Zooplankton Prediction Study

By Ryan Lewis

Zooplankton

Zooplankton

- Cute?

Zooplankton

- Cute?

- Edible?

Zooplankton

- Cute?

- Edible?

- Delta Smelt

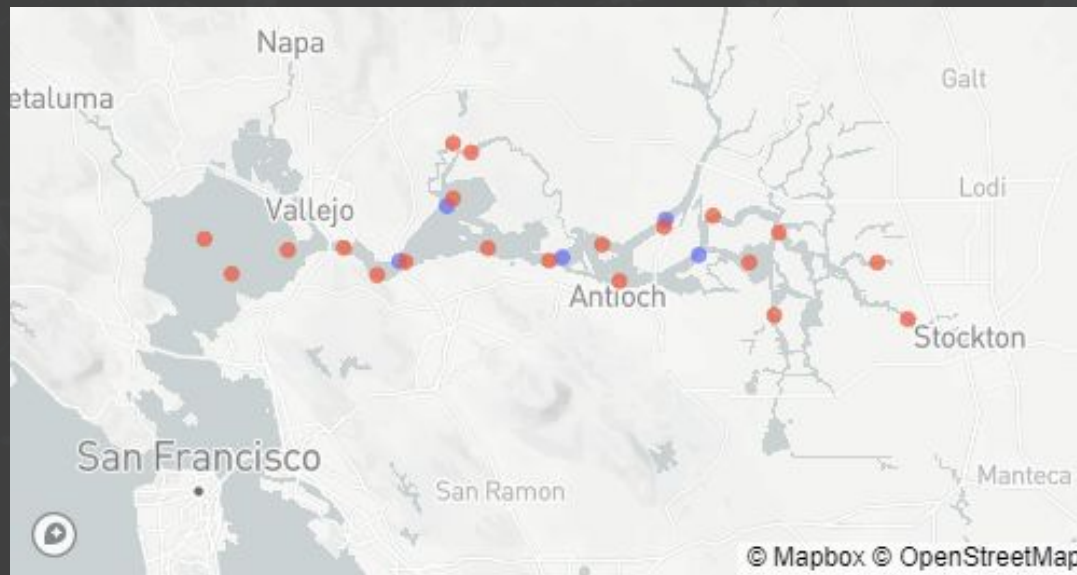Photo Credit: Dave Giordano
Ecositemedia.com

Process

- Find water quality data

- Match nearby survey stations

- Match data by time

- Find correlations
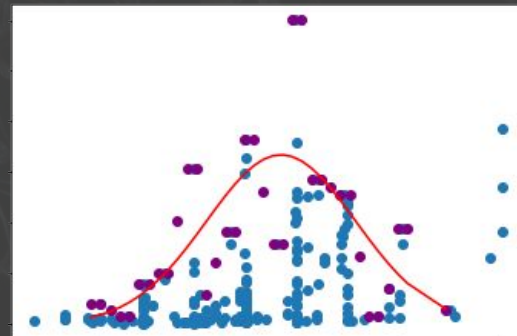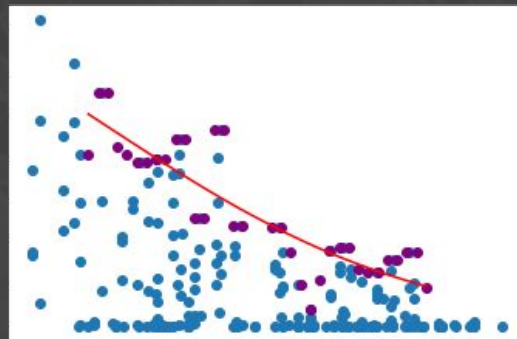
- Produce prediction model

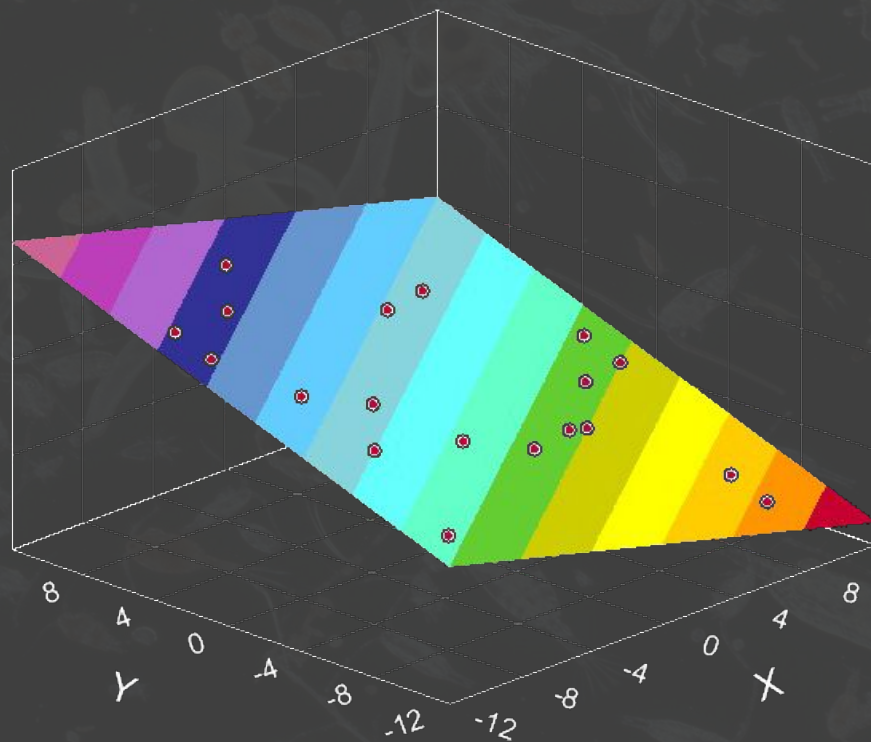# Matching the Stations

EDA:

- Correlations

EDA:
- Correlations
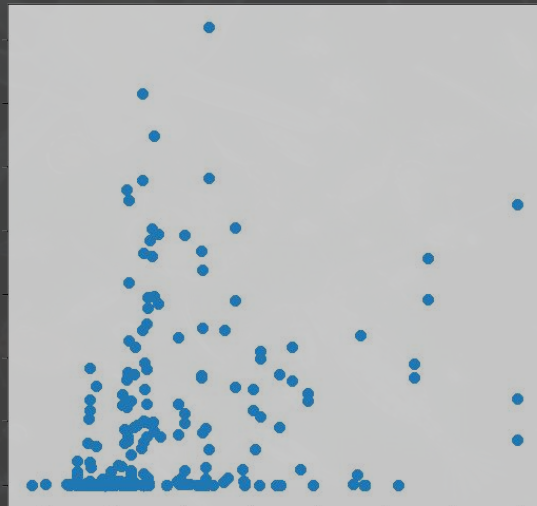- Trends

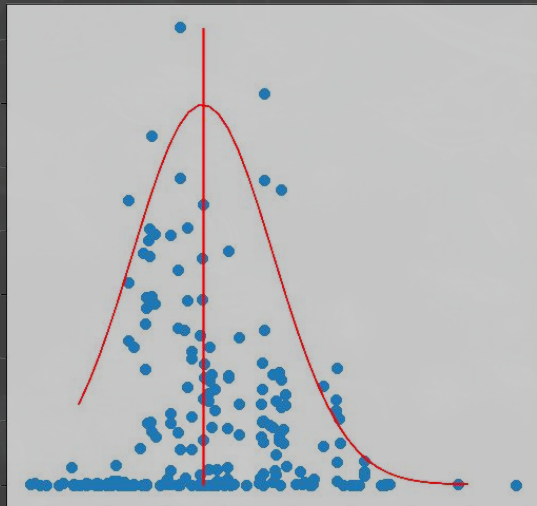**EDA:**
- Correlations
- Trends
- Modelling

Initial Model

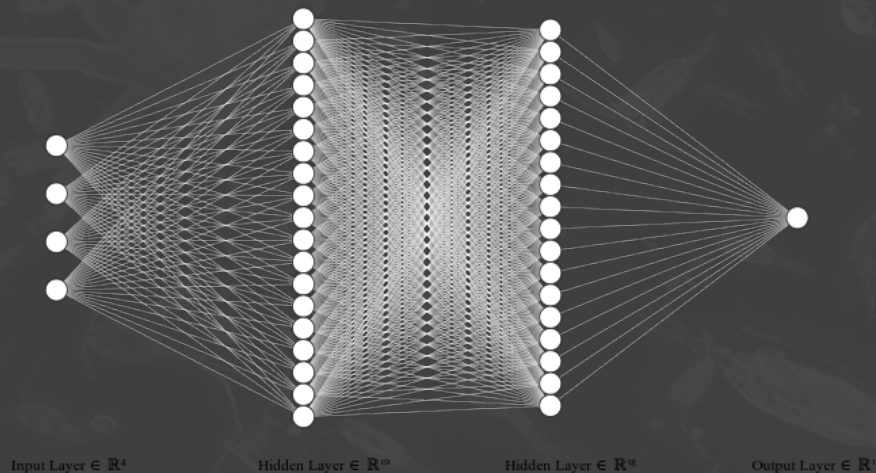Prediction = $C_1 \text{pH} + C_2 \text{Temp} + \ldots + C_n \text{dO}_2 + C_{n+1}$

Feature Engineering

"Improved" models

- Lasso
- Ridge
- Neural Net

Input Layer ∈ $\mathbb{R}^4$ Hidden Layer ∈ $\mathbb{R}^{19}$ Hidden Layer ∈ $\mathbb{R}^{18}$ Output Layer ∈ $\mathbb{R}^1$
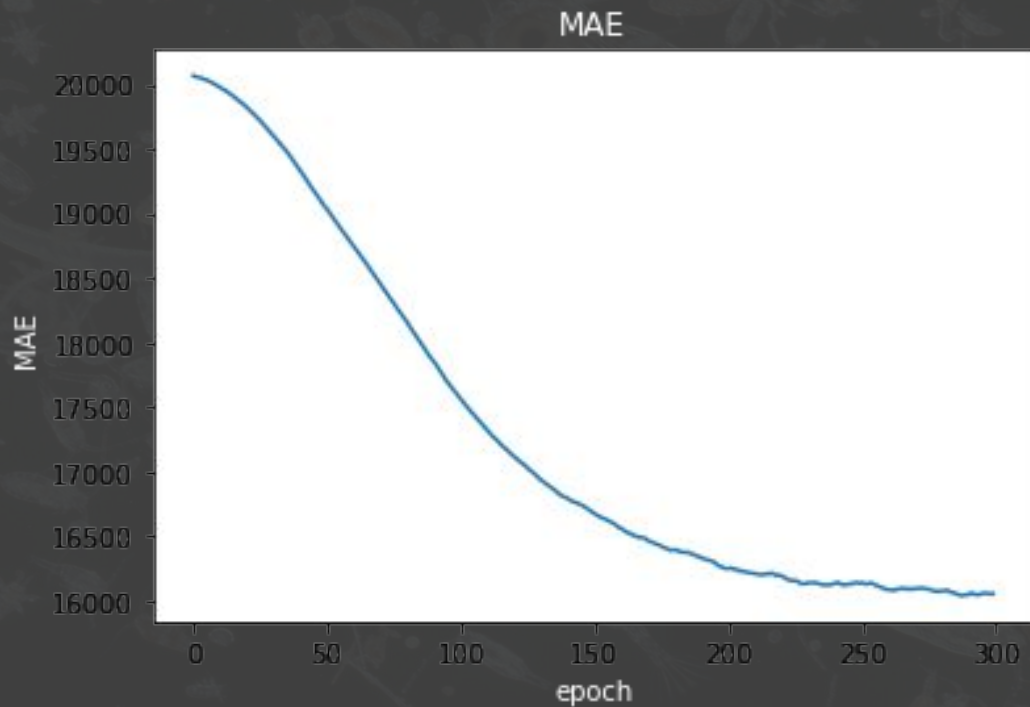
Resultant MAEs

- linreg: 14,694
- lasso: 17,747
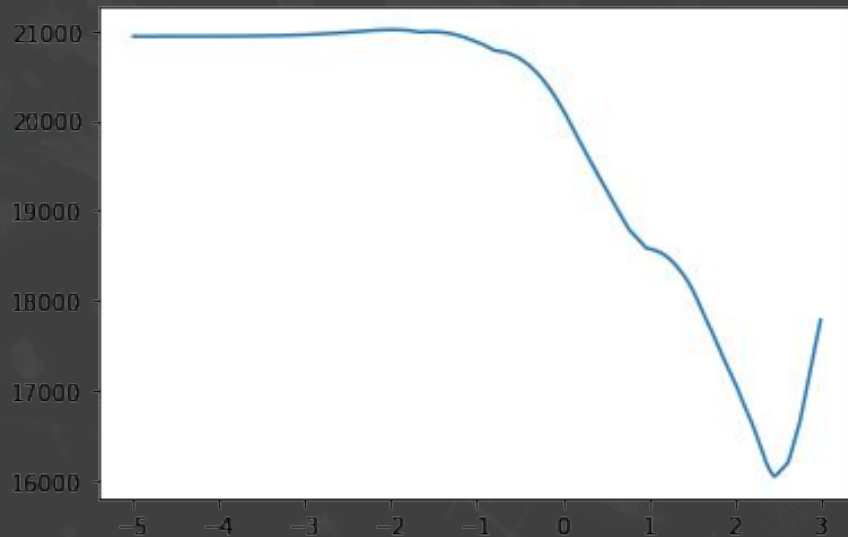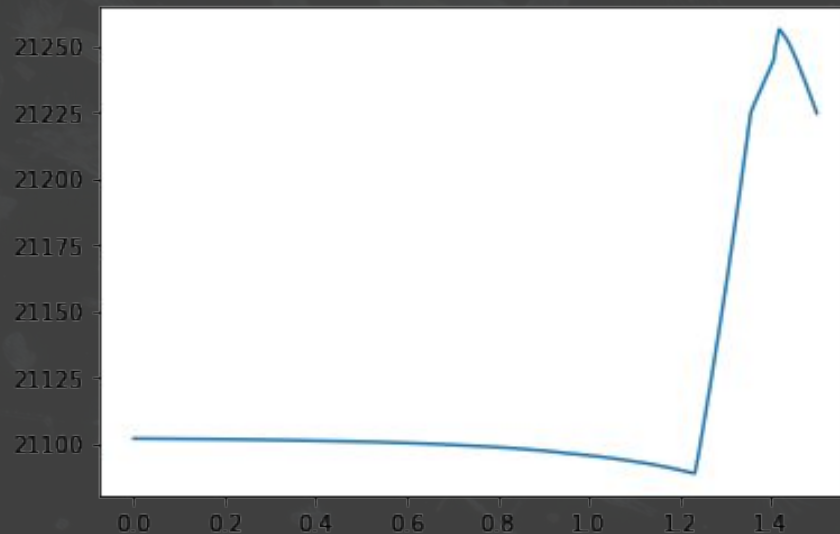- ridge: 16,882
- keras: 16,056

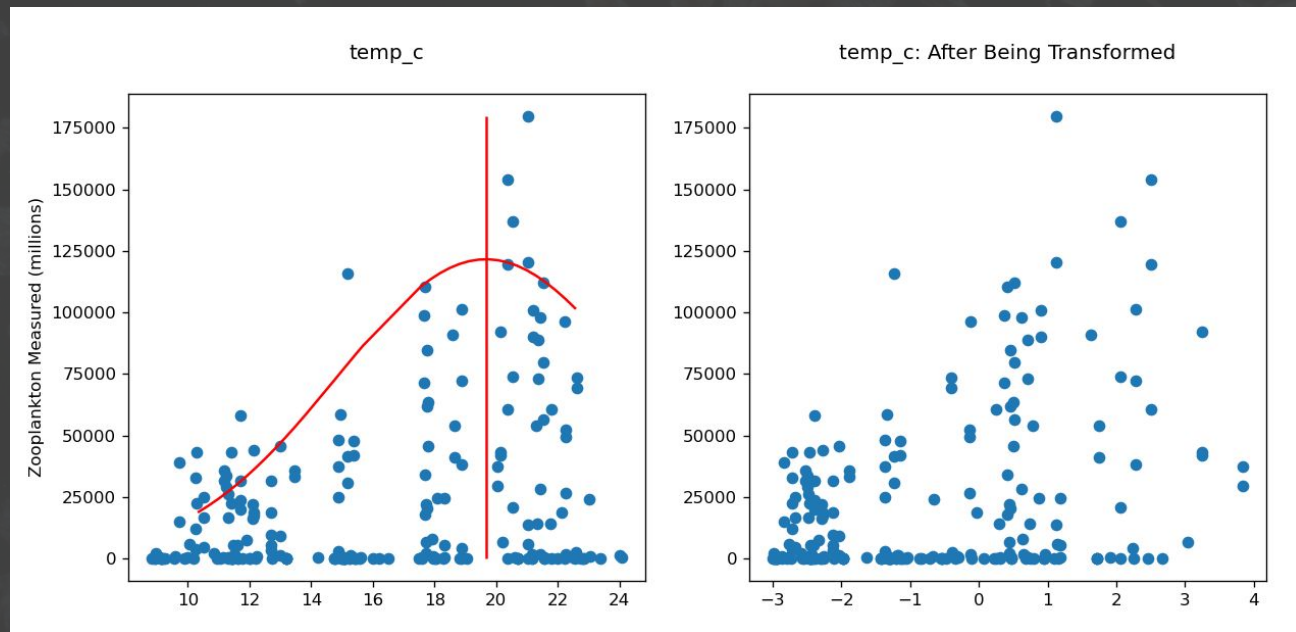# Max Values:

- ~1 million

Appendix: Ridge MAE vs Alpha
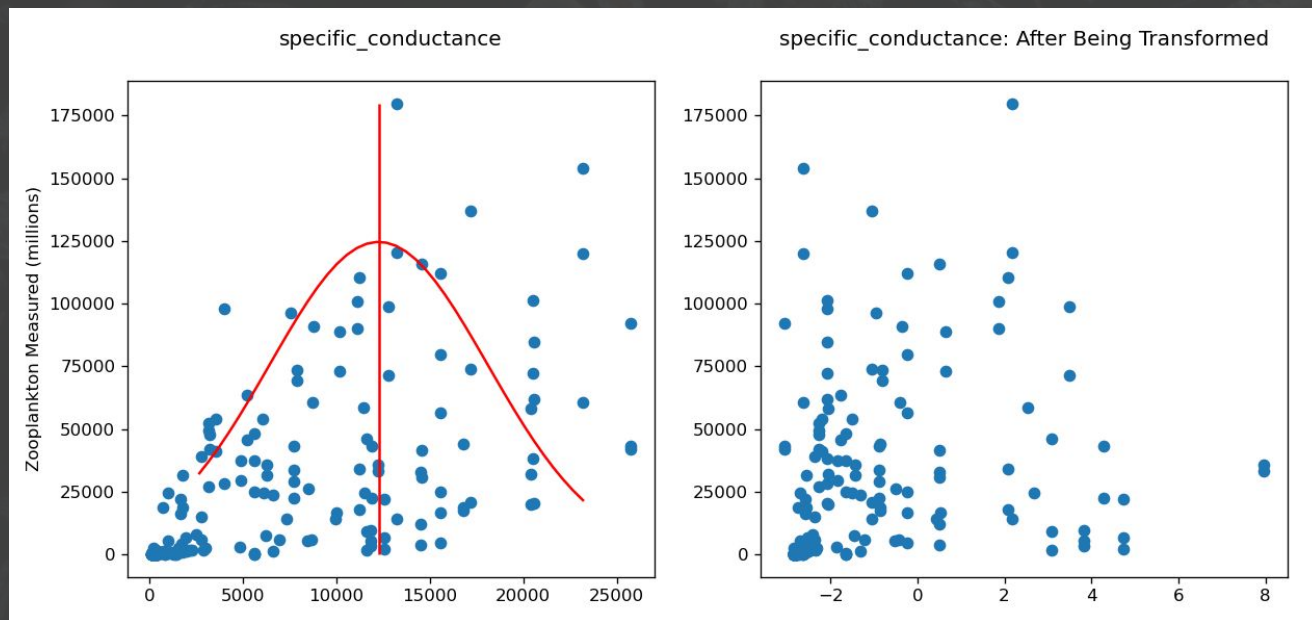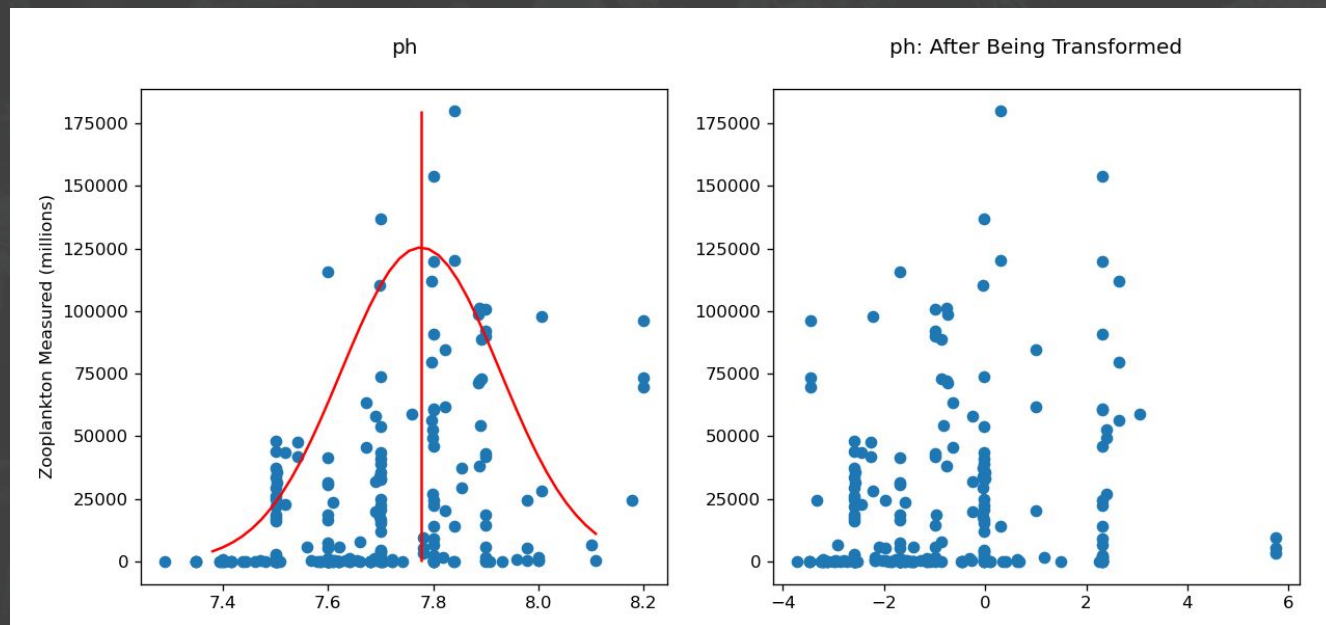
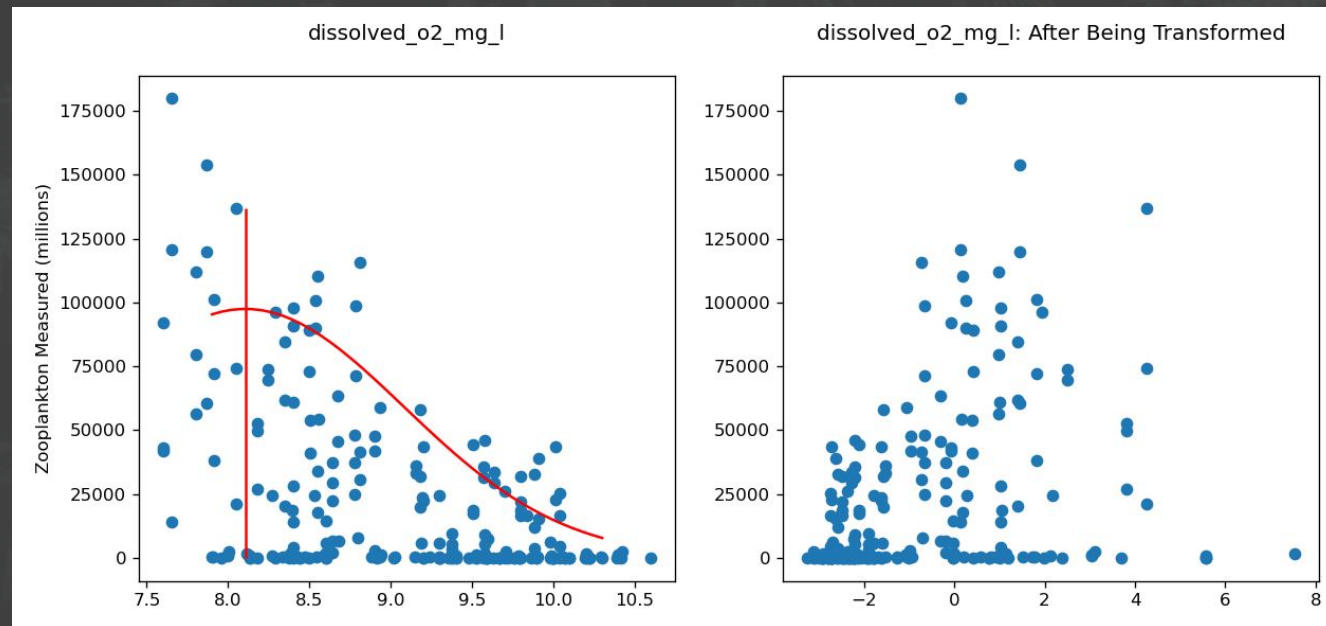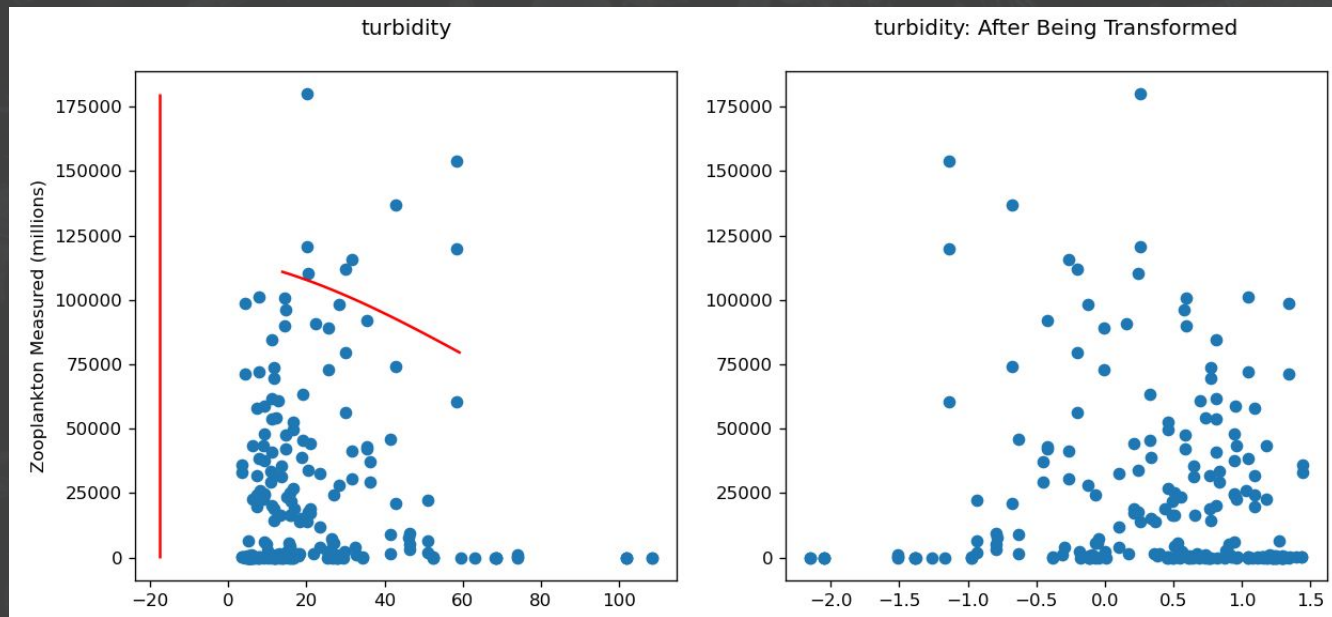# Appendix: Lasso MAE vs Alpha

Appendix:

Appendix:

Appendix:

ph   ph: After Being Transformed

Appendix:

Appendix:

turbidity

turbidity: After Being Transformed

Appendix:

Appendix:

organic_matter / organic_matter: After Being Transformed

Appendix:

salinity

salinity: After Being Transformed

Appendix:

dissolved_o2_percent_sat | dissolved_o2_percent_sat: After Being Transformed
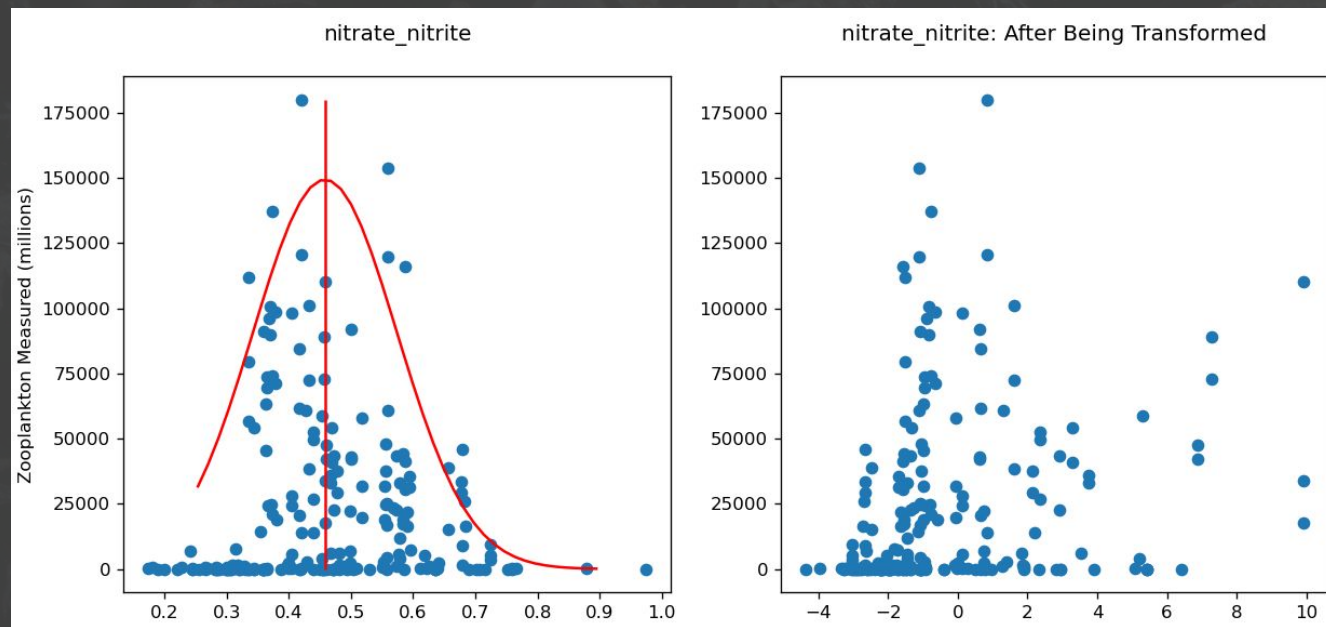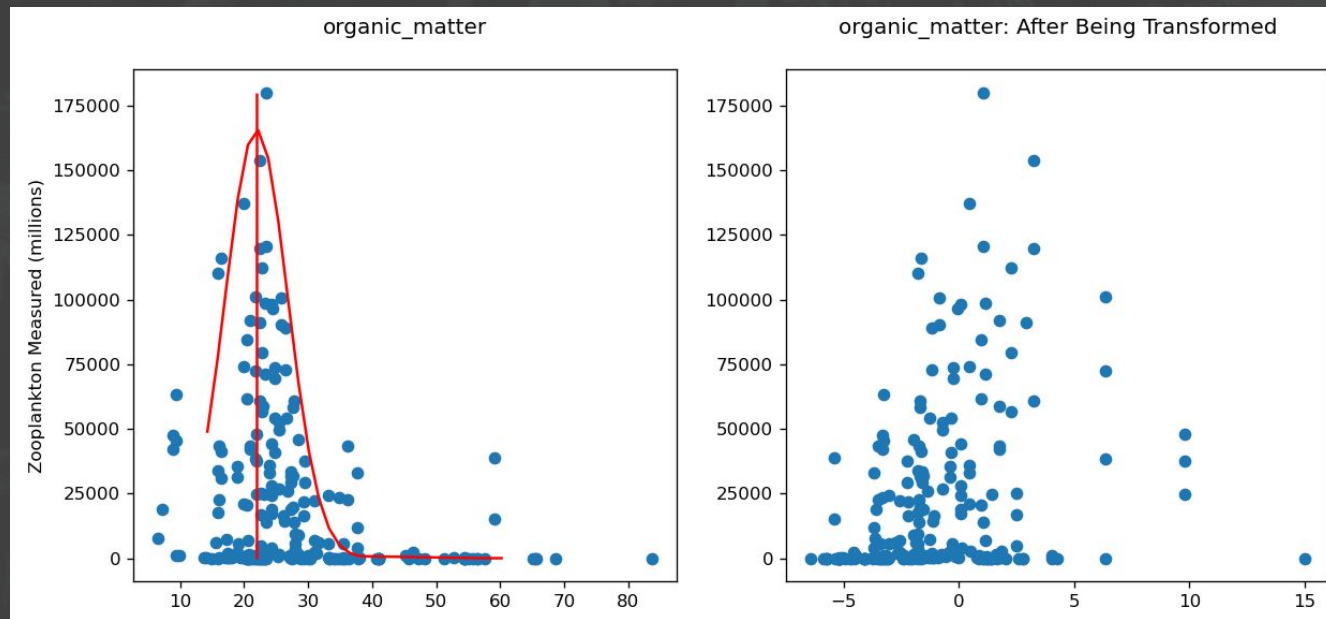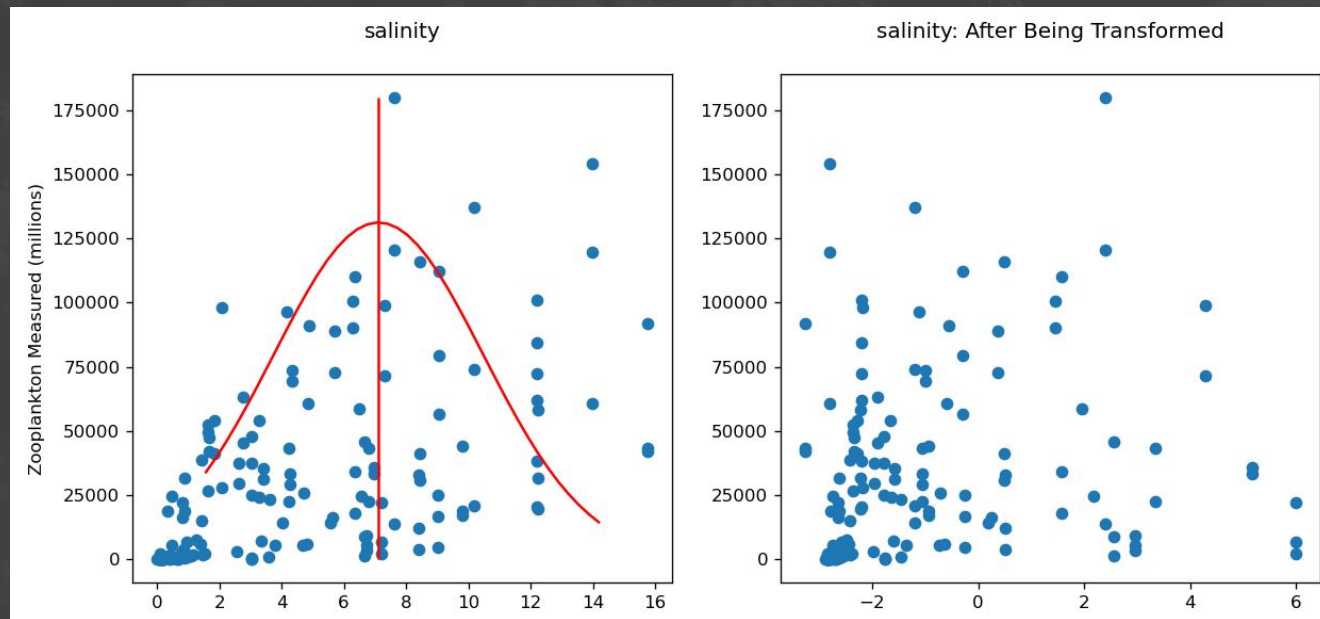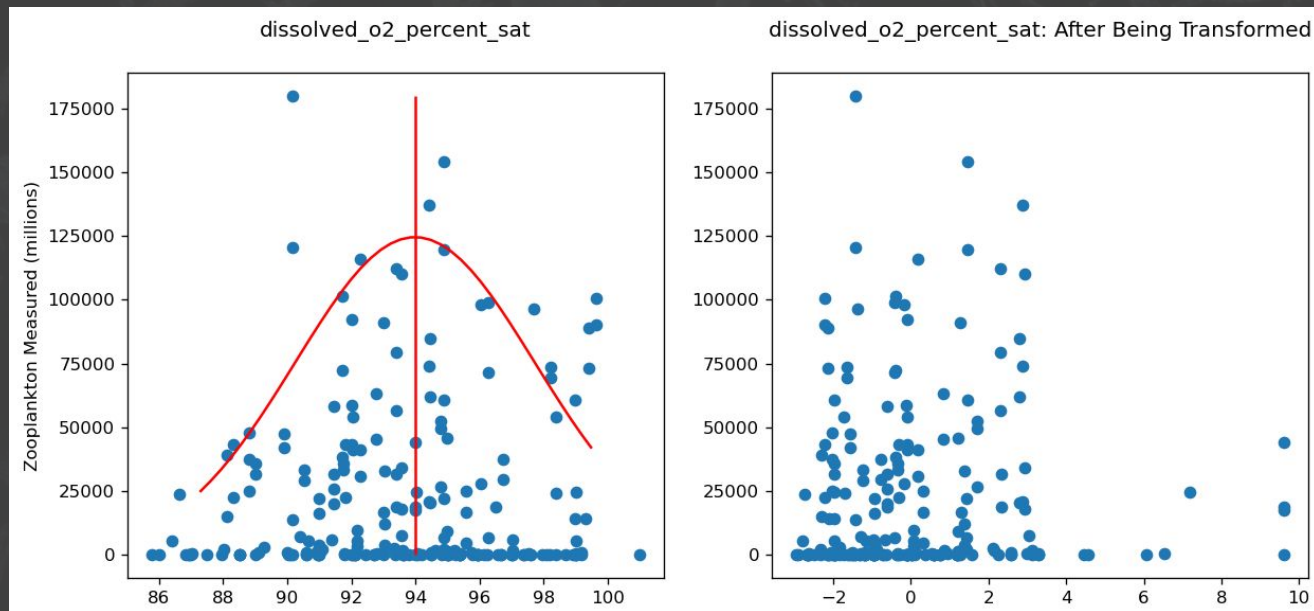
Appendix:

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- Put in the pics of the feature engineering subplot stufffff

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