INTRODUCTION

Birds are one of the most populous life forms on the planet, and that biodiversity leads to a richness of life and beauty. Birds are ideal bio-indicators and useful models for studying a variety of environmental problems. The relationship between bird species distribution and vegetation was first investigated by Bond [1] found that the bird species distribution followed an individualistic pattern in a vegetation gradient in North American. Several authors have suggested that simpler population parameters with direct biological interpretation be used to quantify both vegetation and wildlife populations (Karr, [2]; James and Rathbun, [3]; Erdelen, [4]). Newton [5] Subsequent studies have confirmed the important role that the flora has on the distribution of bird species (James and Warner, [6]; Bibby et al., [7]; Rotenberry, [8]; Peck, [9]). In the present study, the avian fauna was studied at Tawa Reservoir and its surroundings in Hoshangabad District of Madhya Pradesh. The vegetation around the Tawa Reservoir is very rich with biological diversity. The area is traditionally rich in wild life due to their rich vegetation and the surrounding environment is very favorable for wild life. A large variety of birds and insects (butterflies and moths) are present in the surrounding area of the reservoir Joshi and Shrivastava [10]. The river provides feeding, roosting, nesting sites for many of bird species. The present paper will help to describe the vegetation structure in relation to avian fauna in the study area.

MATERIALS AND METHODS

2.1 Study area: - Tawa Reservoir is situated at Hoshangabad District of Madhya Pradesh, India (Fig-1). It is almost 1,815 meters long and 57.91 meters high which extend over approximately an area of 204 km² and located at 22°33'44” North latitude and 77°58’30” East longitude. Due to the Tawa Reservoir water availability is much better in Hoshangabad District. There are two canals supplying water to both right and left sides of the Tawa Reservoir. The left canal supplies water to Hoshangabad District for agriculture passing through Itarsi which located at a distance of about 33 km from the Tawa Reservoir. The river provides feeding, roosting, nesting sites for many of bird species. The present paper will help to describe the vegetation structure in relation to avian fauna in the study area.
During the time of heavy rainfalls this area gets flooded with water, the rest of the year local tribal cultivate a variety of crops.

**Station - B. Ghoghara Nallah** - It is situated 0.5Km away from LBMC (Left Bank Main Canal) here many times the nearby tribals are seen doing fishing.

**Station - C. Garden Area** - There are two gardens in Tawa Reservoir area, namely “Main Garden” and “Downstream Garden”. The main gardens spread over 5-6 acres area of land have wide variety of vegetation. The tourists visit Tawa-Dam and Tawa Resort; view the Reservoir from the garden area.

**Station - D. Ranipur Village** - Ranipur is near river (Down stream) of Tawa Dam. The soil of this region is sandy and is not suitable for cultivation but it has variety of vegetation.

**Station - E. Belawada Village** – Belawada has been chosen for bird study in agricultural area on moving from LBMC (Left Bank Main Canal). It is situated on the right side of LBMC at a distance of 6 Km.

### 2.2 Methodology:

The study was carried out over every seasonal period of the year. Regular field trip is continuing throughout these periods at intervals of two or five days. The line transects method Burnham et al., [11] used for survey. Identification and information about the vegetation were obtained from the local senior residents and the persons who have the knowledge of vegetation. The division in various categories, family wise classification and approx per hectare availability in the area were obtained from the forest department, Itarsi. For the behaviour study of birds, photography and videography were done by using DCR-DVD 610E Digital Video Camera Recorder (Sony Handycam, 40x Zoom).

### 3. RESULT AND DISCUSSION

It was observed that the study area have different vegetation types *i.e.* plant forms comprise of big trees, small trees, and shrubs, under-shrubs, herbs, climbers and grasses. According to our study, fifty six species of big trees, 26 species of small trees, 41 shrubs and undershrub species while, 29 herb species, 24 climbers and 21 grasses species were observed in chosen five study stations. It was noticed that **Leguminosae** was the most abundant family in which Babul (*Acacia arabica*, 25%), Palas (*Butea monosperma*, 35%), Bija (*Pierocarpus marsupium*, 25%), Astura (*Bauhinia racemosa*, 22%), Amltas (*Cassia fistula*, 25%), Panwar Chirotia (*Cassia tora*, 60%), Mahul (*Bauhinia vahlii*, 25%) were the dominant species. In relation to this Kumar [12] studies tree species diversity and distribution patterns in tropical forests of Garo Hills, Western Meghalaya, and Northeast India. The main vegetation of the region included primary forests (PFs), secondary forests (SFs), and sal (*Shorea robusta*) plantations, with 162, 132, and 87 tree species respectively. Sharma [13] observed vegetation structure, composition and diversity in relation to the soil characteristics of temperate mixed broad-leaved forest along an altitudinal gradient in Garhwal Himalaya. Qureshi et al., [14] reported vegetation and smooth coated otter survey in Chotiari wetlands complex, Sanghar, Sindh, Pakistan, various vegetation parameters like cover, frequency and density were recorded along each transect line using the line intercept method. Within vegetation stands a total of 66 species belonging to 50 genera and 23 families were identified. In all, 10 plant communities were constructed based on Summed Dominance Ratio (SDR). The high percentage of vegetation provide better habitat conditions to survive the avian fauna. Because, vegetation structure may impede the movement of foraging birds both physically Brodmann et al., [15] and behaviourally Desrochers and Hannon, [16] and may influence foraging efficiency through its effects on the delectability and accessibility of food items (*e.g.* Moorcroft et al., [17]; Whittingham and Markland, [18]. In the present study area sufficient vegetation was available that was required for the presence of birds.

During the study period along with different vegetation types avian activities were also recorded in all the five stations. It has been observed that Cattle Egrets were roosting and nesting on Neem (*Azadirachta indica*), Pipal (*Ficus religiosa*), Bargad (*Ficus bengalensis*), Babul (*Acacia Arabica*), Imli (*Tamarindus indica*), Nilgiri (*Eucalyptus spp*), Gulmohar (*Delonix regia*), and Ashoka (*Saraca indica*) trees. Similarly other birds like Crow, Indian pond heron, Black ibis, also seen spending most of the time on particular trees such as Black ibis was seen on Palas (*Butea monosperma*), Rose-Ringed Parakeet on fruit plants and Purple sunbirds were observed on flowering plants. Apart from this, the birds were seen on different vegetation in search of food such as Red wattled lapwing, Yellow wattled lapwing, Indian peafowl, Mayna, Greater coucal, Yellow wagtail, Citrini wagtail, Plain Prinia, Jungle babbler, Indian robin, Brahminy starling, Asian pied starling, etc were seen on different type of vegetation present in the study areas like small trees, herbs, shrubs and grass area in search for food items (**Fig-2 a to d**). In connection to this Mills et al., [19] observed an index of total vegetation volume was strongly correlated with breeding bird density at 31 sites in four separate studies conducted in southwestern shrub and desert habitats between 1974 and 1987. Daniels [20] reported the relationship between bird and woody plant species diversity.
in the Uttara Kannada district of south India. The birds depend on vegetation for nesting, roosting and food. Our result concluded that the vegetation of Hoshangabad district is the home of wide array of floral diversity, which has multifarious uses as food, medicine, timber, etc. The area surrounded by the rivers and canals, which receive water throughout year-round. The different varieties of vegetation provide favorable habitat conditions to survive the avian fauna in the study area. It was also observe that the sufficient vegetation was available in the study area that was required for the presence of birds i.e. nesting, roosting and food.

4. CONCLUSION:-
This study has been undertaken to draw attention to the avifauna of Tawa Reservoir and surrounding area in Hoshangabad district. In conclusion it was found that the vegetation structure of all the five stations under the study area was almost similar. Rich vegetation of this area i.e. dense tree, herbs, shrub, climbers and grasses provides suitable atmosphere for birds as food, nesting and roosting sites. But apart from this, the anthropogenic activities such as use of chemicals in agriculture land and logging will affect adversely the bio-diversity of birds at this region in future.

5. ACKNOWLEDGMENT:- We express our gratitude to Mr. M. M. Kashyap, former S.D.O and Sub-Engineers of Tawa reservoir for providing valuable information’s and maps of Tawa Reservoir area. We gratefully acknowledge the support and contribution received from the forest department of Itarsi and Hoshangabad for helping us during the study period.

6. REFERENCES

Source of support: Nil; Conflict of interest: None declared