Ahead of the Herd Newsletter - 2018 Issue Twenty nine

Saturday June 30th

Poisoning the Earth

As a general rule, the most successful man in life is the man who has the best information

aheadoftheherd.com

All living organisms have four main elements in common: carbon, hydrogen, oxygen and nitrogen. These elements make up 96% of atoms found in humans, animals, fish, insects and micro-organisms. The four "macromolecules" that make life possible - protein, carbohydrates, lipids and nucleic acids - are all made of carbon, plus the other three organic elements. The other major elements, phosphorous, sulfur, sodium, chlorine, potassium, calcium and magnesium, total just 3.5% of a living being's body, with trace elements like iron making up the remaining. 0.5%.

The other thing that human beings and most animals have in common is that we all need oxygen to breathe, water to drink, and food to eat. While simplistic, humans have tossed this fundamental condition of life into the trash-can. We are the only species on Earth that "shits where we eat," to put it crudely. More eloquently, we are the only living organisms that pay little to no attention to the effects of polluting the very water, soil and food we need to survive and thrive.

If nothing is done to correct this problem which has become so extreme that our very civilization is in jeopardy, we as a species will drown in a putrid sea of our own waste, and we'll have no-one but ourselves to blame.

Why do we do it? Over-population is the obvious answer. Too many people to water and feed, especially in crowded countries like India and China, are stretching our finite resources to the brink.

Current World Population

7,632,471,227

The result is over-use of groundwater, too many pesticides to increase crop yields, cutting down trees to make way for new crops, ruining the soil, and pesticide-laden runoff that is poisoning our rivers and lakes. Then again, we do have choices. Here in North America, we don't have to stick to a fossil-fuel economy which continues to emit noxious chemicals into the air and line oil companies with obscene profits. We could make a more concerted effort to switch

to renewables in order to preserve the health of the planet. But we don't. Neither do other countries. Project Syndicate noted Argentina recently decided to pursue fracking, an activity known to pollute groundwater and cause mini-earthquakes, instead of utilizing plentiful wind, solar and hydro power.

Pope Francis recently told an audience of oil and gas company executives:

> "Our desire to ensure *energy for all* must not lead to the undesired effect of a spiral of extreme climate changes due to a catastrophic rise in global temperatures, harsher environments, and increased levels of poverty." The Pope also reminded the CEOs that, "Civilization requires energy, but energy use must not destroy civilization!"

Our recent five-part series focused on climate change in all its manifestations and ill effects (links to other articles at bottom – Rick) - many of which are natural and beyond our control. This article will discuss what we *can* control: how we are poisoning the Earth and why we need to take immediate action to stop the reckless ways we are slowly but surely killing the environment.

We need to stop taking our natural resources for granted. The Earth's ability to supply us with its bounty is finite yet we continue to misuse, misallocate and poison what we have left.

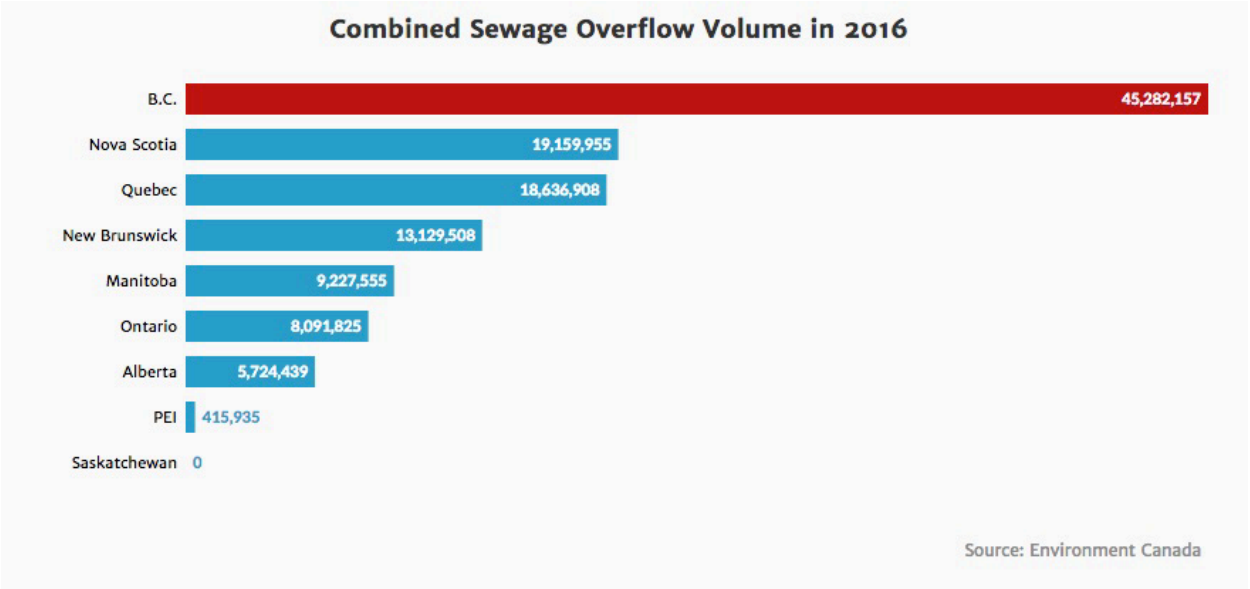
Polluting our freshwater

Water quality has always been of utmost importance to the health of human populations. Unsafe water sources and open sewers in the Middle Ages led to plagues that decimated villages and towns. Chlorine was first discovered in Sweden in 1744 but it wasn't until the 1890s that chlorine started being used in drinking water to kill pathogens. Chlorination began in Britain and expanded to the United States in 1908 and Canada in 1917. Today chlorination is the most popular method of treating/ disinfecting drinking water.

However despite the advance of science, many freshwater supplies are getting

fouled. The Guardian recently reported that since the 1990s, pollution has worsened in almost every river in Africa, Asia and Latin America. The situation is expected to deteriorate due to runoffs of fertilizer and other agrochemicals that lead to the growth of pathogens and algae blooms. About 80% of industrial and municipal wastewater is discharged without treatment, the newspaper states.

It might surprise Canadians to learn that in 2016, nearly 120 million cubic meters of untreated sewage and runoff entered Canadian waterways.



In Victoria BC, about 130 million liters of raw sewage flows into the Strait of Juan de Fuca daily because the city does not have a treatment plant. After years of squabbles between tiny municipalities, Victoria finally decided on a location in 2016.

The use of fertilizers and pesticides in agriculture is one key source of freshwater contamination. Another is the oil and gas industry.

Over the last several years there's been a dramatic rise in the use of hydraulic fracturing - the technology used to extract shale oil and gas.

As use of this technology has increased, worries are growing about fracking's effect on our freshwater supply; it's easy to see why:

- Fracking just one well can use 2 to 8 million gallons of water with the major components being water (90%), sand or proppants (8 to 9.5%), and chemicals (0.5 to 2%). One 4-million-gallon fracturing operation uses from 80 to 330 tons of chemicals and each well will be fracked numerous times. Many of these chemicals have been linked to cancer, developmental defects, hormone disruption, and other conditions.
- Cracked wells and rock movement frequently leak fracking fluid and gases into nearby groundwater supplies. Fracturing fluid leakoff (loss of fracturing fluid from the fracture channel into the surrounding permeable rock) can exceed 70% of injected volume.
- Methane concentrations are 17x higher in drinking-water wells near fracturing sites than in normal wells. Hydraulic fracturing increases the permeability of shale beds, creating new flow paths and enhancing natural flow paths for gas leakage into aquifers.

Hydraulic fracturing flowback not only contains chemicals added during well stimulation, but the fluid that flows out of the well as the gas is produced will contain a variety of toxic and carcinogenic substances, many of which were not present in the fracturing additives. This is because chemicals and minerals that are present in the shale zone formation water may be released during the

fracking process. This release results in additional contaminates formed in the wastewater. For instance, bronopol is a biocide with low human toxicity that can release nitrite, which in alkaline medium reacts with secondary amines to produce the potent nitrosamine carcinogens.

The recovered waste fluid - water contaminated with chemicals and anything that water has come in contact with, meaning heavy metals and minerals - is often left in open air pits to evaporate, releasing harmful volatile organic compounds (VOCs) into the atmosphere, creating contaminated air, acid rain and ground level ozone.

Some of the recovered waste water is injected deep underground in oil and gas waste wells or even in saline aquifers. There are serious concerns about the ability of these caverns and aquifers to handle the increased pressure and in the US, evidence shows that deep-well injecting is linked to the occurrence of earthquakes.

According to the industry's own numbers just 60 to 70% of the fracturing fluid is recovered. The remaining 30 to 40% of the toxic fluid stays in the ground and is not biodegradable.

Moreover, some of the most intensive oil and gas development in the US is

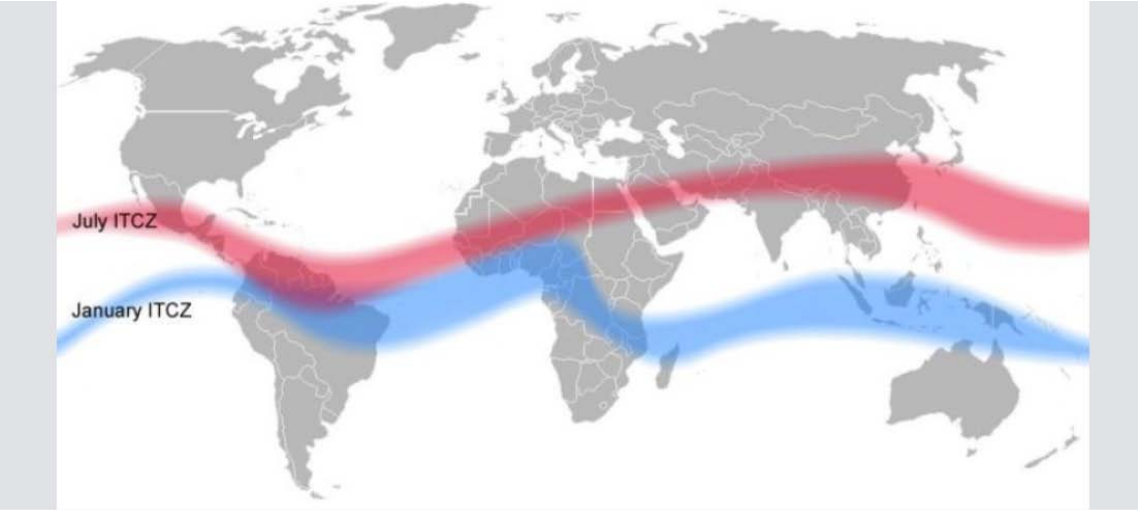
occurring in regions where water is already at a premium. In 2014 a paper published by Ceres, a nonprofit that works on sustainability issues, looked at 25,000 shale oil and shale gas wells in operation and monitored by an industry-tied reporting website called FracFocus.

Ceres found that 47% of these wells were in areas “with high or extremely high water stress” because of large withdrawals for use by industry, agriculture, and municipalities. In Colorado, for example, 92% of the wells were in extremely high water-stress areas, and in Texas more than half were in high or extremely high water-stress areas.

The Ceres report goes on to say that:

Prolonged drought conditions in many parts of Texas and Colorado [in 2013] created increased competition and conflict between farmers, communities and energy developers, which is only likely to continue. … Even in wetter regions of the northeast United States, dozens of water permits granted to operators had to be withdrawn last summer due to low levels in environmentally vulnerable headwater streams…

As we noted in a previous climate change article, global warming is exacerbating an already troubling situation with the depletion of groundwater aquifers - which together with freshwater in lakes and rivers - comprise less than 1% of the total water on Earth including the oceans.



During boreal summer, Earth's tropical rain belt migrates north. A similar but prolonged shift could happen if the north continues to heat faster than the south, disrupting global rainfall patterns.

As the Earth warms, precipitation is shifting from the mid-latitudes to the low and high latitudes - wet areas are becoming wetter and dry areas drier. Less rainfall in the mid-latitudes means less new water to refill the aquifers that are being depleted the fastest.

A report from the UN Intergovernmental Panel on Climate Change says that global temperatures will rise from between 0.3 and 4.8 degrees Celsius by the late 21st century. The report notes developing countries like India are likely to be worst hit by climate change due to the frequency of droughts which will lead to water shortages and problems with food production.

Population growth is putting unprecedented pressure on our limited freshwater supplies. The world's population is growing by roughly 80 million people each year and freshwater withdrawals have tripled over the last 50 years. Demand for freshwater is increasing by 64 billion cubic meters a year (1 cubic meter = 1,000 liters). The world's 7 billion people are using almost 60% of all accessible freshwater contained in rivers, lakes and underground aquifers. By 2050 the United Nations estimates we will have upwards of 10 billion people on this planet.

The other part of the equation of declining groundwater is over-use. For example the Ogallala aquifer in the US Midwest is being sucked dry at an annual volume equivalent to 18 Colorado Rivers. A World Bank study indicates that China is over-

pumping three river basins in the north: the Hai, the Yellow and the Huai. A 2017 study in *Nature Journal* found that in 10 years, China doubled its use of irreplaceable groundwater from underground reservoirs, and that they are draining faster than they are being replenished. From 2000 to 2010, the study found that globally, the amount of water drawn from aquifers for the purpose of irrigation increased by a quarter.

According to a new study from NASA, a third of Earth's largest groundwater basins are being rapidly depleted.

Iran is over-pumping its aquifers by an average of 5 billion tons of water per year. Saudi Arabia, relying heavily on subsidies, developed an extensive irrigated agriculture based on its deep fossil aquifer, and they sucked it dry. Some Saudi farmers are now pumping water from wells that are 4,000 feet deep. In 2015, the country announced that the 2016 wheat harvest would be its last. The research in *Nature Journal* found that depleted water reserves will limit the availability of food and raise food prices. Pakistan uses the most irreplaceable groundwater to grow and export its food, closely followed by the US, then India. The crops that contribute most to trade in food grown using groundwater are rice, wheat, cotton, maize and soybeans.

Scraping off the soil

Water and food. The two are closely linked by a thin layer of topsoil we need to grow our crops and sustain human and animal populations.

About 2% of all cropland, or 277 million hectares, is under irrigation, and irrigation multiplies yields of most crops by 2 to 5 times - irrigated agriculture currently contributes to 40% of the world's food production. When freshwater,

rainfall and topsoil are in ample supply, crops flourish. Take away any of the three, and crop failure is a near certainty. Like aquifer depletion, the degradation of the soil has been made worse by climate change.

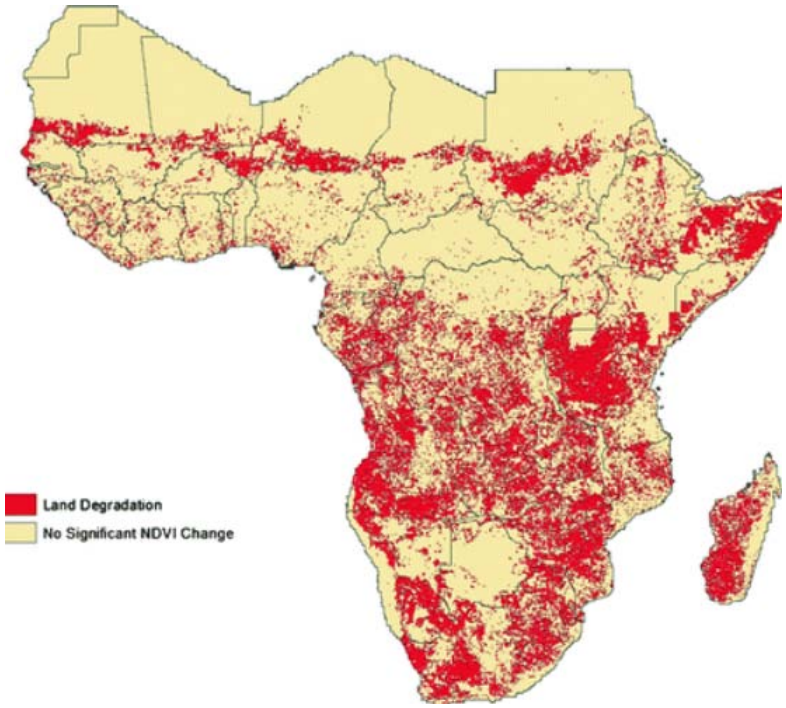
According to Climatica.org, in the last few decades precipitation has declined in the Sahel, the Mediterranean, southern African and parts of southern Asia. From 1950 to 1980, 10 to 14% of the world's land mass was considered dry, but between 2000 and 2010, this figure had risen to 25 to 30%.

1930's Dust bowl USA

Droughts are responsible for denuding the landscape of vegetation, which has dire implications for crops and food supply. Desertification is what happens when fertile land is degraded, due to it becoming too arid, or as a result of deforestation or improper agriculture. The process usually results in a loss of vegetation, water bodies and wildlife. The issue of desertification is not new, it has constantly played a significant role in human history, even contributing to the collapse of the world's earliest known empire, the Akkadians of Mesopotamia. One of the most fundamental problems we've created for ourselves is the impact of human activities on the land we need to cultivate for our very survival.

River run-off and water availability is expected to decrease in dry regions as global temperatures increase and rainfall is reduced - further adding to desertification. According to the United Nations Convention to Combat Desertification (UNCDD), by 2020, 60 million people could be forced from desertified areas of sub-saharan Africa towards North Africa and Europe. These “climate” refugees would add to the political refugees already pouring into Europe. By 2050, some 2.4 billion may be living in areas subject to periods of intense water scarcity, with up to 700 million being forced to move elsewhere.

Desertification strips away fertile soil and leads to crop failure. It takes 100 years to generate a single millimeter of topsoil - 24 billion tons of fertile soil disappear annually. “The top 20 cm of soil is all that stands between us and extinction,” says Luc Gnacadja, executive secretary of the UNCDD. We reached “peak soil” a long time ago; soil can be considered a non-renewable and rapidly depleting resource. Global demand for food is projected to increase by 50% by 2030. It is predicted there will be 9 billion people to feed by 2050. That’s an increase of one billion tonnes of cereal and 200 million tonnes of meat.



According to The Guardian, a UN study found that a third of land on Earth is

severely degraded and fertile soil is lost at a rate of 24 billion tonnes a year.

The worst-affected region is sub-Saharan Africa, but even in the UK, nearly a billion tonnes of soil a year are lost to erosion. The situation is made worse by high levels of food consumption in wealthy countries that get their food from overseas, the newspaper states.

Another important fact about soil is it's the largest land-based reservoir of carbon on the planet. The carbon is absorbed into the soil from trees and plants as they decay.

Losses of carbon from chemically intensive use of soils and land-use change from ploughing up grasslands and clearing forests and peatlands constitute the second-largest source of CO2 after burning fossil fuels. It's a little-known fact that soils store four times more carbon than all trees and other life. We will not be able to feed people in the future if the soil continues to be degraded, and we are degrading soils at a faster rate than ever before. - The Guardian

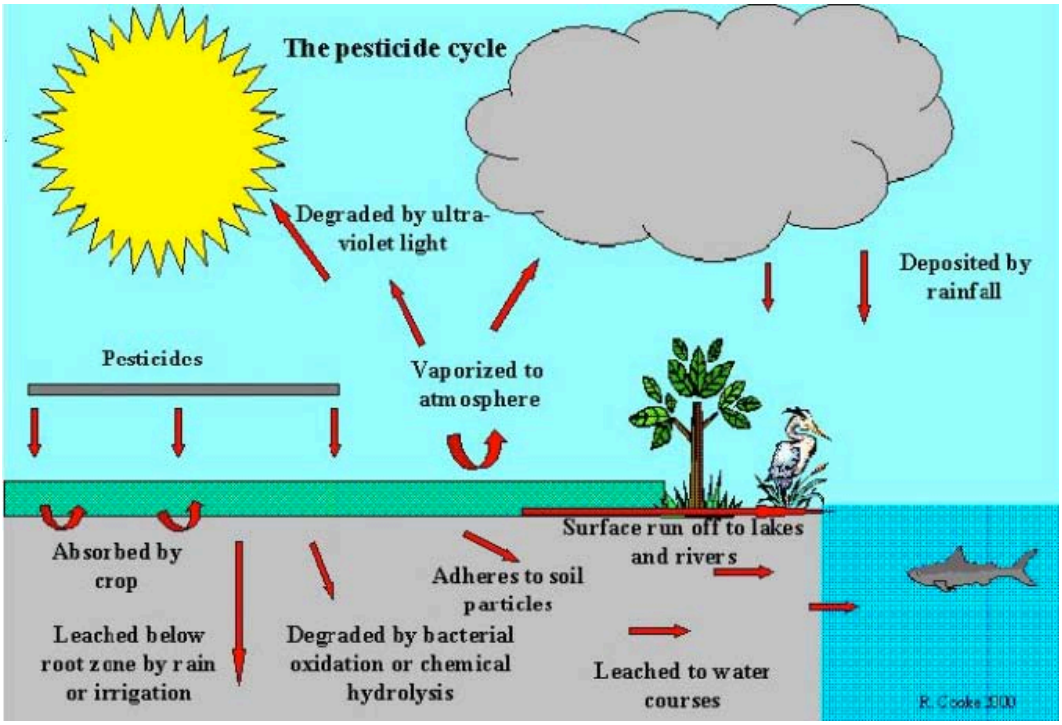
Industrial agriculture is the chief culprit in depleting soil at such an alarming rate. The European Commission notes over the past 20 years, agricultural production has tripled and the amount of irrigated land has doubled - but it comes at a price: abandonment of land and desertification. For example expanded cattle farming in the Amazon has destroyed one-eighth of the world's forests.

"Heavy tilling, multiple harvests and abundant use of agrochemicals have increased yields at the expense of long-term sustainability," states the Guardian.

And poisoning it

Desertification isn't the only way we're ridding ourselves of valuable, life-giving soil. Soil is also polluted by pesticides. Used for destroying insects or other organisms that are harmful to cultivated plants, some pesticides contain ammonia, benzene, chlorine, dioxins, ethylene oxide, formaldehyde and methanol. These substances become persistent soil contaminants that stay in the

ground for decades, and are passed from one organism to another. Quora notes that most hazardous pesticides include those that are water-soluble and fat-soluble, meaning the pesticides can easily make their way into groundwater and streams, or get absorbed into animals and fish. Rainfall accelerates the movement of pesticides into watercourses and ecosystems.



According to safewater.org, the effects of pesticides on the human body depend on the pesticide, with some affecting the nervous system and others irritating the skin and eyes. They can also be carcinogens that cause cancer, and affect the hormone or endocrine system.

GMO

We've been spraying pesticides on crops for years, putting our soils, ecosystems and health at risk, but only recently have we began monkeying with the genetics of our food. According to the Grocery Manufacturers Association, up to 80% of foods in the United States have been genetically modified. GMO foods are plants, animals and seeds that have been altered using genetic engineering to create a combination of genes that do not occur in nature. One of the main goals of GMO

is to make crops resistant to herbicides that kill weeds or insects. However the process can also increase allergens or toxins, and block nutrient absorption. GMO foods have been found to have a number of negative health impacts, including digestive problems, fatigue, allergies, and even anxiety/ depression, according to a study by Rutgers University.

There was a big pushback by farmers in the early 2000s who wanted to avoid using Monsanto's genetically modified soybeans. In a landmark ruling, an Indiana farmer in 2013 lost a Supreme Court case to the agri-business giant, which had a patent on GMO soybeans that resisted the herbicide Roundup Ready. The decision meant that farmers had to keep buying Monsanto's genetically modified soybeans each time they plant a crop, effectively giving the company a monopoly on Roundup Ready seeds.

More recently, Mexico is considering restricting imports of US corn as retaliation against US tariffs of imported steel and aluminum. The GMO connection is that according to a 2017 study, 9 out of 10 tortillas contain traces of genetically modified corn. More seriously, a third of the food samples that tested positive for GMO substances also detected the alleged carcinogen glyphosate, Wolf Street reported. In 2017 Mexico was the third largest importer of corn in the world.

Japan has reportedly suspended its tender and sale of Canadian wheat after plants containing a genetically modified trait were discovered in Alberta, CBC said. The trait was developed by Monsanto to tolerate Roundup.

Killing off the animals

The over-use of pesticides plays a starring role in getting into ecosystems where species that ingest noxious substances can die off, even to the point of extinction.

According to research by the World Wildlife Fund and the Zoological Society of London, over the past 40 years the number of wild animals living on Earth has been cut in half. Among the most hard-hit species are forest elephants in central Africa, where deaths by poachers now exceed birth rates, the Hoolock gibbon in

Bangladesh, the European meadow and asp vipers, grey partridges in the UK and curlew sandpipers in Australia. Marine populations have also suffered badly, with sea-based creatures crashing by 40%. The number of turtles has fallen by 80%, due to the destruction of nesting grounds and drowning in fishing nets, said the Guardian, quoting stats from the 2014 report.

Curiosity.com

Scientists blame the destruction of wild habitat on farming, logging and development, for what is seen as the sixth mass extinction of life to occur on our 4 billion-year-old Earth.

Species extinctions are exacerbated by global warming. The early arrival of spring in some places, caused by higher temperatures, means birds that arrive late miss the chance to find good nesting spots or to feed on insects. Due to warming, bees are not migrating to cooler areas to establish new hives. Insects are declining due to pesticide-based agriculture, where a variety of poisonous chemicals are dusted over crops to prevent insects from eating them and affecting farmers' yields. The losses are said to be compounded by global warming, which causes habitat destruction.

A new reports warns the Earth is rapidly losing its capacity to support human life, with two-fifths of humanity already in danger. The report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) says at the moment under a quarter of the planet is untouched by human activity but by 2050 that number will be just 10%. Up to 700 million people will be displaced in the next 40 years, from drought and land loss.

“Human activities [are] pushing the planet towards a sixth mass species extinction," professor Robert Scholes, the co-chair of the assessment, was quoted by CBC. "Avoiding, reducing and reversing this problem, and restoring degraded land, is an urgent priority to protect the biodiversity and ecosystem services vital to all life on Earth.”

Overfishing, dead zones

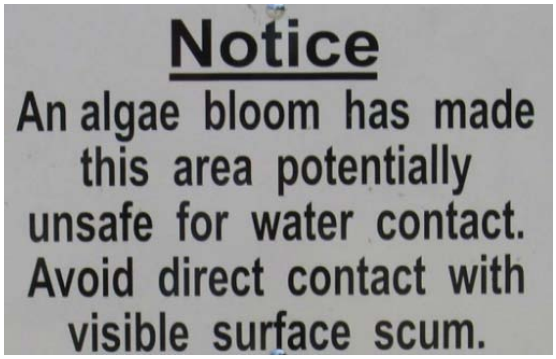
The ocean too - thought to be teeming with life - is slowly dying.

A story in IRIN, a blog about environmental and other crises, describes the “perfect storm” that is occurring in the oceans due to overfishing and climate change. The result could mean a dramatic decline in fish stocks, with the most serious affect being malnutrition in poor countries in tropical climates that depend on fishing as a protein staple.

Warmer ocean temperatures also cause acidification, which stunts the growth of corals and shell-based creatures like oysters. The destruction of coral reefs is a major problem resulting from climate change, since they provide critical habitat and food for so many species in the reef ecosystem. If current rates of temperature rise continue, the ocean will become too warm for coral reefs by 2050.

World fisheries are in a state of collapse – caught between plagues of jellyfish, overfishing, nutrient pollution, accumulation of toxins in marine mammals, carbon emissions turning our oceans acidic, the oceans’ phytoplankton declining by about 40% over the past century, dead zones, garbage patches, increasing ocean

temperatures and changing currents; our entire marine food chain seems to be in peril.



Populations of jellyfish are exploding around the globe. They feed on the same kinds of prey as fish so if fish numbers are depleted jellyfish fill the gap. Overfishing isn't the only explanation for exploding jellyfish populations. An ocean dead zone is an area of the ocean that's hypoxic, which means that it has low oxygen. The reasons for ocean dead zones are most commonly attributed to toxic chemicals and human waste (eutrophication - high levels of nutrients), infiltrating the water near coastlines. The low oxygen levels created favor jellyfish as they can thrive in oxygen-depleted water whereas fish can't.

Oceanographers first began noticing ocean dead zones in the 1970s, and instances of dead zones have been increasing ever since - a 10-fold global increase over the last 40 years. Large lakes can also have dead zones.

Phytoplankton are microscopic single cell plant organisms and are the most abundant vegetation in the ocean - they drift in the ocean currents and occupy most of the surface area of the earth's oceans. They are the bottom link in the oceanic food chain - the crucial nutrient at the base of the food chain on which all marine life depends. They are eaten by zooplankton (microscopic animal organisms) which are eaten by other animals, then consumed by other animals higher up the food chain. Temperatures on the surface of our oceans are rising - the result is a reduction in the numbers of phytoplankton. Since 1950, phytoplankton numbers have declined globally by about 40%. Experts are already warning us that because of overfishing the world's fisheries could collapse by 2050; the decline in phytoplankton could make the situation even worse.

Sea of plastic

Most people have heard of the Great Pacific garbage patch, aka the Pacific trash

vortex. The gyre of floating marine debris is estimated at anywhere between 700,000 square kilometers, about the size of Texas, to over 15 million kilometers squared. First noticed by a sailor completing a yacht race in 1997, the Pacific trash vortex is both emblematic of our careless, materialistic society, and a serious hazard to marine and aquatic life.

As the plastic decomposes it is ingested by marine animals, fish and sea birds. Scientists cite plastic as one of the biggest threats to coral reefs after global warming, according to National Geographic. The long-running nature magazine says over 11 billion pieces of plastic have been found on a third of coral reefs in the Asia Pacific - a figure that is expected to grow to 15 billion by 2025. The plastic bags, bottles and rice sacks found on the reefs raises the risk of disease outbreaks on coral reefs by 20 times, putting over 275 million people who rely on them for food and tourism income in jeopardy. Plastic takes over 400 years to degrade, meaning most of it still exists, and only 12% has been incinerated. About 91% of plastic is not recycled.

National Geographic says the problem of discarded plastic is so severe, scientists predict that if nothing is done, by 2050 the oceans will contain more plastic than fish, ton for ton.

Much of it gets reduced to microscopic particles that are digested by fish and can even end up at the top of the food chain, in humans. The sun breaks down plastic into extremely small pieces, some no larger than seeds, which are a threat to at least 600 wildlife species says Ocean Conservancy. These includes leatherback turtles, whales, and seabirds. One study says a quarter of fish bought from fish markets in Indonesia and the US had plastic in their guts. Microplastics have been found in the digestive tracts of oysters, mussels and lobsters.

Consume it, then chuck it

Our throwaway, consumer-oriented society generates too much garbage on a daily basis with not enough landfill space to fill it with. Incineration is another option, but it too exacts a price on the environment in terms of air pollution. According to a 2012 World Bank report, the amount of solid waste generated globally was on pace to rise by over 3.5 million tonnes a day in 2010 to 6 million tonnes by 2025. The reports says the waste from cities alone is enough to fill a line of garbage trucks 5,000 kilometers long every single day. The average North American will throw away 600 times his or her weight in garbage, meaning a 150-pound adult will heave 90,000 pounds of trash into the dumpster from birth to death.

In August 2017 China told the World Trade Organization (WTO) that it will no longer accept 24 categories of solid waste as part of a government campaign against “foreign garbage,” According to the Institute of Scrap Recycling Industries (ISRI), China accounts for over half of the world’s total imports of recovered paper and fiber, plastic scrap, and copper scrap. The Economist notes the Chinese government began facing public pressure following a documentary showing workers dismantling discarded electronic devices and dumping the toxic remains into a river. The film “Plastic China” exposed the environmental damage caused by the country’s plastic-recycling industry, which is dominated by thousands of small-scale outfits that often lack proper pollution controls. Government officials say the new ban on foreign garbage will improve the environment and protect public health.

Conclusion

Slowly but surely, we are killing the planet. This needs to stop. Why we don’t take the man-made destruction of the planet more seriously is a function of both our confidence in technology and our arrogance at being on top of the food chain.

The modernization and industrialization of our global agricultural industry led to the single greatest explosion in food production in history. The agricultural reforms and resulting production increases fostered by the Green Revolution are responsible for avoiding widespread famine in developing countries and for feeding billions more people since.

The term Green Revolution refers to a series of research, development, and technology transfers that happened between the 1940s and the late 1970s. The initiatives involved:

- Development of high yielding varieties of cereal grains
- Expansion of irrigation infrastructure
- Modernization of management techniques
- Mechanization
- Distribution of hybridized seeds, synthetic fertilizers, and pesticides to

farmers

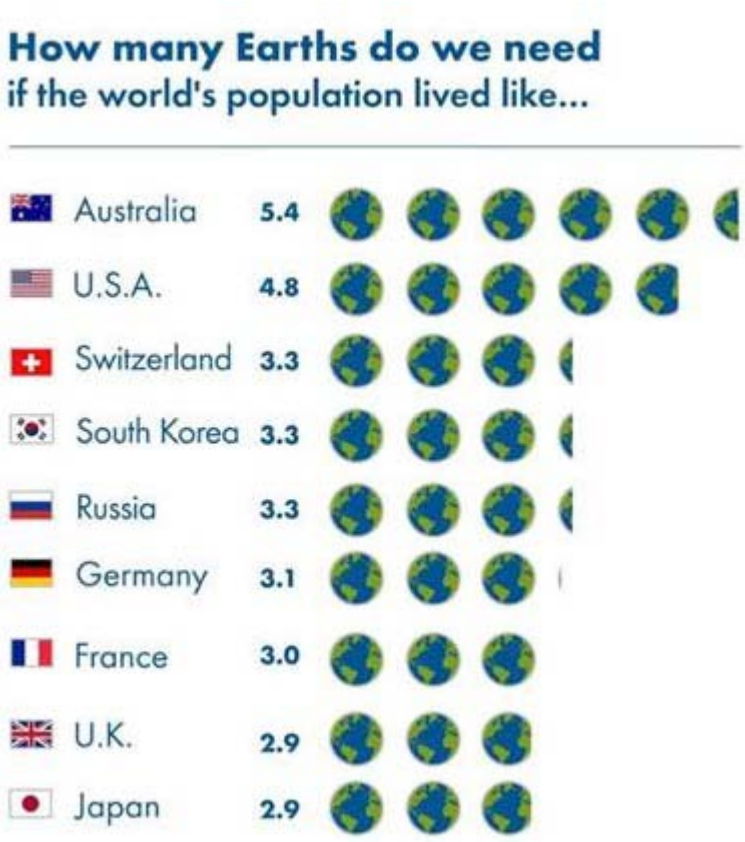
The Green Revolution helped kickstart the greatest explosion in human population in history - it took only 40 years (starting in 1950) for the population to double from 2.5 billion to five billion people.

For most of human history there is no doubt we were consuming resources at a rate far lower than what the planet was able to regenerate.

Unfortunately we have crossed a critical threshold. The demand we are now placing on our planet's resources appears to have begun to outpace the rate at which nature can replenish them.

The gap between human demand and supply is known as ecological overshoot. To better understand the concept think of your bank account – in it you have $5000.00 paying monthly interest. Month after month you take the interest plus $100. That $100 is your financial, or for our purposes, your ecological overshoot and its withdrawal is obviously unsustainable.

Humans are currently withdrawing more natural resources then our Earth bank is able to provide on a sustainable basis. How much more? If today, everyone on Earth were to start consuming the same amount of natural resources as the average Australian we'd need 5.4 planets, an ecological overshoot of 4.4 planets.



We are seeing the results of ecological overshoot in species extinction, freshwater depletion, deforestation, soil degradation and the obscene piling up of garbage on land and in the oceans. This is what too many people consuming too many resources with not a care for the other living beings we are sharing this planet with, looks like. It's arrogant, narrow-minded, short sighted and dangerous.

How to save the planet from ourselves? Practice better birth control to keep a handle on over-population; pass laws to make polluting our environment so extreme that nobody would dare do it; implement programs to make agriculture more sustainable - turning over exhausted cropland to grass pasture, thus protecting soil, for example; put far more stringent limits on fish catches and actually enforce them. These would all be good starts.

Is stopping the poisoning of our home on your radar screen?

It is certainly on mine.

Ahead of the Herd has put together a series of articles on climate change. We covered the whole range of global warming causes and effects. Each article endeavors to explain a facet of climate science that is not only extremely interesting, but also has investment implications.

Our changing climate - Part 1

Birds, bees and bugs: going going gone – Part 2

Gone Fishing – Part 3

The day they turned off the taps – Part 4

Climate Armageddon – Part 5

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