

Habitat factors related to the occurrence of water birds in Ekana Wetland, India

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ABSTRACT

Wetlands are important water bird habitats and birds use them for breeding, nesting and rearing young. Green plants in wetland prepare their food with the help of sunlight by the process of photosynthesis. Food provides the source of energy. Energy is the currency of population sustainability. It is advantageous for an animal to conserve any energy that it acquires. Birds also use wetlands as a source of drinking water and for feeding, resting, shelter and social interaction. Some water birds adapted to wetlands to such an extent that their survival as individual species depends on the availability of certain types of wetlands within their geographic range. The relation between wetlands and water birds is shaped by many factors. These include the space, cover, food, water, vegetation, topography, water depth etc.

Key words: Wetland, Waterbirds, Habitat, Topography, vegetation, Sustainability, Photosynthesis

Introduction

Wetlands are distinct type of ecosystem that are flooded by water either seasonally or permanently (Zhijun Ma *et al.*, 2009). Wetlands are most precious ecosystem in our environment. The term water bird or aquatic bird is used to refer the birds that live on or around water bodies, the types may be fresh water or marine. The wetland serves as a good habitat for availability of food stuff to various water birds in moderate proportion. Some water birds are more terrestrial (wading birds) while others are more aquatic and their adaptations will vary depending on the environment. These adaptations include webbed feet, beaks and legs adapted to feed in the water, and the ability to dive from the surface or the air to catch prey in water. Education awareness is necessary to conserve wetland and water birds. Most of the work has been done to conserve wetlands in India. Ramsar convention on wetlands was one of the

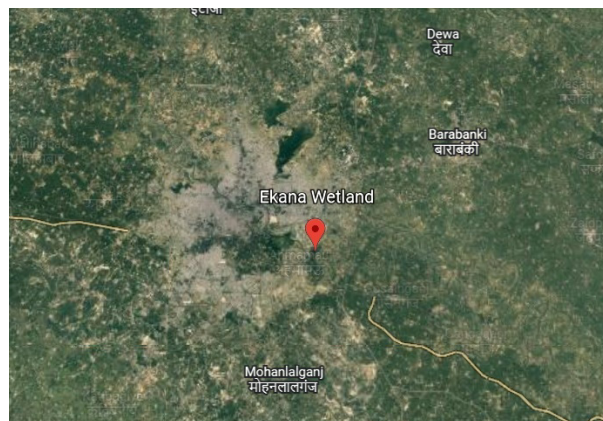
international treaties signed in 1971 for national action and international cooperation for the conservation and wise use of wetland and their resources. Water bird is a good pollution indicator. The abundance of water birds is inversely proportional to the pollution.

Materials and Methods

Study Area

Ekana is situated in Lucknow which is a capital of Uttar Pradesh. Lucknow is much more warmer in summer and much more colder in winter. In summer temperature ranges from 32 to 45 °C and in winter 2-25 °C. The geographic coordinates of Lucknow are 26.8467°N-80.9462°E. Ekana is located behind the Atal Bihari Vajpayee Ekana Stadium. Ekana wetland is one of the small natural, perennial wetland situated beside Gomti river. The study area involves Ekana wetland and its associated areas up

to (50km) nearby Mastemau village, south bank of Gomti river. The average annual rainfall is about 990.1mm. The geographic coordinates of Ekana are 26.8113°N-81.0154°E.



Water bird Habitat factors were observed throughout the wetland by using binoculars (Bunshell 10×70×70). On the other hand information will be collected through the interviews with approximately 10 people who live in the study area.

Habitat Function

Green plants prepare their food with the help of sunlight by the process of photosynthesis. We get food from green plants in the form of fruits and vegetables. Food provide the source of energy (and nutrients) for individuals and population. Energy is the currency of population sustainability, give it more the population will grow; give it less the population will decline. When an individual goes energetically bankrupt, he dies. When a population goes energetically bankrupt, it goes extinct. Plant species vary in their ability to provide protein and carbohydrates to herbivores. Some parts of plants are more digestible than others and some plant species are more digestible than others. It is this the digestible energy and the net energy remaining after digestion and metabolism that influences the fitness of individuals and population. But fitness, the ability to survive and reproduce, is also influenced by cover quality. It is advantageous for an animal to conserve any energy that it acquires. Mammals and birds maintain a constant body temperature and expend a large amount of energy to maintain that temperature. Cover provides a mechanism for conserving energy. The thermal neutral zone is the range of ambient temperature where an animal has to expend a least amount of energy maintaining a constant

body temperature. Thermal cover places the animal closer to the thermal neutral zone to maintain body temperature (Kevin *et al.*, 2009). Any departure from the thermal neutral results in increased expenditure of energy; so animals often select habitat that reduces climatic extremes.

Habitat Factors Related to the Occurrence of Water Birds in Ekana Wetland

SPACE: In any habitat it is important that animals not be overcrowded, if a species is too heavily represented in an area, the resulting competition for food can be a serious problem. Wildlife populations can severely damage their habitat if they are overcrowded. The results can be poor reproductive rates, increased death rates due to malnutrition and stress, and generally poor health for the entire species. Another serious problem when wildlife become too numerous is disease. For example, in any area where hundreds of thousands of geese spend the winter, an outbreak of avian cholera or other contagious disease can devastate the population. In any situation in which large numbers of species are in close proximity, disease tends to spread rapidly. For these reasons adequate space is an important component of an animals habitat (Kelvin *et al.*, 2009).

COVER: Cover or shelter serves several important functions for wildlife. It provides a relatively safe haven from predators and shelter from inclement weather, such as rain, snow or excessive heat (Kelvin *et al.*, 2009). It must also give them a place to reproduce and raise their young ones. Wildlife must have places to retreat if threatened by a predator. Ideally cover is so arranged at an animal need not overexpose itself to predators or the elements as it goes about its daily business. A wildlife population can suffer unusually high mortality rates if it is forced to feed water, or travel too a great distance from its escape cover. Shelter takes many forms for wildlife. Although it is typically some form of vegetation, it also can be a pile of rocks, a cliff overhang, a hole in the ground or a small depression in the earth.

FOOD: All living beings require food. Food is anything an animal consumes and digests to provide energy. The animal uses energy provided by food to meet its daily needs. Animals require varying amounts of food at different times of the year. For example, an animal's food requirements generally increase during extremely cold weather, reproduction, migration or any other situation that cause

stress in the animal. Animal use the energy they get from food just as humans do: to stay warm, walk and run, and reproduce. If for some reason the quality or quantity of food is inadequate, animals will likely suffer from weakness and malnutrition. The actual amount of food required by an animal depends on a variety of factors: its age, sex, size, location and season of the year. In response to the cold they shed their fur and minimize their activities to conserve energy. Most of the birds build up internal food reserves in the form of fat deposits in certain parts of the body. These reserves act as an insulating layer and protect them from the cold. Birds have a natural way to insulate themselves from the cold. Their down feathers provide plenty of extra warmth that is necessary when temperature drops. On the other hand birds have a oil-producing glands. They preen to coat their feathers in this oil to waterproof and insulate their down feathers. While many animals hibernate during winter, so species of birds go into torpor. This hibernation like state allows birds to lower their body temp and rate to conserve body heat. Like hibernation, it helps them to survive the cold temperatures of winter. The shorter the distance an animal has to travel to secure its meal, the less vulnerable the animal is to predators (Kelvin *et al.*, 2009).

WATER: Water is a resource that most wildlife cannot live without. Birds have no sweat glands, so they need less water than mammals. However they do lose water through respiration and in their droppings. Most small water birds need to drink at least twice a day to replace the lost water. Birds get the liquid they need from their food and by drinking. Birds use water for preening and bathing. Water is a renewable natural resource and vital for all life. There is no substitute for water. Man uses water not only for drinking but also for a number of other activities like bathing, cooking, washing, irrigation, power generation and also used as a means for transportation. Our water requirement is fulfilled entirely by nature. We get water through rainfall and from oceans, rivers, canals, wells and wetlands. Whenever the watercycle in nature is disrupted, the ecological balance in nature is disturbed. Water is often wasted during its use. The rivers, canals and wetland like Ekana near the big cities get polluted due to industrial wastes or sewage which is thrown into them. Indiscriminate felling of plants by man to satisfy his greed has also upset the watercycle in nature. This has resulted in water shortage.

VEGETATION: Aquatic plants are called hydrophytes grow in water or in soil spermanently saturated with water. They are well distributed around the world. They are found in areas called littoral zone, which is the shallow part of the water where the sunlight could rich the soil. Aquatic plant can serve as food and habitat for organisms living in different bodies of water such as ponds, rivers, lakes and wetlands. Some of the major factors affecting the number of aquatic plants growing in a specific body of water include water depth, nutrient availability and type of soil. One of the most important features of aquatic plants that make them adapt to water is the formation of aerenchyma. Aerenchyma is the prenychmatous tissues with large intracellular air spaces. This tissue is used to store oxygen and transport it to other plant tissues. The stored oxygen is also used by leaves for buoyancy (Zhijun *et al.*, 2009). Wetlands flora can broadly be classified into submerged water plants, floating water plants, emergent water plants and riparian water plants.

Submerged water plants are 100 percent under water and provide food source for native fauna and habitat for invertebrates. They also possess filtration capabilities. These plants are aquatic plants which are rooted on the water's bottom but do not extend all the way to the surface. The leaves, stems and roots grow entirely under water although some of its leaves float. In addition they have flowers usually raised above the water surface. They usually grow near the shore up to the deepest part of the littoral zone. They can tolerate fluctuating water levels, shoreline waves and erosion. Some common examples of submerged plants are Pondweed, Hornwort, Ricefield, waternymph, Coontail and Waterthymes etc. Some species of submerged plants are known to have antipollution mechanisms. They are known to have antipollution mechanisms. They are often used for phytoremediation-the use of plants to remove, degrade the heavy metals containing contaminants.

Floating plants are found in slow moving water and have small roots. They are a source of food for avian species ex-Duckweed, Waterlily, Water hyacinth and water lettuce. They are responsible for creation of important habitat, food sources of wildlife, filtering and trapping soil etc. Floating plants are not rooted at the water's bottom, and the leaves and flowers float and move freely on the water's surface. Some of them are rootless. Others have roots with hair like structures that dangles from the underside

of the leaves. They usually grow in areas where there is a little wave in the water.

Emergent plants grow in above water and their roots submerged in marsh localities. Emergent plants are rooted on the water bottom and extend their leaves and stem to the surface. The leaves of these plants have spongy tissue packed with air spaces. They typically grow along the shore where the water is low. Some common examples of emergent plants are Wildrice, Cattails, Pickerelweed, floatingheart, Horsetail etc. A few species of emergent plants grow via stolons or rhizomes. Stolons also called runners, are stems that allow the plants to spread and reproduce. These stems enable emergent plants to overcrowd other species and allow them to endure periods of environmental stress. On the other hand rhizomes are modified stems, where the roots and shoots arise through the nodes. The shoots and roots serve as the overwintering buds of plants during cold weather.

Surrounding shrubs and herbs found along the

edges of wetlands or other water bodies are called riparian water plants. Common examples are *Acacia nilotica*, *Eucalyptus globulus*, *Abutilon indicum*, *Calatropis gigantea*. Riparian plants provide food and organic matter for terrestrial and aquatic organisms, moderate stream temperature, stabilize river banks, filter out sediments and function as a corridor for the movement of animals (Zhijun *et al.*, 2009).

TOPOGRAPHY: Wetlands are transitional zones. They are neither totally dry land nor totally under water; they have characteristics of both. The saturation of wetland soil determines the vegetation that surrounds it. Plants that live in wetlands are uniquely adapted to their watery (hydric) soil. Wetland plants are called hydrophytes. Seasonally dry wetlands or wetlands with slow moving water can often support trees and other sturdy vegetation. More frequently flooded wetlands have mosses or grasses as their dominant hydrophytes. Wetlands go by many names, such as swamps, peatlands, sloughs, marshes, muskegs, bogs, fens, potholes and

S. No.	Common Name	Scientific Name	Properties	Plant Type	Material Used
1.	Bulrush	<i>Scirpoides holoschoemus</i>	The stem are often used to weave strong mats, baskets and chair seats. Bulrushes may act as a filter, absorbing poisonous and toxic microorganisms thus help in to reduce water pollution.	Herb	Stem
2.	Sweet flag	<i>Acorus americans</i>	Used for the treatment of various ailments like nervous disorders, appetite loss etc.	Herb	Root
3.	Duckweed	<i>Lemno minor</i>	The whole fresh plant is used as a food and is some time used to make medicine. People take duck weed for swelling (inflammation) of the upper airways and yellowed skin due to liver problems (jaundice) and arthrities.	Herb	Whole fresh plant
4.	Tussock sedge	<i>Carex stricta</i>	The sedge can be used to reduce maintenance and hold ground on various shore lines. It is also used to treat bronchitis and catarrhs.	Herb	Root
5.	Cattail	<i>Typha latifolia</i>	The long flat leaves of the cattail are used specially for making mats and chair seats. It also helps in preventing anaemia, provides skin care, helps in cancer prevention, provides steady increase in energy.	Herb	Leaves
6.	Water hyacinth	<i>Eichhornia crassipes</i>	Water hyacinth is reported to have anti-inflammatory, antifungal and antibacterial functions. It can be used to treat cholera, sore throat and snake bites.	Herb	Leaves

wires. In more temperate climates, cypress trees often grow out of the still waters of fresh water swamps, spanish moss may hang from tree branches, willows and other shrubs may grow beneath the trees. Tiny water plants are called duckweed often form a green cover on the surface of the water. Alligators, frogs and snakes called water moccasins may swim among the plants. Reptiles and amphibians thrive in fresh water swamps because they are adapted to the fluctuating water levels. Some hydrophytes, such as mangroove trees can tolerate brackish water. Mangrooves are easy to recognize because of their tall, stilt-like roots, which hold the small trunks and branches of trees above water. Mangroove roots anchor sediment and help soil accumulate around them. They also help build sediment through their growth and decay (Zhijun *et al.*, 2009).

Conclusion

It could be concluded from the present study that the village ponds are an essential habitat for the water birds providing them nesting, feeding and breeding sites. So an effective way to save these birds is to save their habitat. The anthropogenic activities like garbage dumping, filling of ponds and discharge of sewage water negatively affect the bird population. There is a need for revival of village wetlands their management and maintenance of habitat. Wetland habitat provides a large scale development of water bird which provides essential functions for maintenance of environment. Such as indicators of water quality, pollination, soil fertility, pest control and rodent control etc. The increase in number of waterbirds is inversely proportional to the water pollution. The loss and degradation of wetlands worldwide has adversely affected waterbirds, which depend on wetland habitats.

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Conflict of interest: None

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