SUNIL KUMAR
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EDUCATION

Ph.D. in Ecology, Graduate Degree Program in Ecology 2007
Colorado State University, Fort Collins, Colorado
Dissertation: "*Effects of spatial heterogeneity on native and nonnative plant and butterfly species richness in Rocky Mountain National Park, Colorado, USA*".

Certificate in Geospatial Sciences (Remote Sensing, GIS, & GPS) 2005
Colorado State University, Fort Collins, Colorado

M.S. in Forestry (Economics & Management) 1998
Forest Research Institute University, Dehradun, Uttarakhand, India
Thesis: "*Mapping of forest cover and land use types in parts of Doon valley using Indian Remote Sensing (IRS) satellite data*".

B.S. in Mathematics (minors- Physics & Chemistry) 1995
Mahatma Jyotiba Phule Rohilkhand University, Bareilly, Uttar Pradesh, India

CURRENT RESEARCH INTERESTS

Ecological niche modeling/species distribution modeling, landscape ecology, biological invasions, forest ecology, biodiversity and conservation, climate change, geospatial analyses, spatial statistics, remote sensing, GIS, GPS, pest risk analysis, and community ecology.

PROFESSIONAL EXPERIENCE

Research Scientist II 2009 – present
Natural Resource Ecology Laboratory, Colorado State University

- Developed models for native and invasive species distribution and abundance using species distribution models to answer management questions at local, regional and national scales at multiple spatial and temporal scales.
- Conducted tree fruit insect pest establishment risk analyses using correlative and mechanistic species distribution models/ecological niche models.
- Communicated technical results at numerous local, national and international meetings and have written reports to both technical and non-technical audiences.
- Taught graduate (Niche Models course) and undergraduate (Quantitative Reasoning in Ecosystem Science) courses.
- Trained undergraduate and graduate students in species distribution and abundance modeling.
- Collaborated with multidisciplinary team of researchers from the USGS, USDA-ARS, USDA-APHIS, and local, state, and regional land managers and stakeholders in the development of new research projects on insect pests and invasive species modeling and monitoring.
- Proficient at using cutting-edge spatial statistical and geospatial models (e.g., MaxEnt, GLM, GAM, CART, BRT, Random Forest and CLIMEX) including SAHM (Software for Assisted

Habitat Modeling) that can be applied to conduct ecological research especially related to energy development and land use, and biodiversity at multiple spatial scales.
- Conducted field sampling (plants and insects), designed laboratory and field experiments to answer questions related to management of invasive species at multiple spatial and temporal scales.
- Developed models for abundance and distribution of invasive species from multiple taxa.
- Applied knowledge of ecological theories and principles, and used advanced landscape ecology tools to quantify and understand the effects of spatial heterogeneity on native and invasive species.
- Investigated the effects of climate change on invasive and native species distributions.
- Collaborated with mathematicians to develop spread and distribution models of invasive species and infectious diseases.
- Published 38 peer-reviewed research articles, and wrote scientific reports for technical and non-technical audiences.

Affiliate Faculty Member 2010 – present
Department of Ecosystem Science and Sustainability, and Department of Bioagricultural Sciences and Pest Management, Colorado State University
- Advise undergraduate and graduate students.
- Serve on graduate student committees.
- Teach/co-teach courses.

Research Scientist I 2008 – 2009
Natural Resource Ecology Laboratory, Colorado State University
- Conducted research on mapping and modeling of native and invasive species distributions and published peer-reviewed articles in high impact journals.
- Collected field data to validate and improve invasive species distribution models.
- Assisted undergraduate and graduate students in quantitative ecological and spatial analyses.
- Wrote grant proposals and managed grants for invasive species research projects.
- Supervised Research Associates, interns and hourly employees.
- Analyzed satellite remote sensing data for mapping invasive species.
- Collaborated with a PhD student from United Kingdom and performed statistical analyses to investigate the effects of anthropogenic factors on amphibians and reptiles of a protected area in southwest Madagascar.
- Developed spatial distribution models for threatened and endangered species.
- Studied the effects of landscape spatial heterogeneity and spatial autocorrelation on butterfly species diversity.
- Used FRAGSTATS landscape pattern analysis program to quantify habitat heterogeneity.

Post-doctoral Research Associate 2007 – 2008
Natural Resource Ecology Laboratory, Colorado State University

- Tested multiple cutting-edge species distribution models and statistical methods (MaxEnt, GARP, and CART) for modeling and mapping of native and invasive species distributions at multiple scales.
- Conducted research on mapping and modeling of native and invasive species distributions and published peer-reviewed articles.
- Collected field data to validate and improve invasive species distribution models.
- Assisted undergraduate and graduate students in quantitative ecological and spatial analyses
- Wrote grant proposals and managed grants for invasive species research projects.
- Supervised Research Associates, interns and hourly employees.
- Analyzed satellite remote sensing data for mapping invasive species.
- Developed spatial distribution models for threatened and endangered species.
- Studied the effects of landscape spatial heterogeneity and spatial autocorrelation on butterfly species diversity.
- Received 1-week advanced training in Maximum Entropy Modeling (MaxEnt) and other species distribution models.

Research Associate 2006 – 2007
Natural Resource Ecology Laboratory, Colorado State University

- Conducted research on quantification of landscape spatial heterogeneity and its effects on native and nonnative plant and butterfly diversity.
- Developed statistical models for predicting invasive species aboveground biomass.
- Performed field (cutting and weighing) and laboratory (oven drying and weighing) measurements of biomass of invasive species.
- Wrote R statistical language code for online mapping of invasive species for the National Institute of Invasive Species Science (www.NIISS.org).

Graduate Research Assistant 2005 – 2006
Natural Resource Ecology Laboratory, Colorado State University

- Conducted research on quantification of landscape spatial heterogeneity and its effects on native and nonnative plant and butterfly diversity.
- Applied spatial statistics and quantification of spatial autocorrelation for invasive species research.
- Used FRAGSTATS landscape pattern analysis program to quantify habitat heterogeneity.
- Wrote R statistical language code for online mapping of invasive species for the National Institute of Invasive Species Science (www.NIISS.org).
- Presented research results at professional meetings.

Ford Foundation International Fellow (Cohort-1 from India; 2001) 2002 – 2005
Natural Resource Ecology Laboratory, Colorado State University

- I was selected as one of the first 30 Ford Foundation International Fellows (IFP Fellows) from India in 2001 (Cohort-1) by the Ford Foundation International Program (http://fordifp.net/Home.aspx) administered by the Institute of International Education, New York, NY.

- Pursued a Ph.D. degree in Ecology at Colorado State University; took courses in forest ecology, landscape ecology, population and community ecology, systems ecology, ecosystem ecology, statistics, spatial statistics, GIS, GPS and remote sensing; earned 72 credit hours only for coursework.
- Developed strong quantitative ecological and spatial analysis skills.
- Developed advanced knowledge of ecological theories and principles.
- Learned SAS, SYSTAT and R statistical software.
- Analyzed uncertainty in net primary production data for grasslands.

Research Fellow, International Geosphere Biosphere Program (IGBP) 1998 – 2002
Regional Remote Sensing Service Centre (RRSSC), Indian Space Research Organization (ISRO), Department of Space, Dehradun, India.

- Collected field data on plant diversity from Indian Central Himalayas, India.
- Organized and analyzed the data, mapped plant biodiversity using remote sensing and geographical information system (GIS).
- Took courses on the use of statistics for ecological and biodiversity research.
- Developed models for plant biomass for a watershed in Indian Himalayas.
- Wrote technical reports and research articles.
- Assisted senior scientists in training in remote sensing and GIS for college teachers.

TEACHING EXPERIENCE

Co-taught, Quantitative Reasoning for Ecosystem Science (ESS330), an undergraduate course (3-credits); Lead Dr. Cameron Aldridge; Dept. of Ecosystem Science & Sustainability, Colorado State University	Spring 2015
Co-taught, Watershed Problem Analysis (WR440); Undergraduate Capstone course (3-credits); Lead Dr. John Stednick; Dept. of Ecosystem Science & Sustainability, Colorado State University	Spring 2014
Guest Lectures, Dept. of Ecosystem Science & Sustainability, Colorado State University	2014
Co-taught, Niche Models (ECOL 592), a graduate-level course (1-2 credits); Drs. Barry Noon and Cameron Aldridge, Dept. of Ecosystem Science & Sustainability and Graduate Degree Program in Ecology, Colorado State University	Fall 2009, SP2011, Fall 2012, Fall 2013
Teaching Assistant, Exploring Ecological Datasets course; Lead Dr. Tom Stohlgren, Colorado State University	Fall 2007
Mathematics Tutor: Self-employed; taught mathematics (Algebra, Calculus, Trigonometry, Statics, Dynamics and Coordinate Geometry) to 11th and 12th	1994 – 1996

grade students (2-3 groups of 8-12 students per academic year) and evaluated their monthly progress (India)

ADVISING/MENTORING EXPERIENCE

Current graduate student committees:

- Mr. Jung G. Cho (Co-advisor), Ph.D., started Fall 2014
- Mr. Kevin McCartney (Advisor), MS, starting Spring 2016
- Ms. Jamie Fuller (Committee member), Ph.D., started Fall 2012
- Mr. Maged A. Hamed Elhemri, (Committee member), Ph.D., started Fall 2014
- Ms. Janet Lane (Informal mentoring), MS Student at the University of Washington Puyallup Research and Extension Center, Puyallup, Washington; Thesis: "Potential distribution modeling of *Fopius arisanus* egg-larval parasitoid using ecological niche models (*assisting with niche modeling*).

Undergraduate students:

- Mr. Jordan Lestina and Mr. Maxwell Cook (Advisor), started Fall 2014; Honors Thesis: "Modeling risk of establishment of wheat stem sawfly *(Cephus cintus*) in Colorado".
- Mr. Maxwell Cook (Advisor), Spring 2015; ColoradoView Intern.
- Mr. Leo Franzone, Skills for Undergraduate Participation in Ecological Research (SUPER) program, Department of Ecosystem Science and Sustainability, CSU (started Nov. 2015).
- Ms. Sara Hines, Skills for Undergraduate Participation in Ecological Research (SUPER) program, Department of Ecosystem Science and Sustainability, CSU (started Nov. 2015).

International Exchange Students:

- Mr. Tarcisio Galdino (11-months), Ph.D. Exchange Student from the Universidade Federal de Viçosa, Brasil; Proposed Research "Spatiotemporal dynamics of Mango Sudden Disease: Bark beetle and *Ceratocystis fimbriata"*. (arrived March 14, 2015).
- Mr. Farajollah Tarnian (6-months), Ph.D. Exchange Student, University of Tehran, Karaj, Iran; Proposed Research "Investigation on ecological and ecotoxical characteristics of *Daphne mucronata* Royle in the provinces of Lorestan, Chaharmahal and Bakhtiari in Iran" (arrived June 15, 2015).

Past graduate student committees:

- Ms. Amanda M. West (Co-advisor), Ph.D. (completed Summer 2015), Dissertation: "Evaluating hot spots for current and future *Bromus tectorum* invasion, incorporating vegetation indices, climate, fire dynamics, propagule pressure and land use: Case studies in Colorado and Wyoming at various temporal and spatial scales". Currently a post-doc at Natural Resource Ecology Lab., Colorado State University.
- Mr. Aaron Sidder (Co-advisor), MS, (completed Summer 2015), Thesis: "Evaluating the climatic and geographic shifts of the mountain pine beetle under past, present, and future climate conditions in the Rocky Mountains". Currently working as a Research Associate with US Geological Survey, Fort Collins, CO.
- Mr. Anthony Vorster (Co-advisor), MS (completed Summer 2014), Thesis: "Relating severity of a Mountain Pine Beetle outbreak to Forest Management History". Currently pursuing Ph.D. at Colorado State University.
- Ms. Jessica A. Schurich (Co-advisor), MS (completed, Fall 2012). Thesis: "Modeling *Culex tarsalis* Coquillett abundance on the northern Colorado Front Range using a Landscape-level Approach". Currently working with Colorado Mosquito Control Inc., Brighton, Colorado.

- Ms. Rizwana Khanum (Informal mentoring), Ph.D. (completed 2013), Quiad-i-Azam University, Islamabad, Pakistan. Dissertation: "Effects of climate change on medicinal Asclepiads of Pakistan". Currently working at the Pakistan Museum of Natural History, Islamabad, Pakistan.

USDA NNF Fellows: Mentored three Ph.D. students as part of the US Department of Agriculture National Need Fellowships (NNF) project. These USDA NNF fellows are working on Agricultural Biosecurity related to science and management of invasive species with our group at Natural Resource Ecology Lab.

HONORS AND AWARDS

Nominated for the membership of American Association for the Advancement in Science (AAAS) Science Program for Excellence in Science by the Dean of College of Natural Resources, Colorado State University. 2007

Award of Graduate Research Assistantship by Natural Resource Ecology Laboratory, Colorado State University. 2005 – 2006

Ford Foundation International Fellowship (http://ifpsa.org/)-for pursuing PhD degree at Colorado State University; One of the first 30 IFP Fellows from India selected from a large number of applicants (2000) from all over India. The selection process involved pre-application, final application, regional interviews at four major Indian cities, and national interviews in New Delhi. 2002 – 2005

Indian Space Research Organization (ISRO, Dept. of Space, India) Fellowship under International Geosphere Biosphere Program (IGBP) Project. 1998 – 2002

World Bank Fellowship during Master degree at Forest Research Institute University, Dehradun, India. 1996 – 1998

Continuous Indian government fellowship during bachelor degree. 1992 – 1995

GRANTS

Current

"*Pest Risk Analysis of Temperate Fruit Flies in Exported Fruits"*; $429,000; US Department of Agriculture - Agricultural Research Service. 2011 – 2016

Goal: Develop ecological niche models using existing and unpublished data on apple maggot (*Rhagoletis pomonella*) western cherry fruit fly (*Rhagoletis indifferens*), and codling moth (*Cydia pomonella*) for prediction of potential of the establishment and spread of these pests in tropical countries importing tree fruits from the Pacific Northwest.

Investigator: **S. Kumar (PI)**

"*Partnering to Sustain India's Biological Diversity in the Context of Rapid Environmental Change: Research, Education and Community Outreach*"; $199,000; Obama-Singh 21st Century Knowledge Initiative, US-Indian Education Foundation (US-India partnership). 2015-2018

Investigators: **S. Kumar (Co-PI);** Barry Noon (PI), other Co-PIs: John Moore, Melinda Laituri, Paul Evangelista, Tara Teel, and Liba Pejchar; Indian PIs: Ajith Kumar (Center for Ecological Sciences, Indian Institute of Science), and Kartik Shanker (National Center for Biological Sciences).

"*A Modeling System for Invasive Species: Phase 3: "Improving the Mapping and Modeling of Invasions of Harmful Plants, Animals and Diseases"*; $163,000; US Geological Survey. **Goal:** Test a variety of ecological niche modeling algorithms for predicting invasive plants, animals, and diseases across U.S. 2014 **–** 2015
Investigators: **S. Kumar (Co-PI)**, Paul Evangelista (PI)

"*Modeling avian responses to climate change using evolving occurrence models*"*;* $138,452; **Macrosystems Biology**; **National Science Foundation**. **Goal:** Study the effects of climate change on avian species in the United States using agent based niche models. 2013 – 2015
Investigators: **S. Kumar (Co-PI),** Randy Boone (PI)

"*Using the USGS "Resource for Advanced Modeling" to connect climate drivers to biological responses"*; $399,000; National Aeronautics and Space Administration (NASA), Climate and Biological Response: Research and Applications. **Goal:** Leverage the strengths of the USGS's Resource for Advanced Modeling which provides a framework for predictive modeling with improved satellite-derived products and computational capacity from NASA to better serve department of interior habitat modeling needs. 2011 – 2015
Investigators: Jeffery Morisette, (PI), **S. Kumar (Co-PI)**, other Co-PIs: Tom Stohlgren, Catherine Jarnevich, Tracy Holcombe, Cameron Aldridge, Petr Votava, Rama Nemani, Claudio Silva, and David Koop.

"*Research opportunities in agricultural biosecurity: strengthening science and management of invasive species*"; $234,000; US Department of Agriculture, National Institute of Food and Agriculture (NIFA) National Needs Graduate and Postgraduate Fellowships Program (NNF); funds are supporting three PhD students. 2011 – 2015
Investigators: **S. Kumar (PI);** Co-PIs: Tom Stohlgren, Paul Evangelista, Jim Graham, John Moore, and Cynthia Brown.

"*Prospection of the Invasive species Didymosphenia geminata in water bodies of the central-southern (Austral) zone in Chile*"; $285,000; Undersecretary of Fisheries, Government of Chile. 2014 – 2016
Investigators: **S. Kumar (International Consultant)**, Vivian Montecino (PI), Ramiro R. Bustamante (Co-PI), Ximena Molina (Co-PI).

Pending

"*Predicting Environmental Suitability for bat White-Nose Syndrome in the United States*"; $38,000; Morris Animal Foundation. 2016-2017
Investigators: **S. Kumar (PI)**; Collaborator: Jeremy Siemers

"*US-India Student-led Ecological Research in Montane Ecosystems in the Context of Rapid Environmental Change*"; $249,999; National Science Foundation. 2016-2019
Investigators: **S. Kumar (PI);** Co-PIs: Barry Noon, John Moore, Stacy Lynn

"*Predicting Environmental Conditions Associated with Snake Fungal Disease in the Eastern United States*"; $38,000; Morris Animal Foundation. 2016-2017
Investigators: **S. Kumar (PI)**; Co-Investigator: Matthew Allender.

Completed

"*RAPID response to the High Park Fire, Larimer County, Colorado*"; $199,978; National Science Foundation. 2012-2014
Investigators: **S. Kumar (Co-PI);** Michael Lefsky (PI) and seven other NREL scientists and CSU faculty members.

"*Refuge system invasive species modeling: Phase1*; Department of Interior, U.S. Geological Survey. **Goal:** Modeling and mapping of invasive species of concern in the refuge system. 2011-2013
Investigators: **S. Kumar (Co-PI);** Paul Evangelista (PI).

"*Statistical tools for web-based data analysis to solve bottlenecks for invasive species early detection, monitoring, and management*"; $95,000/yr; USGS, Fort Collins Science Center. **Goal:** Test a variety of statistical tools for mapping and modeling of invasive species. 2007-2009
Investigators: **S. Kumar (PI)**, Thomas J. Stohlgren (Co-PI).

"*Proposed integration of the global organism detection and monitoring system with the invasive species forecasting system using an early adopters approach*"; $50, 000; US Geological Survey, Fort Collins Science Center. **Goal:** integrate Global Organism Detection and Monitoring (GODM) system, developed at Natural Resource Ecology Laboratory, with www.NIISS.org website. 2008-2009
Investigators: **S. Kumar (PI)**, Thomas J. Stohlgren (Co-PI).

"*Preliminary site design recommendations for FIU (Fundamental Instrument Units) equipment and FSU (Fundamental Sentinel Units) measurements";* $468,000; National Ecological Observatory Network (NEON) Inc., Boulder, Colorado. **Goal:** Help NEON in selecting NEON Core research sites that represent US eco-regions, and compile geospatial datasets for planning and development. 2008-2010
Investigators: **S. Kumar (PI)**, Thomas J. Stohlgren (Co-PI).

"*Design, implementation, and analysis of FSU (Fundamental Sentinel Units) prototype activities*"; $221,000; National Ecological Observatory Network (NEON) Inc.; **Goal:** Test biological sampling strategies (i.e. native and invasive plants, rodents, birds, insects) for maximizing data collection and scalability Investigators: **S. Kumar (PI)**, Thomas J. Stohlgren (Co-PI). 2008-2010

Other Grant Work Experience

"*Ponderosa Pine Inventory and Risk Assessment for the Western United States*; USDA Forest Service. 2008-2009
Role: Lead ecological niche modeler/geospatial modeler; acquired data from several different sources including beetle damage and diseases GIS data layers from aerial surveys conducted by the U.S. Forest Service's Forest Health Protection Aviation Program; modeled and mapped risks due to invasive plants, insects (pine beetles) and diseases and wrote the report.

"*Biological Fingerprinting Native and Non-native Species in the Western United States (Invasive Species Forecasting System)*; National Aeronautics and Space Administration (NASA)/US Geological Survey. 2004-2008
Role: Geospatial modeler; modeling invasive plant species distributions using field data, remotely sensed, and other environmental data.

"Global Organism Detection and Monitoring (GODM) project for developing online mapping tools for harmful invasive species for the National Institute of Invasive Species Science (www.niiss.org)" Natural Resource Ecology Laboratory, Colorado State University; funded by multiple institutions including USGS, USDA, and NSF. 2004-2009
Role: Geospatial and Statistical Modeler; wrote R scripts that run behind the website to produce invasive species distribution maps online.

"Analysis of patterns of biodiversity in Indian central Himalaya using remote sensing and GIS", Indian Space Research Organization's (ISRO) Geosphere Biosphere Program project. 1998-2002
Role: Research Fellow; collected plant species diversity data from the field from Indian Himalayas, analyzed it, integrated it with topographic and other geospatial layers to model plant diversity.

"Biodiversity characterization at landscape level using remote sensing and GIS in Tripura, Mizoram and Uttar Pradesh Hills, India", Department of Space/ Department of Biotechnology (DOS/DBT) project. 1998-2002
Role: Research Fellow; collected plant species field data from Indian Himalayas, analyzed it, integrated it with topographic and other geospatial layers to model plant diversity.

PUBLICATIONS

Peer-Reviewed Articles (Total 38; *indicates a graduate student)

West*, A.M., **Kumar, S.**, Jarnevich, C. (2015**).** Regional Modeling of Large Wildfires under Current and Potential Future Climates in Colorado and Wyoming, USA. Climate Change, DOI: 10.1007/s10584-015-1553-5.

Kumar, S., LeBrun, E.G., Stohlgren, T.J., Stabach*, J.A., McDonald, D.L., Oi, D.H., and LaPolla, J.S. (2015). Evidence of niche shift and global invasion potential of Tawny Crazy Ant *Nylanderia fulva*. Ecology and Evolution DOI: 10.1002/ece3.1737.

Kumar, S., Neven, L.G., Zhu*, H., and Zhang, R. (2015). Assessing the global risk of establishment of codling moth (*Cydia pomonella*) using CLIMEX and MaxEnt niche models. Journal of Economic Entomology 108(4): 1708-1719.

West*, A.M., **Kumar, S.,** Wakie, T., Brown, C.S., Stohlgren, T.J., Laituri, M., and Bromberg, J. (2015**).** Using high-resolution future climate scenarios to forecast *Bromus tectorum* invasion in Rocky Mountain National Park. PLoS ONE 10(2): e0117893.

Jarnevich, C.S., Stohlgren, T.J., **Kumar, S.**, and Morisette, J.T. (2015). Caveats for correlative species distribution modeling. Ecological Informatics 29: 6-15.

Strickland*, C., Dangelmayr, G., Shipman, P.D., **Kumar, S.**, and Stohlgren, T.J. (2015). Network spread and control of invasive species and infectious diseases. Ecological Modeling 309: 1-9.

Kumar, S., Neven, L.G., and Wee, Y.L. (2014). Evaluating correlative and mechanistic niche models for assessing the risk of pest establishment. Ecosphere 5(7): 86. http://dx.doi.org/10.1890/ES14-00050.1

Montecino, V., Molina, X., **Kumar, S.**, Castillo*, M.L.C., and Bustamante, R.O. (2014). Niche dynamics and potential geographic distribution of *Didymosphenia geminata* (Lyngbye) M. Schmidt, an invasive freshwater diatom in southern Chile. Aquatic Invasions 9(4): 507-519.

Kumar, S., Neven, N.G., and Wee, Y.L. (2014). Assessing the Potential for Establishment of Western Cherry Fruit Fly using Ecological Niche Modeling. Journal of Economic Entomology, 107(3): 1032-1044.

Kumar, S., Graham, J., West*, A., and Evangelista, P. (2014). Using district-level occurrences in MaxEnt for predicting the invasion potential of an exotic insect pest in India. Computers and Electronics in Agriculture, 103: 55-62.

Schurich*, J.A., **Kumar, S.,** Eisen, L., and Moore, C.G. (2014). Modeling *culex tarsalis* abundance on the northern Colorado Front Range using a landscape-level approach. Journal of the American Mosquito Control Association, 30: 7-20.

Pfeifer, M., Lefebvre, V., Gardner, T., Arroyo-Rodriguez, V., Baeten, L., Banks-Leite, C., Barlow, J., Betts, M., Brunet, J., Cerezo, A., Cisneros, L., Collard, S., D'Cruze, N., da Silva Motta, C., Duguay, S., Eggermont, H., Eigenbrod, F., Hadley, A., Hanson, T., Hawes, J., Heartsill Scalley, T., Klingbeil, B., Kolb, A., Kormann, U., **Kumar, S.,** Lachat, T., Lakeman Fraser, P., Lantschner, V., Laurance, W., Leal, I., Lens, L., Marsh, C., Medina-Rangel, G., Melles, S., Mezger, D., Oldekop, J., Overal, W., Owen, C., Peres, C., Phalan, B., Pidgeon, A., Pilia, O., Possingham, H., Possingham, M., Raheem, D., Ribeiro, D., Ribeiro Neto, J., Robinson, R., Robinson, W., Rytwinski, T., Scherber, C., Slade, E., Somarriba, E., Stouffer, P., Struebig, M., Tylianakis, J., Tscharntke, T., Tyre, A., Urbina Cardona, J., Vasconcelos, H., Wearn, O., Wells, K., Willig, M., Wood, E., Young, R., Bradley, A., and Ewers, R. (2014). BIOFRAG – A new database for analysing BIOdiversity responses to forest FRAGmentation. Ecology and Evolution, 4(9): 1524-1537.

Khanum*, K., Mumtaz, A.S., and **Kumar, S.** (2013). Predicting impacts of climate change on medicinal Asclepiads of Pakistan using Maxent Modeling. Acta Oecologica- International Journal of Ecology, 49: 23-31.

Flory*, A., **Kumar, S.Ψ,** Stohlgren, T. J., and Cryan, P. (2012). Environmental conditions associated with bat White-Nose Syndrome mortality in the north-eastern United States. Journal of Applied Ecology, 49: 680-689 (Ψcorresponding Author).

Nick*, Y., Stohlgren, T.J., Evangelista, P.H., **Kumar, S.,** Graham, J., and Newman, G. (2012). Regional Data Refine Local Predictions: Modeling the Distribution of Plant Species Abundance on a Portion of the Central Plains. Environmental Monitoring and Assessment, 184: 5439-5451.

D'Cruze*, N. C., and **Kumar, S.** (2011). Effects of anthropogenic activities on lizard communities in northern Madagascar. Animal Conservation, 14(5): 542-552.

Evangelista, P.H., and **Kumar, S**. (2011) Trade and Transportation is Changing the Game. Current Zoology 57: I-I (Guest Editorial).

Evangelista, P.H., **Kumar, S.,** Stohlgren, T.J., and Young*, N.E. (2011). Assessing forest vulnerability and the potential distribution of pine beetles under current and future climate scenarios in the Interior West of the US. Forest Ecology and Management, 262(3), 307–316.

Bromberg*, J. E., **Kumar, S.,** Brown, C. S., and Stohlgren, T. J. (2011). Distributional changes and range predictions of downy brome in Rocky Mountain National Park. Invasive Plant Science and Management 4(2): 173-182.

Stohlgren, T. J., **Kumar, S.**, Barnett, D., and Evangelista, P. (2011). Using maximum entropy modeling for optimal selection of sampling sites at regional scales. Diversity *3: 252-261*.

York*, P., Evangelista, P.H., **Kumar, S.,** Graham, J., Flather, C., and Stohlgren, T.J. (2011). A Habitat Overlap Analysis derived from Maxent for Tamarisk and the Southwestern Willow Flycatcher. Frontiers of Earth Science 5(2): 120-129.

Stohlgren, T. J., Ma*, P., **Kumar, S.,** Rocca, M., Morisette, J. T., Jarnevich, C. S., and Benson, N. (2010). Ensemble habitat mapping of invasive plant species. Risk Analysis 30(2): 224-235.

Lee*, A. T. K., **Kumar, S.,** Brightsmith, D. J., and Marsden, S. J. (2010). Parrot claylick distribution in South America: do patterns of "where" help answer the question "why"? Ecography 32, 503-513.

Graham, J., Newman, G., **Kumar, S.,** Jarnevich, C., Nick, Y., Crall, A., Stohlgren, T. J., and Evangelista, P. H. (2010). Bringing modeling to the masses: A web based system to predict potential species distributions. Future Internet, 2, 624-634.

Evangelista*, P. H., Stohlgren, T. J., Morisette, J. T., and **Kumar, S.** (2009**)**. Mapping invasive tamarisk (*Tamarix*): a comparison of single-scene and time-series analyses of remotely sensed data. Remote Sensing 1: 519-533.

Kumar, S., Spaulding, S. A., Stohlgren, T. J., Hermann, K. A., Schmidt, T. S., and Bahls, L. L. (2009). Predicting habitat distribution for the freshwater diatom *Didymosphenia geminata* in the continental US. Frontiers in Ecology and the Environment, 7(8): 415-420; **(Cited by 64; ISI Web of Science).**

Kumar, S., Simonson, S. E., and Stohlgren, T. J. (2009). Effects of spatial heterogeneity on butterfly species richness in Rocky Mountain National Park, Colorado, USA. Biodiversity and Conservation, 18(3): 739-763.

Kumar, S., and Stohlgren, T. J. (2009). Maxent modeling for predicting suitable habitat for threatened and endangered tree *Canacomyrica monticola* in New Caledonia. Journal of Ecology and Natural Environment 1(4): 94-98; **(Cited by 72; ISI Web of Science).**

D'Cruze*, N.C., Sabel, J.A., Dawson, J., **Kumar, S.** (2009). The influence of habitat type and structure on the abundance of *Phelsuma madagascariensis grandis* (Gekkonidae) in northern Madagascar. Herpetological Conservation and Biology, 4(1): 55-61.

D'Cruze*, N.C., Olsonn, A., Henson, D., **Kumar, S.,** and Emmett, D. (2009). The amphibians and reptiles of the Lower Onilahy River Valley, a temporary protected area in southwest Madagascar. Herpetological Conservation and Biology, 4(1): 62-79.

Evangelista*, P.H., **Kumar, S.,** Stohlgren, T. J., Jarnevich, C., Crall, A., Norman III, J. B., and Barnett, D. (2008). Modeling invasion for a habitat generalist and a specialist plant species. Diversity and Distributions 14: 808-817; **(Cited by 74; ISI Web of Science).**

Li, M.-Y., Ju, Y.-W., **Kumar, S.,** and Stohlgren, T. J. 2008. Modeling potential habitat for Zebra mussel *Dreissena polymorpha* in the continental USA. Acta Ecologica Sinica (Chinese Ecology journal) 28 (9):4253-4258.

Evangelista*, P.H., Norman III, J. B., Berhanu, L, **Kumar, S.,** and Alley, N. (2008). Predicting habitat suitability for endemic mountain nyala (*Tragelaphus buxtoni*) in Ethiopia. Wildlife Research 35: 409-416.

Stohlgren, T. J., Jarnevich, C., **Kumar, S.** (2008). Forest legacies, climate change, altered disturbance regimes, invasive species, and water. Unasylva 229 (58): 44-49.

Evangelista*, P.H., **Kumar, S.,** Stohlgren, T. J., Newman, G., and Crall, A. (2007). Modeling aboveground biomass of *Tamarix ramosissima* in the Arkansas river basin of southeastern Colorado, USA. Western North American Naturalist 67(4): 503-509.

Kumar, S., Stohlgren, T. J., and Chong, G. W. (2006). Spatial heterogeneity influences native and nonnative plant species richness. Ecology 87(12): 3186-3199 **(Cited by 89; ISI Web of Science).**

Lauenroth, W. K., Wade, A. A., Williamson, M.A., Ross, B.E., **Kumar, S.,** and Cariveau, D. P. (2006). Uncertainty in calculations of net primary production for grasslands. Ecosystems 9: 843-851.

Tiwari, A. K., Agarwal, A., **Kumar, S.** and Tiwari, S. C. (2005). Analysis of land use and biomass in Khanda watershed, Garhwal Himalaya, using satellite remote sensing data. Tropical Ecology 46: 253-263.

Peer-reviewed Abstract

Kumar, S., Evangelista, P.H., Brown, C.S., Moore, J.C., Stohlgren, T.J., Graham, J.J., and Hanzlik, J.R. (2014). Recruiting and Retaining National Needs Fellows in the Area of Sciences for Agricultural Biosecurity. North American College Teacher Association (NACTA) Journal 58:66.

Books and Book Chapters

Barnett, D.T., Chong, G.W., Stohlgren, T.J., Jarnevich, C., **Kumar, S.**, and Holcombe, T. (**In Press**). Mapping harmful invasive species. In: Brunn, S.D. (editor), Mapping Across the Academia. Springer., New York, NY.

Morain, S.A., **Kumar, S.,** and Stohlgren, T.J. (**2013**). Environmental modeling for health. In: Environmental Tracking for Public Health Surveillance, Morain, S.A., and Budge, A.M. (editors), Taylor & Francis Group, Chapter 7, 293-332.

Stohlgren, T.J., and **Kumar, S.** (**2013**). Endangered plants. In: Encyclopedia of Biodiversity, 2nd Edition. S. A. Levin (editor), Academic Press, Waltham, MA, Volume 3, pp. 205-215.

Kumar, S. (2008). Effects of Spatial Heterogeneity on Species Richness: Methods to Quantify Spatial Heterogeneity and the Effects of Spatial Scale. 156 pp. VDM Verlag Dr. Müller, Saarbruken, Germany. ISBN: 978-3836488884.

In Review (*indicates a graduate student)

Sidder*, A.M., **Kumar, S.,** Laituri, M., and Sibold, J.S. (**In Review**). Evaluating spatiotemporal transferability of correlative niche models: A case study on the effects of climate change on mountain pine beetle. Ecosphere

West*, A.M., Evangelista, P.H., Jarnevich, C., **Kumar, S.**, Swallow, A., Luizza, M., and Chignell, S. (**In Review**). More than NDVI: Incorporating multi-temporal spectral indices in iterative species distribution models for an invasive species in a post-wildfire landscape. Environmental Management.

Javed, S.M.M., Raj, M., and **Kumar, S.** (**In Review**). Predicting potential distribution of an endemic Gecko *Calodactylodes aurus* and its conservation implications in India. Tropical Ecology.

Solorzano*, A., **Kumar, S.,** Hanan, N.P., Pinto, J.R.R., and Hay, J.D.V. (**In Review**). Modelling the potential distribution of Brazilian cerradão woodland, an endangered plant physiognomy. Journal of Land Use Science.

Caskey, D.S., Miller, W.R., Miller, J.D., and **Kumar, S.** (**In Press**). Tardigrada of Texas. Texas Journal of Science.

In Progress or Draft (*indicates a graduate student)

Kumar, S., Neven, L.G., and Yee, W.L. (**In Progress**). Global potential risk of establishment of apple maggot (*Rhagoletis pomonella*) using niche models. For Environmental Entomology.

Zhu*, H., **Kumar, S.,** Zhang, R., and Neven, L.G. (**In Progress**). How far south can codling moth (*Cydia pomonella*) establish in China? For PLoS ONE.

Galdino*, T.V.S., Picanco, M.C., **Kumar, S.,** Oliveira, L.S.S., Alfenas, A.C., and Neven, L.G. (**Draft**). Mapping global potential risk of mango sudden decline disease cause by fungus *Ceratocystis fimbriata*. For PLoS ONE.

Vorster*, A.G., Evangelista, P.H., Stohlgren, T.J., **Kumar, S.,** Hubbard, R.M., Cheng, A.S., and Elder, K. (**Draft**). Relating Severity of a Mountain Pine Beetle Outbreak to Forest Management History: A Case Study from Fraser Experimental Forest, Colorado, United States. For Forest Ecology and Management.

Strickland, C., Brown, C.S., Childs, L.M., Delaney, J., Ho, A.M., Jenkins, E.W., Kristensen, N., **Kumar, S.,** Pasour, V., Shipman, P.D., Taylor, D., Waldrop, L., and Miller, L.A. (**In Progress/Draft)**. The fluid physics of long distance dispersal and its significance to ecology and epidemiology. For Journal of Theoretical Biology.

THESIS AND DISSERTATION

Kumar S. (2007). Effects of spatial heterogeneity on native and nonnative plant and butterfly species richness in Rocky Mountain National Park, Colorado, USA. Ph.D. Dissertation, Colorado State University, Fort Collins, Colorado.

Kumar S. (2003). Studies on the woody species diversity in Kail Ganga watershed, Garhwal Himalaya, using remote sensing and geographical information system**.** Ph.D. Dissertation, Forest Research Institute University, Dehradun, Uttarakhand, India.

Kumar S. (1998). Mapping of forest cover and land use types in parts of Doon valley using Indian Remote Sensing (IRS) satellite data. M.Sc. Thesis, Forest Research Institute University, Dehradun, Uttarakhand, India.

TECHNICAL REPORTS

McMahon, R., **Kumar, S.**, Sytsma, M., Hall, R., Britton, D., Spaulding, S., Willimas, E., Farag, A., O'Ney, S., and Carpurso, J. . 2009. Aquatic Invasive Species inventory and monitoring framework for the Greater Yellowstone Area. GYCC Aquatic Invasive Species Cooperative. Available online at www.greateryellowstonescience.org/ .

Gass, T. M., **Kumar, S.,** Evangelista, P. H. (2009). Ponderosa Pine in the Interior West: Current condition and land management legacies. Technical Report for the U.S. Department of Agriculture, Forest Service, Missoula, MT. 106pp.

Evangelista, P., D. Barnett, T.J. Stohlgren, P. Stapp, C. Jarnivich, **S. Kumar,** and S. Rauth. (2009). Field and Costs Assessment for the Fundamental Sentinel Unit (FSU) at the Central Plains Experimental Range, Colorado. Technical Report for National Ecological Observatory Network (NEON), Inc. Boulder, CO. 98pp.

Davern, T., Evangelista, P. H., Gass, T., **Kumar, S.,** Stohlgren, T. J., and Li, M. (2008). A maximum entropy modeling approach to predicting the spread and consequences of White Pine Blister Rust (*Cronartium ribicola* J. C. Fisch. ex Rabenh.) in the southern Rocky Mountains. A report submitted to NCEAS (National Center for Ecological Analysis and Synthesis), University of California, Santa Barbara, California. A part of NCEAS's Distributed Graduate seminar.

Tiwari, A. K. and **Kumar S.** (2003). Analysis of patterns of diversity in Indian central Himalaya. Regional Remote Sensing Service Center, Dehradun, India. ISRO/DOS International Geosphere Biosphere Program project report.

Tiwari, A. K., **Kumar, S.,** Ghosh, S. and Sharma, N. K. (2001). Biodiversity Characterization at landscape level using remote sensing and GIS in Uttaranchal and Uttar Pradesh Hills. Phase I Report. Regional Remote Sensing Service Center, Dehradun, India.

Tiwari, A. K., Kudrat, M., **Kumar, S.,** Ghosh, S., Sharma, N. K. and Datta, N. (2001). Biodiversity characterization at landscape level using remote sensing and GIS in the state of Tripura. Phase I Report. Regional Remote Sensing Service Center, Dehradun, India.

Tiwari, A. K., Ghosh, S., **Kumar, S.,** Sharma, N. K., and Chhetri, P. (2001). Biodiversity characterization at landscape level using remote sensing and GIS in the state of Mizoram. Phase I Report. Regional Remote Sensing Service Center, Dehradun, India.

PRESENTATIONS, POSTERS AND ABSTRACTS

Kumar, S., Neven, L.G., Zhu, H., and Zhang, R. (2015). Assessing the global risk of establishment of codling moth (*Cydia pomonella*) using CLIMEX and MaxEnt niche models. A talk presented at the Entomological Society of America annual meeting, Minneapolis, Minnesota, Nov. 15-18, 2015.

Kumar, S., LeBrun, E.G., Stohlgren, T.J., Stabach*, J.A., McDonald, D.L., Oi, D.H., and LaPolla, J.S. (2015). Tawny Crazy Ants in Hawaii? Evidence of niche shift and global

invasion potential of *Nylanderia fulva*. A poster presented at the Entomological Society of America annual meeting, Minneapolis, Minnesota, Nov. 15-18, 2015.

Galdino*, T.V.S., Picanco, M.C., **Kumar, S.,** Oliveira, L.S.S., Alfenas, A.C., and Neven, L.G. (2015). Mapping global potential risk of mango sudden decline disease cause by fungus *Ceratocystis fimbriata*. A poster presented at the GIS day at CSU Geospatial Centroid, Nov. 18, 2015.

Kumar, S., Neven, L.G., Zhu, H., and Zhang, R. (2015). Assessing the global risk of establishment of codling moth (*Cydia pomonella*) using CLIMEX and MaxEnt niche models. A talk presented at the International Pest Risk Research Group (www.pestrisk.org) meeting at USDA-APHIS, Fort Collins, Colorado, August 25-28, 2015.

Kumar, S., Montecino, V., Molina, X., Castillo, M.L.C., and Bustamante, R.O. (2015). Niche Shift and Potential Distribution of an Invasive Freshwater Diatom (*Didymosphenia geminata*) in Southern Chile. A talk presented at the Hydrology Days 2010, Colorado State University, Fort Collins, Colorado, March 25, 2015.

Vorster, A.G., P.H. Evangelista, T.J. Stohlgren, **S. Kumar**, R. Hubbard, T. Cheng, K. Elder (2015). Relating Severity of a Mountain Pine Beetle Outbreak to Forest Management History: A case study from Fraser Experimental Forest Colorado, United States. 2015 North Central Climate Science Center Open Science Conference, May 20-22, 2015, Colorado State University, Fort Collins, CO.

Sidder, A., **Kumar, S.,** Sibold, J., and Laituri, M. (2015). Evaluating the Climatic and Geographic Shifts of the Mountain Pine Beetle under Changing Climate in the Rocky Mountains. 2015 North Central Climate Science Center Open Science Conference, May 20-22, 2015, Colorado State University, Fort Collins, CO.

Kumar, S., Neven, L.G., and Yee, W.L. (2015). Progress on the Pest risk analyses for temperate fruit flies in exported fruits project. A talk presented at the Washington Tree Fruit Research Commission Apple Review Meeting, Pasco, Washington, January 29, 2015.

Kumar, S., Lisa, L.G., Yee, W.L. (2015). Do species care about statistics? Examples from codling moth and apple maggot niche modeling. **An Invited** talk presented at the Yakima Agricultural Research Laboratory, U.S. Department of Agriculture, Wapato, Washington, January 28, 2015.

Kumar, S., Neven, L.G., and Yee, W.L. (2014). Assessing the potential for Establishment of western cherry fruit fly (*Rhagoletis indifferens*) using MaxEnt and CLIMEX Niche Models. A talk presented at the Entomological Society of America Annual Meeting, Portland, OR, November 16-19, 2014.

Kumar, S. (2014). Pest risk analysis and sustainability: Tree fruit insect pests and crazy ants. **An Invited** talk delivered at the Natural Resource Ecology Laboratory's Sense and Sustainability seminar series; Oct. 17, 2014.

Kumar, S. (2014). Ecological Niche Models for Pest risk analysis. **An Invited** talk presented at the Faculty of Science, University of Chile, Santiago, Chile; Sept. 26, 2014.

Kumar, S. (2014). Landscape Ecology and Niche Modeling for Predicting Patterns of Invasion. **An Invited** talk presented at the Faculty of Science, University of Chile, Santiago, Chile; Sept. 24, 2014.

Kumar, S., Evangelista, P.H., Brown, C.S., Moore, J.C., Stohlgren, T.J., Graham, J.J., and Hanzlik, J.R. (2014). Recruiting and Retaining National Needs Fellows in the Area of Sciences for Agricultural Biosecurity. Poster presented at North American College Teacher Association annual meeting, 25-28 June, 2014, Bozeman, Montana.

Kumar, S., Neven, L.G., and Yee, W.L. (2014). Progress on the Pest risk analyses for temperate fruit flies in exported fruits project. A talk presented at the Washington Tree Fruit Research Commission Apple Review Meeting, Wapato, Washington, January 30, 2014.

Kumar, S., Lisa, L.G., Yee, W.L. (2014). Pest risk analysis using ecological niche models. An Invited talk presented at the Yakima Agricultural Research Laboratory, US Department of Agriculture, Wapato, Washington, January 27, 2014.

Vorster, A.G., P.H. Evangelista, T.J. Stohlgren, **S. Kumar**, R. Hubbard, T. Cheng, K. Elder (2014). Relating Severity of a Mountain Pine Beetle Outbreak to Forest Management History. Forest Health Summit. September 29, 2014, Fort Collins, CO.

Vorster, A.G., P.H. Evangelista, T.J. Stohlgren, **S. Kumar**, R. Hubbard, T. Cheng, K. Elder (2014). Relating Severity of a Mountain Pine Beetle Outbreak to Forest Management History. Society of American Foresters. October 10, 2014, Salt Lake City, UT.

Kumar, S., Neven, L.G., and Yee, W.L. (2013). Assessing the risk of establishment of western cherry fruit fly (Diptera: Tephritidae) in commercial cherry-growing areas of California. A Talk presented at the Entomological Society of America Annual Meeting, Austin, TX, November 10-13, 2013.

Neven, L.G., **Kumar, S.**, and Yee, W.L. (2013). Why Western Cherry Fruit Fly Can't Establish in Commercial Cherry-Growing Areas of California. A talk presented at the Orchard Pest and Disease Management Conference, Portland, Oregon, January 9-11, 2013

Kumar, S., Neven, L.G., and Yee, W.L. (2013). Pest risk analyses for temperate fruit flies in exported fruits. A talk presented at Northwest Cherry Review of the Washington Tree Fruit Research Commission, Wenatchee, WA, November 12, 2013.

Stohlgren, T.J., Evangelista, P., **Kumar, S.,** and Jarnevich, C. (2013). Mapping invasive hybrid swarms and swarms of hybrids. A talk presented at Ecological Society of America's 98th Annual Meeting, Minneapolis, MN, August 4-9, 2013.

Holcombe, T., C. Jarnevich, C. Aldridge, C. Brown, D. Koop, **S. Kumar,** D. Manier, J. Morisette, C. Talbert, M. Talbert, P. Votava (2013). Combining modeling techniques, large data sets, and streamlined visualization tools to explore background point selection for cheatgrass models: VisTrails and the Software for Assisted Habitat Modeling (SAHM). A talk presented at Ecological Society of America's 98th Annual Meeting, Minneapolis, MN, August 4-9, 2013.

West, A.M., **S. Kumar,** T. Wakie, C.S. Brown, T.J. Stohlgren, M. Laituri, and J. Bromberg (2013). Using High-Resolution Future Climate Scenarios for Predicting Climate Change Effects on Biological Invasions in Rocky Mountain National Park. A talk presented at Ecological Society of America's 98th Annual Meeting, Minneapolis, MN, August 4-9, 2013.

Boone, R.B., **Kumar, S.,** Stabach, J.A. (2013). Modeling avian responses to climate change using evolving occurrence models. Macrosystems PI Meeting, National Science Foundation Headquarters, Arlington, VA, June 6-7, 2013.

Schurich, J.A., **Kumar, S.,** and Kondratieff, B. (2013). Modeling *Culex tarsalis* Abundance at the Landscape-Level Using GIS Technology. West Central Mosquito and Vector Control Association Annual Meeting, March 13-14, 2013, Albuquerque, New Mexico.

Kumar, S., Neven, L.G., and Yee, W.L. (2013). Pest risk analyses for temperate fruit flies in exported fruits. A talk presented at the Washington Tree Fruit Research Commission Apple Review Meeting, Wenatchee, Washington, January 30, 2013.

Kumar, S., Lisa, L.G., Yee, W.L. (2013). Pest risk analysis using ecological niche models. An Invited talk presented at the Yakima Agricultural Research Laboratory, US Department of Agriculture, Wapato, Washington, January 29, 2013.

Kumar, S., Lisa, L.G., Yee, W.L. (2013). Pest risk assessment for insect pests in exported temperate tree fruits using ecological niche modeling. A Poster presented at International Biogeography Society Meeting, Miami, Florida, January 9-13, 2013.

Kumar, S., Lisa, L.G., Yee, W.L. (2012). Developing Ecological niche models to evaluate the probability of invasive species to establish and spread. A Talk presented at the Entomological Society Annual Meeting, Knoxville, TN, November 11-14, 2012.

Kumar, S.¸ Stohlgren, T.J., and Evangelista, P.H. (2012). Novel methods to improve predictions of alien plant species richness. A talk presented at Ecological Society of America Annual Conference, Portland, Oregon, August 5-10, 2012.

West, A., Wakie, T., **Kumar, S.**¸ Bromberg, J., and Laituri, M. (2012). Climatic niche modeling of Bromus tectorum in Rocky Mountain National Park. A poster presented at Ecological Society of America Annual Conference, Portland, Oregon, August 5-10, 2012.

Kumar, S. (2012). Ecological niche modeling of *Didymosphenia geminata* (Didymo) in United States and Chile. An **Invited talk** delivered via Skype Video Conference, April 2-4, 2012, Workshop on Online Platform for Didymo, Puerto Montt, Chile.

Lisa, L.G., **Kumar, S.**, Yee, W.L. (2012). Ecological niche modeling for temperate pests in exported fruits. A Poster presented at the Pacific Branch, Entomological Society Annual Meeting, Portland, Oregon, March 25-28, 2012.

Kumar, S., Neven, L.G., and Yee, W.L. (2012). Pest risk analyses for temperate fruit flies in exported fruits. A talk and Poster presented at the Washington Tree Fruit Research Commission Apple Review Meeting, Pasco, Washington, January 24-26, 2012.

Kumar, S. (2012). Pest risk analysis using ecological niche models. An **Invited talk** presented at the Yakima Agricultural Research Laboratory, US Department of Agriculture, Wapato, Washington, Jan. 26, 2012.

Kumar, S. (2010). Assessment of ecosystem vulnerability to multiple stressors using large scale habitat models. **Invited talk** delivered at US Geological Survey, Fort Collins Science Center, Sept. 22, 2010, Fort Collins, Colorado.

York, P.M., **Kumar, S.,** Evangelista, P., Graham, J. and Stohlgren, T. J. (2010). Differentiating existing habitat of the invasive saltcedar (*Tamarix* spp.) from potential habitat of the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) using maximum entropy modeling. A talk presented at 95th Annual Ecological Society of America conference, Aug. 1-6, 2010, Pittsburgh, Pennsylvania.

Kumar, S., Stohlgren, T. J., and Evangelista, P. (2010). Climate change effects on multiple stressors in the Rockies. Presented at 3rd USGS Modeling Conference: Understanding and Predicting for a Changing World, June 7-11, 2010, Broomfield, Colorado.

Stohlgren, T. J., Jarnevich, C. S., **Kumar, S.,** and Morisette, J. T. (2010). Advances in species-environmental mapping modeling. Presented at 3rd USGS Modeling Conference: Understanding and Predicting for a Changing World, June 7-11, 2010, Broomfield, Colorado.

York, P.M., Stohlgren, T. J., Evangelista, P., **Kumar, S.,** and Graham, J. (2010). A Comparative Model differentiating suitable habitat of the endangered southwestern willow flycatcher from existing habitat of the non-native, invasive tamarisk. A talk presented at 16th

Annual Front Range Student Ecology Symposium, Feb. 23-24, 2010, Colorado State University, Fort Collins, Colorado.

Kumar, S. (2010). Niche models, Climate Change and Native and Invasive Species Distributions**. Invited Talk**, April 30th, 2010, Natural Resource Ecology Laboratory, Fort Collins, Colorado.

Kumar, S., and Stohlgren, T. J. (2009). Predicting hotspots of plant invasion from small sample sizes. Presented at Ecological Society of America annual meeting, August 2-7, 2009, Albuquerque, New Mexico.

Bromberg, J. E., **Kumar, S.,** and Brown, C. S. (2009). Assessing *Bromus tectorum* in Rocky Mountain National Park using sampling and modeling approaches. Presented at Ecological Society of America annual meeting, August 2-7, 2009, Albuquerque, New Mexico.

Kumar, S. (2009). Forecasting invasive species distributions at multiple scales. **Invited talk** delivered at "Invasive Plants in the Tropics: Ecology, Management and Livelihoods", an international conference, Jan. 5-6, 2009, Bangalore, India, organized by Ashoka Trust for Research in Ecology and the Environment (ATREE).

Kumar, S. (2009). Modeling species distributions. **Invited talk** delivered at the 'Institute of Environment Education and Research', Bharati Vidyapeeth University, Pune, India, February 3, 2009.

Kumar, S. (2009). Modeling species distributions at multiple scales. Presented at the 'Nature Conservation Foundation (NCF), Mysore, Karnataka, India, January 7, 2009.

Morisette, J., N. Benson, K. Paintner, P. Ma, M. Rocca, **S. Kumar,** A. Swanson, C. Jarenvich, T. Stohlgren, P. Lineback, A. Demetry, J. Allen, A. Rodman, C. McClure, T. Caprio, J. Silverman, and N. Most (2009). Evaluation of Ensemble Habitat Mapping to support National Park Service decisions on fire management activities and invasive plant species control (Abstract). In: Rethinking Protected Areas in a Changing World: The 2009 George Wright Society Biennial Conference on Parks, Protected Areas, and Cultural Sites, George Wright Society. p.1 (http://www.georgewright.org/gws2009_program.pdf).

Morisette, J. T., Gao, F., Tan, B., Wolfe, R., Jarnevich, C., **Kumar, S.,** Swanson, A., Ma, P., Benson, N., Rodman, A., McClure, C., Lineback, P., Caprio, T., Demetry, A., Abendroth, D., and McCloskey, K. (2009). Using satellite-based phenology data for invasive weed species habitat modeling. Presented at US- IALE Annual conference, April 12-16, 2009, Snowbird, Utah.

Kumar, S. (2008). Modeling invasive species distributions at multiple scales. Presented at Natural Resource Ecology Laboratory, Colorado State University, Sept. 26, 2008, Fort Collins, Colorado.

Kumar, S., Stohlgren, T. J., and Spaulding, S. A. (2008). Modeling potential habitat distribution for freshwater diatom *Didymosphenia geminata* in the continental United States. Presented at Ecological Society of America annual meeting, August 3-8, 2008, Milwaukee, Wisconsin.

Bromberg, J. E., **Kumar, S.,** and Brown, C. S. (2008). Changes in the distribution of *Bromus tectorum* in Rocky Mountain National Park over the past decade: A maximum entropy distribution modeling approach. A poster presented at Ecological Society of America annual meeting, August 3-8, 2008, Milwaukee, Wisconsin.

Holcombe, T., Evangelista, P. H., Gass, T., **Kumar, S.,** Li, M., and Stohlgren, T. J. (2008). Modeling white pine blister rust in the southern Rocky Mountains. Presented at Ecological Society of America annual meeting, August 3-8, 2008, Milwaukee, Wisconsin.

Edlund, M. B., Spaulding, S. A., and **Kumar, S.** (2008). The diatom *Didymosphenia geminata*, its spread, distribution, and formation of nuisance blooms. Presented at the 5th Annual International Lake of the Woods Water Quality Forum, March 12-13, 2008. Ontario, Canada: Lake of the Woods Water Sustainability Foundation.

Bromberg, J., and **Kumar, S.** (2008). Changes in the Distribution of *Bromus tectorum* in Rocky Mountain National Park over the Past Decade Using Maxent: A Predictive Model. A poster presented at 14th Annual Front Range Student Ecology Symposium, Feb. 26-27, 2008, Colorado State University, Fort Collins, Colorado.

Kumar, S., and Stohlgren, T. J. (2007). The role of spatial autocorrelation in native -exotic plant species richness relationships. Presented at Ecological Society of America/ Society of Ecological Restoration joint meeting, August 5-10, 2007, San Jose, California.

Stohlgren, T. J., **Kumar, S.,** Jarnevich, C. and Kalkhan, M. (2007). Essential attributes of plant diversity and invasion studies. Presented at Ecological Society of America/ Society of Ecological Restoration joint meeting, August 5-10, 2007, San Jose, California.

Newman, G., Graham, J., **Kumar, S.,** Jarnevich, C. and Stohlgren, T. J. (2007). Bringing modeling to the masses: Online tools for invasive species management. A poster presented at Ecological Society of America/ Society of Ecological Restoration joint meeting, August 5-10, 2007, San Jose, California.

Suazo, A. A., **Kumar, S.** and Stout, I. J. (2007). Habitat heterogeneity influences rodent abundance at Cape Canaveral, Florida, USA. A poster presented at Ecological Society of America/ Society of Ecological Restoration joint meeting, August 5-10, 2007, San Jose, California.

Kumar, S., Stohlgren, T. J., and Chong, G.W. (2007). How spatial heterogeneity influences native and nonnative plant species richness in Rocky Mountain National Park, Colorado, USA**? Invited Guest Lecture** at Spring 2007 Seminar series- Emerging approaches in Ecology, Natural Resource Ecology Laboratory, Colorado State University, March 2, 2007, Fort Collins, Colorado.

Kumar, S., Evangelista, P., Stohlgren, T. J., Newman, G., and Crall, A. (2006). Modeling aboveground biomass of *Tamarix ramosissima* in the Arkansas river basin in southeastern Colorado, USA. Presented at Tamarisk Research Conference: Current Status and Future Directions, October 3-4, 2006, Fort Collins, Colorado.

Kumar, S., S. E. Simonson, and Stohlgren, T. J. (2006). Spatial heterogeneity of vegetation influences butterfly species richness in Rocky Mountain National Park, Colorado, USA. Presented at 91st annual meeting of Ecological Society of America, August 6-11, 2006, Memphis, Tennessee.

Stohlgren, T. J., Barnett, D., Flather, C., **Kumar, S.,** C. Jarnevich, and J. Kartesz (2006). The myth of community saturation: the plants and birds in the conterminous United States. Presented at 91st annual meeting of Ecological Society of America, August 6-11, 2006, Memphis, Tennessee.

Kumar, S., Simonson, S. E. and Stohlgren, T. J. (2006). Effects of spatial heterogeneity on butterfly species richness in Rocky Mountain National Park, Colorado, USA. Presented at 12th Annual Front Range Student Ecology Symposium, March 8, 2006, Colorado State University, Fort Collins, Colorado.

Kumar, S., Stohlgren, T. J., and Chong, G.W. (2005). Effects of spatial heterogeneity on native and non-native plant species diversity in Rocky Mountain National Park, Colorado,

USA. Presented at 90th Ecological Society of America Annual meeting, August 8-12, 2005, Montreal, Canada.

Kumar, S., Stohlgren, T.J., and Chong, G.W. (2005). Effects of spatial heterogeneity on native and non-native plant species diversity in Rocky Mountain National Park, Colorado, USA. Presented at 11th Annual Front Range Student Ecology Symposium, April 5-6, 2005, Colorado State University, Fort Collins, Colorado.

Kumar, S., Agarwal, A., Tiwari, S. C., Tiwari, A. K. (2001). Analysis of floristic diversity in an Indian central Himalayan watershed using remote sensing. Presented at National Symposium of Indian Society of Remote Sensing, December 11-13, 2001, Ahmedabad, India.

PROFESSIONAL AFFILIATIONS

- Member of Ecological Society of America (ESA) 2004 – present
- Member of Entomological Society of America (ESA) 2012 – present
- Member International Pest Risk Research Group (http://www.pestrisk.org/) 2014 - present
- International Society for Tropical Ecology 2014 – present
- Member of United States- International Association for Landscape Ecology (US-IALE) 2005 – present
- Member of International Biogeographic Society 2013 – present
- Member of "The Society for Conservation" GIS (SCGIS) 2008 – present
- Member of American Society for Photogrammetry & Remote Sensing (ASPRS) 2003 – 2007
- Elected member of "Xi Sigma Pi", Natural Resources Honor Society 2003 – present
- Member of International Ford Foundation Fellowships Worldwide Community 2003 – present
- Biodiversity Working Group, School of Global Environmental Sustainability (SoGES), Colorado State University 2013 – present
- Member of "National Geographic Society" 2005 – present
- Member of IEEE Geoscience and Remote Sensing Society 2003 – 2004

Advocacy/activist groups:

- Member of the Union of Concerned Scientists (http://www.ucsusa.org/)

- Signed an advocacy letter "Scientist and Expert Statement of Support for Public Investment in Agroecological Research"
http://www.ucsusa.org/sites/default/files/legacy/assets/documents/food_and_agriculture/scientist-statement-agroecology-7-2-2014.pdf

- Member of "Avaaz" (http://www.avaaz.org/en/about.php; a global online activist network).

PROFESSIONAL AND COMMUNITY SERVICE

- **Designed Invasive Freshwater diatom** (*Didymosphenia geminata*; *aka* Didymo) monitoring plan for southern Chile; visited University de Chile, Santiago, Chile (Sept. 19-27, 2014).

- **Aquatic Invasive Species** (AIS) expert, AMK Ranch in Grand Teton National Park, Wyoming, June 9-10, 2009: Helped in developing an AIS inventory and monitoring plan for the Greater Yellowstone Area, USA.
- **Clark and Ellis graduate Scholarship Committee**, Natural Resource Ecology Laboratory, Colorado State University, (2009-present).
- Member Diversity Group, Natural Resource Ecology Lab., Colorado State University.
- Technical Advisor/Faculty Consultant for Interns at **Geospatial Centroid** at Colorado State University (2014-present).
- Member, **International Pest Risk Research Group** (IPRRG; http://www.pestrisk.org/; Nov. 2014- present)
- **Associate Editor**, Tropical Ecology (Oct. 2014- present).
- **Associate Editor**, Halteres (Feb. 2015- present); an international peer-reviewed open access journal of Entomology.
- **Editorial Board**, "International Jr. of Bio-resource & Stress Management" (Oct. 2014- present)
- **Editorial Board**, 'Journal of Ecology and Natural Environment' (April 2009- present).
- **Associate editor**, 'International Journal of Ecology and Development' (July 2008- present)
- **Guest editor**, Current Zoology journal's Special Issue on "Invasive Species" (2010-2011).
- **Editorial Board**, "Environment, Ecology and Management" (June 2012- present)
- **Proposal Reviewer (# of proposals reviewed):**
  - National Science Foundation (2): 2010
  - US-Israel Binational Science Foundation (1): 2011
  - Panelist USDA National Institute of Food and Agriculture (12): 2011
  - USDA Small Business Innovation Research (1): 2012
  - EndNote Launch Pad Student Short Proposals Contest (6): 2013
  - AgreenSkills Post-doctoral Fellowships sponsored by the European Union and the French National Institute for Agricultural Research (2): June 2014, June 2015.

- **Reviewer for >35 journals (# of manuscripts reviewed):**

Agroforestry Systems (1)
Aquatic Invasions (2)
Applied Vegetation Science (1)
Austral Entomology (1)
Biological Invasions (2)
Biological Control (1)
Chinese Journal of Oceanology and Limnology (1)
Conservation Biology (1)
Diversity and Distributions (1)
Ecological Applications (6)
Ecological Modelling (1)
Ecological Engineering (2)
Forest Ecology and Management (3)
Functional Ecology (1)
Global Change Biology (1)
Global Ecology and Biogeography (1)
International Journal of Science and Technology Education Research (1)
International J of Biometereology (1)
Journal of Applied Entomology (1)
Journal of Ecology (1)
Journal of Ecology and Biogeography (1)
Journal of Ecology and Natural Environment (4)
Journal of Environmental Biology (1)
Landscape Ecology (4)

Ecology Letters (2)
Ecosphere (2)
Endangered Species Research (1)
Entropy (1)
Environmental Engineering Science (1)
European Journal of Forest Research (1)
Evolutionary Ecology (1)
Forests (1)
Nordic Journal of Botany (1)
Plant Biosystems (1)
PLoS ONE (3)
Rangeland Ecology and Management (1)
Studies on Neotropical Fauna and Environment (1)
Tropical Ecology (4)
USGS internal review (3)
USDA internal review (4)

- Treasurer, Colloquium in the Life Sciences, Colorado State University, Fort Collins, Colorado, 2004-2005.
- Student host, Dr. Andrew J. Hansen, Colloquium in the Life Sciences, Colorado State University – 2005.
- Student host, Dr. Marie-Josee Fortin, distinguished ecologist visiting Colorado State University- Jan. 2007.
- Judge, oral presentations and posters, Ecological Society of America (2007-2008) for Buell and Braun awards.
- Judge, poster sessions during 12th Annual Front Range Student Ecology Symposium, March 8, 2006, Colorado State University, Fort Collins, Colorado.
- Judge, poster sessions during 11th Annual Front Range Student Ecology Symposium, April 5-6, 2005, Colorado State University, Fort Collins, Colorado.
- Moderator, 'Invasion Ecology' session, 13th Annual Front Range Student Ecology Symposium, April 4, 2007, Colorado State University, Fort Collins, Colorado.
- Moderator, Forest Research Institute (FRI) University Alumni online Yahoo group (>200 members) - since 2003.

TRAINING, COURSES AND WORKSHOPS

- One week course "RA101: Fundamentals of Risk Analysis for Plant Protection" offered by the US Department of Agriculture-APHIS-PPQ-S&T Plant Epidemiology and Risk Analysis Laboratory, Raleigh, North Carolina, USA (July 7-11, 2014).
- Completed "Applied & General Entomology" (2 credits), and "Agricultural Entomology Laboratory" (1 credit) courses at Colorado State University (Fall 2014).
- Attended Workshop: Communicating Environmental Science to the Public and Policy-Makers; sponsored by the Biodiversity Working Group of the School of Global & Environmental Sustainability (SoGES), Colorado State University (March 29, 2014).
- Completed a three-day intensive course, "Quantitative Risk Analysis", Epix Analytics, Boulder, Colorado, USA, taught by Dr. Huybert Groenendaal (April 2-5, 2013).
- Completed "Introduction to Python for ArcGIS10", workshop; Colorado State University (Oct. 2011).
- Completed a course, "EDUC 696: College Science Teaching Methods", (1-credit); taught by Dr. Meena Balgopal, School of Education, Colorado State University, gained an understanding of how to teach science to undergraduate and graduate students (Fall 2009).
- Information Theoretic Approaches to Empirical Science: one-day workshop taught by Dr. David R. Anderson at Colorado State University, Fort Collins, Colorado (Nov. 24th, 2009).

- Species Distribution Modeling (or Niche Modeling) Methods for Conservation Biologists Workshop (1-week), American Museum of Natural History Southwestern Research Station, Arizona, USA, taught by Drs. Steven Phillips & Richard Pearson (October 13-17, 2008); learned MaxEnt, GARP, ENFA and other niche models.
- R Statistical Software Introductory Course, Ecological Society of America, August 6 - 11, 2006, Memphis, Tennessee.
- Leadership course: Leadership for Social Justice Institute, July 13-18, 2003, a part of the Ford Foundation International Fellowships Program, organized by School of International Training, Brattleboro, Vermont.
- Advanced Course in English Proficiency, June 2002, Anveshi Research Center for Women's Studies, Hyderabad, India. A part of the International Fellowship Program (2001-2002) of the Ford Foundation.
- Computer Applications and Statistical Analysis course, June 1, 2001- Aug. 30, 2001, Forest Research Institute University, Dehradun, India.
- Biodiversity Conservation Training Program, Feb. 7- 11, 2000, Forest Research Institute (Indian Council of Forestry Research and Education), Dehradun, India.
- Introduction to ArcView GIS, Nov. 12-13, 1998, GIS Training Program organized by ESRI (Environmental Systems Research Institute), New Delhi, India.

IMPACT

(Researcher ID: A-6730-2009): http://www.researcherid.com/rid/A-6730-2009

Career citations: 487 (senior author citations- 237*)
Average Citations per Article: 18.0; **h-index:** 9.0
First most cited paper: Kumar, S., Stohlgren, T. J., and Chong, G. W. (2006). Spatial heterogeneity influences native and nonnative plant species richness. Ecology 87(12): 3186-3199; **(Cited by 89; ISI Web of Science).**
Second most cited paper: Evangelista, P.H., **Kumar, S.**, Stohlgren, T. J., Jarnevich, C., Crall, A., Norman III, J. B., and Barnett, D. (2008). Modelling invasion for a habitat generalist and a specialist plant species. Diversity and Distributions 14: 808-817; **(Cited by 74; ISI Web of Science).**

Google Scholar profile: http://scholar.google.com/citations?user=y1trUUYAAAAJ&hl=en

Total citations: 949 (878 since 2010); **h-index:** 15.0; i10-index: 17
First most cited paper: Kumar, S., Stohlgren, T. J., and Chong, G. W. (2006). Spatial heterogeneity influences native and nonnative plant species richness. Ecology 87(12): 3186-3199; **(Cited by 146).**
Second most cited paper: Kumar, S., and Stohlgren, T. J. (2009). Maxent modeling for predicting suitable habitat for threatened and endangered tree *Canacomyrica monticola* in New Caledonia. Journal of Ecology and Natural Environment* 1(4): 94-98; **(Cited by 142; 72 ISI Web of Science citations; 68 Citations in Scopus).**
Third most cited paper: Evangelista, P.H., **Kumar, S.**, Stohlgren, T. J., Jarnevich, C., Crall, A., Norman III, J. B., and Barnett, D. (2008). Modelling invasion for a habitat generalist and a specialist plant species. Diversity and Distributions 14: 808-817; **(Cited by 115).**

(*Journal of Ecology and Natural Environment not included in ISI Web of Science yet)

ResearchGate profile: https://www.researchgate.net/profile/Sunil_Kumar58
(6,148 views; 5,173 downloads, 71.3 Impact Points)

Academia.edu profile: https://colostate.academia.edu/SunilKumar