
MICHAEL TUFFLY PH.D.

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Principal at ERIA Consultants, LLC

Work experience

- 2017 - 2018 GIS Specialist
United State Department of Agriculture, Forest Service, Fort Collins Colorado
Performing spatial analysis and cartographic duties for the Arapahoe and Roosevelt National Forest related to long term planning efforts.
- 2017 - Present Adjunct Professor
University Denver, Denver Colorado
Teaching graduate courses in Remote Sensing, Geographic Information Systems, and Image Processing; both online and in person.
- March 2015 - Present Climate Change Researcher at Colorado State University, Fort Collins, Colorado.
Computing Global Greenhouse Gas emission contributions via organic matter decomposition (OMD) modeling. The inputs into the OMD model are Potential Evapotranspiration (PET), monthly temperature, monthly precipitation. The latter two are computed using the DayCent Model
<http://www.nrel.colostate.edu/projects/daycent/>. Results were computed for the entire globe on an annual basis from 1983 – 2011.
- Jun 2005 - Present Principal Scientist
ERIA Consultants, LLC
Clients have included Ocean Imaging, the US Forest Service Forest Health Enterprise Team (FHTET), The Nature Conservancy (TNC), and NatureServe.. Contracts are mapping kelp beds in Oregon and California using four band digital imagery collected from fixed wing aircraft. Other projects have involved spatially modeling risk assessment for the potential introduction of exotic forest pathogens and insects to the United States (FHTET) and Colorado Forest Assessment (TNC). Additional projects include “Wildland Tree Resources at Risk from *Agriulus coxalis*” and “A Spatial Model to Determine the Economic Availability of Woody Biomass in Colorado.” In addition to wildland fire susceptibility and intensity modeling. Expert witness analyses and testimony for natural resources damages due to wildfires.
- Jan 2009 - 2016 Adjunct Professor
Colorado State University
Teaching courses to undergraduates and graduates students in GIS and Remote Sensing. Courses include: Geographic Information Systems and Remote Sensing Seminar (NR493), Geographic Information System, Applied Natural Resource Management (NR 422), Natural Resource Sampling (NR 421), Forest Biometrics (F321), Remote Sensing (NR323), and Spatial Statistical Modeling of Natural Resources (NR512).
- Sep 2004 - Sep 2006 Geographic Information Systems and Remote Sensing Instructor
Front Range Community College
Adjunct professor for the following courses: Introduction to Geographic Information Systems, Intermediate Geographic Information Systems, Cartography, and the Fundamentals of Remote Sensing. Software used are Environmental Systems Research Institute (ESRI) ArcGIS version 9.1 and Leica Geosystems ERDAS Imagine version 8.7.

- Nov 2002 - Nov 2005 Spatial Ecologist
NatureServe, Boulder CO.
 Corporate charter is to conduct spatial analysis in order to preserve Biodiversity over the natural landscape. Responsible for the assessment and classification of wide ranging critical or sensitive habitats in the western United States, Canada, South America, and the Caribbean using the following: Geographic Information System (GIS), Remote Sensing (RS) techniques, and mathematical modeling algorithms. Responsible for coordinating vegetation classification, sample design, terrestrial and aquatic landscape evaluation. Have most recently developed a series of spatial models (i.e. flow accumulation, optimization selection criteria for reserve design using simulated Annealing, and Geodatabase development).
- Nov 1998 - Nov 2002 Lead Environmental Scientist
California Department of Conservation, Abandoned Mine Lands Unit, Sacramento, CA
 Tasked with designing, constructing, implementing, and maintaining a relational database and a GIS of abandoned mines for the State of California. Co-authoring a Strategic Plan for managing Mercury in the Sacramento River Watershed. Responsible for GPS location of mine sites, collecting field data, and conducting spatial analysis using ancillary data sets. Additional duties include locating and collecting data for "Point Source" and "Non-Point Source" occurrences of heavy metals in stream river sediments and wetlands. Administrative duties include: • contract and grant writing; • contract administration; • supervising and training student assistants; • writing for scientific report publications; • public relations; • participating in the Delta Tributaries Mercury Council (DTMC) planning committee;
- Nov 1993 - Nov 1998 Geographic Information Systems Research Analyst
California Department of Fish and Game, Natural Heritage Division, Sacramento, CA
 Conducted spatial analysis on natural resource data for map production, quality control, systems analysis, application design, (GPS) application and instruction, Relational Database construction in ORACLE, hardware and software review, as well as GIS and Remote Sensing modeling. Also responsible for construction of field sampling design and implementation of accuracy assessment of the wetlands and vernal pools spatial data in the Sacramento Valley, San Joaquin Valley, and San Francisco Bay.
- Jan 1992 - Nov 1993 Graduate Research Assistant
Humboldt State University Foundation and USDA Forest Service
 Constructed a Fire Hazard Model for vegetation on the Middle Fork of the Smith River, working under a cooperative agreement with Humboldt State University Foundation and Six Rivers National Forest in Eureka, CA. This model predicted fire hazard based on slope, aspect, and vegetation data, the latter of which was derived from spectral signatures (Six Band Landsat TM Data), using image processing classification algorithms. The construction of a relational database coupled with multivariate statistical analysis, GPS, and ground truthing for accuracy assessment facilitated operations and model validation.

Education

- Dec 2007 - Dec 2012 Ph.D.
Colorado State University
 Forest Science and Spatial Statistics, Warner College of Natural Resources, Colorado State University (CSU), Fort Collins Colorado USA. Dissertation at CSU is to create spatial and temporal models to predict the spread of Amber-marked Birch Leaf Miner (*Profenusa thomsoni* [Konow]) in Alaska. A copy of the dissertation can be view here http://digitool.library.colostate.edu//exlibris/dtl/d3_1/apache_media/L2V4bGlicmlzL2R0bC9kM18xL2FwYWNoZV9tZWRpYS8xODY2MDg=.pdf
- 1990 - 1995 M.S.
Humboldt State University
 Remote Sensing, Geographic Information Systems (GIS), and Statistical Analysis. Thesis "Fire Hazard Assessment Model for the Smith River National Recreation Area", Gasquet California. Humboldt State University, Arcata, California USA 1995. A copy of this thesis can be viewed here <http://humboldt-dspace.calstate.edu/xmlui/handle/2148/839>
- 1983 - 1988 B.S.
Humboldt State University

Skills

Technical Computer

Python (3.5.3) numpy, scipy, gdal, and arcpy

Geospatial (ArcGIS ver 10.5, QGIS 2.18.7)

Remote Sensing and Image Processing (ERDAS Imagine 2016)

Statistics (R ver 3.4.1) Univariate (regression), multivariate (MANOVA), nonparametric (CART), Random Forest, spatial (Kriging, IDW, GWR) and temporal (GLS)

Operating Systems Windows and Linux Ubuntu 16.02

Database MySQL, MS Access, SQL Server

Certifications

Sep 2011 - Sep 2021 Certified Mapping Scientist (CMS) - Remote Sensing
American Society of Photogrammetry and Remote Sensing (ASPRS)

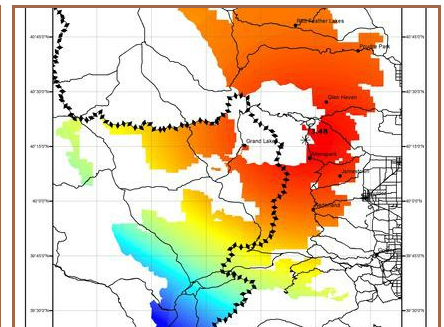
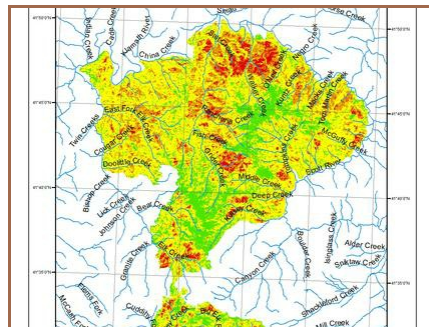
Jun 2009 - Jun 2021 Certified Forester (CF)
Society of American Foresters

Jun 2011 - Jun 2021 Certified Senior Ecologist (CSE)
Ecological Society of America

Jul 2010 - Jun 2018 Geographic Information Systems Professional (GISP)
Geographic Information System Certification Institute (GISCI)

Portfolio

Modeling Examples

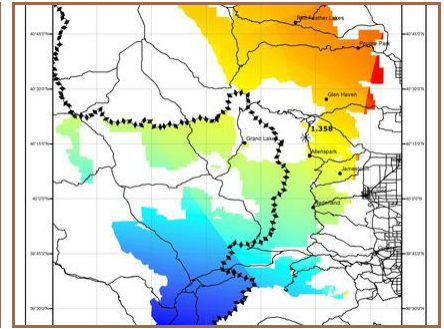
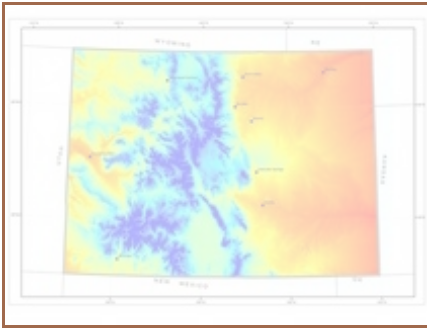


Potential Introduction, Establishmen...

Difference in Normalized Burn Reflecta..

Wet and Dry Nitrogen Deposition

Portfolio



Revised Universal Soil Loss Equation M. Fire Hazard Assessment for Bark Beetle.

Wet and Dry Sulfur Deposition

Objective

Secure short or long term contracts for inventories and spatially modeling of natural resources.

Teaching workshops on Remote Sensing (ERDAS 2016), GIS (ArcGIS), Spatial Statistics (R).

Teaching Experience

Spring 2017. Remote Sensing and Image Processing (GIS4700) Denver University, Denver Colorado.

Spring 2016. Natural Resources Inventory and Data Analysis (NR566), Colorado State University Warner College of Natural Resources, Fort Collins, Colorado.

Spring 2013 Seminar Geographic Information System, and Remote Sensing (NR 493) Colorado State University Warner College of Natural Resources, Fort Collins, Colorado.

Spring 2012 Geographic Information System, Applied Natural Resource Management (NR 422) Colorado State University Warner College of Natural Resources, Fort Collins, Colorado.

Spring 2011 Natural Resource Sampling (NR 421) Colorado State University Warner College of Natural Resources, Fort Collins, Colorado.

Fall 2010, 2011 Forest Biometrics (F321) Colorado State University Warner College of Natural Resources, Fort Collins, Colorado.

Fall 2009 Remote Sensing (NR323) Colorado State University Warner College of Natural Resources Fort Collins, Colorado.

Fall 2008 Spatial Statistical Modeling of Natural Resources (NR512). Colorado State University Warner College of Natural Resources Fort Collins, Colorado.

Professional Affiliations

Vice-President of the Rocky Mountain Region of American Society for Photogrammetry and Remote Sensing (ASPRS) (<http://www.asprs.org>)

The Society for Conservation GIS (**SCGIS**) (<http://www.scgis.org>)

The Ecological Society of America (**ESA**) (<http://www.esa.org>)

Board of Directors for Professional Certification (<http://www.gisci.org>)

Member of the Society for Ecological Restoration (www.ser.org)

Summary

Seasoned Geographic Information Systems (GIS), Remote Sensing, and the Global Positioning System (GPS) professional with over 20 years of experience. Currently focused on environmental modeling, resource inventories, and landscape assessment. Responsible for conducting statistical analysis of short and long-term environmental impacts due to natural and anthropogenic actions.

Affiliations

American Society for Photogrammetry and Remote Sensing (ASPRS) Rocky Mountain Region (RMR). I serve at the ASPRS RMR on the Board of Directors as the Vice-President for the 2016 year.

· The Society for Conservation GIS (SCGIS)

· Ecological Society of America (ESA)

· Society of American Foresters (SAF) I also serve as the secretary for Long's Peak Chapter of SAF (2013) and I am on the National Foresters Certification Review Board (2013 – 2015)

Society of Ecological Restoration

Publications

Peer-reviewed

Lundquist, J. E., R. M. Reich, and M. Tuffly. 2012. Spatial dynamics of the invasive defoliator Amber-marked birch leaf miner (*Profesusa thomsoni*) across the Anchorage landscape. *Journal of Economic Entomology* 105: 1659 - 1667.

Downing, M.C., T. Jung, V. Thomas, M. Blaschke, M. Tuffly, and R. Reich. 2010. Estimating the susceptibility of *Phytophthora alni* globally using both statistical analysis and expert knowledge. General Technical Report PNW-GTR-802.

Modeling the Spatial and Temporal Dynamics of the Amber-Marked Birch Leaf Miner Infestation in Anchorage, Alaska (in Review).

White Papers

1. Predicting vegetation type and fire hazard in the Smith River National Recreation area using a Geographic Information System. Remote Sensing and Ecosystem Management, Proceedings of the Fifth Forest Service Remote Sensing Applications. p 336.1997. (<http://hdl.handle.net/2148/839>).
2. Using a Geographic Information System, the Global Positioning System and a Relational Database for the Inventory of Abandoned Mines in California. July, 2000 Environmental Systems Research Institute (ESRI) Users Conference Proceedings.
3. California's Mining Legacy, Society of Ecological Restoration, Conference Paper. October 2000.
4. Impact from Historical Mining, Society for the Conservation of Geographic Information Systems, Conference Paper. July 2001.
5. Mercury in Stream Sediments in the Sierra Nevada, American Geophysical Union, Conference Poster. December 2001.
6. Managing Mercury in the Sacramento River Watershed, Delta Tributaries Mercury Council Strategic Planning Committee.
7. Upland and Wetland Ecological Systems in Colorado, Wyoming, South Dakota, Nebraska, and Kansas. Report and Map to the National Gap Analysis Program. Arlington, VA June 2003.
8. Biodiversity Values of Geographically Isolated Wetlands: An Analysis of 20 U.S. States, NatureServe, Arlington, VA. February 2005.
9. Generating Conservation Scenarios for Puerto Rico. July 2005 Environmental Systems Research Institute (ESRI) User Conference Proceedings.

10. Potential Introduction Establishment, and Susceptibility to Pine species in the Conterminous United States from Sirex Woodwasp - *Sirex noctilio* USFS Technical Paper
http://www.fs.fed.us/foresthealth/technology/invasives_sirexnoctilio_riskmaps.shtml.

11. Potential Introduction, Establishment, and Susceptibility of Forest Tree species in the Conterminous United States from European spruce bark beetle - *Ips typographus* USFS Technical Paper :
http://www.fs.fed.us/foresthealth/technology/invasives_ipstypographus_riskmaps.shtml

12. Introduction, Establishment, and Susceptibility of Alder species in the Conterminous United States from *Phytophthora alni*. USFS Technical Paper: http://www.fs.fed.us/foresthealth/technology/invasives_phytophthoraalni_riskmaps.shtml

13. URISA's GISCorps United Nations Institute for Training and Research Operational Satellite Applications Programme (UNOSAT). Myanmar (Burma) Project. 2008 http://www.giscorps.org/index.php?option=com_content&task=view&id=71&Itemid=63

14. Resources at Risk in the Conterminous United States from Goldspotted Oak Borer (*Agrilus coxalis* [Waterhouse]) USFS Technical Paper : http://www.fs.fed.us/foresthealth/technology/invasives_agriluscoxalis_riskmaps.shtml