

State of pollution in the Yamuna

Introduction: While the Delhi government had been debating on what needs to be done to clean the river, the pollution levels have only worsened. In its book *Sewage Canal: How to Clean the Yamuna*, published in 2007, the Centre for Science and Environment reported that the Delhi stretch of the river is not only dead but had an overload of coliform contamination. Two years later, the pollution data shows no respite to the river.

The 22-km stretch of the Yamuna, which is barely 2 per cent of the length of the river basin, continues to contribute over 80 per cent of the pollution load in the entire stretch of the river. There is also no water in the river for virtually nine months. Delhi, impounds water at the barrage constructed at Wazirabad where the river enters Delhi. What flows in the river subsequently is only sewage and waste from Delhi's 22 drains. In other words, the river ceases to exist at Wazirabad. (See Map)

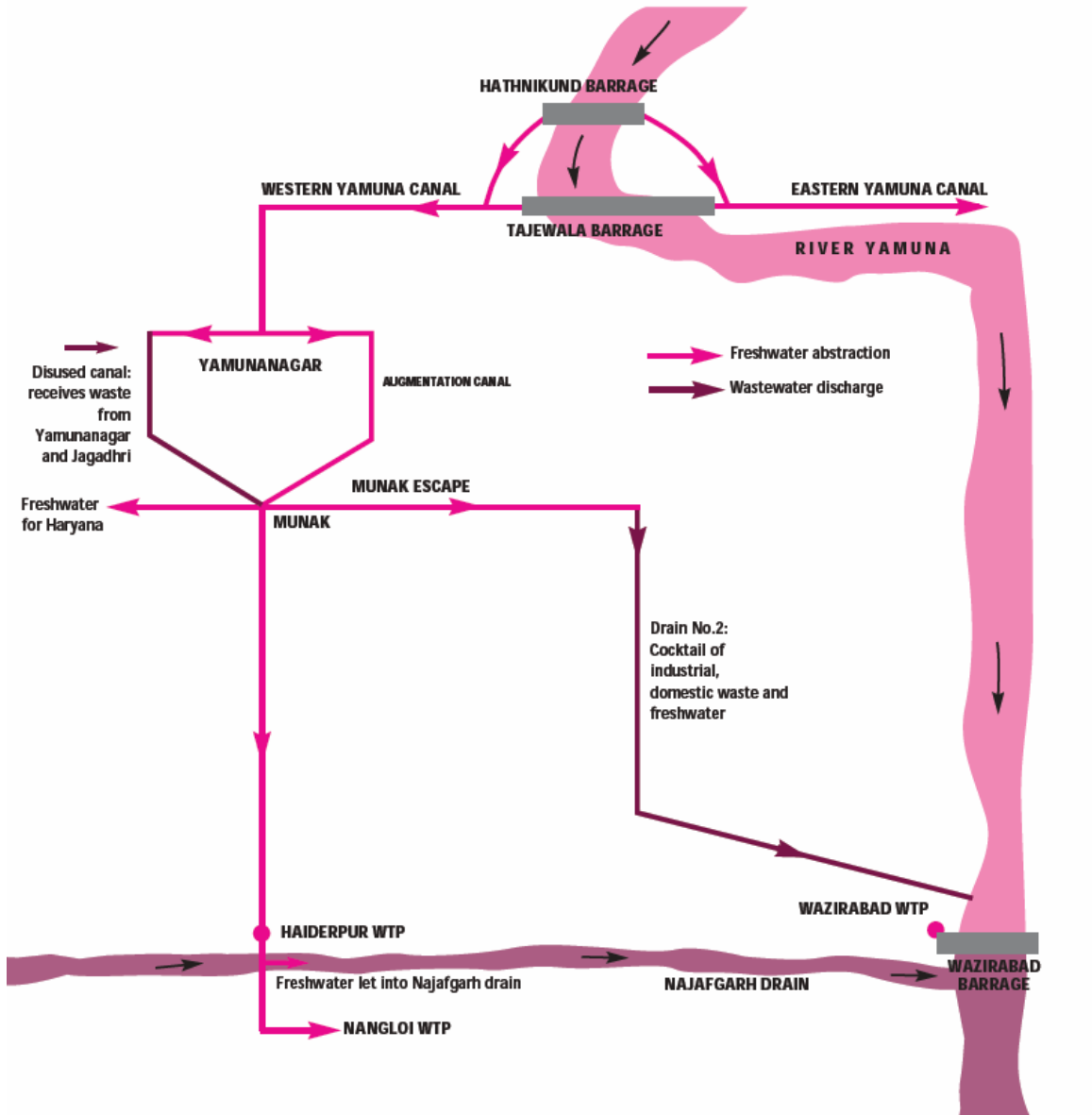
This also means that there is just no water available to dilute the waste. The issue of a basic minimum flow in the river has been discussed time and again, but with water becoming more and more scarce and contested, Delhi's upstream neighbours are reluctant to release water. Delhi itself is water greedy and sucks up each drop that is released as its share. The river is then reduced to a drain for the filth and waste of the city's inhabitants.

In 2005, YAP II at an estimated cost of Rs 380 crore was sanctioned for Delhi. The plan was to rehabilitate some 30.2 kilometers of defunct sewers by 2008. About 50 per cent of the fund for Delhi, was to be spent on this. This works out to Rs 5.88 crore per km of sewers rehabilitated. In 2006-2007 Delhi Jal Board introduced its pet interceptor plan—to lay over 60 kilometers of sewers along Najafgarh, Supplementary and Shahdara drains. In the process of giving shape to the massive hardware programme nothing concrete was done to arrest pollution in the river. Today, as the data of the Central Pollution Control Board (CPCB) the pollution levels have only worsened. The CPCB monitors the river at upstream of the Wazirabad barrage, at Nizamuddin (midstream) and downstream of Okhla barrage (after meeting the Shahdara drain).

It is clear that the Delhi Jal Board has failed to meet the directives and deadlines of the Supreme Court order in the “and quiet flows mailee Yamuna” in WP[C] 725/1994. The Court ordered the DJB to restore the dissolved oxygen levels to 4 mg/l in the river so that it can be used atleast for bathing purposes.

Map: From river to sewage canal

From the time Yamuna reaches the plains, its flow regime is tampered with. Reservoir barrages, and canals hamper its flow. Towns along the river abstract water and return only waste. After Delhi it is reduced to a sewage canal and remains so for almost nine months of the year



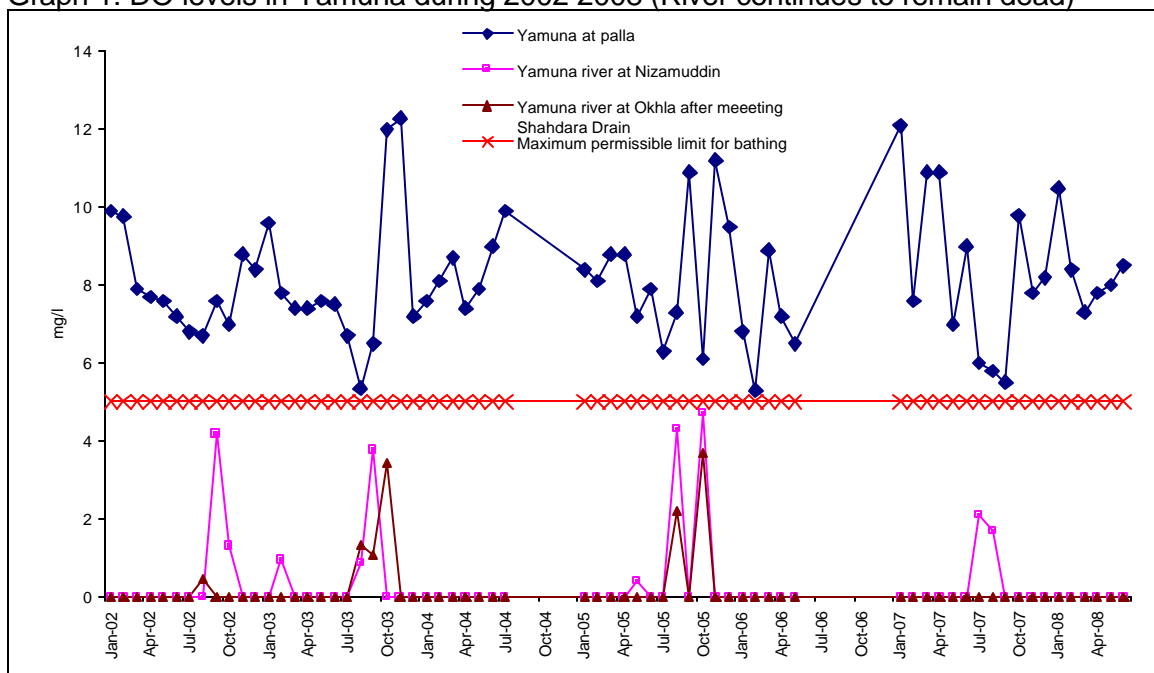
Note: Tajewala barrage is not operational now. Instead, Yamuna is dammed and diverted at Hathnikund barrage; WTP = Water Treatment Plant
Source: Anon 2006, Hathnikund barrage circle, Haryana Irrigation Dept. Jagadhri, mimeo

Source: Sunita Narain et.al, 2007, *Sewage Canal: How to clean the Yamuna*, Centre for Science and Environment, New Delhi

Pollution trends: The following section analyses the pollution trends at three locations in the river Palla (upstream), Nizamuddin (midstream) and Okhla after meeting Shahdara drain (downstream)

Dissolved Oxygen (DO): Once the river flows past the city, there is no oxygen present in the river. This had been the case for many years. But what is worrying is the fact that even during monsoon, the river is not able to rejuvenate it self. During 2005 during monsoon, the DO levels at Nizamuddin (midstream) rose to 4 mg/l (October 2005) where as in 2007 observed levels were 2.1 mg/l (August 2007). The river recorded high levels of dissolved oxygen before it enters the city at Palla (upstream point)—the average DO level was almost 8 mg/l during 2008. (see Graph: DO levels in Yamuna 2002-2008)

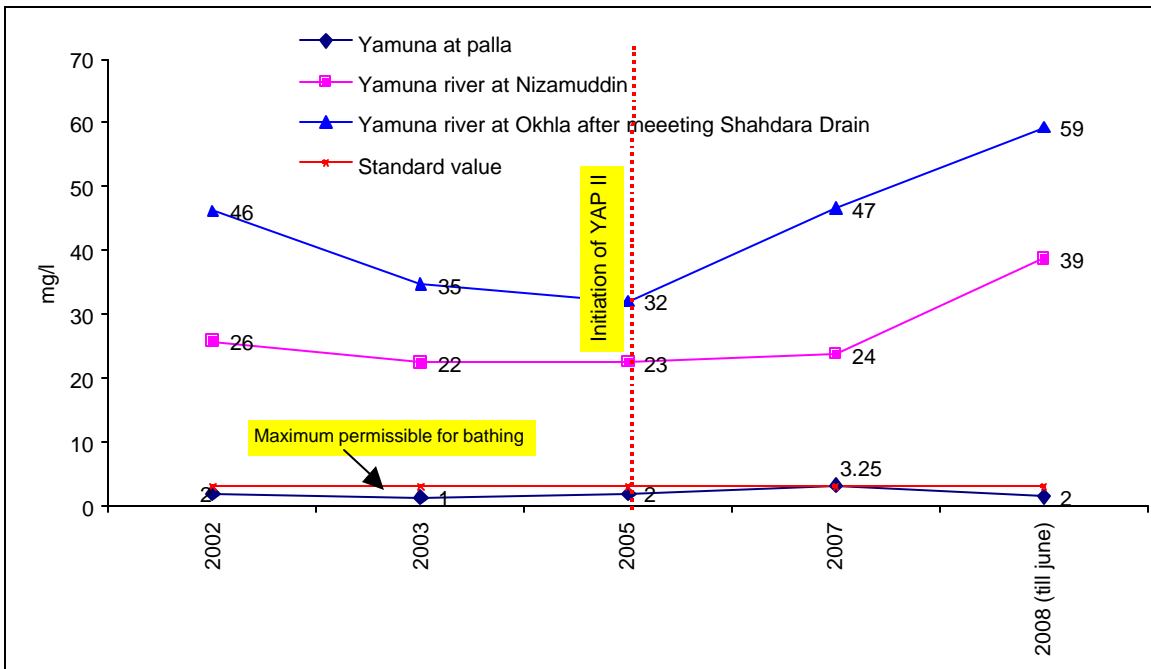
Graph 1: DO levels in Yamuna during 2002-2008 (River continues to remain dead)



Source: Compiled from the water quality monitoring reports of CPCB during 2002-2008

BOD: Biochemical oxygen demand (BOD) is an indicator of organic pollution. The following chart establishes a clear trend in the fluctuations the annual average BOD levels. Here year 2005 emerges as a very important phase—it is from here on that the BOD levels have actually started to increase. Graph indicates that during 2002-2005, the average BOD levels declined and since then started increasing. The average BOD levels reported by the CPCB during 2005 was 23 and 32 mg/l respectively at midstream and downstream. This has increased to 39 and 59 mg/l respectively the first six months of 2008. The maximum permissible level of BOD for bathing is 3 mg/l. (see Graph 2: average BOD levels in Yamuna during 2002-2008)

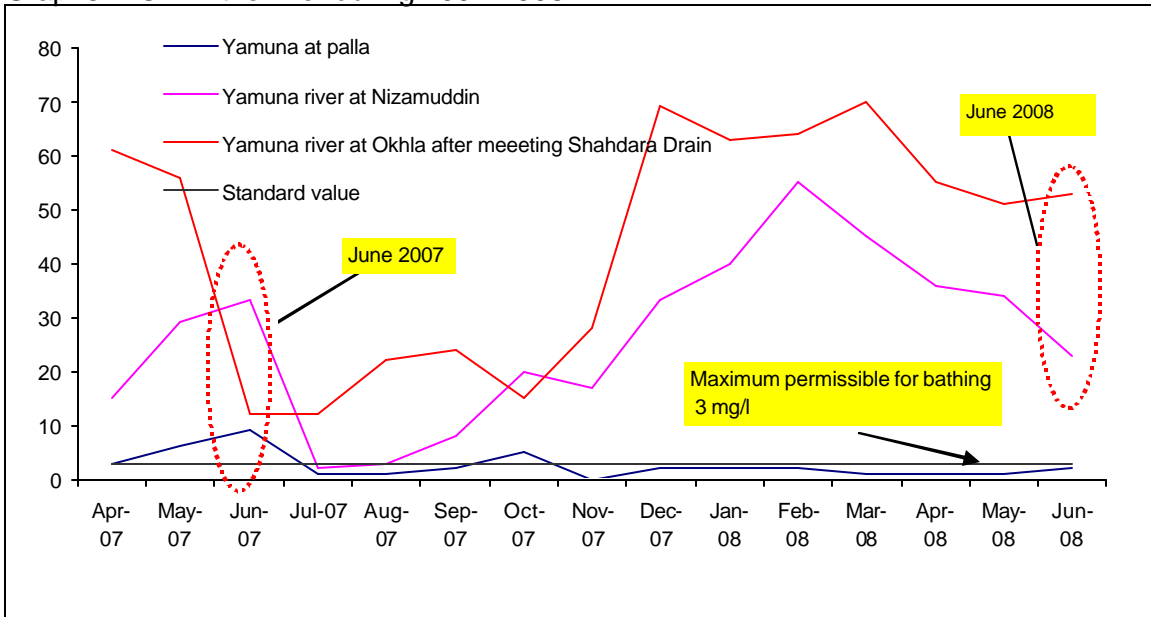
Graph 2: BOD levels in Yamuna



Source: Compiled from the water quality monitoring reports of CPCB during 2002-2008

The graph below presents the BOD levels in the Yamuna during April 2007-June 2008. While the river is almost fit for drinking after treatment at upstream, the scenario is really bad as it flows through the city. As a matter of fact, throughout the year the river is unfit for any human purpose. It could also be seen that the BOD levels during summer months (May & June) of 2008 were higher than the corresponding values for the previous year. (Graph 3: BOD in the river during 2007-2008)

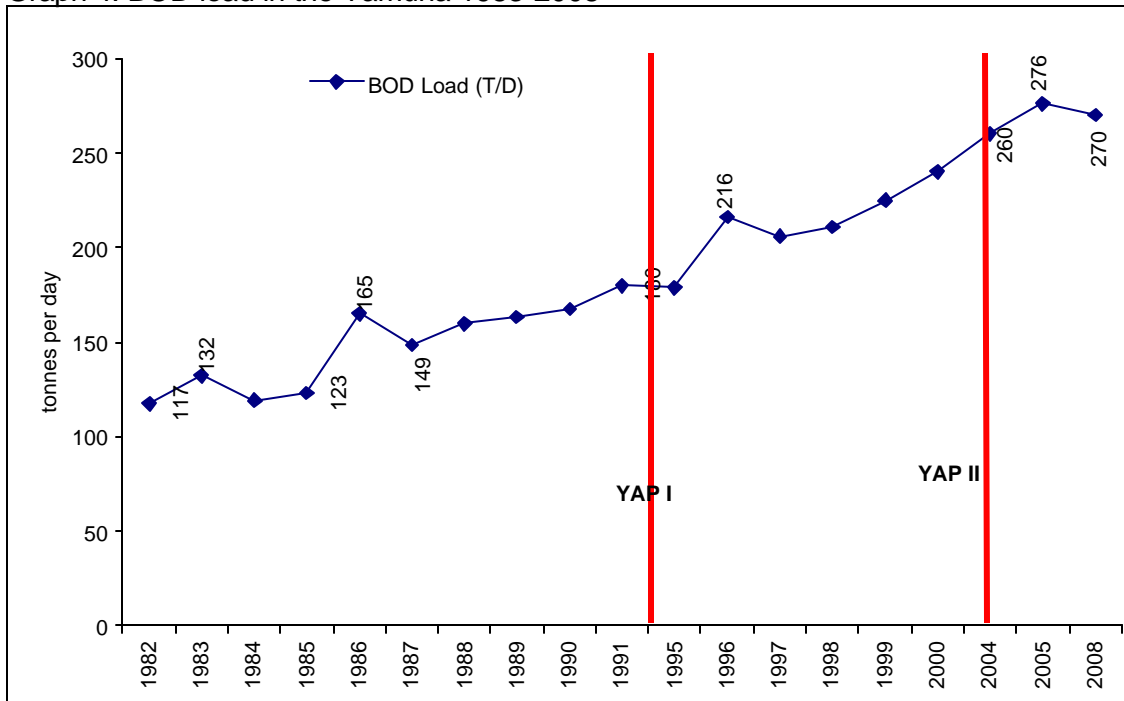
Graph3: BOD in the river during 2007-2008



Source: Compiled from the water quality monitoring reports of CPCB during 2002-2008

BOD load: An analysis of the BOD load (obtained by multiplying the volume of wastewater by the BOD concentrations) clearly indicates that nothing has changed in terms of pollution load in the river Yamuna. The BOD load increased from 117 tonnes per day in 1983 to 270 in 2008. (Graph 3: BOD load in the Yamuna 1983-2008)

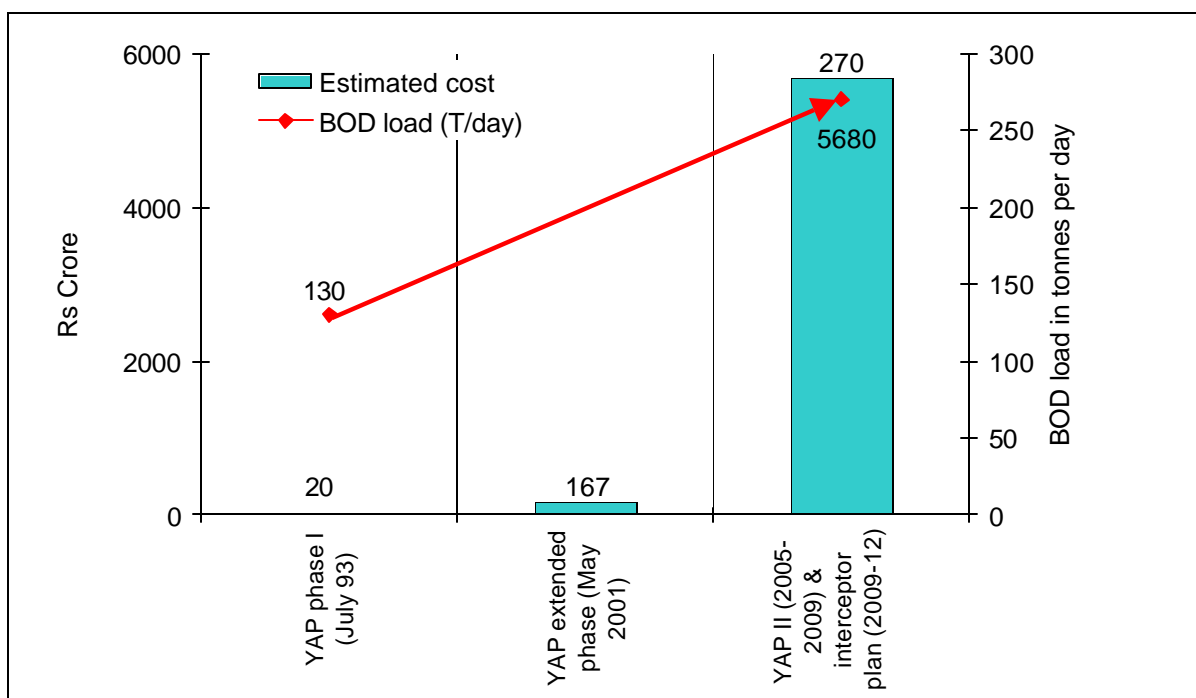
Graph 4: BOD load in the Yamuna 1983-2008



Source: Compiled from the water quality monitoring reports of CPCB; National River Conservation Directorate and Delhi Jal Board

It is also interesting, though ironic, to note that the increase in the BOD load had been proportional to the investments made. With time and investment, the pollution load in the river has only gone up. The BOD load which was 117 tonnes per day (tpd) in 1980 increased to 270 tpd in 2008 – an increase which does not support the huge investments made in this stretch.

Graph 5: Comparison of investments and pollution load in Yamuna



Note: 270 tonnes per day corresponds to Year 2008;
 Source: 1. National River Conservation Directorate 2. Central Pollution Control Board 3. Delhi Jal Board

(See annexure 1: Month wise records of the BOD in the Yamuna during 2002-2008)

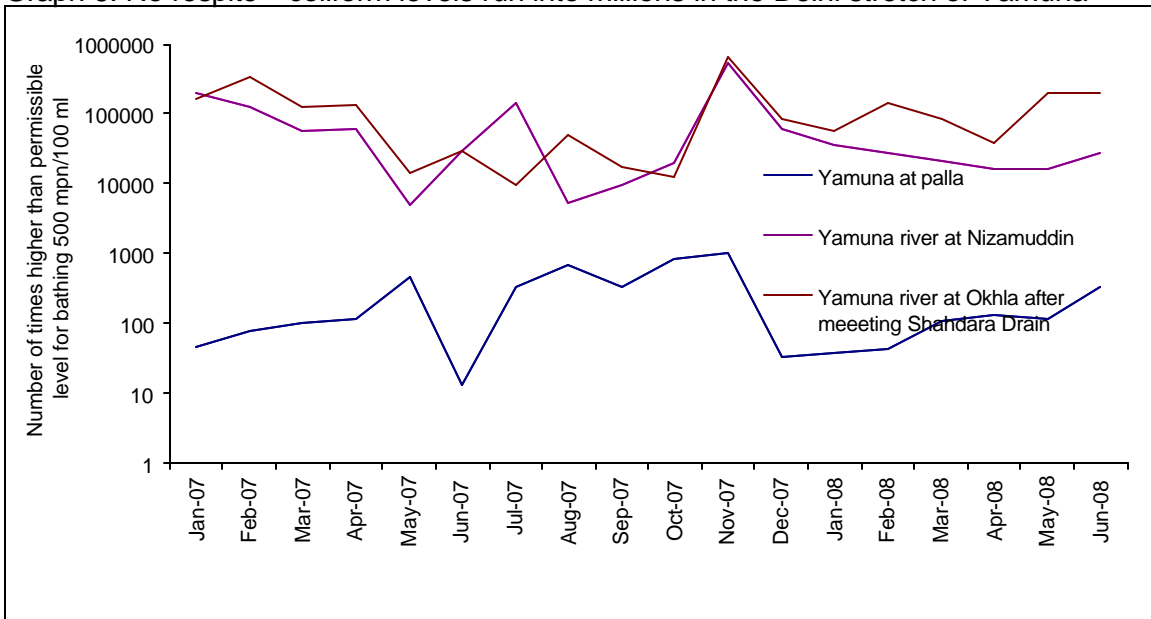
Coliform count

There is no doubt that the river is a cesspool for Delhi's waste. A look at the bacteriological contamination or high coliform count of the water confirms this.

At both upstream and downstream, the coliform counts have been increasing. Data for the period January-June 2008, indicates that the total coliform levels at Palla (upstream Delhi) were in the range of 32 to 1000 times higher than the maximum permissible level of 500 mpn/100 ml specified for bathing purposes. It is this water that is treated and supplied to Delhi.

The scenario becomes worse as the river traverses through the city. By the time the river is midway through Delhi, the total coliform count increases so much that it is difficult to count the zeroes. During June 2008, the total coliform levels were 103 million mpn/100ml respectively at Okhla downstream. Corresponding values during 2007 were 5 million—a clear indication of an increase in untreated waste flowing downstream. In November 2007, at Okhla downstream the coliform levels were 640,000 times higher than the maximum levels. (see graph 6; also see annexure: Coliform levels in the Yamuna 2002-2008)

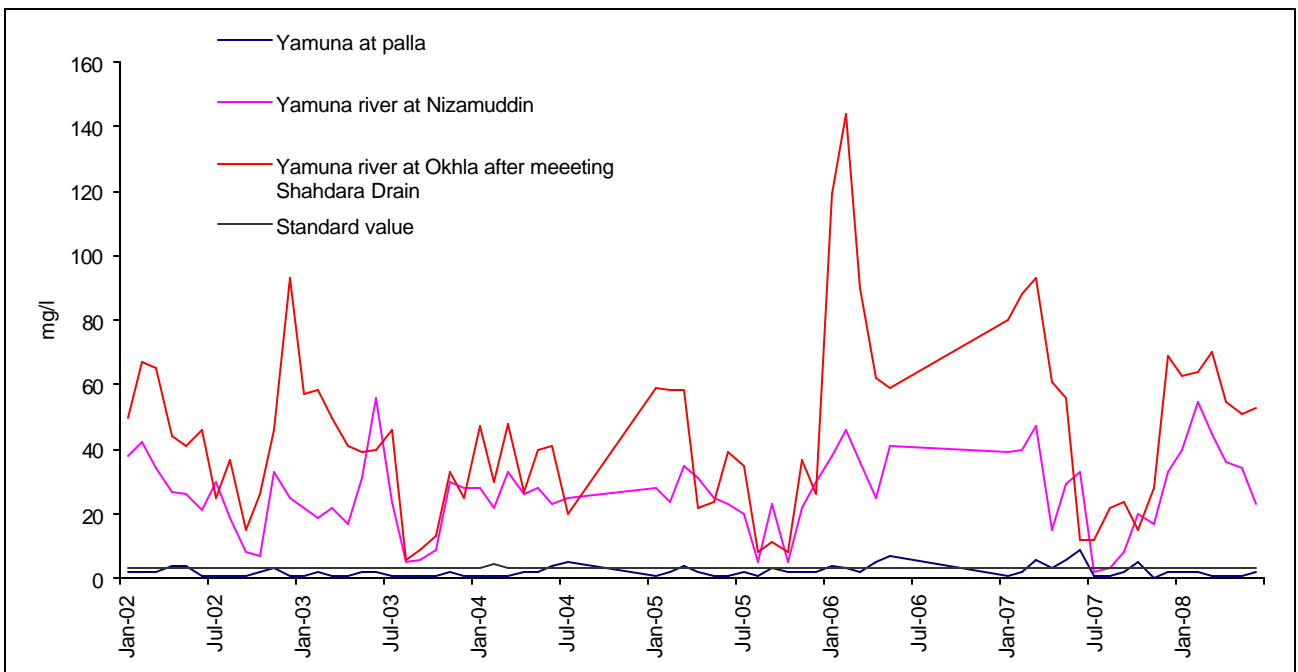
Graph 6: No respite—coliform levels run into millions in the Delhi stretch of Yamuna



Source: Compiled from the water quality monitoring reports of CPCB

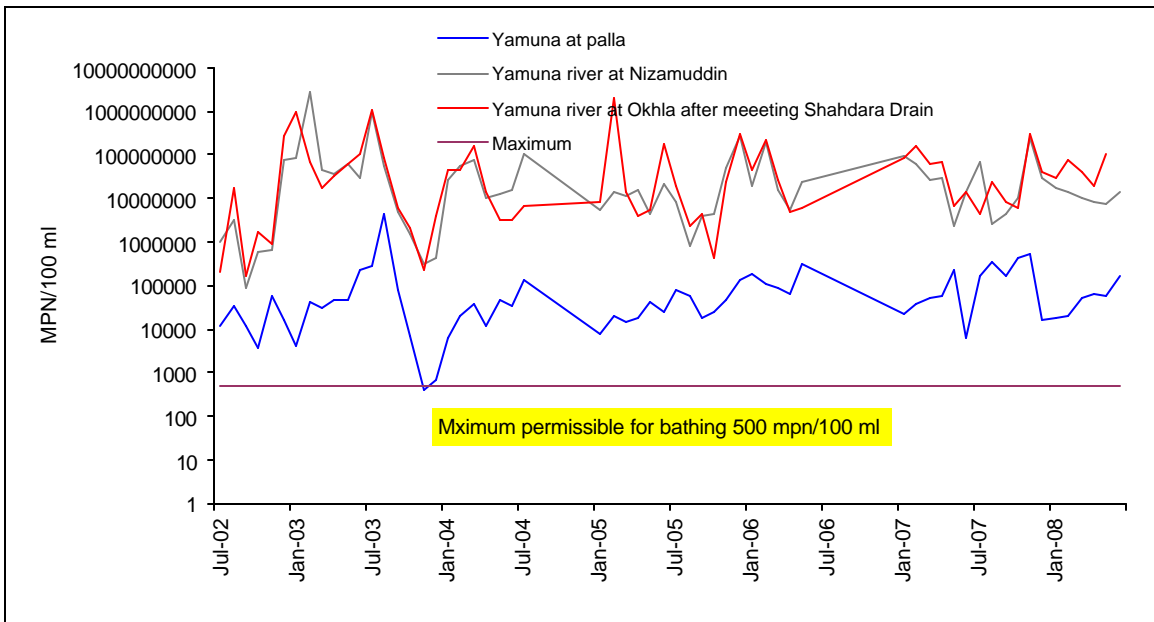
Annexures

Annexure 1: Month wise records of the BOD in the Yamuna during 2002-2008



Source: Compiled from the water quality monitoring reports of CPCB

Annexure 2: Coliform levels in the Yamuna 2002-2008



Source: Compiled from the water quality monitoring reports of CPCB