Soil Compaction at Sonoma State

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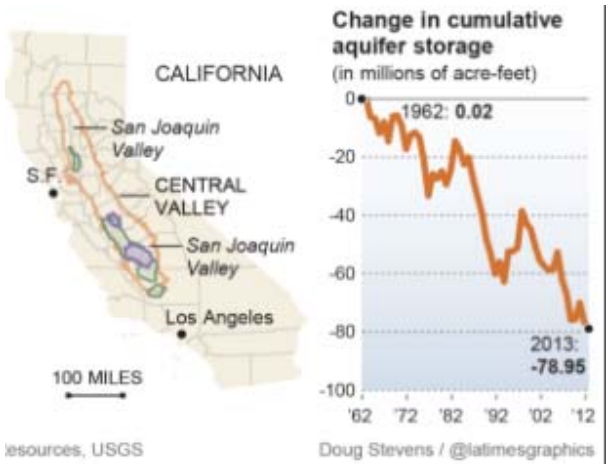
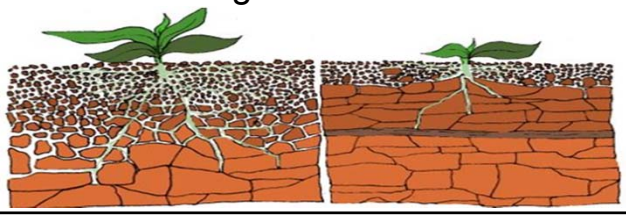
Groundwater in California

- Over pumping of ground water in California has led to the loss of over 80 million acre feet of land since 1962.
- Areas of the central valley are shrinking due to water being pulled from the ground.
- If we cannot recharge our groundwater supply will continue declining.



Background

- How compacted is the soil on Sonoma State University's campus?
- Our original focus was on groundwater recharge but we made our research question more specific to soil compaction.
- Compact soils provide less space for root growth, seedling germination, and groundwater recharge.
- Without groundwater recharge there will not be a sustainable water supply



Mother Earth News, 2015

More Background

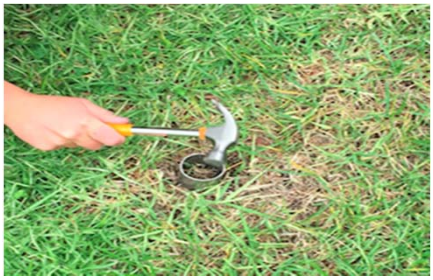
- Soil compaction can be tested by measuring the bulk density of soil.
- Bulk density is found by dividing the weight of a soil sample by its volume.
- Soils with low bulk densities are most desirable because they have the most porosity.
- More porosity means more space between the soil to allow water to drain through

Materials

- 3 Inch Metal Ring
- Hammer
- Microwave
- Sample Bags
- Scale
- Ruler
- Calculator

Methods

- Hammer 3 inch ring into the ground to obtain a core of soil.
- Remove excess dirt from sample and place into airtight bag.
- Microwave the sample in 2 minute intervals until soil is dried.
- Weigh dried sample and calculate bulk density.



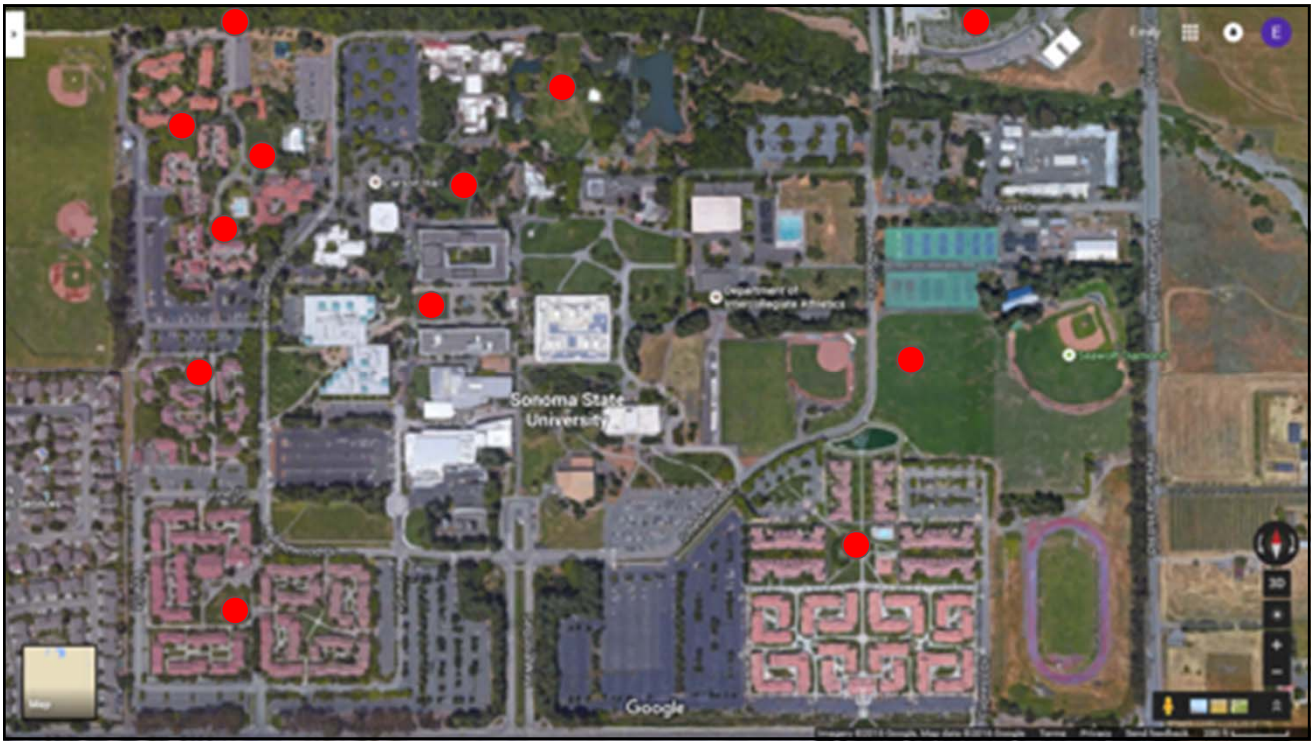
Timeline

Week 1:

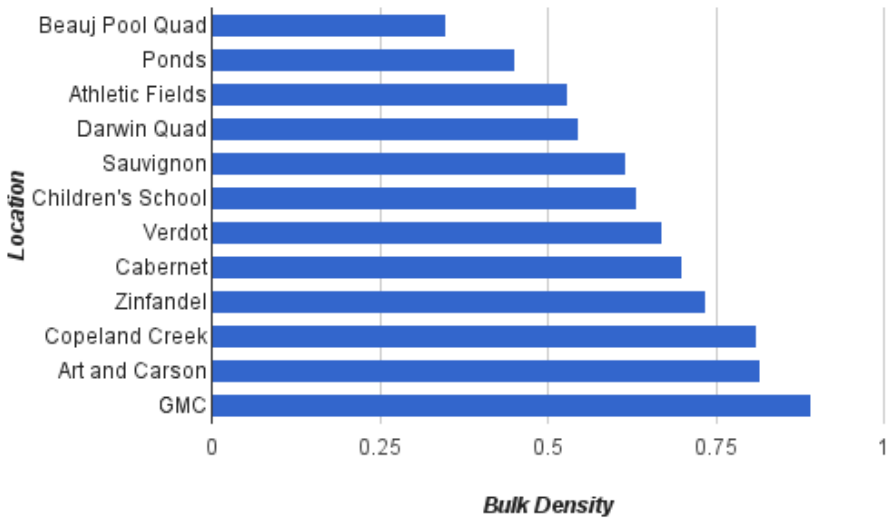
- Talked with Vanessa Dodge, a Graduate student in the geology department who is studying soil compaction in Tamales Bay
- Learned methods and acquired soil compaction testing materials

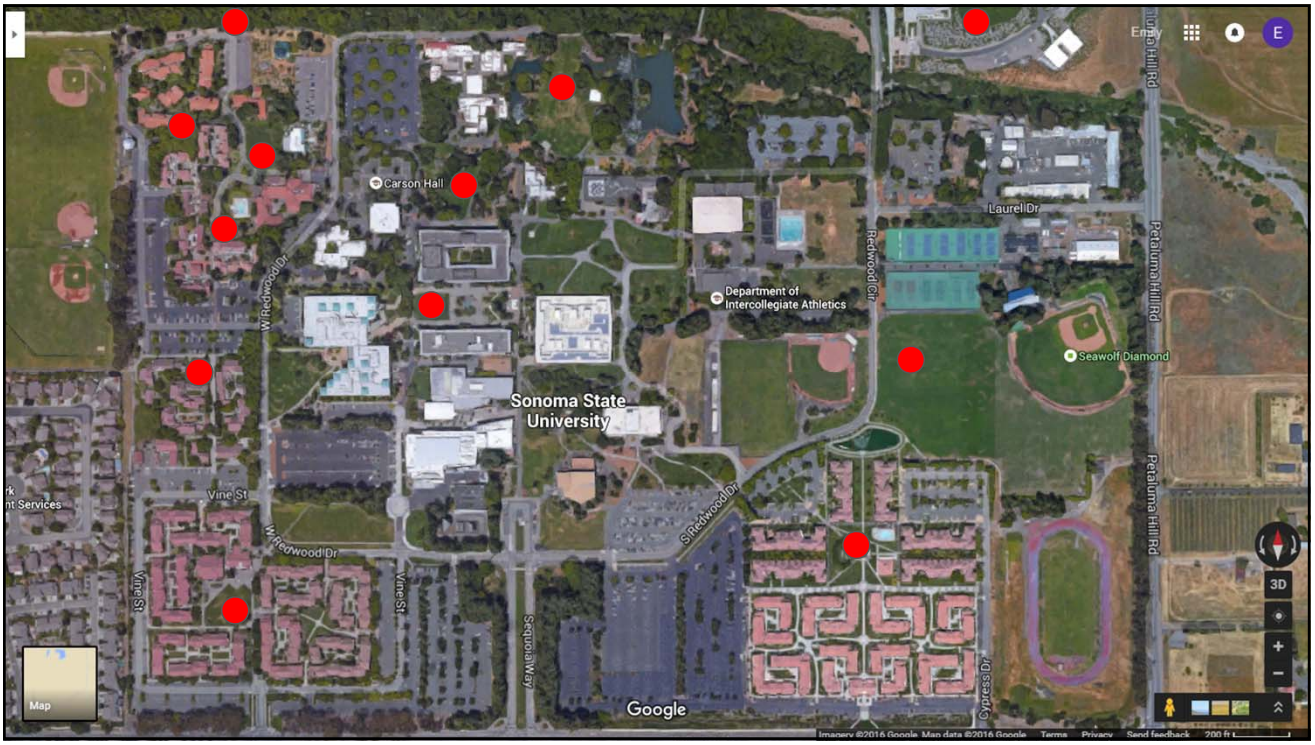
Week 2:

- Created map
- Collected soil samples
- Weighed samples and calculated bulk densities



Location vs Bulk Density





Conclusion

- All soil on Sonoma State's campus has a desirable level of porosity according to the bulk density measuring system.
- Our campus was previously farmland and the soil has not been negatively affected by the buildings and infrastructure.
- Future studies can compile ongoing data about compaction across campus.

Acknowledgments

- Thank you to Vanessa Dodge for allowing us to use her materials and teaching us her methods of bulk density testing
- Thank you to our professors Dr. Martha Shott, Dr. Jeremy Qualls, Dr. Fran Keller, and Dr. Nathan Rank

Questions or comments?

Sources of Information I

- Images of Materials: Wikimedia Commons
- Background Slide Image: http://www.motherearthnews.com/organic-gardening/measure-soil-compaction-with-a-carrot-test-zbcz1511.aspx
- Map of SSU: Google Maps

Sources of Information II

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