

**From:** [Suzanne Hume](#)  
**To:** [Montoya, Michelle](#)  
**Subject:** [EXTERNAL] Santa Rosa City Council Climate Action Subcommittee  
**Date:** Wednesday, October 4, 2023 3:30:26 PM  
**Attachments:** [City of Santa Rosa No Synthetic Letter CleanEarth4Kids.org.pdf](#)

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CleanEarth4Kids.org supports the ban on synthetic turf. Our letter is attached.

Wishing you a great day!

Suzanne

Suzanne M. Hume



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Our Children's Health and Future Depend on the Actions We Take Today!



October 4, 2023

## **RE : No Synthetic Turf**

CleanEarth4Kids.org strongly supports banning the use of synthetic grass/artificial turf. Synthetic grass/artificial turf is harmful to human health and the environment.

Our youth, interns, and volunteers have worked hard to create videos and resources that can be found on our [CleanEarth4Kids.org Team 5: Stop Synthetic Turf page](#).<sup>1</sup>

## **Natural Grass is Best**

We highly recommend the City of Santa Rosa follow organic land management practices, especially for managing playing fields.

Training is available online through the [University of California, Riverside](#) and other [locations](#).<sup>2</sup>

High-use, organically managed, natural grass fields have been in use [in many areas](#) including [Irvine, CA](#).<sup>3,4</sup>

[Natural grass is the healthiest choice](#) for playing fields and parks.<sup>5</sup> [Natural grass fields are more cost-effective](#) than [synthetic grass/artificial turf fields which have higher maintenance and long-term costs](#).<sup>6,7</sup> [Natural grass fields are also cheaper to install](#) than synthetic grass/artificial turf.<sup>8</sup>

With proper care and maintenance, a natural grass field can accommodate any amount of play as demonstrated by Marblehead, MA with [20 acres of organically managed fields](#) for over 15 years.<sup>9</sup>

## **Synthetic Grass/Artificial Turf is HOT**

Synthetic grass/artificial turf is 40°-70° [hotter](#) than surrounding air temperatures and has burned hands and feet.<sup>10</sup> A [study](#) by Brigham Young found the surface temperature of synthetic grass/artificial turf was 37° higher than asphalt and 86.5°

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<sup>1</sup> <https://cleaneearth4kids.org/team-5-synthetic-turf-toxic-chemicals>

<sup>2</sup> <https://cpe.rutgers.edu/landscape/natural-turf-certificate>

<sup>3</sup> <https://www.nontoxiccommunities.com/organic-athletic-fields.html>

<sup>4</sup> <https://youtu.be/o3P1T3fgv6I>

<sup>5</sup> <https://www.safehealthyplayingfields.org/health-benefits-of-natural-turf>

<sup>6</sup> [https://www.safehealthyplayingfields.org/s/Natural Grass Athletic Fields Ppoint Final.ppt](https://www.safehealthyplayingfields.org/s/Natural%20Grass%20Athletic%20Fields%20Ppoint%20Final.ppt)

<sup>7</sup> <https://www.safehealthyplayingfields.org/maintenance-grass-vs-synthetic-turf>

<sup>8</sup> <https://www.safehealthyplayingfields.org/cost-grass-vs-synthetic-turf>

<sup>9</sup> <https://www.turi.org/content/NaturalGrassPlayingFieldCaseStudyMarbleheadMAJune202019.pdf>

<sup>10</sup> <https://www.safehealthyplayingfields.org/heat-levels-synthetic-turf/>

hotter than natural grass.<sup>11</sup> A study found that in 90° weather, the surface temperature of a natural grass field was about 98° while a synthetic grass/artificial turf field was [over 160°](#).<sup>12</sup> [Shoes have melted](#) from the heat on synthetic grass/artificial turf with players and coaches getting blisters on the bottom of their feet through their shoes.<sup>13</sup> [First-degree burns](#) occur at 118° with blistering and second-degree burns at 131°.<sup>14</sup> Several synthetic grass/artificial turf fields in the Los Angeles Unified School District are currently [closed](#) due to high heat and melting surfaces.<sup>15</sup>

Playing on synthetic grass/artificial turf can [increase](#) the chance of [heat stroke, dehydration, and other heat-related illnesses](#).<sup>16,17</sup> Synthetic grass/artificial turf fields also [create heat islands](#) which cause [higher daytime and nighttime temperatures along with higher levels of air pollution](#).<sup>18,19</sup>

Synthetic grass/artificial turf also poses a flammability risk. The EPA stated that tire rubber in stockpiles, such as rolls of synthetic grass/artificial turf, can ignite and create fires that are difficult to extinguish and can burn for months [generating toxic smoke and oils](#).<sup>20</sup>

### **Synthetic Grass/Artificial Turf is Dangerous to Athletes**

Synthetic grass/artificial turf fields contain [bacteria](#) and must be regularly cleaned with chemicals.<sup>21</sup> [Turf burns](#) from synthetic grass/artificial turf can become infected with bacteria like staph and MRSA which can be life-threatening.<sup>22</sup> An EPA study found [MRSA in 70%](#) of the fields tested.<sup>23</sup>

Playing on synthetic grass/artificial turf can cause more injuries. According to an NFL Players Association (NFLPA) [study](#), playing and practicing on synthetic grass/artificial turf increases the chance of a lower extremity injury with a 69% higher rate of non-contact foot/ankle injuries than on natural grass.<sup>24</sup> The NFLPA has called for [all NFL fields to be natural grass](#).<sup>25</sup>

A [study](#) of National Collegiate Athletic Association (NCAA) athletes found playing on

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<sup>11</sup> <https://aces.nmsu.edu/programs/turf/documents/brigham-young-study.pdf>

<sup>12</sup> <https://www.center4research.org/injuries-related-to-artificial-turf/>

<sup>13</sup> <https://ftw.usatoday.com/2015/08/its-so-hot-in-texas-turf-is-melting-cleats>

<sup>14</sup> <https://www.nist.gov/el/fire-research-division-73300/firegov-fire-service/fire-dynamics>

<sup>15</sup> <https://www.latimes.com/sports/highschool/story/2022-08-17/synthetic-l-a-unified-out-of-commission>

<sup>16</sup> <https://www.npr.org/2008/08/07/93364750/high-temps-on-turf-fields-spark-safety-concerns>

<sup>17</sup> <https://www.tandfonline.com/doi/full/10.1080/02656736.2019.1605096>

<sup>18</sup> <https://aces.nmsu.edu/programs/turf/documents/brigham-young-study.pdf>

<sup>19</sup> <https://www.epa.gov/heatislands/heat-island-impacts>

<sup>20</sup> <https://www.vdr.com/in-depth/news/2019/11/18/old-artificial-turf-fields-pose-huge-waste-problem-envi>

<sup>21</sup> <https://sportsturfinc.com/wp-content/uploads/2015/11/Bass-paper-in-big-sky-journal.pdf>

<sup>22</sup> <https://www.healthline.com/health/turf-burn#pictures>

<sup>23</sup> [https://www.epa.gov/sites/default/files/2019-08/documents/tc\\_public\\_webinar\\_-\\_august\\_6\\_2019.pdf](https://www.epa.gov/sites/default/files/2019-08/documents/tc_public_webinar_-_august_6_2019.pdf)

<sup>24</sup> <https://nflpa.com/posts/only-natural-grass-can-level-the-nfls-playing-field>

<sup>25</sup> <https://apnews.com/article/9b34d4402f2f82ae60708605f65aa560>

synthetic grass/artificial turf greatly increased the chance of knee ligament injuries while another [study](#) of high school athletes found they were 58% more likely to sustain an injury playing on synthetic grass/artificial turf than natural grass.<sup>26,27</sup>

The United States Men's Professional Soccer Team and other national teams only play on natural grass in the World Cup, and the [United States Women's Soccer Team sued FIFA](#) to not play on synthetic grass/artificial turf due to the increased risk of injury.<sup>28</sup> Soccer legend [Lionel Messi](#) will only play on real grass.<sup>29</sup>

Studies have also shown that more [serious concussions](#) come from playing on synthetic grass/artificial turf compared to grass.<sup>30</sup>

Upon hearing of the death of David West, the sixth player from the Philadelphia Phillies to die of the same rare form of brain cancer ([glioblastoma](#)), [Philadelphia Inquirer investigative journalists David Gambacorta and Barbara Laker](#) investigated pieces of AstroTurf from Veterans Stadium, which was the Philly home stadium until 2004.<sup>31,32</sup> The pieces of turf analyzed from 1977 and 1981 were found to contain at least 16 different PFAS. It was also determined that in the summer, the synthetic grass/artificial turf would heat up to 165°F. The experts they consulted explained that this type of heat would allow some of the toxins to release and become airborne, creating additional modes of transmission to the players. PFAS [bioaccumulates](#) in our bodies, making the risk of cancers and other health problems more likely as we get older.<sup>33</sup>

## **Human Health Hazards: PFAS and Synthetic Turf/Artificial Grass**

Doctors, nurses, health professionals, children's health organizations, public health organizations, researchers, and the public are deeply concerned with the toxic and carcinogenic [chemicals](#)<sup>34</sup> and [heavy metals](#)<sup>35</sup> found in the infill and plastic blades of "grass" of synthetic grass/artificial turf.

Synthetic grass/artificial turf is plastic, made from resins like polyethylene and nylon. PFAS are used in the [extrusion of plastic yarn](#) for the "grass" blades.<sup>36</sup> No synthetic grass/artificial turf manufacturer can state they are free of PFAS. PFAS, PAHS, lead, and other toxic chemicals have been found in [synthetic grass/artificial](#)

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<sup>26</sup> <https://pubmed.ncbi.nlm.nih.gov/30995074/>

<sup>27</sup> <https://www.uhhospitals.org/articles-and-news/articles/2019/08/artificial-turf-vs-natural-grass>

<sup>28</sup> <https://www.npr.org/353312770/soccer-players-sue-over-proposed-turf-field-for-womens-world-cup>

<sup>29</sup> <https://www.sbnation.com/soccer/lionel-messi-inter-miami-mls-turf>

<sup>30</sup> <https://journals.sagepub.com/doi/10.1177/03635465000280050401>

<sup>31</sup> <https://deadspin.com/philadelphia-phillies-brain-cancer-tug-mcgraw-1850202995>

<sup>32</sup> <https://www.mediaite.com/sports/6-phillies-players-died-of-same-brain-cancer/>

<sup>33</sup> <https://www.mdpi.com/2305-6304/10/2/44>

<sup>34</sup> <https://theintercept.com/2019/10/08/pfas-chemicals-artificial-turf-soccer/>

<sup>35</sup> <https://www.hilarispublisher.com/open-access/release-of-polycyclic-aromatic-hydrocarbons-and-heavy-metals>

<sup>36</sup> <https://www.documentcloud.org/documents/6434596-Kulikov2005.html>

[turf](#).<sup>37</sup>

PFAS (perfluoroalkyl and poly-fluoroalkyl substances) are a class of over [12,000 synthetic \(man-made\) chemicals](#)<sup>38</sup> found in [many products](#)<sup>39</sup> like synthetic grass/artificial turf, food packaging, waterproofing sprays, household cleaners, stain-resistant carpet, nonstick cookware, fire fighting foam, clothing, makeup, toilet paper, personal care products, textiles, children's products and much more. PFAS as a [class](#) share many characteristics and toxicities.<sup>40</sup> Three PFAS (perfluorooctanesulfonic acid [PFOS], perfluorononanoic acid [PFNA], and perfluorooctanoic acid [PFOA]) are on California's [Proposition 65 list](#) as carcinogens and developmental toxicity.<sup>41</sup> The EPA released in June 2022 a [health advisory](#) for PFOS, PFOA and their replacements, PFBS, and GenX chemicals in drinking water.<sup>42</sup>

PFAS are known as "forever chemicals" as they are extremely strong and don't break down in the environment or in our bodies. Once in the body, they [accumulate](#) in the kidneys and liver with a biological half-life of 3-8 years.<sup>43</sup> Many states and cities have found PFAS in their drinking water. PFAS are found in the blood of [97% of Americans](#) and even in [umbilical cords](#).<sup>44,45</sup>

PFAS are toxic. According to the [CDC](#),<sup>46</sup> [EPA](#),<sup>47</sup> and the [European Union Environment Agency](#),<sup>48</sup> PFAS are linked to low birth weight, thyroid disease, increased cholesterol, liver damage, kidney cancer, and testicular cancer. They are also linked to [liver cancer](#),<sup>49</sup> [diabetes](#),<sup>50</sup> [endocrine disruption](#), and other [serious health problems](#).<sup>51</sup>

Another concern regarding synthetic grass/artificial turf health risks is zinc in the crumb rubber infill. Too much zinc can cause health problems such as [stomach cramps, skin irritations, vomiting, nausea, anemia, pancreatic damage, and even arteriosclerosis when zinc levels are very high](#).<sup>52</sup> Zinc can be a danger to unborn and newborn children when mothers absorb large concentrations of zinc. Zinc can also contaminate the environment and fish living in zinc-contaminated waterways can

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<sup>37</sup> <https://theintercept.com/2019/10/08/pfas-chemicals-artificial-turf-soccer/>

<sup>38</sup> <https://comptox.epa.gov/dashboard/chemical-lists/pfasmaster>

<sup>39</sup> [https://www.cdc.gov/biomonitoring/PFAS\\_FactSheet.html](https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html)

<sup>40</sup> <https://experts.unthsc.edu/en/publications/response-to-comment-on-scientific-basis-for-managing-pfas>

<sup>41</sup> <https://oehha.ca.gov/proposition-65/proposition-65-list/>

<sup>42</sup> <https://www.epa.gov/sdwa/drinking-water-health-advisories-pfoa-and-pfos>

<sup>43</sup> <https://www.niehs.nih.gov/health/topics/agents/pfc/index.cfm>

<sup>44</sup> <https://www.atsdr.cdc.gov/pfas/health-effects/us-population.html>

<sup>45</sup> <https://www.theguardian.com/environment/2022/forever-chemicals-found-umbilical-cord-blood-samples>

<sup>46</sup> <https://www.atsdr.cdc.gov/pfas/health-effects/index.html>

<sup>47</sup> <https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>

<sup>48</sup> <https://www.eea.europa.eu/publications/emerging-chemical-risks-in-europe>

<sup>49</sup> <https://www.insider.com/study-confirms-link-between-forever-chemicals-and-liver-cancer-risk-2022-8>

<sup>50</sup> <https://pubmed.ncbi.nlm.nih.gov/35970987/>

<sup>51</sup> <https://pubmed.ncbi.nlm.nih.gov/32476019>

<sup>52</sup> <https://www.lenntech.com/periodic/elements/zn.htm>



accumulate zinc in their bodies which is then biomagnified through the [food chain](#).<sup>53</sup>

Dr. Sarah Evans, an environmental health professor for the Icahn School of Medicine at Mount Sinai, asked: [“We already know there are toxic chemicals in the products, so why would we continue to utilize them and have children roll around on them when we have a safe alternative, which is natural grass?”](#)<sup>54</sup> Dr. Evans wrote a [letter](#) in support of stopping the use of recycled tire rubber in municipal and school playgrounds because children are particularly vulnerable to these harmful chemical exposures from playground surfaces due to “their developmentally appropriate hand-to-mouth behaviors”.<sup>55</sup> Additionally, children are closer to the ground and have [higher respiratory rates](#) than adults, increasing their likelihood of inhalation exposures.<sup>56</sup>

### **Crumb Rubber Infill is Toxic**

Made from ground-up tires, this common infill for synthetic grass/artificial turf fields is full of [heavy metals and toxic chemicals](#).<sup>57</sup> One of these chemicals, 6PPD-quinone, has been shown to be [very toxic to the endangered coho salmon](#)<sup>58</sup> and other [aquatic life](#).<sup>59</sup> Research has identified [over 300 chemicals](#) in crumb rubber infill with over 50 known or suspected carcinogens.<sup>60</sup> Humans can be exposed to these crumb rubber-derived chemicals through inhalation, ingestion, and dermal contact, leaving [humans vulnerable to carcinogenic exposure in many different ways](#).<sup>61</sup> [Alternative infills](#) like TPE or cork have inhalation and chemical risks as well.<sup>62</sup>

Studies on synthetic grass/artificial turf fields have shown [higher-than-acceptable levels of zinc](#) in surface water, groundwater, and/or aquatic environments from [crumb rubber infill](#).<sup>63,64</sup> The Norwegian Institute for Water Research conducted a [risk assessment](#) on runoff from synthetic grass/artificial turf fields finding concentrations of zinc, alkylphenols, and octylphenol exceeded the limits of environmental effects and were a significant local risk of environmental effects in surface water.<sup>65</sup> Studies, such as one from the [Connecticut Department of Environmental Protection \(DEP\)](#), also concluded runoff from synthetic grass/artificial turf fields was a potential risk to surface waters and aquatic organisms.<sup>66</sup>

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<sup>53</sup> <https://www.lennotech.com/periodic/elements/zr.htm>

<sup>54</sup> <https://www.theguardian.com/environment/2022/boston-bans-artificial-turf-toxic-forever-chemicals-pfas>

<sup>55</sup> [https://drive.google.com/file/d/1jrGrAyAU\\_hVvgej2L0Zd2cIAGCdDOZWD/view](https://drive.google.com/file/d/1jrGrAyAU_hVvgej2L0Zd2cIAGCdDOZWD/view)

<sup>56</sup> <https://www.medicalnewstoday.com/articles/324409#summary-table>

<sup>57</sup> <https://www.sciencedirect.com/science/article/pii/S0048969721076208>

<sup>58</sup> <https://science.sciencemag.org/content/371/6525/185>

<sup>59</sup> <https://www.sciencedirect.com/science/article/pii/S0304389421025917>

<sup>60</sup> <https://www.sciencedirect.com/science/article/pii/S0013935118305528>

<sup>61</sup> <https://ncceh.ca/documents/guide/human-health-risk-assessments-addressing-artificial-turf>

<sup>62</sup> <https://www.safehealthyplayingfields.org/the-problem-with-alternative-infills>

<sup>63</sup> [https://www.researchgate.net/publication/27453426\\_Leaching\\_of\\_zinc\\_from\\_rubber\\_infill\\_on\\_artificial\\_turf](https://www.researchgate.net/publication/27453426_Leaching_of_zinc_from_rubber_infill_on_artificial_turf)

<sup>64</sup> <https://link.springer.com/article/10.1007/s00128-021-03123-9>

<sup>65</sup> [https://www.iss-sportsurfacescience.org/downloads/documents/5VEU2CZB25\\_NIVAEngelsk.pdf](https://www.iss-sportsurfacescience.org/downloads/documents/5VEU2CZB25_NIVAEngelsk.pdf)

<sup>66</sup> <https://portal.ct.gov/-/media/DEEP/artificialturf/DEPArtificialTurfReportpdf.pdf>

## Understanding the True Costs of Synthetic Grass/Artificial Turf

The true cost of PFAS include investigations into contaminated sites, health reports, site remediation, waste disposal/recycling, damages to human health, and more. Studies are already revealing the amount of money that goes into health-related PFAS costs in the [United States](#)<sup>67</sup> and [Europe](#),<sup>68</sup> with studies showing just 13 PFAS-related health conditions costing Americans anywhere between [\\$5.5 to \\$63 billion](#).<sup>69</sup>

The largest cost is the harm to human health. PFAS manufacturers such as 3M have already paid billions to treat human health conditions caused by PFAS contamination. Medical problems, increased medical bill costs, reduced workplace productivity, and diminished mental health and well-being are all health consequences of PFAS contamination. Many report [feeling depressed and anxious about PFAS](#) and this affects their day-to-day lives.<sup>70</sup> In addition, due to the [increased risk of injury for athletes](#) on synthetic grass/artificial turf, it is important to consider the costs of treatment, recovery, and rehabilitation for athletes.<sup>71</sup> For children and adults alike, not only can this be financially draining, but also damaging to mental health and physical well-being.

The costs associated with PFAS contamination also include monitoring and testing of water supplies and the development of new treatment technologies.

## The PFAS Contamination Crisis: A Threat to Our Drinking Water

PFAS have been detected in air, drinking water, wastewater, groundwater, soil, and even [rain](#) around the world.<sup>72</sup> PFAS can be volatile, especially with higher temperatures and can be carried long distances via the air, leading to soil and groundwater contamination near and far from the source. Industrial sites, landfills, and wastewater treatment plants are all major sources of PFAS that contaminate [drinking water sources](#) such as lakes and rivers.<sup>73</sup> PFAS exposure through drinking water can potentially lead to [cancer, harmful effects to a developing fetus or infant, and damage to the immune system and liver](#).<sup>74,75</sup> In addition, PFAS accumulating in our waterways can also lead to these chemicals contaminating the country's crops and other food sources, leading to more widespread pollution.

The cost of cleanup for PFAS-contaminated water can be astronomical for affected communities. Low-income communities in particular struggle to financially recover

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<sup>67</sup> <https://nyulangone.org/news/daily-exposure-forever-chemicals-costs-united-states-billions-health-costs>

<sup>68</sup> <https://www.pfasciencepanel.org/true-cost-of-pfas>

<sup>69</sup> <https://jheor.org/post/1612-study-ties-forever-chemicals-exposure-to-billions-in-us-health-costs>

<sup>70</sup> <https://www.themainemonitor.org/the-price-of-pfas-forever-chemicals-generate-boundless-costs/>

<sup>71</sup> <https://www.usnews.com/news/health-news/articles/2022-10-07/could-synthetic-turf-raise-kids-odds>

<sup>72</sup> <https://www.ctvnews.ca/climate-and-environment/pfas-levels-in-rainwater-have-made-it-unsafe-to-drink>

<sup>73</sup> [https://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/pfas.html](https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas.html)

<sup>74</sup> <https://calmatters.org/projects/california-water-contaminated-forever-chemicals/>

<sup>75</sup> <https://oehha.ca.gov/water/notification-level/notification-level-recommendations-perfluorooctanoic-acid-pfoa>

from PFAS contamination in their drinking water due to the [high expenses](#).<sup>76</sup> Testing soil and water samples can cost hundreds of dollars per sample; landfilling contaminated soil includes costs of transportation, labor, and tip fees; and clean-up options are limited and costly. Early estimates of the cost of clean-up for PFAS in the nation's drinking water are about [\\$400 billion](#).<sup>77</sup> Lastly, PFAS contamination in the water can [decrease property values](#), further distressing affected communities.<sup>78</sup>

## **Synthetic Grass/Artificial Turf is Plastic Pollution**

The installation and use of synthetic grass/artificial turf is the intentional installation and use of [microplastics](#)<sup>79</sup> which does serious harm to the [environment](#)<sup>80</sup> and [human health](#).<sup>81</sup> Recent [research](#)<sup>82</sup> has found microplastics in placentas, infant feces, breastmilk, and even infant formula. Other studies have shown microplastics changing [lung and liver cells](#).<sup>83</sup> [Microplastics were banned in United States cosmetics](#)<sup>84</sup> in 2015, but the ban on microplastics should apply to all areas of life in order to reduce these health risks.

Plastics don't break down in the environment, simply breaking down into microplastics. [Wildlife can mistake microplastics for food](#) and marine animals have been found to consume microplastics accidentally.<sup>85</sup> Microplastics attract and carry [pollutants](#) in the water and also [release toxic chemicals](#).<sup>86,87</sup> Lab studies have shown that microplastics may impact the [developmental stages](#) of animals, causing reproductive issues and their ability to fight disease.<sup>88</sup> Furthermore, since humans consume fish and other marine animals, the impacts of microplastics are passed on to humans through the food chain.

The plastic life cycle is incredibly toxic. [Research](#) shows it causes premature birth, low birth weight, decreased fertility, asthma, childhood leukemia, lymphoma, brain cancer, breast cancer, mesothelioma, cardiovascular disease, chronic obstructive pulmonary disease, neuropathy, and lung cancer.<sup>89</sup>

## **Synthetic Grass/Artificial Turf is Not Recycled**

Used synthetic grass/artificial turf is expected to produce [1-4 million tons of plastic](#)

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<sup>76</sup> [https://www.akaction.org/wp-content/uploads/Cordner\\_2021\\_True-Cost-of-PFAS-and-Benefits-of-Acting-Now](https://www.akaction.org/wp-content/uploads/Cordner_2021_True-Cost-of-PFAS-and-Benefits-of-Acting-Now)

<sup>77</sup> <https://www.politico.com/news/2022/09/13/the-battle-over-who-pays-to-clean-up-chemicals-00056136>

<sup>78</sup> <https://aeiconsultants.com/pfas-real-estate/>

<sup>79</sup> <https://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/microplastics>

<sup>80</sup> <https://www.unep.org/news-and-stories/story/plastic-planet-how-tiny-plastic-particles-are-polluting>

<sup>81</sup> <https://www.theguardian.com/environment/2021/dec/08/microplastics-damage-human-cells-study>

<sup>82</sup> <https://www.news-medical.net/news/20220921/Microplastics-detected-in-placentas-infant-feces-breast>

<sup>83</sup> <https://www.onegreenplanet.org/environment/microplastics-are-disrupting-metabolism-of-lung-and-liver>

<sup>84</sup> <https://www.fda.gov/cosmetics/cosmetics-laws-regulations/microbead-free-waters-act-faqs>

<sup>85</sup> <https://marinedebris.noaa.gov/what-marine-debris/microplastics>

<sup>86</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7924819>

<sup>87</sup> <https://link.springer.com/article/10.1007/s42452-019-1352-0>

<sup>88</sup> <https://www.frontiersin.org/articles/10.3389/ftox.2022.748912/full>

<sup>89</sup> <https://www.theguardian.com/environment/2023/plastics-cause-issues-from-cancer-to-birth-defects>



[waste](#)<sup>90</sup> in the next ten years. The plastic carpet and rubber crumb infill from synthetic grass/artificial turf fields are often [dumped illegally or sent to landfills](#) since there are [no United States recycling facilities for synthetic turf](#).<sup>91,92</sup> [Reuse is not recycling!](#)<sup>93</sup>

## **Synthetic Grass/Artificial Turf Hurts the Climate**

Synthetic grass/artificial turf is plastic and [plastic emits methane](#), a powerful greenhouse gas (GHG).<sup>94</sup> Plastics start as fossil fuels and emit greenhouse gasses in every stage of their [lifecycle](#), from the extraction of oil/gas to the trash pile.<sup>95</sup> Plastics have a [huge carbon imprint](#).<sup>96</sup> Research showed the emissions from plastics in 2019 were nearly 1.8 billion metric tons of greenhouse gasses, and that number is [projected to continue growing](#).<sup>97</sup>

Dr. Sarah-Jeanne Royer of the Scripps Institution of Oceanography in California wrote a [letter](#) in opposition to synthetic grass/artificial turf, citing methane as a major concern.<sup>98</sup> Dr. Royer and her colleagues found that polyethylene, used to make synthetic turf/artificial grass, [releases more methane](#) than any other plastic.<sup>99</sup>

During the [breakdown of polyethylene, the release of methane gas accelerates](#) and the surface area of the plastic increases, reacting more with the sunlight and releasing more methane.<sup>100</sup> As synthetic grass/artificial turf is commonly made of polyethylene, these fields constantly release methane as it interacts with the sun and everyday use. Over a 20-year period, [methane is 80x more potent](#) at warming than carbon dioxide and is responsible for 25% of global warming.<sup>101</sup>

## **Native Pollinators and Biodiversity at Risk**

Synthetic grass/artificial turf create [inhabitable](#) areas for pollinators and birds to live and survive.<sup>102</sup> Pollinators and birds [rely](#) on grasses for protection, food, and nesting sites.<sup>103</sup> Birds rely on [worms](#) and other soil-dwelling organisms for food but these organisms can not survive on synthetic turf.<sup>104</sup> The chemicals in synthetic grass/artificial turf [leach into the ground causing harm](#) to soil-dwelling organisms

<sup>90</sup> <https://www.ydr.com/in-depth/news/2019/11/18/old-artificial-turf-fields-pose-huge-waste-problem>

<sup>91</sup> <https://www.theatlantic.com/science/artificial-turf-fields-are-piling-no-recycling-fix/603874/>

<sup>92</sup> <https://peer.org/artificial-turfs-big-lie-old-fields-not-recycled/>

<sup>93</sup> <https://peer.org/artificial-turfs-big-lie-old-fields-not-recycled/>

<sup>94</sup> <https://www.mvtimes.com/2019/02/20/synthetic-turf-will-contribute-greenhouse-gas-problems/>

<sup>95</sup> <https://www.ciel.org/reports/plastic-health-the-hidden-costs-of-a-plastic-planet-may-2019/>

<sup>96</sup> <https://www.sciencedaily.com/releases/2019/04/190415144004.htm>

<sup>97</sup> <https://www.oecd.org/environment/plastics/increased-plastic-leakage-and-greenhouse-gas-emissions.htm>

<sup>98</sup> <https://drive.google.com/file/d/1O9NHwhVtY0vgHCcZDHHufkfcRdGFA35k/view>

<sup>99</sup> <https://www.bbc.com/news/science-environment-45043989>

<sup>100</sup>

<https://www.surfrider.org/news/new-study-shows-plastic-as-source-of-greenhouse-gases-potentially-contribut>

<sup>101</sup> <https://ecology.wa.gov/Blog/Posts/February-2023/The-trash-climate-connection-what-you-need-to-know>

<sup>102</sup> <https://metro.co.uk/2020/04/22/world-earth-day-time-rip-fake-grass-save-birds-bees-12595457>

<sup>103</sup> <https://dyckarboretum.org/native-grasses-help-pollinators/>

<sup>104</sup> <https://outlookgardens.com/cms/10-reasons-why-fake-lawns-are-not-good-for-the-environment/>

for years.<sup>105</sup> This damage can completely [inhibit](#) life to be able to grow in the area.<sup>106</sup> [Habitat loss](#) is one of the main drivers of the pollinator decline and synthetic turf is part of that problem.<sup>107</sup> About a third of the crops humans rely on for food are pollinated by pollinators. Synthetic grass/artificial turf is already causing a [decline](#) in pollinators and birds.<sup>108</sup> Over time these species will only continue to decline unless action is taken.

## **Natural Areas Improve Mental Health**

Plastic is not comparable to nature and [experiencing nature](#) enhances a child's understanding of the world and can shape who they are.<sup>109</sup>

Access to nature is a key factor in mental health and functioning, especially for children. According to the American Psychological Foundation [green spaces have been proven](#) to promote cognitive development in children, better attentional functioning in adults, and improvements in working memory and cognitive flexibility.<sup>110</sup> Studies have shown that children who play in natural green areas also exhibit fewer symptoms of [ADHD](#)<sup>111</sup> and [mental illness](#).<sup>112</sup>

[Nature-deficit disorder](#) contributes to the diminished use of the senses, attention difficulties, conditions of obesity, and higher rates of emotional and physical illnesses.<sup>113</sup> Connecting with animals and nature in true green spaces can help children form new connections with the natural world that will [greatly improve their mental and physical well-being](#).<sup>114</sup>

## **Stop the Use of Synthetic Grass/Artificial Turf**

[Chemical exposure](#) is believed to be the cause of increased [childhood cancer rates](#) in the US with cancer being the leading cause of death by disease in children under 15.<sup>115,116</sup> [Leukemia has increased by 21% in children since 1976 with brain cancer rates increasing by 45%](#).<sup>117</sup>

With about [43 children diagnosed with cancer every day](#), we must reduce their exposure to toxic chemicals.<sup>118</sup> We must protect the places where they run and play,

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<sup>105</sup> <https://www.unep.org/news-and-stories/story/plastic-planet-how-tiny-plastic-particles-are-polluting-our-soil>

<sup>106</sup> <https://www.jackwallington.com/17-reasons-to-avoid-fake-lawns-how-bad-is-artificial-grass>

<sup>107</sup> <https://www.fws.gov/initiative/pollinators/threats>

<sup>108</sup> <https://www.theguardian.com/environment/2022/jul/17/why-fake-grass-is-far-from-green>

<sup>109</sup> <https://naturalearning.org/01-benefits-of-engaging-children-with-nature/>

<sup>110</sup> <https://www.apa.org/monitor/2020/04/nurtured-nature>

<sup>111</sup> <https://www.ctinsider.com/news/article/RTM-proactively-bans-crumb-rubber-artificial-turf-13464197.php>

<sup>112</sup> <https://www.sciencedirect.com/science/article/pii/S0160412014001779>

<sup>113</sup> <https://richardlouv.com/blog/what-is-nature-deficit-disorder/>

<sup>114</sup> <https://www.nature.org/en-us/about-us/who-we-are/how-we-work/benefits-of-outdoors-for-kids>

<sup>115</sup> <https://www.annals-research-oncology.com/pediatric-cancer-and-the-environment-a-fifty-year-perspective>

<sup>116</sup> <https://www.webmd.com/special-reports/cancer-strikes-a-small-town/20161020/childhood-cancer-rates>

<sup>117</sup> [https://www.annals-research-oncology.com/wp-content/uploads/2022/05/Landrigan\\_AnnResOncol-1.pdf](https://www.annals-research-oncology.com/wp-content/uploads/2022/05/Landrigan_AnnResOncol-1.pdf)

<sup>118</sup> <https://www.stjude.org/get-involved/other-ways/childhood-cancer-awareness-month.html>

the water they drink, and the air they breathe.

There is more than enough evidence concerning synthetic grass/artificial turf to show it puts our children and our environment at risk.

Please use real, natural grass for the Lucchesi Park MultiUse Field.

Additional Video Resources:

[Tire Particulate Matter in Synthetic Turf and Children](#)<sup>119</sup>

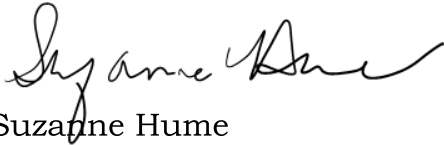
[Failing Synthetic Turf Fields](#)<sup>120</sup>

[Artificial Turf is Not Recycled](#)<sup>121</sup>

[Environmental Health Impacts of Synthetic Turf and Safer Alternatives](#)<sup>122</sup>

[Insult to Injury: Plastic Fields Hurt Players](#)<sup>123</sup>

Sincerely,



Suzanne Hume  
Educational Director and Founder  
S@CleanEarth4Kids.org  
(760) 518-2776  
CleanEarth4Kids.org

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<sup>119</sup> <https://youtu.be/UEVeAmqHTSM>

<sup>120</sup> [https://youtu.be/iV-Mh\\_q0gMI](https://youtu.be/iV-Mh_q0gMI)

<sup>121</sup> <https://youtu.be/Y5o3J7uy4Tk>

<sup>122</sup> <https://youtu.be/mel-tIUQImY>

<sup>123</sup> <https://youtu.be/f1Ahv1ve1A4>

**From:** [Rika Gopinath](#)  
**To:** [Montoya, Michelle](#)  
**Subject:** [EXTERNAL] Public Comment to Climate Action Sub-Committee  
**Date:** Wednesday, October 4, 2023 1:46:59 PM

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Hello Chair Rogers and Members Rogers and Fleming,

My name is Rika Gopinath and I am Chair of YardSmartMarin and Co-Chair of the California chapter of NonToxic Communities. We support efforts to eliminate toxic chemicals to protect public health and the environment.

Purveyors of artificial turf pitch their products as an environmentally smart choice. A closer look at the facts shows this is not the case and artificial turf has a negative impact on efforts to combat climate change.

It is not surprising that fields of plastic would create heat islands, directly worsening climate change. Surface temperatures can be dangerously high, even leading to melted shoes and heat stroke. Artificial turf contributes to climate change in indirect ways as well.

Artificial turf is made of petroleum-based polyethylene plastic. This plastic is the most prolific emitter of methane (20 times more potent than carbon dioxide) and ethylene gases. These fields generate greenhouse gasses over the course of their useful lives (only 8-10 years) and for hundreds of years after they are dumped in landfills - an astonishing 40,000 lbs of synthetic waste per acre. Despite industry claims, artificial grass cannot be effectively recycled.

All of this plastic degrades into microplastics that contaminate our water, soil, and air. The plastic blades of grass and their backing contain dangerous chemicals such as PFAS and flame retardants. The infill material contains chemicals including known carcinogens plus heavy metals like lead.

The answer is to turn to organically managed real grass instead. Real grass sequesters carbon and cools the earth. And Santa Rosa can get funding, training, and support from Beyond Pesticides with their [Parks for a Sustainable Future](#) program. I am the North Bay contact and I am currently working with multiple Marin municipalities to apply for this program. I would be happy to talk with you about this opportunity as well.

Organic grass has come a long way in the past decade. Today, organically managed grass is more drought-tolerant, more-pest-resistant and healthier than conventionally managed grass. This is possible because organic land management systematically builds the health of the soil. When soil is healthy, purchasing chemical fertilizers and herbicides is not necessary and thus it is actually less expensive to manage grass

this way. And of course not using pesticides makes these fields a safer place to play.

I encourage you to pass a ban on artificial turf and pesticides, and turn to organic land management instead. Our children and our planet will thank you for making this choice.

Rika Gopinath  
Chair, Yard Smart Marin



Pronouns: she/her

[www.yardsmartmarin.org](http://www.yardsmartmarin.org)



**From:** [Annie Stuart](#)  
**To:** [Montoya, Michelle](#)  
**Subject:** [EXTERNAL] Ban plastic grass, stop using herbicides  
**Date:** Wednesday, October 4, 2023 2:03:12 PM

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Dear Santa Rosa City Council Members,

Most of us care deeply about the health of our children, environment, and climate.

If this describes you, ask yourself why it makes sense to continue to install plastic grass – an “invasive species” that **seriously harms all three**. Synthetic turf:

- Contains plastic, a petrochemical product, and recycled tires or other untested materials
- Releases microplastics and toxic chemicals – many that are linked to cancer – into our soil, water, and air, putting children at greatest risk
- Creates heat island effects – an increasing concern, given rising temperatures
- Requires ongoing maintenance costs for sanitation and disinfection
- Has a short “life,” requiring regular replacement and increasing overall costs
- Is not recyclable in the U.S. and is therefore incinerated or landfilled at the end of its useful “life,” contributing to our climate crisis and putting nearby communities at risk

Lead the way in Sonoma County.

**First**, ban installation of new plastic grass fields. With adequate funding for our parks, we *can* successfully maintain natural grass fields and address issues such as watering and injuries from gopher holes.

**Second**, stop using synthetic herbicides. According to the Pesticide Action Network, 99 percent of all synthetic chemicals, including pesticides, are derived from fossil fuels and can release greenhouse gas emissions after application. Additionally, their production, on average, requires 10 times more energy than that of nitrogen fertilizer.

With a rapidly accelerating climate crisis and myriad environmental challenges, we cannot afford short-term thinking. Please act on our behalf.

Annie Stuart,



Steering Committee Member

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Annie Stuart  
Encore Editorial Services



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