

Curriculum Vitae

Hal Caswell

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Professor of Mathematical Demography
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Institute for Biodiversity and Ecosystem
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University of Amsterdam, Netherlands

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Born 27 April 1949

B.S. (with high honor), Michigan State University, 1971 (Zoology)

Ph.D., Michigan State University, 1974 (Zoology)

Professor of Mathematical Demography and Ecology, 2013-present, University of Amsterdam

Emeritus Research Scholar, 2014 - present, Woods Hole Oceanographic Institution

Senior Scientist, March 1988-2014, Woods Hole Oceanographic Institution

Associate Scientist, 1981-1988, Woods Hole Oceanographic Institution

Assistant to Associate Professor, 1975-1982, University of Connecticut

Research Associate, 1974-1975, Michigan State University

Honors and Awards

Advanced Grants from the European Research Council:

The formal demography of kinship and families (FORMKIN): 2018-2023

Individual stochasticity and population heterogeneity in plant and animal demography (INDSTOCH): 2013-2018

Distinguished Lorentz Fellowship 2019-2020, Netherlands Institute for Advanced Study in the Humanities and Social Sciences.

Rollie Lamberson Medal of the Resource Modeling Association, 2019.

Mindel C. Sheps Award for Mathematical Demography, 2014, Population Association of America

Fellow of Ecological Society of America; Elected 2014 for "distinguished contributions to the discipline"

Vice President and President, Evolutionary Demography Society, 2013-2015.
Honorary Professor of Biodemography, Institute of Biology, Southern Denmark University.
2013-present.
Research Fellowship Award of the Alexander von Humboldt Foundation (Germany) 2011-
2012.
Distinguished Brandt Memorial Lecturer, North Carolina State University, March 2009.
Distinguished Research Scholar, Max Planck Institute for Demographic Research, Rostock,
Germany 2008 – present.
Recipient of the first Per Brink Oikos Award, presented by the Swedish Oikos Society in
February 2008.
US Department of Interior Unit Citation Award for Excellence of Service, International Polar
Bear Science Team, 2007.
Recipient of the 2007 Ecological Research Award from the Ecological Society of Japan.
ISI Highly Cited Researcher in Ecology/Environment, Thomson Scientific, 2007.
Certified Senior Ecologist, Ecological Society of America.
Fellow of the Ocean Life Institute, Woods Hole Oceanographic Institution, 2006-2009.
Maclaurin Fellowship, New Zealand Institute of Mathematics and its Applications, 2003.
Fellow of the American Academy of Arts and Sciences; Elected 2000.
Robert W. Morse Chair for Excellence in Oceanography, Woods Hole Oceanographic
Institution, 2000 - 2005.
John Simon Guggenheim Memorial Fellowship, 1989-1990.
Fellow of the American Association for the Advancement of Science; Elected 1985,
Winner, 1992 Annual Prize for Best Scientific Paper in Biological Sciences, National
Council for Scientific and Technological Investigation (CONICIT), Venezuela.
Vice-Chairman (1995-1996) and Chairman (1996-1997), Theoretical Ecology Section,
Ecological Society of America.
Editor, *Advances in Ecological Research*, 2000 – 2007.
Board of Editors, *Ecology and Ecological Monographs*, 1987-1990.

Member: Ecological Society of America; Population Association of America, Evolutionary
Demography Society, Dutch Society for Theoretical Biology (NVTB), Netherlands
Demographic Society (NVD), Interdisciplinary Association for Population Health
Science.

Visiting and Honorary Appointments

Honorary Professor of Biodemography, University of Southern Denmark, Odense, Denmark.
May 2013 – present.
Distinguished Research Scholar, Max Planck Institute for Demographic Research, Rostock,
Germany. January 2008 – present.
Maclaurin Fellow, New Zealand Institute of Mathematics and its Applications, University of
Auckland, December 2003 – March 2004
Visiting Fellow, Institute for Mathematics and its Applications, University of Minnesota, 1-
30 April 1999.

Japan Society for Promotion of Science Invitational Fellowship for Research in Japan, June 1996.

Visiting Fellow, Center for Applied Mathematics, Cornell University, June-July 1993

Visiting Scientist, Laboratory of Theoretical Biology, Department of Biophysics, Kyoto University, Japan. November 1992.

Visiting Lecturer, Estacion Biologica de Donana, Sevilla, Spain, November 1991

Lecturer, Third Autumn Course on Mathematical Ecology, Trieste, Italy, October 1990

Visiting Professor, Dept. of Biology, Universidad de los Andes, Venezuela, September 1989

Distinguished Visiting Professor, Dept. of Biology, University of Miami, February 1989

Science Alliance Visiting Professor of Mathematics and Ecology, University of Tennessee, January-April 1987

Sloan Foundation Distinguished Lecturer in Demography, University of California, Berkeley, March 1986

Visiting Lecturer in Quantitative Ecology, W. K. Kellogg Biological Station, Michigan State University, July 1985

Research Associate, University of California, Berkeley, 1980-1981

Visiting Faculty, OTS 80-3, Tropical Biology, Costa Rica, Summer 1980

Visiting Professor, Washington State University (Pure and Applied Mathematics), May 1978

Visiting Lecturer, University of Texas (Zoology), January 1975

PUBLICATIONS

Papers submitted:

- a) **Caswell, H.** and S. F. van Daalen. Healthy longevity from incidence-based models: More kinds of health than stars in the sky.

Papers in press:

- a) van Daalen, S. F. and **H. Caswell**. Demographic sources of variance in fitness. To appear in *Human Evolutionary Demography*, ed. Rebecca Sear, Oskar Burger, and Ronald Lee. Open Book Publishers (in press)
- b) Vindenes, Y., C. Le Couer, and **H. Caswell**. Introduction to matrix population models. To appear in *Demographic Methods Across the Tree of Life*, ed. R. Salguero-Gomez and M. Gamelon. Oxford University Press (in press).

Preprints:

- a) Jenouvrier, S., L. Aubrey, S. F. van Daalen, C. Barbraud, H. Weimerskirch, and **H. Caswell**. 2019. When the going gets tough, the tough get going: effect of extreme climate on an Antarctic seabird's life history. bioRxiv preprint. <http://dx.doi.org/10.1101/791855>
- b) Hernandez, C. M., S.F. van Daalen, **H. Caswell**, M.G. Neubert, and K.E. Gribble. 2019. Maternal effect senescence and fitness: A demographic analysis of a novel model organism. bioRxiv preprint <http://dx.doi.org/10.1101/847640>.
- c) **Caswell, H.** 2020. The formal demography of kinship II: Multistate models, parity, and sibship. bioRxiv preprint <https://doi.org/10.1101/2020.03.23.003848>

Books:

2019. **Caswell, H.** *Sensitivity Analysis: Matrix Methods in Demography and Ecology*. Demographic Research Monographs. Springer Nature.
- 2005a. Keyfitz, N. and **H. Caswell**. *Applied Mathematical Demography*. Third edition. Springer-Verlag, New York, NY. 555pp.
- 2005f. **Caswell, H.** (ed.) *Food Webs: From Connectivity to Energetics*. Advances in Ecological Research 36. Elsevier Academic Press, San Diego, California. 194pp.
- 2001a. **Caswell, H.** *Matrix Population Models: Construction, Analysis, and Interpretation*. Second edition. Sinauer Associates, Sunderland MA. 722pp.
- 1997a. Tuljapurkar, S. and **H. Caswell** (eds.). *Structured Population Models in Marine, Terrestrial and Freshwater Systems*. Chapman and Hall, New York. 643pp.
- 1989a **Caswell, H.** *Matrix Population Models: Construction, Analysis, and Interpretation*. Sinauer Associates, Sunderland, MA. 328 pp.

All publications, reverse chronological order:

- 2020a. van Daalen, S.F. and **H. Caswell**. Variance as a life history outcome: Sensitivity analysis of the contributions of stochasticity and heterogeneity. *Ecological Modelling* 147: 108856. <https://doi.org/10.1016/j.ecolmodel.2019.108856>
- 2020b. de Vries, C., R. A. Desharnais, and **H. Caswell**. A matrix model for density-dependent selection in stage-classified populations, with application to pesticide resistance in *Tribolium*. *Ecological Modelling* 416:108875 <https://doi.org/10.1016/j.ecolmodel.2019.108875>
- 2020c. **Caswell, H.** The formal demography of kinship II: Multistate models, parity, and sibship. *Demographic Research* 42: 1097-1144. DOI: 10.4054/DemRes.2020.42.38
- 2020d. Hernandez, C.M., S.F. van Daalen, **H. Caswell**, M.G. Neubert, and K.E. Gribble. A demographic and evolutionary analysis of maternal effect senescence. *Proceedings of the National Academy of Sciences USA*. www.pnas.org/cgi/doi/10.1073/pnas.1919988117
- 2019a. Ackleh, A., **H. Caswell**, R. Chiquet, T. Tang, and A. Veprauskas. Sensitivity analysis of the recovery time for a population under the impact of an environmental disturbance. *Natural Resource Modeling* 32:e12166. doi: 10.1111/nrm.12166
- 2019b. de Vries, C. and **H. Caswell**. Stage-structured evolutionary demography: linking life histories, population genetics, and ecological dynamics. *American Naturalist* 193:545-559.
- 2019c. Reimer, J. R., **Caswell, H.**, Derocher, A. E., Lewis, M. A. Ringed seal demography in a changing climate. *Ecological Applications*. Online e01855
- 2019d. Seaman, R., T. Riffe, and **H. Caswell**. The changing contribution of area-level deprivation to total variance in age at death: A population-based decomposition analysis. *BMJ Open* 9:e024952
- 2019e. **Caswell, H.** *Sensitivity Analysis: Matrix Methods in Demography and Ecology*. Demographic Research Monographs. Springer Nature.

- 2019f. de Vries, C. and **H. Caswell**. Selection in two-sex stage-structured populations: genetics, demography, and polymorphism. *Theoretical Population Biology* 130:160-169. <https://doi.org/10.1016/j.tpb.2019.07.012>.
- 2019g. **Caswell, H.** The formal demography of kinship: A matrix formulation. *Demographic Research* 41:679-712.
- 2019h. Jenouvrier S., Holland, M., Iles, D., Labrousse, S., Landrum, L., Garnier, J., **Caswell, H.**, Weimerskirch, H., LaRue, M., Ji, R., Barbraud, C. The Paris Agreement objectives will likely halt future declines of emperor penguins. *Global Change Biology* 00:1-15. DOI 10.1111/gcb.14864
- 2018a. Roth, G. and **H. Caswell**. Occupancy time in sets of states for demographic models. *Theoretical Population Biology* 120:62-77.
- 2018b. Needham, J., C. Merow, C-H. Chang-Yang, **H. Caswell**, and S. McMahon. A cross-scale demographic approach to forest dynamics. *Proceedings of the Royal Society B* (online) doi: 10.1098/rspb.2017.2050
- 2018c. Jenouvrier, S., L. Aubry, C. Barbraud, H. Weimerskirch, and **H. Caswell**. Interacting effects of unobserved heterogeneity and individual stochasticity in the life history of the southern fulmar. *Journal of Animal Ecology* 87:212-222. DOI: 10.1111/1365-2656.12752.
- 2018d. Shyu, E. and **H. Caswell**. Matings, births, and transitions: a new two-sex matrix model for evolutionary demography. *Population Ecology* 60:21-36.
- 2018e. Hartemink, N. and **H. Caswell**. Variance in animal longevity: contributions of heterogeneity and stochasticity. *Population Ecology* 60:89-99.
- 2018f. **Caswell, H.** and V. Zarulli. Matrix methods in health demography: a new approach to the stochastic analysis of healthy longevity and DALYs. *Population Health Metrics* 16:8 doi.org/10.1186/s12963-018-0165-5
- 2018g. **Caswell, H.** and Y. Vindenes. Demographic variance in heterogeneous populations: Matrix models and sensitivity analysis. *Oikos* 127:648-663.
- 2018h. Hamel, S., Gaillard, J-M, Yoccoz, N. G., Bassar, R., Bouwhuis, S, **Caswell, H.**, Douhard, M., Gangloff, E., Gimenez, O., Lee, P., Smallegange, I. M., Steiner, U., Vedder, O., and Vindenes, Y. Moving forward on individual heterogeneity. *Oikos* 127:750-756.
- 2018i. Jenouvrier, S. M. Desprez, R. Fay, C. Barbraud, H. Weimerskirch, K. Delord, and **H. Caswell**. Climate change and functional traits impact population dynamics of a long-lived seabird. *Journal of Animal Ecology* 87:906-920. DOI: 10.1111/1365-2656.12827
- 2018j. **Caswell, H.**, C. de Vries, N. Hartemink, G. Roth, and S. F. van Daalen. Age x stage-classified demography: a comprehensive approach. *Ecological Monographs* 88:560-584.
- 2018k. de Vries, C. and **H. Caswell**. Demography when history matters: construction and analysis of second-order matrix population models. *Theoretical Ecology* 11:129-140.
- 2017a. Hartemink, N., T.I. Missov, and **H. Caswell**. Stochasticity, heterogeneity, and variance in longevity in human populations. *Theoretical Population Biology* 114:107-117.

- 2017b. Oli, M., J. Loughry, **H. Caswell**, C. Perez-Heydrich, C. McDonough, and R. Truman. Dynamics of leprosy in Nine-Banded Armadillos: Net reproductive number and effects on host population dynamics. *Ecological Modelling* 350:100-108.
- 2017c. **Caswell, H.** and E. Shyu. Senescence, selection gradients, and mortality. pp. 56-82 in *The Evolution of Senescence in the Tree of Life*. R.P. Shefferson, O.R. Jones, and R. Salguero-Gomez (editors). Cambridge University Press, Cambridge, UK.
- 2017e. Ackleh, A., R.A. Chiquet, B. Ma, T. Tang, **H. Caswell**, and N. Sidorovskaia. Analysis of the impact of environmental disasters on sperm whales using stochastic modeling. *Ecotoxicology* 26:820-830.
- 2017f. Smallegange, I., **H. Caswell**, M.E.M. Toorians, and A.M. de Roos. Mechanistic description of population dynamics using dynamic energy budget theory incorporated into integral projection models. *Methods in Ecology and Evolution* 8:146-154.
- 2017g. Wensink, M. J., **H. Caswell**, and A. Baudisch. The rarity of survival to old age does not drive the evolution of senescence. *Evolutionary Biology* 44:5-10. DOI 10.1007/s11692-016-9385-4
- 2016a. Salguero-Gomez, R., 20 co-authors, **H. Caswell***, and J.W. Vaupel*. [*=joint senior authors]. COMADRE: A global database of animal demography. *Journal of Animal Ecology* 85:371-384.
- 2016b. Shyu, E. and **H. Caswell**. A demographic model for sex ratio evolution and the effects of sex-biased offspring costs. *Ecology and Evolution* 6:1470-1492. doi: 10.1002/ece3.1902
- 2016c. Shyu, E. and **H. Caswell**. Frequency-dependent two-sex models: a new approach to sex ratio evolution with multiple maternal conditions. *Ecology and Evolution* 6:6855-6879. doi: 10.1002/ece3.2202
- 2016d. Koons, D.N., D.T. Iles, M. Schaub, and **H. Caswell**. A life history perspective on the demographic drivers of structured population dynamics in changing environments. *Ecology Letters* 19:1023-1031.
- 2016e. Roth, G. and **H. Caswell**. Hyperstate matrix models: extending demographic state spaces to higher dimensions. *Methods in Ecology and Evolution* 7:1438-1450. doi: 10.1111/2041-210X.12622
- 2016f. **Caswell, H.** and S. van Daalen. A note on the vec operator applied to unbalanced block matrices. *Journal of Applied Mathematics (online)* Volume 2016, Article ID 4590817. doi 10.1155/2016/4590817
- 2015a. **Caswell, H.** and F. A. Kluge. Demography and the statistics of lifetime economic transfers under individual stochasticity. *Demographic Research* 32:563-588.
- 2015b. Salguero-Gomez, R., **H. Caswell**, and 33 co-authors. The COMPADRE Plant Matrix Database: an open online repository for plant demography. *Journal of Ecology* 103:202-218.
- 2015c. van Daalen, S. and **H. Caswell**. Lifetime reproduction and the second demographic transition: Stochasticity and individual variation. *Demographic Research* 33:561-588.
- 2015d. **Caswell, H.** and N. Sanchez Gassen. The sensitivity analysis of population projections. *Demographic Research* 33:801-840.

- 2014a. Jones, O., A. Scheuerlein, R. Salguero-Gomez, C.G. Camarda, R. Schaible, B. Casper, J.P. Dahlgren, J. Ehrlén, M.B. Garcia, E. Menges, P.F. Quintana-Ascencio, **H. Caswell**, A. Baudisch, and J. Vaupel. Diversity of aging across the tree of life. *Nature* 505:169-173. (published online 2013).
- 2014b. Engelman, M., **H. Caswell**, and E. M. Agree. Why do lifespan variability trends for the young and old diverge? A perturbation analysis. *Demographic Research* 48:1367-1396.
- 2014c. Shyu, E. and **H. Caswell**. Calculating second derivatives of population growth rates for ecology and evolution. *Methods in Ecology and Evolution* 5:473-482.
- 2014d. Jenouvrier, S., M. Holland, J. Stroeve, M. Serreze, C. Barbraud, H. Weimerskirch, and **H. Caswell**. Climate change and continent-wide declines of the emperor penguin. *Nature Climate Change* 4:715-718. doi:10.1038/nclimate2280.
- 2014e. **Caswell, H.** A matrix approach to the statistics of longevity in heterogeneous frailty models. *Demographic Research* 31:553-592. doi: 10.4054/DemRes.2014.31.19
- 2013a. **Caswell, H.** Sensitivity analysis of discrete Markov chains via matrix calculus. *Linear Algebra and its Applications* 438:1727-1745. doi:10.1016/j.laa.2011.07.046 (published online 2011).
- 2013b. **Caswell, H.** and R. Salguero-Gomez. Age, stage, and senescence in plants. *Journal of Ecology* 101:585-595. doi: 10.1111/1365-2745.12088
- 2013c. van Raalte, A. and **H. Caswell**. Perturbation analysis of indices of lifespan variability. *Demography* 50:1615--1640.
- 2013d. Shyu, E., E. Pardini, T. Knight, and **H. Caswell**. A seasonal, density-dependent model for the management of an invasive weed. *Ecological Applications* 23:1893-1905.
- 2012a. Jenouvrier, S., M. Holland, J. Stroeve, C. Barbraud, H. Weimerskirch, M. Serreze, and **H. Caswell**. Effects of climate change on an emperor penguin population: analysis of coupled demographic and climate models. *Global Change Biology* 18:2756-2770. doi: 10.1111/j.1365-2486.2012.02744.x.
- 2012b. **Caswell, H.** and E. Shyu. Sensitivity analysis of periodic matrix population models. *Theoretical Population Biology*. 82:329-339.
- 2012c. **Caswell, H.** Matrix models and sensitivity analysis of populations classified by age and stage: a vec-permutation matrix approach. *Theoretical Ecology* 5:403-417. DOI 10.1007/s12080-011-0132-2 (published online 2011)
- 2012d. Strasser, C.A., M.G. Neubert, **H. Caswell**, and C.M. Hunter. Contributions of high and low quality patches to a metapopulation with stochastic disturbance. *Theoretical Ecology* 5:167-179. doi 10.1007/s12080-010-0106-9 (published online 2010).
- 2011a. **Caswell, H.** Beyond R_0 : Demographic calculation of variability in lifetime reproductive output. *PLoS ONE* 6(6): e20809. doi:10.1371/journal.pone.0020809
- 2011b. **Caswell, H.** Perturbation analysis of continuous-time absorbing Markov chains. *Numerical Linear Algebra with Applications* 18:901-917. doi:10.1002/nla.791
- 2011c. Klepac, P. and **H. Caswell**. The stage-structured epidemic: a multi-state matrix population model approach. *Theoretical Ecology* 4:301-319 (published online 2010).

- 2011d. **Caswell, H.**, M.G. Neubert and C.M. Hunter. Demography and dispersal: invasion speeds and sensitivity analysis in periodic and stochastic environments. *Theoretical Ecology* 4:407-421. DOI 10.1007/s12080-010-0091-z (published online 2010).
- 2010a. **Caswell, H.** Life table response experiment analysis of the stochastic growth rate. *Journal of Ecology* 98:324-333.
- 2010b. Jenouvrier, S., **H. Caswell**, C. Barbraud, and H. Weimerskirch. Mating behavior, population growth and the operational sex ratio: a periodic two-sex model approach. *American Naturalist* 175:739-752.
- 2010c. **Caswell, H.** Reproductive value, the stable stage distribution, and the sensitivity of the population growth rate to changes in vital rates. *Demographic Research* 23:531-548. DOI:10.4054/DemRes.2010.23.19
- 2010d. Hunter, C.M., **H. Caswell**, M.C. Runge, E.V. Regehr, S.C. Amstrup, and I. Stirling. Climate change threatens polar bear populations: a stochastic demographic analysis. *Ecology* 91:2883-2898.
- 2010e. Cooch, E.G., E. Cam, and **H. Caswell**. Incorporating 'recruitment' in matrix projection models: estimation, parameters, and the influence of model structure. *Journal of Ornithology* DOI 10.1007/s10336-010-0573-1
- 2009a. Hunter, C.M. and **H. Caswell**. Rank and redundancy of multistate mark-recapture models for seabird populations with unobservable states. *Modeling Demographic Processes in Marked Populations*. D. Thomson, E.G. Cooch, and M.J. Conroy (editors). *Ecological and Environmental Statistics* 3:797-825.
- 2009b. Knight, T., **H. Caswell**, and S. Kalisz. Population growth rate of a common understory herb decreases non-linearly across a gradient of deer herbivory. *Forest Ecology and Management* 257:1095-1103.
- 2009c. Jenouvrier, S., **H. Caswell**, C. Barbraud, M. Holland, J. Stroeve, and H. Weimerskirch. Demographic models and IPCC climate projections predict the decline of an emperor penguin population. *Proceedings of the National Academy of Sciences* 106:1844-1847.
- 2009d. Aberg, P., C.J. Svensson, **H. Caswell**, and H. Pavia. Environment-specific elasticity and sensitivity analysis of the stochastic growth rate. *Ecological Modelling* 220:605-610.
- 2009e. **Caswell, H.** Sensitivity and elasticity of density-dependent population models. *Journal of Difference Equations and Applications* 15:349-369.
- 2009f. Lawler, R.L., **H. Caswell**, A.F. Richard, J. Ratsirarson, R.E. Dewar, and M. Schwartz. Population dynamics of Verreaux's sifaka in a stochastic rainfall environment. *Oecologia* 161:491-504.
- 2009g. Amstrup, S.C., **H. Caswell**, E. DeWeaver, I. Stirling, D.C. Douglas, B.G. Marcot, and C.M. Hunter. Rebuttal of "Polar bear population forecasts: a public-policy forecasting audit." *Interfaces* 39:353-369.
- 2009h. Jenouvrier, S., C. Barbraud, H. Weimerskirch, and **H. Caswell**. Limitation of population recovery: a stochastic approach to the case of the emperor penguin. *Oikos* 118:1298-1298.
- 2009i. Neubert, M.G., **H. Caswell**, and A.R. Solow. Detecting reactivity. *Ecology* 90:2683-2688.

- 2009j. Regehr, E.V., C.M. Hunter, **H. Caswell**, S.C. Amstrup, and I. Stirling. Survival and breeding of polar bears in the southern Beaufort Sea in relation to sea ice. *Journal of Animal Ecology* doi: 10.1111/j.1365-2656.2009.01603.x
- 2009k. **Caswell, H.** Stage, age, and individual stochasticity in demography. The Per Brinck Oikos Award Lecture 2008. *Oikos* 118:1763-1782.
- 2008a. Ripley, B.D. and **H. Caswell**. Contributions of growth, survival, and reproduction to fitness in brooding and broadcast spawning marine bivalves. *Population Ecology* 50:207-214.
- 2008b. **Caswell, H.** Perturbation analysis of nonlinear matrix population models. *Demographic Research* 18:59-116.
- 2008c. Verdy, A. and **H. Caswell**. Sensitivity analysis of reactive ecological dynamics. *Bulletin of Mathematical Biology* 70:1634-1659.
- 2007a. **Caswell, H.** Sensitivity analysis of transient population dynamics. *Ecology Letters* 10:1-15.
- 2007b. Chen, J., D. Senturk, J.L. Wang, H.G. Muller, J.R. Carey, **H. Caswell**, and E.P. Caswell-Chen. A demographic analysis of the fitness cost of extended longevity in *Caenorhabditis elegans*. *Journal of Gerontology: Biological Sciences* 62A:126-135.
- 2007c. **Caswell, H.** Extrinsic mortality and the evolution of senescence. *Trends in Ecology and Evolution* 22:173-174.
- 2007d. **Caswell, H.** Evolutionary demography: the invasion exponent and the effective population density in nonlinear matrix models. pp. 237-256 in N. Rooney, K.S. McCann and D. L.G. Noakes (eds.) *From energetics to ecosystems: the dynamics and structure of ecological systems*. Springer, Dordrecht.
- 2007e. Regehr, E.V., C.M. Hunter, **H. Caswell**, S.C. Amstrup, and I. Stirling. Polar bears in the southern Beaufort Sea I: Survival and breeding in relation to declining sea ice, 2001-2006. U.S. Geological Survey Administrative Report (peer-reviewed and publicly released; http://www.usgs.gov/newsroom/special/polar_bears/docs/regehr.pdf). 50 pp.
- 2007f. Hunter, C.M., **H. Caswell**, M.C. Runge, E.V. Regehr, S.C. Amstrup, and I. Stirling. Polar bears in the southern Beaufort Sea II: Demography and population growth in relation to sea ice conditions. U.S. Geological Survey Administrative Report (peer-reviewed and publicly released; http://www.usgs.gov/newsroom/special/polar_bears/docs/hunter.pdf). 51 pp.
- 2007g. Klanjscek, T., R.M. Nisbet, **H. Caswell**, and M.G. Neubert. A model for energetics and accumulation in marine mammals with application to the right whale. *Ecological Applications* 17:2233-2250.
- 2006a. Ripley, B.J. and **H. Caswell**. Recruitment variability and stochastic population growth of the soft-shell clam *Mya arenaria*. *Ecological Modelling* 193:517-530.
- 2006b. Kawasaki, K., F. Takasu, **H. Caswell**, and N. Shigesada. How does stochasticity in colonization accelerate the speed of invasion in a cellular automaton model? *Ecological Research* 21:334-345.
- 2006c. Lewis, M.A., M.G. Neubert., **H. Caswell**, J.S. Clark, and K. Shea. A guide to calculating discrete-time invasion rates from data. pp. 169-192 in M.W. Cadotte, S.M. McMahon, and T. Fukami (editors), *Conceptual ecology and invasion biology: reciprocal approaches to nature*. Springer, Dordrecht, Netherlands.

- 2006d. **Caswell, H.** Applications of Markov chains in demography. pp. 319-334 in A.N. Langville and W.J. Stewart (editors), *MAM2006: Markov Anniversary Meeting*. Bosen Books, Raleigh, North Carolina, USA.
- 2006e. Fujiwara, M., K. Anderson, M.G. Neubert, and **H. Caswell**. On the estimation of dispersal kernels from individual mark-recapture data. *Environmental and Ecological Statistics* 13:183-197.
- 2006f. Klanjscek, T., **H. Caswell**, M.G. Neubert, and R.M. Nisbet. Integrating dynamic energy budget models into matrix population models. *Ecological Modelling* 196:407-420.
- 2006g. Chen, J., E.E. Lewis, J.R. Carey, **H. Caswell**, and E. P. Caswell-Chen. The ecology and biodemography of *Caenorhabditis elegans*. *Experimental Gerontology* 41:1059-1065.
- 2005a. Keyfitz, N. and **H. Caswell**. *Applied Mathematical Demography*. Third edition. Springer-Verlag, New York.
- 2005b. **Caswell, H.** Sensitivity analysis of the stochastic growth rate: three extensions. *Australian and New Zealand Journal of Statistics* 47:75-85.
- 2005c. Smith, M., **H. Caswell**, and P. Mettler-Cherry. Stochastic flood and precipitation regimes and the population dynamics of a threatened floodplain plant. *Ecological Applications* 15:1036-1052.
- 2005d. **Caswell, H.** and M. Neubert. Reactivity and transient dynamics of discrete-time ecological systems. *Journal of Difference Equations and Applications* 11:295-310.
- 2005e. Hunter, C.M. and **H. Caswell**. Selective harvest of sooty shearwater chicks: effects on population dynamics and sensitivity. *Journal of Animal Ecology* 74:589-600.
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