
INST 627

FINAL PROJECT

TEAM - 1

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Our Research Question

Does the water quality vary between Modoc County, CA and Santa Clara County CA?





DATA SOURCES

1. National Association of Realtors

The county median home price and property value dataset contains the median home price of all the counties in the US. We picked one of the highest median home price counties and the lowest median home price county in California.

2. California Open Data Portal

The quality of water dataset contains DWR-collected, current and historical, chemical and physical parameters found in drinking water, groundwater, and surface waters throughout the state of California.



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ANALYSIS

Method: Two-sample t-test

1. Specific Conductance

Specific conductance (also called specific conductivity or just conductivity) is a measure of the ability of water to conduct an electrical current. Specific conductance is an important water-quality measurement because it gives a good idea of the amount of dissolved material in the water.

The sample 1 mean (340.25) is significantly different to sample 2 mean (507.26)($t=-8.15$), ($p<0.01$). Quality of water based on specific conductance varies from county to county depending on their property value.



2. Dissolved Oxygen

Dissolved Oxygen is the amount of oxygen present in the water. Water containing high levels of organic matter can make water oxygen deficient which in turn degrades the quality of water.

The sample 1 mean (8.763291) is significantly different to sample 2 mean (9.287785) ($t=-6.0741$), ($p<0.01$). Quality of water based on dissolved oxygen varies from county to county depending on their property value.

3. Turbidity

Turbidity is measure of relative clarity of water. Large particles such as minerals, dirt, and clay can cause cloudiness. Turbidity is an important water-quality measurement because it gives a good idea of the amount of large particles in the water.

The sample 1 mean (24.43195) is significantly different to sample 2 mean (8.016418), ($p=0.00002$). Quality of water based on turbidity varies from county to county depending on their property value.

4.pH

pH levels impact most chemical reactions in the water. It is one of the critical elements of drinking water. pH levels under five and beyond ten are considered harmful to humans as they are acidic and alkalic, respectively.

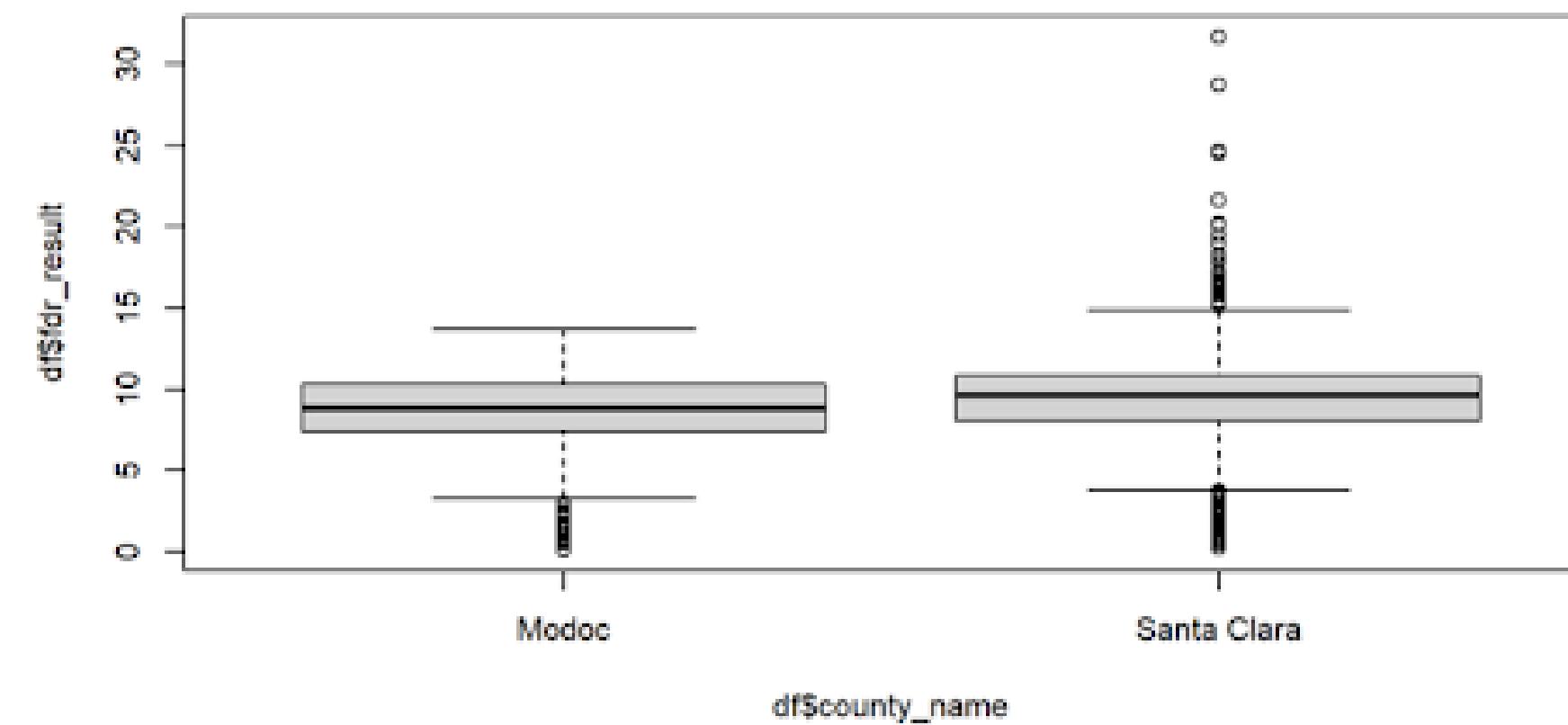
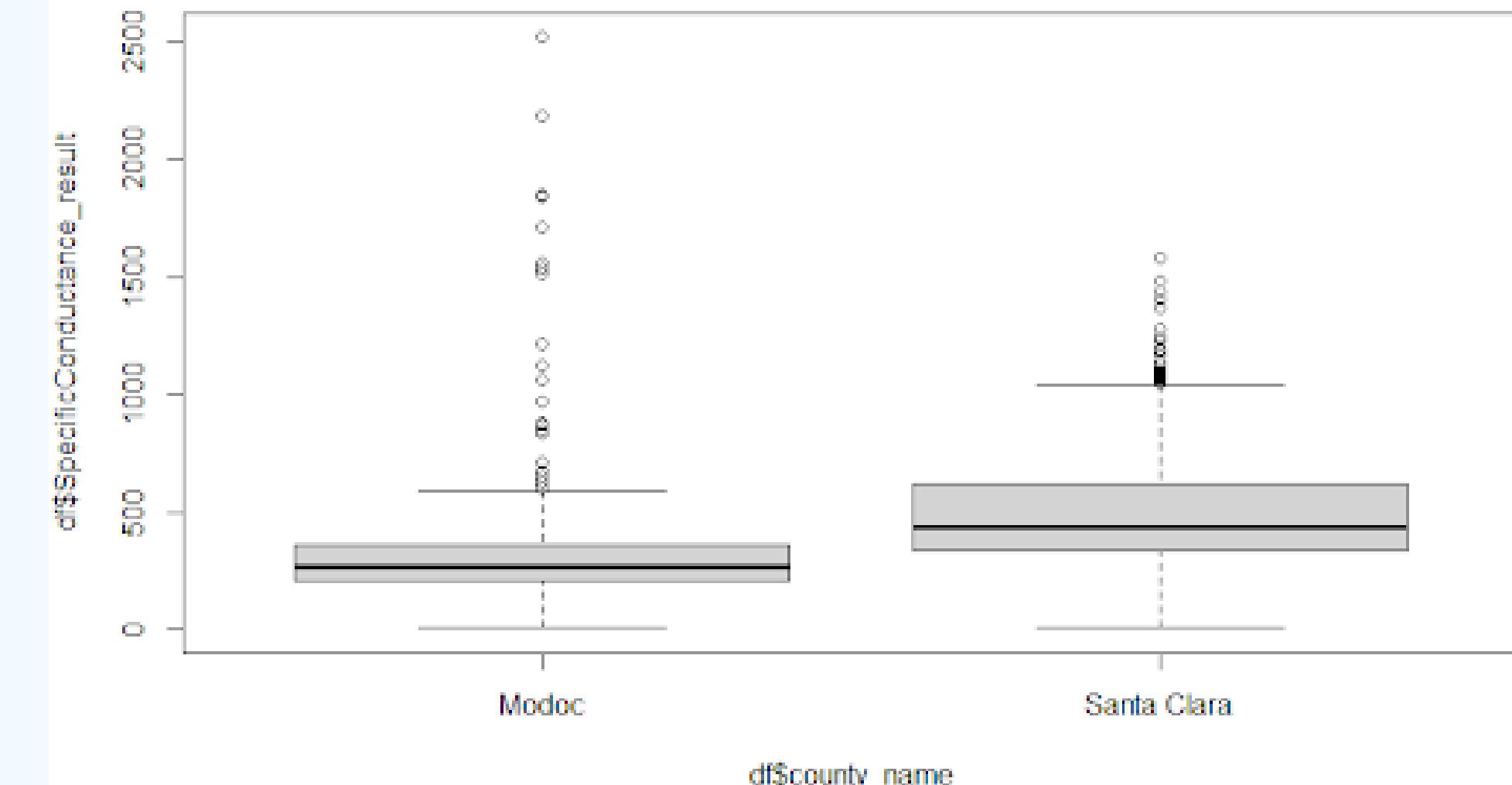
The sample 1 (7.78754) mean is significantly different to sample 2 mean (7.75360) ($t=2.4728$) ($p\text{-value} = 0.1345$).

- Since the average pH for water quality in Santa Clara and Modoc Counties lie within the range of 6.5-8 pH levels. We cannot determine if water quality has any impact on either county.



BOX PLOTS OF PARAMETERS

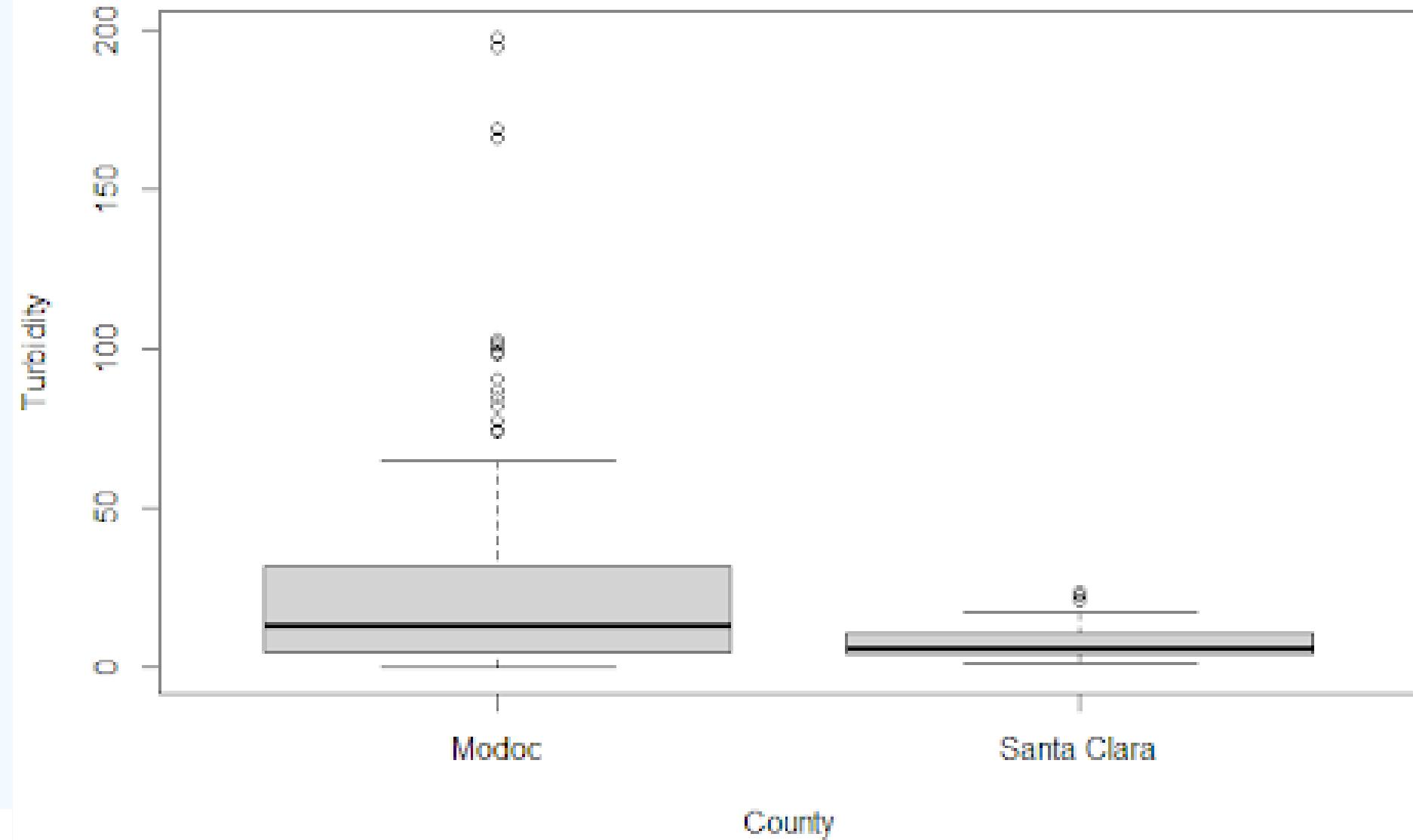
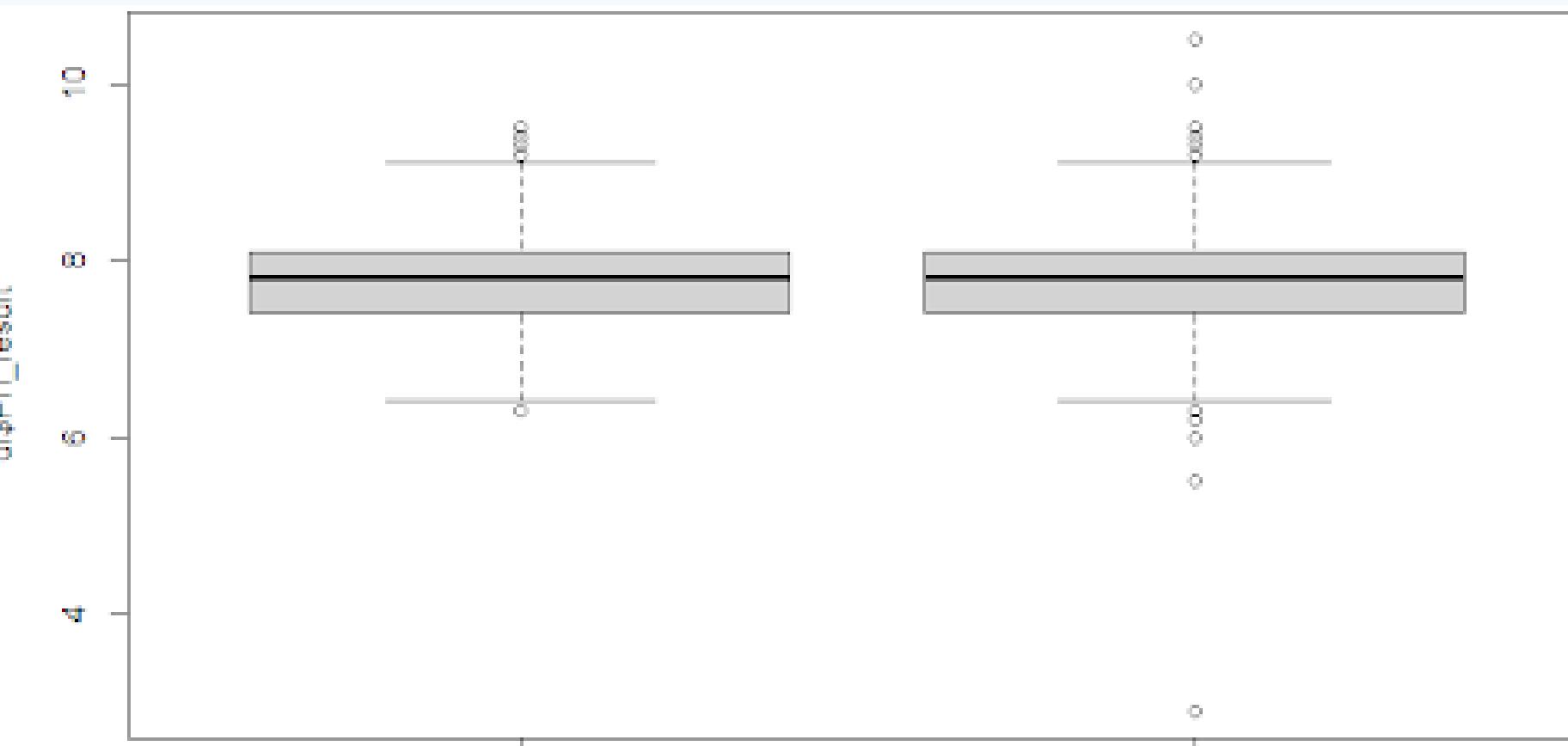
SPECIFIC CONDUCTANCE -->



<--DISSOLVED OXYGEN

BOX PLOTS OF PARAMETERS (CONTD.)

TURBIDITY -->



County

<-- PH

MAIN FINDINGS

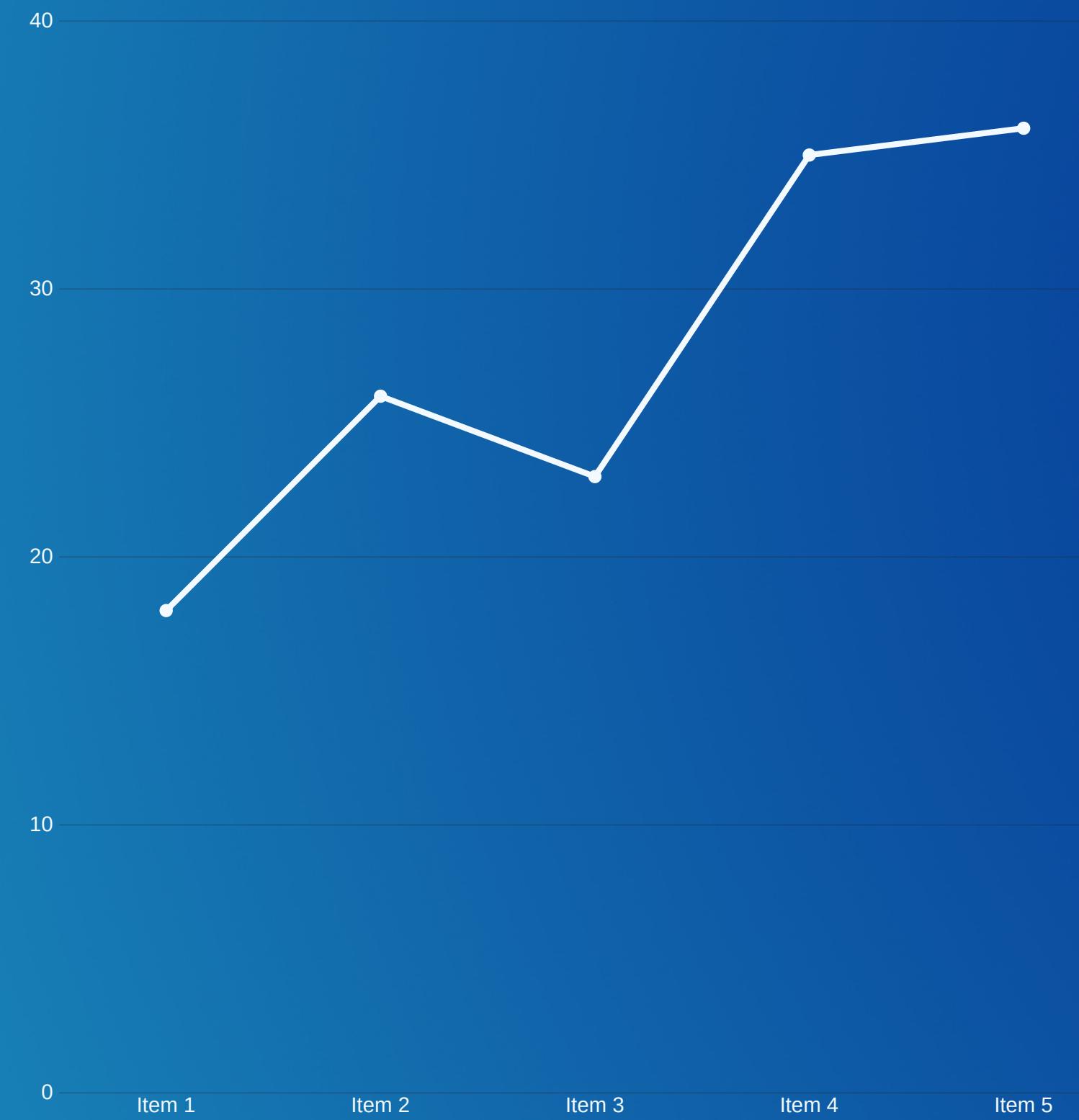
In conclusion, we used the following parameters to measure the quality of water:

- Specific conductance
- Turbidity
- Dissolved Oxygen
- pH

And by using the two-sample t-test, it can be seen that the quality of water significantly varies from a rich county like Santa Clara to a poor county like Modoc in the state of California because water quality is worse in Modoc County.

CONCLUSION

- The practical implication of this finding is that the quality of water differed in a rich county versus a poor county, which could be the case in other states.
- The findings can be used to help people make more informed choices about the areas that they move to.
- The findings can be used to study why certain water quality parameters are worse in a county.
- The California State Water Resource Control Board must look into this matter and ensure all residents are provided with the same quality of water regardless of the county they live in.



REFERENCES

1. <https://data.ca.gov/>
2. National Association of REALTORS®
(nar.realtor)

**QUESTIONS?
COMMENTS?
LET US KNOW!**

THANK YOU !

