November Air Quality Health Monitoring Task Force Meeting

North Central Texas Council of Governments

November 6, 2020

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North Central Texas Council of Governments

UPDATE ON PARTICULATE MATTER (PM) EXCEEDANCE DAYS

Vivek Thimmavajjhala

NCTCOG

Air Quality Health Monitoring Task Force Meeting

November 6, 2020

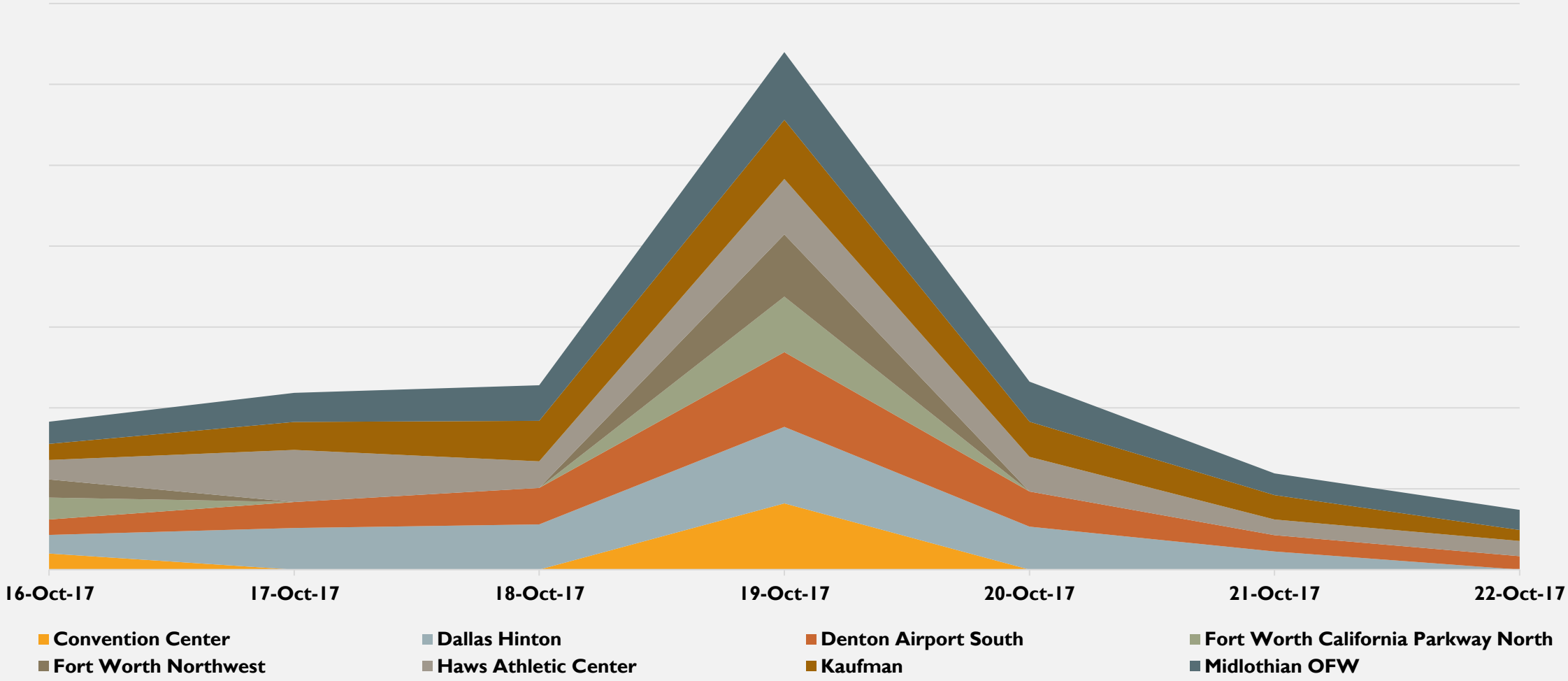
REGIONAL PARTICULATE MATTER (PM) EPISODES

- October 19, 2017 (Source: Unknown)
- January 22, 2018 (Source: Grass Fires)
- June 27 and June 28, 2020 (Source: Saharan Dust)

NCTCOG'S ACTIONS - OCTOBER 19TH, 2017 (RECAP)

- Issued a PM alert through the "Air North Texas"
- Responded to various enquires throughout the region
- Coordinated with the cities and local governments in an effort to determine source of the haze
- Discussed with the EPA and the TCEQ regarding the source of the haze and further actions
- The event could not be classified as an exceptional event in accordance with EPA's definition

HOW WERE THE MONITOR READINGS? PARTICULATE MATTER (PM) 2.5



TEXAS DEPARTMENT OF STATE HEALTH SERVICES
2017 ANNUAL DATA

County	Population	COPD Hospital Discharges	Asthma Outpatient Visits
Collin	1,025,618	1,071	2,655
Dallas	2,552,920	3,542	15,890
Denton	846,738	1,125	2,882
Ellis	183,618	468	985
Erath	40,353	77	174
Hood	58,168	164	218
Hunt	96,586	360	347
Johnson	175,030	574	1,192
Kaufman	133,652	264	476
Navarro	53,020	135	301
Palo Pinto	30,638	131	173
Parker	145,104	301	437
Rockwall	103,544	165	306
Somervell	9,844	20	*
Tarrant	2,023,985	3,284	11,771
Wise	202	121	69,449
Note: * Indicates fewer than 12 visits were reported, corresponding rates were not reported			

DATA REQUIREMENTS AND NEXT STEPS

- **Looking for daily health data (COPD Hospital Discharges, Asthma Outpatient Visits) at the county-level a week prior to and after October 19th, 2017 to analyze the trends**

- **Continue similar analysis for other identified regional PM episodes**
- **Channel discussion towards local/neighborhood-level hotspots**
- **Combine/consolidate regional interests/analysis with various cities, local governments, and communities**

- **Discussion**

EFFECTS OF COVID-19 ON TRANSPORTATION and AIR QUALITY

Air Quality Health Monitoring Taskforce Meeting

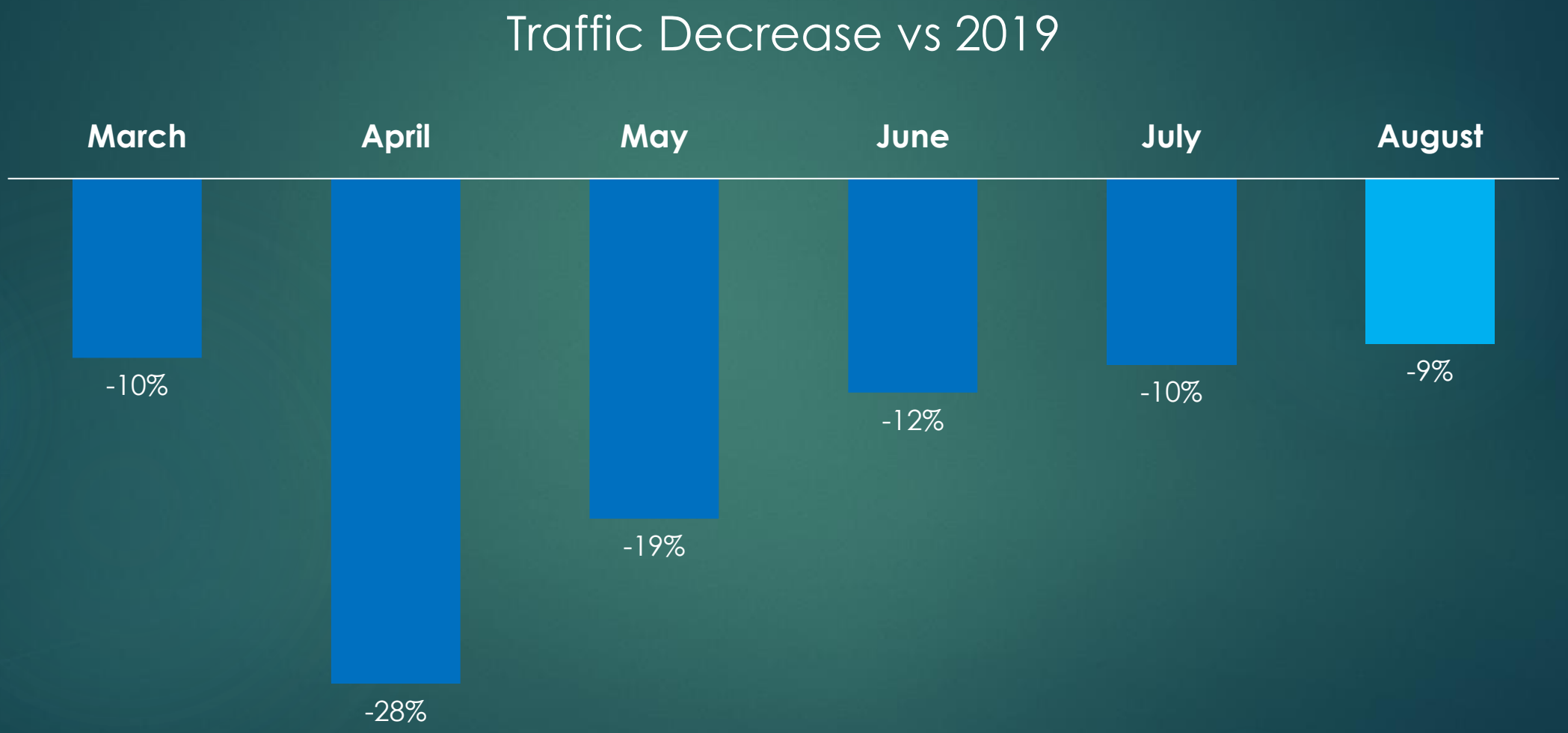
November 6, 2020

Nick Van Haasen

North Central Texas Council of Governments

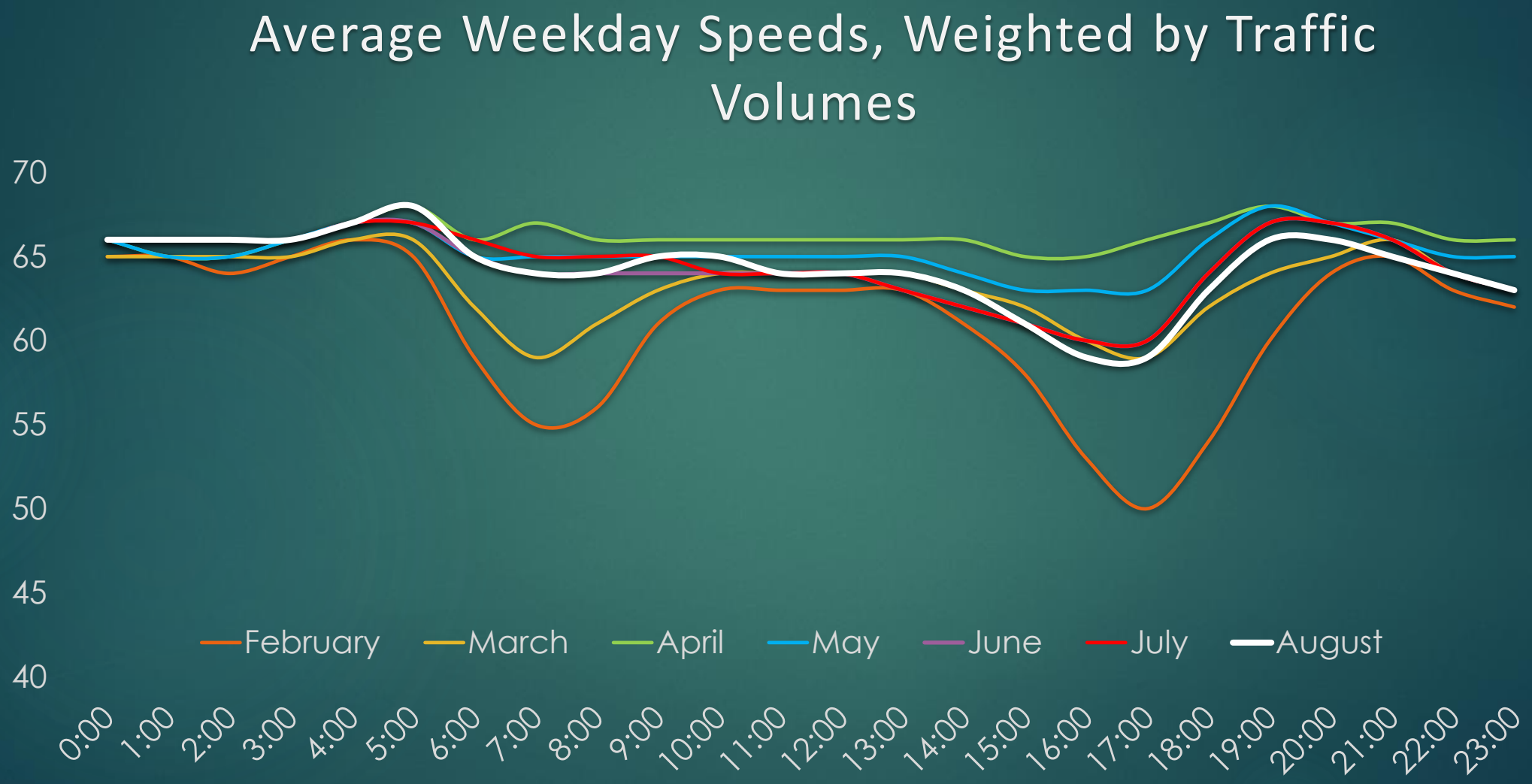
1. TRANSPORTATION

Average Weekday Freeway Volumes: Respective 2019 to 2020



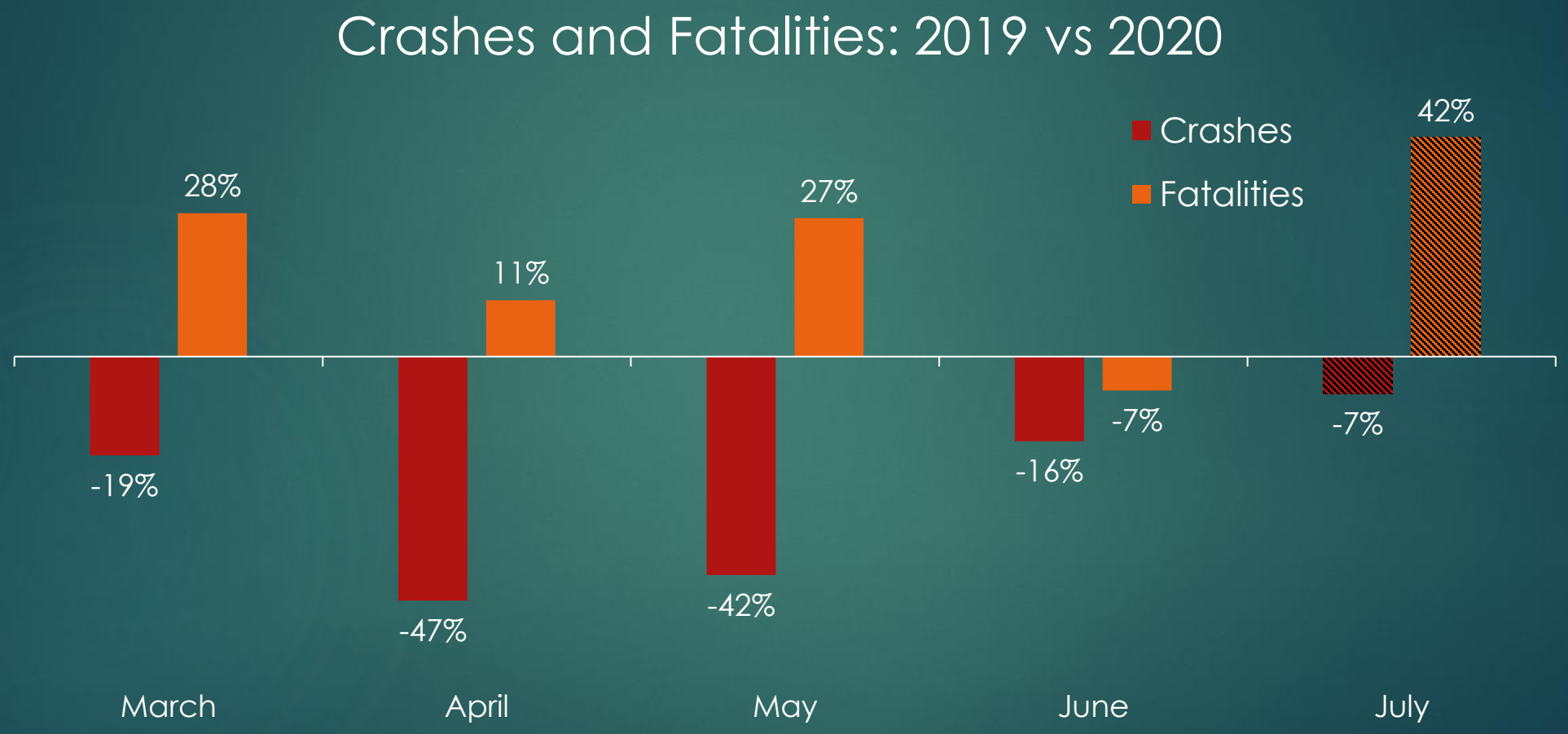
Source: TxDOT Dallas/TxDOT Fort Worth Radar Traffic Counters

Regional Average Freeway Speed By Time of Day



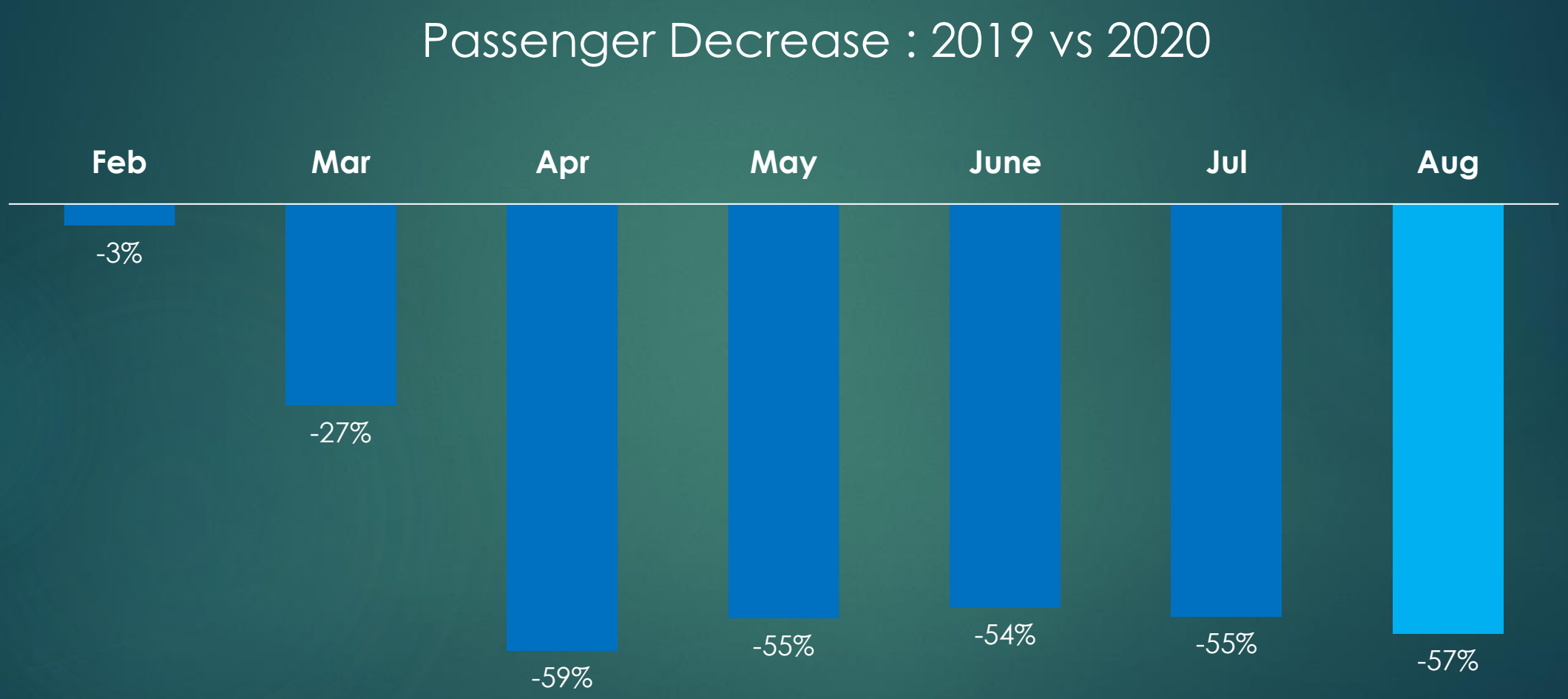
Source: TxDOT Sidefire Devices

Percentage of Crashes: March and April 2019 vs March and April 2020



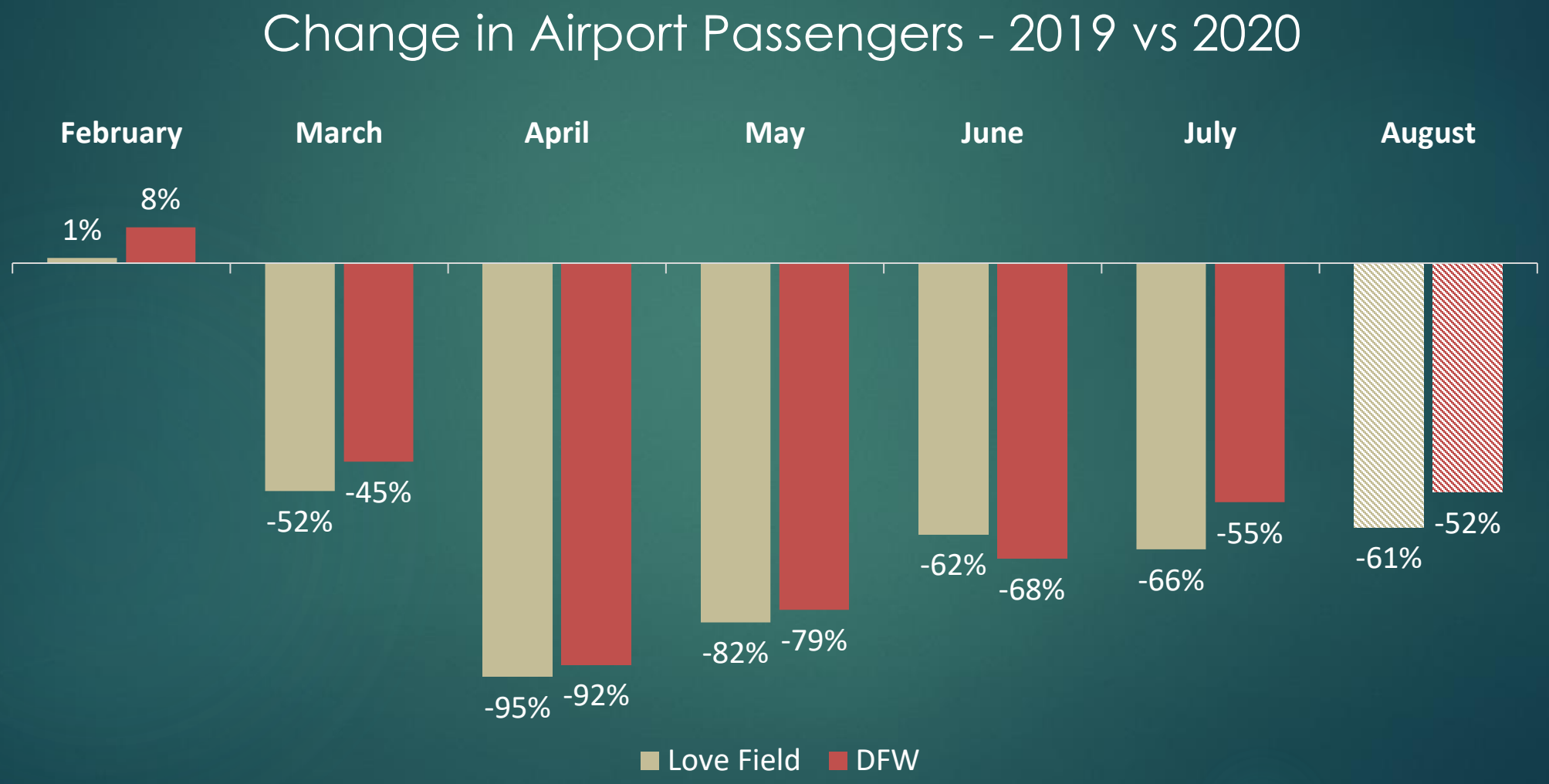
Source: TxDOT Crash Records Information System
Crash data is accurate as of August 12, 2020.
Traffic enforcement was significantly reduced during the COVID-19 shelter-in-place orders.

Transit Impacts: Weekday Ridership



Source: DART, DCTA, and Trinity Metro

Airport Impacts: Passenger Trends



Source: Dallas Love Field Website and DFWIA data

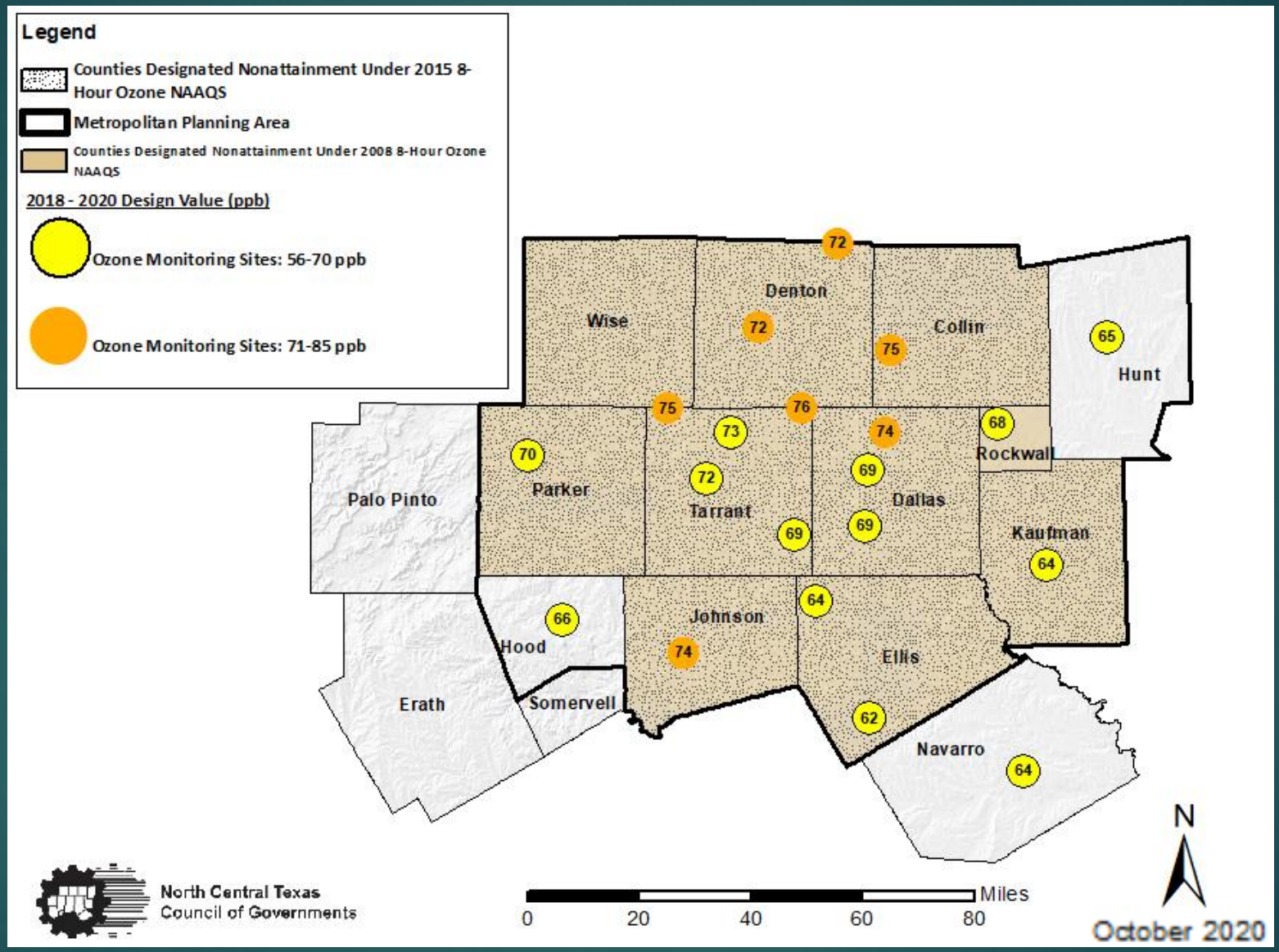
2. AIR QUALITY

Regional Air Quality Impacts During COVID-19

- Emissions from vehicles reduced
- Lowest frequency of high-level, unhealthy, exposure days to ozone
  (prior to exceedances on August 3, 2020)
  - Ozone levels influenced by meteorological conditions: high temperatures, low winds, high UV index, limited rain, and little cloud coverage
- Cleaner air = blue(r) skies
- Leading to a healthier populous (under review)
- Real world analysis on local contributions suggest multi-state SIP's to reduce background
- How Can We Sustain Impacts? (To be determined)
  Electric and Fuel Cell Vehicles
  Travel Demand Management (Telecommuting)

Real world analysis on local contributions suggest multi-state SIPs to reduce background

DFW OZONE NONATTAINMENT AREA



Colors represent Air Quality Index breakpoints

Attainment Goal - According to the US EPA National Ambient Air Quality Standards, attainment is reached when, at each monitor, the three-year average of the annual fourth-highest daily maximum eight-hour average ozone concentration is less than or equal to 70 parts per billion (ppb).

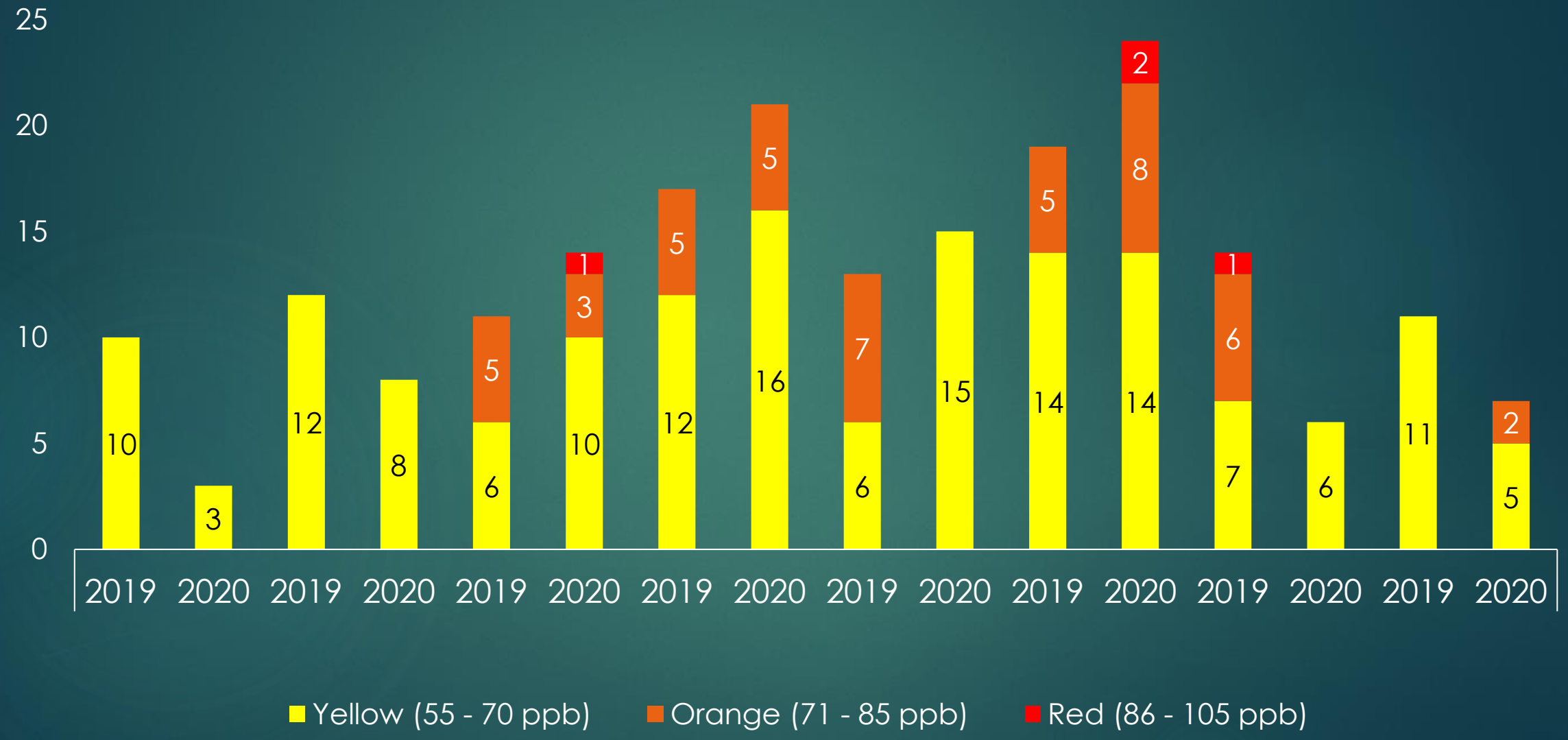
North Central Texas Ozone Comparison

	2017	3 Year Design Value		
		2018	2019	2020*
March	2 yellow days High: 62 at Eagle Mtn Lake	8 yellow days High: 63 at Denton	10 yellow days High: 66 at Cleburne	3 yellow days High: 64 at Pilot Point
April	10 yellow days High: 68 at Dallas Hinton	16 yellow days 2 orange days High: 81 at Dallas North High: 81 at Dallas Hinton	12 yellow days High: 69 at Greenville	8 yellow days High: 69 at Rockwall High: 69 at Grapevine
May	15 yellow days 5 orange days High: 80 at Dallas North High: 80 at Dallas Hinton	9 yellow days 6 orange days **2 red days** **High: 92 at Eagle Mtn Lake**	6 yellow days 5 orange days High: 80 at Pilot Point	10 yellow days 3 orange day **1 red day** **High: 86 at Grapevine Fairway**
June	6 yellow days 4 orange days High: 84 at Cleburne Airport	7 yellow days 2 orange days High: 85 at Dallas North	12 yellow days 5 orange days High: 76 at Frisco High: 76 at Arlington Municipal High: 76 at Cleburne Airport	16 yellow days 5 orange days High: 77 at Eagle Mountain Lake
July	14 yellow days 3 orange days High: 81 at Cleburne Airport High: 81 at Granbury	14 yellow days 8 orange days **3 red days** **High: 92 at Grapevine Fairway**	6 yellow days 7 orange days High: 83 at Cleburne Airport	15 yellow days High: 69 at Dallas North
August	11 yellow days 3 orange days High: 83 at Grapevine Fairway	12 yellow days 6 orange days **2 red days** **High: 91 at Parker County**	14 yellow days 5 orange days High: 84 at Keller	14 yellow days 8 orange days **2 red days** **High: 89 at FT. Worth Northwest**
September	11 yellow days 8 orange days High: 82 at Dallas Hinton	6 yellow days High: 69 at Pilot Point	7 yellow days 6 orange days **1 red day** **High: 88 at Frisco**	6 yellow days High: 69 at Frisco

Data Source: TCEQ
Data Analysis: NCTCOG

* as of October 5, 2020. At this time last year (October 5, 2019), there were three Yellow days, whereas 2020 has 1 Yellow day.

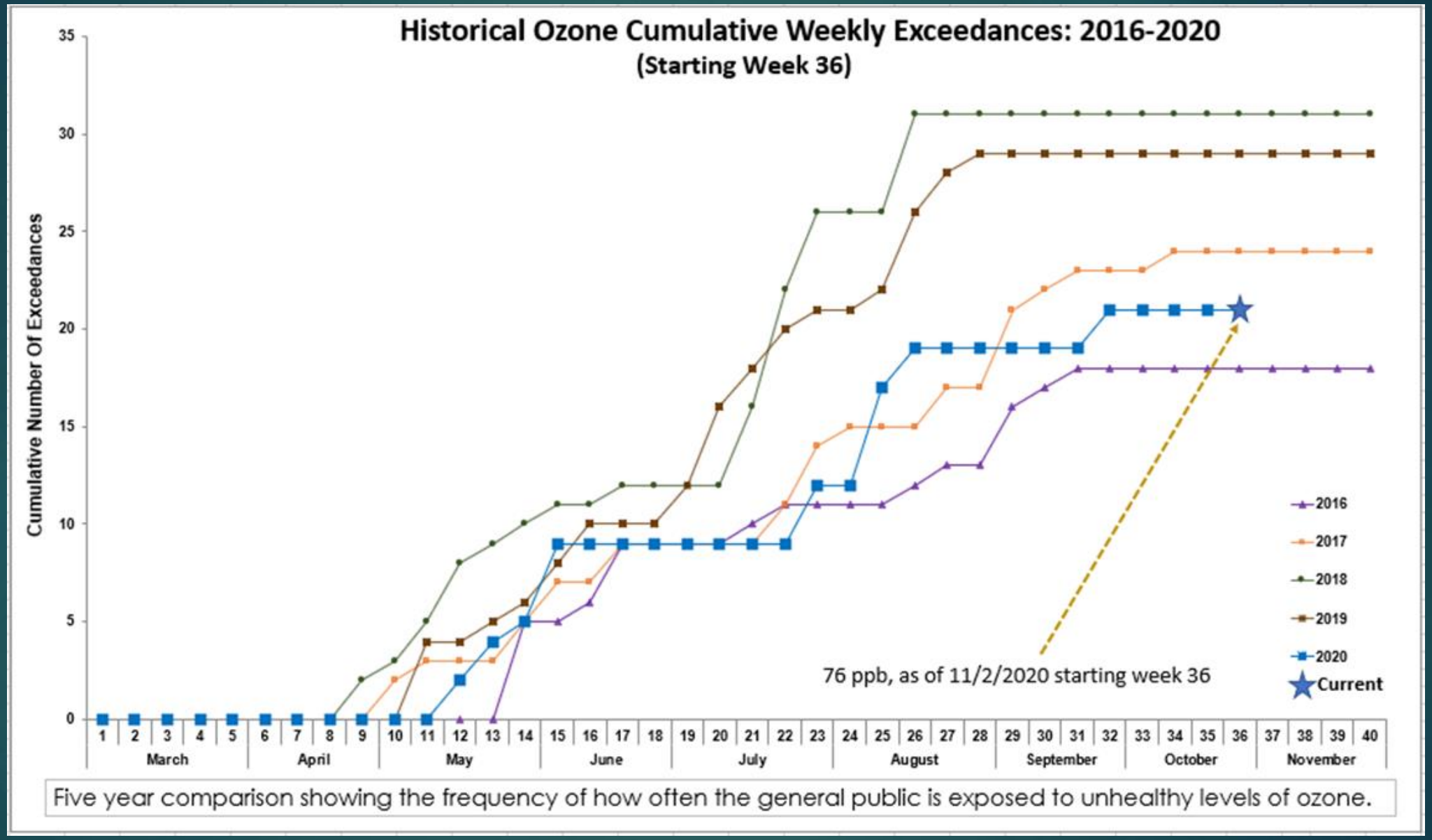
North Central Texas Ozone Exceedance Comparison: 2019-2020



Data Source: Texas Commission on Environmental Quality

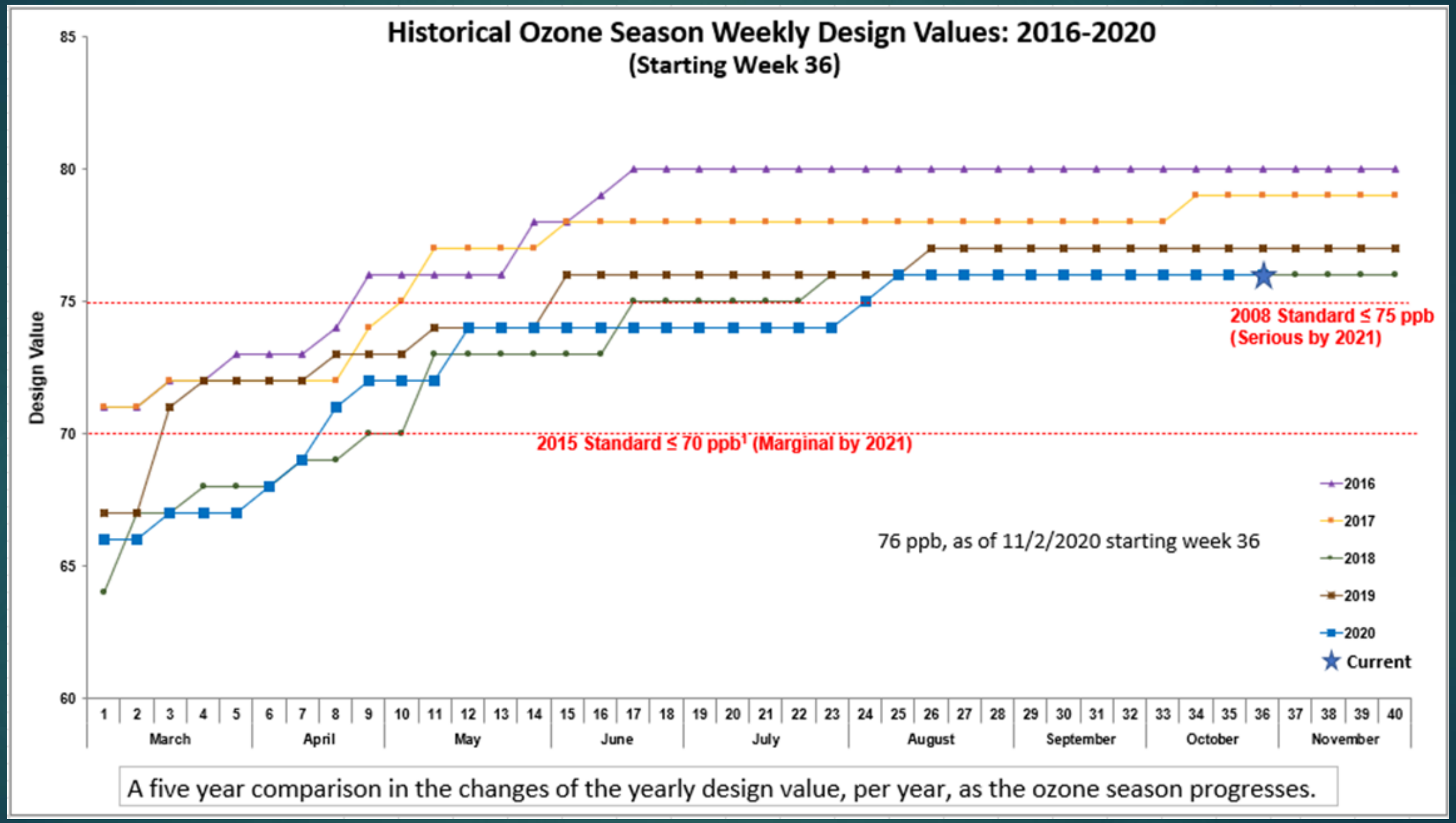
Data Analysis: North Central Texas Council of Governments

Cumulative Ozone Exceedances, 2016-2020



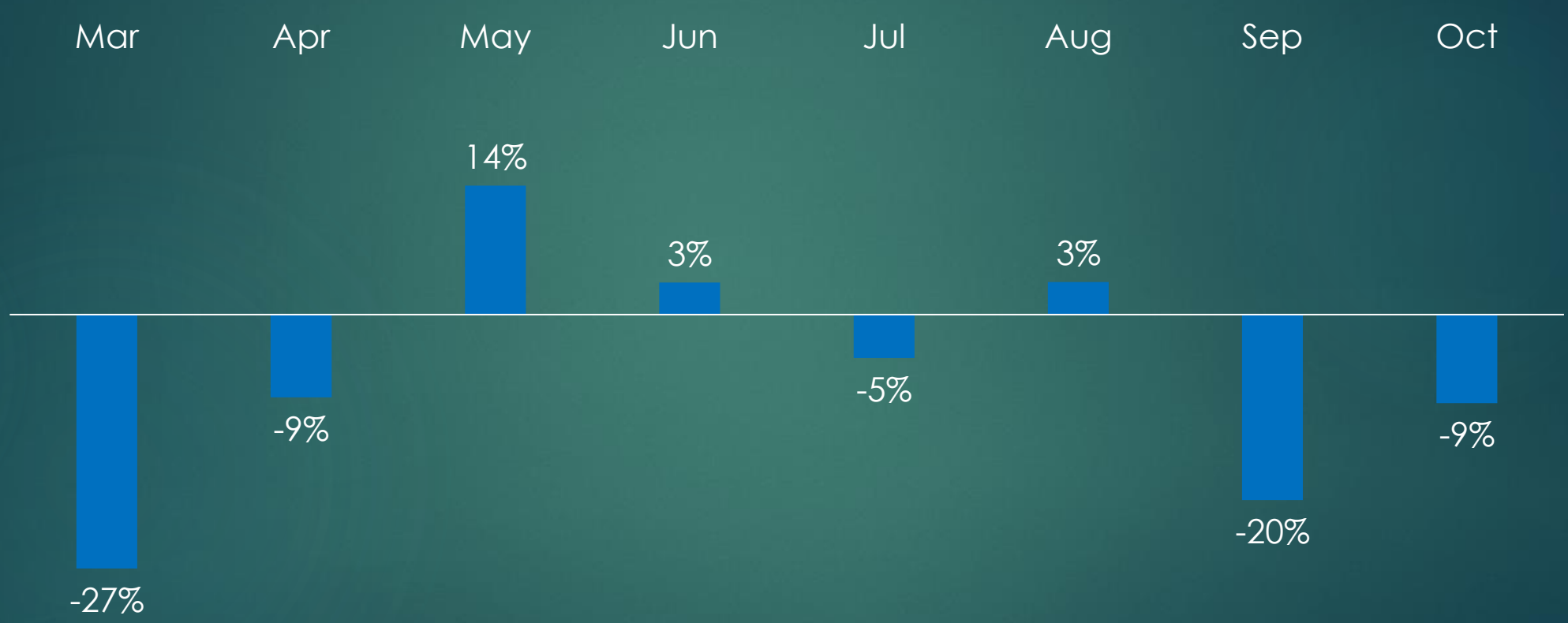
Data Source: Texas Commission on Environmental Quality
Data Analysis: North Central Texas Council of Governments

Weekly Ozone Design Values, 2016-2020



Data Source: Texas Commission on Environmental Quality
Data Analysis: North Central Texas Council of Governments

Percent Change in Average Regional Ozone Emissions: 2019 vs 2020



*ozone levels are influenced by meteorological conditions: high temperatures, low winds, high UV index, limited rain, and little cloud coverage.

Data Source: Texas Commission on Environmental Quality

Data Analysis: North Central Texas Council of Governments

FOR MORE INFORMATION, PLEASE CONTACT:

Chris Klaus
Senior Program Manager
(817) 695-9286
CKlaus@nctcog.org

Jenny Narvaez
Program Manager
(817) 608-2342
JNarvaez@nctcog.org

Vivek Thimmavajjhala
Transportation System Modeler
(817) 704-2504
VThimmavajjhala@nctcog.org

Nick Van Haasen
Air Quality Planner
(817) 640-3300
NVanhaasen@nctcog.org

Nondiscrimination Analysis for Long-Range Planning

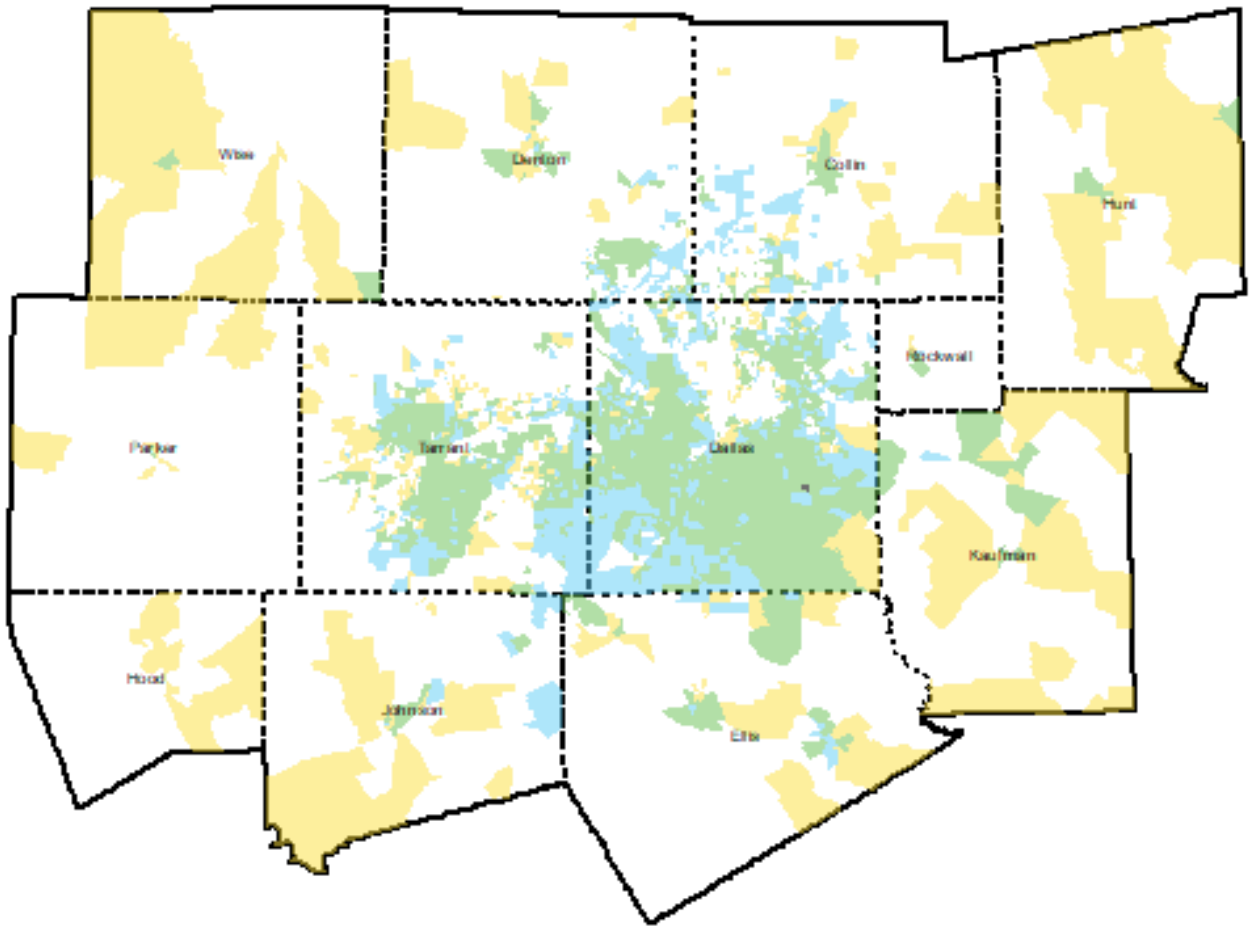
Potential Air Quality Metric

North Central Texas
Council of Governments

Long-range planning and nondiscrimination requirements at NCTCOG

- 20+ year planning horizon with updates every 4 years (because of nonattainment)
- Compliance with EO 12898 and EO 13166; environmental justice and limited English proficiency, respectively
- Compliance with Title VI of Civil Rights Act of 1964; race, color, national origin

Environmental Justice Index

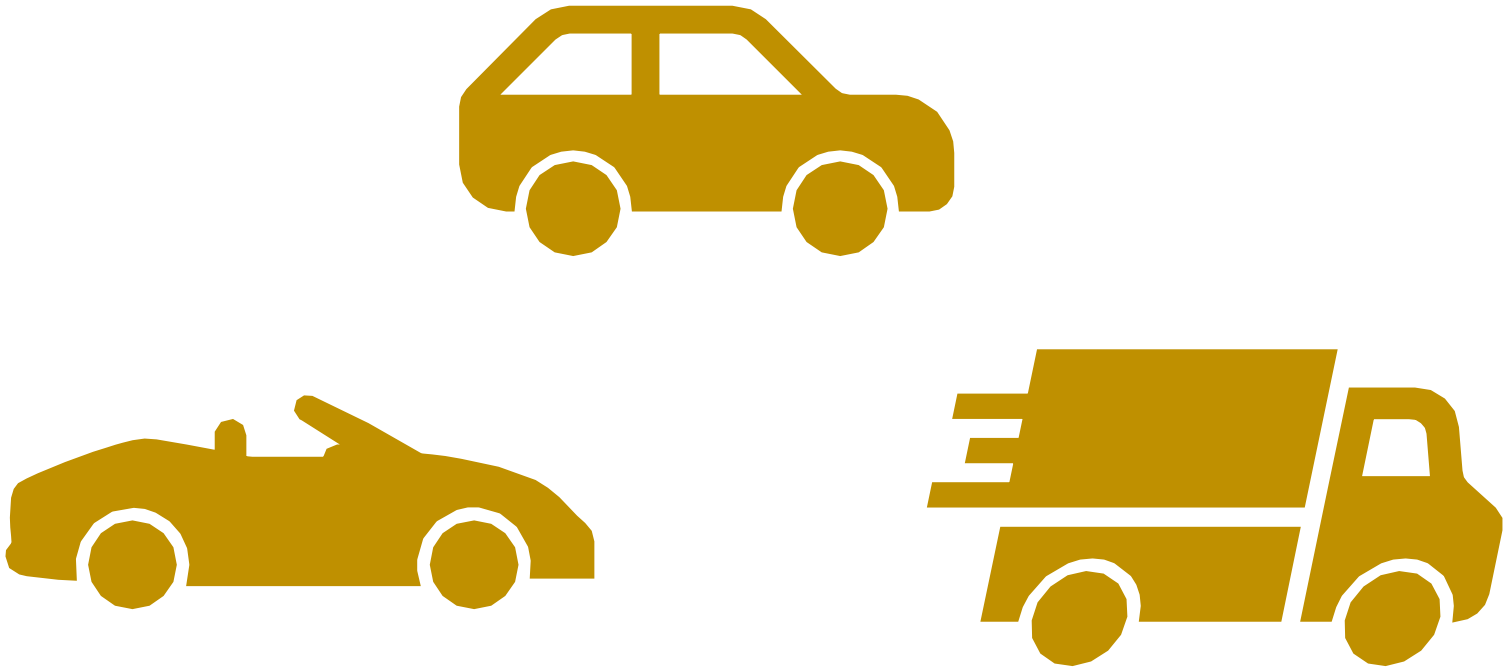


Goals for revising non-discrimination analysis

- Expand to include Title VI of Civil Rights Act of 1964 (limited English-proficient communities)
- Diversify metrics beyond roadway and transit accessibility, such as grade-separated vs. at-grade rail crossings; access to on-street bike facilities
- Include benefits *and* burdens
- Continue comparing current conditions to future conditions (post construction of long-range plan projects)
- Conduct a needs assessment that will help inform:
  - Future project selection and prioritization for the long-range plan, 10-year plan, and calls for projects (funding opportunities)
  - Programmatic tasks that are not roadway/transit alignments in the long-range plan

Potential air quality metric

Equity of communities neighboring roadways with >125,000 vehicles per day (VPD)

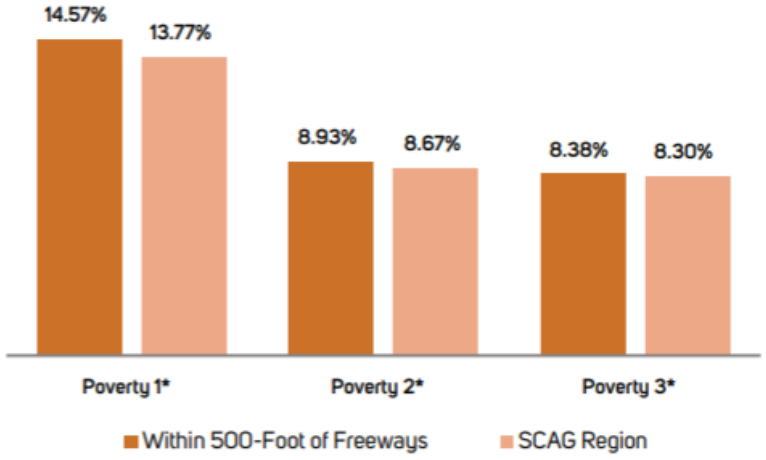


Reference for selecting 125,000 VPD metric

Population neighboring roadways with >125,000 VPD – focus on PM, CO

2012

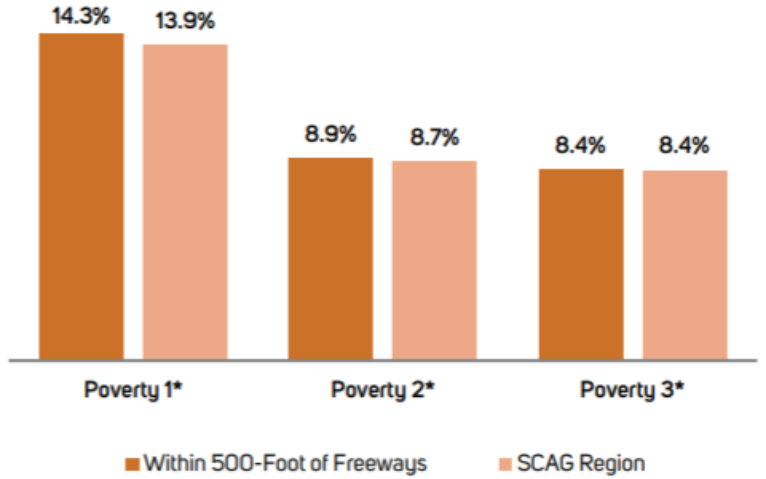
FIGURE 72 Breakdown of Poverty Households along Freeways and Highly Traveled Corridors (Base Year 2012)



Source: SCAG

2040

FIGURE 73 Breakdown of Poverty Households along Freeways and Highly Traveled Corridors (20 Plan)



Source: SCAG

Poverty 1 is households < poverty; Poverty 2 is households 100%-149% poverty;
Poverty 3 is households 150%-199% poverty

http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_EnvironmentalJustice.pdf

Three challenges

1. Burden generated by individual roadway impact, or burden generated by cumulative roadway impact?

2. Relevance of 125,000 vehicles per day?
   - Why 125,000?
   - Volume, congestion, or diesel truck use?
   - LA is out of attainment for PM 2.5?

3. Distance of greatest exposure
   - 500-600 feet typically accepted
   - Are other distances worth considering?
   - Roadway segment lengths, Census geographies, and traffic survey zones (TSZs) exceed these distances

1

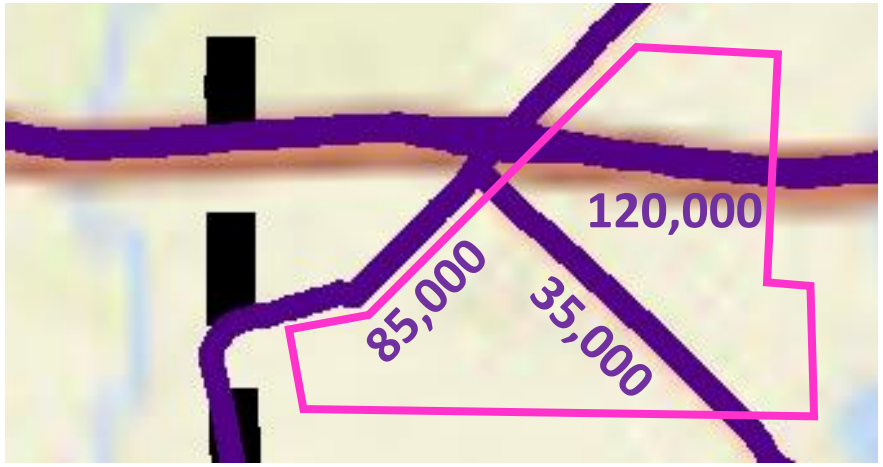
Individual roadway burden

- ID roadways >125,000 VPD
- ID neighboring communities

vs.

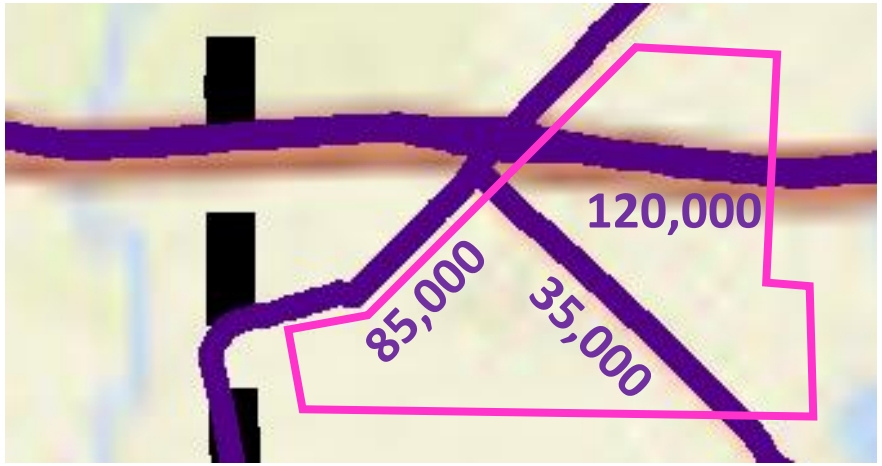
Cumulative burden

- ID communities within 500 feet of cumulative burden of >125,000 VPD



Roadway

Block group

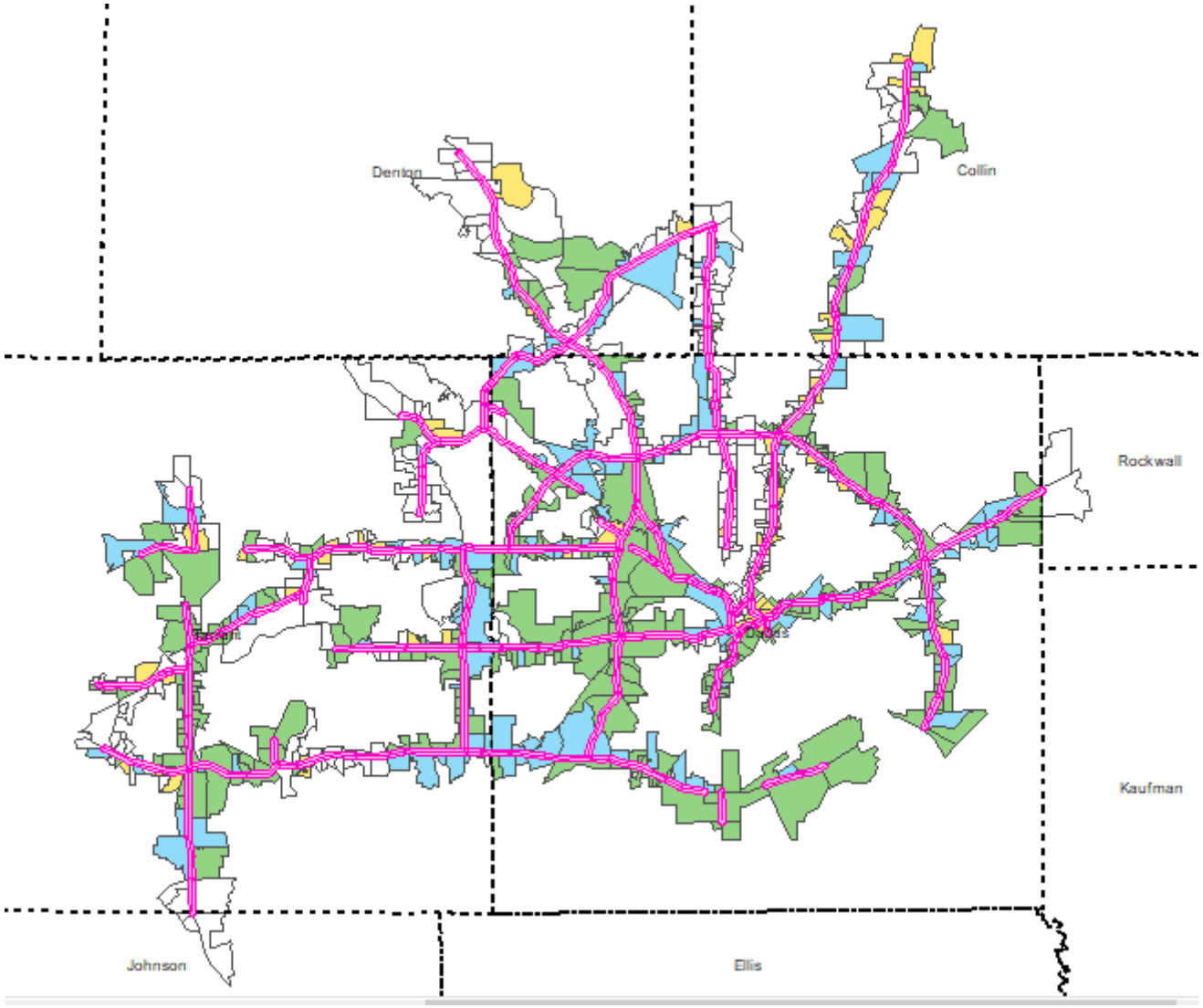


No impact

Impact

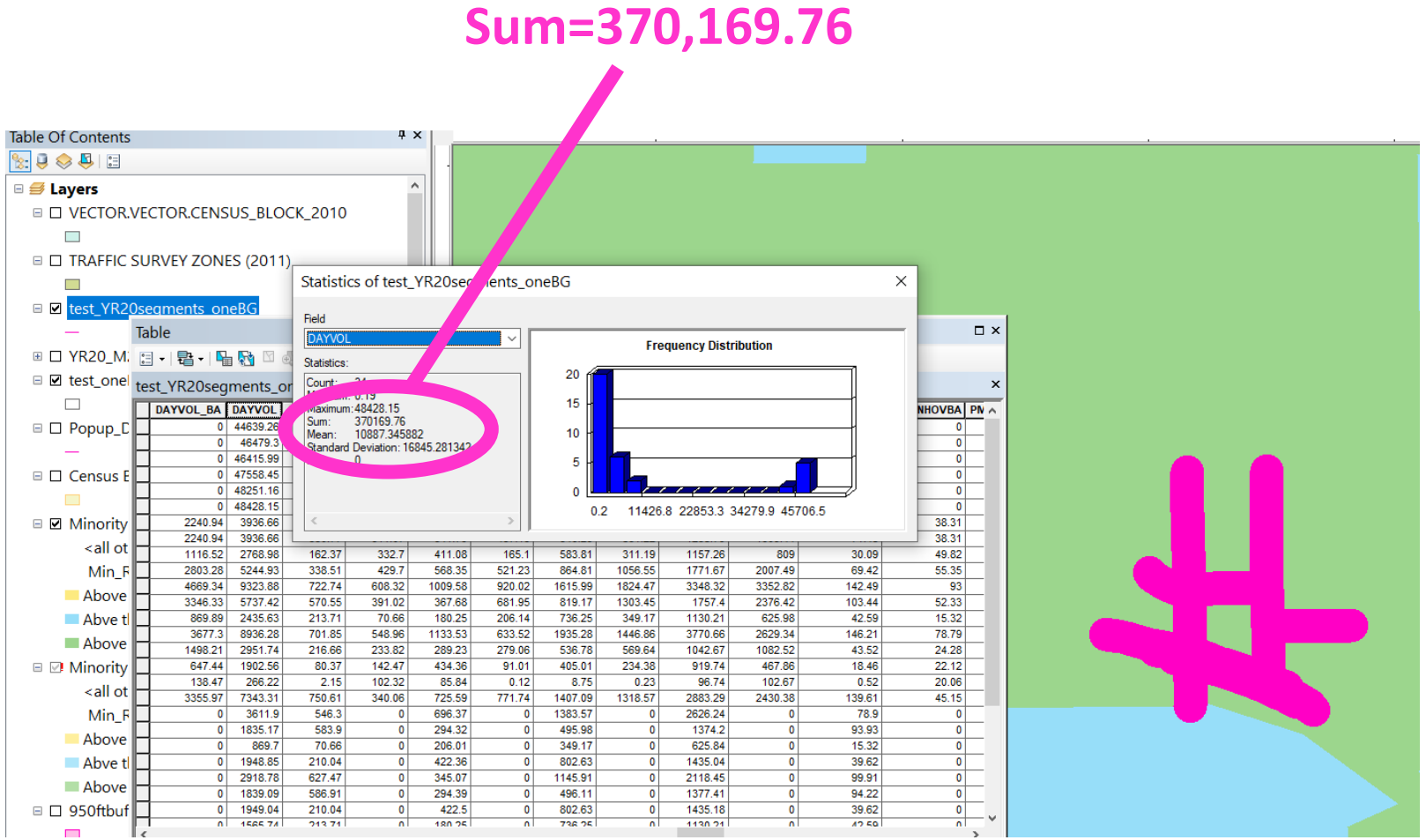
1

Environmental justice (and other) block groups intersecting roadways with >125,000 VPD



1

Cumulative vehicles per day >125,000 within 500 feet of one block group (in this case with high environmental justice population)



2

number

Qualitative Project-Level "Hot-Spot"

5.2 NEPA Triggers

- A CO TAQA is required if the project is NOT exempt in accordance with Section 6.2 of this handbook.
- MSAT consultation is required if the project is NOT exempt from an MSAT analysis in accordance with Section 6.2 of this handbook and any of the following apply:
  - The project is adding capacity and has an Annual Average Daily Traffic (AADT) greater than the 140,000 vehicles per day, or
  - The project affects or is affected by an intermodal facility or another facility which may be a large generator of diesel traffic, or
  - The public has expressed air quality concerns specifically about this project (the consultation process would assess if the public concerns would be addressed by conducting a quantitative MSAT analysis).

meters, or approximately 650

ocation of roads and traffic

levels come from the 2011 National Transportation Atlas Database; data on population come from the 2010 Census.

Related Links

From TxDOT's Environmental Handbook: Air Quality, https://ftp.txdot.gov/pub/txdot-info/env/toolkit/210-01-gui.pdf

2

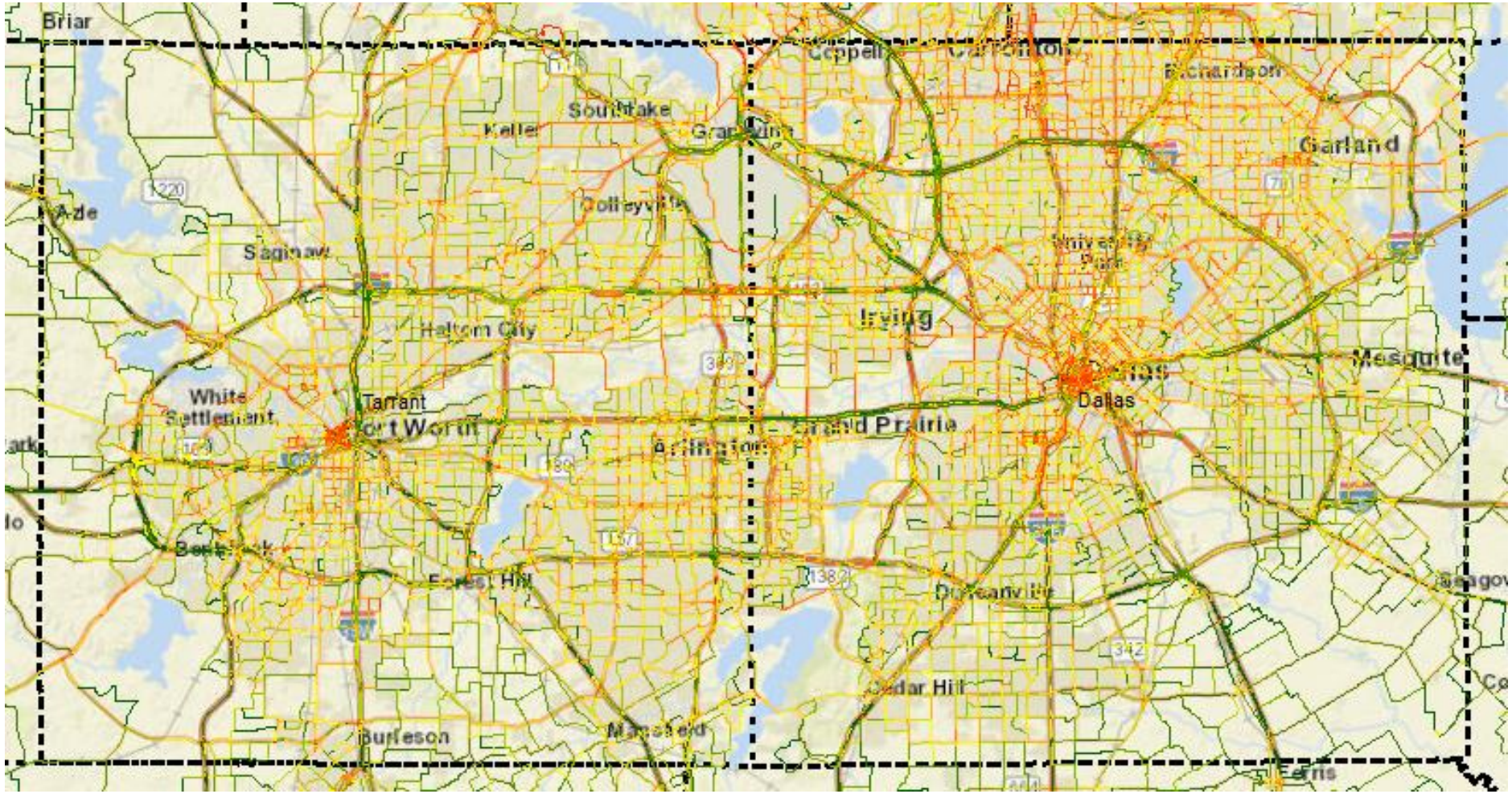
Reasons for 125,000 (or other) VPD threshold:

a) Volume?
b) Congestion?
c) Presence of trucks?
d) LA (reference metric) is in nonattainment for PM 2.5?

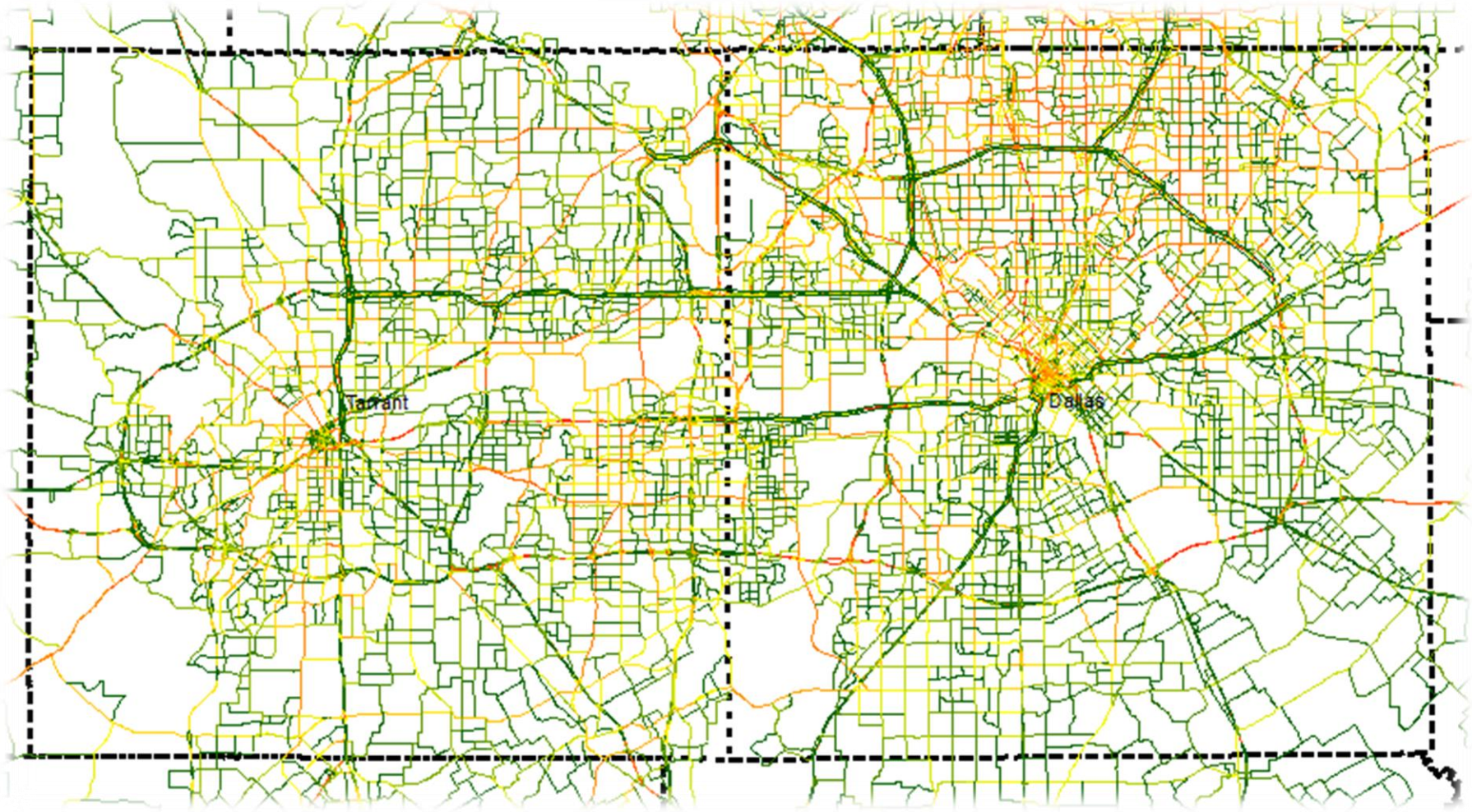
a) Volume


Briar
Southlake
Keller
Grapevine
Garland
Azle
Saginaw
Haltom City
Irving
Mesquite
White Settlement
Tarrant
Fort Worth
Arlington
Grand Prairie
Dallas
Forest Hill
Cedar Hill
Burleson
Mansfield
Ferris

b) Congestion



c) Presence of trucks*



* NCTCOG truck data is not calibrated for individual locations, so it is less accurate on a local scale than on an aggregated, regional scale

d) LA is in nonattainment for PM 2.5…

Making 125,000 relevant in LA. Is it also relevant for DFW?

Los Angeles County		
Lead (2008)	*	Los Angeles County-South Coast Air Basin, CA
PM-2.5 (1997)	*	Los Angeles-South Coast Air Basin, CA - (Moderate)
PM-2.5 (2006)	*	Los Angeles-South Coast Air Basin, CA - (Serious)
PM-2.5 (2012)	*	Los Angeles-South Coast Air Basin, CA - (Moderate)
8-Hour Ozone (2008)	*	Los Angeles-San Bernardino Counties (West Mojave Desert), CA - (Severe 15)
8-Hour Ozone (2008)	*	Los Angeles-South Coast Air Basin, CA - (Extreme)
8-Hour Ozone (2015)	*	Los Angeles-San Bernardino Counties (West Mojave Desert), CA - (Severe 15)
8-Hour Ozone (2015)	*	Los Angeles-South Coast Air Basin, CA - (Extreme)

https://www3.epa.gov/airquality/greenbook/ancl.html

3

Living within 500-600 feet from roadway documented as creating increased health risk
www.transportation.gov/mission/health/proximity-major-roadways

But…

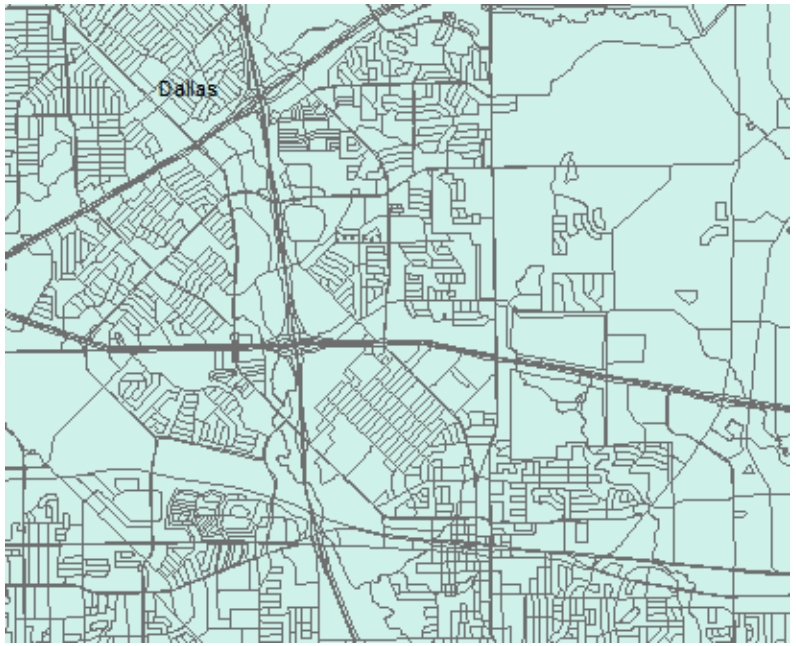
a) Geography presents challenges

- Census block (finest-scale) data not always available and can exceed 500-foot distance
- Census block group data can exceed 500-foot distance by greater amount than blocks
- Traffic survey zones can exceed 500-foot distance

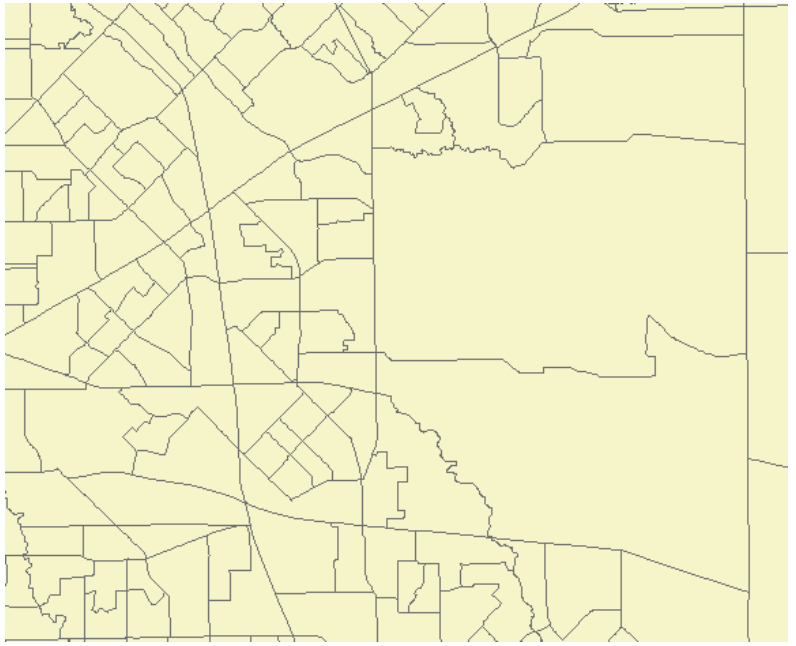
b) Roadway segment lengths present challenge

- Segment may exceed 500-foot distance

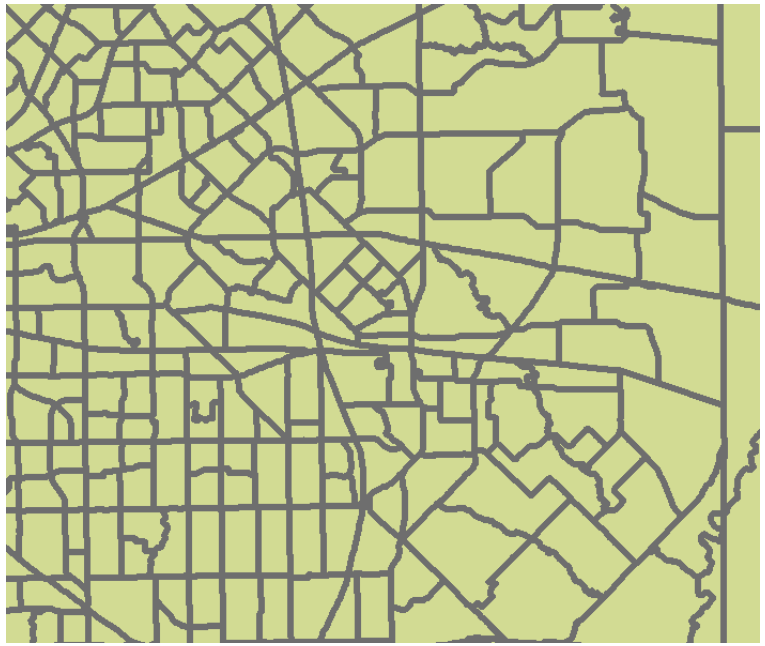
a) Census geography and TSZ sizes



Blocks

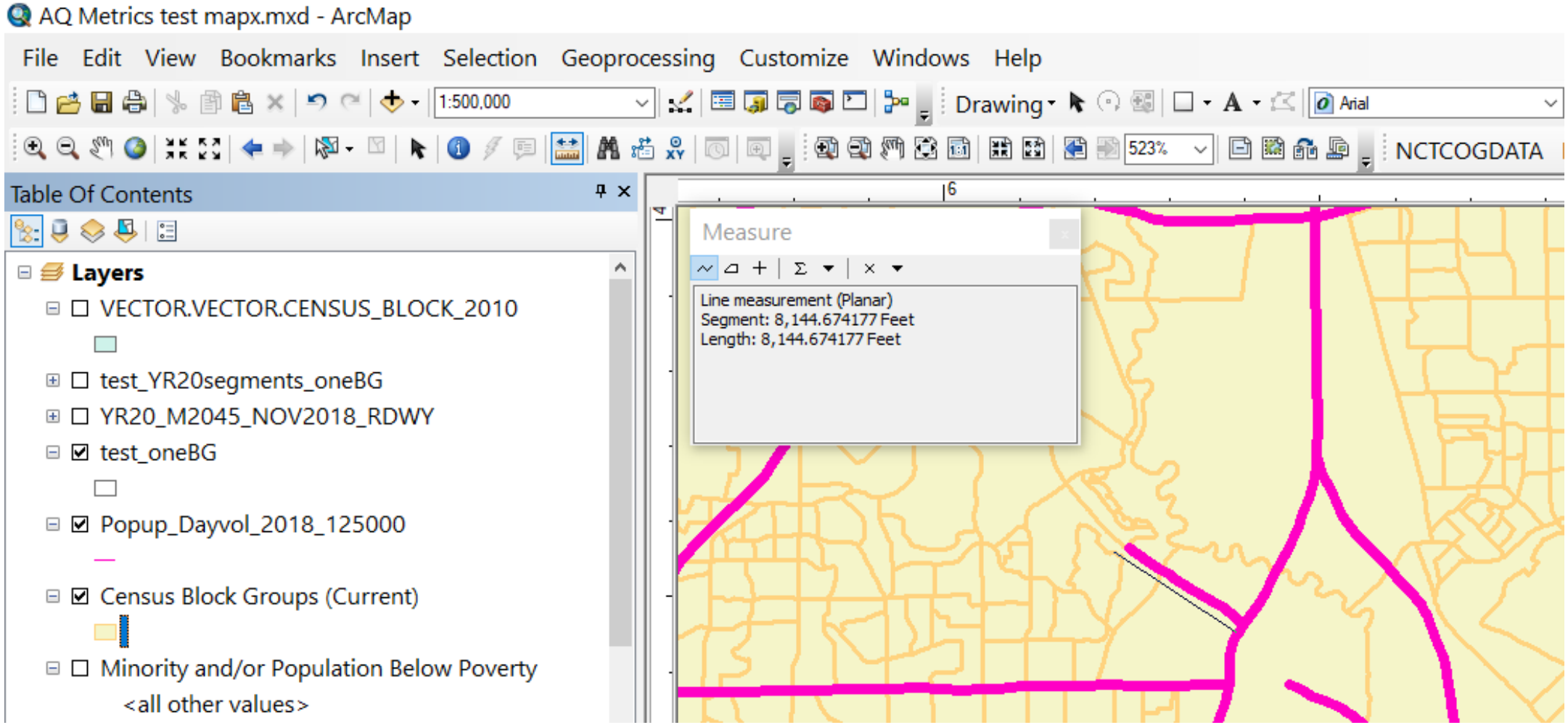


Block groups



TSZs – used when projecting demographics into future

b) Roadway segment lengths



Your thoughts?

Contact

Kate Zielke

Principal Transportation Planner

kzielke@nctcog.org

CO-Benefits Risk Assessment (COBRA) Health Impact Screening and Mapping Tool

Emma Zinsmeister, MPH

Presentation to the North Central Texas Council of Governments
Webinar | November 6, 2020

EPA United States Environmental Protection Agency

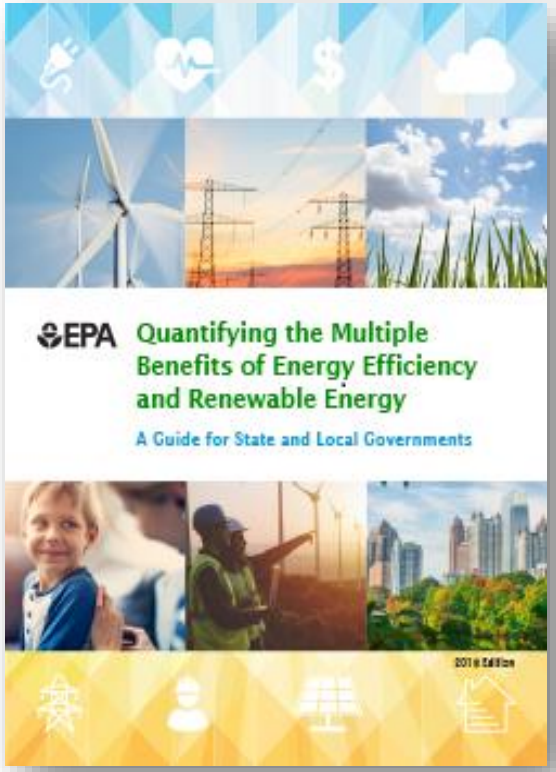
Today

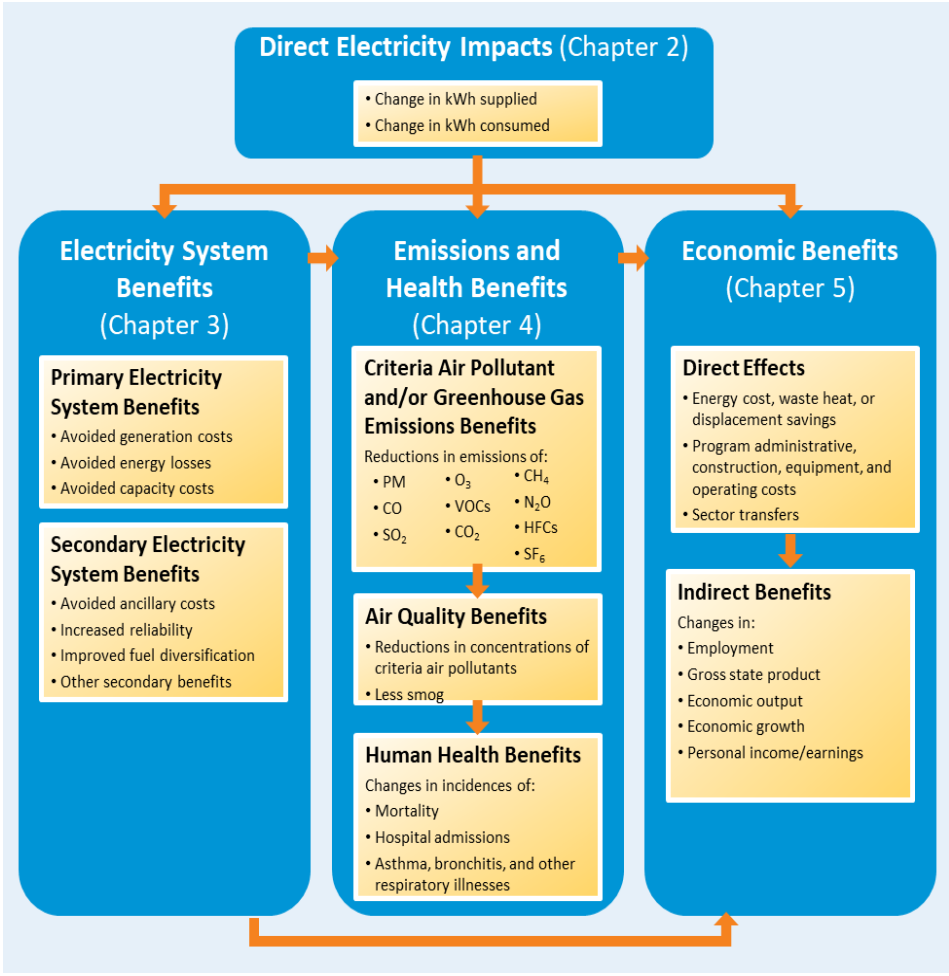
- Provide an overview of EPA's CO-Benefits Risk Assessment (COBRA) Health Impacts Screening and Mapping Tool
- Offer an example of how COBRA can be used
- Invite you to share ideas for how COBRA can support your work within local governments

EPA

EPA's State and Local Energy and Environment Program

Emissions, air quality (AQ), and health benefits are a key component of EPA's multiple benefits framework

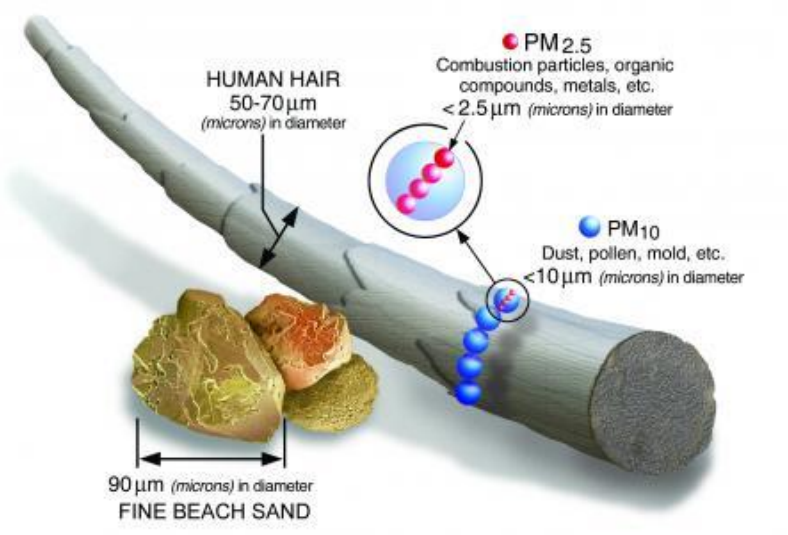




Fine particulate matter ($PM_{2.5}$) and public health

Numerous scientific studies have linked $PM_{2.5}$ exposure to a variety of health problems, including:

- premature death in people with lung or heart disease
- nonfatal heart attacks
- irregular heartbeat
- aggravated asthma
- decreased lung function
- increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

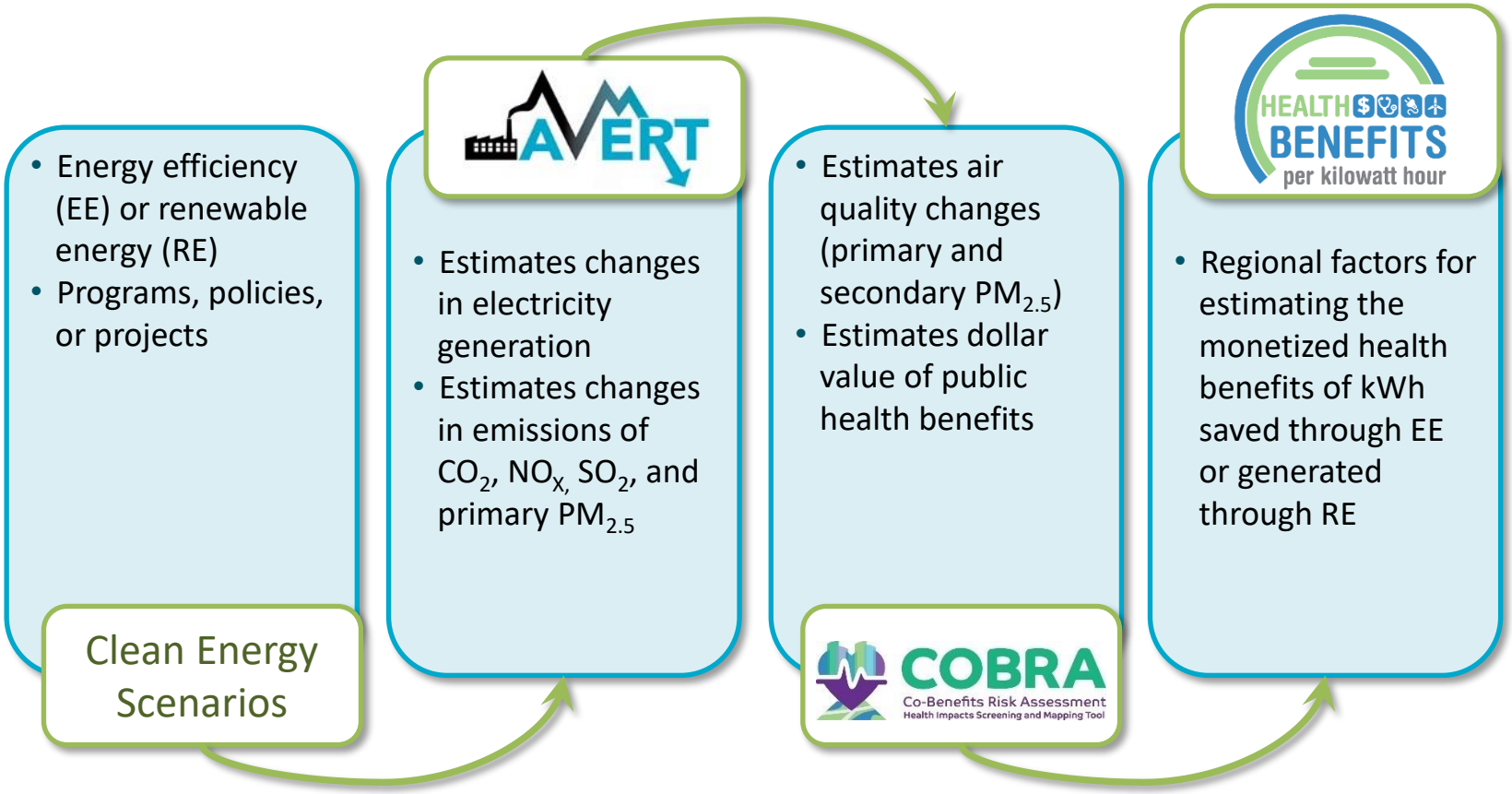


$PM_{2.5}$ Sources

- Some $PM_{2.5}$ emitted directly
  - construction sites, unpaved roads, fields, smokestacks or fires.
- Most forms in the atmosphere
  - a result of complex reactions of chemicals such as sulfur dioxide (SO_2) and nitrogen oxides (NO_x),
    - pollutants emitted from power plants, industries and automobiles.

EPA

EPA offers a suite of tools for quantifying emissions, AQ, and health impacts of clean energy



EPA

What is COBRA?

- COBRA is a free, easy-to-use, peer reviewed screening model that quickly:
  - *Estimates county-level health impacts* from changes in criteria air pollutants,
  - *Monetizes the economic value* of those benefits, and
  - *Presents results via tables and maps* that facilitate visualization of the results.
- COBRA uses approaches and assumptions consistent with EPA's standard practices
- Intended to support inclusion of health benefits in cost-benefits analyses and policy making

How does COBRA work?

USER INPUTS = Change in 2016, 2023, or 2028 Emissions

- Primary $PM_{2.5}$, SO_2, NO_x, NH_3, VOCs

COBRA[1]

Quantifies Changes in Air Quality
(Fine particulate matter, $PM_{2.5}$)

Calculates Change in Health Outcomes
(Resulting from $PM_{2.5}$ changes) [2]

Calculates Monetary Value of Health Outcomes

OUTPUTS = Tables and maps of changes in morbidity and mortality and related economic value.

[1]COBRA is a peer-reviewed screening model that based on rigorous methods used by EPA health benefits assessments as described in the User Manual.

[2] COBRA estimates only particulate matter-related benefits and may be conservative in that respect.

What health effects does COBRA estimate and what are their economic values?

Health Incidence Avoided	Economic Value ($2017)	
	3% discount rate	7% discount rate
Adult Mortality*	$10,040,738	$8,943,125
Infant Mortality	$11,191,541	$11,191,541
Non-Fatal Heart Attacks*	$39,174 - $309,825	$37,2038 - $297,494
Hospital Admissions	$17,707 - $47,652	$17,707 - $47,652
Asthma ER Visits	$457 - $547	$457 - $547
Acute Bronchitis	$556	$556
Respiratory Symptoms (upper + lower)	$24 - $39	$24 - $39
Asthma Exacerbations	$67	$67
Minor Restricted Activity Days	$77	$77
Work Loss Days	$178	$178

*Discounted due to time lag between $PM_{2.5}$ exposure and health outcome.

Who can use COBRA and why?

- Analysts, planners, and officials from environmental, health, energy, transportation, and economic development agencies can use COBRA to:

Quickly and inexpensively compare different clean energy policies and identify those that:

- Are likely to result in the greatest health benefits
- Are expected to reduce health risks in the most cost-effective manner

Estimate and promote improvements in air quality and economic value of associated human health benefits of:

- Clean and/or renewable energy projects
- Other types of projects, such as transportation or municipal waste

Visually convey - using COBRA's mapping capabilities - how clean energy benefits can go beyond a single county and impact people at the state, regional, and national levels

Strengths & limitations of COBRA

STRENGTHS

- Consistent with EPA's standard practices
- Enriches discussion of co-benefits
- Easy-to-Use screening tool
- Flexible for User
- Inexpensive (free!) compared to rigorous air quality models
- Quick to generate results
- Mapping of results facilitates visualization of impacts

LIMITATIONS

- COBRA is a free, screening tool not a highly sophisticated model
- Requires inputs generated elsewhere
- While there are limitations that users should understand, technical peer reviewers found COBRA to be "a valuable model that produces a screening tool that can contribute to policy analysis and public dialogue"

EXAMPLE:

WHAT ARE THE HEALTH BENEFITS OF UTILITY INVESTMENTS IN EE PROGRAMS IN TEXAS IN 2019?

Step 0. Develop inputs

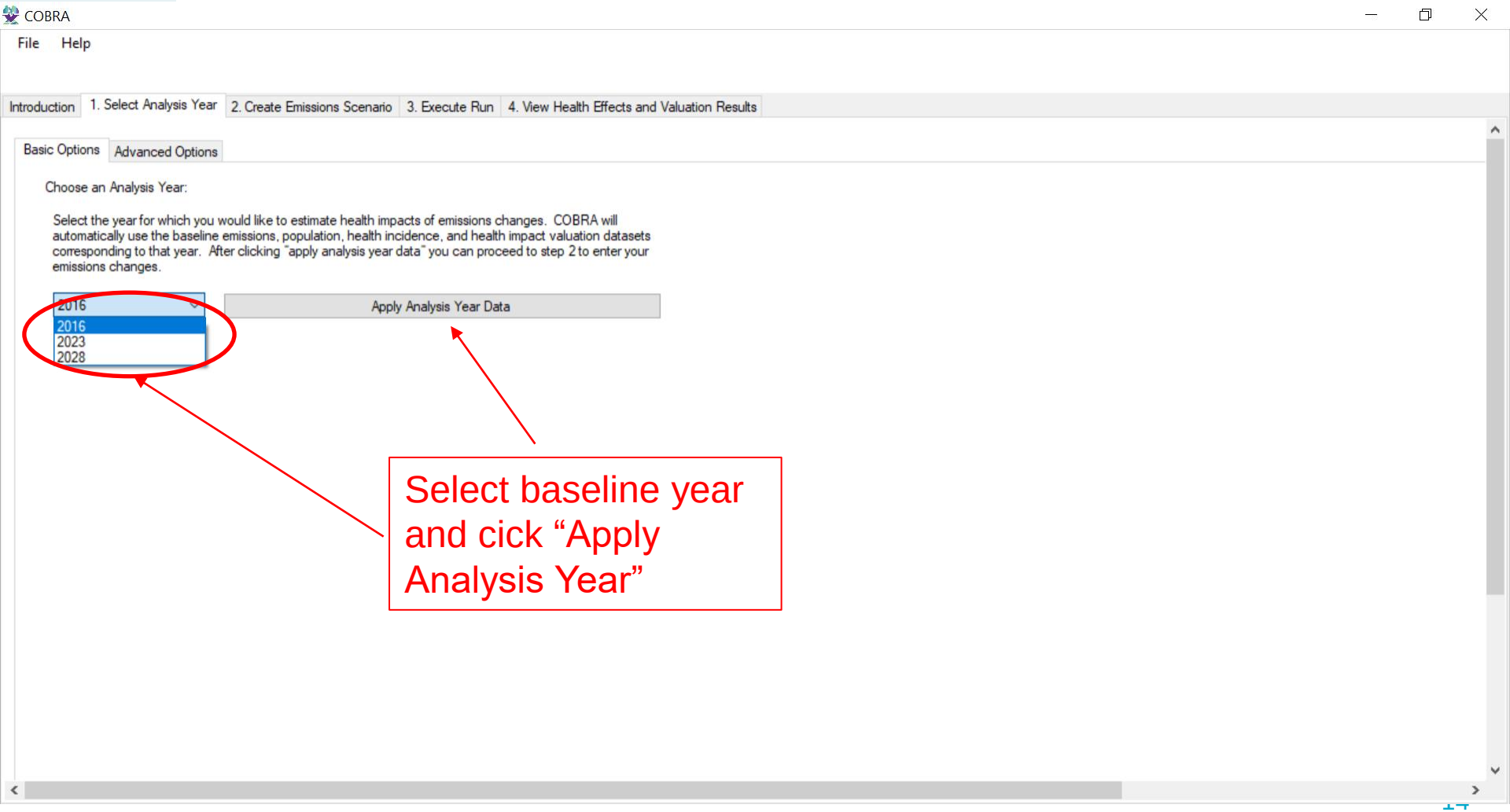
Form 861

https://www.eia.gov/electricity/data/eia861/

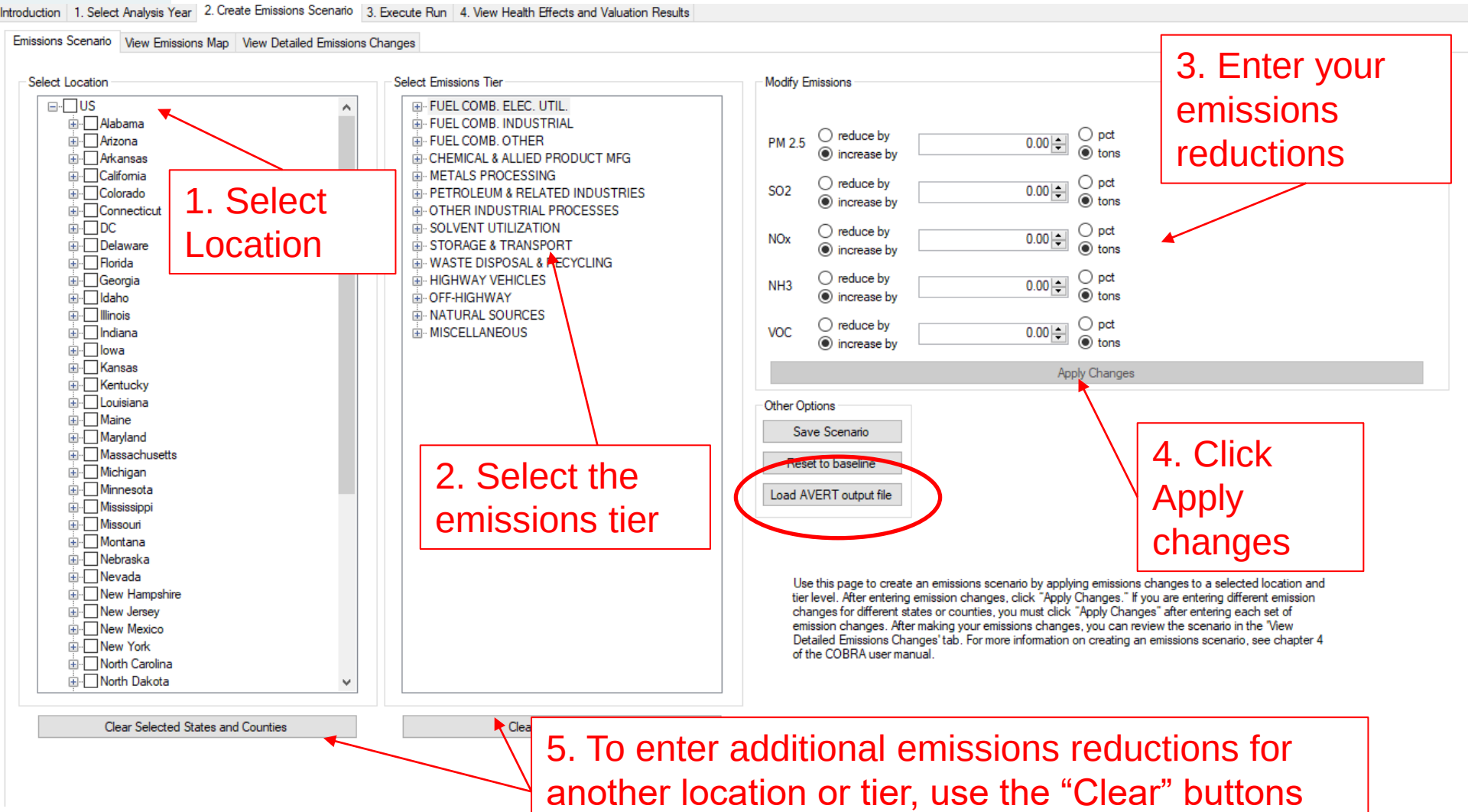
State	Total Annual Energy Savings (2019)
Texas	**960.51 GWh**

State	PM2.5 (tons)	SO2 (tons)	NOx (tons)
Texas	-23.657	-208.51	-213.634
Oklahoma	-1.056	-3.373	-12.516
Nebraska	-0.183	-17.848	-8.507
Kansas	-0.475	-2.475	-6.719
Missouri	-0.815	-9.219	-6.135
Louisiana	-0.252	-3.026	-4.614
Indiana	-1.947	-3.649	-3.951
Arkansas	-0.206	-6.942	-3.462
Arizona	-0.316	-1.003	-3.447
Iowa	-0.29	-4.751	-3.268
Michigan	-0.093	-4.214	-2.833
Kentucky	-0.305	-3.517	-2.342
Illinois	-0.136	-4.72	-2.129
Minnesota	-0.135	-1.097	-1.784
Wisconsin	-0.238	-0.578	-1.517
New Mexico	-0.069	-0.374	-1.433
North Dakota	-0.113	-1.307	-1.085
Mississippi	-0.036	-0.02	-0.53
South Dakota	-0.044	-0.1	-0.371
Montana	-0.008	-0.005	-0.072
California	-0.001	0	-0.004

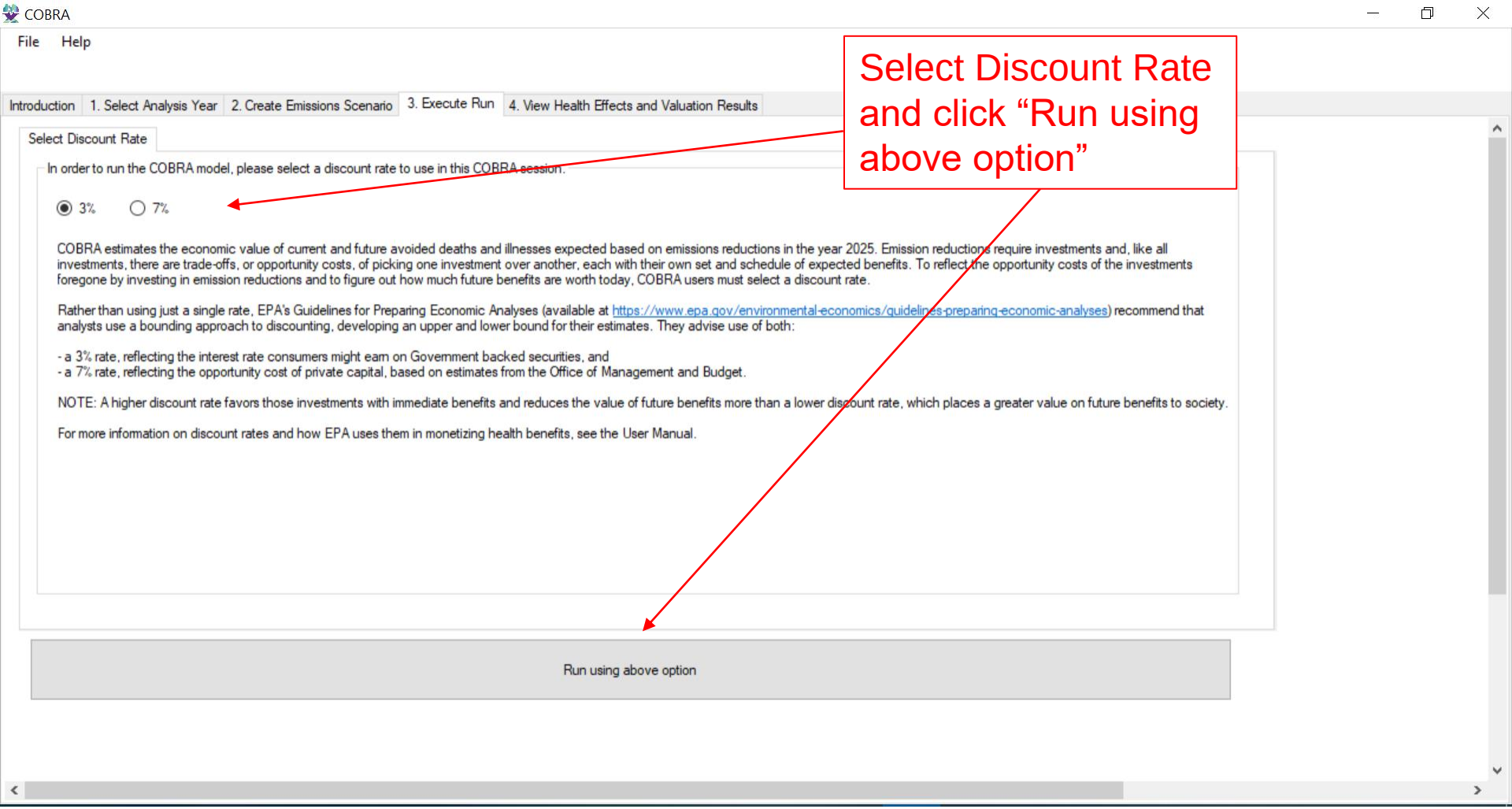
Step 1. Apply analysis year



Step 2. Create emissions scenario

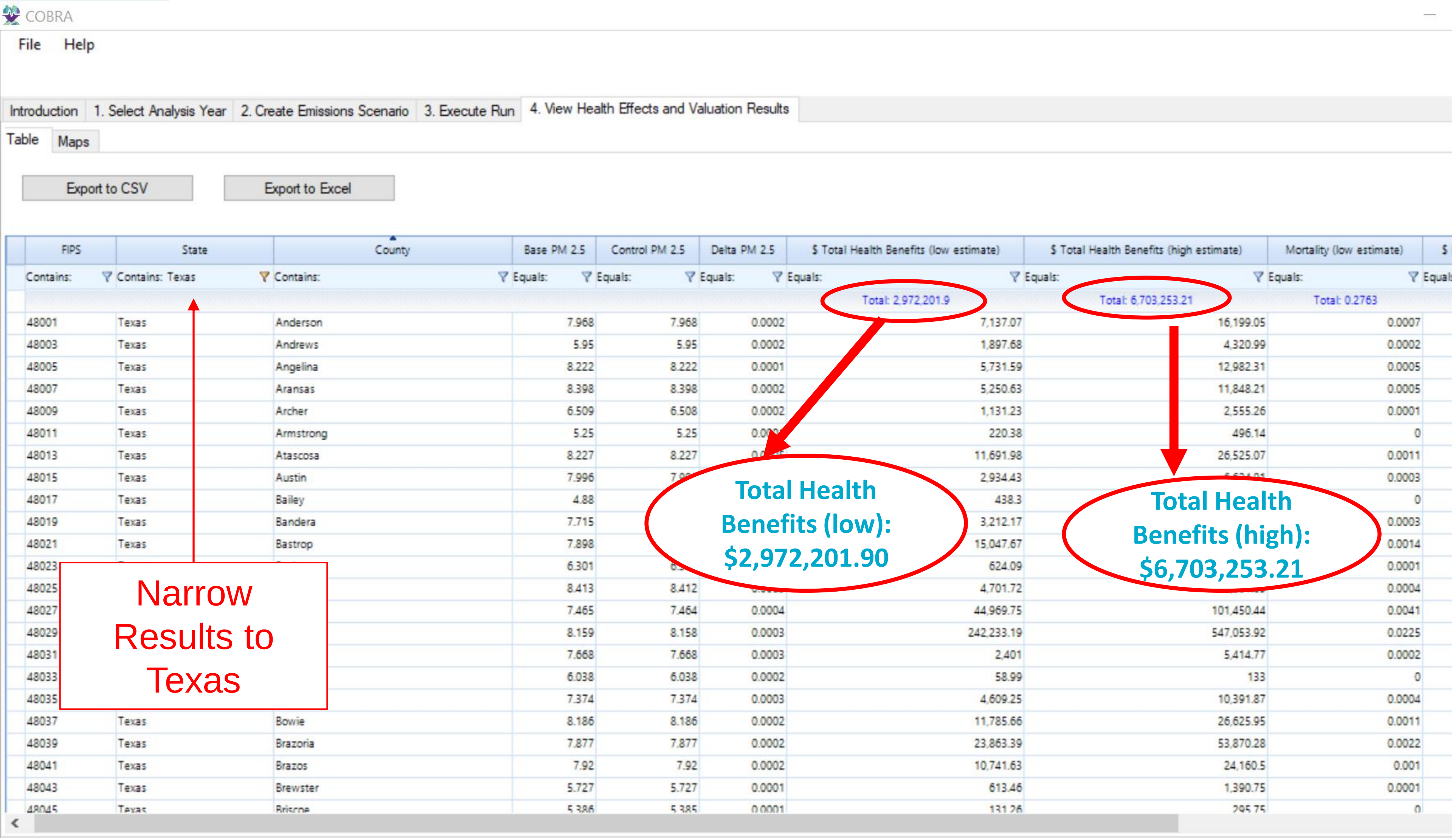


Step 3. Execute run

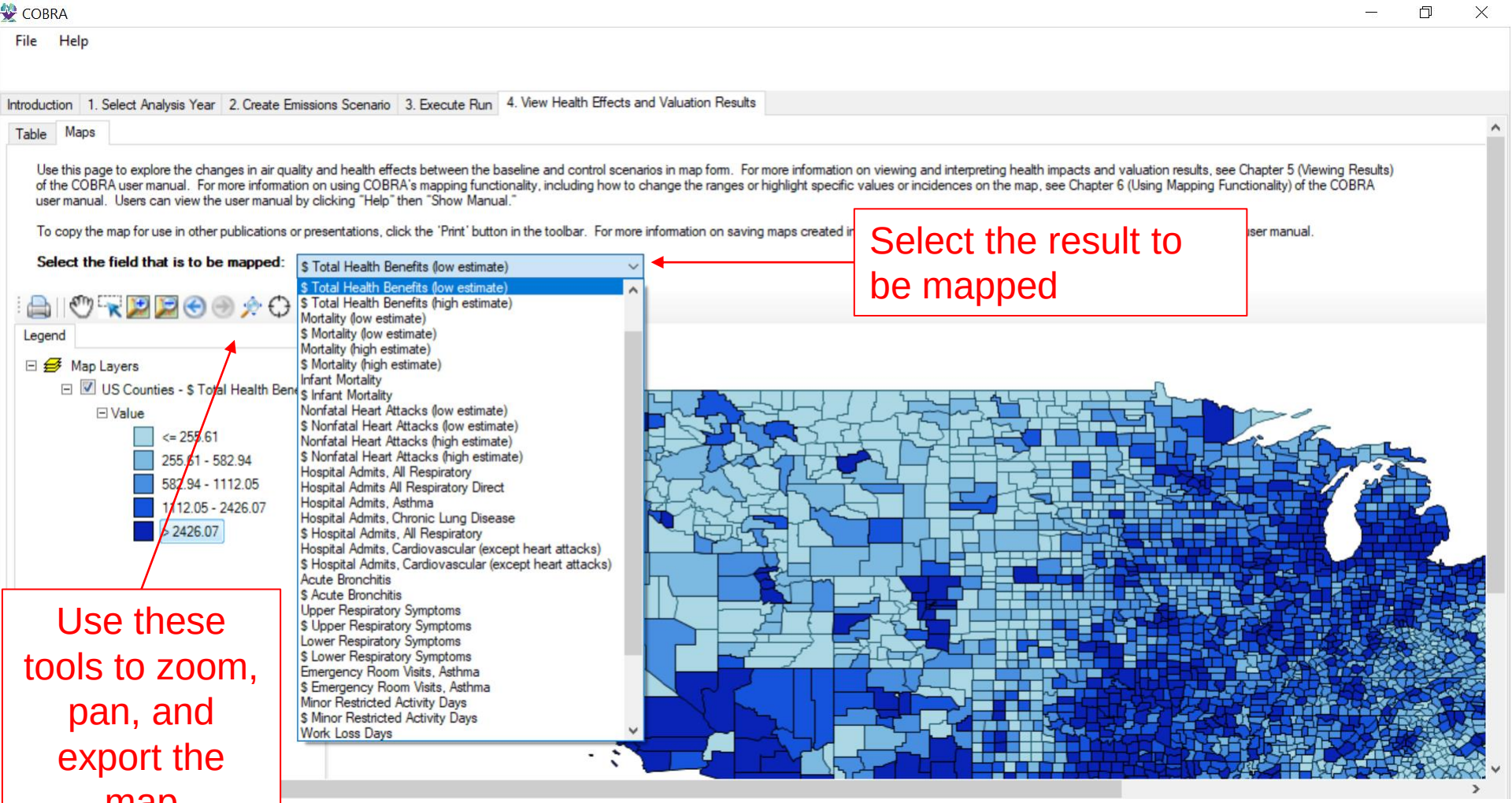


Select Discount Rate and click "Run using above option"

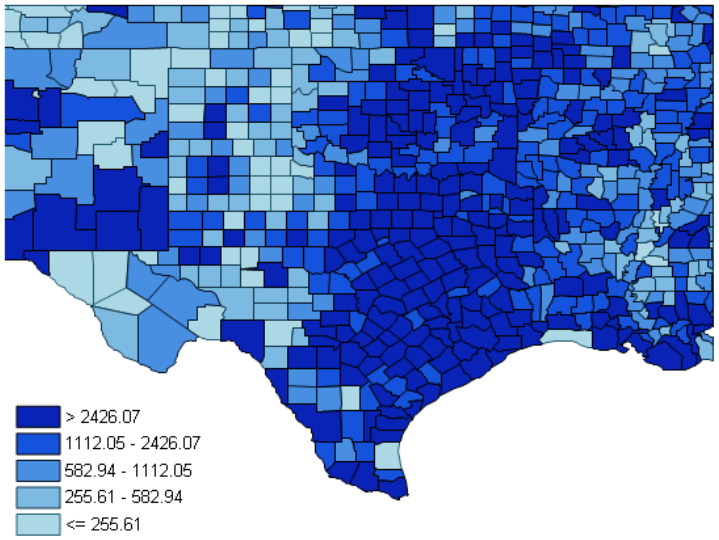
Step 4. View health effects and valuation results



Step 4. View health effects and valuation results *(cont'd)*



Step 5. Export Results



Total Health Benefits, $2017 (3%, Low Estimate)

	Economic Value ($2017)	
Health Incidence Avoided	**3%, Low Estimate**	**3%, High estimate**
Adult Mortality*	$ 2,903,048.35	$ 6,603,554.88
Infant Mortality	$ 29,188.15	$ 29,188.15
Non-Fatal Heart Attacks (NFHAs)*	$ 3,683.67	$ 34,228.45
Hospital Admissions, All Respiratory	$ 2,101.20	$ 2,101.20
Hospital Admissions, Cardiovascular (excl. NFHAs)	$ 3,282.94	$ 3,282.94
Asthma ER Visits	$ 127.26	$ 127.26
Acute Bronchitis	$ 313.97	$ 313.97
Upper Respiratory Symptoms	$ 394.67	$ 394.67
Lower Respiratory Symptoms	$ 174.95	$ 174.95
Asthma Exacerbation	$ 704.58	$ 704.58
Minor Restricted Activity Days	$ 20,998.73	$ 20,998.73
Work Loss Days	$ 8,183.43	$ 8,183.43
Total Health Benefits	**$ 2,972,201.90**	**$ 6,703,253.21**

*Discounted due to time lag between $PM_{2.5}$ exposure and health outcome.

We welcome your feedback!

- EPA wants to understand how we can make the COBRA tool work for you
- Please reach out with questions and ideas
- Download the software and learn more at: epa.gov/COBRA
- Access all our resources and sign up for our newsletters at: epa.gov/statelocalenergy

EPA

Thank you!

Emma Zinsmeister, MPH

Senior Health Analyst & Community Programs Manager
U.S. EPA State and Local Energy and Environment Program
zinsmeister.emma@epa.gov | (202) 343-9043

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