St. Louis Ozone Gardens

Update for the EW-Gateway Air Quality Advisory Committee

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Update for the EW-Gateway Air Quality Advisory Committee

Background

- Started by Saint Louis University's Center for Environmental Sciences (CES) in 2012, in partnership with the Saint Louis Science Center.
- Project Goal: To increase awareness of ground-level ozone pollution and its impact on the environment.
- In 2016 there were five Ozone Gardens in the St. Louis metro area.

St. Louis Ozone Gardens

Ground-level ozone is often difficult to understand because:

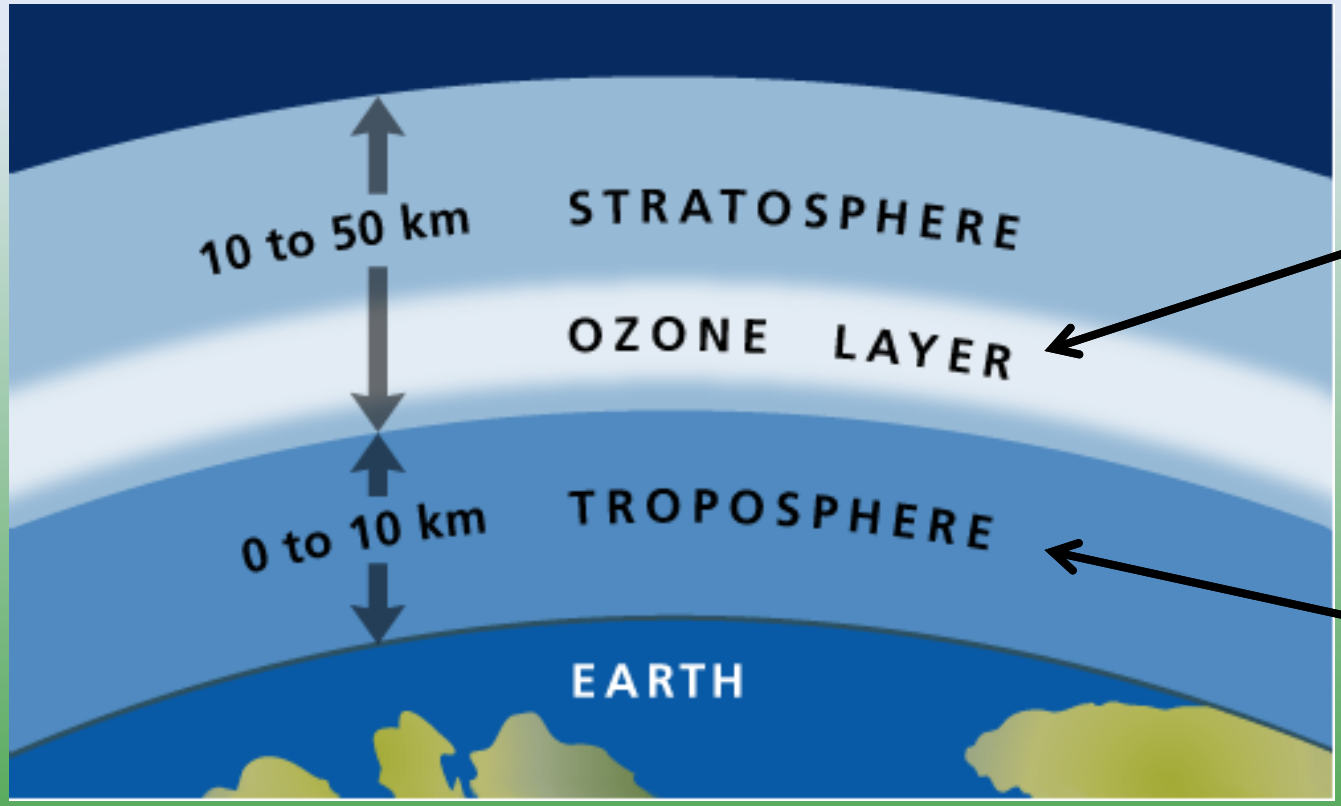
- It is invisible
- It is not a point source pollutant
- People often confuse it with stratospheric ozone

Ozone Gardens include:

- Ozone *bio-indicator* plants
- An ozone monitor and weather station
- Educational display signs

As an interactive component of the exhibits, ozone leaf damage data is collected by students and/or volunteers during the summer months.

Ozone: “Good up high, bad nearby”

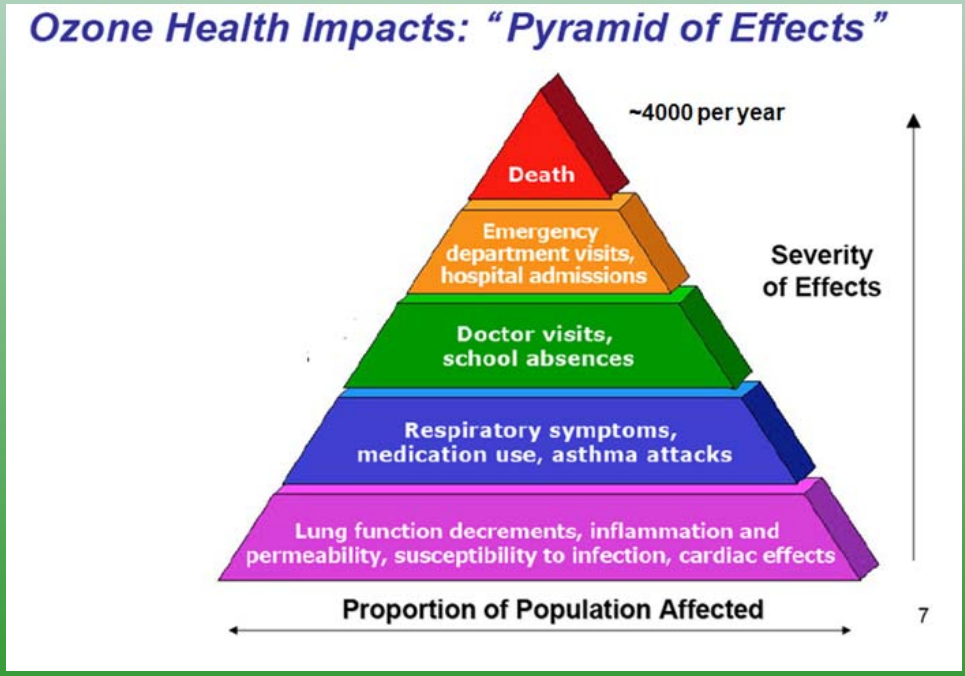


Good ozone

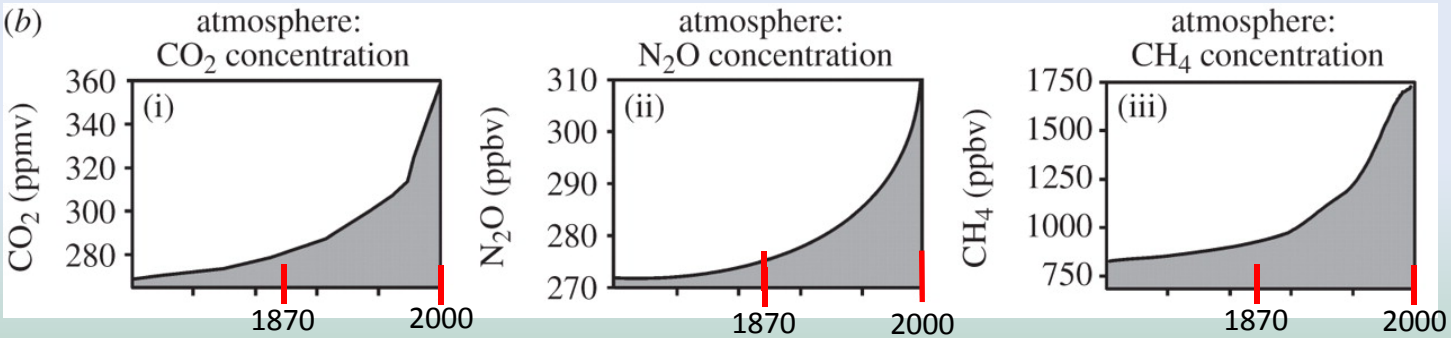
Bad ozone

Ozone is a strong oxidizing agent, causing other substances to lose electrons.

Ozone harms lungs and plants.



Observed Increase in Tropospheric Ozone during the Anthropocene: Similar to Increases of Greenhouse Gases



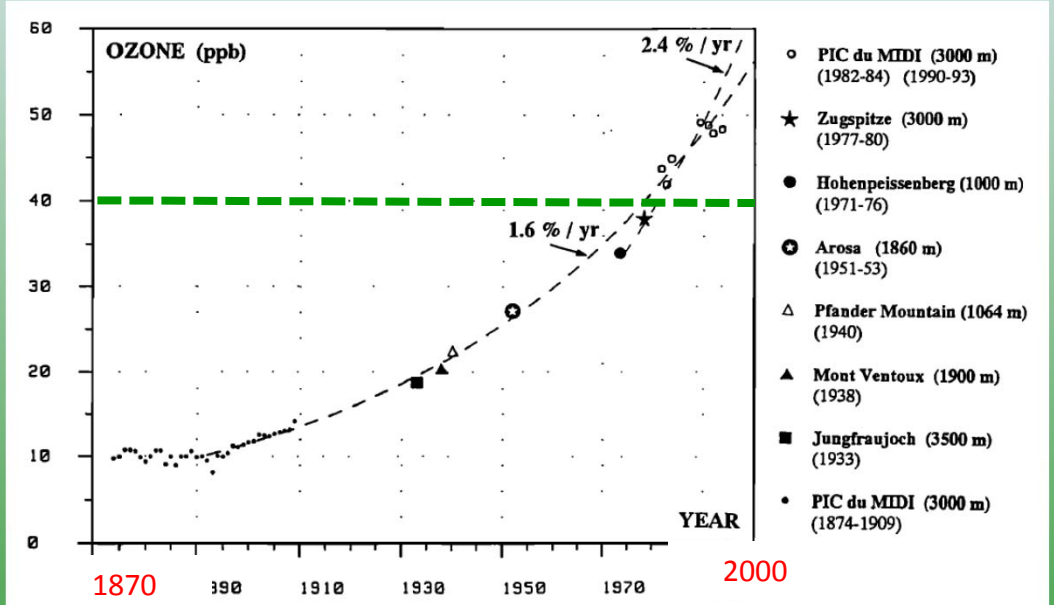


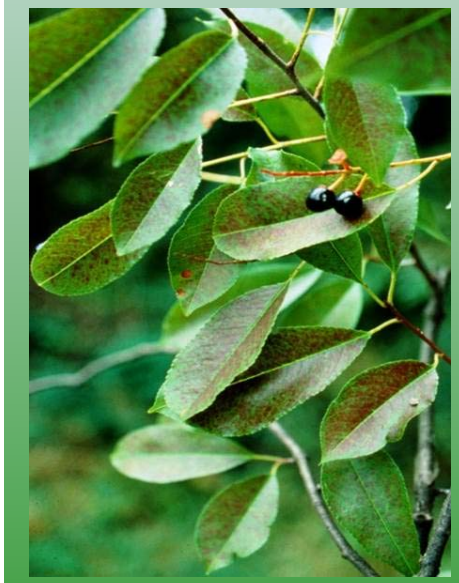
Figure 5. Ozone evolution in the free atmosphere over western Europe, from measurements at the Pic du Midi and in various European stations at high altitudes (see text).

(from Marenco et al., 1994; JGR, doi: 10.1029/94JD00021)

Ground-level background ozone concentrations have increased significantly since the industrial revolution.

We use *bioindicator* plants to tell us about the ozone in our environment

Ozone caused **stipples** are dot-like areas of tan, red, brown, purple or black on the leaf surface.



Ozone-injury on black cherry, willow, yellow poplar, and grape variety Chambourcin; *photos courtesy Prof. John Skelly.*

St. Louis Locations

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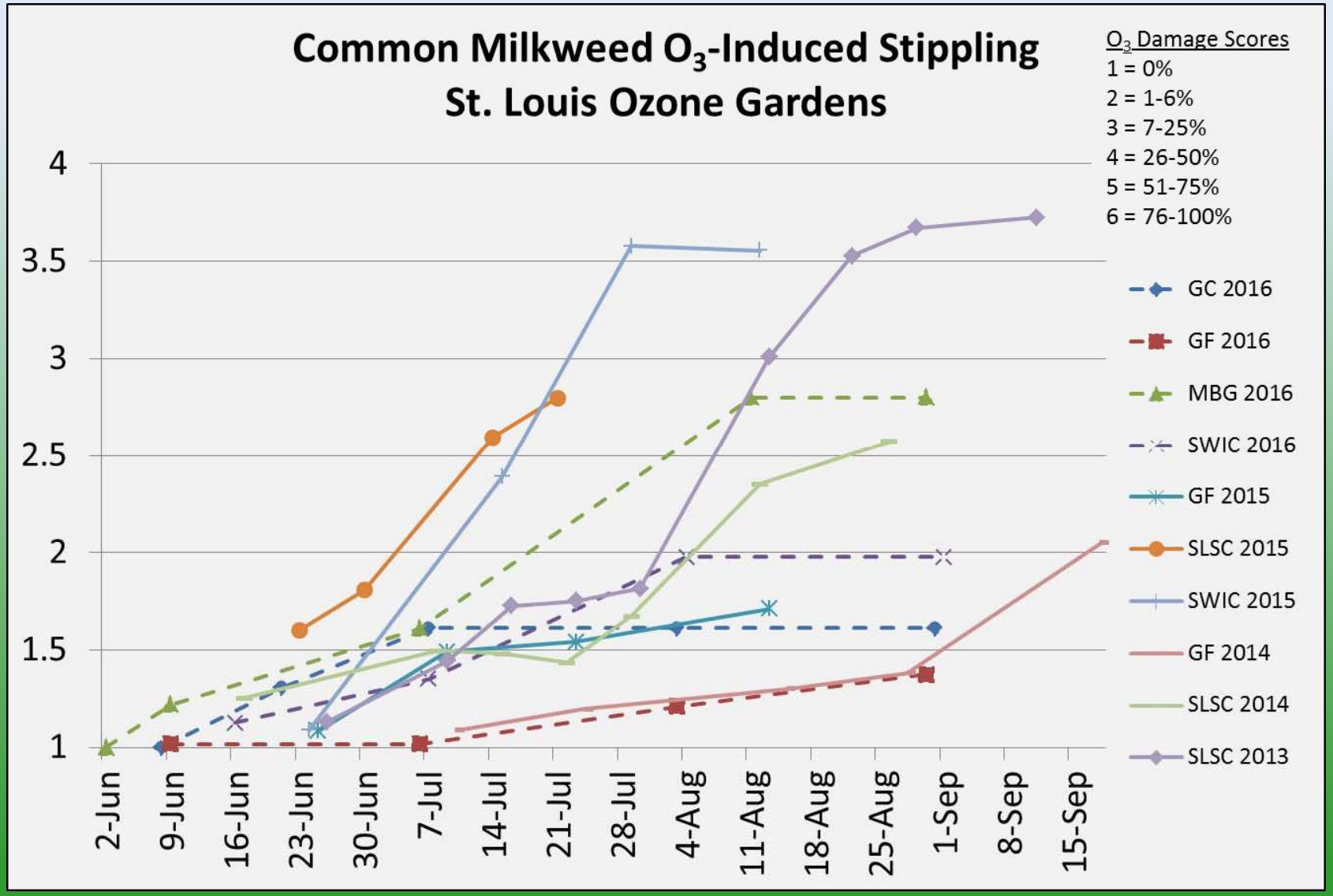
Saint Louis Science Center Ozone Garden moved into new GROW exhibit

Grant's Farm Ozone Garden

SWIC, Belleville Ozone Garden

Ozone-induced stippling in common milkweed



Granite City Ozone Garden

Part of the “Cleaner, Greener Granite City” Project: Linda Aud, Jeff Rains, United Congregations of the Metro East, Saint Louis University’s Center for Environmental Sciences, City of Granite City, Madison County Green Schools Program

“A Visual Approach to Educating the Community on Air Quality” received an Outstanding Local Government Achievement Award from EW-Gateway in in the Exemplary Public/Non-profit Collaboration category

EPA Region 7 Environmental Education Grant to Saint Louis University and the Missouri Botanical Garden

Three parts

Build an educational ozone chamber
Develop educational programs for teachers and students
Administer sub-grant awards within Region 7

EPA Region 7 Environmental Education Grant

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“On-the-Go” Ozone Chamber

- Engineer Sam Ray traveled to St. Louis to assemble the chamber in May 2016.
- Currently located in the Missouri Botanical Garden’s Plant Lab classroom.

EPA Region 7 Environmental Education Grant

Build an educational ozone chamber

Develop educational programs for teachers and students

Administer sub-grant awards within Region 7

"Climate Science and Stewardship"

- Three day teacher workshop in July 2016
- Nine field trips during 2016-17 school year

EPA Region 7 Environmental Education Grant

Build an educational ozone chamber

Develop educational programs for teachers and students

Administer sub-grant awards within Region 7

“Build Your Own Ozone Garden”

Coming to EPA Region 7 in 2017

Plans for 2017

- Continue EE grant – field trips and sub-grants
  - Five St. Louis sites
  - Common milkweed comparison trial

Thank you

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