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Ecological Ethics

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Ecological Ethics

Jame Schaefer

Challenged to determine the efficacy of Christian theology for addressing human-induced problems that are imperilling species, ecosystems, and the biosphere of Earth, theologians have been responding in a variety of ways for several decades. Some theologians have corrected uninformed interpretations of the Bible. Some have identified anthropocentric attitudes in the Bible and the Christian theological tradition that compromise promising expressions of faith and render Christianity ambiguous. Some have retrieved expressions of faith that appear promising but reflect a pre-scientific understanding of the world, probed these expressions philosophically and semantically for their meaning, and informed them with our current scientific understanding of the world. From these reformulations, theologians have discerned directions for moral behaviour that constitute 'ecological ethics'. Among the most prominent in theological discourse that are explored in this entry are the sacramentality, goodness, beauty, integrity, and giftedness of creation, the kinship of creatures, virtuous living, and loving God's creation. Each yields ethical imperatives for action and requires particularizing to address ecological concerns.

Keywords: Ecology, Creation, Ecosystem, Biosphere, Anthropocentrism, Expressions of faith, Ethical imperative, Orthopraxis, Theology and science

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1 Introduction

Can Christian theology be responsive to ecological problems that are imperilling Earth – the accelerated rate of species extinction, forced changes in the global climate, polluted land and water, wetlands filled for commercial and industrial development, clear-cut forests, mined mountaintops, ploughed grasslands, over-fished waters, bleached coral reefs, islands of plastics in the oceans, increasing amounts of radioactive waste requiring isolation from the biosphere, and vast volumes of relatively benign wastes from affluent societies? Can Christian theology be responsive to the adverse effects these problems are having on human health and wellbeing, especially on vulnerable people today who are least able to protect themselves and on future people who are threatened with inheriting a life-impooverished planet? Is Christianity guilty of causing these problems when underscoring the preeminent role of the human person who, as *'imago Dei'* (in the 'image of God'), is intended 'to subdue' and 'to have dominion' (Gen 1:28) over other species and systems of Earth as warrants for trampling, dominating, and exploiting them?

Theologians have been addressing these questions in various ways. Some have responded to charges against Christianity for promoting anthropocentric attitudes that have caused ecological crises and threaten the biosphere of Earth. Some have found ambiguity in the Bible and in Christian theological traditions for addressing the plight of endangered species and the degradation of ecological systems (ecosystems). Some have identified, reflected upon, and worked with traditions that appear promising for addressing ecological problems when informed by current scientific findings about the world. Examples of each are provided in this entry, with focus on efforts to retrieve and reformulate expressions of faith that motivate action.

Essential to note when reading this entry is the use of 'ecological' instead of 'environmental'. Whereas the latter has been used widely for several decades as a category for thinking about how humans should relate to other species and systems, using 'ecological' (*eco*, Greek for 'house'; *logi*, Greek for 'study of') underscores the position of humans as integral constituents of ecosystems and the encompassing biosphere. All living and inanimate entities within these systems are mutually affected by actions, conditions, and circumstances in the past, occurring in the present, and predicted with varying degrees of certainty to occur in the future.

2 Responses to charges against Christianity

In a speech delivered at a meeting sponsored by the American Association for the Advancement of Science, a prominent historian of medieval technology charged Christianity with bearing 'a huge burden of guilt' for fostering anthropocentric attitudes that have prompted the destruction of species' habitats, the disruption of ecosystems'

functioning, and the degradation of the biosphere (White 1967: 1206). The concerned historian conflated the two stories of creation in the book of Genesis, substituted 'dominance' for 'dominion', and disparaged the characterization of the human creature as an *imago Dei* whose body was constructed with clay but who is 'not simply part of nature' and is willed by God to 'exploit nature for his proper ends' (White 1967: 1205). Because science and technology are 'so tintured with orthodox Christian arrogance toward nature that no solution for our ecologic crisis can be expected from them alone', the historian insisted, the remedy must also be 'essentially religious'. The remedy to which the historian pointed is the 'profoundly religious, but heretical, sense of the primitive Franciscans for the spiritual autonomy of all parts of nature' and proposed naming Francis of Assisi (c. #181–1226) as 'a patron saint for ecologists' (White 1967: 1207).

Theologians responded vigorously and variously, initiating attention to the ecological crisis that has continued to the present day. Drawing upon biblical scholars' meticulous exegetical efforts to understand the meaning of the story of creation in Genesis 1 within the contexts of the sixth to the fifth centuries BCE (Anderson 1977; Clifford 1985), theologians have underscored the combination of 'dominion' and 'subdue' as conveying human responsibility to God for taking over and maintaining God's orderly and highly valued creation as the Judahites returned from captivity in the kingdom of Babylon and reclaimed the land they believed God had promised to their ancestors (Hall 1986). This basic understanding of human responsibility to God for how humans should function within God's creation is also conveyed in the Genesis 2 creation story when the ancient Israelites were developing their agricultural economy and intended to cultivate and care for the 'garden' (Gen 2:15). Centuries of theologians have underscored the concept of 'dominion' as limited by God's expectations that humans are intended to use their intellectual abilities to make informed decisions, whereas God's dominion is absolute (e.g., *Summa Theologica* 2-2.66.1; Aquinas 1981: 1470). Domination, exploitation, degradation, and destruction are contrary to God-given directives (Clifford 1994; 2000). Humans are responsible to God for functioning sustainably within God's creation (e.g., Granberg-Michaelson 1988), and, as explained below, restraint in using other animate and inanimate creations was a primary ethical imperative throughout the patristic and medieval periods (third to fifteenth centuries CE).

Cognisant of biblical scholars' examinations of the stories of creation and explicit references to imaging God in the Bible, some theologians have concluded that human creatures are intended to *image* God (Peterson 2016; Middleton 2005) by valuing, caring for, and conserving God's creation in ways that facilitate its internal flourishing while God actively sustains its existence. This understanding of the God-creation-human relationship prevails in the Christian theological tradition wherein humans are expected to function responsibly in relation to one another, other species, and inanimate constituents of God's creation during their temporal lives while hoping for eternal life in God's presence. To

emphasize this responsibility from a soteriological perspective, some theologians have reflected on biblical depictions of the entire creation's 'groaning' for Christians to conform to the image of God (Southgate 2008).

Current theologians have been identifying other models of the human that may be meaningful for Christians and motivational for demonstrating human value of and care for God's creation. One is thinking about the human as a *steward* of Earth who cares humbly and responsibly for other species and ecosystems (Hiebert 2000). The Catholic bishops in the United States embraced this model and added the exemplar of the human as a *co-creator* to emphasize human ingenuity and participation in the ongoing development of the world (USCC 1992). Concerned that 'co-creator' may be misconstrued as conveying equivalency with God the Creator, a Lutheran theologian proffered the *created co-creator* model (Hefner 2000; 2001). Additional models surface below when discussing expressions of faith in the Christian tradition that have been retrieved from texts by eminent theologians during pre-scientific periods, informed by the current scientific understanding of the world, and probed for ethical imperatives to guide action. This bridging of faith and practice (orthopraxis) is particularly important for systematic theologians who focus on examining doctrines for their meanings that should motivate actions.

3 Ambiguity in the Bible and Christian theology

Consulting the Bible and perusing the works of eminent Christian theologians prior to the scientific revolution (sixteenth to seventeenth centuries) for directions on how to relate responsibly to other species, ecosystems, and Earth has proven problematic. Though theologians have discovered some promising expressions of faith that situate humans as creatures among other types of creatures in an orderly creation, their efficacy for addressing ecological crises is compromised when emphasizing the spiritual nature and quest of humans that place them apart from and above other species and abiota (air, land, and water). Bifurcating and anthropocentric attitudes discovered in the Christian theological tradition have prompted some theologians to lament this ambiguity (Santmire 1985) and to chart other approaches. Among them is dismissing the Bible and the Christian theological tradition and developing a nature spirituality that is informed by evolutionary biology (Goodenough 1998; Sideris 2003).

4 Working with Christian theological traditions: foundations and ethical imperatives

Some theologians have found expressions of faith in biblically grounded theological traditions that appear promising for addressing the ecological crisis and have examined them to discern their meanings in the historical contexts that prompted their writing and their authors' understandings of the world. Among the expressions that have been

explored are the sacramentality, goodness, beauty, integrity, and giftedness of the creation, the kinship of creatures, living virtuously, and loving God's creation. All are found in the works of Christian theologians during the patristic to medieval periods.

Though meaningful for their writers' times, current theologians recognize that these expressions of faith were generated from pre-scientific understandings of the world. Retrieving them for application today requires caution and careful reconstruction to ensure their relevance when recognizing our current scientific understanding of the world: the universe developed from infinitesimal to increasingly expansive sizes over a period of approximately fourteen billion years; elements essential for organic bodies were manufactured in the furnaces of stars; many species within Earth evolved from microorganisms over vast and sometimes sporadic periods of time; biota and abiota interacted to produce diverse ecosystems in states of flux; and the future of Earth, the solar system, and the universe cannot be predicted with accuracy. Retrieving faith-based expressions from early theologies of creation for application today also requires recognizing Earth as a community of multiple and varied biota and abiota that are related, interdependent, mutually affected by random occurrences, and constrained by physical laws. Furthermore, retrieving these expressions of faith requires acknowledging *Homo sapiens* as having emerged relatively recently within the evolutionary process from and with other species (Haught 2012: 2), the human connectedness with everything living and inanimate within Earth, and the dependence of humans on other species and abiota for human health and well-being – physically, socially, and economically.

Cognisant of these scientific findings, theologians during the twentieth and twenty-first centuries have explored faith-based expressions in texts written by eminent Christian theologians prior to the scientific revolution to discern their meaning, examined these texts semantically and philosophically for insight on using them today, and, where necessary, reformulated them to cohere with our current scientific understanding of the world. From these reformulations, theologians have discerned behavioural trajectories that are helpful for addressing ongoing ecological crises and threats to the life-supportive capacity of Earth.

4.1 The sacramentality of creation and ethical imperative to venerate

The belief that the faithful can experience God's presence in the physical world and discern some attributes of God through the world permeates the Bible. Eminent Christian theologians reflected on biblical texts during the patristic and medieval periods and early scientists reflected on their discoveries to express a shared faith that the visible world manifests the invisible God.

4.1.1 God's active presence in the world

Biblical writers recounted the ancient Israelites sensing God's presence to them individually and collectively as a community. God is depicted as calling, listening, and responding to them throughout the Old Testament, self-manifesting through theophanies described in the books of Genesis and Exodus, and speaking to them through prophets who reminded them about their covenantal responsibilities. Jews, Greeks, and Romans who followed Jesus the Christ professed faith in him as the Son of God who taught them how to orient their temporal lives towards eternal happiness in God's kingdom. This interplay between God's presence in the world (immanence) and God's existence beyond the world (transcendence) has inspired theological reflection throughout history.

Many early theologians reflected on God's presence in the world in the contexts of their times and understandings of the world (Schaefer 2009: 65–80). Among them, Clement of Alexandria (c. 150–c. 215) wrote about God as 'always present' and 'touching us' in the world in ways that are 'observant, beneficent, and educative' (*Stromateis* 2.2.5.1–5; Clement 1991: 160). Ephrem the Syrian (c. 306–373) believed that the world is full of symbols of God's presence and, reflecting on prologue to the Gospel of John, expressed his wonder and gratitude for the opportunity to experience God's presence through his eyes, mouth, ears, and nostrils (*Ephrem the Syrian: Hymns* 31.16–17; Ephrem 1989: 401–402). Bernard of Clairvaux (c. 1090–1153) found the bodily senses indispensable as the initial input for experiencing God's presence and gaining knowledge about God (Bernard 1987: 227–231). John Scotus Eriugena (c. 800–c. 877) described God's presence in creatures through a process of *theosis* (deification) whereby God descends into all things in the hierarchical scheme of creation and manifests through them (*Periphyseon* 3; Eriugena 1987: 249–251). Maximus the Confessor (c. 580–662) reflected on God's active presence in the world as 'divine energies' that create, sustain, and guide the unfolding of all things (*On Difficulties in the Church Fathers* 22; Maximus 2014: 448–451; Theokritoff 2009: 52–64). Hildegard of Bingen (c. 1098–1179) envisioned the enlivening but 'hidden' presence and 'fiery power' of God working in all creatures (*Book of Divine Works* 1.2.8; Hildegard 1987: 10–11). Thomas Aquinas (1225–1274) described God's presence in creatures as innermost, intimate, and immediate (*ST* 1.8.1–3; Aquinas 1981: 34–36) as their primary cause.

After the scientific revolution began, reflection on God's transcendence became more prominent than reflection on God's presence, but meditation on God's presence continued, especially within religious orders. For example, members of the Society of Jesus (the Jesuits) founded by Ignatius of Loyola (1491–1556) dedicated themselves to meditating on God's presence in all things and seeking God in them. Foundational to their training was (and continues to be) Ignatius's *Spiritual Exercises*, a manual of detailed directions for a thirty-day retreat that each Jesuit endeavours to make annually. The fourth week

culminates in a contemplation wherein the retreatant meditates on God's dwelling, working, and labouring in all living and inanimate creatures (Ignatius 1991: 176–177).

4.1.2 Learning about God through the 'Book of Nature'

Inspired by the Wisdom of Solomon chapter 13 and Romans chapter 1, early theologians reflected on three major attributes of God – power, wisdom, and goodness – which they believed can be recognized when studying the world. This 'book of nature' was readily available for everyone to 'read', whereas the 'book of scripture' could not be read by some people but could be heard when listening to clergy preach. Augustine of Hippo (354–430) believed that the Blessed Trinity can be recognized by the faithful when contemplating the world (*The Trinity* 2.15.25, 6.10.12; Augustine 1963: 81–82, 214). Influenced by his reflections, medievalists Hugh of St Victor (c. 1096–1141) and Bonaventure of Bagnoregio (1221–1274) detailed how God's power, wisdom, and goodness can be discovered in all living and inanimate creatures as manifestations of God the Father, God the Son, and God the Holy Spirit. These theologians expressed their awe and gratitude to God for self-revealing through the variety of creatures and urged their readers to study the physical world to know about God (Hugh 1996; Bonaventure 1978b). Aquinas considered the interaction of all animate and inanimate creatures according to their natures as God intended to be most revelatory of God's goodness and wisdom (*ST* 1.47.1–2; Aquinas 1981: 245–47). When studying the world, Gregory Palamas (1296–1359) found in the visible creation 'indirect knowledge' of God's power, wisdom, and providential care (Palamas 1983: 59–61).

Leaders of Christian denominations were also inspired by biblical texts and theological reflections on the sacramentality of creation. Reformer John Calvin (1509–1564) believed that investigating God's creation should compel admiration and praise for God's wisdom, power, goodness, and providence, arouse worship of God, and enliven hope for eternal life (*Institutes of the Christian Religion* 1.5; Calvin 1960: 96–111). John Ray (1627–1705), the Puritan minister who catalogued England's flora and fauna in the seventeenth century, identified God's power and wisdom in the details and relationships of the physical world's diverse components (Ray 1717). Cardinal John Henry Newman (1801–1890) insisted that the entire visible world is a sacrament and symbol of the invisible world that are joined together in the incarnation of God as Jesus the Christ (Newman 1903: 28). William Temple (1881–1944), the Archbishop of Canterbury, titled his prestigious 1932–34 Gifford Lectures 'The Sacramental Universe' and exclaimed that the whole universe is an expression of God's will and a means by which God is known (Temple 1949: 479). Arthur Peacocke (1924–2006), the Honorary Canon of Christ Church Cathedral, Anglican priest, theologian, and biochemist, reflected on the sacramentality of the natural world that he studied from a scientifically informed perspective (Peacocke 1975). Patriarch Bartholomew likened Earth to an 'icon' (a symbol) of the Creator (Bartholomew 2012j: 204–205) and urged Christians

to strive to achieve this 'sacramental vision of creation' (Bartholomew 2010), a sense of wonder about nature as 'a book [...] to savor and celebrate' (Bartholomew 2012a: 143), and 'seeing all things in God, and God in all things' (Bartholomew 2012e: 203).

Aware of and building upon earlier theological discourses about the sacramentality of God's creation, recent theologians have moved from reflection to action informed by current natural and social science findings. Believing that the entire universe is 'infused with the visionary, loving, creative, and active power' of God the Spirit should prompt Christians to participate in the work of the Spirit by caring compassionately for Earth, members of the biotic community, and members of the human community who are suffering and by participating in 'concrete efforts to restore and conserve ecosystems' (Hart 2006: xviii). Cultivating this sacramental vision of God's creation requires recognizing that more than the human self or species is at stake, expanding the notion of the common good to include other species and abiota, and identifying means for safeguarding and promoting the 'universal common good' politically and economically (Himes and Himes 1990). How to live in a sacramental world informed by evolutionary biology and ecology has been described from a Franciscan perspective with Jesus the Christ as the centre and goal within which all things are unified and 'brought to destiny with God' (Delio 2003: 46). Steps for training sacramental sensibilities have been delineated to facilitate readiness for venerating other species and systems (Schaefer 2009: 86–89).

Reflecting today on the sacramentality of the universe informed by current scientific knowledge, theologians encourage thinking about God as having made all things possible through cosmological to biological evolutionary processes, actively sustaining the entirety as it develops, and intending all to flourish. God's power can be recognized as voluntarily self-limited through the freedom given to the universe to evolve at its own pace in expanding place and extending time. God's goodness can be recognized through the seemingly endless potentialities with which God has endowed matter and energy to develop without divine interference. God's wisdom can be recognized through the physical laws within which chance occurs as the universe grows in increasing diversity and complexity (Schaefer 2009: 81–82).

New attributes of God can be discerned when theological discourse is informed by contemporary science: *empowering* the self-development of the universe while serving as its constant invigorating ground; *freedom-giving* by allowing the universe to produce diverse entities without dictation or coercion; *generous* by supporting the possibility of a plethora of material entities and immaterial forces that can be observed and measured; *caring* by lovingly sustaining the evolution of an internally self-sufficient universe within which entities can function harmoniously for their mutual flourishing; *humble* by allowing diverse beings to interact without divine interference in surprising ways amidst considerable suffering, decay, waste, and death; and *patient* throughout the billions of

years the universe has expanded from an infinitesimal quantity to billions of galaxies out of which at least one planet evolving around a medium-sized, middle-aged star has produced a magnificent array of ecosystems with varied biota that include intelligent beings who can study, reflect on, and respond to God's self-revelation (Schaefer 2009: 81–82).

4.1.3 Ethical imperative to venerate the community of Earth

Reflecting on the sacramentality of God's creation constitutes a way of beholding the sensate world that prompts an ethical imperative to venerate the Earth community of interconnected people, species, ecosystems, and the biosphere because they manifest God's dynamic presence and some aspects of God's character. The more the faithful know about Earth, the more deeply God's presence can be experienced, God's attributes can be recognized, and ways of venerating can be identified and implemented individually and collectively. From this sacramental perspective, the faithful can venerate Earth by: (1) remaining open to sensing the presence of God and discerning divine attributes that are manifested by species, abiota, ecosystems and the encompassing biosphere of Earth; (2) reacting cautiously when other biota threaten the health, domicile, and well-being of humans in order to avoid overreacting and destroying them, thereby diminishing their ability to manifest God's presence and character; (3) committing deeply to preserving the capability of ecosystems and the biosphere to manifest God's presence and empowering character; (4) working diligently with other faithful people in identifying and implementing practices for relating to vulnerable people, species, and abiotic constituents of their ecosystem in ways that protect their ability to reflect God's freedom-giving character; and (5) actively supporting evidence-grounded, faith-motivated efforts to protect ecosystems and Earth so they can reflect God's generous, caring, and humble character. Scholars underscore the need for particularizing these general imperatives to address specific ecological issues by relying on verifiable data, identifying actions that should be taken, and encouraging as well as participating in their implementation.

4.2 The goodness of creation and ethical imperative to value

The creation story in the first chapter of the book of Genesis has stimulated centuries of theological reflection on the goodness of creation. In this story, God is depicted as creating and declaring each type of creature as 'good', and the totality of creation as 'very good'. Other biblical passages have enriched discussions of the goodness of God's creation, including Psalms 103 and 104, Sirach 39:12–35, and 1 Tim 4:4. Also highly important for Christianity is the assumption of creation's goodness in the prologue to the Gospel of John and in Col 1:15–20 wherein the Word of God – Jesus the Christ – has been integral to the world's creation from its beginning and is vital for human redemption.

After early Christians defended and clarified their belief in one uncreated God who created the universe (Athenagoras 1885; Irenaeus 1885) and the Nicene-Constantinopolitan Creed

solidified belief in three persons in one God (Father, Son, and Holy Spirit), theologians wrote more explicitly about the goodness of creation. The context of their teachings and the nuances of their reflections varied: some theologians responded to contemporary heresies; others commented on the Genesis 1 story of creation and God's valuing creatures; and some wove their understanding of the goodness of creation into systematic treatments of God's relation to the world. All shared a faith perspective that is profoundly monotheistic: God is the creator of all natural beings that constitute the universe; each animate and inanimate entity has a God-given nature and purpose in itself and in relation to others that constitute an orderly creation; the entire universe is utterly dependent upon God for its existence; and human creatures are responsible to God for how they function in the world of many different creatures. These theologians also shared a non-evolutionary worldview in which all living and inanimate creatures were created with specific natures and established in an orderly relationship to function as God intended.

Christian theologians writing from this pre-scientific understanding of the world discouraged complaining about any aspect of God's creation. Cyril of Jerusalem (c. 313–386) cautioned against finding fault with the sun, fire, rain, snow, hail, wild beasts, snakes, scorpions, and darkness God created and instead urged wondering about them and trying to understand their purposes within God's awesome creation (Cyril 1984). John Chrysostom (c. 347–407) pointed to the goodness of all creatures, including those that are harmful to humans, and warned against disparaging any as 'arrogant folly' and ingratitude to God (*Homilies on Genesis 1–17* 10.12; Chrysostom 1986: 135–137). Augustine (354–430) observed that humans who are displeased by the natural state or behaviour of creatures and experience discomfort from them are thinking only about themselves and how they are affected personally, whereas they should be recognizing the nature of creatures in themselves 'without regard to our convenience or inconvenience' (*City of God* 12.4; Augustine 1972: 475). From his faith perspective, 'all nature's substances are good, because they exist and therefore have their own mode and kind of being, and, in their fashion, a peace and harmony among themselves [...] in the orderly scheme of nature' that God made and sustains in existence (*City of God* 12.4; Augustine 1972: 476). Augustine lauded the goodness of Earth 'by the height of its mountains, the moderate elevation of its hills, and the evenness of its fields' and the cosmos 'with its own sun, moon, and stars', all of which God created from nothing (*ex nihilo*) (*The Trinity* 8.3.4; Augustine 1963: 247).

Aquinas (1225–1274) emphasized the goodness of all types of creatures in themselves, each of which God endowed with a particular way of existing and a particular way of functioning in relation to other creatures (plants relying upon soil, air, and water, animals relying upon plants, and humans relying upon animals and plants to sustain their physical needs) (*ST* 1.96.1; Aquinas 1981: 486). He described these differences as 'grades of goodness' that are ordered to one another to achieve their temporal common good while God maintains the totality in existence (*Summa contra Gentiles* 3.71.3; Aquinas 1956:

237–242; *ST* 1.47.1–3; Aquinas 1981: 245–248). He explained that God gave humans ‘natural dominion’ over other creatures that humans are intended to use to sustain their bodies while God maintains ‘sovereign dominion’ over all (*ST* 2-2.66.1; Aquinas 1981: 1470).

Current theologians point to parallels between these pre-scientific reflections on the goodness of creation and philosophical discussions about the intrinsic value of animate and inanimate entities apart from their usefulness to humans. Especially significant are retrievals of Aquinas’s thinking by theologians and Christian ethicists who underscore the intrinsic goodness and value of all creatures (Kavanaugh 1997). Valuing creatures intrinsically would require limiting the human use of animals and plants for the necessities of life and directing their use ‘to the good of all humanity’ (Porter 1990: 178). Taking this inclusive approach would also require considering future humans and striving to ensure that all current uses of other species and abiota are compatible with the flourishing of ecosystems and the biosphere of Earth (Scheid 2016).

Bishops who are responsible for promulgating the faith of the Roman Catholic Church (the ‘magisterium’) have also reflected on the goodness of creation. In the *Catechism of the Catholic Church*, the bishops underscored the intrinsic value of other creatures and criticized a distorted human self-centredness (anthropocentrism) that has reduced other species, the air, land, and water to unbridled use and abuse. All must be valued, the bishops urged, because ‘[e]ach creature possesses its own particular goodness and perfection’ (USCC 1994: 339). In the first papal encyclical dedicated to the ecological-social crisis, *Laudato si’ On Care for Our Common Home*, Pope Francis emphasized the intrinsic value of each living and inanimate creature apart from human use and the intrinsic value of ecosystems within which humans, other species, the air, land, and water function (Francis 2015: no. 69, 86, 115, 118, 140). He dedicated a significant section of his encyclical to lamenting and correcting the rampant anthropocentric attitudes that have accelerated the rate of species extinction, degraded and destroyed ecosystems, and threaten the biosphere of Earth (Francis 2015: no. 115–136).

Scientifically informed theologians who reflect on the goodness of the Earth community and the entirety of the universe underscore God’s valuing the self-development of the universe within which Earth emerged approximately 4.5 billion years ago; God’s valuing the evolutionary process within which modern humans emerged from and with other species and systems approximately 250,000 years ago; and God’s valuing species, abiota, and their interactions through which they achieve their common good as ecosystems and the encompassing biosphere of Earth (Schaefer 2005: 805–806). These many diverse species and systems can be recognized as God’s valued and valuable possession both intrinsically (in themselves) and instrumentally (through the interactions of humans, other biota, and abiota that enable their flourishing). People who believe in God can be

understood as discoverers of the value of one another and of other species and systems and as responders to their value out of a desire to share in God's valuation of the past, present, and future.

4.2.1 Ethical imperative to value the community of Earth

'Intrinsic-instrumental valuing' is the basic ethical imperative that emerges when theologians reflect on the goodness of humans, other species and abiota, ecosystems within which they interact, and the biosphere of Earth. When following this imperative, the faithful will be motivated to: (1) value scientific knowledge about the evolution of *Homo sapiens* from and with other species; (2) value the intrinsic goodness of other species and abiota that constitute ecosystems by striving to understand their natures and proscribing human actions that inhibit their functioning; (3) value the instrumental goodness of other species and abiota by recognizing their interdependence, identifying the extent to which humans can use other species and abiota for necessities, and proscribing human overuse and abuse; and (4) value the need for scientific knowledge about ecosystems and the biosphere, promoting research on them, discerning evidence-based decisions that promote their flourishing, and advocating the implementation of these decisions at appropriate levels of governance.

4.3 The beauty of creation and ethical imperative to appreciate

Expressions of delight over the beauty of the God's creation permeate the Bible and prompt the faithful to appreciate other species and systems of Earth. In biblical texts, the beauty of creatures is attributed to God's artistry in making them and God's agency in sustaining their existence (1 Chr 29). The harmonious functioning of creatures in relation to one another reflects God's wisdom (Ps 104; Wis 13) and gives glory to God (Ps 19). From the perspectives of these writers, the beauty of creatures and their functioning harmoniously as God intended should stir the faithful to wonder and to know more about them (Job 37; Ps 145). An appreciation for the beauty of creatures may be assumed in the New Testament from occasional comments by Jesus in the gospels in which he discourages his disciples from worrying about what they will eat and wear and encourages them to have confidence that God will provide for them as God provides for birds and flowers that are dressed in 'splendour' (Luke 12:27).

Early Christian theologians delighted in the beauty of God's creation. Cyril of Jerusalem urged his catechumens to observe 'the spring, and the flowers of every kind in all their likeness still diverse one from another [...] the deepest crimson of the rose, and the purest whiteness of the lily', the 'thickness of knots around reeds', 'golden-tinted clouds', wild beasts, cattle, fish, 'drops of dew', and colourful minerals, all of which God 'the Artificer' made (Cyril 1984: 9). In homilies on Genesis 1, Basil of Caesarea (330–379) glowingly described the beauty of the world and urged his listeners to witness through their senses

the abundance of beauty that is observable in animals, plants, landscapes, and the sky. He lauded 'cornfields waving in the hollows, meadows verdant and abounding with varied flowers, woodland vales in bloom, and mountain peaks shaded over with forest trees' (*Hexaemeron* 2.6–7; Basil 1963: 31–32). When viewing the area in which he chose to live, he expressed delight with the cool and transparent streams, the deep ravine through which a river glided, the whirlpool when the river encountered rocks, and the breezes from the river (Basil 1926: 14: 46–48). He marvelled at the sense perception of sheep and goats that enables them to avoid harmful plants, starlings whose physical makeup allows them to consume hemlock, meadows deep with abundant grass, the fertile earth, the dense woods with their many types of trees, the thick and leafy bushes, and the grapevines heavy with ripening fruit (*Hexaemeron* 5.3–8; Basil 1963: 70–80). He studied the activities of bees when constructing honeycombs, the discipline of cranes in flight, the relationship between storks and crows, the monogamous turtledove, and many other creatures (*Hexaemeron* 8.1–6; Basil 1963: 118–128). He urged his listeners to pay attention to all creatures, to never cease admiring them, and to give glory to God for them (*Hexaemeron* 5.9; Basil 1963: 81).

Though an entire treatise by Augustine of Hippo on the beauty of creation is no longer extant (*Confessions* 4.13.20; Augustine 1960: 106), his works are filled with exclamations of awe, astonishment, delight, and wonder about the world. In *City of God*, he extolled the 'manifold diversity of beauty in sky, earth, and sea', the 'loveliness' of light in the sun, moon, and stars, the 'dark shades of woods, the colour and fragrance of flowers', the 'bright plumage' and songs of 'the multitudinous variety of birds', the 'living creatures of all shapes and sizes' from tiny bees to immense whales (*City of God* 22.24; Augustine 1972: 1075). In *Confessions*, he expressed his appreciation for the beauty of the land, ferocious animals, elements of weather, mountains, trees, cattle, and birds (*Confessions* 7.13.19; Augustine 1960: 173), the agility of a mosquito, and the work of ants (*The Literal Meaning of Genesis* 3.14.22; Augustine 1982: 89–90).

Appreciation for the beauty of creation is evident in 'Description of the Position and Site of the Abbey of Clairvaux' during the twelfth century (Unattributed 1993). Throughout, the author acclaimed the beauty found within the site – the 'stout oak' that salutes the 'height of heaven', the 'subtle branches' of the lime tree, the 'pliant ash', many 'sweet' fruit-bearing trees, the 'chorus of brightly feathered birds that caress' the ears with the 'sweetest melody', the sky that 'smiles serene and clear,' the 'delights of colour, song and scent', the 'kindred river', the 'smiling face of the earth with its many hues', the vast meadow, the 'translucent water', the 'clear air' that enables everything to shine, the 'verdant bank of a pool filled with pure and running water', and the 'sweet spring' that quenched the author's thirst (287–291).

In 'The Three Days of Invisible Light', Hugh of St Victor (c. 1096–1141) marvelled over the crocodile's ability to chew without moving its lower jaw, the salamander's remaining in fire without being harmed, the hedgehog who spikes apples when rolling in them and who 'squeaks like a wagon' when moving, the ant who foresees the upcoming winter and fills its stores with grain, and the spider who weaves a web to capture prey. He appreciated the consistency of the shape, ribs, and teeth of the leaves of a tree and the arrangement of the mulberry and strawberry seeds. He expressed gratitude to God for senses through which to experience 'very sweet and pleasant' aspects of the natural world, and he urged frequent training of the senses to facilitate investigating creatures' characteristics (Hugh 1996).

Some early Christian theologians wrote more abstractly about the beauty of the entire world, attributing its beauty to God's wisdom in having designed all creatures with natures intended to function in harmony with one another. According to Basil of Caesarea, God intentionally designed the universe as a 'mighty' and 'elaborate system' within which all creatures are attracted to one another in 'one fellowship and harmony' (*Hexaemeron* 2.2; Basil 1963: 22–24). For Augustine, each creature contributes to the overall 'splendour' and 'perfection' of God's entire creation (*City of God* 11.22; Augustine 1972: 453–454) that is 'a scheme of ordered beauty' (*City of God* 12.4; Augustine 1972: 475–476). Thomas Aquinas saved his superlatives for the harmonious functioning of all creatures in relation to one another that constitutes 'the most beautiful order given to things by God' (*ST* 1.25.6 Aquinas 1981: 141).

Jesuit theologians have explored the beauty of God's creation in detail and depth. Gerard Manley Hopkins S.J. (1844–1889) wrote about the beauty of God's creation in the poems 'Pied Beauty', 'Spring', and 'Hurrahing the Harvest'. In 'Binsey Poplars' and 'God's Grandeur', Hopkins lamented human failures to appreciate the beauty that God made possible (Hopkins 2018). John Navone S.J. (1930–2016) authored *Toward a Theology of Beauty* with the intention of stimulating other theologians to contribute to a systematic way of thinking about the beauty of God's creation and demonstrating appreciation for Earth's beauty in words and actions (Navone 1996).

Feminist theologians have underscored the importance of developing a way of knowing about others ('attention epistemology') that can foster appreciation for their bodies and a healthful relationship with them. To achieve a 'subject-subject' relationship that could be helpful for preserving plant and other-than-human animals, Sallie McFague (1933–2019) urged 'detailed, careful, concrete attention' to a tree, flower, or bird, and becoming 'transfixed by its beauty' (McFague 1997: 37).

4.3.1 Ethical imperative to appreciate the community of Earth

Theologians' appreciation for the beauty of creatures and the greater beauty of their harmonious functioning can motivate thinking ethically about how people who believe that God made all beauty possible can demonstrate their appreciation for other species, ecosystems, and the encompassing biosphere of Earth. Among the probabilities are: (1) opening to and appreciating the beauty of the smallest to largest animals, plants, water, and land of the ecosystem; (2) paying close attention to and appreciating the details of their beauty and their diversity; (3) striving to understand and appreciate their harmonious interactions and thinking about ways to interact within them that are compatible with their continuing beauty and biological diversity; and (4) becoming alarmed at the human degradation of species' diversity, acting to prevent further degradation, and striving to restore their diversity.

4.4 The integrity of creatures and ethical imperative to cooperate

Another important expression of faith that surfaces in the early Christian theological tradition and illuminates the interrelatedness of all creatures is the integrity of creation. From the opening of the Old Testament to the closing of the New Testament, the writers underscored their belief that God created many diverse creatures and intended them to function in relation to one another according to their natures, thereby ensuring creation's internal flourishing, while God maintains the entirety in existence.

Belief in the relatedness of all creatures is obvious in the Genesis 1 story of creation wherein each type of creature has an indispensable function that God is depicted as valuing and their functioning as a cohesive unity is highly valued. Within this story, humans are created last and charged with responsibility to God for how they function in relation to other creatures. Humans are depicted throughout the book of Psalms within the panorama of living and inanimate creatures (Ps 104) that are wisely arranged by God to function cooperatively (Ps 103). All creatures are depicted as sharing in human rejoicing and sorrows: in Isaiah 35, nature rejoices in Israel's future salvation; in Joel 1:12, the wheat, barley, vines, and trees droop with sadness when Yahweh punishes Judah; in Amos 1:2, shepherds' pastures mourn over the corruption of city life, social injustice, and meaningless ceremonies; and in Jonah 3:7–9, men and beasts repent for the Israelites' evil behaviour. Furthermore, the entirety of creation is affected by human failure to image God (Gen 3–4; Hos 4:1–3) and awaits sharing in the 'new heaven and new earth' (Rom 8:19–23). Key to this anticipated sharing is the belief that all creatures were made through Jesus the Christ, the Word of God, at the beginning the world (John 1), that all things exist for and through Jesus (Heb 2:10), and that all creatures are held together and sustained in existence through Jesus (Col 1:15–20).

Before the scientific revolution, eminent theologians reflected metaphysically for centuries on the integrity of all living and inanimate creatures (Van Till 1996). In homilies on the Genesis 1 story of creation, Basil of Caesarea explained that God knew what the world needed to be able to function in the future. God fully equipped the world accordingly and empowered its cooperative functioning at the beginning of time while maintaining the entirety of existence. According to Basil, the world is a 'mighty' and 'elaborate system' that was brought to 'perfection' through powers God established in the world (*Hexaemeron* 5.6; Basil 1963: 69) to yield 'an unbroken bond of attraction into one fellowship and harmony' (*Hexaemeron* 2.2; Basil 1963: 22–24).

Augustine of Hippo shared Basil's view of the integrity of the world and its ability to function through capabilities given and sustained by God. Focusing on the changeable nature of the universe, Augustine explained that God implanted 'seeds' within the world when creating 'the order of things in the heavens, on the earth, and in the sea' and intended all to function cohesively (*The Trinity* 3.2.7; Augustine 1963: 100). Within this order, material bodies are affected by 'subtler and stronger bodies' to prompt changes within the 'commonwealth of all creation' (*The Trinity* 3.4.9; Augustine 1963: 104). These seeds remain hidden in the material elements, generate when the conditions are suitable, and grow gradually according to rules that God established when creating the world (*The Trinity* 3.8.13; Augustine 1963: 108).

Thomas Aquinas approached the integrity of diverse creatures from a metaphysical perspective. Recognizing the distinctiveness of natural entities from non-living elements to living vegetation, sensible/irrational creatures, and rational creatures, he described them as 'grades of goodness' (SCG 2.44.16; Aquinas 1956: 136) in an 'order of generation' (SCG 3.22.8; Aquinas 1956: 87) with capabilities to be, act, and interact according to their natures. He attributed their unity to God's wisdom in ordering them in relation to one another to achieve their mutual good – their internal cooperative functioning – while God maintains the world's existence (ST 1.47.1–3; Aquinas 1981: 245–248). He lamented that humans do not always use their innate ability to reason, seek good only for themselves, and cause evil to occur in an otherwise orderly creation (ST 1.49.3 ad 5; Aquinas 1981: 256).

Aquinas' thinking about the orderly functioning of all creatures stimulated a prominent Jesuit in the twentieth century to describe the interactivity of diverse living and inanimate creatures as a 'community of creatures' in which humans are integral constituents (Wright 1957: 181). His insights stimulated an exploration of the four ways in which Aquinas thought about creatures' inter-activities (in relation to one another and in relation to God) that parallel the functioning of ecosystems when humans are acknowledged as integral actors who cooperate with other species and abiota (Schaefer 2003: 173–177). As the primary cause of existence, God intends that all creatures cooperate according to their

natures as secondary causes to achieve their shared temporal good – their flourishing. Human creatures use their unique intellectual abilities to cooperate with other species and abiota for their mutual good and seek God’s grace to facilitate making decisions about how to cooperate. Cooperating with others is integral to a theocentric way of life in which the loving and caring attitudes and actions of Jesus the Christ are imaged (Gustafson 1981: 276–278).

Recent studies by evolutionary biologists on the prevalence and importance of cooperation within the evolutionary process have significance for recognizing the need for human cooperation with other species and abiota to facilitate the flourishing of ecosystems and the encompassing biosphere of Earth. Evolutionary biologists recognize ‘natural selection’ as the mechanism through which species compete for limited resources and some have a better chance to thrive, reproduce, and pass on their genes. They also recognize that some ‘selfish replicators’ have forsaken their reproductive potential to help one another and prompt the construction of new levels of organization (e.g., genomes, cells, multicellular organisms, social insects, and human society) over vast periods of time (Nowak 2006). This evidence of cooperation within the evolutionary process has been stimulating research by and discussions among natural and social scientists, mathematicians, economists, philosophers, theologians, and ethicists (Nowak and Coakley 2013). Their efforts to probe the importance of cooperation from their various perspectives are complementary to promoting human cooperation as a faith-based ethical imperative within a system of ecological ethics.

4.4.1 Ethical imperative to cooperate with constituents of Earth’s ecosystems

The degradation and destruction of wetlands, forests, grasslands, coral reefs, and tundra manifest the failure of humans to cooperate with other species and abiota of the ecosystems within which they are interacting. Grounded in faith that God made ecosystems possible and sustained the evolutionary process out of which humans emerged with the ability to cooperate intentionally, following the ethical imperative to cooperate with other living and inanimate constituents of ecosystems is essential for their survival and flourishing. Among ways of following this imperative that need adjusting to a particular ecosystem are: (1) cooperating with other people, species, the air, land, and water that constitute the ecosystem by gaining information about them, recognizing them as interconnected, and acknowledging their contributions to the ecosystem’s functioning; (2) cooperating with constituents of the ecosystem by seeking to live, work, and recreate compatibly with the ecosystem’s flourishing in the present and future, including foregoing human wants; (3) cooperating with other humans to ensure access of vulnerable people to their needs within the ecosystem while ensuring their availability in the future; (4) protecting and conserving the flourishing of the ecosystem by acting locally and at higher levels of governance when necessary; (5) cooperating with God’s grace to facilitate

working with other people, species, and abiota of the ecosystem to achieve and foster its flourishing in the present and future; and (6) confessing and demonstrating penitence for non-cooperative conduct that jeopardizes ecosystem flourishing.

4.5 Creation as God's gift and ethical imperative to receive gratefully

As scientists continue to point to the degradation and destruction of ecosystems and threats to the life-supportive capacity of Earth, Christian leaders have been urging their followers to think deeply and practically about the world as God's gift to be received with gratitude in words and actions. That the world is God-given is assumed from the beginning to the end of the Bible and summarized in the doctrine of creation.

Biblical and theological foundations for thinking about the world as God's gift have been explored in depth by scholars (Schmitz 1982; O'Callaghan 2022). Among the early Christian theologians who reflected on the world as God's gift, Ignatius of Loyola thought poignantly about how his followers should respond. In 'Contemplation to Attain Love', the final reflection of *Spiritual Exercises* that he wrote for members of the Society of Jesus, Ignatius led them in (1) reflecting individually on the gift of the world that God has given to all, and on particular gifts that God has given to each person; (2) considering how God gives existence to the elements, life to plants, sensation to animals, and intelligence to humans; (3) recognizing how God works for each person in the heavens, elements, plants, fruits, cattle, and all things by giving them existence, conserving them, and concurring with their particular activities; and (4) realizing how all these gifts come from God like rays from the sun. Contemplating these gifts should stir 'profound gratitude' and commitments to serve God 'more by deeds than by words' (Ignatius 1991: 176–177).

Pope Francis expounded on the world as God's 'original gift' within which humans are interconnected to all other creatures and urged the faithful to show gratitude to God for them through actions (Francis 2015: no. 5). He encouraged imitating God's 'generosity through self-sacrifice' (no. 220); demonstrating the value of other species and ecosystems for themselves and not exclusively for human use (no. 69, 115, 118, 140); practising self-restraint when encountering and using the goods of Earth (no. 220, 226); respecting the traditional knowledge of Indigenous peoples about caring for the land (no. 146); establishing ecologically protective laws at appropriate levels of governance (no. 38); working for justice for current vulnerable generations and concern for future generations (no. 159, 227); and advancing science and technology to serve others (no. 131). Earth is a 'loving gift' from God, the pope insisted, a gift to be received for all people, to be shared by all people, to benefit all people, and to be preserved and protected by all people for their common good (no. 67, 71, 76, 95, 159).

When serving as the archbishop of Canterbury, Justin Welby called for ‘new hearts’ when thinking about interrelationships and implored Anglicans ‘to receive as gift, with wonder and gratitude, the gift of each other with our differences, the gift of creation, supremely the gift of God’. These gifts constitute ‘the greatest tools to build the greatest hope for the greatest future’ (Welby 2020). Archbishop Winston Halapua taught from his Polynesian context in which islanders are struggling to survive as fossil fuel emissions from materially developed nations are forcing the inundation of salty sea water into low-lying land and freshwater. He explained the islanders’ beliefs that their lives and contexts are ‘precious gifts of creation’ for which they accept ‘responsibility as custodians of the legacy of the past for the sake of the future’ and ‘live out of abundant generosity’ by contributing ‘to each other what is lacking in any situation’. He lamented the ongoing abuse of God’s creation that is epitomized by the islanders’ plights and urged growth in understanding that humans are ‘interconnected with the environment and that the gifts of creation are not to be abused but are to be honoured and shared’ (Halapua 2008: 35–39).

Through the lens of Eastern Orthodox Christianity, Patriarch Bartholomew viewed the world as ‘God’s gift of love to us’ (Bartholomew 2012g: 100), a gift that must be returned with ‘gratitude and love’ (Bartholomew 2010) by protecting it from harm and showing self-restraint when consuming its goods (Bartholomew 2012f: 107). He urged replacing consumption with sacrifice, greed with generosity, and wastefulness with a spirit of sharing, and he implored his followers to cultivate an asceticism of ‘conscious awareness and deeper recognition that humanity is dependent not only on God, but also on the world, and indeed on the food chain, just like every other creature made by God’ (Bartholomew 2012e: 201). Aware of ecological crises throughout the world, Bartholomew lamented the accelerated rate of species extinction, the degradation and destruction of ecosystems, and threats to the biosphere of Earth. He judged them as manifestations of human failure to receive, respect, and respond to God’s gift with gratitude (Bartholomew 2010), and he was the first leader of a world religion to declare these manifestations as ‘sins’ against God (Bartholomew 2009; 2012d: 152; 2012g: 99). From his faith perspective, the ‘thoughtless and abusive treatment of even the smallest material and living creation of God’ constitutes ‘an unforgivable insult to the uncreated God’ (Bartholomew 2012i: 227).

Leaders of several Christian denominations have collaborated in efforts to care for God’s gift of Earth and to express their gratitude in words and actions. One of the most prominent ecumenical efforts is the World Day of Prayer for the Care of Creation that was initiated in 1989 by Patriarch Dimitriou and held annually on the first day of September. In 2015, Pope Francis embraced this day of prayer for Roman Catholics and extended it to a ‘Season of Creation’ to be held from 1 September–4 October (the feast day of Francis of Assisi). The ‘Season of Creation’ is currently concelebrated worldwide with the Anglican Communion, the Lutheran World Federation, and other Christian denominations. This ecumenical spirit

was highly active in 2021 (prior to the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change) when Patriarch Bartholomew, Archbishop Welby, and Pope Francis issued a joint statement in which they underscored the individual and collective responsibility of caring for Earth – a ‘God-given endowment’ that has been abused with catastrophic consequences (Bartholomew, Welby, and Francis 2021).

Professing members of Christian denominations have put their faith into action by caring about and for God’s gifts of Earth’s ecosystems. For example, the Sisters of Charity of New York, Sisters of the Divine Compassion, Maryknoll Sisters, Dominican Sisters of Hope, and Sisters of Our Lady of Christian Doctrine established Religious Organizations Along the River to protect the Hudson River ecosystem as a ‘pure gift’ they are protecting and described their efforts as their ‘gift’ to Earth (Herlinger 2021). The Franciscan Sisters in Iowa and the Benedictine Sisters in Wisconsin have restored grassland and forest ecosystems and invited local people to explore, reflect, and help protect them with gratitude to God (Rowe 2021).

4.5.1 Ethical imperative to receive the community of Earth gratefully

When believing that the world is God’s gift, receiving this gift with deep gratitude emerges as the basic ethical imperative for action. Determining exactly how to express gratitude requires careful consideration of the scientific evidence pertaining to the species and abiota that constitute the ecosystem within which people are functioning. Among the general imperatives that require particularization are: (1) express gratitude to God orally for the gifts of air, land, water, vegetation, and animals when encountering and/or using them and consider expressing gratitude to them as gifts for human health and well-being; (2) express gratitude to God for ecosystems and Earth’s biosphere by functioning within them in ways that facilitate their flourishing; (3) express gratitude to God for other species and abiota by thinking carefully about why and how they should be used, using them appropriately according to their natures for the necessities of life, and conserving them by avoiding their overuse and abuse; (4) express gratitude to God by striving individually and in collaboration with others to ensure the availability of other species and abiota to vulnerable and future humans who need them for their lives; and (5) express gratitude to God by remaining mindful of human accountability for how these gifts are used.

4.6 The kinship of creatures and ethical imperative to live companionably

According to the different stories of creation in Genesis 1 and 2, humans are creatures among many diverse animate and inanimate creatures. All are valued according to their natures, as evidenced in Genesis 1–2 and subsequently in Genesis 6–9, wherein representatives of various types of creatures are saved by Noah as God commanded. Other creatures are also depicted as sharing the curses and joys of the Israelites (Joel

1:12), mourning over corruption in city life and social injustice (Amos 1:2), doing penance when Judah, the southern kingdom, is punished by God for evil deeds (Jonah 3:7–9), rejoicing in anticipation of the future salvation of the ancient Israelites (Isa 35:1–2, 6–10), and groaning in travail for the redemption of the people (Rom 8:19–23).

Stories by and about early Christian desert fathers, Celtic wanderers, and English hermits convey their close relationships with animals whose habitats they shared while seeking intimate and unencumbered relationships with God. Categorized as ‘hagiographies’ (legends of the saints), these stories convey the saints’ attitudes toward and affinity for animals who were often the only living beings with whom they interacted in their otherwise solitary lives (Schaefer 2009: 150–164). The saints protected and fed the animals and demonstrated piety towards them in the fullest medieval sense (loving, affectionate, kind, faithful, compassionate, devoted and, in a sacramental sense, reverential). The saints appreciated and preserved the habitats they shared with animals and valued their reciprocity when they helped the saints with their tasks. They treated animals as their followers, disciples, and companions and used familial language toward them. Stories of animals lamenting for dying and deceased solitaries convey the close affinity they had with the animals in their midst. The blossoming of these attitudes and actions appears in the writings by and about Francis of Assisi (Francis 1982; Bonaventure 1978a; Ashley 1985: 415–423). The term ‘kinship’ best captures the saints’ close and caring relationships with animals in their shared habitats.

Though the saintly desert fathers, Celtic wanderers, English hermits, and Francis of Assisi had affinity for the animals and habitats they shared, they did not have scientific knowledge about them. They did not know that all species and phenomena have a common beginning approximately fourteen billion years ago when elements essential for life were produced in the furnaces of stars and approximately 3.5 billion years ago when life emerged within Earth. Nor did they know how closely related humans are to other species molecularly. When informed by contemporary cosmology and biology, some current theologians have concluded that humans should recognize and demonstrate in their attitudes and actions an even more profound sense of kinship than expressed prior to the scientific revolution.

Theologians who are cognisant of the emergence of humans from and with other species in the evolutionary process have urged Christians to stand beside other species and natural systems as their ‘cherishing brother’ who is ‘God’s creation and bears God’s image’ (Sittler 1954: 372), to recognize that humans exist as creatures among other diverse creatures in a ‘community of creation’, to accept and live their ‘ecological vocation’ (Johnson 2014), and to urge them to practice the presence of God in animals (McDaniel 2006). In the writings by St Francis and his contemporaries, Franciscan scholars have identified attitudes and actions that serve as models for members of his

order (Nothwehr 2002; Delio 2003). They have urged embracing and demonstrating Franciscan piety for all creatures in the fullness of its meaning (Horan 2018) and encouraged situating human behaviour within the context of companionship with other species and abiota in the journey of life (Himes and Himes 1990).

Popes of the Roman Catholic Church have demonstrated Francis of Assisi's influence on their thinking about the ecological crisis. Pope John Paul II designated Francis of Assisi 'the heavenly Patron of those who promote ecology' because 'he offers Christians an example of genuine and deep respect for the integrity of creation' (John Paul 1979). He subsequently issued the first papal statement dedicated to the ecological crisis, proclaiming it a moral responsibility for the faithful to address. In this statement, he pointed to Francis of Assisi as the inspiration for 'keeping alive a sense of 'fraternity' with all those good and beautiful things which Almighty God has created' and reminded Christians of their 'serious obligation to respect and watch over them with care' (John Paul 1989). Pope Francis opened his encyclical, *Laudato si' On Care for Our Common Home*, with a quotation from Francis of Assisi and proceeded in several paragraphs to explain the saint's contributions to thinking about human kinship with other species, ecological integrity, and the sacramentality of Earth (Francis 2015: no. 1, 10–12).

4.6.1 Ethical imperative to live companionably with the constituents of Earth

When recognizing the physical and spiritual relatedness of humans and other species, the imperative to live companionably with them can guide Christians in orienting their behaviour by (1) acknowledging human kinship with other species from and with whom *Homo sapiens* emerged over biological time; (2) cherishing kinship with other species as companions in life and the roles they play in relation to one another in ecosystems of which humans are integral actors; (3) acknowledging with humility and gratitude the radical dependence of humans on one another, other species, and ecosystems within which they function; and (4) assuming with Francis of Assisi and Bonaventure a posture of Franciscan piety towards other creatures by (i) cherishing them for themselves and not simply for their usefulness to humans, (ii) devoting thoughts and actions toward other creatures' interests in surviving and flourishing, (iii) protecting them from human intrusions that prevent them from procuring their needs to flourish, (iv) acting kindly toward them as co-travellers on a shared journey of life who need dedicated space to meet their needs, (v) standing up for them when they are threatened individually and as a species, (vi) showing compassion for their suffering, and (vii) acting generously toward them without interfering in their expressions according to their natures.

4.7 The moral virtues and imperatives to live virtuously

Virtues are positive habits of action that demonstrate a person's character. Though theologians have identified many moral virtues, four are prominent in the Christian

theological tradition: prudence, justice, temperance, and fortitude. Prudence is the habit of making well-informed decisions. Justice is the habit of giving to others what is due to them and ensuring that the necessities of life are available to others. Temperance is the habit of controlling one's desires, including the desire for material goods. Fortitude is the habit of controlling one's fears when encountering obstacles to be prudent, just, and moderate. Moral virtues are distinguishable from intellectual virtues (wisdom, science, art, and understanding) that perfect the power of reason in the person (*ST 1|2.57.1–6*; Aquinas 1981: 827–833) and theological virtues (faith, hope, and love) that are given innately to each person and unite the person to God (*ST 1|2.62.1–4*; Aquinas 1981: 851–853). While the inclination to be moral is innate in each person, Aquinas explained, the moral virtues must be activated in and perfected by the person (*ST 1|2.58.1–3*; Aquinas 1981: 833–835).

These four moral virtues are exemplified throughout the Bible. Acting justly looms large among the prophets of the Old Testament who warned the Israelites about their unjust social behaviour toward the poor, widows, and orphans and urged the wealthy to restrain themselves in accumulating material things (Isa 1–4). Justice is underscored in Psalm 72 as a key virtue of an Israelite king who is entrusted with caring about and for vulnerable people. Prudence is detailed in the deuterocanonical book of Wisdom 7–8 wherein kings are expected to make knowledge-based decisions. Fortitude is exemplified in narratives about men and women who, motivated by their faith in God, hope and confidence in God, and love for God, conducted themselves courageously under difficult circumstances.

The moral virtues are also prominent in the New Testament in which Jesus the Christ is the epitome of virtue. According to the writers of the gospels, the Acts of the Apostles, and the letters by Paul and other missionaries, Jesus demonstrated prudence, justice, moderation, courage, compassion, and many more virtues throughout his ministry, and his followers were urged to image these virtues. Caring about and for poor and vulnerable people are demonstrations of justice that are especially prominent in the Gospel of Luke. The virtue of temperance is underscored in Paul's letters to the members of the fledgling Christian communities he visited, whom he exhorted to avoid encumbering themselves with material goods as they anticipated the imminent return of Jesus. Evangelists Mark, Matthew, Luke, and John appealed to their communities to remain steadfast in following Jesus, despite fear of reprisals that are depicted subsequently in the book of Revelation. Many examples of courageous behaviour by Jesus' disciples are recounted in the Acts of the Apostles and post-biblical literature.

Theologians reflected for centuries on the moral virtues and urged Christians to develop, strengthen, and demonstrate virtuous characteristics in temporal life as they aim for eternal happiness with God. Thomas Aquinas provided a systematic treatment of the moral virtues and their sub-virtues during the thirteenth century that have resonance

today for directing responsible behaviour toward other species, ecosystems, and the encompassing biosphere (Schaefer 2003). Theologians who specialize in ethical behaviour have urged turning to the virtues for effectively addressing climate change and other ecological problems (e.g., Jenkins 2016).

4.7.1 Prudence

According to Aquinas, prudence is the habit of discerning and choosing the most appropriate means for achieving good for oneself that is compatible with the good of others. Prudence is cultivated through a process of seeking information and advice from knowledgeable sources, forming a good judgement, and commanding its implementation (*ST 2-2.47.1–11*; Aquinas 1981: 1383–1390). Implementing an informed decision requires three considerations that have special significance for ecological ethics: foresight, to ensure that the means implemented in the present are appropriate for the future; circumspection, to ensure that a combination of circumstances occurring in the present are compatible with the good sought; and caution, to avoid evil through a firm understanding of good (*ST 2-2.49.6–8*; Aquinas 1981: 1398–1400). Decisions made through this process inform and direct the exercise of other moral virtues. The ecological crisis manifests the failure to make informed decisions at all levels of governance, individually to internationally (Cobb 1994).

The need for prudent decision-making pertaining to the global climate crisis has been underscored by the US Conference of Catholic Bishops. Accepting the consensus findings of many scientists and the conclusions of the United Nations' Intergovernmental Panel on Climate Change as 'a basis for continued research and prudent action', the bishops pointed to the virtue of prudence as 'paramount' for addressing climate change individually, for leading morally good lives, and for discerning and adopting 'courses of action to protect the common good' (USCCB 2001).

4.7.2 Justice

As reports abound about the grave injustices committed against Indigenous and vulnerable people who are least culpable for causing ecological problems, ensuring that ecological decisions meet justice criteria has become increasingly important. Aquinas' explanation of justice is helpful for grappling with these injustices today. As he explained, individuals who have developed the virtue of justice would readily relate to others in prudent ways that are conducive to achieving their temporal common good as they seek their eternal common good in God's presence (*ST 2|2.58.1–2*; Aquinas 1981: 1428–1430). One general and two particular types of justice that Aquinas identified are especially pertinent today: general justice inclines the person to will the temporal common good of the community (*ST 2|2.58.5–6*; Aquinas 1981: 1431–1433); distributive justice inclines the person to ensure that individuals receive proportionate parts of the whole that is due

to them; and communitive justice directs the person to ensure mutually agreeable terms when relating to another person (*ST 2|2.61.1–2*; Aquinas 1981: 1445–1447). Integral to the virtue of justice is the demonstration of mercy that Aquinas connected to the theological virtue of love (*caritate*) and described as a person's 'compassionate heart' and grieving for another person's unhappiness (*ST 2|2.30.1–2*; Aquinas 1981: 1311–1312).

Theologians have been grieving with vulnerable people throughout the world who are suffering from pollutants in the air, on the land, and in the water and the degradation of the ecosystems within which they are striving to function. In a growing collection of 'eco-justice' literature, theologians have reflected on the Christian tradition and emphasized the need for thinking about and acting to correct the inequities that vulnerable people are currently experiencing (intra-generational injustice) and that future people are predicted to experience (inter-generational injustice) (Hessel 1992; Rasmussen 1996). Scientific evidence of the co-suffering of people, other species, and Earth's ecosystems has fuelled theological reflection and appeals for faith-motivated action by Christian churches (Boff 1997; Hessel and Rasmussen 2001). Feminist theologians have emphasized the vital role women can play in addressing ecological injustices (Ruether 1996; Gebara 1999) and human-induced climate change (Koster 2017). Christian ethicists have examined economic structures that are harming vulnerable people and urged restructuring the economy to achieve the common good of all people and all constituents of Earth (Cobb 1994; Finn 2019).

4.7.3 Temperance

The virtue of temperance looms large throughout the Bible and the Christian theological tradition as the characteristic that all Christians should demonstrate during their temporal lives as they hope for eternal happiness in God's presence. Many theologians during the third to fifteenth centuries wrote prescriptively about the need to practice self-restraint when using the goods of creation (Schaefer 2009: 232–234). Among them, John Chrysostom taught that God provides many types of creatures that are essential for sustaining human life and urged the faithful to use them moderately, to avoid luxuries and excesses of any kind, and to fast (*Homilies* 9.11; Chrysostom 1986: 123–124, 135–136). Augustine urged restraint when using 'temporal things' for life's necessities and acting as pilgrims in a foreign land who avoid being distracted by material goods and instead treat them 'as supports' in their quest for eternal life with God (*City of God* 11.22, 19.17; Augustine 1972: 453, 877). He also warned Christians against the inappropriate use of God's creations that are intended to be used according to their natures as both good in themselves and as serving useful purposes in the 'universal commonwealth' (*City of God* 11.22; Augustine 1972: 453). Benedict of Nursia (480–547) stipulated the distribution of goods to the monks solely based on need but instructed abbots to use discretion and compassion when caring for the infirmed (Benedict 2008: Rule 34, 56).

Aquinas explained that the virtue of temperance readily inclines the person to curb irrational desires and passions for material goods that God intends to be used for the necessities of life, whereas taking excessive pleasure in material goods distracts the person from focusing on the ultimate good who is God (*ST 2|2.141.5–6*; Aquinas 1981: 1762–1764). Over-consumption, wastefulness, hoarding, and excessive standards of living would be avoided by persons who practice the virtue of temperance. Possessing or desiring immoderate amounts of material goods would also be avoided by persons who strive to practice the virtues of temperance and justice because, as Aquinas explained, one individual cannot have an abundance of external riches without other individuals lacking them (*ST 2|2.118.1–2*; Aquinas 1981: 1679–1681).

Christian ethicists who are concerned about the vices of over-consumption and overuse of Earth's living and inanimate constituents have explored their adverse effects in depth, have concluded that over-consumers and over-users are degrading their own dignity, their work, their communities, and the economy, and have developed an ethic of consumption that Christians should consider following (Cloutier 2015). Central to overconsumption and overuse of animals, plants, air, land, and waters is the 'pervasive influence of individualism' and how Christians understand themselves individually and collectively in the world in which they are living (Finn 2019: 6).

Among leaders of Christian denominations who have addressed excessive use of material goods, Pope John Paul II recounted the history of thinking about the right to own and consume them. He concluded that this right should be limited by individuals and groups of people because God's gifts are intended for the needs of all people (John Paul 1991: no. 30–31). This principle of the 'universal destination of material goods' has been a frequent topic of discussion and exhortation among prelates of the Christian churches and reflection by theologians (Benedict 2009: no.48; Jenkins 2008).

4.7.4 Fortitude

Frequently referred to as 'courage', the virtue of fortitude inclines individuals to persevere despite impediments and fears that may weaken their efforts to make prudent decisions, to live justly, and to function moderately (*ST 2|2.123.2–3*; Aquinas 1981: 1702–1703). Fortitude strengthens prudence in persons to help them persist in discerning the best ways of relating to other living and inanimate constituents of Earth that ensure their flourishing. Fortitude strengthens justice in persons to persist in seeking the good of others in the present – especially people who are suffering – and others who are threatened with suffering in the future. Fortitude strengthens temperance in the faithful person to persist in using material goods for the necessities of life.

A person who manifests the virtue of fortitude will be cognisant of evidence predicting threats to the degradation and destruction of ecosystems and the life-sustaining capacity

of Earth and will persist in urging actions at individual to international levels of governance that mitigate these threats and prevent others. A person who is courageous will also persist in advocating for close monitoring of hazardous materials out of a realistic fear that they could imperil present and future generations. When challenged and/or disparaged for sharing evidence-based fears about current or future threats to other people, species, ecosystems, or the biosphere of Earth, a courageous person will be fortified by God's grace to persist despite criticisms by others who are seeking their self-interests.

4.7.5 Ethical imperative to live virtuously within the community of Earth

Theological reflection on the major moral virtues yields imperatives for acting today that can help mitigate the degradation of ecosystems and threats to the life-supportive capacity of Earth's biosphere. Among the moral imperatives to live virtuously that need particularizing are: (1) acting prudently by discovering verifiable evidence of problems and ways to address them, deciding the best course of action in light of circumstances in the present and anticipated in the future, and implementing the action while remaining cautious to ensure that the intended outcome is achieved; (2) acting justly to ensure that vulnerable people, species, and ecosystems in the present and anticipated in the future are not adversely affected; (3) acting with self-restraint when interacting with other species and abiota within systems, thinking carefully about why and how they should be used, planning to use them appropriately according to their natures, and limiting their use to what is needed, not what is wanted; and (4) acting courageous individually and collectively with other faithful persons and faith-based organizations by remaining steadfastly prudent, just, and moderate when addressing ecological problems despite impediments that occur.

4.8 Loving God's creation and ethical imperative to love

Faith in God who loves the world and imperatives that humans should love God and one another permeate the Bible. For centuries, Christian theologians have reflected on God's love for the world, human love for one another, and ways in which humans should express their love. Most recently, as the ecological crisis has challenged thinking about human responsibility for relating to other species and systems of Earth, some theologians have reflected on inclusive love as the most effective way of demonstrating love for God and love for one's neighbours near and far, now and into the future.

4.8.1 God's inclusive love

Faith in God's love and care for the world is expressed throughout the Bible. In the Old Testament, explicit exclamations about God's steadfast love appear in Deut 7:9, Isa 54:10, Jer 31:3, Lam 3:22–23, Prov 3:3–4, and Psalms (63:3, 86:15, 136:26, 143:8), and the Israelites are urged in Lev 19:18 to love their neighbours as they love themselves. In the deuterocanonical book of Wisdom, the sage reminded the Jewish diaspora in Alexandria about God's steadfast love and care for their ancestors, God's love for all creatures, and

God's sustaining their existence lovingly (Wis 11:24–26). The New Testament writers underscored God's great and abiding love that is epitomized by the life, ministry, suffering, death, and resurrection of Jesus the Christ and exhorted their readers to love one another as God loves them (John 13:34–35; 15:12–13), their neighbours as themselves (Rom 13:8–10; Mark 12:31; Luke 10:27), and their enemies as well as their friends (Matt 5:43–48; 22:39). Ways in which Christians should love one another in their fledgling community are described poignantly (1 Cor 13:1–13), and all are urged to act accordingly in all aspects of their lives (1 Cor 16:14). Love is considered the greatest of the theological virtues (1 Cor 13:13). God is described as love, and those who love abide in God and God abides in them (1 John 4:16).

Many patristic and medieval theologians reflected on God's love and care for all creatures (Schaefer 2009: 255–66). Though expressed variously, they believed that God lovingly willed all creatures into existence and cares lovingly for them by providing for their needs to sustain themselves while God sustains the entirety in existence. Augustine emphasized God's love for the world as totally gratuitous and God's loving governance of the world by allowing creatures to function according to their natures (*City of God* 7.30; Augustine 1972: 292). Pseudo-Dionysius (c. late 5th–early 6th century) reflected on God's love for all creatures and God's yearning for them, unifying them, and caring for them (*The Complete Works* 4.13–15; Pseudo-Dionysius 1987: 82–83). John Scotus Eriugena (c. 800–c. 877) emphasized the unifying action of God's love as 'a bond and chain by which the totality of all things is bound together in ineffable friendship and indissoluble unity' (*Periphyseon* 1.519b; Eriugena 1987: 117).

Aquinas distinguished two ways in which God loves: the love of desire for each creature to exist and function according to its nature and the love of friendship for rational creatures who need other living and inanimate creatures to sustain themselves during their temporal lives (*ST* 1.20.1–5; Aquinas 1981: 113–117). God offers humans a special kind of loving care in the form of grace through which they can be aided in ordering their wills and actions toward happiness with God (*ST* 1|2.109.2–3; Aquinas 1981: 1124–1126). Moreover, God so loved and cared about the world that God assumed human nature as Jesus the Christ to help humans remedy their tendencies to stray from God's intentions (*ST* 1.20.4; Aquinas 1981: 116–117).

One of the earliest contemporary theologians to address the ecological crisis found in the Genesis 1 declarations of the goodness of all creatures 'the deepest, profoundest meaning [...] that every being is intended and even loved by the Creator' (Pieper 1951: 433). Subsequent theologians explained that love is 'God's mode of creative action' (Cobb 1969: 10), that the world is 'charged' with God's love for 'every entity [...] and the cosmic whole' (Santmire 2000: 56–57), and that 'every sparrow that falls to the ground is loved and held in the living memory of God' (Edwards 2009: 99).

Leaders of Christian denominations have also explored God's love for the world for its meaning and application today. Pope Benedict XVI wrote his first encyclical (*Deus caritas est*) on the inseparable connection between God's love and human love for one's neighbour (Benedict 2005). In a subsequent encyclical (*Caritas in veritate*), he taught that the 'whole world' God brought into existence is 'dear' to him (Benedict 2009: no.9). Archbishop Halapua taught that Polynesian islanders' thinking about God's love as 'world-encompassing, interconnecting', 'life-giving, dynamic and embracing' is analogized meaningfully as *theomoana* – like the ocean that 'unifies and gives life to all' (Halapua 2008: 92). Patriarch Bartholomew taught that the 'very essence' of God is love (Bartholomew 2012b: 44), a love that is 'overflowing' and manifested by the 'creation of a material world of incomprehensible beauty, variety, and expanse' (Bartholomew 2012c: 229).

4.8.2 Human love for God's creation

Early theologians also reflected on why and how humans can and should love God's creation. Augustine attempted an exhaustive list of creations that humans should love – mountains, hills, fields, the salubrious air, good health, and celestial bodies (*The Trinity* 8.3.4; Augustine 1963: 247). Some centred their reflections on loving God's creation primarily on the biblical commandment to love one's neighbour, a love that is exemplified in the life, ministry, suffering, and death of Jesus the Christ. Though humans cannot love other creatures as God loves and wills them into existence, Aquinas explained, humans can love other creatures in two ways: with the *love of friendship* as necessities they wish for their neighbours during their temporal lives and with the *love of desire* for God's honour (ST 1.20.2, 2|2.25.3; Aquinas 1981: 114–115, 1281–1282).

Contemporary theologians have recognized love as central to Christianity and essential for directing Christian living within the Earth community. Loving nature is a Christian responsibility that constitutes the essence of imaging God (Nash 1991). Christians can image God's love by honouring God's valuations of creatures individually and as a totality as depicted in the Genesis 1 story of creation and by mirroring Jesus' inclusive love for all of God's beloved – humans and non-humans (Nash 1996: 108). Christians can also image God's love by drawing on descriptions of Jesus in the New Testament, especially his taking the form of a servant (Phil 2:5–8) as the exemplar of sacrificial service that demonstrates *agape* – the love of desire that Christians should image as their vocation in life (Hall 1986: 183–187). When emulating Jesus' *agape*, Christians recognize that they are creatures among creatures who image God by serving as caretakers of God's creation (Gunton 1991: 60) and by caring especially for suffering creatures (Johnson 2018: 187–194). Christians who follow the ways of love described throughout the Bible and the Christian theological tradition connect intimately to God and the fullness of life, whereas failing to love loses God and diminishes life's fullness (Wirzba 2016).

According to Patriarch Bartholomew, Christian love for God's creation 'stems from our love for the Creator' (Bartholomew 2012b: 44) who 'granted us the whole of creation for our use and enjoyment'. Christians should 'give thanks and glorify God', 'feel a sense of duty to creation', and protect the environment that is 'more proximate' to them (Bartholomew 2012c: 230).

Nevertheless, evidence of failure to love and protect Earth abounds: failure to love other people, other species, ecosystems, and the biosphere; failure to love the most vulnerable humans who have least caused ecological and biospheric problems; and failure to love the next generation and generations into the future. These failures threaten the diminishing capability of Earth to support life, biological diversity, and ecosystem flourishing. Evidence of failure to love inclusively by failing to care about and for God's creation has deeply concerned Christian prelates who have judged the degradation and destruction of ecosystems and threats to the life-supportive capacity of Earth as sinful, thereby distancing perpetrators from God (Bartholomew 2012g; Francis 2015; Welby 2021).

4.8.3 Ethical imperative to love the community of Earth inclusively

As the key motivator for Christian living in the world, love can be demonstrated by loving Earth inclusively for God's honour and glory and for love of one's neighbours in the present and in the future. Christians who are aware of the ongoing manifestations of failures to love will be motivated to image God's love for the world through individual and collective action by: (1) venerating the Earth community of interacting species and abiota that manifest God's active presence and character; (2) valuing the intrinsic-instrumental goodness of other people, species, and abiota that contribute to their common good; (3) appreciating their beauty and diversity by protecting and preserving their harmonious interrelationships; (4) cooperating intelligently with them in ecosystems to ensure their shared flourishing; (5) receiving the gift of creation with deep gratitude and humility; (6) acting companionably with other people and species with special concern for the most vulnerable; and (7) living virtuously in relation to other people, species, and abiota of ecosystems through the development of prudence, justice, temperance, fortitude, compassion, and other moral virtues to achieve happiness in temporal life with the hope for happiness in the presence of God forever.

5 Conclusions

Expressions of faith in the Bible, the Christian theological tradition, contemporary theologians' reflections, and teachings by leaders of Christian denominations provide motivation for acting to address ecological crises and threats to the biosphere of Earth when informed by our current scientific understanding of the world. Among these expressions are: (1) the sacramentality of creation that motivates the veneration of

ecosystems and the encompassing biosphere in which human and other species interact with the air, lands, and waters (abiota); (2) the goodness of creation that motivates valuing species and systems intrinsically and instrumentally; (3) the beauty of creation that motivates appreciating them individually and their harmonious interactions; (4) the integrity of creation that motivates human cooperation with other species and abiota within ecosystems; (5) the giftedness of creation that motivates receiving them with deep gratitude; (6) the kinship of creatures that motivates living companionably with them; (7) the moral virtues that readily incline acting prudently, justly, moderately, courageously, and compassionately towards humans and other species; and (8) loving creation by striving to image God's love for all. Each directive requires particularizing with evidence from pertinent sources, careful discernment to decide the most appropriate actions to address the problem, and implementation at individual and collective levels of governance.

These links of faith and action (orthopraxis) also provide models of human behaviour beyond the models of steward, co-creator, and created co-creator that have been proffered: venerator, valuer, appreciator, co-operator, grateful receiver, companion, virtuoso, and lover. As theologians have concluded from sources in the Christian tradition, God's grace is readily available for embracing, developing, and demonstrating ways of living within Earth that promote human health and well-being, biological diversity, the flourishing of ecosystems, and the integrity of the biosphere within which humans are integral actors.

Attributions

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• Further reading

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