



Presentation for the South Florida Aquatic Plant Management Society (SFAPMS)

December 9, 2021



Emilio Lopez

SOP Technologies, CEO

American Public Works Association, South Florida Branch

Biscayne Bay Marine Health Coalition, Steering Committee

Florida Stormwater, Erosion, and Sedimentation Control Inspector (FSESCI)

Engineering & Manufacturing | Stormwater Focus | Community Collaboration

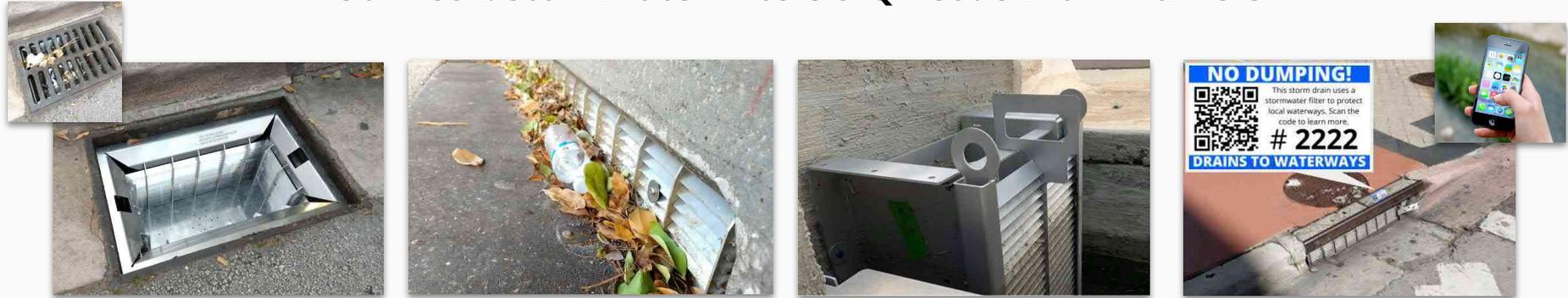
About SOP Technologies



Our company's mission is to **Stop Ocean Pollution**

We are based in Miami, FL and provide technologies to prevent ocean pollution, prevent floods, and provide cost savings to communities and businesses globally.

Our Tech: Stormwater Filters & QR Code Drain Markers



Why should we address stormwater pollution?



*There is perhaps no better demonstration of the folly of human conceits than this distant image of our tiny world. To me, it underscores our responsibility to deal more kindly with one another, and to preserve and cherish the pale blue dot, the only home we've ever known. — Carl Sagan, *Pale Blue Dot*, 1994*



Images Source: [SFAPMS - The Hydrophyte Magazine](#)

Economic Benefits of Waterways

Biscayne Bay, FL

Biscayne
Bay-related uses
generated **\$6.9
billion in income
to southeast
Florida residents
in 2004**

Direct, Indirect and Induced Economic Contribution to Southeast Florida Contribution is 4% of Southeast Florida's Economy

Activity	Output (Million \$)	Income (Million \$)	Jobs	Tax Revenue (Million \$)
Recreation	\$3,992	\$2,243	58,800	\$272
Commercial Fishing	\$30	\$18	473	\$2
Port of Miami Shipping	\$8,895	\$4,259	77,048	\$368
Miami River Shipping	\$805	\$406	6,741	\$44
Total	\$13,722	\$6,926	143,062	\$686

Source: <https://www.hazenandsawyer.com/work/projects/biscayne-bay-economic-study/>

Chesapeake Bay, MD

“In 2009 (before the Blueprint) the lands and waters of the Chesapeake Bay Region provided **economic benefits totaling \$107.2 billion annually.** [...]

the economic benefits provided by nature in the Chesapeake Bay watershed will total **\$130 billion annually when the Chesapeake Clean Water Blueprint is fully implemented.**”

Source:
[https://www.cbf.org/news-media/features-publications/reports/economic-benefits-of-cleaning-up-the-chesapeake-bay/index.html#:~:text=In%202009%20\(before%20the%20Blueprint,protection%20from%20floods%20and%20hurricanes.](https://www.cbf.org/news-media/features-publications/reports/economic-benefits-of-cleaning-up-the-chesapeake-bay/index.html#:~:text=In%202009%20(before%20the%20Blueprint,protection%20from%20floods%20and%20hurricanes.)



What pollutants get into storm drains?



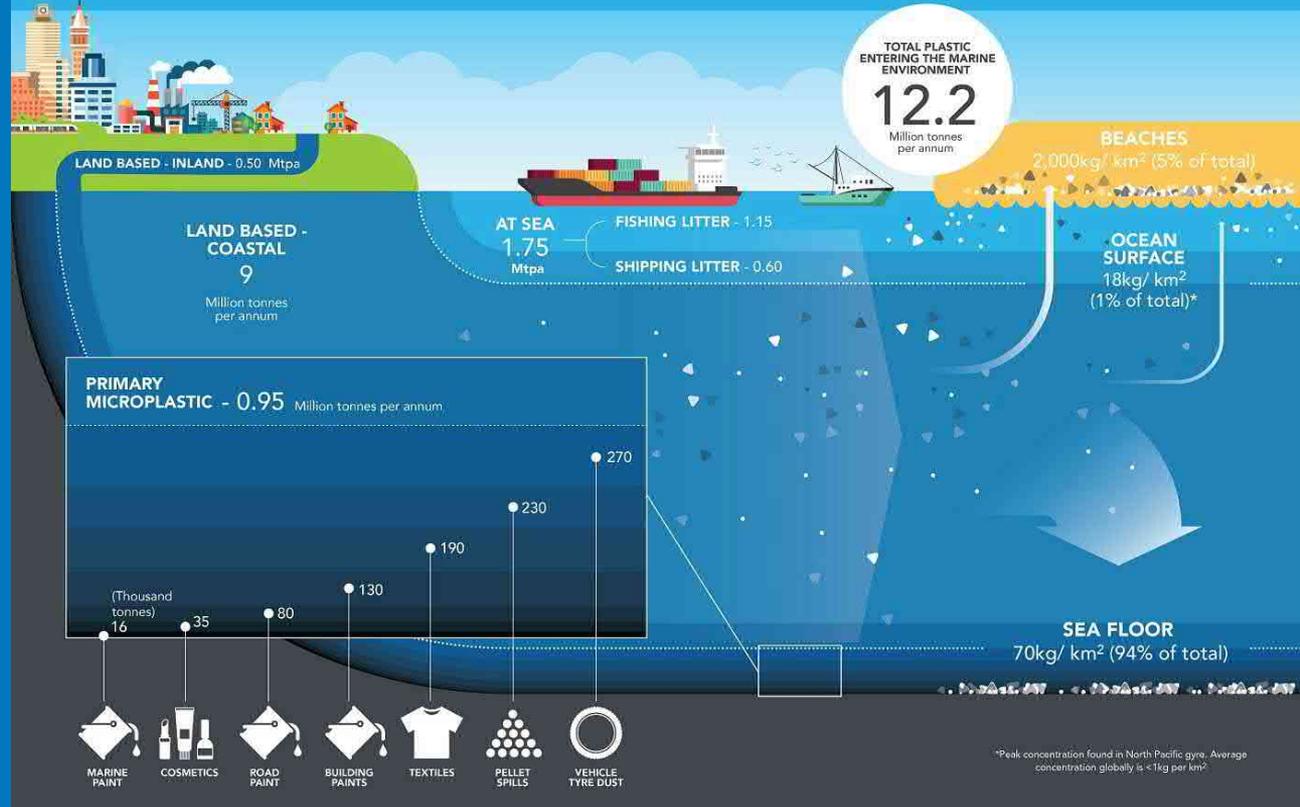
What are the origins of ocean plastic debris, and how does it leak into the ocean?

“over 80 percent of ocean plastic comes from land-based sources;

once plastic is discarded, it is not well managed, and thus leaks into the ocean.”¹

“19 to 23 million metric tons, or 11%, of plastic waste generated globally in 2016 entered aquatic ecosystems.”³

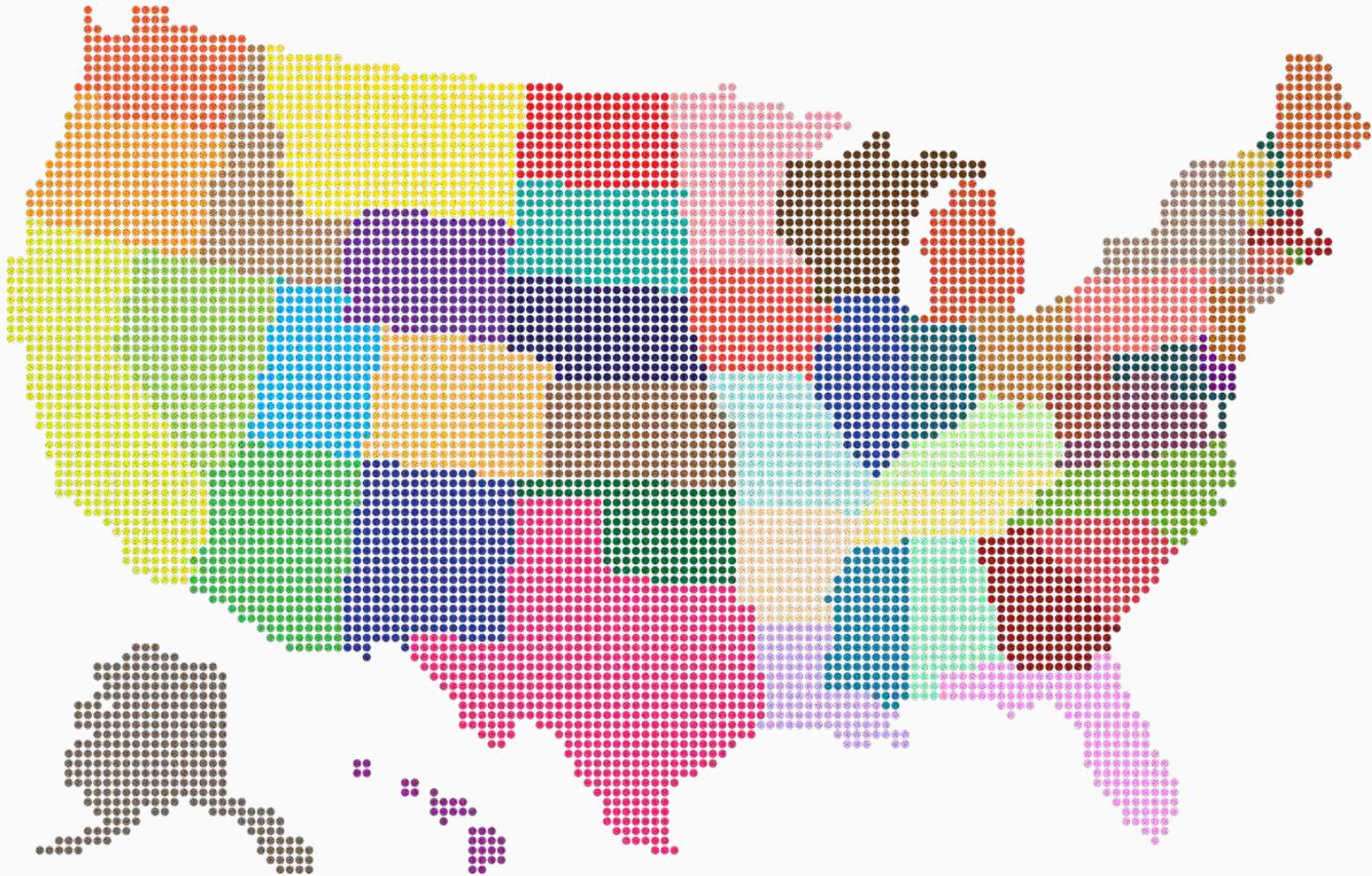
PLASTICS IN THE MARINE ENVIRONMENT: WHERE DO THEY COME FROM? WHERE DO THEY GO?



1. Ocean Conservancy <https://act.oceanconservancy.org/wp-content/uploads/2017/04/full-report-stemming-the.pdf>

2. Graphic: Eunomia <https://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-environment/>

3. Science: <https://science.sciencemag.org/content/369/6510/1515>





Nonpoint Source (NPS) Pollution: Urban Areas

- Sediment
- Oil, grease and toxic chemicals from motor vehicles
- Pesticides and nutrients from lawns and gardens
- Viruses, bacteria and nutrients from pet waste and failing septic systems
- Road salts
- Heavy metals from roof shingles, motor vehicles and other sources
- Thermal pollution from impervious surfaces such as streets and rooftops

Source: <https://www.epa.gov/nps/nonpoint-source-urban-areas>



As polluted water makes its way to the oceans, water quality can be affected, which often results in the **closing of local beaches due to unhealthy water conditions. Stormwater carries disease-causing bacteria and viruses.** Swimming in polluted waters can make you sick.

A study in Santa Monica Bay showed that **people who swim in front of flowing storm drains are 50 percent more likely to develop certain symptoms than those who swim 400 yards from the same drain.**

How Trash Gets Into Creeks



Pollution Also Causes Flooding

“Never dump any waste in the storm sewers or canals within the City. It is illegal for any direct or indirect entry of any solid, liquid or gaseous matter to enter the drainage system. **Even grass clippings and branches can accumulate and plug channels.**

A plugged channel or storm drain cannot carry water and **when it rains, clogged storm drains will cause water to back up into the street and may cause flooding.**¹

Inside a local stormwater basin ([video](#))



1. City of North Miami: <https://www.northmiamifl.gov/757/Flooding>

Stormwater Flooding in the News

Tampa, FL *Heavy Rains Test Tampa Stormwater Drainage Improvements* [link](#)

“We’ve actually had dive teams go out and do major cleaning of barnacles and trash in some of our big pipes that outfall into the bay that have completely been blocked,” said Jean Duncan, director of the city’s stormwater services.”

Wellington, FL *What caused Wellington roads to flood? Rapid rainfall plus clogged drains* [link](#)

“Not only did the sluggish storm system dump 4.25 inches of rain on Wellington in less than an hour and a half, it also came with wild winds that knocked loose branches, leaves and pine needles and clogged drains, Assistant Village Manager Jim Barnes said.”

San Diego, CA *Rain floods buildings on the campus of UC San Diego* [link](#)

“Campus police told 10News that clogged drains may have been the cause for most of the flooding.”

Denver, CO *Denver clearing debris-clogged storm drains to avert flooding* [link](#)

“The wrath of Mother Nature is not the only culprit behind the flooding. Trash tossed in the streets is as much to blame, said Public Works spokeswoman Emily Williams. “A lot of times, it’s trash, yard debris and pet waste that is being removed from the drains,” she said.”

Sacramento, CA *With More Rain On The Way, County Officials Say Months Of Planning Goes Into*

Preventing Flooding [link](#)

“The county said it’s also reminding people to simply pick up any trash or leaves in their neighborhood to prevent possible drain clogging.”

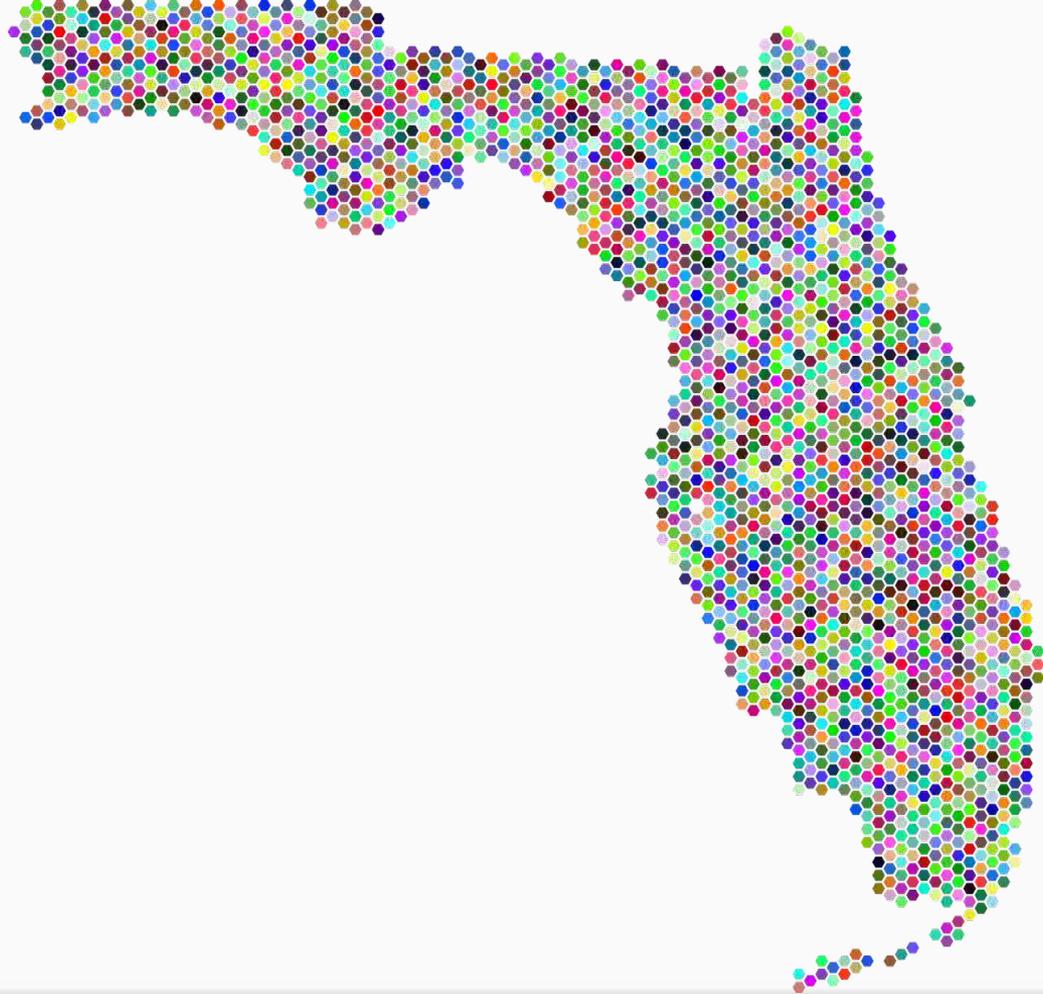
New York, NY *Storm Drains Fail Again in Brooklyn* [link](#)

“The flooding occurred because to the catch basins, which collect rain water, were full of garbage, said a city Department of Environmental Protection spokeswoman.”

Malaysia *Maintain drainage system to avoid floods - Malacca exco* [link](#)

“We hope all parties would adhere to the standards and regulations (on drainage system maintenance) according to schedule as we know floods occur when drains and rivers are not properly maintained. “The rain may be heavy but with the drainage system clogged with grass and mud, the situation is worsened and as such all parties should not take lightly frequent cleaning up of drains,” he told *Bernama*.”





How much trash and debris enter storm drains?

Per inlet, per year: **Approx. 175 lbs of leaves (nutrients) and trash enter stormwater basins and pipes.**

0.051 lbs TP

0.106 lbs TN*

Leaves
(nutrient pollution)

Various plastics, paper and litter



*Based on data we collected in 2019 and 2020 at 3 cities, and with the collaboration of SENDIT4THESEA

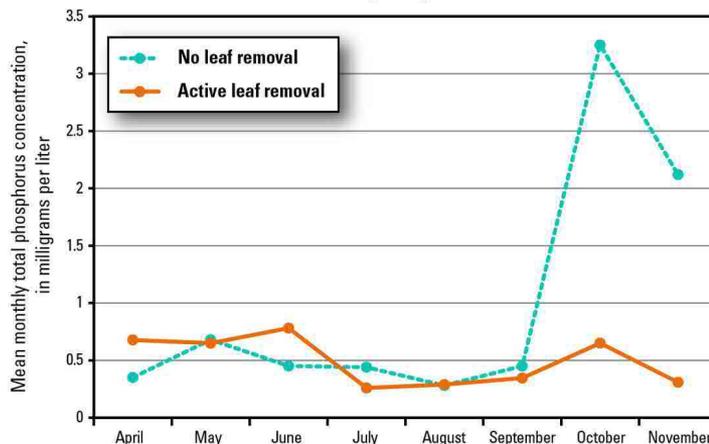


Mostly Leaves/organics

Contributing to nutrient pollution



Total phosphorus



This graph shows a significant reduction in total phosphorus in a residential neighborhood in Madison, Wis., after the implementation of a timely leaf collection and street cleaning program (Selbig, 2016).

While the sources of nutrients to urban stormwater are many, a primary contributor is often decaying organic materials like leaves. [...]

The leaves continue to decay, releasing excess phosphorus and nitrogen into local streams and lakes.

[...]
Loads of total and dissolved phosphorus were reduced by 84 and 83% ($p < 0.05$), and total and dissolved nitrogen by 74 and 71% ($p < 0.05$) with an active leaf removal program.¹

1. USGS [Using leaf collection and street cleaning to reduce nutrients in urban stormwater](#)

Mostly Leaves/organics

Contributing to nutrient pollution



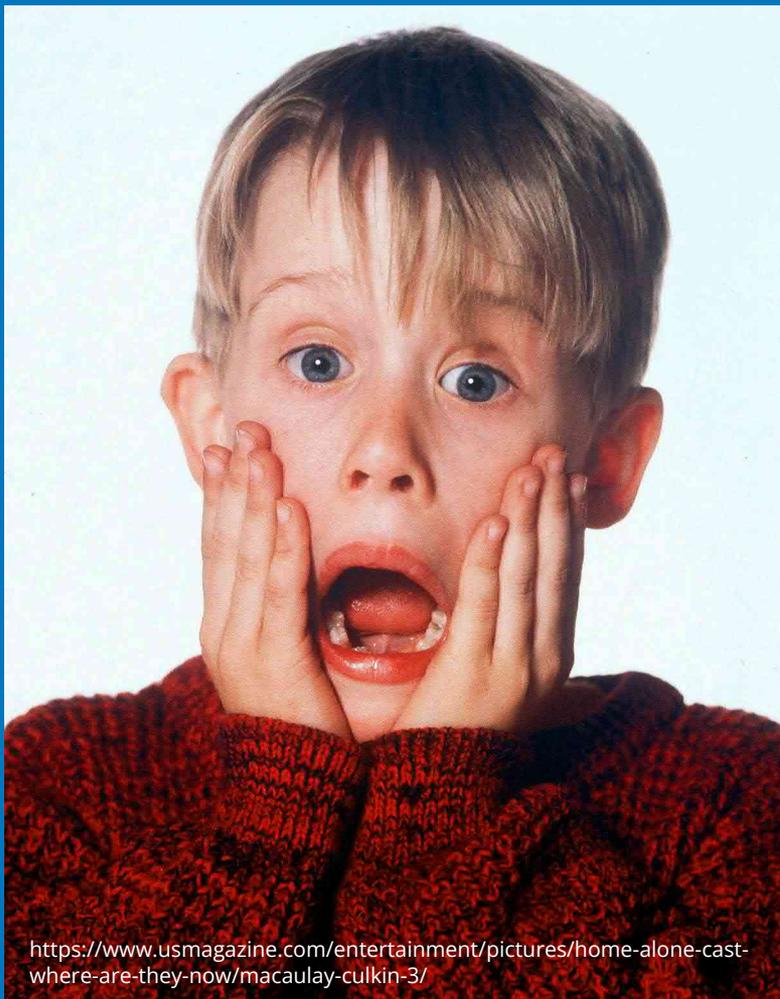
“Decomposition of **leaf litter** has been reported to be one of the main contributors to [**Dissolved Organic N**] **DON** in urban runoff suggesting that in order to reduce DON input in stormwater runoff, a control measure (e.g., street cleaning) prior to storm events could be used to eliminate the potential of PON decomposition to DON.”²

“Today, a major concern is that **leaf litter (i.e., organic debris)** spikes stormwater systems and watersheds with nutrients during and after rainfall, especially when it gathers along street curbs.

Excess phosphorus and nitrogen often lead to major water quality problems for municipalities, a process called eutrophication, and harmful algal blooms (HABs).”³

2. Jani J, Yang Y-Y, Lusk MG, Toor GS (2020) Composition of nitrogen in urban residential stormwater runoff: Concentrations, loads, and source characterization of nitrate and organic nitrogen. PLoS ONE 15(2): e0229715. <https://doi.org/10.1371/journal.pone.0229715>

3. Water Quality and Health Council <https://waterandhealth.org/disinfect/autumn-leaves-fall-can-water-quality/>



<https://www.usmagazine.com/entertainment/pictures/home-alone-cast-where-are-they-now/macaulay-culkin-3/>

How can we
prevent pollution
from reaching
lakes, rivers, canals
and waterways?

National Pollutant Discharge Elimination System (NPDES) Stormwater Program Areas



Stormwater Discharges from Construction Activities

Stormwater Discharges from Industrial Activities

Stormwater Discharges from Municipal Sources

Stormwater Discharges from Transportation Sources

Oil and Gas Stormwater Permitting

Oil and Gas Stormwater Permitting

EPA's Residual Designation Authority

Stormwater Maintenance

Long-Term Stormwater Planning

EPA NPDES Program Areas: <https://www.epa.gov/npdes/npdes-stormwater-program>

Many options for maintenance and removal

← LOWER OVERALL COST

HIGHER OVERALL COST →



Street Sweeping



Catch Basin Cleaning



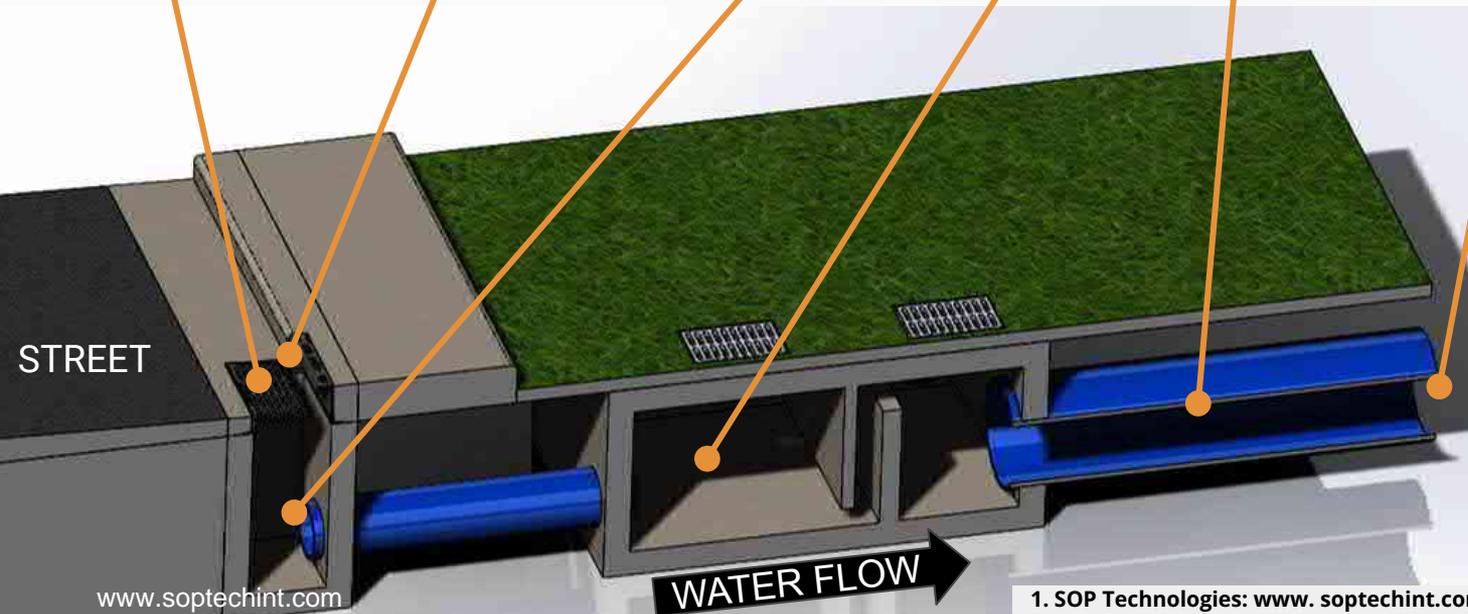
www.soptechint.com



1. University of Florida:

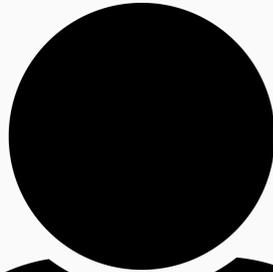
https://www.florida-stormwater.org/assets/FSAEF/Research/MS4/UF%20FDEP%20MS4%20Maintenance%20Final%20Report_edited.pdf

Many solutions to capture trash and debris

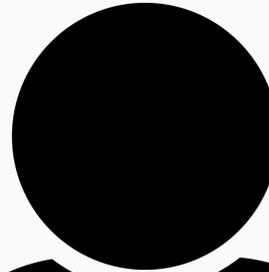


What should you consider when selecting technologies for addressing stormwater debris?

Once upon a time...at the Biscayne Bay Marine Health Summit



Stormwater Manager



Emilio



Before Contacting Vendors



Assembling your Team

- Who is going to use the technology?
- Who (internally and externally) may be impacted?
- Who will decide what to implement?

Initial Discussion Topics (these will evolve)

- What goals would you like to achieve?
- What are some existing capabilities?
- What are current budgets and timelines?

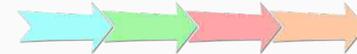
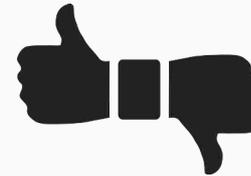


Initial Vendor Meeting(s)



Share and Ask

Goals, Budget, Timeline, Preferences, Processes



What makes you different?



Stormwater
Manager



Emilio



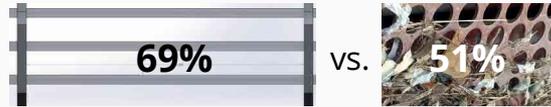
What makes your **technology** different from your competitors?

Unique, Patented upward flow
minimizes clogging

Lab and Field Tested

We have more open area for water flow

Patent Pending, unique,
easy-to-use web app



Others have moving parts, and they get stuck



Others have large openings and don't custom fit



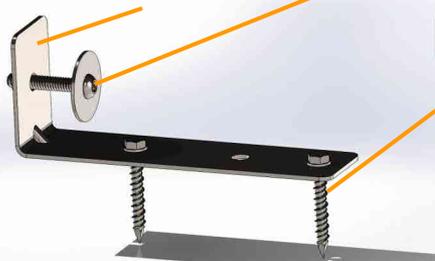
What can be customized / changed?



Custom Dimensions for Inlets



Mounting Brackets Design



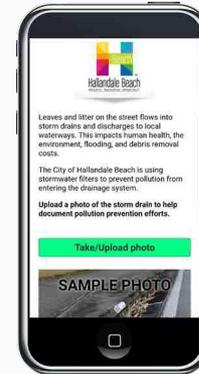
Types of screws

Types of bolts

Drain Marker Text/Message



Logo and Landing Page Text



Info Page



What makes you different?



What makes your **services** different from your competitors?

Field Measurements for Custom Fit

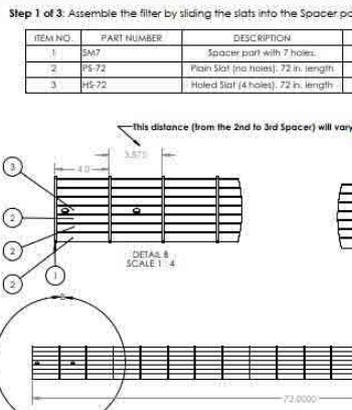
Technical Designs

Installations

Follow-on Analysis

Community Engagement

Promotion



Calculated Nutrient Load Reductions from MS4 Maintenance Practices
FSA 2019

TOTAL PHOSPHORUS		Subtotal TP Removed (kilograms)	Subtotal TP Removed (pounds)
Street Sweepings - Dry Mass Collected (kg)	0	0	0
Amount of TP Removed (kilograms)	0	0	0
Catch Basins - Dry Mass Collected	17.47	17.47	14
Amount of TP Removed (kilograms)	17.47	17.47	14
BMP - Dry Mass Collected	0	0	0
Amount of TP Removed (kilograms)	0	0	0
GRAND TOTAL TP REMOVED (KILOGRAMS) =	6.60417	6.60417	14.5666
GRAND TOTAL TP REMOVED (POUNDS) =			14.5666
TOTAL NITROGEN		Subtotal TN Removed (kilograms)	Subtotal TN Removed (pounds)
Street Sweepings - Dry Mass Collected (kg)	0	0	0
Amount of TN Removed (kilograms)	0	0	0
Catch Basins - Dry Mass Collected	17.47	17.47	14
Amount of TN Removed (kilograms)	17.47	17.47	14
BMP - Dry Mass Collected	0	0	0
Amount of TN Removed (kilograms)	0	0	0
GRAND TOTAL TN REMOVED (KILOGRAMS) =	17.47	17.47	14
GRAND TOTAL TN REMOVED (POUNDS) =			30.241



Where can we save?



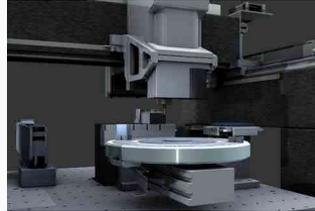
Save money, time, steps, etc.

Bulk Field Measurements



www.soptechint.com

Manufacturing & Shipping Larger Quantities



SOP Technologies | soptechint.com | info@soptechint.com | 305-792-8778

Plan with other Infrastructure Projects



Bulk Installations



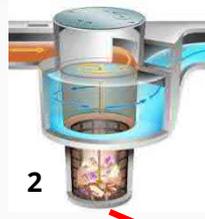
What are the long-term maintenance and operations needs?



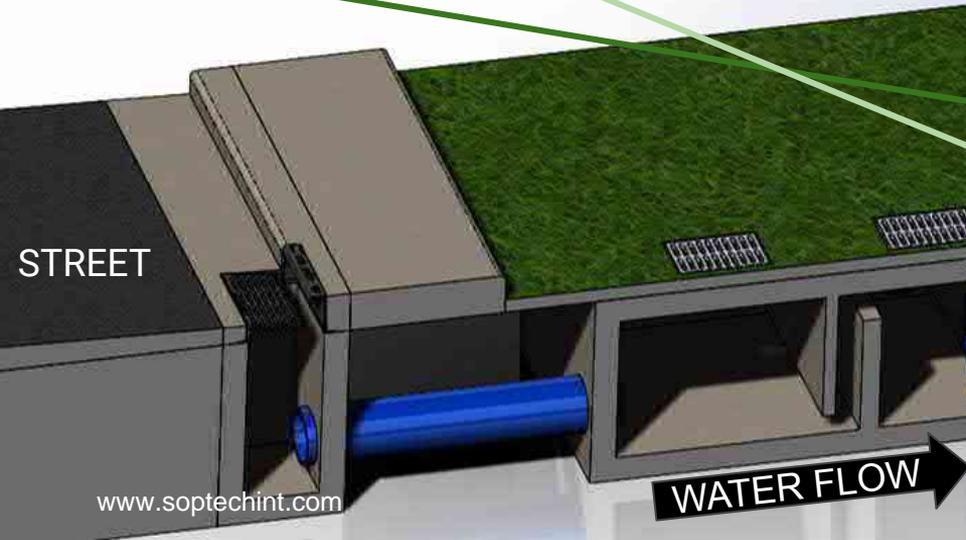
Street Cleaning



Catch Basin Cleaning



2



Cost \$/Pound: PM, TP, TN Separation or Recovery

Separation or Recovery Method	Cost (\$/lb) (excluding SW landfill costs)		
	TN	TP	PM
BMP Treatment Train ^a	935	32,600	26
FL Database for BMPs ^b	1,900	10,500	41
Screened Hydrodynamic Separator ^c	3,730 (1,280 - 14,860)	9,210 (3,170 - 36,680)	4 (1 - 13)
Baffled Hydrodynamic Separator ^c	3,020 (1,280 - 14,860)	7,450 (3,170 - 36,680)	3 (1 - 13)
Street Cleaning (lowest cost)	165	257	0.10
Catch Basin Cleaning ^d (2nd lowest)	1,016	1,656	0.70

^a Wet basin sedimentation followed by granular media filtration, UF, 2010.

^b TMDL database for FL Best Management Practices, 2009

^c Based on 2000 m² urban catchment draining to a screened hydrodynamic separator (HS) with 50% PM annual removal efficiency *based on clean sump conditions*

^d Based on 100 dry pounds of PM recovery with an annual cleaning frequency

Sansalone, John. Screenshot from presentation during the BBMHC Webinar:
<https://soptechint.com/blog/2021/11/16/stormwater-management-webinar-maintenance-john-sansalone-phd-pe-february-19-2021>

2. EPA: <https://www.epa.gov/trash-free-waters/trash-capture-technologies#drain>

What is the expected pollution prevention?



Stormwater
Manager



Emilio



SOP Technologies



Leaves and Litter Capture

Cigarette Butts

Plastic bottles, lids and other larger plastics

Plastic bottle caps, wrappers and smaller plastics

Glass bottles

Paper wrappers, napkins and paper products

Metal cans and metal objects

Styrofoam pieces and other materials

How can we analyze results?



FSA-MS4 Load Reduction Tool updated 2019
Home • Downloads • Division of Water Resource Management • NPDES Stormwater Program • FSA-MS4 Load Reduction Tool updated 2019

NPDES Stormwater Program Quick Links

Document: [2019_FSA-MS4 Load Reduction Assessment Tool updated 7-28-19.xlsx](#)
 Document Type: Educational
 Author Name: Bull_M

Program Areas

Enter Weight of Solids⁽¹⁾ Removed - Calculate Equivalent Dry Weight

FSA 2019

Category of Maintenance Activity	For Dry Solids by Weight		For Wet Solids by Weight ⁽²⁾		Sum of Calculated Equivalent Dry Weight Collected (Kilograms)
	If Known, Enter Weight of "Dry" Solids ⁽¹⁾ (Pounds)	Enter Weight of Wet Solids (Pounds)	Enter Moisture Content ⁽²⁾ as decimal i.e., "0.15"	Calculated Weight of Dry Solids (Pounds)	
Street Sweepings	0	0	0.04	0	0
Catch Basin Cleanout	38,529	0	0.24	38,529	17,477
BMP Cleanout	0	0	0.33	0	0

GREEN Denotes Cells for DATA ENTRY
 ### BLUE Denotes Calculation Results

Better for use with SOP Tech screens.
 This is more for the downstream devices.

Calculated Nutrient Load Reductions from MS4 Maintenance Practices
 FSA 2019

	Subtotal TP Removed (Kilograms)	Subtotal TP Removed (Pounds)
TOTAL PHOSPHORUS		
Street Sweepings - Dry Mass Collected (Kg)	0	0
Amount of TP Removed (Kilograms)	0	0
Catch Basins - Dry Mass Collected	17,477	15
Amount of TP Removed (Kilograms)	7	15
BMP - Dry Mass Collected	0	0
Amount of TP Removed (Kilograms)	0	0
GRAND TOTAL TP REMOVED (KILOGRAMS) =	6.60617	
GRAND TOTAL TP REMOVED (POUNDS) =		14.56660
TOTAL NITROGEN		
Street Sweepings - Dry Mass Collected (Kg)	0	0
Amount of TN Removed (Kilograms)	0	0
Catch Basins - Dry Mass Collected	17,477	30
Amount of TN Removed (Kilograms)	14	30
BMP - Dry Mass Collected	0	0
Amount of TN Removed (Kilograms)	0	0
GRAND TOTAL TN REMOVED (KILOGRAMS) =	13.719	
GRAND TOTAL TN REMOVED (POUNDS) =		30.251

Instructions | INPUT Solids Weight | INPUT Solids Volume | **Calculated Load Reductions** | Nutrient Values

Community Participation



NO DUMPING!

This storm drain uses a stormwater filter to protect local waterways. Scan the code to learn more.

2222

DRAINS TO WATERWAYS



Download the Excel Spreadsheet:

<https://floridadep.gov/water/stormwater/documents/fsa-ms4-load-reduction-tool-updated-2019>

Is there a financial ROI?

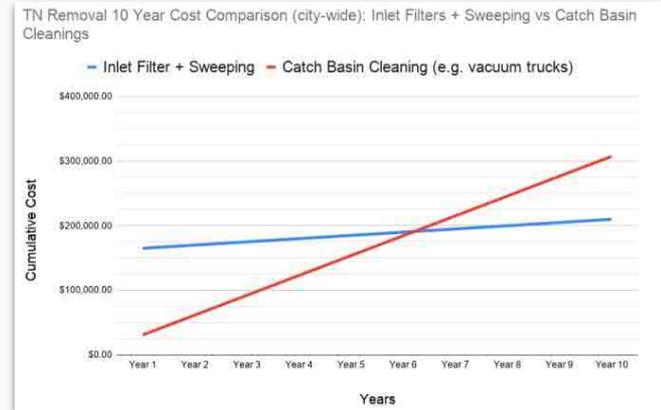
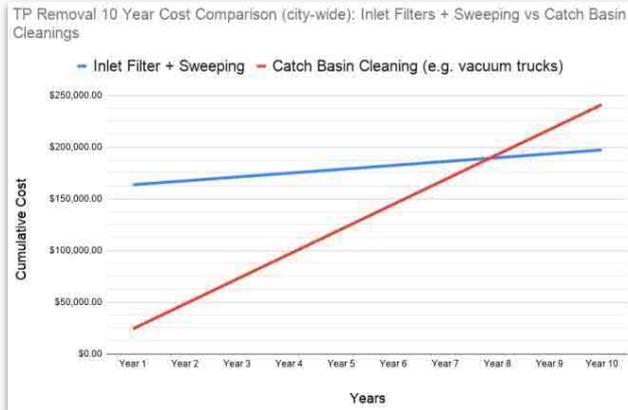


The **net cost savings** per inlet with a curb inlet filter is \$188 - \$420 within 10 years. This includes the cost of the filter, filter installation, and ongoing debris removal using street sweeping after filter implementation.

Operational Benefits with Street Sweeping: Collecting leaves, debris and street litter costs much less using street sweepers when compared to using vacuum trucks. Implementing stormwater inlet filters allowed the City of Aventura to collect significantly more debris with street sweepers, thereby saving money.

Street Sweeping
\$257 / lb. of TP
\$165 / lb. of TN

Catch Basin Cleaning
\$1,656 / lb. of TP
\$1,016 / lb. of TN



Do you have references & testimonials?



Stormwater
Manager



Emilio



"It has not been necessary to clean the drains since the devices have been installed. The filter does what it is designed to do, all debris is collected at the inlet, keeping it out of the basin."

- Public Works Director, Village of Virginia Gardens, FL Customer

"We committed, based on the pilot program, to fund 1,000 of the curb inlet screens to be placed in our downtown area, which is where we have probably the greatest challenge of plastics, floatables and debris getting into our system. That's projected to capture a lot of nutrients that otherwise are flowing into the bay right now."

- Department of Resilience and Public Works Director, City of Miami, FL Customer

"I was amazed at the results because of the way the water flows and the leaves and the debris do not block the filter."

- Engineer and Faculty Member, Miami-Dade College

"It is in the best interest of the city to purchase these filters from SOP Technologies. Staff have tested filters from two companies. The SOP product is much stronger and better built. They are comparable in price. No other comparable products exist to staff's knowledge after lengthy research. The filters have been effective at keeping debris out as intended and have had no mechanical or corrosion issues to date."

- Utilities Director, City of Key West, FL Customer

How can you engage your community to help tackle stormwater pollution?

Community Engagement Survey

Inputs from several organizations



TOWN of CARY
NORTH CAROLINA



Watershed Connections, LLC



Survey: Recurring Themes



1. **Partnerships:** Establish long term multi-stakeholder engagement: NGOs, businesses, local leaders, influencers, etc.
2. **Education:** Educate kids and adults about stormwater pollution and how it happens (including data and science).
3. **Resources:** Provide resources so individuals and organizations know what they can do.
4. **Messaging:** Have consistent and frequent messaging.
5. **Connect with nature:** Take people to physically see the problem (at the street level, streams, canals, etc.).
6. **Enforcement:** Increase enforcement of litter laws.
7. **Community Data:** Provide a way for community members to gather and report data about stormwater pollution.
8. **Action:** Take action on projects and obtain commitments from others.
9. **Incentives:** Provide incentives for best practices.
10. **Funding:** Increase funding to address the problem.
11. **Several Solutions:** Use several solutions to tackle the problem (there's no silver bullet).
12. **Fun:** Make it fun and entertaining.

Many Opportunities and Programs



K-12 Education Resources

Education for Organizations and Adults

Hosting Webinars

Organizing Cleanups

Crowdsourcing and Mobile Apps

Trained Volunteers

Cigarette Litter Prevention Programs

Art and Stormater

Businesses and Pledge Programs

Finding partners

- Google search terms:
 - [city/region] surfrider
 - [city/region] waterkeeper
 - [city/region] riverkeeper
 - [city/region] volunteer clean up
 - [city/region] environmental groups
- Local Government Sustainability and Environmental Committees
- Global Organizations
 - [Surfrider Foundation](#)
 - [Ocean Conservancy](#)
 - [Waterkeeper Alliance](#)



Community Participation Programs

- [SOP Technologies Community Stormwater Watch](#)
 - Stormwater filters (BMPs)
 - QR Code for uploading photos and easy reporting via the web
- [San Francisco Adopt-a-Drain](#)
- [City of Fort Lauderdale](#)
- [Respect Our Waters](#)
- [Adopt-a-Drain.org](#)

SOP Technologies Storm Drain marker with QR code





Webinar survey: <https://forms.gle/NonTYN3ZRE8YsYRB8>



Questions and Answers



Thank you!

Emilio Lopez

SOP Technologies, CEO

emilio@soptechint.com



Additional Resources

K-12 Education Resources



- [American Public Works Association K-12 Resources](#)
- [City of Dallas resources for students and teachers \(and videos\)](#)
- [Lake County, FL Water Atlas Stormwater Education \(see Kid's Corner\)](#)
- [Pasco County Stormwater Drain Marker Program](#)
- [EPA Storm Smart Schools guide \(detailed program\)](#)
- [Clean Water Education Partnership \(videos and other resources\)](#)
- [Debris Free Oceans \(virtual education resources\)](#)

Education for Organizations and Adults



- [EPA NPS Outreach Toolbox](#)
- [Lake County, FL Water Atlas Stormwater Education \(businesses too\)](#)
- [Clean Water Campaign resources for various organizations](#)
- [North Central Texas Council of Governments BMP library](#)
- [Rhode Island Stormwater Solutions \(resources for individuals\)](#)
 - [Education materials by pollutant](#)
- [Gulf Coast Foundation Community Playbook](#)
- Bonus: Block parties that feature tours of existing green infrastructure in the neighborhood.

Hosting Webinars

2-3 months before webinar

Select speakers and topics, and create timeline with action items. Set weekly planning meetings with your core team.

1-2 weeks before webinar

Promote the webinar via social media, email, etc. Have a practice session with all presenters/speakers.

During the webinar

Have assigned roles. Separate the work of presenting from IT troubleshooting. Make it as interactive as possible.

Within 1 week after the webinar

Send follow-up email with resources and survey to request feedback.

Sample webinars:

- [Stormwater Management Webinar \(Biscayne Bay Marine Health Coalition\)](#)
- [Biscayne Bay Marine Health Coalition Town Hall](#)



Organizing Cleanups

- [Kent Island Beach Cleanups](#)
- [Colorado Springs Utilities Creek Week webinar](#)
- [Volunteercleanup.org](#)
 - [Corporate Day of Service](#)
- [Ocean Conservancy \(and International Coastal Cleanup\)](#)
- [Eneco Clean Beach Cup \(large event - view video and slides\)](#)
- [Fountain Creek Week](#)
- Example with sports: [Athletes 4 The Sea](#)
- Stations with bags: [Fill A Bag Stations](#)



HOW TO CONDUCT YOUR OWN CLEANUP

A SOLID BEACH CLEANUP DOESN'T NEED TO TAKE A HUGE CHUNK OF YOUR DAY AND IT DOESN'T NEED TO BE AN ORGANIZED EVENT. EVERY PIECE OF TRASH REMOVED MAKES A DIFFERENCE. EVEN 5 MINUTES SPENT COLLECTING LITTERED DEBRIS ON THE BEACH OR IN THE STREETS ON YOUR WAY TO WORK OR SCHOOL CAN MAKE A HUGE IMPACT.

- 01** Pick a location you feel needs a little TLC.
- 02** Some locations require permission, so be sure to contact your local government agency. Inquire where to place collected trash.
- 03** Get supplies: trash bags and/or bucket, gloves, trash picker, and water.
- 04** Take BEFORE pictures—it is always good to demonstrate what the location looked like before you start cleaning.
- 05** Don't just look for the "BIG" pieces of trash. If cleaning a beach, look for the tide line and you'll see micro-debris (the most deadly).
- 06** Take MORE photos of the debris you collect. SHARE on social media to encourage others to do the same.
- 07** Reflect on what you have learned, and most importantly, HAVE FUN!

KIBCU
KENT ISLAND BEACH CLEANUPS

SOURCE: KENT ISLAND BEACH CLEANUPS-KIBCU

Crowdsourcing and Mobile Apps

- [Clean Swell App - Ocean Conservancy](#)
- [Water Reporter App](#)
- [1,000 Eyes on the Water](#)
- [Marine Debris Tracker](#)
- [Litterati](#)



Trained Volunteers

- [National Stormwater Center](#)
- [Miami Waterkeeper 1000 Eyes on the Water](#)
- [Raleigh Stormwater Volunteers](#)
- [City of SeaTac, WA Stormwater Volunteers](#)



Cigarette Litter Prevention Programs



- Keep Southwest Virginia Beautiful ([cigarette prevention presentation slides here](#))
- Keep America Beautiful ([grant and program resources](#))

Cigarette Litter Prevention Program

Upper Tennessee
River Roundtable



Art and Stormwater

- [Bay Soundings Murals on Storm drains](#)
- [Yellow Fish Road Program Guide](#)
- [Blue Water Baltimore](#)
- [Washed Ashore art exhibits](#)



Businesses and Pledge Programs

- [Surfrider Ocean Friendly Businesses - a type of certification for restaurants](#)
- [My Chesapeake Clear Choices Community Pledge Program](#)
- [A & E Straws engaging businesses to reduce straws usage \(webcast\)](#)

