

Analysis and Actions:

Reflecting on Climate Change Developments in 2021

By Ian Urquhart, *Editor and Executive Director*



This article began as a straightforward review of what I believe to be the most important climate change document the public should read in 2021 – the August 2021 Summary for Policymakers that prefaced the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). It's become more than that and is now a reflection on the climate change analysis and policy making we've seen in the last half of this year. The reflection begins with the Summary's release in August and ends with the Glasgow Climate Pact. This was the agreement reached at the conclusion of the 26th conference of the parties (COP) that signed the United Nations Framework Convention on Climate Change (UNFCCC) more than a generation ago, in 1992.

What is the IPCC? How Has Its Language about Climate Changed From 1990 to Now

For years climate change figured importantly in my teaching about international and Canadian environmental politics. My conclusion about the “must read” character of the 2021 Summary for Policymakers is based on that experience. In the classroom, I told my students there were good reasons to take the analyses and conclusions of the IPCC seriously.

Before getting to those reasons I'll offer a few words about the IPCC for those unfamiliar with the history of this United Nations institution. Given the messaging in today's IPCC analyses and conclusions, there's some irony in its creation. In 1979 the United Nations' World Meteorological Organization held the First World Climate Change

Conference. Approximately 350 specialists from the natural and social science worlds gathered in Geneva for this conference. The conference ended with a call to investigate urgently climate knowledge and “to foresee and prevent potential man-made changes in climate that might be adverse to the well-being of humanity.”

The IPCC was fathered by American concerns about what this agenda could mean for economic and corporate activities. The Bush Administration worried that quite a small number of eminent scientists from the International Council of Scientific Unions would produce analyses calling for important restrictions on economic activity. To try to minimize this risk the United States urged the establishment of a much larger, open-ended intergovernmental panel to assess climate change science. This panel is the IPCC and it was born in 1988. It is composed of 195 governments. Its Working Groups draw on the expertise of hundreds, thousands of scientists.

Involving hundreds, thousands, of scientists in writing and assessing the reports IPCC assessment reports is one reason I told my students they should be confident in the credibility of the IPCC's work. There may be other examples of where so many experts focus their attention on a set of related subjects. But, if so, they're unlikely to be many of them. With extensive scientific comment should come greater confidence in their conclusions.

A second reason was at least as important. This was the refusal of the scientists to rush to judgment in their assessment reports. Their analytical reach didn't go beyond what

the evidence available to them suggested. Their assessments were careful, measured. This is seen very well through comparing the language used over time, as the scientific community produced and assessed more climate change related data. And, as we've moved from the first assessment report in 1990 through to the sixth one of 2021 the careful, measured language of those assessments has become more and more certain about the causes of climate change. We are primarily responsible.

In 1990 the IPCC wasn't prepared to say anything definitive about the human contribution to climate change. It left the door open to the possibility that the amount of warming the climate models appeared to show could have been due to natural variability. In 1995, after analyzing more data, the IPCC said the evidence suggested there was “a discernible human influence” on the climate record. However, it didn't conclude human activity was the most important influence on global climate, just that our influence was discernible.

In 2001, the IPCC's assessment was more certain of our responsibility. But, even then, it was cautious about the amount of influence it would grant to our activities. It wrote: “There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities.” By the time of the fourth assessment report in 2007 the cumulative research record left little doubt where most of the responsibility for climate change rested. Our greenhouse gas emissions were “very likely” responsible for “most of the observed increase” in global average temperatures in the last half of the

Twentieth Century. It was “extremely unlikely” that the recent record could be explained without considering those emissions. As more and more evidence was gathered, as more and more scientists evaluated the data, the human responsibility for climate change evolved from a possibility to a near certainty.

Some eminent contributors to our knowledge and awareness of climate change likely see this cautiousness as fulfilling the American desire to protect business. Tim Flannery, for example, sees the IPCC’s assessments as “lowest-common-denominator science.” The IPCC’s consensus decision-making model has given too much influence over the years to governments in league with the fossil-fuel industry. “If the IPCC says something,” Flannery wrote in 2005, “you had better believe it – and then allow for the likelihood that things are far worse than it says they are.”

So, what is the IPCC saying now? The language of this year’s sixth assessment report is even more categorical.

The Current Climate

Have humans warmed the planet? There

is no hedging in the IPCC’s 2021 answer: “It is unequivocal that human influence has warmed the atmosphere, ocean and land.” Increases in greenhouse gas (GHG) concentrations in the atmosphere since the 18th Century “are unequivocally caused by human activities.” And, as the Chart below shows, we are warming the climate at an “unprecedented” rate – unprecedented at least in the last 2000 years!

What is responsible for the retreat of glaciers, Arctic sea ice, and the melting of the Greenland Ice Sheet? The IPCC concludes: “Human influence is *very likely* the main driver of the global retreat of glaciers since the 1990s and the decrease in Arctic sea ice between 1979-1988 and 2010-2019...” (emphasis in the original; all italicized text was emphasized by the IPCC’s authors) It is also *very likely* we have contributed to the melting in Greenland over the past 20 years.

How severe is this retreat? In the last decade, the IPCC concludes with *high confidence*, the annual average level of Arctic sea ice was at the lowest level it’s been since 1850. With *medium confidence*, the IPCC of-

fered the following two conclusions. Arctic sea ice in the late summer was smaller than at any point in the previous 1,000 years; the global retreat of glaciers since the 1950s, like the rate of global warming, is unprecedented at least in the last 2,000 years.

And what about the oceans? “It is *virtually certain* that the global upper ocean (0-700 m) has warmed since the 1970s and *extremely likely* that human influence is the main driver. It is *virtually certain* that human-caused CO₂ emissions are the main driver of current global acidification of the surface open ocean.”

With *high confidence*, the sixth assessment reports that the global mean sea level has risen more rapidly since the start of the Twentieth Century than in any earlier century in the last 3,000 years, at least.

With respect to the state of the climate currently the sixth assessment report has much more to say. None of it is soothing.

A Lost World

One of the most disturbing aspects of the summary for policymakers found in the latest assessment report is the section on possible climate futures.

Barring a catastrophic global cooling event, the world we see outside our windows today is already lost. The possible climate futures section of the summary presents several climate change scenarios, each one based on different assumptions about the trajectories GHG and CO₂ emissions will take in the remainder of this century.

Whether the globe follows a low or high GHG emissions scenario, the world’s surface temperatures will continue to increase until at least the middle of the Twenty-first Century. Here the ambitions of the 2015 Paris agreement on climate change are worth considering. That much-celebrated agreement put numbers on the goal of reducing the risks and impacts associated with human-caused climate change. It aspired to hold the average global temperature increase “to well below 2° C above pre-industrial levels and (to) pursuing efforts to limit the temperature increase to 1.5° C above pre-industrial levels.”

“Global warming of 1.5° C and 2° C will be

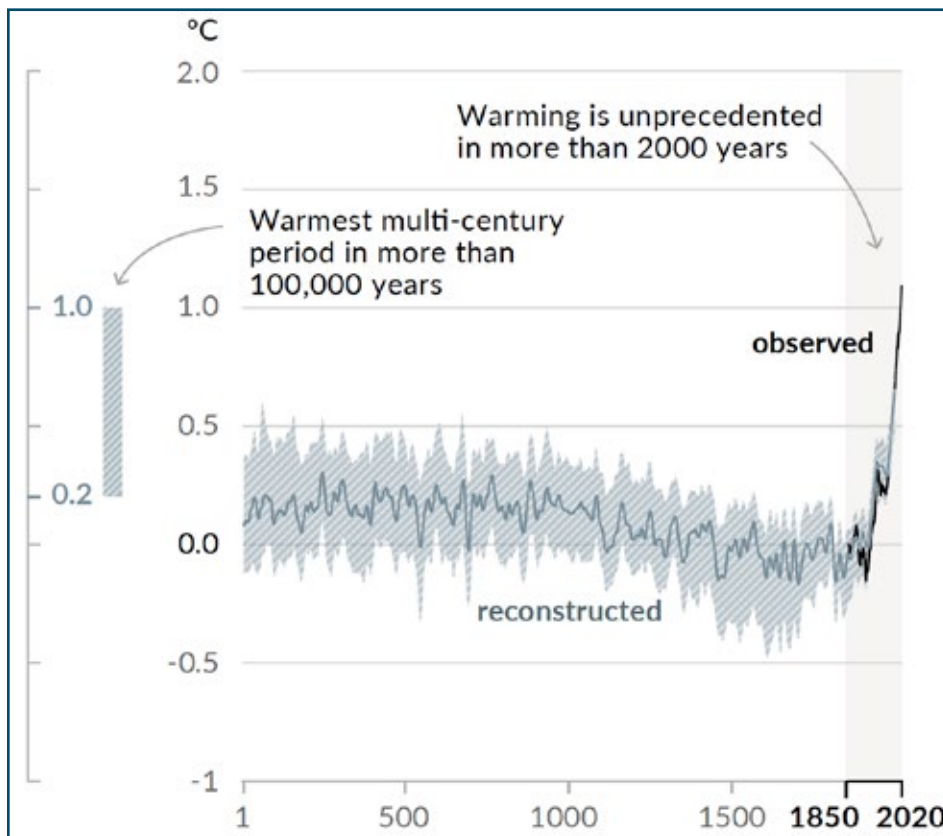


Figure SPM.1(a) of *Climate Change 2021: The Physical Science Basis* shows that the speed and scale of warming since 1850 is unprecedented in over the last 2000 years.



Celebrating the Paris Agreement in December 2015, an Agreement that is no closer to being realized today than it was in 2015. CREDIT: UNCLIMATECHANGE, CREATIVE COMMONS ATTRIBUTION 2.0 GENERIC (CC BY 2.0) LICENSE.

exceeded during the 21st century,” says the report, “unless deep reductions in CO₂ and other greenhouse gas emissions occur in the coming decades.” In the IPCC’s intermediate GHG increase scenario, the last twenty years of this century are likely to be characterized by an increase of 2.1° C to 3.5° C relative to temperatures in the last half of the Nineteenth Century. With *medium confidence* the IPCC states that the last time global temperatures were 2.5° C higher than the 1850-1900 period was...over three MILLION years ago.

We might take a small dose of encouragement from the suggestion that under the very low GHG emissions scenario it is “just,” in the IPCC’s words, “more likely than not” that the 1.5° C global temperature increase will be exceeded by 2040.

Is today’s world lost? Yes, our new world is one where the damaging impacts of climate change are expected to increase “in direct relation to increasing global warming.” We can expect to see increases in the frequency and intensity of heatwaves, droughts, tropical cyclones, the shrinking of Arctic sea ice, and heavy precipitation.

Furthermore, the report concludes that many of the changes caused by past and future GHG emissions “are irreversible for centuries to millennia.” This is especially likely for the oceans, ice sheets, and global sea level. It is *virtually certain*, notes the report, that the

Greenland Ice Sheet will continue to lose ice throughout this century. Such certainty also is attached to the report’s conclusions about rising global sea levels in this century.

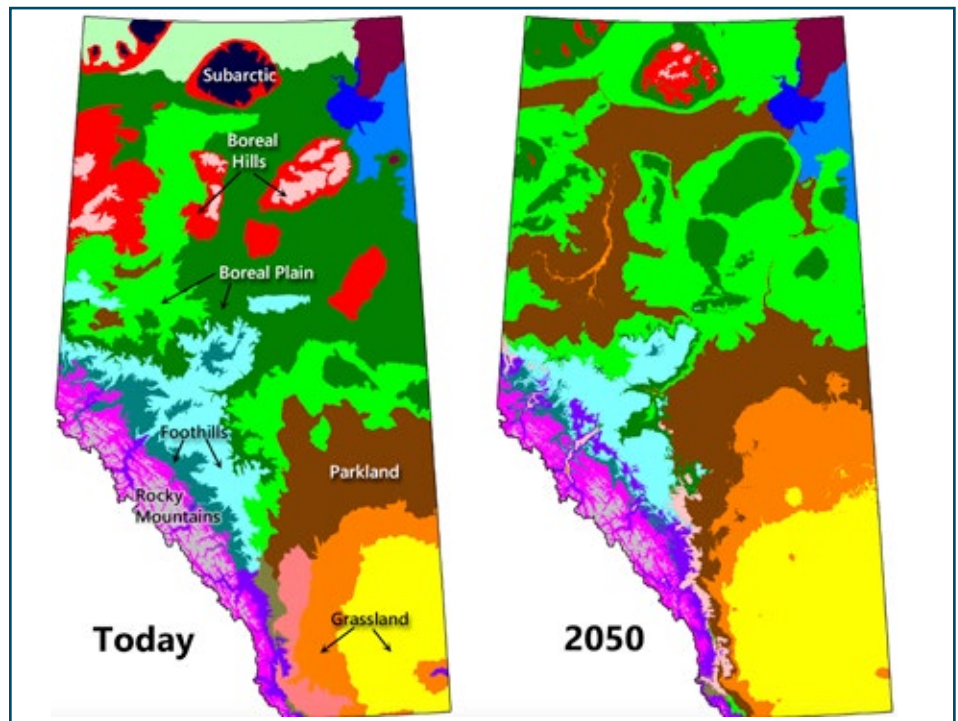
And What About Alberta?

A regional or local analysis of how climate change will affect Alberta over the medium to longer term is found in the Prairie Provinces chapter in *Canada in a Changing Cli-*

mate: Regional Perspectives. Here I focus on only one theme of that chapter – the shifting, transformation, and likely disappearance of ecosystems.

A warmer future likely will see Alberta’s grasslands ecosystem expand significantly. Both the mixedgrass/fescue and dry mixedgrass subregions are predicted to expand northward. The mixedgrass/fescue’s northward shift will come at the expense of the central parkwood subregion. The dry mixedgrass may nearly double in size by 2050 as it moves north and west to cover lands now home to the mixedgrass/fescue environment.

The most dramatic change may occur in the Rocky Mountains and the boreal natural region. In the Rockies, the alpine subregion seems at risk of nearly disappearing altogether by the middle of this century. Species of flora and fauna that must have alpine conditions to survive likely will be extirpated from the Rockies by the end of this century. They will disappear from Alberta’s landscape. The boreal subarctic subregion is likely to disappear altogether; virtually all of the boreal highlands (shaded light pink) will disappear. The lower boreal highlands subregion is expected to shrink dramatically. And, the cen-



Temperature changes according to an intermediate climate change scenario are likely to change Alberta’s distribution of natural regions. It will take decades for the actual ecological transitions to occur. Source: *Nature Alberta Magazine*, Summer 2021. PHOTO: © R. SCHNEIDER

tral mixedwood boreal subregion, the largest ecosystem in Alberta today, loses that status as it transitions into the dry mixedwood (boreal) and central parkwood (parkland) subregions. These changes are expected to take place in a millisecond of geological time.

It's important to note that, as Richard Schneider points out in *Nature Alberta Magazine*, as quickly as these ecological transitions will take place they will not appear in a blink of an eye. It will take decades for the ecosystem changes to catch up to the increases in temperature we can expect.

COP 26 in Glasgow: More Than “Blah, Blah, Blah?”

Between October 31st and November 13th the Conference of the Parties to the United Nations Framework Convention on Climate Change met for the 26th time. Alok Sharma, the British Member of Parliament who was the President of the Glasgow Conference proclaimed the Conference to be an important success. He described the Glasgow Climate Pact as “a historic achievement. We kept 1.5 in reach.” Teenage climate change campaigner Greta Thunberg wasn't impressed; she harshly characterized COP 26 as “blah, blah, blah.”

The smart money favours Thunberg's view. On the one hand, Sharma is right – the 1.5° C objective remains in reach and will be until the day when the global average increase exceeds that value. But, collectively governments do not have the world on a path where it can be realized. If governments meet what they've pledged to so far, the IPCC estimates we will experience an increase of 2.4° C over the course of this century. This is a scenario where the much-celebrated promises made in Paris in 2015 won't be honoured. The Glasgow Climate Pact, despite recognizing the urgent need for more action, kicked that can down the road again. The Pact “invites” Parties, “urges” Parties to do more. In that vein, Parties are asked to come to the next COP with strengthened plans. We've heard this song before.

It's still hard to believe that, 26 years after the COP first met in Bonn, the fact coal is finally mentioned in a COP document is regarded by some as a major achievement. Such a delay supports well Flannery's point about how the IPCC's consensus decision-making style dilutes serious action. And, his point is reinforced by the semantic gamesmanship surrounding how the obvious damage to the current climate from burning coal would be

described in the Glasgow Climate Pact. To call for a “phase out” of coal was a bridge too far for some coal-producing and coal-burning nations. Instead, India and China, the two countries that together burn two-thirds of the world's coal pushed back and succeeded in replacing the call for a coal phase out with one to “phase down” coal.

A Reason to Hope?

At Glasgow we saw the largest gap yet emerge between the IPCC's scientific assessment of the current and future climates and the actions of governments. This may provide a reason to hope we can avoid the worst impacts of our changing climate as we move deeper into this century. The science, natural and social alike, leave little to no doubt about what awaits us if we don't finally act decisively to address this growing emergency. This knowledge is an important political resource we can expect to see used domestically and internationally to try to secure the dramatic changes needed to rescue us from the dangerously warmer planet we are stumbling towards. ♣



Scottish primary school children plead for action at COP 26 in Glasgow.

CREDIT: UNCLIMATECHANGE, KIARA WORTH, CREATIVE COMMONS ATTRIBUTION 2.0 GENERIC (CC BY 2.0) LICENSE.