Revenue Forecasting and Cash Flow Management

NYSAC®
NEW YORK STATE
ASSOCIATION OF COUNTIES

Mark LaVigne, PhD

Deputy Director

NYSAC

Revenue Forecasting and Cash Flow Management

How Data Can Enhance Your Finance Office

Joe Rulison
three+one

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The Marketplace Has Evolved

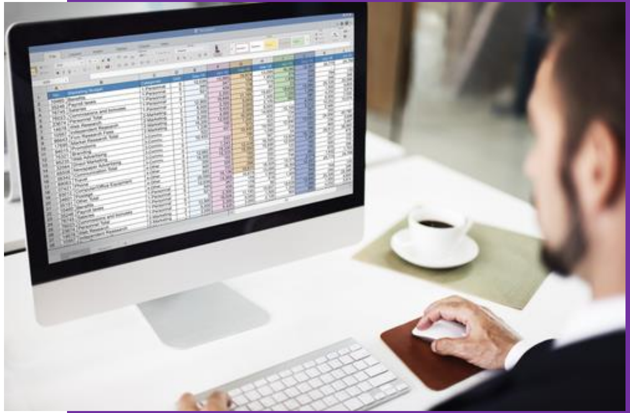
Three Views of Cash

How **you** see your cash -
cash flow

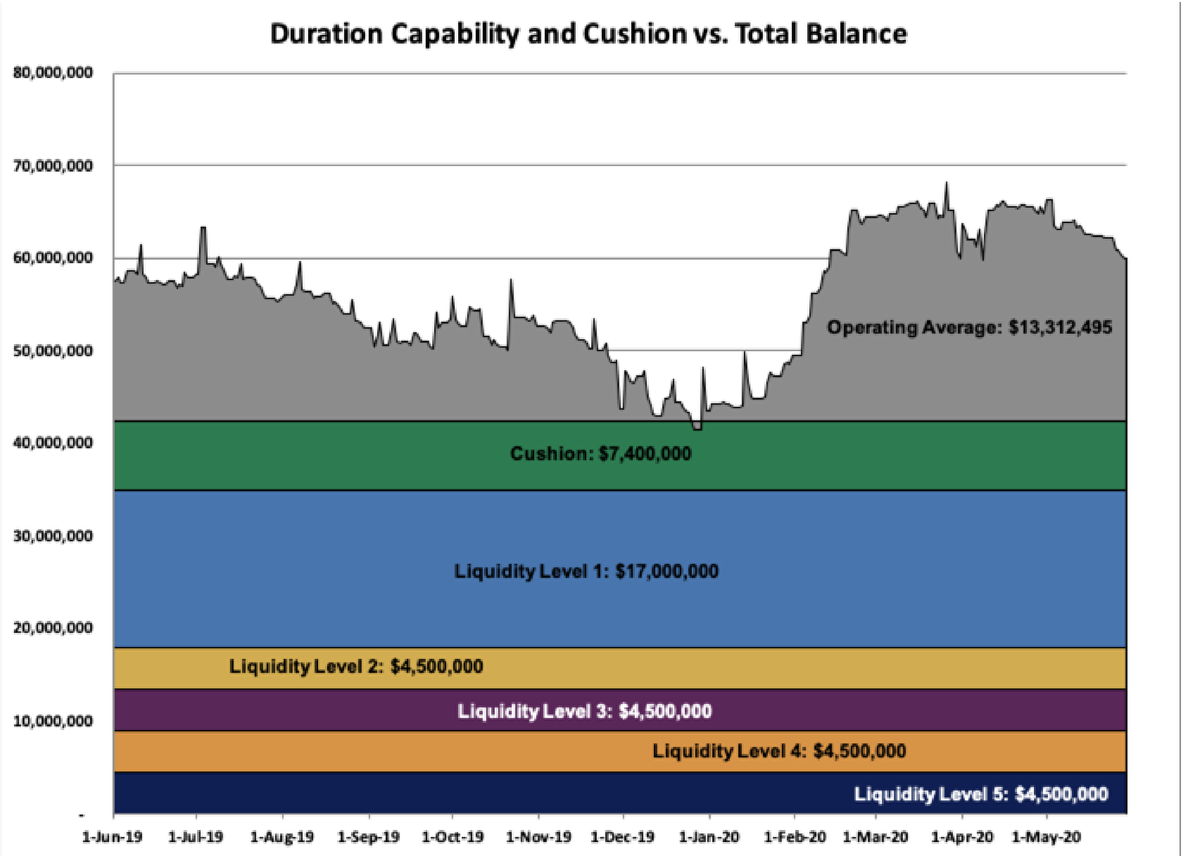
How **your bank** sees your cash -
liquidity

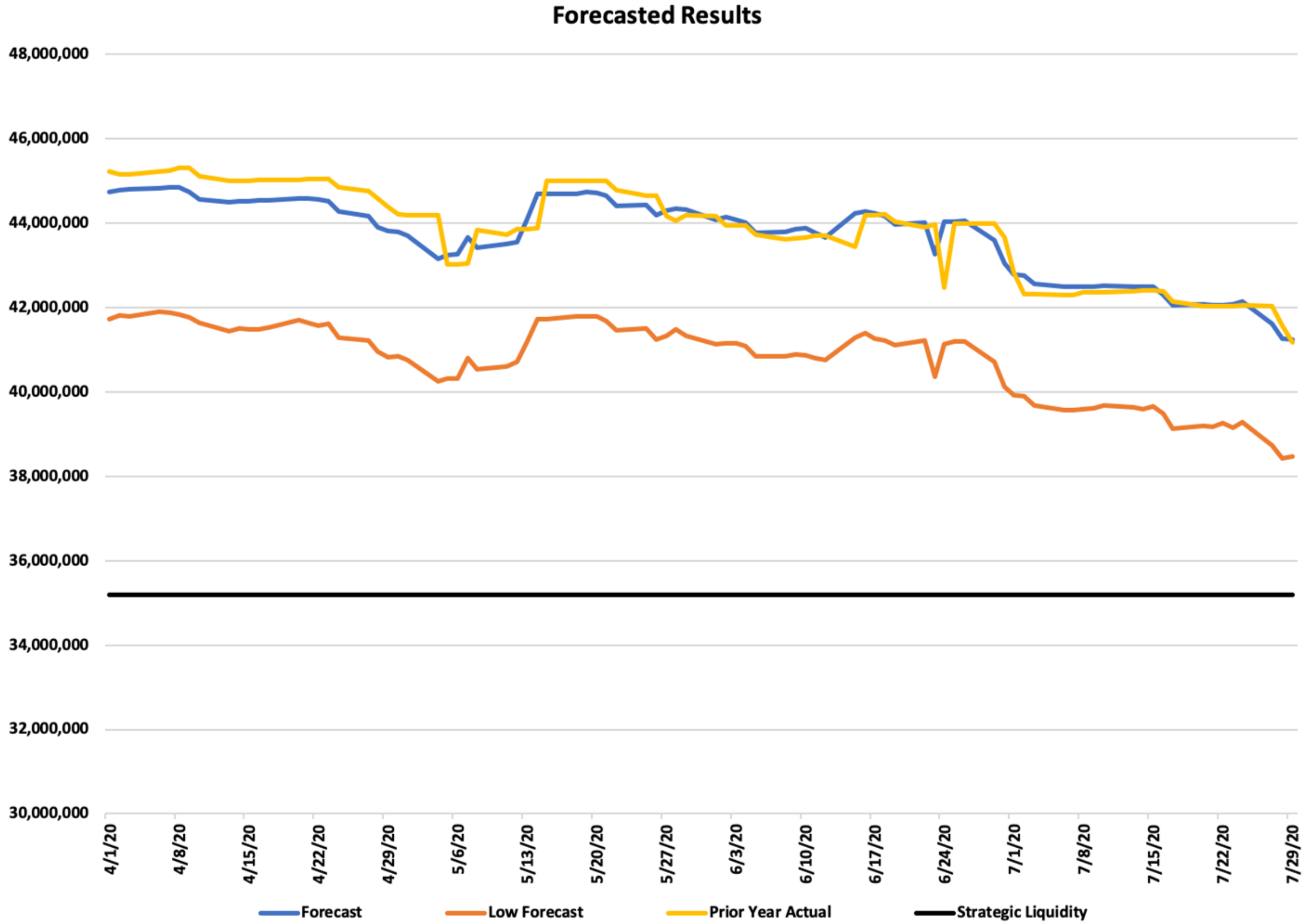
How **the market** values your cash -
marketplace value

What is Data?



What is Time Horizon Data?




Forecasted Results
48,000,000
46,000,000
44,000,000
42,000,000
40,000,000
38,000,000
36,000,000
34,000,000
32,000,000
30,000,000
4/1/20
4/8/20
4/15/20
4/22/20
4/29/20
5/6/20
5/13/20
5/20/20
5/27/20
6/3/20
6/10/20
6/17/20
6/24/20
7/1/20
7/8/20
7/15/20
7/22/20
7/29/20
Forecast
Low Forecast
Prior Year Actual
Strategic Liquidity

+ Benefits of Liquidity Management

1. Boost Credit rating for debt refinancing

1. Data allows ability to forecast future cash & debt needs

1. Ability to identify all cash as a revenue generating asset

1. Monitor all bank fees

1. Provide “peace of mind" In addressing financial stresses during a natural, medical or human inflicted crisis

cashvest®
by three+one®

Joe Rulison

CEO & Co-Founder

three+one

cashvest

by three+one

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NYSAC

NEW YORK STATE ASSOCIATION OF COUNTIES

Modernized Approach to Revenue Forecasting

Deb Pianko, Senior Tax Industry Consultant, US Public Sector

Joe Zilka, Senior Manager, Government Solutions, US Public Sector

Bobby Gutierrez, Senior Analytic Consultant, US Public Sector

Andrew Ball, Director, Public Affairs & Policy, US Public Sector

SAS in Government

Analytics-driven Decisions for Smarter Government

Government is our second-largest industry by revenue

SAS supports 700+ Government Departments, Ministries, Offices, and Agencies in 134 countries around the world

100% of U.S. Government Cabinet Departments and Agencies, as well as all 50 states are SAS customers

SAS in New York State

- 20 NYS Agencies and Authorities are currently leveraging SAS software including:
  - Supporting New York State Dept. Of Health Epidemiologists with COVID-19 Response;
  - Advanced budget and revenue forecasts at New York State Division of the Budget
  - Audit prioritization at New York State Department of Tax and Finance;
  - Leveraging predictive analytics to improve mental health outcomes at Office of Mental Health

WELCOME
TO
NEW YORK
The Empire State
EXCELSIOR

Phases of Disruption

01 Respond

Achieving Situational Awareness

Responding and Adjusting

Mitigating Disruptions

02 Recover

Rebuilding Organization to Operate in the New Environment

03 Reimagine

Preparing the Organization for the Future

Building Resilience

The Challenge

The global **COVID-19** pandemic has a significant impact on governments' ability to **generate and forecast revenue**.

Integrate Newly Relevant Data

- Unprecedented problems need new insights
- Identification of novel data sets and healthcare response information

Understand Duration and Trends

- Quickly understand "cold spots"
- Industries, regions, and operations impacted

Accurately Forecast Revenue Streams

- Rapidly changing economic parameters
- Scenario analysis

Simulate Policy

- Quickly understand legislative and policy changes

How Analytics Can Help

Provide **reliable, timely** data and **revenue forecasting** and **planning**

Leverage New Data

Leverage multiple, previously unused data to understand trends and supports complex analysis

Visualize Trends

Understand how quickly revenue streams are diminishing. Sales/use tax/bankruptcies by industry or sector. Licensing applications/renewals

Scenario Analysis

Modify underlying factors to understand impact on revenues. Ex. If vehicle-miles-travelled increases next week due to easing restrictions, what is the impact?

Advanced Forecasting

Quickly identify relevant indicators to better model tax forecasts. Ex. Understand how projected unemployment forecasts and consumer confidence impact sales tax, and personal/corporate income tax

Interactive Simulation

Allow modification of tax filing rules, thresholds, deductions, etc. at return level for a complete picture of impact

Revenue Impact for Government

Trend Analysis and Scenario Demonstration

Example: Fuel Tax Revenue

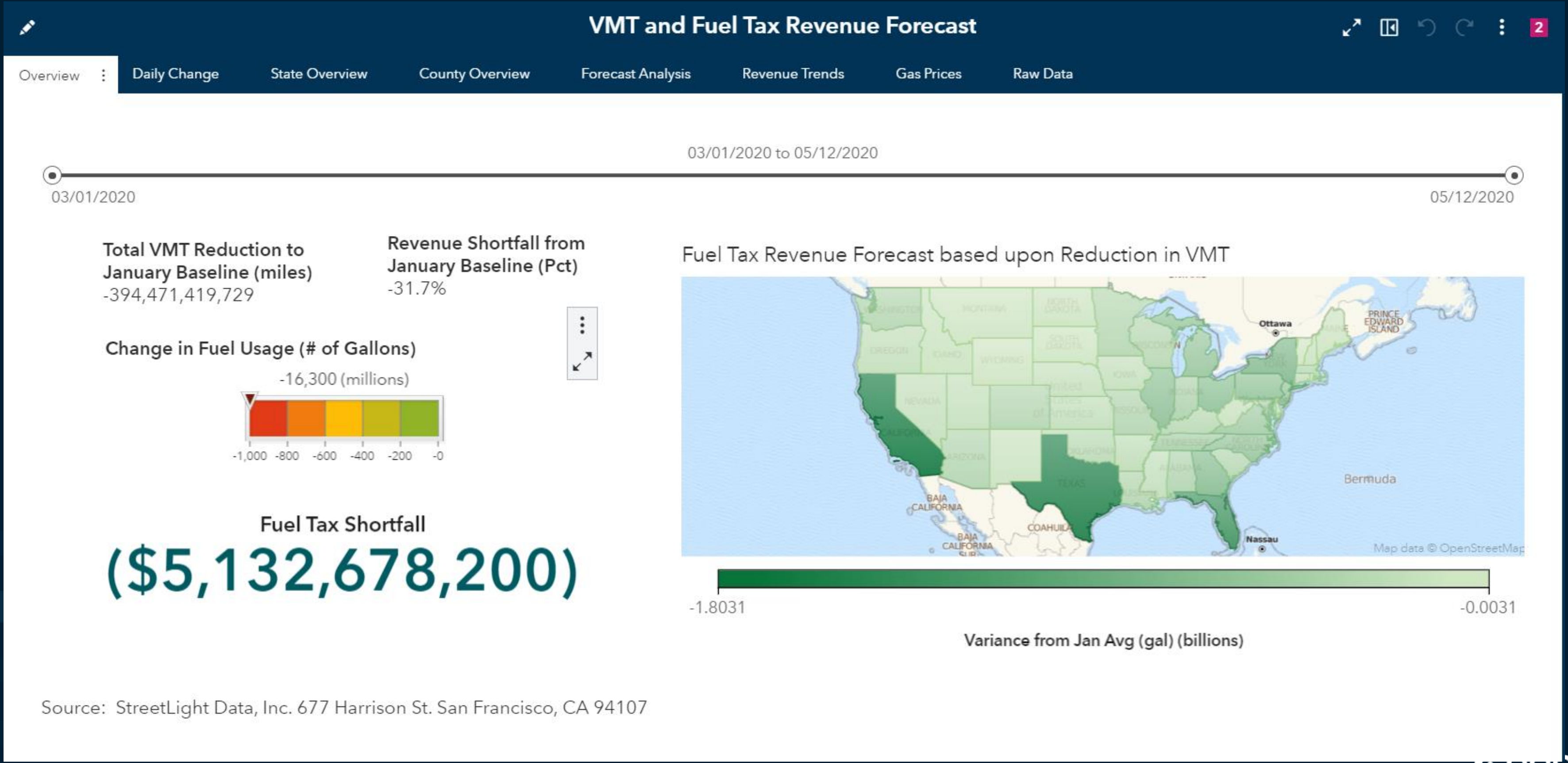
Hypothesis: Revenue from Fuel Tax decrease due to less Vehicle Miles Traveled (or VMT)

Key Variables:

- Data Captured: Average Road Traffic by County
- Cost of Fuel: Average Fuel Cost in State
- Fuel Tax: Cost per Gallon by State
- Miles per Gallon: Average MPG for Vehicle

SAS can begin to estimate the potential loss in Fuel Tax revenue.

Example: Fuel Tax Revenue


Overview
Daily Change
State Overview
County Overview
Forecast Analysis
Revenue Trends
Gas Prices
Raw Data
2
-1,000
-800
-600
-400
-200
-0
Ottawa
PRINCE EDWARD ISLAND
Bermuda
Nassau
BAJA CALIFORNIA
COAHUILA
BAJA CALIFORNIA SUR
TEXAS
CALIFORNIA
Map data © OpenStreetMap
-1.8031
-0.0031
Variance from Jan Avg (gal) (billions)

VMT and Fuel Tax Revenue Forecast

03/01/2020 to 05/12/2020

03/01/2020

05/12/2020

Total VMT Reduction to January Baseline (miles)
-394,471,419,729

Revenue Shortfall from January Baseline (Pct)
-31.7%

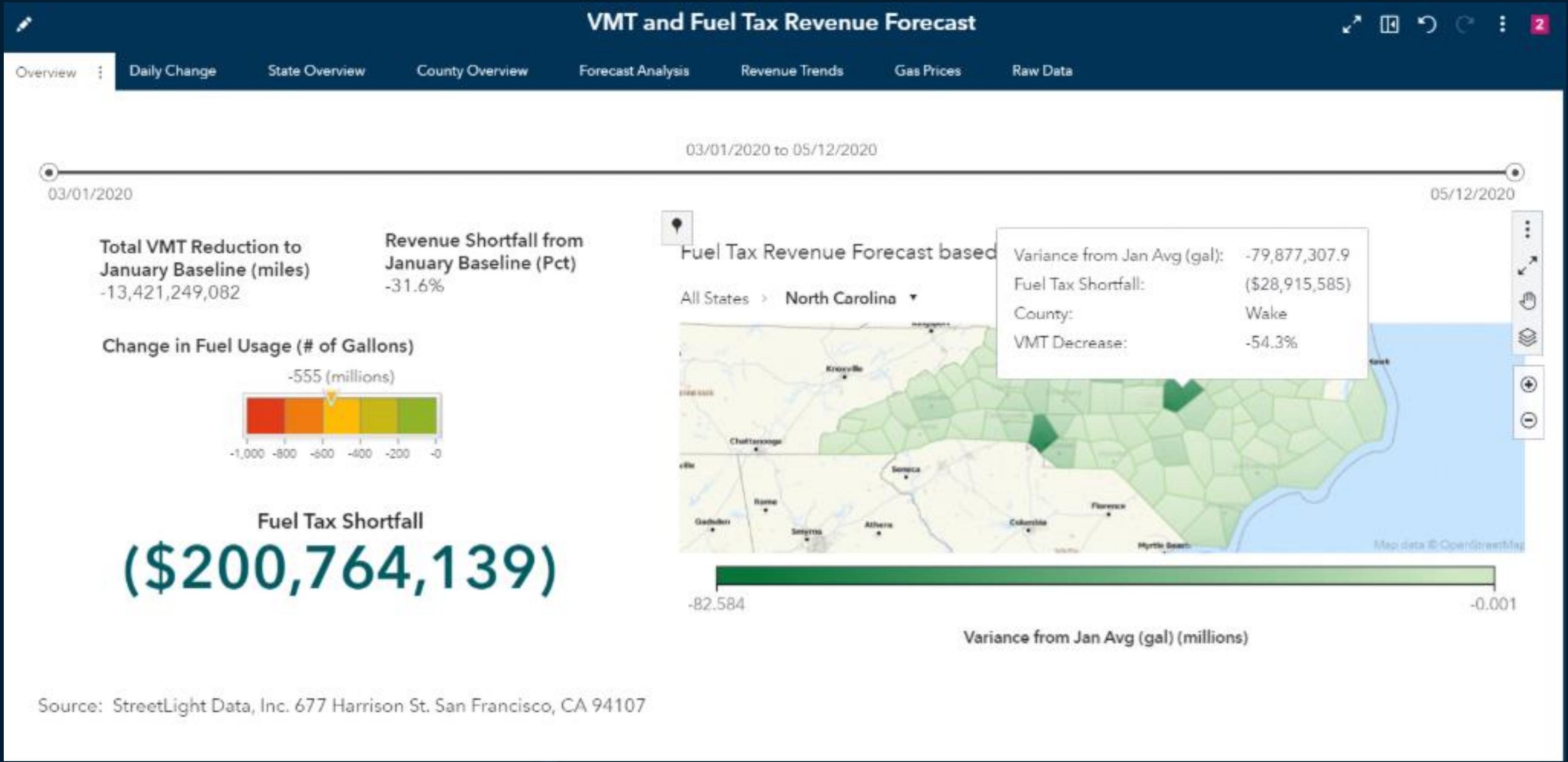
Change in Fuel Usage (# of Gallons)
-16,300 (millions)

Fuel Tax Shortfall
($5,132,678,200)

Fuel Tax Revenue Forecast based upon Reduction in VMT

Source: StreetLight Data, Inc. 677 Harrison St. San Francisco, CA 94107

Example: Fuel Tax Revenue


Overview
Daily Change
State Overview
County Overview
Forecast Analysis
Revenue Trends
Gas Prices
Raw Data
03/01/2020
05/12/2020
-1,000
-800
-600
-400
-200
-0
All States
North Carolina
-82.584
-0.001
Map data © OpenStreetMap

VMT and Fuel Tax Revenue Forecast

03/01/2020 to 05/12/2020

Total VMT Reduction to January Baseline (miles)
-13,421,249,082

Revenue Shortfall from January Baseline (Pct)
-31.6%

Change in Fuel Usage (# of Gallons)
-555 (millions)

Fuel Tax Shortfall
($200,764,139)

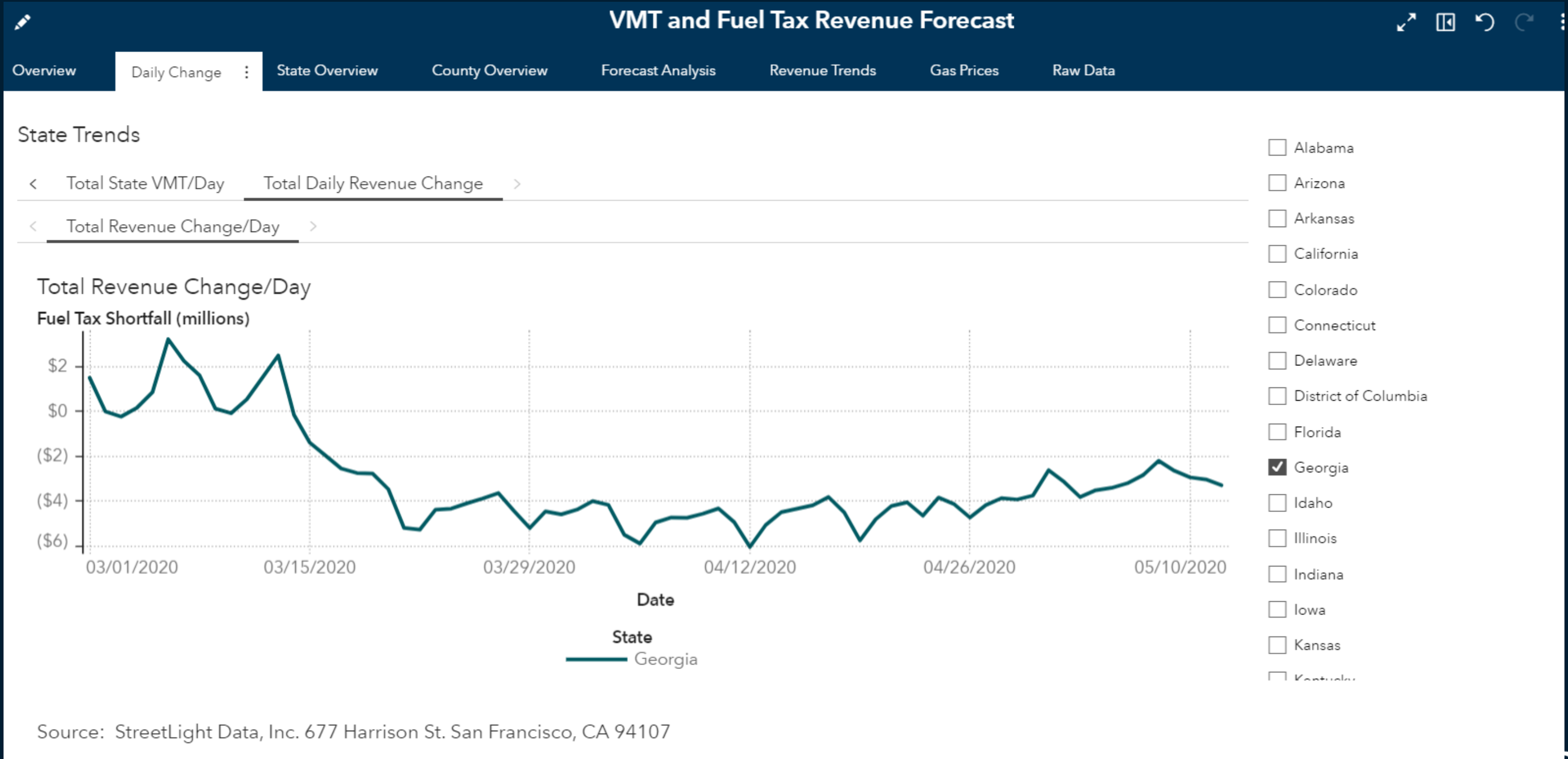
Fuel Tax Revenue Forecast based

Variance from Jan Avg (gal):	-79,877,307.9
Fuel Tax Shortfall:	($28,915,585)
County:	Wake
VMT Decrease:	-54.3%

Variance from Jan Avg (gal) (millions)

Source: StreetLight Data, Inc. 677 Harrison St. San Francisco, CA 94107

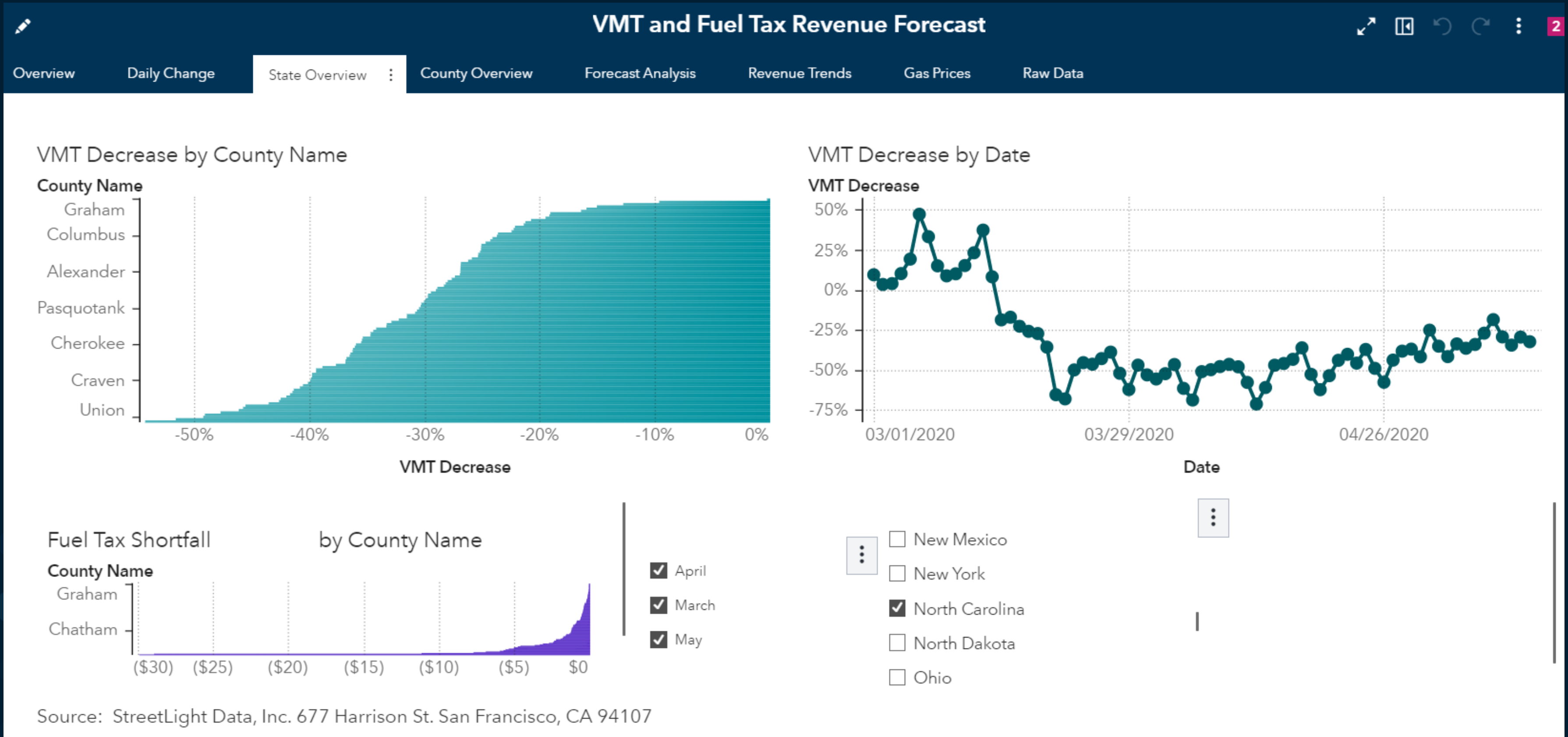
Example: Fuel Tax Revenue


VMT and Fuel Tax Revenue Forecast
Overview
Daily Change
State Overview
County Overview
Forecast Analysis
Revenue Trends
Gas Prices
Raw Data
State Trends
Total State VMT/Day
Total Daily Revenue Change
Total Revenue Change/Day
Total Revenue Change/Day
Fuel Tax Shortfall (millions)
$2
$0
($2)
($4)
($6)
03/01/2020
03/15/2020
03/29/2020
04/12/2020
04/26/2020
05/10/2020
Date
State
Georgia

☐ Alabama
☐ Arizona
☐ Arkansas
☐ California
☐ Colorado
☐ Connecticut
☐ Delaware
☐ District of Columbia
☐ Florida
☑ Georgia
☐ Idaho
☐ Illinois
☐ Indiana
☐ Iowa
☐ Kansas

Source: StreetLight Data, Inc. 677 Harrison St. San Francisco, CA 94107

Example: Fuel Tax Revenue

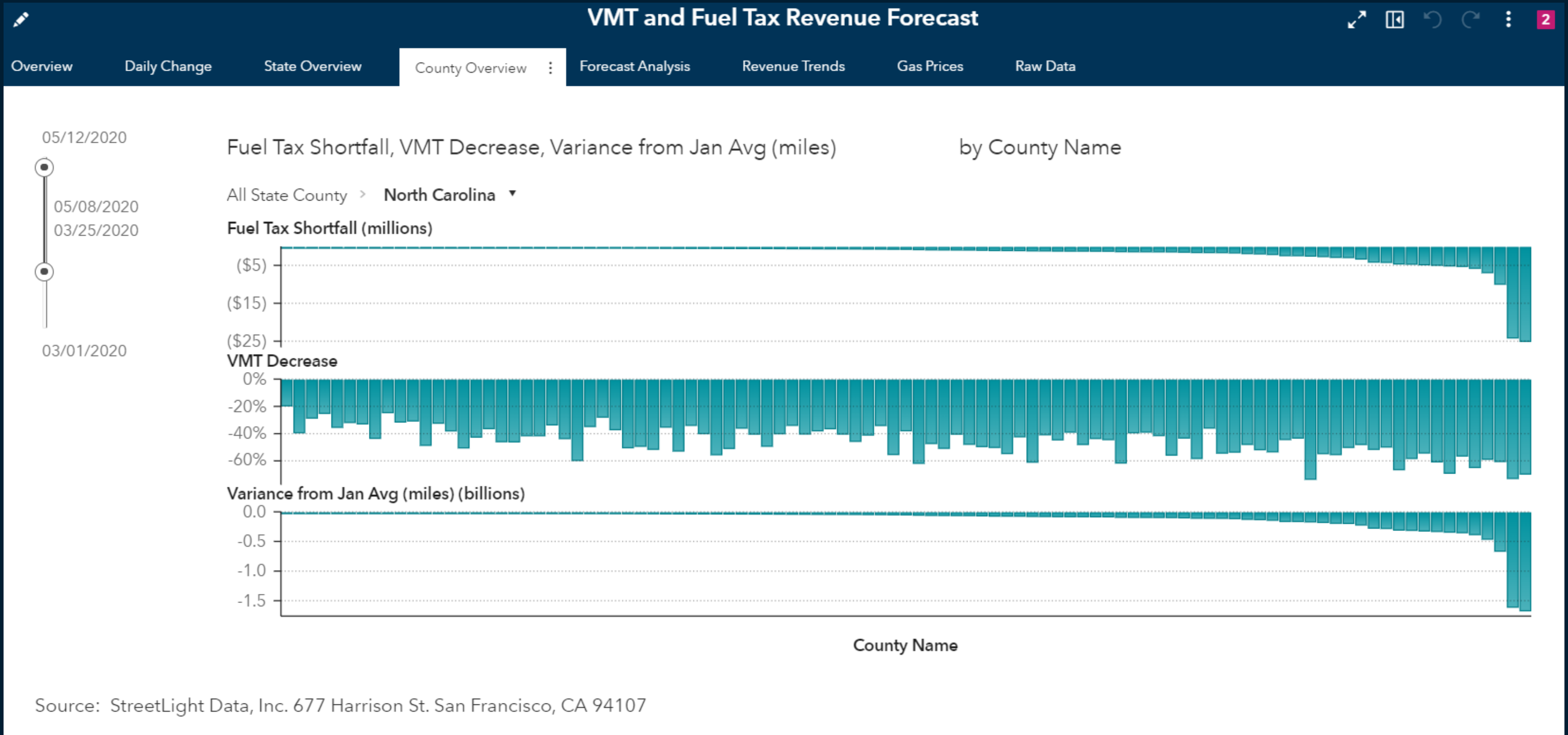

VMT and Fuel Tax Revenue Forecast
2
Overview
Daily Change
State Overview
County Overview
Forecast Analysis
Revenue Trends
Gas Prices
Raw Data
VMT Decrease by County Name
County Name
Graham
Columbus
Alexander
Pasquotank
Cherokee
Craven
Union
-50%
-40%
-30%
-20%
-10%
0%
VMT Decrease
VMT Decrease by Date
VMT Decrease
50%
25%
0%
-25%
-50%
-75%
03/01/2020
03/29/2020
04/26/2020
Date
Fuel Tax Shortfall
by County Name
County Name
Graham
Chatham
($30)
($25)
($20)
($15)
($10)
($5)
$0

☑ April
☑ March
☑ May

☐ New Mexico
☐ New York
☑ North Carolina
☐ North Dakota
☐ Ohio

Source: StreetLight Data, Inc. 677 Harrison St. San Francisco, CA 94107

Example: Fuel Tax Revenue



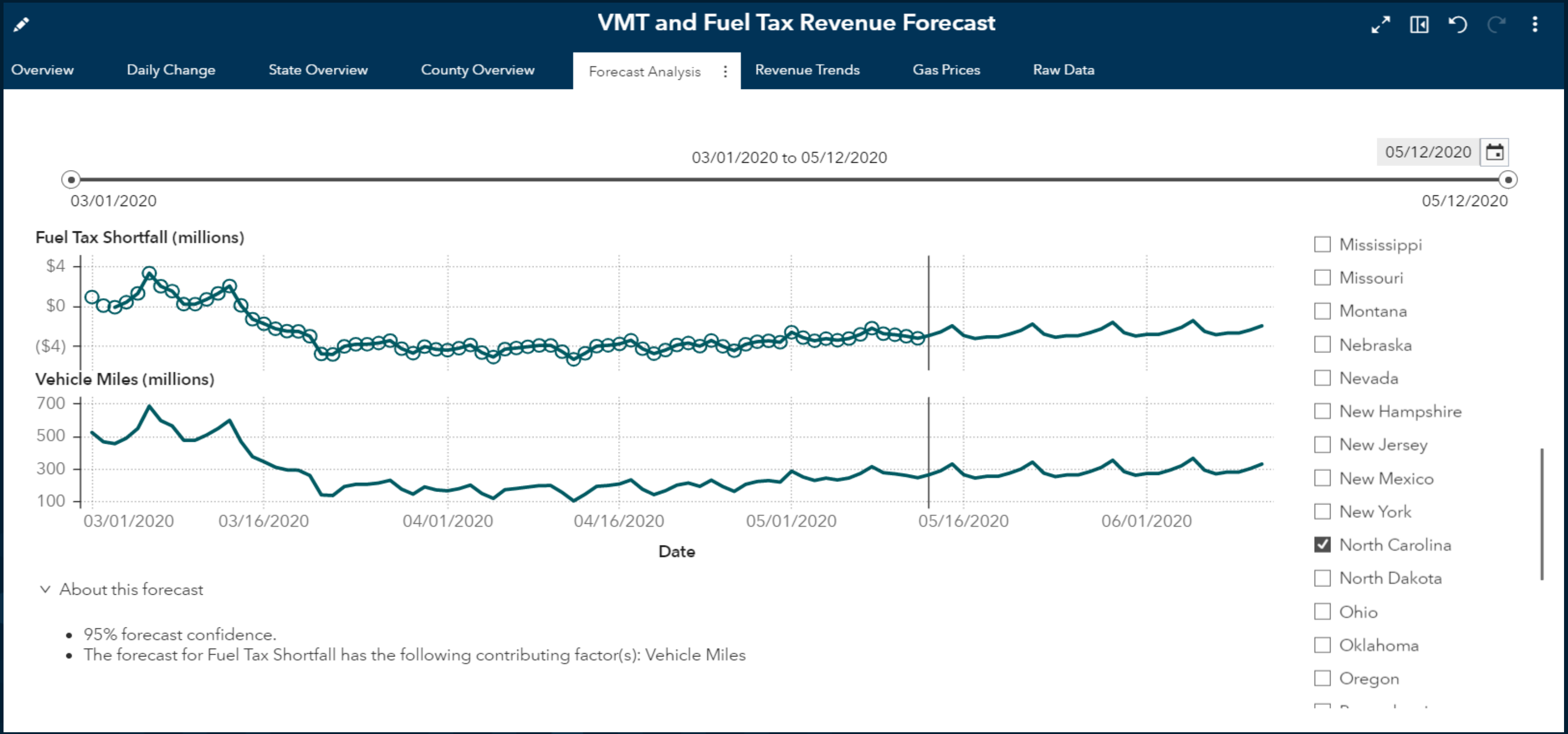
VMT and Fuel Tax Revenue Forecast

Fuel Tax Shortfall, VMT Decrease, Variance from Jan Avg (miles) by County Name

Overview
Daily Change
State Overview
County Overview
Forecast Analysis
Revenue Trends
Gas Prices
Raw Data
2
05/12/2020
05/08/2020
03/25/2020
03/01/2020
All State County
North Carolina
Fuel Tax Shortfall (millions)
($5)
($15)
($25)
VMT Decrease
0%
-20%
-40%
-60%
Variance from Jan Avg (miles) (billions)
0.0
-0.5
-1.0
-1.5
County Name

Source: StreetLight Data, Inc. 677 Harrison St. San Francisco, CA 94107

Example: Fuel Tax Revenue



VMT and Fuel Tax Revenue Forecast
Overview
Daily Change
State Overview
County Overview
Forecast Analysis
Revenue Trends
Gas Prices
Raw Data
03/01/2020
05/12/2020
Fuel Tax Shortfall (millions)
$4
$0
($4)
Vehicle Miles (millions)
700
500
300
100
03/01/2020
03/16/2020
04/01/2020
04/16/2020
05/01/2020
05/16/2020
06/01/2020
Date

03/01/2020 to 05/12/2020

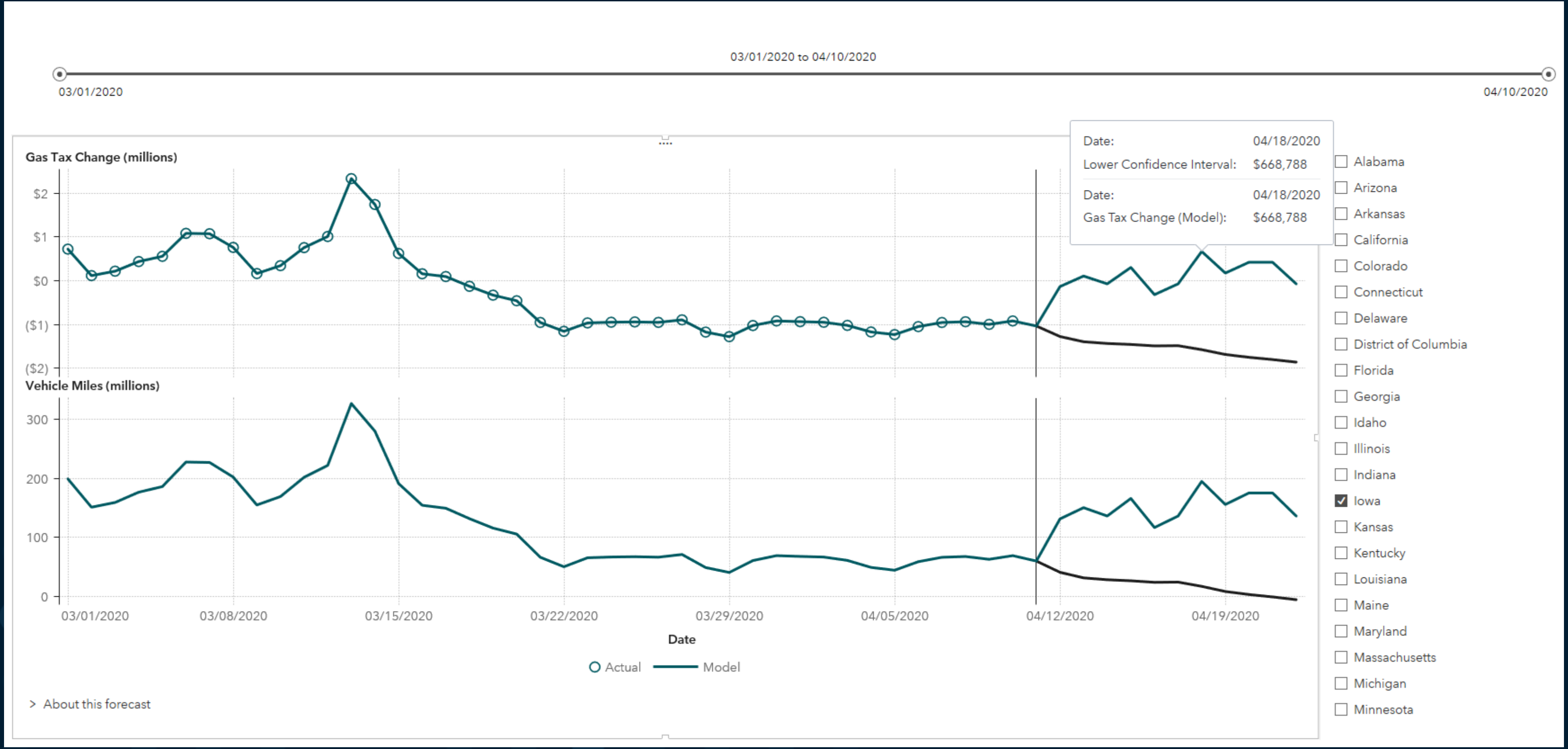
05/12/2020

- ☐ Mississippi
- ☐ Missouri
- ☐ Montana
- ☐ Nebraska
- ☐ Nevada
- ☐ New Hampshire
- ☐ New Jersey
- ☐ New Mexico
- ☐ New York
- ☑ North Carolina
- ☐ North Dakota
- ☐ Ohio
- ☐ Oklahoma
- ☐ Oregon

About this forecast

- 95% forecast confidence.
- The forecast for Fuel Tax Shortfall has the following contributing factor(s): Vehicle Miles

Example: Fuel Tax Revenue



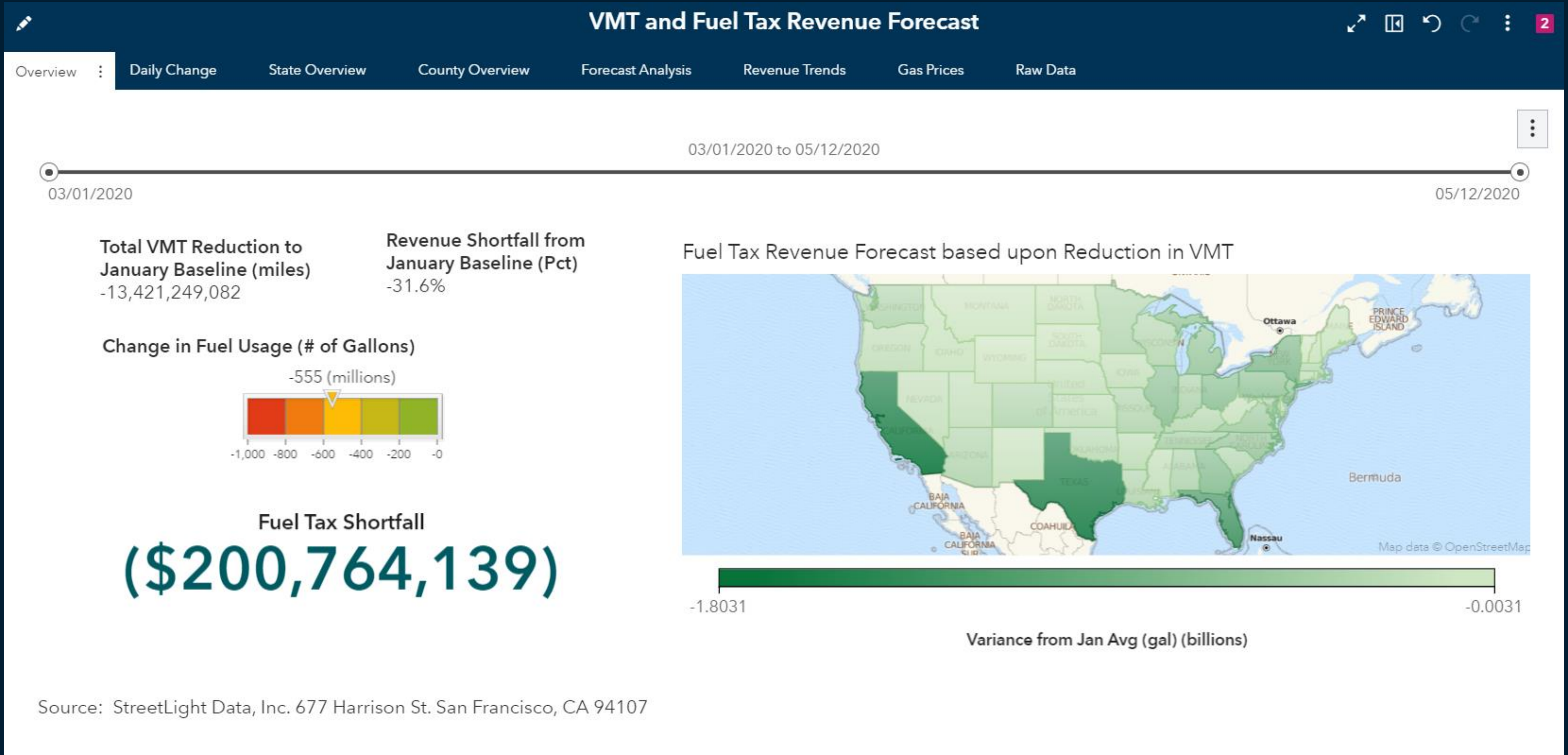
03/01/2020 to 04/10/2020
03/01/2020
04/10/2020
Gas Tax Change (millions)
$2
$1
$0
($1)
($2)
Vehicle Miles (millions)
300
200
100
0
03/01/2020
03/08/2020
03/15/2020
03/22/2020
03/29/2020
04/05/2020
04/12/2020
04/19/2020
Date
Actual
Model
> About this forecast

Date: 04/18/2020
Lower Confidence Interval: $668,788

Date: 04/18/2020
Gas Tax Change (Model): $668,788

- ☐ Alabama
- ☐ Arizona
- ☐ Arkansas
- ☐ California
- ☐ Colorado
- ☐ Connecticut
- ☐ Delaware
- ☐ District of Columbia
- ☐ Florida
- ☐ Georgia
- ☐ Idaho
- ☐ Illinois
- ☐ Indiana
- ☑ Iowa
- ☐ Kansas
- ☐ Kentucky
- ☐ Louisiana
- ☐ Maine
- ☐ Maryland
- ☐ Massachusetts
- ☐ Michigan
- ☐ Minnesota

Example: Fuel Tax Revenue


VMT and Fuel Tax Revenue Forecast
2
Overview
Daily Change
State Overview
County Overview
Forecast Analysis
Revenue Trends
Gas Prices
Raw Data
03/01/2020 to 05/12/2020
03/01/2020
05/12/2020
-555 (millions)
-1,000
-800
-600
-400
-200
-0
Ottawa
PRINCE EDWARD ISLAND
Bermuda
BAJA CALIFORNIA
COAHUILA
BAJA CALIFORNIA SUR
Nassau
Map data © OpenStreetMap
-1.8031
-0.0031
Variance from Jan Avg (gal) (billions)

Total VMT Reduction to January Baseline (miles)
-13,421,249,082

Revenue Shortfall from January Baseline (Pct)
-31.6%

Change in Fuel Usage (# of Gallons)

Fuel Tax Shortfall
($200,764,139)

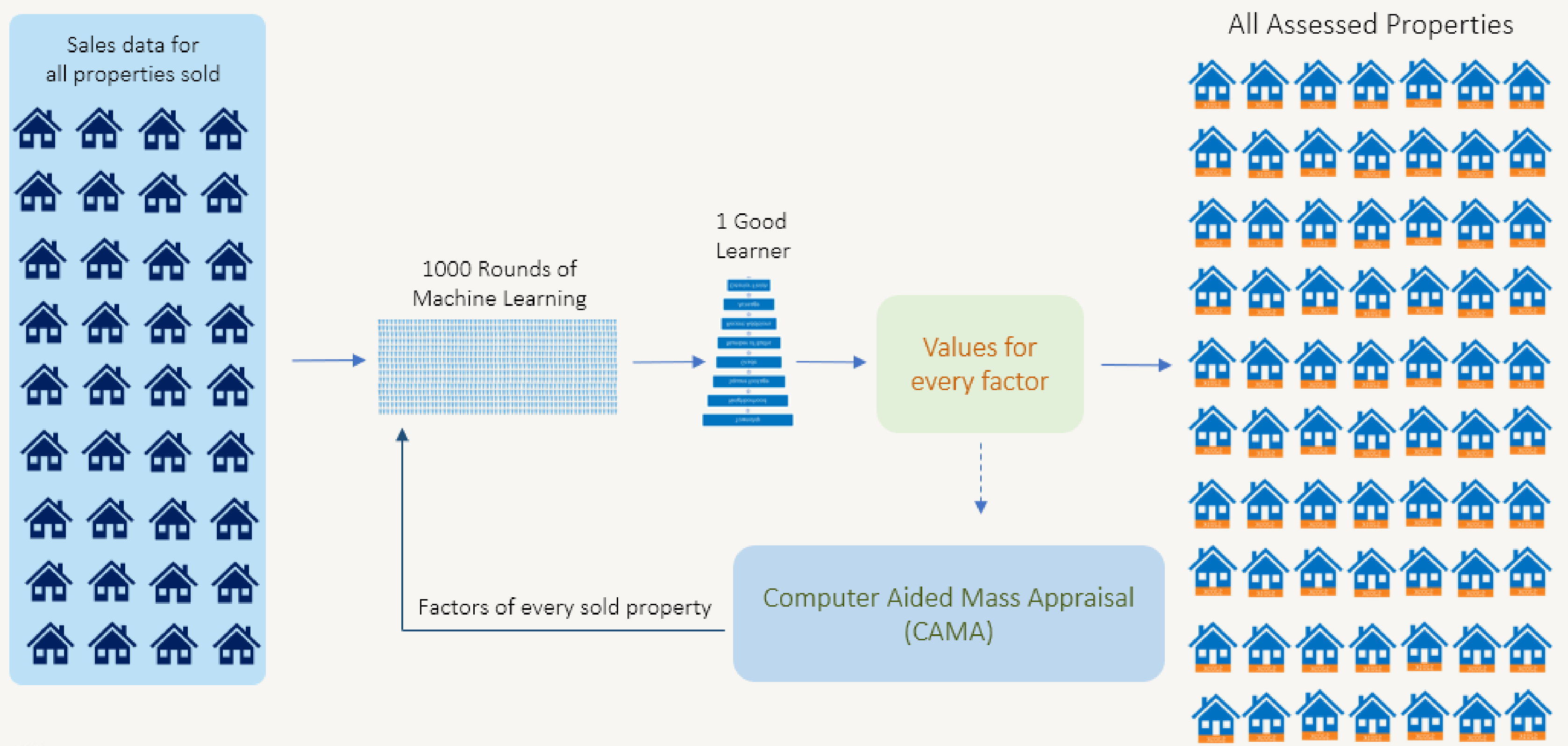
Fuel Tax Revenue Forecast based upon Reduction in VMT

Source: StreetLight Data, Inc. 677 Harrison St. San Francisco, CA 94107

Revenue Impact for Government

Property Valuation

Artificial Intelligence Property Valuation



Sales data for all properties sold

1000 Rounds of Machine Learning

1 Good Learner

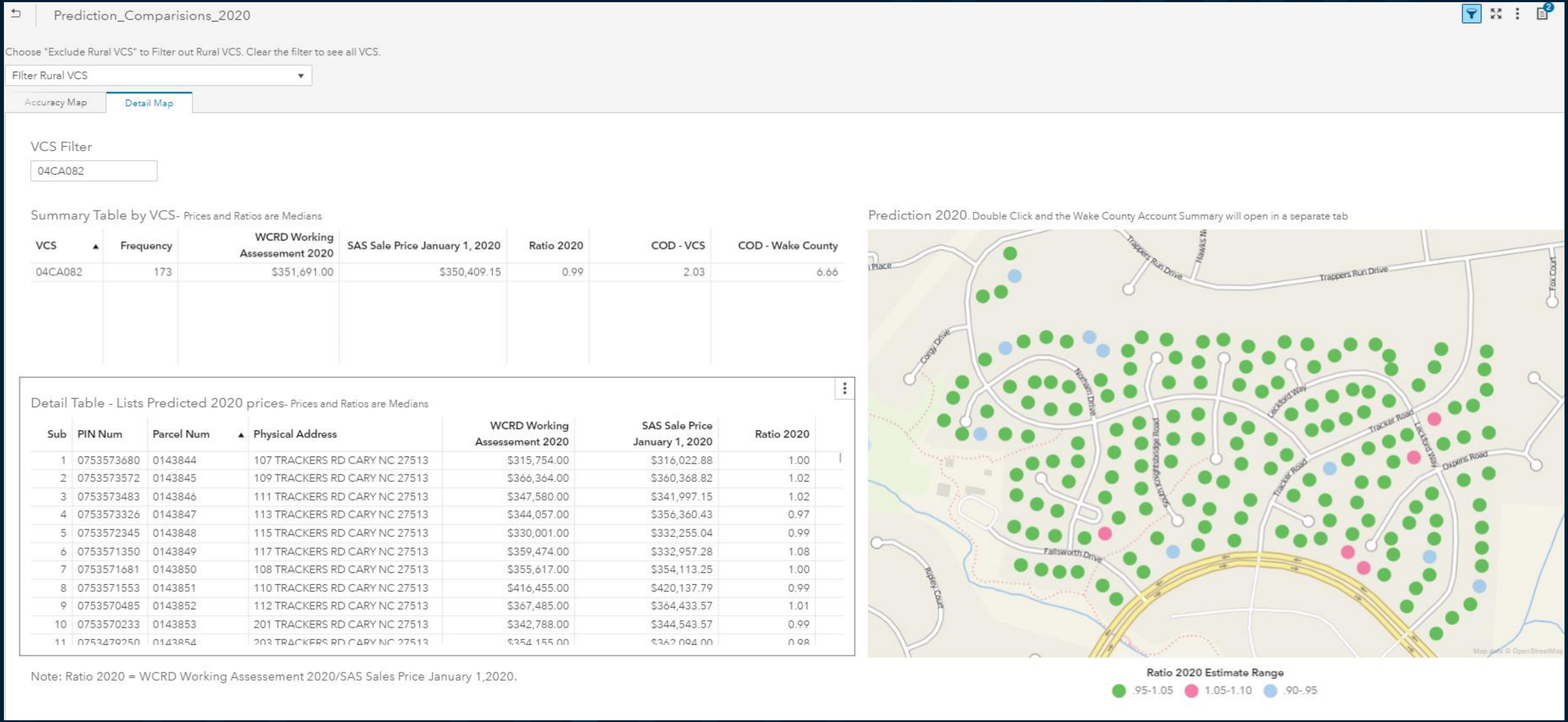
Values for every factor

All Assessed Properties

Computer Aided Mass Appraisal (CAMA)

Factors of every sold property

2020 Reassessment Dashboard



Prediction_Comparisions_2020

Choose "Exclude Rural VCS" to Filter out Rural VCS. Clear the filter to see all VCS.

FIlter Rural VCS
Accuracy Map
Detail Map

VCS Filter: 04CA082

Summary Table by VCS- Prices and Ratios are Medians

VCS ▲	Frequency	WCRD Working Assessement 2020	SAS Sale Price January 1, 2020	Ratio 2020	COD - VCS	COD - Wake County
04CA082	173	$351,691.00	$350,409.15	0.99	2.03	6.66

Detail Table - Lists Predicted 2020 prices- Prices and Ratios are Medians

Sub	PIN Num	Parcel Num ▲	Physical Address	WCRD Working Assessement 2020	SAS Sale Price January 1, 2020	Ratio 2020
1	0753573680	0143844	107 TRACKERS RD CARY NC 27513	$315,754.00	$316,022.88	1.00
2	0753573572	0143845	109 TRACKERS RD CARY NC 27513	$366,364.00	$360,368.82	1.02
3	0753573483	0143846	111 TRACKERS RD CARY NC 27513	$347,580.00	$341,997.15	1.02
4	0753573326	0143847	113 TRACKERS RD CARY NC 27513	$344,057.00	$356,360.43	0.97
5	0753572345	0143848	115 TRACKERS RD CARY NC 27513	$330,001.00	$332,255.04	0.99
6	0753571350	0143849	117 TRACKERS RD CARY NC 27513	$359,474.00	$332,957.28	1.08
7	0753571681	0143850	108 TRACKERS RD CARY NC 27513	$355,617.00	$354,113.25	1.00
8	0753571553	0143851	110 TRACKERS RD CARY NC 27513	$416,455.00	$420,137.79	0.99
9	0753570485	0143852	112 TRACKERS RD CARY NC 27513	$367,485.00	$364,433.57	1.01
10	0753570233	0143853	201 TRACKERS RD CARY NC 27513	$342,788.00	$344,543.57	0.99
11	0753479250	0143854	203 TRACKERS RD CARY NC 27513	$354,155.00	$362,094.00	0.98

Note: Ratio 2020 = WCRD Working Assessement 2020/SAS Sales Price January 1,2020.

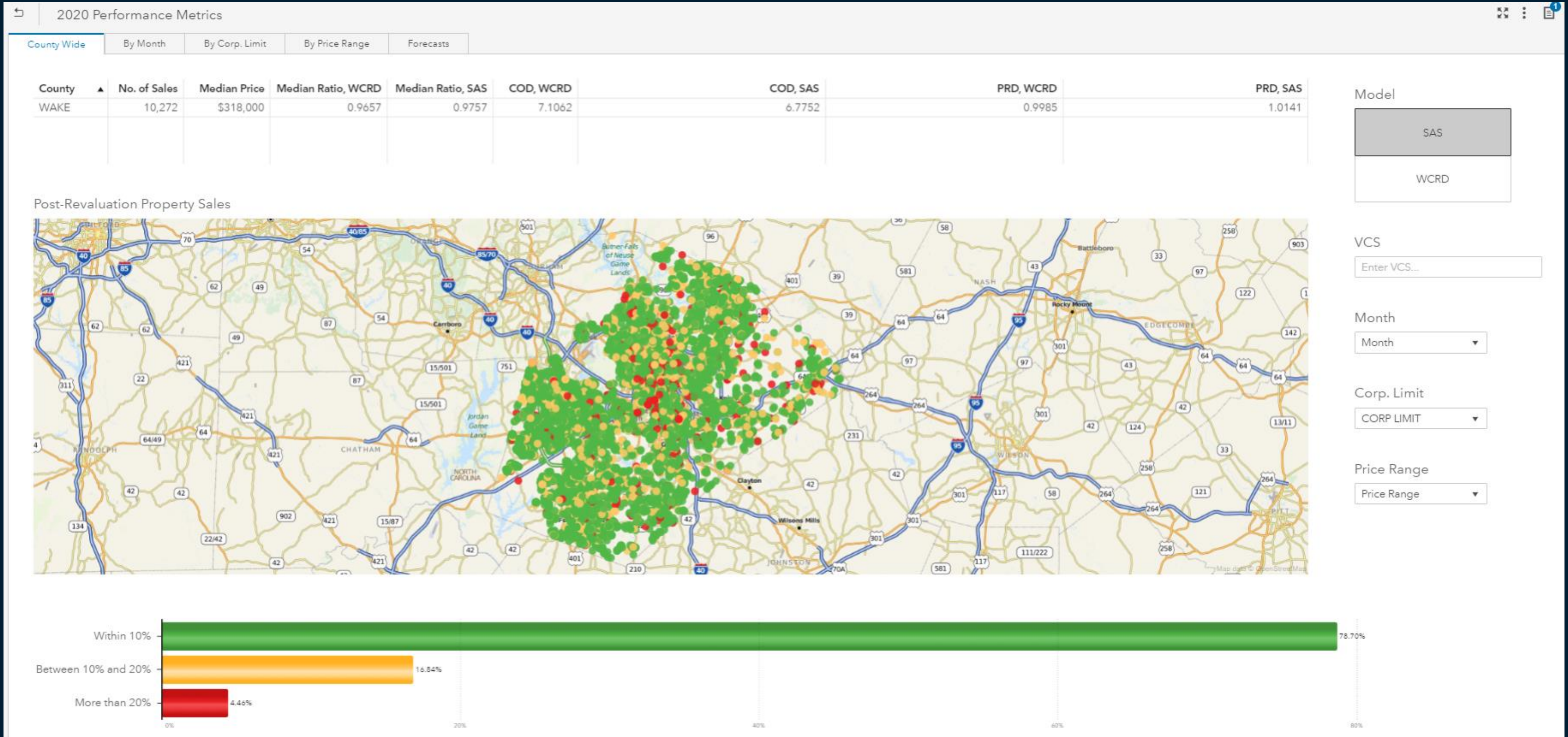
Prediction 2020. Double Click and the Wake County Account Summary will open in a separate tab

Place
Trappers Run Drive
Hawks N
Trappers Run Drive
Fox Court
Corgy Drive
Northam Drive
South Knightsbridge Road
Leckford Way
Tracker Road
Leckford Way
Oxpens Road
Tracker Road
Fallsworth Drive
Ripley Court
Map data © OpenStreetMap

Ratio 2020 Estimate Range

● .95-1.05 ● 1.05-1.10 ● .90-.95

2020 Performance Dashboard


2020 Performance Metrics
County Wide
By Month
By Corp. Limit
By Price Range
Forecasts
Post-Revaluation Property Sales
Within 10%
Between 10% and 20%
More than 20%
78.70%
16.84%
4.46%
0%
20%
40%
60%
80%

County ▲	No. of Sales	Median Price	Median Ratio, WCRD	Median Ratio, SAS	COD, WCRD	COD, SAS	PRD, WCRD	PRD, SAS
WAKE	10,272	$318,000	0.9657	0.9757	7.1062	6.7752	0.9985	1.0141

Model: SAS (selected) / WCRD

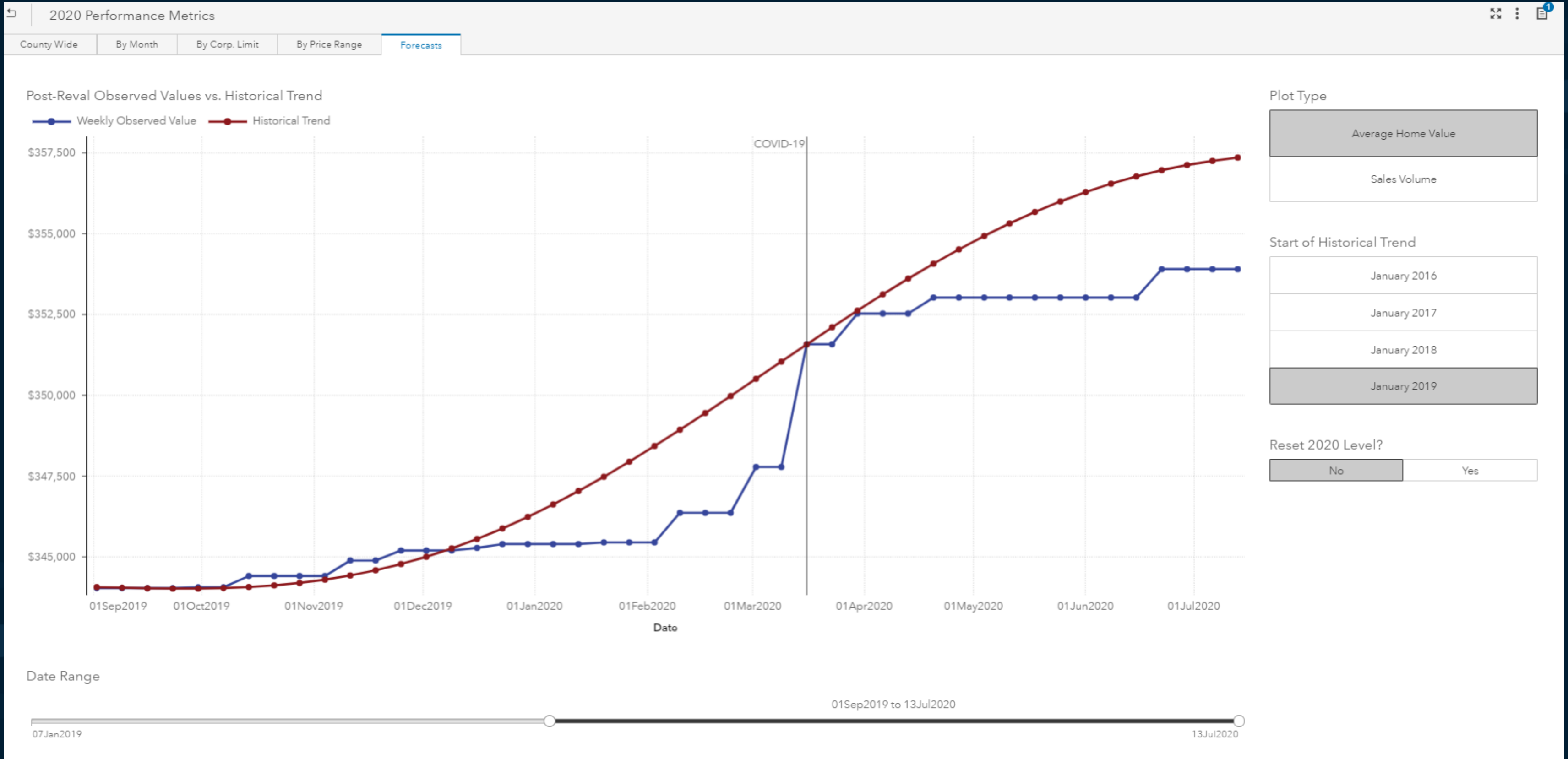
VCS: Enter VCS...

Month: Month ▾

Corp. Limit: CORP LIMIT ▾

Price Range: Price Range ▾

2020 Forecast Dashboard



2020 Performance Metrics

Post-Reval Observed Values vs. Historical Trend

Plot Type: Average Home Value

Start of Historical Trend: January 2019

Reset 2020 Level?: No

Date Range: 01Sep2019 to 13Jul2020

County Wide
By Month
By Corp. Limit
By Price Range
Forecasts
Weekly Observed Value
Historical Trend
COVID-19
$357,500
$355,000
$352,500
$350,000
$347,500
$345,000
01Sep2019
01Oct2019
01Nov2019
01Dec2019
01Jan2020
01Feb2020
01Mar2020
01Apr2020
01May2020
01Jun2020
01Jul2020
Date
Average Home Value
Sales Volume
January 2016
January 2017
January 2018
January 2019
No
Yes
07Jan2019
13Jul2020

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sas
THE POWER TO KNOW.

Let's Work Together!

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