



Committee: Education, Health, and Environmental Affairs

Testimony on: SB 321 “Environment – Synthetic Turf and Turf Infill – Chain of Custody and Reuse”

Position: Support

Hearing Date: February 2, 2022

The Maryland Chapter of the Sierra Club strongly supports SB 321, which addresses a serious waste problem posed by the lack of transparency and accountability for disposal of synthetic turf and turf infill. The bill would require manufacturers to establish a system to track the chain of custody for synthetic turf fields and turf infill sold or distributed in the state and to report information on the disposition of the turf and infill, from installation to removal, reuse, repurposing, recycling, and disposal to the Maryland Department of the Environment (MDE). Current owners of synthetic turf fields would be responsible for reporting the same information directly to MDE.

Synthetic turf sport fields, which account for nearly two-thirds of all synthetic turf,¹ 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.² 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 347 synthetic turf playing fields in Maryland, located in 18 counties and the City of Baltimore (Exhibit 1, Table 1A). Using the STC parameters, these fields represent 67,216 tons of plastic turf carpet and infill, 24.3 million square feet of plastic turf, and 122,850 cubic yards of infill, likely to be disposed of in the next decade when the fields will be replaced.³ While the industry continues to explore ways of recycling, reusing, or repurposing used synthetic turf, ultimately the turf and its components must be disposed of.

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.⁴ 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 vulnerable

¹ Synthetic Turf Council (STC) website: https://www.syntheticurfCouncil.org/page/About_Synthetic_Turf

²STC. 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

³According 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.*

⁴For example, Prince George’s County would not accept synthetic turf fields at its landfill, and they are not accepted for incineration or recycling in Montgomery County. If deposited at the Montgomery County transfer station, synthetic turf 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.

communities.^{5,6,7} 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).⁸ Synthetic turf from the University of Virginia was dumped illegally on the side of a mountain.⁹ As of last year, there was only one licensed recycling plant for end-of-life synthetic turf – in Europe.¹⁰

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.¹¹ The direct toxic effects of tire particles have been demonstrated in aquatic organisms in particular.¹²

The STC already recommends maintaining a chain of custody for reuse, repurposing, recycling, and removal of synthetic turf fields,¹³ but accountability requires that the public be informed. HB 131’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. Based on our inventory of synthetic turf fields in Maryland, the sponsor may want to consider removing the exemption of fields less than 15,000 feet for indoor venues with smaller fields that collectively sum to 15,000 sf or more (Exhibit 1, Table 1B).

With SB 321, 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 through a publicly documented chain of custody. We respectfully request a favorable report.

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Attachments:

Exhibit 1 – Inventory of synthetic turf playing fields in Maryland

Exhibit 2 – Synthetic turf disposal from Richard Montgomery High School on Bird Creek in White Marsh

⁵Lundstrom, 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).

⁶Meyer, 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.

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

⁸ Lundstrom and Wolfe. *op.cit.*

⁹ Meyer, *op. cit.*

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

¹¹ 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/>

¹²Einhorn, 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>

¹³STC 2017. *op cit.*, pp 13-18.

Exhibit 1: Inventory of synthetic turf fields in Maryland

The Maryland Sierra Club's testimony before the Environment and Transportation Committee on HB857 in 2021 remarked that "The number of synthetic turf fields in Maryland, the number disposed of, and the projected volume of the synthetic turf waste stream by currently installed synthetic turf are unknown."

Over the summer and fall of 2021, Sierra Club volunteers resolved to address that issue by conducting an inventory of synthetic turf fields in the state. This exercise was undertaken to document the number of fields in the state, enable estimation of the amount of waste that will be generated when the fields are retired, and demonstrate the degree of difficulty of obtaining the information.

Methodology

The following information was sought on each synthetic turf playing field currently in place in all 23 counties and the City of Baltimore, including 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 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.¹⁴

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 GoogleEarth's tool to measure the area of the field. Fields were located using the address and are easily distinguishable from natural turf fields. However, the GoogleEarth photos are from 2017, so this method could not be used for fields installed in more recent years. Furthermore, that method could not be used to estimate the dimensions of indoor fields, which are mostly at private sports venues. The dimensions of indoor fields were not easily obtained. Many calls and emails were sent, but many were not returned.

The research was conducted over about 6 months. As of the date of this testimony, there are still missing data for the 347 fields that were identified. The installation date could not be obtained for 105 fields and area could not be ascertained for 19.¹⁵ Field area was obtained from a reliable source for 150 fields (43%), while for 178 (51%) the area was estimated from GoogleEarth.

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*

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

¹⁵Tonnage 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 about 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 347 synthetic turf fields have been identified in Maryland (Table 1A). It was not a trivial exercise. Some fields have surely been missed and more are being approved or installed every day.

The enumerated fields are located in 18 counties and the City of Baltimore; to date, none have been identified in Caroline, Dorchester, Kent, Somerset, or Talbot counties. The counties with the greatest number of synthetic turf fields in the inventory are: Montgomery County (62); Baltimore County (60); Howard County (46); Anne Arundel County (39); Baltimore City (30); Prince George's County (26); Harford County (19); Frederick County (17); and Wicomico County (13). Ten counties had fewer than 10 fields each.

Ownership

More than half of the fields belong to public schools, parks, or universities (61% of the fields, 69% of the tonnage). The remaining fields are at private schools (22% of the fields, 25% of the tonnage) or private clubs (17% of the fields, 6% of the tonnage).

Field size

The 328 playing fields for which size could be estimated ranged from a minimum of 3,375 sf to a maximum of 156,800 sf. Forty-one of the fields were less than 15,000 sf and therefore would be exempted from the chain-of-custody reporting requirements of HB 131. All but one of these smaller fields were located at eleven indoor venues. All but one indoor venue had multiple fields, and some had as many as eight. Most, if not all, of them individually were less than 15,000 sf, but collectively would exceed that threshold (Table 1B). This raises the issue of whether HB 131 should also apply to indoor synthetic turf fields at venues where there are multiple small fields under the same roof that collectively sum to more than 15,000 sf. Under the current bill, the vast majority of indoor synthetic turf playing fields would be exempted from the chain of custody requirements because of their small size, even if they are basically one large field subdivided into smaller playing surfaces.

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, during which 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 328 fields for which field area were available amount to:

- 67,216 tons of mixed plastic carpet and infill;
- 122,850 cubic yards of infill, the equivalent of 4,095 30-yard containers; and
- 24.3 million square feet (557 acres) of mixed plastic carpet.¹⁶

End of life and disposal

The inventory did not attempt to record fields that have been replaced, or whether any of the components of discarded fields 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, when a volunteer asked about the disposal of removed fields, the company declined to provide information.

Conclusions

There are at least 347 synthetic turf fields installed in Maryland. They represent a significant amount of potential waste over the next decade, and 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.

It required considerable effort to establish the existence of these fields, and considerably more effort to obtain basic information like the year of installation and field dimensions, which is still incomplete. *In the absence of a publicly disclosed chain of custody it will be very difficult for the public or state authorities to track the existence of 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 disposed of in a landfill – and serve as a strong disincentive for improper disposal.

¹⁶ 557 acres covers an area the equivalent of a circle that is 1.1 miles in diameter (5,558 feet).

Table 1A. Inventory of Synthetic Turf Fields and Estimated Waste in Maryland, December 2021

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 sports venues			
Allegany*	4	3	0	0	1	712.8	259,200	1,296
Anne Arundel	39	22	6	8	3	9,753.5	3,546,723	17,734
Baltimore City*	30	7	6	16	1	5544.3	2,017,444	10,087
Baltimore County*	60	25	12	18	5	11,394.1	4,256,802	21,284
Calvert	1	0	0	1	0	22.8	81,000	405
Carroll	6	1	0	0	5	568.7	206,810	1,034
Cecil*	5	2	3	0	0	548.6	199,500	998
Charles	1	1	0	0	0	264.6	108,924	545
Frederick	17	8	4	3	2	3,407.1	931,117	6,195
Garrett*	2	2	0	0	0	n.a.	n.a.	n.a.
Harford*	19	11	3	3	2	4,463.4	1,622,704	8,114
Howard	46	13	16	1	16	9,190.4	3,341,964	16,710
Montgomery*	62	16	7	20	19	10,435.2	3,794,606	18,973
Prince George's	26	16	6	4	0	6,864.6	2,496,222	12,481
Queen Anne's	2	2	0	0	0	367.5	133,650	668
St. Mary's	8	1	6	1	0	1,506.9	547,960	2,740
Washington	3	1	0	2	0	683.3	248,479	1,242
Wicomico*	13	4	4	0	5	498.3	181,205	903
Worcester	3	3	0	0	0	790.7	287,515	1,438
TOTAL	347	140	73	77	59	67,215.8	24,261,825	122,850

*The dimensions of 19 fields were not available: Allegany (1); Baltimore City (4); Baltimore County (3); Cecil (3); Garrett (2); Harford (1); Montgomery (2); Wicomico (3). The tonnage, carpet area, and volume of infill could not be estimated for these fields and are not included in the table.

Source: Maryland Sierra Club Chapter, Zero Waste Team.

Table 1B. Indoor sports venues with small fields that collectively exceed 15,000 sf

Venue	County	# Indoor fields	Smallest field (sf)	Largest field (sf)	Total, all fields (sf)
Freestate Sports Arena	Baltimore	3	7,200	14,800	35,600
Goals Baltimore	Baltimore	2	7,200	11,900	19,100
Northeast Regional Recreation Center	Baltimore	2	10,875	12,600	23,475
Carroll Indoor Sports Center	Carroll	3	8,370	16,740	40,410
Soccer Dome	Howard	3	5,400	16,200	36,990
Sofive Columbia	Howard	8	3,375	3,375	27,000
Sofive Rockville	Montgomery	8	5,400	5,400	43,200
Michael & Son Rockville Sports Complex	Montgomery	4	2,400	11,900	36,700
Crown Sports Arena	Wicomico	5	8,100	12,800	51,925
Harry S. Parker Athletic Complex	Wicomico	4	6,800	6,800	27,200

Exhibit2 :
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.