

understand

Freshwater species and ecosystems provide services we depend upon for our survival—but their future remains at risk. Conservation International (CI) is delivering solutions to restore the health of vital freshwater ecosystems and ensure that people and freshwater-dependent species can survive and thrive, both now and in the future.

## one solution: understand

### what do we mean by *understand*?

While we know relatively little about our planet's freshwater biodiversity or ecosystems, we do know that fresh water contains a higher concentration of biodiversity than either terrestrial or marine ecosystems. Of all of the fish species on the planet, for example, almost half are found in freshwater environments.

We also know that humans depend upon the essential goods and nearly 200 services that come from these ecosystems, from drinking water to hydroelectricity to fish for food, but we are losing these services even faster than we can fully comprehend how they benefit us. For our own well-being, we need to better understand what these services are, how they are threatened, where they are concentrated, and how they relate to both the ecosystems that sustain them and the people that benefit from them. In short we cannot manage threats to freshwater ecosystems unless we understand their impacts. We also need to gain insight into where rare and threatened species live in order to best protect them. CI will prioritize and target efforts in those places most critical for protecting ecosystem services and biodiversity.

## why is it important?

Our planet is covered by a network of springs, rivers, lakes, wetlands and underground aquifers; fresh water flows across landscapes, both on and below the surface, and empties into our oceans. Along the way, it supports a vast array of species and delivers a suite of services, including some that are more difficult to measure, like climate regulation and soil formation.

Freshwater ecosystems are made up of the fresh water itself and its flows, as well as microbes, plants, animals, rocks and soils. All of these components contribute to an ecosystem's capacity to function and deliver services. Functioning ecosystems help deliver the water that comes from our tap, the electricity that enters our homes, and the irrigation that helps grow our crops.

Freshwater species are important components of freshwater ecosystem function and serve as good proxies for freshwater ecosystem health. Current estimates of the total number of freshwater species are probably low because many freshwater species remain undiscovered or have not yet been scientifically described. For example, the number of scientifically recognized species of amphibians increased by 48 percent between 1985 and 2006. Without knowing how many freshwater species exist, it is easy to underestimate the value of this biodiversity and to insufficiently conserve and manage the freshwater systems.





## how is CI contributing?

CI and our partners are analyzing the critical components of freshwater ecosystems, including biodiversity, to determine how they interact with and deliver services to us. We are mapping places where freshwater biodiversity and the sources, flows and delivery of ecosystem services are the most concentrated. We are working to understand how humans disrupt ecosystem function and how climate change and our responses to it impact ecosystems.

We are also studying ecosystem services “trade-offs.” For example, if we build a hydropower dam upstream, it will generate electricity and allow for greater water storage and flood control, but it could also prevent fish migrations and cause the collapse of a fishery downstream. A sophisticated understanding of trade-offs and development alternatives will allow us to recommend solutions for managing our lands and waters to benefit both species and people.

## CI's niche

- Prioritizing the most valuable places, describing threats to freshwater ecosystems and creating effective interventions for conservation and service delivery through research and data analysis.
- Developing tools to improve decision-making in land and water resource use and management so that key threats are minimized, trade-offs between development and services are understood and the most important services are provided to people and species alike.

## results expected

- Global prioritization of places critical for the protection of freshwater ecosystem services for people and species, globally and locally.
  - Creation of a strategic global-to-local conservation agenda for CI and our partners for the next 10 to 20 years.
  - Quantification of the threats impacting freshwater ecosystems and the benefits that they provide, including water for drinking, irrigation and sanitation.
- 



For more information, contact:

Tracy Farrell, Senior Director, Freshwater Initiative; [tfarrell@conservation.org](mailto:tfarrell@conservation.org)

[www.conservation.org](http://www.conservation.org) | [people need nature to thrive](https://www.conservation.org/people-need-nature-to-thrive)

PHOTOS LEFT TO RIGHT: © FRANS LANTING, © CI / PHOTO BY DAVID EMMETT

- Reduction in the ecological footprint of infrastructure development and agricultural practices by demonstrating how freshwater ecosystems can be better managed to help sustain those services.
- Development of standards for planning and managing watersheds, landscapes and sites to integrate conservation and development, through the use of toolkit and web-based products and publications.
- Collection of data to create Integrated Water Resource Management (IWRM) plans for CI's flagship projects, which will suggest ways to provide an optimal mix of conservation, ecosystem service flows, sustainable use and land and water production for human well-being in critical geographies.

## priorities

- Filling in geographic and taxonomic gaps in the Global Freshwater Biodiversity Assessment to identify patterns of species distribution and threats, indicators of habitat quality and ecosystem health.
- Piloting cross-biome (terrestrial, freshwater and marine) Rapid Assessment Programs to build upon CI's headwater-to-estuary watershed conservation and seascape efforts.
- Defining freshwater hotspots, priority watersheds, and key biodiversity and ecosystem service provision sites—and goals for their conservation.
- Developing spatial planning and mapping tools for fresh water; field-testing and evaluating a new toolkit for our field programs.
- Mapping locations where ecosystem-based solutions for infrastructure needs and climate change adaptation can be accomplished by enhancing freshwater ecosystem management.