PANTHERA
PARTNERS IN WILD CAT CONSERVATION

# GUIDELINES SIX MONTH AND FINAL TECHNICAL REPORTS

1. **PROJECT TITLE:** Phylogeography of the fishing cat (*Prionailurus viverrinus*) in India: identifying populations for conservation.

2. **REPORTING PERIOD (END OF YEAR REPORT, PROVIDE START AND END DATES)**
   START DATE: 1ST MARCH 2010
   END DATE: 31ST MAY 2011 (WITH A NO COST EXTENTION)

3. **REPORT SUMMARY – Briefly summarize the rationale, goals, objectives and issues that were addressed. Provide sufficient background information so that anyone unfamiliar with the project can understand its overall goals and objectives. This section should summarize your achievements of project objectives, or, if this is a six month report, it should summarize your progress towards achieving your stated objectives. The Report Summary should be written as if for an external audience (donors, press, etc.) — in a non-technical style and not to exceed 1000 words.**

India is home to 15 species of cats, the highest number any country has (Nowell and Jackson 1996). Yet, apart from the four big cats the small ones do not feature in any major research or conservation planning. Until now, for the most part information on small cats in India, including the fishing cat, has been in the form of natural history notes on distribution and habits, ad-hoc records on sightings and behaviour or short studies on diet and habitat use. The distribution of the fishing cat in India was unclear and recent surveys for mammals in some potential fishing cat habitats had not yielded any positive result. Even more alarming were the negative results obtained from areas such as Bharatpur which had several reports of fishing cats until a few years ago. These were all based on sightings of the cat. Such negative results are indicative of the possible gradual extinction of this species from parts of its range.

With no specific focus on the species, the distribution projected within India was largely an expected/predicted presence of the cat in its potential habitats, from records in the past. In fact, most reported fishing cat records were from protected areas. The species perhaps also exists outside the protected area network in the country and these populations could be crucial to maintain genetic connectivity between populations. However, no information was available on such populations.

One reason why many small cats have not been studied is the difficulty they pose due to their cryptic habits and rarity. Advancement in molecular techniques in the past few decades has now made it possible to circumvent this and address questions related to rare and endangered species with higher precision and accuracy. Given this opportunity, the project was designed to study the phylogeography (genetic variation with respect to the geographical distribution of populations) of the fishing cat in India, using molecular tools, in order to assess the connectivity between populations and to identify any unique population that requires immediate conservation attention. Another objective was to study the phylogeography of the species across its global range by sharing data with fishing cat researchers in range countries outside India. The method involved collecting samples from areas where fishing cats were reported earlier and inferring from data if and how the populations are currently connected and how each of them is faring. Connectivity of populations could imply occurrence in areas/localities that the cat was not earlier reported from. This could set the objectives for a future study to determine populations outside reported localities.

The team traversed across the country through 6 states (From east to west: Andhra Pradesh, Orissa, West Bengal, Uttar Pradesh, Uttarakhand and Rajasthan) for sample collection, in regions where fishing cats were expected to occur based on earlier reports. Most of the samples we collected were fecal (scat) samples from natural habitats but we also obtained scat samples from captive individuals in zoos. A total of 155 scats were collected from 6 states in India. One skin of unknown location was obtained from Assam. One tissue sample of a dead fishing cat was obtained from Aima village, Howrah district, West Bengal. Only 19 (12%) of the 156 scats from natural habitats were of fishing cats and this indicates the rarity of the species. Even with a small sample size it is clear that the fishing cat has considerable genetic variation within the country. From this we can infer connectivity in habitat from the Terai region of Uttarakhand and Uttar Pradesh through Nepal, Assam, Bengal, Orissa. This variation was intermediate to the very high variation seen in jungle cat and the low variation in leopard cat within India. However, the very small sample size for fishing cat did not permit analysis of structure and so no conclusions can be made for

The detection of fishing cat from Bharatpur (through molecular identification with scat and subsequent sighting in the area where the scat was collected) was very encouraging since we now know that the cat still exists in the region. However, it is in a precarious situation given that this species was until less than a decade ago sighted very regularly in several parts of the Protected Area. It is also possible that individuals have dispersed to satellite wetlands surrounding the main wetland. The limited duration of this study did not permit forays into these adjoining areas.

The fishing cat seems to be safe in the Terai belt (Uttar Pradesh and Uttarakhand) with no obvious conflict and with a relatively large portion of the habitat under the Protected Area scheme. This habitat also continues into Nepal. The population in Coringa (Andhra Pradesh) is very small but safe and a survey specifically through the Andhra wetlands is required to assess their status there. Similarly surveys are required in and around Keoladeo Ghana, Bharatpur (Rajasthan) in the several satellite wetlands. In contrast the Eastern part of India (mainly West Bengal) conflict with fishing cats seems to be severe and villagers often kill the cat after snaring or trapping it. Meat is sold in the market and the extent of killing for consumption is as yet unclear. The other threat of habitat destruction due to brick mining and urbanisation seems to be a hopeless and lost case. Unless there is a political effort made to use land judiciously from an ecological perspective, these small pockets of populations will be soon lost.

The global dataset is under analysis currently and the final outcome is expected soon.

**4. SUMMARY LINE: A 1-2 sentence description of project**

The project looked at the genetic variation and connectivity of fishing cat populations in India and determined the current conservation status in the country.

**5. PROJECT LEADERS: Include names, affiliations and contact details**

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Tel: +91 422 22657101, 2657102, 2657131, 2657199.
Fax: +91 422 2657088

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6. **OTHER STAFF: Number of people who work on project in the last six months: full-time and part-time (include names of key people):**

   Prachi Thatte, Tiasa Adhya, Ovee Thorat

7. **COLLABORATORS / PARTNERS and other Institutional affiliations**
   Dr. Uma Ramakrishnan, National Centre for Biological Sciences, Bangalore
   Collaborating Agency: National Centre for Biological Sciences, GKVK Campus, Bellary Road, Bangalore 560065.

8. **PROJECT DURATION with project start date, funding start date, and projected end dates**
   Date of commencement (with funding): 1st April 2010
   Date of completion: 31st May 2011 (after a no-cost extension for two months)

9. **APPROVED BUDGET (INCLUDE ONLY IN ANNUAL REPORT); include funds spent during** project. Please include financial report in the format provided.
   Total approved:
   Total Expended:

10. **Description of ACTIVITIES/PROGRESS referencing your goals outlined in the PROPOSAL**
    **Objectives:**

    i) Study genetic variation of the fishing cat in India and identify populations that need urgent conservation attention.
    ii) Using results from the above objective, we aim to identify large connected habitats suitable for the fishing cat in India, using imageries and Geographical Information System and conduct surveys in these for presence.
    iii) Compare fishing cat distribution and genetic variation to already existing data on jungle cat and leopard cat from India: Can abundance and distribution of a species be used to predict its genetic variation and genetic structure?
    iv) Relate genetic and spatial data to environmental/landscape variables for the fishing cat, leopard cat and jungle cat. What limits cat distributions?
    v) Identify populations of fishing cats, across its global range that need urgent conservation attention, using non-invasive molecular techniques. This will be done at the global scale with samples from museum specimens and captive individuals in zoos across the world as well as from natural habitats in India and other countries where collaborators will be willing to share samples.

    **Methods**
    For locating scats in each site locals knowledgeable in natural history were contacted and preliminary information on sightings were obtained. Next, visits were made to these locations and scats were searched in areas that were potentially favourable for scat deposition viz. prominent structures such as culverts, bridges, large boulders and along dirt

tracts. Fishing cats have a habit of depositing scats in latrines on prominent structures. In case a knowledgeable local could not be contacted, forest staff was asked to direct us to locations that had water bodies, reed beds, bridges and culverts in close proximity. We then visited those sites specifically to locate scats.

Once scats were located, a small sample was collected in a zip-loc bag and labeled for date and GPS readings. In the laboratory they were transferred into vials containing 100% alcohol for storage. DNA was extracted using QIAmp (QIAGEN) tissue and stool kits following the manufacturer's protocols with slight modifications (Mukherjee *et al.* 2007). All extractions were carried out in a PCR-free environment to decrease chances of contamination. Since the samples were mostly fecal, we included controls will all extractions to monitor contamination. DNA extractions and screening for fishing cats were conducted after every field session. This helped us economise the process since sequencing is expensive and we had to maximise the chance of obtaining different individuals. Hence, once we obtained results of scat identity from a location, others from the same were excluded from extractions or further analysis.

After extraction we used the felid specific primer for the 16srRNA region (Mukherjee *et al.* 2010) and sequenced the product for quick results. Once the 16s sequence was obtained, only scats that were identified as fishing cat through sequencing and furthest apart from each other were used for further analysis with cytochrome b and microsatellite markers.

PCR amplifications were carried out in 10µl PCR reactions using a PCR master mix (QIAGEN, Inc.), 4µg Bovine Serum Albumin (Sigma) and 2 µM primers using the following program: Initiation at 94°C for 10 min, followed by 94°C for 30s, 49-60°C (annealing, depending on the primer pair, see Table 1) for 45s, 72°C for 50s, followed by 10 min at 72°C, repeated for 59 cycles. All PCR reactions included controls to monitor contamination as is required with non-invasive samples.

The sequences of fishing cat obtained were shared with a global network of fishing cat researchers to obtain an understanding of genetic patterns for the global population and identify crucial and distinct ones. This analysis is ongoing.

*Analyses:*

Sequences were aligned using the program MEGA (Tamura *et al.* 2007). Genetic structure was assessed through median-joining haplotype networks (Bandelt *et al.* 1999) using the program NETWORK (version 4.5.1.0; http://www.fluxus-engineering.com). Diversity indices were obtained using the program DNAsp (Librado and Lozas 2009)

**Results:**

A total of 155 scats were collected from various regions (Figure 1) including Andhra Pradesh (Coringa Wildlife Sanctuary), Orissa (Monglajori), West Bengal (Howrah, Hooghly, Sundarbans, Jhargram), Uttar Pradesh (Dudhwa Natioanl Park, Katarniaghat Wildlife Sanctuary), Uttarakhand (Corbett Tiger Reserve), Rajasthan (Keoladeo Ghana National Park). One skin of unknown location was obtained from Assam. One tissue sample of a dead fishing cat was obtained from Aima village, Howrah district, West Bengal.

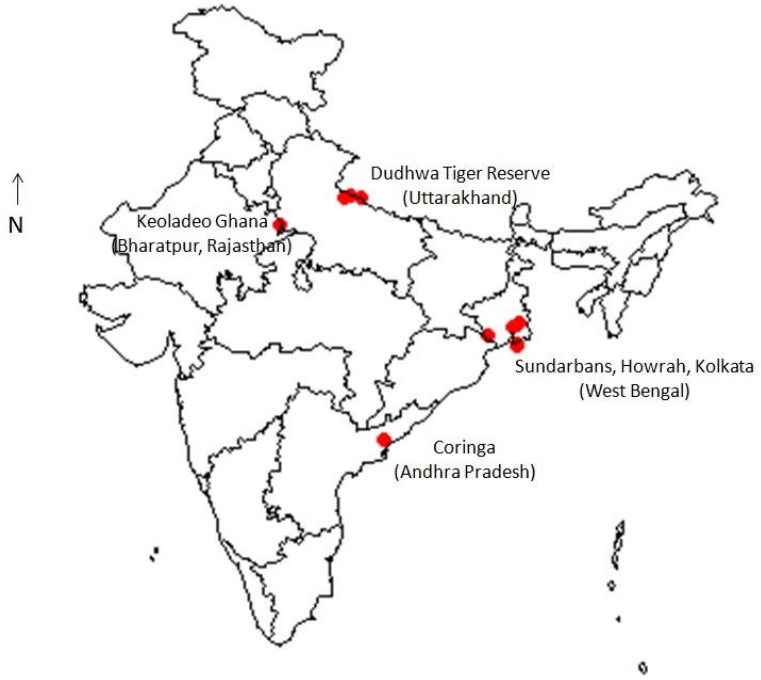


Figure 1. Map of India showing locations where scats were collected.

Of the 155 scats, 4 were of known identity since they were collected from captive fishing cats, all from West Bengal (3 from the Kolkata zoological gardens and 1 from a captive facility in Jhargram, West Medinipur District. Of the 151 scats we extracted DNA from 114. The remaining 37 scats were not included in the extractions because they were in close physical proximity to already identified scats. Thirty two percent (37 scats) of the 114 scats showed positive results for felids with the felid specific 16s rRNA primers (Mukherjee et al. 2010).

Results from the 16srRNA marker are provided in Table 1. Four scats failed to give satisfactory sequences and they were not classified under any felid and left out of further analysis. The failure could be due to contamination from other sources. Another scat (from Bharatpur) gave positive results for fishing cat after sequencing with the 16s marker but with all other markers of the cytochrome b gene, it showed heavy contamination with jungle cat DNA and hence could not be used for analysis. This is discussed further in the discussion section of the report.

We obtained a total of 800 bp of cytochrome b sequence and the results are summarised below in Table 2. A comparison of 3 cats in India shows that the fishing cat is intermediate in the degree of genetic variation, having lower variation than the jungle cat but higher than leopard cat. The small sample size in the case of the fishing cat did not permit analysis on genetic structure.


Table 1. Summary of results of scat collection and identification

| Region | Scats collected | Extracted for DNA | 16srRNA amplification (% success) | Fishing cat | Jungle cat | Leopard cat | Sequence failed |
|---|---|---|---|---|---|---|---|
| Coringa (AP) | 10 | 10 | 2 (20%) | 2 | 0 | 0 | 0 |
| West Bengal* | 55 | 49 | 11 (22.4%) | 7 | 1 | 0 | 3 |
| Dudhwa &Katarniaghat | 36 | 30 | 12 (40%) | 8 | 1 | 2 | 1 |
| Bharatpur | 32 | 18 | 9 (50%) | 1 | 8 | 0 | 0 |
| Corbett National Park | 7 | 3 | 1 (33%) | 0 | 0 | 1 | 0 |
| Monglajodi (Orissa) | 11 | 4 | 2 (50%) | 1 | 1 | 0 | 0 |
| TOTAL | 151 | 114 | 37 (32.5%) | 19 | 11 | 3 | 4 |

*This does not include scats from 4 captive individuals and one tissue sample.

Table 2: Summary of overall genetic diversity for jungle cat and leopard cat populations in India.

| | Fishing cat | Jungle cat | Leopard cat |
|---|---|---|---|
| N | 12 | 55 | 40 |
| Base pairs | 800 | 601 | 564 |
| Haplotypes | 7 | 33 | 8 |
| Gene Diversity | 0.909 +/- | 0.976 +/- | 0.793 +/- 0.039 |
| Nucleotide | 0.004 +/- | 0.007 +/- | 0.005 +/- 0.003 |
| $\theta\ \pi$ | 3.424 +/- 2.12 | 3.452 +/- | 3.074 +/- 1.814 |
| $\theta$ s | 3.311 +/- | 7.212 +/- | 2.601 +/- 1.061 |
| Tajima's D (*P*) | 0.140 (0.578) | -1.725 (0.02) | 0.648 (0.781) |
| Fu's F (*P*) | -10.442 (0.00) | -26.04 (0.00) | 0.813 (0.657) |

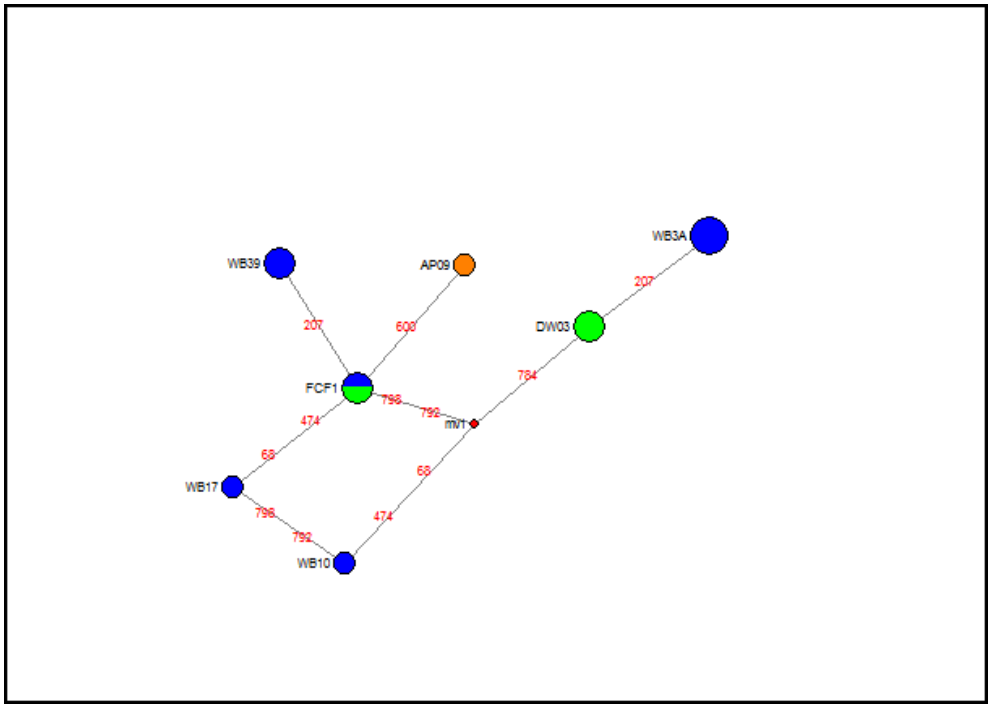


Fig.2 Median Joining haplotype network for fishing cats from India with Cytochrome b (800 bp). (n=12). Haplotypes are sequences of DNA from the same location on a gene that differ from each other by at least one nucleotide substitution. Numbers on branches denote the location on the alignment file and number of substitutions between connected haplotypes (e.g. 474 and 68 would denote 2 mutations/substitutions on the 474$^{th}$ and 68$^{th}$ positions on the 800 bp sequence between two haplotypes). Size of circle denotes number of individuals in the haplotype. Small red circles are missing haplotypes.
Legend: Blue-West Bengal, Green-Dudhwa and Katarniaghat, Orange-Coringa.
The network shows a loop which indicates unresolved linkages and could be an effect of insufficient sampling. The network does not indicate any structure since haplotypes from various regions are mixed with one or two mutations between them, and not segregated.

**Discussion:**

Though the final sample size (n=19) obtained for fishing cats seems low, this indicates the rarity of the cat since the effort put into scat collection was high and a large geographical area including 6 states (Andhra Pradesh, Orissa, West Bengal, Uttar Pradesh, Uttarakhand and Rajasthan) was covered within 7 months (October 2010 to April 2011). The scats that failed to amplify with the felid primers were likely to be of other sympatric carnivores such as jackals and feral dogs.

The small sample size did not permit us to obtain substantial information for Objective 1 which was to determine unique populations within India (if any). However, even with a small sample size it is clear that the fishing cat has considerable genetic variation within the country. From this we can infer connectivity in habitat from the Terai region of Uttarakhand and Uttar Pradesh through Nepal, Assam, Bengal, Orissa. The haplotypic network does not suggest any structure with the haplotypes from various regions being separated by a single or couple of mutations. In fact samples from West Bengal seem to be maximally separated with

a maximum of 6 mutations between two haplotypes (WB17 from the Sundarbans and WB3A a captive individual caught around the Kolkata airport).

Although it was not possible to determine any genetically unique population given the small sample size, threats and conservation status could be assessed in various regions by talking to locals and from observations of habitat and the number of scats procured. The fishing cat seems to be safe in the Terai belt where it occurs within several Protected Areas such as Dudhwa National Park, Katarniaghat Wildlife Sanctuary and Corbett National Park. Discussions with locals around these areas did not reveal any form of conflict. In contrast the Eastern part of India (mainly West Bengal) conflict with fishing cats seems to be severe and villagers often kill the cat after snaring or trapping it. Reports of fishing cat meat being sold in the market were obtained by Tiasa Adhya (pers comm.). While this can be addressed through awareness programs which Tiasa is currently doing, the other threat of habitat destruction due to brick mining and urbanisation seems to be a hopeless and lost case. All of South Kolkata was once connected to the Sundarbans and was potential fishing cat habitat. This is borne out by the fact that a couple of years ago two fishing cats were captured from the Kolkata airport area and are now in captivity in the zoological gardens there. Unless there is a political effort made to use land judiciously from an ecological perspective, these small pockets of populations will be soon lost. The population in Coringa is very small but safe and a survey specifically through the Andhra wetlands is required to assess their status there. Similarly surveys are required in and around Keoladeo Ghana in the several satellite wetlands.

Additional information and samples are required from areas between Bharatpur and the Terai and between Orissa and Andhra Pradesh. Furthermore, from current records, the Western Ghats do not seem to be within the range of the fishing cat, though potential fishing cat habitat does occur there. This is also perplexing given that they are found in Sri-Lanka. However, this needs to be verified but was not possible within the limited span of this project though it was to be addressed through Objective 2.

A comparison with other small cats (Objective 3) shows that despite the very small sample size fishing cats were genetically more variable than leopard cats and it is possible that further sampling would reveal more variation. The current sample size for fishing cats is too low to answer questions related to genetic structure, limits to distributions or very specific habitat preferences. There were areas with potential fishing cat habitat (e.g. Corbett National Park) where scat surveys yielded negative results but where locals have indicated the presence of the species and which is also similar to Dudhwa where several fishing cat scats were located.

**11. EXPLORATORY ACTIVITIES (not included in PROPOSAL): Briefly describe any activities implemented during the reporting period that were not originally in your work plan.**

Although collaborations were part of the proposal, I did not foresee the extent to which these could be carried into the future until I met certain people during the surveys. Tiasa Adhya was one such researcher who I met in West Bengal and who is independently conducting conservation work for fishing cats in that region. We had the opportunity, through this project to meet and discuss various strategies for future work not just in

West Bengal and India but across the border into Nepal. We met another researcher from Nepal (Sagar Dahal) who we plan to work with in the future.
We have also networked with some people in Southern India who have collected a few scat samples from the Western Ghats that they think are of fishing cat and which they will send to me for identification using molecular tools.
The International collaboration (Andreas Wilting) has provided important insights into the current global distribution of fishing cats and will be extremely important in determining the overall conservation status of the species. This has provided us with ideas for further collaborative studies on the entire genus *Prionailurus*. The article is currently under review for a peer reviewed journal publication.

**12. PROBLEMS AND CONSTRAINTS: This section can be written on a separate page and, if necessary, marked confidential. Please put confidential items in a SEPARATE electronic file, clearly marked "CONFIDENTIAL" so that it is not inadvertently forwarded. Sections thus marked will NOT be circulated.**

One of the major complications for this project emerged when I was appointed on a new job and had to move to a city almost 400 km away from the laboratory that I was to conduct the work in. Apart from the additional travel and logistics involved, the Institute that I joined had some formalities that differed from the place that I was in when I wrote the proposal. This was especially true with the budget, and hence some of the budget heads (salaries and equipment) were not utilized suitably. For instance, hiring a person on the project for the entire year long period on a salary would, in my new Institute, entail formal advertising and interviewing which would take up considerable time to begin the project. Buying equipment would have to be through several quotations in each case, which would again delay the commencement of the project.
The duration of the project (one year) was too short for such wide spatial coverage and any delay in obtaining permits caused a series of changes in planning, which reduced the efficiency of meeting the overall objectives. In some areas like West Bengal, a much larger area was covered than expected or earlier planned since the cats occur in many places that are not formally reported in literature. Moreover, this region had maximum reports of conflict between fishing cats and humans and since there were researchers and locals interested in resolving this, the time spent in visiting sites and discussing resolution strategies was thought to be justified. The Orissa Forest Department refused to issue permits for scat collection from Protected Areas (with no reason provided) and hence we had to shift plans to areas outside the jurisdiction of the Forest Department to cover that region. Ultimately the time budgeted for lab work had to be shortened from 5 months to 3 months and some work (that required standardizing prior to actual data generation, such as PCR's for microsatellites), could not be done appropriately despite forming part of the objectives and study. Hence, results for microsatellites have not been included in the report.
The rarity of the species made it all the more problematical when the schedule was delayed or changed and time was limited.
Nevertheless it must be mentioned that all State Forest Departments were extremely helpful once permits were issued and much of the success in sample collection was due to facilities and help extended by them.

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**13. GOALS/ACTIVITIES FOR THE NEXT YEAR: Summarize previously outlined goals from the PROPOSAL and include any new GOALS/ACTIVITIES.**

The project ended on May 31st 2011 and the budget account was closed by SACON. Hence no further work can be conducted formally since there is no money for surveys or laboratory work. However, collaborative work specifically for the fishing cat as well as projects with broader objectives that will include fishing cat surveys are being planned.

**14. CONSERVATION ACCOMPLISHMENTS & EVALUATION: This section should be a reflective analysis of project outcomes and effectiveness, as well as how the outcomes will influence next steps for the year ahead for the project.**

The project commenced in May 2010 and the initial month went into preparations for the survey and in obtaining permits from the various forest departments. However, due to the monsoons actual field surveys could commence only from October.

Several of the objectives listed could not be fulfilled as expected at the start of the project due to time constraints, a large geographical coverage and a few other unforeseen issues such as delays in obtaining permits or in the case of Orissa, not being issued a permit. One of the biggest constraints was the rarity of the species and the very few samples obtained at the end of the study. Despite this, the information obtained is extremely crucial being the first time such data was collected for fishing cats in India. This can form as a baseline for further information.

The sample from Bharatpur was very important since fishing cats have not been reported from here since a year according to forest department staff. Unfortunately, the same location where the fishing cat scat was found was also used by a jungle cat to mark its area. Hence the fishing cat scat was contaminated with the jungle cat scats and we could not obtain pure fishing cat DNA for further analysis with the cytochrome b region. Nevertheless, the presence of the fishing cat was confirmed through a sighting around the same location where the scat was found by Mr Bholu Khan after we informed him of the result through genetic analysis. This result highlights the importance of genetic tools in surveying rare species. Incidentally, in 1989 more than 35 sightings of fishing cats were obtained in Bharatpur in a period of 6 months in various places (pers obv.) and the same places were visited to collect scats on this survey.

One of the most important outcomes of the project was in joining the global network of fishing cat researchers and a global fishing cat working group has been formed addressing conservation issues across the fishing cat distribution range. Within India, Tiasa Adhya from Kolkata who had volunteered on this project is now pursuing fishing cat research in West Bengal and Orissa. The global dataset with contribution from this work has been written up as an article that is now under review to be published in a peer reviewed journal.

15. **LIST OF PUBLICATIONS DURING PAST 6 MONTHS: List any articles or books published and/or in press (popular and technical), as well as "gray literature" (e.g., management plans, field surveys, etc.).** ***Please attach/mail reprints or copies if you have not already submitted them.***
Mukherjee (2010). In search of an elusive cat. SACON NEWS Vol 7(2):2-3.
Mukherjee (2011). On the fishing cat trail. SACON NEWS Vol 8(1) 3-4.

16. **SUMMARY DATA: Please include summary data in a form acceptable for scientific publications (FINAL REPORT ONLY)**

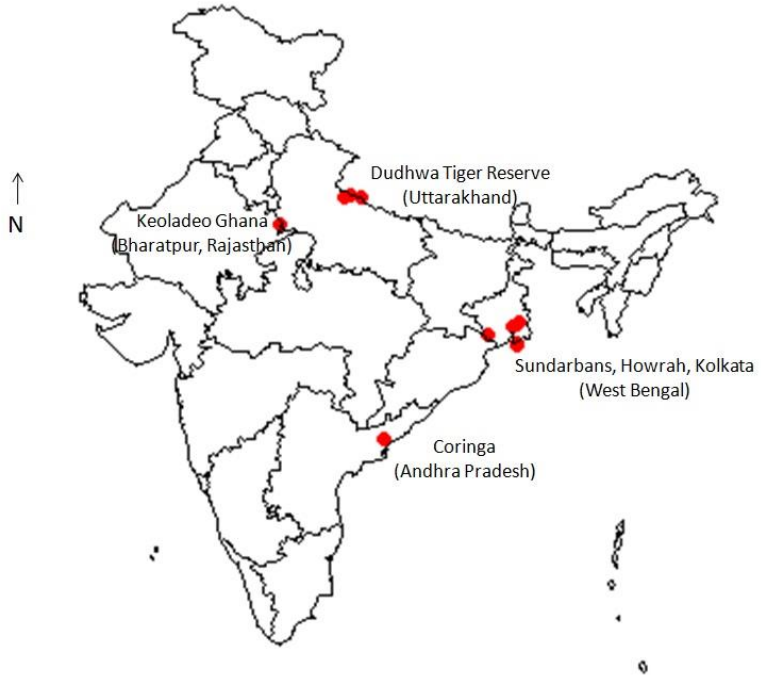


Figure 1. Map of India showing locations where scats were collected.

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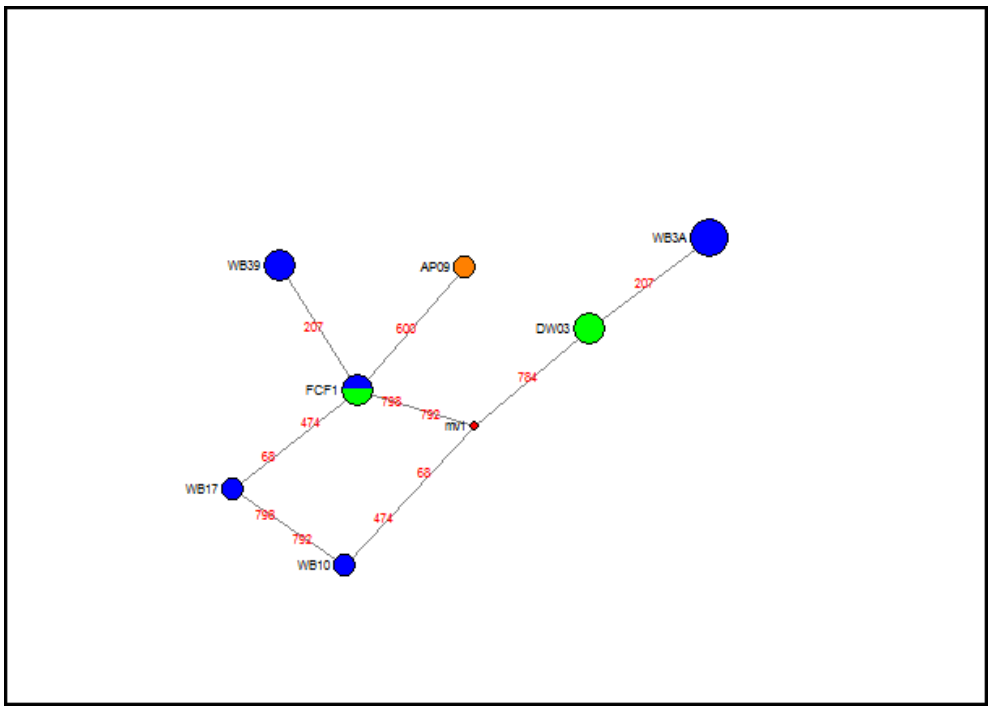


Fig.2 Median Joining haplotype network for fishing cats from India with Cytochrome b (800 bp). (n=12). Haplotypes are sequences of DNA from the same location on a gene that differ from each other by at least one nucleotide substitution. Numbers on branches denote the location on the alignment file and number of substitutions between connected haplotypes (e.g. 474 and 68 would denote 2 mutations/substitutions on the 474$^{th}$ and 68$^{th}$ positions on the 800 bp sequence between two haplotypes). Size of circle denotes number of individuals in the haplotype. Small red circles are missing haplotypes.
Legend: Blue-West Bengal, Green-Dudhwa and Katarniaghat, Orange-Coringa.
The network shows a loop which indicates unresolved linkages and could be an effect of insufficient sampling. The network does not indicate any structure since haplotypes from various regions are mixed with one or two mutations between them, and not segregated.

17. **FINAL FINANCIAL REPORT: Please see attached spreadsheet (FINAL REPORT ONLY)**

**Project Name: Phylogeography of Fishing Cat in India**

| Panthera Final Financial Report(01.04.2010 to 24.10.11) | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| Category/Budget Item | Panther's Approved Budget(USD) | Budget Amount in Indian Rupee | Actual Expenses in USD | Actual Expenses in Indian Rupee | Balance in USD | Balance in Indian Rupee |
| | | | | | | |
| Personnel/Local Salaries/ Perdiems | 2500 | 113675.00 | 0 | 0.00 | 2500.00 | 113675.00 |
| Travel/Lodging/Meals | 1500 | 68205.00 | 1863.05 | 84713.00 | -363.05 | -16508 |
| Equipment(GPS Units, Telemetry Equipment, camera traps) | 1500 | 68205.00 | 0 | 0.00 | 1500.00 | 68205.00 |
| Genetic Analysis | - | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Expendables & Supplies | 2850 | 129590.00 | 5439.41 | 247330.00 | -2589.41 | -117740 |
| Operating Expenses/Office supplies | - | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Professional fees/Purchased services | - | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Other/Miscellaneous Costs (Bank Interest), etc., | - | 12686.00 | 24.74 | 1125.00 | 279.00 | 11561.00 |
| | | | | | -24.74 | |
| Sub Total | 8350 | 392361.00 | 7327.20 | 333168.00 | 1307.80 | 59193.00 |
| **Grand Total** | **8350** | **392361.00** | **7327.20** | **333168.00** | **1301.80** | **59193.00** |
| | | | | | | |

**Balance - Rs:59193.00**

Dr. Shomita Mukherjee
Principal Scientist

Sálim Ali Centre for Ornithology and
Natural History
Anaikatty (Post),
Coimbatore – 641 108

P. KARUPPIAH
Finance Officer
Salim Ali Centre for Ornithology
and Natural History, Anaikatty,
Coimbatore - 641 108

Salim Ali Centre for Ornithology and Natural History
Anaikatty (Post)
Coimbatore 641 108

THESE ADDITIONAL MATERIALS SHOULD BE SUBMITTED WITH THE SIX MONTH AND FINAL REPORTS:

1. NEW/UPDATED CV'S: We need to have current CV's on file for all project P.I.s

2. PHOTOS – Please upload or email 5-10 digital photos per report (six month and final report), labeled with photo credits for publicity and other non-commercial uses, in jpeg or tiff format. Please include photos of you and staff, the species studied, landscapes, and any other high-quality photos that are relevant to the project. Please save photo file in the following format:

   Project Name_Photo#_Description_Date_Copyright Info.jpg/tiff

   Please provide on a separate sheet a short descriptive sentence or two about each photo, corresponding to the # in the file name, including copyright information, the specific location where the photo was taken, names of people who appear in the photo (if possible) and dates.

   If uploading photos, please use our FTP site:
   ftp.panthera.org
   Username: ftp49270829-2
   Password: public2008
   *Please create a new folder labeled with your name