

Building a better bridge to the future



Climate science and politics in an age of change

By Robert W. Sandford

More and more thoughtful people are concerned that climate change, in combination with a number of contributing environmental circumstances, is poised to create a perfect storm of economic, social and political consequences.

A perfect storm

The notion of a 'perfect storm' emerged into popular culture in 1997, with the appearance of Sebastian Junger's non-fiction work of the same name. The book is about a storm that struck the east coast of North America in 1991.

On October 28 of that year, an extra-tropical cyclone developed along a cold front which

had moved off the northeast coast of the US. However, this was not the only storm that existed at the time in that great expanse. Hurricane Grace, which had formed on October 27 from a pre-existing subtropical storm, was moving northwestward when this new storm formed. Under the influence of this new storm, the hurricane made a hairpin turn to the east. By the next day, the new storm had astoundingly absorbed the hurricane.

This new storm was a colossus. Its inner core developed first into a tropical storm and then into a hurricane. On the ocean, waves reached nearly 40 feet in height.

The storm combined with high tides, causing extraordinary damage to infrastructure not designed for such extremes. Coastal flooding occurred along the Atlantic shoreline from Canada all the way down the American coast to as far south as Puerto Rico, the Dominican Republic and the Bahamas.

But it was not the damage that impressed itself in the public imagination. Never before had weather and climate scientists on this continent seen so many seemingly disparate circumstances come together so perfectly to create such violent weather on such a massive scale. The 1991 incidence remained everyone's notion of a



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The challenge

One of the reasons it has been difficult to convince the public that climate change is happening is that the most rapidly occurring and accelerating changes are taking place in parts of the world where there are the fewest people, at the poles and in the highest mountain ranges. Changes that are occurring elsewhere in the world are happening when the fewest people are up or about – at night and in winter.

There has never been a time in history when so many people have congregated in cities where they are far less likely to be in contact with changes in natural rhythms. People spend more time than ever inside houses, offices, restaurants, planes and cars. We are also shielded from these changes by elaborate, very expensive, largely immovable, aging and increasingly vulnerable global infrastructure.

Climate change is also happening at a time in history, and is in part caused by a degree of human physical mobility never before imagined. Our mobility presents unique challenges. If you have never lived in a place for more than five years, how would you know if that place is changing?

Another factor contributing to the perfect storm coalescing around climate change is the fact that the most frightening potential impacts of global warming are, at present, barely discernable. The reason for this is that small temperature changes have the greatest impact at the most fundamental levels upon which our ecosystems function and these levels take time to respond. Very small changes in temperature, for example, affect the water-ice interface which impacts soil temperature and moisture retention which, in turn, affects the timing and extent of water supply – especially in places like Canada.

These very small changes in temperature are also magnified in significance at the molecular and cellular interface. These changes will alter first at the viral level, then extend into the huge universe that is bacterial and fungal life, and then move upward into the insect kingdom – all with unpredictable results.

We have already seen what this can mean in the context of the altered behaviour of forest pests – Western Canadians have learned a great deal.

Think about the last time we faced an environmental catastrophe on a continental scale in North America. The dust storms of the 1930s meant that the Great Plains were close to death ecologically.

This issue invites comparisons. Historians have argued that the Dust Bowl of the 1930s was one of the three greatest ecological disasters in

‘perfect storm’ for 14 years – until 2005, when Hurricane Katrina flattened 150 miles of Gulf Coast coastline, before it turned the Mississippi River back on itself, destroying New Orleans.

There are concerns that a perfect storm of even more unpredictable dimensions is gathering. If that is so, then it is a storm we are helping to create. The storm of which I speak is that which is forming as wide-ranging human environmental impacts are superimposed on a warming globe.

All perfect storms have one thing in common: when conditions are right, circumstances can align to create a serial combination of vulnerabilities that can lead to disaster. So, what have we got?

Elements of storm

Deteriorating environmental conditions, private property precedents, short-sighted economic imperatives, self-centred social preferences,

debt (economic and otherwise), the increasingly atomized and contaminated nature of public discourse and the reduced capacity of almost paralyzed contemporary political frameworks to function in a timely manner in addressing urgent issues, all lining up globally in just the way they need in order to create a perfect storm. It is up to us to prevent that.

The elements converging in our time to create this storm are all familiar to us. We know a lot about environmental impacts caused by population growth, agricultural expansion, industrial development, land-use changes, a rapidly growing food scarcity and energy security crisis, habitat and biodiversity loss and destruction of terrestrial and ocean ecosystems and fisheries. We have been bickering over what to do about these issues for 50 years. Now, let’s talk about how it is that, in tandem with these issues, climate change may present a different order of challenge than we have confronted before.

all of human history. Is the pine bark beetle the Dust Bowl of our time? In British Columbia, it is. And we have only started to feel its downstream impact on the province's hydrology or ecology. This is just the beginning.

After altering the behaviour and range of pathogens and insects, the impacts of rising temperature regimes will then continue to move erratically up the chain to affect the physiology, behaviour and range of plants and animals.

We have difficulty at present imagining how a rise in global temperature of a couple of degrees should be a big deal. As we can see, however, nature operates by its own rules and establishes its own thresholds, and many of them revolve around only slight changes in temperature.

It is entirely possible that an increase in global atmospheric temperature can trigger feedbacks that will make global warming its own cause. We know what these feedbacks are, but we still do not know if or when they will kick in or how they will reinforce one another. Unfortunately, we do not know enough about either climate or ecological systems to predict exactly what will happen at any of these levels. We do know, however, that, by the time the average person fully grasps these changes for what they really mean, they will already be of significant magnitude and irreversible in direction.

What can we do?

If we want to survive as a prosperous society we have to be brutally honest with ourselves about our current circumstances. That is the only way we can break up the current alignment of converging threats. Being honest with ourselves leads us directly and without halt into the domain of water management. Climate change mitigation is about carbon. Climate change adaptation is about water. Follow the water.

There are many among us who understand that land, water and climate are reflections of one another. By managing one, we are in effect managing the others. Intact ecosystems slow and moderate the impacts of climate change. Different types of landscapes and ecosystems retain, purify and release water at different rates. For that reason alone, we need to take land-use impacts seriously. (Though we sometimes pretend otherwise, we also know which land-use impacts to avoid.)

We know value of ecological services. Some of us have learned that technology will never be more than a partial solution, until we make the public understand why we need to invest more and more into expensive technological applications that perform functions that nature used to perform on our behalf for free.

In the absence of ecosystem health all we

have are engineering solutions that are the equivalent of putting all of nature and all of humanity on dialysis. Unless we all know why it is impossible to slow our destruction of natural ecosystem and understand where this destruction and our over-reliance on technology is taking us we will never be able to keep up with the difficulties we are creating for ourselves in terms of water security, ecosystem integrity or climatic stability.

Only by building a better bridge between science and public understanding that leads to action can we break out of this vicious circle.



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