

# Exposures to Chemicals in Synthetic Turf

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**Ideas and opinions expressed in  
this talk are mine and they do not  
represent the official position of  
OEHHA and CalEPA**

# Synthetic Turf on Athletic Fields

## (1) Synthetic grass blades:

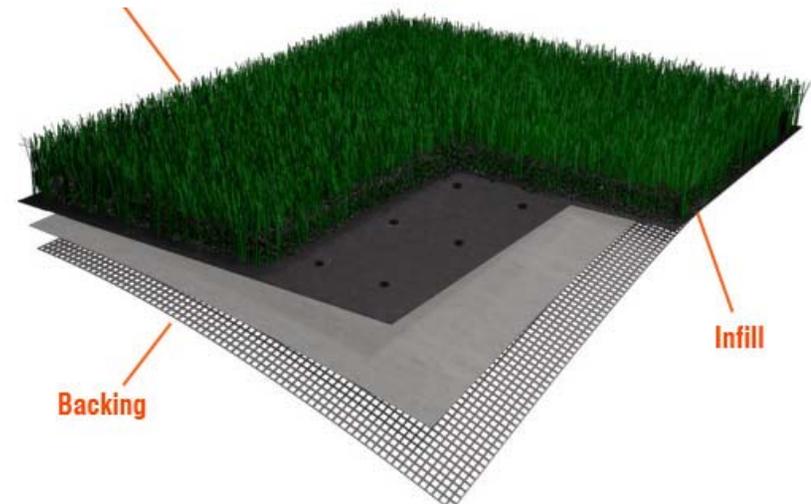
- soften the surface
- look like natural grass

## (2) Backing materials

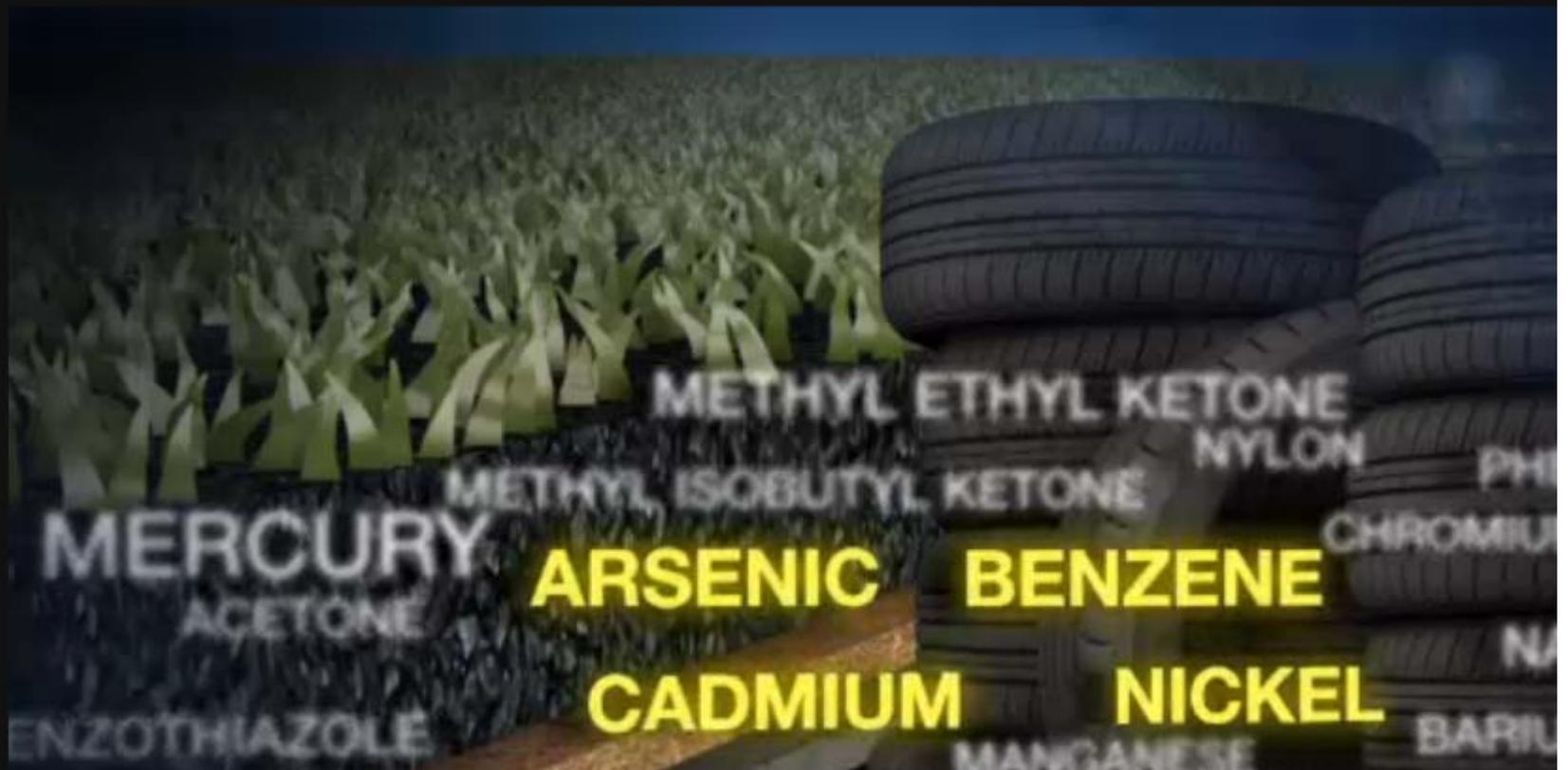
## (3) Crumb rubber infill:

- is made from chopped-up waste tires
- supports synthetic grass blades
- cushions falls

Synthetic grass blades



# How Safe is the Artificial Turf on Your Child's Sports Field?



# A New Study Under a Contract with CalRecycle

- **Conducted two studies in 2007 and 2010**

<http://oehha.ca.gov/risk-assessment/background/human-health-studies-synthetic-turf>

- **Started the new study in July 2015**
- **Concerns of parents, the public, and elected officials**
- **Data gaps in published studies:**
  - Mostly focused on the inhalation route
  - Number of fields studied are limited
  - Little information on the effect of weathering on synthetic turf fields

# Overview of the Study

- **Task #1: Expert, public, and interagency consultation and input**
- **Task #2: Hazard identification**
- **Task #3: Exposure scenario development**
- **Task #4: Characterization of chemicals that can be released from synthetic turf**
  - » Laboratory work
  - » Field work
- **Task #5: Biomonitoring and/or personal monitoring protocol development**
- **Task #6: Health hazard assessment**

# Task #1

## Expert & Interagency Consultation

- **Consultation – academia, US EPA, CDC, other California State Agencies**
- **Requested the National Toxicology Program to conduct short-term toxicity tests on crumb rubber**
- **External advisory panel – the first public meeting held in Feb. 2016 (webcasted and video is available online)**

<http://oehha.ca.gov/risk-assessment/general-info/synthetic-turf-scientific-advisory-panel-meeting-february-8-2016>



# Federal Research on Recycled Tire Crumbs Used on Playing Fields

## Background

Concerns have been raised by the public about the safety of recycled tire crumb used in playing fields and playgrounds in the United States. Limited studies have not shown an elevated health risk from playing on fields with tire crumb, but the existing studies do not comprehensively evaluate the concerns about health risks from exposure to tire crumb.

## Federal Research

On February 12, 2016 the U.S. Environmental Protection Agency (EPA), the Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (ATSDR), and the U.S. Consumer Product Safety Commission (CPSC) launched a multi-agency action plan to study key environmental human health questions

### Related Links

- [Federal Research Action Plan on Recycled Tire Crumbs Used on Playing Fields and Playgrounds](#)
- [Public Comment Now Closed: Federal Register Notice for Select Tire Crumb Studies](#)
- [Tire Crumb Questions and Answers](#)
- [Tire Crumb and Synthetic Turf Field Literature and Report List \(November 2015\)](#)

# Task #1

## Public Outreach

- **World-café style workshops in Berkeley, LA, and San Diego in the fall of 2015**
- **Webinar in November 2015**
- **Web page – announcements, progress of the study, contact information**  
<http://oehha.ca.gov/risk-assessment/synthetic-turf-studies>
- **Listserv – notifications and updates**

# World-Café Style Workshop



July 13, 2016

Home » Risk Assessment » Synthetic Turf Studies



## Synthetic Turf Studies

OEHHA has conducted studies on potential negative human health effects associated with the use of recycled waste tires in playground and synthetic turf products. In June 2015, OEHHA committed under a contract with CalRecycle to conduct a new study on synthetic turf and potential human health impacts. The new study is comprised of five separate tasks:

- Expert and stakeholder input and consultation
- Hazard identification
- Exposure scenario development
- Sampling and analysis of new and in-field synthetic turf
- Biomonitoring study protocol development

For information about the OEHHA Synthetic Study, please contact Sam Delson at (916) 324-0955 or [Sam.Delson@oehha.ca.gov](mailto:Sam.Delson@oehha.ca.gov).

To submit comments or questions about the project, please send emails to [SyntheticTurf@oehha.ca.gov](mailto:SyntheticTurf@oehha.ca.gov).

Sign up for the [listserv](#) to get notifications about updates and information regarding meetings and scientific research on Synthetic Turf



### OEHHA Links

- [About OEHHA](#)
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# Task #2

## Hazard Identification

- **Conducted a literature review (>30 studies)**
- **Compiled a list of chemicals that can be released from crumb rubber (>250 chemicals)**
  - Metals
  - Organic compounds (e.g., VOCs, SVOCs, PAHs, anti-oxidants, plasticizers)
- **Collected other information**
  - analytical methods reported
  - toxicity criteria of the chemicals (if available)
- **Bioaccessibility of the chemicals**

# Environmental Health Hazard

Exposure + Toxicity = Hazard

# Task #3 – Exposure Scenarios



# Task #4

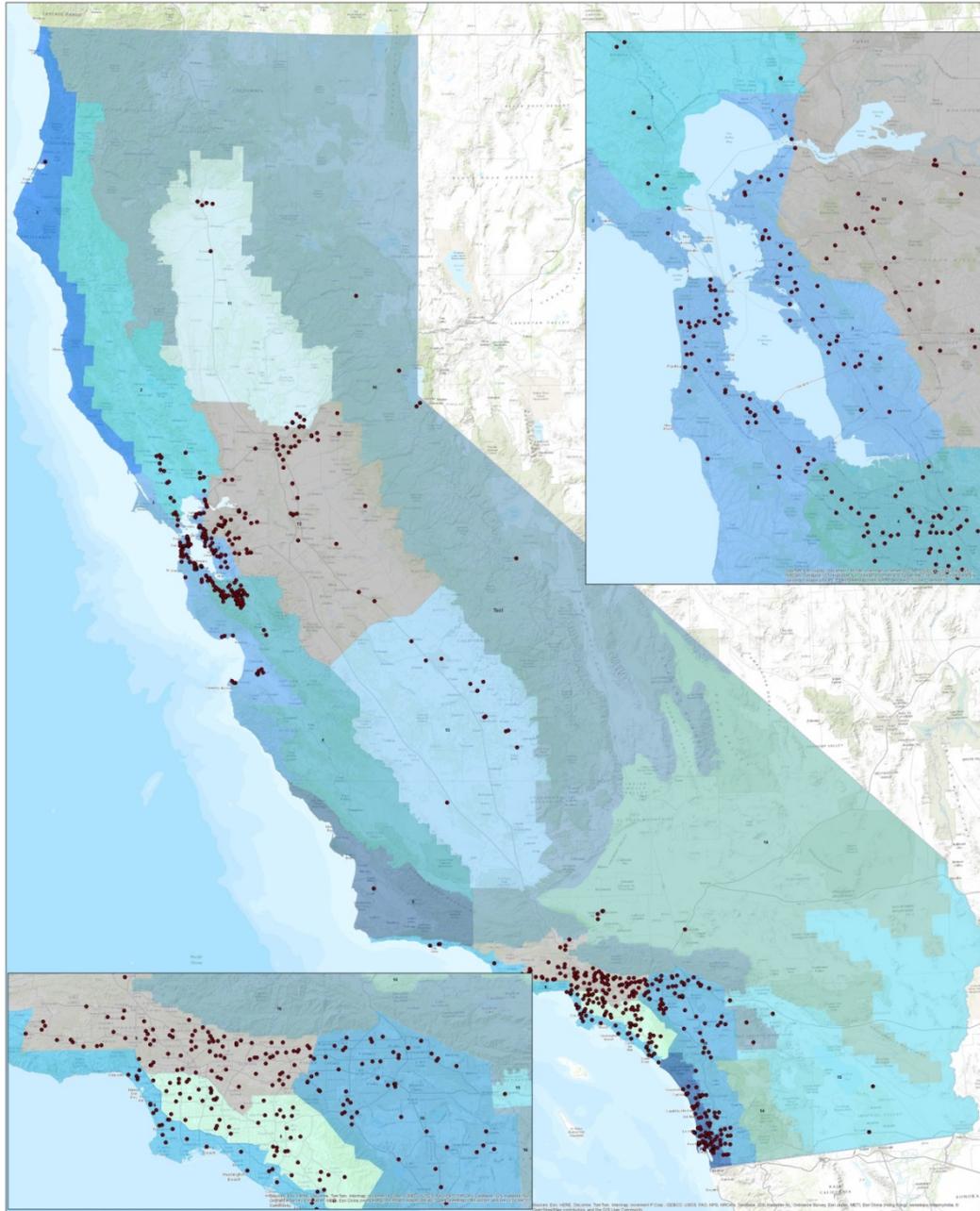
## Laboratory Work (I)

- **Particle size distribution of new and used crumb rubber**
  - Fine particles are more relevant for dermal and inhalation exposures
  - Effects of weathering?
- **Non-targeted chemicals**
  - Emission of chemical vapor from new synthetic turf assembly exposed to elevated temperature, UV, or ozone
  
  - Sequential solvent extractions of new and used crumb rubber (solvents with decreasing polarity)

# Task #4

## Laboratory Work (II)

- **Compile a list of chemicals of concern**
- **Develop sampling, clean-up, and analytical procedures for chemical vapor, particulate, wipe, and crumb rubber samples**
  - Develop extraction procedures of crumb rubber that mimic physiological conditions
- **Conduct a pilot study to fine tune the procedures**
- **The finalized procedures will be used in the field work**



# 902 Known Synthetic Turf Field Locations in California

# Field Selection

- **Different characteristics**
  - Age
  - Indoor or outdoor
  - Maintenance (e.g., some are better maintained and have their crumb rubber replenished more often)
  - Usage (type of sport, frequency and intensity of use)
  - Climate (max. temperature, annual rainfall)
  - Geographic location
  - Consent by owner

# Summary

- **A comprehensive & detailed study, apply advanced science**
- **Focus on health effects associated with the chemicals released from crumb rubber**
- **Collaboration with other state and Federal agencies**
- **Transparent process**
- **Work in progress**  
<http://oehha.ca.gov/risk-assessment/synthetic-turf-studies>

**END**

**The following slides are for informational purposes and may not be used in the talk**

# Background

- **Air sample**
  - Upwind location?
  - How far away from the field?
- **Crumb rubber sample**
  - Grass or dirt next to the synthetic turf?
  - Deposition of air pollutants
- **Wipe sample**
  - New ball or gloves?

# The OEHHA 2007 study – playground material

- Evaluation of toxicity due to ingestion of tire shreds based on the existing literature
- Evaluation of toxicity due to ingestion of tire shreds based on gastric digestion simulation
- Testing for skin sensitization by playground surfaces made of recycled tires

# The OEHHA 2010 study – synthetic turf

- >Background levels of PM2.5 and VOCs were detected in a small number of samples. All exposures were below acute and chronic screening levels.
- No correlation between the concentrations or types of VOCs detected above artificial turf and the surface temperature.
- Fewer bacteria were detected on artificial turf compared to natural turf.
- The rate of skin abrasions due to contact with the turf was two- to three-fold higher for college soccer players competing on artificial turf compared to natural turf.