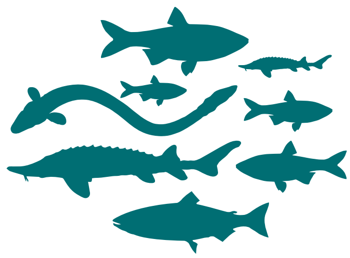
BRIEFING NOTE

SEPTEMBER 2022

THE POST-2020 GLOBAL BIODIVERSITY FRAMEWORK PROPOSAL ON TARGET 2 ON ECOSYSTEM RESTORATION FOR RIVERS

KEY MESSAGES



- **Freshwater habitats, of which rivers are an important habitat type, cover only about 2% of the Earth's surface but are home to 10% of known species[1].**
- **Freshwater species are suffering declines in species abundance more than twice as fast as the declines observed on land or in the oceans[2].**
- **River ecosystems are unique and should have their own restoration targets and measurable indicators within Target 2 of the post-2020 GBF.**
- **A Connectivity Status Index (CSI) is available to measure river connectivity[3] at the global, national and river basin scales and indicate where restoration may be needed[4].**
- **The amount of riverine restoration is best monitored in linear units (km) given the linear nature of river systems. Therefore, metrics limited to areal extent (e.g., hectares) as currently proposed in Target 2 will fail to adequately include this important ecosystem.**
- **As Target 2 will be more effective if expressed in absolute numbers and there is a methodology available to calculate approximate target figures globally, it is suggested that it includes "at least 300,000 km of rivers" among the other ecosystems.**

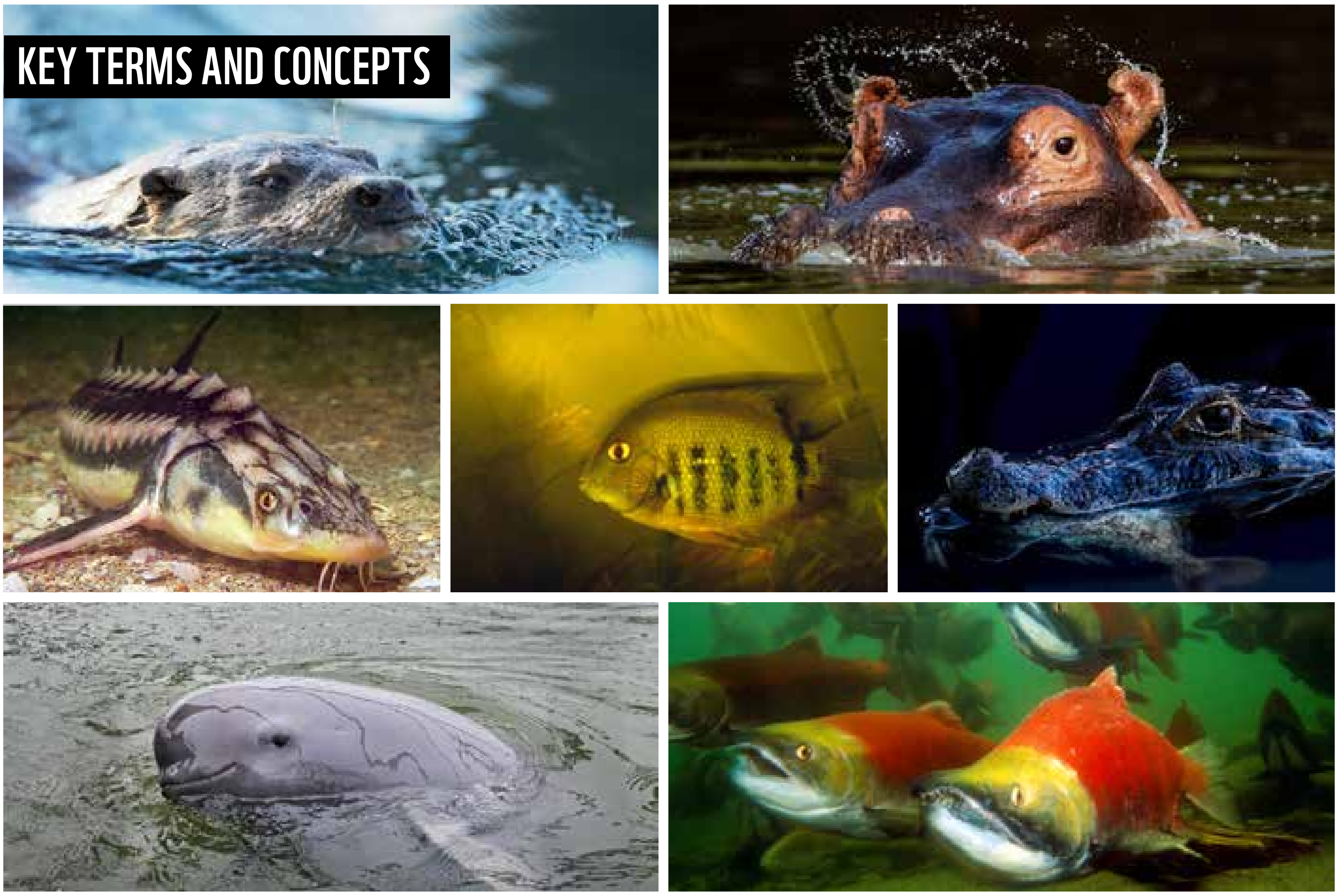
INTRODUCTION

To achieve the overall goal of reversing biodiversity loss, it is crucial to highlight the role played by free-flowing rivers in ensuring ecological connectivity for inland water species[5]. Although connectivity has featured in the Convention's policy making for over a decade and continues to play a key role across the post-2020 GBF (Goal A, Milestone A.1, Target 1, 2, and 3), the importance of restoring river connectivity and flows has not been explicitly mentioned in the latest draft versions of the framework and more specifically in Target 2.

River restoration is needed to reverse biodiversity loss. Restoring rivers means restoring the unimpeded movement of species and the flow of natural processes that sustain life on earth. Removing barriers and other actions to restore flows and connectivity in rivers are important restoration activities that need to be considered by the GBF Target 2. Such an approach would align with the Ramsar Convention on Wetlands, particularly Strategic Plan target 6 on ecological connectivity and target 12 on restoration of degraded wetlands[6].

River ecosystems need a separate sub-target under the ecosystem restoration target and specific indicators: To avoid known issues with defining the current extent of 'transformed' or 'converted' areas, draft text for Target 2 is moving away from a percentage target and toward the expression of a restoration target in terms of a global area in (billions of hectares). While this is readily applicable for terrestrial ecosystems and certain types of inland waters or wetlands, an area-based approach is "poorly adapted" to river ecosystems[7]. This briefing proposes to address this gap by proposing a global target and indicator to define and track river restoration under the post-2020 GBF.

KEY TERMS AND CONCEPTS



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Why river connectivity is important for the ecological integrity of river ecosystems

Loss of fluvial or river connectivity is considered one of the main threats to freshwater ecosystem integrity[8] and has been linked –together with other threats, like water pollution– with the extinction and population declines of freshwater species[9]. Where river connectivity has been restored and remnant populations of freshwater species remain, dramatic recovery in those populations has been documented[10,11].

What do river flows do and how connectivity add value

The connectivity and natural flow regime of river systems is fundamental to their biological integrity[12,13]. River or fluvial connectivity extends in four dimensions: longitudinally (up- and downstream in the river channel), laterally (between main channel, floodplain, and riparian areas), vertically (between groundwater, river, and atmosphere) and temporally (natural flows that include seasonal variations, transport of sediment, and other organic materials)[14,15].

How the breakdown of integrity leads to population declines

The flow regime has long been recognized as the 'master variable' in driving the state of river systems (including periodic connectivity of floodplains to the main river channel and sediment and nutrient transport that shapes downstream habitats)[16]. In addition to the flow regime, connectivity is critical for aquatic species movements to complete their life cycles and for genetic exchange. Healthy rivers and their floodplains also provide critical services for people, including fisheries and other foods upon which hundreds of millions of people depend; a buffer during flood events; sediments and nutrients that nourish fields and deltas; and recreational, cultural and spiritual values. The IUCN World Conservation Congress formally recognized the critical role of connected rivers in buffering against climate impacts on freshwater species and certain services in its passage of Resolution 8 in 2020[17].

Grill et al. (2019)[4] mapped river connectivity across the globe. They found that river connectivity has declined markedly, and that long free-flowing rivers (>1,000 km) are rare outside of the Arctic region and Amazon and Congo Basins.

WHY RIVERS NEED A DIFFERENT METRIC

Rivers are linear systems through which water flows in varying quantities such that their restoration is best measured either in linear units or river flow volume[18]. Restoration metrics within the post-2020 GBF that are limited to areal extent (e.g., square kilometers) will be inadequate for measuring restoration of rivers, a key ecosystem type that, along with other inland waters, supports a disproportionate amount of Earth's biodiversity[19]. Researchers are developing metrics that use river flow volume as a basis for understanding the status of habitat quality. However, until these metrics have been published, linear units are most appropriate for measuring how connectivity, and therefore restoration of riverine ecosystems, can be monitored and the increase or decrease properly reported in the post- 2020 GBF.

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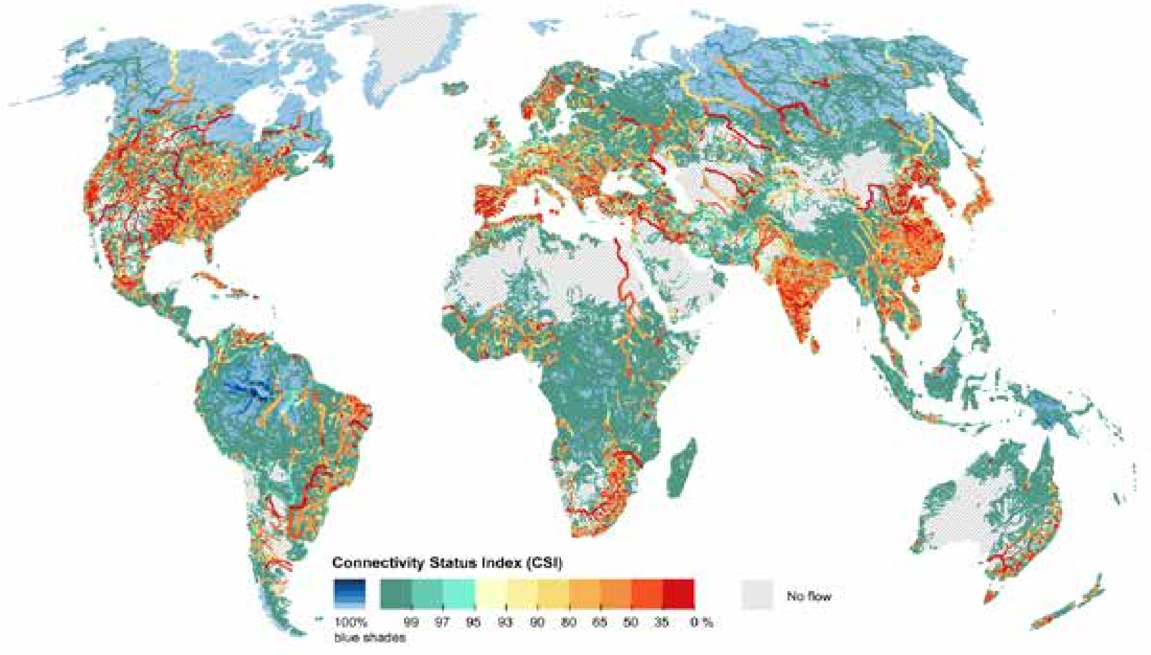
HOW RIVER CONNECTIVITY RESTORATION IS CALCULATED: INDICATORS & MONITORING



A Connectivity Status Index (CSI)[20,21] is available to measure river connectivity and indicate where restoration may be needed. The CSI's component indicators are tied to the four connectivity dimensions; the indicators are river fragmentation, flow regulation, sediment trapping, water consumption, and infrastructure development in riparian and floodplain areas. A global application of the CSI has calculated index scores for over 12 million river kilometers.

The CSI is applied at the scale of a river reach and the results can be aggregated at many larger scales, for example, at the scale of countries, basins, regions, and globally. The CSI meets multiple criteria identified by UNEP-WCMC for viable CBD indicators: 1) Alignment with target; 2) Availability and suitability for use at global and national scales; 3) Scientific robustness; 4) Data availability anticipated for the time period post-2020, and historical data available; 5) Geographic coverage of data for all regions of the world; 6) Indicator planned for use at national level (Canada); and 7) Easily understandable. The CSI addresses river connectivity more comprehensively than other indicators and is as such positioned to play a key role for tracking connectivity for multiple proposed goals and targets of the Global Biodiversity Framework (Targets 2 and 3 and Goal A[22]).

For Target 2, CSI data aggregated at global, country-, basin- or region-levels could be used to set targets for river connectivity restoration. Here we provide a recommended global river restoration target based on CSI data from the global assessment. To arrive at a target number, we calculated 30% of the total river kilometers of impacted river reaches (CSI < 95%). Using this methodology, the global target for restoration of transformed to natural river reaches is at least **300,000 kilometers**.[23] The working group is also summarizing best available information to assess the restoration target using the proposed methodology for achieving no-net loss by 2030.[24] Transposition of any global target to national and local targets should always take account of the views of local communities (including indigenous peoples) and other stakeholders, it should take account of any trade-offs between the contributions that rivers provide to groups of people before restoration (e.g., through hydroelectricity generation, food production) and afterwards (e.g., enhanced wild caught fisheries). Prioritization methodologies, such as systematic conservation planning[25] or many-objective trade-off analysis[26], are useful tools to inform restoration decisions. Where river connectivity has been adversely affected by flow alteration basin-scale environmental flow assessments that incorporate socio-economic, cultural and environmental values of rivers can also guide restoration decisions[27].

IMPLICATIONS FOR GBF

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In the implementation of the Strategic Plan for Biodiversity 2011-2020, inland water ecosystems have often been overlooked in the national targets reflected in the National Biodiversity Strategies and Action Plans (NBSAPs), as highlighted by the Assessment of Progress towards Aichi Target 5 and 15 released by the CBD secretariat in 2016[28]. While biodiversity targets should be representative of the diversity of all natural ecosystems, the risk of overlooking the inland water ecosystems persists (in the post-2020 GBF), especially in Target 2 on restoration and Target 3 on conservation through protected areas and other effective area-based conservation measures. For Target 2, the CSI (or a derivative of it) has already been proposed in document CBD/WG2020/3/INF/2 (2021)[29].

The restoration target risks being the one to not deliver on the result, as it may be expressed in percentage of degradation. Since a definition of degradation has not been agreed within the CBD process, due to the lack of consensus on the baseline, the percentage areas to be restored will be difficult to measure. Despite the fact that the Science Briefs on Ecosystems presented at the OEWG-4 in Nairobi advised that this target should be expressed in absolute numbers[30], several Parties are still convinced that expressing the target in percentages would be easier and consistent with the rest of the framework.

Unit-based (km and km^2) global restoration potential for different ecosystems might better translate to national targets which can be achieved practically. To ensure a balance among the different types of ecosystems to be restored, Parties should set targets for each of them estimating their global restoration potential: hectares of degraded inland water and terrestrial ecosystems, kilometers of rivers, and hectares of coastal and marine ecosystems. As in the draft EU Nature Restoration Law[31] – which is the only example that is currently available of a regional piece of legislation on restoration - rivers need to be accounted for with separate metrics because of the linear nature of this particular ecosystem. Measuring restoration of rivers in hectares would lead to the omission of a crucial habitat for a high number of species hampering the achievement of the overall framework.

While this proposal suggests that the restoration of 'at least 300,000 km of rivers' should be included in Target 2, the results of the global river connectivity assessment could also be used to support countries to set national level river connectivity (river km) restoration targets. Interventions that would support river connectivity and flow restoration include barrier removal (dams, levees, weirs), re-operation of existing dams, installation of effective fish passage facilities, and floodplain restoration, among others. Moreover, to secure that the restoration investments have long lasting benefits on river connectivity, it will be crucial to establish effective mechanisms to protect the free-flowing character of restored rivers[32].

Finally, we encourage the Food and Agriculture Organization (FAO)-led Task Force on Monitoring of the UN Decade on Ecosystem Restoration that is currently working to propose a monitoring system for Target 2 to consider the CSI index to measure progress on river connectivity.

ENDNOTES

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3 Noting the definition of river connectivity here includes alteration of the natural flow regime insofar as it affects river connectivity.
4 Where available, complementary indicators that directly measure the status of river biodiversity are important for monitoring the impacts of restoration
5 See **Inland Water Ecosystems**
6 4th Ramsar Strategic Plan 2016-2024: https://ramsar.org/sites/default/files/documents/library/4th_strategic_plan_2016_2024_e.pdf
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22 See **Inland Water Ecosystems: Post-2020 GBF – Support and a Pathway for Inland Water Ecosystems in the 30 x 30 Target**
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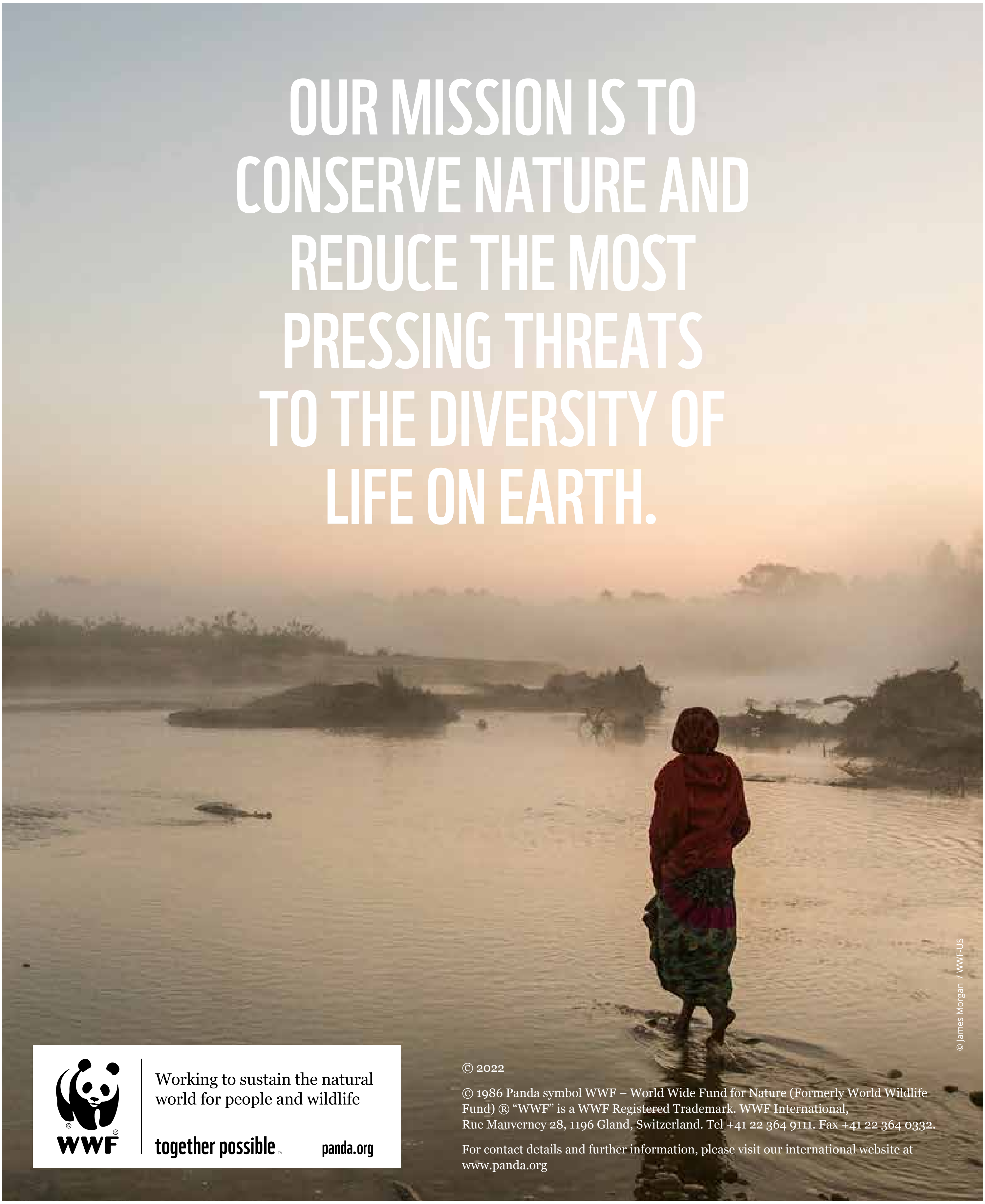

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