



Risk Assessment in the Trenches: The Importance of Getting it Right

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Conservatism

- Regulatory risk assessment – tendency towards conservatism
 - Upper bound values
 - Compounding of conservative values
 - Precautionary principle
- New Value
 - “Is it more conservative?” vs “Is it more scientifically supported?”
- All well and good, but there are consequences...



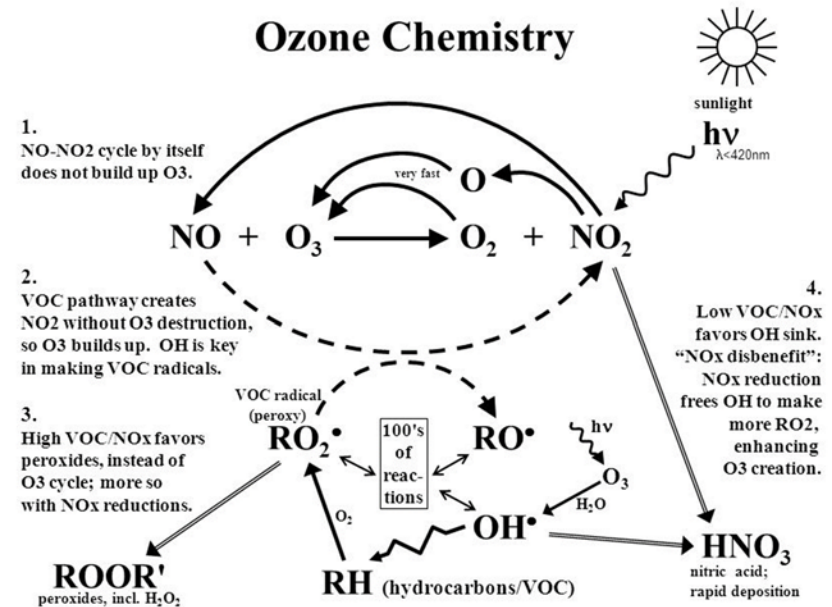
Allocation of Resources

- Example - 2015 Ozone Standard
- EPA sets National Ambient Air Quality Standards (NAAQS) for 6 pollutants (ozone, NO_x, PM, SO₂, Pb, CO)
- Required to review these standards every 5 years – First set in 1971

2008 73 FR 16483 Mar 27, 2008	Primary and Secondary	O ₃	8 hours	0.075 ppm	Annual fourth- highest daily maximum 8- hr concentration, averaged over 3 years
2015 80 FR 65292 Oct 26, 2015	Primary and Secondary	O ₃	8 hours	0.070 ppm	Annual fourth- highest daily maximum 8 hour average concentration, averaged over 3 years

Background

- Photochemical product, not directly emitted
- O_3 is a highly-reactive, poorly water soluble gas at room temperature, and is a respiratory irritant
- O_3 reacts with indoor surfaces and ventilation, scavenging it from indoor air: O_3 is effectively an outdoor pollutant
- Inhaled O_3 :
 - Is scavenged by antioxidants in the respiratory tract
 - When antioxidants are depleted, it causes a neural reaction that decreases FEV1, in addition to other responses such as inflammation
 - Decreased FEV1 – Basis for lowering standard



Human Controlled Exposure Studies

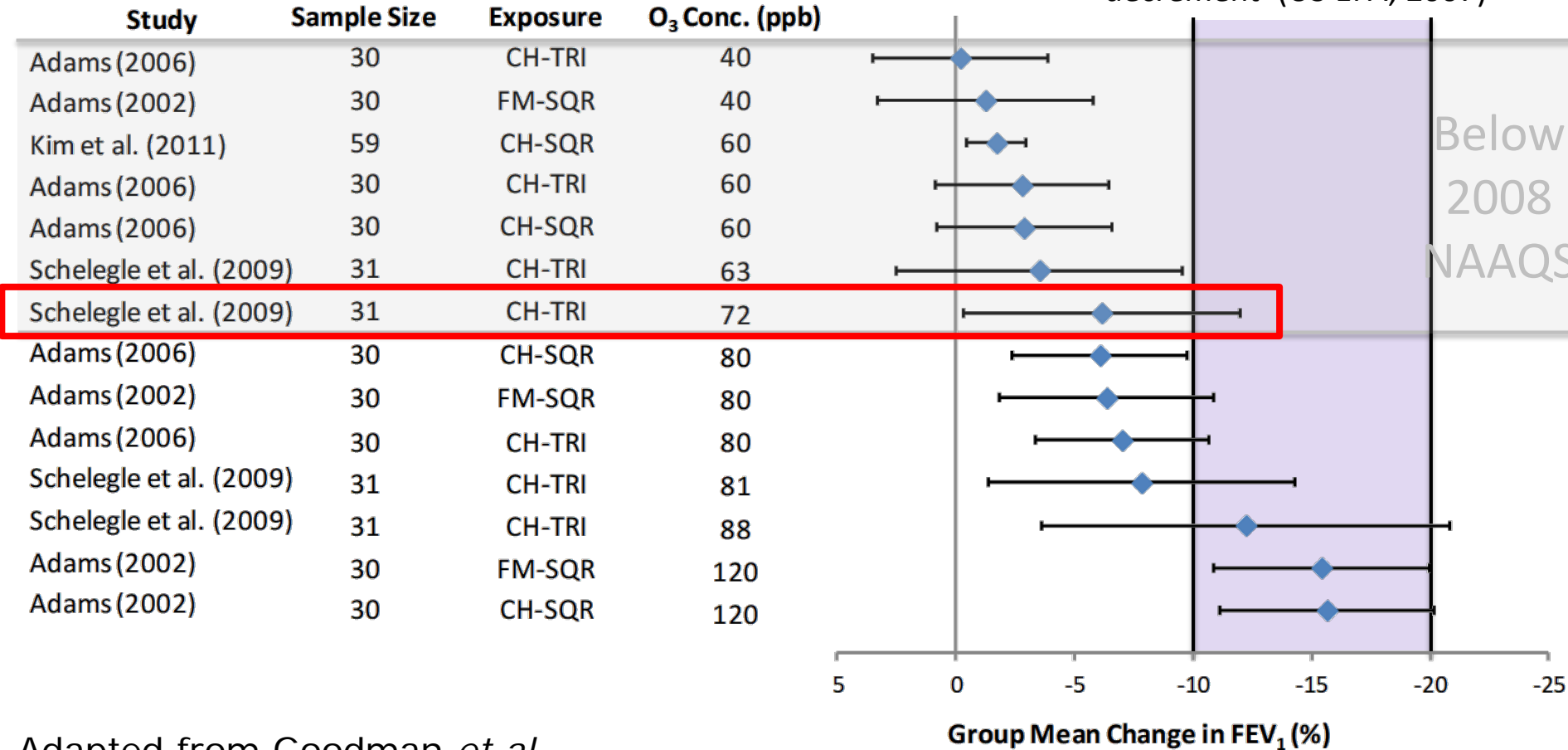


- Healthy volunteers are exposed to ambient or near-ambient concentrations of O_3 while exercising at moderate to vigorous exertion for 50 min/hr for 6.6 hours; face mask or chamber
- Averaged 33 L/min ventilation rate; resting rate ~ 6 L/min
- These studies measure primarily forced expiratory volume in 1 second (FEV_1)
- FEV_1 decreases with increasing air toxicant
- Mild, reversible effect (within minutes to hours)



Clinical Data – 6.6 hr exposure with moderate to vigorous exercise

10-20% defined as “moderate” decrement (US EPA, 2007)

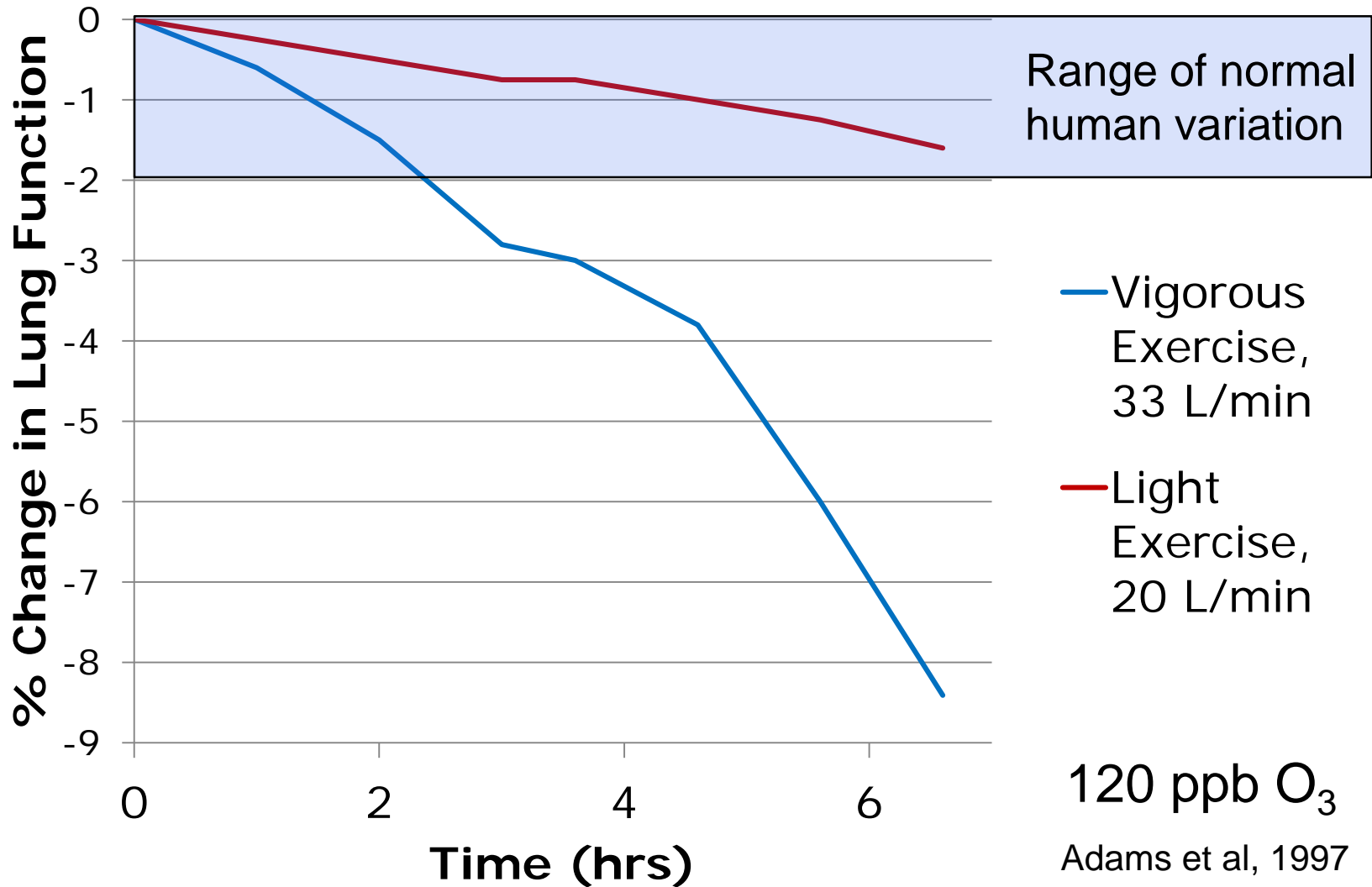


Adapted from Goodman *et al.* (2013)

Schelegle 72 ppb Exposure - 6 of 31 individuals had > 10% decreases and 5 of 31 individuals had increases in FEV₁. Lung function returned to normal within 1-4 hours.

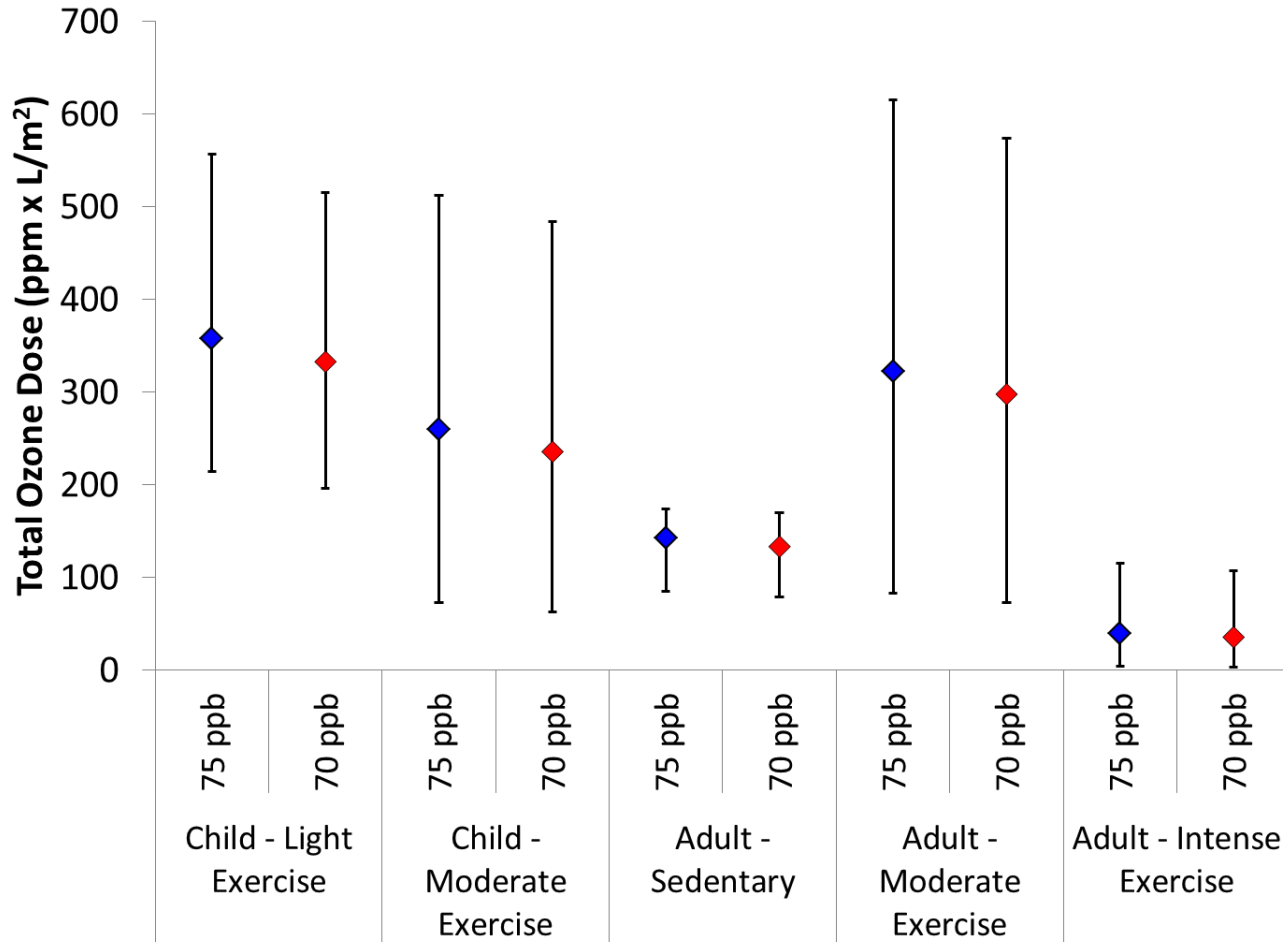


Characteristics of Human Exposure Studies - Exercise





Ozone Dose & Exposure Examples



Ozone dose (based on EPA-derived exposure patterns) **changes very little with a changing ozone standard**



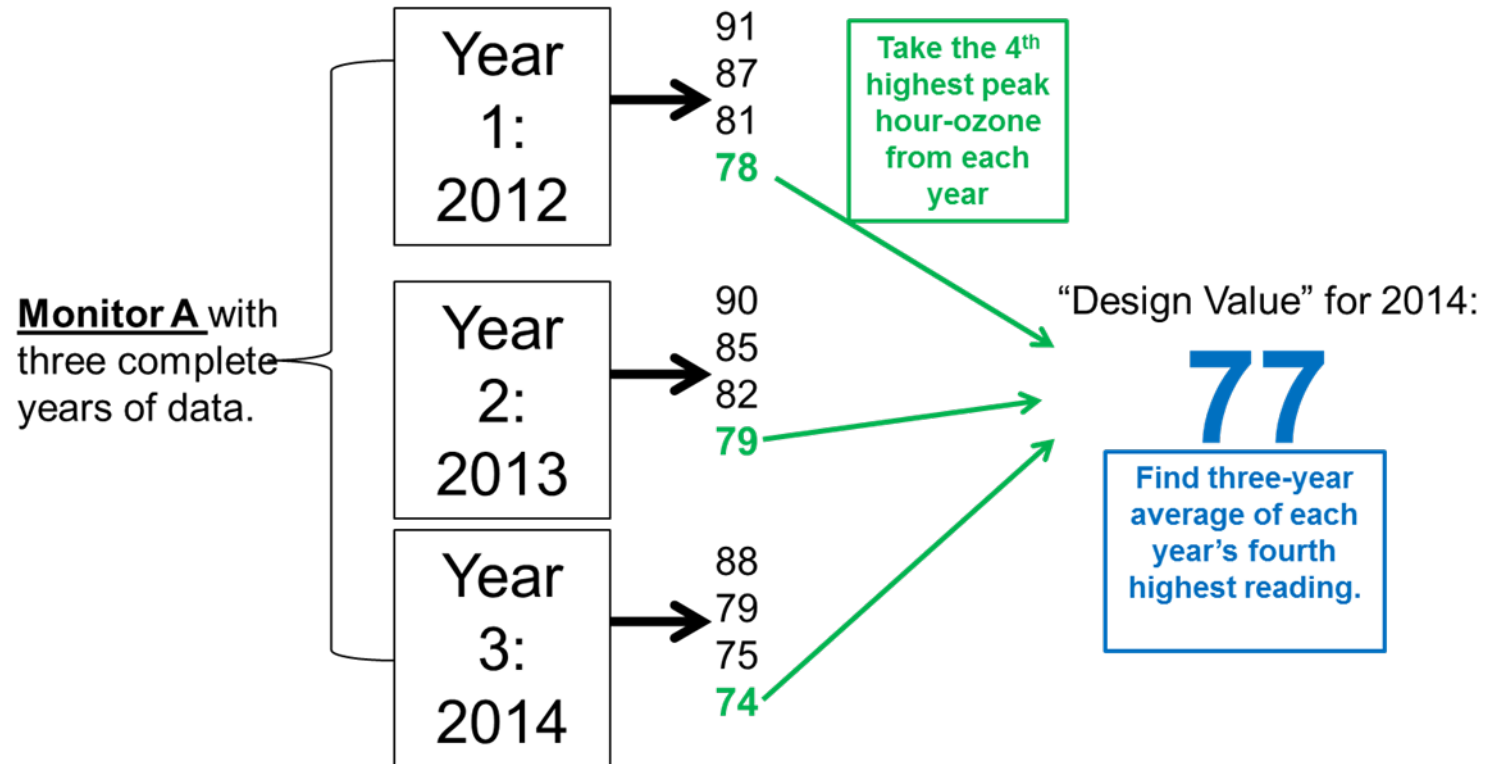
What's the Big Deal?

- 75 ppb vs. 70 ppb doesn't sound like a big change
- We'll get to that but first some more background info...



Calculating Ozone Design Value

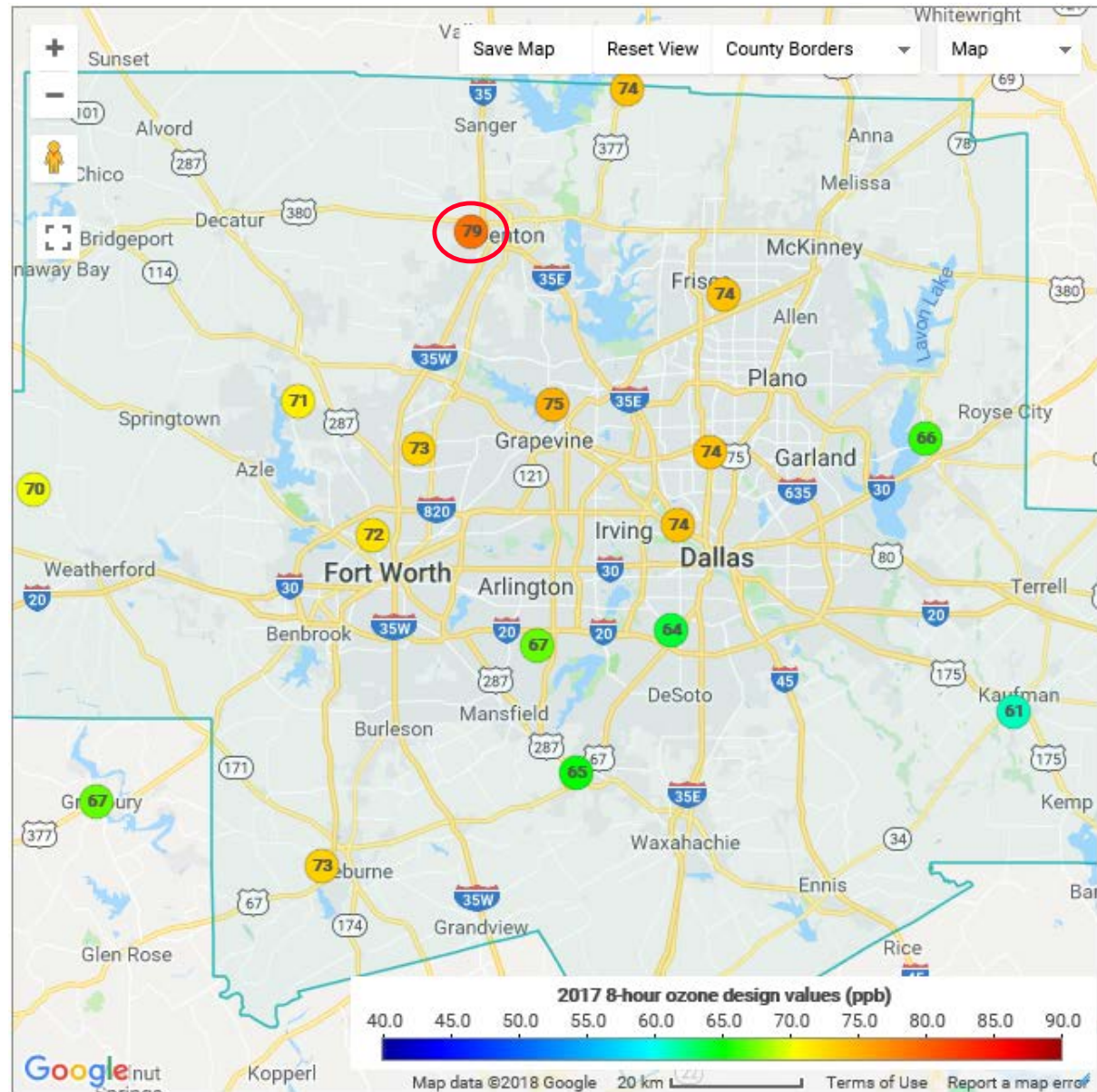
The design value is the three-year average of each year's fourth highest reading.





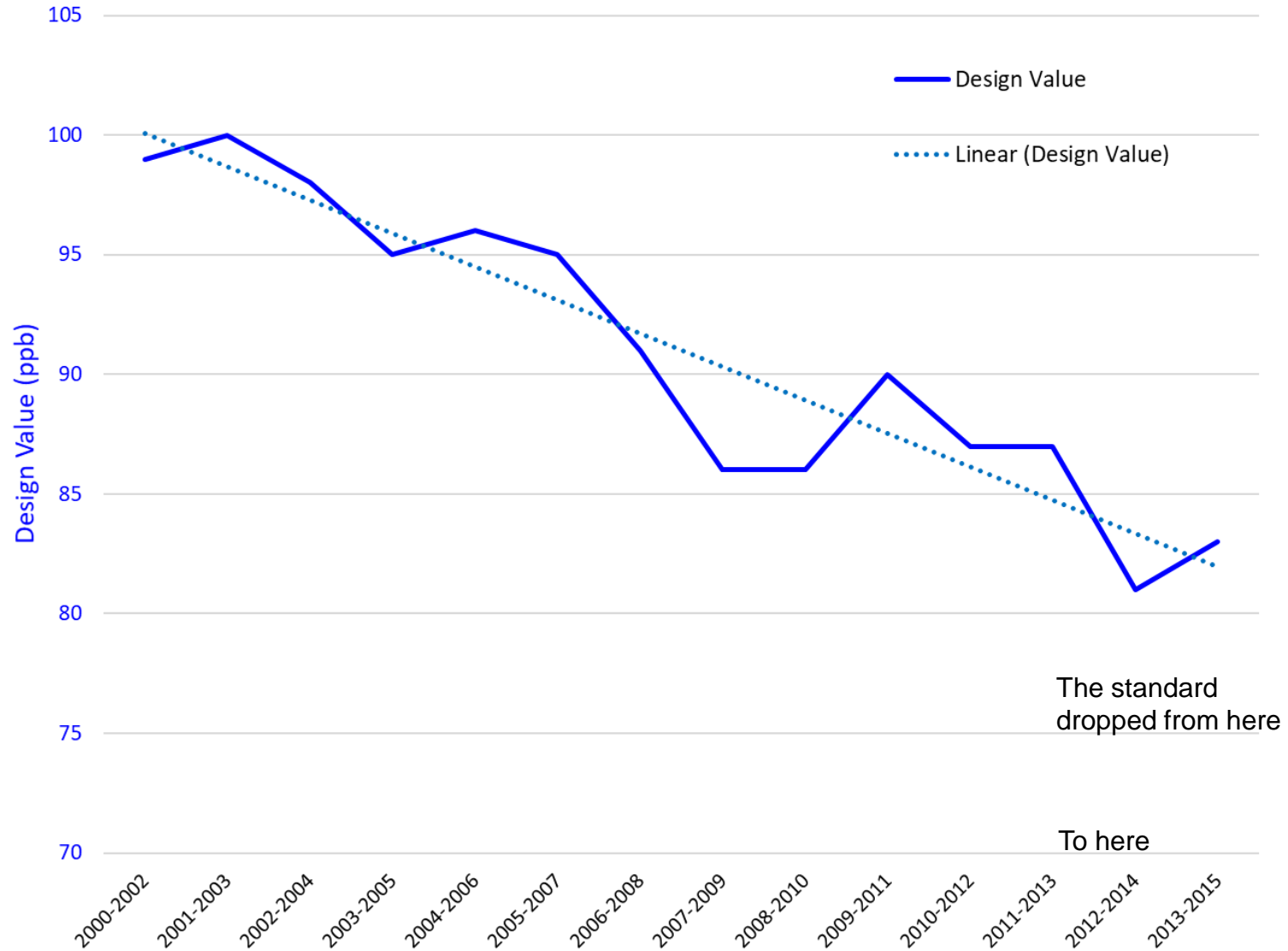
Calculating Design Values

- Values are not averaged across monitors
- Highest monitor in the area is the design value
- If only 1 monitor design value exceeds the standard: nonattainment





Design Value Ozone Concentrations in Dallas-Fort Worth





State of Texas Effort

- \$66M to \$150M state funds (TERP) per year for 20+ years on ozone by TCEQ alone
- By far largest expenditure for any single pollutant
- By far largest use of staff resources for any single pollutant
- ~1 ppb reduction per year in design value
- FCAA – can't consider costs



73% of Expenditures

Texas Commission on Environmental Quality FY 2017 Operating Budget

Table IV - Remediation, Reimbursement and Grant (RRG) Contracts

Remediation, Reimbursement and Grant Contracts

Air Quality and Monitoring Grants	\$ 6,177,833
Drinking Water Quality and Standards Grants	3,349,880
Dry Cleaning Facilities	3,342,584
Estuary Programs	1,300,304
Local Air Grants - Federal	862,500
Local Air Grants - State	1,751,863
Low Income Vehicle Repair Program	48,043,825
Misc RRG Contracts	859,270
Other Remediation	2,546,691
Petroleum Storage Tank Program	14,877,781
Solid Waste Management Grants	5,493,162
Superfund	9,418,639
Texas Emission Reduction Plan Grants	109,212,636
Water Quality and Monitoring Grants	7,311,659
Water Quality Clean Rivers	4,250,290
Agency Total	\$ 218,798,917



Second Point

- Rules can have unintended consequences

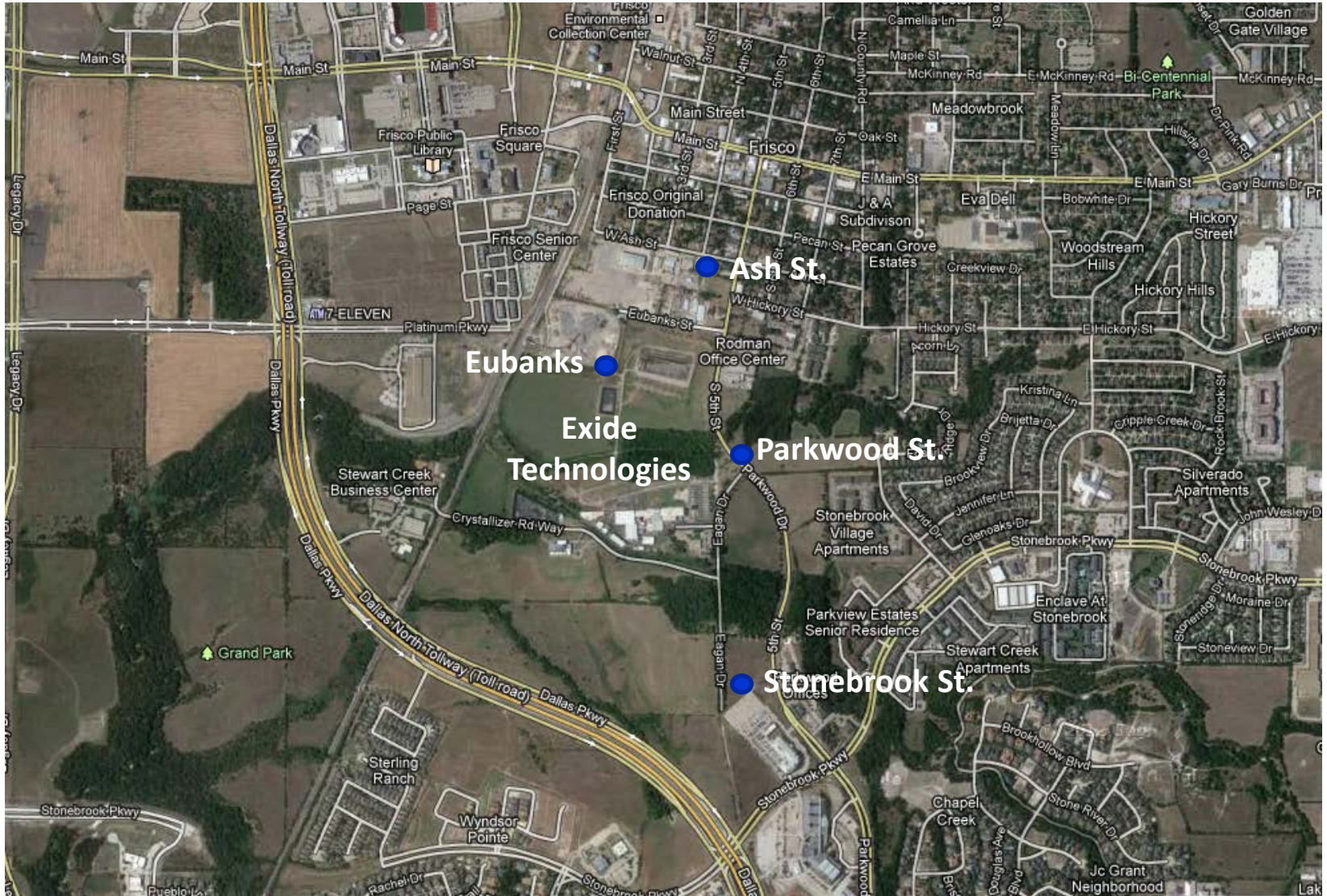


Lead NAAQS

- Inhalation insignificant (~1% of total exposure)
- Oral exposure predominates (food, paint, toys, soil, etc.)
- EPA considered eliminating the 1.5 ug/m³ standard
- Instead, lowered to 0.15 ug/m³ in November, 2008
- In a nutshell - no threshold, other media/sources predominate, therefore should lower exposure as much as possible

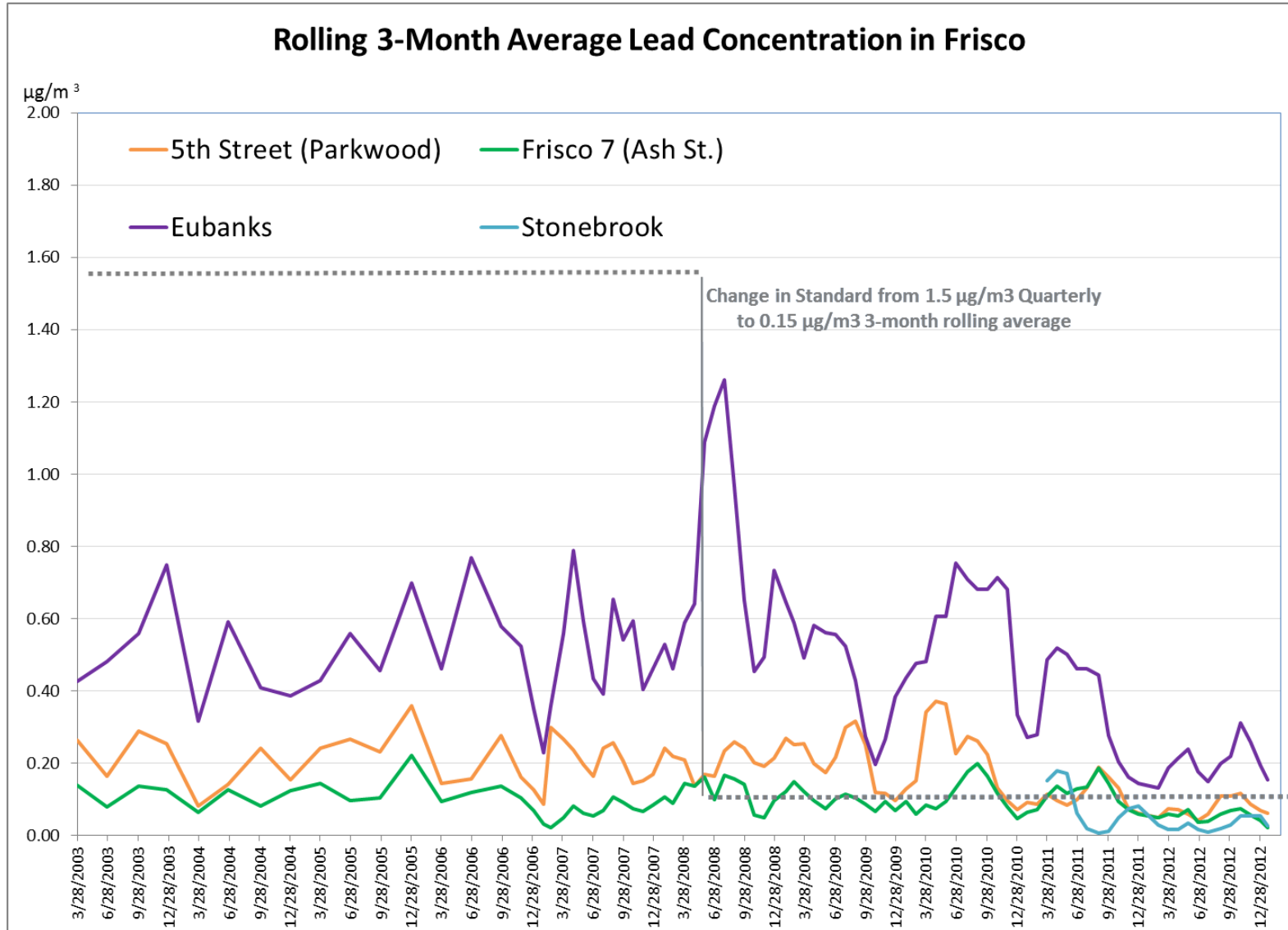


Lead in Frisco





Lead in Frisco





Community Concern

The screenshot shows the website <http://www.leadfreefrisco.com/>. The main heading is "Get the LEAD Out of Frisco!" with the subtitle "A Community Partnership for a Lead-Free Frisco". The navigation menu includes: HOME, ABOUT US, EPA REPORT ON EXIDE, TCEQ, OSHA, HEALTH RISKS - NO SAFE LEVEL FOR LEAD, LEAD/TOXIC CHEMICALS: FIND YOUR FRISCO SCHOOLS, IMPACT ON PROPERTY VALUES, HOW DALLAS GOT RID OF ITS LEAD SMELTERS, WHICH IS BETTER FOR FRISCO?, EXIDE'S NEGATIVE IMPACT ON OTHER COMMUNITIES, LEAD EXPERTS / RESEARCH, CITY OF FRISCO UPDATES, MEDIA COVERAGE, and SITEMAP. A search bar is located at the bottom right of the navigation area.

Brain or Nerve Damage >>> <<< Hearing Problems

<<< Digestive Issues >>> <<< Stunted Growth >>>

BREAKING NEWS: CDC Advisory Committee Report: Low Level Lead

Upcoming Events
There are no upcoming events at this time.

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The screenshot shows the Facebook page for Lead-Free Frisco. The page header includes the Facebook logo and the text "Lead-Free Frisco | Facebook". The main content area features a large image of a residential area with a "LEAD FREE Frisco!" logo overlaid. Below the image, the page name "Lead-Free Frisco" is displayed with "123 likes · 1 talking about this". The page is categorized as a "Community Organization" with the website www.leadfreefrisco.com. A description states: "This page supports the Frisco City Council's stated position to assure that the Exide lead smelter in Frisco is the most environmentally advanced".

Lead-Free Frisco is on Facebook.
To connect with Lead-Free Frisco, sign up for Facebook today.
[Sign Up](#) [Log In](#)

123 likes · 1 talking about this

Community Organization
Website: www.leadfreefrisco.com This page supports the Frisco City Council's stated position to assure that the Exide lead smelter in Frisco is the most environmentally advanced

Highlights

Recent Posts by Others on Lead-Free Frisco

- Henry Bradbury
Channel 11 newscast of Exide's public meeting <http://df...>
11 hours ago
- Henry Bradbury
<http://www.wfee.com/news/Some-Frisco-residents-unha...>
11 hours ago
- Henry Bradbury



TDSHS Blood Lead Screening

- 608 blood samples
 - 1-5 yrs n=69
 - 6-11 yrs n=98
 - 12-19 yrs n=54
 - 20+ yrs n=387
- 575 (95%) non-detect (<2 ug/dL)
- 594 (98%) consistent with NHANES
- 2 adults > 10 ug/dL, but less than 15 ug/dL
- Frisco children had levels less than Texas children in general

Final Report

Frisco Blood Lead Testing
FRISCO, COLLIN COUNTY, TEXAS

August 26, 2011

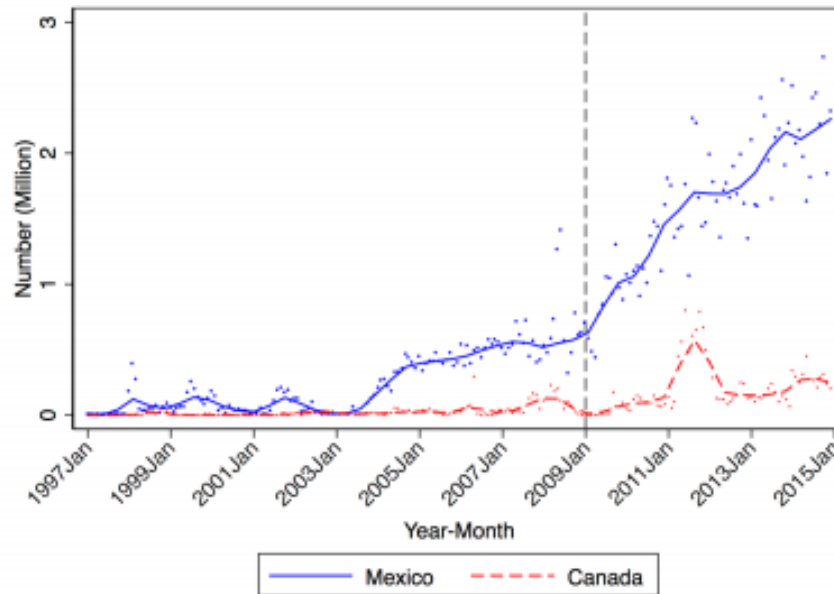




Path Forward

- SIP Order to come into compliance – June 2011
- Plant closed – November 2012
- Facility demolished

Figure 6: The US Monthly Exports of ULAB



Notes: Each dot in the figure above indicates the amount of ULAB exported from the US to Mexico (in green) and Canada (in orange). The corresponding lines indicate smoothed local polynomial trends with the bandwidth of three months. The trend for Mexico does not consider May and June, 2008, as these two deviate from the trend due to the announcement of the NAAQS revision.

Data source: The US ITC with corrections provided by the US Census Bureau Foreign Trade Division

Good Policy Decision?

The New York Times Environment


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Charles Maund Volkswagen Family Owned Since 1957

The 2012 Touareg See Special Offer

Lead From Old U.S. Batteries Sent to Mexico Raises Risks



Elementary school students attend class near a recycler, Industrial Mondelo. Soil samples at the school showed high levels of lead.

By ELISABETH ROSENTHAL
Published: December 5, 2011 | 242 Comments

NAUCALPAN DE JUÁREZ, Mexico — The spent batteries Americans turn in for recycling are increasingly being sent to Mexico, where their lead is often extracted by crude methods that are illegal in the United States, exposing plant workers and local residents to dangerous levels of a toxic metal.

The rising flow of batteries is a result of strict new Environmental Protection Agency standards on lead pollution, which make domestic recycling more

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1. GREEN

Hazardous Trade? An Examination of US-generated Spent Lead-acid Battery Exports and Secondary Lead Recycling in Canada, Mexico, and the United States. 2013. Secretariat of the Commission for Environmental Cooperation. <http://www3.cec.org/islandora/en/item/11220-hazardous-trade-examination-us-generated-spent-lead-acid-battery-exports-and-en.pdf>



Take Home

- It is important that we as risk assessors accurately assess risk
- Decisions made by risk managers can impact resource allocation, have unintended consequences, etc.

Questions?