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A Biodiversity Literacy: A Systematic Literature Review of Conceptual Frameworks, Educational Strategies, and Policy Implications (2015-2025)

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ABSTRACT

As reported in our data, global biodiversity is in crisis due to ecosystem changes caused by human activities over thousands of years. This crisis threatens the achievement of sustainable development, making biodiversity literacy, which encompasses essential skills in conservation, a key component of sustainable programs. This article presents a systematic literature review (SLR) aimed at identifying aspects and concepts focused on approaches in educational practice and policy implications to support biodiversity literacy, thereby limiting the selection to articles focused on efforts to promote biodiversity literacy. The search was conducted in the Scopus database to find relevant articles published between 2015 and 2025. Articles were included and excluded based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting standards, followed by an independent double-anonymized analysis process. From the search results, 302 articles were identified, 32 of which met the analysis criteria. The review findings indicate that biodiversity literacy encompasses knowledge, attitude, awareness, and biodiversity action. The findings also reveal variations in the conceptualization of biodiversity literacy among different researchers.

1. INTRODUCTION

The urgency of biodiversity as a key agenda for sustainable development is no longer matched by the health of biodiversity [1]. Several findings report that the biodiversity crisis is increasing yearly, making it an important issue affecting ecosystems worldwide [2]. This crisis is caused by human activities that are harmful to the environment, such as illegal hunting, activities that cause pollution, and those that contribute to climate change, all of which significantly impact biodiversity at all levels [3], leading to a decline in biodiversity far exceeding natural rates [4, 5]. Furthermore, this issue has prevented biodiversity from being fully integrated into sustainable development [6-9]. As a result, research on this topic remains a developing focus within Society [10], education [11] and various global organizations addressing these aspects [12].

The issue of biodiversity requires deep public knowledge [13], because various forms of damage causing biodiversity loss are caused by a lack of knowledge, awareness, and conservation actions on the part of the public [14]. The majority of countries in the world assume that human actions have destroyed ecosystems and eliminated the Earth's biodiversity [15, 16]. Based on this, the indicators for achieving biodiversity targets are far from what is expected [17]. In this situation, biodiversity literacy is key to the biodiversity issue, encompassing understanding, awareness, and actions regarding Earth's diversity [18, 19]. The relationship between these three aspects is based on the Theory of Planned Behavior (TPB) as the foundation for environmental behavior change, which explains that individual attitudes and knowledge, along with subjective norm factors (social influence), can help change individual actions toward biodiversity conservation or pro-conservation behavior [20]. This theory explains that their knowledge and awareness of conservation greatly influence individual participation in conservation [21]. Therefore, these skills are essential in empowering and preparing individuals as decision makers in overcoming environmental challenges [22]. Individuals with good biodiversity literacy can also build relationships with particular species [23, 24]. The relationship between the three aspects of biodiversity literacy that play a role in sustainable conservation can be seen in Figure 1.

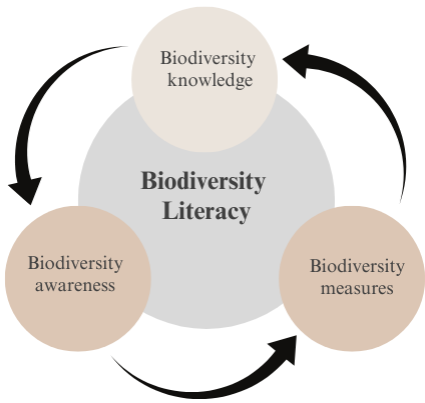

Figure 1. The relevance of the biodiversity literacy aspect

The urgency of biodiversity literacy necessitates classifying concepts and their constituent aspects, as there are still frequent limitations on concepts related to this issue [25].

RQ1	What aspects of biodiversity literacy were identified from the selected articles?
RQ2	How do experts conceptualize biodiversity literacy in the context of educational strategies?
RQ3	How do experts conceptualize biodiversity literacy policy implications?

This review focuses on research articles that reveal aspects and concepts of biodiversity literacy and explore other aspects that have not been widely discussed, providing new insights and a framework for further research. This review is also expected to provide theoretical benefits in understanding the concept of biodiversity literacy through the analysis of published articles in the Scopus database, particularly within educational programs, thereby increasing user and public awareness of the importance of preserving biodiversity to achieve sustainable development.

2. METHODOLOGY

This study is a systematic literature review (SLR), which involves collecting and analyzing data from various existing studies to provide a comprehensive overview of a particular topic [26]. The following is an overview of the research stages:

2.1 Research process

The research process is based on a detailed flow diagram for systematic reviews [27]. To answer the research questions, an initial search was conducted to identify relevant articles, validate the research idea, and comprehensively analyze the appropriate articles [28]. The research process is described in Figure 2.

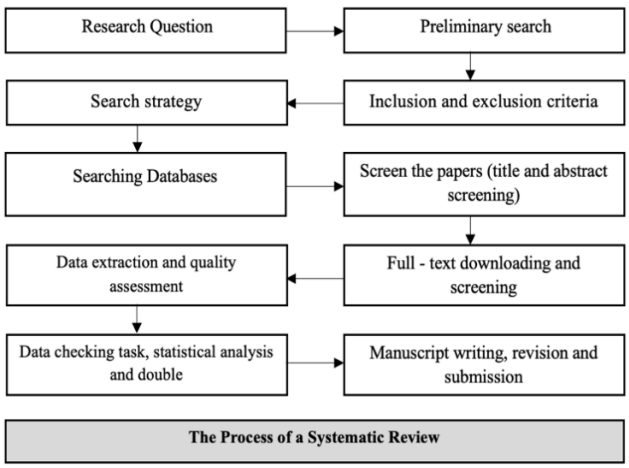

Figure 2. The process of the systematic review

2.2 Research and keywords

The article search was conducted based on the Boolean search strategy [29], using the words "Literacy" and "Biodiversity" in the Scopus data search menu. The data obtained was stored in RIS and CSV formats, which were then synchronized with the Mendeley application. The history of articles searched in Scopus is as follows: TITLE-ABS-KEY (literacy AND biodiversity) AND PUBYEAR > 2014 AND PUBYEAR < 2026 AND (LIMIT-TO (SUBJAREA, "ENVI")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (OA, "all")).

2.3 Eligibility criteria

Articles selected based on study criteria and research themes are described in Figure 3.

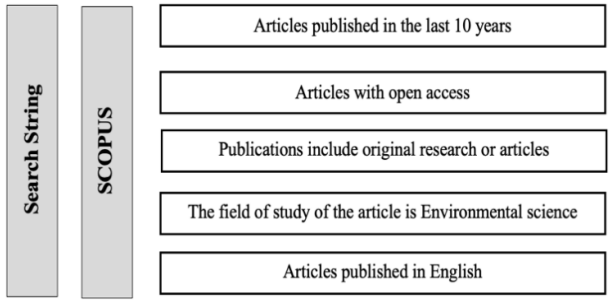

Figure 3. Search string

2.4 Database filtering

The articles were included and excluded based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting standards, which reflect advances in the methodology and terminology of systematic reviews [30]. These are widely recognized as appropriate guidelines for reporting systematic reviews [31].

Figure 4 shows that the initial "biodiversity literacy" search yielded 302 Scopus documents. We then applied a restriction based on the publication year criteria within the last 10 years (2015–2025), resulting in 238 articles and 64 excluded articles. This study focused on Environmental Science, resulting in 109 articles, with 129 articles excluded from fields such as Social Science, Engineering, Psychology, Medicine, Computer Science, Health Professions, and others. Next, the selection criteria were research articles, resulting in 76 articles, and 33 were excluded. We excluded conference papers, reviews, books, and book chapters. Finally, the selection criteria were English-language articles, resulting in 76 articles. The following criterion was open-access articles, as we needed to access the full articles in full-paper format, resulting in 52 articles and 24 articles excluded, excluding gold, green, hybrid gold, and bronze articles. Based on the criteria set previously and through a rigorous review process of the entire article content (full text review), the number of articles relevant to the research theme was 32.

In the inclusion or exclusion process, we use several steps, including translating articles into Indonesian to facilitate understanding of all parts of the article. This process is carried out through an independent double-anonymized process. Independent assessors code the data without knowing the results given by other assessors. Each evaluator selects articles based on pre-established criteria (topic relevance, methodological quality, and contribution to the research objectives). This process ensures that individual bias does not influence article selection outcomes, resulting in more objective and accurate decisions.

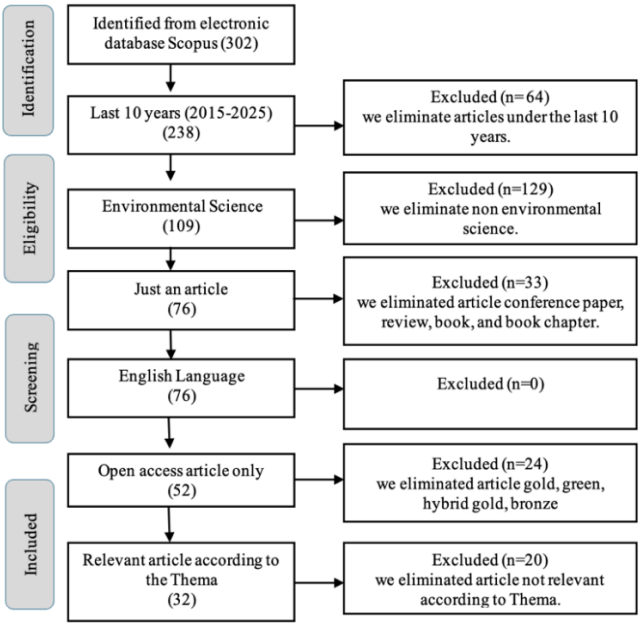

Figure 4. The PRISMA flow chart

Next, manual coding was performed to classify selected articles based on three main aspects of biodiversity literacy: knowledge, attitude, and behavior. **Knowledge aspect coding** was performed if the article provided information about species knowledge (such as wildlife, trees, and invertebrates), ecological knowledge (relationships between living things in ecosystems), and knowledge about conservation, biodiversity loss, and anthropogenic threats to marine life. **Coding for the awareness aspect** includes views or awareness of the importance of biodiversity conservation (such as articles discussing attitudes toward endangered species, ecological awareness, and attitudes toward environmental policies). **Coding for the measures aspect** relates to concrete actions taken to protect biodiversity (such as articles discussing actions to protect endangered species or participation in biodiversity conservation).

3. RESULT

3.1 Distribution of articles by year, journal, and country

The number of relevant articles identified and analyzed in this review was 32 articles discussing biodiversity literacy from 2015 to 2025. The number of publications on biodiversity literacy fluctuated each year. From 2015 to 2018, it was evident that biodiversity literacy had not received significant attention, with only two articles published during that period. However, 2019 marked the beginning of consistent articles on biodiversity literacy, with three articles published and indexed in Scopus. In 2020, there were four articles, in 2021, there were three articles, and in 2022, there was a significant increase in research in this field, with nine articles published. In 2023, there were five articles, and in 2024 and 2025, there were three articles each, with the possibility of further research continuing until the end of those years. The selected articles were published in various journals, comprising 19 journals, predominantly those focusing on sustainability and conservation.

The graph in Figure 5 shows the distribution of articles by year, namely the publication of articles from 2015 to 2025, with the number of articles published fluctuating throughout the years. A significant increase in articles published occurred in 2019, with the highest number of publications in 2022, followed by the following year. This graph illustrates that research on biodiversity topics is increasingly in demand, directly proportional to biodiversity issues.

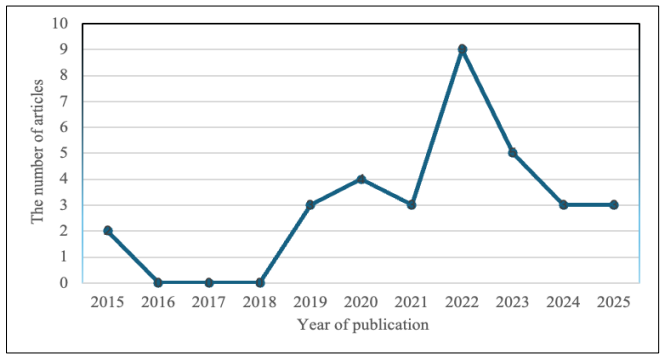

Figure 5. Distribution of articles by years

Figure 6 illustrates the distribution of articles based on publication source. Nineteen journals contributed to this topic, with the most articles published in the journal Sustainability, followed by the Journal of the Society for Conservation Biology and Ecology and Evolution.

In addition to considerations of publication year and journal type, the distribution of articles based on country of origin is essential in providing information related to global biodiversity research, as shown in Table 1.

Table 1. Distribution of the article by country

No.	Continent	Country	n
1	Europe	Netherlands	1
		United Kingdom	2
		Italy	1
		Switzerland	1
		Finland	1
		Portugal	1
		Germany	1
		Greece	3
		Spain	2
2	Africa	Nigeria	1
		Ghana	1
3	America	United States of America	3
		Brazil	1
		California	1
		Canada	1
		Colorado	1
4	Asia	India	1
		Iran	1
		China	2
		Taiwan	1
		Hongkong	1
5	Australian-Oceania	Australia	4

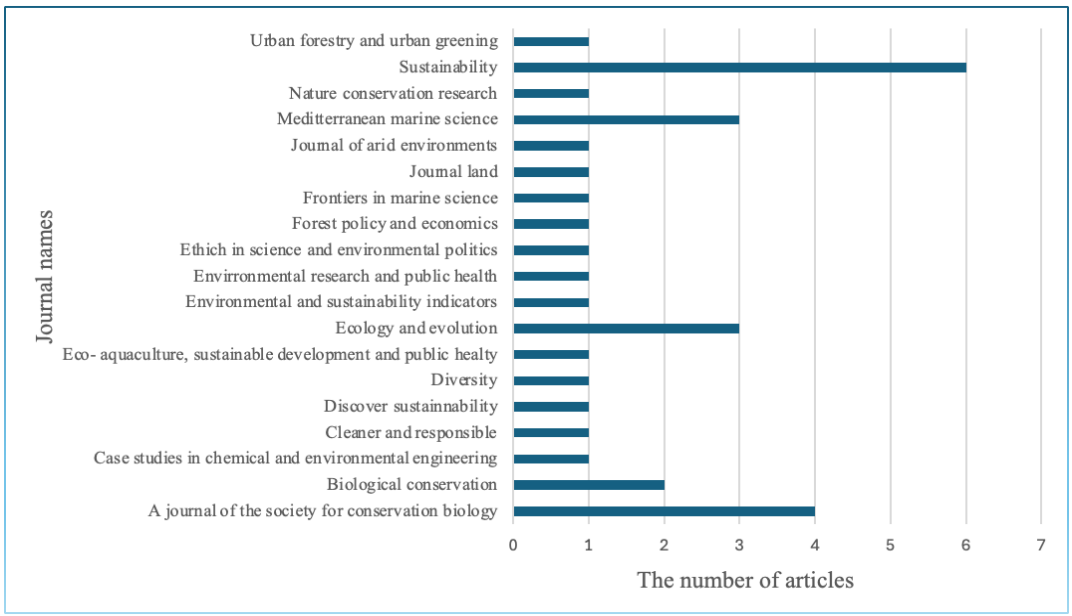

Figure 6. Distribution article by source

The graph in Figure 7 shows that most countries contributing to research on biodiversity literacy are from Europe, with 10 countries, followed by the Americas and Asia, with five countries each. Countries from Africa and Australia also contribute to related research. This distribution shows that this topic is getting attention from different regions, although it's not evenly spread globally. Most European publications are spread across ten countries (the Netherlands, the United Kingdom, Italy, Switzerland, Finland, Portugal, Germany, Greece, Spain, and Switzerland) with 13 articles. This is followed by the Americas with 7 articles spread across five countries (the United States, Brazil, California, Canada, and Colorado). Next is the Asian continent with 6 publications spread across 5 countries (India, Iran, China, Taiwan, and Hong Kong). The African continent has 2 countries (Nigeria and Ghana), each with one publication, and the Australian continent has 4 publications. This data indicates that research on biodiversity literacy has spread across all continents, but the quantity remains relatively low.

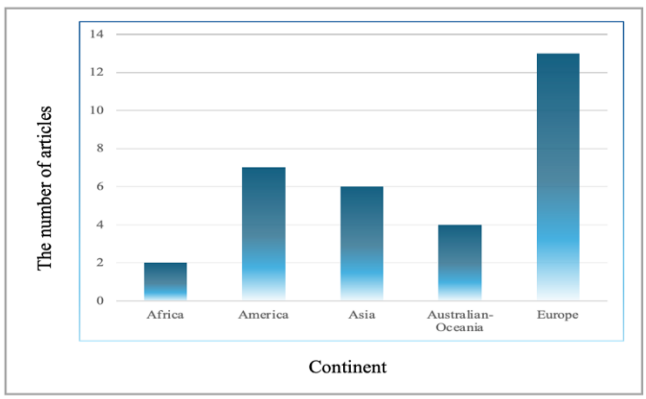

Figure 7. Distribution article by continent

3.2 Author affiliation

Mapping articles based on the relationship between authors is also necessary to obtain an overview of the collaboration between authors in each article. The relationship between the authors of the articles reviewed can be seen in Figure 8. The illustration shows a network of collaboration between authors. Each point represents an individual, and the lines connecting the points indicate a relationship or collaboration between authors. It can be seen that the collaboration between authors is balanced, as evidenced by the even distribution of connecting lines between one author and another. This indicates that all authors share the same research interests or focus.

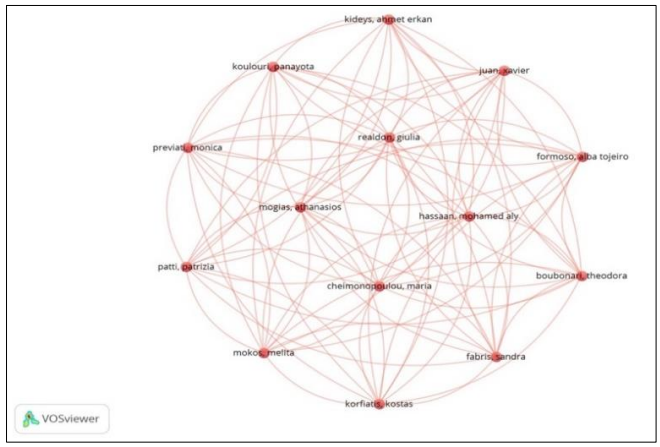

Figure 8. Author affiliation

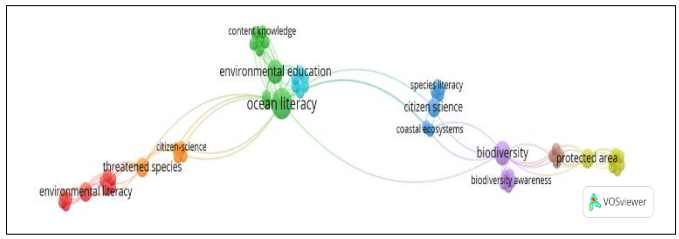

Figure 9. Simultaneous appearance of the keyword VOSviewer

The keywords most frequently used by authors in articles, as shown in Figure 9, are ocean literacy, environmental

education, biodiversity, threatened species, and environmental literacy. These interrelated keywords represent essential aspects of biodiversity literacy contributing to sustainable environmental conservation. Environmental education is an important aspect that bridges each keyword, serving as a medium for developing aspects of biodiversity literacy.

3.3 Characteristics of studies included

The included studies illustrate that research on biodiversity literacy has been conducted extensively using various methods to explore the concept more broadly. These studies are grouped according to the type of method used to provide a more comprehensive overview. Figure 10 shows that most studies used a quantitative approach (44%), focusing on numerical measurements and presenting findings based on figures and statistics, describing how biodiversity literacy is understood among various groups. Qualitative approaches account for 37%, presenting a deeper understanding of the context and perspectives surrounding biodiversity literacy phenomena and identifying issues and challenges related to biodiversity literacy. Meanwhile, mixed approaches account for 19%, presenting a more comprehensive and holistic concept of biodiversity literacy.

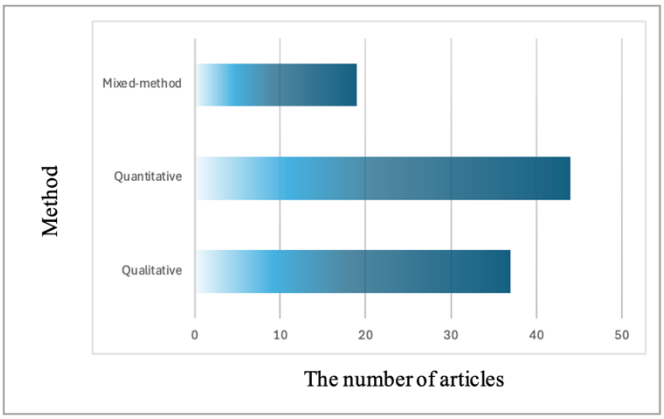

Figure 10. Types of research studies included

3.4 Aspects of the study included

Table 2 illustrates that researchers divide biodiversity literacy into three aspects, namely knowledge, awareness, and behavior. Articles discussing the three aspects of biodiversity literacy are distributed across various combinations, including 5 articles discussing the aspects of knowledge and awareness, 6 articles discussing the aspects of knowledge and behavior, 3 articles discussing the aspects of awareness and behavior, and 2 articles discussing all three aspects of biodiversity literacy simultaneously.

Table 2. Review of included study aspects

No.	Aspects of Biodiversity Literacy	References
1	Knowledge of biodiversity	[32-56]
2	Biodiversity awareness	[34, 35, 43, 44, 52, 57-60]
3	Biodiversity measures	[36, 39, 44, 45, 51, 52]

Figure 11 shows the developing trends in the three aspects of biodiversity literacy. Between 2015 and 2018, publications were minimal, with only articles discussing the knowledge aspect being published. In 2019, the number of articles began to increase, with two articles discussing the knowledge aspect and one discussing the awareness and action aspects. In 2020, the knowledge aspect dominated with four articles. The peak in publications occurred in 2022, with 7 articles discussing knowledge, 3 on awareness, and one on action. Although the number of articles decreased in subsequent years, publications focused on the knowledge aspect, while the awareness and action aspects showed variations.

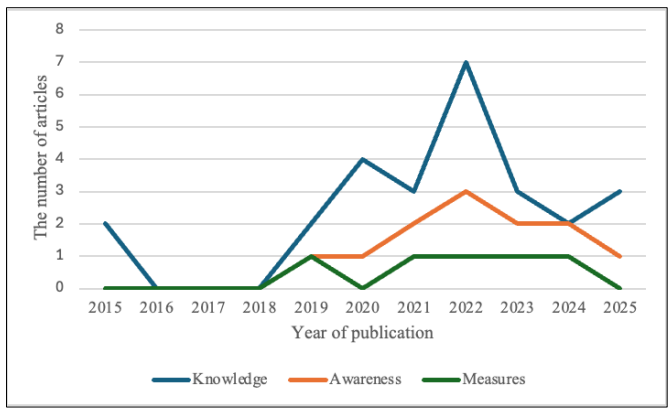

Figure 11. Development of biodiversity literacy aspects

3.5 Included study concepts

Based on a review of 32 selected articles, scientists conceptualized biodiversity literacy into several related studies. This concept is an essential part of comprehensively discussing aspects of species literacy, ecological literacy, conservation literacy, marine literacy, and climate literacy. As described in Table 3.

Table 3. Review of the study concept included

Study	Concept	Education Strategy	Policy Implications	Number of Studies
Species literacy	The concept of biodiversity literacy is conceptualized into several aspects that include species literacy, such as attitudes toward animals or wildlife and protected area networks, as well as sociodemographic factors that threaten species extinction [38, 57, 60]. Understanding and appreciation of totemic animals [44].	Efforts to introduce species literacy can be carried out through environmental education about the relationship between humans and species [60], such as birds [57]. This can be implemented through public education, such as workshops [38, 39, 43]. This strategy can also be implemented through the learning process in	Citizen science is a policy that empowers local communities in wildlife conservation [39, 43, 60]. Other policies, such as the provision of protected areas [38] and regulations on pesticide use, also play a role in preserving species. In addition, this policy also needs to be implemented in schools, for example, through	10

Study	Concept	Education Strategy	Policy Implications	Number of Studies
	Understanding, attitudes, and actions toward native species of a region [41], such as protection of land crabs [39], knowledge of insects that create "ontomo literate" [61], the ability to identify birds and butterflies' [43] knowledge of tree diversity [55], and further discussion of understanding invertebrate animals that provide evolutionary traces [46].	scyls, for example, by identifying plants [41], presenting local knowledge about tetomik animals [44], and studying insects through outdoor learning [61]. The concept of species can also be used as a tool to trace evolutionary pathways through phylogenetic trees (tree thinking) [46]. Making schools green areas is also essential in maintaining species conservation [55].	learning to identify species [41], and the use of tree vegetation in school yards [55].	
Ecological literacy	Biodiversity literacy encompasses ecological literacy as a natural system, namely, how living things are interconnected [35]. Awareness and attitudes towards ecosystem services [59], including the impact of agricultural land use on biodiversity distribution [32], knowledge about urban biodiversity decline [62], knowledge about ecosystem restoration [63], and further discussion on environmental policy [58], namely stakeholder participation in maintaining the three pillars of environmental sustainability (forest quality, public green spaces, and biodiversity) [34], [36].	Ecological literacy can be developed through environmental education [36], such as conservation area outreach [58], environmentally friendly agricultural practices [32], and environmental literacy training (ELT) [35], to address the challenges of pollution and climate change [36]. These efforts can be implemented by applying project-based learning in schools [62] and a multidisciplinary learning approach [63].	Policies supporting ecological literacy include protected areas [58, 63], land ownership [32], mining land management systems [35], and green environmental policies [36]. In addition, maintaining the three pillars of environment, economy, and Society [34], including involving local communities in environmental policies [59].	8
Conservation literacy	Conservation literacy is an aspect of this study that refers to community knowledge related to biodiversity conservation issues [56], including knowledge about the conservation of animals on the red list of endangered species [40], understanding of the relationship between biodiversity conservation and human health [45], as well as community involvement in conservation campaigns and land management [37], such as scientific activities that support the conservation of tropical regions [54].	Conservation literacy can be introduced through environmental education [37], through conservation literacy promotion strategies [56], and through ecological health literacy to the public through educational interventions [45]. This strategy can also be implemented through training residents to connect local knowledge with scientific studies [54]. In addition, conservation project strategies for species listed on the Red List through learning are also an effort to develop conservation literacy [40].	Policies to support conservation literacy can be implemented by providing infrastructure such as national parks [37], National Biodiversity Policies and Action Plans (NBSAP) [40], local community involvement [54], and community organizations [56]. Integrating ecosystem health with human health in public policy [45].	6
Marine literacy	Marine literacy encompasses the reciprocal relationship between humans and marine life [53], including knowledge of the sea and anthropogenic threats [49], the importance of preserving marine biodiversity and ecosystems [51], [52], and the involvement of indigenous communities in marine life conservation [50].	Marine literacy in this study can be introduced through citizen science (CS) projects [49], marine education programs (Blue School) [50], integration of marine issues into educational program curricula [51], such as the use of game-based learning strategies [53]. These efforts can also be carried out through training that improves marine literacy [52].	Citizen science programs such as red fish (an endangered marine species) [49] and marine biodiversity monitoring [52]. empowerment of environmental [50], and government support for the promotion of marine literacy and support for marine ecosystem sustainability [51].	5
Climate literacy	Widely discusses the impact of climate change on biodiversity [42], including Urban Green Infrastructure (UGI) and carbon sequestration and storage affecting biodiversity and human well-being [33], as well as efforts to conserve land biodiversity to prevent climate change that affects human health [48].	Introducing climate literacy can be done through training programs [48], such as Urban Green Infrastructure (UGI) training [33]. These efforts can also be carried out through interdisciplinary climate education [42].	Efforts to enforce climate literacy must be supported by interdisciplinary climate education [42], greening policies [33], and the involvement of governments and non-governmental organizations in mitigating the impacts of climate change [48].	3

4. DISCUSSION

The articles reviewed focused on the concept and aspects of biodiversity literacy. The author conducted a systematic literature review to identify articles from various related studies. This study is expected to provide theoretical benefits in broadly understanding the aspects and concepts of biodiversity literacy. The research was conducted using the Scopus database, searching for relevant articles published between 2015 and 2025. Out of the 302 articles found, 32 met the analysis criteria. Based on the systematic literature review conducted shows that research on this topic over the past 10 years has experienced fluctuating changes. This indicates that the topic has received significant attention from various circles, leading to rapid development in related research over the past few decades [64]. Biodiversity issues dominate research on this topic, a finding consistent with Our World in Data, which explains that biodiversity has been in crisis year after year. Even though there has been an increase in policies addressing the biodiversity crisis, the trend toward improvement in biodiversity conditions has not yet been fully reflected [65].

The trend of articles on biodiversity literacy increased in 2009 and remained consistent in subsequent years. These articles were published in various journals relevant to the topic, with sustainability journals dominating. The articles were distributed across various countries spanning five continents. Europe contributed the most articles. Europe has developed multinational conservation efforts, including the Natura 2000 network of protected sites [66]. Research on Natura 2000 focuses on ecological conservation aspects [67]. Additionally, this continent has conventions that have protected natural heritage for over 30 years [68], such as flora, fauna, and species habitats across the European region [69]. Thus, this aspect has become one of the driving factors for research in the region to assess the effectiveness of these programs. The collaboration and balance among authors in related research indicate that no single researcher dominates in this case. Furthermore, this analysis identified the most frequently occurring keywords in the articles. "Environmental education" is a frequently occurring keyword and serves as a link to other keywords. This aspect is crucial in supporting biodiversity literacy [70].

The review results show that biodiversity literacy encompasses three aspects, namely knowledge, awareness, and action regarding biodiversity. This study aligns with the concept of biodiversity literacy, which describes that the fundamental aspects of its development generally include these three aspects [71]. This competency plays a role in enabling individuals to understand and appreciate biodiversity and its role in ecosystem balance [72], including the diversity of life on Earth, such as plants, animals, and ecosystems. This includes human activities that impact biodiversity and the importance of its conservation for planetary health and human well-being [73]. This review also found variations in conceptualizing the topic among researchers. The findings highlight that scientists use biodiversity literacy as a foundation for understanding concepts such as species literacy, ecological literacy, conservation literacy, marine literacy, and climate literacy.

Based on the review conducted, the articles mainly discuss species literacy. 31% of the articles explain that species literacy is part of this topic. Articles discussing species literacy focus on endangered wildlife, highlighting the area and sociodemographic factors threatening their extinction, and studies on endemic species in a region, including totemic animals. Studies conducted on the selected articles indicate that there is still a gap in discussing species literacy as an effort to conserve biodiversity. This gap is concerning because it could undermine native biodiversity as a support for conservation [74]. Researchers are exploring various approaches, including environmental education, to address this issue. This strategy is essential in improving biodiversity literacy [75], which can address this gap [76]. Integrating species literacy studies into school curricula can reveal gaps in addressing biodiversity loss [77]. Various policies have also been implemented to support these efforts, such as citizen science, which can empower citizens to contribute to biodiversity conservation [78]. The provision of protected areas can preserve biodiversity. Protected areas are essential in preserving biodiversity and providing ecosystem services [79].

The relationship between ecological literacy and biodiversity literacy is multifaceted and interrelated [35]. This concept is considered urgent in the development of biodiversity literacy. In this study, 25% of articles discussing ecological literacy were part of biodiversity literacy. These articles discuss the relationship between living organisms and nature and the impact of land use on biodiversity distribution. Ecological literacy is essential for biodiversity conservation, encompassing an understanding of ecological and sustainable principles [80, 81]. A review of the articles indicates that efforts to develop ecological literacy can be carried out through environmental education programs. This strategy can be implemented through training or outreach activities involving local communities [82] and if the program is well-designed, it can significantly enhance knowledge, awareness, and action [83]. Empowering ecological literacy to support biodiversity literacy also needs to be implemented in schools. Appropriate learning approaches can enhance ecological understanding [84, 85]. Policies supporting these competencies are also outlined in this study, such as protected areas, land management systems, creating green environments, and involving local communities in conservation efforts. Community attitudes influence the optimization of these policies [86] and collaboration among relevant stakeholders [87].

Biodiversity literacy also includes conservation literacy, with 19% of articles in this study discussing conservation literacy. Many studies have explored the relationship between these two aspects. The interconnection between these two aspects is understood in the concept of biodiversity issues, which addresses endangered animals [88] and the role of conservation in the health of nature, including humans, thereby enhancing ecological stability [89]. Environmental education is crucial to empower conservation literacy through formal and non-formal channels [90]. Non-formal channels can be optimized through training residents on nature conservation to connect their local knowledge with scientific studies. In contrast, formal channels can be implemented through project-based learning on the conservation of animals listed on the Red List. Therefore, stakeholders play a key role in implementing policies that require precise, coherent, and integrated targets [91].

Marine literacy is defined as an understanding of the relationship between the sea and humans. Based on this study, 16% of articles examined marine literacy as part of biodiversity literacy. This concept encompasses communities' knowledge, awareness, and behaviour regarding the

importance of preserving marine ecosystems [92], through reciprocal relationships. These competencies can be developed through marine education programs by integrating marine issues into school curricula. This can address gaps in the formal education system [93]. Additionally, community-based monitoring programs involving residents can support marine conservation efforts [94]. The involvement of community members and organizations is also crucial in safeguarding marine ecosystems. Empowering communities in scientific activities can foster a deeper understanding of marine ecosystems [95].

Biodiversity literacy also includes knowledge about the impact of climate change on biodiversity. In this study, 3 articles discuss the relationship between these two aspects, one of which highlights the knowledge gap, especially regarding the impact of climate change on biodiversity [42]. Therefore, a holistic and interdisciplinary approach is needed to improve public understanding, awareness, and participation in efforts to reduce the impact of climate change on biodiversity. One such approach is participatory, interdisciplinary, and impact-oriented climate education [96]. In addition, training and promotional activities on the impact of climate change on biodiversity can also foster a sense of responsibility among citizens [97]. Therefore, these efforts require optimal policies involving both government and non-government entities. The legal framework for protecting biodiversity from climate change is established through various international agreements, including the United Nations Framework Convention on Climate Change, the Kyoto Protocol, the Paris Agreement, and the Convention on Biological Diversity [98].

5. CONCLUSION

Studies on biodiversity literacy have shown significant progress in recent years. This progress is directly proportional to the increasing importance of biodiversity issues over time. Studies indicate that researchers examine aspects of biodiversity literacy, including knowledge, awareness, and biodiversity-related actions, through various studies. Additionally, researchers conceptualize biodiversity literacy as the foundation for developing aspects of species, ecological, conservation, marine, and climate literacy. Educational strategies to support biodiversity literacy can be optimized through environmental education, both through formal and non-formal channels. Policies to optimize these strategies must also be maximized through collaboration between the government, local communities, educational institutions, and civil society organizations.

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