

**Floodplain characterization and water pollution implications of urban riverfront  
transformation in the 'Delhi stretch' of River Yamuna**

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**Abstract:** The Yamuna River is a prominent and sacred river that traverses through five North Indian states with a total length of 1,376 km. The Central Pollution Control Board (CPCB) segregates the entire Yamuna River qualitatively into five stretches. These are the Himalayan stretch (172 km), upper stretch (224 km), Delhi stretch (22 km), mixed and diluted stretch (together 958 km). The 22 km long Delhi stretch (Wazirabad to Okhla barrage) - despite being the shortest among all stretches – adds the greatest load of pollution to the Yamuna River. The chief reason for this is the urban metabolism of River Yamuna by the rapidly urbanizing NCT of Delhi. A series of drains in the capital carry treated and untreated sewage into the river. Significant among these is the Najafgarh drain which is the largest contributor of sewage and flows into River Yamuna right after the Wazirabad barrage. The magnitude of the pollution is such that the river is unable to rejuvenate itself even until long after the 'Delhi stretch'.

The NCT of Delhi continues to grow at a phenomenal rate and the 'Delhi stretch' remains worst polluted among all stretches. The Wazirabad barrage ensures that the river floodplain remains dry almost throughout the year, except in 2-3 monsoon months when it 'floods'. Rest of the year, various temporary and permanent activities take place on the floodplain making it a point as well as non-point source of river pollution. At the same time, the growth of the NCT of Delhi is now consuming the Yamuna River floodplain and transforming the riverfront at a much faster pace than ever before. This is alarming since the Yamuna river floodplain provide significant ecosystem services, act as a water reservoir and can also be used for natural and artificial cleaning of the river.

This research contribution is an inter-disciplinary attempt at characterizing and mapping the Yamuna floodplain in the 'Delhi stretch' and identifying point and non-point sources of pollution which is flowing into the river untreated. Water demand and supply of residential and commercial/ agricultural units is determined along with identifying non-municipal sources of water supply along the floodplain. This is used to calculate the total sewage generated and different land-use patterns are rated in terms of their pollution potential. Using survey and direct observation, additional pollution sources (e.g. power house plant, SSI) located on the floodplain are also identified. Simultaneously, existing and planned land-use change pattern of the Yamuna River floodplain is reviewed. We conclude with the finding that the existing land-use of the

Yamuna floodplain in the 'Delhi stretch' adds considerable pollution to the river. The floodplain land-use in the north is more polluting than in the south of the city within the 'Delhi stretch'. The Yamuna river floodplain should be left to itself, or at best, explored for treatment technologies like bioremediation. Further, the government should unconditionally uphold and implement the entire Yamuna floodplain as a 'O' (no construction) zone.

**Keywords:** urbanisation, River Yamuna, floodplain, Delhi stretch, pollution

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