

James J. Hayes

Assistant Professor

Department of Geography
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Education: Ph.D. Geography, Indiana University, Bloomington, 2008
M.A. Geography, Indiana State University, 2001
B.A. Geography, Indiana University, Indianapolis, 1999

Academic Appointments:

Assistant Professor Department of Geography, California State University,
Northridge, 2008-present
Associate Instructor Department of Geography, Indiana University, 2006-2008
Indiana University Future Faculty Teaching Fellow
Appointed to Indiana University-Purdue University at
Indianapolis, Department of Geography, 2005-2006
Graduate Fellow, Teaching Assistant
Department of Geography, Indiana University Graduate
School, 2002-2004

Professional Interests:

Human-environment Interaction; impacts of climate and land use/land cover change on
plant and animal distributions and ecological processes
Landscape ecology of human-modified environments; landscape function, urban
forestry, environmental justice, and sustainable landscapes
Applications of Remote Sensing, GIS, Spatial Statistics, and Dendroecology

Professional Affiliations:

Member, Association of American Geographers
Member, California Geographical Society, Executive Board
Member, International Association for Landscape Ecology
Member, Gamma Theta Upsilon, Geographical Honor Society

PUBLICATIONS**Peer Reviewed Articles:**

- Hayes, J.J.** 2013. Heterogeneity in Recruitment and Habitat Patterns of Valley Oak (*Quercus lobata* Née) at the Site and Landscape Scale in the Santa Monica Mountains, California, USA, *Plant Ecology*, in review.
- Hayes, J.J.**, Valentovich, T., Morisson, P. 2013. Moving Window Analysis of Precipitation Variability around the Mean in a *Quercus lobata* Tree-ring Chronology, *Dendroecologia*, in preparation.
- Hayes, J.J.** 2013. Site-specific Measure of Ecological Clustering, Morista's I, Differences across Three Valley Oak Stands in Southern California, *Forest Ecology and Management*, in preparation.
- Timms, B., **Hayes, J.J.**, and McCracken, M. 2012. From Deforestation to Reforestation in the Cockpit County, Jamaica: Beginning of a Forest Transition? *Area*, DOI: 10.1111/j.1475-4762.2012.01122.x
- Hayes, J.J.**, and Robeson, S.M. 2011. Relationships between Fire Severity and Post-fire Landscape Pattern Following a Large Mixed-Severity Fire in the Valle Vidal, New Mexico, USA. *Forest Ecology and Management* 261:1392-1400.
- Hoch, S., and **Hayes, J.J.** 2010. Geolinguistics: The Incorporation of Geographic Information Systems and Science. *The Geographical Bulletin* 51:23-36.
- Hayes, J.J.**, and Robeson, S.M. 2009. Spatial Variability of Landscape Pattern Change Following a Ponderosa Pine Wildfire in Northeastern New Mexico, USA. *Physical Geography* 30:410-429.
- Cowell, C.M. and **Hayes, J.J.** 2007. Structure, History, and Dynamics of a Mature Oak-beech Forest in Western Indiana. *Journal of the Torrey Botanical Society* 134:215-222
- Book Chapters:**
- Hayes, J.J.**, and Timms, B. 2012. *Physical Geography: The Human-Environment Connection*. In *Placing Latin America: Contemporary Themes in Geography*, 2nd Edition. Bosco, F.J. and Jackiewicz, E.L., eds. Rowman and Littlefield. Lanham, MD.

Technical Papers and Reports:

- Stein, E.D., Cover, M., O'Reilly, C., **Hayes, J.J.**, Fetscher, A.E., Ambrose, R., Fong, L.S., Guardado, R., Solek, C., Kondolf, G.M., Alford, C., Zuri, C. 2011. *Evaluation of Stream Condition Indicators for Determining Effects of Direct Hydromodification via Stream bank Armoring.* Southern California Coastal Water Research Project. Tech. Rep. 643, March 2011.
- Augumbaugh, K., Harvey, B., **Hayes, J.J.**, Kernan, J., Marion, D.A., Peterson, J., Pipkin, A., Riley, K., and Kaye, M.W. 2009. *Fire on Tekoa Mountain, A Dendrochronological Fire History Reconstruction in Western Massachusetts. In: Speer, J.H. (ed.) Final Report to the National Science foundation of the 19th Annual North American Dendroecological Fieldweek (NADEF).* Indiana State University.
- Kaye, M.W., Speer, J.H., Allen, M., Brose, P., DeRose, R.J., Guetersloh, E., Gutierrez-Garcia, G., **Hayes, J.J.**, Halofsky, J., Phillip, K.C., Shatford, J.P.A., Toeneiet, M. 2007. *A Ridge Top Fire History in the Blue River Watershed, West-central Cascades, Oregon.* In: Speer, J.H. (ed.) Final Report of the 16th Annual North American Dendroecological Fieldweek (NADEF). Indiana State University.
- Castillo, A., Flores, A., Fortin, I., Gatzweiler, F., **Hayes, J.J.**, Karna, B., van Laerhoven, F., Lara, Y., Mathenge, C., and Persha, L. with Andersson, K., Hayes, T., England, J., Humphrey, R., and Ostrom, E. 2003. *Painted Hills and its Forests Revisited.* International Forestry Resources and Institutions Research Program, Workshop in Political Theory and Policy Analysis. Indiana University, Bloomington, Indiana.
- Hayes, J.J.**, Matthieu, M.P., and Lindsey, G.H. 2000. *Effectiveness in Erosion and Sediment Control: New Initiatives in Indianapolis.* National Conference on Tools for Urban Water Resource Management. US EPA Publication #EPA/625/R00/001.
- Center for Earth and Environmental Science, Graphics Laboratory, Indiana University – Purdue University at Indianapolis. 1999. *Marion County, 1941 Aerial Photo Mosaic.* Poster.
- Hayes, J.J.** and Matthieu, M.P. 1998. *Rule 5 Evaluation Report.* Marion County Soil and Water Conservation District. Indianapolis, Indiana.

GRANTS AND AWARDS

- Award for Research, Scholarship, and Creative Activity, California State University, Northridge, *Spatial and Temporal Analysis of Valley Oak (Quercus lobata) Regeneration Dynamics in the Santa Monica Mountains*, (award - 3 units course release to pursue publication), 2011-2012.
- Summer Research Stipend Award, College of Social and Behavioral Sciences, CSUN, *Evaluating National Park Effectiveness in Jamaica using Remote Sensing of Vegetation Change*, (\$4,200), 2011.
- Southern California Coastal Watershed Resources Project (SCCWRP), *Impact of Hydromodification on Stream Processes*, (\$75,589), 2010.
- Summer Research Stipend Award, College of Social and Behavioral Sciences, CSUN, *Combining Complexity and Landscape Ecosystem Theory in a Comprehensive Framework for Analysis of Human-Environment Interaction*, (\$5,000), 2009.
- Research Competition Grant, College of Social and Behavioral Sciences, CSUN, *Landscape Ecology and Institutional Analysis for Understanding Historical Environmental Change*, (\$3,500), 2009.
- New Faculty Research Grant, College of Social and Behavioral Sciences, CSUN, *Historical Change of Valley Oak Population Structure and Disturbance Conditions*, (\$1,500), 2008-2009.
- Future Faculty Teaching Fellowship, IU Graduate School. Awarded for outstanding academic performance and commitment to excellence in teaching. Teaching-fellow appointment at IUPUI Department of Geography, 2005-2006.
- Chairman's Graduate Student Recognition Award, Department of Geography, Indiana University, Award for outstanding academic performance, 2003-2006.
- Graduate Fellowship, Department of Geography, Indiana University, 2003-2004.
- National Academy of Sciences, through Sigma Xi, The Scientific Research Society, Grant-in-Aid of Research, *Regeneration in an Old-growth Forest near the Prairie- Deciduous Forest Ecotone*, (\$500), 2000.

PROPOSALS IN PREPARATION

Coping with Change: Water Availability and Rangeland Management in the Eastern Sierras. Submitted to NSF Coupled Natural Human Systems Programs (November 2012) to support an exploratory interdisciplinary research team to model interactions among climate variability, rangeland ecological dynamics, and perceptions of climate change and coping strategies employed by ranchers in watersheds of the Owens River Valley on the east-side of the Sierra Nevada Mountains in California. \$200,000 proposed budget.

Multi-scale Modeling of Past Climate and Valley Oak Dynamics to Inform Conservation Management and Sustainable Water Use. In preparation for NSF Geography and Spatial Sciences Program. This proposal is intended to fund field work, lab facilities, and graduate students working on developing models of past climate and streamflow developed from *Quercus lobata* tree-ring chronologies and applied toward understanding sustainable water use policies and conservation and land management decision support in southern California. \$60,000 proposed budget.

CONFERENCE PRESENTATIONS

Hayes, J.J. 2012. *Multi-scale Analysis of Valley Oak (*Quercus lobata* Née) Ecological Clustering at Three Sites in the Santa Monica Mountains, California, USA.* Annual Meeting of the Association of American Geographers. New York. February, 2012.

Hayes, J.J. 2011. *A Multi-site Analysis of Valley Oak (*Quercus lobata* Née) Regeneration, Stand Structure and Spatial Distribution in the Santa Monica Mountains, California, USA.* Mediterranean Ecosystems Conference MEDECOS XII: Linking Science with Management. UCLA, Los Angeles, CA., September, 2011.

Hayes, J.J., and, Ilicheva, A. 2011. *Stand Structure and Dendroecology of Valley Oak in the Santa Monica Mountains.* Annual Meeting of the Association of American Geographers. Seattle, WA. April, 2011.

Timms, B.F., McCracken, M., and **Hayes, J.J.** 2011. *Simulating a Counterfactual Experiment to Evaluate National Park Effectiveness in Jamaica.* Annual Meeting of the Association of American Geographers. Seattle, WA. April, 2011.

Hayes, J.J. (discussant) 2011. *Landscape.* Panel Discussion at the Annual Meeting of the Association of American Geographers. Seattle, WA. April, 2011.

Greer, C., Donnelly, S., and **Hayes, J.J.** 2011. *Re-reading George Perkins Marsh for 19th Century Roots of Landscape Sustainability.* Speaking Nature, Interdisciplinary Nineteenth-Century Studies Conference. Pitzer College. Claremont, CA.

Conference Presentations (Cont'd):

- Hayes, J.J.** 2010. *Structure and Regeneration of Valley Oak at Three Sites in the Santa Monica Mountains*. Annual Meeting of the Association of American Geographers. Washington, D.C. April, 2010
- Hayes, J.J.**, Donnelly, S.D., Greer, C., and Rickly-Boyd, J. 2009. *The Role of Aggregate Complexity in an Energy-based Framework for Comprehensive Landscape Study*. Annual Meeting of the Association of American Geographers. Las Vegas, NV. March, 2009.
- Hayes, J.J.** 2008. *Differential Spatial and Compositional Effects of Fire Severity on Landscape Pattern*. Annual Meeting of the Association of American Geographers. Boston, MA. April, 2008.
- Greer, C., Donnelly, S.D., **Hayes, J.J.**, and Rickly, J. 2007. *Landscape as Embodied Energy: Ecosystem Perspectives on the Human-Environment Relationship*. Emerging Energies, Emerging Landscapes: Revisioning the Past, Constructing the Future. European Science Foundation Exploratory Workshop. Paris, France. June 2007.
- Hayes, J.J.** 2007. *Spatial Variation in Landscape Pattern Change Following a Ponderosa Pine Forest Fire*. Annual Meeting of the Association of American Geographers. San Francisco, CA. April, 2007.
- Greer, C., Donnelly, S.D., **Hayes, J.J.**, and Rickly, J. 2007. *An Ecosystem Energy Framework of Landscape Form and Function*. Annual Meeting of the Association of American Geographers. San Francisco, CA. April, 2007.
- Hayes, J.J.** 2007. *Landscape Scale Interactions of Forest Fire and Forest Structure in Northeastern New Mexico*. Landscape, Space, and Place: 1st Annual Graduate Student Conference in Landscape Studies. Bloomington, IN. April 2007.
- Donnelly, S.D., Greer, C., **Hayes, J.J.**, and Rickly, J. 2007. *Sustainability and Landscape: An Ecosystem Energy Framework for Landscape Form and Process*. Landscape, Space, and Place: 1st Annual Graduate Student Conference in Landscape Studies. Bloomington, IN. April 2007.
- Hayes, J.J.** 2006. *Examining a Ponderosa Pine Fire Using Discrete and Continuous Landscape Representations*. Annual Meeting of the Association of American Geographers. Chicago, IL. March 2006.
- Odland, J. and **Hayes, J.J.** 2005. *Concentration of Periodical Cicadas in Human-modified Environments*. Annual Meeting of the Association of American Geographers, Denver, CO. April 2005.

Conference Presentations (Cont'd):

- Hayes, J.J.**, Robeson, S.M., and Cowell, C.M. 2005. *Spatial Pattern in Species Regeneration and Light Resources in a Transitional Hardwood Forest: Linking Pattern and Process*. Annual Meeting of the Association of American Geographers, Denver, CO. April 2005.
- Hayes, J.J.** 2004. *Spatial Structure of Forest Composition and Understory Light in an Old-growth Forest Preserve of Vigo County, Indiana*. Young Researchers Conference: School of Public and Environmental Affairs, Indiana University, Bloomington, IN. April 2004.
- Hayes, J.J.**, Robeson, S.M., and Cowell, C.M. 2004. *Comparing Ranges of Spatial Variability in Light Levels and Regeneration at Kieweg Woods, IN*. Centennial Meeting of the Association of American Geographers, Philadelphia, PA. March 2004.

TEACHING**Courses Taught:**

<i>Semester</i>	<i>Course</i>	<i># Students</i>
Fall 2012	GEOG101 Physical Systems of the Environment (2 sections)	81, 84
	GEOG102OL Physical Systems Lab	107
	GEOG460 Spatial Analysis (Lecture and Lab)	15
Summer 2012	GEOG107OL Introduction to Human Geography	48
Spring 2012	GEOG101 Physical Systems of the Environment	135
	GEOG364 World Ecosystems: Biogeography (with lab)	19
	GEOG630B Seminar in Biogeography	10
Winter 2012	GEOG150OL World Geography	20
Fall 2011	GEOG101 Physical Systems of the Environment	84
	GEOG460 Spatial Analysis (Lecture and Lab)	22
	GEOG600 Seminar in Geographic Thought and Research	13
Spring 2011	GEOG101 Physical Systems of the Environment	82
	GEOG459 Environmental Impact Studies	14
	GEOG600 Seminar in Geographic Thought and Research	14
Fall 2010	GEOG101 Physical Systems of the Environment	42
	GEOG460 Spatial Analysis (Lecture and Lab)	24
	GEOG600 Seminar in Geographic Thought and Research	16
Spring 2010	GEOG101 Physical Systems of the Environment (2 sections)	41, 39
	GEOG404UA Field Studies: Dendrochronology	9
	GEOG459 Environmental Impact Studies	20
Fall 2009	GEOG101 Physical Systems of the Environment (2 sections)	85, 84
	GEOG630C Seminar in Landscape Ecology	10
Spring 2009	GEOG101 Physical Systems of the Environment (2 sections)	72, 41
	GEOG459 Environmental Impact Studies	18
Fall 2008	GEOG101 Physical Systems of the Environment (3 sections)	63, 35, 33

Student Thesis Committees, Chair:

- Bedoor Mohammad, *Validating measures of Fire Severity in the Santa Monica Mountains using Remote Sensing and GIS*, M.A., 2009.
- Laura Yetter, *Spatial Variability of California Gnatcatcher Habitat: Effects of Landscape Pattern and Spatial Context on Population Size and Viability*, M.A., 2012.
- Cady Bow, *Assessing Forest Composition and Structure Change through Historical Oblique Photography and Field Survey, Letchworth State Park, New York*, M.A., 2012.
- Tracy Valentovich, *Distribution and Dynamics of Valley Oak (Quercus lobata) in the Santa Monica Mountains, California*, M.A., in progress.
- Maria Gomez, *Analysis of Landscape-scale Land Use and Land Cover Change Association with Vegetation Modification in the Santa Monica Mountains, California, USA*, M.A., in progress.
- Christopher Schultz, *Stand Dynamics and Fire Regime Analysis Using Dendroecology of Quercus garryana var. breweri*, M.A., in progress.
- Shane Western, *Variability of Forest Landscapes across Fire Management Regimes in the Southwestern Sierra Nevada*, M.A., in progress.
- Danielle De Mello, *Electronic Waste Recycling: Differences in Public Awareness and Behavior in Urban and Rural Populations*, M.A., in progress.
- Eryn Morigan, *Habitat Analysis of the Coast Horned Lizard (Phrynosoma blainvillii): Conservation Concerns in the Santa Monica Mountain Range*, M.A., in progress.

Student Thesis Committees, Member:

Joshua Graham	M.S., Geological Sciences	In Progress
Lisa Black	M.A., Geography	In Progress
Afsaneh Rafii	M.A., Geography	In Progress
Ahmed Aldossary	M.A., Geography	2012
Andrea Nick	M.A., Geography	2012
Deanna Wilson	M.A., Geography	2012
Aleks Ilicheva	M.A., Geography	2011
Rich Lee	M.A., Geography	2011
Jose Huerta	M.A., Geography	2011
Brittany Fargher	M.A., Geography	2010

Independent Study Supervised (GEOG499):

<i>Student</i>	<i>Area of Focus</i>	<i>Semester</i>
Areeya Tivasuradej	Remote Sensing Image Processing	Fall 2009
Aleksandra Ilicheva	Political Landscape Ecology	Fall 2010
Lara Saikali	Statistical Data Analysis in ArcGIS	Spring 2011

Teaching at IU and IUPUI (2001-2008):

G336/535: Remote Sensing and Air Photo Interpretation

G337/537: Computer Cartography and Graphics

G338/538: Geographic Information Science

G107: Physical Systems of the Environment

G108: Physical Systems of the Environment Lab

G237: Cartography and GIS

G311: Introduction to Research Methods in Geography

SERVICE**Professional Service:**Journal Articles Reviewed:

- Canadian Journal of Forest Research
- Physical Geography
- Forest Ecology and Management
- Geography Compass
- Journal of Geography
- Biological Invasions

Proposals Reviewed:

- National Science Foundation, Geography and Spatial Sciences Program

Reviewer of Books, Book Chapters, and Reports for:

- Oxford University Press
- Springer
- US National Park Service

Professional Associations:

- Co-founder and current Chair: Landscape Specialty Group, Association of American Geographers, 2010-2013.
- Executive Board Member, California Geographical Society, 2009-2015
- Organized multiple conference presentation sessions for 2013 Annual Meeting of the Association of American Geographers, Los Angeles, CA, 2013.
- Organized Conference field trip to Tejon Ranch for 2013 Annual Meeting of the Association of American Geographers, Los Angeles, CA, 2013.
- Judge, Landscape Specialty Group Student Paper Competition, 2011, 2012
- Organized multiple conference presentation sessions for 2012 Annual Meeting of the Association of American Geographers. New York. February, 2012.
- Organizer and Session Chair, *Landscape Ecology and Biogeography – Spatial Context*, Association of American Geographers Annual Meeting. Las Vegas, NV, 2009.
- Co-Organizer, *Landscape: Heuristic Tool, Cultural Artifact, Ecological Concept, or Political Entity?II*, AAG Annual Meeting, Las Vegas, NV, 2009.
- Judge, Biogeography Specialty Group Student Poster Competition. AAG Annual Meeting, Las Vegas, NV, 2009.
- Co-Organizer and Session Chair, *Perspectives on Landscape*, Association of American Geographers Annual Meeting. Boston, MA, 2008

University Service:

- GE Paths Initiative, piloted GEOG101 as new course in Sustainability Path. Recruited students, developed learning outcomes and assessment tools, 2012.
- Faculty Development for Sustainability in the GE Paths Initiative, with Peirce College and CSUN faculty development, developed assessment and learning outcomes for sustainability course content to align CSUN and community college practices. Develop high-impact teaching strategies, 2012.
- Judge, 13th Annual CSUN Student Research and Creative Works Symposium, 2009.
- University Library Lobby Display: Geographic Information Science. Worked with Eric Garcia and library staff and Geography faculty and students to create and present examples of GIS applications and technologies, 2009.

College Service:

Academic Planning Committee (2009-2011)

Departmental Service:

- Graduate Student Committee (2008-present)
- Curriculum Committee (2009-present), Chair (2010-2011)
- Field Studies Committee (2009-present)
- Center for Geographical Studies, Faculty Advisor (2009-present)
- Gamma Theta Upsilon and Geography Council, Faculty Advisor (2008-Present)
- GIS Committee (2008-2010)
- Student Awards Committee (2008-2010)
- Guest Lecture, GEOG 600 Fall 2008: *Fire Severity and Landscape Pattern Change*
- Guest Lecture, GEOG 600 Fall 2009: *Research Planning and Methods in Landscape Ecology*

Community Service:

- National Parks Science Day (2010) at Paramount Ranch, Santa Monica Mountains National Recreation Area

- Developing research and outreach efforts with the Tejon Conservancy, a non-profit conservation organization created to manage newly acquired conservation easements from the Tejon Ranch Company.
 - 1) 3 class field trips have been held at the ranch with Conservancy cooperation
 - 2) Two student theses are progressing on work relevant to Conservancy management goals
 - 3) Collaborating with Conservancy staff on proposal for external research funding

- National Parks Service (NPS), Santa Monica Mountains National Recreation Area (SMMNRA). Developing research projects and field studies courses to advance teaching and research within the park to aid management decision making and for conservation and recreational use of national park lands. Including:
 - 1) A multi-site assessment of valley oak population dynamics.
 - 2) Landscape-scale effects of urban development on park vegetation.
 - 3) Student research projects for GEOG 490 and Thesis work.

- External reviewer for NPS reports related to the conservation and management of the Santa Monica Mountains National Recreation Area.

Service At Indiana and IUPUI:

- Geography Representative: Graduate and Professional Student Organization.
Represent geography graduate student interests in the IU GPSO, graduate student government body. (2007-2008)
- GPS Curriculum Development: Developed GPS exercise for Intro to GIS and purchased GPS units for department of geography at IUPUI, 2006
- GIS Day, GPS Workshop: Planned and executed GPS Workshop for the public on IUPUI campus, 2005
- Graduate Student Representative: Elected to represent graduate student body to faculty. (2004-2005, 2005-2006)
- Committee Member: Human-Environment Interaction Program Committee. Dr. Phil Keating, Program Committee Chair. (2002 – 2003)

PROFESSIONAL DEVELOPMENT

- **Matlab Statistics Toolbox. June, 2011, San Francisco, CA.** Three day workshop on functionality and applications of statistical tools in Matlab, technical computing language.
- **Early Career GFDA Workshop. June, 2010. Boulder, CO.** Week-long workshop with sessions focused on effective teaching, writing strategies, grant proposal writing, building research strategies, collegiality, conflict management, and work-life balance.
- **North American Dendroecological Fieldweek, Hampshire College, Amherst, MA, June 2009.** Fire-history reconstruction of a mixed oak-hickory forest stand on Tekoa Mountain, MA, with colleagues from universities and resource management agencies across the United States. Margot Kaye, workgroup leader.
- **North American Dendroecological Fieldweek, Hatfield Marine Science Center, Newport OR, June 2006.** Fire-history reconstruction of a forest stand in the Andrews Experimental Forest (Willamette National Forest) with colleagues from universities in the United States, Mexico, and Europe. Margot Kaye, workgroup leader.
- **Future Faculty Teaching Fellow's Summer Institute, July 15 – 17, 2005.** Attended workshops on "Discussion in the Classroom", "Diversity in the Classroom", "Cooperative Learning and Discovery Learning", "Teaching Portfolio Development", and "Strategies for Success as First-year Faculty".
- **Excellence in Teaching, G700.** Campus-wide course on pedagogy and the psychology of learning.

APPLIED EXPERIENCE IN GEOGRAPHY

Project Assistant/ Results compilation:	Geography Educator's Network of Indiana (GENI), June 2001 – 02 GENI/National Council for Geographic Education Standards Based Testing. Revised and edited text and graphic materials for follow-up study of 1985 assessment of entry-level Indiana college students' geographic knowledge.
Lab Facilitator:	Geography Educator's Network of Indiana, GeoSpatial Summer Institute for K-12 Teachers. June 2002. Provided assistance and instruction to institute participants completing individual projects.

Applied experience in Geography (Cont'd):

Research Assistant:
Dr. John Ottensman School of Public and Environmental Affairs, Indiana
University-Purdue University at Indianapolis, IN.
2000 – 2001.

Research Assistant:
Dr. Jeffrey Wilson Department of Geography, Indiana University-
Purdue University at Indianapolis, IN. 2000.

Research Assistant:
Dr. Mark Cowell Department of Geography, Geology and
Anthropology, Indiana State University, Terre
Haute, IN. 2000.

Research Associate: Center for Earth and Environmental Science,
Indiana University – Purdue University at
Indianapolis, IN. 1999.

Conservation Associate: Marion County Soil and Water Conservation
District, Indianapolis,
IN. 1998.