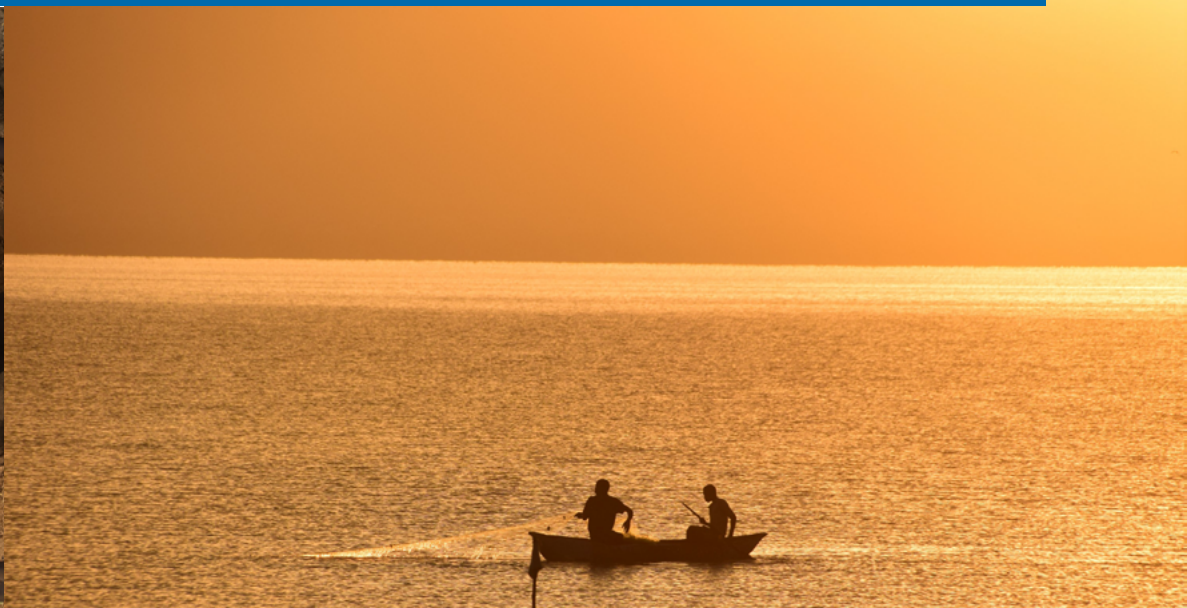


Inland Water Ecosystems



Mekong River - photo courtesy of Zeb Hogan

Post-2020 Global Biodiversity Framework: An Indicator to Monitor the Threats to Inland Fisheries, as a Component of Target 5



Freshwater fish catch and fishers in Malawi - photos courtesy of Gretchen Stokes

Proposing a New Indicator

1 Introduction and background.

Achieving effective conservation and sustainable development of inland aquatic ecosystems is dependent on inland fisheries*, but they are frequently absent from associated policy because of the lack of a globally applicable method for monitoring their status (see section 4). To address this problem, **the Food and Agriculture Organization of the United Nations (FAO) and the United States Geological Survey (USGS) have developed an indicator for assessing threats to inland fisheries.** Providing a means to assess the threats to inland fisheries will help conservation and management of this critical source of nutrition and livelihoods, especially for poverty and food security issues, considering climate change, land use and human development impacts on fisheries.

The Post 2020 Global Biodiversity Framework (GBF) provides a critical opportunity to insert this indicator into global policies for conservation and sustainable development.

2 Application of the inland fisheries threat indicator to the GBF.

The inland fisheries threat indicator is included in CBD's¹ proposed complementary indicators for **GBF draft Target 5** (*“Ensure that the harvesting, trade and use of wild species is sustainable, legal, and safe for human health”*)¹ with an earlier working title of *“Sustainable watershed and inland fisheries index”* (indicator t.4.1). Although the indicator is focused on threats to fisheries, it also serves as a metric for ecosystem status and its capacity to support harvesting.

We (the authors listed below) support the proposed adoption of this indicator. Our recommendation is that Parties consider adopting this at the higher level of a **component indicator**, because it is designed to measure a specific component of the target, i.e., the sustainability of the inland fishery, and changes in that sustainability as a product of multiple stresses. This indicator also meets the requirement that a component indicator must be able to be applied at national, regional, and global levels. At a minimum, it can be adopted as a complementary indicator.

This **same indicator can also be applied to the Sustainable Development Goals (SDGs)** for monitoring inland fisheries. This allows countries to monitor inland fisheries in both the GBF and the SDGs, using the same process, thereby simplifying and reducing the need for multiple indicators. CBD has highlighted the importance of linking the GBF and the SDGs, stating that the GBF should contribute to the implementation of the SDGs, and that the SDGs can help to create the conditions necessary to implement the GBF².



Fishing boats in Malawi - photo courtesy of Gretchen Stokes

* “Inland fisheries” refers to wild-caught fisheries from inland waters that includes freshwater ecosystems like rivers, lakes, wetlands and peatlands as well as inland brackish river, lake and wetland ecosystems and estuaries.

3 How the indicator is designed.

A major challenge for inland fisheries assessment is obtaining robust primary data about freshwater fishes and associated fisheries. FAO and the USGS have created a new method to assess the impacts of multiple threats on the status of inland fisheries, using publicly available environmental data and proxy measurements^{3,4}. Importantly, the main drivers for the health of inland fisheries differ from marine fisheries, for which overfishing is among the key drivers. Many of the threats to inland fisheries are environmental, including degraded water quality and altered flows, pollution, and climate change. The indicator's environmental risk-based approach to assessing inland fisheries captures a more accurate picture of these multiple threats than conventional indicators that only consider fishing threats.

FAO and USGS have created a global threat map for inland fisheries using a composite threat indicator that combines 20 identified anthropogenic pressure categories (e.g., climate, harvest, habitat, pollution, invasives) that act across hydrological catchments and affect inland fisheries (Figure 1). The threat indicator includes outputs from over 150 spatial data layers across those categories. The individual threat measures are calibrated according to their importance in a catchment, using information from multiple sources (Figure 1) with extensive global coverage, including:

- over 9,000 peer-reviewed articles on threats, responses, and impacts that are important to inland fisheries, from 45 basins (representing 86% of global inland fish catch); and
- survey responses from 536 inland fisheries professionals from 79 countries, with expertise on 93 basins (representing 82% of global inland fish catch), who applied threat scores locally for fisheries with which they were familiar.

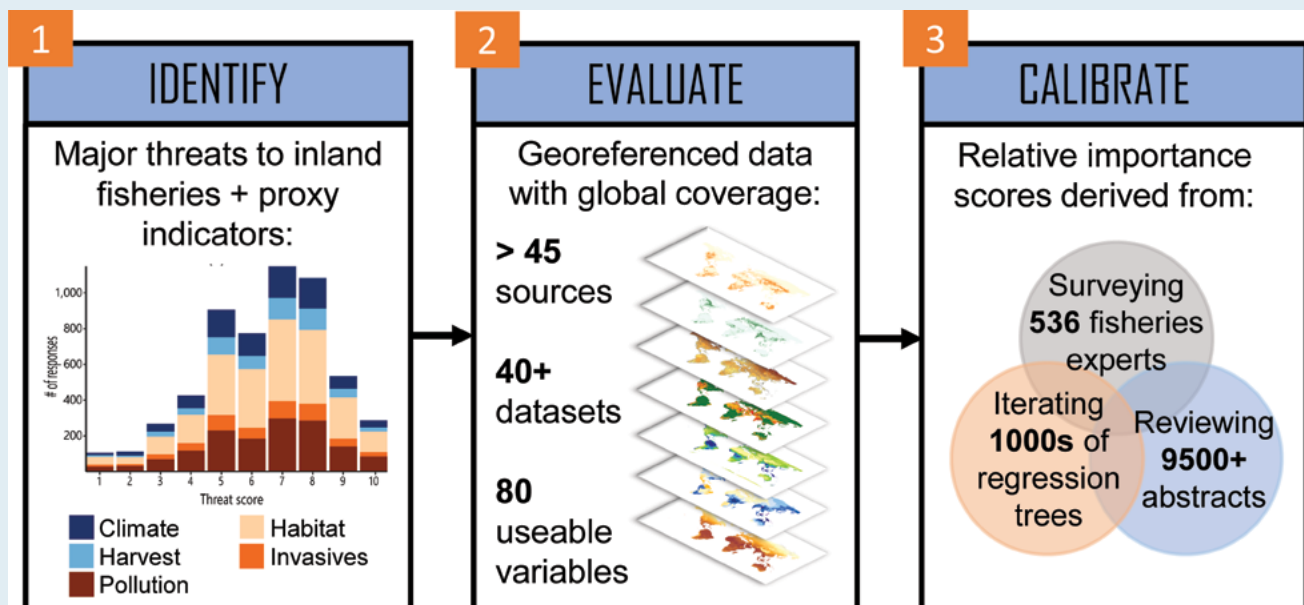


Figure 1. Illustration of the method for creating the inland fisheries threat indicator. (1) Identify major threats to fisheries and designate proxy indicators; (2) Evaluate spatial data relevant to selected indicators; and (3) Calibrate the relative importance of each indicator using scores derived from experts, computer modeling, and literature. Image: Stokes 2022 *Fisheries*⁵

This threat assessment is a transparent and reproducible, open-source framework that produces an index for the threats to inland fisheries. The index and associated data offer a valuable means for managers to track changes in key characteristics related to their fishery at multiple scales. The framework can be updated when new spatial data inputs become available, or datasets become available at higher resolution. Data may be analyzed for individual basins or be aggregated for national, regional, or global-scale analyses (Figures 2 & 3). The indicator may be adapted in the future as the science and experience on inland fisheries progresses.

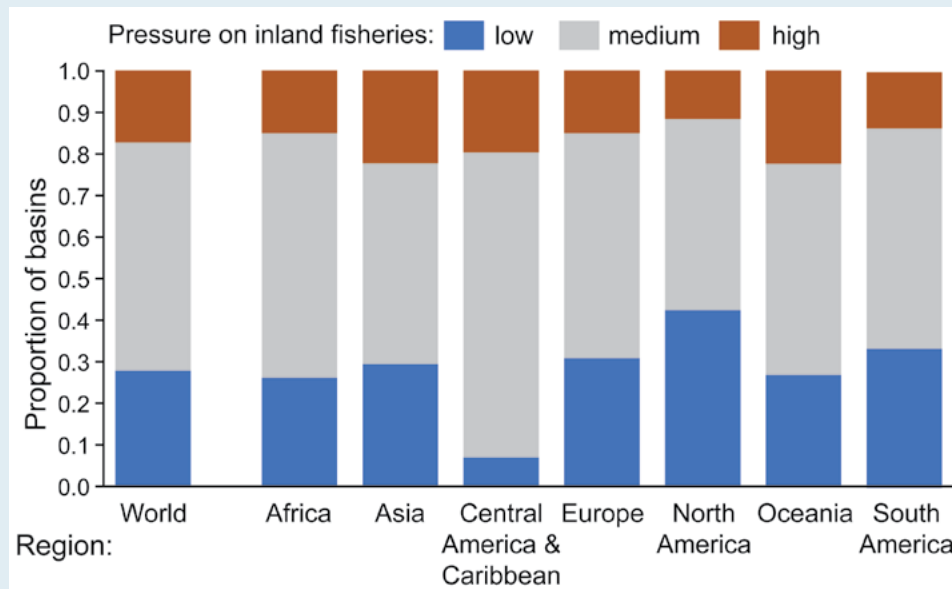


Figure 2. Estimated pressure levels to major inland fisheries (n = 45) by region and pressure category [low (1–3) medium (4–7) and high (8–10)], according to the inland fisheries indicator. See FAO^{3,4} for further details. Image: FAO (Figure 26, page 58)⁴.

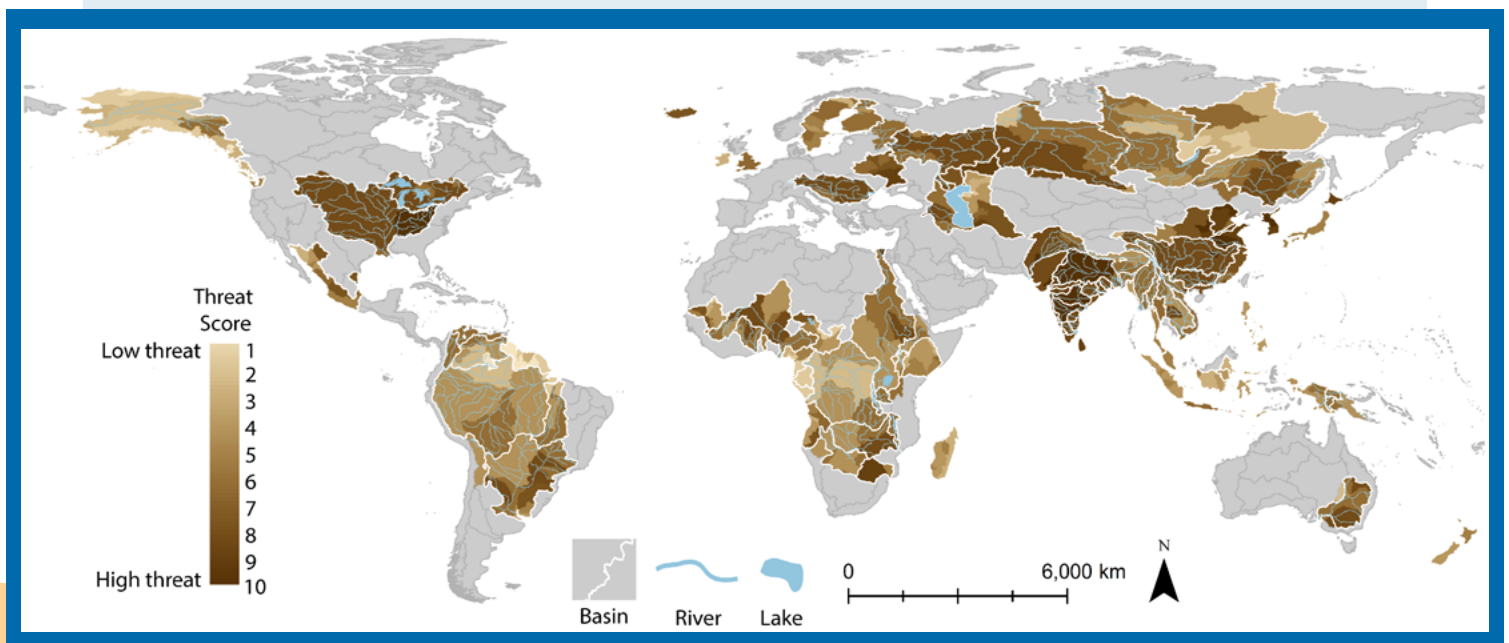


Figure 3. Global map of relative threat to inland fisheries, based on indicator. Image: FAO (Figure 57, page 180)³.

More detailed discussion of the indicator, including the methods discussed above and the application of the indicator to examples is available in Stokes (2022)⁵, FAO (2020: pages 179–183)³, and FAO (2022: pages 57–59)⁴, which also notes that a web portal is under development to summarize and publicly display results from the assessment.⁴



Fisher on the Amazon - photo courtesy of Gretchen Stokes



Fish market in Uganda - photo courtesy of Gretchen Stokes

4 The importance of the indicator to global policy for biodiversity conservation and sustainable development.

Inland waters have high biodiversity value, as they are home to more than 50% of all fish species (>18,000 species⁶). They also support productive inland fisheries, critical for human well-being and livelihoods⁷. Inland fisheries employ approximately 60 million people as fishers and in post-processing jobs (over 50% are women)⁸. More than 90% of inland-capture harvest is for human consumption and 43% comes from low-income food-deficit countries, where fish provide vital micronutrients and animal protein to communities that have few alternative sources⁸. Inland fisheries have an estimated economic value of USD 122 billion, which is compounded when the value is weighted by the local gross domestic product⁸.

Despite the importance of inland fisheries, they have rarely been considered in global policy frameworks⁹, in part because they are hard to measure directly, owing to the inherent challenges of monitoring a dispersed and hidden resource that is compounded by the complex nature of monitoring small-scale inland fisheries activities, and the lack of standardized assessment methods. Though seemingly covered by the inclusive language of Aichi Target 6 (“By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based approaches...”), it was made clear by the CBD¹⁰ that the focus of this previous target was on marine fisheries, and the lack of a tracking system for data for inland fisheries meant they were not a priority for monitoring. Inland

fisheries are directly or indirectly integral to achieving many of the Sustainable Development Goals¹¹. However, they are not directly referenced in the goals to which they are most closely linked. They are not covered by SDG 14, because its focus is to “*Conserve and sustainably use the oceans, seas and marine resources for sustainable development.*” Although inland fisheries are implicit in Target 15.1 of SDG 15 – Life on Land – which refers to the conservation of inland freshwater ecosystems and their services, there is no explicit provision to measure them among the proposed indicators.

In conclusion, the inland fisheries threat indicator developed by FAO and USGS is an unparalleled opportunity to track the threat to inland fisheries, and is proposed at a critical time of GBF adoption. It provides a valuable proxy for the health of these fisheries, by measuring environmental characteristics that directly affect inland fisheries status and sustainability. Using this metric overcomes many of the challenges associated with directly measuring fisheries status globally. An indicator for assessing the threats to inland fisheries will provide the mechanism for evaluation that is essential for, but currently missing from, GBF Target 5 and SDG Targets 14/15.



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Submitted to CBD by the European Bureau for Conservation and Development and the IUCN Commission on Ecosystem Management [Fisheries Expert Group](#) also on behalf of the members of [InFish](#) and the [Inland Fisheries Alliance](#) who compiled this document:

- Robin Abell, The Nature Conservancy
- Julie Claussen, Fisheries Conservation Foundation, USA
- Steven Cooke, Carleton University, Canada
- Ian G Cowx, Hull International Fisheries Institute, University of Hull, UK
- Vittoria Elliott, WorldFish
- Serge Garcia, IUCN Commission on Ecosystem Management Fisheries Expert Group
- Ian Harrison, Conservation International, USA
- Kathy Hughes, WWF, UK
- Jeppe Kolding, University of Bergen, Norway
- Abigail Lynch, United States Geological Survey, USA
- Matthew McCartney, International Water Management Institute
- Karen Murchie, Shedd Aquarium, USA
- Sui Phang, The Nature Conservancy, UK
- Carmen Revenga, The Nature Conservancy, USA
- Gretchen Stokes, University of Florida, USA

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