



**freshwater
ecosystems:**
sources,
flows and
services

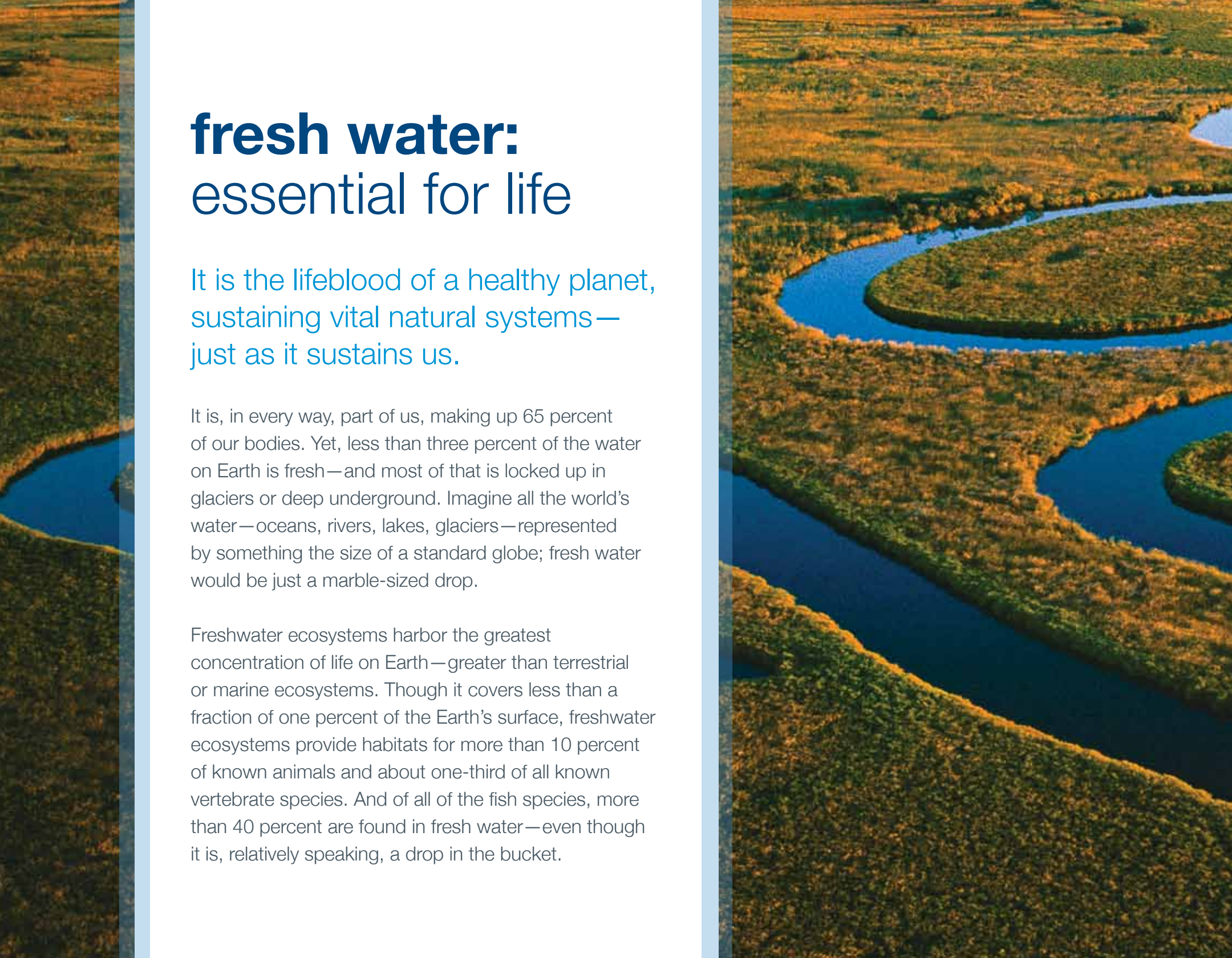


fresh water: essential for life

It is the lifeblood of a healthy planet, sustaining vital natural systems—just as it sustains us.

It is, in every way, part of us, making up 65 percent of our bodies. Yet, less than three percent of the water on Earth is fresh—and most of that is locked up in glaciers or deep underground. Imagine all the world's water—oceans, rivers, lakes, glaciers—represented by something the size of a standard globe; fresh water would be just a marble-sized drop.

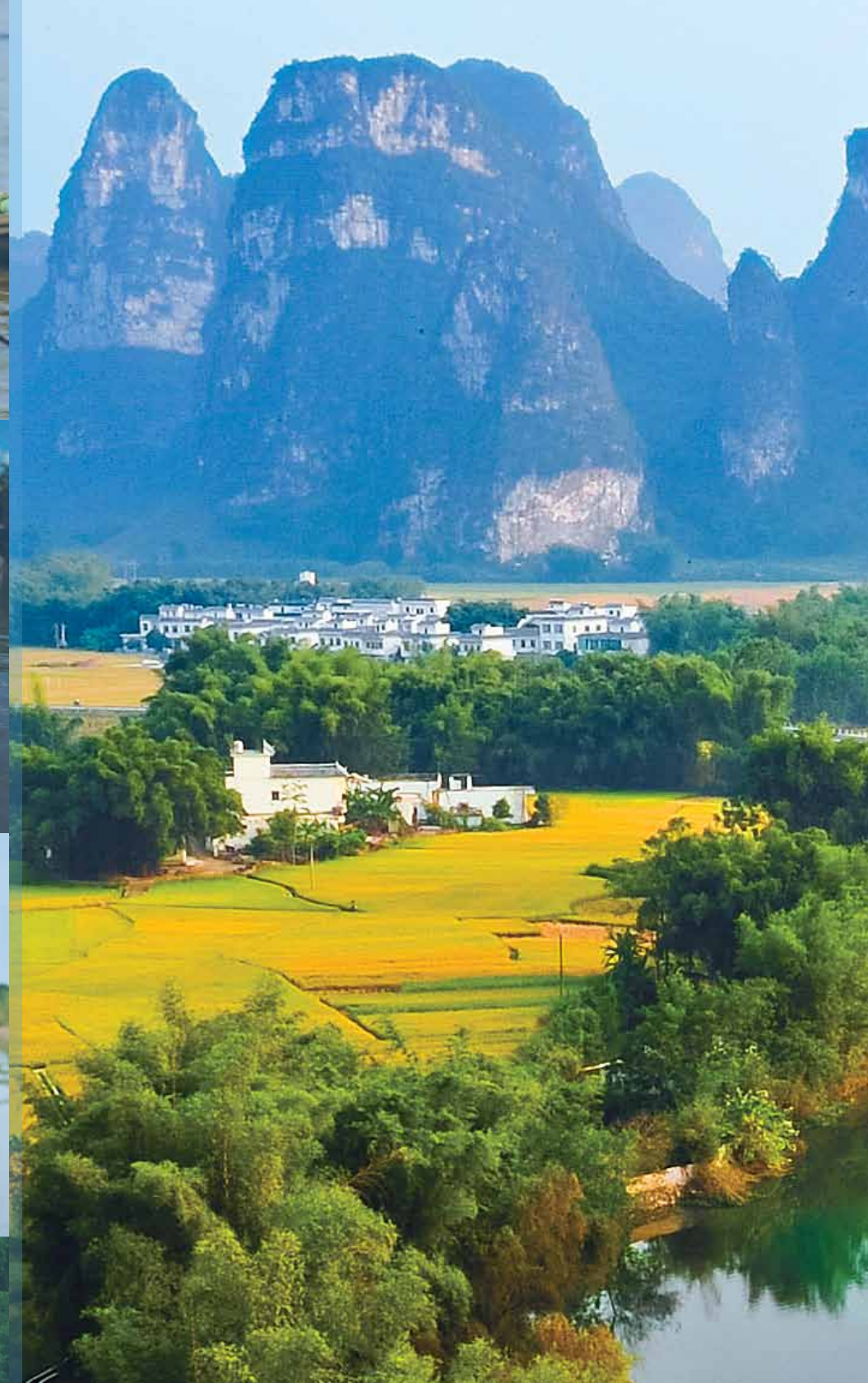
Freshwater ecosystems harbor the greatest concentration of life on Earth—greater than terrestrial or marine ecosystems. Though it covers less than a fraction of one percent of the Earth's surface, freshwater ecosystems provide habitats for more than 10 percent of known animals and about one-third of all known vertebrate species. And of all of the fish species, more than 40 percent are found in fresh water—even though it is, relatively speaking, a drop in the bucket.





Photos from left to right, top to bottom:
- Aerial view of the Okavango delta and swamps, Botswana. © George Steinmetz / Corbis
- Saddle-billed stork catching fish, Moremi Wildlife Reserve, Botswana.
© Richard Du Toit / Minden Pictures
- Macushi girl playing in the Rupununi River, Guyana. © Pete Oxford*
- Freshwater crab foraging on the forest floor. © Piotr Naskrecki*

*member of iLCP



Photos from left to right, top to bottom:
- River running through rice paddies in Guangxi, China. © Quan Long / iStock
- Women at a floating market in southern Mekong Delta. © Anka Kaczmarzyk / iStock
- Giant otter eating fish, Guyana. © Pete Oxford*
- Community fisherman in Manaus, Brazil. © William Crosse

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freshwater ecosystems provide many services

Freshwater ecosystems play an important role in moderating the location, distribution and timing of freshwater flows, ensuring that we receive a multitude of nature's benefits:

- drinking water
- water for bathing + sanitation
- water for food production
- hydroelectric power generation
- water purification + waste removal
- nutrient cycling
- transportation
- recreation
- flood control
- climate regulation

Despite its obvious importance, we overuse and abuse fresh water and degrade the ecosystems and watersheds that provide it. We must use water sensibly and equitably or we will suffer the loss of freshwater ecosystems and services—with the related human consequences of increased poverty, disease, food insecurity, political instability and even war.



freshwater ecosystem degradation + loss

- **Agriculture uses more than 70 percent** of available surface water each year.
- Nutrient runoff from agriculture has created algal blooms that deplete oxygen from the water and result in **dead zones**.
- Nearly 40 percent of the rivers in the U.S. are too **polluted** for fishing and swimming.
- Nearly every major river in the world has been dammed, **altering natural freshwater flows, cutting off migration routes and depleting fisheries downstream**.
- We have already **lost more than half of our planet's wetlands and an estimated 30 percent of freshwater species**.
- Sixty-nine percent of river catchments, responsible for the capture and provision of our freshwater supply, remain unprotected—putting **more than two-thirds of the source areas of our rivers at risk**.



Photos from left to right, top to bottom:

- Rice paddies near Makassar, Sulawesi, Indonesia. © Robin Moore / iLCP

- Teenager looking for recyclable items in polluted stream, India.

© David Woodfall / NPL / Minden Pictures

- Guri Dam, Venezuela. © CI / photo by Russell A. Mittermeier

- Health worker lifts slabs of mud to look for moisture in a dried lake bed in Mali.

© Karen Kasmauski

An aerial photograph showing a river meandering through a landscape of agricultural fields. The fields are divided into irregular shapes by thin lines, likely roads or irrigation canals. The river is a prominent feature, curving through the center of the frame. The overall color palette is dominated by blues and greens, with some brownish tones in the fields.

protecting + restoring freshwater ecosystems: our holistic approach

An ever-worsening water crisis demands that we respond aggressively with freshwater efficiency and ecosystem management. Failure is not an option—at the current rate, we will degrade the remaining 11 percent of ecosystems that provide us with freshwater services by 2050.

Conservation International (CI) strives to create a fundamental shift in how we manage our fresh water. Our freshwater strategy targets the protection and restoration of the sources, flows and services related to freshwater ecosystems that support more than 500 million people and 126,000 freshwater-dependent species.

CI is taking up the challenge to transform the freshwater sector, building upon our quarter-century of conservation experience, the strength of our diverse network of partnerships and our grounding in sound science and practice.

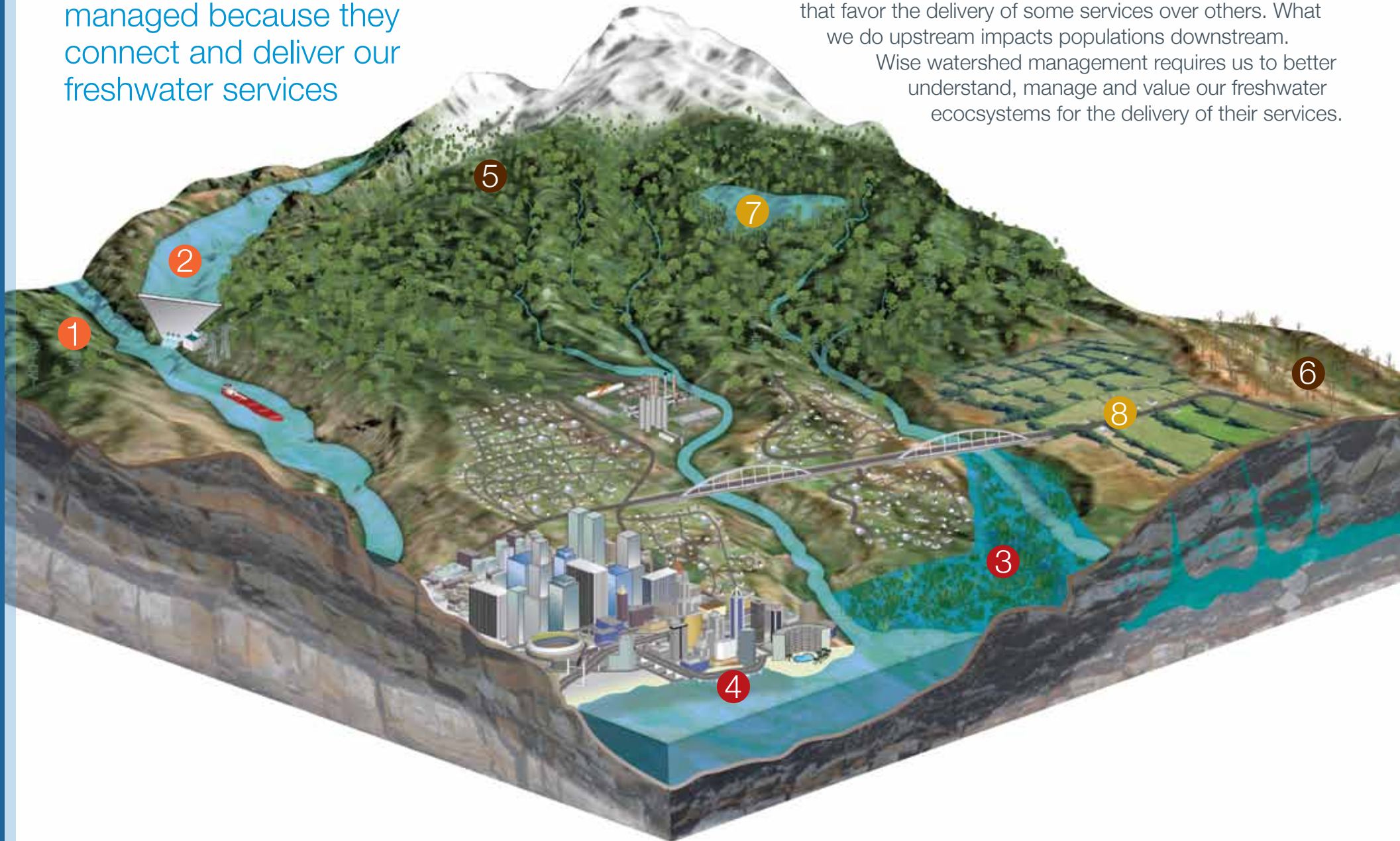
Our freshwater conservation program will deliver innovative, replicable solutions in watersheds vital to human interests. We will enhance freshwater security by increasing knowledge of improved water- and land-management practices, incorporating the value of freshwater ecosystem function and services into development decisions, strengthening markets for freshwater services, promoting good governance and water resource management policies and scaling up action for the conservation of natural freshwater systems, from headwater to estuary.

watershed management

watersheds must be well managed because they connect and deliver our freshwater services

Fresh water comes from glaciers melting and precipitation. It flows from ridges, down mountain tops and across our lands, replenishes our aquifers and empties into estuaries and oceans. It ultimately returns to the atmosphere from water and plants, starting the water cycle all over again. To make sure people and other freshwater-dependent life benefit from its bounty, we must avoid making decisions that favor the delivery of some services over others. What we do upstream impacts populations downstream.

Wise watershed management requires us to better understand, manage and value our freshwater ecosystems for the delivery of their services.



production + consumption



1 Free-flowing fresh water supports our most basic human needs. It allows us to grow food. It generates hydropower. It permits the migration of fish that are eaten by hundreds of millions. And it allows us to ship goods around the world.



2 If freshwater flows are diverted, as in the construction of dams or dikes, the day-to-day needs of people living downstream may be imperiled. Commercial fish stocks decline or even disappear. Dried up riverbeds no longer provide water for croplands. Shipping routes disappear.

protection + health



3 Freshwater ecosystems such as wetlands, rivers and floodplains protect humans from harm and secure our health. They filter pollutants to provide us with clean drinking water, they sustain wildlife and they buffer the impacts of storm surges and floods.



4 When freshwater ecosystems are degraded or lost, such as in filling in wetlands to build cities, wildlife becomes displaced or dies. People face increased exposure to pollutants and waterborne disease unless expensive treatment plants are installed. Exposure to flooding increases.

the cycles of life



5 The freshwater cycle replenishes freshwater supplies and flows. Precipitation falls from the atmosphere, flows over lands, fills our aquifers and evaporates back into the atmosphere, sustaining life on Earth.



6 As our climate changes, so does our planet's supply and flow of fresh water. Droughts and floods intensify and last longer. People must walk miles to access water. Crops die. Homes are destroyed. Plants, animals and people adapt or perish.

natural heritage + renewal



7 Fresh water helps renew us, culturally and spiritually, as well as physically. We swim in it, we catch its fish, we gaze admiringly at its wildlife and we place it at the center of some of our most ancient spiritual rituals.



8 If freshwater flows are overused, or if freshwater quality is compromised (e.g., as a result of poorly planned agriculture), much of fresh water's spiritual and cultural values are lost. Recreation and tourism also diminish as wildlife is displaced and aesthetic appeal decreases.

Photos:

1 Rows of soybean plants. © iStock

3 People fishing in a lagoon from a dugout canoe, Benin. © Peeter Viisimaa / iStock

5 Man farming seaweed. © Robin Moore*

7 A Macushi Amerindian boy plays in a river near his village in Guyana. © Pete Oxford*

2 Brown trout floating on a polluted lake. © David Kjaer / NPL / Minden Pictures

4 Flooded alley, Dominican Republic. © Peeter Viisimaa / iStock

6 Turkana woman carrying a bucket of water through an arid landscape. © Gerri Hernández / iStock

8 Polluted, trash-filled river. © Andrew Reese / iStock

*member of iLCP



freshwater security: three solutions

To solve our current water security and ecosystem management crisis, we are proposing three critical global-to-local solutions: We must better understand, manage and value our freshwater ecosystems, linking them across large watersheds.

understand

Identify places where species, ecosystems and services are highly concentrated and under threat, and evaluate the role that freshwater species and ecosystems play in delivering services to people in order to design effective interventions benefitting conservation and human well-being.

manage

Ensure good governance and secure protection of freshwater species and ecosystems, from headwaters to estuaries, by implementing eight flagship projects in key freshwater scapes and replicating and amplifying results across the globe.

value

Create incentives for using fresh water efficiently, reducing pollution and developing natural alternatives to meet water infrastructure needs—and attribute and capture the financial values of the ecosystem services that are provided by protecting and restoring freshwater ecosystems.





CONSERVATION
INTERNATIONAL



Conservation International brings government, business and local community leaders together to foster healthy, sustainable economies that promote human well-being while protecting our natural resources.

our vision

We imagine a healthy, prosperous world in which societies are forever committed to caring for and valuing nature, our global biodiversity, for the long-term benefit of people and all life on Earth.

our mission

Building upon a strong foundation of science, partnership and field demonstration, CI empowers societies to responsibly and sustainably care for nature, our global biodiversity, for the well-being of humanity.



people need nature to thrive

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Front cover photos, from left to right:
- Cambodian boy working in field. © Robert Churchill / iStock
- Piraputanga schooling in clear water stream, Brazil.
© Luciano Candisani / Minden Pictures
- River meandering through the tropical forests, Guatemala. © Robin Moore*

Back cover photos, from left to right:
- Lake Chamo and Nech Sar National Park, Ethiopia. © Joel Carillet / iStock
- Liberian woman. © CI / photo by Mike Matarasso

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