



**CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY**

Name(s) Anita Garg	Project Number S1904
Project Title The Effect of Water Usage on Native Coastal Sage Scrub Plants	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of the experiment was to understand how best to preserve and restore the native coastal sage scrub community.</p> <p>Methods/Materials Materials: 48 <i>Salvia apiana</i> plants, over 150 samples of <i>Artemisia californica</i>, <i>Eriogonum fasciculatum</i>, and <i>Sonchus oleraceus</i>, 10 <i>Encelia californica</i> plants, 10 <i>Isocoma menziesii</i> plants, Decagon leaf porometer, scientific oven, scientific scale, meterstick. Methods: I first tested the effect of two different seeding styles on the growth of <i>Salvia apiana</i>. Next, I tested the effect the effect of slope aspect on <i>Artemisia californica</i>, <i>Eriogonum fasciculatum</i>, and <i>Sonchus oleraceus</i>. Finally, I simulated a drought to test the drought tolerance of <i>Encelia californica</i> and <i>Isocoma menziesii</i>.</p> <p>Results For the first part of the project on seeding styles, the average height of the shrubs only group was 31.9% greater than the average height of the mixed group. However, the average stomatal conductance of the mixed group was 27% greater than that of the shrubs-only group. For the second part of the project on slope aspect, the only plant that had a higher SLA on the north-facing slope was <i>Eriogonum fasciculatum</i>. A possible reason why could be because south-facing slopes in this hemisphere receive less sunlight than north-facing slopes, and therefore plants that consume more water such as <i>Sonchus oleraceus</i> and <i>Artemisia californica</i> grow better on south-facing slopes than on north-facing slopes. For the dry down experiment, <i>Encelia californica</i> had many more dead leaves than <i>Isocoma menziesii</i> did. This could be tied to the fact that <i>Encelia californica</i> consumed an average of 84.25 grams more water than <i>Isocoma menziesii</i> did, which means it depletes it water source more quickly and therefore is less drought tolerant.</p> <p>Conclusions/Discussion A species# rate of water consumption is partially dependent on its nature to consume water and partially dependent on its environment. A species with a natural disposition to consume less water and with a more hospitable environment tends to exhibit greater growth than a species that consumes more water or that is placed in a less hospitable environment.</p>	
Summary Statement I created an action plan for future coastal sage scrub restoration projects based on the amount of water available.	
Help Received I conducted the experiment and collected all data by myself. I was able to borrow the UCI CEB's porometer to take stomatal conductance measurements.	