CRITICAL PROBLEMS WITH ARTIFICIAL TURF

Across New York and the nation, artificial turf fields are replacing natural grass at parks, schools, sports fields, and in landscaping at an alarming rate. Currently, there are 12,000-13,000 artificial turf fields in the U.S., with an estimated 1,200-1,500 new artificial turf fields being installed every year. Artificial turf is made up of 3 layers: infill, fibres, and shock pad. The materials used in artificial turf can vary but often they contain crumb rubber, foam, polyethylene, polypropylene, and nylon. There is growing concern and research connecting artificial turf to a variety of adverse health, safety, and environmental impacts. Increase in injuries, exposure to toxic chemicals, water contamination, PFAS pollution, and plastic pollution are all problems associated with artificial turf.

PFAS CHEMICALS IN ARTIFICIAL TURF

PFAS (per- and polyfluoroalkyl substances) are a class of over 12,000 chemicals used in a diverse range of products and industrial processes.[1] PFAS are often referred to as "forever chemicals" due to their persistence in our environment and bodies—meaning that they don't break down and they accumulate over time. Exposure to PFAS is a threat to public health that leads to adverse human health effects such as increased high blood pressure, reproductive effects, developmental effects or delays in children, increased risk of some cancers including prostate, kidney, and testicular cancers, reduced ability of the body's immune system, interference with the body's natural hormones, and increased cholesterol levels—some of which occur at extremely low levels of exposure.[2] According to the U.S. Environmental Protection Agency (EPA), there is essentially no safe level of exposure to certain PFAS chemicals.[3]

PFAS can be used in the manufacturing process of artificial turf and added to the polymer mixture to help it extrude from equipment into its final shape as a blade of grass. Recently, research has been conducted to determine if PFAS is present in artificial turf. In 2019, **Public Employees for Environmental Responsibility** (PEER) conducted testing on artificial turf and found the blades and backing contained PFAS.[4] Given the large areas in which artificial turf is used in sports fields, parks, and outdoor municipal and residential settings, this represents a potentially large source of PFAS pollution in the environment. Whenever it rains, PFAS can leach from artificial turf fields and enter our environment as runoff contaminating soil and water resources. Additionally, the potential for human exposure to PFAS associated with playing on artificial turf is an important concern. Health impacts of PFAS exposure through artificial turf are presently unstudied; however, there is the potential for PFAS exposure through inhalation, ingestion, and dermal routes.

HUMAN HEALTH IMPACTS OF ARTIFICIAL TURF

There is growing concern from communities and athletes on impacts to human health from playing on artificial turf. These include increased injuries, heat hazards, and exposure to a number of toxic chemicals. Because of these increased threats to our health, there are growing call from communities stop any new installation of artificial turf fields and reinstall natural grass fields.

Recent studies conducted on the injury rate of professional and amateur sports on artificial turf and natural grass sports fields suggest that there is an increased occurrence of foot and leg injuries on artificial turf. Research evaluating NFL foot and leg injuries during the 2012-2016 regular season games found that 16% more injuries per play occurred on artificial turf compared to natural grass.[5] Athletes and children playing on artificial turf also experience "turf burns" from slipping or falling on the turf. The hard plastic "grass" blades can severely scrape off skin and has been associated with the spread of bacteria and MSRA in school sports teams. Additionally, artificial turf fields absorb and retain a lot of heat, in the summer these fields can reach temperatures of 170 degrees Fahrenheit.[6] This poses a risk of dehydration, heatstroke, and blistering of the hands and feet of athletes and children playing on the fields.

Artificial turf utilizes large amounts of crumb rubber as infill, made from ground up tires, that holds the "grass" blades upright and provides cushioning for athletes. In 2019, the U.S. EPA, Agency for Toxic Substances and Disease Registry (ATSDR), and the Center for Disease Control and Prevention released research that found a range of metals, volatile organic compounds (VOCs), and bacteria in and on the tire crumb infill.[7] Additionally, an evaluation conducted by Yale University found 306 chemicals in crumb rubber, 197 of which were predicted to be carcinogenic to humans and 58 chemicals were classified as carcinogens by government agencies.[8] Industry is moving away from the use of crumb rubber in artificial turf, however there are still many fields installed with infill material.

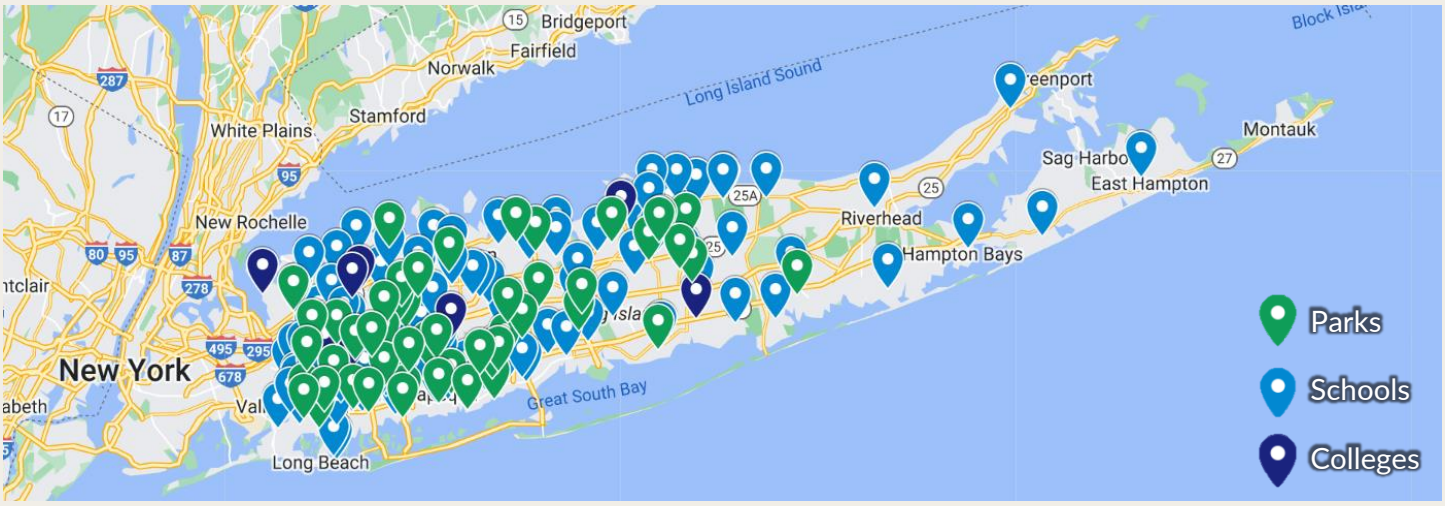
Studies show that human exposure to PFAS is widespread and that nearly all people in the United States have some PFAS compounds in our blood. Exposure to PFAS can lead to a variety of adverse human health impacts and research is underway to better understand the health effects associated with low levels of exposure over long periods of time, especially in children. Testing of artificial turf found the blades and backing contained PFAS. As schools, parks, and sports centers continue to install artificial turf, children and athletes who play on these surfaces are regularly being exposed to harmful PFAS chemicals and could potentially experience negative health effects.

WATER CONTAMINATION

Artificial turf contains hundreds of chemicals that regularly leach off the field and enter our water resources, with PFAS being of particular concern. In recent years, communities across New York and the nation discovered their drinking water sources are contaminated with harmful PFAS chemicals. Due to widespread use of PFAS chemicals in numerous products and industries, PFAS chemicals are now ubiquitous in the environment, including our soil, air, and drinking water. Testing revealed some levels of PFAS in approximately 50% of public water systems across New York.[9]

According to the U.S. Environmental Protection Agency, there is essentially no safe level of exposure to PFAS chemicals in drinking water. In April 2024, the U.S. Environmental Protection Agency established the nation's first legally enforceable drinking water standards for 6 PFAS chemicals.[10] As a result of new federal drinking water standards, 296 additional communities throughout New York are

estimated to need treatment technology to remove PFAS chemicals.[11] The growing use of artificial turf across the state is a potential contributor to PFAS contamination of water resources.
Long Island is a sole-source aquifer region, which means residents rely on groundwater for 100% of their drinking water. This makes the aquifer particularly vulnerable to any contamination on the land and through runoff. Unfortunately, artificial turf has replaced natural grass fields at parks, schools, and colleges across Long Island.[12] There is estimated to be over 200 artificial turf fields on Long Island.



When an artificial turf field is installed, the soil is flattened and compacted, inhibiting rainwater's ability to penetrate the ground. This results in increased stormwater runoff and pollutants leaving artificial turf fields and entering our environment. According to the U.S. EPA, artificial turf is "impervious," and water cannot move through the surface as it would on a natural turf field.[13] Instead, rainwater leaves the field as stormwater runoff carrying PFAS, toxic chemicals and other pollutants from the artificial turf fields into nearby groundwater and waterways. There are real world examples showing water near artificial turf is contaminated with PFAS due to the chemical leaching off the field into water resources. In Martha's Vineyard, MA, a study found that 12 parts per trillion of 6 different PFAS chemicals leach off a new artificial turf field and that amount increases as the field ages and deteriorates.[14] In Woodridge, CT, PFAS levels increased significantly in waters nearby an artificial turf field just 2 months after it was installed.[15]

The new federal drinking water standards will prevent PFAS exposure in drinking water for approximately 100 million Americans and $1 billion in federal funding has been made available for the testing and treatment of drinking water supplies.[16] ***However, the increased installation of artificial turf fields across the state puts additional communities and drinking water sources at risk of additional PFAS contamination.***

MICROPLASTIC POLLUTION

Microplastic pollution is an ongoing problem for our environment and aquatic species. These are small pieces of plastic less than 5 millimetres in size that are from both commercial products and the breakdown of larger plastics. There are at least 13,000 different chemicals in plastics, many of which are known to be toxic, which leach out from microplastics into the surrounding environment.[17] Aquatic species often mistake microplastics for food and when consumed it causes a variety of negative health impacts, including death.

Artificial turf fields are contributing to the microplastic problem. When installed outdoors, the plastic fibers or "grass" blades rapidly deteriorate in the sun and begin to breakdown. These fibers break off into smaller and smaller pieces of plastic that eventually make their way into the environment from stormwater runoff or are carried off on athlete's shoes. Additionally, the crumb rubber used as infill are small pieces of rubber that are easily carried off the fields in the same manner as the plastic fibers. Tire crumb infill is not only a source of microplastic pollution, but also leaches toxic chemicals into the environment. Studies have shown that the chemicals in crumb rubber pose a risk to the aquatic environment.[18]

New research from the University of Barcelona found that artificial turf can significantly contribute to microplastic pollution. A full-sized athletic field can release 1.5 - 2.5 tons of infill and 0.5 - 0.9 tons of fibers into the environment each year.[19] Data shows that 0.5 – 10% of fibers are lost from sports fields annually and up to 6% of those fibers reach surface waters.[20] Considering that an artificial turf field can contain up to 3 billion fibers, the release of plastic from these fields into surface waters is very high. Over 50% of samples taken nearshore and near big cities such as Barcelona contained artificial turf fibers.[21] While samples from rivers contained less artificial turf fibers than samples from the ocean, the number of fibers found in rivers is still significant. These fibers will continue to break down into micro and nano plastics polluting our oceans, rivers, and water resources. This study focused on plastic pollution from athletic fields; the amount of plastic entering our environment and water is likely much higher when artificials turfs installed at schools, parks and residences is accounted for.

GREENWASHING AND RECYCLABILITY

Greenwashing is when businesses make false, deceptive, or misleading claims about a product's environmental benefits. The artificial turf industry has successfully used this tactic to promote the sale and installation of these fields instead of natural grass. Their claims include a long lifespan, lower maintenance, recyclability, non-toxic materials, reduced water use, and more. Consumers that are environmentally conscious may choose to install artificial turf over natural grass due to these deceptive claims. Artificial turf fields have a typical lifespan of 8-10 years,[22] yet many artificial turf companies claim these fields can last over 25 years. With over 1,000 new fields being installed every year and an estimated 750 fields being removed annually,[23] there is a significant amount of waste being generated by this industry. The short lifespan of these fields presents an ever-growing problem when dealing with waste and disposal when the fields need to be replaced, yet companies dismiss this problem by falsely claiming these fields are recyclable.

Artificial turf is extremely difficult and expensive to recycle since the fields utilize various types of plastics, rubber, and other infill materials that all must be separated in the recycling process. Globally, there are only two facilities that recycle artificial turf located in the Netherlands[24] and in Denmark,[25] however, U.S. artificial turf fields are not being sent to these facilities. Artificial turf fields cannot be sent to traditional recycling facilities and currently there are no artificial turf recycling plants in the United States.[26] This poses an immense burden on the communities these fields are installed in who do not have a recycling option for old artificial turf fields. Without any recycling option, U.S. artificial turf fields that reach the end of their life are being disposed of in landfills, incinerators, or illegally dumped. This is contributing to the solid waste crisis and represents another avenue for PFAS to enter the environment through landfill leachates.

ARTIFICIAL TURF WORSENING THE IMPACTS OF CLIMATE CHANGE

The impacts of climate change are being felt across New York and the nation. Extreme weather events, increased precipitation, flooding, drought, and heatwaves are occurring more frequently and severely. Artificial turf is not only contributing to climate change but is also making communities more vulnerable to the impacts. Everything from the manufacturing, installation, and disposal of artificial turf has a large carbon footprint. It is estimated that construction, maintenance, and removal of artificial turf fields creates 527 tons of CO2 equivalents.[27] Artificial turf is made from petroleum-based plastics and the manufacturing process is very energy intensive contributing to climate change. Greenhouse gasses ethylene and methane are released throughout the life of artificial turf and continue to when

they are disposed of in landfills. The installation of artificial turf not only contributes to climate change through the loss of natural grass and soil which captures carbon, but also makes communities more vulnerable to the impacts.

When installing an artificial turf field, the ground is compacted to the point where is becomes impervious and water cannot move through and be absorbed by the soil. Instead, water runs off artificial turf fields and increases the chance of flooding especially during extreme weather events or from increased precipitation. Flooding damages infrastructure, residential homes, local businesses, and increases raw sewage overflows into local waterbodies. The heat island effect is an impact of climate change that occurs in urbanized areas where they experience higher temperatures than outlying rural areas. Artificial turf becomes significantly hotter than natural grass and is contributing to the urban heat island effect.

COST OF ARTIFICIAL TURF

One of the selling points of artificial turf fields is that it cost less than natural grass fields between the installation and lifetime maintenance of the field. The actual lifetime costs of artificial turf fields are much higher than that of natural grass. The average cost of installing a new artificial turf fields costs between $850,000 - $1,000,000 depending on size and material, while the cost of a natural grass field can cost between $250,000 and $600,000 depending on the size and type of field being installed.[28] Because the materials used for artificial turf fields wear out over time, they must be replaced every 8-10 years at the same cost of the initial installation. The replacement of a natural grass field is a fraction of the cost—between $18,000 and $44,000.[29]

There is a misconception that artificial turf fields are cheaper over their lifetime comes from the myth that maintenance costs are much lower than those for natural grass. In reality, maintaining a natural grass field is only slightly more expensive than artificial turf. Some of the maintenance an artificial turf requires includes additional infill, chemical disinfectants, seam repairs, and watering to lower high temperatures reached on the fields. The Michigan State University Certified Sports Turf Manager cited that the typical annual maintenance costs of their artificial turf fields ranged from $13,720-$39,220, while the typical annual maintenance costs of their natural turf fields had a similar range of $8,133-$48,960.[30] Additionally, artificial turf requires specific maintenance equipment that differs from what's needed for a natural grass field. This would be an additional expense for schools or sports centers looking to replace natural grass with artificial turf.

ADDRESSING THE PROBLEMS WITH ARTIFICIAL TURF

Despite all the known environmental and health problems associated with artificial turf fields, they continue to be installed. This is particularly concerning for residents in New York where the runoff from these fields is contaminating our treasured water resources and drinking water. Many cities and states across the U.S. are now responding to the threats of artificial turf. Some cities, including Boston, have banned the installation of new artificial turf fields; California and Vermont have introduced legislation banning PFAS in artificial turf, and some municipalities and communities are holding public hearings on their concerns with artificial turf. In New York, extended producer responsibility legislation for carpet was passed into law and takes effect in 2026. This bill prohibits carpet sales unless the producer is participating in an approved industry-wide plan for carpet recycling or has established its own plan for carpet collection, and artificial turf is expressly included in the definition of carpet. This has the potential to limit the number of artificial turf fields being installed because these fields cannot be recycled and there are no artificial turf recycling facilities in the U.S. This law also bans the use of PFAS in carpeting, including artificial turf. While this will help address the environmental and public health concerns of PFAS in new fields, many other problems remain with artificial turf.

Legislation has been introduced in the New York Senate to place a moratorium on the installation of artificial turf fields that contain crumb rubber pending a comprehensive environmental and public health study (S.7239). This would help the state to understand impacts artificial turf has while preventing thousands of new fields from being installed every year. A moratorium on the installation of artificial turf products that contain crumb rubber is a starting point for New York, however, many artificial turf products have moved away from crumb rubber infill and still pose significant threats to our environment and health. In order to full address the damage caused by artificial turf, New York needs to address the issue in its entirety.

New York's legislative efforts may limit the installation and use of artificial turf, however there is concern these fields may continue to be installed in the state. Microplastic pollution, water contamination, disposal, public health threats, and climate implications are all significant problems posed by artificial turf regardless of if they contain PFAS or crumb rubber. More state and local action is needed to ensure the highly problematic artificial turf fields are not installed and properly disposed of at the end of their short lifespan.

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