FRESH WATER

You make springs gush forth in the valleys; they flow between the hills, giving drink to every wild animal.

Psalm 104

The planet is running out of fresh water. Less than one percent of all water on Earth is fresh; the rest is sea water or polar ice. Imagine a giant bucket holding all the water on the planet. Dip in a finger. According to H_2O by Philip Ball (Weidenfeld & Nicolson, 1999), that single drop is all that's fit to drink, one hundredth of the one percent that is fresh water.

WATER AND HUMAN HEALTH

In the year 2000, one billion of Earth's six billion people do not have access to safe water and two billion lack proper sanitation, the UN-sponsored World Commission on Water for the 21st Century reported. It found that half the world's 500 major rivers are seriously polluted and depleted; only the Amazon and Congo are considered healthy. The cause: population growth, the related demand for irrigation, and the fact that less than 10% of the world's waste (farm runoff, industrial pollution and sewage) is treated before entering rivers.

UNEP's *GEO 2000* reported, "In many developing countries, rivers downstream of major cities are little cleaner than open sewers." In Latin America, only about 2 percent of sewage receives any treatment, and the fecal coliform count in Asia's rivers is 50 times higher than World Health Organization guidelines. Forty percent of U.S. rivers and streams are too dangerous for fishing, swimming or drinking. Worldwide, polluted water affects the health of a staggering 1.2 billion people and contributes to the death of about 15 million children under age 5 every year.

The use of Earth's fresh water has outstripped population growth in the 20th century — by two to one. One-third of humanity now lives in countries where water consumption exceeds the renewable supply. Yet 90 percent of the planet's fresh water goes to agriculture — mostly agroindustry — and other industrial uses. If present use patterns continue, the World Meteorological Organization predicts that two out of every three persons on Earth will live in water-stressed areas in just 25 years.

ECONOMIC DEVELOPMENT NEEDS WATER

While water shortages are most acute in Africa and West Asia (the Middle East), the problem is global, constraining economic growth in China and India. Even in water-abundant North America, the competition between municipal, agricultural and industrial demands has led to conflicts over water rights — especially in the west and southwest.

Using water faster than it can be replaced has affected groundwater quality and led to a drop in the water table — tens of meters (yards) in many places and the subsidence of land in several regions. As the fresh water table drops, salt water intrudes into coastal farmlands and irrigation wells, rendering them useless.

Explaining that the water table beneath Beijing had fallen 2.6 meters (8.5 feet) in the previous year and nearly 60 meters (195 feet) since the late 1960s, in January 2000 Chinese authorities announced they would undertake a huge project to transport water from the south of the country to the north. Three routes were being considered, one taking water from the Mekong River, which would reduce its water flow to several downstream rice-growing countries on the Indochina Peninsula.

AGRICULTURE DEMANDS WATER

Worldwide, agriculture accounts for more than 70 percent of fresh water use, and demand is expected to increase sharply. Most of the food needed for a population of up to nine billion in 2050 will likely come from increased irrigated land.

In recent decades, intensive agriculture has led to increased fresh water pollution. Not only do animal wastes contaminate water supplies but the extensive use of pesticides and fertilizers causes chemicals to runoff and leach into groundwater. In 1999, the U.S. Geological Survey found that much of America's groundwater and many streams are contaminated with pesticides and fertilizers, a potential threat to the aquifers that supply water to tens of millions of people. In 2000, it determined that most of the nitrogen pollution killing marine life in the Gulf of Mexico — the infamous "dead zone" — comes from areas near Midwestern U.S. rivers. Worldwide, nitrate pollution from fertilizers has become a serious water quality problem. Nitrates also are dangerous to human health, and can lead to brain damage and even death in some infants.

LOSS OF LIFE

Scientists from more than 90 countries analyzed trends for 281 fresh water species — mammals, birds, reptiles, amphibians and fishes — for the World Wide Fund for Nature's *Living Planet Report 1999* and found a greater than 50 percent decline overall in populations.

Worldwide evidence suggests a number of forces at work, even in parks, nature reserves and other protected areas, indicating just how pervasive the threats can be. While habitat loss plays a major role, particularly as fresh water ecosystems continue to be modified on a massive scale by human activity, other likely causes are disease, pollutants, climate change, ultraviolet radiation (from a depleted ozone layer) and invasive species.

POWER AND INDUSTRY

Many northern lakes and streams — and the life within them — continue to be damaged by acid rain, which is formed when rainclouds meet emissions from dirty power plants. Although waterways in northern Europe are becoming less acid, an international team of scientists found that North America's have not recovered, possibly because the U.S. imposed sulfur dioxide regulations later than Europe did. China is urging cities to shut down old coal-fired power plants, factories and unlicensed coal mines to cut emissions of sulfur dioxide, since acid rain now falls on 40 percent of the country. New standards require Chinese cities to develop pollution control programs before 2000 and some 80 percent of major industrial firms to reduce their emissions.

Currently, Europe and North America are the only regions using more water in industry than in agriculture. Industrial wastes have contaminated water supplies ever since the Industrial Revolution began, putting heavy metals such as lead, mercury, arsenic, cadmium into the water and food chain along with PCBs and other persistent organic pollutants. If current trends continue, industrial water use will more than double by 2025, with a four-fold increase in watercourse pollution; in China industrial water use is projected to increase five-fold by the year 2030.

Environmental scientists from 50 countries, in a survey commissioned for UNEP, identified the shortage and pollution of fresh water as one of the most pressing problems facing humanity.

Between 1900 and 1995, global water consumption rose sixfold, more than double the rate of population growth.

The amount of irrigated land has grown from 9 million hectares (20 million acres) in 1800 to 255 million (630 million acres) in 1995.

In 1950, there were 5,170 large dams worldwide; today, there are more than 36,500. In the U.S. only 2 percent of rivers have *not* been dammed.

Restoration efforts have improved the Rhine, Thames, St. Lawrence, and Hudson Rivers.

THE GREEN PATRIARCH

For ten days in October 1999, 150 churchmen, environmentalists, politicians and scientists sailed the Danube from Germany to the Black Sea. Literally looking into its pollution, at the end of the trip they urgently demanded the river's restoration.

For decades toxins and sewage have flowed into the Danube from all ten countries along its path. The situation worsened in the spring of 1999 when NATO bombed petrochemical plants, oil refineries and fuel depots in Yugoslavia. Because the Danube was blocked by bridges destroyed in the bombardment of Novi Sad, the group had to disembark and travel through Serbia by road.

The floating conference was organized by one of Europe's foremost "greens," not a politician but Bartholomew I, the Ecumenical Patriarch of Constantinople, spiritual leader of 300 million Orthodox Christians worldwide. Since his enthronement in Istanbul in 1991, Bartholomew has made environmental protection an official policy of his patriarchy, labeling pollution a "sin" against creation. With environmental protection opening the door to other, related issues, he has traveled the world promoting peace, justice, interfaith tolerance and coexistence – important in a church with 15 separate Orthodox branches and in a patriarchate with headquarters in a predominantly Muslim country.

Bartholomew I has hosted other floating conferences in the Aegean and Black Sea, and with Prince Philip, who chairs the World Wide Fund for Nature, organized environmental seminars at the Theological School of Halki, Turkey. "The idea is to help the priests understand that part of worshipping God is to respect the natural world. In modernity we have separated the soul from nature. We are saying that we should bring them back together again," the Halki coordinator, The Rev. John Chryssavgis, explained.

The "Green Patriarch," as Bartholomew is now known, has established the first day of September as the occasion of an annual Message on the protection of creation, as well as establishing it as a day of prayer in the Ecumenical Patriarchate and throughout the Orthodox world.

To learn more, visit the web site: www.patriarchate.org

The good news is that in recent years cleaner production practices coupled with environmental regulations have contributed to an overall slowdown in industry-related pollution in the developed economies — and more efficient and profitable industries. Developing countries, however, continue on a rising curve of industrial production — and pollution.

ASSESSING INEQUITY

Water shortages increase social inequity. In Gujurat, India, where groundwater levels have dropped considerably, poor farmers cannot afford to sink deep boreholes, while wealthier farmers can move inland.

Ironically, the world's poor pay far more for water than the wealthy. Developing country water systems tend to reach richer citizens first, even though they often are built with international aid intended for the poor. The poor then are forced to buy water from private dealers, who charge high prices, often for unclean water.

Major social and environmental problems are certain to emerge as growing demand leads to decreasing usable water. "The potential for disputes and even conflict, both within and among States over water resources" is real, UNEP Executive Director Klaus Töpfer warned in October 1999 as he announced a four-year project to assess the water situation worldwide: shortages, pollution, over-exploitation, habitat and other changes.

This international scientific, political and economic water assessment will provide the hard data that governments need to negotiate agreements on water management, nationally and internationally, which they will — only if they feel political water pressure.