

# The Various Silver Linings of Covid-19 Mitigation

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# Acknowledgements

CHP Officers – Source of crash data in real-time

CDPH – CMOD – Drs. Nana Tufuoh and Orion Stewart

UCDMC – Drs. Christy Adams and David Shatz

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Tricia Nguyen, Malak Saleh, Min-Khant Kyaw, Gabrielle Trujillo, Mireya Bejarano, & Karla Tapia (Road Ecology Center Interns)

# Data and Methods

[Streetlightdata.com](http://Streetlightdata.com) – Source of VMT data, based on anonymized movement of cell phones

PemS – Source of highway traffic volumes and speeds

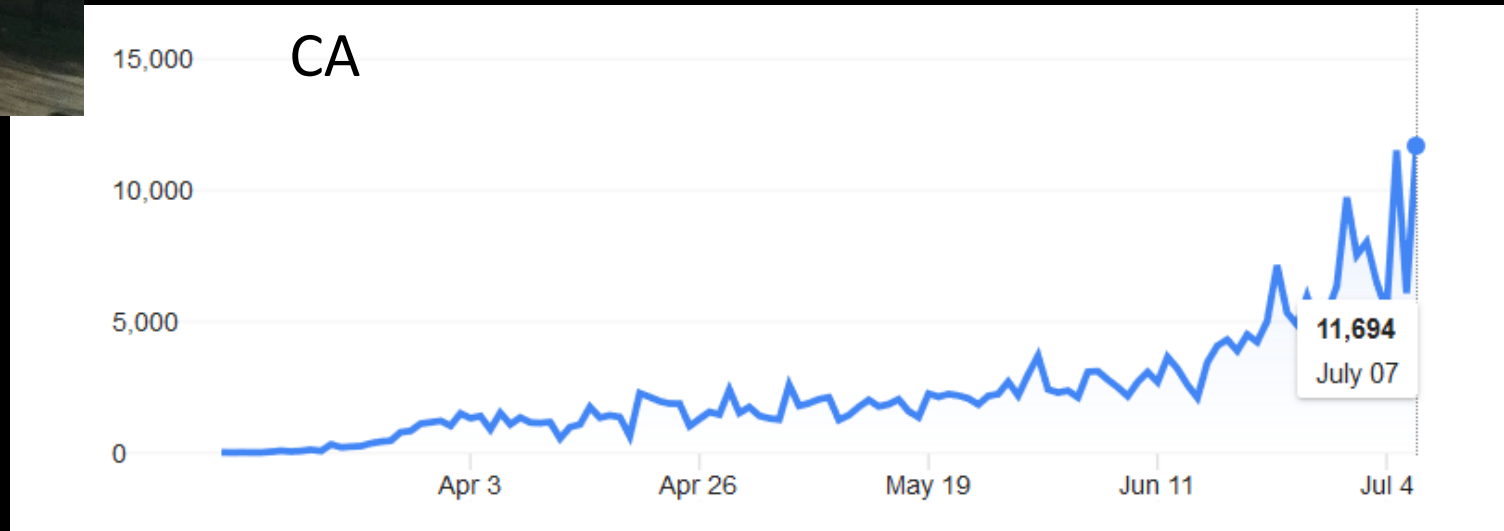
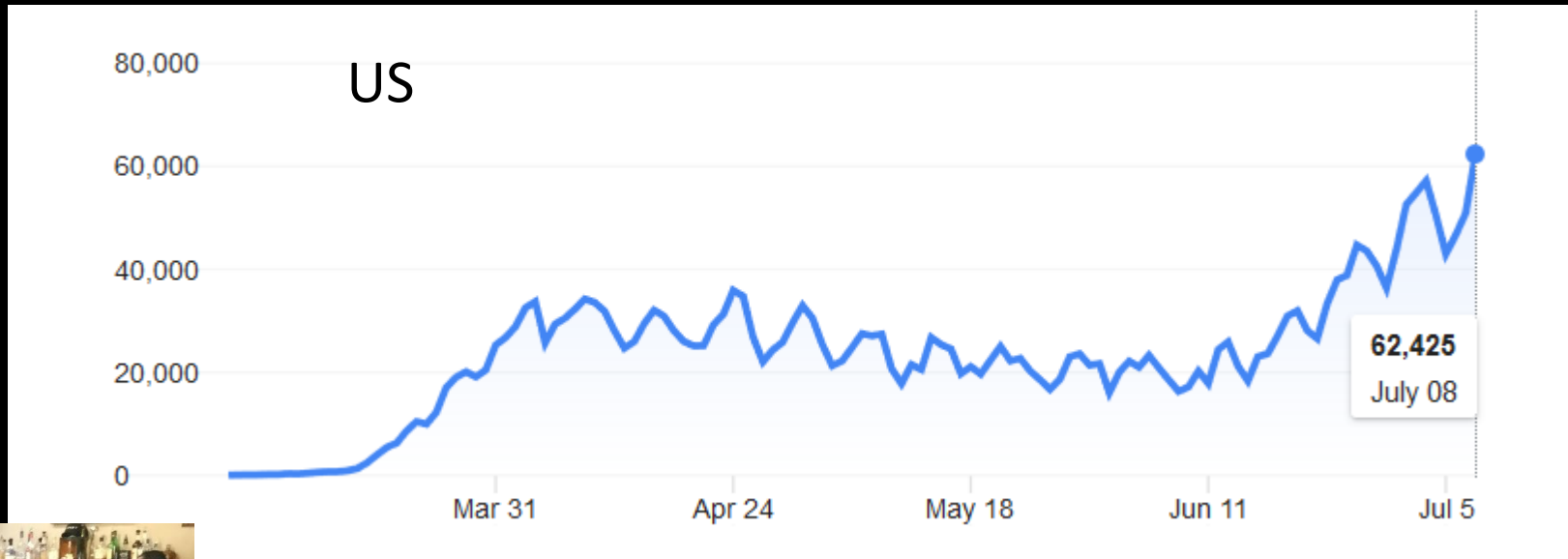
[California Highway Incident Processing System](#) – Source of crash data, reported by CHP officers in real-time, custom system designed by Road Ecology Center

Other sources cited during presentation

Differences – Students t-test, significance of slope,  $P < 0.05$

# Cases surging

New surge began after Memorial Day

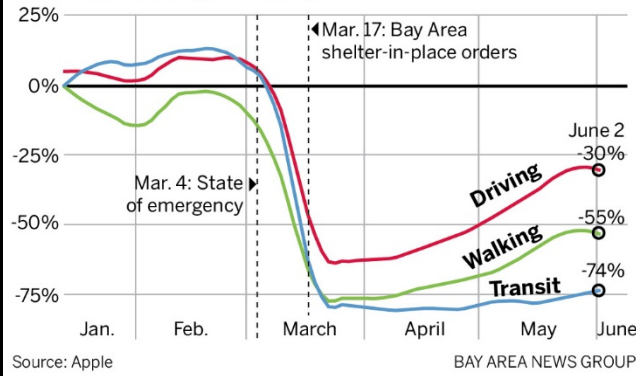


# Transportation fundamentally changed

## BAY AREA RESIDENTS ON THE MOVE

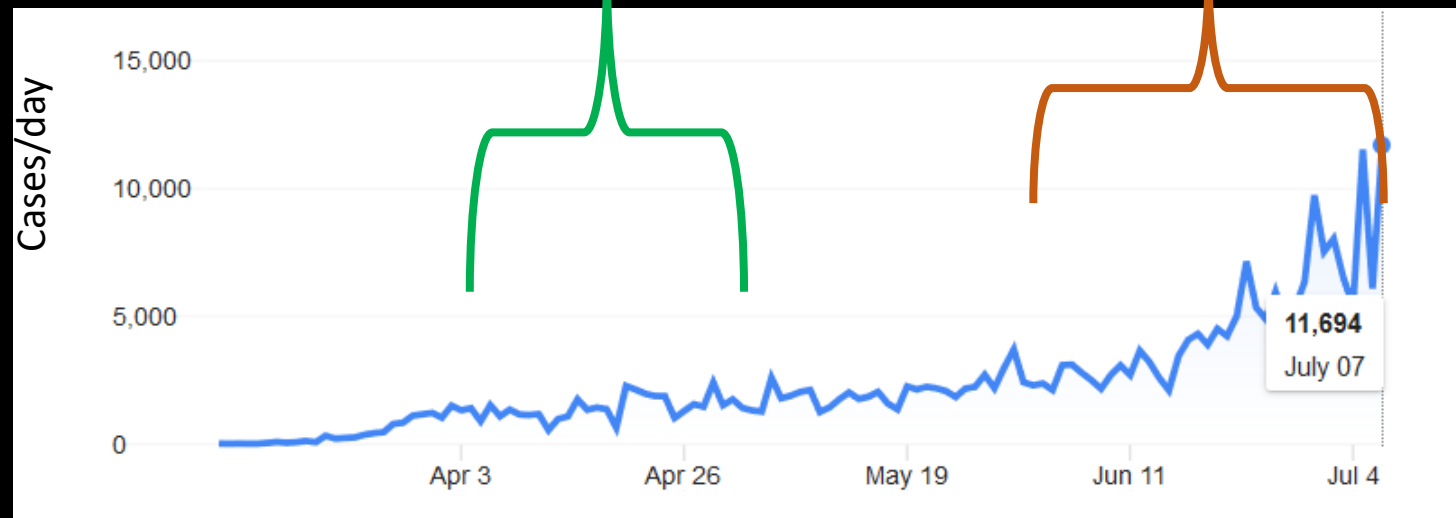
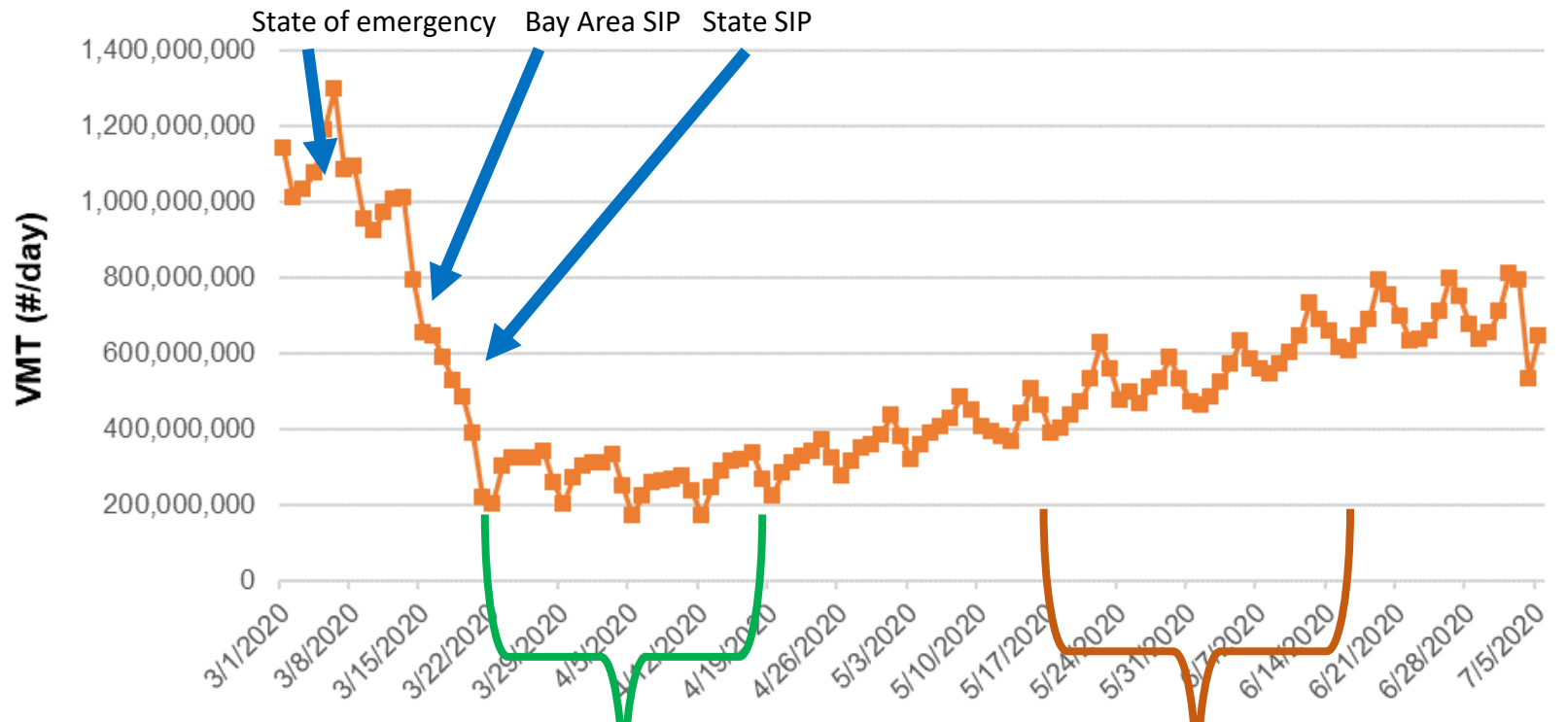
Data from Apple and Google show Bay Area residents began staying home en masse around March 4, when Gov. Gavin Newsom declared a state of emergency because of the pandemic. But residents began venturing out of their homes just days after shelter-in-place rules took effect nearly two weeks later. Travel by car and on foot gradually increased as the lockdown wore on, but residents are still avoiding public transit.

### Trendline of % change in mobility



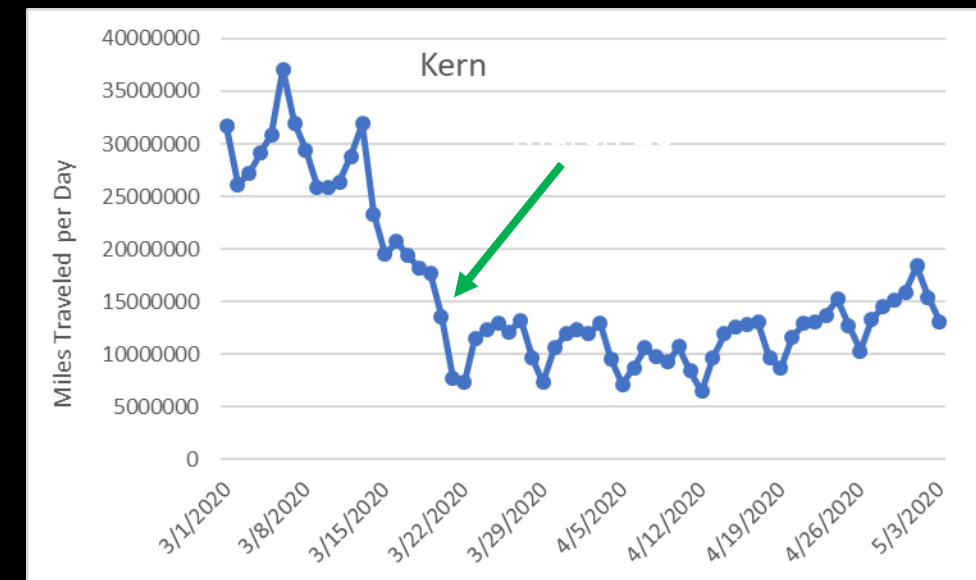
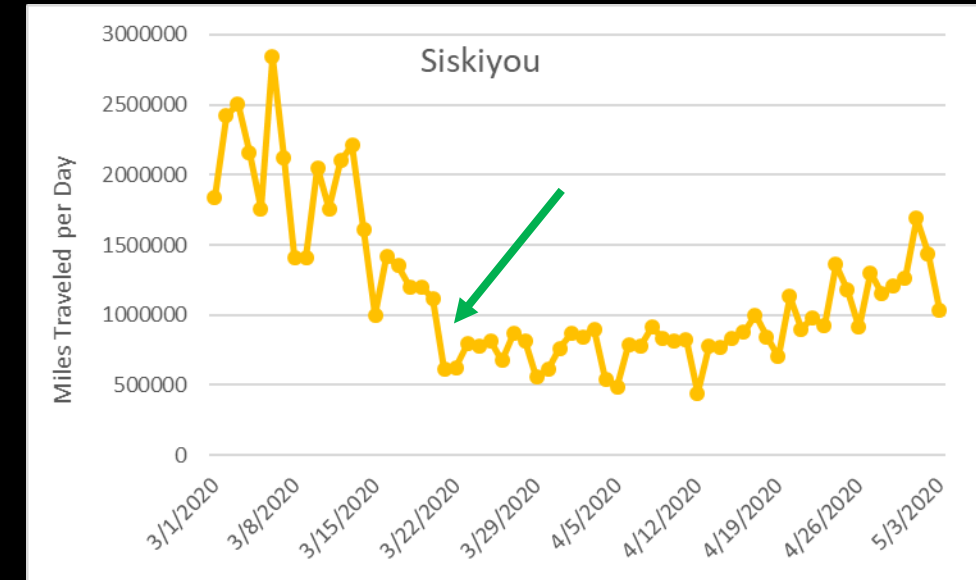
<https://www.mercurynews.com/2020/06/08/data-show-people-challenged-the-limits-of-shelter-in-place-orders/>

[https://en.wikipedia.org/wiki/COVID-19\\_pandemic\\_in\\_the\\_United\\_States](https://en.wikipedia.org/wiki/COVID-19_pandemic_in_the_United_States)



# CA – Counties

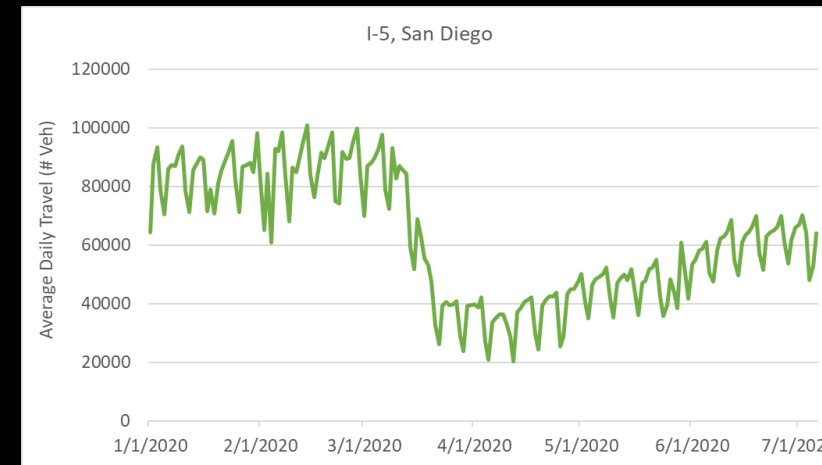
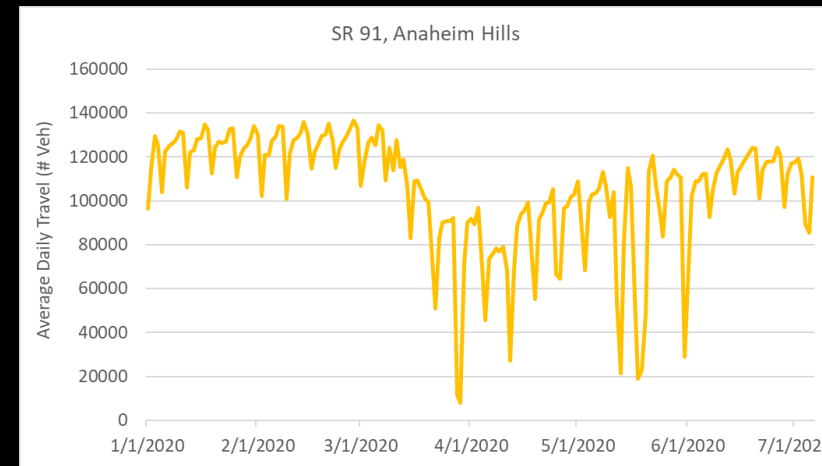
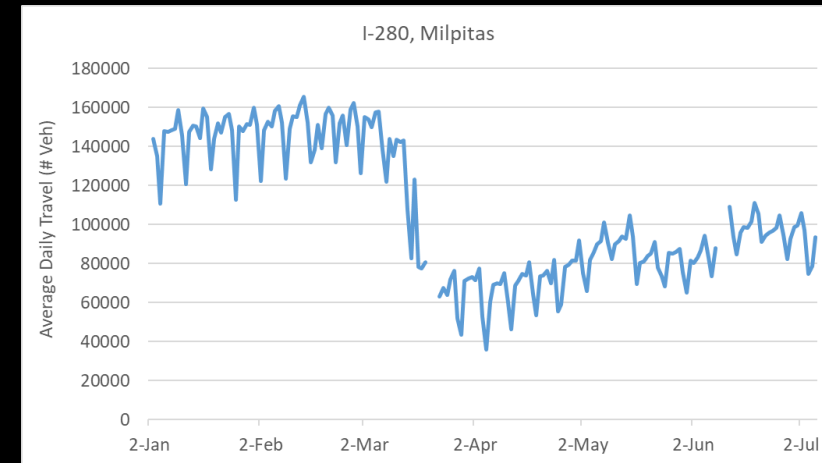
Not all counties responded the same



Source: Streetlightdata.com

# CA -- Highways

Highways varied in how much traffic declined and how much it has come back up



# Reduction in traffic → reduction in GHG emissions

US emissions 44 million metric tons CO<sub>2</sub>e (first week of March) declined to 12 million metric tons CO<sub>2</sub>e (second week of April)

Over 8 weeks = 4% decline in GHG for US, putting us on track for Paris Climate Accord commitments

CA – GHG emissions from vehicles dropped from 400,000 to 100,000 metric tons CO<sub>2</sub>e/day

Avoided cost 300,000 tons X \$75/ton\* X 120 days = \$2.7 billion

\* <https://www.imf.org/external/pubs/ft/fandd/2019/12/the-true-cost-of-reducing-greenhouse-gas-emissions-gillingham.htm>

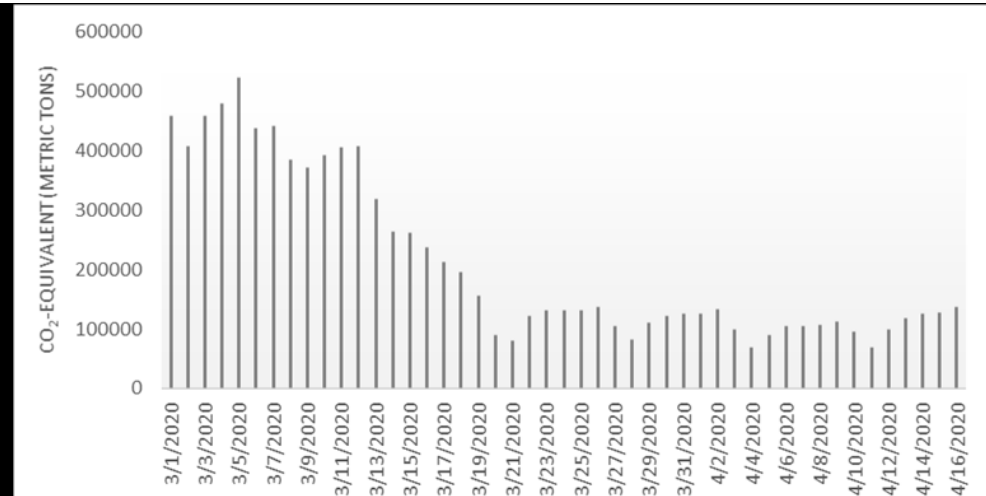
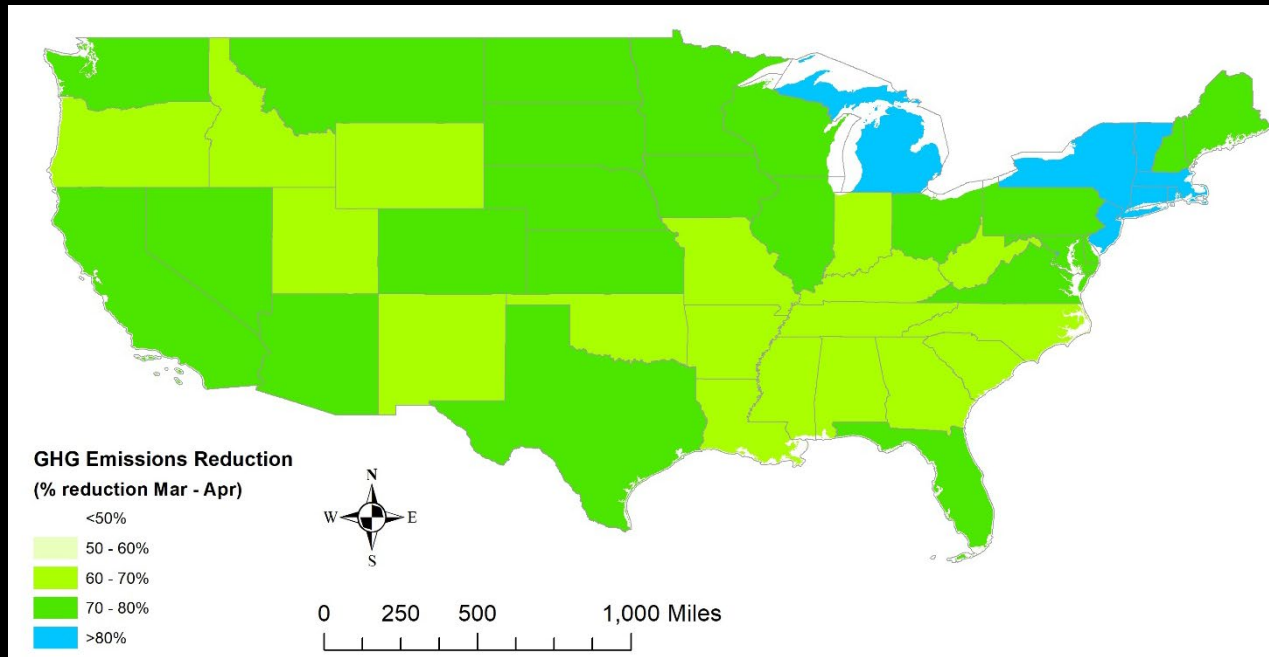


Figure 2. Estimated change in California greenhouse gas emissions as carbon dioxide-equivalents for March 1, 2020 to April 17, 2020.



# Reduction in traffic → reduction in wildlife impacts

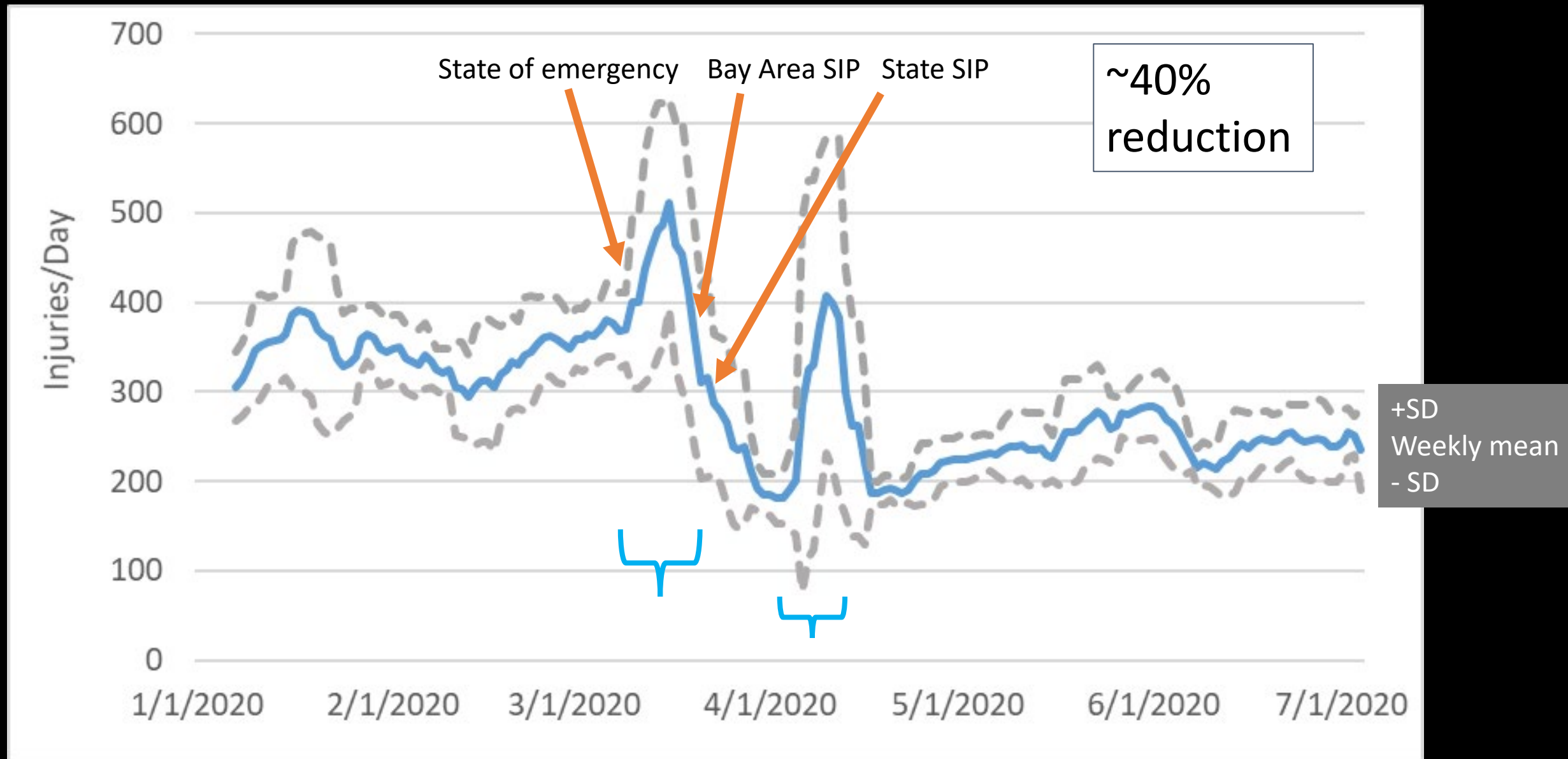
Wildlife mortality on roads declined 21% in CA between pre and post-statewide shelter-in-place order; 34% averaged across CA, ID, and ME

Mountain lion (proposed for listing) mortality declined 58%

Total decline in wildlife mortality on roads and highways in US estimated to be in the tens of millions during traffic reduction so far



# Reduction in traffic → reduction in injury crashes



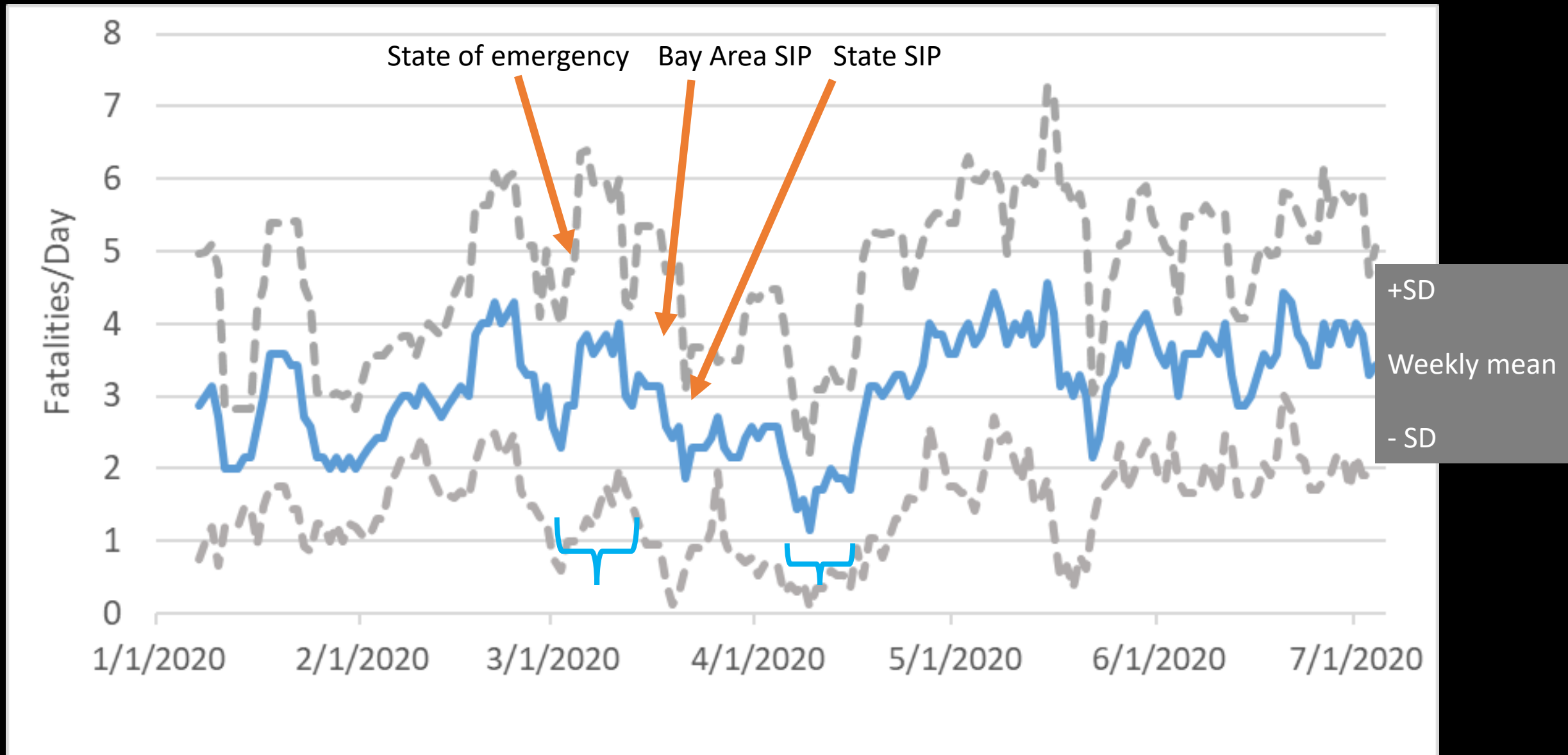
# Trauma Center Independent Confirmation

Sacramento regional hospitals reported 38% reduction in injuries in/on vehicles (auto/truck/MC) and 46% reduction in injuries to pedestrians and cyclists between early March and mid-April

There was no difference between early March 2019 and mid-April 2019

(preliminary results)

# Reduction in traffic → little change in fatal crashes

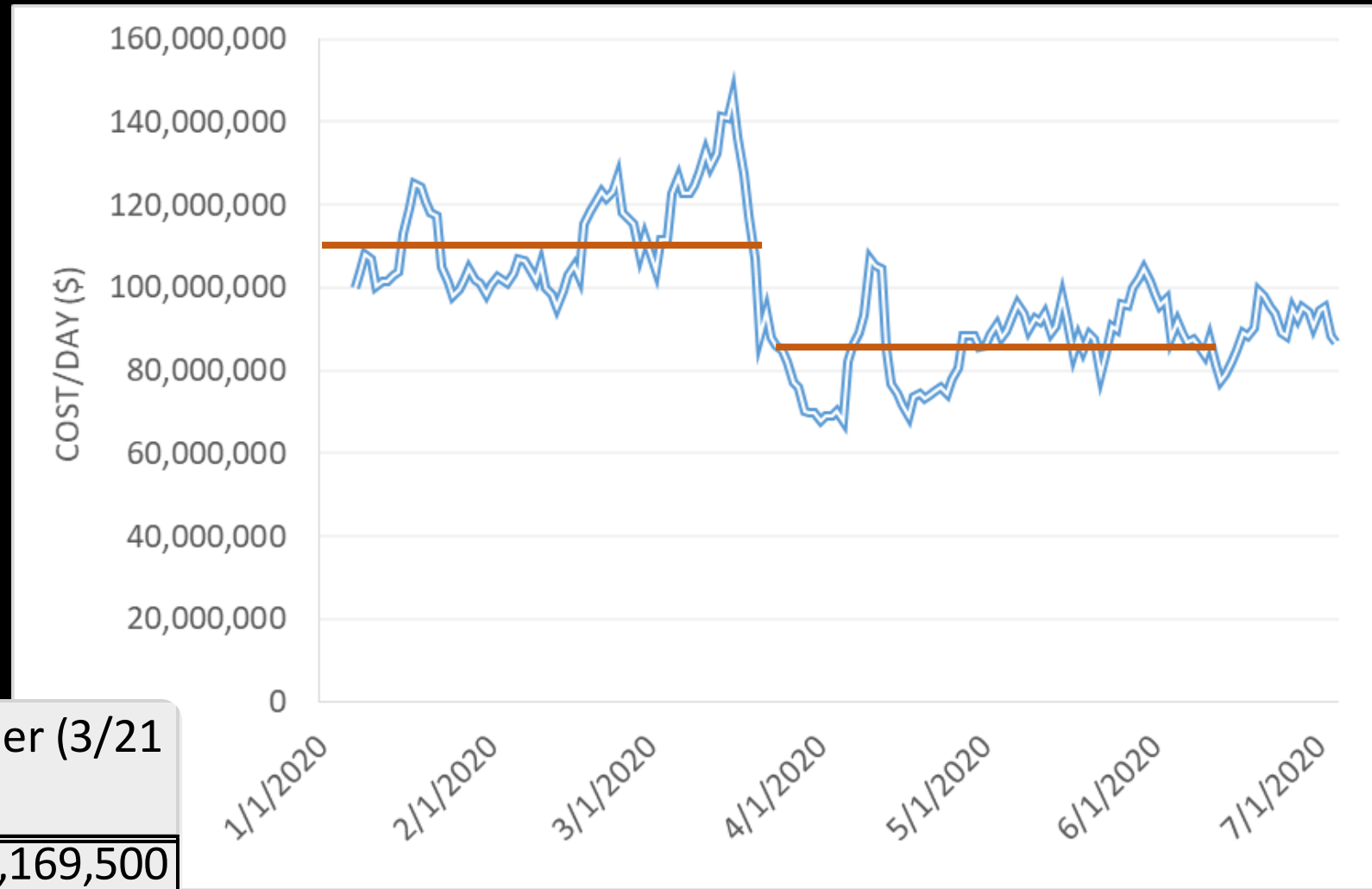


# Reduction in traffic → reduction in crash costs

22% decrease

~\$24 million/day

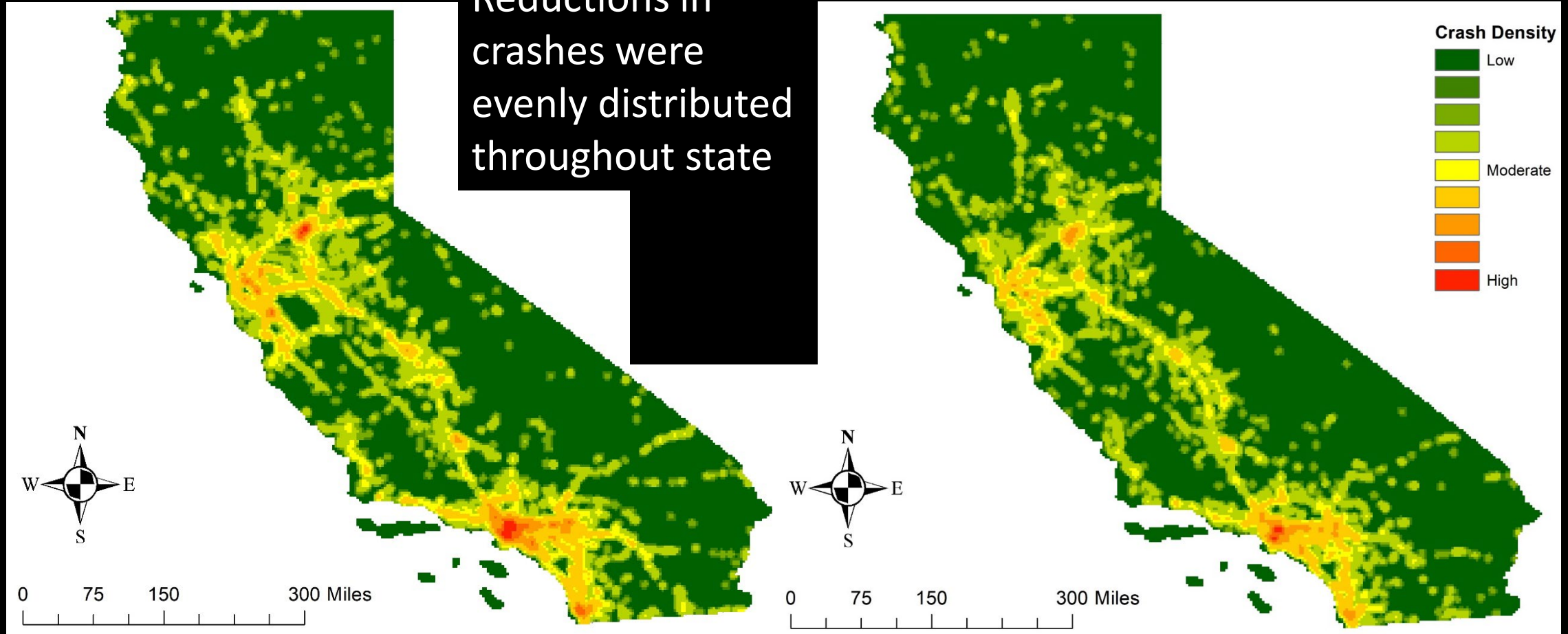
\$2.9 billion/120 days



	Pre-Order (1/01 - 3/19)	Post-Order (3/21 - 6/7)
Sum Cost	\$8,802,165,940	\$6,892,169,500
Daily Cost	\$111,419,822	\$87,242,652

# CA – Crash Distribution

Reductions in crashes were evenly distributed throughout state



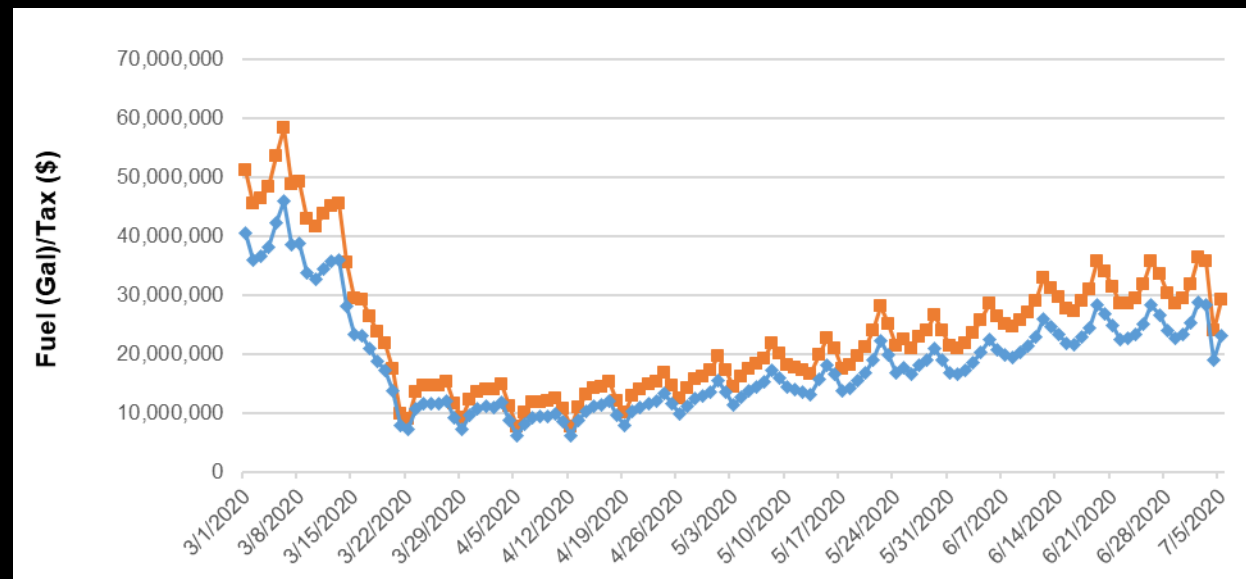
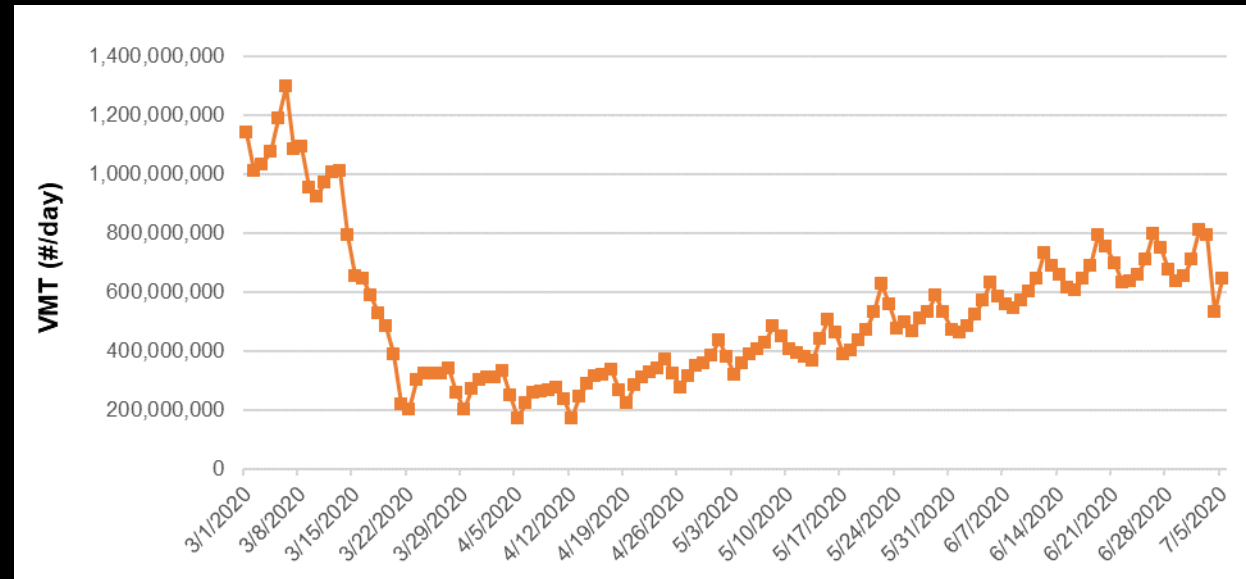
March 1-14, 2020 (12,990 crashes)

April 1-14, 2020 (7962 crashes)

# Accounting for Costs: Lost Fuel-Tax Revenue

Californians spent LESS on fuel  
 $\$3/\text{gal} * 4 \text{ billion gal}$   
 $= \$12 \text{ billion}/120 \text{ days}$

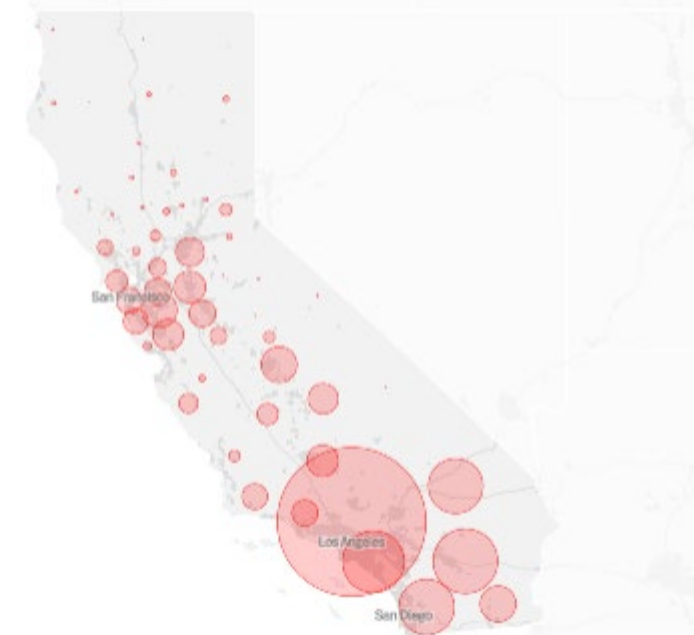
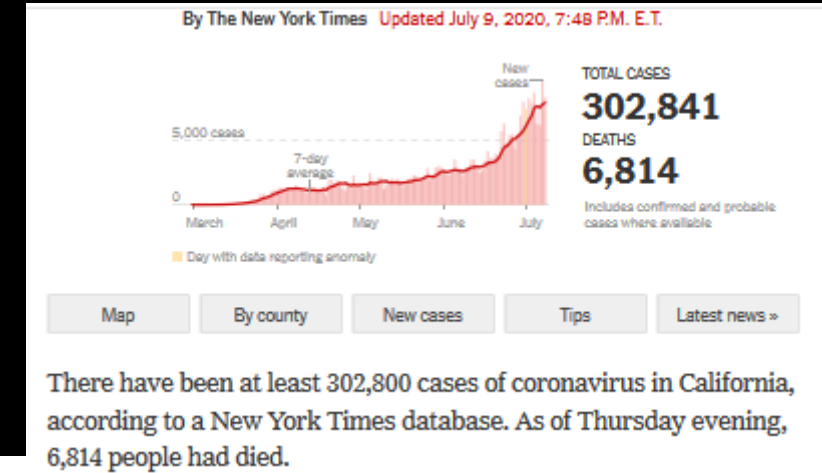
Lost fuel tax revenue =  $\sim \$26$   
million/day =  $\$3.1 \text{ billion}/120 \text{ days}$



# Accounting for Costs: Covid-19 Treatment

20% of cases require treatment and average cost of treatment = \$30,000 (insurer and cost-share/individuals)

**\$30k x 60,568 = \$1.8 billion/120 days**



<https://www.ahip.org/estimating-the-cost-of-covid-19-treatment-for-u-s-private-insurers/>

<https://www.nytimes.com/interactive/2020/us/california-coronavirus-cases.html>



# Accounting for Costs and Benefits

Medical costs, Covid-19 treatment	\$1.8 billion/120 days
Lost fuel tax revenue	\$2.4 billion/120 days
Reduced crash costs	\$2.9 billion/120 days
Reduced fuel cost	\$12 billion/120 days
Reduced GHG emissions	\$2.7 billion/120 days

Contact

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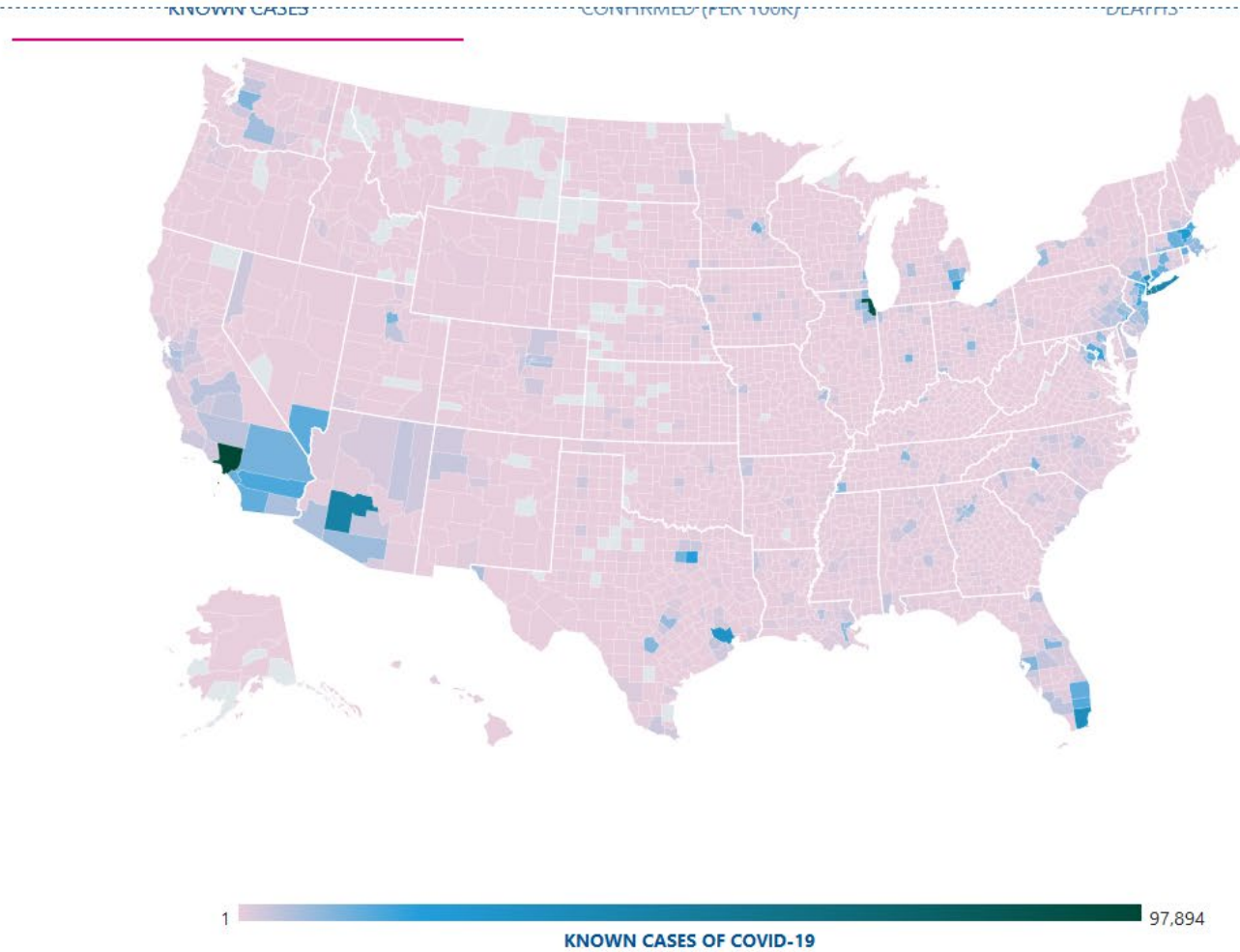
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# Coronavirus Locations: COVID-19 Map by County and State

Data Updated Jun 28, 2020



## More Info

[COVID-19 ISSUE PAGE](#)

## Download Data

[↓ KNOWN CASES](#)

[↓ DEATHS](#)

[↓ COUNTY POPULATIONS](#)