



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) <p align="center">D. Tre Risk, III</p>	Project Number <p align="center">S1598</p>
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Project Title
Waste Not, Want Not: Reducing Aquifer Depletion through Increased Recycled Water Consumption (Year 2)

Abstract

Objectives/Goals
 In the Coachella Valley, the golf industry consumes an enormous amount of water. Golf courses need to have well-manicured, visually pleasing water features, which also acts as a reservoir for nightly watering and a source of nutrients for aquatic life. They frequently use aquifer water to achieve this. However, this resource is limited; the other two water sources are Colorado River water and Reclaimed water which is treated waste water. My goal was to mix different percentages of Reclaimed, Aquifer, and Colorado River water to find a solution that encourages little to no algae growth. I duplicated the work done during last years project and added a survey of golf course superintendents.

Methods/Materials
 I ran 11 various combinations of water sources (from the Colorado River, the Aquifer, and Reclaimed Water). 3 tests of each sample type were made. I sampled each water combination for a total of 33 tests and examined the samples for algae growth. This was out of my budget so I developed a color system to measure algae growth.
 I sent out a survey to 300 golf course superintendents in my area and questioned them on the different water sources that they use in their ponds and lakes.

Results
 Algae started growing in the second week of the tests and continued throughout the study. At the end of the six week period the following levels of algae growth were noted:
 100% Aquifer(Aqu)4.3; 100% Reclaimed(Rec)2.0; 100% Colorado (Col)5.7; 33% Aqu/33% Rec/33% Col 2.3; 50% Aqu/20% Rec/30% Col 3.0; 30% Aqu/50% Rec/20% Col 2.7; 20% Aqu/30% Rec/50% Col 3.7; 50% Aqu/30% Rec/20% Col 2.7; 60% Aqu/20% Rec/20% Col 3.3; 20% Aqu/60% Rec/20% Col 2.3; 20% Aqu/20% Rec/60% Col 5.0

Conclusions/Discussion
 Colorado River water and its high percentage combinations allowed the highest levels of algae growth. Reclaimed water is highly treated and as a result, it hinders the algae growth the most. Reclaimed water was not available to most of the golf courses who responded to my survey; CVWD is currently working on making this available to more golf courses. Reclaimed water not only proved to be effective as an added mixture to control algae growth but is also a plentiful resource during golf season. Therefore reclaimed water is at a peak at the same time water usage is highest on the courses. Currently there is not enough use for our existing reclaimed water so the excess water is actually dumped into the desert.

Summary Statement
 Can algae growth be minimized by using water sources other than Aquifer water?

Help Received
 Coachella Valley Water District provided water samples.