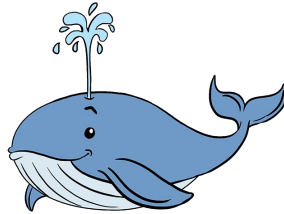


Top 5 US Zip Codes for Real Estate Investment

Brent Butler, Wyatt Sharber, & Karen Warmbein



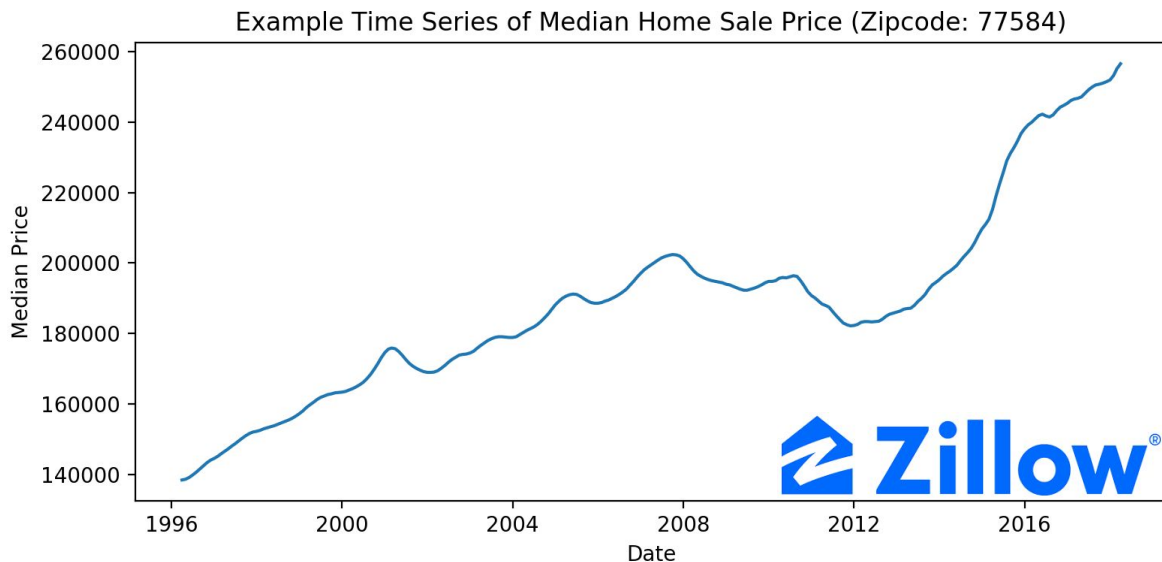
Blue Whale Flippers, LLC

Objective

- Real estate can turn quick profits if investments are made properly
- Our business helps customers invest in real estate for resale at a later date (i.e., “house flipping”)
- In this project, we identify housing markets that are projected to rapidly grow within the next five years for real estate investment

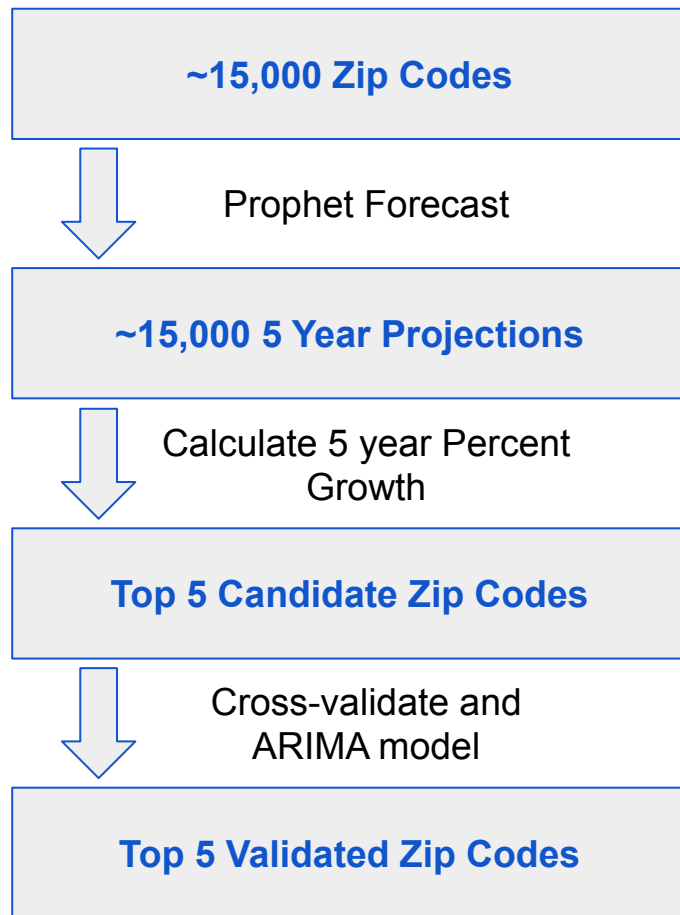
Data Gathering and Processing

- We used data from Zillow on the median home sale price for nearly 15,000 for Zip Codes across the US
- This data is represented as a time series of monthly median prices since approximately 1996 (although some regions have a shorter record)



Modeling and Evaluation

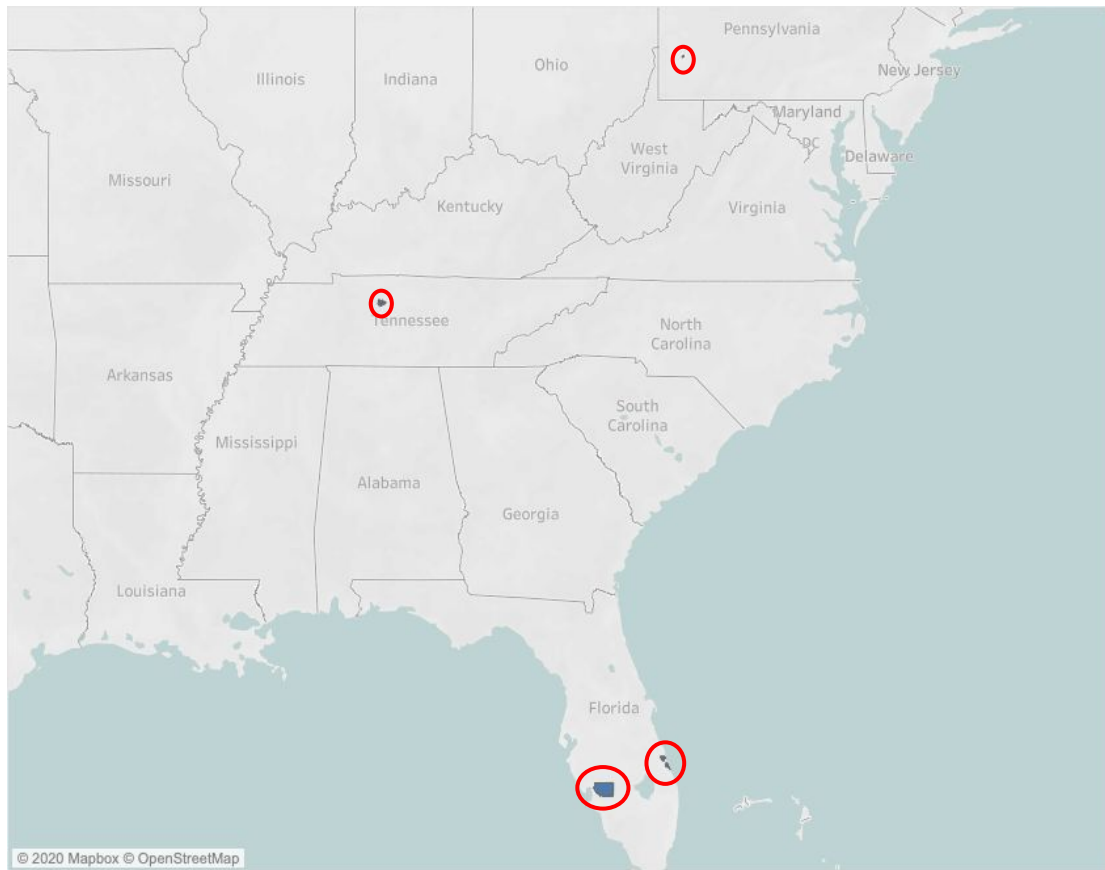
1. Forecast 5 years of future home sale prices with Facebook Prophet for all Zip Codes in our dataset
2. Select top 5 Zip Codes with at least 20 years of data
3. Cross-validate to evaluate the Prophet model and forecast with ARIMA model



Key Results

Top 5 Zip Codes with 5 year projected growth over 60%:

1. Ft. Pierce, FL, 34982
2. Punta Gorda, FL, 33982
3. Ft. Pierce, FL, 34951
4. Nashville, TN, 37209
5. Pittsburgh, PA, 15201



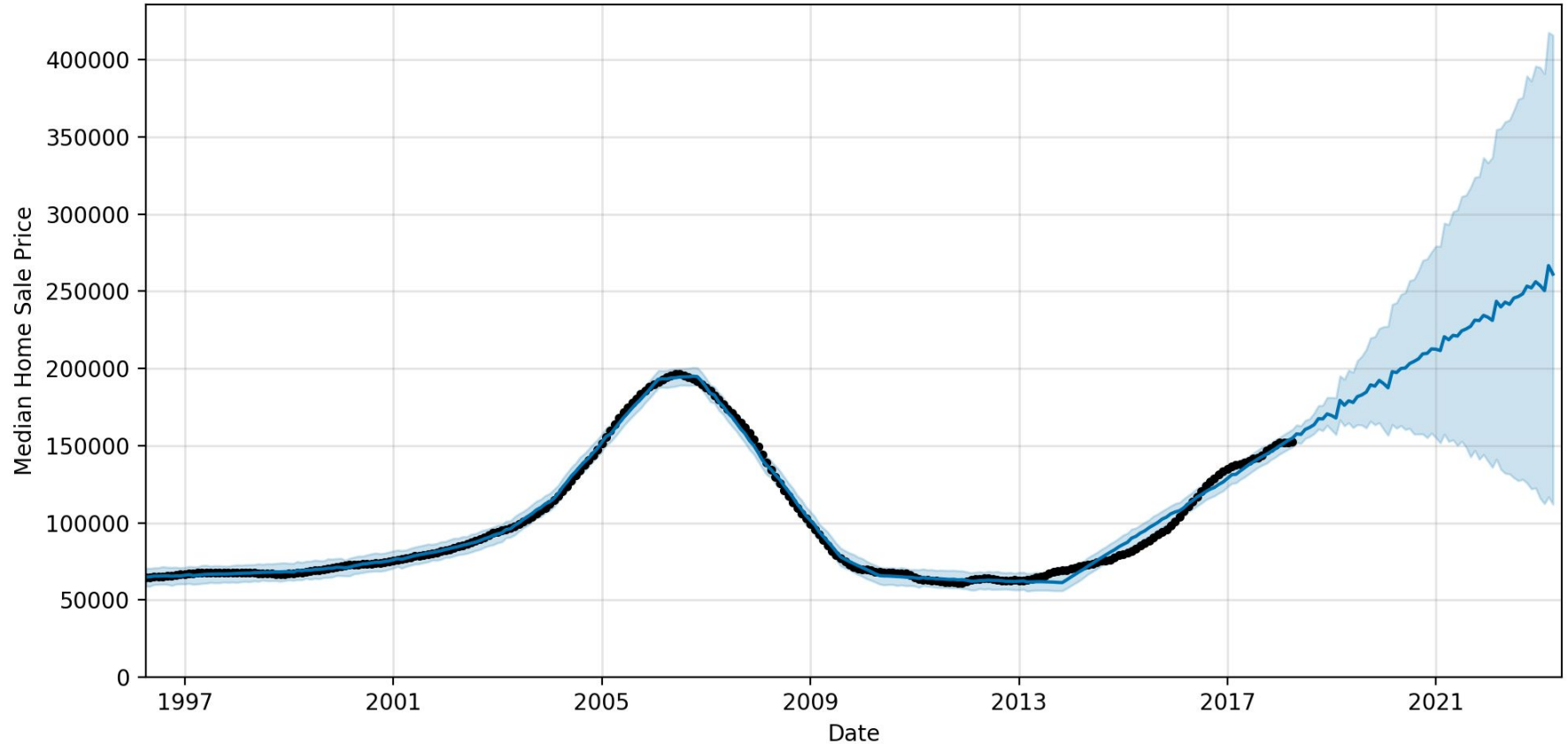
Five year forecast of median home sale price for Fort Pierce, FL, 34982

Current Price (as of April 2018): \$152500

One Year Estimate: \$179044 (Percent Growth: 17.41%)

Five Year Estimate: \$261115 (Percent Growth: 71.22%)

RMSE: 23904.77



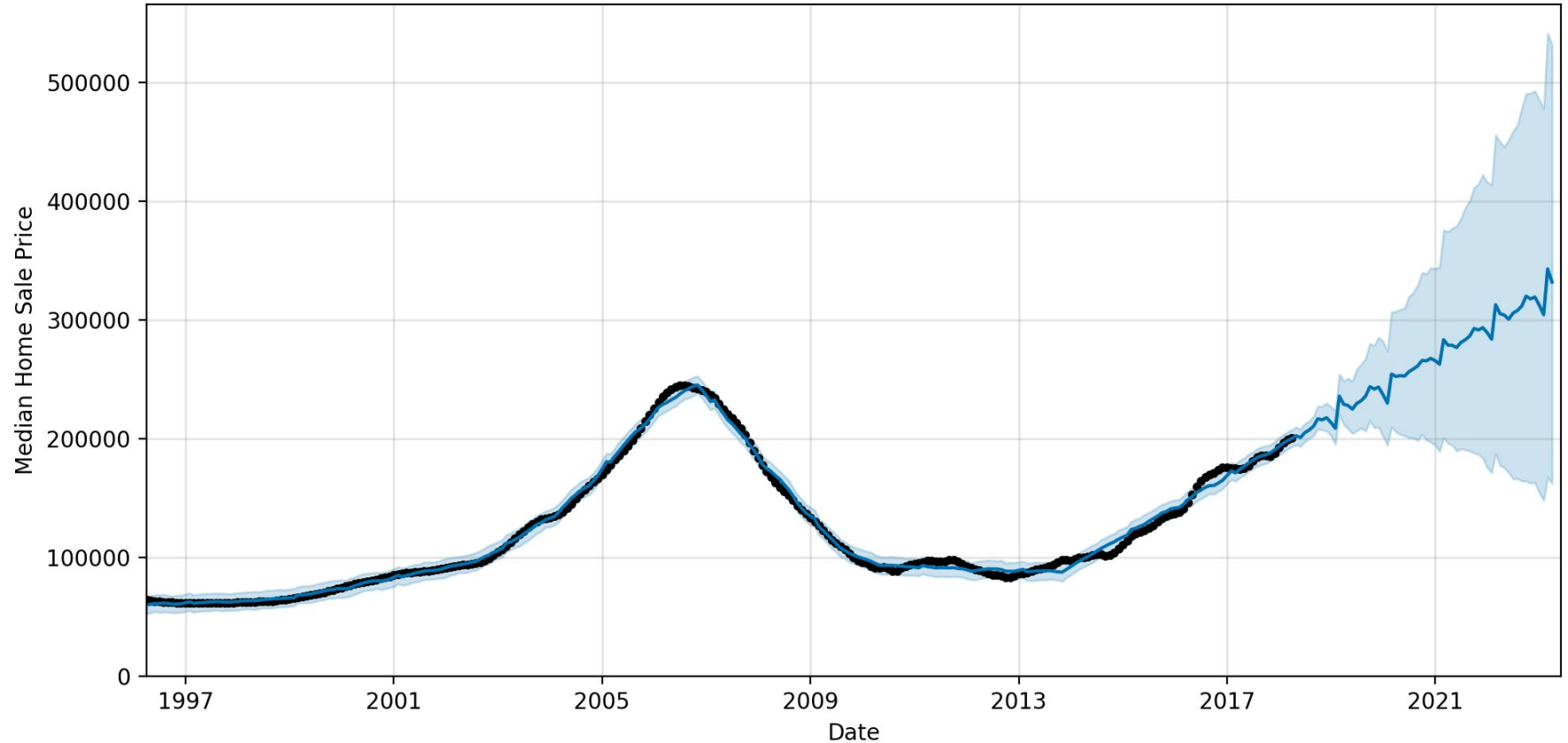
Five year forecast of median home sale price for Punta Gorda, FL, 33982

Current Price (as of April 2018): \$200200

One Year Estimate: \$227813 (Percent Growth: 13.79%)

Five Year Estimate: \$331671 (Percent Growth: 65.67%)

RMSE: 31441.0



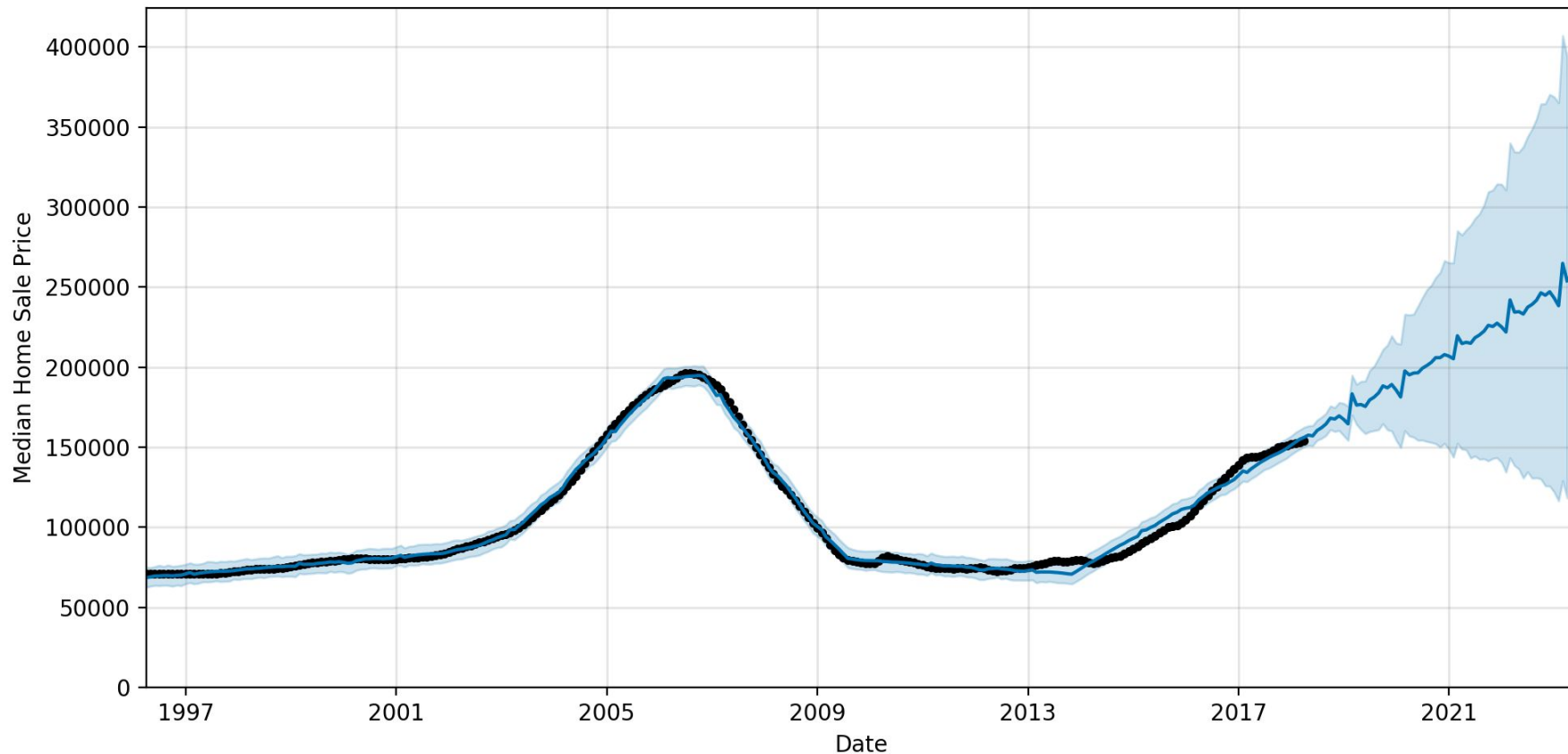
Five year forecast of median home sale price for Fort Pierce, FL, 34951

Current Price (as of April 2018): \$154100

One Year Estimate: \$176698 (Percent Growth: 14.66%)

Five Year Estimate: \$253952 (Percent Growth: 64.8%)

RMSE: 21470.09



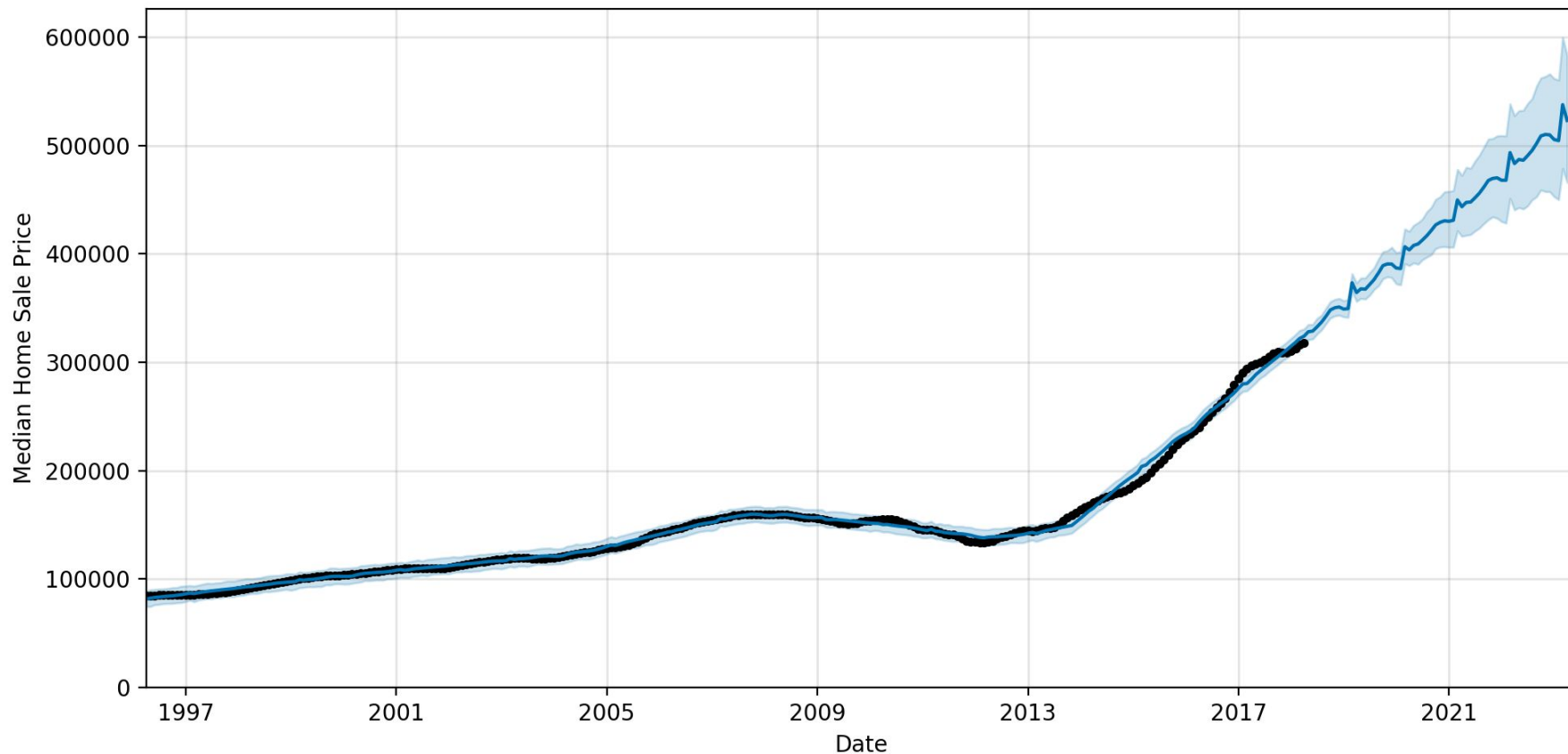
Five year forecast of median home sale price for Nashville, TN, 37209

Current Price (as of April 2018): \$318000

One Year Estimate: \$367745 (Percent Growth: 15.64%)

Five Year Estimate: \$523122 (Percent Growth: 64.5%)

RMSE: 14152.5



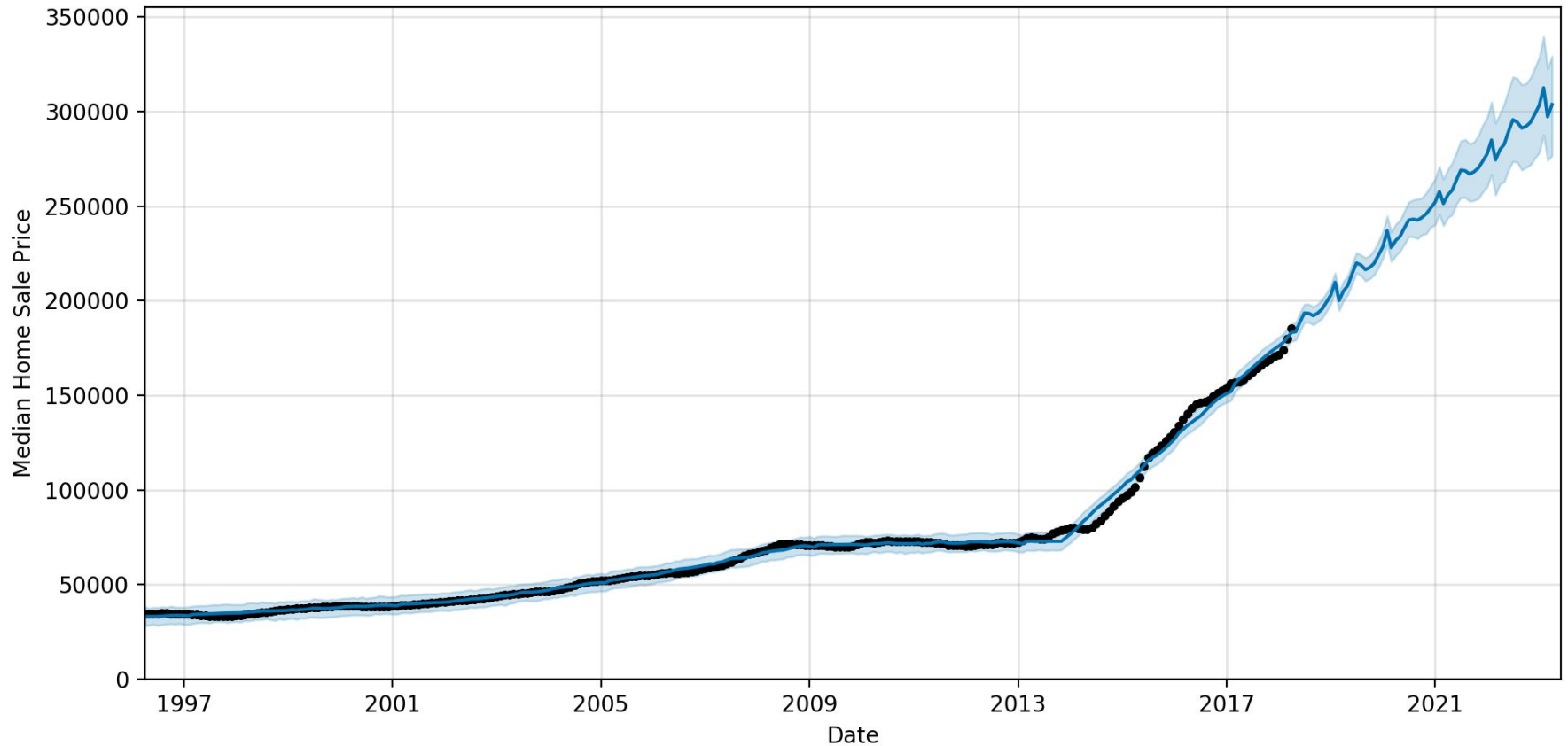
Five year forecast of median home sale price for Pittsburgh, PA, 15201

Current Price (as of April 2018): \$185200

One Year Estimate: \$207961 (Percent Growth: 12.29%)

Five Year Estimate: \$303588 (Percent Growth: 63.92%)

RMSE: 10889.11

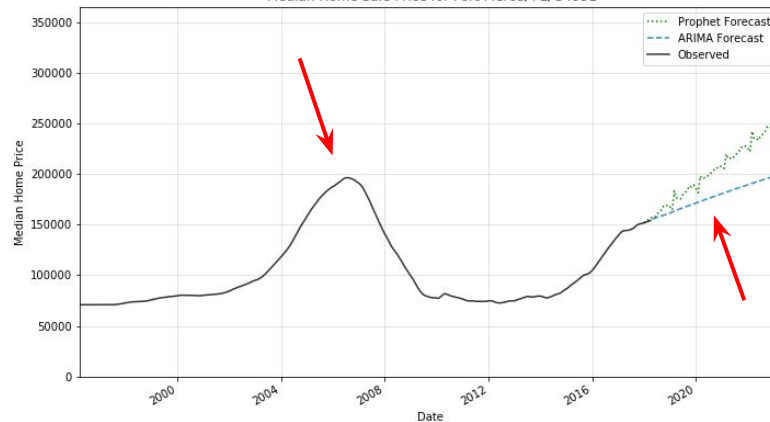


ARIMA Comparison

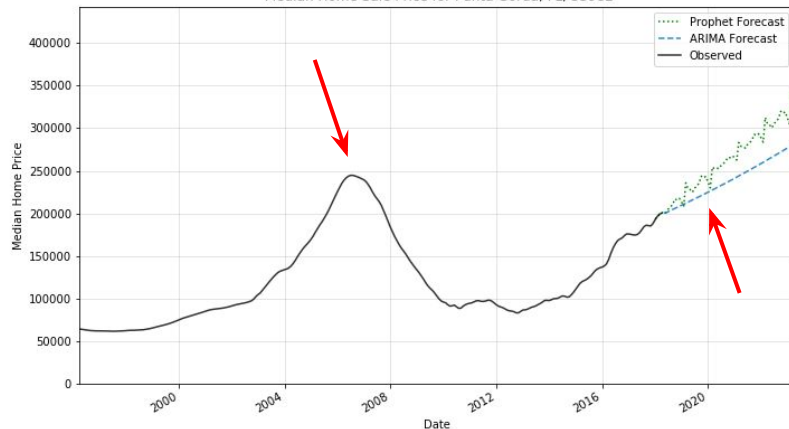
Florida locations:

- Large impact from recession
- ARIMA predictions more conservative

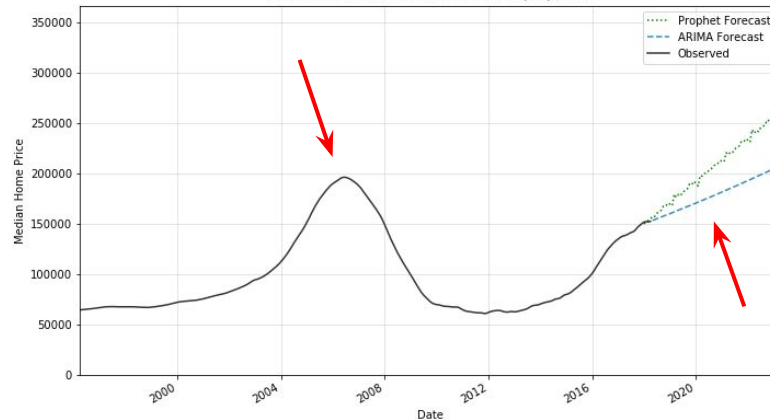
ARIMA/Prophet Model Comparison
Median Home Sale Price for Fort Pierce, FL, 34951



ARIMA/Prophet Model Comparison
Median Home Sale Price for Punta Gorda, FL, 33982



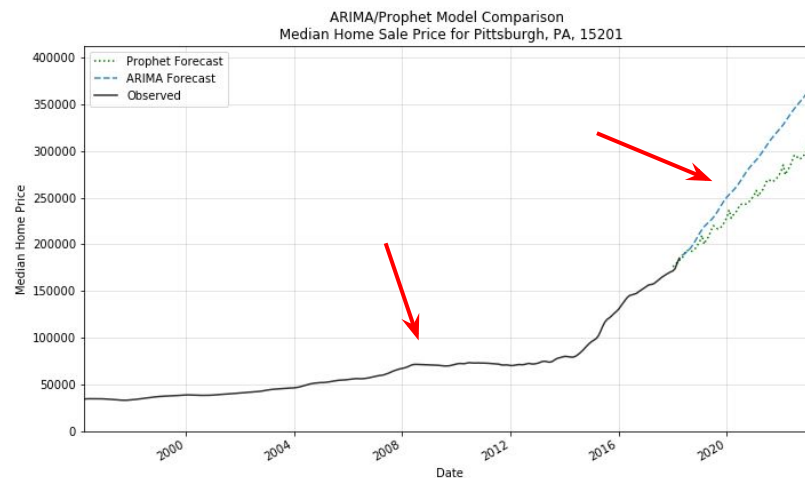
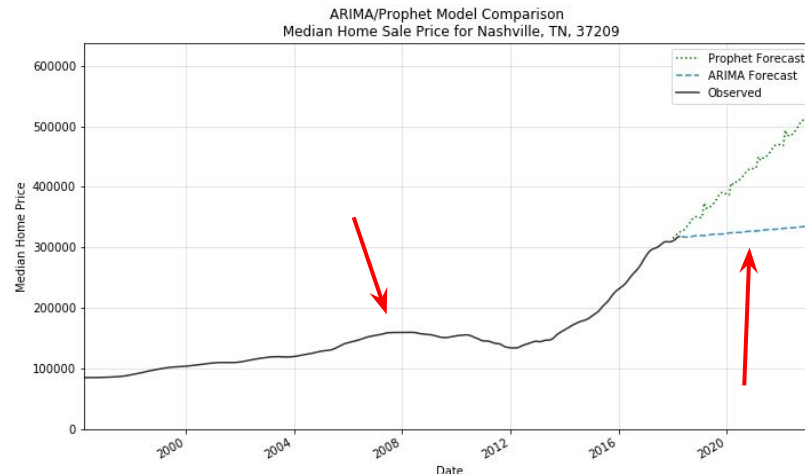
ARIMA/Prophet Model Comparison
Median Home Sale Price for Fort Pierce, FL, 34982



ARIMA Comparison

Nashville and Pittsburgh:

- Both locations had smaller impact from recession
- ARIMA prediction more conservative for Nashville



Considerations

- Although Florida communities have higher projected appreciation, they also have higher uncertainty in the projections, likely a function of the local real estate market being greatly affected by the 2008 recession
- Nashville and Pittsburgh have much lower confidence intervals on the forecasts and may represent “safer” investment choices

Future Directions

- Cross-validate ARIMA model
- Check level of agreement between other forecasting models (e.g., ARMA, SARIMA)
- In order to better identify investment opportunities for our customers, we would like to consider other factors in our recommendations, such as population growth, unemployment rate, job growth, and cost of living