Burleigh Manor Middle School

Safer Sealants Team


Meet Our Team!

What are COAL TAR Sealants?

Coal tar sealants are substances put on driveways, black tops, and parking lots that are used to extend the life of asphalt.

Why are they used?

- They extend the life of asphalt
- They provide a clean, finished look

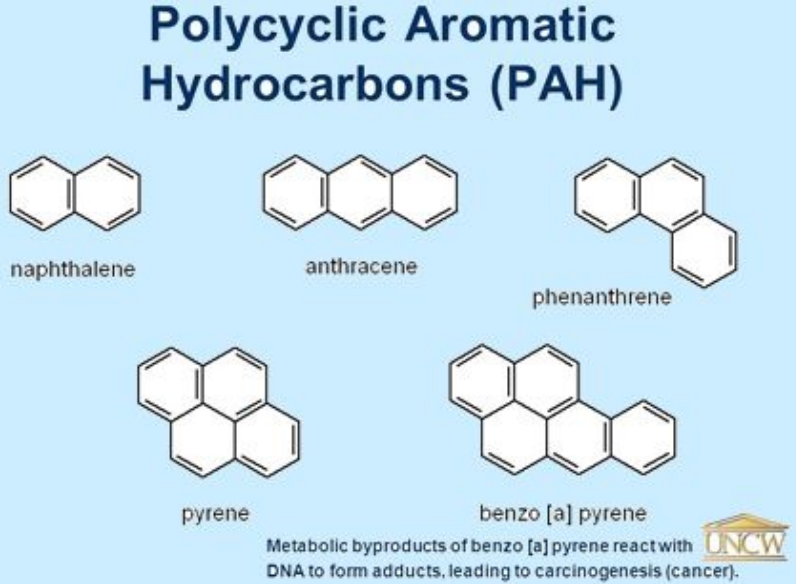
However, coal tar sealants contain dangerous chemicals called PAHs that are harmful to people and the environment.

What are PAHs?

Polycyclic aromatic hydrocarbons (PAHs) are the harmful chemicals found in coal tar sealants.

They cause rashes, skin irritations, cancers, mutations, birth defects, and death.

They are also toxic to aquatic animals, including fish and aquatic invertebrates (McIntyre 2017).

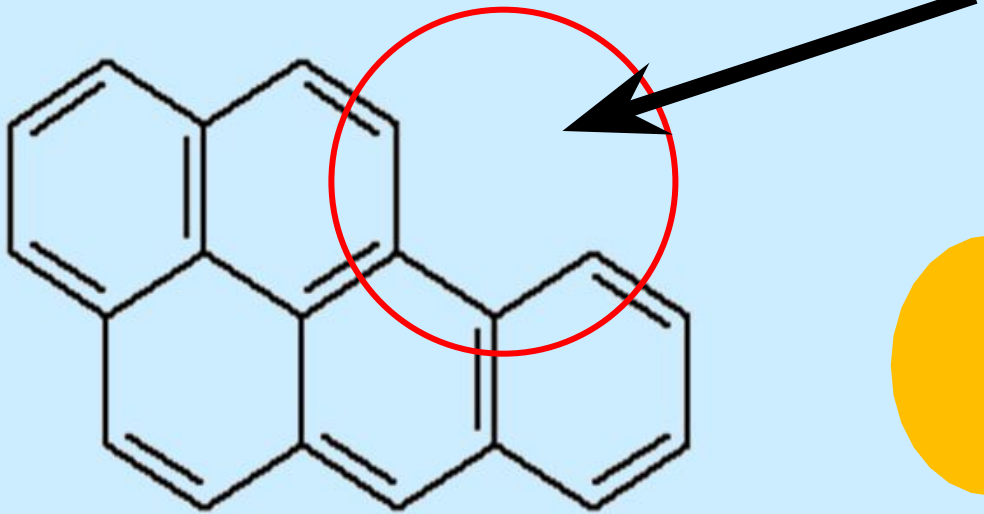


These are five PAH compounds, all are known carcinogens, and all are found in coal tar sealants.

How do PAHs Cause Cancer?

When PAHs are taken into the body, they go directly to the liver.

Carbon atoms of benzo[a]pyrene



This creates an ETHER.

Ethers bind naturally with DNA and damage it, causing cancer. (Maryland Dept. of Health 2019)

UV and PAH Dangers

PAHs and UV light are a toxic combination. When UV rays come in contact with PAHs, it makes the PAHs even more harmful.

“However, recent toxicology studies particularly in the discipline of aquatic toxicology have presented evidence that PAHs may become toxic or substantially more toxic upon exposure to UV light (300-400 nm) (Arfsten *et al.*).”

How PAHs in Coal Tar Travel

There are multiple ways that PAHs from coal tar can enter our environment.

House Dust

House dust adjacent to coal tar sealed parking lots contain concentrations of PAHs 25 times higher than house dust collected in houses near unsealed or asphalt sealed parking lots (Williams and Wilbur 2017).

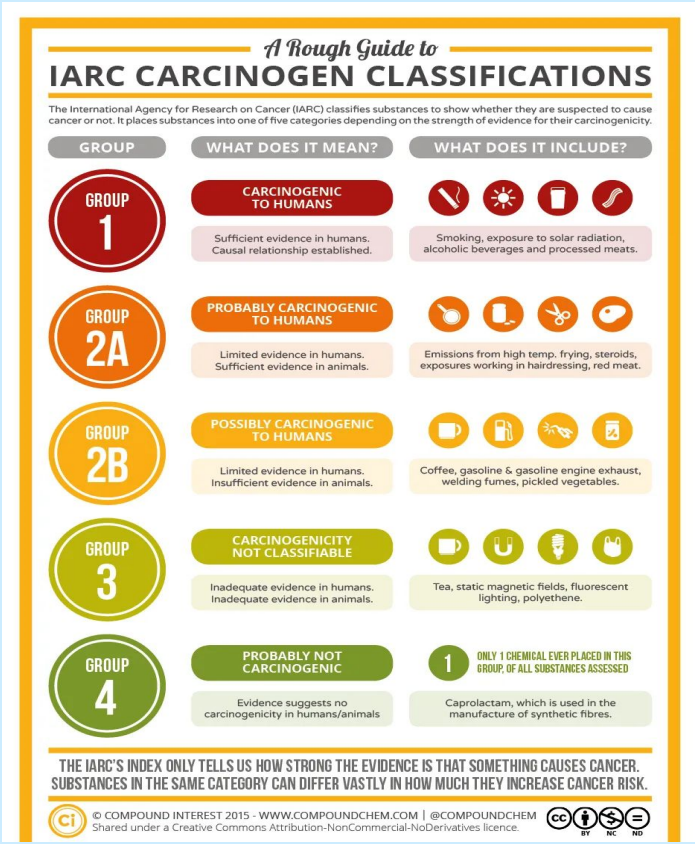
Children crawl and play on floors and put their fingers in their mouths a lot, so they have a higher chance of being affected by PAHs (Williams and Wilbur 2017).

Household dust with PAHs leads to an elevated cancer risk for children (Mahler *et al* 2016).

How Carcinogenic are PAHs?

Benzo[a]pyrene, benzene, coal tar, and coal tar pitch are all classified as known carcinogens by numerous health agencies.

- Group 1 carcinogen (carcinogenic to humans)
  International Agency for Research on Cancer
  World Health Organization
- Known to cause cancer
  National Toxicology Program
- Group A Carcinogen (carcinogenic to humans)
  Environmental Protection Agency
- Occupational Carcinogen
  Centers for Disease Control and Prevention



Types of Cancers Associated with Coal Tar Exposure

Agencies below have found that exposure to PAHs increase the risk of…

- skin
- lung
- kidney
- bladder
- stomach

…cancers in humans and animals (Williams and Wilbur *et al.* 2017).

NIH NATIONAL CANCER INSTITUTE

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

ATSDR AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Columbia University Center for Children's Environmental Health Study

A 2012 study was conducted on 164 randomly selected, healthy pregnant women:

- They concluded that PAH exposure is associated with methylation (*changing DNA segments, genes, and white blood cells*) in the umbilical cord of the participants
- The study also showed that PAHs can cross the placenta and fetal blood-brain barrier, triggering inflammation that is toxic to the developing brain
- They also concluded that coal tar exposure causes lower IQs
  (Perera, F., Weiland, K., Neidell, M. *et al.* 2014)

COLUMBIA UNIVERSITY

Taylorville, Illinois, Neuroblastoma Cases Linked to Coal Tar

On Feb. 22, 2002, the Illinois Supreme Court upheld the jury award in the case of ZACHARY DONALDSON *et al.*, Appellees, v. CENTRAL ILLINOIS PUBLIC SERVICE COMPANY *et al.*

- 50,000 gallons of coal tar was buried
- Construction disturbed it
- A jury awarded $3.2 million to four children
- The children were stricken with Neuroblastoma as a result of their exposure to coal tar

PAHs in Urban Sources

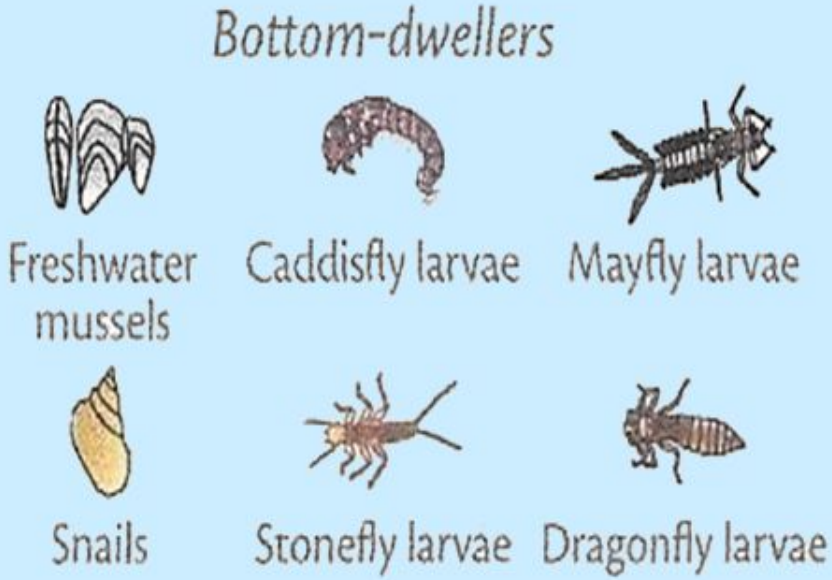
All concentrations in mg/kg (averages of up to 6 studies)

Fresh asphalt	1.5
Weathered asphalt	3
Fresh motor oil	4
Brake particles	16
Road dust	24
Tire particles	86
Diesel engine	102
Gasoline engine	370
Used motor oil	440

Pavement Sealcoat

- Asphalt Based ~50
- Coaltar based ~70,000

PAHs and the Environment



Coal tar contains 16 PAHs that are classified as U.S. Environmental Protection Agency Priority Pollutants, including naphthalene and pyrene (Mahler and Van Metre 2017).

When benthic organisms (bottom-dwellers) are exposed to PAHs, they experience problems such as loss of consciousness, inability to reproduce, and ***death***, which can disrupt entire food chains (McIntyre 2017).

PAHs and Environmental Health

Tumors in brown bullhead catfish from the Anacostia River, Washington, D.C., are believed to be related to elevated PAH concentrations (Pinkney and others, 2009). Photograph by A.E. Pinkney.

Varying levels of exposure to PAHs from sealants are toxic to human and aquatic health.

- "Acutely toxic" to fathead minnows and water fleas (Mahler *et al.* 2016)

- May be linked to tumors in brown bullhead catfish in the Anacostia and Potomac Rivers (Pinkney 2013)

Fish embryos that are exposed to low amounts of PAHs can develop eyes with shorter retinas and smaller lenses, misshaped hearts, and abnormal heartbeats.

PAHs in Soil

Wind, runoff, and especially snow plows, can move PAH-contaminated pavement dust into nearby soil.

- PAH concentrations in soil can range from 2.3 to 14 times higher in soils adjacent to sealcoated pavement than unsealed pavement (VanMetre *et al.* 2009).
- Elevated levels of PAHs can be found for up to three years after the sealcoat is applied (UNH Sea Grant).

Soil contaminated with PAHs excavated at a former manufactured- gas plant site (Photo by Michael Aitken)

PAHs in Stormwater

A 2013 Minnesota Pollution Control Agency sediment study found that coal-tar sealants contributed 67% of total PAHs in 15 metro-area stormwater ponds:

- High concentrations of PAHs have accumulated in some stormwater pond sediments around the state
- Research conducted by the MPCA, the Metropolitan Council, the U.S. Geological Survey, and the University of New Hampshire Stormwater Center shows that coal tar-based sealants are a significant source of PAHs to urban waterways

MDH Minnesota Department of Health

Minnesota Pollution Control Agency

Clean Up Costs

Cities must maintain stormwater ponds by dredging them, and if the PAH concentrations in the dredged material are high enough, disposal can be very costly, in the hundreds of millions of dollars statewide.

- Studies by the MPCA show that the decrease in use of coal tar products will reduce the cleanup costs
- In 1990, it cost $12,000,000 to cleanup the contaminated stormwater in Minnesota

Minnesota Pollution Control Agency

Safety Data Sheets

We looked through many safety data sheets that sealcoating companies provide on their websites. Many of these safety data sheets say their sealants contain hazardous PAHs like benzo[a]pyrene and naphthalene (both are known carcinogens).

Safety Data Sheets

GemSeal is a company that manufactures coal tar sealants and their safety data sheet states that their coal tar is classified as a Category 1A carcinogen.
The safety data sheet also states that the refined tar may cause:

- allergic reactions
- genetic defects
- fertility damage
- organ damage
- reproductive effects

Alternatives to Coal Tar Sealants

Home Depot Latex-ite Sealant Display

Latex-based sealers and asphalt-based sealers are two alternatives easy to get and priced about the same as coal tar based sealers.

Asphalt and latex-based sealers cost about $16.84-$35.99 per 4.75 gallon bucket at Home Depot, Lowe's, and ACE stores, which is comparable to coal tar sealants.

A Comparison of Driveways...

Can you identify the different sealants?

Asphalt-Based Sealers... a GREAT Way to Go!

Al Innes, a Minnesota state official who runs an EPA-funded program to reduce the use of coal tar sealants, held webinars throughout the Great Lakes region last summer (2019) to educate businesses about how to shift to asphalt products.

"We're making progress," he said, noting schools are abandoning coal tar on playgrounds and parking lots and at least 73 contractors (24 in Wisconsin and 49 in Minnesota) have pledged to switch to asphalt sealants. He said that there are few applications for which asphalt sealants won't work well.

Lonny Harris, President of West Suburban Asphalt Maintenance

Harris applied coal tar sealants to parking lots for years and says he got second-degree burns on his neck from carrying an applicator hose around his shoulders. He says that he got lightheaded and had panic attacks, which would go away during his work's off-season.

"It's very difficult to attribute it to coal tar, but it was the only new chemical introduced into my system then," he says, noting he now uses only asphalt-based products and feels better.

Asphalt is Better! JetBlack International

Nick Kelso, owner of Minnesota-based Jet-Black International, says his seal-coating company phased out their usage of coal tar sealants in 2012. He now uses asphalt based sealers, which he says aren't as smelly after application and don't burn a worker's skin upon contact. "We're not seeing much of a difference in performance," he says.

Jet-Black® Asphalt Sealcoating & Repair

Minnesota Pollution Control Agency

Coal Tar Industry Claims

Claim: Coal tar is deemed safe for workers, has minimal to no health effects, and is classified as safe and effective by the Food and Drug Administration.

In reality: Throughout our research, we found that coal tar is dangerous to humans and can cause skin, lung, kidney, bladder, and stomach cancers.

Coal Tar Industry Claims

Claim: Coal tar is utilized in several household products like shampoo and soap, which are applied directly on the skin.

In reality: Health Canada says that coal tar dye, found in many of these products, is no longer made from coal tar and is rather made synthetically, as coal tar in the dye was proven to be dangerous for the body.

Coal Tar Industry Claims

Claim: The only alternative to coal tar is epoxy sealants, and they are four times more expensive than coal tar.

In reality: There are several alternatives to coal tar, such as asphalt and latex-based sealants, that are priced about the same as coal tar sealants.

Coal Tar Industry Claims

Claim: Coal tar sealants have zero correlation to cancers in humans and aquatic species.

In reality: The EPA states that coal tar emulsion sealants can contain up to 35% refined coal tar, which is made up of 50% PAHs by mass. According to key health agencies, PAHs are carcinogens known to be toxic to human and aquatic life.

Coal Tar Industry Claims

Claim: Banning coal tar would be devastating to local businesses.

In reality: Many seal coat application companies have already stopped using coal tar sealants. Additionally, the major coal tar sealant manufacturers all make asphalt and latex sealers, so they have the know-how and the equipment to produce these safer products.

Coal Tar Industry Claims

Claim: Coal tar can help the Chesapeake Bay. PAHs are the building blocks of life, as they are hydrocarbons and are made of water and carbons.

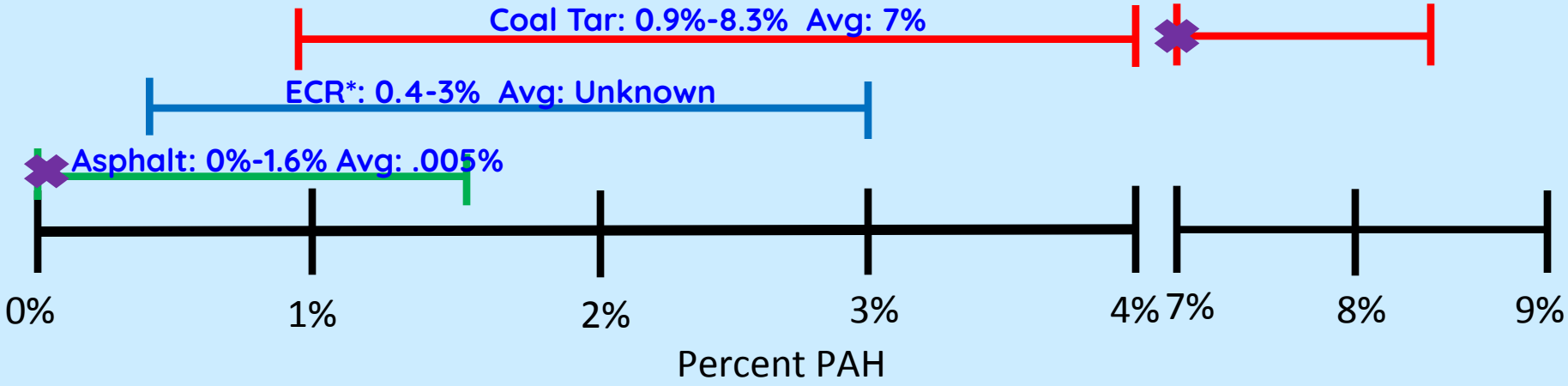
In reality: Hydrocarbons are not made of water and carbons, but hydrogen and carbon. PAHs actually harm the environment, especially bottom-dwellers, which are the building blocks of the freshwater food chain.

Coal Tar Industry Claims

Claim: Coal tar coats the roadway for stormwater and sewage treatment, which would help slow down the deterioration of infrastructures.

In reality: Even though coal tar may cover the infrastructure of the roads, when abrasion wears off the sealant, PAHs are released into the environment.

PAH Concentrations by Sealant Type



*concentration range is an estimate from Minnesota Pollution Control Agency

The difference between the coal tar and asphalt averages is 6.995%

✖ Average PAH concentration

Why We Need A 0.1% PAH Limit

A 0.1% PAH limit will prevent companies from creating new sealants such as ECR, which contain dangerous levels of PAHs.

Legislative Precedent:

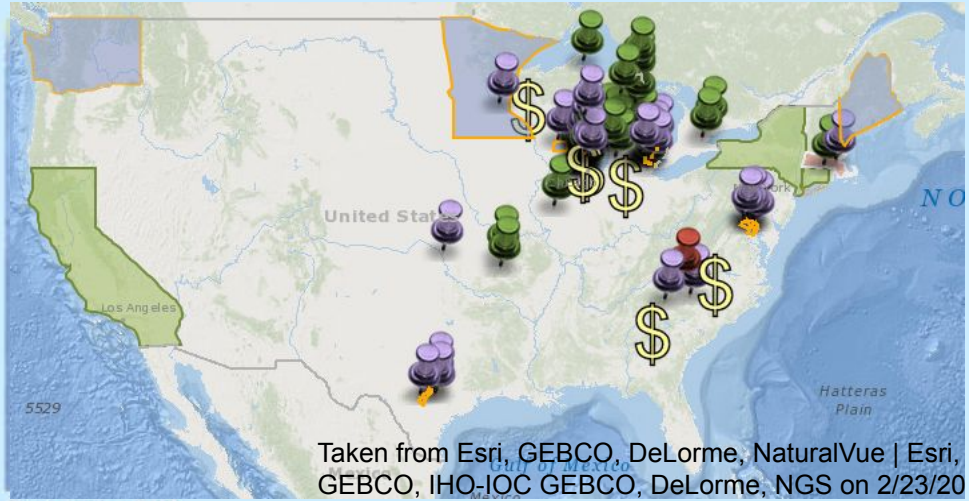
- The District of Columbia, Wisconsin (1/2024), and Maine (10/2020)
- The European Union classifies road waste with 0.1% PAHs or higher as hazardous waste (Vansteenkiste & Verhasselt 2004)

List of US State and County Bans

Albertville, MN
Almont, MI
Annapolis, MD
Ann Arbor, MI
Ann Arbor Township, MI
Anne Arundel County, MD
Austin, TX
Bee Cave, TX
Buffalo, MN
Cannon Falls, MN
Centerville, MN
Circle Pines, MN
Dane County, WI
Dexter, MI
Eden Prairie, MN
Edwards Aquifer Authority, TX
Edina, MN
Elk River, MN
Evanston, IL

coaltarfreeusa.com

Falcon Heights, MN
Glendale, WI
Golden Valley, MN
Greenville, SC
Hamburg Township, MI
Hutchinson, MNV
Howard County, MD!!
State of Indiana - pending
Inver Grove Heights, MN
Home Depot Stores Throughout U.S.
Little Canada, MN
Lowes Stores
Maplewood, MN
State of Maryland??
Medina, MN
Milwaukee, WI
Minneapolis, MN
State of Minnesota
Montgomery County, MD
New Hope, MN
Newport, MN
North Barrington, IL



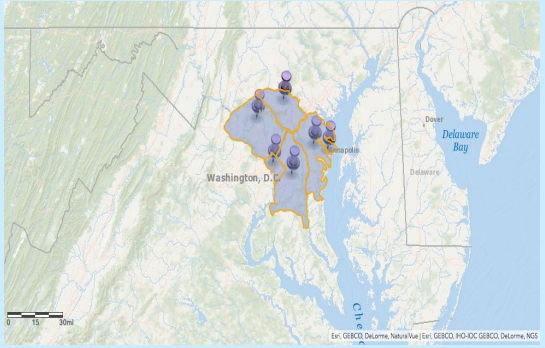
Taken from Esri, GEBCO, DeLorme, NaturalVue | Esri, GEBCO, IHO-IOC GEBCO, DeLorme, NGS on 2/23/20

Oakdale, MN
Pittsfield Township, MI
Prior Lake, MN
Prince George's County, MD
Rosemount, MN
Roseville, MN
San Antonio, TX
San Marcos, TX
Scio Township, MI
Shoreview, MN
Shorewood, MN
South Barrington, IL
Spring Lake Township, MI
State of Maine

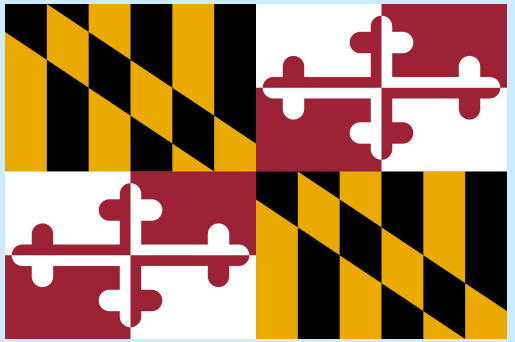
Suffolk County, NY
Vadnais Heights, MN
Van Buren Township, MI
Waconia, MN
Washington, DC
State of Washington
West Bloomfield Township, MI
White Bear Lake, MN
West St. Paul, MN
Westwood, MA
Wilmette, IL
Winnetka, IL
Winfield, KS
Woodland, MN
State of Wisconsin

Protect Maryland!

Currently, there are coal tar sealant bans in 4 Maryland counties: Montgomery County (2012), Prince George's County (2015), Anne Arundel County (2015), and Howard County (2018).



Currently, about 45% of all Maryland residents are now under a coal tar ban, so why not ban it in the whole state?



Let's join the 22.6 million Americans who are currently protected under a coal tar ban!

Help Protect Maryland and Support the Bill!