Project Topics for the MS in Environmental Sciences and Management for 2021-2022 cohort

Title	Group or Individual Project (proposed number)	Description	Funding	Point of Contact
Spatial and Depth Distribution and Immobilization and Speciation of Soil Lead at a Contaminated Site on a California University Campus	Individual (1)	The objectives of this study were to 1) assess the spatial and depth distribution of total and bioaccessible soil lead (Pb) across the Cal Poly campus, 2) evaluate the efficacy of inorganic (triple superphosphate and potassium phosphate dibasic) and organic (bonemeal) phosphorus (P) amendments on the immobilization of soil lead at several P:Pb molar ratios over a nine month incubation period, 3) determine lead speciation post incubation via x-ray absorption fine structure spectroscopy, and 4) correlate various measures of soil lead (total via pXRF, total via USEPA 3050B, bioaccessible via Mehlich 3 extraction).	N/a	Dr. Chip Appel ; cappel@calpoly.edu
Sustainable Agriculture Research and Education at the Cal Poly Student Experimental Farm (SEF)	Group (3)	The project goal is to develop research and education programs at the SEF. This is a group project for three students. One student will focus on the design and installation of an agroforestry demonstration garden at the SEF. Another student will be responsible for managing ongoing vegetable intercropping research at the SEF. Another student will be responsible for design and installation of a common garden experiment at the SEF, in collaboration with the Land Institute (TLI), evaluating the performance of different ecotypes of Silphium integrifolium, a perennial sunflower undergoing domestication by TLI. One student will focus on the design and installation of an agroforestry demonstration garden at the SEF. Another student will be responsible for managing ongoing vegetable intercropping research at the SEF. Another student will be responsible for design and installation of a common garden experiment at the SEF, in collaboration with the Land Institute (TLI), evaluating the performance of different ecotypes of Silphium integrifolium, a perennial sunflower undergoing domestication by TLI.	Funding for appropriate project materials will be provided. Limited funding is available for a stipend of $17/ hour for use in tasks associated with these and other related projects.	Dr. Nick Babin (nbabin@calpoly.edu)
Documenting the impacts of solar array development on rangeland	Group (2)	How do USSE arrays impact microclimatic conditions, and how do these effects vary seasonally? ii) Do altered abiotic conditions affect plant and soil decomposer community structures and functions? How might these changes affect forage quality and quantity for sheep grazers? iii) How are soil carbon and nutrient pools under USSE arrays impacted by array placement?	Funding for travel, research supplies, and a modest quarterly stipend are available.	Dr. Seeta Sistla (ssistla@calpoly.edu)
Assessing stakeholder concerns and externalities of remanent plastics in CA agricultural systems	Group (2)	1.Identify farmer concerns regarding plastic pollution in soils through a stakeholder survey approach. 2.Document existing plastic pollution levels in agricultural soils. 3.Characterize the consequences of plastic pollution on soil abiotic and biotic properties	Funding for travel, research supplies, and a modest quarterly stipend are available.	Dr. Seeta Sistla (ssistla@calpoly.edu)
Conduct a comprehensive study to assess the underserved city residents most vulnerable to the physical, social, and economic impacts of climate change, as well as the root causes for these members being underserved.	Group (3)	Outcomes of this project are intended to inform the City of SLO Climate Action Plan, in particular, with regard to policies on residential building retrofits for the residents who make up the underserved segments of the target population, including equity considerations and corresponding development of potential implementation programs that drive benefit and target identified root causes. The assessment shall also support MCC's objective to formulate relevant curriculum to increase literacy and action around environmental justice and climate change adaptation and resilience.	The City of SLO has granted MCC funding that can be provided toward achieving the project objectives. While the majority of funds are programmed for project oversight and management, limited funding is available for student stipends, materials and supplies, or transportation.	Luaren Bell, Micro Community Collaborative (lauren@sloclimatecoalition.org)
Support for carbon farm-planning program	Individual or Group (2)	oFramework for connecting conservation practices to larger efforts at regional and state scale. oAssess the drivers for carbon farm planning and benefits to landowners developing and implementing carbon farm plan practices	Likelihood of funding for wages and travel. Potential summer internship in 2022	Las Tablas RCD; Devin Best (devin.usltrcd@gmail.com)
Greenhouse gas monitoring of area farms	Group (2-3)	oWhat are the greenhouse gas rates and/or ratios from conventional vs. organic vs. regenerative ag? oAre there on-site offsets that mitigate for greenhouse gas emissions? oTotal volume of carbon that can be sequestered on ag land? Does the Central Coast have the potential to act as a carbon sink through implementation of carbon sequestration practices? If so, what practices are highest priority for developing and implementing?	Likelihood of funding for wages and travel. Potential summer internship in 2023	Las Tablas RCD; Devin Best (devin.usltrcd@gmail.com)

Support for healthy soils program	Individual	oAssess and evaluate the various healthy soils program conservation practices. What is working and working well? Why? Economics? Supply chains? Application? oWhat ag use (orchard, vineyard, row crops, range) has benefited significantly? Which sector has gone underserved? oWhat are the long-term benefits of a single healthy soil conservation practice? oWhat soil conservation practices that have not been incorporated into state-wide initiatives would be beneficial for local growers? oComparative study of soil conservation practices for hydrogeology? Are some practices better are groundwater infiltration and soil moisture retention than others? If so, why?	Likelihood of funding for wages and travel. Potential summer internship in 2024	Las Tablas RCD; Devin Best (devin.usltrcd@gmail.com)
Evaluate post fire soil erosion and influence in policy for post-fire rehabilitations	Individual	The goal is to study the effects of wildfire severity on soil surface erosion and stream sedimentation and determine which agencies, land managers, or organizations will benefit from this information as well as data gaps that exist to inform policies toward post-fire recovery. Objective 1: Quantify surface soil erosion for moderate and high burn severity hillslopes and subsequent downstream sediment response for one winter post-fire. Objective 2: Examine existing policies and stakeholders for the control of post fire soil erosion to give guidance on producing more effective policies for post-fire response.	Student wages, travel costs, and professional conference fee covered.	Dr. Chris Surfleet (csurflee@calpoly.edu)
Develop long term water quality assessment for SLO and Stenner Creeks	Individual	Develop plan for long term monitoring of macroinvertebrates communities, stream and riparian habitat, and chemical water quality for San Luis Obispo and Stenner Creeks	Funding for lab costs. Potential TA position.	Dr. Chris Surfleet (csurflee@calpoly.edu)
Water Quality Conditions in Central California Bar Built Estuaries	Individual	1)Do water quality parameters in Central Coast estuaries exceed critical thresholds known to impair critical native species such as steelhead trout or tidewater goby? 2)How does the frequency or duration of bar-breaching affect water quality parameters that are known to impair critical native species?	At a minimum, the student and data collection costs will be covered; $250 Stipend; Depending on available grant funding, CLC may hire the student on an hourly basis for some portion of the work.	Aleksandra Wydzga, Creeks Land Conservation (aleks@creeklands.org)