

Climate Catastrophe and Transformationalism

by John Barkdull & Paul G. Harris

We are currently facing an environmental crisis which will require radical global economic, social, and political change. This is the essence of transformationalist thought, one of the burgeoning perspectives on how to best address a changing natural environment. Global climate change is said to portend consequences so dire that failure to act quickly to reduce greenhouse gas (GHG) emissions and prepare societies to adapt to climate disruption invites global catastrophe, potentially even human extinction. This paper will outline the major changes transformationalists view as absolutely necessary to address this crisis, and what it means for our future if we do not act accordingly.

Since pre-industrial times, the global average temperature has risen just short of 1° Celsius. Even this relatively small rise has resulted in many adverse effects on natural and social systems. “In recent decades,” notes the Intergovernmental Panel on Climate Change (IPCC), “changes in climate have caused impacts on natural and human systems on all continents and across the oceans.”¹ Recently, similar research has indicated that human-caused climate change contributes to the probability of increasingly frequent and far reaching extreme weather events.² Our existing institutions are simply not equipped to adequately deal with rising temperatures and their consequent effects.

The international community has agreed that the appropriate target is to hold the average rise in global temperature below 2° Celsius, and a 1.5° Celsius rise is already locked in due to current GHG concentrations in the atmosphere. Little room remains to stay under the level that is considered safe by the international community. A recent assessment finds that current policy and expected commitments to reduce GHG pollution are unlikely to hold accumulated emissions low enough to stay below the 2° Celsius threshold.³ The Kyoto Protocol, the largest international climate change agreement, set carbon emissions commitments that obligated states to address environmental issues based on the development status of any given state as of 1990. The ability of any given state to adhere to these commitments is difficult at best, and ignores changes in industrial capabilities of states since the 1990 mark. It is becoming increasingly difficult to expect

John Barkdull is the Undergraduate Director for the Department of Political Science at Texas Tech University. His areas of specialization include international relations theory, international organization, international ethics, and globalization. **Paul G. Harris** is Chair Professor of Global and Environmental Studies at the Hong Kong Institute of Education. His academic interests include climate change politics and policy, global environmental justice and the ethics of climate change.

atmospheric concentrations of carbon dioxide (CO₂), the most important and long-lasting GHG, to decline from today's 400 parts per million to the 350 parts per million climate activists advocate.⁴ Thus, decades of efforts to achieve global climate policy to safeguard nature and human society have failed.⁵ Moreover, without reductions in GHG emissions, "there is a 40 percent chance of warming exceeding

**THUS, DECADES OF EFFORTS
TO ACHIEVE GLOBAL CLIMATE
POLICY TO SAFEGUARD NATURE
AND HUMAN SOCIETY HAVE
FAILED.**

4° Celsius by 2100 and a 10 percent chance of it exceeding 5° Celsius in the same period."⁶ Major reductions are unlikely; instead, the rate of increase of emissions continues to rise.⁷ The world is on track to surpass the presumably safe 2° Celsius level by 2036,⁸ and continuing temperature increases, with all related effects on natural and social

systems, will follow.

What is to be done regarding this vital issue? The existing institutions are not adequate to force necessary changes; indeed, they may be entirely wrong in the direction they are taking. Transformationalist scholars and journalists argue that today, more of the same will not work, and existing social systems present major barriers to effective action to prevent catastrophic climate change. They call for transformation of global economic, political, and social institutions, without which global ecological catastrophe looms.⁹ The transformationalist movement calls for a sort of eco-socialism in order to enable sensible, humane, equitable responses to the ecological crisis. Capitalism's profit motive, growth imperative, and economic imperialism make sustainable environmental policy difficult to attain.¹⁰ The environmental crisis is severe, transformationalists assert, because of "the inability of our social system to respond effectively," due to the "inner characteristic of the capitalist economy," notably its limitless quest for expansion.¹¹ The "rush to grow" entails "widening environmental degradation," worsened by corporations' short time horizons and the system's lack of overall planning.¹² The constant drive for business expansion further exacerbates the burden of GHG emissions, as businesses are not always penalized for pollution.

Transformationalists agree on two key points relating to climate change. First, that it is indeed happening. Observations on global temperatures show a long-term upward trend that began with industrialization and which has accelerated in recent decades. Much, if not all, of the observed change is due to human activity, primarily from the burning of fossil fuels. Second, existing institutions are inadequate to address all the consequences of climate change.

While they share enormous concern about climate change and agree that addressing it requires major social change, the transformationalists disagree on some important points. We will examine these disagreements, particularly as they relate to mobilizing action to address the problem effectively. Apparent differences over strategy and rhetoric are actually about deeper disagreements on the scope and

urgency of the climate crisis. These strategic discrepancies, and how they are resolved have important implications for whether concerned citizens and climate activists should focus efforts on climate diplomacy or instead direct organizing energy toward other avenues of effecting solutions.

ENVIRONMENTAL CATASTROPHISM

Transformationalists debate whether apocalyptic predictions about the future help to further the policies, attitudes, and social transformations needed to meet the ecological and climate change challenge. Differences of opinion among otherwise like-minded people occur over how best to present the issue to the public. On one side, several observers have expressed qualms about presenting the ecological crisis in apocalyptic language. On the other, noting the absolute certainty with which we can forecast social, environmental, and political catastrophe is imperative in explaining the need to address climate change now. It is not a matter of the end of the world occurring immediately that causes disagreements among those who adhere to this perception. It is that the capacity of humans to mitigate GHG emissions sufficiently to prevent the initiation of dangerous climate feedback loops will be gone with two more decades of “business as usual.”

In terms of scholars who question severe rhetoric in reference to future catastrophe, David Harvey wrote in 1998 that he was:

...by no means as sanguine as many that a rhetoric of crisis and imminent catastrophe will sharpen our minds in the direction of class politics or even cooperative, collective, and democratic responses as opposed to a “lifeboat ethic” in which the powerful pitch the rest overboard.¹³

Similarly, political scientists Leo Panitch and Colin Leys acknowledge the severity of the crisis but with a degree of caution. They note that ecological catastrophism promotes anxiety in much the same way that describing economic catastrophism leads to particular modes of thinking among the public.¹⁴ Recently, Eddie Yuen, in an article outlining the problems of using severe language in regards to environmental crises, argues that “catastrophism” will prove politically disabling or counterproductive, leading to apathy and despair on one hand, xenophobic and militaristic responses on the other. While acknowledging the severity of environmental crisis, Yuen asserts that “apocalyptic action...hinders rather than helps the efforts of activists, scholars, [and] scientists.”¹⁵ It is easy to find theorists who worry about the impact of harsh rhetoric surrounding this issue, given the need to promote widespread desires for change, not quench activism before it happens. Sam Gindin, a Canadian research director focusing on social justice, sums these sentiments up perfectly and states:

To be sure, the climate crisis must be decisively confronted. But declarations that the end of the planet is only decades away if capitalism isn't radically changed now may just reinforce a sense that we are doomed and can't really do anything about it.¹⁶

Other transformationalists respond that devastating natural and social crisis is actually imminent, and that clarifying the nature of the climate crisis will increase the likelihood of realizing humane, rational solutions. The reality of coming crisis must be emphasized regardless of political calculation. The following scholars approach, in terms of rhetoric, how realistic long term future consequences should be taken into consideration in advertising the absolute need for better methods of addressing climate change. Ian Angus points out, “the first step is to tell the truth—about the danger we face, about its causes, and about the measures that must be taken to turn back the threat.”¹⁷ John Bellamy Foster’s response to Harvey was that prominent scientists were issuing serious warnings of impending disaster.¹⁸ Human activities likely will not eradicate all life on Earth, or even do harm so great that the planet cannot repair itself over the long run, but on any time scale relevant to human interests the threat is grave. It is possible that climate change could even “destroy the planet as a place for human habitation.”¹⁹ Harvey, Foster says, adopts a grand geological time scale so as to dismiss the immediate threats to human interests, whereas the likelihood that the microbes and mites will survive is not pertinent to the catastrophe looming over human civilization.

Angus’s recent response to Gindin and Yuen follows similar lines. Like Foster, Angus asserts that it is the science and the scientists, not environmental activists, ringing the alarm bells. According to Angus, the science speaks clearly:

Although there are disagreements on details, the overwhelming scientific consensus, expressed in the latest IPCC reports, is that the changes caused by greenhouse gas emissions are very near the danger zone, and if we don’t radically reduce emissions soon, the effects will be catastrophic for many living things, including most of the world’s poorest people. In the long term, climate change could make the earth uninhabitable by humans. Many scientists think the IPCC underestimates the seriousness of the crisis; in particular regarding how close we are to dangerous tipping points and how quickly we must act.²⁰

Thus, says Angus, scholars, authors, and activists making strong claims about the dangers ahead are in line with scientific consensus, not guilty of exaggerating for political effect.

Angus also rejects the notion that “environmental catastrophism” has led to immobility. He points to signs of increasing activism on climate change, including opposition in the United States to constructing the Keystone Pipeline, which would carry crude oil taken from Canadian tar sands, showing that popular mobilization is happening regardless of how the issue is framed. While Gindin, Harvey, and Yuen argue that catastrophism can lead to apathy and reaction, Angus posits that frank acknowledgment of the high stakes is a useful element for organizing.

Angus states that no one in the progressive climate movement is making extreme claims regarding the magnitude of the crisis anyway. No one, he says, asserts that the world will end in two decades. Climate activists are simply relating the alarming scientific consensus, which needs no exaggeration. There are, however, numerous examples of transformationalist analysts who go even further, claiming that the collapse of civilization, or even human extinction, could occur. John Bellamy

Foster and Brett Clark argue that environmental change “is threatening the entire planet as a place of habitation for humanity and countless other species.”²¹ Similarly, Foster and Fred Magdoff assert that the damage being done to the global ecology today is so severe that it threatens the existence of nearly every species on the planet.²² Foster elaborates:

I think it is incontrovertible that for the first time in human history, beginning in 1945 with Hiroshima, and since then with the disruption of the biogeochemical cycles of the Earth, humanity has created the conditions for its own potential annihilation as a species—and certainly the destruction of civilization as we know it.²³

Failure by the United States to take effective action assures catastrophic consequences.²⁴ Paul Street asserts that blocking the Keystone XL pipeline project “would buy humanity some time to properly address anthropogenic global warming (AGW), which increasingly poses the issue of human extinction.”²⁵ Minqi Li writes, “The global ecological system is now literally on the verge of collapse and the survival of human civilization is at stake.”²⁶ Dar Jamail wonders “how my generation will survive the impending climate crisis,” and “how coming generations will survive.”²⁷ Thom Hartmann outlines a scenario under which human extinction might happen: human-induced warming could recreate the conditions that led to the Permian Extinction of 250 million years ago, which eradicated as much as 95 percent of the earth’s species.²⁸

Certainly transformationalists posit the possibility of human extinction, and the perceived need for replacing global capitalism with a sustainable form of eco-socialism. Such skeptics cited above may agree that in the long run global climate change could lead to civilization collapse, and perhaps human extinction. Yet even

**THE WORLD COULD SOON
CROSS CERTAIN THRESHOLDS
BEYOND WHICH HUMANS
CAN NO LONGER CONTROL
OR LIMIT CLIMATE CHANGE.**

then, the point of disagreement is on the time remaining to cope with the crisis and ideally to avert the most catastrophic outcomes.²⁹ Angus asserts that the world will not end abruptly within the next couple decades, but this does not mean that Gindin and others are wrong about claims that the end is “near.” The world could soon cross certain thresholds beyond which humans can no longer control or limit climate change. The process leading to the “end of the world” (or at least the end of human civilization) could begin within decades unless energy and economic systems are radically transformed almost immediately. Taken together, these interpretations of climate science do make the claim that the end is near: uncontrolled climate change could result in something close to human extinction, and our ability to head off uncontrolled climate change will expire very soon. While no one on the left is specifically saying that the planet will die before the middle of this century, the upshot is the same—very little time remains to bring about a massive transformation of the world order without risking human extinction.

This massive transformation explains fears that apathy and despair could overtake the ecologically oriented among the transformationalists, scientists, and the mass public. It is highly unlikely that global capitalism would be replaced by global eco-socialism, and even less likely in such a short time. The dilemma then is that if catastrophe is imminent, then climate activism is futile. If catastrophe is not imminent, then the urgency of the task is considerably reduced. The ecological problem should remain important, from this perspective, but it might not be the top priority, as it would be if the crisis were imminent. Organizing and mobilizing to deal with climate change should be feasible because time would remain to make a difference, whereas if the crisis is imminent, we have other concerns to prioritize.

Disagreements among environmental scholars and activists are not simply about what kind of story to tell in order to motivate political action. Underlying these disagreements on strategy and tactics are deeper differences regarding the character and tempo of the ecological problem. Despite Angus's claim that there is an overwhelming scientific consensus, science cannot settle this matter of judgment and expectations regarding a highly uncertain future. Simply noting that the IPCC and other scientific sources declare that the world is near the danger zone is insufficient because the definition and timeline of danger is subject to debate. If danger means what the IPCC has outlined in its most recent report, the case for global transformation on these grounds alone might not be all that strong. Scientific studies suggest, however, that human extinction remains a possibility, however large the range of distinctions remains.

POSSIBLE FUTURES

The authoritative representation of the scientific consensus on climate change is the IPCC. Its most recent assessment reports on science, impacts, and adaptation were released in 2013 and 2014. Compiled in the IPCC's Fifth Assessment Report (AR5), working group contributions compile knowledge from numerous scientific studies to meet the IPCC's mandate of informing domestic and international policy makers how to avoid dangerous interference with the climate. According to the IPCC, "Human interference with the climate system is occurring, and climate change poses risks for human and natural systems."³⁰ Necessarily one must ask though, what are these risks?

The IPCC assesses the global risks from such interference in a number of categories, such as physical systems (water, glaciers, coastlines), biological systems (terrestrial and marine ecosystem effects, wildfires), and human and managed systems (food production, livelihood impacts).³¹ As the IPCC notes, "Understanding future vulnerability, exposure, and response capacity of interlinked human and natural systems is challenging due to the number of interacting social, economic, and cultural factors . . .," including the distribution of wealth, demographics, a variety of other social and economic factors, and international economic and political policies.³² Nevertheless, climate change is expected to result in many adverse impacts, including reductions of freshwater availability in presently dry regions, higher rates

of extinction of freshwater and terrestrial species, coastal flooding and erosion as sea level rises, greater risks to marine ecosystems due to increased ocean acidification, challenges to food security as agricultural productivity falls in some regions, stress on urban infrastructure, exacerbated human health threats, displacement of populations, and difficulty reducing poverty.³³

States will be forced to cope with extreme weather events, chronic drought conditions, torrential rains, floods, heat waves, water shortages, and adverse changes to ecosystems. Agricultural productivity will likely decline, and fisheries, already over-exploited, will be less productive. Food will become more expensive, and people will be migrating in search of livable environmental conditions. Coastal regions will face rising seas and more violent storms; eventually, many of the world's largest coastal cities might have to be abandoned. Scarcity and mass migration hold the potential for generating conflict. These impacts are likely to ensue if the global average temperature rises by only 2° Celsius above preindustrial levels, and they will be significantly more severe if the earth warms further, as is likely. Adaptation policies alone could reduce the expected human and social impacts to some extent, but adaptation policies coupled with lower GHG emissions offer the best hope for reducing risks from climate change.³⁴

**THERE WILL BE UNCOORDINATED,
CHAOTIC, AND CONFLICTING
RESPONSES AMONG STATES WHEN
DEALING WITH THESE MAJOR
SOCIETAL STRUCTURAL CHANGES.**

The effects on human interests outlined in the IPCC's AR5 fall considerably short of apocalypse, even with just a 4° Celsius increase in global average temperature. Coping with such matters as relocating major cities, shifting populations, and maintaining food security will be horrifically challenging. There will be uncoordinated, chaotic, and conflicting responses among states when dealing with these major societal structural changes. Nevertheless, the thrust of the IPCC report does not warrant the necessity of a worldwide eco-socialist transformation. Certainly, the IPCC notes, abrupt climate change could occur if the environment crosses certain "tipping points" or thresholds. But whether one judges this risk to be too great, or emphasizes the manageable challenges outlined emphasized in AR5 is a judgment call. The IPCC leaves room for either interpretation. A stronger warning comes from the World Bank, hardly known for being apocalyptic:

*A world in which warming reaches 4°C above preindustrial levels ... would be one of unprecedented heat waves, severe drought, and major floods in many regions, with serious impacts on human systems, ecosystems, and associated services.*³⁵

Heat waves, drought, drenching precipitation, sea level rise and species loss can all be anticipated. Moreover, World Bank research "indicate[s] a significant risk of high-temperature thresholds being crossed that could substantially undermine food security globally in a 4° Celsius world."³⁶ If certain thresholds are crossed, impacts

on human society might be catastrophic. Rather than a linear relationship between increasing GHG concentrations and rising temperatures, it is possible that exceeding a certain concentration will set off dangerous climate feedbacks, resulting in uncontrollable and sudden climate changes, as suggested by Hartmann. Hans Joachim Schellnhuber of the Postdam Institute for Climate Impact Research has asserted that roughly 5° Celsius of increased global temperatures would leave “Earth’s population devastated,” perhaps reducing the planet’s carrying capacity to only one billion or fewer people.³⁷ James Lovelock, originator of the Gaia hypothesis, asserts, “We are in a fool’s climate, accidentally kept cool by smoke, and before this century is over, billions of us will die and the few breeding pairs of people that survive will be in the arctic region where the climate remains tolerable.”³⁸ James Hansen has said that building the Keystone Pipeline, and more precisely burning the fossil fuels that it will transport from Canada’s tar sands, would mean it is “game over” for halting dangerous climate change.³⁹ He has also tentatively speculated that runaway global warming could happen, leaving the planet similar to Venus (and its 450° Celsius temperature) in the very long term.⁴⁰

The effects of crossing thresholds are not certain. The National Research Council of the National Academy of Sciences has addressed the matter of abrupt climate change, including from the release of GHGs now held in tundra, permafrost, and the ocean floor. The council points to “the inevitability of ‘tipping points’—thresholds beyond which major and rapid changes occur when crossed—that lead to abrupt changes in the climate system.”⁴¹ The council believes abrupt changes will be likely, severe, and imminent in regard to extreme weather, stress on water supplies, and impact on ecosystems, especially when other sources of ecological stress are considered. Some of these changes are already occurring, but the council observes that an abrupt release of massive amounts of methane, as Hartmann warns, is not likely this century. Although release of carbon stored in permafrost and soils will likely increase significantly after 2100, there is only “moderate” risk that ocean methane hydrates will be released in large quantities in the long run. Nor is it likely that Atlantic currents will be disrupted, even in the long term. The report identifies fourteen potential abrupt changes and states that half display low probability of near-term abrupt change.⁴²

Still, because CO₂ remains in the atmosphere for quite a long time, choices made today will matter for decades and even centuries to come, and the observations we forecast for the long run are not necessarily immutable. As another National Research Council publication observes:

*The impacts of human activities particularly emissions of carbon dioxide, but also including other greenhouse gas emissions, land use, and population growth are so vast that they will largely control the future of the Earth’s climate system. This future could bring a relatively mild change in climate, or it could deliver an extreme change from today’s climate to entirely different climate conditions that will last many thousands of years. The eventual course of the climate system over millennia will be determined largely by the actions taken this century by governments, businesses, and individuals around the world.*⁴³

Moreover, as the council notes that to keep CO₂ levels stable and avoid further environmental impacts, “global emissions would have to be reduced by at least 80 percent.”⁴⁴

What we see then is a wide range of views among scientists on the potential severity of the climate crisis and the time frame in which the worst might happen. The scientific consensus that we are nearing the danger zone leaves wide open the question of what that danger might be. Will it require relocating our cities and farms, adoption of new agricultural techniques, coping with social disruptions as people migrate, and investing in infrastructure improvements to withstand extreme weather events? Such adaptation measures, managed by corporations and supportive governments, would likely be costly and painful for large numbers of people. Yet the international system could well have sufficient resilience to persist even in the case of severe climate-induced disruptions.

Alternatively, what if the future portends even greater ecosystem disruptions and associated stresses on social systems—stresses so great—that civilization collapses? Science has no definitive answer for what lies ahead, nor the probability that the worst could happen. Without that information, there is no overwhelming scientific consensus on which to base transformationalist political strategy. Different analysts will emphasize one or the other, with important implications regarding what to say, how to say it, which coalitions to form, where to apply pressure for change, and whether the ecological crisis should be the top priority.

FROM UNCERTAINTY TO ACTION

Uncertainty about future climate change, and specifically about how significant the consequences will be on human societies presents governments and diplomats with the most profound challenges and uncertainties ever faced by humanity. How we choose to act on behalf of the interests of the environment from this point forward is crucial. Unfortunately, science provides no clear-cut answers on whether catastrophe looms or how much time remains to avoid a crisis so great that it threatens human survival. Science offers no unambiguous basis for political action to those who identify as transformationalist.

One response would be to assume that the worst predictions of climate change are just too shrill. Climate policies and diplomacy can be expected to continue on their current trajectories. Diplomats will continue to meet to hammer out international agreements ostensibly to bring GHG emissions under control. These negotiations will span many decades (akin to world trade talks). If the past generation of climate diplomacy and domestic policies serve as any guide, these talks will not prevent increasing GHG emissions globally for decades to come. Business as usual, in other words, is a recipe for at best limiting increases in GHG pollution in coming decades. In such a world, global average temperatures will inevitably break through the 2° Celsius threshold set by governments and continue rising. The climate change regime, including related international agreements and associated environmental, energy and economic policies within states, will have failed, especially

if one takes the perspective of the billions of people in the poorer countries which will be unable to cope with the effects of climate change. Nevertheless, even at its worst, climate change might not portend drastic reductions in human population or the collapse of civilization. Thus, the struggle for sustainable ecological practices and an eventual transition to eco-socialism can go on, including putting pressure on the diplomats and governments that have so far failed to ameliorate the concerns surrounding the climate crisis.

On the other side, there is sufficient scientific warrant to assume that climate change could eventually destroy modern civilization and even lead to an Earth unfit for human habitation. This response points to something utterly different than business as usual, it points to the need for an immediate and radical transformation in international society, including a rapid move away from today's profit driven practices, premised as they are on material consumption, overuse of environmental resources, and vast GHG emissions (not to mention other forms of pollution). From this perspective, diplomacy, domestic policies and trade would need to be transformed to something akin to eco-socialism within years or a few decades at most. The aim would be a world where natural resources are used sustainably, pollution is greatly restrained through robust enforceable regulation, and the benefits that come from national and international society are shared widely within and among countries to ensure human well-being. However, it is very unlikely that any governments, foreign ministries or international organizations are seriously contemplating going in this direction, and it is doubtful that climate activists can build sufficient political power to bring it about. To do so would mean responding to climate change in a way that the world has never responded to past problems. If climate catastrophe is imminent, if we have only a short time to transform the world before uncontrollable climate change begins, then the task that the transformational left would have set for itself is all but impossible.

That said, if one imagines the consequences of moving toward global transformation as much as possible, even if not enough, this direction looks very appealing. In the end, perhaps the only way forward for the transformationalist movement is to act as if the catastrophic outcome of global climate change is highly probable, but to assume simultaneously that enough time remains to limit the worst impacts. The transformationalist movement should call for fair, equitable and sustainable means for limiting future GHG emissions and for adapting to the now-unavoidable effects of climate change. Even if many dire effects of climate change are not avoided, others may be, and some of them will at least be ameliorated. Perhaps most importantly, in the process of trying to transform global society in order to limit future climate change and to cope with it, the global community would be creating a world that has fewer of the problems faced today—human suffering due to pollution, widespread poverty and recurring war—and a wider distribution of the things society should aspire to: environmental sustainability, fair development, and peace. That notion is a direction worth moving toward regardless of what happens to Earth's climate. On this last point, transformationalists can indeed agree.

Notes

- 1 Intergovernmental Panel on Climate Change, *Climate Change 2014: Impacts, Adaptation, and Vulnerability* (New York: Cambridge University Press, 2014).
- 2 Herring, Stephanie C., "Explaining Extreme Events of 2013 From a Climate Perspective," *American Meteorological Society* Vol. 95, No. 9 (September 2014).
- 3 Henry D.Jacoby, and Y.-H. Henry Chen, "Expectations for a New Climate Agreement," Report No. 264, MIT Joint Program on the Science and Policy of *Global Change* (August 2014).
- 4 Bill McKibben, "Remember This: 350 Parts Per Million," *Washington Post*, December 28, 2007.
- 5 Dale Jamieson, *Reason in a Dark Time: Why the Struggle Against Climate Change Failed - and What It Means For Our Future* (New York: Oxford University Press, 2014); Paul G. Harris, "Collective Action on Climate Change: The Logic of Regime Failure," *Natural Resources Journal* 47, 1 (2007), 195-224.
- 6 World Bank, "Turn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience, A Report for the World Bank by the Potsdam Institute for Climate Impact Research and Climate Analytics," (Washington, DC: World Bank, 2013), xv.
- 7 World Meteorological Organization, "Record Greenhouse Gas Levels Impact Atmosphere and Oceans," *Press Release No. 1002* (September 9, 2014).
- 8 Michael Mann, "False Hope," *Scientific American* 310, no. 4 (April 2014): 78-81.
- 9 John Barkdull and Paul G. Harris, "Environmental Change and Foreign Policy: A Survey of Theory," *Global Environmental Politics* 2, no. 2 (2002): 63-91.
- 10 Chris Williams, *Ecology and Socialism* (Chicago: Haymarket Books, 2010).
- 11 John Bellamy Foster, Brett Clark, and Richard York, *The Ecological Rift: Capitalism's War on the Earth* (New York, NYU Press, 2011), 39.
- 12 John Bellamy Foster, *Ecology Against Capitalism* (New York: Monthly Review Press, 2002), 10.
- 13 David Harvey, "Marxism, Metaphors, and Ecological Politics," *Monthly Review* 49, No. 11 (April 1998): 20.
- 14 Leo Panitch and Colin Leys, *Socialist Register 2007* (London: The Merlin Press, 2006), x-xi.
- 15 Eddie Yuen, *Catastrophism: The Apocalyptic Politics of Collapse and Rebirth* (Oakland, CA: PM Press, 2012), 32.
- 16 Sam Gindin, "Unmaking Global Capitalism," *Jacobin* 14 (Spring 2014); Douglas H. Boucher, "Not with a Bang but a Whimper," *Science and Society* 60, No. 3 (Fall 1996): 279-289.
- 17 Ian Angus, "The Myth of 'Environmental Catastrophism,'" *Monthly Review* 65, no.4 (September 2013): 28.
- 18 Foster, John Bellamy, "Marx's Ecology: Materialism and Nature," (New York: Monthly Review Press, 2000).
- 19 John Bellamy Foster, "The Scale of Our Ecological Crisis," *Monthly Review* Vol. 49, Issue 11, (March 1, 1998).
- 20 Ian Angus, "The Real Environmental Problem is Catastrophe, Not 'Catastrophism,'" *Climate & Capitalism* (July 30, 2014).
- 21 John Bellamy Foster and Brett Clark, "The Planetary Emergency," *Monthly Review* 64, No. 07 (December 2012): 21-22.
- 22 Fred Magdoff and John Bellamy Foster, *What Every Environmentalist Needs to Know About Capitalism* (New York: Monthly Review Press, 2011), 12.
- 23 Steve da Silva, "Climate Change and Socialism: An Interview with John Bellamy Foster," *MRZine* (December 18, 2013).
- 24 Noam Chomsky, *Making the Future: Occupations, Interventions, Empire and Resistance* (San Francisco: City Lights Books, 2012), 288.
- 25 Paul Street, "Ecocidal Times," *eZNet* (February 22, 2013).
- 26 Minqi Li, "The 21st Century: Is There An Alternative (to Socialism)?" *Science & Society* 77, No. 1 (January 2013): 10-43.
- 27 Dahr Jamail, "The Climate Change Scorecard" *TomDispatch* (December 17, 2013).
- 28 Thom Hartmann, *Last Hours of Humanity: Warming the World to Extinction* (Waterfront Digital Press, 2013).
- 29 Schwartzman, David, "Is Zero Economic Growth Necessary to Prevent Climate Catastrophe?" *Science and Society* Vol. 78, No. 2 (April 2014): 235.
- 30 C.B., V.R. Barros, et al, IPCC: *Summary for Policymakers, Climate Change 2014: Impacts, Adaptation, and Vulnerability, Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2014), 3.
- 31 Ibid, 7.
- 32 Ibid, 11.
- 33 Ibid.
- 34 Ibid, 21-25.
- 35 Schellnhuber, Hans Joachim, W. Hare, O. Serdeczny, S. Adams, D. Coumou, K. Frieler, M. Martin et al. "Turn Down the Heat—Why a 4 C Warmer World Must be Avoided." *World Bank* (2012): 1-2.

³⁶ Ibid, 7.

³⁷ James Kanter, "Scientist: Warming Could Cut Population to 1 Billion," *New York Times*, March 13, 2009.

³⁸ James Lovelock, *The Revenge of Gaia: Earth's Climate in Crisis and the Fate of Humanity* (New York: Basic Books, 2006).

³⁹ James Hansen, "Game Over for the Climate," *New York Times*, May 9, 2012.

⁴⁰ James Hansen, *Storms of My Grandchildren: The Truth About the Coming Climate Catastrophe and Our Last Chance to Save Humanity* (New York: Bloomsbury, 2009), 238-251.

⁴¹ National Research Council, *Abrupt Impacts of Climate Change: Anticipating Surprises* (Washington, DC: National Academies Press, 2013), vii.

⁴² Ibid, 8-17.

⁴³ National Research Council, *Warming World: Impacts by Degree* (Washington, DC: National Academies Press, 2011), 4.

⁴⁴ Ibid, 7.