

# Curriculum Vitae

## Hal Caswell

29 November 2019

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

Emeritus Research Scholar  
Biology Department  
Woods Hole Oceanographic Institution  
Woods Hole, MA 02543-1049  
USA

PO Box 94240  
1090 GE Amsterdam  
The Netherlands

+1 (508) 289-2751  
[hcaswell@whoi.edu](mailto:hcaswell@whoi.edu)

+31 (0)20 525 8574  
[h.caswell@uva.nl](mailto:h.caswell@uva.nl)

ORCID ID:  
[orcid.org/0000-0003-4394-6894](https://orcid.org/0000-0003-4394-6894)

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:

### 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.
- b) van Daalen, S.F. and H. Caswell. Accounting for heterogeneity: the sensitivity of demographic variance components. *Ecological Modelling* (in press)
- c) 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* (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>

### 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:**

- 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*. Online <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. Ehrlen, 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. Strøve, 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* 5:167-179l. 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](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](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*. Boson 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.
- 2005f. **Caswell, H.** (ed.) *Food Webs: From Connectivity to Energetics*. Advances in Ecological Research 36. Elsevier Academic Press, San Diego, California.
- 2005g. Kraus, S.D., M.W. Brown, **H. Caswell**, C.W. Clark, M. Fujiwara, P.K. Hamilton, R. D. Kenney, A.R. Knowlton, S. Landry, C.A. Mayo, W.A. McLellan, M.J. Moore, D.P. Nowacek, D. A. Pabst, A.J. Read, R.M. Rolland. North Atlantic right whales in crisis. *Science* 309:561-562.
- 2005h. Hunter, C.M. and **H. Caswell**. The use of the vec-permutation matrix in spatial matrix population models. *Ecological Modelling* 188:15-21.
- 2004a. Freville, H., B. Colas, M. Riba, **H. Caswell**, A. Mignot, E. Imbert, and I. Olivieri. Spatial and temporal demographic variability in the endemic plant species *Centaurea corymbosa* (Asteraceae). *Ecology* 85:694-703.
- 2004b. **Caswell, H.**, T. Takada, and C.M. Hunter. Sensitivity analysis of equilibrium in density-dependent matrix population models. *Ecology Letters* 7:380-387.
- 2004c. **Caswell, H.** and T. Takada. Elasticity analysis of density-dependent matrix population models: the invasion exponent and its substitutes. *Theoretical Population Biology* 65:401-411.
- 2004d. Hill, M.F., J.D. Witman, and **H. Caswell**. A Markov chain model of a rocky subtidal community: succession and species interactions in a complex assemblage. *American Naturalist* 164:E46-E61.
- 2004e. Neubert, M.G., T. Klanjscek, and **H. Caswell**. Reactivity and transient dynamics of food web and predator-prey models. *Ecological Modelling* 179:29-38.
- 2004f. **Caswell, H.** and M. Fujiwara. Beyond survival estimation: mark-recapture, matrix population models, and population dynamics. *Animal Biodiversity and Conservation* 27:471-488.
- 2003a. Lesnoff, M., P. Ezanno, and **H. Caswell**. Sensitivity analysis in periodic matrix models: a postscript to Caswell and Trevisan. *Applied Mathematics Letters: Mathematical and Computer Modelling* 37:945-948.
- 2003b. **Caswell, H.**, R. Lensink, and M. G. Neubert. Demography and dispersal: comparing invasion speeds using Life Table Response Experiments. *Ecology* 84:1968-1978.
- 2003c. **Caswell, H.** Review of Kot, M. *Elements of mathematical ecology*. 2001. Cambridge University Press. *Quarterly Review of Biology* 78:251-252.
- 2003d. **Caswell, H.** Models, experiments, and chaos. A review of Cushing, J.M., R.F. Costantino, B. Dennis, R.A. Desharnais, and S.M. Henson. 2003. *Chaos in ecology*. Academic Press. *Ecology* 84:2804-2805.
- 2002a. **Caswell, H.** Matrix population models. *Encyclopedia of Environmetrics* 3:1228-1229. Wiley, New York.

- 2002b. Neubert, M.G., **H. Caswell**, and J.D. Murray. Transient dynamics and pattern formation: reactivity is necessary for Turing instability. *Mathematical Biosciences* 175:1-11.
- 2002c. Bullock, J.M., I.L. Moy, R.F. Pywell, S.J. Coulson, A.M. Nolan, and **H. Caswell**. Plant dispersal and colonization processes at local and landscape scales. pp. 279-302 in J.M. Bullock, R. Kenward, and R. Hailes (eds.) *Dispersal Ecology*. Blackwell, Oxford, United Kingdom.
- 2002d. Hill, M.F., J.D. Witman and **H. Caswell**. Spatio-temporal variation in Markov chain models of subtidal community succession. *Ecology Letters* 5:665-675.
- 2002e. Harding, K.C., T. Harkonen, and **H. Caswell**. The 2002 European seal plague: epidemiology and population consequences. *Ecology Letters* 5:727-732.
- 2002f. Fujiwara, M. and **H. Caswell**. Estimating population projection matrices from multi-stage mark-recapture data. *Ecology* 83:3257-3265
- 2002g. Fujiwara, M. and **H. Caswell**. A general approach to temporary emigration in mark-recapture analysis. *Ecology* 83:3266-3275
- 2001a. **Caswell, H.** *Matrix Population Models: Construction, Analysis, and Interpretation*. Second edition. Sinauer Associates, Sunderland MA.
- 2001b. Hill, M.F. and **H. Caswell**. The effects of habitat destruction in finite landscapes: a chain-binomial metapopulation model. *Oikos* 93:321-331.
- 2001c. **Caswell, H.** and T. Kaye. Stochastic demography and conservation of *Lomatium bradshawii* in a dynamic fire regime. *Advances in Ecological Research* 32:1-51
- 2001d. **Caswell, H.** Remarks on behalf of Biological Sciences, Induction Ceremony, American Academy of Arts and Sciences. *Bulletin of the American Academy of Arts and Sciences* 54:47-52 (Winter 2001).
- 2001e. Fujiwara, M. and **H. Caswell**. Demography of the endangered North Atlantic right whale. *Nature* 414:537-541.
- 2000a. **Caswell, H.** Prospective and retrospective perturbation analyses and their use in conservation biology. *Ecology* 81:619-627.
- 2000b. Heppell, S.S., **H. Caswell**, and L.B. Crowder. Life histories and elasticity patterns: perturbation analysis for species with minimal demographic data. *Ecology* 81:654-665.
- 2000c. **Caswell, H.**, S. Brault, J.-D. Lebreton, M. Neubert, R. Sibly, T. Takada, and S. Tuljapurkar. No inconsistencies in sensitivity analysis. *Trends in Ecology and Evolution* 15:204.
- 2000d. Neubert, M.G. and **H. Caswell**. Demography and dispersal: calculation and sensitivity analysis of invasion speed for structured populations. *Ecology* 81:1613-1628.
- 2000e. Neubert, M.G. and **H. Caswell**. Density-dependent vital rates and their population dynamic consequences. *Journal of Mathematical Biology* 43:103-121.
- 2000f. **Caswell, H.** Life table response experiments in ecotoxicology. Pp. 43-55 in J. Kammenga and R. Laskowski (editors) *Demography in Ecotoxicology*. Wiley, New York, New York, USA.
- 2000g. Guardia, R., J. Raventos and **H. Caswell**. Spatial growth and population dynamics of a perennial grass (*Achnatherum calamagrostis*) in a badland area. *Journal of Ecology* 88:950-963.

- 1999a. Barbeau, M.A. and **H. Caswell**. A matrix model for short-term dynamics of seeded populations of sea scallops. *Ecological Applications* 9:266-287.
- 1999b. **Caswell, H.**, M. Fujiwara, and S. Brault. Declining survival probability threatens the North Atlantic right whale. *Proceedings of the National Academy of Sciences, USA*.96:3308-3313.
- 1999c. Hill, M. F. and **H. Caswell**. Habitat fragmentation and extinction thresholds on fractal landscapes. *Ecology Letters* 2:121-127.
- 1999d. **Caswell, H.** and R. Etter. Cellular automaton models for competition in patchy environments: facilitation, inhibition, and tolerance. *Bulletin of Mathematical Biology* 61:625-649.
- 1998a. **Caswell, H.** Entries for *Elasticity analysis, Generation time, Lefkovich matrix, Leslie matrix, Malthusian parameter, Population projection matrix, Reproductive value, Residual reproductive value, Sensitivity analysis, Situational sensitivity, Size distribution, Stage distribution* in P. Calow (editor) *The Encyclopedia of Ecology and Environmental Management*. Blackwell Science, Oxford, UK.
- 1998b. Pineda, J. and **H. Caswell**. Bathymetric species-diversity patterns and boundary constraints on vertical range distributions. *Deep-Sea Research II* 45:83-101.
- 1998c. **Caswell, H.** and M. Neubert. Chaos and density-dependent closure terms in planktonic food web models. *Journal of Plankton Research* 20:1837-1845.
- 1998d. **Caswell, H.**, S. Brault, A. Read and T. Smith. Harbor porpoise and fisheries: an uncertainty analysis of incidental mortality. *Ecological Applications* 8:1226-1238.
- 1997a. Tuljapurkar, S. and **H. Caswell** (eds.). *Structured Population Models in Marine, Terrestrial and Freshwater Systems*. Chapman and Hall, New York. 643pp.
- 1997b. **Caswell, H.**, A. DeRoos, R. Nisbet, and S. Tuljapurkar. Structured population models: many methods, a few general principles. pp. 3-18 in Tuljapurkar, S. and H. Caswell, (editors). *Structured Population Models in Marine, Terrestrial and Freshwater Systems*. Chapman and Hall, New York.
- 1997c. **Caswell, H.** Methods of matrix population analysis. pp. 19-58 in Tuljapurkar, S. and H. Caswell, (editors). *Structured Population Models in Marine, Terrestrial and Freshwater Systems*. Chapman and Hall, New York.
- 1997d. Horvitz, C., D. Schemske, and **H. Caswell**. The "importance" of life history stages to population growth: prospective and retrospective analyses. pp. 247-272 in Tuljapurkar, S. and H. Caswell, (editors). *Structured Population Models in Marine, Terrestrial and Freshwater Systems*. Chapman and Hall, New York.
- 1997e. Pascual, M. and **H. Caswell**. From the cell cycle to population cycles in phytoplankton-nutrient interactions. *Ecology* 78:897-912.
- 1997f. Neubert, M. and **H. Caswell**. Alternatives to resilience for measuring the response of ecological systems to perturbation. *Ecology* 78:653-665.
- 1997g. Takada, T. and **H. Caswell**. Optimal size at maturity in size-structured populations. *Journal of Theoretical Biology* 187:81-93.
- 1997h. Pascual, M. and **H. Caswell**. Environmental and biological pattern in a chaotic predator-prey system. *Journal of Theoretical Biology* 185:1-13
- 1997i. Pineda, J. and **H. Caswell**. Dependence of settlement rate on suitable substrate area. *Marine Biology* 129:541-548.

- 1996a **Caswell, H.** Demography meets ecotoxicology: untangling the population level effects of toxic substances. pp. 255-292 in M. C. Newman and C. H. Jagoe (eds.) *Ecotoxicology: A Hierarchical Treatment*. Lewis Publishers, Boca Raton, Florida.
- 1996b McGraw, J. B. and **H. Caswell**. Estimation of individual fitness from life history data *American Naturalist* 147:47-64.
- 1996c Tayasu, I., N. Shigesada, H. Mukai and **H. Caswell**. 1996. Predator-mediated coexistence of epiphytic grass shrimps that compete for refuges. *Ecological Modelling* 84:1-10.
- 1996d Caswell, H. Second derivatives of population growth rate: calculation and applications. *Ecology* 77:870-879.
- 1996e Caswell, H. Analysis of life table response experiments. II. Alternative parameterizations for size- and stage-structured models. *Ecological Modelling* 88:73-82.
- 1996f Little, S., S. Ellner, M. Pascual, M. Neubert, D. Kaplan, T. Sauer, H. Caswell, and A. Solow. Detecting nonlinear dynamics in spatio-temporal systems, examples from ecological models. *Physica D* 96:321-333.
- 1996g Levin, L. A., H. Caswell, T. Bridges, C. DiBacco, D. Cabrera, and G. Plaia. Demographic response of estuarine polychaetes to pollutants: Life table response experiments. *Ecological Applications* 6:1295-1313.
- 1996h Barradas, I., H. Caswell and J. E. Cohen. Competition during colonization vs. competition after colonization in disturbed environments: A metapopulation approach. *Bulletin of Mathematical Biology* 58:1187-1207.
- 1995a. Pascual, M., A. Ascioti and **H. Caswell**. Intermittency in the plankton: a multifractal analysis of zooplankton biomass variability. *Journal of Plankton Research* 17:1209-1232.
- 1995b **Caswell, H.** and J. E. Cohen. Red, white and blue: environmental variance spectra and coexistence in metapopulations. *Journal of Theoretical Biology* 176:301-316.
- 1994a **Caswell, H.** and M. C. Trevisan. The sensitivity analysis of periodic matrix models. *Ecology* 75: 1299-1303.
- 1994b Etter, R. J. and **H. Caswell**. The advantages of dispersal in a patchy environment: effects of disturbance in a cellular automaton model pp. 93-109. In: K.J. Eckelbarger and C.M. Young (eds.), *Reproduction, Larval Biology and Recruitment in the Deep-Sea Benthos*. Columbia University Press.
- 1994c Canales, J., M. C. Trevisan, J. F. Silva, and **H. Caswell**. A demographic study of an annual grass *Andropogon brevifolius* (Schwarz) in burnt and unburnt savanna. *Acta Oecologica* 15: 261-273.
- 1993a Brault, S. and **H. Caswell**. Pod-specific demography of Killer Whales (*Orcinus orca*). *Ecology* 74: 1444-1454.
- 1993b **Caswell, H.** and R. J. Etter. Ecological interactions in patchy environments: from patch-occupancy models to cellular automata. pp. 93-109 In: S. A. Levin, T. Powell and J. H. Steele (eds.) *Patch Dynamics*. Springer-Verlag, New York.
- 1993c McDonald, D.B. and **H. Caswell**. Matrix methods in avian demography. *Current Ornithology* 10:139-185.

- 1993d Maley, C. C. and **H. Caswell**. Implementing individual configuration models for population dynamics: an object-oriented program approach. *Ecological Modelling* 68:75-89.
- 1993e **Caswell, H.** and J. E. Cohen. Local and regional regulation of species-area relations: a patch-occupancy model. pp. 99-107. In: R. E. Ricklefs and D. Schluter (eds.). *Species Diversity in Ecological Communities: Historical and Geographic Perspectives*. University of Chicago Press.
- 1992a **Caswell, H.** and A. M. John. From the individual to the population in demographic models. pp. 36-61. In: D. L. DeAngelis and L. J. Gross (eds.), *Individual Based Models and Approaches in Ecology*. Chapman and Hall, New York.
- 1992b **Caswell, H.** and S. Brault. Life cycles and population dynamics: mathematical models for marine organisms. *Oceanus* 35(3): 86-93.
- 1991a **Caswell, H.** and J. E. Cohen. Disturbance and diversity in metapopulations. *Biological Journal of the Linnean Society* 42: 193-218.
- 1991b **Caswell, H.** and J. E. Cohen. Communities in patchy environments: a model of disturbance, competition, and heterogeneity. pp. 97-122. In: J. Kolasa and S. T. A. Pickett (eds.), *Ecological Heterogeneity*. Springer-Verlag, New York.
- 1991c Pascual, M. and **H. Caswell**. The dynamics of a size-classified benthic population with reproductive subsidy. *Theoretical Population Biology* 39:129-147.
- 1991d Walls, M., H. Caswell and M. Ketola. Demographic costs of Chaoborus-induced defenses in *Daphnia pulex*: a sensitivity analysis. *Oecologia* 87:43-50.
- 1991e Twombly, S. and H. Caswell. Demographic analysis of tropical zooplankton populations. *Verh. Int. Ver. Limnol.* 24:1183-1187.
- 1991f. Silva, J. F., J. Raventos, **H. Caswell** and M. C. Trevisan. Population responses to fire in a tropical savanna grass *Andropogon semiberbis*: a matrix model approach. *Journal of Ecology* 79: 345-356.
- 1990a Harvell, C. D., **H. Caswell** and P. Simpson. Density dependence in clonal populations: experimental studies with a marine bryozoan (*Membranipora membranacea* L.). *Oecologia* 82: 227-237.
- 1990b Silva, J. F., J. Raventos and **H. Caswell**. Fire, fire exclusion, and seasonal effects on the growth and survival of two savanna grasses. *Acta Oecologica* 11: 783-800.
- 1989a **Caswell, H.** *Matrix Population Models: Construction, Analysis, and Interpretation*. Sinauer Associates, Sunderland, MA. 328 pp.
- 1989b **Caswell, H.** and S. Twombly. Estimation of stage-specific demographic parameters for zooplankton populations: methods based on stage-classified matrix projection models. pp. 93-107. In: L. McDonald, B. Manly, J. Lockwood, and J. Logan (eds.) *Estimation and Analysis of Insect Populations*. Springer-Verlag, New York
- 1989c **Caswell, H.** The analysis of life table response experiments. I. Decomposition of effects on population growth rate. *Ecological Modelling* 46: 221-237.
- 1989d **Caswell, H.** Life history strategies. pp. 285-308. In: J. M. Cherrett (ed.) *Ecological Concepts*. Blackwell, Oxford.
- 1988a van Groenendael, J., H. de Kroon, and **H. Caswell**. Projection matrices in population biology. *Trends in Ecology and Evolution* 3: 264-269.
- 1988b **Caswell, H.** Theory and models in ecology: a different perspective. *Ecological Modelling* 43: 33-44.

- 1988c **Caswell, H.** Approaching size and age in matrix population models. pp. 85-105. In: B. Ebenman and L. Persson (eds.) *Size Structured Populations*. Springer-Verlag, New York.
- 1988d **Caswell, H.** Theory and models in ecology: a different perspective. *Bulletin of the Ecological Society of America* 69: 102-109. [Reprint of 1988b]
- 1987a **Caswell, H.** and L. A. Real. An approach to the perturbation analysis of optimal life histories. *Ecology* 68: 1045-1050.
- 1987b Crouse, D. T., L. B. Crowder, and **H. Caswell**. A stage-based population model for loggerhead sea turtles and implications for conservation. *Ecology* 68: 1412-1423.
- 1987c Levin, L. A., **H. Caswell**, K. D. De Patra, and E. L. Creed. Demographic consequences of larval development mode: planktotrophy vs. lecithotrophy in *Streblospio benedicti*. *Ecology* 68: 1877-1886.
- 1986a De Kroon, H., A. Plaisier, J. van Groenendael and **H. Caswell**. Elasticity: the relative contribution of demographic parameters to population growth rate. *Ecology* 67: 1427-1431.
- 1986b **Caswell, H.** and D. E. Weeks. Two-sex models: chaos, extinction and other dynamic consequences of sex. *American Naturalist* 128: 707-735.
- 1986c **Caswell, H.** Life cycle models for plants. *Lectures on Mathematics in the Life Sciences* 18: 171-233. American Mathematical Society.
- 1986d **Caswell, H.** and J. R. Weinberg. Sample size and sensitivity in the detection of community impact. *IEEE Oceans '86 Conference Proceedings*, pp. 1040-1045, Washington, D.C.
- 1986e **Caswell, H.** The demographic and evolutionary consequences of planktonic development. *UNESCO Technical Papers in Marine Science* 49: 47-50.
- 1986f. Weinberg, J., **H. Caswell**, and R. B. Whitlatch. Demographic importance of ecological interactions: how much do statistics tell us? *Marine Biology* 93: 305-310.
- 1985a **Caswell, H.** The evolutionary demography of clonal reproduction. pp. 187-224. In: J. B. C. Jackson, L. W. Buss and R. E. Cook (eds.) *Population Biology and Evolution of Clonal Organisms*. Yale Univ. Press.
- 1984a **Caswell, H.** Optimal life histories and the costs of reproduction: two extensions. *Journal of Theoretical Biology* 107: 169-172.
- 1984b **Caswell, H.**, R. J. Naiman and R. Morin. Evaluating the consequences of reproduction in complex salmonid life cycles. *Aquaculture* 43: 123-134.
- 1983a **Caswell, H.** Phenotypic plasticity in life history traits: demographic effects and evolutionary consequences. *American Zoologist* 23: 35-46.
- 1983b **Caswell, H.** Interpreting neutral models: a reply to comments by Ugland and Gray. *Ecology* 64: 605-606.
- 1983c **Caswell, H.** Zadeh's theory of state and Ichazo's trialectic analysis: convergent approaches to understanding dynamics. *Proceedings of the Society for General Systems Research* 27: 481-485.
- 1983d **Caswell, H.** An injunctive form of the axioms of trialectics. pp. 41-46. In: E. R. Horn (ed.) *Trialectics* (Proceedings First Lexington Conference on Trialectics).
- 1983e **Caswell, H.** Trialectics, cybernetics, and Zadeh's theory of state. pp. 157-190. In: R. E. Horn (ed.) *Trialectics* (Proceedings First Lexington Conference on Trialectics).

- 1983f. Hartman, J. M., **H. Caswell**, and I. Valiela. Effects of wrack accumulation on salt marsh vegetation. *Oceanologica Acta* (Proc. 17<sup>th</sup> European Marine Biology Symposium) pp. 99-102.
- 1982a Abrahamson, W. G. and **H. Caswell**. On the comparative allocations of biomass, energy, and nutrients in plants. *Ecology* 63: 982-991.
- 1982b Caswell, H. Life history theory and the equilibrium status of populations. *American Naturalist* 120: 317-339.
- 1982c Caswell, H. Optimal life histories and the maximization of reproductive value: A general theorem for complex life cycles. *Ecology* 63: 1218-1222.
- 1982d Caswell, H. Stable population structure and reproductive value for populations with complex life cycles. *Ecology* 63: 1223-1231.
- 1982e Caswell, H. Optimal life histories and the age-specific costs of reproduction. *Journal of Theoretical Biology* 98: 519-529.
- 1981a Caswell, H. The evolution of "mixed" life histories, in marine invertebrates and elsewhere. *American Naturalist* 117: 529-536.
- 1981b Caswell, H. Reply to comments by Yodzis and Schaffer. *Ecology* 62: 1685.
- 1980a Caswell, H. On the equivalence of maximizing reproductive value and maximizing fitness. *Ecology* 61: 19-24.
- 1980b Caswell, H. and A. Hastings. Fecundity, developmental time, and population growth rate: an analytical solution. *Theoretical Population Biology* 17: 71-79.
1979. Hastings, A. and H. Caswell. Environmental variability and the evolution of life history strategies. *Proceedings of the National Academy of Sciences, USA* 76: 4700-4703.
- 1978a Caswell, H. Predator-mediated coexistence: a non-equilibrium model. *American Naturalist* 112:127-154.
- 1978b Caswell, H. A general formula for the sensitivity of population growth rate to changes in life history parameters. *Theoretical Population Biology* 14: 215-230.
- 1978c Caswell, H. and P. A. Werner. Transient behavior and life history analysis of teasel (*Dipsacus sylvestris* Huds.). *Ecology* 59: 53-66.
1977. Werner, P. A. and **H. Caswell**. Population growth rates and age vs stage-distribution models for teasel (*Dipsacus sylvestris* Huds.). *Ecology* 58: 1103-1111.
- 1976a **Caswell, H.** The validation problem. pp. 313-325. In: B. C. Patten (ed.) *Systems Analysis and Simulation in Ecology*, Vol. IV. Academic Press, N.Y. Reprinted in *Benchmark Papers in Ecology: Systems Ecology*, H. H. Shugart and R. V. O'Neill (eds.). Dowden, Hutchinson and Ross.
- 1976b **Caswell, H.** Community structure: a neutral model analysis. *Ecological Monographs* 46: 327-352.
- 1976c **Caswell, H.** Why are there so many kinds of ecologies? pp. 48-54. In: S. A. Levin (ed.) *Ecological Theory and Ecosystem Models*. Office of Ecosystem Studies, The Institute of Ecology.
- 1976d **Caswell, H.** and F. Reed. Plant-herbivore interactions: the indigestibility of C<sub>4</sub> bundle sheath cells by grasshoppers. *Oecologia* 26: 151-156.
1975. **Caswell, H.** and F. Reed. 1975. Indigestibility of C<sub>4</sub> bundle sheath cells by the grasshopper *Melanoplus confusus*. *Annals of the Entomological Society of America* 68: 886-888.



1974. **Caswell, H.** *A Neutral Model for Community Structure*. Doctoral Dissertation, Michigan State University. 98 pp.
1973. **Caswell, H.**, F. Reed, S. Stephenson and P. Werner. Photosynthetic pathways and selective herbivory: a hypothesis. *American Naturalist* 107: 465-480.
- 1972a **Caswell, H.** A simulation study of a time-lag population model. *Journal of Theoretical Biology* 34: 419-439.
- 1972b **Caswell, H.** On instantaneous and finite birth rates. *Limnology and Oceanography* 127: 787-791.
- 1972c **Caswell, H.**, H. Koenig, J. Resh and Q. Ross. An introduction to systems analysis for ecologists. pp. 1-78. In: B. C. Patten (ed.) *Systems Analysis and Simulation in Ecology*, Vol. II. Academic Press, N.Y.
- 1971 **Caswell, H.** A classified bibliography of matrix theoretical population models. In: Annual Report, Design and Management of Environmental Systems, NSF Grant GI-20, Michigan State University.

### Technical Reports:

- 1985a Grassle, J. F., **H. Caswell**, J. W. Farrington, J. J. Stegeman and J. P. Grassle. Contaminant levels and relative sensitivities to contamination in deep ocean communities. NOAA Ocean Assessment Division Final Report, WASC-83-00220, 243 pp.
- 1985b **Caswell, H.** Mortality and variability: Is there a necessary relation: pp. 39-41. In: C. S. Davis et al. (eds.) WHOI-NEFC Fisheries Ecology Seminar Series: A Summary. Technical Report WHOI-85-25.
- 1986a Naiman, R. J., R. Morin, **H. Caswell**, W. L. Montgomery, E. Klopfer and T. Kana. The Atlantic salmon (*Salmo salar*) population of the Matamek River, Quebec: 1967-1984 Data Report. WHOI Technical Report 86-21.
- 1993a **Caswell, H.** and S. Brault. Nonparametric estimates of age-specific mortality in pilot whales. Working Paper WP-5, ICES Study Group on Long-Finned Pilot Whales, Copenhagen.
- 1993b Brault, S., G. Desportes, and **H. Caswell**. Estimates of foetal mortality rates in long-finned pilot whales. Working Paper WP-4, ICES Study Group on Long-Finned Pilot Whales, Copenhagen.
1997. **Caswell, H.** and T. Kaye. Life, Death and Fire: Demography of *Lomatium bradshawii* in a Dynamic Environment. Report to the Oregon Department of Agriculture and The Bureau of Land Management, Eugene District.
2012. van Raalte, A. and **H. Caswell**. 2012. Perturbation analysis of indices of lifespan variability. Working Paper WP 2012-004, Max Planck Institute for Demographic Research.

### Book reviews:

1980. **Caswell, H.** A milestone in population biology. Review of J. Roughgarden (1979) *Theory of population genetics and evolutionary ecology: an introduction*. Ecology 61:1555-1556.
2003. **Caswell, H.** Review of Kot, M. *Elements of mathematical ecology*. 2001. Cambridge University Press. Quarterly Review of Biology 78:251-252.
2003. **Caswell, H.** Models, experiments, and chaos. A review of Cushing, J.M., R.F. Costantino, B. Dennis, R.A. Desharnais, and S.M. Henson. 2003. *Chaos in ecology*. Academic Press. Ecology 84:2804-2805.