

Global Warming, Climate Change, and Music

As an expressive medium, music is an important part of experiencing the joys and struggles of human existence: from religious exuberance and community building, to social upheaval and war; from love and happiness, to sadness and loss. It should be no surprise, then, that music resonates with one of the most daunting challenges for human life on earth: climate change brought about by global warming. While this threat extends over the entire planet, American musicians and listeners have engaged with it in multifarious and subtle, even unknowing, ways, not only by expressing concerns about its impacts and reflecting on the changing natural world around us, but also by participating in systems that contribute to environmental degradation and climate change.

Global warming refers to the rapid increase of average surface temperatures on earth. This rise is a result of greenhouse gases, such as carbon dioxide, that come from burning the fossil fuels coal and oil, which humans have done on a large scale since the nineteenth-century thanks to the developments of the Industrial Revolution. Global warming is exacerbated by degradation to ecological systems, such as deforestation in the Amazon and erosion from development (farming, mineral extraction, homebuilding, etc.), and it contributes to climate change: alterations in the expected and observed weather patterns on earth. Areas that once contained permafrost begin to thaw, areas that previously experienced temperate rainfall suffer from drought, areas that previously enjoyed mild winters experience blizzards, and land ice levels decrease and lead to concomitant increases in sea level — and all these contribute to feedback loops that exacerbate the warming. Although it is difficult to show causation between climate change and individual weather events — such as Hurricane Katrina of 2005, the mid-Atlantic blizzards of 2009-2010, or the record tornados of April 2011 — such events do fit into scientists'

understanding of the large-scale climate change impacts of anthropogenic (i.e., human-influenced) global warming.

Climate scientists refer to anthropogenic variables as cultural factors that contribute to climate change but are difficult to measure. By considering the relationship between music and climate change, we can begin to understand some of those unquantifiable issues. To do so, we rely upon a relatively new approach of understanding: ecomusicology, which studies the relationships among nature, culture, and music, or more broadly, the relationships between musical and sonic issues, both textual and performative, related to ecology and the environment. Thinking about American composers of art and popular music and about their performers, listeners, contexts, and practices in this way provides connections between diverse worlds of music and the complex realms of global warming and climate change.

Nature has long been hailed as a determining factor in the character of the people and places of the United States. American art music reflects this connection. Like painters of the Hudson Valley School, nineteenth-century American composers reflected similar interests: composers such as Anthony Philip Heinrich, William Henry Fry, and George Frederick Bristow all created musical evocations of the grandiose, nationalistic nature represented by Niagara Falls (which, incidentally, now provides electricity through mostly carbon-free hydropower, which does not contribute to global warming). The early twentieth-century composer Ferde Grofé captured conflicting ideas about conservation and preservation in his 1931 *Grand Canyon Suite* (Toliver 2004); he also reflected the industrial progress of the age in pieces such as *Wheels, for orchestra* (1939), dedicated to the Ford Motor Company (today, the transportation sector accounts for about one third of U.S. climate change emissions). Many American composers have exhibited a fascination with place: from Grofé's many place-based suites and Charles Ives's *Three Places in*

New England (1903-29), to William Grant Still's *Kaintuck'* (1935) and Steve Reich's *The Desert Music* (1982-84) (Von Glahn 2003). Classical art music has primarily been one of reflective, impressionistic engagement with nature, although some have done more with the medium. For example, Stephen Albert won the Pulitzer Prize for his *Symphony: RiverRun* (1983-84), which Watkins (2007) interpreted as entering a philosophical debate about cultural conceptions of nature. Pulitzer Prize-winning composer Ellen Taaffe Zwilich's *Symphony No. 4, The Gardens* (1999) includes a children's chorus pledging to "leave a verdant earth" in the context of a symphonic meditation on endangered and extinct species. And composer John Luther Adams has written numerous pieces evocative of the Arctic that draw attention to the fragile ecology of a place central to understanding climate change.

Soundscapes, the aural equivalent to visual experiences of land, also have connections with climate change. Artists, ethnographers, bioacousticians, scientists, and others have, since the advent of recording technology, made sonic portraits of the environment. One such interdisciplinary investigator is Bernie Krause, who has spent decades recording the sounds of diverse ecologies across the globe, studying them, and sharing them. Some of his work chronicles the sound of places that are now extinct or no longer the same due to human impacts, including climate change. Soundscape artist David Dunn has applied his skills as a composer to the problem of the bark beetle in Western pine trees; when stressed by climate-change-exacerbated drought, the trees are more susceptible to beetle attacks. Dunn has collaborated with scientists to hear the beetles in order to develop tools to fight and prevent the infestations using sound.

More than classical music and soundscapes, however, American popular music has been the most fertile ground for musical and practical engagements with global warming. The most

significant artists to do so before the modern era of environmentalism, which began in the late 1960s and thus before widespread understanding of climate change, are Woody Guthrie and Pete Seeger. In the 1940s Guthrie was commissioned to write music for a film (*The Columbia*, 1949) about the Bonneville Power Administration's dams on the Columbia River. His songs reflect his wonder and respect for the environment of the Pacific Northwest as well as his technological awe and concern for the people of the area who worked on and were affected by the dams. The main subjects of the songs and the film, however, are the dams that provided irrigation and carbon-free electricity but have caused other environmental problems (Pedelty 2008). Seeger's album *God Bless the Grass* (1966) included many songs of environmental protest, which grew out of his work in the Civil Rights movement. Protests against the war in Vietnam and nuclear proliferation resonated with the struggle for equality and a less toxic environment; while many concerns were anthropocentric, some of Seeger's songs expressed biocentric values as well (Ingram 2008).

A great variety of American musical styles and genres engage with environmental issues (Ingram 2010). The connections with climate change are usually through the stories they tell more so than the specific sounds they produce, although the sounds can be evocative of meaningful places. The music of Appalachia has long commented on the lives and fortunes — usually lamentable — of the coal miners who risked their lives to provide fuel for the world and a living for their families, as with Darrell Scott's "You'll Never Leave Harlan Alive." Country music, such as that of John Denver, presented images of agrarian life and wilderness conservation. Michael Jackson's "Earth Song" catalogued a litany of environmental problems. Paul Winter's jazz album *Whales Alive* incorporated whale songs and helped draw attention to the plight of the mammals, and philosopher/clarinetist David Rothenberg has improvised jazz

with birds and other animals. Hip-hop artist Dr. Octagon raises environmental consciousness through his urban-centric lyrics, as in his “Trees” (those organisms are fundamental to air quality and regulating climate). And non-professional musicians have gotten into the mix with professional climatologists and journalists producing educational (and entertaining) songs such as the rap “I’m a Climate Scientist (Hungry Beast)” and the funk “The Fracking Song.”

In addition to the music itself, activities around music making are relevant for their climate connections, including the music business, concerts, recordings, and instruments. The Green Music Alliance works with industry, musicians, and listeners to reduce the carbon footprint of the music business. Numerous ensembles have worked toward similar ends independently and with other organizations (Pedelty 2011). Cloud Cult has experimented with numerous environmentally friendly touring methods. Green Day has lived up to their name and worked with the National Resources Defense Council on various environmental issues. Moby’s animal rights work and veganism are complemented by limited touring to reduce his carbon footprint (and increase the excitement and value of his live engagements). U2’s world tour in 2009-10 was criticized for the band’s environmental doublespeak: despite their well-known commitments to environmental and social justice causes, the tour involved extremely large stages that were transported across the globe, yet they also purchased carbon offsets and encouraged their audiences to do the same. Numerous music venues — from Bonaroo in Tennessee to Outside Lands in San Francisco (and beyond to festivals in Spain, Denmark, and England, as well as the global phenomenon of Live Earth concerts) — are making environmentally conscious practices part of the norm for concert goers: from minimizing waste and promoting locally sourced products to providing sustainability education and powering up with climate-friendly alternatives such as solar energy. But it is not only popular music venues that have climate impacts: jet-

setting classical musicians tour internationally, as do major orchestras, and most conductors maintain international careers that keep them constantly flying between far-flung venues.

While concerts and tours can have immediately visible environmental impacts and large carbon footprints, recordings are less conspicuous. The impact of compact disks versus electronic song downloads has been studied by the Microsoft and Intel Corporations; although small variables such as file size can change the calculations, the study found that downloads were more energy efficient than CDs (and carbon-free sources of energy could improve the balance further). The Patagonia Music Collective — which includes artists such as Pearl Jam, Guster, and Philip Glass — provides funding for environmental nonprofit organizations through the purchase of music downloads.

Whether the music is downloaded or on CD, most playback of music is experienced through technological devices, be they iPods, home stereos, or coliseum sound systems. Modern electronics use plastics, derived from petroleum, and mined minerals, such as gold, silver, lead, brass, copper, zinc, tantalum, and rare earth elements. Mining has profound environmental impacts: deforestation, habitat destruction, waterway siltation, water and air contamination, and direct human health impacts on bystanders and workers. In countries rich in mineral resources but weak in labor and environmental standards, workers, including children, may be forced to toil for low pay and in poor or dangerous conditions (particularly in war-torn regions of central Africa's Congo Basin). In addition, significant amounts of energy from coal and petroleum are consumed to obtain, refine, develop, manufacture, and ship the minerals and their resulting electronic components (such as LCDs, capacitors, cases, CDs, and circuitry) and finished products. And of course, playback itself requires electricity. Burning coal to create electricity contributes significantly to global warming as well as more local impacts of acid rain and smog.

Furthermore, coal mining in Appalachia — one of the most biologically diverse ecological regions on earth and home ground to many local cultural subgroups with unique musical traditions — is often conducted through the extremely destructive practice of mountain-top removal.

A further material connection with climate change concerns the instruments used to make music. Consider the most common instruments in art and popular musics: the guitar and the violin. Acoustic guitars commonly use old-growth trees, such as the hardwoods mahogany and rosewood from the tropics and the softwood Sitka spruce from the temperate rainforests of the Pacific Northwest. Although an individual guitar uses only a small amount of wood, the high quality of the material results in the need to harvest large amounts to provide that necessary caliber. In addition, the desire for excellent wood from ancient forests that are far flung around the globe results in high prices (rosewood can sell for as much as \$5,000 per cubic meter) that encourage piracy, criminality, and destructive harvesting practices. Guitar makers Fender, Gibson, Martin, and Taylor have been working with Greenpeace and the Forest Stewardship Council to ensure sustainable management of the same ancient forests that supply musical instrument wood — and help regulate the carbon cycle of the planet.

Professional violin bows are made from wild pernambuco, also known as *pau brasil*, which grows only in Brazil's Atlantic Coastal Forest. Once an abundant and fundamental resource to both native and colonial peoples (the country was named after the tree), today *pau brasil* is nearly extinct due to many ecological pressures, similar to those impacting the nearby Amazon. Bow makers have made valiant efforts to use the resource responsibly and find alternatives, yet professional players continue to insist on expensive — and ecologically destructive — pernambuco bows. The red spruce growing in the unique alpine microclimate of the Val di

Fiemme's Paneveggio Forest has fared better. Although spruce is widely distributed, a special microclimate in the Paneveggio yields excellent spruce resonance wood for instrument soundboards. Antonio Stradivari used Paneveggian spruce, and his creations have contributed to the renown of this region, which is known as "the forest of violins." (One hypothesis by dendrochronologists, who study tree ring dating, says that during the period 1645-1715, a unique climatic situation known as the Maunder Minimum resulted in trees that made excellent soundboards, particularly in the Paneveggio; during the latter part of his career, Stradivari used wood grown during the Maunder Minimum.) Despite external development pressures, Fiemmesi traditions of conservation since the twelfth century have maintained the forests; today, more trees grow in the Paneveggio than loggers harvest, thanks in part to those traditions but also to the fame of the musical wood from the forest of violins.

Music traditions interact in complex ways with the climate crisis. In some cases, they may contribute to promoting awareness (as with the messages in songs or the concerts of interested musicians), or they may encourage the conservation or sustainable development of a natural resource (as with musicians' fundraising or with violins). In other cases, music traditions may cause environmental destruction (as with guitar woods and electronics), or they may result in destructive behaviors (as with touring or concerts). Cultural traditions of music making are intertwined in the same context as global warming, and many more examples than those mentioned here could be cited as connections. Music creation, production, and consumption in the United States reflect the world-wide concern with environmental issues and climate change and, at the same time, they have global impacts.

See also: Anti-war songs; Art music (experimental); Art music (mainstream); Club venues; Composers; Country music; Denver, John; Environmental activism through music; Festivals; Glass, Philip; Green Day; Guitars; Guthrie, Woody; Hip hop; Hurricane Katrina and music; Ives, Charles; Jackson, Michael; Music instruments; Jazz; Pearl Jam; Pop music; Private music experiences/personal music devices; Protest music; Reich, Steve; Seeger, Pete; Tours and touring

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