

# BETHANY A. BRADLEY

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## EDUCATION

**Brown University**, Providence, RI

PhD Geological Sciences, 2006

*Thesis Title:* A Regional Analysis of Drivers and Impacts of Land Cover Change and Long-term Land Cover Trends in the Great Basin, U.S.

*Thesis Advisor:* John Mustard

MS Geological Sciences, 2003

*Thesis Title:* Identifying Land Cover Variability Distinct from Land Cover Change: Cheatgrass in the Great Basin

**Pomona College**, Claremont, CA

BA Geology, 2000

*Thesis Title:* Using Mars Orbiter Laser Altimeter Data to Remap Unit Boundaries and Stratigraphy of the Medusae Fossae Formation South of Elysium Basin

## RESEARCH INTERESTS

I am interested in how terrestrial ecosystems respond to anthropogenically driven changes, particularly land use and global climate change. The goals of my research are to identify land cover change using primarily remote sensing analysis, to analyze the geographical and ecological relationships of land cover change to land use and climate, and to predict risks to ecosystems based on models of future climate and land use change.

## PUBLICATIONS

**Bradley, B.A.**, “Assessing ecosystem threats from global and regional change: Hierarchical modeling of risk to sagebrush systems from climate change and invasive species in Nevada, USA”, In Press, *Ecography*, 2009

**Bradley, B.A.** and D.S. Wilcove, “When invasive plants disappear: transformative restoration possibilities in the western United States resulting from climate change”, In Press, *Restoration Ecology*, 2009

**Bradley, B.A.**, “Accuracy assessment of mixed land cover using stratified random sampling”, In Press, *International Journal of Remote Sensing*, 2009

Orenstein, D.E., **B.A. Bradley**, J. Albert, J.F. Mustard, and S.P. Hamburg, “The Truth is in the Data? Comparative Methodologies for Monitoring Urban Development in Israel”, In Press, *International Journal of Remote Sensing*, 2009

Marvin, D., **B.A. Bradley**, and D.S. Wilcove, “A Novel, Web-based, Ecosystem Mapping Tool using Expert Opinion”, *Natural Areas Journal*, 29(3), 2009

**Bradley, B.A.**, M. Oppenheimer, and D.S. Wilcove, “Climate Change and Plant Invasion: Restoration Opportunities Ahead?”, *Global Change Biology*, 15, 1511-1521, 2009

**Bradley, B.A.**, “Regional Analysis of the Impacts of Climate Change on Cheatgrass Invasion Shows Potential Risk and Opportunity”, *Global Change Biology*, 15, 196-208, 2009

- Bradley, B.A.** and E. Fleishman, “*Commentary: Can Remote Sensing Improve Species Distribution Modelling?*”, *Journal of Biogeography*, 35, 1158-1159, 2008
- Bradley, B.A.** and E. Fleishman, “*Relationships Between Expanding Pinyon-Juniper Cover and Topography in the Central Great Basin*”, *Journal of Biogeography*, 35, 951-964, 2008
- Bradley, B.A.** and J.F. Mustard, “*Comparison of Phenology Trends by Land Cover Class: A Case Study in the Great Basin, U.S.A.*”, *Global Change Biology*, 14(2), 334-346, 2008
- Bradley, B.A.**, R.W. Jacob, J.F. Hermance, and J.F. Mustard, “*A curve-fitting technique to derive inter-annual phenologies from time series of noisy satellite data*”, *Remote Sensing of Environment*, 106, 137-145, 2007
- Hermance, J.F., R.W. Jacob, **B.A. Bradley**, and J.F. Mustard, “*Extracting Phenological Signals from Multi-Year AVHRR NDVI Time Series: Framework for Applying High-Order Annual Splines with Roughness Damping*”, *IEEE Trans. in Geoscience and Remote Sensing*, 45, 3264-3276, 2007
- Bradley, B.A.**, R.A. Houghton, J.F. Mustard, and S.P. Hamburg, “*Invasive Grass Reduces Carbon Stocks in Shrublands of the Western U.S.*”, *Global Change Biology*, 12(10), 1815-1822, 2006
- Bradley, B.A.**, and J.F. Mustard, “*Characterizing the Landscape Dynamics of an Invasive Plant and Risk of Invasion Using Remote Sensing*”, *Ecological Applications*, 16(3), 1132-1147, 2006
- Bradley, B.A.**, and J.F. Mustard, “*Identifying Land Cover Variability Distinct from Land Cover Change: Cheatgrass in the Great Basin*”, *Remote Sensing of Environment*, 94(2), 204-213, 2005
- Bradley, B.A.**, S.E.H. Sakimoto, H. Frey, and J.R. Zimbelman, “*Medusae Fossae Formation: New Perspectives from Mars Global Surveyor*”, *Journal of Geophysical Research*, 107(E8), 5058, doi:10.1029/2001JE001537, 2002

#### **MANUSCRIPTS IN PREPARATION**

- Bradley, B.A., M. Oppenheimer, and D.S. Wilcove, “*Climate Change Increases Risk of Plant Invasion in the Eastern United States*”, In Revision, *Biological Invasions*, 2009
- Bradley, B.A. and M.T. O’Sullivan, “*Assessing the short term impacts of changing grazing regime at the landscape scale with remote sensing*”, In Preparation, 2009
- Bradley, B.A., D.M. Blumenthal, and D.S. Wilcove, L.H. Ziska, “*The science and management of plant invasions in the face of global change*”, In Preparation for *Trends in Ecology & Evolution*, 2009
- Bradley, B.A., K. Vanderbilt, K. Wetherill, and J.E. Nickeson, “*A comparison of field observations with remote sensing measurements: Phenological patterns of perennial semi-arid grassland ecosystems in central New Mexico*”, In Preparation, 2009

#### **SELECTED CONFERENCE ABSTRACTS**

- Bradley, B.A., D.S. Wilcove, and M. Oppenheimer, “*Climate change may create new opportunities for invasive plant restoration*”, *Ecological Society of America Annual Meeting*, August, 2009
- Bradley, B.A., and J.C. Chambers, “*What the modeling community needs from experiments: Ideas on integrating predictions of the impacts of climate change*”, *International Association for Landscape Ecology Annual Meeting*, April, 2009 (*Invited*)
- Bradley, B.A., and D.S. Wilcove, “*Invasive species and climate change: Quantifying risks and finding opportunities*”, *National Council for Science and the Environment Annual Meeting*, December, 2008
- Bradley, B.A., K. Wetherill, K. Vanderbilt, and J. Nickeson “*Integrating ground observations of phenology with remotely sensed measurements: A 2007 growing season experiment at Sevilleta LTER*”, *American Geophysical Union Annual Meeting*, December, 2007
- Bradley, B.A., “*Predicting Future Trajectories of Plant Invasion with Climate Change in the Western United States*”, *Ecological Society of America Annual Meeting*, August, 2007 (*Invited*)

- Bradley, B.A., “*Impacts of climate variability on non-native plant invasion in the western U.S.*”, American Geophysical Union Annual Meeting, December, 2006
- Bradley, B., J. Mustard, R. Jacob, and J. Hermance, “*Using a curve-fitting methodology on remotely sensed time series to detect subtle patterns of land surface phenology*”, American Geophysical Union Annual Meeting, December, 2005
- Bradley, B.A., J.F. Mustard, and L.C. Schneider, “*Assessing Spatial Changes and Drivers of Biological Invasions Using Remote Sensing: The Case of Cheatgrass in Northern Nevada*”, American Association of Geographers Annual Meeting, April, 2005 (*Invited*)
- Bradley, B., and J. Mustard, “*Land-use and Invasive Species in Semi-Arid Systems: Cheatgrass in the Great Basin*”, Ecological Society of America Annual Meeting, August, 2004 (*Invited*)
- Bradley, B.A., J.F. Mustard, and R. Tausch, “*Regional Mapping of Cheatgrass (*Bromus tectorum*) in the Great Basin, U.S.*”, Ecological Society of America Annual Meeting, August, 2003
- Bradley, B.A., and J.F. Mustard, “*Vegetation Disturbance on a Multi-year Scale in the Great Basin, U.S. as Identified by AVHRR*”, American Geophysical Union Annual Meeting, December, 2002

## FUNDING PROPOSALS

- “Integrated spatial models of non-native plant invasion, fire risk, and wildlife habitat to support conservation on military lands in the arid Southwest”, Co-I, PI – Brett Dickson, 2010-2013  
Funding Agency: Department of Defense, Strategic Environmental Research and Development Program (SERDP); \$1.5 million
- “Modeling major threats to sagebrush systems in Nevada”, 2007-2008  
Funding Agency: Wilburforce Foundation; \$15,000
- “Landscape scale detection of land cover change in Idaho using remote sensing”, 2006-2007  
Funding Agency: Lava Lake Foundation for Science and Conservation; \$5000

## INVITED TALKS

- “Impacts of Climate Change on Invasive Plants in the Western U.S.: Opportunities for Restoration?”, Presented to the Invasive Species Advisory Council bi-annual meeting, Tucson, May, 2009
- “Plant Invasions in the Context of Global Change: State of the Science and Future Directions”, Presented to the Annual Meeting of the Western Weed Coordinating Committee, Las Vegas, December, 2008

## RESEARCH EXPERIENCE

### Princeton University

*Research Associate* *2006-present*

- Assessing the regional geography of major non-native plant invasions in the United States and changing invasion risk with climate change
- Modeling the impacts of climate change on agricultural productivity in South Africa and the resulting secondary threats to biodiversity
- Using remotely sensed data to measure landscape scale changes in ecosystems resulting from land use

*Project Manager, Invasive Species Mapping Program* *2007-present*

- Initiated and directed a novel effort to map regional distributions of invasive species across the Southeast United States using digital survey methods (<http://invasive.princeton.edu>)
- Initiated and directed a mapping program for the Western U.S. to collect and digitize abundance and distribution information from over 700 counties in 15 states

## **Brown University**

*Research Assistant* 2001-2006

- Combined remote sensing, spatial analysis, and time series modeling to identify and interpret ecosystem change in the Great Basin, U.S.
- Assessed regional and landscape-scale risk of cheatgrass invasion in the Great Basin, U.S.

## **NASA/Goddard Space Flight Center**

*Research Analyst, Geodynamics Branch* 2000-2001

- Used remotely sensed laser altimetry to study Martian geology

## **TEACHING EXPERIENCE**

### **Princeton University**

*Research Director, Princeton Staff* 2007-2008

- Advised a Princeton staff member (now in graduate school) on developing a database for regional mapping of invasive plant species (results accepted in *Natural Areas Journal*)

*Research Mentor, Undergraduate Senior Thesis* 2007-2008

- Designed and advised undergraduate research on remote sensing of long-term variability of spring-fed vegetation in eastern Nevada

### **Brown University**

*Teaching Assistant, Geographic Information Science* 2004, 2005

- Co-taught lectures and labs including topics such as the importance of spatial analysis, spatial modeling, the relationship of GIS and remote sensing, and interpolation
- Student overall average evaluation scores of 1.58 in 2004 and 1.18 in 2005 on a scale of 1-5 (1 being excellent)

*Research Mentor, Undergraduate Senior Thesis* 2005

- Designed and facilitated undergraduate research on land use change in central Idaho

### **Pomona College**

*Teaching Assistant, Introductory Planetary Geology* 2000

*Teaching Assistant, Geomorphology* 1999

*Teaching Assistant, Mineralogy* 1998

## **RELATED TEACHING EXPERIENCE**

### **Brown University**

*Writing Center Associate* 2003-2005

- Worked with students one-on-one identify strengths and weaknesses in their arguments, think through written organization, and learn the merits of constant revision

*Graduate Student Teaching Liaison* 2003-2005

- Organized teaching related activities for the department of Geological Sciences

*Teaching Consultant* 2003-2006

- Attended and evaluated graduate student presentations from a range of academic departments to help graduate students improve their teaching technique and communication skills

## **PROFESSIONAL DEVELOPMENT**

NSF Advance Workshop 2008

Dissertation Initiative for the Advancement of Climate Change Research Workshop 2007

National Association of Geoscience Teachers Workshop 2005

## **AWARDS AND RECOGNITION**

Brown University Dissertation Writing Fellowship	2006
Brown University Geology Club Award for Service to the Department	2006
Dept. of Defense: National Defense Science and Engineering Graduate Fellowship	2001-2004
National Science Foundation Honorable Mention	2001
D.B McIntyre-H. Stanton Hill Award for an outstanding student in geology	2000
Isabel F. Smith Award for service in geological sciences	1999
National Merit Scholar	1996-2000
Girl Scout Gold Award (equivalent of Eagle Scout)	1995

## **UNIVERSITY SERVICE**

Search Committee, Brown University Athletic Director	2004-2005
Geology Department Women in Science and Engineering (WISE) representative	2004-2005
Career Services advisory committee	2001-2005
Sheridan Center for teaching and learning graduate student liaison	2003-2005
Faculty committee on athletics and physical education	2003-2004
Graduate Geology Club treasurer	2003-2004
Graduate Geology Club president	2002-2003

## **PROFESSIONAL AFFILIATIONS & SERVICE**

### *Member of:*

American Geophysical Union  
Ecological Society of America  
International Association of Landscape Ecology

### *Reviewer for:*

Remote Sensing of Environment, Global Change Biology, Ecology, International Journal of Remote Sensing, Diversity and Distributions, Risk Analysis, Global Ecology and Biogeography, Ecography, Ecological Modelling, Weed Science, Wildlife Research, Landscape Ecology, Journal of Environmental Management, Photogrammetric Engineering & Remote Sensing