



air pollution control district
SANTA BARBARA COUNTY

2022 OZONE PLAN – MEETING #2

Community Advisory Council Santa Barbara County Air Pollution Control District

Our Mission: To protect the people and the environment
of Santa Barbara County from the effects of air pollution.

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June 22, 2022



2022 OZONE PLAN STRUCTURE

- **Chapter 1:** Introduction
- **Chapter 2:** Local Air Quality
- **Chapter 3:** Emission Inventory
- **Chapter 4:** Stationary Source Control Measures
- **Chapter 5:** On-Road Transportation Control Measures
- **Chapter 6:** Voluntary Incentive Strategies
- **Chapter 7:** Attainment and Maintenance Strategy



WHAT IS OZONE?

- Ozone is formed through a reaction of NO_x and ROCs in the presence of heat & sunlight.
 - NO_x: Oxides of Nitrogen (NO and NO₂)
 - Primarily from combustion sources
 - ROCs: Reactive Organic Compounds
 - Primarily consumer products, solvents, mobile sources
- High levels of ozone are typically recorded during the afternoon between April - October.
- Breathing ground-level ozone can cause numerous health-related effects.

WHAT'S THE RECIPE FOR GROUND-LEVEL OZONE?

Ozone isn't emitted directly! It is "cooked" by chemical reactions in the air with heat and sunlight

Step 1) Mix together:

NO_x

Nitrogen Oxides

ROCs

Reactive Organic Compounds

BOTH come from:



ROCs also come from:



Step 2) Then, cook it in:



Heat + Sunlight



STATE OZONE STANDARDS

Standard	Year Adopted	Ozone Concentration
State 1-Hour Ozone	1988	0.09 ppm
State 8-Hour Ozone	2005	0.070 ppm

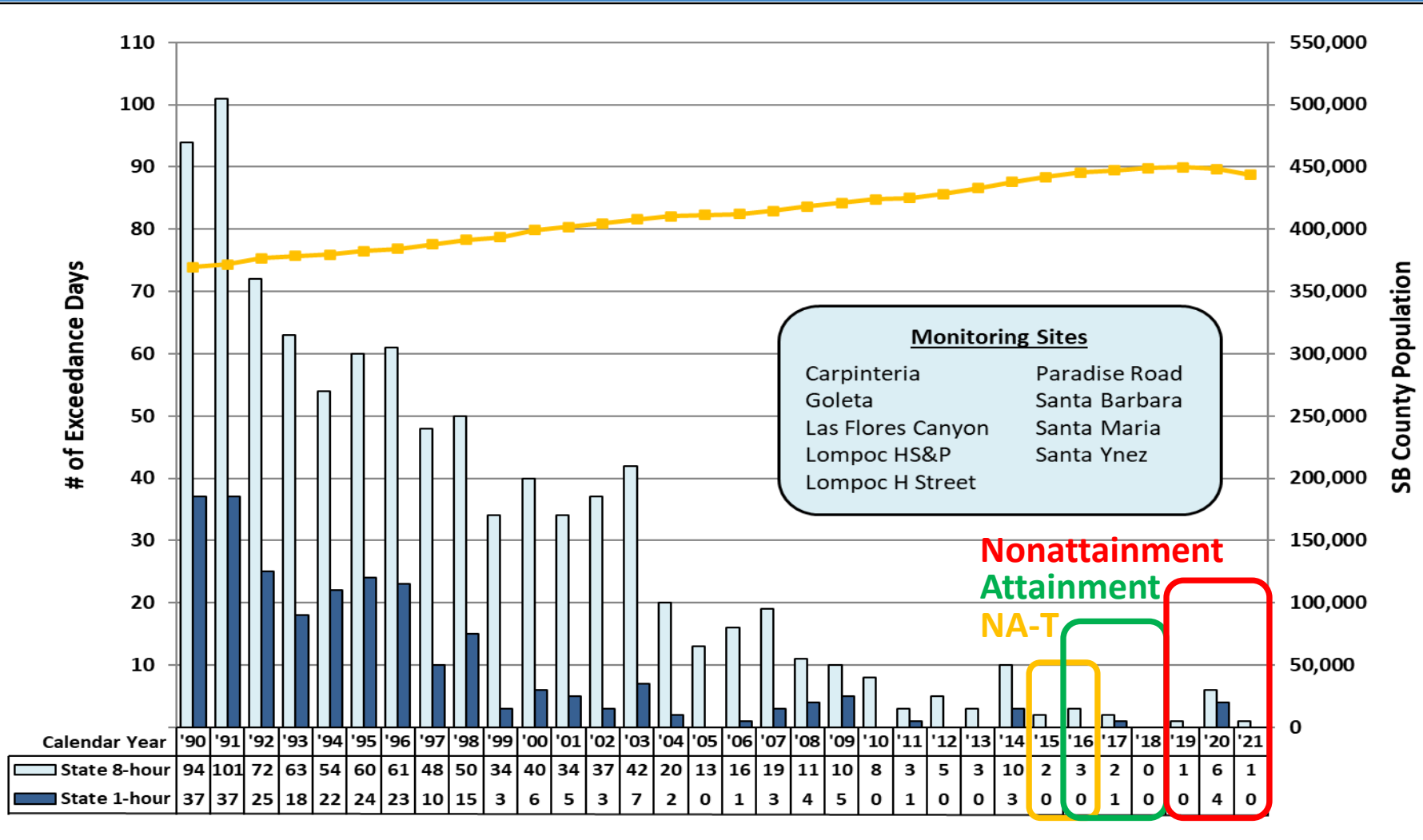
Designation Years	Attainment Status
1989 - 2015	Nonattainment
2016 - 2018	Nonattainment-Transitional
2019	Attainment
2020 - 2021	Nonattainment

STATE PLAN REQUIREMENTS

- **California Clean Air Act (1988):**
 - Attain the Ozone standard by the earliest practicable date
- **Original plan adopted in 1991**
- **Triennial progress reports:** 1994, 1998, 2001, 2004, 2007, 2010, 2013, 2016, 2019
- **Objectives:**
 - 1) Assess the effectiveness of our program
 - 2) Evaluate strategies to obtain additional emission reductions

QUESTION BREAK

OZONE EXCEEDANCE DAYS (FIGURE 2-1)



OZONE EXCEEDANCE DAYS (TABLE 2-1)

Year	Exceedance Day	8-hour Ozone Concentrations (ppb)								
		Paradise Road	Las Flores Canyon	Carpinteria	Santa Barbara	Goleta	Santa Ynez	Lompoc HS&P	Lompoc H St.	Santa Maria
2019	10/6/2019	71	72	72	66	62	69	64	28	45
2020	8/18/2020	72	45	51	35	38	60	44	17	32
	8/19/2020	85	50	56	45	43	67	40	17	21
	8/20/2020	75	59	43	38	37	41	30	16	20
	8/21/2020	85	46	43	35	34	66	50	14	27
	10/2/2020	62	74	86	72	66	63	64	30	48
	10/3/2020	69	74	83	81	67	62	62	20	35
2021	6/17/2021	72	41	31	40	38	61	40	18	NA

■ Influenced by:

2019: Strong southeast transport winds with hot weather

2020: Northern & central CA wildfires

2021: Heat wave and stagnant conditions

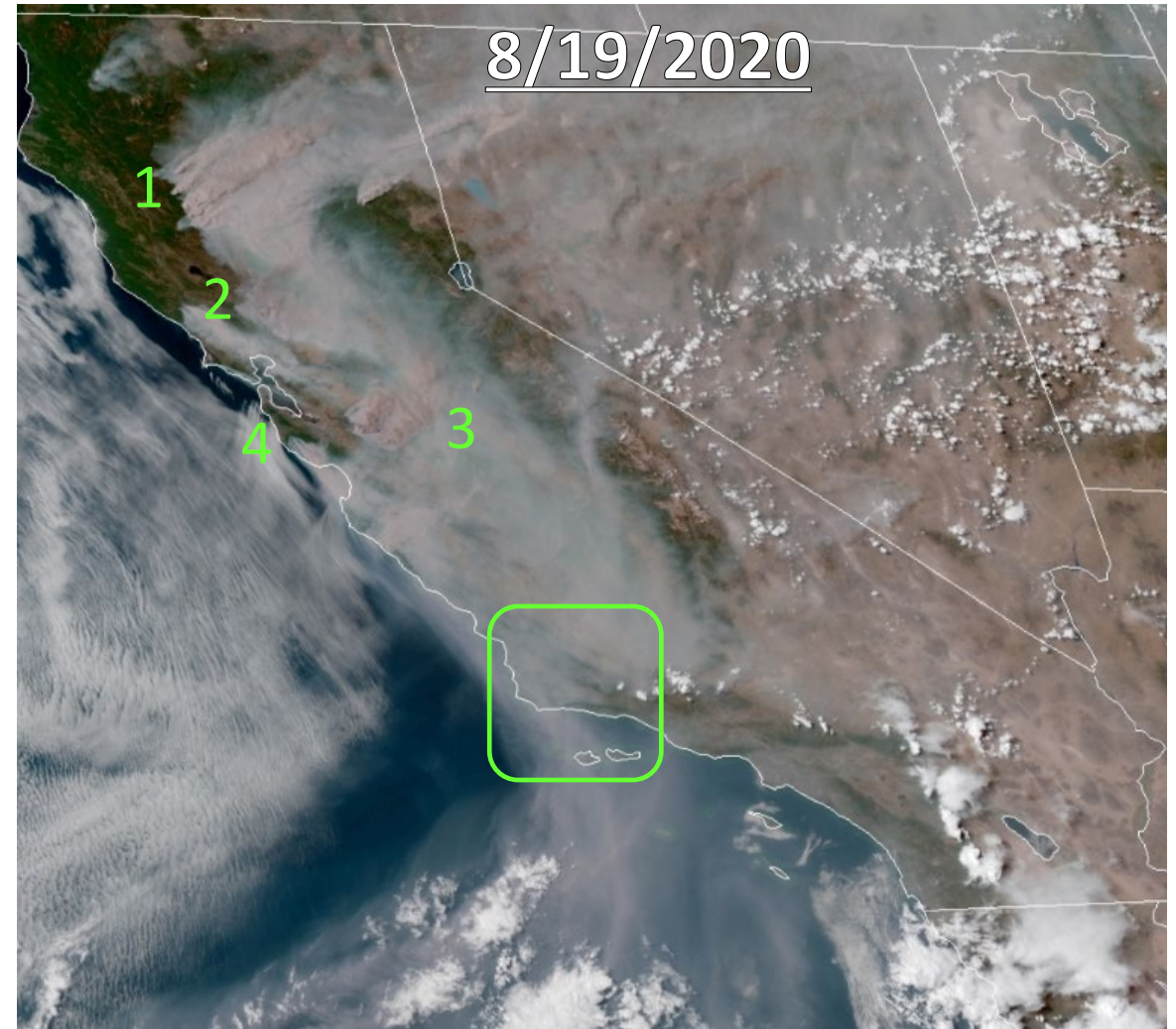


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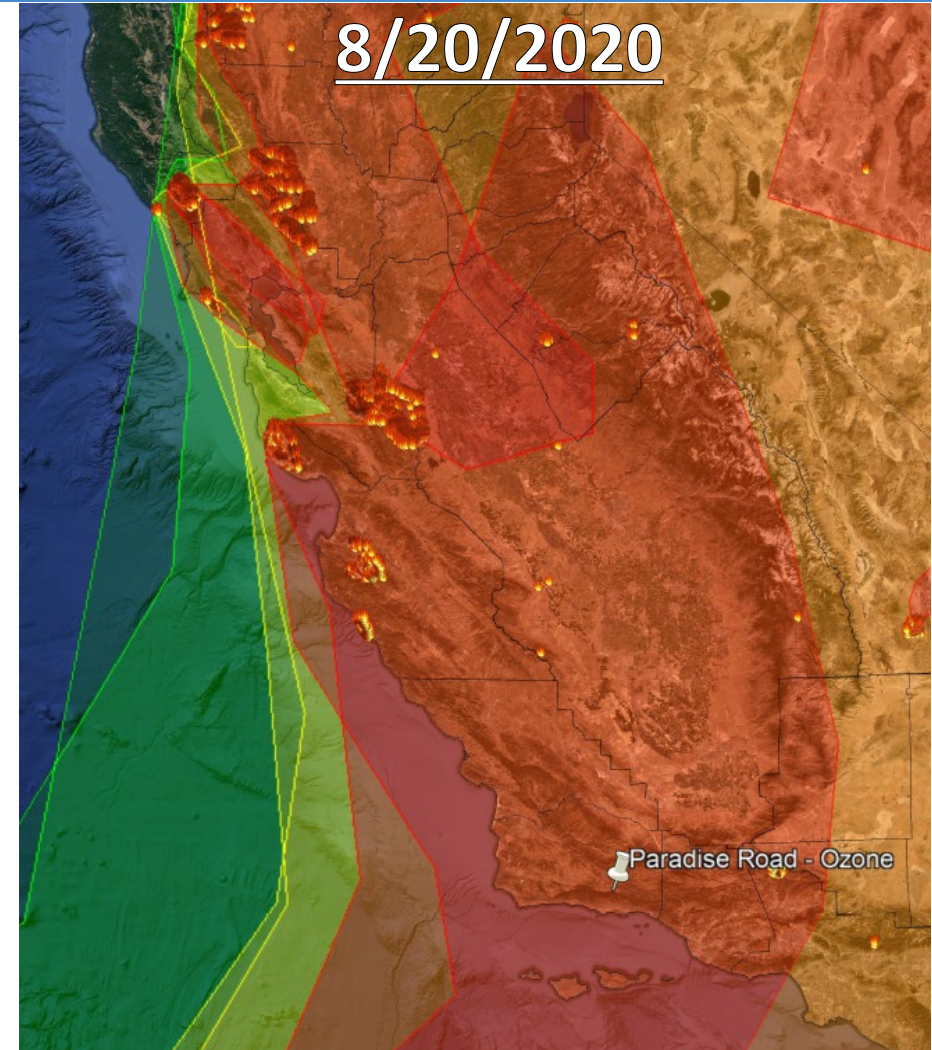
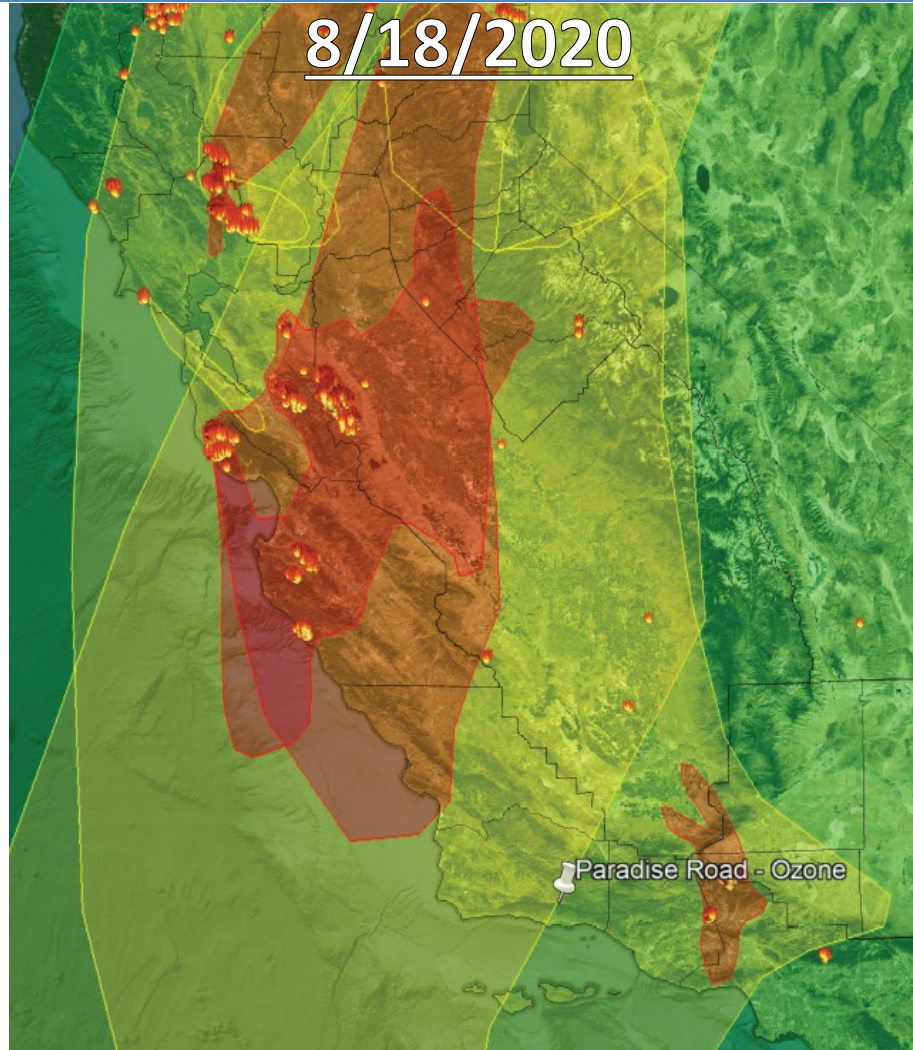
IMPACTS FROM THE 2020 WILDFIRES

8/18 – 8/21 Ozone Exceedances

#	Fire	Start Date	End Date	Total Acres
1	August Complex	8/16	11/11	1,032,648
2	LNU Complex	8/17	10/2	363,220
3	SCU Complex	8/18	10/1	396,624
4	CZU Complex	8/16	9/22	86,509



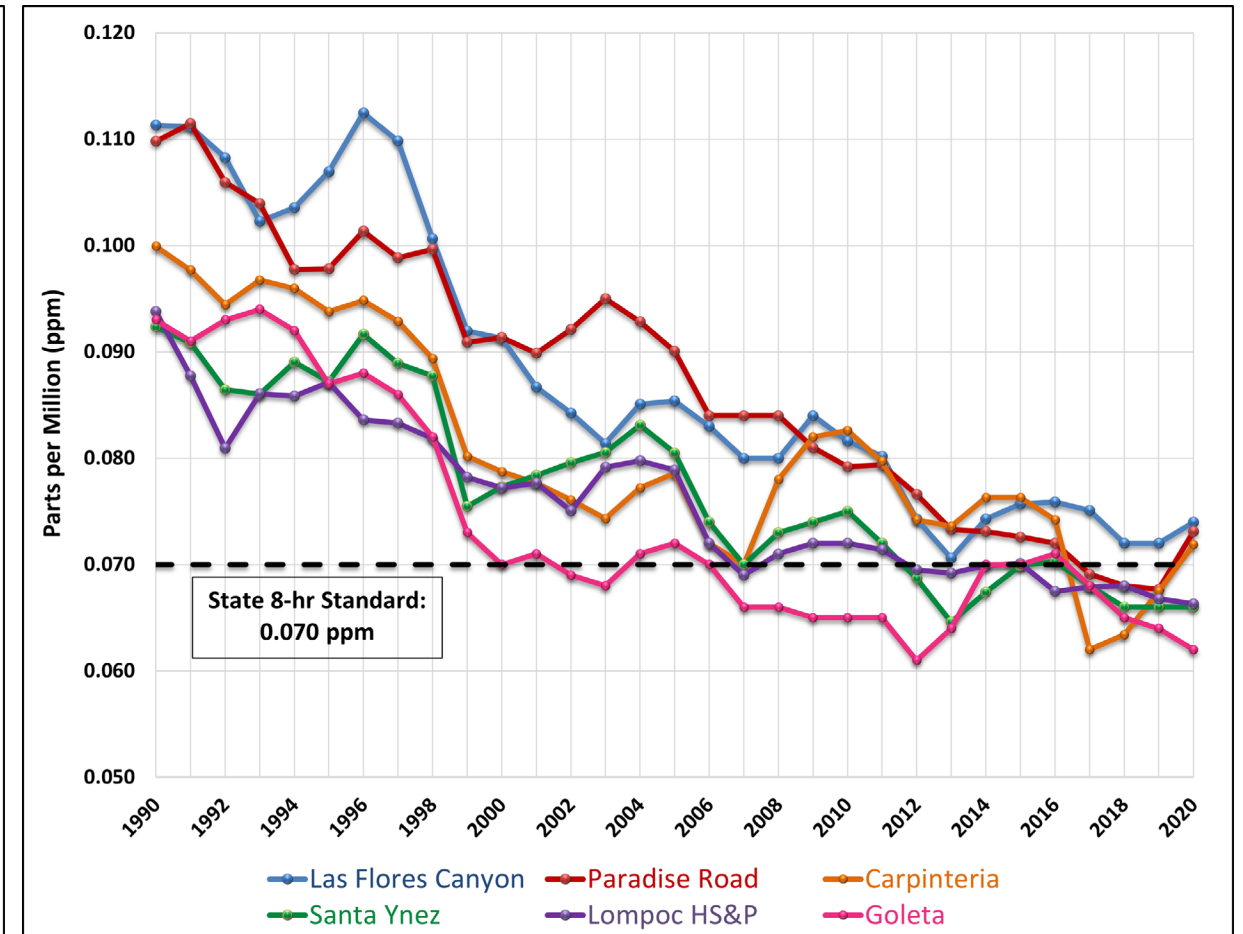
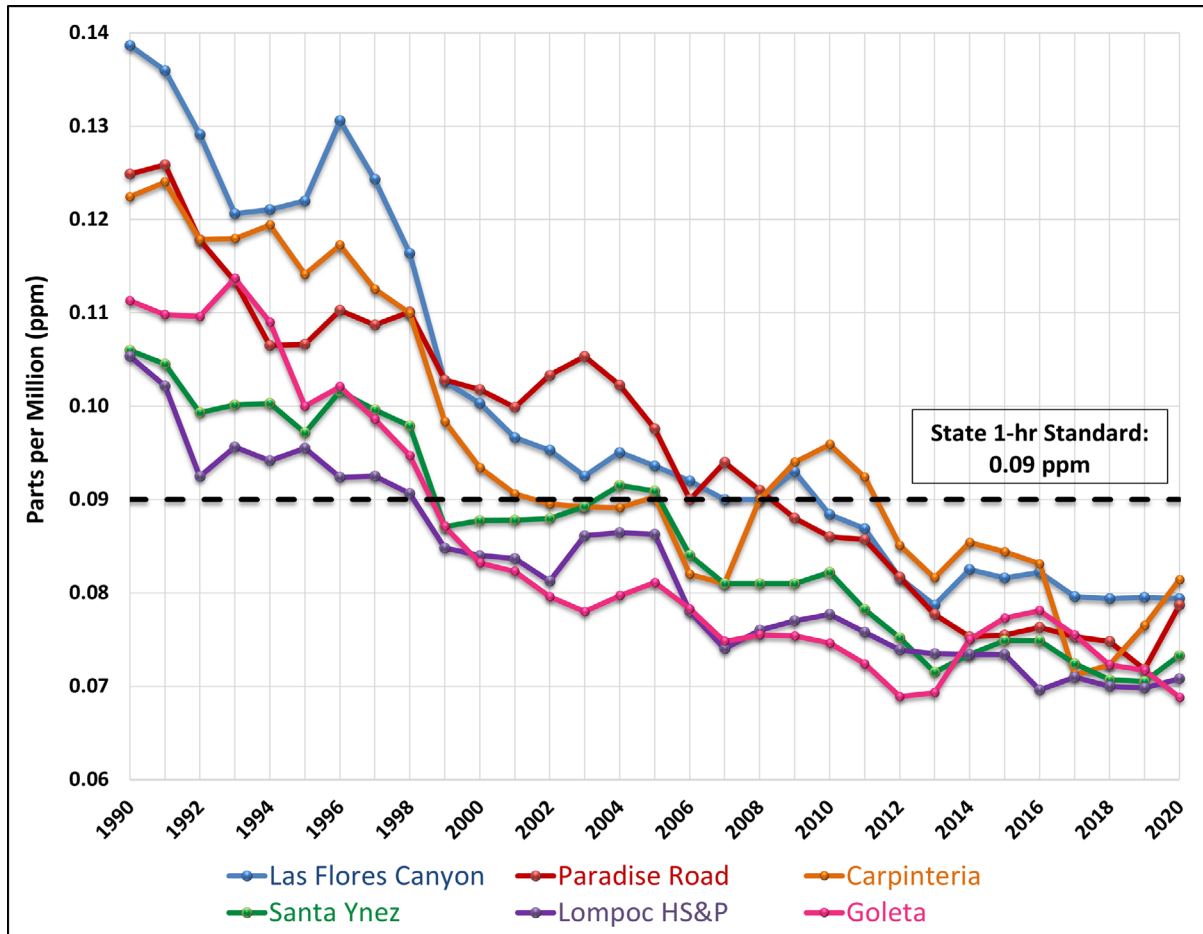
IMPACTS FROM THE 2020 WILDFIRES



CHAPTER 2: TERMINOLOGY

- Exceedance
 - Measured concentration surpasses the standard.
- Expected Peak Day Concentration (EPDC)
 - Highest concentration expected to occur once per year at a monitoring station.
 - Measured values greater than the EPDC are “extreme concentration events.”
- Violation
 - Measured concentration surpasses the standard, and
 - Measured concentration is equal to or less than the EPDC.
- Designation Value
 - Highest representative reading at a monitoring site for the last 3 years.

1-HR AND 8-HR EPDCs (FIGURES 2-2 & 2-3)



8-hour Designation Values (Simplified Table 2-3)

Monitor Location	State Criteria for 8-hour Ozone	2020 Value (ppm)
Paradise Road	EPDC	0.073
	Designation Value	0.086
Las Flores Canyon	EPDC	0.074
	Designation Value	0.074
Carpinteria	EPDC	0.072
	Designation Value	0.086
Santa Barbara	EPDC	0.064
	Designation Value	0.062
Goleta	EPDC	0.062
	Designation Value	0.062
Santa Ynez	EPDC	0.066
	Designation Value	0.066
Lompoc HS&P	EPDC	0.066
	Designation Value	0.067
Lompoc H St.	EPDC	0.038
	Designation Value	0.038
Santa Maria	EPDC	0.051
	Designation Value	0.050

* **Yellow:** Exceeds standard

* **Gray:** Invalid EPDC

CHAPTER 2: SUMMARY

- In the last 3 years, there were 8 exceedance days of the 8-hour ozone standard.
 - 6 exceedance days were caused by wildfires.
- 3 monitoring stations have designation values above the 8-hour ozone standard.
 - Paradise Road, Las Flores Canyon, Carpinteria.
- Santa Barbara County is designated Nonattainment.

Goleta Monitoring Station



QUESTION BREAK

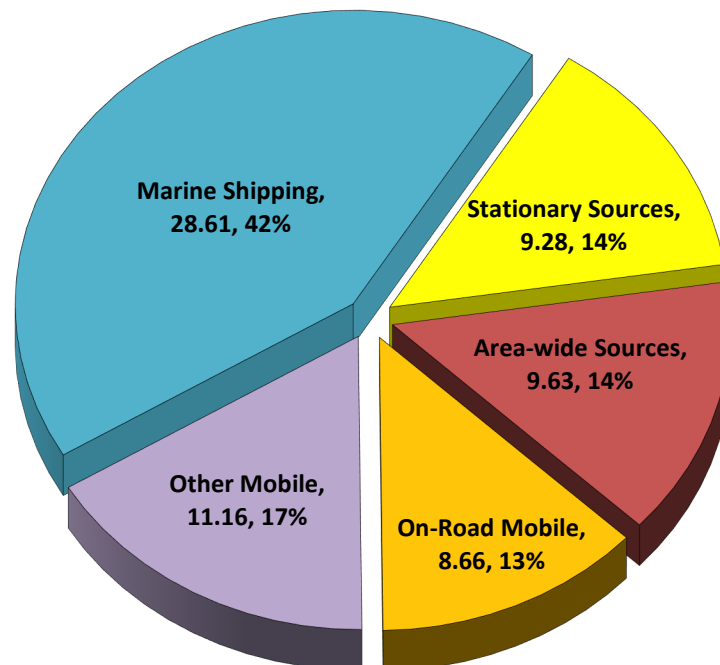
CHAPTER 3: EMISSION INVENTORY

- Four major categories:
 - 1) **Stationary sources:** Engines, Boilers, Oil Wells
 - 2) **Area sources:** Residential Heaters, Asphalt Paving
 - 3) **On-road vehicles:** Light-duty & Heavy-duty vehicles
 - 4) **Other mobile sources:** Boats, Trains, Airplanes
- Planning inventory does not include natural sources:
 - Biogenics, Oil & Gas Seeps, and Wildfires shown in Appendix B
- “Base year” (2018) and “Future years” (2025, 2035, 2045)
 - Future years apply “growth profiles” and “control profiles” from CEPAM [California Emission Projection Analysis Model]

ROC + NOx EMISSION INVENTORY (FIGURES 3-1 & 3-2)

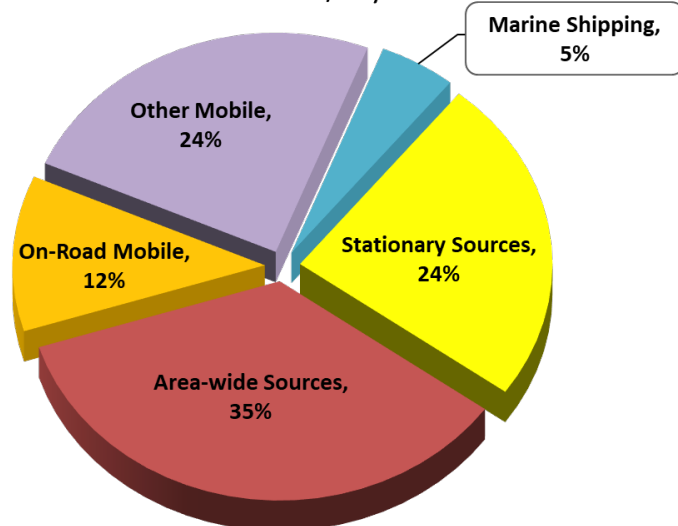
2018 ROC + NOx

67.33 tons/day



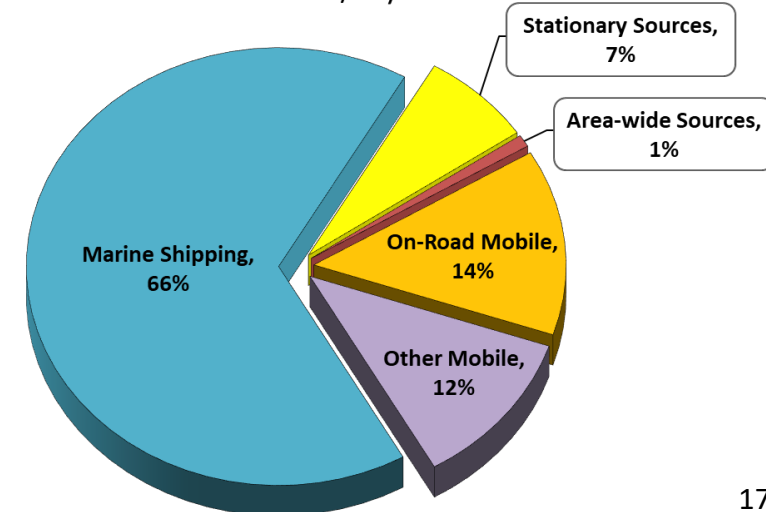
2018 ROC

26.27 tons/day



2018 NOx

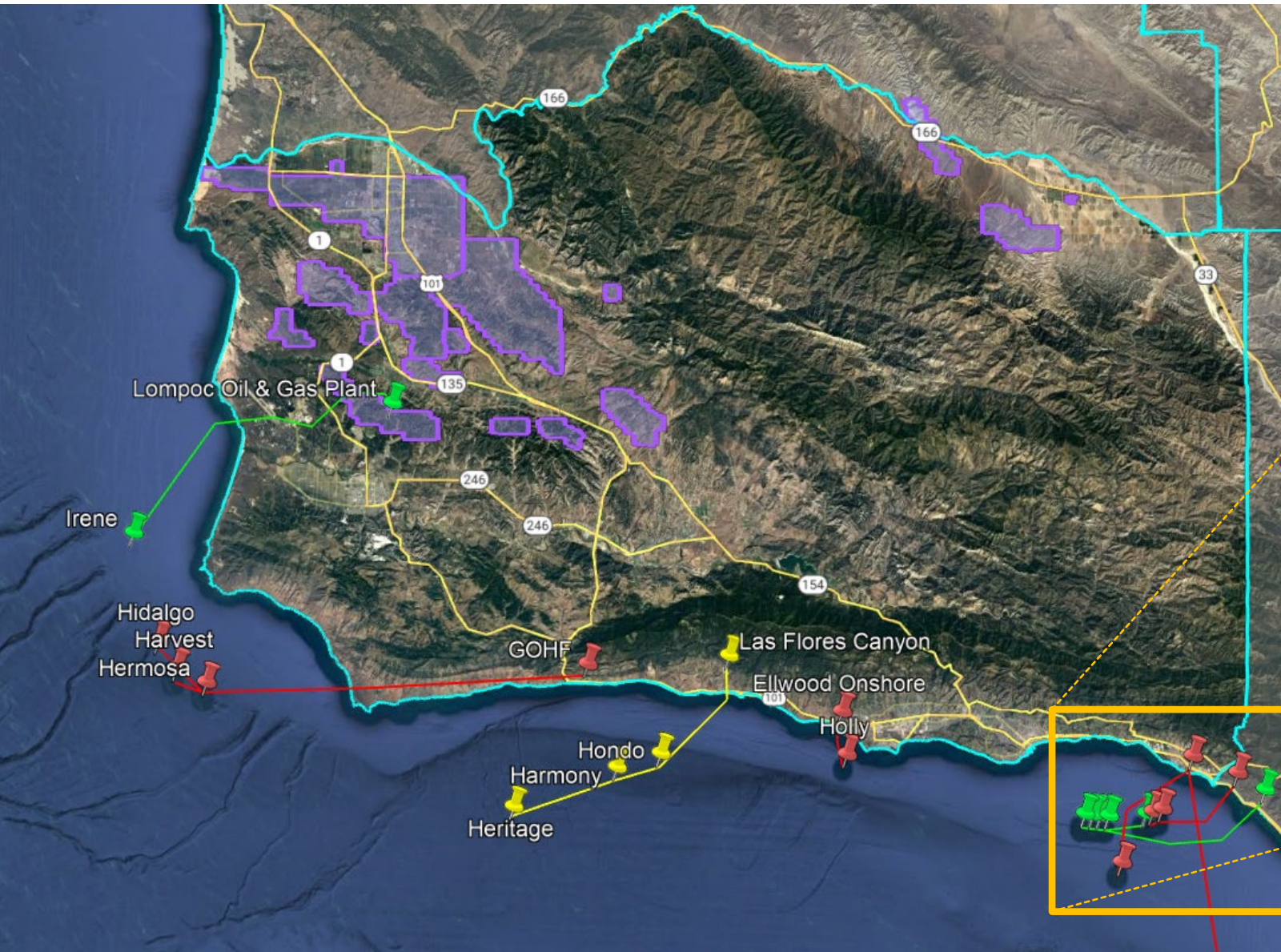
41.06 tons/day



GROWTH PROFILES (TABLE 3-1)

Activity Indicator	Units	Value				Growth Rate from 2018		
		2018	2025	2035	2045	2025	2035	2045
Population	Residents	452,953	470,188	501,060	524,389	4%	11%	16%
Housing	Households	148,071	154,657	164,811	172,485	4%	11%	16%
Vehicle Miles Travelled	Million Daily Miles	9.91	10.19	10.33	10.52	3%	4%	6%
NG Combustion: <i>Residential</i>	Million Therms	54.18	55.07	53.43	48.77	2%	-1%	-10%
NG Combustion: <i>Commercial</i>	Million Therms	22.66	24.74	26.66	29.40	9%	18%	30%
NG Combustion: <i>Industrial</i>	Million Therms	9.85	10.39	11.02	11.56	5%	12%	18%
Petrol. Production: <i>Onshore</i>	MMbbl Oil	3.31	3.31	3.31	3.31	0%	0%	0%
Petrol. Wells: <i>Onshore</i>	Active + Idle Wells	2,186	2,037	1,843	1,666	-7%	-16%	-24%
Petrol. Wells: <i>Offshore</i>	Active + Idle Wells	396	324	352	318	-18%	-11%	-20%
OGVs: <i>Auto Carriers</i>	Growth Rate	--	--	--	--	6%	17%	14%
OGVs: <i>Containerships</i>	Growth Rate	--	--	--	--	22%	74%	136%
OGVs: <i>Tankers</i>	Growth Rate	--	--	--	--	-2%	2%	2%

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Offshore Legend

Green: Active

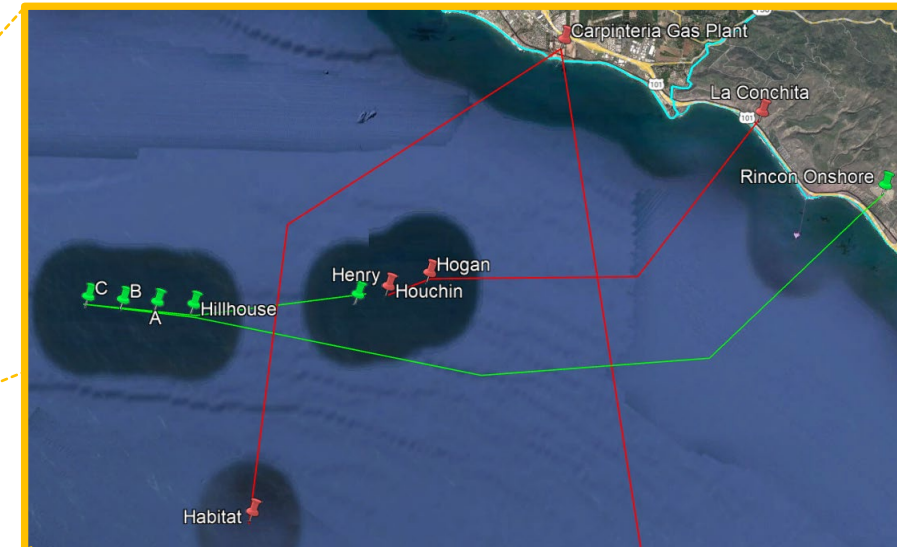
Yellow: Idle

Red: Future Decommission

Green: Active

Yellow: Idle

Red: Future Decommission



OIL & GAS SUMMARY

Activity Indicator	Indicator Tracks With	Units	Value				Growth Rate from 2018		
			2018	2025	2035	2045	2025	2035	2045
Petrol. Production: <i>Onshore</i>	NOx	MMbbl Oil	3.31	3.31	3.31	3.31	0%	0%	0%
Petrol. Wells: <i>Onshore</i>	ROC	Active + Idle Wells	2,186	2,037	1,843	1,666	-7%	-16%	-24%
Petrol. Wells: <i>Offshore</i>	NOx & ROC	Active + Idle Wells	396	324	352	318	-18%	-11%	-20%

- Onshore petroleum production uses boilers and engines to help extract oil, creating NOx.
 - New combustion projects may be created to maintain the current oil production levels.
- Onshore wells have fugitive components that may leak ROC emissions.
 - Wells are anticipated to decline due to recent CalGEM regulations, reducing ROC emissions.
- Offshore emissions (NOx + ROC) tracks best with total well count.
 - Emissions may fluctuate as platforms are decommissioned or returned to active service.

ROC INVENTORY FORECAST (TONS PER DAY)

Table 3-2:

Source Category	ROC				% Change (2018 – 2045)
	2018	2025	2035	2045	
Stationary Sources	6.32	6.09	6.10	6.32	0%
Area-wide Sources	9.26	10.41	10.75	11.06	20%
On-Road Vehicles	3.02	1.99	1.24	0.92	-70%
Other Mobile	6.39	4.97	3.22	2.64	-59%
Marine Shipping	1.29	1.51	2.02	2.80	117%
ERCs	-	0.40	0.40	0.40	-
Total	26.27	25.37	23.72	24.14	-8%

NO_x INVENTORY FORECAST (TONS PER DAY)

Table 3-2 (continued):

Source Category	NO _x				% Change (2018 – 2045)
	2018	2025	2035	2045	
Stationary Sources	2.95	2.85	2.83	2.92	-1%
Area-wide Sources	0.37	0.35	0.32	0.31	-17%
On-Road Vehicles	5.64	2.82	1.69	1.36	-76%
Other Mobile	4.77	3.47	2.68	2.33	-51%
Marine Shipping	27.32	30.09	39.53	21.80	-20%
ERCs	-	0.81	0.81	0.81	--
Total	41.06	40.39	47.87	29.52	-28%

MARINE SHIPPING UPDATE

- CARB Ocean Going Vessel (OGV) Emission Inventory
 - Old methodology (2011) estimated 55 tpd NOx off the coast of SB County in calendar year 2018.
 - New methodology (2022) reduced this amount to 27 tpd NOx.
 - CARB used updated AIS ship tracking data to calculate emissions.
 - Emission estimates account for the Vessel Speed Reduction (VSR) program.
- VSR Program
 - Expanding to other ship types (general, bulk)
 - CARB investigating statewide VSR
- Challenges Remain
 - Future growth & Port Backlogs
 - Tier 3 engines earlier than 2035

October 2021: Backlog near Port of LA & Long Beach¹



CHAPTER 3: SUMMARY

- District is actively working with CARB to refine methodologies to accurately depict both the current and future inventory.
- On-road and Off-road inventories will decrease in future forecast years due to existing regulations.
- Marine Shipping continues to be a large contributor to the local emission inventory, and additional work is needed to achieve NOx reductions.



QUESTION BREAK

TIMELINE

- **April 27, 2022 - CAC Meeting:** Introductory meeting and initial feedback
- **June 22, 2022 - CAC Meeting:** Present Chapters 1-3
- **August 24, 2022 - CAC Meeting:** Send complete Plan; Present Chapters 4-7
- **October 20, 2022 - Board Meeting:** Target adoption hearing

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