Regulatory Determinations Report to the Legislature:

Safer Products for Washington Cycle 1.5 Implementation Phase 3

Hazardous Waste and Toxics Reduction

Washington State Department of Ecology

Olympia, Washington

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State of Washington

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Related Information

- Per- and Polyfluoroalkyl Substances Chemical Action Plan (CAP)[2]
- Safer Products for Washington Cycle 1 Implementation Phase 2: Report to the Legislature on Priority Consumer Products[3]
- Safer Products for Washington Cycle 1 Implementation Phase 3: Final Report to the Legislature on Regulatory Determinations[4]
- Safer Products for Washington Cycle 1 Implementation Phase 4:
    - Chapter 173-337-Washington Administrative Code (WAC)—Safer Products Restrictions and Reporting[5]
    - Concise Explanatory Statement[6]

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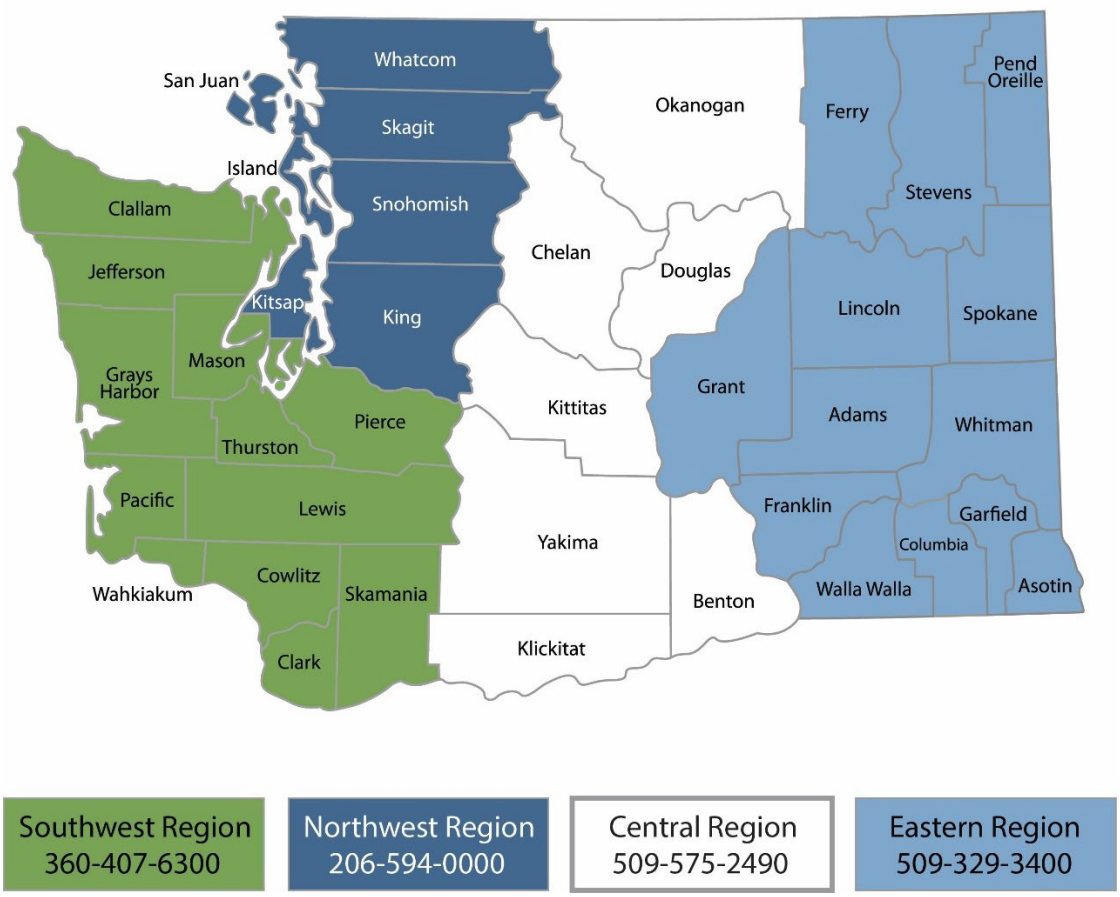
[1] ecology.wa.gov/accessibility
[2] apps.ecology.wa.gov/publications/SummaryPages/2104048.html
[3] apps.ecology.wa.gov/publications/summarypages/2004019.html
[4] apps.ecology.wa.gov/publications/SummaryPages/2204018.html
[5] app.leg.wa.gov/WAC/default.aspx?cite=173-337
[6] apps.ecology.wa.gov/publications/SummaryPages/2304033.html
[7] ecology.wa.gov/contact

Department of Ecology's Region Offices

Map of Counties Served



Region	Counties served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

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Executive Summary

Legislative directive

The Washington Department of Ecology (Ecology), in consultation with the Washington Department of Health (Health) (jointly "we"), developed this Regulatory Determinations Report to the Legislature. The Revised Code of Washington (RCW) 70A.350.090[8] provides the following regarding consumer products containing per- and polyfluoroalkyl substances (PFAS):

(1) For purposes of the regulatory process established in this chapter, the department may consider any product identified in the department's final PFAS chemical action plan dated November 2021 as a source of or use of PFAS chemicals to be a priority consumer product under this chapter. No additional action, including publication in the Washington State Register, is required for the department to designate such a product as a priority consumer product for purposes of this chapter. For such products, the department may, under the process established in RCW 70A.350.040,[9] determine regulatory actions and adopt rules to implement those regulatory determinations.

(2) Firefighting personal protective equipment, as defined in RCW 70A.400.005,[10] is established as a priority consumer product for PFAS chemicals.

(3) For the products identified in this section, the department is directed to:

(a) Determine an initial set of regulatory actions under this chapter by June 1, 2024; and

(b) Adopt rules to implement the initial set of determinations of regulatory actions under (a) of this subsection by December 1, 2025.

This report details the initial set of regulatory actions required in (3)(a) above. As noted in (1) above, we follow the process RCW 70A.350.040(1), which requires Ecology to "submit a report to the appropriate committees of the legislature at the time that it determines regulatory actions."

Regulatory determinations

In this report, we present regulatory determinations for firefighting personal protective equipment (PPE) and the products recommended in the 2021 PFAS Chemical Action Plan (CAP).[11] With the resources and timeline available, we evaluated alternatives to PFAS in:

- Apparel and gear
- Firefighting PPE

[8] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.090
[9] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.040
[10] app.leg.wa.gov/RCW/default.aspx?cite=70A.400.005
[11] apps.ecology.wa.gov/publications/SummaryPages/2104048.html

- Cleaning products
- Automotive washes
- Automotive waxes
- Floor waxes
- Ski waxes

The CAP also recommended that cookware and hard surface sealants be reviewed as priority products under the Safer Products for Washington program. With the time and resources available for this review, we were not able to fully evaluate all the products identified in the CAP. We did not evaluate alternatives to PFAS in cookware and hard surface sealants at this time. While cookware and hard surface sealants do contribute to PFAS exposure, we prioritized the products in the list above because PFAS serve similar functions in these products; this allowed us to perform our reviews more efficiently. Cookware and hard surface sealant products will likely be part of the next review (Cycle 2) or another future review cycle, which could result in future restrictions.

Based on our review, we made the following regulatory determinations on PFAS in each product category:

- Apparel and gear:
  - Reporting requirement for outdoor apparel designed for experts or professionals who are exposed to extreme weather for extended periods of time[12]
  - Reporting requirement for shoes
  - Reporting requirement for gear
  - Restriction for all other types of apparel
- Firefighting PPE: reporting requirement
- Cleaning products: restriction
- Automotive washes: restriction
- Automotive waxes: reporting requirement
- Floor waxes: reporting requirement
- Ski waxes: reporting requirement
- Hard surface sealants: reporting requirement

[12] Extended-use products are defined as outdoor apparel designed for experts or professionals who are exposed to extreme weather for extended periods of time. Extended-use products protect the health and safety of the user against extended exposure to extreme wet weather conditions, such as hurricanes, or against extended immersion in water or wet conditions, including snow. Examples of extreme and extended-use products include outerwear for offshore fishing, offshore sailing, whitewater kayaking, and mountaineering.

- Cookware (Food Contact Materials): reporting requirement

If at any point federal action preempts our ability to implement restrictions on any of these categories of priority consumer products, we will require reporting of PFAS instead.

Regulatory Determinations

Legislative directive

In 2022, the Washington State Legislature amended Chapter 70A.350 RCW[13] to require the Department of Ecology (Ecology) in consultation with the Department of Health (Health) to make regulatory determinations on additional products containing per- and polyfluoroalkyl substances (PFAS) as part of our work under the Safer Products for Washington implementation program. The amended law allows Ecology to consider firefighting personal protective equipment (PPE) and products identified in the as priority products without taking the actions outlined in RCW 70A.350.030.[14] We are required to make an initial set of regulatory determinations on these PFAS-containing products by June 2024. As this work falls between the due dates for our first two review cycles, we are referring to this new review as "Cycle 1.5."

The law specifies that Ecology may make one the following regulatory determinations for each chemical-product combination in this report (RCW 70A.350.040(1)[15]):

- Determine that no regulatory action is currently required.
- Require a manufacturer to provide notice of the use of a priority chemical or class of priority chemicals consistent with RCW 70A.430.060.[16]
- Restrict or prohibit the manufacture, wholesale, distribution, sale, retail sale, use, or any combination thereof, of a priority chemical or class of priority chemicals in a consumer product.

To restrict priority chemicals in priority products, Ecology must confirm the following (RCW 70A.350.040(3)):

- Safer alternatives are feasible and available.
- The restriction will either reduce a significant source or use of a priority chemical or is necessary to protect the health of sensitive populations or sensitive species.
    - "Sensitive population" means a category of people that is identified by the department that may be or is disproportionately or more severely affected by priority chemicals.

[13] app.leg.wa.gov/RCW/default.aspx?cite=70A.350
[14] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.030
[15] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.040
[16] app.leg.wa.gov/RCW/default.aspx?cite=70A.430.060

- "Sensitive species" means a species or grouping of animals that is identified by the department that may be or is disproportionately or more severely affected by priority chemicals.

Legislative background

In 2019, the Washington State Legislature directed Department of Ecology (Ecology), in consultation with Department of Health (Health) to implement a regulatory program to reduce toxic chemicals in consumer products under Chapter 70A.350 RCW.[17] The implementation program is called Safer Products for Washington.

The law requires Ecology to determine regulatory actions that will increase transparency and reduce the use of priority chemicals in priority consumer products.

Safer Products for Washington implements the law's five-year repeating process in four phases (see Figure 1). Each five-year review is referred to as a "cycle."

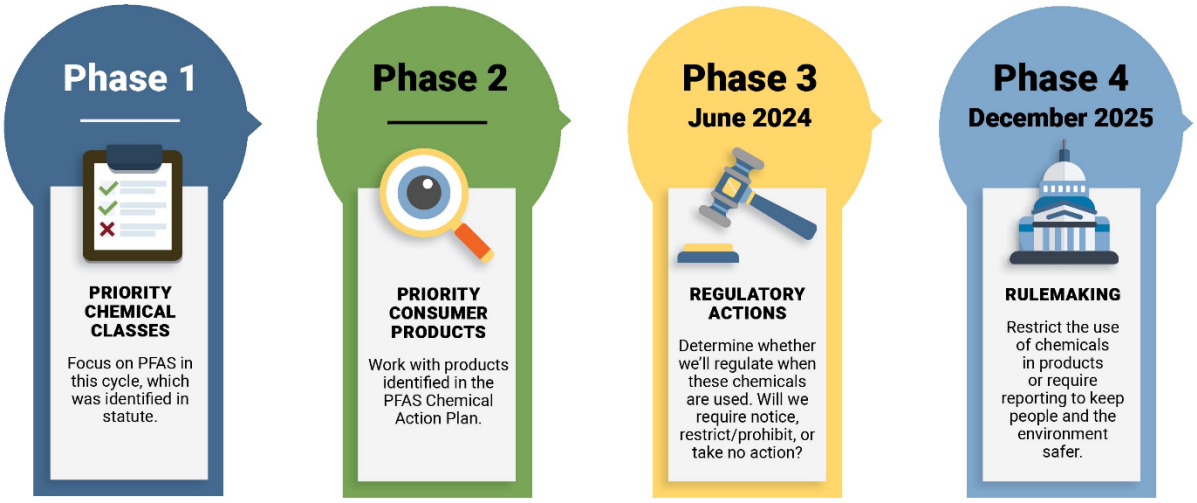

Figure 1. Implementation phases for cycle 1.5 of Safer Products for Washington

Safer Products for Washington cycle 1: 2019–2023

We recently completed the first review cycle of Safer Products for Washington, where we focused on priority chemical classes identified in the statute. In phase 2 of the first review cycle, we identified eleven priority consumer products that were significant sources or uses of the priority chemical classes in the statute, including some products containing PFAS. After evaluating the feasibility and availability of safer alternatives, we made regulatory determinations in phase 3 and adopted those regulatory determinations through rulemaking in

[17] app.leg.wa.gov/RCW/default.aspx?cite=70A.350

phase 4. Ecology adopted Chapter 173-337 WAC – Safer Products Restrictions and Reporting[18] in May 2023, completing cycle 1.

Safer Products for Washington cycle 1.5: 2022–2025

In 2022, the Washington State Legislature amended Chapter 70A.350 RCW[19] to require Ecology to make regulatory determinations on additional products containing PFAS as part of our work under the Safer Products for Washington implementation program. The amended law allows Ecology to consider firefighting PPE and products identified in the CAP as priority products without taking the actions outlined in RCW 70A.350.030.[20] We are required to make an initial set of regulatory determinations on these products by June 2024 and adopt rules by December 2025. As this work falls between the due dates for our first two review cycles, we are referring to this new review as "Cycle 1.5" (see Figure 1).

Since the amended statute allowed us to skip phases 1 and 2 of cycle 1.5, this report focuses on phase 3 of cycle 1.5 – making regulatory determinations.

Based on the recommendations in the PFAS CAP, we are considering the following priority products:

- Apparel and gear
- Firefighting PPE
- Cleaning products (including automotive washes)
- Automotive waxes and polishes
- Floor waxes and polishes
- Ski waxes
- Hard surface sealants
- Cookware (Food Contact Materials)

Cosmetics were also included in the CAP recommendations. We excluded this category because the Legislature passed the Toxic-Free Cosmetics Act in 2023. This new law (Chapter 70A.560 RCW[21]) banned PFAS in cosmetics.

In this report, we use some product category names that differ slightly from the category names identified in the recommendations section of the PFAS CAP. These modifications are based on data in the "Sources and Uses" appendix of the CAP (Ecology & Health, 2021). We listed some of the changes below.

- The CAP identified automotive products. To find alternatives, we need to know the function of PFAS, which can vary by automotive product. We reviewed the

[18] app.leg.wa.gov/WAC/default.aspx?cite=173-337
[19] app.leg.wa.gov/RCW/default.aspx?cite=70A.350
[20] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.030
[21] app.leg.wa.gov/RCW/default.aspx?cite=70a.560

underlying data in the CAP and determined that the CAP described automotive washes, waxes, and polishes.

- The CAP identified water-resistant clothing and gear. In this report, we called the product category "apparel and gear" and focused our alternatives research on the functions that PFAS provide as described in the CAP.
- The CAP identified nonstick cookware and kitchen supplies. In this report, we called the product category "cookware" and plan to focus future alternatives research on food contact materials with a nonstick function provided by PFAS.

Review scope

As noted above, in order to restrict priority chemicals in priority products, Ecology must confirm that safer alternatives are feasible and available, and that the restriction will either reduce a significant source or use of a priority chemical or is necessary to protect the health of sensitive populations or sensitive species.

This report explains the basis of our regulatory determinations. We fully evaluated six priority product categories for safer, feasible, and available alternatives. For all priority products, we evaluated whether a restriction would reduce a significant source or use.

If a restriction would reduce a significant source or use and safer alternatives were feasible and available, we proposed a restriction. If a restriction would reduce a significant source or use, but we did not or could not identify safer, feasible, and available alternatives, we proposed a reporting requirement. Reporting requirements can help us better understand current PFAS use and prioritize future actions. We might reevaluate these products in the future.

Time and capacity limitations meant that we could not evaluate alternatives to all products identified in the CAP. We did not evaluate alternatives to PFAS in cookware and hard surface sealants in this cycle. We prioritized the other products identified in the CAP because of their shared functions, which allowed us to work more efficiently. Because we didn't evaluate alternatives to PFAS in cookware and hard surface sealants, we cannot propose restrictions on PFAS in these products at this time. We anticipate continued work on these products and will consider restrictions in the future.

Reducing exposure to PFAS

RCW 70A.350.010[22] defines PFAS as a class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.

PFAS are sometimes called "forever chemicals" because they do not break down in the environment (Cousins et al., 2020). Some PFAS bioaccumulate (accumulate in human and animal tissue), so they can build up in species higher up the food chain, such as orcas. This poses a problem because many PFAS are associated with human and environmental health concerns. Many PFAS cause cancer, are reproductive and developmental toxicants, and are

[22] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.010

toxic to fish. Washington State regulations list some PFAS as "persistent, bioaccumulative, and toxic" chemicals (Washington Administrative Code [WAC] 173-333-310[23]) and "chemicals of high concern to children" (WAC 173-334-130[24]). Summaries of PFAS toxicity can be found in the 2021 PFAS Chemical Action Plan (Ecology & Health, 2021) and the 2022 Regulatory Determinations Report to the Legislature[25] (Ecology, 2022b).

Nearly everyone is exposed to PFAS. The National Health and Nutrition Examination Survey routinely detects these chemicals in the blood of nearly all participants (ASTDR & CDC, 2022). PFAS are also detected in house dust (de la Torre et al., 2019; Karásková et al., 2016; Strynar & Lindstrom, 2008). Children and babies have higher exposure to chemicals in house dust than adults because they spend more time on and near the floor and have increased hand-to-mouth activity. One study in childcare centers estimated that exposure to PFAS from dust accounted for 75 percent of this exposure in children (Zheng et al., 2020). Replacing PFAS-containing consumer products with PFAS-free products can significantly reduce concentrations in dust (Young et al., 2022). PFAS detected in house dust are also found in breastmilk (Kang et al., 2016; Kubwabo et al., 2013; Zheng et al., 2021). Reducing PFAS in consumer products can reduce exposure, particularly in sensitive populations, such as babies and children.

In Washington, PFAS have been detected in various media including drinking water, surface waters, groundwater, wastewater effluent, freshwater, soil, sediments, and wildlife. Environmental monitoring in the state has shown that concentrations are highest in urban surface water and surface waters receiving minimally diluted wastewater effluent (Ecology & Health, 2021). PFAS have also been found in Washington wildlife, such as freshwater fish and osprey eggs (Ecology & Health, 2021). These chemicals can be released into the environment during the manufacture, use, and disposal of consumer products (Lang et al., 2016; Shoeib et al., 2011a). Figure 2 shows how consumer products can release PFAS into the environment. The toxicity, persistence, and potential to bioaccumulate and move throughout the environment make PFAS a concern for sensitive species.

[23] apps.leg.wa.gov/WAC/default.aspx?dispo=true&cite=173-333-310
[24] apps.leg.wa.gov/WAC/default.aspx?dispo=true&cite=173-334-130
[25] apps.ecology.wa.gov/publications/SummaryPages/2204018.html

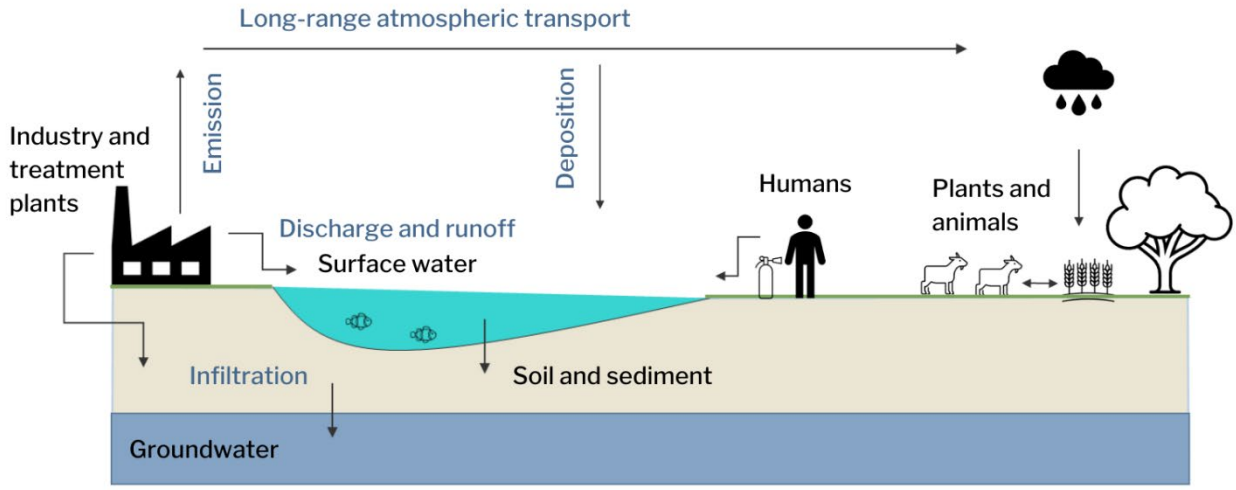

Figure 2. PFAS in the environment after release from consumer products

Our goal is to reduce exposure to PFAS in sensitive species and populations. A recent review of PFAS in rainwater found concentrations were often higher than environmental and public health limits (Cousins et al., 2022). Finding PFAS above environmental and public health limits is problematic, especially because these chemicals are so persistent. It is difficult to reduce environmental contamination after releases have occurred. In addition to their persistence, many PFAS accumulate in our bodies and in food chains (Zheng et al., 2021). If PFAS use continues, we expect environmental and human body burdens and detection frequency to increase. A study of PFAS in breastmilk detected currently used PFAS twice as often as they did four years ago (Zheng et al., 2021).

The best way to reduce exposure to persistent chemicals is through pollution prevention. It is better to avoid the use of PFAS rather than attempting to mitigate exposure or clean it up once contamination has occurred. Regulating PFAS in consumer products is one form of pollution prevention.

Regulatory determinations methods

When making regulatory determinations, we consider whether safer alternatives are feasible and available. We also consider whether a restriction would reduce a significant source or use of the chemical or if a restriction is necessary to protect sensitive populations or species. We can also consider:

- Hazards of the priority chemical class
- Criteria to be listed as a priority product
- Existing regulations from other states and nations
- Other relevant information

To help us understand the potential impacts of regulatory determinations, we also considered a market analysis as part of our feasibility analysis. We used available information to assess where the market is in the shift away from PFAS in specific products. We also considered the cost difference between PFAS-containing products and alternatives in general. The market analysis is separate from the economic analysis that we will complete during the rulemaking process. However, information from the market analysis can feed into the rulemaking process.

In general, if safer alternatives are feasible and available and a restriction would reduce a significant source or use of PFAS, we proposed a restriction. If we were not able to identify safer, feasible, and available alternatives, but a restriction would reduce a significant source or use of PFAS, we proposed a reporting requirement. We intend to continue work on some priority products where we didn't identify safer, feasible, and available alternatives.

Below, we provide summaries of the information, studies, and data we relied on when making our regulatory determinations. A more complete explanation and additional detail for each determination are provided in our Technical Supporting Documentation for Regulatory Determinations: Safer Products for Washington Cycle 1.5 Implementation Phase 3 report.[26]

Identifying safer, feasible, and available alternatives

To determine whether an alternative is safer, feasible, and available, we evaluated:

- Whether the PFAS is functionally necessary
- The hazards of the priority chemical class
- The hazards of the alternative
- Whether manufacturers use the alternative for the relevant application

We used the methods for identifying safer alternatives described in our 2022 Regulatory Determinations Report to the Legislature (Ecology, 2022b), which are summarized below.

Safer alternatives

RCW 70A.350.010[27] defines safer as "less hazardous to humans or the environment than the existing chemical or process."

Safer alternatives to priority chemicals can be:

- Alternative chemicals
- Alternative products or processes that eliminate the need for priority chemicals or alternative chemicals

As part of our work in the first review cycle under Chapter 70A.350 RCW, we developed hazard-based criteria to determine whether alternative chemicals are safer than priority chemicals (Ecology, 2022b). The criteria for what constitutes "safer" focuses on how we identify alternative chemicals that function like priority chemicals. For purposes of evaluating alternatives, "safer" should be thought of as a spectrum: hazardous chemicals are at one end,

[26] apps.ecology.wa.gov/publications/summarypages/2404024.html
[27] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.010

while chemicals that meet the relevant criteria are at the other (Ecology, 2022b). Chemical alternatives that meet Ecology's minimum criteria are less hazardous than PFAS.

We previously determined that PFAS do not meet our minimum criteria for safer (Ecology, 2022b). We also apply a within-class criteria to identify chemicals within priority chemical classes that are safer and should be treated differently. We did not identify any PFAS that meet our within-class criteria.

As before, we relied on chemical hazard assessments and authoritative lists to determine whether alternatives are safer than PFAS. Hazard assessments collect existing data into a single report and score or rank the chemical. They provide a systematic way to integrate data from multiple sources. Other government agencies and industry often use these hazard assessment methods. That means we can integrate our methods with tools that manufacturers already use, making collaboration and information sharing easier. During our first review cycle, we identified existing hazard assessment methods and certifications that meet our transparency and independence requirements and our criteria for safer; these are detailed in Appendix E of our 2022 Regulatory Determinations report to the Legislature (Ecology, 2022b).

In cases where we were evaluating alternative products or processes, we considered available information about all chemicals known to be in the alternative (Ecology, 2022b). The reason we assess alternative products or processes differently than alternative chemicals is to avoid underestimating the hazards of a replacement product or process. Comparing the hazards of a chemical ingredient to an entire product is uneven. PFAS can be used in products that have unrelated hazards as well. Therefore, safer alternative products and processes generally do not contain chemicals known to cause cancer, cause genetic mutations, or that are reproductive or developmental toxicants.

Feasible and available alternatives

As in the first review cycle, we based our process for identifying feasible and available alternatives on the Interstate Chemicals Clearinghouse (IC2) Guide (IC2, 2017). It provides a framework that aligns with other authoritative bodies, while still offering enough flexibility to meet the requirements in the law we are implementing. Based on the IC2 Guide, we set criteria to identify feasible and available alternatives. These are the same criteria we used in our first review cycle, and the criteria were detailed in Appendix D of our 2022 Regulatory Determinations report to the Legislature (Ecology, 2022b). As before, the criteria focus on identifying alternatives that manufacturers already use in the relevant application.

Reducing a significant source or use of PFAS

In our PFAS CAP, we identified and evaluated how PFAS is used in Washington State, and we recommended actions to reduce exposure to PFAS. The information included in the CAP aligns with the criteria for identifying consumer products that are significant sources or uses of PFAS listed in RCW 70A.350.030.[28] In determining whether a restriction would reduce a significant source or use of PFAS, we summarized relevant information from the CAP to address the estimated volume of PFAS in the product and the potential for exposure to sensitive

[28] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.030

populations and species. Information describing the estimated volume in Washington and presence of PFAS in the environment can be found in the CAP. Existing regulations from other states or nations and the availability and feasibility of safer alternatives are discussed elsewhere in this report.

In 2022, the Washington State Legislature amended Chapter 70A.350 RCW[29] authorizing Ecology to consider products identified in our PFAS CAP as priority products, showing the Legislature's determination that those products are significant sources or uses of a priority chemical. As a result, RCW 70A.350.040(3)(b)(ii)'s[30] statutory requirements regarding if PFAS restrictions in these products would reduce a significant source or use are met.

Nonetheless, this report highlights information relevant to the RCW 70A.350.030[31] criteria we used to identify priority products that are significant sources or uses of PFAS. We leveraged information from the PFAS CAP to summarize the potential for sensitive species and populations to be exposed to PFAS from priority products. This report bolsters the conclusion that restrictions would reduce significant sources or uses of PFAS.

Market analysis

We conducted a market analysis on the priority products identified in this report.

Cost information on specific alternatives is limited and there are often many more alternatives than those assessed in this report. The market analysis allows us to look broadly at the market for specific products and alternatives to understand the potential impacts of regulatory actions.

We placed particular focus on the product categories for which there will be proposed restrictions on the intentional addition of PFAS, namely apparel and cleaning products. We estimated the sales volume of companies that manufacture these products using a Dun & Bradstreet database (Dun & Bradstreet, 2023). This is the same database we used to characterize the costs and benefits in the rulemaking to adopt Chapter 173-333 WAC.[32] This enabled us to characterize the size of the potentially impacted industry. Chapter 7 of the Technical Supporting Documentation for Regulatory Determinations: Safer Products for Washington Cycle 1.5 Implementation Phase 3 report[33] describes the results of our market analysis. We used third-party lists and certifications and found that PFAS-free alternatives are prevalent in the market for both apparel and cleaning products. While there is insufficient data to determine the market share of specific products, many apparel brands and retailers have transitioned away from PFAS or have committed to a timeline for doing so.

Due to the proprietary nature of the various production processes, there is limited data concerning the costs of manufacturing the priority products. As a result, we used publicly available pricing data from online retailers to estimate the difference in prices among products containing PFAS compared to products that are PFAS free. We used existing literature, including published estimates of consumer responses to eco-labeling and estimates of demand response

[29] app.leg.wa.gov/RCW/default.aspx?cite=70A.350
[30] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.040
[31] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.030
[32] apps.leg.wa.gov/WAC/default.aspx?cite=173-333
[33] apps.ecology.wa.gov/publications/summarypages/2404024.html

to price changes, to approximate the expected response of consumer demand to PFAS restrictions.

This market analysis is separate from the economic analysis we conduct during rulemaking. However, much of the information included in the market analysis is also included in economic analysis related to potential rulemaking, such as identification of manufacturers, identification of products already using alternatives, and issues related to supply chains and customer demand.

Regulatory determinations

We consulted peer-reviewed scientific data, government reports, and available economic and market information to determine whether each product category met the criteria for a proposed restriction or reporting requirement under RCW 70A.350.040.[34] This list of citations is included as Appendix A.

We also reviewed existing regulations and voluntary policies restricting the use of PFAS in products. There is significant momentum in the market around phasing out PFAS. Many of the products under consideration are already regulated by other states or nations. (See more in Appendix B.)

Table 1 summarizes the regulatory determinations we made for PFAS in each priority product. If at any point federal action preempts our ability to implement the restrictions in Table 1, we will require reporting of priority chemicals in those priority products.

[34] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.040

Table 1. Initial regulatory determinations for PFAS in CAP products and firefighting PPE

Technical Report Chapter	Priority Products	Product Examples	Regulatory Determinations	Rationale
Chapter 1: Apparel and gear	Apparel	Examples of apparel include athleticwear, reusable diapers, menstrual underwear, rain wear, school uniforms, dresses, hats, scarves, gloves, and shoes.	Reporting requirement for outdoor apparel designed for experts or professionals who are exposed to extreme weather for extended periods of time[35] Reporting requirement for shoes Restriction for all other types of apparel	A restriction would reduce a significant source and use. Safer alternatives are feasible and available for some product categories.
Chapter 1: Apparel and gear	Gear	Examples of gear include non-clothing items used in contact with or near the body, such as backpacks, sleeping bags, umbrellas, camping furniture, and climbing rope.	Reporting requirement for gear	A restriction would reduce a significant source and use, but safer alternatives were not identified.

[35] Extended-use products are defined as outdoor apparel designed for experts or professionals who are exposed to extreme weather for extended periods of time. Extended-use products protect the health and safety of the user against extended exposure to extreme wet weather conditions, such as hurricanes, or against extended immersion in water or wet conditions, including snow. Examples of extreme and extended-use products include outerwear for offshore fishing, offshore sailing, whitewater kayaking, and mountaineering.

Technical Report Chapter	Priority Products	Product Examples	Regulatory Determinations	Rationale
Chapter 2: Firefighting PPE	Firefighting PPE	Examples include jackets, pants, shoes, gloves, helmets, and respiratory equipment designed with the intent for use in fire and rescue activities.	Reporting requirement	A restriction would reduce a significant source and use, but safer alternatives were not identified.
Chapter 3: Cleaning products	Cleaning products	Examples include all-purpose cleaners, disinfectants as well as cleaners for glass, bathrooms, dishes, tiles, boats, and cars. In cleaning products that contain propellants, the propellant function of PFAS is out of scope; however, PFAS added for other uses are included.	Restriction	A restriction would reduce a significant source and use. Safer alternatives are feasible and available.
Chapter 3: Cleaning products	Automotive washes	Examples include boat, car, and truck washes.	Restriction	A restriction would reduce a significant source and use. Safer alternatives are feasible and available for some product categories.

Technical Report Chapter	Priority Products	Product Examples	Regulatory Determinations	Rationale
Chapter 4: Waxes and polishes	Automotive waxes	Examples include polish, wash and wax, all-in-one wax, spray wax, and wet wax for cars, RVs, and boats. When waxes and polishes are applied during automotive manufacturing, they are excluded from this product scope.	Reporting requirement	A restriction would reduce a significant source and use, but safer alternatives were not identified.
Chapter 4: Waxes and polishes	Floor waxes and polishes	Examples include multi-surface floor finishes, low-gloss, semigloss, and high-gloss polishes.	Reporting requirement	A restriction would reduce a significant source and use, but safer alternatives were not identified.
Chapter 4: Waxes and polishes	Ski waxes	Example products include hot wax, spray wax, and rub-on wax for Nordic skis, alpine skis, and snowboards.	Reporting requirement	A restriction would reduce a significant source and use, but safer alternatives were not identified.

Technical Report Chapter	Priority Products	Product Examples	Regulatory Determinations	Rationale
Chapter 5: Hard surface sealants	Hard surface sealants	Examples include products used to seal stone, unglazed tile, concrete, and wood.	Reporting requirement	A restriction would reduce a significant source and use, but we did not evaluate whether safer alternatives are feasible and available.
Chapter 6: Cookware	Cookware	Examples include frying pans, cooking pots, rice cookers, waffle makers, griddles, bakeware, reusable baking liners, and cooking utensils.	Reporting requirement	A restriction would reduce a significant source and use, but we did not evaluate whether safer alternatives are feasible and available.

We describe the rationale for each regulatory determination below and include supporting technical information and references in the Technical Supporting Documentation for Regulatory Determinations: Safer Products for Washington Cycle 1.5 Implementation Phase 3 report.[36]

Apparel and gear

Apparel is defined as clothing, including footwear and outerwear, meant to cover the body. This priority product includes apparel and gear marketed for general consumer use, as well as extended-use products intended for use by experts or professionals and not available to the general public.

People can be exposed to PFAS during the manufacture, use, and disposal of PFAS-treated apparel and gear. PFAS can also be released into the environment during these product lifecycle phases. A restriction on these chemicals in apparel and gear would reduce a significant source or use of PFAS.

[36] apps.ecology.wa.gov/publications/summarypages/2404024.html

Alternative processes that avoid the use of textile coatings and treatments are less hazardous than using PFAS. We found safer, feasible, and available alternatives to PFAS in most types of apparel, including one PFAS-free durable water repellent.

We did not find examples of alternative processes in use for extended-use products, and we found very limited evidence of alternative processes in use for shoes. Therefore, we did not find safer alternatives to PFAS for gear, shoes, and extended-use products.

To protect people and the environment, we are proposing a restriction on the use of PFAS in apparel and reporting for PFAS in apparel for extended-use products, gear, and shoes.

Firefighting PPE

RCW 70A.400.005(4)[37] defines "firefighting personal protective equipment" (also referred to as firefighting PPE) as, "any clothing designed, intended, or marketed to be worn by firefighting personnel in the performance of their duties, designed with the intent for use in fire and rescue activities, including jackets, pants, shoes, gloves, helmets, and respiratory equipment."

PFAS can be added to firefighting PPE (such as coats and pants) and components of mechanical firefighting PPE (such as respiratory equipment) to meet specifications for protection against water, heat, oil, fuel, or pathogens. Firefighters can be exposed to PFAS from wearing and using firefighting PPE. This disproportionate exposure can lead to health impacts. A restriction on PFAS in firefighting PPE would reduce a significant source or use of PFAS.

We identified multiple PFAS-free coatings and one moisture barrier for firefighting PPE. However, to determine whether these alternatives are safer, we needed more information about the chemicals used in their formulations. At present, this information is not publicly available, and Ecology does not have the regulatory authority to require manufacturers to provide it. Therefore, we were unable to evaluate these alternatives against our criteria for safer, feasible, and available.

Because exposure to PFAS from firefighting PPE is a concern for sensitive populations and species, we are proposing a reporting requirement. Reporting requirements can be a helpful intermediate step to gather more information about and discourage the use of PFAS in products. We plan to continue our research on safer, feasible, and available alternatives to PFAS in firefighting PPE and may update this regulatory determination in the future if more information becomes available.

Cleaning products

This priority product category includes cleaning products and cleaning agents intended for household and institutional uses. Examples include all-purpose cleaners; disinfectants; and cleaners for glass, bathrooms, dishes, tiles, boats, and cars.

PFAS are primarily used in cleaning products as surfactants, which help disperse ingredients so products can clean more effectively. Additionally, PFAS can be used as propellants to aide in effectively applying cleaning solutions. Ecology limited the scope of this review to non-propellant uses of PFAS in cleaning products. We excluded propellants from this analysis

[37] app.leg.wa.gov/RCW/default.aspx?cite=70A.400.005

because they are used across a variety of product categories, not just cleaning products. Evaluating alternatives to the propellant function of PFAS could be done more completely in a future cycle when we can address the full breadth of product use.

People can be exposed to PFAS during the manufacture, use, and disposal of cleaning products made with these chemicals. This is a particular concern for people who work with cleaning products or spend time in facilities that are frequently cleaned (such as healthcare facilities). PFAS from cleaning products can be released into the environment and expose sensitive species. A restriction on PFAS in cleaning products would reduce a significant source or use of PFAS.

We found 14 safer, feasible, and available surfactants used in cleaning products. The surfactants are used in a variety of cleaning products such as dishwashing products, stain removers, glass care, toilet care, all-purpose cleaners, disinfectants, and vehicle washes.

Safer alternatives to PFAS used as surfactants in cleaning products are feasible and available, and a restriction would reduce a significant source and use. To protect people and the environment, we are proposing a restriction on PFAS in cleaning products.

Waxes and polishes

Waxes and polishes include automotive polishes and waxes, floor polishes and waxes, and ski waxes.

- Automotive polishes and waxes are formulated products marketed for use on an automotive exterior as either a wax, a polish, or a finish. Examples include polish, wash and wax, all-in-one wax, spray wax, and wet wax for cars, recreational vehicles, and boats. When waxes and polishes are applied during automotive manufacturing, they are excluded from this product scope.
- Floor polishes and waxes are formulated products designed to polish, protect, or enhance a floor's surface. Examples include multi-surface floor finishes and low-gloss, semigloss, and high-gloss polishes.
- Ski waxes are formulated products intended for use on snow sport equipment, including but not limited to skis and snowboards, with the intent of modifying friction properties. Example products include hot wax, spray wax, and rub-on wax for Nordic skis, alpine skis, and snowboards.

People can be exposed to PFAS during the manufacture, use, and disposal of waxes and polishes with these chemicals. Certain occupations can have particularly high exposure to PFAS from applying waxes and polishes. People applying floor and ski wax have elevated exposure to PFAS. PFAS from waxes and polishes can be released into the environment and expose sensitive species. This is particularly problematic when PFAS-containing waxes and polishes are applied outdoors or applied to products used outdoors. A restriction on PFAS in waxes and polishes would reduce a significant source or use of these chemicals.

We received one product formulation and can confirm that Nikwax Ski Skin Proof is a safer alternative to PFAS products applied to ski skins. However, alternatives to PFAS are often used as mixtures in these products. Frequently, more than one alternative chemical is used to

provide the function of PFAS (waxes and surfactants). While we were able to identify several safer waxes and surfactants used in products, we did not have the formulation disclosure necessary to confirm whether they can meet the performance needs without additional chemical ingredients. At present, this information is not publicly available, and Ecology does not have the regulatory authority to require manufacturers provide it. Therefore, we were unable to evaluate these alternatives against our criteria for safer, feasible, and available.

Because PFAS in waxes and polishes are a concern for sensitive species and populations, we are proposing reporting requirements on PFAS in automotive waxes and polishes, floor waxes and polishes, and ski waxes. We plan to continue working to identify safer alternatives to PFAS in floor waxes and polishes and may revisit other waxes and polishes if reporting data suggest continued use.

Hard surface sealants

Hard surface sealants are used to seal hard porous surfaces such as stone, unglazed tile, concrete, and wood. They are designed to protect a variety of surfaces from liquids and soils. They can be used for interior or exterior applications.

People can be exposed to PFAS during the manufacture, use, and disposal of sealants with these chemicals. Certain occupations, such as construction workers, can have higher exposure to PFAS if they are frequently applying PFAS-containing sealants. PFAS from sealants can be released into the environment and expose sensitive species. This is particularly problematic when PFAS-containing sealants are applied outdoors or applied to products used outdoors. A restriction on PFAS in sealants would reduce a significant source or use of these chemicals.

Although we determined a restriction would reduce a significant source and use, we did not evaluate safer alternatives to PFAS in this cycle of Safer Products for Washington. We may evaluate whether alternatives to PFAS in sealants are safer, feasible, and available in the future. Because exposure to these chemicals originating from sealants is a concern, we are proposing a reporting requirement for PFAS in hard surface sealants.

Cookware

Cookware is a broad category that includes frying pans, cooking pots, rice cookers, waffle makers, griddles, bakeware, reusable baking liners, and other cooking utensils.

People can be exposed to PFAS during the manufacture, use, and disposal of cookware with nonstick coating. Certain occupations, such as cooks, can have higher exposure from inhaling PFAS released from cookware during use. People who eat food prepared using nonstick cookware can be exposed to these chemicals. PFAS from cookware can be released into the environment and expose sensitive species. A restriction on PFAS in cookware would reduce a significant source or use of these chemicals.

Although we determined a restriction would reduce a significant source and use, we did not evaluate safer alternatives to PFAS in cookware in this cycle of Safer Products for Washington. Because exposure to these chemicals from cookware is a concern, we are proposing a reporting requirement for PFAS in cookware. We may evaluate whether alternatives to PFAS in cookware are safer, feasible, and available if reporting data suggests continued use in these applications.

Summary and draft schedule

If the 2025 Legislature does not direct Ecology otherwise, we will adopt rules to implement the restrictions and reporting requirements noted above. Should the 2025 Legislature make changes to our regulatory determinations, Ecology will alter our rulemaking accordingly.

We plan to release our draft rule for discussion and public input in late 2024. We expect to file a Proposed Rule-Making Order (CR-102) to begin rulemaking by summer 2025, with final rule adoption by December 2025.

Conclusion

This report identifies safer, feasible and available alternatives to PFAS for most types of apparel and cleaning products, including automotive washes. Lack of product ingredient transparency limited our ability to determine whether safer alternatives to PFAS are available in floor waxes and polishes, ski waxes, and firefighting PPE. We intend to continue our research on safer alternatives for these products as well as cookware and hard surface sealants in future cycles of Safer Products for Washington.

Based on the availability of safer, feasible, and available alternatives, we proposed a mix of restrictions and reporting requirements. Adopting these restrictions will help reduce the use of PFAS in consumer products; adopting reporting requirements will encourage manufacturers to avoid using PFAS, help promote transparency that will aid consumers make safer choices, and provide us with additional information for future decision making.

Appendix A. References

Overview

The following citation list was developed to meet the requirements outlined in RCW 70A.350.050[38] and RCW 34.05.272.[39] It identifies the peer-reviewed science, studies, reports, and other sources of information used to support our identification of priority consumer products. The following are the types of sources used to support this report:

1. Peer review is overseen by an independent third party
2. Review is by staff internal to Ecology
3. Review by persons that are external to and selected by Ecology
4. Documented open public review process that is not limited to invited organizations or individuals
5. Federal and state statutes
6. Court and hearings board decisions
7. Federal and state administrative rules and regulations
8. Policy and regulatory documents adopted by local governments
9. Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under other processes
10. Records of best professional judgment of Ecology employees or other individuals
11. Sources of information that do not fit into one of the other categories listed

Citation list

Table 2. References found in this report, categorized by source type.

Citation	Category
1908 Brands Inc. (2019). *Product Name: Boulder Clean Granite + Stainless Steel Cleaner (Lavender Fields, Lavender Vanilla, and Clear)*. https://bclean.com/product/granite-stainless-cleaner/	11
ASTDR, & CDC. (2022). *Per- and Polyfluoroalkyl Substances (PFAS) and Your Health*. https://www.atsdr.cdc.gov/pfas/resources/index.html	11

[38] app.leg.wa.gov/RCW/default.aspx?cite=70A.350.050
[39] app.leg.wa.gov/RCW/default.aspx?cite=34.05.272

Citation	Category
Bello, A., Quinn, M. M., Perry, M. J., & Milton, D. K. (2009). Characterization of occupational exposures to cleaning products used for common cleaning tasks-a pilot study of hospital cleaners. *Environmental Health*, *8*(1), 11. https://doi.org/10.1186/1476-069X-8-11	1
BLS. (2022). *Labor Force Statistics from the Current Population Survey*. https://www.bls.gov/cps/cpsaat11.htm	11
Blueland. (2020). Product Name: Toilet Bowl Cleaner Tablets. In *2020*. https://www.epa.gov/saferchoice/products#search=a04t0000009vCuGAAU	11
BonaKemi USA Inc. (2021). *Product Name: Bona Multi-Surface Floor Cleaner, Dog Formulation*. https://www.bona.com/en-us/products/homeowners/cleaners/pet-multi-surface-dog-32oz/	11
Borg, D., & Ivarsson, J. (2017). *Analysis of PFASs and TOF in products*. https://doi.org/10.6027/TN2017-543	1
C2C Products Innovation Institute. (2021). *C2C Certificate: Royal Mosa BV Floor Tiles*. https://c2ccertified.org/certified-products/floor-tiles	11
C2C Products Innovation Institute. (2022). *C2C Certificate: TARKE Linoleum Flooring*. https://c2ccertified.org/certified-products/tarkett-linoleum-flooring	11
Carlson, G. L., & Tupper, S. (2020). Ski wax use contributes to environmental contamination by per- and polyfluoroalkyl substances. *Chemosphere*, *261*, 128078. https://doi.org/10.1016/j.chemosphere.2020.128078	1
Conard, W. M., Whitehead, H. D., Harris, K. J., Lamberti, G. A., Peaslee, G. F., & Rand, A. A. (2022). Maternal Offloading of Per- and Polyfluoroalkyl Substances to Eggs by Lake Michigan Salmonids. *Environmental Science & Technology Letters*, *9*(11), 937–942. https://doi.org/10.1021/acs.estlett.2c00627	1
Cousins, I. T., DeWitt, J. C., Glüge, J., Goldenman, G., Herzke, D., Lohmann, R., Ng, C. A., Scheringer, M., & Wang, Z. (2020). The high persistence of PFAS is sufficient for their management as a chemical class. *Environmental Science: Processes & Impacts*, *22*(12), 2307–2312. https://doi.org/10.1039/D0EM00355G	1
Cousins, I. T., Johansson, J. H., Salter, M. E., Sha, B., & Scheringer, M. (2022). Outside the Safe Operating Space of a New Planetary Boundary for Per- and Polyfluoroalkyl Substances (PFAS). *Environmental Science & Technology*, *56*(16), 11172–11179. https://doi.org/10.1021/acs.est.2c02765	1
Cui, D., Li, X., & Quinete, N. (2020). Occurrence, fate, sources and toxicity of PFAS: What we know so far in Florida and major gaps. *TrAC Trends in Analytical Chemistry*, *130*, 115976. https://doi.org/10.1016/j.trac.2020.115976	1

Citation	Category
de la Torre, A., Navarro, I., Sanz, P., & Mártinez, M. de los Á. (2019). Occurrence and human exposure assessment of perfluorinated substances in house dust from three European countries. *Science of The Total Environment*, *685*, 308–314. https://doi.org/10.1016/j.scitotenv.2019.05.463	1
DeLuca, N. M., Minucci, J. M., Mullikin, A., Slover, R., & Cohen Hubal, E. A. (2022). Human exposure pathways to poly- and perfluoroalkyl substances (PFAS) from indoor media: A systematic review. *Environment International*, *162*, 107149. https://doi.org/10.1016/j.envint.2022.107149	1
DEPA. (2015). *Polyfluoroalkyl substances (PFASs) in textiles for children*.	1
Dun & Bradstreet. (2023). *Market Insight Database*. https://www.dnb.com/products/marketing-sales/market-insight.html	11
Earth Friendly Products. (2020a). *Product Name: ECOS™ Lemon Surface Scrub*. https://www.ecos.com/household-cleaners/surface-scrub-lemon/	11
Earth Friendly Products. (2020b). *Product Name: ECOS™ Pro Dishmate™ Manual Dishwashing Liquid, Free & Clear*. https://ecosproline.com/products/dishmate-manual-dish-liquid-free-clear	11
Earth Friendly Products. (2020c). *Product Name: ECOS™ Window Cleaner, Vinegar*. https://www.ecos.com/household-cleaners/window-cleaner-vinegar/	11
Earth Friendly Products. (2023). *Product name: ECOS™ All Purpose Cleaner Parsley*. https://www.ecos.com/household-cleaners/all-purpose-cleaner-parsley/	11
Ecology, & Health. (2021). *Per- and Polyfluoroalkyl Substances Chemical Action Plan*. https://apps.ecology.wa.gov/publications/documents/2104048.pdf	2 and 4
Ecology. (2022a). *Product Replacement Program: List of Participating Business*. https://ecology.wa.gov/waste-toxics/reducing-toxic-chemicals/product-replacement-program	11
Ecology. (2022b). *Regulatory Determinations Report to the Legislature: Safer Products for Washington Cycle 1 Implementation Phase 3*. https://apps.ecology.wa.gov/publications/documents/2204018.pdf	2 and 4
EPA, Williams, A. J., Grulke, C. M., Edwards, J., McEachran, A. D., Mansouri, K., Baker, N. C., Patlewicz, G., Shah, I., Wambaugh, J. F., Judson, R. S., & Richard, A. M. (2017). The CompTox Chemistry Dashboard: a community data resource for environmental chemistry. *Journal of Cheminformatics*, *9*(1), 61. https://doi.org/10.1186/s13321-017-0247-6	1
EPA. (2023). *EPA Safer Choice Laundry Detergents*. https://www.epa.gov/saferchoice/products	11

Citation	Category
Fast Retailing Co. Ltd. (2023). *Product Name: Rayon Printed Long-Sleeve Blouse*. https://www.uniqlo.com/us/en/products/E463486-000/00?colorDisplayCode=69&sizeDisplayCode=003	11
Faust, J. A. (2023). PFAS on atmospheric aerosol particles: a review. *Environ. Sci.: Processes Impacts*, *25*(2), 133–150. https://doi.org/10.1039/D2EM00002D	1
Guo, Z., Liu, X., Krebs, K., & Roache, N. (2009). *Perfluorocarboxylic Acid Content in 116 Articles of Commerce*. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-09/033	4
H&M Group. (2022). *Product Name: Skinny Fit Suit Pants*. https://www2.hm.com/en_us/productpage.0714032043.html	11
Hamid, H., & Li, L. (2016). Role of wastewater treatment plant in environmental cycling of poly- and perfluoroalkyl substances. *Ecocycles*, *2*(2), 43–53. https://doi.org/10.19040/ecocycles.v2i2.62	1
Helly Hansen. (2020, September 28). *LIFA Infinity Pro: The Next Level of Responsible, Waterproof, Breathable Technology*. https://www.Hellyhansen.Com/Lifa-Infinity-Pro/	11
Herzke, D., Olsson, E., & Posner, S. (2012). Perfluoroalkyl and polyfluoroalkyl substances (PFASs) in consumer products in Norway – A pilot study. *Chemosphere*, *88*(8), 980–987. https://doi.org/10.1016/j.chemosphere.2012.03.035	1
Hsieh, Y.-L. (1995). Liquid Transport in Fabric Structures. *Textile Research Journal - TEXT RES J*, *65*, 299–307. https://doi.org/10.1177/004051759506500508	1
IC2. (2017). *Interstate Chemicals Clearinghouse Alternatives Assessment Guide Version 1.1*. https://www.theic2.org/alternatives-assessment-guide/	4
IKEA. (2023a). *Product Name: KÅLFJÄRIL Apron*. https://www.ikea.com/us/en/p/kalfjaeril-apron-patterned-blue-light-beige-10493129/	11
IKEA. (2023b). *Product Name: MATVRÅ Baby Bibs*. https://www.ikea.com/us/en/p/matvra-bib-fruit-vegetables-pattern-green-yellow-40426925/	11
Jardak, K., Drogui, P., & Daghrir, R. (2016). Surfactants in aquatic and terrestrial environment: occurrence, behavior, and treatment processes. *Environmental Science and Pollution Research*, *23*(4), 3195–3216. https://doi.org/10.1007/s11356-015-5803-x	1
Jelmar LLC. (2020). *Product Name: CLR® Everyday Clean (All Fragrances)*. https://clrbrands.com/Products/CLR-Household/CLR-Everyday-Clean	11

Citation	Category
Jelmar LLC. (2021). *Product Name: CLR ® OUTDOOR FUNITURE CLEANER*. https://clrbrands.com/Products/CLR-Household/CLR-Outdoor-Furniture-Cleaner	11
Jelmar LLC. (2023). *Product Name: CLR® Calcium, Lime & Rust Remover*. https://clrbrands.com/Products/CLR-Household/CLR-Calcium-Lime-and-Rust-Remover	11
Joyce Dinglasan-Panlilio, M., Prakash, S. S., & Baker, J. E. (2014). Perfluorinated compounds in the surface waters of Puget Sound, Washington and Clayoquot and Barkley Sounds, British Columbia. *Marine Pollution Bulletin*, *78*(1), 173–180. https://doi.org/10.1016/j.marpolbul.2013.10.046	1
Kang, H., Choi, K., Lee, H.-S., Kim, D.-H., Park, N.-Y., Kim, S., & Kho, Y. (2016). Elevated levels of short carbon-chain PFCAs in breast milk among Korean women: Current status and potential challenges. *Environmental Research*, *148*, 351–359. https://doi.org/10.1016/j.envres.2016.04.017	1
Karásková, P., Venier, M., Melymuk, L., Bečanová, J., Vojta, Š., Prokeš, R., Diamond, M. L., & Klánová, J. (2016). Perfluorinated alkyl substances (PFASs) in household dust in Central Europe and North America. *Environment International*, *94*, 315–324. https://doi.org/10.1016/j.envint.2016.05.031	4
Kelly, E. (2021). *NFPA 1970 (1971) Proposed Tentative Interim Amendment (TIA) No. 1594 – Public Comment Review*. www.nfpa.org/1971	11
Kleerwhite Chemical. (2015). *Smartcare Wet Cleaning Detergent SDS*. https://www.dry-clean.com/smartcare/smartcare.html#:~:text=SMARTCare%20is%20The%20Only%20Wetcleaning,all%20there%20is%20to%20it.	11
Knepper, T., Frömel, T., Gremmel, C., van Driezum, I., Weil, H., Vestergren, R., & Cousin, I. (2014). *Understanding the exposure pathways of per- and polyfluoroalkyl substances (PFASs) via use of PFASs-Containing products – risk estimation for man and environment* .	1
Kotthoff, M., Müller, J., Jürling, H., Schlummer, M., & Fiedler, D. (2015). Perfluoroalkyl and polyfluoroalkyl substances in consumer products. *Environmental Science and Pollution Research*, *22*(19), 14546–14559. https://doi.org/10.1007/s11356-015-4202-7	1
Kubwabo, C., Kosarac, I., & Lalonde, K. (2013). Determination of selected perfluorinated compounds and polyfluoroalkyl phosphate surfactants in human milk. *Chemosphere*, *91*(6), 771–777. https://doi.org/10.1016/j.chemosphere.2013.02.011	1

Citation	Category
Kwiatkowski, C. F., Andrews, D. Q., Birnbaum, L. S., Bruton, T. A., DeWitt, J. C., Knappe, D. R. U., Maffini, M. V, Miller, M. F., Pelch, K. E., Reade, A., Soehl, A., Trier, X., Venier, M., Wagner, C. C., Wang, Z., & Blum, A. (2020). Scientific Basis for Managing PFAS as a Chemical Class. *Environmental Science & Technology Letters*, *7*(8), 532–543. https://doi.org/10.1021/acs.estlett.0c00255	1
Lang, J. R., Allred, B. M., Field, J. A., Levis, J. W., & Barlaz, M. A. (2017). National Estimate of Per- and Polyfluoroalkyl Substance (PFAS) Release to U.S. Municipal Landfill Leachate. *Environmental Science & Technology*, *51*(4), 2197–2205. https://doi.org/10.1021/acs.est.6b05005	1
Lang, J. R., Allred, B. M., Peaslee, G. F., Field, J. A., & Barlaz, M. A. (2016). Release of Per- and Polyfluoroalkyl Substances (PFASs) from Carpet and Clothing in Model Anaerobic Landfill Reactors. *Environmental Science & Technology*, *50*(10), 5024–5032. https://doi.org/10.1021/acs.est.5b06237	1
Lee, K., Alava, J. J., Cottrell, P., Cottrell, L., Grace, R., Zysk, I., & Raverty, S. (2023). Emerging Contaminants and New POPs (PFAS and HBCDD) in Endangered Southern Resident and Bigg's (Transient) Killer Whales (Orcinus orca): In Utero Maternal Transfer and Pollution Management Implications. *Environmental Science & Technology*, *57*(1), 360–374. https://doi.org/10.1021/acs.est.2c04126	1
Lenka, S. P., Kah, M., & Padhye, L. P. (2021). A review of the occurrence, transformation, and removal of poly- and perfluoroalkyl substances (PFAS) in wastewater treatment plants. *Water Research*, *199*, 117187. https://doi.org/10.1016/j.watres.2021.117187	1
Lerch, M., Nguyen, K. H., & Granby, K. (2022). Is the use of paper food contact materials treated with per- and polyfluorinated alkyl substances safe for high-temperature applications? – Migration study in real food and food simulants. *Food Chemistry*, *393*, 133375. https://doi.org/10.1016/j.foodchem.2022.133375	1
Liu, X., Guo, Z., Folk, E. E., & Roache, N. F. (2015). Determination of fluorotelomer alcohols in selected consumer products and preliminary investigation of their fate in the indoor environment. *Chemosphere*, *129*, 81–86. https://doi.org/10.1016/j.chemosphere.2014.06.012	1
López-Gálvez, N., Wagoner, R., Quirós-Alcalá, L., Ornelas Van Horne, Y., Furlong, M., Avila, E., & Beamer, P. (2019). Systematic Literature Review of the Take-Home Route of Pesticide Exposure via Biomonitoring and Environmental Monitoring. *International Journal of Environmental Research and Public Health*, *16*(12). https://doi.org/10.3390/ijerph16122177	1

Citation	Category
Maizel, A., Thompson, A., Tighe, M., Veras, S. E., Rodowa, A., Falkenstein-Smith, R., Jr., B. A. B., Hoffman, K., Donnelly, M. K., Hernandez, O., Wetzler, N., Ngu, T., Reiner, J., Place, B., Kucklick, J., Rimmer, K., & Davis, R. D. (2023). *Per- and Polyfluoroalkyl Substances in New Firefighter Turnout Gear Textiles*. Technical Note (NIST TN), National Institute of Standards and Technology, Gaithersburg, MD. https://doi.org/10.6028/NIST.TN.2248	11
Mazumder, N.-U.-S., Hossain, M. T., Jahura, F. T., Girase, A., Hall, A. S., Lu, J., & Ormond, R. B. (2023). Firefighters' exposure to per-and polyfluoroalkyl substances (PFAS) as an occupational hazard: A review. *Frontiers in Materials*, *10*. https://doi.org/10.3389/fmats.2023.1143411	1
Meguiar's Inc. (2018). *Product Name: Shampoo Plus (Detailer)*. https://www.meguiars.com/professional/products/meguiarsr-shampoo-plus-d11101-1-gallon-liquid	11
Meguiar's Inc. (2019). *Product Name: Extreme Marine Multi-Surface Cleaner*. https://www.meguiars.com/marine/products/meguiarsr-extreme-marine-multi-surface-cleaner-m180332-32-oz-spray	11
Meguiar's Inc. (2021). *Product Name: Gel Wash (Boat/RV)*. https://www.meguiars.com/marine/products/boat-gel-wash-16-oz	11
Meguiar's Inc. (2022). *Product Name: Citrus Power Cleaner Plus (Detailer)*. https://www.meguiars.com/professional/products/meguiarsr-citrus-power-cleaner-plus-d10701-1-gallon	11
Milliken & Company. (2023, January 23). *Milliken Successfully Eliminates PFAS from Portfolio*. https://www.Milliken.Com/En-Us/Businesses/Textile/News/Milliken-Successfully-Eliminates-Pfas-from-Portfolio.	11
Mintel. (2023). *Global New Products Database*. https://www.gnpd.com/	11
NFPA. (1997). *NFPA Standard 1971: Protective Ensembles for Structural Firefighting*.	4
NFPA. (2000a). *NFPA Standard 1971: Protective Ensembles for Structural Firefighting*.	4
NFPA. (2000b). *NFPA Standard 1976: Protective Ensembles for Proximity Firefighting*.	4
NFPA. (2000c). *NFPA Standard 1991: Vapor-Protective Ensembles for Hazardous Materials Emergencies*.	4
NFPA. (2000d). *NFPA Standard 1992: Liquid Splash Protective Ensembles and Clothing for Hazardous Materials Emergencies*.	4

Citation	Category
NFPA. (2007). *NFPA Standard 1971: Protective Ensembles for Structural Firefighting*.	4
NFPA. (2018). *NFPA Standard 1971: Protective Ensembles for Structural Firefighting*.	4
NFPA. (2019). *NFPA Standard 1981: Open-Circuit Self-Contained Breathing Apparatus for Emergency Services*.	4
Nikwax LLC. (2023a). *Product Name: Ski Skin Proof*. https://www.nikwax.com/en-us/products/waterproofing/ski-skin-proof/	11
Nikwax LLC. (2023b, March 22). *Nikwax Develops Industrial PFAS-Free Waterproof Coating*. https://www.nikwax.com/usblog/nikwax-develops-industrial-pfas-free-waterproof-coating/	11
Nilsson, H., Kärrman, A., Rotander, A., van Bavel, B., Lindström, G., & Westberg, H. (2013). Professional ski waxers' exposure to PFAS and aerosol concentrations in gas phase and different particle size fractions. *Environ. Sci.: Processes Impacts*, *15*(4), 814–822. https://doi.org/10.1039/C3EM30739E	1
Olson, W., Vesley, D., Bode, M., Dubbel, P., & Bauer, T. (1994). Hard Surface Cleaning Performance of Six Alternative Household Cleaners under Laboratory Conditions. *Journal of Environmental Health*.	1
Outdoor Research LLC, "Statement on the Nikwax Direct.Dry X OR collection", email, February 9, 2024.	11
Peaslee, G. F., Wilkinson, J. T., McGuinness, S. R., Tighe, M., Caterisano, N., Lee, S., Gonzales, A., Roddy, M., Mills, S., & Mitchell, K. (2020). Another Pathway for Firefighter Exposure to Per- and Polyfluoroalkyl Substances: Firefighter Textiles. *Environmental Science & Technology Letters*, *7*(8), 594–599. https://doi.org/10.1021/acs.estlett.0c00410	1
Poothong, S., Padilla-Sánchez, J. A., Papadopoulou, E., Giovanoulis, G., Thomsen, C., & Haug, L. S. (2019). Hand Wipes: A Useful Tool for Assessing Human Exposure to Poly- and Perfluoroalkyl Substances (PFASs) through Hand-to-Mouth and Dermal Contacts. *Environmental Science & Technology*, *53*(4), 1985–1993. https://doi.org/10.1021/acs.est.8b05303	1
Ralph Lauren Corporation. (2022). *Product Name: Poplin Dress Shirt*. https://www.ralphlauren.com/men-clothing-button-down-shirts/r/poplin/white	11
Ram, A. (2023, March 22). *Say Goodbye to "Forever Chemicals"*. https://www.patagonia.com/stories/say-goodbye-to-forever-chemicals/story-133800.html	11

Citation	Category
Ramírez Carnero, A., Lestido-Cardama, A., Vazquez Loureiro, P., Barbosa-Pereira, L., de Quirós, A., & Sendón, R. (2021). Presence of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) in Food Contact Materials (FCM) and Its Migration to Food. *Foods*, *10*(7). https://doi.org/10.3390/foods10071443	1
Rosenfeld, P. E., Spaeth, K. R., Remy, L. L., Byers, V., Muerth, S. A., Hallman, R. C., Summers-Evans, J., & Barker, S. (2023). Perfluoroalkyl substances exposure in firefighters: Sources and implications. *Environmental Research*, *220*, 115164. https://doi.org/10.1016/j.envres.2022.115164	1
Sajid, M., & Ilyas, M. (2017). PTFE-coated non-stick cookware and toxicity concerns: a perspective. *Environmental Science and Pollution Research*, *24*(30), 23436–23440. https://doi.org/10.1007/s11356-017-0095-y	1
Schellenberger, S., Liagkouridis, I., Awad, R., Khan, S., Plassmann, M., Peters, G., Benskin, J. P., & Cousins, I. T. (2022). An Outdoor Aging Study to Investigate the Release of Per- And Polyfluoroalkyl Substances (PFAS) from Functional Textiles. *Environmental Science & Technology*, *56*(6), 3471–3479. https://doi.org/10.1021/acs.est.1c06812	1
Schlummer, M., Gruber, L., Fiedler, D., Kizlauskas, M., & Müller, J. (2013). Detection of fluorotelomer alcohols in indoor environments and their relevance for human exposure. *Environment International*, *57–58*, 42–49. https://doi.org/10.1016/j.envint.2013.03.010	1
Schreder, E., & Goldberg, M. (2022). *Toxic Convenience: The hidden costs of forever chemicals in stain- and water-resistant products*.	11
Scivera. (2024). Nikwax® Direct.Dry. Verified GHS+ Hazard Assessments. Retrieved 1/18/2024 from https://www.scivera.com/sciveralens/	11
Scott, R. A. (1995). Coated and laminated fabrics. In C. M. Carr (Ed.), *Chemistry of the Textiles Industry* (pp. 210–248). Springer Netherlands. https://doi.org/10.1007/978-94-011-0595-8_7	1
Seventh Generation. (2023, March 23). *Product Name: Disinfecting Bathroom Cleaner, Lemongrass Citrus Scent*. https://smartlabel.seventhgeneration.com/732913228119-0001-en-US/index.html	11
Shoeib, M., Harner, T., M. Webster, G., & Lee, S. C. (2011a). Indoor Sources of Poly- and Perfluorinated Compounds (PFCS) in Vancouver, Canada: Implications for Human Exposure. *Environmental Science & Technology*, *45*(19), 7999–8005. https://doi.org/10.1021/es103562v	1

Citation	Category
Shoeib, M., Harner, T., M. Webster, G., & Lee, S. C. (2011b). Indoor Sources of Poly- and Perfluorinated Compounds (PFCS) in Vancouver, Canada: Implications for Human Exposure. *Environmental Science & Technology*, *45*(19), 7999–8005. https://doi.org/10.1021/es103562v	1
Sinclair, E., Kim, S. K., Akinleye, H. B., & Kannan, K. (2007). Quantitation of Gas-Phase Perfluoroalkyl Surfactants and Fluorotelomer Alcohols Released from Nonstick Cookware and Microwave Popcorn Bags. *Environmental Science & Technology*, *41*(4), 1180–1185. https://doi.org/10.1021/es062377w	11
Spartan Chemical Company. (2019). *Product Name: Green Solutions Glass Cleaner (#3507,#3512)*. https://www.spartanchemical.com/products/product/351202/#packaging-variations	11
Staples Inc. (2019). *Ingredient Communications Statement: Whiteboard Cleaner*. https://www.staples.com/Sustainable-Earth-by-Staples-Multi-Whiteboard-Cleaner-8-oz/product_887114	11
Strynar, M. J., & Lindstrom, A. B. (2008). Perfluorinated Compounds in House Dust from Ohio and North Carolina, USA. *Environmental Science & Technology*, *42*(10), 3751–3756. https://doi.org/10.1021/es7032058	11
Sunshine Makers Inc. (2021). *Product Name: Simple Green Professional Glass Cleaner Concentrate*. https://simplegreen.com/professional/products/clean-building-glass-cleaner/	11
Tencate Protective Fabrics. (2020). *Product Name: TenCate Advance™ Ripstop Fabric*. https://us.tencatefabrics.com/advance-wildlands	1
The Clorox Company. (2022). *Product Name: Clorox Multi-Surface Cleaner Free & Clear*. https://smartlabel.labelinsight.com/product/13032419/ingredients	11
The Period Company. (2020). *Product Name: Menstrual Underwear (Various Styles) 2*. https://period.co/collections/all?gclid=EAIaIQobChMIxLetjMW8gQMVfYnCCB0LQwahEAAYASAAEgJAE_D_BwE	11
Trimaco. (2023). *Product Name: Polypropylene Painters Coveralls*. https://trimaco.com/products/protective-wear/polypropylene-coveralls/	11
Trudel, D., Horowitz, L., Wormuth, M., Scheringer, M., Cousins, I. T., & Hungerbühler, K. (2008). Estimating Consumer Exposure to PFOS and PFOA. *Risk Analysis*, *28*(2), 251–269. https://doi.org/10.1111/j.1539-6924.2008.01017.x	1
True North Gear LLC, "Sale of Firefighting PPE containing PFAS chemicals", letter, May 10. (2019).	1

Citation	Category
Vessi. (2018, September). *About Vessi Shoes (FAQ)*. https://vessi.com/a/faq	1
WAXIE Sanitary Supply. (2019a). *Product Name: WAXIE-Green EDC 43 HP Multi-Purpose Cleaner*. https://shop.waxie.com/mStorefront/itemDetail.do?item-id=567739&warehouse-id=37	1
WAXIE Sanitary Supply. (2019b). *Product Name: WAXIE-GREEN SOLSTA 943 DISH KLEENZ LIQUID DISH SOAP*. https://shop.waxie.com/mStorefront/itemDetail.do?item-id=244281&warehouse-id=37	1
Xia, C., Diamond, M. L., Peaslee, G. F., Peng, H., Blum, A., Wang, Z., Shalin, A., Whitehead, H. D., Green, M., Schwartz-Narbonne, H., Yang, D., & Venier, M. (2022). Per- and Polyfluoroalkyl Substances in North American School Uniforms. *Environmental Science & Technology*, *56*(19), 13845–13857. https://doi.org/10.1021/acs.est.2c02111	1
Young, A. S., Pickard, H. M., Sunderland, E. M., & Allen, J. G. (2022). Organic Fluorine as an Indicator of Per- and Polyfluoroalkyl Substances in Dust from Buildings with Healthier versus Conventional Materials. *Environmental Science & Technology*, *56*(23), 17090–17099. https://doi.org/10.1021/acs.est.2c05198	1
Zheng, G., Boor, B. E., Schreder, E., & Salamova, A. (2020). Indoor exposure to per- and polyfluoroalkyl substances (PFAS) in the childcare environment. *Environmental Pollution*, *258*, 113714. https://doi.org/10.1016/j.envpol.2019.113714	1
Zheng, G., Schreder, E., Dempsey, J. C., Uding, N., Chu, V., Andres, G., Sathyanarayana, S., & Salamova, A. (2021). Per- and Polyfluoroalkyl Substances (PFAS) in Breast Milk: Concerning Trends for Current-Use PFAS. *Environmental Science & Technology*, *55*(11), 7510–7520. https://doi.org/10.1021/acs.est.0c06978	1
Zhou, J., Baumann, K., Chang, N., Morrison, G., Bodnar, W., Zhang, Z., Atkin, J. M., Surratt, J. D., & Turpin, B. J. (2022). Per- and polyfluoroalkyl substances (PFASs) in airborne particulate matter (PM2.0) emitted during floor waxing: A pilot study. *Atmospheric Environment*, *268*, 118845. https://doi.org/10.1016/J.ATMOSENV.2021.118845	1

Appendix B. Existing Laws, Regulations, and Restrictions

Table 3 and Table 4, respectively, describe existing regulations and voluntary actions to reduce PFAS in relevant consumer products. There are many regulations on PFAS, we focus here on those most relevant to the product categories under consideration for this cycle of Safer Products for Washington. We reviewed actions from other nations, as well as actions at the U.S. federal and state levels. We supplemented the information with voluntary actions taken by retailers. The existing regulations and voluntary efforts listed below could provide insight during potential rulemaking. Bold rows in Table 3 indicate proposed measures still under consideration at the time of this report.

The references below from states fall within citation category 5 and from private entities fall within category 11. The citation categories are described in Appendix A.

Table 3. Existing and proposed regulations for PFAS in consumer products

Entity	Year	Link to regulation or legislation	Requirements and standards
California	2022	CA HSC Sec 108970[40]	Bans the manufacture, distribution, sale, and offer for sale of any new, not previously used, textile articles that contain regulated PFAS. Regulated PFAS includes intentionally added PFAS (effective 2023), 100 ppm PFAS (effective 2025), or 50 ppm PFAS (effective 2027).
California	2022	CA HSC §109010 – 109014[41]	Manufacturer must label cookware sold in CA that contains one or more intentionally added chemicals present in the designated list of chemicals published on DTSC's website (includes PFAS). Effective January 1, 2024.
Colorado	2022	C.R.S. 25-15-604[42]	Label cookware that contains intentionally added PFAS. Effective January 1, 2024.

[40] leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=HSC&division=104.&title=&part=3.&chapter=13.5.&article=
[41] leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=HSC&division=104.&title=&part=3.&chapter=15.&article=2.
[42] advance.lexis.com/api/document/collection/statutes-legislation/id/6603-CRR3-GXF6-83XN-00008-00?cite=C.R.S.%2025-15-604&context=1000516

Entity	Year	Link to regulation or legislation	Requirements and standards
Illinois	**2023**	**SB0088 (proposed)[43]**	**Bans the sale, offer for sale, and distribution for sale or use of apparel containing intentionally added PFAS. Effective January 1, 2025.** **Requires manufacturers to label cookware containing intentionally added PFAS. Effective January 1, 2025.**
Indiana	2023	IC 36-8-27[44]	Requires Indiana fire departments to only purchase firefighter gear that is labeled indicating whether the firefighter gear contains PFAS. Effective July 1, 2024.
Maine	2023	L.D. 258[45]	Provides one-time funding to replace firefighting gear that is known to have PFAS.
Maine	2021	MRS Title 38 Chapter 16 Section 1614[46]	Manufacturers must report any product that contains intentionally added PFAS. Effective January 1, 2023. Bans the sale, offer for sale, and distribution of any products containing intentionally added PFAS. Effective January 1, 2030.
Maryland	2022	MD Code § 6-1603[47]	Requires notification for firefighter turnout gear that contains PFAS.
Massachusetts	**2024**	**H.2317 (proposed)[48]**	**Would establish a "PFAS Research and Development Public Safety Fund" for the purpose of supporting the development, testing, and purchasing of a PFAS-free firefighter PPE.**

[43] ilga.gov/legislation/fulltext.asp?DocName=&SessionId=112&GA=103&DocTypeId=SB&DocNum=88&GAID=17&LegID=143372&SpecSess=&Session=
[44] iga.in.gov/laws/2023/ic/titles/36#36-8-27-1
[45] mainelegislature.org/legis/bills/getPDF.asp?paper=HP0163&item=14&snum=131
[46] legislature.maine.gov/statutes/38/title38sec1614.html
[47] mgaleg.maryland.gov/mgawebsite/laws/StatuteText?article=gen&section=6-1603&enactments=False&archived=False
[48] malegislature.gov/Bills/193/H2317

Entity	Year	Link to regulation or legislation	Requirements and standards
Massachusetts	**2023**	**S1556H.2339 (proposed)[49]**	**Requires notification for firefighter turnout gear that contains PFAS. Proposed effective January 1, 2025.** **Bans the manufacture, sale, offer for sale, and distribution of firefighting PPE containing intentionally added PFAS. Proposed effective January 1, 2027.**
Minnesota	2023	Minn Stat 116.943 (2023)[50]	Bans the manufacture, sale, offer for sale, and distribution of specified products (cleaning products, cookware, ski wax) containing intentionally added PFAS. Effective January 1, 2025. Bans the manufacture, sale, offer for sale, and distribution of any product containing intentionally added PFAS. Effective January 1, 2032.
New York	2023	Chapter 43-B § 37-0121[51]	Bans the sale and offer for sale of any new apparel (not previously used) containing intentionally added PFAS. Effective January 1, 2025. Bans the sale and offer for sale of any outdoor apparel for severe wet conditions (not previously used) containing intentionally added PFAS or PFAS above levels that the department will establish, irrespective of whether intentionally added or not. Effective January 1, 2028. Bans the sale and offer for sale of any apparel (not previously used) containing PFAS (irrespective of whether intentionally added or not) at or above levels that the department will establish. Effective January 1, 2027.

[49] malegislature.gov/Bills/193/H2339
[50] revisor.mn.gov/statutes/cite/116.943
[51] nysenate.gov/legislation/laws/ENV/37-0121

Entity	Year	Link to regulation or legislation	Requirements and standards
North Carolina	**2023**	**HB 660 (proposed)[52]**	**Bans the manufacture of PFAS for use within the state or for export from the state. Proposed effective 30 days after adoption.** **Bans the use of PFAS for the production of any product for use within the state or for export from the state. Proposed effective 30 days after adoption.** **Bans the process and distribution in commerce any PFAS or any product containing PFAS. Proposed effective 30 days after adoption.**
Vermont	**2023**	**H152 (proposed)[53]**	**Bans the manufacture, sale, offer for sale, distribution for sale, and distribution for use of cookware containing intentionally added PFAS beginning January 1, 2024.** **Bans the manufacture, sale, offer for sale, distribution for sale, and distribution for use of any product containing intentionally added PFAS beginning July 1, 2030.**
Vermont	**2023**	**S25 (proposed)[54]**	**Bans the manufacture, sale, offer for sale, distribution for sale, and distribution for use of a textile or textile article (not used) containing intentionally added PFAS beginning January 1, 2025.**
Vermont	2021	Title 18 Chapter 33C[55]	Bans the manufacture, sale, offer for sale, distribution for sale, and distribution for use of ski wax or related tuning products containing intentionally added PFAS. Effective July 1, 2023.

[52] webservices.ncleg.gov/ViewBillDocument/2023/3939/0/DRH40355-CCa-7
[53] legislature.vermont.gov/Documents/2024/Docs/BILLS/H-0152/H-0152%20As%20Introduced.pdf
[54] legislature.vermont.gov/Documents/2024/Docs/BILLS/S-0025/S-0025%20As%20passed%20by%20the%20Senate%20Official.pdf
[55] legislature.vermont.gov/statutes/fullchapter/18/033C

Entity	Year	Link to regulation or legislation	Requirements and standards
Vermont	2021	Title 18 Chapter 33[56]	Requires manufacturers to notify the purchaser if firefighting PPE contains PFAS.
Sweden	2018	KIFS 2017:7 (in Swedish)[57] Explanation document (in English)[58]	Must report PFAS that are deliberately added to chemical products to the Swedish Chemicals Agency's Products Register. This requirement applies to those who manufacture or import notifiable products, irrespective of the percentage of the substance in that product. Examples of products include textiles and leather, firefighting foam, and household goods.
U.S.	2023	40 CFR part 705[59]	Persons who manufactured for commercial purposes PFAS at any period from January 1, 2011, through the end of 2023 must report by May 8, 2025. Effective October 28, 2023.
U.S.	**2023**	**H.R. 5260 (proposed)[60]**	**Prohibit the U.S. Department of Defense from the procurement and purchase of any "covered item" containing one of the listed PFAS. Covered items include nonstick cookware or food service ware; furniture or floor waxes; cleaning products; and shoes and clothing for which treatment with PFAS was not necessary for an essential function.**

[56] legislature.vermont.gov/statutes/fullchapter/18/033
[57] kemi.se/download/18.f1b904217860f8d6f02669/1702997709162/KIFS-2017-7-konsoliderad.pdf
[58] kemi.se/en/products-register/products-obliged-to-be-reported
[59] epa.gov/system/files/documents/2023-09/prepublicationcopy_7902-02_fr-doc_aa_esignatureverified_2023-09-28.pdf
[60] congress.gov/bill/118th-congress/house-bill/5260/text?s=1&r=1&q=%7B%22search%22%3A%22PFAS+Free+Military+Purchasing+Act%22%7D

Table 4. Voluntary actions for PFAS in consumer products

Entity	Year	Link to policy	Requirements and standards
3M	2022	3M[61]	Work to discontinue use of PFAS across 3Ms product portfolio by the end of 2025. Exit all PFAS manufacturing by the end of 2025.
Dick's Sporting Goods	2023	Dick's Sporting Goods[62]	Dick's Sporting Goods restricted PFAS from their products.
IKEA	2016	IKEA[63]	Restricted the use of PFAS in textile materials.
Jack Wolfskin	2019	Jack Wolfskin[64]	Makes PFC-free clothing, footwear, and equipment. All their clothing items, packs, and bags are completely 100% PFC-free since 2019.
KEEN	2018	KEEN[65]	Eliminated PFAS from their entire product line and ban all PFAS chemical compounds from their entire supply chain. Keen also maintains a restricted substances policy.
Office Depot	2021	Office Depot[66]	Restricted PFAS in disposable food ware, furniture, and textiles.
Patagonia	2023	Patagonia[67]	By fall 2023, about 96% of Patagonia's weather and waterproof garments that include DWR membranes and finishes will be made without PFCs and PFAS. All DWR finishes, except those for waders, will be PFAS-free. Effective 2024.
REI	2023	REI[68]	Ban PFAS in all textile products and cookware from its suppliers. Effective 2024.

[61] news.3m.com/2022-12-20-3M-to-Exit-PFAS-Manufacturing-by-the-End-of-2025
[62] s27.q4cdn.com/812551136/files/doc_downloads/csr/Restricted-Substances-List-(RSL)-April-2022.pdf
[63] ikea.com/us/en/files/pdf/2a/0f/2a0f5e67/ikea_restricted_substance_list.pdf
[64] jack-wolfskin.com/information-pfc/
[65] keenfootwear.com/blogs/keen-blog/outdoor-footwear-pfas-challenge
[66] media.officedepot.com/image/upload/v1612302301/content/od/pdf/BRSL_List_2021.pdf
[67] patagonia.com/stories/say-goodbye-to-forever-chemicals/story-133800.html
[68] rei.com/assets/stewardship/sustainability/rei-product-impact-standards/live.pdf

Entity	Year	Link to policy	Requirements and standards
Salomon	2020	Salomon[69]	Salomon's entire collection of shoes for running and hiking (2020-2021 footwear range) are PFC- or PFC EC-free. Salomon's bag collection (2021 spring/summer) are PFC- or PFC EC-free. Salomon expects to have apparel and winter sports PFC- or PFC EC-free in 2023.
Staples	2019	Staples[70]	Restricted intentionally added PFAS in disposable food ware, furniture, and textiles.
Target	2021	Target[71]	Seeks to remove intentionally added PFAS from owned brand products including textiles, formulated, cosmetics, beauty, and cookware by 2025.

[69] salomon.com/en-us/blog/pfc-ec-free-footwear
[70] media.staples.com/pdf/Staples_Priority_Chemicals_of_Concern_List.pdf
[71] corporate.target.com/sustainability-governance/responsible-resource-use/chemicals