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ORIGINAL ARTICLE OPEN ACCESS

Navigating Narratives: An Exploratory Scoping Review on the Framing of the Illegal, Unreported and Unregulated Fishing Research

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Received: 20 June 2025 | **Revised:** 20 November 2025 | **Accepted:** 1 December 2025

Keywords: fisheries management | illegal, unreported and unregulated (IUU) fishing | large-scale fisheries | small-scale fisheries | socio-ecological systems

ABSTRACT

Sustainable fisheries are often undermined by illegal, unreported and, in some cases, unregulated fishing (collectively, IUU fishing). As such, it is critical to ensure that current research effectively informs practical fisheries management interventions. We conducted an exploratory scoping review of 509 scholarly articles to assess general trends related to how IUU fishing is framed and distributed in the literature, identifying prevailing narratives that may influence governance. Research on the topic of IUU fishing has increased over time, although geographic distributions in terms of study locations and lead authorship do not necessarily align with global hotspots and priorities. While most location-specific studies include at least one author affiliated with an institution from the region being studied, a bias remains towards first authors from high-income countries. Moreover, while there is a justified focus on the Western Pacific Ocean, other vulnerable regions, such as the West Indian Ocean, remain comparatively underrepresented. Contrary to the assumption of a social science deficit in marine conservation, over half of the articles categorised applied a primarily social science lens; however, coverage from the behavioural sciences was limited. A subset analysis revealed a strong emphasis on large-scale illegal fishing, with frequent conceptual blurring across fishery scales and IUU components. These patterns suggest a high-level and often ambiguous framing of IUU fishing, which may risk oversimplifying complex issues and diluting context-specific nuances. We recommend a shift towards more grounded and solutions-oriented research, with more focus on unreported and unregulated fishing, particularly in small-scale contexts and underrepresented locations.

1 | Introduction

Overexploitation, primarily through overfishing, is the leading cause of marine resource depletion worldwide, resulting in a global decline in fish stocks and marine biodiversity (Dulvy et al. 2021; Edgar et al. 2024; IPBES 2019). Policies and fisheries management interventions are essential to maintain and restore ocean health, yet are often undermined by illegal, unreported and, in certain instances, unregulated fishing (collectively, IUU fishing) (FAO 2024; UNGA 1999). Defined by the Food and Agriculture Organization of the United Nations (FAO) in the 2001 International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (IPOA-IUU), the term 'IUU fishing' was initially devised to address international regulatory gaps regarding the operations of industrial, large-scale fishing fleets in areas beyond national jurisdiction (ABNJ) (CCAMLR 1997; Edeson 2001; FAO 2001; Palma et al. 2010). However, due to the ambiguity of the IPOA-IUU and a lack of a universally accepted conception of IUU fishing, the term is now used across many contexts for which it may not be appropriate (Rosello 2017; Song et al. 2020; Tsamenyi et al. 2015). Moreover, while there is ongoing debate regarding the illegality of unreported and unregulated fishing as presented in the IPOA-IUU (e.g., Theilen 2013), IUU fishing is often combined into a single catch-all term that conflates three distinct threats, which vary across time and space and encompass diverse drivers, impacts and management requirements (Cisneros-Montemayor et al. 2018; Serdy 2011). While 'illegal fishing' compromises sustainability and the rule of law, 'unreported fishing' results in knowledge gaps and 'unregulated fishing' hinders appropriate management (Bartlett et al. 2025); in concert, these issues can have both local and global ecological and socioeconomic implications (e.g., Agnew et al. 2009; Okafor-Yarwood 2019; Sumaila et al. 2020).

There has been a rapid rise in fisheries research over the last quarter-century; however, this research may not be translating into evidence-based policy (Gupta et al. 2022; Liu et al. 2023). While the marine conservation landscape is ever-changing, there is little evidence that research keeps pace with these changes, nor does it address the research questions necessary to foster real-world impact (Grantham et al. 2010; Williams et al. 2020). To maximise impact, conservation science needs to be relevant, incorporating the values and views of all stakeholders (Cook et al. 2013). In this context, the prevailing reductionist concept of IUU fishing can circumvent context-specificity, leading to assumptions that may result in ineffective and inequitable management recommendations. Through semi-structured key informant interviews, Bartlett et al. (2025) found that, in practice, these assumptions can include: (1) a predominant focus on large-scale fisheries (LSFs) that often excludes small-scale fisheries (SSFs) from the narrative; (2) a view of IUU fishing from a myopic ecological lens, disregarding socioeconomic implications; (3) the interchangeable use of IUU fishing and illegal fishing that neglects the nuances inherent in the term; and (4) a potential overinflation of IUU fishing as the sole driver of unsustainable fisheries.

In reality, the interpretation of and appropriate responses to IUU fishing depend on the context in which it occurs. Yet, despite the need for contextualised responses, approaches to combat IUU fishing are often shaped by top-down interventions that may overlook relevant local contexts and human dynamics (Bartlett et al. 2025; Bennett et al. 2017; Booth et al. 2019; McClanahan et al. 2009; Song et al. 2020). This can lead to management responses that are incompatible with the diversity within fisheries. For example, one of the primary components of the European Union (EU)-IUU regulation (Council Regulation (EC) No. 1005/2008) is the exchange of fisheries data through a catch certification scheme, which requires the collection and reporting of individual fishing vessel activity (The Council of the European Union 2008). However, this proves problematic in SSFs, where there is often a lack of capacity and/or institutional resources to report. In these instances, specific fisheries can be excluded from markets on which they depend, which in turn undermines market-based incentives for good practice (Bartlett et al. 2025; Song et al. 2020).

Understanding how IUU fishing is conceptualised and framed can help identify narratives that inhibit or promote positive outcomes via equitable, well-regulated, adequately reported and compliant fisheries. Therefore, guided by Bartlett et al. (2025), we developed several key research questions (Table 1) to support the development of effective fisheries management interventions towards a just and sustainable blue economy. Through a preliminary examination of trends in the literature, we aim to identify potential biases and gaps that may lead to inappropriate management responses, highlighting key areas that may require attention and suggesting potential ways forward.

2 | Methods

2.1 | Literature Collection

We conducted an exploratory scoping review of scholarly literature focusing on the framing of the term IUU fishing, with the aim of increasing understanding of how the term is conceptualised and used. We used the ROSES (RepOrting standards for Systematic Evidence Synthesis) guidelines, tailored to the exploratory nature of a scoping review, rather than a full systematic evidence synthesis (CEE 2013; Haddaway et al. 2018; Temple et al. 2022). While a systematic review aims to synthesise all empirical evidence related to a particular topic, a scoping review is designed to synthesise knowledge more rapidly and address exploratory research questions and knowledge gaps (Arksey and O'Malley 2005; Colquhoun et al. 2014; Munn et al. 2018). This scoping approach was deemed most suitable for addressing our research questions, as this study aimed to identify broad trends and gaps related to the framing of IUU fishing, rather than conducting a comprehensive evaluation of the entire body of literature (Bouck et al. 2022; Tricco et al. 2016).

All literature was collated in February 2024 using structured search phrases via Google Scholar, Scopus and Web of Science. We used the following search phrases: (1) '(IUU OR ILLEGAL* OR UNREPORT* OR UNREG*) AND FISH*'; (2) 'ILLEGAL* AND UNREPORT* AND UNREG* AND FISH*'; and (3) 'IUU AND FISH*', where using an asterisk expanded the search to include words that begin with the same letters, allowing for variations in word endings. While we recognise the potential redundancy of the terms, this provided greater coverage, including

TABLE 1 | Primary research questions, hypotheses and rationale.

Category	Research question		Hypothesis	Rationale
Geographic distribution	How is the IUU fishing research geographically distributed?	Who is conducting the research?	Most publications will originate from high-income institutions of the Global North.	Conservation science research is primarily designed and led by researchers from higher-income nations (de Vos and Schwartz 2022; Miller et al. 2023; Stefanoudis et al. 2021).
		Where is the research primarily focused?	The research will primarily focus on areas perceived to be most at risk of IUU fishing, specifically the Western Pacific and the West Indian Ocean.	Based on the 2023 IUU Fishing Risk Index, the overall most at-risk ocean basins are the Western Pacific and the West Indian Oceans (Macfadyen and Hosch 2023).
Disciplinary focus	What are the research disciplines most represented in the IUU fishing literature?		The research will primarily emanate from the natural sciences, with a limited consideration of the social sciences.	Historically, the social sciences have been underutilised and undervalued in the conservation and sustainability literature (Bennett et al. 2017; Zheng et al. 2021).
Fishery scale	What is the primary scale of focus for fisheries covered in the IUU fishing literature?		The research will focus primarily on large-scale, industrial fleets.	Originating from concerns in the Southern Ocean and the high seas, IUU fishing is often difficult to operationalise beyond a large-scale, industrial fishing fleet context (Song et al. 2020; Temple et al. 2022).
IUU components	How are the different components of IUU fishing—illegal, unreported, unregulated—differentiated within the literature?		The literature will conflate the different terms of IUU fishing into one overarching entity, favouring illegal fishing over the unreported and unregulated fishing components.	The IUU fishing terminology has been criticised for conflating three distinct entities of fishing activity into one (Serdy 2011). IUU fishing is often used interchangeably with illegal fishing, disregarding the nuanced differences between the terms and their components (Bartlett et al. 2025).
Temporal trends	How has research on IUU fishing changed over time?		The literature will become more inclusive with time.	There has been increased recognition of the importance of understanding the specific contexts in which fisheries operate (Bartlett et al. 2025; Booth et al. 2019, 2023).

accounting for potential inconsistencies in indexing across the databases. For example, while only illegal fishing may be mentioned in the title, abstract or keywords, the body of the text may heavily focus on IUU fishing, which would only be captured after a full text review. Although 'non-compliance' implies illegal activity, we chose not to include this, as the scope of the study was to understand the framing of the IUU fishing concept, specifically.

The search phrases yielded an extensive number of studies; therefore, in line with similar studies, only the first 200 references from each search string were downloaded to ensure relevance in the context of resource constraints (Haddaway et al. 2015; Hamelin et al. 2024; Willis Key et al. 2025). These were stored in EndNote and categorised by database and search phrase. For those searches that produced fewer than 200 articles, all articles were selected and downloaded.

To address the limitation of the restricted number of articles reviewed, we searched each database by 'relevance'. Although bias may persist in the temporal distribution of articles, this approach enabled the most accurate representation of the current field while keeping the review manageable and in scope. Following a similar methodology to Temple et al. (2022), which conducted a systematic review of the impacts of IUU fishing, ten relevant papers were preselected to validate the search term criteria (Supporting Information S1). The search criteria were refined to ensure that all ten target papers appeared within the top 200 results for at least one of the search phrases and databases before initiating the comprehensive literature search.

2.2 | Screening

Once the search was complete, an initial duplicate search was conducted and all identified duplicates were removed. Next, we screened the titles, abstracts and keywords of the remaining articles using a predetermined exclusion criterion (Table 2; Supporting Information S1). If available, executive summaries, simple summaries, table of contents or forewords were also reviewed (Godin et al. 2015). Titles and supporting information were recorded, along with the screening result (included or excluded). All literature that met the exclusion criteria was removed. Notably, we confined our analysis to scholarly, scientific or academic articles and, therefore, excluded, for example, government reports. Additionally, we aimed to conceptualise IUU fishing holistically, rather than analysing each element in isolation; therefore, the screening criteria required 'illegal, unreported and unregulated' or 'IUU' to be present in union, as opposed to its discrete components. As such, articles mentioning only one component of IUU fishing were not included. While this may have limited the scope and accompanying national perspectives, this approach enabled consistency across the dataset, allowing for a better understanding of the IUU fishing framing.

The literature search yielded 1774 articles (600 articles across three search phrases for Scopus, 600 articles across three search phrases for Web of Science and 574 articles across three search phrases for Google Scholar, selecting the first 200 articles, or all articles if fewer than 200 were generated, from each of the three separate phrases). This resulted in 942 unique records after initial duplicates were removed. Of the remaining 942 articles, an additional 433 records were removed based on the exclusion criteria. As such, 509 articles were included in the initial analysis (Figure 1). Moreover, a subset of publications ($n = 180$) was selected using an online random number generator as a compromise between researcher time and coverage, to explore in more detail how articles address different fishery scales and conceptualise IUU fishing activity and its independent components.

TABLE 2 | Exclusion screening criteria. All reviewed literature meeting one or multiple exclusion criteria was not included in the data synthesis.

Criteria	Additional comments
Inaccessible or duplicate (not initially identified).	
Not available in English.	We initially conceived this study as including French and Spanish articles; however, during our pilot searches, we found a limited number of articles in these languages. Following our literature review, we identified 16 non-English articles, the majority of which were published in languages from Asia.
Not produced between 1997 and 2024.	We chose 1997 as the initial date, as it is the first year that the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was attributed with the IUU fishing term (CCAMLR 1997).
Not a stand-alone scholarly, scientific or academic article.	The following types of literature were excluded: blogs, books, book chapters or sections, book reviews, bulletins and briefs, datasets, magazines, media articles, meeting or working group minutes or outputs, theses, reports or working papers (governmental, intergovernmental or non-governmental) and yearbooks.
The screening entities did not contain 'IUU' or 'illegal, unreported and unregulated' fishing as a unified phrase.	There were instances where an article was missing several screening entities (e.g., abstract, keywords) or did not meet the objective screening criteria. However, if the body of the text was heavily concerned with IUU fishing and the article met the other criteria, these articles continued to be included.

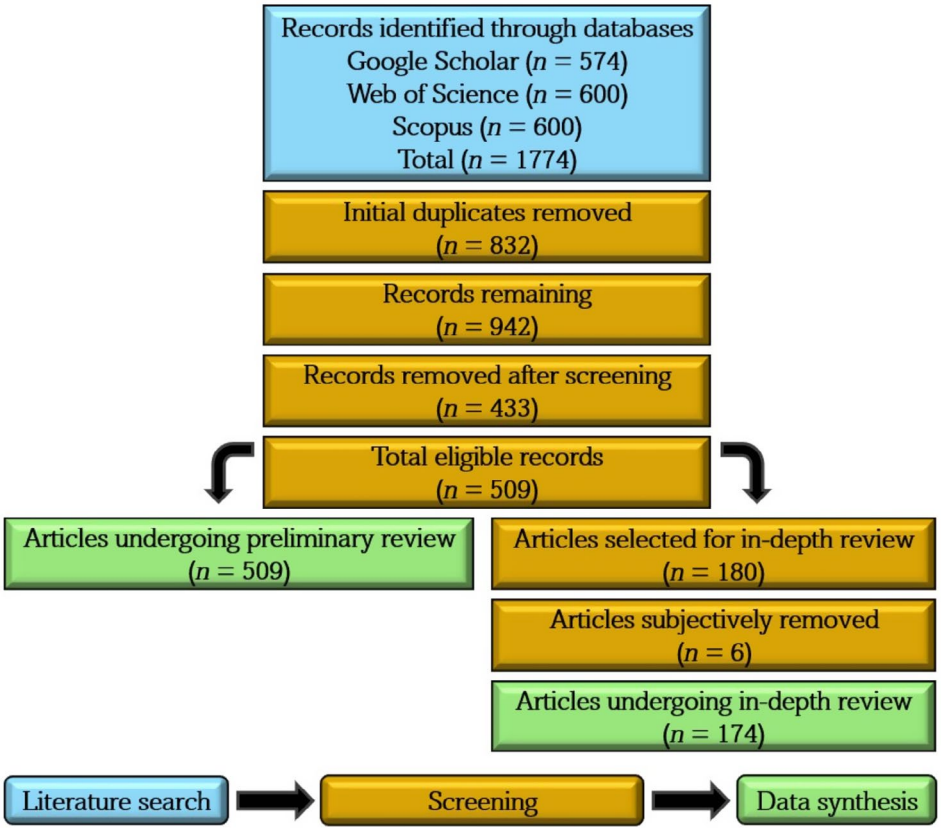

FIGURE 1 | Scoping review process (adapted from Gupta et al. 2022; Page et al. 2021). This figure illustrates the order in which articles were identified, screened and synthesised, with colour-coding representing each stage (blue: Literature search; gold: Screening; green: Data synthesis).

However, of these, six were removed because, although meeting the criteria, they did not focus on IUU fishing in a way that would foster the data extraction goals. This resulted in a total of 174 articles being reviewed in-depth (Supporting Information S1 and S2).

2.3 | Data Extraction and Analysis

2.3.1 | Geographic Distribution

All eligible articles ($n = 509$) were recorded for: (1) the geographic location of the first author's affiliation (country and region [classifications based on Macfadyen and Hosch 2023]); (2) the country's economic status (based on 2023 gross national income [GNI] per capita [World Bank 2024]); and (3) the article's primary focal location or jurisdiction (Supporting Information S1–S3). However, prior to classifying the article's primary focal location or jurisdiction, articles were categorised as: (1) 'location-specific' or (2) 'actor-specific' to avoid misrepresentation of the distinct geopolitical roles of diverse locations. Location-specific articles were further categorised into: (1) 'site of occurrence, assessment, impact or combat of fishing' or (2) 'location of market'. Actor-specific articles were further categorised into: (1) 'market/regulatory' or (2) 'jurisdiction of fishing fleet or regulated party'. Multiple locations or jurisdictions could be selected; however, secondary locations with minimal relevance to the study (i.e., locations that were only briefly highlighted and did not represent a paper's primary focus) were excluded to avoid the risk of overrepresentation. An article was labelled as 'undefined/global' if it was undefined, global, or focused on the general high seas.

Articles classified as 'location-specific (site of occurrence, assessment, impact or combat of fishing)' were further investigated. Firstly, we noted whether at least one author was affiliated with an institution within the study location. Secondly, we identified the relevant ocean basin of focus, classified based on Macfadyen and Hosch (2023) (Supporting Information S1 and S2). This could not be mirrored for other designations because the jurisdictions of, for example, a fishing fleet, are not necessarily the same as those where the fishing activity takes place.

To investigate underrepresented high-risk ocean basins, we examined the relationships between the number of articles focused on each ocean basin and the 2023 IUU Fishing Risk Index (Macfadyen and Hosch 2023). The 2023 IUU Fishing Risk Index scores coastal nations, regions and ocean basins on a scale of one to five, with five indicating the highest risk of IUU fishing. This Index is based on indicators (see Macfadyen and Hosch 2023) that evaluate the prevalence of IUU fishing, vulnerability to IUU fishing and response capacity, assessing coastal, flag, port, and general state responsibilities, both individually and collectively. We compared article counts by ocean basin with the coastal, port and general responsibility ocean basin indices through a rank index, excluding flag responsibilities, as this measure was heavily focused on fleet operations (Supporting Information S3). The rank index was calculated by subtracting the article output rank (the most prolific ocean basin being ranked one) from the 2023 IUU Fishing Risk Index rank (the most at-risk ocean basin being ranked one). A four-quadrant graph was used to visualise the results, like an importance-performance grid (Lankia

et al. 2022; Martilla and James 1977), where the median value of the rank and risk indices defined the quadrant axes.

2.3.2 | Disciplinary Focus

The article source (i.e., journal name, conference/proceeding name) was categorised for all 509 articles (Supporting Information S1 and S2). This data was used to objectively classify the disciplinary lens through which the literature was viewed, using 'subject areas' from Scopus (https://www.Scopus.com/sources). Scopus indexes its journals and conferences/proceedings under relevant disciplines and supporting sub-disciplines; for example, 'Environmental Science: Ecology' and 'Environmental Science: Nature and Landscape Conservation', with 'Environmental Science' being the discipline and 'Ecology' and 'Nature and Landscape Conservation' being two unique sub-disciplines. While many journals encompass multiple disciplines, we assigned the discipline with the highest 2023 CiteScore rank percentile (i.e., the subject area where the journal has had the greatest impact, referred to here as the primary discipline) to avoid inflating the influence of less relevant subject areas. If multiple disciplines shared the highest percentile rank, we selected the first listed to maintain a replicable method for categorisation. While most CiteScores were based on 2023 data, in certain instances (e.g., if a journal had been discontinued in Scopus), CiteScores may have been calculated using data from earlier years.

2.3.3 | Fishery Scale

We extracted the fishery scale of focus (i.e., 'LSF', 'SSF' or 'Both') for the subset of 174 articles (Supporting Information S1 and S2). Each article was first classified by whether a fishery scale was 'defined' or 'undefined'. If it was defined, we next classified the scale of focus. We noted whether the scale was determined through: (1) an 'explicit' statement or (2) 'predetermined criteria' based on generally accepted characteristics of a particular fishery scale (Supporting Information S1). The guiding definitions for large and small-scale fishing activity were those provided in the 2024 FAO, Duke University and WorldFish report (FAO et al. 2024).

To be classified as being determined by an explicit statement, within the main text (not references), there must have been a statement in the appropriate context that signified the article's primary focus. For SSFs, the explicit terminology included 'small-scale', 'artisanal' or 'subsistence'. The explicit terminology for LSFs was either 'large-scale' or 'industrial'. While, for example, both 'large-scale fishing activity' and 'large-scale fishery' qualified as explicit statements, terms such as 'large' or 'small' vessels did not, as vessel size does not necessarily imply scale due to the diversity of fisheries and varying definitions of scale (FAO CWP on Fishery Statistics 2011; Smith and Basurto 2019). We could select more than one fishing scale; however, we avoided doing so if there was only minimal mention or acknowledgement. If both scales were selected, the fishery scale was identified as being 'fully clear' if all focal fisheries were explicitly identified and 'partly clear' if only one scale was explicit and the other was determined through the predetermined criteria.

2.3.4 | IUU Components

Lastly, we extracted the IUU fishing activity of focus for the subset of 174 articles (Supporting Information S1 and S2). We sought to assess whether the article primarily focused on 'illegal', 'unreported' or 'unregulated' fishing, selecting multiple activities as appropriate and avoiding irrelevant mentions. In many cases, the IUU terminology is often used as a collective catch-all phrase which conflates the three components (Serdy 2011). Thus, while 'IUU', as a conflated entity, may have been an appropriate co-answer for many articles reviewed, to remain systematic in our classification, it was only selected if there was no obvious understanding of the discrete focal fishing activity(ies). This enabled an additional level of standardisation and consistency to identify coverage gaps across the three independent components.

While Supporting Information S1 outlines the coding methodology in more detail, we note that the three terms used in this study have potentially been broadened beyond the interpretation of the IPOA-IUU (FAO 2001). While illegal fishing is relatively straightforward, we extended the concept of unreported fishing to include all forms of legal or illegal non-reporting, misreporting or underreporting. Moreover, we often classified discussions on mislabelling as concerned with unreported fishing, acknowledging that it may frequently result from fraudulent reporting (Hasan et al. 2023). Articles about unregulated fishing included those focused on unregulated and underregulated fisheries, as well as those acknowledging gaps and loopholes in regulatory frameworks. While this coding may have inflated the number of components extracted for a given article, particularly for the unreported and unregulated components, it enhanced consistency and better reflected the real-world complexities of the concept. In conjunction, as unreported fishing may fall under illegal or unregulated activities, there may have been instances in which unreported fishing was implicitly included without explicit mention, potentially underrepresenting it compared to the other components.

All analyses were performed using Microsoft Excel Version 2505 (Microsoft Corporation 2025) and the R statistical software, Version 4.3.1 (R Core Team 2023), while the geographies were mapped using ArcGIS Pro Version 3.2.0 (ESRI 2023).

2.4 | Ensuring Data Reliability and Consistency

The data extraction was susceptible to various biases and uncertainties, including a lack of clarity in the literature and subjectivity amongst reviewers. Therefore, we implemented several measures to minimise potential biases. Six reviewers conducted an initial review, with 30 articles assigned to each reviewer. To maximise consistency, the second review, conducted for all articles ($n = 509$), was carried out by the lead author using tailored criteria based on feedback and insights from the initial review (Supporting Information S1). The analysis presented in this manuscript is based on the second review (Supporting Information S2).

Additionally, twenty-five articles were randomly selected to assess inter-rater reliability between the lead author and two co-authors using a Cohen's kappa test and Jaccard similarity

test. The Jaccard similarity test enabled us to account for partial agreement, considering the potential for diverse arrangements for specific questions. Both tests generate a coefficient between 0 and 1, where a score of 1 indicates complete agreement (Ivchenko and Honov 1998; McHugh 2012). The sample was coded across seven variables: national economic status of the first author's institutional location, regional first author location, primary dimension of focus, sub-domain of the primary dimension of focus, relevant ocean basin, fishery scale and IUU fishing component of focus. In cases where multiple ocean basins were selected, we categorised them as 'multiple' for simplicity for the Cohen's kappa test.

After the inter-rater reliability test, we made minor adjustments to improve the clarity of the reviewers' instructions. Accounting for these adjustments in our scoring, an average Cohen's kappa test score of 0.67 across the three reviewers was calculated, indicating sufficient agreement (McHugh 2012). However, while the average scores for national economic status, regional first author location, primary dimension of focus, primary dimension of focus (sub domain) and relevant ocean basin of focus all achieved moderate to perfect agreement (1.0, 1.0, 0.74, 0.70, 0.66, respectively), fishery scale of focus received weak agreement (0.46) and IUU fishing component of focus received minimal to no agreement (0.12). The Jaccard similarity test produced an average score of 0.82 across reviewers: national economic status (1), regional first author location (1), primary dimension of focus (0.84), primary dimension of focus (sub-domain) (0.80), relevant ocean basin (0.83), fishery scale of focus (0.78), IUU fishing component of focus (0.46). The discrepancies related to the IUU fishing component of focus and fishery scale may be the result of ambiguity and a lack of clarity within the text. Results were discussed and, in certain instances, updated for the final output. However, as such, these results should be interpreted with caution. Literature reviews often involve a high degree of subjectivity, dependent on reviewer judgement; however, they nonetheless provide valuable insights into overarching trends in the field and remain an effective tool for identifying research patterns (Bangdiwala 2024; Snyder 2019).

3 | Results

Of the 509 articles, 90% ($n = 459$) were classified as sourced from a journal, while 10% ($n = 50$) were sourced from a conference/proceeding. All articles were published between 2001 and 2024, with the number substantially increasing over time: 24 articles (5%; 2001–2006), 54 articles (11%; 2007–2012), 100 articles (20%; 2013–2018) and 331 articles (65%; 2019–2024). Notably, 2024 was limited to two months, as the literature was collated in February 2024.

3.1 | Geographic Distribution

3.1.1 | Research Origin

The first authors originated from 54 unique countries (Figure 2; Supporting Information S2 and S3), spanning eight world regions (Africa, Asia, Caribbean and Central America, Europe, the

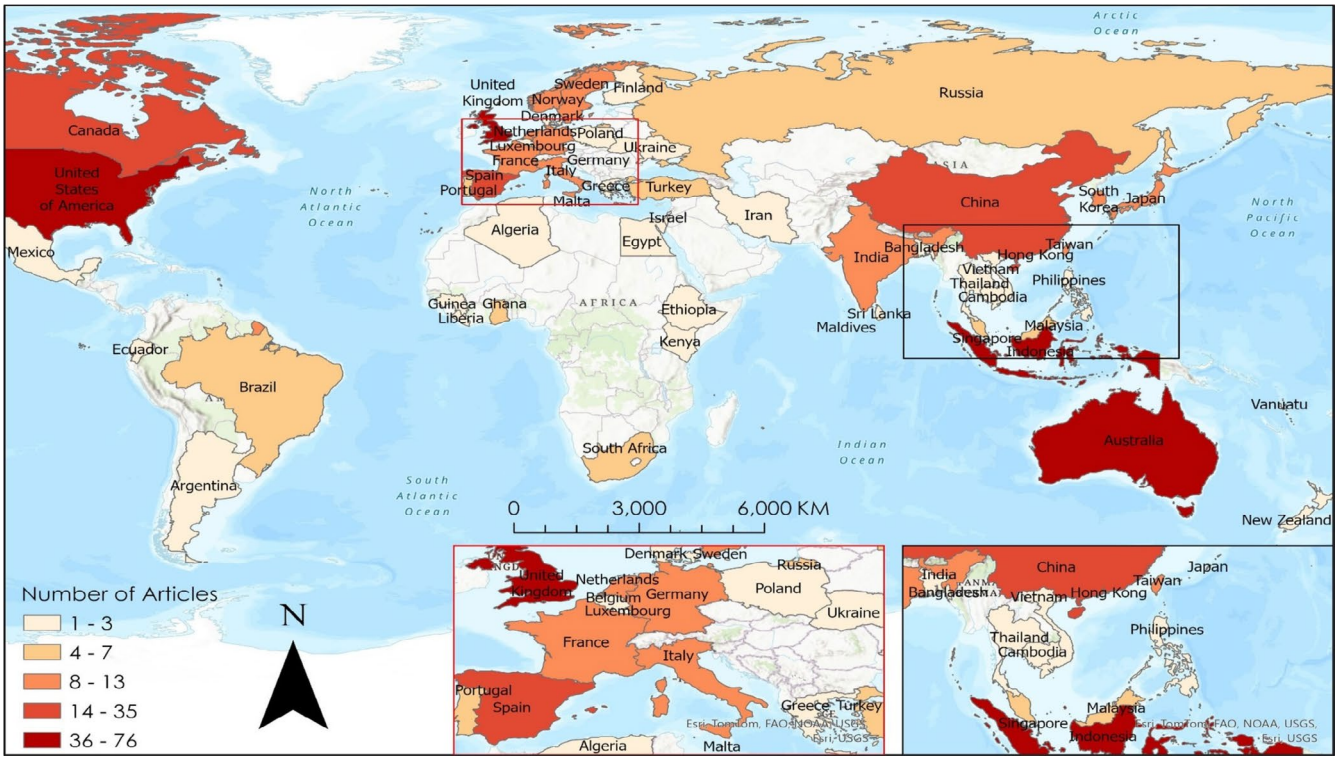

FIGURE 2 | Geographic distribution of first-authored articles ($n = 509$). The map highlights the count of first-authored publications by country, with darker shadings denoting higher counts. The absence of a designated colour indicates that no eligible articles were reviewed from those countries. Portions of Europe and Asia are zoomed in to provide greater detail. Basemap: ESRI, TomTom, FAO, NOAA, USGS (2023). Jurisdictional boundaries: Natural Earth (2022).

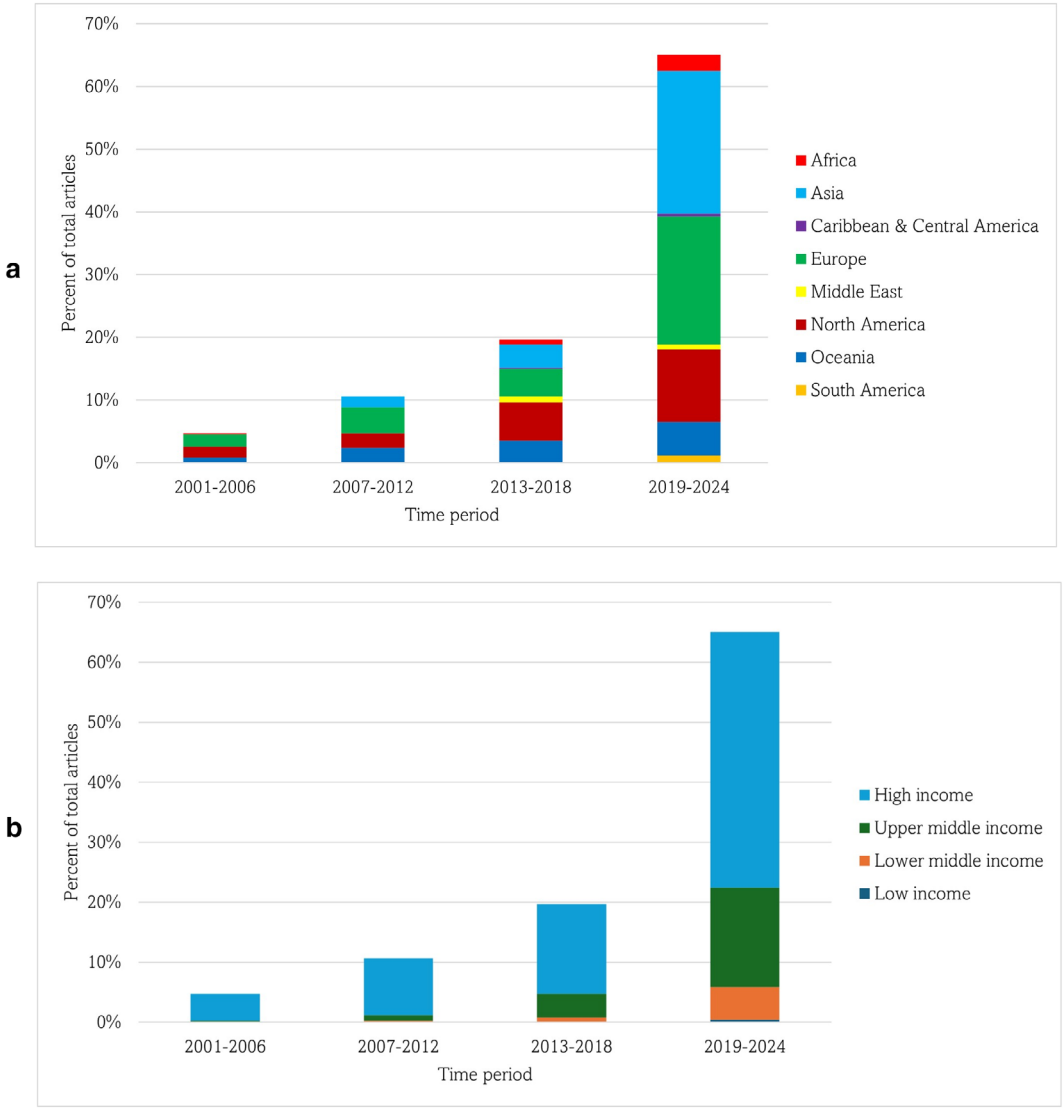

FIGURE 3 | Distribution of first-author institutional affiliation by: (a) geographic region and (b) national economic status by time. Stacked bars display the proportion of publications in each time bin, calculated as a percentage of the total articles across all time periods (2001–2024, $n = 509$). Economic status is based on 2023 GNI per capita (low income: $1145 or less; lower middle income: $1146 to $4515; upper middle income: $4516 to $14,005; high income: Over $14,005) (World Bank 2024). Regional classifications are based on Macfadyen and Hosch (2023).

Middle East, North America, Oceania, South America) and four income levels (high income, upper middle income, lower middle income, low income). Most research (72%, $n = 364$) was led by researchers affiliated with institutions in high-income countries. Lower-income country-based first authors comprised 28% ($n = 145$) of the articles reviewed, with the majority originating from upper-middle-income countries (22%, $n = 110$) and only two from low-income countries. However, notably, when applicable, 78% of articles (189 out of 243) were authored by at least one author affiliated with an institution in which the study was focused. The top five countries with the most first-author articles produced over half of all articles reviewed: United States of America (U.S.A; 15%, $n = 76$), Indonesia (11%, $n = 58$), Australia (11%, $n = 57$), United Kingdom (10%, $n = 53$) and Canada (7%, $n = 35$).

When grouped by region, most first authors were affiliated with European institutions (31%, $n = 157$), followed by Asia (28%, $n = 144$ [East: 9%, $n = 48$; South: 3%, $n = 16$; Southeast: 16%, $n = 80$]), North America (22%, $n = 111$) and Oceania (12%, $n = 61$). Other regions had very few first-author papers: Africa (4%, $n = 18$ [Central: $< 1\%$, $n = 1$; East: 1%, $n = 3$; North: $< 1\%$, $n = 2$; South: 1%, $n = 5$; West: 1%, $n = 7$]), the Middle East (2%, $n = 9$), South America (1%, $n = 6$) and the Caribbean and Central America (1%, $n = 3$). Notably, Indonesia accounted for 73% of all articles from Southeast Asia (40% of all articles from Asia), Australia accounted for 93% of all articles from Oceania and the United Kingdom comprised 34% of all articles from Europe.

Articles became more geographically widespread over time, with the number of distinct countries first-authoring articles increasing across the four study periods: 2001–2006 (9 countries), 2007–2012 (17 countries), 2013–2018 (28 countries) and 2019–2024 (50 countries). Moreover, primarily due to the increase in articles from Indonesia, the proportion of first-authored publications from countries that are not high income also increased

(Figure 3), as authors affiliated with Indonesia served as first authors on 53% of the articles originating from upper-middle-income countries.

3.1.2 | Geographic Region of Focus

Of the 509 articles reviewed, 56% ($n = 283$) were classified as location-specific, 30% ($n = 154$) as undefined/global and 14% ($n = 72$) as actor-specific. The proportion of articles classified as undefined/global declined over time (2001–2006: 50%; 2019–2024: 29%). Of the 283 location-focused articles, 95% ($n = 268$) centred on the site of occurrence, assessment, impact or combat of IUU fishing; 5% ($n = 15$) centred on the location of the market. A detailed analysis of the actor-specific articles and market-location-focused articles is beyond the scope of this paper. However, of the 72 articles categorised as actor-specific, 26 were focused on the role of a country or region as a market or regulatory actor, while 46 were focused on the role of a country or region as a fishing power and/or regulated party. Discussions on countries or regions as market/regulatory actors were confined to the European Union or its member countries (e.g., the EU-IUU regulation), the U.S.A. (e.g., the Seafood Import Monitoring Programme), Australia, China and Japan. Of the 46 articles that focused on countries operating foreign fishing fleets or parties subject to regulatory sanctions, the majority ($n = 40$) were at least partially focused on Asia, primarily on countries such as China, South Korea, Sri Lanka, Taiwan, Thailand and Vietnam. The 15 articles classified as location of market focused on Japan ($n = 5$), the U.S.A ($n = 3$), Australia ($n = 1$), Hong Kong Special Administrative Region ($n = 1$), India ($n = 1$), Italy ($n = 1$), Spain ($n = 1$), the United Kingdom ($n = 1$) and wider Europe ($n = 1$).

While 268 articles focused on the site of occurrence, assessment, impact or combat of fishing, 5% ($n = 13$) concentrated on solely inland waters (e.g., enclosed seas, such as the Caspian Sea, rivers or lakes). Of the remaining 255 articles, 46% ($n = 117$) focused on the Western Pacific Ocean, 33% ($n = 83$) focused on the East Indian Ocean and 18% ($n = 46$) focused on the East Atlantic Ocean. Other ocean basins received comparatively less attention: West Indian Ocean (10%, $n = 26$), Southern Ocean (9%, $n = 23$), West Atlantic Ocean (8%, $n = 20$), Mediterranean and Black Sea (7%, $n = 17$), Eastern Pacific Ocean (6%, $n = 15$) and the Arctic Ocean (3%, $n = 8$). Except for the Arctic and Southern Oceans, all other ocean basins had the highest number of articles focused on them between 2019 and 2024.

We calculated a rank index of research representation across seven ocean basins related to the 2023 IUU Fishing Risk Index (Macfadyen and Hosch 2023), focusing on coastal, port and general responsibilities, to highlight understudied basins in relation to risk. The Arctic and Southern Oceans were excluded due to the unavailability of risk index values. Based on these results, the West Indian Ocean was identified as at-risk and underrepresented across all three indices. Additionally, the Mediterranean

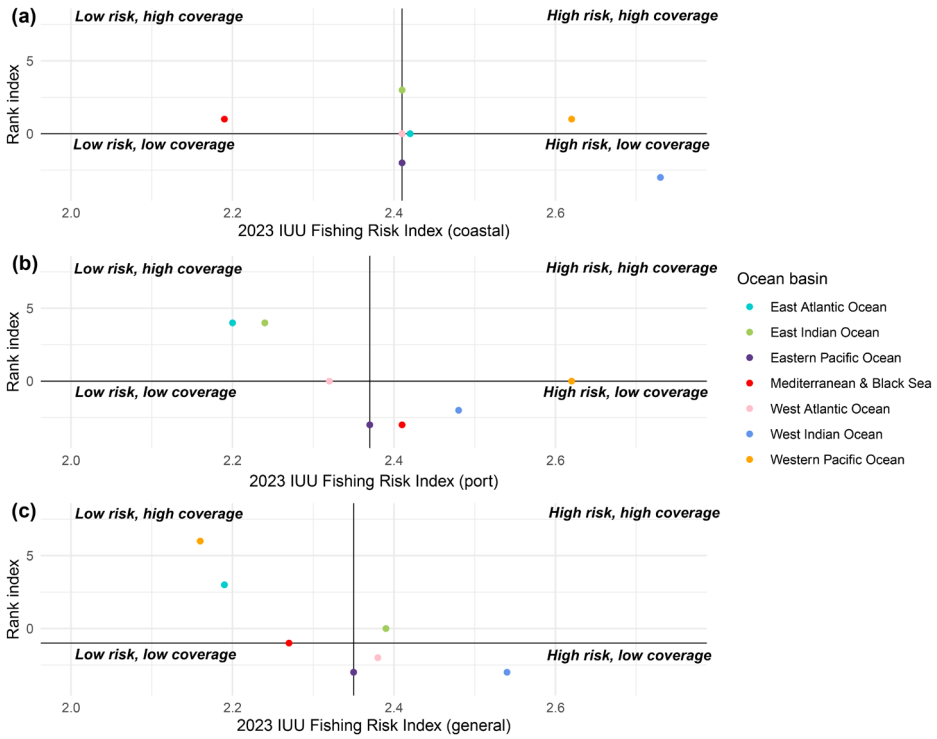

FIGURE 4 | Gap analysis of research coverage versus 2023 IUU Fishing Risk by responsibility: (a) coastal, (b) port and (c) general. Each point represents the risk index (x-axis) versus a rank index (y-axis). The x-axis threshold was calculated as the median risk index value, while the y-axis threshold was calculated as the median rank index value. Positions within the fourth quadrant (excluding boundary lines) represent critical coverage gaps (high risk, low coverage).

and Black Sea, as well as the West Atlantic Ocean, appear underrepresented in terms of port and general risk, respectively (Figure 4; Supporting Information S3).

3.2 | Disciplinary Focus

Of the unique journals and conferences/proceedings in which articles were published, the largest number of articles originated from the journal *Marine Policy* (17%, $n = 89$), followed by the *International Journal of Marine and Coastal Law* (3%, $n = 15$) and *Ocean and Coastal Management* (3%, $n = 13$). Of the 509 articles, Scopus categorised 438 under at least one discipline. The remaining 71 articles were not indexed in Scopus and thus not included in this analysis. Social Sciences was the primary discipline for 51% of the articles reviewed ($n = 222/438$), followed by Agricultural and Biological Sciences (23%, $n = 101$). Earth and Planetary Sciences comprised 8% ($n = 34$), Environmental Science 6% ($n = 25$), Multidisciplinary 4% ($n = 16$) and Engineering 3% ($n = 11$). The remaining articles were categorised into a wide range of fields (Supporting Information S2). Notably, Law was the sub-discipline for 169 of the 222 Social Sciences articles (76%), while other Social Sciences sub-disciplines, such as Anthropology, Cultural Studies and Linguistics and Language, were less represented.

3.3 | Fishery Scale

Of the subset of 174 articles reviewed in-depth, we were able to classify at least one fishery scale of primary focus in 147 articles; the remaining 27 articles were identified as having an undefined or unclear focus. Articles often lacked descriptive operational characteristics (e.g., vessel size, gear type, target species) or socioeconomic descriptors, and commonly conflated or failed to distinguish between scales. In many instances, even if articles provided operational characteristics, we could not appropriately classify them as either large- or small-scale, due to the diversity and variability of fisheries across locations and types of fisheries operations.

Of the remaining 147 articles, SSFs were the sole primary focus in 16 (11%), while LSFs were the sole primary focus in 75 (51%). Both scales were identified as co-primary focuses in 56 (38%) articles. Across all sets of articles, the scale of focus was often framed in terms of the perpetrator. However, those discussing SSFs often appeared more human-centred, often exploring underlying motivations, while LSFs were examined through a more critical lens of a systematic issue. Moreover, in other instances, SSFs were discussed as the party impacted by large-scale IUU fishing or the party impacted by IUU regulation. Of the 147 articles, over half (54%, $n = 80$) of the classifications were implied by the predetermined criteria that outlined conventional vessel scale characteristics, as opposed to explicit and clear designations or statements within the articles themselves (Table 3; Supporting Information S2). When the article was designated as partly clear (i.e., one scale was precise, while the other was determined through predetermined criteria; $n = 21$), SSFs were the explicitly identified scale 90% of the time. Of the scale-defined articles published between 2001 and 2006 ($n = 7$), none focused on SSFs. This increased to 54 out of 92 between 2019 and 2024 (59%), with 13 (14%) primarily focusing only on SSFs.

TABLE 3 | Distribution of fishery scales of focus of articles reviewed ($n = 147$). Rows indicate the proportion and number of articles coded to each fishery scale (LSF [large-scale fishery], SSF [small-scale fishery], Both), distinguished by whether the scale was explicitly stated by the authors or implied by the reviewer from the context provided. Those articles deemed unclear/undefined ($n = 27$) are not included.

Fishery scale of focus	Explicitly stated	Implied
LSF ($n = 75$)	36% ($n = 27$)	64% ($n = 48$)
SSF ($n = 16$)	69% ($n = 11$)	31% ($n = 5$)
Both ($n = 56$)	52% ($n = 29$)	48% ($n = 27$)
Total ($n = 147$)	46% ($n = 67$)	54% ($n = 80$)

3.4 | IUU Components

Of the 174 articles reviewed, 17% ($n = 30$) conflated illegal, unreported and unregulated fishing to such a degree that we could not distinguish the primary component under investigation. In the remaining 144 articles, the illegal fishing component was a primary focus 91% ($n = 131$) of the time, the unregulated fishing component was a primary focus 41% ($n = 59$) of the time and the unreported fishing component was a primary focus 33% ($n = 47$) of the time. Unreported or unregulated fishing was described independently of illegal fishing in only 13 instances (Figure 5).

Except for a handful of articles that clearly stated their focus (e.g., Vince et al. 2021, which specifically stated 'in this paper, we focus on the illegal component of IUU fishing') or those articles that were focused on a specific fishing activity (e.g., illegal infiltration of fishing vessels into the exclusive economic zones of other countries, quantification of unreported catch), distinguishing between the components was challenging. Similar to our findings regarding fishery scale, it was often left to the reader to interpret which aspect of IUU fishing was being addressed based on the provided context. This was particularly true in the case of unreported and unregulated fishing. While discussions on illegal fishing were often more explicit, readers were frequently left to infer whether the article was focused on these other elements through, for example, discussions of data gaps, absent frameworks or a review of the methodologies referenced.

4 | Discussion

To promote sustainable fisheries, research on IUU fishing must be framed in ways that are relevant to management and policy needs and capture the underlying social complexities that may influence management. However, our results highlight several challenges that may undermine such efforts. As hypothesised, our review revealed biases in the geographic distribution of research authorship, the fishery scale and the IUU fishing component of focus, some of which align with previous research. However, contrary to our hypotheses, we found that IUU fishing is studied through a predominantly social science lens, albeit unsurprisingly, with a law-focused emphasis. We

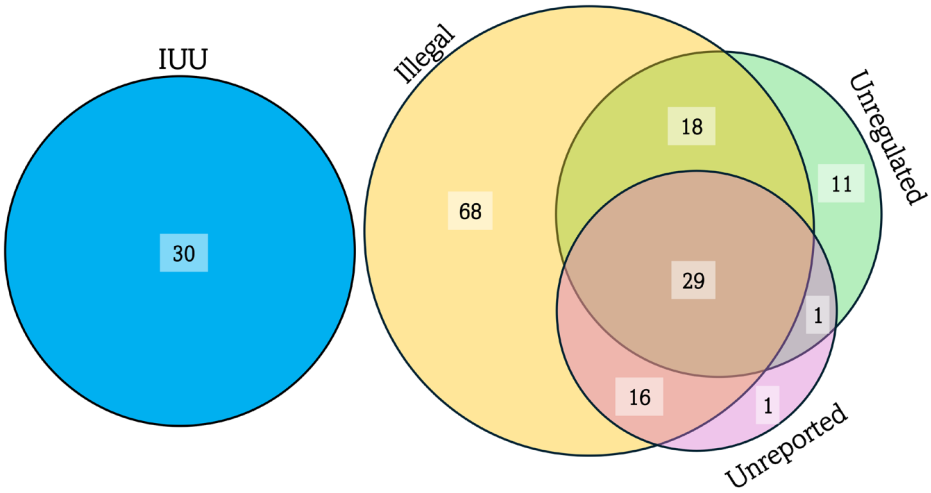

FIGURE 5 | Venn diagram of IUU fishing components amongst reviewed articles ($n = 174$). Circles denote articles focused on illegal, unreported or unregulated fishing, with intersections indicating studies that covered multiple components. The independent IUU circle represents articles in which the primary component of focus was not apparent.

also identified unexpected gaps in the geographic coverage of research, particularly in some of the most at-risk locations. Moreover, we noted frequent conceptual blurring across fishery scales and IUU components (Table 4). These patterns point to a high-level and often conflated framing of IUU fishing, which risks oversimplifying a complex issue. Although research appears to be becoming more inclusive and more geographically widespread, our findings reveal an overly narrow and macro-level conception of IUU fishing, which may not provide contextualised and relevant insights for management, underlining the need for refocused research priorities.

4.1 | Biases in the IUU Fishing Research

We found a substantial concentration of first authorship from high-income countries, often with low IUU risk, throughout Asia, Europe, North America and Oceania. Like other conservation science research, the IUU fishing literature exhibits a geographic bias in both the location of researchers and the focus of research (Di Marco et al. 2017; Miller et al. 2023; Mott and Clarke 2018). While we acknowledge that researchers lacking a local affiliation do not necessarily mean they are not from or affiliated with other, potentially more vulnerable countries, high-income, lower-risk countries appear to dominate the literature. Thus, while researchers affiliated with institutions where they conduct their studies are often included in research, this could potentially sideline locally led and contextually relevant perspectives from countries that are more heavily impacted by IUU fishing.

Research tended to focus most often on the Western Pacific Ocean, which primarily includes countries of East and Southeast Asia, as well as Oceania. East Asia and the Pacific are the largest-producing region for global capture fisheries, contributing over 36 million metric tons of fish in 2022 (World Bank Group 2025). Moreover, the Central Indo-Pacific region is regarded as one of, if not the most, biologically rich regions in the world with the Coral Triangle (the waters around Indonesia, Malaysia, Papua New Guinea, the Philippines, the Solomon Islands and Timor-Leste) being a global marine biodiversity hotspot that acts as a significant source of livelihood for over 120 million people (Cabral et al. 2012; Förderer et al. 2018; Miller et al. 2018; NOAA Coral Reef Conservation Programme 2020). With the Western Pacific Ocean being identified as one of the most at-risk ocean basins, the focus on this region appears justified (Macfadyen and Hosch 2023).

However, based on our findings, IUU fishing research in other vulnerable parts of the globe remains limited. For example, the West Indian Ocean, which is bordered by countries in East Africa, the Middle East and South Asia is also highly at-risk (Macfadyen and Hosch 2023). Yet only 10% of the literature focused on this region, compared to 46% for the Western Pacific. Moreover, East Asia and Southeast Asia contributed 25% of first-authored papers, and Oceania contributed 12%. In contrast, East Africa, the Middle East and South Asia contributed only 6%. Similar underrepresentation was also highlighted in relation to the Mediterranean and the Black Sea, as well as the Western Atlantic Ocean, in terms of specific responsibilities. Thus, while the geographic distribution of research and first-authorship countries has expanded over the last 25 years, this expansion has primarily been confined to Asia and the Western Pacific.

As hypothesised, LSFs and illegal fishing activity were the primary focuses of most of the literature reviewed, likely reflecting the origins of the IUU fishing concept and its enforcement-centric framing (CCAMLR 1997; Edeson 2001; FAO 2001). Generally speaking, SSFs do not often align with the traditional IUU fishing framework (Song et al. 2020; Temple et al. 2022), which may explain the regional gaps previously highlighted, particularly the limited attention to the West Indian Ocean. While there is substantial heterogeneity and the definition of small and large-scale fisheries varies across diverse contexts, this region is highly dependent on SSFs (Smith and Basurto 2019; Zeller et al. 2023). The limited focus on SSFs in comparison to LSFs in the IUU fishing literature may be interpreted as positive, reflecting the recognition that the IUU fishing terminology is not suitable for all scales. While we identified an increase in research regarding SSFs over time, we noted that this often focused on the impact of LSFs on SSFs or articles that highlighted the differences in, for example, socioeconomic status and regulatory frameworks

TABLE 4 | Summary of results, management implications and recommendations for future research.

Category	Hypothesis	Hypothesis evaluation	Result	Management implication	Recommendation
Geographic distribution	Most publications will originate from high-income institutions of the Global North.	Supported	Despite lower-income countries often being most at risk of IUU fishing (Macfadyen and Hosch 2023), most publications (72%) originated from high-income institutions.	Locally led research in countries at high risk of IUU fishing can enhance the relevance of research (Hobaiter et al. 2021; Utset 2024).	Prioritise research led by experts based in regions most affected by IUU fishing.
	The research will primarily focus on areas perceived to be most at risk of IUU fishing, specifically the Western Pacific and the West Indian Ocean.	Partially supported	While the Western Pacific and the West Indian Ocean are both highlighted as the most at-risk ocean basins (Macfadyen and Hosch 2023), the West Indian Ocean was comparatively underrepresented in the literature.	A geographic gap in research exists regarding areas vulnerable to IUU fishing, which undermines the ability to respond effectively.	Prioritise research in high-risk IUU fishing areas that are currently underrepresented in the literature, including the West Indian Ocean.
Disciplinary focus	The research will primarily emanate from the natural sciences, with a limited consideration of the social sciences.	Refuted	Most research on IUU fishing has been viewed through a social science lens (51%); of this, 76% has been published in law-focused journals.	Fisheries operate in unique socio-ecological systems and, as such, also require an increased understanding of human dimensions and insights into what drives behaviour (Battista et al. 2018; Bergseth et al. 2023).	Prioritise the use of behavioural science to increase understanding of the drivers of fishing activity.
Fishery scale	The research will focus primarily on large-scale, industrial fleets.	Supported with emergent findings	When distinguishable, research has focused more on large-scale (89%) versus small-scale (49%) fisheries. However, distinguishing between scales was often challenging.	The conflation of diverse fisheries into a single homogeneous scale and a lack of distinction between fisheries and scales can result in ineffective and inequitable management (Chevallier et al. 2021; Song et al. 2020).	Enhance research on small-scale fisheries, with a greater focus on appropriate contextual framing and more precise distinctions between fishery scales.

(Continues)

TABLE 4 | (Continued)

Category	Hypothesis	Hypothesis evaluation	Result	Management implication	Recommendation
IUU components	The literature will conflate the different terms of IUU fishing into one overarching entity, favouring illegal fishing over the unreported and unregulated fishing components.	Supported	When distinguishable, the literature primarily focused on illegal fishing (91%) rather than unreported (33%) and unregulated (41%) fishing. However, distinguishing between the often-conflated components was often challenging.	IUU fishing is a three-component fishing activity that spans spatiotemporal scales, requiring separate and targeted management (Serdy 2011).	Increase research on unreported and unregulated fishing, with more precise distinctions between the three components.
Temporal trends	The literature will become more inclusive with time.	Supported	The literature has become more widespread over time; however, mainly in the Asia-Pacific region.	While this highlights a positive trend, further inclusivity is needed to enhance context-relevant research in underrepresented locations.	Continue to foster inclusivity to foster more contextually relevant research.

between fishery scales, acknowledging the inapplicability of the term or portions of it, to SSFs. However, much of the literature anchored in large-scale illegal fishing activity may also systematically underrepresent SSF-dominated regions and their role in perpetuating illegal, unreported and unregulated fishing.

The lack of inclusion and integration of the social sciences and human-oriented disciplines in conservation research has been frequently noted within the academic literature (Bennett et al. 2017; Zheng et al. 2021). This has also been noted within fisheries management (Booth et al. 2019; Gupta et al. 2022; Roberts et al. 2024). However, we found that the social sciences were the primary discipline through which the IUU fishing research was viewed. This is, in part, promising, as fisheries are part of complex socio-ecological systems, which require an understanding of how contextual dimensions influence human activities (Bergseth et al. 2023; Oyanedel et al. 2020). However, while the social sciences were the primary discipline, most studies were published in law-focused journals. While this is not surprising, given the legal frameworks in which the concept of IUU emerged and is embedded, in contrast, there were very few studies in behaviour-focused journals, which are needed to better understand and contextualise the underlying drivers of (non)-compliance.

4.2 | Conflated Characteristics and Ambiguity

The high-level nature of much of the IUU fishing research was noticeable. Much of the research we reviewed lacked a clear geographic focus, inhibiting the generation of context-specific insights. Moreover, many of our conclusions were often drawn from an informed, yet subjective and interpretive process based upon previous expertise and experience. In the case of fishery scale, this was most apparent with LSFs, which were often treated as the implied default, while SSFs were typically described using more detailed specifications. This lack of specification has the capacity to lead to incorrect assumptions that findings apply to all fishery scales, resulting in misleading conclusions and poor policy outcomes. Moreover, we noted a range of misconceptions, including the interchangeable use of 'large-scale' and 'commercial', which excludes SSFs from discussions of commercial fishing. While several articles clearly described a specific fishery of focus (e.g., vessel size, gear used and species of focus), a lack of global, universal and standardised definitions (Smith and Basurto 2019) often limited our ability to categorise articles as being related to a particular scale. Similarly, the three components of IUU fishing—illegal, unreported and unregulated—were frequently conflated, with unreported and unregulated fishing activities rarely being identified independently of illegal fishing activities. This ambiguity was further exemplified by the lack of inter-rater reliability tested through the Cohen's kappa and Jaccard similarity tests. Thus, a concrete and precise understanding of the specific fishing activity(ies) being discussed and the issues they represented was often unclear and challenging to deduce.

4.3 | Mechanisms to Enhance Contextual Relevance

The gaps and biases that characterise current IUU fishing research, as well as the lack of conceptual clarity presented,

undermine the ability to inform management and, thus, maximise impact. In line with previous conclusions, the available fisheries data within lower-income countries is limited and there is a lack of empirical data, which constrains our ability to understand and respond to local realities (Samy-Kamal and Teixeira 2023). Data collection remains challenging due to limited resources, institutional obstacles, and logistical constraints (Basurto et al. 2025; Pauly and Charles 2015), as well as biases surrounding the collection of data on illegal and sensitive behaviours (Brittain et al. 2020; Ibbett et al. 2021). As a result, decisions are often made based on assumptions derived from irrelevant and incompatible data sources (Kolding et al. 2014; Purcell and Pomeroy 2015). A collective and interdisciplinary effort is therefore needed to increase data collection efforts in vulnerable, data-poor regions worldwide, through both ecological fisheries monitoring and an understanding of fishers' narratives (Patil et al. 2025; Phillipson and Symes 2013).

Moreover, while our results suggest that IUU fishing research frequently incorporates the social sciences, we emphasise the potential need to prioritise sciences that specifically evaluate human behaviour. This may include the cultural sciences, psychology and anthropology, which were found to be limited in our analysis. The unpredictability of human behaviour represents one of the most significant sources of uncertainty in fisheries management (Fulton et al. 2011). As a result, understanding the motivational factors behind fisher and institutional behaviour is critical for developing and implementing practical fisheries management (Boonstra et al. 2017; Oyanedel et al. 2020). Increased behavioural sciences research relating to the distinct dimensions of illegal fishing, unreported fishing and unregulated fishing can, therefore, help unpack what encourages human action and decision-making, fostering insight into more effective management approaches (Balmford et al. 2021; Nielsen et al. 2021).

Lastly, we emphasise the need to enhance the clarity and discreteness of current research. A generalised and macro-level conception of IUU fishing, coupled with conflation across fishery scales and distinct fishing activities, undermines relevant and context-specific management (Bartlett et al. 2025; Serdy 2011; Song et al. 2020). It also homogenises the problems and solutions across discrete spatiotemporal scales. We suggest that future research could disaggregate the three components into their three constituent parts—illegal, unreported and unregulated—and focus on specific fisheries through a problem-oriented approach (Bartlett et al. 2025; Booth et al. 2021; Goldstein 1979). This could help develop comprehensive, targeted, solutions-focused interventions as opposed to top-down regulatory approaches that overlook the locally relevant contexts in which fisheries occur (Lemieux and Pickles 2020).

5 | Conclusion

We conducted a scoping review focused on how IUU fishing is framed and distributed in the scholarly literature. Based on our findings, we recommend closing the geographic gap in research output and focus related to some of the areas most vulnerable to IUU fishing. We also highlight the potential need to focus additional research efforts on the unreported and unregulated aspects of fishing activity and address detrimental fishing activities within the context of SSFs. Lastly, there appears to be a lack of contextually grounded research and, as a result, the academic literature on IUU fishing may not provide the evidence needed for effective management. To disentangle the bias and often abstract characteristics presented in the literature, we suggest placing on-the-ground research at the centre of IUU fishing research priorities. This could support more precise and solutions-focused research, with a prioritisation of the neglected elements of IUU fishing and actionable insights to foster equitable and well-managed fisheries.

Acknowledgements

B.B. thanks the Theodore Gordon Flyfishers Inc. Founders Fund Scholarship for their financial assistance. MIA thanks Fondecyt 3220110, ANID PIA/BASAL AFB240003 and Millennium Science Initiative Programme ICN 2019–015 for their support.

Funding

No direct funding was received for this specific project.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that supports the findings of this study are available in the Supporting Information of this article.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** faf70047-sup-0001-SupplementaryMaterial 1.docx. **Data S2:** faf70047-sup-0002-SupplementaryMaterial 2.xlsx. **Data S3:** faf70047-sup-0003-SupplementaryMaterial 3.docx.