USGS NSF GRIP, GSP Opportunity

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USGS Center:	Northern Rocky Mountain Science Center
Project Title:	Finding edible berries with analytic approaches
Summary:	Work with remote sensing and quantitative spatial wildlife ecologists to map the pattern of the iconic huckleberry and assess the processes important to their distribution using cutting edge statistical and remote sensing techniques. Field validation will occur in beautiful northwest Montana, in and near Glacier National Park and will include field validation and sampling the abundance of berries.
Project Hypothesis or Objectives:	Huckleberries are an important food for high-elevation pollinators, people, grizzly bears, small mammals and birds. The student will use existing plot and remote sensing data to develop a method to identify the locations of this important shrub species. The student will assess the accuracy of the classification and conduct field testing in and near Glacier National Park to validate the map, identify weaknesses and make improvements. These maps will inform future sampling of huckleberry productivity and feed into assessments of the role of huckleberries in the diet of grizzly bears as well as scenario-planning map products to assist managers in managing this keystone species for resilience to climate and land use change.
Duration:	Up to 12 months
Internship Location:	West Glacier, MT
Field(s) of Study:	Geoscience, Life Science
Applicable NSF Division:	EAR Earth Sciences, DEB Environmental Biology, DMS Mathematical Sciences
Intern Type Preference:	Either Type of Intern

Keywords:	Remote sensing, occupancy, classification, grizzly bears, Montana, Glacier National Park, pollinators, bees, birds, small mammals, tribal, climate change, traditional food, food security
Expected Outcome:	The project will result in predictive maps that will be used directly to improve huckleberry productivity sample designs and be paired with berry productivity models to inform decision support scenario maps of predicted berry abundance under climate and land use change. The USGS will benefit from the algorithm developed for estimating berry shrub presence, particularly under a partial forest canopy, and the predictive map of shrub presence, as will other land management agencies. The intern will benefit from participation in an important applied natural resource management exercise, exposure to a range of USGS science, advances in spatial modeling skill sets including occupancy and spatial autocorrelation models.
Special skills/training Required:	Intern should have intermediate skills in the statistical environment R and at least basic skills with GIS. We will teach the student more advanced skills in R and HPC. A background in ecology, with emphasis on species distribution modeling of either plants or animals would also be beneficial. For the field portion, intern should be able to hike up to 12 miles/day with a 20 pound pack under a variety of weather conditions.
Duties/Responsibilities:	The intern will spend time at the pulse of a USGS field station located on the doorstep of Glacier National Park. They will work with remote sensing and spatial ecologists to develop a full analysis plan, learn techniques to classify remote imagery, increase their spatial analysis skills (occupancy modeling, spatial autocorrelation), and learn to use/set up use of a high performance computer. After developing an initial model using R and potentially other software/code, they will conduct field testing in and near the park to validate their map. In stage 2 they may have the opportunity to assess various processes that influence the distribution of huckleberries, with a particular emphasis on contagious processes including dispersal and disturbance ecology.