

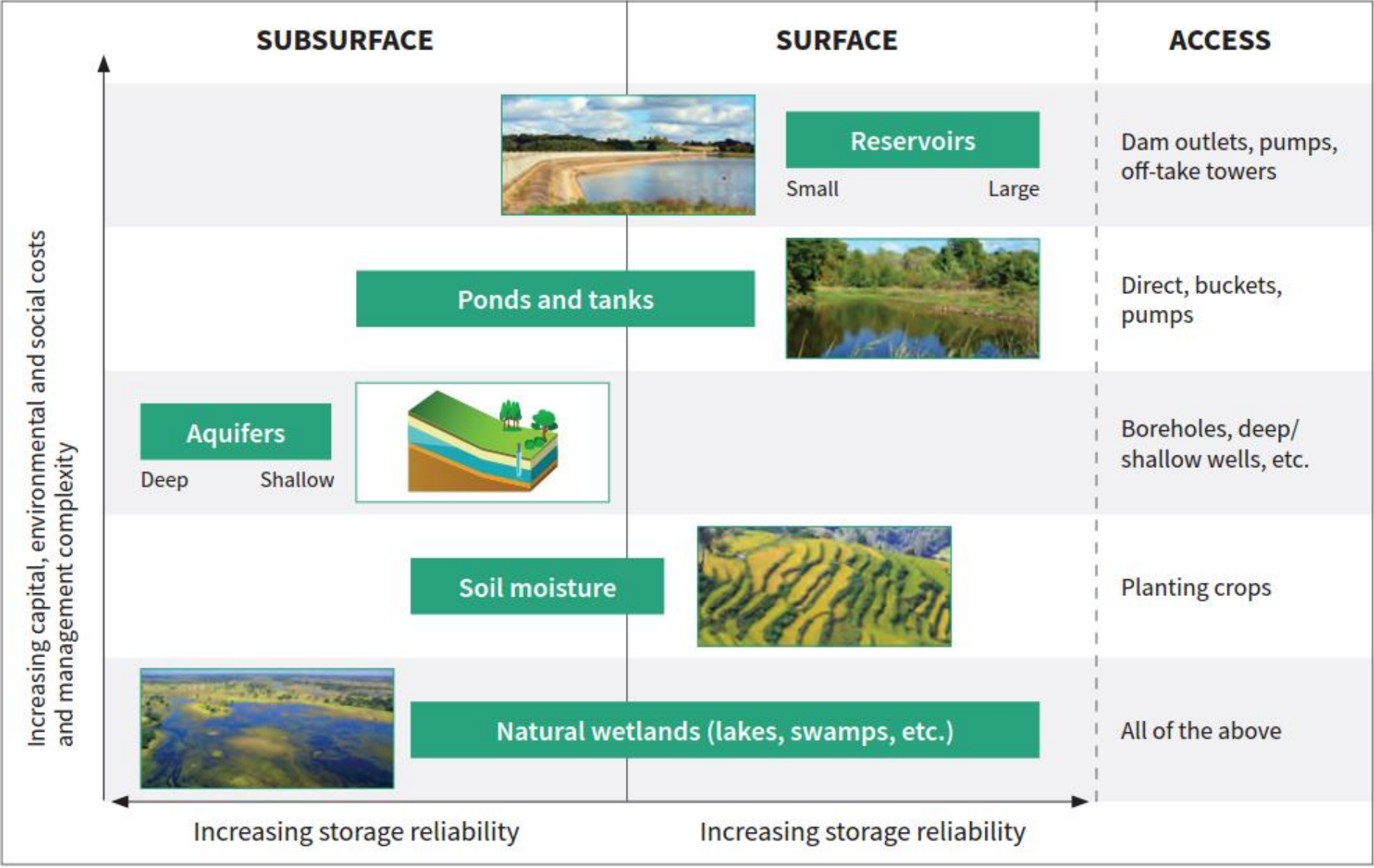
Protection Mechanisms for Rivers



Free-flowing rivers are the freshwater equivalent of wilderness areas.

They are amongst the most ecologically important freshwater habitats, and many are critical to both people and nature. But they are disappearing.





WWAP /UN-Water. 2018. World Water Development Report: Nature-Based Solutions for Water. Paris, UNESCO, adapted from McCartney and Smathkin, 2010.



Recreation

Pristine scenery and natural flows often offer recreational and business opportunities, including rafting, fly-fishing and wildlife watching.

Spiritual

In places around the world, free-flowing rivers hold cultural and spiritual importance.

Floodplain Agriculture

An important livelihood and food source in parts of the world, this kind of farming requires a connected, naturally flowing river to seasonally bring nutrients, sediment, and water.

Sediment Transfer

Connected, free-flowing rivers balance nutrients in soil and carry sediment downstream, including to deltas challenged by rising sea levels.

Healthy Floodplains

Connected rivers support healthy floodplains, which help reduce risks from floods and droughts.

Biodiversity

Rivers with high connectivity are among the most ecologically important freshwater habitats, places where vulnerable species can thrive and adapt to climate change.

Fish Stocks

Tens of millions of people depend on freshwater fish populations, many of which require certain natural conditions - such as seasonal flows and temperature changes - in order to breed and thrive.



Inland Fisheries

Globally 11.5 million tons catch/year from inland fisheries, worth > \$43 billion USD

Funge-Smith, S.J. 2018. Review of the state of world fishery resources: inland fisheries. FAO.


Habitat and refuge

Extinction rates for freshwater fish
in US and Europe 100x natural rates

Dias et al. 2017. Ecological Indicators 79:37.

Nutrient cycling & sediment delivery

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An aerial photograph showing a wide, muddy river channel flowing through a dense, lush green mangrove forest. The vegetation is thick and vibrant, covering most of the landscape. In the lower right quadrant, a person wearing a traditional conical hat and a red shirt is seated in a narrow wooden boat, navigating the water. The water appears slightly turbid, reflecting the surrounding greenery.

Sediment reduction in coastal deltas due to upstream dams ranges from 0-98%, contributing to sinking deltas around the globe

Syvitiski et al. 2009 Nature Geosciences 2:681.

Types of River Protection Mechanisms

Protected Areas

- Terrestrial or Wetland PA
- Community-managed Zones or Indigenous lands
- River-specific Designation
- Species Conservation Area
- Water Reserve


Areas designated via Mitigation or Avoidance

- Biodiversity Offset
- Strategic Environmental Assessment or Hydropower Planning




Case Studies of River Protection Mechanisms

<https://www.worldwildlife.org/publications/securing-a-future-that-flows--2>

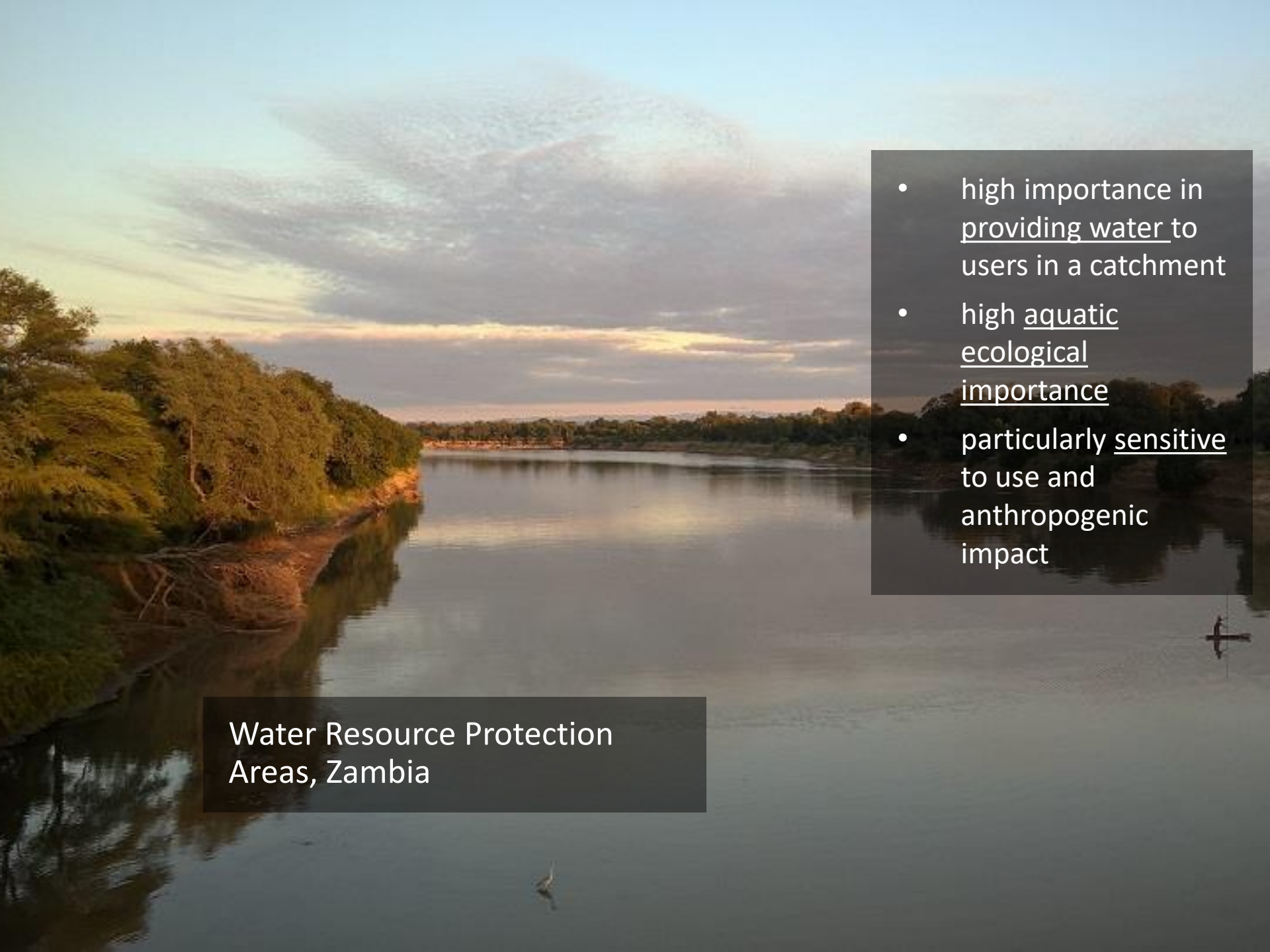
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- 1st National Law protecting rivers
 - Originated as mechanism to keep rivers free-flowing
 - 208 rivers, 20,400 km

Wild and Scenic River
Designations, USA

An aerial photograph showing a wide, brownish river winding through a vast, mountainous landscape. The mountains are covered in dense green vegetation and are layered in the distance, creating a sense of depth. The sky is clear with some light clouds. The river flows from the upper center towards the bottom of the frame.

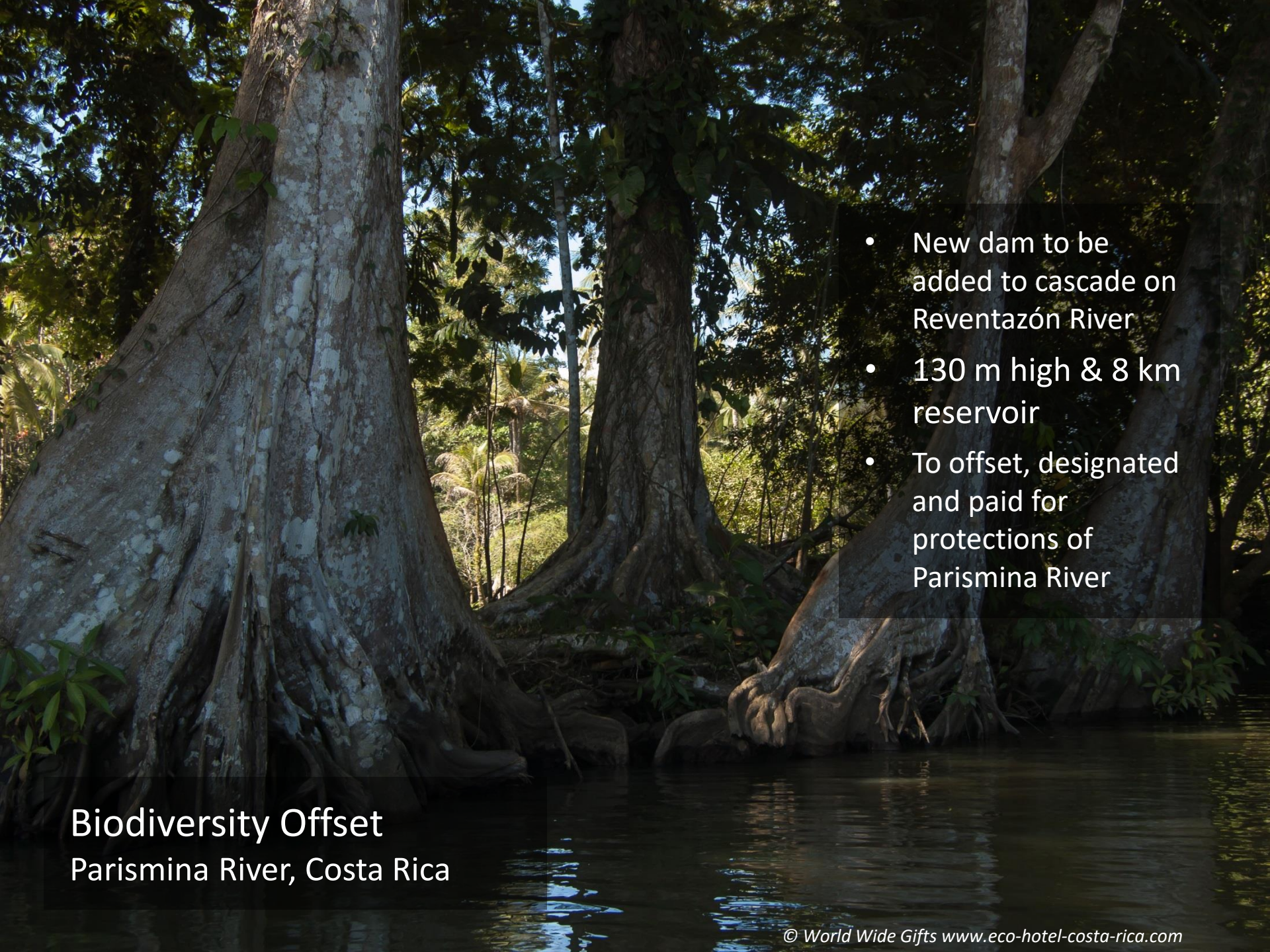
Water Reserves, Mexico

- Protect river flow in 300 basins
- volume of water in a river basin allocated for protection of nature and human consumption
- About half of volume of flow for the country



Water Resource Protection
Areas, Zambia

- high importance in providing water to users in a catchment
- high aquatic ecological importance
- particularly sensitive to use and anthropogenic impact



Biodiversity Offset
Parismina River, Costa Rica

- New dam to be added to cascade on Reventazón River
- 130 m high & 8 km reservoir
- To offset, designated and paid for protections of Parismina River



Thank you

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