

State of the World 2013

IS
SUSTAINABILITY
Still Possible?



THE WORLDWATCH INSTITUTE

Crafting a New Narrative to Support Sustainability

Dwight E. Collins, Russell M. Genet, and David Christian

In 1968—during the first manned voyage to orbit the moon—Astronaut William Anders took the famous photograph known as *Earthrise*, which graphically depicts Earth as a small oasis in a dark, cold, hostile space. Environmentalists used *Earthrise* to spread their message of the need to care for our fragile planet, and it played a pivotal role in catalyzing the great environmental campaign successes of the 1970s in the United States, such as Earth Day, the Clean Air and Clean Water Acts, and the creation of the Environmental Protection Agency.¹

There is another more subtle message embedded in the *Earthrise* photograph. It was taken by a species able to travel beyond Earth by building a human-friendly, short-term, artificial environmental system. In both the spaceships we build and Spaceship Earth on which we live, our survival is at stake.

Finding a new set of myths and stories that remind us frequently of our dependence on planet Earth and our role as stewards is essential in this Anthropocene epoch, when humanity is having a severe impact on the biosphere—enough even to disrupt life itself. Many religions are trying to do just that, reminding their adherents of the lessons from their stories about stewardship, protecting the earth. The Judaic concept of a covenant or legal agreement between God and humanity can be extended to all creation. Christianity’s focus on sacrament and incarnation can be interpreted as a lens through which one can see the entire natural world as sacred. The Islamic vice-regency concept teaches that the natural world is not owned by humans but rather given to them in trust, implying a responsibility to preserve all of creation. But modern science, too, has much to contribute to people’s understanding of our beginning and our future.²

One story that is now known globally and understood by billions of people is the story of humanity’s evolution—what E. O. Wilson, the Pulitzer Prize–winning Harvard entomologist, calls “probably the best myth we

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will ever have.” This story starts 13 billion years ago with the Big Bang and continues into the future beyond *Homo sapiens* and toward new species into which even humans may evolve. But it also includes much more beyond humans and planet Earth, the “billions and billions” of stars and planets where processes similar to those here on Earth are likely taking place. What is exciting is that there are now efforts around the world to draw on this evolutionary story—which has been incorporated into an academic discipline often called Big History—to help humanity set a course to a sustainable future.³

Teaching Big History

Courses on Big History are now being taught in some 50 colleges and universities around the world—from Harvard University and the University of Amsterdam to the American University in Cairo and the International State University in Moscow. Big History courses offer semester-long or year-long accounts of the history of the cosmos, of life and civilization on planet Earth, and of humanity’s place within the universe. These courses, by their very nature, are interdisciplinary, multiscalar, and both global and cosmic in their perspective. Often they take as their central theme the idea of increasing complexity.⁴

These courses typically begin by explaining what Big History is, often comparing it to traditional origin stories. They then launch into a narrative that begins with the Big Bang, explaining the key ideas of Big Bang cosmology in language that nonscientists can grasp. The creation of stars is the next chapter in the story. With the appearance of stars, a universe that was previously both homogenous and quite simple suddenly acquired new chemical elements and energy flows of increased intensity. The narrative then moves on to the dispersal of these new chemical elements from dying stars, a story that helps explain the appearance of chemically complex objects such as planets. Describing the creation of these new chemical elements sets up the story of planets in general and our own solar system in particular, preparing students for the history of Earth and its life.

The emergence of life seems to have been made possible by these chemically complex environments with a liquid solvent (water) and gentle energy flows that allowed the evolution of increasingly sophisticated molecules. The



story of life and its evolution on Earth leads to the appearance of our own species some 200,000 years ago. Many Big History courses identify our species as distinct because of our capacity for “collective learning”—the ability to share ideas so efficiently that the information learned by individuals begins to accumulate in the collective memory from generation to generation. This creates a level of technological creativity that no other species has been able to match in the almost 4 billion years that life has existed on Earth.⁵

The final parts of the story describe the results of this collective learning. As humans learned to ever more successfully exploit their environments, they evolved ever larger, complex, populous, and energy-hungry societies. Today, in the Anthropocene epoch, for better or worse humans have acquired the power to transform the biosphere. It is natural, therefore, that Big History courses end by considering where the story is headed—the story of humans and the biosphere, and also the story of the planet, the solar system, and even the Universe as a whole.⁶

There are different schools of thought when teaching Big History. Some focus more on Earth and its origins; others, on life in the universe. But whatever way you slice it, Big History gets to some of the biggest questions of time, space, and our survival.⁷

For example, Big History raises the question of whether the history of our own species is unique. Is it possible that there have been many examples of other species beyond Earth capable of collective learning and able as a result to accumulate new technologies over many generations? Assuming such species exist, we can make some plausible generalizations about the likely shape of their histories. And these generalizations can help place our own predicament into a larger context.

It seems likely that other collective-learning species might pass through similar stages in their histories as their knowledge base and technological resources accumulate. One line of discussion hypothesizes three stages. In Stage 1, childhood, these species accumulate a growing body of knowledge about their environment. This gives them increasing power to extract resources from their environment and support ever larger and more complex communities. Barring extreme events such as asteroid strikes, they eventually reach Stage 2, adolescence. In this stage, they have accumulated so much power over their environment that they can now transform their planet, although it is not yet clear if they have the wisdom needed to use their power well. This potential mismatch of power and wisdom may create a bottleneck, difficult to pass through, and this may explain why we have not heard from other such species although we have been listening for over half a century. Is it possible that all such species are like galactic fireflies, only briefly flashing on and off, here and there? Perhaps our species has reached this adolescent phase.⁸

The primary impediment to making it through our bottleneck is the runaway success of our species. Like other species capable of collective learning, we presumably have not only the ability to fill our own niche but also, because we keep accumulating new technologies, the ability to fill and overexploit almost every niche on Earth. Through our cultural evolution, we have developed powerful machines, tapped fossil fuels, and are now rapidly transforming the biosphere. So far, other species have lacked the power or foresight to restrain us. Our cultural evolution has been too fast for their genetic evolution to counter.

Thanks to our capacity for collective learning, there is a potential pathway through the bottleneck. We can become the first species on Earth to develop the effective planet-wide evolutionary foresight we will need if we are to avoid the dangers of ecological overreach and death as a civilization. Effective planet-wide action based on foresight is the key to a flourishing future. Science provides the foresight, while long-view narratives such as Big History can energize the public will, enabling politicians to make wise, long-term choices.⁹

In summary, from a cosmic perspective, sustainability can be seen as the requirement for civilizations of species capable of collective learning to safely negotiate their bottlenecks, to pass through their adolescent stages to Stage 3: planet-wide cooperative maturity leading to a flourishing future. The cosmic perspective presented by this Big History narrative places the question of sustainability into a nonconfrontational context. It also provides a foundation of meaning upon which we can unite and align our ethics of exploration and environmental stewardship in pursuit of a common goal: negotiating a way through our cosmic bottleneck to reach Stage 3 of our history.

Can Big History Courses Change Attitudes?

The Big History Project, founded by Bill Gates and David Christian, is bringing this curriculum into high schools by building what will eventually be a free online syllabus in Big History. A two-year pilot offering of the course began in 2011 at individual high schools in the United States. In 2012, schools from Australia, the Netherlands, Scotland, and South Korea joined the pilot.



The Rocinha Favela in Rio de Janeiro is one of the largest shantytowns in South America, with over 200,000 inhabitants.

Eventually, using feedback from these pilot high schools, the syllabus will be revised. In late 2013, it will be made freely available to high schools as well as individual learners. Systematic feedback from high schools will also provide valuable data about the capacity of such courses to change the way students think about issues such as sustainability. The eventual goal of this project is to see Big History taught in a majority of high schools throughout the world. Already Big History is catching on in high schools, colleges—with some, like Dominican University of California, even requiring all undergraduates to take this course—and even science museums.¹⁰

Adults may react in different ways when exposed to the Big History account. For some, it may generate an awareness that they should change their behavior. But they may need more support for change because, for example, they are caught up in the paradigm of well-being defined by the material things that surround them. Others may react by initiating a change in personal values and priorities for what has meaning out of a heightened awareness of their interconnectedness with all life. Still others may need to connect the contents of the account to their spiritual identity in order to change behavior. They may look to practices like Religious Naturalism, an approach to spirituality with a focus on the religious attributes of the universe and nature.¹¹

In any case, a great deal of anecdotal evidence from many Big History courses taught at the college level over the last 20 years suggests the powerful ability of these programs to transform a student's perspectives with respect to the major global challenges of the Anthropocene epoch. Big History has the capacity to expand our vision of humanity and its trajectory just as the *Earthrise* picture changed how the first astronauts and cosmonauts viewed their home planet. Here, for instance, is the reaction of one student to a Big History course taught in the United States:

When I was first asked to consider my role in the universe four months ago . . . I do not think I fully realized there was even a living community around me, never mind an Earth full of other humans and an entire universe beyond. . . . But after this long, incredible voyage of exploration . . . I have a newfound sense of what the universe is. I have learned . . . that we are all part of the Global Future, and I can make a difference in my life as well as the lives of others. . . . My role is now to change my ways and respect this beautiful planet that granted us life, and to get others to join me.¹²

This anecdotal evidence suggests that students learning the new narrative can change their “reality map,” resulting in more-sustainable behavior. This hypothesis can be tested in a rigorous systematic way using before-and-after surveys.

Since 2009, staff from the Alliance for Climate Education (ACE) have been giving presentations on climate science to high school assemblies

across the United States. Their presentations incorporate animation, music, and documentary footage of students taking on climate-related projects in their schools. In three years, ACE has engaged over 1.3 million students and won numerous awards for their innovative presentation style. Before-and-after ACE surveys have measured students' knowledge, attitude, behaviors, and intentions related to climate and energy. The results suggest that students have the potential to shift their attitudes and behavior in response to a creatively crafted message about climate science. Before an ACE assembly, 37 percent of 1,388 students surveyed passed a test on climate science; after the assembly, the pass rate rose to 56 percent. And the share of students categorized as concerned or alarmed about climate change rose 43 percent. The key seems to be presenting compelling information in an engaging format that incorporates a sense of hope and empowerment. A course in Big History, given that it is taught over several months, is likely to have an even greater impact on attitudes and behaviors than a one-time high school assembly engagement.¹³

The Future of Big History

As Spaceship Earth speeds toward the brick wall of its own planetary finiteness, Big History has great potential as a teaching vehicle to change the attitudes of its passengers about sustainability. However, a more critical need is to educate its pilots—our leaders in business and government—in Big History.

Graduate schools of management could, for instance, offer a one-semester Big History course at the beginning of their Masters of Business Administration and Public Administration (MBA/MPA) curricula. Knowledge of Big History grounds us in how to live as good citizens of Earth. Hence, this strategy could strengthen MBA/MPA programs by teaching students how to weave Earth citizenship values into the leadership cultures of public and private institutions.

A small number of graduate programs have already made substantial headway in this direction. One is the 10-year-old San Francisco-based Presidio Graduate School, which offers a dual MBA/MPA degree in sustainable management. This program integrates sustainability values and tools for conducting business and managing public institutions throughout every course in its curricula. Addressing the sustainability dimension of businesses and public policies requires students to learn how to think at a global level with a sense of the broadest impacts of decisions. The primary discipline used by the school to teach this skill is “systems thinking,” developed and popularized by Jay Forrester, Donella and Dennis Meadows, and others at the Massachusetts Institute of Technology in the 1970s. It was used in connection with the discipline of system dynamics invented by Forrester and

found in this team's famous work for the Club of Rome, *Limits to Growth*. Systems thinking is mathematics- and logic-based, with a focus on concepts like feedback loops and leverage points within a system.¹⁴

The discipline of Big History offers a complementary approach to teaching a student to think globally. The student assimilates a breadth of knowledge that by its very nature requires him or her to think from a global/cosmic perspective. Big History and systems thinking are two very different approaches to achieving similar learning outcomes. A course in Big History—with its broad opportunity for use of both cognitive and affective learning modalities—could augment a student's knowledge of systems thinking, providing the student with an even stronger sense of the interconnectedness of all things in space and time.

It remains to be seen whether or not we Earthlings will safely negotiate Spaceship Earth's bottleneck and advance from our civilization's reckless adolescence to a state of sustainable and flourishing maturity. Anecdotal evidence indicates that teaching people Big History can help on this journey. These courses educate students toward sustainable behavior by enabling them to understand the sustainability challenge in the broadest context and by deepening their understanding of what it means to be a good citizen of Earth. They teach us how to think in terms of multiple time scales and across disciplines. Offering such courses in our high schools and institutions of higher learning can provide the education that both the passengers and the pilots of Spaceship Earth need to steer a safe course through our bottleneck.

The Big History narrative gives new meaning to our journey to a state of true sustainability and flourishing. It anchors the journey's starting point, and its unified perspective serves as a constant reminder of why we are on the journey and why we should not divert from its path. This cosmic narrative was eloquently expressed by Carl Sagan when he ended the thirteenth and final episode of *Cosmos*—"Who Speaks for Earth?"—with these words: "Our loyalties are to the species and to the planet. We speak for Earth. Our obligation to survive and flourish is owed not just to ourselves but also to that Cosmos, ancient and vast, from which we spring!"¹⁵

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17. Ibid.

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2013

STATE OF THE WORLD

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Sustainability gets plenty of lip service, but the relentless worsening of key environmental trends reveals much of that attention to be “sustainababble.” From climate instability and species extinctions to approaching scarcities of freshwater, minerals, and energy, worrisome limits to human economic activity look more pressing each year—all while our political institutions seem impotent to address the challenge.

THE WORLDWATCH INSTITUTE, in this edition of the celebrated *State of the World* series, takes an unflinching look at what the data say about the prospects for achieving true sustainability, what we should be doing now to make progress toward it, and how we might cope if we fail to do so.



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