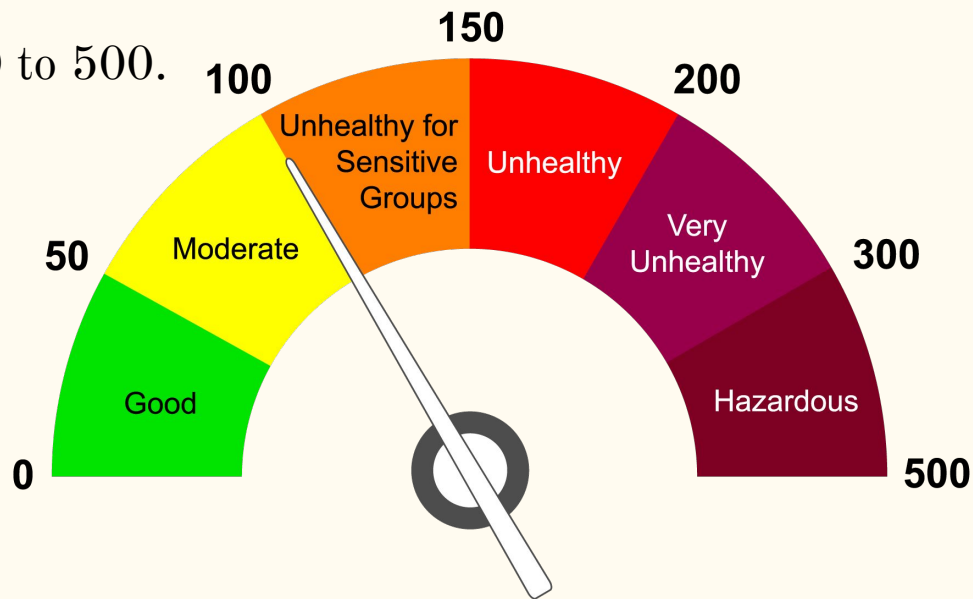


Air Quality 101

Introduction to Air Quality and Air Quality Index

- Air quality is the measure of how clean or polluted the air is
- The Air Quality Index (AQI) is how we report air quality
 - The AQI is divided into six categories of health concern.
 - Each category has a specific color.
- The AQI measurements run from 0 to 500.
- The higher the AQI value, the greater the level of air pollution and the greater the health concern.



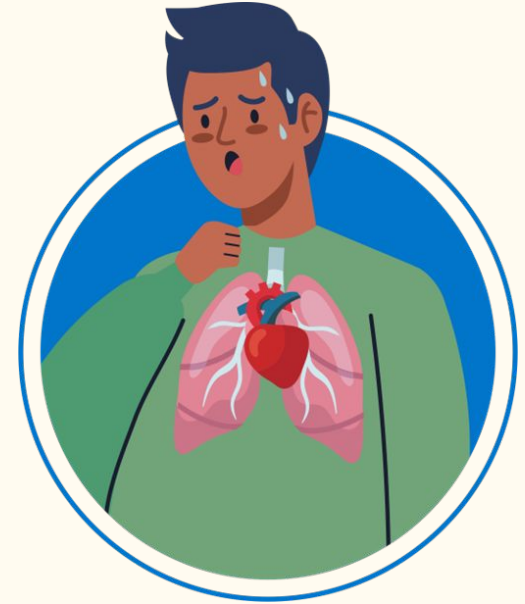
AQI health recommendations for each category

Levels of Concern	Air quality Categories
Good	Air quality is satisfactory, and air pollution poses little or no risk.
Moderate	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Unhealthy	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	Health alert: The risk of health effects is increased for everyone.
Hazardous	Health warning of emergency conditions: everyone is more likely to be affected.

Health Effects

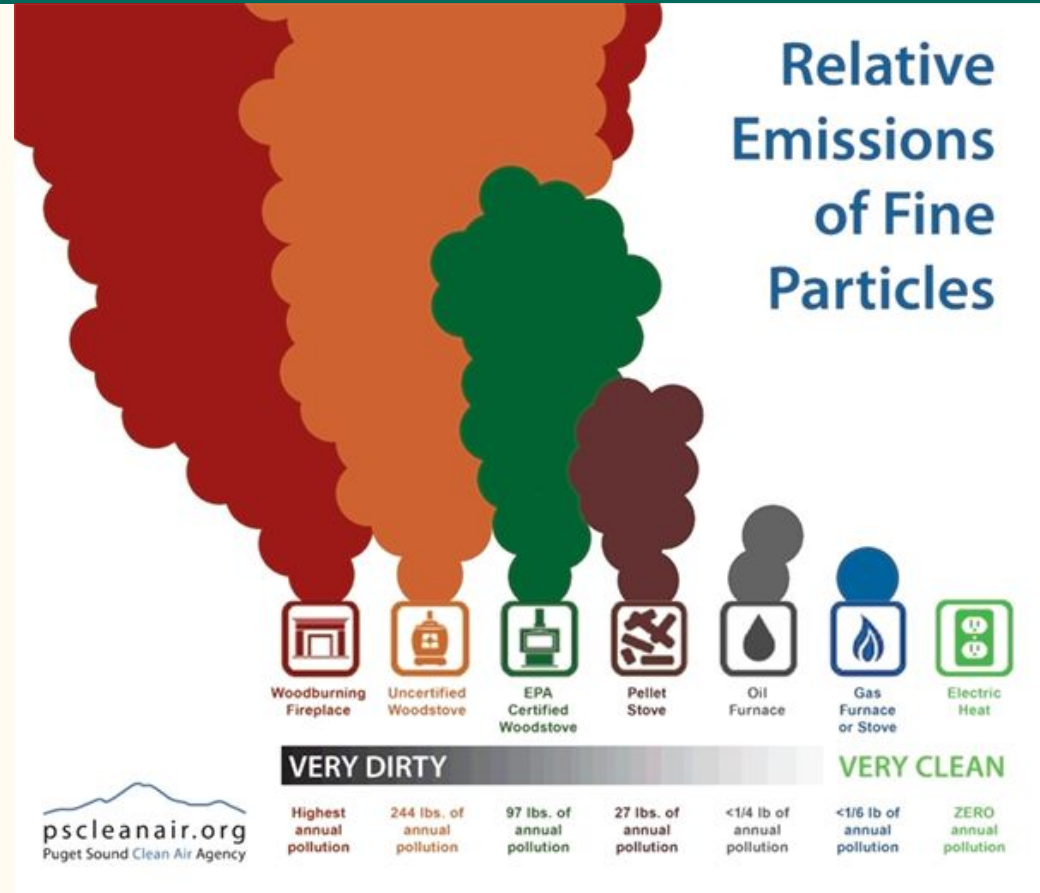
Air pollution harms human and animal health, damages agricultural crops, forests, ornamental and native plants, and creates haze that reduces visibility.

- Causes nausea, dizziness, headaches, chest pain
- Causes eye, nose, and throat irritation
- Makes it more difficult to breathe
- Increases the likelihood of heart attacks
- Increases respiratory disease including asthma attacks
- Decreases lung function
- Decreases life expectancy



Sources of Outdoor Air Pollution

- Roads and traffic
- Air planes
- Wildfires
- Power plants
- Burning fuels
- Construction
- Fireworks
- Wildfires



Sources of Indoor Air Pollution

- Indoor smoking
- Gas stoves
- Allergens
- Gas heaters
- Building materials
- Mold
- Lead paint
- Improper ventilation



Particulate Matter (PM)

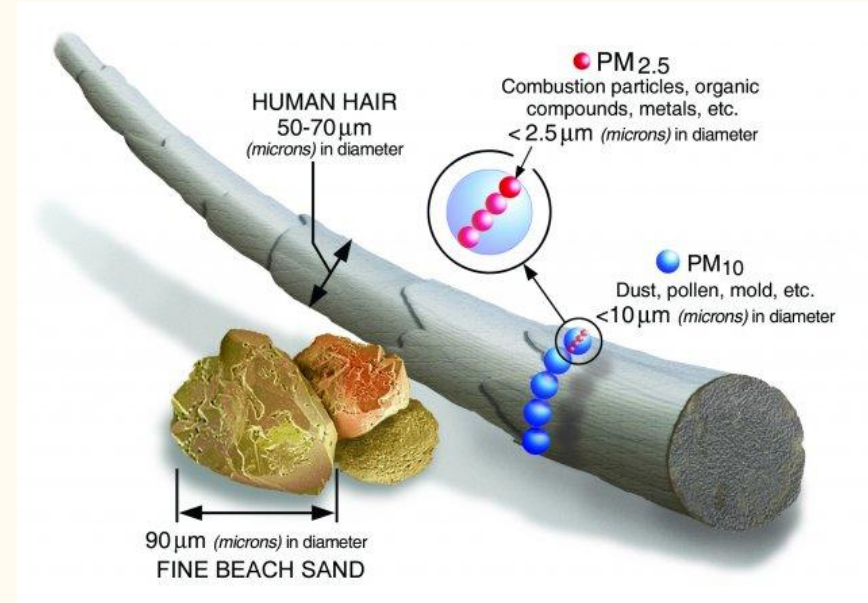
PM is one of the pollutants that is monitored to determine the AQI.

PM are particles found in the air, including dust, dirt, soot, smoke, and liquid droplets.

Sources: Diesel, power plants, wildfires are mostly PM

Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope.

Ultrafine particulate matter are the smallest form of PM. They come from cooking particles, air crafts, etc.



TVOCs (Total Volatile Organic Compounds)

- Paints and solvents
- Cleaners and disinfectants
- Pesticides
- Air fresheners
- Consumer products
- Transportation sources
- Natural sources
- Building materials and furnishings
- Office equipment
- Craft materials

Description	Abbreviation	Boiling Point Range (°C)	Example Compounds
Very volatile (gaseous) organic compounds	WVOC	<0 to 50-100	Propane, butane, methyl chloride
Volatile organic compounds	VOC	50-100 to 240-260	Formaldehyde, d-Limonene, toluene, acetone, ethanol (ethyl alcohol) 2-propanol (isopropyl alcohol), hexanal
Semi volatile organic compounds	SVOC	240-260 to 380-400	Pesticides (DDT, chlordane, plasticizers (phthalates), fire retardants (PCBs, PBB))



Nitrogen Dioxide (NO₂)

Nitrogen Dioxide (NO₂) is a gas that is created when fossil fuels are burned.

Sources: Vehicles, burning coal and other industrial processes.

Older vehicles emit large amounts of NO₂

NO₂ decreases lung function and exacerbates asthma.

Note about measuring NO₂!!



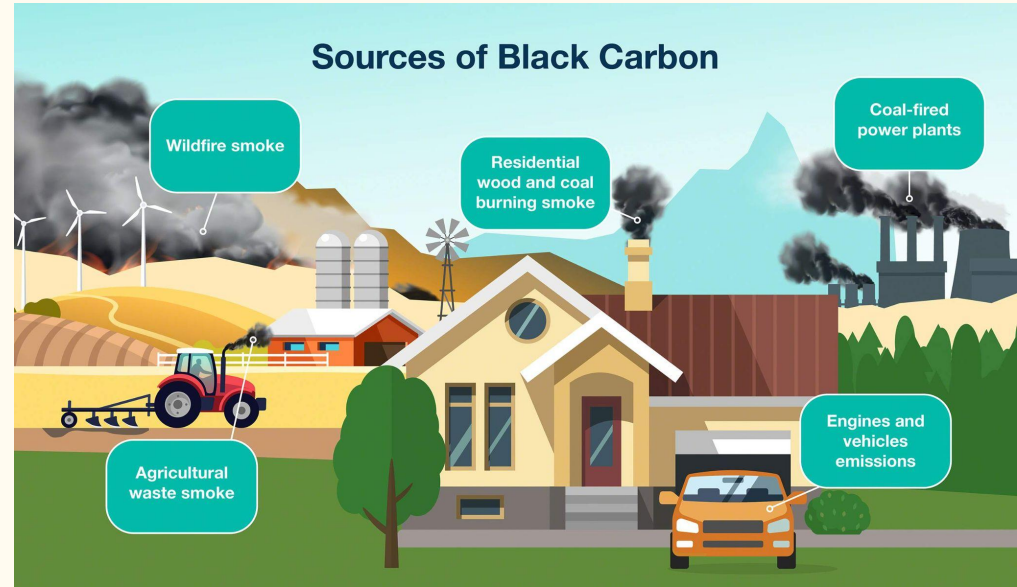
Black Carbon (or Soot)

Black Carbon (or soot) is one kind of particulate matter. It is created during the incomplete combustion of fossil fuels.

Soot is not regulated, and therefore there are no guidelines for how much soot is unhealthy.

Sources: Vehicles, burning coal and other industrial processes.

Black carbon is the second most important contributor to climate change (as it absorbs solar energy and releases heat).



How do we know what is in the air?

Visual Observations

- What we can see and smell
- Satellite images



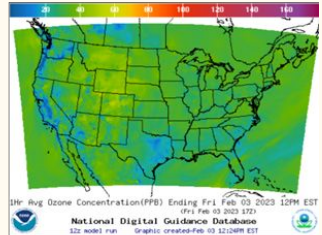
Air Monitoring

- Takes a sample of air
- Makes a measurement of specific pollutants



Modeling

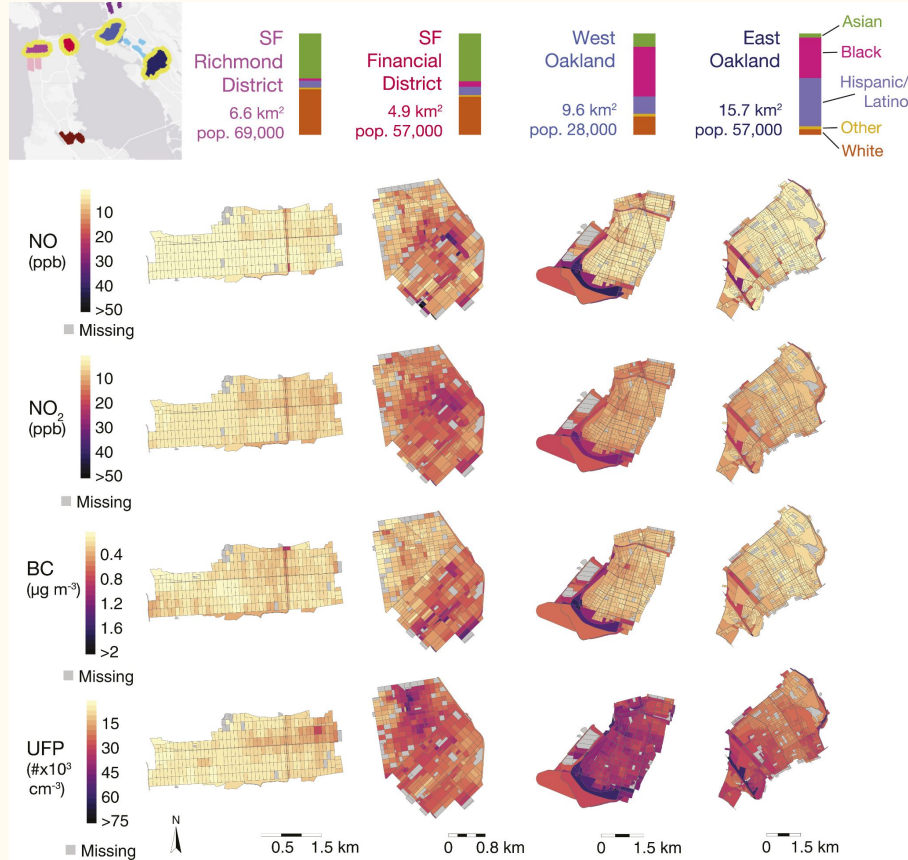
- Estimate of pollutants in the air
- Based on emissions



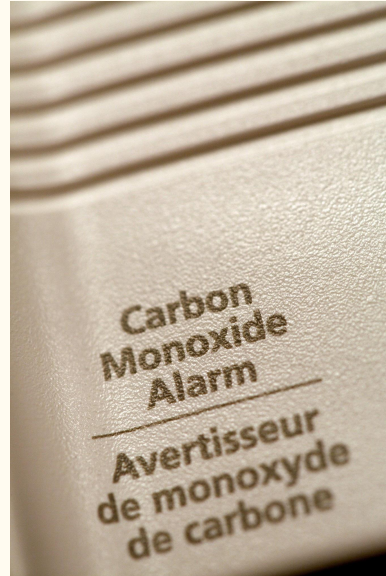
Thinking about air quality monitoring in the Bay Area

- Bay Area air quality has steadily improved over the last 20 years
- So why are we doing community air monitoring and why are we still so concerned about the air quality?

The importance of community-level monitoring



How do we measure indoor air pollutants?



Dispersion, Concentration, and Wind and Bubbles!

