



The Great Acceleration: The Anthropocene, Kicks, Dead Zones And Bridging The Abyss

In *Seventeenth Century and the Arts* Stephen Toulmin cautions that “the more narrowly we draw the boundaries between our sciences, the less reliable they are”. Toulmin, advises us to “reappropriate the wisdom of the 16th century humanists, and develop a point of view that combines the abstract rigor and exactitude of 17th century “new philosophy” with a practical concern for human life in its concrete detail”.

In the spirit of Toulmin this poster is designed to: (1) provide a conceptual framework for rethinking the relationships between physical and social scientists and scholars in the humanities; (2) to provide a starting point for the reconceptualization of school and university curricular divisions; and (3) to encourage the reengagement of the public in conversations about inseparable relationships between people and the planet.

Crossing fields, disciplines and paradigms, and working with different scales of documentation, this 11-year transdisciplinary study draws on the physical and social sciences and humanities in response to the overwhelming scientific evidence that people are changing the planet.

Five theoretically grounded conceptual metaphors have been constructed based upon the analysis of the data: 1) *The Anthropocene*; 2) *Kicks*; 3) *Dead Zones*; 4) *The Great Acceleration*; and 5) *Bridging the Abyss*. These metaphoric representations draw on the humanities as well as the sciences, and each descriptor embedded in the graphics is supported by the analysis of key research within the specific fields and disciplines represented. Each Conceptual Metaphor is made up of a series of interrelated graphic representations constructed to address head on the issues of resilience, vulnerability, adaptation, and transformation across biophysical and social dimensions of anthropogenic global change.

Thus the visual representations can be thought of as *useful fictions* – an attempt to depict the interactions of phenomena, occurring on multiple temporal and spatial scales, happening simultaneously and sequentially, that are contingent and conditional, and highly dependent on the interactions of an infinite number of other phenomena, that have taken place, from deep time stretching through the present time and into the future.

Each Conceptual Metaphor: 1) combines the physical, biological, and social sciences with the humanities; 2) pulls from governmental, economic, and industrial sources, as well as social media; 3) provides transdisciplinary spaces that encourage situated engagement in research on climate change, biodiversity loss, ecosystem degradation with research on the impact of human enterprise on the planet as well as research on human vulnerability and resiliency; and 4) encourages the global science community to find new approaches to engage political leaders, government establishments, and the public sector – to prevent, mitigate, adapt and transform – but most importantly to act.

This poster focuses on the first conceptual metaphor: *The Anthropocene*.

The first graphic (figure 1.1) focuses on the potential for environmental and atmospheric stressors to cause the decline and extinction of bees, bats, birds, and frogs, and the critical concern of scientists and environmentalists about what is happening to these vulnerable and declining populations.

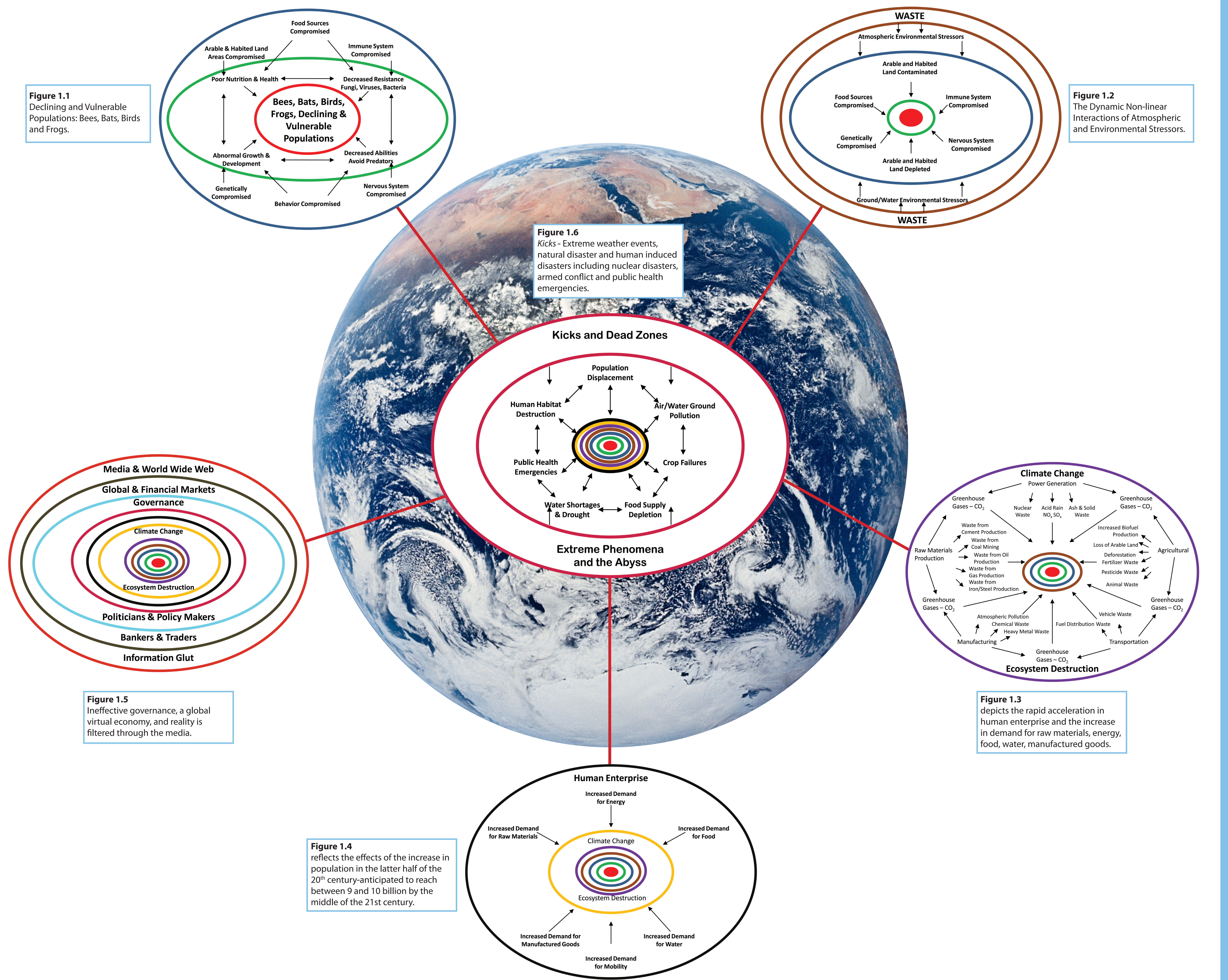
The observed factors identified in the research include: 1) poor nutrition and health; 2) abnormal growth and development; 3) decreased abilities to avoid predators; 4) decreased resistance to fungi, viruses and bacteria; and (5) shifts in reproductive timing. The factors are dynamic, complexly interrelated, and contingent and conditional on upon local, regional and global conditions. Tracie Seimon (2010) in *Acta Zoologica Lilloana*, provides a forum for frogs to speak for themselves:

*We, the frogs, have continuously inhabited and evolved on this planet since the Devonian period some 350 million years ago. Our calls announce the beginnings of spring, we keep insect populations under control, we serve as toxic pollutant indicators for human health, we are bellwethers for environment change, we provide important medicine from the chemicals we produce, we help forest peoples hunt food with our poisons, we inspire art and poetry, and perhaps most importantly we inspire peoples to appreciate nature. Once a stronghold of 6200 species, we are now disappearing rapidly and scientists predict that nearly one third, or 2000 species, will disappear within this century. Our population declines have been attributed to a number of factors such as habitat loss, disease outbreaks, and environmental. In particular, the global spread of an emerging infectious disease, the pathogenic chytrid fungus *Batrachochytrium dendrobatidis* (BD), has resulted in population collapses and outright extinction among many amphibian taxa over the past 20 years. Now, we serve as indicators to humans of a more insidious slow-motion catastrophe playing out on a global scale. Human-created climate shifts resulting in increasing temperature and changing precipitation patterns are having large impacts on amphibian assemblages, population numbers, reproduction, behavior, phenology, and physiology. The climate changes are resulting in desiccation of ponds and aquatic breeding habitats, reducing leaf litter, reducing precipitation in cloud forests, all culminating in increased stress, disease outbreaks, and mortality.*

In the **second graphic (figure 1.2)** birds, bees, bats and frogs are represented by the red dot at the center and their local habitat is circled in green. Now we can see the atmospheric and environmental stressors. The second graphic makes the case that biodiversity and ecosystem functioning are intimately connected, and that the negative impact of anthropogenic changes has serious and possible lethal consequences for assemblages, populations, and species. The brown bands around the second graphic represent the waste from human enterprise. To this image of our own detritus we can add the everyday toxicity of the run-off of contaminated water, which is compounded by environmental disasters, such as in the 2008 collapse of the coal ash pond in Kingston, Tennessee, in the U.S., and in Ajka, Hungary in 2010, when the dam holding back a vast reservoir of toxic red sludge from an alumina plant gave way, releasing a flood of processing chemicals and heavy metals, such as cadmium, cobalt and lead.

In *Sustaining Lie: How Human Health Depends on Biodiversity*, Eric Chivian and Aaron Bernstein (2008) make the case:

During the past fifty years or so, for example, our actions have resulted in the loss of roughly one-fifth of Earth's topsoil, one-fifth of its land suitable for agriculture, almost 90 percent of its large commercial marine fisheries, and one-third of its forests, while we now need these resources more than ever, as the population has almost tripled during this period of time, increasing from 2.5 to more than 6.5 billion. We have dumped millions of tons of chemical onto soils and into fresh water, the oceans, and the air, while knowing very little about the effects these chemicals have on other species or, in fact, on ourselves. We have changed the composition of the atmosphere, thinning the ozone layer that filters out harmful ultraviolet radiation, toxic to all living things on land and in surface waters, and increasing the concentration of atmospheric carbon dioxide to levels not present on Earth for more than 600,000 years. These carbon dioxide emissions, caused mainly by our burning fossil fuels, are unleashing warming of Earth's surface and of the oceans and a change in the climate that will increasingly threaten our health and the survival of other species worldwide. And we are now consuming or wasting or diverting almost half of all the net biological production on land, which ultimately derives from photosynthesis and more than half the planet's renewable fresh water.



Figures 1.3 and 1.4 depict the rapid acceleration in human enterprise and the increase in demand for raw materials, energy, food, water, manufactured goods. The graphic relies on primary data and a critical document analysis of research studies in the physical sciences – including reports by IGCC, NOAA, and primary research data available on websites, and presentations to the U.S. congress. Our focus here is on human enterprise, ecosystem destruction and climate change. It is important that we resist reading each descriptor as if it were a category separate from every other category, laminated or pasted on. The supercomplexity and infinite possibilities for Earth-biota “synaptic”, could be described as the *infinity of semiosis*, of life on and of the planet. These figures show the planet domesticated for human use. Earth has been and is being transformed by the activities of people. We use the planet as an infinite source of products and services for our use alone and an infinite sink for our wastes. We are now consuming or wasting or diverting almost half of all the net biological production on land, and more than half the planet’s renewable fresh water. The human driven changes that are taking place are a global threat that will deprive future generations of the life sustaining possibilities. We cannot live independent of nature—as if we own the planet.

Figure 1.5 reflects the effects of the increase in population in the latter half of the 20th century which is anticipated to reach 9-10 billion by the middle of the 21st century. In this figure research in the social sciences becomes increasingly significant. The negative consequences of the protection of “invested interests” and the limited piecemeal and mechanistic responses of governments is examined, and is used to support the proposition that it is the inertia of governments, combined with the aggressive competition of geopolitical markets and the greed of the global financial institutions, that provide the tipping elements for a step change for the planet and for humanity. Based upon the empirical evidence, if we wait for a response from global leaders and policy makers it will be too late. Governments must act. Reducing carbon dioxide (CO₂) will require legislation, but this will not be enough to reduce our transgression of planetary boundaries which places humanity at grave risk. There are also multiple social tipping points that urgently need to be addressed, including global changes in financial regulation. Immediate action must be taken to stop speculative trading in vital commodities such as oil and food which causes extreme volatility in the market. Gambling on the price of food is catastrophic for vulnerable populations, counted in the billions, for whom the rapid rise in the price of food is a matter of life or death. When food prices rise rapidly there are cascading effects, including a rise in social unrest and armed conflict, public health emergencies, a rise in the internal displacement of people, and massive migrations, all of which lead to further destruction of ecosystems, accelerating climate change, and diminishing the essential conditions for human life as we know it.

Jean Baudrillard (1993) in *The Transparency of Evil: Essays on Extreme Phenomena*, who makes us aware of our mindless intransigence and of the imminent dangers to our very existence. Baudrillard writes of “an economy freed from ‘Economics’ and given over to pure speculation; a virtual economy emancipated from real economics (not emancipated in reality), of course, we are talking about virtuality – but that is the point too: today, power lies not in the real but in the virtual; and an economy that is viral, and which connects with all other viral processes. ... We forget a little too easily that the whole of our reality is filtered through the media, including tragic events of the past. The moral and social conscience is now a phenomenon entirely governed by the media ... symbolic power is always superior to the power of arms and money. ... The striking thing about all present-day systems is their bloatedness: the means we have devised for handling data – communication, record keeping, storage, production and destruction – are all in a condition of ‘domestic pregnancy’ ... So many reports, archives, documents – not a single idea generated ... So many messages and signals are produced and disseminated that they can never possibly all be read. ... Ours is a society founded on proliferation, on growth which continues even though it cannot be measured against any clear goals. A society whose development is uncontrollable, occurring without regard for self-definition, where the accumulation of effects goes hand in hand with the disappearance of causes ... when a system rides roughshod over its own basic assumptions, supersedes its own ends, so that no remedy can be found, then we are contemplating not crisis but catastrophe. ... It is as though the two poles of our world had been brought into contact, short-circuiting in such a way that they simultaneously hyperstimulate and enervate potential energies. This is no longer a crisis, but a fatal development – a catastrophe in slow motion.

In the central graphic (figure 1.6) Vulnerable and declining populations are critically affected by abrupt changes – *kicks* – natural disasters, earthquakes, tsunamis and hurricanes and social disasters such as global and regional armed conflicts, and public health emergencies. *Kicks* are exacerbated by the impact of local and regional increase of extreme weather patterns, and become additional stressors on ecosystems and further exacerbate climate change. The increasing scale and intensity of these complexly interrelated disasters challenges our capacity to adequately respond, either in the aftermath of the events taking place or in the recovery phase of disasters.

“What we have to do,” Stephen Toulmin once said to Sheldon Hackney, the University of Pennsylvania’s Past President, “is make the technical and the humanistic strands in modern thought work together more effectively than they have in the past.” “Technical, technical excellence, is no longer an end in itself. It’s something which has to be kept in balance with humane consequences,” Toulmin told Hackney. “I’m sure that it will never be possible to get the governments of the members of the United Nations and the rest to sign a common document,” Toulmin said. “On the other hand, I think on the nongovernmental level there is in practice a strong and large consensus which governs the way in which people do things. And, if ethics is more a practical matter than an intellectual matter that may be what is important”. “That’s what I thought you would say,” Hackney responded, “that it’s not so much discovering the platonic ideal of justice universally, but people talking with each other across their differences and reaching some agreement”.

Nevertheless, governments must act. There are multiple social tipping points that urgently need to be addressed, including global changes in financial regulation. Immediate action must be taken to stop speculative trading in vital commodities such as oil and food which causes extreme volatility in the market. Gambling on the price of food is catastrophic for vulnerable populations, counted in the billions, for whom the rapid rise in the price of food is a matter of life or death. When food prices rise rapidly there are cascading effects, including a rise in social unrest and armed conflict, public health emergencies, a rise in the internal displacement of people, and massive migrations, all of which lead to further destruction of ecosystems, accelerating climate change, and diminishing the essential conditions for human life on the planet.