# ASSESSMENT OF NOISE LEVEL IN THE VICINITY OF BIRDS HABITAT AT INDORE CITY

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#### ABSTRACT

Noise - the unwanted sound is a major factor of dissatisfaction with the environment in urban residential areas. In general, the noise pollution affects the auditory system, nervous system, circulatory system, human physiology and the performance behavior. Therefore, the assessment of noise originating infrastructures and industries, which are the most widespread noise source of today's developed world, is of foremost important in order to reduce the noise level at source. The present study deals with the special source of noise, i.e., noise caused by various activities of avi-fauna in Indore City. In fact, chirping and flapping of variety of birds including eagles, owls, pigeons and kingfishers etc. are the major source of noise pollution. Therefore, present study has been focused on the assessment of noise level in the vicinity of birds habitat where thousands of birds, nestled on tree branches and in pond, creating various sounds with the chirping and flapping all around. The noise measurements have been carried out near railway station using sound level meter and sound book for 24 hours. The results show that the noise level, Leq varies from 74.2 dBA to 77.2 dBA, which has been found to be quite above the prescribed permissible level.

Keywords: Birds Habitat, Noise Assessment, Singing Noise, Chirping Noise and Flapping Noise

## INTRODUCTION

Noise - the unwanted sound is a major factor of dissatisfaction with the environment in urban residential areas. In general, the noise pollution affects the auditory system, nervous system, circulatory system, human physiology and the performance behavior. Therefore, the assessment of noise originating infrastructures and industries, which are the most widespread noise source of today's developed world, is of foremost important in order to reduce the noise level at source. Every day, early in the morning, about an estimated 1, 00,000 parrots gather at a Indore city temple to have their fill with sorgam grain. Total registered vehicles in Indore city are around 8, 75000 (2007), out of this approx. 6, 75000 are twowheelers. At present (2012) total vehicles in Indore city is approx. ten lakhs. Urban birds sing differently and at a higher frequency than woodland birds in an effort to penetrate the wall of constant noise produced by traffic, machines and human activity. These study findings have recently been published in the journal PLoS One by Emily J. Mockford et al., (2011). And about hearing ranges for several birds' species have been measured in the laboratory by Brand and Kellogg (1939a, b) and Edwards (1943). Values ranged from 60Hz to 15,000 Hz, which is well within the hearing range of man (20 to 20,000 Hz; Spear 1966). Even if such sounds were heard by birds and caused a frightening response, they might not be practical for use, because of ultrasonic frequencies diminish much more rapidly than audible sounds with increasing distance from their source (Spear, 1966; Stewart, 1974 and Blokpoel 1976). Ultrasonic frequencies leave shadows, if sound waves are obstructed (Spear, 1966 and Fitzwater, 1970). Birds also habituate to many sounds that are heard repeatedly, thus the devices would be unlikely to produce longterm control.

The present study deals with the special source of noise, i.e., noise caused by various activities of avifauna in Indore City. In fact, chirping and flapping of variety of birds including eagles, owls, pigeons and kingfishers etc. are the major source of noise pollution.

## MATERIALS AND METHOD

The study has been focused on noise pollution caused by different varieties of birds near bird's sanctuary. Therefore, the noise measurement has been performed nearby locations of affected areas. The ambient noise level study was carried out in 2012, using Bruel and Kjaer, Denmark, modular precision sound level meters (Model 2231), Soundbook (multichannel instrument) at various locations during 24 hrs.



Source: R. Dooling (2002): parrot frequency limits



Figure 1: Campus of the office of the Superintendent of Police (SP), Indore at 10:30 pm. Parrots are sleeping with inadequate space for proper staying. Sometimes they are fighting among each other for the space. The noise pollution increases 5 dB (A) in the evening and morning hours due to bird chirping. These trees are newly grown, but due to overloading of birds, they might get damaged very soon as shown in the figure below.



Figure 2 and 3: Due to overloading of parrots on the trees, the growth of trees inside the city is affected



Figure 4: eagles/ baj/chil are sleeping on the tree of one side of road of Indore Railway station



Figure 5: At the Indore Railway Station, Parrots are sleeping at on the other side of trees. There is no mixing of birds in the night



Figure 6 and 7: Due to overloading, the top portions of the trees are damaged and SLM at Indore airport



Figure 8: Sonogramme of parrot chirping

## **Research Article**

This is a good example of bio-diversity, big birds like eagle, chil etc. are completely sleeping on the tree on one side of road, while 100% parrots are sleeping on the tree of other side road. In an interview of shopkeepers, they are saying that from our childhood we are absorbing the same behavior of birds, in the day all birds will sit together, but in the night, they don't like sharing.

CRRI has recorded the sound of different birds in 2010; this Sonogramme clearly shows in fig. no.1, that the high frequency limit of Indian parrot is approx. 6.5 khz, which is similar to the study of R. Dooling (2002).

# **RESULTS AND DISCUSSION**

The result of noise data near railway station where parrots are in lakhs with respect to  $L_1$ ,  $L_{10}$ ,  $L_{50}$ ,  $L_{90}$ ,  $L_{99}$ ,  $L_{eq}$ ,  $M_{axL}$ ,  $M_{inL}$  etc. are shown in Table No.1 for Indore city. The  $L_1$  ranges from 73.9 dBA to 87.6 dBA; the  $L_{10}$  ranges from 64.5 dBA to 80.6 dBA; the  $L_{50}$  ranges from 61.4 dBA to 76.2 dBA; the  $L_{90}$  ranges from 56.4 dBA to 69.3 dBA and the  $L_{99}$  ranges from 46.9 dBA to 67.8 dBA. The values of  $L_{eq}$  ranges from 74.2 dB (A) to 77.2 dB (A). The comparison of average Leq with the permissible standard ( $L_{eq} = 55$  for day time) is quite above. However, at night ( $L_{eq} = 45$  for day time) is also found to be above the permissible limit. Photo 1-7 has shown the real image and their positions of living particular in the night.

Time	L1	L10	L50	L90	L99	SEL	LEQ	MaxL	MinL
00-1.0	74.8	70.3	66.6	66.3	62.8	107	68.2	89.8	60.2
1.0-2.0	75.1	68.6	64.6	57.9	48.6	106.2	66.2	92.5	48.2
2.0-3.0	74.8	67.3	63.9	56.4	46.9	97.5	65.6	85.6	45.9
3.0-4.0	73.9	64.5	61.4	55.3	52.8	100.5	62.9	88.4	51.4
4.0-5.0	74.8	67.8	63.2	57.6	54.2	101.1	65.8	90.4	53.8
5.0-6.0	75.8	69.8	65.4	62.1	59.4	111.2	67.1	100.4	58.8
6.0-7.0	84.3	79.3	72.8	65.4	57.8	111	74.2*	96.8	58.3
7.0-8.0	81.3	76.3	69.3	63.3	58	105.6	72.3	89.4	58
8.0-9.0	86.7	79.7	74.7	67.2	62.7	112.2	76.8	99.2	56.9
9.0-10	84.3	78.8	72.8	68.3	64.8	111	75.5	94.4	62
10.0-11.0	86.3	79.8	75.8	69.3	67.8	96.1	77.4	89.1	67.7
11.0-12.0	87.6	80.3	76.2	69.3	67.7	96.4	77.3	89	62
12.0-13.0	81.8	76.8	71.3	66.3	62.8	109.6	74.2	109.2	59.5
13.0-14.0	82.8	77.3	72.4	67.8	64.3	110.8	75.4	104.8	60.6
14.0-15.0	82.3	77.8	72.3	68.3	65.8	110	74.5	95	62.4
15.0-16.0	81.1	77.3	73.6	68.8	66.8	110.5	75.1	106.2	64.6
16.0-17.0	83.8	77.8	74.1	68.3	65.3	110.4	75	92.2	60.6
17.0-18.0	83.3	77.8	73.3	69.3	66.3	109.6	75.3	98.2	63.8
18.0-19.0	86.8	80.8	74.8	69.3	67.3	99.5	77.2*	89.9	65.8
19.0-20.0	85.9	79	73.6	69.9	64.2	110.4	76.2	107.7	64.5
20.0-21.0	83.8	78.3	72.3	67.3	63.8	106.8	75.9	107.4	59.1
21.0-22.0	84.3	78.3	72.8	67.8	63.8	107.1	74.4	107.4	59
22.0-23.0	84	75.4	72.2	67.1	63.7	107.3	73.1	107.3	58
23.0-0.00	78.8	74.8	69.2	66.3	64.3	110.1	70.3	94	57.1

 Table 1: Noise Monitoring Near Indore City Railway Station

\* Due to Birds Singing



Figure 9: Diurnal Variation of Leq Values at different locations of Indore

## CONCLUSION

It is planned that the new proposed township near Indore should have adequate tree cover so as not only to sustain the excellent growth of these birds but also to create an initiating environment to provide ample space for them. It will also provide the space for these birds of Indore city. Habitation will provide food to these birds in non-fruit bearing seasons. The noise level at the Indore city will decrease due to upcoming township near to the city due to shifting of parrots.

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