



Ministry of Housing and Urban Affairs  
Government of India



# RIVER CENTRIC URBAN PLANNING GUIDELINES

**TOWN AND COUNTRY  
PLANNING ORGANISATION**

**MINISTRY OF HOUSING AND URBAN AFFAIRS  
GOVERNMENT OF INDIA**



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## FOREWORD

The Indian subcontinent is blessed with numerous rivers and water bodies and these provide livelihood opportunities to millions of people across the country. The Government vision for 2030 envisages clean rivers, with safe drinking water for all Indians, sustaining and nourishing life and efficient use of water in irrigation using micro-irrigation techniques.

2. These River Centric Urban Planning Guidelines are prepared an Advisory for States/ UTs, especially their Town and Country Planning Department, Urban Development Authorities and Urban Local Bodies to ensure sustainability of rivers passing through cities and towns and to regulate the development along the river banks and flood plains. These guidelines suggest model River Zone Regulations, which can be adopted by States/ UTs in accordance with the riverine topography and local conditions.

3. I hope that these Guidelines will go a long way in preserving and conserving our rivers and States/ UTs will make an extensive use of these Guidelines for formulating their own river centric urban planning guidelines.

4. I complement the officers of Town and Country Planning Organisation, New Delhi who have contributed in preparing this Advisory diligently.

(Durga Shanker Mishra)

New Delhi  
18 May, 2021



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## PREFACE

Rivers are lifelines of cities and towns. Since the ancient times, several civilizations grew around rivers. Civilization of Harappa and Mohenjo-Daro came up along the Indus, Sutlej and ancient Saraswati. In southern part of the country also, civilization developed around the Krishna, Kaveri and Godavari rivers. Rivers have been revered as mothers for sustaining life of the population living alongside its banks. The Ganga Basin traversing a distance of 2525 km from its source houses almost 40% population of India.

In the present times, Indian cities are growing at unprecedented pace, sometimes causing harmful impact on the health of the rivers. Several programs for cleaning the rivers are being implemented by the government with focus on their rejuvenation and ecological conservation and, health and wellbeing of people dependent on these rivers. Ministry of Housing and Urban Affairs has prepared these guidelines as per the decision taken in the First Ganga Council Meeting held under the chairmanship of Hon'ble Prime Minister at Kanpur on 14 December, 2019.

I am hopeful that these guidelines will assist Urban Local Bodies, Urban Development Authorities and Municipal Corporations and State Town and Country Planning Departments for taking action to conserve and preserve their rivers, water bodies and flood plains.

I congratulate the team of Metropolitan and Union Territories Division of Town and Country Planning Organization for bringing out this advisory and hope that States and UTs will make full use of it and draw up action plans for protecting the rivers and their flood plains. The contribution of interns from Schools of Planning and Architecture, Delhi and Bhopal is also duly acknowledged.

  
(D. Thara)

May, 2021



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# 1. Introduction

1. Rivers passing through the urban areas are their lifelines. However, due to unprecedented urbanization and manufacturing activities in the areas along the rivers, many of these have become polluted and in some cases, unfit even for bathing. Flood plains of the rivers in urban areas have witnessed the construction activities including the unauthorized residential development, a phenomenon which has severely degraded the overall natural environment and river ecology.

2. The pollution load in rivers has been increasing over the years due to disposal of human and industrial waste in the rivers. The situation is likely to be further aggravated due to impact of climate change on the water resources, including rivers. Central Pollution Control Board (CPCB) monitors the water quality of water bodies, including rivers across the country. According to the CPCB reports of the year 2009 and 2015, considering the Bio-Chemical Oxygen Demand (BOD), numbers of polluted river stretches have increased from 150 in year 2009 to 302 in year 2015.

3. As per another CPCB Report of 2009-10, the estimated sewage generation from Class-I & Class-II towns in the country was around 38,255 MLD (Million Litres per Day), against which sewage treatment capacity of only 11,787 MLD i.e 30% of the sewage generated was available. In the latest CPCB report of 2014-15, these figures changed to 61,948 MLD and 23,277 MLD (37% of the sewage generated). Thus, it can be seen that although installed treatment capacity has nearly doubled over the last 5 years, the gap between sewage generated and installed capacity has only slightly reduced because of increased urbanization and increase in urban population. Water crisis is particularly severe in highly populated urban areas and the condition is going to be further aggravated with increased urbanization. Due to the increased demand of the cities, water is being brought from distant points. Higher amount of waste water, mainly in the form of sewage and industrial effluents, is being generated resulting in additional challenge for urban planning.

## 2. Need for Urban River Water Conservation and Mainstreaming it with Urban Planning

4. Flow is the major driver of biodiversity in rivers. River flow regime, ranging from low flows to high flows, significantly affects the river ecosystem. For various water demands, water is stored and diverted through various structures built on rivers that changes the flow regime and reduces the flow in the downstream reaches, resulting in degradation of the services that society gets from rivers.

5. By definition an urban river is a stretch or section of a water resource located within a catchment that contains a town or a city, where the structure and function of that water resource is altered from its natural state. These river systems are not only used for irrigation, drainage and supply of potable water but they also have a close relationship with the social fabric.

6. Due to the pressure of urbanization and population growth, riverfront areas are getting degraded with poor water quality, limited access, formation of slums etc. and are often found functioning as open sewers or dumping grounds. Such problems are not confined to a particular geographic region of the world, but are common to all places subject to the level of urbanization, and India is no exception. One can see many examples across the world, where city authorities have made successful efforts to reconnect people to the rivers by reshaping their riverfronts

such as in Portland, Boston, Seattle, San Francisco, and Tokyo. Major development projects in India such as Ganga action plan, Yamuna action plan and Sabarmati riverfront development have been initiated to improve the river environment.

7. Waterfronts have long been used for different purposes and are now being developed for thriving and layered public use. Waterfronts can be developed for different functions and activities such as parklands, recreational public spaces, retail or tourist centre. However, studies suggest that mixed use development along the waterfront is beneficial for the community and city authorities as it provides wide public access to the riverfront and contribute in the economic development of the city.

8. Realizing the significance of river water conservation as well as river front development, Ministry of Housing and Urban Affairs has been directed to prepare the guidelines on the same in the First Ganga Council Meeting held under the chairmanship of Hon'ble Prime Minister on 14 December, 2020. The relevant para of the minutes is reproduced:

“There is need for new thinking for ‘river cities’. There is need for the residents of those cities to ask, ‘What can we do for the rivers’ Learning from experience of Namami Gange, there is need for a new



**Figure 1:** Two views of the same part of the River Don, fifty years apart. (a) The river as a drain behind industrial buildings. (b) The river as an attractive location in front of residential developments which have replaced the industrial buildings. (Source: David N Lerner\*, Alison Holt)

river centric thinking in planning for cities on the banks of rivers, the city master plan, at present, does not adequately address this. The river health needs to be mainstreamed into urban planning process by development of Urban River Management Plans. Cities should be responsible for rejuvenating their rivers. It has to be done not just with the regulatory mindset but also with development and facilitatory outlook.”

### 3. Objectives of the Guidelines

9. The broad objectives of the guidelines are:

- Highlight the need for river centric master planning, and urban river management and planning, and provide guidance to cities and towns.
- Prepare a framework for river water conservation and development of river water front
- Devise development regulations /zoning

for river front development.

- Recommend suitable planning strategies for river water management and river front development as a part of sustainable urban planning and development. Riverfront to be transformed as a place to live, work and use for recreational activities by means of improvements in public access, development of green spaces along river edges etc.



**Figure 2:** The number of polluted rivers stretches in India have increased in the last few years. (Photo by Abhishek727 /Wikimedia Commons)

## 4. Factors Responsible for Degradation of Floodplains in Urban Areas

10. In urban areas, rivers continued to be channelized to accommodate for development and flood prevention. As urban areas expanded, rivers at urban centers have come under more pressure and lost the ability to function naturally. Construction activities on the flood plains damage their natural setting. Damage to floodplains harms the riverine ecosystem, lessens groundwater recharge capacity and poses threats of flash floods. Unplanned construction and encroachment on riverbeds reduces the capacity of rivers to carry flood waters and may lead to floods.

11. Floodplains in Indian cities are very much exposed to unauthorized construction which has taken place without preparation and approval of layout plans. Built up paved areas on the flood plains are also responsible for reducing the absorption of water into the ground and increasing runoff. Reduced flow along the embankments has led to utilization of urban river plains for residential, commercial and recreational purpose thereby interfering with the ecological functions of the river. Flood plains are encroached upon by various means and are also used as landfill sites, leading to degradation of overall river ecology.

12. River Channelization is the practice of dredging and realigning the river to increase its flow rate and carrying capacity. Traditionally, channelization

of the rivers flowing through the cities is done to check the flooding. However, channelization, through the elimination of riverine habitat and the creation of excessive flows, may not be desirable for "well-being" of streams and rivers. Rivers, which have undamaged floodplain, are considered to be in good health.

13. Water quality degradation, which happens due to indiscriminate discharge of waste water without any treatment through open drains, is also one of the important concerns. Industrial discharge further deteriorates the quality of water. Disposal of untreated waste causes severe pollution in urban and peri urban areas. During 2015, approximately 61,754 Million Litres per Day (MLD) sewage was generated in the country against the available sewage treatment capacity of 22,963 MLD. Because of the deficit in sewage treatment capacity, about 38,791 MLD of untreated sewage (62% of total sewage) is discharged directly into nearby water bodies (CPCB, 2016).

14. Use of such wastewater loaded surface water for irrigation has resulted in the significant built up of heavy metals in agricultural land near several cities and towns of India. In the cities around river Ganga, although untreated sewage is being used by farmers to grow crops on urban peripheral lands due to its high nutrient contents, its use for longer periods is a matter of great concern. Urban sewage carries high amounts of

heavy metals (Ni, Cr, Pb, Cd, and Zn) and salts, causing salinity and alkalinity hazards. It is projected that wastewater generation across the country will reach 1,22,000 MLD by the year 2050. The country generates ~50 million tonnes (Mt) of municipal solid wastes/year from its urban areas (CPCB, 2000). About 9%-10% of these wastes find its way into agricultural land in the form of compost, contaminating soil with heavy metals.

15. Reduction of vegetative coverage also adversely impacts the urban river flood plain. The increase of human population will further lead to degradation of riparian areas, intensification of the hydrological cycle and increase in the discharge of pollutants, leading to proliferation of species. This will disturb the river biodiversity and bio production river flood plains are indeed habitat for more species of plants and animals compared to any other landscape unit in most regions of the world. Since cities are hubs of global transportation networks, urban rivers are also vulnerable to invasion of non-native species which may outcompete the native species and degrade the natural environment.

16. Increased frequency of flood and reduced flow due to over-exploitation and increased surface run-off in urban areas reduces the flows within a river but increases the frequency of flood in case of heavy rainfall. Continuous encroachment over the floodplains of the country's rivers has resulted into the constriction of the most suitable recharge zone. The water level in the rivers prior to onset of monsoon remains usually low resulting in longer recharge period for the groundwater aquifers compared to the high pumping (discharge) rate.

## 5. River regulations

17. Efforts for regulating the development on floodplains can be traced to the River Conservancy Act of 1884 that directed for conducting surveys and defined limits for the river which was termed "river-bed"; any construction or plantation within the river-bed for the area covering the present States of Tamil Nadu and Andhra Pradesh was to be permitted by Conservators of Rivers.

18. The Central Water Commission (CWC), a part of the Ministry of Water Resources (MoWR) circulated a model bill in 1975 for flood plain zoning which proposed delineating the areas that are subject to flooding including classification of land with reference to relative risk of flood.

19. The National Water Policy, 2012 includes a section on conservation of rivers and 4 river corridors. It also mentions that encroachments and diversion of water bodies must not be allowed and restoration must be promoted to the extent feasible.

### State Government Efforts

20. In 1989, Tamil Nadu Pollution Control Board passed an order stating that no industry causing serious water pollution will be permitted within 1 km of reservoirs, rivers and public drinking water sources. Maharashtra Pollution Control Board also framed a River Regulation Zone policy for the State in 2000 (revised in 2009) based on the designated best use as per water quality for rivers, high flood line

and categorizing industry based on their pollution levels. However, this was later withdrawn based on a resolution passed by the state government dated 3 February, 2015. With floodplains, it is also important to look at relevant land use legislations which come under the ambit of States. State Town and Country Planning Acts were enacted by the States based on Model Town and Country Planning Laws in 1962 (later revised in 1985).

21. Ministry of Environment Forests and Climate Change (MoEFCC) released a "River Regulation Zone" (RRZ) notification draft under the Environment Protection Act (EPA), 1986.

22. Draft RRZ notification intended to regulate developmental and industrial activities upto 5 kms from the banks of the river stretches having floodplains and an equivalent area for mountain/ hill stretches under three River Conservation Zones (RCZ) demarcated with reference to the Highest Flood Level (HFL) with a 100 year return period. The Prohibited Activity Zone (RCZ-PA) in the immediate vicinity of the river is offered the highest protection since existing activities and constructions within the zone should adhere to the notification. Attention has been paid to regulating new developments within three zones.

23. The RRZ draft policy also defined the area for protection from further encroachments as the "active flood plain", which will be marked by the high

flood line. This, in entrenched stretches will be the available space in the valley. In embanked stretches, this would be the area between two embankments or roads along a river acting as an embankment. In other stretches of the river, the active flood plain will be the 100-year flood line, the land which gets flooded during a 100-year storm. The idea was to establish a no-development zone not less (in area) than the active floodplain.

24. In February 2016, Ministry of Environment, Forests and Climate Change (MOEF & CC) had come out with a draft notification for River Regulation Zones wherein it proposed to prohibit or regulate the developmental activities on riverfronts and floodplains. The draft notification has been circulated to all the States and UTs.

#### **Key proposals in the draft notification:**

- The proposed River Regulation Zones (RRZs) are to be set up on the lines of Coastal Regulation Zones (CRZ) and would fall under the Environment Protection Act, 1986.
- The key objective of River Regulation Zones is to prevent encroachments along the rivers and floodplains. The notification proposes to declare river stretches and floodplain zones as River Conservation Zones and to regulate or prohibit developmental activities in these zones.
- There would be a National River Conservation Authority to be headed by the Secretary of the Ministry of Environment, Forests and Climate Change at the Central level, and a

State River Conservation Authority headed either by the Chief Secretary or Additional Chief Secretary at the State level.

Under the proposal, the river stretches and their tributaries were classified into three categories namely floodplain rivers, seasonal rivers and mountain rivers/ hill streams. Also, the river regulation zones have been divided into three, depending upon the permission granted to carry out developmental activities:

- Prohibited activities zones: up to 500 meters from the highest flood level in past 50 years
- Restricted activities zone: Outer limit of prohibited zone to 1 kilometer
- Regulated activities zone: Outer limit of restricted zone to 3 kilometers

#### **Prohibited activities zone:**

This zone extends from the river bank to the outer edge of the floodplain and beyond. The limit will be extended up to 500 meters from the highest flood level in the past 50 years. These zones are the area which are subjected to frequent flooding and are most vulnerable to adverse impacts of human activities.

In case of the presence of embankments in the floodplain area, then this zone will extend from the river bank to the present outermost embankment and further a 100 m buffer is provided outside that embankment.

Alternatively, if the flood plain is marked by the presence of ecologically sensitive and fragile watersheds, heritage sites, areas



with outstanding beauty, areas which are genetically diverse and important for rare and endangered species, national parks, biosphere reserves, wildlife sanctuaries etc., then the whole area will be included under this zone irrespective of the above criteria.

### **Restricted activities zones:**

Restricted activities zone includes the floodplain areas which are less frequently affected by the floods and lie farther from the river. It will have limits extended from the outer limits of the prohibited zone and up to 1 KM.

### **Regulated activities zone:**

This zone extends up to 3 km from the outer limits of the restricted activities zone. Certain activities will be permitted in this zone.

Activities which are permitted  
Traditional grazing by domestic animals, traditional capture fishing and organic farming, discharge of treated domestic waste waters, withdrawal of ground water using hand pump, recreational activities which will not require boat jetties etc.

Activities which are not permitted  
Bunding, dumping of solid waste, construction of new embankment, land reclamation, storage of inflammable and toxic materials, and withdrawing water for commercial purposes other than hydro power and irrigation projects are prohibited.

### **Urban and Regional Plan Formulation and Implementation Guidelines (URDPFI), 2014**

25. The URDPFI Guidelines, 2014 identify river flood plain as natural hazard zones. Buffer zones are areas created around the conservation area, often peripheral to it, inside or outside to enhance its protection. Buffer zones are identified on the basis of activities. Flood plain zoning is done to regulate the land use in the flood plains to restrict the damage caused by floods. Flood plain can be identified based on last 50 or 100 year flooded area of water bodies or river. There can be different considerations for regulations. For example, the area likely to be affected by floods up to a 10 year frequency should be kept reserved only for gardens, parks, playgrounds, etc. Residential or public buildings, or any commercial buildings, industries, and public utilities should be prohibited in this zone.

In area liable to flooding in a 25-year frequency flood, residential buildings could be permitted with certain stipulation of construction on stilts (columns), minimum plinth levels, prohibition for construction of basements and minimum levels of approach roads, etc. In urban areas there should be double storied buildings. Ground floors could be utilized for schools and other nonresidential purposes.

## 6. Strategies for Urban River Conservation

### Planning and development of river bed

26. Three alternative approaches for planned development of cities and towns with objective of conserving the flood plains of the rivers passing through them are suggested.

#### A) River ecology conservation plan

This is purely an environmental approach to the river bed development and comprises of the following components.

a) Augmenting water recharge potential – through extended storage of water in the form of retention and detention ponds.

b) Reducing pollution of river water  
(i) installation of sewerage treatment plants with detention facilities at the outfall points and (ii) effluent management of adjoining peripheral areas of cities.

c) Conservation of natural areas – through natural swamps, marshes and special aggregation of flora and fauna, with proper mechanism to inhibit misuse through protective barriers and sound management.

d) Hierarchy of green areas – to be developed depending on existing accessibility and viability of development of areas with varying use intensities such as remnant forests, landscaped parks, bio diversity parks and zoological gardens

with significant emphasis on pollution control.

e) Recreation – to be limited to ecotourism as in development of near passive greens and water sports facilities where environmentally viable.

f) Continuation and renewal of existing areas be envisaged with special emphasis on improvement in the built environment. Agriculture and allied activities such as horticulture and floriculture are also proposed to be promoted in limited manner wherever the possibilities exist.

#### B) Integrated Development Scenario

27. With proper use and integration of the river into the urban fabric, development is to be achieved through appropriate consideration of the local and transient requirements of facilities of adjoining areas and also through inclusion of such uses that would give citizens desirable proximity to the river. The various features of this scenario are:

a) Retention of essential features of the eco-based scenario such as augmentation of ground water recharge, pollution control and conservation of natural areas.

b) Assignment of uses, according to demand and suitability, mainly incorporating those uses which are either presently under consideration or are

derived to facilitate improvement of the perceived quality of life of other areas.

c) Modification of certain existing/ongoing uses to improve their respective environmental qualities.

d) Integrated tourism development, through development of appropriate infrastructure networks and facilities.

e) Higher level of recreational activities is also proposed under the scenario. These will include, water sports and other recreational uses which are presently wanted in the city.

f) Inland water transportation is also envisaged for development, subject to feasibility.

g) Management of higher order is also identified as an essential requirement to ensure economic viability and sustenance of integrated development

### **C) Post channelization development scenario**

28. It is essentially an extension of the integrated development scenario with partial/ limited channelization as a precondition. This scenario also requires:

a) Reduction of peak flood water release, as flow volumes are likely to increase on channelization.

b) Pumping regulation to prevent backflow of existing drains and consequent flooding in other areas of the city

c) Limited assignment of religious and other water bound facilities as channelization will restrict the stream width, will not permit stream bifurcation and will permit limited in stream uses.

### **Outline a Development Strategy**

29. The Strategy that involves a substantial degree of alternative models of public - private partnerships, and proposes a stronger land management system with a project-based approach in development or master plan. Channelization, considering the enormous investments/resource requirements, adverse impacts on the areas upstream and downstream and, major implementation constraints, may not yield any justifiable benefit. It may therefore be more appropriate to adopt the integrated development model, which foresees only partial channelization.

## 7. Objectives and Framework for the River Zonal Development Plan

30. Zonal development plan for river flowing through the city may be prepared to address the following objectives: -

- a) Water supply augmentation
- b) Pollution abatement
- c) Land utilization/ management
- d) Eco-friendly development.

Critical concerns for the development of the river areas are: -

- a) Involvement of multiple agencies
- b) High resource requirement
- c) Special significance of the area and its linkage with the other States- upstream and downstream, development/re-development of the existing areas.

- Development should not increase the pollution within the river area, rather it should regenerate a healthy environment.

- Any kind of development should be safe from flood damage even at peak flood level.
- The resource requirement is partially recovered with the development of land in the river bed area without compromising the quality of the environment.
- Stretches which need to be developed on priority, do not require large financial resources or are prone to encroachments, should be identified.
- Mitigate the constraints of allotment of land for public and semi- public uses in the adjoining areas of river, more so on banks of the river.



**Figure 3:** Two views of the same part of the River Cheonggyecheon, S. Korea (a) 1949 (b) 2018  
(Source: [https://www.reddit.com/r/korea/comments/8jua0q/cheonggyecheon\\_in\\_1950s\\_vs\\_2018/](https://www.reddit.com/r/korea/comments/8jua0q/cheonggyecheon_in_1950s_vs_2018/))

## 8. Conservation of the River as a Natural Entity

31. As the river is a vibrant ecosystem which bestows numerous ecological functions such as recharge and discharge, erosion and deposition, storm water drainage etc. It is of critical importance to retain these natural functions and processes. This necessitates that the ecological value must be prioritized over the economic utility arising from the river. The proposed interventions must respond to this natural context sensitively, and not cause any major deviations to these functions.

32. Priority needs to be given for the restoration of the natural course of the river over a human-centric built designs. This would not only make the river conservation unique but also contribute to the ecological value accrued by the city.

## 9. Restoration of Natural Zones along the River

33. Ecological restoration is the process of returning an ecosystem as closely as possible to pre-disturbance conditions and functions. The restoration process includes rejuvenation of the structure, function and self-sustaining behavior of the ecosystem. Following restoration strategies may be applied in stages and considering the ecological status of each zone.

1. Substantial intervention for managed recovery
2. Partial intervention for assisted recovery
3. Non-intervention and undisturbed recovery

## 10. Maintaining Environmental Flow and Carrying Capacity

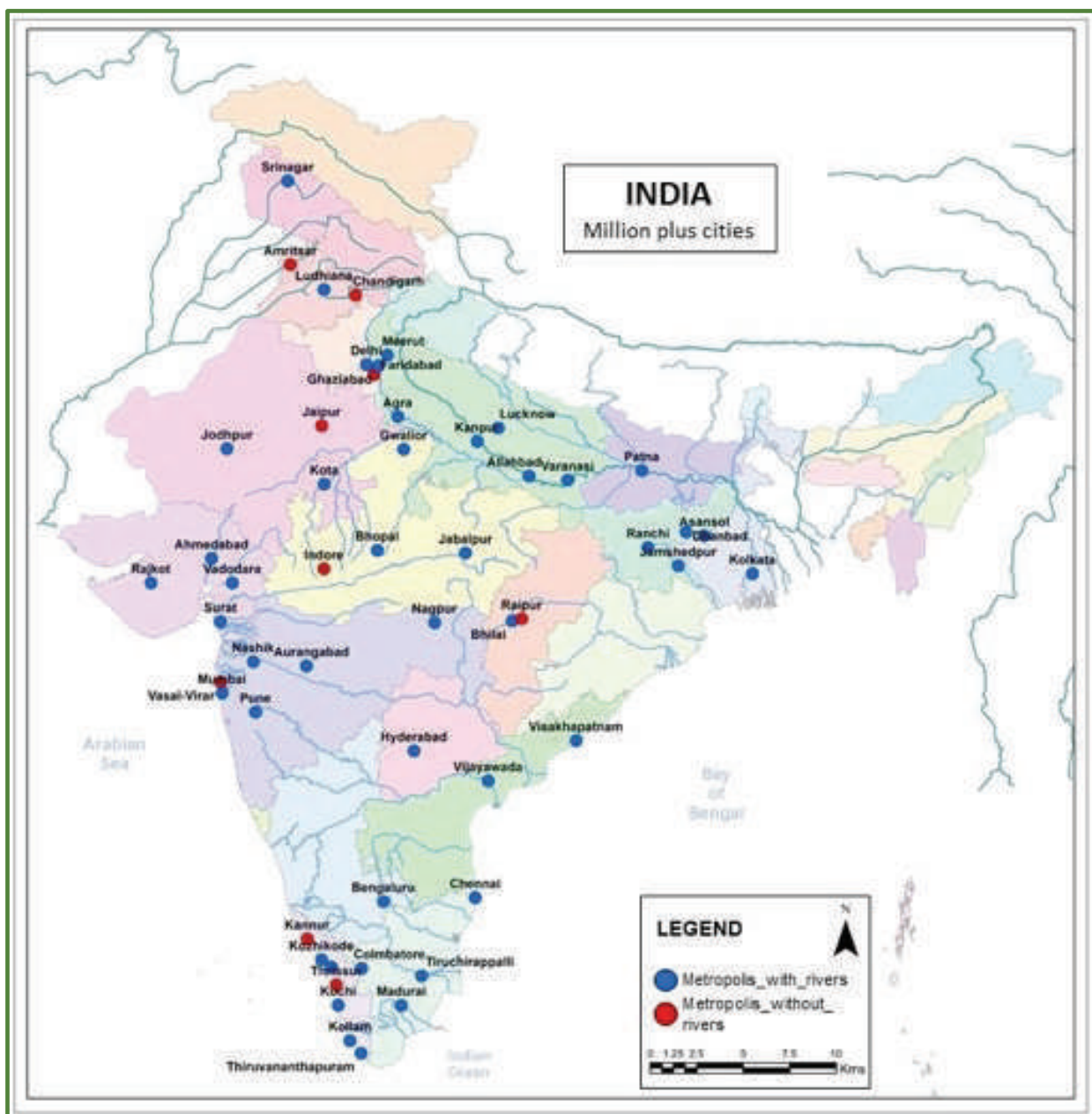
34. For a natural state and to protect the habitats, it is essential to maintain the minimum and maximum levels. Environmental flow is a system for managing the quantity, timing, and quality of water flows from a dam, with the goal of sustaining freshwater and estuarine ecosystems and the human livelihoods that depend on them. The most ecologically important aspects of a river's flow are extreme low flows, low flows, high flow pulses, small floods, and large floods. Environmental flows can be designed to restore any of these, with the goal of improving water quality, restoring sediment deposition, addressing the life-cycle needs of fish and wildlife, and restoring the livelihoods of river-based communities.

35. Pollution abatement measures through infrastructure development may be made effective for improving the health of the rivers if survival need of the river system is made an integral factor of our river planning. Thus, it is of prime importance to maintain the minimum requirement of environmental flow for sustenance of the river ecosystem along with its functions and services. In case of non-perennial rivers, the flow may be erratic and environmental flow is many times absent, causing the loss of habitat and biodiversity.

# 11. Decentralized Approach to River Rejuvenation

36. The tributaries of major rivers such as Ganga, Yamuna, Narmada have been encroached upon which resulted into limited recharge of groundwater aquifers, reduction in the natural flow and large contribution of sewage water through these streams to the main stream.

Therefore, restoration of the tributary streams is essential in the planning. If issues such as those relating to dumping of debris, solid waste, sewage and others are addressed at the catchment level, they can lead to a sustainable solution.





## 12. Restoration for Utility and Aesthetic Value

37. Restoration of the river ecosystem will not only contribute to the ecological utility of the river, but also complement the beautification of the riverfront. Maintaining water quality is important for enhancing visual appeal of the riverfront. This will help the river to host macro and micro habitats for a wide biodiversity. Hence, there is an immense potential for research and scientific activities such as bird-watching, insect trails, herpetology studies along the river banks. Conservation of ghats, historical monuments and gardens is essential, and their design should be sustainable.

# 13. Urban River Zoning Regulations

38. United Nations has on 26 July, 2010 resolved unanimously to declare “right to safe and clean drinking water and sanitation as a human right”. Healthy rivers are essential for realization of the said obligation by India as a Party to the UN. Further, statutory mandate from Section 3, 5 and 6 of the Environment (Protection) Act, 1986 seeks to regulate such activities that are found to be incompatible with maintaining the health of the river systems as dynamic and life sustaining entities. It is thus proposed to frame rules to regulate harmful activities in and around the rivers.

## Categorization of urban river stretches

**Category I** Urbanized stretch shall include stretches of rivers (including their tributaries), with or without embankments, in designated urban areas where infrastructure facilities in the form of roads, buildings (residential, commercial, recreational), temples, ghats etc exist.

**Category II** Peri urban stretch shall include stretches of rivers (including their tributaries) in suburban and rural areas, with or without embankments, where infrastructure development if any is moderate and the land is primarily under natural vegetation, forestry, agriculture and grazing.

## Lateral zonation of river banks

“Active Flood Plain” is defined as High

Flood Line (HFL) which in entrenched / embanked stretches of a river stretch shall be the available space (including the river channel/s) in the valley of entrenched stretch or between two embankments or between existing roads on either side along a river acting as an embankment. In other stretches of the river, HFL/ active flood plain shall be the 100-year flood line.

**No Development and Construction Zone (NDCZ):** The competent authority shall determine a NDCZ on either bank for each river which shall not be less than the “Active Flood Plain” of the river.

**High & medium impact zones:** The competent authority shall identify and designate suitable distance/s from the NDCZ on either bank keeping local topographical conditions in mind, to be called as high impact and medium impact zones. In plains, where river topography is relatively flat, these distances shall not be less than 1 and 3 Km respectively from the NDCZ depending on the width of the urban river.

Following public facilities shall not be permitted in active flood plain/ NDCZ:

- Hospitals, nursing homes, and housing likely to have occupants who may not be sufficiently mobile to avoid injury or death during a flood,
- Police stations, fire stations, vehicle

and equipment storage facilities, and emergency operations centers that are needed for flood response activities before, during, and after the flood,

- Structures or facilities that produce, use, or store highly volatile, inflammable, explosive, toxic, and/or water-reactive materials,
- Public semi-public facilities like sewage and water treatment plants (STP/ WTP); power plants and stations; bus depot; metro stations/ depot etc which form the life line infrastructures for any city,
- Commercial extraction of ground water by non-government / private agencies shall not be permitted within NDCZ in any category of the river.

The Urban Local Body/ Urban Development Authority shall act as per the directions of Ministry of Environment and Forests to designate the State Environment Impact Assessment Agency (SEIAA) or the State Pollution Control Board (SPCB) to act as the Competent Authority for implementation of these regulations for environmental conservation and preservation, including water bodies, forests and drains, parks, playgrounds, burial and crematoria.

### **Uses/Activities permitted**

Parks/Gardens, playgrounds, sports facilities including stadium, swimming pools, burial cemeteries and crematoria may be permitted under this category. The Parking for these facilities shall be provided as per the provisions of the Master Plan and up to 2% of the total land

area with FAR of 0.50 and G+1 structure may be permitted for ancillary uses required to support the main activity such as eating joints/ restaurants, stalls, sheds for storage etc.

### **Uses/Activities permissible under special circumstance by the Competent Authority**

- i. Open air theatres, indoor recreational uses, dwelling for watch and ward, sports clubs, water front tourism development projects, libraries, milk booths, Horticultural Producers' Cooperative Marketing and Processing Society (HOPCOMS), public toilets.
- ii. The ground coverage for such use shall not exceed 5% of the total area with required parking facility and shall not be more than G+1 floor in any case.

## 14. Regulations for Eco-sensitive Zones and Water Bodies

i. Restrictions imposed by the competent authorities are to be maintained as buffers for various eco sensitive zones such as reserve forests/ protected forests etc. Permissions in sensitive areas earmarked on the land use plan shall be considered only by the planning authority.

ii. The buffer for water bodies such as lakes/ streams/ drains shall be governed as per the NGT Orders. In case of water bodies, a 75 meter buffer of No Development and Construction Zone is to be maintained around the lake as per the revenue record with exception of activities associated with lakes. This buffer may be taken into account for reservation of park while sanctioning plans.

iii. Similarly storm water drains that get discharged into the river may be categorized into 3 types namely Primary, Secondary and Tertiary. These drains may have a buffer of 50, 35 and 25 m (measured from the edge of the drains) respectively on either side. In case the buffer has not been marked due to cartographical error for any of the above types of drains, then based on the revenue records buffer and the existing ground situation may be considered by the Authority in all such cases without referring the land use plan while according approval for building/ development/ layout plan.

iv. In addition, any other notifications or directions and applicable buffers which may be issued by the Competent

Authority from time to time for such eco-sensitive areas shall become applicable.

v. In case of any amendment in the existing regulations of the Competent Authority resulting in reduction of the extent of buffer, the land use of the adjoining parcel of land will be the land use for such exempted land parcels.

vi. Within the demarcated buffers for the valley systems excluding the requirements of buffer as per NGT judgment, the following uses are allowed:

(a) Sewerage treatment plants and water treatment plants

(b) Roads, pathways, formation of drains, culverts, bridges etc which will not obstruct the water course, run offs, channels.

vii. If the river portion is a part of the layout/ development plan, then that part of the river zone could be taken into account for reservation of parks and open spaces both in development plan and in sub-division regulations, as the case may be.

viii. Any land falling within the river zone for which permission was accorded by the Authority or Government prior to the date of notification, and then such permission shall be valid irrespective of the land use classification in the Development Plan or Master Plan of the city concerned.

39. While preparing/ revising the master plans, it would be appropriate to categorize the zones as per the environment sensitivity as given below.

**Passive recreational zone:** These zones are established to provide recreational and leisure facilities and activities in selected areas that have unique features (including visual corridors, environmentally sensitive areas, buffer areas, or are along significant routes). These parks can include recreational commercial or public facilities at the neighborhood, community, and regional level.

**Active recreational zone:** Are those zones established to provide parks that offer active recreational and sporting activities. While structures within the parks are allowed, the general character of the Active Recreational Zone should remain as green and recreational.

**Protected area:** These zones are established to conserve and protect the environmentally sensitive areas such as steep slopes and rivers which are rich in nature and biodiversity. These areas are non-developable for other strategic purposes. In the case of highly sensitive areas such as forests and rivers, the zoning for the protected areas shall supersede.

## 15. Way Forward

40. Co-operation between cities which share a common river is necessary not only to meet the evolving ambitions of the States in the shared basin, but also to face common challenges that might be stopping the States from achieving their maximum potential. It is high-time to prioritize our water resources sustainability and think for the environmental security; else our future might face a serious crisis on water. Life is important, but survival in 21st century should be equal for all, people should not suffer because of lack of basic amenity like water- whether it is for drinking, irrigation, industry, hygiene, recreation or even religious. Sustainable urban planning and development has to take into consideration that river

flowing through the urban centers require prioritized attention to ensure that the rivers are clean, free of any untreated discharge of waste water and the flood plains are not only protected from the construction activities but also become the hub of recreational activities without compromising the overall natural environment.

41. State governments and UT administrations while preparing or revising the master plans/development plans need to ensure that protection of river flood plains get utmost attention and the entire river zone is designated as special zone.

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# Illustrations

(Source: Robert Milhouset et al(2012): Modelling Environmental flow need for riparian vegetation)

## River Morphology and Ecology: Components of River

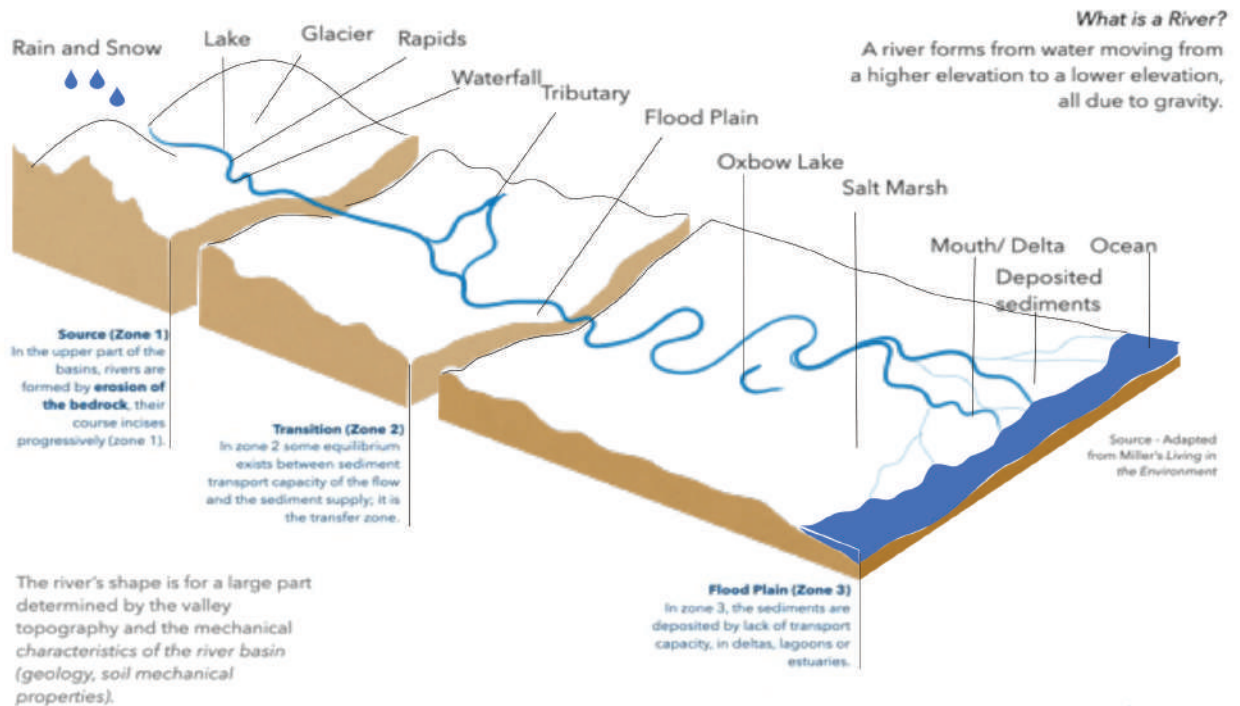


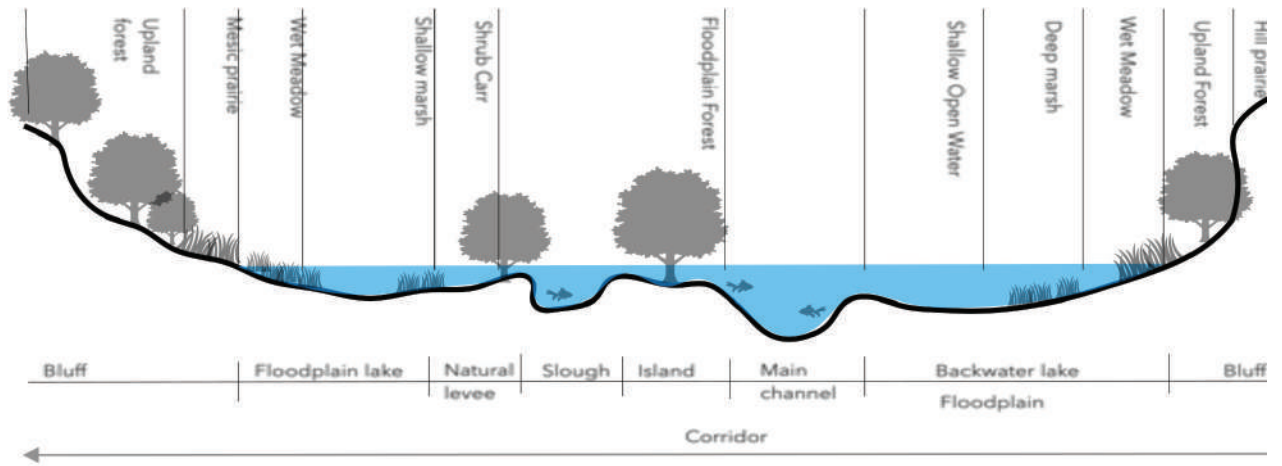
Figure 5: Components of a River

Figure 1

Figure 2: River cross-section  
(Source: Robert T Milhouse, et al, 2012) Figure 3: Components of a River



# River Cross Section









**Ministry of Housing and Urban Affairs**  
**Government of India**