Ecomusicology: Tributaries and Distributaries of an Integrative Field

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ABSTRACT: Ecomusicology engages scholars in interdisciplinary exchanges concerning music-and-environment. Ecomusicological research is environmental, relational, holistic, systemic, explanatory, and crisis-oriented, bringing the field into conversation with several disciplines and sister fields. The authors of this article suggest the "watershed" as a metaphor for understanding ecomusicology as a transdisciplinary conversation, a stream of inquiry fed by multiple tributaries. These arterial influences feed back into a number of intellectual distributaries, making ecomusicology a transdisciplinary nexus, rather than an easily locatable and definable discipline. This article brings together key contributions to ecomusicology from musicology, ethnomusicology, popular music studies, and acoustic ecology, while acknowledging major influences from sound studies, zoömusicology, music education, music theory, anthropology, communication studies, bioacoustics, geography, political science, and sociology, among other disciplines. In turn, ecomusicology has contributed to environmental research in each of these disciplines as well as the broader study of sound-and-environment. This review is intended as an introduction to the field for those who are new to ecomusicology, while adding novel perspectives for scholars already engaged in ecological study, teaching, and music performance.

KEYWORDS: ecomusicology, sound, environment, ecology, environmental justice, interdisciplinarity, transdisciplinarity, music studies, sound studies, acoustic ecology

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INTRODUCTION

The transdisciplinary field of ecomusicology has been generative and, for some, contentious. Such contestation is to be expected for any interdisciplinary pursuit or transdisciplinary conversation. Consider, for example, the establishment of ethnomusicology. In 1976, just two decades after the field had started to become recognized as a distinct discipline, the music scholar Fredric Lieberman and his colleagues called for its abolishment. They argued that anthropology and musicology were robust enough to take on the musics and issues that ethnomusicologists emphasized (Lieberman, Helm, and Palisca 1977). They were by no means alone in making that argument. Despite such criticisms, the first generations of ethnomusicologists continued their work apace, believing that neither anthropology nor musicology was fully equipped to foster the rigorous ethnographic study of music in its variegated forms around the world. As we will show in this synthetic review, ecomusicology is, unlike ethnomusicology, a transdisciplinary field, not a discipline (Hammarfelt 2019). Yet recent criticisms in

regard to the ecological study of music have been strikingly similar to those leveled at the burgeoning discipline of ethnomusicology decades ago.

Ethnomusicology had a challenging relationship with its parent disciplines throughout its adolescence. Scholars in this new area of study felt that their discipline was being treated like "a second-class citizen in the society of the social sciences and the humanities" (Rhodes 1956, 457). Time has demonstrated that ethnomusicology's critics were off base. Ethnomusicology has been integrative as well as additive; its work has complemented as well as overlapped with that of other disciplines, but it has by no means been redundant. Ethnomusicology is integrative in that ethnomusicologists have combined knowledge from both of its parent disciplines to do work that neither had adequately covered before their "child" came into existence. It is additive in that ethnomusicology focuses intellectual effort on musical cultures that musicology has tended to ignore. This is similar to the field of ecomusicology, in that this relatively young, transdisciplinary area is developing ecological (i.e., relational, holistic, systemic, explanatory, and crisis-oriented) analyses of music and covering topics (e.g., environmental movements, climate change, pollution, environmental justice, biodiversity) that were previously understudied in the music disciplines and thus deserve a more concerted focus.

To continue the historical parallel, we can observe that once their discipline was more comfortably established, ethnomusicologists drew on antecedents in anthropology and musicology to deepen their own institutional history. Ethnomusicologists claimed inspiration from comparative musicologists and ethnologists from the late nineteenth and early twentieth centuries who had neither heard of nor uttered the word "ethnomusicology" in their lifetimes. For example, such connections are made throughout Bruno Nettl and Philip Bohlman's classic history of the discipline (1991). Perhaps adopting disciplinary precursors is the intellectual equivalent of proxy baptism. Nevertheless, ethnomusicology's historiographic recasting was more of an homage than an appropriation. Doing so provided the young discipline with an intellectual history that enriched ethnomusicological theory and gave appropriate credit to foundational influences. We have a similar goal for this article—recognizing all of the disciplines, interdisciplines, and fields influencing ecomusicology. Understanding ancestral influence is key to contextualizing each new generation of scholarship. Ethnomusicologists were certainly not the first to study musicking outside of the Western classical canon but were the first to make it the focus of their collective work. Similarly, ecomusicology is not the first field to focus on music and/in/as environment. Yet ecomusicology is distinct in the ways that its scholars have collectively centered sound research in broader ecological contexts, with attention to existential environmental concerns, topics, and questions.

Fifty years since the field of ecomusicology was first proposed, and as the conversation has expanded, scholars in the established music studies disciplines have begun questioning whether or not ecomusicology is necessary.[1] In this context, ecomusicology is a field in Pierre Bourdieu's (1983) sense of the term—a site of "struggle" occupying a productive and fraught territory between disciplines. As with all boundary crossings, the ecomusicological conversation is viewed by some as a disciplinary threat and by others as an opportunity to generate new knowledge. Given that contention, those of us engaging in the ecomusicological conversation have been taxed with demands from colleagues who, understandably, ask that we explain what ecomusicology's multidisciplinary collection of musicologists, ethnomusicologists, anthropologists, acoustic ecologists, sound studies scholars, bioacoustics researchers, anthropologists, popular music scholars, musicians, composers, and zoömusicologists bring to the discussion that previous music scholars have not already considered. Indeed, scholars in the ecomusicological conversation were by no means the first to think about music in environmental contexts, nor are we alone in doing so now. Hollis Taylor (2020) made a similar point in her exceptionally well rendered history and review of zoömusicology, noting that her field "is not alone in seeking to bridge the gap between the arts and sciences through intermingled investigations of musical, ecological, and epistemological issues" (13). Similarly, ecomusicology is by no means alone in its work.[2] And, as Taylor noted, "No one discipline can provide comprehensive answers when the problems at hand are embedded in complex structures" (19).

As with all meaningful transdisciplinary conversations, ecomusicology is integrative, bringing together knowledge, scholars, and theory from across various fields and disciplines. The main point of this review is to recognize that legacy and demonstrate how synthesizing various theoretical influences into a concerted, interdisciplinary conversation around the topic of music and the environment has been productive. Another hallmark of transdisciplinary scholarship is that it goes beyond the recombination of existing ideas, creates new knowledge, and focuses attention on realities that are not adequately captured in established disciplines (thus recognizing the partiality of all knowledge). Ecomusicology has entertained environmental questions that have not been a mainstay in any of the music or sound studies disciplines, and it draws on ecological principles and theories that have not been consistently integrated into musicological or ethnomusicological research. Per the name, the approach of ecomusicology is recognizably "environmental," in the ways that that term is defined in the broader field of environmental studies. Ecomusicologists thus emphasize ecological analyses and reasoning to understand music, musicking, and sound in relational, holistic, systemic, and explanatory terms, and, in so doing, respond to the exigency of studying the sonic dimensions of the compounding ecological crises besetting all living communities.

Therefore, ecomusicology is by no means a replacement for preexisting disciplines but rather an interdisciplinary field of exchange that adds value to related conversations in environmental, music, and sound studies disciplines. Ecomusicology fills a useful, interstitial niche vis-à-vis those disciplines. It is an interlocutor, and giving a relatively straightforward name to this productive field of research, exchange, and application has been useful. Beyond thinking about ecomusicology as a transdisciplinary field, we understand it to be a watershed of sound inquiry, "ecomusicologies," as Aaron Allen and Kevin Dawe have phrased it in the plural (2016, 1–15). The ecomusicological stream is fed by several tributaries, which we will explore here. We trace these tributaries while noting how ecomusicological research feeds back into several disciplinary distributaries in the music and sound studies watershed. The purpose of this piece is therefore to provide an intellectual history of ecomusicology, explore its current ferment, and, perhaps most importantly, highlight the promising new work in this area underway around the world. In our discussion, we emphasize research by graduate students and early career scholars, which promises to address the inevitable shortcomings of the current field, including the essential work of decolonizing disciplines predicated on the primacy of Whiteness, capitalism, and colonial metropoles.

So, what is ecomusicology beyond a set of aquatic metaphors? In terms of subject matter, scholars in this field consider sound, music, and musicking in ecological contexts and deal with matters of environmental justice, biodiversity, and ecological crises, including climate change, pollution, habitat degradation, and mass extinction. Such work was far less common in music research before the turn of the millennium. We use the term "ecomusicology" to refer to the scholarship on these topics and thus avoid deploying an awkward list of descriptors and qualifiers each time we want to make reference to the field. A phrase like "environmental musical research concerned with the study of musicking in broader and deeper ecological contexts, with consideration of biodiversity, environmental justice, and environmental crises," for example, does not exactly roll off the tongue, nor does it effectively capture the broader, unifying concepts under discussion. Ecomusicology is not only the simplest, most obvious, and encompassing appellation for such research, it is also the most firmly established, dating back at least to the work of Malcolm Troup in 1972.

This article begins by providing a brief history of ecomusicology, and we follow this with sections that discuss contributions to ecomusicology from musicology, ethnomusicology, popular music studies, and acoustic ecology. The article concludes by featuring exciting work underway by graduate and early career scholars who are radically advancing the field. Each of the article's co-authors has taken primary responsibility for drafting the section that deals with their home discipline, and all of us have contributed to the theoretical framing of this article. We have written this review to serve as an introduction for those who are new to ecomusicology, while adding new perspectives that will interest scholars who have already been involved in the ecomusicological conversation.

WELLSPRINGS OF ECOMUSICOLOGY: HISTORY AND INSTITUTIONS

Malcolm Troup provided what we believe is the first published reference to "ecomusicology," in the masthead of the 1972 volume of the *Guildhall School of Music and Drama Review*: "The aim of this year's *Review* is to propose Ecomusicology—the specific study of our sonic environment—as an ear to Ecology's eye, just as Ethnomusicology is to Ethnology." Troup (1971) states that he had contemplated the idea, implicitly and tenuously, in an October 1970 lecture, where he discussed music and sound in the "first environment—that of mother and child" (3). He expanded his thinking in the 1972 *Review*, which included the essays "Music of the Environment" (R. Murray Schafer), "Deep Harmony: The Song of the Humpback Whale" (Roger Payne), "Earth's Magnetic Field" (Charles Dodge and Bruce Boller), and "Nuclear Music" (E. J. Wells). The Swedish composer Bengt Hambraeus reported approvingly on these articles and their "easy-to-understand introduction to new research fields" (1973, 50, translation ours). About a decade earlier, anthropologist William Archer (1964) had called for an "ecology of music," but it was a metaphor for interdisciplinary music study and not a reference to anything resembling ecomusicology. So, with Troup and his colleagues have we discovered the wellspring of ecomusicology?

Yes and no. Yes, in that Troup's is the earliest use we have found of the term "ecomusicology," which thus allows us to tentatively identify his 1972 publication as the source for this stream of research. The Google Books Ngram Viewer first registers the word "ecomusicology" in the last two decades of the twentieth century, and this period saw a small flourishing of the term in diverse contexts. At this time, ethnomusicologist Wendy Wickwire promoted an ecomusicology of "social and natural interdependence" as the goal of an anthropology of music (1985, 212). In 1996, a brief editorial blurb titled "Eco-musicology" reported on Gibson Guitars' use of Rainforest Alliance certified lumber for their Les Paul Standard model (Mandel 1996, 8). And an environmental educator (Randle 1989, 117), a musicologist (Harley 1995), and a music psychologist (Kaipainen 1997) all used the term around this time.

Despite Troup's early use of the term, the wellspring of ecomusicology is not solely the work of Troup and his colleagues in the early 1970s; it is significantly older and more diffuse. Rather than identifying some mythical font, we are better served by recognizing the diversity and dialogue of multiple ecomusicologies, a term that was employed in a series of conference titles between 2012 and 2014 (see Table 1, below). This section briefly maps two ecomusicological tributaries: an early broadening of music research to include environmental sound and the increasing awareness of environmental crisis in the arts, humanities, social sciences, and beyond.

By broadening their conversation to consider sound, music scholars created an opening that allowed for a more holistic approach, one that was less anthropocentric (Allen and Titon 2019). Limiting music studies to a humanistic or social science project (i.e., focusing on the work, act, and/or people who make or listen to music) excludes the larger Earth context that is necessary for all human endeavors. While scholars in the humanities have long emphasized "context," this term has usually been used to refer to the social, political, and cultural contexts of *humans*, rather than the consideration of other biotic species and abiotic processes that constitute the entire Earth context. Framed in terms of the human/environment binary, even the term "environment" is a limited, anthropocentric concept, since it treats the environment as if it were the Other of and separate from humans, rather than something that is inherently connected to them. When open to both anthropogenic and non-anthropogenic sound, which includes or contains what is popularly (if confusingly) called "music," humans are on a path to think ecomusicologically. In this context, we can consider Indigenous ways of knowing (e.g., the Kaluli notion of *dulugu ganalan*; see Feld [1982] 2012), ancient Chinese literature (e.g., *The Chunqiu* [Spring and autumn annals]; see Titon 2018, 258), and classical Greek philosophy (Allen and Dawe 2016, 3; Bocast 2012) as tributaries of ecomusicological thought.

Yet ecomusicology is also a twenty-first-century phenomenon born of twentieth-century social and biophysical crises that have resulted from centuries of Western colonial and industrial projects. In part due

to these complicated histories of human and environmental exploitation, as well as the resulting cultural and scholarly debates that came from them, ethnomusicologist Jeff Todd Titon defines ecomusicology as "the study of music, culture, sound and nature *in a period of environmental crisis*" (2013, 8, emphasis added).[3] The increased awareness of these crises (pollution, biodiversity loss, climate change, etc.) and the developing prominence of the ecological sciences led in the twentieth century to the establishment of interdisciplinary academic programs in environmental studies, which in turn influenced interdisciplinary environmental work in fields such as biology, economics, history, philosophy, and public policy (Allen 2021a). While individual scholars have contributed to *research* on the environment during this period, one prominent literary scholar has argued that "the humanities have been nearly invisible" in those institutional processes (Heise 2016, 24). Nevertheless, at the start of the twenty-first century, music theorist and musicologist Alexander Rehding observed that "the cultural study of nature has become a burgeoning industry in other humanistic disciplines but has hardly hit musicology" (2002, 305).[4]

Given the plural, transdisciplinary, and integrative nature of ecomusicology discussed above, the field's relationship to existing academic disciplines and their institutions is complex and resistant to the tidy disciplinary organization that follows in this essay. The recent publication of interdisciplinary edited volumes (e.g., Allen and Dawe 2016; Allen and Titon 2018; Cooley 2019; McDowell et al. 2021) is one way that such complexity and resistance has been addressed. Another is through the formation of organizations within existing scholarly societies. Of the four academic music societies that are members of the American Council of Learned Societies, three have units or groups dealing with the environment: the Society for Ethnomusicology (SEM), the Society for Music Theory (SMT), and the American Musicological Society (AMS). SEM established its Ecomusicology Special Interest Group (ESIG) in 2011, an effort led by Allen, Andrew Mark, and Alyssa Van Thoen. SMT began to address the environmental impacts of the society (particularly regarding its conferences) with an ad hoc sustainability committee that Yonatan Malin established circa 2008, which SMT eventually made permanent. The AMS Ecocriticism Study Group (ESG) began officially in 2007 but had informally existed since at least 2002, when there was a session of four papers at the annual AMS conference on the theme of "Musical Landscapes and Ecologies" (Toliver 2004, 330n20), which led to the publication of one of those contributions in that organization's top journal (Toliver 2004). Three junior scholars led the writing of the official proposal to establish the ESG (Allen, Catherine Cole, and Robert Fallon), and they were joined by twenty-one signatories (sixteen of whom were AMS members).[5]

The AMS study group and SEM interest group helped facilitate some of the intellectual infrastructure that has brought scholars together around shared concerns and goals. Since their establishment, the ESG and ESIG have organized regular events at their respective annual meetings, and since 2012 the two have published the *Ecomusicology Newsletter*, which in 2016 became the *Ecomusicology Review* and which, in 2021, severed official ties with the ESG. (Informal ties through the editorial board remain with both groups.)[6] Although not exclusive to these groups, a number of symposia and conferences have been organized around related themes and have often involved their members. Table 1 provides a partial listing of such events. It should be noted that the table does not reflect the growing interest in ecomusicology that resulted in hundreds of scholars attending the Ecomusics and Ecomusicologies 2014 conference, or the standing-room-only crowd at the Ecomusicology Listening Room at the AMS/SEM/SMT joint conference in 2012 (Kinnear 2012). Beyond academic conferences, the *Ecomusicology Review* has developed forms of asynchronous, ongoing scholarly interaction to further scholarship in this area, including email lists, e-seminars, and a dynamic bibliography that is shared via the Zotero bibliography management software app (Allen and Freeman 2012). Notwithstanding all this interest, ecomusicologists have thus far resisted creating a formal academic society.

Year	Title	Sponsoring Organization and Location
2006	Music and Nature	Syracuse University, New York, USA
2010	Sound Ecologies (conference theme)	55th annual meeting of the Society for Ethnomusicology, Los Angeles, California, USA
2010	Nature versus Culture (conference theme)	Conference on Interdisciplinary Musicology, University of Sheffield, UK
2011	Music and Nature	Iceland Academy of Music (and University of Music and Dance, Cologne), Kópavogur, Iceland
2011	Music and Nature Reloaded	University of Music and Dance, Cologne (and Iceland Academy of Music), Cologne, Germany
2011	Listening for a Change: Environment, Music, Action (conference theme)	British Forum for Ethnomusicology, University of London School of Advanced Studies, UK
2012	Hearing Landscape Critically: Sense, Text, Ideology	University of Oxford, UK
2012	Ecomusicologies 2012	Tulane University, New Orleans, Louisiana, USA
2013	Hearing Landscape Critically: Music, Place, and the Spaces of Sound	Stellenbosch University, South Africa
2013	Ecomusicologies 2013: Ecosystems & Ecocriticism	Queensland Conservatorium, Griffith University, Brisbane, Australia
2014	Ecomusics and Ecomusicologies 2014: Dialogues	University of North Carolina, Asheville, North Carolina, USA
2015	Music and Ecology International Multidisciplinary Symposium	City Museum of Ljubljana, Slovenia
2015	Hearing Landscape Critically: Music, Place, and the Spaces of Sound	Harvard University, Cambridge, Massachusetts, USA
2015	Music, Nature, and Environmental Crisis	University of Turku, Finland
2016	Symposium on Music, Sound & Environment	East Tennessee State University, Johnson City, Tennessee, USA
2016	Locations and Dislocations: An Ecomusicological Conversation	Westminster Choir College of Rider University, Princeton, New Jersey, USA
2017	Performing Diverse Environmentalisms: Expressive Culture at the Crux of Ecological Change	Indiana University, Bloomington, Indiana, USA
2018	Arts de la Scène et Musique dans l'Anthropocène	IRCAM and Université Paris 8, Paris, France
2020	Music Studies on a Damaged Planet	University of Oxford and University of Glasgow, UK (online conference)
2021	Music, Culture, and Nature	British Forum for Ethnomusicology, Bath Spa University, UK (online conference)
2021	Responses in Music to Climate Change	The Graduate Center, City University of New York, USA (online conference)
2022	Climates of Popular Music (conference theme)	21st biennial conference of the International Association for the Study of Popular Music, Daegu, South Korea

Table 1. Selected ecomusicology conferences and conference themes, 2006 to 2022

MUSICOLOGY AND ECOMUSICOLOGY

For historical musicology, Western cultural thought provided an important tributary in the ecomusicological watershed: from ideas about the harmony of the spheres and the pastoral (Allen 2016a, 2017b; Beckerman 1991; Ingram 2010; L. Epstein 2014; Watkins 2007) to William Gardiner's ([1832] 2009) musings on animal sounds reflected in music (discussed below), and from medieval philosophies about birdsong and nature (Leach 2007; Saltzstein 2019) to the seventeenth-century Jesuit polymath Athanasius Kircher's wide-ranging curiosity about everything from animal sounds to musical machines (McKay 2015). Considering the prefix "eco" and Troup's (1972) early use of this term, ecomusicology seems to be based in ecology; yet, for historical musicology, "ecocriticism" (i.e., "ecological criticism") has been the more significant tributary (see Rehding 2002; Allen et al. 2011; Ingram 2011; Allen 2016a, especially 644–647).

When the group of scholars discussed above advocated for the establishment of the AMS ESG, they provided two bibliographies: one on "Literary Ecocriticism/Environmental History" and another on "Musicological Studies with Ecocritical Aspects." The former provided examples of environmental work in the related disciplines of literature and history to help justify the creation of an environmental group within a musicological organization. The latter, which was a broadly collaborative endeavor, might be understood as a foundational bibliography for the musicological stream of ecomusicology. The bibliography included studies of contemporary composers, such as John Luther Adams (see Morris 1998), Stephen Albert (Watkins 2007), and Philip Glass (Morris 2007), along with contributions by composer-authors (Mâche 1992; Mellers 2001; Rothenberg 2002; Rothenberg and Ulvaeus 2001; Schafer [1977] 1994). Studies of historical composers included works on Edward Elgar (Riley 2002), Edvard Grieg (Grimley 2006), Wolfgang Amadeus Mozart (Heartz 1991), and numerous opera composers, such as Vincenzo Bellini, Gaetano Donizetti, Giuseppe Verdi, and Giacomo Puccini (Senici 2005), as well as Richard Wagner and others (Leppert 2002, 2007). The European roots of historical musicology were given attention via the foreign-language titles in the bibliography, signaling to traditionalists that it would be acceptable to approve the proposal of a new study group focused on the environment; there were references in German (De la Motte-Haber 2000; Dremel 2005; Schleuning 1998; Schmenner 1998; cf. Rehding 2002), French (Fritz 2000; Mâche 1992; Maurin 1992; Pistone 1988), and Italian (Martinelli 1999). Interdisciplinarity received an appropriate nod, with citations to representative works from music theory (S. Clark and Rehding 2001), the science of sound (Krause 1998, 2002; Marler and Slabbekoorn 2004), geography (Knight 2006), and a title in environmental history that deals with historical sound (M. Smith 2004). Much of the bibliography referenced sources from prestigious publications and prominent musicologists; the most notable source, due to its preeminence in the field, is the *Journal of the American Musicological Society* (*JAMS*). A 1998 article by Linda Phyllis Austern is an early, significant ecomusicological article in *JAMS*; her study of gender and magic in sixteenth- and seventeenth-century England examines the topic of animals and nature sounds in the music of this period. Raymond Knapp (2000) argues that Beethoven's use of birdsong in the Sixth Symphony (the "Pastoral") is, despite its seemingly non-symphonic role, fundamental to the notion of this symphony.[7] But it was the work of Brooks Toliver (2004) that is the most significant here, given his direct engagement with ecocriticism and his affirmative response to the question "Is there already an 'ecomusicology'?" (329). Toliver interprets Ferde Grofé's *Grand Canyon Suite* (1931) in the context of debates about approaches to the conservation and preservation of the American wilderness; his original conference paper and the events stemming from it, along with his subsequent *JAMS* article, have been a touchstone for ecomusicology. Denise Von Glahn's (2003) seminal study *The Sounds of Place* profiles various musics of the United States, and Elaine Keillor (2008) takes a similar approach to Canada. Von Glahn (2003) considers how the "place pieces" of fourteen American composers "reflected a changing nation" (2). Although her list of composers includes only one woman, an imbalance Von Glahn would address in subsequent ecomusicological books (2013, 2017), her approach to connecting music and place is one that continues to resonate. A 2007 article by Elizabeth Eva Leach elaborates on the complicated philosophical

positions regarding music and birdsong in medieval Europe, thus addressing a canonical area of musicological study. Although the allied fields of ecocriticism and environmental history have made extensive forays into the literature and history of the medieval and ancient worlds, musicological works such as Leach (2007) and Saltzstein (2019) remain rare in ecomusicological scholarship.

Growing from the first, tentative publications in the last three decades of the twentieth century to the establishment of institutional foundations in the first decade of the twenty-first century, ecomusicological approaches began flourishing in the 2010s. Allen et al. (2011) provides a touchstone for much ecomusicological work, particularly given its publication in *JAMS*. The contributors to this colloquy address music in relation to ecocriticism, guiding questions, and the environmental crisis (Allen); cultural geography and landscape studies (Grimley); gender and American identity (Von Glahn); and place and placelessness (Watkins). One contribution to the colloquy has been particularly noteworthy: Rehding (2011) proposed that ecomusicology emphasize nostalgia, which he understands as "the quieter sister of the attention-seeking [attitudes about environmental] apocalypse" (413). Such a perspective, he wrote, would "enlist the commemorative and community-building powers of music in the service of ecological approaches" (413), offering an alternative to the otherwise common dystopian manner of confronting the environmental crisis. Rehding builds on the influential work of historian Simon Schama (1995), whose work "productively harnesses a sense of nostalgia, and ultimately of cultural memory, under an ecological banner" (Rehding 2011, 413), thus collapsing the problematic nature/culture duality.

That duality is a common, if unresolved, theme in the first major book dedicated to the diversity of ecomusicology: Allen and Dawe's (2016) *Current Directions in Ecomusicology: Music, Culture, Nature*, which is a collaboration between ethnomusicologists and musicologists as well as ecologists, ecocritics, historians, and scholars from related fields (see J. Cohen 2017; Devine 2019b). To organize the nineteen chapters in the volume, Allen and Dawe charted four broad but interconnected "current directions" in the field ("current" in the temporal rather than the fluvial sense). Together, these directions constitute a mapping of the ecomusicological watershed's significant terrain. The book's "ecological directions" are grounded in the science of ecology and related fields, such as climatology, natural history, landscape ecology, soundscape ecology, and resilience theory; such approaches in themselves are diverse, cutting across the natural sciences, social sciences, and humanities. Examples in this section include music and sound studies scholar Ellen Waterman and biologist W. Alice Boyle's use of ecological and scientific methods for studying human musical performance and avian vocal communication as potential methods for ecomusicology; ethnomusicologist Robin Ryan's consideration of the impacts of climate change and anthropogenic land use on the growth and availability of the trees employed in Australian musical traditions; and Titon's reflections on Henry David Thoreau's work in natural history and the way his own ideas and those of Thoreau's can shed light on the interdependent, relational ontology and epistemology that characterize living systems. "Fieldwork directions" use research and experiences informed by ethnographic investigation in particular places. Examples in this section include works by ethnomusicologists Anthony Seeger and Helena Simonett, which are discussed in the next section of this essay. "Critical directions" involve diverse and primarily humanistic disciplinary methods, emphasizing the importance of ethics and critique in order to marshal evidence, evaluate and make judgments, formulate arguments, and accentuate ethical upshots. Examples in this section include ethnomusicologist James Rhys Edwards's chapter, which situates ecomusicology in the critical theory tradition and emphasizes responses to environmental crises informed by critical hearing and materialist approaches; music psychologist W. Luke Windsor's work in ecological psychology on the nature/culture and noise/music binaries, particularly as they are relevant to music curricula; and Mark Pedelty's analysis of Mexican pop songs, which treats music as environmental communication about biodiversity and environmental justice. "Textual directions" mostly come from ecocritical musicology; they consider texts such as folk music, works of music by individual composers, literary prose, and popular writings, and they draw on environmental history, environmental philosophy, geography, and especially literary ecocriticism. Examples in this section include music theorist Eric Drott's chapter, which analyzes a tape piece through the lens of postcolonial ecocriticism

and by contrasting the voice of the work's metropolitan tourist-composer and that of the rural, subaltern Other captured in the recording; musicologist Sabine Feisst's (2016b) analysis of two composers' environmental concerns and how they engage with ecofeminism via technology-based music; and Allen's (2016b) examination of Italian-language opera criticism in relation to (eco)musicological historiography and environmental issues.

The conspectus of the field in Allen and Dawe (2016) is not the only mapping of ecomusicological flows. Ethnomusicologist Marc Perlman (2012) describes three approaches to ecomusicology—the metaphorical (e.g., comparing musical and biological diversities; see Titon 2009b), the representational (e.g., cultural interpretations of musical works; see Toliver 2004), and the literal (e.g., regarding material issues of musical instruments; see Allen 2012). In an extensive literature review of ecomusicology revolving around three of his own previous essays, Allen (2016a) describes a continuum "from poetic to practical" approaches (644): Here, the reflective, aesthetic concerns of the poetic approach (represented by the pastoral analysis of symphonies in Allen 2011 and 2017d) are contrasted with the politicized, activist concerns of the practical approach (represented by work on the material impacts of musical instruments in Allen 2012). These two approaches are connected by a middle-ground example that blends the two (represented by a profile of a singer-songwriter who incorporates environmentalism in Allen 2013). These three mappings of the field—Allen and Dawe (2016), Perlman (2012), and Allen (2016a)—all represent readings of the literature that was current then; they differ from Allen's most recent book chapter (2021a), which posits three opportunities for "diverse ecomusicologies" to make a difference in the environmental liberal arts by drawing on political ecology, the environmental humanities, and environmental education, all of which push away from anthropocentrism and toward ecocentrism (see Allen and Titon 2019).

Further ecomusicological distributaries in musicology include the updating of classic directions and the charting of new ones. Place is a concept that has long engaged musicology. Even before the ecomusicological work of Feisst (2012, 2016a), musicologist Travis Stimeling (2012), and Von Glahn (2013, 2016), music scholars published the landscape studies cited above (Von Glahn 2003; Senici 2005; Grimley 2006). Musicologist Dan Grimley has made connections between landscape studies, geography, and music studies more prominent by convening the scholarly Hearing Landscape Critically conferences and through his own publications (e.g., Grimley 2016). Devine (2019a) and Brennan and Devine (2020) update music technology studies by considering the social and environmental impacts of recording equipment and playback media. Allen (2012, 2020) adds an ecomusicological approach to traditional organology by considering the trees that are used to make violins, which are central to Western art music, and the wider environmental impacts of building these instruments. In another study (2017a), he provides varied ecomusicological readings of a canonical composer (Beethoven). A rare example of the application of approaches from ecocriticism and environmental history to early music is Jennifer Saltzstein's (2019) ecocritical and environmental historical approach to thirteenth-century *trouvère* songs and motets (cf. Leach 2007). Allen (2017b) made the case for doing further work of this kind in historical musicology and also for altering the foundational music history sequence in the college curriculum.

Another example of ecomusicological approaches to classic topics and fields comes from music theory, which has many intellectual and institutional connections to musicology. In the history of music theory, nature has long been an important generative concept, and this topic is explored by the essays in Suzannah Clark and Rehding's 2001 edited volume *Music Theory and Natural Order from the Renaissance to the Early Twentieth Century*. Theorists also examine the intersection of music analysis, composers' intentions and politics, and socio-environmental issues (Cook 2017; Drott 2016). Rehding (2021) has even made connections between contemporary Actor-Network Theory, the Gaia hypothesis, the Anthropocene, and traditional music-theoretical concerns.

In addition to these works that illustrate how ideas about ecology and the environment are updating research on traditional topics, ecomusicology is moving in new directions, including musicologists examining the relationship between posthumanism, ecology, and the sciences (see Mundy 2018; Watkins 2019; cf. Silvers 2020) as well as those engaging with the topics of climate change (Sweers 2019), the Anthropocene (Currier 2014; Whealton 2019; cf. Cooley et al. 2020; Rehding 2021), and the environmental dimensions of historical sound

studies (Guida 2020), activism (Stimeling et al. 2016), film (Lee 2019), and postcolonialism (Velasquez 2019).[8] Many of these new ecomusicological directions reflect a blurring of disciplinary boundaries and a synthesis of approaches from musicology and ethnomusicology.

ETHNOMUSICOLOGICAL CONTRIBUTIONS TO ECOMUSICOLOGY

Like other music disciplines, ethnomusicology in the past several decades has seen a rapidly expanding interest in ecomusicology and environment-related research.[9] Limited in scope, this section of the article mostly focuses on English-language scholarship by authors based in North America, Europe, and Australia or New Zealand, even as their publications address geographic regions around the globe. It should be noted that parallel academic conversations are happening in Latin America, Africa, and Asia as well. Moreover, much more research remains to be done on the ways that that environmental and climate crises intersect with other harms done to marginalized groups. With these caveats in place, we extend the fluvial metaphor introduced above and highlight a few key tributaries and distributaries of ecomusicological thought within ethnomusicology over the past forty years.

We begin by continuing the discussion of the intellectual infrastructure that has brought scholars together over shared interests in music and the environment. Along with the organizations within scholarly societies devoted to ecomusicology and the growing number of symposia and conferences around ecomusicological themes, noteworthy edited volumes have compiled recent research across disciplines. Besides the Allen and Dawe volume (2016) discussed above, these include ethnomusicologist Timothy Cooley's (2019) edited book on cultural and environmental sustainabilities; ethnomusicologists Britta Sweers and Sarah Ross's (2020) edited volume using cultural mapping to discuss how issues of cultural diversity and intangible cultural heritage play out in the face of conflict and climate change; folklorist John Holmes McDowell et al.'s (2021) volume on performing environmentalisms, expressive culture, and ecological change, co-edited by two ethnomusicologists (Rebecca Dirksen and Sue Tuohy) and another folklorist (Katey Borland); and Allen and Titon's forthcoming edited volume *Sounds, Ecologies, Musics*. Additionally, we find important contributions in special issues of journals, including Titon's (2009a) special issue of *the world of music*, which ultimately argues that interventions for sustaining music cultures should be guided by principles drawn from ecology, rather than economics; the special issue of *Musicology Australia* edited by Dan Bendrups, Katelyn Barney, and Catherine Grant (2013), which focuses on the sustainability-related work of Australasian ethnomusicologists conducting research in the Asia-Pacific region; Bernd Brabec de Mori's (2013) special issue of *Ethnomusicology Forum*, which considers music, sound, ritual, and nonhuman agency in Lowland South American Indigenous societies by drawing on the theories of perspectivism and new animism; and Tyler Kinnear's (2014) special issue of *Music and Politics*, which assesses the politically and economically motivated human actions relating to sound and environment. The special issues continue with Bendrups and Huib Schippers's (2015) issue of *the world of music (new series)*, which employs the discourse of sustainability in a metaphoric manner in order to discuss "musical 'ecosystems' "; Allen and Titon's (2018) special issue of *MUSICultures*, which aims to explore the complexities of invoking ecology for music and sound studies; Kate Galloway's (2020b) special issue of the *Yale Journal of Music and Religion*, which curates spiritual and religious perspectives on music, sound, and aurality in the environment during the age of the Anthropocene; and Emily Hansell Clark's (2022) special issue of *the world of music (new series)*, which attends to the theme of "audibilities of colonialism and extractivism." Scholars trained in ethnomusicology have been involved in each of these landmark publications, although it is crucial to emphasize again that many researchers in this area do not rigidly adhere to disciplinary boundaries.

The term "ecomusicology" has been used with increasing frequency by ethnomusicologists, especially in recent years, which have seen growing attention to urgent matters of environmental crises and climate change, multispecies approaches, forms of research that go beyond the human realm, and sound studies. Yet several

scholars writing in the 1970s, 1980s, and 1990s were attending to issues similar to the ones that animate today's debates. For example, with the establishment of the World Soundscape Project by Schafer and his colleagues in the late 1960s, the field of acoustic ecology, discussed further below, emerged as a way to study sonic environments and guard against their perceived degradation. Responding to Schafer's notion of the soundscape ([1977] 1994), Steven Feld coined the term "echo-muse-ecology" (1994) as a way to explore the acoustemology (acoustic epistemology) of place, a concept that has had a significant impact on ethnomusicology. (An expanded version of this idea appears in Feld 1996.) Feld's fieldwork with the Kaluli people of Papua New Guinea, also foundational for ethnomusicology at large, attended to ecological and environmental themes, where he examined how voice and other sounds flow through the body like waterfalls and how song "paths" are linked to the spirit world of Bosavi rain forest birds ([1982] 2012).

Around the same time, Seeger (1987) considered the songs and cosmological belief system of the Kĩsêdjê (Suyá) people of the Brazilian Amazon, and he similarly proposed challenges to the sound/music, human/nonhuman, and culture/nature binaries, which are based in the ideas of the Enlightenment. In later publications, Seeger (2016) expanded on this work by drawing on Eduardo B. Viveiros de Castro's (2004) notions of perspectivism and multinaturalism[10] to consider topics such as aurality, "the humanness of animals" (92–93), the song/sonic/knowledge repertoires that the Kĩsêdjê learn from animals and plants, and the Kĩsêdjê's use of ritual music to turn into the animals whose songs they sing. Marina Roseman's (1991) ethnography of healing sounds among the Temiar people of Malaysia described songs as "paths" linking humans to spirit guides from the rain forest, which represents another way that the human and nonhuman realms are merged. In Temiar cosmology, healing happens when a medium, who is understood as a "singer of the landscape," leads an ill person's "lost" "head soul" (8) back on the path to its home. In later work, Roseman (1998) explains that Temiar hunter-gatherers and horticulturists have created a cartography of the land and its history through these song paths, and she shows how they navigate colonial and neocolonial pressures in the Malay postcolony with a "medico-acoustic armature" of songs that call on spirits to address individual and social wounds (2007, S55). These studies of the Kaluli, the Kĩsêdjê, and the Temiar offer glimpses into Indigenous ontologies and show the limitations of the Western division between, as Allen and Dawe put it in the subtitle of their 2016 volume, "music, culture, and nature," common in ecomusicological tributaries. While sometimes skirted or left out of the history of ecomusicology (e.g., the introductory chapter of Allen and Dawe 2016 does not cite Roseman or Seeger), they are foundational texts for ecomusicological research.

The topics of Indigenous knowledge (IK), traditional ecological knowledge (TEK), and local ecological knowledge (LEK) have continued to be of primary interest among music researchers focusing on environmental concerns. Highlights of this literature include Thomas Solomon's (2000) study of musical performance as a means for the embodiment and emplacement of identity and landscape in Highland Bolivia; Theodore Levin and Valentina Süzükei's (2006) exploration of the animistic sonic worlds inhabited by Tuvan and Kyrgyz nomadic herders; Tina K. Ramnarine's (2009) consideration of a Nordic Sámi composer's incorporation of *joik* songs into his symphonies, thereby presenting listeners with the opportunity to reflect on the politics of Indigeneity, environmental history, and postcoloniality in an Arctic setting; Simonett's (2014, 2016) regard for the multisensory, sentient ecology of the Yoreme in modern-day northwestern Mexico; and Michael B. Silvers's (2015) work on the ways that rain prophecy practices and birdsong have shaped popular music in drought-prone northeastern Brazil. More recently, Olusegun Stephen Titus (2019; see also Titus and Obonose Titus 2017) has used his work on the Yoruba song repertoire to show that as IK about environmental practices has been forgotten, residents of the Nigerian city of Ibadan have been forced to deal with now-perennial flood disasters, which were not an issue when IK was heeded in the past. Brian Diettrich (2018) describes a spiritually integrated performative ecology practiced by inhabitants of the Chuuk islands of Micronesia, where music is used to summon breadfruit crops on land and engage in wayfinding across the seas. (The work of Titus and Diettrich is discussed further below.)

In a resonant view from the Western hemisphere, Chad S. Hamill (2021) writes of the Spokane people's sacred geographies of songs, which together reflect an Indigenous ecology of the Columbia Plateau region and stand counter to the colonial regimes that have stolen and polluted the land and waters. Along similar lines, Dirksen (2018) sees Haitian Vodou as sacred ecology and the Vodou song repertoire as a means of cultivating ecological metaphysics and environmental awareness. Her work (2019) traces how, in a context of centuries of deforestation in Haiti, humanity, the divine, and the environment intersect in powerful ways, with the sacred Vodou drum at the center of these intersections. Complementary ideas are developed in Galloway's (2020a) work, which discusses the artistry and activism of a noted Inuk throat singer from the Canadian Arctic whose song repertoire is about ecological protest and healing, and is rooted in an Indigenous ecofeminism. Klisala Harrison (2020) has recently written a review essay on the scholarship on Indigenous music in the era of climate change, although the author's sense of finding a "cohesive concept" in "Indigenous music sustainability" (28) is simultaneously reductionist and universalizing—a large matter that the field has yet to grapple with. Among the most important contributions to emerge from the study of IK is the recognition that there is no singular "cohesive concept" to be derived from Indigenous lifeways and no magic bullet that one can apply to the creation of sustainable soundscapes or communities. Indeed, learning from and with Indigenous colleagues can enhance the settler scholar's awareness of the many coexisting biocultural knowledge systems in the world and the diversity of ontological orientations to living in this pluriverse (see Escobar 2018).

Indigenous ways of knowing and being significantly overlap and intersect with multispecies, multinaturalist, and post-humanist approaches to understanding, which inform some of the most promising new avenues of inquiry among music scholars. Exemplifying these approaches are Brabec de Mori and Seeger's (2013) writing on perspectivism and new animism in Lowland South America; Ryan Koons's (2019) multispecies ethnography of the rituals of the Tvlwv Pvlvcekolv American Indian community, which seek to cultivate relationships with nonhuman (avian) kin; Julianne Graper's (2018) examination of bat-human relationships in Austin, Texas, which charts the historical shift from a human fear of bats rooted in colonial and nativist narratives to recent efforts toward conservationism and musical processes of "becoming with" these animals, which has shaped life in "Bat City"; and Silvers's (2020) call for a multispecies ethnomusicology, a position informed by posthumanism and a survey of the ethnomusicological literature on birds, including the author's own research in Brazil.

While often remaining attentive to Indigenous and local knowledges, another approach within ethnomusicology has been to foreground the urgency of changing geographies or the sense of a loss of place, which may arise from the climate crisis, socioeconomic (and thus also environmental) precarities, or environmental degradation. For example, Nancy Guy (2009) ponders the popular music repertoire about Taiwan's Tamsui River, marking its transformation due to decades of economic development from a site for daily swimming, bathing, and boating into "a poisoned, dangerous, and necessarily distant space" (242). In related work, Helen Rees (2016) focuses on nostalgia in her study of China's "original ecology folksongs," which index concerns about the country's changing physical environment and social realities, as well as the perception that traditional arts there are disappearing. In addition, Dirksen (2013, 2021b) documents Haitian youths' musical engagement with the mounting problem of trash in that country, placing an assessment of a "politics of trash" alongside a critique of the constructions of poverty that have resulted from neoliberal developmentalist policies. Stimeling (2014) discusses Gulf Coast tourism since the 2010 BP *Deepwater Horizon* oil spill, pointing out that since the disaster, BP has amply supported music festivals and sponsored other forms of cultural tourism as a means to rehabilitate its image and dissuade political or judicial action against the company. In demonstrating a contested sound commons in western Washington State, Pedelty (2021b) considers the tensions felt between the adoring crowds who enjoy the loud aerial spectacles of US Navy "Growler" jets and local residents who have concerns about noise pollution and its potentially harmful health and environmental effects. While not explicitly foregrounding the ecomusicology literature in her research, Jessica A. Schwartz (e.g., 2012, 2015, 2019, 2021) has amply demonstrated the many different forms of violence the people of

the Marshall Islands have experienced, including the devastating health and environmental impacts of US nuclear testing there.

Discussing related concerns about changing geographies, Jennifer C. Post (2007) demonstrates how Kazakh pastoral herders in Mongolia reconstruct perceptions of identity, homeland, and place through performances on the *dombra* long-necked lute and serve as "ecosystem stewards" (2019) by using songs as pathways for transmitting knowledge about ruptured ecosystems and families in the post-Soviet context. In other work, she explores the issues of displacement and mobility affecting Kazakhs living between Mongolia and Kazakhstan, and discusses how their senses of longing for homeland are expressed in music (2014, 2021c). At least as important is Post's work with a scientist (Margaret Q. Guyette) from landscape ecology, which uses sound to better understand habitat and biodiversity loss and is a model for effective transdisciplinary collaboration (Guyette and Post 2016). Such efforts have helped to strategically reshape soundscape ecology and sound studies by combining epistemologies and methodologies from science and humanities disciplines to address what Post and landscape ecologist Bryan Pijanowski, in borrowing a popular expression (i.e., see Balint et al. 2011), call our "wicked environmental problems" (2018).

The concerted focus on such problems has been met with a push for, and discourses of, musical sustainability. The most prominent work in this area comes from Titon, whose influential research blog *Sustainable Music* (https://sustainablemusic.blogspot.com/) has germinated a number of publications, culminating to date in the release of his book *Toward a Sound Ecology* (2020). This volume proposes a fundamental reorientation toward "sound worlds"—and away from the "object worlds, social group worlds, or text worlds" (255) that scholars typically prioritize—as a means to recreate communities, economies, and ecologies in more just and sustainable forms. This paradigmatic shift represents what Titon calls "sound ecological rationality," a notion he derives from the series of previously published articles gathered in this volume. One article, for example, recommends that the safeguarding of cultural heritage be guided by principles from ecology rather than economy (2009b). Another suggests that protecting a sound commons for all living creatures will allow each species to communicate in their own acoustic niches in the soundscape (2012). A third encourages ecomusicologists to prioritize "an ecological construction of nature based in a relational epistemology of diversity, interconnectedness, and co-presence" (2013, 8), while a fourth article considers Thoreau's writing on sound and naturalism (2015).

Spurred on by a sense that forms of expressive culture around the world are, variously, flourishing or threatened due to rapid cultural, socioeconomic, technological, educational, and environmental shifts, Schippers and Grant organized an edited volume (2016) around understanding musics and their maintenance by using a cultural ecosystem model. This model reflects contemporary discussions about environmental sustainability and also current initiatives in cultural heritage management, particularly those of UNESCO, such as the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage. Earlier, Bendrups et al. (2013) tied conversations on sustainability to work in Australasian ethnomusicology and evoked applied ethnomusicology frameworks as means to assist communities "with matters of musical vitality and viability" (155). It is worth noting that not all scholars find the concept of music ecology or music sustainability to be entirely effective. On the one hand, Brent Keogh and Ian Collinson (2016) address the difficulties in appropriating terms and principles from the science of ecology to explain human musical activity, which they argue can lead to overly generalized and politically problematic utopian conceptions. On the other hand, Allen (2017c) argues that Schippers and Grant (2016) superficially extend the metaphor of an ecological perspective and miss opportunities to reach beyond an anthropocentric outlook, and he encourages scholars to engage with ideas from environmental studies, ecology, and the work on sustainability as well as the wealth of literature that more squarely falls within ecomusicology. Silvers, meanwhile, broadly addresses the notion of cultural sustainability and finds some common ground with it, seeing sustainability as "a matter of balancing social wellbeing against environmental conditions" and arguing that "both involve changing conditions that ultimately threaten music as a meaningful cultural practice" (2016, 103).

An alternative line of response by ethnomusicologists to ecological and environmental urgencies has been to focus on and commit to environmental justice through advocacy and activism. This includes an increasingly determined examination of the gross inequities and uneven impacts of climate change and its causes. Pedelty has followed up his pathbreaking work on the political ecologies that shape rock and folk music on the local and global levels (2012) with a study of environmentally engaged musicians in the Cascadia region of North America who seek to help save the Salish Sea (and beyond) through their activist music-making (2016b). This research has led to his proposal for an applied ecomusicology (2016b, 255–258). Pedelty is a model for scholars seeking to do work that goes beyond the written word. His influential, multimodal project Ecosong.Net (Pedelty 2020a) features environment-related music videos and documentary films, such as *Sentinels of Silence? Whale Watching, Noise, and the Orca* (Pedelty 2020b). He is also the principal investigator of a Mellon-funded Humanities Without Walls project titled Field to Media: Applied Ecomusicology for a Changing Climate (see, for example, Pedelty et al. 2020). Dirksen is the co-principal investigator for the project, which also involves Yan Pang Clark, Tara Hatfield, Elja Roy, and their respective on-site teams and has culminated in a series of music videos that speak to urgent environmental issues in Bangladesh, China, Haiti, Tanzania, and the Salish Sea.

Angela Impey is another visionary of environmentalist music scholarship and applied ethnomusicology. She made an early contribution to participatory action research in ethnomusicology with a study on environmental conservation, tourism, and community development in the Dukuduku Forests of Northern KwaZulu Natal, South Africa (2002). These efforts were extended in her 2018 book *Song Walking: Women, Music, and Environmental Justice in an African Borderland*, which considers what women's walking songs in Maputaland, a region located at the meeting place of South Africa, Mozambique, and Swaziland, can show about the complicated and conflicting nature of land-use practices, memory, international development, and environmental conservation. In related work, Silvers (2018) presents a sweeping and sophisticated model for scholarship rooted in the politics of environmental justice. Attuned to the ways that neoliberal capitalism has created conditions for drought in the *sertão* of northeastern Brazil, Silvers shows how the drought has resulted in poverty, limited access to water, and ecological exile for the people in the region and how these issues are reflected in the *forró* music that they produce. In a recent article, Dirksen and Lois Wilcken (2021) discuss musically guided reforestation and environmental education projects in Haiti and the Haitian diaspora. This work has led to a 2022 article by Dirksen, which demonstrates how Haitian intellectual traditions and sacred ecologies have been used to counter globalist rhetorics on human rights (such as the *Universal Declaration of Human Rights*) and, in so doing, get much closer to conceiving of and achieving environmental justice than those universalizing discourses do. Other contributions in this area include research on the use of popular music to protest oil extraction in the Niger Delta and its resulting economic and ecological violence (Okuyade 2011); a study of how *Etëtung* (women's water music) in the Pacific nation of Vanuatu is being used to work toward climate justice and cultural sustainability (Grant 2019); and research on the use of soundscapes as "ecotopian spaces" to effect attitudinal and behavioral change within audiences and promote environmental awareness and redress (Galloway 2014).

Not all of the above-cited scholars directly affiliate with ecomusicology, even if they are writing about the intersections between music/sound/acoustics, environmental matters, and ways of experiencing or being in the world. Indeed, ethnomusicologists have heatedly debated whether the term "ecomusicology" itself is a useful one around which they should gather. For example, Ana María Ochoa Gautier has developed a prominent critique of the "operational implications of naming the field" of ecomusicology, an act she characterizes as "reaffirm[ing] a multiculturalist ethos…that accounts for all forms of diversity under a single epistemological umbrella" and is thus marked by the Western ontological splitting of "nature" and "culture" (2016, 111). Tracing the linkages between acoustemology, structuralism, perspectivism, and multinaturalism, she argues that an *acoustic multinaturalism*[11] could serve as a "a different entry point into the problematics of sound/music, the anthropological, and the cosmological" (109). Per Ochoa Gautier, acoustic multinaturalism allows for alterities (alternative modalities) and attends to the "political importance of different ontologies across cultures and history" (139)

in ways that a new field or disciplinary subdivision cannot. In his remarks for the President's Roundtable at the 2018 meeting of the Society for Ethnomusicology, Pedelty responded to Ochoa Gautier's ideas by arguing that there has, in fact, been no such effort by scholars to create a new discipline of ecomusicology. Rather, the goal has been to facilitate transdisciplinary conversations through a term that is "specific enough to indicate environmental relevance while sufficiently polysemic to bring together a very broad range of research" (Pedelty in Cooley et al. 2020, 311). He recalls that in the early 2000s, which was prior to any notion of ecomusicology, few music scholars were focusing on the intersections between sound/music and the environment, and those who were "had to constantly argue for the relevance" of such music research (311). Instead of fighting over the usefulness of one expression over the other, he recommends looking for the complementarities between them and "tak[ing] our research beyond text and talk" (313).

Another demonstration of the wide-ranging, expanding, and evolving stances of ethnomusicologists and ethnomusicology-informed peers on ecomusicology may be found in the essay series "Disciplinary Entanglements in Ecomusicology," which was published in the *SEM Newsletter* (Post 2021a). Preferring the term "eco-ethnomusicology" to "ecomusicology," Post (2021b) argues for integrative knowledge production among pastoralists, scientists, and humanists, which she situates within a social-cultural-ecological systems (SCES) framework. Dirksen's essay (2021a) in the series explores throughlines that entangle Haitian Vodou as sacred ecology, development theory and practice, applied ethnomusicology, and ecomusicological work, while reminding scholars of the complicated backstories behind naming projects and associations, including those that have shaped ecomusicology. Silvers's essay (2021) asserts that ecomusicology has been insufficiently attentive to the nonhuman and argues that without adequate consideration of race, gender, class, and other "significant social constructs," the field risks being apolitical; he advocates for "a focus on environmental justice in a more-than-human ethnomusicology" (19). Allen (2021b) notes the "itineracy" and "disciplinary homelessness" that ecomusicologists face when navigating administrative and scholarly worlds, and the "obvious misunderstandings" and "rather tangled mess" that arise when making the case for ecomusicology as a field (20, 23). Citing political ecology as "one of the most promising and productive 'entanglements' for music scholars," in this same series Pedelty (2021a) emphasizes that applied ecomusicology makes space for the coexistence of "radically varied" disciplines, musical responses, identities, forms of privilege, ideologies, and orientations to shared environmental challenges (25). Exploring how these innumerable tangles work from various vantage points and why they matter, ecomusicology must welcome a diverse array of new voices, which can better speak to intersectional positionalities. This idea is illustrated in our concluding section, on the new generation of researchers in ecomusicology.

POPULAR MUSIC STUDIES' CONTRIBUTIONS TO ECOMUSICOLOGY

David Ingram's book *The Jukebox in the Garden* (2010) was one of the first environmental analyses of popular music, and it remains one the most insightful studies in this area. The book appeared almost two centuries after composer William Gardiner's title *The Music of Nature* ([1832] 2009), which was the first environmental study of Western art music. Comparing these books illustrates more than the difference between two historical periods; it also shows the differences between the genres that the books examine—differences that remain salient to the present day and can help to explain why and how ecomusicological contributions from popular music studies differ so markedly from those in musicology and ethnomusicology.

Gardiner analyzed relationships between the sounds of human instruments and those heard in the more-than-human world. As the subtitle to *The Music of Nature* states, his book was "an attempt to prove that what is passionate and pleasing in the art of singing, speaking, and performing upon musical instruments is derived from the sounds of the animated world." In other words, *The Music of Nature* is mainly about organology, animal sounds (mainly those of birds), and sonic references to "nature" in Western art music. Almost two cen-

turies later, those subjects remain central to musicological research on the environment. Conversely, Ingram's environmental study of popular music in the late-twentieth-century UK and USA is less about instrumental inflections of animal sounds and more about lyrical meanings, as well as biographical, sociological, and historical connections between popular artists and environmental issues, ideologies, and social movements. Ingram's approach is more influenced by cultural studies than musicology, and it is representative of popular music scholars' emphasis on the relationship between environmentalist musicians and environmental movements (Mattern 1998; Rickwood 2014).

Gardiner noted that the acoustic instruments of his time simulated what Bernard L. Krause (1998) would later categorize as "biophonic" and "geophonic" sounds. A century and a half later, in his landmark ethnographic study of the Kaluli ([1982] 2012), Feld similarly demonstrated connections between human sound-makers, animal musics, and instrumentation. As in Western classical forms, the acoustic instrumentation, composition, and (sound) performance of place-based, traditional, Indigenous musics often reflect the more-than-human worlds surrounding human musicians. Conversely, rock, hip-hop, and most other popular forms tend to reference anthropophonic sounds—those that characterize the urban and industrialized world, where most popular musicians and their audiences live. Of course, all human music is anthropophonic, but most of the sonic signifiers of popular music move beyond the simple and direct *simulation* of animal life and into mechanical, electrical, and digital *simulacra*, which per Jean Baudrillard's definition (1994) take on a life of their own, divorced from articulation to their original referents (e.g., real bird sounds or a real flute). Taking it one step further, increasingly, digitally created sounds make no attempt at either natural or organological mimicry, presenting both conundrums and opportunities for the ecomusicology of popular music.

One popular music scholar who explores this issue is Philip Tagg, whose work has sought to explain the connection between rock and the urban environment. Tagg (1994) argues that the rock audience celebrates thrashing lead guitarists and screaming lead singers, reveling in their ability to pierce through the urban din, much in the way that motorcycles and babies use volume and pitch to find their sonic niches in sonically crowded environments. To understand the environmental articulations of genres associated with electronic instruments, urbanity (Atkinson 2007), global deterritorialization, and massive touring concerts (Garofalo 1992) thus requires the development of distinct theories and methodologies.

For example, environmental studies of hip-hop have tended to emphasize urban ecologies. Michael J. Cermak (2012) argues that hip-hop provides a pedagogical inroad to critical ecological literacy. Similarly, Debra J. Rosenthal (2006) considers hip-hop to be a form of "environmental literature" and explores rural/urban distinctions, noting that the rural and pastoral have been associated with danger for Black communities throughout US history. Therefore, the study of Black musics in the Americas and Europe has tended to focus on urban soundscapes. This stands in contrast to the mostly White rock musicians featured in Ingram's study, whose music ideologically codes rural wilderness as "nature," a problematic tendency that Ingram effectively critiques in his book. Perhaps because of popular music's articulation with "alienated urban ecology" (Regev 1994, 91) and American environmentalists' articulation of the environment with sublime rural and wilderness settings, environmental concerns have been less of an emphasis in popular music studies until fairly recently, as more and more environmental researchers recognize the ecological centrality of cities and music scholars recognize the environmental dimensions of music associated with urbanity.

In addition to identifying connections between sound and context, Rosenthal's approach represents popular music studies' relatively greater emphasis on song lyrics. As she demonstrates, songs such as Mos Def's "New World Water" provide much clearer signals of the composer-performer's intended meanings than might be the case for musics that place less emphasis on lyrics (2006, 669–670). In popular music, the lyrics are particularly influential in forming and communicating environmental meaning. Yet lyrics can also be more like vocables, in that they might perform a musical function that is distinct from their ostensible meaning. Songwriters sometimes choose specific words as much for their musical sound as for their lexical meaning, and/or audiences

experience them that way ("The Law" might as well be "lee la"). Popular music scholars must study lyrics in relation to the entire musical text, social context, and performance (Boucher 2004; Frith 1986).

Of course, all composers and performers use some form of semiotic articulation to create and communicate environmental meaning, even in genres largely devoid of lyrics. For example, John Luther Adams's audience knows that his music is environmentally themed because the composer tells us that it is, and the music is commissioned explicitly for that purpose. Further, his work is performed in biodiverse, outdoor contexts (Adams 2009) and includes textual framing and titling to contextualize the sounds as such. And it is not only composers and performers who connect music to the environment. Music scholars play a role in creating ecomusical meaning as well, such as in Feisst's (2012) insightful analysis of Adams's environmental artistry. In other words, music, like all communication, is intertextual. It is never just a matter of "organized sound" (Varèse and Wen-Chung 1966) communicating meaning in isolation from textual, contextual, and intertextual cues.

In research that highlights connections among the landscape, soundscape, music, and literature of Ireland, Donna Potts (2018) demonstrates how ecomusicology is concerned with that broader, intertextual, and ecological conception of environment(s). Slowly warming to the kind of approach that Potts employs, popular music researchers are beginning to expand their understanding of intertextuality to study local, regional, and global ecological contexts. As the field moves beyond limiting, pastoral conceptions of "nature" (Morton 2007) toward a more ecological conception of the contexts in which musics are produced, distributed, and experienced, new avenues are opening up for an ecomusicology of popular music. As evidence of this, the 2022 worldwide conference of the International Association for the Study of Popular Music (IASPM), which will be held in South Korea, will be dedicated to environmental themes.

Before this shift started, most works on popular music and the environment were about space and place in general, and the environment (or environments) was defined mostly in terms of cultural geography (Whiteley, Bennett, and Hawkins 2004; Butler 1994; Davies 1993). As music psychologist Nicola Dibben has observed, "The relationship between music and place has a long history in scholarly research" (2017, 164), and a number of works that draw out the connections between music, place, and culture have had an environmental resonance. For example, Sara Cohen's *Decline, Renewal and the City in Music: Beyond the Beatles* (2007) and her subsequent musical "mapping" research (2012) provide both a model for and methodological route toward creating fine-grained studies of popular music in context, with environmental implications and applications. Similarly, Dibben (2017) examined the relationship between Icelandic pop and hydropower, demonstrating the ecopolitical affordances of studying music in relation to environmental crises and the need to attend to the local, place, and musical identities. Musicologist Tore Størvold advanced that effort a few years later with his more detailed examination of Icelandic music in relation to the politics of hydropower (2019).

Kyle Devine's book *Decomposed* (2019a) represents this new wave of ecomusicology as well, one that deeply embraces the potential of ecological theory as articulated in the ecological sciences and environmental studies. *Decomposed* explores the making, sharing, and material afterlives of music as it has been inscribed and communicated via changing technologies and media. As evidence of its impact, *Decomposed* was in 2020 awarded IASPM Canada's Book Prize. Devine's current work explores more sustainable ways to make and share music (Brennan and Devine 2020).

As in the case of Devine's groundbreaking example, ecomusicological research in popular music has tended to adopt the tone, tenor, and foci of political ecology, including an interest in applied research and environmental movements. Ingram's (2008) historical case study of Pete Seeger's shift into environmental organizing is among the best examples. Ingram notes that Seeger was attacked by the Old Left for what they interpreted as the abandonment of labor politics and by the New Left for using what they viewed as an outdated musical vernacular—folk music. Music and movements are also at the center of Pedelty's research, starting with a book titled *Ecomusicology: Rock, Folk, and the Environment* (2012), which built on his earlier ethnographic work concerning musical ritual in urban Mexico (2004, 2016a). *Ecomusicology* explores the roles and meanings of popular music in

relation to multiple levels of ecological scale, from the global to the hyper-local, with an emphasis on musicians' direct involvement in environmental movements. His book *A Song to Save the Salish Sea: Musical Performance as Environmental Activism* (2016b) moved further in the direction of studying environmental musicianship by developing case studies of environmental musician-activists and organizers.

Despite these and other environmental studies of the popular music, ecomusicology has to date made less of an impact on popular music studies than on ethnomusicology and musicology. Yet there are signs of a growing ferment. The burgeoning of environmentally themed popular music conferences, increasing interest in environmental themes among popular musicians, and mounting concern for the environment among graduate students and early career music scholars promises to make the study of music-and-environment a growing interest in popular music studies.

ACOUSTIC ECOLOGY'S CONTRIBUTIONS AND CONNECTIONS TO ECOMUSICOLOGY

Acoustic ecologists work to better understand sonic environments (actual, recorded, or imagined) as well as the ways people experience and shape those environments. Central to the research and creative activities of acoustic ecology is an effort to raise awareness of socio-environmental issues and offer paths for improvement. The field is known for its work on soundscape ethics, which seek to identify the qualities that define a healthy, balanced soundscape (Kinnear 2018; Westerkamp 2011; Schafer [1977] 1994). These qualities include a low ambient noise level and the audibility of both quiet and distant sounds (e.g., songbirds, footsteps, and faraway church bells), qualities that reinforce a preference for what scholars in this field refer to as "hi-fi environments." Like acoustic ecology, ecomusicology rings of the urgency that comes from operating "in a period of environmental crisis" (Titon 2013, 8). The crisis for early acoustic ecologists was noise pollution, which has since broadened to include climate change, biodiversity loss, and other environmental issues. Acoustic ecologists engage these topics through new creative works as well as presentations and publications on what sound tells us about environmental change. These and other topics, such as Indigenous perspectives on sound and sustainable music practices, are of particular concern to scholars engaged in the ecomusicological conversation (Galloway 2020a; Mark 2016). Although ecomusicology and acoustic ecology share common topics, it is important to recognize that they use different research methods. Ecomusicology has historically drawn on methods used in music studies and ecocriticism, whereas acoustic ecology has origins in music composition and communication studies. This section discusses the foundational work of the World Soundscape Project (WSP) and more recent engagements with soundscapes in order to review acoustic ecology's contributions and connections to ecomusicology.

The roots of the field of acoustic ecology lie in the work of the WSP, a research team formed by composer R. Murray Schafer at Simon Fraser University, outside Vancouver, Canada, in 1969.[12] The team conducted the first systematic study of an acoustic environment and sought to raise awareness of noise pollution and promote soundscape heritage and preservation.[13] The WSP attributed the problem of noise to human activity, particularly developments since the Industrial Revolution. That nature sounds were given a privileged place in Schafer's model of the soundscape makes sense given the environmental movement sweeping North America in the 1970s.[14] Certain artists and scholars working in acoustic ecology continue to promote the sounds of nature and problematize those created by humans (M. Epstein 2020; Krause 2012; Hempton and Grossmann 2009).

The work of the WSP continues to be a resource for many, and it has influenced numerous areas of scholarly and artistic inquiry, such as acoustemology, ecoacoustics, ecomusicology, soundscape ecology, and sound studies (Allen and Dawe 2016; Burtner 2011; Pijanowski et al. 2011; Feld 1994). In addition to establishing research on soundscapes as a field of study, acoustic ecology also informed work in sonic art (Westerkamp 2002). Soundscape composition is a practice-based research method that uses a combination of ethnographic

and studio techniques to raise awareness about the social and environmental conditions of place (Drever 2002; Truax [1984] 2001). Approaches to soundscape composition are wide-ranging and include outdoor performance, field recording (also known as phonography), electroacoustic composition, and installation (Kinnear 2017). Soundscape composers are increasingly commenting on environmental crises and related social and political issues in their works. David Monacchi, Leah Barclay, Bernie Krause, Andrea Polli, and others have explored threatened soundscapes and ecosystems.[15] Human spaces (occupied or abandoned) have also been of interest, with topics ranging from protests (Christopher DeLaurenti's *Live at Occupy Wall Street N15 M1 S17*) to ravaged environments (Peter Cusack's *Sounds from Dangerous Places*) and from heritage tourism (Cathy Lane's *The Hebrides Suite*) to anthropogenic noise (Brian Garbet's *Manifest*). In addition to stand-alone works, outreach initiatives have been established, including Biosphere Soundscapes (2022), Quiet Parks International (2021), and the World Listening Project (2021).[16] These diverse approaches to soundscapes share a commitment to raising awareness of distinct sonic environments,[17] the importance of listening, and the value of environmental and cultural sustainability.

Soundscapes play a critical role in understanding how minority voices have been and continue to be silenced. Significant work is being done to decolonize representations of identity in both live and electronically mediated performance (Robinson 2020; Perea 2019; Tahmahkera 2017; Stoever 2016). Critiquing the settler-colonial bias in Schafer's work, Dylan Robinson advocates for a "resonant theory" of sound studies. Describing the project of his 2020 book *Hungry Listening*, Robinson writes that "moving away from a conceptualization of the listener as the sole subject in the act of listening,…[this study] reorients the [listening] act toward the life, agency, and subjectivity of sound within Indigenous frameworks of perception" (15). He is not alone in this view. Other artists and scholars are raising awareness of the ethics of listening to and composing with culturally sensitive soundscapes (Droumeva and Jordan 2019; Yoganathan 2017; Wynne 2010).[18]

Building on this awareness, recent work in ecomusicology has discussed women composers and the natural world (Von Glahn 2013), historical soundscapes (Eyerly 2020; Fisher 2014), and animals, music, and evolutionism (Mundy 2018). Von Glahn develops a concept of "skillful listening" in order to examine nature-informed music by American women composers, a topic that was overlooked in earlier scholarship. A plausible culprit for this gap in the literature is the historical association of "environmental" music with notions of monumentality and the sublime, which have in the past been tied to classical music written by male composers (e.g., Beethoven, Mendelssohn, and Grofé). Per her case studies, Von Glahn reminds us that our immediate environments are as ecologically relevant as the Grand Canyon and Niagara Falls, subjects associated with a more masculine tradition. Von Glahn's work with American women composers and the natural world resonates with the contributions of soundscape composers like the Australian Leah Barclay and the Canadians Carmen Braden and Hildegard Westerkamp. These composers, among others, often use recorded sounds from distinctly local sites to comment on such topics as global warming, habitat loss, and noise pollution. This bridging of music and sound with other disciplines can also be found in Rachel Mundy's (2018) work, which connects posthumanism to the human observation of animal life, in Eyerly's (2020) engagement with historic Moravian soundscapes, and in Fisher's (2014) exploration of the aural culture of Counter-Reformation Bavaria. In their own ways, each of these scholars or composers is a careful listener, using music and sound (studies) to explore particular environments and the sociopolitical nuances therein.

Still, those working in acoustic ecology and ecomusicology continue to face inherited challenges, including a problematic, romanticized definition of nature (Allen and Dawe 2016, 8–10; Kinnear 2018; Titon 2013, 2020) and the Eurocentricity of their "subjects" of study (i.e., documenting White colonial voices over those of people of color; see Akiyama 2015; İşcen 2014). With this critical awareness, scholars in music and sound studies are employing new terminology that will impact research on soundscapes. For example, Ochoa Gautier's "acoustic multinaturalism," which considers differing ontologies of sound (2016), Titon's work with the notion of "relational epistemology" in ecomusicology (2020), and Robinson's application of "resonant theory" to sound

studies (2020) all offer conceptual shifts from a subject-object orientation to a subject-subject one. In doing so, they challenge anthropocentric ontologies and epistemologies of sound/music.

A means for opposing Eurocentrism, the technique of soundwalking is one method being used to shed light on historically subjugated knowledge and recognize the agency of marginalized groups (Martin 2019; Sandals 2017). Through a silent walk that explores the sounds of a place, participants are invited to attend to the sounds around them and their responses to those sounds. A soundwalk typically is followed by a post-walk discussion, in which participants share their experience of the activity. Several recent projects apply soundwalking to politicized spaces, such as contested and erased sites on the campus of Western Carolina University (Kinnear et al. n.d.), the Peace Wall Belfast in West Belfast (Varoutsos 2020), and the "Silent Sam" Confederate monument at the University of North Carolina at Chapel Hill (Black and Bohlman 2017). Soundwalking—and other forms of engagement with soundscapes—can be an important step in the process of understanding which voices are audible or inaudible, dominant or suppressed, preserved or lost. To listen in a space is a political move, for listening is about giving attention, being present with sounds heard and unheard, and letting those sounds affect us, instead of remaining disengaged from them (McCartney 2012; Westerkamp 1974). Listening also entails being aware of one's own bias(es) and privilege(s), and involves the possibility of self-criticism. We cannot productively engage topics of race, class, gender, and (dis)ability at the intersection of sound/music and the environment without fully considering their environmental contexts, the at-risk and underrepresented communities found in those contexts, and the narratives in which their identities unfold. In this way, soundwalk participants are charged with the task of engaging in purposeful acts of listening to and discussing the sociopolitical issues of a place.

This challenge raises larger questions about who is deciding which soundscapes matter, who is representing those soundscapes, and who has the resources necessary to explore them (including the costs of recording technology and travel, and their associated carbon footprints; see Grant 2018). One challenge, then, is to find new ways to include contributions from marginalized people and communities and to support those in need (Pettan and Titon 2015). There continues to be a shortage of voices in acoustic ecology from outside North America and Europe, which is also the case for all of the fields and disciplines covered here, including the field of ecomusicology. Nevertheless, new generations of scholars are broadening and deepening the scope of sonic inquiry.[19]

NEW GENERATIONS OF RESEARCH IN ECOMUSICOLOGY ACROSS THE DISCIPLINES

In response to the need to problematize the concept of nature and the need to engage voices from outside of North America and Europe, this section draws on several works from graduate students and early career scholars who are addressing environmental concerns by recourse to Indigenous epistemologies. Rooted in inquiry into Indigenous knowledge and environmental activism, a new generation of researchers is exploring how sound and ecological advocacy are interwoven to reconceptualize nature, while musicians demand fundamental cultural change. These concerns have drawn some early career music scholars to ecomusicology, where the interest in Indigenous worldviews reflects a desire to explore the connectivity of music, sound, people, and their physical and spiritual environments. Drawing on Titon's work with "relational epistemology," which he understands as "an alternative to economic rationality and scientific reductionism regarding nature" (2020, 232), ecomusicologists have argued that both humans and nature must be understood in terms of relationality and embodiment, in contrast to romanticized notions of nature, cold scientific realism, or the reduction of the "more-than-human world" to "resources."

Many of these early career scholars turn to Indigenous epistemology to problematize the culture/nature dichotomy and explore music's relation to the environment and environmental activism. In many Indigenous

worldviews, environment and culture are not separate entities. For example, Candice Elanna Steiner has explained that Pacific Islanders do not see the environment as a stage set for the human drama but instead understand that it "was and is very much part of…[that] drama" (2015, 156). She articulated the complex relation between Islanders and their environment by applying Robert Melchior Figueroa's (2011) concepts of "environmental identity" and "environmental heritage." He defines the former as "the amalgamation of cultural identities, ways of life, and self-perceptions that are connected to a given group's physical environment," while environmental heritage concerns "the meanings and symbols of the past that frame values, practices, and places [that] peoples wish to preserve as members of a community" and expresses "an environmental identity in relation to the community viewed over time" (233). Such interconnectedness is celebrated most notably through the performing arts—the songs, dances, and other forms of creative expression found throughout Pacific Islands; indeed, it is through performance that "Islanders…make sense of and raise awareness about current events" (Steiner 2015, 158). Outsiders frequently represent Islanders as helpless victims in a rising sea; analyzing three performative campaigns, Steiner argued that the Islanders reject these representations and engage in empowering performances that depict themselves as warriors fighting against climate change. In the multimedia dramatic performance *Moana: The Rising of the Sea* (2013), Steiner highlighted the aria of the Vesi Loa tree. Here, the tree sacrifices herself so that the Islanders can build canoes, which sustain their lives. "I give my life to generations to come," sings the tree; "The sacrifice is mine" (Steiner 2015, 158). The aria illustrates the Islanders' holistic understanding of their surroundings and their position in them. The piece "Koburake," which was performed by artists from Kiribati during the 2011 Water Is Rising concert tour, raised awareness of climate change through a narrative of a lost frigate bird. The song compares the bird's longing for home to the Islanders' experience of losing their homeland to climate change, and Steiner interprets the bird's call for Kiribati to rise from the ocean as a declaration of the resilience of the Islanders. A related theme is present in the war dances, songs, and war challenges performed during the Warrior Day of Action in 2013, which featured the slogan "We are not drowning. We are fighting." Islanders use these performance initiatives to announce their solidarity in confronting the challenges of climate change and to "make Islanders' voices heard and their human faces seen in order to encourage support from beyond the region for mitigation and adaption efforts" (Steiner 2015, 149).

In a related study that examines songs from the Chuuk islands, Diettrich (2018) has proposed the concept of "performative ecology" to emphasize the efficacy of music and dance in addressing spiritual and environmental relationships, as well as their role in natural resource management and in navigating among places in Oceania. Breadfruit chants are stories of sustenance that describe vital relationships between people, the land, the cosmos, and deities. The significance of breadfruits and the chants' life-giving value are not merely cultural memory; the chants are summoning songs, forms of music and dance that actively transform the community and its survival. Diettrich's article also considered ocean wayfinding chants. The Chuukese mariners' rhythmic vocalizations map the ocean voyage with names of currents, channels, reefs, birds, stars, and other spiritual beings, signifying Indigenous knowledge of the sea and a "recitational mapping" of the ocean (Diettrich 2018, 18). Through musical interaction, the Chuukese come to see the ocean as a living place that is home to an active interplay between humans and non-human beings. Diettrich emphasizes women's roles in wayfinding knowledge as they compose and document past mariners' travels upon the sea, representing a nuanced alternative to the often-cited division of the ocean as men's territory and land as the women's realm.

Also connecting music and spirituality, Titus (2019) examines how Yoruba popular music expresses the interdependence of physical and spiritual beings in Ibadan, the capital city of Oyo State in Nigeria. Yoruba musicians call for a return to Indigenous knowledge that draws on the value of spiritual beliefs about the River Goddess Yemoja for people facing the perennial, present-day threat of flood disasters. In addition to informing cultural beliefs, traditions, and practices, Yoruba popular music raises awareness of environmental sustainability, and songs admonish people who neglect spiritual beings and dump waste in the waterways. Titus concludes the

article by observing that the human-nonhuman relationship "is vital to the discourse on music in environmental sustainability and the reduction of floods in this particular location" (Titus 2019, 86; see also Titus and Obonose Titus 2017).

Yoruba popular music also mobilizes, sustains, and transforms protests, from protests on social media to the musical sound space of protest marches. Titus (2017) argues that both performances and recordings played at the rallies maintain the protests' dynamism and help with mass mobilization. His study of song texts performed during protests demonstrates how singers articulate the daily struggles of everyday people while criticizing political leaders' corruption. Titus delved into the linguistic strategies deployed in the songs, such as the use of Nigerian Pidgin and the artists' code-switching between Nigerian Pidgin and local languages, which highlight their negative perceptions of the government. As Titus indicated, mixing languages provides performers with more flexibility in expressing themselves and reaches out to more communities than the use of English or any single local language could. Furthermore, the use of Nigerian Pidgin also contributes to a "de-tribalizing effect," encouraging solidarity among the various groups within the nation and helping them transcend strictly local identities (Titus 2017, 125). Analyzing soundscapes, song texts, the musicians, and their performances, Titus concludes that artists in Nigeria protested political corruption and sought to reverse the government's withdrawal of fuel subsidies, which had improved the public's standards of living.

Music plays many roles in mass mobilization, and two papers from the 2020 annual meeting of the Society for Ethnomusicology show how Indigenous communities use music in environmental protests and challenge dichotomies rooted in Western perspectives. In the first paper, Susan Jacob (2020) explains how the protectors of a sacred mountain use singing and dancing to transcend the sacred/secular binary during the 2019–2020 anti–Thirty Meter Telescope (TMT) protest movement on the Island of Hawai'i. Mauna Kea (White Mountain) is a dormant volcano and a sacred place in Native Hawaiian culture, with ancestral ties to creation. Protestors against the TMT construction frame themselves as "*kia'i* (protectors or guardians) of the mountain" and led a series of protests starting in July 2019.[20] The kia'i performed a Mauna Protocol Ceremony in tribute to Mauna Kea. The ceremony was carried out in a precontact style of prayer called *kahiko* and employed newly composed chants, songs, and hula (dance). Such protocols are new traditions in old styles, bridging the past and the present, and connecting Mauna Kea with the people who protect it. The chant and hula "'Ai Kamumu Kēkē" illustrate how musicians, dancers, and cultural practitioners embodied the volcano's eruption and lava flow by using chant poetry, movement, and onomatopoetic sounds that involve tense vocal timbres. The performers, Jacob (2020) explains, "helped a dormant volcano continue to grow."

The Mauna Kea performance transformed secular space through musical expressions of reverence, connection, and calls to action. In her paper, Jacob problematized the use of the word "sacred" and warned against the application of the simple Western sacred/secular binary. Rather than seeing the environment as distinct from humans, Native Hawaiians view it as relational and interconnected. When participants all over the world performed together with the kia'i on Mauna Kea at the Jam 4 Mauna Kea, an online music jam event livestreamed on Facebook, they temporarily transformed their personal spaces into sacred ones. While the COVID-19 pandemic and the stay-at-home order moved the protest entirely online, kia'i have continued to bring Mauna Kea to everyone, through the screens of their devices, by performing on Zoom and Facebook (Jacob 2020).

Related ideas are developed in the SEM conference paper by Chiao-Wen Chiang (2020), who explored how nuclear waste and the expressive culture of the Indigenous Yami/Tao ethnic group in Taiwan have changed social and political realities. Since 1987, the Yami/Tao have staged protests against the Taiwanese government's dumping of nuclear waste on their island Pongso no Tao (Island of People). By making the analogy between nuclear waste and *anito* (evil spirits from their Indigenous belief system) and by symbolically expelling the anito with aggressive gestures derived from new interpretations of men's traditional ritual performances, the Yami/Tao enact their long-standing ecological knowledge to address environmental degradation and engender a sense of guilt among the Taiwanese. Using the frameworks of "tradition vs. modernity" and "us (Indigenous Yami/Tao)

vs. them (Taiwanese)," the Yami/Tao are demanding environmental justice and the right to self-determination (Chiang 2020).

As the Taiwanese government turned its policies in the early 2000s from Chinese-centered cultural assimilation to multiculturalism, the format of anti-nuclear waste protests has gradually shifted from an exclusion of outsiders to a conditional inclusion of them. Although the nuclear waste issue remains unsolved, the influx of tourism has created unexpected problems, such as massive crowds and huge piles of trash on Pongso no Tao, which were particularly bad in the summer of 2020.[21] Instead of being helpless or calling for an end to tourism, the Indigenous Yami/Tao have been actively mobilizing residents and tourists to appreciate Indigenous knowledge and practices through traditional and newly composed song repertoires performed in concerts, musical festivals, and cultural workshops. These provide immersive experiences for participants to envision an idealized environment based on Indigenous culture. The sound spaces of both aggressive demonstrations and participatory performances responded to the immediate pollution problems and served as a way for activists to promote environmental and cultural sustainability on Pongso no Tao (Chiang 2020).

As global environmental crises have encouraged solidarity among Indigenous peoples, early career scholars are reconceptualizing environmental protest movements and recognizing that they do not only seek material goals, such as policy change or reducing carbon emissions. Ecomusicological research in Indigenous communities has helped scholars reconceptualize nature as a set of interconnected relationships, including human and more-than-human communities. Theirs is not a regressive call to restore what has been lost. Rather, many are adopting what Rehding called the "nostalgic imagination," drawing on elements of the past "with an urgent ethical imperative to preserve and perpetuate it for future generations" (2011, 413).

CONCLUSION

In closing, it is useful to reiterate a main point from the introduction: ecomusicology is a transdisciplinary field, not a discipline. In traversing the field's tributaries and distributaries, we hope to have provided the reader with a more holistic, or perhaps synthetic, sense of the broader conversations that take place in ecomusicology. We feel that naming this field of shared inquiry and exchange is a useful project, but it is not our goal to make this field, conversation, or subject into a discipline. It is more accurate to speak of plural "ecomusicologies" than it is to reify the field by treating it as a singular noun. Ecomusicology is an interlocutor across and between disciplines, and it is becoming more so as the conversation expands to an increasingly global network of scholars. With an emphasis on complexity and interconnection, ecomusicology adds an integrative dimension to our understanding of organized sound while assisting musical communities' ongoing struggles to achieve environmental justice, foster biodiversity, and survive.

NOTES

1. Our goal here is not to counter the scholars who have issued those challenges, whether in print or in person. Their questioning has been reasonable and helpful, and we have decided not to cite ecomusicology's critics by name. This article is an explanation and answer, not a polemic.

2. In this context, we emphasize that this article is intended as an interdisciplinary sampling, rather than an exhaustive review. We have barely touched on contributions from sound studies and bioacoustics, for example, two fields that have immensely influenced ecomusicology. Nor have we discussed music education, including individuals whose work has helped to make ecomusicology a public-facing and praxis-oriented endeavor (Forbes 2004; MacDonald 2017; Smith 2016). Similarly, we have neglected fascinating discussions concerning inter-species musicianship (Rothenberg 2002, 2008; Rothenberg and Ulvaeus 2001; Taylor 2020) and other topics that transcend disciplinary confines. It is

important to note that environmental studies of music have been completed under the aegis of "sonic ecology" as well as other combinations of the root terms "music" and "ecology," including "music ecology" and the "ecology of music." Given that multiplicity of descriptors, we are not wedded to calling this conversation "ecomusicology" *per se* but are, instead, committed to creating a space for the ecological study of music, no matter what it is called. Hybridizing the key terms—music and ecology—seems to make sense, and that is probably why so much work done in regard to music-and-environment has taken on that title. And as noted above, the plural "ecomusicologies" is, perhaps, a more accurate way to describe the field's diversity and multiplicity. Possibly the greatest limitation of this review is that it is focused almost exclusively on Anglophone literature, and thus over-represents music-making and academic work in English-speaking contexts. As the recent florescence of ecomusicological research in Japan and Nigeria demonstrates (Edwards 2018; Giolai 2018; Okoye et al. 2020; Snyder 2019; Titus 2017, 2019), the environmental study of music is occurring in various places around the world and will most likely continue to become a more central facet of global music and sound studies.

3. Titon was building on Allen (2014), which was circulated and available years before its final publication.

4. The influences of environmental studies and ecological ideas are evident throughout *Current Directions in Ecomusicology* (Allen and Dawe 2016, e.g., the "Glossary of Keywords"; cf. Feisst 2016b).

5. The signatories (and their institutional affiliations at the time) were Michael Beckerman (New York University), Michael Broyles (Pennsylvania State University), Theo Cateforis (Syracuse University), Suzannah Clark (Merton College, University of Oxford), Patricia Gray (University of North Carolina at Greensboro), Daniel Grimley (University of Nottingham), Raymond Knapp (University of California, Los Angeles), Elizabeth Eva Leach (Royal Holloway, University of London), Richard Leppert (University of Minnesota), Neil Lerner (Davidson College), Beth Levy (University of California, Davis), Mitchell Morris (University of California, Los Angeles), Thomas Peattie (Boston University), Alexander Rehding (Harvard University), Scott Spencer (New York University), Brooks Toliver (University of Akron), Maja Trochimczyk (independent scholar), Denise Von Glahn (Florida State University), Ellen Waterman (University of Guelph), Holly Watkins (Eastman School of Music), and Richard Will (University of Virginia). At the time, Gray, Spencer, Trochimczyk, and Waterman were not AMS members.

The establishment of the SEM ESIG was a relatively simple process, which the SEM leadership welcomed, but the establishment of the AMS ESG was fraught with disagreement and pushback from the AMS leadership. This was due, in part, to the rarity of study groups in the AMS (though many more groups have been established there in the intervening years). Another factor was the fear of activist scholarship—the concern that such work is politically motivated and thus not "objective," although, as Philip Bohlman (1993) has observed, practicing any kind of musicology is itself a political act. The proposal that the group's founders submitted to the AMS board of directors in October 2007 addressed these fears directly by including "ecocriticism" in the group's title, which allied it with an established discipline (English) and referenced the well-known discipline of environmental history. Literary ecocriticism was useful because musicology had traditionally drawn critical methods from literary studies and also because ecocriticism considers relationships between literature and physical environments (see Allen et al. 2011; Allen 2014, 2016a; Ingram 2010, 2011).

In 2010, the *Grove Dictionary of American Music* commissioned AMS ESG chair Aaron Allen to write the inaugural entry on "ecomusicology" (Allen 2014), which, in its reliance on ecocriticism, reflects some of these tensions, even after extensive community drafting of the entry at annual meetings and via the Ecomusicology List Google Group. After over a decade of scholarly work, the AMS ESG began in 2019 to consider a name change; by 2021, after extensive discussions and surveys, members adopted the new name of the organization—the Ecomusicology Study Group.

6. An open access, peer-reviewed journal, *Ecomusicology Review* can be found at https://ecomusicology.info/.

7. Knapp built on a significant body of work on Beethoven's "Pastoral," including Will (1997), which was not included in the ESG proposal bibliography but certainly could have been (cf. Allen 2017a, 2017d). *JAMS* has continued to publish ecomusicological articles (e.g., Allen et al. 2011; Mundy 2014; Deathridge et al. 2017; Saltzstein 2019).

8. Juan Velasquez is at work on a project tentatively titled "Equinoctial Noises: Ecological Crisis, Neoliberalism, and New Music in Latin America" and, as has become increasingly common in musicology and among younger music scholars, has collaborated extensively with ethnomusicologists. One example of this is a panel titled "Decolonizing the Anthropocene: Environmental Justice and Epistemologies of Sound in Latin America and the Caribbean," which was held at the 2020 annual meeting of the Society for Ethnomusicology.

9. We use the designation of "ethnomusicology" loosely, as it is often difficult and counterproductive to confine scholars and scholarship to a single discipline. In this section, we present a selection of sources that have influenced ethnomusicological discussions about ecomusicology.

10. Viveiros de Castro (2004) evades offering clear definitions of "perspectivism" and "multinaturalism," which originate in Indigenous cosmologies; nevertheless, both have been adopted as central terms in anthropology and,

increasingly, in ecomusicology. Álvaro Fernández Bravo (2013) helps us to understand that perspectivism "is the presupposition that each living species is human in its own department, human *for itself*," and regards the world from its own perspectives experienced in relation to others, while multinaturalism stands in contrast to multiculturalism, thus moving us away from the anthropocentric frames that contribute to "the epistemic violence that has characterized taxonomies and racialist hierarchies in the History of Science in the West."

11. Refer also to note 10, which discusses perspectivism and multinaturalism.

12. The members of the WSP were Bruce Davis, Howard Broomfield, Peter Huse, R. Murray Schafer, and Barry Truax. Several students provided assistance, most notably Hildegard Westerkamp. Acoustic ecology was established as a field in 1993 at the inaugural meeting of the World Forum for Acoustic Ecology, which took place at the Banff Centre in Banff, Alberta, Canada. For more on the WSP, see Droumeva and Jordan (2019).

13. The team turned to their local area for their first study, *The Vancouver Soundscape*, which was published as a book and double LP (Schafer 1978). Their research techniques included soundwalking, interviews, field recordings, and sound maps. Subsequently, the WSP conducted similar studies across Canada (Schafer, Huse, and World Soundscape Project 1974) and in Europe (Schafer, Davis, and Truax 1977). The efforts of the WSP culminated in Schafer's book *The Soundscape: Our Sonic Environment and the Tuning of the World* ([1977] 1994). In the mid-1980s, Truax ([1984] 2001) provided a lexicon for the field. For a follow-up assessment of the European sites visited by the WSP, see Järviluoma et al. (2009).

14. In addition to being the original site of the WSP, Vancouver was also home to the formation of Greenpeace, the environmental nonprofit organization founded in 1971.

15. See, for example, Monacchi's *Fragments of Extinction*, Barclay's *Sonic Reef*, Krause's *Great Animal Orchestra*, and Polli's *N.* Sound-based installations in addition to art exhibitions hold promise for acoustic ecology to reach broader audiences, but both require the space, labor, and funding that other forms of outreach do not (e.g., a soundwalk or an online sound map). For one approach to an acoustic ecology–informed art exhibition, consider *Resounding Change: Sonic Art and the Environment* (Western Carolina University Fine Art Museum 2019).

16. See also Hempton and Grossmann (2009), Barclay (2012), and Marshall (2014).

17. The environments that are generally engaged in soundscape composition are acoustically interesting, rich in cultural or geological history, threatened, or have all three of these features.

18. Droumeva and Jordan (2019) is a robust investigation of current directions in this area.

19. This problem is exemplified by two recent themed issues of *Soundscape: The Journal of Acoustic Ecology*, one on Australia (2019) and the other Canada (2014–2015). Sound studies is facing a similar challenge. Kyle Devine attributes this problem to "the prevalence of US-based sound scholars (not to mention the increasing interest in sound in American studies)…and…the central role that the United States has played in the development of sound technology since the 1870s" (2014). In acoustic ecology, scholarship and creative work in Japan is an exception, with an active acoustic ecology community affiliated with the World Forum for Acoustic Ecology.

20. Mauna Kea already hosts thirteen telescopes at its summit. The proposed construction of the Thirty-Meter Telescope has been the subject of ongoing controversy since 2014, and Native Hawaiians have held a diversity of opinions about it. Shortly after the state government of Hawai'i relaunched work on the telescope in July 2019, protestors gathered at Mauna Kea Access Road and set up a campsite to block the project's construction vehicles.

21. With zero COVID-19 cases and a turn to domestic tourism in 2020, the island had been overwhelmed by Taiwanese visitors. From January to early August 2020, a total of 118,952 tourists visited the island (Taitung County Tourist Department 2020), which has a resident population of only 5,188 (Taitung Budget Accounting and Statistics Department 2021). As the local landfill site was already at capacity, the volume of trash produced by the massive number of tourists had created an urgent environmental crisis.

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