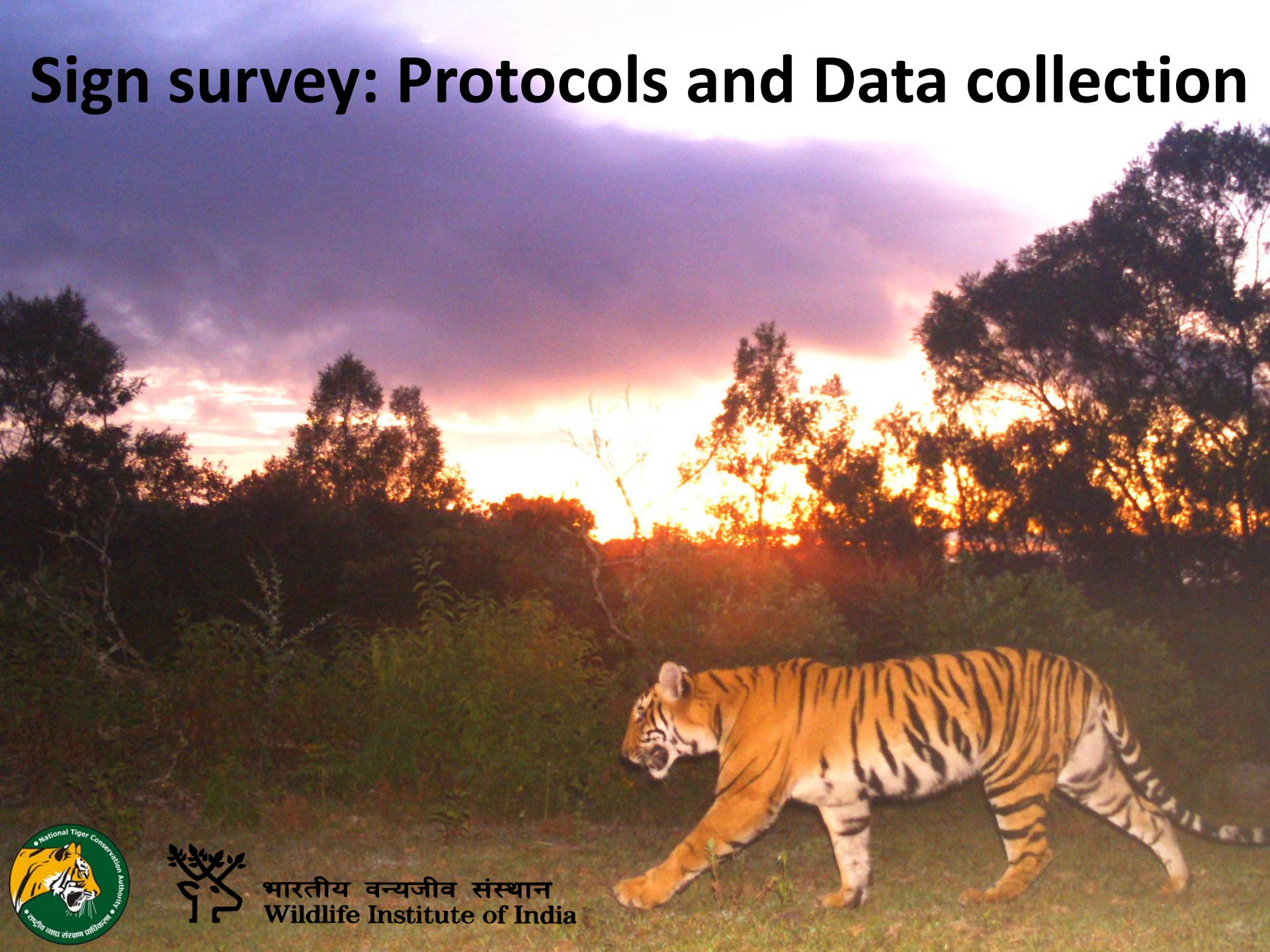
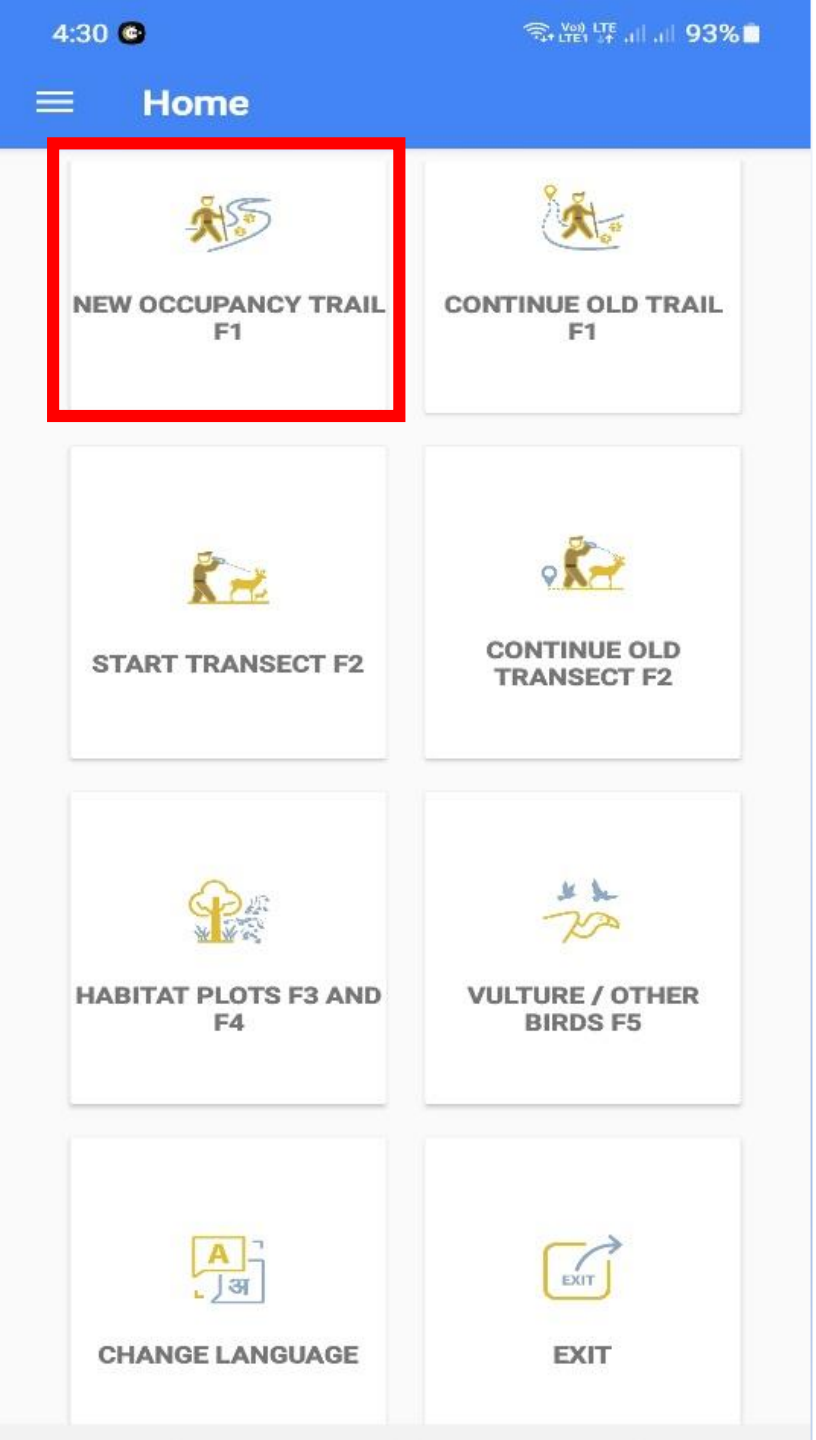
Sign survey: Protocols and Data collection



भारतीय वन्यजीव संस्थान
Wildlife Institute of India

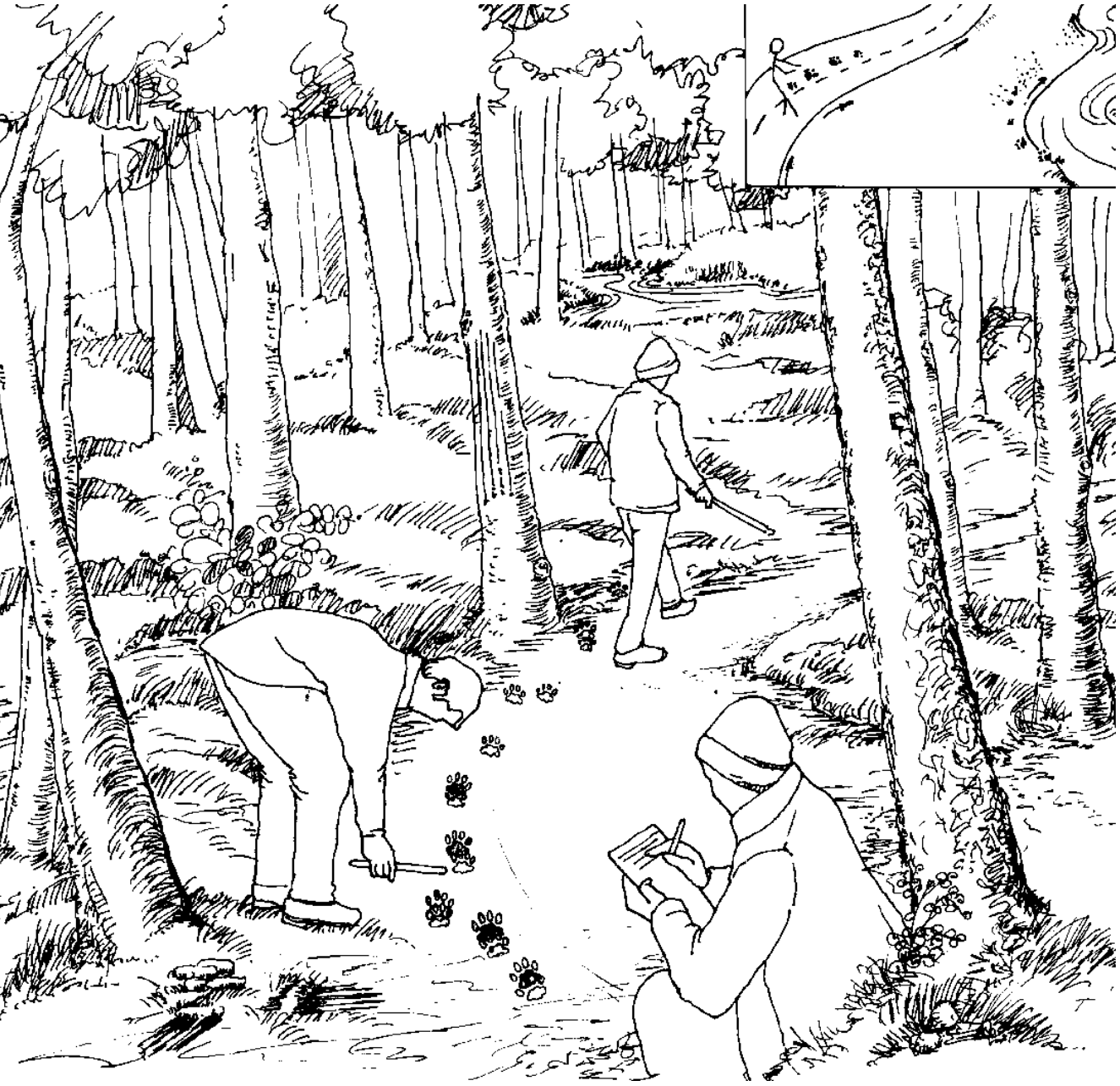


Form 1: Carnivore/ Mega herbivore sign survey and analysis

Carnivore sign survey

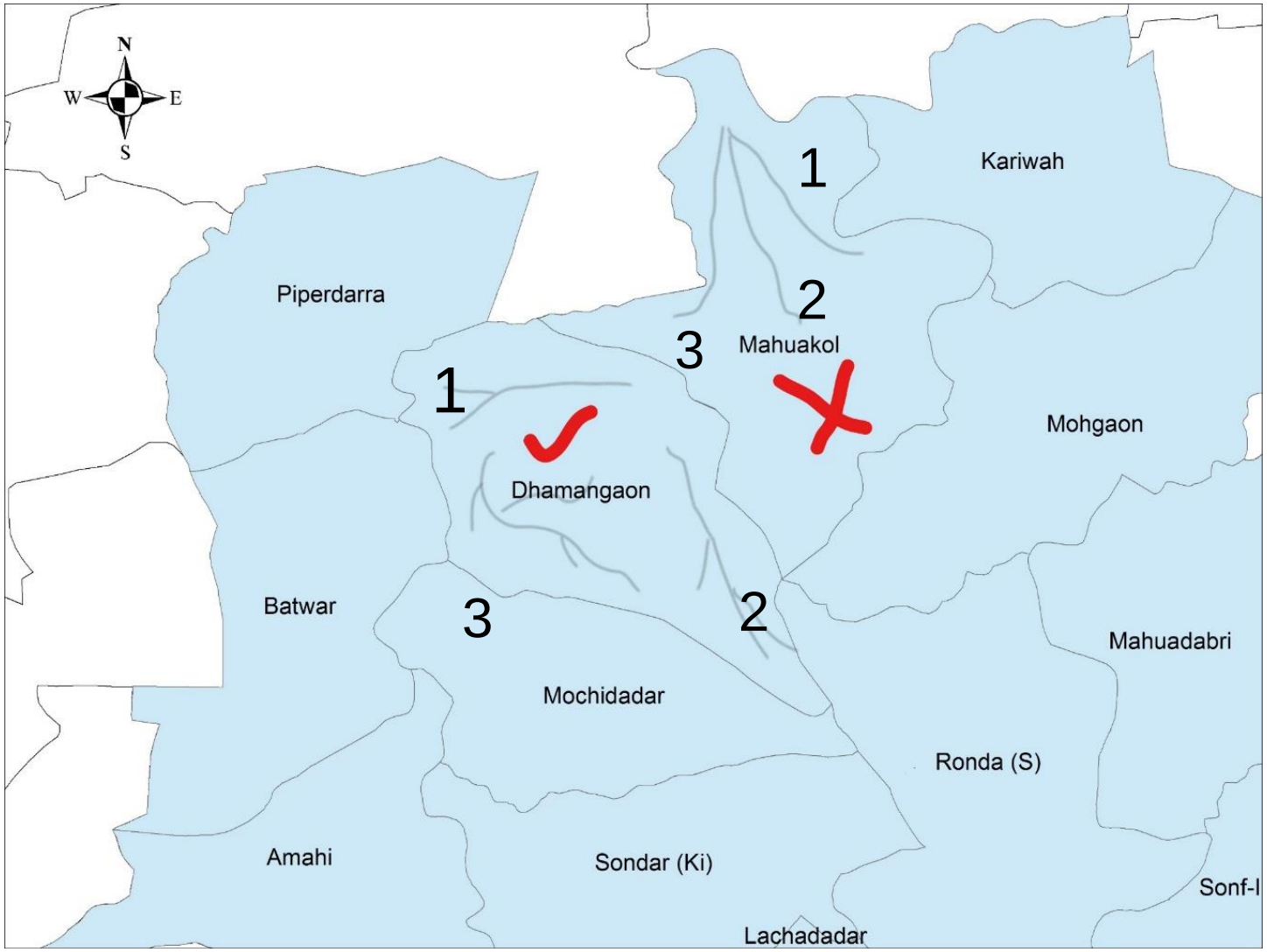
- Important sampling protocol of Phase - I survey
- To obtain data on presence, intensity of use and absence of Carnivores and Mega herbivores (Occupancy Survey)
- Areas within the beat which has maximum potential of animal presence should be intensively searched for signs.
- Maximum Potential of animal signs (River beds, Nullah, Dirt Road, and Trails)

Carnivore sign survey



- Signs like tracks, scats, scrape, rake, rolling, dung, direct sighting and vocalization should be recorded.
- Minimum 3 searches each of 5 km at least
- Best Location for camera trap placement can be identified during this survey
- Continuous Pugmark track set should be counted as one sign (shall be explained in the field)
- Pugmarks found in opposite direction, scat/ dung, scrape, rake and other signs have to recorded individually

Issues in sampling design



Try to get a full coverage of the beat/ administrative unit by sign survey tracks

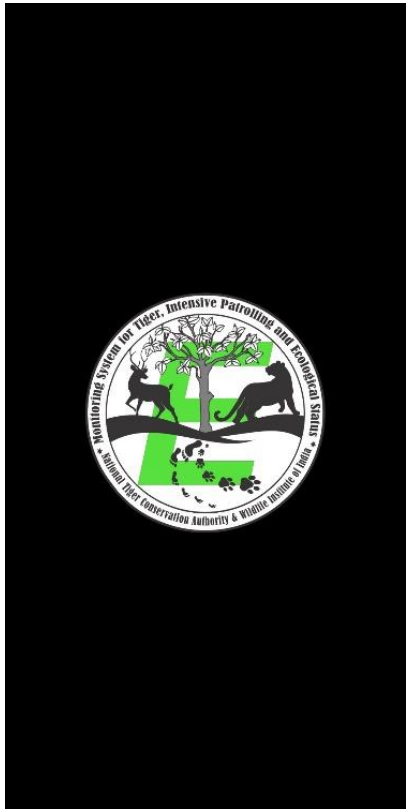
FORM-1: DATASHEET FOR TIGER, LEOPARD, OTHER CARNIVORE & MEGA HERBIVORE SIGN ENCOUNTER RATE

Forest Division: **Range:** **Beat:** **Date:**
Start Time: **End Time:** **Trail Id:**
Starting Latitude:N **Starting Longitude:E**
End Latitude:N **End Longitude:E**
Total distance covered (km): **Time spent in other activities (Resting etc.):**

Observers	Name	Designation	Phone No.
1			
2			

Sl. No.	Time	Latitude			Longitude			Sign Type*	Species	Age of Track/sign**	Remarks
		Deg.	Min.		Min.	Sec.					
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											

In case of Direct sighting, observer should mention the Age, Sex and Individual number in the Remarks column.
***Sign types-: Scat/Pellets/Dung-SCT/PLT/DNG, Pugmark_Track-PT, Vocalization-VC, Rake-RK, Scrape-SCR, Rolling-RL, Spray-SPR, Digging-DIG, Kill- K, Scat & Scrape- SS**
**** Age of Track & Sign: Very Fresh- VF, Fresh- F, Old-O, Very Old- VO**
Signs of 4 mega herbivores (Gaur, Elephant, Water buffalo & Rhino) should also be recorded.
Note: 1. If you get more sign than these, then enter it on another datasheet.

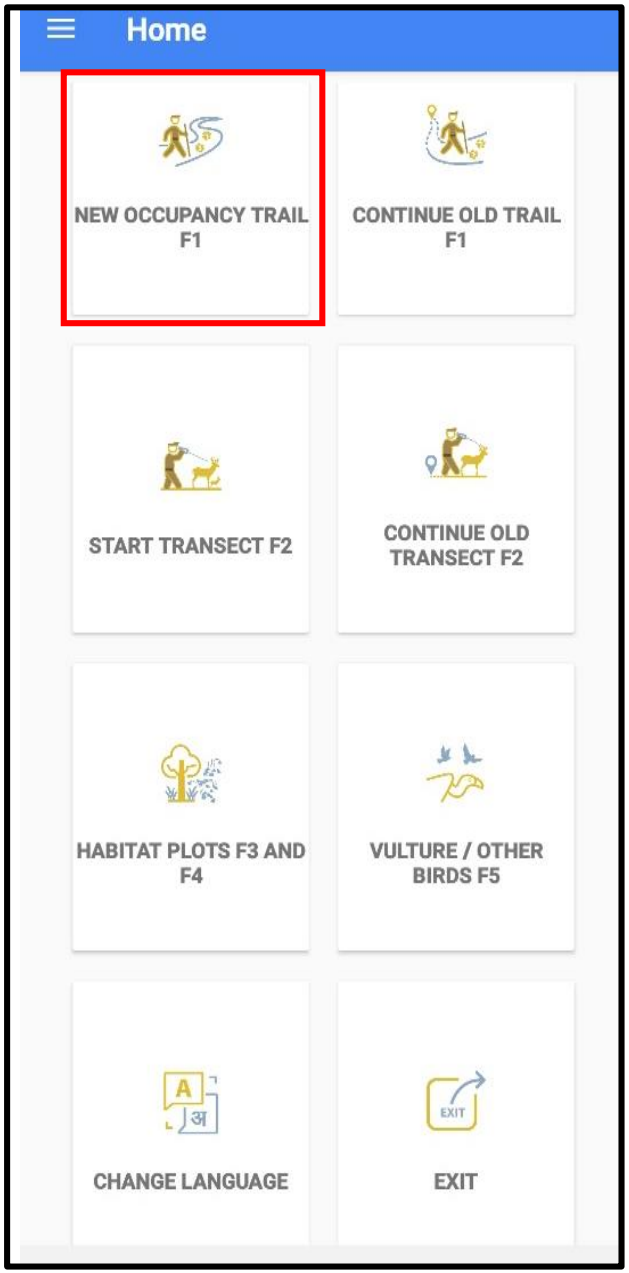


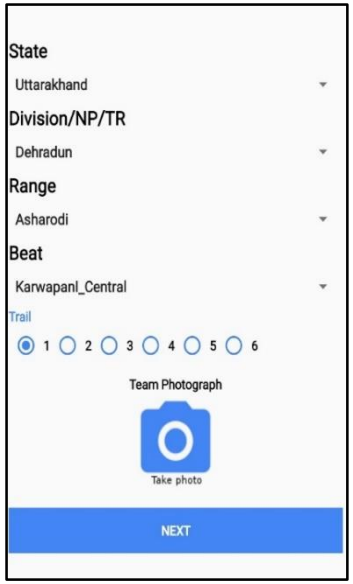
Due to Errors Associated with Manual Data Entry in Forms only Digitally recorded Data will be Analysed Further

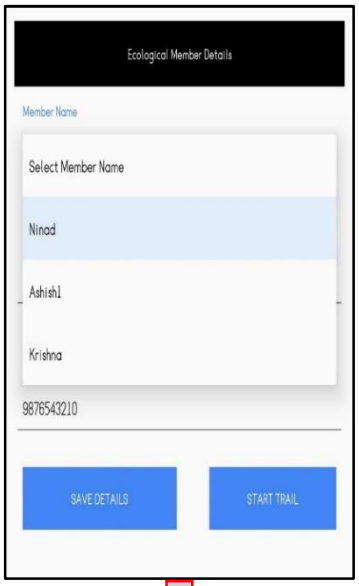
Advantages of using digital software (MSTrIPES)

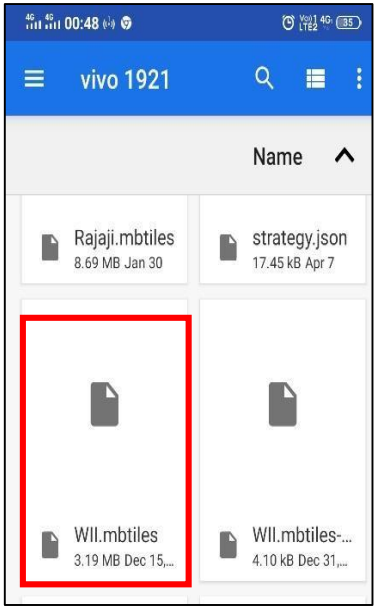
- Ease of data collection
- Data transparency
- Do away with data entry error
- Timely report generation

MSTrIPES ecological app: Form 1









MSTrIPES ecological app: Form 1

Map Page Options

Status of GPS signal

Toggle map view

Pause/ resume

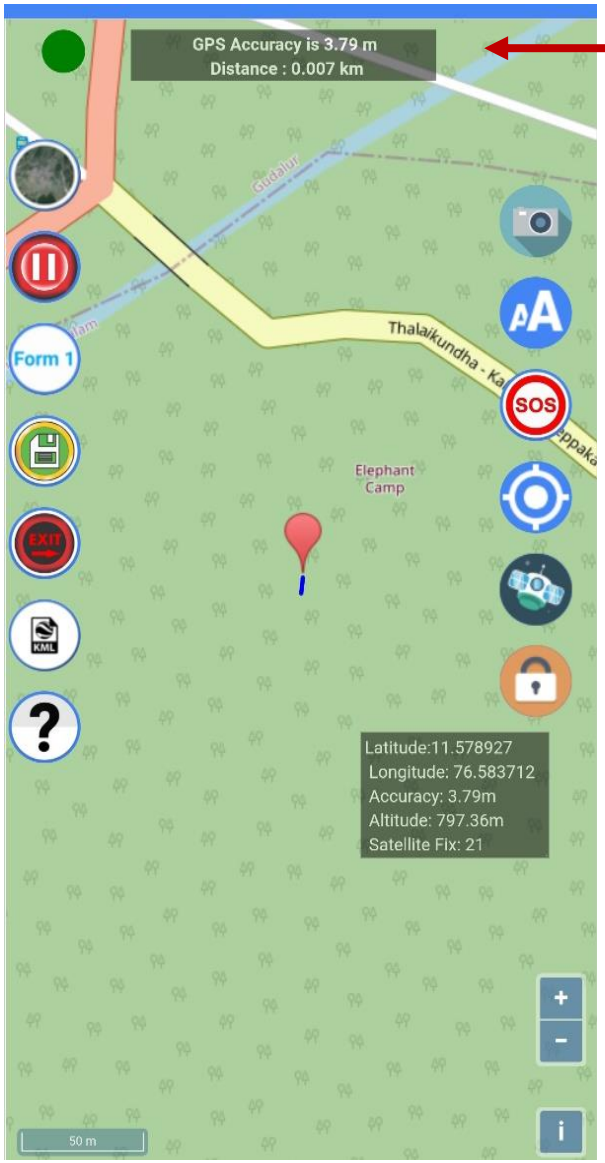
Data form

Save Data form

Exit button

Load .kml file

Questionnaire form



GPS accuracy and odometer

Camera button

Change language

SOS button

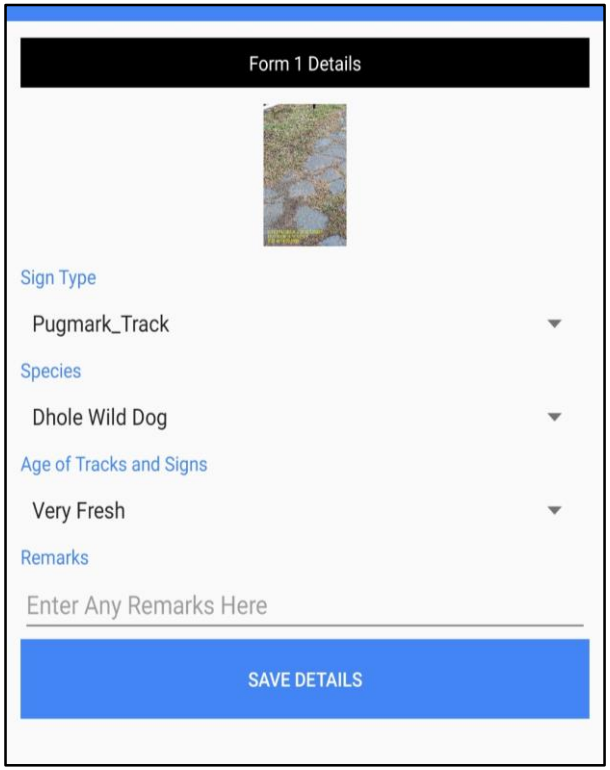
Re-centre button

Satellite information

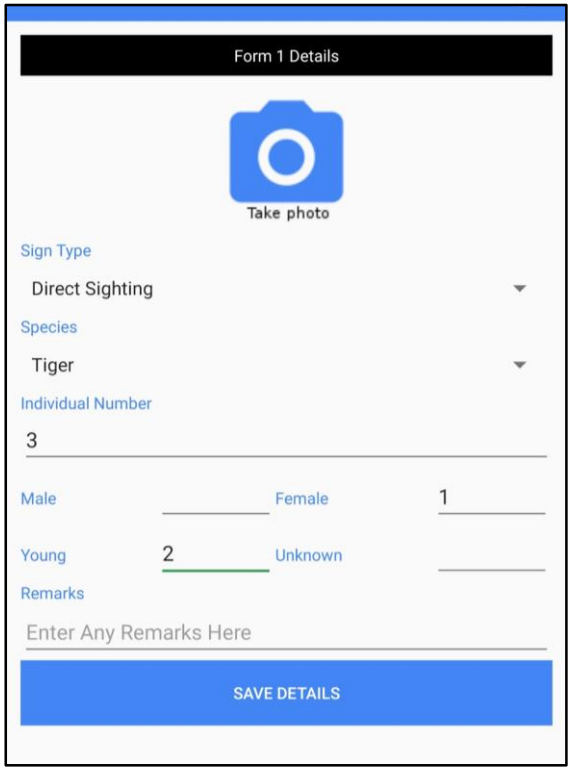
Lock map screen

MSTrIPES ecological app: Form 1

Indirect Sighting



Direct Sighting



MSTrIPES ecological app: Form 1

1) Has any tigress with cubs reported during the past twelve months?

(•) Yes ( ) No

Approximate Date

14-5-2020

(•) A) Seen by Staff ( ) B) Pugmark ( ) C) Reported by Locals

How Many Cubs?

2

Approximate age of cubs? (In Month)

6

3) Has any leopard with cubs reported during the past twelve months?

(•) Yes ( ) No

Approximate Date

11-4-2021

( ) A) Seen by Staff (•) B) Pugmark ( ) C) Reported by Locals

How Many Cubs?

3

Approximate age of cubs? (In Month)

10

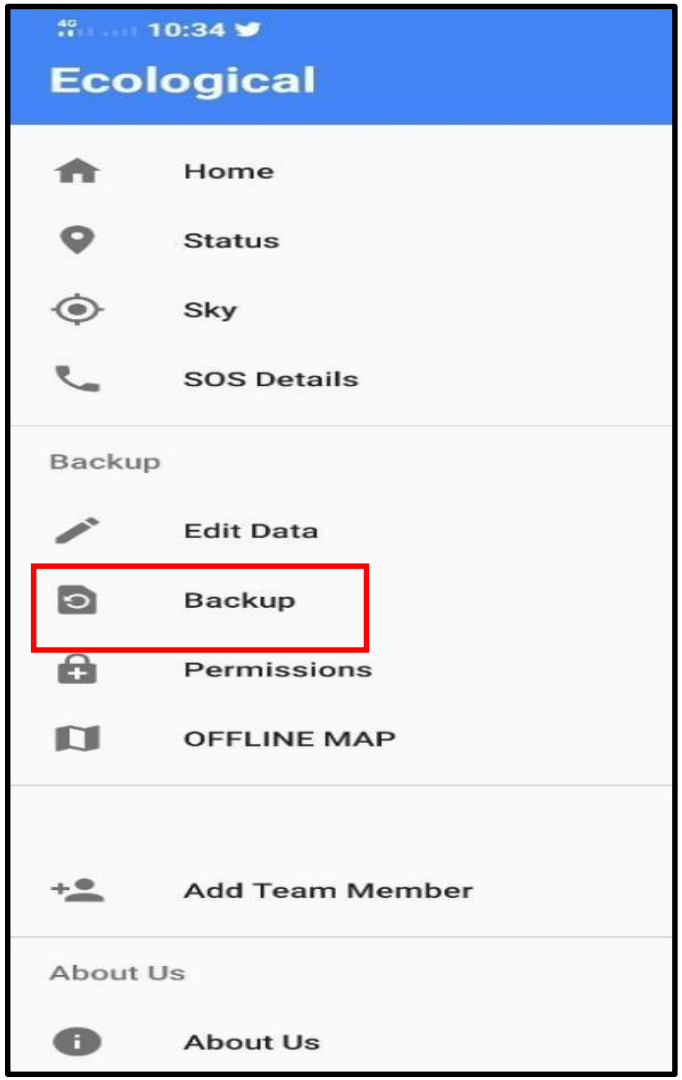
How many livestock predation events have been recorded in the past three months?

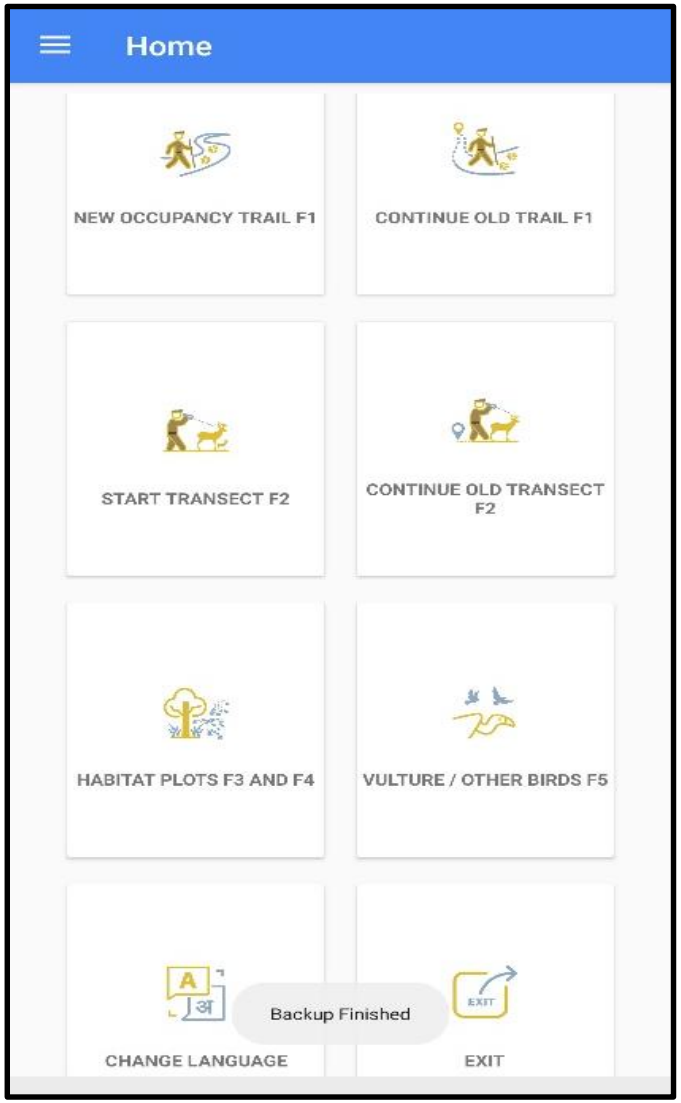
Tiger 1 Leopard 2 Dhole ___ Other Carnivore ___

Remarks

SAVE DETAILS

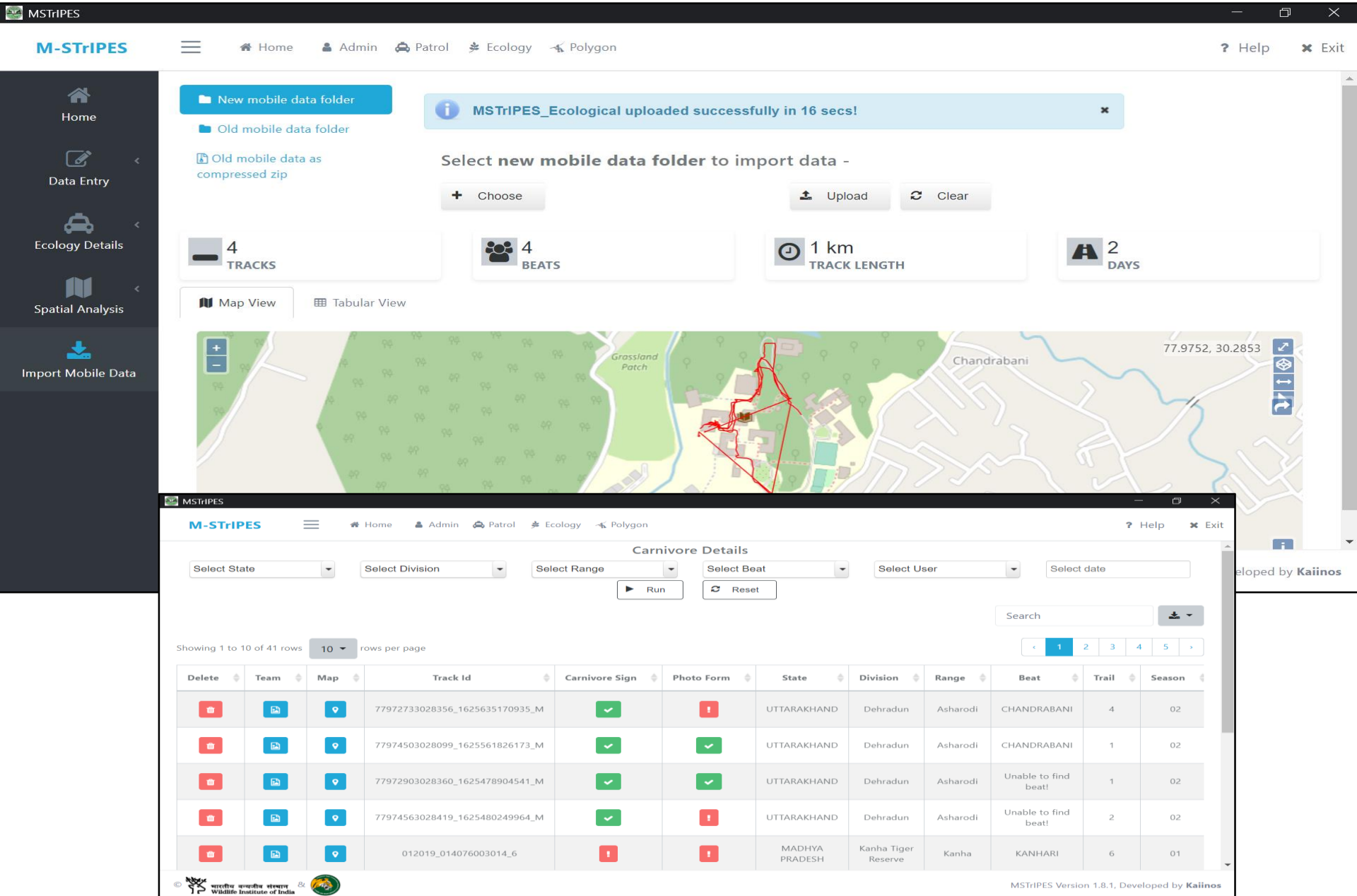
MSTrIPES ecological app: Form 1





Importing in MSTrIPES desktop

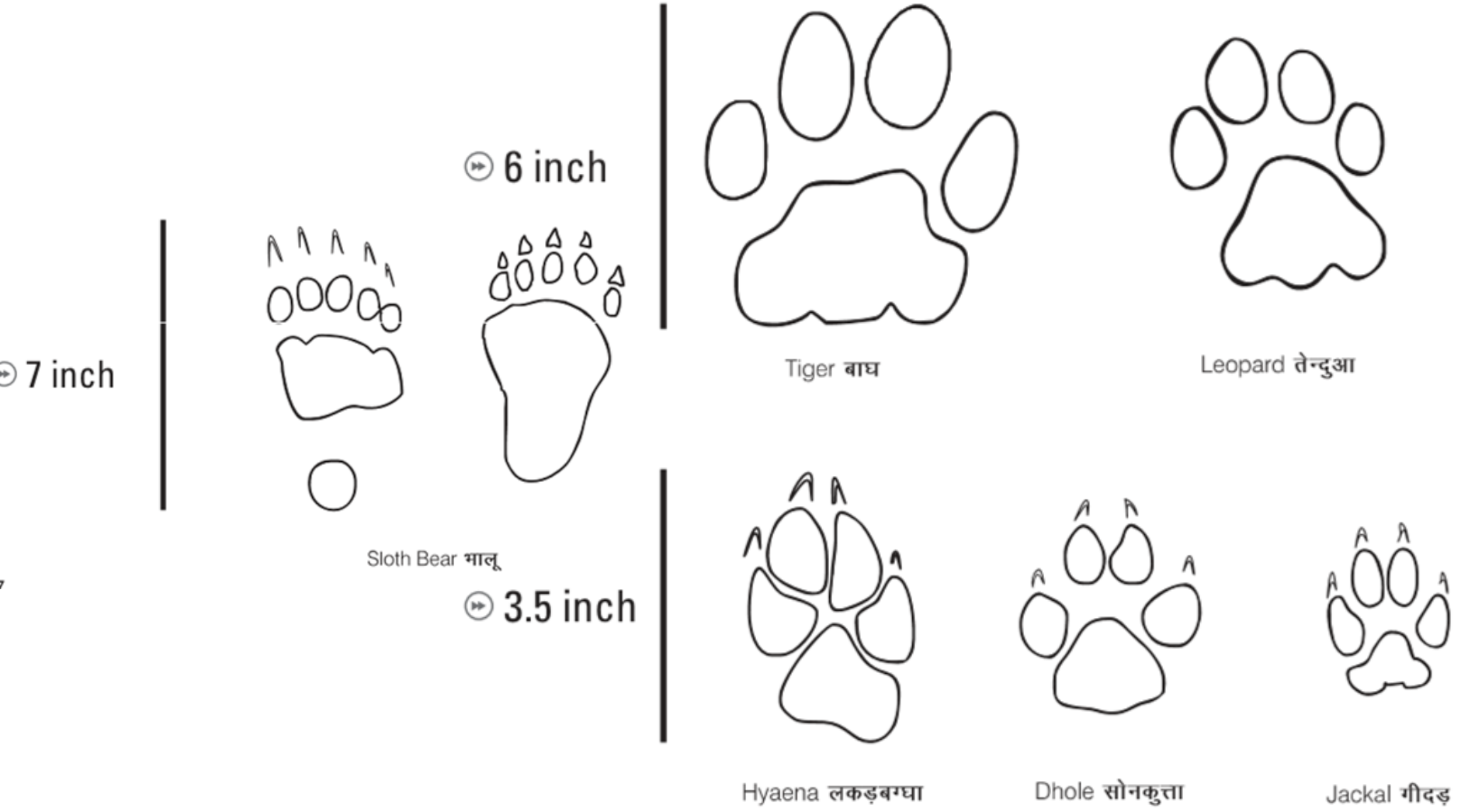
Importing in MSTrIPES desktop



Carnivore distribution

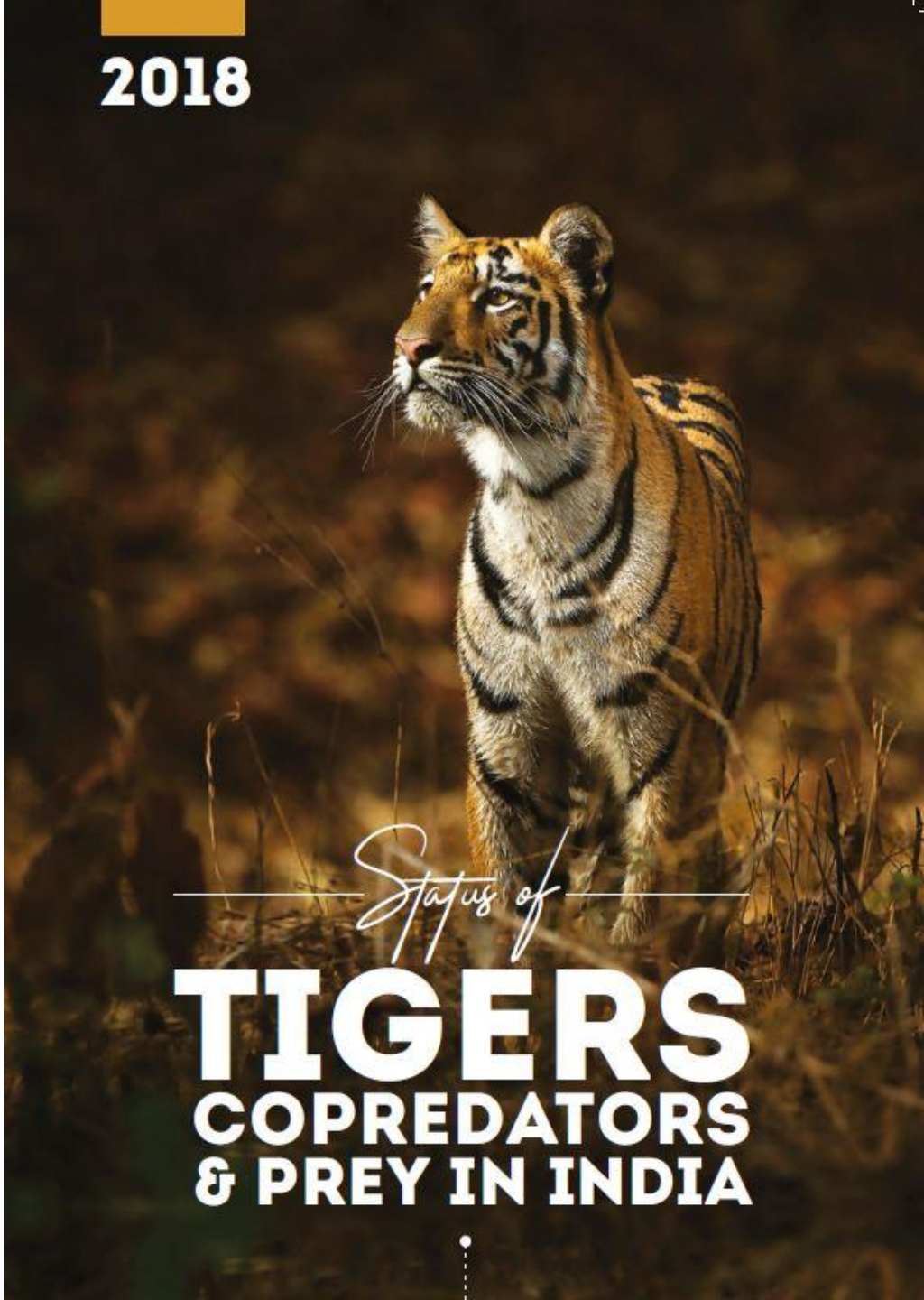
1. The signs are **plotted in the GIS** platform using MSTrIPES
2. Encounter rates of different signs for carnivores & mega herbivores are calculated by dividing the number of signs by effort invested for surveying at that scale as encounter rates.

Pugmarks


7 inch
6 inch
Sloth Bear भालू
3.5 inch
Tiger बाघ
Leopard तेन्दुआ
Hyaena लकड़बग्घा
Dhole सोनकुत्ता
Jackal गीदड़

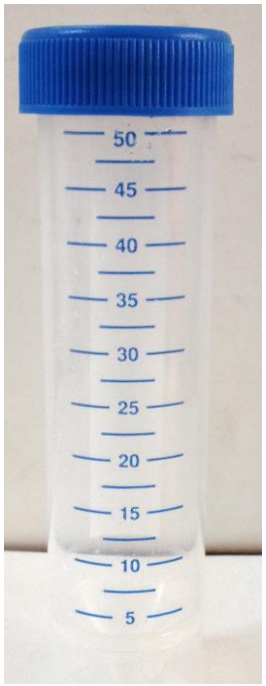
Scat/ Dung collection during AITE

- To address the objectives of
  - Estimating minimum number of individuals and CMR estimates.
  - Population genetic structure of tigers in India
  - Prioritizing populations for conservation attention



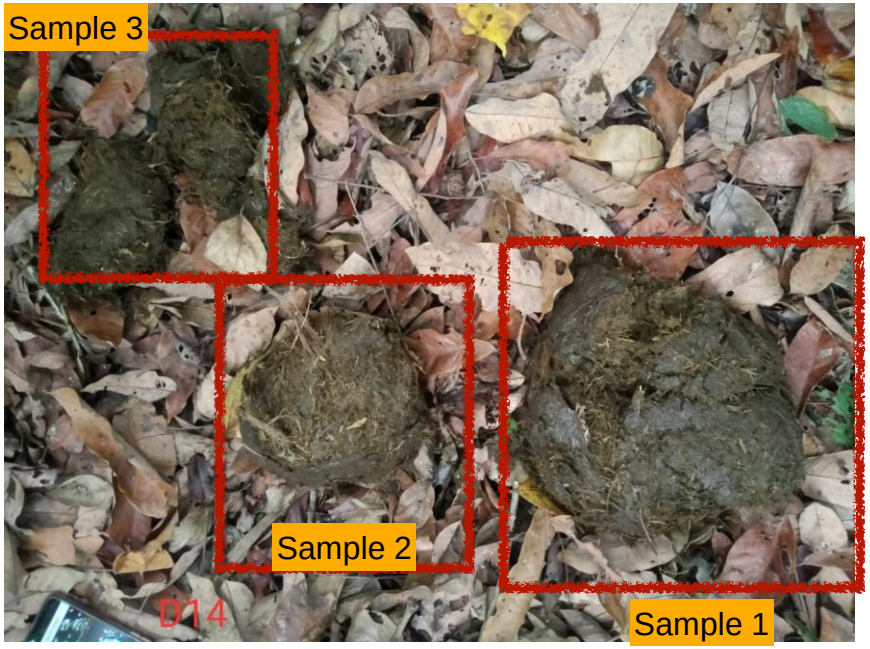
Collection Protocol

- Very Fresh or fresh scat/dung
- All carnivores and elephants
- Tube/Ziplock with silica gel
  - Preferable - whole scat (zip lock)
- GPS location, and place (state, division, range, beat)

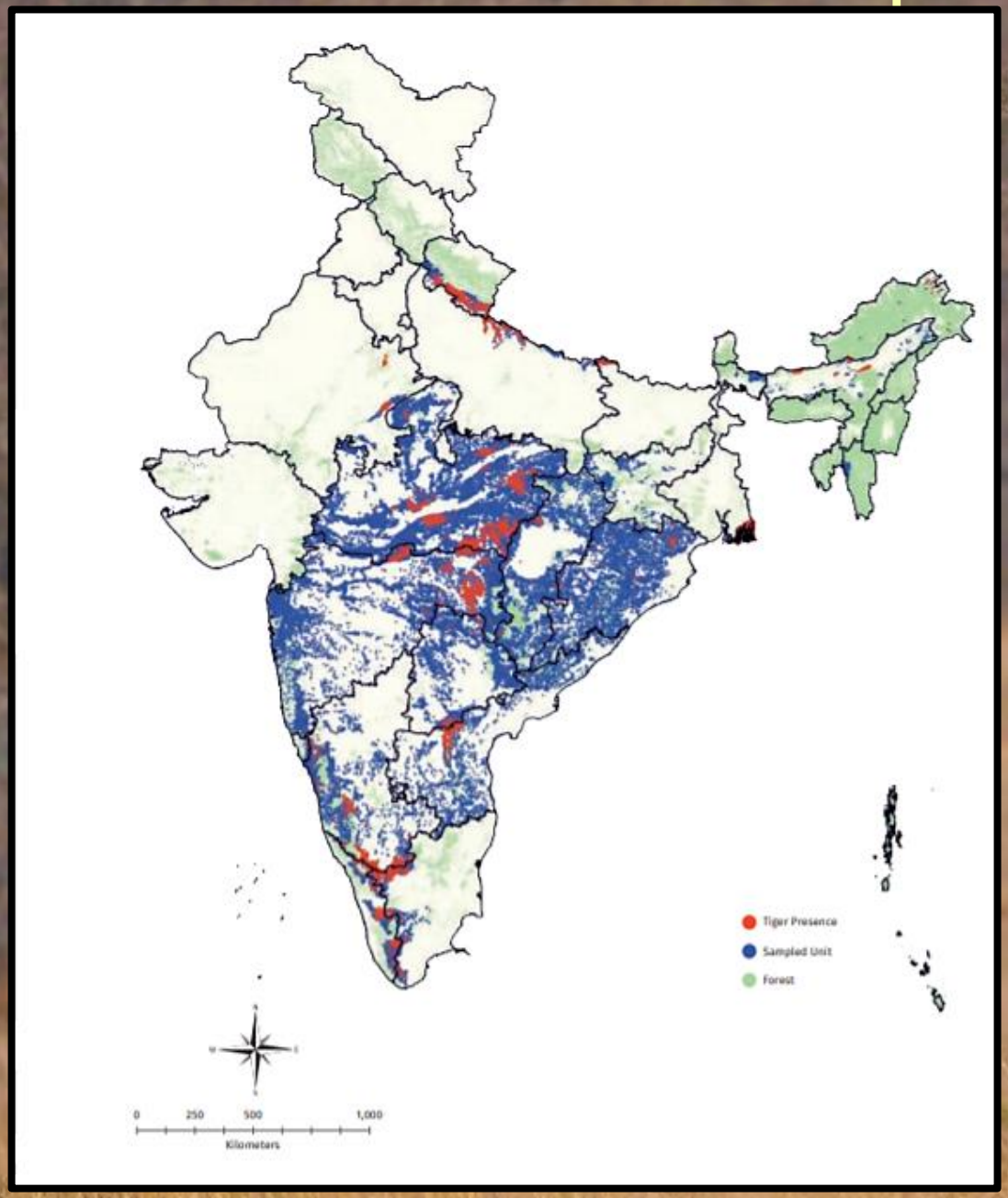


Elephant (& Mega Herbivore) Dung Collection Protocol for population estimation.

- During Carnivore and Megaherbivore sign survey (Form 1), collect samples of fresh elephant dung whenever encountered.
- Old dung (bolus is broken up and totally dry) should not be collected but just recorded on the MSTrIPES ecological app in form 1.
- Break the fresh dung with a stick or stone or an inverted zip lock bag and collect a sample of about 25 gms from the interior of the bolus.
- If you come across a dung pile from multiple animals (dung boluses of different sizes), collect one sample from each size class bolus.
- Collect fresh dung samples wherever encountered during the sign survey.
- Fill approximately 1/5th of the bag with silica gel
- Seal tightly after putting in the sample
- Record details of the following on the zip lock bag on a paper sticker adhered to the bag. Do not write directly on the plastic bag as it will wear off.
  - Sample ID (Of users choice, but generally includes name of PA, for eg. Sample first sample collected in Bandipur on 23May 2019 would be BND23052019_1).
  - Date
  - Species (Elephant/Gaur/Wild Buffalo/Rhino)
  - GPS location,
  - Location: Division, Range, Beat.
  - collectors name

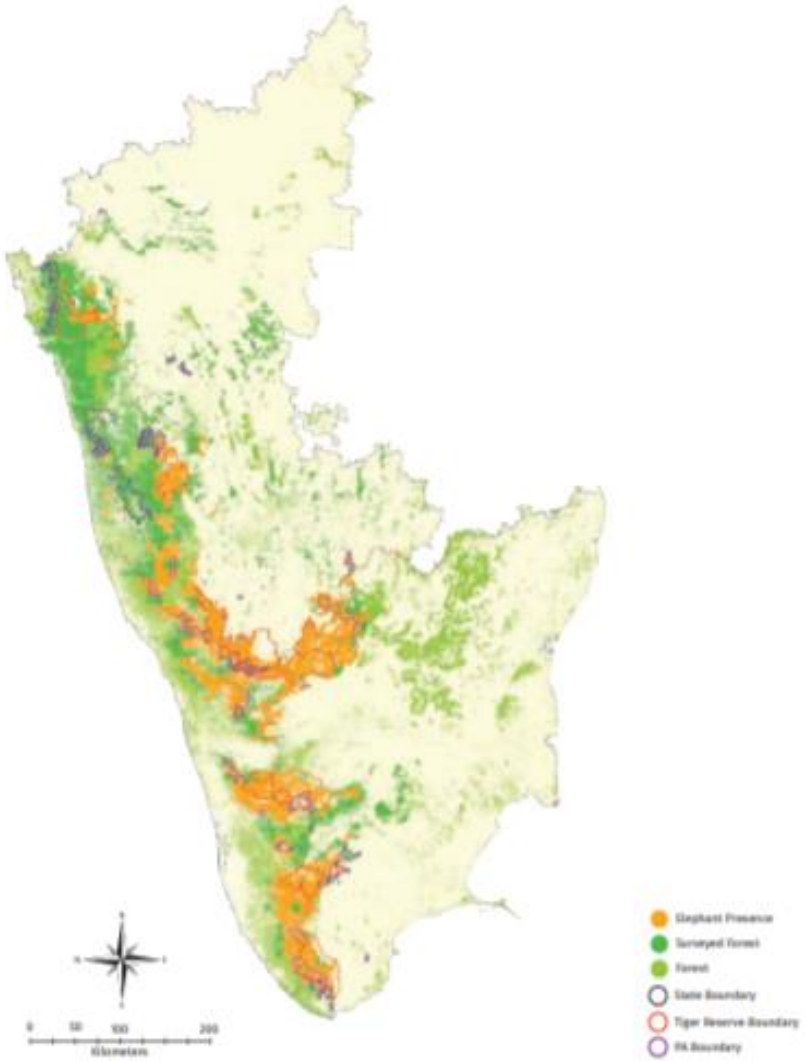


One of the Largest Wildlife Surveys in terms of Scale, Effort & Spatial Resolution in the World

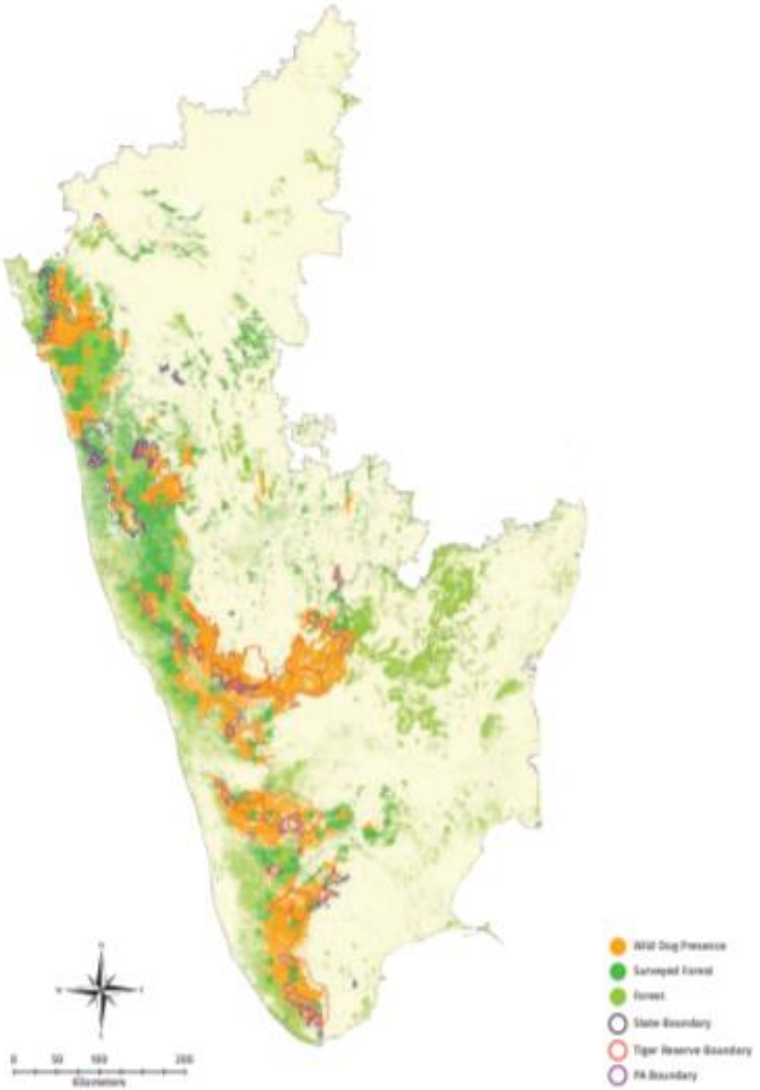


Area Occupied by Tigers
88,985 km^2

Elephant



Dhole



Carnivore occupancy

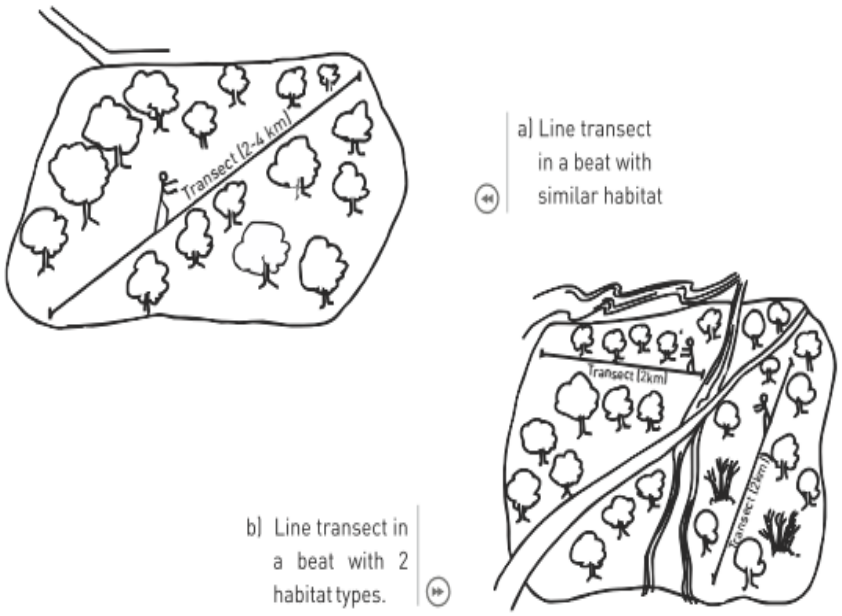
- It is possible that the surveyed beat is having the presence of tigers or other carnivores, however, during the sigh survey no evidence was found.
- In such cases occupancy models allow and correct imperfect detection. Therefore, report actual data as collected from the field and do not worry if it does not show a tiger sign.
- Occupancy models also incorporate covariates, i.e. factors that influence the presence of carnivores (tigers/leopards etc.) in an area, e.g. Human disturbance, prey availability, habitat quality.

Form 2: Line transect sampling for Prey estimation

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

Line transect (Form 2)

Marking transects in a beat.

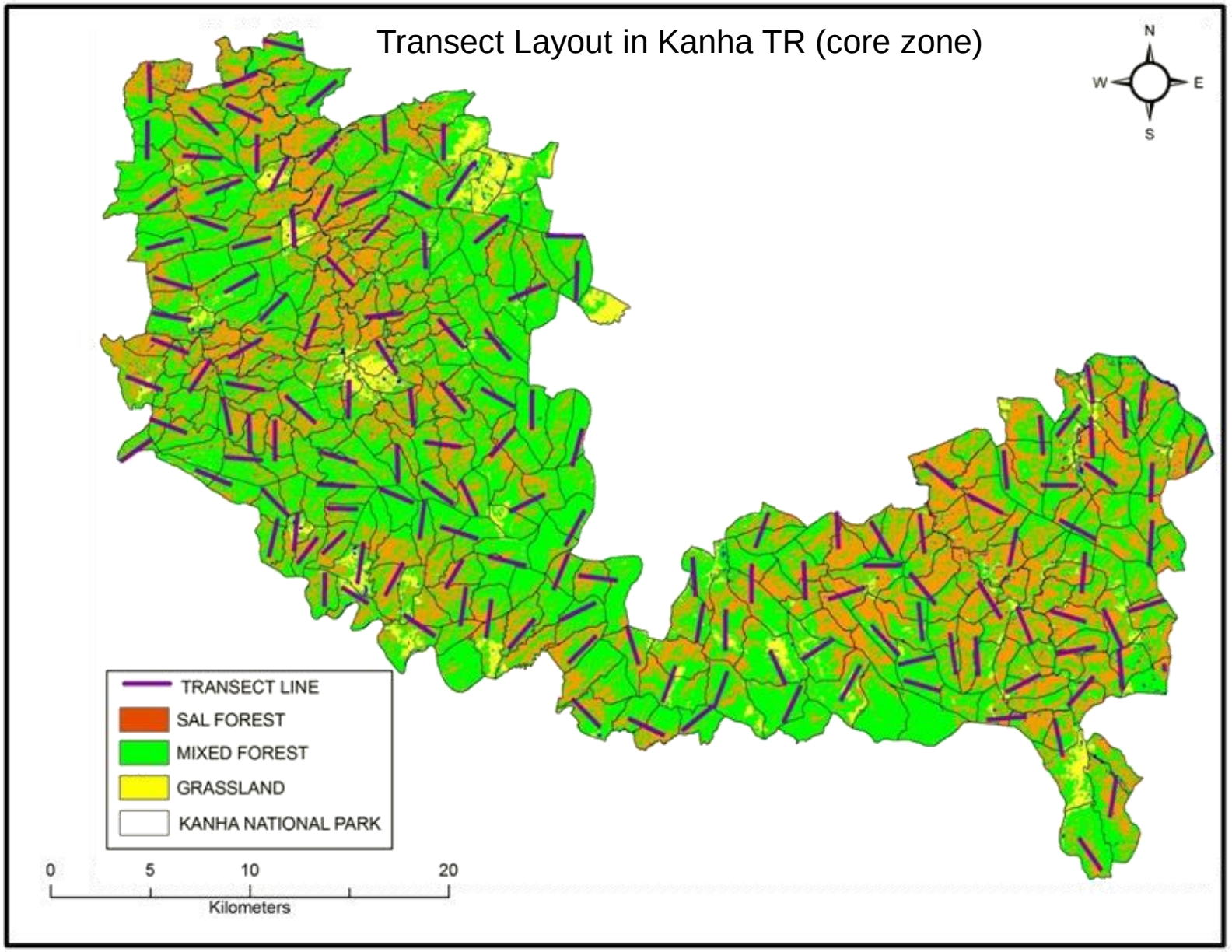


a] Line transect in a beat with similar habitat

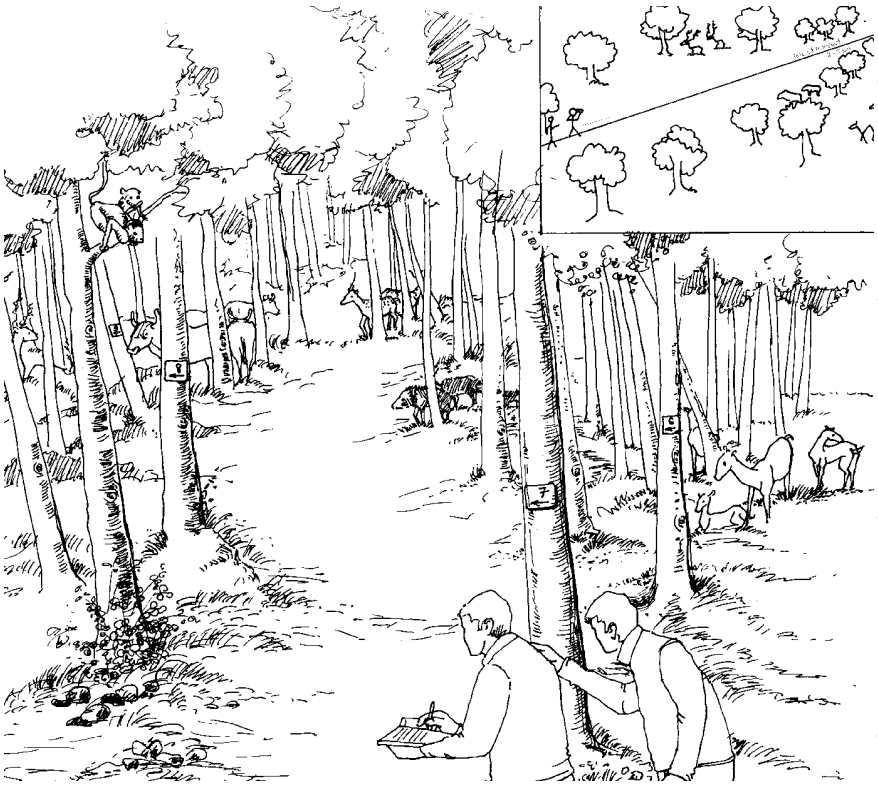
b] Line transect in a beat with 2 habitat types.

- Each Forest Beat would be considered as the unit for sampling.
- Each forest beat (around 15 km^2), should have at least one transect line, Beats more than 15 km^2 may consider for two transect lines.
- If a forest beat has two or more distinct habitat types (e.g. grassland 40%, deciduous forest 60%), then two habitat specific transects should be laid and sampled.
- Length of transect should preferably be of 2 km (not exceeding 4 km).
- Transect should not be located near busy road nor parallel to the river, road or other features of the landscape which may bias the sighting of ungulates.
- Transect should clearly marked throughout the line so that observers do not deviate from the line of walk.

Line transect (Form 2)



Line transect (Form 2)



- Transect should be walked by only 2-3 persons during the early morning hours.
- Before Transect walk, Get well acquainted with use of Range finder, Compass and MSTrIPES Ecological Mobile App .
- The observer should minimize the chances of the animal getting disturbed by the noise and presence of the observer during transect walk.
- Each line transect needs to be walked at least on three different mornings (temporal Replicates).
- Record walk bearing, animal bearing, radial distance and count of each species (Adults and Young)
- For each animal sighting, the animals are considered to belong to two different groups if the closest animals from the two groups are separated by a distance of over 30m.

FORM 2: SAMPLING FOR PREY SPECIES ABUNDANCE

Forest Division: **Range:** **Beat:** **Date:**
Transect ID: **Transect Replicate:** **Transect Bearing:** **Transect length (km):**
Start time: **End time:** **Habitat type*:** **Terrain type**:**
Start Latitude: N **Start Longitude:E**
End Latitude: N **End Longitude:E**
Weather: Sunny ( ) / Cloudy ( ) / Rain ( )

Observers	Name	Designation	Phone No.
1			
2			

S. No.	Time	Latitude			Longitude			Species	Total no. (Adult & young)	Young	Angular Sighting Distance (m)	Compass bearing		Habitat type*	Terrain type**	Remarks
		Deg.	Min.	Sec.	Deg.	Min.	Sec.					Animal	Walk			
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																

Instructions: (1) The start and end time of the transect must be recorded. **(2)** The format of GPS location should be in degree-minute-seconds. **(3)** The walk bearing and animal bearing should be written while walking the 2 km transect (the walk bearing and transect bearing can be different if line transect is passing through hill or different terrain).

***Habitat type should be one of:** Agriculture/Plantation, Alpine meadows, Bamboo, Coniferous forest, Desert rocky, Desert sandy, Dhonk forest, Fallow land, Himalayan broad leaved, Hollong forest, Mangroves, Miscellaneous dry deciduous forest, miscellaneous evergreen forest, miscellaneous moist deciduous forest, miscellaneous Semi-evergreen forest, Orchards, Pasture, Riverine & Wetland, Sal forest, Scrub, Shola grassland, Short grassland, Tall grassland, Teak forest, Thorn forest

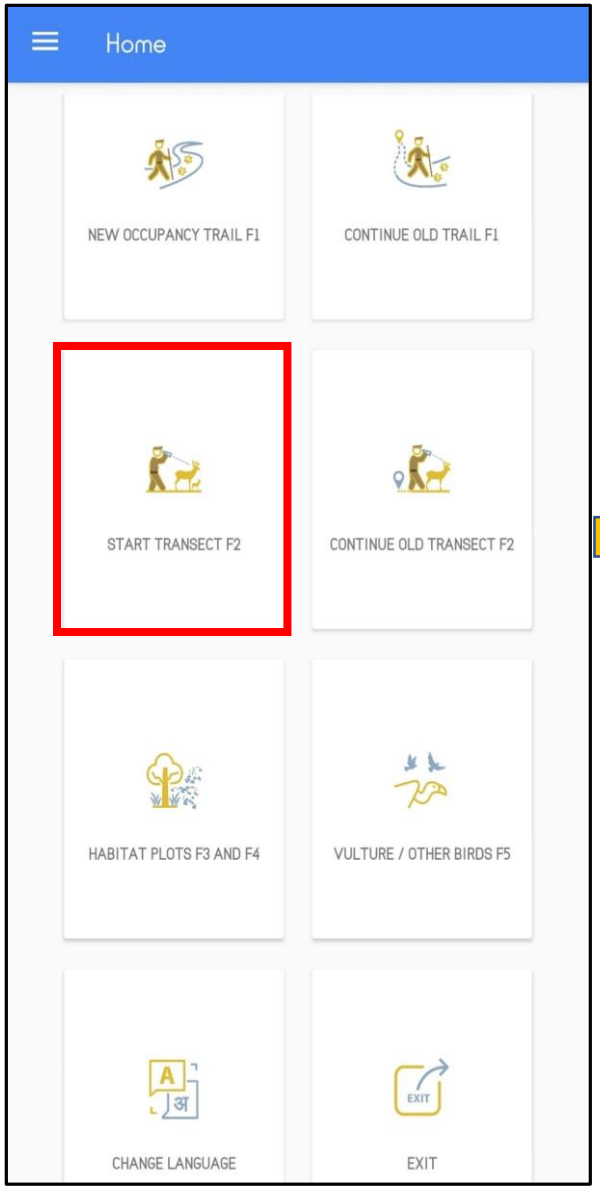
** **Terrain type should be one of:** Hilly, Plain, Steep, Undulating, Valley, Very steep.

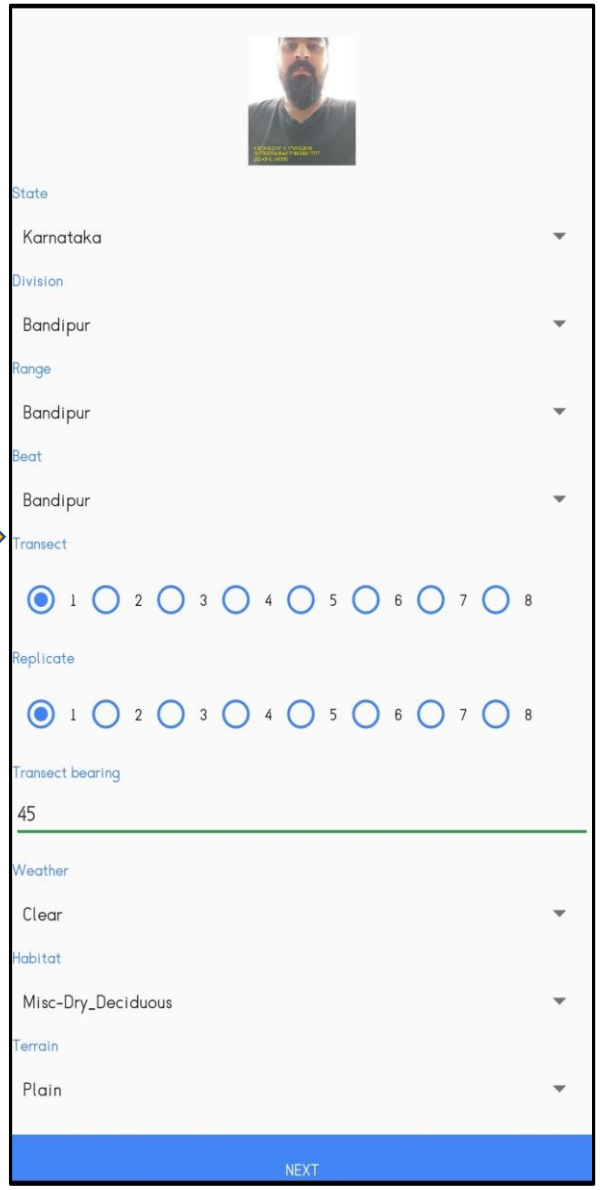
Due to Errors Associated with Manual Data Entry in Forms, only Digitally recorded Data will be Analyzed Further.

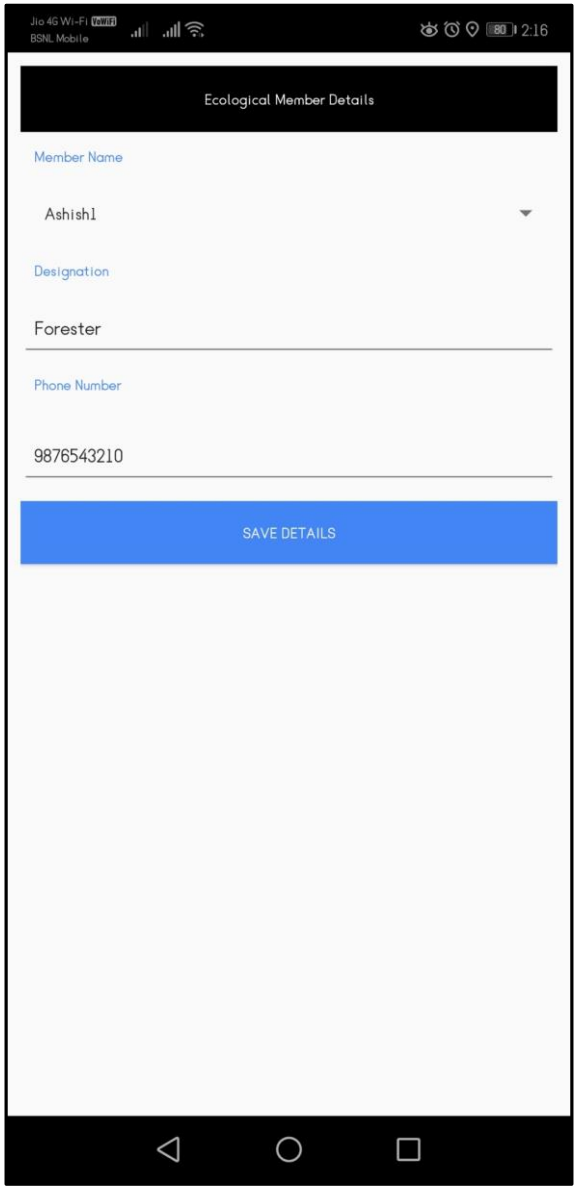
Advantages:

- Ease of data collection
- Data transparency
- Do away with data entry error
- Timely report generation

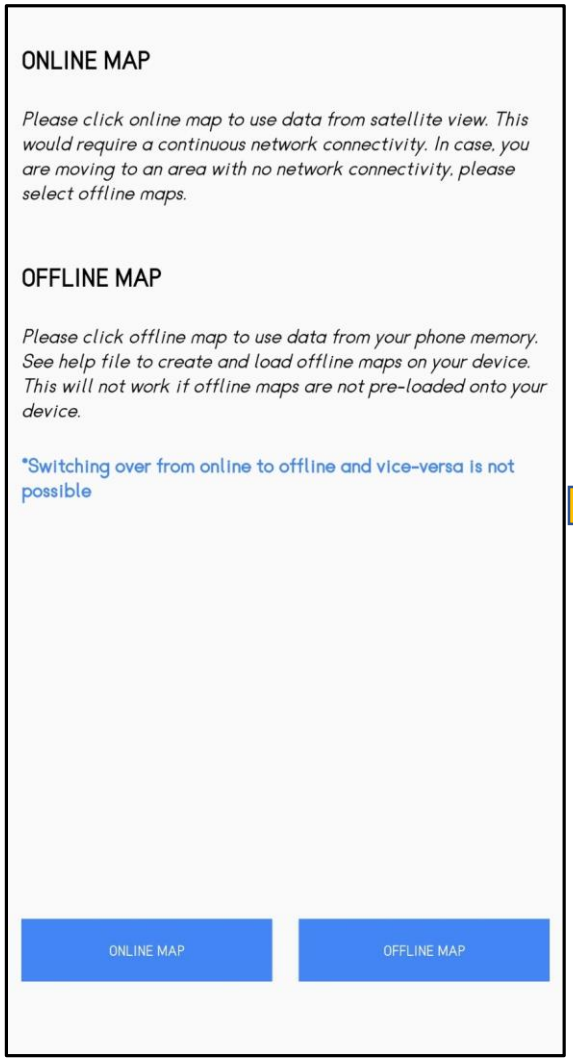
MSTrIPES Ecological app: Form 2

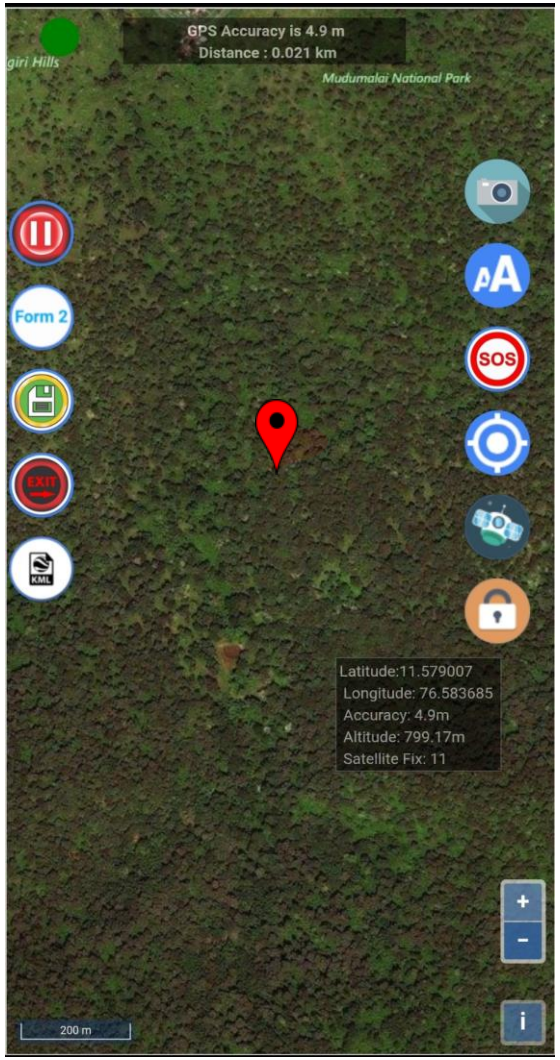


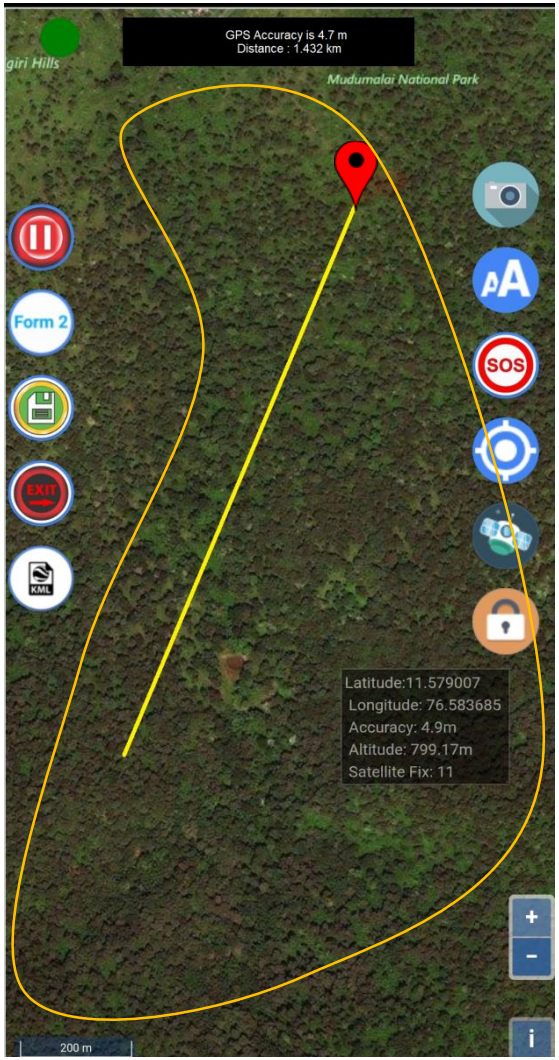




MSTrIPES ecological app: Form 2



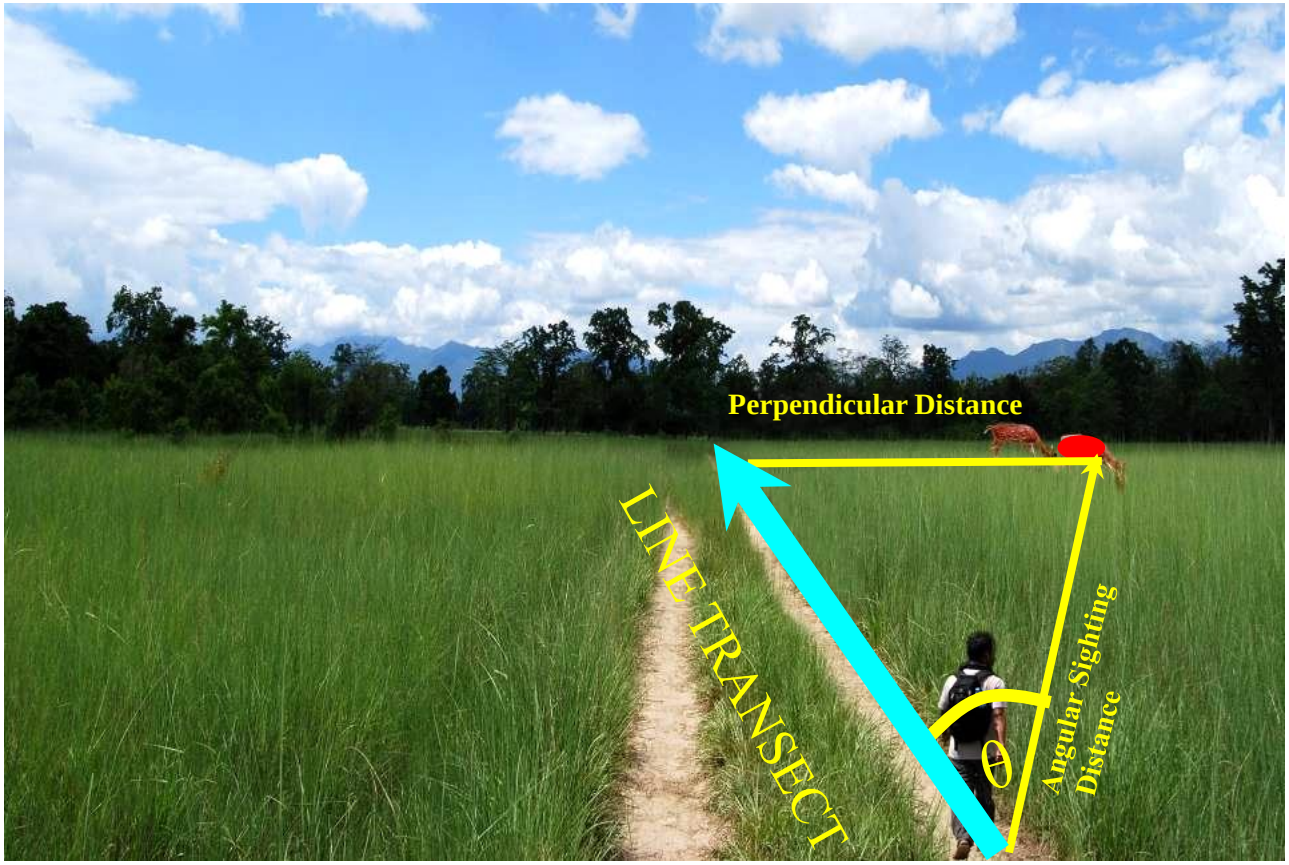




Line transect (Form 2)

Walking Line Transects

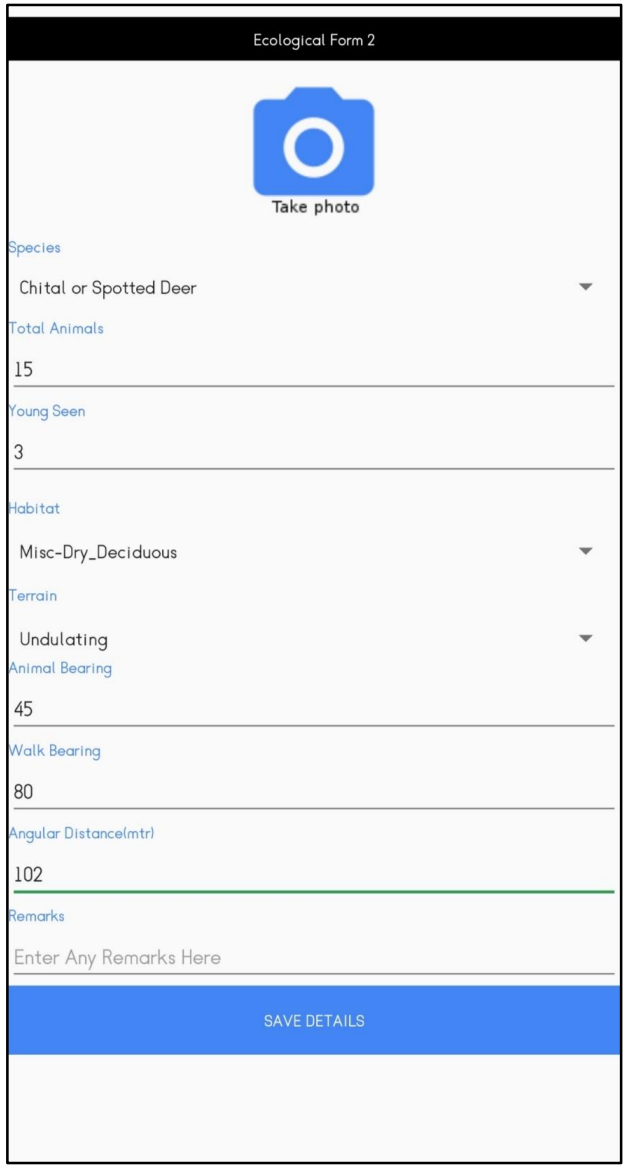
- Record **animal bearing** (suntto compass)**, transect bearing** (suntto compass)**, GPS location, distance of animal** (range finder) at every sighting
- To calculate Perpendicular Distance of the sighted animal from the transect line We record Radial Distance & Sighting Angles



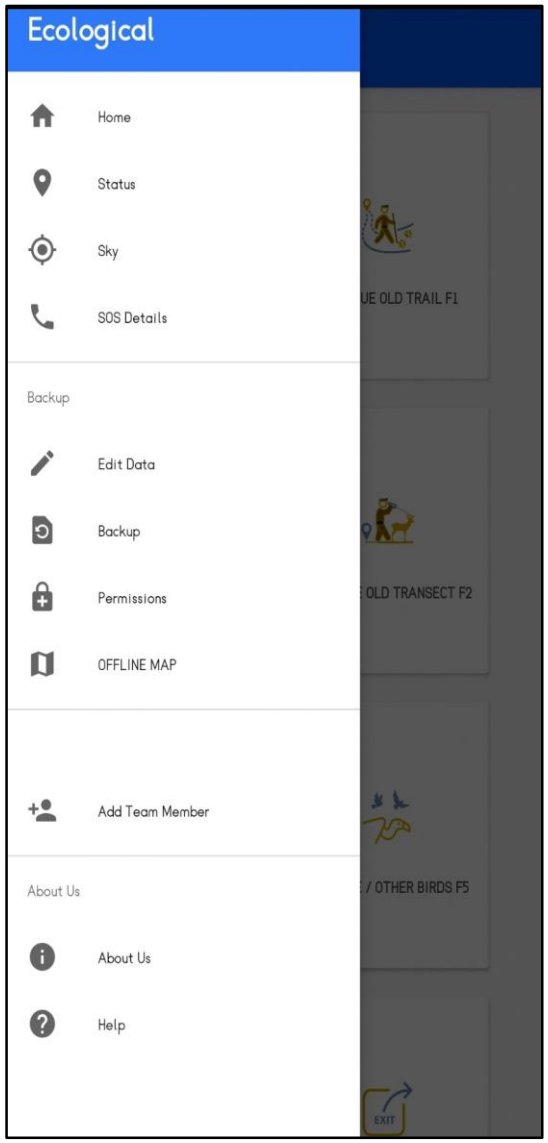
Perp. Dist= Ang. Dist * Sin Angle

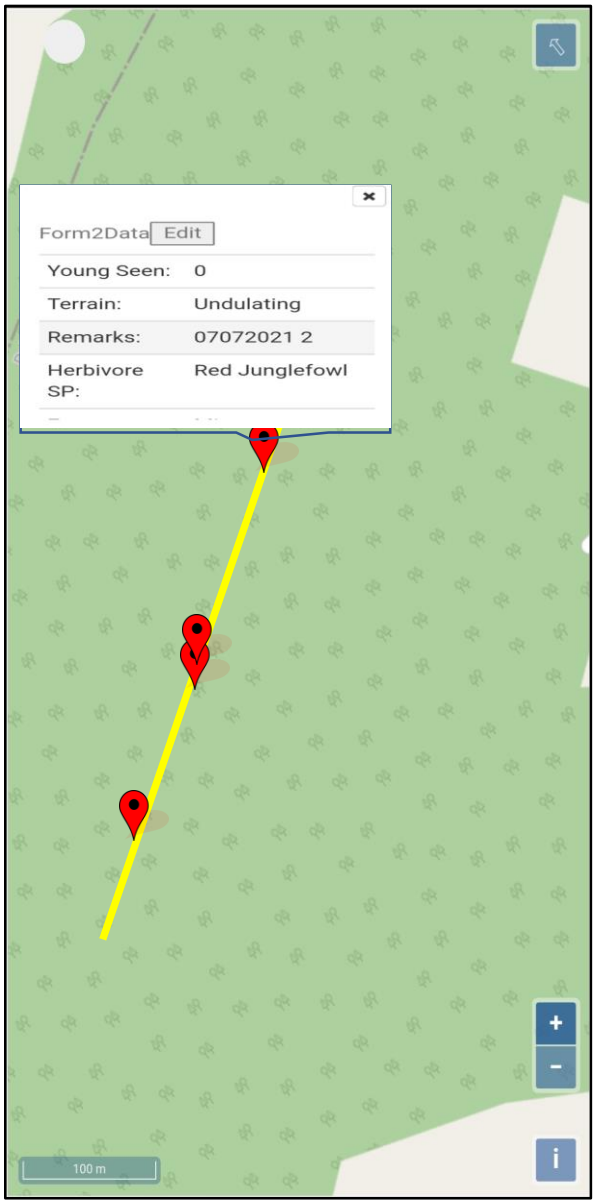
These computations are done automatically by the software.

MSTrIPES ecological app: Form 2



MSTrIPES ecological app: Form 2

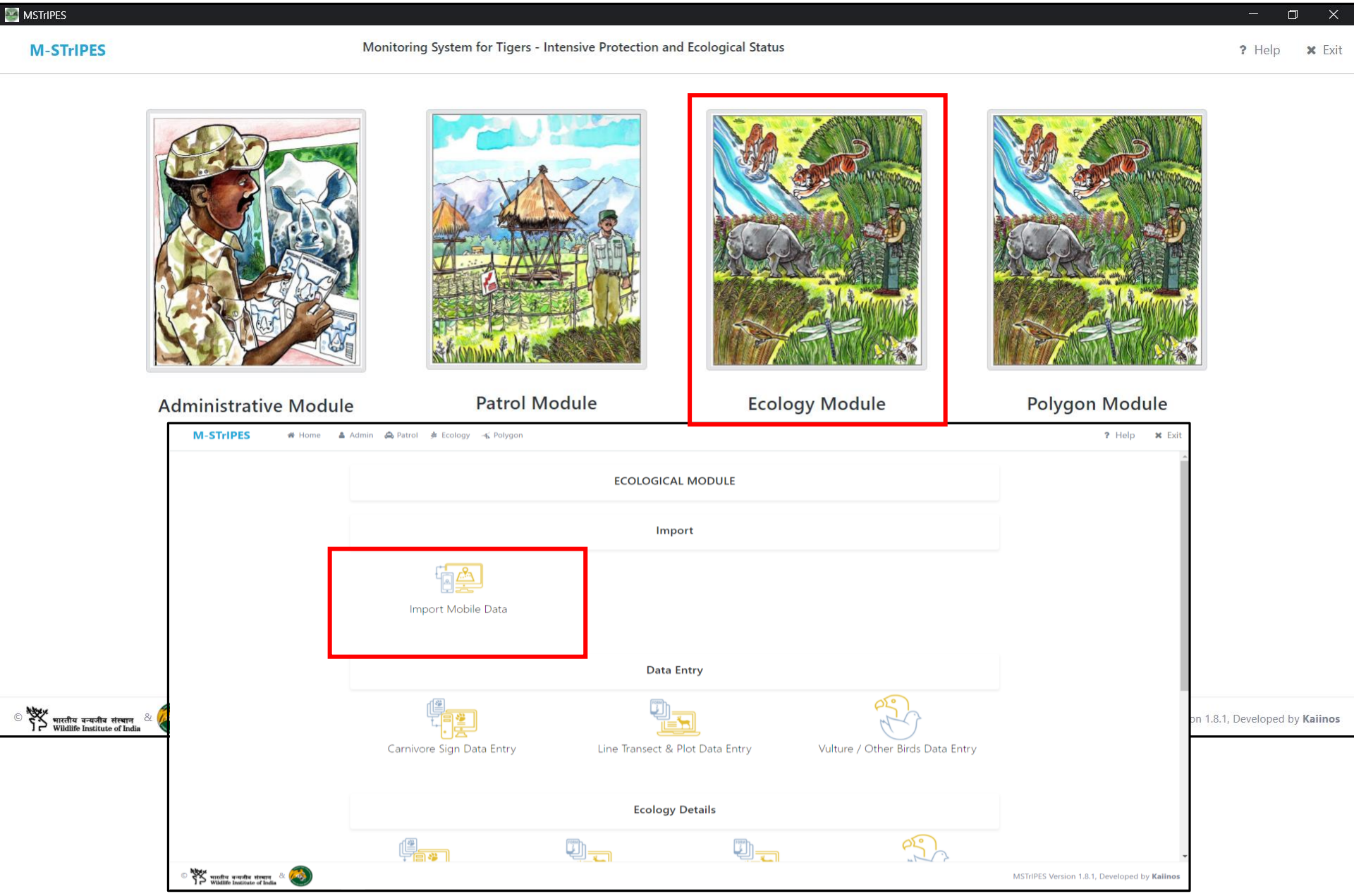




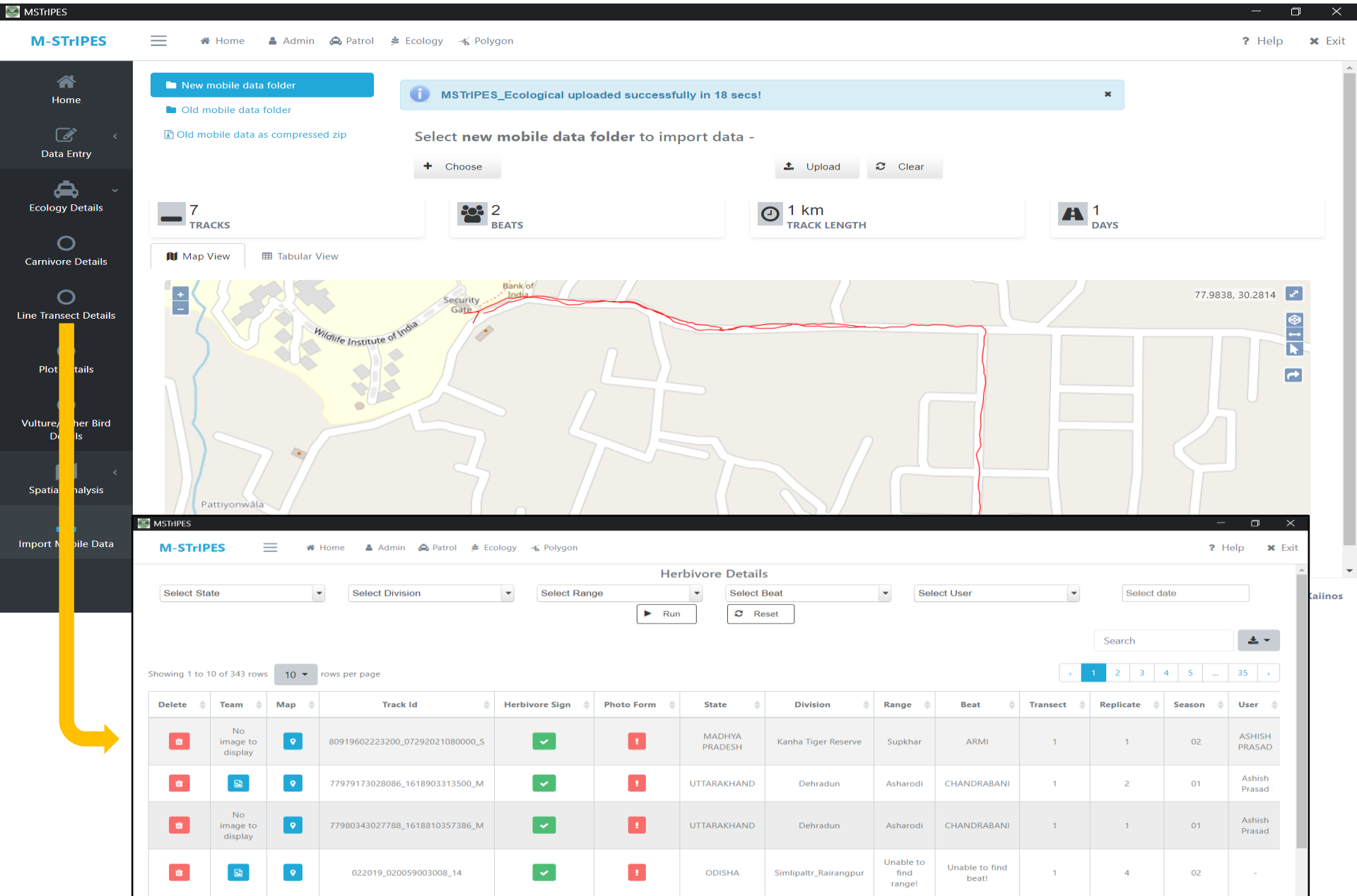
Important species to record

Important species to record

Importing in MSTrIPES desktop



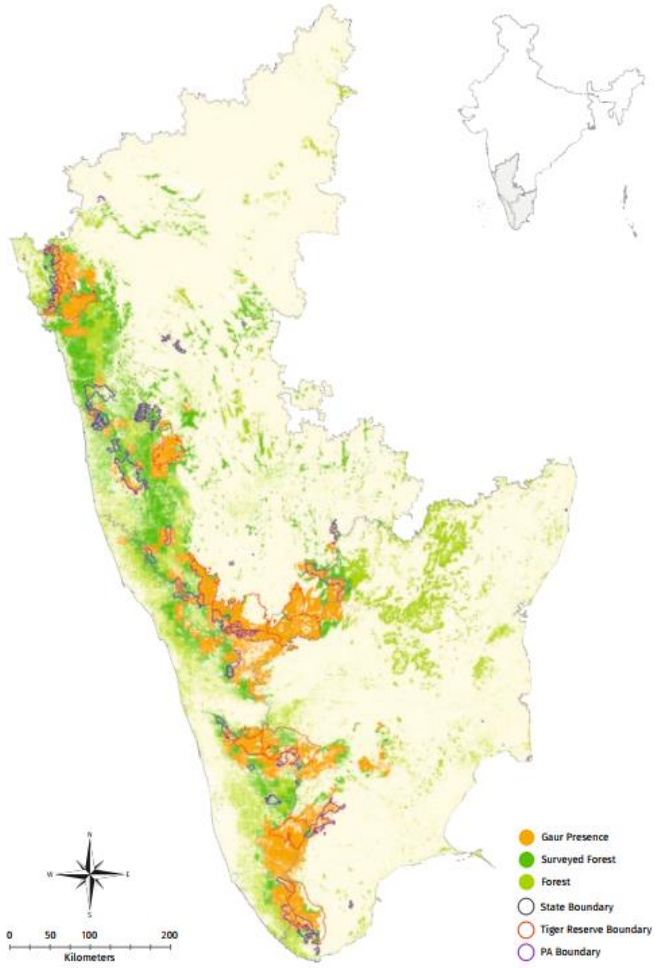
MSTrIPES Form 2 analysis



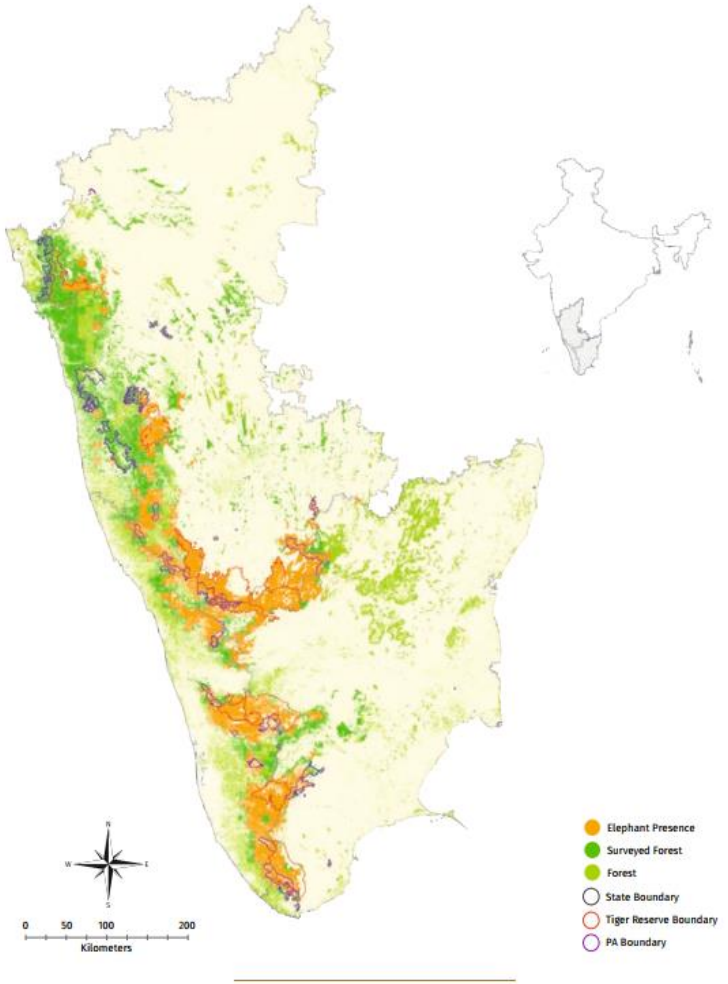
Prey distribution

The sightings are **plotted in the GIS** platform using MSTrIPES

Gaur

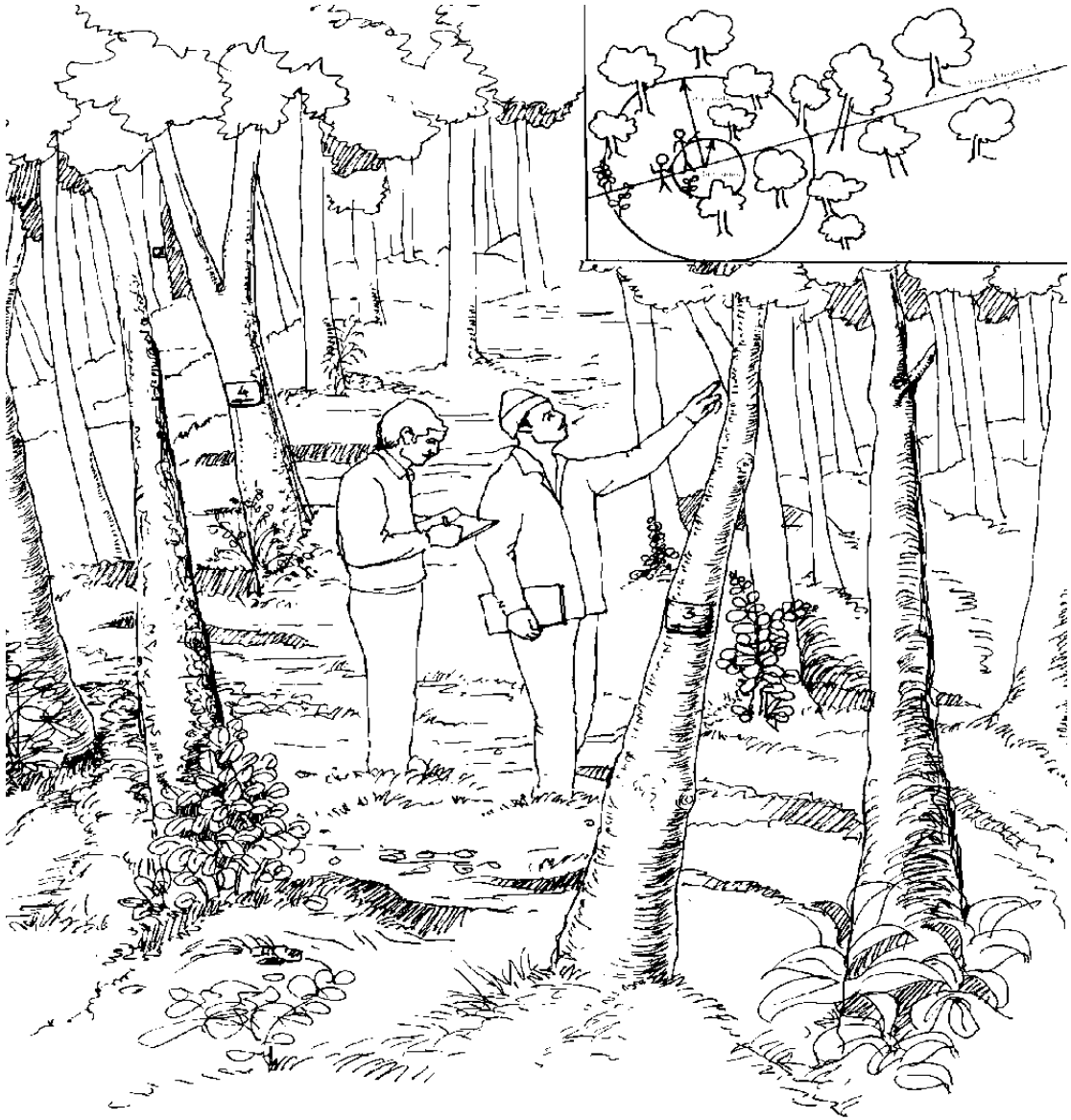


Elephant



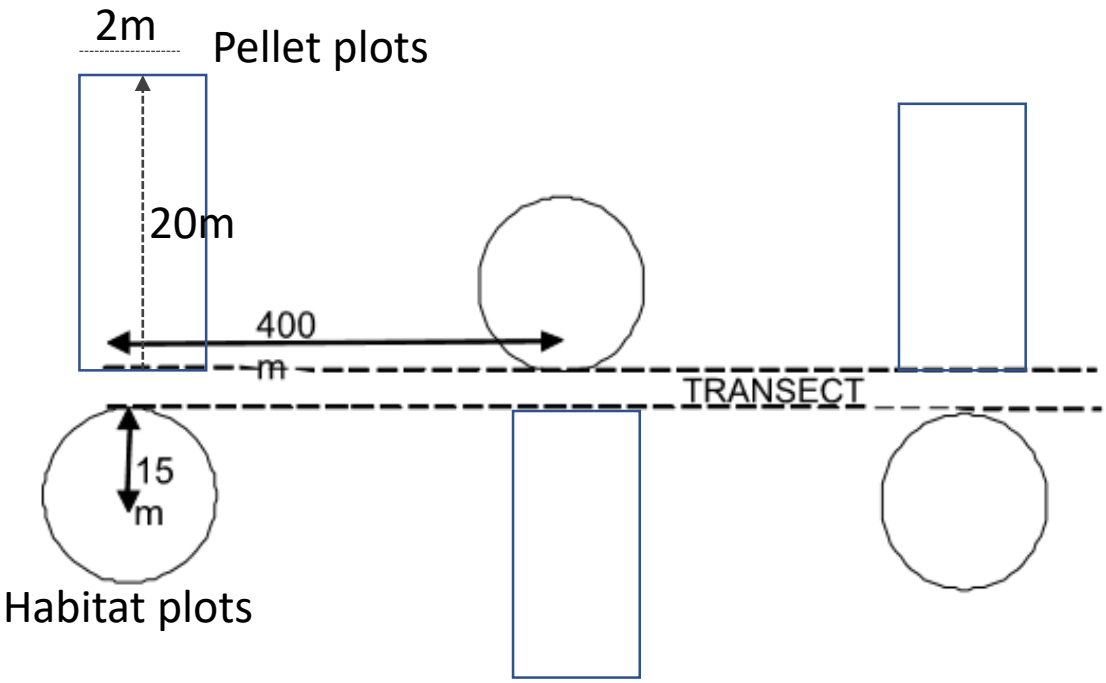
Form 3 (A,B,C) and 4: Habitat and pellet plots

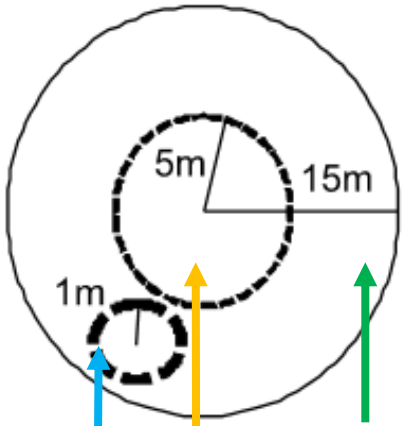
Habitat and pellet plots



- To quantify the **habitat parameters** and **human disturbance**
- **Sample Plots at every 400m interval** while returning from each transect
- **6 plots on an average on a 2 km transect**
- **Form 3** has (A) **vegetation** parameters (B) **human disturbance** signs and (C) **ground cover**
- **Form 4** to **pellet counts**

Habitat and pellet plots





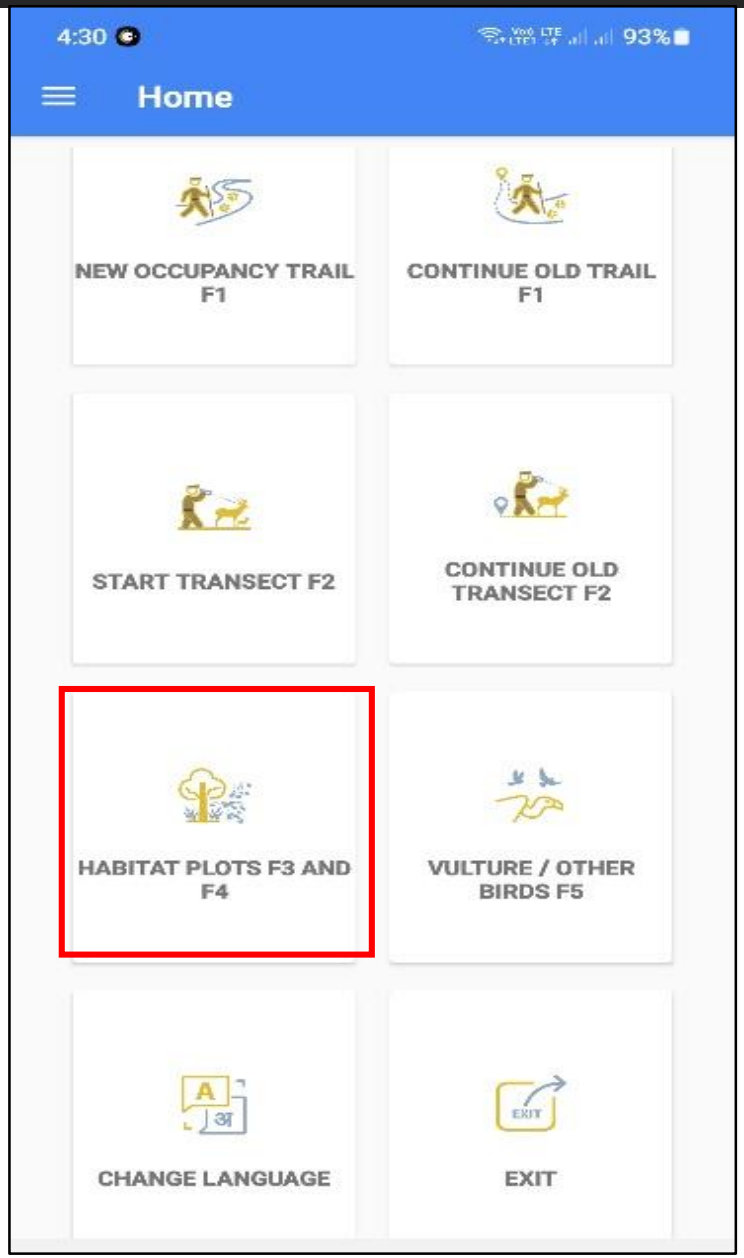
15m plot for form **3A (trees) & 3B**

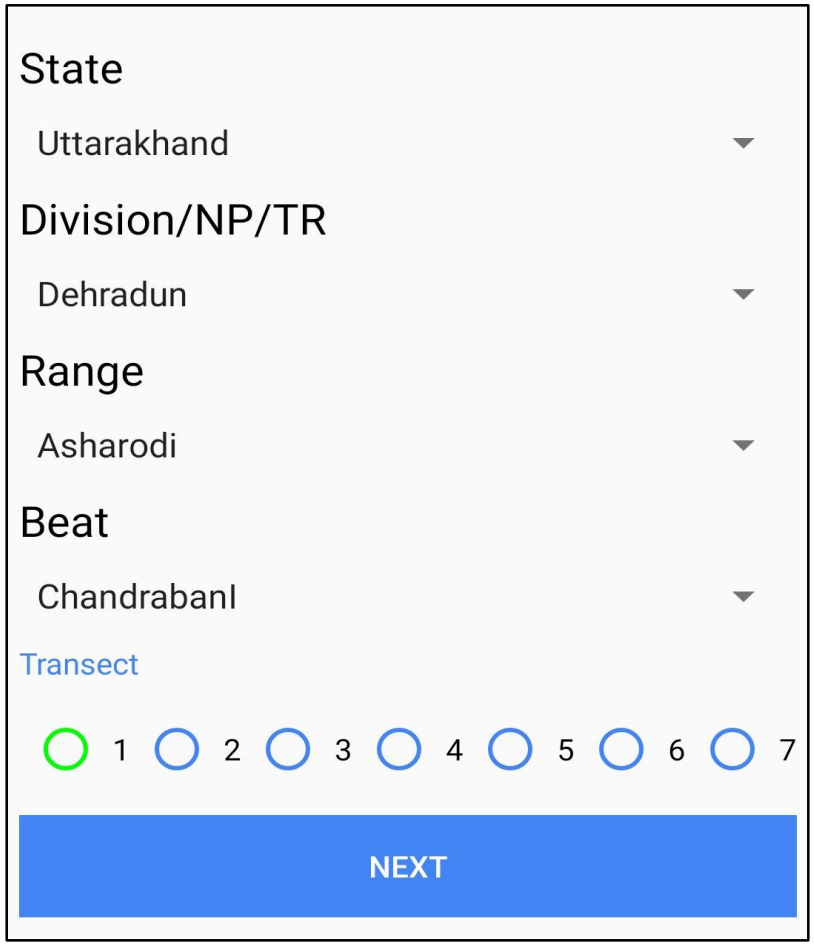
1m plot for form **3C**

5m plot for form **3A (shrub, weeds)**

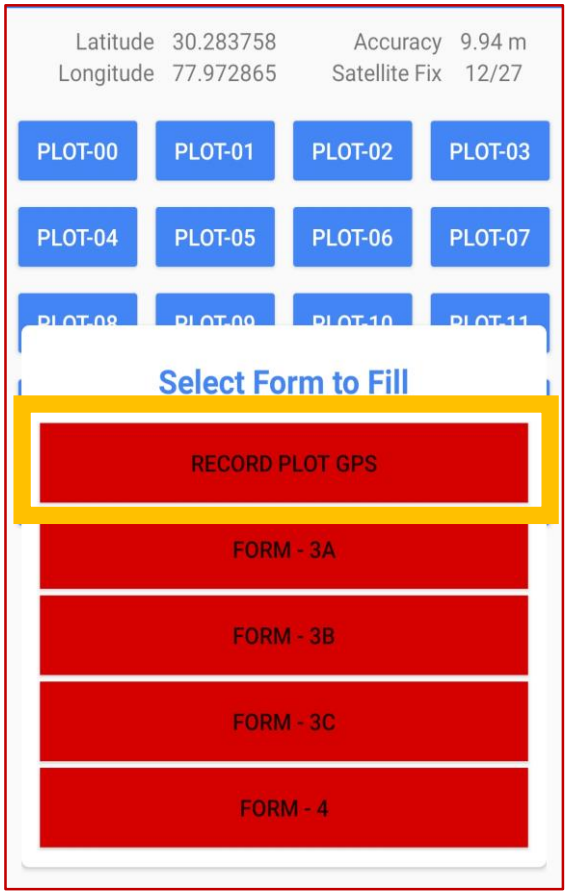
Form 3A: trees, shrubs and shruby weeds
Form 3B: Human disturbance signs
Form 3C: herbs, grass and ground cover
Form 4: ungulate pellet count

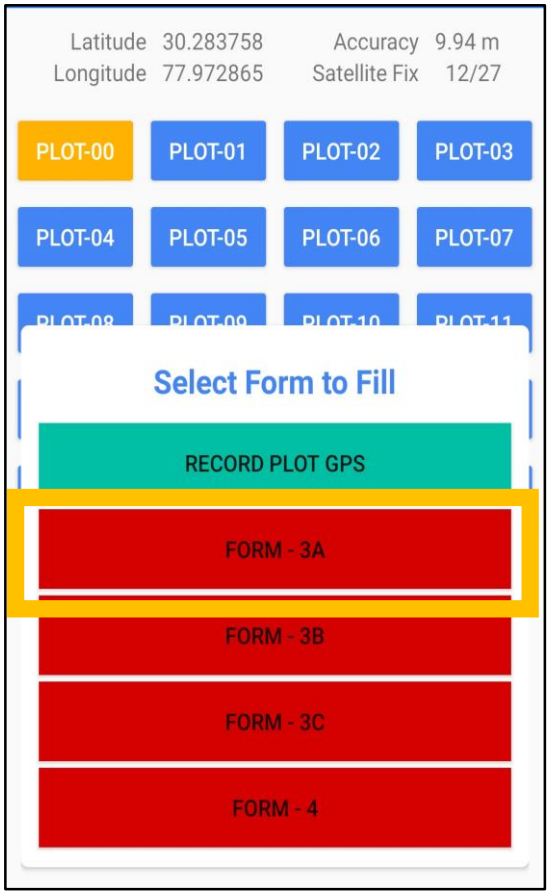
MSTrIPES ecological app: Form 3 & 4



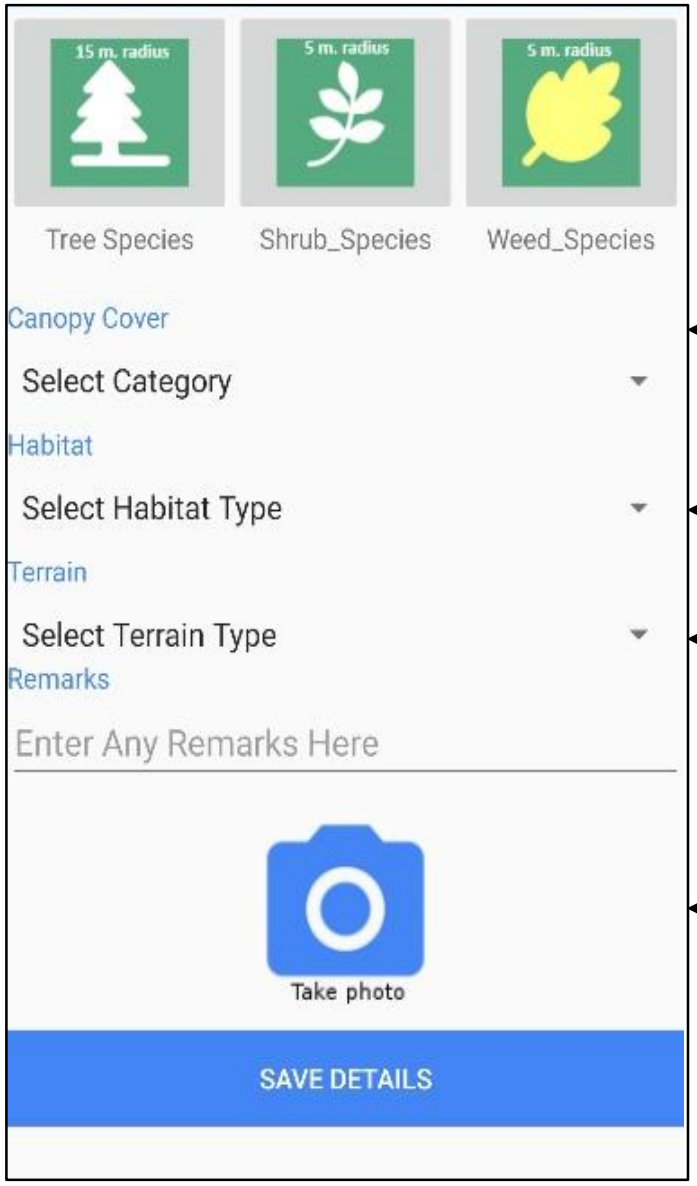


MSTrIPES ecological app: Form 3 & 4





MSTrIPES ecological app: Form 3A

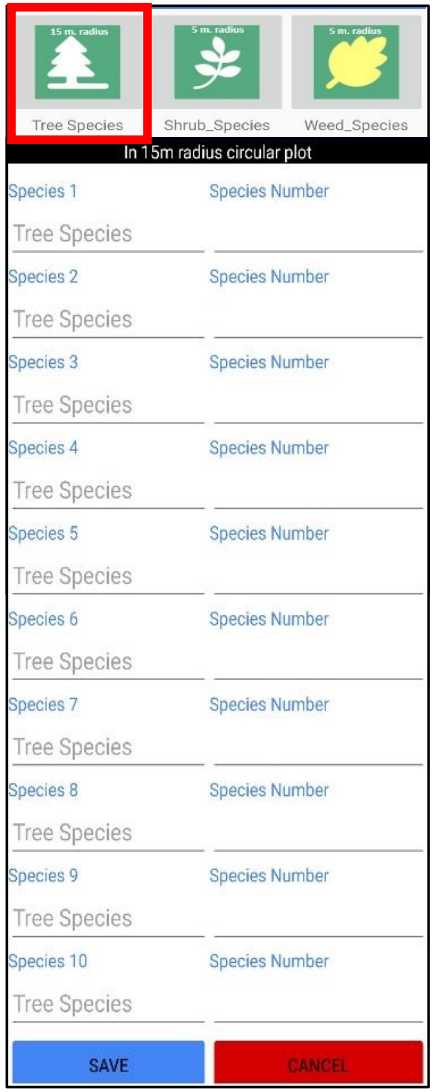


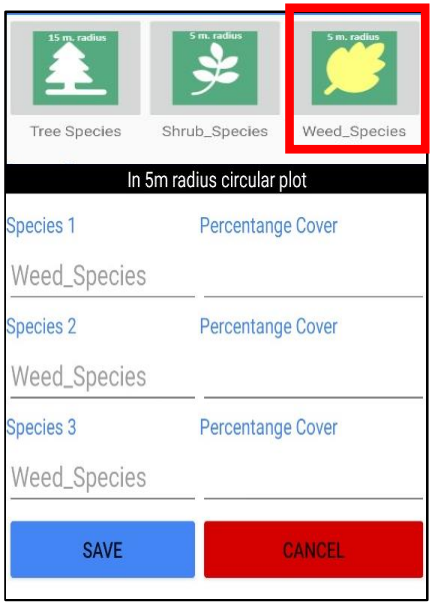
Visual canopy cover. Check with the tree number

Habitat type in the overall plot

Terrain type in the overall plot

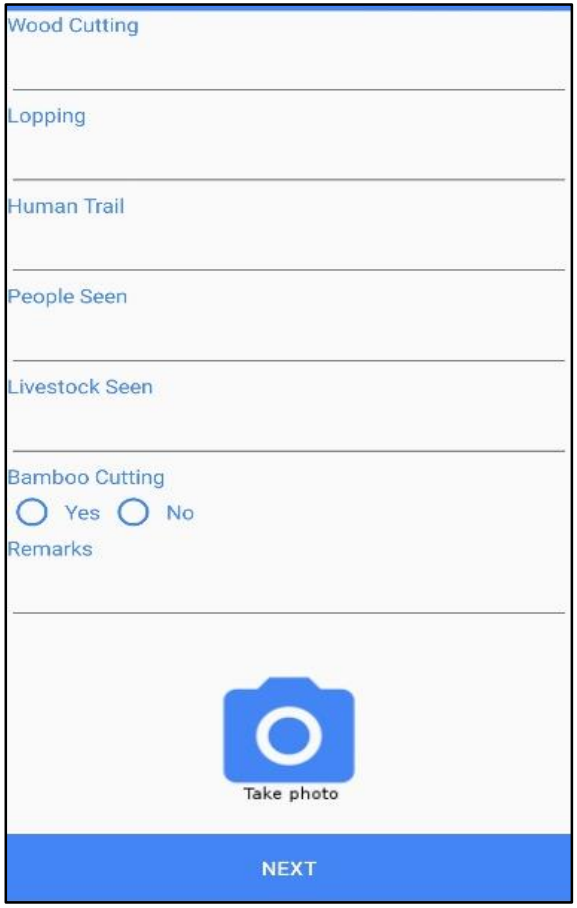
Photograph of the overall plot

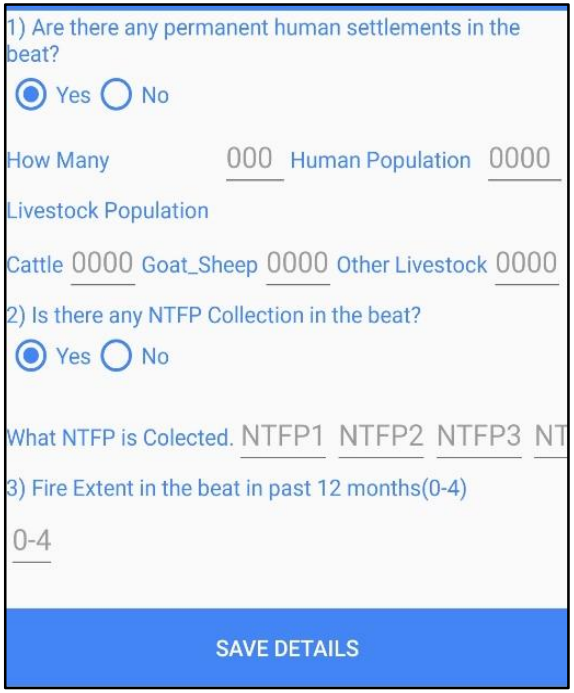




1. Common and scientific names in the drop own, provided in previous cycles
2. For trees, provide number. For shrubs and weeds, provide percent ground cover.
3. In case no species is present, enter ‘No_species’
4. In case an unidentified species is present, enter ‘unidentified species’
5. In case of additional names, please provide the list within a week

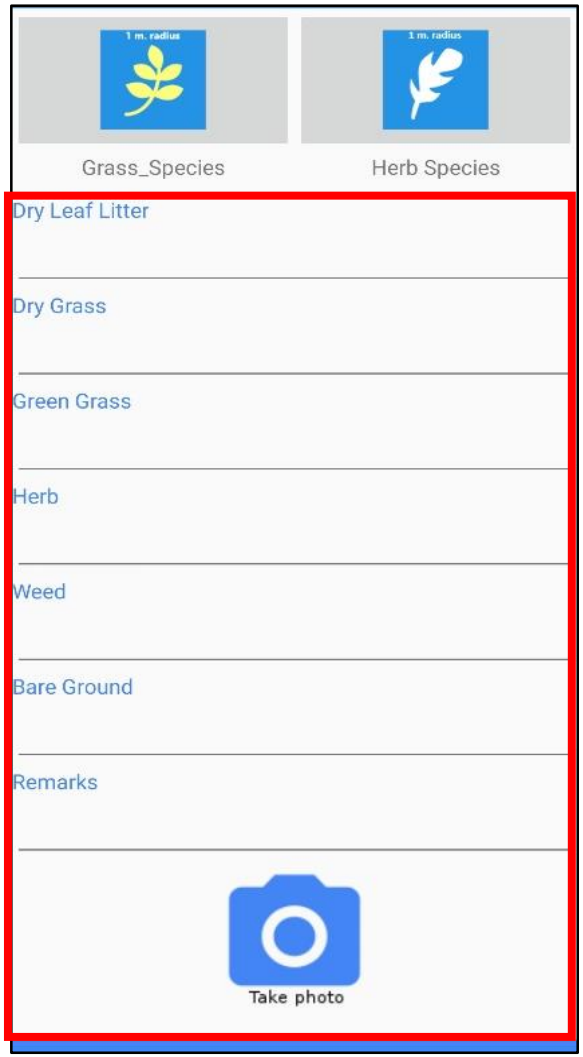
MSTrIPES ecological app: Form 3B



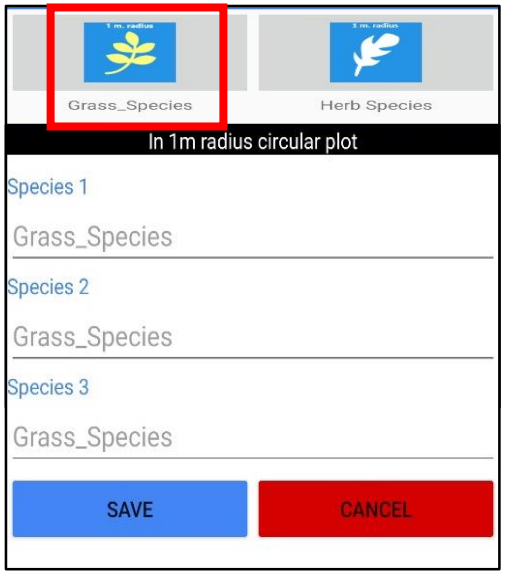


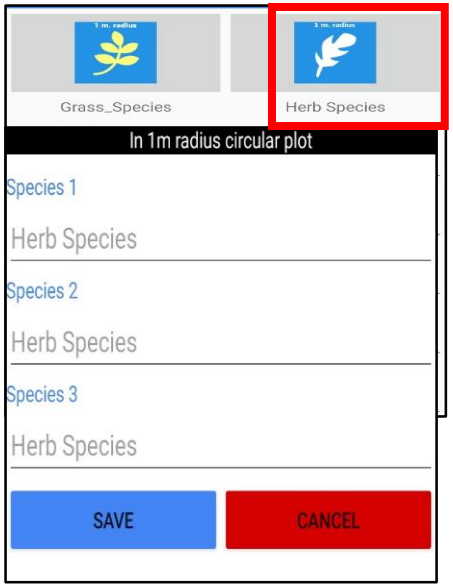
1. Count of the human impacts to be reported.
2. Enter ‘0’ if no signs found
3. Photograph depicting the human disturbance

MSTrIPES ecological app: Form 3C



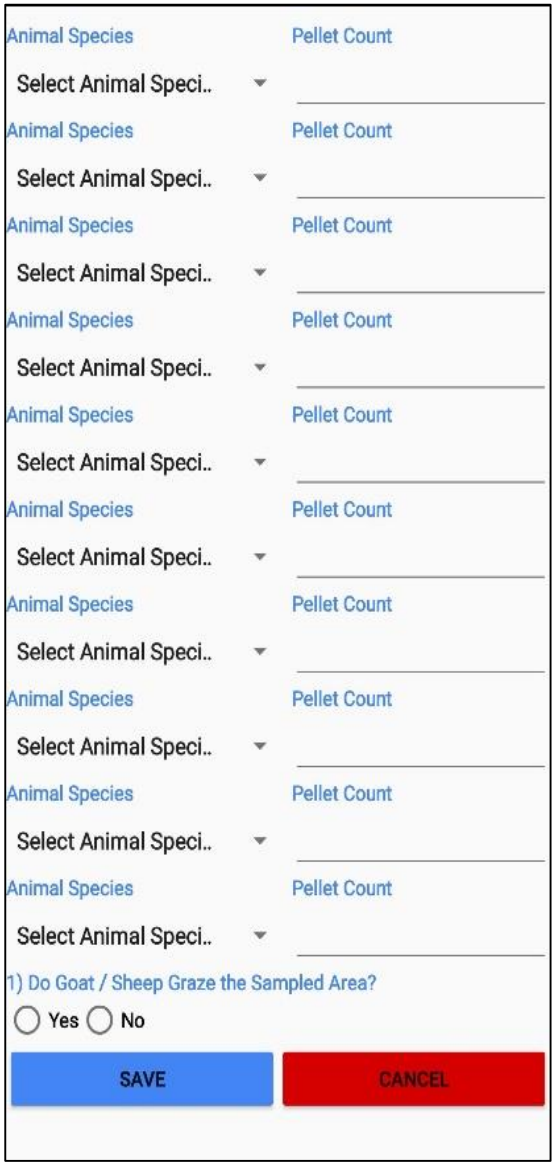
Addition, after removing the dry leaf litter should be 100%

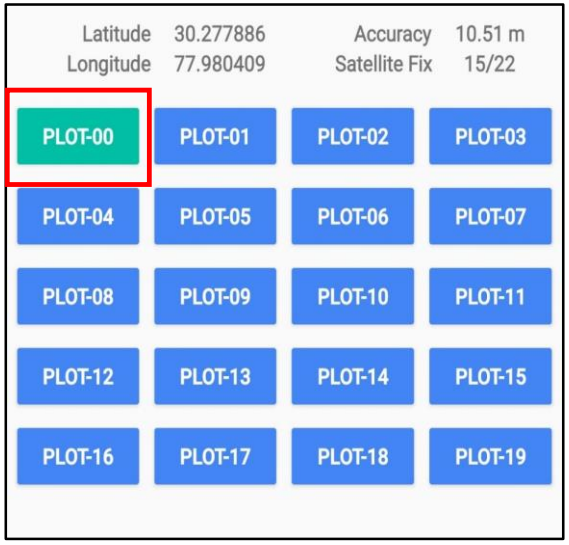




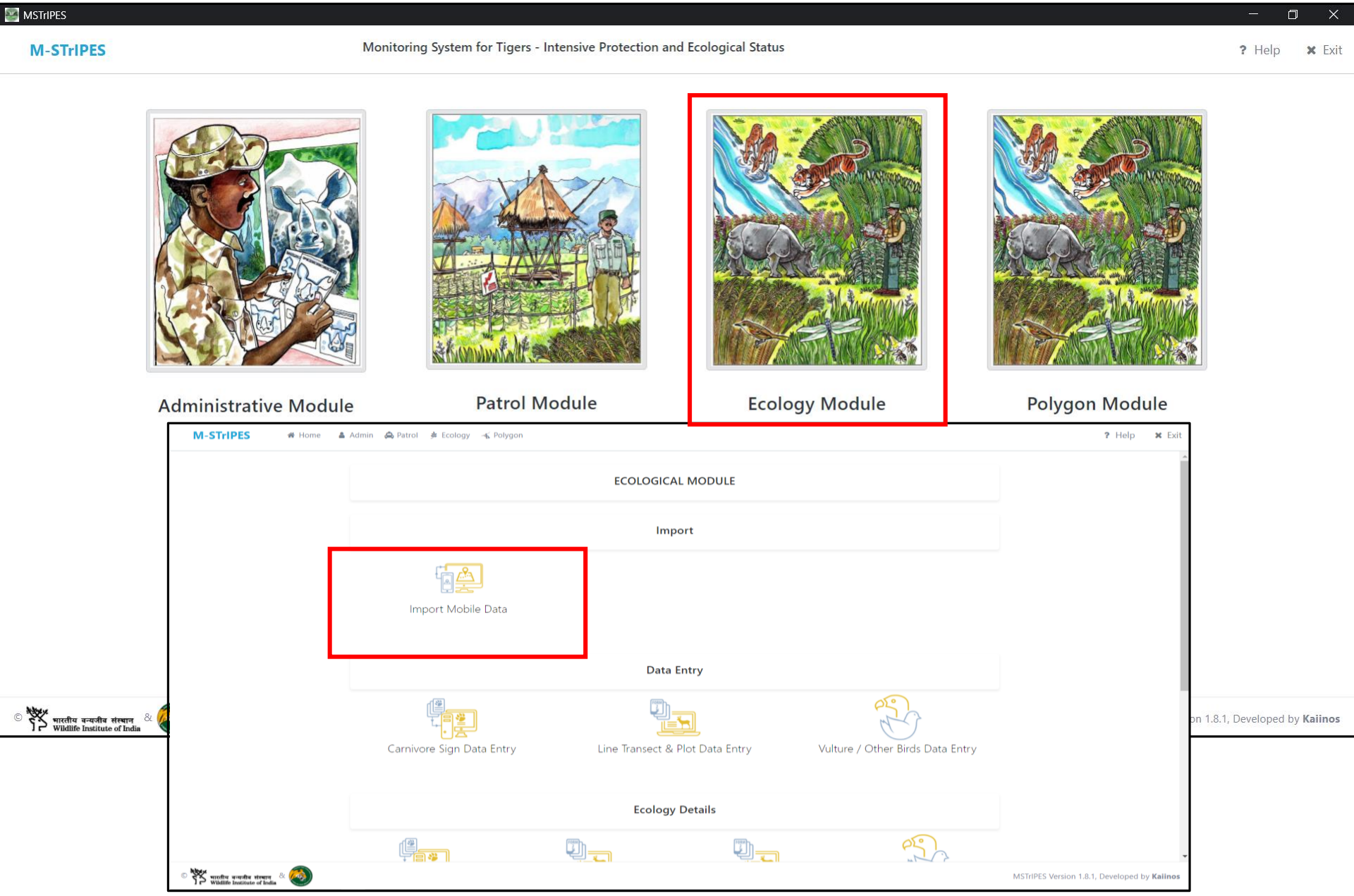
1. Percent cover of every grass species to be entered
2. Percent cover of every herb species to be entered
3. The total of all herbs/grasses can not exceed 100%
4. It has a check with the grass cover and herb cover of the ground cover form

MSTrIPES ecological app: Form 4

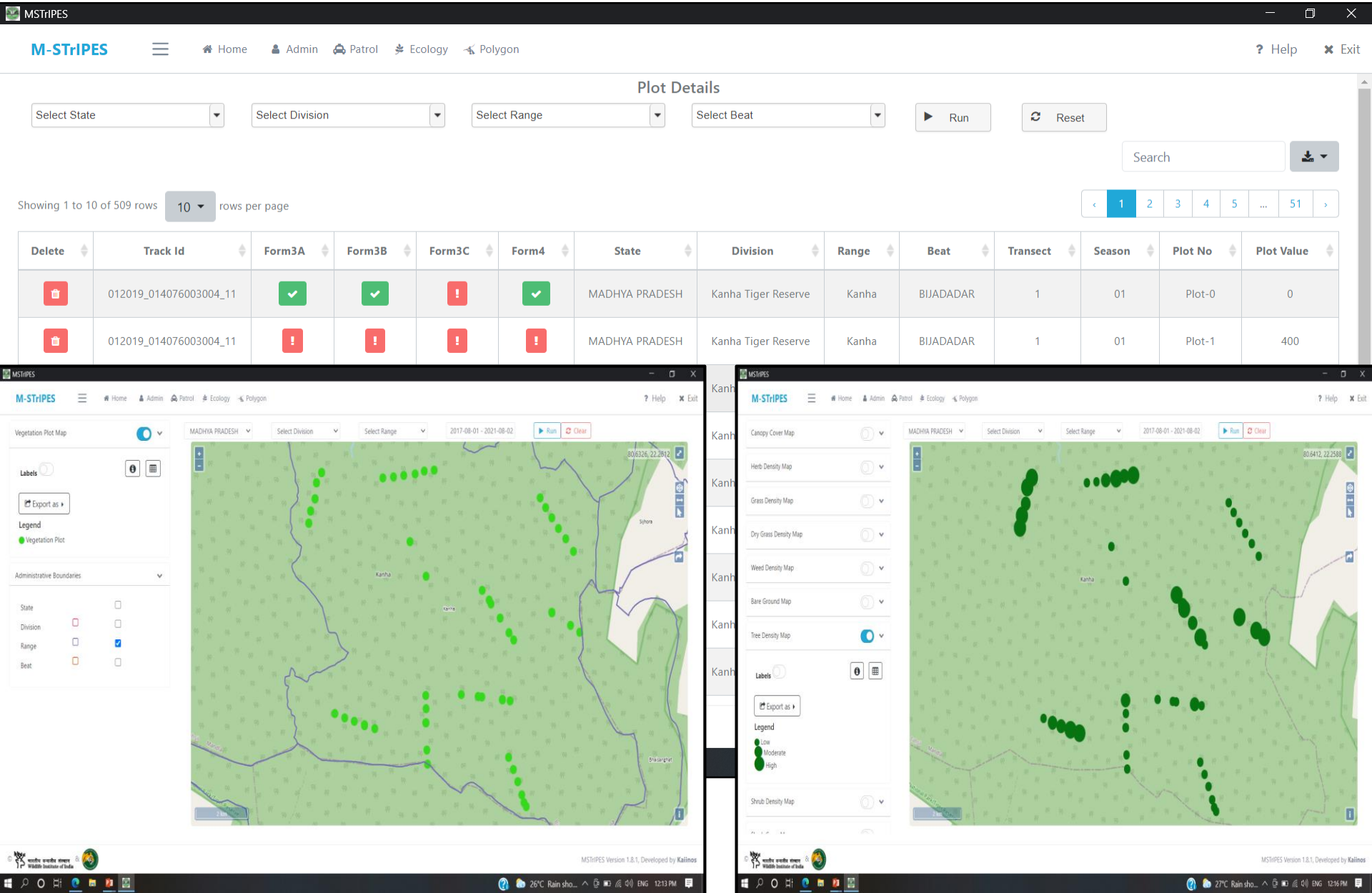




Importing in MSTrIPES desktop



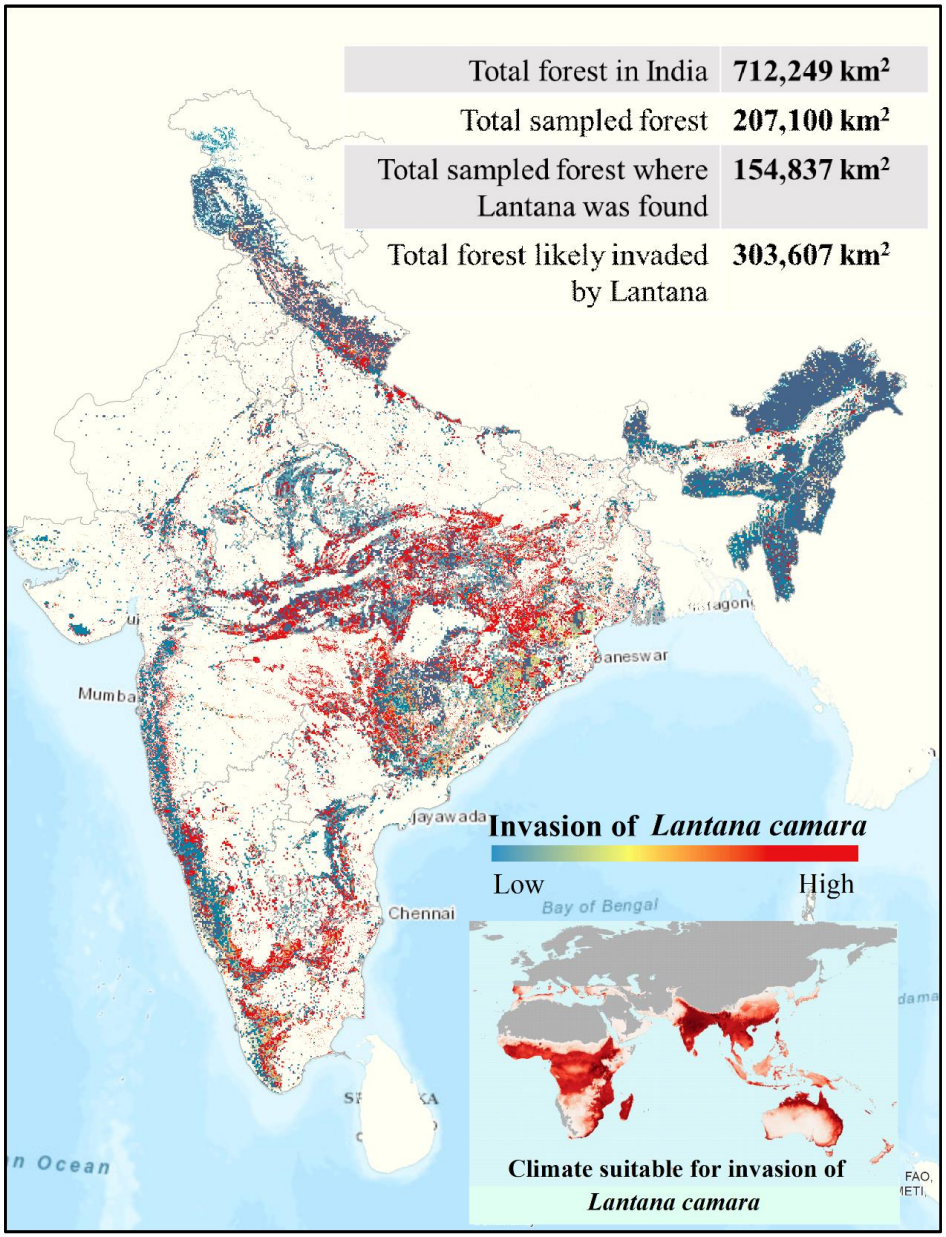
MSTrIPES Form 3 analysis



Vegetation and pellets

1. The plants/pellets are **plotted in the GIS** platform using MSTrIPES
2. At optimal scale, the densities of different important plants/pellets are calculated by using the efforts invested for sampling at that scale
3. **The densities of palatable plants, invasive weedy plants and grasses serves as a distribution map** of various species at national scale
4. **Pellet** serves as an **index for abundance of ungulates and are important for illusive and hunted** species that are difficult to sight on the line transects
5. The information derived from pellet helps refine the distribution maps of ungulate.

Invasive weed map



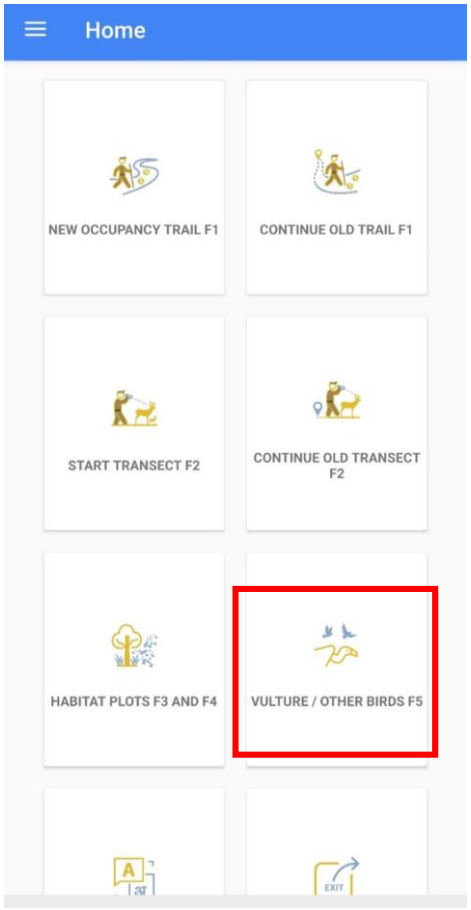
Habitat covariates

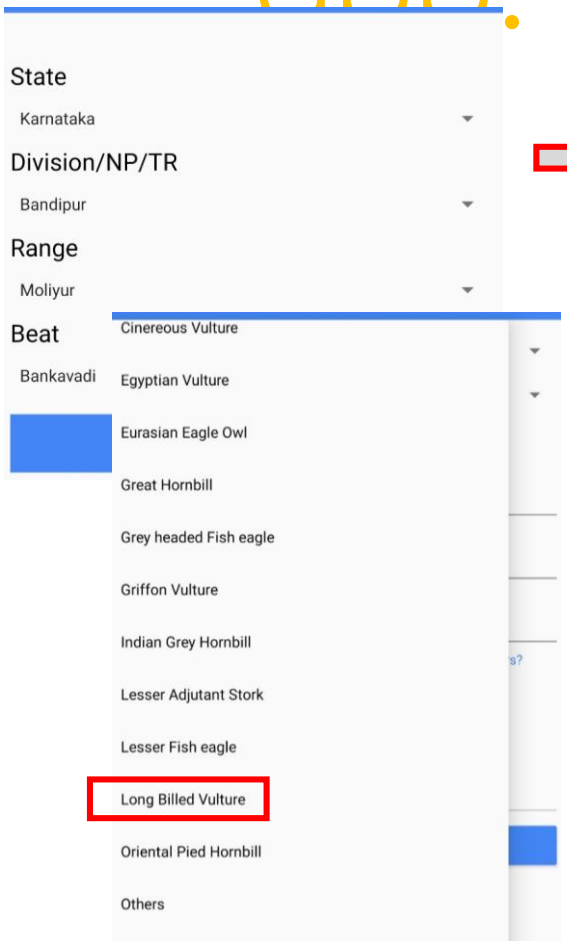
- The information from form 3 and 4 are use as covariates of habitat for estimating the densities of carnivore and herbivore species
- The human disturbance signs serve as an important predictor for tiger and leopard densities
- The grass and other plant species can serve an important covariate for understanding the densities of important ungulate species

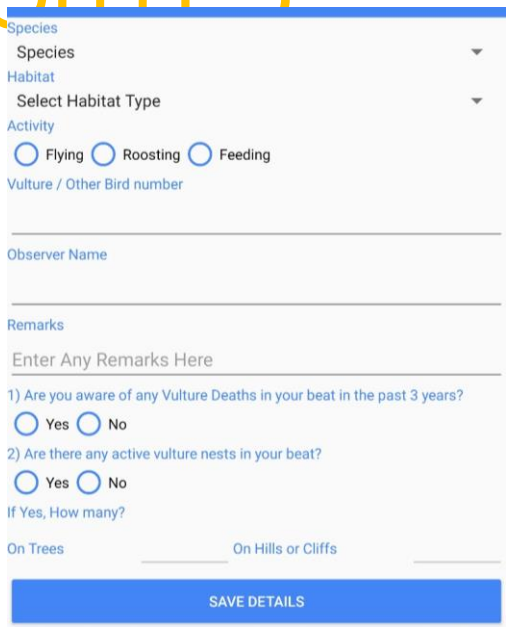
Form 5: Vulture/ Other birds

भारतीय वन्यजीव संस्थान
Wildlife Institute of India

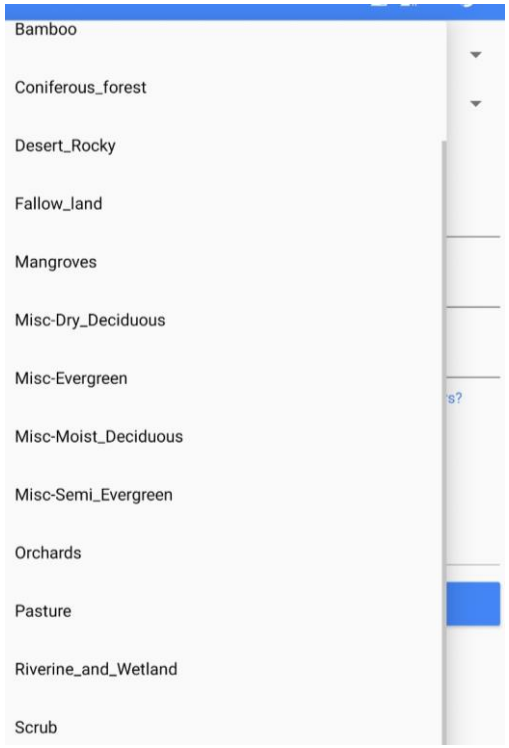
MSTrIPES ecological app: Form 5

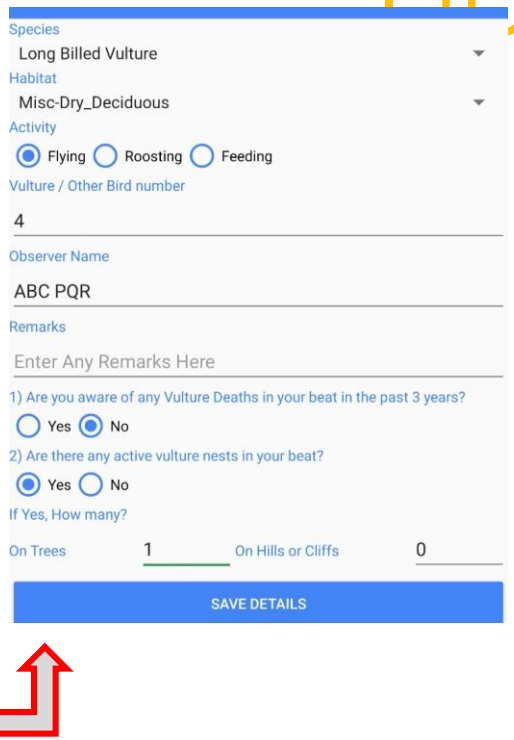


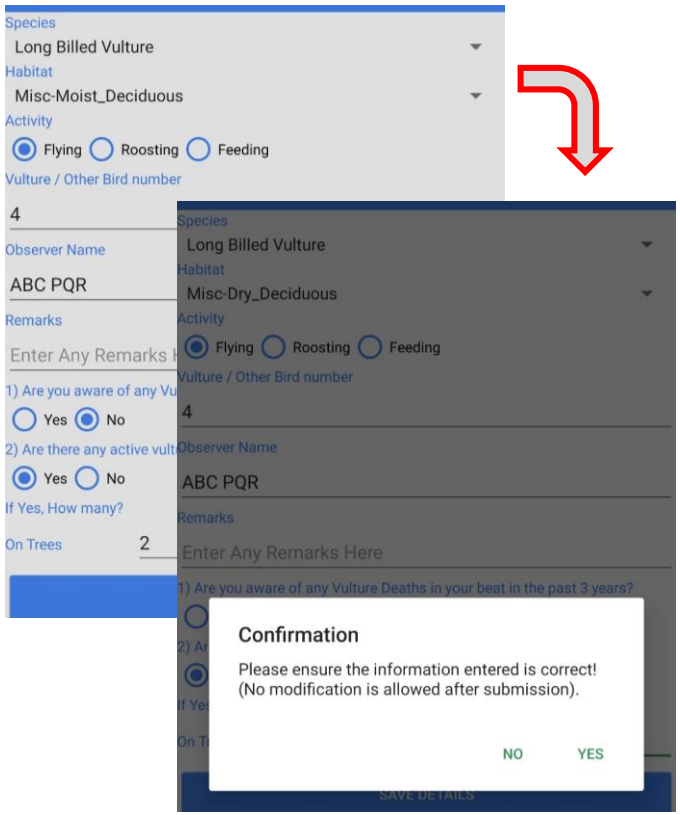




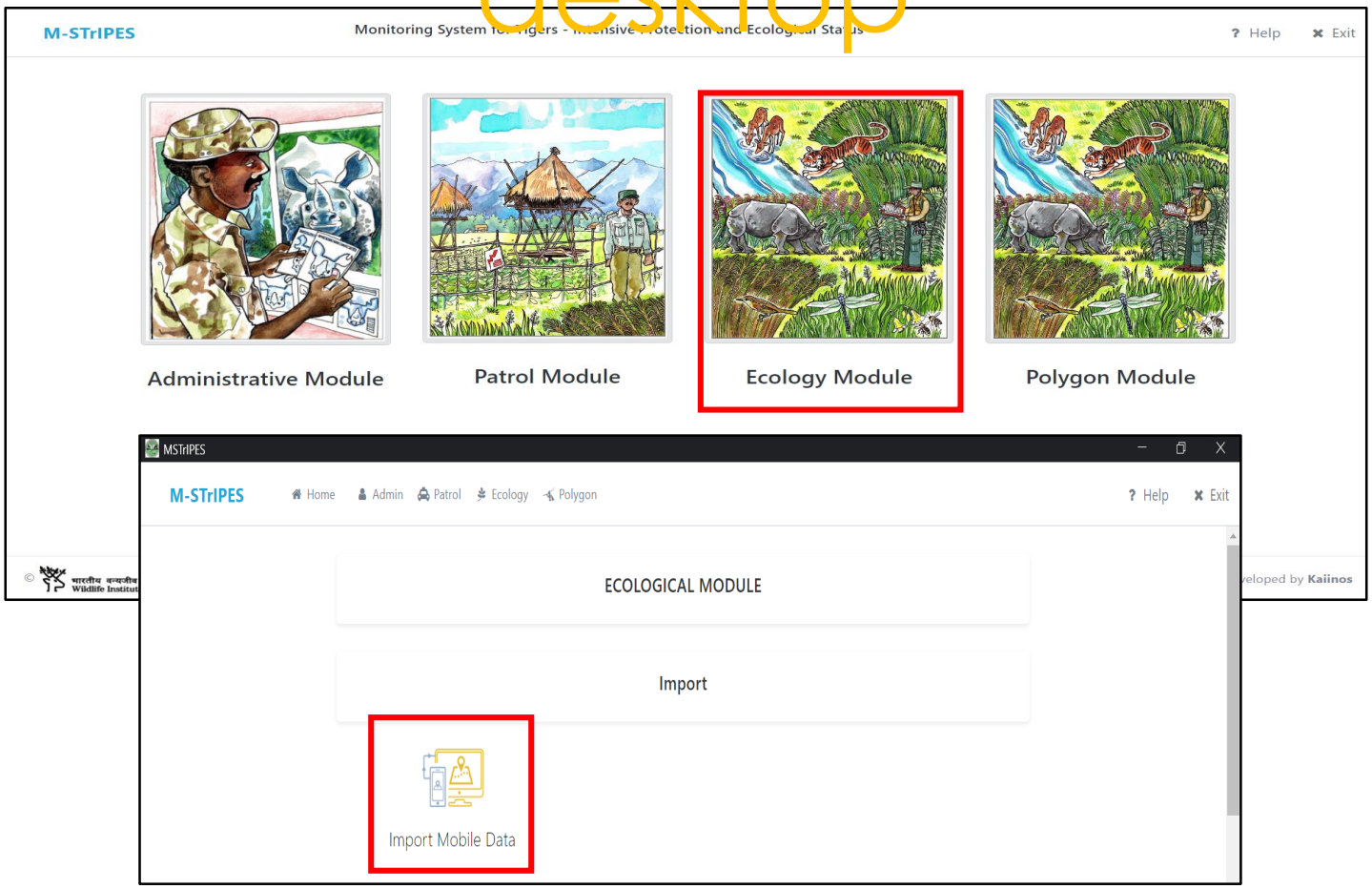
MSTrIPES ecological app: Form 5



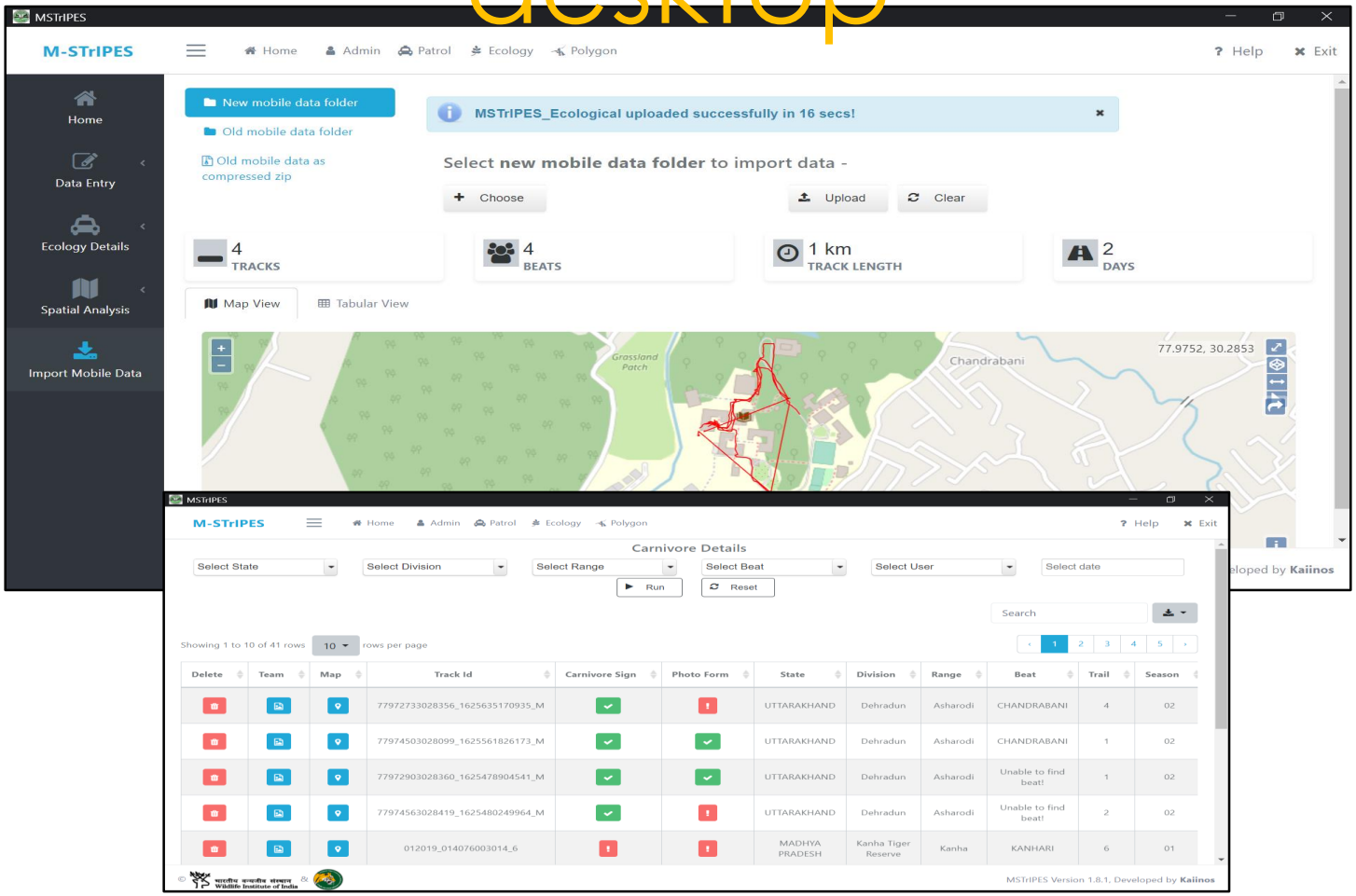


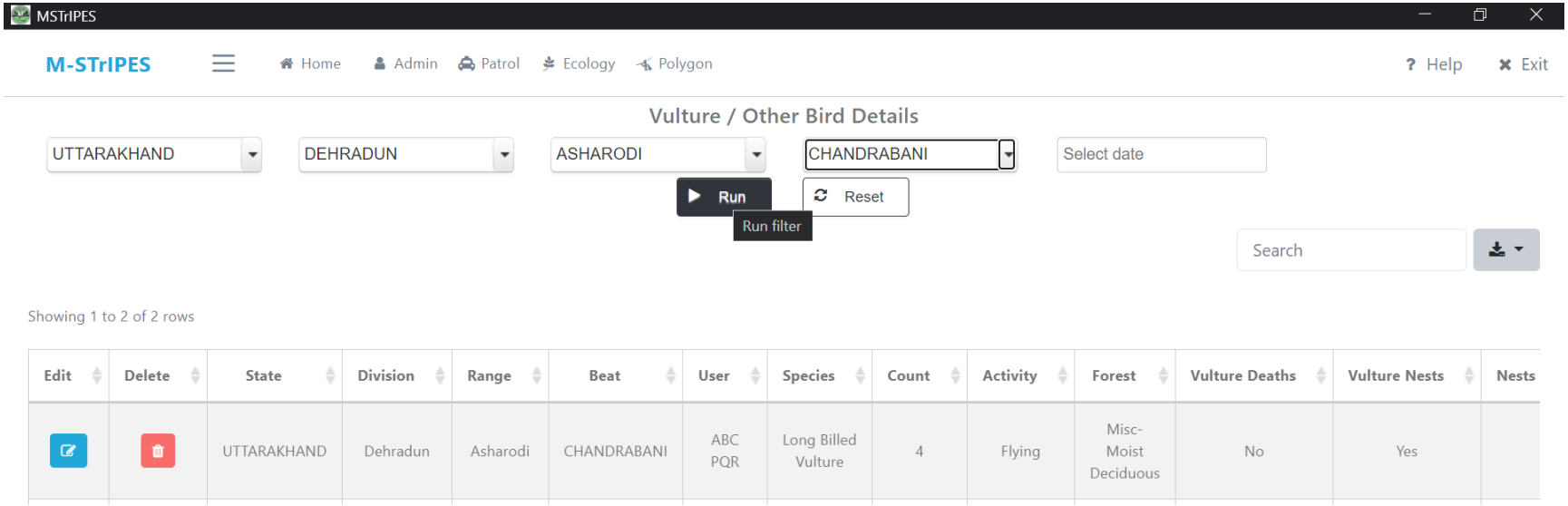


Importing in MSTrIPES desktop



Importing in MSTrIPES desktop

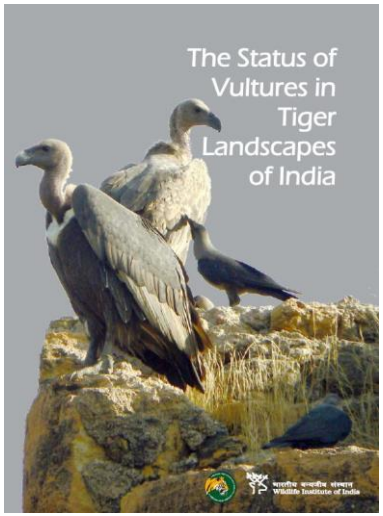



MSTrIPES
M-STrIPES
Home
Admin
Patrol
Ecology
Polygon
Help
Exit
Vulture / Other Bird Details
UTTARAKHAND
DEHRADUN
ASHARODI
CHANDRABANI
Select date
Run
Reset
Run filter
Search
Showing 1 to 2 of 2 rows
Edit
Delete
State
Division
Range
Beat
User
Species
Count
Activity
Forest
Vulture Deaths
Vulture Nests
Nests
UTTARAKHAND
Dehradun
Asharodi
CHANDRABANI
ABC
PQR
Long Billed Vulture
4
Flying
Misc-Moist Deciduous
No
Yes

Vulture/ Other birds distribution

1. Observations are mapped to grids/ administrative units using GIS operation in MSTrIPES.

2. No. of observations of vultures/ other birds vis-a-vis species mapped to 100 sq. km. grids/ administrative units serve as distribution map of these birds at regional and national scale.




Thank You