



West Nile Virus: Data and Modeling

DC-DSI 4
April 2017

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Roadmap

- Background
- Introductory data exploration
- Model building and methodology
- Findings
- Recommendations

Objectives

Analysis of provided data

Model building for predictions

Recommendations for pesticide deployment

Data Overview

1. Chicago DPH mosquito data

- Trap location, date, species, WNV present

Data Overview

2. NOAA weather

- 2 stations
- Times, temperature, precipitation, atmospheric pressure, observations

Data Overview

3. Pesticide spray data

- Date and location

Data Overview

- Data - 3 sources:
 1. Chicago DPH mosquito data
 2. NOAA weather data
 3. Pesticide spray data

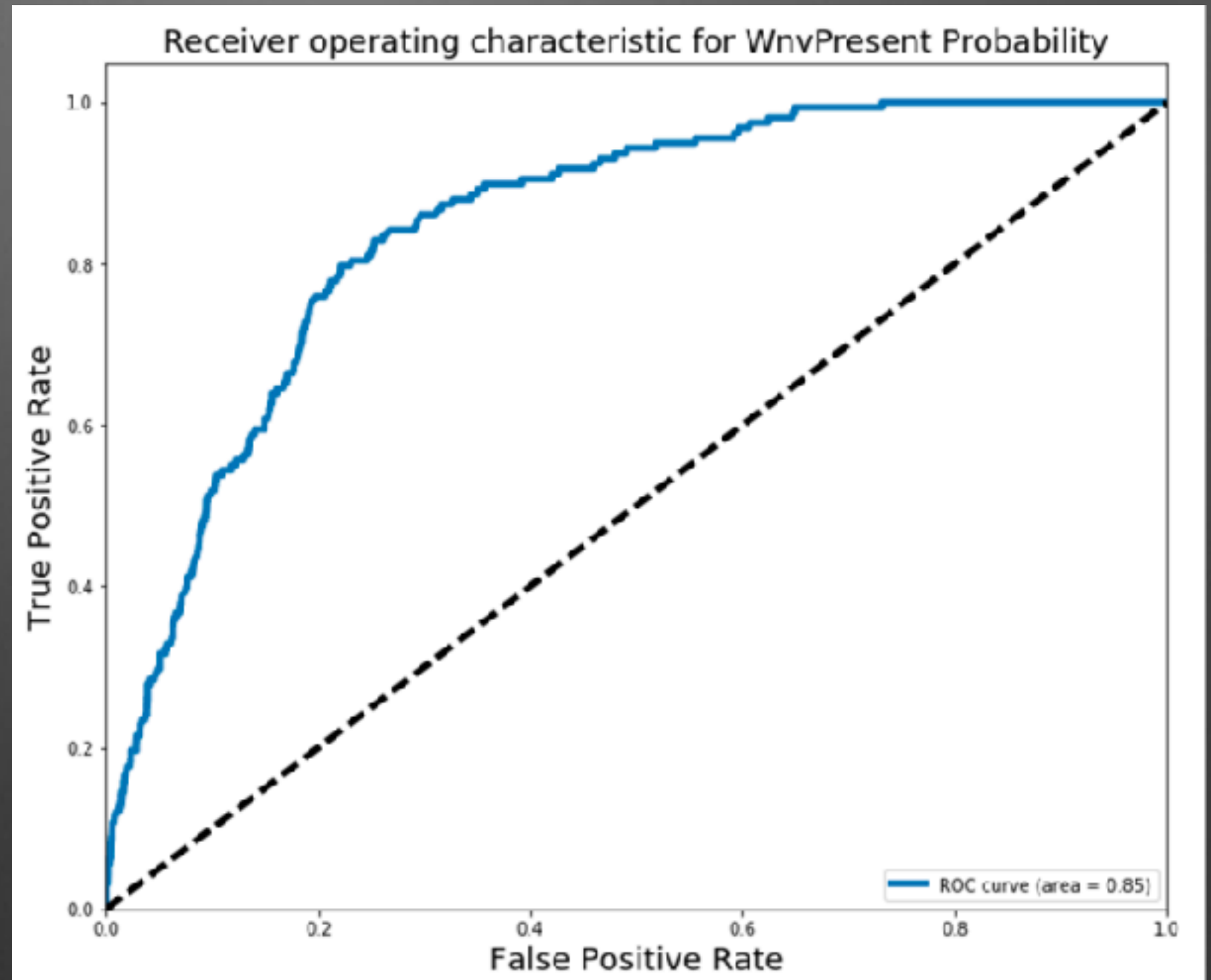
Modeling Approach

- Associate each trap test with weather and spray data
- Determine factors that made for an effective predictive model
- Measure model effectiveness

Model Effectiveness

ROC-AUC

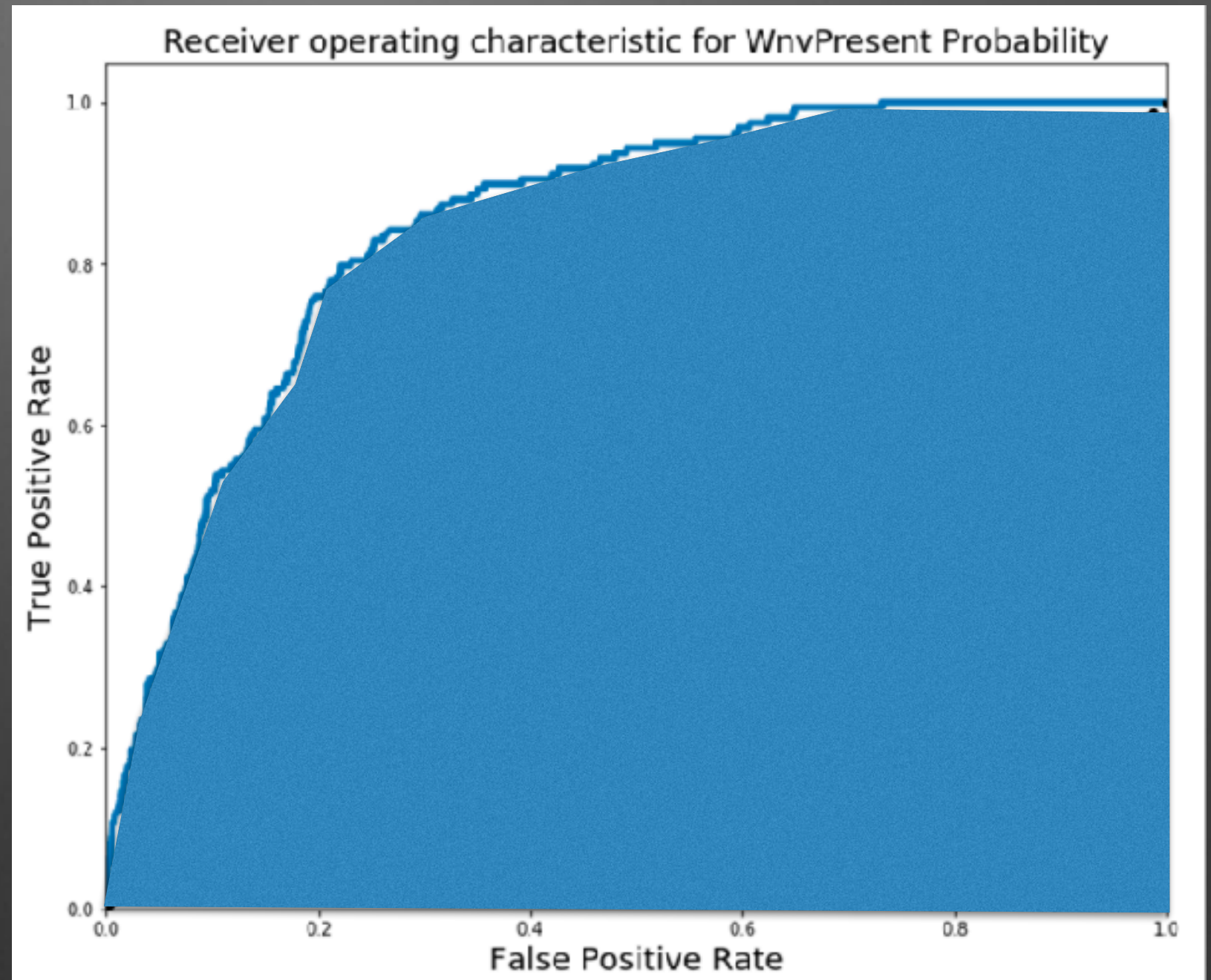
“Area under the curve”



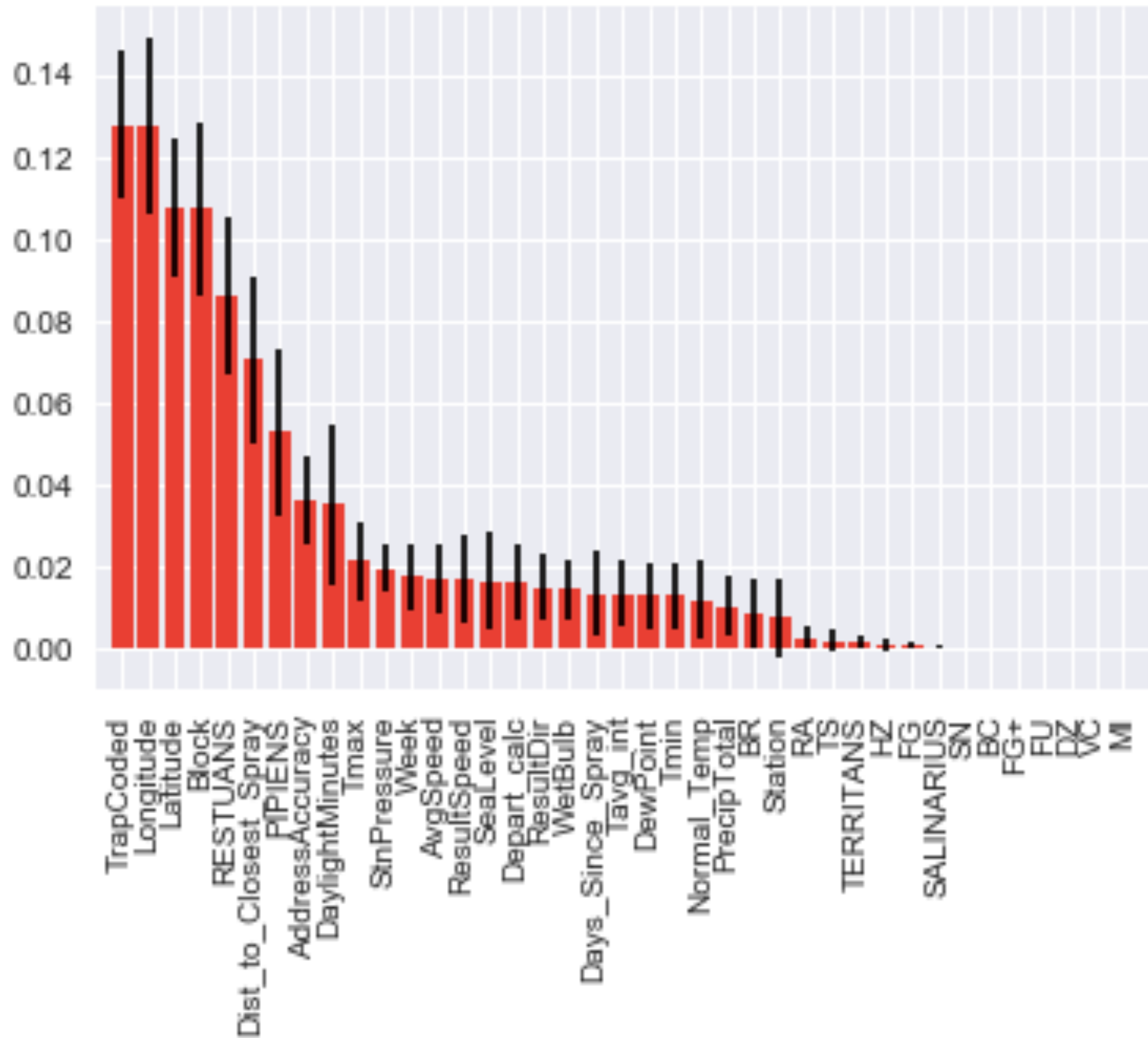
Model Effectiveness

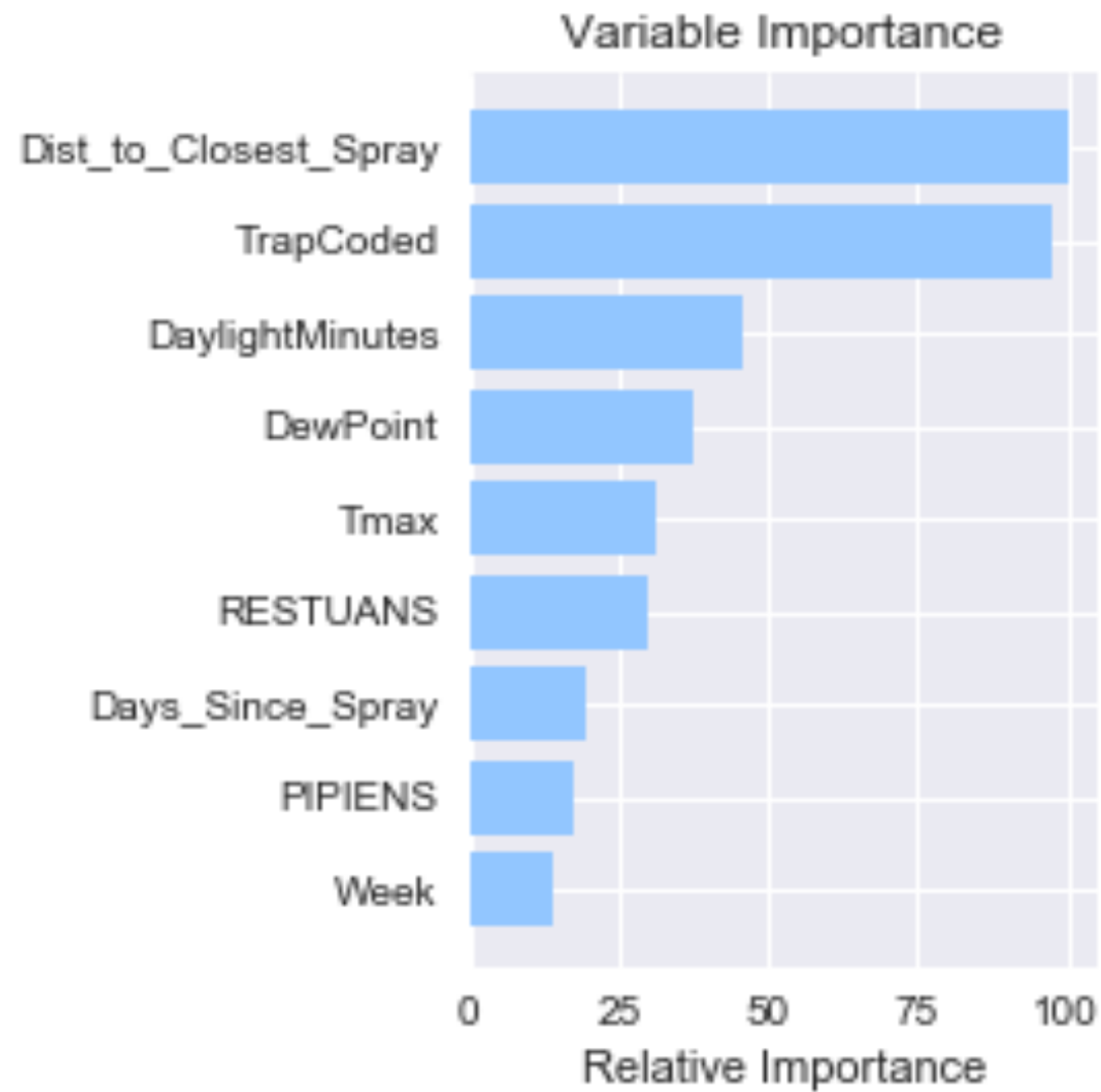
ROC-AUC

“Area under the curve”



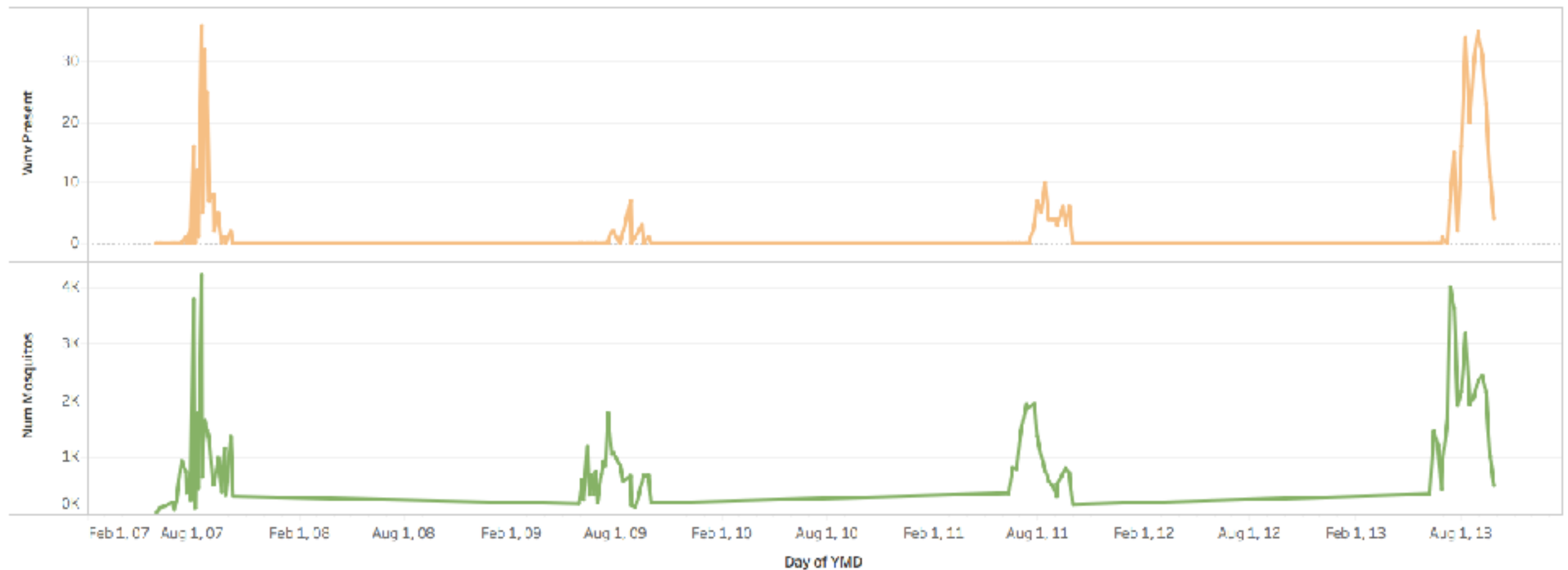
Feature importances



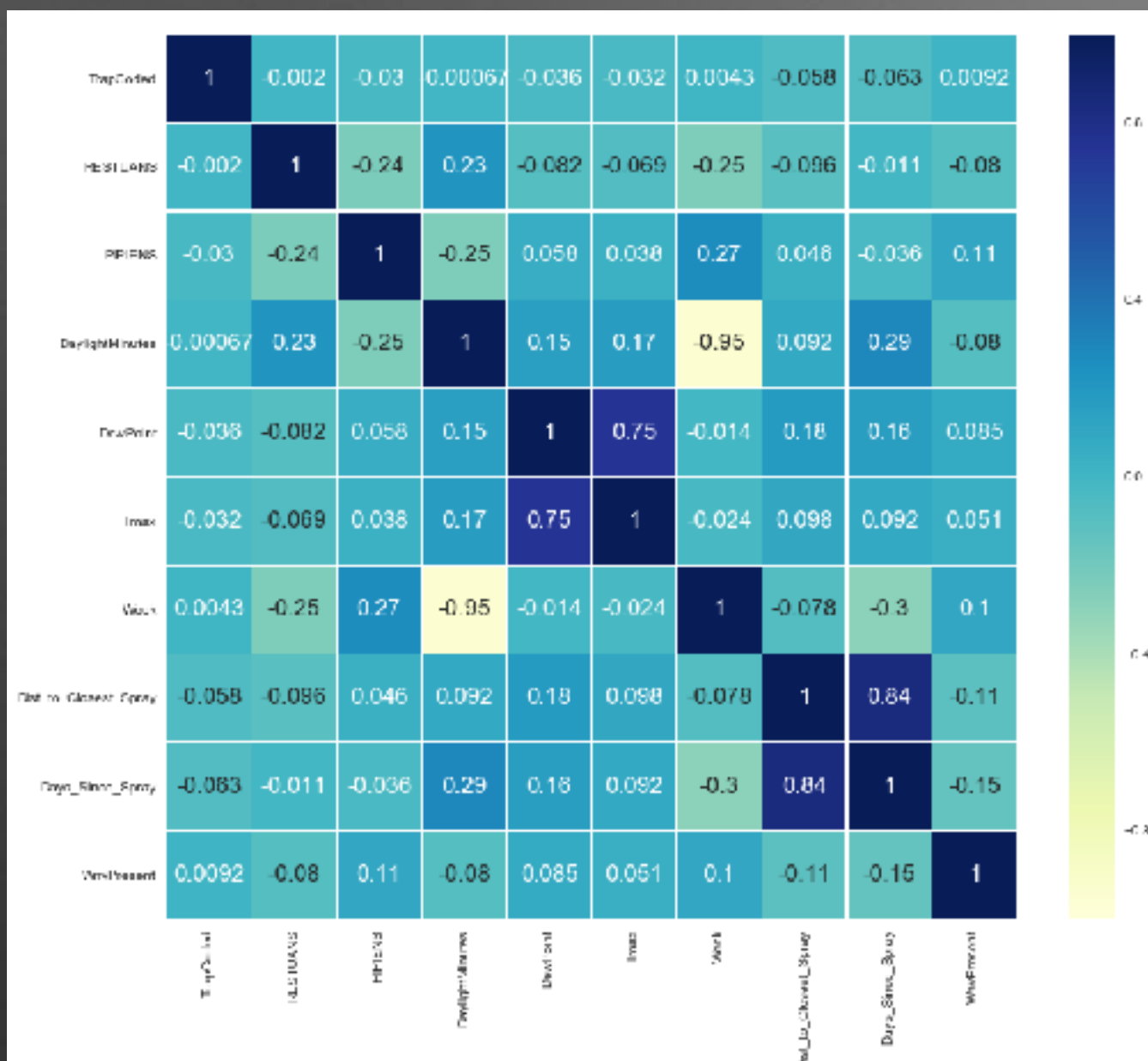


To Tableau

West Nile Virus Spikes when Mosquito Populations Spike

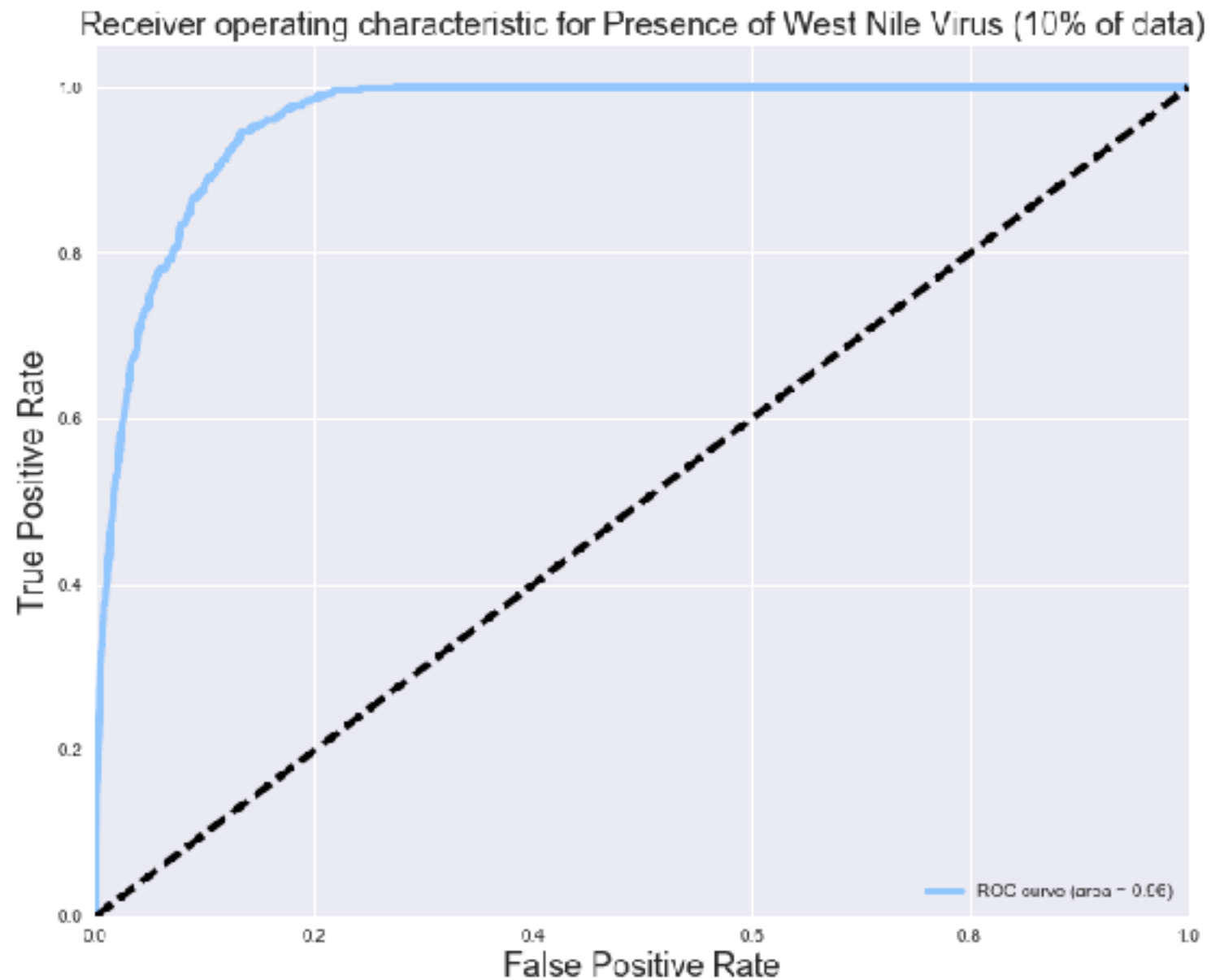


Unfortunately, # mosquitoes is the
strongest predictor



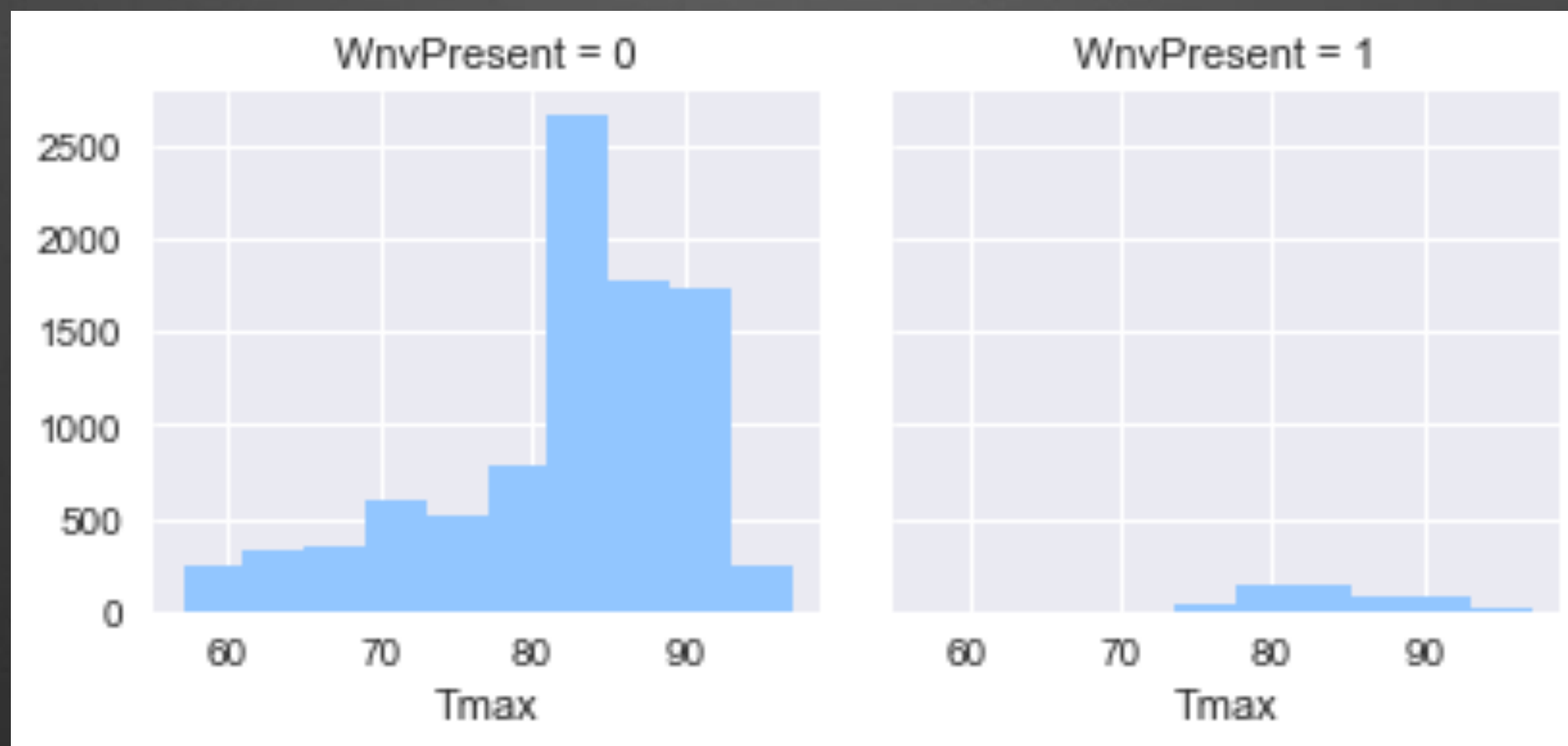
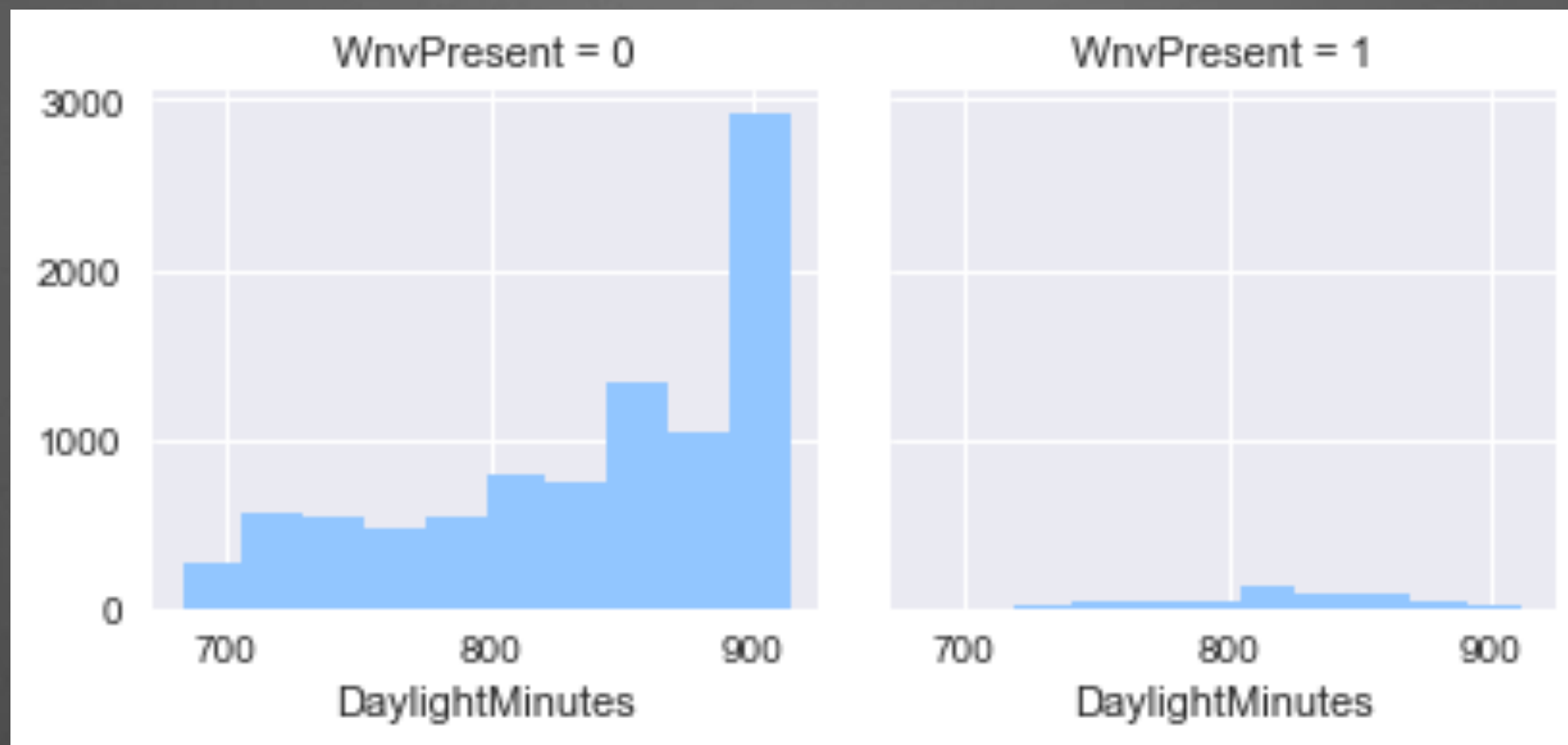
Findings

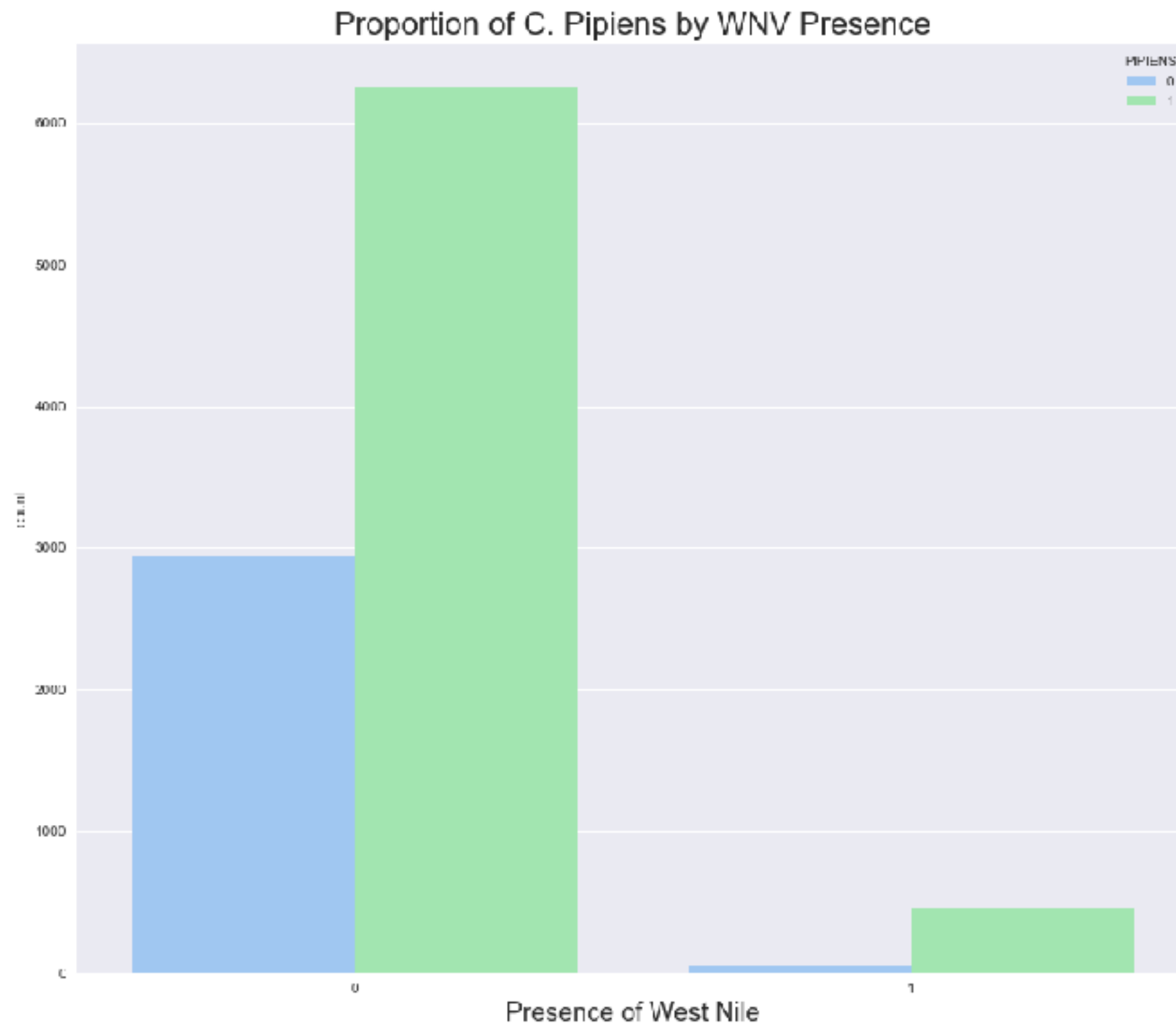
Model Evaluation

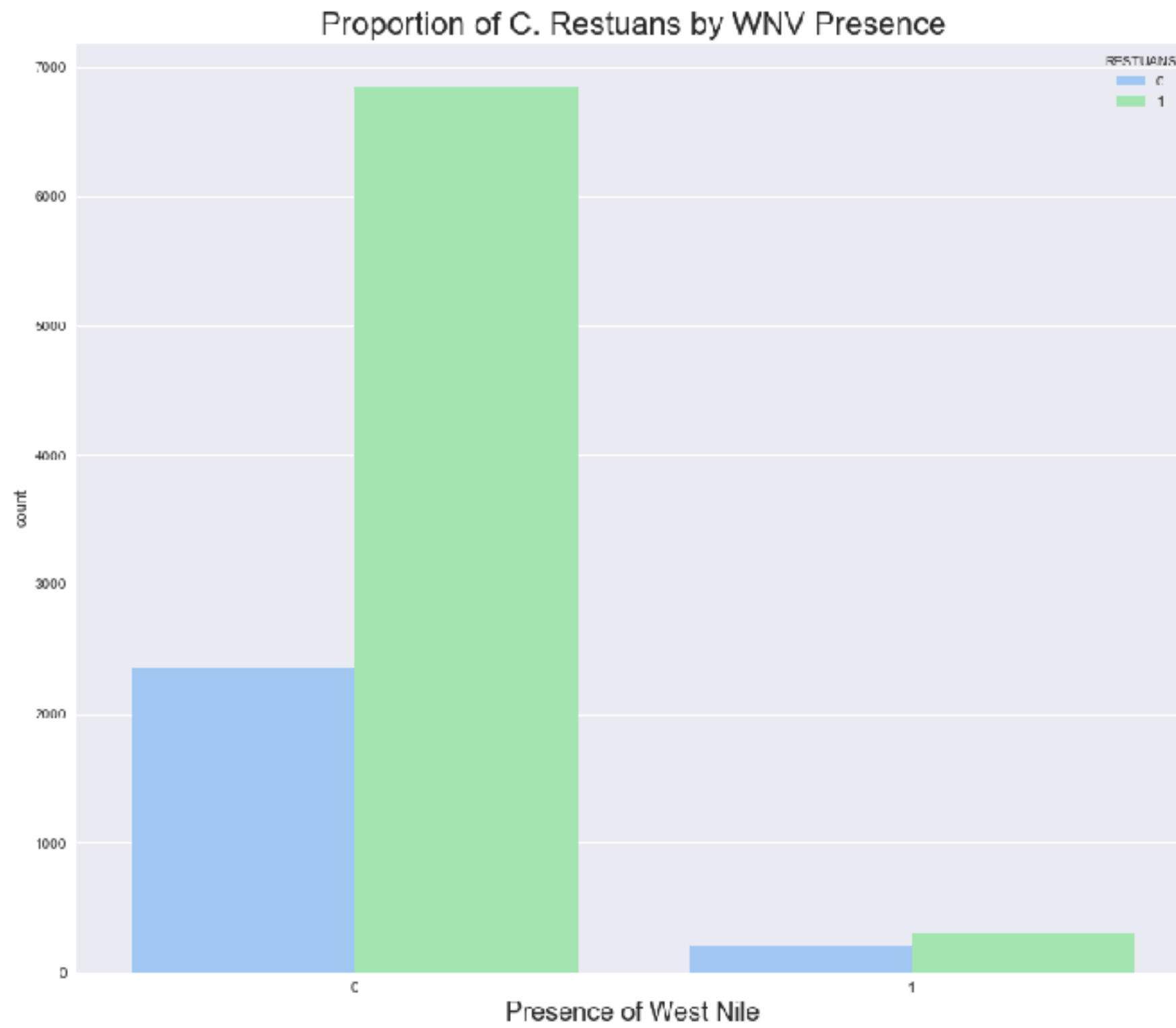


ROC-AUC Score: 0.745 / 0.748

Background • Exploration • Modeling • Findings • Recommendations







Recommendations

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- Preventative vs. Reactionary?

Difficult to recommend with this spray data

Recommendations

- Enhanced risk:

↑ moisture & ↑ temperature

Recommendations

- Focus areas:
 - + trap, *C. restuans* and *C. pipiens*
- Population centers, ORD, MDW

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Future Directions

- Model runs with more complete data
(Test group missing # of mosquitoes)
- Incorporate updated data

Questions?