



# **Environmental Justice Assessment**

## **Chapter 173-337 WAC**

### **Safer Products Restrictions and Reporting (Cycle 1.5)**

Hazardous Waste and Toxics Reduction Program

Washington State Department of Ecology  
Olympia, Washington

**November 2025 | Publication 25-04-073**

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<sup>1</sup> <https://ecology.wa.gov/contact>

<sup>2</sup> <https://ecology.wa.gov/ADA>

# Language Services

Under the state Environmental Justice law (Chapter 70A.02 RCW), Ecology is required to conduct environmental justice assessments during development of certain significant actions. This assessment provides information about the potential impacts to overburdened communities and vulnerable populations, and strategies to mitigate identified harms and fairly distribute known benefits. For translation, interpretation, or accessibility assistance, please contact Courtney Cecale at [courtney.cecale@ecy.wa.gov](mailto:courtney.cecale@ecy.wa.gov) or (360) 480-6270.

**Spanish:** Bajo la ley estatal de Justicia Medioambiental (Chapter 70A.02 RCW), Ecología está obligada a realizar Evaluaciones de Justicia Medioambiental durante el desarrollo de ciertas medidas importantes. Esta evaluación proporciona información sobre los posibles impactos en las comunidades sobrecargadas y las poblaciones vulnerables, y las estrategias para mitigar los daños identificados y distribuir justamente los beneficios conocidos. Para asistencia de traducción, interpretación o accesibilidad, por favor póngase en contacto con Courtney Cecale escribiendo a [courtney.cecale@ecy.wa.gov](mailto:courtney.cecale@ecy.wa.gov) o llamando al (360) 480-6270.

**Chinese:** 根据华盛顿州环境正义法(Chapter 70A.02 RCW), 生态管理署在制定某些重大行动时必须进行环境正义评估。该评估需提供对负担过重社区和弱势群体潜在影响的信息, 以及减轻已明确 的危害和公平分配已知利益的策略。如需笔译、口译或无障碍协助, 请联系 Courtney Cecale, 电子邮件: [courtney.cecale@ecy.wa.gov](mailto:courtney.cecale@ecy.wa.gov) 或电话 (360) 480-6270。

**Vietnamese:** Theo luật Công Bằng Môi Trường của tiểu bang (Chapter 70A.02 RCW), Bộ Môi Sinh được yêu cầu tiến hành Đánh Giá Công Bằng Môi Trường trong quá trình triển khai một số hành động quan trọng. Đánh giá này cung cấp thông tin về các tác động tiềm ẩn đối với các cộng đồng đang chịu tổn hại và các nhóm dân cư dễ bị tổn hại cũng như các chiến lược nhằm giảm thiểu tác hại đã xác định và phân chia công bằng các lợi ích đã biết. Để được hỗ trợ về thông dịch, giải thích hoặc sự giúp đỡ cho người khuyết tật, vui lòng liên hệ với Courtney Cecale theo địa chỉ [courtney.cecale@ecy.wa.gov](mailto:courtney.cecale@ecy.wa.gov) hoặc (360) 480-6270.

**Korean:** 주 환경부는 중요한 조치를 계획할 때 환경 정의 평가를 수행해야 합니다. 이 평가는 취약계층 지역사회와 취약인구에 대한 잠재적 영향 관련 정보와, 확인된 피해를 완화하고 알려진 혜택을 공정하게 분배하기 위한 전략을 제공합니다. 번역, 통역, 또는 장애인 서비스 지원은 담당자 (Courtney Cecale)에게 이메일 [courtney.cecale@ecy.wa.gov](mailto:courtney.cecale@ecy.wa.gov) 또는 전화 (360) 480-6270으로 문의하십시오.

# Department of Ecology's Regional Offices

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<b>Southwest Region</b> 360-407-6300	<b>Northwest Region</b> 206-594-0000	<b>Central Region</b> 509-575-2490	<b>Eastern Region</b> 509-329-3400
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Region	Counties served	Mailing Address	Phone
<b>Southwest</b>	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	P.O. Box 47775 Olympia, WA 98504	360-407-6300
<b>Northwest</b>	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	P.O. Box 330316 Shoreline, WA 98133	206-594-0000
<b>Central</b>	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 West Alder Street Union Gap, WA 98903	509-575-2490
<b>Eastern</b>	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 North Monroe Spokane, WA 99205	509-329-3400
<b>Headquarters</b>	Statewide	P.O. Box 47600 Olympia, WA 98504	360-407-6000

# Environmental Justice Assessment

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## Chapter 173-337 WAC Safer Products Restrictions and Reporting (Cycle 1.5)

Hazardous Waste and Toxics Reduction Program  
Washington State Department of Ecology  
Olympia, Washington

**November 2025 | Publication 25-04-073**



DEPARTMENT OF  
**ECOLOGY**  
State of Washington

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# Executive Summary

The Washington State Department of Ecology (Ecology) conducts environmental justice assessments when planning significant agency actions. The subject of this environmental justice assessment is a rulemaking to revise a chapter in the Washington Administrative Code (WAC): Chapter 173-337 WAC—Safer Products Restrictions and Reporting.

**The purpose of this rulemaking (or action)** is to adopt restrictions and reporting requirements to:

- Protect Washington residents, particularly sensitive populations such as children and people with higher toxic exposures.
- Make consumer products safer and reduce consumers' and workers' exposure to per- and polyfluoroalkyl substances (PFAS).
- Increase transparency so consumers can make more informed decisions about the products they use every day.

**This action applies to all Washington communities.** PFAS are a class of toxic chemicals that are used for various functions in consumer products, such as adding water resistance in apparel or to aid in soil or stain removal in cleaning products. Although those qualities have made them widely used in a range of products, many of these chemicals have also been shown to build up in people, animals, and the environment over time. They're often called "forever chemicals" because many don't completely break down in the environment.

People can be exposed to PFAS when they use products containing PFAS. Consumer products can also release PFAS into dust or the air. Many PFAS are linked to cancer as well as reproductive and developmental harm in humans. They're also linked to toxicity in fish and wildlife.

**Ecology provided opportunities for public comment and Tribal Government-to-Government consultation.** We:

- Conducted community engagement efforts for this action from November 2023 through April 2025.
- Provided notices about the rulemaking in Chinese, English, Korean, Russian, Spanish, Ukrainian, and Vietnamese.
- Invited Tribal Government-to-Government consultation with 29 federally recognized Tribal governments. We didn't receive requests for formal consultation or formal or informal comments from Tribal governments or Tribal organizations.
- Invited public input during three online public workshops in December 2023 and in August and September 2024.

- Invited public input on a preliminary draft rule in September and October 2024 and received input from interested parties.
- Hosted a formal public comment period from June 4 to July 20, 2025, and hosted two online formal hearings on July 9 and 10, 2025. We received 45 formal comment submissions (42 written and 3 verbal), including one submission signed by 203 individuals.

**Ecology assessed potential environmental benefits and harms from this action.** We identified the following environmental and human health **benefits** from this action. The amended rule will:

- Reduce PFAS exposure for people who use priority consumer products.
- Reduce exposure to PFAS for members of overburdened communities and sensitive populations in Washington State.
- Reduce the amount of PFAS that enters the environment when priority consumer products are used or disposed of.
- Reduce exposure pathways that lead to environmental releases where PFAS can bioaccumulate in fish and other aquatic species.
- Likely improve indoor and outdoor air quality and reduce environmental pollution from priority consumer products containing PFAS. This helps improve environmental and working conditions for the health of sensitive populations.

We didn't identify any **environmental harms** from this action.

We identified the following **potential harms** from this action. The amended rule may:

- Change the availability of priority consumer products. Companies that don't reformulate priority consumer products to meet the new restrictions aren't allowed to make, sell, or distribute these products in Washington State. This could reduce the number of priority consumer products available to people in the state.
- Change the performance of priority consumer products. Reformulated consumer products may perform differently (better or worse).
- Changes in product availability or performance may impact members of overburdened communities and sensitive populations through product availability and performance. These changes may affect personal, cultural, and other elements of their identity.

The amended rule protects the people and environment of Washington State. This rule will help reduce exposure to PFAS and may improve health outcomes and safeguard the environment from pathways of pollution.

# Introduction

## Purpose of the Environmental Justice Assessment

The environmental justice assessment process helps assess the environmental justice impacts of significant agency actions. The assessment informs and supports consideration of overburdened communities and vulnerable populations when making decisions. This information assists with the equitable distribution of environmental benefits, the reduction of environmental harms, and the identification and reduction of health disparities.

The environmental justice assessment process aligns with Washington's environmental justice law, called the Healthy Environment for All (HEAL) Act ([Chapter 70A.02 RCW](#)).<sup>3</sup> The assessment process draws on best practices established in [Promising Practices for EJ Methodologies in NEPA Reviews](#).<sup>4</sup>

Environmental justice assessments are to be completed for the following actions:

- The development and adoption of significant legislative rules as defined in [RCW 34.05.328](#).<sup>5</sup>
- The development and adoption of any new grant or loan program that a covered agency is explicitly authorized or required by statute to carry out.
- A capital project, grant, or loan award of at least \$12,000,000 or a transportation project, grant, or loan of at least \$15,000,000.
- The submission of agency request legislation to the Office of the Governor or the office of financial management for approval.

This assessment is not required to be a comprehensive or an exhaustive examination of all potential impacts of a significant agency action and doesn't require novel quantitative or economic analysis of the proposed significant agency action.

The time and resource investment and depth of assessment will be influenced by the reasonable applicability of the questions to the agency action.

Ecology plans to update this document and incorporate what we learn through practice, community engagement, Tribal consultation, and any guidance we may receive from the Environmental Justice Council.

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<sup>3</sup> <https://app.leg.wa.gov/RCW/default.aspx?cite=70A.02&full=true>

<sup>4</sup> [https://www.epa.gov/sites/default/files/2016-08/documents/nepa\\_promising\\_practices\\_document\\_2016.pdf](https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf)

<sup>5</sup> <https://app.leg.wa.gov/RCW/default.aspx?cite=34.05.328>

# Section 1: Background

Ecology included the following information in the notification submitted to the [Office of Financial Management Dashboard](#).<sup>6</sup>

**1. Descriptive title of project or action**

Safer Products for Washington Cycle 1.5 Rulemaking

**2. Date Environmental Justice Assessment initiated**

Friday, December 8, 2023

**3. Ecology Program or Office**

Hazardous Waste and Toxics Reduction

**4. Point of Contact for Environmental Justice Assessment**

Stacey Callaway

**5. Significant Agency Action type, select one or more**

- Rulemaking
- New grant or loan program
- New capital project, grant, or loan of \$12 million or more
- Request legislation
- Other, explain:

**6. Write a short summary of the action.**

The Washington State Department of Ecology (Ecology) is starting a rulemaking to revise the Safer Products Restrictions and Reporting rule—[Chapter 173-337 WAC](#)<sup>7</sup>—aiming to reduce PFAS in consumer products.

Ecology plans to conduct this rulemaking to:

- Reduce the use of priority chemicals in priority consumer products.

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<sup>6</sup> <https://ofm.wa.gov/budget/budget-related-information/environmental-justice-and-health-act/environmental-justice-assessment-notices>

<sup>7</sup> <https://app.leg.wa.gov/WAC/default.aspx?cite=173-337>

- Revise Chapter 173-337 WAC in accordance with the regulatory actions outlined in the Regulatory Determinations Report to the Legislature that Ecology will submit by June 1, 2024.

Under the authority of [Chapter 70A.350 RCW](#),<sup>8</sup> Ecology may restrict the manufacture, sale, and distribution of a chemical in a product, or require manufacturers to report the use of a chemical in a product.

In this rulemaking, Ecology may create reporting requirements or restrictions that apply to the use of PFAS in product categories such as:

- Apparel and gear.
  - Apparel examples include athleticwear, rainwear, school uniforms, clothing for everyday use, undergarments (reusable baby diapers and period underwear), hats, scarves, gloves, shoes, outerwear for mountaineering, outerwear for whitewater kayaking, and commercial fishing bibs for offshore fishing.
  - Gear examples include backpacks, sleeping bags, umbrellas, camping furniture, and climbing rope.
- Cleaning products, including products to wash automobiles and boats.
- Cookware and kitchen supplies.
  - Examples include frying pans, cooking pots, rice cookers, waffle makers, griddles, bakeware, and reusable baking liners.
- Firefighting PPE (personal protective equipment).
- Hard surface sealants.
  - Examples include sealants applied to hard porous surfaces like stone, unglazed tile, concrete, and wood that can be used for interior and exterior applications.
- Waxes and polishes, including products for floors, automobiles, skis, and snowboards.

PFAS are a group of toxic chemicals that are very persistent in the environment. Most people living in the United States have PFAS in their blood. People are exposed through food, drinking water, and products with PFAS. As products are created, used, and disposed of, exposure can occur:

- Directly from items such as apparel, cleaning products, and cookware.

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<sup>8</sup> <https://app.leg.wa.gov/rcw/default.aspx?cite=70A.350>

- Indirectly from the environment—through the air we breathe, water we drink, and food we eat.

Ecology plans to develop rules that could:

- Reduce the use of PFAS in products by restricting PFAS when Ecology identifies safer, feasible, and available alternatives. This will help:
  - Reduce consumers' and workers' exposure to PFAS.
  - Reduce the amount of PFAS entering the environment.
- Increase product ingredient transparency.

## **7. Identify the method(s) for the public to comment on this proposed action for this assessment.**

Get involved in this rulemaking by:

- Sharing feedback<sup>9</sup> on the [Cycle 1.5 Draft Regulatory Determinations Report](#).<sup>10</sup> The comment period is open now and closes at 11:59 p.m. PST on January 12, 2024.
- Signing up for [email announcements](#).<sup>11</sup>
- Attending webinars. Our next webinars will occur on December 13 and 14, 2023. See our [interested parties webpage](#)<sup>12</sup> for more information.
- Contacting Stacey Callaway at [stacey.callaway@ecy.wa.gov](mailto:stacey.callaway@ecy.wa.gov) or 360-584-5661.

As we schedule additional opportunities to provide feedback and participate in workshops, we will share details on our webpages and via our email list. We anticipate:

- Developing draft rule requirements in the summer of 2024.
- Sharing a preliminary draft rule, providing a public comment period, and hosting webinars in the fall of 2024.
- Proposing a formal draft rule, providing a public comment period, and hosting hearings, in the summer of 2025.
- Adopting the revised rule by December 1, 2025.

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<sup>9</sup> Review the [comments we received](#) for this public comment period (<https://hwtr.ecology.commentinput.com/comment/extra?id=UguCSsFZD>).

<sup>10</sup> <https://apps.ecology.wa.gov/publications/SummaryPages/2304062.html>

<sup>11</sup> [https://public.govdelivery.com/accounts/WAECY/subscriber/new?topic\\_id=WAECY\\_113](https://public.govdelivery.com/accounts/WAECY/subscriber/new?topic_id=WAECY_113)

<sup>12</sup> [https://www.ezview.wa.gov/site/alias\\_\\_1962/37555/safer\\_products\\_for\\_washington.aspx](https://www.ezview.wa.gov/site/alias__1962/37555/safer_products_for_washington.aspx)

8. **Create or provide an Ecology webpage with information about this proposed action.**

Visit our [rulemaking webpage](#).<sup>13</sup>

## Section 2: Notification that an Environmental Justice Assessment Has Been Initiated

This section instructs Ecology staff to notify the Office of Financial Management about the initiation of the action.

## Section 3: Identify Affected Tribes

This section summarizes preliminary planning for Tribal consultation. Ecology must offer consultation with Tribes on significant agency actions that affect federally recognized Tribes' rights and interest in their tribal lands.

### Preparing for Tribal consultation

1. **Is the proposed action likely to have any local or regional impacts to federally reserved Tribal rights and resources, including but not limited to those protected by treaty, executive order, or federal law? Choose one of the following:**

Yes

No

Unsure

2. **List any federally recognized Tribes that are expected to be affected by the proposed action. If it is determined during consultation that Tribes do not wish to be included, then do not include them.**

This action (rulemaking) is statewide and may indirectly impact federally recognized Tribes in Washington State because it impacts priority consumer products containing PFAS that are sold online and distributed to, or used on, Tribal lands. This rulemaking may also impact the availability of priority consumer products containing PFAS that Tribes and Tribal members can purchase outside of Tribal lands.

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<sup>13</sup> <https://ecology.wa.gov/regulations-permits/laws-rules-rulemaking/rulemaking/wac-173-337-nov2023>

For these reasons, we determined that the following 29 federally recognized Tribes may be impacted by this action.

- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Chehalis Reservation
- Confederated Tribes of the Colville Reservation
- Cowlitz Indian Tribe
- Hoh Indian Tribe
- Jamestown S'Kallam Tribe
- Kalispel Tribe of Indians
- Lower Elwha Klallam Tribe
- Lummi Nation
- Makah Tribe
- Muckleshoot Indian Tribe
- Nisqually Indian Tribe
- Nooksack Indian Tribe
- Port Gamble S'Klallam Tribe
- Puyallup Tribe
- Quileute Tribe
- Quinault Indian Nation
- Samish Indian Nation
- Sauk-Suiattle Indian Tribe
- Shoalwater Bay Indian Tribe
- Skokomish Indian Tribe
- Snoqualmie Indian Tribe
- Spokane Tribe of Indians
- Squaxin Island Tribe
- Stillaguamish Tribe of Indians
- Suquamish Tribe
- Swinomish Indian Tribal Community
- Tulalip Tribes
- Upper Skagit Indian Tribe

**3. If it is determined at any other point in the process of the assessment that Tribes have self-identified as being potentially impacted by the action, then include them in the assessment and offer consultation.**

**4. Describe plans to offer consultation to identified Tribes.**

Ecology intends to offer Government-to-Government consultation to 29 Tribal governments at three stages during this rulemaking. We intend to send notifications to Tribal Chairs and Natural Resource Directors when we:

- Announce the start of rulemaking.
- Propose the formal draft rule and announce the formal comment period and formal hearings.
- Adopt the rule.

We also intend to offer Tribal engagement opportunities at Tribal conventions, through relationships with Tribal organizations, and through updates to email distribution lists and Ecology webpages.

## Section 4: Offer Consultation

This section directs Ecology staff to offer consultation with Tribes on significant agency actions that affect federally recognized Tribes' rights and interest in their tribal lands.

## Section 5: Summary of Tribal Consultation and Engagement

Tribal consultation is intended to inform the answers to all questions in this section.

### Summary of Tribal consultation

- 1. Describe potential impacts (including harms and benefits) to federally recognized Tribal rights and interests in their Tribal lands. Do not share sensitive data or location information attributable to individual sites. Do not share any information that Tribes have requested that you not share.**

This rulemaking applies statewide. It may indirectly impact federally recognized Tribes in Washington State because it impacts priority consumer products containing PFAS that are sold online and those that are distributed to, or used on, Tribal lands and lands with federally protected Tribal rights.

Because Tribes are sovereign nations, Ecology doesn't have the authority to regulate priority consumer products that are manufactured, sold, or used on Tribal lands.

However, this action may impact priority consumer products made, distributed, and sold on non-Tribal land in Washington State. Priority consumer products made outside of Tribal lands and priority consumer products brought into Washington State must meet the new restrictions in the amended rule. Therefore, Tribally-owned businesses and businesses operating within Tribal lands may see a change in the availability of some priority consumer products offered for sale or distribution in Washington State.

We are unsure of all the impacts that could occur on Tribal lands and can only offer possible outcomes.

For newly restricted priority consumer products, the amended rule may:

- Reduce PFAS exposure for people who use priority consumer products containing PFAS that are made, sold, or distributed on non-Tribal lands.
- Reduce environmental pollution introduced from priority consumer products containing PFAS entering Tribal and non-Tribal lands and waterways.
- Affect the sale and distribution of priority consumer products containing PFAS on Tribal lands because these products are restricted on non-Tribal lands in Washington State. Sales of priority consumer products containing PFAS on Tribal lands may increase or decrease, depending on market factors such as reformulation, demand, and availability.

**2. Describe potential impacts related to Tribal rights and interests that are not in Tribal lands.**

This rulemaking may indirectly impact federally recognized Tribes in Washington State because it impacts newly restricted priority consumer products containing PFAS sold online or in physical stores that are then distributed to lands with federally protected Tribal rights.

**3. Summarize recommendations from Tribes to mitigate or eliminate potential harms from the action.**

We didn't receive requests for Government-to-Government consultation from any of the affected Tribes or feedback during Tribal engagement opportunities. We presented information about the rulemaking at the Affiliated Tribes of Northwest Indians 2024 Winter Convention.

**4. Summarize recommendations from Tribes to equitably distribute benefits from the action.**

We didn't receive requests for Government-to-Government consultation from any affected Tribes or feedback during Tribal engagement opportunities. Therefore, we didn't discuss or receive recommendations to equitably distribute benefits from the action.

**5. Describe how consultation, engagement, and analyses of impacts to Tribes has informed the development of the action. If it has not, explain why.**

Ecology offered Government-to-Government consultation to 29 Tribal governments at each formal stage of this rulemaking. We sent notifications to Tribal Chairs and Natural Resource Directors on:

- December 8, 2023, when we announced the start of rulemaking.
- June 4, 2025, when we proposed the formal draft rule and announced the formal comment period and formal hearings.

No Tribes requested Government-to-Government consultation in response to these previous notifications. Therefore, consultation did not directly inform this action.

However, Ecology presented about the rule at the Affiliated Tribes of Northwest Indians Winter Convention in 2024. We invited questions following the presentation and shared contact information. We also invited attendees to participate in a Tribal webinar held in February 2024, where we described the Safer Products for Washington program and gave updates about our work on PFAS and other priority chemicals.

We are planning to provide Tribal engagement in future actions. We are also sending notifications about the amended rule to Tribal Chairs and Natural Resource Directors on November 20, 2025, to invite Government-to-Government consultation.

## **6. Describe any plans to continue consultation or engagement with Tribes related to this action.**

Ecology will continue to conduct outreach to Tribal governments, members, and Tribal community groups in Washington State. Our outreach efforts will focus on the holistic health impacts of toxic chemicals in priority consumer products, such as: effects on a person's or community's well-being, including but not limited to physical, emotional, social, environmental, and economic health. Outreach will also focus on how the restrictions in rules and laws may impact them as individual consumers, manufacturers, and business owners.

While we do not anticipate additional communications or outreach for this rulemaking covering priority consumer products containing PFAS, we will continue to identify and support engagement opportunities with Tribes related to the ongoing programmatic work of Safer Products for Washington. These actions will include:

- Developing educational materials and guidance and sharing them with Tribal members and Tribal community groups.
- Attending and presenting at Tribal events, such as the Affiliated Tribes of Northwest Indians conventions.

## **Section 6: Identification of Overburdened Communities and Vulnerable Populations**

This section identifies overburdened communities and vulnerable populations, as identified in the [definitions of Chapter 70A.02 RCW](#),<sup>14</sup> that will be affected by the action.

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<sup>14</sup> <https://app.leg.wa.gov/RCW/default.aspx?cite=70A.02.010>

## Identify overburdened communities and vulnerable populations

### 1. Identify the geographic area(s) anticipated to be affected by the action.

The amended rule applies statewide and will impact priority consumer products made, sold, or distributed throughout Washington State.

### 2. When applicable, using the [Washington State Department of Health's Environmental Health Disparities Map \(EHD Map\)](#),<sup>15</sup> identify the EHD Map rankings for all census tracts likely to be impacted by the action.

All census tracts will be impacted by the amended rule because PFAS are found everywhere (see Faust, 2023, regarding global distribution of PFAS).

### 3. From the rankings identified in question 2, are there any census tracts ranked 9 and 10?

Yes

No

If yes, describe.

The amended rule impacts all census tracts in Washington State due to the global prevalence of PFAS (Ecology & Health, 2022; see also Faust, 2023, regarding global distribution of PFAS). Specifically, census tracts ranked 9 and 10 will benefit from the outcomes of this action. It is important to note that sites around the state with drinking water contamination are already overburdened and may also benefit from the outcomes of this action.

### 4. Please describe additional cumulative health considerations relevant to this action.

PFAS chemicals can be released into air, water, indoor dust, and soil from products that contain PFAS. They can also be released from industrial facilities that make PFAS or use PFAS to make products.

As noted in Ecology and Health's [Chemical Action Plan](#)<sup>16</sup> (2022), having higher levels of PFAS chemicals in our bodies could increase risk for negative health impacts, including:

- Higher cholesterol levels.
- Blood pressure problems during pregnancy.
- Thyroid disease.

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<sup>15</sup> <https://fortress.wa.gov/doh/wtnibl/WTNIBL/>

<sup>16</sup> <https://apps.ecology.wa.gov/publications/summarypages/2104048.html>

- Lower birthweights for babies.
- Weaker immune system responses to some vaccinations, making them less effective at preventing infections (for example, the tetanus vaccine).
- Increased risk of some cancers, including kidney and testicular cancer.

Additionally, data and research show that members of overburdened communities and vulnerable populations regularly face compounded environmental health challenges. Disparities in resources, such as access to good indoor air or water quality, or healthcare or health information, make them more vulnerable to negative cumulative health impacts (Morello-Frosch et al., 2011). Individuals who are low-income, people of color, or immigrants to the United States are also exposed more frequently to multiple environmental and social risk factors (Libenson et al., 2024; Liddie et al., 2023; UC Berkeley, 2024). Moreover, because PFAS are widely distributed in the environment (Ecology & Health, 2022), sensitive communities and species near treatment facilities and affected waterways may experience greater cumulative health effects in addition to those stemming from priority consumer products containing PFAS (see Ahrens et al., 2009; Hamid & Li, 2016).

Certain priority consumer products can worsen these cumulative impacts, increasing negative health outcomes (see Guo et al., 2009, regarding releases from consumer products containing PFAS). Consequently, consumer products containing PFAS may add to existing exposures from other sources of toxic chemicals, particularly in communities already exposed to higher levels of toxic chemicals or among people more vulnerable to health effects.

PFAS are a class of toxic chemicals that are used for various functions in consumer products, such as adding water resistance in apparel or to aid in soil or stain removal in cleaning products. Although those qualities have made them widely used in a range of products, many of these chemicals have also been shown to build up in people, animals, and the environment over time. They're often called "forever chemicals" because many don't completely break down in the environment.

Additionally, PFAS accumulate in people and are excreted more slowly in humans relative to other mammals (Interstate Technology & Regulatory Council, 2023). Fish and other aquatic species also accumulate PFAS in their bodies, and this can be an important source of exposure in people (Pickard et al., 2022). When fish that are exposed to PFAS are consumed, they may further impart negative health impacts associated with PFAS.

Specific human health effects related to PFAS include:

- Cancer, including kidney, lung, and testicular cancers.
- Immune toxicity, including decreased vaccination response.
- Developmental effects, including low birth weight.

- Cardiovascular disease.
- Endocrine effects, including thyroid disease.
- Liver effects.
- Diabetes.

(See Fenton et al., 2020; Granum et al., 2012; Interstate Technology & Regulatory Council, 2023.)

To reduce Washingtonians' exposure to PFAS, the amended rule restricts the manufacturing, sale, and distribution of certain priority consumer products that contain intentionally added PFAS. These products include:

- Apparel and accessories.
- Automotive washes.
- Cleaning products.

Restricting PFAS in priority consumer products will lead to a gradual reduction in cumulative health impacts resulting from PFAS exposure (Ecology, 2024). Replacing PFAS-containing consumer products with PFAS-free products can significantly reduce concentrations in dust (Young et al., 2022), as well as instances of ingestion (Kang et al., 2016; Kubwabo et al., 2013; Zheng et al., 2021). Reducing PFAS in consumer products can, therefore, reduce exposure—particularly in sensitive populations such as babies and children who potentially ingest more harmful chemicals for their size.

The best way to reduce exposure to persistent chemicals is through pollution prevention. It is more effective 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.

Additionally, the amended rule also requires manufacturers to report the intentional use of PFAS in the following products:

- Apparel intended for extreme and extended use.
- Footwear.
- Gear for recreation and travel.
- Automotive waxes.
- Cookware and kitchen supplies.
- Firefighting personal protective equipment.
- Floor waxes and polishes.
- Hard surface sealers.

- Ski waxes.

Reporting requirements indirectly support all Washingtonians because they promote greater consumer transparency and market change. As chemicals of concern are reported in the publicly accessible [High Priority Chemicals Data System \(HPCDS\)](#),<sup>17</sup> the reports help the Safer Products team understand where and how PFAS are used in products. Additionally, as safer alternatives become available, reporting requirements may help inform regulations for future cycles of Safer Products for Washington.

Ultimately, the amended rule will reduce environmental and health effects of PFAS exposure. Environmental policy and regulatory actions that have a narrow focus on a specific chemical or product often underestimate cumulative health impacts from exposure to multiple chemicals from multiple sources (Morello-Frosch et al., 2011). However, reducing toxic chemicals in multiple product categories can reduce those impacts. The total impact of each specific PFAS is uncertain, but reducing exposure to any toxic chemical can result in cumulative health benefits.

- 5. Identify areas likely to be impacted by the action that are at or above the 80th percentile (in state) for the “People of color” and “Low income” socioeconomic indicators. You can do this by looking at the EHD map rankings for these individual indicators (rank 9 or higher roughly approximates those census tracts at or above the 80th percentile), and/or by downloading the appropriate data on these indicators from the Washington Tracking Network or the Census Bureau’s American Community Survey 5-year estimates and running additional analysis to determine percentiles.**

Washington State Department of Health developed the Washington Tracking Network to:

- Collect, manage, integrate, and share environmental public health data.
- Generate indicators from environmental public health tracking data.
- Build a network of environmental public health partners to contribute to the Tracking Network for public health action.

Chronic diseases account for 70 percent of deaths in the United States, and environmental hazards may influence many of these diseases and health conditions. The Tracking Network’s mission is to provide information from a nationwide network of integrated health and environmental data that drives actions to improve the health of communities.

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<sup>17</sup> <https://hpcds.theic2.org/Search>

The U.S. Environmental Protection Agency (U.S. EPA) has identified the 80th percentile as an initial starting point and potential indicator of environmental justice considerations. We evaluated the following socioeconomic and health disparity indicators and included the U.S. EPA description of each indicator:

- **People of color**

The percent of individuals in a block group who list their racial status as a race other than White alone or list their ethnicity as “Hispanic” or “Latino.” The word “alone” in this case indicates that the person is of a single race, not multiracial.

- **Low income**

The percent of a block groups’ population in households where the household income is less than or equal to twice the federal “poverty level.” The federal poverty level (FPL) is the annualized income earned by a household below which they would be eligible to receive certain welfare benefits. For example, in 2024 the FPL for a three-person household was \$25,820.00.

- **Cancer**

Cancer prevalence (excluding skin cancer) among adults aged 18 or older. This data is available at the tract level; the same tract value is then assigned to all sub block groups within that tract.

- **Low birth weight**

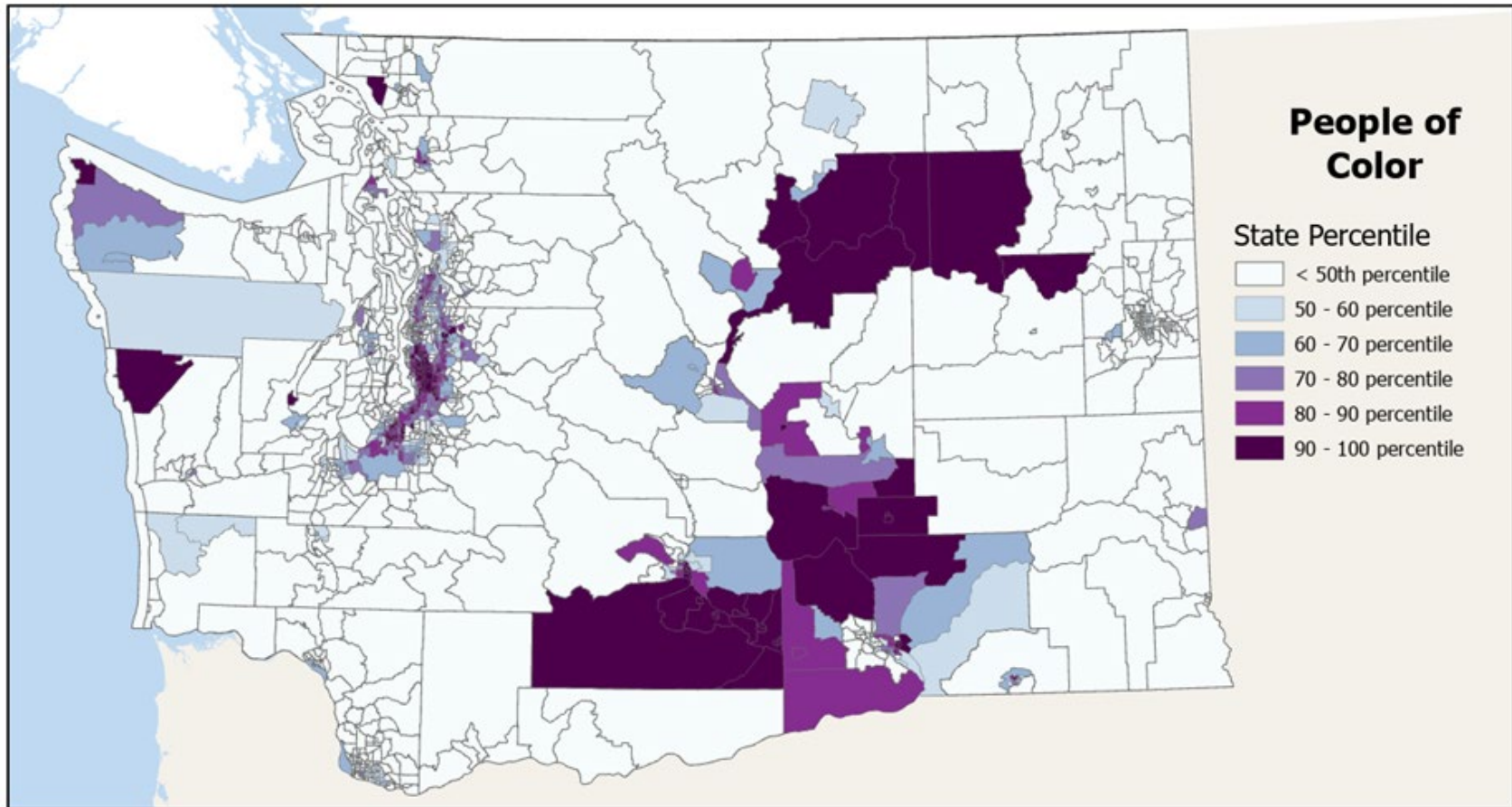
The number of single live born babies with a birth weight of less than 2500 grams or approximately 5.5 pounds. Low birth weight outcomes are globally recognized markers for population health due to existing disparities associated with certain demographics. There is also evidence that environmental stressors not only impact low birth weight infants throughout their lifetime, but also put infants at risk for low birth weight before birth.

- **Death from cardiovascular disease**

Mortality from cardiovascular diseases represents the proportion of deaths to a population due to cardiovascular disease. The rate represents the age adjusted per 100,000 population. The prevalence of cardiovascular disease in a community captures the population susceptible to environmental risk factors; however, the data may underestimate the true population with pre-existing heart disease in the community.

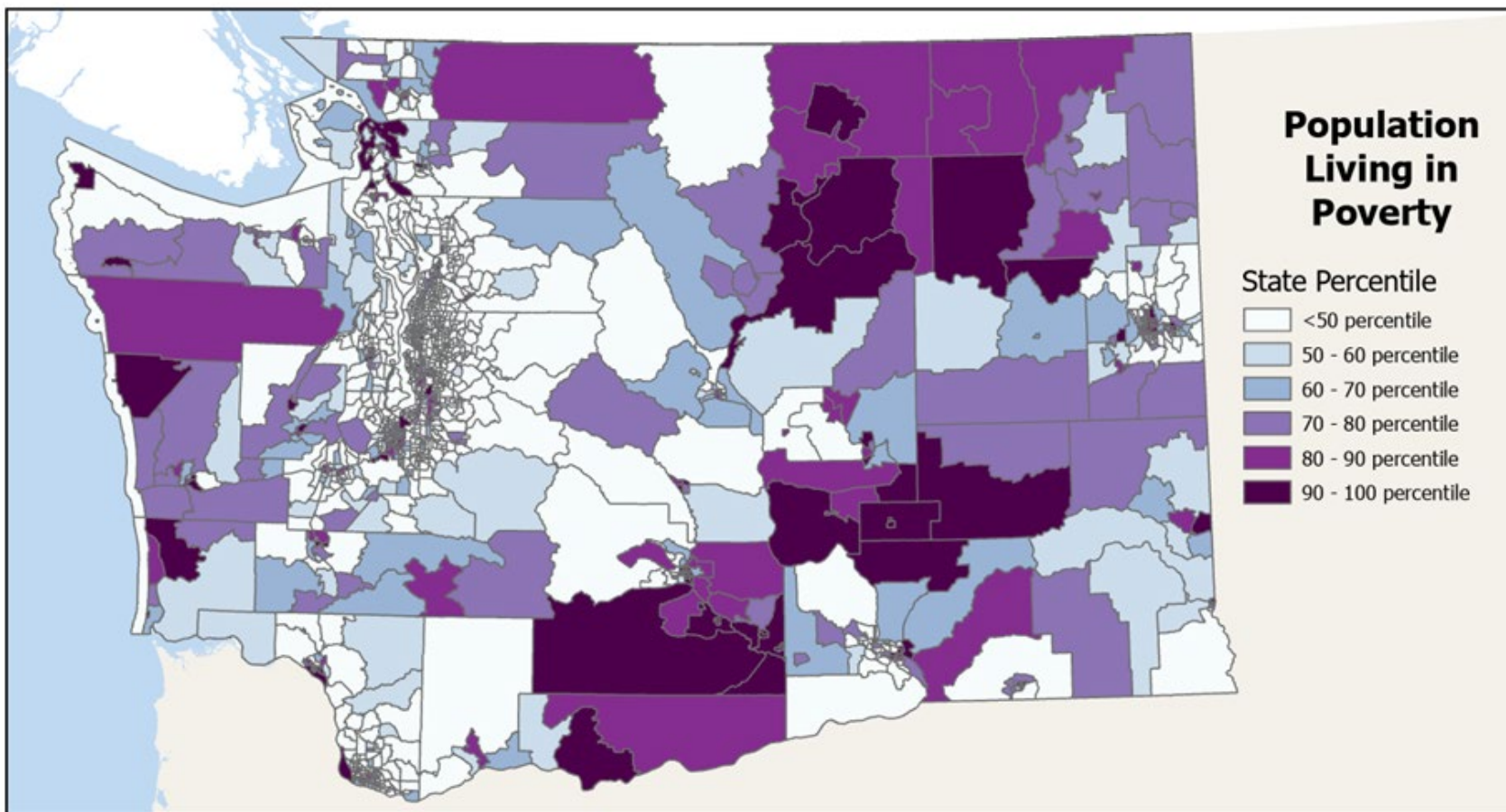
This action applies statewide, so all areas at or above the 80th state percentile for “people of color” and “low income” will be impacted. This includes Tribal lands, even though Ecology doesn’t have authority to regulate priority consumer products manufactured, sold, or used on Tribal lands (see [Summary of Tribal Consultation](#)).

**Figure 1. People of color (state percentiles)**



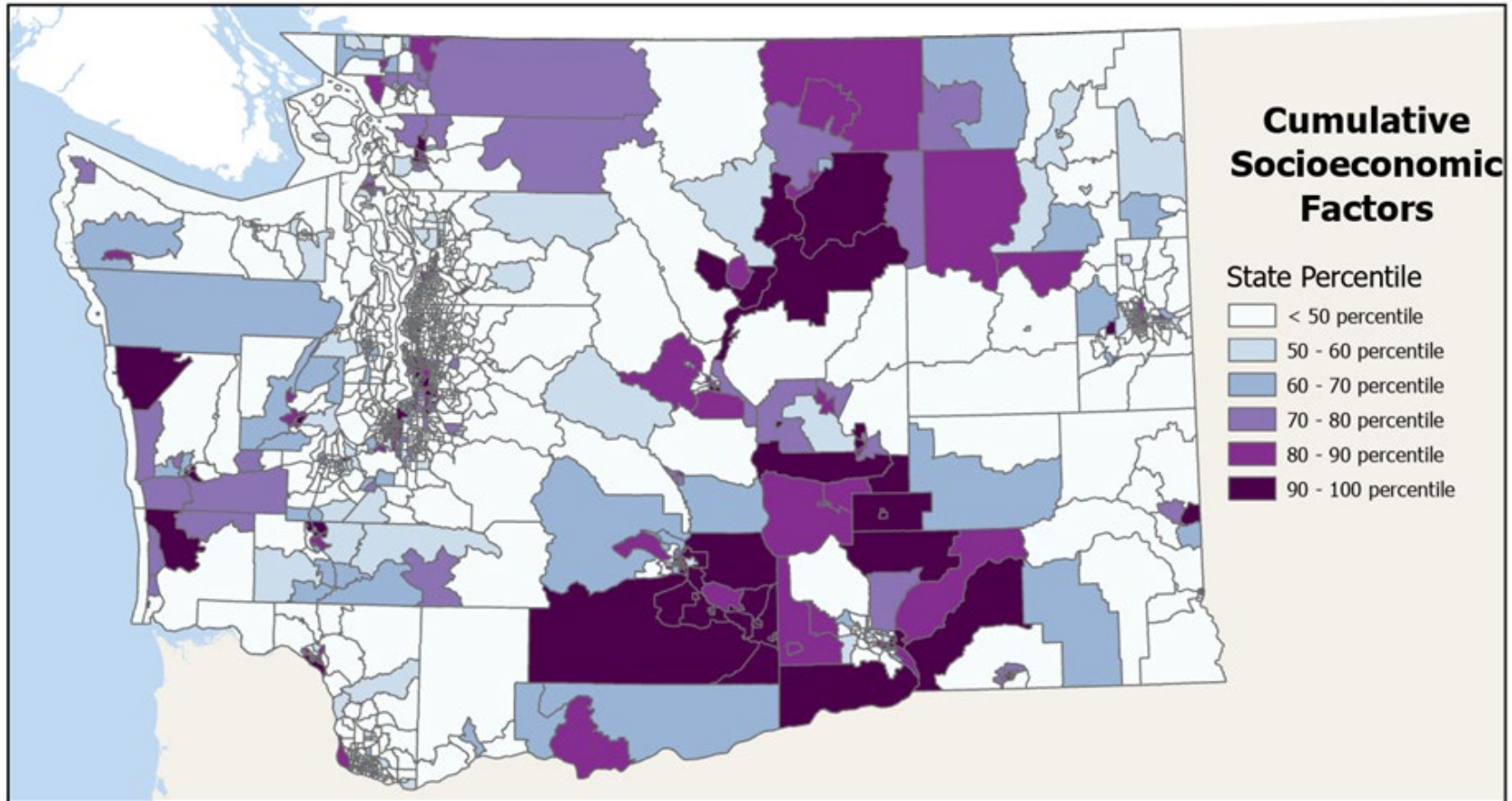
Population of all race/ethnicity categories *except* White/Non-Hispanic. Data obtained from 2019 population estimates from the Washington State Office of Financial Management. Source: Washington State Department of Health, Washington Tracking Network Environmental Health Disparities Map, Version 2.0, July 1, 2022 (<https://fortress.wa.gov/doh/wtnibl/WTNIBL/>).

Figure 2. Population living in poverty (less than or equal to 185 percent of federal poverty level) (state percentiles)



Population living at or below 185 percent of the Federal Poverty Level. Data obtained from the U.S. Census American Community Survey, 2021. Source: Washington State Department of Health, Washington Tracking Network, Environmental Health Disparities Map, Version 2.0, July 1, 2022 (<https://fortress.wa.gov/doh/wtnibl/WTNIBL/>).

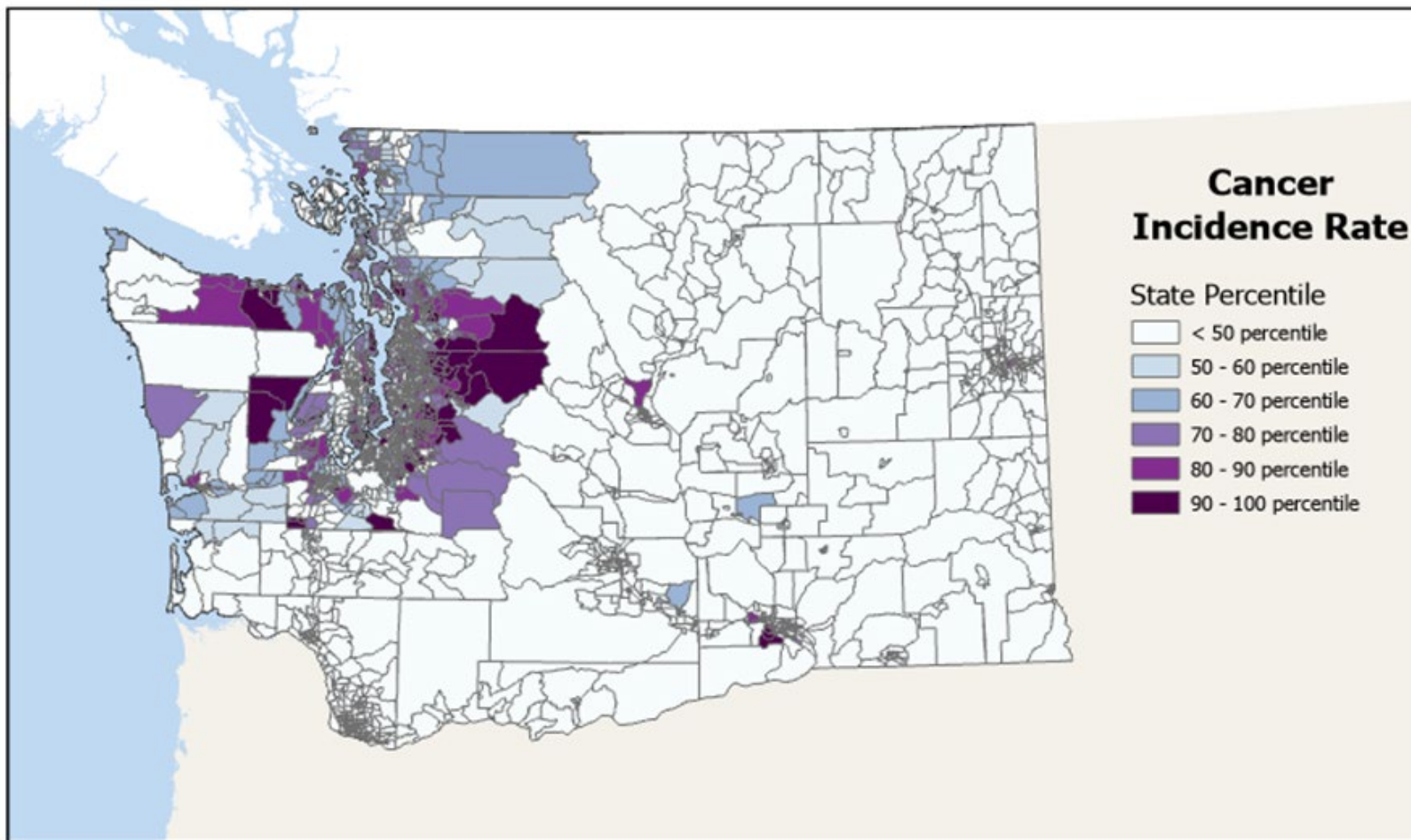
Figure 3. Cumulative socioeconomic factors (state percentiles)



A cumulative measure of socioeconomic vulnerability, including factors for: No high school diploma, Poverty, Race, Primary language other than English, Transportation expense, Unaffordable housing, Unemployment. Source: Washington State Department of Health, Washington Tracking Network, Environmental Health Disparities Map, Version 2.0, 2022 (<https://fortress.wa.gov/doh/wtnibl/WTNIBL/>).

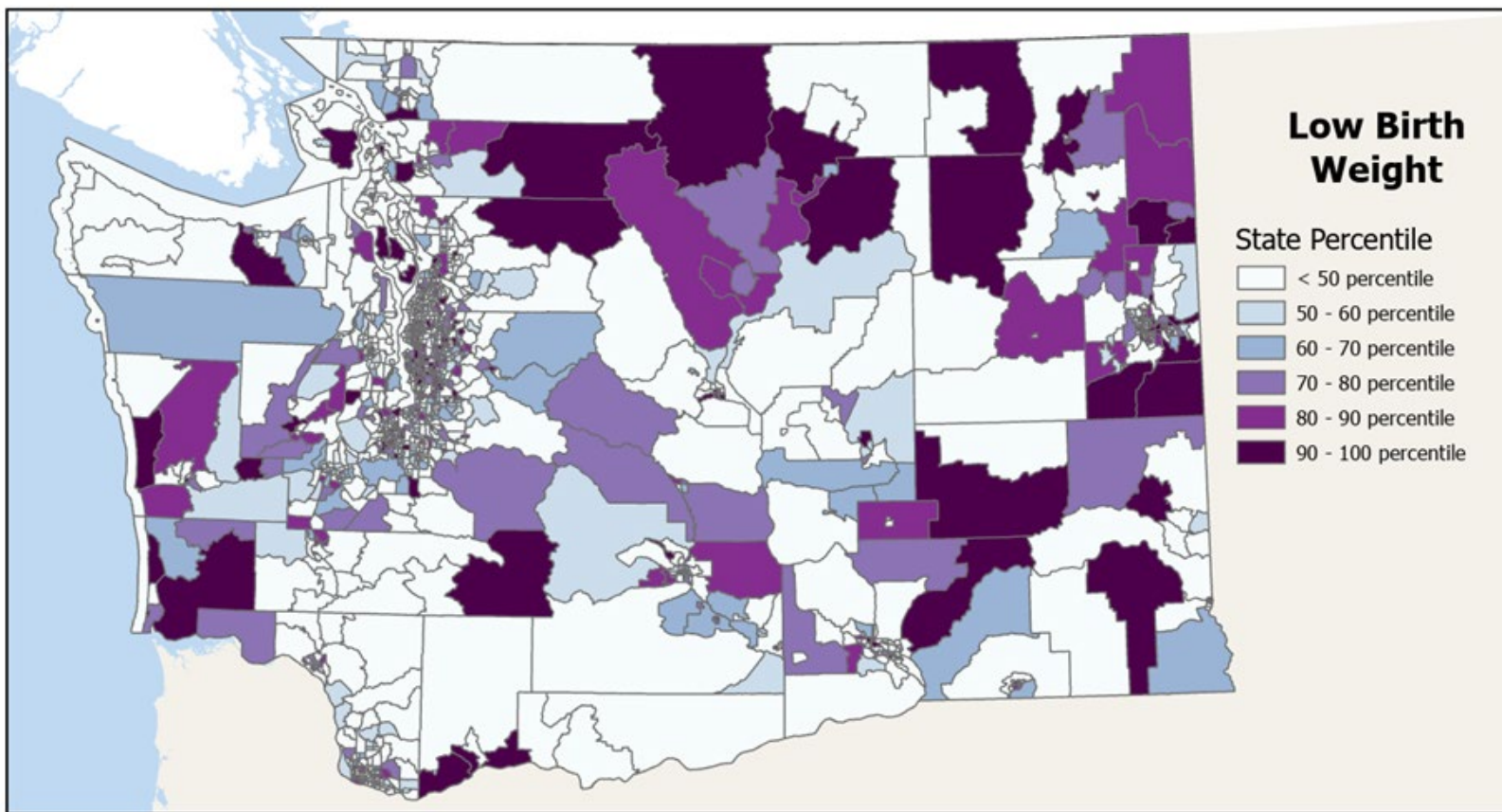
6. Using the EHD map and/or data from Washington Tracking Network, identify any other indicators pertaining to socioeconomic characteristics, health disparities, and/or climate and environmental impacts at or above the 80th percentile (in state) that are relevant to this action.

Figure 4. Cancer health disparity (state percentiles)



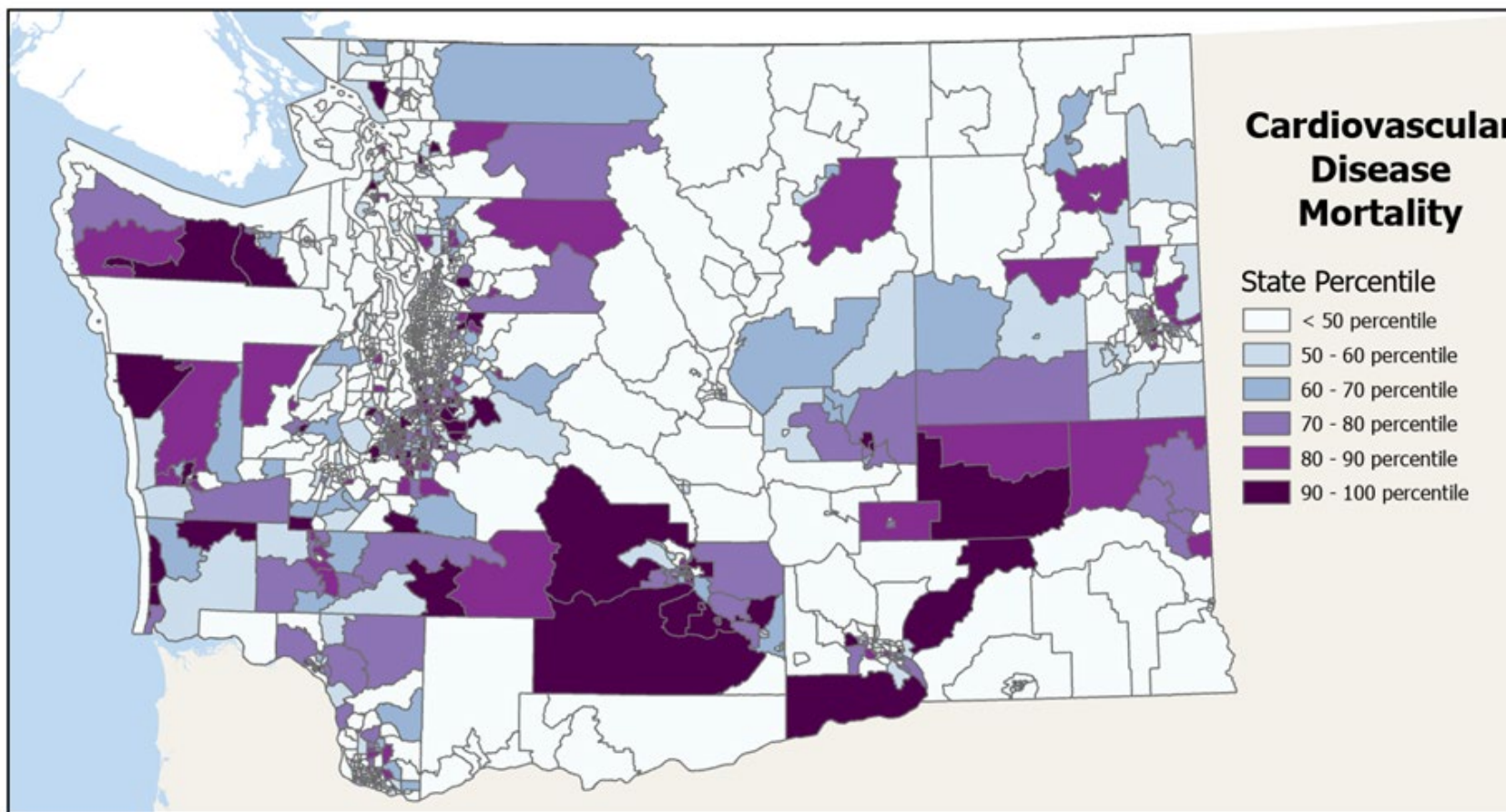
Age-adjusted combined incidence rate for all cancers. Data obtained from the Washington State Cancer Registry, 2023. Source: Washington State Department of Health, Washington Tracking Network, Environmental Health Disparities Map, Version 2.0, 2022 (<https://fortress.wa.gov/doh/wtnibl/WTNIBL/>).

**Figure 5. Low birth weight (state percentiles)**



Number of live born singleton (one baby) infants with a birth weight of less than 2500 grams. Data obtained from the Washington State Department of Health Center for Health Statistics, Community Health Assessment Tool (CHAT), published July 2024. Source: Washington State Department of Health, Washington Tracking Network, Environmental Health Disparities Map, Version 2.0, 2022 (<https://fortress.wa.gov/doh/wtnibl/WTNIBL/>).

Figure 6. Cardiovascular health disparity (state percentiles)



Age adjusted rate of mortality from cardiovascular diseases. Data obtained from the Washington State Department of Health's Center for Health Statistics, Death Certificate Data, 1990–2022, published July 2024. Source: Washington State Department of Health, Washington Tracking Network, Environmental Health Disparities Map, Version 2.0, 2022 (<https://fortress.wa.gov/doh/wtnibl/WTNIBL/>).

## **7. Identify additional overburdened communities and vulnerable populations that are likely to be affected by the action.**

This amended rule applies statewide. It will likely impact people who use priority consumer products containing PFAS and people who make, sell, or distribute these products in Washington State.

While the overall impact of restricting the use of PFAS in cleaning products, apparel and accessories, and automotive washes will reduce a significant source or use of PFAS (Ecology, 2024), the direct effects of the rule will likely be limited. Because this rule restricts the manufacture, sale, and distribution of three new priority consumer product categories containing PFAS and requires reporting for nine other new product categories, we also recognize that there will be direct and indirect impacts.

Below, we outline direct and indirect impacts, connecting them to specific overburdened communities and vulnerable populations.

### **Direct impacts**

People subject to more environmental and economic harms may experience direct impacts from the regulations in the amended rule.

Communities that may be directly impacted from the restriction of PFAS in apparel, car washes, and cleaning products may include:

- Workers who regularly use priority consumer products that release PFAS, including janitorial staff and automotive workers (Ecology, 2024; see also Bello et al., 2009, regarding janitorial exposures and Mazumder et al., 2023, regarding firefighters).
- Workers who are employed in the manufacture of priority consumer products that contain PFAS or apply PFAS during manufacturing (Christensen & Calkins, 2023).
- Communities near industries that manufacture priority consumer products containing PFAS (Liddie et al., 2023).
- People who are pregnant or nursing, and children (Zheng et al., 2021; Nyberg et al., 2018).
- People with low incomes who use priority consumer products containing PFAS (Flatt, 2022; Stuck, 2020).

### **Indirect impacts**

Reporting requirements for the nine new product categories of priority products containing PFAS may lead to broad indirect impacts. While we don't know all indirect impacts, reporting requirements can help us identify additional impacts because they

create more product transparency across supply chains. These reports help manufacturers and Ecology understand where and how PFAS are used in a product, whether they are intentionally added, and whether PFAS are serving a function in the product.

Benefits from the reporting requirements may include:

- Transparency and possible reduction in PFAS in apparel intended for extreme and extended use, which may benefit workers who use waterproof gear for work, including workers in:
  - Offshore fishers
  - Offshore sailors
  - Whitewater kayakers
  - Mountaineers
- This action may also benefit professionals in Washington who purchase or use apparel intended for extreme and extended use when they purchase or use new gear.
- Transparency and possible reduction in PFAS in footwear may benefit workers who wear waterproof shoes and consumers who buy or use waterproof shoes, including children.
- Transparency and possible reduction in PFAS in gear for recreation and travel may benefit:
  - Workers in the recreation industry, including guides for hiking, whitewater rafting, skiing, and other sports.
  - Recreationalists who purchase and use gear for recreation and travel.
  - All people in Washington State who purchase or use gear for recreation and travel, including backpacks.
- Transparency and possible reduction in PFAS in automotive waxes may benefit workers in the automotive industry, including:
  - Car wash workers.
  - Car and boat salespeople.
  - Deckhands and vessel crews.
- Transparency and possible reduction in PFAS in cookware and kitchen supplies may benefit all people in Washington who consume food prepared with nonstick cookware and kitchen supplies.
- Transparency and possible reduction in PFAS in firefighting personal protective equipment may benefit firefighting personnel in Washington.

- Transparency and possible reduction in PFAS in floor waxes and polishes may benefit janitorial staff and all people in Washington state who use floor waxes and polishes or come in contact with waxed and polished floors, including young children exhibiting hand to mouth behavior.
- Transparency and possible reduction in PFAS in hard surface sealers may benefit workers who use hard surface sealers, including construction workers, maintenance workers, accommodation workers, and utility workers. It may also benefit people in Washington who buy or use hard surface sealers.
- Transparency and possible reduction in PFAS in ski waxes may benefit workers who maintain ski equipment. It may also benefit recreationalists who wax their skis.

**8. Through community engagement, were additional overburdened communities and vulnerable populations identified who are likely to be affected by the action? Describe additional communities or populations identified, and the reasons they would be considered overburdened and vulnerable.**

No additional overburdened communities or populations were identified.

**9. Through Tribal consultation, were additional overburdened communities and vulnerable populations identified who are likely to be affected by the action? Describe additional communities or populations identified, and the reasons they would be considered overburdened and vulnerable.**

No additional overburdened communities or vulnerable populations were identified through Tribal consultation.

## Section 7: Summary of Community Engagement

This section summarizes community engagement activities. Community engagement should be tailored to specifically reach overburdened communities and vulnerable populations. Community engagement is required for all significant agency actions, but the engagement methods will vary depending on the size, scope, and topic of the project. The level, type, and form of engagement is based on the likelihood that the actions may cause environmental harm or may affect the equitable distribution of environmental benefits to an overburdened community or a vulnerable population.

## Summarizing community engagement

### 1. Describe the engagement activities with identified overburdened communities and vulnerable populations.

#### Rule Outreach

During this rulemaking, Ecology conducted outreach and provided opportunities for engagement to the public and interested parties about the rule. We:

- Conducted community engagement efforts for this action from November 2023 through April 2025.
- Provided notices about the rulemaking in Chinese, English, Korean, Russian, Spanish, Ukrainian, and Vietnamese.
- Invited public input during three online public workshops in December 2023 and in August and September 2024.
- Invited public input on a preliminary draft rule in September and October 2024 and received input from interested parties.
- Hosted a formal public comment period from June 4 to July 20, 2025, and hosted two online formal hearings on July 9 and 10, 2025. We received 45 formal comment submissions, including one petition signed by 203 individuals. We also received a letter from Toxic-Free Future signed by 14 additional organizations.

#### PFAS Engagement and Rule Engagement

In addition to the opportunities listed above, we also co-created workshops with a community-based organization, Mother Africa. These workshops highlighted toxic chemicals in consumer products—particularly those containing PFAS, as requested by Mother Africa. This co-creation process ensured that information was culturally and linguistically relevant for their community.

As part of this project, Mother Africa and Ecology held three digital workshops in November 2023—one each in English, French, and Arabic. Fifty-nine members from Mother Africa’s community based in Kent, Washington, attended these workshops.

Based on feedback from the workshops, Ecology and Mother Africa identified that nonstick pots and pans were a potential source of exposure to PFAS (see Sajid & Ilyas, 2017, regarding specific toxicity concerns in nonstick cookware). Some Mother Africa community members use these items multiple times a day. Through awareness of concerns around frequently used cookware, Mother Africa successfully advocated using some of the grant funds to buy stainless steel alternatives for participants to run a cookpot exchange. The cookpot exchange offered community members an opportunity to exchange their nonstick pans for a

stainless-steel cookpot set. The sets were various sizes, and Mother Africa distributed the sets based on family size. This made it less likely that community members would use nonstick cookware because they had adequate supplies to cook for their whole family. The cookpot exchange also served as an opportunity to share more information about safer alternatives.

Following the workshops and cookpot exchange, Mother Africa staff shared their findings with additional programs they oversee. These programs include Flourishing Under Five to support child development, the Environmental Justice Program, and Civic Engagement & Policy and Advocacy. Mother Africa staff also used the stainless-steel cookware to demonstrate how to prepare culturally appropriate meals. For example, they found that the stainless steel alternatives work well but require more oil and lower cooking temperatures.

Learning about the prevalence of toxic chemicals in our environment for the first time was shocking for many participants. Other products of concern identified by Mother Africa community members that could contain PFAS included: tampons, menstrual pads, and food and beverages.

Mother Africa staff expressed interest in ongoing engagement to help drive long-term changes that prevent PFAS from being used in consumer products. This included participating in legislative advocacy and contributing to Ecology's decision-making processes. Ecology staff personally invited Mother Africa staff to participate in webinars and submit comments on this rule.

Ecology and Department of Health staff hope to replicate this partnership of co-creation with other communities across the state after the rule is adopted.

### **Engagement on Toxic Chemicals**

Ecology presented and shared resources about Safer Products for Washington and PFAS across Washington State, including:

- Educational and professional associations
  - Yakima Valley Community College Climate and Environment Club (Educational Institution)
  - People of Color Legislative Alliance of WA (Professional Association)
- Nonprofit organizations
  - Glenn Acres Senior Housing (Nonprofit)
  - La Casa Hogar (Nonprofit)
  - Inspire Center (Nonprofit)
  - Catholic Charities (Nonprofit)
  - Chuck Austin Place (Nonprofit)

- Nuestra Casa (Nonprofit)
- Latinx Youth Summit (Nonprofit)
- Deldridge Community Farmers Market by the African Community Housing and Development (Nonprofit)
- Community events
  - Yakima and Sunnyside Health Fairs
  - MOSAIC multicultural festival (City of Tacoma Event)

## **2. What actions were taken to help address barriers to meaningful engagement?**

Ecology's ongoing partnership with Mother Africa supported meaningful engagement by:

- Building trusted relationships to connect with community members.
- Co-creating meaningful and relevant content to raise awareness about toxic chemicals in products.
- Creating language and dialect-appropriate content.
- Providing lived experience compensation to participants through gift cards.
- Providing stainless steel cookpots to illustrate safer alternatives and to eliminate economic burdens to changing product use.

Ecology staff also created venues for public engagement through multiple methods: morning and evening webinars, public comment periods, web content, and email announcements during the two-year rulemaking process. These methods of disseminating information and the multi-year public process supported meaningful engagement.

## **3. Identify overburdened communities or vulnerable populations potentially affected by the action who were not engaged and explain why not.**

Workers in janitorial, automotive, and retail work who may face higher exposure to PFAS were not specifically engaged by Ecology due to limited staff time and capacity (see Christensen & Calkins, 2023; Wu et al., 2019, regarding elevated PFAS exposures in workers).

While not directly related to this rule, Ecology staff plan to hold focus groups in 2026 with different occupational groups where we may discuss the harmful effects posed by PFAS, as well as other priority chemicals. The findings from these focus groups will help inform alternative assessments as part of Safer Products for Washington's Cycle 2 work.

Additional outreach and engagement between now and 2027 may include community events where members of the public of different occupations may participate and learn more about exposures to priority consumer products containing PFAS, as well as other toxic chemicals.

**4. Summarize recommendations from members of overburdened communities and vulnerable populations to mitigate or eliminate potential harms from the action and/or equitably distribute benefits from the action.**

During the outreach and engagement efforts to support this action, Ecology heard the following suggestions to equitably distribute benefits from the action.

**Rule Outreach**

We received 19 public comments on the proposed rule from individual members of the public. A majority of these comments expressed support for the proposed rule. Many commenters expressed concerns about PFAS and their impact on human health and the environment, specifically the importance of protecting drinking water, the Spokane aquifer, community safety, and children's health.

Specific products of concern to commenters include:

- Artificial fragrances, including personal, cosmetic, cleaning, household, and other products.
- Apparel and cosmetics.
- PFAS-contaminated biosolids application to farmland.
- Fireworks and plastics.

A few commenters noted the need for additional transparency regarding the use of chemicals in consumer products or requested that Ecology provide educational outreach on the hazards of chemicals and ways to avoid them.

A few other commenters noted that companies are aware of the harmful effects of chemicals but are not held responsible for health issues.

And one commenter urged Ecology to begin enforcement on the new rule requirements in January 2026, increase penalty amounts, and pursue strict enforcement actions with minimal delay when products are found to be out of regulatory compliance.

**Summary of comments from non-governmental organizations (Zero Waste Washington, Washington Conservation Action Education Fund, Toxic-Free Future)**

We received additional comments from three non-governmental organizations (NGOs), including three letters from Toxic-Free Future. One letter from Toxic-Free Future included over 200 individual signatures, and a second letter included

signatures from 14 additional organizations. These NGOs expressed concerns about PFAS and stated that strong regulatory actions are needed to protect sensitive populations and species, from pregnant women and children to salmon and orcas.

Commenters support the restrictions from the proposed rule but oppose the proposed reporting requirements and would like Ecology to do more to ban PFAS, particularly with cookware and kitchen supplies. They indicate that safer alternatives are on the market, including cast iron and stainless steel, so a restriction should be placed on PFAS in this product category. Other product categories that commenters noted for restrictions include ski waxes and firefighter gear. For other product categories with reporting requirements, commenters urge Ecology to use authority under the Safer Products for Washington law to identify alternatives quickly and further restrict PFAS use.

### **Engagement on PFAS**

Community members shared the following points, which inform ongoing communication and outreach efforts stemming from this rule and into future efforts:

- Community compensation is essential for engaging communities who may be disproportionately affected by PFAS exposure. Understanding this topic and the regulatory process takes time, and community compensation, as well as childcare, elder care, and transportation support, are necessary for meaningful engagement.
- Continue to work towards preventing PFAS in consumer products so more products are safer and the burden to choose safer products is not on the consumer.
- Continue to seek collaborations with key community members and community groups, including the co-creation and translation of materials that help inform individuals and groups about new research, guidance, and safer alternatives.
- Continue to monitor translation quality from translation contractors and move towards transcreation (creating documents in languages in consultation with language speakers and a translator) whenever possible.

### **5. Describe any plans for ongoing engagement with overburdened communities and vulnerable populations related to this action.**

As capacity and funding allows, we will continue to engage communities through continued partnerships with a variety of organizations. We intend to:

- Create workshops and focus group opportunities, as well as host and attend in-person events. We plan to attend community fairs and festivals, especially in locations with communities who face higher toxic exposure or who experience other environmental and health disparities.

- Share short, informative videos on YouTube that highlight: the Safer Product for Washington process, specific priority chemicals and priority consumer products, and ways individuals can be involved in the process.
- Create engaging social media content that enhances awareness of Safer Products for Washington's current restrictions and approach to safer alternatives.

## Section 8: Potential Environmental Benefits and Harms from Action

This section summarizes anticipated benefits and harms from the potential action and assesses impacts on overburdened communities and vulnerable populations. The level, type, and form of engagement is based on the likelihood that the actions may cause environmental harm or may affect the equitable distribution of environmental benefits to an overburdened community or a vulnerable population. Answers to the questions in this section may have helped in strategizing our approach to engagement.

### Identify potential environmental benefits & harms from action

#### 1. Describe the anticipated benefits (direct and/or indirect) from this action.

Because this action restricts intentionally added PFAS in apparel and accessories, automotive washes, and cleaning products, we anticipate this action will prevent future PFAS use in these product categories in Washington.

Preventing PFAS use in apparel and accessories, car washes, and cleaning products may benefit all Washingtonians by reducing their exposure to PFAS. Higher PFAS levels in people are correlated with negative health impacts (Fenton et al., 2020). This may also benefit occupations that use these products most, including:

- Workers who may be exposed when PFAS are added to manufactured items such as cleaning products and carwashes.
- Workers who manufacture apparel containing PFAS, who may be exposed during the addition of PFAS to the product.
- Workers who manufacture apparel from textiles containing PFAS, who may be exposed during product construction.
- Retail workers who sell apparel containing PFAS.
- Janitorial workers who use cleaning products containing PFAS.

- Automotive workers who use car washes containing PFAS.

The amended rule also establishes new reporting requirements for some priority consumer products. Manufacturers must identify where PFAS are intentionally added to their products in the manufacturing process to fulfill their reporting requirements in the High Priority Chemicals Data System (HPCDS). By reporting when and where PFAS are intentionally added to consumer products, manufacturers can better determine if PFAS are serving a function in their product. Identifying unnecessary uses of PFAS may encourage manufacturers to stop using PFAS where it does not serve a function. Some manufacturers have found PFAS is being added to products like water shoes where water repellency is not necessary (see Keen Footwear, 2022).

The amended rule will improve human health and the environment by reducing PFAS exposure for people who use priority consumer products containing PFAS. New restrictions on intentionally added PFAS in some priority consumer products will reduce the amount of PFAS chemicals that enter the environment from product use and disposal. Information from required reporting of priority consumer products containing intentionally added PFAS may also help Ecology identify potential sources of PFAS contamination and the potential exposure from those sources.

## **2. Who will primarily benefit from this action?**

There will be direct and indirect benefits from this rule adoption. Below, we highlight both direct and indirect benefits as a result of new product restrictions.

### **Direct benefits**

People who use priority consumer products containing PFAS, especially:

- Apparel, car washes, and cleaning products.

Consumers and workers who purchase and use new apparel and gear after the rule takes effect, including:

- Athleticwear.
- Backpacks.
- Clothing for everyday use.
- Hats, scarves, and gloves.
- Rainwear.
- School uniforms.
- Shoes.
- Umbrellas.
- Undergarments (for example, period underwear).

Children who use:

- School uniforms.
- Undergarments (reusable baby diapers).

Outdoor recreationalists who use gear, including:

- Outdoor apparel, including outerwear for mountaineering, outerwear for whitewater kayaking.
- Sleeping bags, camping furniture, and climbing rope.

Commercial fishers who use:

- Commercial fishing bibs for offshore fishing.

All consumers, especially workers, including janitorial staff, who use:

- Cleaning products.

All consumers, especially workers, including automotive workers, who use:

- Automotive washes, including products to wash cars and boats.

### **Indirect benefits**

Young children who have higher exposure to PFAS escaping from consumer products that accumulate in indoor air and dust.

People who use gear, footwear, and other apparel for extended use.

All workers, and particularly firefighters and first responders who use firefighting personal protective equipment.

### **3. How is the action expected to benefit specifically overburdened communities or vulnerable populations? If there is no benefit, identify potential barriers to benefitting from the action.**

Employees at facilities that manufacture priority consumer products containing PFAS may be exposed to PFAS chemicals. Manufacturing facilities may be in historically industrialized areas, adding toxic pollution and exposure to overburdened communities (see Puget Sound Regional Council, 2024, regarding impacts to overburdened communities in Washington). The amended rule aims to lower toxic exposure during the manufacturing process and improve health outcomes.

A study on janitorial services in Washington State showed that people employed in janitorial work were often members of overburdened communities. Janitorial workers were more likely to be Hispanic or Black and have lower levels of education when compared to other occupations. Additionally, employee and employer turnover are high and may increase risk of unsafe working conditions with limited safety protocols

(Washington State Department of Labor & Industries, 2020). These workers may benefit from removing exposure to PFAS from cleaning products.

Data and research show that members of overburdened communities and vulnerable populations regularly face compounded environmental health challenges. Disparities in resources, such as access to good indoor air or water quality, or healthcare or health information, make them more vulnerable to negative cumulative health impacts (Morello-Frosch, et al. 2011). The restrictions in this rule are expected to reduce toxic chemical exposure in these communities, particularly by reducing PFAS contamination in drinking water, indoor air, food, and consumer products, which may help lower the risk of associated adverse health effects. However, improvements in overall health outcomes may depend on multiple factors and cannot be guaranteed.

The amended rule restricts some priority consumer products containing PFAS that are made, sold, or distributed in Washington State. New restrictions may cause manufacturers to reformulate products with safer chemicals. We anticipate the amended rule will also improve indoor and outdoor air quality and reduce environmental pollution from priority consumer products containing PFAS. This helps improve environmental and working conditions and health outcomes for vulnerable populations.

Consumers and workers may not directly benefit from this rule if they do not purchase new products after the rule takes effect or if they buy products secondhand.

#### **4. Describe anticipated harms (direct and/or indirect) from this action.**

We expect manufacturers of automotive washes and cleaning products to reformulate any product that includes intentionally added PFAS. Reformulation carries costs to manufacturers, which will depend, in part, on availability, cost, and substitutability of alternative chemicals. PFAS in cleaning products are generally used as a surfactant and many alternatives for this function are readily available.

This may create a burden if products consumers and businesses use are no longer available. At least for janitorial firms, companies are under pressure to keep overhead costs low (Washington State Department of Labor & Industries, 2020). Changes in product cost could impact those companies that want low-cost products. However, we anticipate that manufacturers will likely reformulate their products, as safer alternatives are feasible and available. Some retailers may remove products from store shelves in response to regulation, though few have based on previous restrictions.

This rule may be an administrative and logistical burden to small manufacturers of apparel and accessories in Washington State who need to find alternative fabrics and components for their products. We found that there are available and

economically feasible alternatives to PFAS-containing materials. We expect some increased costs in the interim for some manufacturers but anticipate these costs will decrease over time as several large manufacturers have already committed to removing PFAS from their apparel products, which will likely drive costs of alternatives down and increase their availability (Hayes & Diamond, 2025).

## **5. Who will primarily experience the harms?**

- Retailers, distributors, and manufacturers of priority consumer products containing PFAS.
- Consumers who use priority consumer products containing PFAS.

## **6. Describe how the action may harm overburdened communities or vulnerable populations? Be as specific as possible.**

Although communities and workers of color will likely benefit from this action, some of these harms may primarily impact people of color.

The restriction of certain products may affect product availability and cost of priority consumer products containing PFAS. Manufacturers with priority products containing PFAS will need to reformulate their products in order to make, sell, or distribute them in Washington State. This may result in a change in the availability of products that people purchased in the past, the products may perform differently (better or worse), and the product price may be different (higher or lower). People with low income may not be able to purchase priority products if reformulation leads to increased product pricing.

Low-income individuals and people of color may face disproportionate impacts if restrictions on PFAS chemicals lead to higher prices or reduced availability of certain consumer products. These communities already experience financial barriers to purchasing durable goods and outdoor equipment (Guzman, 2021), as well as access barriers to outdoor spaces that may contribute to less representation in outdoor spaces (Flatt, 2022). Price increases associated with transitioning to safer alternatives could further limit access to these products, exacerbating existing inequities related to affordability and consumer choice.

Members of overburdened communities and vulnerable populations who are business owners may also experience administrative and logistical burdens.

## **7. Describe how the action would address environmental and health disparities.**

Exposure to toxic chemicals in consumer products may add to exposure from other sources of toxic chemicals and worsen health outcomes for communities exposed to higher levels of toxic chemicals or people who are more vulnerable to health impacts. The restrictions in this rule will help improve health outcomes by reducing toxic chemical exposure in the following groups:

- Communities that have a higher percentage of people working in the industries that manufacture, use, or interact with the regulated priority consumer products containing PFAS.
- Other population groups that may be disproportionately impacted by environmental harms from the use of priority consumer products containing PFAS.
- People who experience disproportionately higher toxic exposure.

The action will also reduce PFAS disposal in landfills, which may benefit communities living near waste disposal sites.

This action will minimize costly PFAS cleanup resulting from the three restricted priority consumer product categories.

## Section 9: Options to Eliminate, Reduce, or Mitigate Harms and Equitably Distribute Benefits

This section summarizes options identified for eliminating, reducing, or mitigating harms, as well as options for equitably distributing anticipated benefits. The answers in this section are informed by engagement, answers from the previous subsections, and any legislative or regulatory boundaries that limit possible decision making.

### Identify options to eliminate, reduce, or mitigate harms & equitably distribute benefits

#### 1. Describe options to reduce, mitigate, or eliminate the identified probable harms to overburdened communities and vulnerable populations. Describe options to equitably distribute the benefits.

Ecology will continue to conduct outreach, provide engagement opportunities, employ purposeful communications, and improve efforts to equitably distribute benefits of the amended rule. Our outreach and communications efforts will continue to focus on the environmental releases, harm to wildlife, and the holistic health impacts of toxic chemicals in priority products. We will continue to highlight how the restrictions affect community members, individual consumers, manufacturers, and business owners. We're exploring the following options:

- Timely messaging about the rule, including communications about the rule adoption, compliance schedule, and compliance assurance activities.
- Improving outreach and engagement for people experiencing higher exposure to toxic chemicals, including occupational groups and those from overburdened communities and vulnerable populations.

- Providing information, responding to inquiries, meeting with businesses, and offering information to help them comply with the requirements of this rule.

**2. Describe methods chosen for this action to reduce, mitigate, or eliminate the identified probable harms to overburdened communities and vulnerable populations. Describe methods chosen to equitably distribute the benefits.**

**For members of overburdened communities and vulnerable populations who are business owners**

- Clear messaging about restrictions and reporting requirements are available on our [compliance webpage](#).<sup>18</sup>

**For members of overburdened communities and vulnerable populations impacted by cost and availability changes to apparel, car washes, and cleaning products containing PFAS**

With limited staff capacity and budget available for engagement, we prioritized engagement around safer cleaning products. Since 2023, we have shared information about safer cleaning products and practices through tabling at events and community presentations statewide, with a focus on overburdened communities and vulnerable populations.

Ecology is currently implementing a grant in collaboration with the Council of Hispanic Affairs to engage Latinx owners of small grocery and convenience stores in the Yakima region who sell cleaning products. The goal of engagement is to provide resources and examples of U.S. EPA Safer Choice<sup>19</sup> cleaning products, demonstrate their efficacy, and encourage businesses to carry these products on their shelves. We anticipate this work will lead to more Hispanic/Latinx communities in Central Washington recognizing and using safer (and PFAS-free) products, which will support this community in experiencing benefits from this rule.

**For members of overburdened communities and vulnerable populations impacted by Safer Products for Washington regulations**

Ecology will be facilitating focus groups to partner with workers statewide who use priority chemicals and products as part of their work. This may include building industry and construction workers, janitorial staff, and transportation workers. We will engage these focus groups to learn about the products they use every day, why the products are used over alternatives, and whether workers experience any health

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<sup>18</sup> <https://ecology.wa.gov/waste-toxics/reducing-toxic-chemicals/washingtons-toxics-in-products-laws/safer-products/compliance-and-reporting>

<sup>19</sup> Safer Choice is a U.S. EPA pollution prevention program which includes practices that reduce, eliminate, or prevent pollution at its source, such as using safer ingredients in products. More information on Safer Choice is available at <https://www.epa.gov/saferchoice>.

impacts from using these products. Focus group members will provide occupational and demographic information through a brief survey, and participants will be selected with attention to who may be most impacted by toxics in products, including workers of color and workers of childbearing age.

Information from focus groups will be recorded and coded through thematic analysis, where we will identify key themes and concerns that will inform areas of our technical reports. This information will also help with specific use and performance qualities of priority chemicals and products. The focus group may also inform alternatives research. By engaging people who use regulated products early on in our processes, we are inviting communities to have more input in our actions.

**3. If the agency determines it does not have the ability or authority to eliminate, reduce, or mitigate environmental harms caused by the action, or address the equitable distribution of environmental benefits, explain why that determination was made.**

Ecology doesn't anticipate environmental harms from this action. For more details about Ecology's assessment of environmental impacts from this rulemaking, see the [SEPA Determination of Nonsignificance and Environmental Checklist](#).<sup>20</sup>

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<sup>20</sup> <https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202502318>

## References

- Ahrens, L., Felizeter, S. & Ebinghaus, R. (2009). [Spatial distribution of polyfluoroalkyl compounds in seawater of German Bight](https://www.sciencedirect.com/science/article/abs/pii/S0045653509003890?via%3Dihub). *Chemosphere*, 76(2), 179-184. <https://www.sciencedirect.com/science/article/abs/pii/S0045653509003890?via%3Dihub>
- 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](https://doi.org/10.1186/1476-069X-8-11). *Environmental Health*, 8, Article 11. <https://doi.org/10.1186/1476-069X-8-11> BioMed Central
- Christensen, B. T., & Calkins, M. M. (2023). [Occupational exposure to per- and polyfluoroalkyl substances: a scope review of the literature from 1980-2021](https://doi.org/10.1038/s41370-023-00536-y). *Journal of exposure science & environmental epidemiology*, 33(5), 673–686. <https://doi.org/10.1038/s41370-023-00536-y>
- Ecology (Washington State Department of Ecology). (2023). [Chemicals in Cosmetics Used by Washington Residents: Report to the Legislature Pursuant to ESSB 5693 \(2022\) Section 302 \(56\)](https://apps.ecology.wa.gov/publications/summarypages/2304007.html). Publication 23-04-007. Olympia. <https://apps.ecology.wa.gov/publications/summarypages/2304007.html>
- Ecology (Washington State Department of Ecology). (2024, September). [Regulatory determinations report to the Legislature: Safer Products for Washington Cycle 1.5 implementation Phase 3 \(Publication No. 24-04-023\)](https://apps.ecology.wa.gov/publications/SummaryPages/2404023.html). <https://apps.ecology.wa.gov/publications/SummaryPages/2404023.html>
- Ecology & Health (Washington State Department of Ecology & Washington State Department of Health). (2022). [Per- and polyfluoroalkyl substances chemical action plan \(Publication No. 21-04-048\)](https://apps.ecology.wa.gov/publications/summarypages/2104048.html). <https://apps.ecology.wa.gov/publications/summarypages/2104048.html>
- Faust, J. A. (2023). [PFAS on atmospheric aerosol particles: A review](https://doi.org/10.1039/D2EM00002D). *Environ. Sci.: Processes Impacts*, 25(2), 133–150. <https://doi.org/10.1039/D2EM00002D>
- Fenton, S. E., Ducatman, A., Boobis, A., DeWitt, J. C., Lau, C., Ng, C., Smith, J. S., & Roberts, S. M. (2021). [Per- and Polyfluoroalkyl Substance Toxicity and Human Health Review: Current State of Knowledge and Strategies for Informing Future Research](https://doi.org/10.1002/etc.4890). *Environmental toxicology and chemistry*, 40(3), 606–630. <https://doi.org/10.1002/etc.4890>
- Flatt, C. (2022, April 13). [Black Washingtonians face many barriers to experiencing the outdoors, state report says](https://www.kuow.org/stories/report-to-washington-state-parks-commission-shows-barriers-for-black-community-outdoors?ref=cascadepbs.org). Northwest News Network. <https://www.kuow.org/stories/report-to-washington-state-parks-commission-shows-barriers-for-black-community-outdoors?ref=cascadepbs.org>

- Granum, B., Haug, L. S., Namork, E., Stølevik, S. B., Thomsen, C., Aaberge, I. S., van Loveren, H., Løvik, M., & Nygaard, U. C. (2013). [Pre-natal exposure to perfluoroalkyl substances may be associated with altered vaccine antibody levels and immune-related health outcomes in early childhood](#). *Journal of Immunotoxicology*, 10(4), 373–379.  
<https://doi.org/10.3109/1547691X.2012.755580>
- Guo, Z., Liu, X., Krebs, K., & Roache, N. (2009). [Perfluorocarboxylic acid content in 116 articles of commerce](#). U.S. Environmental Protection Agency.  
<https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100EA62.TXT>
- Guzman, C. (2021, August 15). [Why don't we see more people of color on the trails of Washington State?](#) South Seattle Emerald.  
<https://southseattleemerald.org/feature/2021/08/15/why-dont-we-see-more-people-of-color-on-the-trails-of-washington-state>
- 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>
- Hayes, A. L., & Diamond, E. (2025, June). [Preliminary regulatory analyses: Chapter 173-337 WAC — Safer products restrictions and reporting \(Cycle 1.5: PFAS\) \(Publ. No. 25-04-027\)](#). Washington State Department of Ecology.  
<https://apps.ecology.wa.gov/publications/SummaryPages/2504027.html>
- Interstate Technology & Regulatory Council. (2020). [Human and ecological health effects of select PFAS](#) (Section 7). In *PFAS: Per-and Polyfluoroalkyl Substances Technical and Regulatory Guidance Document*. <https://pfas-1.itrcweb.org/7-human-and-ecological-health-effects-of-select-pfas>
- Interstate Technology & Regulatory Council. (2023, September). [Full PFAS guidance](#) [Guidance document]. <https://pfas-1.itrcweb.org/wp-content/uploads/2023/12/Full-PFAS-Guidance-12.11.2023.pdf>
- 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>
- Keen Footwear. (2022, November 23). ['Forever Chemical' Free!](#) [Blog post]. KEEN Footwear. <https://www.keenfootwear.com/blogs/keen-blog/pfas-free-getting-forever-chemicals-out-of-footwear>
- 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>

- Libenson, A., Karasaki, S., Cushing, L. J., Tran, T., Rempel, J. L., Morello-Frosch, R., & Pace, C. E. (2024). [PFAS-contaminated pesticides applied near public supply wells disproportionately impact communities of color in California](#). *ACS ES&T Water*, 4(6), 2495–2503. <https://doi.org/10.1021/acsestwater.3c00845>
- Liddie, J. M., Schaidler, L. A., & Sunderland, E. M. (2023). [Sociodemographic Factors Are Associated with the Abundance of PFAS Sources and Detection in U.S. Community Water Systems](#). *Environmental science & technology*, 57(21), 7902–7912. <https://doi.org/10.1021/acs.est.2c07255>
- 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>
- Morello-Frosch, R., Zuk, M., Jerrett, M., Shamasunder, B., & Kyle, A.D. (2011). [Understanding the cumulative impacts of inequalities in environmental health: Implications for policy](#). *Health Affairs (Millwood)*, 30(5), 879-887. <http://doi.org/10.1377/hlthaff.2011.0153>
- Nyberg, E., Awad, R., Bignert, A., Ek, C., Sallsten, G., & Benskin, J. P. (2018). [Inter-individual, inter-city, and temporal trends of per- and polyfluoroalkyl substances in human milk from Swedish mothers between 1972 and 2016](#). *Environmental Science: Processes & Impacts*, 20(8), 1136-1147. <https://doi.org/10.1039/C8EM00174J>
- Pickard, H. M., Ruyle, B. J., Thackray, C. P., Chovancova, A., Dassuncao, C., Becanova, J., Vojta, S., Lohmann, R., & Sunderland, E. M. (2022). [PFAS and precursor bioaccumulation in freshwater recreational fish: Implications for fish advisories](#). *Environmental Science & Technology*, 56(22), 15573–15583. <https://doi.org/10.1021/acs.est.2c03734>
- Puget Sound Regional Council. (2024, June). [People of color and industrial lands](#). <https://www.psrc.org/media/8830>
- 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>
- Stuck, E. (2020, December 14). [Nature gap: Why outdoor spaces lack diversity and inclusion](#). College of Natural Resources News, NC State University. <https://cnr.ncsu.edu/news/2020/12/outdoor-diversity-inclusion/>
- UC Berkeley (University of California, Berkeley, School of Public Health). (2024, June 13). [Study shows PFAS threat to drinking water in rural, predominantly Latinx communities](#). <https://publichealth.berkeley.edu/articles/spotlight/research/study-highlights-racial-and-ethnic-disparities-in-pfas-threat/>

- U.S. Environmental Protection Agency. (2023, June 7). [Our current understanding of the human health and environmental risks of PFAS](https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas).  
<https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas>
- Washington State Department of Health. (n.d.). [PFAS](https://doh.wa.gov/community-and-environment/contaminants/pfas) [Web page].  
<https://doh.wa.gov/community-and-environment/contaminants/pfas>
- Washington State Department of Labor & Industries: SHARP Program. (2020, June 30). [Economic scan of the janitorial services industry in Washington State: Appendix C](https://www.lni.wa.gov/safety-health/safety-research/files/2020/102-57-2020%20Janitors%20Leg_Appendix%20C%20-%20Economic%20Scan_.pdf). (SHARP Publication No. 102-57-2020).  
[https://www.lni.wa.gov/safety-health/safety-research/files/2020/102-57-2020%20Janitors%20Leg\\_Appendix%20C%20-%20Economic%20Scan\\_.pdf](https://www.lni.wa.gov/safety-health/safety-research/files/2020/102-57-2020%20Janitors%20Leg_Appendix%20C%20-%20Economic%20Scan_.pdf)
- Wu, N., Cai, D., Guo, M., Li, M., & Li, X. (2019). [Per- and polyfluorinated compounds in saleswomen's urine linked to indoor dust in clothing shops](https://doi.org/10.1016/j.scitotenv.2019.02.287). *The Science of the Total Environment*, 667, 594–600. <https://doi.org/10.1016/j.scitotenv.2019.02.287>
- 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](https://doi.org/10.1021/acs.est.2c05198). *Environmental Science & Technology*, 56(23), 17090–17099. <https://doi.org/10.1021/acs.est.2c05198>
- 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](https://doi.org/10.1021/acs.est.0c06978). *Environmental Science & Technology*, 55(11), 7510–7520. <https://doi.org/10.1021/acs.est.0c06978>