

Biographical Sketch: Stephen Russell Carpenter

Stephen Russell (Steve) Carpenter is a leader of whole-ecosystem experiments focused on basic and applied questions about lake ecosystems. Topics include trophic cascades and their effects on production and nutrient cycling, contaminant cycles, freshwater fisheries, eutrophication, nonpoint pollution, ecological economics of freshwater, and resilience of ecosystems and social-ecological systems.

Carpenter is a Free-Range Scientist at the Center for Limnology of the University of Wisconsin-Madison, where he is the emeritus Director and Stephen Alfred Forbes Professor of Integrative Biology (formerly Zoology). He is a member of the U.S. National Academy of Sciences, a Fellow of the American Academy of Arts and Sciences, and a foreign member of the Royal Swedish Academy of Sciences. Carpenter is the 2011 laureate of the Stockholm Water Prize and was honored by the Margalef Prize (2019). Other notable awards include a Pew Fellowship in Conservation and Environment, the G. Evelyn Hutchinson Medal of the American Society of Limnology and Oceanography, the Robert H. MacArthur Award from the Ecological Society of America, the Excellence in Ecology Prize from the Ecology Institute, the Naumann-Thienemann medal of the International Society for Limnology, and the A.C. Redfield Award of the Association for the Sciences of Limnology and Oceanography.

Carpenter is co-Editor in Chief of *Ecosystems*, and a member of the science board for the Stockholm Resilience Centre. Carpenter is a fellow of the Ecological Society of America, and founding member and Fellow of the Resilience Alliance. From 2000-2005 he served as co-chair of the Scenarios Working Group of the Millennium Ecosystem Assessment. He led the North Temperate Lakes Long-Term Ecological Research program at U.W.-Madison from 1999-2009. He is a former President of the Ecological Society of America. Carpenter has published 5 books and more than 450 scientific papers, book chapters, reviewed reports and commentaries. He received a B.A. from Amherst College (1974), M.S. from University of Wisconsin-Madison (1976), and Ph.D. from U.W. Madison (1979). From 1979-1989 he served as Assistant and then Associate Professor at the University of Notre Dame. He joined the U.W.-Madison faculty in 1989. A full biographical sketch, publication list and contact information are posted on <https://limnology.wisc.edu/faculty/stephen-r-carpenter/>

Stephen Russell Carpenter: Professional Background

Address:

Center for Limnology, University of Wisconsin, Madison, WI 53706.
Tel. 608-262-3014. Email: srcarpen@wisc.edu. FAX: 608-265-2340.

Personal:

Born Kansas City, MO, 5 July 1952; U.S. citizen; married Susan G. Carpenter in 1979, two children, Paul born 1982, Emily born 1984.

Education:

B.A. *magna cum laude*, 1974, Biology, Amherst College, Amherst, MA.
M.S., 1976, Botany, University of Wisconsin-Madison.
Ph.D., 1979, Botany/Oceanography and Limnology, University of Wisconsin-Madison.

Positions:

Free-Range Scientist, Emeritus Director of the Center for Limnology, and Stephen Alfred Forbes Professor Emeritus of Integrative Biology, University of Wisconsin-Madison, 9/2017 -

Director of the Center for Limnology and Stephen Alfred Forbes Professor of Integrative Biology, University of Wisconsin-Madison, 8/2009 –

Professor, Center for Limnology, and Department of Zoology, University of Wisconsin-Madison, 8/1991-8/2009.

Associate Professor, Center for Limnology, and Department of Zoology, University of Wisconsin-Madison, 6/1989 - 7/1991.

Associate Professor, Department of Biological Sciences, University of Notre Dame, Notre Dame, Indiana. 8/1985 to 5/1989.

Assistant Professor, Department of Biology, University of Notre Dame, 8/1979 to 7/1985.

Honors:

Research awards from the National Science Foundation, Andrew W. Mellon Foundation, James S. MacDonnell Foundation, Rockefeller Foundation, Pew Foundation, Packard Foundation, Winslow Foundation, Wisconsin Sea Grant Institute, Wisconsin Department of Natural Resources, National Biological Survey, U.S. Geological Survey and Environmental Protection Agency

Bassett Research Professor, University of Wisconsin, 1989-1994

Science Watch Top 10 Research Paper, 1992 (Carpenter et al. 1987 was one of the 10 most frequently cited papers in ecology)

Pew Fellow in Conservation and the Environment, 1995-1998

Per Brinck Award in Limnology, Lund University, Lund, Sweden 1996

Kellett Mid-Career Award, Graduate School, University of Wisconsin-Madison, 1999

G. E. Hutchinson Medal, American Society of Limnology and Oceanography, 1999

Ralf Yorque Society, inducted 1999

R.H. MacArthur Award, Ecological Society of America, 2000

Ecology Institute (ECI) Prize for Excellence in Limnetic Ecology, Oldendorf/Luhe, Germany, 2000

National Academy of Sciences, elected 2001

Most Highly Cited Researcher in Environmental Science, Institute for Scientific Information, 2003

Stephen Alfred Forbes Professorship in Zoology (later Integrative Biology), 2004

Royal Swedish Academy of Sciences, elected as a Foreign Member 2004

Sustainability Science Award, Ecological Society of America, August 2004 (with M. Scheffer, J. Foley, C. Folke and B. Walker, for our paper published in *Nature* in 2001).

Chinese Academy of Sciences, elected as Einstein Professor 2005

American Academy of Arts and Sciences, elected Fellow 2006

Naumann-Thienemann medal for excellence in limnological research, International Society for Limnology, 2007

Stockholm Water Prize, Swedish International Water Institute, 2011

Hilldale Professor, University of Wisconsin-Madison, 2011

Fellow of the Ecological Society of America, elected 2012

Fellow of the Resilience Alliance, elected 2012

Highly Cited Researcher for top 1% of researchers for most cited documents in Environment and Ecology, Thompson Reuters, 2014 -

John Martin Award, Association for the Sciences of Limnology and Oceanography, 2015, for Carpenter et al. 1985 paper in *BioScience*.

Fellow of the Wisconsin Academy of Sciences, Arts, and Letters, elected 2016

Ramon Margalef Prize in Ecology, 2018

A.C. Redfield Award, Association for the Sciences of Limnology and Oceanography, 2019

Teaching Program:

Courses at Wisconsin: Ecosystem Analysis; Ecosystem Concepts; Graduate Seminars.

Courses taught at Notre Dame: Advanced Aquatic Ecology; Aquatic Botany; Biostatistics; Practicum in Aquatic Biology; Graduate Seminars.

Research Program:

Research Interests: Limnology; Experimental analysis of ecosystems; Ecological modeling; Adaptive management; Environmental policy and governance.

Professional Societies: American Association for the Advancement of Science, American Society of Limnology and Oceanography; British Ecological Society; Ecological Society of America; North American Lake Management Society; Sigma Xi; Societas Internationalis Limnologiae.

Publication list is available below and as a separate document from my web site <http://limnology.wisc.edu/personnel/carpenter/>

Trainees:Masters Graduates:

Darren Bade (M.S. 2002)
 David Christensen (M.S. 1994)
 Ben Greenfield (M.S. 2000)
 Mary Jaynes (M.S. 1985)
 Owen Langman (M.S. 2008)
 Zach Lawson (M.S. 2014)
 Kathleen McTigue (M.S. 1992)
 Nate Nibbelink (M.S. 1996)
 Amanda Stone (M.S. 2012)
 Luke Winslow (M.S. 2012)

Doctoral Graduates:

Darren Bade (Ph.D. 2004)
 Ryan Batt (Ph.D. 2014)
 T. Douglas Beard (Ph.D. 2002)
 Elena Bennett (Ph.D. 2002)
 Ann Bergquist (Ph.D. 1985)
 Reinette (Oonsie) Biggs (Ph.D. 2008)
 Kathryn Cottingham (Ph.D. 1996)

Michael Dini (Ph.D. 1989)
 Jereme Gaeta (Ph.D. 2012)
 Paul Hanson (Ph.D. 2003)
 Jeffrey Houser (Ph.D. 2001)
 Pieter Johnson (Ph.D. 2006)
 Amy Kamarainen (Ph.D. 2009)
 Richard Lathrop (Ph.D. 1998)
 Peter Leavitt (Ph.D. 1989)
 Nancy McCreary (Ph.D. 1985)
 Nicholas Preston (Ph.D. 2009)
 Tara Reed-Andersen (Ph.D. 1998)
 Ann St. Amand (Ph.D. 1990)
 Patricia Soranno (Ph.D. 1995)
 Anett Trebitz (Ph.D. 1995)
 Matthew Van de Bogert (Ph.D. 2012)
 Paul West (Ph.D. 2010)

Former Postdoctoral Trainees:

Steven Baines
 Beatrix Beisner
 Elena Bennett
 Ishi Buffam
 Jeff Cardille
 Graeme Cumming
 Lisa Dent
 Sarig Gafny
 Gretchen Hansen
 Lars-Anders Hansson
 Jane Horlings
 Lee Jackson
 Susan Knight
 Conrad Lamon
 Charles Madenjian
 Thomas Martin
 Mark Olson
 Garry Peterson
 Lars Rudstam
 Greg Sass
 Craig Stow

Professional Activities:

Executive Board, *American Midland Naturalist*, 1982-1989.

Scientific Advisory Committee, Northern Highland Lakes Long-Term Ecological Research Site, 1986-1989.

Editorial Board, *Limnology and Oceanography*, 1986-1989.

Oversight Committee, Ecology Program, N.S.F. 1987.

Member, Working Group on Biological Systems and Dynamics, Committee on Global Change, U.S. N.A.S., 1988.

Member, Advisory Panel for Land-Margin Ecosystem Research, N.S.F., 1988.

Member, Steering Committee, Conference on "Global System Dynamics: Comparison of Terrestrial and Marine Systems", 1988-1989.

Member, Advisory Panel for Ecosystem Studies Program, N.S.F., 1989-1992

Editorial Board, *Ecological Applications*, 1989-1994.

Member, Technical Advisory Committee, Dane County, WI, Lake and Watershed Commission, 1989-1992

Member, Committee on Restoration of Aquatic Systems: Science, Technology, and Public Policy. National Research Council. 1989-1991.

Member, Committee on Research Agenda for the 1990s, Ecological Society of America, 1989-1990.

Member, Steering Committee, Lake Michigan Roundtable on An Ecosystem Approach for Remediation of Toxics, Great Lakes Fisheries Commission, 1990.

Member, Working Group on Ecosystem Effects, Committee on Global Change, U.S. N.A.S. 1990-1991.

Member, Academic Advisory Board, Graduate Center in Ecological and Environmental Sciences, Central European University, Budapest, Hungary. 1990-1993.

Member, Steering Committee, "Conference on Evolutionary, Population, and Community Responses to Global Change", 1991.

Co-Chair, Local Arrangements Committee for 1993 Annual Meeting, Ecological Society of America

Co-Chair, ESA/AERC Steering Committee on the Center for Ecological Synthesis and Analysis, 1992-1994

Member, U.S. National Committee for SCOPE, National Research Council, 1993 -1995

Member, Committee on Ecosystem Management, Ecological Society of America, 1993-1995

Chair, Research Needs Committee, Ecological Society of America, 1993-1995

Member, Peer Advisory Committee, Institute of Ecosystem Studies, Millbrook,N.Y., 1993 - ;
Chair 1995 - 1996

Editorial Board, Annual Review of Ecology and Systematics, 1993-1994.

Advisory Editor, Ecological Studies Series, Springer-Verlag Publishers.

Chair, Freshwater Committee, ICSU/SCOPE Global Biodiversity Assessment, 1993 -1995.

Member, Advisory Panel for the National Center for Ecological Analysis and Synthesis, National Science Foundation, 1994.

Science Advisory Board, National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara 1995 - 1998 (Chair 1995-1997).

Editorial Board, *Ecological Issues*, Ecological Society of America, 1995-

Editorial Board, *Conservation Ecology*, Ecological Society of America and Resilience Alliance, 1995-

Member of the Science Council, Conservation Ecology Program to Link Leaders in Ecology, Business and Policy, Beijer Institute of Ecological Economics, Stockholm, 1996-1998

Co-Editor-in-Chief, *Ecosystems*, 1997-

Member, Executive Committee, Resilience Alliance, 1998-

Member, Awards Committee, Ecological Society of America, 1998-1999

President-Elect, Ecological Society of America, 1999; President 2000-2001, Immediate Past-President 2001-2002

Member, Assessment Panel, Millennium Assessment of World's Ecosystems, 2000-2005

Co-Chair, International Program on Ecosystem Change, co-sponsored by ICSU/SCOPE and the Millennium Assessment of World Ecosystems, 2000-2005

Co-Chair, Working Group on Scenarios, Millennium Ecosystem Assessment, 2000-2005

Chair, Science Advisory Board, Resilience Alliance (publishers of *Ecology and Society*), 1999-

Member, Steering Committee, Cary Conference IX, Institute of Ecosystem Studies, Millbrook, NY, 2000-2001

Chair, Graduate Program in Limnology and Marine Science, University of Wisconsin-Madison, 2000-2002

Member, Advisory Board, Robustness Program, Santa Fe Institute, Santa Fe New Mexico, 2001-2002

Member, MacArthur Award Committee, Ecological Society of America, 2003-2005

Member, Board of Directors, Beijer Institute of Ecological Economics, 2003-2014; Chair 2003-2008

Member, Board of Directors, Sand County Foundation, 2002 - 2004

Member, Editorial Board, *Frontiers in Ecology and Environment*, 2002 - 2006

Member, Board of Trustees, Institute of Ecosystem Studies, Millbrook, New York, 2003-2009 ; Chair 2008

Member, Editorial Board, *Proceedings of the National Academy of Sciences*, 2003-2006

Member, Review Panel on Long-Term Ecological Research, National Science Foundation, 2004

Member, Review Panel on Network Office for Long-Term Ecological Research, National Science Foundation, 2005

Member, Search Committee for Director of the Beijer Institute of Ecological Economics, Royal Swedish Academy of Sciences, 2006

Vice-Chair, Search Committee for the President, Institute of Ecosystem Studies, Millbrook, New York, 2006.

Jury for the ECI and IRPE prizes, Ecology Institute, Oldendorf/Luhe, Germany, 2006.

Nominations Committee, Ecological Society of America, 2007-2008

Member, Review Committee for Moorea Coral Reef Long-Term Ecological Research Program, 2007

Science Advisory Board, South American Institute for Resilience and Sustainability (SARAS), 2007-

Member, Editorial Board, *Trends in Ecology and Evolution*, 2009-

Chair, Program on Ecosystem Change and Society, International Council of Science, Paris, France, 2009-2018.

Member, Sustainability Roundtable, U.S. National Academy of Sciences, 2010-present.

Chair, Ecosystem Services Conference, Keck Futures Initiative, U.S. National Academy of Sciences, US National Academy of Engineering, U.S. Institute of Medicine, 2010-2012

Hilldale Professor, University of Wisconsin-Madison 2011-

Fellow, Synergy Program for Analyzing Resilience and Critical Transitions, 2012-

Member, Advisory Group for the Gulf Research Program, U.S. National Academy of Sciences, 2013-2014

Member of the Board, Stockholm Resilience Centre, Stockholm, Sweden 2014-

Bibliography of Stephen Russell Carpenter

(updated 11 January, 2019)

Up-to-date bibliography is posted at:
<http://limnology.wisc.edu/personnel/carpenter/>

Books

1. Carpenter, S.R., ed. 1988. *Complex Interactions in Lake Communities*. Springer-Verlag, NY.
2. Carpenter, S.R. and J.F. Kitchell (eds.). 1993. *The Trophic Cascade in Lakes*. Cambridge University Press, Cambridge, England.
3. Carpenter, S.R. 2003. *Regime Shifts in Lake Ecosystems: Pattern and Variation*. Volume 15 in the Excellence in Ecology Series, Ecology Institute, Oldendorf/Luhe, Germany.
4. Bennett, E.M., S.R. Carpenter, P. Pingali and M. Zurek (eds.). 2005. *Ecosystems and Human Well-Being: Scenarios*. Island Press, Washington, D.C.
5. Levin, S.A., S.R. Carpenter, C.J. Godfray, A.P. Kinzig, M. Loreau, J.P. Losos, B. Walker and D.S. Wilcove (eds.). 2009. *Princeton Guide to Ecology*. Princeton University Press, Princeton, N.J.

Papers and Book Chapters

1. Fisher, S.G. and S.R. Carpenter. 1976. Ecosystem and macrophyte primary production of the Fort River, Massachusetts. *Hydrobiologia* 47: 175-187.
2. Carpenter, S.R. and M.S. Adams. 1977. The macrophyte tissue nutrient pool of a hardwater eutrophic lake: Implications for macrophyte harvesting. *Aquatic Botany* 3: 239-255.
3. Carpenter, S.R. and A. Gasith. 1978. Mechanical cutting of macrophytes: Immediate effects on littoral water chemistry and metabolism. *Water Research* 12: 55-57.
4. Carpenter, S.R. and M.S. Adams. 1978. Macrophyte control by harvesting and herbicides: Implications for phosphorus cycling in Lake Wingra, Wisconsin. *Journal of Aquatic Plant Management* 16: 20-23.
5. Carpenter, S.R. and M.S. Adams. 1979. Effects of nutrients and temperature on decomposition of *Myriophyllum spicatum* L. in a hardwater eutrophic lake. *Limnology and Oceanography* 24: 520-528.
6. Carpenter, S.R., A. Gurevitch, and M.S. Adams. 1979. Factors causing elevated biological oxygen demand in the littoral zone of Lake Wingra, Wisconsin. *Hydrobiologia* 67: 3-9.

7. Prentki, R.T., M.S. Adams, S.R. Carpenter, A. Gasith, C.S. Smith, and P.R. Weiler. 1979. Role of submersed weed beds in internal loading and interception of allochthonous materials in Lake Wingra, Wisconsin. *Archiv fur Hydrobiologie (Supplement)* 57: 221-250.
8. Carpenter, S.R. 1980. The decline of *Myriophyllum spicatum* in a eutrophic Wisconsin lake. *Canadian Journal of Botany* 58: 527-535.
9. Carpenter, S.R. 1980. Estimating net shoot production by a hierarchical cohort method of herbaceous plants subject to high mortality. *American Midland Naturalist* 104: 163-175.
10. Carpenter, S.R. 1980. Enrichment of Lake Wingra, Wisconsin by submersed macrophyte decay. *Ecology* 61: 1145-1155.
11. Carpenter, S.R. 1981. Decay of heterogeneous detritus: A general model. *Journal of Theoretical Biology* 89: 539-547.
12. Carpenter, S.R. 1981. Submersed vegetation: An internal factor in lake ecosystem succession. *The American Naturalist* 118: 372-383.
13. Carpenter, S.R. and J.K. Greenlee. 1981. Lake deoxygenation after herbicide use: A simulation model analysis. *Aquatic Botany* 11: 173-186.
14. Kimbel, J.C. and S.R. Carpenter. 1981. Effects of mechanical harvesting on *Myriophyllum spicatum* regrowth and carbohydrate allocation. *Aquatic Botany* 11: 121-127.
15. Carpenter, S.R. 1981. Effects of control measures on pest populations subject to regulation by parasites and pathogens. *Journal of Theoretical Biology* 92: 181-184.
16. Fish, D. and S.R. Carpenter. 1982. Leaf litter and larval mosquito dynamics in tree-hole ecosystems. *Ecology* 63: 283-288.
17. Sullivan, P.F. and S.R. Carpenter. 1982. Evaluation of 14 trophic state indices for phytoplankton of Indiana lakes and reservoirs. *Environmental Pollution (Series A)* 27: 143-153.
18. Carpenter, S.R. 1982. Stemflow chemistry: Effects on population dynamics of detritivorous mosquitoes in tree-hole ecosystems. *Oecologia* 53: 1-6.
19. Carpenter, S.R. 1982. Comparisons of equations for decay of particulate detritus in tree-hole ecosystems. *Oikos* 39: 17-23.
20. Carpenter, S.R. 1983. Resource limitation of larval tree-hole mosquitoes subsisting on beech detritus. *Ecology* 64: 219-223.

21. Carpenter, S.R. 1983. Submersed macrophyte community structure and internal loading: Relationship to lake ecosystem productivity and succession. *Lake and Reservoir Management* 2: 105-111.
22. Carpenter, S.R. and J.E. Chaney. 1983. Scale of spatial pattern: Four methods compared. *Vegetatio* 53: 153-160.
23. McCreary, N.J., S.R. Carpenter, and J.E. Chaney. 1983. Coexistence and interference in two submersed freshwater perennial plants. *Oecologia* 59: 393-396.
24. Carpenter, S.R. 1983. Lake geometry: Implications for production and sediment accretion rates. *Journal of Theoretical Biology* 105: 273-286.
25. Carpenter, S.R., J.J. Elser, and K.M. Olson. 1983. Effects of roots of Myriophyllum verticillatum on sediment redox conditions. *Aquatic Botany* 17: 243-249.
26. Carpenter, S.R. 1984. Experimental test of the pupation window model for development of detritivorous insects. *Ecological Modelling* 23: 257-264.
27. Carpenter, S.R. and J.F. Kitchell. 1984. Plankton community structure and limnetic primary production. *The American Naturalist* 124: 159-172.
28. Carpenter, S.R. 1984. First-order error analysis for aquatic plant production estimates. pp. 36-45 in: W.M. Dennis and B.G. Isom, eds. *Ecological Assessment of Macrophyton*. American Society for Testing and Materials (STP 843), Philadelphia.
29. Carpenter, S.R. and J.E. Titus. 1984. Composition and spatial heterogeneity of submersed vegetation in a softwater lake. *Vegetatio* 57: 153-165.
30. Carpenter, S.R. and A.M. Bergquist. 1985. Experimental tests of grazing indicators based on chlorophyll a degradation products. *Archiv fur Hydrobiologie* 102: 303-317.
31. Jaynes, M.L. and S.R. Carpenter. 1985. Effects of submersed macrophytes on phosphorus cycling in surface sediment. *Lake and Reservoir Management* 4: 370-374.
32. Carpenter, S.R. and N.J. McCreary. 1985. Effects of fish nests on pattern and diversity of submersed vegetation in a softwater lake. *Aquatic Botany* 22: 21-32.
33. Bergquist, A.M., S.R. Carpenter, and J.C. Latino. 1985. Shifts in phytoplankton size structure and community composition during grazing by contrasting zooplankton assemblages. *Limnology and Oceanography* 30: 1037-1045.
34. Carpenter, S.R., J.F. Kitchell, and J.R. Hodgson. 1985. Cascading trophic interactions and lake productivity. *BioScience* 35: 634-639.

35. Carpenter, S.R., M.M. Elser, and J.J. Elser. 1986. Chlorophyll production, degradation, and sedimentation: Implications for paleolimnology. *Limnology and Oceanography* 31: 112-124.
36. Jaynes, M.L. and S.R. Carpenter. 1986. Effects of vascular and nonvascular macrophytes on sediment redox and solute dynamics. *Ecology* 67: 875-882.
37. Bergquist, A.M. and S.R. Carpenter. 1986. Limnetic herbivory: Effects on phytoplankton populations and primary production. *Ecology* 67: 1351-1360.
38. Elser, J.J., M.M. Elser, and S.R. Carpenter. 1986. Size fractionation of algal chlorophyll, carbon fixation, and phosphatase activity: Relationships with species-specific size distributions and zooplankton community structure. *Journal of Plankton Research* 8: 365-383.
39. Elser, M.M., J.J. Elser, and S.R. Carpenter. 1986. Paul and Peter lakes: A liming experiment revisited. *American Midland Naturalist* 116: 282-295.
40. Carpenter, S.R. and D.M. Lodge. 1986. Effects of submersed macrophytes on ecosystem processes. *Aquatic Botany* 26: 341-370.
41. Kitchell, J.F. and S.R. Carpenter. 1987. Piscivores, planktivores, fossils, and phorbins. pp. 132-146 in: C. Kerfoot and A. Sih, eds. *Predation: Direct and Indirect Impacts on Aquatic Communities*. University Press of New England, Hanover, NH.
42. Carpenter, S.R. and J.F. Kitchell. 1987. The temporal scale of variance in limnetic primary production. *The American Naturalist* 129: 417-433.
43. McCreary, N.J. and S.R. Carpenter. 1987. Density-dependent interactions of two co-occurring aquatic plants. *Aquatic Botany* 27: 229-242.
44. Carpenter, S.R., J.F. Kitchell, J.R. Hodgson, P.A. Cochran, J.J. Elser, M.M. Elser, D.M. Lodge, D. Kretchmer, X. He, and C.N. von Ende. 1987. Regulation of lake primary productivity by food web structure. *Ecology* 68: 1863-1876.
45. Dini, M.L., J. O'Donnell, S.R. Carpenter, M.M. Elser, J.J. Elser, and A.M. Bergquist. 1987. Daphnia size structure, vertical migration, and phosphorus redistribution. *Hydrobiologia*: 185-191.
46. Elser, J.J., N.C. Goff, N.A. MacKay, A.L. St. Amand, M.M. Elser, and S.R. Carpenter. 1987. Species-specific algal responses to zooplankton: Experimental and field observations in three nutrient-limited lakes. *Journal of Plankton Research* 9: 699-717.
47. Elser, M.M., C.N. von Ende, P. Soranno, and S.R. Carpenter. 1987. Chaoborus populations: Response to food web manipulations and potential effects on zooplankton communities. *Canadian Journal of Zoology* 65: 2846-2852.

48. Bartell, S.M., A.L. Brenkert, and S.R. Carpenter. 1988. Parameter uncertainty and the behavior of a size-dependent plankton model. *Ecological Modelling* 40: 85-95.
49. Kitchell, J.F. and S.R. Carpenter. 1988. Food web manipulation in experimental lakes. *Internationale Vereinigung fur Theoretische und Angewandte Limnologie, Verhandlungen* 23: 351-358.
50. Elser, J.J., M.M. Elser, N.A. MacKay, and S.R. Carpenter. 1988. Zooplankton-mediated transitions between N and P limited algal growth. *Limnology and Oceanography* 33: 1-14.
51. Carpenter, S.R. 1988. Transmission of variance through lake food webs. pp. 119-138 in: S.R. Carpenter, ed. *Complex Interactions in Lake Communities*. Springer-Verlag, NY.
52. Kitchell, J.F., S.M. Bartell, S.R. Carpenter, D.J. Hall, D.J. McQueen, W.E. Neill, D. Scavia, and E.E. Werner. 1988. Epistemology, experiments, and pragmatism. pp. 263-280 in: S.R. Carpenter, ed. *Complex Interactions in Lake Communities*. Springer-Verlag, NY.
53. Carpenter, S.R., P.R. Leavitt, J.J. Elser, and M.M. Elser. 1988. Chlorophyll budgets: response to food web manipulation. *Biogeochemistry* 6: 79-90.
54. Dini, M.L. and S.R. Carpenter. 1988. Variability in *Daphnia* behavior following fish community manipulations. *Journal of Plankton Research* 10: 621-635.
55. Elser, J.J. and S.R. Carpenter. 1988. Predation-driven dynamics of zooplankton and phytoplankton communities in a whole-lake experiment. *Oecologia* 76: 148-154.
56. Carpenter, S.R. and J.F. Kitchell. 1988. Consumer control of lake productivity. *BioScience* 38: 764-769.
57. Carpenter, S.R. 1989. Replication and treatment strength in whole-lake experiments. *Ecology* 70: 453-463.
58. Carpenter, S.R., T.M. Frost, D. Heisey, and T.K. Kratz. 1989. Randomized intervention analysis and the interpretation of whole ecosystem experiments. *Ecology* 70: 1142-1152.
59. Leavitt, P.R. and S.R. Carpenter. 1989. Effects of sediment mixing and benthic algal production on fossil pigment stratigraphies. *Journal of Paleolimnology* 2: 147-158.
60. Leavitt, P.R., S.R. Carpenter, and J.F. Kitchell. 1989. Whole lake experiments: The annual record of fossil pigments and zooplankton. *Limnology and Oceanography* 34: 700-717.
61. Hodgson, J.R., S.R. Carpenter, and A.P. Gripentrog. 1989. The effect of sampling frequency on intersample variance and food consumption estimates of largemouth bass. *Transactions of the American Fisheries Society* 118: 11-19.

62. St. Amand, A.L., P.A. Soranno, S.R. Carpenter, and J.J. Elser. 1989. Algal nutrient deficiency: growth bioassays versus physiological indicators. *Lake and Reservoir Management* 5: 27-35.
63. Carpenter, S.R. 1989. Temporal variance in lake communities: Blue-green algae and the trophic cascade. *Landscape Ecology* 3: 175-184.
64. Leavitt, P.R. and S.R. Carpenter. 1990. Aphotic pigment degradation in the hypolimnion: implications for sedimentation studies and paleolimnology. *Limnology and Oceanography* 35: 520-535.
65. Leavitt, P.R. and S.R. Carpenter. 1990. Regulation of pigment sedimentation by photo-oxidation and herbivore grazing. *Canadian Journal of Fisheries and Aquatic Sciences* 47: 1166-1176.
66. MacKay, N.A., S.R. Carpenter, P.A. Soranno, and M.J. Vanni. 1990. The impact of two Chaoborus species on a zooplankton community. *Canadian Journal of Zoology* 68: 981-985.
67. Barko, J.W., D. Gunnison and S.R. Carpenter. 1991. Sediment interactions with submersed macrophyte growth and community dynamics. *Aquatic Botany* 41: 41-66.
68. Carpenter, S.R., T.M. Frost, J.F. Kitchell, T.K. Kratz, D.W. Schindler, J. Shearer, W.G. Sprules, M.J. Vanni, and A.P. Zimmerman. 1991. Patterns of primary production and herbivory in 25 North American lake ecosystems. pp. 67-96 in: J. Cole, S. Findlay, and G. Lovett, eds. *Comparative Analyses of Ecosystems: Patterns, Mechanisms, and Theories*. Springer-Verlag, NY.
69. Carpenter, S.R. and P.R. Leavitt. 1991. Temporal variation in a paleolimnological record arising from a trophic cascade. *Ecology* 72: 277-285.
70. Madenjian, C.P. and S.R. Carpenter. 1991. Individual-based model for growth of young-of-the-year walleye: A piece of the recruitment puzzle. *Ecological Applications* 1: 268-279.
71. Madenjian, C.P., B.M. Johnson, and S.R. Carpenter. 1991. Stocking strategies for fingerling walleyes: An individual-based model approach. *Ecological Applications* 1: 280-288.
72. Dini, M.L. and S.R. Carpenter. 1991. The effect of whole-lake fish community manipulations on Daphnia migratory behavior. *Limnology and Oceanography* 36: 370-377.
73. Kitchell, J.F., S.R. Carpenter, S.E. Bayley, K.C. Ewel, R.W. Howarth, S.W. Nixon, and D.W. Schindler. 1991. Aquatic ecosystem experiments in the context of global change. pp. 229-238 in: H.A. Mooney, E. Medina, D.W. Schindler, E.D. Schulze and B.H. Walker (eds.). *Ecosystem Experiments*. J. Wiley and Sons, Sussex, England.

74. Dini, M.L. and S.R. Carpenter. 1992. Fish predators, food availability, and diel vertical migration in Daphnia. *Journal of Plankton Research* 14: 359-378.
75. Lathrop, R.C. and S.R. Carpenter. 1992. Phytoplankton and their relationship to nutrients. pp. 97-126 in: J.F. Kitchell, ed. *Food Web Management: A Case Study of Lake Mendota*. Springer-Verlag, NY.
76. Lathrop, R.C. and S.R. Carpenter. 1992. Zooplankton and their relationship to phytoplankton. pp. 127-150 in: J.F. Kitchell, ed. *Food Web Management: A Case Study of Lake Mendota*. Springer-Verlag, NY.
77. Nichols, S.R., R.C. Lathrop, and S.R. Carpenter. 1992. Long-term vegetation trends: a history. pp. 151-172 in: J.F. Kitchell, ed. *Food Web Management: A Case Study of Lake Mendota*. Springer-Verlag, NY.
78. Carpenter, S.R. 1992. Modeling in the Lake Mendota program: an overview. pp. 377-380 in: J.F. Kitchell, ed. *Food Web Management: A Case Study of Lake Mendota*. Springer-Verlag, NY.
79. Vanni, M.J., S.R. Carpenter, and C. Luecke. 1992. A simulation model of the interactions among nutrients, phytoplankton, and zooplankton in Lake Mendota. pp. 427-450 in: J.F. Kitchell, ed. *Food Web Management: A Case Study of Lake Mendota*. Springer-Verlag, NY.
80. Carpenter, S.R. 1992. Destabilization of planktonic ecosystems and blooms of blue-green algae. pp. 461-482 in: J.F. Kitchell, ed. *Food Web Management: A Case Study of Lake Mendota*. Springer-Verlag, NY.
81. Carpenter, S.R., B. Johnson, C. Luecke, C. Madenjian, J. Post, L. Rudstam, M. Vanni, Y. Allen, R. Dodds, K. McTigue, and D. Schael. 1992. Modeling the Lake Mendota ecosystem: synthesis and evaluation of progress. pp. 451-460 in: J.F. Kitchell, ed. *Food Web Management: A Case Study of Lake Mendota*. Springer-Verlag, NY.
82. Kitchell, J.F. and S.R. Carpenter. 1992. Summary: Accomplishments and new directions of food web management in Lake Mendota. pp. 539-544 in: J.F. Kitchell, ed. *Food Web Management: A Case Study of Lake Mendota*. Springer-Verlag, NY.
83. Frost, T.M., S.R. Carpenter, and T.K. Kratz. 1992. Choosing ecological indicators: effects of taxonomic aggregation on sensitivity to stress and natural variability. pp. 215-227 in: D.H. McKenzie (ed.). *Ecological Indicators*. Elsevier Applied Science Publishers, Essex, England.
84. Carpenter, S.R., C.E. Kraft, R. Wright, X. He, P.A. Soranno and J.R. Hodgson. 1992. Resilience and resistance of a lake phosphorus cycle before and after food web manipulation. *The American Naturalist* 140: 781-798.

85. Carpenter, S.R., S.G. Fisher, N.B. Grimm, and J.F. Kitchell. 1992. Global change and freshwater ecosystems. *Annual Review of Ecology and Systematics* 23: 119-139.
86. Carpenter, S.R., K.L. Cottingham and D.E. Schindler. 1992. Biotic feedbacks in lake phosphorus cycles. *Trends in Ecology and Evolution* 7: 332-336.
87. Carpenter, S.R., T.M. Frost, T.K. Kratz, and J.F. Kitchell. 1993. Species dynamics and global environmental change: A perspective from ecosystem experiments. pp. 267-279 in: P. Kareiva, J. Kingsolver, R. Huey (eds.). *Biotic Interactions and Global Change*. Sinauer Associates, Sunderland, MA.
88. Madenjian, C.P., S.R. Carpenter, G.W. Eck and M.A. Miller. 1993. Accumulation of PCBs in lake trout (*Salvelinus namaycush*): an individual-based model approach. *Canadian Journal of Fisheries and Aquatic Sciences* 50: 97-109.
89. Rudstam, L.G., R.C. Lathrop and S.R. Carpenter. 1993. The rise and fall of a dominant planktivore: direct and indirect effects on zooplankton. *Ecology* 74: 303-319.
90. Madenjian, C.P., S.R. Carpenter and G.E. Noguchi. 1993. Individual-based model for dieldrin contamination in lake trout. *Archives of Environmental Contamination and Toxicology* 24: 78-82.
91. Carpenter, S.R., X. He, J.F. Kitchell, and P.A. Soranno. 1993. Whole-lake experiments: is grazer functional response stable? *Internationale Vereinigung fur Theoretische und Angewandte Limnologie, Verhandlungen* 25: 398-400.
92. Kitchell, J.F., S.R. Carpenter, J.G. Hodgson, X. He and P.A. Soranno. 1993. Phosphorus in food webs: compensatory responses in experimental lakes. *Internationale Vereinigung fur Theoretische und Angewandte Limnologie, Verhandlungen* 25: 344-348.
93. Madenjian, C.P. and S.R. Carpenter. 1993. Simulation of the effects of time and size at stocking on PCB accumulation in lake trout. *Transactions of the American Fisheries Society* 122: 492-499.
94. Hansson, L.-A. and S.R. Carpenter. 1993. Relative importance of nutrient availability and food chain for size and community composition in phytoplankton. *Oikos* 67: 257-263.
95. Kitchell, J.F. and S.R. Carpenter. 1993. Variability in lake ecosystems: Complex responses by the apical predator. pp. 111-124 in: M.J. McDonnell and S.T.A. Pickett (eds.), *Humans as Components of Ecosystems*. Springer-Verlag, NY.
96. Steele, J.H., S.R. Carpenter, J.E. Cohen, P.K. Dayton and R.E. Ricklefs. 1993. Comparing terrestrial and marine ecological systems. pp. 1-12 in S.A. Levin, T.M. Powell, and J.H. Steele (eds.), *Patch Dynamics*. Springer-Verlag, NY.

97. He, X., J.F. Kitchell, S.R. Carpenter, J.R. Hodgson, D.E. Schindler and K.L. Cottingham. 1993. Food web structure and long-term phosphorus recycling: a simulation model evaluation. *Transactions of the American Fisheries Society* 122: 773-783.
98. Schindler, D.E., J.F. Kitchell, X. He, S.R. Carpenter, J.R. Hodgson and K.L. Cottingham. 1993. Food web structure and phosphorus cycling in lakes. *Transactions of the American Fisheries Society* 122: 756-772.
99. Carpenter, S.R., R.C. Lathrop and A. Muñoz-del-Rio. 1993. Comparison of dynamic models for edible phytoplankton. *Canadian Journal of Fisheries and Aquatic Sciences* 50: 1757-1767.
100. Trebitz, A.S., S.A. Nichols, S.R. Carpenter and R.C. Lathrop. 1993. Patterns of vegetation change in Lake Wingra following a Myriophyllum spicatum decline. *Aquatic Botany* 46: 325-340.
101. Kratz, T.K., J.J. Magnuson, T.M. Frost, B.J. Benson and S.R. Carpenter. 1994. Landscape position, scaling, and the spatial and temporal variability of ecological parameters: considerations for biological monitoring. pp. 217-232 in: S.L. Loeb and A. Spacie (eds.). *Biological Monitoring of Aquatic Systems*. Lewis Publishers, Ann Arbor, Michigan, USA.
102. Madenjian, C.P., S.R. Carpenter and P.S. Rand. 1994. Why are the PCB concentrations of salmonine individuals from the same lake so highly variable? *Canadian Journal of Fisheries and Aquatic Sciences* 51: 800-807.
103. Carpenter, S.R., K.L. Cottingham, and C.A. Stow. 1994. Fitting predator-prey models to time series with observation errors. *Ecology* 75: 1254-1264.
104. Johnson, B.M. and S.R. Carpenter. 1994. Functional and numerical responses: A framework for fish-angler interactions? *Ecological Applications* 4: 808-821.
105. Carpenter, S.R., A. Muñoz del Rio, S. Newman, P. Rasmussen and B.M. Johnson. 1994. Interactions of anglers and walleyes in Escanaba Lake, Wisconsin. *Ecological Applications* 4: 822-832.
106. Carpenter, S.R., T.M. Frost, A.R. Ives, J.F. Kitchell and T.K. Kratz. 1994. Complexity, cascades and compensation in ecosystems. pp. 197-207 in Yasuno, M. and M.M. Watanabe (eds.), *Biodiversity: Its Complexity and Role*. Global Environmental Forum, Tokyo, Japan.
107. Stow, C.A. and S.R. Carpenter. 1994. PCB accumulation in Lake Michigan Coho and Chinook salmon: Individual-based models using allometric relationships. *Environmental Science and Technology* 28: 1543-1549.

108. Stow, C.A., S.R. Carpenter and J.F. Amrhein. 1994. PCB concentration trends in Lake Michigan Coho and Chinook salmon. *Canadian Journal of Fisheries and Aquatic Sciences* 50: 1384-1390.
109. Cottingham, K.L. and S.R. Carpenter. 1994. Predictive indices of ecosystem resilience: Consistency and testability in models of North Temperate lakes. *Ecology* 75: 2127-2138.
110. Leavitt, P.R., P.R. Sanford, S.R. Carpenter and J.F. Kitchell. 1994. An annual fossil record of production, planktivory and piscivory during whole-lake experiments. *Journal of Paleolimnology* 11: 133-149.
111. Stow, C.A., S.R. Carpenter, L.A. Eby, J.F. Amrhein, and R.J. Hesselberg. 1995. Evidence that PCBs are approaching stable concentrations in Lake Michigan fishes. *Ecological Applications* 5: 248-260.
112. Pace, M.L., S.R. Carpenter and P.A. Soranno. 1995. Population variability in experimental ecosystems. pages 61-71 in: C. Jones and J. Lawton (eds.), *Linking Species and Ecosystems*. Chapman and Hall, NY.
113. Frost, T.M., S.R. Carpenter, A.R. Ives and T.K. Kratz. 1995. Species compensation and complementarity in ecosystem function. pages 224-239 in: C. Jones and J. Lawton (eds.), *Linking Species and Ecosystems*. Chapman and Hall, NY.
114. Carpenter, S.R., D.L. Christensen, J.J. Cole, K.L. Cottingham, X. He, J.R. Hodgson, J.F. Kitchell, S.E. Knight, M.L. Pace, D.M. Post, D.E. Schindler, and N. Voichick. 1995. Biological control of eutrophication in lakes. *Environmental Science and Technology* 29: 784-786.
115. Jackson, L.L. and S.R. Carpenter. 1995. PCB concentrations in Lake Michigan invertebrates: reconstruction based on PCB concentrations of alewives (*Alosa pseudoharengus*) and their bioenergetics. *Journal of Great Lakes Research* 21: 112-120.
116. Carpenter, S.R., P. Cunningham, S. Gafny, A. Muñoz del Rio, N. Nibbelink, M. Olson, T. Pellett, C. Storlie and A. Trebitz. 1995. Responses of bluegill to habitat manipulations: Power to detect effects. *North American Journal of Fisheries Management* 15: 519-527.
117. Carpenter, S.R., S.W. Chisholm, C.J. Krebs, D.W. Schindler and R.F. Wright. 1995. Ecosystem experiments. *Science* 269: 324-327.
118. Stow, C.A., S.R. Carpenter and K.L. Cottingham. 1995. Resource vs. ratio-dependent consumer-resource models: A Bayesian perspective. *Ecology* 76: 1986-1990.
119. Christensen, D.L., S.R. Carpenter, and K.L. Cottingham. 1995. Predicting chlorophyll vertical distribution in response to epilimnetic nutrient enrichment in stratified lakes. *Journal of Plankton Research* 17: 1461-1478.

120. Stow, C.A., S.R. Carpenter, C.P. Madenjian, L.A. Eby and L.J. Jackson. 1995. Fisheries management to reduce contaminant consumption. *BioScience* 46: 752-758.
121. Schindler, D.E., S.R. Carpenter, K.L. Cottingham, X. He, J.R. Hodgson, J.F. Kitchell, and P.A. Soranno. 1995. Food web structure and littoral zone coupling to pelagic trophic cascades. pp. 96-105 in G.A. Polis and K.O. Winemiller (editors), Food Webs: Integration of Pattern and Dynamics. Chapman and Hall, N.Y.
122. Kratz, T.K., J.J. Magnuson, P. Bayley, B.J. Benson, C.W. Berish, C.S. Bledsoe, E.R. Blood, C.J. Bowser, S.R. Carpenter, G.L. Cunningham, R.A. Dahlgren, T.M. Frost, J.C. Halfpenny, J.D. Hansen, D. Heisey, R.S. Inouye, D.W. Kaufman, A. McKee and Y. Yarie. 1995. Temporal and spatial variability as neglected ecosystem properties: lessons learned from 12 North American ecosystems. pp 359-383 in D. Rapport and P. Calow (editors), Evaluating the Health of Large-Scale Ecosystems. Springer-Verlag, NY.
123. Soranno, P.A., S.L. Hubler, S.R. Carpenter and R.C. Lathrop. 1996. Phosphorus loads to surface waters: A simple model to account for spatial patterns of land use. *Ecological Applications* 6: 865-878.
124. Carpenter, S.R., J.F. Kitchell, K.L. Cottingham, D.E. Schindler, D.L. Christensen, D.M. Post and N. Voichick. 1996. Chlorophyll variability, nutrient input and grazing: Evidence from whole-lake experiments. *Ecology* 77: 725-735.
125. Christensen, D.L., B.R. Herwig, D.E. Schindler and S.R. Carpenter. 1996. Impacts of lakeshore residential development on coarse woody debris in north temperate lakes. *Ecological Applications* 6: 1143-1149.
126. Christensen, D.L., S.R. Carpenter, J.J. Cole, K.L. Cottingham, S.E. Knight, J.P. LeBouton, M.L. Pace, D.E. Schindler and N. Voichick. 1996. Pelagic responses to changes in dissolved organic carbon following division of a seepage lake. *Limnology and Oceanography* 41: 553-559.
127. Lathrop, R.C., S.R. Carpenter and L.G. Rudstam. 1996. Water clarity in Lake Mendota since 1900: Responses to differing levels of nutrients and herbivory. *Canadian Journal of Fisheries and Aquatic Sciences* 53: 2250-2261.
128. Trebitz, A., S. Carpenter, P. Cunningham, B. Johnson, R. Lillie, D. Marshall, T. Martin, R. Narf, T. Pellett, S. Stewart, C. Storlie and J. Unmuth. 1997. A model of bluegill-largemouth bass interactions in relation to aquatic vegetation and its management. *Ecological Modelling* 94: 139-156.
129. Carpenter, S.R. and M.L. Pace. 1997. Dystrophy and eutrophy in lake ecosystems: Implications of fluctuating inputs. *Oikos* 78: 3-14.

130. Stow, C.A., S.R. Carpenter and R.C. Lathrop. 1997. A Bayesian observation error model to predict cyanobacterial biovolume from spring total phosphorus in Lake Mendota, Wisconsin. *Canadian Journal of Fisheries and Aquatic Sciences* 54: 464-473.
131. Carpenter, S.R. and K.L. Cottingham. 1997. Resilience and restoration of lakes. *Conservation Ecology* 1: 2. Available on the Internet. URL: <http://www.consecol.org/vol1/iss1/art2>.
132. Schindler, D.E., S.R. Carpenter, J.J. Cole, J.F. Kitchell and M.L. Pace. 1997. Food web structure alters carbon exchange between lakes and the atmosphere. *Science* 277: 248-251.
133. Carpenter, S.R., M. Olson, P. Cunningham, S. Gafny, N. Nibbelink, T. Pellett, C. Storlie, A. Trebitz and K. Wilson. 1997. Macrophyte structure and growth of bluegill (*Lepomis macrochirus*): design of a multi-lake experiment. pp. 217-226 in Jeppesen, E., Ma. Sondergaard, Mo. Sondergaard and K. Christofferson (eds.), *The Structuring Role of Submerged Macrophytes in Lakes*. Springer-Verlag, Berlin.
134. Post, D.M., S.R. Carpenter, D.L. Christensen, K.L. Cottingham, J.R. Hodgson, J.F. Kitchell and D.E. Schindler. 1997. Seasonal effects of variable recruitment of a dominant piscivore on pelagic food web structure. *Limnology and Oceanography* 42: 722-729.
135. Soranno, P.A., S.R. Carpenter and R.C. Lathrop. 1997. Internal phosphorus loading in Lake Mendota: Response to external loads and weather. *Canadian Journal of Fisheries and Aquatic Sciences* 54: 1883-1893.
136. Pace, M.L., J.J. Cole and S.R. Carpenter. 1997. Trophic cascades and compensation: Differential responses of microzooplankton in whole-lake experiments. *Ecology* 79: 138-152.
137. Carpenter, S.R., D. Bolgrien, R.C. Lathrop, C.A. Stow, T. Reed and M.A. Wilson. 1998. Ecological and economic analysis of lake eutrophication by nonpoint pollution. *Australian Journal of Ecology* 23: 68-79.
138. Cottingham, K.L., S.E. Knight, S.R. Carpenter, J.J. Cole, M.L. Pace and A.E. Wagner. 1998. Response of phytoplankton and bacteria to nutrients and zooplankton: a mesocosm experiment. *Journal of Plankton Research* 19: 995-1010.
139. Carpenter, S.R., J.J. Cole, J.F. Kitchell, and M.L. Pace. 1998. Impact of dissolved organic carbon, phosphorus and grazing on phytoplankton biomass and production in experimental lakes. *Limnology and Oceanography* 43: 73-80.
140. Carpenter, S.R. 1998. Ecosystem ecology: Integrated physical, chemical and biological processes. pp. 123-162 in S.I. Dodson (ed.), *Ecology*. Oxford University Press, London.

141. Olson, M.H., S.R. Carpenter, P. Cunningham, S. Gafny, B.R. Herwig, N.P. Nibbelink, T. Pellett, C. Storlie, A.S. Trebitz and K.A. Wilson. 1998. Managing macrophytes to improve fish growth: A multi-lake experiment. *Fisheries* 23: 6-12.
142. Nibbelink, N. and S.R. Carpenter. 1998. Interlake variation in growth and size structure of bluegill: inverse analysis of an individual-based model. *Canadian Journal of Fisheries and Aquatic Sciences* 55: 387-396.
143. Carpenter, S.R. 1998. The need for large-scale experiments to assess and predict the response of ecosystems to perturbation. pp. 287-312 in M.L. Pace and P.M. Groffman (eds.), *Successes, Limitations and Frontiers in Ecosystem Science*. Springer-Verlag, N.Y.
144. Carpenter, S.R., J.J. Cole, T.E. Essington, J.R. Hodgson, J.N. Houser, J.F. Kitchell and M.L. Pace. 1998. Evaluating alternative explanations in ecosystem experiments. *Ecosystems* 1: 335-344.
145. Cottingham, K.L. and S.R. Carpenter. 1998. Population, community and ecosystem variates as ecological indicators: phytoplankton response to whole-lake enrichment. *Ecological Applications* 8: 508-530.
146. Lamon, E.C., S.R. Carpenter and C.A. Stow. 1998. Forecasting PCB concentrations in five species of Lake Michigan salmonids: a dynamic linear model approach. *Ecological Applications* 8: 659-668.
147. Carpenter, S.R., N.F. Caraco, D.L. Correll, R.W. Howarth, A.N. Sharpley and V.H. Smith. 1998. Nonpoint pollution of surface waters with phosphorus and nitrogen. *Ecological Applications* 8: 559-568.
148. Lathrop, R.C., S.R. Carpenter, C.A. Stow, P.A. Soranno and J.C. Panuska. 1998. Phosphorus loading reductions needed to control blue-green algal blooms in Lake Mendota. *Canadian Journal of Fisheries and Aquatic Sciences* 55: 1169-1178.
149. Cottingham, K.L., S.R. Carpenter and A.L. St. Amand. 1998. Responses of epilimnetic phytoplankton to experimental nutrient enrichment in three small seepage lakes. *Journal of Plankton Research* 10: 1889-1914.
150. Jackson, L.J., S.R. Carpenter, J. Manchester-Neesvig, and C.A. Stow. 1999. Current concentrations of PCBs in Lake Michigan invertebrates, a prediction test, and a corroboration of hindcast concentrations. *Journal of Great Lakes Research* 24: 808-821.
151. Lathrop, R.C., S.R. Carpenter, and D.M. Robertson. 1999. Summer water clarity responses to phosphorus, *Daphnia* grazing, and internal mixing in Lake Mendota. *Limnology and Oceanography* 44: 137-146.

152. Ives, A.R., S.R. Carpenter and B. Dennis. 1999. Community interaction webs and the response of a zooplankton community to experimental manipulations of planktivory. *Ecology* 80: 1405-1421.
153. Bennett, E.M., T. Reed-Andersen, J.N. Houser, J.R. Gabriel and S.R. Carpenter. 1999. A phosphorus budget for the Lake Mendota watershed. *Ecosystems* 2: 69-75.
154. Lamon, E.C., S.R. Carpenter and C.A. Stow. 1999. Rates of decrease of PCB concentrations in five species of Lake Michigan salmonids. *Canadian Journal of Fisheries and Aquatic Sciences* 56: 53-59.
155. Carpenter, S.R., D. Ludwig and W.A. Brock. 1999. Management of eutrophication for lakes subject to potentially irreversible change. *Ecological Applications* 9: 751-771.
156. Wilson, M.A. and S.R. Carpenter. 1999. Economic valuation of freshwater ecosystem services in the United States, 1977-1997. *Ecological Applications* 9: 772-783.
157. Stow, C.A., L.J. Jackson and S.R. Carpenter. 1999. A mixed-order model to assess contaminant declines. *Environmental Monitoring and Assessment* 55: 434-444.
158. Carpenter, S.R., W.A. Brock and P.C. Hanson. 1999. Ecological and social dynamics in simple models of ecosystem management. *Conservation Ecology* 3(2): 4. URL: <http://www.consecol.org/vol3/iss2/art4>.
159. Janssen, M. A. and S. R. Carpenter. 1999. Managing the Resilience of Lakes: A multi-agent modeling approach. *Conservation Ecology* 3(2): 15. [online] URL: <http://www.consecol.org/vol3/iss2/art15>
160. Pace, M.L., J.J. Cole, S.R. Carpenter and J.F. Kitchell. 1999. Trophic cascades revealed in diverse ecosystems. *Trends in Ecology and Evolution* 14: 483-488.
161. Carpenter, S.R. and R.C. Lathrop. 1999. Lake restoration: capabilities and needs. *Hydrobiologia* 395/396: 19-28.
162. Kasprzak, P., R.C. Lathrop and S.R. Carpenter. 1999. Influence of different-sized *Daphnia* species on chlorophyll concentration and summer phytoplankton community structure in Wisconsin lakes. *Journal of Plankton Research* 21: 2161-2174.
163. Baines, S.B., K.E. Webster, T.K. Kratz, S.R. Carpenter, and J.J. Magnuson. 2000. Synchronous behavior of temperature, calcium and chlorophyll in lakes of northern Wisconsin. *Ecology* 81: 815-825.
164. Essington, T.E. and S.R. Carpenter. 2000. Nutrient cycling in lakes and streams: insights from a comparative analysis. *Ecosystems* 3: 131-143.

165. Lamon, E.C., C.A. Stow and S.R. Carpenter. 2000. Depuration of PCBs in the Lake Michigan ecosystem. *Ecosystems* 3: 332-343.
166. Houser, J.N., S.R. Carpenter and J.J. Cole. 2000. Food web structure and nutrient enrichment: effects on sediment phosphorus retention in whole-lake experiments. *Canadian Journal of Fisheries and Aquatic Sciences* 57: 1524-1533
167. Reed-Anderson, T., S.R. Carpenter, D.K. Padilla, and R.C. Lathrop. 2000. Predicted impact of zebra mussel invasion on water clarity in Lake Mendota. *Canadian Journal of Fisheries and Aquatic Sciences* 57: 1617-1626.
168. Reed-Anderson, T., S.R. Carpenter and R.C. Lathrop. 2000. Phosphorus flow in a watershed-lake ecosystem. *Ecosystems* 3: 561-573.
169. Schindler, D.E., B.R. Herwig and S.R. Carpenter. 2000. Biotic manipulations of aquatic ecosystems. Pp. 308-315 in O. Sala, R. Jackson, H. Mooney and R. Howarth (eds.), *Methods in Ecosystem Science*. Springer-Verlag, NY.
170. Scully, N.M., P.R. Leavitt, and S.R. Carpenter. 2000. Century-long effects of forest harvest on the physical structure and autotrophic community of a small temperate lake. *Can. J. Fish. Aquat. Sci.* 57 (Supplement 2): 50-59.
171. Lathrop, R.C., S.R. Carpenter and D.M. Robertson. 2000. Interacting factors causing exceptional summer water clarity in Lakes Mendota and Monona. *Internationale Vereinigung fur Theoretische und Angewandte Limnologie* 27: 1776-1779.
172. Vadeboncoeur, Y., D.M. Lodge and S.R. Carpenter. 2001. Whole-lake fertilization effects on the distribution of primary production between benthic and pelagic habitats. *Ecology* 82: 1065-1077.
173. Carpenter, S.R., J.J. Cole, J.R. Hodgson, J.F. Kitchell, M.L. Pace, D. Bade, K.L. Cottingham, T.E. Essington, J.N. Houser and D.E. Schindler. 2001. Trophic cascades, nutrients and lake productivity: whole-lake experiments. *Ecological Monographs* 71: 163-186.
174. Cole, J.J., M.L. Pace, S.R. Carpenter, and J.F. Kitchell. 2001. Persistence of net heterotrophy in lakes during nutrient addition and food web manipulations. *Limnology and Oceanography* 45: 1718-1730.
175. Carpenter, S.R. 2001. Alternate states of ecosystems: Evidence and its implications. Pages 357-383 in M.C. Press, N. Huntly and S. Levin (eds), *Ecology: Achievement and Challenge*. Blackwell, London.
176. Jackson, RB, SR Carpenter, CN Dahm, DM McKnight, RJ Naiman, SL Postel, SW Running. 2001. Water in a changing world. *Ecological Applications* 11:1027-1045.

177. Bennett, E.M., S.R. Carpenter and N.F. Caraco. 2001. Human impact on erodible phosphorus and eutrophication: a global perspective. *BioScience* 51: 227-234.
178. Riera, J., P.R. Voss, S.R. Carpenter, T.K. Kratz, T.M. Lillesand, J.A. Schnaiberg, M.G. Turner and M.W. Wegener. 2001. Nature, society and history in two contrasting landscapes in Wisconsin, USA: interactions between lakes and humans during the twentieth century. *Land Use Policy* 18: 41-51.
179. Jackson, L.J., S.R. Carpenter, J. Manchester-Neesvig and C.A. Stow. 2001. PCB congeners in Lake Michigan coho (*Oncorhynchus kisutch*) and chinook (*Oncorhynchus tshawytscha*) salmon. *Environmental Science and Technology* 35: 856-862.
180. Carpenter, S.R. and L.H. Gunderson. 2001. Coping with collapse: Ecological and social dynamics in ecosystem management. *BioScience* 51: 451-458.
181. Havlicek, T. and S.R. Carpenter. 2001. Pelagic species size distributions in lakes: Are they discontinuous? *Limnology and Oceanography* 46: 1021-1033.
182. Clark, J.S., S.R. Carpenter, M. Barber, S. Collins, A. Dobson, J. Foley, D. Lodge, M. Pascual, R. Pielke, Jr, W. Pizer, C. Pringle, W. Reid, K. Rose, O. Sala, W. Schlesinger, D. Wall, and D. Wear. 2001. Ecological forecasting: an emerging imperative. *Science* 293: 657-660.
183. Greenfield, B.K., T.R. Hrabik, C.J. Harvey and S.R. Carpenter. 2001. Predicting mercury levels in yellow perch: use of water chemistry, trophic ecology, and spatial traits. *Canadian Journal of Fisheries and Aquatic Sciences* 58: 1419-1429.
184. Scheffer, M., S. Carpenter, J. Foley, C. Folke and B. Walker. 2001. Catastrophic shifts in ecosystems. *Nature* 413: 591-596.
185. Carpenter, S.R., B.H. Walker, J.M. Anderies and N. Abel. 2001. From metaphor to measurement: Resilience of what to what? *Ecosystems* 4: 765-781.
186. Westley, F., S.R. Carpenter, W.A. Brock, C.S. Holling and L.H. Gunderson. 2002. Why systems of people and nature are not just social and ecological systems. Pp. 103-120 in L.H. Gunderson and C.S. Holling (eds.), *Panarchy: Understanding Transformations in Human and Natural Systems*. Island Press, Washington D.C.
187. Carpenter, S.R., W.A. Brock and D. Ludwig. 2002. Collapse, learning and renewal. Pp. 173-194 in L.H. Gunderson and C.S. Holling (eds.), *Panarchy: Understanding Transformations in Human and Natural Systems*. Island Press, Washington D.C.
188. Holling, C.S., S.R. Carpenter, W.A. Brock and L.H. Gunderson. 2002. Discoveries for sustainable futures. Pp. 395-418 in L.H. Gunderson and C.S. Holling (eds.), *Panarchy: Understanding Transformations in Human and Natural Systems*. Island Press, Washington D.C.

189. Yorque, R., B. Walker, C.S. Holling, L.H. Gunderson, C. Folke, S.R. Carpenter and W.A. Brock. 2002. Toward an integrative synthesis. Pp. 419-438 in L.H. Gunderson and C.S. Holling (eds.), *Panarchy: Understanding Transformations in Human and Natural Systems*. Island Press, Washington D.C.
190. Walker, B., S. Carpenter, J. Anderies, N. Abel, G. Cumming, M. Janssen, L. Lebel, J. Norberg, G. D. Peterson, and R. Pritchard. 2002. Resilience management in social-ecological systems: a working hypothesis for a participatory approach. *Conservation Ecology* 6(1): 14. [online] URL: <http://www.consecol.org/vol6/iss1/art14>
191. Rusak, J. A., N. D. Yan, K. M. Somers, K. L. Cottingham, F. Micheli, S. R. Carpenter, T. M. Frost, M. J. Paterson, and D. J. McQueen. 2002. Temporal, spatial, and taxonomic patterns of crustacean zooplankton variability in unmanipulated north-temperate lakes. *Limnology and Oceanography* 47: 613-625.
192. Dent, C.L., G.S. Cumming and S.R. Carpenter. 2002. Multiple states in river and lake ecosystems. *Philosophical Transactions of the Royal Society of London Series B* 357:635-645
193. Folke, C., S.R. Carpenter, T. Elmqvist, L. Gunderson, C.S. Holling and B. Walker. 2002. Resilience and sustainable development: Building adaptive capacity in a world of transformations. *Ambio* 31: 437-440.
194. Carpenter, S.R. 2002. Ecological futures: building an ecology of the long now. ESA MacArthur Award Paper. *Ecology* 83: 2069-2083.
195. Reed, T. and S.R. Carpenter. 2002. Comparisons of P yield, riparian buffer strips, and land cover in six agricultural watersheds. *Ecosystems* 5: 568-577.
196. Lathrop, R.C., B.M. Johnson, T.B. Johnson, M.T. Vogelsang, S.R. Carpenter, T.R. Hrabik, J.F. Kitchell, J.J. Magnuson, L.G. Rudstam, and R.S. Stewart. 2002. Stocking piscivores to improve fishing and water clarity: a synthesis of the Lake Mendota biomanipulation project. *Freshwater Biology* 47: 2410-2424.
197. Cole, J.J., S.R. Carpenter, J.F. Kitchell and M.L. Pace. 2002. Pathways of organic C utilization in small lakes: Results from a whole-lake ¹³C addition and coupled model. *Limnology and Oceanography* 47: 1664-1675.
198. Carpenter, S.R. and K.L. Cottingham. 2002. Resilience and the restoration of lakes. Pp. 51-70 in L.H. Gunderson and L. Pritchard Jr. (eds.), *Resilience and the Behavior of Large-Scale Ecosystems*. Island Press, Washington, D.C. [reprinting of Carpenter and Cottingham 1997, #131].
199. Hobbie, J.E., S.R. Carpenter, N.B. Grimm, J.R. Gosz and T.R. Seastedt. 2003. The U.S. Long Term Ecological Research program. *BioScience* 53: 21-32.

200. Peterson, G.D., G.S. Cumming and S.R. Carpenter. 2003. Scenario planning: A tool for conservation in an uncertain world. *Conservation Biology* 17: 358-366.
201. Cohen, J.E., T. Jonsson and S.R. Carpenter. 2003. Ecological community description using food webs, species abundance and body size. *Proceedings of the National Academy of Sciences* 100: 1781-1786.
202. Ives, A.R., B. Dennis, K.L. Cottingham and S.R. Carpenter. 2003. Estimating community stability and ecological interactions from time-series data. *Ecological Monographs* 73: 301-330.
203. Peterson, G.D., S.R. Carpenter and W.A. Brock. 2003. Uncertainty and management of multi-state ecosystems: an apparently rational route to collapse. *Ecology* 84: 1403-1411 .
204. Peterson, G. D., T. D. Beard Jr., B. E. Beisner, E. M. Bennett, S. R. Carpenter, G. S. Cumming, C. L. Dent, and T. D. Havlicek. 2003. Assessing future ecosystem services: a case study of the Northern Highlands Lake District, Wisconsin. *Conservation Ecology* 7(3): 1. [online] URL: <http://www.consecol.org/vol7/iss3/art1>
205. Beard, T. D., Jr., M.J. Hansen and S. R. Carpenter. 2003. Development of a regional stock-recruitment model for understanding factors affecting walleye recruitment in Northern Wisconsin lakes. *Transactions of the American Fisheries Society* 132: 396-405.
206. Beisner, B.E., C.L. Dent and S.R. Carpenter. 2003. Variability of lakes on the landscape: roles of phosphorus, food webs and dissolved organic carbon. *Ecology* 84: 1563-1575 .
207. Beisner, B.E., A.R. Ives and S.R. Carpenter. 2003. Effects of an exotic fish invasion on the prey communities of two lakes. *Journal of Animal Ecology* 72: 331-342.
208. Bennett, E.M., S.R. Carpenter, G.D. Peterson, G.S. Cumming, M. Zurek and P. Pingali. 2003. Why global scenarios need ecology. *Frontiers in Ecology and the Environment* 1: 322-329.
209. Hanson, P. C., D. L. Bade, S. R. Carpenter, and T. K. Kratz. 2003. Lake metabolism: Relationships with dissolved organic carbon and phosphorus. *Limnology and Oceanography* 48: 1112-1119.
210. Ludwig, D., S. Carpenter and W. Brock. 2003. Optimal phosphorus loading for a potentially eutrophic lake. *Ecological Applications* 13: 1135-1152.
211. Beard, T. D., Jr., S. P. Cox and S.R. Carpenter. 2003. Impacts of daily bag limit reductions on angler effort in Wisconsin walleye lakes. *North American Journal of Fisheries Management* 23: 1283-1293.

212. Beard, T.D., Jr., P.W. Rasmussen, S.P. Cox and S.R. Carpenter. 2003. Evaluation of a mixed walleye spearing and angling fishery management system in northern Wisconsin. *North American Journal of Fisheries Management* 23: 481-491.
213. Carpenter, S.R. 2003. The need for fast and frugal models. Pp 455-460 in C. Canham, J. Cole and W. Lauenroth (eds.), *Models in Ecosystem Science*. Princeton University Press, Princeton, N.J., U.S.A.
214. Scheffer, M. and S.R. Carpenter. 2003. Catastrophic regime shifts in ecosystems: linking theory to observation. *Trends in Ecology and Evolution* 12: 648-656.
215. Pace, M.L., J.J. Cole, S.R. Carpenter, J.F. Kitchell, J.R. Hodgson, M. Van de Bogert, D.L. Bade, E.S. Kritzberg, and D. Bastviken. 2004. Whole-lake carbon-13 additions reveal terrestrial support of aquatic food webs. *Nature* 427: 240-243.
216. Carpenter, S. R. and W. A. Brock. 2004. Spatial complexity, resilience and policy diversity: fishing on lake-rich landscapes. *Ecology and Society* 9(1): 8. [online] URL: <http://www.ecologyandsociety.org/vol9/iss1/art8>
217. Hanson, P.C., A.I. Pollard, D.L. Bade, K. Predick, S.R. Carpenter and J.A. Foley. 2004. A model of carbon evasion and sedimentation in temperate lakes. *Global Change Biology* 10: 1285-1298.
218. Bade, D.L., S.R. Carpenter, J.J. Cole, P.C. Hanson and R.L. Hesslein. 2004. Controls of $\delta^{13}\text{C}$ -DIC in lakes: Geochemistry, lake metabolism and morphometry. *Limnology and Oceanography* 49: 1160-1172.
219. Folke, C., S. Carpenter, B. Walker, M. Scheffer, T. Elmqvist, L. Gunderson and C.S. Holling. 2004. Regime shifts, resilience and biodiversity in ecosystem management. *Annual Review of Ecology Evolution and Systematics* 35: 557-581.
220. Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig. 2004. Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society* 9(2): 5. [online] URL: <http://www.ecologyandsociety.org/vol9/iss2/art5>
221. Jonsson, T., J.E. Cohen and S.R. Carpenter. 2005. Food webs, body size, and species abundance in ecological community description. *Advances in Ecological Research* 36: 2-84.
222. Genkai-Kato, M. and S.R. Carpenter. 2005. Eutrophication due to phosphorus recycling in relation to lake morphometry, temperature and macrophytes. *Ecology* 86: 210-219.
223. Cohen, J.E. and S.R. Carpenter. 2005. Species' average body mass and numerical abundance in a community food web: statistical questions in estimating the relationship. Pp. 137-156 in P.C. de Ruiter, V. Wolters, and J.C. Moore (editors), *Dynamic Food Webs*:

Multispecies Assemblages, Ecosystem Development and Environmental Change. Academic Press.

224. Bennett, E. M., S. R. Carpenter, and M. Clayton. 2005. Soil phosphorus variability: Scale-dependency in an urbanizing agricultural landscape. *Landscape Ecology* 20: 389-400.
225. Gergel, S.E., S.R. Carpenter and E.H. Stanley. 2005. Do dams and levees impact nitrogen cycling? Simulating the effects of floodplain alterations on floodplain denitrification. *Global Change Biology* 11: 1352-1367.
226. Carpenter, S.R., J.J. Cole, M. L. Pace, M. Van de Bogert, D.L. Bade, D. Bastviken, C.M. Gille, J. R. Hodgson, J. F. Kitchell, and E. S. Kritzberg. 2005. Ecosystem subsidies: terrestrial support of aquatic food webs from ^{13}C addition to contrasting lakes. *Ecology* 86: 2737-2750.
227. Carpenter, S.R., R.C. Lathrop, P. Nowak, E.M. Bennett, T. Reed and P.A. Soranno. 2006. The ongoing experiment: Restoration of Lake Mendota and its watershed. Pp. 236-256 in J.J. Magnuson, T.K. Kratz and B.J. Benson (eds.), *Long-Term Dynamics of Lakes in the Landscape*. Oxford University Press, London, England.
228. Foley, J., R. de Fries, G.P. Asner, C. Barford, G. Bonan, S.R. Carpenter, F.S. Chapin, M.T. Coe, G.C. Daily, H.K. Gibbs, J.H. Helkowski, T. Hollaway, E.A. Howard, C.J. Kucharik, C. Monfreda, J.A. Patz, I.C. Prentice, N. Ramankutty, and P.K. Snyder. 2005. Global consequences of land use. *Science* 309: 570-574.
229. Carpenter, S.R. 2005. Eutrophication of aquatic ecosystems: Bistability and soil phosphorus. *Proceedings of the National Academy of Sciences* 102: 10002-10005. Available on the Internet: <http://www.pnas.org/cgi/doi/10.1073/pnas.0503959102>.
230. Brose, U., L. Cushing, C. Banasak-Richter, E.L. Berlow, L.-F. Bersier, J.L. Blanchard, T. Brey, S.R. Carpenter, M.-F. Cattin-Blandinier, J.E. Cohen, H.A. Daway, T. Dell, F. Edwards, S. Harper-Smith, U. Jacob, T. Jonsson, R.A. Knapp, M.E. Ledger, N.D. Martinez, J. Mennott, K. Mintenbeck, J.K. Pinnegar, T. Rayner, L. Ruess, W. Ulrich, P. Warren, R.J. Williams, G. Woodward and P. Yodzis. 2005. Empirical body sizes of consumers and their resources. *Ecology* 86: 2545-2545.
231. Adger, W.N., T.P. Hughes, C. Folke, S.R. Carpenter and J. Rockstrom. 2005. Social-ecological resilience to coastal disasters. *Science* 309: 1036-1039.
232. Brock, W.A., Carpenter, S.R. & Scheffer, M. 2008. Regime shifts, environmental signals, uncertainty and policy choice. p. 180-206 in *A Theoretical Framework for Analyzing Social-Ecological Systems*, eds. Norberg, J. and Cumming, G. (Columbia, New York).
233. Scheffer, M., S.R. Carpenter and B. de Young. 2005. Cascading effects of overfishing marine systems. *Trends in Ecology and Evolution* 20: 579-581.

234. Ludwig, D., W. A. Brock and S. R. Carpenter 2005. Uncertainty in discount models and environmental accounting. *Ecology and Society* 10 (2): 13. [online] URL: <http://www.ecologyandsociety.org/vol10/iss2/art13/>
235. Carpenter, S.R. and W.A. Brock. 2006. Rising variance: A leading indicator of ecological transition. *Ecology Letters* 9: 311-318.
236. Walker, B., L. Gunderson, A. Kinzig, C. Folke, S. Carpenter and L. Schultz 2006. A Handful of Heuristics and Some Propositions for Understanding Resilience in Social-Ecological Systems. *Ecology and Society* 11 (1): 13. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art13/>
237. Gunderson, L. H., S. R. Carpenter, C. Folke, P. Olsson and G. Peterson 2006. Water RATs (Resilience, Adaptability, and Transformability) in Lake and Wetland Social-Ecological Systems . *Ecology and Society* 11 (1): 16. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art16/>
238. Olsson, P., L. H. Gunderson, S. R. Carpenter, P. Ryan, L. Lebel, C. Folke and C. Holling 2006. Shooting the Rapids: Navigating Transitions to Adaptive Governance of Social-Ecological Systems. *Ecology and Society* 11 (1): 18. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art18/>
239. Bade, D.L., M.L. Pace, J.J. Cole and S.R. Carpenter. 2006. Can algal photosynthetic fractionation in lakes be predicted from existing models? *Aquatic Sciences* 68: 142-153.
240. Hanson, P.C, S.R. Carpenter, D.E. Armstrong, E.H. Stanley and T.K. Kratz. 2006. Lake dissolved inorganic carbon and dissolved oxygen: changing drivers across scales from days to decades. *Ecological Monographs* 76: 343-363.
241. Cole, J.J., S.R. Carpenter, M.L. Pace, M.C. Van de Bogert, J.F. Kitchell and J.R. Hodgson. 2006. Differential support of lake food webs by three types of terrestrial organic carbon. *Ecology Letters* 9: 558-568.
242. Bade, D., S.R. Carpenter, J.J. Cole, M.L. Pace, E. Kritzberg, M.C. Van de Bogert, R. Corey and D.M. McKnight. 2007. Sources and fates of dissolved organic carbon in lakes as determined by whole-lake isotope additions. *Biogeochemistry* 84: 115-129.
243. Carpenter, S.R. and C. Folke. 2006. Ecology for transformation. *Trends in Ecology and Evolution* 21: 309-315.
244. Carpenter, S. R., E. M. Bennett, and G. D. Peterson. 2006. Scenarios for ecosystem services: an overview. *Ecology and Society* **11**(1): 29. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art29/>

245. Chapin, F. S., III, M. Hoel, S. R. Carpenter, J. Lubchenco, B. Walker, T. V. Callaghan, C. Folke, S. Levin, K.-G. Mäler, C. Nilsson, S. Barrett, F. Berkes, A.-S. Crépin, K. Danell, T. Rosswall, D. Starrett, T. Xepapadeas, and S. A. Zimov. 2006. Building resilience and adaptation to manage Arctic change. *Ambio* 35: 198-202.
246. Sass, G.G., J.F. Kitchell, S.R. Carpenter, T.R. Hrabik, A.E. Marburg, and M.G. Turner. 2006. Fish community and food web responses to a whole-lake removal of coarse woody habitat. *Fisheries* 31: 321-330.
247. Brock, W. A. and S. R. Carpenter 2006. Variance as a leading indicator of regime shift in ecosystem services. *Ecology and Society* 11 (2): 9. [online] URL: <http://www.ecologyandsociety.org/vol11/iss2/art9/>
248. Brose, U., T. Jonsson, E.R. Berlow, P. Warren, C. Banasek-Richter, L.F. Bersier, J.L. Blanchard, T. Brey, S.R. Carpenter, M.F. Cattin Blandinier, L. Cushing, H.A. Dawah, T. Dell, F. Edwards, S. Harper-Smith, U. Jacob, M.E. Ledger, N.D. Martinez, J. Memmott, K. Mintenbeck, J.K. Pinnegar, B.C. Rall, T.S. Rayner, D.C. Reumann, L. Reuss, W. Ulrich, R.J. Williams, G. Woodward and J.E. Cohen. 2006. Consumer-resource body size relationships in natural food webs. *Ecology* 87: 2411-2417.
249. Johnson, P.T.J. and S.R. Carpenter. 2006. Influence of eutrophication on disease in aquatic ecosystems: patterns, processes and predictions. In R. Ostfeld, F. Keesing and V. Eviner (eds.), *Reciprocal Interactions of Ecosystems and Disease*. Princeton University Press, Princeton, N.J.
250. Johnson, P.T.J., D.E. Stanton, E.R. Preu, K.J. Forshay, and S.R. Carpenter. 2006. Dining on disease: How interactions between infection and environment affect predation risk. *Ecology* 87: 1973-1980
251. Carpenter, S.R., R. DeFries, H.A. Mooney, S. Polasky, W. Reid and R. Scholes. 2006. Millennium Ecosystem Assessment: Research Needs. *Science* 313: 257-258.
252. Sterner, T., M. Troell, M., S. Aniyar, S. Barrett, W. Brock, S. Carpenter, K. Chopra, P. Ehrlich, M. Hoel, S. Levin, K-G. Mäler, J. Norbert, L. Pihl, T. Söderqvist, J. Wilen and A. Xepapadeas. 2006. Quick fixes for environmental problems: Part of the solution, or part of the problem? *Environment* 48: 20-27.
253. Carpenter, S.R., B.J. Benson, R. Biggs, J.W. Chipman, J.A. Foley, S.A. Golding, R.B. Hammer, P.C. Hanson, P.T.J. Johnson, A.M. Kamarainen, T.K. Kratz, R.C. Lathrop, K.D. McMahon, B. Provencher, J.A. Rusak, C.T. Solomon, E.H. Stanley, M.G. Turner, M.J. Vander Zanden, C.-H. Wu and H. Yuan. 2007. Understanding regional change: Comparison of two lake districts. *BioScience* 57: 323-335.
254. Hanson, P.C., S.R. Carpenter, J.A. Cardille, M.T. Coe and L.A. Winslow. 2007. Small lakes dominate a random sample of regional lake characteristics. *Freshwater Biology* 52: 814-822.

255. Roth, B.M., I.C. Kaplan, G.G. Sass, P.T. Johnson, A.E. Marburg, A.C. Yannarell, T.D. Havlicek, T.V. Willis, M.G. Turner and S.R. Carpenter. 2007. Linking terrestrial and aquatic ecosystems: The role of woody habitat in lake food webs. *Ecological Modelling* 203: 459-452.
256. Van de Bogert, M.C., S.R. Carpenter, J.J. Cole and M.L. Pace. 2007. Assessing pelagic and benthic metabolism using free water measurements. *Limnology and Oceanography Methods* 5: 145-155.
257. Carpenter, S.R. 2008. Seeking adaptive change in Wisconsin's ecosystems. In Waller, D.M. and T.P. Rooney (eds.), *The Vanishing Present: Wisconsin's Changing Lands, Waters and Wildlife*. University of Chicago Press, Chicago, Illinois USA.
258. Pace, M.L., S.R. Carpenter, J.J. Cole, J.J. Coloso, J.F. Kitchell, J.R. Hodgson, J.J. Middelburg, N.D. Preston, C.T. Solomon and B.C. Weidel. 2007. Does terrestrial organic carbon subsidize the planktonic food web in a clear-water lake? *Limnology and Oceanography* 52: 2177-2189.
259. Ives, A.R. and S.R. Carpenter. 2007. Stability and diversity of ecosystems. *Science* 317: 58-62.
260. Cardille, J. A., S. R. Carpenter, M. T. Coe, J. A. Foley, P. C. Hanson, M. G. Turner, and J. A. Vano. 2007. Carbon and water cycling in lake-rich landscapes: Landscape connections, lake hydrology, and biogeochemistry, *J. Geophys. Res.*, 112, G02031, doi: 10.1029/2006JG000200.
261. Solomon, C.T., S.R. Carpenter, J.J. Cole and M.L. Pace. 2008. Support of benthic invertebrates by detrital resources and current autochthonous primary production: results from a whole-lake ¹³C addition. *Freshwater Biology* 53: 42-54.
262. Liu, J., T. Dietz, S.R. Carpenter, M. Alberti, C. Folke, E. Moran, A.N. Pell, P. Deadman, T. Kratz, J. Lubchenco, E. Ostrom, Z. Ouyang, W. Provencher, C.L. Redman, S.H. Schneider, and W.W. Taylor. 2007. Complexity of coupled human and natural systems. *Science* 317: 1513-1516.
263. Brock, William A., and Stephen R. Carpenter. 2007. Panaceas and diversification of environmental policy. *Proceedings of the National Academy of Sciences USA* 104:15206–15211.
264. Johnson, P.T.J., J.M. Chase, K.L. Dosch, R.B. Hartson, J.A. Gross, D.J. Larson, D.R. Sutherland, and S.R. Carpenter. 2007. Aquatic eutrophication promotes pathogenic infection in amphibians. *Proceedings of the National Academy of Sciences USA* 104: 15781-15786.
265. Carpenter, S.R., W.A. Brock, J.J. Cole, J.F. Kitchell and M.L. Pace. 2008. Leading indicators of trophic cascades. *Ecology Letters* 11: 128-138.
266. Bennett, E.M., S.R. Carpenter and J.A. Cardille. 2008. Estimating the risk of exceeding thresholds in environmental systems. *Water, Air & Soil Pollution* 191: 131-138.

267. Liu, J., T. Dietz, S.R. Carpenter, C. Folke, M. Alberti, C.L. Redman, S.H. Schneider, E. Ostrom, A.N. Pell, J. Lubchenco, W.W. Taylor, Z. Ouyang, P. Deadman, T. Kratz and W. Provencher. 2007. Coupled human and natural systems. *Ambio* 36: 639-649.
268. Weidel, B.C., T. Ushikubo, S.R. Carpenter, N.T. Kita, J.J. Cole, J.F. Kitchell, M.L. Pace and J.W. Valley. 2007. Diary of a bluegill (*Lepomis macrochirus*): daily $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ records in otoliths by ion microprobe. *Canadian Journal of Fisheries and Aquatic Sciences* 64: 1641-1645.
269. Carpenter, S.R. and R.C. Lathrop. 2008. Probabilistic estimate of a threshold for eutrophication. *Ecosystems* 11: 601-613.
270. Preston, N.D., S.R. Carpenter, J.J. Cole and M.L. Pace. 2008. Airborne carbon deposition on a remote forested lake. *Aquatic Sciences* 70: 213-224. DOI 10.1007/s00027-008-8074-5.
271. Solomon, C.T., S.R. Carpenter, J.A. Rusak and M.J. Vander Zanden. 2008. Long-term variation in isotopic baselines and implications for estimating consumer trophic niches. *Canadian Journal of Fisheries and Aquatic Sciences* 65: 2191-2200.
272. Kamarainen, A., F. Rowland, R. Biggs and S.R. Carpenter. 2008. Zooplankton and the total phosphorus – chlorophyll *a* relationship: Hierarchical Bayesian analysis of measurement error. *Canadian Journal of Fisheries and Aquatic Sciences* 65: 2644-2655.
273. Hanson, P.C., S.R. Carpenter, N. Kimura, C.-H. Wu, S. Cornelius, T.K. Kratz. 2008. Evaluation of metabolism models for free-water dissolved oxygen methods in lakes. *Limnology and Oceanography Methods* 6: 454-465.
274. Carpenter, S. R. and W. A. Brock 2008. Adaptive Capacity and Traps. *Ecology and Society* 13 (2): 40. [online] URL: <http://www.ecologyandsociety.org/vol13/iss2/art40/>
275. Biggs, R., S.R. Carpenter and W.A. Brock. 2009. Spurious certainty: How ignoring measurement error and environmental heterogeneity may contribute to environmental controversies. *BioScience* 59: 65-76.
276. Weidel, B.C., S.R. Carpenter, J.J. Cole, J. Hodgson, J.F. Kitchell, M.L. Pace, and C.T. Solomon. 2008. Carbon sources supporting fish growth in a north temperate lake. *Aquatic Sciences* 70: 446-458.
277. Biggs, R., S.R. Carpenter and W.A. Brock. 2009. Turning back from the brink: Detecting an impending regime shift in time to avert it. *Proceedings of the National Academy of Sciences* 106(3): 826-831. Online at: www.pnas.org/cgi/doi/10.1073/pnas.0811729106
278. Carpenter SR, Mooney HA, Agard J, Capistrano D, DeFries R, Diaz S, Dietz T, Duriappah A, Oteng-Yeboah A, Pereira HM, Perrings C, Reid WV, Sarukhan J, Scholes RJ, Whyte A. 2009.

Science for managing ecosystem services: Beyond the Millennium Ecosystem Assessment. *Proceedings of the National Academy of Sciences* 106: 1305-1312.

279. Carpenter, S. R., C. Folke, M. Scheffer and F. Westley 2009. Resilience: Accounting for the Noncomputable. *Ecology and Society* 14 (1): 13. [online] URL: <http://www.ecologyandsociety.org/vol14/iss1/art13/>

280. Carpenter, S.R. and M. Scheffer. 2009. Critical transitions and regime shifts in ecosystems: consolidating recent advances. pp. 22-32 in Hobbs, R.J. and K.N. Suding (eds.), *New Models for Ecosystem Dynamics and Restoration*. Island Press, Washington DC.

281. Johnson, P.T.J., A.R. Ives, R.C. Lathrop and S.R. Carpenter. 2009. Long-term disease dynamics in lakes: causes and consequences of chytrid infections in *Daphnia* populations. *Ecology* 90: 132-144.

282. Carpenter, S.R., J.J. Cole, J.F. Kitchell, M.L. Pace. 2010. Trophic cascades in lakes: Lessons and prospects. pp. 55-69 in: J. Terborgh and J. Estes (eds). *Trophic Cascades*. Island Press, Washington, D.C.

283. Carpenter, S.R., W.A. Brock, J.J. Cole and M.L. Pace. 2009. Leading indicators of phytoplankton transitions caused by resource competition. *Theoretical Ecology* 2: 139-150. Online DOI 10.1007/s12080-009-0038-4

284. Biggs, R., M.W. Diebel, D. Gilroy, A.M. Kamarainen, M.S. Kornis, N.D. Preston, J.E. Schmitz, C.K. Uejio, M.C. Van de Bogert, B.C. Weidel, P.C. West, D.P.M. Zaks and S.R. Carpenter. 2009. Preparing for the future: teaching scenario planning at the graduate level. *Frontiers of Ecology and Environment* 8: 267-273. DOI 10.1890/080075.

285. Cardille, J.A., S.R. Carpenter, J.A. Foley, P.C. Hanson, M.G. Turner, and J.A. Vano. 2009. Climate perturbations and lakes: estimating sensitivities of water and carbon budgets. *Journal of Geophysical Research* 114: G0311: 1-11. doi:10.1029/2008JG000891

286. Scheffer, M., J. Bascompte, W.A. Brock, V. Brovkin, S.R. Carpenter, V. Dakos, H. Held, E.H. Van Nes, M. Rietkerk and G. Sugihara. 2009. Early warning signals for critical transitions. *Nature* 461: 53-59.

287. Kamarainen, A.M., R.M. Penczykowski, M.C. Van de Bogert, P.C. Hanson and S.R. Carpenter. 2009. Phosphorus sources and demand during summer in a eutrophic lake. *Aquatic Sciences* 71: 214-227.

288. Carpenter, S.R. 2009. Managing the biosphere. pp. 679-682 in Levin, S.A., S.R. Carpenter, C.J. Godfray, A.P. Kinzig, M. Loreau, J.P. Losos, B. Walker and D.S. Wilcove (eds.). *Princeton Guide to Ecology*. Princeton University Press, Princeton, N.J.

289. Kamarainen, A.M., H. Yuan, C.H. Wu, and S.R. Carpenter. 2009. Estimates of phosphorus entrainment in Lake Mendota: A comparison of one-dimensional and three-dimensional approaches. *Limnology and Oceanography Methods* 7: 553-567.
290. Carpenter, S.R. and R. Biggs. 2009. Freshwaters: Managing across scales of space and time. pp. 197-220 in F.S. Chapin III, G.P. Kofinas and C. Folke (eds.), *Principles of Ecosystem Stewardship*. Springer-Verlag, NY.
291. Walker, B., S. Barrett, S. Polasky, V. Galaz, C. Folke, G. Engstrom, F. Ackerman, K. Arrow, S. Carpenter, K. Chopra, G. Daily, P. Ehrlich, T. Hughes, N. Kautsky, S. Levin, K-G. Maler, J. Shogren, J. Vincent, T. Xepapadeas and A. de Zeeuw. 2009. Looming global-scale failures and missing institutions. *Science* 325: 1345-1346.
292. Walker, B., G. Peterson, M. Anderies, A. Kinzig and S.R. Carpenter. 2005. Robustness in ecosystems. pp. 173-190 in E. Jen (ed.), *Robust Design*. Oxford University Press, Oxford, England.
293. Chapin, F.S. III, S.R. Carpenter, G.P. Kofinas, C. Folke, N. Abel, W.C. Clark, P. Olsson, D.M. Stafford Smith, B. Walker, O.R. Young, F. Berkes, R. Biggs, J.M. Grove, R.L. Naylor, E. Pinkerton, W. Steffen and F.J. Swanson. 2010. Ecosystem stewardship: sustainability strategies for a rapidly changing planet. *Trends in Ecology and Evolution* 25: 241-249.
294. Buffam, I., S.R. Carpenter, W. Yeck, P.C. Hanson and M.G. Turner. 2010. Filling holes in regional carbon budgets: Predicting peat depth in a north temperate lake district. *Journal of Geophysical Research* 115. G01005, doi:10.1029/2009JG001034
295. Brock, W.A. and S.R. Carpenter. 2010. Interacting regime shifts in ecosystems: implications for early warnings. *Ecological Monographs* 80: 353-367.
296. Langman, O.C, P.C. Hanson, S.R. Carpenter and Y.H. Hu. 2010. Control of dissolved oxygen in north temperate lakes over scales ranging from minutes to days. *Aquatic Biology* 9: 193-202.
297. Folke, C., S. R. Carpenter, B. Walker, M. Scheffer, T. Chapin and J. Rockström. 2010. Resilience Thinking: Integrating Resilience, Adaptability and Transformability. *Ecology and Society* 15 (4): 20. [online] URL: <http://www.ecologyandsociety.org/vol15/iss4/art20/>
298. Biggs, R., F. R. Westley and S. R. Carpenter. 2010. Navigating the Back Loop: Fostering Social Innovation and Transformation in Ecosystem Management. *Ecology and Society* 15 (2): 9. [online] URL: <http://www.ecologyandsociety.org/vol15/iss2/art9/>
299. Collins, S.L., S.R. Carpenter, S.M. Swinton, D.E. Orenstein, D.L. Childers, T.L. Gragson, N.B. Grimm, J.M. Grove, S.L. Harlan, J.P. Kaye, A.K. Knapp, G.P. Kofinas, J.J. Magnuson, W.H. McDowell, J.M. Melack, L.A. Ogden, G.P. Robertson, M.D. Smith and A.C. Whitmer.

2010. An integrated conceptual framework for long-term social-ecological research. *Frontiers in Ecology and Environment* 9: 351-357.

300. Buffam, I., Turner, M.G., Desai, A.R., Hanson, P., Rusak, J., Lottig, N.R., Stanley, E.H., and Carpenter, S.R., 2010. Integrating aquatic and terrestrial components to construct a complete carbon budget for a north temperate lake district. *Global Change Biology* 17: 1193-1211, [doi:10.1111/j.1365-2486.2010.02313.x](https://doi.org/10.1111/j.1365-2486.2010.02313.x).

301. Solomon, C.T., S.R. Carpenter, M.K. Clayton, J.J. Cole, J.J. Coloso, M.L. Pace, M.J. Vander Zanden, and B.C. Weidel. 2011. Terrestrial, benthic and pelagic resource use in lakes: results from a three-isotope Bayesian mixing model. *Ecology* 92: 1115-1125.

302. Carpenter, S. R., and W. A Brock. 2010. Early warnings of regime shifts in spatial dynamics using the discrete Fourier transform. *Ecosphere* 1:art10. [doi:10.1890/ES10-00016.1]

303. West, P.C., H.K. Gibbs, C. Monfreda, J. Wagner, C.C. Barford, S.R. Carpenter and J.A. Foley. 2010. Trading carbon for food: Global comparison of carbon stocks vs. crop yields on agricultural land. *Proceedings of the National Academy of Sciences* 107: 19645-19648.

304. Gaeta, J.W., M.J. Guarascio, G.G. Sass and S.R. Carpenter. 2010. Lakeshore residential development and growth of largemouth bass (*Micropterus salmoides*): a cross-lakes comparison. *Ecology of Freshwater Fish* 20: 92-101.

305. Weidel, B.C., S.R. Carpenter, J.F. Kitchell and M.J. Vander Zanden. 2011. Rates and components of carbon turnover in fish muscle: insights from bioenergetics models and a whole-lake ¹³C addition. *Canadian Journal of Fisheries and Aquatic Sciences*: in press.

306. Cole, J.J, S.R. Carpenter, J.F. Kitchell, M.L. Pace, C.T. Solomon and B.C. Weidel. 2011. Strong evidence for terrestrial support of zooplankton in small lakes based on stable isotopes of carbon, nitrogen and hydrogen. *Proceedings of the National Academy of Sciences* 108: 1975-1980.

307. Carpenter, S.R., E.H. Stanley and M.J. Vander Zanden. 2011. State of the world's freshwater ecosystems: Physical, chemical and biological changes. *Annual Review of Environment and Resources* 36: 75-99.

308. Carpenter, S.R. and E.M. Bennett. 2011. Reconsideration of the planetary boundary for phosphorus. *Environmental Research Letters* 6:014009. <http://dx.doi.org/10.1088/1748-9326/6/1/014009> .

309. Carpenter, S.R., J.J. Cole, M.L. Pace, R.D. Batt, W.A. Brock, T. Cline, J. Coloso, J.R. Hodgson, J.F. Kitchell, D.A. Seekell, L. Smith and B. Weidel. 2011. Early warnings of regime shifts: A whole-ecosystem experiment. *Science* 332: 1079-1082.

310. Polasky, S., S.R. Carpenter, C. Folke and B. Keeler. 2011. Decision making under great uncertainty: Environmental management in an era of global change. *Trends in Ecology and Evolution* 26: 398-404. Also Available Online: DOI 10.1016/j.tree.2011.04.007
311. Lawson, Z., J. Gaeta and S.R. Carpenter. 2011. Coarse woody habitat, lakeshore residential development, and largemouth bass nesting behavior. *North American Journal of Fish Management* 31: 666-670.
312. Kara, E.L., C. Heimerl, T. Killpack, M.C. Van de Bogert, H. Yoshida and S.R. Carpenter. 2011. Assessing a decade of phosphorus management in the Lake Mendota, Wisconsin watershed and scenarios for enhanced phosphorus management. *Aquatic Sciences* 74: 241-253. online DOI 10.1007/s00027-011-0215-6
313. Seekell, D.A., S.R. Carpenter and M.L. Pace. 2011. Conditional heteroscedasticity as a leading indicator of ecological regime shifts. *The American Naturalist* 178: 442-451.
314. Estes, J., J. Terborgh, J.S. Brashares, M.E. Power, J. Berger, W. J. Bond, S.R. Carpenter, T. Essington, R.D. Holt, J.B.C. Jackson, R.J. Marquis, L. Oksanen, T. Oksanen, R.T. Paine, E.K. Pickett, W.J. Ripple, S.A. Sandin, M. Scheffer, T.W. Schoener, J.B. Shurin, A.R.E. Sinclair, M.E. Soulé, R. Virtanen and D.A. Wardle. 2011. Trophic downgrading of planet Earth. *Science* 333: 301-306.
315. Carpenter, S.R. and W.A. Brock. 2011. Early warnings of unknown nonlinear shifts: a nonparametric approach. *Ecology* 92: 2196-2201.
316. Foley, J.A., N. Ramankutty, K.A. Brauman, E.S. Cassidy, J.S. Gerber, M. Johnston, N.D. Mueller, C. O'Donnell, D.K. Ray, P.C. West, C. Baker, E.M. Bennett, S.R. Carpenter, J. Hill, C. Monfreda, S. Polasky, J. Rockstrom, J. Sheehan, S. Siebert, D. Tilman and D.P.M. Zaks. 2011. Solutions for a cultivated planet. *Nature* 478: 337-342.
317. Thompson, J.R., A. Wiek, F.J. Swanson, S.R. Carpenter, N. Fresco, T. Hollingsworth, T.A. Spies and D.R. Foster. 2012. Scenario studies as a synthetic and integrative research activity for Long-Term Ecological Research. *BioScience* 62: 367-376.
318. Batt, R.D. and S.R. Carpenter. 2012. Free-water lake metabolism: addressing noisy time series with a Kalman filter. *Limnology and Oceanography Methods* 10: 20-30.
319. Lottig, N.R. and S.R. Carpenter. 2012. Interpolating and forecasting lake characteristics using long-term monitoring data. *Limnology and Oceanography* 57: 1113-1125.
320. Sass, G. G., S. R. Carpenter, J. W. Gaeta, J. F. Kitchell, and T. D. Ahrenstorff. 2012. Whole-lake addition of coarse woody habitat: response of fish populations. *Aquatic Sciences - Research Across Boundaries* 74(2):255-266.

321. Seekell, D.A., S.R. Carpenter, T. Cline and M.L. Pace. 2012. Conditional heteroskedasticity forecasts regime shift in a whole-ecosystem experiment. *Ecosystems* 15:741-747, doi: 10.1007/s10021-012-9542-2
322. Gaeta, J. W., J. S. Read, J. F. Kitchell, and S. R. Carpenter. 2012. Eradication via destratification: whole-lake mixing to selectively remove rainbow smelt, a cold-water invasive species. *Ecological Applications* 22:817-827.
323. Dakos, V., S. R. Carpenter, W. A. Brock, A. M. Ellison, V. Guttal, A. R. Ives, S. Kéfi, V. Livina, D. A. Seekell, E. H. van Nes, and M. Scheffer. 2012. Methods for Detecting Early Warnings of Critical Transitions in Time Series Illustrated Using Simulated Ecological Data. *PLoS ONE* 7:e41010.
324. Walker, B. H., S. R. Carpenter, J. Rockstrom, A.-S. Crépin, and G. D. Peterson. 2012. Drivers, "slow" variables, "fast" variables, shocks, and resilience. *Ecology and Society* 17(3): 30. <http://dx.doi.org/10.5751/ES-05063-170330>
325. Brock, W.A. and S.R. Carpenter. 2012. Early warnings of regime shift when the ecosystem structure is unknown. *PLoS ONE* 7(9): e45586. doi:10.1371/journal.pone.0045586
326. Van de Bogert, M.C., D.L. Bade, S.R. Carpenter, J.J. Cole, M.L. Pace, P.C. Hanson and O.C. Langman. 2012. Spatial heterogeneity strongly affects estimates of ecosystem metabolism in two north temperate lakes. *Limnology and Oceanography* 57: 1689-1700.
327. MacDonald, G.K., E.M. Bennett and S.R. Carpenter. 2012. Embodied phosphorus and the global connections of United States agriculture. *Environmental Research Letters* 7: 044024. DOI: [doi:10.1088/1748-9326/7/4/044024](https://doi.org/10.1088/1748-9326/7/4/044024)
328. Scheffer, M., S.R. Carpenter, T.M. Lenton, J. Bascompte, W. Brock, V. Dakos, J. van de Koppel, I.A. van de Leemput, S.A. Levin, E.H. van Nes, M. Pascual and J. Vandermeer. 2012. Anticipating critical transitions. *Science* 338: 344-348.
329. Batt, R.D., S.R. Carpenter, J.J. Cole, M.L. Pace, T.J. Cline, R.A. Johnson and D.A. Seekell. 2012. Resources supporting the food web of a naturally eutrophic lake. *Limnology and Oceanography* 57: 1443-1452.
330. Pace, M.L., S.R. Carpenter, R.A. Johnson and J. T. Kurzweil. 2013. Zooplankton provide early warnings of a regime shift in a whole-lake manipulation. *Limnology and Oceanography* 58: 525-532.
331. Carpenter S.R., Arrow K.J., Barrett S., Biggs R., Brock W.A., Crépin A.-S., Engström G., Folke C., Hughes T.P., Kautsky N., Li C.-Z., McCarney G., Meng K., Mäler K.-G., Polasky S., Scheffer M., Shogren J., Sterner T., Vincent J.R., Walker B., Xepapadeas A., Zeeuw A.D. 2012. General Resilience to Cope with Extreme Events. *Sustainability* 4(12):3248-3259.

332. Sharma, S., G. Mendoza, J.J. Magnuson and S.R. Carpenter. 2013. Influences of local weather, large-scale climatic drivers, and the ca. 11 year solar cycle on lake ice breakup dates: 1905-2004. *Climatic Change* 118: 857-870. Online DOI: 10.1007/s10584-012-0670-7
333. Seekell, D.A., T.J. Cline, S.R. Carpenter and M.L. Pace. 2013. Evidence of alternate attractors from a whole-ecosystem regime shift experiment. *Theoretical Ecology* 6: 385-394. DOI 10.1007/s12080-013-0183-7.
334. Hansen, G.J.A., A.R. Ives, M.J. Vander Zanden and S.R. Carpenter. 2013. Are rapid transitions between dominance by invasive and native species a result of alternate stable states, and does it matter? *Ecology* 94: 2207-2219.
335. Hansen, G.J.A., Hein, C., Roth, B., Vander Zanden, M.J., Gaeta, J., Latzka, A. and Carpenter S.R. 2013. Food web consequences of long-term invasive crayfish control. *Canadian Journal of Fisheries and Aquatic Sciences* 70: 1109-1122.
336. Batt, R.D., W.A. Brock, S.R. Carpenter, J.J. Cole, M.L. Pace and D.A. Seekell. 2013. Asymmetric response of early warning indicators of phytoplankton transitions to and from cycles. *Theoretical Ecology* 6: 285-293.
337. Wilkinson, G., S. Carpenter, J. Cole, M. Pace and C. Yang. 2013. Terrestrial support of pelagic consumers: Patterns and variability revealed by a multi-lake study. *Freshwater Biology* 58: 2037–2049.
338. Hughes, T., S. Carpenter, J. Rockstrom, M. Scheffer and B. Walker. 2013. Multi-scale regime shifts and planetary boundaries. *Trends in Ecology and Evolution* 28: 389-395.
339. Gaeta, J.W. , B. Beardmore , A. W. Latzka , W.R. Provencher & S. R. Carpenter . 2013. Catch-and-Release Rates of Sport Fishes in Northern Wisconsin from an Angler Diary Survey, *North American Journal of Fisheries Management* 33: 606-614.
340. Bernes, C., S.R. Carpenter, A. Gardmark, P. Larsson, L. Persson, C. Skov and E. Van Donk. 2013. What is the influence on water quality in temperate eutrophic lakes of a reduction of planktivorous and benthivorous fish? A systematic review protocol. *Environmental Evidence* 2: 9 (online).
341. Carpenter, S.R., W.A. Brock, J.J. Cole and M.L. Pace. 2013. A new approach for rapid detection of nearby thresholds in ecosystem time series. *Oikos* 123: 290-297. DOI: 10.1111/j.1600-0706.2013.00539.x
342. Batt, R.D., S.R. Carpenter, J.J. Cole, M.L. Pace and R.A. Johnson. 2013. Changes in ecosystem resilience detected in automated measures of ecosystem metabolism during a whole-lake experiment. *Proceedings of the National Academy of Sciences* 110: 17398-17403.

343. Carpenter, S.R. and R.C. Lathrop. 2014. Phosphorus loading, transport and concentrations in a lake chain: a probabilistic model to compare management options. *Aquatic Sciences* 76: 145-154. DOI 10.1007/s00027-013-0324-5
344. Lathrop, R.C. and S.R. Carpenter. 2013. Water quality implications from three decades of phosphorus loads and trophic dynamics in the Yahara Chain of lakes. *Inland Waters* 4: 1-14
345. Anderies, J.M., S.R. Carpenter, W. Steffen and J. Rockstrom. 2013. The topology of non-linear global carbon dynamics: From tipping points to planetary boundaries. *Environmental Research Letters* 8: 044048.
346. Gaeta, J.W., Sass, G.G., and Carpenter, S.R. 2014. Drought-driven lake level decline: effects on coarse woody habitat and fishes. *Canadian Journal of Fisheries and Aquatic Sciences* 71: 1-11. DOI 10.1139/cjfas-2013-0451
347. Kéfi, S., V. Guttal, W. A. Brock, S. R. Carpenter, A. M. Ellison, V. N. Livina, D. A. Seekell, M. Scheffer, E. H. van Nes, and V. Dakos. 2014. Early Warning Signals of Ecological Transitions: Methods for Spatial Patterns. *PLoS ONE* 9:e92097
348. Wilkinson, G.M., S.R. Carpenter, J.J. Cole and M.L. Pace. 2014. Use of deep autochthonous resources by zooplankton: Results of metalimnetic addition of ^{13}C to a small lake. *Limnology and Oceanography* 59: 986-996.
349. Barrett, S., T. M. Lenton, A. Millner, A. Tavoni, S. Carpenter, J. M. Anderies, F. S. Chapin III, A.-S. Crepin, G. Daily, P. Ehrlich, C. Folke, V. Galaz, T. Hughes, N. Kautsky, E. F. Lambin, R. Naylor, K. Nyborg, S. Polasky, M. Scheffer, J. Wilen, A. Xepapadeas, and A. de Zeeuw. 2014. Climate engineering reconsidered. *Nature Clim. Change* 4:527-529.
350. Lawson, Z. and S.R. Carpenter. 2014. A Morphometric Approach for Stocking Walleye Fingerlings in Lakes Invaded by Rainbow Smelt. *North American Journal of Fish Management* 34: 998-1002.
351. Carpenter, S.R, E.G. Booth, C.J. Kucharik and R.C. Lathrop. 2014. Extreme daily loads: Role in annual phosphorus input to a north temperate lake. *Aquatic Sciences* 77: 71-79. DOI 10.1007/s00027-014-0364-5.
352. Cline, T.J., D. A. Seekell, S. R. Carpenter, M. L. Pace, J. R. Hodgson, J. F. Kitchell, and B. C. Weidel 2014. Early warnings of regime shifts: evaluation of spatial indicators from a whole-ecosystem experiment. *Ecosphere* 5:art102. <http://dx.doi.org/10.1890/ES13-00398.1>
353. Bennett, E.M., S.R. Carpenter, L.J. Gordon, N. Ramankutty, P. Balvanera, B. Campbell, W. Cramer, J. Foley, C. Folke, L. Karlburg, J. Liu, H. Lotze-Campen, N.D. Mueller, G.D. Peterson, S. Polasky, J. Rockstrom, R.J. Scholes, M. Spierenburg. 2014. Toward a more resilient agriculture. *Solutions* 5(5) 65-75. URL: <http://www.thesolutionsjournal.com/node/237202>

354. Elser, J.J., T.J. Elser, S.R. Carpenter and W.A. Brock. 2014. Regime shift in fertilizer commodities indicates more turbulence ahead for food security. *PLoS One* 9(5): e93998. doi:10.1371/journal.pone.0093998
355. Dakos, V., S.R. Carpenter, E.H. Van Nes, and M. Scheffer. 2014. Resilience indicators: prospects and limitations for early warnings of regime shifts. *Phil. Trans. R. Soc. B* 370: 20130263. <http://dx.doi.org/10.1098/rstb.2013.0263>
356. Steffen, W., K. Richardson, J. Rockström, S. E. Cornell, I. Fetzer, E. M. Bennett, R. Biggs, S. R. Carpenter, W. de Vries, C. A. de Wit, C. Folke, D. Gerten, J. Heinke, G. M. Mace, L. M. Persson, V. Ramanathan, B. Reyers, and S. Sörlin. 2015. Planetary boundaries: Guiding human development on a changing planet. *Science*. 1259855 *Published online 15 January 2015* [DOI:10.1126/science.1259855]
357. Scheffer, M., S. Barrett, S.R. Carpenter, C. Folke, A.J. Green, M. Holmgren, T.P. Hughes, S. Kosten, I.A. van de Leemput, D.C. Nepstad, E.C. van Nes, E.T.H.M. Peeters and B. Walker. 2015. Creating a safe operating space for iconic ecosystems. *Science* 347: 1317-1319.
358. Hanson, P.C., M.L. Pace, S.R. Carpenter, J.J. Cole, E.H. Stanley. 2015. Integrating landscape carbon cycling: research needs for resolving organic carbon budgets in lakes. *Ecosystems*: 18: 363-375. DOI: 10.1007/s10021-014-9826-9
359. Hansen, G.J.A., J.W. Gaeta, J.F. Hansen and S.R. Carpenter. 2015. Learning to manage and managing to learn: Sustaining recreational fisheries in a changing environment. *Fisheries* 40: 56-64.
360. Batt, R.D., S.R. Carpenter, J.J. Cole, M.L. Pace, R.A. Johnson, J.T. Kurtzweil and G.M. Wilkinson. 2015. Altered energy flow in the food web of an experimentally darkened lake. *Ecosphere* 6(3):33. <http://dx.doi.org/10.1890/ES14-00241.1>
361. Carpenter, S. R., E. G. Booth, S. Gillon, C. J. Kucharik, S. Loheide, A. S.Mase, M. Motew, J. Qiu, A. R. Rissman, J. Seifert, E. Soyulu, M. Turner and C. B.Wardropper. 2015. Plausible futures of a social-ecological system: Yahara watershed, Wisconsin, USA. *Ecology and Society* 20 (2): 10. [online] URL: <http://www.ecologyandsociety.org/vol20/iss2/art10/>
362. Lawson, Z., M.J. Vander Zanden, C. Smith, E. Heald, T. Hrabik and S.R. Carpenter. 2015. Experimental mixing of a north temperate lake: Testing the thermal limits of a coldwater invasive fish. *Canadian Journal of Fisheries and Aquatic Sciences* 72(6): 926-937. DOI: 10.1139/cjfas-2014-0346
363. Hansen, G. J. A., S.R. Carpenter, J. W. Gaeta, J. M. Hennessy, and M. J. Vander Zanden. 2015. Predicting walleye recruitment as a tool for prioritizing management actions. *Canadian Journal of Fisheries and Aquatic Sciences* 72(5): 661-672. DOI 10.1139/cjfas-2014-0513

364. Scheffer, M., J. Bascompte, T. K. Bjordam, S. R. Carpenter, L. B. Clarke, C. Folke, P. Marquet, N. Mazzeo, M. Meerhoff, O. Sala, and F. R. Westley. 2015. Dual thinking for scientists. *Ecology and Society* **20**(2): 3.
<http://dx.doi.org/10.5751/ES-07434-200203>
365. Scheffer, M., S. Carpenter, V. Dakos and E. van Nes. 2015. Generic indicators of ecological resilience. *Annual Review of Ecology Evolution and Systematics* **46**: 145-167.
366. Pace, M.L., S.R. Carpenter and J.J. Cole. 2015. With and Without Warning: Adapting Ecosystems to a Changing World. *Frontiers in Ecology and the Environment* **13**: 460–467.
<http://dx.doi.org/10.1890/150003>
367. Bernes, C., S. Carpenter, A. Gardmark, P. Larsson, L. Persson, C. Skov, J. Speed, and E. Van Donk. 2015. What is the influence of a reduction of planktivorous and benthivorous fish on water quality in temperate eutrophic lakes? A systematic review. *Environmental Evidence* **4**:7.
doi:10.1186/s13750-015-0032-9
URL: <http://www.environmentalevidencejournal.org/content/4/1/7>
368. Rissman, A. and S.R. Carpenter. 2015. Progress on nonpoint pollution: barriers and opportunities. *Daedalus* **144**(3): pages 35-47.
369. Fischer, J., T. A. Gardner, E. M. Bennett, P. Balvanera, R. Biggs, S. Carpenter, T. Daw, C. Folke, R. Hill, T. P. Hughes, T. Luthe, M. Maass, M. Meacham, A. V. Norström, G. Peterson, C. Queiroz, R. Seppelt, M. Spierenburg, and J. Tenhunen. 2015. Advancing sustainability through mainstreaming a social–ecological systems perspective. *Current Opinion in Environmental Sustainability* **14**:144-149.
370. Carpenter, S.R., W.A. Brock, C. Folke, E. van Nes and M. Scheffer. 2015. Allowing variance may enlarge the safe operating space for exploited ecosystems. *Proceedings of the National Academy of Sciences* **112**:14384-14389.
www.pnas.org/cgi/doi/10.1073/pnas.1511804112
371. Mulder, C., Bennett, E.M., Bohan, D.A., Bonkowski, M., Carpenter, S.R., Chalmers, R., Cramer, W., Durance, I., Eisenhauer, N., Fontaine, C., Haughton, A.J., Hettelingh, J.-P., Hines, J., Ibanez, S., Jeppesen, E., Krumins Adams, J., Ma, A., Mancinelli, G., Massol, F., McLaughlin, Ó., Naeem, S., Pascual, U., Penuelas, J., Pettorelli, N., Pockock, M.J.O., Raffaelli, D., Rasmussen, J.J., Rusch, G.M., Scherber, C., Setälä, H., Sutherland, W.J., Vacher, C., Voigt, W., Vonk, J.A., Wood, S.A., Woodward, G. 2015. Ten Years later: Revisiting priorities for science and society a decade after the Millennium Ecosystem Assessment. – *Advances in Ecological Research* **53**: 1-53.
372. Carpenter, S.R., J.J. Cole, M.L. Pace and G.M. Wilkinson. 2016. Response of plankton to nutrients, planktivory and terrestrial organic matter: a model analysis of whole-lake experiments. *Ecology Letters* **19**: 230-239.

373. Kok, M., Kok, K, G.D. Peterson, R. Hill, J. Agard and S.R. Carpenter. 2015. Biodiversity and ecosystem services require IPBES to take novel approach to scenarios. Sustainability Science DOI 10.1007/s11625-016-0354-8
374. Wardropper, C. B., S. Gillon, A. S. Mase, E. A. McKinney, S. R. Carpenter and A. R. Rissman. 2016. Local perspectives and global archetypes in scenario development. Ecology and Society 21 (2):12. [online] URL: <http://www.ecologyandsociety.org/vol21/iss2/art12/>
375. Walsh, J.R., S.R. Carpenter and M.J. Vander Zanden. 2016. Invasive species triggers a massive loss of ecosystem services through a trophic cascade. PNAS 113: 40181-4085. www.pnas.org/cgi/doi/10.1073/pnas.1600366113
376. Schindler, D.W., S.R. Carpenter, S.C. Chapra, R.E. Hecky, and D.M. Orihel. 2016. Reducing phosphorus to curb lake eutrophication is a success. Environmental Science and Technology 50 (17), pp 8923–8929. DOI: 10.1021/acs.est.6b02204
377. Booth, E.G., J. Qiu, S.R. Carpenter, J. Schatz, X. Chen, K.J. Kucharik, S.P. Loheide, M.M. Motew, J.M. Siefert, and M.G. Turner. 2016. From qualitative to quantitative environmental scenarios: Translating storylines into biophysical modeling inputs at the watershed scale. Environmental Modeling and Software 85: 80-97. <http://dx.doi.org/10.1016/j.envsoft.2016.08.008>
378. Bennett, E. M., M. Solan, R. Biggs, T. McPhearson, A. V. Norström, P. Olsson, L. Pereira, G. D. Peterson, C. Raudsepp-Hearne, F. Biermann, S. R. Carpenter, E. C. Ellis, T. Hichert, V. Galaz, M. Lahsen, M. Milkoreit, B. Martin López, K. A. Nicholas, R. Preiser, G. Vince, J. M. Vervoort, and J. Xu. 2016. Bright spots: seeds of a good Anthropocene. Frontiers in Ecology and the Environment 14:441-448.
379. Nyborg, K., J. M. Anderies, A. Dannenberg, T. Lindahl, C. Schill, M. Schlüter, W. N. Adger, K. J. Arrow, S. Barrett, S. Carpenter, F. S. Chapin, A.-S. Crépin, G. Daily, P. Ehrlich, C. Folke, W. Jager, N. Kautsky, S. A. Levin, O. J. Madsen, S. Polasky, M. Scheffer, B. Walker, E. U. Weber, J. Wilen, A. Xepapadeas, and A. de Zeeuw. 2016. Social norms as solutions. Science 354:42-43.
380. Heald, E., T.R. Hrabik, Y. Li, Z.J. Lawson, S.R. Carpenter, and M.J. Vander Zanden. 2017. The Effects of Experimental Whole-Lake Mixing on Horizontal Spatial Patterns of Fish and Zooplankton. Aquatic Sciences 79:543–556. DOI 10.1007/s00027-016-0516-x
381. Pace, M.L., R.D. Batt, C.D. Buelo, S.R. Carpenter, J.J. Cole, J.T. Kurzweil and G.M. Wilkinson. 2017. Reversal of a cyanobacterial bloom in response to early warnings. PNAS 114(2):352-357. www.pnas.org/cgi/doi/10.1073/pnas.1612424114
382. Carpenter, S.R. and M.G. Turner. 2017. Twenty Years of Ecosystems: Emerging Questions and Challenges. Ecosystems 20(1): 1-3.

383. Motew, M., Chen, X, Booth, E.G., Carpenter, S.R. Pinkas, P. Zipper, S., Loheide, S., Donner, S., Tsuruta, K., Vadas, P., Kucharik, C. 2017. The influence of legacy P on lake water quality in a Midwestern agricultural watershed. *Ecosystems* 20: 1468-1482. DOI: 10.1007/s10021-017-0125-0
384. Tunney, T.D., S.R. Carpenter, and M.J. Vander Zanden. 2017. The consistency of a species' response to press perturbations with high food web uncertainty. *Ecology* 98: 1859-1868. DOI: 10.1002/ecy.1853
385. Turner, M.G. and S.R. Carpenter. 2017. Ecosystem modeling for the 21st century. *Ecosystems* 20: 211-214.
386. Batt, R. D., S. R. Carpenter, and A. R. Ives. 2017. Extreme events in lake ecosystem time series. *Limnology and Oceanography Letters*: in press. doi: 10.1002/lol2.10037
387. Butitta, V. L., S. R. Carpenter, L. C. Loken, M. L. Pace, and E. H. Stanley. 2017. Spatial early warning signals in a lake manipulation. *Ecosphere* 8(10):e01941. 10.1002/ecs2.1941
388. Qiu, J., S. Carpenter, E. Booth, M. Motew, S. Zipper, C. Kucharik, X. Chen, S. Loheide II, J. Seifert, and M. Turner. 2017. Scenarios reveal pathways to sustain future ecosystem services in an agricultural landscape. *Ecological Applications* 28: 119-134. DOI 10.1002/eap.1633
389. Soranno, P. A., L. C. Bacon, M. Beauchene, K. E. Bednar, E. G. Bissell, C. K. Boudreau, M. G. Boyer, M. T. Bremigan, S. R. Carpenter, J. W. Carr, K. S. Cheruvilil, S. T. Christel, M. Claucherty, S. M. Collins, J. D. Conroy, J. A. Downing, J. Dukett, C. E. Fergus, C. T. Filstrup, C. Funk, M. J. Gonzalez, L. T. Green, C. Gries, J. D. Halfman, S. K. Hamilton, P. C. Hanson, E. N. Henry, E. M. Herron, C. Hockings, J. R. Jackson, K. Jacobson-Hedin, L. L. Janus, W. W. Jones, J. R. Jones, C. M. Keson, K. B. S. King, S. A. Kishbaugh, J.-F. Lapierre, B. Lathrop, J. A. Latimore, Y. Lee, N. R. Lottig, J. A. Lynch, L. J. Matthews, W. H. McDowell, K. E. B. Moore, B. P. Neff, S. J. Nelson, S. K. Oliver, M. L. Pace, D. C. Pierson, A. C. Poisson, A. I. Pollard, D. M. Post, P. O. Reyes, D. O. Rosenberry, K. M. Roy, L. G. Rudstam, O. Sarnelle, N. J. Schuldt, C. E. Scott, N. K. Skaff, N. J. Smith, N. R. Spinelli, J. J. Stachelek, E. H. Stanley, J. L. Stoddard, S. B. Stopyak, C. A. Stow, J. M. Tallant, P.-N. Tan, A. P. Thorpe, M. J. Vanni, T. Wagner, G. Watkins, K. C. Weathers, K. E. Webster, J. D. White, M. K. Wilmes and S. Yuan (2017). "LAGOS-NE: A multi-scaled geospatial and temporal database of lake ecological context and water quality for thousands of U.S. lakes." *GigaScience*: gix101-gix101. <https://doi.org/10.1093/gigascience/gix101>
390. Carpenter, S. R., W. A. Brock, G. J. A. Hansen, J. F. Hansen, J. M. Hennessy, D. A. Isermann, E. J. Pedersen, K. M. Perales, A. L. Rypel, G. G. Sass, T. D. Tunney, and M. J. Vander Zanden. 2017. Defining a Safe Operating Space for inland recreational fisheries. *Fish and Fisheries* 18:1150-1160.

391. Wilkinson, G. M., S. R. Carpenter, J. J. Cole, M. L. Pace, R. D. Batt, C. D. Buelo, and J. T. Kurtzweil. 2018. Early warning signals precede cyanobacterial blooms in multiple whole-lake experiments. *Ecological Monographs* 88: 188-203. DOI: 10.1002/ecm.1286
392. Motew, M., Booth, E.G., Carpenter, S.R., Chen, X. and Kucharik, K. 2018. The synergistic effect of manure supply and extreme precipitation on surface water quality. *Environmental Research Letters*: in press.
393. Qiu, J., Carpenter, S.R., Booth, E.G., Motew, M., Zipper, S., Kucharik, C., Loheide S.P. III, Turner M.G. 2018. Understanding relationships among ecosystem services across spatial scales and over time. *Environmental Research Letters*: in press.
394. Carpenter, S. R., E. G. Booth, and C. J. Kucharik. 2018. Extreme precipitation and phosphorus loads from two agricultural watersheds. *Limnology and Oceanography* **63**:1221-1233.
395. Motew, M., E. G. Booth, S. R. Carpenter, X. Chen, and C. J. Kucharik. 2018. The synergistic effect of manure supply and extreme precipitation on surface water quality. *Environmental Research Letters* **13**: 044016.
396. Ratajczak, Z., S.R. Carpenter, A.R. Ives, C.J. Kucharik, T. Ramiadantsoa, M.A. Stegner, J.W. Willians, J. Zhang, and M.G. Turner. 2018. Abrupt change in ecological systems: Inference and diagnosis. *Trends in Ecology and Evolution* 33: 513-526.
397. Pace, M.L., S.R. Carpenter, and G.M. Wilkinson. 2018. Long term studies and reproducibility: Lessons from whole lake experiments. *Limnology and Oceanography* 63, in press. doi:10.1002/lno.11012.
398. Buelo, C. D., Carpenter, S. R., & Pace, M. L. A modeling analysis of spatial statistical indicators of thresholds for algal blooms. *Limnology and Oceanography Letters*, 3(5): 384-392. doi:10.1002/lol2.10091
399. Zipper, S. C., Motew, M., Booth, E. G., Chen, X., Qiu, J., Kucharik, C. J., . . . Loheide li, S. P. (2018). Continuous separation of land use and climate effects on the past and future water balance. *Journal of Hydrology*, 565, 106-122. doi:https://doi.org/10.1016/j.jhydrol.2018.08.022
400. Carpenter, S.R. and M.L. Pace. 2018. Synthesis of a 33-Year Series of Whole-Lake Experiments: Effects of Nutrients, Grazers, and Precipitation-Driven Water Color on Chlorophyll. *Limnology and Oceanography Letters*: in press.
401. Taranu, Z. E., Carpenter, S. R., Frossard, V., Jenny, J.-P., Thomas, Z., Vermaire, J. C., & Perga, M.-E. (2018). Can we detect ecosystem critical transitions and signals of changing resilience from paleo-ecological records? *Ecosphere*, 9(10), e02438. doi:doi:10.1002/ecs2.2438

Reviewed Reports

1. Lubchenco, J., A.M. Olson, L.B. Brubaker, S.R. Carpenter, M.M. Holland, S.P. Hubbell, S.A. Levin, J.A. MacMahon, P.A. Matson, J.M. Melillo, H.A. Mooney, C.H. Peterson, H.R. Pulliam, L.A. Real, P.J. Regal, and P.J. Risser. 1991. The sustainable biosphere initiative: an ecological research agenda for the nineties. *Ecology* 72: 371-412.
2. Cairns, J., G.R. Best, P.L. Brezonik, S.R. Carpenter, G.D. Cooke, D.L. Hey, J.A. Kusler, C.L. Schelske, L. Shabman, R.R. Sharitz, S. Sorooshian, R.E. Sparks, J.T.B. Tripp, D.E. Willard and J.B. Zedler. 1992. *Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy*. National Academy Press, Washington, D.C.
3. Carpenter, S.R. 1995. Thresholds in ecosystems. pp. 314-315 in H.A. Mooney, J. Lubchenco, R. Dirzo and O.E. Sala, *Biodiversity and Ecosystem Functioning: Basic Principles*. pp. 275-325 in V.H. Heywood and R.T. Watson, *Global Biodiversity Assessment*. Cambridge University Press, Cambridge, England.
4. Carpenter, S.R., T.M. Frost, L. Persson, M. Power and D. Soto. 1995. Lakes and rivers. pp. 399-402 in V.H. Heywood and R.T. Watson, *Global Biodiversity Assessment*. Cambridge University Press, Cambridge, England.
5. Christensen, N.L., A.M. Bartuska, J.H. Brown, S.R. Carpenter, C. D'Antonio, R. Francis, J.F. Franklin, J.A. MacMahon, R.F. Noss, D.J. Parsons, C.H. Peterson, M.G. Turner and R.G. Woodmansee. 1996. The report of the Ecological Society of America committee on the scientific basis for ecosystem management. *Ecological Applications* 6: 665-691.
6. Carpenter, S.R., T.M. Frost, L. Persson, M. Power and D. Soto. 1996. Freshwater ecosystems: Linkages of complexity and processes. pp. 299-325 in H. Mooney, J.H. Cushman, E. Medina, O. Sala and E.D. Schulze (eds.), *Functional Roles of Biodiversity: A Global Perspective*. Wiley, NY.
7. Postel, S. and S.R. Carpenter. 1997. Freshwater ecosystem services. pp. 195-214 in G. Daily (ed.), *Nature's Services*. Island Press, Washington D.C.
8. Carpenter, S.R., E. van Donk and R.G. Wetzel. 1997. The nutrient loading gradient in shallow lakes. pp 393-396 in Jeppesen, E., Ma. Sondergaard, Mo. Sondergaard, and K. Christofferson (eds.), *The Structuring Role of Submerged Macrophytes in Lakes*. Springer-Verlag, Berlin.
9. Turner, M.G., S.R. Carpenter, E.J. Gustafson, R.J. Naiman and S.M. Pearson. 1998. Land use. pp. 37-61 in M.J. Mac, P.A. Opler, P. Doran and C. Haecker (eds.), *Status and Trends of Our Nation's Biological Resources*. Volume 1. National Biological Service, Washington, D.C.

10. Carpenter, S.R., N.F. Caraco, D.L. Correll, R.W. Howarth, A.N. Sharpley and V.H. Smith. 1998. Nonpoint pollution of surface waters with phosphorus and nitrogen. *Issues in Ecology* 3. Ecological Society of America, Washington D.C.
11. Jackson, R.B., S.R. Carpenter, C.N. Dahm, D.M. McKnight, R.J. Naiman, S.L. Postel, and S.W. Running. 2001. Water in a changing world. *Issues in Ecology* 9: 1-16.
12. Cottingham, P., S. Carpenter, R. Hilborn, J. Kitchell and C. Stow. 2001. Large-scale ecological studies and their importance for freshwater resource management. Technical Report No. 4/2001, Cooperative Research Centre for Freshwater Ecology, Canberra, ACT, Australia.
13. Folke, C., S.R. Carpenter, T. Elmqvist, L. Gunderson, C.S. Holling, B. Walker, J. Bengtsson, F. Berkes, J. Colding, K. Danell, M. Falkenmark, L. Gordon, R. Kasperson, N. Kautsky, A. Kinzig, S. Levin, K.G. Maler, F. Moberg, L. Ohlsson, P. Olsson, E. Ostrom, W. Reid, J. Rockstrom, H. Savinije, U. Svedin. 2002. Resilience and sustainable development. ICSU Series on Science for Sustainable Development, Number 3, 37 pages. International Council for Science, Paris, France.
14. Folke, C., S.R. Carpenter, T. Elmqvist, L. Gunderson, C.S. Holling, B. Walker, J. Bengtsson, F. Berkes, J. Colding, K. Danell, M. Falkenmark, L. Gordon, R. Kasperson, N. Kautsky, A. Kinzig, S. Levin, K.G. Maler, F. Moberg, L. Ohlsson, P. Olsson, E. Ostrom, W. Reid, J. Rockstrom, H. Savinije, U. Svedin. 2002. Resilience and sustainable development: Building Adaptive Capacity in a World of Transformations. Scientific Background Paper for the World Summit on Sustainable Development. Swedish Ministry of the Environment, Stockholm, Sweden. Available on the internet through www.mvb.gov.se
15. Millennium Ecosystem Assessment (Carpenter was one of 51 authors). 2003. *Ecosystems and Human Well-being*. Island Press, Washington D.C.
16. Millennium Ecosystem Assessment (Carpenter was one of 28 core authors). 2005. *Synthesis Report*. Island Press, Washington, D.C.
17. Bennett, E.M., S.R. Carpenter, S. Cork, G. Peterson, G. Petschel-Held, T. Ribeiro and M. Zurek. 2005. Scenarios for ecosystem services: Rationale and overview. Pp 99-124 in Millennium Ecosystem Assessment, *Ecosystems and Human Well-Being: Scenarios*. Island Press, Washington, D.C.
18. Bennett, E.M., S.R. Carpenter, P. Pingali and M. Zurek. 2005. Scenarios: summary for decision makers. Pp. 1-17 in Millennium Ecosystem Assessment, *Ecosystems and Human Well-Being: Our Human Planet*. Island Press, Washington D.C.
19. ICSU-UNESCO-UNU (Carpenter was one of 15 co-authors). 2008. Ecosystem Change and Human Well-Being: Research and Monitoring Priorities Based on the Millennium Ecosystem Assessment. Paris, International Council of Science.

20. Carpenter, S.R., E.V. Armbrust, P.W. Arzberger, F.S. Chapin III, J.J. Elser, E.J. Hackett, A.R. Ives, P.M. Kareiva, M.A. Leibold, P. Lundberg, M. Mangel, N. Merchant, W.W. Murdoch, M.A. Palmer, D.P.C. Peters, S.T.A. Pickett, K.K. Smith, D.H. Wall and A.S. Zimmerman. 2009. Synthesis must be accelerated in ecology and environmental sciences. *BioScience* 59: 699-701.
21. Folke, C., A. Jansson, J. Rockstrom, P. Olsson, S.R. Carpenter, F.S. Chapin III, A.-S. Crepin, G. Daily, K. Danell, J. Ebbesson, T. Elmqvist, V. Galaz, F. Moberg, M. Nilsson, H. Osterblom, E. Ostrom, A. Persson, G. Peterson, S. Polasky, W. Steffen, B. Walker, F. Westley. 2011. Reconnecting to the biosphere. *Ambio* 40: 719-738.
22. Carpenter, S.R. and A. Rissman. 2012. Scenarios and decision making for complex environmental systems. Pages 37-43 in D.N. Bengston, ed., *Environmental Futures: Experiences, Approaches and Opportunities*. Gen. Tech. Rep. NRS-P-107, U.S. Department of Agriculture, Northern Research Station, Newtown Square, PA, USA.

Reviews and Commentary

1. Carpenter, S.R. 1987. Mirror lake viewed through the microscope. *Ecology* 68: 240-241.
2. Carpenter, S.R. 1990. Large-scale perturbations: opportunities for innovation. *Ecology* 71: 2038-2043.
3. Carpenter, S.R. 1992. Trophic ecology. *Encyclopedia of Science and Technology* 18: 574-576. McGraw-Hill Publishing Co., NY.
4. Carpenter, S.R. and J.F. Kitchell. 1992. Trophic cascade and biomanipulation: interface of research and management. *Limnology and Oceanography* 37: 208-213.
5. Carpenter, S.R. 1993. Connections between population and ecosystem ecology. *Bulletin of the Ecological Society of America* 74: 353-355.
6. Carpenter, S.R. 1994. Marine biodiversity. *Science* 266: 468.
7. Carpenter, S.R. 1995. Organochlorine contaminants in the Great Lakes. *Ecological Applications* 5: 291-292.
8. Power, M.E., D. Tilman, S.R. Carpenter and 22 others. 1995. The role of experiments in ecology. *Science* 270: 561.
9. Carpenter, S.R. 1996. Cyclic renewal in adaptive ecosystem management. *EcoScience* 2: 420-421.
10. Carpenter, S.R., P.A. Soranno and R.C. Lathrop. 1995. Land use determines the water quality of the Yahara lakes. *The Yahara Watershed Journal* 1: 6-8.
11. Carpenter, S.R. 1996. Microcosm experiments have limited relevance for community and ecosystem ecology. *Ecology* 77: 677-680.
12. Carpenter, S.R., L.J. Jackson, J.F. Kitchell and C.A. Stow. 1996. That was then but this is now: A reply to Gilbertson and Ludwig. *Ecological Applications* 6: 671-674.
13. Carpenter, S.R. and T. Reed. 1997. Integrating salmon, trees and people. *Ecological Economics* 23: 184-185.
14. Wilson, K. and S. Carpenter. 1997. Making the weedline work for your lake. *Wisconsin Natural Resources* 21(2): 4-8.
15. Stow, C.A., S.R. Carpenter, K.E. Webster and T.M. Frost. 1998. Long-term environmental monitoring: some perspectives from lakes. *Ecological Applications* 8: 269-276.

16. Carpenter, S.R. 1998. Keystone species and academic-agency collaboration. *Conservation Ecology* 2(1). Available on the Internet. URL: www.consecol.org/vol2/iss1/resp2.
17. Wilson, K. and S. Carpenter. 1998. Making the weedline work for your lake: when life gives you invasive weeds, make habitat. *LakeLine* 18(1): 18-19, 38-40.
18. Carpenter, S.R. and M.G. Turner. 1998. At last- A journal devoted to ecosystem science. *Ecosystems* 1: 1-5.
19. Schindler, D.W. and S.R. Carpenter. 1998. Workshop on ecosystem manipulation. *Ecosystems* 1: 321-322.
20. Carpenter, S.R. 1998. Foreword. pp. v-vi in C. Brönmark and L.-A. Hansson, *The Biology of Lakes and Ponds*. Oxford University Press, N.Y.
21. Carpenter, S.R. 1999. Role of microcosm experiments in aquatic ecology: reply. *Ecology* 80: 1085-1088.
22. Turner, M.G. and S.R. Carpenter. 1999. How are we doing? Reflections on the first year of *Ecosystems*. *Ecosystems* 2: 1-3.
23. Carpenter, S.R., J.F. Kitchell, J.J. Cole and M.L. Pace. 1999. Predicting responses of chlorophyll and primary production to changes in phosphorus, grazing and dissolved organic carbon. *Limnology and Oceanography* 44: 1179-1182.
24. Turner, M.G. and S.R. Carpenter. 1999. Tips and traps in interdisciplinary research. *Ecosystems* 2: 275-276.
25. Carpenter, S.R. and M.G. Turner. 2000. Opening the black boxes: ecosystem science and economic valuation. *Ecosystems* 3: 1-3.
26. Collie, J., S. Saila, C. Walters and S. Carpenter. 2000. Of salmon and dams. *Science* 290: 933-934.
27. Carpenter, S.R. and M.G. Turner. 2000. Hares and tortoises: Interactions of fast and slow variables in ecosystems. *Ecosystems* 3: 495-497.
28. Carpenter, S.R. and M.G. Turner. 2001. More issues, more impact, more opportunity. *Ecosystems* 4: 1-2.
29. Carpenter, S.R. and M.G. Turner. 2001. Panarchy 101. *Ecosystems* 4: 389.
30. Carpenter, S.R., and J.F. Kitchell. 2001. Resolution of respect: Arthur Davis Hasler, 1908-2001. *Bulletin of the Ecological Society of America* 82:172-3.

31. Bennett, E.M. and S.R. Carpenter. 2002. P Soup. *World Watch*, March-April 2002, pp. 24-32.
32. Johnson, B., and S.R. Carpenter. 2002. The invisible collapse of Canada's recreational fisheries. *Fisheries* 27(3):34.
33. Turner, M. and S.R. Carpenter. 2004. Challenges for riparian science. Page 16 in: Naiman, R.J., H. Décamps, and M.C. McClain. *Riparia*. Academic Press, San Diego.
34. Scott, Eugenie C., and 445 co-authors including S.R. Carpenter. 2004. The morphology of Steve. *Annals of Improbable Research*, July/August. pp. 24-29.
35. Carpenter, S.R., F. Westley and M.G. Turner. 2005. Surrogates for resilience of social-ecological systems. *Ecosystems* 8: 941-944.
36. Carpenter, S. R., E. M. Bennett, and G. D. Peterson. 2006. Editorial: special feature on scenarios for ecosystem services. *Ecology and Society* 11(2): 32. [online] URL: <http://www.ecologyandsociety.org/vol11/iss2/art32/>
37. Reid, W., H.A. Mooney, D. Capistrano, S.R. Carpenter, K. Chopra, A. Cropper, P. Dasgupta, R. Hassan, R. Leemans, R.M. May, P. Pingali, C. Samper, R. Scholes, R.T. Watson, and A.H. Zakri. 2006. Selling ecosystem services short. *Nature* 443: 749.
38. Carpenter, S.R., W.A. Brock and D. Ludwig. 2007. Appropriate discounting leads to forward looking ecosystem management. *Ecological Research* 22: 10-11.
39. Carpenter, S.R. 2007. No model for policymaking. *Issues in Science and Technology* 23(4): 82-84.
40. Carpenter, S.R. and M.G. Turner. 2007. A decade of Ecosystems. *Ecosystems* 10: 519-522.
41. Carpenter, S.R. 2008. Emergence of ecological networks. *Frontiers in Ecology and the Environment* 6: 228.
42. Carpenter, S.R. 2008. Phosphorus control is critical to mitigating eutrophication. *Proceedings of the National Academy of Sciences* 105:11039-11040
43. Carpenter, S.R. 2008. Foreword. In Miao, S, Carstenn, S, Nungesser H. (eds.) *Real World Ecology: Large-Scale and Long-Term Case Studies and Methods*. Springer, NY.
44. Carpenter, S.R. 2010. Changing views of ecological change. *Trends in Ecology and Evolution* 25: 205-206. doi:10.1016/j.tree.2009.12.002

45. Carpenter, S.R. 2010. Trophic Cascade. Encyclopædia Britannica. 2010. Encyclopædia Britannica Online. 20 Aug. 2010
<<http://www.britannica.com/EBchecked/topic/1669736/trophic-cascade>>.
46. Carpenter, S.R. 2010. The concept of resilience: Retrospect and prospect: Commentary. Pp 30-33 in T. Söderqvist, A. Sundbaum, C. Folker and K.-G. Mäler (eds.). *Bringing Ecologists and Economists Together: The Askö Meetings and Papers*. Springer, Berlin.
47. Carpenter, S.R. 2010. Commentary on “Coping with Uncertainty – A Call for a New Science-Policy Forum. Pp. 129-131 in T. Söderqvist, A. Sundbaum, C. Folker and K.-G. Mäler (eds.). *Bringing Ecologists and Economists Together: The Askö Meetings and Papers*. Springer, Berlin.
48. Carpenter, S.R. 2010. Sorting among options for a more sustainable world. Box 1.2 in Kareiva, P., Tallis, H., Ricketts T.H., Daily G.C. and S. Polasky (eds.). *Theory and Practice of Ecosystem Service Valuation*. Oxford University Press, Oxford, England.
40. Gleick, P.S. and 255 signatories from the National Academy of Sciences including S.R. Carpenter. 2010. Climate change and the integrity of science. *Science* 328: 689-890.
<http://www.sciencemag.org/content/328/5979/689.full.pdf>
50. West, P.C., H.K. Gibbs, C. Monfreda, J. Wagner, C. Barford, S.R. Carpenter and J. Foley. 2011. Reply to Vermeulen and Wollenberg: Distinguishing food security and crop yields. *Proceedings of the National Academy of Sciences* 108. 10.1073/pnas.1019348108.
51. Carpenter, S.R., C. Folke, A. Norstrom, O. Olsson, L. Schultz, B. Agarwal, P. Balvanera, B. Campbell, J.C. Castilla, W. Cramer, R. DeFries, P. Eyzaguirre, T.P. Hughes, S. Polasky, Z. Sanusi, R. Scholes, M. Spierenburg. 2012. Program on Ecosystem Change and Society: An international research strategy for integrated social-ecological systems. *Current Opinion on Environmental Sustainability* 4: 134-138.
52. Carpenter, S.R. 2011. Phosphorus: approaching fundamental limits? *Stockholm Water Front* 2: 4.
53. Carpenter, S.R. 2013. Spatial signatures of resilience. *Nature* 496: 308-309.
54. Tallis, H., Lubchenco, J. Adams, V.M., Adams-Hosking, C., Agostini, V.N., Andelman, S.J., Arkema, K., Balvanera, P., Ban, N., Beger, M., Bennett, E., Biggs, R., Blanchette, C., Boersma, P.D., Bottrill, M.C., Chaplin-Kramer, R., Coll, M., Corrigan, C., Cross, M.S., Daily, G., DeFries, R., DiFonzo, M.M.I., Ehrlich, A., Carmona, N.E., Ferreira, J., Foley, M., Francis, T., Fraschetti, S., Fuentes, M.M.P.B., Gaiser, E.E., and 210 additional co-Authors including S.R. Carpenter. 2014. A call for inclusive conservation. *Nature* 515: 27-28.