

Rebekah Brassfield | Curriculum Vitae

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Education

M.S. Systems Ecology – University of Montana, Missoula, Montana 2020-2022
B.S. Biology – Concordia University, Seward, Nebraska 2014 - 2017

Work Experience

NSF REU Mentor – Salish Kootenai College Department of Geosciences, Pablo MT May-August 2021, 2022

Mentored students during Research Experience for Undergraduates (NSF REU) with the geosciences program through University of Minnesota. Oversaw student research projects and helped direct their research as well as their presentations and papers for their final REU project.

Research Assistant – Salish Kootenai College Department of Wildlife, Pablo MT April 2019-Present

Managed field data collection by sampling vegetation and surveying bumble bee populations. Collected detailed phenological data on huckleberry plants using trail cameras and temperature sensors. Gathered primary source pollen for microscope slides as well as secondary source pollen from bumble bees. Identified preserved specimens of bumblebees using dichotomous keys. Assisted with student coursework and laboratory management. Including overseeing research on pollen identification, soil moisture at huckleberry sites, huckleberry productivity, and floral diversity.

Substitute taught ecology field methods, avian studies, and wetland plants courses.

Wildlife Technician – US Forest Service, Salmon-Challis National Forest, Salmon ID May - September 2017

Used GIS and remote sensed data to locate suitable habitats for sage grouse leks and nesting. Ground truthed locations and collected vegetation and habitat data including species inventory and pollinator capture.

Laboratory Teaching Assistant – Concordia University, Seward, Nebraska 2016 - 2017

Work with professors to assist students with experiments and teach students biological concepts. Prepared laboratory classes, met with students for tutoring, and worked with faculty to design lab experiments for student.

Biology Intern – Kenai National Wildlife Refuge, Soldotna, Alaska Summer 2016

Worked with biology refuge staff to complete research projects. Field work included remote location data collection through backpacking and aerial survey. Projects included invasive species control and eradication, snowshoe hare population data, fire prevention survey, insect species evaluation and bird survey. Most projects involved GPS use for locating points or marking points and GIS preparation using Google Earth and ArcGIS.

Research Assistant – Concordia University, Seward, Nebraska Spring 2016

Auburn University REU Fellowship – Auburn University, Auburn, Alabama Summer 2015

Teaching Experience

Substitute Teaching

Entomology February 11, 2022

Ecology Field Methods October 2, 2019

Wetland and Riparian Habitats	October 1, 2019
Teaching Assistant	
Soils, Water and Climate (NRSM 210)	Spring 2021, 2022
Rangeland Management (NRSM 360)	Fall 2021, 2022
Practice of Silviculture (FORS 349)	Fall 2021
Intro to Forestry Field Methods (FORS 130)	Fall 2021

Extra-Curricular Activities

Missoula Butterfly House and Insectarium Guest Speaker	2021, 2020
Missoula Climate Lobby	2019
Salish Kootenai College Visit Day Helped create interactive natural resources visit day event for high school students. Coordinated timing, various events and speakers.	2019
Science Club President	2016 - 2017
Sierra Student Coalition and Chinese Youth Climate Action Online Youth Exchange Science Educator	2015 - 2016 October 2016

Research

University of Montana

Applying resource selection probability function to understand floral resource use in a common bumble bee, *Bombus vancouverensis*

Bombus vancouverensis is a common bumble bee in North America. Like many bumble bees, they are considered generalist species, but have known floral associations throughout the flowering season. Bumble bees acquire all their nutrients through the pollen they eat, and as consumers, they must forage to meet their nutritional requirements. Using ecological stoichiometry, we can examine the elemental composition of pollen and compare it to the ratio of elements in the bumble bee bodies to determine what flowers are most beneficial to meeting their nutrient requirements through the flowering season. This will assist researchers with understanding how bumble bees forage for the flowers they pollinate, what flowers are more nutritious, and assist conservationists with targeted planting efforts.

Predicting Huckleberry Habitat Using Species Distribution Models

Black huckleberry, *Vaccinium membranaceum* is a common understory shrub across the northern and western US. Along with its considerable ecological importance as a keystone species, it's a culturally significant plant for the indigenous people of North America. Centuries of fire suppression have resulted in decreased suitable habitat and increased competition by taller and faster growing species. Using an ensemble species distribution model (SDM), six covariates were used to fit three SDMs: generalized linear modeling (GLM), generalized additive modeling (GAM), and a BioClim

envelope model to determine current huckleberry distribution at 1km resolution and predict future distributions using the EC-EARTH3-Veg climate model for the years 2021-2040 and 2041-2060. Present models found spring temperatures and winter precipitation to be most important determinates in huckleberry distribution, with higher spring temperatures and decreased winter precipitation limiting occupancy probability. 2021-2040 climate projections found an initial decrease in distributions as spring temperatures increased, however 2041-2060 climate showed an increase in winter precipitation that was found to increase huckleberry probability. Understanding organisms' response to climate change is critical to conservation and using huckleberries provides insight into potential distributions of other organisms as well as important cultural preservation for future generations.

Spatial data was gathered and managed using ArcGIS and all analysis was done in R. Research presented at Grad Con 2022.

Using Classification Trees to Identify Bumble Bees

Using a suit of taxonomically important data collected 2019-2020, a recursive partitioning classification tree and random forest model were trained to identify bumble bees to one of 12 species. The two methods were compared to explore the accuracy of identification. Random forest model had an accuracy of 93% and recursive partitioning had an accuracy of 88%. The models commonly confused species that are similar taxonomically suggesting similar decision making to dichotomous keys.

All analysis and training was done in R. Research presented at Grad Con 2021.

Salish Kootenai College

April 2019-present

Huckleberry Phenology

Ongoing research into flowering phenology, overall plant health, berry production and the effects of temperature, soil, precipitation, and forest succession. Used trail cameras to track flowering periods. Conduct phenology surveys to pair with berry productivity surveys later in the year. All data were examined with coupled climate data to determine the effects of temperature and precipitation on phenological stages.

Bumble Bee Pollination

Examined the potential mutualistic relationship between huckleberries and spring emergent queens. Using sweep net sampling, focal surveys, pollen analysis and blue vane traps to understand foraging behavior, species distribution and diversity. Captured and identified bees using dichotomous keys to create a species list as well as information on habitat, flowering resource availability and preferences.

Pollen Analysis

Collected pollen baskets from captured bees and prepared microscope slides for identification. Used confocal microscope and light microscopy to identify pollen grains to family. Prepared primary sources for reference material.

Salmon-Challis National Forest

May-September 2017

Mesic Meadow Monitoring

Used GIS and remote sensed data to identify potential areas for sage grouse nesting. Collected data following established AIM protocol.

Kenai National Wildlife Refuge

May - August 2016

HUC12 Slikok Creek Watershed

Using NLCD data and GIS analysis, the Slikok Creek Watershed was sampled for an inventory of arthropod and avian species. Arthropods were sampled using sweep nets along a transect and preserved for identification to family prior to DNA analysis. Avian species were sampled using point-count surveys.

Snowshoe Hare Populations

Generated backcountry grids were aligned with game trails and total amount of hare scat was collected to tally hare populations whose numbers were used to estimate lynx populations.

Fire Prevention

Worked with fire ecologists to accurately map out regions of the refuge that are fire dangers using remote sensing and ground truthing methods.

Auburn University Biosystems Engineering REU
Department of Forestry and Forest Products

Summer 2016

Technology and Certifications

Earth Engine

ArcGIS and ArcPro including integrated Python functionality

R, Python, Tableau

Microsoft Programs

Publications and Presentations

- Thesis: Applying resource selection probability function to understand floral resource use by a common bumble bee, *Bombus vancouverensis* December 2022
- University of Montana Graduate Student Convention: Predicting Huckleberry Habitat Using Species Distribution Models March 2022
- Missoula Insectarium and Butterfly House Winter Newsletter: “The Buzz on Buzz Pollination” December 2021
- University of Montana Graduate Student Convention: Using classification trees to identify bumble bees March 2021
- The Missoulian: “Consider Huckleberries’ Place in Grizzly Bear Management” January 9, 2020
- Towards conserving natural diversity: A biotic inventory by observations, specimens, DNA barcoding and high-throughput sequencing methods (Co-Author) February 27, 2020
- Mechanical and Physical Properties of OSB Exposed to High Temperature and Relative Humidity and Coupled with NIR Modeling August 11, 2017
- Peninsula Clarion Refuge Notebook Article: “Moss piglets? More common than you think on the Kenai.” July 7, 2016

Peninsula Clarion Refuge Notebook Article: "Elodea gone from the Kenai Peninsula?"

June 2, 2016

Concordia University Research Symposium: Relative abundance of tardigrades in samples of moss and lichen.

April 7, 2016

References

Diana Six	406-243-5573	diana.six@umontana.edu
Sean Carter	251-509-6660	carter@earthtosean.com sean2.carter@umontana.edu
Janene Lichtenberg	406-212-5473	janene.lichtenberg@skc.edu