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World's rivers in crisis, scientists report

UW researcher is co-author of first global study of fresh water, humans

By [Don Behm](#) of the Journal Sentinel

Sept. 29, 2010 | [\(48\) Comments](#)

A lifeless "dead zone" the size of Massachusetts in the Gulf of Mexico. Excessive irrigation. Mercury and pesticides in fish. Declining river water quality.

For the first time, scientists from around the world have assessed how the most critical threats to rivers affect people and aquatic life.

Their diagnosis: It's a crisis.

Nearly 80% of the world's human population lives where river waters are degraded or depleted and their water security is highly threatened, according to the report published Thursday in the [journal Nature](#).

And thousands of species of plants and animals in 65% of the globe's rivers are at risk of extinction because of lack of water, pollution and destruction of watersheds, the report says.

"We're pushing these river systems toward catastrophe," said Peter B. McIntyre, a professor of zoology at the University of Wisconsin-Madison's Center for Limnology and a co-author of the report.

Water security is determined by access to a reliable source as well as the quality and quantity of the resource.

The team concludes that threats to water security for humans are on a par with threats to the water security required for biological diversity.

"Our focus is on rivers, which serve as the chief source of renewable water supply for humans and freshwater ecosystems," according to researchers in the Nature report.

A wider look at rivers

Unlike other studies of rivers, this global analysis of numerous threats to fresh water, for the first time, summarizes the impact of activities along entire rivers, headwaters to mouth, rather than single locations.

Adding insult to injury over a few thousand years of human civilization resulted in a "fully global

syndrome of river degradation," according to Charles J. Vorosmarty of the City University of New York and a co-author of the report.

The report's careful accounting documents "a pandemic deterioration of fresh waters," wrote Margaret A. Palmer, a river restoration expert at the University of Maryland Center for Environmental Science, in a separate essay in the journal. She is not a member of the team.

The report provides more evidence of the vital links between healthy ecosystems, biodiversity and human well-being, Palmer said.

Team members were not surprised to find levels of threat to water security increasing downstream on rivers where there is dense development. Not even dilution by increasingly larger water volumes could eliminate the problems. The Nile of Egypt and the Yangtze basin are on this list.

"What made our jaws drop is that some of the highest threat levels in the world are in the United States and Europe," McIntyre said. "Americans tend to think water pollution problems are pretty well under control, but we still face enormous challenges."

"The fundamental chemistry of rivers in much of the U.S. has profoundly changed with agricultural chemicals, stormwater runoff, air pollution, high density of development and other threats," he said.

By investing in drinking water treatment technologies to remove contaminants, U.S. communities are insulating themselves against problems but not fixing causes of those problems or preventing new threats, according to the team.

Consequently, risk of illness and disease for residents of the U.S. and other wealthy nations is reduced while biodiversity of those nations remains vulnerable to the pollution, loss of water and other problems.

"We're not making similar investments to protect aquatic species," McIntyre said.

Protection vs. treatment

Since poor nations cannot afford investing in treatment technologies, levels of threats to water security remain high for their residents, as well as the aquatic species struggling to survive in those rivers.

"We know it is far more cost effective to protect these water systems in the first place," Vorosmarty said. Preserving floodplains, protecting watersheds through better land-use management, and keeping pollutants out of rivers are among the team's recommendations.

The team's analysis of river health around the globe used information on 23 damaging activities summarized as four common problems: water resource development, such as dams and water withdrawals; pollution, including nitrogen from Midwestern farm fields flowing in the Mississippi River to the Gulf of Mexico, or into Green Bay of Lake Michigan and inland lakes; watershed disturbance, such as loss of wetlands and forests and stormwater runoff to streams; and the disruption of native aquatic species through release of exotic pests and overfishing.

For information on the team's work, go to the researchers' website: www.rivertthreat.net.

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