

ERIA Consultants, LLC

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Statement of Qualifications

Overview

Environmental Research Inventory and Analysis (ERIA), LLC is a highly qualified Resource Management and Geospatial consulting firm offering the following services:

- Highly accurate mapping services
- Spatial analysis
- Wildland Fire Hazard Assessment
- Spatial Modeling
- Watershed Management
- Hydrologic Modeling
- GIS support
- Remote Sensing (RS) analysis
 - Multispectral (MS)
 - Synthetic Aperture Radar (SAR)
 - LiDAR
- Global Positioning Systems (GPS) applications and Data Collection
- Relational Database construction
- Statistical Analysis (R programming)
- Forest Inventory
- Forest Health Assessment
- Reducing Emissions from Deforestation and Forest Degradation (REDD+)
- Accredited Lead Verifier Forest Carbon (California Air Resources Board (AB 32))
- Forest Biometrics (Forest Vegetation Simulator (FVS))
- 3-Dimensional Modeling (LiDAR)
- Abandoned Mine Assessment and remediation
- Geologic Modeling
- Precision Farming
- GIS and Remote Sensing Education
- Wetlands Assessment
- Wildlife Habitat Analysis
- Resource Damage Assessment
- Python Programming (DL, NN, pytorch)
- Cartography

- Expert witness services as it relates to:
 - Wildland Fire Assessment, GIS, Remote Sensing, Statistics, and Forestry

We have over 30 years of experience in resource inventories, GIS, RS, GPS, and statistics. Our software suite for GIS consists of ESRI ArcGIS ver 10.8.0, for remote sensing we use ERDAS IMAGINE 2018, for GPS we use Trimble Navigations JUNO 3D units, and for statistics we use R (ver 3.5.2).

Previous Projects and Expertise with References

1. **Accuracy Assessment of the IdentiFlight system (2019).** Assess and quantify the false-positive and false-negatives of eagle identification on wind farms.
2. **Forest Health Assessment (2019).** Modeling Sitka spruce (*Picea sitchensis*) susceptibility to the spruce beetle (*Dendroctonus rufipennis*) on the Cook Inlet and Copper Plateau ecoregion Alaska for the Chugachmiut Tribal Consortium.
http://www.eriaconsultants.com/documents/Copper_ver2.pdf
http://www.eriaconsultants.com/documents/Cook_Inlet_ver2.pdf
3. **REDD+ Modeler (Oct 2018)** Modeling reductions in forest due to degradation and deforestation in Myanmar. Company Terraglobal Capital 220 Montgomery Street, Suite 1109, San Francisco, CA 94104.
4. **Forest Carbon Stratification (Oct 2018 – Current)** Assessing temporal and spatial extent of potential forest in areas of Queensland Australia
5. **Ecologist (June 2017 – Jan 2018)** conducting a comprehensive Ecoregional Assessment for the Arapahoe and Roosevelt National Forest. Developing Lynx (*Lynx Canadensis*) spatial models, designing sampling methods for aquatics, and applying stochastic modeling methods to forecasting long-term forest succession due to wildfire. Organization: US Forest Service Arapahoe and Roosevelt National Forest. 2150 Centre Ave, Building E Fort Collins, CO 80526-8117.
6. **Adjunct Professor in Remote Sensing at University of Denver (March 2017 – Current).**
Teaching graduate Remote Sensing, and spatial modeling courses (GIS-4700).
7. **Climate Change Researcher Consultant to Colorado State University, Fort Collins, Colorado (2014 – 2016).**
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.
8. **Adjunct Professor at Colorado State University, Warner College of Natural Resources, Fort Collins, Colorado (2010 – 2016)**

Teaching courses to undergraduates and graduates' students in GIS and Remote Sensing, Statistics, and Forestry. 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) using Forest Inventory and Analysis (FIA) methods from the USFS, Remote Sensing (NR323), Spatial Statistical Modeling of Natural Resources (NR512) and Inventory and Monitoring of Natural Resources (NR566).

9. **Expert Witness on Burn Severity (2014 - 2016).** I have served as an expert witness in assessing forest resource damages post-wildfire. I have given a deposition and testified in a court of law where I was required to defend my analysis and professional reputation. Without going into details, the case was settled and my analysis was vindicated. The client's name is withheld. Total litigations fee was ten-million dollars.
10. **Expert Witness on Burn Severity (2015 - 2017).** This is an ongoing project for a wildfire in California; due, to the current litigation the client's name is withheld. For this fire I have served as an expert witness in assessing forest resource damages post-wildfire. Case has not gone to court and is not settled. Potential litigations fee is five-million dollars
11. **Southwest Research, Denver Colorado (2015).** Conducted Collaborative Forest Landscape Restoration Project (CLFRP) plots on the Arapaho-Roosevelt National Forest. These CLFRP plots were designed to create a base line of current forest condition as it pertains to wildfire. These plots will be revisited and re-measured in the coming years to assess and quantify forest change metrics as it pertains to wildfire and forest management efforts.
12. **ERIA Consultants, LLC (2015).** Conducting independent research for post-fire assessment for the High Park Fire that occurred in Larimer County, CO on June 9th 2012. I created a two year post-fire recovery map and assessment www.eriaconsultants.com/documents/recovery1.pdf. In addition, I created extremely detail watersheds using high resolution LiDAR data. www.eriaconsultants.com/documents/watershed_modeled1.pdf
13. **ERIA Consultants, LLC (2015).** Conducting independent research, Tuffly created a standalone ArcGIS application that assess, quantifies, and categorizes pre-fire severity conditions for any area in the western United States. I tested this application using two wildfires that occurred in Colorado: 1) High Park Fire (Boulder County, Sept 6th 2010), and High Park Fire (Larimer County, June 9th 2012). Results from this test illustrate that the model is 68% accurate in assessing current severity conditions. www.eriaconsultants.com/documents/GISITR_2015_coloradoautomatic_map2.pdf

- 14. Garfield County, Colorado (2014).** Peer review document “Use of Modeling in a Geographic Information System to Predict Greater-Sage Grouse Habitat.”
- 15. ERIA Consultants, LLC (2014).** Conducting independent research that resulted in a spatial and temporal model for predicting ground ozone in the United States www.eriaconsultants.com/documents/Ozone_modeled_2010.pdf
- 16. Leonie Industries (2014).** Socio-Economic Analysis for Selected National Parks, Proposal and Statistical Analysis.
- 17. Edge Environmental (2013).** Fire Hazard Assessment and Northern Spotted Owl and Marbled Murrelet Habitat Assessment for the Pacific Gas Connect Project NEPA Documents for the State of Oregon and Bureau of Land Management. This project is ongoing and has a annual budget of over three-million dollars.
- 18. Colorado State University (CSU) Fort Collins, CO, (2012).** Using US Census Data coupled with finical records from CSU Institutional Research I estimated where areas in Colorado are receiving finical aid.
- 19. NatureServe 2011.** Assisting NatureServe in the data modeling for the Bureau of Land Management’s Rapid Ecoregional Assessment (REA) for the Great Basin and Range & the Mojave Desert Ecoregion.
- 20. Ocean Imaging 2011.** Inventorying and assessing tidal vegetation in California using high resolution multi spectral imagery coupled with remote sensing techniques.
- 21. USDA USFS Forest Health Technology Enterprise Team (FHTET) (2005 – 2011).** For FHTET, ERIA Consultants modeled invasive insects and diseases in the United States. In addition, I conducted a nationwide forest health assessment. I used a series of criteria, datasets, and modeling techniques which can be view here: <http://www.fs.fed.us/foresthealth/technology/products.shtml> under the Insects and Disease Risk Analysis section. For the risk-maps, ERIA used the National Hydrologic Data (NHD) for modeling the hydrographic component for the susceptibility model. Forest resources were quantified using Forest Inventory and Analysis (FIA) data. Using different techniques ERIA has modeled *Sirex noctilio* (Sirex woodwasp), *Ips typographus* (European spruce bark beetle), and *Orthotomicus erosus* (Mediterranean Pine Engraver) for Alaska and the conterminous United States just to name a few. These projects had an annual budget of 2.5 million dollars.
- 22. Dynamic Corporation 2010.** Bureau of Land Management’s Rapid Ecoregional Assessment (REA) for the Colorado Plateau and Sonoran Desert.
- 23. JW Associates 2010.** Spatial explicit fire hazard models for selected watersheds in Colorado and Wyoming. We used LANDFIRE data coupled with forest mortality from

bark beetle infestation coupled with the Fire Behavior Assessment Tool (FBAT)
www.eriaconsultants.com/documents/fire_hazard_all2a.pdf

- 24. Mangi Environmental 2010.** Environmental Impact Statements (EIS) for the United States Forest Service Sierra National Forest, Kings River Ecological Watershed (KREW). Conducted Forest Assessment, Fire hazard and erosion potential for the KREW.
- 25. Greenlands Reserve 2009:** ERIA Consultants conducted environmental analysis, ecosystem assessment, and hydrological impact studies on the 50,000 hectares of conservation easement properties located along the Arkansas River in southeastern Colorado.
- 26. Greenlands Reserve 2009:** ERIA Consultants, LLC partnered to conduct analysis and spatial modeling to produce a report that illustrated the Economic Availability of Woody Biomass in Colorado. I looked at the cost of biomass
www.eriaconsultants.com/documents/cost4.pdf. And the total available biomass
www.eriaconsultants.com/documents/all_ton12.pdf
- 27. The Nature Conservancy (TNC) 2008:** ERIA Consultants conducted an assessment of the forest of Colorado. Working under the parameters of the 2008 Farm Bill ERIA consultants produced data sets and reports summarizing the health of the forest of Colorado. Accomplished spatial implementation of the Revised Universal Soil Loss Equation: www.eriaconsultants.com/documents/RUSLE_GIS_webver2.pdf
- 28. NatureServe 2003:** Mapped the following states in their entirety: Colorado, Wyoming, Kansas, Nebraska, and South Dakota. Base data were GAP data for each state. The GAP data were augmented with ancillary data (e.g., DEM, hydrography, and watersheds boundaries) via spatial modeling techniques. NatureServe 2004: Began developing an ecological assessment for the Utah High Plateau Ecoregion, spanning 11 million hectares. Using remotely sensed data for an existing landcover layer and approximately 25 other ancillary data sets depicting anthropogenic activity (i.e. dams, oil wells, hazardous materials sites, etc.), all data were linked from the relational database to a spatial feature (point, line, or polygon).
- 29. Geographic Information Systems and Remote Sensing Instructor • Front Range Community College 2003 – 2006:** Adjunct professor for the following courses: Introduction to Geographic Information Systems, Intermediate Geographic Information Systems, Cartography, and the Fundamentals of Remote Sensing. Software used: Environmental Systems Research Institute (ESRI) ArcGIS version 9.1 and Leica Geosystems ERDAS Imagine version 8.7.

- 30. Lead Environmental Scientist • California Department of Conservation • Abandoned Mine Lands Unit • Sacramento, California 1998 – 2002:** 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.
- 31. Geographic Information Systems Research Analyst • California Department of Fish and Game • Natural Heritage Division • Sacramento, California 1993 - 1998**
Conducted spatial analysis on threaten and endanger plants and animals. Also responsible for the construction of field sampling design and implementation and accuracy assessment of the wetlands and vernal pools spatial data in the Sacramento Valley, San Joaquin Valley, and San Francisco Bay Area. Member of the Oil Spill and Prevention Response (OSPR) team.

Education

Ph.D. Forest Science and Spatial Statistics, Warner College of Natural Resources, Colorado State University. 2012. Dissertation: *Using Cellular automata to predict the spread and intensity of the Amber-Marked Birch leaf miner infestation in Alaska.*
<https://dspace.library.colostate.edu/handle/10217/71597>

M.S. Natural Resources: Remote Sensing (RS), Geographic Information Systems (GIS), and Statistical Analysis. Humboldt State University, 1995. Thesis: *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>

B.S. Forest Management: Emphasizing in forest inventories and forest health. Humboldt State University, 1988.

A.S. Natural Resources Management: Los Angeles Pierce College 1983.

Certifications

Geographic Information Systems Professional (GISP) Certification number 59559. From the Geographic Information Systems Certification Institute (GISCI) Expiration 2021
<http://www.gisci.org/>. Continuously Certified since 2009

Certified Forester (CF) Certification number 4050. From the Society of American Forester (SAF) <https://www.eforester.org/> Expiration 2022. Continuously Certified since 2008.

Certified Senior Ecologist. From the Ecological Society of America (ESA) (<http://www.esa.org/>). Expiration 2021. Continuously Certified since 2010.

Certified Mapping Scientist-Remote Sensing (CMS) license number RS196 (American Society for Photogrammetry and Remote Sensing (ASPRS) <http://www.asprs.org/>). Expiration 2021. Continuously Certified since 2011.

Lead Verifier for Forest Carbon (2018) (California Air Resources Board) <https://ww3.arb.ca.gov/cc/capandtrade/offsets/verification/orders/228.pdf>