*

- Sustainability Steering Committee, student representative
- Green-House Environmental Residence, co-founder
- Natural History Society, co-founder and president
- Environmental Resident Program, chair
- Forestry & Geology Club, vice president
- Outdoor Program, student trip leader
- Track & Field Team, member
- Order of the Gownsmen, member
- Table Tennis Team, co-founder and president
- Post-graduation:

- Landscape Analysis Lab post-baccalaureate fellow
- Assistant director, Sewanee Outdoor Program
- Cycling fundraising campaigns. In 2008, a friend and I biked 4,000 miles across Canada in 40 days; our efforts raised $12,000 to build a school in Guatemala. In 2010, I led a team of 10 undergraduates in a 12-day, 1,000-mile ride that raised $12,000 to build a school in Colombia. Both schools are now built & operational.

Select teaching

Currently offering:

- **ENST 101: Introduction to Environmental Studies** *(since 2022)*: An interdisciplinary introduction to Environmental Studies through the examination of the scientific and social aspects of environmental issues. Field components of the course focus on the University Domain and the surrounding area. This course is required for all students who major or minor in environmental studies and should be taken before the junior year. *Open only to first-year students, sophomores, and juniors.*

- **ENST 140: Readings in Island Ecology** *(since 2018)*: Supervised readings and discussion in geology, hydrology, invertebrate zoology, marine zoology, maritime plant communities, and wildlife behavior as preparation for participation in the interdisciplinary summer Island Ecology program. *Prerequisite: Only open to students admitted to the Island Ecology program.*

- **ENST 209: Ecosystems of the Ocean** *(since 2018)*: As an introduction to the geologic, physical, chemical, and biological processes of the world's ocean, this course emphasizes its complex relationships with human cultures. Students in this course engage with a mix of readings from scientific journals, textbooks, and classic literature while conducting their own scientific reviews to pursue questions at the frontiers of ocean sciences.

- **ENST 211: Sustainability and Global Environmental Change Seminar** *(since 2023)*: This seminar-style course exposes students to literature on a variety of issues related to climate change and other examples of our dynamic global environment including natural resource use and natural hazards. *Prerequisite: Only open to students who have been admitted to the Global Environmental Change Field Studies Program.*

- **ENST 212: Sustainability and Global Environmental Change Field Studies** *(since 2023)*:This course is an interdisciplinary field immersion into a selected location that provides tangible experience of the concepts introduced in ENST 211. Students travel throughout the field site, exploring real-world examples of sustainability efforts in the context of our changing global environment. Concepts of sustainability, climate change, natural resource use, and natural hazards will be explored in the field context. Field sites may change from year to year. *Prerequisite*: *Only open to students who have been admitted to the Global Environmental Change Field Studies Program.*

- **ENST 222: Fantastic Beasts: the culture & conservation of monstrous megafauna** *(since 2025)*: From big cats and terrible lizards to leviathans and legendary kaiju, the “monster” has played a critically important role in our understanding of the world and our place within it. That perspective, in turn, has informed our attitudes toward – and our exploitation of – megafauna throughout history and in the present day. This course is a multi-disciplinary exploration of the role that dangerous and gigantic beasts have played in shaping humanity: our psychology, our spirituality, our arts, and our environmental ethic. What would our world be like without such fantastic beasts?

- **ENST 234: Equitable Environmental Education** *(since 2024)*: A service-oriented exploration of environmental pedagogies, investigated through a critical lens that is dedicated to correcting historical barriers to access, opportunity, and belonging in nature for marginalized learners. Through readings, site visits, reflective writing, and self-designed lesson planning, students analyze educational models for developing environmental literacy, identity, and stewardship in learners of all ages in a wide range of contexts, from backcountry to rural county to inner city. *Prerequisite: ENST 101 or BIOL 101 or GEOL 121 or FORS 121.*

- **ENST 338: Marine Conservation & Policy** *(since 2024)*: A survey of the policies that have shaped humanity's relationship with marine resources & coastal ecosystems throughout history and around the world. Using a case-study approach, this course critically evaluates how laws, treaties, and regulated markets interact with existing and emerging threats to the world's oceans. *Prerequisite: ENST 101 or ENST 209 or BIOL 130.*

- **ENST 424: Environment & Sustainability capstone** *(since 2021)*: This course provides a capstone experience for the Environment and Sustainability major. Major components include independent student research projects and an examination of selected environmental issues from a variety of perspectives in the natural and social sciences. Open only to seniors pursuing majors in environment and sustainability. *Prerequisite: ENST 320.*

- **ESCI 222: Data storytelling & sustainable development** (coming in 2026): Data science plays a critically important role in guiding and monitoring sustainable development goals that seek to align environmental, social, and economic progress. This course explores the intersection of data science and sustainable development, with a practical focus on several core skills: managing real-world datasets, data visualization design, reproducible workflows, complex project management, and impactful data-driven storytelling. Students learn tools such as interactive data dashboards, data storyboards and blogs, automated report generation, data cleaning, data repositories, version control, and data entry software design. They then apply these skills to investigate and communicate emerging issues in sustainable development.

- **ESCI 240: Island Ecology Program** *(since 2024)*: This interdisciplinary field course combines the study of geology, oceanography, marine biology, botany, and wildlife behavior in a single coastal island ecosystem. *Prereq: Only open to students who have completed ENST 140 and been admitted to the program.*

Previous offerings:

- BIOL 424: Senior capstone in science communication, Biology major 2020
- BIOL 399: Marine Tetrapods 2019
- BIOL 130: Field Investigations in Biology 2018 - 2020
- ENST 100: Walking the Land (field-based environmental literature course) 2018 - 2021
- ESCI 220: The Science of Sustainability 2022
- FYRP 125: The Idea of Home: ecology, economics, & nativity 2020
- FYRP 104: The Ecology of Place 2019
- Independent research topics in Biology & Environmental Science 2017 - 2022