

## Sustainability, Natural Law, and the "Real World"

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(Reframed using the Universe Story by Milt Hetrick, 2012 – see Red Text)

In the realm of natural resource conservation, a very real limitation to sustainability, based on biologically reasonable and well-considered actions, ~~seems to be~~ is the "Real World." Competent resource biologists with a long-term vision of sustainability who, for example, develop plans for endangered species recovery that include limits on suburban development, or try to limit old-growth logging to protect drainage basins, inevitably come up against powerful **human-induced**<sup>1</sup> forces that quickly and efficiently disassemble such plans. These **human** forces typically invoke what they call "economic reality," or the "real (**human created**) world." This alleged real (**human created**) world consists of powerful economic and political constraints that seemingly cannot be overcome, and border on the sacred (**not to be questioned**). People who do not take them (**the anthropocentric social constructs, paradigms**) into account, and in fact do not place them at the center of any resource plan, are said to be idealists living in a dream world (**by those who are actually living in a human created dream world rather than the natural Real World.**)

This typical and powerful "real (**human created**) world" view places short-term human interests, often expressed as immediate resource depletion and financial gain, far ahead<sup>2</sup> of any long-term naturalistic<sup>3</sup> or humanistic<sup>4</sup> vision of sustainability. Current resource use, for this generation and even just this year (e.g., "get the timber cut and out"), is given far greater credibility than a long-term, inter-generational perspective. This folly is a very powerful and difficult one to fight. In essence, it places (**human created**) constraints of the "real (**human created**) world" on many resource conservation plans that would otherwise upset the *status quo* of multiple-use, short-term economic gain, and political expediency. These (**human created**) constraints are often based on two-, four- or six-year election cycles, or even one-year budget cycles.

Are these constraints real and necessary? More significantly, are they the most important constraints on resource management, or are there larger issues that bear on sustainability? I will argue that these traditional views, powerful and pervasive though they may seem, are unrealistic and are in fact the very antithesis of the "**Real World**"; nothing could be more artificial and ignorant of truly critical issues and constraints on resource use and sustainability than short-term economic and political considerations. For such a view implicitly, if not explicitly, denies the existence of, or assigns a secondary and diminutive role to, something far more powerful in the long-term: *natural laws*.

**Natural laws are in fact the only "Real World" that counts in the long term, and are the rules that govern whether humanity will maintain itself in a sustainable manner;** yet, they are blatantly ignored by most decision-makers and many resource managers. For example, the traditional economic models that guided western industrial expansion for several centuries ignore natural law: natural resources are explicitly assumed to be infinite or totally substitutable, and waste products are assumed to be irrelevant (e.g., Simon 1981; see Daly 1991 for a comprehensive critique of these models). This is hardly the "**Real World**" **but rather the "real human created world."** In fact, the entire "real (**human created**) world" as used today is an absurdity; it is based on socioeconomic systems that are new **human** inventions, several hundred to perhaps 1,000 years old at best, and artificial constructs of humankind. They have the potential to work sufficiently in the short-term and under low human population densities, with abundant resources and free ecosystem services, and with many costs "externalized." With high density and fewer resources, natural systems begin to break down, as we have seen through much of the 20th century, and the reality of natural law

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<sup>1</sup> The Universe Story describes 13.7 billion years of emergence: the creation of something more (complex) from nothing but (something simpler) as a result of new relationships. Recently, around 100,000 years ago, homo sapiens emigrated from eastern Africa and began to populate the entire planet. Homo sapiens are a species capable of influencing natural (pre-human) emergence. We humans have proven to be adept at reshaping nothing but natural resources into more complex objects (tools) to extend our capabilities. We humans are also adept at creating abstract systems (e.g. social contracts) intended to enhance our life and to extend our consciousness.

<sup>2</sup> Far ahead: meaning give 'financial gain' more priority even exclude any other perspective, i.e. the Real World.

<sup>3</sup> Naturalistic: meaning based on the natural Laws of the Universe / Physics / Chemistry

<sup>4</sup> Humanistic: meaning human created social constructs intended to impose a life serving set of behaviors- ethics, morality – as opposed to influences based on economic calculation (profit /loss).

catches up to (and will always trump) this "real (human created) world" IF the human created world is inconsistent with the Real World.

It's safe to say that that no human, a child of the Universe, has or will defy successfully any "Law of the Universe"

**Example:** Humans did not defy the law of gravity to travel to the moon, explore its surface and return with some lunar rocks. Just the opposite. That marvelous human feat was possible only because humans meticulously and strictly observed the laws of orbital mechanics, physics, chemistry, thermodynamics, aerodynamics, metallurgy, electromagnetism, etc. and worked totally within these laws.

Unfortunately humans tend to learn these laws the hard way. One single violation of the law of chemical combustion (within a 100% oxygen environment - the original design of the Apollo Command Module) caused the death of three brave Apollo 1 astronauts<sup>5</sup>. The Life Support System of Command Module was redesigned to use a 20% concentration of oxygen similar to conditions on Earth (a heavier design that meant we could bring less lunar soil/rock back to Earth) and humans successfully walked on the Moon and returned safely.

So let me define what I propose as the real "Real World": physical, chemical, and biological laws that have operated for not hundreds, but billions<sup>6</sup> of years. For example, natural selection, the first and second laws of thermodynamics, electromagnetic forces, material and energy flow through ecosystems, and heritable genetic variation are all the Real World. All have been operating in their present form for billions of years, and show no indication of fundamentally changing in response to human needs and desires<sup>7</sup>. All operate independently of and in total disregard for what humanity does. None can be changed or engineered to suit our needs, despite the misguided and dangerous fantasies of some. Hardin (1993) relates the following, which nicely illustrates fundamental misunderstandings of natural laws:

*When plans were being made in Stockholm for the 1974 World Population Conference in Bucharest, 'as each new perpetual motion-machine solution was propounded,' to furnish the world with unlimited supplies of energy, 'one of the scientists would simply point out that it violated the second law of thermodynamics. Finally, in frustration, one of the economists blurted out, 'Who knows what the second law of thermodynamics will be like in a hundred years?'*

This is a telling example of the type of pathetic and tragic thinking in our economic and political machines that creates environmental and social catastrophes. Yet, this is the type of thinking that has guided and led human actions with respect to resource use for generations. Natural law means nothing to short-term, narrowly trained thinkers.

By comparison to natural laws, the so-called real (human created) world of politicians, economists, and other supposed managers of our world is a trivial and fleeting experiment in evolutionary time and is meaningless by comparison to natural laws that are **incontrovertible and inviolate**. One can violate an economic or political law if one wishes: a person could steal money from a bank and possibly not get caught; another can murder and perhaps get away with it. But as talented as one might be in corrupt and unethical behavior, one still cannot violate natural laws that are inconvenient to their desires: we cannot by-pass entropy; we cannot ignore gravity; we cannot consistently destroy habitat, toxify groundwater, clear-cut old growth forests, or desertify grasslands through overgrazing or poor agricultural practices and expect natural systems to continuously support exploding human populations at ever-increasing standards of living.<sup>8</sup>

Much of this comes down to attempted control and remodeling of natural systems to better suit human development in the short-term<sup>9</sup>. The human species has adopted a perspective<sup>10</sup> that we can and should control nature, even re-model nature, to our own ends<sup>11</sup>. "Improvement" of forest stands or fishing returns through manipulation are

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<sup>5</sup> Apollo 1 Fire.. <http://www.space.com/10674-apollo-1-fire-nasa-disaster.html>

<sup>6</sup> Although unknown in 1992 when this was written, today it appears the Universe that we can see began (poetically described as the Big Bang) 13.7 billion years ago. The Solar System (Sun, and all its planets) emerged from just star stuff and Earth was formed around 4.56 billion years ago.

<sup>7</sup> Appears Meffe is suggesting that the Universe, the Solar system, Earth and all life on it does not revolve around our human ego.

<sup>8</sup> Agree completely. However the leap from the "law of gravity" to "clear-cutting old growth forests" is too big for the politician, economist or average person to make.

<sup>9</sup> This anthropocentric viewpoint is obviously unacceptable despite what world religions, politics, (invalid) economics might say.

<sup>10</sup> Perspective: A morality, an ethic, a way of thinking and behaving.

<sup>11</sup> This perspective, morality, set of ethics of controlling nature for our personal pleasure (our own ends) results in influencing humans to make choices that are simply unsustainable – meaning this type of behavior by 7 billion homo sapiens defies the basic laws of the Universe. Example: The first violation is a failure to acknowledge that Planet Earth is finite in size and most importantly has finite quantities of life-supporting resources. [See [Spaceship Earth](#) – a visual aid to better appreciating the amount of air, water

good examples of remodeling nature. "Improvement" in these cases is merely a synonym for "changing nature for short-term human benefit." Ultimately, of course, this is a ludicrous and even childish notion, and has been coined "the arrogance of humanism" by Ehrenfeld (1981) and "techno-arrogance" by Meffe (1992). Attempted control of, and technological mastery over nature is failing, will continue to fail, and can only result in great human suffering as the human population grows exponentially while ecological support systems continue to be modified or destroyed. The managerial emphasis instead should be to recognize natural laws of ecology and evolution, and work within their constraints<sup>12</sup>. It is time to mature as a species and recognize and accept limitations, rather than forge blindly ahead with outdated, frontier mentalities of conquering and engineering nature.

Largely, this involves a major dose of humility, something many humans seem loathe to embrace. Accepting constraints and limitations is foreign to the engineering, techno-think mentality that has driven our civilization for the last two centuries and our resource agencies for this century. But technology is irrelevant with respect to normal functioning of ecosystems; it can only degrade them. The idea that nature may be "improved" is an absurd concoction of high-level managers who are either justifying their jobs or trying to re-design nature for short-term human gain.

Let's stop here and take a deep breath. Although immersing oneself in the Universe Story (as it is now available in the language of science) is not the cure for all human problems, it can provide "a major dose of humility."

**First** one must hear and take in some recently discovered (within our lifetimes) facts about our **Universe**.

It began 13.7 billion years ago. At this point in human history, homo sapiens have learned how to make tools (telescopes) that extend our vision to the outer limits of the Universe. Using these amazing new tools (technology such as the Hubble telescope), we can actually see, with our own eyes, that our solar system (our Sun, Earth and all the other planets orbiting around the Sun) is one of over 100 billion such solar systems in our Milky Way galaxy— all circling around an immense gravitational center called a black hole. Hubble and other telescopes can now look even further out, beyond our own galaxy, and see another 100 billion galaxies, each with 100 billion stars. By carefully observing the light from these distant stars<sup>13</sup>, we see that the Universe consists primarily of Hydrogen (74 %) and Helium (23 %) with less than 3 % of all the other elements in a Universal Periodic Table.<sup>14</sup>

*But who cares about the Universe? Everyone knows that all this stuff in the Universe revolves around us here on the Planet Earth. (An Arrogance Joke).*

We are here because Earth is here. Earth is here because our Sun, a later generation star, became the gravitational center that captured star stuff from earlier generation SuperNova stars that lived and died (exploded) and spewed basic atomic elements in all directions. Our Sun collected some of this material that was streaming within the reach of its gravitational force and captured it for its family of planets. Our planet is a collection of those most unique materials in the Universe.

Our planet Earth appears to be huge<sup>15</sup> compared to a single human being – but size is relative. The Sun is

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/ fresh water and hydrocarbon resources we have available for all Life.] Because of the finite nature of these resources, any loss, any net consumption is intolerable. Yes, humans have the right and even responsibility to **Borrow** Earth's resources as humans continue to create something more from nothing but as a result of forming new relationship – but a sustainable ethic demands that every atom borrowed must be returned / recycled for future generations at the end of one's life – or if placed in the commons, at the end of the creation's useful life. Landfills, dumps, waste, consumption must be avoided like the plague. A second violation is a failure to acknowledge that all Life on Earth is supported by (driven by) the energy from the Sun. The amount of solar radiation reaching the ground, on the average, is 170 W/m<sup>2</sup>. [Smil, p20] The amount of this energy we can capture, harvest and convert into chemical energy to support life determines the vitality of Life on the Planet. Every square meter where this life supporting energy falls on a barren surface (concrete, bare earth, asphalt, singled or thatched roof) and is converted directly into waste heat to be re-radiated into space is a lost opportunity for Life. Because the Earth is finite and the energy coming to the Earth to support Life is finite, human population must be controlled/stabilized – some say at a number lower than 7 billion but the appropriate number is to be determined. Any oral culture, religious teaching, economic propaganda that promotes perpetual growth is not only immoral; it is advocating suicide/ genocide. And that is the Real World despite what the politicians, for-profit corporations, and some churches, have to say.

<sup>12</sup> Couldn't agree more. What is wrong with our "system" if some of us can see this inevitability, while others cannot or will not? It says that our method of transferring lessons learned from one generation to the next is flawed. Generally human created laws, morality / ethics are a means of transferring this collective learning from one generation to the next – but obviously that is broken.

<sup>13</sup> Analyzing Light, pg33, Universe: The Definitive Guide, Martin Rees, Dorling Kimbersley Limited.

<sup>14</sup> Ibid, pg 51

<sup>15</sup> Earth's mass is  $5.97 \times 10^{24}$  kg of mass

333,000 times more massive.<sup>16</sup> Earth is 0.0003% of the mass of our solar system.

*And of course the Sun revolves around the massive human ego (Another Arrogance Joke).*

There are an estimated 10 million different species of life forms on Planet Earth that are an integral part of the interdependent web of Life. Only 1.9 million have been documented.<sup>17</sup> DNA sequencing has revealed that all Life on planet Earth can be traced back to a common ancestor some 3.5 billion years ago. See the Phylogenetic Tree of Life. Homo sapiens are one of 1.9 million living species.<sup>18</sup>

**Second**, one must pause for a moment and let these facts sink in. One would think that with this knowledge, with this awareness of the Real World within which we are immersed, we homo sapiens might temper our arrogance. One would think we could put our ego in perspective yet continue to know each of us is unique but related to every other homo sapien AND related to every other living creature now living on this planet.

The Universe Story shows us we are all one related and interdependent family of Life – Life that exists only because of the daily energy from the Sun. Violence<sup>19</sup> to one part of our family is violence to the whole family. One would think the wisdom within the Universe Story could provide “a major dose of humility.”

Now there is nothing wrong with the latter in limited circumstances. Actually there is something wrong. “Short-term human gain” is still a concept found only in the unsustainable sandbox/ frame. Humans have evolved to be so complex, so able, they can go beyond their DNA instinctive behavior and exercise free will – as a result they take on the responsibility to make choices that result in MUTUAL BENEFIT for All Life. Obviously, we need to provide energy (food) for our existence and we created agricultural systems (that at this point in time are not being operated sustainably), to borrow resources for constructing shelter from the harsh environment and other useful products so we look to wood and created a lumber production industry (that at this point in time are not being operated sustainably), to borrow basic mineral resources for human stimulated emergence so we invented the mining industry that never has been operated in a sustainable manner, and the like; nobody realistically expects people to just sit in unspoiled forests and worship nature or respects people who consume life sustaining energy in such anthropocentric self-indulgence. However, such activities (current farming, logging, mining,...) should not be passed off as sustainable development. There is nothing sustainable about animal factories, clear cutting ancient forests for lumber or clearing tropical lowlands for cattle grazing. They are one-way streets; we do not return to the original systems in any meaningful period of time, if ever. (Edit. I personally think that ‘return to original systems’ needs some clarification. The Universe continues to expand, the Sun continues to fuse its finite supply of hydrogen and helium, the Earth’s core continues to cool – there is a direction of the Universe. Despite the wonderful spiritual construct of reincarnation and soul recycling until we get it right, there is no such thing in the Real World. There is no going back to an original system or even an original state of a system. We cannot go back to the good old days. Each moment of our existence is unique and therefore special and of utmost irreplaceable value – as is each future moment. )

Real sustainability will require dropping the techno-arrogant<sup>20</sup> anthropocentric worldview approach to that (any) part of nature that we truly are serious about sustaining – that in the Real World is everything – all Life. Rather than thinking like an anthropocentric engineer (concerned solely about reshaping the basic elements of Earth into some new product that will wear out in a few years), we need to "think like a mountain" (Leopold 1949; Grumbine 1992).

<sup>16</sup> [http://en.wikipedia.org/wiki/List\\_of\\_Solar\\_System\\_objects\\_by\\_size](http://en.wikipedia.org/wiki/List_of_Solar_System_objects_by_size)

<sup>17</sup> “Number of Earth's species known to scientists rises to 1.9 million”

<http://www.guardian.co.uk/environment/2009/sep/29/number-of-living-species>

<sup>18</sup> Some believe that there as many other species that are now extinct as there are still alive.

<sup>19</sup> Here we define violence as any action that prevents (the energy within) a living being from reaching its potential.

<sup>20</sup> Meffe has a problem with “technology.” He fails to see that it is another way of saying “human created tools.” I remember quite vividly, as if it happened yesterday but in fact is a memory going back at 40 years, when visiting Yellowstone Park and surrounding area, on a hike I came upon a vein of obsidian in a nearby rock formation. I was fascinated by this glassy black mineral and couldn’t help but reach down and pick up a chunk to examine it more closely. My first encounter with this amazing star stuff was a bit painful because I ended up cutting my finger on its razor sharp edge as I picked up – never had I seem something in nature that was so lethally sharp. But instantly I knew I had found a tool – if I could just wrap something around a portion of the rock to protect me as I held it. Since I have the same genetic makeup as my homo sapiens ancestor did 100,000 years ago, and they probably had similar DNA to their ancestors that preceded them by several million years, it seems hard to define when tools may have first been used. Any reshaping, any modification to a natural tool would be called human technology. Anything that extends our abilities to see, to hear, to hunt, to cook, to eat, to learn, to remember, to teach the next generation, to live together, to defend oneself, ... could be called technology. Technology gets a bad name, when these tools help homo sapiens destroy life rather than become an integral part of life in a mutually beneficial manner. Technology gets a bad name when it is used to help a human deceive, misinform, overpower another, kill or otherwise act in a violent manner.

That is, managers of the natural world should think very long-term (as in 500 million years), accept natural systems as they are and understand all living beings that have evolved to live within that natural system down to the microbial level, and manage them so that human impacts are always mutually beneficial with an appreciation for the dynamic states in which they have always been. They (people with responsibility for management of the common resources) would do well to heed Rachel Carson's closing words in *Silent Spring*(1962): "The 'control of nature'<sup>21</sup> is a phrase conceived in arrogance, born of the Neanderthal age of biology and philosophy, when it was supposed that nature exists for the convenience of man." Natural resource managers should recognize the Real World of natural law rather than human fantasies of how nature should work for our benefit only – nature evolved using the principle of mutual benefit. Life is a sophisticated cascade of energy from solar radiation to autotrophs to heterotrophs that include homo sapiens who have evolved with a high degree of consciousness (allegedly) that can appreciate this interdependency (hopefully). Management of truly sustainable systems must work within the framework of constraint and natural law. Political expediency and short-term economic gain have no place in truly sustainable systems.

We cannot simply re-invent natural biological laws to suit our image of short-term economic gain, four-year political cycles, and perpetually expanding economies. This flies in the face of everything we know about natural law and common sense. Yet, we have allowed uncompromising and un-democratic politics (e.g. human created ideology such as the Republican insistence that anything that is public should be minimized and instead sold and privatized) - and invalid economics (e.g. where real human values such as empathy, cooperation, creativeness, love, beauty, evolving consciousness, ... are not even considered and Real values such as respect for All Life, pure air and water and soil, harvesting current sunlight to support one's own existence rather than consuming ancient reserves of energy, etc. ... are externalized / ignored) to emerge as the guiding principles that direct resource management, while ignoring the natural laws (and human purpose to grow in consciousness and mutual benefit to All Life) that guide the world from which we take borrow resources. I cannot think of a more foolish and self-defeating (suicidal/genocidal) way to approach human long-term well-being and sustainability.

The typical response to this attitude of managing resources for sustainability is that the current unsustainable system cannot be changed because of momentum – this excuse of course is pure bull@#&\*. Although there is a natural law dealing with momentum and non-living matter/mass, homo sapiens (e.g. Americans) who pride themselves as having free will and the right to own guns so they can protect their precious individual freedom cannot also claim to have no control over their behavior / life choices because of "momentum." Anyone expounding such crap should be locked in the Colonial Williamsburg stocks and be ridiculed by all passers-by. I counter that it *must* be changed if our resources and natural systems are not to be depleted and altered to the point of no return, leaving us eventually to face collapse of the very systems that support human life. The human momentum in behavior and philosophy that must be overcome is minuscule compared with the long-term results of ignoring natural laws and their forces. Continued disregard of natural law simply cannot be sustained in the long term, and resource agencies must not only accept this, but lead the way in changing the *status quo*.

So what is the conscientious and progressive resource manager to do? If we want to retain any semblance of ecosystem function, biological diversity, and long-term sustainability, not only of resources but of reasonable quality of human life, we need a philosophical renaissance that recognizes supremacy of natural law over artificial, human institutions, or what those currently in economic and political power tell us is the "real (human created) world." We must recognize limits to our control of nature, and limits to the ability of natural systems to suffer abuse upon abuse yet still provide the services we expect of them, including continued and abundant natural resources.

How do we do this? I believe education at all levels is the answer: education of mid- and high-level resource managers whose training and value systems are sadly out of date, of politicians and economists, who typically have no training or interest in resource management, and especially of the public at large. This can best be done through absolute honesty by resource managers of the consequences of continued growth in human population and capital. We can no longer sugar-coat what we know is happening to the natural world through public relations blitzkriegs that serve only to continue agency funding and advance careers. Let's tell the Emperor he has no clothes – Let's start with the most basic of concepts: the human use of Earth's non-living elements. Let's tell the Interior Department, particularly the Bureau of Land Management, to tell the public there will no more leases issued for the extraction of

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<sup>21</sup> Humans do not control nature – never have, never will. It is not live serving to even imagine that we do – thinking we control nature is like living in Disney's Fantasy Land. Any accomplishment, any creation by homo sapiens is the result of careful observation of the Universe to discern its "Laws" followed by meticulous adherence to them. Airplanes do not defy the law of gravity. A pilot knows that attempting to defy gravity causes death. An airplane is designed by observing nature, learning the laws of aerodynamics and constructing something we call a wing that will produce an upward force (when air flows over it rapidly) that exceeds the force of gravity – allowing the plane move off the ground and as we say fly. Homo sapiens stimulated the emergence of something more called a wing (for an airplane) from nothing but aluminum as a result of bringing earth's resources together into a new relationship known as an airfoil.

coal, oil, natural gas, oil shale, and tar sands – Why? Because these particular Earth's resources are a one-time-only ancient reserves of hydrocarbons –they are not only non-renewable, they are too precious to burn. Because extraction of these resources for the purpose of burning them is not only immoral with respect to future generations over the next 500 million years who will no longer have this energy available, but burning these hydrocarbons at the present rate we are doing so is leading to an increase in the concentration of CO<sub>2</sub> in our common atmosphere that is causing a heat unbalance, extreme weather and long term climate change that is not in the direction of goodness.

Let's tell the Interior Department, particularly the Bureau of Land Management, to tell the public there will no more "Mine-ing." All "Mine-ing" is hereafter replaced by "Our-Owing/Returning." There will be no mineral rights issued to allow the extraction of any finite mineral (and all minerals are finite because we live on a finite planet) unless the extraction company agrees to require that every buyer provide evidence that every atom of the precious mineral they are "Our-Owing" will be Returned/Recycled. Why? For a planet to be sustainable for 500 million years, every atom of precious metals and other rare materials must be recycled 100%. If there is any consumption whatsoever, meaning any loss at all, then future generations at some point will not have that resource available for their enrichment. Every child in Kindergarten knows that if you borrow a book you have to return it – you don't burn it when you are through using it, you don't bury it in a landfill, you don't dump it into the ocean – you recycle it completely – not just some of the pages, but the whole book.

And it gets ever more complicated when we start to consider our cousins within our planet's interdependent web of Life

I am reminded of my visit to an Idaho salmon hatchery, whose public displays praised the glories of salmon hatcheries, indicating what a wonderful job they are doing in protecting our resources. Yes, perhaps they are doing a good job, but their displays should instead tell visitors how unfortunate and desperate it is that hatcheries need to exist at all, and that they are last-ditch efforts at recovering the resources that our control-of-nature mentality has destroyed. They should be teaching that hatcheries will only be a success when they can be dismantled because of healthy runs of native fishes. Such honesty and revisionist thinking is long overdue in many of our resource agencies.

I realize that the public makes extraordinary, conflicting, and unrealistic demands on resource managers, but that is no reason to comply **to these unsustainable demands**; the public and political leaders are generally ignorant of the ecological realities surrounding resource issues. **There are still living and making choices within a framework/worldview of infinite resources.** Rather than accede to unrealistic demands based on ignorance, it is up to resource experts trained in the natural laws of ecology and evolution to inform, rather than conform to fantasy. We would not let the public guide medical professionals in the best way to perform a surgery, nor would we tell our auto mechanics how to fix a transmission. Yet, the public, largely through untrained political and business leaders with self-rewarding personal agendas **and a lack of knowledge about (and acceptance of) the Real World**, tells resource managers how to manage nature.

In closing, there is a saying that goes "unless we change direction we might just get where we're going." This is a sobering thought relative to resource conservation and sustainability. Directions in resource agencies must change, as must basic human value systems, if real sustainability is to be achieved. Directions must change by rejecting the artificial notion of the traditional "real (human created) world" of resource management, and accepting the realistic world of natural laws of ecology and evolution, **The Real World**. Nothing short of 3.8 billion years of the history of Life is at stake.

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