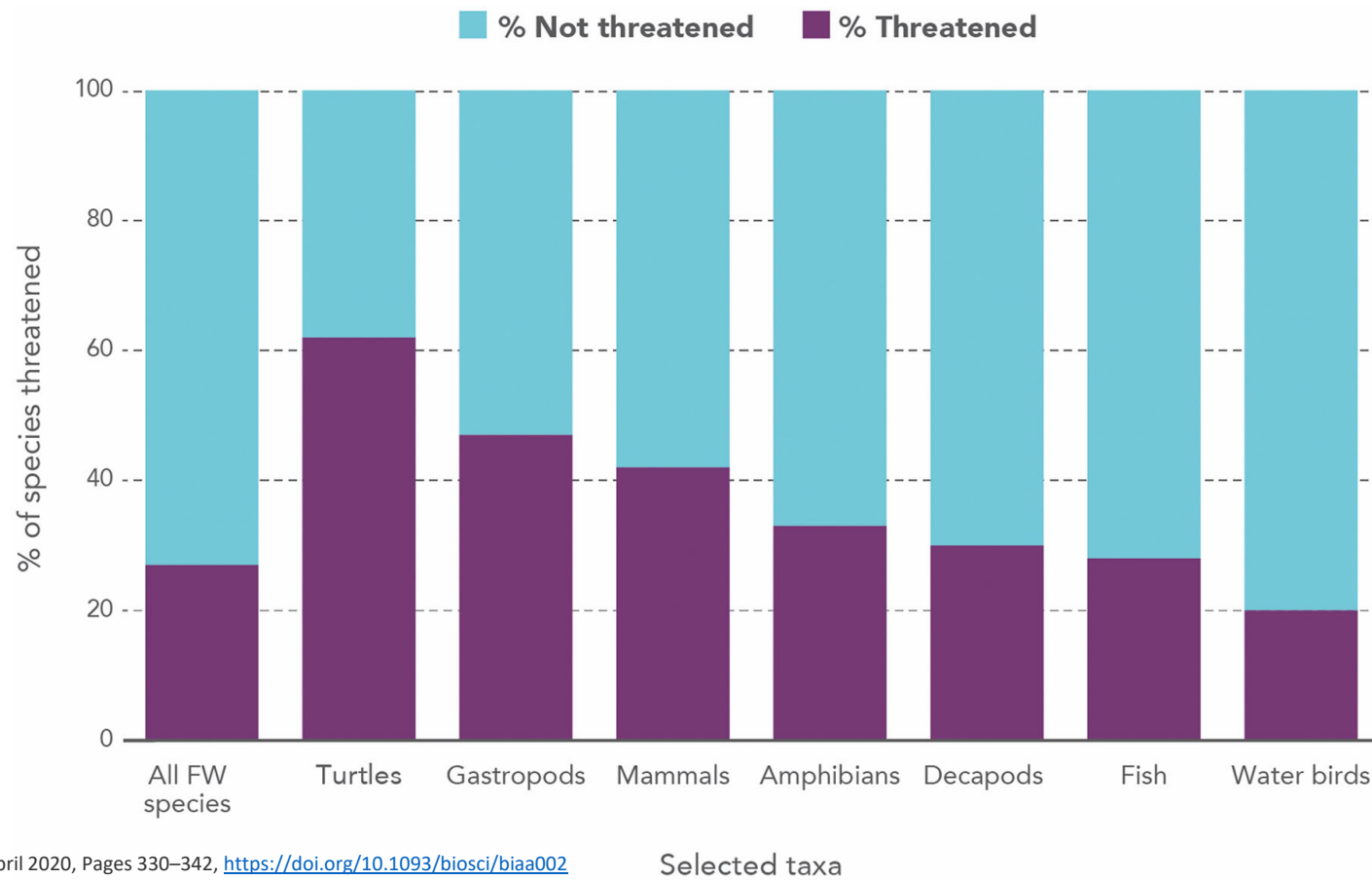
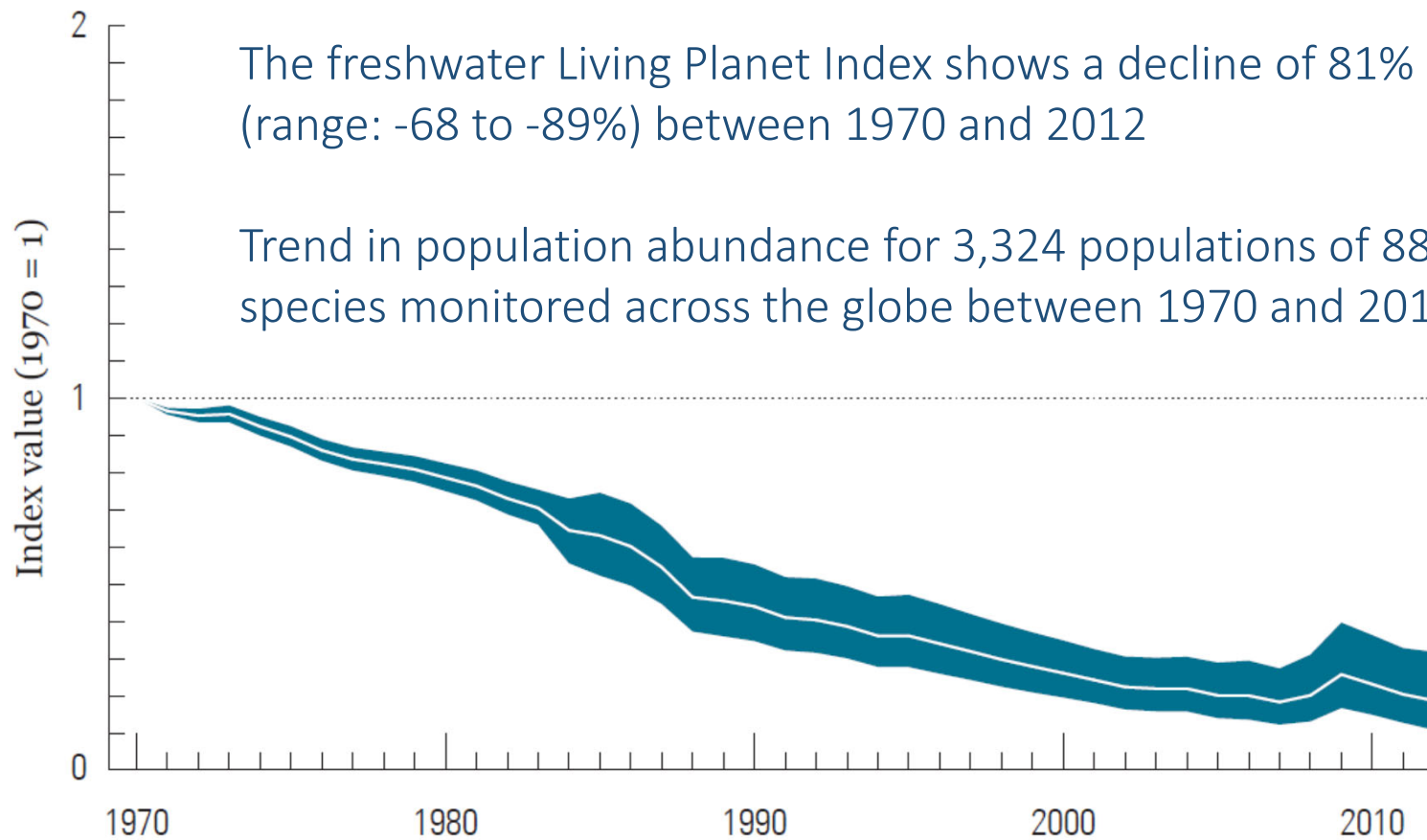


# Sharing water with nature to meet the SDGs



## Proportions of freshwater taxa threatened with extinction. Source: IUCN (2019).



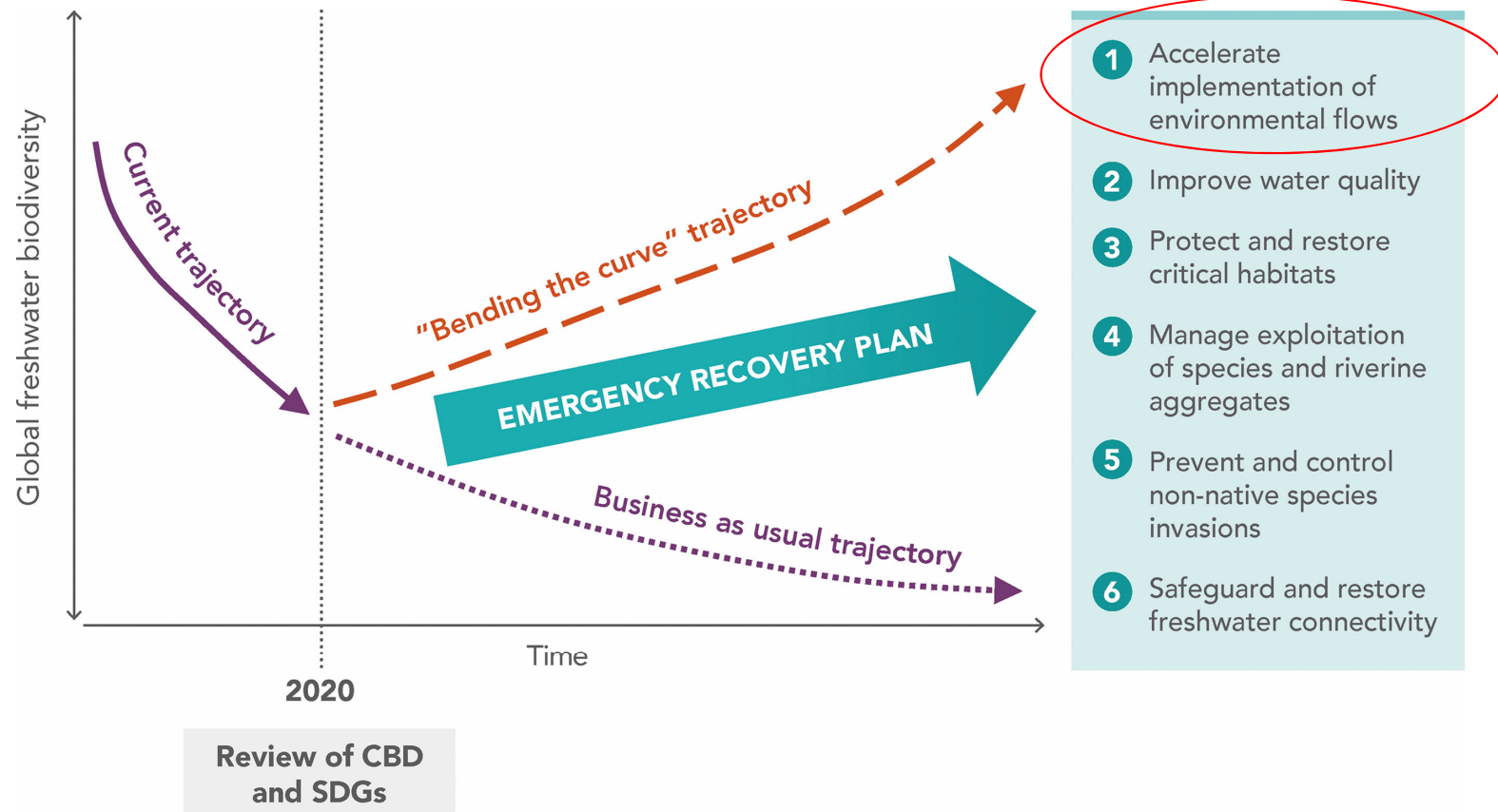


The freshwater Living Planet Index shows a decline of 81% (range: -68 to -89%) between 1970 and 2012

Trend in population abundance for 3,324 populations of 881 freshwater species monitored across the globe between 1970 and 2012.

WWF. 2016. Living Planet Report 2016. Risk and resilience in a new era. WWF International, Gland, Switzerland

# The Emergency Recovery Plan for freshwater biodiversity: Six priority actions for global action

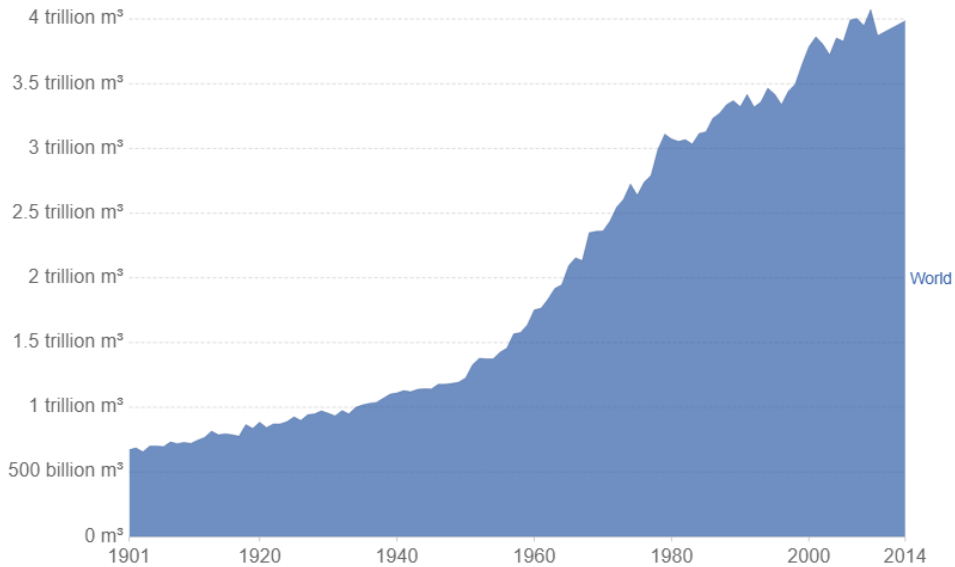


BioScience, Volume 70, Issue 4, April 2020, Pages 330–342, <https://doi.org/10.1093/biosci/biaa002>

OXFORD  
UNIVERSITY PRESS

## Global freshwater use over the long-run

Global freshwater withdrawals for agriculture, industry and domestic uses since 1900, measured in cubic metres (m<sup>3</sup>) per year.



Source: Global International Geosphere-Biosphere Programme (IGB)

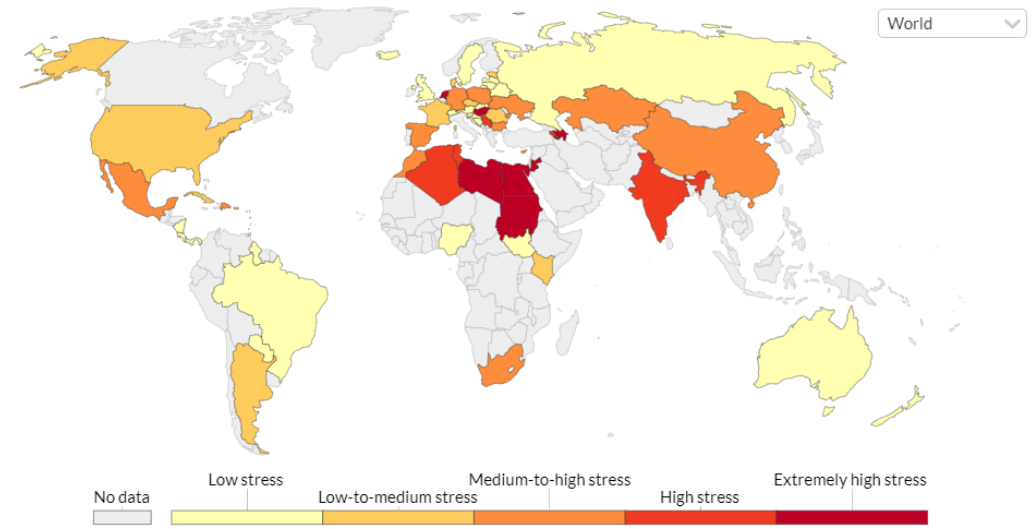
OurWorldInData.org/water-access-resources-sanitation/ • CC BY

Our World in Data

## Freshwater withdrawals as a share of internal resources, 2014

Annual freshwater withdrawals refer to total water withdrawals from agriculture, industry and municipal/domestic uses. Withdrawals can exceed 100% of total renewable resources where extraction from nonrenewable aquifers or desalination plants is considerable.

Our World in Data

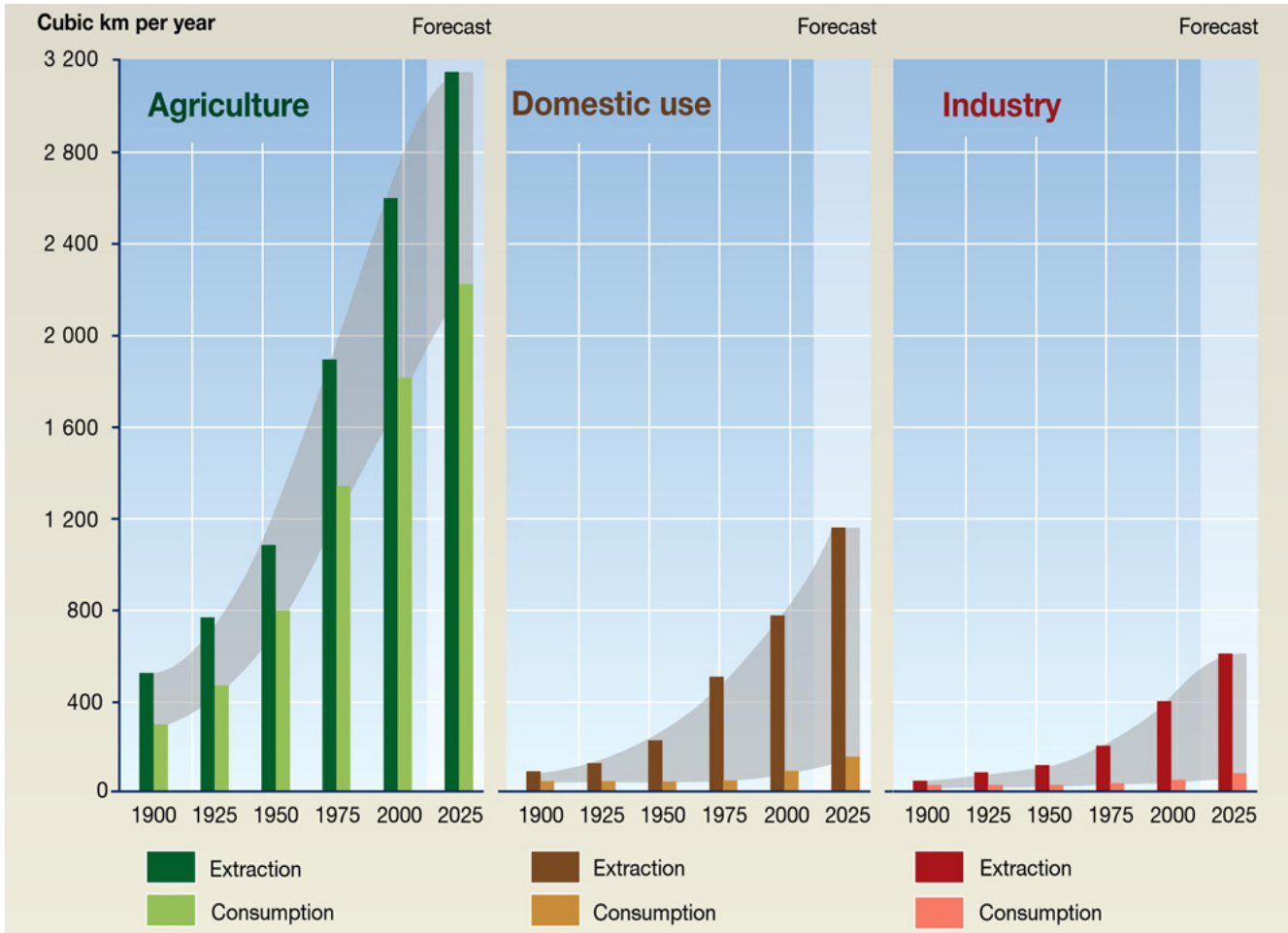


Source: UN Food and Agriculture Organization (FAO)

CC BY

<https://ourworldindata.org/water-use-stress>





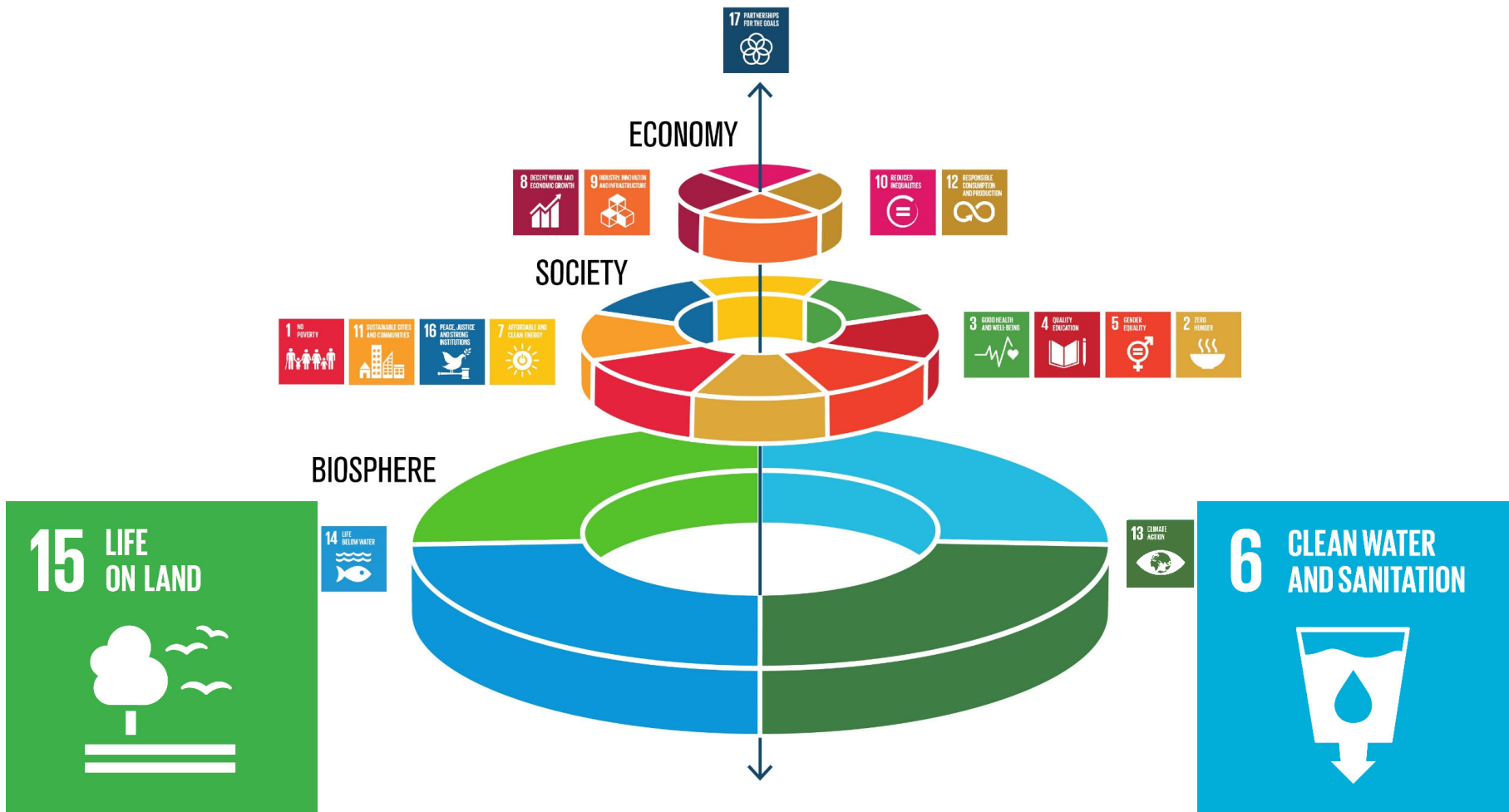
<https://www.grida.no/resources/5626>

# The Brisbane Declaration 2018

“Environmental flows describe the quantity, timing, and quality of freshwater flows and levels necessary to sustain aquatic ecosystems which, in turn, support human cultures, economies, sustainable livelihoods, and well-being.”

In this definition, “Aquatic ecosystems include rivers, streams, springs, riparian, floodplain and other wetlands, lakes, coastal waterbodies, including lagoons and estuaries, and groundwater-dependent ecosystems”

The image shows the front cover of a journal article. At the top left is the 'frontiers in Environmental Science' logo. At the top right, it says 'POLICY AND PRACTICE REVIEWS', 'published: 02 July 2018', and 'doi: 10.3389/fenv.2018.00045'. Below this is a 'Check for updates' icon. The title 'The Brisbane Declaration and Global Action Agenda on Environmental Flows (2018)' is prominently displayed in the center. Below the title is the list of authors: Angela H. Arthington<sup>1\*</sup>, Anik Bhaduri<sup>2</sup>, Stuart E. Bunn<sup>1</sup>, Sue E. Jackson<sup>1</sup>, Rebecca E. Tharme<sup>1,3,4</sup>, Dave Tickner<sup>1</sup>, Bill Young<sup>5</sup>, Mike Acreman<sup>6</sup>, Natalie Baker<sup>7</sup>, Samantha Capon<sup>8</sup>, Avril C. Horne<sup>9</sup>, Eloise Kendy<sup>9</sup>, Michael E. McClain<sup>10,11</sup>, N. LeRoy Poff<sup>12,13</sup>, Brian D. Richter<sup>14</sup> and Selina Ward<sup>15</sup>. A list of affiliations follows, numbered 1 through 15. On the left side, there are sections for 'OPEN ACCESS', 'Edited by:', 'Reviewed by:', and 'Correspondence:'. The main text on the right side of the cover provides a summary of the article's content, starting with 'A decade ago, scientists and practitioners working in environmental water management crystallized the progress and direction of environmental flows science, practice, and policy in The Brisbane Declaration and Global Action Agenda (2007)'. At the bottom, there is a citation: 'Arthington AH, Bhaduri A, Bunn SE, Jackson SE, Tharme RE, Tickner D, Young B, Acreman M, Baker N, Capon S, Horne AC, Kendy E, McClain ME, Poff NL, Richter BD and Ward S (2018) The Brisbane Declaration and Global Action Agenda on Environmental Flows (2018). Front. Environ. Sci. 6:45. doi: 10.3389/fenv.2018.00045'. The footer of the journal page includes 'Frontiers in Environmental Science | www.frontiersin.org', the page number '1', and the date 'July 2018 | Volume 6 | Article 45'.







Target

**15.1**

By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements



Target

**15.5**

Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species &lt;br&gt;



Target

**15.9**

By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts &lt;br&gt;



Target

**6.5**

By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate



Target

**6.6**

By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes &lt;br&gt;



Target

**6.4**

By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity &lt;br&gt;

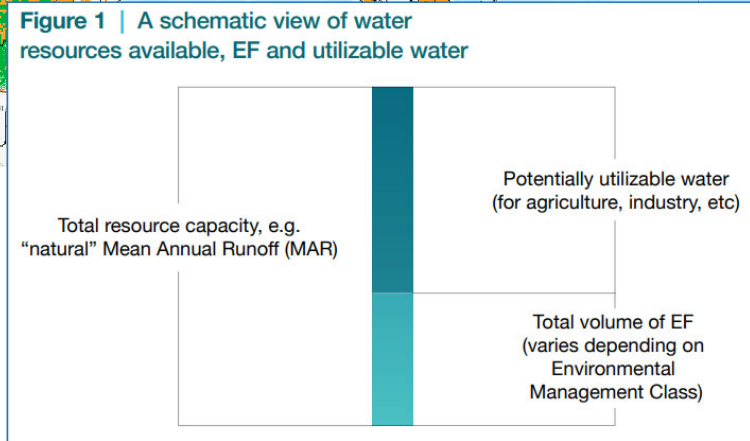
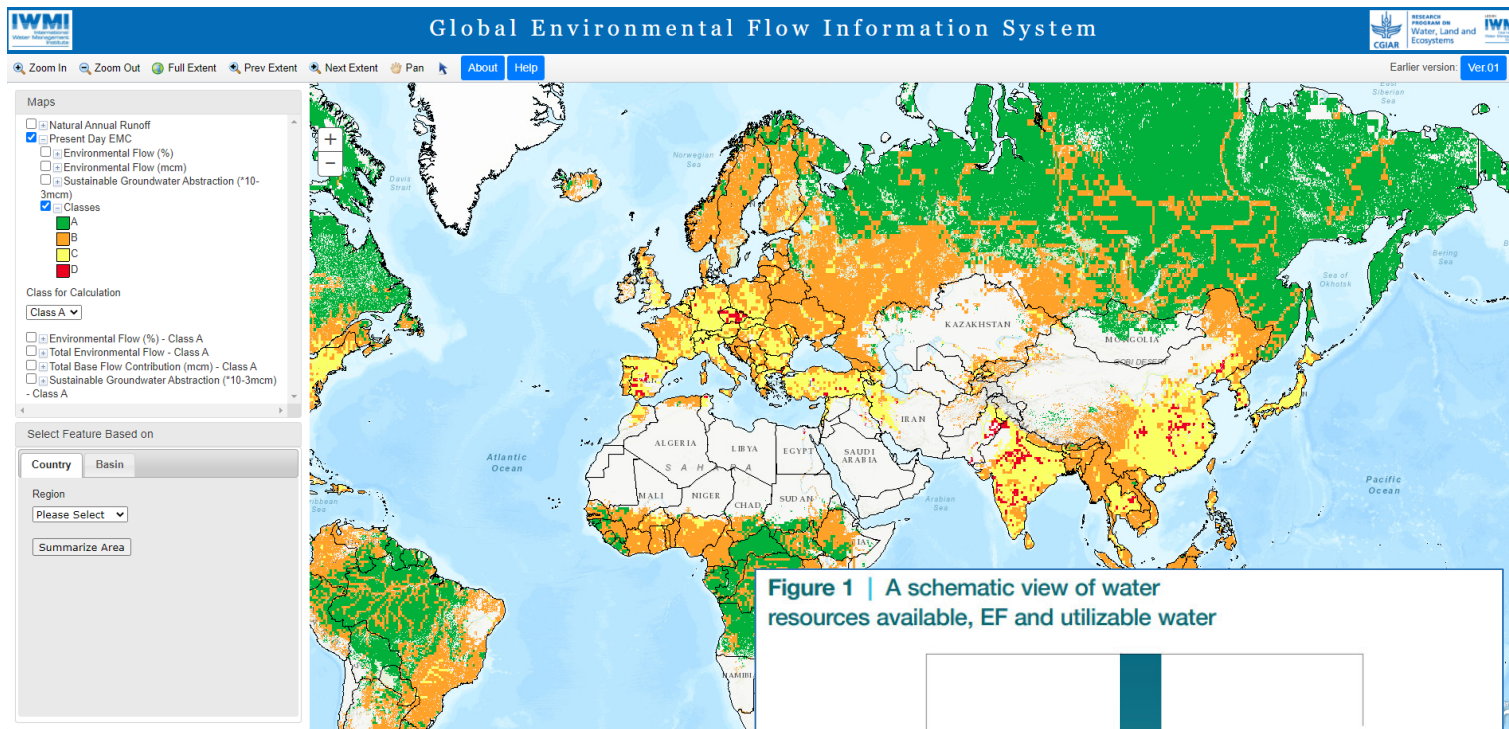


Food and Agriculture Organization  
of the United Nations

SDG 6.4 MONITORING SUSTAINABLE  
USE OF WATER RESOURCES PAPERS

Incorporating environmental  
flows into “water stress”  
indicator 6.4.2

Guidelines for a minimum standard  
method for global reporting



$$\text{Water Stress (\%)} = \frac{\text{TFWW}}{\text{TRWR} - \text{EFR}} * 100$$

<http://eflows.iwmi.org>

# 2018 Global Action Agenda on Environmental Flows

## STATEMENT

E-flows are essential to protect and restore biodiversity, aquatic ecosystems, and the ecosystem services they provide for all societies

## LEADERSHIP / GOVERNANCE

Develop and implement government e-flow programs to support achievement of water-related Sustainable Development Goals (SDGs)

Develop and implement government programs to support provision of e-flows to freshwater-dependent ecosystems, including Groundwater Dependent Ecosystems (GDEs)

## MANAGEMENT

Develop and implement e-flow programs that integrate surface and groundwater processes into e-flow planning, assessment, monitoring, and management

## RESEARCH

Quantify flow-ecology relationships and ecosystem services for all aquatic ecosystems that depend on fresh water, including GDEs.

Demonstrate ecological, economic, and societal benefits of e-flows and healthy freshwater-dependent ecosystems in programs and projects that support water-related Sustainable Development Goals (SDGs)



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Mara River Basin in Serengeti National Park



# 2018 Global Action Agenda on Environmental Flows

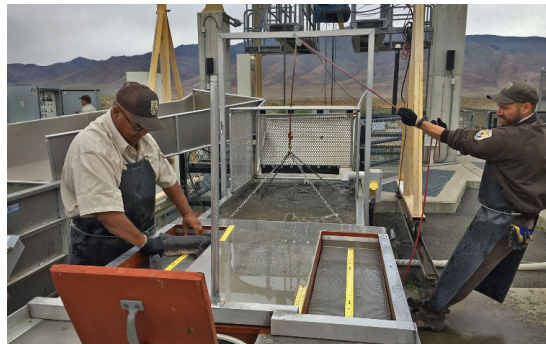
## STATEMENT

E-flows are critical to protect and restore the world's cultural and natural heritage

## RESEARCH

Improve understanding and quantify relationships between e-flows, healthy aquatic ecosystems, and cultural heritage values, and attachments to freshwater-dependent ecosystems

FWS staff measure and document cui ui as they pass through the facility at Marble Bluff Dam.



A Pyramid Lake Paiute tribal member hangs cui ui to dry for the winter in a historical photo. Courtesy photo: Pyramid Lake Museum and Visitor's Center.

# 2018 Global Action Agenda on Environmental Flows

## STATEMENT

E-flows have been compromised and today many aquatic systems around the world are at risk

## RESEARCH

Identify obstacles to implementation of e-flows in different world settings.

Improve systematic planning tools and trade-off processes that can guide the location, design, and operation of new dams/other water infrastructure, for social-ecological benefit



HidroAgoyan Dam, Pastaza River, Ecuador



# 2018 Global Action Agenda on Environmental Flows

## STATEMENT

Climate change increases the risk of aquatic ecosystem degradation and intensifies the urgency for action to implement e-flows

## RESEARCH

Conduct long-term studies of freshwater-dependent ecosystem adjustments and societal responses to changing flow and other environmental regimes in areas experiencing shifts in climate, human demographic patterns, and demands for water.

Research new approaches to maintain/restore ecological resilience and societal benefits in such areas.



Ramganga River, India



thank you



Michael McClain  
Professor of Ecohydrology  
[m.mcclain@un-ihe.org](mailto:m.mcclain@un-ihe.org)  
IHE Delft, The Netherlands  
Webinar Wednesday 18th  
September 2019