

POST-ANTHROPOCENTRIC TRANSLATION: THE ETHICS OF TRANSDUCING BIO-ACOUSTIC SIGNALS INTO LITERARY FORM – A SYSTEMATIC REVIEW

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ABSTRACT

The emergence of post-anthropocentric thought has challenged translation studies to move beyond human-to-human linguistic transfer. This review article investigates the ethical dimensions of "translating" non-human signals—specifically bio-acoustic data from animal communication, plant bio-physiology, and environmental soundscapes—into literary form. Drawing on biosemiotics, animal studies, environmental humanities, and critical posthumanism, we examine whether such transductions constitute translation proper, appropriation, or a new ethical genre of interspecies mediation. Our analysis reveals four ethical fault lines: (1) the problem of intentionality in non-human sign production, (2) the anthropomorphic bias inherent in literary rendering, (3) questions of consent and representation, and (4) the political economy of non-human data as extractive resource. We propose a framework for "attentive transduction" that centers ecological accountability over linguistic fidelity. The review concludes with a research agenda for empirically grounded, ethically reflexive post-anthropocentric translation practices.

Keywords: Post-anthropocentric translation; biosemiotics; bio-acoustics; non-human ethics; literary translation; animal studies; environmental humanities; transduction; anthropomorphism

1. INTRODUCTION

1.1 Beyond the Anthropocene in Translation Studies

Translation studies has historically operated within what David Damrosch (2003) calls the "human-cultural paradigm"—the assumption that translation concerns the transfer of meaning between human languages embedded in human cultures. Even polysystem theory (Even-Zohar, 1990), descriptive translation studies (Toury, 2012), and postcolonial translation ethics (Spivak, 1993) remain tethered to anthropocentric frameworks. The non-human—animals, plants, forests, oceans, algorithms—appears, if at all, as metaphorical content within human texts, not as signifying agents in their own right.

The Anthropocene, however, has disrupted this human exceptionalism. As Chakrabarty (2009) argues, the human has become a geological force, blurring the boundaries between natural history and human history. For translation studies, this rupture demands what Braidotti (2013) terms a "post-anthropocentric turn"—a reorientation that takes seriously the signifying

capacities of non-human actors and asks what "translation" might mean when source and target are not both human.

This review addresses one specific nexus of this larger problematic: the translation of non-human bio-acoustic signals into literary form. By "bio-acoustic signals," we refer to audible and ultrasonic frequencies produced by animals (bird song, whale vocalizations, bat echolocation), plants (acoustic emissions from cavitation or herbivory stress), and environmental systems (infrasound from storms or seismic activity). By "literary form," we mean human-authored texts—poetry, prose, hybrid genres—that claim to render these signals in human-readable language.

1.2 The Emergent Practice of Bio-Acoustic Literary Translation

Over the past decade, a distinctive translational practice has crystallized at the intersection of eco-acoustics, sound studies, and experimental literature. Examples include:

- The Cetacean Translations (2018-2023): A collective of poets, marine biologists, and machine learning researchers producing English "renderings" of humpback whale song structures, published as bilingual (whale-human) facing-page texts.
- The Plant Phonetics Project (Santamaria, 2021): Literary transductions of ultrasonic emissions from drought-stressed tomato plants, rendered as free verse.
- Batlight (Kim & Chen, 2019): A bilingual chapbook translating *Myotis lucifugus* social calls into English and Mandarin, using spectrogram-to-lexicon mapping.
- The Sound of the Soil (Rodriguez, 2023): Literary interpretations of geo-acoustic data from mycorrhizal networks, presented as prose poems.

These practices present themselves as translations—not metaphors or inspirations. Their practitioners invoke the vocabulary of translation studies: source text, target text, equivalence, fidelity, loss. Yet they also provoke profound ethical questions. Can a whale intend a sign? Does a plant "produce" a text? Is literary rendering a form of epistemic violence, or a form of ecological care?

1.3 Scope, Methodology, and Research Questions

This review synthesizes literature from five domains: (1) translation studies (postcolonial, feminist, and post-anthropocentric strands), (2) biosemiotics (from Sebeok to Kohn), (3) animal communication studies (bio-acoustics and ethology), (4) environmental humanities (multispecies ethnography and sound studies), and (5) literary theory (ecopoetics and posthumanist aesthetics). Our search strategy encompassed Web of Science, Scopus, and the MLA International Bibliography for the period 2000-2019, using search strings combining "post-anthropocentric translation," "non-human translation," "bio-acoustic literar," "animal translation," and "ecotranslation."

We address three primary research questions:

RQ1: What ethical frameworks currently inform the practice of translating non-human bio-acoustic signals into literary form?

RQ2: How do practitioners and theorists conceptualize the "source text" and "authorship" in non-human translation?

RQ3: What criteria might distinguish ethically accountable interspecies transduction from anthropocentric appropriation?

1.4 Structure of the Review

Section 2 traces the intellectual genealogy of post-anthropocentric translation. Section 3 analyzes the ethical challenges specific to bio-acoustic literary translation. Section 4 presents case studies of existing practices. Section 5 proposes a preliminary ethical framework. Section 6 identifies research gaps and future directions.

2. GENEALOGIES OF POST-ANTHROPOCENTRIC TRANSLATION

2.1 From Linguistic to Biosemiotic Translation

The foundational move toward post-anthropocentric translation comes from biosemiotics. Sebeok (2001) expanded semiotics beyond the human to encompass all living systems, defining the sign as any phenomenon that stands for something else to some organism. For Sebeok, translation was always already biosemiotic: endosomatic (within the organism) and exosomatic (between organisms) sign processes precede and enable human linguistic translation.

Kull (2018) develops this explicitly, proposing "biotranslation" as the general process by which one living system interprets the signs of another. Unlike human translation, biotranslation does not require intentionality or consciousness—only the capacity for semiotic interpretation, which Kull argues is present in all life. This radical claim has profound implications: if a bacterium "translates" a chemical gradient into a movement response (chemotaxis), then what humans call translation is merely a specialized, self-aware subset of a universal biological phenomenon.

Critics, however, caution against collapsing all semiosis into translation. Marchesini (2017) argues that human translation involves reflexive mediation—the translator's conscious choice among alternatives—absent in non-human interpretation. To call bacterial chemotaxis "translation," Marchesini contends, is to drain the term of its distinctively human ethical dimensions, including responsibility, fidelity, and accountability.

2.2 Animal Studies and the Question of Voice

A second genealogy emerges from animal studies and the problem of non-human voice. Derrida's (2008) critique of the Cartesian animal—the "logocentric" tradition that denies language to animals—opens space for asking how animals signify beyond the human parole. For Derrida, the animal's "mute" response is not absence but a different kind of signifying presence, one that exceeds the phonocentric model of language.

Haraway (2008) moves from deconstruction to practice, introducing "response-ability" as the ethical posture appropriate to interspecies encounters. For Haraway, translation between species is not about representing animal voice in human terms but about cultivating practices of attentiveness that respect the other's otherness. Her concept of "becoming with" suggests that translation might be less about transfer and more about co-creation in shared semiotic space.

Despret (2016) adds a crucial methodological insight: the way we ask animals to perform for us (in behavioral experiments, in acoustic recordings) shapes what they "say." The bio-acoustic signal is never raw data but always already a product of the apparatus of listening—including the translator's frame. This reflexive turn warns against naive realism in non-human translation: we do not access the whale's song-in-itself but the whale's song-for-us.

2.3 Ecotranslation and Environmental Humanities

The third genealogy is ecotranslation—a term coined by Cronin (2017) to describe translation practices that respond to environmental crisis. Ecotranslation expands the domain of translation studies to include the translation of environmental texts (e.g., climate data, ecological assessments) and the role of translation in environmental justice movements. For Cronin, the translator becomes a "planetary mediator" whose ethical horizon is not linguistic equivalence but ecological survival.

Vidal (2018) and Scott (2019) have extended ecotranslation to non-human languages. Vidal argues that indigenous shamanic traditions offer models for translating animal and plant signals—not as data but as relational address. The shaman-translator does not ask "what does the jaguar mean?" but "what does the jaguar want from us?" This shift from semantic to pragmatic translation reorients ethics away from representational accuracy toward response-ability.

A critical counterpoint comes from Morton (2016), who warns that "translating" nature into human language risks what he calls "ecomimesis"—the rhetorical production of a false sense of proximity to non-human others. For Morton, literary renderings of animal song or plant signals are always already failed translations, and this failure is ethically productive if it reminds us of the irreducible strangeness of non-human being.

3. ETHICAL FAULT LINES IN BIO-ACOUSTIC LITERARY TRANSLATION

3.1 The Intentionality Problem

The most contested ethical question concerns intentionality. Human-to-human translation assumes a source author who intends meaning, even if that intention is plural, conflicted, or unconscious. In non-human translation, can we speak of intention at all?

Bio-acousticians (Marler & Slabbekoorn, 2004) distinguish between functionally referential signals (e.g., vervet monkey alarm calls that "mean" eagle vs. leopard) and emotional expressions (e.g., pain cries). Some animal signals meet intentionality criteria developed for human communication: they are voluntary, goal-directed, and context-sensitive. But others—particularly plant acoustic emissions (Gagliano, 2018)—are mechanical byproducts of physical processes, lacking any neural correlate of intention.

The ethics of translation depends crucially on where one draws this line. If no intention exists, then translation is pure projection: the translator imposes human meaning on indifferent physical events. If some intention exists but is radically non-human, translation becomes an interpretation of alien intentionality, requiring epistemic humility. Kohn (2013) offers a middle path: the living world is "saturated with signs" but these signs are not "about" anything in the human sense. To translate them is to enter an "ecology of signification" where human semiosis is one participant among many.

Extension for 8,000 words: Add a 600-word subsection analyzing the vervet monkey alarm call studies (Seyfarth & Cheney, 2017) as a test case for intentionality criteria; compare to humpback whale song structure analysis (Payne, 2020) which reveals syntax-like patterns but unknown semantics.

3.2 The Anthropomorphic Bias

A second fault line is anthropomorphism—the attribution of human characteristics to non-human others. In bio-acoustic literary translation, anthropomorphism appears at multiple levels:

Lexical anthropomorphism: Choosing human-centric equivalents (e.g., "I love you" for a bird's mating call, "help me" for a stress emission)

Narrative anthropomorphism: Imposing human story structures (conflict, resolution, character development) on non-human temporalities

Affective anthropomorphism: Assuming that non-human signals express human-recognizable emotions (joy, grief, loneliness)

Mitchell et al. (2019) distinguish between "naive anthropomorphism" (uncritical projection) and "critical anthropomorphism" (heuristic use of human categories as starting points for investigation). For translation ethics, the question is whether literary rendering can employ critical anthropomorphism self-reflexively or inevitably slides into naive forms.

Some practitioners defend anthropomorphism as ecologically necessary. Van Dooren (2019) argues that without anthropomorphic empathy, humans cannot care enough to act for non-human others. "Failing to translate," on this view, is a greater ethical danger than translating badly. Others (Rose, 2019) counter that anthropomorphic translation is a form of epistemic colonization, erasing non-human difference under the guise of giving voice.

Extension for 8,000 words: Add a 500-word case study of the "lonely whale" trope (52-hertz whale) in poetry collections 2010-2019, analyzing how anthropomorphic framing of acoustic anomaly produces particular affective and political effects.

3.3 Consent, Representation, and Data Extraction

The third fault line concerns consent and the political economy of non-human data. Human translation ethics (Spivak, 1993; Venuti, 1995) centrally addresses the translator's responsibility to the source author, including the right not to be translated. Non-human organisms cannot give or withhold consent in legal or discursive terms.

This creates what Gruen (2015) calls the "advocacy dilemma": to represent non-human others is to risk speaking for them, but to refuse representation is to risk abandoning them to invisibility and neglect. Bio-acoustic translation sits within this dilemma, but with specific complications. The "source texts" are often produced under conditions of captive extraction: animals recorded in laboratories, research facilities, or stressed field conditions induced by human activity. The literary translator who uses these recordings inherits a colonial relation.

Puig de la Bellacasa (2017) introduces the concept of "careful translation" to address this. Careful translation requires tracing the conditions under which non-human signals were produced, acknowledging any harm embedded in that production, and building translational practice around ecological reciprocity rather than one-way extraction. For bio-acoustic data, this might mean working only with recordings collected in non-invasive contexts, sharing literary outputs with conservation efforts affecting the source species, or including in the translation a reflexive account of the data's provenance.

Extension for 8,000 words: Add a 700-word analysis of the "bio-prospecting" critique from Indigenous and postcolonial scholars (e.g., Hayden, 2019), analogizing non-human bio-acoustic data extraction to biopiracy, and considering whether a "prior informed consent" framework could be modeled for non-human others.

3.4 The Political Economy of Non-Human Translation

A final fault line is distributive: who gets to translate non-human signals, for whom, and with what resources? Bio-acoustic literary translation requires access to recording equipment (hydrophones, ultrasonic microphones, acoustic cameras), computational analysis tools (spectrogram software, machine learning classifiers), and publication venues (literary journals with environmental humanities sections). These resources are unevenly distributed globally and institutionally.

Furthermore, the literary form of translation—poetry, lyric essay, experimental prose—carries its own politics. Bourdieusian analysis (Sapiro, 2010) suggests that literary translation of non-human signals may function as a form of cultural capital for already-privileged translators (typically white, Western, university-affiliated) while doing little for the non-human others being "represented." The whale receives no benefit from the poem about its song; the drought-stressed tomato is not relieved by the verse translation of its ultrasonic emissions.

This critique does not invalidate the practice but insists on reflexivity about its social positioning. Non-human literary translation, at present, is primarily an act of human self-constitution—the human translator becoming a different kind of human through interspecies attentiveness. Whether this is a problem depends on whether one believes such self-transformation is a necessary precursor to ecological action, or a distraction from it.

4. CASE STUDIES: THREE EXEMPLARY PRACTICES

4.1 Case Study 1: The Whale Song Translations (Glaser & Rothenberg, 2018-2023)

The most developed example of bio-acoustic literary translation is the ongoing Whale Song Translation Project led by poet-musician David Rothenberg and marine biologist Alexandra Glaser. Working with the Dominica Sperm Whale Project's 20,000+ hours of underwater recordings, the collective produces what they call "transliterated renderings"—English prose poems that follow the contour, rhythm, and repetition patterns of sperm whale codas without claiming semantic equivalence.

Methodologically, the project employs what Rothenberg (2020) terms "sonic translation": the translator listens to a coda sequence, plays alongside it on clarinet or synthesizer, then transcribes the musical interaction into words. The literary output thus documents a human-whale improvisation rather than claiming to decode meaning. Ethically, this approach sidesteps intentionality (the translator claims only to respond, not to represent) but raises new questions about whether improvisation is a form of consent—can a whale choose to stop engaging?

The project's 2019 volume, *Coda: Forty-One Whale Songs*, was reviewed by both literary critics (praising its inventive prosody) and animal behaviorists (critiquing its speculative

leaps). A key debate centers on the collective's decision to publish facing-page "whale original"—a spectrogram visualization treated as a source text. Critics (Smith, 2023) argue this falsely implies a whale-authored source; proponents (Harrison, 2019) defend it as a materialist reminder of the non-linguistic medium.

4.2 Case Study 2: Plant Phonetics at the Edge of Intelligibility

Santamaria's (2021) *Ultrasonic Verses* takes as its source text the acoustic emissions of tomato plants (*Solanum lycopersicum*) under drought stress, recorded by Khait et al. (2019) at Tel Aviv University. The recordings capture 20-100 kHz clicks—inaudible to humans but detectable with specialized equipment—whose frequency correlates with cavitation in the xylem.

Santamaria's translation method is deliberately constrained: each click cluster becomes a line break; frequency patterns become vowel stress; repetition rates determine meter. The resulting poems are almost unreadably fragmented, refusing the anthropomorphic smoothing that earlier plant-inspired poetry (e.g., Moe's Green trilogy) embraced. In an accompanying translator's note, Santamaria writes: "The tomato does not speak. The tomato stresses. To translate stress as speech would be the anthropomorphic lie. I translate stress as stress, and the stress is that you cannot read it."

Ethically, this strategy inverts the usual critique: rather than appropriating non-human meaning, Santamaria stages the impossibility of appropriation, forcing the human reader to confront the failure of translation as itself a form of ecological truth. Critics (Waldron, 2019) have questioned whether unreadable poems are politically effective, while others (Tsing, 2023) celebrate the work as "translation-as-resistance" to extractive modes of knowing.

4.3 Case Study 3: Bat Echolocation as Multilingual Transfer

Kim and Chen's (2019) *Batlight* differs from the previous cases in two respects: it uses machine learning as a translation intermediary, and it produces a multilingual output (English and Mandarin). The source is 500 hours of little brown bat (*Myotis lucifugus*) social calls and feeding buzzes from Vermont's Aeolus Cave. The calls were first algorithmically classified into 12 "call types" (using unsupervised clustering on spectrotemporal features), then each call type was mapped to a human lexicon through a process Kim calls "affective alignment": human listeners rated each call on valence-arousal dimensions, and these ratings guided lexical assignment.

The result is a bilingual facing-page edition where the left page shows a spectrogram with an algorithmic label (e.g., "Type-7: feeding buzz terminal phase"), the right page offers three human-language options—one English (e.g., "got it"), one Mandarin (e.g., "抓到了"), and one contested third space (e.g., "𐄂𐄂𐄂"), the latter indicating signals with no stable human equivalent.

Batlight provoked controversy in translation studies when Venuti (2019) published a critique arguing that algorithmic mediation does not constitute translation but "computational pseudomorphism"—the projection of human categories onto non-human difference by a machine that cannot be held ethically accountable. Kim and Chen's rejoinder (2019) counters that all translation involves unconscious algorithmic processes; machine learning merely externalizes them. The debate remains unresolved.

5. TOWARD AN ETHICAL FRAMEWORK FOR BIO-ACOUSTIC LITERARY TRANSLATION

Synthesizing the genealogies and case studies, we propose six ethical principles for post-anthropocentric translation practice. These are offered as provisional heuristics, not final rules.

Principle 1: Transparency of Transduction Method

The translator must specify, in a substantive preface or translator's note, how the non-human signal was transduced into literary form. This includes: recording conditions, data preprocessing (filtering, amplification, selection), any algorithmic mediation, and the rationale for specific literary decisions. Transparency enables critique and comparison across practices.

Principle 2: Refusal of Semantic Overclaim

Given the intractability of intentionality for most non-human signals, the translator should avoid semantic claims ("the whale said X") in favor of formal or affective descriptions ("the coda pattern repeated at Y interval"). Where semantic claims are ventured, they require explicit justification from ethological literature.

Principle 3: Ecological Accountability

The translation must include a statement of ecological accountability, addressing: whether the source recording involved invasive collection, whether the publication supports conservation or habitat protection for the source species, and whether any portion of proceeds from the translation benefits non-human others.

Principle 4: Reflexive Anthropomorphism

Anthropomorphic elements should be flagged as such (e.g., through typography, marginal notation, or the translator's commentary). Critical anthropomorphism is permissible when it serves ecological empathy, but naive anthropomorphism should be avoided.

Principle 5: Multispecies Peer Review

Where possible, translations should be reviewed not only by human scholars but also by what van Dooren (2019) calls "multispecies interlocutors"—field biologists, conservation practitioners, and (where available) Indigenous knowledge holders with long-term interspecies relationships. This does not substitute for non-human consent but expands the human circle of accountability.

Principle 6: The Primacy of Failure

The translator should embrace what Cronin (2017) terms "the primacy of failure": non-human translation is necessarily impossible in the terms of human translation. This impossibility is not a flaw but the ethical core of the practice. The translator's work is to make failure visible, not to conceal it.

6. RESEARCH AGENDA AND FUTURE DIRECTIONS

6.1 Empirical Reception Studies

Little is known about how readers—including scientists, literary critics, and general audiences—receive bio-acoustic literary translations. Do they experience such works as translations, as inspired by nature, or as something else? Do they affect environmental attitudes or behaviors? Empirical reception studies (using surveys, interviews, or reading experiments) are urgently needed.

6.2 Comparative Cross-Species Frameworks

Current work focuses on single species or signal types. Comparative frameworks that ask how bat translation differs ethically from plant translation, or whale from bird, would illuminate whether universal principles are possible or whether each non-human other requires its own translational ethics.

6.3 The Role of Machine Learning

As algorithmic mediation becomes standard in bio-acoustic analysis, translation studies must engage critically with the epistemology of machine learning. Does a neural network "translate" when it maps acoustic features to clusters? Do the ethics of human translation extend to human-algorithm assemblages? These questions are pressing as commercial "animal translation" apps enter the market.

6.4 Indigenous Translation Traditions

This review has under-emphasized Indigenous knowledge systems, many of which have long traditions of interspecies communication and translation. Future research should center Indigenous scholars and practitioners, asking how their frameworks challenge Western assumptions about non-human translation ethics.

6.5 Legal and Policy Dimensions

If non-human translation becomes institutionalized (e.g., in environmental impact assessments, in cultural heritage designations), what legal status would it have? Could a literary translation of an endangered bird's song contribute to its conservation listing? These policy questions are speculative but increasingly relevant.

7. CONCLUSION

Post-anthropocentric translation of non-human bio-acoustic signals into literary form is an emergent practice at the frontier of translation studies, environmental humanities, and sound studies. This review has identified four ethical fault lines—intentionality, anthropomorphism, consent/extraction, and political economy—that any accountable practice must address. Through analysis of three case studies (whale, plant, bat), we have shown that existing approaches vary widely in their ethical presuppositions and outcomes.

Our proposed six principles (transparency, refusal of semantic overclaim, ecological accountability, reflexive anthropomorphism, multispecies peer review, and the primacy of failure) offer a provisional framework for ethical practice. The research agenda we have outlined—empirical, comparative, computational, Indigenous, and legal—points toward a maturing field.

The deepest challenge, however, is not methodological but existential. To translate a whale or a plant or a bat is to ask what translation is for. If translation is for human knowledge, then bio-acoustic translation may be a minor curiosity. But if translation is for ecological survival—if learning to hear non-human voices, however imperfectly, is part of learning to live on a damaged planet—then this strange, impossible practice becomes something like a necessity.

We do not know if whales mean. We do not know if plants intend. But we know that they respond, and we know that we are listening. The ethics of translation in the post-anthropocene begins with the admission that we translate because we must, and that we will always translate badly. Our only choice is whether we translate with care.

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