

# Pretty Poison at Play

Hidden hazards of plastic and tires for sports field and playground surfacing



Sierra Club Maryland - Jamboree 2017  
(Sheldon Fishman, Jerry Kickenson)



Keep landfills out of playfields and playfields out of landfills!

# What's Wrong with Natural Turf Fields?



# Benefits of Natural Turf Fields

- ▶ Environmental
- ▶ Human Health
- ▶ Cost Effective



# Groundwater Preservation and Recharge

- Dense aboveground turf biomass traps water and reduces excess runoff which allows more water to infiltrate the soil.
- Extensive fibrous turfgrass root system filters water percolating through the soil to enhance groundwater recharge.
- Turfgrass ecosystems support earthworms, which contribute to better water infiltration and improved soil structure.

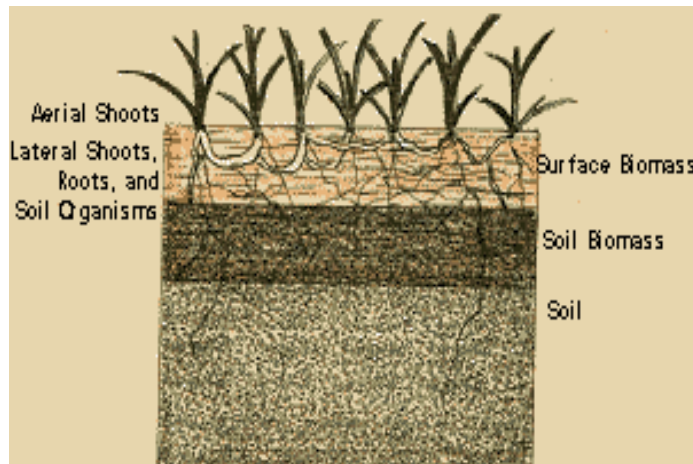


Photo from A.J. Turgeon,  
Ph.D. Penn State University

# Soil Erosion Control and Dust Stabilization

- The turfgrass rootzone and canopy are one of the most cost effective ways to control water and wind erosion of soil.
- High shoot density and root mass provides surface stabilization to help reduce water and wind erosion.
- Acts as a vegetative filter to reduce quantity of sediment entering surface streams and rivers.
- Acts as a trap for dust and other particulate matter to improve air quality.



# Atmospheric Pollution Control

- Turfgrass contributes to reductions in noise levels by absorbing, deflecting, reflecting, and refracting various sounds.
- Reduction in discomforting glare and light reflection.
- Reduces atmospheric carbon dioxide and releases oxygen. During active growth, 25 square feet of healthy turfgrass will provide enough oxygen for an adult person for one day.



# Restoration of Disturbed Soils

- Turfgrass improves soils through the addition of organic matter. As plant tissue dies, it is incorporated into the rootzone as organic matter. This organic matter improves soil structure and provides nutrients to turfgrass systems.
- Planting turfgrass accelerates the restoration of environmentally damaged areas (i.e. burned-over land, garbage dumps, eroded rural landscapes, mining operations, and steep timber harvest areas).



Cesar Chavez Park, Berkeley, CA - This Bay-side park is built on top of one of the Bay Area's largest landfills.



# Urban Heat Dissipation

- ▶ Natural turf surfaces dissipate high levels of radiant heat through the cooling process of transpiration.
- ▶ High levels of heat on a synthetic turf playing surface can be dangerous for athletes and increase the potential for heat stroke, muscle cramping and overall fatigue.



# Fertilizer or Pesticide Concerns

- Proper fertilizer and pesticide applications (or organic and Integrated Pest Management approaches) keep water safe. Contamination of groundwater occurs with excessive overwatering, heavy rainfall events, or when turf is dormant.
- Turfgrass roots are highly efficient at uptake of applied nutrients. Therefore, there is a low potential for nutrient elements to pass through the rootzone into groundwater or be transported by runoff into surface water.
- Turfgrass leaves, crowns, stems, roots, thatch, soil, and soil microbes support large populations of microscopic decomposers. These decomposers break down pesticides and other noxious organic chemicals into harmless substances.



# Human Health Benefits

- Aesthetics and recreational opportunities enhance physical and mental health of participants. Research shows that natural turfgrass relieves stress and contributes to the enjoyment of life.
- Well maintained natural turfgrass athletic fields provide low cost, safe playing surfaces for athletes.
- Fields with good quality turfgrass cover have higher traction, cushioning, and resiliency, and lower surface hardness, reducing the probability of injury in contact sports.



## Natural is also Cost Effective

Activity	Natural Sand Base Field	Synthetic Turf Field	Difference
Installation	\$600,000*	\$1,200,000**	\$600,000
Annual Maintenance	\$25,000***	\$22,500****	\$2,500
TCO (10 years)^	\$850,000	\$1,425,000	\$575,000

\* Top of the line, premium sand base field with drainage

\*\* Montgomery County planned cost per field at Einstein, Whitman HS

\*\*\* Reported cost, North Scott Community School District, Iowa + complete surface renovation every 5 years

\*\*\*\* Reported cost, Michigan State University

^ Cost of funds not included (favors higher initial cost of synthetic turf)

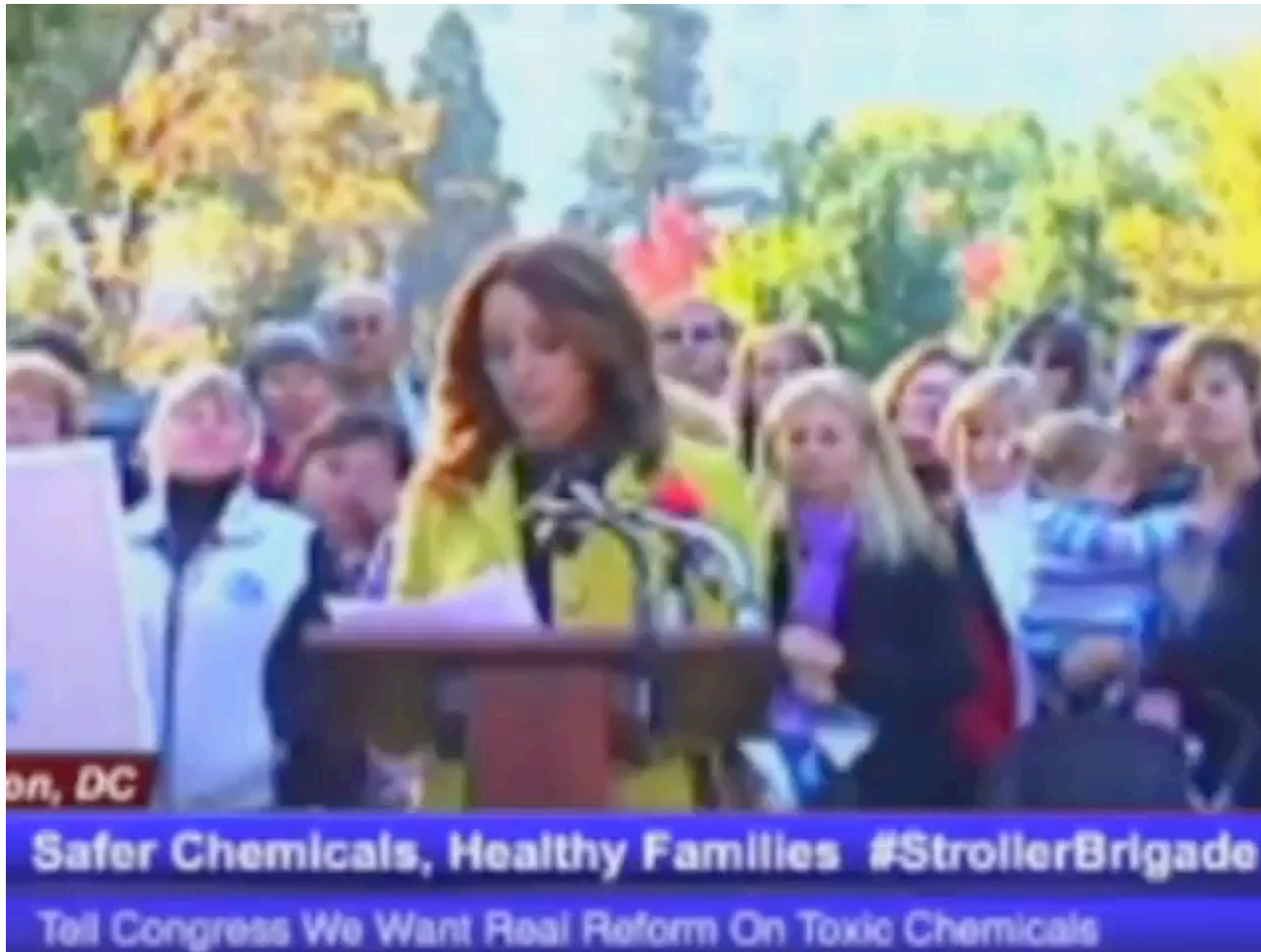
**Synthetic turf field must be thrown away and replaced every 8-10 years!  
Replacement of field at Blair HS, Silver Spring MD: \$750,000**

## So What's Wrong with Synthetic Turf?



- ▶ Toxic Infill
- ▶ Toxic Plastic (and hot!)





Actress, Activist and Mother - Jennifer Beals

# Plastic “Grass” Blades

- ▶ Dangerous Ingredients
  - ▶ Lead
  - ▶ Color Pigments
  - ▶ Zinc
  - ▶ Cadmium
- ▶ And HOT!



## Do synthetic fields really contain lead?

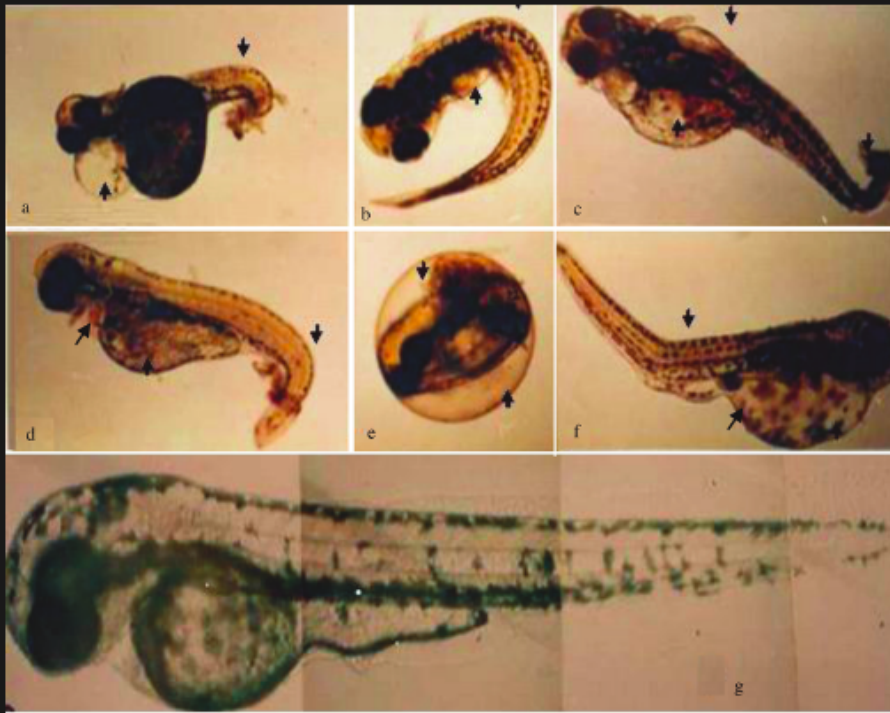


Field Turf representative testifying before Maryland House of Delegates



# Zinc Acutely Toxic to Aquatic Organisms

- 80% of leachate acutely toxic to aquatic life for Cu and Zn and 20% for Cd, Mn, Pb
- Runoff samples from rain events:
  - Zn major metal in runoff
  - 3 of 8 runoff sampling events were acutely toxic to aquatic life
- ▶ Source: Connecticut DEP Leachate and Storm Water Study (2010)



**Figure 3. The anomalies of different ZnCl<sub>2</sub> concentrations ranging from 1.0 to 5.0 mg/L: embryos with vertebra and edema defects (a, b, c, d, f), hemorrhage (c, d), and opaque particles in perivitelline space (e), and normal zebrafish embryos (g).**

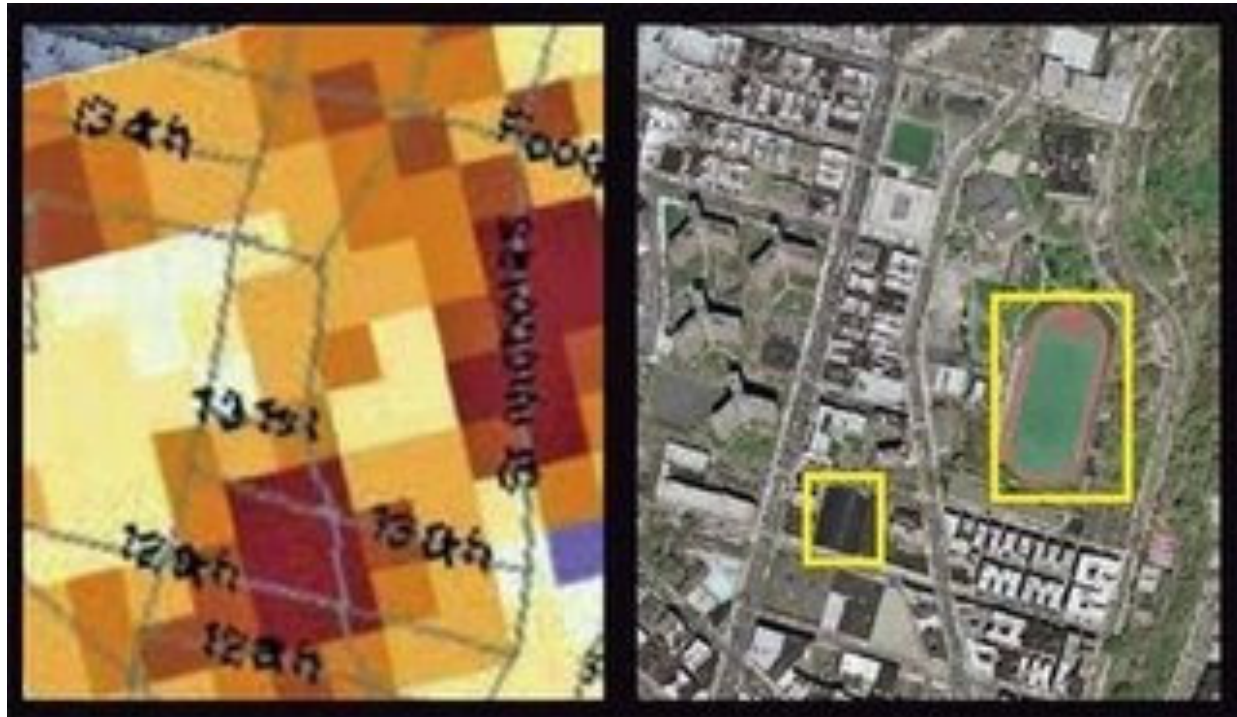
The effects of zinc chloride during early embryonic development in zebrafish, Turkish Journal of Biology · April 2013

## Surfaces will degrade and leach into environment

- PAHs leached from synthetic turf rubber pellets at levels 3x what is allowed in contaminated soil  
- Rutgers University (2006)
- Zinc, Selenium, Lead, Cadmium were found in distilled water leachate after 7 weeks  
– EHHI, Connecticut (2007)



# Plastic is Hot!



## Plastic is Really Hot!



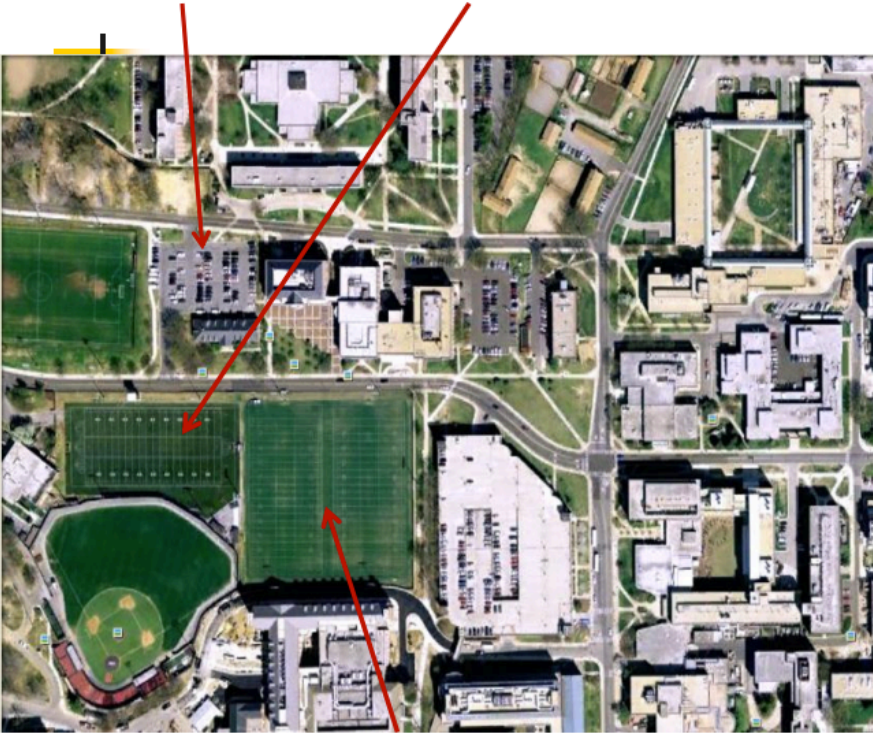
Blair High School, Silver Spring MD  
Air temperature: 92°F

- Highest temperature published in research paper: 200° F (93° C) on 98° F (37° C) day in Provo, UT (Williams and Pulley, 2002)
- Central PA: 175° F (79° C) (McNitt et al., 2008; McNitt and Petrunak, 2010) (<http://ssrc.psu.edu/infill/infill.cfm>)

Penn State's Center for Sports Surface Research

# Hotter than Asphalt!

Parking Lot : 140 F Synthetic Field : 157 F



Natural fields (Bermudagrass): 94 F



July 6, 2010  
At 4:00 pm  
Temperature  
Was 100 F

Transpirational  
cooling lowered  
temperatures by  
as much as 63 F

Credit: Dr. Kevin Mathias, University of Maryland

## Infill - “Recycled” Tire Crumb

- ▶ Intended to soften field surface
- ▶ Made from ground up used tires
- ▶ Tires are made of:
  - ▶ Carcinogens
  - ▶ Heavy Metals
  - ▶ Carbon Black
  - ▶ Nanoparticles
  - ▶ Proprietary, “secret” ingredients
- ▶ And when the field wears out and needs to be replaced in 8 years:
  - ▶ It all goes to ... the landfill!



# Crumb Rubber Composition





# Do Synthetic Fields Cause Cancer?



And carbon black, and heavy metals



And nanoparticles



And who knows what else?!



Infill is tracked everywhere!



## It Gets Worse - FieldTurf Fraud

- ▶ **1) They knew.** For most of the time they sold the fields, at \$300,000 to \$500,000 each, executives were aware the turf was deteriorating faster than expected and might not last a decade or more as promised.
- ▶ **2) They misled.** Despite candid, internal email discussions about their overblown sales pitches, executives never changed their marketing campaign for Duraspine fields.
- ▶ **3) They tried to cover up.** A lawyer warned that some of those internal emails could be damaging in a lawsuit, and an executive sought to delete them. An IT consultant refused, calling it a “possible crime.”
- ▶ **4) They kept quiet.** From the time fields began to fail in 2006 until today, executives have never told most customers about Duraspine’s problems or how to identify signs it was prematurely falling apart.
- ▶ **5) They stonewalled.** Some customers who did report problems said FieldTurf officials slow-footed warranty claims and told them the deterioration was normal, or that their fields needed more maintenance.

# Resource Conservation and Recovery Act (RCRA) of 1976

- ▶ our nation's primary law governing disposal of solid and hazardous waste, gives the EPA the authority to control hazardous waste from "cradle-to-grave," including used rubber tires. But it also states that **the recycling of a hazardous waste product into a useable consumer product automatically exempts it from RCRA requirements, even if the end product it creates is more toxic than other similar products on the market.** This loophole means that new products that have been manufactured from recycled hazardous waste, such as synthetic turf crumb rubber infill or recycled rubber playground surfaces, are not monitored.





## What Can You Do?

- ▶ Encourage Sierra Club to continue to resist synthetic turf through legislation and advocacy
- ▶ Lobby to stop Maryland using Open Space funds to install synthetic turf fields
  - ▶ Bills introduced to prevent this have not passed
- ▶ Educate your local county council and school district - natural turf fields are safer, healthier, better for the environment and more cost effective
- ▶ Go to [www.safehealthyplayingfields.org](http://www.safehealthyplayingfields.org) to learn more, connect with other activists in Maryland and around the country

[www.safehealthyplayingfields.org](http://www.safehealthyplayingfields.org)

SAFE HEALTHY  
PLAYING FIELDS  
COALITION

[GRASS FIELDS](#)

[SYNTHETIC TURF](#)

[GRASS VS. SYNTHETIC](#)

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**WELCOME!**

**I WANT TO LEARN ABOUT SYNTHETIC TURF, BUT WHERE DO I START?**