

# The Harmful Effects of Smoking Materials on Outer Banks Beaches and Waterways

A Conservation Guide for Protecting Outer Banks Wildlife & Waterways





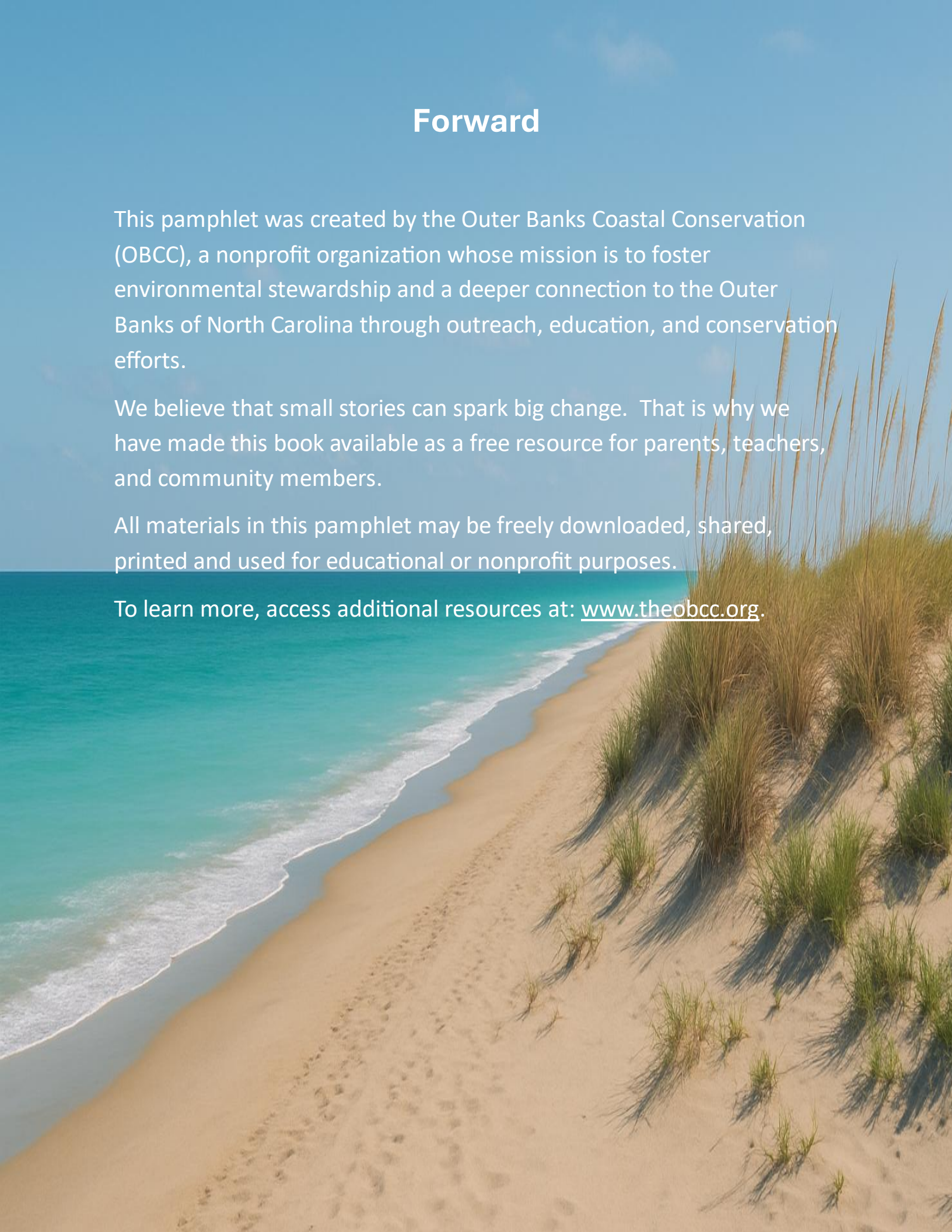
# Forward

This pamphlet was created by the Outer Banks Coastal Conservation (OBCC), a nonprofit organization whose mission is to foster environmental stewardship and a deeper connection to the Outer Banks of North Carolina through outreach, education, and conservation efforts.

We believe that small stories can spark big change. That is why we have made this book available as a free resource for parents, teachers, and community members.

All materials in this pamphlet may be freely downloaded, shared, printed and used for educational or nonprofit purposes.

To learn more, access additional resources at: [www.theobcc.org](http://www.theobcc.org).





The Outer Banks are one of the most biologically rich barrier island chains in the United States—home to nesting sea turtles, migratory shorebirds, dolphins, crabs, coquinas, and fragile dune ecosystems. While many forms of pollution threaten these islands, improperly discarded smoking materials are among the most common and most damaging.

This guide provides an in-depth look at how cigarette butts, vape waste, and other smoking debris harm coastal ecosystems, wildlife, dunes, and community health.





# Understanding Smoking Litter: More Than Just “Butts”

Smoking-related pollution includes:

- Cigarette butts (filters)
- Cigar tips
- Vape pens & disposable vapes
- E-cigarette pods and cartridges
- Lighters and match debris
- Packaging and plastic wrappers

Even when small, these items contain combinations of plastic, carcinogens, toxic metals, and fire risks.

Why the Outer Banks Is Especially Vulnerable

- Strong winds transport small litter from dunes into water quickly
- Narrow barrier islands concentrate pollution
- Wildlife density is high along the beach strand
- Storms and overwash redistribute litter into soundside marshes





# The Science Behind Cigarette Filters

## Filters Are Not Biodegradable

Cigarette filters consist of:

- Cellulose acetate (a plastic)
- Titanium dioxide
- Triacetin (a binding agent)

They do not break down naturally. Instead, they fracture into microplastics under sunlight and wave action. These microplastics:

- Persist for decades
- Are eaten by wildlife
- Spread through food webs
- Accumulate toxins
- Never fully disappear

### One Butt = Toxic Chemical Cocktail

Each used filter contains up to 7,000 chemicals, including:

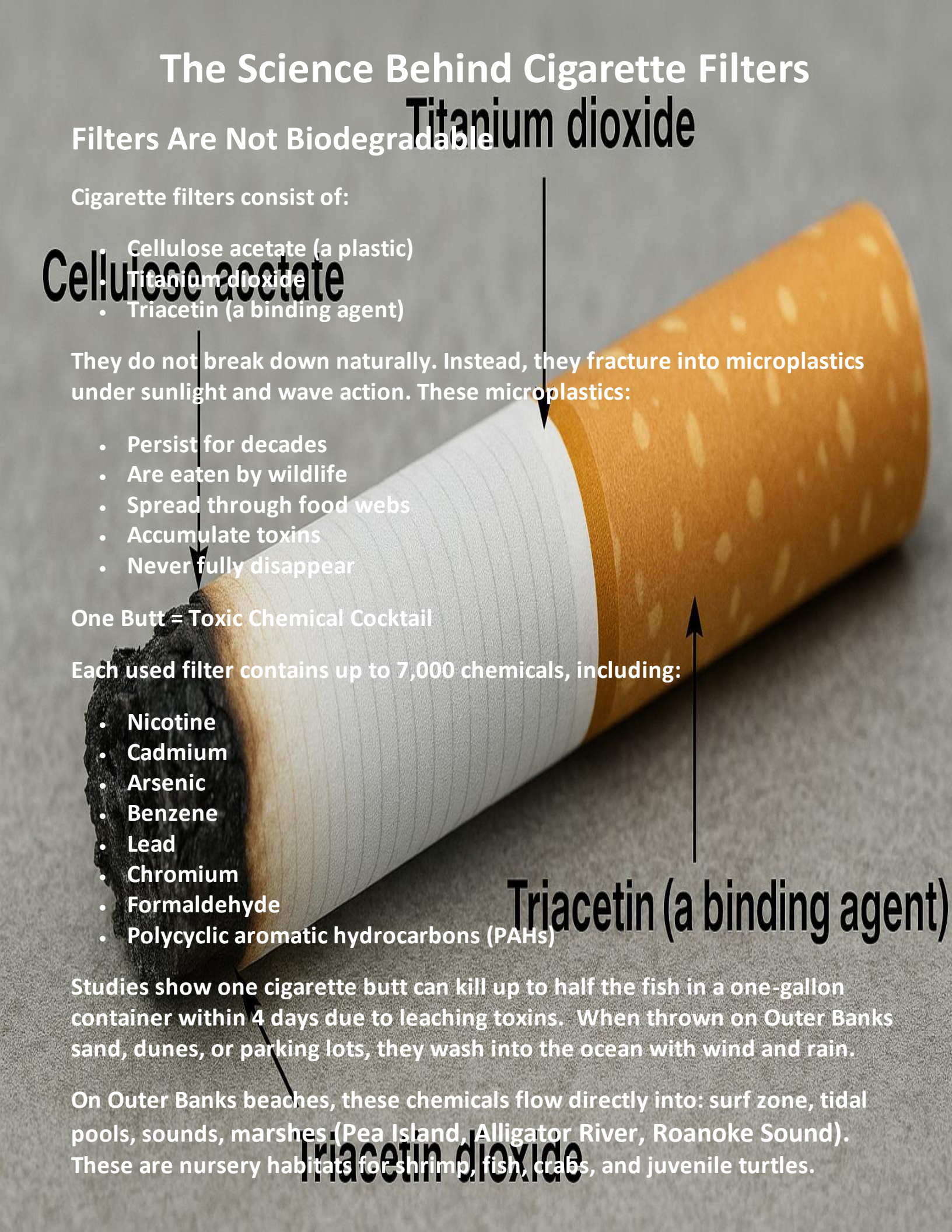
- Nicotine
- Cadmium
- Arsenic
- Benzene
- Lead
- Chromium
- Formaldehyde
- Polycyclic aromatic hydrocarbons (PAHs)

Studies show one cigarette butt can kill up to half the fish in a one-gallon container within 4 days due to leaching toxins. When thrown on Outer Banks sand, dunes, or parking lots, they wash into the ocean with wind and rain.

On Outer Banks beaches, these chemicals flow directly into: surf zone, tidal pools, sounds, marshes (Pea Island, Alligator River, Roanoke Sound). These are nursery habitats for shrimp, fish, crabs, and juvenile turtles.

Triacetin dioxide

Triacetin (a binding agent)





# Microplastics Threaten Wildlife

As filters break apart, they turn into microplastics that:

- Are eaten by fish, sea turtles, crabs, shorebirds, and dolphins
- Accumulate in the food web
- Transfer toxins into animal tissues
- Remain in the ecosystem indefinitely

Outer Banks scientists already document rising levels of microplastics in the surf zone and estuaries.





# How Smoking Waste Harms Outer Banks Wildlife

## Sea Turtles

Threats from smoking litter include:

- Ingestion of filters mistaken for squid, algae, or shell bits
- Intestinal blockages preventing digestion
- Internal infections from toxins
- Microplastics entering bloodstream
- Entanglement in vape devices or packaging

Hatchlings are especially vulnerable—they crawl across litter during their critical first journey to the sea.





## Shorebirds

Piping plovers, sanderlings, and gulls will pick up brightly colored cigarette filters, confusing them for shell fragments or small crabs.





## Fish & Crabs

Nicotine and chemical leachates can kill:

- Small fish
- Blue crabs
- Coquina clams
- Zooplankton

These species form the foundation of the Outer Banks food web.





## Dolphins & Marine Mammals

Dolphins, which feed nearshore, ingest floating debris accidentally while hunting fish. Filters and disposable vape pieces can be ingested or become entangled, causing:

- Choking
- Digestive blockages
- Reduced buoyancy
- Long-term health decline

Stranding teams have documented rising microplastic presence in stomach contents along the NC coast.





# Vape Waste: An Emerging Threat

Disposable vapes contain:

- Lithium-ion batteries
- Circuit boards
- E-liquid containing nicotine salts
- Plastic housings

When vapes enter Outer Banks waters:

- Batteries corrode → releasing heavy metals
- Plastic shells → break into micro- and nanoplastics
- Nicotine salts → highly toxic to aquatic life
- Metal coils → shed nickel and chromium

Vape pods can leach more toxins than cigarette butts.





# Impacts on Dune and Vegetation Systems

## Fire Risk

Improperly discarded cigarettes can ignite:

- Dry sea oats
- American beachgrass
- Switchgrass
- Dune vegetation under boardwalks

Dunes are the only natural defense against storm surge. Fires weaken these systems, leading to:

- Increased erosion
- Loss of habitat for birds and foxes
- Destabilized dune roots

Every Outer Banks community—Duck, Corolla, Nags Head, Kill Devil Hills, Hatteras—reports multiple dune and brush fires annually from cigarettes.

## Chemical Damage to Soil & Plants

Nicotine is a natural pesticide. When filters degrade in dunes:

- Nicotine leaches into sand
- Damages root systems
- Weakens sea oats
- Reduces dune stability





# How Smoking Litter Reaches the Water

## Wind Transport

Outer Banks wind speeds often exceed 20–30 mph. Lightweight filters can travel long distances into:

- Surf
- Dunes
- Parking lots
- Soundside marshes

## Stormwater Drainage

Cigarette butts left in:

- Parking lots
- Beach access ramps
- Pier walkways
- Or Thrown from shipping vessels/boats

Are easily washed into storm drains → ocean.

## High Tide & Overwash

At high tide, buried butts reappear and enter the water.

## Visitor Density

Millions of tourists increase:

- Smoking rates
- Litter volume
- Pressure on trash systems





# Impacts on Tourism, Public Health, & Local Communities

## Beach Cleanliness

Cigarette butts are the #1 most commonly found item on the Outer Banks beaches during cleanups.

## Public Health Hazards

- Filters contain carcinogens
- Children dig them up in sand
- Dogs often ingest them
- Vape batteries can explode or leak

## Economic Effects

Dirty beaches lower:

- Visitor satisfaction
- Rental value
- Community appearance





# Solutions: What Visitors, Residents & Communities Can Do

## For Individuals

- Use pocket ashtrays or sealable containers
- Never bury butts in sand
- Avoid smoking in dunes
- Pack out every vape pod and battery
- Keep lighters and packaging in a bag

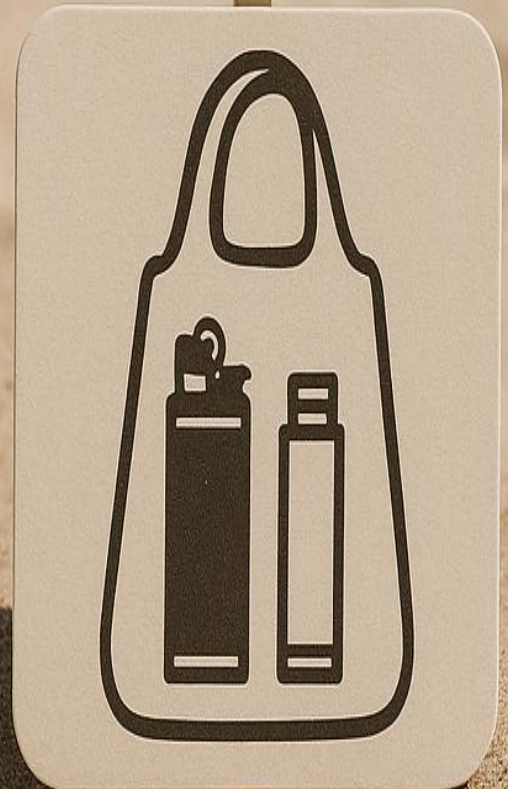
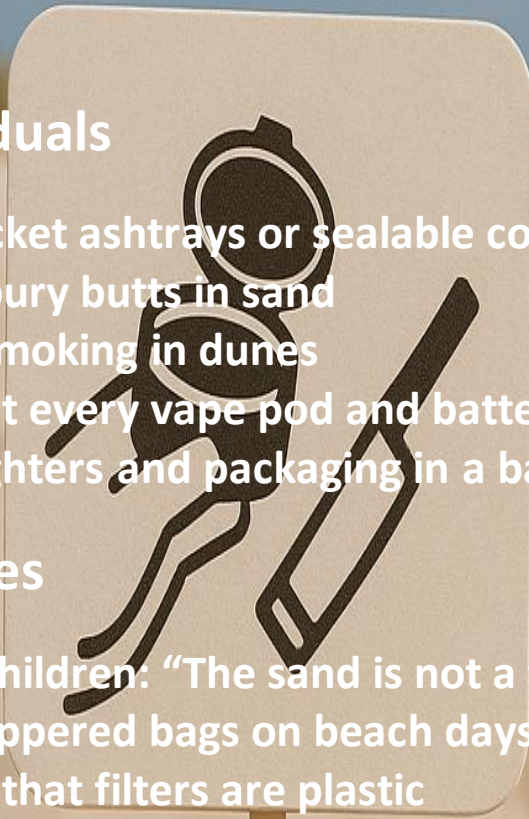
## For Families

- Teach children: “The sand is not a trash can.”
- Carry zippered bags on beach days
- Explain that filters are plastic

## For Pet Owners

Dogs often ingest cigarette butts.  
Keep beaches clean to prevent:

- Vomiting
- Stomach blockages
- Nicotine poisoning





# Community-Level Solutions

## Install Smoking Waste Receptacles

Especially at:

- Beach accesses
- Piers
- Parking lots
- Boardwalks

## Expand Public Education Campaigns

Use signage such as:

- “Filters Are Plastic.”
- “Keep Outer Banks Beautiful — Pack Out Your Butts.”
- “Vapes = Toxic Waste.”

## Support Recycling & Battery Programs

Set up vape battery disposal at:

- Fire departments
- Visitor centers
- Tackle shops





# Concluding Message

Smoking materials may be small, but their impact on the Outer Banks is enormous. By keeping cigarette butts, filters, vape devices, and all smoking waste off the beaches and out of the dunes, we protect:

- Sea turtles
- Birds
- Fish
- Dunes
- Water quality
- Community safety
- The future of the Outer Banks

Every butt packed out is one less piece of plastic, one less source of toxins, and one step closer to a cleaner, healthier, more resilient Outer Banks.





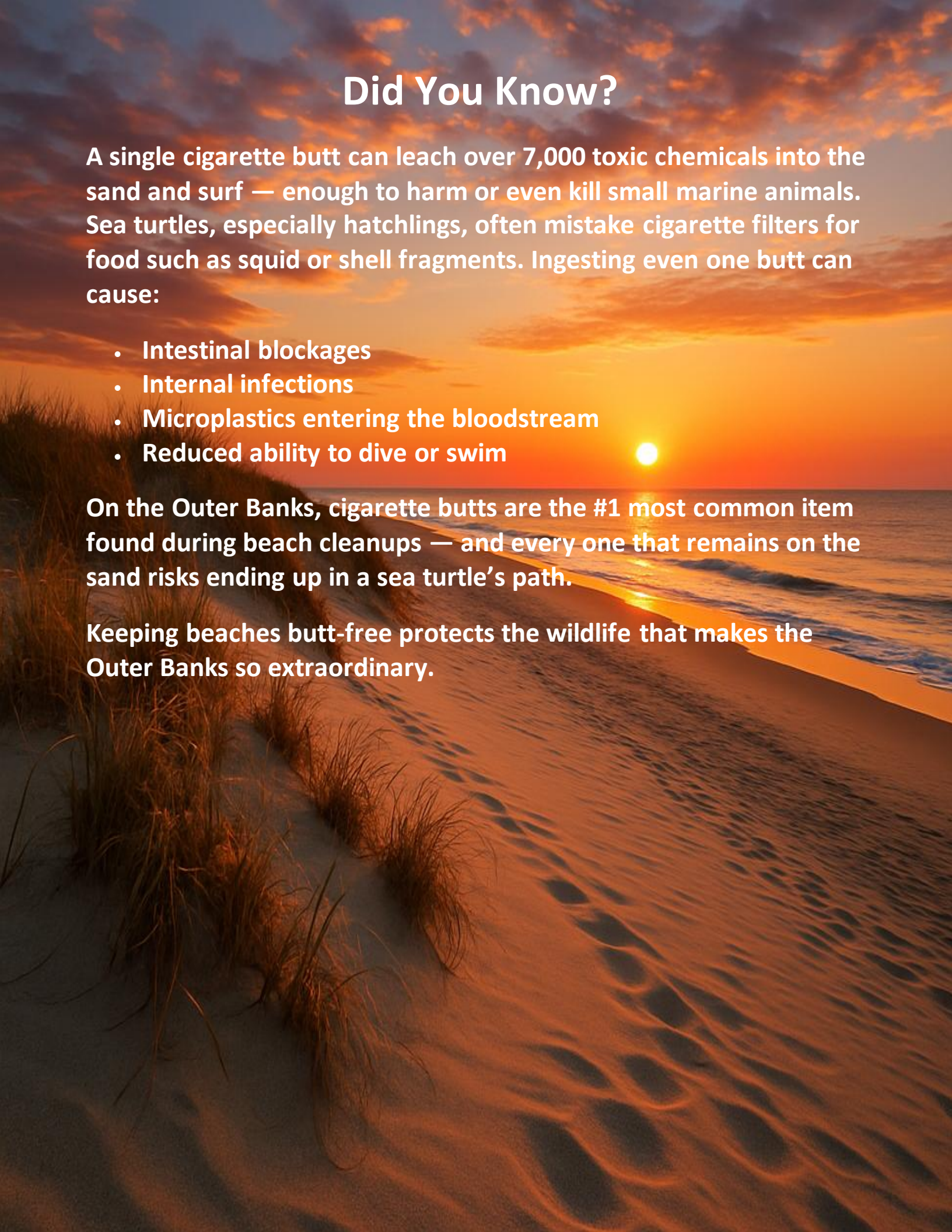
# Did You Know?

A single cigarette butt can leach over 7,000 toxic chemicals into the sand and surf — enough to harm or even kill small marine animals. Sea turtles, especially hatchlings, often mistake cigarette filters for food such as squid or shell fragments. Ingesting even one butt can cause:

- Intestinal blockages
- Internal infections
- Microplastics entering the bloodstream
- Reduced ability to dive or swim

On the Outer Banks, cigarette butts are the #1 most common item found during beach cleanups — and every one that remains on the sand risks ending up in a sea turtle's path.

Keeping beaches butt-free protects the wildlife that makes the Outer Banks so extraordinary.





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