# Widening and Deepening of the Houston Ship Channel: Air Quality & Health Impacts

*Executive Summary*

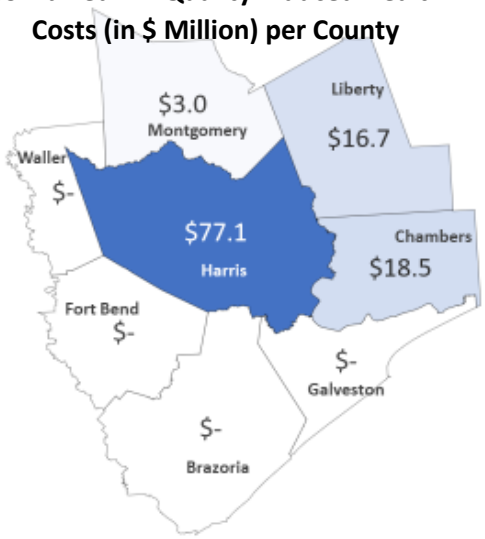
This study was commissioned in 2020 by Public Citizen and the Healthy Port Communities Coalition to model **regional air quality** and **human health impacts** expected to occur when construction emissions peak during the proposed project to deepen and widen the Houston Ship Channel by the Army Corps of Engineers and Port of Houston Authority.

Two scenarios were compared:
**A)** the current business-as-usual, base case without construction; and

**B)** a construction year scenario that represents the maximum annual emissions expected from construction equipment and activities during project.

**Modeled air pollutants:** nitrogen oxides (NO + $NO_2$ = $NO_x$), fine particles ($PM_{2.5}$), and ground level ozone ($O_3$).

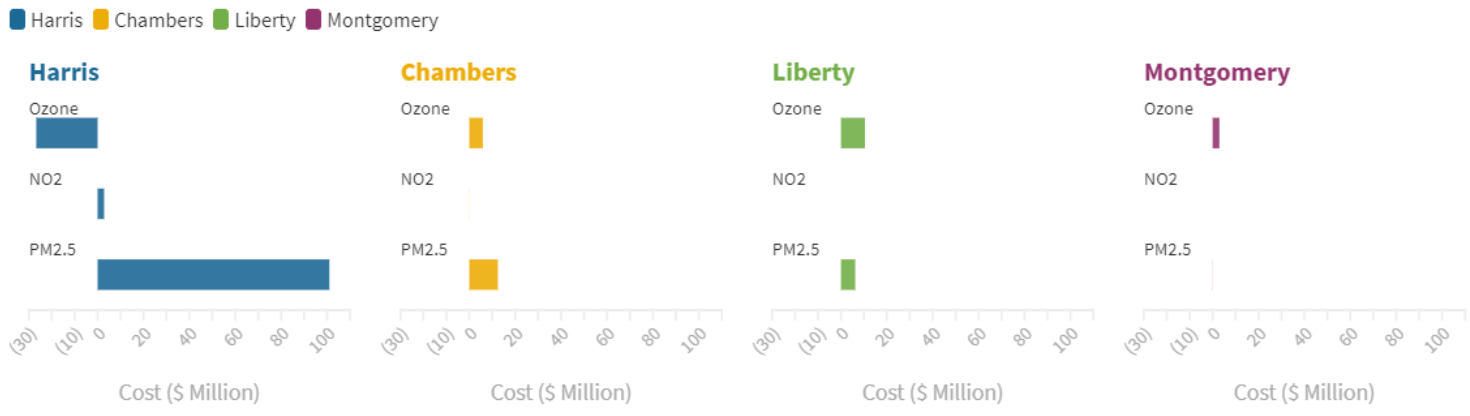
**Combined Air-Quality Induced Health Costs (in $ Million) per County**




Across the Houston region, changes in $PM_{2.5}$, ozone, and $NO_2$ concentrations in the construction year scenario are estimated to cost **$115 Million in Air Quality-Induced Health Expenses.**

| Health Effect | Cost Across Region | % of Total Cost |
|---|---|---|
| Mortality | $ 110,490,000.00 | 95.9% |
| Hospitalizations | $ 2,960,700.00 | 2.6% |
| ER visits | $ 1,130,000.00 | 1.0% |
| Asthma exacerbations | $ 227,150.28 | 0.2% |
| Work loss days | $ 442,481.20 | 0.4% |
| **Total Cost:** | **$ 115,250,331.48** | **100.0%** |

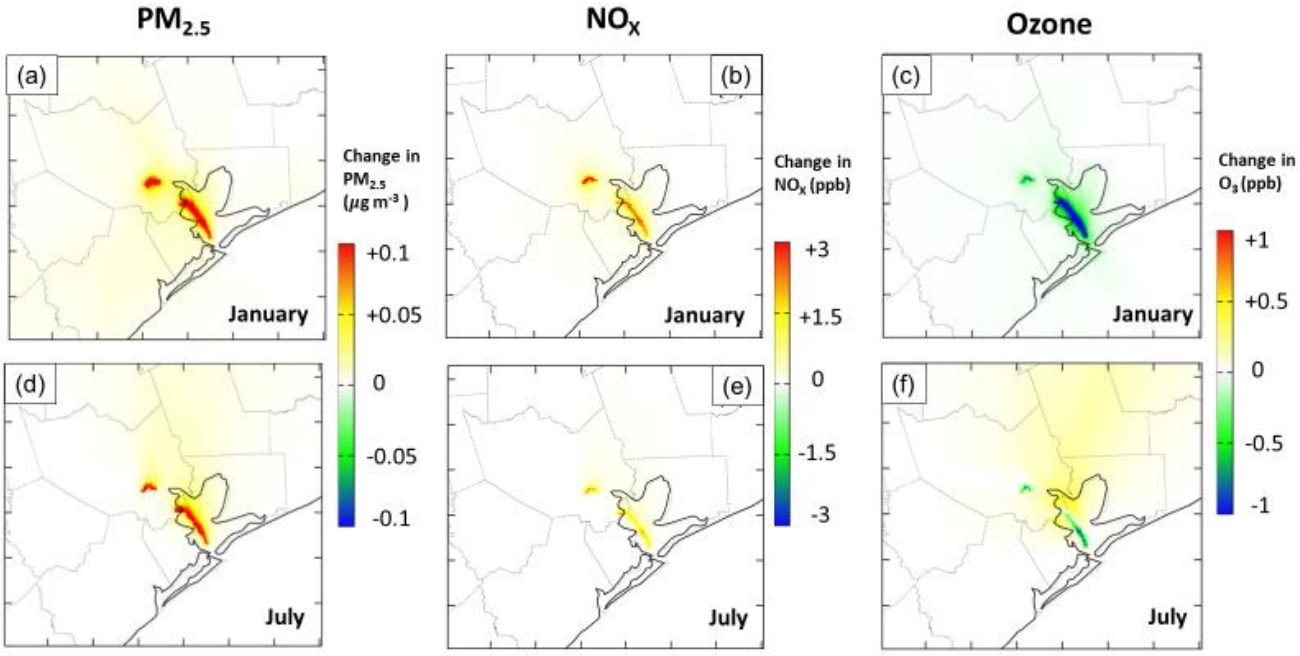
**Pollutant-Specific Health Costs per County:** Ozone-induced health costs were highest in Liberty County and negative (or avoided) in Harris County. Both $NO_x$ and $PM_{2.5}$-induced health costs were highest in Harris County.



**Ozone levels decreased around the Houston Ship Channel where and when $NO_x$ pollution was highest.**

Impacts from construction pollution varied by season. In January, the air near the ship channel is already $NO_x$ saturated. This effect of reducing ozone levels from additional $NO_x$ pollution is known as "**$NO_x$ scavenging**".

## Estimated Changes in Air Quality During Peak Construction (Year 2)




Ozone chemistry is complicated. Although $NO_x$ is required for ozone to form, **too much $NO_x$ can actually decrease ozone levels** because $NO_x$ reacts with existing ozone and removes it from the air.