

Arctic Screaming:
Accelerating Down the Tracks to Hell on
Earth

Second Edition

Chad Kister

Arctic Screaming

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Dedication

This book is dedicated to the thousands of activists and organizations who are working to reduce greenhouse gas emissions at all levels. Efforts from the local to the regional, state, national and global are critical to tackle what is by far the greatest threat that we face.

A further dedication goes to those who will be inspired through the words of top climate scientists and native peoples to join the rising environmental movement and work to reduce and ultimately stop greenhouse gas emissions while creating a nicer, cleaner, healthier world and sustainable economy.

Through a change to mass transit, efficiency, wind, solar, conservation, muscle power (walking and bicycling, etc.) and other renewable and ecological sources of energy, we can meet our needs while improving our health and safeguarding the future. It is the moral duty of our day to dedicate time to learn about this critical issue, and make the changes before it is too late.

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Preface

Boating the Arctic Ocean with Inupiat guide Robert Thompson, where all was ice a decade prior, the scale of the change in such a short time foretold global catastrophe. Flying from Arctic Village to Fairbanks, the forest was scorched for miles, with fires blazing in all directions. Our planet is burning. Smoke was so thick as we approached the airport that our pilot said (later) that it was the most challenging landing he had ever had in his 30-year career.

Major changes are wreaking havoc on the Arctic environment, melting the ice of the Arctic Ocean, melting the permafrost, killing millions of acres of forest, eroding shorelines, crumbling native villages into the sea and disrupting Arctic ecosystems. The extinction of Arctic megafauna like polar bear, walrus and seal is predicted, unless massive changes are made.

While the impacts are being seen most dramatically now in the Arctic, it is not just the polar bear that is threatened. Well respected scientists warn that billions of people could die this century from climate change-caused storm events, heat waves, flooding, drought and disease.

Predictions of when we will see an ice-free Arctic Ocean changed from 2080 in 2005 to 2040 in 2006 to as early as 2012 in December, 2007, after scientists realized the implications of the record 2007 melt. Warming is accelerating so fast, that scientists

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fear the tipping point to unstoppable climate change they have long feared may have been reached as the warming is triggering positive feedbacks that cause more warming.

I experienced the massive, horrific changes to the Arctic in two expeditions in 2004 and 2005. In 2004, I journeyed across the continent by train, ending in British Columbia. I took a ferry to southeast Alaska where I explored the Tongass National Forest by foot, kayak, bus, ferry, Greenpeace boat and Greenpeace helicopter. Next, I went up to the Arctic to visit with the Gwich'in in Old Crow with a group from Appalachian State College. I attended the Gwich'in Nation General Assembly in Old Crow.

Next, we boated hundreds of miles down the Porcupine River from Canada into Alaska with Gwich'in guides. We then took a bush plane into the Arctic National Wildlife Refuge. The tundra was much drier and the landscape far different in just the 13 years since I had backpacked and rafted hundreds of miles through the Arctic in 1991. Giant sinkholes caved into the permafrost, riverbanks eroded into the sea and foot-wide cracks opened along lake banks, where the permafrost was melting.

The climate changes are being caused mostly by the burning of fossil fuels. While some think it unfathomable that we can change the climate, we need only look at a satellite photo of the Earth at night to realize the scale to which we have conquered the planet, and are burning fossil fuels. Carbon dioxide levels are up 37 percent and

Arctic Screaming methane levels have gone up two and a half times in the atmosphere since 1850. Both are greenhouse gases, trapping in heat like the panes of a greenhouse.

Fossil fuels should be renamed carbon reserves to better describe the true purpose for coal in particular and also oil and natural gas. As long as we leave them in the ground, and switch our energy sources very fast to proven renewables, efficiency and conservation, we can avoid the worst of the climate crisis.

As we learn more about tipping points, and the attractor states of the climate, we should be very worried. Scientists warn that we may be on the very rapid shift to a super-warm earth that has not been seen in 55 million years. While we should hope they are wrong, the increasing scientific support of this argument and the severity of the implications means we should devote commensurate resources to understanding and acting on this issue.

Instead of leaving it at the doom and gloom of our current path, this book also shows how we can make massive reductions and ultimately eliminate our emissions of greenhouse gases through increasing efficiency in every sector of our economy, and changing to renewable energy sources. This can be done using existing technology and economic resources.

Rather than sitting back in despair and giving up on our planet and all life to come, we must take action like never before. We have seen amazing changes in industry and lifestyles when the U.S.

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mobilized for World War II. World War III is here, but it is a different kind of war. We are collectively at war against our life support system, and we must make tremendous changes very fast if we are to leave a livable planet for future generations.

We not only can, we must make the shift to conservation, efficiency, solar, wind, geothermal, waste methane, wave and tidal energy if we have a chance of leaving a planet with the semblance of the diversity of life as we know it to our children. The facts are far too proven by thousands of scientists to ignore. The impacts are far too severe to leave our fate to politicians guided by the interests of the fossil fuel industries that are causing the destruction. We must commit ourselves to being citizen activists, and make a difference in the world instead of being a bystander as our beloved planet burns.

We all have the power to make a difference to slow climate change. Through this climate journey across the continent and far into the Arctic and Arctic Ocean, you will understand the latest findings and the credibility behind them so you can then make the information widely known to family, friends, media and decision-makers. Such a vast amount of understanding is unfolding at such a breathtaking pace that it can be quite overwhelming. I have worked to take the most powerful and credible of it, and put it into one book, along with my first-hand witness of the massive impacts already seen.

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Armed with the facts, make it a routine to contact your local, state, and federal representatives, despite how they vote, and educate them about the urgency of this crisis, and your support for strong mandatory measures to cut greenhouse gas emissions. Also make sure to contact the media with letters to the editor, calls to talk radio and more.

The latest findings show that we all should be very alarmed, and engaged as full time as we can in making critical changes. One of the best is passage of cap and trade carbon reduction legislation. This would use the free market to find the most cost-effective means to cut emissions. Then we can work on the strengthening of the legislation until emissions are cut at least 80 percent.

Meanwhile, we should begin efforts to increase long-term carbon sequestration through sustainable means, such as old growth forest protection and restoration, and building up carbon in soils with composting and organic agriculture, possibly enhanced by burying charcoal. The idea of capturing carbon from coal power plants is unwise: the key is to stop releasing that stored carbon in the first place, by stopping the burning of coal, oil and natural gas and instead generate our energy from renewable sources.

The scariest thing that I have encountered in speaking around the world on this issue is people giving up: people who say it is not even worth it to try to do something about climate change. While the facts are dire, and getting worse every day with the increasing

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emissions and understanding of the forces we are unleashing by them, we cannot give up. We cannot give up on future generations. We cannot give up on all life on our planet, and all life to come. We must get involved politically and make a difference, before it is too late.

Chapter 1

Anthropocene: On a Runaway Train to a Hellish Climate

Think of our planet like a freight train, accelerating along its tracks on a high mountaintop where life flourishes. The top is a near equilibrium of amazing abundance and stability that life has evolved to fit into for thousands of years. But downhill on the tracks, lays an inhospitable desert with heat so unbearable as to wither nearly all life to death. For thousands of years, the train has remained on the top, moving very slowly back and forth, with the climate relatively stable.

The mountaintop is the only place full of life in its grand abundance and diversity, albeit heavily trampled by past environmental abuses. While very degraded, it still has most of its constituent parts, and above all the climate as we know it: critical to the survival of the great diversity of life today, including us. It is only up on the mountaintop, with that relatively stable interglacial climate, that creates the vast array of life that we have today.

On the top, our planet is easily repairable into its far grander former abundance when hundreds of millions of salmon returned to the rivers of California, Oregon and Washington States to feed millions of Native Americans, and tens of millions of buffalo roamed the Great Plains.

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But on down the tracks, all hope of restoration, or preserving the remaining wonders of our planet, are beyond hope. Keeping our 6.75 billion people alive will be near impossible in the climate down the mountainside. The loss of stable rainfall for crops, rivers overflowing their banks, sea levels rising, increased frequency of hurricanes and tornadoes, and tropical diseases in temperate regions threaten massive loss of life.

Realize the seriousness of this issue. We are not talking about remote speculation. This is the undeniable course that we are on: just look at the Arctic sea ice, and all the documentation in this book. The permanence is eerie. When working to save 3,000 year-old redwood and sequoia trees, the age of the giants is impressive. Now we are talking about shifting to a climate not seen for 55 million years, threatening to wipe out the vast majority of species alive today, including those that have survived tens of millions of years, and threatening the survival and quality of life of most of our own species. That is the train we are on, whether we want to deny it or not, and we had better wake up, because we are the ones fueling its motion down toward a hellish oblivion of mass suffering, chaos, disease and death.

Our vision has been clouded by the wonders and might of our civilization's ever growing technological power that makes us feel impervious to all threats. That fuel for the train is fossil fuel consumption and deforestation. Those most knowledgeable of the climate situation of today beg people to take heed of the gravity of

the situation we face, and realize how much we depend upon natural systems to provide our basic needs of clean air with oxygen, clean water, and food. These are the systems that are collapsing in the climate crisis.

The fact that we have increased carbon dioxide levels 37 percent and methane 150 percent in our atmosphere puts any thought that we are an insignificant influence to rest. The science is clear that it is our activities that have caused the changes. Had we listened to the credible warnings of two decades ago, we could have made the adequate investment to switch to a fossil-free infrastructure that also solves so many other problems, and greatly improves our health by nearly eliminating pollution. We likely could have stabilized carbon levels, and begun to reduce them to 350 parts per million carbon dioxide (the amount in 1987) as top scientists say is necessary.

Instead, we have increased carbon dioxide emissions a record 2.9 percent in 2007 and 3.5 percent in 2008, more than three times the rate of increase of the 1990s. The reason is the power and corruption of the world's political systems by the coal, oil and auto industries, which have invested their fortunes into coal and oil reserves, and gas-guzzler futures. Their investments would be near worthless if we could meet our energy needs through renewable power and travel primarily by fuel-efficient train.

In the beginning half of the twentieth century, industries abused their power by buying up tracks and turning them into roads so that the oil, auto and tire companies could increase profits. This

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hastened the demise of passenger rail as the primary mode of transportation. Next, oil companies bought patents for fuel efficient cars that were then kept off the market and both oil and coal companies bought patents for solar panels and wind generators to keep them from production. Now these industries are engaged in multi-billion dollar campaigns against efforts to tackle climate change and shift to renewable energy.

Coal and oil industries have massively pushed the freight train Earth toward the precipitous edge of the mountainside, at an accelerating pace. Instead of investing their billions of dollars into renewable energy and energy efficiency improvements, the fossil industries are orchestrating the release of vast amounts of carbon stored for hundreds of millions of years in our ever expanding coal mines and oil and gas fields.

Chances of stopping this train from roaring down the mountain into a hellish climate grow increasingly lower every second of every minute of every hour of every critical day in these pivotal times. The technological might that has moved mountains for coal and highways is all based on fossil fuels that are running out, and that we should not be burning. It would be near impossible to push freight train Earth back up the mountain if we let it go down.

The slope in this metaphor is caused by what scientists call positive feedbacks. This is where the warming we have initiated triggers natural mechanisms that cause more warming, a runaway greenhouse effect until a new stable climatic system is reached. The

problem is that next stable condition is about 20 degrees Fahrenheit warmer, last seen 55 million years ago, when tropical conditions existed in the Arctic and Antarctic region. We are unleashing great forces of nature that are just now being understood, that can force our climate into inhospitable levels not just for the 60 percent of the planet's species already known to be threatened with extinction this century, but for humanity as well.

The scale of the melting ice in the Arctic to alter Earth's temperature exceeds that of all the fossil fuels we have already burned. The permafrost contains twice as much. Then there are the methane hydrates, that scientists believe were the largest factor in reaching the super-hot conditions seen 55 million years ago, when most of the life on our planet was wiped out. This is frozen methane that has been stored thousands of feet deep on the ocean floor throughout the world. It contains 3,000 times the amount of methane in the atmosphere today, and there are signs it is beginning to melt, releasing bursts of methane that bubble to the surface.

The Arctic sea ice is like a switch that rockets the planetary train to overdrive when melted. With ice conditions year round in almost all of the Arctic, as was seen until recent years, it acted like a brake on the train, reflecting much of the sun's energy, giving us a fighting chance to stop before we go over the edge. Once sea ice melts, warming conditions threaten to rapidly melt permafrost, and possibly even methane hydrates, catapulting the planet to super-hot,

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deadly conditions. When a house is on fire, you get outside. What do you do when the whole planet is burning?

The horrific conditions of the destination into which we are headed is the most troubling, and something few scientists realized until very recently. Several years ago, many would have described my analogy in terms of a flat surface, that once we get that climate train moving, it can be hard to stop, and could cause horrendous damage with a few degrees temperature rise. But few understood that once we get it moving past a certain threshold, the slope takes over and even if we stop the engine, it is going down toward the unbearable conditions none of us would want to leave to future generations.

We take for granted the life support system in nature that keeps humanity alive far too much. We are talking about the life or death of billions of people, not to mention millions of other species. Such is the value of the climate on the mountaintop for our beloved Earth: the critical element that brings life-giving rains at just the right amount and time, and temperature ranges in which all plants and animals are evolved to fit.

Climate change has turned from a few degrees warming about which we should be concerned, to a likely terrifying lurch into such temperature extremes that the very survival of the majority of humanity this century is being put into question by top scientists like Sir James Lovelock.

We are triggering so many positive feedbacks of such a gigantic scale, that the runaway greenhouse effect that we are unleashing could exceed the worst case IPCC predictions of 6.4 degrees Celsius, which are already horrific. Our planet is in critical condition, the situation very dire. But, an optimist at heart, as all activists inherently are or they would just sit on the sidelines, I will never give up hope.

To give up the hope that we can make a difference, since it is our species that has caused the crisis, is the ultimate nail in the coffin of the welfare of all life on our planet for all foreseeable time to come. Through the collective ingenuity and the might of humanity, we need to mobilize for the enormous needed changes. For now, the best thing to do is speak up persistently, and demand strong action from government and industry leaders, while trying to reduce our own carbon footprint.

All of the effects detailed in this book, as horrific as they are, are bound to get much worse very fast. Even with no new emissions, our planet will continue to warm for another 35 years as there is a thermal inertia with the length of time that it takes for the oceans to absorb heat. Also, through the global dimming caused by all the soot pollution in the atmosphere, we are about two degrees cooler than we otherwise would be. Ironically, if we were to immediately stop burning fossil fuel and wood fires, temperatures would immediately rise in just a few days. But we surely can't keep

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burning fossil fuels, either, or on down the tracks to a deadly climate we go, with no way back.

The 220 billion tons of greenhouse gases we have already emitted have moved the train to where the slope is beginning to take over. Meanwhile, we are fueling the locomotive with three times the global emissions of a decade ago, and the slope increases as we go down the tracks.

Drastic change needs to be made very fast, and we need more people demanding faster action from lawmakers and industry. Through a broad understanding of the facts presented in this and similar books by the citizenry of our planet, we can work to collectively realize that the issue is not our lifestyle, it is our survival, and particularly the survival of future generations that is at stake.

Working with organizations such as Greenpeace, I began asking for action on climate change in 1989. Then, few understood the threat global warming presented. It was after working for a year with Ozone Action, which merged with Greenpeace USA in 2000, that I realized how serious the issue was.

I spent six weeks in The Hague, Netherlands at the United Nations Conference on Climate Change, working with Greenpeace to show support from the U.S. for strong mandatory cuts in emissions. I was impressed with Greenpeace, as they combined banner drops with suit and tie negotiations very effectively and professionally. Greenpeace activists chained themselves to a coal

barge, shutting down Rotterdam Harbor. I witnessed Greenpeace activists chain themselves to the truck they stopped in the middle of the road in front of the UN building. They took the tires off and poured cement onto the chained-in volunteers. Meanwhile a siren blared: an effort to sound the alarm on this issue that we should have made number one back then.

I cheered support for the brave souls willing to risk death to get the message out on this critical issue. I also passed out fliers explaining the purpose of the demonstration, along with dozens of other Greenpeace volunteers. One of the facts that startled me the most was how 42 percent of the polar ice had melted in the prior 40 years. Having trekked through the Arctic Wilderness twice, I began looking into it in much greater depth.

Two years prior, Greenpeace sent researchers up to the Arctic to get witnesses to the change that scientists knew was occurring, and publicized those findings. Greenpeace “wanted to work to educate Americans on Global Warming and raise the level of concern,” said Dan Ritzman, who worked on the project. “The second component was we wanted to do something directly to combat climate change. Greenpeace was unique in that it is international, and they did the science to prove that we are getting to the critical point of no return. We cannot burn a quarter of our known reserves. So there is no point in finding new reserves. We should use that effort to find renewable energy sources.”

Chapter 2

A Climate Journey to Alaska by Train and Boat

With my constant desire to minimize my own carbon footprint, my third journey to Alaska, and the Arctic, began by train. Sacrificing safety and comfort, I drove four hours through the night to catch the 5 a.m. train in Toledo, a regular chore to get from my rural southern Ohio home to the luxury and fuel efficiency of passenger rail. The trains only come through in the early morning hours, with the terrible train system that we have in America today.

I unloaded my gear and found a window seat, exhausted from the ordeal of packing for a three-week speaking tour, and an entire summer in the far north on two expeditions, one in southeast Alaska and one in the Canadian and Alaskan Arctic, then driving through the night with no sleep. Such a relief and feeling of utter joy and fulfillment it was to lounge in my seat, with the clicketty-clack of the rail: a soothing sound. Without the stress of driving, when one split second mistake can mean death, train travel is so much more relaxing.

But looking at the landscape, I knew all was not well with the world. Large power plants were lit in eerie scenes of industrial blight at the shore of Lake Erie and Lake Michigan. While we should be rapidly shutting down power plants, replacing the energy with conservation, efficiency and renewable energy, we are actually building more of them, with several proposed just upwind of my

rural home. Scores more are proposed nationwide. Such is the industrial scene all throughout our continent, on lakes and rivers where otherwise spectacular scenery would dwell.

With ecological eyes, I watched mile upon mile of corn, wheat and soybean fields where previously had stood the largest contiguous forest in the world, with trees 500+ years old. I had just spent years battling Ohio Valley Coal Company and its owner, Robert Murray from mining under Dysart Woods, among the last of the .004 percent of old growth forest left in Ohio. Now I was on a journey that included research for a book and future speaking tour to protect the largest old-growth forest left in the U.S.: The Tongass National Forest in Southeast Alaska. Along with being critical for the salmon that form the base of that ecosystem, logging is a climate change issue. Deforestation causes about 30 percent of greenhouse gas emissions.

In Chicago, I changed trains to the California Zephyr, heading over the Rocky Mountains for an intense three-week speaking tour of California, including time to visit my brother and his wife in nearby San Francisco. By train, one can really see the scale at which we have altered the landscape, if one knows how the land was like centuries ago. All of the logging, tilling and bulldozing has released vast amounts of carbon, and continues to release carbon that had been stored in the soils, making them less fertile and less able to sequester carbon with forests in the future.

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In Denver, I picked up a growler of India Pale Ale at the Wynkoop microbrewery across from the train station: Denver's first brew pub. Heading up the mountains from Denver, we were delayed for hours by mile-long coal trains that came lumbering in from Utah and Wyoming. About a hundred train cars, each filled with more than 120 tons of coal rolled by as we waited on the side. Coal that has been in the ground for hundreds of millions of years gets priority over people in our country: the perverted priorities of coal's criminal corruption in politics. In Ohio, we spend hundreds of millions of taxpayer dollars to build rail lines for coal mines, but have among the worst passenger rail systems in the country.

Up in the mountains, we watched rafters cascade down the white-water headwaters of the Colorado River that the train went by. Mountain streams and rivers, and all of the animals and people that depend upon that water downstream are threatened by climate change. As the snow packs and glaciers that once fed these streams year-round dry up, so do the streams. We finally reached western California, and the smog and endless development of the Bay area.

The train went over massive highways, and I had a wonderful feeling of elation as I lounged in my seat, closing my eyes to rest as desired, and skipping the chore and stress of driving in such mayhem. Mass transit can not only exponentially slash our carbon emissions, it is also a much better quality of life, and hundreds of times safer than driving. We forget about the trillions of dollars we

have invested in roads, highways, cars, insurance and gas when comparing the paltry billion or two we give Amtrak each year.

The 12-lane highways of San Francisco and Los Angeles were a stark reminder of the massive burning of fossil fuels that is accelerating on our planet: causing about half of greenhouse gas emissions. Even in Yosemite, the smog drifts in, threatening the giant trees.

Hiking in Yosemite, I was reminded of my first journey to the Arctic, where I backpacked and rafted hundreds of miles, from Prudhoe Bay into and throughout the Arctic Refuge. I had conditioned in Yosemite. I had barely survived my first Arctic Quest, nearly dying of starvation, then drowning and hypothermia.

Now I understood the complexities of the greater ecosystems around me far greater because of my extensive travels and studies. I knew how rare the amazing wonders of Alaska are, and how fragile. The collapse of salmon fisheries along the west coast of the lower 48 foretell the fate of the salmon runs in southeast Alaska, unless the forests are protected.

In one of my many past trips by train to California, I took a ferry to Santa Cruz Island, part of the Channel Islands National Park, and backpacked around it. On the way back, we saw a pod of gray whales mating. After this journey around California, I would meet those whales again in Alaskan waters, though by a much longer route, crisscrossing the continent by train.

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Millions of native Americans once lived on the hundreds of millions of salmon that once swam up the rivers and streams each year from Washington to California. Now, most are wiped out, or in the tens of thousands of fish at best, teetering on the brink of survival.

The old growth forest was destroyed. Without the roots to hold the land in place, landslides blocked streams, and massive amounts of silt washed into the streams. Salmon eggs need clean streams with gravel bottoms to spawn.

In addition to the logging, dams blocked migration routes. Development further damaged the salmon with silt and alteration of the riparian habitat. Now these fish are under assault from climate change as well. Having traveled all throughout the Pacific Northwest, where I heard of the plight of the salmon, I could not wait to spend some time in southeast Alaska. The Tongass National forest there is one of the few left on Earth that still have salmon in their original numbers: tens of millions of five species of salmon.

I still needed more gear for my expeditions in southeast Alaska and the Canadian-Alaskan Arctic. I picked up a water bottle at the Yosemite store. Later, a few blocks from the hostel where I stayed in downtown San Diego, I found a used army store and a \$30 tent. While not exactly Arctic gear, I figured I would be there in the summer, and with climate change, it should do, assuming everything worked out perfectly and several thousand dollars in credit card debt.

I returned home on the Southwest Chief, from LA to Chicago, then on to Toledo, and Columbus for my 15th high school reunion. Exhausted from dancing past 2 a.m. after the reunion, the next day I drove to Cleveland, to catch the train headed east. Driving in Ohio, I could smell the mega-farms from miles away, as the local residents must do all the time.

Much of the state now stinks from massive megafarms where cattle, pigs and chickens are grown in abysmal living conditions. Livestock production was recently found to contribute as much as 18 percent of greenhouse gases, mostly from methane. The nitrogen fertilizer used on the grains to feed the livestock also contributes a significant amount of emissions. I hopped on the train in Cleveland with an entirely new set of gear, going through Buffalo, New York, then Toronto and on across Canada toward British Columbia.

It would have been much easier to go up through Windsor to get to Toronto, headed west and north instead of way east and up through Buffalo then back west. But excessive security delays by paranoid police after September 11, 2001, along with other factors put a stop to the train from Chicago to Toronto in 2004. I wonder how many more people will be killed by the auto accidents and increased greenhouse gas emissions as people drove the route instead of taking the train.

Such is the lunacy of police state USA, which under the former George Bush Regime has been the primary cause of global inaction on climate change. While we increasingly invade the privacy of

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travelers in America, and have trampled on the Constitutional rights of all citizens with the Patriot Act, the failed former George Bush regime fanned the flames, censored the science and stymied action to prevent the mass murder of billions of people this century through climate change. Obama is a refreshing change in priorities.

The previous September, I attended a lobby week in Washington D.C., sponsored by the Alaska Wilderness League, in which scores of citizens from around the country came to our capital and met with Representatives and Senators asking that they protect the Arctic National Wildlife Refuge as wilderness. While I was there, Appalachian State College Anthropology Professor Harvard Ayers asked if I would be interested in guiding a group of students up to the Arctic. I jumped at the opportunity.

On the way, I would spend an intensive month in southeast Alaska, for a book about the ancient forest and the vibrant ecosystem and peoples that it supports. Then I would meet the group in Whitehorse, traveling all by land and water to that point except for two amazing flights through the Tongass National Forest and the clear-cut devastation by Greenpeace helicopter, from their boat Arctic Sunrise.

In Alberta, the train followed the Athabasca River, with snow-capped mountains towering above. The train had a dome car, allowing passengers to look up at the mountaintops and sunsets. But just downriver, the river was being decimated by the single most environmentally destructive project in the world. A wetland area the