

An aerial photograph of a coastal landscape. In the foreground, a large body of water, possibly a bay or lagoon, is visible with a small island or peninsula extending into it. The water is a mix of light blue and greyish-brown. In the middle ground, a small town with colorful houses is situated on a green hillside. The background features steep, forested mountains under a clear sky.

Setting the stage: water, ecosystems, and health

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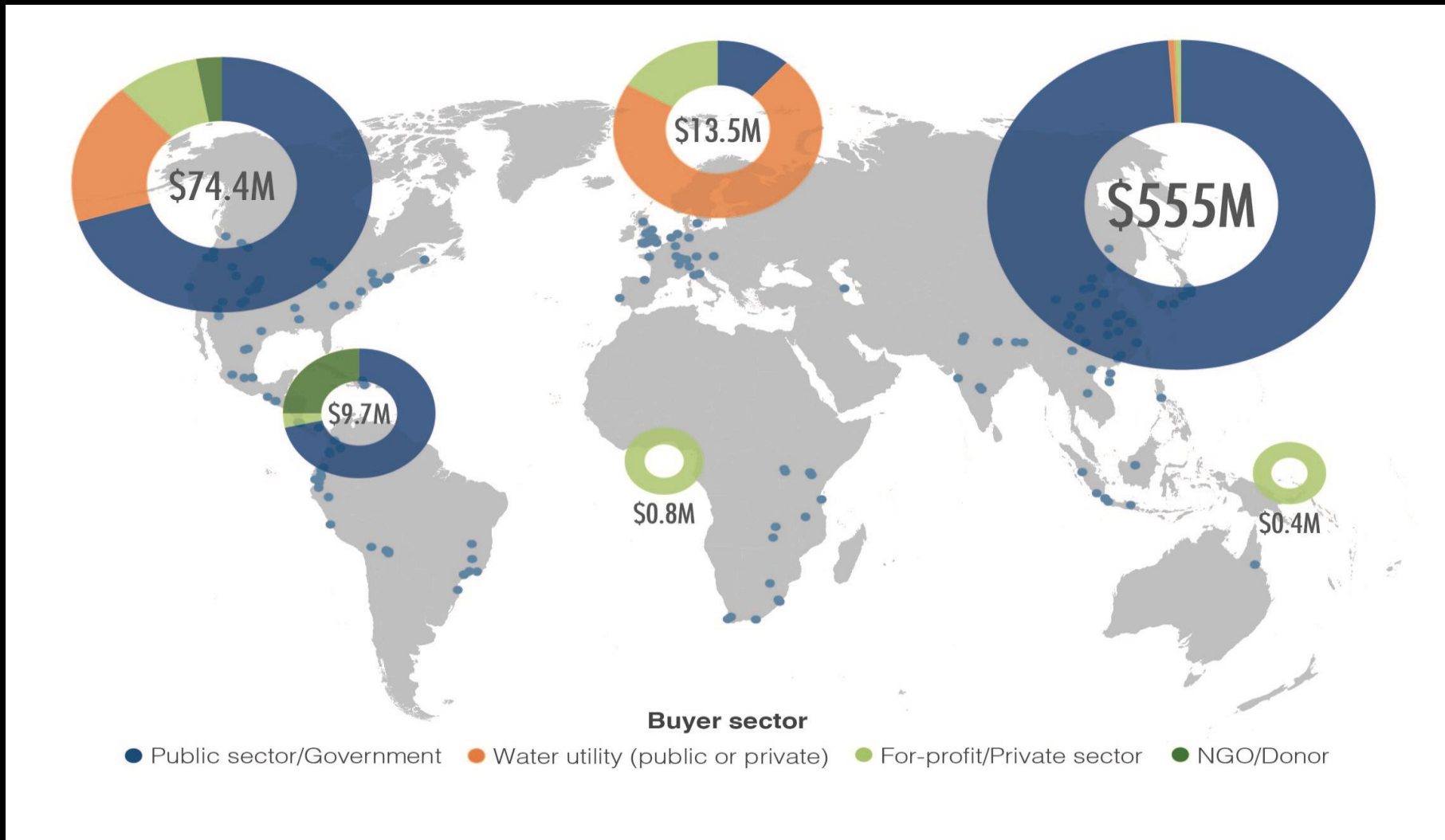
Green infrastructure as place-based stewardship

“It’s really about aloha aina.... It’s love for the land that then takes care of you. It’s the reciprocal relationship.”



KĀKO‘O ‘ŌIWI

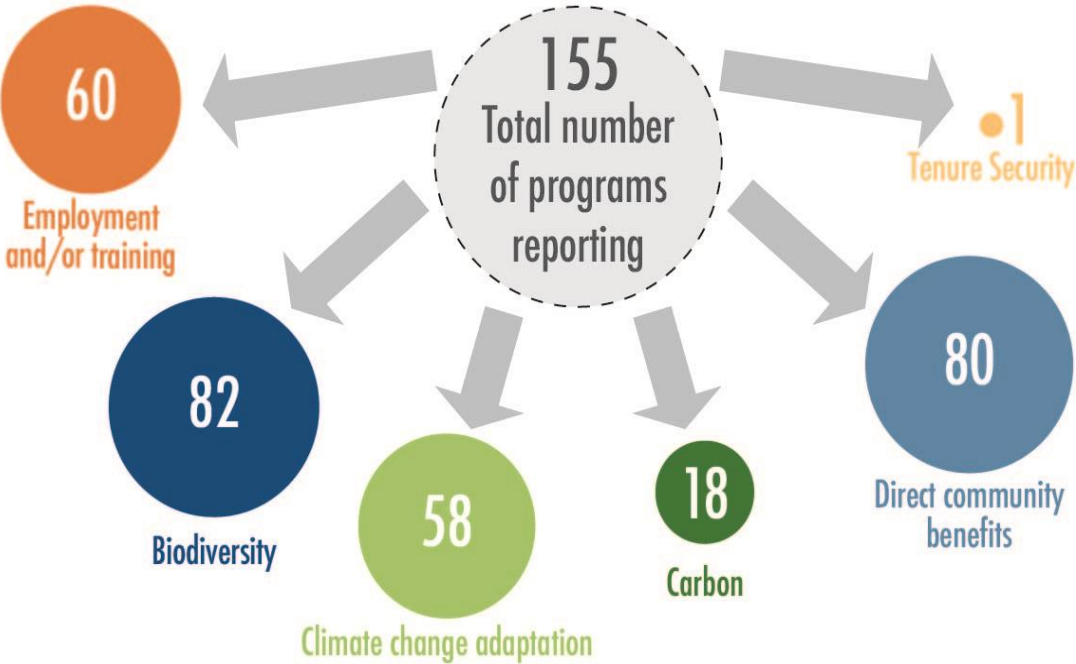
An exciting time - the water sector embraces green infrastructure



Bennett and Ruef
2016, State of
Investment in
Watershed Services,
Forest
Trends/Ecosystem
Marketplace

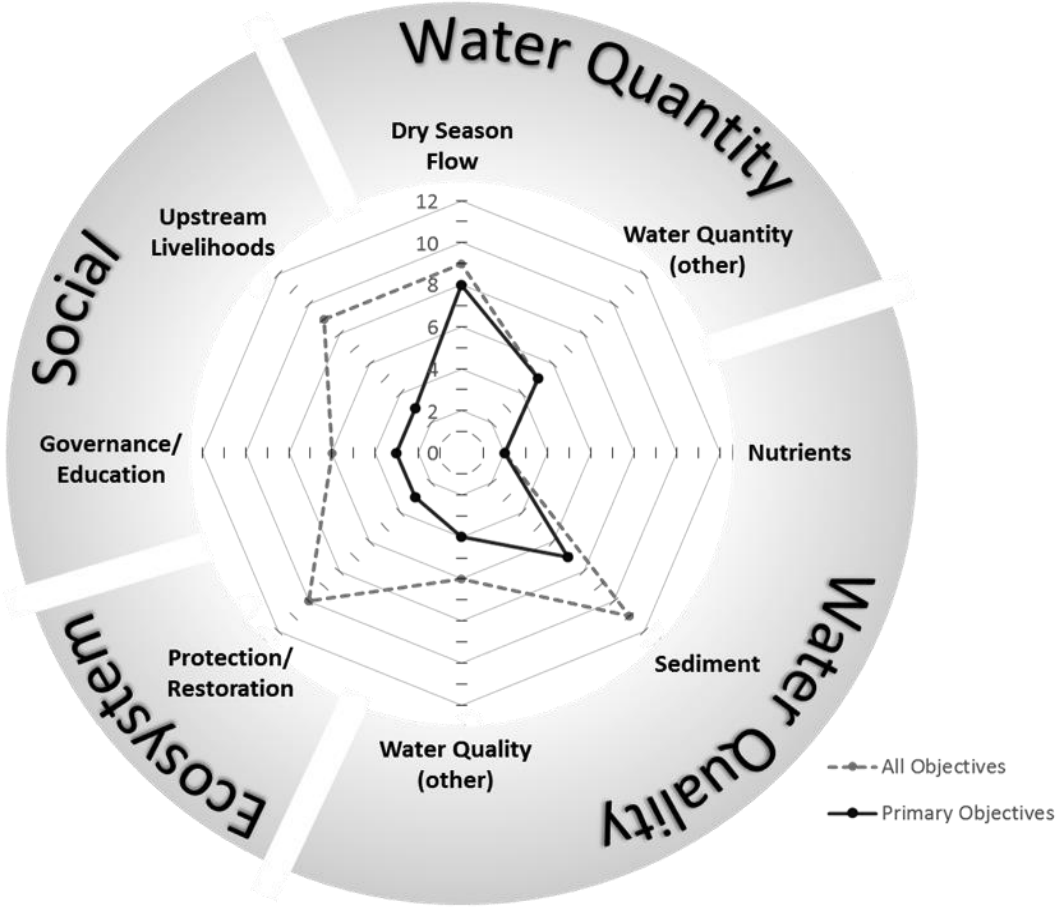
Green infrastructure addresses multiple objectives

Watershed investment reported co-benefits



Bennett and Ruef 2016, State of Investment in Watershed Services, Forest Trends/Ecosystem Marketplace

Water Fund Objectives



Bremer et al. 2016, Ecosystem Services

What about human health?

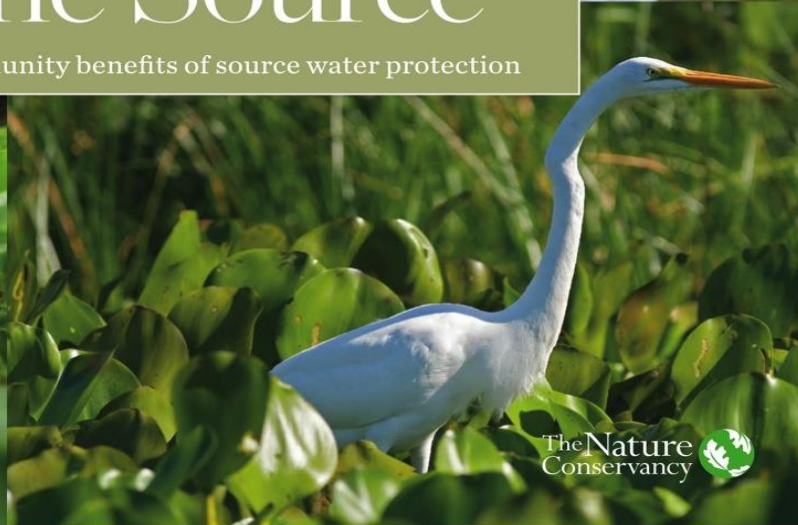
- “Many of the global health problems we face today are all linked to the decline of biodiversity and ecosystems” ~ Dr. Maria Neira, WHO
- <2% of assessments of human well-being outcomes of conservation address health (McKinnon et al. 2016)

Green infrastructure as a “strategic health care partner”



Beyond the Source

The environmental, economic and community benefits of source water protection



1. Green infrastructure as part of a systemic approach to clean water



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Cases of diarrhea attended at the Pucar Health Centre, Bolivia

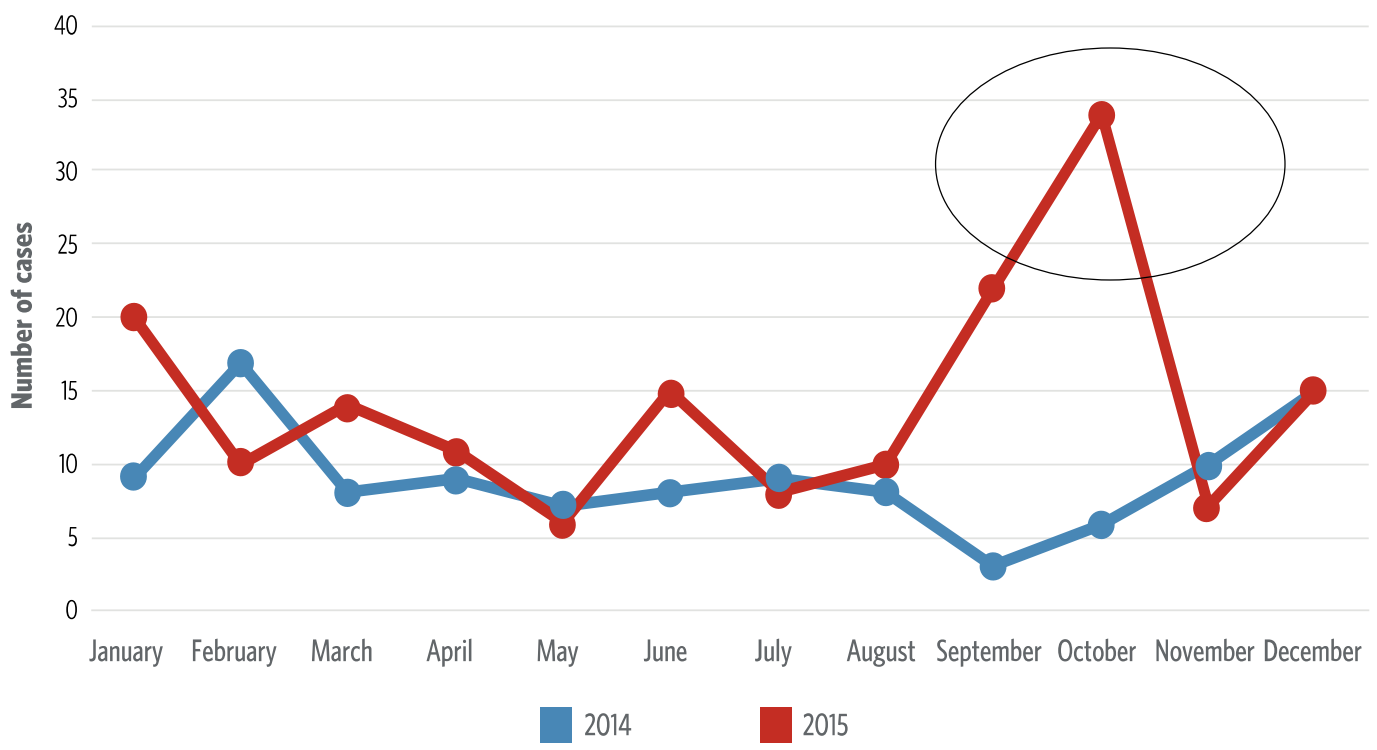


Figure 3.15. Cases of diarrhea attended at the Pucar Health Centre. The new water system was connected in August 2015.



Natura Bolivia, in Beyond the Source

2. Green infrastructure and the fight against “hidden hunger”



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Global malnutrition overlaps with
pollinator-dependent micronutrient
production

Rebecca Chaplin-Kramer¹, Emily Dombeck², James Gerber², Katherine A. Knuth², Nathaniel D. Mueller², Megan Mueller³, Guy Ziv^{1,4} and Alexandra-Maria Klein⁵

OPEN ACCESS Freely available online

PLoS one

Contribution of Pollinator-Mediated Crops to Nutrients in the Human Food Supply

Elisabeth J. Eilers^{1,2*}, Claire Kremen³, Sarah Smith Greenleaf⁴, Andrea K. Garber⁵, Alexandra-Maria Klein⁶

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2. Green infrastructure and the fight against “hidden hunger”



3. Green infrastructure boosts mental health



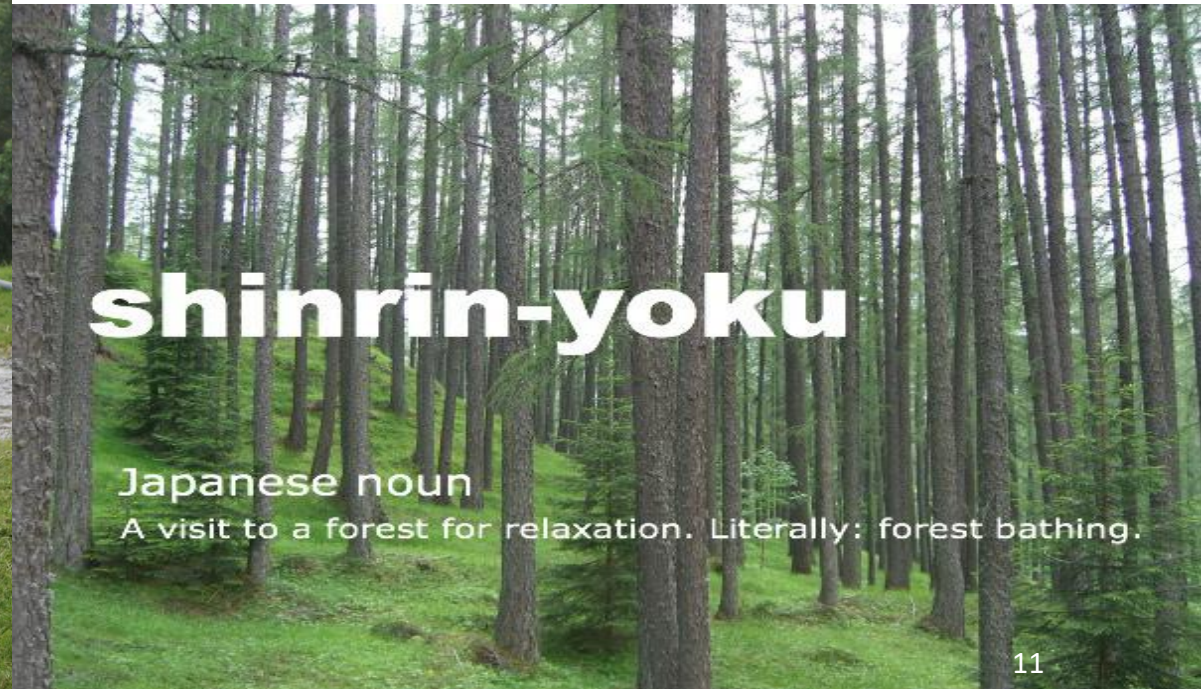
Nature experience reduces rumination and subgenual prefrontal cortex activation



YOUR HEALTH

Forest Bathing: A Retreat To Nature Can Boost Immunity And Mood

July 17, 2017 · 4:56 AM ET
Heard on [Morning Edition](#)



A lush, misty tropical forest with a prominent tree with red flowers in the foreground. The background is a dense, hazy forest of various green plants and trees. The foreground features a tree with a thick, gnarled trunk and a canopy of green leaves topped with bright red flowers. The overall atmosphere is soft and ethereal due to the mist.

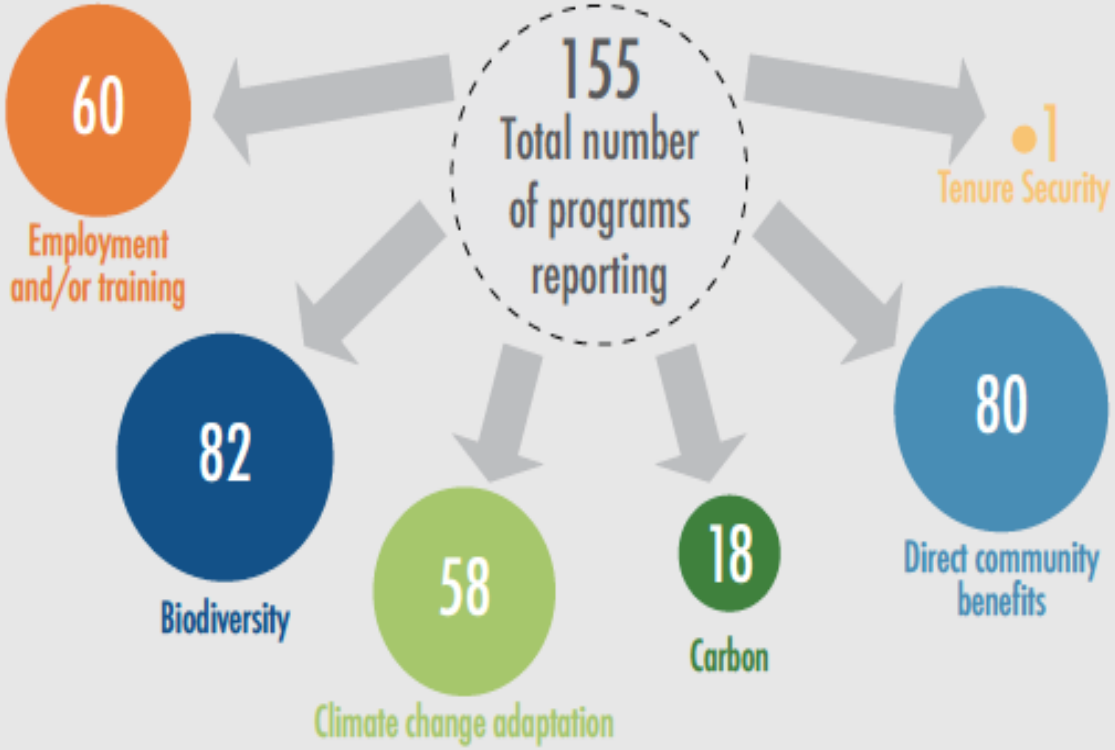
Mahalo!

lbremer@hawaii.edu

<https://global.nature.org/content/beyond-the-source?src=r.global.beyondthesource>

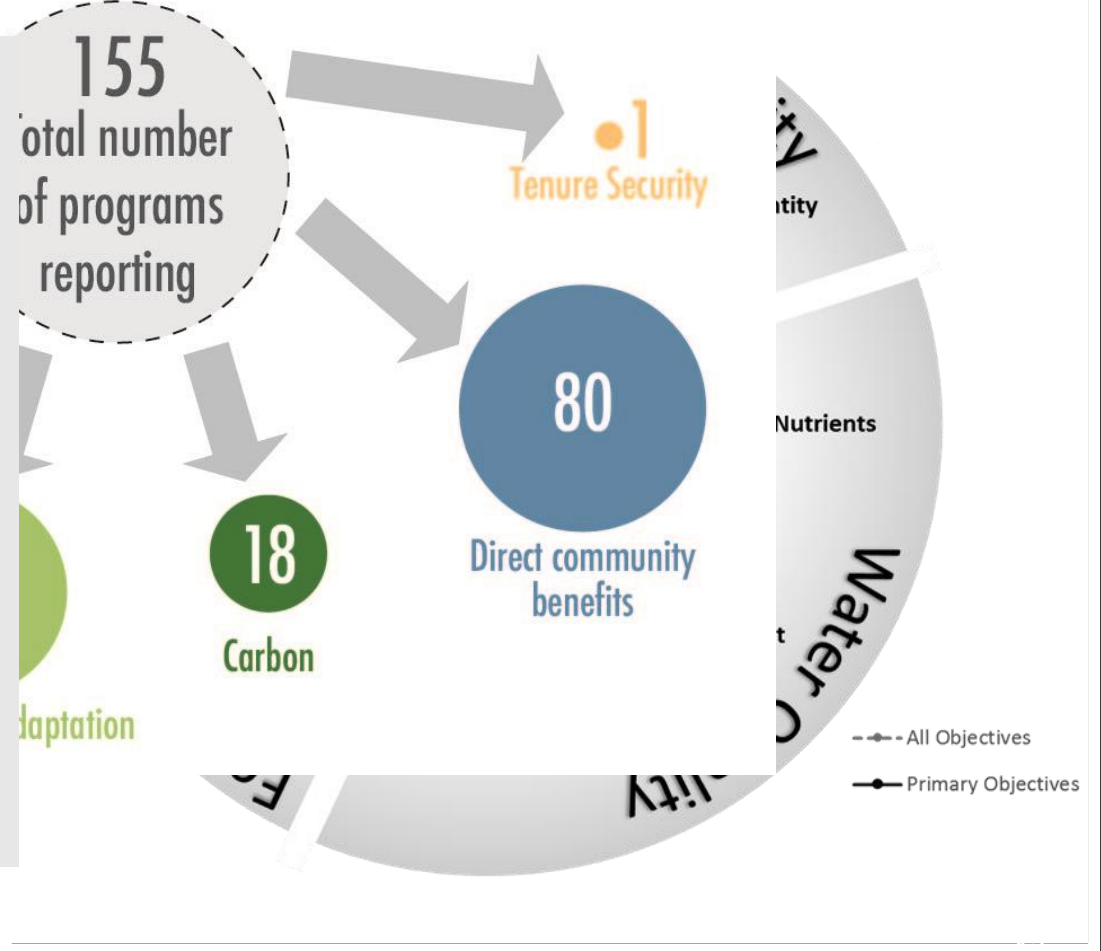
Green infrastructure addresses multiple objectives

Watershed investment benefits



Bennett and Ruel 2016, State of investment in watershed services, Forest Trends/Ecosystem Marketplace

Objectives



Bremer et al. 2016, Ecosystem Services

2. Green infrastructure and coastal fisheries

National dependence on coastal artisanal fisheries

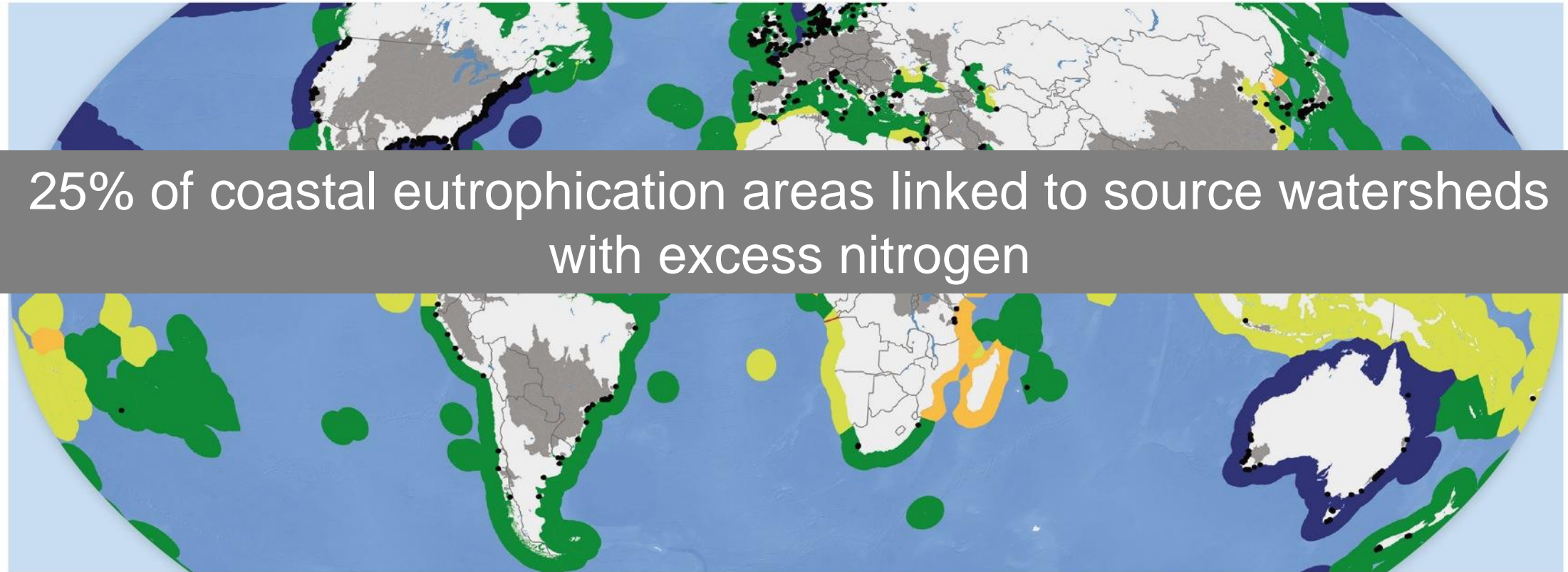


Figure 3.29. Dependence on artisanal fisheries, as determined by the Ocean Health Index based on the log-normalized per capita GDP adjusted for purchasing power parity. Lower PPPpcGDP areas are expected to depend more on small-scale artisanal fisheries for a source of protein and livelihoods than countries with higher scores. Urban source watersheds contributing to existing eutrophication problems are displayed in gray. (Source data: World Resources Institute eutrophication database 2013; Halpern, et al., 2012 ; World Bank GDP per capita data)

OHI Score: Dependence PPPpcGDP

Very low dependence (>0.8)

Low dependence (0.6-0.8)

Moderate dependence (0.4-0.6)

High dependence (0.2-0.4)

Very high dependence (<0.2)

Contributing watersheds

Urban source watersheds

Eutrophication point

Black dot