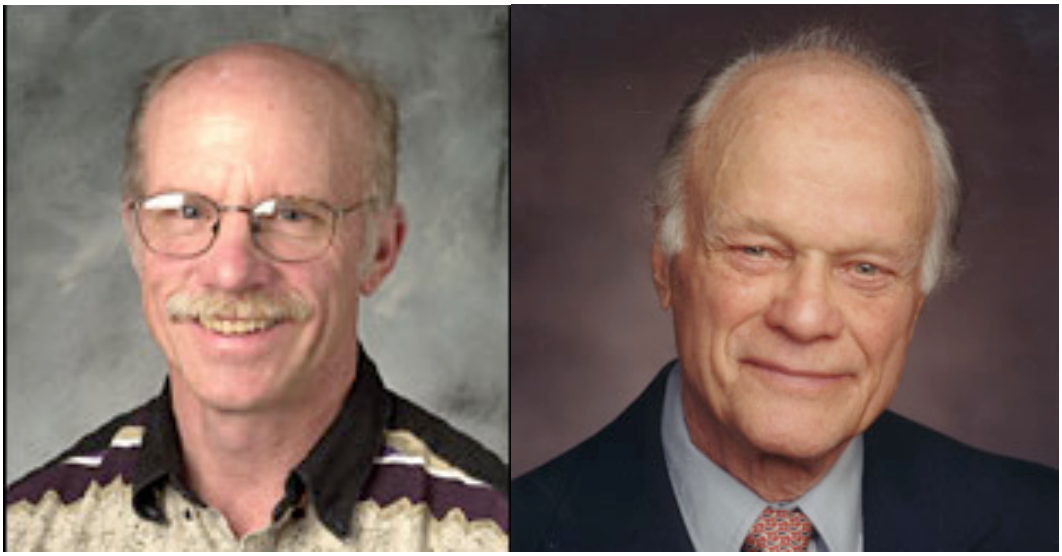

Bruce E. Mahall Frank Herbert Bormann

The Earth has its own set of rules

Our view of nature is based on our human desire for more, and that economic model is broken.

By B.E. Mahall and F.H. Bormann
March 2, 2010

Early in our history it didn't make any difference how we viewed our environment. We could change it, and if we didn't like what we did to it, we could move and natural processes would soon obliterate whatever we had done. Over the years, models of our relationship to the environment have been based on religious views, with the world provided for us to dominate and subdue as described in Genesis, and philosophical views, seeing wisdom and virtue in nature as described by Thoreau.

But by far our most prevalent view of nature derives from a rudimentary human desire for more. This is the basis of the economic

model that currently directs our relationships with one another and with our environment. It has produced stupendous human population growth and dramatic, deleterious effects on nature. Recognizing these effects, efforts have been marshaled to change the self-serving economic model with notions of Earth "stewardship," eloquently advanced decades ago by then-Interior Secretary Stewart Udall, and, most recently, to infiltrate the economic model with "ecosystem services" by assigning monetary values to functions performed by the Earth that are beneficial to people.

All of these views are fundamentally and dangerously flawed, because all are anthropocentric. They begin and end with humans. This isn't the way the Earth works.

The Earth has its own set of rules, solidly grounded in laws of physics and chemistry and emergent principles of geology and biology. Unlike our economic model, these are not artificial constructs. They are real, and they govern. Earthquakes, tsunamis, volcanic eruptions, hurricanes, tornadoes, 100-year floods, massive wildfires and disease epidemics are dramatic examples of parts of nature, neither all service nor all harm, creating and destroying, and governed by rules that are indifferent to humans. Our anthropocentric economic model for interacting with the world ignores and is proving to be incompatible with Earth's rules, and is therefore on a direct collision course with them.

To achieve a more accurate model of our relation to nature, we need to see ourselves as *part of nature*, governed by nature (not economics), beholden to nature for ecosystem services and subject to nature's disturbances.

We need to view our existence in nature as dependent on numerous

functions we are unable to perform ourselves, and without which we couldn't survive. And we need to recognize that we now have the power and the reckless inclination, driven by shortsighted anthropocentrism, to disrupt these functions to the degree that Earth will become uninhabitable for us.

In the end, the physical, chemical and biological rules of Earth will certainly win, and we will either be on the winning side or we will be vanquished. These are the only choices.

Our anthropocentric economic model needs to be reconceived, incorporating Earth's rules, to become an Earth-centered, "terracentric" model. Stewardship needs to progress from a condescending view of humans tending their "garden" to an effort to become part of Earth without disrupting its vital functions. Ecosystem services need to advance from recognition of services to humans to recognition of services to our planet. We need to find ways to avoid changing Earth in irreversible directions. We need to soberly evaluate anthropocentric economics' sacred cow, growth, in light of sustainability. And we need to think beyond our own brief lifetimes. Most important, in the new terracentric model, we need to acknowledge that there is nothing more important than preserving the viability of planet Earth. Nothing.

Using human ecologist Garrett Hardin's metaphor, Earth is our only "lifeboat" in a sea of empty, cold blackness. Our lives, and those of other organisms, are allowed in this boat only because of a quasi-steady environmental state created by a unique balance of physical, chemical and biological conditions and processes governed by Earth's rules. The central task of ecology is to understand these conditions, processes and rules and thereby understand the qualities and dimensions of this steady state.

Unfortunately, before ecology has reached this understanding, humans are testing this steady state's robustness with anthropogenic changes in atmospheric chemistry that cause changes in radiation through the atmosphere, fundamental changes in ocean chemistry and changes in the whole planet's energy budget -- its balance of energy in and energy out. We are testing it with pervasive, potentially irreversible, long-term pollution of Earth's fresh and salt water, using a vast assortment of man-made chemicals that often possess biologically hazardous and ecologically unpredictable properties. We are testing it with relentless, massive, wholesale conversions of ecosystems, channeling their products exclusively into our own limitless consumption. And we are testing it with the global spread of biological species, causing a complex, hugely damaging homogenization of Earth's biota.

Recent measurements of unprecedented, directional changes in the vital signs of Earth suggest that we may have already staved in our lifeboat's hull, causing changes beyond the ability of Earth's biogeochemical forces to maintain balance. The quasi-steady state that makes our lives possible may be disappearing before our eyes. We are in direct conflict with Earth's rules.

The anthropocentric economic model is fundamentally incapable of providing more than temporary fixes for our massive environmental problems. Reliance on this invalid, incompetent model underlies the recent struggles of world leaders in Copenhagen and Washington to make significant progress in solving global environmental problems. Replacement of this failed model with an economic model that recognizes Earth's rules and embraces terracentricity as its essential focus is the primary step necessary to bring reality into our collective thinking and behavior, and provide an accurate conceptual basis for

the hard decisions ahead that will determine the fate of life on our planet.

Bruce E. Mahall is a professor of ecology at UC Santa Barbara. F. Herbert Bormann, a professor emeritus at Yale University, is one of the founders of the Hubbard Brook Ecosystem Study.