

# PLASTIC POLLUTANTS

## INTRODUCTION

**Plastic pollution and the chemical and physical impacts of plastics are large contributors to decreases in water quality and fish populations**

- Entanglement and the poisoning of fish and wildlife after ingestion
- Microplastics
- Endocrine disruptors found in plastics
- Plastics overrunning habitat spaces

**Each year a quantity between 4.8 and 12.7 million tons of plastic ends up in the ocean worldwide**



# INFRASTRUCTURE ASSESSMENT

## CURRENT ACTIONS

## PLASTIC POLLUTANTS

### Biodegradable and Compostable Plastic

- Increases rate of degradation, limiting the quantity leaving facilities and entering bodies of water
- Decreases release of toxic chemicals into the environment

### Sampling Technologies for Macroplastics: Visible Counts and Remote Sensing

- Determines levels of plastic pollution and identifies areas of concern
- Locates sources of plastic pollution

### Pyrolysis

- Contains plastic waste, decreases the risk of it entering bodies of water
- Produces energy

### Plastic Waste Management: Composting, Recycling, and Combustion with Energy Recovery

- Reduces plastic pollution from disposal sites
- Decreases greenhouse emissions
- Limits risk of chemicals affecting fish population

### Lead Organizations

Environmental Protection Agency (Southeast Regional Office)

Recycle for Change

Cooperation of Research Infrastructures (COOP+)

Various Research Institutions



# INFRASTRUCTURE ASSESSMENT

## RECOMMENDED FUTURE ACTIONS

## PLASTIC POLLUTANTS

### Updated Wastewater Treatment and Waste Management Infrastructure

- Filters microplastics from wastewater
- Reduces the amount of plastics exiting waste facilities and entering the environment

### Microplastic Filtration Technologies

- Decreases microplastic contamination
- Reduces toxic impacts on aquatic life

### Bioengineering Technologies: Plastic-Degrading Organisms

- Degrades plastics and reduces the amount of plastics entering bodies of water
- Decreases leaching of chemicals into the environment

### Restructuring Manufacturing Process of Plastics: Changing Chemical Composition and Product Design

- Decreases excess plastic production and contamination
- Increases chemical stability of plastics and reduces toxin levels
- Reduces entanglement and ingestion of plastics for marine life

### Lead Organizations

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Recycle for Change

Cooperation of Research Infrastructures (COOP+)

Various Research Institutions

### Develop Marine-based Research Infrastructures (RIs)

- Allows for microplastic contamination assessment and identification of problem areas

### Improving Plastic Disposal Bins (Recycling Bins)

- Increases amount of plastic recycled
- Decreases plastic pollution resulting from litter



# POLICY AND ENFORCEMENT ASSESSMENT

## CURRENT ACTIONS

## PLASTIC POLLUTANTS

### Marine Debris Research, Prevention, and Reduction Act

- Identifies sources of marine debris and reduces contributions to plastic pollution
- Protects marine habitat

### The UNEA Resolutions

- Limits industrial pollutants entering bodies of water through stormwater discharges
- Regulates industrial activities exposure to the environment

### Act to Prevent Pollution from Ships

- Limits ship emissions and pollution of marine waters

### Microbead-Free Waters Act

- Reduces micro-bead contamination in aquatic ecosystems

### Lead Organizations

United Nations Environment Assembly

National Oceanic and Atmospheric Administration (Marine Debris Program)

US Food and Drug Administration

Environmental Protection Agency (Southeast Regional Office)

North Carolina Division of Marine Fisheries

Agriculture and Natural and Economic Resources Committee

### NC Managing Environmental Waste Act of 2021

- Decreases plastic waste from food packaging
- Reduces plastic pollution from facilities

### North Carolina Littering Policies

- Reduce debris from entering coastal waters
- Monitor plastic pollution



# POLICY AND ENFORCEMENT ASSESSMENT

## RECOMMENDED FUTURE ACTIONS

## PLASTIC POLLUTANTS

				Lead Organizations
<p><b>Plastic Bag Tax</b></p> <ul style="list-style-type: none"> <li>● Reduces plastic bag usage and pollution</li> <li>● Decreases risk of entanglement, ingestion, and poisoning for aquatic life</li> </ul>	<p><b>Plastic Bag, Styrofoam, Single-Use Plastic, and Straw Bans</b></p> <ul style="list-style-type: none"> <li>● Eliminates plastic contamination from these sources</li> <li>● Protects fish populations and habitat</li> </ul>	<p><b>Extended Producer Responsibility Policies</b></p> <ul style="list-style-type: none"> <li>● Increases recycling and composting of plastic products, reducing the amount of plastic entering water systems</li> <li>● Decreases implications of plastic pollution on fisheries</li> </ul>	<p><b>Implementation of a State-Wide Plastic Pollution Program</b></p> <ul style="list-style-type: none"> <li>● Encourages collaboration among municipalities, greatly reducing plastic pollution and consumption</li> <li>● Holds polluters responsible</li> <li>● Establishes water quality standards for plastic pollutants</li> </ul>	<p>United Nations Environment Assembly</p> <p>National Oceanic and Atmospheric Administration (Marine Debris Program)</p> <p>US Food and Drug Administration</p> <p>Environmental Protection Agency (Southeast Regional Office)</p> <p>North Carolina Division of Marine Fisheries</p> <p>Agriculture and Natural and Economic Resources Committee</p>
<p><b>Government Funded Debris Clean-Up Initiatives</b></p> <ul style="list-style-type: none"> <li>● Improves beaches and rivers conditions through clean-ups</li> <li>● Protects aquatic habitat and populations</li> </ul>	<p><b>International Treaty Setting Measurable Plastic Reduction Targets</b></p> <ul style="list-style-type: none"> <li>● Holds countries accountable for plastic pollution</li> <li>● Reduces plastic pollution in the oceans and protect marine life</li> </ul>	<p><b>Microplastic Regulatory Policy</b></p> <ul style="list-style-type: none"> <li>● Decreases microplastic pollution in the nation's bodies of waters</li> <li>● Protects aquatic life from entanglement, ingestion, and poisoning due to plastic pollution</li> </ul>		



# RESEARCH ASSESSMENT

## CURRENT ACTIONS

## PLASTIC POLLUTANTS

### First Global Analysis of Plastic Pollution

- Quantifies the amount of plastic in the ocean
- Identifies greatest sources of pollution, assisting in the mitigation of their contamination

### Evaluation of Toxicity of Plastics and Related Impacts

- Limits the amount of toxic chemicals leaching into the environment
- Provides information about the implications of chemicals on aquatic life

### Assessment of Plastic Pollution Levels in North Carolina

- Provides data that can be utilized in the development of regulatory actions
- Reduces plastic pollution from identified sources

### Studies Focused on Heavy Metal Contamination

- Provides data regarding the utilization of heavy metals in plastics and their effects on aquatic species

### Research on the Impacts of Plastic Ingestion on Aquatic Life

- Determines the extent of effects of plastic ingestion on aquatic life and methods to mitigate the occurrence
- Provides estimates for percentage of aquatic life ingesting plastics

### Analyzing Plastics' Effects on Local Water Temperatures

- Assesses the extent of influence plastic has on coastal waters
- Analyzes the impacts of warmer temperatures on aquatic life

### Generating Estimates of Plastic Loadings in Water Bodies across N.C.

- Establishes linkages between the presence of macroplastics and levels of microplastics
- Creates a sampling protocol for plastics
- Protects rivers feeding into estuaries from plastic pollution

### Generating Estimates of Plastic Loadings in the Neuse River

- Establishes linkages between the presence of macroplastics and levels of microplastics
- Creates a sampling protocol for plastics
- Protects rivers feeding into estuaries from plastic pollution

### Lead Organizations

North Carolina Marine Debris Symposium

National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program

North Carolina Coastal Federation

Duke University (Plastic Pollution Working Group)

North Carolina Marine Mammal Stranding Network

Environmental Protection Agency (Southeast Regional Office)



# RESEARCH ASSESSMENT

## RECOMMENDED FUTURE ACTIONS

## PLASTIC POLLUTANTS

### Lead Organizations

#### Green Chemistry Research

- Protects aquatic ecosystem from harmful effects of toxins found in plastics
- Reduces plastic pollution

#### Studies Focused on the Interactions of Molecules in the Environment

- Defines the implications of chemicals on wildlife, fish, and flora
- Assists in creating regulations and criteria levels for chemicals
- Protects aquatic populations from toxins and plastics

#### Developing Technologies to Identify Plastics in Aquatic Organisms

- Increases our understanding of how prevalent plastics are inside aquatic organisms
- Improves technologies and necropsie techniques to identify causes of death in organisms due to plastics, therefore preventing other deaths

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# Advocacy, Outreach, and Education Assessment

## CURRENT ACTIONS

## PLASTIC POLLUTANTS

### Lead Organizations

#### Public Educational Material Developed by Environmental NGOs

- Decreases plastic consumption and pollution
- Teaches proper plastic disposal techniques

#### Ocean Friendly Establishments Certification

- Decreases plastic consumption and waste in local communities
- Advocates for alternatives to plastics, therefore reducing pollution

#### Advocating for Plastic Regulations

- Eliminates use of styrofoam and other products that break down easily and pollute aquatic ecosystems
- Encourages plastic reduction efforts

#### Companies Publicizing Plastic Reduction Efforts

- Reduces plastic consumption, waste, and pollution
- Addresses social, environmental, and economic impacts of plastic production and pollution
- Encourages other companies to participate in plastic reduction initiatives

North Carolina Marine Debris Symposium

Wrap Recycling Action Program

Coastal Carolina Riverwatch

North Carolina Stream Watch: NCDEQ

NC Division of Environmental Assistance and Customer Service NCDEACS

North Carolina Aquariums' Initiative: In Our Hands

Carolina Recycling Association

NC Marine Debris Action Plan

North Carolina Solid Waste Association of North America NCSWANA

Environment America

Plastic Ocean Project

Ocean Friendly Establishments

NC Green Travel

Duke University (Plastic Pollution Working Group)

#### Plastics Policy Inventory

- Identifies policy gaps in plastic regulatory actions
- Promotes sustainable policy development and aquatic ecosystem protection

#### National Caucus of Environmental Legislators' Initiatives

- Provides the public with information and data related to plastic pollution and its effects on health
- Provides educational information about current policy initiatives

#### Beach and River Clean-ups

- Creates concern for local recreational and fishing sites and their protection
- Reduces amount of plastic currently in bodies of water
- Encourages decreased consumption of plastics





# Advocacy, Outreach, and Education Assessment

## RECOMMENDED FUTURE ACTIONS

## PLASTIC POLLUTANTS

### Educational Material Regarding Alternatives to Plastics

- Decreases plastic consumption and a market for those products
- Reduces amount of plastics entering aquatic ecosystems

### Writing, Calling, and Lobbying Legislators

- Increases protection of water quality and aquatic habitats
- Informs politicians on local environmental issues

### Increasing Corporate Transparency

- Reduces contaminated discharge from entering nearby bodies of water
- Decreases risks to human health and the environment

### Public Outreach regarding Human Contribution to Aquatic Plastic Pollution from Land Sources

- Educates public on strategies to reduce littering and improper plastic disposal
- Reduces quantity of plastics entering streams and estuaries

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