



UCLA Sustainability Action Research

Biodiversity Team

2017 Midterm Report

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ABSTRACT

We coordinated ideas with Professors Thomas Gillespie, Dr. Carl Maida, and Dr. J Cully Nordby. Last year's Biodiversity team concluded that weeding was the best method to promote native plant growth. We continued performing research at Sage Hill, ousting invasive species and repopulating the site with native species. We will catalog the species and mark their locations with iNaturalist. It is our goal to use Sage Hill as an educational facility. We will use the TGIF grant we secured to fund signage for Sage Hill and this will help with our educational focus. Lastly, we will implement suggestions from TreePeople Wildlife Restoration manager Cody Chappel.

INTRODUCTION

Last year's SAR biodiversity team studied biodiversity at Sage Hill, a 4-acre plot of undeveloped, naturally thriving land on the UCLA campus. The team created an experiment to test the effects of weeding and watering on biodiversity. They created experimental plots, crossed the two variables (weeding and watering) and measured factors such as soil moisture, invertebrate diversity, and plant growth. Their study revealed that weeding significantly improved the survival of native plants. They also reached out to students and faculty across campus, informing them of the importance of conserving this natural space. They conducted a campus survey and developed a lesson plan for the UCLA Krieger Day Care Facility. This year, our team decided to continue researching biodiversity at Sage Hill, specifically through the development and implementation of a restoration plan involving weeding invasive species and transplanting native ones. Similar to last year's team, we also want to emphasize community outreach and education, as awareness is one of the most effective aspects of conservation. We plan to do this by implementing permanent signage at Sage Hill and conducting a survey based on the educational benefits of the sign's contents once it is constructed.

Habitat destruction and degradation are among the most threatening of environmental issues, causing decreased and even critically endangered wildlife populations. Restoration plans are the primary solution to these issues. They often involve the documentation of land ownership, soil richness, flora and fauna, and finally suitability of the area for volunteer work (Finstad, Parry, Schwartz). One example of a successful habitat restoration plan that resulted in increased biodiversity can be

witnessed through efforts to restore the endangered El Segundo Blue Butterfly. The species became endangered after losing ninety percent of its coastal habitat to the construction of the Los Angeles International Airport and other housing developments. Furthermore, on the small portion of land that remained undeveloped, the butterfly's host plant was overcrowded and outcompeted by foreign plants. On June 1st, 1976, the El Segundo Blue Butterfly was placed on the U.S. Fish and Wildlife Service's endangered species list, thus commencing the LAX Dunes Restoration project 10 years later ("State & Federally Listed"). To increase the dwindling population, the project focused on reintroducing and protecting the butterfly's primary source of food, the coastal buckwheat plant. Additionally, the restoration project expanded the habitat area from 20 acres to 200 acres, further allowing the population to flourish from just 500 individuals to over 123,000 ("El Segundo Blue"). The combined efforts of reintroducing native flora and expanding the butterfly's habitat made a tremendous impact on the species.

Based on the previous research and information in the scientific community as well as the efforts of last year's biodiversity team, we can see the evident need for projects that protect biodiversity, especially from urban development. As suitable habitats continue to diminish and the number of endangered species climbs, understanding species distributions and populations becomes increasingly more important. Los Angeles in particular is under constant development, and identifying the right habitats for these endangered species is critical. Our project aims to address these issues by cataloging the native species of Sage Hill onto the iNaturalist mobile

application, creating informative signage for the public, and finally implementing a restoration plan to increase biodiversity at Sage Hill. We hope that through these efforts we can provide a multi-pronged solution to biodiversity loss in Southern California.

METHODS

We had trouble initially deciding what our project should be, but once we decided on our project topic our goals and objectives came easily. From last year's SAR Biodiversity team, we know a lot about the best way to maintain native species at Sage Hill since they found that consistent weeding was highly effective. Our ultimate goal is to create a comprehensive restoration plan for Sage Hill that increases the native plant populations, decreases the invasive plant populations, spreads awareness about biodiversity conservation, and lays the foundation for more restoration efforts in the future. Additionally, we would like to actually start implementing the plan and improve Sage Hill as much as possible during this year.

One of our first tasks was to apply for The Green Initiative Fund (TGIF) to get a permanent sign made for Sage Hill since there is currently nothing there demarking the area. Surveys from the previous SAR biodiversity team revealed that a large portion of UCLA students and faculty were unaware that Sage Hill existed or did not know where it is or what it is. We hope that a permanent sign explaining the site will be the first step in raising awareness about Sage Hill and informing the UCLA community about all it has to offer. We will be creating the sign's content information that will go on the sign next quarter. Similar to the interpretive signs found at National Parks and Monuments, we hope to include information and facts about native species, biodiversity, restoration, and local Native American tribes that used to

live in the region. Since the sign will be a glass-front, hinged case, the content will be replaceable so that information can be updated easily.

While we waited to hear back from TGIF about the sign funding, we regularly went out to Sage Hill with our stakeholder, Dr. Thomas Gillespie. Gillespie showed us around the site, taught us to identify a multitude of native and invasive plant species, demonstrated how to catalog species in iNaturalist, and showed us the most effective weeding techniques. To facilitate the long-term survival of newly sprouted native plants (mainly California Sagebrush, *Artemisia californica*), we spent a few afternoons weeding around the natives to ensure that they could receive ample sunlight and water and not be outcompeted by the invasive grasses. We also tagged existing native species with blue flagging tape to make sure that UCLA facilities workers are aware of which individuals to avoid cutting.

Our next major task was to begin restoring Sage Hill with transplanted California native plants. The small nursery at Sage Hill has a number of native plants, grown in pots from seed. Our goal for this segment of our project is to get as many of the seedlings planted in the ground, with the highest survival rate possible. We chose locations for seven plots around the site and weeded two by two meter areas for each plot. We tried to pick plot locations that would provide the transplants with enough sunlight. The plots differ in many aspects including slope, aspect, soil texture, sun exposure, and proximity to other species. At each plot we planted ten *Encelia californica* plants (common name: California bush sunflower), so we have 70 total individuals transplanted. For each plant, we dug a shallow hole, inserted the seedling so the roots were below groundlevel, replaced the soil, and watered the transplant. The plants varied in size so we measured both the initial height of each plant and the amount of water we give it. We plan to

continue these measurements into next quarter to assess the progress of our plants and their survivorship, and to ensure that this is an effective restoration method.

CHALLENGES AND DIFFICULTIES

One of the largest challenges we faced was figuring out what to do for our project. We wanted to solidify an idea of our own, and avoid just continuing off of last year's project or integrating ourselves too much with Sage Hill's task force. During our initial meeting with Dr. Gillespie, he floated a few ideas, such as expanding the Biodiversity Atlas, planting native species around campus, and collecting endangered plants for Sage Hill's nursery. To solve this dilemma, we had many discussions within our group, and also paid several visits to Sage Hill to tour the area, see what could be improved, and have a test run at fieldwork. All the member of our group were in agreement that we wanted to work on a project that involved fieldwork, made a difference on the UCLA campus, and that would have a tangible final result. We eventually narrowed our options down to our current project idea, which is to create and implement a restoration plan on Sage Hill. Further visits to Sage Hill and communication with Dr. Gillespie also helped us chisel out the details, and by the end of winter quarter we had weeded out seven plots and planted ten *Encelia californica* individuals in each one.

We also faced more technical challenges along the way once we started our project. For example, we had trouble getting the hose on Sage Hill to work, so we had to be creative when figuring out how to get water in our watering cans. Our most effective current technique involves using an abandoned plastic water bottle to capture the spraying water and fill our watering cans,

leaving the person filling the watering can soaking wet. Furthermore, although we enjoyed plenty of rain early on in the quarter, it made conducting fieldwork slightly more difficult because of the mud and slippery grass. However, the later weeks gave us drier weather, which meant we had to monitor the plants more intensely and water them more to help them back on their feet after transplanting. Also, poor soil conditions in some of the plots also gave us some trouble. One of the plots we had weeded initially had rocky and incredibly dry soil that prevented us from being able to dig holes. Since we could not plant at that site we had to abandon the initial plot and re-weed and dig elsewhere. Finally, we have already lost one plant out of seventy. However, this individual was quite small, and was also in the plot with the worst soil conditions, so we expect the other *Encelia californica* to perform better.

FUTURE PLANS

We have a big workload ahead of us as we proceed to Spring Quarter. Our most urgent task is to finalize and implement the Sage Hill sign. The content for the sign will need to be created under the guidance of Dr. Gillespie and the Sage Hill Task Force. We would like to have the sign completed before Earth Day so that we can showcase the preserve.

Another item on our agenda is to continue monitoring the 70 plants that were planted at the end of this quarter. Every week, we will take measurements of the plants and make sure they are watered and growing. We will also be working on inputting data about our native plants on Sage Hill in iNaturalist. iNaturalist is an application that allows anyone to input scientific observations of flora and fauna. By documenting the native vegetation found on Sage Hill, we can help expand knowledge on the amount of wildlife in this area.

Lastly, we will continue implementing our restoration plan. As we continue to weed and monitor our plants, we will be able to observe and document what restoration ideas work and which ones don't. In addition, we will carry through some of the suggestions that Cody Chappel gave to our team.

CONCLUSION

We believe that Sage Hill is an important biodiversity hotspot that needs to be preserved at UCLA. In order to do this, we have decided to draw up a plan that focuses on not only education and awareness, but also restoring the area in the most effective way possible. At the end of this year, we hope to have helped Sage Hill grow as a defined and important area on campus.

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