Technical/Regulatory Guidance

Microplastics Outreach Toolkit

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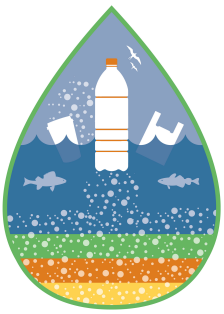

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Prepared By

The Interstate Technology & Regulatory Council

(ITRC) Microplastics Outreach Toolkit Team

MICROPLASTICS OUTREACH TOOLKIT

The ITRC Microplastic Outreach Toolkit was created to help professional and technical staff deliver information to a variety of audiences on the topic of microplastics. The toolkit provides several materials focusing on microplastics that can be used for various outreach activities and audiences. All outreach materials are based on information published in the ITRC Microplastics Guidance (2023). Outreach materials are formatted to allow some customization where appropriate. This toolkit has been developed by a group of volunteers from state and federal government agencies, industry, academia, and unaffiliated public stakeholders. For ease of use, outreach materials are grouped by the intended audience: general, including the public, K-12 teachers and other educators; those with a scientific or regulatory background; and decision-makers (including legislators). A description of each stakeholder group is provided below, as well as pointers for how to engage them.

Outreach materials in the toolkit are intended for use in encouraging people to attend events, when engaging with different stakeholders at events, for taking home by event attendees and in schools.

Background Information on Outreach

General Audiences

- Fact Sheets
- Social Media Materials

Scientists and Regulators

- Fact Sheets
- Social Media Materials
- Presentations

Decision Makers

- Fact Sheets
- Presentations
- Social Media Materials
- Elevator Speeches

BACKGROUND INFORMATION ON OUTREACH

This section contains helpful background information on outreach in general and guidance for creating outreach materials.

What Is Outreach?

Outreach is the act of working with different populations of people to provide information or a service to which they have not yet had access or exposure. Typically, outreach involves meeting people where they are, educating them on an issue, and empowering them to act.

Who Are the Audiences?

The audience is the group of individuals you are targeting to receive your information. Materials in this toolkit are aimed at one of three audiences:

- General audience – Everyone, including the general public, K-12 teachers, and other educators, is included in this audience. Materials are developed at a level that most adults can understand.
- Scientists and regulators – Individuals with some level of scientific knowledge and understanding are included in this audience. Materials are developed assuming a level of scientific knowledge.
- Decision-makers – This audience includes managers and leaders in both the public and private sectors, as well as legislators—in other words, those with limited time and multiple priorities. Materials created for this audience prioritize providing information in a compact manner.

Although outreach materials are aimed at targeted audiences, they may be used by or for any audience with the understanding that some materials are more technical in nature.

What Are Some Best Practices for Outreach?

Below are some practices that will help you connect with your audience in the most effective way:

- **Research your audience.** If possible, before the event/meeting, determine the backgrounds of people likely to attend and cater your message to their level of knowledge. Burke (2015) provided a summary of tips and tricks for scientists to use in communicating with different audiences**.**
- **Use examples or analogies that are applicable to your audience.** When providing examples, make sure they are age-appropriate and take your audience's background into account.
- **Show the BIG picture.** Details are important but try not to overwhelm your audience with all the facts/examples at once. Like in a well-written essay or in a presentation, start with the big picture view before working your way to the more specific supporting facts.
- **Develop key messages supporting the main message you want to send to your audience.** Key messages will allow a more focused, well-prepared conversation to occur.
- **Sharing a clear concise action.** Provide an example of an action that you would like your audience to take.

Developing Messages

Key messages are the main points of information you want to share with your audience. They often address a specific area of concern or a question that needs to be answered. Key messages can be combined into mapped messages. Message mapping (Covello 2006) is a process that helps ensure that

important information is shared simply and concisely. More information on message mapping is available in Section 4.5.1.1 of ITRC's Risk Communication Toolkit. A good rule of thumb for messages is 3-9-27, which means there are 3 key points, delivered in 9 seconds, with no more than 27 total words for the message (Figure 1).

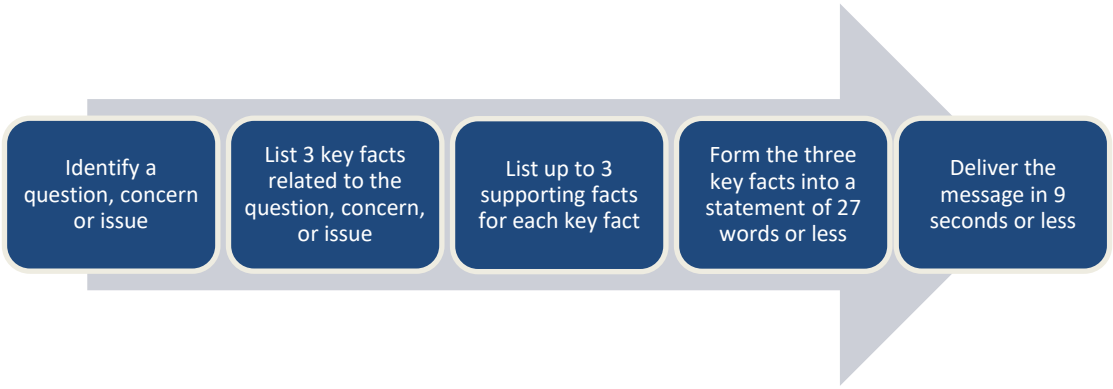


Figure 1. Process for creating a mapped message.

Source: ITRC Microplastics Team

A template, such as the one provided in Figure 2, can be used to create a mapped message.

Audience:	**Question/Concern/Issue:**	
Key Message/Fact 1:	**Key Message/Fact 2:**	**Key Message/Fact 3:**
Key Words/Supporting Fact 1.1:	**Key Words/Supporting Fact 2.1:**	**Key Words/Supporting Fact 3.1:**
Key Words/Supporting Fact 1.2:	**Key Words/Supporting Fact 2.2:**	**Key Words/Supporting Fact 3.2:**
Key Words/Supporting Fact 1.3:	**Key Words/Supporting Fact 2.3:**	**Key Words/Supporting Fact 3.3:**

Figure 2. Tool for message mapping.

Source: Covello (2006)

A completed example of a message map is included as Table 1 under the Social Media Materials section A blank Message Map tool is included in this toolkit.

Outreach Can Come in Many Forms

Below is a list of outreach formats used in the ITRC toolkit and information on how and when to use them.

Fact Sheets

Fact sheets can be used in all settings—schools, events, offices, meetings, conferences, etc. They can be structured to apply to all audiences or to specific groups of people. A well-designed fact sheet keeps the text brief, but has key words defined, and includes examples and graphics, if necessary. The goal of a fact sheet is to provide a surface-level introduction to a topic that inspires readers to do their own research and take further action. In a fact sheet, it's important to define the issue, explain why it's an issue, and suggest the action to be taken on the issue. It's helpful to provide links to additional resources for people to gain more information.

The ITRC Microplastics Team has designed fact sheets aimed at different audiences. The fact sheets can be used either in their single-sided, one-page format or mixed and matched to create double-sided two-page fact sheets. A list of microplastics outreach materials prepared by the team can be found in the index.

Slide Presentations

Slide presentations can be an effective tool for all audiences and could be used in schools, homeowner association meetings, office lunch-and-learn presentations, or research/academia symposia, or could be printed out to provide visuals to a legislative group. PowerPoint presentations can be extended or shortened easily to fit time needs and still contain a similar flow of information. A good rule of thumb is to have fewer words (around four bullets with four words each) and more pictures on each slide. A helpful flow for a PowerPoint includes an outline, body of the presentation (in which you include a description of the issue, an explanation of why it's an issue, and the action to be taken), and a conclusion slide to reiterate what has been covered. Make sure to practice the presentation aloud and time yourself before getting in front of an audience. Including interactive questions can foster discussion among the attendees and presenter. An example slide presentation can be found in the index.

Posters

Posters are typically used in a general public or scientific setting. For the general public, a poster could include an eye-catching graphic to move them to action through charismatic themes or bite-sized information. Scientific posters typically are found in an academic, conference, or research institution setting. The vocabulary used in these posters tends to cater to an audience with a stronger scientific background, and data and graphics are usually included on these posters. At conferences and research symposia, scientific posters can go hand-in-hand with elevator speeches because poster presenters will have only a few minutes to interact with attendees. An example poster can be found in the index.

Elevator Speech

Elevator speeches should be used in environments where there is not much time to go into detail about a topic. Key messages need to be presented effectively and efficiently. The speech should contain a quick synopsis of the issue, why it's an issue, and an action that people can take. A good rule of thumb is to keep your speech to under two minutes. An example elevator speech can be found in the Outreach Material for Decision-Makers section.

Social Media

Social media can include Facebook, X (a.k.a. Twitter), LinkedIn, TikTok, etc. Posts should grab people's attention quickly and not be too long. Using images in a post increases its visibility. Asking a question or providing facts/figures can be effective for reeling in interest. Some examples of social media posts appear in the Outreach Materials for a General Audience section.

Tips for Using Social Media

Social media is a popular tool for quickly spreading information to large audiences. Several social media platforms exist, and more are likely to be developed. Each platform reaches a different audience in its own way. Some well-established social media platforms are listed below. This list should not be construed as an endorsement by ITRC. When using social media to circulate your messages, it's important to consider the intended audience and how they interact with a social media platform before choosing a platform and designing a message. You also need to make sure your messages fit within the guidelines for the platform.

Hashtags (#) can be used with any of the social media listed below to help boost visibility of your post. The placement of the # symbol before a word or a phrase will categorize your post and make it accessible for audiences searching for that keyword. For example, if you place #environmentalremediation in your post, it will be linked to all other posts that also contain that same hashtag. Users can also specify which hashtags they want to follow/receive notice about postings of, making it easier to follow relevant news.

Here is a brief description of several social media platforms:

LinkedIn - LinkedIn is considered a more professional social media outlet focused on networking and learning. The audience tends to have a more in-depth educational background, so including links to scientific studies and resources can be beneficial. There is no limit to post length, and hashtags are helpful. The ITRC LinkedIn page posts about upcoming trainings and guidance documents.

YouTube - YouTube is a platform for posting videos. It's one of the most heavily trafficked websites and is highlighted in most Google searches. YouTube allows for posting both long- and short-version videos. The ITRC YouTube Channel has high-quality training videos on a variety of environmental topics.

Facebook - Facebook is considered a more recreational, quick source of information/news social media platform. The audience is generally less scholarly, so it's important not to be too technical. There is no word count limit for posts, but it's a good strategy to keep them shorter with a link to learn more. The ITRC Facebook page posts about upcoming trainings and guidance documents.

X (Twitter) - X is useful for communicating short bites of information. The character count is limited to 280, including spaces. Hyperlinks are encouraged but count as 23 of the allowed 280 characters. Abbreviations and misspellings of words to condense information are acceptable; X users are familiar with this. Because the X platform is tight on word count, make sure your message is concise. The ITRC X (Twitter) page posts about upcoming trainings and guidance documents.

Instagram - Instagram is a picture-based social media site. Its audience is recreational. Although Instagram captions allow generous word space, we recommend keeping messages short because most users are unlikely to click the expand button to read additional text. For a longer message, create a slideshow with a sentence on each picture slide. Instagram users like to interact with the information. A successful post should be eye-catching to get people's attention.

TikTok - TikTok can be a very useful tool for communicating about topics such as microplastics. TikTok's format is video rather than text, so messaging will need to be read like a script. The algorithm regularly

throws new content into the mix, so a new user may get a good deal of exposure on the app. TikTok users like action items—something they can do in response to the information.

Snapchat - Snapchat may not be the best social media platform for informational messages. The “snapchat stories” section of the app is more entertainment-based and very competitive. It’s unlikely that users will navigate to or stay engaged with this messaging.

OUTREACH MATERIALS FOR A GENERAL AUDIENCE

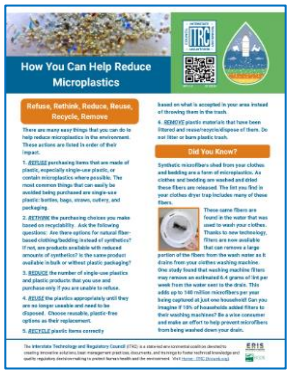
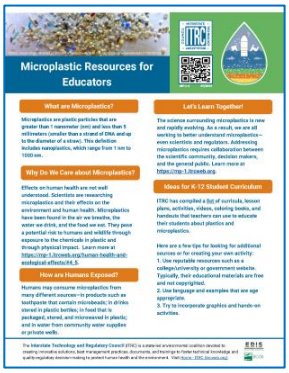
For the purposes of this microplastics toolkit, we have defined a general audience as adults with a nonscience background, as well as K-12 teachers and educators. However, because of their general nature, the materials in this section can be used with almost any audience.

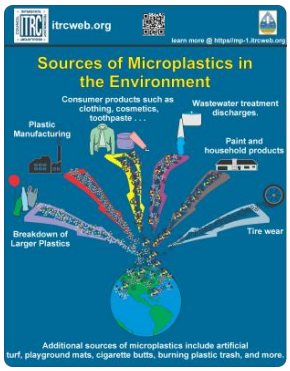
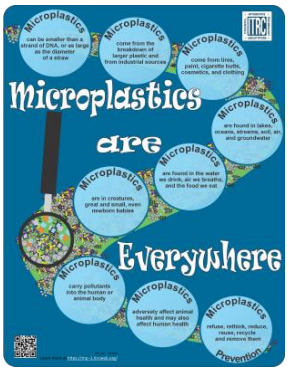
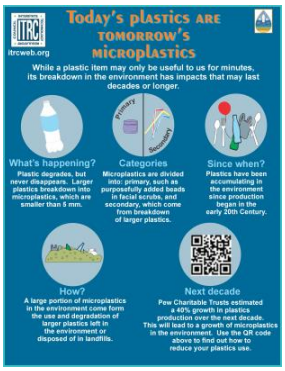
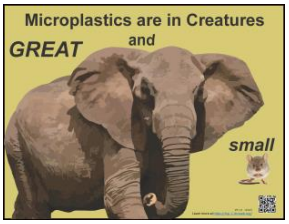
Information provided to general audiences needs to be introductory and use plain language. Text that describes the big picture generally works well. More detailed information can be incorporated by inserting references and links to additional resources.

Types of Materials for a General Audience

Fact Sheets

The goal of a fact sheet is to introduce a topic. Sometimes fact sheets may inspire readers to seek additional information and to do their own research. Many fact sheets have links to additional resources for readers to obtain more information. The fact sheets provided below can be used either in their single-sided, one-page format or mixed and matched to create double-sided two-page fact sheets. Additionally there is a list of curricula and resources for K-12 educators. Please see the index for the full list of outreach materials created for all audiences.

			
Microplastics: The Basics You Need to Know Fact Sheet	Sources of Microplastics Fact Sheet	How You Can Help Reduce Microplastics Fact Sheet	Microplastics Resources for Educators Fact Sheet

			
Sources of Microplastics Graphic	Microplastics Are Everywhere Graphic	Today's Plastics Are Tomorrow's Microplastics Graphic	Tired of Plastics Graphic
			
Help Keep Microplastics Out of Your Body Graphic	Microplastics are in Creatures Great and Small Terrestrial Graphic	Microplastics are in Creatures Great and Small Aquatic Graphic	Microplastics are in Creatures Great and Small Avian Graphic
			
Microplastics are in Creatures Great and Small (and Deep) Graphic			

Social Media Materials

Social media posts are designed to be succinct and grab people's attention. Asking a question, including photos or graphics, or providing facts/figures can be effective for reeling in interest. See the "Tips for Using Social Media" for more information.

Example Key Messages with Associated Social Media Posts

Ideally, social media posts (Figure 3) should be tied to the key messages you would like to communicate to your audience. Key messages can be used to succinctly communicate the concepts to a target

Figure 3. Example of an X (Twitter) post.

Source: ITRC Microplastics Team

audience using a mapped message process. This process is described in more depth in Section 4.5 of ITRC's Risk Communication Toolkit. In general, the goal is to create a mapped message that provides three components of the key message in 27 words or less and begins with posing a question. An example of the process using the message "Microplastics are everywhere" and three related facts is shown in Table 1.

Table 1. Message map for "Microplastics are Everywhere"

Audience: General	**Question/Concern/Issue:** Microplastics are Everywhere	
Key Message/Fact 1: In the environment.	**Key Message/Fact 2**: In things we ingest.	**Key Message/Fact 3**: In your body.
Key Words/Supporting Fact 1.1: Found on mountain peaks.	**Key Words/Supporting Fact 2.1**: Found in fish tissue.	**Key Words/Supporting Fact 3.1:** Found in blood.

Key Words/Supporting Fact 1.2: Found in the deep sea.	**Key Words/Supporting Fact 2.2**: Found in salt.	**Key Words/Supporting Fact 3.2**: Found in lungs.
Key Words/Supporting Fact 1.3: Found in the air.	**Key Words/Supporting Fact 2.3**: Found in bottled water.	**Key Words/Supporting Fact 3.3**: Found in meconium (baby's first poop).

A key message that can be created from this message map is:

> *"Microplastics are everywhere, from mountain peaks to ocean depths, and even in the human body due to their presence in the food and water we ingest." (26 words)*

Table 2 lists several key messages related to microplastics and an associated social media post.

Table 2. Key messages and associated social media posts

*If using a URL, please note that an additional 23 characters will be included in your total character count for X (Twitter).

Key Message	Example Social Media Post	Character Count
Microplastics are everywhere	**Microplastics—tiny plastic particles—are everywhere.** Plastics break down into tiny particles called #microplastics. Microplastics are found in air, drinking water, surface waters, and food that humans consume. Microplastics can move through the food chain and carry chemical additives. https://mp-1.itrcweb.org/introduction/	290 characters + 23 for URL = 313
Today's plastics are tomorrow's microplastics	**Microplastics have accumulated on the planet since the 1950s**. Industrial products and breakdown of larger plastics have led to smaller pieces getting into surface water, air, soil, organisms, and people's food. Explore routes of exposure – https://mp-1.itrcweb.org/human-health-and-ecological-effects/	240 characters + 23 for URL = 279
Microplastics are found in creatures great and small	**After being thrown away, plastic products break down into smaller pieces called #microplastics.** They get into the food chain and fish, wildlife, and eventually humans eat them. By buying less plastic you can prevent it from getting into the environment. https://mp-1.itrcweb.org/environmental-distribution-fate-and-transport/	254 characters + 23 for URL = 282

Regulating microplastics is complex	**Regulating #microplastics is complex**. This is a global issue that cannot be tackled by a single country. Plastics have many beneficial uses and cannot be eliminated entirely. Follow the #UNPlasticsTreaty for ongoing global actions. https://www.unep.org/inc-plastic-pollution	232 characters + 23 for URL = 255
I can do something to reduce plastics in the environment	**Remember the 6 Rs of #microplastic reduction** – 1. REFUSE single-use plastics, 2. RETHINK clothing, 3. REDUCE use of single-use plastics, 4. REUSE plastics as you can, 5. RECYCLE what is left, and 6. REMOVE plastic litter. Learn why to change habits at https://mp-1.itrcweb.org/introduction/.	254 characters + 23 for URL = 277
Society can do some things to reduce microplastics in the environment	**Tires hit the road, so do microplastics!** Tires degrade into #tirewearparticles due to friction over time. Maintain the correct tire pressure, avoid sharp braking or acceleration, and reduce vehicle load to minimize the amount of #microplastics released into the environment. https://mp-1.itrcweb.org/appendix-a/#a_5	274 characters + 23 for URL = 295

Images for Use in Social Media

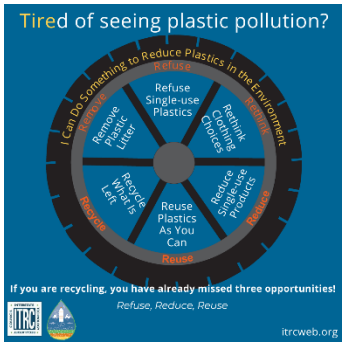
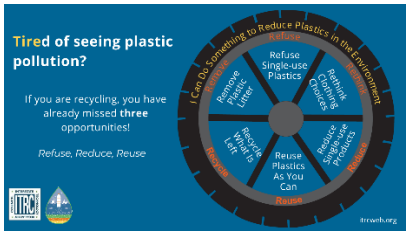
Social media posts are generally more eye-catching and effective when they are accompanied by an image. To help ensure that they are as attention-grabbing as possible, your images should be sized and shaped appropriately for the platform. Keep in mind that each social media platform has slightly different recommendations for image size and aspect ratio (Figure 4).

Figure 4. An example of an X (Twitter) post using a microplastics graphic.

Source: ITRC Microplastics Team

Many of the images in this toolkit can be used in social media posts. As an example, Table 3 presents one image that has been resized and optimized for different social media platforms.

Table 3. Examples of graphics formatted for different social media platforms.

	LinkedIn header Image formatted for use as a header on a LinkedIn page. Size: 1584 x 396 pixels Aspect ratio: 4:1
	Facebook Post Image optimized for use in a Facebook post. Size: 1200 x 630 pixels Aspect ratio: 1.91:1
	Instagram Post Image optimized for use in an Instagram post. Size: 1080 x 1080 pixels Aspect ratio: 1:1
	X (Twitter) Post Image optimized for use in an X (Twitter) post. Size: 800 x 418 pixels Aspect ratio: 1.91:1

Picture: Oregon State University, CC BY-SA 2.0 - tps://www.flickr.com/photos/oregonstateuniversity/21282786668/

Microplastics: *The Basics You Need to Know*

MP-1-1 07/2024

What Are Microplastics?

Microplastics are plastic particles that are greater than 1 nanometer (nm) and less than 5 millimeters (smaller than a strand of DNA and up to the diameter of a straw). This definition includes nanoplastics, which range from 1 nm to 1,000 nm.

What Are Sources of Microplastics?

Microplastics may be intentionally added to consumer products (like body wash/cosmetics, toothpaste, etc.), released during product use and care (synthetic clothes, tires, paint, etc.), released during plastic manufacturing, and may result from the breakdown of larger plastics into smaller pieces.

How Do Microplastics Get into the Environment?

Microplastics can enter the environment when:

- Consumer products, such as tires, cigarette butts, paint, or any synthetic clothing, break down.
- Larger plastic materials are improperly disposed and break down into smaller pieces.
- Microplastic-containing sewage sludge (biosolids) from wastewater treatment plants is applied to agricultural fields as fertilizer.
- Improperly stored plastic materials from industrial processes get into the air and wastewater discharges or are spilled into surface water bodies.
- Rain and stormwater collect microplastics from the ground and carry them into water bodies.
- Plastic pollution in the ocean breaks down.

Why Should You Care?

Microplastics can be ingested and inhaled. They can carry pollutants and harmful chemicals that can lead to potential adverse effects in animals, plants, and humans. Microplastics have been detected in several human tissues, including lungs, placenta, blood, and breast milk, although the health effects remain uncertain.

What Can You Do?

- Purchase nonplastic alternatives.
- Replace single-use products—water bottles, bags, straws, etc., with reusable versions.
- Buy sustainable, synthetic-free clothing such as cotton, linen, etc.
- Check for ingredients such as polyethylene and polypropylene in personal care products.
- Recycle or dispose of plastics correctly.
- Spread the word and support initiatives about the importance of reducing plastics.

The **Interstate Technology and Regulatory Council** (ITRC) is a state-led environmental coalition devoted to creating innovative solutions, best management practices, documents, and trainings to foster technical knowledge and quality regulatory decision-making to protect human health and the environment. Visit Home - ITRC (itrcweb.org).

Picture: Oregon State University, CC BY-SA 2.0 - tps://www.flickr.com/photos/oregonstateuniversity/21282786668/

Sources of Microplastics

MP-1-2 07/2024

Breakdown of Larger Plastics

Plastics in bottles and bags, cigarette butts, packaging materials, human-made fibers in textiles, larger pieces of consumer products, balloons, plastic utensils, and similar materials can be improperly disposed and break down in the environment to microplastics.

Plastic Manufacturing

Air and wastewater emissions from factories release plastic to the environment. Spillage and poor handling of raw materials used in plastic production provide sources of microplastics.

Consumer Products

Microplastics are intentionally added to many everyday consumer products, such as cosmetics, paints, toothpastes, cleansers, detergents (pods), and textiles. Washing synthetic clothes and using and rinsing off personal care products sends microplastics to wastewater treatment plants (WWTPs).

Paint and Household Products

Paint flaking off buildings contributes to microplastics in stormwater. Abrasives, such as sandpaper, commonly have microplastics as a component and are released during construction and maintenance activities.

Wastewater Treatment Plant Discharges

Household waste and industrial sewage can be a source of microplastics to WWTPs. Microplastics can spread when WWTPs release treated water into surface water and groundwater. As part of the treatment process, WWTPs generate nutrient-rich biosolids (sewage sludge), which can contain microplastics. The biosolids can be placed on cropland as fertilizer or in landfills. This can result in microplastics being taken up by crops, sinking into groundwater, and running off into streams after heavy rain or too much irrigation. Sludge disposed in landfills can lead to microplastics leaking into groundwater.

Tire and Road Wear

Tires, and in many instances, road materials and paint markings, contain plastics. Regular use and abrasion releases tire and road particles into the air and roadside soils. Ground-up tires are used for cushioning in some synthetic turf fields, which are made of plastic. Use of those fields, combined with wind and stormwater runoff, allows plastic and microplastics to move through the environment.

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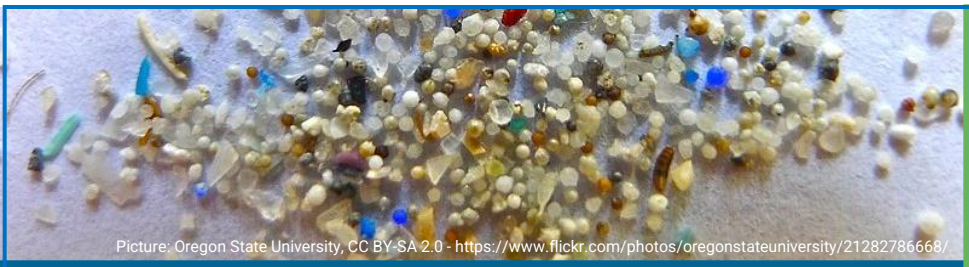

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How You Can Help Reduce Microplastics

MP-1-3 07/2024

Refuse, Rethink, Reduce, Reuse, Recycle, Remove

There are many easy things that you can do to help reduce microplastics in the environment. These actions are listed in order of their impact.

1. ***REFUSE***, where possible, to purchase items that are made of plastic, especially single-use plastic, or contain microplastics. The most common things that can easily not be purchased are single-use plastic: bottles, bags, straws, cutlery, and packaging.

2. ***RETHINK*** the purchasing choices you make based on recyclability. Ask the following questions: Are there options for natural fiber-based clothing/bedding instead of synthetics? If not, are products available with reduced amounts of synthetics? Is the same product available in bulk or without plastic packaging?

3. REDUCE the number of single-use plastics and plastic products that you use, and purchase only if you are unable to refuse.

4. ***REUSE*** the plastics appropriately until they are no longer useable and need to be disposed. Choose reusable, plastic-free options as their replacement.

5. ***RECYCLE*** plastic items correctly based on what is accepted in your area instead of throwing them in the trash.

6. ***REMOVE*** plastic materials that have been littered and reuse/recycle/dispose of them. Do not litter or burn plastic trash.

Did You Know?

Synthetic microfibers shed from your clothes and bedding are a form of microplastics. As clothes and bedding are washed and dried, these fibers are released. The lint you find in your clothes dryer trap includes many of these fibers.

These same fibers are found in the water that was used to wash your clothes. Thanks to new technology, filters are now available that can remove a large portion of the fibers from the wash water as it drains from your clothes washing machine. One study found that washing machine filters may remove an estimated 6.4 grams of lint per week from the water sent to the drain. This adds up to 140 million microfibers per year being captured at just one household! Can you imagine if 10% of households added filters to their washing machines? Be a wise consumer and make an effort to help prevent microfibers from being washed down your drain.

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Microplastic Resources for Educators

MP-1-4 07/2024

What Are Microplastics?

Microplastics are plastic particles that are greater than 1 nanometer (nm) and less than 5 millimeters (smaller than a strand of DNA and up to the diameter of a straw). This definition includes nanoplastics, which range from 1 nm to 1,000 nm.

Why Do We Care about Microplastics?

Effects on human health are not well understood. Scientists are researching microplastics and their effects on the environment and human health. Microplastics have been found in the air we breathe, the water we drink, and the food we eat. They pose a potential risk to humans and wildlife through exposure to the chemicals in plastic and through physical effects. Learn more at https://mp-1.itrcweb.org/human-health-and-ecological-effects/#4_5.

How Are Humans Exposed?

Humans may consume microplastics from many different sources—in products such as toothpaste that contain microbeads; in drinks stored in plastic bottles; in food that is packaged, stored, and microwaved in plastic; and in water from community water supplies or private wells.

Let's Learn Together!

The science surrounding microplastics is new and rapidly evolving. As a result, we are all working to better understand microplastics—even scientists and regulators. Addressing microplastics requires collaboration between the scientific community, decision makers, and the general public. Learn more at https://mp-1.itrcweb.org.

Ideas for K-12 Student Curricula

ITRC has compiled a list of curricula, lesson plans, activities, videos, coloring books, and handouts that teachers can use to educate their students about plastics and microplastics. The list can be found at https://mp-toolkit.itrcweb.org/wp-content/uploads/2024/05/23-K12-Resources-for-Educators.xlsx.

Here are a few tips for looking for additional sources or for creating your own activity:

1. Use reputable resources such as a college/university or government website. Typically, their educational materials are free and not copyrighted.
2. Use age-appropriate language and examples.
3. Try to incorporate graphics and hands-on activities.

The **Interstate Technology and Regulatory Council** (ITRC) is a state-led environmental coalition devoted to creating innovative solutions, best management practices, documents, and trainings to foster technical knowledge and quality regulatory decision-making to protect human health and the environment. Visit Home - ITRC (itrcweb.org).

Learn more @ https://mp-1.itrcweb.org

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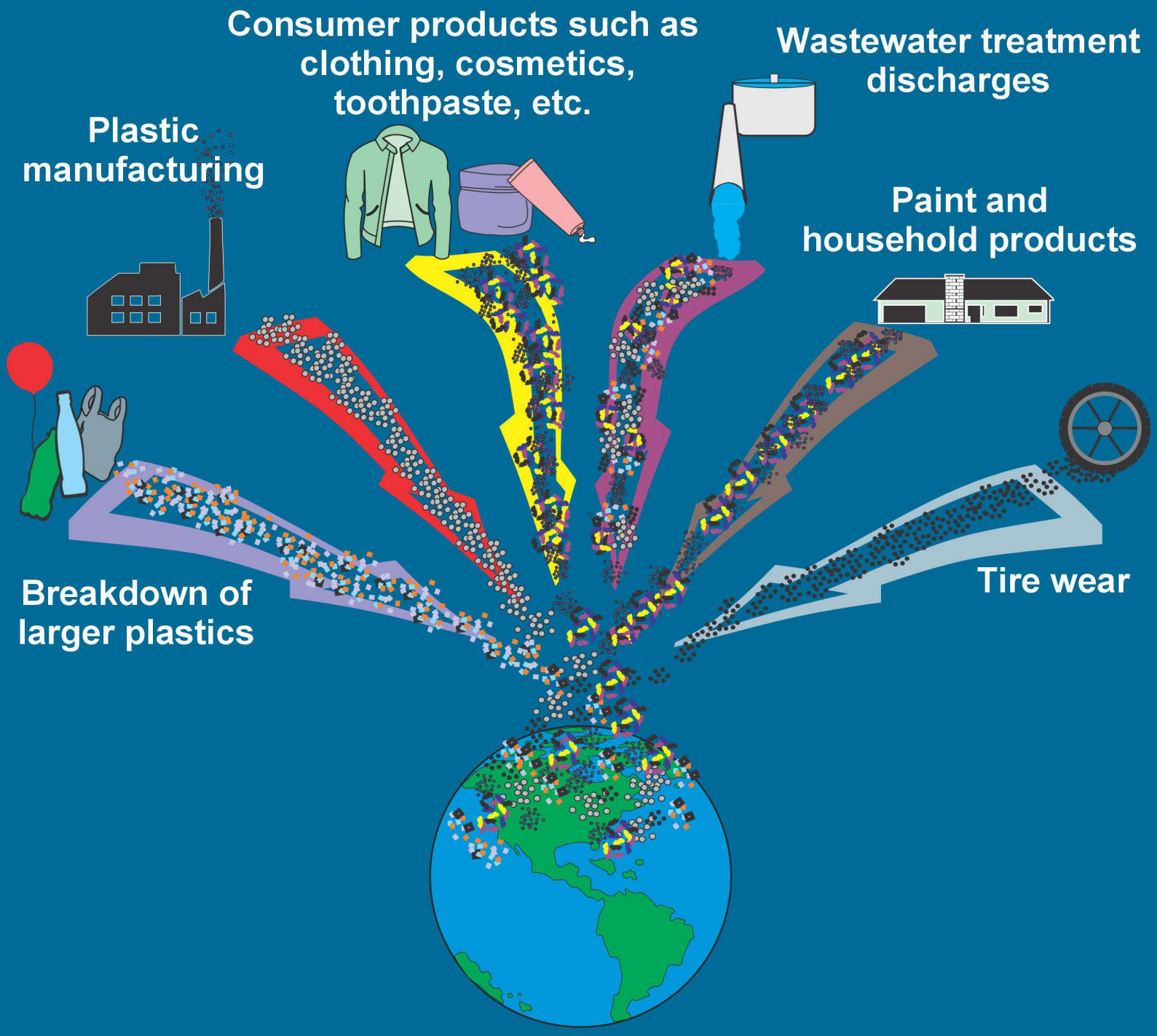
Sources of Microplastics in the Environment



Additional sources of microplastics include artificial turf, playground mats, cigarette butts, burning plastic trash, and more.

Microplastics are Everywhere

Microplastics
can be smaller than a strand of DNA, or as large as the diameter of a straw

Microplastics
come from the breakdown of larger plastic and from industrial sources

Microplastics
come from tires, paint, cigarette butts, cosmetics, and clothing

Microplastics
are found in lakes, oceans, streams, soil, air, and groundwater

Microplastics
are found in the water we drink, the air we breathe, and the food we eat

Microplastics
are in creatures, great and small, even newborn babies

Microplastics
carry pollutants into the human or animal body

Microplastics
adversely affect animal health and may also affect human health

Microplastics
refuse, rethink, reduce, reuse, recycle and remove them

Prevention

Learn more at https://mp 1.itrcweb.org/

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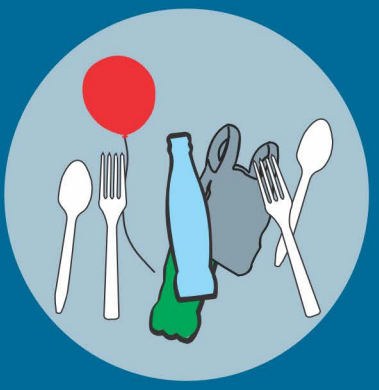
Today's plastics are tomorrow's microplastics

itrcweb.org

While a plastic item may only be useful to us for minutes, its breakdown in the environment has impacts that may last decades or longer.

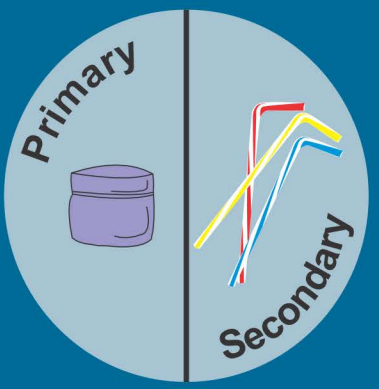
What's happening?

Plastic degrades, but never disappears. Larger plastics break down into microplastics, which are smaller than 5 mm.



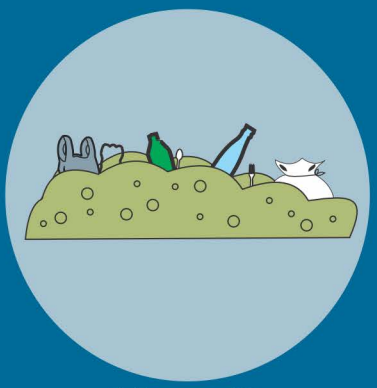
Since when?

Plastics have been accumulating in the environment since production began in the early 20th century.



Categories

Microplastics are divided into primary, such as purposefully added beads in facial scrubs, and secondary, which come from breakdown of larger plastics.



How?

A large portion of microplastics in the environment come form the use and degradation of larger plastics left in the environment or disposed of in landfills.

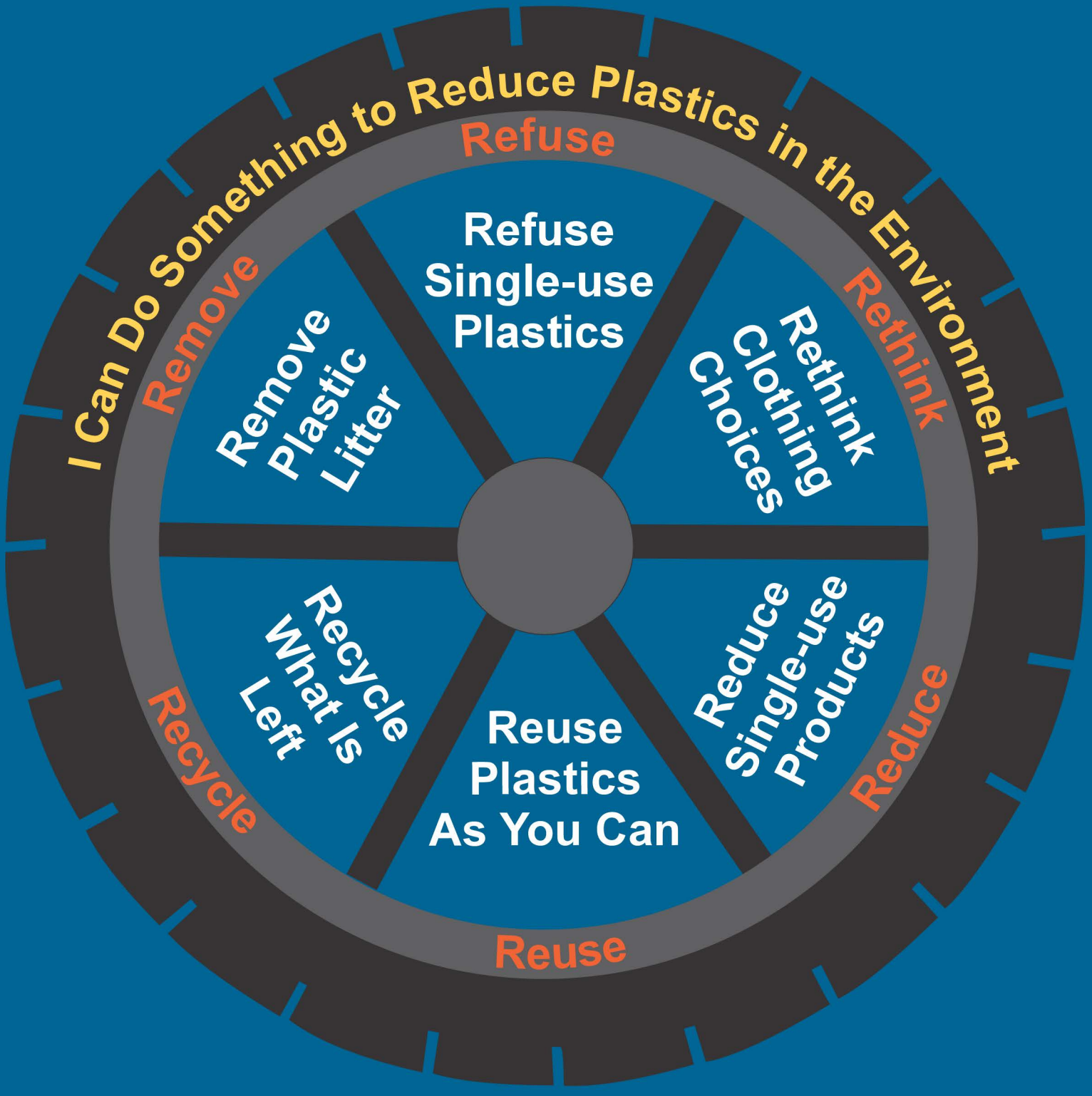
Next decade

Pew Charitable Trusts estimated a 40% growth in plastics production over the next decade. This will lead to a growth of microplastics in the environment. Use the QR code above to find out how to reduce your plastics use.

Learn more @ https://mp-1.itrcweb.org

MP-1-8 07/2024

Tired of seeing plastic pollution?



If you are recycling, you have already missed three opportunities!

Refuse, Reduce, Reuse

Learn more @ https://mp-1.itrcweb.org

MP-1-9 07/2024

Help Keep Microplastics Out of Your Body

Zap in glass instead!

Have an option on which water to choose?

Water in plastic bottles contains more microplastic than tapwater.

Go with Tap!
Filter if you can.

Hussain, *et al.* (2023), *Enivronmental Science and Technology*

Mohammed Nor *et al.* (2021), *Enivronmental Science and Technology*

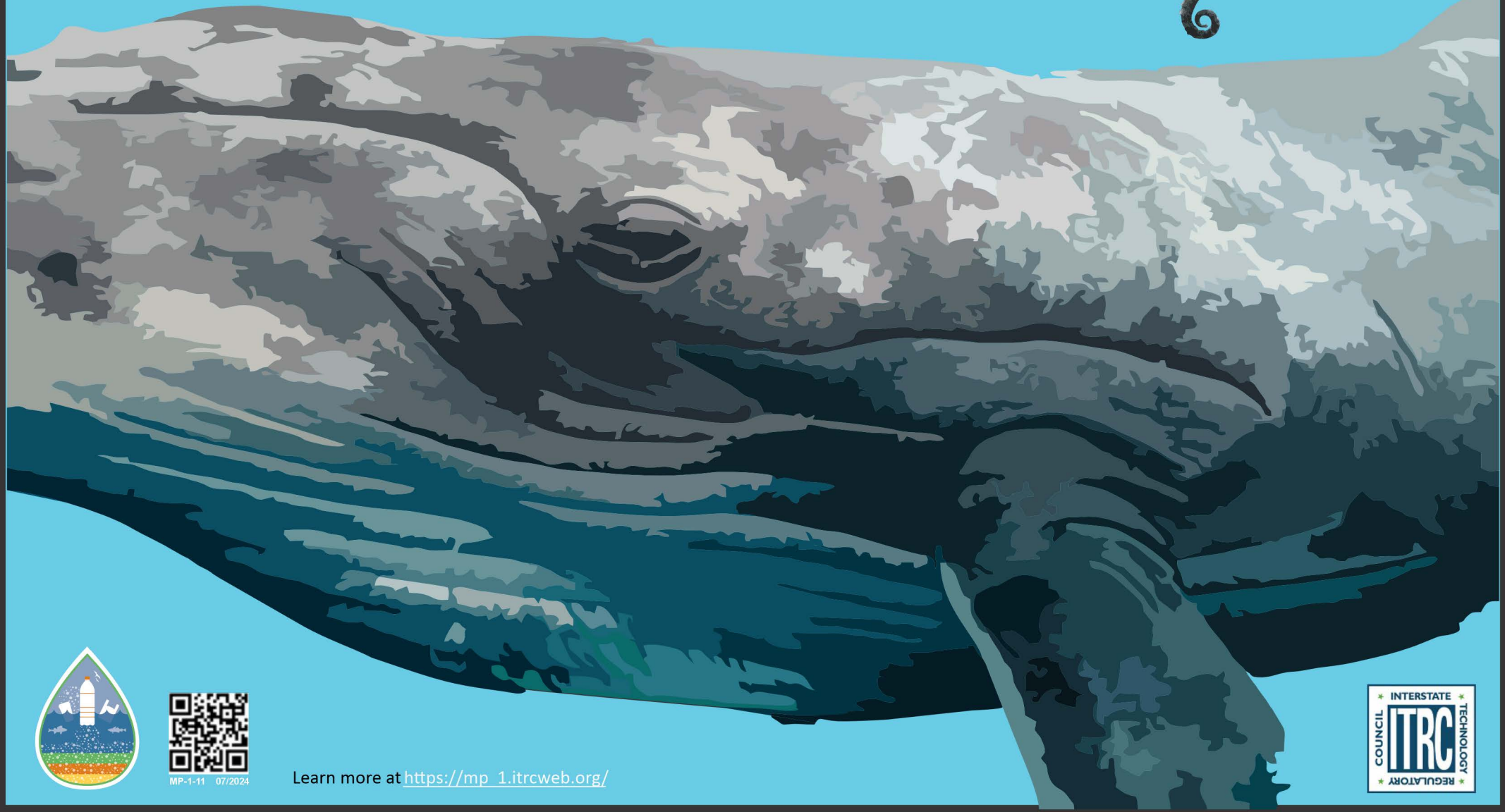
Microplastics are in Creatures

GREAT and *small*

Learn more at
https://mp 1.itrcweb.org/

MP-1-10 07/2024

Microplastics are in Creatures *GREAT* and *small*



MP-1-11 07/2024

Learn more at https://mp_1.itrcweb.org/

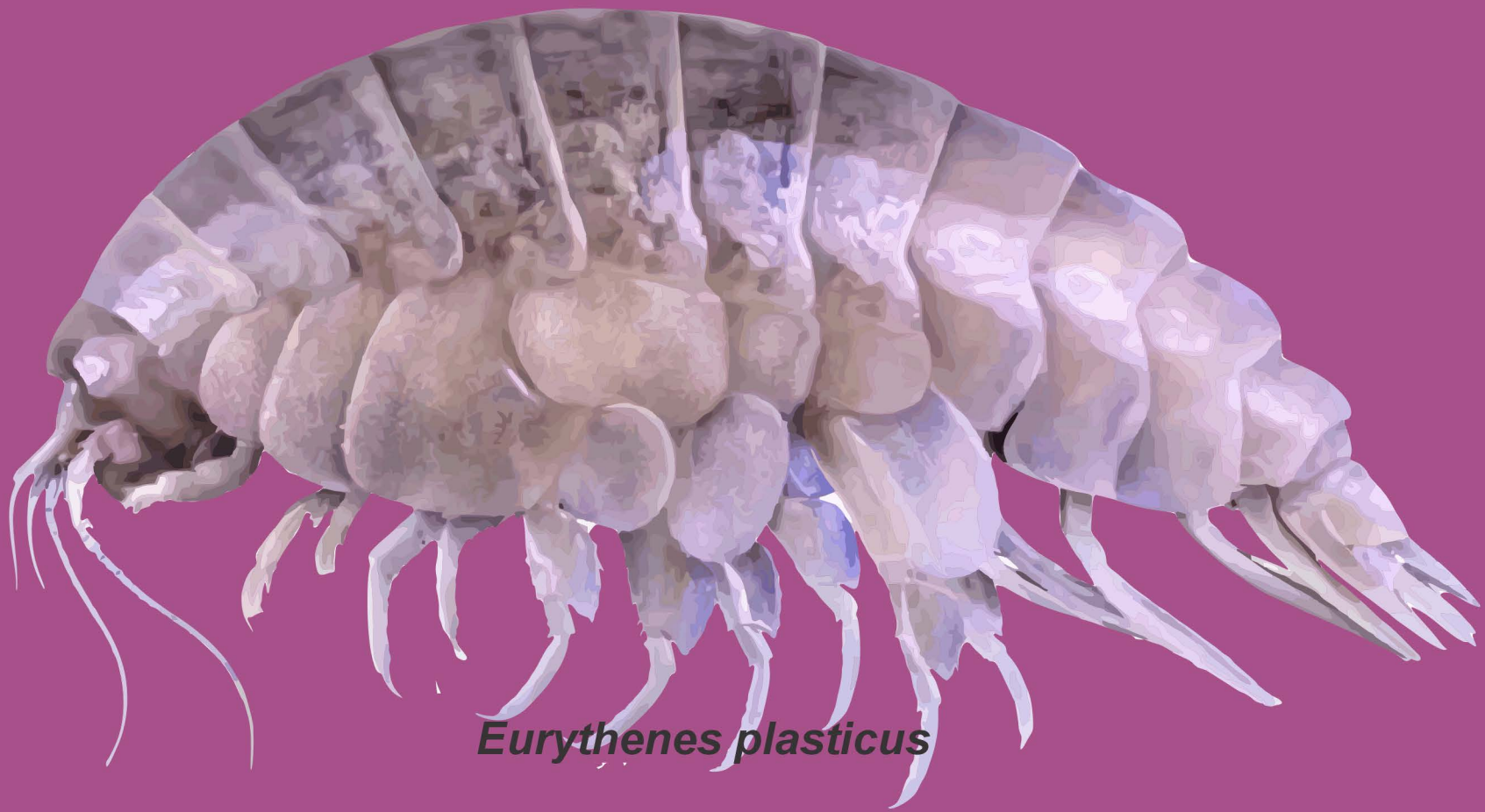
Microplastics are in Creatures

MP-1-12 07/2024

Learn more at https://mp_1.itrcweb.org/

INTERSTATE COUNCIL ITRC TECHNOLOGY REGULATORY

Microplastics are in Creatures *GREAT* and *small* (and deep)



Eurythenes plasticus

Mariana Trench - 7000 meters

MP-1-13 07/2024

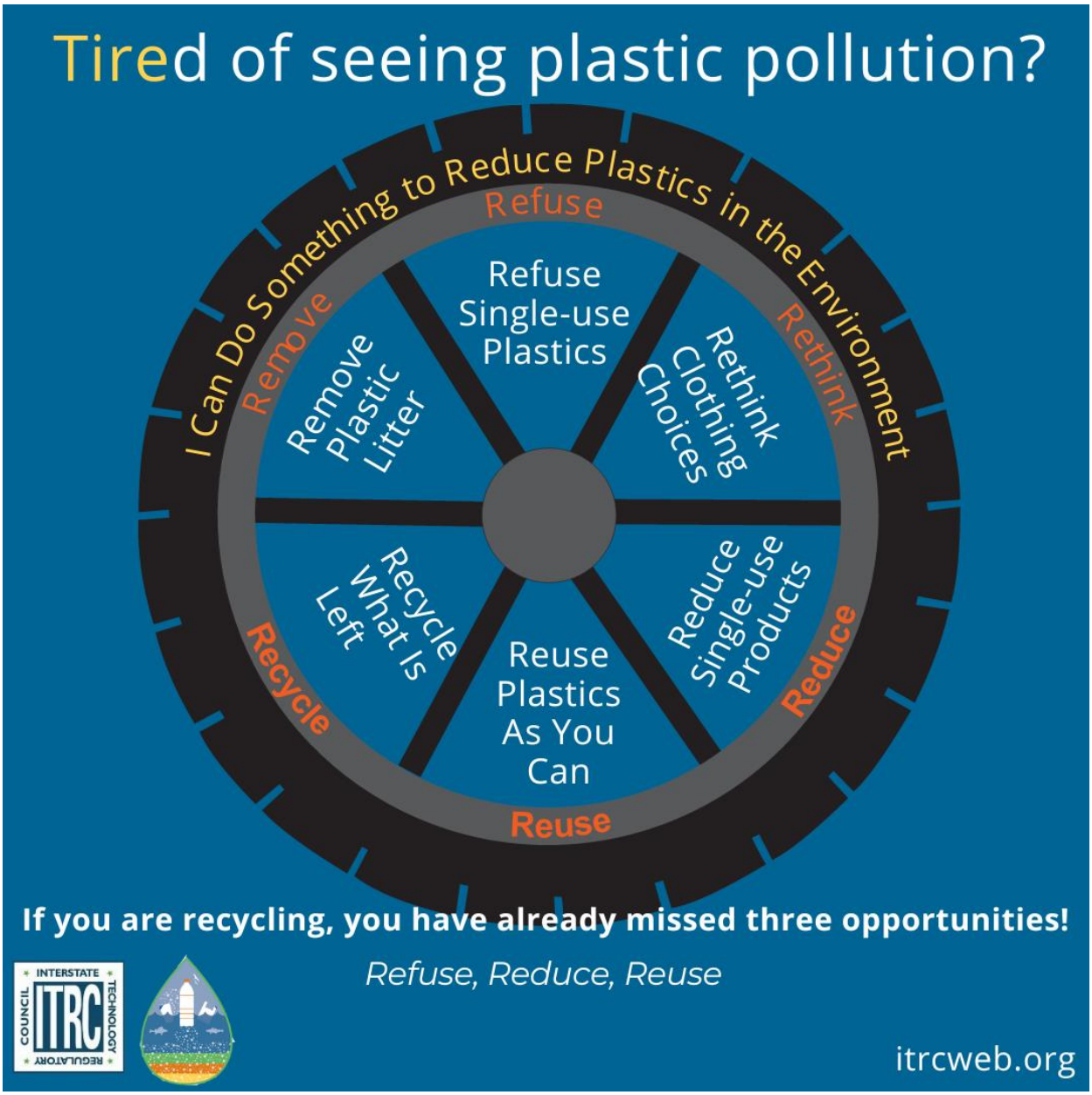
Learn more at https://mp_1.itrcweb.org/

INTERSTATE COUNCIL ITRC TECHNOLOGY REGULATORY

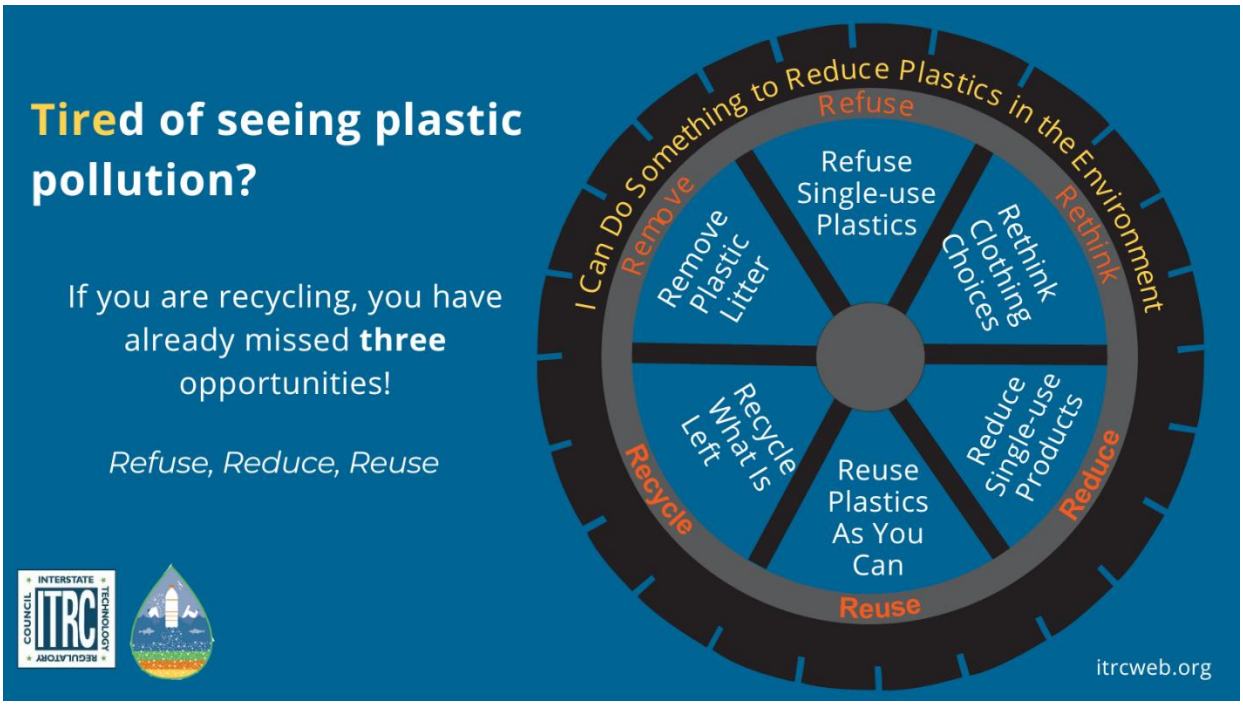
LinkedIn Header

Facebook Post

Instagram Post



X (Twitter) Post



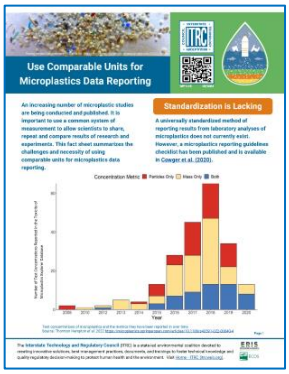
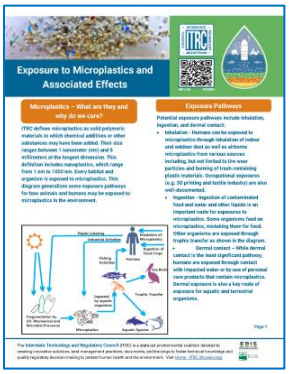
OUTREACH MATERIALS FOR SCIENTISTS AND REGULATORS

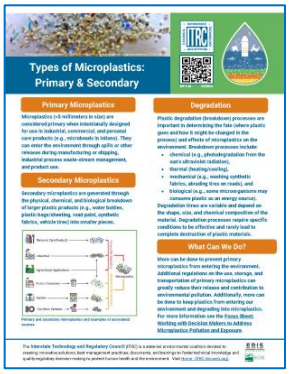
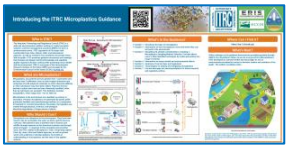
The scientific and regulatory community includes federal, state, and local government technical and regulatory personnel, along with academic researchers interested in increasing their understanding about microplastics. Outreach materials for scientists and regulators should include detailed information described in technical terms, focusing on what is known while acknowledging data gaps. Links to additional information resources from reputable sources, including peer-reviewed research articles, should be included. Although the information is more technical, it should still be presented in an interesting and compelling format.

Types of Materials for Scientists and Regulators

Fact Sheets

The goal of a fact sheet for scientists and regulators is to introduce a potentially complex topic in understandable terms and provide references and links to more detailed information. Regulators, scientists, or others working with the public may also use fact sheets designed for a general audience to educate themselves and provide information to the public. A list of outreach materials for all audiences prepared by the ITRC Microplastics Team can be found in the index.

		
Microplastics Sampling and Analysis Fact Sheet	Use Comparable Units for Microplastics Data Reporting Fact Sheet	Exposure to Microplastics and Associated Effects Fact Sheet

		
Data Gaps and Future Research Needs Fact Sheet	Types of Microplastics – Primary vs Secondary Fact Sheet	Microplastics Poster

Social Media Materials

The scientific and regulatory community may use social media to communicate among themselves about new research findings and technical innovations, and to provide information to a general audience in short but understandable bites. Social media posts for a general audience may be helpful in the second instance.

Posters and Presentations

Posters and presentations are two ways that scientists and regulators communicate information and research results to other scientists and regulators, generally at conferences and meetings. When a presenter speaks to an audience, they are usually accompanied by a visual presentation. Posters are generally set up to convey information visually, with or without a presenter or attendant. ITRC created a poster to provide general information on microplastics and promote the ITRC Microplastics Guidance. The abstract for the poster is:

> **Interstate Technology Regulatory Council (ITRC) Microplastics Outreach Toolkit Abstract Example**
>
> The Interstate Technology and Regulatory Council (ITRC) is a state-led environmental coalition working to create innovative solutions and best management practices (BMPs) for the environmental sector. ITRC produces guidance documents and trainings that broaden and deepen technical knowledge and expedites quality regulatory decision-making while protecting human health and the environment. ITRC is a program of the Environmental Research Institute of the States (ERIS), a 501(c)(3) organization incorporated in the District of Columbia and managed by the Environmental Council of the States (ECOS). ITRC represents all 50 states with membership from state, federal, tribal, and international agencies, as well as members from academia, the private sector, and the public. A recent ITRC activity was to develop a microplastics guidance document. The guidance introduces the topic of microplastics (Section 1), information on how they move and where they can be found in the environment (Section 2), sampling and analysis considerations (Section 3), information on human health and environmental effects (Section 4), a summary of current laws and regulations (Section 5), and

technologies that can be used to abate and mitigate microplastics in the environment (Section 6). Additionally, there is a discussion regarding the current data gaps and recommendations for future research and regulatory actions (Section 7). Online trainings on the guidance document are provided quarterly through USEPA CLU-IN platform. ITRC further developed an outreach toolkit to provide resources for environmental professionals to use in communicating microplastics issues to lawmakers and members of the public. Here is a link to the Microplastics Guidance: https://mp-1.itrcweb.org/.

The poster is included as a resource in this toolkit.

Microplastics Sampling and Analysis

MP-1-14 07/2024

Standardized methods and best practices for sample collection and analysis of microplastics particles and fibers are still being developed. To date, few standard methods have been adopted, and currently there are no regulations governing acceptable levels of microplastics. This fact sheet is an overview of sampling and analysis considerations for study preparations. This fact sheet is not intended to represent technical standard operating procedures.

Data Quality Objectives

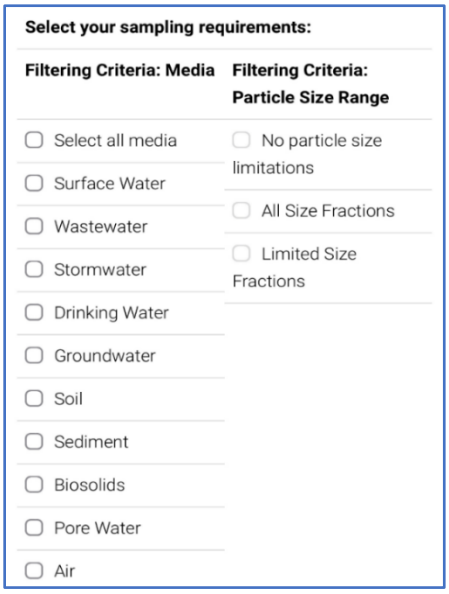
Chosen sampling methods should be compatible with study objectives. Data quality objectives for a microplastics study should consider:

1. Sample matrix
2. Identification and measurement of particle mass
3. Identification of microplastic particle quantity, size, and shape
4. Characterization of specific properties of individual microplastic particles
5. Equipment availability and cost

Example of a subset of microplastics collected from a single experiment. The large end of the MP scale is visible to the naked eye.

Sampling Method Tool

ITRC has developed a sampling method tool. The tool outputs the available microplastic sample methods based on the selected inputs for sampling matrix and particle size, and provides additional details, such as equipment needed, advantages and disadvantages, relative cost, and references for additional information.



Screenshot of Sampling Method Tool

Check it out!

The **Interstate Technology and Regulatory Council** (ITRC) is a state-led environmental coalition devoted to creating innovative solutions, best management practices, documents, and trainings to foster technical knowledge and quality regulatory decision-making to protect human health and the environment. Visit Home - ITRC (itrcweb.org).

Quality Assurance/Quality Control

Quality assurance and quality control are particularly important in microplastics analysis due to the high possibility of contamination and the lack of method standardization. Introduction of contaminants can be through a variety of products, materials, and sources. When sampling for microplastics, it is important to minimize contamination by limiting or eliminating plastic products used for sampling and processing. This also applies to personal protective equipment and clothing worn by and personal care products used by individuals collecting and analyzing samples. Consider nonsynthetic materials, such as cotton shirts and jeans. Additionally, cross contamination must be accounted for by using equipment, laboratory, and field blanks to measure contamination introduced during processing.

Analysis

Analysis of microplastics can be either destructive or nondestructive, and identification can be quantified in mass or count, depending on study objectives. Nondestructive methods (e.g., spectroscopy, such as Fourier transform infrared [FTIR] or Raman) allow physical characteristics including size, shape, and color of microplastics to be characterized. Destructive methods (thermal degradation methods such as pyrolysis-gas chromatography/mass spectrometry) are potentially faster and provide polymer mass, but the process destroys the physical characteristics of the microplastics particles. Method selection is dependent on study objectives.
Microplastics can be detected using several different methods:

Visual methods. Visual examination of a sample with or without magnification, including:

- Naked eye (no magnification)
- Stereo, fluorescence, or scanning electron microscopy

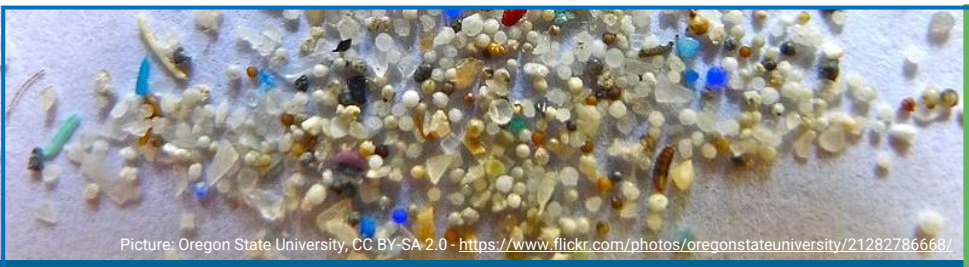
Spectroscopic methods. Capture and assign the characteristics of specific chemical structure of polymers using reference spectra, such as:

- FTIR and focal plane array FTIR
- Laser direct infrared spectroscopy
- Raman

Thermoanalytical/chemical methods. Pyrolyze the sample under inert conditions and specific decomposition products of the individual polymers are detected.

Reporting

A universally standard method of reporting microplastics analyses does not currently exist. This is partially due to the emerging nature of microplastics studies and the wide range of their physical and chemical impacts. Therefore, detailed reporting, including sufficient documentation of the mass or volume of the sampled environmental matrix, laboratory extraction process used, and analysis performed is needed so that conversion to other commonly used units can be performed. Though a standardized method does not yet exist, a highly cited microplastics reporting guidelines checklist has been published and is available in Cowger et al. (2020).



Picture: Oregon State University, CC BY-SA 2.0 - https://www.flickr.com/photos/oregonstateuniversity/21282786668/

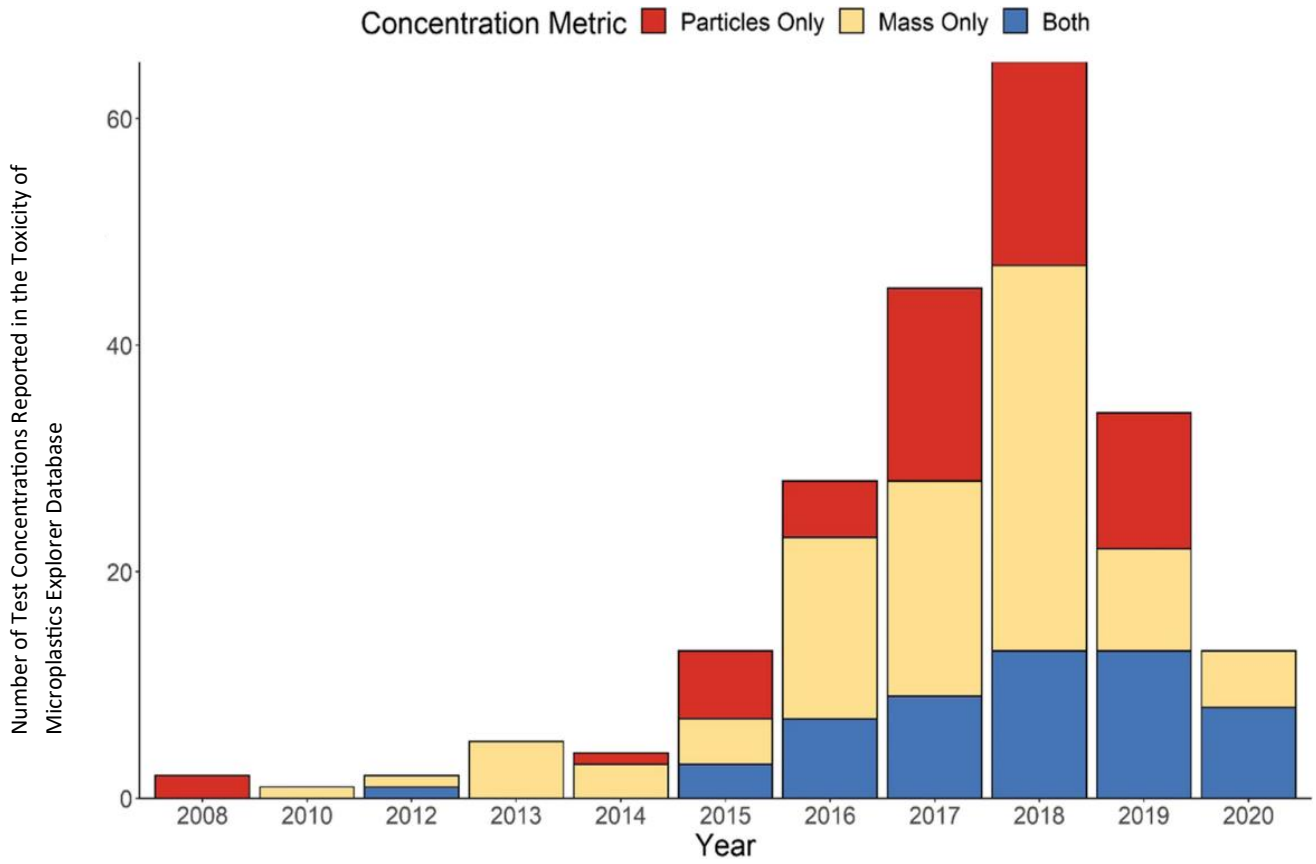
Use Comparable Units for Microplastics Data Reporting

MP-1-15 07/2024

An increasing number of microplastics studies are being conducted and published. It is important to use a common system of measurement to allow scientists to share, repeat, and compare results of research and experiments. This fact sheet summarizes the challenges and necessity of using comparable units for microplastics data reporting.

Standardization Is Lacking

A universally standardized method of reporting results from laboratory analyses of microplastics does not currently exist. However, a microplastics reporting guidelines checklist has been published and is available in Cowger et al. (2020).



Test concentrations of microplastics and the metrics they have been reported in over time.
Source: Thornton Hampton et al. 2022 https://microplastics.springeropen.com/articles/10.1186/s43591-022-00040-4

The **Interstate Technology and Regulatory Council** (ITRC) is a state-led environmental coalition devoted to creating innovative solutions, best management practices, documents, and trainings to foster technical knowledge and quality regulatory decision-making to protect human health and the environment. Visit Home - ITRC (itrcweb.org).

Use Comparable Units for Microplastics Data Reporting

Comparison Between Microplastic Studies Is Difficult

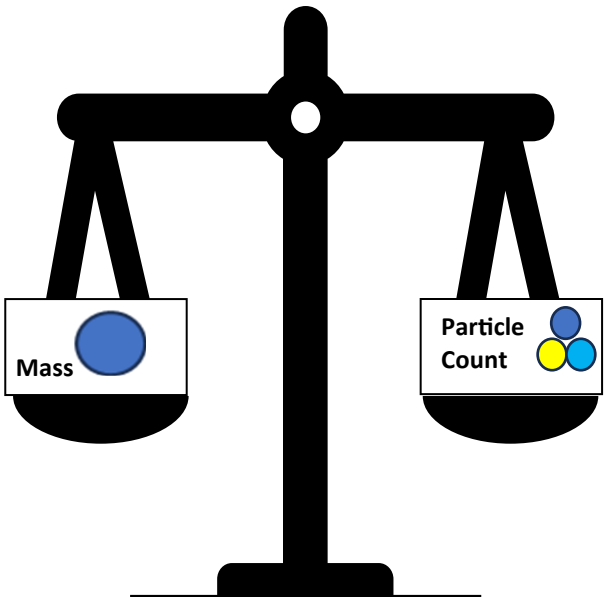
Comparison of data between studies is complicated by variability in how microplastics are defined, a lack of standardized analytical methods, differences in the units used to report the presence of microplastics in various media, and missing particle size data. Microplastics can be quantified in mass, particle count, or both, depending upon project goals.

Units Need to Be Comparable to Be Useful

Many current microplastics analytical methods report results using particle count (per volume or surface area) as the numerical value unit. Particle count allows descriptors of shape and size that support calculation of concentrations of specific types of particles and are therefore easier to link to toxicity studies. Particle size should be reported in all studies.

Another reporting unit is mass per volume (e.g., µg/L) or mass per weight (e.g., mg/kg). These concentration units are commonly used for contaminants in regulatory, monitoring, and toxicological programs. In addition, pyrolysis gas chromatography/mass spectrometry (GC/MS) is increasingly used as an analytical method to identify and quantify small microplastics. This instrument reports microplastics in concentration (mass/volume), not particle count.

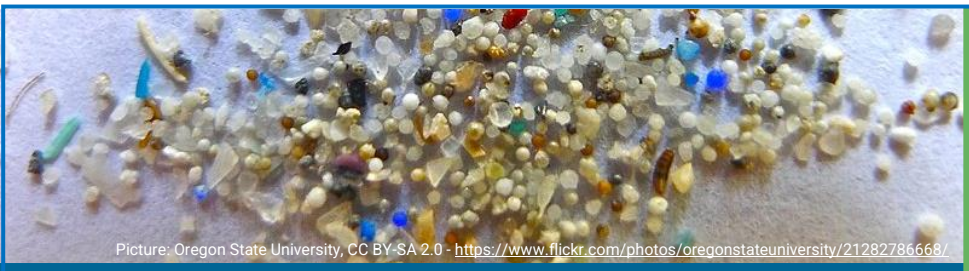
Concentrations in sediment or soil samples containing microplastics should be reported as dry or wet weight. The weight of dry sample particles remains constant, but as water content varies, wet weight will vary; therefore, include a wet:dry ratio if using wet weight so that it can be converted to dry weight based on moisture content.



Note: The mass of one large particle can be equal to the mass of multiple smaller particles. Units need to be comparable to be useful.

Suggested Reporting

To provide maximum usefulness when comparing concentrations to other toxicity studies or environmental concentrations, microplastics concentrations should be reported as both mass (per volume or per unit dry weight) and particle count (per volume or surface area). Microplastic particles that are well-characterized (e.g., detailed characterization of particle size distributions) can allow concentrations to be converted between mass, count, and volume, if the density of the plastic is also reported.



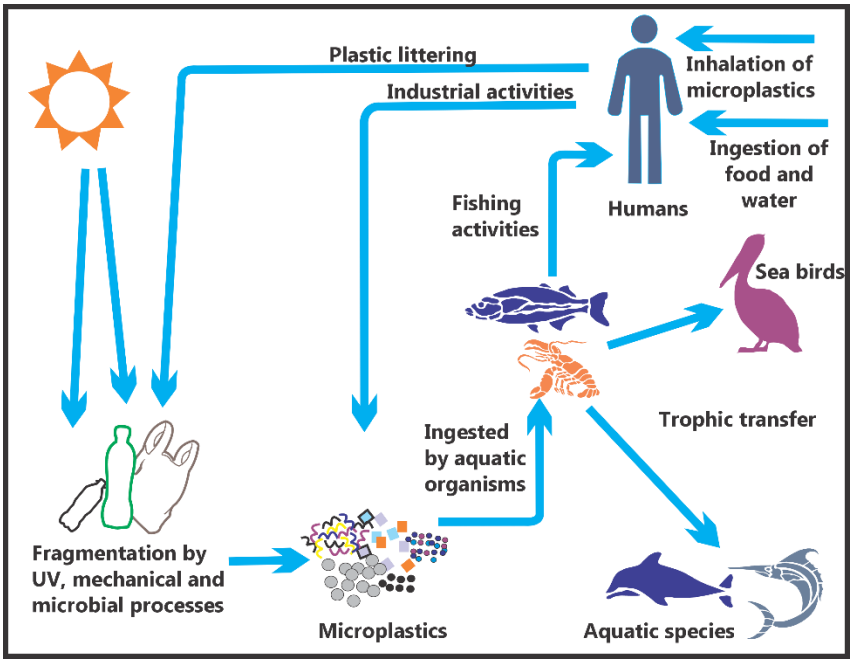
Picture: Oregon State University, CC BY-SA 2.0 - https://www.flickr.com/photos/oregonstateuniversity/21282786668/

Exposure to Microplastics and Associated Effects

MP-1-16 07/2024

Microplastics – What Are They and Why Do We Care?

ITRC defines microplastics as solid polymeric materials to which chemical additives or other substances may have been added. Their size ranges between 1 nanometer (nm) and 5 millimeters at the longest dimension. This definition includes nanoplastics, which range from 1 nm to 1,000 nm. Every habitat and organism is exposed to microplastics. The diagram here generalizes some exposure pathways for how animals and humans may be exposed to microplastics in the environment.



Exposure Pathways

Potential exposure pathways include inhalation, ingestion, and dermal contact:

- Inhalation - Humans can be exposed to microplastics through inhalation of indoor and outdoor dust, as well as airborne microplastics from various sources, including but not limited to tire wear particles and burning of trash containing plastic materials. Occupational exposures (e.g., 3-D printing and textile industry) are also well-documented.
- Ingestion - Ingestion of contaminated food and water and other liquids is an important route for exposure to microplastics. Some organisms feed on microplastics, mistaking them for food. Other organisms are exposed through trophic transfer, as shown in the diagram.
- Dermal contact – Although dermal contact is the least significant pathway, humans are exposed through contact with impacted water or by use of personal care products that contain microplastics. Dermal exposure is also a key route of exposure for aquatic and terrestrial organisms.

Exposure to Microplastics and Associated Effects

Challenges in Toxicity Assessment

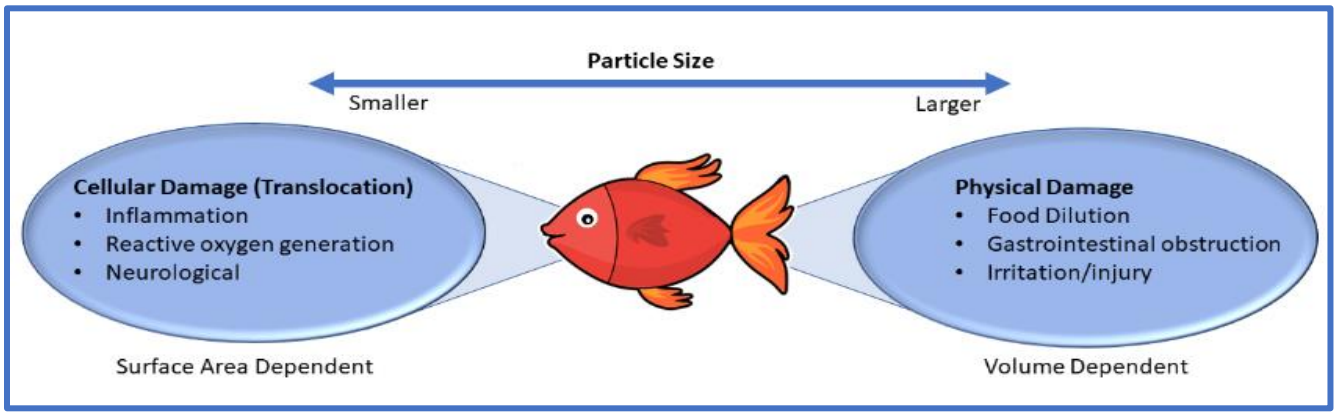
There is a lot of variation in quality and usability of available information on health impacts related to microplastics exposure. Microplastics toxicity can be caused by both physical and chemical properties and the pathogens that may adhere to them. Exposure does not necessarily equal adverse effects.

There has been an exponential growth in recent years of nonhuman mammalian studies, but variations in study design, exposure concentration, data quality, and data reporting have led to significant data gaps. Currently, there is not enough information to establish toxicity criteria to use in environmental or human health risk assessments.

Human Health Effects

Although the associated risks of exposure remain uncertain, microplastics have been detected in several human tissues, including lungs, placenta, and blood. Microplastics have also been detected in human breast milk and meconium of newborn babies. Currently, there is not sufficient weight-of-evidence to definitively state what the health effects are for humans exposed to microplastics. Additional information regarding potential human health effects can be found in the ITRC Microplastics Guidance Document - https://mp-1.itrcweb.org/human-health-and-ecological-effects.

Ecological Effects



The figure above is a conceptual diagram of aquatic organisms exposed to microplastics. These concepts are expected to be similar for terrestrial organisms. There are two kinds of health effects associated with microplastics, both of which are related to their particle size. The first is that, when the particle size is very small, as shown on the left side of the continuum, it is more capable of causing molecular- and cellular-level damage, such as inflammation and oxidative stress reactions.

The second is that, when the particles are larger, as shown on the right side, the effects are more physical damage, often related to the ingestion route. If microplastics are accidentally or intentionally consumed with food, this can lead to food dilution, or blocking certain portions of the gastrointestinal tract or other types of injury. Even the particle surface (rough or smooth) can make a difference when it comes to causing irritation.

Picture: Oregon State University, CC BY-SA 2.0 - https://www.flickr.com/photos/oregonstateuniversity/21282786668/

Microplastics Data Gaps & Future Research Needs

MP-1-17 07/2024

The topic of microplastics as emerging contaminants is evolving quickly. As such, it is helpful to keep in mind the areas where additional information is needed to inform potential regulatory initiatives and to provide approaches to mitigation. The ITRC Microplastics Guidance document, published in February 2023, identified future research needs related to fate and transport, sampling and analysis, potential health risks, trophic transfer, and ecological exposure and effects. Potential research areas are listed below and in Section 7 of ITRC's Microplastics Guidance.

Fate and Transport

- Microplastics in groundwater: occurrence, types, concentrations
- Degradation characteristics: What constitutes *fully degraded* microplastics?
- Modeling to include environmental variables, physical and chemical characteristics
- Microplastics in sediment and in relation to aquatic systems
- Occurrence and characteristics of transport in the atmosphere

Sampling and Analysis

- Standardized microplastics reference materials to improve accuracy of extraction and identification methods
- Acceptable blank and reference recovery ranges; replicate numbers and variability
- Affordable instruments for identification/quantification and automated systems, such as use of machine learning
- Develop methods for nanoplastics detection. Nanoplastics may be the most numerous in the environment, and current approaches are not effective for this size range.

Potential Health Risks

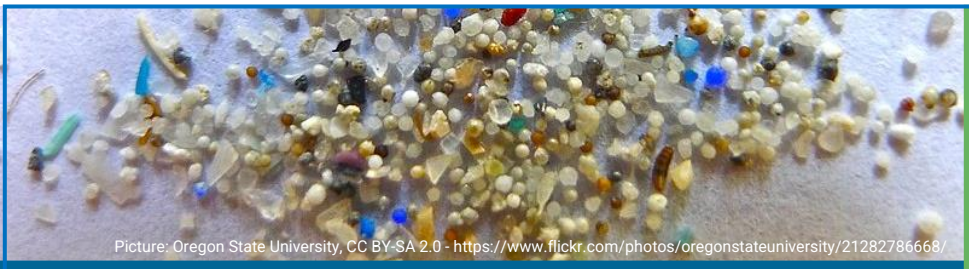
- Develop basis for evaluation of effects on humans and assess effects of environmentally relevant concentrations
- Effects with variation in properties (size, morphology), biofilm presence, chemical additives
- Potential for accumulation in body tissues

Trophic Transfer & Ecological Exposure

- Bioaccumulation/biomagnification risks for ecological receptors
- Ecological risks for varying particle characteristics
- Ecological effects of weathered vs. nonweathered particles
- Microplastics as vectors for other pollutants in sediment/water

Mitigation, Abatement, & Management

- Low-cost, sustainable alternatives to plastic
- Economic studies to determine value of plastic waste
- Infrastructure and programs for sustainable plastic waste management (stormwater systems, wastewater treatment, etc.)
- Enhance public education and engagement with disproportionally affected communities



Picture: Oregon State University, CC BY-SA 2.0 - https://www.flickr.com/photos/oregonstateuniversity/21282786668/

Types of Microplastics: Primary & Secondary

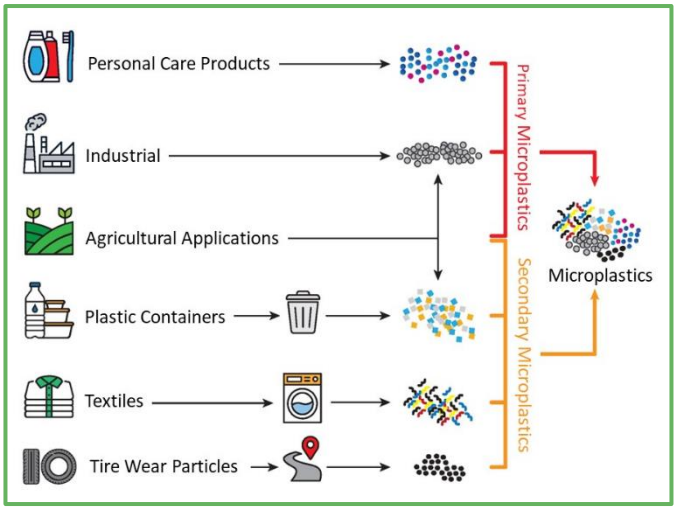
MP-1-18 07/2024

Primary Microplastics

Microplastics (<5 millimeters in size) are considered primary when intentionally designed for use in industrial, commercial, and personal care products (e.g., microbeads in lotions). They can enter the environment through spills or other releases during manufacturing or shipping, industrial process waste-stream management, and product use.

Secondary Microplastics

Secondary microplastics are generated through the physical, chemical, and biological breakdown of larger plastic products (e.g., water bottles, plastic bags/sheeting, road paint, synthetic fabrics, vehicle tires) into smaller pieces.



Primary and secondary microplastics and examples of associated sources.

Degradation

Plastic degradation (breakdown) processes are important in determining the fate (where plastic goes and how it might be changed in the process) and effects of microplastics on the environment. Breakdown processes include:

- chemical (e.g., photodegradation from the sun's ultraviolet radiation)
- thermal (heating/cooling)
- mechanical (e.g., washing synthetic fabrics, abrading tires on roads)
- biological (e.g., some microorganisms may consume plastic as an energy source)

Degradation times vary and depend on the shape, size, and chemical composition of the material. Degradation processes require specific conditions to be effective and rarely lead to complete destruction of plastic materials.

What Can We Do?

More can be done to prevent primary microplastics from entering the environment. Additional regulations on the use, storage, and transportation of primary microplastics can greatly reduce their release and contribution to environmental pollution. Additionally, more can be done to keep plastics from entering our environment and degrading into microplastics. For more information see the Focus Sheet: Working with Decision-Makers to Address Microplastics Pollution and Exposure.

Introducing the ITRC Microplastics Guidance

MP-1-21 07/2024

Who Is ITRC?

The Interstate Technology and Regulatory Council (ITRC) is a state-led environmental coalition working to create innovative solutions and best management practices (BMPs) for the U.S. environmental sector. ITRC represents all 50 states with membership from state, federal, tribal, and international agencies, as well as members from academia, the private sector, and the public. ITRC produces guidance documents and trainings that broaden and deepen technical knowledge and expedites quality regulatory decision making while protecting human health and the environment. ITRC is a program of the Environmental Research Institute of the States (ERIS) and managed by the Environmental Council of the States (ECOS). itrcweb.org

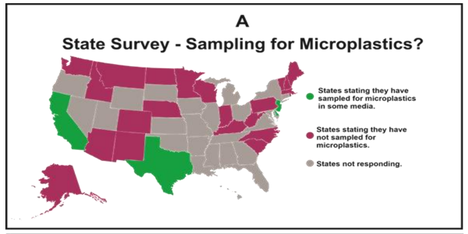
What Are Microplastics?

Microplastics are particles that are greater than 1 nanometer (nm) and less than 5 millimeters (mm) in their longest dimension and comprised of solid polymeric materials to which chemical additives or other substances may have been added. Polymers that are derived in nature that have not been chemically modified (other than by hydrolysis) are excluded. This definition includes nanoplastics, which range from 1 nm to 1,000 nm.

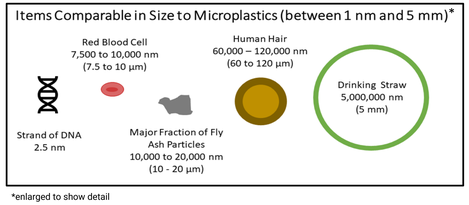
Microplastics in the environment are classified as primary or secondary. Primary microplastics are generated by plastic pellet production facilities and manufacturing facilities as a component of industrial or commercial products. Secondary microplastics are created through physical, chemical, and biological alteration/degradation of larger pieces of plastic.

Why Should I Care?

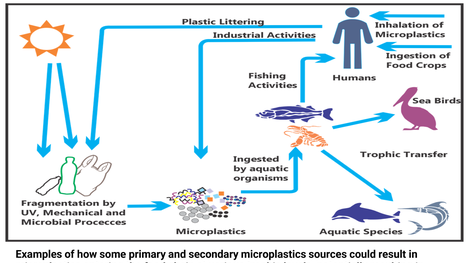
Microplastics are ubiquitous in the environment. They have been found in the air we breathe, the water we drink, and the food we consume. Microplastics pose a potential risk to humans and wildlife through exposure to the chemicals in plastic and through physical impact. In response to this emerging environmental issue, the ITRC created a *Microplastics Team,* comprising experts from city, state, tribal, and federal agencies, as well as the private sector and academia, to develop guidance that provides an understanding of microplastics and the state of the applied science.



State survey data current as of June 2021



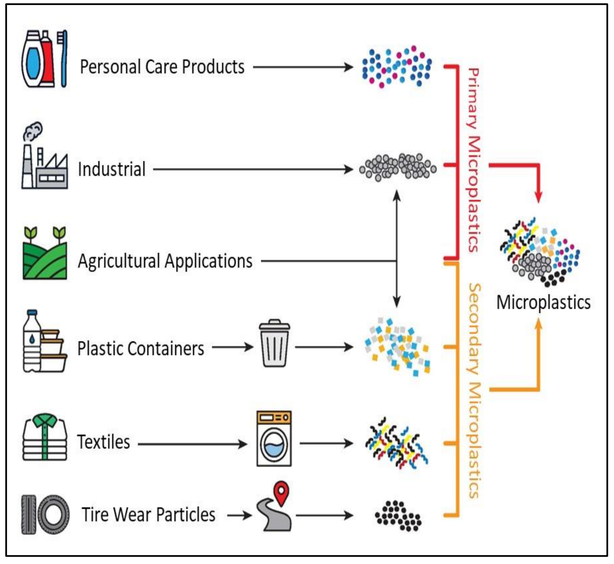
*enlarged to show detail



Examples of how some primary and secondary microplastics sources could result in microplastics entering the food chain at various trophic levels, potentially resulting in environmental and human exposures.

What's in the Guidance?

- Section 1 - Introduces the topic of microplastics
- Section 2 - Information on how microplastics move and where they can be found in the environment
- Section 3 - Sampling and analysis considerations, including a Microplastics Sampling Method Selection Tool that allows users to filter identified techniques by media and particle size range of interest
- Section 4 - Information on human health and environmental effects
- Section 5 - Summary of current laws and regulations
- Section 6 - Technologies for abating and mitigating microplastics
- Section 7 - Current data gaps and recommendations for future research and regulatory actions



Examples of primary and secondary microplastic sources.

Where Can I Find it?

https://mp-1.itrcweb.org/

What's Next?

Online trainings on the guidance document are provided quarterly through USEPA CLU-IN platform (https://www.clu-in.org/conf/itrc/Microplastics/). ITRC developed an outreach toolkit and encourages its use to communicate microplastics issues to decision-makers and members of the public. The toolkit is available online.

Movement of microplastics in surface waters.

All figures on this poster are from the ITRC guidance document. ITRC has permission/copyright release forms from each of the creators of the images used. The views expressed in this presentation are those of the ITRC Microplastics Team and do not necessarily represent the views or policies of the USEPA or other associated government agencies.

OUTREACH MATERIALS FOR DECISION-MAKERS

The target audience category "decision-makers" includes state and federal legislators, directors and managers at state and federal agencies, and other leaders (both public and private sector) in the position to influence policy or the allocation of funds to address microplastics. When creating material for decision-makers:

- keep messaging brief
- explain the issue
- state why they should care
- convey how they should act/respond (what should they do?)

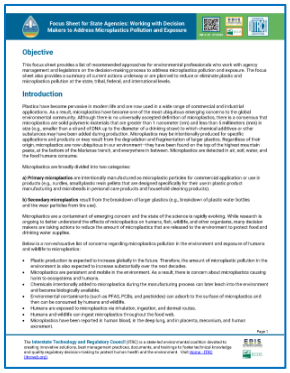
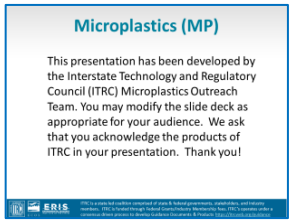
When presenting information on an issue to decision-makers, make sure to include the reasons why the issue is important and actions that can be taken to mitigate the issue. Actions to be taken may include providing information, encouraging further research, providing support or funding, etc.

First and foremost, follow your organization's policies and procedures for legislative contacts! Whether you work for a governmental agency or represent a volunteer organization, your agency likely has a policy or process in place for contact with legislators. Please follow your agency's guidance.

Types of Outreach Materials for Decision-Makers

Fact Sheets

Fact sheets for decision-makers should be focused and short (maximum of one double-sided page). Use color appropriately, and make sure to include figures and graphics to illustrate your points. Additional information can be provided in a background document that answers further questions. Below is a fact sheet for decision-makers and a background document/focus sheet. A list of microplastics outreach materials prepared for all audiences can be found in the index.

		
What Are Microplastics Fact Sheet	Focus Sheet: Working with Decision-Makers to Address Microplastics Pollution and Exposure	Microplastics Presentation

Social Media Materials

Social media posts geared toward a general audience may provide useful information for decision-makers, as well as for their constituents.

Presentations

In some, but definitely not all cases, a slide presentation may be an effective way to provide information to decision-makers. A short (5–10 slide) slide presentation containing concise, bulleted text and interesting images can be used to provide information to decision-makers on an issue, why they should care, and what they can do. The ITRC Microplastics Team created a short presentation to provide a high-level overview on the topic of microplastics and current regulatory actions aimed at addressing this important topic. Users may modify the slide deck as appropriate for their audience. We ask that you acknowledge the products of ITRC in your presentation.

Elevator Speeches

Elevator speeches can be used in situations where there is a brief time allowed to present information. Elevator speeches should be concise and present key messages effectively and efficiently. An example of an elevator speech on microplastics is:

> Plastic pollution isn't just single-use plastics, like water bottles and straws. A big problem is their breakdown into micro- and nanoplastics. These microplastics can then get into the food web, wreaking havoc on the environment and human health. Microplastics also include particles from the wear of tires. We now have concerns related to tire additives called antiozonants that are toxic to fish. More research is needed to determine which plastic additives are detrimental.

Tips for Communication and Engaging with Legislators

Working with legislators is a unique experience. Legislators represent a diverse cross section of society where decisions must consider broad, and sometimes conflicting, societal demands. Legislators are often called upon to be knowledgeable in many diverse topics, while having limited time to learn about the nuances of any one topic. The following are some tips for working with legislators.

First and foremost, follow your organization's policies and procedures for legislative contacts! Whether you work for a governmental agency or represent a volunteer organization, your agency likely has a policy or process in place for contact with legislators. Please follow your agency's guidance.

Strategize your campaign
Timing is important. When reaching out to legislative groups, consider the legislative session calendar and time communication with legislators and their staff accordingly during their less busy times. The following timeframes apply to a federal legislative calendar. For state calendars, timeframes should be adjusted accordingly to align with their legislative calendars.

- The best time to reach out to federal legislative groups is March to June, as that's after the president's budget is released and before the legislative break in August and the end of the fiscal year on September 30th.
- In August, Congress/House staff return to their home states, so it could be effective to try to reach out to members at events while they are at home.

Meeting with legislators
Meeting with staff members can be beneficial even if a specific "action" has not yet been identified, because it establishes a relationship and provides education for them to be better prepared to support

the issue. Congressional staff teams will have a subject matter expert to research and follow up on ideas and material brought to them.

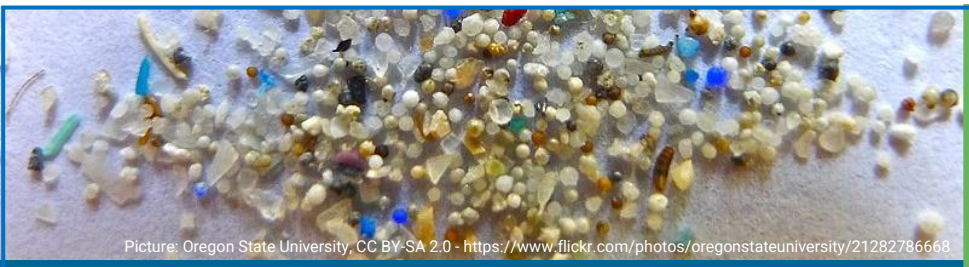
- Typically, 30 minutes are allotted for meetings with a legislative aid, so use your time wisely. Do at most a 10-minute presentation to share the issue, why they should care, and action requested (don't use the whole time on introducing and framing the issue), and use the rest of the time for Q&A.
- Don't just talk at the staffer—have a conversation.
- Tell a story effectively by using statistics/facts, verbally giving high points, and providing a handout with more details. A printed handout of a PowerPoint presentation showing statistics/graphs can be provided when technology is not available for an actual PowerPoint presentation.
- Choose one person in the group to tell the story and hold off on introducing the whole group until the end, if you have time.
- Make connections between microplastics and other issues/chemicals, such as per- and polyfluoroalkyl substances (PFAS) or climate change.
- Follow your agency's or company's process for reaching out to legislative representatives.
- Research your representatives and "Committee of Jurisdictions" chairs by visiting Congress.gov

Provide handouts

- Use colorful, 1–2 page fact sheets that contain succinct information which is general and not too technical.
- Follow up with an email of a digital copy of the handout (easier to access later and easier to email to a committee).
- Graphs with statistics can serve as good visuals.

Tips for Communication and Engaging with Business Leaders and Industry Groups (Private Sector Decision-Makers)

In general, the same stepwise approach to communicating and engaging with legislators applies to communicating and engaging with business leaders and industry groups. One key distinction is that legislators work for the people, and business leaders and, by proxy, industry groups, work for owners/investors whose primary interest is profit. Although decisions that affect profit are a keen consideration for business leaders and industry groups, they also astutely understand the benefits and impacts that their products and services can have on society and the planet, often much more than they are given credit for. This is evidenced in the environmental, social, and governance (ESG) movement, which has propelled dramatic changes in sustainability by publicly held corporations around the world. You will be in a much better position when approaching business leaders and industry groups (and legislators) by understanding that any major business decision made will consider factors such as reputation, liability, profitability, and access to capital (a key reason why ESG ratings carry so much weight in the business world).



Picture: Oregon State University, CC BY-SA 2.0 - https://www.flickr.com/photos/oregonstateuniversity/21282786668

What are Microplastics?

MP-1-19 07/2024

What Are Microplastics?

Microplastics are plastic particles that are greater than 1 nanometer (nm) and less than 5 millimeters (smaller than a strand of DNA and up to the diameter of a straw). This definition includes nanoplastics, which range from 1 nm to 1,000 nm.

What Are Sources of Microplastics?

Primary microplastics are manufactured as raw materials, such as nurdles (small plastic resin pellets designed specifically for use in plastic product manufacturing) and textiles, or for use in other products such as cosmetics and household cleaning products. Secondary microplastics are the result of larger plastic items, such as car tires, cigarette butts, and water bottles, breaking down due to exposure to physical or environmental forces.

Where Are Microplastics?

Microplastics have been accumulating since early plastic production in the 1940s and are ubiquitous in the environment. They are found in drinking water, surface waters, air, soil, living organisms, and in the food we consume. Microplastics accumulate and persist for a long time and can move great distances through different habitats in the environment.

Why Are We Concerned?

- Microplastics can contain or carry harmful chemical contaminants and additives that are introduced into the environment. Due to their small size, humans and other organisms can inadvertently consume, inhale, or ingest these microplastics, and some organisms can mistake them for food.
- Microplastics pose a potential risk to humans and wildlife through exposure to the chemicals in plastic and through physical impact. More research is needed to better understand potential impacts on human health and the environment.
- Organisms (including humans) are exposed to microplastics from many different sources during daily activities via ingestion, inhalation, and sometimes dermal contact.
- Additional research, education, and regulation are needed to reduce and mitigate the presence of microplastics.

Want to Know More?

The Interstate Technology & Regulatory Council (ITRC) has a complete, interactive Microplastic Guidance document available at https://mp-1.itrcweb.org/#gsc.tab=0.

The **Interstate Technology and Regulatory Council** (ITRC) is a state-led environmental coalition devoted to creating innovative solutions, best management practices, documents, and trainings to foster technical knowledge and quality regulatory decision-making to protect human health and the environment. Visit Home - ITRC (itrcweb.org).

Objective

This focus sheet provides a list of recommended approaches for environmental professionals who work with agency management and legislators on the decision-making process to address microplastics pollution and exposure. The focus sheet also provides a summary of current actions underway or planned to reduce or eliminate plastic and microplastics pollution at the state, tribal, federal, and international levels.

Introduction

Plastics have become pervasive in modern life and are now used in a wide range of commercial and industrial applications. As a result, microplastics have become one of the most ubiquitous emerging concerns to the global environmental community. Although there is no universally accepted definition of microplastics, there is a consensus that microplastics are solid polymeric materials that are greater than 1 nanometer (nm) and less than 5 millimeters (mm) in size (e.g., smaller than a strand of DNA up to the diameter of a drinking straw) to which chemical additives or other substances may have been added during production. Microplastics may be intentionally produced for specific applications and products or may result from the degradation and fragmentation of larger plastics. Regardless of their origin, microplastics are now ubiquitous in our environment—they have been found on the top of the highest mountain peaks, at the bottom of the Mariana Trench in the Pacific Ocean, and everywhere in between. Microplastics are detected in air, soil, water, and the food humans and animals consume.

Microplastics are broadly divided into two categories:

a) Primary microplastics are intentionally manufactured as microplastic particles for commercial application or use in products (e.g., nurdles—small plastic resin pellets that are designed specifically for in plastic product manufacturing—and microbeads in personal care products and household cleaning products).

b) Secondary microplastics result from the breakdown of larger plastics (e.g., breakdown of plastic water bottles and tire wear particles from tire use).

Microplastics are a contaminant of emerging concern, and the state of the science is rapidly evolving. While research is ongoing to better understand the effects of microplastics on humans, fish, wildlife, and other organisms, many decision-makers are taking actions to reduce the amount of microplastics that are released to the environment to protect food and drinking water supplies.

Below is a non-exhaustive list of concerns regarding microplastics pollution in the environment and exposure of humans and wildlife to microplastics:

- Plastic production is expected to increase globally in the future. Therefore, the amount of microplastic pollution in the environment is also expected to increase substantially over the next decades.
- Microplastics are persistent and mobile in the environment. As a result, there is concern about microplastics causing harm to ecosystems and humans.
- Chemicals intentionally added to microplastics during the manufacturing process can later leach into the environment and become biologically available.
- Environmental contaminants (such as PFAS, PCBs, and pesticides) can adsorb to the surface of microplastics and then can be consumed by humans and wildlife.
- Humans are exposed to microplastics via inhalation, ingestion, and dermal routes.
- Humans and wildlife can ingest microplastics throughout the food web.
- Microplastics have been reported in human blood, in the deep lung, and in placenta, meconium, and human excrement.

- Vulnerable communities, including those who depend on wild fish and shellfish for their diet, face greater risks to their health and livelihoods from litter and microplastics in marine and freshwater environments.

Recommendations for State Agencies to Address Microplastics Pollution and Exposure

It is recommended that state agencies develop strategies to reduce microplastics pollution and exposure and improve the plastics circular economy. Here's a summary of recommended strategies:

- Implement programs and support legislation to reduce plastic containers and packaging and increase reuse.
- Reduce consumption of plastic products by reducing their appeal to consumers through the development of educational resources and public outreach.
- Improve strategies to collect waste and to manage materials more sustainably to prevent plastic pollution.
- Develop resources for local government agencies to improve recycling of plastic waste.
- Conduct or support the development of life cycle assessments and alternative analysis of plastic products and materials to prevent regrettable substitutions.
- Support research and development (e.g., at state universities) that address microplastic data gaps, technology developments, and more sustainable alternatives.
- Increase stakeholder engagement and collaboration to address microplastics.
- Where practical, align state goals with federal and global recommendations to prevent plastic pollution.
- Enhance public education and engagement with disproportionately affected communities.

Detailed information on prevention and mitigation of microplastics pollution can be found in the Mitigation and Abatement section of the ITRC Microplastics Guidance document.

Summary of Actions Taken to Address Microplastics Pollution and Exposure

States

In 2021, ITRC surveyed agencies from all states in the United States to determine regulatory status for microplastics. The ITRC survey showed that only four of the 26 states that responded had sampled microplastics and none of the states had established a criterion or standard for microplastics in any environmental and industrial media. See Section 5.1 and Appendix B of the ITRC Microplastics Guidance Document for more information about the state survey. U.S. EPA programs associated with the Clean Water Act and the Safe Drinking Water Act include tools available to state agencies to assess and mitigate emerging contaminants, including microplastics. As more information becomes available on the effects of microplastics in the future, it is anticipated that states will have increasing interest in developing regulations on microplastics. Currently, California is the leading state to address microplastics; it has a number of legislative bills addressing the issue (Appendix A.1) The summary of current state-level actions taken on microplastics can be found at Appendix C of ITRC's Microplastics Guidance document.

Tribes

No specific tribal microplastics regulations were enacted prior to the publication of ITRC's Microplastics Guidance document. However, in August 2023 three tribes in the Northwest petitioned the U.S. EPA to ban the use of the chemical 6PPD in tires. The chemical is used as a stabilizer to extend the life of the tire but when 6PPD reacts with oxygen/ozone, 6PPD-quinone is created, which is linked to significant impacts to wild salmon populations. Many tribal entities administer their own regulatory programs, which are generally aligned with the U.S. EPA programs, but as is the case with

6PPD-quinone, reduction of this harmful chemical is likely only if mitigated at a federal level. Many tribes have initiated plastic reduction strategies, single-use plastic bans, and marine debris cleanups. These initiatives are important components for mitigating plastic and microplastics pollution. The summary of current tribal-level actions taken on microplastics can be found at Appendix C of ITRC's Microplastics Guidance document.

Federal

Although there are limited federal regulations that specifically address microplastics, some initiatives and regulations exist to limit or eliminate intentionally added microplastics in consumer products (e.g., microbeads in personal care products). The summary of current federal-level actions taken on microplastics can be found at Appendix C of ITRC's Microplastics Guidance document.

International

The European Commission has a directive to ban certain single-use plastics, and in September 2023 approved regulations to reduce microplastics intentionally added to consumer products. The government of Canada and several countries in Europe and other parts of the world, including India, also have legislative actions or executive orders to reduce or eliminate plastic and microplastics pollution. The summary of current international-level actions taken on microplastics can be found at Appendix C of ITRC's Microplastics Guidance document.

Working with Agency Management and Legislators

State agencies can work with state and federal legislators to develop approaches to address the growing problem of mismanaged plastic waste. State agencies often have agency-specific protocols that must be followed when communicating with legislators. Below is a summary of recommendations for state agency staff when engaging with management or elected officials.

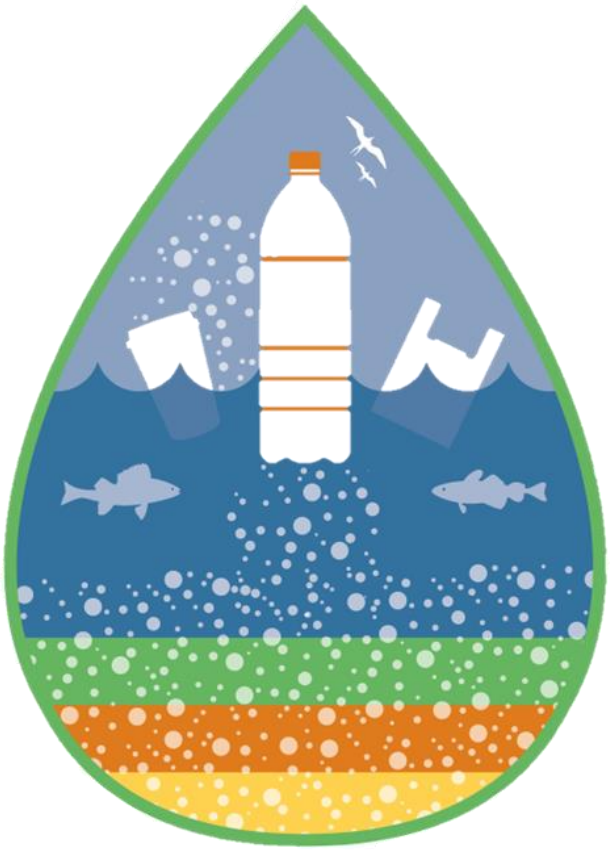
- Prepare a briefing document that answers the following questions:
  - What is the problem?
  - Why should the legislator or director/manager care?
  - What action are you asking for?
  - What is the recommended solution?
- During a meeting with legislative staff or agency management, be prepared to define the problem clearly and summarize key messages quickly. It is important to allow time to answer questions from the legislative staff and agency management.
- If there is existing proposed legislation that addresses the issue:
  - review the proposed legislation to ensure there are no concerns with the current proposal
  - note any concerns with the proposed legislation and summarize recommended amendments
  - discuss the proposed legislation with the legislator to gain their support
- If there are existing programs that address the issue, contact those programs—via phone calls, emails, and meetings—to solicit input on your recommended approaches, proposed actions, and implementation plans.
- If a new program implementation is necessary:
  - prepare a one-page document that summarizes the issue, recommended actions, and the implementation plan
  - prepare talking points for a meeting with agency managers or legislators
  - contact agency managers or legislators to brief them on the issue and the proposed program
  - integrate recommendations into long-term state agency planning documents/action plans to highlight the importance of new program needs, and so the recommendations can be referenced in these plans

Microplastics (MP)

This presentation has been developed by the Interstate Technology and Regulatory Council (ITRC) Microplastics Outreach Team. You may modify the slide deck as appropriate for your audience. We ask that you acknowledge the products of ITRC in your presentation. Thank you!

What's the Big Deal with Small Plastic?

Microplastics (MP)



What are they?

Plastic particles ranging in size from 1 nanometer to 5 millimeters that contain chemical and/or other additives

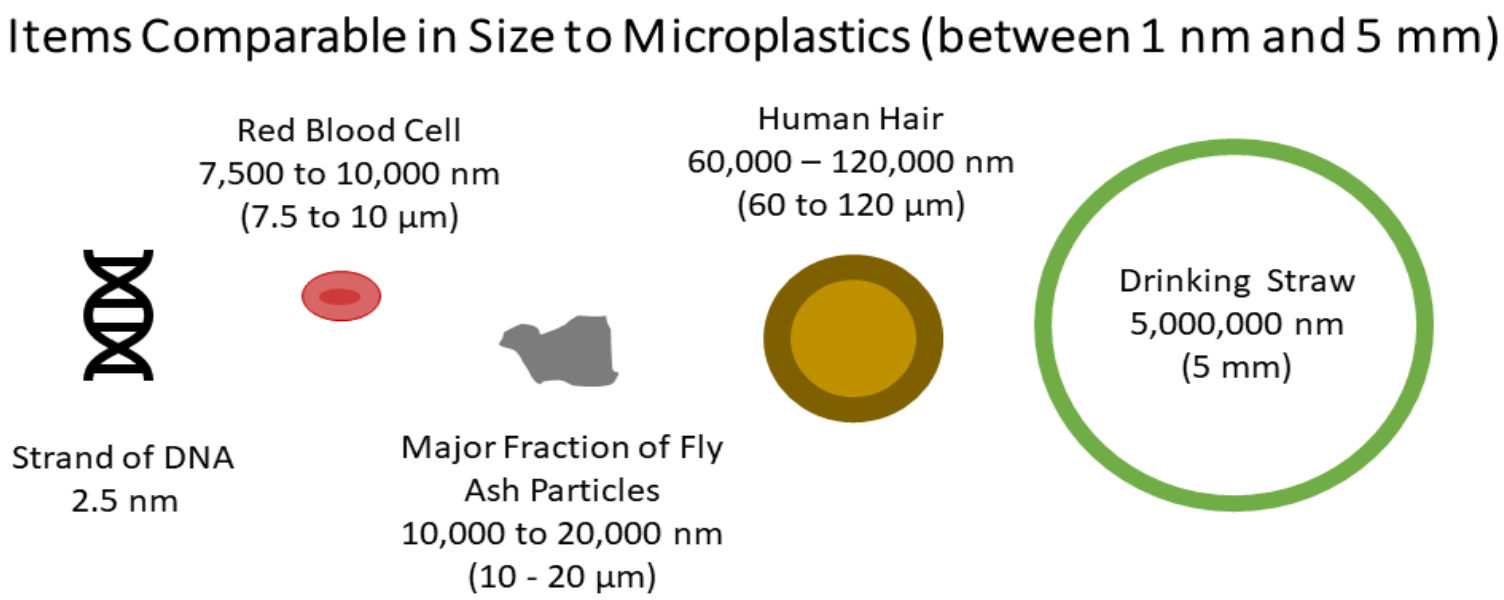
Where do they come from?

Consumer products (primary and/or direct point source) and/or the breakdown of larger plastics (secondary and/or nondirect point source)

Where are they found?

Everywhere. MP have been found in drinking water, the human body, food, air, soil, and in water, to name a few places

Microplastic Size



1,000 nm = 1µm
1,000,000 nm = 1 mm
1,000 µm = 1 mm

ITRC MP Figure 1-2
Source: V. Hanley

What We Know about Microplastics

- Ubiquitous in the environment
- Accumulate & persist in the environment
- Can contain harmful chemical contaminants & additives
- Consumed by humans and other organisms
- Cause adverse health impacts in organisms

Source Top: Flickr, Global Water Forum
Source Bottom: Oregon State University, CC-BY-SA-2.0

Where Are Microplastics Found?

- ITRC MP conceptual site model
- Multifunctional tool
  - Overview information
  - Document navigation

Conceptual Site Model - Point Sources

Marine point sources: Materials lost or discarded from vessels

Stormwater outfalls

Industrial smokestacks

Wastewater outfalls

Conceptual Site Model - Nonpoint Sources

Microplastics transported through atmosphere and deposited far away from the source

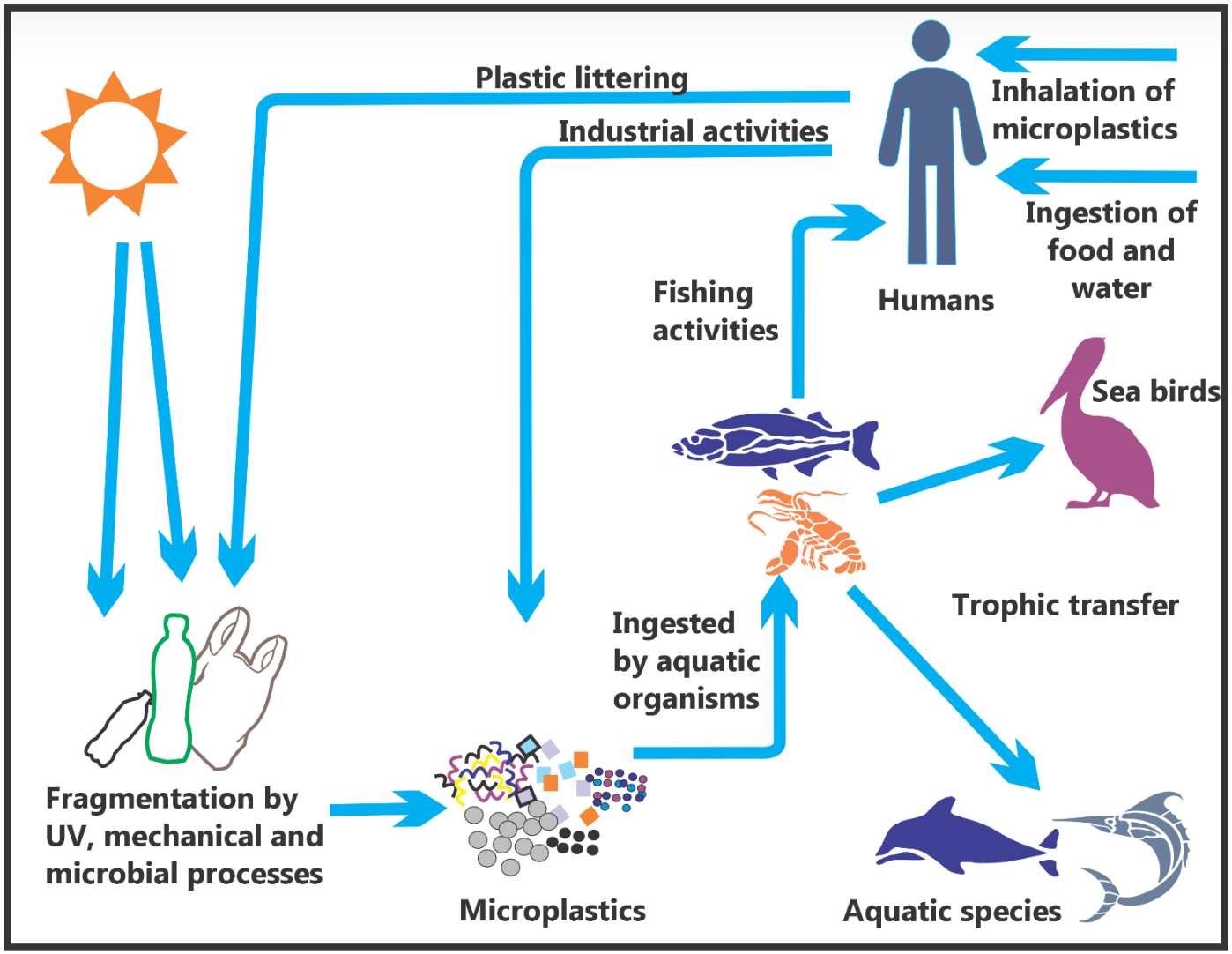
(Macro)plastic trash washes into the ocean, then breaks down into smaller pieces, eventually becoming microplastics

Microplastics generated through typical tire wear and breakdown of roadway materials

Microplastics present in household products such as toothpaste or facial cleaners. Microplastics generated through household activities such as laundering of clothing

Microplastics present in agricultural lands due to direct application of fertilizer pellets, biosolids from wastewater treatment plants, or breakdown of plastic sheeting

Why Should We care?



ITRC MP Figure 4-2

Challenges in Toxicity Research

- Exposure ≠ Adverse health effect
- Numerous nonhuman mammalian studies available but methodologies vary
- Uncertainties due to study design, exposure concentration, data quality, reporting, data gaps
- Not enough information to establish toxicity criteria to use in environmental or human health risk assessment

Source: Thornton Hampton et al. 2022

What Is Being Done?

- Local actions
- State actions
- Federal actions
- International actions

Local Actions

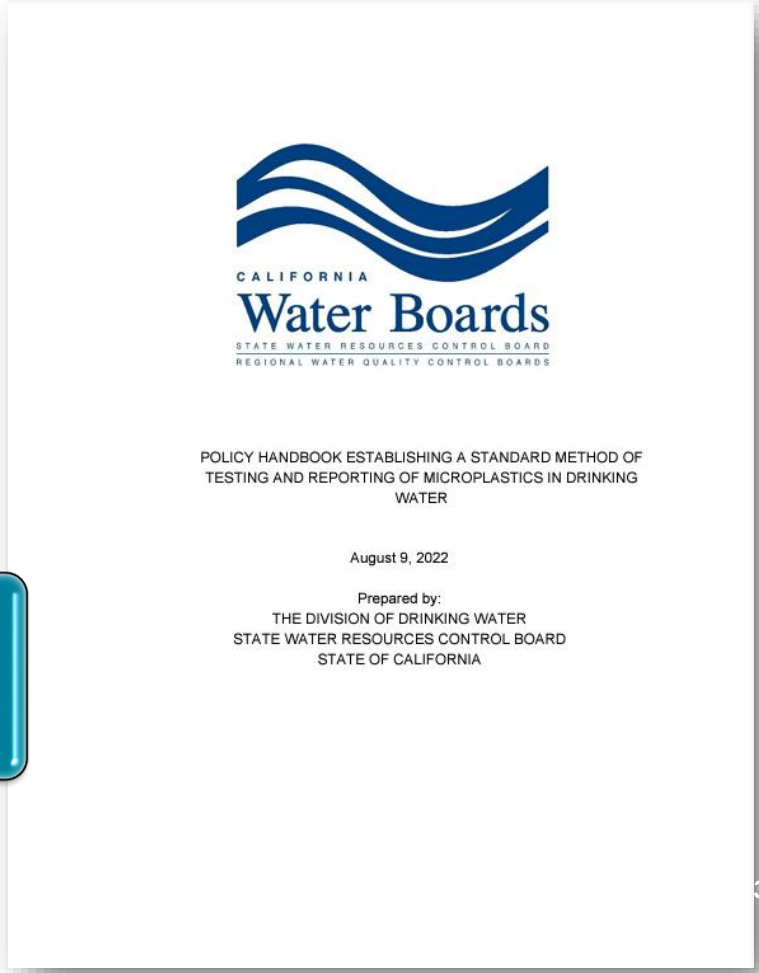
Single-Use Plastic Bans

Photo credit: Rob Barnes, Grid Arendal

State Actions

California Safe Drinking Water Act: Microplastics

- Adopt a definition of microplastics in drinking water
- Adopt a standard methodology to test drinking water for microplastics
- Establish requirements for four years of testing and reporting microplastics in water


CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

POLICY HANDBOOK ESTABLISHING A STANDARD METHOD OF TESTING AND REPORTING OF MICROPLASTICS IN DRINKING WATER

August 9, 2022

Prepared by:
THE DIVISION OF DRINKING WATER
STATE WATER RESOURCES CONTROL BOARD
STATE OF CALIFORNIA

[CA Health and Safety Code 116376]

State Actions

Statewide Microplastics Strategy - 2 Track Approach

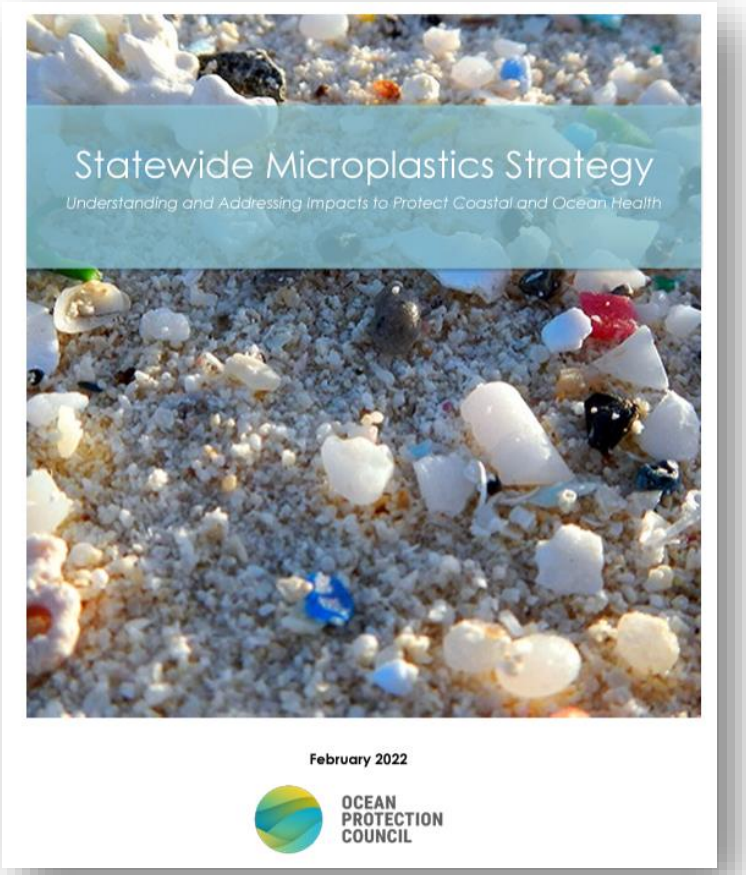
Track 1: Solutions

- **Pollution prevention**
- **Pathway interventions**
- **Outreach & education**

Track 2: Science to inform future action

- **Monitoring**
- **Risk thresholds & assessments**
- **Sources & pathways prioritization**
- **Evaluating new solutions**

[CA Public Resources Code, Division 26.5, Chapter 3.2]

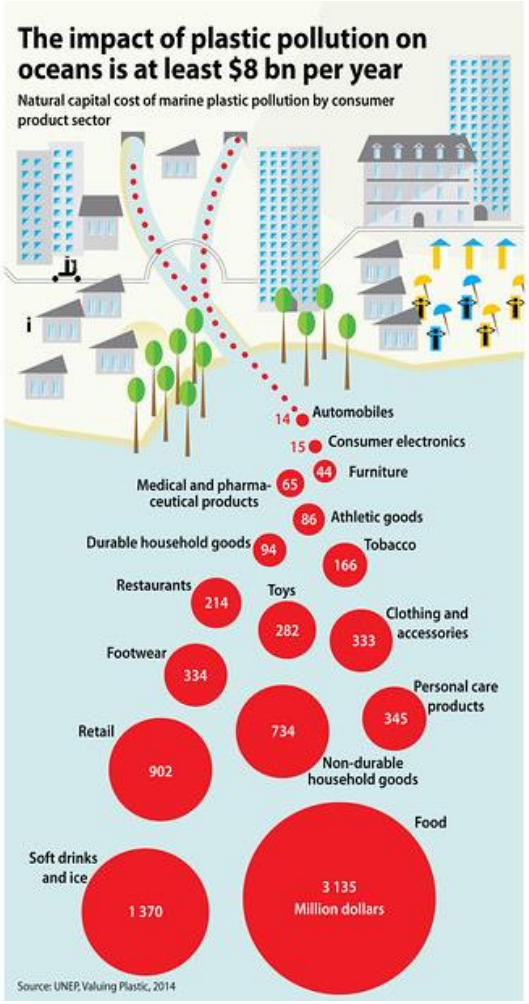


Federal Actions
Save Our Seas 2.0 Act

(Public Law 116-224)

Three main goals of Act

- Combat marine debris
- Enhance global engagement
- Improve domestic infrastructure



Source: https://www.grida.no/resources/6912 (Maphoto/Riccardo Pravettoni)

International Actions: European Union

European Chemicals Agency proposes restriction on intentionally added microplastics to consumer and professional products

2019

Approved by European Parliament and the Council

2023

International Actions- UN Plastics Report

Purpose of report:

- Designed for decision-makers & stakeholders
- Explains the changes surrounding plastics
  - Market shifts
  - Policies
- Goal is to end plastic pollution

Today's Plastics Are Tomorrow's Microplastics – How Do We Manage Them?

- Identify & remediate point sources of pollution
- Understand fate & transport of microplastics
- Establish thresholds for toxicity for human health and the environment
- Responsible:
  - Governing bodies
  - Consumerism
  - Manufacturing
  - Recycling

Technical Guidance:

Web-based document: https://mp-1.itrcweb.org

Outreach Materials

Following is a list of microplastics outreach items developed by the ITRC Microplastics Toolkit.

Index of Microplastics Outreach Materials

#	Fact Sheet Title	Target Audience	Description
MP-1-1	Microplastics: The Basics You Need to Know	All Audiences	One-page fact sheet that provides a general overview of microplastics.
MP-1-2	Sources of Microplastics	All Audiences	One-page fact sheet providing details about different sources of microplastics. Pairs nicely with MP-1-5 graphic.
MP-1-3	How You Can Help Reduce Microplastics	All Audiences	One-page fact sheet that provides information on actions individuals can take to reduce microplastics in the environment.
MP-1-4	Microplastics Resources for Educators	General Audience	One-page fact sheet focusing on introducing microplastics and resources for educators of K-12 students. Includes a link to MP-1-23, a spreadsheet listing educational resources for K-12 and other educators.
MP-1-5	Sources of Microplastics Graphic	All Audiences	One-page fact sheet providing a visual example of the different routes/sources from which microplastics can enter the environment. Pairs nicely with MP-1-2.
MP-1-6	Microplastics are Everywhere Graphic	All Audiences	One-page fact sheet containing a graphic highlighting the six microplastics key messages developed by ITRC.
MP-1-7	Today's Plastics are Tomorrow's Microplastics Graphic	All Audiences	One-page fact sheet containing a brief overview and history of microplastics.
MP-1-8	Tired of Plastics Graphic	All Audiences	One-page fact sheet containing a graphic related to reducing plastics in the environment.

MP-1-9	Help Keep Microplastics Out of Your Body–Graphic	All Audiences	One-page fact sheet containing a graphic related to reducing your intake of microplastics.
MP-1-10	Microplastics Are in Creatures Great and Small Terrestrial–Graphic	All Audiences	Graphic highlighting land-based animals.
MP-1-11	Microplastics Are in Creatures Great and Small Aquatic–Graphic	All Audiences	Graphic highlighting aquatic animals.
MP-1-12	Microplastics Are in Creatures Great and Small Avian–Graphic	All Audiences	Graphic highlighting birds.
MP-1-13	Microplastics Are in Creatures Great and Small (and Deep)	All Audiences	Graphic highlighting invertebrates from the Mariana Trench.
MP-1-14	Sampling and Analysis Fact Sheet	Scientists and Regulators	Two-page fact sheet providing an overview of considerations for sampling and analysis of microplastics in the environment.
MP-1-15	Use Comparable Units for Microplastics Data Reporting Fact Sheet	Scientists and Regulators	Two-page fact sheet highlighting challenges in comparing studies due to lack of harmonization on units used to describe microplastics.
MP-1-16	Exposure to Microplastics and Associated Effects Fact Sheet	Scientists and Regulators	Two-page fact sheet summarizing exposure pathways for humans and known ecological health effects.
MP-1-17	Data Gaps and Future Research Needs Fact Sheet	Scientists and Regulators	Two-page fact sheet providing a summary of research needs with a focus on how microplastics move through the environment.
MP-1-18	Types of Microplastics: Primary vs Secondary Microplastics Fact Sheet	All Audiences	One-page fact sheet that discusses primary and secondary microplastics and their respective sources.
MP-1-19	What Are Microplastics Fact Sheet	All Audiences	One-page fact sheet with broad overview of microplastics.
MP-1-20	Focus Sheet: Working with Decision-Makers to Address Microplastics Pollution and Exposure	Decision-Makers	Three-page summary of background microplastics information and regulations related to plastics and microplastics both nationally and internationally This sheet would be useful for staff preparing to present

			to management on issues related to microplastics.
MP-1-21	Microplastics Poster	Scientists and Regulators	Scientific poster that highlights the ITRC Microplastics Technical Guidance.
MP-1-22	Microplastics Presentation	Scientists, Regulators, and Decision-Makers	Approximately 15-minute presentation that presents issues related to microplastics. Slides and speaker notes included.
MP-1-23	K-12 Resource List	K-12 and Other Educators	A spreadsheet with links to more than 25 K-12 educational resources, including curricula, fact sheets, videos, and more.

Message Map Tool

Type of Audience:	**Question/Concern/Issue:**	
Key Message/Fact 1:	**Key Message/Fact 2:**	**Key Message/Fact 3:**
Keywords/Supporting Fact 1.1:	**Keywords/Supporting Fact 2.1:**	**Keywords/Supporting Fact 3.1:**
Keywords/Supporting Fact 1.2:	**Keywords/Supporting Fact 2.2:**	**Keywords/Supporting Fact 3.2:**
Keywords/Supporting Fact 1.3:	**Keywords/Supporting Fact 2.3:**	**Keywords/Supporting Fact 3.3:**

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A full list of references is included in the ITRC Microplastics Guidance. Each fact sheet and graphic in this toolkit has a link to the guidance, either via a URL or a QR code.