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The dirt on cheap tar sands oil

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In a warming world, the most important natural resource is fresh water. Yet, as the price of crude oil soars past \$100 a barrel, our insatiable addiction runs the risk of polluting 4.2 percent of Earth's fresh water in the Mackenzie River system.

Alberta's Athabasca and Peace rivers drain into Lake Athabasca, Canada's eighth largest lake, which flows northward into Slave Lake. Eventually the Mackenzie River system reaches the Arctic Ocean carrying 20 percent of Canadian freshwater.

Northern Alberta has 175 billion barrels of oil locked in sand mixed with tar or bitumen. The tar sands are a result of ancient marine life, mostly made up of algae and plankton. The exquisite, slow-growing northern or boreal forests are the emerald crown covering the vast gooey-oil deposits.

Over millions of years and with heat from the outer mantle, the prehistoric life transformed into bitumen, which is 5 percent sulfur, 0.5 percent nitrogen and 1,000 parts per million heavy, toxic metals.

There are two methods of extracting bitumen from the boreal forests and both exemplify unbridled destruction. About 20 percent of the bitumen can be open mined by 400-ton Caterpillar trucks and gargantuan Bucyrus electric shovels. To get one

barrel of bitumen from the Athabasca tar sands, hundreds of old trees are felled, wetlands drained and four tons of earth yielding two tons of bitumen sand are hot-washed. Every second day, open tar sand mines handle enough dirt to

fill the Dallas Cowboys' stadium.

Most of the tar sands are deep within the earth and must be steamed or melted out of the ground. An immense amount of fresh water is required for this process; it kills millions of trees and exacerbates the loss of species, including caribou, fish, bears, moose and many others critters.

Alberta's tar sands are the second-largest hydrocarbon reserves in the world; only Saudi Arabia has more. In order to extract oil from the tar sands, a forest about the area of New York state will be irreparably destroyed.

Every major oil company in the world is present in the tar sands, as it currently produces 1.3 million barrels a day. By 2018, it's projected to reach 3 million barrels a day. Each barrel of tar sands oil requires three barrels of Athabasca or Peace River water.

Global warming is taking a bite out of everything and every industry on the planet. Last year was the warmest year ever recorded in Canada, temperatures in the north country were 11 degrees warmer than normal. Will the Athabasca River carry enough water to meet the profligate water demands of 100 tar sands projects in the coming decade?

Steam-mining bitumen from the tar sands produces at least 30 million pounds of salts and water-solvent carcinogens a year, which are trucked to landfills. Arsenic, a cancer-causing heavy metal, is also a byproduct of bitumen mining, and it has a propensity of seeping insidiously into ground water

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from landfills.

Most of the contaminated wastewaters or tailings are stored in toxic ponds along the Athabasca River. These ponds are so large that they are visible from space; astronauts have confused them with lakes.

Each pond is about 240 feet deep and contains toxic sludge filled with phenols, benzene, cyanide, arsenic and dozens of other known cancer-causing agents including polycyclic aromatic hydrocarbons.

The tar sands oil is eventually refined just east of Edmonton, a city of a million people. UC-Irvine scientists found the air pollution levels in Upgrader Alley were comparable to those of the most polluted cities on the face of the Earth.

Mining the tar sands is leaving a colossal global footprint, which has risen 27 percent since 1990. In fact, Canada has the highest increased, heat-trapping greenhouse gas emissions of any industrial nation on the globe.

Intact ecosystems provide services that benefit all life forms on Earth. Canada's boreal forests and fresh water hold an astounding 186 billion tons of carbon and they help suck rising CO2 (from burning fossil fuels) out of the air.

Economists estimate that the trees of the Mackenzie River system provide \$252 billion worth of stored CO2. Furthermore, intact boreal forests with peat bogs, wetlands and forests filter water and the air; they are worth \$1,064 per acre, or 10 times the value of the \$99 per acre of bitumen that desecrates intact ecosystems.

Globally, the natural carbon absorbing systems are beginning to shut down. A recent worldwide study has shown the forests in the U.S. Amazon, Russia, Canada, Australia, Europe, Central America and

Africa are dying, due to rising temperatures and prolonged droughts linked to global warming. Moreover, 40 percent of oceanic phytoplankton is missing due to rising ocean temperatures.

Extreme weather from intense flooding to prolonged droughts has caused the price of all staple food crops including cotton to dramatically rise.

Each of us must lend a helping hand by powering down and consuming less -- our children are counting on us to lead by example.

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