2010 Biodiversity Indicators Partnership

Water Quality Index for Biodiversity

Facts

CBD Focal Area: Ecosystem integrity and ecosystem goods and services

CBD Headline Indicator: Water quality of freshwater ecosystems

Key Indicator Partners: UNEP GEMS/Water Programme

Data Available: Global time series (1931 onwards, with regional variations) and regional/national case studies

Development Status: Ready for global and national use

Reason

The integrity of an ecosystem is typically assessed through its ability to provide goods and services on a continuous basis. Together with the air we breathe, the provision of clean water is arguably the most fundamental service provided by ecosystems. Yet, human activities have fundamentally altered inland water ecosystems and their catchments. As a consequence species dependant on inland waters are more likely to go extinct, and future extinction rates of freshwater animals could be up to 5 times higher than for terrestrial animals.

Water quality refers to the physical, chemical and biological characteristics of a water body. These characteristics determine how and for what water can be used and the species and ecosystem process it can support.

Status

The Water Quality Index for Biodiversity (WQIB), developed by the United Nation's Environment Programme's Global Environment Monitoring System, is based on the most comprehensive global water quality dataset in the world. The WQIB uses data related to water temperature, dissolved oxygen, pH, electrical conductivity (salinity), nitrogen and phosphorus, to determine how water quality is affecting biodiversity. Data is collected and compiled from 6,216 water monitoring stations around the globe. By examining changes in water quality at each of these stations over time it becomes possible to determine if water quality is declining, remaining stable or improving with regard to its ability to sustain biodiversity.

This approach has the advantage of incorporating spatial patterns of observed species responses to fragmentation operating at multiple spatial scales. Performing similar analyses for 20-50 different datasets from around the world will help to select the best possible form of BioFrag for application at regional and global scales.

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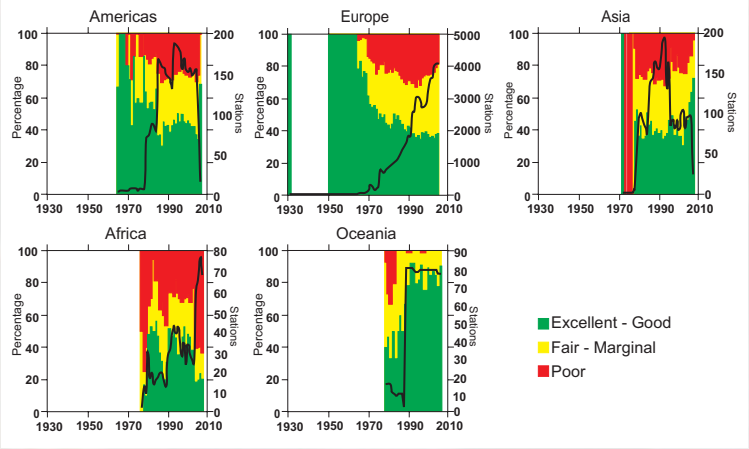
The Indicator



Regional WQIB for monitoring scores.

Excellent to good scores are indicated in green, fair – marginal and poor score are indicated in yellow and red respectively. Solid black line indicates number of stations reporting in any given year.

Source: UNEP-GEMS.

How to interpret the indicator:

A decrease in the percentage of stations with excellent-good scores and an increase in the percentage of stations with poor scores, means water quality is worsening. Reduced water quality will result in freshwater biodiversity loss. An increase in the percentage of stations with excellent-good scores and a decrease in the percentage of stations with poor scores, means water quality is improving. Improved water quality will reduce the rate of freshwater biodiversity loss.

Current Storyline

'General declines in the percentage of stations classified as good or excellent were detectable in the Americas and Europe dating back to the 1970s and 1980s. Water quality in Asia and Oceania appears to have increased in the last decade or two, as the proportion of stations classified as Excellent or Good has increased. Patterns in Africa were more variable, but it appears as though water quality has been declining, with fewer river and lake monitoring stations being classified as excellent or good in recent years.'

National Use

The WQBI is designed as a global index, but can also be calculated at a variety of scales. At the most basic geographic unit, WQIB scores can be interpreted over time at individual monitoring stations and compared to raw water quality monitoring data to interpret patterns observed. There are many ways to extrapolate station by station patterns to larger geographic units, such as by drainage basin, freshwater ecoregion, country, continent or the globe. Patterns in the number of stations classified as poor to good or in average WQIB scores can be examined over time in the geographic unit of interest.

To date, two sub-national case studies have been undertaken, one applied for the Orange River, and the other for the Vaal Rivers in South Africa.

For more information about producing regional and national WQBIs contact Richard Robarts from UNEP GEMS/Water Programme (Richard.Robarts@gemswater.org).

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For the latest information on this indicator, including publications, future development and useful links visit the 2010 BIP website: **www.twentyten.net/wqib**.