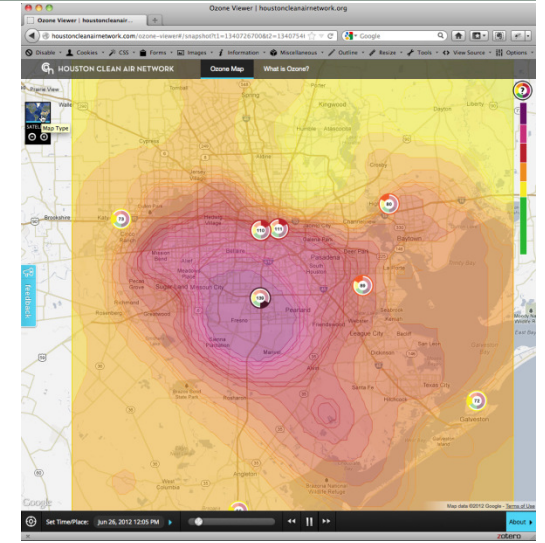
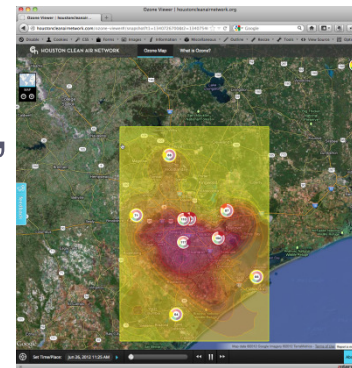
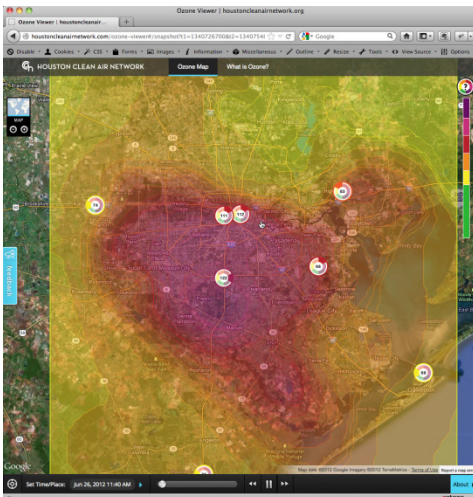
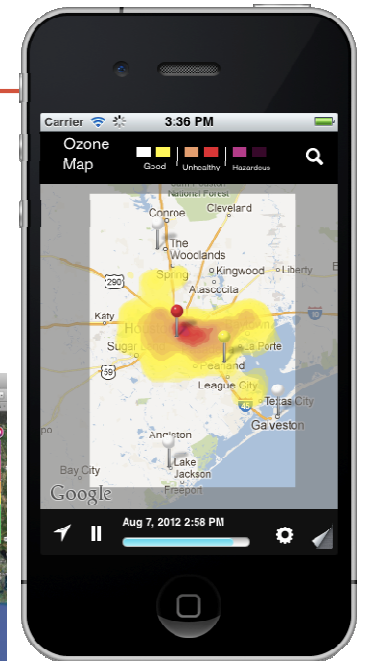


REAL TIME OZONE MAPPING



Houston Clean Air Network,
Mapping as Community Outreach
and Epidemiology

Dan Price, Ph.D.,
University of
Houston



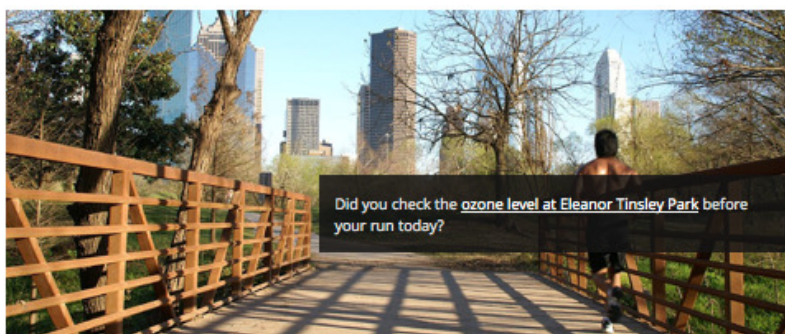
Utility of the maps

- Sensitive groups need better information
- Seeing clouds emerge and move
- Better Understanding for science and community
- Action
 - **Individuals can change their exposure**

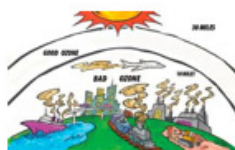


Tour of the site

- <http://houstoncleanairnetwork.com/>
- The information pages:



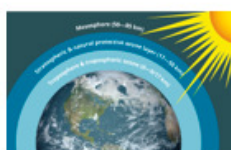
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What is Ozone?

What does it mean when the weather reporter says it's going to be a "bad ozone day"? Or when a doctor says that "sensitive groups" should avoid outdoor activities? Generalizations like these can be confusing and frustrating as you plan your day. But because our new real-time ozone maps give us...

[read more](#)



Tropospheric and Stratospheric Ozone

Perhaps the most common misunderstanding about ozone comes from the fact that, in certain places, ozone is essential to life. When ozone is high above the Earth in the stratosphere, it helps protect life on the ground from solar radiation by scattering incoming ultraviolet rays from the sun. The...

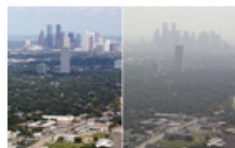
[read more](#)



How is Ozone Formed?

Ozone does not come from a single source, but is formed in the air through a complex series of reactions involving light and chemical precursors. Although we cannot simply shut down a single emission source and stop ozone, we can limit the amount of precursor chemicals that produce ozone in the...

[read more](#)



Ozone in Houston

Although ozone levels have recently declined, Houston still has ample amounts of the ingredients necessary to form ozone in the atmosphere. With the petrochemical industry composing a substantial portion of Houston's economic base and a population of around 6 million people, the Greater Houston...

[read more](#)

Air Quality Index Values (ozone parts per billion)	Levels of Health Concern
>155	Hazardous
151-155	Very Unhealthy
96-150	Unhealthy
77-95	Warning
63-76	Moderate
0-60	Good

EPA and Ozone

Although this site is mainly concerned with helping users to understand what happens when ozone is already present in the atmosphere, it is important to know that the Environmental Protection Agency (EPA) has regulated ozone and other air pollutants since the passage of the Clean Air Act in 1971...

[read more](#)



Ozone in the Body

Ozone enters the body when you breathe. As it travels through the mouth and nose, ozone reacts with the linings of airways and starts chemical reactions which cause the tissues to break apart and then recombine with the excess oxygen. This recombination compromises the structure of the linings...

[read more](#)



How do I Limit Exposure?

When speaking about ozone prevention, it is important to recognize that there are ways through which ozone can be managed; the first, and most visible, is attempting to reduce the level of ozone in the atmosphere by controlling the amount of chemicals that we produce. Efforts in this area may...

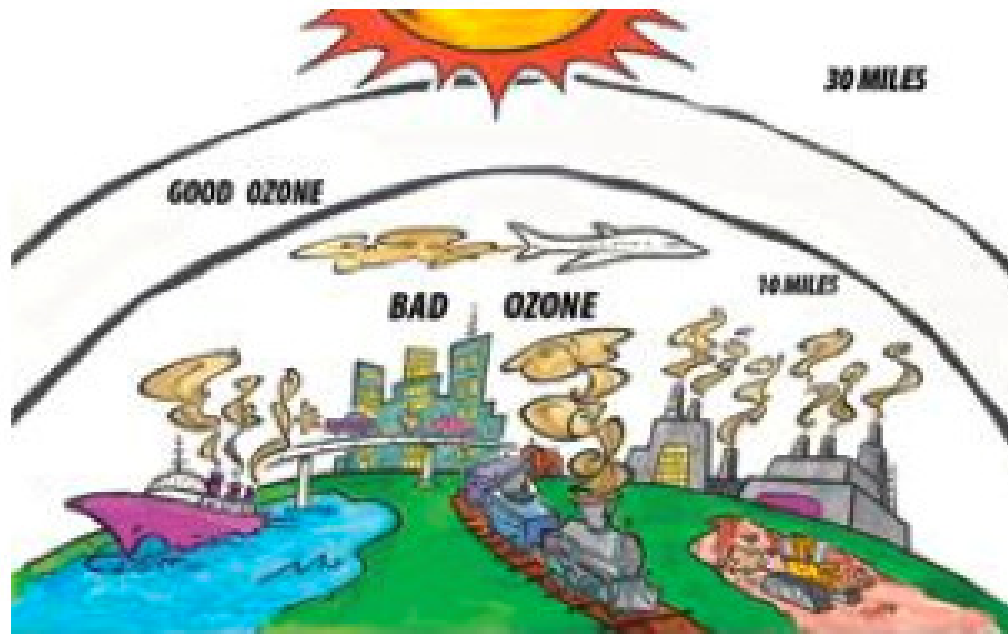
[read more](#)



Ozone Exposure in Sensitive Groups

Although the health effects of ozone can vary greatly between individuals, the EPA recognizes that certain "sensitive" groups may be at greater risk to the adverse effects of ozone. These sensitive groups include children, who tend to be outdoors more, have developing immune and respiratory systems...

[read more](#)



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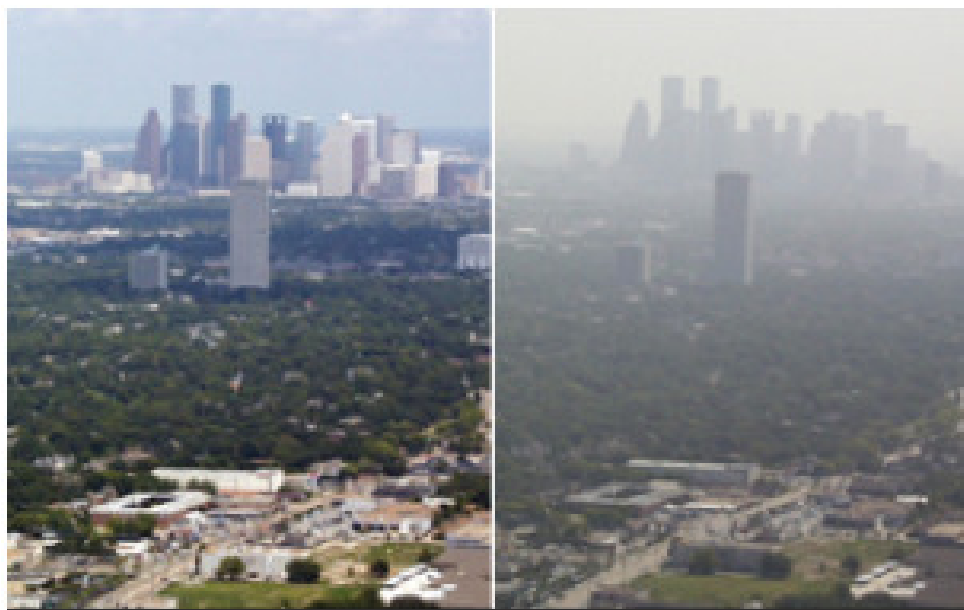
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[read more](#)



Ozone in the Body

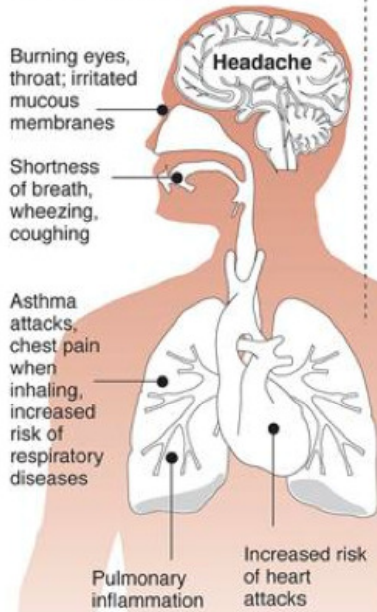
Ozone enters the body when you breathe. As it travels through the mouth and nose, ozone reacts with the linings of airways and starts chemical reactions which cause the tissues to break apart and then recombine with the excess oxygen. This recombination compromises the structure of the linings,...

[read more](#)

Why smog is harmful

Ozone, the main ingredient in smog, is one of the most widespread air pollutants and among the most dangerous.

Effects on health



How ozone forms

- 1 Oxygen in the atmosphere O2
- 2 Nitric oxide, byproduct of combustion NO
- 3 Sunlight breaks up nitric oxide
- 4 Ozone formed by three oxygen atoms O3

U.S. ozone limits

In parts per billion

- | | |
|--------------------|--------------|
| • 1997-2008 | 84 |
| • 2008-present | 75 |
| • New EPA proposal | 60-70 |

© 2010 MCT
Source: American Lung Association, State of the Air 2008.
AP Graphic: Staff

What is Ozone?

Tropospheric and Stratospheric Ozone

How is Ozone Formed?

Ozone in Houston

EPA and Ozone

Ozone in the Body

Ozone Exposure in Sensitive Groups

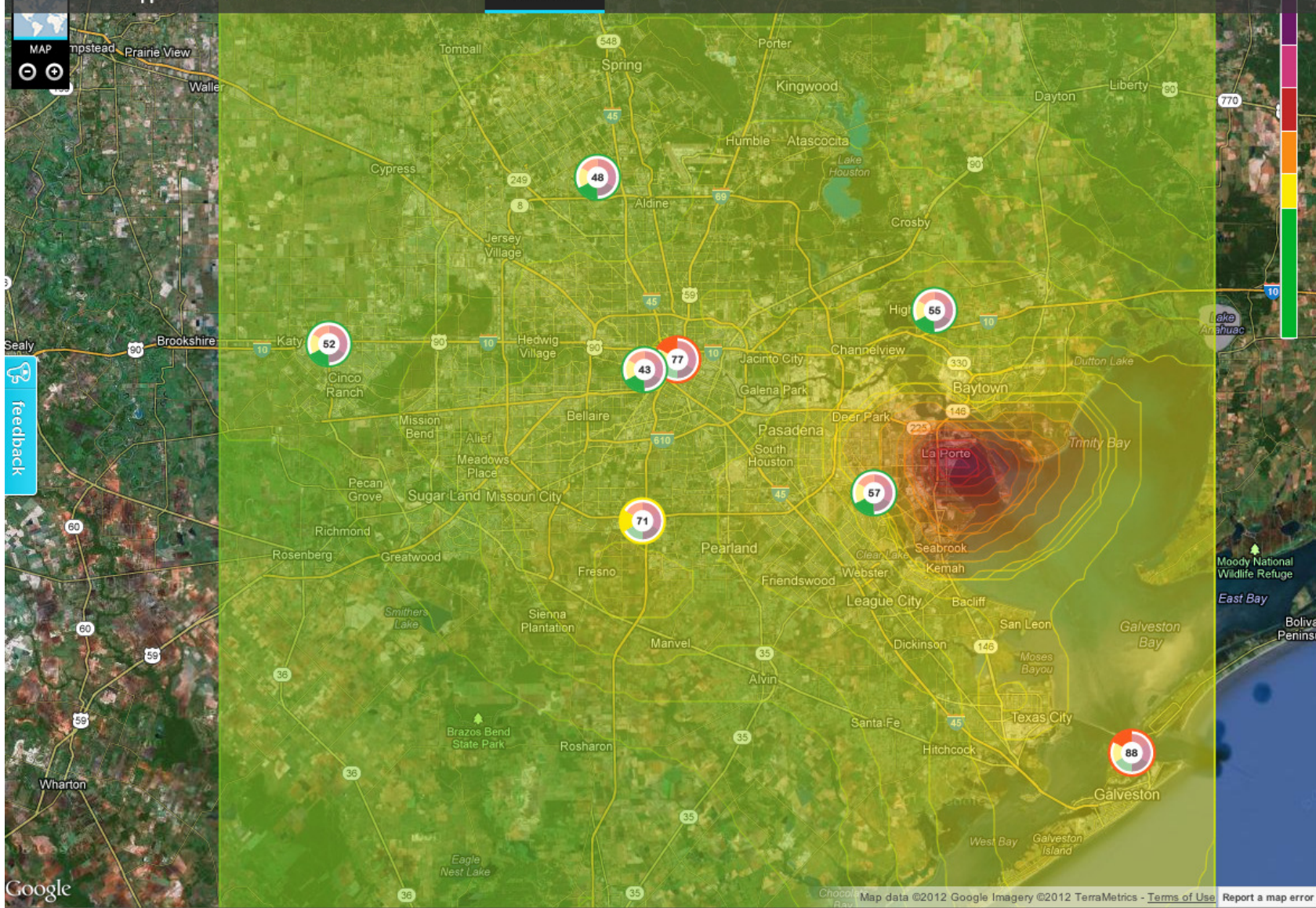
How do I Limit Exposure?

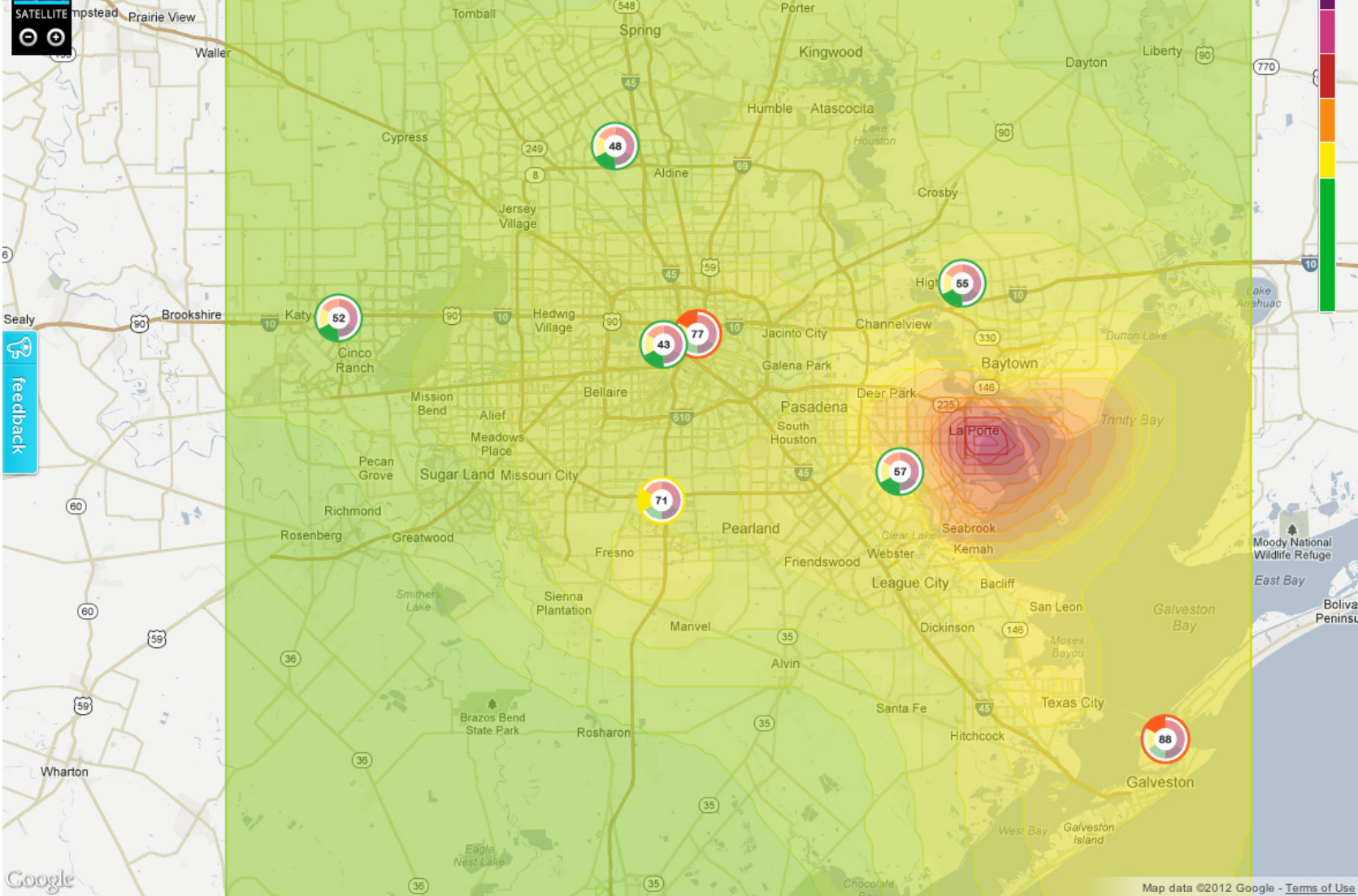
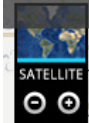
Ozone in the Body

Ozone enters the body when you breathe. As it travels through the mouth and nose, ozone reacts with the linings of airways and starts chemical reactions which cause the tissues to break apart and then recombine with the excess oxygen. This recombination compromises the structure of the linings, which normally act to keep bacteria and other microorganisms from entering the lungs. The airways react to this change by producing excess amounts of mucus and constricting to reduce the flow of air through our lungs. The physiological effects can vary widely between individuals and can result in shortness of breath, wheezing, asthma, and may even lead to pulmonary infection and an increased risk of heart attack.

Tour of the site

- <http://houstoncleanairnetwork.com/>
- The maps:





feedback

Google

Map data ©2012 Google - [Terms of Use](#)

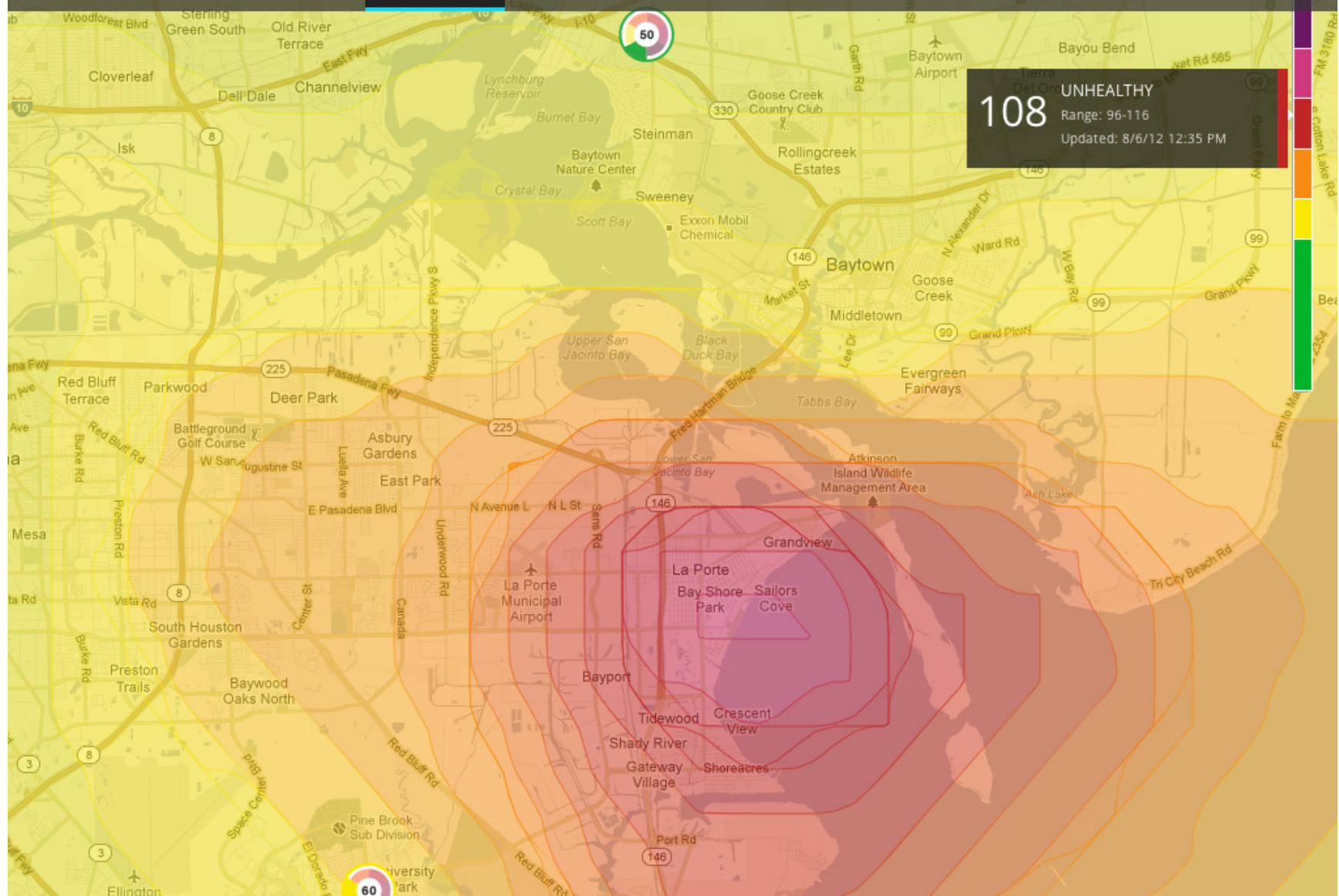
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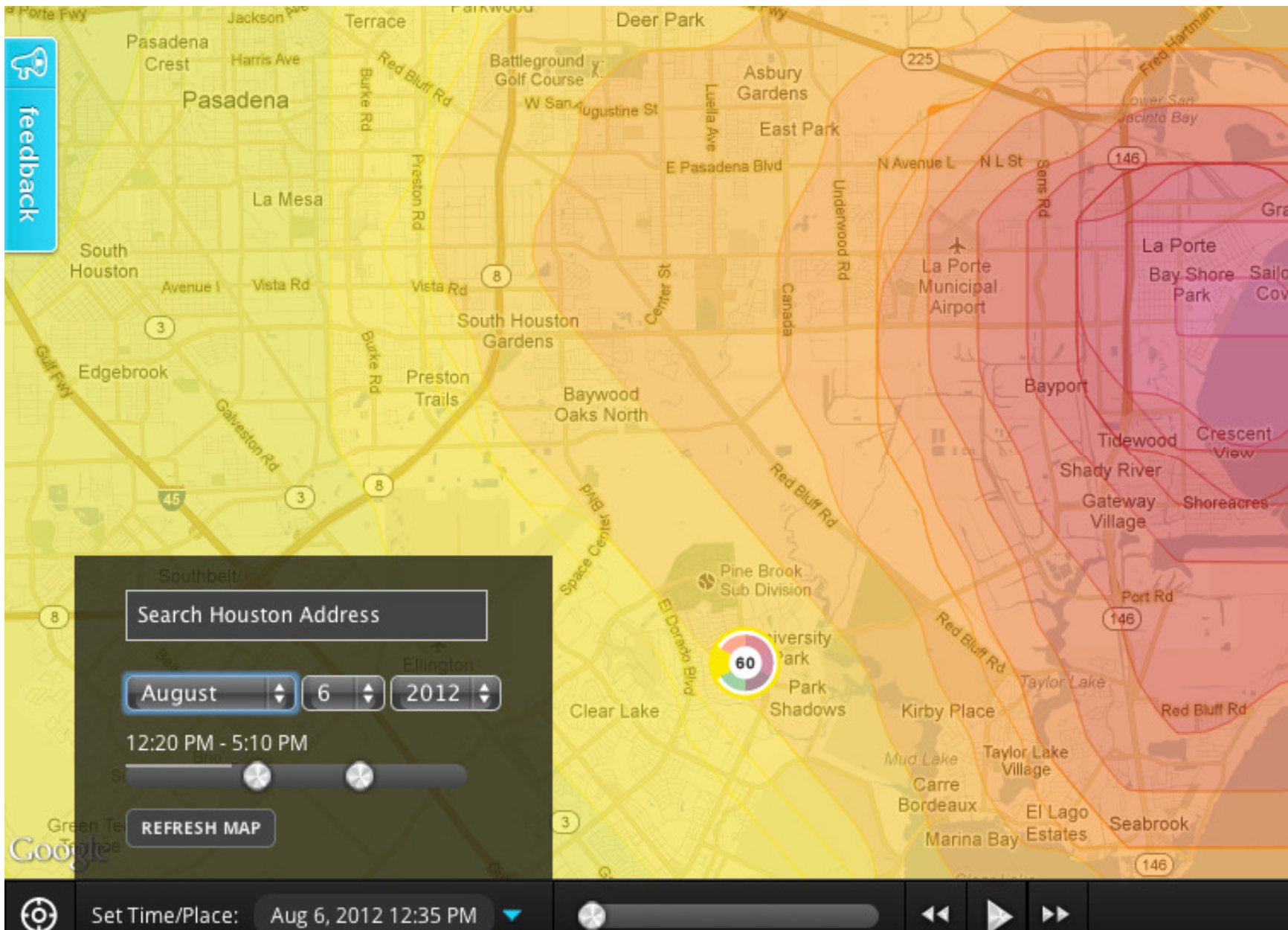
About

HOUSTON CLEAN AIR NETWORK

Ozone Map

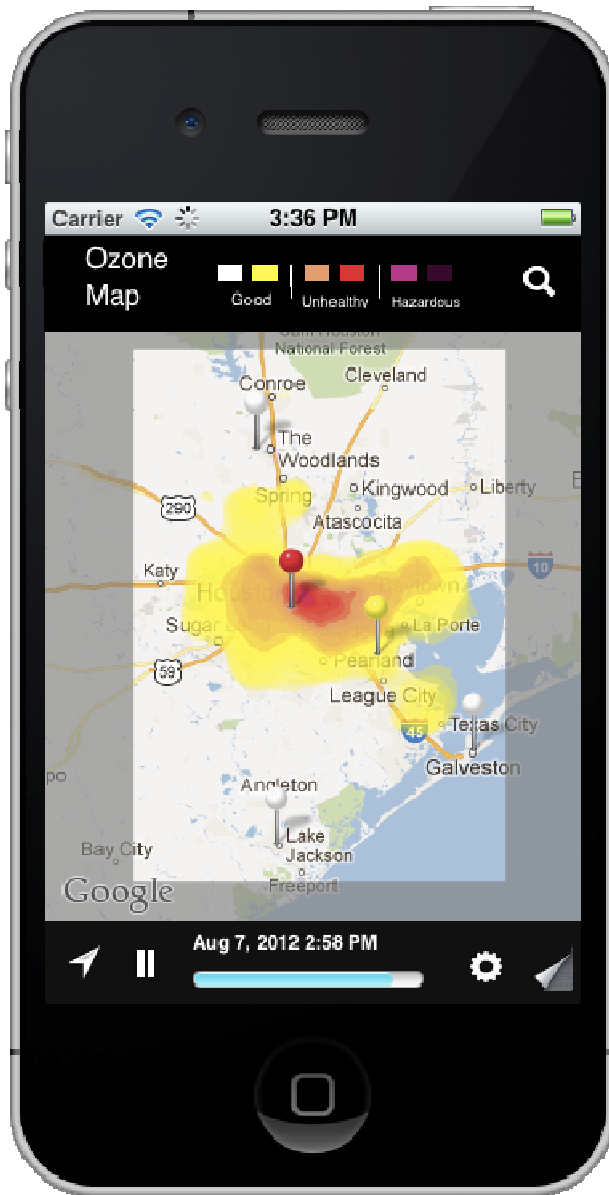
What is Ozone?





Tour of the site

- <http://houstoncleanairnetwork.com/>
 - The iPhone App:
 - (Android coming soon)



Utility of the site

- You can see ozone clouds emerge and move in near real time!
- The clouds are often localized in time and space – you can do something about your exposure besides staying indoors all day

Utility of the site

- Technology is modular:
interpolation for producing grid data and for generating contour lines can be adapted for new places, new pollutants, and new interfaces.

Utility of the site

- Visualization tool for public health, not for regulatory enforcement
- (This is important for public outreach, and for eventually changing how the public sees pollution data)
- (We are using 8hr AQI)

Future of the site

- New Locations
- Epidemiology
- Personal Health Calculators
- Historical Maps
- Forecast maps
- Now-casting
- Other pollutants
- Future outreach