

Warren J. Baker Endowment

for Excellence in Project-Based Learning

Robert D. Koob Endowment for Student Success

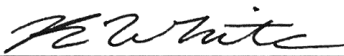
Proposal Cover Page

Title of Project:

Monitoring of rangeland plant compositions and soil surface
type on Cal Poly grazing pastures using assessment, Inventory, and Monitoring
(AIM) plots and the newly developed app, LandPKS.

Proposal Author: Katie White Cal Poly Email: kwhite32@calpoly.edu

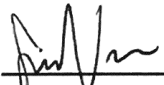
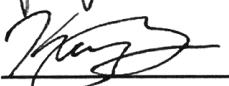
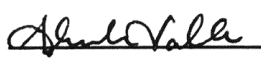

Student ID: 011390999 Dept.: Animal Science

Signature (Optional): 

Signature provides permission to check financial aid eligibility.

Previous Baker/Koob Endowment funding? (circle one): Yes ☐ No ☒

Is this request to support a Senior Project or thesis? (circle one): Yes ☐ No ☒

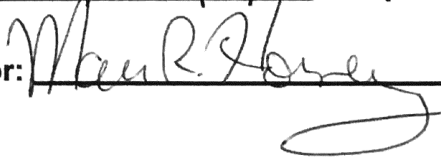
Team Member(s)	Signature	Cal Poly Email	Department
<u>Sarah James</u>	<u></u>	<u>snjames@calpoly.edu</u>	<u>ASCI</u>
<u>Kayla Bowerman</u>	<u></u>	<u>kkbowerm@calpoly.edu</u>	<u>ASCI</u>
<u>Alondra Valle</u>	<u></u>	<u>avalle01@calpoly.edu</u>	<u>ASCI</u>
<u>Andrea Brkic</u>	<u></u>	<u>anbrkic@calpoly.edu</u>	<u>ASCI</u>

Anticipated Start Date: 12-24-18

Total Funds Requested: \$ 2,170.53 Anticipated End Date: 6-15-18

Faculty Advisor: Dr. Marc Horney Department: Animal Science

Faculty Advisor email: mhorney@calpoly.edu Telephone: (805) 756-7543

Signature of Faculty Advisor:  Date: 11/5/18

Warren J. Baker Endowment

for Excellence in Project-Based Learning

Robert D. Koob Endowment for Student Success

CAL POLY

PROPOSAL NARRATIVE

(Max. of 3 pages including figures/tables but excluding budget page, 1" margins, 12-point font. See Sec. XII of RFP for more details.)

Proposals not complying with format guidelines will not be considered.

I. Project Title

Monitoring of rangeland plant compositions and soil surface type on Cal Poly grazing pastures using Assessment, Inventory, and Monitoring (AIM) plots and the newly developed app, LandPKS.

II. Abstract

The purpose of this project will be to conduct laboratory and field trials to determine the ease of use, efficiency, and information content of the LandPKS app, using complete AIM plots for comparison. The LandPKS app has the potential to be widely used by public, private, and non-governmental entities to monitor rangeland conditions. This includes places that have limited access to resources and trained staff for monitoring efforts including in countries like Kenya, Namibia and Mongolia. Results from this project will be provided to the USDA-Agricultural Research Service to inform continued development and refinement of the LandPKS app.

III. Objective(s)

Our primary objective is to provide the USDA-ARS staff with useful feedback on how well their app works, and what might be done to improve its usefulness to inexperienced and untrained users. The Assessment, Inventory, and Monitoring (AIM) program is a standardized process used by the US Department of the Interior's Bureau of Land Management (BLM) to collect quantitative information on the status, condition, trend, amount, location, and spatial pattern of resources on the nation's public lands. Dr. Jeff Herrick, the first author of the procedures manual for the AIM program, recently designed a cellphone app called the "Land-Potential Knowledge System" ("LandPKS") for world-wide distribution to land managers who have limited resources and training for purposes of enabling them to record conditions and document changes in grassland ecosystem conditions. This was conceived of as a very simplified corollary to the AIM protocol. This app is currently being distributed across the Western United States (national level) and is being tested in other countries, including Mexico, Costa Rica, China, Mongolia, Kenya, Namibia, and Australia (International level).

Our group will be working closely with Dr. Herrick and his staff to do lab and field trials with the app to determine if it is user friendly and accurate when compared to its AIM counterpart. The group will also have to establish AIM plots to use as a comparison between what is collected with the simplified app and what is used by rangeland managers today.

The project has three overarching related objectives. All are listed below:

1. Field test a new rangeland plant monitoring app, LandPKS, for Jeff Herrick (soil scientist for the Agricultural Research Service).

2. Establish Assessment, Inventory, and Monitoring (AIM) rangeland plots in Cal Poly animal pastures at different ranches with similar and varying environmental traits.

IV. Methodology

There are three main steps of this project: (1) In lab analysis of the LandPKS app to determine how user friendly the app is as well as determine accuracy (LandInfo section of LandPKS) (2) Field test the app's LandCover section by replicating its plot design and tutorial by conducting the experiment in field (3) at the same plot sight establish and collect data for a complete AIM plot to be compared to the app's collected data for accuracy. Objective one would be met by completing these three main steps. Step one would be done by determining if students with no natural resource experience can read directions and perform tasks with little to no further information (example: go through the steps to soil texturing with no prior experience and rate how well the student does by just using the app as a guide). Step two would be completed by the same students to determine if collected data is scientifically accurate while using the app when compared to data collected through AIM plots. Step three would be to propose additional improvement changes that we encounter when using the app (example: technological crashing, hard to understand sections or instructions, etc.). These findings will be released back to Herrick at the end of the academic year to be used to revise the current LandPKS app.

The AIM program uses a three line transect system, called spoke design, to allow variability within the ecological site. Methods collected in a complete AIM plot along each line includes: Photo Points (for visual record of data), Line Point Intercept (for plant cover and composition), Vegetation Height (for vertical structure), Gap Intercept (for size and distribution of exposed ground), Soil Stability test (for soil susceptibility to water erosion), and Species Inventory (for biodiversity). If established, these plots would allow all AIM data to be recorded for our Cal Poly pasturelands. This data collected on a complete AIM Plot would be used as a control comparison to the LandCover data collected using the app therefore the project depends on establishment of a few complete AIM plots.

V. Timeline

The work for the project will be divided between three periods: After-Funding (December- Early January), Winter 2019 (Late January through March) and Spring 2019 (April through June).

After-Funding phase:

All equipment will be ordered and delivered by the end of December. In this phase surveys for potential participants will occur. Surveys would be distributed through organizational email chains (examples: club, department emails, etc.) and through faculty through late December to early January. All participants will be placed into categories: no experience, moderate experience, and lots of experience. Categories will be gauged by 1) Number of soil science classes that they have been enrolled in. 2) How much field soil experience they have. 3) how much rangeland soil experience they have had. No Experience: No levels have been met. Moderate: has taken a soil science class with no field experience. Experienced: Has fulfilled two out of the three levels above. Note: Majority of Participants will be of the no experience category due to the goal of the app to be user friendly to individuals with no experience. Lastly, dates for laboratory testing will be decided depending on survey availability.

Winter 2019 phase:

Laboratory soil tests will be done with students to determine LandInfo Accuracy and Soil

Texturing Tutorial Accuracy. This will be done in Building 180 in one of the soil science lab rooms using already tested soil samples. After this is completed one representative from the group will attend the Society for Range Management conference to meet with Herrick to get feedback on currently completed results and determine future additions to the project. After this conference, official AIM plot survey sights will be determined in preparation for the next phase.

Spring 2019 phase:

This phase starts off with in-field tests when grass production is nearing its peak season. Students involved in the last phase of the project will be using the app to conduct the LandPKS “Stick method” rangeland monitoring method recorded in LandCover. This method is similar to Line Point Intercept data method mentioned before but is more simplified. Also, at the same location group members will be collecting AIM plot data to be used as the comparison between the data collection methods.

VI. Final Products and Dissemination

The final form of the project will be mainly be a written report for both the Baker and Koob Endowment fund and a final report written for USDA-Agricultural Research Service on the accuracy and social student reaction to using the app LandPKS. There is also potential of presenting our findings in the way of presentation at the following Society of Range Management Conference in Winter 2020 after the project has been completed.

VII. Budget Justification

Budget descriptions for each section is listed below:

Travel: In-state

AIM plots will be established at Swanton Pacific Ranch. Traveling to the ranch requires driving 177 miles from San Luis Obispo to Santa Cruz. The budgeted \$221.25 goes towards this long trip travel. The amount is calculated by refunding \$0.50 per mile for a complete round about trip and accounts for some driving time on the ranch.

Operation Expenses: Non-computer Supplies & Materials

Establishing AIM plots require a lot of basic supplies. The \$1,173.36 covers these material expenses. Some of these supplies include: rebar (establishing a permanent AIM Plot requires permanent markers), a Munsell Color Book (for both field use and laboratory use), transect tapes, a clinometer, basic office supplies, soil knife, Soil stability kits, etc.

Operation Expenses: Computer Supplies & Materials

This section is comprised of a few items needed for fast efficient data collection in the field. The \$762.92 goes to purchasing a field ready tablet that can use the official DIMA database software required to collect data for AIM plots. The cost of the tablet and all its accessories to make it field safe costs in itself the total budget because the DIMA software is free of charge. Another use for this tablet is that it will be used as a way to navigate to the selected plot using the app “Collector” create by ArcGIS. This is a moderately new mapping software that operates similarly to google maps but allows for navigation, photo storage, long term plot location storage and unknown plant sample locations for later reference. Cal Poly has an ArcGIS organizational account, so this service is available to the group without any added expense.

Warren J. Baker Endowment

for Excellence in Project-Based Learning

Robert D. Koob Endowment for Student Success

CAL POLY

PROPOSAL BUDGET

Student Applicant(s): Katie White, Sarah James, Kayla Bowerman, Andrea Brkic, and Alondra Valle	
Faculty Advisor: Dr. Marc Horney	
Project Title: Monitoring of rangeland plant compositions on Cal Poly grazing pastures using Assessment, Inventory, and Monitoring (AIM) plots and the newly developed app LandPKS.	Requested Endowment Funding
Travel <i>subtotal</i>	\$ 221.25
Travel: In-state	\$ 221.25
Travel: Out-of-state	\$ 0.00
Travel: International	\$ 0.00
Operating Expenses <i>subtotal</i>	\$ 1,949.28
Non-computer Supplies & Materials	\$ 1,173.36
Computer Supplies & Materials	\$ 762.92
Software/Software Licenses	\$ 0.00
Printing/Duplication	\$ 13.00
Postage/Shipping	\$ 0.00
Registration	\$ 0.00
Membership Dues & Subscriptions	\$ 0.00
Multimedia Services	\$ 0.00
Advertising	\$ 0.00
Journal Publication Costs	\$ 0.00
Contractual Services <i>subtotal</i>	\$ 0.00
Contracted Services	\$ 0.00
Equipment Rental/Lease Agreements	\$ 0.00
Service/Maintenance Agreements	\$ 0.00
TOTAL	\$ 2,170.53



California Polytechnic State University
San Luis Obispo, CA 93407-0255
Animal Science Department
(805) 756-2419

Nov 5, 2018

Baker-Koob Endowment Student Project Proposal Letter of Recommendation: Katie White

Katie and her project team are a collection of the most proactive and productive students I currently have in the growing rangeland resources program in the College of Agriculture. They have been assisting me with projects for several years, and several of them have spent at least one summer working for professional organizations (US Forest Service, USDA Natural Resources Conservation Service, environmental consulting organizations). I have been encouraging them to take on research topics that I could support them with, and this is the first of what I hope will be many more.

This project comes from one of the professional relationships I established with the USDA Agricultural Research Service (ARS) before I came to Cal Poly. Earlier this year they approached Katie and I, who were presenting a poster together at a national conference, and asked if we would be interested in field-testing and evaluating a new product they were in the process of releasing.

The students and the staff have been working out details through teleconferences, and I do believe the timeline for the first phase (soil condition system evaluation) is reasonable. The interdisciplinary focus is there – chiefly between animal science and environmental management students. If they can get this first phase completed, they are already developing connections with other colleges and departments (COSAM/BIO and Engineering) that are likely to expand that dimension. The potential scale of impact of this project could be large, since the app is already being field tested on several other continents. At least, these students should be able to help make it more effective in California and the US.

I have a high confidence in the ability of this team to produce an effective result from this project.

Sincerely,

Marc R. Horney, Ph.D., CRM
Associate Professor, Rangeland Resource Management
California Polytechnic State University, San Luis Obispo
Animal Science Department
California Polytechnic State University
San Luis Obispo, CA 93407-0255
(805) 756-7543
805-756-5069 (fax)
mhorney@calpoly.edu