Ecology Research Project

This project is designed to give you some hands-on experience in ecological or ethological fieldwork and applications of the scientific method to your original ideas. Working in a small group, you will design, conduct, and report on a project. As a *field* project, it must primarily be conducted at a field site, although a lab component may be included if performed during scheduled open lab times. The project must be designed to test a reasonable hypothesis with scientific rigor.

Research groups shall consist of three or four students. ***Everyone* in the group must participate in *all* aspects of the project!** These aspects include: initial planning and experimental design; literature review; obtaining access permission and needed permits; gathering or constructing equipment, conducting the actual experiment; writing the proposal and abstract; and presenting the oral report. If you are the loner type that prefers to work alone — get over it! Teamwork and collaboration is mostly how research is done nowadays.

You may use any of the techniques we have been practicing in the class exercises. Or you may use some new methods that you have discovered in the literature or developed on your own if we can get the necessary equipment and supplies. Keep in mind that you only have a very limited amount of time, probably not that much field experience, and very limited equipment. Restrict your project to a do-able study within these constraints.

Themes

Try to create a plan of action that will allow you to experience a variety of techniques. For example, if you decide to survey aquatic invertebrates in Stevens Creek, add a component assessing the water quality or adjacent riparian plant community too. Or compare sites such as a pristine location with one more urbanized or invaded by exotic species.

Our goal is to familiarize you with several basic protocols, with the necessary practical limitations imposed, and with the joys and challenges of fieldwork. I will try to accompany you at least once on your fieldwork to share in the good times.

Guidelines

- **Be specific** with your objectives. Stay focused on what you need to do, when you need to do it.
- Select a **local study site**. Don't spend unnecessary time and gas driving repeatedly to a distant site.
- Don't select a project that takes longer than you have!
- Do a thorough **literature search** on the organisms, community, and sampling methods you wish to study. If a similar experiment has already been done, there's no need to reinvent the wheel.
- Plan your study **logistics** well ahead of time. Be sure that the necessary equipment is available or can be constructed when you need it. Reserve gear in advance. Don't assume that something will be there only to find out it's been checked out by another group.
- If you are hoping to work in a park or open space preserve, you should **contact the agency** responsible for managing that site to **request permission** to conduct the specific procedures desired. They may require a written proposal from you specifying your methods, dates, and objectives. It's best if in return you get the permission approved in writing also and keep a copy with you in the field in case you are questioned. Typically, most local agencies are happy to encourage research as long as it does not damage or interfere with their mission. Some sites have restricted access. And some organisms or habitats have special designation requiring state or federal permits for any manipulations — it is unlikely you have time to process such paperwork within this academic session.
- Be minimally invasive with your procedures and **limit your impact** on the organisms and communities you are trying to study. Be especially aware of sensitive habitats and rare species.
- Be prepared to **invest a lot of time** in your project. Even though some release time from class labs is provided, do not plan on getting it all done at those times. Remember that most animal activity occurs early in the morning or just before dark.
- **Do not procrastinate!** Time is precious. Get started on defining your objectives, doing literature reviews, scoping out possible study sites, and obtaining needed permissions and equipment as soon as possible. (I.e., **NOW!**) Remember, you need to have your rough draft of a proposal by Monday of the third week of class, and a complete plan and proposal to present to the class on that Tuesday!
- Be sure that **everyone gets to try all the components** of the project! Rotate jobs so that each member of your team gets a chance to try each activity and technique.

Examples of Past Student Projects

- Aquatic arthropod survey of Guadalupe River below Almaden/Quicksilver Park.
- Territorial and nesting behavior of western bluebirds in JD Grant County Park.
- Microfauna diversity on lichens in different habitats
- The display of floral nyctinasty in the plant *Eschscholzia californica*
- *In situ* food preference of different ant species
- Plant diversity related to slope and sun exposure at Villa Monatlvo
- Nutrient limitation on duckweed growth
- Effect of the presence of soil endomycorrhizal fungi on the growth of green onion
- Relation of water availability and sun exposure on leaf size and stomatal density in coast live oak
- Effects of wild pig rooting on vegetation in JD Grant County Park.
- Small mammal live trapping on a private cattle & horse ranch in Morgan Hill.
- Vegetation survey of coast redwood forest understory in Sanborn Park.
- Soil arthropod comparison (coast redwood vs. oak woodland) in Sanborn County park.
- Progress of restoration efforts along Almaden Creek, southwest San Jose.
- Resource partitioning by shorebirds at Palo Alto Baylands.
- Tree size and diversity versus distance from creek banks at sites along Stevens Creek.
- Incidence of and species killed by sudden-oak-death along Skyline Blvd.
- Behavior patterns/habitat utilization of black-tail deer at Rancho San Antonio.
- Nesting behavior of Coopers hawks at Rancho San Antonio.
- Behavior of western fence lizards in fallen trees at Rancho San Antonio County Park.
- Insect & bird pollinators of native plants in Fremont-Older Open Space Preserve.
- Night-lighting survey of insects in Los Trancos open Space Preserve.
- Behavior of great blue herons in the nesting colony along Los Gatos Creek.
- Survey of and habitat utilization by birds on the De Anza campus.

Possible Nearby Study Sites

- De Anza College campus (Cupertino)
- Stevens Creek County Park (Cupertino)
- Rancho San Antonio County Park & Open Space Preserve (Cupertino)
- McClellen Ranch Preserve (Cupertino)
- Fremont-Older Open Space Preserve (Cupertino)
- Palo Alto Baylands (Palo Alto)
- Los Trancos Open Space Reserve (Palo Alto/Los Altos)
- JD Grant County Park (Mt. Hamilton)
- Alum Rock Park (e. San Jose)
- Guadalupe Oak Grove Park (sw. San Jose)
- Los Alamitos Creek Park (sw. San Jose)
- Sanborn County Park (Saratoga)
- Montalvo County Park (Saratoga)
- Lexington Reservoir County Park (Los Gatos)
- Los Gatos Creek Trail & Percolation Ponds

Relevant Agencies & Organizations

- MPROSD (Midpeninsula Regional Open Space District)
- POST (Peninsula Open Space Trust)
- CNPS (California Native Plant Society)
- SCVWD (Santa Clara Valley Water District)
- USFWS (United States Fish & Wildlife Service)
- SFBNWR – ([Don Edwards] San Francisco Bay National Wildlife Refuge)
- CDFG (California Department of Fish & Game)
- CDF (California Department of Forestry)
- USGS (United States Geological Survey)
- CAS (California Academy of Sciences)
- SCVAS (Santa Clara Valley Audubon Society)
- Grassroots Ecology
- Nature Conservancy
- Yerba Buena Nursery [specializing in native plants]