

STATE OF THE WORLD

EarthEd

*Rethinking Education on a
Changing Planet*



THE WORLDWATCH INSTITUTE

Education for the Eighth Fire: Indigeneity and Native Ways of Learning

Melissa K. Nelson

How do educators prepare the next generation of adults and leaders in an era of radical climate disruption, ecological tipping points, economic volatility, and social and political inequity? In other words, should there be a new type of education for a dystopian future? Although the world has never been a stable, serene place, the changes to the Earth globally and the social disruptions happening in this second decade of the twenty-first century are unprecedented and alarming. The present epoch has been called the Anthropocene, a time of human domination of the Earth. This new epoch requires educators to completely rethink the purpose and goals of education, especially in terms of preparing young people for a viable and hopeful future.

Indigenous peoples, however, have centuries of experience with radical unwanted change from the many ongoing forms of colonialism that have been thrust upon them—western education being one of the most insidious and destructive. It is fair to say that most Indigenous communities and communities of color have experienced some form of oppression, racism, violence, and discrimination through western education. As a consequence, these students often are reluctant to fully trust and give their attention to a system that may have harmed them or their families, or may harm them again. This is one factor behind the high dropout rates for Native students and students of color, as well as for those who are brown, female, artistic, queer, disabled, or on a different learning spectrum. Education is in need of radical transformation for many communities in our growing, diverse world.¹

Melissa K. Nelson is an Anishinaabe/Cree/Métis (Turtle Mountain Chippewa) ecologist, educator, and scholar-activist who serves as an associate professor of American Indian Studies at San Francisco State University and as president of the Cultural Conservancy.

Some scholars have noted that Native Americans already experience a “post-apocalyptic” reality, or “already inhabit what our ancestors would have called a dystopian future.” Land dispossession, genocidal policies, relocation, containment on reservations, resource extraction, toxic pollution, institutional and environmental racism—these are realities for modern Native Americans and for many other Indigenous peoples around the globe. In many ways, these groups are already living in a dystopic reality, and young people feel that. Where is there room to find what many call a “geography of hope”?

The etymological root of the word education is *educare*, to “bring out, draw out.” It is like drawing water out from a well. In this sense, education is primarily endogenous (from within) rather than exogenous (from outside/external). Of course, with the teacher/student relationship, education focuses on a subtle dance between internal and external learning. Many postcolonial, social justice educators refuse to accept what educational philosopher Paulo Freire

has termed the dehumanizing and oppressive “banking model” of western education, which thinks of knowledge like capital that can be deposited into empty students and later extracted like money.²

This banking model of education is also antithetical to Indigenous ways of learning and knowing. A primary difference is that Indigenous education often focuses on the *process of learning* as much, if not more, than the *content of knowing*, thereby focusing on knowledge as a living system, not as a com-

modity. Tewa educator Greg Cajete talks about this process as “coming-to-know.” It is not just about what we know, but how we come to know it and why we know it. According to Native worldviews, gaining knowledge comes with great responsibility; therefore, educational programs should reflect and promote life-affirming cultural values and ethical actions.³

Given the approximately three hundred and seventy million Indigenous peoples on the planet and the five million American Indians/Alaskan Natives



Melissa K. Nelson

Two participants in the Guardians of the Waters youth program plant corn at Indian Valley Organic Farm and Garden, Novato, California.

in the United States today (who represent hundreds of Indigenous nations, tribes, and cultures), there are innumerable types of Indigenous learning processes. These ways of knowing or “Indigenous Knowledge Systems” are based in distinct languages, epistemologies, and ontologies—ways of knowing and being in the world. These diverse worldviews inherently express themselves in different pedagogies, or ways of teaching.

Three Elements of Indigenous Learning and Knowing

Indigenous education is based on ways of learning and knowing that include elements that are quite distinct from western education. Three leading elements are learning spirits, embodied learning, and symbiotic and contextual learning. These are all interconnected and are linked directly to a participatory relationship and to an intimate understanding of the natural world that provides a sense of identity, belonging, and purpose. Additionally, these elements help reveal an inherent attachment to place and a sense of guardianship and stewardship of the natural world that surrounds a person and provides the nutrients of life. These educational practices are rooted in learning from place and gaining knowledge about how to live harmoniously within the limits of the ecological processes of local regions.

There are innumerable differences and variations on these fundamental and interconnected elements of Indigenous education, depending on place and culture. Yet, at their core, they demonstrate that humans have a holistic and sophisticated capacity for learning when they listen to the “learning spirits” of the land (and their ancestors), exercise their whole faculties, and practice their cultural values and environmental ethics on the lands that they live on and with their communities. Many of these Indigenous educational “methods” can be integrated into non-Indigenous educational programs to help all students be better connected to holistic learning practices and the natural world. This also will help prepare them for the dystopian future that they may soon join.

Learning Spirits

Chickasaw law professor James “Sakej” Youngblood Henderson and Mi-kmaw educator Marie Battiste discuss the concept of a learning spirit. These spirits are latent in the ecosystems of the land. Throughout a person’s lifetime, he or she awakens to and remembers different learning spirits for different phases of his or her life. The idea is that every human, and perhaps even every life form, has the capacity to learn and grow: life equals learning. Henderson says

that these learning spirits “are like cognitive gravity.” They are strong attractors that lead us to the paths and experiences that we need at particular times, to nurture and bring forth our gifts and skills.⁴

There are learning spirits contained within each person from birth that awaken over time or come to the person at different periods of life. Perhaps they are inherent in the cellular tissue or DNA of any living organism, perhaps they come to people from ancestral spirits or other entities, or possibly a person’s own unique personality wants to express these learning spirits as the person resonates with certain places and matures over time. Whatever it is, many tribes have this notion and understanding that one of the main roles that people have as human beings is to pay attention to and support the blossoming of their learning spirits. As parents, teachers, and elders, we need to nurture the learning spirits of young people especially. Whether explicit or not, many Indigenous education programs work to educate the whole human and to respect the seen and unseen communities that they come from, including their learning spirits.

Embodied Learning

Many Indigenous education programs focus on the whole body as an organism for learning: the mind, body, heart, and spirit. They include all of the major senses—sight, sound, taste, smell, and touch—as well as intuition and kinesthetic sensory awareness (or proprioception), a whole-body, non-mental physical awareness of self and space. The mind is the most obvious place to learn and teach as we have language, ideas, questions, and logical and translogical thought processes. Our minds are beautiful and complex organs that can be our greatest allies, but, as many have said, the mind is a good servant but not a good master. It needs the ethical connection of our learning spirits and other modes of knowing to balance out its reductionism and tendency to create binaries.

The Eurocentric overemphasis on the mind—specifically on the logical, linear, reductive, and shortsighted parts of the mind—has had grave consequences for humanity and the planet. The overemphasis on creating increasingly complex technology and using it without regard for its long-term consequences has enabled humans to destroy forests, mountains, and habitats and to drive numerous species to extinction. We are currently in the sixth great extinction crisis—all at the hands of humans. By 2050, 15–35 percent of the known species on Earth are expected to go extinct due to human activity. Even our own species, *Homo sapiens*, is at risk.⁵

Additionally, due to the unleashing of nuclear power and the release of massive amounts of stored carbon into the atmosphere, humans have forever changed both the geological strata of the Earth below and the atmosphere above. In addition to these impacts, the Eurocentric obsession with logical positivism, reductionism, Cartesian dualism, and abstraction has meant that humans have been forced to ignore and atrophy their other learning capacities, especially other ways of learning and knowing through the heart, body, and spirit.

The policies and practices of cultural genocide used by religious and government-run boarding schools in Australia, Canada, and the United States in the nineteenth and twentieth centuries have had long-term, devastating impacts on the health of Indigenous peoples. In addition, this type of education has harmed all peoples, regardless of ethnic background, as we all have other creative, imaginative, and emotional ways of knowing that have been disrupted, repressed, and atrophied. These transrational creative ways of learning need to be cultivated and nurtured for true, holistic education to be ignited and expressed.

Indigenous peoples learn through their bodies when they “learn by doing,” as in dancing, wood carving, basket weaving, paddling a canoe, planting trees, or cleaning seeds. It engages the external and internal senses. There is a palpable physical learning and knowing that is expressed when engaged in these important cultural activities. The rhythms of movement and music and dance are excellent stimuli for embodied learning and memory. Sports, too, can be a great way to use the body as a site of learning: thus, the Haudenosaunee have a strong emphasis on lacrosse, and the Maya had a strong tradition of ball games. Many tribes use stick games as well as “gambling” games with dice and other objects to encourage young people to cultivate a strong physical awareness and embodied learning process. These games also teach about topics such as mathematics and geometry.

Additionally, because people’s “gut feelings” often tell them things faster than the mind, it is important to listen to the body’s wisdom and ways of knowing. Science is now confirming the notion of a “second brain” in the gut. People also have their emotions, their hearts, and their spirits, whether they subscribe to a spiritual worldview or not. Much research and work has been done on emotional intelligence and ecopsychology in the past twenty years. Educators and researchers are uncovering the significant role that emotional intelligence and place attachment have in overall learning and success in education and life. (See Chapter 8.)⁶

Symbiotic and Contextual Learning

Learning is an important individual endeavor, whether reading a book, writing an essay, pondering a significant question, or going on a “learning quest” (literally or metaphorically). But for much Indigenous-based education, learning is a collaborative, community process. It is about interrelationships and fostering reciprocity.

Indigenous education is about facilitating productive spaces for the transmission of knowledge among generations: from elders to youth and from youth to elders, as well as peer-to-peer. But Indigenous education does not just focus on learning from other humans, it also focuses on learning from cultural treasures, or “texts,” such as regalia, pottery, baskets, masks, canoes, etc. These cultural treasures are made from natural materials and are imbued with great symbolic meaning and knowledge. These treasures are a perfect marriage of

human creativity and the gifts of nature, the nonhuman relatives that give humans food, shelter, medicine, clothing, cultural items, and so on.

Learning from the land is a primary method of gaining knowledge. Many Indigenous worldviews see nature as the ultimate teacher. It is essential to learn from and be in reciprocal relationships with the more-than-human world: the local plants, animals, and elements that give us life, the sun, moon, wind, fire, soil. Potawatomie botanist Robin Kimmerer states,

“This orientation to the world as an ongoing gift exchange between the human and the more-than-human world is foundational in Indigenous environmental philosophy.” This direct, intimate connection to the natural world is the basis of Native sciences and is critical for fostering an emotional and spiritual bond with place.⁷

Implied within the concept of symbiosis—living together in community—there is an important emphasis on dialogue, exchange, and council. These



Melissa K. Nelson

A participant in the Guardians of the Waters youth program gathers tule reeds, Sonoma Mountain, California.

exchanges are intergenerational, intertribal, intercultural, and often interspecies. Unlike normal classroom discussions, which can be very productive in terms of outcomes, this kind of communication usually is not based on achieving certain results (although it can be). Many Indigenous learning circles focus on a different type of learning and sharing. First, there is generally not a single, specific teacher, but all in the circle are considered teachers and learners. Second, everyone sits in a circle, making an even playing field (no one is higher or lower or privileged as special). Third, there is often no time limit on what one shares. It can be very short or very long, and there is no cross-talk or interruption, unless the speaker asks for it. Fourth, there is an emphasis on deep listening, where personal assumptions and biases are internally questioned and suspended so as to truly hear another's voice and meaning. Long spaces of silence are welcome and considered healthy.⁸

This Indigenous learning space, often called a learning lodge, invites deeper questions that generally are not asked and engenders a collective inquiry—a type of “group mind” or group meditation through words—that is palpably different from other learning spaces. In this circle, there is shared wonder and sometimes grief or frustration at the complexity or contradiction of certain questions or topics. Most importantly, judgment and competitive ego activity are strongly discouraged in this circle, whereas deepening the capacity to hold divergent views as equal to one's own is encouraged, thus making a safe and, many would say, ceremonial or even sacred learning space where one can share without fear of being wrong, reprimanded, scolded, or ignored. It is shameless education.

Indigenous Environmental Education: Linking All to the Natural World

Given these principles and elements, it should be clear that Indigenous education is inherently environmental education. It starts with a cosmological orientation to the sun, moon, and stars in relation to local geography (mountains and rivers) and ecology (plants and animals), which creates eco-cultural landscapes and sacred places. One cannot learn about California Indians, for example, without learning about their reliance on abalone and the Pacific Ocean or acorns and oak woodlands. One cannot learn about a birch bark canoe without learning about the Anishinaabeg peoples of the Great Lakes and their reliance on the water and their dependence on wild rice and fish for sustenance.

One cannot learn about the history of *any* place without understanding the First Peoples of the land and their unique cultural and environmental practices, as well as the impacts of conquest, and cultural resilience. Indigenous learning is always contextual, starting with exactly where you are—cosmologically, geographically, ecologically, culturally, and historically. This starts with honoring the local peoples and places where one learns. In many traditional protocols, one has to ask permission from the land, its spirits, and the Native peoples that dwell in that place to learn in a specific location. An offering generally is made in this process of asking for permission and support. The land has so much to teach us. As Wintun ethnobotanist and herbalist Sage LaPena has said: “[W]herever you go, there you are. There is no place on Earth that is not a place-based classroom.”⁹

Guardians of the Waters Youth Program

Since 2013, the Cultural Conservancy, an Indigenous-rights community organization based in San Francisco, California, has been offering a Native youth summer internship program called Guardians of the Waters. Through this program, fifteen to twenty-five Indigenous youth (many of them urban and intertribal) are selected to participate in a six-week immersion experience, exploring Native water consciousness through a diversity of site visits, participating in canoe making, and learning about Native foodways through exposure to seeds, native plants, and traditional agriculture. Guest teachers for the program include artists, navigators, farmers, Knowledge Holders, and teachers that are associated with the flourishing Indigenous canoe and Indigenous food movements in the United States and around the world.¹⁰

Tribal canoes are sacred vessels that connect nature and culture for travel on water. Through human ingenuity—or “indigenuity,” as Native studies scholar Daniel Wildcat calls it—Native communities transform trees and plant materials such as bark (and sometimes animal skins) into functional and beautiful canoes for water travel. These vessels have great historical and cultural significance to Indigenous communities who live by rivers, lakes, and oceans. Learning about ancestral canoe traditions, whether a Yurok dugout canoe, a Hawaiian double-hull canoe, or a Micmac bark canoe, connects one to ancestral waters and cultural traditions. Relearning canoe traditions such as paddle making and ocean navigation links people directly to the ecology of water—whether fresh water or salty, flowing or still, polluted or clean—and to their own personal waters (humans are 60 percent water). Learning how to carve paddles, build canoes, and navigate by the stars has inspired the youth in this

program to reclaim their role as “Guardians of the Waters,” where they become advocates for the sacredness of water and the need to protect it as a relative.¹¹

Through talking circles and learning exchanges, the youth share their connection—or, more frequently, disconnection—to ancestral waters, thereby instigating a process of personal exploration and reconnection. By visiting springs, creeks, rivers, bays, and the ocean, they learn firsthand that the water cycle is both an ecological and spiritual system of renewal. By witnessing dammed and diverted waterways filled with trash and invasive species, they also learn about the need to rediscover dormant knowledge of water guardianship and how this is a part of Indigenous revitalization and environmental justice.¹²

The youth program also emphasizes the importance of ancestral seeds and native foodways. It conveys the view that the future of life is based on healthy seeds, and, just as the waters need protection and renewal, so do the seeds and native foods that have sustained Indigenous nations, and all peoples, for thousands of years. Program participants visit the Indian Valley Organic Farm and Garden, a certified organic teaching garden at the College of Marin, to learn about organic agriculture, native seeds, ethnobotany, and Three Sisters Native agriculture (the joint planting of corn, squash, and beans). Ideally, they experience all aspects of growing food, from seed planting and farm tending (watering, weeding, composting, natural pest management) to harvesting and feasting, all with an eye toward maintaining carbon-rich, healthy organic soils. The act of “getting dirty” on a farm is a visceral way to literally reconnect to Mother Earth and to explore and learn about the magical alchemy of soil, water, and seeds—the basis of all life.¹³

Learning directly from the land and First Peoples, Guardians of the Waters youth gain critical understanding of the ecological and cultural contexts in which they reside. They also learn from the facilitators, peer teachers, Traditional Knowledge Holders, and each other, experiencing the “symbiosis” of



Melissa K. Nelson

A participant in the Guardians of the Waters youth program tests out a newly created tule reed boat, Occidental Arts and Ecology Center, California.

community learning and sharing. By gathering and processing native plants such as tule and acorns, using chisels to carve redwood and cedar, and weaving baskets, as well as learning Hawaiian navigation chants and dances and Anishinaabe planting songs, youth engage in embodied ways of learning and knowing and are inspired to claim their roles as water and seed guardians.

Indigenizing the Ivory Tower

In 2012, Native educator Rose von Thater-Braan and Indigenous scholar-activist Melissa K. Nelson co-taught a variety of American Indian Studies' Native science classes at San Francisco State University. They introduced students to the concept of a learning lodge to explore Indigenous ways of learning, with a particular focus on exploring the concept of learning spirits, engaging in embodied forms of learning, and creating a safe context for holistic inquiry. The experience was transformational, leading many of the participating students to change their academic and career choices and to commit more deeply to a new type of learning. By incorporating artwork, sound, plants, and movement as valid ways of learning, students commented that they felt liberated from purely intellectual forms of inquiry. The instructors used these embodied methods to share concepts such as quantum time, plant pollination, and ocean dynamics.

During the learning lodges, students had a higher level of participation in dialogue, as they felt that a safe and ceremonial learning space had been created. For example, students who were usually hesitant to speak up in typical university classrooms felt freer to be present and visible and to express divergent or unique perspectives without fear or judgment. Students also commented that they experienced a deeper quality of listening and an altered sense of time. The students learned the importance of “the good mind,” grounding and clearing themselves mentally, emotionally, and physically before engaging in a learning process where deep listening is required. This active presence, which Buddhists may call mindfulness, changes one's relationship to time and was new and refreshing for the students, helping them gain a greater sense of belonging and well-being.

In addition to cultivating these more internal Indigenous learning processes, the classes also focused on the importance of symbiotic and contextual learning: gaining knowledge directly from local landscapes and Native communities. A required part of the coursework was four intensive all-day Saturday field visits to different natural areas to learn about local ecosystems and cultural landscapes. Getting out of the classroom and into natural areas

is key to Indigenous education. The class visited Indian Canyon, a beautiful, natural oak woodland canyon and living cultural heritage area of the Ohlone people; an urban watershed in the Presidio national park; an organic teaching farm where native foods are grown; and a shellmound or beach site along the Pacific Ocean.

During these field visits, the participants learned directly from the original peoples of the land—the Ohlone, Miwok, and other Native California Indian peoples. These Native Knowledge Holders, and Cultural Practitioners shared their traditional ecological knowledge on a variety of topics, depending on the place and theme. The students learned about the history of the land from both Indigenous oral narratives and conventional human and environmental histories. They interacted with native plants and learned about traditional foods and medicines. They also learned about invasive plant species such as eucalyptus and French broom and about local efforts to limit their growth, learning in the process about ecological restoration or “eco-cultural restoration”: bringing back the health and well-being of Native communities, First Peoples, and the ecosystems that they rely on.

Indigeneity and the New People of the Eighth Fire

The Anishinaabeg peoples carry the Seventh Fire Prophecy, which is relevant for our precarious times. The prophecy states that Native peoples in North America are currently living in the Seventh Fire, a time of cultural recovery after the devastating impacts of colonization on Native minds, bodies, hearts, and spirits. Native people are mending the “split-head society” and healing the historical trauma of the boarding-school era and other oppressive impacts due to the policies of the U.S. and Canadian governments during the nineteenth and twentieth centuries. According to this prophecy, urban and rural, mixed-raced Native people will rediscover dormant traditional knowledge and practices, create new lifeways, and begin to weave together a new culture of modern indigeneity. These will be the New People of the Eighth Fire, devoted to kinship, peace, and reciprocity.¹⁴

But Indigenous peoples cannot do this alone. The “light-skinned” people need to make a decision whether they will continue down the path of exploitation, oppression, and destruction, which is characterized by a scorched-earth path; or whether they will choose to remember their own indigeneity to pursue a path of respect, reverence, and renewal, where they will join the New People and a green path of beauty and peace will prevail. Interestingly, Okanagan

writer and Knowledge Holder Jeannette Armstrong has suggested that indigeneity is more about a lived environmental ethic based on ecoliteracy and collective governance than a bloodline. Likewise, Mohawk seed saver Rowen White encourages all peoples to “rehydrate the native seeds and wisdom in our own DNA.” Wes Jackson, the famed agronomist and founder of the Land Institute, writes that humans must again “become native to place.”¹⁵

Given the powerful statements and prophecies above, the possibility of reclaiming indigeneity appears to be a viable answer to the question of how to create a new type of education in order to prepare for or avoid a dystopian future. In this Anthropocene epoch, it seems urgent that humanity transform and evolve into an era of indigeneity and kincentrism. Yet how to do this without falling into the trap of White appropriation and exploitation of Native ways?¹⁶

The Kogi of Colombia call modern industrial humans “Little Brother,” and they refer to themselves—in their role as Indigenous Knowledge Holders that remain deeply tied to the heartbeat of Mother Earth—as “Elder Brother.” What will it take for Little Brother to listen? Is there still time, or is it too late? Regardless of whether Little Brother listens or not, Indigenous peoples are exercising their self-determination and educational rights, fueled by prophetic teachings, to renew Indigenous lifeways and teach them to younger generations to help light the Eighth Fire and create the New People. From the many examples of Indigenous education now taking place, it is clear that peoples of all walks of life are listening to these teachings, decolonizing their minds, and preparing to learn anew to create the New People for a green future.

24. Sustainable Caerphilly County Borough, “Eco School Case Studies: Ynysddu Primary School–Incredible Edible Project,” <http://your.caerphilly.gov.uk/sustainablecaerphilly/schools-and-esdgc/eco-schools/eco-school-case-studies>; Eco-Schools Indian Ocean, “Mauritius Hosts Its First Eco-Schools Award Ceremony,” eco-schools.io/news/mauritius-hosts-its-first-eco-schools-award-ceremony.
25. Box 3–2 from the following sources: Bruce Stokes, Richard Wike, and Jill Carle, “Global Concern About Climate Change, Broad Support for Limiting Emissions,” Pew Research Center, November 5, 2015; Richard Wike, “What the World Thinks About Climate Change in 7 Numbers,” Pew Research Center, April 18, 2016; Diego Román and K. C. Busch, “Textbooks of Doubt: Using Systemic Functional Analysis to Explore the Framing of Climate Change in Middle-school Science Textbooks,” *Environmental Education Research* (September 2015): 1–23; Roger Beck et al., *Modern World History: Patterns of Interaction* (Austin, TX: Holt McDougal, 2007) (the 2012 edition eliminates the line “Not all scientists agree with the theory of the greenhouse effect”; however, many schools continue to use older editions of the textbook); Portland Public Schools, “Resolution to Develop an Implementation Plan for Climate Literacy,” Board of Education Resolution No. 5272 (Portland, OR: May 17, 2016); Bill Bigelow, “Nation’s Largest Teachers Union Endorses Teaching ‘Climate Justice,’” *Common Dreams*, July 19, 2016; Our Children’s Trust, “Landmark U.S. Federal Climate Lawsuit,” www.ourchildrenstrust.org/us/federal-lawsuit; classroom activities from Bill Bigelow and Tim Swinehart, *A People’s Curriculum for the Earth: Teaching Climate Change and the Environmental Crisis* (Milwaukee, WI: Rethinking Schools, 2015).
26. Global Action Plan International, “ESD in Action, Ukraine: Phase 2,” www.globalactionplan.com/esda2.
27. Biomimicry 3.8, “Life’s Principles,” <http://biomimicry.net/about/biomimicry/biomimicry-designlens/life-principles>.

Chapter 4. Education for the Eighth Fire: Indigeneity and Native Ways of Learning

1. Jon Rehyer et al., eds., *Honoring Our Children: Culturally Appropriate Approaches for Teaching Indigenous Students* (Flagstaff, AZ: Northern Arizona University, 2013); Kelsey Sheehy, “Graduation Rates Dropping Among Native American Students,” *U.S. News & World Report*, June 6, 2013; Education Week, *Diplomas Count 2016: High School Redesign* (Bethesda, MD: 2016).
2. Etymology Online, www.etymonline.com; Paulo Freire, *Pedagogy of the Oppressed* (New York: Continuum, 1970); Md. Mahbubul Alam, “Banking Model of Education in Teacher-Centered Class: A Critical Assessment,” *Research on Humanities and Social Sciences* 3, no. 15 (2013): 27–31.
3. Greg Cajete, *Native Science: Natural Laws of Interdependence* (Santa Fe, NM: Clear Light Publishing, 1999), x; Rose von Thater-Braan, “What Is the Native American Learning Bundle,” 2014, <http://silverbuffalo.org/NSA-ScienceOfLearning.html>.
4. Marie Battiste, *Decolonizing Education: Nourishing the Learning Spirit* (Saskatoon, SK: Purich Publishing, 2013); Rose von Thater-Braan and Melissa K. Nelson, “Grandfather How Do I Learn? Exploring the Foundations of Diversity,” documentary film, 2013, <https://vimeo.com/71449994>.
5. See Joan Roach, “By 2050 Warming to Doom Millions of Species,” *National Geographic News*, July 12, 2004.
6. Adam Hadhazy, “‘Second Brain’ Influences Mood and Well-being,” *Scientific American*, February 12, 2010; Joseph Ciarrochi et al., *Emotional Intelligence in Everyday Life: A Scientific Inquiry* (New York: Psychology Press, 2001); Andy Fischer, *Radical Ecopsychology: Psychology in Service of Life* (New York: State University of New York, 2013); Catherine Baumgartner, Embodied Ecologies website, <http://embodiedecologies.moonfruit.com>; Lynne C. Manzo and Patrick Devine-Wright, *Place Attachment: Advances in Theory, Methods, and Applications* (New York: Routledge, 2014).
7. Robin Kimmerer, “Mishkos Kenomagwen, ‘The Lessons of Grass’: Restoring Reciprocity with the Good Green Earth,” in Melissa K. Nelson and Dan Shilling, eds., *Keepers of the Green World: Traditional Ecological Knowledge*

and Sustainability (Cambridge, U.K.: Cambridge University Press, forthcoming 2017); Leanne Simpson, "Land as Pedagogy: Nishnaabeg Intelligence and Rebellious Transformation," *Decolonization: Indigeneity, Education & Society* 3, no. 3 (2014).

8. Dan Moonhawk Alford, *A Report on the Fetzer Institute-sponsored Dialogues Between Western and Indigenous Scientists*, presented at the annual meeting of the Society for the Anthropology of Consciousness, April 11, 1993, <http://hilgart.org/enformy/dma-b.htm>; David Bohm, *On Dialogue* (New York: Routledge, 2004).

9. Sage LaPena, presentation at annual Bioneers Conference, San Rafael, CA, October 24, 2016.

10. Melissa K. Nelson and Nicola Wagenberg. "Linking Ancestral Seeds and Waters to the Indigenous Places We Inhabit," in Jeannine M. Canty, ed., *Ecological and Social Healing: Multicultural Women's Voices* (New York: Routledge, 2016); Winona LaDuke, "Slow, Clean, Good Food," *Indian Country Today Media Network*, September 30, 2016.

11. Daniel R. Wildcat, *Red Alert! Saving the Planet with Indigenous Knowledge* (Golden, CO: Fulcrum Publishing, 2009).

12. The Cultural Conservancy, "Guardians of the Waters: Preserving and Regenerating Water Guardianship," www.nativeland.org/guardians-of-the-waters.

13. The Cultural Conservancy, "Native Foodways: Protecting the Sanctity of Native Foods," www.nativeland.org/native-foodways; Wendy Johnson and Melissa K. Nelson, "Wild and Cultivated Foods: A Collaboration," *Whole Thinking Journal* (Center for Whole Communities), no. 8 (Spring 2013): 30–33; Jane Brody, "Babies Know: A Little Dirt Is Good for You," *New York Times*, January 26, 2009.

14. Melissa K. Nelson, "Mending the Split-Head Society with Trickster Consciousness," in Melissa K. Nelson, ed., *Original Instructions: Indigenous Teachings for a Sustainable Future* (VT: Inner Traditions, 2008); Leanne Simpson, *Lighting the Eighth Fire: The Liberation, Resurgence, and Protection of Indigenous Nations* (Winnipeg, ON: Arbeiter Ring Publishing, 2008).

15. Jeannette Armstrong, *Constructing Indigeneity: Syilx Okanagan Oraliture and Tmix Centrism*, doctoral dissertation (Griefswald, Germany: Ernst-Moritz-Arndt University, 2009); Rowen White, presentation at Cultural Conservancy Harvest Festival, Indian Valley Organic Farm and Garden, College of Marin, CA, October 8, 2016; Wes Jackson, *Becoming Native to This Place* (Berkeley, CA: Counterpoint, 1996).

16. Enrique Salmon, "Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship," *Ecological Applications* 10, no. 5 (October 2000): 1,327–32; Dan Hart, "White Shamans and Plastic Medicine Men," film, 1995, www.iupui.edu/~mstd/e320/white%20shamans%20video.html; Toby McLeod, "Pilgrims and Tourists," film, 2014, http://standingonsacredground.org/sites/default/files/Pilgrims-Tourists_SOSG-teachers_bookmarked.pdf.

Chapter 5. Pathway to Stewardship: A Framework for Children and Youth

1. David Sobel, *Beyond Ecophobia, Reclaiming the Heart in Nature Education*, second edition (Great Barrington, MA: The Orion Society, June 2013).

2. Simeon Ogonda, "What Kind of Children Are We Leaving Behind for Our Planet," *Huffington Post*, April 21, 2015.

3. Mark Olfson, Benjamin G. Druss, and Steven C. Marcus, "Trends in Mental Health Care Among Children and Adolescents," *New England Journal of Medicine* 372 (May 21, 2015): 2,029–38; Jean T. Twenge et al., "Birth Cohort Increases in Psychopathology Among Young Americans, 1938–2007: A Cross-temporal Meta-analysis of the MMPI," *Clinical Psychology Review* 30, no. 2 (March 2010): 145–54; U.S. Centers for Disease Control and Prevention, "Increasing Prevalence of Parent-Reported Attention-Deficit/Hyperactivity Disorder Among Children,

STATE OF THE WORLD

EarthEd

Rethinking Education on a Changing Planet

THE WORLDWATCH INSTITUTE, in its flagship publication, analyzes how we can equip students with the skills to navigate the turbulent century ahead. With global environmental changes locked into our future, what we teach must evolve. All education will need to be environmental education, teaching students to be ecoliterate, deep-thinking, and deeply moral leaders, ready to face unprecedented challenges. *EarthEd* explores traditional areas of environmental education such as nature-based learning and systems thinking, as well as new essential topics including social-emotional learning and the importance of play. This latest edition of *State of the World* examines how, by rethinking education, people worldwide can better adapt to a rapidly changing planet.

“In our shared time on Earth, we must create a new Earth Education. We must help future generations learn the skills necessary to survive the rapid changes ahead—including moral leadership and conflict resolution—and engender a deep connection with other species, as well as our own. This book, and the Earth Education it defines and illuminates, points us toward that new path.”

—**RICHARD LOUV**, author of *Last Child in the Woods*, *The Nature Principle*, and *Vitamin N*

“Perilous times call for smart, hopeful, and vital education, grounded in deep understanding of how the world works and our place in it. *EarthEd* is a reason to take heart, reminding us that we can learn from educators around the world who are drawing from traditional wisdom, new discoveries about learning, and innovative strategies to prepare and inspire students to become effective actors in our changing world.”

—**ZENOBIA BARLOW**, Cofounder and Executive Director of the Center for Ecoliteracy

“The authors in this volume are among the leaders at the forefront of environmental education. The stories, research, and insight that follow will inspire by the examples, models, and sheer dedication and perseverance.”

—**DAVID W. ORR**, Paul Sears Distinguished Professor Emeritus and Counselor to the President, Oberlin College

Cover design: Bruce Gore

Cover illustration: © Kydriashka | Dreamstime.com



Washington | Covelo | London

www.islandpress.org

All Island Press books are printed on recycled, acid-free paper.

ISBN 13: 978-1-61091-842-8

ISBN 10: 1-61091-842-8

