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Reconciliation Ecology in the Anthropocene

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Call for Papers

Readers are encouraged to take up one of the insights or questions spurred by the following invitation essay and its endnotes, or maybe a related one that was not yet mentioned, and draft an article (typically about 5,000–8,000 words) that contributes to the conversation. This can be sent as an attachment to David Clements at clements@twu.ca. An abstract should be included in the text of both the email and the essay. The best essays will go on to peer review, with the potential for publication in a theme issue of *Perspectives on Science and Christian Faith*, or independently in a variety issue of *PSCF*.

The lead editorial in the December 2021 issue of *PSCF* outlines what the journal looks for in the articles we publish. For best consideration for inclusion in the theme issue, manuscripts should be received electronically before January 31, 2025.

Looking forward to learning from your contributions,

James C. Peterson, *Editor-in-Chief*

Ten years ago Gordon College ecologist Dorothy Boorse called for submissions to Perspectives on Science and Christian Faith in recognition of the many new findings in environmental science.¹ This ever-increasing knowledge of the environment, while, simultaneously, environmental change is occurring as part of the “Great Acceleration,” was said to alert humanity that the new Anthropocene age is upon us.² A decade on from Boorse’s invitation, I likewise invite Christian scholars to encourage believers to put Christian faith into action in the face of Anthropocene-level challenges and with the promise of reconciliation ecology.

Keywords: reconciliation ecology, call for papers, Anthropocene, restoration ecology, Indigenous values, United Nations, decade of restoration, creation care, Colossians

Although some may doubt the ability of humankind to influence global processes such as climate, much evidence has been assembled to show that human influence on our planet is so overwhelming as to have ushered in a “scene change.” Many now argue we are no longer in the Holocene period, but have entered a new geological age best termed the Anthropocene.³ The Anthropocene is the name given to the period that began when human activity became the dominant influence on climate and the environment. Dutch meteorologist Paul Crutzen, credited with popularizing the term, said,

It’s a pity we’re still officially living in an age called the Holocene. The Anthropocene—human dominance of biological, chemical, and geological processes on Earth—is already an undeniable reality.⁴

How does God call us to respond to environmental changes arising due to such sweeping levels of human influence on creation? In Colossians 1:19–20, the apostle Paul points to the reconciling work of Christ in creation:

For God was pleased to have all his fullness dwell in him, and through him to reconcile to himself all things, whether things on earth or things in heaven, by making peace through his blood, shed on the cross.

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Call for Papers

Reconciliation Ecology in the Anthropocene

It is also evident from Romans 8:19–21 that we, as God’s redeemed image bearers, are not merely spectators but rather are clearly part of the process:

For the creation waits in eager expectation for the children of God to be revealed. For the creation was subjected to frustration, not by its own choice, but by the will of the one who subjected it, in hope that the creation itself will be liberated from its bondage to decay and brought into the freedom and glory of the children of God.

Restoration ecology is a discipline that attempts to navigate the difficult interface between ecological science and ethics, where the goalposts are sometimes hard to see clearly. Yet the game is on, as the United Nations has declared the current decade (2021–2030) as the United Nations Decade on Ecosystem Restoration.⁵ The stated purpose of this initiative is to “prevent, halt and reverse the degradation of ecosystems on every continent and in every ocean.”⁶ As the goalposts come into greater focus at this critical time, combining restoration ecology with the reconciling work of Christ promises to provide a clearer vision of humanity’s goals for healing and restoration amidst the onslaught of environmental problems we face in the Anthropocene.

A New Epoch: Is the Anthropocene for Real?

Geological periods are designated according to major shifts in the Earth’s system, often tied to climate shifts as read in the geology. For example, the beginning of the era of the dinosaurs occurred as the climate went from “icehouse” conditions in the late Paleozoic to “greenhouse” conditions in the Mesozoic.⁷ The next major transition is probably the best known, with evidence showing that the sudden extinction of the dinosaurs was precipitated by a meteor approximately 10 km in diameter striking the Gulf of Mexico leaving a distinct geological signature, although other factors were involved in the extinction itself.⁸ The Mesozoic era was followed by the Cenozoic era, the era we are currently still in, but the question has become, if we properly divide the Cenozoic into epochs, should it include a newly emerging epoch, the Anthropocene?⁹ The Pleistocene epoch was characterized by a series of ice ages. The Holocene epoch is said to begin 11,700 years bp (before present), as defined by a sharp boundary in the Greenland ice core marked by a spike in deuterium, also corresponding to the end of the last ice

age.¹⁰ Can a similar geological signature be identified to mark the beginning of the Anthropocene?

Not all major human changes to Earth’s environment qualify as a change to a new *geologic* epoch, something that must be evaluated in rock strata.¹¹ The international organization charged with naming these periods is the International Commission on Stratigraphy.¹² The commission sets the boundaries by identifying Global Boundary Stratotype Sections and Points (GSSPs).¹³

As of October 2021, there were 12 candidate GSSP sites scattered around the globe, including Crawford Lake, located near Milton, Ontario (fig. 1).¹⁴ At a news conference in Berlin, July 11, 2023, the Anthropocene Working Group announced that Crawford Lake was chosen to be the golden spike of the new epoch—the Anthropocene.¹⁵

Why Crawford Lake? Part of the reason is that Crawford Lake is unusually deep for its size. Less than 300m wide at its widest, it reaches 24m in depth. Whereas most lakes experience mixing of lower layers with upper layers, with the lake extending that deep, it is termed meromictic, meaning that the bottom layers do not mix with the upper layers. According to lake researcher Francine McCarthy, the bottom of the lake is “completely isolated from the rest of the planet, except for what gently sinks to the bottom and accumulates in sediment.”¹⁶ Furthermore, the lake is nestled in limestone, and white annual layers form as calcium carbonate crystals precipitate, allowing organic particles such as pollen and microorganisms to be read from these layers that form a varved sediment (layers with contrasting colors).¹⁷ This is known as varved succession, whereby “varve couplets of organic matter capped by calcite precipitated each summer in alkaline surface waters reflect environmental change at global to local scales.”¹⁸ This allows many different indicators of importance to be read from the sediments, including biotic indicators such as diatoms or pollen, or inorganic geochemical signals, and the ability to capture information at various scales, namely, local, regional, and global.¹⁹

Climate scientists have embraced the Anthropocene as reinforcing their observations and predictions of atmospheric changes on a massive scale, hitherto unprecedented over the ages of human civilization. Still, it is fair to ask, is the Anthropocene for real?

Key related questions are the following:

1. Is the magnitude of change comparable to transitions between previous geological epochs?
2. Are the changes associated with the Anthropocene manifested in a multitude of ways? and
3. Can these changes be pinned on us?

One phenomenon that has been helpful in trying to define the Anthropocene is the “Great Acceleration,” a term first used at a workshop in 2005 as participants poured over figures produced under the International Geosphere-Biosphere Programme showing dramatic increases in many indicators of human influence on the Earth’s system since 1950.²⁰ These indicators point to 1950 as a starting point for the Anthropocene, and also coincide with distinct

changes observed in the layers of Crawford Lake at the same point in time.

Major drivers of the Great Acceleration since 1950 include global human energy consumption, global productivity (as measured in GDP), and global population (fig. 2).²¹ Because these drivers have increased at an accelerated rate since 1950, there are many other measurable indices to indicate the sheer magnitude of the impact humanity has had on the planet. The accelerated CO₂ emissions, now at 17.5X 1900 levels, along with an accompanying increased energy production largely via fossil fuels, have fortunately resulted in only 1.4X as much atmospheric CO₂ as in 1900; yet this 1.4X increase still has dire consequences as discussed below. (It is only thanks to a massive increase in the net land²² and the ocean carbon sinks²³ that the rate of atmospheric CO₂ increase has been relatively low.) Furthermore, huge



Figure 1. One of the field trips at the 2023 ASA/CSCA Annual Meeting in Toronto, Ontario, led by Bob Geddes (third from the left) visited Crawford Lake, Ontario. This lake was nominated by the international Anthropocene Working Group as the Global Boundary Stratotype Sections and Points to mark the beginning of the Anthropocene Epoch. The unique characteristics of the lake allow scientists to see recent Earth’s system changes in the varved annual layers formed in the lake bottom. Photo by Vicki Best.

Call for Papers

Reconciliation Ecology in the Anthropocene

increases in production of commodities such as copper and steel create impacts on unprecedented scales (fig. 2).

Even considering the production of a single commodity, cement, the acceleration is mind boggling. In 1900, annual cement production was 5 Mt (Megatonnes). It rose to 130 Mt in 1950 and then increased 32-fold from that point to reach 4180 Mt in 2015, representing an 836-fold increase from 1900.²⁴ The growth of the concrete jungle that humans are erecting across the planet has many implications for planetary health. These include increased CO₂ emissions both from cement production and from energy required to mine it, along with the many harmful results of the immense structures (e.g., many large dams as highlighted in fig. 2) that are built from this annual production of 4180 Mt of the material.²⁵ Cement production is also indicative of the staggering impact of *acceleration* in many such indicators—the amount of cement produced in the previous decade (2010–2019) exceeded the amount produced in the entire twentieth century.²⁶

Resource exploitation has accelerated along with increasing human population and wealth since 1950,

as indicated by fossil fuel consumption (and by association production), plastic production, and steel production among many other resources tapped to an ever-increasing degree.²⁷ By 2015, plastic production had increased to 315 Mt annually, up from 2 Mt in 1950. A large portion of this plastic must also be disposed of each year, with a lot of it in the “single use” plastics category. Plastic inevitably accumulates in unwanted places, such as in the massive North Pacific Garbage Patch which covers 1.6 million square km and weighs about 100,000 t.²⁸

Many other indicators of the Great Acceleration show up in the sediments at the bottom of Crawford Lake. Nuclear bomb testing showed up as a spike in plutonium in the lake bottom from 1950 to 1968. Fortunately, the acceleration of radioactive material leveled off in the 1980s, corresponding to reduced global nuclear testing.²⁹ A sharp rise in fossil fuel consumption also begins in the 1950s, as indicated by the increasing number of spheroidal carbon particles (SCPs) in the lake sediment layers. Many of the indicators are best evaluated by looking at the siliceous organisms (diatoms and relatives) identified in the varve layers in the lake bottom; these can be used to track the increasing levels of radioactivity,

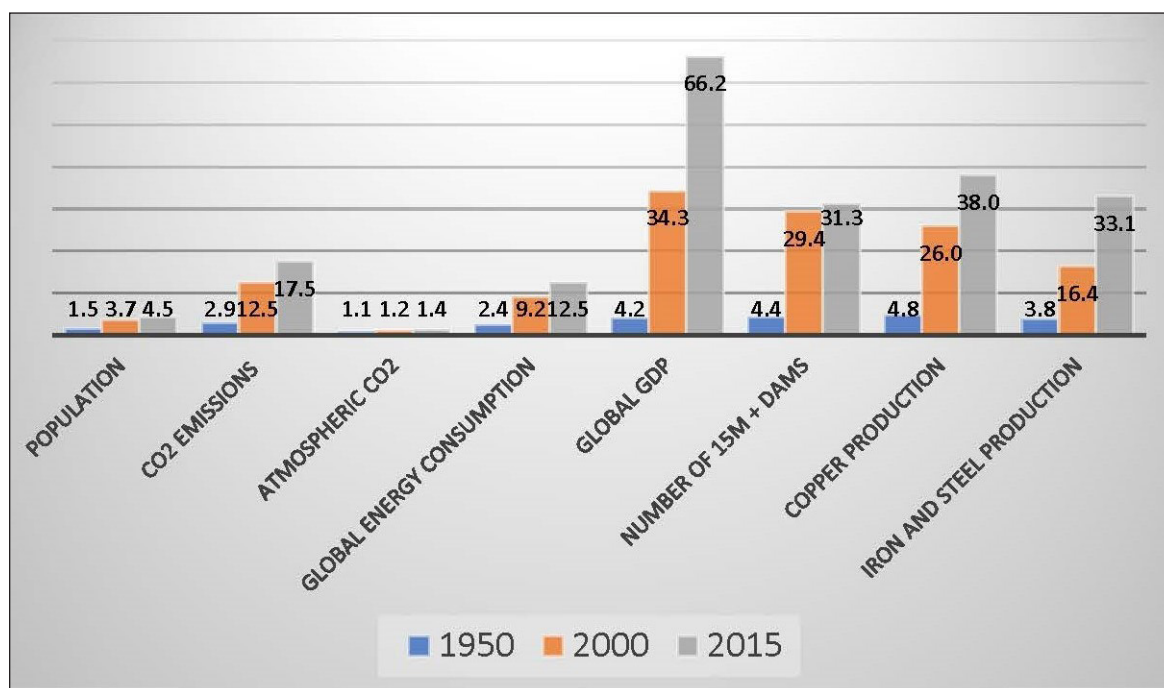


Figure 2. Increases in various indicators of the “great acceleration” from 1900 according to the factor by which the parameter increased compared to 1900; e.g., the global human population in 1950 was 1.5 times the population in 1900, then 3.7 times the 1900 population in 2000, and 4.5 times the 1900 population in 2015. The parameter “15m + dams” signifies dams 15m or more in elevation from the substrate. Data used to create the figure are from Jaia Syvitski et al., “Extraordinary Human Energy Consumption and Resultant Geological Impacts Beginning Around 1950 CE Initiated the Proposed Anthropocene Epoch,” *Communications Earth & Environment* 1, no. 1 (2020): 32, <http://dx.doi.org/10.1038/s43247-020-00029-y>.

SCPs, and another notable substance, $\delta^{15}\text{N}$, with the latter tied to local steel production not far from the Crawford Lake site.³⁰

Despite the efforts by geologists to try to establish the beginning of the Anthropocene epoch as 1950, it seems for now that there will be no official geological Anthropocene epoch. On March 4, 2024, the International Union of Geological Sciences (IUGS) voted against the proposed epoch, and there is apparently no way of appealing the decision.³¹ Outside an official geological designation, it is clear the concept will live on, given the multitude of indicators showing that the earth's ecology has changed.³²

The consequences of staggering increases in the production of concrete, energy, and other commodities are measured via the climate impacts of rising atmospheric CO_2 . Current levels of atmospheric CO_2 exceed 400 ppm, when pre-industrial levels were never higher than 300 ppm.³³ When global average temperature trends are plotted alongside these rising CO_2 levels, the picture that emerges is that post-1950, the global temperature barely dips below the long-term average (1850–2019),³⁴ and continues upward on average from the 1970s, with the world seeing the warmest years ever recorded post-2010, including 2023 as the warmest year ever recorded.³⁵

An optimist might believe that lowering CO_2 levels would reverse climate change trends, making the Anthropocene merely a blip, rather than a genuine geological epoch. Alas, the way the Earth's system works, the ocean possesses a great deal of momentum, and the recent high levels of CO_2 absorbed by the ocean will be released back to the atmosphere for some time. Likewise, glacial melt and sea-level rise create a great deal of inertia.³⁶

With the accelerated rise in global temperatures comes an acceleration in extreme weather events, as we have witnessed since 1950. Climate models predict increases in both the frequency and intensity of extreme climate events such as heat waves, downpours, hurricanes, flooding, and wildfires, which is exactly what we have been seeing in the news over the past few years.³⁷ Data from reputable agencies such as NOAA (National Oceanic and Atmospheric Administration) and other agencies accurately validate the increasing trend in these extreme events.³⁸

As well as the severe and often terrifying consequences of the extreme storm events for humanity,

there is also the "perfect storm" of runaway species extinction levels associated with the Anthropocene.³⁹ Anthropogenic forces combining to create this perfect storm of biodiversity loss include climate change, habitat loss, pollution, invasive species, and over-exploitation, placing the current extinction rate as approaching that of the five great past extinctions events.⁴⁰ It is argued that the Anthropocene extinction has not yet reached the same level of these previous mass extinctions, but this does not excuse us from sounding the alarm.⁴¹

The case for the reality of the Anthropocene epoch is predicated on the assumption that the various indicators of the abrupt disjunction are evidence that humans have caused planetary change. However, many Christians, and evangelical Christians in particular, have resisted this notion. In evangelical Christian circles, particularly in the United States, these conflicting views have sometimes stymied efforts to support attempts to reduce our human carbon footprint. The hesitancy for some evangelical Christians to accept humanity's role in the climate crisis is well represented by the 2005 Cornwall Declaration on Environmental Stewardship, which includes the statement: "Some unfounded or undue concerns include fears of destructive man-made global warming, overpopulation, and rampant species loss."⁴² In his critique of the Cornwall Declaration, Thomas Ackerman, Executive Director of the Joint Institute for the Study of the Atmosphere and Ocean at the University of Washington summarizes the position of the statement's authors as arguing that

- (1) recent and foreseeable climate change are largely natural in cause rather than the result of human activity,
- (2) climate change over this century will be moderate rather than catastrophic,
- (3) increased CO_2 will be good for plants and thereby help feed the world,
- (4) current plans such as Kyoto protocol would not produce significant mitigation, and
- (5) such efforts would seriously hurt the world's poor.⁴³

In addition to concerns over the position taken by the Cornwall Declaration and many other Christian organizations,⁴⁴ there are concerns by other Christian groups that Christian environmental stewardship does not go far enough, given the serious crisis the advent of the Anthropocene represents. Many have argued that "stewardship," as used to describe Christian care of the environment, while useful, is not a strong enough term, and that indeed the

Call for Papers

Reconciliation Ecology in the Anthropocene

Cornwall Declaration is a statement on “environmental stewardship.” Calvin University’s David Warners, Michael Ryskamp, and Randall Van Dragt have argued that a better paradigm is “Reconciliation Ecology,” because this term acknowledges the gravely serious environmental problems on an accelerating timescale related to our sinful nature as human beings struggling to care for the gift God gives us in his magnificent creation.⁴⁵ Should we not repent from what we have done to bring on the Anthropocene epoch, and does the hope of reconciliation not provide a powerful motivator for action to try to mitigate the dangerous consequences of a runaway Earth’s system?

Holding It All Together: Reconciliation of All Things

Regardless of whether one is convinced that we ought to name a new epoch called the Anthropocene, the specter of the demise of God’s good creation is profoundly disheartening. The creation is deeply wounded and so are we, who, as caretakers of the Lord’s irreplaceable living art collection can but weep over the losses in many cases where there seems to be no hope of restoration to its former glory. If one believes Rembrandt to be a gifted creator of art, to see his works of art damaged or even stolen is a travesty for a follower of the great artist.⁴⁶ Likewise, this is what God’s worshippers should be experiencing at this point when God’s creation is being despoiled and plundered more than ever before.

Pick your favorite corner of creation and ponder the wasteful plunder of God’s canvases. Whole paintings lost, left out in the rain so the colors run together and become an amorphous gray, stepped on, ripped, broken up with axes and chainsaws, and worse, until even the memory of what once was, is largely lost.

I think of the Hawaiian Islands, and in particular the portrait painted by *Islands in a Far Sea*, in which Culliney documents how the original “paradise” was broken down piece by piece, story by sad story.⁴⁷ So often the tragic irony of human brash arrogance is repeated in these stories, as what was intended for good, works evil against the provisions in creation. There was no attempt to try to understand the uniqueness of these island ecosystems or to ask the native Hawaiians about it in the headlong rush to transform the land—first for agriculture, later for urbanization, and finally for tourism. The Hawaiian

Islands that tourists began flocking to in increasing numbers from the 1950s onward were already radically altered by a series of unfortunate events that had taken place since Captain Cook first “discovered” the Hawaiian Islands in 1779, particularly as a result of the introduction of invasive species.⁴⁸ Even before then, the Hawaiian Islands were drastically altered by the arrival of the Polynesians. These strikingly unique island ecosystems, the most isolated archipelago in the world, had thrived without human presence for millions of years prior to the relatively recent arrival of Polynesians, likely between 1000 and 1200 AD.⁴⁹ The Hawaiian story of habitat destruction, occurring over at least three separate waves, illustrates the general challenge of trying to focus in on 1950 as the definitive starting point for the Anthropocene. Island systems such as these represent only a tiny fraction of the earth’s surface, but they contain a disproportionately large species complement, a myriad of voices singing of God’s creativity. Many of these songs relatively few people have had the privilege of hearing before the voices were forever silenced by some version of human thoughtlessness and greed.

The somber story of loss in the Hawaiian Islands has been repeated the world over. The world in a very real sense is an island, a rare room within a gallery that one naturally enters, feeling a hush of awestruck wonder, perhaps projecting from the immanence of the Artist himself, because this is the exhibit where the precious miracle of life dwells on a miracle planet. And yet the lights that used to shine on the paintings have dimmed, or is it the paintings themselves that have been darkened and fallen into shadow? It is a dark canvas, regardless. This is hard. Still, it is against the backdrop of this dark canvas that our hope for a better future must shine as we strive to bear the weight and responsibility of the creator’s image.

As we stand in the middle of this groaning creation, we pick up the text from Colossians and read a vision for reconciliation which is somehow more than a vision because it is actively taking place as narrated in these cosmic verses. It is not lamenting the losses or pining for what could have been. The text is not troubled by the dark storms that have passed over many places on the earth, such as the Hawaiian Islands, and that continue to batter creation, often literally battering the land and sea in the form of extreme storms. Yet the sovereign Lord who inspired

Colossians is aware of these dark storms. The Lord stands up in a boat in these raging storms and commands the wind and waves to be still (Matt. 8:23–27).

Who is this Jesus, the disciples ask, that even the wind and the waves obey him? In Colossians 1:15, Paul lays it out clearly: “The Son is the image of the invisible God, the firstborn over all creation.” True, humans also were created in God’s image (Gen. 1:27), but as the firstborn over all creation, there is more that Jesus represents, as we read in Colossians 1:16, “For in him all things were created: things in heaven and on earth, visible and invisible, whether thrones or powers or rulers or authorities; all things have been created through him and for him.” Although we bemoan the losses of many Hawaiian bird species (among many other losses!), these ultimately were not created for us but for Jesus. So at least Jesus saw that these lost life forms were good, and he reveled in them. That is all well and good, but are we not pulling everything apart in our human rebellion, abusing the very framework of creation on Earth, discovering it to be more fragile than we might imagine?

Here it gets hopeful, in that the dark clouds are pulled aside to reveal that the sun yet shines. For in the next verse, we see Jesus holding together everything we are trying to pull apart in our avarice and ignorance. “He is before all things, and in him all things hold together” (Col. 1:17). If Jesus is holding everything together, where do we fit in? In the next verse, we are reminded that we are in fact his body, and if we acknowledge his headship, things look much better than if we ignore it. “And he is the head of the body, the church; he is the beginning and the firstborn from among the dead, so that in everything he might have the supremacy” (v.18). Here the church is not a building, or a loose connection of affiliated people wandering in different directions, but image-bearers of the creator following the supreme image-bearer.

Reconciliation can happen. It does happen. It has happened. It will happen. There is power in the blood. “For God was pleased to have all his fullness dwell in him, and through him to reconcile to himself all things, whether things on earth or things in heaven, by making peace through his blood, shed on the cross” (Col. 1:19–20). It is clearly a 3-way reconciliation among God, humanity, and nature, and it is not just a tenuous reconciliation, it is a peace-making reconciliation through the cross, which brings peace to all for all time. In the meantime, of course, there

is much to work out at a practical level, and we are not free from the cries of desperation from nearly all corners of creation. Still, this is a more solid hope than any of us could imagine from what we know of the science of environmental degradation. At the same time, it also represents a call to action, because reconciliation is at least a two-way street, and, in this case, a three-way street as we work out how to connect better to God and nature, and, in turn, God and nature are connecting with us, often in powerful and unexpected ways.

This three-way reconciliation does not have to be too complicated. As climate scientist Katharine Hayhoe has said,

For Christians, doing something about climate change is about living out our faith—caring for those who need help, our neighbors here at home or on the other side of the world, and taking responsibility for this planet that God created and entrusted to us.⁵⁰

As I previously referenced about a decade ago, Warners, Ryskamp, and Van Dragt argued that reconciliation ecology provided a “new paradigm for advancing creation care.”⁵¹ They carefully explained how this new paradigm was distinguished from Christian environmental stewardship. Their model of reconciliation ecology is characterized by the following five steps:

1. Recognize the wrong we have done,
2. Lament personal complicity,
3. Minimize further harm and work to fix the wrong that was done,
4. Accept forgiveness, and
5. Move forward in a new relationship marked by mutual flourishing.⁵²

Just as reconciliation requires a reckoning with one’s sinfulness and complicity in allowing bad things to happen, reconciliation ecology requires us to call our harm of the creation, sin. Pope Francis is clearly not hesitant to do so and calls upon all Christians to do the same.⁵³ By comparison to environmental stewardship, the power inherent in the reconciliation ecology paradigm lies in its requirement of a humble confession of wrongdoing against creation.

Warners and colleagues point out that reconciliation ecology does a much better job than Christian environmental stewardship of emphasizing the relational

Call for Papers

Reconciliation Ecology in the Anthropocene

aspects of caring for the earth. Furthermore, such an approach is consonant with Indigenous worldviews that emphasize strong and vibrant relationships among people, animals, and the rest of creation. As Robin Kimmerer writes in *Braiding Sweetgrass*:

Joanna Macy [philosopher of ecology] writes that until we can grieve for our planet we cannot love it—grieving is a sign of spiritual health. But it is not enough to weep for our lost landscapes; we have to put our hands in the earth to make ourselves whole again. Even a wounded world is feeding us. Even a wounded world holds us, giving us moments of wonder and joy. I choose joy over despair.⁵⁴

The Indigenous approach to creation care enforces and reinforces deep long-term connections between people and land. Kimmerer also writes:

It was through her actions of reciprocity, the give and take with the land, that the original immigrant became indigenous. For all of us, becoming indigenous to a place means living as if your children's future mattered, to take care of the land as if our lives, both material and spiritual, depended on it.⁵⁵

Such a relational viewpoint stands to provide helpful insights, coming alongside Western approaches to restoration ecology which often struggle in the pursuit to restore lands and oceans, locked within too rigid a scientific framework.

Restoration Ecology, Values, and Land Healing

A number of fields take the science of ecology and apply it in practical ways, including sustainable agriculture, forestry, range management, invasive species ecology, conservation biology, ecosystem health, and many others. For my purposes here, I will restrict my commentary to one such field, restoration ecology. However, many of the problems I will summarize apply to other disciplines within applied ecology.

The science of restoration ecology is ever fraught with the challenge of “restore to what?” Because ecosystems are complex, often without clear stable states, restoration ecologists are often challenged to come up with the ideal species composition. Value judgments are often necessary to decide what the restored ecosystem ought to look like.⁵⁶ Much of the debate among restoration ecologists is on how best to set goals.⁵⁷ If the goal is strictly to restore an ecosystem from the past, such a restoration may be difficult

or impossible (e.g., because the species composition of the area and/or some aspect of functional ecology has changed). However, if efforts are directed at producing an ecosystem that is sustainable into the future, such restoration efforts are more likely to succeed.⁵⁸

Because these goal-setting efforts acknowledge value judgments, there has been much discussion on how to incorporate them, and on the importance of acknowledging that even “impartial” scientists, developing restoration plans, come with their own biases, as do the human communities advocating for restoration. What about religious values? German conservation biologist Joern Fischer and colleagues point to the need for social-ecological systems thinking, acknowledging “the moral responsibility of taking care of the environment, advocating a stewardship ethic.”⁵⁹ They acknowledge that such a view has been criticized because of its religious roots, but they maintain that stewardship should be placed in a “broader perspective” where stewardship consists of an “ethic of caring about all living things while recognizing their interconnectedness.”⁶⁰

Pope Francis in his *Laudato Si'—On Care for Our Common Home*, released June 18, 2015, similarly argued for an “integral ecology”—a holistic approach to earth stewardship.⁶¹ *Laudato Si'* was widely endorsed by both scientific organizations such as the Ecological Society of America, and religious organizations such as the National Religious Partnership for the Environment in the U.S., as a promising response to the planetary environmental crisis we face.⁶² The Pope warned against narrow or short-term technical approaches that ignore the larger underlying fundamental concepts, especially our God-given calling and motivation:

Any technical solution which science claims to offer will be powerless to solve the serious problems of our world if humanity loses its compass, if we lose sight of the great motivations which make it possible for us to live in harmony, to make sacrifices and to treat others well.⁶³

Osage Nation theologian George Tinker argues that we ignore Indigenous perspectives on the relationship between humans and creation at our peril:

Like the varieties of species in the world, each culture has a contribution to make for the sustainability of the whole. Given the reality of eco-devastation threatening all of life today, the

survival of American Indian cultures and cultural values may make the difference for the survival and sustainability for all the earth as we know it. What I have suggested implicitly is that American Indian peoples may have something of value—something corrective to Western values and the modern world system—to offer the world. The loss of these gifts, the loss of the particularity of these peoples, today threatens the survivability of us all.⁶⁴

Another Native American theologian, Richard Twiss, identifies the critical difference between Western and native cultures that must be resolved about land:

To the Native, the land is sacred, given by Wakan Tanka or the Creator, to be cared for and loved. They perceive a balanced relationship between humanity and the environment, a partnership of equality and respect. Native culture has an existential assumption that land is God-created, hence sacred, while Western culture views land like time, as a natural resource/commodity. Issues of identity, belonging, “place” relationships, providence, etc., are all issues of land. The West has commodified land as a natural resource, moving it out of the realm of the sacred to the “secular” world of matter. Incorporating a consideration of land into the redemption equation has never figured into the evangelistic Gospel endeavors of the West.⁶⁵

As Kimmerer advocates in *Braiding Sweetgrass*:

We need acts of restoration, not only for polluted waters and degraded lands, but also for our relationship to the world. We need to restore honor to the way we live, so that when we walk through the world we don't have to avert our eyes with shame, so that we can hold our heads up high and receive the respectful acknowledgment of the rest of the earth's beings.⁶⁶

This focus on relationality points to some fundamental difficulties with the term “restoration” because the latter can be seen as technical progress toward some target ecosystem state, without expressly involving people. Indigenous scholar Jennifer Grenz advocates for “healing the land and the academy” through re-envisioning restoration ecology as healing.⁶⁷ Using healing to describe restoration efforts explicitly incorporates the values that restoration ecologists have been struggling to reckon with, and acknowledges that the area being restored almost always has an Indigenous history, whereby the landscape was shaped by the activities of Indigenous cultures over millennia.⁶⁸ Jennifer Grenz describes this kind of approach as a “medicine wheel for the

planet” that integrates knowledge and wisdom of elders—seeing the world with fresh eyes, letting go of colonial narratives, and re-envisioning the role of western science in the process.⁶⁹ The medicine wheel illustrates the worldviews of many Indigenous Peoples, and is composed of a circle with four quadrants representing various important sets, such as the four directions (north, south, east west), the four seasons, and the four aspects of being (mental, physical, emotional, spiritual), in an interconnected way.⁷⁰

It is clear that, unlike the narrowly technical approaches frequently taken within western science, values are integral to Indigenous ways of land healing, and spiritual elements are not merely add-ons. The need for more holistic approaches to setting goals for restoration is evident in a highly ambitious project now underway: the United Nations Decade on Ecosystem Restoration.

The United Nations Decade on Ecosystem Restoration

The United Nations Decade on Ecosystem Restoration strives to “prevent, halt and reverse the degradation of ecosystems on every continent and in every ocean.”⁷¹ Fischer and colleagues advocate that social-ecological systems thinking is needed to accomplish such lofty goals.⁷² They acknowledge that the prospect of including human social and well-being considerations in the pictures has brought many new challenges to restorations. Ultimately, ecosystem restoration is seen to improve the state of the planet, both through social and environmental benefits, but there are many questions around what counts as a good result in every way. Furthermore, in the midst of rapid climate change, climate trajectories make it much more difficult for restoration planning.⁷³ Another key element requiring complex restoration decisions at an unprecedented scale is the continued rise of invasive species, which is, in fact, spurred on by climate change.⁷⁴ Thus, in restoring the planet's ecosystems, we need to decide when to accept that certain nonnative species are actually beneficial in restoration because, in many situations, there may be no other choice.⁷⁵

As Fischer and colleagues assert, social and cultural factors are already becoming part of restoring ecosystems, so we should embrace the complex challenges; in tackling the United Nations initiative, we should welcome these opportunities to make restoration a

Call for Papers

Reconciliation Ecology in the Anthropocene

more truly multidisciplinary endeavor.⁷⁶ Since 2001, the Ecological Society of America has included a Traditional Ecological Knowledge section that has sought to foster such initiatives.⁷⁷ In speaking to this need for multiple perspectives, Jake Robinson and colleagues press for the need for Indigenous perspectives as integral to the United Nations 2021–2030 initiative.⁷⁸ In particular, they highlight the value of traditional ecological knowledge of Indigenous Peoples, and their right to “maintain, protect, and control their culture and ecological knowledge” according to Article 31 of the UN Declaration on the Rights of Indigenous Peoples.⁷⁹ If we can but think about the UN goal of planetary restoration more as healing, and work actively with those possessing working knowledge of the ecosystems, and see the ecosystems as cultural landscapes, both the landscapes and the peoples will benefit.

As *Laudato Si'* advocates, faith perspectives are important voices for planetary stewardship values on the international stage. The United Nations Faith for Earth program raises up such voices, as encapsulated as part of the vision statement of the Parliament of the World's Religions which states: “The Earth and all life are cherished, protected, healed, and restored. All people commit to living out their highest values and aspirations.”⁸⁰ A world-wide awakening of faith groups advocating values-based approaches to caring for creation in the last several decades was highlighted by Gregory Hitzhusen and Mary Evelyn Tucker, who argued,

Mobilizing religious believers to contribute to responsible stewardship of the Earth requires a critical appreciation of the complexity of religious traditions and the ways that religious communities view nature, as well as the cultural and spiritual resources that religious teachings provide in confronting change and human suffering.⁸¹

None of this is easy, and as other commentators have pointed out, “we have a long way to go if we want to realize the promise of the Decade on Ecosystem Restoration.”⁸² Still, others more optimistically have said, “The Decade on Ecosystem Restoration is an impetus to get it right.”⁸³

The Promise of Reconciliation Ecology

What does reconciliation ecology offer in the context of Christian faith? As I discussed previously, a decade ago, Warners and colleagues proposed that

reconciliation ecology offered a far more robust model for creation care than stewardship. They argued that “the stewardship concept does not sufficiently emphasize our embedded, dependent relationship with the creation.”⁸⁴ It is likewise clear from Indigenous perspectives that acknowledging the long-term relationship of peoples to place is pivotal to understanding how to heal a wounded planet. This kind of perspective does not see humans as separate from creation but as an integral part of it, as active agents working to make the world a better place. Could this mean future ecosystems configured in new ways, different from those in the past, and envisaged by those who see “novel ecosystems” as a way forward amid widespread ecosystem alteration by invasive species, climate change, urbanization, and other drivers?⁸⁵

David Warners and Matthew Heun edited *Beyond Stewardship* in 2019 in which a number of authors took on the challenge of answering the question, if not stewardship, then what is the best way of expressing the biblical mandate for caring for the earth?⁸⁶ There are many creative ways in which Christians have expressed the deep-seated need to honor our creator by caring for his creation, often expressing beliefs in powerful and sacrificial actions. To me an organization that embodies reconciliation ecology through sacrificial actions is A Rocha, an international Christian creation care organization founded by Peter and Miranda Harris. In his book *Under the Bright Wings*, commemorating the early days of the first A Rocha project in Portugal in the 1980s, Peter Harris describes the holistic mission and vision A Rocha has taken on:

Mission is the whole gospel because the gospel has never been just words about salvation. God did not send a voice from heaven or a letter, he sent Jesus. In his life was the message that we are cut off from God, and in his death and resurrection is the possibility of forgiveness, reconciliation and new life. In order for that message to have meaning or content to those who hear it, his disciples must live that life in the power of the Holy Spirit, and so mission will encompass the whole of human experience.⁸⁷

Today A Rocha centers all over the world follow this overarching mission, and often focus on very particular places or organisms. For example, where I live in Langley, British Columbia, there are roads where migrations of baby Western toads reach epic proportions, numbering in the tens of thousands.

A Rocha Canada, led by Conservation Science Director Christy Juteau, argued that a local road should be closed temporarily to allow the toadlets to cross safely.⁸⁸ A Langley Township counselor suggested that putting signs up warning motorists of the migration should be good enough, to which Juteau emphatically responded “no!” Her actual response was: “Not really, because if you’re in a car, and the toadlets are covering the road, you just wouldn’t have a chance to miss them. So, they may be aware, but they’ll just listen to them squishing underneath them.” The toad situation is one of the many crossroads we are at in our current society where, if no one stands in the road to say “no!” nonhuman life forms will be run over by progress.

A Rocha is not the only expression of reconciliation ecology by any means, and there is need for a better assessment of the value of such an approach. Why is the reconciliation ecology approach unique? Why might it be an invaluable answer to the quandary of incorporating values into restoration? How might such an approach motivate a more sacrificial caring ethic in the Christian community than we have seen in recent creation care movements? As described in this essay, the needs of creation are more pressing than ever amid the ominous weight of a new age we now call the Anthropocene. Can we include in our collective wisdom and response, insights from Indigenous Peoples, as native theologian George Tinker admonishes us to?⁸⁹

Merely understanding creation theology and ecological science is not enough to save the planet from our destructive human tendencies. Biblical wisdom requires redemptive action to heal the numerous rifts between God, humanity, and creation. Redemption and reconciliation are difficult by definition and we instinctively avoid these, just as we avoid hard conversations about potentially thorny issues such as climate change. Yet we have the strong voice of evangelical Christian and climate scientist Katharine Hayhoe admonishing us to “talk about it” as she declares:

The bottom line is this. To care about climate change, you only need to be one thing, and that’s a person living on planet Earth who wants a better future. Chances are, you’re already that person—and so is everyone else you know.⁹⁰

I look forward to seeing the collective wisdom that emerges through contributions to the upcoming

special issue of *Perspectives on Science and Christian Faith* on Reconciliation Ecology in the Anthropocene.

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But the proposal still needed an exemplar, a single geologic deposit that best captures the changes, just as a layer of iridium between two clays in a Moroccan cliffside left

Call for Papers

Reconciliation Ecology in the Anthropocene

- by the dinosaur-killing asteroid strike marks the end of the Cretaceous period 66 million years ago." (Voosen, "Anthropocene's Emblem May Be Canadian Pond," *Science* 381, no. 6654 [2023]: 114, <https://www.science.org/doi/epdf/10.1126/science.adj7016>)
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Call for Papers

Reconciliation Ecology in the Anthropocene

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