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## Status of Ramsar sites in India 2022

**Satyaveer, NK Suyani, KB Rajanna, SS Rathore and Durgesh Kumar Verma**

### Abstract

Wetland also known as “Jheelon” in Hindi language is one of the most important natural resources, contributing various economic and ecological benefits. As of August 2022, there are 75 Ramsar sites in India covering approximately 13.27 thousand sq km of land. The largest and smallest Ramsar site in India is Sundarban Wetland and Vembannur Wetland Complex respectively. Twenty-three Ramsar sites has been added to the list in the year 2022. Tamil Nadu is having the highest number of Ramsar sites in the country.

**Keywords:** Biodiversity, conservation, Ramsar site, Tamil Nadu, wetlands

### Introduction

The Ramsar site is a wetland site that is designated to be of international importance under the Ramsar convention. This convention is also known as the Convention of Wetlands. It is intergovernmental environmental treaty established in 1971 by United Nations Educational, Scientific and Cultural Organization (UNESCO) in the Iranian city of Ramsar. The convention came into force on 21<sup>st</sup> December 1975. It provides the framework for the conservation and sustainable use of wetlands resources. At present, 172 countries have signed the convention and a total of 2439 Ramsar sites are present in the world (GOC, 2022) [5]. India signed the Ramsar Convention on 1<sup>st</sup> February 1982. Every year on 2<sup>nd</sup> February, World Wetlands Day is celebrated worldwide to mark the importance of wetland and its resources.

The Ramsar Convention defines the wetland as an area of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters. The Union Ministry of Environment excludes river channels, paddy fields, and other areas where the commercial activity takes place in its definition of wetlands. Wetlands cover 6.40% of the world's land surface while it covers 4.63% of the total geographical area of India. India has 19 types of wetlands.

### Importance

According to the World Wildlife Fund (WWF) report, up to 40% of the world's plant and animal species live or breed in wetlands, over 1 lakh freshwater species are situated in wetlands, and more than 25% of all wetland plants and animals are currently threatened with extinction (WWF, 2022) [8]. The purpose of declaring Ramsar sites under the Ramsar Convention is to stop the worldwide loss of wetlands and conserve them through wise use and management. This aim requires international cooperation, policymaking, capacity building, and technology transfer. Wetlands International or the Ramsar wetlands are selected because of their ecological, botanical, zoological, limnological, or hydrological importance.

### History

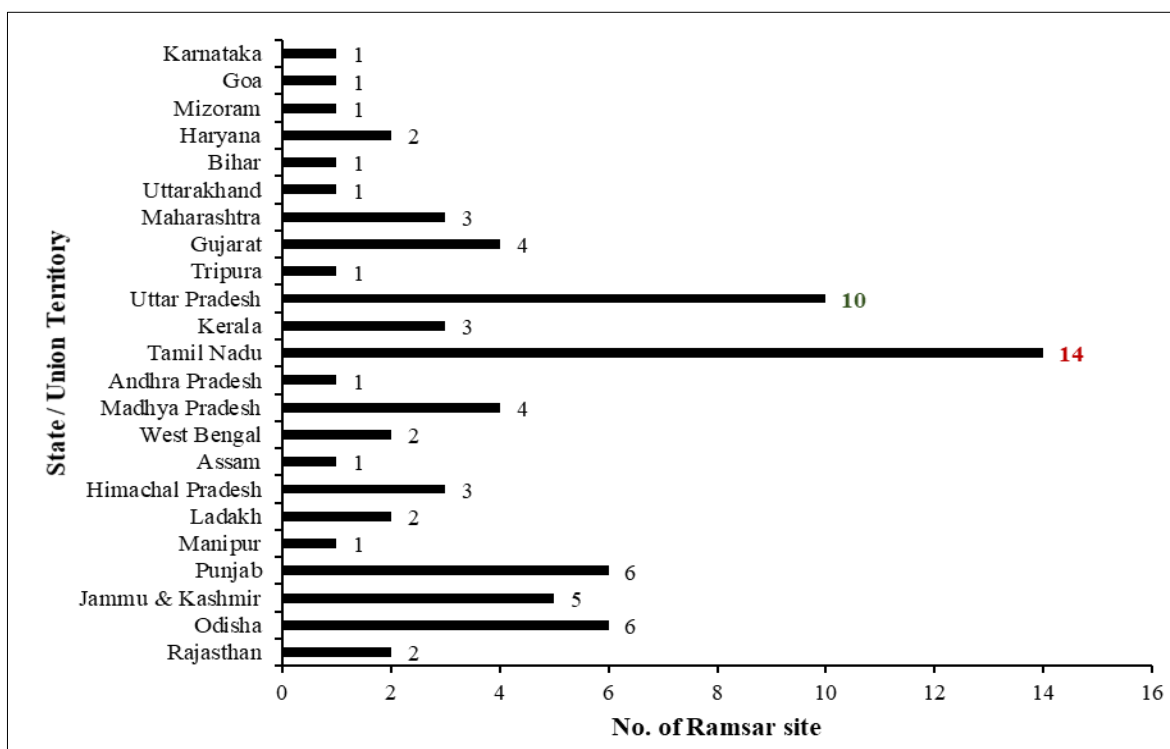
The Cobourg Peninsula in Australia was the first designated Ramsar site in world in 1974. The United Kingdom (175) has the world's largest number of Ramsar sites followed by Mexico (142). Bolivia has the largest area with 1.48 crore hectares under the Convention protection (Dubey, 2022) [4]. India has a network of 75 Ramsar sites (as of August 2022) marking the highest number in South Asia (Anonymous, 2022a) [1].

### Ramsar sites in India

Chilika Lake in Odisha and Keoladeo National Park in Rajasthan were the first Indian wetland added to the list of Ramsar sites of India in 1981. In the country's Azadi ka Amrit Mahotsav

(75<sup>th</sup> year of independence), India has designated a total of 23 Ramsar sites in 2022, bringing the total to 75 Ramsar sites

spanning a total area of 13266.78 Km<sup>2</sup>. The state-wise number of Ramsar sites in India is presented in Fig. 1.



**Fig 1:** State-wise number of Ramsar sites in India

Tamil Nadu (14) has the highest number of Ramsar sites in India followed by Uttar Pradesh (10), Odisha (6) and Punjab (6). In the year 2022, Karnataka and Goa got their first Ramsar site (MOEFCC, 2022). Brief description of all the

seventy five Ramsar site is provided in the Table 1 (Anonymous, 2022a; Anonymous, 2022b; Anonymous, 2022c, RSIS, 2022) <sup>[1, 2, 3, 7]</sup>.

**Table 1:** Details of different Ramsar sites in India

No.	Ramsar site	State / Union Territory	Year of declaration	Area (Km <sup>2</sup> )	Short description
1.	Keoladeo National Park	Rajasthan	1981	28.73	It is a popular avifauna sanctuary situated in the Bharatpur district of Rajasthan. It declared as World Heritage Site in 1985. It is placed under the Montreux Record in 1990 due to water shortage and growth of invasive grass. It is home of 370 species of birds and animals. It is famous for the migratory bird Siberian Crane for breeding and feeding ground.
2.	Chilika Lake	Odisha	1981	1165	It is the world's 2 <sup>nd</sup> largest coastal lagoon and the country's 1 <sup>st</sup> largest lagoon located at the mouth of the Daya River on the eastern coast of India. It harbours rare Irrawaddy dolphin species. It is one of the biggest breeding places of flamingos in the world.
3.	Wular Lake	Jammu & Kashmir	1990	189	It is the largest lake among all freshwater lakes in India. It is known for its floating vegetation like water chestnut. It also helps the government to earn revenue from its fishing industry, paddy cultivation, etc. It was formed as a result of tectonic activity and is fed by the Jhelum River.
4.	Harike Lake	Punjab	1990	41	It is the largest wetland in the northern part of the country. It is a shallow water reservoir consisting of 13 islands. It is located near the confluence of two rivers namely Beas and Sutlej. It is a breeding zone for various species of Anatidae. It is particularly famous for diving ducks.
5.	Sambhar Lake	Rajasthan	1990	240	It is the largest lake among all inland saline lakes in India, called "Salt Lake of Rajasthan". It is an important wintering region for migratory birds like flamingos travelling from northern Asia. It has geological importance as it provides evidence of the Tethys Sea. It is famous for pink flamingos and other birds that migrate from northern Asia and Siberia.
6.	Loktak Lake	Manipur	1990	266	It is the largest freshwater lake in the northeastern states of India. The world's only floating national park is Keibul Lamajo which spreads over it. It is well known for the Phumdis Vegetation. It is the last natural abode of Sangai Deers (Dancing Deers).
7.	Tsomoriri Lake	Ladakh	2002	120	It is located in the Changthang Plateau. It is considered to be the sole breeding zone in India for the bar-headed geese. It is the only breeding region outside China where the endangered, black-necked crane is spotted.

					The Barley field of Karzok located here is believed to be the world's highest cultivated land.
8.	Pong Dam Lake	Himachal Pradesh	2002	156.62	It is a man-made wetland constructed across the Kali Bein River. It is also called Maharana Pratap Sagar Lake. It was constructed by having the highest embankment dam in the country on the Beas River. Nearly 220 species of birds have been identified including 54 species of waterfowl.
9.	Kanjli Lake	Punjab	2002	1.83	It is made by building a barrage across the Bein River which is a tributary of the Beas River for providing irrigation facilities. The common reptile found in this wetland is a tortoise.
10.	Ropar Lake	Punjab	2002	13.65	It is a man-made wetland that was built by constructing a barrage for diverting the water from the Sutlej River. It provides a suitable breeding ground for hog deer, sambar deer, smooth-coated otter, etc. Also it is home to the endangered turtle <i>Chitra indica</i> and threatened snake <i>Python molurus</i> .
11.	Deepor Beel	Assam	2002	40	It is a permanent freshwater lake situated in the former channel of Brahmaputra River. It serves as a big stormwater storage water basin for Guwahati and it is considered as the wetland's representative under the Burma Monsoon Forest Biogeographic Region.
12.	East Calcutta Wetlands	West Bengal	2002	125	It is a mixture of natural and man-made wetland regions. It helps to treat the sewage of Kolkata city. It is an example of a multi-purpose wetland. It is conserved and maintained with the help of the local community.
13.	Bhitarkanika Mangroves	Odisha	2002	650	It is located near the catchment area of Brahmani and Baitrani rivers and is considered as second largest mangrove ecosystem in the country. It is known for Olive Ridley sea turtles and saltwater crocodiles.
14.	Bhoj Wetland	Madhya Pradesh	2002	32.01	It is made of two lakes namely Bhojtal/ Upper Lake and Lower Lake in Bhopal. It was created by Paramara Raja Bhoj. The Upper Lake acts as the lifeline of the city of Bhopal as it supports around 40% of its potable water supply. The largest bird of India named Sarus crane is also seen here.
15.	Kolleru Lake	Andhra Pradesh	2002	901	It is a large natural eutrophic lake situated between the river basins of Godavari and Krishna rivers. It acts as the natural soaking agent to check the flood-like situations here. It makes the largest shallow lake among all the freshwater lakes in Asia. It was an important habitat for 20 million migratory birds.
16.	Point Calimere Wildlife and Bird Sanctuary	Tamil Nadu	2002	385	It is situated along the Palk Strait at Point Calimere which meets the Bay of Bengal. It has mangroves, tropical evergreen forests, and grassland ecosystems. It was created in 1967 for the conservation of the Blackbuck Antelope, and other endemic mammal species. It is known for the congregation of greater flamingos.
17.	Ashtamudi Wetland	Kerala	2002	61.4	It is the second-largest wetland of Kerala. It is a large palm-shaped natural backwater wetland. It makes an estuary with the sea at the point of Neendakara. It is also a popular fishing zone in the state. It is said that the tastiest fish in Kerala named Karimeen comes from this lake.
18.	Sasthamkotta Lake	Kerala	2002	3.73	It is called the largest freshwater lake in the state of Kerala. It is known as the Queen of Lakes. It is named after the primitive pilgrimage center Sastha Temple situated on the banks of this lake. The smallest migratory birds named common teal/ dabbling duck are seen here.
19.	Vembanad-Kol Wetland	Kerala	2002	1512.5	It is the largest brackish water, humid tropical wetland ecosystem in the state of Kerala and longest lake in the country. It is considered the second largest Ramsar Site in India. It is situated below sea level and is known for the exotic fishes and unique paddy fields.
20.	Hokera Wetland	Jammu & Kashmir	2005	13.75	It is situated at the back of the Pir Panjal ranges of Himalayan Mountain. It is a natural perennial wetland site next to the Jhelum River basin. It is considered to be the only region having the remaining parts of the reedbeds of Kashmir. It is the largest bird reserve in the Kashmir valley.
21.	Surinsar-Mansar Lakes	Jammu & Kashmir	2005	3.5	It is situated in the semi-arid zone of the Jammu area. It covers the catchment area of Jhelum River. Mansar site is fed mainly by surface run-off while Surinsar site is rain-fed. It is home to thousands of bats. Surinsar and Mansar Lakes are considered twin lakes.
22.	Chandertal Wetland	Himachal Pradesh	2005	0.49	It is a barren but beautiful lake located at a height of 14100 feet. It is situated near the origin of the Chandra River on the Samudra Tapu plateau. It is home to several species like golden eagle, red fox, snowcock, Himalayan ibex, etc.
23.	Renuka Wetland	Himachal Pradesh	2005	0.2	The lake has significant religious consideration and is named after the deity named Renuka (Mother of Sage Parshuram).
24.	Upper Ganga River (Brijghat to Narora stretch)	Uttar Pradesh	2005	265.9	It is a shallow stretch of the Ganges River. Six species of turtles are found here. It is home to the Ganges River Dolphins, Gharial, Crocodiles, etc.
25.	Rudrasagar Lake	Tripura	2005	2.4	It is a lowland sedimentation reservoir in the northeast region fed by three perennial streams discharging into Gomti River.
26.	Nalsarovar Bird Sanctuary	Gujarat	2012	120	It is the largest natural wetland site in the biogeographic region of the Thar Desert. It is said to be the lifeline for the endangered Indian Wild Ass

					population.
27.	Beas Conservation Reserve	Punjab	2019	64.29	It is the first river to be declared as a conservation reserve. The gharial reintroduction in the Beas Conservation Reserve is an ambitious programme of the Punjab government. It is the last abode of the Indus River Dolphins in India.
28.	Keshopur-Miani Community Reserve	Punjab	2019	3.44	It is a composite wetland where mosaic of natural marshes, aquaculture pond and agricultural wetlands maintained by the annual rainfall-runoff. It is influenced by human interference. There are crop fields for lotus & chestnut.
29.	Nangal Wildlife Sanctuary	Punjab	2019	1.16	Site has historical importance of "Panch Sheel Principles". It hosts many floras and faunas like Indian pangolin Egyptian vulture, Indian leopard, etc.
30.	Nawabganj Bird Sanctuary	Uttar Pradesh	2019	2.25	It provides protection to more than 250 species of migratory birds. It has been renamed after the Shahid Chandra Shekhar Azad Bird Sanctuary. It hosts species like lesser lesser adjutant, golden jackal, Pallas's fish eagle, etc. The invasive species of common water hyacinth poses threat to the ecosystem.
31.	Parvati Agra Bird Sanctuary	Uttar Pradesh	2019	7.22	It is a permanent freshwater lake having two oxbow lakes (Parvati Tal & Agra Tal). It provides both breeding grounds as well as roosting sites for several water-birds.
32.	Saman Bird Sanctuary	Uttar Pradesh	2019	5.26	It is a type of seasonal oxbow lake located in the Ganges floodplain which receives rainfall during the southwest monsoon. Various threatened species like the greater spotted eagle, greylag goose, etc. are found in the sanctuary.
33.	Samaspur Bird Sanctuary	Uttar Pradesh	2019	7.99	It is a perennial lowland marshy region which is situated on the Indo-Gangetic Plain. The majority of species found here are exotic. It harbors common pochard, Palla's fish eagle, Egyptian vulture, etc.
34.	Sandi Bird Sanctuary	Uttar Pradesh	2019	3.09	It is a freshwater marshy land on the Indo-Gangetic plain that is heavily dependent on monsoon rains for its water. It is famous for migratory birds.
35.	Sarsai Nawar Jheel	Uttar Pradesh	2019	1.61	It is a permanent marshy region of the Indo-Gangetic floodplain. Site play an important role in conserving the waterbirds like vulnerable sarus crane. It is an example of co-habitation of humans and wildlife.
36.	Sundarban Wetland	West Bengal	2019	4230	It is the largest Ramsar Site in India situated within the world's largest mangrove forest ecosystem. It is a deltaic region formed by the confluence of Ganges and Brahmaputra rivers. It is also home to many critically endangered species including the Irrawaddy dolphin, fishing cat, etc.
37.	Nandur Madhameshwar Bird Sanctuary	Maharashtra	2019	14.37	It has been formed by shallow backwaters of the Nandur Madhmeshwar dam. It is known for the avian population. It spans the riparian forest and marshy region of the Deccan Plateau.
38.	Tso Kar Wetland Complex	Ladakh	2020	95.77	It is situated at >4500 m above sea level. The complex consists of two connected lakes namely Startsapuk Tso (Freshwater) and Tso Kar (hypersaline). It is home to Snow leopard, Asiatic wild dog, etc.
39.	Asan Barrage (Asan Conservation Reserve)	Uttarakhand	2020	4.44	It is the only Ramsar site in the state situated at the confluence of the Asan and Yamuna river. Around 49 fish species are found and it is also a home to critically endangered species like Bear's pochard, red-headed vulture, etc.
40.	Sur Sarovar (Keetham Lake)	Uttar Pradesh	2020	4.31	It is a man-made reservoir also called as Keetham Lake. It was constructed for water supply to Agra City in summer months. Species like <i>Wallago attu</i> , <i>Anser anser</i> , <i>Clanga clanga</i> , <i>Grus antigone</i> , etc. are found.
41.	Kanwar Taal or Kabar Taal Lake or Kabartal Wetland	Bihar	2020	26.2	It is one of the 18 wetlands situated on the Indo-Gangetic plain, also known as Kanwar Jheel. It is an important stopover along the Central Asian Flyway, with different migratory waterbirds using it to rest and refuel.
42.	Lonar Lake	Maharashtra	2020	4.27	It is an endorheic lake that is circular in shape, also termed as Lonar crater lake which was made by a meteorite impact in the basaltic bedrock. It is recognized as the National Geo-heritage site.
43.	Bhindawas Wildlife Sanctuary	Haryana	2021	4.12	It is a man-made wetland site that houses freshwater lakes. It is considered the largest wetland area wise in Haryana. It supports >10 globally threatened species. In 1986, it was designated as a protected area and in 2011, it was declared as an Eco-sensitive zone by the MoEFCC.
44.	Sultanpur National Park	Haryana	2021	1.43	The lake supports seasonal aquatic vegetation, open grasslands, and is dotted with artificial islands. The area within 5 km of the Park was designated as an eco-sensitive zone in 2010. It supports more than ten globally threatened species.
45.	Haiderpur Wetland	Uttar Pradesh	2021	69.08	It is a man-made wetland located within the boundaries of Hastinapur Wildlife Sanctuary. It supplement habitats for various animal and plant species, including >30 plant species, over 300 bird species, >40 fish and >10 mammal species. It also supports >15 globally threatened species.
46.	Thol Lake Wildlife	Gujarat	2021	6.99	It is situated on the Central Asian Flyway and supports >320 bird species.



	Sanctuary				The Lake bestow water for irrigation and drinking purposes, enables groundwater recharge, and used for recreation and tourism.
47.	Wadhvana Wetland	Gujarat	2021	6.30	The reservoir is situated in the semi-arid agricultural zone and it is surrounded by paddy & wheat fields and villages. During the winter season, the rare red-crested pochard duck is spotted here. It is home to >80 species that migrate on the Central Asian Flyway.
48.	Bakhira Wildlife Sanctuary	Uttar Pradesh	2021	28.49	It is the largest natural floodplain wetland of eastern part of the state. It supports as a wintering ground for >25 species migrating on the Central Asian Flyway.
49.	Pala Wetland	Mizoram	2021	18.50	It is largest wetland in the Mizoram State surrounded by green woodland forest. The wetland has two small outlets, one named Tipo Didao, which converges with the small Pala River. It is said that the Mara tribe (immigrated from Myanmar) first settled around this wetland.
50.	Koonthankulam Bird Sanctuary	Tamil Nadu	2021	0.72	It is the largest wetland reserve for breeding resident and migratory waterbirds in South India. It supports rich social and cultural heritage. It also act as a buffer against the floods.
51.	Satkosia Gorge	Odisha	2021	981.97	It is an agglomerate of marshes, rivers and evergreen forests at the junction of 2 biogeographic regions, namely the Eastern Ghats and Deccan Peninsula.
52.	Khijadia Wildlife Sanctuary	Gujarat	2021	5.12	It is located near the coast of Gulf of Kutch. It was formed in 1920 during the formation of bund to protect the farmland from saltwater ingress.
53.	Tampara Lake	Odisha	2022	3	It is situated in the Ganjam district and is one of the most prominent freshwater lake in the state. The depression on the ground eventually filled with flow of rainwater from catchment area and it was termed as "Tamp" and "Tampura" by British and local peoples respectively.
54.	Hirakud Reservoir	Odisha	2022	654	It is the largest earthen dam in the state. Fisheries play an important role in the reservoir and support livelihood of 7000 fisher's population. It also provides important hydrological services by moderating floods in the Mahanadi delta and also supports tourism.
55.	Ansupa Lake	Odisha	2022	2.31	It is the largest horseshoe-shaped freshwater lake in the state situated in the Banki sub-division of Cuttack district.
56.	Shallbugh Wetland Conservation Reserve	Jammu & Kashmir	2022	16.75	This site qualifies as a Key Biodiversity Area of international significance and is located near Srinagar. The area has widespread reedbeds of <i>Phragmites communis</i> and <i>Typha angustata</i> , and abundant growth of <i>Nymphaea sp.</i> in open water. It plays an important role in recharge of aquifers.
57.	Hygam Wetland Conservation Reserve	Jammu & Kashmir	2022	8.02	The wetland is situated within the Jhelum River basin located in the Baramulla district. The site play a key role in biodiversity conservation, eco-tourism site, flood absorption basin and livelihood security for the local peoples.
58.	Yashwant Sagar dam reservoir	Madhya Pradesh	2022	8.23	It is one of the most significant birding sites in Malwa region and is considered as one of the two Important Bird Areas (IBA) in the Indore region.
59.	Thane Creek Flamingo Sanctuary	Maharashtra	2022	65.21	It is surrounded by mangroves on both sides and encompasses around 20% of total Indian mangrove species.
60.	Chitrangudi Bird Sanctuary	Tamil Nadu	2022	2.60	It is locally known as "Chitrangudi Kanmoli". It provides an ideal habitat for winter migratory birds. Wetland is protected area since 1989 and presently declared as Bird Sanctuary.
61.	Suchindram Theroor Wetland Complex	Tamil Nadu	2022	0.94	Around 250 species of birds have been identified in the area because it was formed for birds nesting purposes. It is declared as an Important Bird Area.
62.	Vaduvur Bird Sanctuary	Tamil Nadu	2022	1.13	It provides appropriate environment for shelter, food and breeding ground for various migratory birds. Numerous wintering waterfowl species, including Eurasian Wigeon, Northern Pintail, and Garganey were observed in high densities.
63.	Kanjirankulam Bird Sanctuary	Tamil Nadu	2022	0.97	It is a protected area declared in 1989. Several migratory heron species use it as a nesting ground, and they roost in the area's profusion of babul trees. Between October and February, migratory waterbirds that breed here include the painted stork, white ibis, black ibis, tiny egret, and great egret.
64.	Sakhya Sagar Lake	Madhya Pradesh	2022	2.48	It is a man-made reservoir and is an important ecological part of Madhav National Park of Shivpuri town. It is a shallow, alkaline and nutrient-rich reservoir and provides the natural aesthetic beauty of the area and permanent source of water for wildlife.
65.	Sirpur Wetland	Madhya Pradesh	2022	1.61	It is a shallow, alkaline, nutrient-rich lake that floods upto 2 m during monsoon season. It is often called as Pakshi Vihar. It provides fisheries and medicinal plants to the local communities and act as a buffer against flood.
66.	Nanda Lake	Goa	2022	0.42	It comprises isolated freshwater marshes that lie next to tributary of Zuari River.
67.	Karikili Bird Sanctuary	Tamil Nadu	2022	0.58	It has history of people cooperating in conserving waterbirds as their excreta helps the supply of nutrient rich water to crop fields.

68.	Pallikaranai Marsh Reserve Forest	Tamil Nadu	2022	12.48	It is a freshwater marsh and partly saline wetland, which act as an aquatic buffer to the flood-prone Chennai and Chengalpattu districts. Notable species include Russell's viper snake and birds like glossy ibis, grey-headed lapwings, etc.
69.	Udhayamarthandapuram Bird Sanctuary	Tamil Nadu	2022	0.44	It is a man-made irrigation tank associated by network of canals and fed by Mettur dam through the Koraiyar canal. It is an important staging and breeding ground for numerous waterbirds.
70.	Vedanthangal Bird Sanctuary	Tamil Nadu	2022	0.40	Due to presence of numerous bird species, the site is an Important Bird and Biodiversity Area (IBA). It provides tourism, educational and research opportunities.
71.	Vellode Bird Sanctuary	Tamil Nadu	2022	0.77	It provides a suitable habitat for birds due to abundant food resources. Important bird species found are oriental darter, Indian river tern and painted stork.
72.	Vembannur Wetland Complex	Tamil Nadu	2022	0.19	It is a man-made irrigation tank which provides ideal habitat to several waterbird species. Site forms part of an Important Bird and Biodiversity Area (IBA).
73.	Gulf of Mannar Marine Biosphere Reserve (MBR)	Tamil Nadu	2022	526.72	It is the first MBR in South and South-East Asia. It is one of the unique and most biologically diverse regions of India. It supports globally threatened species like whale shark, hawksbill turtle, dugong, green-sea turtle and humpback dolphin.
74.	Ranganathittu Bird Sanctuary	Karnataka	2022	5.18	It is a part of River Kaveri on the Southern Deccan Plateau. It is the first Ramsar site of the state located in the Mandya district, which is commonly called as "Pakshi Kashi". It is an eco-sensitive zone.
75.	Pichavaram Mangrove	Tamil Nadu	2022	14.79	It is the second largest mangrove ecosystem in the world situated between the estuaries of Coleroon and Vellar Rivers in India. Site hosts a natural hybrid mangrove species, <i>Rhizophora annamalayana</i> .

### Threats

Wetlands are one of the world's most threatened ecosystems; the wildlife that calls them home is some of the most endangered. Presently, our wetlands are facing numerous and tremendous threats such as natural and anthropogenic and they are still being disappeared three times faster than forests. Some common threats are habitat destruction, discharge of wastewater, weed infestation, pollution, invasive species, over-harvesting, unregulated tourism and climate change.

### Conservation and management

Wetlands are important ecosystems providing numerous ecological services. They manifest several benefits to people and nature, including flood control, water purification, erosion control, climate regulation, and habitat for plants and animals. Unfortunately, wetlands are being lost at an alarming rate due to various factors, including development, agriculture, pollution, and climate change. The Ministry of Environment, Forest and Climate Change (MoEFCC) has notified Wetlands (Conservation and Management) Rules, 2017 under the provisions of the Environment Protection Act, 1986 as the regulatory framework for conservation and management of Indian wetlands. Some common state laws regarding the conservation of wetlands are Kerala Conservation of Paddy Land & Wetland Act, 2008, Andhra Pradesh Water, Land & Trees Act, 2002 and East Kolkata Wetlands (Conservation & Management) Act, 2006. Other laws that indirectly help to conserve wetlands such as National Environment Policy, 2006, Wildlife Protection Act, 1972, Indian Forest Act, 1927, Forest (Conservation) Act, 1980 and Indian Fisheries Act, 1857. Similarly several measures are required by the state governments for the conservation and protection of different wetlands in respective states.

### Recommendations

Based on the identified status of wetlands in India, the following recommendations were formulated to promote wetland conservation and improve the ecosystem services of

these natural features:

- Natural wetlands should be constantly monitored to ensure that ecosystem services are properly maintained or improved. An inventory of the wetlands' resources should also be created to track the changes in the benefits of natural wetlands.
- Additional government policies regarding the protection of natural wetlands and the limits for the utilization of various wetland resources should be formulated to ensure that the loss of wetlands' productivity can be prevented.
- The support for scientific studies on wetland preservation and restoration should be expanded. Large-scale initiatives for ecological wetlands restoration and scientific research on important technologies for wetland conservation and restoration should also be conducted.
- Regulations limiting pollutant discharges can be imposed in order to mitigate wetland degradation. This may be accomplished by integrating wetland and river basin environmental management strategies.
- Marsh wetlands were the most threatened wetland types. The exploitation of biological resources should be temporarily prohibited or limited, and attention should be given to the restoration of wetlands that harbors migratory, rare, and endangered animal species.

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