

August 15, 2023

## RE : Oppose Synthetic Turf

City Of Petaluma Recreation, Music & Parks Commission Members,

CleanEarth4Kids.org strongly opposes using synthetic grass/artificial turf for the Lucchesi Park MultiUse Field. 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 Petaluma Parks & Recreation Department follow organic land management practices, especially for managing playing fields.

### PROFESSIONAL-LEVEL TRAINING ORGANIC FIELD MANAGEMENT

**Organically maintained lawns and fields are:**

- more resilient
- more drought-tolerant
- more resistant to pest infestations
- safer, cooler, less expensive than plastic turf

**Thurs., Sept. 28, 2023  
8:30 am - 4:30 pm**

**Petaluma CA**

Lunch will be provided

Scan the code to register.  
Or go to [www.NonToxicSchools.org](http://www.NonToxicSchools.org)

Thanks to our sponsors, this seminar is offered at a highly-discounted rate of \$40. **CE Credits available.**

For more information, contact [info@nontoxicschools.org](mailto:info@nontoxicschools.org)

**Chip Osbourne, the nation's top organic turf expert, will cover:**

- Developing and maintaining healthy soil
- Choosing the right grass
- Fertilization, soil amendment, and the importance of soil testing
- Best practices for irrigation, mowing, aeration, and over-seeding
- Pesticide use and IPM
- Addressing specific pest problems without traditional chemical pesticides
- Gopher management

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>

Chip Osborne, the recognized expert in organic turf management, will be in Petaluma on Thursday, September 28th for a training.

He will go over all you need to know about how to install and maintain healthy, drought-resistant natural grass playing fields.

<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/o3P1T3fgy6I>

[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° 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](#)

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<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/>

<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>

[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 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

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

<sup>21</sup> <https://sportsturfnow.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>

<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/>

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 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>

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<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>

<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>



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 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

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<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>

<sup>53</sup> <https://www.lenntech.com/periodic/elements/zn.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>

[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>

### **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**

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<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.isss-sportsurfacescience.org/downloads/documents/5VEU2CZB25\\_NIVAEngelsk.pdf](https://www.isss-sportsurfacescience.org/downloads/documents/5VEU2CZB25_NIVAEngelsk.pdf)

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

<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>

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 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

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<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>

<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>

[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 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

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<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>

<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.mytimes.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/1Q9NHwhVtY0vgHCcZDHhufkfcRdGFA35k/view>

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



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 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

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<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/>

<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://naturalelearning.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>

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, 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>

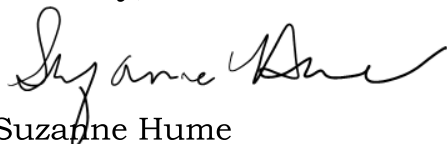
[Failing Synthetic Turf Fields](#)<sup>120</sup>

[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,



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<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>

<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/f1AhvIve1A4>