सूचना का अधिकार
RIGHT TO INFORMATION

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

BY SPEED POST

No. WII/RTI/CPIO/2019-20 (Qtr-IV)

Date: 28 February, 2020

To,

Mr. Harjot Singh Oberoi
S/o S.Harvinder Singh
Oberoi resident of House
No. 64, Sukhna Enclave, WWRW Society Block-C,
Kaimbwala Road, Kansal,NAC Nayagaon. Distt.
SAS Nagar. Punjab.
Mobile no. 9781088880

Sub.: Information under RTI Act, 2005–reg.

Ref.: Your RTI application dated 10.02.2020

Dear Sir,

Please refer to your application cited above under RTI Act, 2005. In this context, point-wise response to your queries is given below:

Information Sought under RTI	Reply
1. It is understood there was joint census in 2010 in regard to the Sukhna Wildlife Sanctuary in 2010, under the guidance of WII. Give the confirmation of numbers of Leopard in the area was to be done by camera traps. Please confirmation whether the confirmation on Leopard population was given by WII to Sukhna WLS, based on camera trap confirmation. Please. provide the "camera trap" photographs, if any. 2 Please provide the latest census to include following information regarding Leopard (panthera): a. Whether there are any "camera trap" photographs after 2010 in respect of Leopard (Panthera). Please provide the "camera trap" photographs, if any. b. The total current population of Leopard (Panthera).	Please see Annexure-I.

RTI Dispose of on 28/02/2020

If you are not satisfied with the aforesaid reply, you may appeal to the **Appellate Authority i.e. "Director, Wildlife Institute of India, Post Box 18, Chandrabani, Dehradun – 248 001, Ph. 0135-2640910".**

Thanking you,

28/02/2020

(Dr. Anju Baroth)
NO & CPIO (RTI)

Encl.: as above.

28/2/2020
3:-PM

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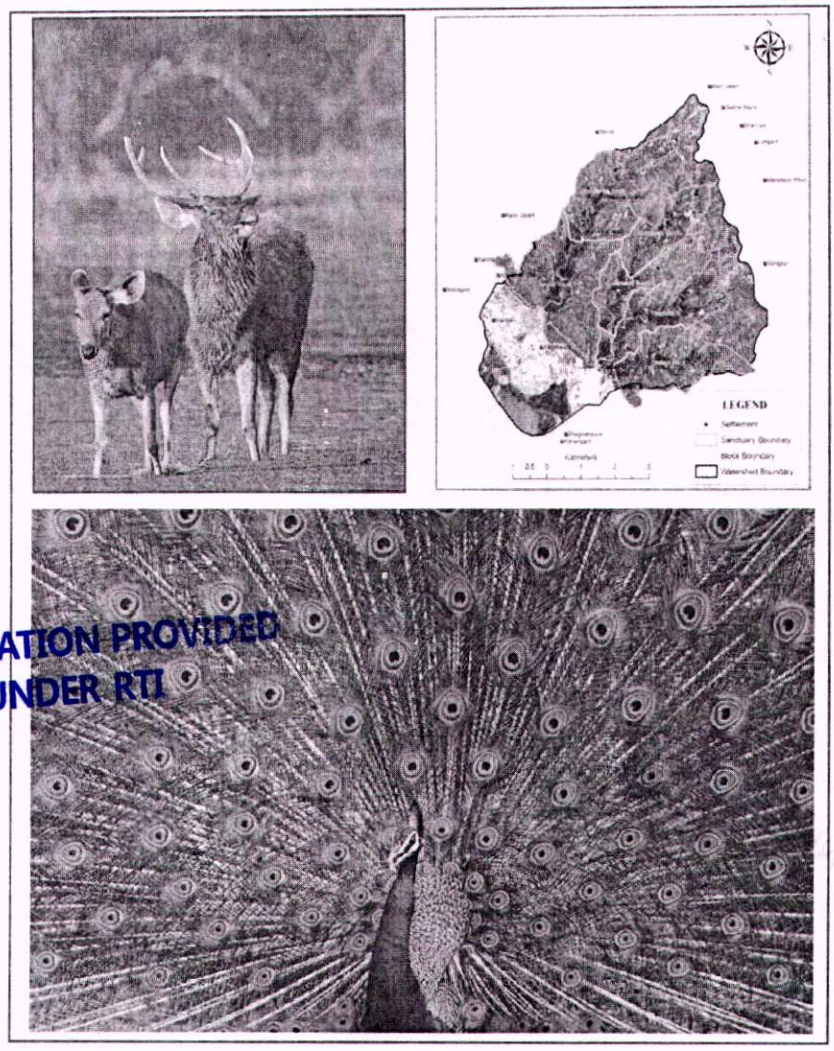
WILDLIFE CENSUS OF SUKHNA WILDLIFE SANCTUARY CHANDIGARH

9th – 11th December, 2010



Department of Forest & Wildlife, UT Administration Chandigarh

With Technical Backstopping From

Wildlife Institute of India, Dehradun

And Active Participation From

Avian Habitat & Wetland Society, Chandigarh
People for Animal, Chandigarh Unit
Yuvsatta Chandigarh
Punjab University

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

WII No. TR 2011/007

(442)

WILDLIFE CENSUS OF SUKHNA WILDLIFE SANCTUARY, CHANDIGARH

9th – 11th December, 2010

By

Shri. Santosh Kumar, IFS
Conservator of Forests, Chief Wildlife Warden & Director (Environment)

Shri. Saurabh Kumar, IFS
Deputy Conservator of Forests

Experts from Wildlife Institute of India, Dehradun

Dr. A. K. Bhardwaj, Scientist – F
Dr. Karthikeyan Vasudevan, Scientist – D
Dr. K. Sivakumar, Scientist – D
Dr. Gautam Talukdar, Scientist – C
Dr. Bilal Habib – Scientist - C
Dr. P. Pal, F.T.O

25th February 2011

Citation: Habib, B., Bhardwaj, A. K., Vasudevan, K., Sivakumar, K., Talukdar, G., Kumar, S. and Kumar S. (2011). Wildlife Census of Sukhna Wildlife Sanctuary, Chandigarh. Wildlife Institute of India and Department of Forest and Wildlife, UT Administration, Chandigarh. TR 2011/007, Pp – 19

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

INTRODUCTION

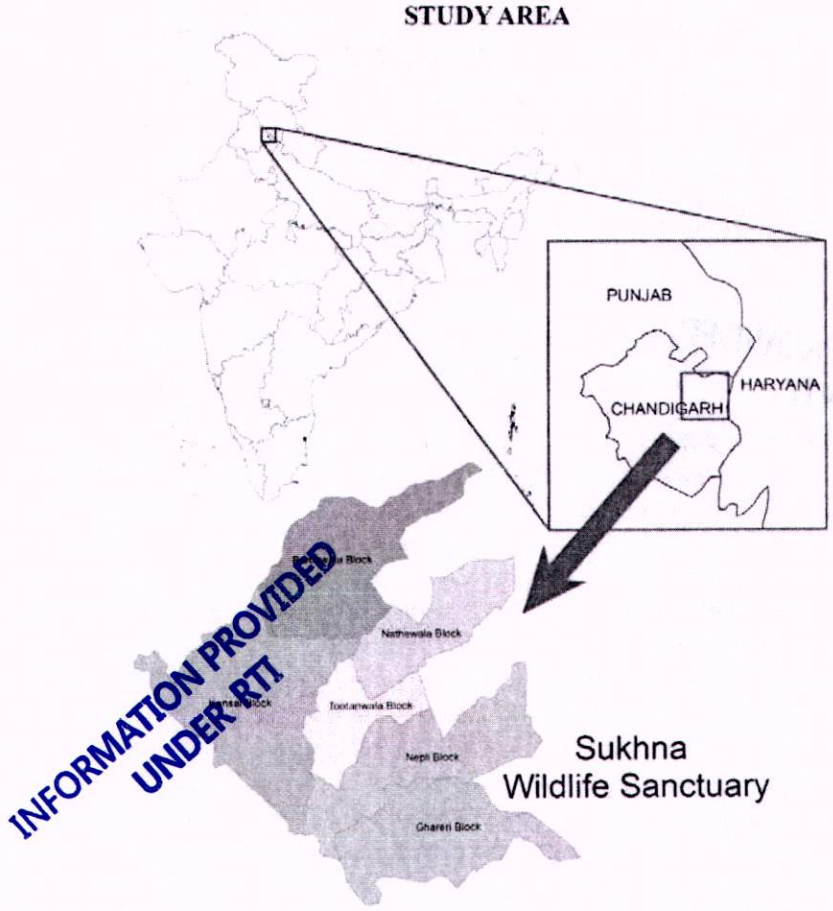
Sukhna Wildlife Sanctuary spreading over an area of 2542 ha is situated 1 Km in the North-East of Sukhna Lake. It forms the part of Sukhna lake catchment area falling in Shiwalik hills. Shiwalik hills are ecologically sensitive and geologically unstable and thus are highly prone to soil erosion during rains. The soil in the Shiwalik is sandy, embedded with pockets of clay which is highly susceptible to erosion by surface run off. Sukhna Wildlife sanctuary is located in Semi-Arid Biogeographic Zone and falls in biotic province 4A – Punjab Province.

History of Sukhna Wildlife Sanctuary: In Chandigarh, Sukhna Lake was constructed in 1958 across the Sukhna Choe, a seasonal stream flowing down the Shiwalik hills, to enhance the aesthetic appeal of the city and as a major tourist attraction. The total catchment area of this manmade lake is 4,207 ha. The Shiwalik hills are ecologically sensitive and geographically unstable and are highly prone to erosion during rains.Therefore after the initial year of the construction of lake the siltation rate was very high due to soil run off from the hilly catchment area. By 1988 66% of original water holding capacity of the lake was lost due to siltation in 1988.

The alarming rate of soil erosion and fast siltation of the lake forced the erstwhile Punjab Government to take various steps to reduce the silt inflow to the lake from the catchment area. One such measure was to acquire the hilly catchment area of the lake. During 1960s 25.42 Km^2 of the land was acquired for the soil and moisture conservation measures. This land vests with the Union Territory of Chandigarh as per section 48(5) of the Punjab Reorganization Act, 1966. In order to minimize & control soil erosion from hilly catchment area, various vegetative and engineering methods were adopted by Forest Department. These soil & water conservation measures under-taken on sustained basis yielded very good results and the rate of siltation of the lake has reduced drastically from 150 $tonha^{-1}y^{-1}$ to 3-5 $tonha^{-1}y^{-1}$. Soil conservation measures supplemented with massive afforestation led to the development of very good forest in hilly catchment area which is now an ideal habitat for wide variety of fauna. This area (25.42 Sq. Kms) due to its "ecological faunal, floral, geomorphologic, natural and zoological significance for the purpose of protecting, propagating and developing wildlife and its environment" was declared as Wildlife Sanctuary vide Chandigarh Administration Notification No.694-HII (4)-98/4519 dated 6th March, 1998. Figure 1 shows the location map of SWS with different management units.

Geology: In SWS, the Shiwalik range extending over a length of 2400 km and a width of about 24 km all along the Himalayas represents the most fragile mountainous region. Most of the hills are represented by eroded ravines and barren slopes leading to enormous quantity of soil being eroded which in turn, result in rise on river beds and siltation of the water bodies. The Shiwalik of Chandigarh are fragile and the composition of the deposits shows that they are alluvial detritus from subarial wastes of the inner mountainous range, swept down by the numerous rivers and streams and deposited at the foot hill. These hills composed mainly of clay sand, sand rocks, poorly bedded sandstones and conglomerates are more or less homogenous along g their entire length and are believed to be deposited contemporaneously. The soil depth varies from shallow to deep. Texture is sandy to clay loam, Organic carbon from 0.1 to 1.1 % and the pH ranges from 5.3 to 8.4.

Figure 1: Geographic Location of SWS (Study Area) Showing the Different Management Units



Based on its history, biogeographic affinities and the ecosystem services it provides, the priority areas of management for SWS are (i) soil and moisture conservation; (ii) restoration of biodiversity; (iii) conservation of flora and fauna. The department is actively engaged for all the three major activities at Sukhna Wildlife Sanctuary.

The sanctuary has extensive drainage and road network. Figure 2 shows the roads and drainage network of the SWS and Table 1 shows the area under different categories based on GIS calculations. The area calculated by this technique is always less than the actual area. The area calculated is 24.65 Km^2 where as the actual area of the sanctuary is 25.42 km^2.

Figure 2: Drainage and Road Network of SWS

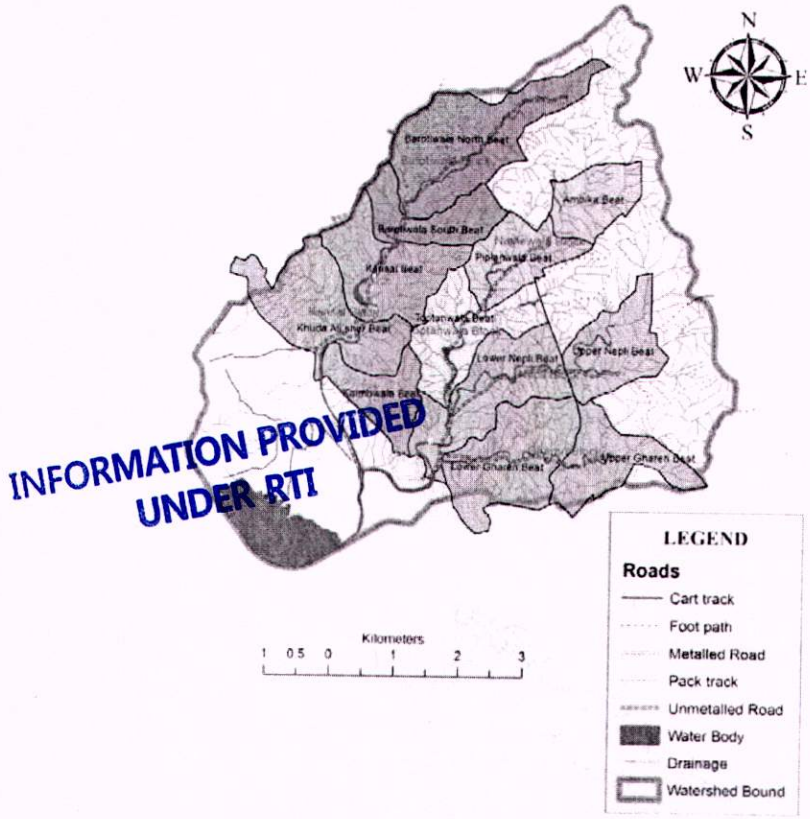


Table 1: GIS Area Statistics of Sukhna Wildlife Sanctuary, Chandigarh

Sanctuary Blocks	Area (Sq km)	Drainage (km)	Road (km)
Ghareri	4.42	32.04	3.10
Nepli	4.34	41.25	11.75
Tootanwala	2.04	25.34	3.86
Kansal	6.28	60.92	15.46
Nathewala	2.74	22.08	2.92
Barotiwala	4.83	44.28	7.39
TOTAL	24.65*	225.92	44.48

*** The area estimate is based on GIS Calculations and is less than the actual area. The actual area of the sanctuary is 25.42 Sq. Kms**

Soil & Moisture Conservation

A two pronged strategy has been adopted to conserve soil & moisture in the SWS watershed depicted in Figure 3 along with Sukhna Lake and Chandigarh Township.

Figure 3: Watershed Map of SWS Showing the Different Management Units along with Sukhna Lake and the Chandigarh Township

a) Vegetative Methods:

Massive afforestation including direct seed sowing in contour trenches was carried out on hill slopes on sustained basis to conserve soil. Soil conserving species like Arundo-donex was planted along choe banks to train the choe and to stabilize the choe banks. Special emphasis has

been laid to plant and seed sowing of indigenous species of trees, shrubs and grasses. The density of vegetation is very good.

Plate 1: Photograph showing dense vegetation of SWS

***b) Engineering Methods*:**

190 silt retention dams, more than 200 check dams, spurs, revetments and brushwood structures have been constructed to conserve the soil and to retain the silt in the water-bodies created behind silt retention dams. Fully silted up water bodies have been de-silted on regular basis to revive its silt retention capacity. The silt taken out from silted up water bodies has been dumped at appropriate locations in the sanctuary itself and soil conserving grasses, herbs & shrubs are planted over it before onset of Monsoon every year.

The aforementioned soil and moisture conservation measures have led to a remarkable improvement in the underground water regime. Due to series of water-bodies in these seasonal nallahs (Choes), there is continuous flow of seepage water throughout the year in few nallahs. The available [illegible] of moisture is responsible for good vegetation in the sanctuary.

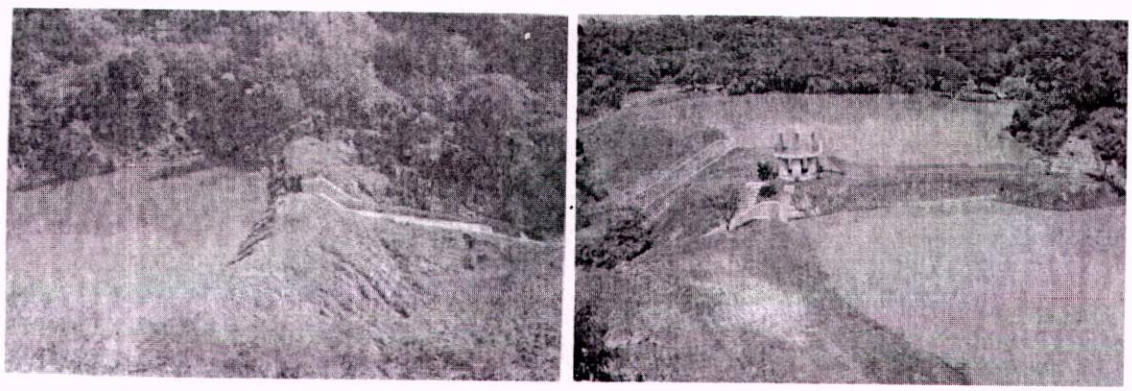


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Plate 2: Photograph showing Water and Soil Conservation Work at SWS

Major Threats to PA: Due to intensive and extensive patrolling by the staff, to combat the commencement of the forests and wildlife offence at source and in transit in the in the protected area, not a single incidence of poaching or wildlife offence has been reported from the sanctuary till date. Anyhow following are the major threats to the sanctuary

1. Forests Fire: Forest type is Tropical dry Deciduous Forests which are highly prone to the forests fire during the summer season.

2. Habitat Fragmentation: The habitat fragmentation of the forests habitat in the areas adjacent to the Sukhna Wildlife sanctuary should be cheeked.

3. Shooting Range: Fringing from the adjoining army firing range should be checked.

4. Stray Dogs: The small population of the stray dogs should be checked in the sanctuary these chase the wild animals (ungulates) and often prey on their young ones.

5. Weeds: Lantana, in weed form, has been completely removed from the protected area, to avoid the reoccurrence of the same department removes regularly.

WILDLIFE CENSUS IN SUKHNA WILDLIFE SANCTUARY

Department of Forests & Wildlife, Chandigarh Administration carried out Wildlife Census Exercise for the first time in association with the Experts of Wildlife Institute of India, Dehradun. This is the first ever organized census being carried for SWS.

The SWS has large number of water holes, grazing grounds and good plantations including natural regeneration of indigenous species provide an ideal habitat for the wildlife in the Sanctuary. The Department of Forests & Wildlife, Chandigarh Administration for better management of the Protected Area, carried out Wildlife Census first time, so as to ascertain the diversity of the faunal population and species richness in the Wildlife Sanctuary in association with the Wildlife Institute of India, Dehradun.

The Wildlife Census in Sukhna Wildlife Sanctuary was carried out from 9th to 11th December, 2010, with the technical assistance of Wildlife Institute of India, Dehradunby involving following stakeholders:-

1. Department of Botany, Panjab University
2. Department of Zoology, Panjab University
3. Avian Habitat & Wetland Society, Chandigarh
4. People for Animals (PFA) – Chandigarh Unit
5. Yuvsatta – Chandigarh
6. St.Kabir School

In order to carry out the Wildlife Census, eight groups comprising of five number each was formed (Annexure-I). The groups collected the data, observations from the eight transects identified by the experts of Wildlife Institute of India, by using following methodology:-

1. Line Transect Sampling for Ungulates & Other Mammals,
2. Estimation of relative abundance of animals based on Pellet/dung deposited,
3. Bird Count Using Variable Radius Point Count Method.
4. Leopard & other Carnivore Sign Encounter Rate.

During census, training was given by six number team of Wildlife Institute of India headed by Prof. A.K. Bhardwaj, Scientist-F, Department of PA Network, WM & CE, Wildlife Institute of India. During the Wildlife Census exercise equipments like GPS, Range Finders, Camera trap, prismatic compass, etc. were used.

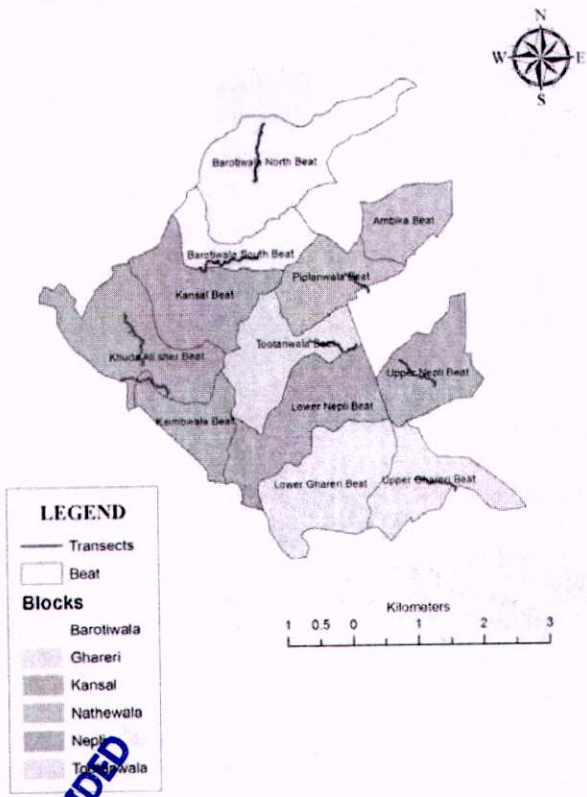
Wildlife Census Techniques and Results

A major management challenge in conserving wildlife species is monitoring their populations, which is crucial both to assess the success of management and to formulate future management strategies. Monitoring wildlife populations helps us better understand various ecological processes at landscape and ecosystem levels. Several investigators have conducted surveys to estimate the densities or numerical abundance of various wildlife populations in India (Schaller, 1967; Berwick, 1974; Johnsingh, 1983), Nepal (Seidensticker, 1976; Dinerestein, 1979; Tamang, 1982) and Sri Lanka (Eisenberg and Lockhart, 1972). All these studies used methods such as belt transects, vehicle transects, block counts roadside counts and indirect evidences such as signs and tracks, pellet counts and call counts which do not have a strong theoretical basis and as a consequence, do not formally and statistically address critical problems such as estimation of probabilities of detecting animals within the surveyed area and representatively sampling animal populations that may be non randomly distributed in space (Karanth and Sunquist, 1992).

In the last decade of advancements in the wildlife research along with the developments in software and their applications in wildlife for using statistically and biologically robust methods, only a few recent studies in India (Karanth and Sunquist, 1992; Varman and Sukumar, 1995; Khan *et al.*, 1996; Raman *et al.*, 1996; Karanth and Nichols, 1998, 2000; Ahrestani, 1999; N. S. Kumar, 2000; Biswas and Sankar, 2002; Koenen*et al.*, 2002; Jathanna*et al.*, 2003) have used methods rooted in distance sampling and analytical procedures (Burnham *et al.*, 1980; Buckland *et al.*, 1993, 2001, 2004) and attempted to generate more reliable estimate of animal densities under varied environmental conditions.

Sukhna Wildlife Sanctuary is small protected area very close to one of the major metro city – Chandigarh spread in an area of 25.24 km2. The sanctuary is subdivided into 8 beats. The present report details the two day effort for having the first hand information on various species present in the sanctuary and abundance or density of few common species.For effective census of the area within two days the sanctuary beats were used as basic units for the survey. In each beat 1 km long transect was used for monitoring ungulates and birds. In same beat trails were used for sign surveys (Figure 4).

Figure 4: Location of 1 km Long Transect on Map, used for Monitoring Ungulates and Birds in Different Beats of SWS



Distance Sampling

Methods of estimating population abundance have been developed andthe most recent is the distance method, which is based on object distancesdetected from points or lines. In distance sampling one traverses a randomlychosen path called line transects and measures the perpendicular distance fromthe path to the object detected. Estimates of density and abundance proved tobe efficient even if some of the objects went undetected.

Assumptions

Although many of the objects of interest may go undetected unbiased estimates of density can still be made if the following conditions andassumptions are met (Buckland et. al., 1993).

- It is assumed that a population comprises objects of interest that are distributed in the area to be sampled according to some stochastic process. It is critical that the transect lines are placed randomly with respect to the distribution of objects.

- The observer must be able to recognize and correctly identify the objects of interest. The distances from the line to the identified objects must be measured without bias. Objects

directly on the line are always detected with certainty. Objects are detected at their initial location.

Survey efforts

16 teams comprising of staff members of forest department and local NGO's surveyed the Sukhna Wildlife Sanctuary for two days covering distance of 16 kms for ungulates, 16 kms for monitoring birds and 32 kms for carnivore sign survey. Total efforts accounted for 64 kms by 40 people which equals to 2560 kms of survey efforts. The location of transects on map of sanctuary is shown in Figure 4.

Species Listing

During the two days survey period the survey team's encountered 09 species of mammals and 63 species of birds. The resident mammalian species listing is given in table below:

Table 2: Mammalian Species with their WPA and IUCN status reported during survey

S. No.	Common Name	Scientific Name	WPA Status	IUCN Status
1	Leopard	*Panthera pardus*	Schedule I	Near Threatened
2	Sambar	*Rusa unicolor*	Schedule III	Vulnerable
3	Chital	*Axis axis*	Schedule III	Least Concern
4	Wild boar	*Sus scrofa*	Schedule III	Least Concern
5	Indian Porcupine	*Hystrix indica*	Schedule IV	Least Concern
6	Indian Pangolin	*Manis crassicaudata*	Schedule I	Near Threatened
7	Blacknaped Hare	*Lepus nigricollis*	Not Listed	Least Concern
8	Golden Jackal	*Canis aureus*	Schedule II	Least Concern
9	Gray Langur	*Semnopithecus entellus*	Schedule II	Least Concern

Nine species of mammals were reported during the survey period from the SWS. Two species are in Schedule I, two in Schedule II, three in Schedule III and one in schedule IV. The presence of all these mammalian species suggests the potential of SWS as one of the important wildlife and biodiversity conservation area. The presence of top predator such as leopard which requires enough prey for its sustenance suggests the importance of Sukhna and its rich biodiversity.

Other than the species presented in the table above, SWS harbors rich biodiversity. The species so far reported from the sanctuary includes:

i) **Mammals**: The following species is reported: sambar, spotted deer (chital), pangolin (ant eater), wild boar, jackal, small Indian civet, jungle cat, porcupine, Hanuman langur, rhesus monkey, Indian hare, common mongoose, and three-striped palm squirrel.

ii) **Birds**: There are more than 150 varieties of birds including aquatic birds. Prominent among them are peacock, red jungle fowl, grey partridge, cuckoos, night jars, golden

oriole, kingfisher, swifts, hoopoes, hornbills, barbets, woodpeckers, rollers, barn owls, parrots, doves, jacanas, plovers, coots, hawks, geese, swan, ducks, grebes, black drongo, tree pie, jungle crow, bulbul, hill myna, koel, bee-eater, common myna etc.

iii) **Reptiles**: There are varieties of reptiles including snakes like cobra, rat snake, Common krait, Russell's viper, Indian python and common monitor (Gho), freshwater turtle etc.

iv) **Insects**: Wide variety of butterflies, moth, honey-bee and other micro-organisms are in abundance.

Birds of Sukhna Wildlife Sanctuary

During two days of survey 63 species of birds were reported from the sanctuary. The number of bird species expected from SWS can be much more than this. Further surveys are required to know the exact bird species diversity of SWS. The complete bird list is given in Table 3 below:

Table 3: Bird Species reported during survey from SWS

S. No.	Common Name	Scientific Name
1.	Little Grebe	*Tachybaptus ruficollis*
2.	Little Cormorant	*Phalacrocorax niger*
3.	Darter	*Anhinga melanogaster*
4.	Red-vented Bulbul	*Pycnonotus cafer*
5.	Himalayan Bulbul	*Pycnonotus illeucogen*
6.	Chiffchaff	*Phylloscopus collybita*
7.	Blue Throated flycatcher	*Cryonis rubeculoides*
8.	Great Tit	*Parus major*
9.	Tailor Bird	*Orthotomus sutorius*
10.	Lesser Whitethroat	*Sylvia curruca*
11.	Hume's Lesser white throat	*Sylvia althaea*
12.	Oriental White-eye	*Zesterops palpebrosus*
13.	Indian Peafowl	*Pavo cristatus*
14.	Black Drongo	*Dicrurus macrocercus*
15.	Red Billed blue magpie	*Urocissa erythrorhyncha*
16.	Dark sided flycatcher	*Muscicapa sibirica*
17.	White browed fantail flycatcher	*Rhipidura aureola*
18.	Greenish warbler	*Phylloscopus trochiloides*
19.	Plum headed parakeet	*Psittacula cyanocephala*
20.	Rose ringed parakeet	*Psittacula krameri*
21.	Red junglefowl	*Gallus gallus*
22.	Green Bee-eater	*Merops orientalis*
23.	Common Hoopoe	*Upupa epops*
24.	Small Minivet	*Pericrocotus cinnamomeus*

25.	Lemon Rumped warbler	***Phylloscopus chloronotus***
26.	Red throated flycatcher	***Ficedula parva***
27.	Dark throated thrush	***Turdus ruficollis***
28.	Rock Pigeon	***Columba livia***
29.	Alexandrine Parakeet	***Psittacula eupatria***
30.	Long tailed minivet	***Pericrocotus ethologus***
31.	Greater coucal	***Centropus sinesis***
32.	Humes Lesser white throat	***Sylvia althaea***
33.	Jungle babbler	***Turdoides striatus***
34.	Purple sunbird	***Nectarinia asiatica***
35.	Plain prinia	***Prinia inornata***
36.	Tickll's blue flycatcher	***Cyornis tickelliae***
37.	Brown-headed barbet	***Megalaima zeylanica***
38.	Tree pipit	***Anthus trivialis***
39.	Shikra	***Accipiter badius***
40.	Verditer flycatcher	***Eumyias thalassina***
41.	White throated fantail flycatcher	***Rhipidura albicollis***
42.	Brown capped Pygmy wpecker	***Dendrocopos nanus***
43.	White breasted waterhen	***Amaurornis phoenicurus***
44.	Grey Wagtail	***Motacilla cinerea***
45.	Common Moorhen	***Gallinula chloropus***
46.	White throated Kingfisher	***Halcyon smyrnensis***
47.	Grey Bushchat	***Saxicola ferrea***
48.	Ashy Prinia	***Prinia socialis***
49.	House sparrow	***Paser domesticus***
50.	Black rumpedflameback	***Dinopium benghalense***
51.	Large billed Crow	***Corvus macrorhynchos***
52.	Common Rose pinch	***Carpodacus erythrinus***
53.	Spanyledtrongo	***Dicrurus hottentottus***
54.	White Browed wagtail	***Motacilla maderaspatensis***
55.	Grey Breasted prunia	***Prunia hodgsonii***
56.	Spotted Owlet	***Athene brama***
57.	Pond heron	***Ardeola grayii***
58.	Grey headed warbler	***Seliercus xanthoschistos***
59.	Grey Hornbill	***Ocyceros birostris***
60.	Yellow bellied fantail flycatcher	***Rhipidura hypoxantha***
61.	Wall creeper	***Tichodroma muraria***
62.	Redheaded Vulture	***Sarcogyps calvus***
63.	**Blue Whistling Thrush**	***Myophonus caeruleus***

Data Structure

Based on two days of survey, the data generated was not statistically robust to come with estimate of numbers (abundance) for most of the species. Only two species namely Sambar and Peafowl provided the reasonable sighting for estimating density. Therefore the report gives the detailed information on abundance of Sambar and Peafowl.

Sambar Population in Sukhna Wildlife Sanctuary

Overall during the survey period 21 groups of Sambar were location on line transect with an average group size of 4.7 individuals. The descriptive statistics of Sambar sightings is given below:

Mean	4.71
Standard Error	0.95
Median	2
Mode	2
Standard Deviation	4.37
Sample Variance	19.11
Kurtosis	0.03
Skewness	1.12
Range	14
Minimum	1
Maximum	15
Sum	99
Count	21
Confidence Level (95%)	1.99

In spite of less than minimum number (40) of sightings required for analysis of Sambar data, the data was analyzed using bootstrap option in Distance 6 to generate statistically robust figures. The details of analysis are given in table below:

	Mean ± S.E.	CV	95% C. L
Effective Strip Width (m)	96.60 ± 17.27	17.88	66.64 – 140.5
Expected Cluster Size	5.84 ± 1.54	26.47	3.39 – 10.07
Average Cluster Size	4.71 ± 0.95	20.00	3.10 – 7.16
Density of Groups (Km^2)	6.80 ± 2.28	33.59	3.47 – 13.30
Individual Density (Km^2)	39.66 ± 16.96	42.77	17.37 – 90.57
Total Abundance Estimation	1031 ± 441	42.77	452 - 2355

Model Fitting in Distance for Sambar Data

The model fitting is an argument in distance sampling - is a formula which specifies the detection covariates followed by density or abundance covariates. By default, the half-normal detection function (which accounts for proportional decrease in detecting animals away from the

line (observer)) is used to model density in animals / km^2. The detection function can be selected using the keyfunction argument. Since dataset generated from survey in SWS was very small to test the robustness of various models, therefore we decided to use the default detection function Half-Normal. The model with lowest AIC value was Half-normal key, k(y) = Exp(-y**2/(2*A(1)**2))Cosine adjustments of order(s) : 2, with GOF, P = 0.02324

Cell No (Distance Class)	Cut Points	Observed Values	Expected Values	X^2 Values
1	0.000	87.5	15.12	0.548
2	87.5	175	3.96	3.961
3	175	262	1.20	0.528
4	262	350	0.72	0.113

Total Chi-square value = 5.1507, DF = 1.00, Probability of a greater chi-square value, P = 0.02324

The group size of sambar encountered during the census was large and thereby the population estimate is high. Associated with the large variation in group size is also the uncertainty with the estimate of the population size. Therefore, the SWS holds high density of sambar and but repeated surveys through transects will yield better estimates of the population size. The average group size of Sambar as reported between 3.39 – 10.07 is higher than any other protected area in India.

Peafowl Population in Sukhna Wildlife Sanctuary

The estimate for pea fowl density is statistically more robust as compared to Sambar density. The details of peafowl population in Sukhna Wildlife sanctuary is given below:

	Mean ± S.E.	CV	95% C. L
Effective Detection Radius (m)	40.24 ± 6.23	12.23	20.28 – 78.43
Expected Cluster Size	1.96 ± 0.98	36.42	1.25 – 5.12
Average Cluster Size	1.75 ± 0.61	35.4	1.00 – 4.00
Density of Groups (Km^2)	20.02 ± 0.29	1.46	19.6 – 20.8
Individual Density (Km^2)	35.36 ± 12.53	35.4	15.7 – 79.7
Total Abundance Estimation	920 ± 326	35.44	408 - 2073

The model with lowest AIC value was Half-normal key, k(y) = Exp(-y**2/(2*A(1)**2))Cosine adjustments of order(s) : 1, with GOF, P = 0.01234 for the peafowl data.

The population estimate of peafowl was made after combining all the age-sex classes for the purpose of the analysis. It is possible that the detection probabilities of the ages and sexes particularly with respect to peafowl are different and therefore, inferences into the population should be done with caution. It will important to repeat the exercise in the transects and obtain greater number of detections and calculate the density for males and females separately.

Camera Trapping Demonstration

During the census operation there was evidence of use by leopards in the different trails walked in SWS. Census operations for leopards and other cats would involve use of remote camera traps and deploying several units in SWS over a period of time. In order to equip the staff and sensitize them to the camera trapping technique, a motion sensitive camera trap was taken from WII and demonstration was made for the park officials.

RECOMENDATIONS

1. This exercise has been carried out for the first time and has provided an important baseline about major wildlife species in the area. However there is a large variation in the population estimation in different species. Therefore, the exercise needs to be repeated in different season so as to further refine the estimates.

2. One time estimation may not be of great utility. Therefore, this exercise should become part of regular monitoring in the WLS.

3. Bird survey should be repeated independently for resident breeding birds in the month of April – May and for wintering birds in the month of November – December at least for three days during the respective months.

4. The monitoring should become the routine work of the staff of SWS. The authorities should mark permanent transects within the sanctuary. Staff while moving within sanctuary should use these permanent transects.

5. For the effective monitoring and population estimation there is need of training to the staff and other volunteers, which should be carried out by the management periodically.

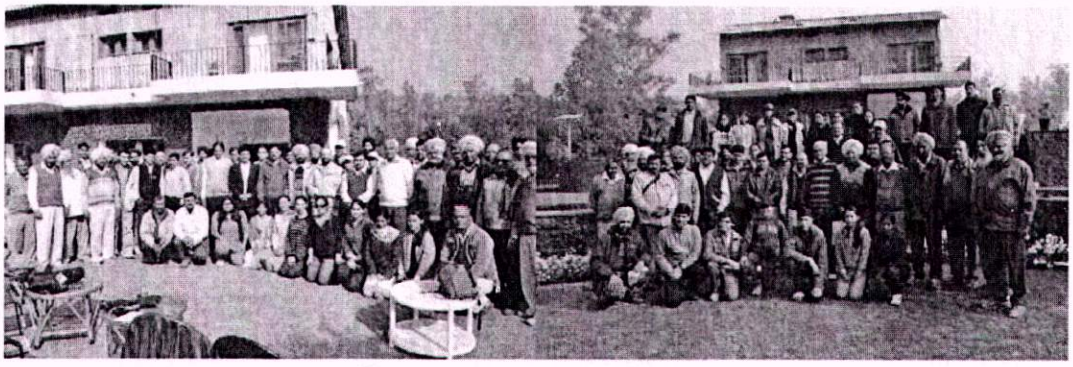
6. This protected area has good ecological diversity but baseline information on various taxa is weak. Management should tie up with research Institution and individuals to document various aspects of component of biodiversity in a planned way. Camera trapping for various species will be very essential for SWS.

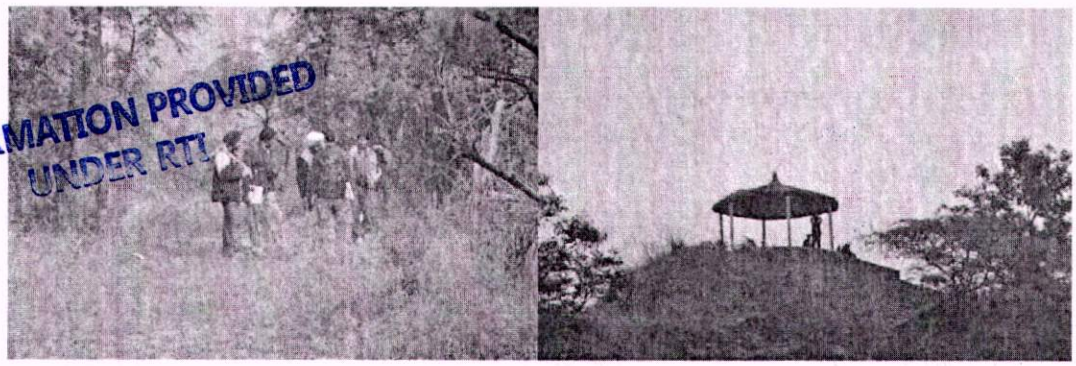
7. Sukhna WLS is fortunate to have good support of different stakeholder and volunteers. This goodwill should be further continued and nurtured.

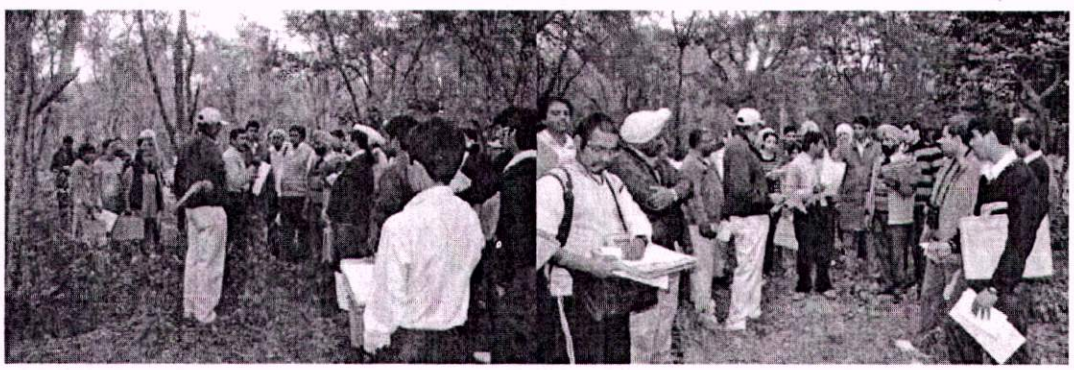
8. To have better estimates of various species present in SWS, an intensive short term survey project should be carried out at the sanctuary followed by regular monitoring exercises.

9. Management should also make efforts to update the existing management plan of the sanctuary. The update management plan should be based on scientific knowledge.

Wildlife Census Training and Census Photo Gallery







Annexure- 1

Details of group members, who carried out the Wildlife Census in Sukhna Wildlife Sanctuary from 9th to 11th December, 2010:

Group-1	Mrs. Shashi Vasundhra –M.Sc. Zoology, Panjab University - Jamuna Negi, M.Sc. Zoology, P.U - Rima Dhillon -Tejvansh Rana, St.Kabir Public School
Group-2	Mrs. Reshma Sinha, M.Sc. IInd year Zoology Deptt., Panjab University - Navjyoti Jamwal - Navjit Singh - Siddharth Gautam (Student-St.Kabir) -Atharav Avhad (Student – Bhavan Vidyala)
Group-3	Kamaljeet Singh, Zoology Deptt., Panjab Univ. - Rajeev Kumar, Zoology Dept, PU - Dr.G.S.Chatha, Associate Professor, Deptt. of Botany & Environmental studies, Govt. Shivalik College, Nangal, - Mr.Prabhat Bhatti, Press Correspondent, Dainik Bhaskar -Er.K.K.Sood, Executive Engineer, Bhakra Beas Management Board, Talwara township.
Group-4	Mr.Jas Preet Singh, -Ms.Urmila Nayak, Volunteer from NGO-PFA -Ms.Mamta Tamang
Group-5	Disha Birdia – Yuvsatta -Om Parkash -Mr.Narbir Singh, Avian Habitat & Wetland Society -Mr.Jagdish Chand – Forester -Ms.Sahil Jindal
Group-6	Sh – Bharat Budhiraja -Ms.Sarbjeet Kaur -Mr.Arvind Kumar -Mr.Ajay Sharma
Group-7	Mr. Puneet Arora -Mr.Karan Singh, Range Officer -Mr.Jagmohan Singh, Block Officer -Mr.Samrath Singh
Group-8	Mr.Vikramjit Singh -Mr.Gurpreet Singh -Mr.Jagjit Singh Mr.Sucha Singh, Forester Mr.Balwinder Singh, Forest Guard

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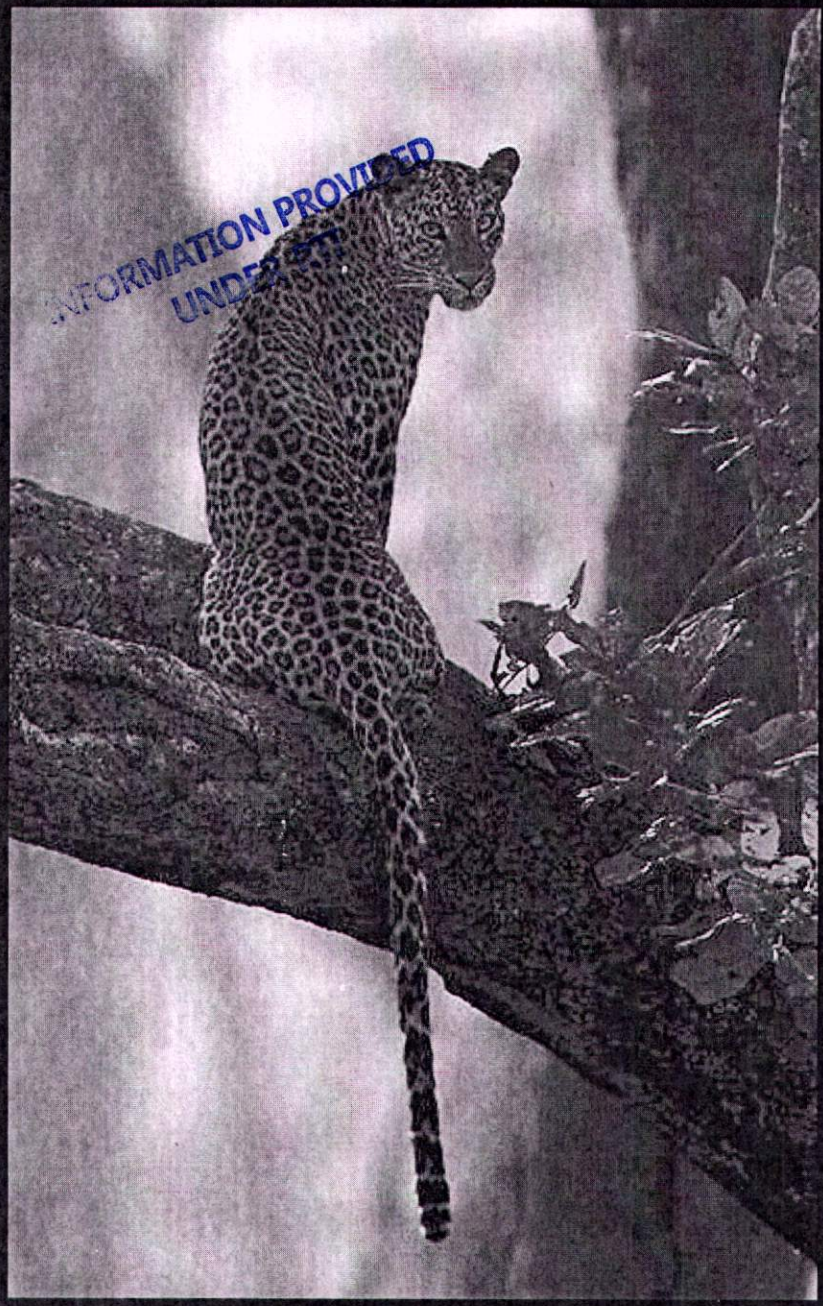

Department of Forest & Wildlife
UT Administration Chandigarh

Wildlife Institute of India
Dehradun