The Dangerous Pileup of Artificial Turf

Recycling scrap tires into synthetic turf was supposed to be an environmental win.

By Marjie Lundstrom, Eli Wolfe, and FairWarning

Nearly three decades ago, the federal government issued a somber warning.

America’s scrap tires had to go somewhere without gobbling up landfill space. Billions of cast-off tires already had accumulated in ugly stockpiles, and millions more were “scattered in ravines, deserts, woods, and empty lots,” sparking toxic fires that burned for months, the Environmental Protection Agency declared in a 1991 report.
“As costs or difficulties of legal disposal increase, illegal dumping may increase,” the agency said.

But there was hope of a solution, and the EPA was all in. In the ensuing years, agency officials—along with their counterparts in many states—promoted the recycling of scrap tires. Among the most popular options: Grinding up the rubber and using it to make artificial turf, creating a dynamic new industry geared toward delivering perfectly green, cushiony, year-round fields for schools, parks, and sports teams.

Fast-forward to today, when America—which has experienced a coast-to-coast explosion in the installation of thousands of synthetic-turf fields, many made with tire crumb—is facing the same dilemma as in 1991: What to do now with old, worn-out athletic fields, many of them reaching the end of their life span?

Where do the millions of square feet of synthetic turf go to die?

The answer: The same place scrap tires went before—to landfills, rural and urban stockpiles, and “ravines, deserts, woods, and empty lots,” according to a FairWarning investigation.

Despite frequent claims by turf manufacturers that synthetic-turf fields are recyclable and environmentally friendly, FairWarning found that worn-out playing fields and playgrounds have limited second lives. Essentially, synthetic turf is a carpet of plastic, grasslike blades interspersed with sand and pulverized tires, or other infill materials, to give the field stability and shock absorbency.

But the technology to recycle this complex product—separating the plastic grass and backing from the sand-and-rubber infill—still isn’t fully developed in the United States, or is deemed too expensive, according to one industry report and interviews with turf experts.

FairWarning found no state or federal regulations specific to disposal of artificial turf, apart from general waste-management rules. The industry has publicly stated that the disposal burden lies with field owners, who often seek direction from turf vendors or consultants.

Meanwhile, a niche industry has emerged to reclaim some of the nation’s old turf and sell custom pieces to homeowners for landscaping, batting cages, and dog kennels. But the end result is the same: eventually, the stuff is bound for the Dumpster.

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The fire threat, lamented by the EPA in its 1991 scrap-tire report, also is creeping back in the age of artificial turf as blazes break out where rolls of discarded playing fields are stashed.

“The government had this problem, and they were looking for a solution,” says Amanda Farber, a Maryland activist and mother who has raised alarms about the potential health risks of artificial turf. “They call this recycling; I would just call it a waste detour.”


An EPA spokeswoman wrote in an email that the agency “encourages the environmentally appropriate beneficial use of secondary materials, including scrap tires.” She said the agency has not studied disposal of turf fields, and has no information about where the waste ends up. That’s up to state and local governments, she said.

The problem is mounting.

The Synthetic Turf Council, the industry’s main trade group, estimates that 12,000 to 13,000 synthetic-turf fields are in the U.S., with some 1,200 to 1,500 new installations a year. The industry’s pitch is that synthetic turf saves on water and eliminates the need for pesticides, fertilizers, and constant mowing. And unlike real grass, the manufactured variety is billed as a year-round surface.

But today, hundreds of fields that were installed in the mid-2000s are at or beyond their estimated eight-to-10-year life spans. Most of these early fields were made with tire crumb, also known as crumb rubber, a product that has come under intense scrutiny in recent years over fears that tiny tire fragments containing heavy metals and chemicals might be dangerous. The Synthetic Turf Council has repeatedly assured the public that these fields are safe.
Now these fields are coming out, en masse. In one 2017 report, the Synthetic Turf Council projected that by the end of the decade, at least 750 fields will be replaced annually. The average field contains approximately 40,000 pounds of plastic carpet and 400,000 pounds of infill, according to the report. This means that as much as 330 million pounds of waste could require disposal every year.

A parallel turf dilemma is unfolding in soccer-loving Europe. Footage from a recent Dutch documentary by the news program Zembla revealed a so-called turf mountain in the Netherlands formed by discarded playing fields, graphically illustrating the enormity of the waste problem overseas.

But one expert who was featured in the documentary said in an email to FairWarning that he believed that the disposal issue is graver on this side of the ocean.

“It is definitely a MUCH bigger problem in America than in Europe,” says Dennis Andersen, owner of Re-Match, a Danish recycling plant that specializes in synthetic turf. “You are not regulated at all with used turf and have massive amounts laying around.”

Dennis Andersen / The atlantic

Among American turf sellers and promoters, disposal is a touchy topic.
Seven large artificial-turf companies who market their product in this country declined to be interviewed by FairWarning about disposal, or the recycling programs they say they maintain. FieldTurf, based in Montreal and one of the largest synthetic-turf vendors in the U.S., did not answer specific questions but issued a statement, attributed to the Synthetic Turf Council and affirming the STC members’ commitment to sustainability.

“Our members have found many applications for end of life turf that are commonly found in the marketplace, and they are at the forefront of technology that is expanding end-of-life turf applications,” the statement said. STC President Dan Bond did not return FairWarning’s phone calls or answer questions submitted in writing.

Even among environmentalists, disposal of artificial turf has gotten scant attention, but for a vocal group of parents and activists, including many with roots in the Washington, D.C., area. They are alarmed by some studies calling out the potential health risks of crumb rubber and the exposure of young people to cancer-causing chemicals, lead, and other dangerous toxins.

The turf industry, bolstered by hundreds of school districts and sports franchises, has maintained that these alleged health risks are overblown and points to conflicting studies that support the fields’ safety.

Diana Conway, president of the nonprofit Safe Healthy Playing Fields, says crumb rubber is notorious for “migrating,” with the tiny tire pellets sticking to players’ skin and socks and spreading into the nearby environment. While that alleged risk has received widespread media attention, most people give little thought to the sheer weight and volume of refuse involved in disposal of used playing fields, says Conway, a retired attorney from Montgomery County, Maryland.

“You think about the effort you go through to recycle a week’s worth of plastic bottles and plastic bags, and you’re talking millions upon millions of that for a single field,” she said. “It’s staggering.”

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Artificial turf has found some diverse resting places. In Montgomery County, one curious resident in July 2018 began following a truck loaded with rolls of used turf from a local high school, later learning that its destination had been a paintball park some 50 miles away. When Amanda Farber visited the location more than a year later, she found the decaying turf still rolled out for use, with some stacked near the edge of the woods—and “tire crumb absolutely everywhere,” she told FairWarning.
In Franklin, Massachusetts, a town of about 33,000 southwest of Boston, a pile of artificial turf and bags of crumb rubber were found abandoned above a wetlands area that helps feed the city’s drinking-water supply. And in Beaumont, Texas, rolls of used crumb-rubber turf removed in 2018 from a school district’s field were later found on an empty residential lot.

In California, artificial turf is big business. The state is home to hundreds of synthetic-turf fields and by one estimate could account for 10 percent of the fields removed nationally each year.

Historically, California has been known as a leader in environmental and recycling programs. But a 2016 consultant’s report prepared for the state on “recycling and reuse” of crumb-rubber fields indicates that most of them are actually going to the dump.

“Anecdotally,” the report stated, “it appears that in practice landfill disposal is by far the most common method for managing field components after removal, and no complete examples of an actual recycling project for the components of a removed field in California were identified.”

Prepared for CalRecycle, part of the state’s Environmental Protection Agency, the report found that “markets for recycled crumb rubber infill are extremely limited.”

This year, for instance, FairWarning found that four fields from the Los Angeles Unified School District went to landfills, according to district officials.

A CalRecycle spokesman said the state “does not have the authority” to track end-of-life synthetic turf fields, and that “users of this material have no legal obligation to report this information to the state.” Synthetic turf can be legally disposed of in any nonhazardous landfill in California that accepts municipal solid waste, he stated in an email.

But landfilling synthetic turf can be expensive, and costs vary widely among states, experts say. Some field owners, wanting to save money, are reusing some of the old tire-crumb infill in their replacement fields—a trend that is growing in California, according to a 2019 report for CalRecycle.

The degree of interest field owners have in recycling—or even knowing where their old fields are heading—also appears to vary widely.

FairWarning contacted numerous school districts and parks departments in California that had replaced synthetic-turf fields in recent years and found that many had given little thought to the next step.
“Nobody I know of raised that question,” said Scott Davis, director of facilities development at Roseville Joint Union High School District near Sacramento, which replaced two high-school fields. “We just trust that it’s done in a compliant manner.”

Industry experts agree that the ideal solution to turf disposal is recycling. But this is easier said than done.

Each square foot of turf contains multiple layers of materials, stacked like tiramisu. On top is the artificial grass, which is usually made of various polymers. Sprinkled in the grass is infill, usually composed of sand and crumb rubber. Underneath this are more layers of plastic and rubber, often including shock pads and drainage mats.

Separating all these materials is difficult, but industry experts say the hardest part is extracting the sand from the crumb rubber, which is necessary if someone wants to reuse the rubber for something else.

“We keep joking that whoever figures out how to separate the sand and grind it up is going to be a rich person,” said Richard Brangwin, vice president at Ohno Construction, a Seattle-based company that installs and removes synthetic turf.

A handful of companies claim to have cracked the recycling problem. One of them is Re-Match, the company founded in Denmark by Dennis Andersen, a former veteran of the tire-recycling industry. Andersen says he hopes to open turf-recycling plants in California, Pennsylvania, and other states in the next few years.

Andersen’s complex proprietary technique, which is described on his website and by FIFA, the Switzerland-based international soccer association, claims to allow for 99 percent of the turf materials to be recycled. The Synthetic Turf Council has cited Re-Match as evidence that recycling turf is a viable option for the industry, and Andersen’s method has been validated by an international program for verifying new technology. Despite such endorsements, Andersen says, he is struggling to get fields, because many owners still find cheaper and easier ways to get rid of old turf.

While the majority of synthetic turf isn't being recycled into postconsumer products, a significant amount is being repurposed or reused.

As the artificial-turf industry has boomed over the past decade, it has funneled more and more used turf to a niche collection of companies that specialize in reselling old turf, usually to homeowners for landscaping, but also businesses such as paintball arenas that need large tracts. Turf sellers can be found on Facebook and Craigslist hawking rolls in many cities.

“It’s a neat little business,” says Rich Charland, a turf salesman who operates TurfCycle USA in Temecula, California.
Charland and other salesmen refer to themselves as “artificial-grass recyclers,” a term activists such as Conway regard as misleading because the pieces are destined to be discarded anyway—just like their parent fields. Additionally, she argues, the niche industry is not a long-term solution for keeping up with the massive volume of fields being removed.

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“There aren’t enough batting cages in the world to take this much stuff,” she said.

Charland says he would like to be able to recycle turf into new products, but currently doesn’t have the technology.

“Our first goal is to keep the material out of the landfill; that’s our goal,” Charland says. “[But] everything has an end of life, unfortunately.”

Synthetic-turf fields are also linked to a problem long associated with waste tires: fires.

In September, downed power lines set fire to a stockpile of turf in Woodland, California. In June, a fire in Lacey, Washington, consumed an eight-foot-tall stack of turf near a forest.

Last year, a grass fire that ignited rolls of artificial turf stored on property in Sutter County, California, sent up thick billows of black smoke that prompted a small evacuation. County Fire Chief John Shalowitz says the owner was planning to use the turf on his own property when an electrical line on adjacent land sparked a fire that spread to the turf. The fire took two days to extinguish and burned 150 acres, he says.

“It’s hard to put out,” Shalowitz says. “It’s plastic and rubber, so it puts lots of irritants into the air.

“It’s nasty stuff when it’s burning. It’s just like having a tire fire.”

As for the safety of crumb-rubber playing fields, the debate rages on.

After several state and federal studies found minimal health risks associated with fields made with scrap tires—research that was criticized by some as faulty and limited in scope—the EPA began backing away from such assurances a few years ago.

Earlier this year, the EPA released the first part of the crumb-rubber research study begun in 2016, along with the Consumer Product Safety Commission and the Centers for Disease Control and Prevention. In that July installment, the EPA and
CDC reported on the chemicals found in a sampling of synthetic-turf fields, but they have not addressed whether they pose any health risks.

California officials are heading up their own eagerly awaited study on the potential health effects of playing fields and playground mats made with recycled tires. The report—the release of which has been repeatedly delayed—is now scheduled for next year.

With no definitive answers for parents and players gathered under the Friday-night lights, some schools and parks have turned to organic infill, such as coconut and cork.

But the disposal issues remain almost universally ignored.

In Maryland, the state legislator Mary Lehman tried this year to win passage of what she believes would have been the nation’s first state law ensuring safe disposal of synthetic-turf fields. She withdrew the bill, but said she plans to reintroduce a measure next year to require a “chain-of-custody” disclosure for every field removed. She said she also is examining the possibility of shifting disposal responsibility back to turf producers.

At a hearing earlier this year, industry representatives attacked the Lehman bill, arguing it was impractical and unfriendly to business.

Said Lehman: “We’ve got to get something on the books. You can’t hold anybody accountable.”

This story was produced by FairWarning (www.fairwarning.org), a nonprofit news organization based in Southern California that focuses on public-health, consumer, and environmental issues.