



Maryland Chapter  
P.O. Box 278  
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**Committee: Education, Energy and the Environment**  
**Testimony on: HB 457 “Environment – Synthetic Turf – Chain of Custody”**  
**Position: Support**  
**Hearing Date: March 20, 2024**

The Maryland Chapter of the Sierra Club supports HB 457, which addresses a serious waste problem posed by the lack of transparency and accountability for disposal of synthetic turf. The bill would require the Maryland Department of the Environment (MDE) to establish a system to track the chain of custody for synthetic turf playing fields and turf infill sold or distributed and installed in the state. The bill would also require each custodian of the synthetic turf and turf infill to report information on its disposition, from installation to removal, reuse, repurposing, recycling, and disposal to MDE.

Synthetic turf sport fields, which account for nearly two-thirds of all synthetic turf,<sup>1</sup> have an 8-10 year average lifetime and produce a large volume of waste, much of it toxic. According to the Synthetic Turf Council (STC), an average field is 80,000 square feet, comprised of 40,000 pounds of mixed plastic turf and 400,000 pounds of infill (usually tire waste and silica sand but sometimes other materials). The infill equates in volume to 400 cubic yards, or the equivalent of almost fourteen 30-cubic-yard dumpsters of infill.<sup>2</sup> The volume of the mixed plastic turf varies, depending on how it is packaged.

Based on an inventory assembled by the Sierra Club, there are at least 437 synthetic turf playing fields in Maryland, located in 19 counties and the City of Baltimore (Exhibit 1). Using the STC parameters, these fields represent 79,277 tons of plastic turf carpet and infill, 28.9 million square feet (663 acres) of plastic turf, and 144,325 cubic yards of infill (equivalent to 4,180 30-yard dumpsters) likely to be disposed in the next decade when the fields will be replaced.<sup>3</sup> While the industry continues to explore ways of recycling, reusing, or repurposing used synthetic turf, ultimately the turf and its components must be disposed.

At present, the fate of this enormous and growing amount of plastic waste and infill in Maryland and the country is difficult, if not impossible, to track. There is currently no documentation on the extent of reuse, repurposing, recycling, and ultimately, disposal of this waste. Several Maryland county waste facilities report they do not accept the volume, weight, and mixture of synthetic turf waste.<sup>4</sup> While some materials may be landfilled, an unknown share of the millions of square feet of removed synthetic turf ends up in rural and urban stockpiles or dumped in the environment, sometimes in sensitive ecosystems or

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<sup>1</sup> Synthetic Turf Council (STC) website: [https://www.syntheticurfCouncil.org/page/About\\_Synthetic\\_Turf](https://www.syntheticurfCouncil.org/page/About_Synthetic_Turf)

<sup>2</sup>STC. 2017. *A Guideline to Recycle, Reuse, Repurpose, and Remove Synthetic Turf Systems*, p.3. [https://qhi7a3oj76cn9awl3qcqrh3o-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/CR-STC\\_Guideline\\_for\\_Recycle\\_Re.pdf](https://qhi7a3oj76cn9awl3qcqrh3o-wpengine.netdna-ssl.com/wp-content/uploads/2019/11/CR-STC_Guideline_for_Recycle_Re.pdf)

<sup>3</sup>According to the STC, there are currently 12,000-13,000 synthetic turf sports fields in the United States, and 1,200-1,500 are installed annually. The number deconstructed annually in the United States increased from 365 in 2013 to 750 in 2018. Assuming that the number of fields deconstructed annually has risen to at least 1,000 by 2020, this represents 80 million square feet of plastic turf carpet weighing 40 million pounds and 400 million pounds of infill per year. Disposal of the existing 12,000-13,000 sports fields nationwide amounts to as much as 260,000 tons of turf and 2.6 million tons of infill over the next decade. STC 2017, *op.cit.*

<sup>4</sup>For example, Prince George’s County would not accept synthetic turf fields at its landfill, and these fields are not accepted for incineration or recycling in Montgomery County. If deposited at the Montgomery County transfer station, it would be sent to a landfill in Virginia and charged a \$70/ton tipping fee. For an average sports field, this would amount to more than \$15,000 for disposal, not including the transport costs.

vulnerable communities.<sup>5,6,7</sup> For example, hundreds of tons of worn-out carpet and granulated tire waste from Montgomery County high schools ended up in landfills in rural Virginia, on Bird Creek in Baltimore County, and in Malaysia (Exhibit 2).<sup>8</sup> Synthetic turf from the University of Virginia was dumped illegally on the side of a mountain.<sup>9</sup> As of last year, there was only one licensed recycling plant for end-of-life synthetic turf – in Europe.<sup>10</sup>

Owners of properties where these plastic carpets are dumped are left to clean up the environmental and physical mess. They face clean-up costs and potential liabilities from the aquatic and human toxins, carcinogens, endocrine disruptors, heavy metal neurotoxins, carcinogens, and immune disruptors such as PFAS “forever chemicals” in the synthetic materials that make up artificial turf carpet systems.<sup>11</sup> The direct toxic effects of tire particles have been demonstrated in aquatic organisms in particular.<sup>12</sup>

The STC already recommends maintaining a chain of custody for reuse, repurposing, recycling, and removal of synthetic turf fields,<sup>13</sup> but accountability requires that the public be informed. HB457’s required reporting to MDE of the chain of custody for synthetic turf and infill will document the number of installations in Maryland; the extent to which synthetic turf and infill is actually reused, repurposed, or recycled; and how and where it is disposed. It will incentivize recycling and proper disposal and provide accountability for improper disposal.

With HB 457, Maryland can be a leader in addressing the waste problem posed by synthetic turf. It will hold those responsible for the materials accountable for proper disposal of synthetic turf through a publicly documented chain of custody. We respectfully request a favorable report.

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<sup>5</sup>Lundstrom, Marjorie, and Eli Wolfe. 2019. “Fields of Waste: Artificial Turf, Touted as Recycling Fix for Millions of Scrap Tires, Becomes Mounting Disposal Mess,” *FairWarning*. December 19. <https://www.fairwarning.org/2019/12/fields-of-waste-artificial-turf-mess/> Reprinted in *The Atlantic* (12/2019), *Salon* (12/21/2019), and *Maryland Matters* (12/20/2019).

<sup>6</sup>Meyer, Pete. 2019. “Hidden gotcha in artificial turf installation.” *Environmental Health News*, Dec. 4. <https://www.ehn.org/hidden-gotcha-in-artificial-turf-installations-2641507579.html>. Woodall, Candy. 2019. “‘Running out of room’: How old turf fields raise potential environmental, health concerns,” *York Daily Record* (Pennsylvania), November 18.

<sup>7</sup>*The Turf Mountain*, video by Zembla, an investigative TV program on BNNVARA, Dutch Public Television. <https://www.youtube.com/watch?v=Y5o3J7uy4Tk>

<sup>8</sup> Lundstrom and Wolfe. *op.cit.*

<sup>9</sup> Meyer, *op. cit.*

<sup>10</sup>The Re-Match company, in Denmark. Sources: Woodall, *op.cit.*; *The Turf Mountain*, *op. cit.*

<sup>11</sup> Lerner, Sharon. 2019. “Toxic PFAS Chemicals Found in Artificial Turf,” *The Intercept*. October 8. <https://theintercept.com/2019/10/08/pfas-chemicals-artificial-turf-soccer/>

<sup>12</sup>Einhorn, Catrin. 2020. “How Scientists Tracked Down a Mass Killer (of Salmon),” *The New York Times*. December 3. <https://www.nytimes.com/2020/12/03/climate/salmon-kill-washington.html>

<sup>13</sup>STC 2017. *op cit.*, pp 13-18.

Maryland Sierra Club Zero Waste Team  
**Inventory of synthetic turf fields in Maryland**

Updated January 1, 2024

Over the summer and fall of 2021, Sierra Club volunteers resolved to inform pending state legislation on tracking the location and disposition of synthetic turf playing fields by conducting an inventory of synthetic turf playing fields in the state. The objective of the exercise was to document the number of fields, estimate the amount of waste that will be generated when the fields are retired, and demonstrate the degree of difficulty to the public of obtaining the information. The volunteers continued to update the inventory throughout 2023.

### **Methodology**

The following information was sought on each synthetic turf playing field currently in place in all 23 counties and the City of Baltimore, both indoor and outdoor fields:

- Name of the field and address
- Sport played
- Ownership of the field (public schools and universities, public parks, private schools and universities, private sports clubs/venues)
- Year the field was installed
- Area of the field in square feet, or its dimensions
- The source of information

Most of the research was done on the internet, which involved accessing websites for: public schools; private schools; colleges and universities; local and major newspapers; athletic organizations and foundations; county departments for parks and recreation; general contractors; and turf installers.<sup>14</sup>

These sources were sufficient to identify most fields or venues with fields. However, discovering the year each field was installed and its dimensions usually required follow-up with phone calls and emails. When the dimensions for outdoor fields were not available from a reliable source, the team used Google Earth's tool to measure the area of the field. They were located by their address and were easily distinguishable from natural turf fields. However, because many of the Google Earth photos were not recent, this method could not be used for some of the fields installed more recently. Furthermore, that method could not be used to estimate the dimensions of indoor fields, most of them privately owned. The dimensions of indoor fields were not easily obtained. Many calls and emails were sent; many were not returned.

**As of January 1, 2024, a total of 437 fields have been enumerated in Maryland.** The installation date could not be obtained for 72 fields (16%) and field size could not be ascertained for 34 (8%).<sup>15</sup> Field size was obtained from a reliable source (the installer, owner, or news reports) or estimated from Google Earth.

To estimate the tonnage of turf and infill, the team used conversion factors from the Synthetic Turf Council's (STC) 2017 publication, *A Guideline to Recycle, Reuse, Repurpose, and Remove Synthetic*

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<sup>14</sup> General contractors and turf installers consulted (website, email, or phone) included: AstroTurf; Athletic Field Consultants, Inc.; BrockUSA; Fields Inc.; Field Turf; JMT; Keystone Sports Construction; King Sports Construction; Playrite; Shaw Sports Turf; Sprinturf; and US GreenTech.

<sup>15</sup> Tonnage and volume could not be calculated for these fields.

*Turf Systems.* According to this document (p. 3), a typical synthetic turf sports field is about 80,000 square feet (sf) and is comprised of 40,000 lb of turf and 400,000 lb of infill. The volume of infill for a typical sport field would amount to +/- 400 cubic yards. The formulas used for the calculations are:

Estimation of turf weight:  $(\text{Field area} / 80,000) \times 40,000 \text{ lb}$   
Estimation of infill weight:  $(\text{Field area} / 80,000) \times 400,000 \text{ lb}$   
Estimation of infill volume:  $(\text{Field area} / 80,000) \times 400 \text{ cubic yards}$

The STC report notes that “The volume of the turf removed from the field depends on how it is collected (rolled, cut up, or shredded) and would be considerable in volume.” However, the total coverage of the plastic turf carpet can be estimated.

## Findings

### Number and distribution of turf fields

**A total of 437 synthetic turf fields have been identified in Maryland (see Annex Table).** It was not a trivial exercise, nor is it likely a complete list. Some fields have surely been missed and more are being approved or installed every day.

**The enumerated fields are located in 19 counties and the City of Baltimore;** to date, none has been identified in Caroline, Dorchester, Somerset, or Talbot counties. The counties with the greatest number of synthetic turf fields in the inventory are: Baltimore County (69); Montgomery County (64); Howard County (47); Anne Arundel County (54); Baltimore City (41); Prince George's County (40); Harford County (36); Frederick County (24); Wicomico County (13); and St. Mary's County (11). Ten counties had fewer than 10 fields each.

### Ownership

**About half of the fields (51%) belong to public schools, parks, or universities.** The remaining fields are at private schools (19%) or private clubs/sports venues (19%). Two percent were owned and/or operated by public-private partnerships, or by a public entity other than a school or park.

### Field size and type of venue

**The 403 playing fields for which size could be estimated ranged from a minimum of 1,600 sf to a maximum of 156,800 sf.** Seventy-five of the fields (17%) were at indoor sports venues, most of which were small, less than regulation size fields at private sports facilities.

### Tonnage and volume of materials

**The tonnage and volume of currently installed synthetic turf fields are a projection of the waste that will be generated from these fields over at least the next decade, before they must be replaced.** According to the 2017 STC document, “Depending on its usage, exposure to intense sunlight, maintenance and other factors, a synthetic turf sports field will last 8-10 years before reaching the end of its useful life.”(p.3).

**The 403 fields for which field size was available amount to:**

- 79,277 tons of mixed plastic carpet and infill;
- 144,325 cubic yards of infill, the equivalent of 4,810 30-yard dumpsters; and

- 28.9 million square feet (663 acres) of mixed plastic carpet.

### **End of life and disposal**

Among the 365 fields for which an installation date was available, 41 (11%) had been replaced, and 71 (19%) were installed before 2014 and likely have been replaced, since the lifetime of a synthetic turf playing field is 8-10 years. The inventory did not attempt to record the disposition of the components of discarded fields – whether they were reused, repurposed, recycled, stockpiled, landfilled, or incinerated. Owners of fields that had been replaced generally are only aware that a contractor removed the fields; they are unlikely to know the destination or processing of the removed materials. In a few cases, a contractor was asked about the disposal of a removed field, but in only one case was the team able to obtain information, because the parks department, at the request of a legislator, asked the vendor to account for the disposition.<sup>16</sup>

### **Conclusions**

There are at least 437 synthetic turf fields installed in Maryland as of January 1, 2024. They represent a significant amount of waste over the next decade as they are replaced, and even more fields are planned. There are limited options for disposal of this waste, much of which cannot be recycled or incinerated, and it would take up significant space in the state’s landfills. In neighboring states (Pennsylvania, Virginia), synthetic turf waste has been stockpiled or dumped. At present, there is no information available to the public on the disposition of Maryland synthetic turf fields that have been removed, nor is there any requirement to document their reuse, recycling, or disposal.

It required considerable effort to document the existence of these fields, and considerably more effort to obtain basic information like the year of installation and field dimensions, which are still incomplete. *In the absence of a mandated, publicly disclosed chain of custody it will be difficult for the public or for state authorities to track the existence of synthetic turf fields and their proper disposition at the end of life.* A chain of custody would ensure transparency on the disposition of synthetic turf and infill – whether recycled, reused, repurposed, or landfilled – and serve as a strong disincentive for improper disposal.

### **ACKNOWLEDGEMENTS**

We are grateful to the following volunteers from the Maryland Sierra Club Zero Waste Team for collecting the information that made this inventory possible: Martha Ainsworth, Michael Brandt, Thomas Brewer, Bente Cooney, Cindy Dillon, Kim Gross, Kerri Hesley, Crystal Konny, Marie LaPorte, Susan McDonald, Kathleen Michels, Carolyn Parsa, Abigail Snyder, Patricia Soffen, Terry Stakem, and Paige Stevens.

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<sup>16</sup> The Heurich Park field in Hyattsville, owned by Maryland National Capital Park and Planning Commission and replaced in 2023. (Letter from King Sports Construction to MNCPPC, May 26, 2023).

### Synthetic Turf Fields and Estimated Waste in Maryland, by County, as of January 1, 2024

County	Total Fields	Distribution by ownership					Total Tonnage (carpet & infill)	Area of carpet (square feet)	Volume of infill (cubic yards)
		Public schools	Public parks	Private schools	Private clubs	Other			
Allegany*	4	3	0	0	1	0	712.8	259,200	1,296
Anne Arundel*	54	33	6	8	7	0	11,782.4	4,284,500	21,423
Baltimore City*	41	10	6	19	5	1**	7,947.4	2,965,469	14,827
Baltimore County*	69	28	13	22	6	0	11,896.6	4,217,409	21,087
Calvert	1	0	0	1	0	0	22.8	81,000	405
Carroll	6	1	0	0	5	0	568.7	206,810	1,034
Cecil*	8	5	3	0	0	0	1,138.2	413,900	2,070
Charles*	4	2	2	0	0	0	299.5	108,924	545
Frederick*	24	13	4	4	3	0	4,489.5	1,632,532	8,163
Garrett*	3	3	0	0	0	0	n.a.	n.a.	n.a.
Harford*	36	12	3	3	18	0	6,401.0	2,324,935	11,625
Howard*	47	14	16	1	16	0	9,190.4	3,341,964	16,710
Kent	1	1	0	0	0	0	313.7	114,085	570
Montgomery*	64	18	7	20	19	0	10,770.4	3,916,497	19,582
Prince George's	40	17	6	4	6	7**	8,617.0	3,133,452	15,667
Queen Anne's*	4	2	2	0	0	0	367.5	133,650	668
St. Mary's*	11	4	6	1	0	0	2,058.9	748,707	3,744
Washington*	4	2	0	2	0	0	683.3	248,479	1,242
Wicomico	13	4	4	0	5	0	1226.1	445,837	2,229
Worcester	3	3	0	0	0	0	790.7	287,515	1,438
<b>TOTAL</b>	<b>437</b>	<b>150</b>	<b>73</b>	<b>85</b>	<b>83</b>	<b>7</b>	<b>79,276.9</b>	<b>28,864,865</b>	<b>144,325</b>

\*The dimensions of 34 fields were not available: Allegany (1); Anne Arundel (5); Baltimore City (1); Baltimore County (9); Cecil (3); Charles (3);Frederick (2); Garrett (3); Harford (1); Howard (1); Montgomery (2), Queen Anne’s (2), St. Mary’s (1), and Washington (1). The tonnage, carpet area, and volume of infill could not be estimated for these fields and are not included in the table.

\*\* Under Armour field, privately owned, public access.

\*\*\*Six fields are a public-private partnership (county owns the land, private foundation owns & runs the fields, Parks & Recreation sports teams have access year round); one is owned by the Prince George’s County Police Department.

Source: Maryland Sierra Club Chapter, Zero Waste Team.

**Exhibit 2 :**  
**Synthetic Turf from Richard Montgomery High School**  
**sent to a site on Bird Creek in White Marsh, Maryland**



Photos courtesy of Susan Loftus and Amanda Farber.

Founded in 1892, the Sierra Club is America's oldest and largest grassroots environmental organization. The Maryland Chapter has over 70,000 members and supporters, and the Sierra Club nationwide has over 800,000 members and nearly four million supporters.