

## Elizabeth Eli Holmes

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## EDUCATION

**Doctor of Philosophy, Zoology**, University of Washington, June 1995

Title: "Spatial models in ecology: explorations into the impact of spatial behavior on population dynamics"

Committee: Peter Kareiva (chair), Robert T. Paine, Joel Kingsolver

**Bachelor of Science, Biology**, Stanford University, June 1988, with honors

**Bachelor of Science, Mechanical Engineering**, Stanford University, June 1988, cum laude

## PROFESSIONAL POSITIONS

**2005- Affiliate faculty**, School for Fisheries and Aquatic Sciences, Univ. of Washington

**1999-present Research Scientist**, Conservation Biology Division, Northwest Fisheries Science Center, Seattle WA

- Research focuses on population dynamics of endangered and threatened species and development of quantitative methods for risk assessment

**1998-99 National Research Council fellow**, National Marine Mammal Lab., Seattle WA

- Project title: "Metapopulation dynamics of Steller sea lions"

**1995-97 National Science Foundation Post-doctoral fellow**, Colorado State Univ., Biology Dept., Fort Collins, CO

- Project title: "An experimental study of the effect of metapopulation structure on parasite-host population dynamics"

## PUBLICATIONS

- E. E. Holmes, J. Sabo, S. V. Viscido, and W. F. Fagan. 2007. A statistical approach to quasi-extinction forecasting. *Ecology Letters* 10:1182–1198.
- E. E. Holmes, L. W. Fritz, A. E. York and K. Sweeney. 2007. Age-structured modeling reveals long-term declines in the natality of western Steller sea lions. *Ecological Applications* 17: 2214–2232.
- Hauser, D. D. W., M. G. Logsdon, E. E. Holmes, G. R. VanBlaricom, R. W. Osborne. 2007. Summer distribution patterns of Southern Resident killer whales (*Orcinus orca*): core areas and spatial segregation of social groups. *Marine Ecology Progress Series* 351: 301-310.
- Hauser, D., G. VanBlaricom, E. Holmes, R. Osbourne. 2006. Evaluating the use of whalewatch data in determining killer whale (*Orcinus orca*) distribution patterns. *Journal of Cetacean Research and Management* 8: 273-281.
- Levin, P., E. E. Holmes, K. Piner and C. Harvey. 2006. Shifts in a Pacific Ocean fish assemblage: the potential influence of exploitation. *Conservation Biology* 20: 1181-1190.
- Fagan, W. F and E. E. Holmes. 2006. Quantifying the extinction vortex. *Ecology Letters* 9: 51-60.
- Holmes, E.E., W.F. Fagan, J.J. Rango, A. Folarin, J.A., Sorensen, J.E. Lippe, and N.E. McIntyre. 2005. Cross validation of quasi-extinction risks from real time series: an

- examination of diffusion approximation methods. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-67, 37 p.
- Holmes, E. E. 2004. Beyond theory to application and evaluation: diffusion approximations for population viability analysis. *Ecological Applications* 14: 1272-1293.
- Holmes, E. E. and B. Semmens. 2004. Population viability analysis for metapopulations: a diffusion approximation approach. Pp. 565-598 in *Ecology, Genetics, and Evolution of Metapopulations*, editors Ilka Hanski and Oscar E. Gaggiotti. Elsevier Press.
- Sabo, J. L., E. E. Holmes, and P. Kareiva. 2004. The efficacy of simple viability models in ecological risk assessment: Does density dependence matter? *Ecology* 85: 328-341.
- Holmes, E. E. and A. E. York. 2003. Using age structure to detect impacts on threatened populations: a case study using Steller Sea Lions. *Conservation Biology* 17:1794-1806.
- McClure, M. M., E. E. Holmes, B. L. Sanderson, and C. E. Jordan. 2003. A large-scale, multi-species risk assessment: anadromous salmonids in the Columbia River Basin. *Ecological Applications* 13(4):964-989.
- Holmes, E. E. and W. F. Fagan. 2002. Validating population viability analysis for corrupted data sets. *Ecology* 83: 2379-2386.
- Holmes, E. E. 2002. Compute and Conserve, Book review of "Quantitative methods for Conservation Biology" *Conservation Biology* 16(1): 275-276.
- Holmes, E. E. 2001. Estimating risks in declining populations with poor data. *Proceedings of the National Academy of Science* 98: 5072-5077.
- Holmes, E. E. and P. M. Kareiva. 2000. Using single-species measurements to anticipate community level effects of environmental contaminants. In *Environmental Contaminants and Terrestrial Vertebrates: Effects on Populations, Communities, and Ecosystems*, P.H. Albers, G.H. Heinz, and H.M. Ohlendorf, editors. Published by the Society of Environmental Toxicology and Chemistry (SETAC), 315 pp.
- Holmes, E. E. 1999. Book review of "Quantitative Analysis of Movement" *Bulletin of Mathematical Biology*
- Holmes, E. E. and H.B. Wilson. 1998. Running from trouble: long distance dispersal and the competitive coexistence of inferior species. *American Naturalist* 151: 578-586.
- Holmes, E. E. 1997. Basic epidemiological concepts in a spatial context. In *Spatial Ecology* (editors, D. Tilman and P. Kareiva). Princeton University Press.
- Holmes, E. E. 1995. Spatial models in ecology: explorations into the impact of spatial behavior on population dynamics. Dissertation. University of Washington.
- Holmes, E. E., M.A. Lewis, J. Banks, and R. Veit. 1994. Partial differential equation models in ecology. *Ecology* 75: 17-29.
- Holmes, E. E. 1993. Is diffusion too simple? Comparisons with a telegraph model of dispersal. *American Naturalist* 142: 779-796.

## REPORTS

- Holmes, E. E. 2003. "Review of methods, progress and cross-validation studies pertaining to population trend and risk assessment for Columbia River salmonids" in Final Report on the Technical Workshop on Population Trends and Extinction Metrics Workshop held December 5, 2003, NWFSC, Seattle, WA.
- Richard G. Gustafson, Jonathan Drake, Michael J. Ford, James M. Myers, Elizabeth E. Holmes, and Robin S. Waples. Status Review of Cherry Point Pacific Herring (*Clupea pallasii*) and Update of the Status Review of the Georgia Basin Distinct Population Segment of Pacific Herring Under the U.S. Endangered Species Act. June 2005 Draft

## SYMPOSIA AND RESEARCH SESSIONS ORGANIZED

- 2007 Co-organized with Kevin Gross, NC State, Organized Oral Session, Ecological Society of America Meetings, August 2007, San Jose, CA. "What's the right size ecological model? Views on model complexity and parsimony from different statistical paradigms"

- 2006** Co-organized with Brian Dennis, U Idaho, Organized Oral Session, Ecological Society of America Meetings, August 2006, Memphis, TN. "Modern paradigms in population ecology: stochastic, statistical, and inferential."
- 2004** Organizer and speaker, Organized Oral Session, Ecological Society of America Meetings, August 2004, Portland, OR. "Emerging approaches for the analysis of stochastic ecological data: dealing with multiple error sources, hidden states, complex non-linearities, and uncertainty."
- 2003** Organizer and speaker, "Technical Workshop on Population Trends and Extinction Metrics", December 5, 2003, Northwest Fisheries Science Center, Seattle, WA.

## TEACHING

### Graduate and Post-Graduate

- 2007** 1-day workshop on multi-variate autoregressive models for analysis of community time series data. Ecological Society Meetings, San Jose, CA, August 2007. (repeated at the National Center for Ecological Synthesis and Analysis, Sept 2007).
- 2005** 1-day workshop on state-space modeling for Population Viability Analysis at the Ecological Society Meetings, Montreal, Canada, August 2005.
- 2001/2002** Graduate course on ecosystem management, Zoology Dept., Univ. of Wash.
- Review of the concept of ecosystem management versus its application in actual Ecosystem Management plans and projects
  - Co-organized and co-lectured with D. Boersma, M. McClure, P. Kareiva
- 2000** Spatial Ecology, graduate course, Zoology Dept, University of Washington
- Course on the effect of spatial structure on population and community dynamics
  - Lecture style course based on a course reader that I developed
- 1998** 10 wk graduate seminar on Metapopulation models, University of Washington
- Course on the population, community and genetic consequences of metapopulation structure
- 1996** 6 wk graduate seminar on Cellular Automata models, Imperial College, UK,

### Undergraduate

- 2005-present** Guest lectures and computers labs on "Matrix modeling for marine mammals", Marine Mammalogy, SAFS, University of Washington
- 1995-1998** Introduction to Biology (1 year), Ecology (2 years) at University of Washington.

## SUPERVISION

### Post-docs

- Dr. Steven Viscido, Assistant professor at Winston-Salem University (NC State)
- Dr. Kim Parsons, presently at NWFSC
- Dr. Brice Semmens, presently at NWFSC
- Dr. Eric Ward, presently at NWFSC
- Dr. Yasmin Lucero, presently at NWFSC
- Dr. John Sabo, Assistant professor Arizona State University

### Graduate students

- Co-chair for Donna Hauser, M.S. student, School of Aquatic & Fisheries Sciences, Univ. of Wash., Seattle, WA. "Summer habitat use by Southern Resident Killer Whales"
- Co-chair for Teresa Mongillo, M.S. student, School of Aquatic & Fisheries Sciences, Univ. of Wash., Seattle, WA. "Effects of contaminants on Southern Resident Killer Whale Population Dynamics"