

# **Bruce Edward Kendall**

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## **EDUCATION**

### **B.A., Williams College, 1986**

MAJOR: Physics                      MINOR: Environmental Studies

### **Ph.D., University of Arizona, 1996**

MAJOR: Ecology and Evolutionary Biology                      ADVISOR: Dr. William M. Schaffer

DISSERTATION TITLE: "Spatial Structure and Transient Periodicity in Biological Dynamics"

## **PROFESSIONAL APPOINTMENTS**

- 1996-98              Postdoctoral Fellow, National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara
- 1998-2004          Assistant Professor, Donald Bren School of Environmental Science and Management, University of California, Santa Barbara
- Spring 2002        Visiting Assistant Professor, Dept. of Ecology and Evolutionary Biology, Cornell University
- 2004-present      Associate Professor, Donald Bren School of Environmental Science and Management, University of California, Santa Barbara
- 2008-2009        Visiting Scholar, School of Biological Sciences, University of Queensland

## **FELLOWSHIPS**

- University Postdoctoral Fellowship, University of Calgary (declined).
- Postdoctoral Fellowship, National Center for Ecological Analysis and Synthesis (1996-1998).
- Graduate Fellowship, Biomathematics and Dynamics Initiative, University of Arizona (1995).
- Graduate Fellowship, Research Training Grant 'The Analysis of Biological Diversification,' University of Arizona (1994).
- Graduate College Fellowship, University of Arizona (1989-1990).

## **EXTRAMURAL FUNDING**

- R. Nisbet, A. Brooks, B. Kendall, P. Holden, K. Lafferty, E. Muller, C. Paige, and A. Stewart-Oaten. 2001-2006. Western Center for Estuarine Ecosystem Indicator Research: Ecological Indicators (EPA: \$1,880,000).
- D.A. Siegel and B.E. Kendall. 2001-2005. Marine protected area design and monitoring using satellite data: a prototype study in the Channel Islands National Marine Sanctuary (NOAA: \$320,000).
- C. Costello and B. Kendall. 2001-2003. On the preservation of transboundary, non-harvested species (Institute for Global Conflict and Cooperation: \$15,000).
- B. Kendall and G. Fox. 2002-2005. Individual variability, environmental stressors, and sampling uncertainty in wildlife risk assessment (EPA: \$427,000).
- B. E. Kendall and C. McAusland. 2002-2003. Assessment of chemical and non-chemical stressors on fall-run chinook salmon (California EPA: \$18,000).
- B. E. Kendall and B. G. Bierwagen. 2002-2004. Dissertation research: Ecological and evolutionary effects of land use changes on butterflies (NSF: \$8,139).

- B. Kendall, C. McAusland, and J. Love. 2002-2003. Dry Creek ecological risk assessment (County of Placer: \$7,855)
- D. Siegel, C. Costello, B. Kendall, S. Gaines, and R. Warner. 2003-2009. Flow, Fish and Fishing: Disparate Scales of Process Make Nearshore Fishery Management a Difficult Task (NSF: \$1,995,951).
- C. White and B. Kendall. 2005-2008. Population Connectivity and the Management of Coastal Fishery Species across the US-Mexico Border (AAAS: \$78,000).
- T. Dunne, F. Davis, B. Kendall, and H. Lenihan. 2006-2011. How abiotic processes, biotic processes, and their interactions sustain habitat characteristics and functions in river channels and floodplains: An investigation of the response of a gravel-bed reach of the Merced River to restoration (CalFed: \$1,400,000).
- B. Kendall and S. MacIntyre. 2006-2008. Determining factors for Eurasian watermilfoil (*Myriophyllum spicatum* L.) spread in and around Lake Tahoe, CA-NV (UC Water Center: \$60,000).
- B. Kendall, G. Fox, and R. Gomulkiewicz. 2006-2010. Demographic heterogeneity within populations and its consequences (NSF: \$502,293).

## **GRADUATE STUDENTS AND POSTDOCTORAL SCHOLARS**

### **Former Ph.D. Students (Chair)**

Britta G. Bierwagen, 2003, Physical Scientist, Global Change Research Program, USEPA  
 Corwith C. (Crow) White, 2008, Postdoctoral Scholar, UCSB  
 Marion Wittmann, 2008, Postdoctoral Scholar, UC Davis  
 Heather A. Berkley, 2009, Adjunct Lecturer, College of the Immaculate Word

### **Former Ph.D. Students (Committee Member)**

Douglas D. Donalson, 2001, Postdoctoral Scholar, California State University, Los Angeles.  
 Julie B. Kellner, 2004, Postdoctoral Scholar, UC Davis  
 Kurt E. Anderson, 2004, Assistant Professor, UC Riverside  
 Annette B. C. Killmer, 2004, Natural Resources Specialist, Inter-American Development Bank  
 Daniel T. Kaffine, 2007, Assistant Professor, Colorado School of Mines  
 Michael R. Springborn, 2008, Assistant Professor, UC Davis  
 Kate Buneau, 2009  
 Heather Coleman, 2009

### **Current Ph.D. Students (Committee Member)**

Tal Ben-Horin, Mary Collins, William Kuhn, Theresa Nogueire, Oliver Soong, Lorena Vieli, Mary Whitfield, Annie Yau

### **Current M.S. Students (Committee Member)**

Natalie A. Senyk

### **Former M.A. Students (Committee Member)**

Cory Craig, 2001, Science Librarian, UC Davis.  
 Abhyudai Singh, 2007, PhD Student, UCSB

### **Current Postdocs supervised**

Joseph Stover

## Former Postdocs supervised

Masami Fujiwara, Assistant Professor, Texas A&M University  
 Caroline (Caz) Taylor, Assistant Professor, Tulane University

## COURSES TAUGHT

ESM 201 Ecological Principles (MESM core class; 1999, 2000, 2001)  
 ESM 206 Data Analysis for Environmental Problem Solving (MESM core class; annually 2002-2008, 2010)  
 ESM 211 Applied Population Ecology (MESM elective in Conservation Planning specialization; annually 1999-2006, 2008-2009)  
 ESM 297 Advanced Topics in Environmental Policy (MESM elective; 2001)  
 ESM 401ABC ESM Group Project (annually 1999-2010)  
 ESM 595G Advances in Applied Ecology (MESM seminar; 2001)  
 ESM 595GG Advances in Applied Ecology (Ph.D. seminar; annually 2002-2005)  
 ESM 595GG Ecological Sustainability (Ph.D. seminar; annually 2007-2009)  
 ESM 595SS Ecology and Economics of Invasive Species (Ph.D. seminar; 2006)

## PUBLICATIONS

### Peer-reviewed papers

Kendall, B.E., W.M. Schaffer, and C.W. Tidd. 1993. Transient periodicity in chaos. *Physics Letters A* **177**: 13-20.  
 Schaffer, W.M., B.E. Kendall, C.W. Tidd, and L.F. Olsen. 1993. Transient periodicity and episodic predictability in biological dynamics. *IMA Journal of Mathematics Applied in Medicine and Biology* **10**: 227-247.  
 Ellner, S.P., B.E. Kendall, S.N. Wood, E. McCauley, and C.J. Briggs. 1997. Inferring mechanism from time-series data: delay differential equations. *Physica D* **110**: 182-194.  
 Kendall, B.E. 1998. Estimating the magnitude of environmental stochasticity in survivorship data. *Ecological Applications* **8**: 184-193.  
 Kendall, B.E., and G.A. Fox. 1998. Spatial structure, environmental heterogeneity, and population dynamics: analysis of the coupled logistic map. *Theoretical Population Biology* **54**: 11-37.  
 Kendall, B.E., J. Prendergast, and O.N. Bjørnstad. 1998. The macroecology of population dynamics: taxonomic and biogeographic patterns in population cycles. *Ecology Letters* **1**: 160-164.  
 Micheli, F., K.L. Cottingham, J. Bascompte, O.N. Bjørnstad, G.L. Eckert, J.M. Fischer, T.H. Keitt, B.E. Kendall, J.L. Klug, and J.A. Rusak. 1999. The dual nature of community variability. *Oikos*, **85**: 161-169.  
 Kendall, B.E., C.J. Briggs, W.W. Murdoch, P. Turchin, S.P. Ellner, E. McCauley, R.M. Nisbet, and S.N. Wood. 1999. Inferring the causes of population cycles: a synthesis of statistical and mechanistic modeling approaches. *Ecology* **80**: 1789-1805.  
 Kendall, B.E., O.N. Bjørnstad, J. Bascompte, T.H. Keitt, and W.F. Fagan. 2000. Dispersal, environmental correlation, and spatial synchrony in population dynamics. *American Naturalist* **155**: 628-636.  
 McCauley, E., B.E. Kendall, A. Janssen, S. Wood, W.W. Murdoch, P. Hosseini, C.J. Briggs, S.P. Ellner, R.M. Nisbet, M.W. Sabelis, and P. Turchin. 2000. Inferring colonization processes from population dynamics in spatially-structured predator-prey systems. *Ecology* **81**: 3350-3361.  
 Kendall, B.E. 2001. Cycles, chaos, and noise in predator-prey dynamics. *Chaos, Solitons and Fractals* **12**: 321-332.

- Ellner, S.P., E. McCauley, B.E. Kendall, C.J. Briggs, P.R. Hosseini, S.N. Wood, A. Janssen, M.W. Sabelis, P. Turchin, R.M. Nisbet, and W.W. Murdoch. 2001. Habitat structure and population persistence in an experimental community. *Nature* **412**: 538-543.
- Kendall, B.E., and G.A. Fox. 2002. Variation among individuals and reduced demographic stochasticity. *Conservation Biology* **16**: 109-116.
- Fox, G.A., and B.E. Kendall. 2002. Demographic stochasticity and the variance reduction effect. *Ecology* **83**: 1928-1934.
- Murdoch, W.W., B.E. Kendall, R.M. Nisbet, C.J. Briggs, E. McCauley, and R. Bolser. 2002. Single-species models for many-species food webs. *Nature* **417**: 541-543.
- Murdoch, W.W., C.J. Briggs, R.M. Nisbet, B.E. Kendall, and E. McCauley. 2003. Natural enemy specialization and the period of population cycles: Reply. *Ecology Letters* **6**: 384-387.
- Turchin, P., S.N. Wood, S.P. Ellner, B.E. Kendall, W.W. Murdoch, A. Fischlin, J. Casas, E. McCauley, and C.J. Briggs. 2003. Dynamical effects of plant quality and parasitism on population cycles of larch budmoth. *Ecology* **84**: 1207-1214.
- Seabloom, E.W., E.T. Borer, V.L. Boucher, R.S. Burton, K.L. Cottingham, L. Goldwasser, W.K. Gram, B.E. Kendall, and F. Micheli. 2003. Competition, seed limitation, disturbance, and reestablishment of California native annual forbs. *Ecological Applications* **13**: 575-592.
- Kendall, B.E., and G.A. Fox. 2003. Unstructured individual variation and demographic stochasticity. *Conservation Biology* **17**: 1170-1172.
- Fujiwara, M., B.E. Kendall, and R.M. Nisbet. 2004. Growth autocorrelation and animal size variation. *Ecology Letters* **7**: 106-113.
- Armsworth, P.R., B.E. Kendall, and F.W. Davis. 2004. An introduction to biodiversity concepts for environmental economists. *Resource and Energy Economics* **26**: 115-136.
- Gram, W.K., E.T. Borer, K.L. Cottingham, E.W. Seabloom, V.L. Boucher, L. Goldwasser, F. Micheli, B.E. Kendall, and R.S. Burton. 2004. Distribution of plants in a California serpentine grassland: are rocky hummocks spatial refuges for native species? *Plant Ecology* **172**: 159-171.
- Kendall, B.E., S.P. Ellner, E. McCauley, S.N. Wood, C.J. Briggs, W.W. Murdoch, and P. Turchin. 2005. Population cycles in the pine looper moth: dynamical tests of mechanistic hypotheses. *Ecological Monographs* **75**: 259-276.
- Fujiwara, M., B.E. Kendall, R.M. Nisbet, and W.A. Bennett. 2005. Analysis of size trajectory data using an energetic-based growth model. *Ecology* **86**: 1441-1451.
- Doak, D.F., W.F. Morris, C. Pfister, B.E. Kendall, and E.M. Bruna. 2005. Correctly estimating how environmental stochasticity influences fitness and population growth. *American Naturalist* **166**: E14-E21.
- Coulson, T., T.G. Benton, P. Lundberg, S.R.X. Dall, B.E. Kendall, and J.-M. Gaillard. 2006. Estimating individual contributions to population growth: evolutionary fitness in ecological time. *Proceedings of the Royal Society of London B* **273**: 547-555.
- Boyce, M.S., C.V. Haridas, C. Lee, C.L. Boggs, E.M. Bruna, T. Coulson, D. Doak, J.M. Drake, J.-M. Gaillard, C.C. Horvitz, S. Kalisz, B.E. Kendall, T. Knight, E.S. Menges, W.F. Morris, C.A. Pfister, and S.D. Tuljapurkar. 2006. Demography in an increasingly variable world. *Trends in Ecology and Evolution* **21**: 141-148.
- Fox, G.A., B.E. Kendall, J.W. Fitzpatrick, and G.E. Woolfenden. 2006. Consequences of heterogeneity in survival probability in a population of Florida Scrub-Jays. *Journal of Animal Ecology* **75**: 921-927.
- Coulson, T., T.G. Benton, P. Lundberg, S.R.X. Dall, and B.E. Kendall. 2006. Putting evolutionary biology back in the ecological theatre: a demographic framework mapping genes to communities. *Evolutionary Ecology Research* **8**: 1155-1171.
- Levine, J.M., E. Pachevsky, B.E. Kendall, S.G. Yelenik, and J.H.R. Lambers. 2006. Plant-soil feedbacks and invasive spread. *Ecology Letters* **9**: 1005-1014.

- White, C., and B.E. Kendall. 2007. A reassessment of equivalence in yield from marine reserves and traditional fisheries management. *Oikos* **116**: 2039-2043.
- Morris, W.F., C.A. Pfister, S. Tuljapurkar, C.V. Harridas, C.L. Boggs, M.S. Boyce, E.M. Bruna, D.R. Church, T. Coulson, D.F. Doak, S. Forsyth, J.-M. Gaillard, C.C. Horvitz, S. Kaylisz, B.E. Kendall, T.M. Knight, C.T. Lee, and E.S. Menges. 2008. Longevity can buffer plant and animal populations against changing climatic variability. *Ecology* **89**: 19-25.
- White, C., B.E. Kendall, S. Gaines, D.A. Siegel, and C. Costello. 2008. Marine reserve effects on fishery profit. *Ecology Letters* **11**: 370-379.
- Klein, C.J., A. Chan, A.J. Cundiff, N. Gardner, Y. Hrovat, A. Scholz, B.E. Kendall, and S. Airamé. 2008. Striking a balance between biodiversity conservation and socioeconomic viability in marine protected area design. *Conservation Biology* **22**: 691-700.
- Siegel, D.A., S. Mitarai, C.J. Costello, S.D. Gaines, B.E. Kendall, R.R. Warner, and K.B. Winters. 2008. The stochastic nature of larval connectivity among nearshore marine populations. *Proceedings of the National Academy of Science of the USA* **105**: 8974-8979.
- Vitt, P., K. Havens, B. E. Kendall, and T. M. Knight. 2009. Effects of community-level grassland management on the non-target rare annual *Agalinis auriculata*. *Biological Conservation* **142**: 798-805.
- Kendall, B.E. 2009. The diffusion approximation overestimates the extinction risk for count-based PVA. *Conservation Letters* **2**: 216-225.
- Kendall, B.E., and M.E. Wittmann. 2010. A stochastic model for annual reproductive success. *American Naturalist*, in press.
- Berkley, H.A., B.E. Kendall, S. Mitarai, and D.A. Siegel. 2010. Turbulent dispersal promotes species coexistence. *Ecology Letters*, in press.

### Book chapters and invited symposium proceedings

- Kendall, B.E., W.M. Schaffer, L.F. Olsen, C.W. Tidd, and B.L. Jorgensen. 1994. Using chaos to understand biological dynamics. Pp. 184-203 in J. Grasman and G. van Straten, eds. *Predictability and Nonlinear Modelling in Natural Sciences and Economics* (Kluwer Academic Press, Dordrecht).
- Kendall, B.E., W.M. Schaffer, C.W. Tidd, and L.F. Olsen. 1997. The impact of chaos on biology: promising directions for research. Pp. 190-218 in C. Grebogi and J.A. Yorke, eds. *The Impact of Chaos on Science and Society* (United Nations University Press, Tokyo).
- Kendall, B.E. 2001. Nonlinear dynamics and chaos. Pp. 255-262 in *Encyclopedia of Life Sciences*, vol. 13 (Nature Publishing Group, London).
- Kendall, B.E. 2001. Chaos and cycles. Pp. 209-215 in H.A. Mooney and J.G. Canadell, eds. *Encyclopedia of Global Environmental Change*, vol. 2 (John Wiley & Sons Ltd., Chichester).
- Turchin, P., C.J. Briggs, S.P. Ellner, A. Fischlin, B.E. Kendall, E. McCauley, W.W. Murdoch, and S.N. Wood. 2002. Population cycles of the larch budmoth in Switzerland. Pp. 130-141 in A.A. Berryman, ed. *Population Cycles: the Case for Trophic Interactions* (Oxford University Press, New York).

### Reports and editorials

- Kendall, B.E. 1987. Growth and seed yield within a polyculture of *Leymus racemosus*, *Tripsacum dactyloides*, and *Desmanthus illinoensis*. *The Land Institute Research Report* **4**: 36-40.
- Kendall, B.E. 1990. Population structure of juvenile *Guaicum sanctum* in a tropical dry forest. *Tropical Biology: an Ecological Approach* **OTS 90-3**: 174-179.
- Kendall, B.E. 1990. Spatial and temporal foraging patterns of an *Atta cephalotes* colony. *Tropical Biology: an Ecological Approach* **OTS 90-3**: 361-367.
- Postdocs at NCEAS. 1998. An individual-based model of data sharing. NCEAS EcoEssay Discussion Forum (electronic document available from <http://www.nceas.ucsb.edu>).

- Kendall, B.E. 1999. Incentives for prompt reviewers. *Bulletin of the Ecological Society of America* **80**: 256.
- Ward, T., R. Stewart, and 37 others. 2009. *Scientific principles for design of marine protected areas in Australia: A guidance statement*. Online document available from [http://www.ecology.uq.edu.au/docs/Scientific\\_Principles\\_2version.pdf](http://www.ecology.uq.edu.au/docs/Scientific_Principles_2version.pdf)
- Fuller, R.A., H.B. Wilson, B.E. Kendall, and H.P. Possingham. 2009. *Monitoring shorebirds using counts from the Queensland Wader Study Group*. A report to the Queensland Wader Study Group and the Department of Environment and Resource Management.

## Software packages

- King, A. A., E. L. Ionides, C. M. Breto, S. Ellner, and B. Kendall. 2009. pomp: Statistical inference for partially observed Markov processes. *The Comprehensive R Archive Network*: <http://cran.r-project.org/web/packages/pomp/>.

## PRESENTATIONS

### Invited presentations

- The impact of chaos on biology. Symposium on ‘The Impact of Chaos on Science and Society,’ Tokyo, Japan (1991).
- Using chaos to understand biological dynamics (keynote address). Symposium on ‘Predictability and Nonlinear Modelling in Natural Sciences and Economics,’ Wageningen, The Netherlands (1993).
- The impact of spatial structure on population dynamics: lessons from coupled map models. SWRIMS Conference on Mathematical Modeling in Population Biology, Logan, UT (1995).
- Inferring causes of population cycles by combining mechanistic models and time-series analysis. NCEAS symposium on ‘Synthesis in Ecology: Applications, Opportunities, and Challenges,’ Santa Barbara, CA (1996).
- Spatial structure and population dynamics: disentangling the effects of environmental heterogeneity and limited dispersal. Dept. of Ecology, Evolution and Marine Biology, University of California, Santa Barbara (1996).
- Distinguishing environmental and demographic stochasticity: what causes the variation in survival of Acorn Woodpeckers? Dept. of Biological Sciences, University of Calgary, Alberta (1997).
- Inferring causes of population cycles by combining mechanistic models and time-series analysis. Symposium on ‘Research at the National Center for Ecological Analysis and Synthesis,’ Ecological Society of America annual meeting, Albuquerque, NM (1997).
- Describing and understanding population fluctuations: demographic stochasticity, environmental stochasticity, and population cycles. Dept. of Biology, College of Staten Island, New York (1998).
- Why do populations fluctuate, and what can we do about it? Donald Bren School of Environmental Science and Management, University of California, Santa Barbara (1998).
- What causes population cycles? Answers from a synthesis of statistical and mechanistic modeling approaches. Symposium on ‘Intersection of Diverse Perspectives: Results from Creative Cross-Disciplinary Collaborations,’ Ecological Society of America annual meeting, Baltimore, MD (1998).
- The ups and downs of life: predicting the fates of small populations in an uncertain, stochastic, and variable world. Dept. of Environmental Studies, University of California, Santa Cruz (1999).
- If extinction is a natural process, why protect species? Energy and Environment Committee of the Southern California Association of Governments, Los Angeles (2000).
- Individuals *do* count! Individual variability and stochastic population dynamics. RTG on Nonlinear Dynamics in Biology, University of California, Davis; Quantitative Ecology Group, Cornell University; Dept. of Biological Sciences, Dartmouth College (2002).

- Individual variation and demographic stochasticity. Symposium on “Stochasticity in population ecology,” 87<sup>th</sup> Annual Meeting of the Ecological Society of America, Tucson, AZ (2002).
- Individual variability, environmental stressors, and sampling uncertainty in wildlife risk assessment. Wildlife risk assessment annual progress review, National Center for Environmental Research, Corvallis, OR (2003).
- Demographic stochasticity, individual variability, and stochastic population dynamics. National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara (2003).
- Individuals count! Population consequences of individual heterogeneity in demography and growth. Centre for Population Biology, Imperial College London (2004).
- Population dynamics under non-equilibrium age structure. Symposium on “Population dynamics of large mammalian herbivores in changing environments: Challenging data with theory,” IX International Mammalogical Congress, Sapporo, Japan (2005).
- Effects of persistent demographic stochasticity on the extinction risk of small populations. Dept. of Ecology, Evolution & Marine Biology, UCSB (2007).
- The diffusion approximation overestimates extinction risk in density-independent PVA. The Ecology Centre, University of Queensland, Brisbane, Australia (2008).
- Population consequences of individual heterogeneity in demography and growth. School of Integrative Biology, University of Queensland, Brisbane, Australia (2008).
- Some theory for reserve planning under (severe) uncertainty. The Ecology Centre, University of Queensland, Brisbane, Australia (2008).
- Ignorant conservation: designing reserves when we don’t know where the species are. Dept. of Biology, Melbourne University, Melbourne, Australia (2009).
- Ignorant conservation: designing reserve networks to protect unobserved biodiversity. 2<sup>nd</sup> Annual Bren Ph.D. Student Symposium, UCSB (2009).
- Population consequences of individual heterogeneity in demography and growth. Dept. of Probability and Applied Statistics, UCSB (2009).

## Presentations at professional meetings

- Kendall, B.E. 1990. Extrafloral nectar production in *Encelia farinosa* (Compositae). 4th Annual Meeting of the Southwestern Association of Biologists, Portal, AZ
- Kendall, B.E. 1994. The extinctions of small populations: demographic stochasticity in a nonlinear model. 79th Annual Meeting of the Ecological Society of America, Knoxville, TN
- Fox, G.A., and B.E. Kendall. 1994. Dispersal and population dynamics: Stability and chaos. Annual Meeting of the Ecological Society of America, Knoxville, TN
- Kendall, B.E. 1994. Stochastic population dynamics, small population size, and life history evolution. 8th Annual Meeting of the Southwestern Association of Biologists, Abiquiu, NM
- Kendall, B.E., and G.A. Fox. 1995. The consequences of spatial structure for population dynamics: lessons from coupled map models. Joint Annual Meeting of the Society for the Study of Evolution and the American Society of Naturalists, Montreal, Quebec
- Kendall, B.E. 1996. Tests to distinguish environmental and demographic stochasticity in survivorship data. 81st Annual Meeting of the Ecological Society of America, Providence, RI
- Fox, G.A., S. Schwinning, and B.E. Kendall. 1997. Exploitation, competition, and cycling in plant communities. Annual Meeting of the Ecological Society of America, Albuquerque, NM
- Kendall, B.E. 1999. Estimating the magnitude of environmental stochasticity in demographic processes. Conference on “Population Viability Analysis: Assessing Models for Recovering Endangered Species,” San Diego, CA

- Harder, L.D., S.C.H. Barrett, and B.E. Kendall. 1999. The role of floral design in pollen dispersal by tristylous *Pontederia cordata*. Joint Annual Meeting of the Society for the Study of Evolution and the American Society of Naturalists, Madison, WI
- Kendall, B.E. 1999. Density-dependent dispersal can destabilize population dynamics. Conference on "Theory and Mathematics in Biology and Medicine," Amsterdam, The Netherlands
- Kendall, B.E. 1999. Density-dependent dispersal can destabilize population dynamics. 84th Annual Meeting of the Ecological Society of America, Spokane, WA
- Boucher, V.L., E. Borer, R.S. Burton, K. Cottingham, L. Goldwasser, W. Gram, B. Kendall, F. Micheli, and E. Seabloom. 1999. Ecology and restoration of California serpentine grasslands. 84th Annual Meeting of the Ecological Society of America, Spokane, WA
- Fox, G.A., and B.E. Kendall. 2000. Individual variability reduces demographic stochasticity. Florida Ecological & Evolutionary Symposium, Archbold Biological Station
- Fox, G.A., and B.E. Kendall. 2000. Demographic stochasticity: when is it important for evolution? Joint Annual Meeting of the Society for the Study of Evolution and the American Society of Naturalists, Bloomington, IL
- Kendall, B.E., and G.A. Fox. 2000. Individual variability reduces demographic stochasticity. 85th Annual Meeting of the Ecological Society of America, Snowbird, UT
- Bierwagen, B., and B. Kendall. 2001. Is butterfly dispersal predictable? Annual Meeting of the Society for Conservation, Hilo, HI
- Fox, G.A., and B.E. Kendall. 2001. How demographic variation among individuals affects extinction risk of populations. Annual Meeting of the Society for Conservation, Hilo, HI
- Kendall, B.E., K.D. Keith, and G.A. Fox. 2001. Birds are not fish: demographic variation in avian clutch size is not Poisson-distributed. Annual Meeting of the Society for Conservation, Hilo, HI
- Kendall, B.E., and G.A. Fox. 2002. Individual growth rate variability increases the population growth rate. 16<sup>th</sup> Annual Meeting of the Society for Conservation Biology, Canterbury, England
- Fox, G.A., and B.E. Kendall. 2002. Estimating extinction risks of heterogeneous populations. 16<sup>th</sup> Annual Meeting of the Society for Conservation Biology, Canterbury, England
- Kendall, B.E., G.A. Fox, G. Woolfenden, J.W. Fitzpatrick, and H. Berkley. 2003. Individual variation in demographic traits of Florida Scrub Jays. 88<sup>th</sup> Annual Meeting of the Ecological Society of America, Savannah, GA
- Fox, G.A., P. Tingiris, and B.E. Kendall. 2003. Power analysis for matrix transition models. 88<sup>th</sup> Annual Meeting of the Ecological Society of America, Savannah, GA
- Ellner, S.P., and B.E. Kendall. 2003. Understanding Simple Population Dynamics: Methods and Insects. 88<sup>th</sup> Annual Meeting of the Ecological Society of America, Savannah, GA
- Siegel, D., C. Costello, S. Gaines, R. Hilborn, B. Kendall, S. Polasky, R. Warner, K. Winters, 2003: Flow, Fish and Fishing: Sources and Implications of Uncertainty in Nearshore Fishery Management. Presented at the 50th Eastern Pacific Ocean Conference, Catalina Island, Sept. 2003
- Berkley, H., B. Kendall, D. Siegel, and C. Costello. 2004. Fishing in a stirred ocean: Sustainable harvest can increase spatial variation in fish populations. 89<sup>th</sup> Annual Meeting of the Ecological Society of America, Portland, OR.
- Fox, G., B. Kendall, G. Woolfenden, and J. Fitzpatrick. 2004. Variation in survival traits within a population of Florida scrub-jays. 89<sup>th</sup> Annual Meeting of the Ecological Society of America, Portland, OR.
- Fujiwara, M, B. Kendall, and R. Nisbet. 2004. On the estimation of parameters in energetic-based individual growth model from individual growth history. 89<sup>th</sup> Annual Meeting of the Ecological Society of America, Portland, OR.
- Kendall, B., D. Siegel, C. Costello, S. Gaines, R. Hilborn, R. Warner, and K. Winters. 2004. Population dynamics in a stirred, not mixed, ocean. 89<sup>th</sup> Annual Meeting of the Ecological Society of America, Portland, OR.

- White, C., B. Kendall, D. Siegel, and C. Costello. 2004. Marine reserves spacing and fishery yield: When are practical designs optimal? 89<sup>th</sup> Annual Meeting of the Ecological Society of America, Portland, OR
- White, C., B. Kendall, D. Siegel, and C. Costello. 2004. Marine reserves and fishery profit: practical designs offer optimal solutions. 85<sup>th</sup> Annual Meeting of the Western Society of Naturalists, Rohnert Park, CA.
- Siegel, D., C. Costello, S. Gaines, B. Kendall, S. Mitarai, R. Warner, R. Hilborn, S. Polasky, and K. Winters. 2005. Flow, fish and fishing. ASLO Aquatic Sciences Meeting, Salt Lake City, UT.
- Siegel, D., Mitarai, S., White, C., Berkeley, H., Costello, C., Gaines, S., Hilborn, R., Kendall, B., Polasky, S., Warner, R., and Winters, R., 2006: Inherent Uncertainties in Nearshore Fisheries: The Biocomplexity of Flow, Fish and Fishing. 2006 Ocean Science Meeting, Honolulu, HI.
- White, C., Kendall, B., Siegel, D., and Costello, C., 2006: Fishing for Profit, Not Fish: A Economic Assessment of Marine Reserve Effects on Fisheries. 2006 Ocean Science Meeting, Honolulu, HI.
- Berkley, H., Kendall, B., and Siegel, D., 2006: Oceanography Creates Stochastic Larval Dispersal: Implications for Fishery Dynamics. 2006 Ocean Science Meeting, Honolulu, HI.
- Kendall, B., P. Vitt, and T. Knight. 2006. Control of invasive shrubs and herbivores required to conserve an endangered annual plant, *Tomanthera auriculata* (Scrophulariaceae), in prairie fragments near Chicago, Illinois, USA. Ecological Society of America conference on Ecology in an Era of Globalization, Merida, Mexico.
- Vitt, P., B. Kendall, and K. Havens. 2006. Rare plant management in the face of global climate change. Ecological Society of America conference on Ecology in an Era of Globalization, Merida, Mexico.
- Knight, T., P. Vitt, and B. Kendall. 2006. Control of invasive shrubs and herbivores required to conserve an endangered annual plant, *Tomanthera auriculata* (Scrophulariaceae), in prairie fragments near Chicago, Illinois, USA. Botanical Society of America annual meeting, Chico, CA.
- Vitt, P., B. Kendall, and K. Havens. 2006. An *Ex Situ* Approach to Managing Species Range Shifts Under Climate Change: Refuge in a bottle. Botanical Society of America annual meeting, Chico, CA.
- Mitarai, S., Siegel, D., Warner, R., Kendall, B., Gaines, S., and Costello, C., 2007: A Scaling Tool to Account for Inherent Stochasticity in Larval Dispersal. American Society of Limnology and Oceanography 2007 Annual Meeting, Santa Fe, NM.
- Kendall, B. E., T. Nogeire, and E. Cunningham. 2007. Effects of persistent demographic stochasticity on the extinction risk of small populations. 21<sup>st</sup> Annual Meeting of the Society for Conservation Biology, Port Elizabeth, South Africa.
- Lundberg, P., T. Coulson, T. G. Benton, B. E. Kendall, and S. R. X. Dall. 2007. A demographic framework for mapping genes to communities. 92<sup>nd</sup> Annual Meeting of the Ecological Society of America, San Jose, CA.
- Nogeire, T., B. E. Kendall, and E. Cunningham. 2007. Effects of persistent demographic stochasticity on the extinction risk of small populations. 92<sup>nd</sup> Annual Meeting of the Ecological Society of America, San Jose, CA.
- Mitarai, S., D.A. Siegel, R.R. Warner, S.D. Gaines, B.E. Kendall, C.J. Costello, and K.B. Winters. 2008. Larval dispersal and population dynamics in a turbulent coastal ocean. Ocean Sciences Meeting, Orlando, FL.
- Kendall, B.E. 2008. The diffusion approximation overestimates extinction risk in density-independent PVA. Annual Meeting of the Ecological Society of Australia, Sydney, Australia.
- Fox, G.A., G. I. Herrick, and B.E. Kendall. 2009. Demographic heterogeneity within populations: its genesis and maintenance. 94<sup>th</sup> Annual Meeting of the Ecological Society of America, Albuquerque, NM.

Kendall, B.E., G.A. Fox, M. Fujiwara, and T. Nogeire. 2009. Heterogeneity in survival increases population growth rates. INTECOL X, Brisbane, Australia.

## **WORKSHOPS & WORKING GROUPS**

### **National Center for Ecological Analysis and Synthesis**

- 1996-99 Complex Population Dynamics Working Group
- 1997 Intrinsic and Extrinsic Variability in Community Dynamics Working Group
- 2001 The Economics of Biodiversity Workshop
- 2001-03 Dynamics of Large Mammalian Herbivores in Changing Environments Working Group
- 2003-05 Seasonality and the Population Dynamics of Infectious Disease Working Group
- 2004-06 Stochastic Demography for an Increasingly Variable World Working Group
- 2007-10 Unifying Approaches to Statistical Inference in Ecology Working Group

### **Ecological Society of America**

- 2002 Twenty-five Years of Ecological Chaos: Do Mathematical Models Really Work After All?

### **Other**

- 2003 Channel Islands Marine Protected Areas Socioeconomic and Biological Monitoring Workshop, Channel Islands Marine Sanctuary
- 2003 2<sup>nd</sup> workshop on coupled socioeconomic and environmental dynamics in marine coastal ecosystems of Baja California
- 2004 Workshop on Predicting Population Consequences of Disturbance by Noise on Marine Mammals, US National Academy of Sciences
- 2008 Experts Forum on Scientific Principles for MPA Design, Applied Environmental Decision Analysis, University of Queensland

## **PROFESSIONAL SERVICE**

- 1993 Member, Organizing Committee for 7<sup>th</sup> annual meeting of the Southwestern Association of Biologists
- 1997-2000, 2002-04 Judge, Murray F. Buell & E. Lucy Braun Awards (Ecological Society of America's awards for outstanding student oral and poster presentations at the ESA annual meeting)
- 1998 Co-organizer, Symposium on "Intersection of diverse perspectives: results from creative collaborations in ecology" for Ecological Society of America annual meeting
- 2000-01 Member, Science Panel for the Marine Reserves Working Group at the Channel Islands National Marine Sanctuary
- 2002-present Member, Equid Specialist Group of the IUCN Species Survival Commission
- 2003 Member, Academic Program Review Committee, Dept. of Ecology and Evolutionary Biology, University of Arizona
- 2005-present Associate Editor, *Ecology* and *Ecological Monographs*
- 2006-09 Member, Science Advisory Board, National Center for Ecological Analysis and Synthesis

Reviewer for *American Naturalist*, *Animal Conservation*, *BioScience*, *Bulletin of Mathematical Biology*, *Conservation Biology*, *Ecological Applications*, *Ecological Modelling*, *Ecology*, *Ecology Letters*, *Evolution*, *Evolutionary Ecology Research*, *Journal of Animal Ecology*, *Journal of Applied Ecology*, *Journal of Mathematical Biology*, *Journal of Theoretical Biology*, *Mathematical Biosciences*, *Mathematical and Computer*

*Modelling*, *Oecologia*, *Oikos*, *Physica D*, *Physics Letters A*, *Plant Ecology*, *Proceedings of the National Academy of Sciences of the USA*, *Proceedings of the Royal Society of London B*, *Resource & Energy Economics*, *Risk Analysis*, *Theoretical Population Biology*, Sinauer Press, National Environment Research Council (UK), Natural Science Foundation, New South Wales Department of Environment and Climate Change (Australia).

## Major University Service

2005-06	Chair, Bren School Faculty Executive Committee
2006-07	Co-Chair, Search Committee for Director of Transportation and Parking Services
2006-08	Chair, Transportation Alternatives Board
2006-08	Member, Graduate Council
2009-10	Member, Chancellor's Sustainability Committee

## THESIS COMMITTEES

### Committee Chair

- Campopiano, M.T., C.M. Denn, E.D. Miller, S.D. Pratt, R.M. Smyk-Newton, and J.S. Yi. 2000. Enhancement alternatives for the Ocean Meadows golf course site, Goleta, California. M.E.S.M Thesis, 195 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara (D. A. Siegel, co-chair).
- Court, D.B., J.S. Glatzer, S.M. Hard, K.D. Keith, J.M. McDonald, and F. Ogushi. 2000. Prioritizing sites along the Santa Clara River for conservation of threatened and endangered species. M.E.S.M Thesis, 132 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara (C. D. Kolstad, co-chair).
- Aldrich, K.L., J.R. Curtis, and S.I. Drucker. 2001. Analysis of the ecological and economic impacts associated with the return of the sea otter to the Southern California Bight. M.E.S.M Thesis, 91 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara (C. McAusland, co-chair).
- Carson, T., A. Deweerd, S. Erickson, M. Hood, and C. Minton. 2002. Casmalia habitat restoration plan for the California red-legged frog & western spadefoot toad. M.E.S.M. Thesis, 198 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara (S. Kamieniecki, co-chair).
- Ayres, E., E. Knapp, S. Lieberman, J. Love, and K. Vodopals. 2003. Assessment of stressors on fall-run chinook salmon in Secret Ravine (Placer County). M.E.S.M. Thesis, 187 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara (C. McAusland, co-chair).
- Bierwagen, B.G.-M. 2003. Ecological and microevolutionary effects of urban land-use change on butterfly dispersal. Ph.D. Thesis, 381 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.
- Grant, J., J.P. Hardie, J. Mazza, and L. Rizo Patron. 2004. Developing a compliance monitoring framework for conservation easements: Case study – North Irvine Ranch. M.E.S.M. Thesis, 121 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.
- Boland, J.E., D.M. Cunningham, C.M. Danko, H.E. Imgrund, J.R. Kreitler, and J.A. Levine. 2005. Classifying sites in the Ventura hillsides for acquisition by the Ventura Hillsides Conservancy. M.E.S.M. Thesis, 71 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.

- Chan, A., A. Cundiff, N. Gardner, Y. Hrovat, L. Kircher, and C. Klein. 2006. Marine protected areas along California's central coast: A multicriteria analysis of network design. M.E.S.M. Thesis, 178 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.
- Althoen, E.J., E.J. Chasin, S. Kent, E.A. Kiyan, and S.A. Schliemann. 2007. Biology and management of non-native plant species in the Santa Monica Mountains National Recreation Area. M.E.S.M. Thesis, 153 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.
- Sullivan, M., G. J. Spence, E. Frost, C. Chen, and J. Anderson. 2008. Balancing Conservation and Commercial Fishing: Methods of Incorporating Socioeconomic Impacts in the Design of Marine Protected Areas in California. M.E.S.M. Thesis, 153 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.
- White, C. C. 2008. Population connectivity and the management of coastal fisheries. Ph.D. Thesis, 142 pp. Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara (W. W. Murdoch, co-chair).
- Wittmann, M. 2008. Recreational boating and the spread of aquatic invasive species in and around Lake Tahoe, CA-NV. Ph.D. Thesis. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.
- Berkley, H. A. 2009. Spatial and temporal patterns in modeling marine species. Ph.D. Thesis, 96 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara.

## **Committee Member**

- Donalson, D.D. 2000. Modeling complex interactions: theoretical ecology meets Pacman. Ph.D. Thesis, 147 pp. Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara (R. M. Nisbet, chair).
- Kellner, J.B. 2004. Spatial dynamics of marine reserves: the importance of fish movement and harvester redistribution. Ph.D. Thesis, 100 pp. Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara (R. M. Nisbet & S. Gaines, co-chairs).
- Killmer, A.B.C.S. 2004. The effect of civil society involvement on regulatory enforcement & environmental outcomes under a mixed pollution prevention policy. Ph.D. Thesis, 378 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara (A. A. Keller & C. A. Ramus, co-chairs).
- Anderson, K.E. 2004. The spatial population dynamic consequences of dispersal behavior: Case studies in aquatic and terrestrial systems. Ph.D. Thesis, 153 pp. Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara (R. M. Nisbet & S. Rothstein, co-chairs).
- Kaffine, D. T. 2007. Incomplete property rights and natural resource use. Ph.D. Thesis, 138 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara (C. Costello, chair).
- Singh, A. 2007. Modeling host-parasitoid dynamics. M.A. Thesis, 62 pp. Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara (R. M. Nisbet, chair).
- Springborn, M. R. 2008. Policies and processes of environmental risk. Ph.D. Thesis, 127 pp. Donald Bren School of Environmental Science and Management, University of California, Santa Barbara (C. Costello, chair).
- Beuneau, K. 2009. Ph.D. Thesis, XXX pp. Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara (R. M. Nisbet, chair).