

# Religion and Environment

Willis Jenkins<sup>1</sup> and Christopher Key Chapple<sup>2</sup>

<sup>1</sup>Yale Divinity School, New Haven, Connecticut 06511; email: willis.jenkins@yale.edu

<sup>2</sup>Department of Theological Studies, Loyola Marymount University, Los Angeles, California 90045; email: cchapple@lmu.edu

Annu. Rev. Environ. Resour. 2011. 36:441-63

First published online as a Review in Advance on August 1, 2011

The *Annual Review of Environment and Resources* is online at [environ.annualreviews.org](http://environ.annualreviews.org)

This article's doi:  
10.1146/annurev-environ-042610-103728

Copyright © 2011 by Annual Reviews.  
All rights reserved

1543-5938/11/1121-0441\$20.00

## Keywords

culture, ethics, science and religion, social movements, sustainability

## Abstract

Understanding the interaction of human and environmental systems requires understanding the religious dimensions to the integration of ecology and society. Research on the significance of religion to environmental problems and of ecological ideas to religion has emerged into a robust interdisciplinary field. One sign of its vitality lies in the methodological arguments over how to conceptualize and assess that significance. Another lies in the diversity of research projects, which appear within most religious traditions, from many geographical contexts, and in several different disciplines. This article introduces major approaches to the field and key questions raised, and then briefly assesses recent work in three broad areas of tradition.

## Contents

1. INTRODUCING THE FIELD . . . . .	442
1.1. Ecological Worldviews . . . . .	443
1.2. Religious Environmentalisms . . . . .	443
1.3. Religion and Nature . . . . .	444
1.4. Ecotheology as Doing Religion for the Earth . . . . .	445
1.5. Gender, Nature, and Justice . . . . .	446
1.6. Sustainability as an Interdisciplinary Challenge . . . . .	447
1.7. Religion and the Environmental Sciences . . . . .	448
1.8. Religion as Cultural Ecology . . . . .	448
1.9. Rise of Pluralism and Pragmatism . . . . .	449
2. ASIA AND ASIAN TRADITIONS . . . . .	450
2.1. General Works . . . . .	450
2.2. Religion and Ecology in India . . . . .	451
2.3. Yoga and Ecology . . . . .	451
2.4. Buddhism and Ecology . . . . .	452
2.5. Lifestyle Critiques and the Challenge of Globalization . . . . .	453
3. CHRISTIANITY AND ENVIRONMENT . . . . .	453
4. DEVELOPMENTS IN ABRAHAMIC AND INDIGENOUS TRADITIONS . . . . .	455
4.1. Abrahamic Traditions . . . . .	456
4.2. Indigenous Traditions . . . . .	456
5. TRENDS AND DIRECTIONS . . . . .	457

## 1. INTRODUCING THE FIELD

As ecological problems stimulate critical reflection on relations between society and environment, a lively interdisciplinary literature has emerged examining relations between religion and environment. Within a few decades, scholarship in the area has grown tremendously, working across many traditions and disciplines. It has also generated methodological controversies over how to conceptualize relations between religion and environment, and it has

developed a reflexive criticism on what counts as religion and whose idea of nature, ecology, or environment the relation involves. Those controversies over interpretation indicate a robust field, hosting multiple research programs.

Shared amid the debate is an investigative interest in connections between patterns of environmental thought and practice as well as patterns of religious thought and practice. Environmental studies and religious studies share research phenomena where human interaction with environmental systems is influenced by religious systems and where religious traditions or forms of experience themselves change in relation to changing environments. This section introduces major questions and methods in understanding the overlap by reviewing recently published introductions to the field. Each constructs its own program for integrating religious and environmental studies, with the result that each establishes its own objectives for successful research in the field (1).<sup>1</sup>

The field is usually called “religion and ecology,” although not without controversy. Since 1991, that has been the name of the American Academy of Religion’s program group in the area. Moreover, public notice that a new field was emerging was established by a groundbreaking series of books from Harvard Press, entitled *Religions of the World and Ecology*. The series established a multireligious, interdisciplinary project with 10 books organized by tradition (*Buddhism and Ecology, Christianity and Ecology*, etc.) (2–11). Work on that project continues through the “Forum on Religion and Ecology” and in the journal *Worldviews: Global Religions, Culture, and Ecology* (12).

Scholars have sometimes criticized the Harvard series for how it invites connections of religion and environment and for the objectives it sets for the field. The *Journal for the Study of Religion, Nature, and Culture* curates some of this criticism, and its editorship has preferred “religion and nature” to designate the field,

<sup>1</sup>This section expands literature reviewed in Jenkins, “Religion and Ecology: A Review Essay on the Field” (1).

for reasons we explain below. Others would examine religion and environment within the disciplines of cultural ecology or environmental anthropology, especially for cases where religion seems a misleading category for interpreting traditional ecological knowledge (TEK). This review follows the prevailing convention of “religion and ecology,” while explaining the multiple approaches to the field and the critical questions that attend them. For a device of overview, we introduce each approach with a recently published introduction to the field. It is important to note, however, that these books do not so neatly represent alternative methodological camps for in every case the scholars collaborate with one another, contributing essays to one another’s introductions and cultivating the emergence of a shared field.

### 1.1. Ecological Worldviews

The idea that the nexus of religion and environment deserves critical study and that it could support ongoing academic research was established by the *Religions of the World and Ecology* series. Edited by Tucker & Grim, its 10 books forged the possibility of intelligible conversation around shared objectives among scholars of diverse disciplinary commitments and many incompatible views of religion and of ecology. It did so by combining several powerful theses to make religious traditions at once environmentally significant, ecologically vulnerable, and open to reform. These include the following: (a) that religious worldviews shape environmental behavior; and (b) that a global environmental crisis therefore represents a religious crisis, which, in turn, requires that (c) scholars reexamine religious traditions with the ecological ideas needed to develop more sustainable worldviews.

By conceptualizing religion in terms of an action-shaping worldview and ecology in terms of a crisis between environment and society, Tucker & Grim (2–11) frame a research arena in which religion has high ecological significance yet also requires critical transformation in light of ecological ideas. Religious traditions

are therefore strongly relevant to environmental problems and yet vulnerable to the reforms that addressing those problems seems to require. As we discuss below, subsequent work in the field sometimes questions this strong interpretive role for religious worldviews. Some think it exaggerates the role of religious ideas, appropriates an abstract idea of ecology for religious reform, concentrates too much on world religions, or situates the scholar in an inappropriately activist stance.

Some of those questions and the alternative relations of religion and environment that they anticipate debate the legacy of Thomas Berry. Tucker and Grim were students of Berry, who exerted major influence on the the field of religion and ecology as a historian of the world’s religions who sought to open religions to a new story of the universe. Berry described the task of religion in a cultural transition to an ecozoic era in which humans live in adaptive, animate relation to the living world around them. Tucker and Grim are editors of two recent collections of his essays: *The Sacred Universe: Earth, Spirituality, and Religion in the Twenty-First Century* and *The Christian Future and the Fate of the Earth* (13, 14). These essays describe a deep intellectual vocation in cultivating the connection of religion and ecology: In Berry’s account of cosmological transition into an ecozoic era, it is the scholar’s task to open ideological possibilities for a more sustaining human presence on the planet.

### 1.2. Religious Environmentalisms

Resting the relation of religion and ecology in a commitment to changing worldviews raises an important question: How does the field relate to environmentalist social movements? In three recent works about the field of religion and ecology, Gottlieb (15, 16, 17) answers the question with a definite political commitment, making “religious environmentalism” the central phenomenon of the field. Religious environmentalism could refer to at least three different movements: (a) the environmental actions of religious leaders and communities,

(b) political environmentalism bolstered by religious resources, or (c) the environmental movement interpreted as a religious movement. Tucker's and Grim's (2–12) sense of religion and ecology tends to celebrate the first, noting the wide response to environmental issues from leaders of all the world religions. Outside the field, this greening of religion is sometimes missed, but communities of all sorts—conservative, moderate, and progressive—exhibit significant response to environmental problems (18, 19).

In *A Greener Faith* (15), Gottlieb focuses on that second sense of religious environmentalism: as a “diverse, vibrant, global movement” of ideas and activism that “roots the general environmental message in a spiritual framework” (17, p. 215, p. 231). Here the “ecology” of “religion and ecology” stands for environmentalism, and its “religion” for normative sources that can inspire and mobilize it. Gottlieb's editorship of *The Oxford Handbook of Religion and Ecology* (16) is also oriented to this sense of religious environmentalism, and it serves as a very useful guide to the field from a perspective committed to the task of reform. Its opening section, “Transforming Tradition,” comprises twelve essays, each offering a one-chapter introduction to the way(s) some major religious tradition is responding to global environmental challenges. Contributors here include several editors of other important anthologies in the field, including Kaza & Kraft, editors of *Dharma Rain* (20); Foltz, editor of *Worldviews, Religions, and the Environment* (21); and Grim, editor of *Indigenous Religions and Ecology* (7); as well as Chapple, editor of the journal *Worldviews*. These chapters often describe key features of a tradition in relation to trajectories of environmentalist change within the religion, which makes them lively and accessible to environmental studies students.

Gottlieb thinks that social change shapes the object of religion and ecology, and the final section of the *Handbook* (16) focuses on his sense of religious environmentalism. The relation of religion and environment is thus political, organized toward the emergence of

environmentalism as a social force. That vision also serves as the selection device for Gottlieb's recent four-volume collection of signal essays in the field (17). A sense of cultural crisis connects the power of religion to the politics of ecology.

So powerful is Gottlieb's sense of environmentalism (analogous to responses to the holocaust, he says in *Greener Faith*) that it comes near the third sense of religious environmentalism in which the environmental movement might bear its own unique sense of religiosity. Perhaps environmentalism could stand alone as a kind of religious experience or could overwhelm the religiosity of the inherited traditions with a more powerful or authentic form of experience. Interpreting environmentalism with the categories of religious studies and theology has been explored by Dunlap (22) and Nelson (23).

If environmentalism is its own kind of religious phenomena, says Taylor (24), then the arena of relevant religiosity greatly expands. Consider why people may be drawn to a nature-based religious experience in an era of sustainability crises, and the future of the great traditions seems in doubt (24). More importantly, looking for the religious dimensions of everyday environmental practices and popular affinities for nature may illuminate relations of religion and environment left hidden by a focus on the global traditions.

### 1.3. Religion and Nature

What idea of religion frames the field's work on religion and environment? Taylor (25) thinks that response to environmental crisis has overdetermined what counts as religiosity, and he has been roundly critical of the role normative politics plays in shaping ideas of religion and ecology. Focusing on worldviews and activism, he claims, has resulted in a narrow notion of religion and a moralized idea of ecology. (Here, we focus on notions of religion, turning to ideas of ecology in another subsection.)

Scholars in the field, says Taylor, face a choice between an inherited “confessional/ethical” approach that works on

transitioning world religions into an ecological consciousness, and a “historical/social scientific” approach that describes a wide array of environment-related religiosity (25, p. 1376). Taylor endorses the latter as the proper object of academic study, thus minimizing the first two senses of religious environmentalism while showing interest in social scientific description of religious phenomena. The relevant religiosity here includes nature-focused practices, like fly-fishing and kayaking, or may reside in dimensions of environmental practices, like habitat restoration (26, 27).

What counts as relevant religiosity might then be marginal to the mainstream traditions, implicit in environmental practices, or embodied in popular culture. As editor of the *Encyclopedia of Religion and Nature*, Taylor uses open definitions of religion and nature “to invite the widest variety of perspectives to engage the meaning and relationships that inhere to the human religious encounter with nature” (25, p. x). Between “Abbey—Edward” and “Zulu War Rituals,” the *Encyclopedia* presents nearly 1,000 articles on everything from the conventional (Hebrew Bible, Sufism) to the unexpected (Disney, surfing).

The *Encyclopedia* is notable for its attention to nature religions, which have sometimes been overlooked by a focus on the major traditions. Taylor and his students criticize the field for focusing on the mainstream ideas of world religions to the exclusion of marginal spiritualities, especially contemporary nature religion (28, 29). Animism, Wicca, pantheism, neo-paganism, and New Age represent both self-identifying communities as well as currents of ecological spirituality that appear in popular culture. Moreover, the diverse experiences within the conventional religions might be missed by an idea of world religions that thinks of religions in terms of ideal worldviews. So the *Encyclopedia* offers multiple entries on contemporary nature spiritualities, with an eye for creative hybrids, marginal movements, and implicit spiritualities.

The *Encyclopedia* thus depicts a field of “religion and nature” characterized by descriptive

phenomenology of nature-related religiosity. Its turn toward interpretation of lived experience opens more possible relations of religion and environment. However, although the pluralism and the focus on practice it represents appear in other approaches to the field, not everyone agrees that pluralism in method requires a move away from confessional activism toward descriptive analysis. Taylor provocatively maps that divide onto a tension in the academy of religion between theology and religious studies, arguing that the field’s task “is properly to analyze religion rather than to defend or engage in it,” which would be a confessional or theological approach (25, p. 1374). But other scholars think that the character of environmental problems warrants some form of constructive engagement—perhaps even a kind of theology.

#### 1.4. Ecotheology as Doing Religion for the Earth

To what degree should responsibility to a context of ecological problems shape how scholars understand the relations of religion and environment? In *Ecospirit: Religions and Philosophies for the Earth*, Kearns & Keller (30) convene a pluralist, self-critical conversation for the purpose of engaging religion with a sustainable future. Contributors from multiple disciplines pursue analyses, offer poetic invocations, and present guild-crossing theories in order to help facilitate ecosocial transition.

The editors describe the mode of their task as a kind of theology, saying that the volume gathers multiple disciplines “into a broad, not readily nameable, transdisciplinarity that may be called ‘ecospirituality,’ or in a self-critically widened sense of the theological, ‘ecotheology’” (30, p. xii). Their “nonliteralist, open-ended theology” intentionally supports an activist pluralism, alive to many emergent movements for sustainable change. Scholars should study religion in ways that help create, accompany, nurture, and realize appropriate ecosocial possibilities as well as “to transmute simple emergency into complex emergence” (30, p. xii).

Theology is conventionally about God, and this ecotheology project does offer a kind of confession. By “its root intuition of the divine relation to the world, a relation in which all earthlings in our ecosocial lives are called to participate, it confesses the holiness of diversity, the goodness of the nonhuman, the multiplicity of truth” (30, p. xiii). But contributors to *Ecospirit* are less interested in defending a confession than constructively working with cultural inheritances to better relate to a vulnerable life world. It is theological primarily in that it is openly constructive, engaged, and normative.

*Ecospirit* develops a theological method as an intellectual strategy for facilitating interdisciplinary confrontation with the social and environmental complexity of sustainability problems. Its active, engaged sense of religion is shaped by the kind of intellectual activity required by adequate confrontation with a complex crisis. The broader point here, in relation to other approaches to the field, is that an intellectual commitment to understand the world from an ethical commitment to its future opens work that is both pluralist and activist. *Ecospirit* destabilizes relations of religion and ecology precisely in order to help stimulate imaginations of sustainability.

### 1.5. Gender, Nature, and Justice

That broad sense of theology—as normative participation in constructive religious argument—has also informed ecofeminist approaches to the field, which have insisted that the question of responsibility for ecological problems cannot be asked apart from responsibility for social problems. Ecofeminism investigates how gender relations connect to human/environment relations and thereby raises a broader question about how ideologies of injustice connect with ideologies of environmental exploitation. How should the field conceptualize the connections of social problems and ecological problems? Ecofeminist approaches usually insist that those are not two separate categories of problem but require an integrated analysis and response.

Ecofeminist scholars have been crucial in developing religion and ecology as a field, and their work continues across traditions and contexts (31, 32). Reuther is an especially important figure here with a groundbreaking early work, *New Woman, New Earth* (33), and coeditorship of the *Christianity and Ecology* volume in the Harvard Series (3). Her recent book, *Integrating Ecofeminism, Globalization, and World Religions* (34), summarizes the relation of ecofeminist analysis to work in religion and ecology through an evaluation of ecofeminist responses to globalization.

Ecofeminism, as Reuther presents it, illustrates an ideology of domination—a “dominology”—running through patriarchal attitudes toward women as well as human attitudes to nature (34, p. 124). Violence against women, from battering and rape to exclusion from education and health care, is supported by patriarchal ideologies that devalue women by identifying them with their bodies and identifying their bodies as the rightful property of men. Violence against nature runs by a similar logic, identifying the rest of Earth as property subject to the disposal of the powerful. The dominology extends to other social relations, including race, class, and ethnicity. If so, then transforming societies toward sustainable human-nature relations includes a task of social transformation toward social justice.

Reuther complains that work in the field, even when it acknowledges the importance of ecofeminism, generally fails to incorporate gender analysis. That indicates, she says, a broader problem for the field connecting ecological problems to problems of social justice—especially race and poverty. Reuther offers her own summary of each of the 10 traditions in the Harvard series, incorporating observations on gender. Her summary of Hinduism, for example, treats the problematic of goddess veneration, which is ambiguous for the treatment of women and of nature. Her point is that religions convey an integrated world of moral values, so scholars should criticize them in an integrated way. By way of example, she summarizes ecofeminist work in areas sometimes

overlooked by the field, including work from third-world scholars, neo-pagan scholars, and antiglobalization protesters.

*Integrating Ecofeminism* thus starts to address a complaint that the field of religion and ecology insufficiently incorporates social justice concerns and inadequately attends to the religious environmental perspectives of oppressed or marginalized communities. Page in fact makes that complaint against Ruether's own work (35). Scholars working on environmental justice or political ecology have criticized the inherited field for failing to integrate analysis of social violence and—when it does—for conflating minority environmental perspectives with an urgency for social justice (36–38).

Ruether's book (34) does not fully answer those objections, but it does insist that environmental sustainability and social justice depend on uprooting a common logic of destruction. She thus presents a pan-religious task to confront the ideologies that underlie multiple kinds of exploitation. Instrumentalist attitudes toward nature and women are supported, she argues, by spiritual and economic individualism (especially when infused with otherworldly ideas of disembodied salvation), as well as by elitist patriarchy. The sciences, too, are shaped by violent ideologies insofar as they imagine nature as instrumental to human objectives. Cultivating alternatives requires cultivating holistic worlds, which seems a religious facility.

### 1.6. Sustainability as an Interdisciplinary Challenge

Another way into the field of religion and environment treats the idea of sustainability as an interdisciplinary arena of deep cultural questioning. Whether or not the received religious traditions or emerging religious experiences have a causal effect on environmental behavior, the imperative of sustainability raises questions about the foundations and purposes of human society. Do those questions have a depth that might be called religious?

Using the term spirit to open a pluralist arena of inquiry into the religious, ethical, and cultural dimensions of the challenge of sustainability, *The Spirit of Sustainability* (39), edited by Jenkins & Bauman, is the first volume of *The Encyclopedia of Sustainability*. Supposing that the multiple social and ecological problems that make up the challenge of sustainability invite many competing interpretations, the editors invite contributors to explain how a philosophy, religion, problem, or topic bears on the question: What must we sustain?

That question bears a paradoxical depth, at once minimal and comprehensive (40). It seems to inquire after a merely decent survival of the human species, but by doing so, it raises issues about the value of nonhuman life, the goals of economies, the role for a human presence on Earth, and the kind of futures humans should want. It forces reflection on what fundamentally sustains societies and on what sustains humans in their humanity. How do human and ecological systems relate? What are the conditions for the human spirit?

As the integrated ecological and social problems confront political societies with decisions about how to protect what sustains us, it pushes sweeping moral questions into public visibility. Global society may not need to find answers in religious traditions, but it may need something like a religious facility to make sense of their scope and complexity. The sensibility of this volume is therefore pluralist and pragmatist, supposing that answers to the basic question of sustainability will come as societies learn how to meet complex problems with their moral and cultural inheritances. This approach supposes that the idea of sustainability does not represent a worldview or applicable value, but rather it represents a conceptual arena to combine knowledge from the sciences and from received cultural traditions to confront new problems. Religion attends that arena because “for many people a fulsome answer about sustenance must involve some reach toward depths typically described as religious—toward beauty, mystery, spirit, love, faith, or God” (39, p. xxii).

## 1.7. Religion and the Environmental Sciences

We have seen that some introductions to the field displace the morally charged term ecology with one more pluriform—nature or sustainability. Doing so raises a question about field's relation to the environmental sciences. How does religion and ecology relate to the science of ecology?

The field exhibits multiple approaches. Most often ecology seems to refer to an idea of interconnectedness, taken by religionists as the summary point of ecological science and developed into moral theory. Here, science supplies a basic picture of reality, a standard of nature, to which religionists endeavor to make traditions conform. Sometimes it seems that religion should also assist civic-minded scientists by supplying moral dimensions or advice in persuading religious constituencies. In other works, religionists critique prevailing metaphors of nature, for example, nature as a mechanism or information. Usually scholars suggest that religionists and environmental scientists should be in some kind of dialogical collaboration (41).

In *Religion and the New Ecology*, Lodge & Hamlin (42) observe that the science of ecology has changed over the decades that the field of religion and ecology has developed. Ecologists have been distancing their research from cultural appropriations of it as depiction of an interconnected nature by complicating what it describes. Several essays in the volume show how ideas of balance, interdependence, and harmony have influenced American religious thought, even while the science of ecology has come to emphasize flux, complexity, and instability. Moreover, human systems increasingly influence environmental systems, further destabilizing any function for ecology as nature's standard for ethical change. "It is not a matter then of doing things nature's way, but rather of deciding which of nature's forms we want to establish, maintain, restore or change" (42, p. 7).

If so, that changes how religionists and scientists should collaborate. Rasmussen's essay (43) in the book proposes that adaptive

management opens an arena for religious engagement with science-based approaches to specific problems. Insofar as environmental scientists work through social policies to address complex problems, they may need interpreters fluent in the dynamics of moral culture. For understanding complex, anthropogenic environmental problems, the science of ecology depends on moral decisions about how human systems should interact with its environment. In those cases, it seems that religion-science collaboration needs religion scholars with the sort of constructivist, reformist engagement with religious communities that facilitates confrontation with the ambiguous science of complex environmental problems (44).

In any case, the role of the environmental sciences in shaping relations of religion and environment remains open and ambiguous. Scholars working in the systemic uncertainties of the "the new ecology" may be tempted, as Bauman observes (45), to grasp for foundationalisms of nature or of creed to guide responses to difficult environmental problems. Where religionists and scientists work out nonfoundationalist approaches to real problems, based in science and attentive to lived moral culture, they demonstrate ways to resist those temptations.

## 1.8. Religion as Cultural Ecology

The field borrows ecological ideas in a different way when it uses the concepts from environmental and biological sciences as a heuristic to interpret religious and cultural systems. Instead of thinking about how religion relates to ecology, scholars might think of religion as itself a kind of ecology and therefore as one part of a culture's more or less adaptive relationship with its environment. Here, ecological ideas gain interpretive control over the meaning of religion and, in some cases, allow scholars to avoid the category altogether. (We show both instances in this section with two different introductory publications; see below.)

In the opening article of the first issue of *The Journal for the Study of Religion, Nature,*

and Culture, biologist Kellert (46) argues that religion and science are both cultural expressions of a genetic human affinity for nature. The various creative expressions of this biophilic disposition can be evaluated by their adaptive function. Sometimes these cultural institutions work to facilitate the ongoing adaptive connection of humanity to its habitat, and sometimes they prove dysfunctional. Kellert's point (46) is that a biologically based concept of adaptive fit allows for a convergent interpretation of religion and science.

In the concluding article of the same issue (47), religionist Taylor asks, "What if religions had ecologies?" Taylor wants the field to analyze how natural history shapes religious communities (47). Environmental scientist Hillel's *Natural History of the Bible* (48), which explains the rise of Middle Eastern monotheism as a response to a particular human environment, provides one example of the work she anticipates. In turn, Taylor wants to interpret religious communities as a kind of ecology—a system of embodied interactions with a particular environment. Her project is different from Kellert's, but her use of a scientific idea to interpret religious systems as environmental systems is similar.

Interpreting lived religion as an adaptive relation to Earth can warrant renewed attention from the sciences to the ecological knowledge resident in the religions of indigenous people and other populations living in ancient or traditional patterns of inhabitation. Here, however, religion may be an imposed and misleading category, used by an alien culture to dissect holistic aspects of lived culture. Relations of religion and environment might be better treated as a matter of environmental anthropology or cultural ecology, investigating TEK (49, 50).

In *Traditional Ecological Knowledge and Natural Resource Management*, contributors focus on how indigenous cultures that have developed in place over millennia can teach outside societies about sustainability, especially sustainable resource conservation over time (51). Their work follows a groundbreaking monograph by Berkes on TEK in *Sacred Ecology* (52). The

environmental sciences have had an ambiguous relationship to TEK, in part, because of their association with primitive religion. Research scientists have sometimes ignored or disregarded TEK because of its embeddedness in cultural narrative, cosmologies, and spiritual practices. Understanding culture in terms of an adaptive ecological relation, however, allows scientists to take seriously TEK despite its suspiciously religious dimensions. In fact, precisely because it "is grounded in a spiritual and reciprocal relationship between the people and their environment," TEK is holistically and historically embedded in a culture (51, p. 10).

Engaging with TEK, even its spiritual dimensions, may not require religious analysis at all, if all its terms are evaluated instead in terms of evolutionary fit with an ecological context. The ambiguous words spiritual and sacred may be sufficient to capture how certain elements of knowledge function in a pattern of inhabitation. While using ecological ideas to frame TEK in a way safe for engagement from the sciences, some religionists and anthropologists may object that interpreting culture entirely in terms of adaptive environmental relations misses lived worlds of meaning.

Interestingly, Berkes and colleagues (53, 54) see TEK as model for the cultural challenge of sustainability to nontraditional societies, and as an example of what we might want from a broad adaptive management process. This links science to social policy in a broad cultural movement toward a more adaptive relation of society and environment.

### 1.9. Rise of Pluralism and Pragmatism

What to make of these many different approaches to the field? As religion and ecology have enjoyed the ferment of multiple approaches to the field, a rising generation of scholars has signaled an interest in sorting out the methodological debates. Two recent anthologies, both coedited by Bauman, Bohannon, and O'Brien (55, 56), offer a snapshot of current work and controversies in the field. Both volumes celebrate the pluralism that characterizes the field, and both nudge the

field toward more productive, more pragmatic collaborations.

*Grounding Religion: A Field Guide to the Study of Religion and Ecology* (55) clarifies the uses of central concepts (including religion and ecology) and explains the state of debate on key issues (including gender, animals, justice, and sustainability). To illustrate the tensions at issue in the field, it employs two chapters centered around dialogue and two around case studies (55).

While *Grounding Religion* is helpful to classroom discussions, especially after students begin to reckon with complexity at issue in studying religion and environment, the second book is especially exciting for scholars working in the field. The result of a collaboration of a diverse group of scholars, working in the field with the various tools and approaches of its methodological schools, *Inherited Land: The Changing Grounds of Religion and Ecology* (56), suggests where the field may be headed.

The essays, many of them sharply perspectival, assess most of the questions raised in this section: the role of the sciences; gender and ecofeminism; global and marginal notions of religion, ideas, and uses of justice (28, 35, 36, 41). Without intending it, they also seem to demonstrate some shared sensibilities, despite the diverse approaches represented by the contributors. It may be fairly said that the book shows an interest in moving beyond study of worldviews while not abandoning the usefulness of cosmology, a concern for reflection on methodology; an interest in marginal, embodied religion; an interest in ethnographic approaches to lived practices; closer collaboration with the sciences; and an interest in analysis of specific problems and particular geographic places.

## 2. ASIA AND ASIAN TRADITIONS

The field of religion and ecology in regard to Asian religions has found many voices in Asia, Europe, and North America. Building on earlier series of books published in the 1990s by the World Wide Fund for Nature and Harvard University's Center for the Study of World

Religions, work with Asian religions and ecology has blossomed over the past decade through the appearance of many new encyclopedias, monographs, and journal articles.

Work in Asian traditions tends to reflect four commitments found among the approaches to the field of religion and ecology identified in our introduction. It often reflects the view that the major religious traditions can and must respond to environmental problems as a moral issue, that environmental activism may itself be a form of religion, that social justice and gender issues must be considered, and that more attention needs to be given to the experience of nature itself as engendering a sense of spirituality or religiosity. On the question of nature religions and global faiths, many Asian traditions tend to blur the distinction between traditional and nature religions, as seen in writings on yoga, plant life, rivers in India, and the Buddhist literature on environmental virtue ethics.

### 2.1. General Works

In its coverage of Asian traditions, *The Encyclopedia of Religion and Nature* provides key summary entries on the major traditions of Asia in light of ecology, including Buddhism, Hinduism, Confucianism, Taoism, Jainism, Sikhism, Yoga, Shinto, and others (25). *The Oxford Handbook of Religion and Ecology* includes longer articles on Asian traditions, including extensive studies of Jainism, Hinduism, Buddhism, Daoism, and Confucianism (57–61). These articles build on and draw from primary sources in original languages, refer to the *Religions of the World and Ecology* series, and give contemporary examples of activism in Asia. *The Encyclopedia of Environmental Ethics and Philosophy* (62) and the first volume of the *Berkshire Encyclopedia of Sustainability, The Spirit of Sustainability* (39), include several articles on Asian religious approaches to the task of sustainability.

Representative current research within an Asian context appears in an anthology published in English and Korean by the Academy of Korean Studies under the title *2008 Civilization*

and Peace (63). It includes essays on restoration, conservation, and localization, as well as survey articles on environmental dimensions of Asian thought from Pak, Tucker, and Chapple (63). A French language resource, *Crise ecologique, crise des valeurs? Defis pur l'anthropologie et la spiritualite* (64), includes many articles on world religions and broader cultural issues surrounding the discourse of sustainability. Among them, the Parisian anthropologist Galey contributes a compelling chapter on the Tulu of South India, and Chapple writes on Jaina nonviolence (64).

Asian worldviews exert influence on constructive work in the field, as demonstrated by three other recent books. Berry's *The Sacred Universe* (13) speaks of the pan-Asian image of the relationship between microphase and macrophase as essential for the development of a feeling of sensitivity to the earth. Berry identifies this with key terms in Sanskrit and Chinese: *Brahman, maya, nirvana, karma, dharma, li, tao, t'ien, jen*. Taylor's *Dark Green Religion: Nature Spirituality and the Planetary Future* (24), although seeking a postmodern, nontheistic response to the problems of global environmental destruction, draws heavily from Asian religious traditions. Asian influence and inspiration for environmental studies in the Western humanities is further evidenced in *Ecology and the Environment: Perspectives from the Humanities* (65), which includes an essay on "Cultivating Nature in East Asia" by Tucker and an extensive discussion of Thai Buddhist environmental activism.

## 2.2. Religion and Ecology in India

Three significant case studies on religion and ecology in India must be noted. *Belief, Bounty, and Beauty: Rituals around Sacred Trees in India* (66) by Nutgeren draws upon traditional literature from the Vedas, the Dharma Shastras, and the literature of Buddhist Tantra to explain the significance of tree worship in India. It cites the contemporary examples of the harvesting of sacred trees for worship in Puri during the time of the Jagannath festival and the ongoing influence of the Chipko tree protection movement (66). *Plant Lives: Borderline Beings in Indian*

*Traditions* (67) by Findly addresses plant sentience, stability, and karma. It includes a survey of traditional literature from Hinduism, Buddhism, and Jainism, and it cites numerous examples of religiously inspired environmental activism, as found in Auroville, the Ashram of Ammachi, the work on behalf of seed preservation by Vandana Shiva, and the Thai Buddhist tradition of forest protection (67). *River of Love in an Age of Pollution* (68) by Haberman documents the ravaging of one of Asia's great rivers through industrial pollution and neglect. Drawing from traditional lore, science, and his own experience, Haberman describes the flow of this river from the Himalayas through the megalopolis of Delhi down into the sacred region of Braj, narrating its decline and the attempts at its revitalization. He includes original translations of religious songs and poems in praise of the river (68).

## 2.3. Yoga and Ecology

As the Yoga tradition has become a globalized voice for Asian religious traditions, practitioners and scholars have begun to explore the ecological values of Yoga as expressed in the Hindu, Buddhist, Jaina, and Gandhian practice of nonviolence (*ahimsa*). (See the sidebar Green Yoga.) Frawley, a popular writer and advocate of the Hindu view of life, suggests in his book *Yoga and the Sacred Fire: Self-Realization and Planetary Transformation* (69) that the experiences of meditation and ritual can help people reconnect with the bare essentials needed for humans to flourish. Feuerstein & Feuerstein give practical advice in their books *Green Yoga* (70) and *Green Dharma* (71), supported with traditional practices and textual resources in light of what the authors regard to be a new ethical imperative.

*Yoga and Ecology: Dharma for the Earth* (72), edited by Chapple, presents a more scholarly approach. It opens with essays on the Vedic heritage of honoring the earth (73-79), particularly as found in the *Atharva Veda*. Whicher & Foulks examine "earth-friendly" aspects of Patanjali's *Yoga Sutra*. The influence of the Bhagavad Gita on Naess's theory of ecosophy

## GREEN YOGA

Consider the complex interaction of religious tradition, globalizing culture, popular spirituality, and environmental consciousness reflected in the Green Yoga Values Statement, which appeals to Yogic teaching to orient practitioners toward sustainable relations with earth:

“The health of our bodies depends on clean air, clean water, and clean food. Yoga is grounded in an understanding of this interconnection. Historically, Yoga developed in the context of a close relationship with the earth and cosmos and a profound reverence for animals, plants, soil, water, and air. This reverence towards life is the basis of the Yogic teaching of *ahimsa*, or non-violence, non-injury, and non-harming.

Today, the viability of earth’s life systems is in danger. If humanity is to survive and thrive, we must learn to live in balance with nature. Now is the time to cleanse and heal the earth and to establish a sustainable relationship with the environment for generations to come” (79).

is documented by Jacobsen (77), and Lidke (78) examines the world-affirming aspects of Tantra through an ecological prism. Finally, Cornell advances eight models for Yogic environmentalism through a reinterpretation of knowledge (*jnana*), devotion (*bhakti*), the forest (*aranya*), the body (*batba*), the mind (*manas/raja*), action (*karma*), community (*sangha*), and integration (*tantra*) (72).

### 2.4. Buddhism and Ecology

Studies of Buddhism and ecology appear in several genres. Kaza (with Kraft) has edited two volumes that focus on resources for ethical lifestyles (20, 80). A second genre probes Buddhism and environmentalism through the prism of philosophical ethics. Sahni (81) discusses what he characterizes as conservation and cosmological approaches to an environmental Buddhist ethics and opts for the approach of Buddhist vow-based virtue ethics. In *Buddhism, Virtue, and Environment* (82), Cooper & James emphasize the centrality of compassion, equanimity, and humility to a Buddhist environmental virtue ethic. De

Silva (83) notes that, according to Buddhism, harm to the environment arises from egoism and greed and cites the Buddha’s objection to animal sacrifice as an indication of a need to overcome anthropocentrism.

A third genre sees environmentalism as one of a cluster of social issues being taken up by Buddhist communities worldwide. *Action Dharma: New Studies in Engaged Buddhism* (84) includes an essay by Darlington on Buddhism and development in Thailand, which she further develops in *TransBuddhism* (85), where she gives an update on environmental actions undertaken by Thai Buddhist monks, who during the 1990s initiated the practice of ordaining trees to prevent their felling. Environmental concerns in Tibet and Thailand are taken up by King’s *Socially Engaged Buddhism* (86) in connection with philosophies of deep ecology, a movement that advocates simple living. King criticizes Chinese land-use policies for their harm to the Tibetan plateau and explores four global leaders of Engaged Buddhism, who she views as deep ecologists: Joanna Macy, John Seed, Gary Snyder, and Thich Nhat Hanh (86).

Some scholars suggest that Buddhist ecology is a modern romantic construct influenced by Western culture and perhaps even exported to Asia from North American thought (87). Yet Buddhist activist practitioners, both Western and Asian, continue to set forth treatises urging a connection between Buddhist philosophy and ecological values. Jones (88) fully embraces a Buddhist-inspired “socially radical culture of awakening.” Loy (89, 90) advocates a Buddhist approach to ecological healing, examining the poisons of greed, ill will, and delusion as the root causes for the current state of environmental degradation. Thai Buddhist activist Sivaraksa gives examples of monastic and lay Buddhism advocacy for the preservation of Thailand’s endangered forests and waters and of the need to be wary of food impurities (91). Balsys (92) develops *ahimsa* as vegetarianism ideal for human and environmental health.

Buddhism and science continue to be active areas of dialogue. Noting the Dalai Lama’s life-long fascination with science, Lopez (93)

surveys the history of Buddhist appropriations of scientific language. Also working on this issue, Zajonc (94) presents transcripts of the Dalai Lama in conversation with scientists and humanists interested in how the scientific worldview is affecting ethical discourse. Dependent origination, often invoked by Buddhist environmentalists, is examined by Ames and others in a similar anthology (95).

## 2.5. Lifestyle Critiques and the Challenge of Globalization

Global environmental changes are disrupting traditional life patterns in Asia. In *Earth Democracy* (96), Shiva criticizes cultural and biological destruction, including “food fascism.” She advocates the honoring of local village lifestyles as an antidote to creeping global consumerism, which she sees as the root of Asia’s environmental challenges (96). Guha makes a convincing case for social ecology as the best alternative to scientific industrialism or subsistence farming in *How Much Should a Person Consume? Environmentalism in India and the United States* (97). Guha’s sense of social ecology stands in contrast to North American deep ecology with its emphasis on simple living, which he decries as irrelevant to the needs of India’s huge population.

For a contrasting note, Nand (98) criticizes tendencies to romanticize the traditional insights of the Hindu faith or overstate their relevance to contemporary life. Likewise, in *Biodivinity and Biodiversity* (99), Emma Tomalin contests assumptions that religious systems have the equipment to develop a valid approach to environmental ethics and suggests that religious environmentalism entails a dishonest projection of Western values onto local societies. There is “no simple, linear relationship between religious and cultural values and how people relate to their natural environment” (99, p. 181). The one-time close relationship between Hindu fundamentalists and the environmental movement was abandoned soon after the former gained power. Clearly, questions about Western, Asian, and indigenous ideas of ecology will continue to attract study (100).

The complexity and scope of Asian religious environmentalism appears in the range of scholarly work appearing over the past five years. While Chapple (101) traces ascetic environmental practices across Jainism, Buddhism, and Yoga, Stibbe (102) considers Zen and environmental education in contemporary Japanese animation. The range includes Christian opposition to mining in the Philippines, ecofeminist comparative analysis of Hindu and Christian traditions, and interpretation of specific Swadhyaya practices (103–105). As Asian economies develop and continue to cope with a range of ecological issues, from pollution to agriculture, urbanization, and habitat depletion, both conceptual and activist resources are necessary. Analyses of development theory, economics, and environmental science need to include understanding of religious dimensions, communities, and activism, pointing to the need for interdisciplinary engagement with religious studies.

## 3. CHRISTIANITY AND ENVIRONMENT

Studies of Christianity and environment include analyses of the environmental practices of particular Christian communities, evaluations of the ecological significance of Christian beliefs, research on relations of environmental sciences to Christian views of creation, “green” renditions of the faith, and constructive proposals for ecologically reforming the tradition. Across methods and foci, research in the area is generally informed by a sense that contemporary environmental problems pose a serious challenge to this major moral tradition. The challenge might require retrieval of forgotten values by adherents, reconstruction of beliefs by reformers, or the reconfiguration of Christianity’s relations with the sciences and with social movements.

Framing inquiry into Christianity and environment in terms of a public crisis with religious causes traces to the influential 1967 article of White, “The Historical Roots of Our Ecologic Crisis” (106). Writing in *Science*, White’s trenchant critique of the role of Christian ideas

in shaping modern attitudes of environmental exploitation simultaneously established the significance of religion for environmental problems and assigned Western Christianity ideological culpability. The first point, about the cultural depth of environmental issues, has been influential in the fields of environmental ethics, religion, and ecology. The second point, about Christian culpability, has occasioned vigorous responses from Christian theology, from defensive denial to revisionary agreement. So influential has been White's critique that scholars in all three fields have begun to reassess its legacy in shaping inquiry (107).

As in the general field of religion and ecology, ecofeminist work has been important for shaping critical reexaminations of theology. Eaton's *Introducing Ecofeminist Theologies* (31) summarizes the key points of scrutiny, including relations among metaphors of God, images of humanity, and ideas of nature. Important criticisms portray environmental problems as symptomatic of deep cultural pathologies. Views of nature as passive matter before human freedom may be supported by masculinist metaphors of God as a transcendent dominating power and embodied in patriarchal legacies of instrumental, exploitative views of women (31). Bauman (108) has recently developed ecofeminist, neocolonial, and postfoundationalist theories to trace a genealogy from the doctrine of creation *ex nihilo* to the imperialist idea of *terra nullius* (empty, uninhabited land) and modern science models of nature as inanimate mechanisms.

Perhaps, then, Christian theology should learn to do without problematic ideas of nature. In *Without Nature?* (109), theologians dialogue with researchers in ecology, genetics, geography, and anthropology in order to consider the fate of religious reasoning in an era when human powers are reshaping ideas of nature. In an era of climate change and biotechnology, nature is always hybrid. However, the collective answer to the book's title turns out to be surprisingly negative. Although its contributors agree that theology must work differently, theology has no new way for making sense of

human-environmental systems without some reconstructed concepts of the natural (109).

The pluralist turn from one nature to many cultures of nature has led scholars to go beyond measuring religion with ecology to also investigate what might be called the ecologies of religion. Some do so through constructive theological accounts of how particular traditions interpret lived human-environment relations, whereas other scholars do so through descriptive interpretations of contemporary communities.

As an example of the former, in *Ecologies of Grace: Environmental Ethics and Christian Theology* (110), Jenkins describes three different strategies of Christian response to environmental problems, each shaped by a different background tradition with its own logic of nature and grace. Rather than look for a common Christian worldview assessed against an ecological worldview, Jenkins examines how different accounts of the experience of God produce different interpretations of the human experience of Earth. Those various ecologies give rise to different ethical strategies for confronting environmental problems (110).

Two other works demonstrate this recent turn toward interpreting the sources of particular theological traditions on their own terms of nature and grace. In *Theological Foundations for Environmental Ethics* (111), Schaefer revisits the ancient and medieval sources of her Catholic tradition. Schaefer organizes a rich survey of important theological texts around virtues that matter for an era of ecological problems: appreciating beauty, reverencing sacraments, respecting creation's agency, and cooperating with creation (111). Theokritoff, in *Living in God's Creation: Orthodox Perspectives on Ecology* (112), does something similar within the Eastern Orthodox tradition. To Western readers, Orthodox theologies can seem exotic for their narrative of Christian life as divinization of the cosmos and the intense veneration of their tradition on patristic fathers and ascetic heroes. Theokritoff explains the distinctive ecological relations produced by a view of life with God as deification, including patristic views of humans

as cosmic priests and asceticism as a training in beauty (112).

Renewed research into the environmental dimensions of theological traditions reflects wide interest from Christian communities for ways to support environmental protection with the distinctive reasons and rhetoric of their own style of faith. A burst of popular books from religious publishing houses shows interest from across the Christian spectrum.<sup>2</sup> However, the significance of that interest and those reasons for a particular community depend on how environmental relations matter for the lived experience of particular communities.

Rather than reinterpret creedal traditions, other researchers focus on the lived theologies and ecologies of specific Christian communities. One of the most interesting is Taylor's *Green Sisters* (114), which describes a network of vowed Catholic religious women (nuns) who have begun to ecologically revise their community life and—to various extents—their Catholic theological tradition. In Taylor's pun, the sisters have begun to “reinhabit” their tradition by reinhabiting ecological communities (and thereby symbolically change the nun's “habit”). Her work picks up an emerging methodological focus on embodied environmental life and creative religious expressions, exhibited in research such as Peterson's *Seeds of the Kingdom* (114, 115).

Some recent work has focused on a nexus where reinterpreting tradition and lived theology meet, i.e., in the rituals and creativity that make up Christian liturgy. Two recent works—one from a liturgist and one from an ecotheologian—explore the importance of worship practices in an era of environmental distress and the ways they might change. In *Holy Ground* (116), Lathrop devotes one of a three-volume reconsideration of liturgy to the way liturgy shapes participants into a sacred cosmology. Ecotheologian Santmire (117) agrees

with Lathrop (116) that by reconnecting senses and soul with an earthly context, liturgy can work as a site of disruption from pathological cultural habits and reorient participants to the earth.

All this environment-driven ferment in Christian theology has begun to open fresh interchanges with the environmental sciences. Moving beyond the usual fissures of religion and science into new tensions, environmental theologies have had to reconsider how the ecological sciences do (or should) inform the various ecologies of belief. For one interesting example, liberal ecotheologies that otherwise privilege ecology as a guide for theology have paused over the moral implications of evolutionary ecology, which seem to trouble Christian hopes for an ecology of peaceful harmony (118, 119). This tension often surfaces in the question of animal ethics (120).

Finally, theology has demonstrated a turn not only toward particular traditions but toward particular problems. Although a reference to ecology often names a sense of general environmental crisis, a number of works in theological ethics have begun to confront particular environmental problems. O'Brien's *Ethics of Biodiversity* (121) is a good example of a problem-focused ethical interpretation that engages theological tradition with the multiple disciplines related to the problem. As evidence of this turn toward problems, more than a half-dozen monographs on theology and climate change have recently been published (122–128).

#### 4. DEVELOPMENTS IN ABRAHAMIC AND INDIGENOUS TRADITIONS

This section represents work within two religious categories so broad and so different that some religion scholars would deny their usefulness and complain about their treatment together. Yet significant work in religion and ecology continues to locate itself in one of these categories, and there may be a common

<sup>2</sup>This review does not cover books of popular Christian environmentalism. For a broad and accessible treatment, see Van Dyke's *Between Heaven and Earth: Christian Perspectives on Environmental Protection* (113).

ecological driver at work in the emergence of these two planetary traditions.

#### 4.1. Abrahamic Traditions

As members of the global religions work on shared global problems, they look for shared moral and interpretive resources that might support collaborative work and mutual understanding across human communities. Thus, adherents of Judaism, Christianity, and Islam, which share some common texts and a narrative beginning in the family of Abraham, may look for a shared perspective on the environment or common methods for confronting environmental problems.

Studies of textual interpretation are an especially rich area of work here, but first consider a note on some other religion and ecology literature focused specifically on Judaism and on Islam. These two world religions obviously merit sections of their own in any overview. In recent years, however, there have been relatively few books focusing on each tradition. After *Judaism and Ecology* (10) and *Judaism and Environmental Ethics* (129) at the beginning of the decade, recent work in Judaism includes *The Way into Judaism and the Environment* (130).

In Islam, Nasr's 1967 *Man and Nature* (131) was pathbreaking for the entire field of religion and ecology. Nasr has kept up a steady stream of publications since, including the 2009 *Islam, Science, Muslims and Technology* (132). Since *Islam and Ecology* (8), there have been few English-language books engaging religious analysis with environmental crisis in general. An exception is the nonscholarly *Green Deen: What Islam Teaches about Protecting the Planet* (133). There is, however, work on particular topics, such as Foltz's book on *Animals in Islamic Traditions and Muslim Cultures* (134). Due to traditions of adaptive beauty in Islamic architecture, there is also continued interest in Islam and sustainability in built environments, e.g., *Arabic-Islamic Cities: Building and Planning Principles* (135).

Shared Abrahamic interests and ideas develop around the reception and interpretation

of scriptures for societies with new (ecological) moral problems. Religious scholars working in all the traditions, as well as a few environmental scientists, find environmental issues an occasion to rethink methods of interpretation, look for values of responsibility, and open new horizons of meaning within texts (136–141). Davis's *Scripture, Cultural, and Agriculture* (142) does all three by using agrarian ideas to revisit the hermeneutics of reading the Hebrew Scriptures, yielding both values for a contemporary agrarian ethic and textual insights lost to modern cultures alienated from the land (142).

Because these three are “religions of the book,” even when research focuses on one tradition's scripture, the interpretive questions matter regarding how all three confront environmental issues. The shared hermeneutical challenge created by environmental issues thus becomes an occasion for developing shared Abrahamic perspectives on human ecology. Johnston (143), for example, develops a shared ethic of trusteeship for creation from close readings of “Genesis” and the *Qur'an*. For Johnston, the task of reading scriptures becomes a point of interfaith dialogue with the potential to yield shared principles of environmental responsibility (143).

Finally, it must be noted that in North America, where the market for Christian Bibles produces a scriptural package for every cultural niche, it was perhaps inevitable that we would eventually have *The Green Bible* (144) in which the editors have selected environment-related passages to print in green.

#### 4.2. Indigenous Traditions

In contrast to the global Abrahamic faiths, the moniker indigenous traditions stands for ways of living marked by locality and names a cultural diversity as various as regional context. Yet, as they confront planetary ecological problems, which often pose threats to ways of life shaped to a local bioregion, indigenous peoples have sometimes presented themselves as bearers of a common wisdom, and they increasingly meet in regional and global councils. Thus, a global

society of indigenous traditions is emerging to face global environmental problems, and with it, perhaps, is the emergence of a somewhat oxymoronic planetary indigenous tradition.

As we noted in the Introduction, religion may not always be an appropriate category of analysis, even where it is used as a useful platform for social expression in the global arena. For example, indigenous peoples may find it useful to claim a human right to religious expression in jeopardy of some noxious land use, even while uncertain about the notion that they “have a religion” (145). Rights and religions may then be concepts appropriated to defend a way of life that resists the very sort of culture that needs such terms. The point of an indigenous religion might be that religion and spirituality are isolable components of life and are understood only within environmental and social relations. The words “land culture” might offer a better way of expressing the intimacy of ecology, history, and spirituality at issue (146).

If it is ambiguous as to whether and how indigenous traditions are religious, it is no more certain that they are ecological—at least in the way that writers on religion and environment would like them to be. That debate is taken up in *Native Americans and the Environment: Perspectives on the Ecological Indian* (147). However, as long as representatives of an indigenous tradition continue to speak out on environmental problems, as they do with increasing visibility and voice around climate change, there will continue to be interest in what some call the “original instructions.” Perhaps indigenous cultures hold needed wisdom about how humans should live intimately and adaptively with Earth (148). That impulse to recover ancient nature-based wisdom also spurs renewed cultural and scholarly interest in animism: A term that was once almost a relic of Western anthropology returns to the cultural scene with new ideological life (149).

## 5. TRENDS AND DIRECTIONS

Connections of religious and environmental studies, we hope to have shown, are multiple,

strong, and in productive ferment. That is promising for interdisciplinary studies of human complexity and environmental sustainability. In an era of integrating human and environmental systems, understanding religious dimensions of human behavior will become increasingly important for investigating how Earth’s systems and communities interact. In closing, we note four areas of emerging interdisciplinary focus, where religious studies have begun to work with other humanities and the sciences.

For environmental thought, the question of the individual animal has occasioned intense ethical debate. How to understand, treat, and interact with animals tests connections of holistic sciences and embodied moralities. Perhaps for that reason, studies of animals in religious traditions have burgeoned in recent years, and “religion and animals” is an emerging subfield of its own with a constructive and tensive relationship with religion and ecology. More studies have appeared than can be here mentioned, but one could start from the programmatic introduction in *A Communion of Subjects: Animals in Religion, Science and Ethics* (150).

A second area of interdisciplinary emergence makes site itself an object of study. Religious studies have taken their own geographic turn with new interpretations of local community informed by ecological relations and environmental studies, constructive theologies reshaping the meaning of paradise with agrarian thought, as well as methodological reflections on the importance of place to understanding religion and culture (151–154).

In line with those practical and particularist directions, a third trend is the movement to focus on particular environmental problems. Sometimes informed by a pragmatist commitment to avoid abstract arguments about religion and ecology, these studies focus on how particular moral communities interpret specific problems, such as climate change or biodiversity loss (120–127, 155). Problem-focused investigations may allow for closer collaboration of religionists and scientists in broad ecological management processes (41, 44). They may also

allow scientists to explore the ethical, cosmological, and/or spiritual dimensions that attend research into environmental decline (156).

Finally, amid the pluralist ferment and practical trends, important work maintains the field's initial focus on the broad evolutionary context for the questions of religion and ecology. Cosmology—as both a moral worldview and an account of humanity and Earth in the evolution of the universe—remains a source of

awe and wonder. In *Journey of the Universe* (157), religionist Tucker and cosmologist Swimme narrate the emergence of humanity from exploding stars and the deep history of the cosmos. In an era of ecological transition, they summon religious and environmental studies to remember their greater context, a story grander than that of specific cultural traditions and one era's ecological problems—and in which their meaning finally lies (157).

### SUMMARY POINTS

1. Religion and ecology is a robust interdisciplinary field growing in both diversity and significance.
2. Researchers in the field face critical questions over the meaning of religion, nature, and ecology.
3. Responses to environmental problems are driving changes within religious traditions, and those changes influence broader social and political interpretation of environmental change.
4. Religion and ecology has been and should continue to be a productive interaction among science and religion, especially among researchers in environmental studies and religious studies.

### FUTURE ISSUES

1. Will social support for sustainability policies require a shared global ethic, or can global governance for planetary problems find support amid many cultural and religious traditions?
2. Is there a general pattern of ecological response across religious traditions? Are new forms of religiosity and ethical orientation emerging? Is there evidence of a wide greening of religion or signs of ecozoic cultural transition?
3. What is the relation of religious environmental projects and science-based environmental policies in social change toward sustainability?
4. What is the ethical and epistemological grounding for sustainability sciences?
5. What is the relation of cultural change and environmental change?

### DISCLOSURE STATEMENT

While the authors have sought critical objectivity, this review may reflect the following affiliations: Christopher Chapple is editor the journal *Worldviews* and Willis Jenkins teaches at Yale University, which hosts the Forum on Religion and Ecology.

## ACKNOWLEDGMENTS

We are grateful to Rebecca A. Henriksen for research assistance in developing this article.

## LITERATURE CITED

1. Jenkins W. 2009. Religion and ecology: a review essay on the field. *J. Am. Acad. Relig.* 77(1):187–97
2. Tucker ME, Williams DR, Grim J, eds. 1997. *Buddhism and Ecology: The Interconnection of Dharma and Deeds*. Cambridge, MA: Harvard Univ. Press
3. Hessel D, Ruether RR, Tucker ME, Grim J, eds. 2000. *Christianity and Ecology: Seeking the Well-Being of Earth and Humans*. Cambridge, MA: Harvard Univ. Press
4. Tucker ME, Berthrong J, Grim J, eds. 1998. *Confucianism and Ecology: The Interrelation of Heaven, Earth, and Humans*. Cambridge, MA: Harvard Univ. Press
5. Girardot NJ, Xiaogan L, Miller J, Tucker ME, Grim J, eds. 2001. *Daoism and Ecology: Ways Within a Cosmic Landscape*. Cambridge, MA: Harvard Univ. Press
6. Chapple CK, Tucker ME, Grim J, eds. 2000. *Hinduism and Ecology: The Intersection of Earth, Sky, and Water*. Cambridge, MA: Harvard Univ. Press
7. Tucker ME, Grim J, eds. 2001. *Indigenous Traditions and Ecology: The Interbeing of Cosmology and Community*. Cambridge, MA: Harvard Univ. Press
8. Foltz R, Denny F, Baharuddin A, Tucker ME, Grim J, eds. 2003. *Islam and Ecology: A Bestowed Trust*. Cambridge, MA: Harvard Univ. Press
9. Chapple CK, Tucker ME, Grim J, eds. 2002. *Jainism and Ecology: Nonviolence in the Web of Life*. Cambridge, MA: Harvard Univ. Press
10. Tirosch-Samuels H, Tucker ME, Grim J, eds. 2002. *Judaism and Ecology: Created World and Revealed Word*. Cambridge, MA: Harvard Univ. Press
11. Bernard R, Tucker ME, Grim J, eds. 2004. *Shinto and Ecology*. Cambridge, MA: Harvard Univ. Press (In Japanese)
12. Tucker ME, Grim J. 2011. *The Forum on Religion and Ecology at Yale*. <http://fore.research.yale.edu/>
13. Berry T. 2009. *The Sacred Universe: Earth, Spirituality, and Religion in the Twenty-First Century*, ed. ME Tucker. New York: Columbia Univ. Press
14. Berry T. 2009. *The Christian Future and the Fate of the Earth*, ed. ME Tucker, J Grim. Maryknoll, NY: Orbis
15. Gottlieb RS. 2009. *A Greener Faith: Religious Environmentalism and Our Planet's Future*. Oxford: Oxford Univ. Press
16. Gottlieb RS, ed. 2006. *The Oxford Handbook of Religion and Ecology*. New York: Oxford Univ. Press
17. Gottlieb RS, ed. 2010. *Religion and the Environment*. Vols. 1–4. London: Routledge
18. Gardner GT. 2006. *Inspiring Progress: Religions' Contributions to Sustainable Development*. New York: Norton
19. Moore KD, Nelson MP, eds. 2010. *Moral Ground: Ethical Action for a Planet in Peril*. San Antonio: Trinity Univ. Press
20. Kaza S, Kraft K, eds. 2000. *Dharma Rain: Sources of Buddhist Environmentalism*. Boston: Shambhala
21. Foltz R, ed. 2002. *Worldviews, Religion, and the Environment: A Global Anthology*. Belmont, CA: Wadsworth
22. Dunlap TR. 2005. *Faith in Nature: Environmentalism as Religious Quest*. Seattle: Univ. Wash. Press
23. Nelson RH. 2009. *The New Holy Wars: Economic Religion Versus Environmental Religion in Contemporary America*. University Park: Pa. State Univ. Press
24. Taylor BR. 2009. *Dark Green Religion: Nature Spirituality and the Planetary Future*. Berkeley: Univ. Calif. Press
25. Taylor BR, ed. 2005. *Encyclopedia of Religion and Nature*. New York: Continuum
26. Taylor BR. 2007. Focus introduction: aquatic nature religion. *J. Am. Acad. Relig.* 75(4):863–74
27. Van Wieren G. 2008. Ecological restoration as public spiritual practice. *Worldviews: Glob. Relig. Cult. Ecol.* 12:237–54

28. Finnegan E. 2011. What traditions are represented in religion and ecology? A perspective from an American scholar of Islam. See Ref. 56, pp. 64–79
29. Berry E. 2011. Nature religion and the problem of authenticity. See Ref. 56, pp. 18–41
30. Kearns L, Keller C, eds. 2007. *Ecospirit: Religions and Philosophies for the Earth*. Bronx, NY: Fordham Univ. Press
31. Eaton H. 2005. *Introducing Ecofeminist Theologies*. Edinburgh: Clark
32. Ress MJ. 2006. *Ecofeminism in Latin America*. Maryknoll, NY: Orbis
33. Ruether RR. 1975. *New Woman, New Earth: Sexist Ideologies and Human Liberation*. Boston: Seabury
34. Ruether RR. 2005. *Integrating Ecofeminism, Globalization, and World Religions*. Lanham, MD: Rowman & Littlefield
35. Page T. 2011. Feminist, gender, and sexuality studies in religion and ecology: where we have been, where we are now, where we are going. See Ref. 56, pp. 102–24
36. Clay E. 2011. How does it feel to be an environmental problem? See Ref. 56, pp. 148–70
37. Taylor Dorceta. 1997. Women of color, environmental justice, and ecofeminism. In *Ecofeminism: Women, Nature, Culture*, ed. K Warren, pp. 38–81. Indianapolis: Indiana Univ. Press
38. Rasmussen L. 2004. Environmental racism and environmental justice: moral theory in the making? *J. Soc. Christ. Ethics* 24:3–28
39. Jenkins W, Bauman W, eds. 2009. *Berkshire Encyclopedia of Sustainability*. Vol. 1. *The Spirit of Sustainability*. Great Barrington, MA: Berkshire
40. Jenkins W. 2009. Introduction. See Ref. 39, pp. xxi–xxiii
41. Fredericks S, O'Brien K. 2011. The importance and limits of taking science seriously: data and uncertainty in religion & ecology. See Ref. 56, pp. 42–63
42. Hamlin C, Lodge D. 2006. Beyond Lynn White: religion, the contexts of ecology, and the flux of nature. See Ref. 158, pp. 1–25
43. Rasmussen L. 2006. Ecology and morality: the challenge to and from Christian ethics. See Ref. 150, pp. 246–78
44. Jenkins W. 2011. Ecological management, cultural reform, and religious creativity. *Union Semin. Q. Rev.* 63:1–17
45. Bauman W. 2011. Opening the language of religion and ecology: viable spaces for transformative politics. See Ref. 56, pp. 80–101
46. Kellert SR. 2007. Connecting with creation: the convergence of nature, religion, science, and culture. *J. Study Relig. Nat. Cult.* 1:25–37
47. Taylor SM. 2007. What if religions had ecologies? The case for reinhabiting religious studies. *J. Study Relig. Nat. Cult.* 1:129–38
48. Hillel D. 2007. *The Natural History of the Bible: An Environmental Exploration of the Hebrew Scriptures*. New York: Columbia Univ. Press
49. Dove M, Carpenter C, eds. 2007. *Environmental Anthropology: A Historical Reader*. Hoboken, NJ: Wiley-Blackwell
50. Dove M, Carpenter C. 2009. Cultural ecology. See Ref. 39, pp. 129–31
51. Menzies CR. 2006. *Traditional Ecological Knowledge and Natural Resource Management*. Lincoln, NE: Univ. Neb. Press
52. Berkes F. 2008. *Sacred Ecology*. London: Routledge. 2nd ed.
53. Berkes F, Folke C, Colding J. 2000. *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*. Cambridge, MA: Cambridge Univ. Press
54. Armitage DR, Plummer R, Berkes F, Arthur RI, Charles AT, et al. 2008. Adaptive comanagement for social-ecological complexity. *Front. Ecol. Environ.* 7:95–102
55. Bauman W, Bohannon R, O'Brien K. 2010. *Grounding Religion: A Field Guide to the Study of Religion and Ecology*. London: Routledge
56. Bauman W, Bohannon R, O'Brien K, eds. 2011. *Inherited Land: The Changing Grounds of Religion and Ecology*. Spokane: Wipf & Stock
57. Chapple CK. 2006. Jainism and ecology: transformation of tradition. See Ref. 18, pp. 147–59
58. Dwivedi OP. 2006. Hindu religion and environmental well-being. See Ref. 18, pp. 160–83

59. Kaza S. 2006. The greening of Buddhism: promise and perils. See Ref. 18, pp. 184–206
60. Miller J. 2006. Daoism and nature. See Ref. 18, pp. 220–35
61. Berthrong J. 2006. Motifs for a new Confucian ecological vision. See Ref. 18, pp. 236–58
62. Callicott JB, Frodeman R, eds. 2008. *Encyclopedia of Environmental Ethics and Philosophy*. Farmington Hills, MI: MacMillan
63. Jung-Bae K, ed. 2009. *2008 Civilization and Peace*. Seoul: Acad. Korean Stud.
64. Bourg D, Roch P, eds. 2010. *Crise écologique, crise des valeurs? Defis pur l'anthropologie et la spiritualite*. Geneva: Labor Fides
65. Swearer D, ed. 2009. *Ecology and the Environment: Perspectives from the Humanities*. Cambridge: Cent. Study World Relig.
66. Nutgeren A. 2005. *Belief, Bounty, and Beauty: Rituals Around Sacred Trees in India*. Amsterdam: Brill
67. Findly EB. 2008. *Plant Lives: Borderline Beings in Indian Traditions*. Delhi: Motilal Banarsidass
68. Haberman D. 2006. *River of Love in an Age of Pollution*. Berkeley: Univ. Calif. Press
69. Frawley D. 2005. *Yoga and the Sacred Fire: Self-Realization and Planetary Transformation*. Twin Lakes, WI: Lotus
70. Feuerstein G, Feuerstein B. 2007. *Green Yoga*. Eastend, Canada: Tradit. Yoga Stud.
71. Feuerstein G, Feuerstein B. 2008. *Green Dharma*. Eastend, Canada: Tradit. Yoga Stud.
72. Chapple CK, ed. 2009. *Yoga and Ecology: Dharma for the Earth*. Hampton, VA: Deepak Herit.
73. Ironbiter S. 2009. Yoga and nature: vital concentration in *Atharva Veda*. See Ref. 72, pp. 13–22
74. Chapple C. 2009. *Prthivi Sukta: earth verses*. See Ref. 72, pp. 23–32
75. Whicher I. 2009. The integration of spirit (*purusa*) and matter (*prakrti*) in the *Yoga sutra*. See Ref. 72, pp. 34–60
76. Foulks B. 2009. Super *samskaras*: soteriological subliminal impressions in Patanjali's *Yoga sutra*. See Ref. 72, pp. 61–82
77. Jacobsen K. 2009. The disharmony of interdependence: Samkya-Yoga and ecology. See Ref. 72, pp. 105–22
78. Lidke J. 2009. Towards a theory of *tantra*-ecology. See Ref. 72, pp. 123–44
79. Cornell L. 2009. Green Yoga: contemporary action and ancient practices: a model for eight paths of green Yoga. See Ref. 72, pp. 145–70
80. Kaza S. 2005. *Hooked! Buddhist Writings on Greed, Desire, and the Urge to Consume*. Boston: Shambhala
81. Sahni P. 2007. *Environmental Ethics in Buddhism: A Virtues Approach*. London: Routledge
82. Cooper DE, James S. 2005. *Buddhism, Virtue, and Environment*. Aldersot, UK: Ashgate
83. De Silva P. 2002. *Buddhism, Ethics, and Society: The Conflicts and Dilemmas of Our Times*. Clayton, Australia: Monash Asia Inst.
84. Darlington SM. 2003. Buddhism and development: the ecology monks of Thailand. In *Action Dharma: New Studies in Engaged Buddhism*, ed. C Queen, C Prebish, D Keown, pp. 96–109. London: Routledge
85. Bhushan N, Garfield JL, Zablocki A, eds. 2009. *TransBuddhism: Transmission, Translation, Transformation*. Amherst: Univ. Mass. Press
86. King SB. 2009. *Socially Engaged Buddhism: Dimensions of Asian Spirituality*. Honolulu: Univ. Hawaii Press
87. McMahan DL. 2008. *The Making of Buddhism Modernism*. Oxford: Oxford Univ. Press
88. Jones K. 2003. *The New Social Face of Buddhism: A Call to Action*. Boston: Wisdom
89. Loy DR. 2008. *Money, Sex, War, Karma: Notes for a Buddhist Revolution*. Boston: Wisdom
90. Loy DR. 2003. *The Great Awakening: A Buddhist Social Theory*. Boston: Wisdom
91. Sivaraksa S. 2005. *Conflict, Culture, Change: Engaged Buddhism in a Globalizing World*. Boston: Wisdom
92. Balsys B. 2004. *Abimsa: Buddhism and the Vegetarian Ideal*. Delhi: Munshiram Manoharlal
93. Lopez DS Jr. 2008. *Buddhism and Science: A Guide for the Perplexed*. Chicago: Univ. Chicago Press
94. Zajonc A, ed. 2004. *The New Physics and Cosmology: Dialogues with the Dalai Lama*. Oxford: Oxford Univ. Press
95. Ames W. 2003. Emptiness and quantum theory. In *Buddhism and Science: Breaking New Ground*, ed. BA Wallace, pp. 285–304. New York: Columbia Univ. Press
96. Shiva V. 2005. *Earth Democracy*. Cambridge, UK: South End
97. Guha R. 2006. *How Much Should a Person Consume? Environmentalism in India and the United States*. Berkeley: Univ. Calif. Press

98. Nand M. 2005. *The Wrongs of the Religious Right: Reflections on Science, Secularism, and Hindutva*. Delhi: Three Essays Collect.
99. Tomalin E. 2009. *Biodivinity and Biodiversity: The Limits to Religious Environmentalism*. Farnham, UK: Ashgate
100. Obadia L. 2008. The conflicting relationships of sherpas to nature: indigenous or Western ecology. *J. Study Relig. Nat. Cult.* 2:116–34
101. Chapple CK. 2008. Asceticism and the environment: Jainism, Buddhism, and yoga. *Cross Curr.* 57:514–25
102. Stibbe A. 2007. Zen and the art of environmental education in the Japanese animated film *Tonari no Totoro*. *J. Study Relig. Nat. Cult.* 1:468–88
103. Holden WN, Jacobson RD. 2007. Ecclesial opposition to mining on Mindanao: neoliberalism encounters the church of the poor in the land of promise. *Worldviews: Glob. Relig. Cult. Ecol.* 11:155–202
104. Dwivedi OP, Reid L. 2007. Women and the sacred earth: Hindu and Christian ecofeminist perspectives. *Worldviews: Glob. Relig. Cult. Ecol.* 11:305–23
105. Jain P. 2009. Dharmic ecology: perspectives from the Swadhyaya practitioners. *Worldviews: Glob. Relig. Cult. Ecol.* 13:303–18
106. White L. 1967. The historical roots of our ecological crisis. *Science* 155:1203–7
107. Jenkins W. 2009. After Lynn White: religious ethics and environmental problems. *J. Relig. Ethics* 37:283–309
108. Bauman W. 2009. *Theology, Creation, and Environmental Ethics: From Creatio Ex Nihilo to Terra Nullius*. London: Routledge
109. Albertson D, King C, eds. 2009. *Without Nature? A New Condition for Theology*. Bronx, NY: Fordham Univ. Press
110. Jenkins W. 2008. *Ecologies of Grace: Environmental Ethics and Christian Theology*. New York: Oxford Univ. Press
111. Schaefer J. 2009. *Theological Foundations for Environmental Ethics: Reconstructing Patristic and Medieval Concepts*. Washington, DC: Georgetown Univ. Press
112. Theokritoff E. 2009. *Living in God's Creation: Orthodox Perspectives on Ecology*. Crestwood, NY: St. Vladimir's Semin.
113. Van Dyke F. 2010. *Between Heaven and Earth: Christian Perspectives on Environmental Protection*. Westport: Praeger
114. Taylor SM. 2009. *Green Sisters: A Spiritual Ecology*. Cambridge, MA: Harvard Univ. Press
115. Peterson AL. 2005. *Seeds of the Kingdom: Utopian Communities in the Americas*. New York: Oxford Univ. Press
116. Lathrop GW. 2009. *Holy Ground: A Liturgical Cosmology*. Minneapolis, MN: Fortress
117. Santmire HP. 2008. *Ritualizing Nature: Renewing Christian Liturgy in a Time of Crisis*. Minneapolis, MN: Fortress
118. Southgate C. 2008. *The Groaning of Creation: God, Evolution, and the Problem of Evil*. Louisville, KY: Westminster John Knox
119. Deane-Drummond S. 2009. *Christ and Evolution: Wonder and Wisdom*. Minneapolis, MN: Fortress
120. Linzey A. 2010. So near and yet so far: animal theology and ecological theology. See Ref. 18, pp. 348–61
121. O'Brien KJ. 2010. *An Ethics of Biodiversity: Christianity, Ecology, and the Variety of Life*. Washington: Georgetown Univ. Press
122. McFague S. 2008. *A New Climate for Theology: God, the World, and Global Warming*. Minneapolis, MN: Fortress
123. Martin-Schramm JB. 2010. *Climate Justice: Ethics, Energy, and Public Policy*. Minneapolis, MN: Fortress
124. Primavesi A. 2009. *Gaia and Climate Change: A Theology of Gift Events*. London: Routledge
125. Muers R. 2008. *Living for the Future: Theological Ethics for Coming Generations*. Edinburgh: Clark Intern.
126. Robb CS. 2010. *Wind, Sun, Soil, Spirit: Biblical Ethics and Climate Change*. Minneapolis, MN: Fortress
127. Northcott MS. 2007. *A Moral Climate: The Ethics of Global Warming*. Maryknoll, NY: Orbis
128. Skrimshire S. 2010. *Future Ethics: Climate Change and Apocalyptic Imagination*. New York: Continuum
129. Yaffe MD. 2001. *Judaism and Environmental Ethics: A Reader*. Lanham, MD: Lexington
130. Benstein J. 2008. *The Way Into Judaism and the Environment*. Woodstock, VT: Jewish Lights

131. Nasr SH. 1967. *Man and Nature: The Spiritual Crisis in Modern Man*. Chicago: Kazi
132. Nasr SH. 2009. *Islam, Science, Muslims, and Technology*. Selangor, Malaysia: Islamic Book Trust
133. Abdul-Martin I. 2010. *Green Deen: What Islam Teaches about Protecting the Planet*. San Francisco: Berrett-Koehler
134. Foltz RC. 2006. *Animals in Islamic Tradition and Muslim Cultures*. Oxford: Oneworld
135. Hakim BS. 2008. *Arabic-Islamic Cities: Building and Planning Principles*. London: EmergentCity
136. Horrell DG. 2010. *The Bible and the Environment: Towards a Critical Ecological Biblical Theology*. London: Equinox
137. Horrell DG, Hunt C, Southgate C. 2010. *Greening Paul: Rereading the Apostle in a Time of Ecological Crisis*. Baylor, TX: Baylor Univ Press
138. Habel NC, Trudinger P. 2008. *Exploring Ecological Hermeneutics*. Atlanta: Soc. Biblic. Lit.
139. Hiebert T. 2008. *The Yabwist's Landscape: Nature and Religion in Early Israel*. Minneapolis, MN: Augsburg Fortress
140. Brown WP. 2010. *The Seven Pillars of Creation: The Bible, Science, and the Ecology of Wonder*. New York: Oxford Univ. Press
141. Bernstein E. 2005. *The Splendor of Creation: A Biblical Ecology*. Cleveland, OH: Pilgrim
142. Davis EF. 2008. *Scripture, Culture, and Agriculture: An Agrarian Reading of the Bible*. Cambridge, MA: Cambridge Univ. Press
143. Johnston DL. 2010. *Earth, Empire and Sacred Text: Muslims and Christians as Trustees of Creation*. London: Equinox
144. Harper Bibles. 2010. *The Green Bible: Understand the Bible's Powerful Message for the Earth*. New York: HarperOne
145. Wenger T. 2009. *We Have a Religion: The 1920s Pueblo Indian Dance Controversy and American Religious Freedom*. Chapel Hill, NC: Univ. N.C. Press
146. Gonzales T, Gonzales ME. 2009. Indigenous traditions—South America. See Ref. 39, pp. 233–36
147. Harkin ME, Lewis DR. 2007. *Native Americans and the Environment: Perspectives on the Ecological Indian*. Lincoln, NE: Univ. Neb. Press
148. Nelson MK. 2008. *Original Instructions: Indigenous Teachings for a Sustainable Future*. Rochester, NY: Bear
149. Harvey G. 2005. *Animism: Respecting the Living World*. New York: Columbia Univ. Press
150. Waldau P, Patton K, eds. 2006. *A Communion of Subjects: Animals in Religion, Science, and Ethics*. New York: Columbia Univ. Press
151. Hakkenberg C. 2008. Biodiversity and sacred sites: vernacular conservation practices in Northwest Yunnan, China. *Worldviews: Glob. Relig. Cult. Ecol.* 12:74–90
152. Kent E. 2009. Sacred groves and local gods: religion and environmentalism in South India. *Worldviews: Glob. Relig. Cult. Ecol.* 13:1–39
153. Wirzba N. 2007. *The Paradise of God: Renewing Religion in an Ecological Age*. New York: Oxford
154. Edwards D, Worthing M. 2005. *Biodiversity and Ecology: An Interdisciplinary Challenge*. Brooklyn Park, Aust.: ATF Press
155. Bergmann S, Scott PM, Jansdotter Samuelson M, Bedford-Strohm H. 2009. *Nature, Space, and the Sacred: Transdisciplinary Perspectives*. Burlington, VT: Ashgate
156. Sideris L, Moore KD. 2008. *Rachel Carson: Legacy and Challenge*. Albany: SUNY Press
157. Tucker ME, Swimme B. 2011. *Journey of the Universe*. New Haven, CT: Yale Univ. Press
158. Hamlin C, Lodge D, eds. 2006. *Religion and the New Ecology: Environmental Responsibility in a World in Flux*. South Bend, IN: Univ. Notre Dame Press



# Contents

Preface .....	v
Who Should Read This Series? .....	vii
<b>I. Earth's Life Support Systems</b>	
Improving Societal Outcomes of Extreme Weather in a Changing Climate: An Integrated Perspective <i>Rebecca E. Morss, Olga V. Wilbelmi, Gerald A. Meehl, and Lisa Dilling</i> .....	1
Ocean Circulations, Heat Budgets, and Future Commitment to Climate Change <i>David W. Pierce, Tim P. Barnett, and Peter J. Gleckler</i> .....	27
Aerosol Impacts on Climate and Biogeochemistry <i>Natalie Mahowald, Daniel S. Ward, Silvia Kloster, Mark G. Flanner, Colette L. Heald, Nicholas G. Heavens, Peter G. Hess, Jean-Francois Lamarque, and Patrick Y. Chuang</i> .....	45
State of the World's Freshwater Ecosystems: Physical, Chemical, and Biological Changes <i>Stephen R. Carpenter, Emily H. Stanley, and M. Jake Vander Zanden</i> .....	75
<b>II. Human Use of Environment and Resources</b>	
Coal Power Impacts, Technology, and Policy: Connecting the Dots <i>Ananth P. Chikkatur, Ankur Chaudhary, and Ambuj D. Sagar</i> .....	101
Energy Poverty <i>Lakshman Guruswamy</i> .....	139
Water and Energy Interactions <i>James E. McMahon and Sarah K. Price</i> .....	163
Agroecology: A Review from a Global-Change Perspective <i>Thomas P. Tomich, Sonja Brodt, Howard Ferris, Ryan Galt, William R. Horwath, Ermias Kebreab, Johan H.J. Leveau, Daniel Liptzin, Mark Lubell, Pierre Merel, Richard Michelsmore, Todd Rosenstock, Kate Scow, Johan Six, Neal Williams, and Louie Yang</i> .....	193

Energy Intensity of Agriculture and Food Systems <i>Nathan Pelletier, Eric Audsley, Sonja Brodt, Tara Garnett, Patrik Henriksson, Alissa Kendall, Klaas Jan Kramer, David Murphy, Thomas Nemecek, and Max Troell</i> .....	223
---	-----

Transportation and the Environment <i>David Banister, Karen Anderton, David Bonilla, Moshe Givoni, and Tim Schwanen</i> .....	247
--	-----

Green Chemistry and Green Engineering: A Framework for Sustainable Technology Development <i>Martin J. Mulvihil, Evan S. Beach, Julie B. Zimmerman, and Paul T. Anastas</i> .....	271
---	-----

The Political Ecology of Land Degradation <i>Elina Andersson, Sara Brogaard, and Lennart Olsson</i> .....	295
--	-----

### III. Management, Guidance, and Governance of Resources and Environment

Agency, Capacity, and Resilience to Environmental Change: Lessons from Human Development, Well-Being, and Disasters <i>Katrina Brown and Elizabeth Westaway</i> .....	321
---	-----

Global Forest Transition: Prospects for an End to Deforestation <i>Patrick Meyfroidt and Eric F. Lambin</i> .....	343
--	-----

Reducing Emissions from Deforestation and Forest Degradation <i>Arun Agrawal, Daniel Nepstad, and Ashwini Chhatre</i> .....	373
--	-----

Tourism and Environment <i>Ralf Buckley</i> .....	397
--	-----

Literature and Environment <i>Lawrence Buell, Ursula K. Heise, and Karen Thornber</i> .....	417
--	-----

Religion and Environment <i>Willis Jenkins and Christopher Key Chapple</i> .....	441
---	-----

### Indexes

Cumulative Index of Contributing Authors, Volumes 27–36 .....	465
---	-----

Cumulative Index of Chapter Titles, Volumes 27–36 .....	469
---	-----

### Errata

An online log of corrections to *Annual Review of Environment and Resources* articles may be found at <http://environ.annualreviews.org>