

Plastic Pollution: A Global Challenge, A Community Opportunity



Jane Dow
Mankato Area Zero Waste
Beyond Plastics Mankato Area



Overview

- The Problem – Global Plastic Pollution
- Why Should You Care?
- Taking Action: What Can We Do?
- Why Should We Do It?
- Next Steps

LOCAL ACTION. GLOBAL IMPACT.

Small choices in our community create a cleaner, healthier planet.

The Problem: Global Plastic Pollution

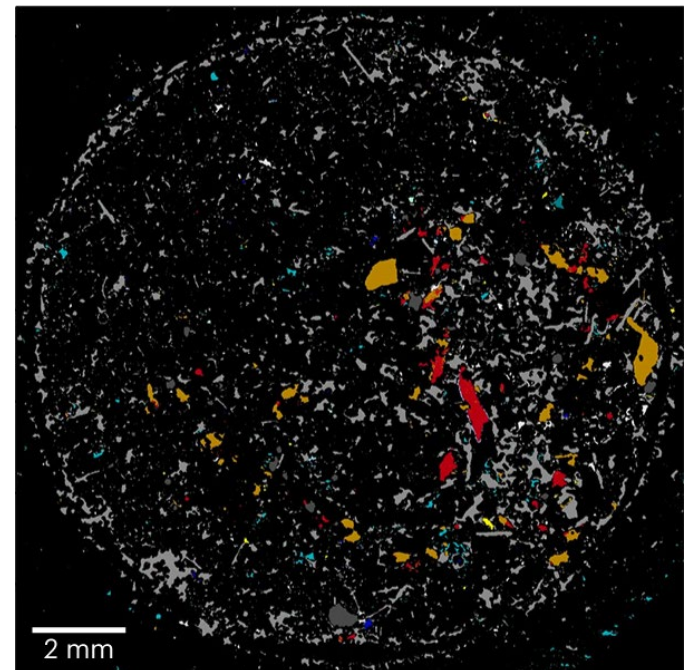
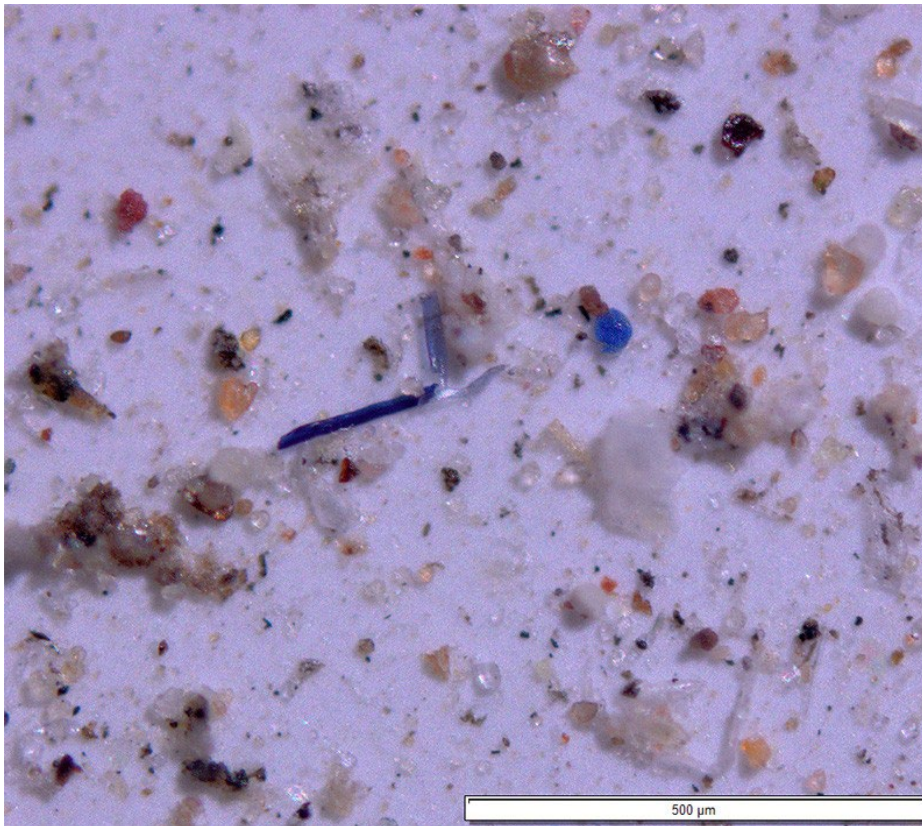
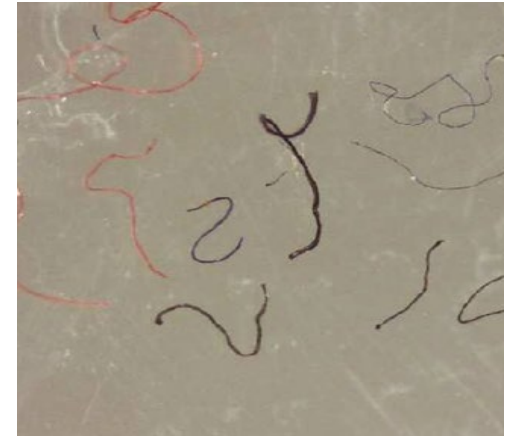
Nearly 9 billion tons of plastic have been produced since 1950.

Plastic is made from fossil fuels – mainly ethane and 16,000 chemical additives.



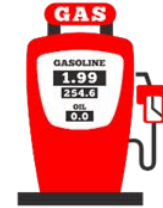
- Plastics never completely break down.
- Microplastics - smaller than five millimeters (about the size of a pencil eraser).
- Nanoplastics - the size of a bacterium or virus and not visible to the naked eye

Microfilaments - upholstery, carpet, clothing

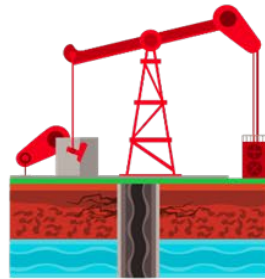


What's The Petrochemical Industry Thinking?

PLAN A



PLAN B



By 2021, 85% of the new power built ran on renewable energy.

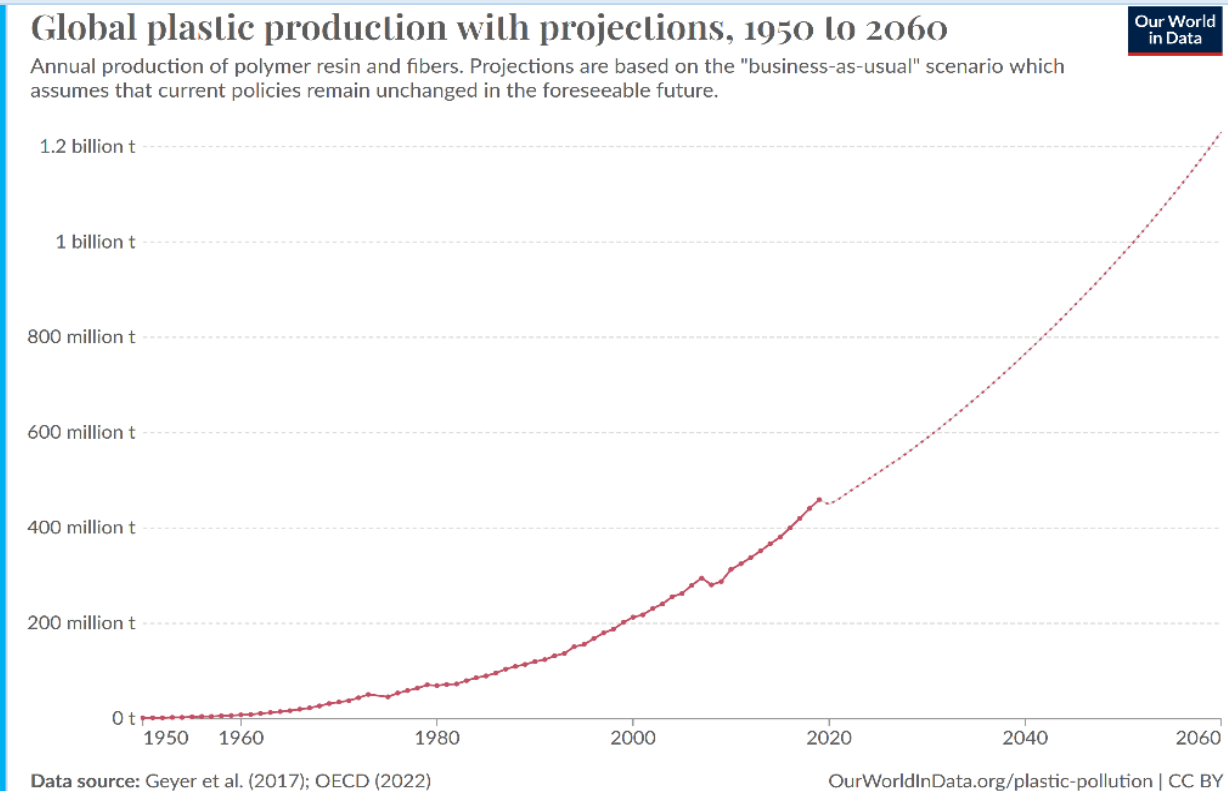
Solar costs fell by 90% over the past decade and solar is now widely used.

Electric cars, solar, wind and geothermal energy have caused fossil fuel demand to fall.

Plastic is the Oil & Gas industry's Plan B. They see 80 percent of their growth potential as “dependent on single-use plastics applications.”

Unfortunately, their Plan B means game over on climate for all of us if we allow it to move forward.

Production will triple by 2060 to 1.2 billion metric tons



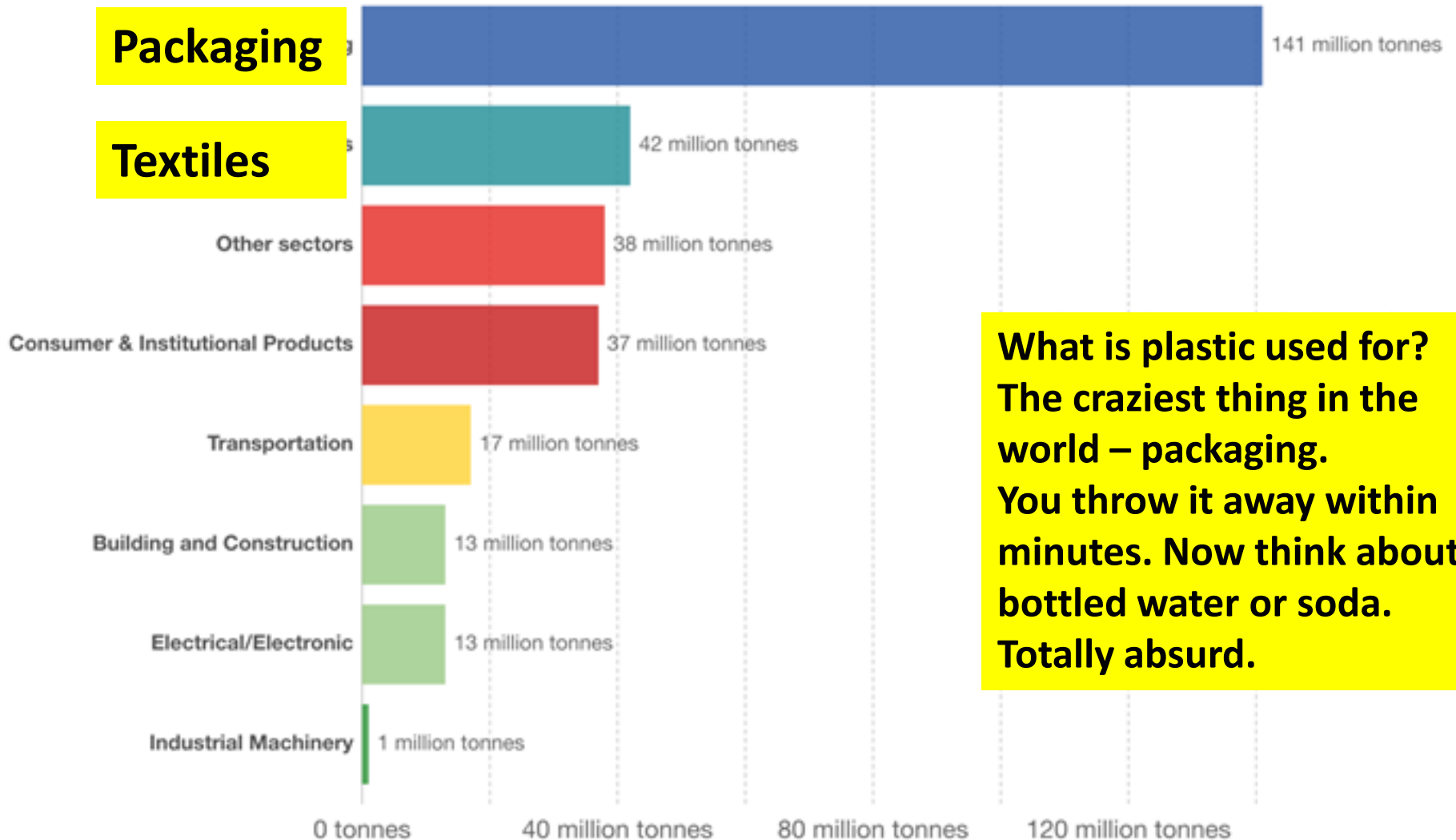
- World production - over 460 million metric tons of plastic in 2019.
- 52 million metric tons a year of plastic pollution, enough to fill New York's Central Park with plastic waste as high as the Empire State Building – expected to triple by 2060.
- U.S. the plastic industry emissions - **32 million tons of GHG a year equal to CO2 emissions from 50 million cars and predicted to outpace coal emissions by 2030.**
- **By 2050, world GHG emissions 15 to 20% of the remaining carbon budget.**

40% OF PRODUCTION IS THROWAWAY PACKAGING

Plastic waste generation by industrial sector, 2015

Global plastic waste generation by industrial sector, measured in tonnes per year.

Our World
in Data



**What is plastic used for?
The craziest thing in the
world – packaging.
You throw it away within
minutes. Now think about
bottled water or soda.
Totally absurd.**

Why Should You Care?

“The level of scientific certainty is absolute. **that plastic causes disease, disability, premature death, economic damage and damage to ecosystems at every stage of its life cycle (\$1.5 trillion in health care costs in 2015).**

If we don't stop releasing these pollutants into our environment now, we may **pass the tipping point that would cause eco-system collapse, making continued life on earth tenuous.”**

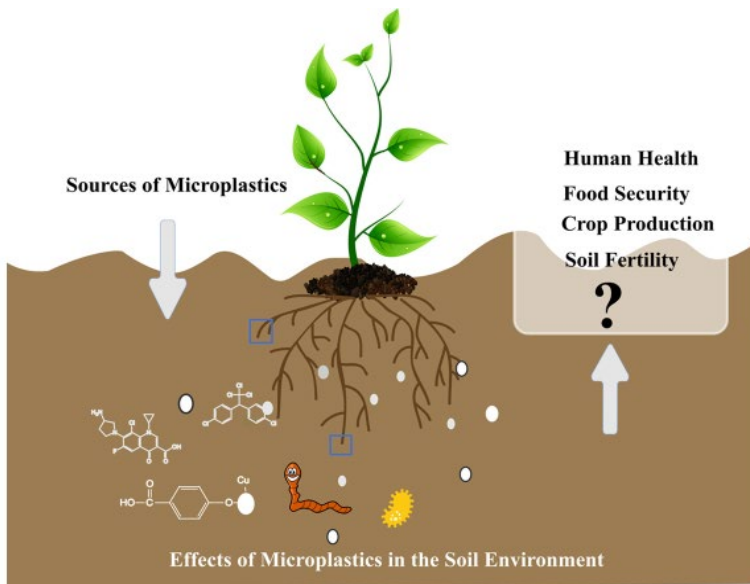
- **Dr. Philip Landrigan**, renowned Epidemiologist and Pediatrician, Professor & Chair Emeritus of Environmental Medicine at Icahn School of Medicine at Mount Sinai



16 to 32 million tons per year



Microplastic in Plants



10 to 25 million tons enter the ocean yearly,
equal to about 2 dump trucks a minute.

(www.beyondplastics.org)

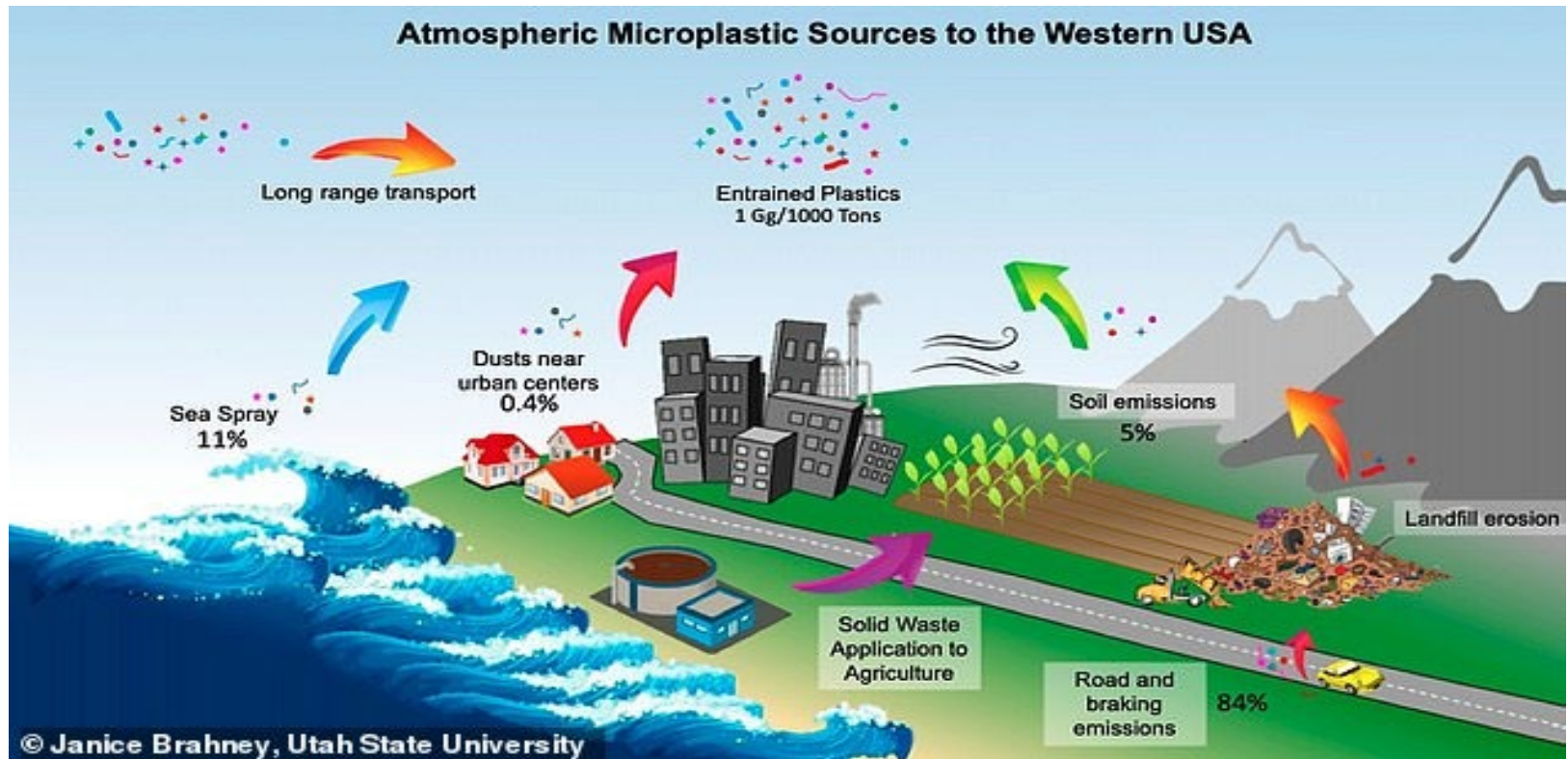


Albatross feeding chick plastic on the Atoll Islands north of Hawaii

100 million marine animals die a year,
1000 turtles die yearly from entanglement



Microplastics are carried by dust globally.



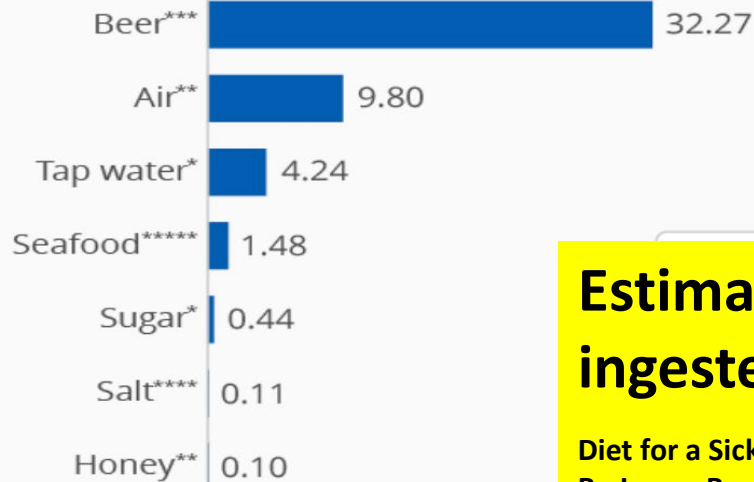
We breathe in 272 microplastics a day from plastic carried in dust from:

- Tires on the road
- Agricultural soil
- Sea spray

MICROPLASTICS IN FOOD AND DRINKS

Average number of microplastic particles found per gram/liter/m³ of selected consumables

Bottled water



Estimated annual microplastic particles ingested or inhaled per person 3.8 million

Diet for a Sick Planet: Studies Find More Plastic in Our Food and Bottled Water
By James Bruggers, January 10, 2024

<https://www.consumerreports.org/health/food-contaminants/the-plastic-chemicals-hiding-in-your-food-a7358224781/>

* Based on 1 study
** Based on 2 studies
*** Based on 3 studies
**** Based on 4 studies
***** Based on 14 studies



Source: 'Human Consumption of Microplastics', Cox et al.
in Environmental Science & Technology (2019)

statista

250,000 to 500,000 nanoplastics per liter of bottled water
Stop drinking bottled water to protect your health.

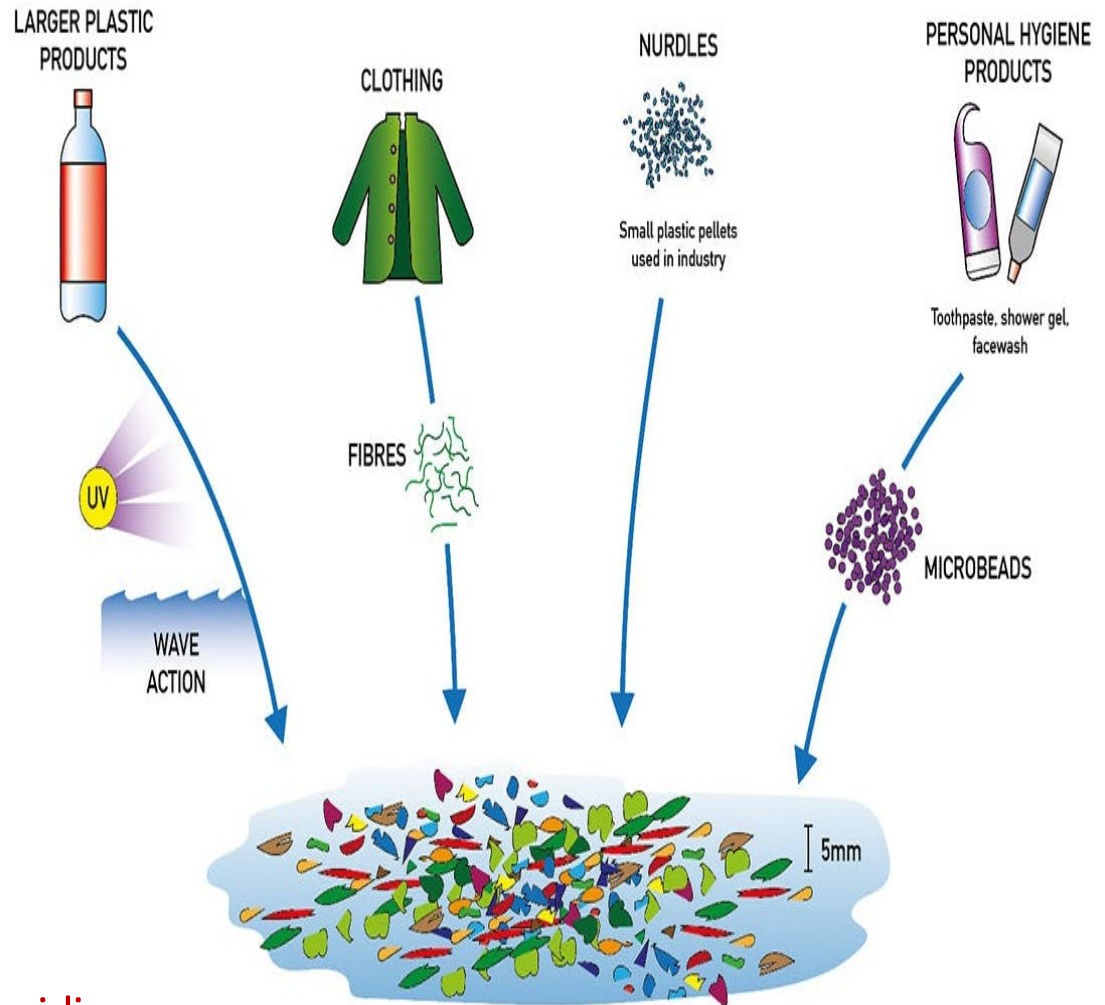
<https://www.bloomberg.com/news/articles/2024-01-08/bottled-water-contains-previously-undetected-nanoplastics>

Microplastics in Our Homes

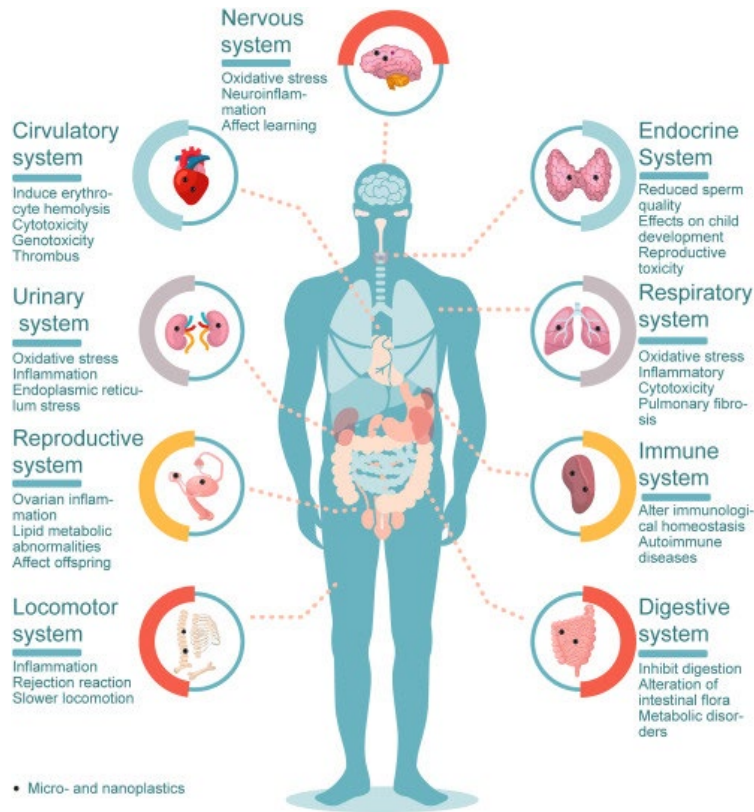
Food containers
Beverage bottles
Plastic wrap
Cleaning supplies
Polyester clothing
Polyester textiles
Paints
Vinyl Flooring and siding
Shower curtains
Polyester Carpets & furniture

Replace with:

Glass or steel containers
Compostable bags
Aluminum foil wrap or plate
Baking soda and vinegar
Cotton, linen and wool clothing
Clay paint
Cork, bamboo or wood flooring
Cotton or linen shower curtain
Cotton or wool carpets
Wood, metal, concrete or stucco siding



NANOPLASTICS EFFECTS IN OUR BODIES



Cancer – [National Institute of Health, Sept 2022](https://www.nationalinstituteofhealth.nih.gov/news-events/press-releases/stories/2022/09/220901_cancer_nano)

Intestinal diseases - lowered immune system – damage to mucous lining and bacterial flora
<https://pmc.ncbi.nlm.nih.gov/articles/PMC9552327/>

Inflammatory bowel disease -
<https://pubmed.ncbi.nlm.nih.gov/34935363/>

Alzheimer's disease – incr. nanoplastics in brain
<https://www.medicalnewstoday.com/articles/dementia-are-microplastics-accumulating-in-our-brains-a-risk-factor>

Parkinson's disease
<https://www.nih.gov/news-events/nih-research-matters/nanoplastics-may-help-set-stage-parkinson-s-risk>

Strokes and heart attacks – higher levels of microplastics in artery plaque
<https://www.nejm.org/doi/full/10.1056/NEJMoa2309822>

Infertility – decline in sperm quality and quantity
<https://www.plasticpollutioncoalition.org/blog/2024/6/14/plastic-harms-mens-fertility-how-to-protect-your-health>

Learning disabilities – damage to hippocampus memory center
<https://www.sciencedirect.com/science/article/pii/S0304389422002199>

Over 16,000 chemicals are intentionally added

PLASTIC CHEMICAL SAMPLER

CHEMICAL GROUP Example	WHAT THEY DO	PRODUCT TYPE	HEALTH HARMS
BISPHENOLS & PHTHALATES • PLASTICIZERS • "Everywhere chemicals" • "BPA-free" does not mean safe. Industry replaces BPA with other toxic bisphenols.	BISPHENOLS #3, #7 Makes plastic clear, rigid, shatterproof	BISPHENOLS Plastic drink bottles, polycarbonate & other containers, clamshells, baby bottles, sippy cups	Pseudo-POP: We eliminate them (through urine) but get daily exposures so we have a constant body-store of them. • EDC, Obesogen • Metabolic Disruptor • Reproductive Disruptor • Neuro-Disruptor • Cardiovascular Disruptor • Carcinogen
	PHTHALATES #3 Makes plastic clear, soft, supple & flexible	PHTHALATES Plastic wrap & bags, shower curtains, toys	 • EDC, Obesogen • Metabolic Disruptor • Reproductive Disruptor • Neuro-Disruptor • Cardiovascular Disruptor • Carcinogen
PFAS/PFOA • PLASTIC COATINGS • Slippery, shiny, non-stick chemicals • "Forever Chemicals"	• Makes food packaging & synthetic (plastic) textiles WATER & GREASE RESISTANT • Keeps plastic from sticking to machinery	Lining of cans, cups, fast food packaging, take-out containers, water bottles,, condiment packets, chip & snack bags, paper and plastic wrappers; textiles	 • EDC, Obesogen • Metabolic Disruptor • Reproductive Disruptor • Neuro-Disruptor • Cardiovascular Disruptor • Carcinogen
FLAME RETARDANTS	• Prevents plastic from catching fire	Almost all products	 • EDC & same as above. Lowered I.Q.
HEAVY METALS • Lead • Mercury • Cadmium and others	• Adds color! • Makes plastic soft, pliable • Catalyzes (kick starts) other chemical reactions used to make plastic	Almost all products	• Neurotoxin Lower IQ, Learning & attention, psych & behavioral disorders • Carcinogen

RECYCLING IS A MYTH

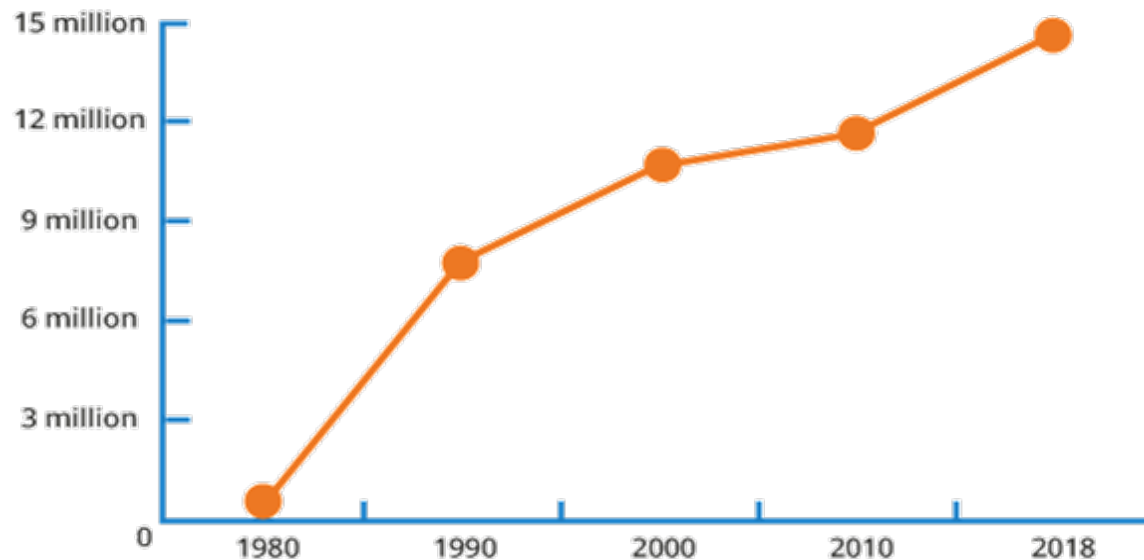


- A U.S. recycling plant creates about 400,000 tons of microplastics a year = about 29,000 dump trucks of microplastics.
- We shipped 1.4 billion pounds of plastic trash overseas in 2020 (50% of our throwaway plastic).

(www.beyondplastics.org)

The Plastics Industry's Continued Expansion Threatens Our Ability to Avoid Climate Crisis

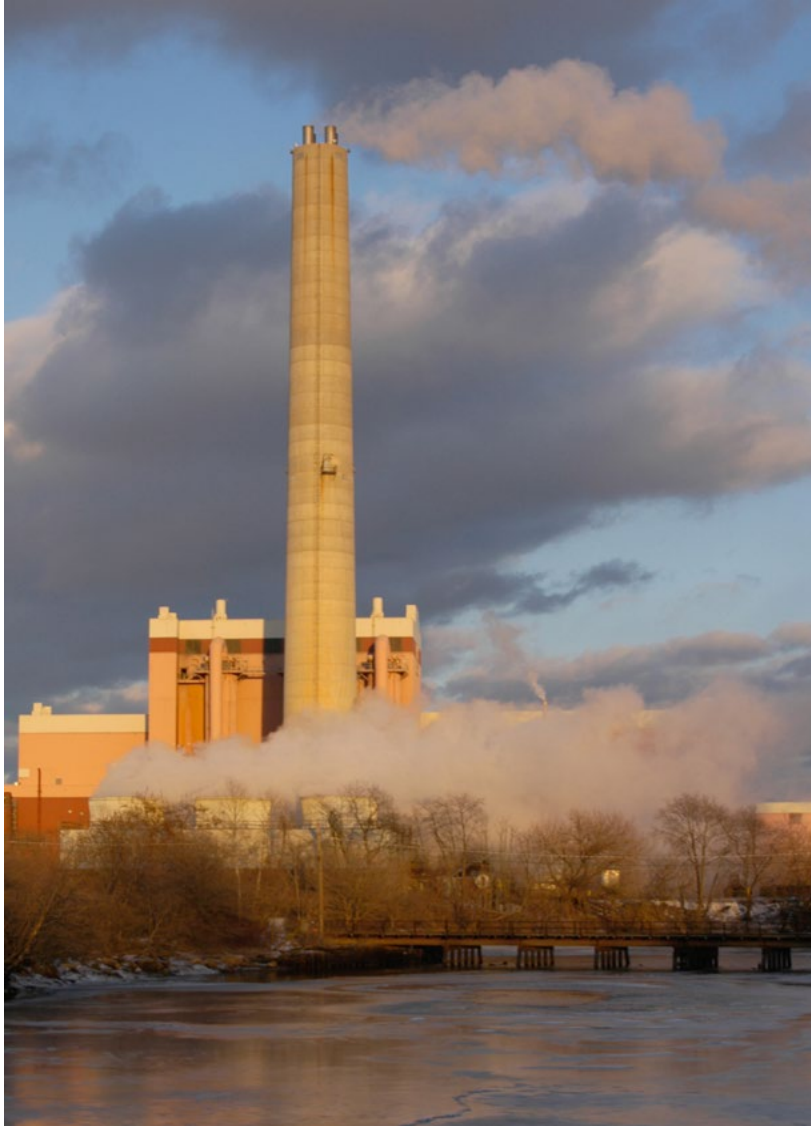
CO2E RELEASED FROM U.S. PLASTIC WASTE INCINERATION MEASURED IN TONS



It has the highest climate impact of any waste management.

12% is burned in 66 incinerators emitting toxic pollution = 14 million tons of CO2 a year = 1.6 million cars driven for a year

Chemical Recycling Is Not the Answer!



- Turns plastic into dirty diesel fuel, chemicals and gases
- Toxic emissions – dioxin, Benzene, GHG, carcinogens and other toxic emissions
- Only about 15% of plastic collected turned into plastics.
- Health effects - cancer, nervous system, reproductive, developmental, organ damage.
- Only recycle 1.3 % of plastics
- Projects, if built, could emit more than 18 million tons of greenhouse gases per year.

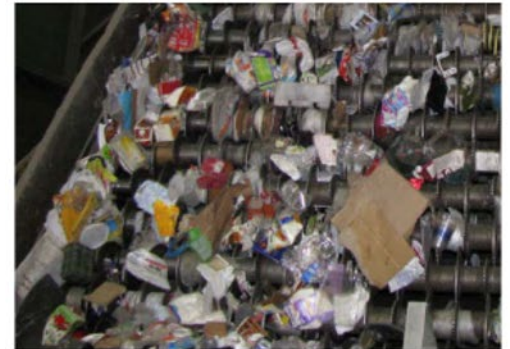
Taking Action: What Can We Do?

Reduce Local Plastic & Other Waste

For starters, target local sources of plastic waste – SINGLE-USE CARRYOUT BAGS.

- 1) Reduce litter in streets, parks, waterways, and stormwater systems.
- 2) Reduce waste.
 - Minnesotans throw away 87,000 tons of plastic bags each year. Less than 5% of plastic bags are recycled.
- 3) Improve efficiency of recycling centers.
 - Recycling centers spend 4-6 hours a day removing plastic bags from equipment.
- 4) Life-cycle environmental impacts.
 - Takes 500 to 1000 years to break down, releasing ethylene and methane, both toxic gases.

Impose local **DISPOSABLE CARRYOUT BAG FEE.**



Why Should We Do It?

A majority of Americans (85%) think that plastic waste pollution is a serious problem that requires immediate political action to solve.

We have gathered 500 Mankato signatures on a resolution to put a fee on plastic bags and skip the stuff.



Why Put a Fee on Disposable Carryout Bags?

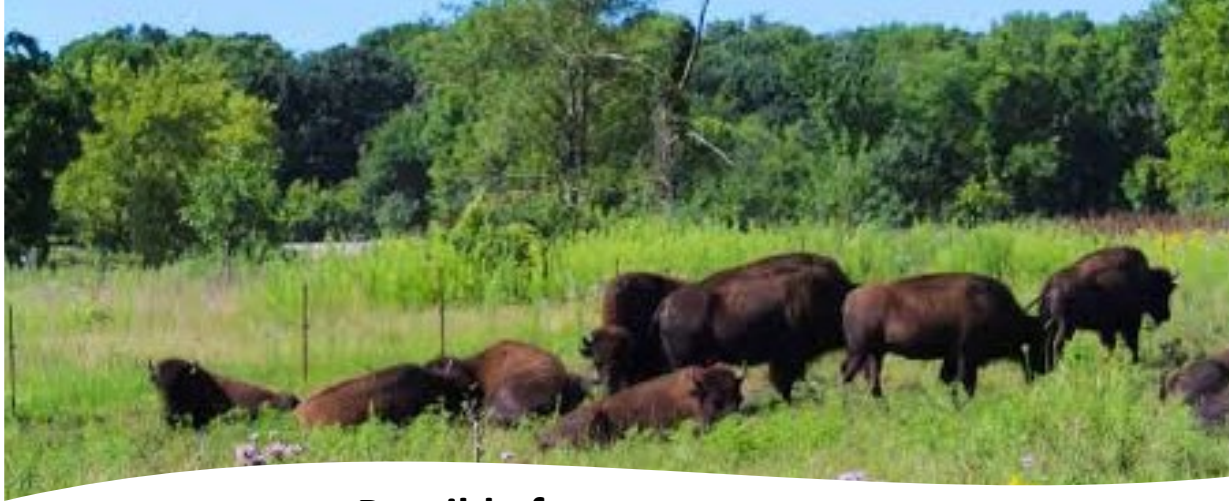
- Curb local plastic pollution.
 - Plastic bags are one of the top five items found during beach and river cleanups.
 - Plastic bags clog sewer drains and recycling equipment, and result in microplastics in our water supply.
 - Environment Minnesota Research and Policy Center tested 40 Minnesota lakes, rivers and streams and found microplastics in everyone of them, including Blue Earth River, Minnesota River and Lake Crystal.
<https://minnesotareformer.com/briefs/report-found-microplastics-in-minnesota-rivers-lakes-in-all-samples-tested/>
<https://publicinterestnetwork.org/wp-content/uploads/2025/10/MNE-Microplastics-Report-Oct25-1.1.pdf>
- Create additional revenue stream for City and local businesses.
- Spread awareness of plastic pollution harms.
- Support local waste-reduction and education programs.
- *Lead the way!*



BAG FEE FACTS

- Over 200 counties and municipalities, plus 12 U.S. states and several U.S. territories, have bag fees or bans.
- 101 countries have bag bans, with varying degrees of enforcement, and 32 countries have bag fees.
- Bag fees range from 5 to 25 cents.
- In Minneapolis, wholesale bag costs are 1.5 to 2.5 cents per plastic bag, and 3 to 5 cents per paper grocery bag. After the fee, the net profit per bag is approximately 2.5 to 3.5 cents. On paper bags, businesses break-even or have a very small profit/loss.
- Minneapolis, Duluth, and Edina charge 5 cents for carryout bags.
- Bag use has dropped an average of 65 to 85% in locations with bag fees.





Mankato characteristics
that make community-
led environmental
change possible:

1. Engaged citizens
2. Strong local
institutions
3. Thriving downtown
4. Commitment to
protect the places
people love

Possible fee:

- Customers are charged 10 cents for every disposable check out bag they receive. 4 cents is retained by the retailer to offset implementation and administration costs. 6 cents is remitted to the City each quarter. The fee applies to all retail stores.

Possible Exemptions:

- Reusable bags
- Produce bags
- Bags for meat, fish, bakery items, and bulk foods
- Pharmacy bags
- Dry-cleaning and garment bags
- Small paper bags (such as many lunch sacks)
- Customers participating in federal or state food assistance programs (such as SNAP or WIC)

REQUIREMENTS FOR RETAILERS

- Charge the required fee on applicable bags.
- Display signs informing customers of the fee.
- Show the number of disposable bags and total fee on customer receipts.
- Submit the city's share of the fee each quarter.
- Use paper checkout bags that are 100% recyclable and contain at least 40% post-consumer recycled content.

CITY'S USE OF REVENUE

- Purchasing and distributing reusable bags
- Public education and outreach
- Community cleanup events
- Waste reduction initiatives
- Recycling and litter-prevention infrastructure
- Reducing impacts to stormwater systems
- Administration and enforcement of the ordinance

SAMPLE PROFITS FROM BAG FEES

- Washington D.C. - 5-cent fee since 2009 - \$1.8 million to \$2 million annually - Businesses remitted \$1,783,172.25 to the city in 2024 - 75% of residents used fewer bags - The money goes to a river cleanup fund.
- Fairfax County Virginia – 5 cent bag fee since 2022 - 7 million fewer bags have been used –The \$10 million in revenue funds environmental education programs, pollution and litter mitigation and cleanup efforts, and the distribution of reusable bags to residents in need.
- Denver, CO - 10-cent bag fee since 2021 generated – 211 million fewer bags (300 bags per resident) - \$5.76 million in revenue over 3 years - The city kept 6 cents per bag, utilizing the funds for free reusable bag programs, recycling, and composting services; Denver offering up to \$600 worth of reusable service ware, such as plates, cups and cutlery to small retail businesses and a reusable cup program for large events to switch from disposable cups to reusable ones.
- Boulder, Colorado – 10 cent fee since 2012 - 70% reduction in plastic bag use - By 2018, \$1 million in revenue which was reinvested into waste-reduction and environmental programs like purchasing reusable bags for the community and food banks; compostable bin liners for businesses; community education
- Edina – 5 cent bag fee since 2025, \$124,062 in collected fees – Businesses keep the fee.

POTENTIAL START UP COSTS

1. **Legal and Ordinance Drafting (\$2,000 - \$5,000)** Staff Time: City Council and city attorney hours required to draft the ordinance text, hold public hearings, and formally adopt the policy. Precedent Savings: Mankato can heavily reduce this cost by mirroring existing, tested ordinance language from Edina's Carryout Bag Fee policy or Minneapolis's "Bring Your Own Bag" ordinance.
2. **Public Education & Business Outreach (\$5,000 - \$12,000)**
3. **Retailer Toolkits (\$3,000 - \$6,000):** Creating and distributing physical and digital packets to Mankato's retail, grocery, and dining establishments. These kits include point-of-sale register signage explaining the fee to customers.
4. **Community Awareness (\$2,000 - \$5,500):** Designing a dedicated city webpage with FAQs, running local press releases, and collaborating with local environmental groups like Mankato Area Zero Waste to distribute free reusable bags to low-income residents.
5. **Translation Services (\$500 - \$1,000):** Translating compliance materials into multiple languages to support Mankato's diverse business owners and residents.
6. **Compliance Setup & Administration (\$1,000 - \$6,000)**
7. **Database Updates (\$1,000 - \$3,000):** Modifying existing city business licensing systems to log which retailers are subject to the fee and tracking initial compliance certifications.
8. **Enforcement Integration (\$0 - \$3,000):** Mankato does not need to hire new staff. Enforcement is typically integrated into the routine workloads of existing environmental health inspectors or code compliance officers or fire inspector or business license renewals. Start-up costs are limited to creating standard warning letters and fine schedules for non-compliant businesses.

CASE STUDY: Duluth Fee Enforcement Details

The enforcement mechanism is a warning followed by a fine.

The warning process is driven by citizen reports of retailer noncompliance or routine fire department inspections

Compliance is easily verified by bag cost appearing on sales receipts.

The incentive for retailers is cost savings in not having to buy bags and their desire to be good environmental stewards.

Many businesses want to do the right thing and this evens the playing field when all are required to do the right thing.

Bag Fees are widespread and growing

Bag fees are now widespread throughout the U.S. Many multistate retailers such as Walgreens, CVS, Target, Walmart, Barnes and Noble and Home Depot already charge for plastic bags in many geographic areas, so their cash registers and software systems are preprogrammed and ready for when their city or state adopts the bag fee.

At the World Economic Forum, delegates said, “Millions have realized that it’s easy to live without plastic bags, get used to bringing a bag from home, or skipping a bag.”



- **Saves money** – Giving out straws, utensils and condiments upon request reduces costs and saves the restaurant owner money and taxpayers money by reducing waste disposal. Restaurants spend \$19 billion purchasing disposable food ware every year and local governments spend \$1 billion managing waste and cleaning litter.
- **Attracts new customers** – People want to go to restaurants who don't use plastic and want to reduce plastic pollution.
- **Protects the planet** – Restaurants have a big role to play in reducing plastic pollution that is harming our health and the planet.



**Plastic utensils, straws and
condiments on request only please**



Thank you!



Next Steps

Develop Ordinance & Implementation Plan

- 1) Connect with stakeholders to facilitate collaborative process and engage the community and local organizations.
- 2) Identify model policies/ordinances.
- 3) Draft ordinance and supporting materials.
 - Requires consideration of definitions, exemptions, enforcement methods, tracking, collection of fees, etc.
- 4) Adopt ordinance.
- 5) Prepare for implementation.
 - Educating businesses, communicating to local residents, distributing reusable bags, etc.
- 6) Implement.
- 7) Use revenue to support local sustainability initiatives.

Thank you!