CHAPTER-1
INTRODUCTION

Birds (Class Aves), feathered, winged, bipedal, endothermic are one of the most diversified of all creatures living on the earth (Ali, 2002). They are found on land, air, water and in every possible habitat from the deserts to the highest mountains (Ali, 1941).

In the nineteenth century, Philip Lutley Sclater (1858) studied the various bird species of the World and divided the planet into different realms. These biogeographic realms are inhabited by various number and types of avian species. The richest among these is the “Neotropical Realm”, which holds 36% (3,370 avian species) of all known bird species, having two endemic families of birds, namely “Trochilidae” including humming birds and “Troglodytidae” including wrens; which is followed by “Afrotropical Realm” having 21% (1,950 avian species); “Indomalayan Realm” 18% (1,700 avian species), having three endemic families of birds, namely “Irenidae” including leafbirds and fairy blue birds, “Megalaimidae” and “Rhabdornithidae”; “Australasian Realm” having 17% (1,590 avian species); “Palearctic Realm” having 10% (937 avian species); “Nearctic Realm” 8% (732 avian species) and “Oceanic Realm” having 2% (187 avian species) (Bird Life International, 2010).

India is located in the tropics at the zone of three major Biogeographic Realms, namely, the Indomalayan Realm (South and South-East Asia), Palearctic Realm (Europe and Northern Asia) and Afrotropical Realm (Africa). Some examples of purely endemic bird species in these three regions are Flame Throated Bulbul (*Pycnonotus gularis*), Indian Yellow Tit (*Parus aplonotus*) and Malabar Woodshrike (*Tephrodornis sylvicola*) in “Indomalayan Realm”; Algerian Nuthatch (*Sitta ledanti*), Bolle’s Pigeon (*Columba bollii*), Cyprus Warbler (*Sylvia melanothorax*) and Scottish Crossbill (*Loxia scotica*) in “Palearctic Realm” and Grey Winged Francolin (*Scleroptila africanus*), Ground Woodpecker (*Geocolaptes olivaceus*), Blue Crane (*Anthropoides paradiseus*) and African Black Oystercatcher (*Haemotopus moquini*) in Afrotropical Realm. It is because of this that India has got rich biological heritage comprising nearly 81,000 species including 340 species of mammals, 1250 species of birds, 420 species of reptiles and 142 species of amphibians (Saharia, 1998; Narang, 2000).
As far as the different countries are concerned, the richest territories for avian diversity are Colombia, Peru, Brazil, Ecuador and Indonesia (each with more than 1500 species) followed by Bolivia, Venezuela, China, India, Mexico, Tanzania, Kenya and Argentina (each with more than 1000 avian species) (Bird Life International, 2010). These big geographic differences in avian diversity are the result of different habitats present.

If we look into the past of the bird’s evolutionary history, they originated from theropod dinosaurs in the Mesozoic era of Jurassic period. Although descended from the dinosaurs, birds have evolved remarkable specialization for flight. The most interesting adaptation in birds is the presence of wings that make them capable to fly. In addition, they have short light and streamlined body. The fusion of some bones (for example, caudal bones into a single pygostyle); elimination of some bones (for example, lacking true jaws) and above all pneumatisation of bones makes their body light in weight.

Various birds have developed various types of bills adapted for various modes of feeding: seed-eating birds like Sparrows have developed short, thick and conical shaped bills for cracking seeds; birds of prey like Hawks and Owls have sharp and hooked bills for tearing flesh; Woodpeckers have got long and chisel-like bills for boring into wood; Humming birds have got long and slender bills for probing flowers for nectar; Kingfishers and Herons have got spear like bills for fishing, omnivorous Crow has got straight and pointed dagger shaped bill, Ducks have widened bills which enable them to feed on planktons and shore birds have thin, elongated bill for probing mud in search of small animals.

Like feeding behaviour of birds, breeding behaviour also varies with the species. Birds of prey, like Storks and Cormorants have their breeding season between October to March whereas Egrets, Ibises, Munias and Weaver birds nest in colonies during the monsoons. Most of the common birds breed during February to May. During the breeding season males of many species develop different plumages and produce sounds called birdsong. Some of them show different courtship displays in breeding seasons.

The smallest bird is Humming bird (*Mullisuga sp.*) weighing 0.056 ounces and 2.75 inches in length whereas biggest bird is North African Ostrich (*Struthio camelus*) weighing 345 pounds and 9 feet tall. Fastest flying bird is the Peregrine Falcon (*Falco peregrinus*) (168 mph), slowest flying bird is American Woodcock (*Scolopax minor*) (5mph). Heaviest flying bird is Kori Bustard (*Ardeotis kori*) of north-east and southern Africa and Great Bustard (*Ardeotis nigreiceps*) of Europe and Asia weighing about 40-42 pounds.

The smallest clutch size in birds is observed in Petrels (*Macronectes sp.*), Albatrosses (*Diomedea sp.*) and Shearwaters (*Calonectris sp.*) of 1 egg and the largest clutch size is
observed in Bobwhite Quail of 28 eggs. The smallest sized egg measuring 10 mm in length and 0.375 g in weight is laid by West Indian Vervain Humming Bird (*Mullisuga minima*) and the largest egg is laid by Ostrich (*Struthio camelus*) measuring 14 cm in length. The largest egg laid by passerine is of Australian Lyrebirds (*Menura novaehollandiae*) weighing 57 g.

Migration is the phenomenon behind the seasonal appearance and disappearance of some species of birds. Many bird species migrate over long distances to overcome unfavourable climatic conditions and some of them even migrate locally in search of food. Generally in birds, migration is seasonal, and in the Indian subcontinent the majority of migratory birds are winter migrants. Thousands of wetland birds like Shelducks, Shoveller, Pintail, Pochards, Mallard, Gargaeny, Wigeon, Teals, Gadwall and many more migrate in our country each year in winters from Central and Northern Asia and Europe by covering large distances.


The first natural historian to write about migration as an observable fact was Aristotle (nearly 3,000 years back). He recorded the time of departure of some species from Greece and listed Pelicans, Turtle Doves, Swallows, Quails, Swans and Geese as migrants. He observed that all migrating birds fatten themselves before migrating. The pre-migratory state
is characterised by a change in neural centers in the lower part of the brain controlling hunger and satiety so that the bird gains weight by overeating. The stimulus for development of the migratory state must be related to the environmental conditions for reproduction or winter survival. Day length is the environmental stimulus that results in pre-migratory weight gain. Light directly affects the hypothalamic feeding centers and other centers in the brain to effect the endocrine secretions. These hormonal changes result in greater food intake because of increased appetite and hence result in fat deposits.

Scientific investigation of bird migration began with tagged, metal leg bands. This method was adopted by a Danish Professor Montensen in 1890 and has generated a lot of useful information. In India it was only in the 1960s that effective bird ringing projects became possible. Some species begin their migrations in July towards south direction whereas there are some species that do not leave the north until stimulated by severe winters.

Various routes are followed by various species of birds for migration. These routes are: Atlantic ocean route practised by species like American Golden Plover (*Pluvialis dominica*), Black Poll Warbler (*Setophaga striata*), Arctic Tern (*Sterna paradisaea*), Petrels (*Macronectes sp.*), Shearwaters (*Calonectris sp.*) etc.; Atlantic coast and tributaries practised by American Coot (*Fulica Americana*), Northern Pintails (*Anas acuta*), Blue Winged Racket Tails (*Prioniturus verticalis*) etc.; American Pacific route (coast of North American continent) followed by Godwits (*Limosa sp.*), Curlews (*Numenius sp.*), Stilts (*Himanotopus sp.*) and Dunlins (*Calidris sp.*) etc.; American Atlantic route followed by Sandpipers (*Tringa sp.*), Turnstone (*Arenaria sp.*), Oystercatcher (*Haemotopus sp.*) and Plovers (*Pluvialis sp.*); Central Pacific route (extends across the ocean from New Zealand to Pacific islands like Hawaii and up through the Alaskan Arctic) followed by Wandering Tattler (*Tringa sp.*), Curlew (*Numenius sp.*) and Turnstone (*Arenaria sp.*) etc. and East Asian Australasian route (from Australia along the east of the Asian continent, through countries like Japan, Korea and China to Russian and Alaskan Arctic) practised by Stints (*Calidris sp.*), Greenshanks (*Tringa sp.*), and Great knot (*Calidris sp.*) etc.

There are many evidences, showing relationship between man and bird as in the paintings of Medieval India, in Ramayana – a bird Jatayu (vulture) played the central role in story, rose-ringed parakeet is oftenly found in several Hindu temples where they are taught to chant the Hindu God Rama’s name. For thousands of years the people have resided in intimate relation with good natural life. If we go through the Rig Veda, about twenty species of birds have been referred to. The Brahminy Duck was known for fidelity, the pairs marked for life, at night they used to separate but by calls they united, reunion was in the morning.
Kalidas, the Sanskrit poet used bird’s imagery in his writings. His “Meghdoot” depicts a lover exiled in monsoon, period of romance and passion. In this period big waterbirds like Storks, Egrets, Cranes and Cormorants breed. Not only the poets but the rulers were also keen in ornithology. Mughal kings were interested in big menageries and enjoyed in huntings on big level. They were also very keen in the readings of wildlife. The first Mughal ruler, Babar saw first Pied Myna in the sixteenth century.

Charles Waterton (1782-1865) of Yorkshire is generally regarded as the father of Nature Conservation. In the seventeenth century Francis Willughby (1635–1672) and John Ray (1627-1705) gave the first major system of bird classification that was based on function and morphology, not on behaviour. The first book devoted to the birds and written in the English language was “The Ornithology of Francis Willughby”, edited by John Ray and published in London in 1678 is considered as the beginning of scientific ornithology.

In the late eighteenth century there began new research works on birds by Mathurin Jacques Brisson (1723–1806) and Comte de Buffon (1707-1788). Brisson produced a six volume work ‘Ornithologie” in 1760 and Buffon included nine volumes on birds “Historie naturelle desoiseaux” (1770-1785).

In the nineteenth century first sixty years were under the command of Ornithologists like Jerdon, Hume, Butler, Blandford, Oates, Baker, Finn, Osmaston. The standard book – “Jerdon’s Birds of India” published in 1862 shows the understanding of ornithology upto that time. Much of the study is founded on the major works of Hodgson. Jerdon’s book is full of marked field points on habits and ecology and at the same time main emphasis was on collecting large number of skins and the local shikaris used to provide help. The explanations of some rare species have not been elaborated. That book was counted as the ideal work on Indian Ornithology for a long time and is considered important even today.

A lot of contribution towards ornithology has been given by Hume, who is also known as the founder of Indian National Congress. He and his team, surveyed birds in most of the Indian region and published eleven volumes of bird observation as “Stray Feathers” between 1872 and 1888. As soon as the last volume of “Stray Feathers” was published two more ornithologists Oates and Blandford (1889-1898) came into emergence and published four volumes of “Fauna of British India”. This publication includes those pieces of information from Indian region which remained uncovered by the previous observers.

The next major step in ornithology was taken by Stuart Baker, an Indian Police Officer for nearly twenty years. He joined Bombay Natural History Society (BNHS) in 1898. Some of his works were published in the Journal of BNHS including “Game Birds of India”.
His most significant works were the “Eight volumes” of second edition of “Fauna of British India”, published between 1922 and 1930 and the “Nidification of Birds of the Indian Empire” published between 1932 and 1935.

During the mid of nineteenth century there was a rise in the number of Indian ornithologists. Foremost among them was Salim Ali (1896-1987) of the Bombay Natural History Society (BNHS). Salim Ali, also known as ‘Birdman’ of India, was one of the very first ornithologists to carry out systematic bird surveys in India and abroad. He made a special contribution to the Indian ornithology. Salim Ali wrote numerous Journal articles, chiefly in the Journal of Bombay Natural History Society. He also wrote a number of popular and academic books. A popular article that he wrote in 1930 “Stopping by the Woods on a Sunday Morning” was reprinted in ‘The Indian Express’ on his birthday in 1984. His most popular work was a book,” The Book of Indian Birds”, first published in 1941. It has been translated into several languages and has been circulated in more than 12 editions. The most important work contributed by him was by the publication of “The Handbook of the birds of India and Pakistan” (1968-1974) written with S. Dillon Ripley. This work started in 1964 and ended in 1974 and its second edition was completed by others, notably J S Serrao of the BNHS, Bruce Beehler, Michel Desfayes and Pamela Rasmussen after his death.

He also produced a number of regional field guides, including “The Birds of Kerela”; “The Birds of Sikkim”; “The Birds of Kutch” (later the Birds of Gujarat); “Indian Hill Birds” and “The Birds of Eastern Himalayas”. In 1985 he wrote his autobiography “The fall of a Sparrow”. Ali also wrote about his own vision for the Bombay Natural History Society, noting the importance of conservation related activities.

Another Indian Ornithologist, Humayun Abdulali, cousin of Salim Ali joined the BNHS Executive Committee as Honorary Secretary from 1949-1961. His first publication was in 1931 on “Eleven Koel eggs in a Crow’s Nest”. He published 348 notes in his lifetime and his greatest contribution was the cataloguing of the specimens in the collection of the BNHS. Zafar Futehally, another great Indian ornithologist served as Honorary Secretary of the BNHS from 1963 to 1974. He was awarded for Salim Ali Memorial award in 1997.

There are many birds who were named after the names of some of the famous ornithologists like Whistler’s Warbler (Seicercus whistleri), Red Whiskered Bulbul (Pycnonotus whistleri) after the name of Hugh Whistler (1889-1943); Barn Swallow (Hirundo rustica tytleri), Tytler’s Leaf Warbler (Phylloscopus tytleri) named after Col. Robert C Tytler (1818-1872); Tickell’s Thrush (Turdus unicolor), Tickell’s Flowerpecker (Dicaeum erythrorhynchos) named after Samuel Tickell (1811-1875); Sykes’s Lark
(Galerida deva), Sykes’s Nightjar, Sykes’s Warbler, Blue-headed Wagtail (Motacilla flava) commonly called Sykes’s Wagtail in British Birds in 1907 after the name of Colonel W. H. Sykes (1790-1872); South central peninsular sub-species of Rock Bush Quail (Perdicula argoondah salimali), eastern sub-species of Finn’s Baya (Ploceus megarhynchus salimali) named after the great ornithologist Salim Ali (1896-1987); Nicobar sub-species of the Bersa (Accipiter abdulali), sub-species of Red vented bulbul (Pycnonototus humayuni) named after the ornithologist Humayun Abdulali (1914-2001); South-western ghats sub-species of the Oriental Bay owl (Phodilus badius ripleyi) and East-Assam race of the Puff throated Babbler (Pellorneum ripleyi) named after the ornithologist Dr. Sidney Dillon Ripley (1931-2001); Lesser Rufous headed parrotbill (Paradoxoornis oatesi), Hill wren babbler (Spelacornis oatesi) named after the name of the ornithologist E. W. Oates (1845-1911). South Assam race of Streak-Breasted Scimitar Babbler (Pomatoorhinus bakeri) and Sri lankan race of Asian Palm Swift were the two birds who were named after the name of E. C. S. Stuart Baker (1864-1944); Slaty Backed Flycatcher (Ficedula Hodgsonii), Hodgson’s Blue Robin (Hodgsonius phaenicuroides), Hodgson’s Hawk Cuckoo (Cuculus frugax), Hodgson’s Frogmouth (Batrachostomus Hodgsoni), Hodgson’s Redstart (Phoenicurus Hodgsoni), and Hodgson’s Bushchat (Saxicola insignis) are the birds named after Brian Hodgson (1801-1894); Grey Breasted Laughing Thrush (Garrulax jerdoni), Jerdon’s Courser (Rhinoptilus bitorquatus), Jerdon’s Baza (Aviceda jerdoni), Jerdon’s Bushchat (Saxicola jerdoni), Jerdon’s Babbler (Chrysomma altirostre) on the name of Capt. Surgeon T. C. Jerdon (1811-1872); Hume’s Groundpecker (Pseudopodoces humilis), Hume’s Warbler (Phylloscopus humei), Hume’s Lesser Whitethroat (Sylvia althaea) and Hume’s Short Toed Lark (Calandrella aequirostris) named after A.O. Hume (1829-1912).

According to Ali (1941) the total estimated avian species in the World is 8600; Parkes (1975) reported 8900 avian species; Sibley and Monroe (1990) observed them as 9648; which is again revised as 9,702 species by Sibley and Monroe (1993) and Lepage (2008) reported approximately 10,000 avian species in the World (Bird Life International, 2010).

India is quite rich in avian fauna accounting for around 10% of the global avian species. Of around 10,000 avian species the World over, more than 1200 species are found in India – 1250 (Woodcock, 1980); 1260 (Ali and Ripley, 1983); 1299 (Inskipp et al., 1999) and 1288 (Bird Life International, 2010). Together with sub-species or geographical races, the total species of birds in India reaches up to 2061. Of this number some 1750 forms are resident within our boundaries, the rest being migratory. The latter’s breed outside our territory, beyond the Himalayas – in central and northern Asia, and eastern and northern Europe.
(Palearctic region). The rich avian diversity in India is as a result of the varied geographical areas like, thick forests, deserts, grasslands, wetlands, mountain ranges and above all because of protected wildlife places in the country.

A new bird was discovered in India on September 12, 2006. Ramana Athreya, a birdwatcher and astronomer at the Indian Institute of Science Education and Research, was the man who discovered the bird, namely, Bugun liocichla. He found it in the “Eaglenest Wildlife Sanctuary” in the state of Arunachal Pradesh. He first spotted the species in 1995 and didn’t see it again until, 2005. This discovery has been described by Birdlife as the most sensational ornithological discovery in India for more than half a century. He was awarded the “Pakshishree” award in 2009 for this discovery by the Government of Rajasthan. Later in 2011, he was also awarded by “Whitley Award”, one of the seven awardees of the year for his work on conservation and involving communities in “Eaglenest Wildlife Sanctuary”.

Inspite of this rich diversity, about 120 – 130 avian species, all over the World have become extinct as a result of human activity since seventeenth century. A few examples of birds that became extinct for the last few decades were Tahitian Sandpiper (Prosobonia leucoptera) and Lord Howe Swamphen (Porphyrio albus) in the eighteenth century, Mauritius Blue Pigeon (Alectroenas nitidissima) in the nineteenth century, Atitlan Grebe (Podilympus gigas) and Pink-headed Duck (Rhodonesia caryophyllacea) during the twentieth century and Liverpool Pigeon (Caloenas maculata), Alaostra Grebe (Tachyaptus rufolavatus) during the twenty first century.

According to IUCN (2009) Red list of Threatened species currently about 1200 species are threatened with extinction. Two species of birds Ivory-billed Woodpecker (Campephilus principalis) of south-eastern part of United States and Kakapo Parrot (Strigops habroptila) of New Zealand are among the World’s top 10 most endangered species of the animals. In addition to this, 14 species of birds are considered critically endangered which include White Rumped Vulture (Gyps benghalensis), Indian Vulture (Gyps indicus), Red-headed Vulture (Sarcogyps calvus), Sociable Lapwing (Vanellus gregarius), Jerdon’s Courser (Rhinoptilus bitorquatus), Siberian Crane (Grus leucogeranus), Bengal Florican (Haubaropsis bengalensis), Himalayan Quail (Ophrys superciliosa) and Spoonbilled Sandpiper (Eurynorhynchus pygmeus). As far as India is concerned, in the twentieth century only it has lost two species of mammals and two species of birds (Narang, 2000). In addition 71 species of birds, 15 species of reptiles, and 3 species of amphibians are facing extinction (Tikader, 1983). The driving force behind current declines in many bird species is as a result
of destruction, degradation and fragmentation of natural habitats due to wasteful consumption of resources.

Many ordinary species are found in large regions of the oriental areas. Some birds belonging to the conifer forests of the hills will be seen only there, grassland birds are limited to their only, some birds grow in close association with human population like sparrows, crows, house martins, mynas and many others which are not restricted to any particular type of habitat. Indian culture is known to love and protect all kinds of life even when sanctuaries and parks were not available. Sarus, the Indian resident crane, harms much of farmer’s pea crop yet it is not harmed. The peacock has a religious level so it is also not harmed by people.

In many city gardens birds have made their homes, for e.g., babblers, tailorbirds, sunbirds and mynas. Pond heron take position in paddy fields and apply as Bagla Bhagat cheating others as if meditating like a sadhu, but actually doing something selfish. Dabchicks or Little grebes make their place in the ponds, vultures prefer great garbage and Pariah kites go to the rubbish heaps of the subcontinent.

In Northern India several workers have focused attention on the field study of birds like, Davidson (1898); Whistler (1914, 1915, 1916, 1918, 1919); Jones (1919); Toor et al. (1982); Sharma (1985); Narang (1986); Gopal and Sah (1993) and Vyas (1996).

As far as Haryana is concerned the first ever checklist of birds for the city of Hissar was given by Whistler (1915) and he reported 10 species. Later Whistler (1918) also provided a list of 200 bird species seen at district Ambala. A comprehensive list of 203 bird species was given by Yadav and Malyewar (1981). Kalsi (1998) studied the birds of Kalesar National Park and gave a list of 161 bird species. Gupta and Ahmed (1993) have studied the natural history of Indian Hoopoe. Further Gupta and Bajaj (1997) have studied the migratory birds of Braham-Sarovar. Gupta and Bajaj (1996) have focused attention on the natural history of Pied Myna. Also Gupta and Bajaj (1998) have studied the wetland birds of Kurukshetra.


Rivers have served the lifeline of humanity since time immemorial. Some most significant human civilizations could develop only on the brinks of rivers (Egyptian civilization across river Nile, Indus civilization across Indus River). At the same time, India
is dotted with rivers all across its boundaries like Brahmaputra, Ganga, Yamuna, Chambal, Indus, Mahanadi, Narmada, Krishna, Tapti, Ravi, Cauveri etc.

Some of the workers have focused their attention on the field study of birds along rivers of the World, Waite (1948); Scott (1949); Proud (1951); Bennign and Johnson (1987); Lingle (1989); Fannes and Lingle (1995); Nores (2000); Davis (2001); Hayes and Sewlal (2004); Awan et al. (2004); Ayanalem and Bekle (2008); Akbar et al. (2009); Mahboob and Nisa (2009); Akbar et al. (2010) and Iqbal et al. (2011).

Similarly, a few workers have also focussed attention on the field study of birds along rivers in India, Ball (1877); Briggs (1934); Lavkumar (1956); Abdulali and Mathew (1962); Gauntlett (1971); Daniel and Somane (1975); Panday (1989); Perennou and Santharam (1990); Acharaya and Kar (1996); Lakshmi (2006); Yardi et al. (2008); Meshram (2010); Joshi and Shrivastava (2012); Saikia and Devi (2011); Naik et al. (2012).

However, little work has been done on describing the scenario of diversity of migratory birds which may be seen in the basin of Yamuna River in Haryana territory, Singh (1983); Urfi (1993, 2003); Kalsi (1998); Harris (2001); Urfi (2006); Tak et al. (2010); Gupta and Kaushik (2011); Gupta et al. (2012a, 2012b) and hence the present work deals with the investigations on the avian diversity of the Yamuna Basin in Haryana.

River Yamuna, the major river of Northern India, one of the country’s most sacred rivers, has got several interesting aspects related with its origin, religious contours etc. River Yamuna originates from the Yamunotri glacier near Bunderpoonch peaks (38.59° N and 78.27° E) in the Mussourie range at an elevation of about 6387 meters above sea level in district Uttarkashi (Uttaranchal).

According to legend the Yamuna is the daughter of Surya and Sharanyu and the sister of Yama, the God of Death. A dip in this holy river is said to be capable of freeing a person from the tormenting fear of death. It has been acclaimed as a holy river in Indian mythology and various pilgrimage centers e.g., Yamunotri in Uttaranchal, Poanta Sahib in Himachal Pradesh, Mathura, Vrindavan, Bateshwar and Allahabad all in Uttar Pradesh are located at the banks of Yamuna River.

At Poanta Sahib, the River Yamuna crosses the last lap of the Himalayas foothills and flows into the plains of Haryana near the Kalesar forests in Yamunanagar district at Hathnikund. From here it flows up to Delhi, by touching Yamunanagar, Karnal, Panipat and Sonepat districts on Haryana side and Muzzafarnagar, Saharanpur and Meerut district on the Uttar Pradesh side. It is interesting to note that after Delhi, the River Yamuna re-enters
Haryana at Faridabad and while crossing Palwal it leaves off Haryana at Hodal in Palwal district and flows via Mathura in Uttar Pradesh to finally merge in Ganga at Allahabad.

River Yamuna has got rich potential for attracting migratory water birds, especially the region of Hathnikund in Yamunanagar district and Okhla region in Delhi, but this potential is decreasing day by day because of the pollution caused in the river.

The total length covered by the river is 1,370 km approx. and of this total distance, the 22km stretch in Delhi between Wazirabad barrage and Okhla Barrage is the most polluted region of the river. This 22km stretch in Delhi is hardly 2% of the total length of the river, but contributes over 70% of the pollution load in river. Average depth of the river is 395 feet (120 meters) and maximum depth is 1088 feet (332 metres).

As river Yamuna has got rich potential for wetland birds, a large number of workers are engaged in getting observations regarding avian diversity along the river, but still this region is the least explored one. Hence the present studies have been conducted along river Yamuna in Haryana from May 2007 to March 2012. The study area consists of selected length of the river. The main objectives of the study are :-

- To generate the information about the distribution patterns of avian diversity in river Yamuna in Haryana (between Hathnikund to Hodal).
- Determination of avian diversity “Orderwise and familywise”.
- To find out region wise dissimilarities and similarities in avian fauna.
- To assort the avian fauna in terms of Residential status and Abundance status.
- To focus attention on Migratory birds and their diversity

These studies have been conducted during 2007-2012 in Yamuna River Basin between Hathnikund in Yamunanagar district and Hodal in Palwal district in Haryana spanning over 360 Km of area approximately.