



## Operationalizing the biocultural perspective part II: A review of biocultural action principles since The Declaration of Belém

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### ABSTRACT

In part 1 of our review of the biocultural conservation literature - conducted in 2019 - we utilized a rapid appraisal approach to determine that while the biocultural perspective was born within the action-oriented and Indigenous People and Local Community (IPLC)-Centered Declaration of Belém, the subsequent scientific discussion remained largely in a conceptual holding pattern. In Part 2, we reengage the literature later in time - mid-2021 - and with a more intensive qualitative analysis methodology to pursue the trends we observed and to more deeply perceive and comprehend the operating principles of the most impactful biocultural action research, which we define as research that fulfills the clear prescriptions of the Declaration of Belém. Toward these ends, we develop and utilize a systematic review methodology including thematic analysis, appreciative inquiry, and collaborative analysis. Our findings not only show an increasing concentration of action-orientation in the emerging literature, but identify and increase comprehension of the core operating principles for biocultural action. We determine that biocultural studies adhered to the following principles: 1) honor IPLC place attachment; 2) rigorously engage with IPLC's; 3) valorize cultural survival and continuity; 4) invert power dynamics; and 5) cultivate new insights. Our results represent a one-of-a-kind diagnostic on the fulfillment of the Declaration of Belém's prescriptions in conservation scholarship and practice, as well as a roadmap for practicing scholars and policy-makers intent on guaranteeing IPLC environmental leadership. These newly forged resources further point the way toward understanding and operationalizing the biocultural perspective as a strategic vision.

### 1. Introduction

The term 'biocultural' as used today within the fields of environmental conservation and policy - as opposed to biological anthropology - is widely deployed to signal a meaningful yet enigmatic synergy which exists between the cultural survival of Indigenous Peoples and Local Communities (IPLC)<sup>2</sup> and the persistence of biodiversity. The core claim disseminated within this particular dispersal of the term - like a gene within a seed - is one of highly specific provenance, namely that "there is

an inextricable link between cultural and biological diversity," as stated within the Declaration of Belém in 1988 (Declaration of Belém, 1988), hereafter referred to as the Declaration. This core idea of linked diversity has been cited to substantiate many more sweeping claims regarding IPLC's, their knowledge, and practices. For example, indigenous knowledge is argued to be a perennial resource for addressing critical environmental problems of the present and future at multiple scales (Berkes et al., 2000; Norström et al., 2020). Cultural diversity in the form of language diversity is attributed the power to preserve

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<sup>2</sup> Though the IPLC term is suitably flexible to describe many of the world's marginalized cultures, we authors recognize that Indigenous Peoples have inherent, international rights that are distinct from those of local communities.

biodiversity and vice versa. (Rockström et al., 2009; Amara-Leret and Bascompte, 2021; Reyes-García et al., 2023).

Still, “the inextricable link between cultural and biological diversity,” or simply the “link,” as we will now refer to it, is widely cited as the cornerstone of the biocultural perspective (Cocks, 2006; Cocks and Dold, 2006; Maffi, 2007; Mathez-Stiefel et al., 2007; Brosius and Hitchner, 2010; Grant, 2012; Maya, 2012; Rozzi, 2012; Boillat et al., 2013; Cocks and Wiersum, 2014; Hong et al., 2014; Larson, 2014; Rozzi et al., 2014; Turner et al., 2016; Sadowski, 2017; Bond et al., 2019; Bridgewater and Rotherham, 2019; Simbiak et al., 2019; Carrillo Yap, 2021; Stålhammar and Brink, 2021) (Fig. 1). Compared to this intriguing claim, the rest of the Declaration in which it was born has received little scholarly consideration in peer-reviewed discussion.

As a result, despite the Declaration’s clear demands for action and its unequivocal prescriptions for course correction in environmental research and policy, the discussions of the biocultural concept in peer-reviewed literature has remained preoccupied with conceptual overtones (Lukawiecki et al., 2022). An emblem of this conceptual fixation is the term and concept of ‘biocultural diversity.’ This specific term was coined in 2001 (Maffi, 2001), partly in order to catalyze awareness of the “link”. An important strategic dimension of this pairing is that the concept of ‘biodiversity’ possessed at the time a swelling global tide of interest from all manner of national, international, governmental and non-governmental institutions as well as broad publics concerned with environmental issues (Fig. 2). Awareness of cultural diversity and cultural survival – the actual core concerns of the Declaration – were and remain small by comparison. It is an interesting fact that E.O Wilson’s book, *Biodiversity*, was published the same year as the Declaration, 1988. This volume is widely credited with launching the term ‘biodiversity’ into the public imagination (Väliverronen, 1998). Fig. 2 allows a visual grasp of as the very strategic benefit, c.a. 2001, of hitching onto the buzz under ‘biodiversity’ from the point of view of advocacy for the “link”. This strategic horse sense dovetailed with scientific academic

proclivities for high-altitude and complex perspectives to ensure that ‘biocultural diversity’ was by far the most discussed biocultural conservation concept in the scientific literature for its first twenty years (Lukawiecki et al., 2022).

The term ‘biocultural diversity’ has gone on to win notable repetition in public discourse and intergovernmental policy realms (United Nations, 2006; United Nations Environmental Programme, 2011a; Reed and Price, 2020). This is in no small part due to the talented work to render the term visible to planners and decision-makers. This was achieved through advanced statistical correlation of trends in global and regional states of biological and cultural diversity –indicated by the known location of languages (Brosius and Hitchner, 2010). These statistical advances have generated a number of compelling visual outputs further portraying the shared fate of biological and languages in space (Loh and Harmon, 2005; Maffi and Dilts, 2014).

However, scholars have pointed out several repercussions of the dissemination of the “the link” plucked away from the more concrete demands made in the Declaration. One result is that the incoherence in the idea itself has limited potential for generating concrete action. As Brosius states,

“It is one thing to recognise that a link between biological and cultural diversity exists; it is another thing altogether to conceptualise the nature of that link in a way that is productive either of new insights or new forms of practice, and a further step still to understand the implications for policy and governance. In this respect, the biocultural perspective must be found wanting.” (Brosius and Hitchner, 2010: p 142).

Other internal contradictions have troubled the roll out of “the link” as a working concept as well. Brosius and Hitchner (2010), applying logic first put forward by Appadurai (Appadurai, 1996), point out the “sacrifice zone” outcome by which the cultural survival of peoples in geographic zones which do not hold relatively high biological diversity would be overlooked in a biocultural framework which hinges on a

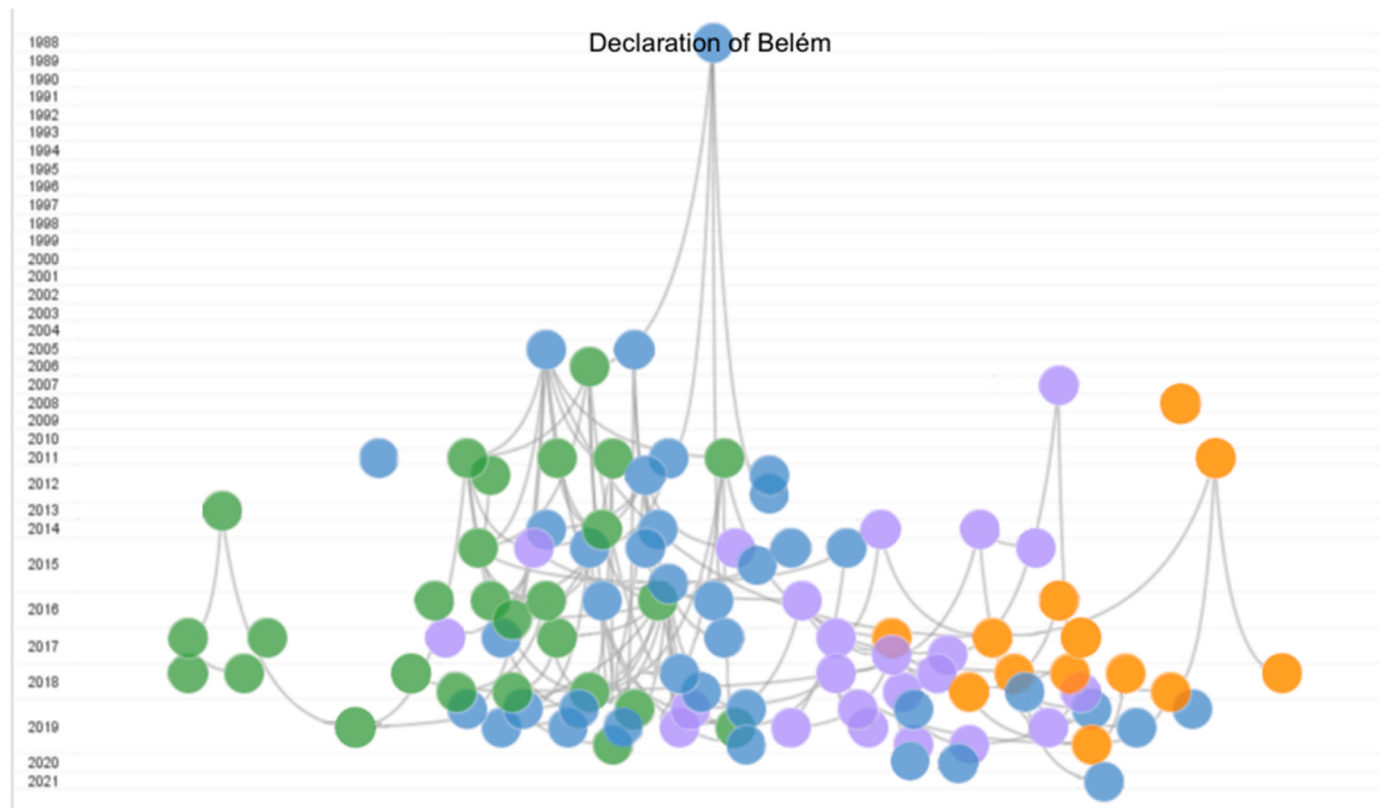
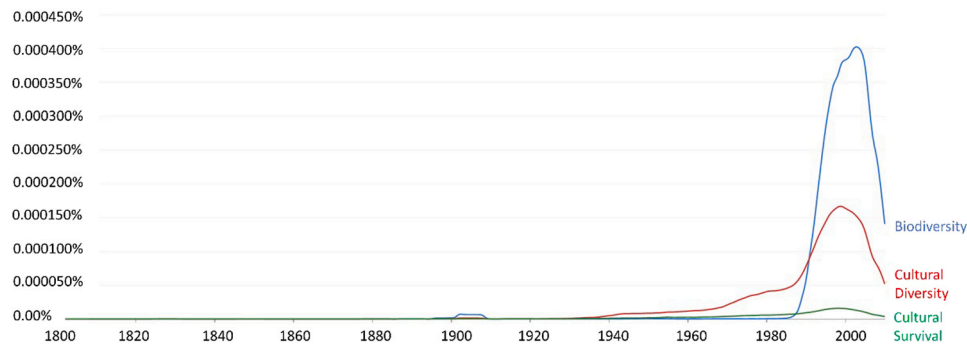


Fig. 1. Citation network of total biocultural conservation publications for paper 1 and 2. Circles represent publications. The position of the publication on the y-axis indicates time of publication. Lines indicate citation relations between publications.



**Fig. 2.** Usage of key terms in published books over time as determined by Google Ngram. The Y-axis represents percentage of occurrence of searched terms among all terms within the American and British English Google library. Figure adapted from Google Ngram native output.

peoples' proximity to biological diversity. Similarly, Cocks and Dodd (Cocks and Dodd, 2006) rightly – though uncritically – point out that the biocultural perspective may very well be suited to promoting the environmental interests of non-indigenous communities such as incorporated cities, their institutions, governments, and wealthy and powerful citizens.

We would add that the high proportion of investment of labor, resources, attention and debate on the subject of biocultural diversity has resurrected the Achilles heel of biological anthropology's usage of 'biocultural' by once again subsuming the cultural dimensions under the biological (Segal and Yanagisako, 2005). This is primarily because diversity, understood in the ecological sciences as a naturally statistical concept, is vastly more important to scientific environmental management than it is to known ecological priorities of IPLC's, which hold considerably more value for interrelations, nourishing complexity, and, above all, environmental health understood holistically and in mutual enrichment with livelihood and cultural continuation (Parlee et al., 2005; Gavin et al., 2018; Wall, 2022). Further, in view of our previous findings showing the driving role of the 'biocultural diversity' term in the over-emphasis of conceptual compared to applied discussion in the early biocultural literature (Lukawiecki et al., 2022), it is our perspective that other, more operationalizable organs of the declaration were left under-activated as a result of this conceptual odyssey.

In this paper, we undertake a second systematic literature review of scientific literature to chart a course for biocultural conservation research of the future. We perform this exercise in order to further operationalize the substance of the Declaration for environmental researchers, practitioners and policy-makers who are intent on achieving environmental impact "by and for" IPLC's. The foundation of such a research platform is the recognition of the fact – as laid out in the Declaration – that the biocultural perspective can only be optimally expressed and operationalized when in service to its core demands, namely the demand for environmental sovereignty for IPLC's as well as crystal clear attribution of environmental health to the legacy and continuation of IPLC's' ways of life. As such we supplement our previous literature review (Lukawiecki et al., 2022) into the origins and early development of the biocultural concept with a second, focused review of the state of the art in biocultural approaches. We aim to illuminate answers to the following questions: In light of the clear prescriptions in the founding document of the biocultural perspective, 1) What is the state of biocultural approaches in the scientific literature?; 2) How can biocultural approaches be identified, replicated, and evaluated?; and 3) What action principles are observed to be operating in impactful biocultural research?

In fulfillment of the concrete governance demands in the Declaration, we also adapt this paper and its findings to what we perceive as the needs of the global policy environment, particularly to the contemporary workings of the Convention on Biological Diversity. While biocultural as a term is used rarely within CBD reporting and programming, there are important features of the biocultural approach which are

indeed included in these texts, particularly the mentioning of Indigenous Peoples' rights, languages, knowledge and practices. However, getting beyond mentioning and citing these attributes of biocultural continuity will be necessary to meaningfully account for demands like those put forth in United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP, 2007), let alone the Declaration of Belém, and its 2018 sequel, The Declaration of Belém + 30 (International Society of Ethnobiology, 2018). The immediacy of this need is more and more broadly recognized. While global awareness of the need for urgent environmental and climatic protection is at a high point, "at the same time, recognitions of the rights of Indigenous Peoples to govern and steward their territories, including within protected and conserved areas, have increased substantially." (Lemieux et al., 2022: p. 110).

The insufficiency of merely mentioning biocultural attributes like languages in the light of the immensity of this need is obvious enough to be reported in its own right. For instance, Target 12 in Canada's sixth national report to the CBD states that "By 2020, customary use by Aboriginal [Indigenous] peoples of biodiversity resources is maintained, compatible with their conservation and sustainable use." However, the report continues, saying that "At the time of reporting there was limited available data to assess clear progress towards Canada Target 12." (Canada, 2019 p: 38) In a very similar vein, The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has recently distributed an advance report - a *Summary for policymakers of the methodological assessment regarding the diverse conceptualization of multiple values of nature and its benefits, including biodiversity and ecosystem functions and services (assessment of the diverse values and valuation of nature)* - intent on "embedding the diverse values of nature into decision-making and policymaking." (IPBES, 2022 p. 3) This report makes substantive progress presenting a rationale for incorporating multiple perspectives into environmental policy design and implementation, as well as putting forward a considerable bank of practical techniques for doing so. The scope of this report, however, does not directly reach out to or connect with rapidly emerging approaches to Indigenous environmental leadership, such as Indigenous Protected and Conserved Areas (IPCA's) (ICE, 2018), Indigenous Guardians Programs (Reed et al., 2020) and others which make much more headway towards meeting the demands of UNDRIP, the Declaration, Canada's Truth and Reconciliation Commission's Calls to Action (Truth and Reconciliation Commission of Canada, 2014) and other momentous initiatives.

We take this gap to show that there is a clear and present need to offer replicable pathways for identifying mutually agreeable indicators of mutually agreeable progress between environmental governance initiatives and IPLC's. This is true at the global, national and sub-national level. We apply our findings regarding authenticated biocultural action principles to this challenge later in this paper, as we believe that the principles we identify can be situated to become practical guidance not just for researchers, but for policy and governance practitioners as well. The 1988 and 2018 Declarations (hereafter, the Declarations) outline a coordinated action campaign across multiple

sectors, and which soundly justifies these actions with clear articulations of the problems to be mitigated and the motivations for doing so. Further, they strategically survey and engage the transnational and international institutional and social movement landscape, going beyond the environmental protection apparatus, for the purposes of building alliances and joining forces. These efforts all map well onto the commonly understood attributes of a strategic vision by spelling out what the project “can be...and should be” (Wilson, 1992: p 18). Here, it must be stated that for purposes of analysis this study assumes the researcher community to be distinct from IPLC’s. We recognize this is not always the case, nor should it be. With this study, we aspire to enrich the biocultural research capabilities and motivations of western trained researchers of any and all cultural backgrounds and social categories.

**2. Methods**

Anchored in the direct prescriptions of the Declaration discussed above, the overarching goal of our study was to systematically review scientific studies intent on advancing biocultural approaches to environmental conservation in order to identify and evaluate the emergent principles of effective biocultural approaches in scientific research. We began our systematic review of the literature by expanding our broad library of articles, established in Part 1, to include those published after mid-2019, when the search for that study was conducted. Key search terms including ‘biocultural’ and ‘bio-cultural’ were entered into the databases Scopus, Web of Science and Science Direct on May 6 of 2021. This yielded a total of 1566 records after duplicated and non-English papers were removed from the search. A further 1072 articles on evolutionary, psychology and medical subject area papers were

excluded, yielding 494 original research articles using the term ‘biocultural’ in the field of applied environmental studies. Of these, 164 articles were excluded for insufficient engagement with environmental conservation as a key concept, yielding a final list of 330 original research articles for our investigation. An example of the type of paper which was excluded at this stage would be one where the term ‘biocultural’ was used in title or abstract to describe some feature of the research context, but which did not go on to elaborate on or investigate key concepts. Our ‘early library’ included 187 articles (See Lukawiecki 2022, [Supplementary Material, Appendix A](#)), while our ‘later library’ included 143 ([Appendix A](#)). With these libraries divided, we were able to conduct preliminary description and analysis of varying trends between these two libraries.([Fig. 3](#)).

In holding to the action orientation demanded by the Declaration, we proceeded with a multi-step methodology towards biocultural action principles identification. We narrowed the later library by identifying a papers engaged with the most actionable elements of the discussion. To do this, we utilized a previously-established approach of harvesting, tabulating and sorting all terms in the library built out of the core term ‘biocultural.’ Examples of these include ‘biocultural diversity’ and ‘biocultural indicator.’ This approach is a step towards saliency analysis common in qualitative research, in particular ethnobiology (Nolan, 2014). This method is a process by which comments, rhetoric or other text is screened for the most prominently used words, terms or concepts. Recurrence in the entire library is therefor taken as an indicator of significance (Buetow, 2010). We also tabulated the number of articles using each term. We categorized each term as applied or conceptual. Terms which were suitable for building concrete applications, either as actions or objects of action (i.e. ‘biocultural restoration’), we categorized as

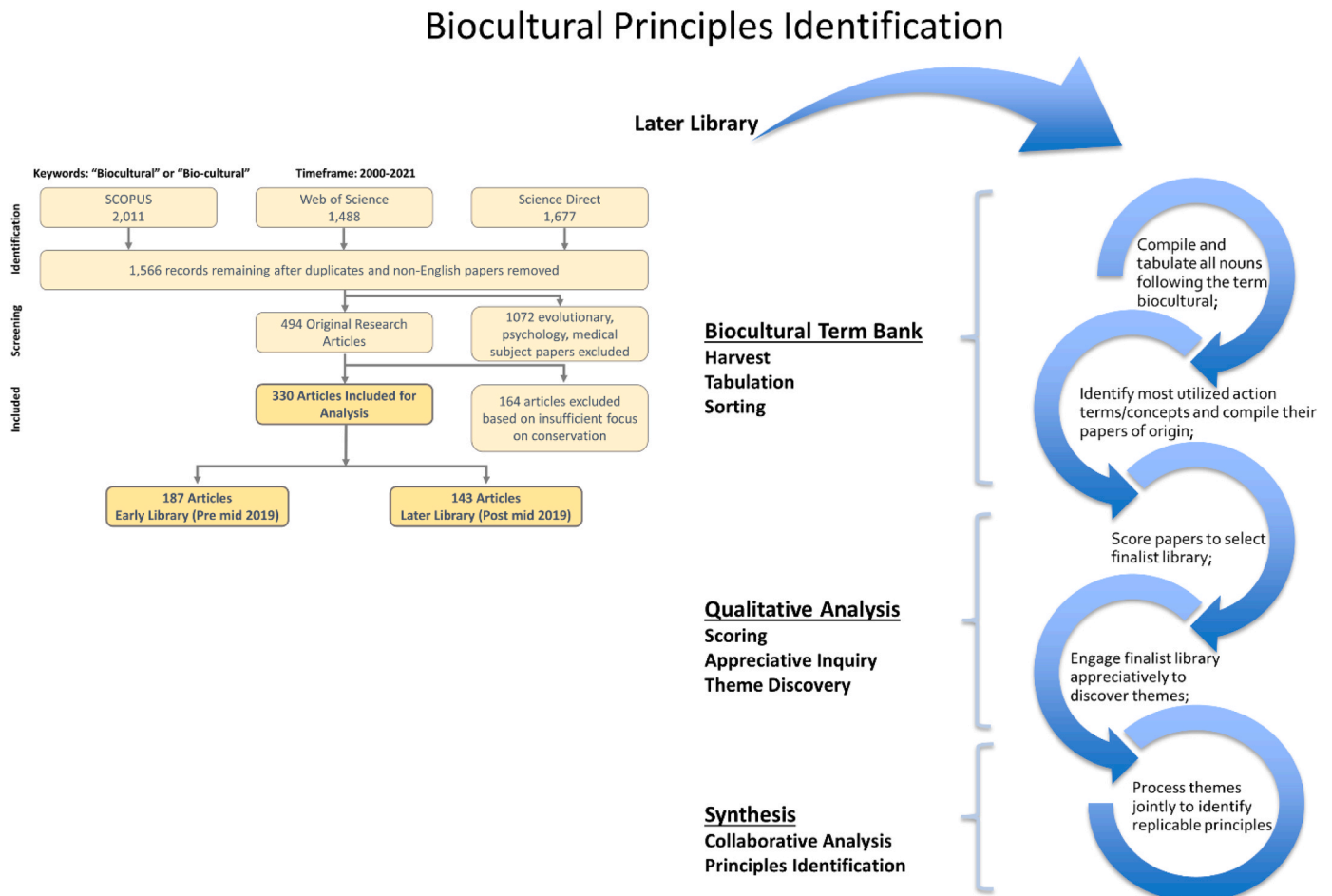


Fig. 3. Diagram depicting the full methodology of biocultural principles identification.

applied. Those terms which focused more squarely on conceptual distinctions we categorized as conceptual (i.e. biocultural diversity). Applied terms we identified as those which described any action which could readily affect some biocultural object, either as a state (i.e. 'biocultural heritage') or attribute (i.e. 'biocultural knowledge'), to a preferred end. We compiled a library of articles which utilized any of our determined applied biocultural terms. Then, so as to engage the ascendant edges of action-oriented discussion, we selected the five most utilized applied biocultural terms/concepts in the literature. By selecting the articles which utilized and therefor contributed to the development of these top five terms/concepts we narrowed the library further to just 94 articles (Appendix B).

Our next step was to develop and apply a scoring rubric which would aid in the selection of the articles most tightly in line with the prescriptions of the Declaration from this narrowed library. In order to generate this, all authors independently utilized a grounded theory approach (Charmaz, 2006) to this narrowed library with the guiding

principle being the main prescriptions of the Declaration, these being demands for 1) action, 2) increased IPLC environmental sovereignty, and 3) increased recognition of IPLC environmental legacy and belonging (Fig. 4). After each of us reviewed all abstracts within the later action library, we synthesized our perspectives with a theme discovery workshop and built a rubric from the key themes we discovered. With this rubric in hand, we next divided the library between four scorers, leaving ten studies to be scored by all authors as a gauge of inter-user reliability. We then scored all articles by assigning a score of 1–5 for each of the rubric categories. Based on the total scores for each article, we generated a selection of our highest scoring action-oriented studies (Appendix C), the final count of which we report in results. We then conducted a round of appreciative inquiry to identify and document what these studies were doing well (Yuliani et al., 2014). In this process, we each scoured the final 25 papers to identify their chief areas of success according to our rubric. In this process we tasked each other to identify core operating principles through thematic analysis, which we

<b>BIOCULTURAL PAPER 2 ARTICLE SCORING GUIDE</b>	
<b>GROUNDING in a specific place</b>	<b>(Score 1-5)</b>
Does the article carry out research in a specific place?	
Does it identify cultural keystone places, cultural keystone species, cultural ecosystem services or sacred sites?	
<b>INDIGENOUS MOTIVES</b>	
<b>Guided by the values of a specific cultural group of people</b>	<b>(Score 1-5)</b>
Does the article work with a specific cultural group?	
Do the researchers effectively engage with this group of peoples?	
Are their values/priorities reflected in the research?	
<b>CONCRETE</b>	<b>(Score 1-5)</b>
Do the researchers develop biocultural indicators, frameworks, etc...?	
Are specific outcomes/objectives articulated?	
Are there concrete measurable outcomes for biocultural diversity?	
<b>IMPACTFUL</b>	<b>(Score 1-5)</b>
Has the outcome of protecting both biological and cultural diversity?	
Are there specific policy recommendations?	
Have outcomes or experiences valuable to community members been produced?	

Fig. 4. Article Scoring Guide developed from grounded review of the later library.

first recorded independently. Finally, within a collaborative analysis workshop, we synthesized our themes into a core set which we put forward as the core biocultural action principles.

### 3. Results

Regarding the composition of the later library, as mentioned it contained 143 articles, all dating from mid-2019 to May of 2021 and all verified as dealing substantively with the biocultural perspective in conservation. Our previous, identical scan, which covered a period of three decades, gathered a total of 187 articles (Lukawiecki et al., 2022). This robust production captured in the later library signifies intensification in the application of the concept and term in contemporary research, but also that there is a growing concentration of papers in the environmental studies arena which deal substantively with the concept rather than using it as a buzzword.

Our preliminary saliency analysis also illuminated variation in the composition of the libraries, variation which can be understood to imply trends in scholarship (Table 1). For example, in the early and later libraries, 'diversity' is the top term, but - much like we argued should happen (Lukawiecki et al., 2022) - it has been losing share in the literature. In part one of this study, in our first library, biocultural diversity was mentioned 4 times more than the next top term, 'biocultural heritage.' On the contrary, in the later library, 'biocultural diversity' is mentioned less than twice as much as the next top term, which is again 'biocultural heritage.' So, it is a deflating dimension in the larger discussion, with the most substantial shift we observed over time, declining 14.6% between the early and later libraries.

All other top-cited terms are those we assessed to be action-oriented. The term 'biocultural heritage' was an illustrative case within our general finding of an emerging concentration of discussion around action-oriented biocultural frontiers. Our original determination was that 'biocultural heritage' was primarily conceptual, as it referred to an abstract, intangible notion of cultural inheritance. However, in this study, we decided to reconsider its potential for application after noticing the growth in the prominence of the term over time. 'Biocultural heritage's' share in the total term bank grew from 8.3% in the early library to 13.5% in the later library. We found that it and other terms were being combined with other terms to build new concepts (See 'biocultural heritage territories' (Grey and Kuokkanen, 2020), 'biocultural heritage landscape' (Sarmiento et al., 2019), 'biocultural heritage artefact' (Grove et al., 2020)) that lend themselves to building concrete actions. This and other examples show the intellectual dynamism which flows from engagement with IPLC's, as they educate researchers about priority areas for impact and targeted strategies for doing so.

For our next stage of analysis, we determined that two categories would best serve our purposes as composites. In the case of biocultural approaches, conservation and restoration, we found these terms to be used interchangeably and synonymously enough that the best reflection of the concept they carried would be explored as one. By contrast, biocultural knowledge and value were not used synonymously but were

rather judged by our team to represent components of a larger concept related to priorities. Subsequently, top-cited actionable terms in the later library were: biocultural heritage; biocultural approach/conservation/restoration; biocultural landscape; biocultural knowledge/value; and biocultural rights.

The scoring rubric which was developed (Fig. 4) reveals our team's synthesized assessment of the most salient attributes of research performed in line with the prescriptions in the Declaration. These were groundedness, indigeneity, concreteness and impactfulness.

No biocultural rights paper made the final list of top scoring articles because they uniformly did not engage with specific communities. We nevertheless included the highest-scoring four of them in addition to our top papers because they offered concrete and impactful suggestions for advancing the biocultural perspective, though they did so from a very different disciplinary background from the environmental sciences, a background which puts a premium on a larger scale of analysis.

Our theme discovery was achieved through appreciative inquiry (Yuliani et al., 2014), meaning that within our final library we engaged each study with an eye to learning what they did well in order to score highly in our rubric categories. Our process determined that researchers did adequate work in five critical areas in order for their work in its totality to deliver important biocultural progress. These five biocultural action principles are, in no particular order: Honor Place Attachment, Rigorously Engage, Valorize Cultural Continuity, Invert Power, and Cultivate New Insight. We provide a list of examples in Table 2 and elaborate on each of these below.

#### 3.1. Honor place attachment

Invariably, practitioners who successfully engaged with communities in line with the biocultural orientation came away with numerous insights into the irreplaceability of the precise place they were working in for the people they were partnered with. It bears emphasizing here that modern understandings of environment based in theories of private property, economics, cost-benefit analysis and other traditions do amount to assumptions of interchangeability of all kinds of goods, place included. Yet, in study after study, Indigenous perspectives are revealed to point to a precisely opposite conviction that each place is entirely unique and special and imbued with fundamentally irreplaceable fabric of life, land, time, seasons, history and more. This reverence for particularity manifested in strong claims of value for cliffs (Ari, 2020), seed mixtures and accompanying traditions (Haider, 2020), songs and associated landforms (Curran, 2019), seasonal specifics in fire science (McKemey, 2020) and many more. The take-away principle is that the practitioners who engaged the community with a worldview capable of perceiving the irreplaceable value of their partners' attachment to their place made more significant headway in the other critical areas.

#### 3.2. Rigorously engage

Engagement rigor was palpable in all of our finalist studies. This

**Table 1**

Counts of biocultural terms, papers which cite them and respective percentages and percentage changes between early and later libraries.

Term	Early Library				Later Library				Percentage Change	
	Mentions	% Mentions	Papers	% Papers	Mentions	% Mentions	Papers	% Papers	Mentions	Papers
diversity	2055	38.7	147	80.2	697	24.1%	85	59.4	- 14.6	-20.8
heritage	441	8.3	32	17.7	390	13.5%	43	30.1	+ 5.2	+ 12.4
approach(es)	301	5.7	50	27.8	239	8.3%	51	35.7	+ 2.6	+ 7.9
conservation	237	4.5	41	20.1	134	4.6%	37	25.9	+ 0.1	+ 5.0
landscape(s)	217	4.1	32	8.6	77	2.7%	25	17.5	+ 1.4	+ 8.9
resource (s)	177	3.3	25	10.7	51	1.8%	8	5.6	- 1.5	-5.1
right(s)	176	3.3	5	2.7	114	3.9%	8	5.6	+ 0.6	+ 2.9
design(s)	133	2.5	22	11.8	41	1.4%	10	7.0	- 1.1	-4.8
knowledge	125	2.4	25	9.8	53	1.8%	14	9.8	- 0.6	-3.6
restoration	123	2.3	16	7.5	48	1.7%	10	7.0	- 0.6	-0.5
value(s)	99	1.9	21	11.2	155	5.4%	14		+ 3.5	-1.44

**Table 2**  
Biocultural Action Principles, description of specific notable outcomes.

Principle	Study	Description
Honor Place Attachment	Haider et al. (2020)	Haider and colleagues engage a locally important and particular seed utilization ceremony in one of the world's highest mountain ranges in Tajikistan, where over millennia people have created fertile niches in narrow valleys where they have domesticated grains, pulses, nuts and fruits. The precise fit of community plant materials and traditions to the exact location of these extant traditions is doubly supported by the nature of the investigation and the investment of local partners.
Rigorously Engage	Curran et al. (2019)	This non-aboriginal author team has built relationships with the community for nearly fifty years at the time of publication. There is no way of knowing whether their insight into Warlpiri and Anmatyerr traditional songs as environmental teachings could have emerged without such engagement, but it was integral to their being trusted with the wisdom held within.
Valorize Cultural Continuity	Grey et al. (2020)	These authors make an intensive conceptual effort to outline optimal institutional arrangements for cultural conservation. By really rooting their thinking in the existential needs of Sami and Quechua needs they arrive at a radical conclusion that the solution required is not to improve co-management but to remove it as a barrier to Indigenous peoples' governance of their own cultural heritage. They nominate a particular boundary object, 'biocultural heritage territory' as having high potential for high esteem in multiple cultural dimensions including applied ecology.
Invert Power	Peterson et al. (2020)	In Brazil's Juatinga Ecological Reserve, the research team sought the input of Indigenous Caicara partners by asking them to photograph what they thought were important environmental features. This trained the focus of the investigation onto verified priorities.
Cultivate New Insight	Lyver et al. (2019)	This team included multiple indigenous authors and compiled insights on local Maori cultural constructs which inform conservation action from years of community engagement. Specifically, they deliver a potent and concrete policy recommendation. Built on traditional Maori philosophical principles which prescribe respect for species and habitat, and reduction of demographic impact, these authors illustrate the way forward for the enactment of mechanisms and legislative warrants which would be key to the implementation of biocultural approaches in conservation.

strength was almost entirely reflected in extensive time spent in the community in a well-designated place. Curran et al. have worked for over five decades in the region of their partners for instance. For Crate, it has almost been 30 years of engagement at the time of publication. However, for several papers at least one author was indigenous to the area. Such an author's deep orientation towards their community and their interest appears to have served as important ballast for their team's ability to consider community perspectives, and relatedly, appears to have augmented the perceptiveness of author teams with more limited work in the area. This was true of Ari (2020), Haider et al. (2020), Curran et al. (2019), and Lyver (2019). This finding makes it clear that it may not be necessary to work for decades in a site to achieve biocultural impact. Instead, indigenous leadership becomes all the more essential for this to occur.

### 3.3. Valorize cultural continuity

Put plainly, the practitioners who took the existential stakes for their community partners seriously implemented more biocultural work. These teams conducted their work in a way which adopted and augmented the esteem and care for cultural survival and continuity which their partners held intuitively and, as it turned out, were striving to communicate with them. The prominence of language revitalization, intergenerational connectiveness and sovereignty, found throughout our larger collection of studies and in our finalist library, points to the conclusion that community partners do not see these issues as distinct or detached from issues around environmental well-being. Rather the opposite is true: cultural continuity is at the center of any such interest. This insight squares well with the ICE Report articulation that "Culture and language are the heart and soul of an Indigenous Protected and Conserved Area." (ICE, 2018: p5).

In our finalist collection of studies this valorization tended to be implied in the elegant identification and presentation of what are known as 'boundary objects'. A boundary object is an observable thing, agreed between cultural dimensions to be of significance and deserving of consideration in their respective knowledge/priority/action systems. In our library these proved to be un-intuitive foci of interest for conventional approaches. For example, Singh et al. (2020) make recipes for the Adi tribe the central focus of their approach. Curran et al. (2019) and Crate (2019a) delve singularly into the highly detailed environmental wisdom and knowledge held in traditional songs. In these cases and more, authors made sufficient headway away from their standard perspectives to understand the value of each of these locally invaluable 'things.' In doing so, they bring back insights to their audience which would otherwise not have been possible. Valorization in this sense is not about justifying the importance of some thing to a more powerful community like that of the researcher, but rather successfully communicating the value between partnering communities, so that it is readily grasped internally by researchers and participating communities.

### 3.4. Invert power

All of our finalist studies dealt openly, diligently, and often cleverly with the fact of power. Most important of all, they devised noteworthy and innovative techniques for inverting or neutralizing power imbalances, if only within the finite dimension in which the study was conducted. Singh et al. (2021), for instance, ensured that community partners dictated the criteria and protocols for strengthening the conservation of key plant species within their traditional land use systems. In Taiwan, Lee et al. (2020) devised Resilience Assessments Workshops to draw on local priorities to determine the locally essential features and purposes for resilience. In all cases, the sheer machinery of inquiry was reverse-engineered to allow for local leadership in the inquiry itself. The studies which energetically took up this rather onerous challenge wound up more biocultural.

### 3.5. Cultivate new insight

Our finalist studies each generated one or more insights that would not have been possible without the rigorous engagement described above. While tricky to generalize, these insights do share the quality of being highly noticeable for their originality and potential for immediate impact. For instance, Lyver et al. show how the very precise fire science tradition of Maori known as Ahikāroa can be engaged and supported best through appeal to another motivating Maori concept of *tūrangawaewae* 'which refers to having a place to stand on your ancestral homeland.' (Lyver et al., 2016 p 400) Similarly, McKemey et al. (2020) work with their Aboriginal partners to develop the Yugul Mangi Faiya En Sisen Kelenda (Yugul Mangi Fire and Seasons Calendar) that drew on Indigenous knowledge of seasonal biocultural indicators to guide the rangers' fire management planning. In each of these cases,

these insights appear to emerge as fruits of successful adherence to the abovementioned principles. If followed, the highly impactful and valuable achievements are closer in reach.

#### 4. Discussion

Our findings demonstrate how the biocultural perspective can be most impactful in so much as it implements the clear prescriptions of IPLC’s in line with their knowledge, values and priorities. In the case of the Declaration, a single tenet of this IPLC statement, “the link”, has been singled out for greater circulation and contemplation. However, our study shows how this tenet promises much greater impact if understood as an organ within the body of the Declaration which includes not just other tenets, but numerous demands for action from institutions, nation-states, scientists, activists, decision-makers, government officials and more. Grasping “the link” in this way, we have shown how the priorities which flow naturally from its recognition can translate into instruments that can be used to bring about the impact and progress demanded by IPLC’s in the Declaration and in numerous other venues. These include a filter for identifying action-oriented rhetoric, a rubric for achieving biocultural work, a literature review method for tracking rhetorical and methodological developments over time, and a set of biocultural action principles.

To evaluate and apply our findings, particularly our Action Principles, it is first important to draw out the evolution between the 1988 and 2018 Declarations of Belém. This is important to steering this discussion by the light of the progress, action, and continued struggles articulated by IPLCs in these documents. Belém + 30, hereon referred to as + 30, is an endorsement of the original as well as a highly sharpened version (for much of this discussion, refer to Table 3). Both statements keep the form of a set of tenets laid out to support a set of demands. Both are voiced by an assembly of IPLC representatives and scientist-allies. Every original tenet from 1988 was restated in 2018, including “the link.” To the original tenets, however, critical additions were made. First, attendees noted observations of significant progress in two critical areas since 1988. IPLC’s, they stated, have been increasingly recognized for their critical service to global environmental sustainability past and present. They further celebrate that this developing global consensus has materialized in major international governance outcomes including the Convention on Biodiversity (United Nations, 1992), the Nagoya Protocol (United Nations Environmental Programme, 2011b) as well as the Decree of the International Labour Organization’s Indigenous and Tribal People’s Convention (International Labour Organization, 1989: No. 169). These notable outcomes being recognized, + 30 authors go on to repeatedly denounce how mere ratification of the above international treaties has failed to materialize into effective protection against several threats, some having been recorded in 1988 (Tenets i, ii, and iii in Table 3) and some newly named in 2018. This dissonance between increasing international recognition and unmitigated declines in biological and cultural richness over time is was a starting observation for our previous study (Lukawiecki et al., 2022).

The first new threat noted by attendees refers directly to challenges to progress described as “tendencies that harm these advances and seek to block others.” (2016) In other words, progress identified by the speakers has not failed, according to the speakers, to stir up adversarial, deliberate, reactionary social forces. One of these they identify by name: “genocide”. This particular tenet (iii in Table 3) deserves special consideration in order to, first, sharpen the prevailing understanding of the biocultural perspective, and second, to apply and calibrate the biocultural action principles applied in this study. This tenet is doubly emphasized later on in the form of direct prescriptions for the application of and adherence to human rights legal frameworks, and international labour legal frameworks. From the somewhat vague and passive 1988 Declaration tenet that “Indigenous cultures around the world are being disrupted and destroyed,” (1988) we now have in 2016 the following, hardened, problematization:

**Table 3**

Tenets and Demands of 1988 and + 30 Declarations of Belém. ✓ indicates unaltered re-iteration, ✓+ indicates enhanced re-iteration and / indicates non-reiteration. \* indicates assignment of responsibility to nation-states.

	1988 TENET (“since...and given that...”)	+ 30	+ 30 Addition
i	Ecosystems disappearing	✓	
ii	Species going extinct	✓	
iii	IPLC cultures being destroyed	✓+	• genocide and ethnocide identified
iv	Humanity’s survival depends on the above ‘resources’	✓	
v	Native peoples are the historical and present-day protectors of 90 + % of these resources	✓	
vi	The “link”	✓	
<b>1988 DEMAND (“urge action as follows...”)</b>			
i	Ethnobiological inventory, conservation and management	✓	
ii	Mechanisms for proper indigenous authority in environmental matters	✓+	• Informed consent; • State* financing and implementation; • State* ratification ILO no. 169
iii	Application of human rights obligations	✓	
iv	Compensation for IPLC knowledge and resources	/	
v	Global awareness/education campaign for evidence and importance of ethnobiological knowledge and value	✓	
vi	Medical pluralism	/	
vii	Repatriation of IPLC knowledge and resources	✓+	• State* responsibility
viii	Nation to nation and farmer to farmer ethnobiological knowledge and resource dissemination	/	
		ix	• State* decriminalization of Indigenous Practices
		x	• State* penalization of environmental and human rights crimes
		xi	• State* investment in biodiversity products
		xii	• Global promotion of philosophy of good living ( <i>Buen Vivre</i> )

*Indigenous peoples, traditional populations and local communities around the world continue to suffer genocide, ethnocide, and the constant appropriation of their territories and knowledge. Their languages are disappearing and their rights continue to be violated... (2016).*

These positive developments and these threats, put forward and taken up together, imply deep motivations for actions and values. The sharp identification of certain threats may even translate into goals. In terms of subsequent actions, one action principle above all strikes us as suited to answer this dire call, the Valorization of Cultural Survival and Continuity. It is our view that the evolution between the Declarations on this front signals a need to place this action principle in a ‘first-principle’ position related to the other four. This principle can essentially be applied in the same way to research, policy, governance and more, namely as a first step for engagement. To elaborate, the Declarations and this principle demand the elevated consideration of whether and how an IPLC feels threatened by genocide, ethnocide or racist modes of appropriation. These same sources demand recognition that this threat is the existential and primary concern to be addressed and navigated, even in strictly “environmental” work. This must be applied, even *and especially* in environmental work. To better grasp this stringent association, we refer practitioners to the Honor Place Attachment Principle. To paraphrase political philosopher Robert Nozick: to use a people’s place to

benefit others “does not sufficiently respect and take account of the fact” that theirs is a separate and incomparable place, that this place is the only place they have. They do not get some “overbalancing good from [their] sacrifice.” (Nozick, 1974: p 33) The fact that environmental conservation practice and research inherently works with the medium of territory means that it should hold closely to both above mentioned action principles. As + 30 makes plain, genocide and improper territorial engagement and use are part and parcel of each other.

The Declarations offers considerable consistencies which might best be viewed as resonant, perennial demands which + 30 signatories have re-ratified (see Table 3 demands marked with ✓). These include demands for continued ethnobiological inventory, global ethnobiological knowledge mobilization, and robust application of human rights law to environmental practice. For the first two, Rigorous Engagement and Cultivating New Insight are the most directly applicable action principles. These demands speak to the continued priority for documentation and audit of essential IPLC resources including knowledge. The detail, rigor and investment required to further the empirical foundation of biocultural data is and will remain immense. Commitment to Cultivating New Insights adds a very important dimension here as well as to knowledge mobilization. For example, our roster of reviewed papers showcases highly variable and promising techniques and approaches for facilitating IPLC leadership in this documentation and audit process (Blair, 2019; Crate, 2019b; Seele et al., 2019). The same innovative and motivating properties are needed in the design and implementation of knowledge mobilization strategies, a core and reiterated demand of the Declarations (Table 3, Demand v). While peer-reviewed papers are the currency of the academic realm, knowledge mobilization in line with IPLC priorities often favors media more conducive to Nation to Nation and grassroots mobilization. These might include Facebook posts, reports, infographics, and intergenerational exchanges such as land camps. The key is for researchers and other practitioners to approach knowledge mobilization much as they would research, namely, in a bioculturally authentic process - characterized by the five action principles - with research partners who are intimate with their own knowledge mobilization priorities, strategies and strengths.

The re-emphasis on the overt application of human rights is augmented by several repeated direct prescriptions for achieving it. In addition to those already suggested, these can readily be translated to goals for biocultural research (Table 3, ✓+). As an underscored position, Belém + 30 puts nation-states on the hook for their demands. States are singled out in six instances in this document compared to zero instances in the 1988 original (see asterisk marked items in Table 3). This is seen by our team as an IPLC-nominated remedy to the problem identified above in which grand international institutional statements and documents are not accompanied by commensurate progress or impact. By far the most emphasized prescriptions for nation-states are the “mechanisms” (Demand ii) for recognitions of IPLC’s as proper authorities. Direct prescriptions put forward in + 30 include nation state ratification, implementation and financial backing of ILO 169, which codifies free-prior-informed consent protocol for any “projects which may affect their territories, sacred places and ways of life.” In interface with environmental projects, this particular “right to say no” resonates squarely with the ICE Report Recommendation 4.1 “that federal, provincial and territorial governments support IPCAs whether they count toward Target 1 or not”. In other words, the authors of + 30 have come to understand since 1988 that environmental projects are as capable of harming their interests as other projects and interventions.

Though the Declarations clearly prioritize policy impact at and within the level of the nation state, a special word here is warranted regarding the importance of guaranteeing compatibility with the many moving parts in the global policy environment. As noted, the Declarations do applaud the rapidly advancing recognition of IPLC rights and roles in the CBD, the Nagoya Protocol, and the International Labour Organization. Though not mentioned directly, UNDRIP and IPBES represent vital support for the biocultural perspective. UNDRIP codifies

the application of human rights law for IPLC’s. Operationalizing UNDRIP in environmental work is perhaps the most apt shorthand for the biocultural perspective. IPBES, in particular, outlines the most ambitious and systematic approaches for embedding IPLC values into environmental planning and governance prescribed by the CBD. In this same vein, it is essential to spotlight and understand the importance of transnational advances such as Indigenous-led conservation, such as Indigenous Protected and Conserved Areas (IPCA’s) (ICE, 2018), Indigenous Guardians Programs (Reed et al., 2020), Canada’s Truth and Reconciliation Commission’s Calls to Action (Truth and Reconciliation Commission of Canada, 2014) and more.

## 5. Conclusions

To summarize, this study has strived to engage with the texts of the Declarations and the now extensive literature documenting biocultural research to distill action principles. In response to the outcomes of this process, we call for the need to for a biocultural strategic vision which these action principles might best serve. Strategic vision is most broadly understood as a coherent idea and statement which “depicts the world after the project is completed,” (Shenhar and Holzmann 2018:p 38) in the process spelling out what the project “can be...and should be” (Wilson, 1992:p 18). Another way of framing it is that a strategic vision is “a means to help organizations become what they wish to evolve into.” (Madsen and Ulhøi 2021: p 3) Strategic vision is understood to comprise clear articulations of the following project attributes: goals, strategies, action plans, and values. Aboveall, “it must be *powerful*, to generate commitment and motivate performance.” (Wilson, 1992: p 18).

Taking a step back, it is of the utmost importance to take stock of how powerful and sweeping the cognitive and practical changes initiated and promoted by the Declaration - and the succeeding biocultural perspective - really are. The Declarations direct the imagination toward a world without genocide, ethnocide and racist appropriation of IPLC territory and knowledge. They envision a world in which there is widespread understanding that these forces are locked in mutual causality with species extinction and environmental destruction and that the fate of humanity hangs in the balance. They articulate how to fight these threats, starting urgently with increased nation-state responsibility and involvement, even tasking nation states with numerous specific and direct action items. What they also do - by illuminating a path to achieving global environmental sustainability which *must* first achieve justice for IPLC’s - is present a fundamentally distinct paradigm and accompanying theory of change for the environmental movement writ large.

This paradigm and theory of change strikes us as tortuously incongruent with those which prevail in environmental sciences and governance. However, it is deeply resonant with numerous, vigorous socio-political and cultural dimensions beyond the environmental fields. Indigenous, Anishinaabe, legal theorist John Borrows states it this way:

In my view, resurgent relations with the natural world are key to the revitalization of Indigenous peoples’ relationships with the rocks, waters, insects, plants, birds, animals, and other forms of life around us. They are also key to our reconciliation with other peoples (Borrows, 2018: 50).

Pope Francis makes a congruent appeal in his encyclical, *Laudato Si*: We cannot presume to heal our relationship with nature and the environment without healing all fundamental human relationships (Pope Francis, 2015).

The biocultural perspective, to succeed in its assignment articulated in Belém Brazil in 1988 and revamped in 2018, must conjure the vision and strategy necessary to multiply with and augment societal forces wherever they can be found, regardless of trends in technocratic environmental governance. When the Declarations are truly recognized, the existential stakes of justice for IPLC’s will ensure that the mandate for and skill in biocultural action penetrates and weaves through the entire apparatus of institutions and communities dedicated to environmental

protection.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data is shared in the paper in the Appendices.

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## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.envsci.2023.103573](https://doi.org/10.1016/j.envsci.2023.103573).

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