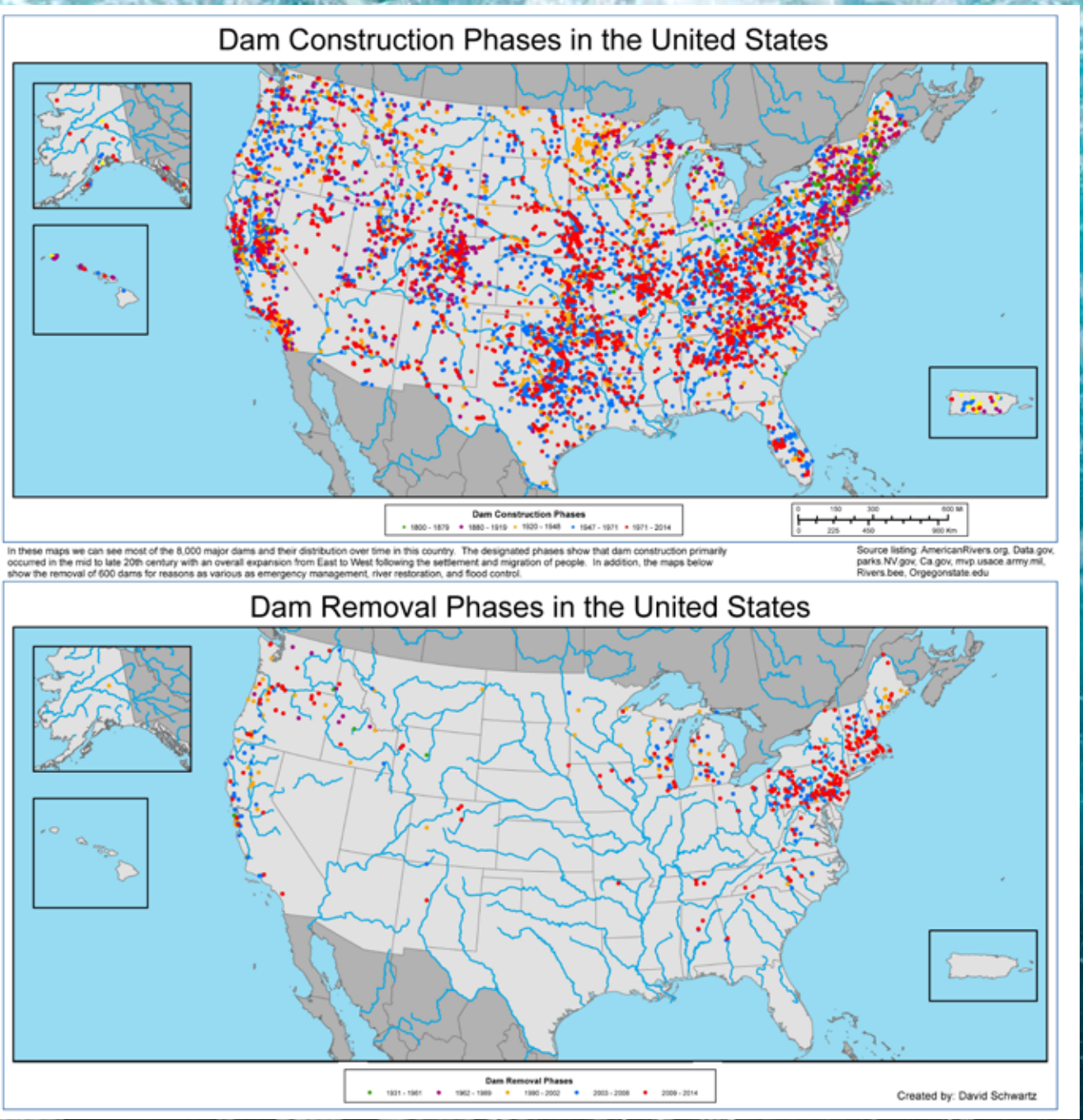
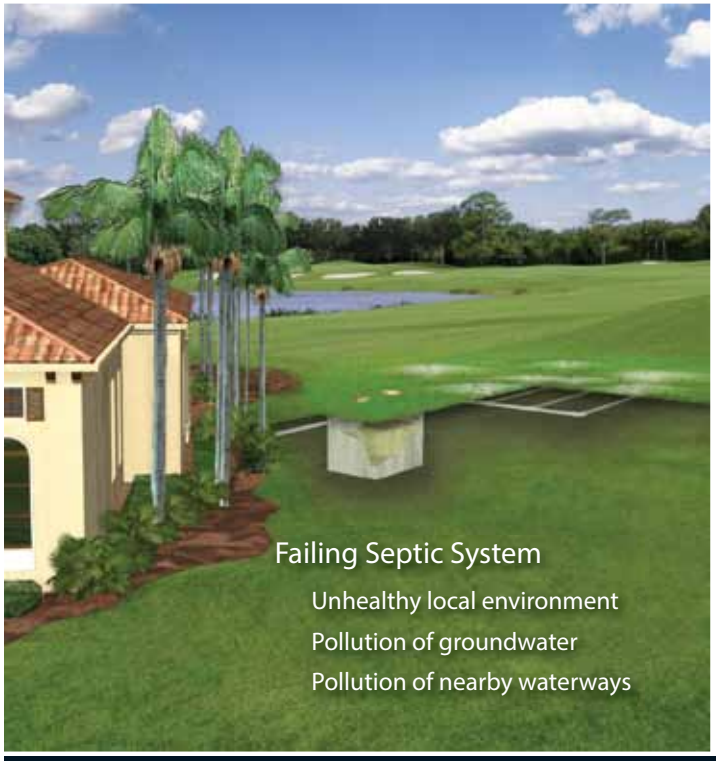


Following a successful crowd-funding campaign that raised almost $28,000, Guerrilla Cartography (Oakland, Calif.), a loose coalition of mapmaking enthusiasts, released *Water: An Atlas* in November 2017. The images on the next few pages show examples from this work.

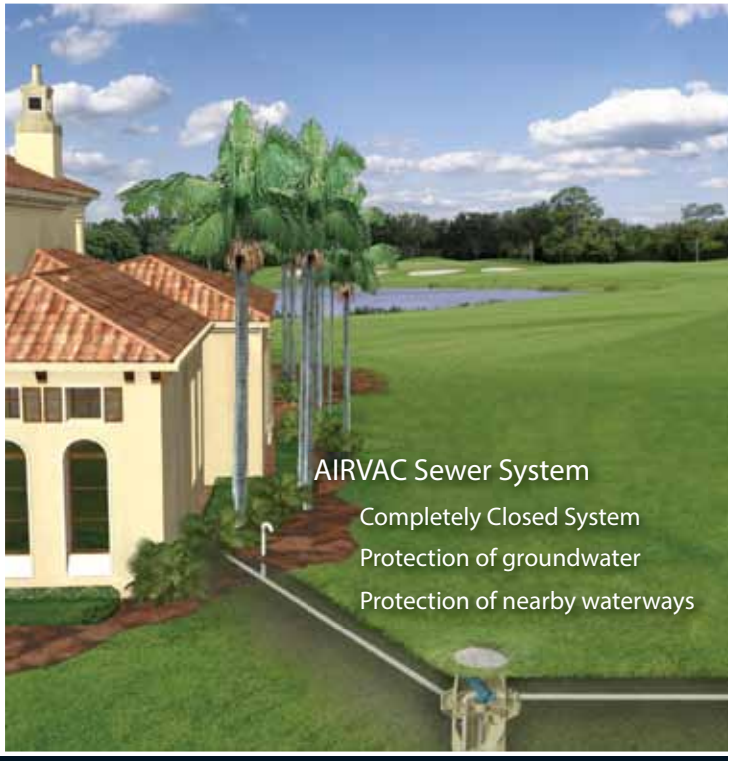
For this compilation, 80 volunteer mapmakers from around the world worked on the atlas. It presents rarely considered sides of how human water use shapes the planet and vice versa.

The map shown here, contributed by California State University (Long Beach) graduate student David Schwartz, offers a timeline of dam construction and removal in the United States from 1800 to 2014, illuminating a pattern that follows westward human migration. David Schwartz/Guerrilla Cartography

POLLUTION



SOLUTION



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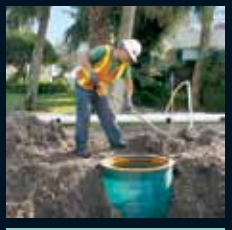

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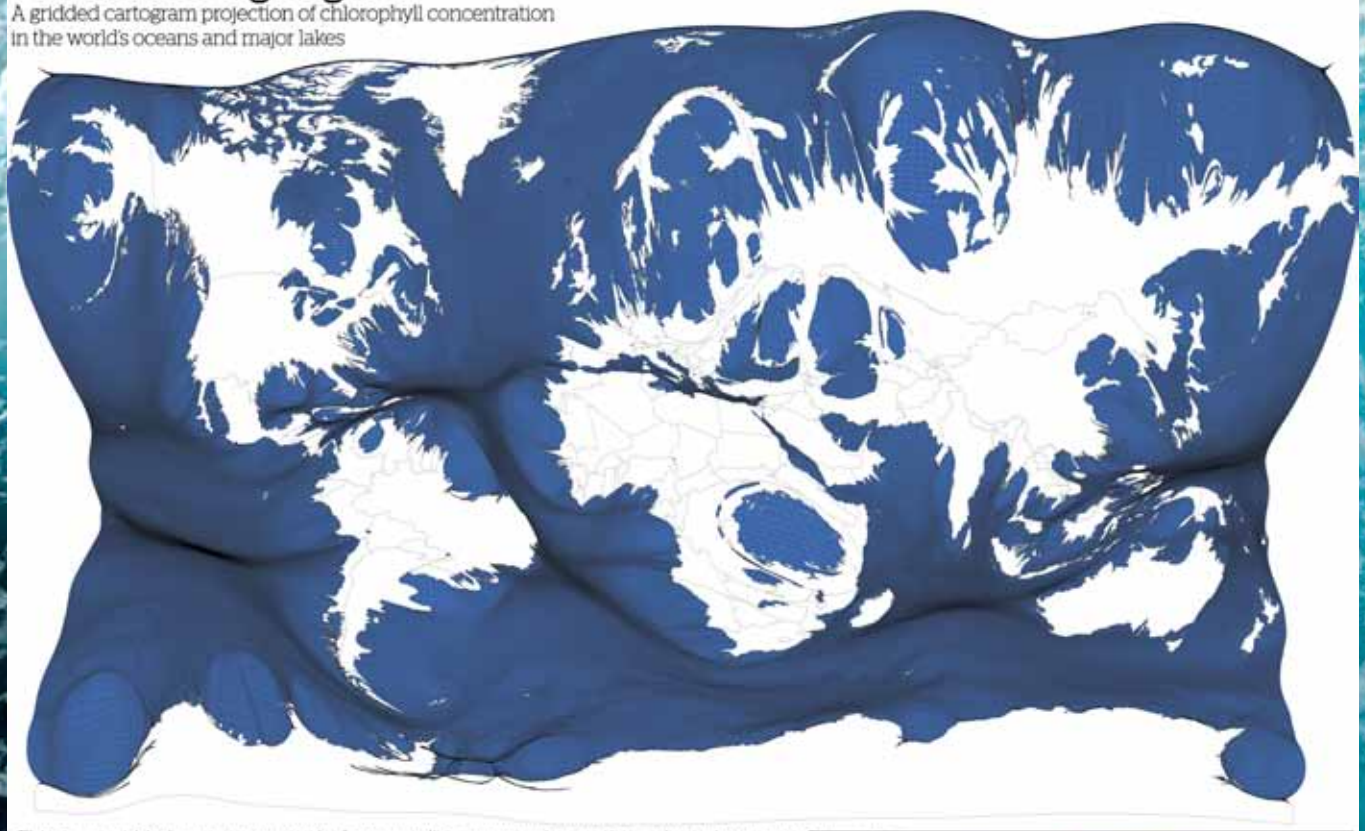
Where the algae grow

A gridded cartogram projection of chlorophyll concentration in the world's oceans and major lakes



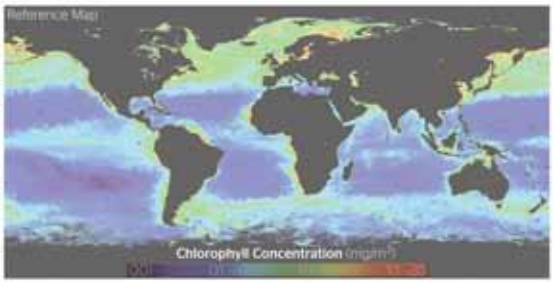
This is a gridded cartogram made from satellite sensor observations about long-term chlorophyll concentration estimates in the world's oceans and largest lakes.

Chlorophyll concentrations in the world's oceans are important indicators for the presence of algae and other plant-like organisms that carry out photosynthesis. Variations and changes in the chlorophyll levels are relevant for the study of the ecology of the sea. Changing chlorophyll levels can also indicate changing sea temperatures and other changing conditions in the oceans that cover about 72% of the planet's surface.

The visualisation shows the quantitative distribution of global chlorophyll concentration as highlighted in the smaller reference map. In a 'gridded cartogram', each of the grid cells shown covers an equal physical space of water area and is then resized according to the total amount of chlorophyll measured in this area.

Sea areas with the highest density of algae and other photosynthetic organisms appear largest while areas with low concentrations disappear into dark black areas where the grid cells converge. The map highlights the increasing levels at most of the coastal zones of the continents which appear as bizarrely distorted white islands in the sea.

Higher levels can be seen along the west coasts of the Americas as well as Africa where rising cold water streams lift nutrients from the ocean floor that support phytoplankton growth. Coastal upwellings also influence the high chlorophyll concentrations of the surface waters in the Baltic Sea. This is also case for the largest lakes, such as Lake Victoria in Africa. In contrast, the dark band of low chlorophyll levels around the Equator eastwards the coast of South America is influenced by the easterly trade winds that also help the upwelling of deeper water layers.



Data source:
MODIS, NASA Earth Observations (2014)

Author:
Benjamin D. Hennig, University of Iceland
www.viewsoftheworld.net

Topics in *Water: An Atlas* are diverse. They range from how water has been used as a weapon in recent conflicts in Iraq and Syria to speculations on where the fabled underwater city of Atlantis might be located. They also run the gamut of complexity.

This map, contributed by Benjamin Hennig from the University of Iceland (Reykjavik), uses satellite observations to chart chlorophyll concentrations and algae growth in lakes and oceans throughout the world. Benjamin D. Hennig/Guerrilla Cartography

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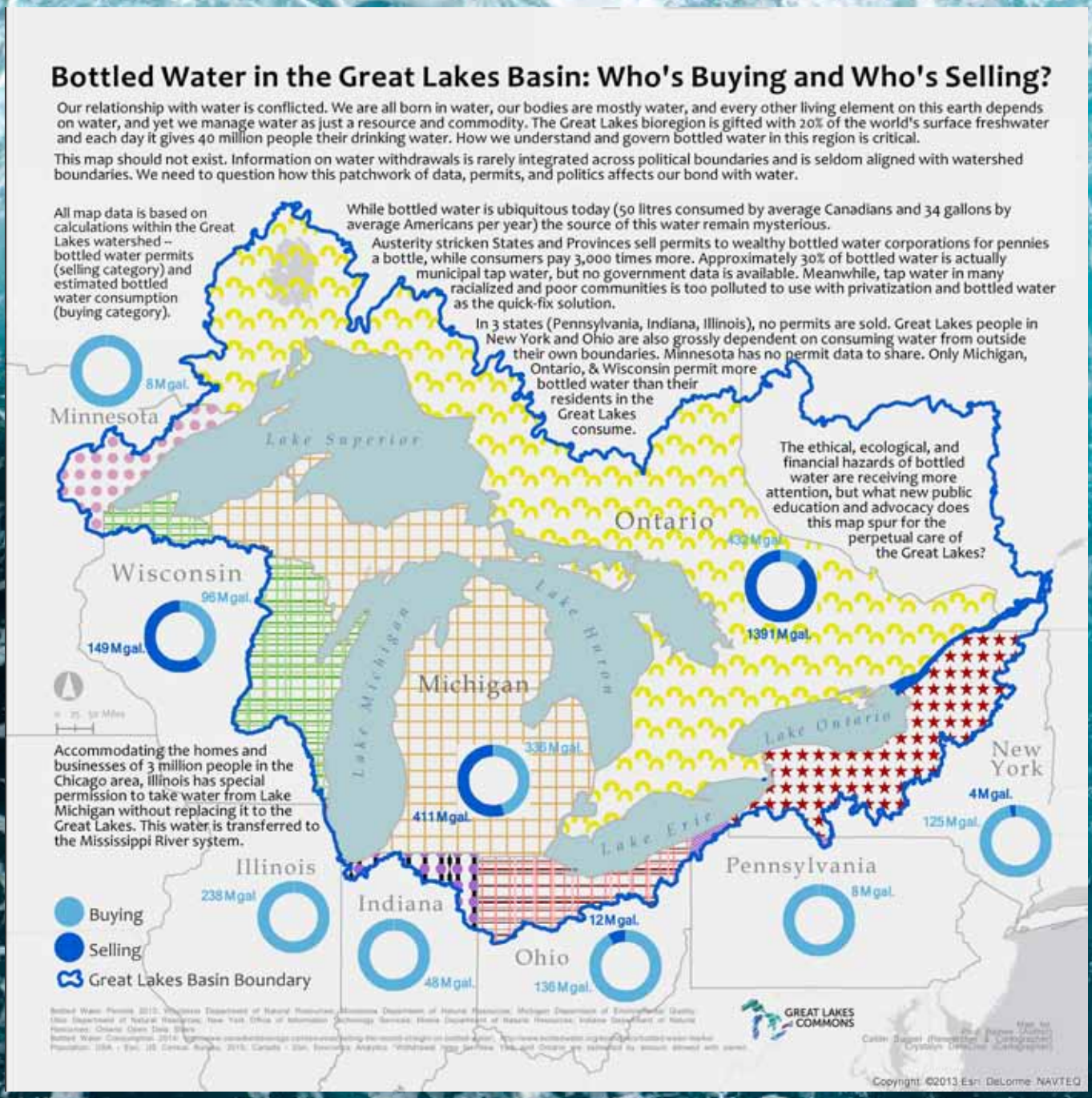

Distribution is a major focus of *Water: An Atlas*, as seen in this map by researchers with Great Lakes Commons (Minneapolis, Minn.). The map depicts how much water each of the U.S. states and Canadian provinces bordering the five Great Lakes draws for use in bottled water. Paul Baines, Crystalyn DelaCruz, and Caitlin Scopel/Guerrilla Cartography

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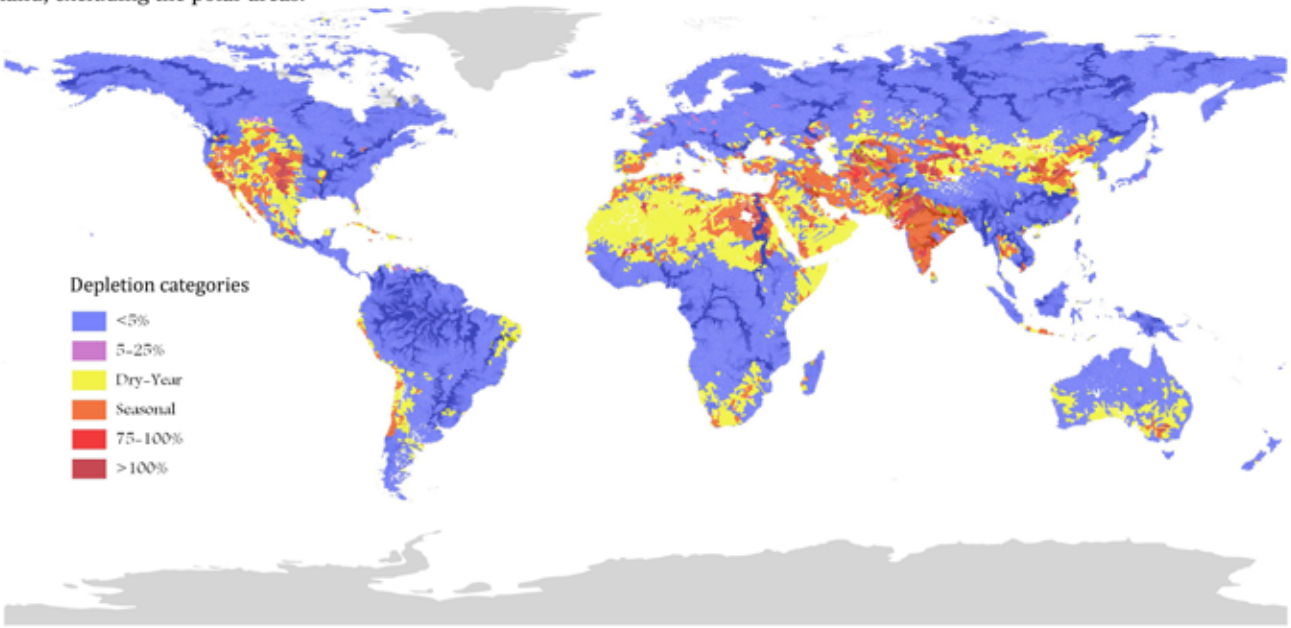
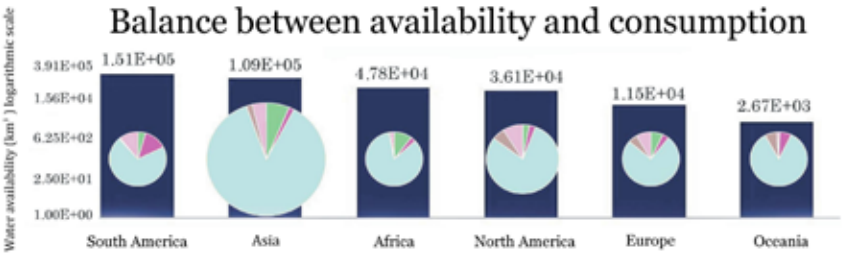
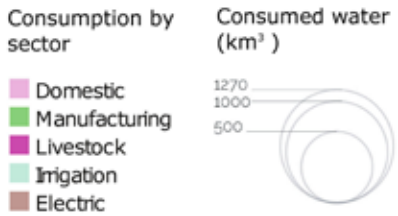
Water Depletion in Global Watersheds

A continental perspective

Water depletion describes the fraction of available, renewable surface and groundwater that is consumed by human activities. A large fraction of annually available water may be used up every year (percentage categories), or water may be scarce only during certain times of year (seasonal depletion) or during dry years. This map illustrates water depletion based on water availability between 1971 and 2000 and water use in the year 2005. It includes 15,091 watersheds larger that 1,000km , constituing 90 percent of the world's land, excluding the polar areas.







"Balance between availability and consumption" logarithmic graph reading guidelines:

A logarithmic scale allows us to visually mitigate the differences between regions while presenting the relative amounts between them. For example, the difference between South America's and Oceania renewable surface and groundwater availability (151,000 km³ vs 2,670 km³ , repectively) is too drastic to show on this map, but a logarithmic rather than a linear scale can still help us represent relative water availability in different regions. "E" notation has been used instead of standard notation; 1.51E+05 translates to 1.51x10^5.

Map and graphs based on data used and generated in the study "Water depletion, an improved metric for incorporating seasonal and dry-year scarcity into water risks assessment". Authors: Kate A. Brauman, Brian D.Richter, Sandra Postel, Marcus Maly, Martina Flörke; published in the Journal Elementa Science of the Anthropocene 2016;4:83.
Cartographers: Perrine Laroche, Natalee Desotell

During the crowd-funding campaign for *Water: An Atlas*, 72 backers had the opportunity to choose local schools and libraries to receive free copies of the finished book. With the goal of using Internet-enabled collaboration to spread water awareness across the world, a free digital download of *Water: An Atlas* will be made available on the Guerrilla Cartography website, www.guerrillacartography.org. Natalee Desotell and Perrine Laroche/Guerrilla Cartography

Water Environment Federation

TRAINING AND EDUCATIONAL EVENTS '18

March 18

Odors and Air Pollutants

March 25–28
Portland, Oregon
wef.org/OdorsAir

April 18

Collection Systems

April 8–11
Virginia Beach, Virginia
wef.org/CollectionSystems

May 18

Residuals and Biosolids

May 15–18
Phoenix, Arizona
wef.org/ResidualsBiosolids

June 18

Nutrient Removal and Recovery

June 18–21
Raleigh, NC
wef.org/Nutrients

July 18

Disinfection & Reuse Symposium

July 29–31
Portland, Oregon
wef.org/DisinfectionReuse

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