

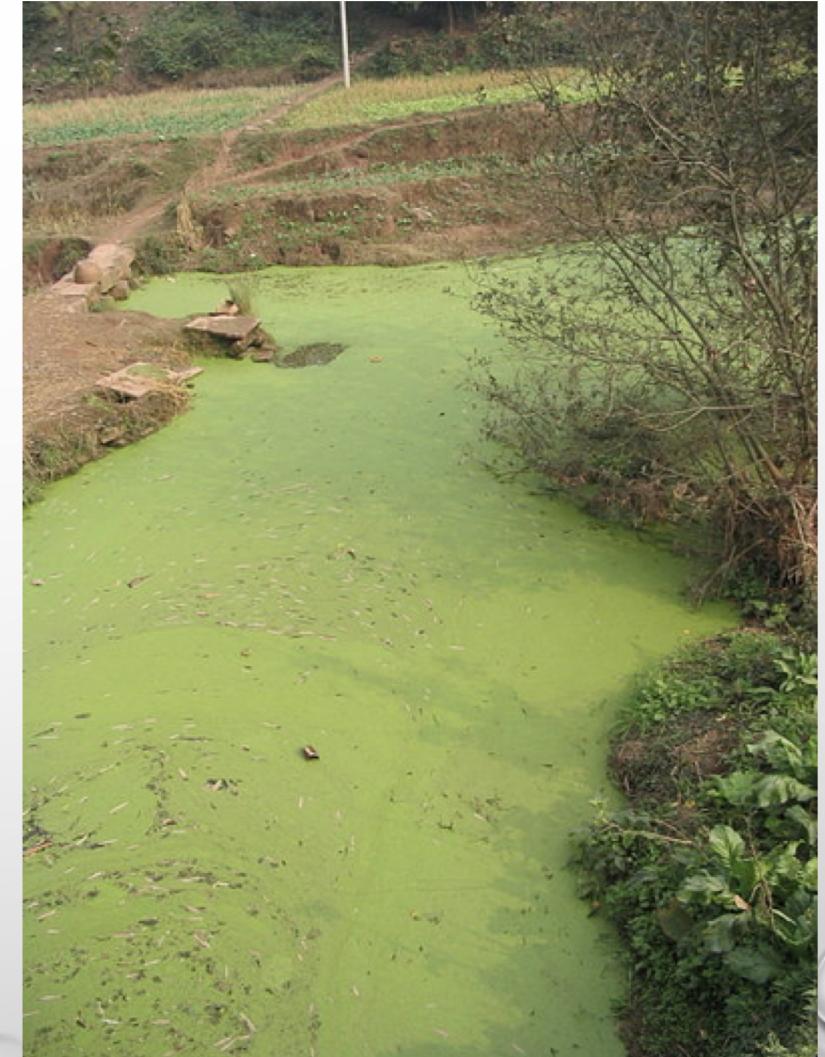
# PREDICTING DISSOLVED OXYGEN LEVELS IN STREAMS

MAURIE KATHAN

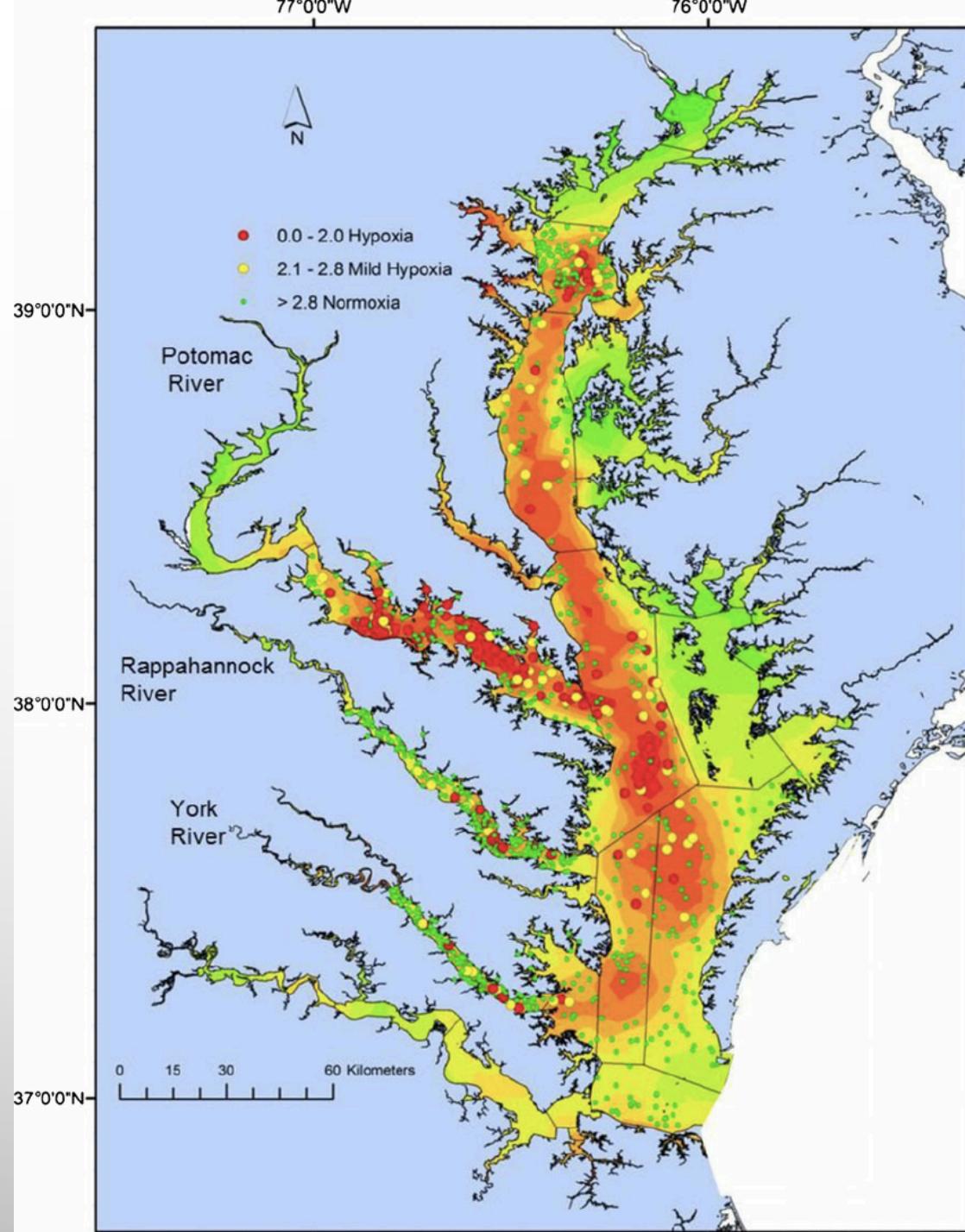
DATA SCIENTIST

# DISSOLVED OXYGEN

- Dissolved Oxygen is one of many common indicators tested to identify stream health.
  - Others include water temperature, PH and clarity
- We use dissolved Oxygen because the levels of oxygen in a stream, lake or bay is very important to the health of the organizations that live within the water. When oxygen levels get too low or two high this can be lethal to fish and micro-organisms.



Eutrophic stream in China

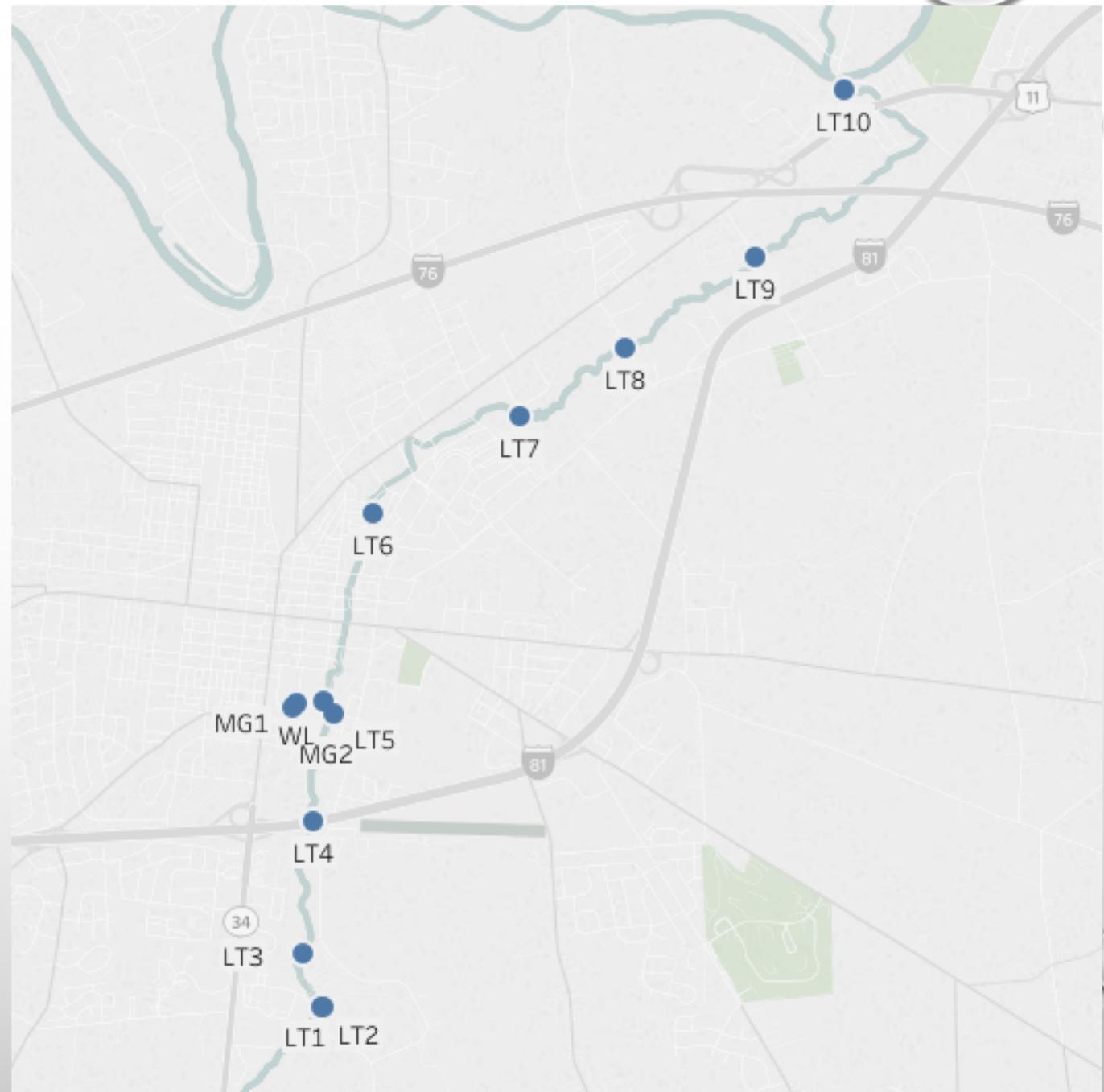


# LETORT SPRING RUN

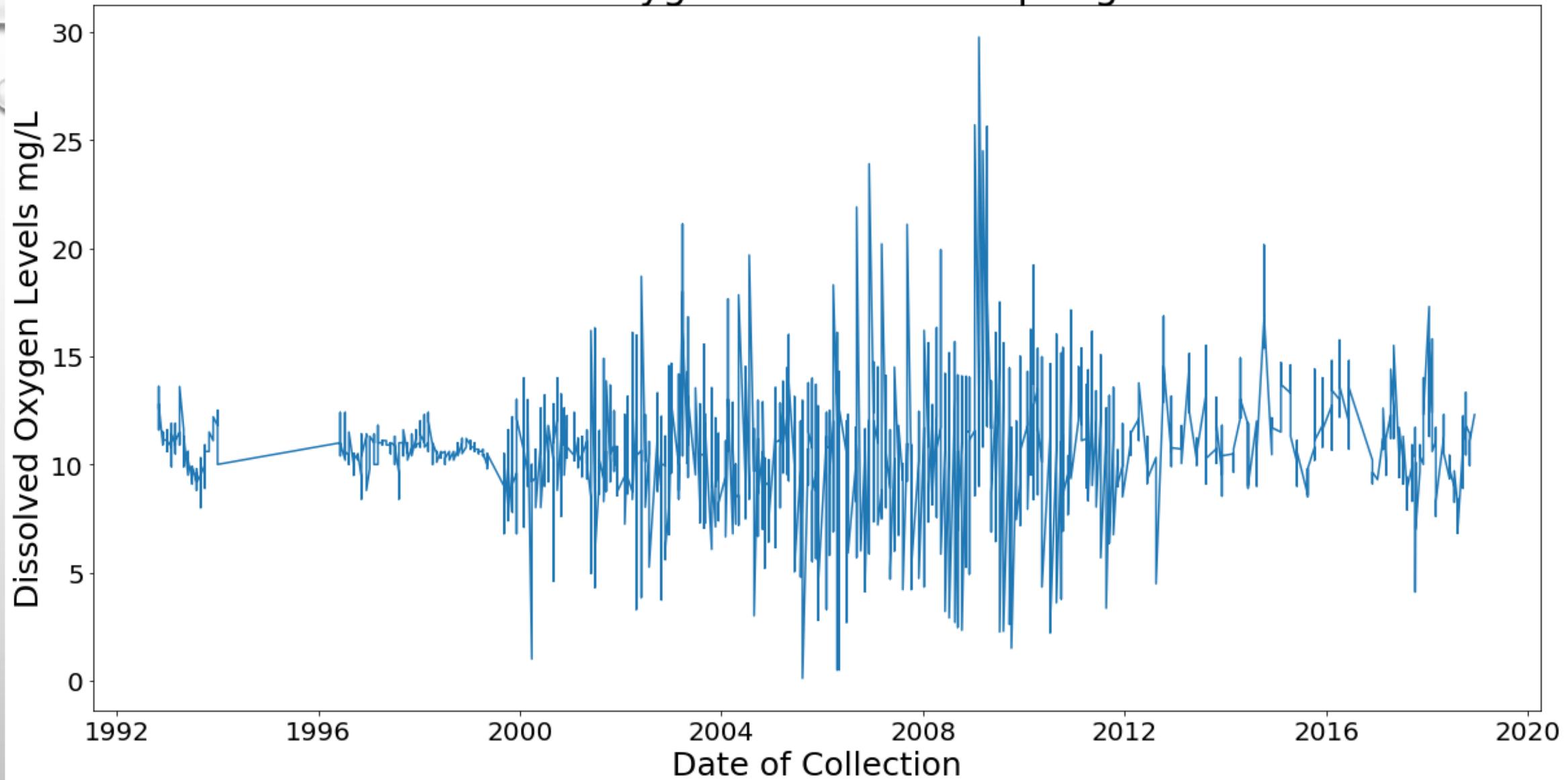




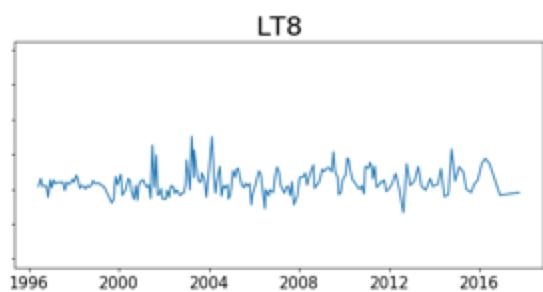
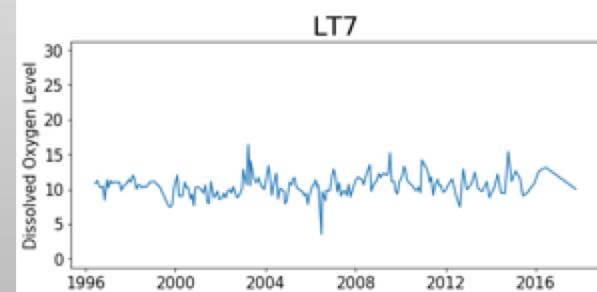
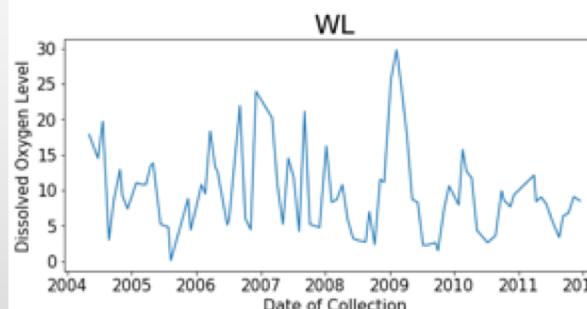
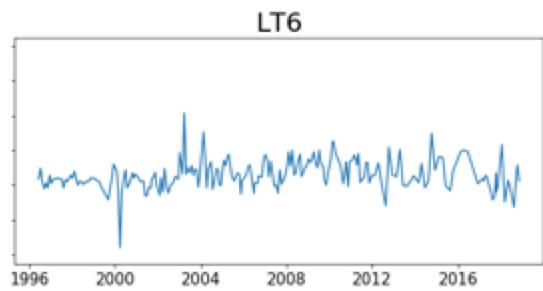
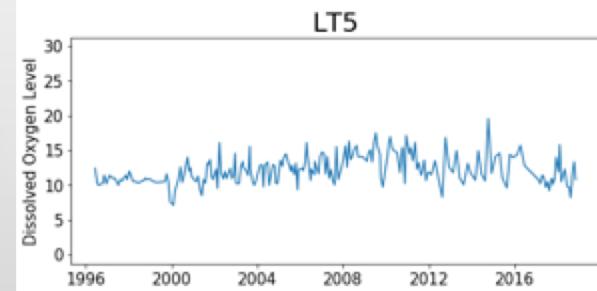
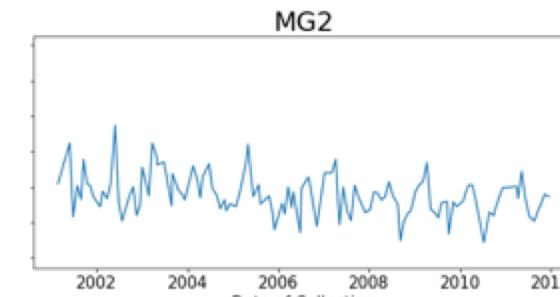
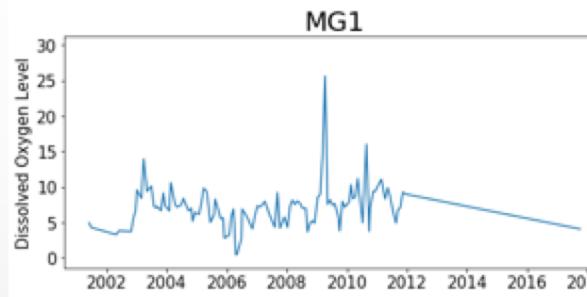
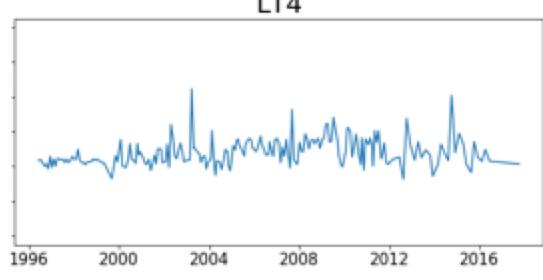
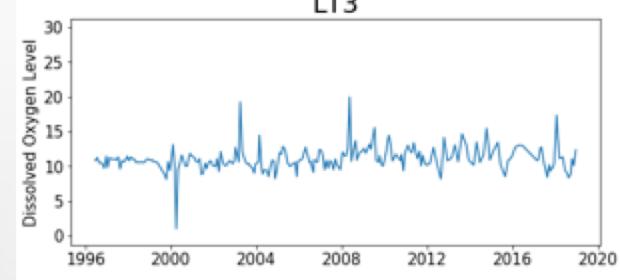
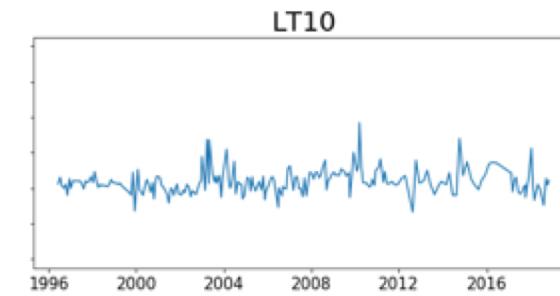
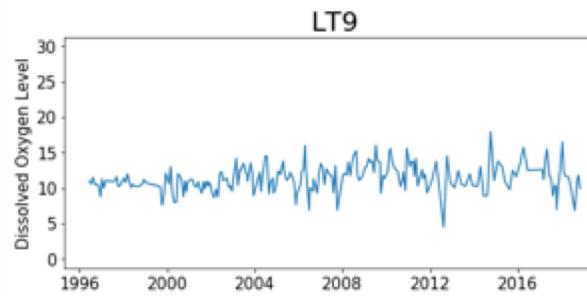
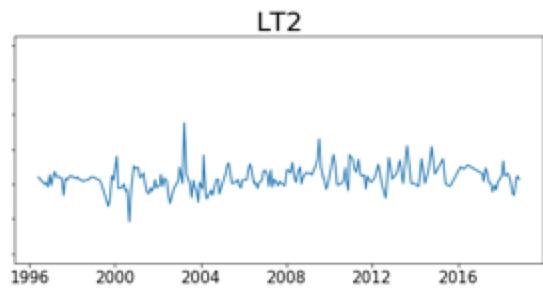
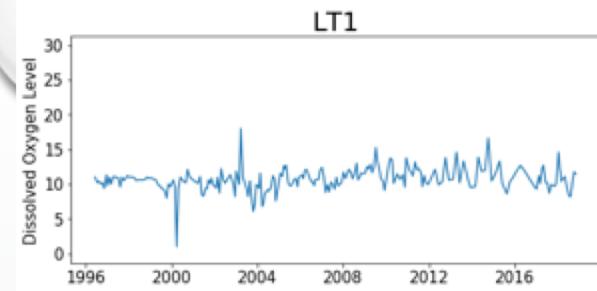
The Letort Regional Authority has been collecting data at 13 sites along the Letort Spring Run outside of Carlisle Pennsylvania since 1992.



## Collected Dissolved Oxygen Level Letort Spring Run 1992 -2018



## Dissolved Oxygen Level by Site



# BUILDING THE TIME SERIES MODEL

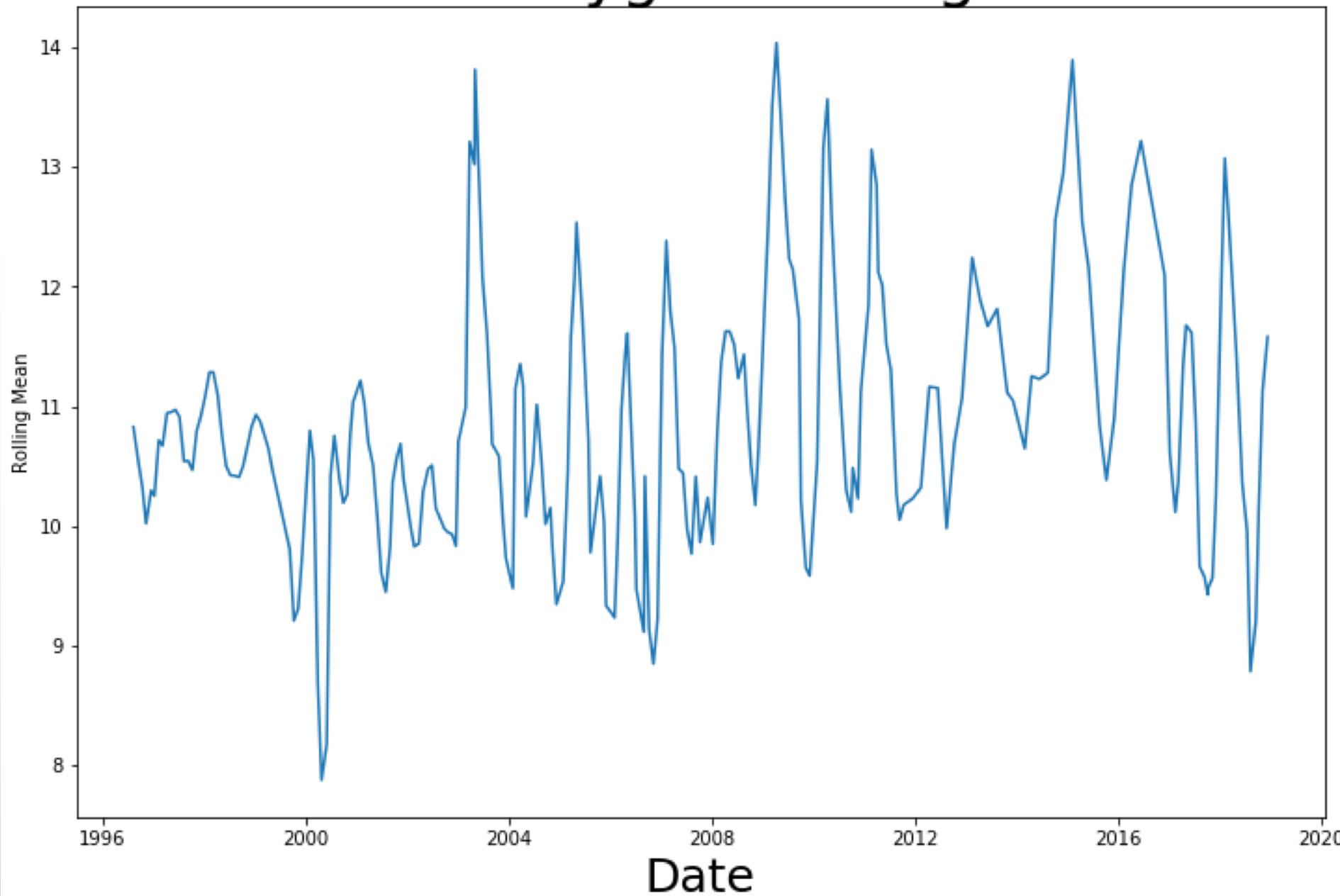


AGGREGATED THE DATA WITH  
THE AVERAGE VALUES OF ALL OF  
THE TESTING SITES.

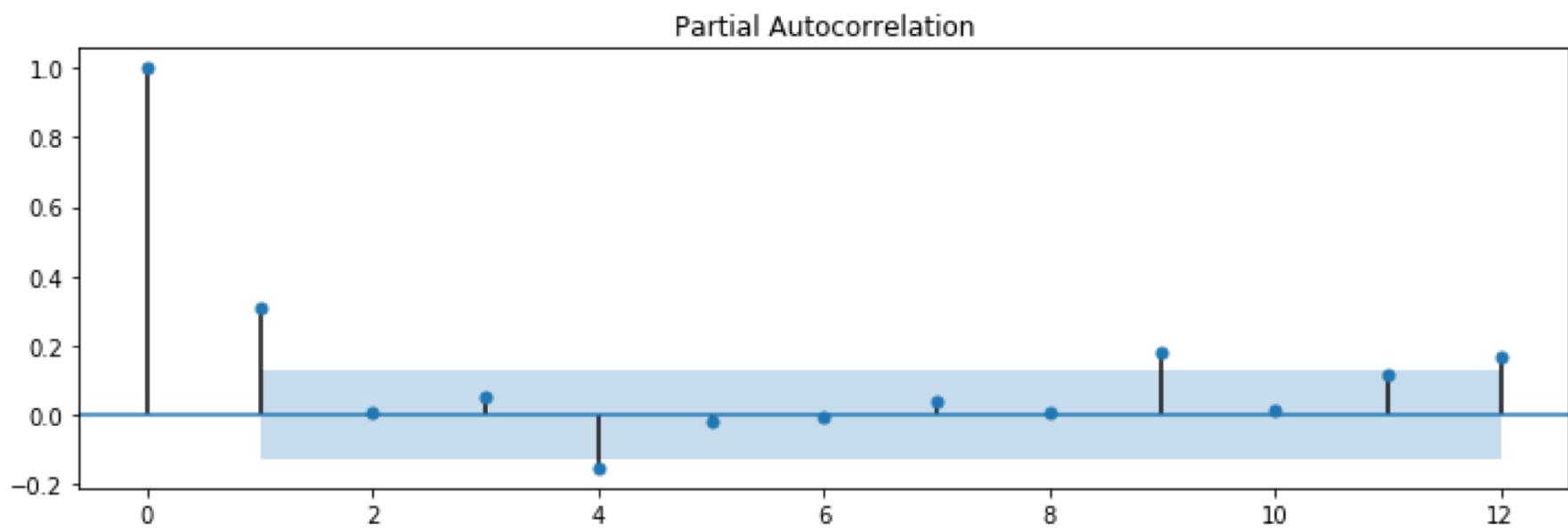
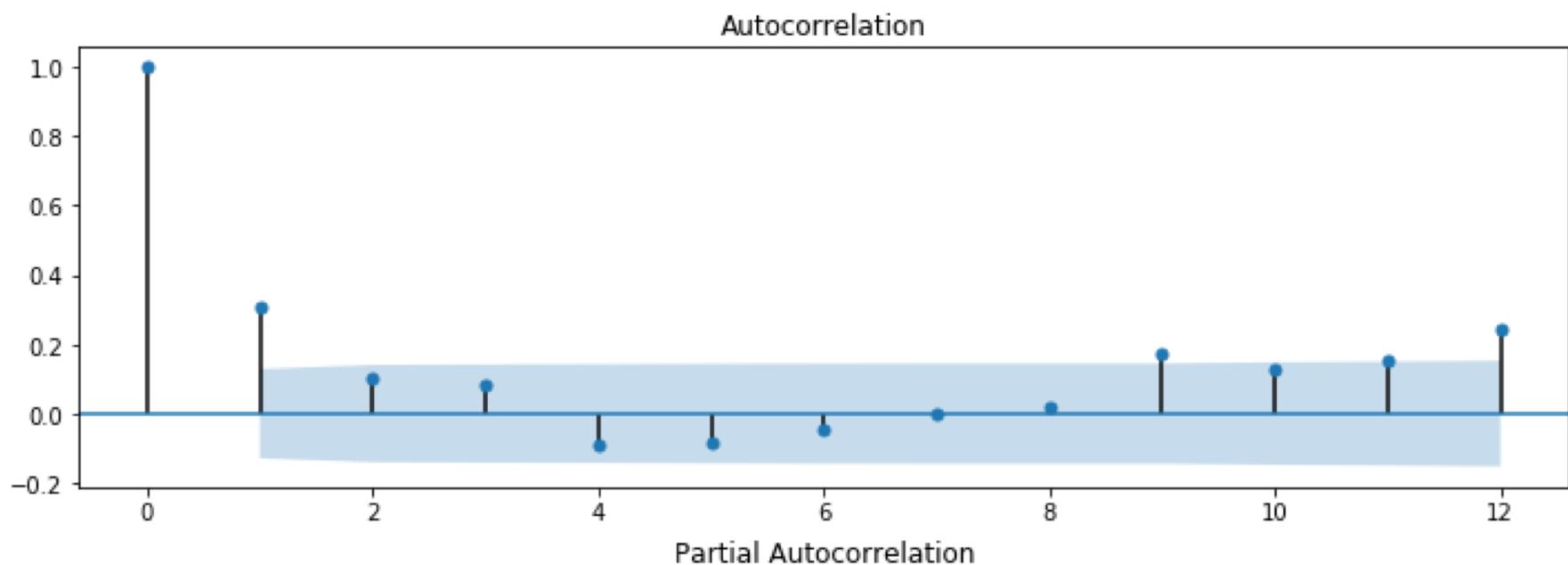


233 DATA POINTS FROM JUNE  
8TH 1996 TO DECEMBER 10TH  
2018

# Dissolved Oxygen Rolling Mean 3



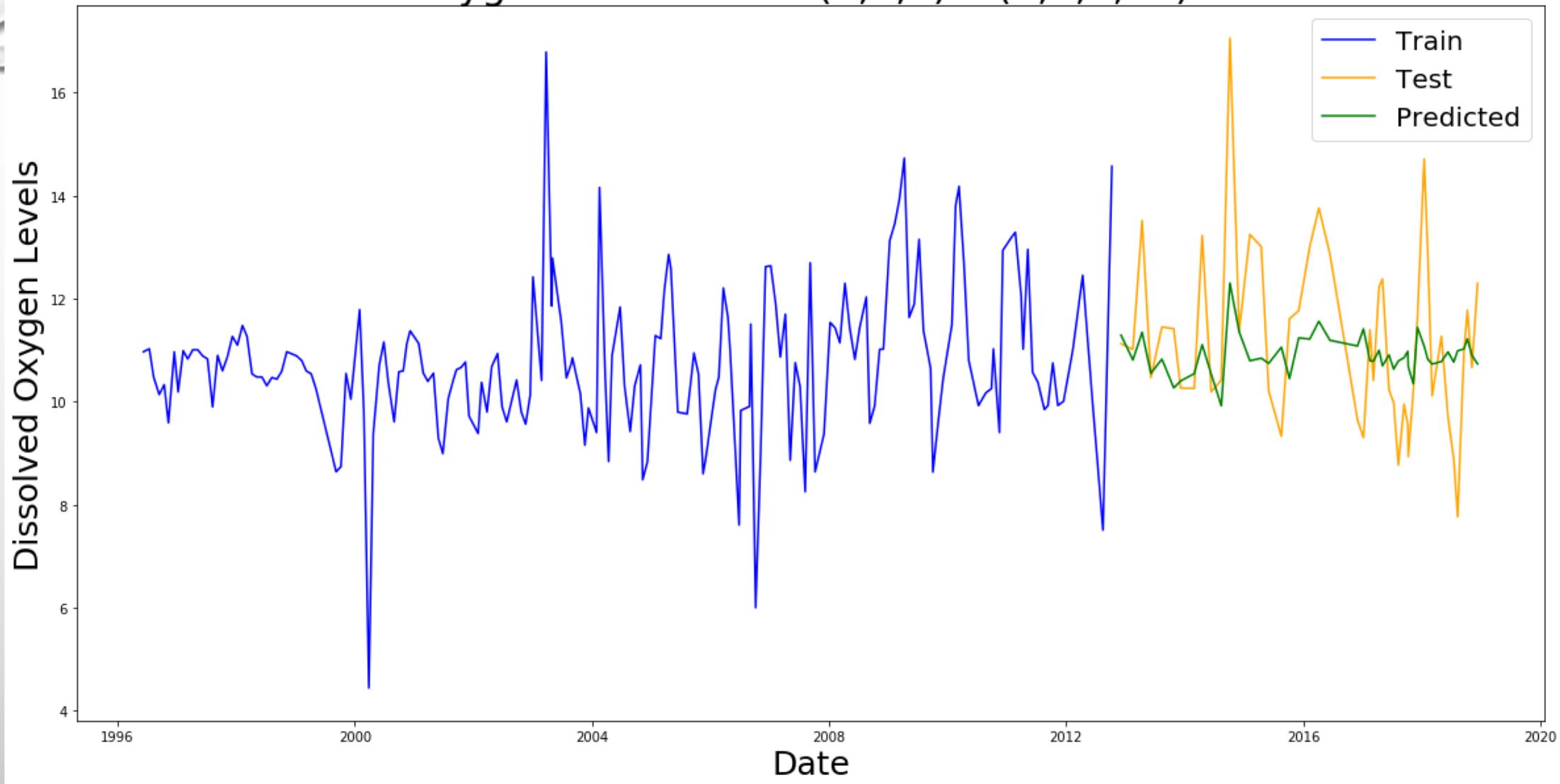
## Dissolved Oxygen Lag 12



# DATA METRICS

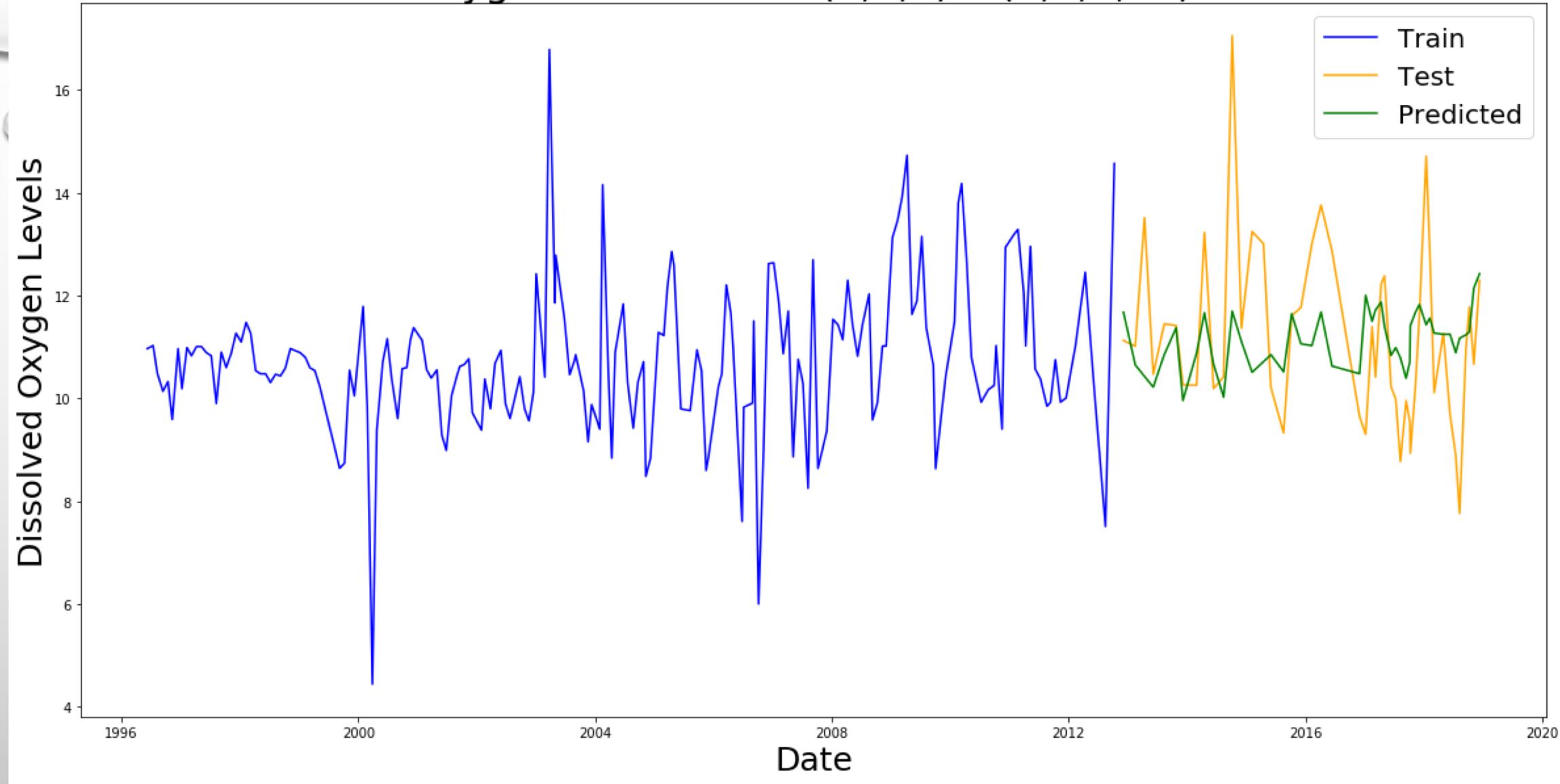
- **DICKEY FULLER:**
  - P VALUE: 8.057773505476658E-20
- **MEAN**
  - 10.739188723462918

## Dissolved Oxygen with SARIMA(3,1,2) x (4,0,3,12) Predictions

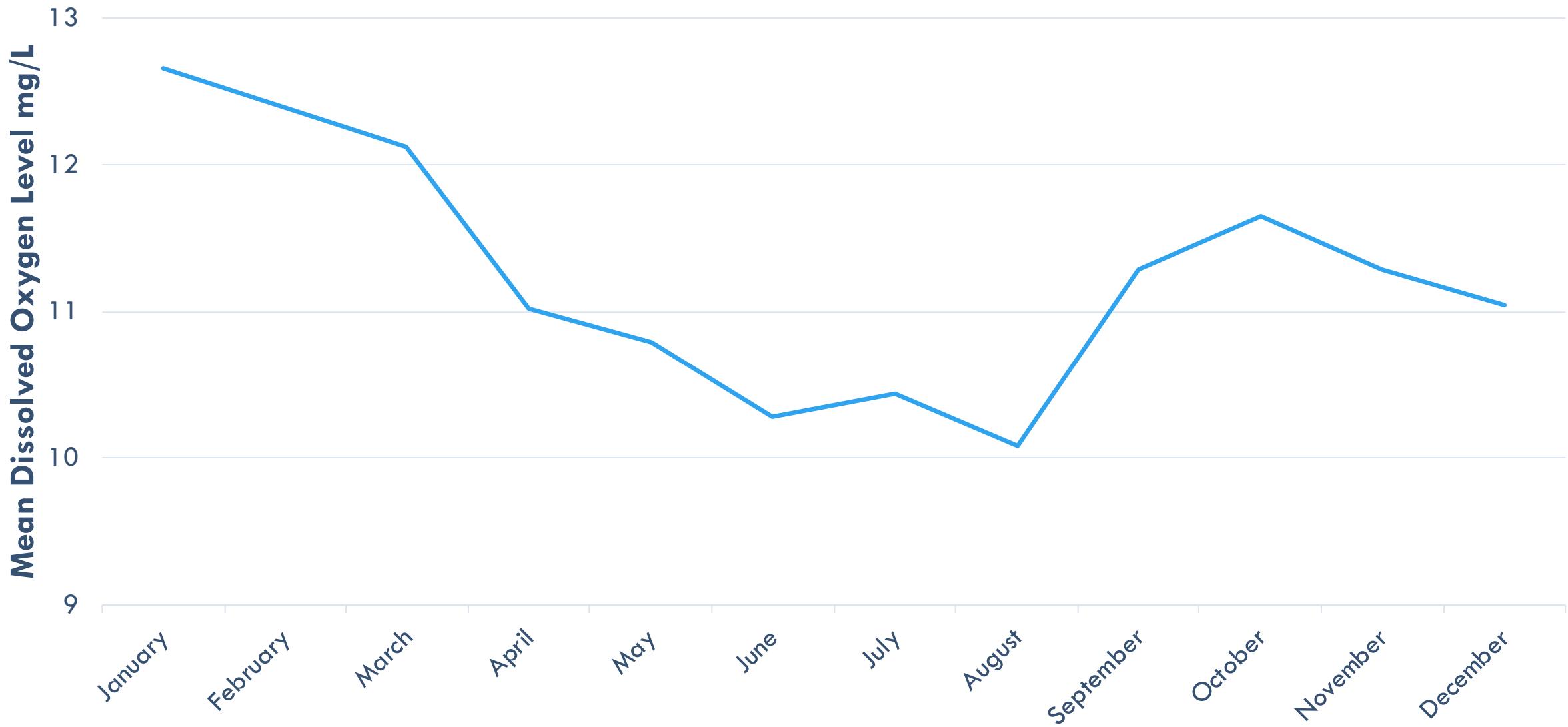


MAE: 1.224938

## Dissolved Oxygen with SARIMA(4,0,2) x (3,0,5,12) Predictions



## Forecasted Dissolved Oxygen Levels



# NEXT STEPS



Look at each location individually



More research into why the data is flatter before 2000



Look at why the levels at MG1, MG2 and WL are more variable than the LT sites.



Compare analysis to other stream data to see how health compares.