MONITORING TIGERS, CO-PREDATORS, PREY AND THEIR HABITAT

4TH NATIONAL TIGER ESTIMATION-2018

Outline and Protocol for the Field Data Collection

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DISCLAIMER

- This presentation is a simplified version of the approved protocols provided by WII and NTCA and the revised instruction. There may be slight modifications based on the previous & recent field experiences and the local requirements. Users are requested to refer to the NTCA/WII guide for the original instructions.
Objectives of National Tiger Assessment Exercise

*To understand (map) Spatial occupancy i.e. presence or absence and relative abundance of wild animals for facilitating better management of wildlife.*
Broad outline of the Presentation

1. Understanding the methodology
2. Design/Outline
3. Procedure for field data collection
   a. Using the paper Forms
   b. Using MSTrIPES App
   c. Data entry/Data transfer
4. Planning for the present exercise - 2018
   a. Advance planning; b. Planning during the field work
   c. Planning Post- data collection activities
5. Resources needed
   a. Material  b. Manpower  c. Training
6. Problems, Errors, FAQs and Suggestions
1. Understanding the methodology

- This is not a traditional waterhole count method. **No machans** required. **No plaster cast or pugmark tracing needed**

- In this method, counting the exact numbers of tigers is not expected. (except may be in Phase IV/ Source population monitoring for minimum number)

- This methodology doesn’t restrict field activities just for a day or two, or only for the full moon, summer period etc.
...Understanding the methodology

▪ This methodology is simple and statistically robust, useful across the *tiger landscape*.

▪ The tiger estimation is based on the study of *sampling units* (i.e. beats) systematically distributed throughout the Tiger landscape.

▪ Outcome of this technique is in the form of *Spatial occupancy (presence/absence)* and *relative abundance* of animals as opposed to the ‘*Total count*’ of animals.

▪ Sampling unit, i.e. ‘Beat’ will be explored for *carnivore sign survey, ungulate abundance, human disturbance and the vegetation (Habitat features).*
...Understanding the methodology

- A sub-sample of landscape will be sampled again by the experts for absolute tiger density. *(Double sampling-Phase II, III).* Phase IV photo-capture data collected by Tiger Reserves, PAs will also be utilized.

- Indices will be calibrated against absolute densities and used in extrapolation for the entire landscape.

*(‘Occupancy modeling’, ‘detection probability’, ‘data collection protocol’ etc. for various habitat types have been already tested and streamlined by the Wildlife Institute of India during the previous cycles and subsequent studies.)*
Field data collected by a beat guard is useful not only for his own area but also for the entire landscape.

*Casually collected, manipulated or cooked-up data* by few individuals can distort the results of entire landscape.

*In this methodology, even absence of carnivore signs or herbivores in the sampling unit or Beat is an important observation.* So no false entries should be made.
This activity will be scrupulously monitored and cross-checked by the experts. No scope for entering incorrect GPS coordinates in the forms because the digitized maps overlaid on the GIS framework will detect the incorrectly recorded data.

Appropriate review of the activities may be taken by the subject experts at national/international level.

Only honestly and correctly recorded data will help getting the correct results.
<table>
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<tr>
<th>PHASE I*</th>
<th>Carnivore &amp; Mega herbivore sign Survey</th>
<th>Prey abundance</th>
<th>Habitat indices</th>
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<td>STATE Forest Department (SFD)</td>
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**Beat level sampling 10-15 sq km**

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<td>WII &amp; NTCA</td>
<td>Landscape complex characterization (Remotely sensed and attribute data in GIS)</td>
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<td>WII &amp; SFD</td>
<td>Occupancy and relative abundance, Spacio-temporal monitoring</td>
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<th>PHASE IV</th>
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<td>FIELD MANAGERS, WII, NTCA</td>
<td>Intensive monitoring of source population</td>
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1. Tiger density through capture-recapture framework
2. Ungulate density through Distance sampling
3. For getting the minimum no. of tigers

**Complete Phase-wise plan of Tiger/Prey/Habitat monitoring**

**PHASE I**

- State Forest Department (SFD)

**PHASE II**

- Wildlife Institute (WII) & National Tiger Conservation Authority (NTCA)

**PHASE III**

- Wildlife Institute (WII) & State Forest Department (SFD)

**PHASE IV**

- Field Managers, WII, NTCA

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- Human Disturbance index
- Prey abundance
- Landscape complex characterization
- Habitat indices
- Carnivore & Mega herbivore sign Survey
- Occupancy and relative abundance, Spacio-temporal monitoring
- Beat level sampling 10-15 sq km
- Modelling patterns underlying tiger occupancy, Source Population and Connectivity
- Sub sampling for absolute abundance
  1. Tiger density through capture-recapture framework
  2. Ungulate density through Distance sampling
- Convert indices to density and numbers
- Complete Phase-wise plan of Tiger/Prey/Habitat monitoring
Out of the 4 phases discussed in preceding table, our present discussion is restricted only to the exercise to be carried out under Phase I by the field foresters.

Phase II & III will be carried out by the experts from WII/NTCA, in selective areas where Phase I data had been collected. (Phase IV is a specialized exercise for source population i.e. ‘Tiger Reserves’ which is expected to be carried out by the Tiger reserve managers twice every year. This year, the P-IV data of the tiger reserve will be used as P-III for the National Tiger Assessment, 2018. For the TR, the sign encounter and ungulate/animal encounter studies of P-I are done more extensively with more replicates.)
2. Design/Outline (Phase-I)

- Beat is the unit of sampling.

- In every beat, data will be collected for:
  - Carnivore and mega-herbivore sign encounter rate *(in entire beat)*,
  - Encounter rate of animals along line transect *(of length, 2 to 4 km)*
  - Habitat quality *(in 15m, 5m & 1m circular plots along the same line transect)*
  - Human disturbance *(in 15 m circular plots along the same line transect & nearby area)*
  - Ungulate pellets abundance *(2m x 20m plots)*

- Entire field data collection will be completed within 6-8 days schedule, excluding the time needed for laying and marking of the transects which would be done well before actual exercise.
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<tr>
<th>Days</th>
<th>Paper Form No.</th>
<th>MSTriPES Ecology App</th>
<th>Activities to be done (Average sized beat, 2km transect)</th>
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<td>Marking of transects in the field to be completed well in advance</td>
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<tr>
<td>Day 1</td>
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<td>Carnivore/mega-herbivore sign survey in entire beat. About 5 km thorough walk in the beat every day totaling minimum 15 km walk in 3 days.</td>
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<td>Day 2</td>
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<td>Day 3</td>
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<td>Day 3</td>
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<td>Day 4</td>
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<td>2, 3A/3C</td>
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<td>3B</td>
<td>F3</td>
<td>- Animal Encounter rate (AER) along entire line transect</td>
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<td>3C</td>
<td>F3</td>
<td>- Vegetation survey (In 15m, 5m &amp; 1m sampling plots laid at 2000m, 1600m; Form 3A, 3C)</td>
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<td>4</td>
<td>F4</td>
<td>- Human disturbance (at same points as in 3B, 15 m plot)</td>
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<td>- Ground cover (at same points as in 3C, 1 m plot)</td>
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<td>- Pellet count (at same points as in 3A; in 20x2 m plot)</td>
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<td>Day 5</td>
<td>2, 3A,3B, 3C, 4</td>
<td>F2, F3, F4</td>
<td>Day 5</td>
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<td>Repeat AER on the same line transect + Record data in 3A,3B, 3C &amp; 4 in plots at 1200m &amp; 800 m.</td>
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<td>Day 6</td>
<td>2, 3A,3B, 3C, 4</td>
<td>F2, F3, F4</td>
<td>Repeat AER on the same line transect + Record data in 3A,3B, 3C &amp; 4 in plots at 400m &amp; 0 m.</td>
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Marking Line Transect
(to be completed well before actual data collection)

- Mark the start point & lay a straight line transect using visible marks but with minimal clearing. Use Compass to make the line straight. (RFOs to cross check the transect lines with Google earth)
  (Select starting point such that observer should not face the sun while walking in the morning. This is to ensure proper sighting of animals)

- Mark Transect no. or id at the beginning and mark prominently by red paint on tree etc at next visible point. Mark at every 400m, sample plot sites prominently. Use GPS to mark the correct distances

- Note down Lat/Long of start point, end point and every 400m sampling plot site using GPS. (This comes handy for Form-based data collection and saves time in the field. One can pre-fill the forms using this data)
Marking Line Transect

- Based on shape, size, habitat/vegetation type and terrain type, there can be 1 line transect or 2 transects. But transect length should be 2 km minimum and up to 4 km maximum. (If length comes less than 2 km due to beat size, replicates will have to be increased more than 3 i.e. 4 to 6 times walk, as discussed in data collection slides ahead)

- Try to orient the transect across the contour lines or across the linear features like road, stream, fire line etc and not along/parallel to them them.

- Give each transect unique id number like T1, T2 etc.

- Use permanent transects laid during previous exercises in 2010, 2014. Re-mark them. Rectify the past errors if any, and redesign or reorient transects as per the instructions given above.

- Study different data forms, read the instructions carefully and understand them beforehand.

- (Understand the MSTrIPES Ecological App properly if you are using APP for the data entry)
Laying down line transect in a average sized beat (here e.g. 2 km long)
Two line transects if the beat is sufficiently large and consists of two dominant habitat types.
Laying down line transect in a smaller beat (here e.g. 1.6 km long)
(This can be an exception, in very few beats)
Day 1-3: Design for Carnivore & mega-herbivore sign survey

- **Day 1**
  - *Walk about 5 km* on a forest trail in a part of beat and record data as per the instructions. (GPS track can measure the distance)
  - Use **Form 1** (or F1 as shown in MSTrIPES app)

- **Day 2 & 3**
  - Repeat above exercise in other trails / parts of beat covering entire beat.
  - Use separate Form-1 sheets everyday. *3 copies of Form-1 will be required, 1 each for 3 days. (In case of MSTrIPES, save the separate tracks everyday.)*
  - *Walk at least 15 km per beat in the 3 days survey.* (3 days x average 5 km.)
    (If the size of the beat is smaller and different trails are not available, same trails can be repeated totaling distance of minimum 15 Km)
  - (*Only 1 copy of Annexure/Questionnaire of Form I will be required which can be filled up anytime during this exercise)*
Trails for Carnivore sign survey – e.g. here the Beat is divided into 3 parts.
Carnivore sign survey trails in a smaller beat - Beat can be divided into 2 parts only. More repeats/replicates will be required to make the total walk of 15 Km. Local level adjustments can be done accordingly. More than 3 copies of Form-1 will be needed.
Day 4 - 6 Study of animal encounter rate, Habitat features, human disturbance....

- This is to be done using the line transect already laid as discussed earlier.

- Study of Animal encounter rate, human disturbance, vegetation survey & Ungulate pellets (Form 2, 3A, 3B, 3C, 4) will be done during this period. (Form F2, F3 and F4 of MStrIPES App)

Day 4.

- Use Form 2 /MStrIPES F2. Record the field observations. (Replicate 1) and complete the transect walk.
- While returning, use forms 3A, 3B, 3C and 4 for different data collection at selected sampling points (may be 2000m, 1600 m for convenience as explained in next slides ) and collect data as per the instructions.

(In case of Tiger reserves, 8 replicates for animal encounter rate are needed. In that case this exercise will go up to 8 days i.e. Day, 4-11)
**Day 5**
- Use new copy of Form-2 and record animal encounter rate again along the same line transect. *(Replicate 2)*
- Use *new copies of forms* 3A, 3B, 3C and collect data at sample plots laid at 1200m & 800m.
- Use previous day Form 4 for recording dung/pellet

**Day 6**
- Use new copy of Form-2 and record encounter rate again along same line transect. *(Replicate 3)*
- Use new copies of Forms 3A, 3B, 3C and collect data at sample plots laid at 400m & 0 m.
- Use previous days Form 4 for recording dung/pellets

If MSTrIPES app is used, the data for 3A, 3B, 3C & 4 can be filled as per convenience, *but complete all forms of a any selected plot same day.*
Studies for a line transect of 2 km with one habitat type.

Day 4-6

Same line transect
To be used for 3 days using 3 sets of Form 1
Studies for one line transect, less than 2 Km long. In this case, increase the replicates, that means walk for more than 3 days to cover total transect walk at least 6 Km and more. More copies of paper Form 2 will be needed.
Day 4-6, Complete plan

Day 4, 5, 6: Use Data sheet 2 for Encounter rate (or F2 for MSTriPES App)

Day 4:
- Use Data sheets 3A, 3B, 3C & 4 (at 2 plots)

Day 5:
- Use Data sheets 3A, 3B, 3C & 4 (at 2 plots)

Day 6:
- Use Data sheets 3A, 3B, 3C & 4 (at 2 plots)

For MSTriPES:
- Use F3 & F4

2 plots per day are suggested to reduce the burden of completing 6 plots in one day.
Sample plots for Form 3A, 3B, 3C, 4
(Or F3 & F4 for MStrIPES App)

15 m radius circular plot
(Form 3A, 3B, 3C)

5m radius circular plot
(Form 3A)

1m radius circular plot
(Form 3C)

20mx2 m plot
(Form 4)

To ensure unbiased data collection, 1 m radius plot should have the same centre that of 15m and 5 m plot, however it can be laid anywhere in 15 m circle, if the centre is obstructed due to some stone, permanent structure etc.
Possible layout of entire line Transect and the sample plots. 1m plot will mostly be at the centre, but in rare cases, can be placed anywhere in the 15 m plot.
3. Field Data Collection Procedure

Please enter data honestly and without any fear. *Systematically collected genuine data is the key to the success of this methodology!*
a. Data collection using paper Forms

**Form 1**: Tiger, leopard and other carnivore & Mega-herbivore sign survey
(F1 for MSTrIPES App)

- In a group of 2-3 persons, start the survey as per convenience, but preferably, early in the morning in tourism zone of PA so as to get the undisturbed signs.

- Enter all the relevant details like Beats name, observers name etc in the top of the Form 1. Start time, Start Lat/Long means the readings from where the trail/data collection starts.

- Walk along trails, paths, forest roads, cart tracks, streams or river banks, along water bodies etc; where there is maximum probability of finding carnivore signs.

- Identify and record each carnivore/mega-herbivore sign found. Record GPS coordinates of the sign and the other details. (Need to record GPS reading after every 20 minutes, even if sign is not found. Here, enter NIL in column)

- Carnivore signs include pugmarks, scats (droppings), scrap marks, rake marks, vocalization, scent marks, puke, direct sighting etc.
If the pugmark trail is continuous, treat it as only one sign. (For animals in a bigger group, like wild dog, there can be many trails/signs at one site. Record them as a single sign)

- Note habitat/vegetation and terrain type at each sign type recorded.
- If sign types are not identifiable, note their details in remarks.
- Note any other important observation in remarks section.
- Record, total distance walked, end GPS coordinates and also the finish time once you complete the trail. Also record the time spent (in minutes) for any other activities (rest etc) while completing this exercise. GPS comes handy in measuring correct distance.

- There are also 5 questions and a note in Annexure to Form-I. Fill up the information for tigress and female leopard with cubs and incidences of cattle attack etc. Only one Annexure will be needed during the entire exercise.

- Cases of recent human attack by tigers/leopards, recorded tiger/leopard mortality in the beat or nearby village can be recorded in remarks. (last para in questionnaire)
प्रप०-५: वाघ, विबट्या, अन्य मासभक्षी व मोठ्या तृणभक्षी" वन्य प्राण्यांच्या औषधचिन्हांचे सर्वेक्षण

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# मार्ग तृणभक्षी प्राणी वागणे नौद्यं ज्यात्याचया प्रजाती: गामा (Gaur), इंडिओन वायरस, रान मोर (केवळ सर्व्हिना विषम), हत्ती (तान्वी) आदी.

*ऑषधचिन्हांच्या (स्टातिक) फॅक्टर: विशेष वैद्यकीय शोध - SCT/PLT/DNG, रक्ताधारण (स्काउट), ट्युन-PT, अंकाना-VC, तंतू चर्म-DS, ऑक्साइड्रस-RR, अक्सेस-SCR, लेव्ही-SL, एच-SPR, डायन-DIG, विबरान- K, विहार असाध्य- SS

**ऑषधचिन्हांच्या (स्टातिक) फॅक्टर: सुदृढ तान्व-VF, तान्व- F, तुून- O, सुदृढ तुून- VO

सूचना: सर्वेक्षणदरम्यान ऑषधचिन्ह भेटल नाही तर तुूनले तर २० मिनिटांनी तित, असाध्य व रक्ताधारण नौद्य असाध्य तर ज्यातील विवरण त्याच्यावर तिथे भेटवावे, अतीती निर्देश वापरावे.
प्रवक्त्र - १ सहपत्र
प्रश्नावली

1. मानीत बांध महिंषना बड्डुकायसाठी वापरीत बांध नंद आहे का? - होय/नाही, बड्डुकायची संख्या ............... बड्डुकायचे साधारण वयोमान ............... महिने ,
लगत्या मोठीचे दिनांक: महिना (वर्षसह)

(अ) वन कर्मचार-यांनी पाहिले ( )
(ब) प्राम पाउलखुण्या (पगमकर) ( )
(क) स्थानिक लोकांकडून कन्हाले ( )
(ड) अधिकार-यांचे निर्धार ( )
(के) लागू/अशी खुश करणार याची)

2. नियंत्रण क्षेत्रात वाढसाठी अस्तित्व आहे परंतु गणना सर्वेक्षणामध्ये काही ओळखाच्या आहात नाहीत. अशांती वस्तुतः बांध असल्याचे कोणते पुढे आहेल?
पुढे मिलात्या लगत्या कालावधी दिनांक: महिना (वर्षसह)
वाढ असल्याचे पुढे - पाउलखुण्या (पगमकर) ( ) / प्रत्येक दिन ( ) / विघट ( ) / इतर चिन्हे ( )

3. मानीत बांध महिंषना बड्डुकायसाठी वापरीत बांध नंद आहे का? - होय/नाही, बड्डुकायची संख्या ............... बड्डुकायचे साधारण वयोमान ............... महिने ,
लगत्या मोठीचे दिनांक: महिना (वर्षसह)

(अ) वन कर्मचार-यांनी पाहिले ( )
(ब) प्राम पाउलखुण्या (पगमकर) ( )
(क) स्थानिक लोकांकडून कन्हाले ( )
(ड) अधिकार-यांचे निर्धार ( )
(के) लागू/अशी खुश करणार याची)

4. नियंत्रण क्षेत्रात विवरणे अस्तित्व आहे, परंतु गणना सर्वेक्षणामध्ये काही ओळखाच्या आहात नाहीत. अशांती वस्तुतः बांध असल्याचे कोणते पुढे आहेल?
पुढे मिलात्या लगत्या कालावधी दिनांक: महिना (वर्षसह)
विवरण असल्याचे पुढे - पाउलखुण्या (पगमकर) ( ) / प्रत्येक दिन ( ) / विघट ( ) / इतर चिन्हे ( )

5. मानीत नीत महिंषना मांगाची वन्यप्राणी पाठवायच्या मांगाची निर्धारित निर्धारी पाठवायची केलेल्या संख्या किती आहे?
वाढाने ............... विवरणे ............... जंगली कुत्तांची ...............
अन्य मांगाची प्राप्त आहे ............... (मांगाची प्राप्त नाही लिहा) घटनाची संख्या ...............

6. टप्पणी: (जसे- मानीत वर्षभरात वाघ किवा विवरणे मुनुपणी किवा मुनुपणी जास्तीत केले असल्यास/वाघ किवा विवरणाची मृत्यूच्या नंतर असल्यास व्यवस्था तपासला)

* सदर सहपत्र हे मासभक्त प्राण्यांच्या संपूर्ण सर्वेक्षण कार्यांची दरम्यान केवळ एकदा भागवती आहे.
Form 2: Encounter rate of animals on line transect (or MSTrIPES App F2)

- Start early in the morning about 7 AM. (in a group of 2-3 persons)
- Enter all the all relevant information on the top of the form. (Start time/start lat-long means readings at the starting point on the transect)
- Then start walking at normal speed and keep looking for animals on both sides of the line transect.
- After each sighting, write ‘serial number’ in column 1 for each sighting and then enter time of sighting in next column.
- GPS Coordinates of the place where observer stands while sighting the animal, should be recorded in next columns.
- Write total number of animals sighted at that point. (including both adult and young ones. Also write no. of young ones separately).
- Record correctly, the animal(s) species found.
Encounter rate of animals on line transect

- If animals or groups of animals are separated by a distance of 30 m or above, treat them as separate individuals or separate herds.
- Record distance in metre and the compass ‘bearing’ (not angle) of the animal or the herd from the observer using range finder and compass respectively. Write walking bearing also. (It will be the same as that of transect bearing but may be different in case there is slight deviation while walking.)
- Write down vegetation/habitat type and terrain of the location, where the animal is sighted in remark column.
- Enter other remarks, if any.
- After reaching the end, write down ‘end GPS’ reading and ‘end time’. (It would not take more than 1 to 2 hours to complete this activity on 2 Km transect.)
- This exercise (Replicate 1) should be repeated for next 2 days (Replicates 2 & 3) in new copies of Forms 1.
The angle shown is the difference between animal bearing and transect or walk bearing. But we need not to calculate this difference. Just record the compass bearings....That’s all!!
Record Observers

GPS coordinates

Animal or herd sighted

Note sighting time

-Record Observers GPS coordinates

Note distance in Metre

Note Forward Bearing of animal

Line Transect

Note compass bearing of walking direction
प्रतिक-2: ट्रांसेक्ट रेषेक्षर खुरुः* असलेल्या वन्य प्राण्यांशी प्रणयना

<table>
<thead>
<tr>
<th>वन निवासाचे नाव</th>
<th>वनपातीकर्ते</th>
<th>जनपदपत्रकंक्रम</th>
<th>अखाडाचे नाव</th>
<th>रंग</th>
<th>जनरेशन</th>
<th>निवणाचे प्रतिक</th>
<th>वन क्षेत्राचे अखाडाचे प्रतिक</th>
<th>वन क्षेत्राची संख्या</th>
<th>विवरण</th>
</tr>
</thead>
<tbody>
<tr>
<td>वनपातीकर्ते तथा जनपदपत्रकंक्रम:</td>
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Form 3A, 3B, 3C & 4: Sampling for habitat quality, human disturbance, ground cover, pellets.
(F3 & F4 for MSTrIPES App)

▪ This activity has to be done along the **line transect, after completing the unidirectional transect walk and during return journey.**

▪ **Basic knowledge of local plants and herbivore pellets is needed.** Do some advance planning for identification. (Use a lists of shrubs, herbs and grasses mentioned in the working plan, TCP or Management Plan)

▪ All the data is to be collected from the sample plots of different sizes and shapes, separated by 400 m, as shown earlier.

▪ There will be 6 plot locations for 2 km and 11 plot locations for 4 km long line transect.

▪ The clustered plots are laid in alternate fashion along either side of the line
Form 3A+3C: Vegetation survey at 15m/5m/1m radius circular plot

- First record the details in the top of the Form.
- Mention vegetation type & terrain type at the ‘plot’ site.
- Record up to 10 most dominant tree species in their descending order of dominance (Number).
- Now, determine canopy cover (0, 0.1, 0.2 .. 0.9....etc) at the 15 m plot site.
- Similarly, record maximum up to 10 shrub species in 5 m plot as per the dominance (Number). (Shrubs also include all weedy shrubs.)
- Mention shrub species percent cover in the plot.
- In next column, record up to 3 shrubby weed species from 5 m plot in descending order of abundance. Mention species percent cover (The total % cover including blank ground should sum up to 100%)
- Lastly, mention 3 species each of herbs and grasses from 1m plot.
- Classify the trees, shrubs, herbs, bamboo as per the height prescribed.
(Tree >2 m, Shrub <2m & >40 cm , Herbs 40cm> . Bamboo as tree if >2m. <2m is shrub
प्रमर-3: वनस्पती; अधिवासी नामक तरलक्षेप आणि ध.आचार्यक विन्योगी नेतृत्व

<table>
<thead>
<tr>
<th>वन विभाग</th>
<th>वनपरिक्रेत्र कार्यक्रम</th>
<th>विनम्र कार्यक्रम</th>
</tr>
</thead>
<tbody>
<tr>
<td>ग्रामीण किनार</td>
<td>ग्रामीण किनार</td>
<td>ग्रामीण किनार</td>
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<thead>
<tr>
<th>खंडाचा अखंड</th>
<th>खंड (प्लाट) कार्यक्रम:</th>
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<tr>
<td>न</td>
<td>खंड (प्लाट) कार्यक्रम:</td>
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<tr>
<th>प्रजाती</th>
<th>संख्या</th>
<th>प्रजाती</th>
<th>आपनाची रसमरकी</th>
<th>प्रजाती</th>
<th>संख्या</th>
<th>प्रजाती</th>
<th>आपनाची रसमरकी</th>
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- ट्रास्टेड रेटर ग्रामीण उपराजधानी खंडाचा खंड (प्लाट) कार्यक्रम: - 0 मीटर - 1, 400 मीटर - 2, 800 मीटर - 3, 1200 मीटर - 4, 1600 मीटर - 5, 2000 मीटर - 6....प्रत्यहारी निमित्तेने.

सूचना: 1. सूचना व सूचना घटक सहसूचना (Abundance) जमाव केवळ ९० प्रजातीची नंदन घटक.

2. केवळ किमा ग्रामीण तणे ग्रामीण तणे व ग्रामीण धारावान देखील विकल्प जमाव बांधणी शासक १०० असेच पत्तन रजिस्टर नंदन शासक नाही.

3. ग्रामीण तणे धारणासह ग्रामीण प्रजाती जी तणे संरक्षण पात्रता तणे ग्रामीण तणे ही धारणा (परवेश) आपल्याची तणे प्रजाती धारणा.

4. तणे वाढत्या तणे नंदन ग्रामीण तणे ग्रामीण तणे (३: 3 अ) तणे स्थिरांक धारणा.

5. अन्य तणे ग्रामीण तणे ही केवळ प्रत्यक्ष असर देखील सूचना जमाव १ नुसार सूचना (३: 3 अ) तणे रसमरकी देखील नंदन धारणा.

6. वाढत्या तणे सूचना, सूचना व संरक्षण कार्यक्रम (नंदन) अंतर्गत वाढत्या वाढत्या उंचीनुसार धारणा (सूचना मध्ये २ मिटर पेक्षा जार उंच संरक्षण, सूचना सहसूचना २ मिटर पेक्षा काम केही उंच पेक्षा ५० से.से.से. पेक्षा जार उंच संरक्षण व संरक्षण कार्यक्रम (नंदन) मध्ये २० से.से.से. पेक्षा काम केही उंच संरक्षण तेजस २ मिटर पेक्षा जार उंचीनुसार वाढत्या झांडे व प्रकाश व ते मिटर पेक्षा काम उंचीनुसार वाढत्या झांडे व प्रकाश लिहाजे)
Examples of Canopy cover, as seen, when overhead crown cover is observed from 3-4 places in the 15 m plot. Canopy cover 1 may not be possible practically. Shown for comparison only.
e.g. Canopy Cover - 0.8

e.g. Canopy Cover 0.6
Form 3B: Human disturbance

- This data is to be recorded from the **same, 15 m. plot**
- Record illicitly cut trees (stumps) and also departmentally felled tree stumps.
- In next column 2, record total number of lopped trees (**and not the number of cut branches**)
- Humans and Animals present **inside or outside the plot, but visible from the plot site should be recorded in column 4 & 5**
- Rest of the information about the beat can be filled up as per the simple instructions given. Fire incidences during the last fire season may be mentioned.
Form 3 C: Ground Cover (in 1 m circular plot)

- First record in first column, the % of dry leaf litter from the circular plot but note that, this % is independent of the % of below 5 categories.

- The Count the % of cover all 5 categories (i.e. dry grass, Green grass, herbs, herbaceous weeds and bare ground) such that sum total of all five should become 100%. If needed, remove the leaf litter before recording the cover of these 5 categories.

(Write names of 3 herbaceous species and 3 grass species in the descending orders of their numbers in the last two columns (shown as 3C) in Form 3A+3C above.)
### ৩ ব: মানবী হস্তক্ষেপার্থী মাহিতি (১৫ মিটার জিল্যুচ্যা বর্তুক্তাত)

<table>
<thead>
<tr>
<th>পূর্ণ কালস্থলী একুফ্র ৩B</th>
<th>ফাঁদ অংশাভানী একুফ্র ৩C</th>
<th>মানবী-পূর্ণ স্তম্ভকৃত পারীবার্তামূলক তথ্য৷</th>
<th>অন্তঃবিতর্কময় মানসনাচৌহার তথ্য ৩B</th>
<th>অন্তঃবিতর্কময় গুঠালামুচুমুচু তথ্য ৩৫</th>
<th>গবত / বোধ করণ (আহং/না)</th>
</tr>
</thead>
</table>

- ১৫ মিটার জিল্যুচ্যা বর্তুক্তাত বিষয়ক তথ্য তথ্যায় মানবী-পূর্ণ স্তম্ভকৃত পারীবার্তামূলক তথ্য গুঠালামুচুমু | তথ্য (নীর, কচাত, মেপুল; টি. পেচেলে ইলামুচু প্রুকশ) | সত্যিকার মানবী পূর্ণ কালস্থলী একুফ্র ফাঁদ প্রুকশ করিয়া ফাঁদ অংশাভানী একুফ্র ফাঁদ প্রুকশ করিয়া দেশীয় নীর তাত্ত্বিক নীর প্রুকশ করিয়া।

**খালিলীন প্রবন্ধার্থী উৎসর্গ ব্যাখ্যা কালাবোধকতার কেশবে একদায় মস্তিস্তাত পারিঃ**

- নিয়মাবলীর কার্যক্রমের মানবী পূর্ণ কালস্থলী আহং করিয়া? হয় / না? অস্তিত্ব কীতি? .............................................................
- অন্যের সংগঠনের নিয়মাবলীর পূর্ণ কালস্থলী প্রুকশ সত্য (পুরুষ) হয় / না? অস্তিত্ব কীতি? ..........................................................

- নির্দিষ্ট মাত্রাতে নিয়মাবলী নিয়মাবলী (NTPP) গোষ্ঠীতে জাতীয় কার্যক্রম করুন / না? হয় / না? অস্তিত্ব কীতি? ..........................................................

- নির্দিষ্ট মাত্রাতে মানবী ৫ বর্ষতঃ অধিকতর অধিক তথ্য প্রদান করুন ৫ বর্ষতঃ অধিকতর অধিক তথ্য প্রদান।

### ৩ ক: ভূ-পৃষ্ঠানিরল আচানন সূক্ষ্মে (১৫ মিটার জিল্যুচ্যা বর্তুক্তাত)

<table>
<thead>
<tr>
<th>সুক্ষ্ম পালনাপ্য ভাষায় (৬%)</th>
<th>ভূ-পৃষ্ঠানিরল আচানন (বাংলা ৫ স্তম্ভধারা ব্যবহার ১০০০ জানীন/পার্শ্ব)</th>
</tr>
</thead>
<tbody>
<tr>
<td>সুক্ষ্ম গাত্র (%)</td>
<td>হিন্দু গাত্র (%)</td>
</tr>
</tbody>
</table>

**টিপো**: পরিষেবা কালাবোধকতার লহন বস্তুলতা (হর্ষ) ৫০০০ টি. পরিষেবা কালাবোধকতার লহন বস্তুলতা (হর্ষ) ৫০০০ টি.
Dry leaf litter % in 1 m circular plot- Form 3C

Eg. Dry leaf litter @ 70%

e.g Dry leaf Litter 40%
Ground cover type and % cover

- Weeds: 5%
- Dry grass: 10%
- Green grass: 15%
- Herbs: 20%
- Bare ground: 50%

Total ground cover: 100%

Form 3C - Ground cover in 1m radius circular plot
Form 4: Pellet count of ungulates - 2m x 20m plot

- Hold 2m stick in both the hands parallel to ground and walk along straight 20 m line (use measuring tape or rope) perpendicular to the transect line on the 15 m plot. Count number of pellets from the imaginary rectangular 2m x 20m plot.

- Write total number of species-wise pellets in the plot. More than 1000 pellets of the same species found in the plot may be written as 999.

- The dungs/heaps of elephants, gaur, cow, buffalo should be recorded in numbers
Form- 4 : Pellet counts of ungulates…

- Pellets/dung of all wild as well as domestic ungulates to be recorded
- Droppings of other animals/birds given in the Form, which are not ungulates, eg. Langoor, Peafowl shall also be noted.
- Topography/terrain and habitat type of each plot must be written even if pellets are not seen.
- In case pellet identification is not possible, collect the sample for the identification by experienced staff/experts.
प्रपत्र-4 : खुरे असलेल्या* प्राण्यांचे (अंगुलेट) विषय/लेख्यांचे सर्वेक्षण

<table>
<thead>
<tr>
<th>निरीक्षकाचे नाव</th>
<th>पदनाम</th>
<th>फोटो नंबर</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>स्वार्थी काङ्क्ष</td>
<td>स्वार्थी कविता</td>
<td>स्वार्थी कविता अधिकारी</td>
</tr>
</tbody>
</table>

(२० मीटर X २ मीटर आकाराच्या आयतावरून विषय/लेख्यांचे सर्वेक्षण करून स्वार्थी मंडळा नोंदविले)

| क्र. सं. | निरीक्षक | पदनाम | फोटो | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील | पुढील |
|---------|-----------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| १       |           |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| २       |           |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| ३       |           |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| ४       |           |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| ५       |           |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| ६       |           |        |       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |

*पूर्वेक असलेले कथास्रोत, पाठ्यक्रम प्राधिक मुख्य तकनीकी हस्तशिल्प प्रविधिक प्राणी खुरे असलेल्या प्राण्यांचा देखील समाप्त करावा.

मुख्यांि - १) नॅटेज प्राण्यांचा प्राणविद्या लेखन १८०० हून जात निर्देशना असल्यात तेच १९९ असे लिहिले.

२) एकमात्र रेडिकल लेख्यांचा श्रेणी रेडिकल तंत्र असल्या ५ एकमात्र रेडिकल माहितीचे मंडळे प्राणकारिता खंड (पृष्ठ) क्रमांक निवडून बाबी हस्तांतरीय पृष्ठावर.

३) फोटो/मंडळयांची निपट्यांजण चाराचार आहे? आहे/ नाही. --------
Pellets of different herbivore- Collected from/around TATR
Comparative Pellet Sizes
Flat terrain
Hilly & undulating terrain
Carnivore Signs
Additional data collection - Vulture presence: Annexure - 5

Field staff can undertake this activity during the main survey or nearby dates.

<table>
<thead>
<tr>
<th>A. नं.</th>
<th>नियमलेले गिथाळ्या/महत्वाचे पक्षी/प्रजाती</th>
<th>संख्या</th>
<th>कुळी (उडानाना, भस्ताना, खाताना किंवा उतर)</th>
<th>वस प्रकार</th>
<th>गोष्ट</th>
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</table>

*महत्वाचे पक्षी यामध्ये महादेश, मुंबई, मारा, शास, गणपति इत्यादी पक्षाची नोंद करती.

# गिथाळ्या प्रजातीची वर्गीकरणाची माहिती असलेला तर तिने तिनी, अन्यथा लहान, मोठे, लाल डोंबावळ, अंडा-या रंगाचा असे करून लिखावे.

1. तुम्हाला नियमक्रमात गिथाळ्या ३ क्रमांक मुळ गिथाळ्या सादरली आहेत काळ? हां/नाही.
2. तुमच्या नियमलेल्या गिथाळ्यांची व्यापक अवलोकनी (Active) घडी आहेत काळ? हां/नाही. अवलोकन त्यांची संख्या किती? जादोंवर................................., उभा कडा किंवा डोंबावळ..............................
b. Procedure for using MSTrIPES App for data collection

- A separate flowchart/presentation will be provided for MSTrIPES Android App based data collection. Only properly trained staff should fill up data using this App.
- Data has to be collected using android mobile phone tested for the ecological app of MSTrIPES
- There are various menus available and data can be entered in online forms like F1, F2, F3, F4 and F5 (for vulture)
- A team can record the information in both paper Forms and Phone based MSTrIPES app wherever possible.
c. Data entry/ Data Transfer

- Data collected through the Forms may be signed by the Beat guards / Foresters and checked by the Range Forest Officers.
- Corrected forms may be submitted at division level for the data entry in the PC based software/App through trained operators.
- (MSTrIPES data collected may be submitted to the designated data collection office like Division office, under the supervision of trained data entry operators who have been specially trained for this purpose.)
- Wherever partial data collection is done through MSTrIPES and partial through the paper forms, suitable entries may be made offline once app based data is uploaded.
### 4. Planning

#### The Timeline

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deadline/Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training of Trainers</td>
<td>December, 5-7, 2017</td>
</tr>
<tr>
<td>Training of staff at Division /PA level</td>
<td>By 31 December</td>
</tr>
<tr>
<td>Cleaning &amp; marking existing transect OR Laying-Marking new transect</td>
<td>By 31 December</td>
</tr>
<tr>
<td>Mock Phase I exercise</td>
<td>By 7 January, 2018</td>
</tr>
<tr>
<td>Mock data entry (by Division coordinator/FDs)</td>
<td>By 10 January</td>
</tr>
<tr>
<td>Check data, communicate errors to the Division Asst coordinator/ACF</td>
<td>By 15 January</td>
</tr>
<tr>
<td>Repeat the training wherever needed (Divisional trainer)</td>
<td>By 18 January</td>
</tr>
<tr>
<td><strong>Phase – I (6 days standard protocol, State-wide dates)</strong></td>
<td>From 20 to 25 January</td>
</tr>
<tr>
<td>Collection of data Forms /App data from field teams (Div. Asst .Co/ACF)</td>
<td>26-31 January</td>
</tr>
<tr>
<td>Phase I data entry and Verification at Division level (Div Asst. Co/ACF)</td>
<td>1 -20 February</td>
</tr>
<tr>
<td><strong>State Nodal officer</strong> to collect, verify data and send to WII/NTCA</td>
<td>By 15 March 2018</td>
</tr>
</tbody>
</table>
a. Advance Planning

- Complete the training component/Mock exercise of field staff at least 10 days prior to the actual survey or as per schedule.
- *Theoretical inputs must be supported by field demo and mock exercise. More the practice, more comfortable is the team and better the data quality.*
- Select and finalize the teams well in advance.
- Decide the vegetation type/habitat type and plan the length (2 km or more) and number of transects to be laid per beat in consultation with RFO.
- Lay/mark the transect at least 4-5 days before actual day of transect walk. (if proper laid permanent transects are available, just clean and mark)
- Give all the line transects, suitable id numbers. *(id numbers to be given by Range or Division office)*
Advance planning

- Procuring & distributing all the essential material like GPS, range finder, compass etc; field guide, forms etc needed for data collection well in advance.

**Minimum** number of data sheets required per beat are:

- **Forms-1** 3 copies per beat for one team for 3 days (However only one copy of Annexure/Questionnaire is required)
- **Form-2** 3 copies *per transect* for one team for 3 days
- **Form- 3A-3C** 6 copies per line transect, for 6 plots on 2 km line transect.
- **Form- 3B & 3C** 6 copies per line transect of 2 Km
- **Form- 4** 1 copy per line transect
- **Annexure -5** 1 copy per Beat

- Some additional Forms may be given for the mock training
- Ensure that all the equipments like GPS are in working condition
- Set the GPS Datum WGS 84 and Position format as hddd:mm:ss.ss. *(Procedure for said setup is given in next slide)*
Procedure for fixing Position Format & Map Datum in GPS

Select Setup option available in main Menu

In Setup select Position Format

From available options select setting as shown here.

In Setup select Units for further setting

From available options select setting as shown here.

Procedure for Unit Setting in GPS
b. Planning during Field survey

- Once, the line transects are marked and ready, the actual data collection can be done as below.

- **Day 1-3** Go for the carnivore & mega-herbivore sign survey. If number of trails or replicates are more, additional days may be planned accordingly (e.g. for smaller beats, in tiger reserves etc)

- **Day 4-6**- Form 2 needs to be filled everyday but readings of Form 3A, 3B, 3C and 4 can either be recorded on the first day itself, or for convenience, can be distributed in 3 different days, covering few points every day. (as shown in diagram earlier)  

*(in later case, for 2 km transect walk, out of 6 points, only two (last) points can be studied on first day, 2 more points on 2nd day and remaining 2 points on last day. Schedule will change for longer transect lines. More days will be required for minimum 8 replicates of transect walk in Tiger reserves)*
c. Post data-collection activities

- Collection of completed paper forms (and/or digitally collected MSTrIPES data) from beat guards by the designated officer.
  
  *(In case of paper forms, checking of all entries is needed followed by correcting missing information if any, like GPS coordinates, terrain type, forest type, locality, transect id etc. Data may be checked for consistency only. No adjustment should be done.)*

- Downloading the digitally collected data at the designated PC.
- Manual Data entry, (paper forms) and its checking by the Divisional designated nodal officer (e.g. ACF)
- Data to be submitted to State nodal officer
- Verified data to be submitted to NTCA by State nodal officer
5. Resources

a. Material/ Equipments needed

- Beat map/Topo-sheet, 1:50000
- GPS-1
- Paper Forms for data entry
- Android mobile phones (MSTrIPES compatible)
- Compass-1
- Laser Range finder (@ 400m-600m range)
- Nylon Rope-@ 20m
- Stick/Staff- 2m
- Pad/pen
- Measuring tape.
- Wrist watch /Timepiece
- Paint for marking transect line
- Camera traps, Data cards,(only for Tiger Reserve, Phase IV))
- Batteries for GPS/Camera trap
- Old newspapers, polythene/ paper bag etc for collecting doubtful pellets, unidentified plants
- Field guide or notes, list of plants etc
...Resources

- **b. Manpower**
  - Primary data collectors
    - Beat guard, Vanmajoor etc. (2-3 persons for carnivore sign survey, 3 persons for each line transect)
  - Supervisors
    (at Round level-RFO and Range level-ACF or Research officer if available)
  - Data entry operators (Division level)
  - Trainers (Master trainers and Trainers at Division level)
c. Training/orientation

- Trainers training (Training by WII/NTCA)- 3 days
- Division-wise training (Training by primary trainers)- Min 2 days
- Mock field exercise -2 days (This is to ensure better understanding of the techniques and getting more accurate data)
- Repeat training if required/ doubt clearance before actual Phase I (Get back to the master trainers in case of doubts).
Field demo & mock data entry
6. Problems, Errors, FAQs and Suggestions

- There are several queries raised and common errors committed by the field staff. A separate presentation has been provided for the same.

- Try to compile as many queries and doubts during the training and mock exercise. It will be useful during the main data collection.
References & studies

2. Discussion with WII Faculty, Researchers & Experts
4. Inputs from State Nodal officers, APCCF (WL) East, Nagpur.
9. Comments of Dr. Boitani, Dr. Christopher Carbone and Dr. Ramona Maraj & John Seidensticker, 2006 (project tiger website),
Acknowledgments

1. Shri. A. K. Mishra, PCCF Wildlife, Maharashtra State
2. Dr. N. Rambabu, APCCF, (WL) East, Nagpur
3. Shri. Qamar Qureshi, WII, Dehradun
4. Ninad Mungi. Research Fellow, WII, Dehradun
5. Uttam Sawant, DFO, NNTR
6. Pradip Patil, ACF, NNTR
7. Rama Warbhe, Vanmajur, TATR
8. Field Staff of NNTR/Gondia Div.
9. Entire Team NTCA & WII
Thank You