8

INDIAN INLAND WATERWAYS

Inland waterways have played a central role in maritime growth in India. The National Waterways Act 2016 has declared nearly 111 waterways or river extensions, creeks and estuaries in India national waterways. Navigation in lakes, rivers, and other water bodies by small ships linking positions not far apart has been around for centuries. This has been the foundation of our inland waterways. In some cases, particularly near ports and coastal locations, this has also progressed to large-scale business shipping. The national waterways venture intends to commercial shipping and navigation structures on all these waterways. These are anticipated to recognize the potential of commodity and passenger traffic, comprising tourism and cruise. They will provide seamless linkage at a lower per-unit price and construct transportation more competently. The scheme, in its whole execution and operation stage, would create a sequence of forward and backward connectivity with prospects to reach deep into the economy.

LEARNING OUTCOMES

After studying this lesson the learner:

- explains structure and location of inland waterways;
- assesses the ocean and their effects on coast, port and waterways infrastructure;
- discuss the NOC's for structures on inland waterways;
- examines climate change and its effect on the coast;
- explains the coastal structures and shore protection.

8.1 STRUCTURE OF INDIAN WATERWAYS

As per The National Waterways Act, 2016, specified that nearly 111 inland waterways (NWs). 106 were during 2016. Further, the NEW system covers approximatly

20,275.5 km. NW-1, 2 & 3 are already operational. On these waterways, cargo, passenger and cruise ships operated. For development of NW-4 & 5 a detailed scheme report was completed in 2010 and in 2014, the NW 5 was updated. Moreover, techno-economic possibility studies have been commenced for the newly confirmed 106 NWs. The National waterways in India has handled nearly 55 million tonnes (MT) of cargoes in 2017-18 and 72 MT in 2018-19 respectively, and anticipated to attain nearly 100 MT during 2021-22.

The Inland ways can be recognized based on their relevant water flows which are as follows the major rivers of India are:

- Rivers which are flow towards the Arabian Sea: Narmada, Tapi, Sindhu, Sabarmati, Mahi, and Purna.
- Rivers flowing into the Bay of Bengal: Brahmaputra, Yamuna, Ganga, Meghan, Mahanadi, Godavari, Krishna, Kaveri.

8.1.1 Rivers flowing into the Bay of Bengal

Table 8.1: **Rivers flowing into the Bay of Bengal**

S. No.	Rivers flowing into the Bay of Bengal
1	Meghna River Basin (To name a few Padma, Dhaleshwari, Gumti, Surma etc.
2	Ganges River Basin (To name a few Ganga, Hooghly, Damodar, Jalangi etc.
3	Brahmaputra River Basin (To name a Beki, Bhogdoi, Dhansiri, Kolong etc.
4	West Bengal Coastal (To name a few Subarnarekha, Kangsabati,Hughli, etc.
5	Odisha Coastal (To name a few Baitarani, Bhargavi, Brahmani, Daya etc.
6	Godavari River Basin (To name a few Purna, Bandiya,Wardha,Taliperu etc.
7	Krishna River Basin (To name a few Koyna,Venna,Bhima,Varada etc.
8	Pennar River Basin (Pennar river)
9	Kaveri River Basin (To name a few Kaveri, Kollidam, Amaravathi, Bhavani etc.
10	Tamilnadu Coastal Rivers (To name a few Thamirabarani, Palar,Vaigai,Vaippar etc.

Data Source: Computed

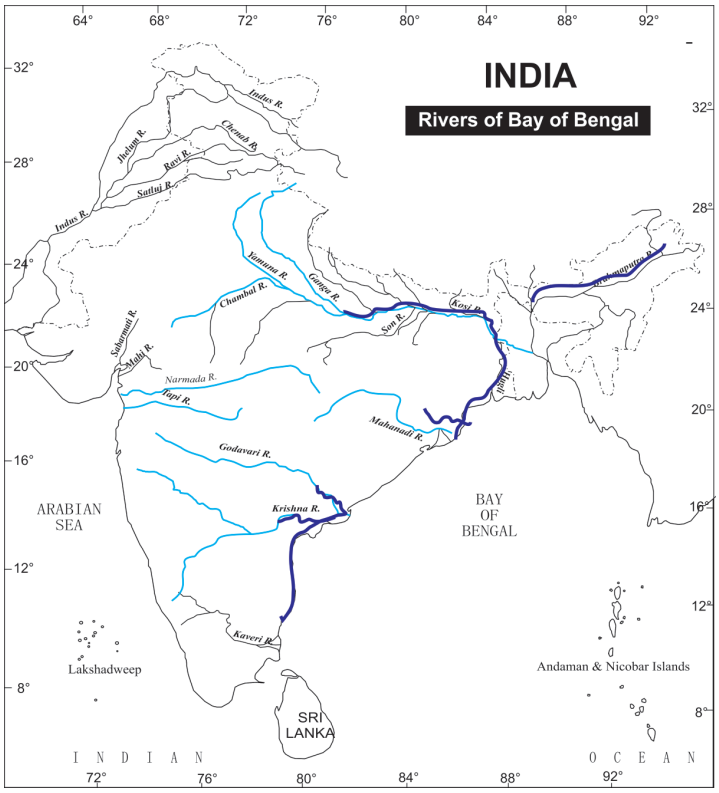


Fig. 8.1: **Rivers of Bay Bengal**

8.1.2 Rivers flowing into the Arabian Sea

Table 8.2: **Rivers flowing into the Arabian Sea**

S. No.	Rivers flowing into the Arabian Sea
1	Indus Basin (To name a few Indus, Panjnad, Chenab, Suru etc..
2	Narmada River Basin (To name a few Kharmer, Silgi, Temur, Hiran etc..
3	Mahi River Basin (To name a Mahi, Som,Gomati etc..
4	Sabarmati River Basin (To name a few Sabarmati, Wakal, Hamav etc..
5	Tapi River Basin (To name a few Tapi, Gomai, Girna, Purna etc..
6	Maharashtra Coastal rivers (To name a few Shastri, Savitri, Ulhas, Surya etc..
7	Coastal rivers of Goa (To name a few Mandovi, Baga, Mapusa, Chapora etc.
8	Karnataka Coastal Rivers (Kali, Netravati, Sharavathi, Gangavalli etc..
9	Kerala Coastal Rivers (To name a few Periyar, Pamba, Chaliyar, Karyangod etc.

Data Source: Computed

INTEXT QUESTIONS 8.1

1. The National Waterways Act came into force during _____.
2. The Yamuna Rivers flows into _____.
3. Goa's costal rivers are _____, Baga, Mapusa, and Chapora
4. The river Narmada flows towards the _____ Sea.

8.2 MAJOR INLAND WATERWAYS OF INDIA

Inland waterways crucial role in maritime development in India. The network consists of natural rivers as well as artificial constructed canals as links as well as important ports as nodes. The major inland waterways in India are as follows:

8.2.1 NATIONAL WATERWAY (NW-1)

In the year 1986 the Ganga - Bhagirathi - Hooghly river structure which is operated between Haldia (Sagar) and Allahabad (1620 km) was announced as National Waterway-1 (NW-1). Ever since then IWAI has been performing several developmental works on the waterway for the development of its navigability and also for the growth and preservation of other infrastructure related to navigation aids and terminal amenities as spotted according to the 82 of 1985 ,IWAI Act. During the financial year 2017-18, the significant works executed for the maintenance and improvement of fairways, navigational substances and terminal amenities on NW-1 are as follows:

A. Development of Fairway:

With the intention of smooth and safe navigation, a fairway of targeted depth and width has been created or maintained on NW-1. Tribeni-Chunar (1226 Kilometers) falls under NW-1, and they have undertaken River Conservancy services such as bandaling and dredging. In addition the length between Haldia (Sagar) – Tribeni (196 km) which is tidal and considered to be the Least Available Depth (LAD) with a depth than 3.0 meters. IWAI was not undertaking any works related to River Conservancy ahead of Chunar to Allahabad stretch. This is excluding the day canal marking as the dredgers owned by IWAI are being utilised in lower stretched areas of NW-1 owing to better traffic demand. Moreover,the day navigational aids were also offered towards the complete stretch of NW-1 from Haldia (Sagar) towards Allahabad (1620 km).

During the year 2017-18, the works of Bandalling of 3,900 m in the location of Tribeni - Rajmahal (399 km) extension and 18,300 m in the area of Rajmahal-Chunar (827 km) extension were implemented for the growth and maintaining the navigation canal (fairway), besides few canals were stabilised. Moreover, the 1.46 lakh m^3 dredging in the connecting canals of Tribeni – Rajmahal and 7.24 lakh m^3 dredging in the canal Rajmahal - Varanasi / Chunar extensions were executed by appointing the IWAI's dredgers.

B. Dredging in development through pipeline on National Waterway-1

The particular of Least Available Depth (LAD), which was administered for several stretches of NW-1 is spotlighted below:

Table 8.3: **Dredging in development through pipeline on National Waterway-1**

S.No	Stretch	Kms	Metres
1	Haldia – Farakka stretch	560	2.6 m to 3.0 m
2	Farakka – Badh stretch	400	2.1 m to 2.5 m
3	Barh – Ghazipur stretch	290	1.6 m to 2.0 m
4	Ghazipur – Chunar/Allahabad	370	1.1 m to 1.5 m

Data Source: Computed

C. Goods Movements:

The shipping of coal for the power plant, NTPC, has been undertaken since November, 2013 from sand heads (Bay of Bengal) towards Farakka via the National Waterway–1. During the financial year 2017-18 approximately 1.60 lakh tonnes of Coal which is imported up to July, 2017 has been effectively shipped by the eminent organisation M/s Jindal ITF Ltd. Further for such movements, barges capacity of 1500 – 2000 tons were utilised. Furthermore, around 30 lakh tons of goods cargo including of food grains fly ash, & general commodities are moved among India and Bangladesh via the National Waterway - 1 and Indo-Bangladesh regulation path under the Inland Water Transmit & Business Moreover, as trial shipment, bagged cement of 240 tons shipped from Kolaghat situated on the river Rupnarayan (NW-87) towards the Bhagalpur on Ganga river (NW-1) as well as bagged fly ash with 300 tons from the Kahalgaon (NW-1) towards Kolaghat of eminent organisation M/s Dalmia Bharat Cements has been made by IWAI's low draft cargo ship namely MV VV Giri based on consultancy services for better strategy and execution assistance for commercialization of NW-1.

8.2.2 NATIONAL WATERWAY 2

On 1st September, 1988, the famous Brahmaputra River which has a length of 891 Km flows along the Bangladesh Border and towards the Sadiya was announced as National Waterway no. 2 (NW-2). IWAI is performing several expansion works on the waterway to enhance navigabilities under the Act 82 of 1985. Further, IWAI is trying to maintain a navigable waterdepth of around 2.5m in the Border of Bangladesh-Neamati (629 Km), 2.0 m in the canal between Neamati to Dibrugarh (139 Km) and 1.5m in the area of Dibrugarh – Sadiya (Uriamghat) extension. Currently, this waterway is being utilised by ships by both government and private sectors such as Govt. Of Assam, Army Border Security Forces, Tourism firms and other private service providers. Tourist vessels such as Long cruise generate voyages among Pandu and Majuli Island adjacent to Neamah regular only. During certain months say October to May, over dimensional goods are also shipped via this waterway

A. Navigation services

In order to offer the safe navigation for several goods vessels, tourist ships with overseas tourists, local standard service by private service providers and mechanised nation boats, day navigation spots with bamboos along with navigational lights are attached on nation boats have been offered from Border of Bangladesh towards Dibrugarh as spotlighted below:

Table: 8.4: **Navigation services**

S. No.	Stretch and Distance in KM
1	Bangladesh Border - Pandu (255 km)
2	Pandu- Neamati (374 Km)
3	Neamati-Dibrugarh(139 km)
4	Dibrugarh- Sadiya (123 Km)

8.2.3 NATIONAL WATERWAY 3

A. Brief explanation:

For a successful navigation on Inland Waterways, there are mostly three needs. These are as follows:

i) Navigable fairway towards inland ships movement,

ii) Aids to ensure safe navigation and

iii) Terminals for stuffing / de-stuffing of goods at several locations along the waterway.

The current amenities on NW-3 are listed below:

B. Navigable Fairway:

For navigation in NW-3, a navigational route of 38m width and 32m in narrow with 2 m depth is to be created. It was pedicted that 40 lakh cu. m of investment dredging would be necessary to develop to navigation route of this size over a length of approximatly 87km. As of 2014, July the IWAI has performed around 36 lakh cu.m dredging for around 80 km shoal length. By this, while the targeted depth of two metres has been offered to the NW-3, the stretching of the navigation route to the needed width of 32 metres is still to be completed in a length of 2 km in the location of

a) Alappuzha (Karuvatta and Mullackal villages).

b) 1.50 km in Kayamkulam Kayal, and

c) 2.75 km from to Chavara.

The remaining shoals of approximately 6 km are at

a) Alappuzha/Kuttanad (2 km) at Kayamkulam Kayal location

b) (1.5km) in Alappuzha District and at

c) Chavara (3.5km) in the Kollam District, for which the work is under progress.

C. Aids to Navigation:

The complete path length of NW-3 has been equipped with aids to assist 24 hours per day.

D. Terminals:

Out of the entire 11 terminal locations eight have already created at the locations of Kottapuram, Thrikkunnapuzha, Aluva, Maradu (Kochi), Cherthala (Thanneermukkom), Vaikkom, Kayamkulam (Ayiram Thengu) and Kollam. Further, the building of one terminal at Alappuzha, kerala is under progress at a price of Rs.9.04 crores and as of july 2014, 88% of the jobs have been completed. Terminals at outstanding two spots specifically Kakkanad as well as Chavara are projected to be built in the next stage after firming up the supply of goods. For efficient and supported private division participation, execution

and maintenance of IWT terminals at Aluva, as well as Vaikkom have been hired from the KSINC (A Govt. of Kerala Undertaking).

Further, to decongest the city of Kochi and to offer a substitute transport path for the container terminal, Vallarpadam, IWAI has set up a couple of Ro-Ro terminals at Willingdon Island and in Bolgatty in association with the Cochin Port Trust. In the year 2011, a route was successfully executed in order to ship the containers in this path.

8.2.4 NATIONAL WATERWAY 4

National Waterway 4 (NW 4) was announced during the year 2008, 25th November.

The canals of Kakinada-Puducherry stretch which combines the Bhadrachalam - Rajahmundry extension of River Godavari as well as Wazira Vijayawada widening of River Krishna with 1078 km)

A. Development in phases

Phase 1: Stretches between Muktyala towards Vijayawada (Krishna River) (82 Km)

Phase 2: Widening between Vijayawada towards Kakinada and Rajahmundry to Polavaram with 233 Km.

B. Subsequent Phases:

- The extending between Commamur & Buckingham Canals and the remaining segment of the Rivers krishna as well as Godavari
- Improvement works in Phase-1 widens from Muktyala towards Vijayawada of river Krishna River are under progress.
- For the development of NW-4 on 14th April'2016, on MOU was signed with the government of Andhra Pradesh.

C. NW-4 stretched by National Waterway act on 2016: Amended length 2890Km

Added Reaches:

- Widened of Krishna river from Wazirabad towards Galagali with 628 KM
- Stretched Godavari river from Bhadrachalam towards Nasik with 1184 Km
- Feasibility studies on Techno-economic are under progress for this widened area of NW-4

8.2.6 NATIONAL WATERWAY 5

Salient characteristics of National Waterway No. 5 - Brahmani River as well as Mahanadi delta structure besides with East Coast Canal (NW-5).The Talcher- Dhamra which widens stretch Brahmani river, Geonkhali- Charbatia widen of East Coast channel, between Charbatia and Dhamra expansion of river Matai and Mangal Ghadi-Paradip broaden of rivers Mahanadi Delta of NW-5 with 623 km.

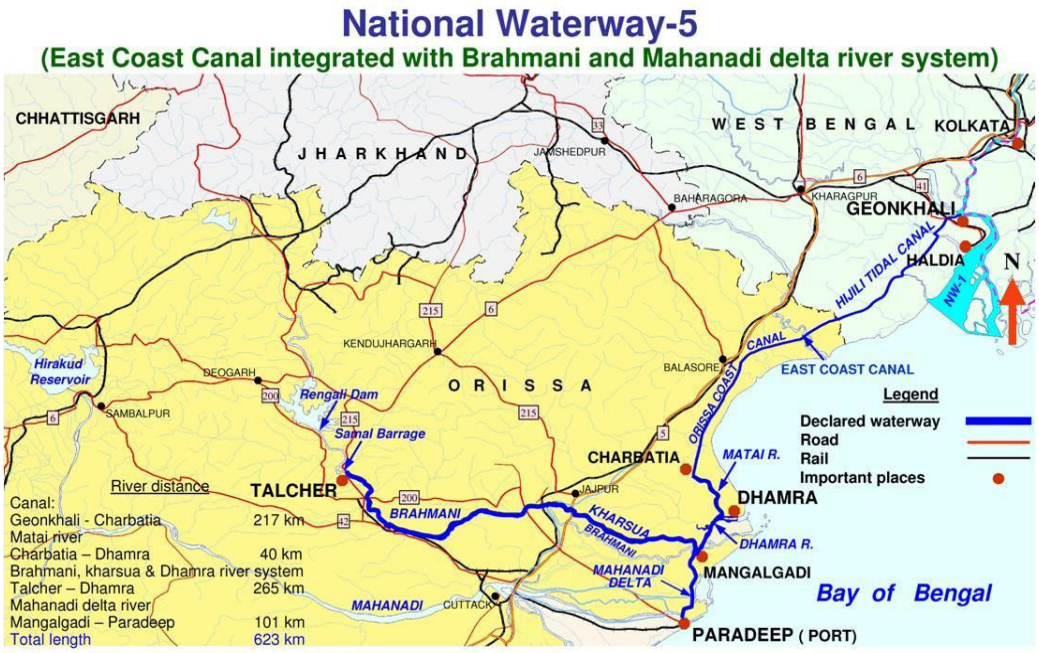


Fig. 8.2: **National Waterway 5**

- National Waterway 5 (NW 5) was announced on 25.11.2008
- Comprehensive venture report was done by M/s. WAPCOS

Total Length – 588 km. **River area** (371 km) **Canal area** (217 km)

Estimated price (atv2009 prices)

a. Charges for improvement of River area Rs.2230 Cr (Barrages – 1843 Cr)

b. Charges of development of channel Portion Rs.1979 Cr (Dredging – 1273 Cr)

c. Total Charges Rs.4209 Crore.

- Time period of Completion – maximum 7 years
- Land acquirement: in West Bengal – 846 Ha essential
- Anticipated charge of land acquisition – Rs.176 crore

A. Dredging details

River area – 10.07 million cum

Channel Portion – 44.77 million cum

B. Barrages

To preserve LAD of 2 m in the river Brahmani throughout the year, nearly 5 barrages with equal heights to the maximum flood level are planned to be built at each 26 km among Talcher as well as Jokadia.Moreover, every barrage will have a navigational security device or locking system to permit the passage of two 500 tone ships at a time.

C. Potential of cargo

The most significant potential cargo which is carried in this waterway is coal and makes its journey from Talcher towards Dhamra as well as Paradip port. Instantly after the enhancement of the waterway, it is anticipated in the DPR that approximately 11 million tonnes of goods can be shipped per year which can move up to 23 million tonnes in subsequent 15 years or so.

D. EIRR

River area 31.77%

Channel Portion 12.75%

River and Channel together 23.75

a. The activities of Phase – I are as follows:-

- The Phase-II of detailed Hydrographic Survey from Talcher towards Pankapal with 120 Km length was completed in the month of October, 2020.
- The Phase–I monthly Thalweg Survey from Pankapal towards Dharma and Paradip through Mangalgadi with 230 km per month.
- Consultancy for generation of DPR comprising FEED for creation of
    - 4 Weirs cum Barrages with 3 Navigation locks
    - 2 Check Dams and
    - 1 Rubber Dam with Nav. Lock (Phase-I)

- Consultancy for creation of DER comprising DEDD for amendment or Reconstruction of Bridges on NW-5 (Phase-I) which is already existing.
- The studies related to Phase-I, EIA / EMP flanked by Paradip, Dhamra as well as Pankapal (Fairway development.
- Phase-I NW-5 by Shifting or repositioning of HT / LT Power lines. This work was assigned to Govt. of Odisha under the deposit basis.

E. NATIONAL WATERWAY 6

In the North Eastern Region, the Barak River is considered as the second largest river. It begins from the south part of Kohima which is situated near the border of Nagaland – Manipur. After moving towards Nagaland, Manipur as well as Assam, it divides at the place Bhanga into two canals referred as Surma and Kushiyara. These two canals reunite at Markuli in Bangladesh and after that the river is referred as Meghna. The river Barak – Meghan structure has a full length of 900 km (beginning upstream at Chandpur in Bangladesh). Out of 524km total in India, it lies nearly 31 km on the border between Indo – Bangladesh and the further is in Bangladesh. Out of the total 524 km which is surrounded in India, 403 km passes through the hilly terrain, Lakhipur which is not navigable in nature. The navigable area of river Barak in India is the stretch of 121km among the Lakhipur and Bhanga which was announced as NW-16 during the year 2016.

For the development of infrastructure on NW-16, execution of several ventures has already been commenced. In order to widen the area between Silchar – Bhanga, the dredging work is under progress and approximately 65% works have been finished. DPRs for enhancing the floating terminals between the Karimganj and Badarpur besides with automatic handling and storage amenities for goods have been prepared. For the enhancement of IWT, a multimodal terminal at the prime area of Silchar is also designed.

INTEXT QUESTIONS 8.2

1. Inland waterways have played a crucial role in the _____ development in India.
2. In the _____, the Barak River is considered the second largest river.
3. On 1st September, _____ , national waterways 2 was announced.
4. For the development of NW-4 on 14th April'2016, on MOU was signed with Govt. of _____.

8.3 ROLE OF INLAND WATERWAYS AUTHORITY OF INDIA

For the development and regulation of inland waterways for shipping and navigation, the Inland Waterways Authority of India (IWAI), with its headquarters in Noida, came into existence on 27th October 1986. Further, the Authority mainly undertakes ventures for enhancement and maintenance of IWT infrastructure on the national waterways via grants obtained from the Ministry of Shipping. Its regional and sub offices are located at in Patna, Kolkata, Guwahati and Kochi. Its has sub-offices at Kollam, Allahabad, Swroopganj, Varanasi, Silchar, Farakka, Sahibganj, Haldia, Hemnagar, Dibrugarh, Dhubri, Bhubaneswar and Vijayawada.

India is equipped with 14,500 km of navigable waterways including rivers, channels, backwaters, streams, etc. Annually, with the assistance of Inland Water Transport (IWT) nearly 55 million tonnes of goods are being moved. It is also viewed as a fuel-efficient and enviromentally friendly form. Its functions are restricted to a few widening areas in the

1. The river Ganga-Bhagirathi-Hooghly
2. The river Brahmaputra
3. The river Barak
4. The rivers in Goa
5. The backwaters in Kerala
6. The inland waters in Mumbai and
7. The deltaic provinces of the rivers Godavari - Krishna Rivers.

Further these organisations are executed by automatic ships; nation boats of several capacities also function in several rivers and channels. A substantial amount of goods and passengers are shipped in this unorganised division as well.

8.3.1 Functions of IWAI

A. National Waterways

- Survey
- Navigation, Infrastructure and Regulations
- Fairway Development
- Pilotage
- Coordination of IWT with other modes

B. General

- Advise Central Govt.
- Carry out hydrographic surveys
- Assist State Governments
- Develop consultancy services
- Research & Development
- Classification of waterways
- Standards & safety

8.3.2 Consideration for declaration as National Waterways

For the declaration of a national waterway, the committee on National Transport Policy suggested the follwing principles:

- It should acquire navigation competence by automatically propelled ships of a reasonable size.
- It must have an approximately 45 m wide canal and a minimum 1.5m depth.
- There should be continuous stretch of nearly 50 kilometers. There is some exception in waterway length in conglomerations as well as intra-port traffic.
- It should move and serve two States (or).
- It should link an enormous and wealthy hinterland and Major Ports (or).
- It should enter via a strategic province where enhancement of navigation is considered essential to provide logistic assistance for national security (or).
- It should link locations not served by other forms of transport.

The Committee of National Transport Policy had considered the following waterways as having the potential for confirming as national waterways:

- The Sunderbans
- The Mahanadi
- The Narmada
- The Mandovi, Zuari rivers and Cumberjua Canal in Goa
- The Tapi,

To establish the prospects and viability of the waterway, feasibility studies to hydrographic surveys an techno economics are tconducted. Widespread surveys and investigations have been executed on all the above-mentioned waterways on the basis which was announced as national waterways, specifically the rivers Ganga, the Brahmaputra and the West Coast Canal. During the current period, several new waterways are being convented into national waterways.

INTEXT QUESTIONS 8.3

1. India has a total of _____ kilometers navigable waterways.
2. IWAI was formded on _____.
3. For the declaration of a national waterway, it must have an approximately 45 m wide canal and a minimum depth of _____ .
4. The Inland Waterways Authority of India is situated in _____ .

8.4 NOC'S FOR STRUCTURES

Under the National waterway 1, there exists 36 structures which are announced as National Further waterway 2 there are nearly 3 structures and under the National waterway 3 it has a total of 25 structures, where as in National waterway 4 there exists a total of 9 structures, in National waterway 5 it consists of only one and in National waterway 3 the extension is total of 5. For the sake of refrence maximum three structures were mentioned.

Table 8.5: NOC's For Structures

S. No.	Waterways	Name of Structure	Location
1	**National waterway 1**	Construction of Road Bridge of NHAI at Nakhwa (Varanasi)	at Ch: 1302 Km near Nakhwa across river Ganga in Ghazipur-Varanasi stretchof NW1
2	**National waterway 1**	Construction of 6 lanes Cable Stayed Road Bridge at Bansberia, Kalyani (WB).	at Ch: 191.30 Km D/s of existing Iswar Gupta Setu in Haldia-Farakka stretch of NW-1, Bansberia, Kalyani

3	**National waterway 1**	Construction of tower foundation of 400 KV D/C Rajarhat-Purnea overhead transmission lines under ERSS-V by Power Grid Corporation of India, Kolkata.	Across river Bhagirathi between Rasulpur Char and Sunderpur Char near Behula Rly station under Nadia and Hooghly (W.B.) at Ch. 226 km in Tribeni-Swaroopganj stretch of NW-1

Table 8.6: **National waterway 2**

S.No	Waterways	Name of Structure	Location
1	**National waterway 2**	Construction of Intake well for South East Guwahati Water Supply Project.	At Ch: 265 Km near IOCL Gate, Sector-1, Guwahati
2		Laying of transmission line upstream of Naranarayan Setu,	U/s of Jogighopa Bridge, (NW2, Class-VII); Ch. 108km Jogighopa
3		Construction of passenger ropeway between Guwahati and North Guwahati	U/s of Umananda, Guwahati (NW2, Class-VII); Ch:260 km

Table 8.7: **National waterway 3**

S. No.	Waterways	Name of Structure	Location
1	**National waterway 3**	Construction of Thottappally - Naluchi Bridge across Pamba River in Alappuzha	chainage- 124 km

2	**National waterway 3**	Construction of foot Over bridge across NW-3(TS Canal) for MS unit of KMML at Chavara	Chainage- 166.0 km
3		Laying of power cable across TS canal through Horizontal Directional Drilling Method	Chainage- 166.0 km

Table 8.8: **National waterway 4**

S. No.	Waterways	Name of Structure	Location
1	**National waterway 4**	Construction of Bridge	Krishnapatnam, Nellore (Dt.), A.P. Buckingham Canal (Under Class-II)
2		Construction of Pipeline Bridge	Km 14 R&B milestone near sugar factory Samalkot A.P., Samalkot canal (Under Class-I)
3		Construction of Bridge	Thamminapatnam (vill), Nellore (Dt.) A.P., Buckingham Canal (Under Class-II)

Table 8.9: **National waterway 5**

S. No.	Waterways	Name of Structure	Location
1	**National waterway 5**	Construction of Railway Bridge	Near Barachira High School (near Ghoshpukur), Hijli Tidal Canal (Under Class-II)

Table 8.10: **National waterway Extension 3**

S.No	Waterways	Name of Structure	Location
1	**National waterway Extension 3**	LAC -ADS-Koothu Mukkal-Chirakkal- Cherupuzha Thodu project Augmentation scheme in painoor Kayal lift irrigation project in Edathiruthy Panchayat of Kaipamangalam Constituency-Sanction for pipeline crossing through PC Canal	Chainage- 22.5 km in extended stretch of (Kottapuram to NW-3 Kozhikode)
2		Underground cable crossing Canoli Canal to Kerala state Electricity Board Ltd. Thrissur	Chainage - 5.0 km in extended of NHW-3 (Kottapuram to Kozhikode)
3		Construction of Bader Palli Bridge across Canoli Canal in Malappuram District	Tanur in Malappuram District

INTEXT QUESTIONS 8.4

1. National waterway 1 contains _____ structures.
2. There are _____ structures in the National waterway 4
3. Construction of Bandra pali bridge across Canoli canal in malappuram district is a National waterway extension of _____.
4. Construction of Railway Bridge near barachira high school, hijli tdal canal is a national waterway extension _____.

8.5 NEW WATERWAYS OF INDIA

I. 106 NEW WATERWAYS

India has a widespread network of inland waterways in the form of rivers, channels,

backwaters and streams. Of the entire canal's navigable length of 20,236 km, nearly 17,980 km and rivers and around 2,256 km of channels can be utilised by automatic crafts. Cargo transportation by waterways is extremely under-used in the nation as compared to nations and economically developed provinces like the United States, China as well as the European Union. Our national waterways are healthy and will become lifeline of the nation. In addition to fulfilling aur country shipping obligations but they can also act, as recreational hubs.

During the development of this phase, the ministry of shipping, Govt., has been involved. Govt. Of India has directed the IWAI to recognize possible waterways in India. Consequently, nearly 106 newly discovered waterways were recognized by the IWAI and reported to the MoS. In respect to this, as per the 2016, National Waterways Act was circulated in the Extraordinary, Part II, Section I, Gazette of India, as an Act No.17 of 2016.

8.5.1 Status of 106 new National Waterways

As part of the preliminary work enhance of 106 newly established National Waterways, IWAI has assembled them under 7 of 3 classifications as follows:

A. **Group – I:** Under group I, nearly 8 waterways which are measured to be the most feasible and can be picked up for enhancement in Phase-I. Consequently, consultancy. Projects for preparing EPC tender manuscripts agreement and ecological studies for these waterways are also being undertaken.

B. **Group – II:** These waterways are located in the coastal provinces and have few tidal widening works considered for the development in this group. This group includes 60 coastal rivers and (nearly 14 rivers in Sunderbans have been applied as a waterway and the expansion of West Coast channel has been identified in NW-3, creative 46 new waterways of the region). Moreover, these 60 rivers based on their geographical locations have been separated into 8 clusters.

   (i) Rivers related to DPR stages, stage-1 feasibililty study based on feasibility stage II DPR studies were awarded. In relation to Stage-1 viability reports, preparation of stage II Detailed Venture Report for nearly 24 National Waterways has already been awarded.

C. **Category – III:** Waterways located in isolated, inaccessible & hilly provinces are included into this class. Further, these 54 rivers/channels (rivers such as Krishna and Godavari have been integrated as on expansion of NW4, resulting 52 existing waterways which is in the catalogue of 106 waterways) have further been subdivided

into several clusters and originally only viability studies related towards these waterways have been awarded.

a, Viability reports are being finalised and the proper strategy is developed based on the result of these reports.

State-wise details of the National Waterways are as follows:-

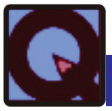
Table 8.11: **State-wise details of new National Waterways**

S. No.	State	Name of the River / Canal	No of Rivers /Canals
1	Andhra Pradesh	Pennar and Tungabhadra	2
2	Arunachal Pradesh	Lohit	1
3	Assam	Aai, Barak, Beki, Dhansiri / Chathe, Dehing, Dikhu, Doyans, Gangadhar, Jinjiram, Kopili, Lohit, Puthimari, Subansiri and Twang (Dhaleswari)	14
4	Bihar	Gandak, Ghagra, Karamnasa, Kosi, Punpun and Son	6
5	Delhi	Yamuna	1
6	Goa	Chapora, Cumberjua, Mandovi, Mapusa, Sal and Zuari	6
7	Gujarat	Jawai-Luni - Rann of Kutch, Mahi, Narmada, Sabarmati and Tapi	5
8	Haryana	Indira Gandhi Canal and Yamuna	2
9	Himachal Pradesh	Beas, Ravi and Sutlej	3
10	Jammu & Kashmir	Chenab, Indus, Jhelum and Ravi	4
11	Jharkhand	Kharkai and Subarnarekha	2

Notes

12	Karnataka	Bheema, Ghataprabha, Gurupur, Kabini, Kali, Malaprabha, Netravathi, Panchagangavali (Panchagangoli), Sharavati, Tungabhadra and Udayavara	11
13	Kerala	AVM Canal, Alappuzha-Changanassery Canal, Alappuzha-Kottayam – Athirampuzha Canal and Kottayam-Vaikom Canal	4
14	Maharashtra	mba, Arunawati - Aran, Dabhol Creek - Vashishti River, Kalyan-Thane-Mumbai Waterway - Vasai Creek - Ulhas River, Manjara, Nag, Narmada, Penganga - Wardha, Rajpuri Creek, Revdanda Creek - Kundalika River, Savitri (Bankot Creek), Shastri River - Jaigad Creek, Tapi and Wainganga – Pranahita	14
15	Meghalaya	Ganol, Jinjiram, Kynshi, Simsang and Umngot (Dawki)	5
16	Mizoram	Tl Wang (Dhaleswari)	1
17	Nagaland	Tizu – Zungki	1
18	Odisha	Baitarani , Birupa - Badi Genguti - Brahmani, BudhaBalanga, Mahanadi and Subarnarekha	5
19	Punjab	Beas, Indira Gandhi Canal and Sutlej	3
20	Rajasthan	Indira Gandhi Canal, Jawai-Luni - Rann of Kutch and Luni	3

21	Tamilnadu	VM Canal, Bhavani, Kaveri - Kollidam, Manimutharu, Palar, Pazhyar, Ponniyar, Tamiraparani and Vaigai	9
22	Telangana	Bheema, Manjara, Penganga - Wardha, Tungabhadra and Wainganga – Pranahita	5
23	Uttarpradesh	Asi, Betwa, Chambal, Gandak, Ghagra , Gomti, Karamnasa, Tons, Varuna and Yamuna	10



INTEXT QUESTIONS 8.5

1. India has a widespread network of inland waterways in the form of _____, channels, backwaters and streams.
2. Nearly _____ newly created waterways were recognized by the IWAI
3. The canal Yamuna is located in _____.
4. No rivers / Canals in Assam are _____ .

WHAT YOU HAVE LEARNT

- The National Waterways Act, 2016, for the determination of inland water transport 111 officially designated Inland National Waterways (NWs) and 106 were created during 2016. Further, this updated system covers approximately 20,275.5 km. and namely NW-1, 2, & 3 are already in operational. On these waterways, cargo, passenger and cruise ships are operate.
- Inland waterways have played a crucial role in maritime development in India. It comprises of natural rivers as well as artificial constructed canals as links and corresponding significant ports as nodes

- For the development and regulation of inland waterways for shipping and navigation, the Inland Waterways Authority of India (IWAI), with its headquarters in Noida, came into existence on 27th October 1986. Further, the Authority mainly undertakes ventures for enhancement and maintenance of IWT infrastructure on the national waterways via grants obtained from the Ministry of Shipping.
- India is stetched with 14,500 km of navigable waterways including rivers, channels, backwaters, streams, etc. Annually, with the assistance of Inland Water Transport (IWT) nearly 55 million tonnes of goods are being moved. It is also considered to be a fuel - effectiveness and enviromentally-friendly.
- Under the National waterway 1, there exist 36 structures which are announced as National Further in National waterway 2 there are nearly 3 structures and under the National waterway 3 it has a total of 25 structures, where as in National waterway 4 there exists a total of 9 structures, in National waterway 5 it consists of only one and in National waterway 3 the extension is total of 5.
- India has a widespread network of inland waterways in the structure of rivers, channels, backwaters as well as streams. Of the entire canal's navigable length of 20,236 km, nearly 17,980 km are rivers and around 2,256 km of channels can be utilised by automatic crafts. Cargo transportation by waterways is extremely under-used in the nation as compared to nations and economically developed provinces like the United States, China as well as the European Union.

KEY TERMS

Transportation	Waterways	Navigation
River	Goods	Cargo
Inland	National	Coastal
Canal	Channel	Backwater

TERMINAL EXERCISE

1. What is navigation?

2. Explain the need for national waterways.
3. Define "The Barak River".
4. What is the full form of IWAI?
5. Explain National Waterway 5.
6. Sketch the rivers flowing into the Arabian Sea.
7. Explain the National Waterways 1.
8. Mention the functions of the inland waterway authority of India.
9. Discuss the NOC structures of the national waterway 4.
10. Outline the development phases of national waterways 4.
11. Spotlight on the rivers flowing into the Bay of Bengal Sea.
12. Discuss national waterways 3 in detail.
13. Point out the main factors to consider when delaring them as National Waterways.
14. Describe the role of IWAI in developing Indian waterways.
15. Highlight the status of new National Waterways.

ANSWER TO INTEXT QUESTIONS

8.1

1. 2016
2. Bay of Bengal
3. Mandovi
4. Arabian

8.2

1. Maritime
2. North Eastern Region
3. 1988.
4. Andhra Pradesh

8.3

1. 14,500
2. 27th October 1986
3. 1.5m
4. Noida

8.4

1. 36
2. Nine
3. 3
4. 5

8.5

1. Rivers
2. 106
3. Delhi
4. 14

DO AND LEARN

Learners can undertake their activity work in the areas of different inland transportation / warehouse /distribution organisations.