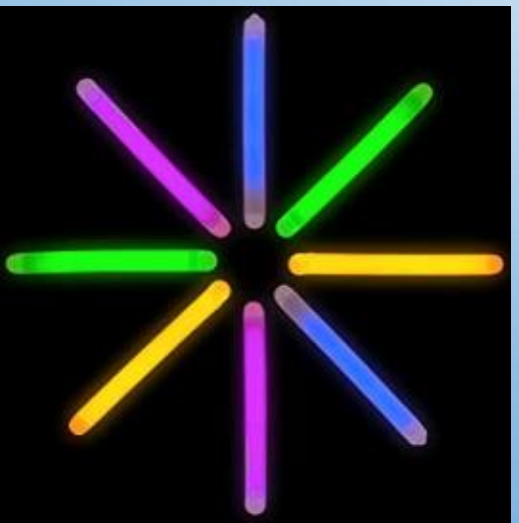
The Nurdle Bill,
the Plastic Industry's Smoking Gun
and
the Push Toward a Circular Economy

Microplastic Team Meeting
May 18, 2020



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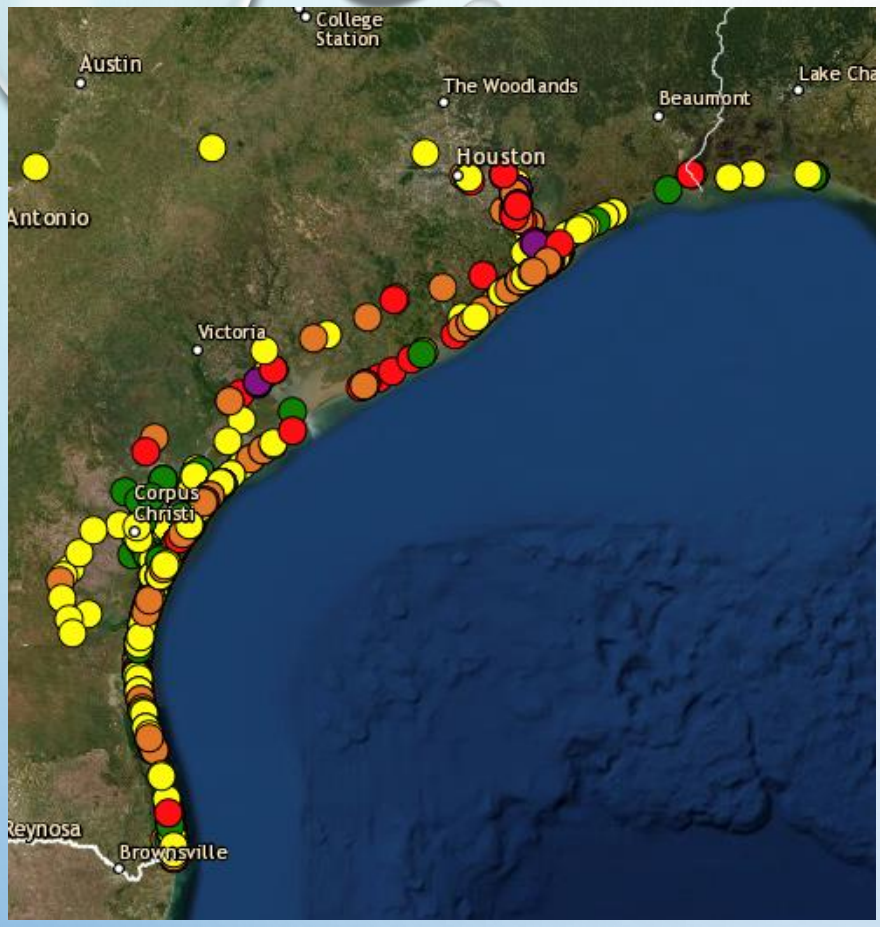

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A BILL TO BE ENTITLED
AN ACT

relating to the regulation by the Texas Commission on Environmental Quality of the release of preproduction plastic from facilities.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:
SECTIONA1.AASubchapter B, Chapter 26, Water Code, is amended by adding Section 26.0481 to read as follows:

Sec. 26.0481. REGULATION OF RELEASE OF PREPRODUCTION PLASTICS.

(a) In this section:

(1) "Facility" means a facility where preproduction plastics are manufactured, handled, or transported.
(2) "Preproduction plastic" means plastic resin pellets, flakes, fibers, powders and powdered coloring for plastics.
(3) “Zero discharge” means no transport of preproduction plastics by stormwater or wastewater to a water body outside the property line of a facility.
(4) “Zero release” means no transport of preproduction plastics to land outside the property line of a facility.
(5) “Total suspended solids” means solids in stormwater other than preproduction plastics.

(b) The commission by rule shall adopt and implement a program to regulate the release and discharge of preproduction plastics from point and nonpoint sources at facilities and to require environmentally responsible cleanup of those plastics. The rules shall require that:

(1) New facilities are required to apply for an individual stormwater permit instead of the Multi-Sector General Permit.
(2) When renewing all existing stormwater permits, the commission shall require facilities with Multi-Sector General Permits to apply for individual stormwater permits.
(3) All wastewater and individual stormwater permits under these rules shall require that:

(i) zero discharge and zero release of preproduction plastics of may occur from the facility;
(ii) the facility will conduct monthly monitoring outside the property line of the facility and in any receiving waters for wastewater or stormwater discharges to confirm that the zero discharge and zero release requirements are being met, with stormwater monitoring conducted within 8 hours of a rainfall event;
(iii) any preproduction plastics found outside the property line of a facility will be presumed to have been released or discharged by that facility, and
(iv) the facility will report any exceedance of the zero discharge and zero release requirements to the commission within 2 working days;

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The Nurdle Bill will:

Establish "zero discharge" and "zero release" standards for stormwater and wastewater discharges from plastics plants, replacing the vague "trace amounts" and "essentially zero" language in existing discharge permits that is difficult to measure and enforce.

Address water and land-based pollution consisting not just of nurdles, but also plastic flakes, fibers, powders and powdered coloring.

Require facilities that manufacture, handle or transport preproduction plastics to apply for a more comprehensive individual stormwater permit instead of the Multi-Sector General Permit. (Sector Y for plastics manufacturing facilities in the Multi-Sector General Permit requires only minimal best management practices and monitoring only for zinc in stormwater discharges).

Require:

1) Containment systems with a capacity to handle the peak flow from a 5-year, 24-hour storm at all storm drain discharge locations in a facility to capture floating and sinking plastics;
2) Sealed containers, capture devices and vacuum systems at loading and unloading locations in a facility;
3) Good housekeeping and spill prevention procedures;
4) A maintenance program to ensure that all best management practices are kept in working order;
5) A source control and inspection program for all transport of plastics off site; and
6) An employee training program.

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The Nurdle Bill will (Continued):

Require monthly monitoring outside the property line of a facility and stormwater monitoring within 8 hours of a rainfall event. If a discharge or release is observed, the company must report it to TCEQ within 2 working days. Reporting must include photos with a GPS location and an estimated count of the plastics.

Establish that any exceedance of the zero discharge and zero release standards are a violation of the permit and that the facility owner/operator must clean the discharge/release up in a manner that cleans up the most plastics possible without causing harm to the ecosystem.

Create a new procedure for qualifying for a Conditional No Exposure Exclusion: If a facility owner/operator claims that they have no chemicals, contaminated equipment or preproduction plastics that are exposed to rainfall, and that they wish to be exempt from a stormwater permit, TCEQ must inspect the site for verification before granting the exclusion.

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SPECIAL ISSUE-LETTER

Microplastic contamination in Corpus Christi Bay blue crabs, *Callinectes sapidus*

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Texas A&M University—Corpus Christi, Coastal Health and Water Quality Lab, Corpus Christi, Texas

Scientific Significance Statement

Plastic materials have been observed in marine and coastal ecosystems around the world and while their full effects are not completely understood, they negatively impact a variety of organisms. Invertebrates have been observed with plastic in their guts, but it is unknown if blue crabs, which are an important U.S. commercial and recreational fishery, consume these materials. This article reinforces the importance of quality control, proper methodology, and material confirmation in microplastic studies and provides evidence that blue crabs in Corpus Christi Bay, TX ingest microplastic fibers and particles.

Abstract

Microplastic pollution has been observed in marine environments around the world and has the potential to negatively impact marine organisms if ingested. Blue crabs (*Callinectes sapidus*) are susceptible to this pollution because they feed in sediment where dense plastics accumulate. Microplastic ingestion by blue crabs was assessed in Corpus Christi Bay, TX. Crab stomachs were extracted and digested using a hydrogen-peroxide based tissue destruction method followed by material confirmation using microattenuated total reflectance Fourier transform infrared spectroscopy (μ-FTIR). From the 39 blue crabs sampled, 28 fully synthetic fragments and fibers and 24 semisynthetic fibers were found within their stomachs. After correcting for possible contamination, 36% of collected blue crabs contained fully synthetic fragments and fibers and semisynthetic fibers with an estimate of 0.87 items per crab. This study demonstrates the need for further studies that assess the impacts of plastic ingestion on blue crabs.

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Author Contribution Statement: E.N.W. and J.L.C. worked together and contributed to the initial preparation of the manuscript. E.N.W. proposed the initial research question of whether or not blue crabs were exposed to and contaminated by microplastics. Both E.N.W. and J.L.C. refined and developed the sampling methods, lab methodology, and sample analysis. E.N.W. conducted the field sampling and processing of blue crabs according to developed methods. E.N.W. and J.L.C. analyzed the results and wrote the initial paper together. N.L. effort focused on revising the original manuscript, where he played a vital role in addressing comments, reviewing data, and general editing.

Data Availability Statement: Data and metadata are available at https://doi.org/10.5061/dryad.mpg4f4qtr or can be accessed at https://datadryad.org/stash/share/DI0rf4gZI2lw42n3QCnFkIf3sNpTMfguezTiTeax4d8.

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Research article

The world is your oyster: low-dose, long-term microplastic exposure of juvenile oysters

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Histology
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ABSTRACT

Bivalve filter feeders, such as oysters, filter large volumes of water and are particularly exposed to microplastics (MP). Consequently, these animals digest and assimilate high levels of MP in their bodies that may likely impact their physiology, and potentially affect shellfish stocks, benthic habitats and, indirectly, the health status of the marine ecosystem and human consumers. In this study we exposed juvenile oysters, *Crassostrea gigas*, to 3 different MP concentrations (10^4, 10^5 and 10^6 particles L^{-1}), represented by 6μm Polystyrene (PS) microbeads, compared to a control treatment receiving no MP. The study ran for a period of 80 days to test for the impacts of MP on growth, Condition Index and Lysosomal Stability. From histological analysis, microbeads were detected in the intestines of exposed oysters and in the digestive tubules, but no cellular inflammatory features were observed over time. Weight and shell length remained comparable between the different treatments and control. We found that Condition Index in the highest concentration increased initially but significantly reduced over time. The oysters in the highest MP exposure also showed the lowest mean Lysosomal Stability score throughout the experiment. Lysosomes play a vital role in the cells defense mechanisms and breakdown of constituents, crucial for the oysters' wellbeing. Most importantly, we detected an increased mortality in those oysters who were chronically exposed to the highest loads of MP.

1. Introduction

It is well established that the marine environment is widely polluted with MPs (<5 mm) and that this issue poses a serious threat to marine biota [1, 2]. Bivalve filter feeders living in coastal waters, such as oysters, are particularly exposed to MPs because of their feeding mode and enormous filtration capacity; individual oysters can filter ~5–25L of seawater h-1 [3, 4, 5], making them likely to ingest MPs [4, 6]. Many specimens have been found to contain high loads of MPs in the field [1]. Microplastics in oysters are directly related to the population density within the watershed. Hooded oysters, *Saccostrea cucullata*, along the Pearl River Estuary (China) near urban areas contained statistically significantly more MPs than those near rural areas [7]. Bivalves ingest and assimilate high levels of MPs in their bodies that may likely impact their physiology, and potentially affect both shellfish stocks, habitats and, indirectly, the health status of the marine ecosystem and human consumers [3, 8, 9, 10, 11]. Bivalves are recommended as ideal sentinel species in several marine monitoring programmes, including those supported by international bodies such as ICES and OSPAR [12]. As a result, bivalves have been recommended as a bioindicator for monitoring MP pollution [13]. They are typically chosen for exposure experiments due to their important role in the economy and the ecosystem. Several experimental studies have shown cellular responses (e.g. loss of lysosomal membrane integrity, oxidative stress, DNA damage) or negative effects on feeding, growth and reproduction of adult bivalves, such as oysters, mussels and clams, after exposure to relatively high concentrations of

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LEGAL, PLASTIC POLLUTION

AUGUST 06 2019

Surfrider Joins Petition Demanding EPA Regulate Pollution from Plastics Manufacturing

by Jennie Romer

Last month, Surfrider joined a legal petition along with more than 270 community and conservation organizations demanding that the U.S. Environmental Protection Agency eliminate plastic pellet discharge and adopt strict pollution limits for toxic waste water from industrial plants that create plastic.

The peition calls for the EPA to take **four specific actions** under the Clean Water Act: 1) **Prohibit the discharge of plastic pellets** and other plastic materials in industrial stormwater and wastewater, 2) Update Effluent Limitations Guidelines and Standards for new facilities to **eliminate the discharge of toxic priority pollutants** from wastewater and stormwater streams, 3) For existing facilities, put into effect Effluent Limitations Guidelines and Standards for **pollutants of concern not currently regulated**, and 4) Update current Effluent Limitations Guidelines and Standards for existing facilities to **reflect advances in detection and treatment technologies** since the last revisions a decade ago.

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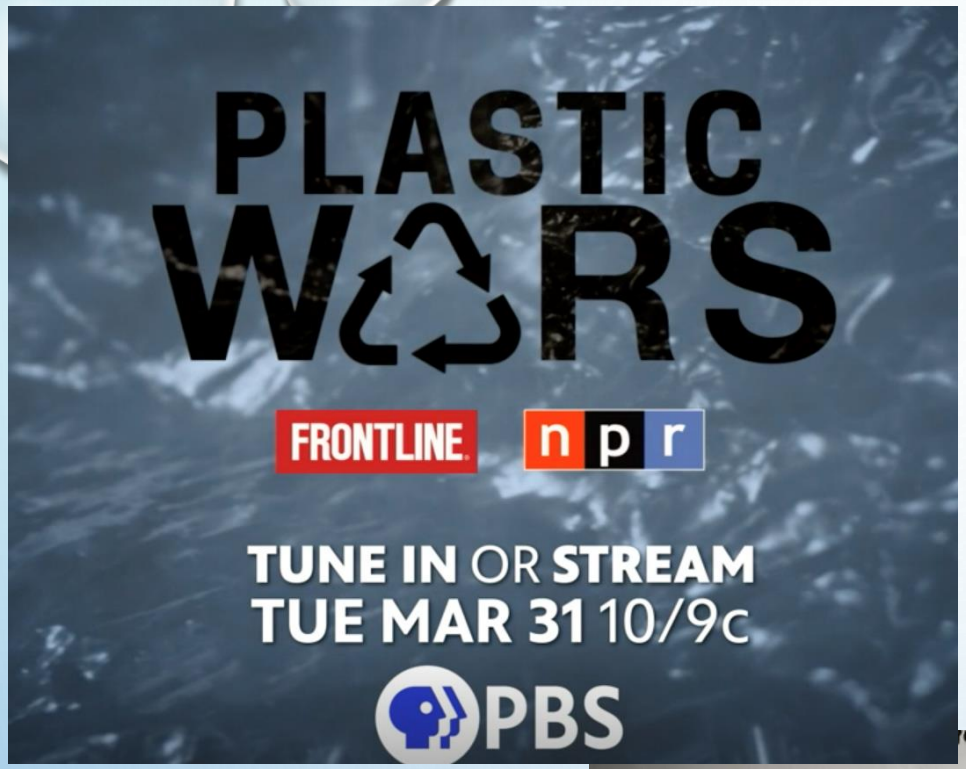

- Name-sensitive plastics users (your customers' customers) are deselecting plastics rather than have their names involved.

Business is being lost. Product growth rates are being dampened. And, stock analysts are beginning to take notice.

There is a growing consensus among plastics executives that we must immediately undertake a major program of unprecedented proportions to reverse this fast-moving tidal wave of growing negative public perception. While the industry has begun to address some of these concerns through SPI's Council for Solid Waste Solutions, much more needs to be done that will reach well beyond the solid waste issue.

The January 15th meeting will feature presentations on the scope of the problem and some innovative concepts to address it. The goal is to demonstrate the critical importance of plastic products and their contributions to environmental progress. It is estimated that this effort will cost upwards of $50 million a year for the next three

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mentioned in my paper we have documented 20 to 25 additional case histories on recycling of plastics from post consumer waste. The recycling of plastics from this source poses the greatest challenge for three reasons: 1) there are no established procedures for separating the plastics from other waste; 2) there are no established markets for contaminated, mixed plastics; and 3) the techniques of cleaning and separating the mixed plastics in major kinds of resins has not been developed for large scale economic application.

material of one kind can be obtained in volume quantities. However, the recovery of large quantities of completely sorted plastics may never become a broadly practiced procedure at the consumer level and there is serious doubt that it can ever be made viable on an economic basis.

The plastics industry is continuing to experiment with and test degradable forms of plastics

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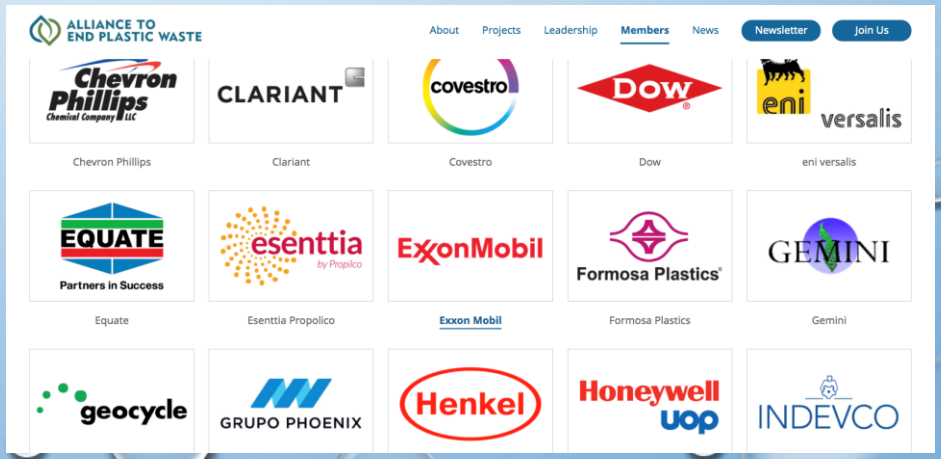
Spring break 2019: 30 tons of trash is left behind on Corpus Christi, Port Aransas beaches



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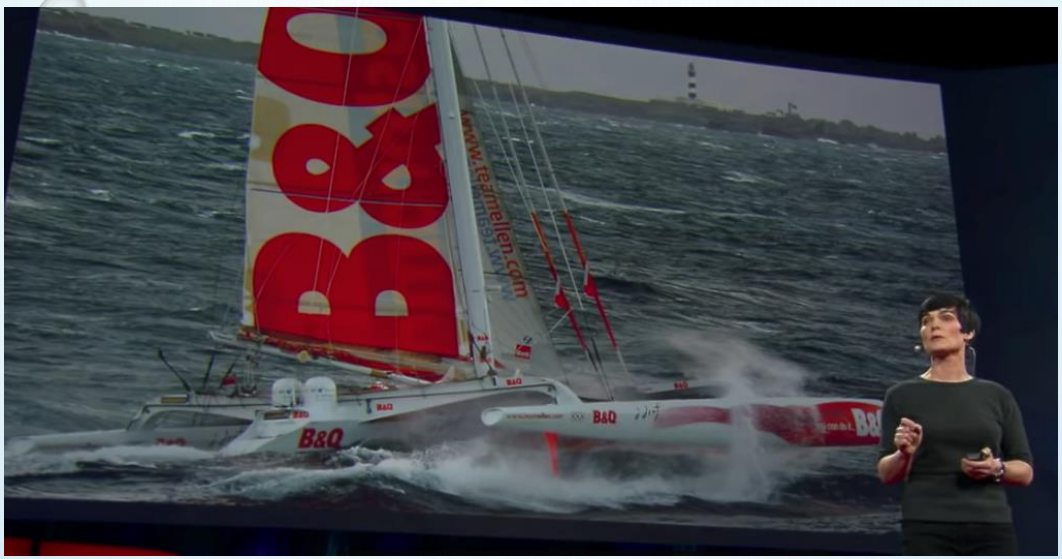

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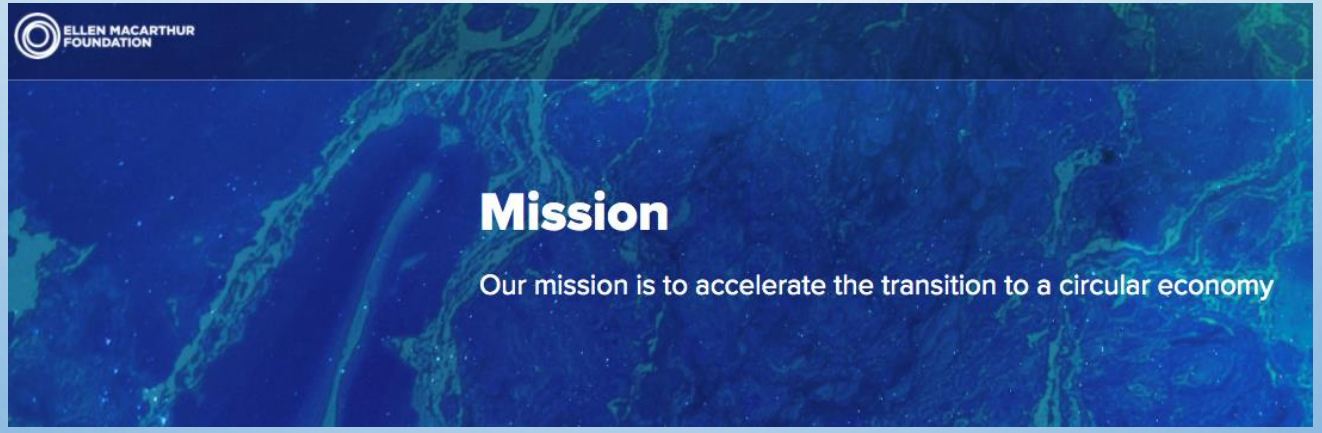

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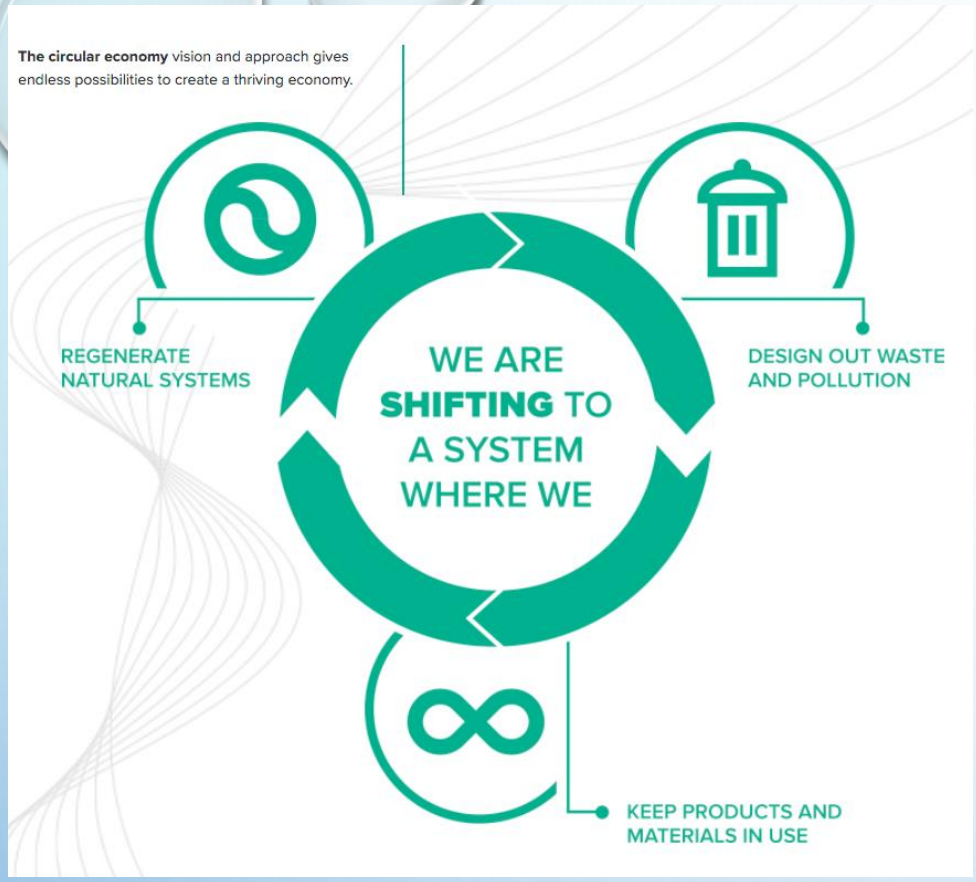

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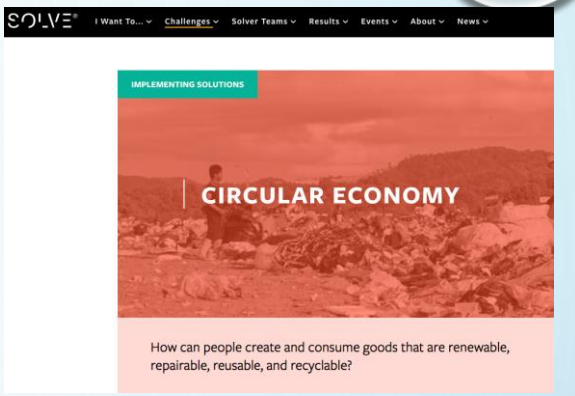

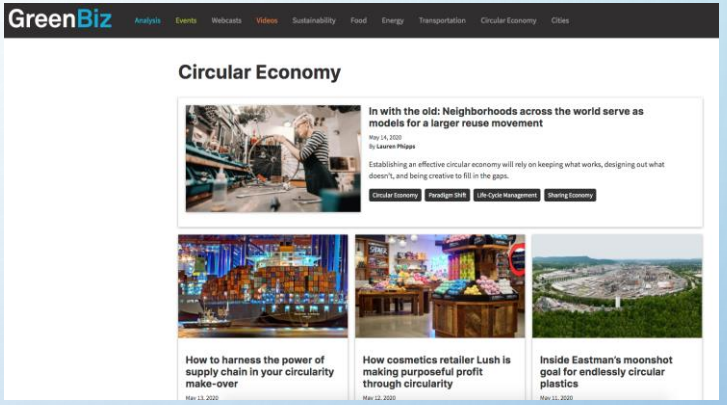

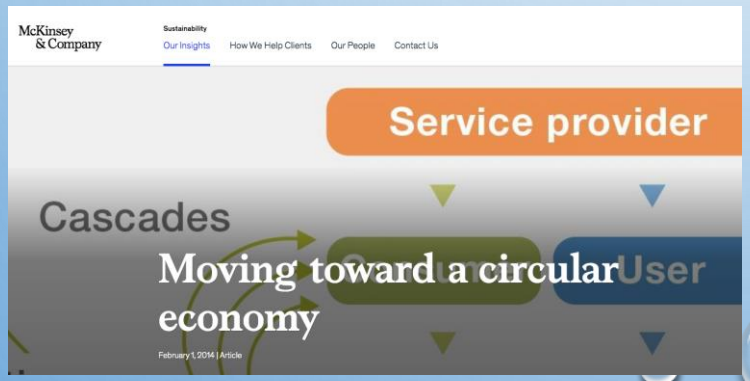

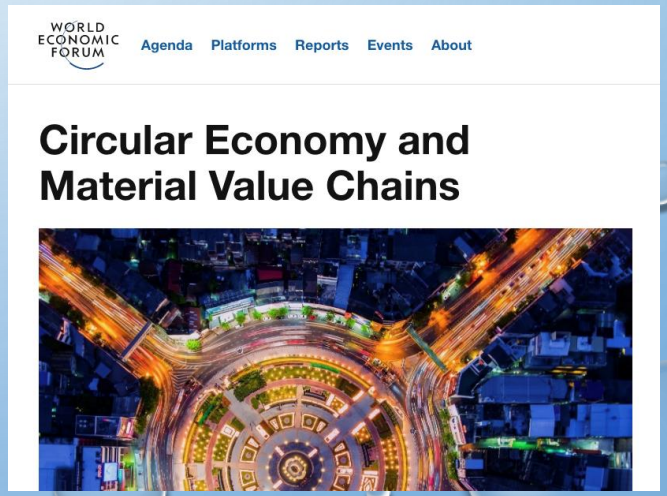

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