

REGISTERED REPORT STAGE 1

Forging pluralistic praxis: Mapping barriers to knowledge braiding in aquatic conservation

Ronald J. Maliao^{1,2}  | Béla Tóthmérész¹

¹Department of Ecology, University of Debrecen, Debrecen, Hungary

²College of Fisheries and Marine Sciences, Aklan State University, New Washington, Philippines

Correspondence

Ronald J. Maliao

Email: rjmaliao@mailbox.unideb.hu and rmaliao@asu.edu.ph

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Abstract

1. A persistent 'knowing-doing gap' separates international policy from the on-the-ground practice of braiding Indigenous and Local Knowledge (ILK) in conservation. This disconnect undermines conservation effectiveness and marginalizes Indigenous Peoples and Local Communities (IPLCs). Because this gap stems from a complex web of poorly understood obstacles, we aim to systematically map the evidence on barriers that impact this braiding process.
2. Following the guidelines of the CEE (Collaboration for Environmental Evidence) and the ROSES (Reporting Standards for Systematic Evidence Syntheses), this systematic map will proceed through five stages: systematic search syntax construction, a comprehensive literature search, a two-stage screening process, structured data coding and a final descriptive synthesis and mapping of evidence using the Population, Concept and Context (PCC) framework.
3. The resulting map will provide a holistic diagnosis of barriers affecting ILK braiding and a summary of documented enablers by characterizing the evidence base through bibliographic, geographic and scientometric features to reveal critical knowledge gaps and research clusters in aquatic conservation practice.
4. This synthesis is a vital step towards a more pluralistic praxis in aquatic social-ecological systems. By systematically identifying these systemic barriers, our work provides the evidence-based foundation required to move from global policy theory to a genuinely inclusive approach. It also provides the basis for future empirical study into social-psychological barriers, such as pluralistic ignorance, within the conservation community.
5. *Practical implication.* Our findings will be translated into two key practical outputs: a conceptual model of the barrier landscape and a practitioner guidebook with actionable strategies. These tools will help bridge the implementation gap by providing conservationists and policymakers with a clear framework to identify, navigate and overcome the systemic obstacles to equitable knowledge braiding.

KEYWORDS

barrier, conservation practice, evidence synthesis, indigenous and local knowledge, knowing-doing gap, knowledge braiding, pluralistic ignorance, pluralistic praxis

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1 | INTRODUCTION

Solving the interconnected crises of the Anthropocene requires moving beyond conventional conservation models, which are insufficient on their own to address the root causes of biodiversity loss (Chapman et al., 2024; Reid et al., 2024). The limited success in meeting the Aichi Biodiversity Targets is a stark reminder of these limitations, underscoring the urgent need for transformative change to achieve the ambitious goals of its successor, the Kunming-Montreal Global Biodiversity Framework (Cumming et al., 2023; Obura et al., 2023; Palomo et al., 2025). This transformation requires a pluralistic praxis: an action-oriented approach centred on co-creating knowledge among diverse actors, from academic researchers to Indigenous and Local knowledge holders (Maliao, 2025; Maliao & Tóthmérész, 2026a; Mistry & Berardi, 2016). This involves actively braiding multiple ways of knowing to forge a more robust and actionable understanding of complex social-ecological systems (Kimmerer, 2013; Robinson, 2011). Ultimately, this approach values the contributions of diverse stakeholders to inform a more sustainable and equitable future (Caniglia et al., 2021; Pascual et al., 2021).

A fundamental component of this praxis is Indigenous and Local Knowledge (ILK), a cumulative knowledge-practice-belief complex that evolves over generations and is deeply rooted in place, providing a rich understanding of long-term ecological change (Agrawal, 1995; Berkes, 2012; Berkes et al., 2000; Brondizio et al., 2021; Maliao & Tóthmérész, 2026a; Molnár et al., 2024). Its holistic and relational worldview offers a vital complement to the often analytical and reductionist methods of Western science (Maliao, 2025; Mazzocchi, 2006). By braiding empirical observations with local values and traditions, ILK moves conservation towards a holistic understanding where social and ecological systems are inseparable. Braiding these knowledge systems creates more effective and equitable conservation outcomes, particularly in dynamic aquatic ecosystems (Hoppenreijs et al., 2024; Maliao et al., 2025; Maliao & Tóthmérész, 2026b; Raymond-Yakoubian et al., 2017; Silvano et al., 2023; Tengö et al., 2017). This principle is affirmed on the global scale, where decision-making that integrates ILK with Western science leads to more just and sustainable outcomes (Brondizio et al., 2021; IPBES, 2024).

Global environmental governance is shifting from top-down expert-led models towards a greater appreciation of pluralistic knowledge systems (Brondizio et al., 2021; Chapman et al., 2024; Molnár et al., 2024). This evolution is captured in three decades of international mandates. The change began with the recognition of the holistic knowledge of Indigenous Peoples and Local Communities (IPLC) in Agenda 21 (Inglis, 1993), a principle later legally codified in the Article 8(j) of the Convention on Biological Diversity (CBD) (2022). More recently, the mandate has changed from passive respect to active integration. The Kunming-Montreal Global Biodiversity Framework (GBF) now commits parties to the full participation of IPLCs in decision-making through its target 22 (Cumming et al., 2023; Palomo et al., 2025). This principle is

actively embodied in the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which braids ILK directly into its assessments as part of a multiple evidence base (IPBES, 2024; Tengö et al., 2017).

Despite clear top-down support, a persistent knowing-doing gap separates international mandates from local realities (Agrawal, 1995; Kollmuss & Agyeman, 2002; Maliao & Tóthmérész, 2026b; Pascual et al., 2021). While regional successes, such as from Indigenous-led co-management in the Arctic to community-based fisheries in the Amazon demonstrate the potential for equitable braiding (e.g. Campion et al., 2023; Campos-Silva & Peres, 2016; Eckert et al., 2018; Ostertag et al., 2018; Rist et al., 2019), these practices have yet to scale globally. On an institutional level, braiding remains largely aspirational, with initiatives of inclusion often fails to move beyond the tokenistic (Brondizio et al., 2021; Maliao & Tóthmérész, 2026b; Yanou et al., 2023). Our map seeks to diagnose the systemic barriers that prevent these successful models from becoming the global standard.

We contend that this implementation gap is not merely a logistical hurdle, but a systemic challenge stemming from a complex web of entrenched barriers (Yanou et al., 2023; Nadasdy, 1999; Figure 1). These barriers span multiple dimensions, from epistemological conflicts over what constitutes valid evidence (Berkes, 2012; Cumming et al., 2023; Mazzocchi, 2006) to incompatible institutional norms and socio-political legacies of mistrust (Nadasdy, 1999). While communication gaps are well-documented (Thornton & Scheer, 2012), we hypothesize that a more specific, under-examined social-psychological barrier is at play: pluralistic ignorance (Geiger et al., 2025; Miller & McFarland, 1987). This phenomenon occurs when individuals privately support braiding ILK but incorrectly believe their peers do not, creating a collective silence that masks systemic obstacles. It is akin to the Emperor's New Clothes effect (Katz et al., 1931): everyone notices the problem, yet assumes they are the only ones who see it, ensuring the status quo remains unchallenged. Our map will identify the prevalence and context of these social-psychological barriers, providing the empirical grounding to investigate how pluralistic ignorance specifically contributes to these entrenched challenges.

The current understanding of these barriers remains fragmented in isolated case studies, preventing a holistic diagnosis of the implementation gap. Systematically mapping this complex barrier landscape is therefore the crucial first step towards a truly pluralistic praxis. This protocol outlines a systematic map designed to provide a comprehensive characterization of these multidimensional barriers, producing a consolidated evidence base that identifies both knowledge clusters and research gaps. Ultimately, our goal is to use this evidence to develop practical solutions (including a conceptual model and practitioner guidebook) that help bridge the knowing-doing gap and promote a more effective and equitable conservation practice (Caniglia et al., 2021; Maliao, 2025; Mistry & Berardi, 2016).

The primary objective of this systematic map is to characterize the evidence on barriers that impact the braiding of indigenous and

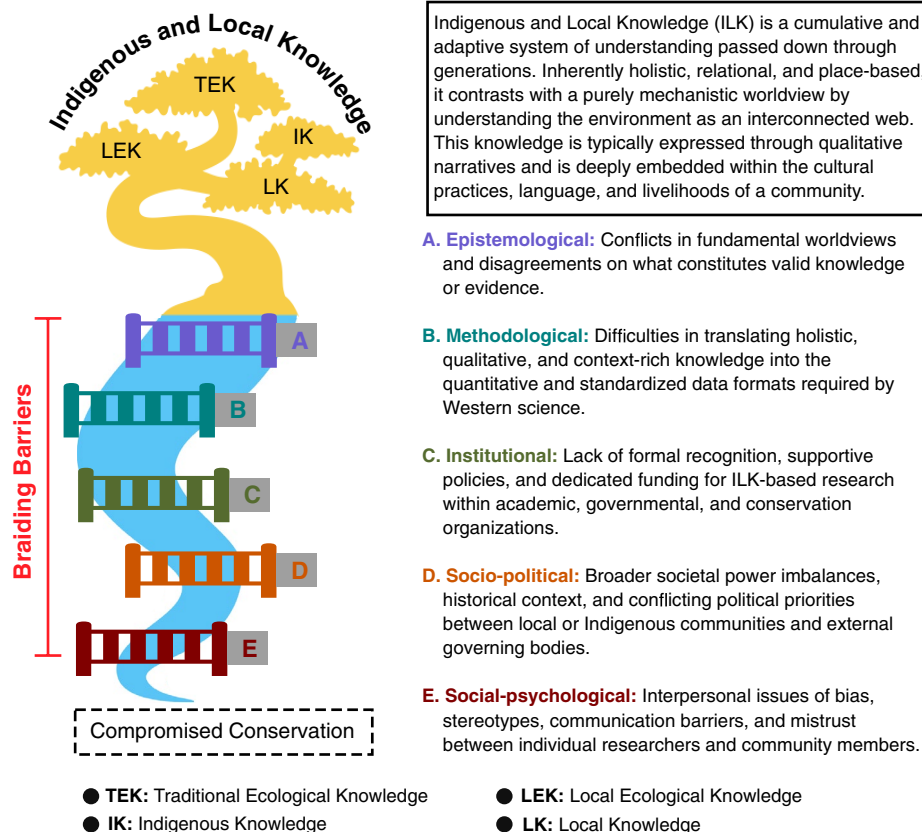


FIGURE 1 A conceptual model of the multidimensional barriers encountered when braiding Indigenous and Local Knowledge (ILK) within Western-dominated conservation frameworks. For this model, ILK encompasses related concepts such as traditional ecological knowledge (TEK), local ecological knowledge (LEK) and Indigenous knowledge (IK). The model illustrates how the integration process can act as a reductive filter: Rich, holistic ILK enters a multilayered landscape where it is progressively stripped of its context by five key dimensions of barriers: (a) Epistemological, (b) Methodological, (c) Institutional, (d) Socio-political and (e) Social-psychological. Note that these dimensions are non-linear and frequently overlapping; the alphabetical labelling and uniform visual representation are for organizational clarity and do not imply a fixed chronological sequence, a hierarchy of impact or a universal magnitude. The final output is a stream of decontextualized data, which ultimately leads to less effective and less equitable conservation outcomes.

local knowledge (ILK) with Western science in aquatic conservation practice. We structured this objective using the Population, Concept and Context (PCC) framework, which is well suited for scoping the key elements of a systematic map question (Peters et al., 2015).

To achieve our primary objective, we will address four broad secondary objectives, explicitly linked to the PCC components:

1. **Population:** We will characterize the knowledge holders (e.g. Indigenous Peoples, local communities) and the dimensions of ILK (e.g. practical, institutional, spiritual) that are the primary focus of the existing evidence base.
2. **Concept:** We will document the specific barriers identified in the literature, along with the conservation practices (e.g. monitoring, planning) in which they occur. Reported facilitators (enablers) will also be recorded during data extraction.
3. **Context:** We will map the concentration of evidence across aquatic ecosystems and geographical regions (global scope).

Finally, our fourth secondary objective will be to synthesize these findings:

4. **Synthesis:** We will synthesize the general evidence base, characterizing its bibliographic characteristics, geographic distribution and select scientometric indicators, identifying key knowledge gaps related primarily to barriers and summarizing documented enablers to inform a future research agenda.

For the purposes of this protocol, we define braiding as a process of connecting different knowledge systems for mutual learning and co-creation (Kimmerer, 2013). Following a multiple evidence-based approach (Tengö et al., 2017), we categorize ILK reported in the literature into four functional dimensions: practical, diachronic, institutional and spiritual. While these categories align with the structural framework of Berkes (2012), they are grounded in Indigenous scholarship that conceptualizes knowledge as a holistic system of relationality and reciprocal obligation (Kimmerer, 2013; McGregor, 2004; Whyte, 2013). We contrast this with Western science, which we define as the formal, hypothesis-driven methodologies used to assess and manage social-ecological systems (Maliao & Tóthmérész, 2025). We interpret conservation practice broadly to include the full spectrum of actions on the ground designed to protect aquatic resources,

and the aquatic context encompasses freshwater to marine environments. Finally, we define braiding barrier as any obstacle that hinders the equitable and effective mobilization of ILK (Nadasdy, 1999; see Figure 1).

This systematic map has two interconnected expected impacts (see Figure 2). The practical impact will be the synthesis of evidence into actionable knowledge, including a conceptual model and practitioner guidebook that equip conservation practitioners to navigate the challenges of braiding ILK (Caniglia et al., 2021). The scientific impact will be the creation of a foundational evidence base to inform a larger research programme designed to test our hypothesis on the

role of pluralistic ignorance as a social-psychological barrier within the conservation community (Miller & McFarland, 1987).

2 | MATERIALS AND METHODS

This systematic map will follow the guidelines of the Collaboration for Environmental Evidence (CEE) (2022). Our conduct and reporting will adhere to the ROSES (Reporting Standards for Systematic Evidence Syntheses) framework (Haddaway et al., 2018), and a completed checklist is provided in Supporting Information S1. Our

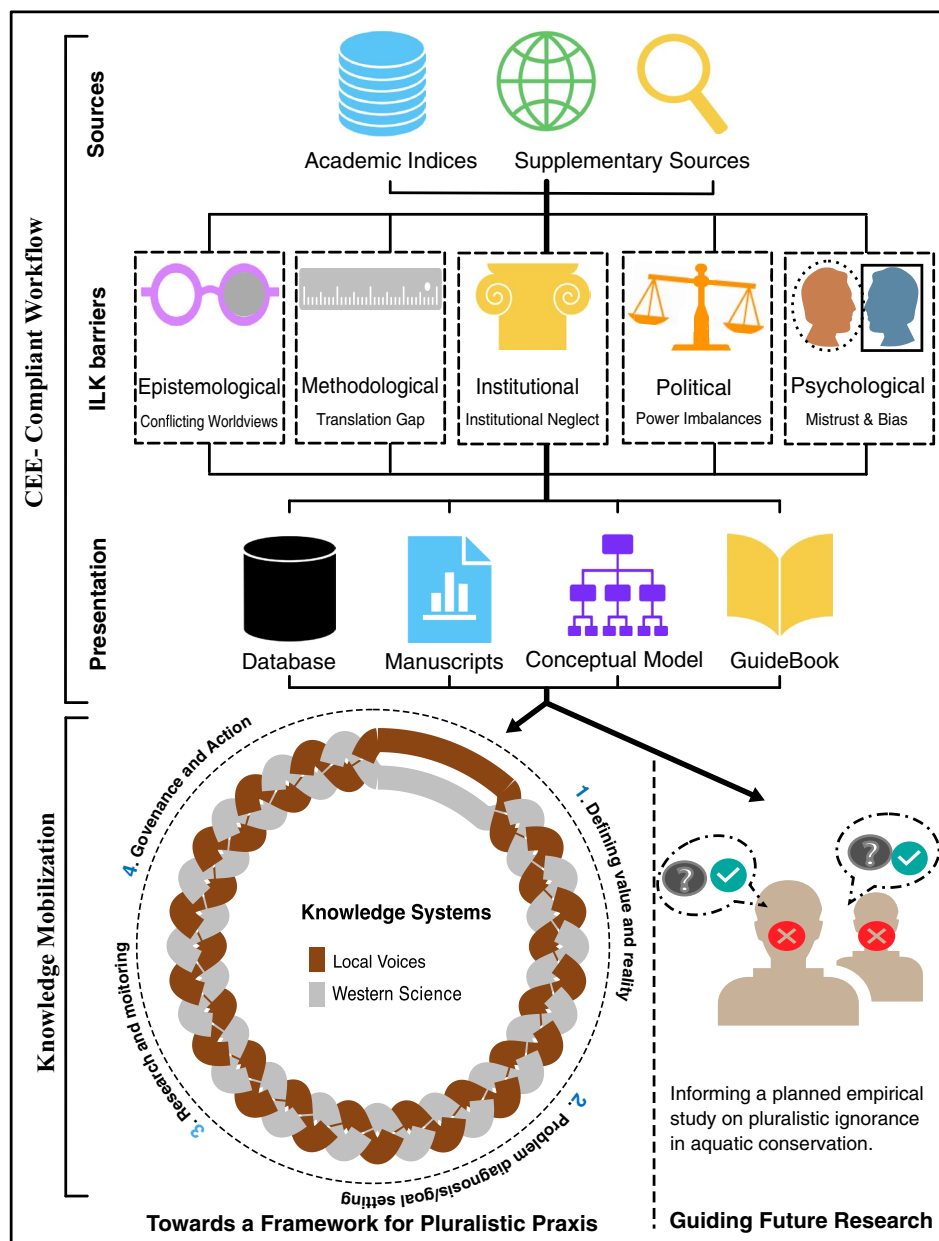


FIGURE 2 Systematic map workflow, outputs and practical applications. The diagram illustrates the iterative stages of the evidence synthesis process, from protocol development to the final evidence map. Key outputs include a consolidated database of documented barriers and a conceptual model that categorizes the socio-psychological and institutional drivers of the knowing-doing gap. These outputs directly inform the development of a practitioner guidebook designed to facilitate the equitable braiding of knowledge systems in aquatic conservation.

methodology will proceed through five key stages: systematic syntax construction, comprehensive article search, two-stage results screening, structured data coding and extraction process, and final descriptive synthesis and mapping of evidence.

2.1 | Searching for articles

2.1.1 | Search term scoping, auditing and classification

First, we will develop a comprehensive long list of potential search terms using a three-pronged approach that integrates data-derived approach with expert knowledge. We will begin by extracting keywords from the metadata of a 20-article test set (see [Supporting Information S2](#)). We will then supplement this list with key terms from our expert knowledge and perform a systematic synonym expansion for all key terms to maximize comprehensiveness (Thesaurus 2020).

Next, we assign each term to one of four conceptual search blocks patterned on our PCC framework. Population (ILK terms), Concept (barrier and application terms) and Context (ecosystem terms). Once sorted, we will audit this list in Scopus by subjecting each term to a quantitative co-occurrence test to generate a relevance score. For terms in the ILK, Barrier and Application blocks, we will calculate this score by combining them with a set of key ecosystem terms. Conversely, we will test ecosystem terms against a set of key ILK terms (see [Supporting Information S2](#)).

Finally, we will classify all audited terms based on their relevance scores using a block-specific, quartile-based system. For ILK, Barriers and Ecosystem blocks, we will classify terms in the upper quartile (75th to 100th percentile) as Core while terms in the lower

quartile (<25th percentile) will be excluded. The remaining middle quartiles will be classified as Broad and Specific, respectively. The application block will be an exception, where custom-built proximity searches will be automatically classified as Core. This systematic process will ensure that our final search syntax is built from terms with proven context-sensitive relevance.

2.1.2 | Optimization, validation and scope of search strings

We will use the classified terms to construct five candidate search syntaxes of increasing sensitivity. The first and most specific syntax will be built using only the Core terms. We will then create progressively broader syntaxes by systematically adding the Broad and then the Specific terms. We will validate this iterative process in Scopus by testing each of the five syntaxes against a predefined list of 20 test articles. We will select the syntax that achieves the highest recall (retrieves the most test articles) while maintaining the lowest number of total hits necessary to achieve that recall level. This a priori decision rule ensures the best balance between comprehensiveness and a feasible screening workload. Based on preliminary tests in Scopus, we anticipate that Syntax 3 will be optimal, yielding approximately 666 results. The proposed optimal search string is presented in Scopus syntax in [Table 1](#), with the full strings for all databases provided in [Supporting Information S2](#).

We will limit the search to articles published in English. This is a pragmatic decision based on the linguistic proficiency of the review team, as the nuanced terminology of ILK research requires a high level of fluency to ensure accurate interpretation. We acknowledge that this limitation may introduce a geographic bias,

TABLE 1 Components of the search strategy.

Conceptual block	Scopus search syntax
Population: ILK	TITLE-ABS-KEY(("indigenous and local knowledge" OR "collaborat* W/10 fisher*" OR "local ecological knowledge" OR "braid* W/10 knowledge" OR "indigenous ecological knowledge" OR "multiple evidence base" OR "traditional ecological knowledge" OR "customary knowledge" OR "community science" OR "citizen science" OR "ethnoecolog*" OR "knowledge pluralism" OR "place-based knowledge" OR "aborigin* knowledge" OR "traditional environmental knowledge") OR ("two-eyed seeing" OR "collaborat* W/10 indigenous" OR "ethnobiolog*" OR "native knowledge" OR "local knowledge" OR "indigenous people*" OR "traditional knowledge" OR "indigenous knowledge" OR "local wisdom" OR "transdisciplinary science" OR "participatory approach*" OR "ancestral knowledge" OR "oral tradition*")) AND
Concept: Barriers	("institutional barrier*" OR "knowledge-action gap*" OR "political ecology" OR "legal framework*" OR "sovereignty" OR "capacity building" OR "colonialism" OR "implementation gap*" OR "legislation*" OR "data sovereignty" OR "mandate*" OR "decoloniz*" OR ("funding" OR "conformit*" OR "asymmetr*" OR "equit*" OR "social pressure*" OR "hegemon*" OR "credibilit*" OR "mistrust*" OR "logistic*" OR "silo*" OR "social barrier*" OR "false consensus effect*" OR "bureaucrac*" OR "structural barrier*")) AND
Concept: Application	((("climate change*" OR overfish* OR pollution* OR "habitat degradation" OR "invasive species") W/5 (resilien* OR adapt* OR recover*)) OR ((govern* OR manag*) W/5 (adaptive OR polycentric OR multilevel OR interactive)) OR ((resource* OR ecosystem* OR environment*) W/0 (manag* OR govern* OR stewardship)) OR ((habitat OR species OR biodiversity) W/0 (protect* OR restor* OR rehabilitation)) OR ((resource* OR ecosystem* OR habitat OR fish*) W/0 (assess* OR monitor* OR plan*))) AND
Context: Aquatic	("kelp forest" OR "coral reef*" OR "fisher*" OR "seagrass*" OR "sea*" OR "mangrove*" OR "wetland*" OR "nearshore" OR "inland water*" OR "coast*" OR "riparian" OR "marine" OR "lentic" OR "lagoon" OR "pelagic" OR "floodplain*" OR "intertidal" OR "freshwater") OR ("estuar*" OR "subtidal" OR "fjord*" OR "watershed*" OR "lotic" OR "aquatic*" OR "headwater*" OR "gulf*" OR "atoll*" OR "ocean*" OR "peatland*" OR "catchment*" OR "river*" OR "pond*"))

which we will address in the discussion of the final systematic map. To ensure coding consistency between this protocol and the final Stage 2 report, we adopt a static dataset approach. While acknowledging the CEE 24-month recommendation, we will not perform a search update before our final Stage 2 submission. This decision, supported by the peer-review process, prevents methodological inconsistencies in the analysis of this comprehensive, already-scoped dataset.

2.1.3 | Search strategy and information sources

We will use a four-tier search strategy to ensure comprehensive coverage of both peer-reviewed and grey literature.

Tier 1: Core bibliographic database search. We will conduct the primary search for peer-reviewed literature in three core bibliographic databases: Web of Science Core Collection (WoS), Scopus and the ProQuest Natural Science Collection. We selected these databases for their combined strengths in curated indexing (WoS), extensive international coverage (Scopus) and specialized environmental focus (ProQuest). This initial search is expected to yield a total of 7024 articles. The full database-specific search strings are detailed in [Supporting Information S2](#).

Tier 2: Supplementary search on the web. To enhance comprehensiveness, we will perform a title-only, simplified search in Google Scholar without date restrictions. Using Publish or Perish (Harzing, 2007), we will retrieve the top 1000 relevance-sorted results to capture articles potentially not indexed by our core databases. This search is expected to yield approximately 238 additional articles.

Tier 3: Grey literature search. We will search for grey literature in two distinct, complementary stages designed for maximum relevance and feasibility. First, we will conduct a systematic search of the ProQuest Dissertations & Theses Global database, filtering results to include doctoral dissertations exclusively. We prioritized this source because doctoral works represent a rich repository of detailed research often excluded from mainstream journals; furthermore, their consistent structure facilitates rigorous screening and data extraction. This search is expected to yield approximately 1022 documents.

Second, we will perform a targeted search of key organizational websites. This strategic search will focus exclusively on capturing high-level policy and evaluation documents from the principal intergovernmental bodies shaping the global discourse on ILK in conservation: the United Nations Educational, Scientific and Cultural Organization (UNESCO) (focusing on its ICH and LINKS programmes; unesco.org), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (ipbes.net), the Convention on Biological Diversity (CBD) (cbd.int) and the UNFCCC's Local Communities and Indigenous Peoples Platform (LCIPP) (lcipp.unfccc.int). We selected these specific bodies because their reports and strategic frameworks are foundational sources for defining and identifying the institutional and political barriers central to our research question (see [Supporting Information S2](#) for full details).

Tier 4: Snowballing. Finally, we will employ a targeted, review-centric snowballing approach. This focused method will use only systematic and scoping/mapping reviews that meet our full eligibility criteria as seed articles. We will then conduct backward snowballing by manually checking their reference lists and, where available, their associated primary study databases (e.g. supplementary materials or open-access repositories). Additionally, we will perform forward snowballing using Google Scholar to identify newer articles citing these synthesis works. We selected this strategy for two key reasons. First, these synthesis articles represent critical, prevetted knowledge hubs whose reference lists offer highly concentrated clusters of relevant primary studies. Second, this approach maximizes efficiency by leveraging the comprehensive search efforts already undertaken by previous synthesis teams, allowing us to capture relevant research clusters potentially missed by our main database search.

2.2 | Article eligibility screening

After the search, we will collate all retrieved records in EndNote (v.21.5, Clarivate) for deduplication. We will then import the final set of unique records into the Colandr systematic review software for a two-stage screening process (Cheng et al., 2018). This process will consist of a title and abstract screening, followed by a full text screening of all potentially relevant articles. To ensure transparency, we will document the entire screening process using a ROSES flow diagram, detailing the number of included and excluded articles at each stage, along with the specific reasons for exclusions at the full-text level.

To be included, an article must meet all the following eligibility criteria (see [Supporting Information S3](#)):

1. **Population:** The study must focus on indigenous and local knowledge (ILK) held by local or Indigenous communities. Knowledge held exclusively by government agencies, academic researchers or private industry will be excluded.
2. **Concept:** The study must focus on the process of braiding ILK within conservation practice (including planning, management, monitoring or assessment) and describe at least one barrier that hinders this process. We will also code for documented facilitators (enablers) when they are reported, but their presence is not a requirement for inclusion. Studies focused on non-conservation applications (e.g. commercial bioprospecting, purely theoretical ethnography) or where ILK is mentioned only peripherally (i.e. not central to the research question, methods or results) will be excluded.
3. **Context:** The geographic scope of the study is global. The study must be located within an aquatic social-ecological system, including freshwater, estuarine and marine environments. Studies from purely terrestrial contexts will be excluded.
4. **Study Characteristics:** Eligible sources are peer-reviewed empirical articles, doctoral dissertations and reports from predefined

international organizations, published in English. We will include articles regardless of publication date. Systematic reviews that meet these criteria will not be coded but will be reserved for our supplementary snowball search.

2.3 | Evaluation of screening consistency and validity

We will ensure consistent application of the eligibility criteria using a two-phase reliability check. First, two reviewers will perform a calibration exercise by independently screening an initial pilot set of 50 records, selected randomly using a number generator from the unique records imported into Colandr. We will formally assess inter-reviewer agreement using Cohen's Kappa (McHugh, 2012). If the score is below 0.7, the reviewers will discuss disagreements, refine their interpretation of the criteria, and then repeat the independent screening exercise on a new random set of 50 records until the threshold is met. After successful calibration, a single reviewer (Reviewer 1) will conduct the main selection at both the title/abstract and the full text stages. To ensure ongoing reliability, at each stage, after Reviewer 1 completes the screening, a second reviewer (Reviewer 2) will independently screen 50 records randomly selected (using a number generator) from those screened by Reviewer 1. We will resolve all disagreements between reviewers by consensus and reviewers will recuse themselves from decisions concerning their own publications.

Consistent with the CEE guidelines for systematic maps, we will not conduct a formal critical evaluation of the validity of included studies (Collaboration for Environmental Evidence (CEE), 2022). Instead, we will perform a descriptive methodological coding for each included study. This will involve extracting key information on study design and data collection methods, which we will present in the final map to provide a transparent overview of the methodological landscape.

2.4 | Data extraction and coding strategy

We will extract data from all included articles using a pre-piloted coding sheet in a spreadsheet (see [Supporting Information S3](#)). To ensure a transparent link to our research questions, we will structure the coding protocol around our secondary objectives. For Population, we will identify the community type (e.g. Indigenous Peoples, local fishers) and the dimensions of ILK reported (e.g. practical, diachronic, institutional, spiritual, following Berkes, 2012; see [Supporting Information S3](#) for full coding definitions). For concept, we will categorize documented barriers using our five-dimensional framework, note the specific conservation application and inductively code documented enablers (when reported) to develop a typology during synthesis. For context, we will code the aquatic ecosystem type.

Finally, we will extract descriptive metadata to address our synthesis objective. This will include bibliographic information (publication year, type, source), geographic context (country/region of study and first author affiliation), funding acknowledgments (presence/absence), collaboration indicators (number of authors, institutions and countries represented), and citation data. We will retrieve citation data exclusively from Google Scholar to ensure consistency across all types of documents (including peer-reviewed articles, dissertations and institutional documents) and calculate Citations per Year (CPY). We will extract all data directly from the published text and will not contact the authors for missing information.

To ensure consistency, we will calibrate the coding protocol before the main extraction begins. This will involve two independent reviewers coding a pilot set of at least 50 articles. The reviewers will then meet to compare the results and resolve discrepancies through discussion. During this comparison, we will calculate the percentage agreement between reviewers for each coding field across the entire pilot set. Any field achieving less than 70% agreement will trigger further refinement of that field's definition and coding guidance. If necessary, we will repeat the calibration exercise with a new pilot set until the 70% agreement threshold is met in all fields. Once the protocol is finalized, a single reviewer will code the remaining articles.

2.5 | Data synthesis and analysis

We will conduct a structured narrative synthesis (Popay et al., 2006) organized around our secondary research objectives, employing a framework-based approach (Alexander et al., 2019; Dixon-Woods, 2011) that uses our multidimensional barrier model ([Figure 1](#)) as the initial deductive structure. This will be complemented by an inductive thematic analysis to capture emerging sub-themes and enablers, such as successful strategies and conditions reported in the literature. This iterative process allows for exploring relationships within the data (Popay et al., 2006) to provide the evidence base for both a pluralistic praxis model and a practical practitioner guidebook. To substantiate this synthesis, we will integrate key data visualizations, such as geographic evidence maps (R and EviAtlas; Haddaway et al., 2019) to identify knowledge cold spots and heatmaps to visualize the frequency of barrier clusters across conservation applications. Furthermore, we will analyse scientometric indicators, including CPY trends and institutional affiliations, to characterize the evolution and collaboration dynamics of the research landscape.

3 | DISCUSSION

This study will produce a comprehensive systematic map focusing primarily on characterizing the barriers to braiding Indigenous and Local Knowledge (ILK) in aquatic conservation, while also summarizing documented enablers. Following established reporting standards (Haddaway et al., 2018), our primary outputs will

include a publicly accessible evidence database, interactive data visualizations, and a narrative synthesis building a comprehensive typology of documented barriers and a summary of reported enablers.

The main contribution of the map will be a holistic diagnosis of the 'knowing-doing gap' between conservation policy and practice (Agrawal, 1995; Pascual et al., 2021). By synthesizing a fragmented literature into a single evidence base, characterized by its bibliographic, geographic and scientometric features (e.g. collaboration dynamics and citation landscapes), this map will reveal critical knowledge gaps and research clusters related to the barriers of braiding ILK in aquatic conservation practice. This synthesis is a vital step towards a more pluralistic praxis. By systematically identifying these barriers (and summarizing documented enablers), our work provides the evidence-based foundation required to answer the global call for equitable knowledge integration. This call is explicitly mandated by international bodies such as the Convention on Biological Diversity (CBD), the Kunming-Montreal Global Biodiversity Framework (GBF) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Caniglia et al., 2021; Cumming et al., 2023; IPBES, 2024; Palomo et al., 2025; Tengö et al., 2017).

Our work builds upon a growing foundation of systematic reviews exploring the interface of pluralistic knowledge systems. Previous syntheses provide critical insights into braiding ILK within natural resource management and monitoring (Bélisle et al., 2018; Stefanelli et al., 2017; Stern & Humphries, 2022). This is exemplified by extensive work in the Canadian context (Alexander et al., 2019, 2021; Bowles et al., 2026; Castleden et al., 2017; Nishima-Miller et al., 2025), which offers essential procedural frameworks for engagement. We extend this evidence by shifting the focus towards the underlying institutional and social-psychological barriers that impede such strategies globally. By categorizing these persistent obstacles across the aquatic continuum, we provide the deeper understanding of systemic challenges required to move from theory to a genuinely pluralistic approach. In these critical systems, bending the curve of biodiversity loss is a matter of survival. Ignoring ILK systems not only undermines conservation effectiveness but crucially marginalizes the very communities at the frontline of rapid ecological change (Kimmerer, 2002; Nadasdy, 1999; Reid et al., 2024). Ultimately, braiding place-based knowledge and engaging local communities will bridge global policy ambition to on-the-ground reality.

Finally, our findings will be translated into two key practical outputs designed to help bridge the 'knowing-doing gap': a conceptual model of the barrier landscape and a guidebook with actionable strategies for practitioners (Mistry & Berardi, 2016). This map will also serve as the foundational stage for a future empirical study testing our hypothesis on pluralistic ignorance as a key social-psychological barrier in conservation (Geiger et al., 2025; Miller & McFarland, 1987).

AUTHOR CONTRIBUTIONS

Ronald J. Maliao: Conceptualization, methodology, data extraction and curation, formal analysis, writing—original and final drafts. **Béla**

Tóthmérész: Conceptualization, supervision, writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have no competing interests to declare relevant to this article's content.

PEER REVIEW

The peer review history for this article is available at <https://www.webofscience.com/api/gateway/wos/peer-review/10.1002/2688-8319.70268>.

DATA AVAILABILITY STATEMENT

All data analysed in the development of this protocol can be accessed through the databases mentioned in the text and the accompanying materials. Upon completion of the study, the resulting systematic map database and associated metadata will be archived and made publicly available in the Dryad Digital Repository.

AUTHORS' POSITIONALITY STATEMENT

Our background shapes this research, and we offer this statement in the spirit of transparency. *Ronald J. Maliao (RJM)* is a Filipino conservation scientist with years of on-the-ground experience in his home country's aquatic ecosystems. This practical experience grounded his doctoral research on the role of Indigenous and Local Knowledge (ILK) and now serves as the foundation for his postdoctoral work, for which this protocol is the central focus. He approaches this study from a dual perspective: as an insider with a cultural connection to the subject, and as an outsider trained in the Western scientific paradigm at a European university. *Béla Tóthmérész (BT)* is a professor of ecology at the University of Debrecen, Hungary, with deep expertise in biodiversity, community ecology, and ecological statistics. As *RJM's* supervisor, he approaches this work from the perspective of a senior European academic focused on quantitative and theoretical ecology. Our collaboration is a praxis in itself, braiding the lead author's insider perspective, rooted in the Philippines, with the coauthor's outsider perspective, grounded in European quantitative science. This fusion of viewpoints drives our shared commitment: to find more equitable and effective ways to build resilient social-ecological systems for the communities at the forefront of environmental change.

STATEMENT OF INCLUSION

This systematic map synthesizes secondary evidence from global literature; therefore, we conducted no primary local data collection.

Our team provides key geographic anchors for the study: the Philippines represents tropical aquatic systems within the Coral Triangle, while Hungary provides a European perspective. This dual-regional expertise allows us to better identify local research venues and ensures that our interpretation of global braiding barriers remains grounded in diverse ecological and cultural contexts.

ORCID

Ronald J. Maliao  <https://orcid.org/0000-0001-7414-1365>

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Data S1.

Data S2.

ROSES Map Protocols.

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