The Yamuna in Delhi: A River's Crisis

A Quantitative & Qualitative Analysis

A Tale of Two Rivers

How a sacred river becomes a city's sewer.

Entry Point (Palla): The Yamuna enters Delhi in a relatively clean state.

- Water is Class B/C, suitable for bathing and supporting aquatic life.
- Biochemical Oxygen Demand (BOD): 2-6 mg/L
- Dissolved Oxygen (DO): >5 mg/L

Exit Point (Asgarpur): The river leaves Delhi as a biologically dead channel.

- Unfit for any designated use.
- BOD: Soars to 127 mg/L (42x the limit)
- DO: Plummets to zero.

The Epicenter: The 22-Kilometer "Dead Zone"

The most critical stretch of the river lies between the **Wazirabad and Okhla barrages**.

A Tiny Stretch with a Massive Impact:

- Represents less than **2%** of the Yamuna's total length.
- Receives **76-80%** of the river's entire pollution load.

Why here?

- Fresh water is diverted at Wazirabad for Delhi's water supply, drastically reducing the river's flow.
- 18 major drains discharge a cocktail of untreated waste directly into this segment. Namely:
    - **Najafgarh Drain:** The single largest polluter, responsible for 60-65% of the total wastewater.
    - **Shahdara Drain:** The second-largest polluter. (Together with Najafgarh, it accounts for about 84% of the pollution).
    - **Supplementary Drain**
    - **Barapullah Drain**
    - **ISBT Drain**

Quantitative Analysis: The Data of Degradation

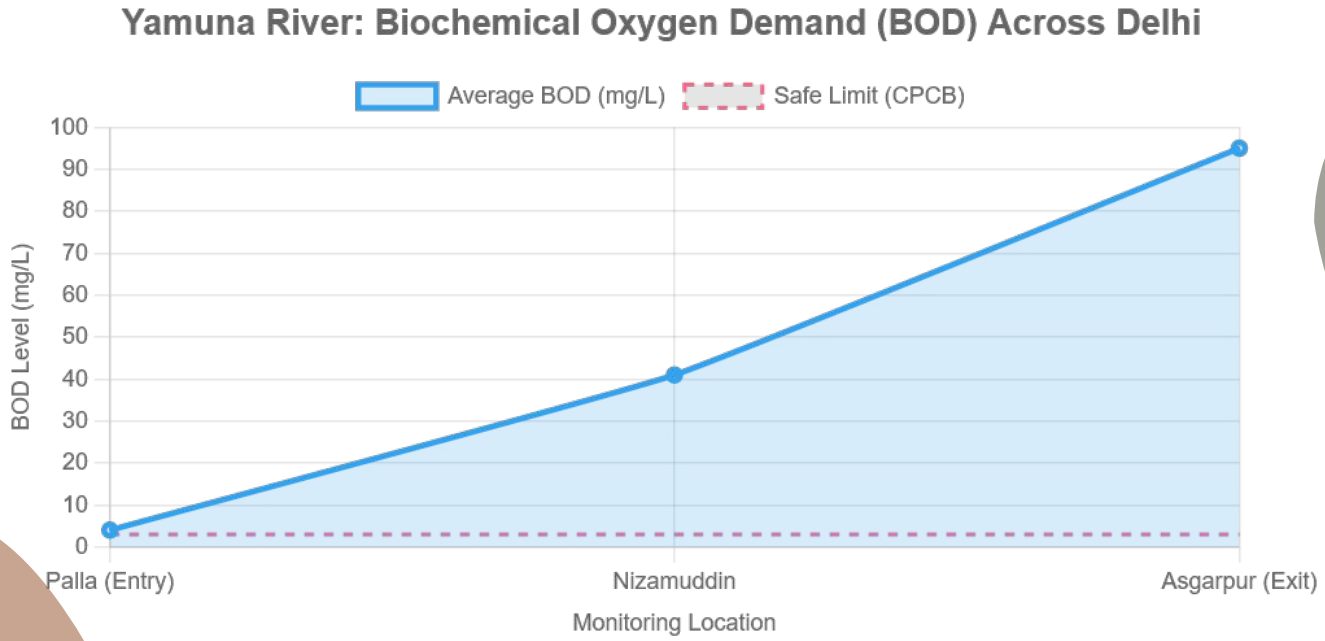
Three key indicators reveal the shocking reality of the water quality.

Parameter	What it Measures	Healthy Level	Delhi Reality (Dead Zone)
BOD	Organic pollution (sewage, waste)	< 3 mg/L	**40 - 127 mg/L**
DO	Oxygen available for aquatic life	> 5 mg/L	**0 mg/L (BDL)**
Fecal Coliform	Sewage contamination	< 2,500 MPN/100ml	**Up to 7.9 Million MPN/100ml**

Biochemical Oxygen Demand (BOD)

This graph shows the explosion of organic pollution as the river enters Delhi's urban core. The river's natural ability to cleanse itself is completely overwhelmed.

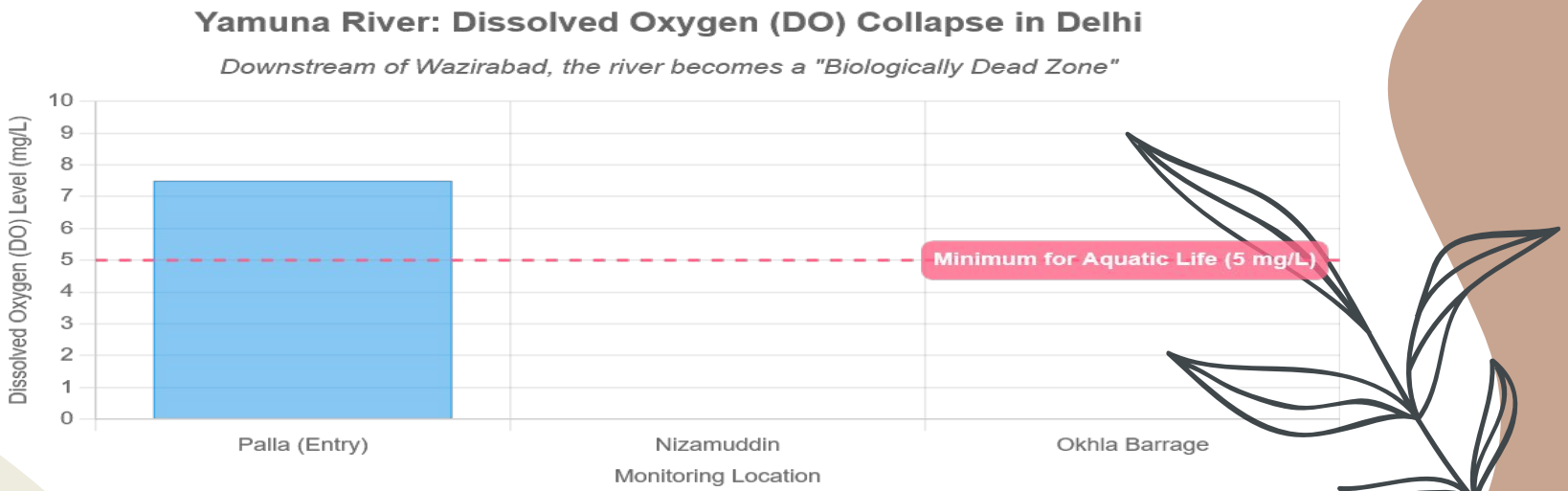
Key Takeaway: The river downstream of Wazirabad is saturated with organic waste, primarily raw sewage.



Graph 2: Dissolved Oxygen (DO)

This is the most critical indicator of a river's health. The data provides compelling evidence of the Yamuna's ecological death in Delhi.

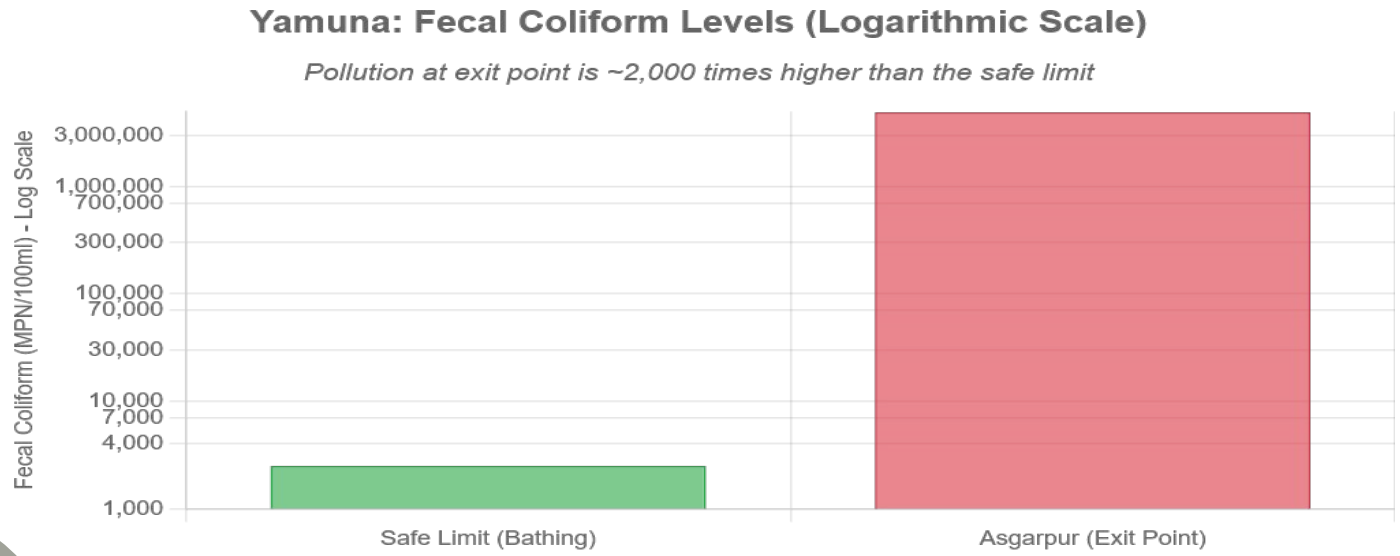
Key Takeaway: The absence of oxygen makes it biologically impossible for fish and other essential aquatic life to survive.



Graph 3: Fecal Coliform (FC)

These astronomical figures confirm the river is not just polluted with sewage; for all practical purposes, it *is* sewage, posing a massive public health risk.

Key Takeaway: Fecal Coliform levels are nearly **2,000 to 3,000 times higher** than the safe standard for bathing.



Diagnosis: The Primary Sources of Pollution

The problem is not an accident. It's the direct result of specific, identifiable failures in urban waste management.

1. **The Deluge of Domestic Sewage** (~85% of pollution)
2. **Unchecked Industrial Effluents** (Toxic and hazardous)
3. **The Arteries of Pollution** (Delhi's major drains)

Source I: Domestic Sewage - A Systemic Failure

Delhi has one of India's largest networks of Sewage Treatment Plants (STPs), yet the river is a sewer. This is a crisis of **connectivity and compliance**.

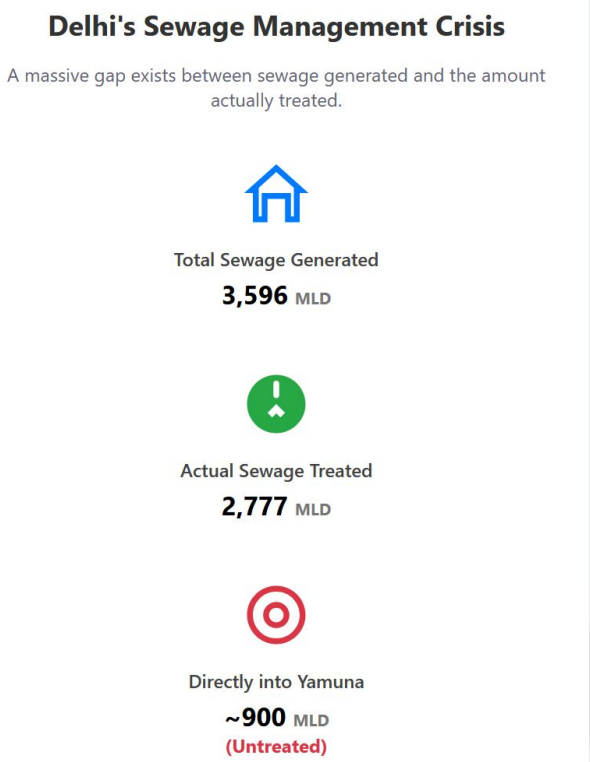
The Generation-Treatment Gap:

- Delhi generates **3,596 MLD** of sewage.
- Installed STP capacity is **3,474 MLD**.
- **BUT... only 2,777 MLD** is actually treated.

The Result: Over **900 Million Liters per Day (MLD)** of raw, untreated sewage flows directly into the Yamuna.

Compounding the Problem:

- Only **14 out of 37** STPs meet discharge norms.
- Over 500 unauthorized colonies remain unconnected to the sewer network.



Source 2: Industrial Effluents - The Toxic Cocktail

While smaller in volume, industrial waste is a highly concentrated source of toxic pollution.

Polluting Clusters: Key industrial areas like Wazirpur, Okhla, and Badli discharge a mix of heavy metals, chemicals, and acids.

Failure of CETPs:

- Common Effluent Treatment Plants (CETPs) are meant to treat this waste.
- A CPCB inspection found a **majority of the 13 CETPs were non-compliant.**

Visible Consequences:

- High levels of **chromium, lead, and iron** in the water.
- Detergents and phosphates from industries cause the infamous **toxic foam** near the Okhla barrage.

Source 3: The Drains - Arteries of Pollution

Delhi's natural stormwater drains have been repurposed into open sewers, delivering a relentless flow of waste directly into the river.

Two Drains, Overwhelming Impact: The **Najafgarh** and **Shahdara** drains are the primary offenders.

- **Najafgarh Drain:** The single largest polluter, contributing **60-65%** of the total wastewater.
- **Shahdara Drain:** The second largest polluter.
- **Together:** They account for approximately **84%** of the river's total pollution load in Delhi.