

### 4.2.1.2 WILDLIFE

**1.0 Subject Matter: Objective:** To derive the State wise water allocation for wildlife conservation

**Background: Water as a resource for wildlife conservation (Table 4.2.1.2.1)**

- i. Number and location (on district map with drainage network) of aquatic habitat in the State/District (Lentic & Lotic)
- ii. Number, location (on district map with drainage network) and extent of protected and non-protected areas (both terrestrial and aquatic) in the State/District
- iii. Number, location (on district map with drainage network) and extent of wetlands /aquatic habitats in the State/District
- iv. Level, type and extent of threat to the protected areas/ wetlands /aquatic habitats

**Status of aquatic species (Table 4.2.1.2.2)**

- i. Population and diversity trend of species of conservation concern
- ii. Dispersal range across the river systems
- iii. Level and extent of threat to the species of conservation concern

**Existing State wise water allocation for wildlife conservation (Table 4.2.1.2.3)**

**2.0 Available & Utilizable Water, Demand, Supply and Consumption**

**4.2.1.2.4 Total water volume or flow available for wildlife conservation (Table 4.2.1.2.4)**

Availability: Total water volume or flow available for wildlife conservation

**4.2.1.2.5 Total utilizable water (volume or flow) for wildlife including migratory water birds and fish (Table 4.2.1.2.5)**

**4.2.1.2.6 Demand (Sector wise and Source wise) (Table 4.2.1.2.6)**

Water availability as per the natural hydro period of a given water body or for lotic systems: 50% of the Mean monthly Runoff (Flow) for sustaining wildlife populations and ecosystem services, 60-75% of the natural mean monthly water volume at human used wetlands, 90-100% of the natural mean monthly water volume in notified wetlands or wetlands in protected areas for sustaining wildlife populations and ecosystem services

**4.2.1.2.7 Supply (Sector wise and Source wise) (Table 4.2.1.2.7)**

The amount of water available in lentic and lotic ecosystems after consumptive use by humans

**4.2.1.2.7 Consumption (Sector wise and Source wise) (Table 4.2.1.2. 8)**

The amount of water required from wetlands, rivers or streams for maintenance of ecosystem level processes

### 3.0 Issues and Challenges

- i. Following defined categories and/or any other State-specific parameter(s) shall be explained and measures taken to address those issues may be provided.
- ii. Issues/ challenges in deriving water requirement for wildlife conservation and maintenance of ecosystem services
- iii. Issues/ challenges in ensuring water availability for conservation: Continuity, Quality and Quantity
- iv. Issues/ challenges in involving communities for water conservation
- v. Any other

### 4.0 Root cause Analysis: Cause, Effect and Interventions

Following defined categories and/or any other State-specific parameter(s) shall be explained and the root-cause, their effects and interventions adopted to address those issues may be provided.

- i. Reduction in water availability
- ii. Deterioration in water quality
- iii. Water allocation issues
- iv. Development – Conservation conflicts
- v. Sand mining
- vi. State of floodplain
- vii. Depletion of prey base
- viii. Any other

## 5.0 Governance / Management

- i. **Statute / Law / Policy/ Regulations if any**
  - . Provision under National Environmental Policy, 2006
  - Provision under Wildlife (Protection) Act, 1972
  - . Provision under Environmental (Protection) Act, 1986
  - Wetland Conservation and Management rules, 2010
  - With specific reference districts in Ganga system, District Ganga Committee and its state
  - Any other
- ii. **Institutions governing / managing / monitoring the resources and Institutional structure**
  - . Forest Department/Wildlife Department
  - Irrigation and water resources, Agriculture, revenue Department
  - Local level institutions (Role of Panchayati Raj System, if any)
  - Central Pollution Control Board (CPCB)/ State Pollution Control Board (SPCB)
  - Pollution control committees (where applicable)
  - State and District level departments
  - Any other
- iii. **Areas of Peoples/Private Participation if any**
  - Participatory management of water resources, if any
  - Local level institutions (Panchayati Raj Institution) in water resource management
  - Interdepartmental collaboration in wetland and river management, if any
  - Any other
- iv. **Schemes & Financing in the area**
  - Central Government schemes
  - State Government aid projects
  - UNDP funded projects
  - World Bank aided projects
  - Other international aided projects (JICA, GIZ, AUSAID and so on)
  - . Local level site-specific projects such as MGNREGA
  - Any other

[Also, relevant tables on Water Financing and Economics may be looked into Chapter 7 and filled up with appropriate data/information]

## 6.0 Measurement, Monitoring and Data Constraints/ Management

Following defined categories and/or any other State-specific parameter(s) shall be explained and interventions adopted to address those issues may be provided.

- i. Monitoring protocol in place
- ii. Description of the area
- iii. Assessment methods
- iv. Periodicity of assessment
- v. Frequency of reporting
- vi. Document control and data management: Availability, Transparency and Circulation
- vii. Monitoring agency
- viii. Availability of human resources (trained manpower)
- ix. Evaluation mechanism
- x. Any other

## 7.0 Performance Indicators: comparison across Districts/ Units/ Products etc.

The performance Indicators shall be evaluated in terms of deviation from norms/benchmarks for spatial and temporal comparisons.

Categories of indicators	Indicators	Bench Mark	Districts		
			1	2	3
Status					
	% of lentic and lotic ecosystems geo-tagged				
	% lentic ecosystems where water storage is assessed				
	Number of Flow Gauging Stations in lotic ecosystems				
	% of lentic ecosystems in Protected Areas surveyed for population estimation of indicator aquatic species				

Categories of indicators	Indicators	Bench Mark	Districts			
			1	2	3	
	% of lentic ecosystems outside Protected Areas surveyed for population estimation of indicator aquatic species					
	% of lotic ecosystems under Protected Areas surveyed for population estimation of indicator aquatic species					
	% of lotic ecosystems outside Protected Areas surveyed for population estimation of indicator aquatic species					
<b>Water conservation efforts</b>	Existence of watershed management plans/wetland management plan for lentic ecosystems					
	Existence of watershed management plans for lotic ecosystems					
	% of lentic ecosystems protected under Wild Life (Protection) Act, 1972					
	% of lentic ecosystems notified as Ramsar Site					
	% of Protected areas with functional waterhole in lean seasons					
	% of lotic ecosystems protected under Wild Life (Protection) Act, 1972					
	% lotic ecosystems notified as Ramsar Site					
	% lotic ecosystems newly notified as Ramsar Site					
	Ecological restoration undertaken in number of lentic and lotic ecosystems in near past					
	% Population increase (index) and/or recurrence of indicator species of aquatic ecosystems					
	River dolphins					
	Otters					
	Crocodilians					
	Amphibians					
	Fish					
	Congregation of winter migratory water birds (Total nos.)					
	Congregation of island/shoreline nesting birds (Total nos.)					
	% Population decline (index) and/or local extinction of indicator species of aquatic ecosystems					
	River dolphin					
	Otters					
	Crocodilians					
	Amphibians					
	Fish					
	Congregation of winter migratory water birds (Total nos.)					
	Congregation of island/shoreline nesting birds (Total nos.)					
	% lotic ecosystems where flow has reduced from 40% of Mean Annual Runoff (Flow, cubic meter per second)					
	<b>Water demand management</b>	Extraction of water from lentic ecosystems (cubic meter per annum)				
		Systems facing recurring water scarcity during lean seasons may be a better indicator				
		% lotic ecosystems suitable for sustenance of wildlife				
	<b>Sustainability of aquatic ecosystems</b>	% new waterhole created in Protected Areas				
		Average increase in ground water table				

Categories of indicators	Indicators	Bench Mark	Districts		
			1	2	3
	% increase in total stored volume (cubic meter) of water in lentic ecosystems				
	% increase in mean annual runoff (cubic meter per annum) in lotic systems				
Assessment of water quality and quantity	% of lentic ecosystems where water quality assessment regularly carried out by State Pollution Control Board or other MoEF&CC recognized agency				
	% of lotic ecosystems where water quality assessment regularly carried out by State Pollution Control Board and other MoEF&CC recognized agency				
	% lentic ecosystems in terms of Biochemical Oxygen Demand (BOD) of 3 mg/L or less				
	% lentic ecosystems in terms of Dissolved Oxygen concentration 6 mg/L or more				
	% lotic ecosystems in terms of Biochemical Oxygen Demand 3 mg/L or less				
	% lotic ecosystems in terms of Dissolved Oxygen concentration 6 mg/L or more				
	Nos. of species locally extinct due to change in water quality and quantity				
	Nos. of species re-appeared due to rejuvenation of water quality and availability				
	% decline reported in migratory water bird congregation				
Participatory management in aquatic ecosystem conservation	Whether there is a participatory wetland and river management framework				
	% lentic ecosystem reclaimed/rejuvenated through participatory management				
	% lotic ecosystem reclaimed/rejuvenated through participatory management				
Water economics of aquatic ecosystems	Investment per hectare in the current year for lentic ecosystem restoration (in INR)				
	Investment per km in the current year for lotic ecosystem restoration (in INR)				
	Revenue generated through river and wetland tourism (in INR)				
	Revenue generated out of ecosystem goods and services (in INR)				

#### 8.0 Reforms undertaken/ being undertaken/ proposed if any

##### 4.2.1.2.12 Reforms undertaken/ being undertaken/ proposed, if any (Table 4.2.1.2.12)

Reforms may be evaluated in terms of the categories included in Table 4.2.1.2.12 and other category if any may also be incorporated.

#### 9.0 Road map of activities / tasks proposed for better governance with timelines and agencies responsible for each task/activity.

##### 4.2.1.2.13 Road map of activities / tasks proposed for better governance with timelines and agencies responsible for each task/activity

Sl. No.	Proposed tasks	Methodology	Probable outcome	Agency responsible	Proposed timeline

#### 4.2.1.2.14 Information Sources

- i. Forest Department/Wildlife Department
- ii. Irrigation Department
- iii. State Wetland Conservation and Management Authority
- iv. State Pollution Control Board
- v. Central Water Commission
- vi. Department of Science and Technology
- vii. Groundwater Board
- viii. State Statistical Department
- ix. Biodiversity Board
- x. Biodiversity Management Committee (BMCs)
- xi. People's Biodiversity Register (PBRs)
- xii. Village Panchayats, blocks and Tehsil Office

Table 4.2.1.2.1 Water as resource for wildlife and aquatic ecosystem conservation (Overall or State)

No.	Status of aquatic habitats	2000	2010	2017
1.	Number of aquatic habitat in the area (Lentic & Lotic)			
2.	Number and extent of protected areas			
a)	Total number of lentic habitats (Wetlands, lakes, ponds, marshes and any other wetland type) inside Protected Areas	Natural		
		Manmade (Dam, barrage, check dam, water holes etc.)		
b)	Total number of lentic habitats outside Protected Areas	Natural		
		Manmade (Dam, barrage, check dam etc.)		
c)	Total number of freshwater protected area (Lotic- Rivers and Streams)			
d)	Total number of lotic habitats (Rivers and Streams) outside Protected Area			
e)	Total stretch of lotic habitats (Rivers and streams) (km) inside Protected Area			
f)	Total stretch of lotic habitats (Rivers and streams) (km) outside Protected Area			
g)	Numbers of wetland covered under National Wetland Conservation Plan (NWCP)			
h)	Numbers of wetlands not covered under National Wetland Conservation Plan (NWCP)			
i)	Number of Ramsar sites			
j)	Maps depicting lentic and lotic ecosystems and Protected Areas			
3.	<b>Level and extent of threat</b>			
a)	Total number of lentic habitats lost (due to reduced water availability, pollution, drought, reclamation and other causes like climate change)			
b)	Total number of lentic habitats need restoration (due to reduced water availability, pollution, draught, anthropogenic factors and other causes like climate shifts)			
c)	Total number of lentic habitats under <b>Designated-Best-Use Water Quality Criteria</b> ( <a href="http://www.cpcb.nic.in/Water_Quality_Criteria.php">http://www.cpcb.nic.in/Water_Quality_Criteria.php</a> )	Class A		
		Class B		
		Class C		
		Class D		
		Class E		
		Un-assessed		
d)	Total number of lotic habitats lost (due to reduced water availability, pollution, draught and other causes like climate shifts)			
e)	Total number of lotic habitats need restoration (due to reduced water availability, pollution, draught, reclamation and other causes like climate shifts)			
f)	Total number of lotic habitats under <b>Designated-Best-Use Water Quality Criteria</b> ( <a href="http://www.cpcb.nic.in/Water_Quality_Criteria.php">http://www.cpcb.nic.in/Water_Quality_Criteria.php</a> )	Class A		
		Class B		
		Class C		
		Class D		
		Class E		
		Un-assessed		

Table 4.2.1.2.2 Status of aquatic species – State wise population trend of important species

Fauna	Name of important species	Location (insert multiple rows)	Global status*	Local status**	2000	2010	2017
Aquatic and semi-aquatic mammals	River dolphin						

Fauna		Name of important species	Location (insert multiple rows)	Global status*	Local status**	2000	2010	2017	
		Otters	1.						
			2.						
			3.						
Birds	Resident	Herons	1.						
			2.						
		Cranes	1.						
			2.						
		Waders	1.						
			2.						
		Ducks and geese	1.						
			2.						
	Total congregation (Number)								
	Migratory	Herons	1.						
			2.						
		Cranes	1.						
			2.						
		Waders	1.						
			2.						
Ducks and geese		1.							
		2.							
Total congregation (Number of birds)									
Nos. of island and shore-nesting bird colonies	Congregation (Total nos.)								
Nos. of Heronry around wetlands/rivers	Congregation (Total nos.)								
Reptiles	Freshwater turtles	1.							
		2.							
		3.							
		4.							
	Crocodilians	Gharial							
		Mugger							
Saltwater crocodile									
	Aquatic snakes	Overall population							
Amphibians	Overall population								
Fish Species 1	Catch per unit effort								
Fish Species 2									
Fish Species 3									
Invertebrates	Catch per unit effort of species like shrimps and prawns								

\*Global status: According to International Union for Conservation of Nature (IUCN) Red List

\*\*Local status: According to Indian Wild Life (Protection) Act, 1972

Table 4.2.1.2.3. Existing State wise water allocation for wildlife and aquatic ecosystems and other common users

Sl. No.	Type of aquatic habitat	Total number of dams/barrages/other impoundments/Irrigation schemes/canals	Total amount of water allocated annually (if done)	
			Sectors	Amount of water (cubic meter per annum)
1.	Lentic ecosystems This needs to be wetland wise		Wildlife and Environment	
			Agricultural sector	
			Drinking water	
			Industrial use	
			Domestic consumption	
			Hydro-projects	
			Wetland reclamation	
2.	Lotic ecosystems Need to be river wise info		Wildlife and Environment	
			Drinking water	
			Industrial use	
			Domestic consumption	
			Hydro-projects	
			Any other	

Table 4.2.1.2.4 Total water volume or flow available for wildlife and aquatic ecosystem conservation (not sure if this info is available)

Year	Lentic ecosystems (cubic meter)	Lotic ecosystems (cubic meter per annum)
2000		
2010		
2017		

Table 4.2.1.2.5. Total utilizable water or flow for wildlife including migratory water birds

Year	Total mean annual volume (cubic meter) of stored water in lentic ecosystems inside Protected Areas	Total mean annual discharge (cubic meter per annum) of lotic ecosystems inside Protected Areas	Total nos. of lentic and lotic ecosystems fulfilling Designated-Best-Use Water Quality Criteria Class D: Propagation of Wildlife and Fisheries ( <a href="http://www.cpcb.nic.in/Water_Quality_Criteria.php">http://www.cpcb.nic.in/Water_Quality_Criteria.php</a> )			
			<ul style="list-style-type: none"> <li>pH between 6.5 to 8.5</li> <li>Dissolved Oxygen 4 mg/L or more</li> <li>Free Ammonia (as N) 1.2 mg/L or less</li> </ul>			
			Lentic ecosystems		Lotic ecosystems	
			Total nos.	Un-assessed	Total No.	Un-assessed
2000						
2010						
2017						



**Table 4.2.1.2.6 Demand (Sector wise and Source wise)**

Year	Water availability as per the natural hydro period of a given water body or for lotic systems 50% of the Mean Annual Runoff (Flow) for sustaining wildlife populations and ecosystem services, 60-75% of the natural mean monthly water volume at human used wetlands, 90-100% of the natural mean monthly water volume in notified wetlands or wetlands in protected areas for sustaining wildlife populations and ecosystem services.		
	Nos. of lentic ecosystems retaining 75% (Optimum level) of the total natural storage at human used wetlands	Nos. of lentic ecosystems retaining 100% (Optimum level) of the total natural storage in notified wetlands or wetlands in protected areas	Nos. of lotic systems retaining more than 50% of the Mean Annual Runoff (flow)
2000			
2010			
2017			

**Table 4.2.1.2.7 Supply (Sector wise and Source wise)**

Year	The amount of water available in lentic and lotic ecosystems after consumptive use by humans		
	Total annual mean storage (cubic meter) or total mean annual runoff (cubic meter per annum)	Total mean annual volume of water withdrawn from all sectors apart from environment and wildlife (cubic meter per annum)	Remaining annual mean storage (cubic meter) or total mean annual runoff (cubic meter per annum)
	Lentic ecosystems		
2000			
2010			
2017			
	Lotic ecosystems		
2000			
2010			
2017			

**Table 8. Consumption (Sector wise and Source wise)**

Sl. No.	The amount of water required from lentic and lotic ecosystems for maintenance of ecosystem level processes	(% of water bodies fulfilling the criteria		
		2000	2010	2017
3.	Lentic ecosystems retaining 75% (Optimum level) of the total natural storage at human used wetlands  <i>Criteria: 60-75% of the natural mean monthly water volume at human used wetlands for sustaining wildlife populations and ecosystem services.</i>			
4.	Lentic ecosystems retaining 100% (Optimum level) of the total natural storage in notified wetlands or wetlands in protected areas  <i>Criteria: 90-100% of the natural mean monthly water volume at notified wetlands and wetlands in Protected Areas for sustaining wildlife populations and ecosystem services.</i>			
5.	Lotic systems retaining more than 40% of the Mean Annual Runoff (flow)  <i>Criteria: More than 40% of Mean Annual Runoff (Flow, cubic meter per second) for sustaining wildlife populations and ecosystem services.</i>			

**Table 4.2.1.2.9 Reforms undertaken/ being undertaken/ proposed for management of lentic and lotic ecosystems for wildlife and ecosystem conservation**

Sl. No.	Categories	Districts		
		1	2	3
15.	Total number of sensitization workshops/seminars on aquatic ecosystem and biodiversity conservation targeting various stakeholders			
16.	Total number of capacity building workshops on aquatic ecosystem and biodiversity conservation for institutions governing/managing/monitoring the aquatic resources			
17.	% systems having species specific or multi species conservation plans			
18.	% reduction in conversion/land use change for lentic ecosystems			
19.	% lentic habitats revived after deterioration (if any)			
20.	% lentic ecosystems newly designated for regular water quality assessment by State Pollution Control Board or other MoEF&CC recognized agency			
21.	% lentic ecosystems restored in terms of Biochemical Oxygen Demand (BOD) of 3 mg/L or less			
22.	% lentic ecosystems restored in terms of Dissolved Oxygen concentration of 6 mg/L or more			
23.	% lotic ecosystems newly designated for regular water quality assessment by State Pollution Control Board or other MoEF&CC recognized agency			
24.	% lotic ecosystems restored in terms of Biochemical Oxygen Demand (BOD) of 3 mg/L or less			
25.	% lotic ecosystems restored in terms of Dissolved Oxygen concentration of 6 mg/L or more			
26.	Water flow enhanced in % of lotic ecosystems			
27.	New riparian area developed/restored under watershed management			
28.	Man-made interventions: Example/Case studies (Criteria: Restored/rejuvenated biodiversity and ecological service value)			
29.	Any other			