

INFLUENCES ON THE MIGRATORY BIRDS AND ENDANGERED SPECIES:A CASE STUDY OF ROPAR WETLAND

Abstract

Ropar (Rupnagar) Wetland is located in Punjab and comes under Ramsar Sites. This wetland is famous for migratory birds in winter season. Wetland areas is land, water, vegetation covered areas. Ropar wetland witnesses every year migratory bird count increase and decrease. According to study migration birds count decrease due to industry pollution, human interferences, etc. These threats are also faced by the species. They move to other areas and migrate less to Ropar Wetland. Secondary data has been used to get information about birds count for years 2013 to 2017. Different sources such as newspaper, web sources, Books, etc. has been analysis by using various methods and techniques such as maps work, bar diagrams, etc. This study includes local, migratory birds and other endangered species. Some birds count has seen increase in the numbers currently whereas some have decreased. The study focusses on empirical analysis of last 5 years data of bird count in Ropar Wetland. It has been analysed What steps should be taken to reduce the crises of wetland. Wetlands are important for reproduction and feeding area for birds or other species, habitat and important for maintaining natural species diversity. This study provides threats information of habitat, rapid increase or decrease of bird count. Industries, agricultural and urban development, hydrological effects and fishing, grazing activities are the reasons for decrease of bird count in the wetland.

Keywords: Wetland, Ropar, migratory birds, Threats,

Introduction

Wetland is an area where water bodies meet with land area. So it can be a coastal area, a river, a lake, a pond, mangroves, marshes, deltas, and flooded forest. Wetlands exist in every climate zone from Polar Regions to the tropics and from high altitudes to dry regions.

There are two types of wetlands which are Inland and Coastal wetland. The two types i.e. coastal as well as inland wetlands are further divided into man-made (conservation) and natural wetlands. These are Ponds, Ox-bow Lake, Waterlogged, Seasonal, Lake and Swamp/Marsh Natural (Inland) wetland. Reservoirs, Tanks, Waterlogged, Ash pond these are manmade (Inland) wetland. The Coastal wetlands exist in natural wetlands like Estuary, Lagoon, Backwater, Bay, Tidal Flatland, Mangroves, etc and man-made (Coastal) in Salts pans, Aquaculture.

Wetland including mammals, birds, fish and serve as nurseries for many of these species.

Wetlands is life supporting eco-systems providing fish, forest, flood control, water, wildlife, groundwater, recreation and tourism area. They are the important and threatened aquatic species which play a critical role for the rural livelihood and economic prospects. Wetland is also an important habitat for water flow, fish and diversity of other flora and fauna and migratory birds. Physical functions of wetlands include flood mitigation, coastal protection, aquifer recharge, and sediment trapping. Wetlands intercept storm runoff, providing an important temporary storage medium for storm waters (Williams 1990).

Study area: Ropar (Rupnagar)

Ropar Wetland situated near Ropar city in Punjab, India. Ropar Wetland is also known as Ropar Lake. The latitude and longitude of Ropar city, latitude is 30.975254 and longitude 76.527328. Ropar wetland is located within the beautiful city of Ropar (Rupnagar). The Ropar Wetland is a declared area in village Katli. The reserved area is near Satluj head Sadabarat forest to village Katli. Sadabarat forest area spread to village Katli, but Katli forest areas are decreasing because of human residential area, road, etc. The town (Ropar) settlement is near Satluj River and Shivalik Hills. This important ecological zone is located in the Shivalik foothills of the Lower Himalayas and was created in 1952 on the Satluj River, in the Punjab state of India. It is surrounded by Shivalik Hills (lower, upper & middle) expand in the north east the part of the wetland. The Ropar Wetland landforms is Shivalik hill, Valley, Piedmont plain, River cover, River terrace and alluvial plain. The study area has poor vegetation due to erosion and sedimentation of Ropar Wetland. These are loose sand stone and silt stone which give rise to sandy and silt soils in the area. These area characterized by gentle to moderate slopes on the foot slopes of Shivalik. Satluj River forms the main drainage system in the area and flows from north to south wards. Sirhand canal is flow from the Satluj River. It is a manmade freshwater wetland. The Ropar wetland maximum depth of 6m (20ft), surface elevation is 275m and it cover Area is 13.65km. The Jhajjar Bacholi Wildlife Sanctuary located in Ropar. Migratory water birds in winter season from central and north Asia, Europe and Indian residential bird are watched at the Ropar wetland in Punjab.

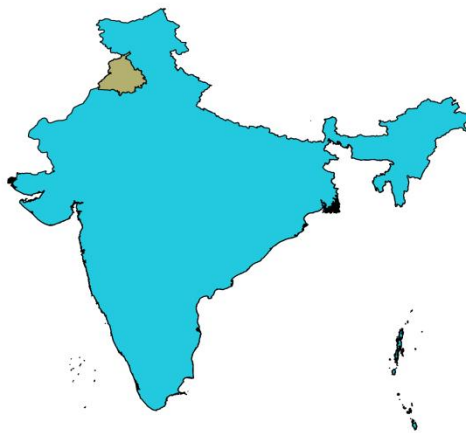
Ropar wetland lies between 31°12.00'N Latitude and 76°30.00'E Longitude near Ropar city. The climate of Ropar wetland has maximum temperature of 42 degree C during June to minimum temperature of 4 degree C during January. The study area annual rainfall is 855 mm, average is 78% during June to September and relative humidity is around 70% during monsoon. Econ-

omy of Ropar mainly based on Agriculture. This city’s people are mostly engaged in agricultural activities. In Ropar ,historical Indus valley civilization is also believed to be situated .

There are 26 wetlands within India which are under Ramsar conservation. Ramsar sites in Punjab are Harike, Kanjli and Ropar wetlands. These wetlands according to number are Kanjli wetland no.1160, Ropar wetland no.1161 and Harike wetland no.1162. In January 2002 Ropar wetland included Ramsar sites list. Ropar wetland is second largest Ramsar sites in Punjab.

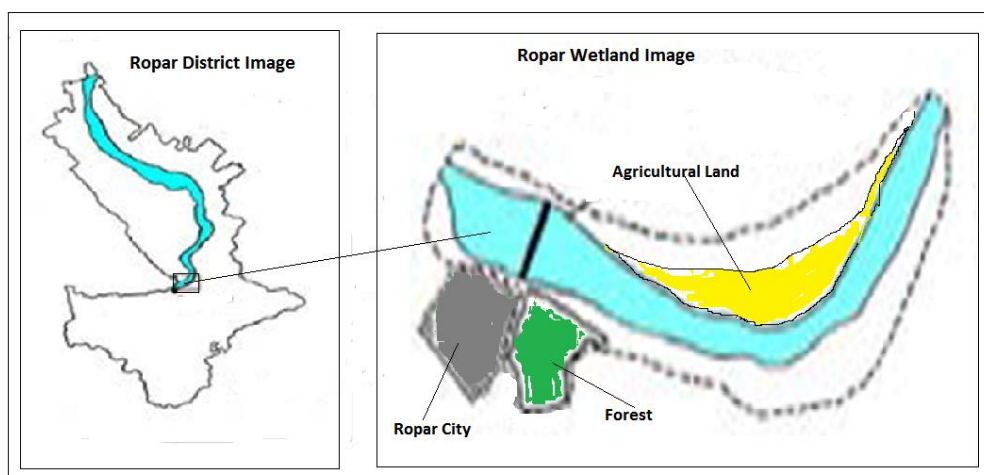
Location of Ropar Wetland

Punjab state in India



Rupnagar District in Punjab





Ropar district and wetland image

Statement of the problem

Ropar wetland is manmade, facing so many problems. The major problems are siltation, water quality, interference of human, habitat of migratory and local birds and animals. Satluj river flow through Nangal city where there are so many chemical industries and Ropar thermal plant is also on the bank of Satluj River which is polluting the water of Satluj River. In rainy season or floods the wetland faces siltation problem because of agricultural fields along the river and use of chemicals like fertilizers, pesticides and insecticides in fields is also leading to decreasing quality of water. Cutting of trees in Shivalik Hills is increasing soil erosion in this area which leads to siltation in the river due to poor vegetation. These all are affecting the migration of the birds and local species like Turtles and snakes in the wetland. Ropar wetland did host a large number of migratory birds in 2016. Last year less number of birds sighted because of the human interference, industry pollution, feeding, illegal fishing, agricultural fertilizer, etc.

Objectives of Study

1. To carry out the temporal analysis of birdcount of migratory of Ropar wetland.
2. To find out major factors responsible for the change in the pattern of numbers of migratory birds in Ropar wetland.

Research Methodology

According to the topic of study, data is collected by different ways or methods. The data has been collected from different sources; techniques like using different type data represent maps, pie diagrams, tables, graph, QGIS etc in the study.

This study focusses mainly on the Ropar Wetland influences of migratory bird and endangered species. Data have been collected from various secondary sources such as:

- Department of Forest and Wildlife Reservation (Ropar)
- IUCN Red list
- Internet
- Newspaper

These are sources used for data information collection and analysis. For example, how many migratory birds are seen in Ropar Wetland? Which are threats faced species? Etc.

Benefits of wetlands

Biodiversity describes the variety of living species on earth other words it is described variety of species life like plants, animals and ecosystems etc. Wetland is management of biodiversity system because they produce food and support level of biodiversity. Support of many number of species they are rich in the form of rainforests. These are combination of water, nutrients and productivity the development of organisms that form the base of food web. Food web supports species of birds, fish, and insects. Food web included so many food chains.

Biodiversity the number of different species living within particular region and wealth of resources maintained and balances ecosystem, food, human health and social benefits, etc. Biodiversity within wetland life and they are depends on biodiversity. So every species has importance in biodiversity. If any species in biodiversity increase and decrease then balance of biodiversity affects. So in wetland depends on biodiversity or biodiversity is provide oxygen for survive of wetland. Biodiversity made of plants, animals community, species diversity, genetic diversity and ecosystem diversity these are divide into three elements better explain and understood biodiversity. Biodiversity supports habitat for different species (plants, animals and birds species) fauna and flora on wetland. Wetland control floods, host a great diversity of species by biodiversity, cultural and economic importance to local communities. Wetland provide ecosystem services like goods, services and other benefits to human and wetland depends flora and fauna.

Wetland protects the environment because around wetland there is better environment growth. Wetland save flora and fauna that are part of environment.. Environment provides safe life and resources for human, vegetation, animals, birds, etc. Wetland balances the environment and saves the flora and fauna. Wetland protects biodiversity, ecosystem, and healthy environment. They also provide important benefits for industry and protect from floods.

Birds count Analysis in years

The data based on migratory birds on Ropar wetland in every year migratory bird increase and decrease in year 2013 to 2017. This bird is census count in month every years December or January. Census count process team work they under in conservation departments, AWC. Authorities select the people, they are register person and move on field work areas. The table bird count data collection source is Department of forest and wildlife reservation (Ropar).

Birds count of Year

Table 1

Sr. No.	Year	Bird Count
1	2012-13	2885
2	2013-14	1654
3	2014-15	1846
4	2015-16	3112
5	2016-17	2294

[Source: Department of forest and wildlife reservation (Ropar)]

Table 1 show 2013 to 2017 in bird count. Table explain by pie diagram. This Fig no 1.1 shows five year migratory bird increase and decrease. 2016 in birds count 26% highest compare to other years. Fig 1.1 easy show and understand years within total birds count, 2017 bird count is 25% lowest compare to 2016, but highest compare to 2015 bird count is 16%. Every year varieties of birds are seen by birdwatchers at Ropar Wetland.

Birds Count

■ 2012-13 ■ 2013-14 ■ 2014-15 ■ 2015-16 ■ 2016-17

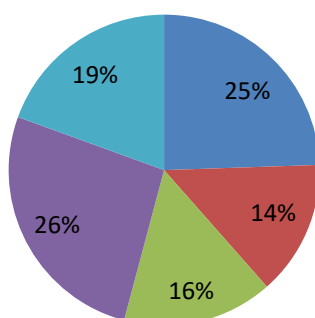


Fig. 1.1 Birds count of Year

Birds count table according to Year 2013 to 2017

The study based on migratory birds on Ropar wetland in every year migratory bird increase and decrease in 2013 to 2017. Last five years migratory and resident bird increase or decrease and near threats, least concern, vulnerable and missed birds in every year show Table 2.

Table 2

Sr. No	Species Name	Years					Remarks	IUCN Status
		2013	2014	2015	2016	2017		
1.	Bar headed goose	2500	556	95	815	227	M	LC
2.	Ruddy Shelduck	150	503	634	1028	719	M	LC
3.	Coot	40	70	193	296	246	M	LC
4.	Blue winged Teal/Garganey	2	—	—	—	—	M	LC
5.	Common Teal	42	127	—	—	69	M	LC
6.	River Tern	—	—	1	—	—	M	NT
7.	Red-wattled Lapwing	—	8	8	8	8	M	LC
8.	Palla's Gull	25	19	14	35	22	M	LC
9.	Eurasian Wigeon	—	—	36	8	—	M	LC
10.	White brown wagtail	—	—	8	1	2	M	LC
11.	Common Pochard	—	—	—	8	—	M	VU
12.	Tufted Duck	—	—	—	10	—	M	LC
13.	Gadwal	—	—	144	14	20	M	LC
14.	Red-crested Pochard	—	30	28	154	458	M	LC
15.	Ferruginous Pochard	—	—	—	—	—	M	NT
16.	Citrine Wagtail	—	4	1	—	2	M	LC
17.	Great Cormorant	26	22	91	485	132	M	LC
18.	Temminck's Stint	—	12	5	—	53	M	LC
19.	Little Ringed Plover	—	—	3	—	3	M	LC
20.	Northern Pintail	—	4	64	—	—	M	LC
21.	Northern Shoveler	—	—	30	—	2	M	LC
22.	Pied Kingfisher	—	2	4	1	4	M	LC
23.	Green Sandpiper	—	—	4	1	3	M	LC
24.	Common Sandpiper	—	12	4	2	2	M	LC
25.	Green Shank	—	5	2	1	6	M	LC
26.	Osprey	—	—	2	1	3	M	LC
27.	Common Moorhen	—	2	17	12	18	M	LC
28.	Yellow Wagtail	—	—	—	4	—	M	LC
29.	Mallard	—	2	—	—	5	M	LC
30.	Grey Wagtail	—	—	—	4	—	M	LC
31.	White Wagtail	—	20	6	6	9	M	LC

[Source: Department of forest and wildlife reservation (Ropar)]

M=Migratory, _ = No count or missed bird in year, IUCN (International Union for Conservation of Nature) Red list status; NT= Near Threatened, VU= Vulnerable, LC= Least Concern

- Red-wattled Lapwing population is stable in Ropar Wetland.

- River Tern, Oriental Darter, Osprey birds are every years decrease the census and endangered species on ropar wetland.

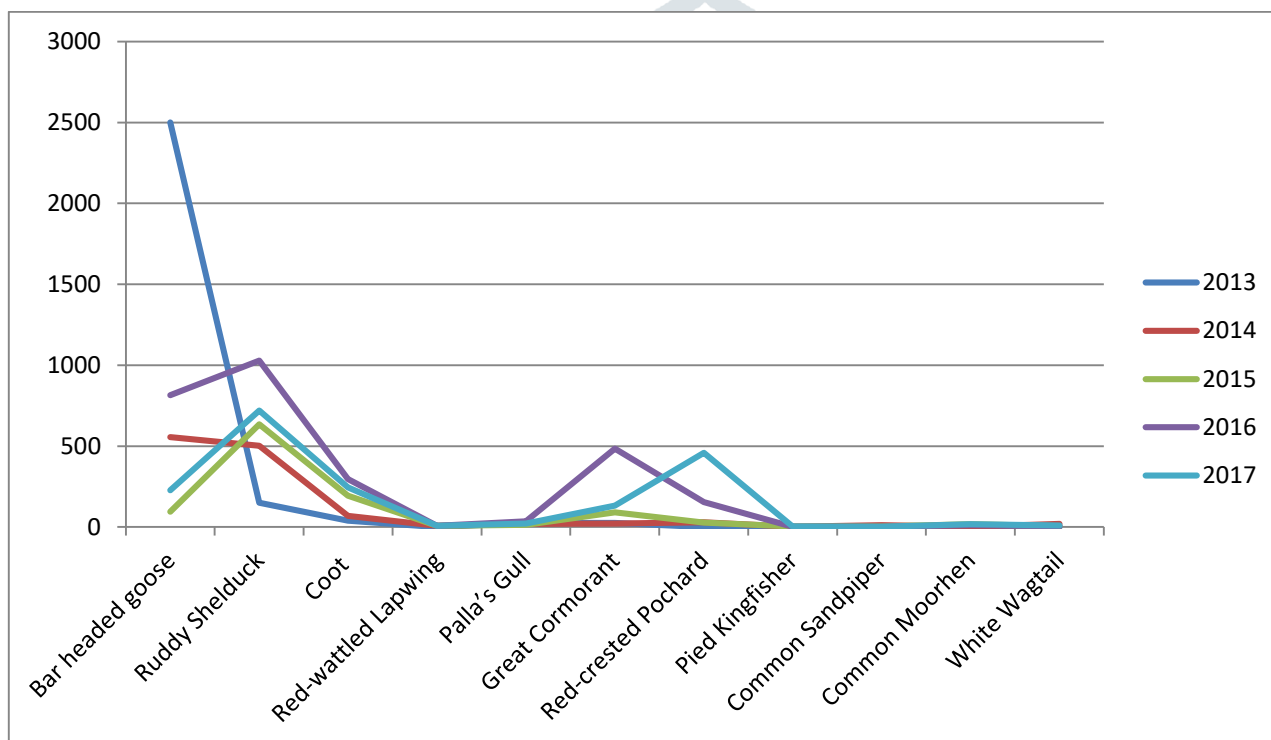
- Ferruginous Pochard, River Tern Blue winged Teal/Garganey are in near threatened according to IUCN Red List.

- Common Pochard is in Vulnerable according to IUCN Red List.

- Temminck’s Stint, Red-crested Pochard both birds count census increase the Ropar Wetland. This bird is census count increase very high. The bird is Mallard increase the count but two year not watching the bird in Ropar Wetland

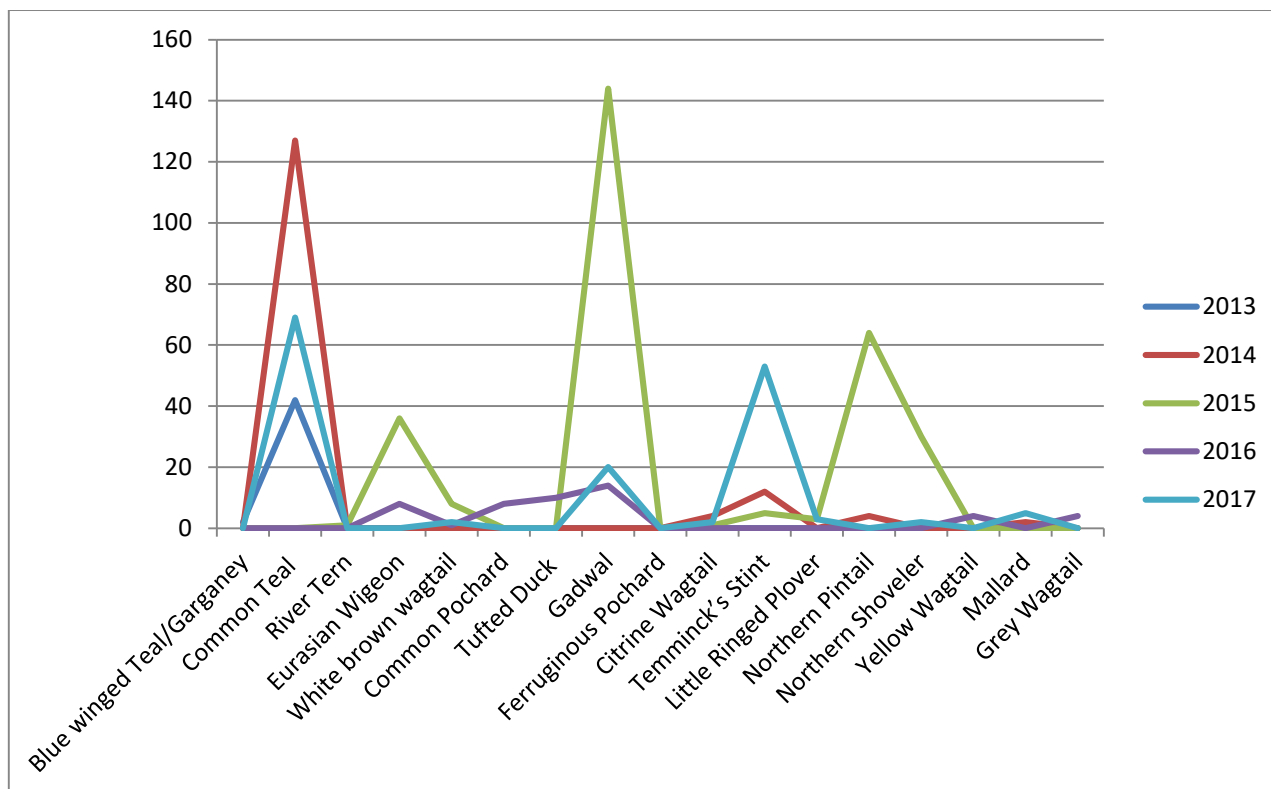
Birds count graph according to Year 2013 to 2017

Fig. 1.2 Birds count of Year



According to Fig. 1.2 Birds count of Year 2013 bar headed goose highest number compare to other years. 2013 bar headed goose decrease the number. This species is hunted of China, breeding affected by the gathering of eggs for food Ropar wetland decrease bird reason pollution, human activities, local level hunting, etc. Ruddy Shelduck in year 2013 very less count, but they increase the number. This bird highest count in year 2016, but 2017 decrease compare to 2016 count at Ropar wetland. Coot is highest count in year 2016. Every year this bird increase the number, but 2017 decrease compare to 2016. White Wagtail 2013 missed the data because this year bird not saw in wetland. 2014 in bird count is 20 and 2016 bird count highest but this bird count decrease. 2017 year this bird count increase, but decrease compare to 2014. Common Sandpiper see in year 2014 to 2017. 2013 year birds not see, but 2014 year bird count is high, decrease the bird count is 4 in year 2015 and 2016, 2017 stable the bird count. Pied Kingfisher see in year 2014 in bird count is 2, 2015 count is 4, 2016 is 1 and 2017 bird count is 4. But 2015 and 2017 number is stable.

Fig. 1.3 Birds count of Year



According to Fig. 1.3 Birds count of Year Common teal count 2014 this bird highest count, but next two year missed this bird and last 2017 again this bird see in area. Gadwal 2013 and 2014 data not available, but 2015 counting is very highest. Citrine Wagtail is 4 in 2014. Then decrease the number 2015. This bird not watch in 2016 and 2017 increase the number compare to 2015. Northern Pintail bird mostly watcher in year 2015 highest count and 2014 year very less count is only 4. 2016 migratory bird count highest but this bird count data not available and 2017 year bird not watch Northern Pintail. Northern Shoveler see in year 2015 is 30 bird count. But 2017 number is decrease and 2013, 2014, 2016 years this bird count data not available because these year bird totally missed.

Endangered species

Animals and birds or species to provide protection, food and proper habitat, they full biotic potential. Indian 25000 plants species and 1000 vertebrate species and many invertebrate species are threatened. The International Union of Conservation of nature and Natural Resources, IUCN red list data book which contains a research of species are now to be in danger. IUCN red list has identified of endangered species.

- The species distribution show present and past.
- The species number of census is decline.
- The species biology value.
- The species natural habitat of availability and quality.

Ropar wetland migratory bird is winter migratory species. Birds migration for food, shelter, etc. Ropar wetland according to IUCN red list identified of endangered species. River Tern, Osprey, Oriental Dater. This birds count in Ropar wetland every year decline and missed some years that wise these bird endangered in Ropar Wetland. According to five year data 2013-2017

Causes of decrease in number of various species in the area of Ropar wetland:

Pollution by domestic sewage-

Pollution is the one of main causes for the decreases of migratory birds and other species on Ropar Wetland. Which are effected many reason of pollution are like pollution by domestic sewage because many resident area are on the bank of Satluj river and on the tributaries of Satluj river, domestic sewage of residential areas mixed with river water. This is affecting species

Solid waste-

Domestic sewage also pick the solid wastage from residential areas like plastic bags, bottles, etc are also accumulate on this wetland. Human and animal excreta, food residues, organic waste, ash, etc. All the domestic sewage is passed into water courses without treatment.

Pollution by Industry-

Industry effect on wetland because industry waste is passed into Satluj River. Pollution by industrial areas which are Chemical Industry Nangal, Bedhi Chemical Industry, hot water from Guru Gobind Singh Super Thermal Plant.

Agriculture –

During the rain water which comes from agricultural land mixed artificial fertilizer with then and to hang out Satluj River. This is also polluting the water. Farmer many areas cover surrounding Satluj River then less wetland areas for survive and food. Farmer use fertilizer for crops but birds going this area for food and rain water flow in river then water accumulate fertilizer. Activates the along the bank of river. Agriculture activates also affecting the wetland.

Pollution by sedimentation-

Sedimentation is also the main reason for the decrease of species many seasonal and choes are from Shivalik Hills are meet with Satluj river. Because of deforestation Shivalik Hills these seasonal choes eroded the rocks and accumulate sand and gravel, soil in Ropar Wetland. This sanitation is also the one of the major problem of Ropar Wetland because water shallow decrease then affects on wetland depended species.

Tourism & Recreation-

The wetland is a popular tourism for bird watcher and boating that wise human interferences increase and disturbance the migrate birds.

Dam construction-

Ropar wetland is manmade, fresh water wetland. This site construction the dam and one side spend Sirhand canal. Dam construction work going on because Ropar wetland on Satluj River and Satluj River Water distribute by Sirhand canal and Pakistan, that wise this areas construction

Ramsar conservation and Government policies

Ramsar conservation international importance in Ramsar, Iran, on 2 February 1971, they concerned wetland conservation within wetland habitat for migration bird. Ropar Wetland in January 2002 included Ramsar site list. Ropar wetland is second largest Ramsar sites in Punjab. Ramsar sites under 2200 wetland. These sites select suitable design for wetland according to wetland region climate. Wetland importance for biodiversity, ecosystem, and provide fresh water, wealth environment, for human, plants, animals. In India 26 wetland under the Ramsar sites and Punjab mainly three wetlands is Kanjali wetland, Harike wetland and Ropar wetland.

The organizations are National Wetland Conservation Programme, The National Wild Life Action Plan in 1983-84, and Ministry of Environment & Forests in 1989, following by Directory of wetland (1990, 1992). In India also working on wetland under the Ramsar sites, they protect tree, wild life, overall one word define this site safe the biodiversity or wetland, then increase forest areas, safe the animals, food, shelter and other needs for migratory bird, animals, them maintain the balance in environment. Environments also provide resources living and non-living for human and animals.

Human population dependence on wetland for water needs, food, fish, irrigation, etc that wise more burden on wetland. India natural and manmade both wetlands are included. Wetland faced so many problems. Ropar wetland seemed threats are agricultural land, decrease water quality; hang on waste water in river.

Government of India promote conservation of wetland. They include state and union territories and execute the legislations.

- The Wildlife (protection), Act, 1972, (53 of 1972) management of Sanctuaries, National Parks. The act 1982(23 of 1982) and 1986 (28 of 1986) and 1991 in animals under different status of protection, but this act under does not refers to wetland conservation.

- The Water (Prevention and Control of Pollution) act 1974, this modify in 1990 with basic aims and control of pollution. The act does not maintained and restored in different water bodies.

- The forest (conservation) act 1980 and Forest Conservation Amendment Bill, 1988. Forest protects and increases on hills, rivers, reservoirs, lake and oceans. The forest cover areas strictly followed policy and reduce the problems of wetland, under National Wetlands and Ramsar sites.

- The Environment (protection) act 1986, this modify in 1992. The environment included water, air, land, and plants are providing wealthy environment or climate and biodiversity. This act, 1986 under Costal Regulation Zone also work on estuaries, bays, seas, rivers.

- The West Bengal Town and Country act 1979 include any development work change of wetland areas and filling of lakes, ponds, water body, tanks, etc.

- Government should take step in Ropar wetland. They banned the boating because human interference and noise pollution disturbed the migratory bird. Fishing ban in Satluj River at Ropar district in 2001 reason for save the fish and death fish causes by fertilizer, chemical industry, Thermal hot water take steps for ban on fishing in Ropar. These polices apply by Punjab Pollution Control Board.

Conclusion

Ropar wetland has so many varieties of migratory and local birds. These birds face so many problems like siltation, human interference, deforestation, agriculture areas, and water quality degradation on wetland. Every year migration bird census increase or decrease because these are threats faced by Ropar Wetland. Ropar Wetland second largest wetland in Punjab comes to Ramsar sites. Migration bird seemed large number at Ropar wetland in winter season. The winter migratory birds come for feeding. Wetland balanced the environment, water supply, food, biodiversity and ecosystem, etc. The number of bar headed goose and Ruddy Shelduck is decreasing due to agricultural area because interference of farmers along the Satluj River during the feeding of birds is also the reason for the birds moved other areas. Temminck's Stint, Red-crested Pochard is increase the number in five years. All over this study shows endangered species. Mainly two government policies have been applied on wetland, which are ban on boating and fishing. In the count of migratory bird ups and downs seemed in every year. According to IUCN red list turtle (*Chitra indica*) comes under endangered species. The Python molurus snake vulnerable due to human activities and killing. This survey mainly focuses on the migratory bird and endangered species, main problems of wetland and controlling steps. Wetlands are important reproduction and feeding area for birds or species, habitat and important for species diversity. This study provides threats information of habitat, rapid increase or decrease of bird count. Industries, agricultural and urban development, hydrological effects and fishing, grazing activities are the reasons for decrease of bird count in the wetland.

Suggestions

There should be proper demarcation or reservation of the areas of wetland to avoid the interference of people or farmers in areas. Improvement in the vegetation cover within the wetland area will be beneficial for the biodiversity. Government policies for wetland should be strictly applied for the improvement of water quality. Reduce the chemical, fertilizer, domestic sewage within water and awareness among the people about wetland, biodiversity and its benefits.

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