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Curriculum Vitae

Lisa K. Schwarz

Institute of Marine Sciences
Long Marine Lab

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Education

Montana State University, Bozeman, MT

Doctor of Philosophy, December 2007. Major: Ecology.

Dissertation title: Survival rate estimates of Florida manatees (*Trichechus manatus latirostris*) using carcass recovery data.

San Diego State University, San Diego, CA

Masters of Science, December 2002. Major: Interdisciplinary Program in Animal Behavior

Thesis title: The impact of anthropogenic activities on the behavior of migrating eastern North Pacific gray whales (*Eschrichtius robustus*).

Lund University, Sweden

Exchange Student, June 1993-December 1994.

University of California, San Diego, CA

Bachelor of Science, December 1994. Major: General Biology.

Cum Laude, Phi Beta Kappa.

Research Experience

University of California, Santa Cruz, CA

Post-doctorate, April 2009 – December 2013

Assistant Research Biologist January 2014 – Present

Investigate correlations between annual population demographics and environmental variables for several species of pinnipeds and cetaceans as part of the E & P Sound and Marine Life Joint Industry Program and the Office of Naval Research Population Consequences of Acoustic Disturbance working group. Responsibilities include 1) develop Bayesian methods to estimate survival and reproductive rates from mark-recapture data with tag loss; 2) determine potential spatial and temporal correlations between population demographics and environmental variables; 3) develop models to link behavior with physiological condition and physiological condition with demographic rates; 4) evaluate and recommend appropriate changes to data collection methods and database systems to correct for or reduce sampling bias and increase reliability in mark-recapture data.

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**NMFS, Southwest Fisheries Science Center and Montana State University, Bozeman, MT
Post-doctorate, January 2008 – March 2009**

Analysis of STAR-LITE 2007 data to quantify potential biases in data collection methodology during cruises performed in the Eastern Tropical Pacific aimed at estimating dolphin abundance. Responsibilities included 1) quantify potential bias in closing mode vs. passing mode; 2) quantify and incorporate sources of uncertainty in school size estimates; 3) investigate potential environmental correlates in daily dolphin abundance estimates.

Montana State University, Bozeman, MT

Graduate Research Assistant, January 2003 – December 2007

Responsibilities included 1) Bayesian analysis of Florida manatee carcass recovery data to estimate survival rates, including hierarchical modeling with incorporation of uncertainty; 2) major restructuring of the carcass recovery database to include information on reproductive status and age indicators; 3) evaluate and recommend appropriate changes to data collection methods to correct for or reduce sampling bias and increase reliability in mortality data; 4) participate in meetings and publications of the Florida Manatee Population Status Working Group, an ancillary group of the Florida manatee recovery team; and 5) preparation of published manuscripts and conference presentations.

San Diego State University, Cetacean Behavior Laboratory

Graduate Researcher, June 1998 – December 2002

Responsibilities included 1) designing and developing research methodologies to assess changes in the behavior of gray whales in relation to man-made noise; 2) collecting theodolite and behavioral data on southbound migrating gray whales using the computer programs Aardvark and Pythagoras; 3) managing data including statistical analysis and interpretation of data; 4) training and supervising entry level laboratory personnel; and 5) preparation of conference presentations.

NMFS, Southwest Fisheries Science Center

Research Assistant

May 2002-December 2002: Counts of Alaska Steller sea lions from aerial photographs.

September 2000-Present: Analyzing ice cover in the Chukchi and Bering Seas in relation to gray whale calf production. Analysis includes spatial analysis and data processing in ArcGIS.

Spring 2000, 2001, 2002, 2007, 2008: Land-based counts of northbound migrating gray whale mother-calf pairs. Recorded observations of other cetaceans spotted from Piedras Blancas lighthouse, California.

Office of Naval Research

Research Assistant, June-November 2001

Helping to develop biometric models of the temporal and spatial movement of specific marine mammal species in their home ranges for a program entitled "Effects of Sound on the Marine Environment," an advanced research effort designed to develop the capability to simulate the marine environment, and to use that simulation to generate predictable hypotheses about the potential effects of anthropogenic sound on marine mammals.

Emory University

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Research Assistant, July 1998-January 1999

Aided Dr. Ann Weaver with ad lib and focal animal sampling of captive bottlenose dolphins to determine the characteristics of post-conflict reconciliation and the context of synchronous behavior. Responsibilities included data collection, weekly discussion sessions, and data transcription from tapes.

University of California, San Diego

Research Assistant, September 1997- June 1998

Helped Dr. Christine Johnson on her project to determine the social structure and behavior of captive Commerson's dolphins. Responsibilities consisted of instantaneous focal animal sampling and data entry.

San Diego State University, Cetacean Behavior Laboratory

Intern, June-December 1997

Assisted graduate students working under Dr. R.H. Defran with research in photo identification, behavior, and acoustics of bottlenose dolphins in the Southern California bight. Responsibilities entailed tracing and cataloging dorsal fin photographs, transcribing behavioral data in the field, and aiding with sonobuoy deployment. In addition, conducted an independent project analyzing four years of bottlenose dolphin behavioral data.

University of Stockholm, Sweden

Research Assistant-Independent Observer, February 1997

Assisted Dr. Per Berggren in his study investigating fishing techniques in Swedish waters in relation to harbor porpoise bycatch. Responsibilities included collecting data on fishing gear and daily catch of all species from local fishermen.

Publications and Reports

- Fleishman E., D. P. Costa, J. Harwood, S. Kraus, D. Moretti, L. F. New, R. S. Schick, **L. K. Schwarz**, S. E. Simmons, L. Thomas, R. S. Wells. (submitted) Monitoring population-level responses of marine mammals to disturbance. *Marine Mammal Science*.
- Schwarz, L. K.**, E. J. Ward, B. L. Taylor, J. Barlow, P. L. Boveng, M. E. Goebel, A. Marm Kilpatrick, D. P. Costa (submitted) The role of demography in marine mammal conservation. *Risk Analysis*.
- Gerrodette, T., E. J. Ward, R. L. Taylor, **L. K. Schwarz**, T. Eguchi, P. R. Wade. (submitted) Daniel Goodman's empirical approach to Bayesian statistics. *Risk Analysis*.
- Villegas-Amtmann, S., **L. K. Schwarz**, J. L. Sumich, D. P. Costa. (In press) A bioenergetics model to evaluate demographic consequences of disturbance in marine mammals applied to gray whales. *Ecosphere*.
- Costa, D. P., **L. K. Schwarz**, P. W. Robinson, R. S. Schick, P. A. Morris, R. Condit, D. E. Crocker, A. M. Kilpatrick. (In press) Book Chapter: A bioenergetics approach to understanding

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population consequences of disturbance: elephant seals as a model system. *The Effects of Noise on Aquatic Life II*.

Peterson, S. H., M. G. Peterson, C. Debier, A. Covaci, A. C. Dirtu, G. Malarvannan, D. E. Crocker, **L. K. Schwarz**, D. P. Costa. (2015) Deep-ocean foraging northern elephant seals bioaccumulate persistent organic pollutants. *Science of the Total Environment* 533: 144-155.

Schwarz, L. K., S. Villegas-Amtmann, R. S. Beltran, D. P. Costa, C. Goetsch, L. Hückstädt, J. L. Maresh, S. H. Peterson. (2015) Comparisons and uncertainty in fat and adipose tissue estimation techniques: the northern elephant seal as a case study. *PLoS ONE* 10(6): e0131877. doi:10.1371/journal.pone.0131877

New, L. F., J. S. Clark, D. P. Costa, E. Fleishman, M. A. Hindell, T. Klanjšček, D. Lusseau, S. Kraus, C. R. McMahon, P. W. Robinson, R. S. Schick, **L. K. Schwarz**, S. E. Simmons, L. Thomas, P. Tyack, and J. Harwood. (2014) Using short-term measures of behaviour to estimate long-term fitness of southern elephant seals. *Marine Ecology Progress Series* 496: 99-108.

Schwarz, L. K., M. Goebel, D. P. Costa, and A. M. Kilpatrick. (2013) Top-down and bottom-up influences on demographic rates of Antarctic fur seals (*Arctocephalus gazella*). *Journal of Animal Ecology*. DOI: 10.1111/1365-2656.12059

Schwarz, L. K., C. McMahon, M. Hindel, and D. P. Costa. (2012) The implications of assuming independent tag loss in southern elephant seals. *Ecosphere* 3: 81. <http://dx.doi.org/10.1890/ES12-00132.1>

Schwarz, L. K., T. Gerrodette, and F. Archer. (2010) Comparison of closing and passing mode from a line-transect survey in the Eastern Tropical Pacific. *Journal of Cetacean Research and Management* 11: 253-265.

Schwarz, L. K. and M. C. Runge (2009) Hierarchical Bayesian estimation of age-at-death from length of Florida manatee carcasses. *Canadian Journal of Fisheries and Aquatic Sciences*. 66:1775-1789.

Schwarz, L. K. (2008) Methods and models to determine perinatal status of Florida manatee carcasses. *Marine Mammal Science* 24: 881-898.

Schwarz, L. K. (2004) Report on the review of Florida manatee necropsy data and restructuring of the carcass recovery database. Report presented to the United States Marine Mammal Commission, 4340 East West Highway, Suite 905, Bethesda, MD 20814. 55 pp.

Schwarz, L. K. (2004) Understanding uncertainty in aging techniques: The Florida manatee, Report presented to Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Marine Mammal Research Program, St. Petersburg, FL. 16pp.

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Perryman, W., G. M. Watters, and **L. K. Schwarz**. (2004) Preliminary results from shore-based surveys of northbound gray whale calves in 2003 and 2004, with a comparison to predicted numbers based on the distribution of seasonal ice. Paper SC/54/BRG43 submitted to IWC scientific committee.

Perryman, W., G. M. Watters, and **L. K. Schwarz**. (2002) Examination of the relationship between seasonal ice and calf production in the Eastern Pacific population of gray whales. Paper SC/54/BRG4 submitted to IWC scientific committee.

Conference Presentations

Goetsch, C., M.G. Conners, Y. Mitani, W. Walker, S. Simmons, **L. K. Schwarz**, C. Reichmuth, S. Budge, and D. Costa. (2014) Specific foraging behaviors are associated with different diets in northern elephant seals. Biologging V. Strasburg, France. Oral Presentation.

Schwarz, L. K. (2014) Empirical Bayesian Example: Steller sea lion spatial-use patterns derived from a Bayesian model of opportunistic observations. Talk presented at the Daniel Goodman Memorial Symposium: Decision-making under Uncertainty, Risk Assessment and the Best Available Science. Topic: Daniel Goodman's Empirical Approach to Bayesian Statistics. Lead: Timothy Gerrodette. Bozeman, MT, March 2014.

Schwarz, L. K., M. Goebel, D. P. Costa, and A. M. Kilpatrick. (2014) Antarctic fur seal population projections: effects of initial age structure and uncertainty in juvenile survival. Talk presented at the Daniel Goodman Memorial Symposium: Decision-making under Uncertainty, Risk Assessment and the Best Available Science. Topic: The Role of Demography in Marine Mammal Conservation. Lead: Barbara Taylor. Bozeman, MT, March 2014.

Schwarz, L. K., R. Beltran, D. P. Costa, S. Habran, L. Huckstadt, C. Louis, J. Maresh, L. New, S. Peterson, P. Robinson, R. Schick, S. Tavoni, S. Villegas-Amtmann. (2013) From physiology to conservation: embracing uncertainty in physiological measurements and models. Talk presented at the Twentieth Biennial Conference on the Biology of Marine Mammals, Dunedin, NZ, December 2013.

Schwarz, L. K., D. P. Costa, M. A. Hindell, C. R. McMahon, P. W. Robinson, R. S. Schick, L. F. New, L. Thomas, S. E. Simmons, J. Harwood, J. S. Clark, R. S. Condit. (2011) Linking disturbance to population changes in elephant seals. Talk presented at the Nineteenth Biennial Conference on the Biology of Marine Mammals, Tampa, FL, December.

Schwarz, L. K. (2005) Bayesian estimation of Richards growth curve parameters for the Florida manatee (*Trichechus manatus*). Talk presented at the Sixteenth Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December.

Perryman, W., G. M. Watters, and **L. K. Schwarz**. (2005) Variability in calf production in the Eastern Pacific population of gray whales is linked to Arctic climate. Talk presented at the

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Sixteenth Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December.

Schwarz, L. K., R. H. Defran, and D. Weller. (2003) The effect of vessel activity on the behavior of migrating gray whales (*Eschrichtius robustus*) off Point Loma, California. Poster presented at the Fifteenth Biennial Conference on the Biology of Marine Mammals, Greensboro, NC, December.

Perryman, W. and **L. K. Schwarz.** (2001) Gray whale calf production: the low calf counts and strong tie to seasonal ice continue through 2001. Poster presented at the Fourteenth Biennial Conference on the Biology of Marine Mammals, Vancouver, Canada, November-December.

Schwarz, L. K., R. H. Defran, and K. Viaud. (1999) The analysis of feeding, feeding bouts, and forage/feed bouts in Pacific coast bottlenose dolphins (*Tursiops truncatus*). Poster presented at the Thirteenth Biennial Conference on the Biology of Marine Mammals, Maui, HI, December.

Funding

Co-P.I. 2014. \$1,050,000 over three years. A Bioenergetics Model to Estimate the Population Consequences of Disturbance. E & P Sound and Marine Life Joint Industry Program.

Co-P.I. 2013. \$775,000 over three years. Development of the PCAD Model to Assess Biological Significance of Acoustic Disturbance. Office of Naval Research.

Co-P.I. 2012 and 2013. Phase I: \$120,000, Phase II: \$174,790. Application of the PCAD Model to the California Gray Whale, Integration of Existing Data and Towards a Quantitative Assessment of Biological Significance of Acoustic Disturbance. Exxon Mobile and Shell Oil.

Co-P.I. 2009. \$236,000 over three years. Environmental Perturbations, Behavioral Change, and Population Response in a Long-Term Northern Elephant Seal Study. Office of Naval Research.

Teaching

Co-Instructor

Fall 2012. UC Santa Cruz BIOE 183W Undergraduate Research in Ecology and Evolutionary Biology: Writing Skills.

Spring 2012. UC Santa Cruz BIOE 129 Biology of Marine Mammals.

Invited Lecturer

Spring 2015. UC Santa Cruz BIOE 129 Biology of Marine Mammals. Topic: Population consequences of disturbance.

Spring 2014. UC Santa Cruz BIOE 129 Biology of Marine Mammals. Topics: Tuna-dolphin controversy, Methods in marine mammal research.

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Summer 2013 and 2014. UC Santa Cruz BIOE 129 Biology of Marine Mammals. Topic: Florida manatee biology and conservation.

Spring 2012. BIOE 148 Quantitative Ecology. Topic: Bayesian mark-recapture modeling.

Winter 2009. Scripps Institute of Oceanography Graduate Statistics. Topic: Bayesian modeling.

Reviewer

Endangered Species Research (Review Editor)

Proceedings of the Royal Society B

Marine Mammal Science

Journal of Fish Biology

Functional Ecology

Journal of Applied Ecology

Polar Research

Professional Membership

Member - Society for Marine Mammalogy (1998 – present)