A Future for the Inland Fish and Fisheries Hidden Within the Sustainable Development Goals

Vittoria L. Elliott [1,2]*, Abigail J. Lynch [3], Sui C. Phang [4†], Steven J. Cooke [5], Ian G. Cowx [6], Julie E. Claussen [7], James Dalton [8], William Darwall [9], Ian Harrison [10], Karen J. Murchie [11], E. Ashley Steel [12] and Gretchen L. Stokes [13]

[1]National Museum of Natural History, Smithsonian Institution, Washington, DC, United States, [2]WorldFish Center, CGIAR, Bayan Lepas, Malaysia, [3]U.S. Geological Survey, National Climate Adaptation Science Center, Reston, VA, United States, [4]Centre for Blue Governance Faculty of Business and Law, University of Portsmouth, Portsmouth, United Kingdom, [5]Department of Biology and Institute of Environmental and Interdisciplinary Science, Carleton University, Ottawa, ON, Canada, [6]Hull International Fisheries Institute, University of Hull, Hull, UK, [7]Fisheries Conservation Foundation, Champaign, IL, United States, [8]Global Water Programme, International Union for Conservation of Nature, Gland, Switzerland, [9]Freshwater Biodiversity Unit, International Union for Conservation of Nature, Gland, Switzerland, [10]Conservation International, Arlington, VA, United States, [11]Daniel P. Haerther Center for Conservation and Research, John G. Shedd Aquarium, Chicago, IL, United States, [12]School of Aquatic and Fisheries Sciences, College of the Environment, University of Washington, Seattle, WA, United States, [13]School of Natural Resources and Environment, University of Florida, Gainesville, FL, United States

The United Nations Sustainable Development Goals (SDGs) are a unifying call for change - guiding global actions at multiple levels of governance for a better planet and better lives. Consequently, achieving the "future we want" may be hindered by overlooking valuable natural resources and services that are not explicitly included in the SDGs. Not recognizing the direct, intrinsic value of some natural resources may threaten the sustainability of the services they provide and their contributions to the SDGs. Here, we use inland aquatic ecosystems, and the fish and fisheries therein, as an example to explore opportunities for recognition and inclusion of other natural resources that are missing from the SDGs. Key resources absent from the SDGs are less likely to be incorporated in global, national, and regional objectives, dialogues, and policies. We outline multiple potential pathways for better inclusion and capitalization of contributions from these overlooked natural resources during the operationalization of the SDGs and other global instruments.

Keywords: sustainable development goal (SDG), SDG (sustainable development goals), inland aquatic ecosystems, inland waters, inland fisheries, missing, limitations, fish

INTRODUCTION

The 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) serve as a unifying and aspirational vision for global change (United Nations, 2015). Globally, Member States and other relevant actors have committed to using the SDGs as their guiding framework to create the "future we want" for a better life (United Nations, 2012). Due to the breadth and scope of the agenda, the 169 targets of the SDGs are intentionally general, but for the goals to be achieved, the targets need to be effectively grounded with context-specific applications, appropriate spatial scaling, and relevant translation into national policies, actions, and interventions (United Nations, 2016; Breuer et al., 2019a).

Joining the 17 goals into a unified system of sustainable development goals presents the opportunity to bind actions together during implementation (leBlanc, 2015). Realizing this potential, however, relies on how each country interprets the goals and what actions they undertake (Jönsson and Bexell, 2021).

Adopting a political framework that recognizes trade-offs and synergies among goals can provide objective evidence for more informed and better coordinated decision making when defining policies and actions for meeting national commitments to the SDGs (e.g., Gratzer et al., 2019). However, when natural resources or ecosystem services are absent or weakly represented among the SDGs (e.g., global food systems, Veldhuizen et al., 2020; mental health, Warmate et al., 2021; food security, Cruz-Garcia et al., 2016; socio-ecological environments, Reyers and Selig 2020; soil, Keesstra et al., 2016; biocultural heritage, Poole 2018; adult education, Orlović Lovren and Popović 2018; knowledge, Alsayyad and Nawar 2019; Briceño and Santos 2019), they can translate into poor recognition and management of associated services (Burford et al., 2013; Griggs et al., 2017). Failing to recognize the contributions of these critical natural resources and ecosystem services, and not adequately protecting them, for whatever reason, can hinder the ability of the global community to realize the vision of sustainable development that the SDGs represent (Gupta and Vegelin, 2016).

Inland fish and fisheries (including other inland aquatic organisms) (Lynch et al., 2020) and the aquatic ecosystems on which they rely (Dickens et al., 2020; Tickner et al., 2020) are prominent examples of overlooked natural resources that provide important contributions to the SDGs. Their fundamental characteristics (e.g., high species diversity, varied and disparate fisheries, and definitions of sustainability) present challenges for capturing their worth and accurately representing them in policy decisions. Nevertheless, given the widespread distribution of inland fish and fisheries and their importance in many regions of the world (Cooke et al., 2016), seeking ways to overcome these challenges and to identify opportunities for increasing recognition of their values is a worthwhile endeavour (Dickens et al., 2020). The aims of this concept piece are twofold: first, to highlight that inland fish and fisheries, while largely assumed to be included in the SDGs and other global policies, are in reality grossly underrepresented and as a result continue to be degraded without appropriate consideration; and second, to note how paying greater attention to natural resources, which have been omitted from the SDGs, could nevertheless help countries implement policies and actions that deliver on their commitment to the SDGs. Using inland fish, fisheries, and aquatic ecosystems, as an example, we identify mechanisms by which missing natural resources can be accounted for during implementation and reporting of the SDGs. We also outline alternate pathways for protecting these natural resources via recognizing their contributions to the SDGs and, more generally, to global sustainability. The particular importance of inland fisheries to developing countries (Funge-Smith and Bennett, 2019) means that these mechanisms would be extremely beneficial to these nations. The options explored here could potentially serve as a model for other natural resources missing from the SDGs.

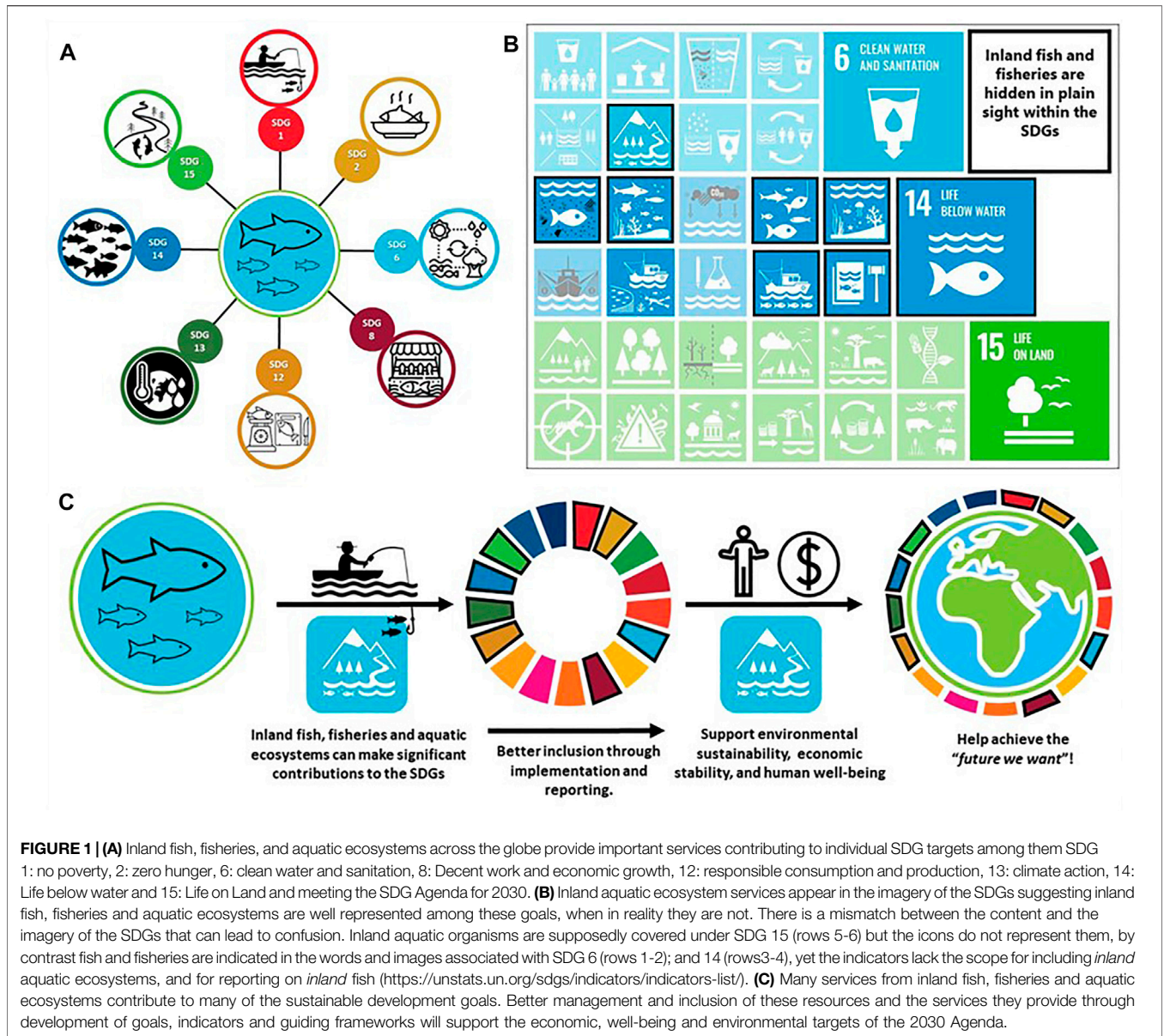## INLAND FISH AND FISHERIES CASE STUDY

Inland fish account for at least 50% of all globally described fish species (Fricke et al., 2020), representing a substantial component of global biodiversity (Loh et al., 2005). They support food,

recreation, and nutrition security of millions and the livelihoods of billions of people (Funge-Smith and Bennett, 2019), and provide an important indicator of inland aquatic ecosystem health (**Figure 1a**) (Tedesco et al., 2017). The future contribution of inland aquatic ecosystems and the fisheries services they support is threatened by multiple stressors associated with economic and urban development, including habitat destruction and environmental disruption caused by water resource and agricultural expansion, water quality issues, and heightened fishing pressure from human population growth (Reid et al., 2018; Tickner et al., 2020).

Despite their importance to the success of the SDGs (Lynch et al., 2017, 2020), explicit targets for recognizing and protecting inland fish, the inland aquatic ecosystems they rely on, and the fisheries services they provide are not obvious in the SDGs (Lynch et al., 2017; Dickens et al., 2020). Indirect references to relevant ecosystems, however, are dispersed across multiple goals, exacerbated by a general assumption among stakeholders that inland fisheries are, indeed, covered under one or more of the following SDGs—SDG 6: Clean Water and Sanitation, SDG 14: Life Below Water, or SDG 15: Life on Land (Nash et al., 2020) (United Nations, 2022a) (**Figure 1b**). Furthermore, impacts of this oversight compound as many global initiatives are intricately linked.

It is commonly assumed that SDG 14: "Life below Water" includes inland fisheries, however, they are all but omitted by the marine-specific language of SDG 14 (United Nations, 2016; Schmidt et al., 2017): "Conserve and sustainably use the oceans, seas and marine resources … ". The overarching language of the goal generally precludes the inclusion of inland fisheries, and its targets and indicators largely lack the scope to recognize inland contributions (Dickens et al., 2020).

It has also been assumed that inland fisheries are addressed under SDG 6, potentially due to visual representations and the reference to "aquatic life" (**Figure1b**). Whilst 'water' is often considered synonymous with *fresh* water, and is accepted to include fisheries services, the focus of this goal is on the extent and status of the water in freshwater ecosystems, and the associated water safety and security for human consumption, rather than the species within those ecosystems (Darwall et al., 2018). Maintaining water quality and quantity for human consumption can be positive for fish and fisheries, however, unless dual aims are specifically outlined, it will not necessarily lead to improvements for life within freshwater (Arthington, 2021). For example, indicator 6.6.1 (change in the extent of water-related ecosystems over time) allows the inclusion of reservoirs, which are not always beneficial to fish (e.g., Marques et al., 2018), and the negative ecological impact of dams and their reservoirs are recognized in the 2021 progress report on this indicator (United Nations Water, 2020). Water demands to meet multiple direct human needs (e.g., domestic consumption, agriculture, hydropower, and industry) tend to take precedence over the needs of fish, other inland aquatic species, and the ecosystems that support them (Tickner et al., 2020). Ultimately, despite the relevance and potential, SDG 6 does not acknowledge aquatic biodiversity and fisheries services (**Figure 1b**).

FIGURE 1 | (A) Inland fish, fisheries, and aquatic ecosystems across the globe provide important services contributing to individual SDG targets among them SDG 1: no poverty, 2: zero hunger, 6: clean water and sanitation, 8: Decent work and economic growth, 12: responsible consumption and production, 13: climate action, 14: Life below water and 15: Life on Land and meeting the SDG Agenda for 2030. **(B)** Inland aquatic ecosystem services appear in the imagery of the SDGs suggesting inland fish, fisheries and aquatic ecosystems are well represented among these goals, when in reality they are not. There is a mismatch between the content and the imagery of the SDGs that can lead to confusion. Inland aquatic organisms are supposedly covered under SDG 15 (rows 5-6) but the icons do not represent them, by contrast fish and fisheries are indicated in the words and images associated with SDG 6 (rows 1-2); and 14 (rows3-4), yet the indicators lack the scope for including *inland* aquatic ecosystems, and for reporting on *inland* fish (https://unstats.un.org/sdgs/indicators/indicators-list/). **(C)** Many services from inland fish, fisheries and aquatic ecosystems contribute to many of the sustainable development goals. Better management and inclusion of these resources and the services they provide through development of goals, indicators and guiding frameworks will support the economic, well-being and environmental targets of the 2030 Agenda.

Although counterintuitive based on its title, inland fisheries services are currently best represented by SDG 15: "*Life on Land.*" The goal's stated objective is to '*protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss*', but one of its 12 targets (15.1) does explicitly reference "*sustainable use of . . . freshwater ecosystems and their services*", thus inland fisheries services do, indeed, fall under this definition (**Figure 1b**). Nevertheless, lumping inland fish and fisheries with terrestrial ecosystems means they tend to be overlooked, as they end up competing for attention with more prominent terrestrial ecosystems, such as forests (Dickens et al., 2020). Consequently, there is limited scope to report on inland aquatic systems and the significant contributions they would provide (Lynch et al., 2017). Whilst

both terrestrial and marine protected areas have scope to incorporate inland waters, in practice, management largely allows them to fall through the gap between *Life on Land* and *Life below Water* (Abell et al., 2017; Reis et al., 2017; Loury et al., 2018; Acreman et al., 2020; Thieme et al., 2020).

REAL-WORLD OPPORTUNITIES FOR INCLUSION

The stated goals of the SDGs are fixed, however; there do remain tangible opportunities for safeguarding and capitalizing on inland aquatic ecosystems and the contributions that their services can make to the 2030 Agenda and other global instruments (**Figure 1c**). Better inclusion of the missing natural resources

TABLE 1 | a) Existing SDG Targets and indicators with potential for reporting inland contributions, b) A *Framework for supporting implementation and reporting of contributions from inland aquatic ecosystems and their services showing a theoretical set of objectives and c) providing universal indicators for inland fish, fisheries and inland aquatic ecosystems that could be globally applicable and relevant to national circumstance.*

Table 1a Identifies Areas where, despite Current Limitations in the Indicators and Language of the SDGs, There is Potential for Future Inclusion and Reporting of Inland Aquatic Ecosystems, Inland Fish, and Fisheries within the Framework

SDG #	Relevant Goal/Target/indicator	Current exclusions	Potential for future inclusion
14.1	*By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.* Indicator: 14.1.1 "*coastal eutrophication and floating plastic debris density,*"	- Does not currently acknowledge the role of inland waters as a conduit (UN, 2015) - Does not provide scope for reporting inland aquatic pollution (but see SDG6) Indicator - Does not permit reporting any reduction in inland water pollution, which is a major source of marine pollution (e.g., Gupta et al., 2018; Packett et al., 2009)	Recognizes the relevance of "land-based" contributions to marine pollution Indicator: There is scope to include the reporting of nitrate and phosphate levels in inland waters to provide early indications of eutrophication There is also scope to expand the indicators more generally to recognize more diverse sources of pollution aside from eutrophication and plastic debris, including microplastics
14.2	*By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans* Indicator 14.2.1 "*sustainable management of ecosystems*" "*. . . using ecosystem approaches to managing marine areas*"	- Does not currently offer the provision for recognizing the connection between inland and marine aquatic systems - Indicator does not currently permit reporting on the management of inland systems	Has scope for expansion to recognize the contributions of sustainable management of inland aquatic ecosystems to achieving 14.2
14.4	*By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated (IUU) fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics* Indicator 14.4.1: *proportion of fish stocks within biologically sustainable levels* - Loans that increase fishing pressure and IUU fishing can be equally harmful in inland aquatic ecosystems	- Doesn't currently allow for reporting of inland fisheries - Indicator focuses on "*sustainable'* levels and currently lacks the scope for reporting inland fisheries	- Reasonable to include and report inland aquatic fisheries 'sustainability' but requires establishing baseline biological references and measures of sustainability other than MSY, which does not represent a feasible metric for inland fisheries - Changes in language and references would allow improvements in inland fisheries to reduce illegal practices for example, to be reported against 14.4
6.6	"*Protect and restore water-related ecosystems . . . ,*" Indicator 1.6.1: "*Change in the extent of water-related ecosystems over time.*"	- the focus of the target is the extent of the ecosystems, not necessarily including their function and limiting scope to report on the ecosystem itself and its inhabitants - Limited scope to acknowledge the other contributions of inland aquatic ecosystems and their services - Additional indicators for ecosystem function would be relevant for reporting on water for human consumption as well and would permit inclusion of factors relevant for inland aquatic organisms and ecosystems function	- Has potential for the scope of the indicators to be expanded beyond the '*extent*' to include indicators of function and quality - There is scope for reporting on extent of wetlands and other inland aquatic environments and their services
6.3	"*improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally*" Indicator 6.3.2 "*Proportion of bodies of water with good ambient water quality*"	- current focus lacks recognition of ecosystem-service role of aquatic organisms in ecosystem function and water quality	- There exists scope for reporting inland aquatic ecosystem functions and biota as indicators of quality - There is potential to recognize the role of functional inland aquatic ecosystems for quality water for human use as well as inherent environmental relevance

TABLE 1 | (*Continued*) a) Existing SDG Targets and indicators with potential for reporting inland contributions, b) A *Framework for supporting implementation and reporting of contributions from inland aquatic ecosystems and their services showing a theoretical set of objectives and c) providing universal indicators for inland fish, fisheries and inland aquatic ecosystems that could be globally applicable and relevant to national circumstance.*

15.1	*"ensure the conservation, restoration and sustainable use of terrestrial and freshwater ecosystems and their services."*	- It is a large and broadly encompassing target and the consequence of lumping freshwater with terrestrial ecosystems, has meant that their significance has been largely overlooked due to the greater attention garnered by terrestrial life and forests (Juffe-bignoli et al., 2016)	The target has much potential for outlining specific inland aquatic targets locally
	Indicator 15.1.1: *"Forest area as a proportion of total land area"* Indicator 15.5.2: *"Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type"*	Forests are specifically covered under other SDG15 targets (15.3, 15.4) yet are also the focus of this quite general target (15.1)	Indicator 15.1.1. could recognize flooded forest and wetlands
			Under indicator 15.1.2 all inland aquatic could ecosystems could be recognized and reported - Specifying inland aquatic ecosystem targets would help highlight and recognize their contribution so they are not lost in the greater focus of terrestrial habitats and forests

b) Objectives for Inland Aquatic Resources

Target for inland fish: *"conserve and manage vulnerable inland aquatic life, prevent extinctions, and ensure biodiversity conservation including by establishing legal provision for the protection of species*

Target for inland fisheries: *"effectively control, illegal and unregulated fishing and destructive fishing practices, develop native species aquaculture where possible, ensuring aquaculture does no harm; and implement ecosystem-based management, to maintain fish and aquatic biota productivities, at least to levels that can be harvested sustainably, as determined by biological characteristics and the best available data"*

Target for inland aquatic ecosystems: *"sustainably manage and protect healthy and productive inland aquatic ecosystems by taking action to mitigate threats and adverse impacts through restoration activities". Specifically, "conserve connectivity of inland waters and their watersheds, including wetlands, floodplains, lakes and rivers, and ensure the conservation, restoration and sustainable use of inland aquatic ecosystems and their services based on best available scientific information and best practices"*

c) Indicators for Inland Aquatic Resources

Relevance	Indicator of	Indicator(s)	Application
Inland Fish Biodiversity	Extent to which inland fish biodiversity is protected under national and international legal systems	*proportion of species identified as threatened for which appropriate protection is recognized in law, policy, or regulation*	Globally relevant Regionally informative Nationally applicable
Inland Fisheries Management	Monitoring, control and surveillance of inland fish and fisheries	*extent to which fishing gears, fishing effort, and fish harvests are monitored, regulated, and enforced spatially, seasonally, by biomass, species and according to size*	Provides a measure that can be used by all nations with inland fisheries
Inland aquatic ecosystems	Health of inland aquatic ecosystems	- *the extent to which water resources are managed without compromising ecological integrity, while maintaining social equity, ecological integrity and economic growth* - *the extent to which the Ecosystem Approach to Fisheries Management is being correctly applied and effectively adapted for national, regional, and local contexts*	Relevant to all nations with inland waters

can be achieved through implementation and reporting of the SDGs, by highlighting them better under existing indicators, and by improving reporting mechanisms, which in turn will also facilitate operationalization of the goals (**Figure 1c**). We identified several targets and indicators (**Table 1a**) where the language currently limits the potential to report on relevant inland aquatic successes that would otherwise contribute towards meeting each target. Contributions from inland aquatic ecosystems, fish, and fisheries could be recognized under the three SDG's mentioned above: SDG 6, where "water-related ecosystems" are mentioned; SDG14, where the relevant language for management of fisheries currently exists; and SDG 15, where "freshwater ecosystem services" are noted. Whilst not a trivial endeavour, re-defining biological reference points based on, for example, life-history parameters (e.g., growth estimates), as indicators and providing clearer mechanisms for reporting may also help nations identify and capitalize on existing resource contributions to support national implementation of the goals. Including such indicators in multiple international instruments [e.g., Convention on Biological Diversity (CBD)] and ensuring alignment among them may enhance their collective contribution whilst improving efficiency. Outlining a blueprint for a national framework specific for inland aquatic ecosystems that reiterates and builds on these specific targets may support national adoption into, or development of, a strategic plan for inland aquatic ecosystems. This may help bridge the gap between real-world application and the SDGs, and in so doing could both complement the existing SDG framework and provide supplemental guidance for Member States.

Implementation of the SDGs by Countries

The indicator progress reports do include various recommendations for implementation of SDGs (*e.g.,* United Nations, 2022b), however the text of the SDGs does not dictate nor outline the specifics of how they are to be executed. Targets need to be localized and adapted to the country context (United Nations, 2016). Consequently, Member States are responsible for translating the targets into policies and actions that will maximize their chances of successfully meeting their commitments to the goals. This flexibility provides significant scope for countries to interpret the goals in a way that accounts for national capacity, interests, and conditions, permitting countries, should they wish, to extend or adopt additional *targets* and *metrics* beyond those listed in the SDGs (Dickens et al., 2020). For example, Mexico has shown great commitment to protecting its water-related ecosystems (SDG target 6.6), by establishing environmental water reserves for nearly 300 basins, to preserve and manage flows, representing 50% of Mexico's surface water (Salinas-Rodríguez et al., 2021). Recent reports from across the EU against various SDG 15 indicators show that some countries, such as Denmark, have chosen to surpass their SDG commitments regarding natural resources (Lafortune et al., 2021). By applying a broad understanding of 'Life below Water' to the interpretation of the goals, Member States could also recognize the contributions of inland aquatic ecosystems for meeting their SDG commitments, reporting relevant fish, fisheries, and

inland aquatic ecosystem metrics under SDGs 6, 14 and 15, respectively (United Nations, 2016; United Nations, 2019).

Identifying prospects for greater inclusion through the implementation and reporting of the SDGs may help to capitalize on existing contributions of inland fish and fisheries for meeting the economic, social, and biodiversity aspirations for 2030. Although interactions among the SDGs are complex (Mohr et al., 2022), and there are challenges for monitoring across targets and indicators (Nilsson et al., 2018; Eurostat, 2021), the widespread benefits of inland fisheries could, nevertheless be further recognized by identifying national indicators for inland aquatic ecosystems under relevant SDG goals and in so doing facilitating reporting progress. For example, if national biological reference points were established, such as defining target species and quantities, under existing indicators, sustainable harvest of inland fisheries could be used at the country level to report on SDG Target 12.2: "*By 2030, achieve the sustainable management and efficient use of natural resources*", whilst sustainable management of inland aquatic ecosystems can be tracked under SDG 6.6, which targets "*water-related ecosystems*" (Arthington et al., 2018).

Inland Targets and Indicators

Recognizing that States have limited human resources and funding to track a multitude of indicators, having additional ways to recognize progress made towards meeting their SDG commitments would nonetheless be useful and intrinsically beneficial. Although, in some ways, simply recognizing "*inland waters*" under SDG14 targets might facilitate inclusion of many of the needs of inland aquatic systems and allow reporting of progress against them distinct differences between marine and inland environments warrant further consideration (Cooke et al., 2014). To highlight the areas of greatest need, and at the same time account for the key differences between inland water and marine ecosystems, we identified a theoretical set of objectives (**Table 1b**). These objectives, which explicitly recognize the diversity of inland aquatic waterways, as well as key attributes of healthy ecosystems (e.g., connectivity within watersheds), provide a framework that would facilitate reporting national contributions against relevant existing SDG targets.

The absence of specific indicators for inland fish and fisheries is partly a consequence of challenges in reporting inland fish production (Deines et al., 2017; FAO, 2018; Elliott et al., 2019), due to a predominance of recreational (Arlinghaus et al., 2019) small-scale (Welcomme et al., 2010), and subsistence (Mills et al., 2011) fisheries, for which, biological and stock assessment approaches commonly utilized in marine contexts (i.e., *maximum sustainable yield*) are often difficult to apply (Cooke et al., 2016), resulting in statistics that are variable in quality (FAO, 2015; FAO, 2018; Funge-Smith and Bennett, 2019). Nevertheless, to implement any inland fish and fishery tracking, alternative relevant and feasible indicators for important inland fish and fishery variables that are applicable to multiple global and national agendas are essential (Funge-Smith and Bennett, 2019). In so doing, key political, biological, and social needs can be prioritized, and greater inclusion of inland aquatic ecosystems and fish in both policy and the SDG process can be facilitated,

bringing benefits for reporting and efficiency of operationalization to Member States.

A first step might be to improve on the limited reporting of inland fishes under existing indicators for SDG targets, such as the IUCN Red List Index being used as an indicator for SDG target 15.5 (IUCN, 2022). The value of existing indicators could also be strengthened by allocating resources to support further inclusion of inland aquatic information [e.g., continued identification of important areas for freshwater biodiversity and production under SDG15.1.2 (Ainsworth et al., 2021); improved assessment of inland fisheries under SDG15.5.1, for which only baseline estimates exist (Fluet-Chouinard et al., 2018)].

It is generally recognized that there is scope to improve on the SDG indicators (Hák et al., 2016). The most practical, near-term objective may be to identify the aforementioned biological reference points and develop realizable indicators (see **Table 1c** examples) for assessing the state of inland fisheries that would be globally applicable and at the same time relevant to national circumstances. If indicators can successfully integrate achieving water security (SDG 6) with ensuring water for ecosystem needs and ecosystem service provision (SDGs 14 and 15), then they may be more readily adopted through various global policy agendas (Saner et al., 2019). For example, there are close links between the SDGs and the Post 2020 Global Biodiversity Framework being developed by the Convention on Biological Diversity. A purpose of the Post 2020 Global Biodiversity Framework is to contribute "to the implementation of the 2030 Agenda for Sustainable Development," and progress towards "the Sustainable Development Goals will help to create the conditions necessary to implement the Framework" (CBD, 2020). Although the goals and targets of the Post 2020 Framework are due to be finalized in 2022 and are thus nearing completion, there are still opportunities to influence the discussion around indicators and implementation (van Rees et al., 2021). Therefore, it will be important to ensure that the wording of fisheries-related targets (e.g., CBD target 5, 9, 10) and indicators effectively cover both marine and inland fisheries (CBD, 2021). A proposed 'Sustainable water and inland fisheries index' (FAO, 2020) is currently listed as a complementary indicator for target 5. Because of the linkages between Post 2020 CBD Targets and the SDGs, there is potential for these to be mapped onto the SDGs, providing a dual opportunity to influence policy implementation. It will nevertheless be important to acknowledge the potential for existing limitations of including inland fisheries within the context of SDG 14 to endure.

A Proposal for a Strategic Plan for Inland Aquatic Ecosystems

Beyond the SDGs, and Post-2020 Framework, there are internationally adopted strategic approaches and agreements that are intended to guide policy and encourage sustainable ecosystem management. Many of these initiatives aim to support and expand upon the SDG targets and assist in national translation and operationalization of the goals

(United Nations, 2019). For example, the UN adopted the 'Strategic Plan for Forests', which includes six voluntary and universal Global Forest Goals and identifies the links for how these additional goals contribute to achieving SDG targets (United Nations, 2017). UN Water also released a progress report for SDG6 (United Nation Water, 2021), which provides an update on the global status of water-related ecosystems and outlines priority actions needed to achieve target 6.6 by 2030.

Unlike forests and terrestrial ecosystems, which already have relatively high global profiles, inland fish and inland aquatic ecosystems are much more obscured (Lynch et al., 2017). There is therefore potentially an even greater need for a *Strategic plan for inland aquatic ecosystems,* akin to the one for forests, that could provide more refined targets and could potentially help Member States and other actors to define policies and actions. To move away from operating in silos, goals identified in such a plan would need to be globally inclusive; and their development and content would need to recognize the requirement for a more strategic, integrated and collaborative global effort (Arthington, 2021), Such a strategy would build from existing fisheries guidance and tenets, be coordinated among on-going initiatives, such as the CBD and the Ramsar Convention on Wetlands (Finlayson et al., 2011), UN Water, as well as recognizing other non-governmental inland water-related initiatives [e.g., the Alliance for Freshwater, (Darwall et al., 2018)], but be tailored specifically for inland fisheries. For inland fish and fisheries, goals and targets may consider the Rome Declaration (FAO and Michigan State University, 2016), the Technical Guidelines for Responsible Fisheries, Inland Fisheries (FAO, 1997), the Ecosystem Approach to Fisheries Management (FAO, 2019), the Small-Scale Fisheries Guidelines (FAO, 2015), the Technical Guidelines for Responsible Recreational Fisheries (FAO, 2012) and other available instruments and guidelines. The "Strategy" could fill the gap between the SDGs and real-world requirements, including the needs for maintaining ecosystem function (Schulze and Mooney, 2012; Tilman et al., 2014), food security (Funge-Smith and Bennett, 2019), nutritional security (Arlinghaus et al., 2019), and recreational services (Arlinghaus et al., 2019). Targets, such as the ones in **Table 1**, could be coupled with more specific aims, such as reversing riparian forest loss, maintaining a proportion of the world's riverine flows as free flowing, reducing pollutants, and improving water quality in freshwater systems (Damania et al., 2019), and development of landscape management plans to support healthy ecosystems on which inland fish and their fisheries rely (Tickner et al., 2020). Expanding on the Rome Declaration (FAO and Michigan State University, 2016), by including protection of inland biodiversity, and identifying the links to the SDGs more clearly, could be among the targets described specifically for inland fish and fisheries, respectively.

More broadly, the goals can consider connections with other relevant guidelines such as, the "EU *Water Framework Directive",* "*UN Climate Action Plan",* and the "*UN Strategic Plan for Forests*". A *Strategic Plan for inland aquatic ecosystems* that

could unify and guide partnerships among relevant initiatives would help to acknowledge and capitalize on a greater understanding of the links among the inland water initiatives and relevant SDGs (**Figure 1c**).

By emphasizing approaches that enhance and facilitate operationalization of the SDGs, whilst capitalizing on existing opportunities, the process of implementing the SDGs can be streamlined for Member States (**Figure 1c**). Furthermore, communicating inland fisheries values through research and education, and evidence-based decision making could help to emphasize the contribution of these overlooked natural resources.

DISCUSSION

In this concept piece, we describe how the SDGs are being used as a guiding mandate for global sustainable development, with potentially far-reaching consequences for anything not included (Griggs et al., 2017; Alsayyad and Nawar, 2019). A lack of explicit reference in the SDGs to certain natural resources and ecosystem services has resulted in them largely being omitted from actions and policies to meet the commitments of the SDGs and other global policy frameworks (Lynch et al., 2020). With such a broad remit, it is realistic to expect that some important natural resources might be less prominent within the SDGs (Biermann et al., 2017; Weber, 2017; Clark et al., 2018; Gusmão Caiado et al., 2018); nevertheless, implementing agencies may still have opportunities to effectively capture the breadth of natural resources in their efforts to meet their commitments to the SDGs through mechanisms such as those described herein.

Here, we present the example of ways in which inland fish, fisheries, and aquatic ecosystems could be more explicitly included in the process for realizing the vision of the SDGs (**Figure 1c**). Their presence "*everywhere and nowhere*" among the SDGs, has meant that they are largely, and inappropriately, assumed to be included "*somewhere*", and consequently are generally overlooked (Funge-Smith and Bennett, 2019; Lynch et al., 2020). By not fully recognizing their potential contributions, achieving the vision for the SDGs may be compromised (Lynch et al., 2020). We present several tangible pathways for safeguarding and capitalizing on inland aquatic ecosystems and the contributions that their services can make to the SDGs and other global instruments. In so doing, we present a model for converting the philosophies outlined in the SDGs to concrete real-world application and highlight opportunities to recognize valuable contributions of other natural resources that have been absent from or obscured by SDG processes (Muff et al., 2017; Breuer et al., 2019b; Grainger-Brown and Malekpour, 2019). Future development of strategies for better monitoring and assessing SDG targets and indicators will help to realize many currently hidden assets. For example, the Illuminating Hidden Harvests initiative, is a global effort to highlight small-scale fisheries in global politics, the findings of which will be summarized in a report due to be released in 2022 (World Bank, 2012). The SDGs are expected to be realized (at least

in part) through national implementation and policies (United Nations, 2016). Consequently, individual countries could include overlooked natural resources in meaningful actions to help them meet their sustainable development goal commitments.

The SDGs are wonderfully ambitious but, if global commitments to a sustainable future are to be met, then targets and indicators will need to be carefully assessed and all available opportunities to meet them will need to be recognized and capitalized upon. A realistic next step could be for the scientific community to help identify these opportunities and provide clear targets and indicators that can help optimize the role of the SDGs in achieving a sustainable future (Harper et al., 2021) (MaasriJähnig et al., 2021). The text of the SDGs is firmly in place, but there is flexibility to define parameters, and how they are to be measured (United Nations, 2019). The diverse stakeholders in the global community can embrace opportunities for improvement, refine existing approaches laid out herein and elsewhere, propose alternatives and, ultimately, coordinate efforts to efficiently achieve the SDGs. Effective management of natural resources and ecosystems is critical for realizing the "sustainability" in the Sustainable Development Goals (Elder and Olsen, 2019). Adequately appreciating the breadth of natural resources that can contribute to the SDGs and taking steps to safeguard their future will be critical in effectively realizing the "future we want" (United Nations, 2012).

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/Supplementary Material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

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