

KELLY ANN KEEN

PhD Candidate ▪ Costa Lab ▪ University of California, Santa Cruz

EDUCATION

- Ph.D. Ecology and Evolutionary Biology**, University of California (UC), Santa Cruz Expected 2023
Designated Emphasis: Coastal Science and Policy
- M.A.S. Marine Biodiversity and Conservation**, Scripps Institution of Oceanography 2012
- B.S. Psychobiology** (*summa cum laude*), University of New England 2006
Coursework toward B.S. Psychobiology, Southampton College, Long Island University (2003 – 2005)

ACADEMIC FELLOWSHIPS

- National Defense Science and Engineering Graduate Fellow** 2020 – Present
UC Santa Cruz Santa Cruz, CA
- Developing a state-dependent behavioral model implemented via stochastic dynamic programming for humpback whales to assess the effects of environmental (e.g., climate change) and anthropogenic (e.g., naval sonar) stressors on reproductive success and survival. This model can be used by wildlife managers, practitioners, and industry to assess the risks of proposed activities, inform management decisions, and guide activity planning.

- California Sea Grant State Fellow** 2013
California State Lands Commission Sacramento, CA
- Collaborated with colleagues and consultants to update the Commission's Offshore Geophysical Survey Permit Program with the best available science on the effects of noise on marine mammals, protections to reduce impacts from surveys, and a revised permitting structure for surveys in state waters.
 - Represented Commission staff as an active member of interagency work groups focused on climate change.

PROFESSIONAL EXPERIENCE

- Graduate Student Researcher** 2018 – 2020
UC Santa Cruz Santa Cruz, CA
- Reviewed existing data-driven models for marine mammals in the Population Consequences of Disturbance literature to identify emerging themes and highlight general principles to consider when assessing the risks of proposed activities. These general principles can help wildlife managers and practitioners identify and prioritize the populations most vulnerable to disturbance and guide industry in planning activities that avoid or mitigate population-level effects. This work resulted in a first-author publication in *Proceedings of the Royal Society B: Biological Sciences*.

- Senior Environmental Scientist** 2013 – 2018
California State Lands Commission Sacramento, CA
- Program Manager, Offshore Geophysical Survey Permit Program: Directly responsible for program implementation, permit compliance, and ArcGIS database maintenance; facilitated a multi-stakeholder technical advisory group to inform program regulations; and drafted state legislation and regulations for geophysical surveys.
 - Project Manager: Managed and collaborated with consultants to draft and publish environmental impact assessments per the California Environmental Quality Act; developed work plans, schedules, and budgets; and coordinated public meetings and comment periods.
 - Represented Commission staff as an active member of interagency work groups focused on climate change.

Staff Research Associate

2012

Scripps Institution of Oceanography

La Jolla, CA

- Collaborated with co-authors to develop a MATLAB-based tool to overlay synthetic spectrograms on hydrophone-recorded airgun pulses to estimate locations of seismic activity and noise levels experienced by bowhead whales in the Beaufort and Chukchi Seas. This work resulted in a first-author publication in *Deep Sea Research Part I: Oceanographic Research Papers*.

Research Assistant & Aerial Observer

2010 – 2011

Provincetown Center for Coastal Studies

Provincetown, MA

- Aerial- and boat-based behavioral studies of North Atlantic right whales in Cape Cod Bay and adjacent waters, including digital photography and identification of individual right whales and data entry and analysis for the preparation of reports and scientific publications.
- Assisted the Center's disentanglement team by assessing the health and behavior of entangled whales.

Research Scientist & Naturalist

2008 – 2010

The Whale Center of New England

Gloucester, MA

- Boat-based behavioral studies of cetaceans in the southern Gulf of Maine, including digital photography and identification of individual humpback whales and data entry and analysis for the preparation of reports and scientific publications.
- Public education and outreach aboard commercial whale watch boats.
- Supervised and assisted interns with behavioral data collection in the field.

PUBLICATIONS

McHuron, EA, Adamczak, S, Arnould, JPY, Ashe, E; Booth, C, Bowen, WD, Christiansen, F, Chudzinska, M, Costa, DP, Fahlman, A, Farmer, NA, Fortune, SE, Gallagher, CA, **Keen, KA**, Madsen, PT, McMahon, CR, Nabe-Nielsen, J, Noren, DP, Noren, SR, Pirota, E, Rosen, DAS, Speakman, CN, Williams, R, Villegas-Amtmann, S, Williams, R. 2022. Key questions in marine mammal bioenergetics. *Conserv. Physiol.* 10(1): coac055. <https://doi.org/10.1093/conphys/coac055>.

Keen, KA, Beltran, RS, Pirota, E, and Costa, DP. 2021. Emerging themes in Population Consequences of Disturbance models. *Proc. R. Soc. B* 288: 20210325. <https://doi.org/10.1098/rspb.2021.0325>.

Keen, KA, Thayre, BJ, Hildebrand, JA, and Wiggins, SM. 2018. Seismic airgun sound propagation in Arctic Ocean waveguides. *Deep Sea Res. Part I Oceanogr. Res. Pap.* <https://doi.org/10.1016/j.dsr.2018.09.003>.

LEGISLATION & REGULATIONS

Title 2, Division 3, Chapter 1, Article 2.9.1: Permits for Geophysical Surveys.

Assembly Bill No. 1274, Public lands: geophysical surveys.

SELECTED ORAL PRESENTATIONS

Keen, KA, Beltran, RS, Pirota, E, and Costa, DP. 2022. Emerging themes in Population Consequences of Disturbance models. Society for Marine Mammalogy Conference. Palm Beach, FL.

Keen, KA. 2022. Assessing the consequences of disturbance on an endangered humpback whale population. National Defense Science and Engineering Fellowship Conference. Boston, MA.

Keen, KA, Beltran, RS, Pirota, E, and Costa, DP. 2022. Filling in the blanks: best practices for minimizing, quantifying, and communicating assumptions in Population Consequences of Disturbance models. Effects of Sound in the Ocean on Marine Mammals Conference. Beaufort, NC.

Keen, KA and Costa, DP. 2020. Emerging themes in Population Consequences of Disturbance models. European Union Technical Group Meeting on Underwater Noise.

SELECTED ORAL PRESENTATIONS (CONTINUED)

DeLeon, J, Pemberton, S, and **Keen, KA**. 2015. Staff Report on the California State Lands Commission Staff's Activities to Address Sea-Level Rise. California State Lands Commission Meeting. San Francisco, CA.

Keen, KA and Toombs, D. 2014. High- and Low-Energy Geophysical Surveys: Making Sense of California's New Geophysical Survey Permit Requirements. California State Lands Commission's Prevention First Conference. Long Beach, CA.

Keen, KA. 2014. Sea-Level Rise and the Public Trust Doctrine: The Importance of Collaboration in Meeting Coastal Governance Challenges. Headwaters to Ocean Conference. San Diego, CA.

Keen, KA. 2013. Geophysical Surveys Along the California Coast: A Primer. Headwaters to Ocean Conference. San Diego, CA.

Keen, KA. 2012. Using passive acoustic monitoring of seismic airgun surveys to provide a regulatory framework for oil and gas development in the Arctic. Center for Marine Biodiversity and Conservation Research Symposium, Scripps Institution of Oceanography. La Jolla, CA.

POSTER PRESENTATIONS

Keen, KA. 2022. Assessing the consequences of disturbance on an endangered humpback whale population. National Defense Science and Engineering Fellowship Conference. Boston, MA.

Keen, KA, Beltran, RS, Pirootta, E, and Costa, DP. 2019. Emerging Themes in Population Consequences of Disturbance Models. Society for Marine Mammalogy, World Marine Mammal Conference. Barcelona, Spain.

SELECTED ENVIRONMENTAL IMPACT ASSESSMENTS & REPORTS

California State Lands Commission. 2019. Wheeler North Reef Palos Verdes Reef Restoration Project. State Clearinghouse No. 1998031027. EIR No. 685.

California State Lands Commission. 2017. Palos Verdes Reef Restoration Project. State Clearinghouse No. 2017021066. ND No. 793.

California State Lands Commission. 2016. Chevron Pipe Line Company, Mallard Farms Pipeline Replacement Project. State Clearinghouse No. 2016072038. MND No. 789.

California State Lands Commission. 2015. Cabrillo Power I LLC, Encina Marine Oil Terminal Decommissioning Project. State Clearinghouse No. 2015101064. MND No. 785.

California State Lands Commission. 2014. The Low-Energy Offshore Geophysical Permit Program's One-Year Program Implementation Report.

California State Lands Commission. 2013. Low-Energy Offshore Geophysical Permit Program Update. State Clearinghouse No. 2013072021. MND No. 751.

TEACHING & TUTORING EXPERIENCE

Teaching Assistant, Ecology, UC Santa Cruz 2020

Teaching Assistant, Biology of Marine Mammals Lab, UC Santa Cruz 2020

Tutor, Behavioral Statistics, Long Island University 2004 – 2005

INTERNSHIP & VOLUNTEER EXPERIENCE

Volunteer, Costa Lab, UC Santa Cruz (Santa Cruz, CA) 2019 – Present
Graduate student research assistant at Año Nuevo Reserve

Volunteer, California Academy of Sciences (San Francisco, CA) 2016 – 2018
Identified, labeled, and integrated marine mammal and bird bones into the collection

INTERNSHIP & VOLUNTEER EXPERIENCE (CONTINUED)

Research Intern , Provincetown Center for Coastal Studies (Provincetown, MA) <i>Boat-based behavioral studies of North Atlantic right whales in Cape Cod Bay</i>	2009
Research Volunteer , University of Queensland (North Stradbroke Island, Australia) <i>Land- and aerial-based population surveys of humpback whales</i>	2007
Research Intern , The Whale Center of New England (Gloucester, MA) <i>Boat-based behavioral studies of cetaceans in the southern Gulf of Maine</i>	2006
Research Volunteer , Long Island University (Manzanillo, Costa Rica) <i>Boat-based behavioral studies of Atlantic bottlenose and tucuxi dolphins</i>	2005
Educator , Long Island Aquarium (Riverhead, NY) <i>Public education and outreach focused on local coastal ecology</i>	2005
Husbandry Intern , Long Island Aquarium (Riverhead, NY) <i>Marine mammal husbandry and public education</i>	2005
Stranding Intern , Riverhead Foundation for Marine Research & Preservation (Riverhead, NY) <i>Marine mammal and sea turtle rescue and rehabilitation</i>	2004

GRANTS, AWARDS, & HONORS

Graduate Dean's Travel Grant, UC Santa Cruz	2022
Graduate Advisory Committee Research Grant, UC Santa Cruz	2019 – 2021
Ecology and Evolutionary Biology Department Summer Grant, UC Santa Cruz	2019 – 2020
First Runner-Up, Outstanding Oral Presentation of Primary Research, University of New England	2006
Dean's List, University of New England	2005 – 2006
Academic Excellence Scholarship, University of New England	2005 – 2006
Psychology Departmental Award, University of New England	2005 – 2006
Dean's List, Long Island University	2003 – 2005
Academic Excellence Scholarship, Long Island University	2003 – 2005

CERTIFICATIONS

PADI Open Water Certification
Aircraft Ditching and Emergency Breathing Systems Course
Large Whale Disentanglement (Levels 1 & 2)
Marine Mammal Stranding Response (Level A)

PROFESSIONAL MEMBERSHIPS

Society for Marine Mammalogy, Member