



Integrated Pest Management 2017 Midterm Report

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Abstract

Our goal is to reduce the usage of rodenticide on campus which can have deleterious effects upon the local ecosystems. To do this we are piloting a pest-proof trash collector called Bigbelly Solar, spatially identifying risk areas and factors on campus, and documenting rodent incidents. We have received funding for the Bigbelly Solar pilot unit and are currently working on finalizing designs and the location to place it. Our GIS team is utilizing work orders from EH&S to display hot spots of rodent activity on a campus map. We have received funding for some motion cameras that we plan to use to document rodent activity near trash cans.

Introduction

This is the inaugural year of the Integrated Pest Management Team. We are dedicated to creating an environment at UCLA that sufficiently deters pests without resorting to using harsh pesticides and poisons. Our team was formed due to the current pest management strategy, which employs many bait stations containing pesticides, not being suitable for the campus goal of sustainability. It also hinders our ability to grow fruits and vegetables on campus, a goal of some members of the sustainability department of UCLA Facilities Management. Our team's goal is specifically to reduce our dependence on rodenticides as a pest management strategy by preventing conditions that are conducive to rodent habitation. To achieve this we are focused upon three main projects that will alleviate some of the conditions that invite rodents and pinpoint areas on campus where UCLA can improve. The projects include creating a map using Geographic Information Systems (GIS) that locates areas high of rodent activity on campus and their related conditions, piloting a new design of a rodent-proof trash can, and documenting the

shortcomings of current waste disposal behaviors using photographic evidence of rodents.

In order to achieve the best results, our team researched best practices for pest prevention using a variety of sources. We looked at previous efforts at Integrated Pest Management including the UC Davis Pest Management plan and the city of San Francisco. In these reports, the best success was found from a combination of designs that prevent pest conditions and keeping detailed records on the prevalence of pest incidents so as to identify and alleviate risk areas. In addition, we spoke to several members of UCLA staff including the pest management contractor, Environmental Health and Safety staff, and Housing staff in order to get a better grasp on the issue here on campus.

GIS Study

Introduction

The Geographic Information System (GIS) portion of our project is focusing on creating a visual representation of rodent-related data. Our GIS team used existing rodent-related work order reports from previous years to determine areas on the UCLA campus with the highest rate of rodent-related incidents, and we plan on employing spatial analysis to explore possible contributing factors, as well as develop a set of recommendations that would help mitigate rodent issues on campus and thereby reduce the need for harmful rodenticides.

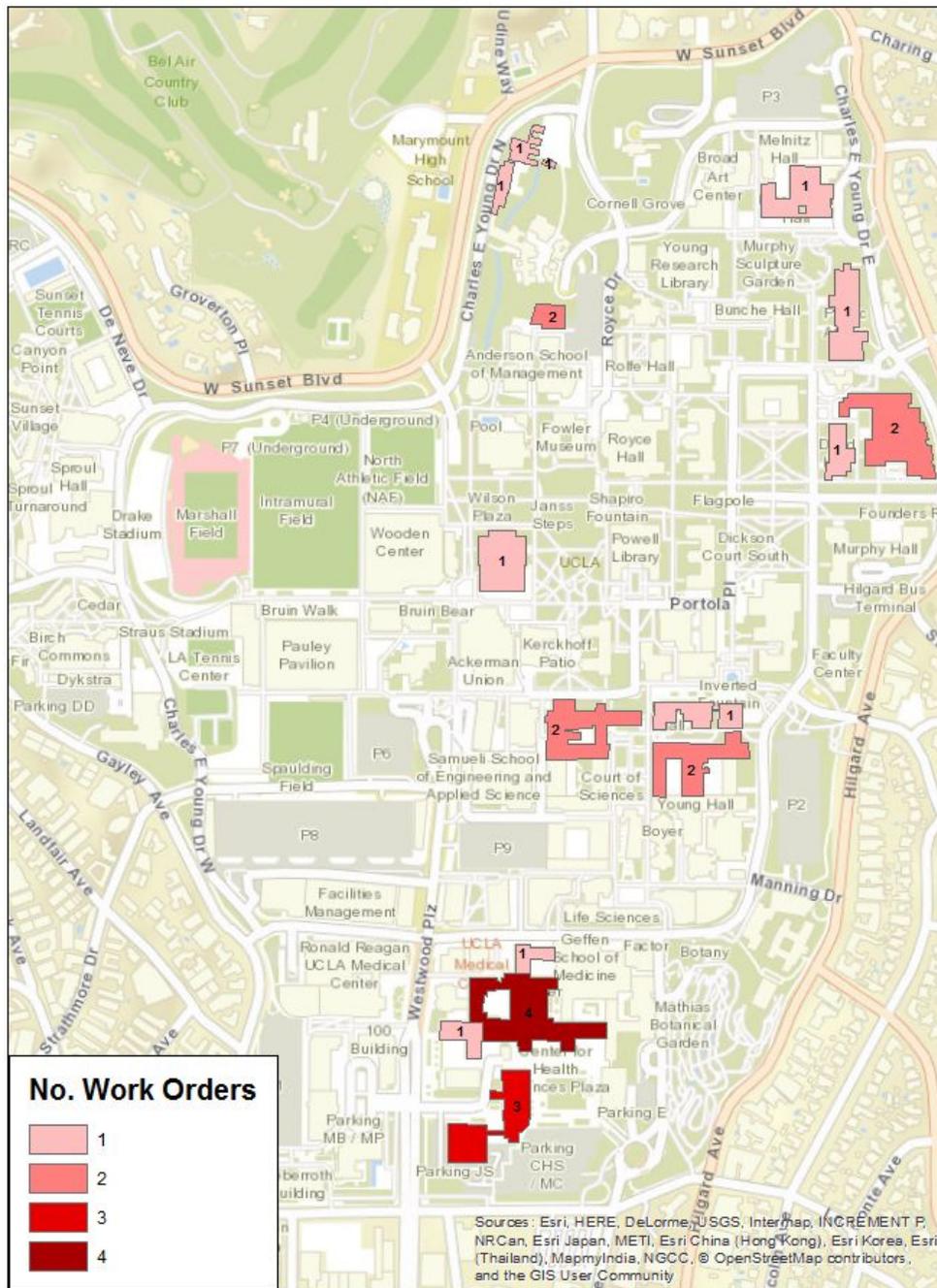
Methodology

Rodent-related work orders, ranging from 2008-17, were obtained from the UCLA Office of Environment, Health & Safety. Each work order had a building location attached to it, thereby allowing us to engage in spatial visualization and analysis. A significant portion of the

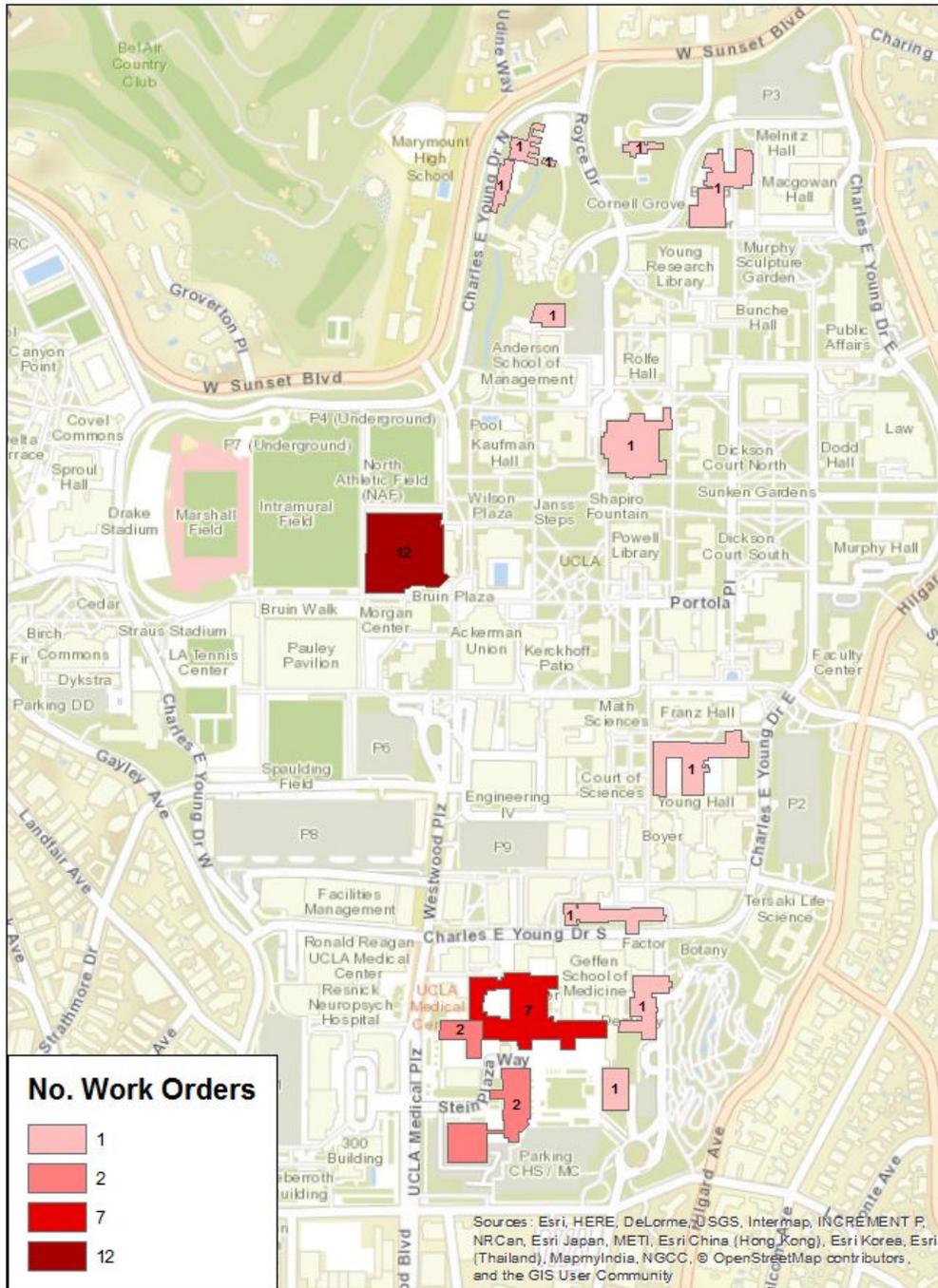
mapping process was manually digitizing each building on the UCLA campus. Following that, we tabulated the total number of work orders that were reported at each building and joined these attributes to the shapefile of digitized buildings. The buildings were then shaded based on the number of rodent work orders that happened there. At this point of the project, we have been able to map work orders from the years of 2015-2017.

A quick visual comparison between the two maps shows three significant rodent hotspot trends. Firstly, the region around Center for Health Sciences continues to be plagued by rodent incidents. Secondly, John Wooden Center experienced a spurt of rodent reports (12) in 2016-17. Lastly, rodent hotspots that were previously in the North-east region of the campus seem to have shifted slightly westward.

Rodent-Related Work Orders 2015-16



Rodent-Related Work Orders 2016-17



Challenges and Difficulties

This quarter had several difficulties for the GIS portion of the project. First and foremost, our team was not able to begin working on GIS mapping until much later into the quarter than anticipated due to lack of direction and data. We knew from the start that we wanted to map the regions where rodents were the most prominent, but were not sure how to find the data or what we could use as an indicator of their presence. After several weeks of being in contact with UCLA EH&S we received the incident rodent reports for the past few years, which detailed the exact nature of the incident (droppings, rat sighting, evidence of rodents) as well as in what building the incident occurred. This solved our lack of rodent data problem, but we were now faced with two new ones: digitizing the UCLA campus and converting the reports into GIS compatible files. By splitting the work, we were able to efficiently convert the data and create a map showing the sites of incidents. Our next and current issue is the lack of further data, which we are trying to solve by contacting other departments for comprehensive data on the locations of trash cans around campus, bait stations, vending machines and other known food sources or shelters for rodents. Our team does have room for improvement, however. Next quarter we aim to be more diligent with the GIS portion of the project. We also have renewed our efforts in gathering the data we need in order to expand upon our project. We have specific goals in place that we strive to accomplish which will help streamline our work.

Future Plans

Although the GIS goals of the project have not changed much over the course of the quarter, they have expanded to include the Big Belly trash portion of our project. We have turned our attention to waste management as a way of managing pests on campus and in order to tailor

the GIS side of the project to complement our waste management goals. In order to do this, our plan is to use a pre-existing map of the trashcan sites around campus and compare them to the gathered rodent data we received from EH&S. Ultimately we would like to see if there is any correlation between rodent activity and trashcan location. By the end of next quarter, we would like to see maps that distinguish between number of incidents reported, the exact nature of the report, and the building the report was filed under. This would allow for a more accurate portrayal of the estimated rodent activity in an area. Other portions of the project also aim to visually document rodents around campus in order to have irrefutable evidence of rodent populations in an area. Furthermore, our GIS section of the project aims to encompass not only the rodent hot spots, but also help target areas of vulnerability for rodent infestation. The GIS section also hopes to compliment the other portions of our project by providing any visualizations to the data gathered. At the end of spring quarter our GIS team aims to have a few specific deliverables; namely, we want to create maps that plot and measure rodent incidents and density while comparing it to factors such as trash placement, ivy prevalence and food/dining stations. We plan on doing this by taking advantage of our contacts within UCLA and utilizing the information already acquired by the university. Because so much of the information we are searching for has already been collected by various divisions within UCLA, it is one of our objectives to combine the intra-departmental data into one cohesive database.

Bigbelly Project

A major component of our work is our project to install Bigbelly Waste and Recycling Stations on the UCLA campus. The idea for our Bigbelly project stemmed from meetings we had

with different people involved with pest management on campus, including people from EH&S, Dining Services, and our current pest management contractor. Throughout our discussions, a recurring theme was that a major contributing factor to rodent issues on campus is the improper storage of food waste. The staff we talked to mentioned Bigbelly Waste and Recycling Stations as a possible solution, as they have been proven to reduce pest problems on the campuses and in the cities where they have been implemented at locations such as UCSD and UCSB. After researching Bigbelly, we decided to apply for a grant from The Green Initiative Fund (TGIF) at UCLA for a pilot program of Bigbelly units. For our TGIF hearing, we provided the committee with a handout explaining the benefits of our project, as seen on the following page.

Our grant proposal was ultimately approved and we were given \$13,710 for a pilot unit with three separate streams for landfill, recycling, and compost. Although we recognize that on its own, our one Bigbelly unit will not make a big impact, our hope is that by getting the first Bigbelly unit installed on campus we can move UCLA to adopt these more sustainable and efficient waste collection systems on a greater part of campus. In the weeks since our grant was approved, we have moved forward with our project and have been coordinating with our stakeholder, Bonny Bentzin, as well as representatives from Bigbelly and Waxie Sanitary Supply, the distributors for the Bigbelly units, to determine the specifications that would be right for our campus. We had originally planned on placing our pilot unit at Sunset Village on the Hill or at Ackerman Union, but unfortunately both options fell through. However, we are now working with Katie Zeller from UCLA Recreation to install our pilot unit at Sunset Canyon Recreation Center.

Reducing harmful rodenticide use through the implementation of a multi-benefit waste collection system

2017 Sustainability Action Research Integrated Pest Management Team

Project Goal: Our team is committed to finding green solutions to UCLA's pest problem. Highly recommended as one of the most significant steps UCLA can take to reducing pesticides on campus by pest management officers, the Bigbelly Solar trash compactors offer varied benefits that go beyond pest prevention.

Current UCLA Trash Collection System



Bigbelly Waste and Recycling Stations



Drawbacks:

- Unsightly waste overflow
- Attracts rodents and other pests to UCLA campus, increasing the need for pesticides.
- Low capacity and requires frequent collection trips

Possible Locations for Bigbelly Units

Two options:

- 1) On campus – Ackerman Union
 - High traffic
 - Student groups (USAC and ASUCLA) have more sway here, and have expressed interest in getting Bigbelly waste collection units
 - Clearer path to full campus adoption
- 2) On The Hill
 - Fairly easy approval process
 - High traffic

Cost for Compost, Landfill, and Recycling Stations (Pictured above right)

\$13,110 - \$14,310

Exact cost will depend on customization options

Benefits:

- Eliminates waste overflow and unsanitary conditions
- Rodent-proof design can help reduce the needs for bioaccumulating pesticides
- High capacity from on-site compaction
- Streamlined collection process lowers number of trips and costs, reducing emissions and saving time.

Case Studies

- Raleigh, NC - 32 open-top trash cans replaced by 10 BigBelly stations with costs reduced from \$40,903 to \$1,607
- Philadelphia, PA - 900 BigBelly stations replaced wire cans with 17 trash collections a week and 3 crew shifts reduced to 3 collections a week and 1 crew shift. Over \$800,000 per year in savings.
- UCSD, UCSB, and many other universities have implemented the Bigbelly trash compactors on their campuses with great results.

Throughout the process, we encountered difficulties with communicating with people from EH&S, Housing, ASUCLA, and other staff involved in pest management. While the people we met with offered valuable perspectives and resources, some were less responsive than others. When reaching out to ASUCLA, the administrator we contacted failed to respond, so we had to look elsewhere to get our Bigbelly unit approved. Similarly, despite receiving preliminary approval to place the Bigbelly pilot station on the Hill from one member of UCLA Dining Services, our plans to place them on the Hill fell through because we were later informed by a member of UCLA Housing that they were not in a place to pilot a new waste collection system at the time. Nonetheless, we kept the momentum alive by being persistent and contacting other departments that were more open to Bigbelly, like UCLA Recreation. Next quarter, we hope to continue fine-tuning our communication skills and coordinate between different parties to have the Bigbelly pilot station installed at Sunset Recreation as soon as possible.

Documentation Project

On the UCLA campus, many dumpsters are seen with their lids left open during the night. The reason for this occurrence is worker safety. In order to avoid injuries from closing the lids at night when it is harder to see, workers are not required to close the lids which results in many being left open. However, the result of leaving the lids open may be the likelihood that rodents and other pests are able to enter the dumpsters during the hours rodents are most active. Due to the trash lids remaining open, there may be a sanitary, health, and pest prevention problem occurring. The open lid trash cans on UCLA campus are similarly a cause for concern. In order to determine if the current equipment and practices by workers are suitable for pest

prevention, we intend to acquire photographic evidence of rodents entering dumpsters and trash cans at night with motion detecting cameras. We have chosen some locations as possible sites to capture the photographic evidence: the trash cans near the Bombshelter and dumpsters in the alleyway between Boelter and CNS. At these locations, we will use motion detecting cameras normally used for home safety or hunting and place them near or behind the target dumpster and trash can. We will set the active hours for 12AM to 5AM to capture rodent behavior during their waking hours and retrieve the camera each subsequent morning to save the photos.

Currently, we are seeking motion detecting cameras to capture our evidence. We have contacted Brad Shaffer and Noah Garrison who have given us possible contacts we may be able to borrow cameras from. In addition, our stakeholder, Bonny Bentzin, has been approved to purchase two cameras which we can use for this component of our project.

Plans for Spring Quarter and Conclusion

At the start of our project, we had nothing more than the broad goal of reducing rodenticide use on campus and moving UCLA towards a more sustainable system of pest management. We were initially apprehensive about how much progress was feasible due to the difficulty of navigating the bureaucracy of UCLA, but after meeting with numerous faculty from different organizations at UCLA, including EH&S, Dining Services, and our current pest management contractor, as well as the invaluable guidance of our stakeholder Bonny Bentzin, we were able to set concrete project goals and focus our project on a few areas where we felt that we could make a real difference. Our original ideas of replacing rodenticides with raptor boxes and making drastic changes to our pest management system evolved into trying to get UCLA to

improve its waste collection system, studying relationships between different factors and rodent incidents through GIS, and getting hard evidence of rats on campus to support our research.

By the end of spring quarter, we hope to have concluded all of our projects and achieved the goals we set for ourselves towards the start of the quarter. We want to install the first Bigbelly units on the UCLA campus and gauge student and staff receptivity to the new design, with the goal of starting the conversation about converting UCLA to these new, more sustainable waste collection systems. We plan to analyze our GIS data to draw conclusions from our study about what factors have been found to be associated with rodent incidents on campus in order to gain insight on what changes we can make to improve our system of pest management. We also hope to catch evidence of rats getting into dumpsters and scurrying around our campus to shed more light on the rodent issues that we actually have on campus and strengthen our case for better food waste storage on campus.

In addition to completing our projects, we plan on conducting more outreach next quarter, specifically tabling at the Earth Day Fair and Ecochella and distributing surveys to learn about what students know about pest management and what they think of the new Bigbelly designs. We look forward to seeing where our project takes us next quarter, and are very excited to continue making a difference at UCLA!