

## Plastic Bags on Our Backs

By Teresa Platt, Executive Director, FCUSA

Created in the 1970s as an inexpensive convenience, the plastic bag is now an everyday item with costs that are adding up fast. We use tens of billions of bags a month, or about half a million bags a minute!<sup>(1)</sup> The vast majority are used only once and end up as litter or in landfills.

Because plastic bags are light and compressible, they constitute only 2% of landfill by volume.<sup>(2)</sup> The crux of the problem is their mineral origin. While materials, natural and synthetic, that derive from vegetable or animal matter are fully biodegradable, those derived from mineral matter are not. And the origin of the ubiquitous plastic bag is, of course, oil.<sup>(3)</sup> So they don't biodegrade, and eventually disintegrate into smaller and smaller polymer pieces that can become sources of pollution in their own right as they migrate into the food chain. The plastic bags we use today will be with us virtually forever.<sup>(4)</sup>

Even more sobering are reports of a massive, swirling dump of debris, mostly plastics, fouling the ocean.<sup>(5)</sup> Floating "clouds" of waste carried by currents into the "North Pacific subtropical gyre" result in a vortex of flotsam halfway between San Francisco and Hawaii. This was just an interesting phenomenon when the debris was all organic matter in various stages of decomposition. But the modern-day Pacific Garbage Patch, as it is now called, has been growing, along with ocean debris worldwide, tenfold every decade since the 1950s when we started our love affair with the "cheap" convenience of inorganic plastic. The Pacific Garbage Patch is now twice the size of Texas, a 3.5-million-ton soupy mass, 80% of it plastic.<sup>(6)</sup>

Now such knowledge is hitting us where we shop. In an effort to reduce usage of the common plastic bag, cities from New York to San Francisco and countries from China to Australia have passed laws and regulations to address the problem, experiencing various levels of success.

Ireland, an island country that declared it had run out of landfill space,<sup>(7)</sup> has been more successful than most. With a young population open to change, Ireland addressed the issue by slapping a tax (equivalent to US 33 cents) on each plastic shopping bag. The result was a stunning 94% reduction in usage within weeks.

Articles lauding this feat featured pictures of happy shoppers pushing carts full of canvas shopping bags - reusable, biodegradable, recyclable, and made from a renewable resource.

Ironically, these very same eco-friendly shoppers have houses full of plush toys<sup>(8)</sup> and were wearing synthetic clothing (essentially plastic bags in another form) on their backs. Plastic plush toys, plastic clothing, plastic belts, plastic purses and wallets, plastic stockings, socks and even shoes. Plastic clothing in its many forms does not biodegrade as it too, like the plastic bag, is chemically manufactured from the same non-renewable oil.

And statistics show that little of this form of plastic, plastic clothing, is reused or recycled.

One has to ask, is plastic clothing killing us?

The *International Herald Tribune* commented on Ireland's test case, "Plastic bags became socially unacceptable - on par with wearing a fur coat or not cleaning up after your dog."



Teresa Platt

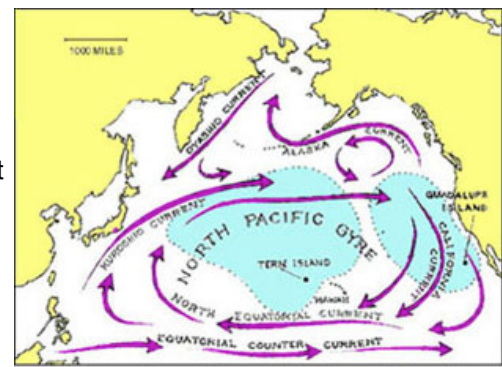


Image: Algalita Marine Research Foundation.

[Navigating the Pacific's "Garbage Patch"](#),  
National Public Radio, Oct. 28, 2007.



To be considered "green" or "environment-friendly", apparel and accessories should be made from natural materials that are:

Renewable / Durable, long-lasting / Reusable, recyclable / Biodegradable / Non-polluting, non-toxic / Energy-efficient in their production, use and disposal

The *IHT* neglected to take the thought much further, ignoring the fact that the alternative to natural fiber fur garments, which it so blithely dissed, is, of course, plastic clothing made from oil. (It also missed the irony that people who do clean up after their dogs, generally use plastic bags!)

Synthetic clothing materials such as eco-fleece, polyester, nylon and pleather (fake leather), and all those fuzzy plush toys, are all just plastic in other forms.<sup>(9)</sup> In the UK, approximately 90% of clothing is imported and fully 1.5 to 2 million tonnes of clothing waste is generated every year!<sup>(10)</sup> Of this clothing offal:

- 63% (1.2 million tonnes) enters the household waste stream going to landfills;
- 16% (300,000 tonnes) is recovered;<sup>(11)</sup>
- 21% is unaccounted for, and assumed to fill the "national wardrobe" - closets and drawers.

Very little fiber - less than 3% - is re-used in the UK.

Volumes of fibers produced, imported or exported for the UK are:

- 60% synthetic;
- 29% non-synthetic or natural fibers (of which 15% is cotton).<sup>(12)</sup>

From these figures we can estimate that 60% of the clothing waste that ends up in British landfills is composed of non-biodegradable synthetics adding up to 720,000 tonnes of waste annually.

But these figures are just for the UK where the population is 60 million souls. The Earth's population is 100 times that. But most of the Earth is full of stalwart fans of natural fibers so it is most likely misleading to extrapolate the UK figure out to the rest of the world. If we did, we'd have 72 million tonnes of plastic clothing waste piling up every year.

Humans have succeeded in a vast manipulation of chemical compounds but we are not all locked into this model, the short-term cheap/long-term expensive plastic clothing culture seen in the UK. Not yet anyway.

Meanwhile, the UK is simply awash in plastic clothing and seeks solutions.

The *Daily Mail* interviewed environmentalists on the subject of natural fiber clothing versus inorganic synthetic clothing, plastic clothing. Said one, "Most people have no idea that every time they buy [synthetic clothing] they are helping to pollute the world."

The *Daily Mail* determined that more than half of the UK's emissions of the poisonous greenhouse gas nitrous oxide comes from nylon production. The same report included a comment from consumer magazine *In Touch*: "[S]ynthetic materials are responsible for large-scale factory pollution of our waterways, rivers, canals and even the sea."

In a recent WWF report, [Deeper Luxury](#) (p32), the manager of a suit outfitter lamented, "Ninety per cent of [the] clothing [that] people buy these days ends up as landfill within two years." He also noted, however, that high-end brands defy this trend, offering repair facilities to ensure that natural fiber garments last several years or even generations.

Commented an environmentalist to the *Daily Mail*, "Unlike a real fur coat which can be refashioned and may last a lifetime, a fake fur jacket is likely to be thrown out at the end of the season" to end up in a landfill.<sup>(13)</sup>

### Heavy carbon footprint for synthetics

The Fiber Economics Bureau<sup>(15)</sup> determined that approximately 55% of the fiber in US landfills was synthetic in origin. This is in line with the recent 2007 UK estimate of 60%.

The Environmental Protection Agency (EPA) assigned an average carbon content of 70% to synthetic fiber using the production-weighted average of the carbon contents of the four major fiber types (polyester, nylon, olefin and acrylic). A carbon content of 85% was assigned to synthetic rubber and leather.

The EPA notes that, "As a biogenic material, the combustion of leather is assumed to have no net carbon dioxide emissions." We would assume the same would hold true for real, natural fiber fur products (which are simply leather with the animal hair retained for warmth), not that you'll find any in your local landfill!<sup>(16)</sup>

Source: [Methodology for Estimating Municipal Solid Waste Recycling Benefits](#), November 2007, EPA, and [Annex I](#).

### Biogenic insulation

A [recent study](#) on heat-insulation materials sponsored by the Deutsche Bundesstiftung Umwelt noted that most are developed from fossil fuels and inorganic substances such as plastics. But there is a growing interest in alternative natural materials that are renewable, currently representing about 5% of the insulation market. When they reach the end of their useful life, these materials may even be recycled organically (by composting) or energetically without affecting the CO<sub>2</sub> regime. The report raved about the desirability of "all-biogenic heat-insulation materials."

"There it will sit with the rest of the tights and stockings made of nylon which have been discarded. Buried out of sight, but a few feet under the ground, the chemicals in them can seep out into nearby fields and rivers. It is a pollution threat to humans, wildlife and our domestic animals."<sup>(14)</sup>

## What the experts say ...

From [Biodegradable and sustainable fibres](#), edited by R.S. Blackburn, Woodhead Publishing, 2005.

Introduction by R.S. Blackburn, page xv:

The main problems with synthetic polymers are that they are non-degradable and non-renewable. Since their invention, the use of these synthetic fibres has increased oil consumption significantly, and this continues today; arguably, polyester now is the most used of all fibres, taking over from cotton. Oil and petroleum are non-renewable (non-sustainable) resources and at the current rate of consumption, these fossil fuels are only expected to last for another 50-60 years; the current petroleum consumption rate is estimated to be 100,000 times the natural generation rate.<sup>(17)</sup>

The Energy Information Administration projects that world conventional oil production will peak somewhere between 2021 and 2112, depending on the annual production growth rate (0-3%) and resource estimates (2248-3896 billion barrels). A maximum production growth rate (3% a year) combined with a low resource estimate (2248 billion barrels) gives a peak production year of 2021. For the expected (mean-resource) USGS case (3003 billion barrels) the peak will be somewhere between 2030 and 2075. This means that the raw material for fibres will change.

An even more important problem with the use of fossil energy is the huge translocation of carbon from the ground into the atmosphere accompanied by emissions of sulphur and nitrogen oxides as well as all kinds of hydrocarbons, and heavy metals. Fossil fuels are also the dominant global source of anthropogenic greenhouse gases (GHG). Of even more concern is the ability of polymeric fibres to remain unchanged in the environment as polymers do not degrade very readily, which has exacerbated the already existing ecological and environmental problems of waste building; the volume in waste disposal and landfill is very high.

**Chap. 1. Microbial processes in the degradation of fibers, by P.M. Fedorak, University of Alberta:**

A fiber is the basic element of fabrics and other textile structure. A fiber is typically defined as a material having a length at least 100 times its diameter. These can be natural, such as cellulose or wool, or synthetic, such as nylon. A textile is any product made from fibers. ...

Of course, natural fibers like wool and cotton are broken down through biotic process. Microorganisms have evolved enzymes that attack key bonds in these natural polymers, thereby releasing monomers that can be used as carbon and energy sources for microbial growth. In contrast, microorganisms lack enzymes to break down many synthetic fibers, thus these materials persist and accumulate in the environment.

**Chap. 9. Biodegradable natural fiber composites, by A.N. Netravalli, Cornell University:**

Most of the fibers and resins currently available on the market are derived from petroleum. There are two major problems associated with using petroleum as feedstock for polymers. First, it is a non-renewable (non-sustainable) resource and at the current rate of consumption, by some estimates, it is expected to last for only 50-60 years. Also the current petroleum consumption rate is estimated to be 100,000 times the rate of natural generation rate.<sup>(17)</sup> Second, most fibers and resins, made using petroleum are non-degradable. Although this is desirable in many applications from the durability point of view, at the end of their life, they are not easy to dispose of.

### Notes:

1) [reusablebags.com](http://reusablebags.com) keeps statistics on plastic bag use. See also [www.discountbiodegradablebags.co.uk](http://www.discountbiodegradablebags.co.uk) for information on bio-"plastic" created from organic sources such as plants, as opposed to "traditional" plastics produced from inorganic and non-renewable sources: oil.

2) [By 'bagging it,' Ireland rids itself of a plastic nuisance](#), by Elisabeth Rosenthal, *International Herald Tribune*, Jan. 31, 2008.

- 3) Complementing an excellent article, [Plastic bags are killing us](#), by Katherine Mieszkowski, for Salon.com, Aug. 10, 2007, is a video tour of San Francisco's Norcal Recycling with a quote from the manager, "They're made from oil. How much more do you need to hear?"
- 4) An interesting book on how long everything would take to break down and biodegrade (or not, in the case of plastics) is [The World Without Us](#), by Alan Weisman, 2007.
- 5) See for example, [Continent-size toxic stew of plastic trash fouling swath of Pacific Ocean](#), *San Francisco Chronicle*, Oct. 19, 2007, and [Floating, Texas-sized garbage patch threatens Pacific marine sanctuary](#), *ARS Technica*, Oct. 23, 2007, which includes an inventory of the waste. While much plastic in the ocean eventually fouls beaches where it can be collected, the Pacific gyre highlights the importance of waste management for plastics.
- 6) According to the [action plan](#) of the [Plastic Debris, Rivers to Sea Project](#), about 100 million tons of plastic are produced each year of which about 10% ends up in the sea where about 70% sinks to the bottom. Fully 80% of the ocean's litter originated on land. This has similarities to pollution drift first noted by the [Arctic Monitoring and Assessment Programme](#).
- 7) "In the last few years the Republic of Ireland declared that they no longer had any space for landfill, imposing large taxes on the use and disposal of polymers." From the introduction to [Biodegradable and sustainable fibres](#), edited by R.S. Blackburn, Woodhead Publishing, 2005.
- 8) No one appears to be counting the billions of plush toys now being sold, including by zoos, aquariums and even green groups that should know better! Shouldn't products bearing conservation messages come from natural fibers that are renewable and biodegradable?
- 9) The yield is three synthetic jackets per gallon of oil. To its credit, in 2005 Patagonia, Inc., one of the world's largest producers of synthetic clothing which it has long promoted as eco-friendly, [started a recycling program](#) to collect discarded garments at its stores and recycle them into more clothing products. The bulk of Patagonia's clothing is made from recovered plastic soda bottles (another oil product) which are not biodegradable and hence its products are not biodegradable.
- 10) This and the following statistics are from [Summary report: Sustainable clothing roadmap stakeholder meeting & next steps](#), Department for Environment, Food and Rural Affairs, Sept. 5, 2007.
- 11) Most of the recovered stream is exported for reuse overseas, Africa being the main market.
- 12) The synthetic clothing industry is encountering "feedstock problems". In other words, the raw material, oil, has become more expensive. See for example, [Prices of petrochemical feedstock and synthetic fibres and filaments in the first half of 2004](#), *Fibre Chemistry*, Sept. 2004.
- 13) [Should you be faking it? Are you wearing fake fur and feeling just a tiny bit smug?](#) *Daily Mail*, Nov. 22, 2004.
- 14) The US military has banned the wearing of synthetic clothing off base in Iraq due to serious burn injuries since such clothing melts, just like plastic, when soldiers are injured. See [Synthetic clothes off limits to Marines outside bases in Iraq](#), American Forces Press Service, Apr. 12, 2006.
- 15) Personal communication between Diane DeZan of the Fiber Economics Bureau and Joe Casola of ICF Consulting, Aug. 4, 2000, as cited in [Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2001](#), Environmental Protection Agency, Apr. 15, 2003.
- 16) Fur garments are made from leather treated lightly (dressed) to retain the hair, and with proper care can last for generations. They are also restyled or recycled, such as through FCUSA's [Furry Friends program](#), which transforms surplus furs into charitable donations. If this is no longer feasible, they can be composted, and are included in "o.k. to compost" lists such as [this one](#) from Home & Garden TV, and will biodegrade back into the Earth. (Petrochemical synthetics cannot be composted and will simply pollute your garden's soil.)
- 17) Stevens, E.S., *Green Plastics*, Princeton University Press, Princeton, 2002.

**See also:**

FCUSA special feature: [Sensitive and Smart - You too can be a sensitive and smart consumer!](#)

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To take a cyber-tour of a fur farm, visit Fur Commission USA's Fur on Film at <http://www.furcommission.com/video/index.htm>