

REQUIEM FOR RIVERS: THE WORLD'S ALMOST DEAD & FAILING RIVERS

*Water, water everywhere and all the boards did shrink
Water, water everywhere nor any drop to drink
Samuel Taylor Coleridge, 1798¹*

THE WORLD HEALTH ORGANIZATION (WHO) has consistently reminded the world that



clean drinking-water, sanitation and hygiene are crucial to human health and well-being. As such, it is a resource that must be managed with care and respect. Access to water and sanitation are human rights. Hygiene knowledge and facilities are life-saving, highly cost-effective health interventions. Governments must take a rights-based, integrated approach to expanding access to these vital services. Water is an endangered resource. The UN makes it clear that at current trends, by 2030:

- **Only 81 per cent of the world's population will have access to safe drinking water at home, leaving 1.6 billion without;**
- **Only 67 per cent will have safe sanitation services, leaving 2.8 billion without;**
- **Only 78 per cent will have basic handwashing facilities, leaving 1.9 billion without.²**

The acronym WASH (Water, Sanitation and Hygiene) is not only essential to life, but for humanity, as a whole, it provides the planet with resilient communities living in healthy environments. WASH plays a crucial part in disease prevention and death. Evidence suggests that improving service levels towards safely-managed drinking-water or sanitation--such as regulated piped water or connections to sewers with wastewater treatment -can dramatically improve the health of people. The Safe Drinking Water Act of 1974, regulated by the Environmental Protection Agency, defines water "contaminant" principally as being anything other than water molecules. It specifically delineates the following toxicities in water as being: any physical, chemical, biological, or radiological substance or matter in water. (Source: Right: Pixabay)



¹ The Rime of the Ancient Mariner, 1798

² UN Water, 2023, Water Conference

By preserving our planet's oceans and waterways, human beings enrich and enhance under-valued cognitive, emotional, psychological and social benefits they provide. “There is an interdependence with the natural world that goes beyond ecosystems, biodiversity or economic benefits. It's a basic of life. Water nurtures us, and so we must nurture water “ (Source: Nichols, 2014)³ . The UN’s Millennium Development Goals (MDG) period (1990–2015) communicated the aspiration, above. The MGDs were superseded by the UN’s 17 Sustainable Development Goals of 2015, which if heeded by nations, will allow for a resilient planet well after 2030.

RIVERS THAT ARE DYING OR DEAD: River pollution is a major global environmental problem that has significant consequences for both human health and the natural world. Rivers are essential for life, providing vital resources such as freshwater for drinking, for irrigation, or hydropower for electricity; and are a home for a wide range of unique plant and animal species that are contributing to creating a healthy well-functioning ecosystems. (Picture Left: Green Tumble, 2022; Below: www.telegraphindia.com)



governments

When rivers, and large bodies of fresh moving water, are polluted, benefits are



lost, and the negative impacts have adverse effects on both terrestrial and aquatic life. Severely polluted rivers are common in many different countries. Water pollution is often the result of a variety of factors including, especially, large scale industrialization, modern agriculture, energy production, and urbanization. Five of the most polluted rivers in the world that will be discussed here will provide a thumbprint of what the conditions of global waterways are coming to, and how well (or not) remedial policies are working:

- **The Citarum River (Indonesia)**
- **The Yellow River (China)**
- **The Ganges River (India)**
- **Mississippi River (USA)**
- **The Danube River (Eur)**

(Image Right: Thejournal.i.e)



³Nichols, W. (2014) *Blue Mind: The Surprising Science That Shows How Being Near, In, On, or Under Water Can Make You Happier, Healthier, More Connected, and Better at What You Do*, Little Brown Inc.



(www.freepik.com)

*It is estimated that globally 80 percent of domestic wastewater and raw sewage is dumped back into the water supply untreated
(Green Tumble, 2022)*

THE CITARUM RIVER: The putrid stink is the first thing that hits a person's nose at the banks of the Citarum River in West Java, Indonesia. The odor is dense: rubbish rotting in hot sun mixed in with an acrid tone of chemical waste. Some 9 million people live in close contact with the river, where levels of fecal coliform bacteria are more than 5,000 times above mandatory limits, according to the findings of the Asian Development Bank in 2013. Many people suffer from dermatitis, contact rashes, intestinal problems; but also from delays in child development, renal failure, chronic bronchitis and a significant incidence of tumors. (Images Left:



wix.com; Right: The Guardian.)



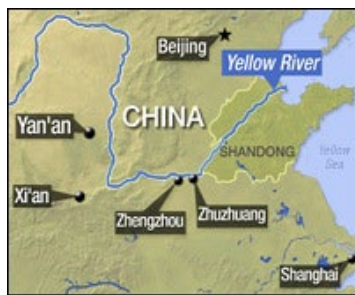
Effects of Citarum's water on humans is catastrophic: organ damage, cancer, infertility, and death due to heavy metal contamination such as: mercury, lead, zinc and chrome. It is also foul-smelling. The Indonesian Bandung Basin is the historic center of Indonesia's textile industry, where 1,500 factories in the region dump 280 tons of toxic industrial waste each day into the Citarum's water.

The number of fish species in the Citarum has decreased by 60% since 2008, nevertheless, fishing is widely practiced in the Citarum, despite the heavy muck and stench. The fish are contaminated with heavy metals and microplastics, but they are sold and eaten as much in areas adjacent to the river, as on the tables of the capital city, Jakarta.

POLICY ACTIONS: The Indonesian government, after pressure from international organizations such as Greenpeace about the state of the river, has established a seven-year cleaning program for the Citarum, with the goal of making its water drinkable by 2025.

THE YELLOW RIVER: Known as China's "mother river", the Yellow River supplies water to millions of people in the north of China. The Yellow River, supplies the Yellow River Valley, which the Chinese say is the cradle of its civilization. It flows from the Bayan Har mountains in Qinghai to the Bohai Sea and is around 3400 miles long.

But in recent years the quality has deteriorated, and much of it is now unfit even for agricultural or industrial use. " said Wen Bo, China program director of the US-based environmental group, Pacific Environment. "They are just treating the river as a dumping site. It's basically a sewage channel for the provinces that share the river." (Image Right: Buzzive.com). In Lanzhou Province residents



we were surprised to find that the Yellow River waters had turned red, due to a contaminant flowing out of a sewage pipe. (Image left : city-data.com; Right: China Daily))



POLICY ACTIONS: The Yellow River Conservancy Committee, affiliated to the Ministry of Water Resources, said 33.8% of the river system's water sampled in 2007 registered worse than level five. That means it is unfit for drinking, aquaculture, industrial use and even agriculture, according to criteria used by the UN Environment Program.

A new law, Yellow River Protection Law, on the ecological protection and high-quality development of the Yellow River basin came into effect in 2023. The law was passed in October 2022 and features enriched content regarding ecological conservation and restoration, as well as environmental pollution control, in areas along the Yellow River. It also stipulates that the water resources along the river basin should be allocated under a unified national allocation system. (Image Right: S. China Morning Post).



However, environmental regulations in some regions only show that there is still more room for improving carbon reduction governance. "Therefore, the Yellow River Basin should strengthen environmental regulations to promote ecological governance and high-quality development." (Liu, et.al, 2023.)

THE GANGES RIVER: The Ganges (Ganga) River known as “*Ganga Maata*” or Mother Ganges is revered as a goddess whose purity cleanses the sins of the faithful and aids the dead on their path toward heaven. In most Hindu families, a vial of water from the Ganga is kept in every house. It is believed that drinking water from the Ganga with one's last breath will take



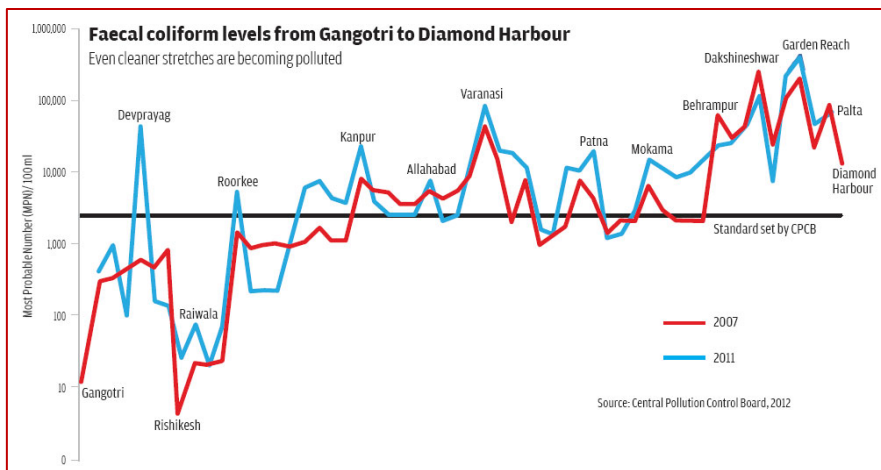
the soul to heaven. Traditional Hindu texts also state that life is incomplete without bathing in the Ganga at least once in their lifetime. Some of the most important Hindu festivals and religious gatherings are celebrated on the banks of the river Ganga--such as the Kumbh Mela or the Kumbh Fair and the Chhat Puja. (Image Left:



www.hindustantimes.com; Right: Pintrest.com.mx).

Most of the Ganges (Ganga) river pollution is organic waste—human burial remains, sewage, trash, food, animal carcasses, and often rejected female babies. Human habitation on the river banks has grown since the 21st century, with minimal (or none) waste-control infrastructure.

The result of this pollution is an array of water-borne diseases including cholera, hepatitis, typhoid and amoebic dysentery. An estimated 80% of all health problems and one-third of deaths in India are attributable to water-borne diseases.



Recent water samples collected in Varanasi revealed fecal coli form counts of about 50,000 bacteria per 100 millilitres of water, 10,000% higher than the government standard for safe river bathing.

In India today, over 29 cities, 70 towns, and thousands of

villages extend along the Ganga banks. Nearly all of their sewage--over 1.3 billion litres per day - goes directly into the river, along with thousands of animal carcasses, mainly cattle. Another 260 million litres of industrial waste are added to this by hundreds of factories along the river's banks. Municipal sewage constitutes 80 per cent by volume of the total waste dumped into the Ganga, and industries contribute about 15 percent.

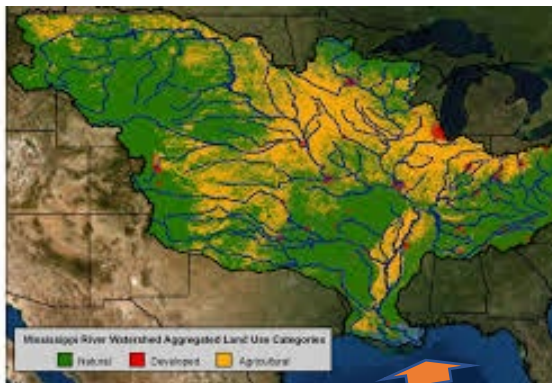
POLICY ACTIONS: The Government of India launched the Namami Gange Programme in June 2014, to accomplish the objectives of effective abatement of pollution, conservation and rejuvenation of the River Ganga and its tributaries. The programme involves various activities such as building sewage treatment plants, developing riverfronts and creating public awareness campaigns .

- “The National Mission for Clean Ganga,” oversees the implementation of various projects , including the "Ganga Gram" project , which develops eco-friendly villages.
- The government enforces laws and regulations to prevent pollution , such as requiring industries to install effluent treatment plants and imposing strict penalties on polluters.
- Despite the challenge , the government's commitment and sustained efforts are crucial to ensuring the long-term health of the river and communities.

THE MISSISSIPPI RIVER: This is one of America’s most famous and culturally significant rivers, but despite her majestic beauty, the Mississippi River is degrading due to climate change, habitat loss, invasive species and water pollution. It has become a dangerous place for humans to be. Stretches of the Mississippi River exceed water quality standards for mercury, bacteria, sediment, and PCBs (polychlorinated biphenyl) which are carcinogenic. These factors make the river water unacceptable recreating--fishing, and swimming; and also for drinking. Olivia Dorothy, American Rivers Restoration Director based in Illinois, warned in a news release that this “has real impacts on local economies, public safety and quality



of life.” (Marohn, 2022)



In the Gulf of Mexico, the river adds to harms for living things--because nutrients flowing downstream have created a dead zone in the Gulf of Mexico, where fish and other organisms can’t survive. Every year, the environmental advocacy



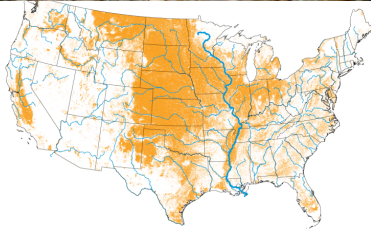
group *American Rivers* publishes a list of the 10 U.S. rivers it considers most at risk. The group considers a waterway's significance, as well as the magnitude of threat it faces. Citing threats from pollution and climate change, a 2022 report, lists the Mississippi River, from its headwaters in northern Minnesota down to the Gulf of Mexico, as one of the most endangered rivers in the United States.

POLICY ACTIONS: The *Mississippi River Restoration & Resilience Initiative (MRRRI) Collaborative*, HR 4282, 2022, comprises local, regional, state and national organizations committed to working together to create a federally-funded initiative focused on the Mississippi River.

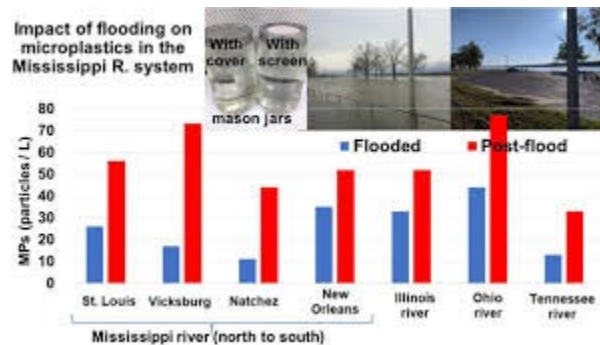
The National Park Service has allied with the Friends of the Mississippi River to respond to inquiries about the condition, strength and vigor of the river. They are contained in the *State of the River Report*, 2016, which provides a picture of the health of the Mississippi River. Using data on a comprehensive scope of water health values and other river data, the report hones in on the trends of 13 critical point indicators of river conditions, emphasizing the swimming, fishing, aquatic life and emerging contamination issues facing the river--as well as critical answers.



(Below: Image: Right: Tampa Bay Times. Left: National Park Service)



(Image Left: WSJ)



THE DANUBE RIVER: The Danube River, particularly the Danube Delta, located at the interface between Danube and the Black Sea, as a relevant habitat for a large number of species of wild flora and fauna, is subject to a growing international interest. As shown on the



map below the river flows through many countries. The basin today includes the territories of 19 countries, making it the world's most international river basin. It is also home to 81 million people, with different cultures and traditions. This makes the river subject to the policies, ideals and whims of many countries. Some of these countries have not been vigilant in maintaining a safe and healthy shared river system.

For example, the River Danube is polluted with feces along its course in Serbia, Romania, and Bulgaria, with the situation particularly alarming in large Serbian cities such as Novi Sad and Belgrade, where concentrations of *Escherichia coli* are very high, according to a microbiological survey carried out by a group of Austrian scientists. (Balkan Green Energy News 2019). The Danube is no longer “blue.”



Nitrogen emissions in the Danube river basin are currently estimated at around 500 000 tons per year, with 44% deriving from agriculture, 30% from urban areas and 23% from forests and natural areas. About 340



000 tons enter the Black Sea, into which the Danube drains. (Images Above Left: CGTN; Right: ICPDR)

POLICY ACTIONS: These are difficult because the Danube River flows through many independent nations, hence the river has been governed *by multilateral agreements and various forms of international administration* almost continuously since 1856. Actions include: high waters regime – floods regime; low waters regime – drought – pond depletion; the morphologic evolution of branches and of sediments at the exit point to the sea; density flows – lack of salt water; pollution phenomena; satisfying the necessities – drinking water supply, maritime navigation, agriculture, pisciculture, ecology, tourism; modifying the hydrologic and hydraulic parameters, as an effect of some hydrotechnical works in the Delta – calibrations of the water bed, embankment, damming , opening new branches, restorations (ecological reconstructions).



DANUBE4all launched in January 2023, seeks to develop a comprehensive, scientifically based, and

practically orientated *Restoration Action Plan* to support the EU's Mission to "Restore our ocean and waters by 2030." With a Science-to-People approach, the project will promote the knowledge, awareness, and participation of local people and business actors in implementing freshwater ecosystem restoration.



UN. SUSTAINABLE DEVELOPMENT GOAL (SDG) # 6:

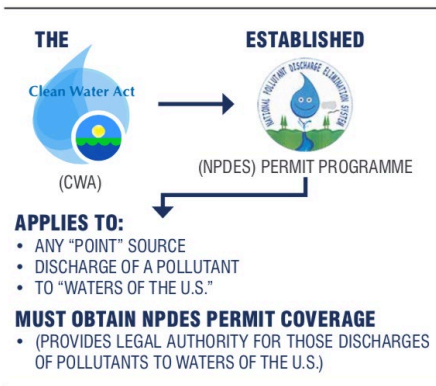
The United Nations' Sustainable Development Goal 6 is about "clean water and sanitation for all". It is one of 17 Sustainable Development Goals established by the United Nations General Assembly in 2015, and its official wording is: "Ensure availability and sustainable management of water and sanitation for all." The UN projects that billions of people will lack access to these basic services in 2030 unless progress quadruples. The U.N. lists the six outcome targets as: Safe and affordable drinking water; end open defecation and provide access to sanitation, and hygiene; improve water quality; wastewater treatment and safe reuse,; increase water-use efficiency and ensure freshwater supplies; implement *Integrated Water Resources Management (IWRM)* –a cross sectoral policy to protect and restore water-related ecosystems.



The U.N. affirms that water shortages undercut food security and the incomes of rural farmers while improving water management makes national economies, the agriculture and food sectors more resilient to rainfall variability and able to fulfil the needs of growing populations. Protecting and restoring water-related ecosystems and their biodiversity can ensure water purification and water quality standards. (UN env. Progr.).

THE U.S. CLEAN WATER ACT (CWA), 1972: Growing public awareness and

concern for controlling water pollution led to enactment of the Federal Water Pollution Control Act Amendments of 1972. This statute became commonly known as the Clean Water Act (CWA). The CWA is the main statute governing pollution control and water quality of the nation's waterways. The object of the CWA is to restore and maintain the chemical, physical and biological integrity of the Nation's waters. Under the CWA, EPA has implemented pollution control programs such as setting wastewater standards for industry. EPA has also developed national water quality criteria recommendations for pollutants in surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit was obtained (EPA).



Postscript: May 26, 2023, Sackett v EPA:

At the time of this writing, the Supreme Court in *Sackett v EPA* ruled that **all wetlands in the United States--100 acres plus--are no longer to be shielded by the Clean Water Act.** In a 5-4 vote, the Supreme Court swept away, scholarly, peer-reviewed science, and plain old common sense, i.e., that you can't protect the water downstream, which even the majority agreed are covered by the law, *if you're polluting it upstream.*⁴

Wetlands are critically important to clean drinking water and flood mitigation; they are also effective at sequestering carbon and a godsend to drought resilience, stowing water during dry periods. Inland/non-tidal wetlands are most familiar on floodplains along rivers and streams-- known as riparian wetlands, they occur in isolated depressions surrounded by dry land (for example, playas,⁵ basins and "potholes"), along the borders of lakes and ponds, and in other low-lying areas where the groundwater intercepts the soil surface, or where precipitation sufficiently saturates the soil. Inland wetlands include marshes and wet meadows dominated by herbaceous plants, swamps dominated by shrubs, and wooded swamps dominated by trees. (Image below: dreamstime.com).



**“Water is Life, and Clean Water means Health”
Audrey Hepburn**

Disclaimer: *The information shown above, is not meant to be exhaustive in this document. This report is provided as a way to start your sustainability research studies—i.e., for JHBC term papers, projects, journal articles, etc.*

Created for JHBC’s PRME Platform by Professor Breana E. Coates, for use by faculty and students in Ethics, and Sustainability Studies

⁴ In 2007, Chantell and Mike Sackett started to build a home on land they own near Priest Lake, Idaho. Then officials from the Environmental Protection Agency showed up unannounced and demanded the Sacketts stop construction, kicking off a 16-year legal battle that reached the Supreme Court twice.

⁵ Playas are shallow, circular-shaped wetlands that are primarily filled by rainfall, although some playas found in cropland settings may also receive water from irrigation runoff. Playas average slightly more than 15 acres in size.

