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CLEAN WATER ACTION

COMMUNITY ACTION WORKS

June 21, 2021

Senator Julian Cyr
Massachusetts State House
24 Beacon Street, Room 163
Boston, MA, 02133

Representative Kate Hogan
Massachusetts State House
24 Beacon Street, Room 312-E
Boston, MA, 02133

Sent via email to: griffin.tighe@mahouse.gov, Jeffrey.soares@masenate.gov

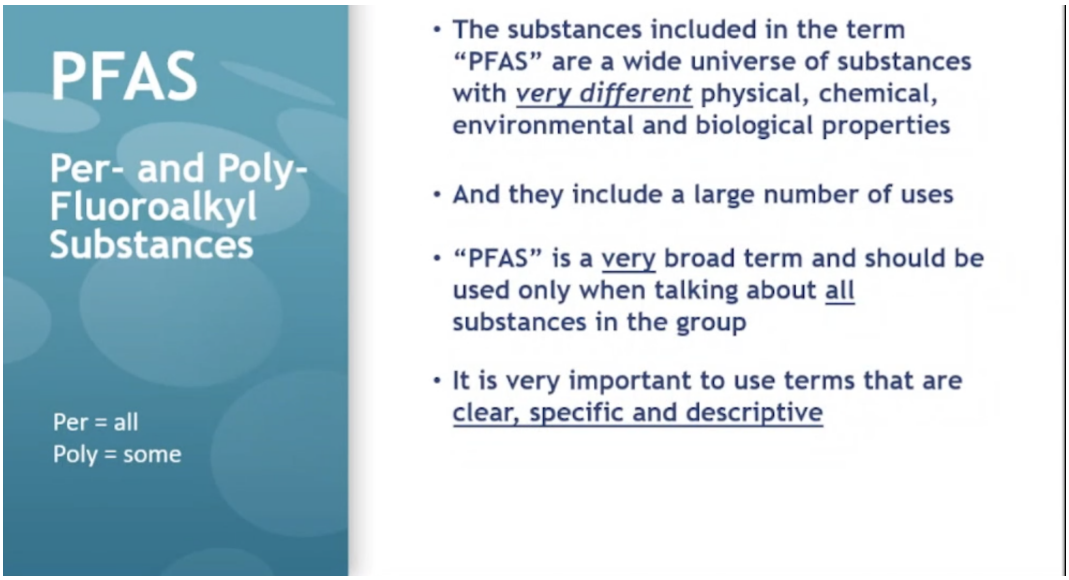
RE: Inaccuracies and misinformation in the June 16, 2021 PFAS Interagency Task Force Hearing

Dear Senator Cyr and Representative Hogan,

Public Employees for Environmental Responsibility (PEER), Massachusetts Sierra Club, Nantucket PFAS Action Group, Massachusetts Breast Cancer Coalition, Seaside Sustainability, Northeastern University's Environmental Justice Research Collaborative, Conservation Law Foundation, Northeastern University Social Science Environmental Health Research Institute, Clean Water Action, and Community Action Works (hereinafter the "Organizations") were dismayed to see that Robert J. Simon, Vice President of Chemical Products and Technology Division of the American Chemistry Council (ACC) was the first speaker at the June 16, 2021, Public Hearing of the PFAS Interagency Task Force. The purpose of this hearing was to "define PFAS chemicals using their chemical composition, identify the origins and pathways of exposure to PFAS chemicals, and consider their presence in the environment."[1] Mr. Simon holds a degree in political science and has an MBA[2] - he is not a scientist - and his presentation was replete with inaccurate statements and misinformation. PFAS chemistry is incredibly complex, and the Organizations therefore urge the task force to hear from one of the many scientists who can address the best way to define PFAS. Our specific issues with the ACC's testimony are set forth below. Note that all figures except a table from EPA and a graphic showing the fate of PFAS are taken directly from the ACC presentation.

The ACC incorrectly focused on the differences between PFAS, rather than their similarities. The ACC alleged that due to the large number of PFAS, the large number of uses, and their "*very different* physical, chemical, environmental and biological properties," they cannot be regulated as a class (see Figure 1).

Figure 1



[1] https://malegislature.gov/Events/Hearings/Detail/3787

[2] https://www.americanchemistry.com/About/ACCLeadership/Robert-J-Simon/

PFAS is an acronym for per-and polyfluoroalkyl substances, and the thousands of chemicals that are considered PFAS have some major commonalities: 1) they all have carbon (C) and fluorine (F) bonds; 2) they are incredible persistent chemicals, which do not break down naturally in the environment; and 3) most of the PFAS for which we do have data show toxicity to humans and wildlife; even those that are considered to be of lower health concerns have precursors, breakdown products, or other PFAS by-products of concern released during their manufacture, use, or disposal, and they can be of high climate or other environmental concerns.

The strong C-F bond makes PFAS stable in extreme temperatures, water resistant, and resistant to hydrolysis, microbial degradation, and metabolism by vertebrates.[3] Given their similarities, the fact that there are thousands of PFAS that have "a large number of uses" is irrelevant to whether they should be regulated as a class. Scientists working on PFAS argue that the persistence of these chemicals alone is enough to warrant grouping PFAS as a class for regulatory purposes. Specifically:

> [The idea behind the] persistence-sufficient, or "P-sufficient," approach to regulating PFAS…is that the persistence of PFAS is a sufficient basis to warrant regulation regardless of, say, the chemicals' bioaccumulation potential or toxicity… That is different from most chemical regulatory approaches, which tend to focus on hazard traits, such as whether a chemical is suspected or known to cause adverse health effects… if we keep emitting PFAS, their concentrations in the environment will increase, because they do not degrade, and ultimately some known or unknown 'effects threshold' will be breached. But because there are thousands of PFAS chemicals and we have inadequate toxicity data on most of them, we do not know what the long-term effects will be.[4]

The ACC presentation given to the PFAS Interagency Task Force is straight out of the industry playbook:

> The diversity in PFAS structures, properties and behaviour is often used by the PFAS manufacturing industry (citations omitted) to argue that PFAS cannot be treated as a single class. We acknowledge the diversity of PFAS in terms of properties, behaviour, hazards and risks, and that statements such as "all PFAS are bioaccumulative and toxic" are overgeneralized and debatable. However, despite their diversity, PFAS do share one common structural feature that makes them highly problematic, namely the presence of perfluoroalkyl moieties, resulting in their shared resistance to environmental and metabolic degradation. The vast majority of PFAS are either non-degradable or degrade to form terminal products which are still PFAS."[5]

As such, it is entirely appropriate to group PFAS together for regulatory purposes.

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[3] Zhu, Y, A. Ro, and S.M. Bartell, *Household low pile carpet usage was associated with increased serum PFAS concentrations in 2005-2006*, Environ Res. 2021 April ; 195: 110758

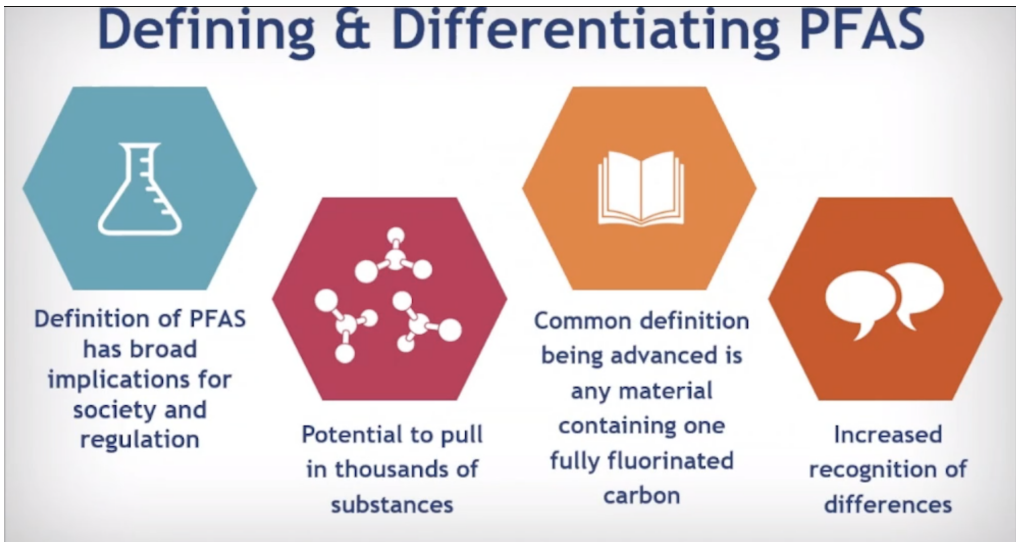
[4] https://ehp.niehs.nih.gov/doi/full/10.1289/EHP9302

[5] Cousins, IT, et al., *The high persistence of PFAS is sufficient for their management as a chemical class*, Environ. Sci.: Processes Impacts, 2020, 22**,** 2307-2312

The ACC implied that the definition of PFAS is too broad, and the regulation of all PFAS will have negative impacts on society. We acknowledge that PFAS are convenient; indeed, the ubiquitous nature of PFAS indicates how useful they are for waterproofing, stain resistance, etc. However, convenience should not override human health and environmental concerns. Moreover, the fact that the definition of PFAS is not settled in the United States should not become a bar to regulating these substances. The Organisation for Economic Co-operation and Development (OECD)/United Nations Environment Programme (UNEP) defines PFAS as "a fully (per) or partly (poly) fluorinated carbon chain connected to different functional groups."[6] The United States is a member of the OECD. In addition, EPA has a "working definition" of PFAS pursuant to the Toxic Substances Control Act (TSCA): "a structure that contains the unit R-CF2-CF(R')(R"), where R, R', and R" do not equal "H" and the carbon-carbon bond is saturated (note: branching, heteroatoms, and cyclic structures are included)."[7] While these definitions are not identical, neither definition is too broad.

Figure 2 from the ACC presentation states that there is an "[i]ncreased recognition of [the] differences" among the thousands of PFAS (see Figure 2, below). It is the PFAS industry and the ACC pushing the idea that there are major differences among PFAS, such that they cannot be regulated as a class. Chemists, toxicologists, epidemiologists, and other scientists who study PFAS are increasingly urging EPA to look at the commonalities, and take a class approach to regulating these chemicals (this will be discussed in more detail, below).

Figure 2



Moreover, we agree that the definition of PFAS has "broad implications for society," but mainly because the *failure* to regulate PFAS will result in increased widespread contamination, and corresponding adverse impacts on human health and the environment.

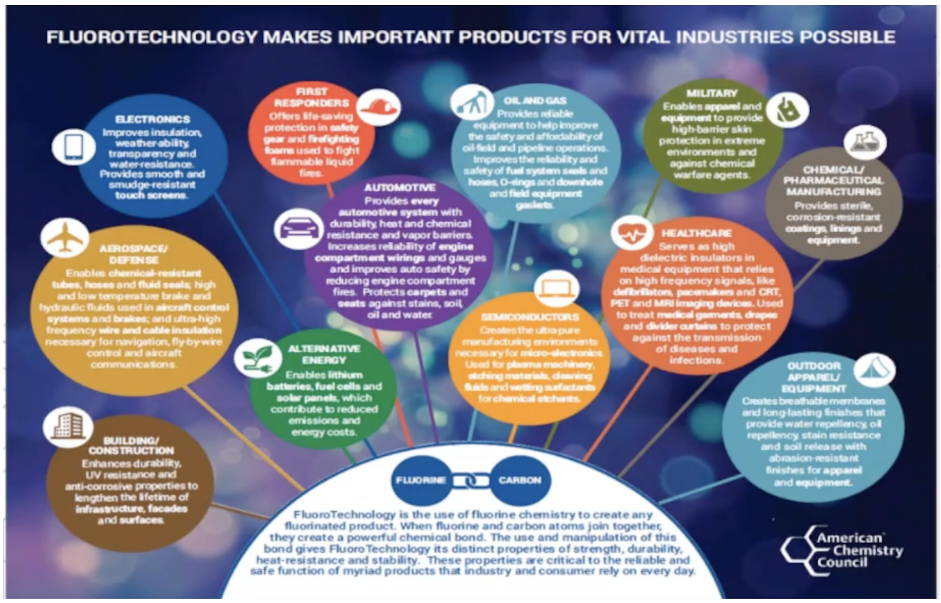
[6] https://www.oecd.org/chemicalsafety/portal-perfluorinated-chemicals/PFASs-and-alternatives-in-food-packaging-paper-and-paperboard.pdf

[7] https://www.epa.gov/pesticides/pfas-packaging

The ACC stated that PFAs are "vital" for industries, yet there are non-fluorinated alternatives for most of these uses. Figure 3 from the ACC presentation indicates that PFAS are "critical," "vital," and that consumers "rely on" these chemicals. The slide shows a number of sectors that use PFAS:

- Building/construction
- Aerospace/defense
- Electronics
- First responders
- Automotive
- Alternative energy
- Oil and gas
- Semiconductors
- Healthcare
- Military
- Chemical/pharmaceutical manufacturing

Figure 3



There is a difference between chemicals being essential and being convenient. Very few of these industries *require* PFAS. For example, the PFAS in firefighter turnout gear is a requirement placed in the standards by the PFAS industry, and it is not necessary.[8] PFAS is not necessary in outdoor apparel and equipment, as evidenced by the number of manufacturers who have removed fluorinated fabrics from their products.[9] PFAS is not "customarily" used in solar panels;[10] again, this is an industry talking point that has no merit and is designed to scare people.

[8] See, e.g., https://www.eenews.net/stories/1063725299

[9] https://pfascentral.org/pfas-free-products/; in fact, PEER recently tested Dyneema fabric, and found it to be PFAS-free. These products are available on the market today: https://www.hyperlitemountaingear.com/pages/dcf-dyneema-cuben-fiber

[10] http://graham.umich.edu/media/pubs/Facts-about-solar-panels--PFAS-contamination-47485.pdf

PFAS is not critical for many of these uses, and alternatives either already exist, or are being developed.

The ACC stated incorrectly that regulating all PFAS as a class is the same as regulating all chemicals with a carbon (C) and hydrogen (H) bond as a class. Figures 4 and 5 from the ACC presentation attempt to equate compounds with a C-F bond with those that have a C-H bond. This is not accurate.

EPA does group chemicals together for regulatory purposes. For example, EPA regulates classes of organophosphate pesticides, organochlorine pesticides, and organohalogen flame retardants. In the case of compounds with C-H listed on the ACC's slide, EPA would consider polyethylene to be a poorly-soluble respirable particulate, ethyl alcohol to be a short chain alcohol and neuro-and developmental-toxicant, and propane to be a flammable gas that can also cause central nervous system depression and suffocation at high concentrations. They are all extremely different compounds.

However, with regard to PFAS, there are hundreds that release PFOA (which is a common metabolite/environmental degradant, and one of the most studied so-called "legacy" PFAS regulated by Massachusetts), hundreds that release PFHxA (one of the other PFAS6 regulated by Massachusetts), and hundreds that release PFBA. From a chemistry standpoint, it would be accurate to construct categories for perfluorinated chemicals based on structural similarity, common degradation pathways, biological properties like half-lives or thyroid effects, etc. However, neither the PFAS industry nor the ACC want PFAS to be regulated as a class, because it would inhibit their ability to continually tweak the chemical formulas of new PFAS to avoid regulation, and continue to make money.

Figure 4

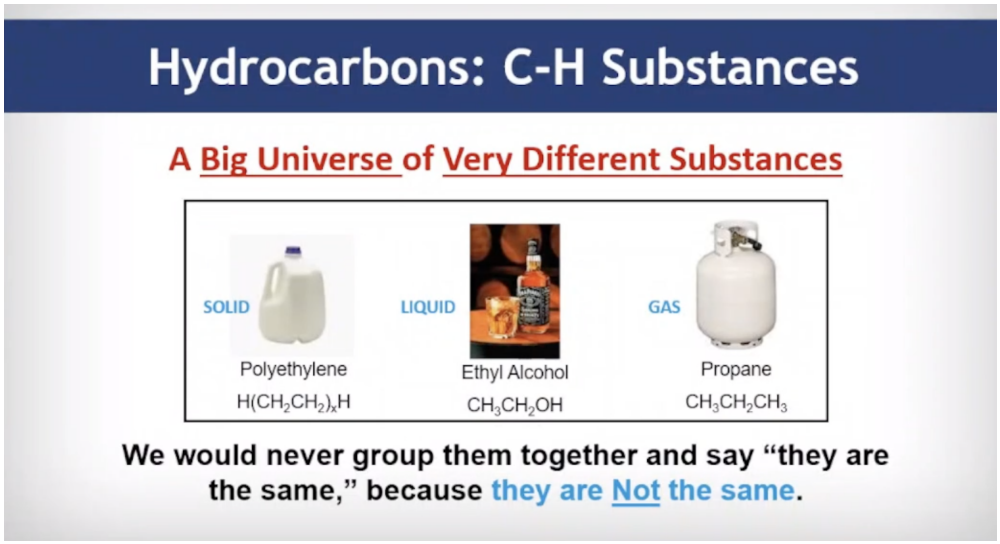
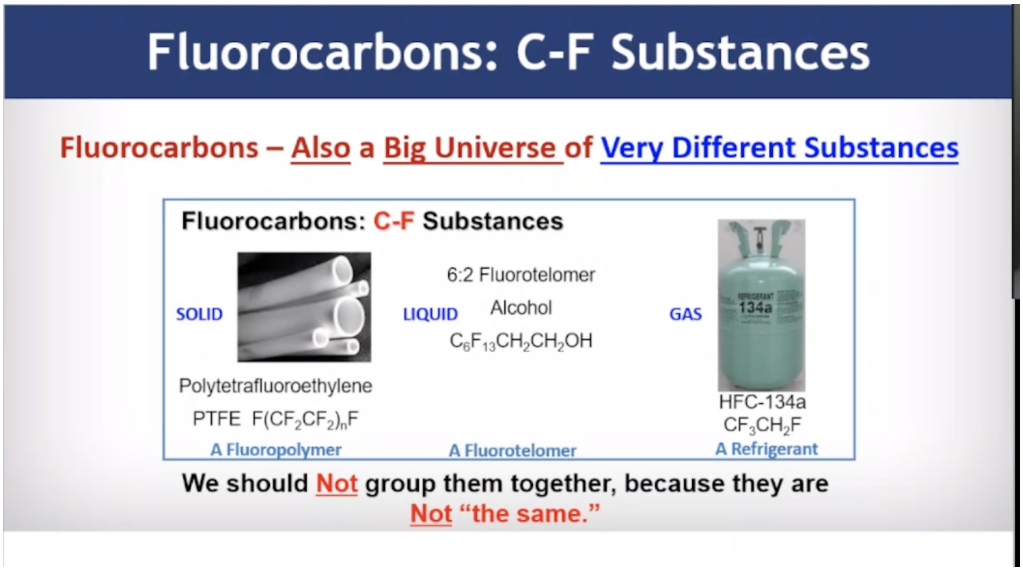
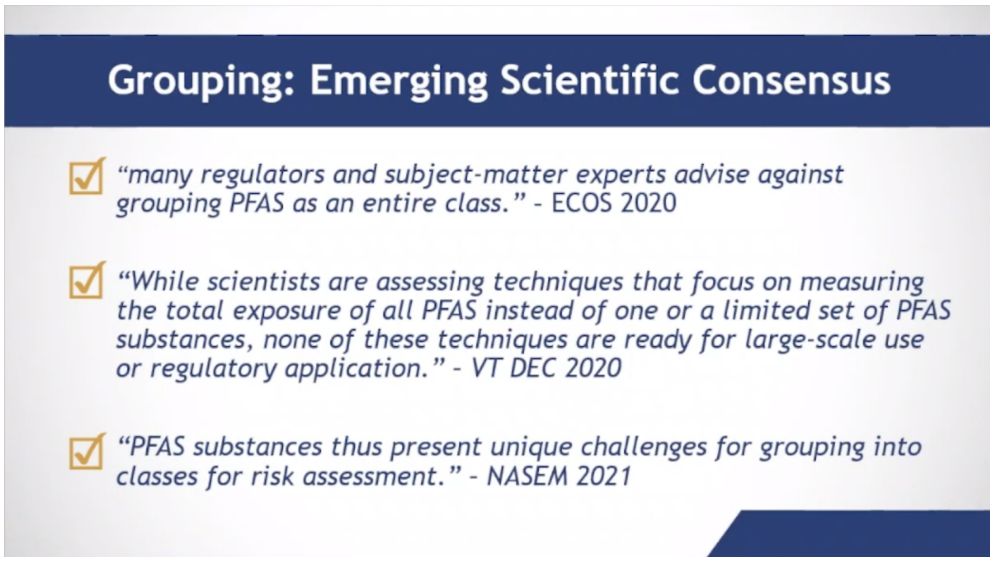


Figure 5



The ACC incorrectly stated that there is an "emerging scientific consensus" that PFAS should not be regulated as a class. Figure 6 in the ACC presentation took quotes out of context and misrepresents the science.

Figure 6



The ACC's *partial* quote from the Environmental Council of the States (ECOS) came from: "Given that there are nearly 5,000 PFAS, most of which have little known information about their toxicities, many regulators and subject-matter experts advise against grouping PFAS as an entire class."[11] The first part of this quote is critical, as it indicates that the hesitance to regulate PFAS as a class comes from our lack

[11] https://www.ecos.org/wp-content/uploads/2021/04/Updated-Standards-White-Paper-April-2021.pdf, p. 10

of knowledge regarding this vast universe of chemicals, which is solely due to the industry's refusal to give us information about them.[12]

The second quote, from Vermont's Department of Environmental Conservation (DEC), was also edited to make it sound as if regulation of PFAS as a class is not possible. The full quote is:

> While scientists are assessing techniques that focus on measuring the total exposure of all PFAS instead of one or a limited set of PFAS substances, none of these techniques are ready for large-scale use or regulatory application. This is important to gain a better understanding of exposures to PFAS as a class (citations omitted)…The State of Vermont does not have the resources to conduct the types of scientific and technical analyses that are normally provided by EPA or WHO to evaluate regulating PFAS as a class at this time. We plan to closely monitor the work by the National Toxicology Program (NTP) and the Agency for Toxic Substances and Disease Registry (ATSDR) to evaluate PFAS as a class. The NTP has published a framework for evaluating PFAS as a class using computational toxicology methods (citations omitted). These methods recognize that a chemical-by-chemical approach will not result in meaningful data to support regulation of PFAS as a class. The NTP approach starts with two lists of 75 PFAS that are evaluated for structural similarities and potency of biological response. The NTP plans to select "anchor" PFAS upon which to build classes or subclasses of PFAS. This work involves hundreds of NTP and EPA scientists, and reflects a level of effort and resources that the State could not independently invest in a similar process.[13]

In other words, Vermont DEC declined to regulate as a class because of lack of information; again, information being deliberately withheld by the PFAS industry. Indeed, Vermont Governor Scott just signed into law a bill that defines PFAS as a "class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom," and banned all of them from food packaging, firefighting foam, ski wax, carpets, and stain-resistant treatments.[14]

The third quote, pulled from the National Academies Press, states this in full:

> According to Rusty Thomas, ***class-based approaches are needed***, and such approaches have been proposed based on structure (i.e., chain length and functional groups), health effects, and intrinsic properties such as bioaccumulation or mobility. However, he noted, "we're really at a data-poor and data-starved state to help inform these categories and groups." Thomas explained that PFAS substances thus present unique challenges for grouping into classes for risk assessment (emphasis added).[15]

So, in reality, the quote used by ACC is arguing *for* regulating PFAS as a class, and simply bemoaning the lack of data due to industry secrecy.

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[12] https://www.consumerreports.org/toxic-chemicals-substances/solvay-impedes-research-into-new-pfas-chemicals-by-threatening-testing-lab-with-legal-action/

[13] https://dec.vermont.gov/sites/dec/files/PFAS/20180814-PFAS-as-a-Class.pdf, p. 4.

[14] https://legislature.vermont.gov/Documents/2022/Docs/ACTS/ACT036/ACT036%20As%20Enacted.pdf

[15] https://www.nap.edu/read/26054/chapter/1#11

Furthermore, a slew of recent articles written by PhD scientists argues over and over for a class-based approach. We list a few here:

- "…the high persistence, accumulation potential, and/or hazards (known and potential) of PFAS studied to date warrant treating all PFAS as a single class."[16]
- "…all PFAS, or their degradation, reaction, or metabolism products, display at least one common hazard trait according to the California Code of Regulations, namely environmental persistence; and *b*) certain key PFAS that are the degradation, reaction or metabolism products, or impurities of nearly all other PFAS display additional hazard traits, including toxicity; are widespread in the environment, humans, and biota; and will continue to cause adverse impacts for as long as any PFAS continue to be used. Regulating PFAS as a class is thus logical, necessary, and forward-thinking."[17]
- "…the weight of evidence suggests that while PFAS vary significantly in exact structure and function, PFAS are universally toxic to some extent, and all pose the same problems of bioaccumulation and high resistance to degradation… The single most impactful action to streamline the implementation of PFAS regulation would be creating a formal class definition for the family of compounds."[18]
- "Grouping strategies are needed for per- and polyfluoroalkyl substances (PFAS), in part, because it would be time and resource intensive to test and evaluate the more than 4700 PFAS on the global market on a chemical-by-chemical basis."[19]
- "Some manufacturers have proposed that fluoropolymers should not be grouped with other PFAS for regulatory purposes, arguing that they are biologically inert because of their high molecular weight. However, these chemicals can release low-molecular weight PFAS and other hazardous substances to the environment throughout their life cycle. Thus, we argue for the inclusion of fluoropolymers and perfluoropolyethers in the overall class approach for PFAS…"[20]
- "While we have enough information on the persistence, mobility, and toxicity of PFAS chemicals to generally support class-based regulation of these chemicals, EPA has made little progress in developing the health effects data on individual chemicals necessary to understand the impacts of past, current, and future exposure from PFAS manufacture, use, and disposal/environmental release. As a result, communities have been subjected to largely undefined risks, and medical professionals have been deprived of the ability totreat PFAS-related health conditions. The limited industry-sponsored health effects research that has been conducted is often declared confidential business information (CBI) and is unavailable to the public or local and state environmental regulators."[21]

In conclusion, there is an emerging scientific consensus that PFAS should be regulated as a class. It is only the chemical industry that wants to continue regulating PFAS individually.

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[16] https://pubs.acs.org/doi/10.1021/acs.estlett.0c00255

[17] https://ehp.niehs.nih.gov/doi/10.1289/EHP7431

[18] https://www.sciencepolicyjournal.org/article_1038126_jspg_16_01_03.html

[19] https://pubs.rsc.org/az/content/articlehtml/2020/em/d0em00147c

[20] https://pubs.acs.org/doi/10.1021/acs.estlett.0c00255

[21] https://www.environmentalprotectionnetwork.org/wp-content/uploads/2021/04/EPN-PFAS-Action-Plan-Recommendations.pdf

The ACC incorrectly stated in its presentation that the industry has "phased out" historical PFAS of "primary concern." There is an urban legend perpetuated by the chemical industry that PFOA and PFOS, the two "C8s," are the PFAS of "primary concern," and that we no longer need to worry, because they are "legacy" and have been phased out. Neither of these statements is true.

There was a *voluntary* decision by eight PFAS manufacturers to cease the production of PFOA and PFOS in the United States.[22] However, smaller manufacturers continue to manufacture these two PFAS, and they are still imported and used in this country. Moreover, as stated above, hundreds – if not thousands – of PFAS release PFOA as a common metabolite/environmental degradant.

Moreover, it is not true that shorter chain PFAS are safe.

> When some major manufacturers phased out the production of long-chain PFAS, most industries turned to structurally similar replacements, including homologues with fewer fluorinated carbons (short-chain PFAS) or other less well known PFAS (e.g., per- and polyfluoroalkylether-based substances). These replacement PFAS were marketed by producers as safer alternatives because of their presumed lower toxicity and lower level of bioaccumulation in human blood. However, several lines of evidence suggest that short-chain PFAS are not safer alternatives. Research has demonstrated that short-chain PFAS can be equally environmentally persistent and are even more mobile in the environment and more difficult to remove from drinking water than long-chain PFAS. Bioaccumulation of some short-chain PFAS occurs in humans and animals, and research in fish suggests they can do so in excess of the long-chain compounds they aimed to replace. Short-chain PFAS also can be more effectively taken up by plants… To date, relatively little is known about possible health effects of long-term exposure to short-chain PFAS. However, a growing body of evidence suggests they are associated with similar adverse toxicological effects as long-chain PFAS.[23]

The scientific community has very little information on the vast majority of PFAS, primarily because of the industry's secrecy and obfuscation. However, the more we learn about PFAS, the more we realize that most – if not all – have adverse impacts.

> All known PFAS are believed to be toxic, even in low doses (Hurley et al. 2016). While this is true of many industrial chemicals, PFAS are uniquely dangerous because of their chemical inertness and poor water solubility, which prevents them from breaking down in or leaving the human body, leading to bioaccumulation. As a result, even small PFAS exposures can cause long-term health problems. There are no known medical interventions to remove PFAS from the human body…Unfortunately, the sheer quantity of new PFAS and the obfuscation of information about their identities, use patterns, and prevalence in waste streams has made it impossible for independent researchers to study them comprehensively.[24]

Therefore, PFOA and PFOS are still a huge problem in the United States, and the shorter chain replacement PFAS are not safe.

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[22] https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-20102015-pfoa-stewardship-program#what

[23] https://pubs.acs.org/doi/10.1021/acs.estlett.0c00255

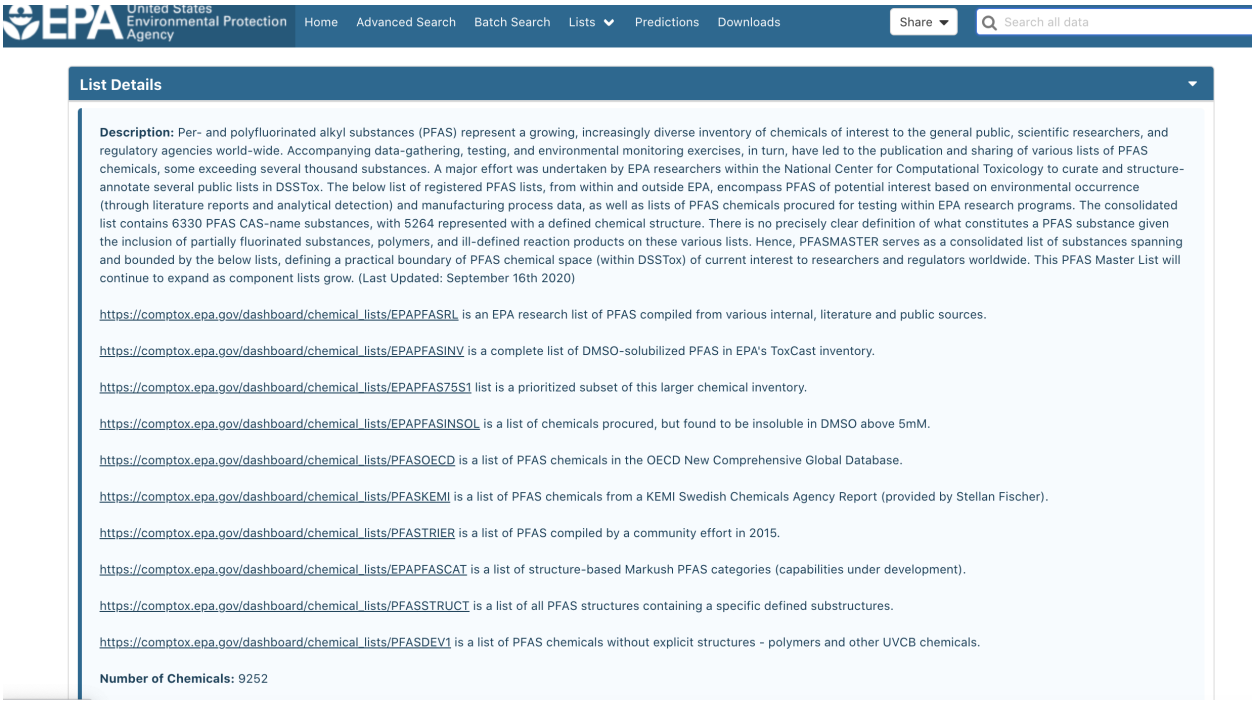
[24] https://www.sciencepolicyjournal.org/article_1038126_jspg_16_01_03.html

The ACC incorrectly stated there are only 600 PFAS. Figure 7 from the ACC's presentation states that "approximately 600 PFAS are manufactured (including imported) and/or used in the United States."

Figure 7

This statement is not true. There are now more than 4,730 PFAS assigned Chemical Abstracts Service (CAS) numbers pursuant to the American Chemical Society.[25] According to EPA, there are 9,252 PFAS (see Figure 8). Clearly then, the number is not 600. The fact that we do not even know how many PFAS are being used in the United States is an indication that we have lost control over the industry.

Figure 8



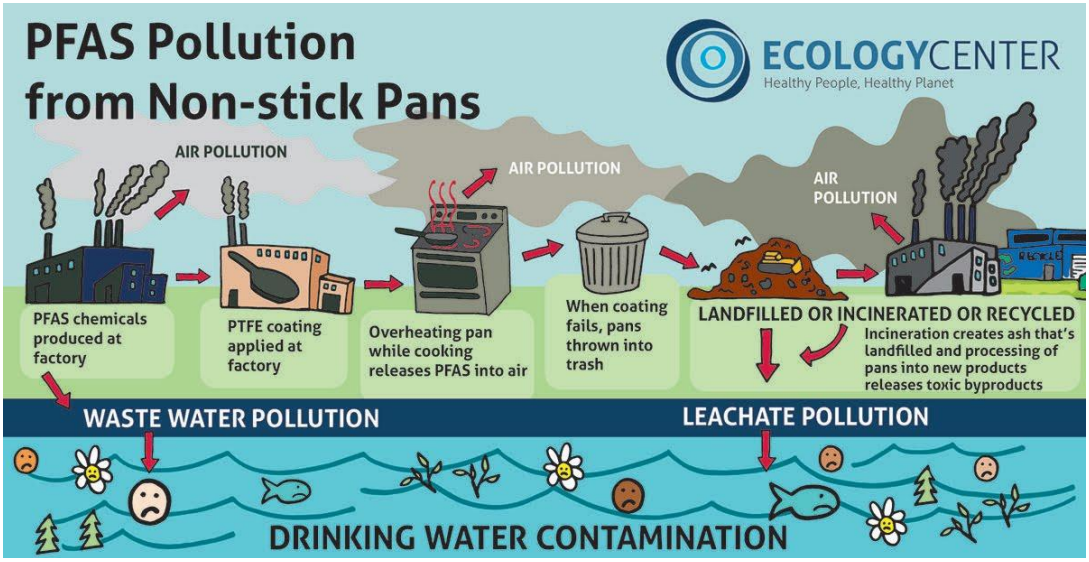
[25] https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV-JM-MONO(2018)7&doclanguage=en

The ACC incorrectly stated in its presentation that "not all PFAS have the potential to get into the environment." The ACC indicated that the industry is using "safe" PFAS which are unable to "get into the environment." This is a misrepresentation. A recent study performed on Cape Cod found large quantities of previously undetectable compounds of PFAS in six watersheds on Cape Cod.[26] Dozens of communities in Massachusetts are finding that their drinking water is contaminated with PFAS.[27] We are finding PFAS in consumer products such as artificial turf, pesticides, biosolids, plastic containers, makeup, firefighter turnout gear, bottled water, clothing, dental floss, car seats, pots and pans, furniture, and more. These consumer products are leaching PFAS into the environment from their use, from washing, and from disposal. Landfill leachate is full of PFAS from these consumer goods.

PFAS in products will eventually end up in the environment (see Figure 9).[28] Because PFAS are virtually indestructible, they cannot be incinerated (they become airborne), landfilled (they end up in the leachate, which is then trucked to wastewater treatment plants, or WWTPs), or sent through the WWTPs (where even more PFAS is produced during "treatment," resulting in higher levels of PFAS in the effluent than in the influent).

If PFAS could not get into the environment, then they would not be found everywhere. In fact, PFAS were recently discovered in rain.[29] Unfortunately, because we can only test for roughly 70 PFAS, we cannot possibly know the extent of the contamination.

Figure 9



However, to state that most PFAS do not get into the environment is false.

[26] https://pubs.acs.org/doi/abs/10.1021/acs.est.0c07296

[27] https://www.bostonglobe.com/2021/05/23/science/more-communities-are-finding-toxic-chemicals-their-drinking-water/

[28] https://www.michiganradio.org/post/nonstick-pans-often-dont-note-they-use-pfas

[29] https://grist.org/science/its-raining-forever-chemicals-in-the-great-lakes/

Conclusion. The ACC is biased, and should not be the entity advising the Massachusetts PFAS Interagency Task Force on the regulation or environmental and health effects of PFAS. Less than 1% of PFAS have been tested for hazardous effects.[30] This lack of data is due to the fact that industry refuses to disclose what they are manufacturing, or even where they are manufacturing it. One company, Solvay, threatened legal action against a Canadian laboratory in order to make it impossible for scientists to accurately measure certain PFAS in the environment.[31]

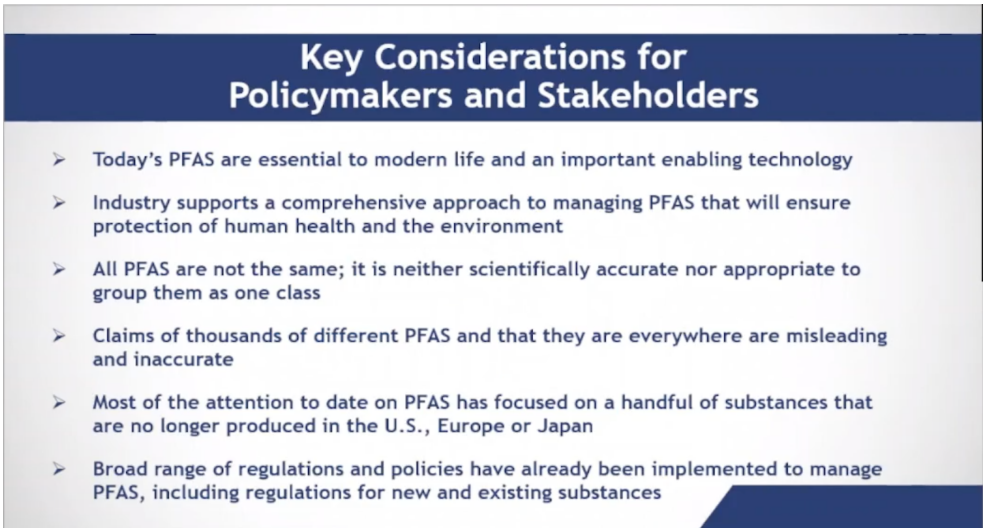
Defining and regulating PFAS one at a time is neither cost effective nor protective of human health and the environment. However, it is in the ACC's interest to maintain the status quo, because it allows them to make more money with unregulated chemicals. Given the 9,000+ PFAS listed by EPA, it would take us centuries to do risk assessments on each, and regulate them one by one.

A recent article arguing for the regulation of PFAS as a class stated:

> …it is not possible to thoroughly assess every individual PFAS, or combination of PFAS, for their full range of effects in a reasonable time frame. Without effective risk management action around the entire class of PFAS, these chemicals will continue to accumulate and cause harm to human health and ecosystems for generations to come…managing PFAS as a class is scientifically sound, will provide business innovation opportunities, and will help protect our health and environment now and in the future.[32]

One of the ACC's conclusory slides demonstrates how desperate they are to prevent a broad definition of PFAS, and to continue regulating them individually (see Figure 10).

Figure 10



[30] https://pubs.acs.org/doi/full/10.1021/acs.estlett.0c00255

[31] https://www.consumerreports.org/toxic-chemicals-substances/solvay-impedes-research-into-new-pfas-chemicals-by-threatening-testing-lab-with-legal-action/

[32] https://pubs.acs.org/doi/full/10.1021/acs.estlett.0c00255

This figure summarizes all the inaccuracies and misstatements in one place:

- In most cases, PFAS are *not* essential, and alternatives exist for many uses;
- Industry clearly supports regulating PFAS individually;
- It is scientifically appropriate to regulate them as a class, and there is a consensus among independent scientists to regulate them as a class;
- There are thousands of different PFAS, not 600;
- Most of the attention to date has focused on two PFAS, PFOA and PFOS, but they still exist in the United States; moreover, our failure to investigate the thousands of new PFAS has been hampered by the industry itself;
- There is no regulation of PFAS at the federal level, and state regulation is spotty and creates a patchwork of regulation across the country that does not fully protect human health or the environment. In the absence of federal action, it is imperative that Massachusetts continue to take strong action.

Therefore, the undersigned Organizations urges you to reach out to one of the many independent scientists working on PFAS to assist the Task Force with its decision-making regarding the regulation of this hazardous class of chemicals.

Thank you for your attention to this matter. We are happy to answer any questions you may have.

Sincerely,

Kyla Bennett, PhD, JD
Science Policy Advisor
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