

Curriculum Vitae: Audrey L. Mayer, Ph.D.

Michigan Technological University
Department of Social Sciences &
School of Forest Resources and Environmental Sciences
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Education:

Ph.D. 2000. University of Tennessee, Knoxville.

Major: Ecology and Evolutionary Biology (minor in Environmental Policy)

Dissertation: Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*) habitat and the Everglades: Ecology and conservation.

B.A. 1994. Pomona College, Claremont, California.

Major: Biology/Public Policy Analysis

Theses: Habitat selection of the California gnatcatcher (*Poliophtila californica*); The Natural Communities Conservation Plan: A problematic solution to species conservation.

Positions held:

January 2009 to present: Assistant professor, Ecology and Environmental Policy, Michigan Technological University

February 2007 to present: Docent (adjunct professor) in Environmental Policy, University of Helsinki

January 2007 to December 2008: Researcher, University of Helsinki, Faculty of Biosciences

January to December 2006: Researcher, University of Tampere, School of Economics and Business Administration

June 2002 to January 2006: Ecologist and Team Leader (Sustainable Systems Team, Ecology Team), US

Environmental Protection Agency (USEPA), Office of Research and Development, National Risk Management

Research Laboratory, Sustainable Technologies Division, Sustainable Environments Branch

April 2002 to January 2006: Adjunct assistant professor, University of Cincinnati, Department of Biological Sciences

September 2001 to June 2002: Post-doctoral research associate, USEPA, ORD, NRMRL, STD, SEB

February 2000 to September 2001: Post-doctoral research associate, University of Cincinnati, Department of Biological Sciences

Research Experience:

Researcher, January 2007 to December 2008, University of Helsinki, Finland. I worked on several issues, including sustainability indices and theories, forest conservation and international trade, and landscape scale conservation policies.

Researcher, January to December 2006, University of Tampere, Finland. I worked on the application of ecologically-based sustainability indices to industrial systems. I also continued collaboration with Dr. Pekka Kauppi and Dr. Päivi Tikka at the Department of Biological and Environmental Sciences, University of Helsinki, investigating the impact of forestry practices and international trade on the ecological communities in the Fennoscandian – Northern Russia region, the “boomerang” effect.

Visiting researcher, November 2004, University of Helsinki, Finland. In collaboration with Dr. Pekka Kauppi and Dr. Päivi Tikka of the Department of Biological and Environmental Sciences, we investigated the characteristics of successful economic incentive programs for biodiversity protection, and conservation priorities in Finland and northwest Russia.

Ecologist, June 2002 to January 2006, USEPA. With a multidisciplinary team, I modified an index based on information theory to detect rapid shifts between dynamic regimes in ecosystems, for use in ecosystem management and restoration. On 10-11 March 2005, I hosted an international meeting in Cincinnati, addressing tools and methods used to identify dynamic regimes and shifts between them by participants from a variety of disciplines, including ecology, economics, physics, mathematics, engineering, and sociology. I was a Principal Investigator in the multidisciplinary Shepherd Creek project, testing the ecological effectiveness of an economic incentive tool (voluntary auction) to mitigate excess stormwater runoff in a local, urbanizing watershed. I was also a Principal Investigator on a project with USEPA – Region 5 to verify a GIS model identifying “critical ecosystems” throughout the region, and produce field-tested rapid assessment protocols. Software used: Matlab, SPSS, ArcView/ArcGIS, ERDAS Imagine.

Post-doctorate researcher, September 2001-June 2002, USEPA. Advisor: H Cabezas. With a multidisciplinary

team, I developed sustainability indices for ecosystems using information theory. I also used differential equations to model ecological and economic relationships in a simulated ecosystem. Software used: Matlab.

Post-doctorate researcher, February 2000-September 2001, University of Cincinnati. Advisor: G Cameron. Using GIS and FRAGSTATS software, I combined Multi-Resolution Land Cover data (derived from Landsat satellite images) with Breeding Bird Survey data, and examined correlations between avian diversity and landscape structure and composition at several scales. Software used: ArcView, ArcInfo, FRAGSTATS, SPSS.

Student coordinator, January through May 1999, University of Tennessee, Knoxville. "Species Recovery" seminar (program through the National Center for Ecological Analysis and Synthesis, Santa Barbara, CA). I coordinated data collection from endangered species recovery reports by graduate students at the University of Tennessee.

Graduate Research Assistant, 1996-1997; and Graduate Teaching Assistant 1995-1996 and 1997-1999, University of Tennessee, Knoxville. Advisor: SL Pimm. I participated in helicopter bird population surveys, banding, breeding behavior observations, territory mapping with GPS units, and plant surveys (50m strip transect). I also used remote sensing/satellite images and GIS to identify and map suitable sparrow habitat. Software used: ERDAS Imagine, SPSS.

Research Associate, 1992-1995, Pomona College. Advisor: WO Wirtz, II. I examined the post-fire recovery of birds, rodents, and reptiles in coastal sage scrub habitat in California. I conducted year-round bird surveys, a detailed study of California gnatcatchers (*Poliophtila californica*) on breeding territories, and mark-and-recapture of small mammals, reptiles, and amphibians.

Research Assistant, 1995, Pomona College. Song learning and hormonal response in Panama bay wrens (*Thryothorus nigricapillus*). Principal Investigator: R Levin. I aided in hand-rearing and laboratory care of hatchling, fledgling, and adult birds in quarantine conditions. I also participated in behavioral observations.

Policy internship, Fall 1993, Riverside County Planning Department, Riverside, California. I evaluated Environmental Impact Statements and participated in policy implementation of the Natural Communities Conservation Plan.

Teaching experience:

Spring 2009: SS 3300 "Environmental Problems", Michigan Technological University
 Spring 2007: "Natural scientific literature on environmental protection", University of Helsinki
 Fall 2003: "Ornithology", University of Cincinnati
 Fall 2002: "Foundations of Ecology", University of Cincinnati
 Fall 2001 and 2002: "All about birds", University of Cincinnati – Communiversity
 Fall 1995 through Fall 1999: Graduate Teaching Assistant, University of Tennessee, Knoxville:
 "General Ecology", "Conservation Biology", "Field Ornithology", "Biodiversity", "General Biology"
 Fall 1996 through Spring 1998: Tutor, biology, ecology, genetics and animal sciences, University of Tennessee Women's Athletic Department
 Spring 1995: General Biology instructor, Pomona College, Claremont, CA

Grants and Project Management:

2009-2011: USAID Higher Education for Development TIES program, \$250,000, "Enhancing the Capacity for Sustainable Forest Management and Ecosystem Service Provisioning in Chiapas and Oaxaca" (as collaborator; co-PIs Alex Mayer and Kathy Halvorsen).

2007-2008: Nordic Forest Research Cooperation Committee, €12,000 for workshop support (written with P Tikka and P Kauppi, awarded to P Kauppi).

2006-2007: Nordic Forest Research Cooperation Committee, €12,000 for workshop support (written with P Tikka and P Kauppi, awarded to P Kauppi).

2006-2008: Academy of Finland, €302,680, "Bumerangi-hypoteesin" testaus: Luoteis-Venäjäns metsien [Testing the "boomerang hypothesis": focus on northwestern Russian forests] (written with P Tikka and P Kauppi, awarded to P Kauppi).

2003-2005: USEPA, Project Officer, \$45,000 contract for international meeting to develop statistical approaches for the identification of dynamic regime shifts.

2002-2006: USEPA, Principal Investigator, Multidisciplinary approach to stormwater management at the watershed scale. With P Parikh and M Clagett (lawyers), H Thurston and M Taylor (economists), A Roy (ecologist) and W Shuster (hydrologist); Project Officer for \$115,000 biological identification contracts.

2002-2006: Project officer and Principal Investigator, USEPA's RARE grant program with USEPA Region 5 –

Chicago, identifying critical ecosystems using GIS and theoretical approaches and developing rapid assessment protocols (\$230,000, 3 year), with M White, C Maurice, and H Cabezas.
 2002-2006: USEPA, Project Officer, \$60,000 (3-year) contract, Dr. Roy Frieden (University of Arizona).
 2001: Principal Investigator, Spring and fall migratory bird kills at communication towers in southwest Ohio, coordinating bird salvage work by 12 student and community volunteers. Ohio Department of Natural Resources (\$2000, one year), with L Peyton.
 1998: Principal researcher, University of Tennessee's Scholarly Activities Research Incentive Fund (SARIF, \$3000, one year).

Awards:

Research:

2007: Scientific and Technological Achievement Award (with H Thurston, CW Pawlowski), USEPA
 2005: Superior Accomplishment Recognition Award, USEPA
 2005: Scientific and Technological Achievement Award (with H Cabezas, CW Pawlowski, NT Hoagland), USEPA
 2004: Superior Accomplishment Recognition Award, USEPA
 2003: Team Achievement Award, USEPA
 2002: Superior Accomplishment Recognition Award, USEPA
 1999: Science Alliance Graduate Student Award of Excellence, University of Tennessee
 1996: National Science Foundation Graduate Fellowship – Honorable Mention
 1994: Vaile Prize in Biology, Pomona College

Teaching:

1999: Graduate Teaching Assistant Merit Award, University of Tennessee

Professional Societies:

American Association for the Advancement of Science, American Ornithologists' Union, Association of Field Ornithologists, Ecological Society of America, International Association for Landscape Ecology, Society of the Sigma Xi.

Public service:

Journal editorial boards: *International Journal of Ecological Economics and Statistics*, *International Journal of Ecology and Development*, *International Journal of Sustainable Society*, *International Journal of Society Systems Science*.
 Journal reviewer: *BioScience*, *Environmental Management*, *Ecological Applications*, *Ecology and Society*, *Frontiers in Ecology and the Environment*, *International Journal of Ecological Economics and Statistics*, *Journal of Applied Ecology*, *Journal of Field Ornithology*, *Journal of Cleaner Production*, *Landscape and Urban Planning*.
 Grants reviewer: (US) National Science Foundation, US Environmental Protection Agency – STAR program, Netherlands Organization for Scientific Research (NWO), Israel Science Foundation.
 Conference organizing committee (2005), “Green Makeover: Retrofitting sites in urban areas to enrich city environments”, 19-20 October 2005, Milwaukee, Wisconsin. Hosted by the USEPA, the Wisconsin Department of Natural Resources, and the University of Wisconsin – Milwaukee.
 Steering committee member (2003-2005), Ohio Bird Conservation Initiative
 Secretary (1998-1999), Southern Appalachian chapter of the Society for Conservation Biology
 Technical advisor (1994-1995), Claremont Colleges land development committee

Advising:

Master's students (mentored 2006-2007)

Annikka Luomi, Noora Nieminen, Leena Nukari, M.S. program in Environmental Science, University of Helsinki
 Summer intern students

Katrina Ingold (2003): M.S. program in Geography, University of Cincinnati

Derric Pennington (2004): Ph.D. program in Ecology, University of Minnesota, St. Paul

Post-doctoral researchers

Dr. Allison Roy (2004-2006)

Thesis committees

Lauren Fry (2009-), Ph.D. program in Environmental Engineering, Michigan Tech University

Peer-reviewed Publications:

Mayer AL, L Viherrmaa, N Nieminen, A Luomi, M Posch. In press. Epiphytic macrolichen community correlates with modeled air pollutants and forest conditions. *Ecological Indicators*.

Mayer AL. 2008. Ecologically-based approaches to evaluate the sustainability of industrial systems. *International*

- Journal of Sustainable Society* 1(2):117-133.
- Mayer AL and PM Tikka. 2008. Family friendly policies and gender bias in academia. *Journal of Higher Education Policy and Management* 30(4):363-374.
- Mayer AL. 2008. Strengths and weaknesses of common sustainability indices for multidimensional systems. *Environment International* 34:277-291.
- Cabezas H, CW Pawlowski, HW Whitmore, and AL Mayer. 2007. On the sustainability of an integrated model system with industrial, ecological, and macroeconomic components. *Resources, Conservation and Recycling* 50:122-129.
- Hopton ME and AL Mayer. 2006. Using Self-Organizing Maps to explore patterns in species richness and protection. *Biodiversity and Conservation* 15:4477-4494.
- Mayer AL and PM Tikka. 2006. Biodiversity conservation incentive programs for privately owned forests. *Environmental Science and Policy* 9:614-625.
- Mayer AL, CW Pawlowski and H Cabezas. 2006. Fisher information and dynamic regime changes in ecological systems. *Ecological Modelling* 195(1-2):72-82.
- Mayer AL, PE Kauppi, PM Tikka, and PK Angelstam. 2006. Conservation implications of exporting domestic wood harvest to neighboring countries. *Environmental Science and Policy* 9:228-236.
- Mayer AL, PE Kauppi, PK Angelstam, Y Zhang and PM Tikka. 2005. Importing timber, exporting ecological impact. *Science* 308(5720):359-360.
- Meshaka, WE Jr. and AL Mayer. 2005. Diet of the southern toad from the southern Everglades. *Florida Scientist* 68(4):261-266.
- Roy AH, Mayer AL, WD Shuster, HW Thurston, MP Clagett, PK Parikh, and MA Taylor. 2005. A multidisciplinary approach to stormwater management at the watershed scale. *10th International Conference for Urban Drainage, 21-26 August 2005, Copenhagen, Denmark*.
- Cabezas H, CW Pawlowski, AL Mayer and NT Hoagland. 2005. Sustainable systems theory: ecological and other aspects. *Journal of Cleaner Production* 13(5):455-467.
- Pawlowski CW, BD Fath, AL Mayer and H. Cabezas. 2005. Towards a sustainability index using information theory. *Energy* 30(8):1221-1231.
- Cabezas H, CW Pawlowski, AL Mayer and NT Hoagland. 2005. Simulated experiments with complex sustainable systems: Ecology and technology. *Resources, Conservation and Recycling* 44:279-291.
- Mayer AL and M Rietkerk. 2004. The dynamic regime concept for ecosystem management and restoration. *BioScience* 54(11):1013-1020.
- Mayer AL, HW Thurston and CW Pawlowski. 2004. The multidisciplinary influence of common sustainability indices. *Frontiers in Ecology and the Environment* 2(8):419-426.
- Mayer AL and GN Cameron. 2003. Landscape characteristics, spatial extent, and breeding bird diversity in Ohio. *Diversity and Distributions* 9:297-311.
- Mayer AL and GN Cameron. 2003. Consideration of grain and extent in landscape-scale studies of terrestrial vertebrate ecology. *Landscape and Urban Planning* 65(4):201-217.
- Mayer AL, CW Pawlowski and H Cabezas. 2003. Estimating sustainability of a simple human society and its associated ecosystem using resilience and Fisher Information. Proceedings of the International Congress on Modelling and Simulation, MODSIM 2003 conference, Townsville, Queensland, Australia, 14-17 July 2003, Volume 2:765-770.
- Cabezas H, CW Pawlowski, AL Mayer and NT Hoagland. 2003. Sustainability: ecological, social, economic, technological, and systems perspectives. *Clean Technologies and Environmental Policy* 5(3-4):167-180. (Also pp. 37-64 In: Technological choices for sustainability (2004), SK Sikdar, P Glavic, and R Jain, eds.)
- Mayer AL, K Petren, A Shelton, MJ Cramer, B Keane, J Markert, B Heath, E Maurer, JA Roberts and B Tonnis. 2002. Scaling natal dispersal distances: confounding factors. *Conservation Ecology* 6(1):r8. [online] URL: <http://www.consecol.org/vol6/iss1/resp8>.
- Mayer AL. 2001. The effects of limited options and policy interactions on water storage policy in south Florida. *Journal of Environmental Management* 63:87-102.
- Lockwood JL, KH Fenn, JL Curnutt, D Rosenthal, KL Balent and AL Mayer. 1998. Life history of the Endangered Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*). *Wilson Bulletin* 109(4):720-731.
- Curnutt JL, AL Mayer, TM Brooks, L Manne, OL Bass Jr, DM Fleming and SL Pimm. 1998. Population dynamics of the Endangered Cape Sable Seaside Sparrow. *Animal Conservation* 1:11-21.
- Wirtz WO II, AL Mayer, MM Raney and JL Beyers. 1997. Effects of fire on the ecology of the California gnatcatcher, *Poliophtila californica*, in California sage scrub communities. Pp. 91-96 in: Proceedings – Fire Effects on Rare and Endangered Species and Habitats Conference, Nov. 13-16, 1995. International

Association of Wildland Fire, Fairfield, WA.

Mayer AL and WO Wirtz II. 1995. Response of the California gnatcatcher to fire in the California sage scrub community. Pp. 77-79 in: Keeley, J. E. and T. Scott (eds.), *Brushfires in California Wildlands: Ecology and Resource Management*. International Association of Wildland Fire, Fairfield, WA.

Book Chapters:

Mayer AL, CW Pawlowski, BD Fath, and H Cabezas. 2006. Applications of Fisher Information to sustainable environmental management. Pp. 217-244 *In* Frieden BR and RA Gatenby (eds.), *Exploratory data analysis using Fisher Information*. Kluwer Academic Press.

Mayer AL and SL Pimm. 1998. Integrating endangered species protection and ecosystem management: the Cape Sable sparrow as a case study. Pp. 53-68 *In* Mace GM, A Balmford and JR Ginsberg (eds.), *Conservation in a Changing World: Integrating processes into priorities for action*. Cambridge University Press.

US Government Reports:

Mayer AL, AH Roy, M White, CG Maurice, and L McKinney. 2008. Quick Assessment Protocols for measuring relative ecological significance of terrestrial ecosystems. US Environmental Protection Agency, Office of Research and Development, EPA/600/R-08/061, 37 pp.

Whitmore HW, CW Pawlowski, H Cabezas, AL Mayer, and NT Hoagland. 2006. Integration of an economy under imperfect competition with a twelve-cell ecological model. US Environmental Protection Agency, Office of Research and Development, EPA/600/R-06/046. 92 pp.

Other Publications:

Mayer AL. 2007. Sustainability Rule #1: Learn from past mistakes (book review). *Ecology* 88(12):3211-3212.

Roy AH, H Cabezas, MP Clagett, NT Hoagland, AL Mayer, MA Morrison, WD Shuster, JJ Templeton, and HW Thurston. 2006. Retrofit stormwater management: Navigating multidisciplinary hurdles at the watershed scale. *Stormwater* 7(3).

Mayer AL. 2004. Bird diversity and landscape characteristics in Ohio. *Ohio Bird Banding Association Newsletter* 18(4).

Mayer AL. 2003. Managing natural resources from a landscape perspective (book review). *Ecology* 84(12):3404-3405.

Mayer AL. 2003. "Putting the right parks in the right places" (book review). *Ecology* 84(1):273-274.

Mayer AL. 2001. Standard operating procedure for ecological assessments (book review). *Ecology* 82(12):3564-3565.

Mayer AL and SL Pimm. 1997. Tropical rainforests: Diversity begets diversity. *Current Biology* 7(7):R430-432.

Scientific Presentations (*invited):

*2008. Michigan Technological University. "Indices for spatial and temporal sustainability."

*2007. University of Illinois-Chicago, Landscape, Ecological & Anthropogenic Processes program. "International markets, ecological connectivity, and sustainability debt."

*2006. Trans-Atlantic Research & Development Interchange on Sustainability (TARDIS), Estes Park, Colorado, USA. "Sustainability and scale: Biodiversity conservation and international trade."

2006. 1st European Congress of Conservation Biology, Eger, Hungary. "Exporting forest harvest to neighboring countries can impact domestic conservation efforts" (with P Kauppi, P Tikka, T Virtanen, P Angelstam).

*2005. Ecological Society of America, Montréal, Canada. "Factors affecting population trends in North American migratory birds."

2005. Society for Conservation Biology, Brasília, Brazil. "Potential aquatic community improvement through a multidisciplinary stormwater management experiment" (with A Roy, L Boczek, W Shuster, H Thurston and M Clagett).

*2004. University of Helsinki, Department of Biological and Environmental Sciences, Helsinki, Finland.

"Economic auction system for environmental protection: a stormwater management case in Cincinnati, Ohio."

*2004. Helsinki University of Technology, Laboratory of Information Technology, Helsinki, Finland. "The challenges of understanding dynamic ecosystems through large datasets."

2004. International Association of Landscape Ecologists, Las Vegas, Nevada, USA. "A multidisciplinary approach to managing stormwater runoff in an urban watershed" (with PK Parikh, MA Taylor, HW Thurston and WD Shuster).

2004. International symposium on dynamical systems theory and its application to biology and environmental sciences, Hamamatsu City, Japan. “An index to detect externally-forced dynamic regime shifts in ecosystems” (with CW Pawlowski and H Cabezas).
- *2004. Illinois Natural History Survey, Urbana-Champaign, Illinois, USA. “Scale and bird diversity in Ohio”.
2003. Joint annual meeting of the Ecological Society of America and the International Society of Ecological Modeling, Savannah, Georgia, USA “Using Fisher Information to detect gradual and rapid ecosystem regime shifts” (with CW Pawlowski and H Cabezas).
- *2003. Chicago Chapter of INFORMS (Institute for Operations Research and the Management Sciences), Managing risk in an uncertain world, Chicago, Illinois, USA. “Using Fisher Information to assess the risk of dynamic regime changes in ecological systems” (with CW Pawlowski and H Cabezas).
- *2003. Pomona College, California, USA. “Sparrows versus Gators: Who wins in Everglades conservation?”
2002. Annual Conference of the American Institute of Chemical Engineers, Indianapolis, Indiana, USA. “Fisher Information of dynamic regime transitions in ecological systems” (with CW Pawlowski and H Cabezas).
2002. Third Conference for the International Society for Ecological Informatics, Rome, Italy. “Fisher information and dynamic regime changes in ecological systems” (with CW Pawlowski and H Cabezas).
- *2002. University of Cincinnati, Ohio, USA. “Avian ecology and conservation policy in the Everglades.”
- *2002. University of Dayton, Ohio, USA. “Avian ecology and conservation policy in the Everglades.”
1998. North American Ornithological Conference, St. Louis, Missouri, USA. “Habitat indicators for the endangered Cape Sable seaside sparrow (*Ammodramus maritimus mirabilis*)”.
- *1996. Royal Zoological Society of London, annual meeting. Conservation in a Changing World: integrating processes into priorities for action, London, UK. “Integrating endangered species protection and ecosystem management: the Cape Sable sparrow as a case study” (with SL Pimm).
1994. American Ornithologists’ Union, Wilson Ornithological Society, and Cooper Ornithological Society, first joint annual meeting, Missoula, Montana, USA. “The effects of fire on the ecology of the California gnatcatcher (*Polioptila californica*), and associated bird species, in the coastal sage scrub community of southern California” (with WO Wirtz, II).
- *1994. Fifth annual “New directions” Undergraduate Research Conference, University of California Riverside, USA. “Plant species utilization by the California gnatcatcher (*Polioptila californica californica*)”.
1994. Southern California Academy of Sciences, annual meeting, Los Angeles, California, USA. “The effects of fire on the ecology of the California gnatcatcher (*Polioptila californica*), and associated bird species, in the coastal sage scrub community of southern California” (with WO Wirtz, II).

Other Presentations (all invited):

- 1999: Tennessee Ornithological Society, Knoxville Chapter (bird ecology in the Everglades)
- 2001: Audubon Society of Ohio, Cincinnati (bird ecology in the Everglades)
- 2001: Dayton Audubon Society (migratory bird kills at communication towers)
- 2002: Sierra Club, Miami Group-Cincinnati (migratory bird kills at communication towers)
- 2004: Cincinnati Bird Club (migratory bird kills at communication towers)