

Climate, Energy and Community: Vermont 2019

Alan K. Betts
 Atmospheric Research, Pittsford, VT 05763
akbetts@aol.com
<http://alanbetts.com/writings>

This is a compilation of my 2019 columns from the Sunday Rutland Herald and Barre/Montpelier Time Argus. This is the twelfth year of a series that started in January 2008; and a 2012 overview paper is available¹. These columns go through the seasons, dealing with weather, climate, climate change, energy and policy issues. They blend science and opinion with a systems perspective, and encourage the reader to explore alternative and hopeful paths for their families and society. They are framed so that a scientist will perceive them as technically accurate (although simplified); while the public can relate their tangible experience of weather and climate to the much less tangible issues of climate change, energy policy and strategies for living sustainably with the earth system. The politically motivated attacks on climate science by the current administration have however sharpened my political commentary; since climate change denial will bring immense suffering to our children and all life on Earth.

I believe that earth scientists have a responsibility to communicate clearly and directly to the public² –as we all share responsibility for the future of the Earth. We must deepen our collective understanding, if we are to we can make a collective decision to protect the biosphere and build a resilient future.

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¹ **Betts, A.K. and E. Gibson (2012)**, Environmental journalism revisited. *Environmental Leadership: a Reference Handbook*. Deborah R. Gallagher, Editor, SAGE publications Inc., Sept. 2012, ISBN: 9781412981507. Available at <http://alanbetts.com/research/paper/environmental-journalism-revisited/#abstract>

² **Betts, A. K. (2011)**, Communicating Climate Science. *EOS Transactions*, 92, No. 24, 14 June 2011. Available at <http://alanbetts.com/research/paper/communicating-climate-science/#abstract>

a) Time to Face the Future

(January 5, 2019)

https://www.rutlandherald.com/opinion/perspective/weekly-planet-time-to-face-the-future/article_1e63028d-5f25-5e9c-bd82-a2bc9836df83.html

In 2018 it became clear that the Earth has passed a threshold where many extreme weather events are now clearly attributable to climate change. In the US, hurricanes Harvey and Florence broke all records for rainfall amount, as they strengthened over warmer tropical oceans, and then stalled on the coast for days. In Kerala, India this year the monsoon floods were the worst in a century, displacing a million people. Warming seas give more evaporation that are fueling stronger rain events.

A distinct but coupled climate change impact comes from the fact that the Arctic is warming twice as fast as the rest of the globe, and this is producing larger amplitude waves in the mid-latitude jet-stream that move slowly. Blocking patterns in the weather are becoming more frequent, and these slow down the movement of storms. This contributed to the disastrous flooding from Harvey and Florence. More generally, blocking patterns can create extremes in temperature, or more rain in one region and longer droughts elsewhere. In 2018, the eastern US had record temperatures for the six months from May to October, with record rainfall in Pennsylvania and the Virginias. In the west, California remained in an extended drought, and the last two years have set new records for both fire severity and damage. One million California buildings now face wildfire risk.

Millions of coastal homes face flooding from storm surges and accelerating sea-level rise, as the massive ice-sheets on Greenland and western Antarctica move slowly towards instability. Global emissions of CO₂ rose in 2018; while in sharp contrast the latest IPCC Special Report 15 says we must reduce emissions rapidly in the next decade to slow climate change. The fossil fuel industry paid no attention, and hampered progress at the recent climate conference in Poland with the assistance of the US.

The fourth National Climate Assessment (NCA-4), compiled by thirteen federal agencies and released over Thanksgiving, mapped out adaption costs and detailed strategies for the US in the coming decades. Our narcissistic leader, unwilling to read even the executive summary, said in response: "I am so smart that I don't need scientists to tell me what is happening to the climate". This prompted more discussion on how individuals can be so stupid that they are unaware of it.

Take a deep breath, and ask if we can make this Assessment a climate tipping point of a different nature? Scrap those New Year resolutions, and read the NCA-4 (<https://www.globalchange.gov/nca4>). Yes it is long and detailed, so plan community potlucks to hold discussions and to keep warm. Assign each other one chapter, and plan to stir up creative trouble this winter. What does your community need to do, and how can you get it done before the apocalypse?

For ideas and backup, join all those forward-looking groups that are thinking of ways to address the exploitation of the Earth and its people before it is too late. Groups like 350.org; Rights and Democracy (radvt.org), Indivisible (indivisible.org), the Transition Town movement (transitionnetwork.org), and many more.

Long-term, we need representatives on local select boards and regional planning commissions to steer constructive change. Short-term, we need town meeting resolutions to tell those newly-elected

politicians in Montpelier that it is far too late for more promises to act someday. The Earth's climate is not waiting for us.

It is time for speedy action to build a resilient Vermont, where as much as possible of our food supply, water resources, renewable energy supplies and businesses are under responsible local control. It will still be painful to watch if the central government continues to crumble, and threaten those who know its fantasies are foolish and cruel. Nonetheless, we can choose a responsible path and create a shared livable future for our communities and for Vermont.

b) The clash between oil and the future (February 23, 2019)

https://www.rutlandherald.com/opinion/perspective/weekly-planet-the-clash-between-oil-and-the-future/article_8603f2be-83d0-5b52-ade3-9c056c3b61ef.html

In the real world, global ocean temperatures set a new record in 2018, beating the previous record set in 2017. New studies show that both the Antarctic and Greenland ice-sheets are melting faster than ever, so that sea-level rise is accelerating. In the 3rd week of January, the weakening polar vortex gave us bitter cold weather and heavy snow, and as I write more is falling. However, our spinach and lettuce in cold-frames are doing fine, as the snow cover has protected them.

Here in the US, the new surreal world continues. I remarked last month that the President refused to read the 4th National Climate Assessment mapping out how bad climate change will be for the US if we stay on our present fossil fuel energy system. The EPA head also said he was too busy to read this report, which his own agency helped produce. His extraordinary excuse was that much of the science in the report came from the time of the Obama presidency. Am I to suppose by implication that the next NCA report will be filled with Trump science?

The Federal government shutdown affected a lot of government science along with so many other 'non-essential' government branches. Science is considered worse than non-essential, because much is incompatible with right-wing doctrine. The shutdown prevented the weather service from upgrading models and updating codes to receive all 2019 global data. It prevented many scientists from reviewing recent climate data. Slowly but surely, government by ideology and blackmail is pushing the US into third-world status.

Both snow and missing data have meant that I have had time to read and think more deeply. Reading the extraordinary book, "Oil, Power and War" by French author Matthieu Auzanneau, has given me a new global perspective on how our dependence on oil has led to far-reaching conflicts over the past century. I learnt a lot about the central role of oil in warfare – and the millions that have suffered and died for oil. The US military and economic dominance has been closely tied to the control and access to global oil supplies. This still continues in the ongoing turmoil in the Middle East, and the latest struggle to regain control of the large Venezuelan oil reserves.

I thought I was well-informed, but now I realize the immense secret power of the US oil monopolies has ruled government policy for the past century, rather than the reverse. In parallel to the military role of oil, the rapid material growth of the US economy in the decades after World War II was also enabled by

the US global control of cheap oil supplies. Remember the magnificent icon of our growth and prosperity was the gas-hungry 1950s V8 Cadillac with fins.

But because we refuse to make the transition from oil, the crash is coming closer. In a tragic microcosm across the border in Mexico, people risk their lives by tapping pipelines for gasoline. The poor are desperate for fuels, and it is a \$3 billion a year business for organized thieves.

I see much more clearly how accelerating climate change is linked to the power of oil in both our industrial society and our military dominance. The present EPA has been told to roll back efficiency standards for cars once again to keep us trapped in this spiral of demand driving supply that is profitable for the oil industry. Right now the US has record oil production, but we ignore the fact that in a decade or so, when this shale oil extraction peaks and the crash comes, the climate impacts will be irreversible.

Yet plug-in hybrid cars can right now deliver an 80% reduction in gasoline use, with large savings in fuel and maintenance costs to the consumer, large gains for the climate system, and a smooth transition away from oil. However, both society and the automobile industry are reluctant to really market them, because oil consumption and inefficiency control policy.

But shifting back to the renewable world, Vermonters are starting to tap trees for maple syrup as they have done for centuries, and soon we will be eating fresh spinach again.

c) Saving our Children

(April 13, 2019)

https://www.rutlandherald.com/opinion/perspective/weekly-planet-saving-our-children/article_b897ba16-6f43-5db6-b5c0-af2a79326a18.html

On Friday, March 15, images and video flowed in from around the world, Australia, the Pacific, Asia, Europe and Africa, as more than a million students in 120 countries walked out of school to strike for the climate. Thousands of scientists supported them, but the real driver was their realization that global society intends to sacrifice them and their children, along with much of life on Earth, just to protect our consumer society and the profits of the oil companies and other wealthy corporations.

This winter, along with shoveling snow, I have been mulling over how our society's indifference towards the future of our children contrasts with the care we take to protect them in the present. There are days and nights when this fills me with dread. We need to discuss this, even though we would rather avoid it. Consider that there are political and religious campaigns to protect the lives of unborn children, but no similar campaigns to protect the unborn millions that will die in the climate catastrophe that we are creating. How can this be?

Other issues are at stake. The campaign in the present to protect the unborn is a convenient political fit for the disempowerment of women and their centuries-old subjugation by male authority. In contrast, the future deaths of the unborn, and much of creation, is consistent with centuries of exploitation of the Earth by humanity. It is coupled to the concept of human dominance, historically male dominance. This led to a misplaced sense of our power and authority over nature, which developed over the centuries in the western and colonial worlds. It led also to the ruthless suppression of the indigenous peoples, and their deeper understanding of our relation to the Earth's ecosystem.

As science and technology emerged as drivers of our civilization, this frame of human dominance and exploitation of the Earth and all its resources spread further. We became deeply embedded in a consumer society powered by oil, which could be cheerfully marketed as liberating for women, as long as they lived in a rich country.

Now the growth of our consumer society and economic system exploit the poor everywhere, the planet's resources and ecosystems, all to maximize current profit and channel wealth and power upward. Advertising and the media keep us in line, and continually feed us the sacred myths about our entitlement. Oil companies and other polluting industries bribe our politicians. Meanwhile, our time horizons get shorter, rather than longer to match the time-scales of the Earth. The reality is that our global consumer economic system, powered by fossil fuels, is driving the energy imbalance of our planet that, in turn, is driving climate change. This is a crime against the Earth that will haunt humanity for centuries, and yes, eyes closed, we are sacrificing our children.

A rude awakening is coming since humanity does not control the Earth. This is obvious in every climate-related disaster, whether rising seas and hurricanes, floods and storms or droughts and fires. Afterward, we borrow the money and rebuild, but so far our societies have refused to discuss and confront the consequences of our doctrines of power and exploitation. We can cooperate with each other on smaller scales, but the understanding that we need to collaborate with the Earth on a grand scale has been suppressed by our economic system, which is protected by well-funded propaganda.

Instead we should listen to Mary Christina Wood, and encourage our teenagers to campaign for a new planetary patriotism that transcends national boundaries, and give them the resources and training to build a truly sustainable society. They need guidance and massive support, but their future is on the line, and our aging, corrupt politicians have failed them. To protect the interests of our children and grandchildren, we must accelerate the transition away from fossil fuels to a much more efficient society, powered at least 80 percent by renewable energy. That is a morally acceptable use of our excellent technology - whereas destroying our stable climate system is not.

The snow has finally melted, and I have been thinning lettuce and spinach that wintered over under glass, and admiring the rhubarb sprouting. The community farm in Pittsford where I live is starting its second year: growing more food locally brings communities together.

d) Rebellion to save the Earth

(June 1, 2019)

https://www.rutlandherald.com/opinion/perspective/weekly-planet-rebellion-to-save-the-earth/article_6e51224b-0cdc-59f2-8a69-435f60d122fd.html

Late snowmelt delayed the transition to spring after a long winter. The six months from November to April were very wet across the Northeast. For Vermont, this was the fourth wettest April on record and we have had another 7 inches of rain in May. The leaf-out of maples was delayed a week or so, as was the planting of our vegetable garden. But while the central US was cold in the first quarter, Alaska, Europe and much of Asia had very warm temperatures. While it was exceptionally cold in the northern US, February temperatures set new records in Europe, and especially England where high temperatures reached 70 degrees and the moorlands started burning. At the same time, visionaries in England were planning the first rebellion to save the Earth.

As the burning of fossil fuels continues and the greenhouse gases trap more heat in the oceans, the climate system is changing. The Arctic ice shrunk to a new minimum for April, and the mid-latitudes are seeing more nearly stationary global weather patterns that are increasing climate extremes. However poorer tropical countries are seeing far worse. In southeast Africa, where tropical cyclones used to be very rare, two powerful storms developed over the warmer ocean and hit Mozambique. First came cyclone Idai in March with massive flooding which left about 1 000 dead. Then Kenneth, an even stronger category 4 storm struck in April with five to six feet of rain in less than a week. Try to imagine the flooding and destruction in a poor nation.

In early May, a new UN report on Biodiversity and Ecosystem Services reported that soon a million species will go extinct from loss of habitat and climate change. Nature is in an unprecedented global decline and species extinction rates are accelerating. The report chair, Sir Robert Watson comments "The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide. We need transformative change."

We must recognize that it is the rich nations that have been responsible for this tragedy that is devastating the Earth and the lives of children everywhere. For 27 years, we have not kept the promises we made in 1992 to stop dangerous climate change, and now we are deep into a climate emergency. Instead we listen to the soothing propaganda from the fossil fuel industry and their many affiliates that say: "Buy bigger cars and trucks and buy more consumer stuff, so that our profits are larger. Use your freedom to exploit the poor and the Earth: the future is not your responsibility."

Yes, it looks as if 'business as usual' intends to go on with our consumer growth economy based on fossil fuels, exploiting people and life on Earth, until the crash comes with the collapse of the Earth's ecosystem.

So it was heartening to see that a new global group, the **Extinction Rebellion** (Website: rebellion.earth) has grasped that the destruction of the Earth is now a civil rights issue, which can only be checked by civil disobedience. This rebellion to save the Earth is not to defend individual rights, but to defend the rights of our children and the rights of life on Earth that faces extinction. They will not accept that while our corporations have the 'right' to exploit the Earth, so far the Earth has been given no rights.

This group is trying to force rich countries who are responsible for destroying the planet to take real action on the global climate and ecological emergency. They shut down London April 15-17 with a huge street party, and they were successful in getting their first demand. The British and Scottish governments declared a 'climate emergency'. We shall see whether this is more than symbolic.

It is clear that given the pathetic collapse of ethical standards in Washington, the attacks on climate science, and the war-mongering, there will be no leadership here from the executive branch. So study and support these global movements to hold governments accountable. Recognize we have no right to sacrifice our children and much of life on Earth. Take a deep breath and start talking to your neighbors and politicians.

e) The Climate Catastrophe is coming

(July 20, 2019)

https://www.rutlandherald.com/opinion/perspective/betts-the-climate-catastrophe-is-coming/article_c83453e2-08ce-5f68-afc7-37d13c9dfa41.html

We had a very wet spring in Pittsford with seven inches of rain in May and six in June. The springs are still running and vegetation has grown fast after a late start. Our sugar snap peas reached a record nine feet tall, so for harvesting I need a small step ladder!

Elsewhere climate extremes are much more severe. Flooding on the Mississippi River has lasted longer in many places than the Great Flood of 1927. Britain has had more wildfires in 2019 than in any year on record. The end of June was extremely warm in Europe with record temps in southern France above 110F. Slowly the realization is sinking in that as the Arctic warms and melts, the fast-moving westerly jet stream patterns are often being replaced by nearly stationary patterns of large amplitude north-south waves. This July, there was severe flooding in southern Japan as 40 inches of rain fell in a week, because the Baiu front stalled over the island of Kyushu. Anchorage hit 90F for the first time on July 5th. The melting of the Arctic sea-ice as well as the glaciers of Greenland is increasing.

A climate catastrophe is approaching, and frightened groups are desperate to keep exploiting the planet for profit, before the collapse. In Washington, many heads of agencies have been appointed with clear conflicts of interests, and charged them with dismantling government regulations that protect both people and the natural environment. Scientific advisory groups have been disbanded, or panels have been stacked with representatives from the fossil fuel industries. The EPA is looking for ways to unwind the Clean Air Acts by cynically changing how the benefits are calculated, or by simply asking industries what provisions they would like to see removed. Remarkably, efforts are being made to roll back vehicle fuel-efficiency standards to prop up the profits of the oil industry, despite the opposition of the auto industry.

Astonishingly, the Republican Party, with a few heroic exceptions, panders to the ego of this clueless President, who has neither read nor supports the US constitution; is utterly selfish and obligated to his financial backers. Incredibly he is also supported in this ethical void by right-wing Christian groups, who have long forgotten that Christ asked us to join the Father's world, the Creation, not destroy it. This is the ultimate crime of Ecocide: the destruction of the Earth's biosphere on which all life depends.

On the scientific front, a new generation of models predicts a larger warming from the doubling of CO₂ and the increase of the other greenhouse gases. Studies show that global natural systems are undergoing destabilization on an unprecedented scale: we are entering an era of environmental collapse. We are also entering the last decade to slow things down. Fortunately scientists at government agencies and in academia, with their global connections, continue to advance our understanding of the real world.

A few countries have declared a climate emergency, Britain and Canada. The Pope agrees that the Earth faces a climate emergency, saying that our children and grandchildren should not have to pay the cost of our generation's irresponsibility. He was speaking to oil and energy executives, urging them to hear the increasingly desperate cries of the Earth and the poor. However the cynical attitude of the oil industry is that despite their staggering profits and decades of presenting false information, carbon taxes are the responsibility of governments, and tax payers should pay for the transition away from fossil fuels.

What can we do? We can support the many local and global groups that are calling for climate justice.

There are many: 350.org started in Vermont and has become a global network. In Rutland County CastletonIndivisible.org is helping organize many holistic projects. Across Vermont, Rights and Democracy (RadVT.org) works politically to support people and a healthy environment. Globally, Fridaysforfuture.org is helping the climate strikes by youth who realize they are to be sacrificed. Rebellion.earth is coordinating the first rebellion to save the Earth, using civil disobedience to force lethargic governments to face the climate and extinction emergency now, rather than just make promises for the future.

Support your local planning commissions and emergency management, and advise them on building resilience as we deal with increasing climate extremes. Mentor our teenagers as they grapple with the realization that they are the child sacrifices in this nightmare. Teach them how to recycle everything, grow their own food, build community and shift to light-weight electric bicycles. Teach them non-violent civil disobedience, so that can join the rebellion to save our Earth.

Just look with clear vision at the choices that we, our society, businesses and politicians keep making, and ask the very simple question. Is this good for the Earth or bad for the Earth? And then choose the Earth over our consumer society and corporate greed. The Earth is way more powerful, and our survival depends on the living biosphere of the Earth.

It is time for us all to stand up everywhere and just say no: we will not tolerate the destruction of our precious Earth and the lives of our children for greed.

f) Floods, ice, fires and drought

(September 7, 2019)

https://www.rutlandherald.com/opinion/perspective/weekly-planet-floods-ice-fires-and-drought/article_d7fd30b5-3231-5693-ab2b-ddf02b231999.html

Water is everything to our planet. Last week, Greta Thunberg arrived in New York after crossing the Atlantic in 15 days on a racing yacht. She will be in the United States for the global strike for the climate system, Friday September 20-27, and she will speak to the United Nations on September 23. This is an existential protest by youth who are unwilling to be sacrificed for corporate greed. Indeed the unchecked exploitation of the Earth and the poor by the fossil fuel industries and society is both a crime against humanity and the Earth itself. Capitalism has given rights to corporations, but the Earth still has no rights. Legal battles are underway across the globe to establish the crime of ecocide, the destruction of the Earth's living ecosystem, but this may come too late.

The fossil fuel industry is spending some \$200 million a year on dishonest propaganda and bribes to politicians to protect



its \$100 billion in annual profits. We need escalating fossil carbon taxes to reframe the economics and to help pay for both present and future costs. But the highly profitable global consumer economy, created and powered by fossil fuel, has purchased the silence of millions.

Let us start with the global weather and climate perspective. The increasing greenhouse gases have slowed the cooling of the Earth to space, and melting ice and snow has reduced the reflection of sunlight, so the Earth is warming. More than ninety percent of this heat is stored in the oceans. But the Arctic is warming twice as fast as the equator, and this has changed the mid-latitude jet stream towards large amplitude north-south waves that move slowly. In July for the first time, a convective storm in Kansas moving to the southeast, circled back over the Gulf as a tropical storm, forming the weak hurricane Barry that struck Louisiana, causing substantial flood damage. As I write, category 5 hurricane Dorian is inflicting catastrophic damage to Grand Bahama, as it sits almost stationary just east of Florida.

For the year ending with June 2019, the central United States was cool with record precipitation in Nebraska, Kansas, Oklahoma and Arkansas. It was the second wettest on record for Iowa and Texas. The flooding on the Mississippi River this spring was the longest on record. The eastern and south-eastern US was warm, but 14 eastern states also had record precipitation for the year. The realization is spreading that billions are needed after floods to rebuild levees, and build new floodwalls to hold back rising waters in towns. All this should be funded by a tax on fossil fuel.

But elsewhere in the northern hemisphere, there were record high temperatures in Europe as well as Alaska, and fires across the warming Arctic, especially in Siberia. These fires spread soot that darkens the Arctic ice and speeds melting. The very warm air from Europe also blew north over Greenland, and set new records for Greenland ice-cap melt in early August. As the Arctic ice melts climate changes, and as Greenland melts sea-level rises.

With Brazil once again encouraging development, more than forty thousand fires were set burning across the Amazon to clear land during the tropical dry season. In India, while south-western states have severe monsoon flooding, millions in the east are running out of fresh water. The city of Chennai with 10 million people has a water crisis, with desiccated reservoirs and shrinking ground water supplies. Water is critical for agriculture and crops everywhere, but three-quarters of the earth's soils are now degraded as well. An era of environmental collapse is coming, as complex natural systems become destabilized. The rich countries that have the largest carbon footprint carry the largest responsibility.

We need this reminder, even though none of this is good news. Here at home remember local agriculture is critical. Harvest and share your crops and thank your local farmers. Plant a rye-grass cover crop to improve the soil in your vegetable garden. What can you plant to winter over under glass? In early April, we delight in eating spinach and lettuce that was planted in October. Teach your children and grandchildren to grow food, and support and educate them when they protest against the corruption in our society. Roots in the Earth can support us through the difficult times ahead.