

Statement of Problem

Will there be a positive correlation between the number of *Poliopitla californica californica* and the growth of the *Artemisia californica*? If the plant growth increases, will the California gnatcatcher grow accordingly?

Introduction

My research project is based on the *Poliopitla californica californica* (California gnatcatcher) in relation to the *Artemisia californica* (California sagebrush).

-California gnatcatchers favor the habitat of Coastal Sage Scrub, which contains *Artemisia californica* (Atwood et al. 2).

-It is known that the California gnatcatcher's diet is Orthoptera (Crickets), Araneae (Spiders), and Coleoptera (Beetles) (Burger et al.).

-The purpose of my experiment is to observe the threatened bird, California gnatcatcher in different habitats.

-Precisely, the experiment will be done to see if the California gnatcatcher is to determine whether the California gnatcatcher will use the new habitat.

Patricia A. Stanton includes a major factor in my experiment, which is the *Artemisia californica*. However, on difference between our experiments is that the California gnatcatcher was not involved in her project, and I am solely investigating an area that was not burned.

-My interest in the comparison of the California gnatcatcher and the California sagebrush was kindled when I was told that this particular species native to my hometown was given the title "threatened"

-We who have taken over their habitats should at least make attempts to salvage the situation through research. The research done in this particular experiment will help others gain a better understanding of how important natural habitats are and whether or not species in general like to adapt to new environments or stay the same.



Photo by: nathisstoc.bio.uci.edu

Hypothesis

-My question is will there be a positive correlation between the number of *Poliopitla californica californica* and the growth of the *Artemisia californica*?

-On average, what volume must the California sagebrush have in order for the California gnatcatcher to be satisfied?

-My hypothesis is states: If there is an increase in volume of the California sagebrush, then the number of California gnatcatchers will increase as well. With these questions in mind, I would like to figure out if it is possible to raise the California gnatcatcher within our neighborhood within its favored habitat's dimensions.

-By doing this project, I will be able to asses on average how large the habitat must be in order for the California gnatcatcher to have a safe home to reproduce and stay for a safe and reliable habitat. Along with finding the measurements increase of the California sagebrush, I hope to see the numbers of the California gnatcatchers increase as well.



Picture by: www.lagunagreenbelt.com

Observation of Threatened California gnatcatchers in various locations of California sagebrush



Picture by: www.roysephotos.com

Methods and Materials

Vicente Bluffs

-At the Vicente Bluffs site, one should walk along the trail until they see the first lemonade berry bush.

-Once you see the bush, you should face the California sagebrush, set a timer for 10 minutes, and listen or look for the California gnatcatcher within a 75m radius (this applies to all sites).

-During the 10 minutes, if there is a sign or no sign of a California gnatcatcher make note of it in your lab book.

-Walk back to the residential area, and look for the white stake with the yellow stripe up on top on the left of the trail. Turn to your right, and from there (and a 75m radius) you will conduct another 10 minute survey, and record any data.



Figure 2. Photo taken by: Stephanie Yong

Three Sister's Reserve

-At the Three Sister's Reserve site, surveys will be conducted with PVPLC.

-Joined the PVPLC bird survey, one must measure the California sagebrush (*Artemisia californica*) in November and May.

-Measured the height to the nearest cm and two diameters to the nearest cm.

- Only use site 2's data.



Figure 2. Photo taken by: Stephanie Yong

Alta Vicente

-Once you enter the site for Alta Vicente, walk to the left of the trail and walk up a very steep slope (there is a sign), where some cacti are.

-Conduct a survey for 10 minutes, looking for visual or auditory signs of California gnatcatchers. After the 10 minutes are up, one must record data.

-Walk down the trail, to the middle of the entire site and stand up on top of the manhole. Again, you will conduct a survey for 10 minutes by visual or auditory observations for the California gnatcatcher. After the 10 minutes, record your data.



Figure 3. Picture by: Stephanie Yong

Data Analysis

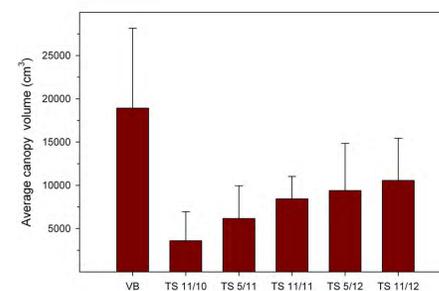
-Three Sister's Reserve from Site 2 will be put together and will be compared to the number of California gnatcatchers from previous years. The same will be done for Vicente Bluffs and Alta Vicente.

-While doing the California sagebrush measurements, I measured the height in cm, two diameters to the nearest cm.

-Round the data to the nearest centimeter, I also took the average of the two diameters. As well as finding the height and diameters, I found the volume of the plant as well. To do this, I used the following equation: height \times radius \times π to get the volume of the 10 plants.

Data

	Vicente Bluffs	Alta Vicente	Three Sisters
Year	2012-2013	2012-2013	2012-2013
Number of Observations	10	10	36
Observation Rate	1.50%	2.2%	1.93%



Three Sisters	Average 2008-2009	Average 2010-2011	Average 2012-2013
Average Volume	None	5605.45 cm³	9486.35 cm³
Observation Rate	1.64%	0.60%	1.93%

Vicente Bluffs	Average 2008-2009	Average 2010-2011	Average 2012-2013
Average Volume	none	18925.88	none
Observation Rate	none	2.50%	1.5%

Results

-When doing my surveys at Three Sisters Reserve, Vicente Bluffs, and Alta Vicente I recollect that the weather the days I did my research on was cloudy and had barely any sun.

-Prey for the *Poliopitla californica californica* typically do not come out during overcast days. Therefore, the California gnatcatcher would not want to display itself either.

-Due to that, there were days where I have not collected a sign of the California gnatcatcher.

- For non-normal distributed data, I used the Kruskal-Wallis test to statistically compare the variance of the maturity of Three Sisters Reserve, Vicente Bluffs, and Alta Vicente sites.

-After completing the test, it was reported that the median values among the three sites were greater than would be expected by chance ($P < 0.001$).

-To investigate the numerical data of the California gnatcatcher, I calculated the observational rate for each site.

-From the calculations, I found that from 2012-2013; Three Sister's Reserve had an observational rate of 1.93%.

-From the 2012-2013 Vicente Bluffs data, I have found that the observational rate is 1.50%. Lastly, the observational rate for Alta Vicente was 2.20%. Overall, from comparing the three observational rates, the number of California gnatcatchers is greatest in Alta Vicente.

Conclusions

-From the years of data, I can see that from October 2009, PVPLC had 500 invasive Acacia trees cut down. From this, during October 2009, data shows that there was not much bird activity. That includes the California gnatcatcher.

-From my results, I cannot say that my hypothesis is agreeable or disagreeable.

-Due to the results showing that the Alta Vicente observational rate is 2.20%, which is the greatest from all three sites, I did not measure the volume of the California sagebrush there.

-Applying my hypothesis to Vicente Bluffs, it shows that my hypothesis was not applicable because the measurements of the California sagebrush are much larger yet the observational rate had a difference of 0.43% compared to Three Sister's Reserve.

-I have acknowledged that many hikers and walkers come to Vicente Bluffs because it is a public trail.

-This may have disrupted my surveys or even make the California gnatcatcher become silent (the California gnatcatcher is not a social bird). Whereas, in my opinion, not as many people visit the public trails for Three Sisters; therefore this must be taken into account.

-Overall, from examining four years of data of Three Sisters Reserve, the observational rate of the California gnatcatcher has increased

Further Research

-For further research, I wish that I can find a better, secure number for the California gnatcatcher, demoting it from the title: threatened.

-Investigate what the California gnatcatcher prefers, examine why California gnatcatchers like a certain canopy volume- are there benefits to a certain volume, and how often do they visit their habitat?