Project Summary

In spite of being the State Animal of West Bengal, scientific works on Fishing Cat in West Bengal are very few. The project titled "Status survey of Fishing cat with special reference to their distribution and abundance in wetland habitats of West Bengal" sanctioned by West Bengal Biodiversity Board is the first state-wide survey on Fishing Cats. Review of available literature revealed that the presence of fishing cats have mainly been **reported from parts of Howrah, Hooghly, South 24 parganas, East Midnapore and some protected areas in West Bengal.** In the present study we have documented the presence of fishing cats (with camera trapped photographic evidence) from wetlands of **Kolkata, Nadia, North 24 Parganas, Murshidabad as well as few new locations of Howrah, Hooghly, South 24 parganas and East Midnapore.** During the research project around thirteen thousand local residents of West Bengal had been interviewed as a part of the questionnaire surveys. Their local and traditional knowledge was very much useful in finding out many of the newly confirmed locations of Fishing cat presence. **Twenty two out of twenty three districts has been surveyed properly in the last two years** following the proposed research protocol and we came up with **eighteen confirmed location of the State Animal**. Some places were also very potential and based on the secondary evidences a distribution map of Fishing cat has been prepared with all the confirmed presence locations along with all the probable areas.

Some major problems regarding the protection of camera traps in human dominated landscape caused hindrance in the 'abundance estimation' of Fishing cats in many of its potentially suitable habitats. However, the team is working on the specified areas where confirmed presence of the cat has been identified. Along with the survey part emphasis is also given to Awareness Programs which held in different academic institutions of the State. **Awareness workshops have been organized in twenty three colleges, seven universities and three schools** where a large number of students have been sensitized about the importance of fishing cat conservation. Local panchayet members, BMC members, and forest officials have also willingly participated in some of those workshops.

This report will certainly add to the existing scientific knowledge regarding the distribution and potential habitat of this elusive nocturnal Felid and will eventually help in their conservation within the State.

Dr. Goutam Kumar Saha
University of Calcutta

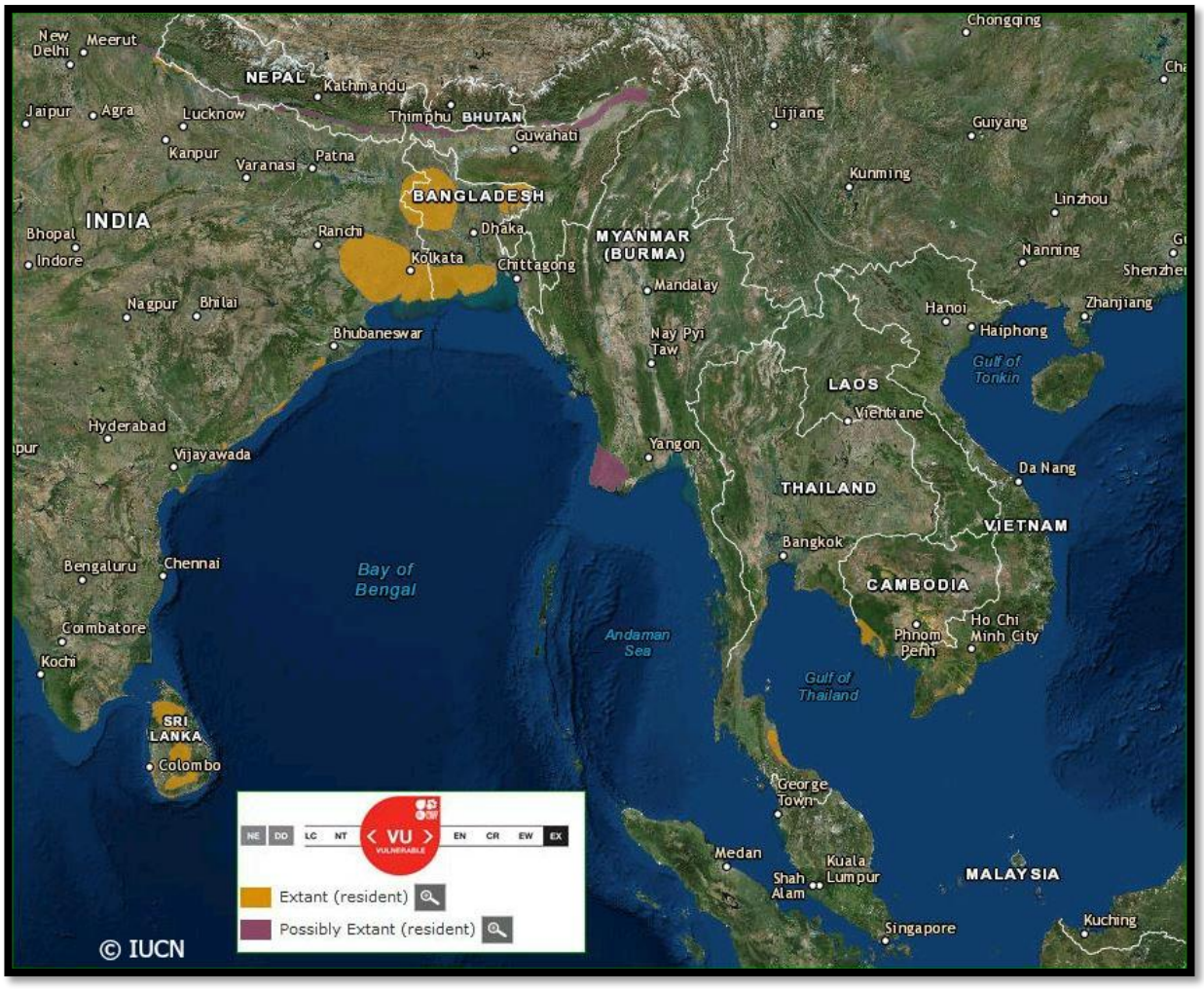
Dr. C. Venkatraman	**Dr. Koushik Deuti**	**Dr. Subhendu Mazumdar**	**Smt. Ajanta Dey**
Zoological Survey of India	**Zoological Survey of India**	**Shibpur Dinabandhu Institution**	**Nature Environment & Wildlife Society (NEWS)**

Introduction:

Fishing cat was named *Felis viverrinus* by the English zoologist Edward T. Bennet in 1833 due to its overall in appearance with civets, particularly the large Indian civet (Viverrazibetha; Sunquist and Sunquist 2002). However, in 1858, it was included under Genus: Prionailurus which are characterized by conspicuous stripes and spot patterns on the head, face and body. Fishing cat (*Prionailurus viverrinus*) is a medium sized stocky built carnivore characterized by brown tinged olive grey coat of short and coarse fur with intermittent oblong black spots along its flank and rows of parallel solid black running along its head. The four dark lines running along the length of its forehead and along its back eventually taper into spots. Their fur coat has distinct layers – (i) immediately next to its skin lies a thick, dense layer of short hair that prevents water from penetrating through to its skin thus keeping the animal warm and dry; (ii) another layer of long guard hairs sprout from the dense layer and create the actual coat of the cat. Their head is large with a broad forehead, an elongated muzzle and two stripes that run from its yellowish green eyes, down along the side of its face. Ears are small and round, and the backs of each ear is black with a prominent white spot in the middle, like that of a tiger. Unlike most other species, tail of a fishing cat is less than half its body length, thick, with a series of incomplete rings and a solid black tip. Their legs are also short and muscular. Fishing cats are well adapted for a semi-aquatic lifestyle for which their front feet are partially webbed with retractile claws. This adaptation is very much beneficial to move in wetland habitats, where they mainly thrive, as well as, to catch their prey (mainly large fishes) by scooping them out of water. There are no prominent sexual dimorphism among the adults.

Distribution:

The species shows a patchy distribution pattern across a wide area of south and south-east Asia, possibly because of its strong association with wetland habitats, which are few and far between in the region. In south and south-east Asia, Fishing cats have been reported from Bangladesh, Cambodia, India, Myanmar, Nepal, Pakistan, Sri Lanka and Thailand. However, present distribution of this species is mainly based on many brief visits, hunting records and several other secondary information, as well as, some unconfirmed reports throughout its range. Hence, the precise location of Fishing Cats are still unavailable from many parts of this distribution range.



Global Distribution Range of Fishing Cat (Fishing Cat Working Group 2016. Prionailurus viverrinus. The IUCN Red List of Threatened Species. Version 2019-2)

Habitat and Ecology

Fishing cats are strongly associated with wetlands, good swimmers and are typically found in swamps and marshy areas, oxbow lakes, reed beds, tidal creeks and mangrove areas and are scarcer around smaller, fast flowing rivers and streams (Macdonald and Loveridge 2010). Nevertheless, localized population of ishing cats have also been reported from various habitats like evergreen and tropical dry forests (Rabinowitz and Walker 1991; Nowell and Jackson 1996). Scat analyses of Fishing Cats in Keoladeo National Park (Rajasthan, India) revealed that fishes comprised 76% of their diet, followed by birds (27%), insects (13%) and small rodents (9%); while molluscs, reptiles and amphibians are occasionally consumed (Mukherjee 1989; Haque and Vijayan 1993). Reports also indicate that in groups they are able to hunt mall chital fawns, small domestic livestock and dogs (Nowell and Jackson 1996, Sunquist and Sunquist

2002; Mukherjee et al., 2010), and were noticed to scavenge on livestock carcasses and tiger kills (Nowell and Jackson 1996).

Home Range

Telemetry studies conducted in the Khao Sam RoiYod area in Thailand estimated the home range size of a male fishing cat to be 7.3 km2 whereas the average female home range was found to be 2.8 km2 (n=3). The average home range overlap of the male over female home ranges was 7.28% and 2.94% among females. Another radio-telemetry study of four fishing cats in Chitwan National Park in Nepal in 2002, showed that the estimated home ranges of three females was 4-6 km², while a single male had an estimated home range of 16-22 km². (Cutter, P., Cutter, P. (2010). Recent sightings of fishing cats in Thailand. Cat News 51: 12–13)

Reproduction

These medium sized cats are polyestrous. They are reported to select dense reed beds along the margin of wetlands as their ideal breeding habitat. However, breeding is also reported to take place inside dense shrubbery, hollow of trees, inside rocky crevices, as well as, in some other secluded locations.

In wild, kittens of fishing cats are recorded wild in April and June. One to four (usually two) kittens are born after a gestation period of 63 – 70 day, and weigh around 170 grams at birth. Their eyes are open by 16 days, meat is taken around 53 days, and the kittens are weaned between four and six months. Adult size is attained at eight to nine months, and the young are independent between 12 – 18 months. It is thought that in the wild the adult male may help with the care and supervision of the young, but this is unverified. Captive individuals have lived to 12 years of age.

<u>Conservation Status</u>:

Owing to the declining population trend throughout its distribution range at an alarming rate due to various threats, Fishing Cat is declared as Vulnerable **(IUCN Redlist Criteria:** A2cd+3cd+4cd ver 3.1) (Mukherjee et al., 2016). It is also included in Wildlife (Protection) Act, 1972 Schedule I species and Appendix II of CITES (Mishra 2015). In the recent past, this illusive species has also been declared as the State Animal of West Bengal (WII 2009).

Review of Literature:

Global and Indian scenario of the works on Fishing Cat

Few studies have been conducted on the diet composition of wild fishing cats, and none has been published based on populations in Southeast Asia. One in-depth study (Haque and Vijayan 1993) was carried out in India and a number of other authors cite ad-hoc observations of diet habits (Jerdon 1874, Prater 1965, Roberts 1977, Sunquist and Sunquist 2002).

Despite its beauty, the Fishing Cat has long been neglected in recent research and its elusive life has rarely been documented by photographic material. The range of the Fishing Cat patchily covers South and Southeast Asian wetlands. On its western distributional fringe, isolated populations of the Fishing Cat live in the lower Indus Valley of Pakistan South West India (Bhattacharya, 1992) and Sri Lanka (Alwis, 1973). Its major distribution ranges from Nepal and Assam (PococK, 1939) to Myanmar (U tun yin, 1967), Thailand (Lekagul & Mcneely, 1977) and Indochina (DelacouR, 1940). BREE & KHAN (1992) recently recorded the Fishing Cat from Peninsular Malaysia but see also Meusch's note from 1995. In Indonesia Prionailurus viverrinus occurs isolated on Java (Melisch, 1992), where it constitutes the eastern limit of its range. Doubtful records from Bali and Borneo have been discussed by Bree & Khan (1992). Records from Sumatra have been controversially discussed in the past (Delsman, 1932a; Sody, 1931 & 1936a; Jacobson, 1936; Zon, 1979). In 1985, nash & nash found footprints of a Fishing Cat in South Sumatra, but did not secure plaster casts. In 1992, a HIMBIO team secured a dead Fishing Cal in Berbak, Jambi Province. However, there is not much known about the species' occurrence on Sumatra and no museum specimens are yet known for the island (bree & khan, 1992). Corbet &hill (1992) indicate East Java as distributional range of P. viverrinus but there is, however, no recent evidence available (Pfeffer, 1965; Hoogerwerf, 1974; m. griffiths, m. indrawan & s. hedges, pers. comm. 1994). The easternmost records of Fishing Cats come from the north coast of Central Java and date back to the l 930's (Brongersma, 1935; Jacobson, 1933). Conclusively, West Javan populations of P. viverrinus remain the only known living examples

in Indonesia. Fishing Cats share the island of Java with two other felids, the Leopard Cat Prionailumsbengalensis and the Javan Leopard Pantherapardusmelas.

Results of a wetland survey carried out in West Java, Indonesia, during the years of 1993 and 1994 revealed five extant, but fragmented subpopulations of Fishing Cats in West Java (Melisch et al., 1996)

In 2003 a series of surveys with the objective of documenting fishing cats in areas where they were likely to occur based on habitat composition in Thailand (Surveys for Fishing Cats: 2003-2005)were started.some positive reports came alongside. Formerly occurring widely over most of Southeast Asia, fishing cats now appear to have the second most restricted range of wild felids in theThailand. They conducted surveys for fishing cats in four locations in peninsular Thailand between 2003 and 2009. Survey methods consisted of interviews, searches for signsand the use of automated camera traps. We documented fishing cats at ThaleNoiNon-hunting Area and Khao Sam RoiYot National Park and found no evidence of thespecies at KlongSaeng and MaenamPachi Wildlife Sanctuaries. Priority actions forconserving fishing cats include surveying additional areas of potential occurrenceand working with communities to disrupt direct persecution of the species.

The presence of fishing cat confirmed in BotumSakor National Park, southwest Cambodia on 20 January 2008. Two juveniles were found abandoned by a park ranger following a natural fire, and were subsequently photographed by Frontier scientists in a village within the national park boundary. Thediscovery of these cats suggests the presence of a wild population of the species. BotumSakor National Park is one of only two coastal protected areas in Cambodia and contains significant potential fishing cat habitat, including large wetland areas and a combination of forest and grassland systems. Therefore, fishing cat mightwell have a widespread distribution within the National Park. (Royan A., 2008)

In December 2009 two captive fishing cats at Khao Sam RoiYot (Cutter&Cutter 2009) prompted the research team to carry out sign and camera trapping surveys initiated in the area adjacent to the southern boundary of the park. Sign surveys and camera trapping surveys had

confirmed at least 10 different individuals,. To date the team have captured fourteen individual fishing cats—7 males, and 7 females. (Cutter, 2009)

A recent comprehensive review of small felids in Southeast Asia (Povey et al. 2009) concluded that fishing cats have the second smallest range among the nine species of small cats. Range maps show that fishing cats were distributed from northern Thailand to the Isthmus of Kra; fishing cats occurred historically in southernmost Thailand and peninsular Malaysia. Prior to this study, they could only find three credible records of fishing cats reported from Thailand in the last 15 years: from KhaoYaiNational Park (T. Redford, pers. comm.), ThaleNoi Non-hunting Area (J. Murray, pers. comm.), and KaengKrachan National Park (D. Ngoprasert, pers. comm.). The purpose of the paper was to report on the results of recent surveys for fishing cats in Thailand.

In Nepal, they occur in the Terai region but their actual distribution is not well understood. They have been reported before from Chitwan National Park NP (Dahal&Dahal 2011) and KoshiTappu Wildlife Reserve WR in Central and Eastern Terai respectively. In Western Terai, they were recorded from Shuklaphanta NP (DNPWC unpublished data) and Jagdishpur reservoir (a Ramsar site; Dahal et al. 2015). Although fishing cats are believed to exist in Bardia National Park (BNP), conclusive evidence has not been reported before despite various ecological researches on carnivores and extensive camera trap surveys (Odden&Wegge 2005, Wegge et al. 2009, Dhakal et al. 2014). A naturalist (B. Chaudary, pers. comm.) reported the sighting of fishing cat during 1990s to the first author but without photographic evidence. during the camera trap survey in 2016-2017 Babai Valley of BNP. team recorded 15 photos (10 left and 5 right flanks) of fishing cats during a camera trap survey targeted at tigers in winter 2016/2017. Solitary fishing cats were camera trapped at a single location in Babai valley of Bardia during two events within a week. Fishing cat was supposed to exist in Bardia but this is the first conclusive evidence with photographs. (CATnews 67 Spring 2018)

In December of 2013 a fishing cat kitten was captured by villagers nearby Kulaura town in Moulovibazar district. This incident confirmed the species existence in north-east Bangladesh. Because of the vast wetland areas in the northeast, Bangladesh may play a significant role as a stronghold for this endangered cat (Rahaman A.H., 2013). In a recent news paperreportalso

shows that On May 01, 2017 For the fifth time in four months, a fishing cat has been beaten to death in the Kushtia district, Bangladesh.On Monday morning, a panicked mob beat to death a fishing cat – colloquially known as "mechhobagh" – in Kushtia(Kushtia villagers beat fishing cat to death)

The Cat was last sighted in Cambodia in 2003. reserchers deployed camera traps at four sites in southern Cambodia during (January–May) 2015 to determine if the fishing cat was still present in the country. Eight photograph/video captures of fishing cats were recorded from the mangroves in PeamKrasop Wildlife Sanctuary and one from Ream National Park, but there were no records from BotumSakor National Park or Prey Nup. A number of other globally threatened species were also photographed in PeamKrasop Wildlife Sanctuary.

In November 2015, the First International Fishing Cat Conservation Symposium was held in Nepal, hosted in association with the NGOs Himalayan Nature and Small Mammals Conservation and Research Foundation. Participants included representatives from Fishing Cat range countries like Nepal, India, Sri Lanka, Cambodia and Bangladesh, as well as conservationists from USA, UK, Spain and Germany. The endangered Fishing Cat *Prionailurus viverrinus* is at home near water bodies. This unique cat has been known to science since the early 19th century. However, its recent discovery in mangroves along the east coast of India and in Cambodia reveals that still little is known about its distribution and ecological needs. In Asia, wetlands are rapidly being devastated, which results in declining Fishing Cat populations in all range countries. Furthermore, they are threatened by killings in retaliation, poaching and traffic. Their status in Pakistan, Myanmar, Thailand, Vietnam and Java is largely unknown. They may have declined dramatically over the last decades. (Cats of Asia, Endangered Cats) Pictures of the endangered fishing cat – the first in Cambodia for more than a decade –provide welcome evidence that these elusive felines still survive in some parts of the country. (Cats of Asia, Endangered Cats, 3rdsept 2015). It has been assumed that this species may have been extirpated from Pakistan. However, recently published articles, surveys, and an incident of a captive fishing cat in southern Pakistan indicate that some populations might still occur in the country. Immediate field surveys for the species are warranted, especially, based on occurrence elsewhere in its range, in mangroves southeast of Karachi. Should fishing

cats be found there, global species records and national protection efforts will need enhancement. (Zubairi F. Naidu A., 2016)

The status of the Fishing Cat Koshi Tappu Wildlife Reserve, Nepal was assessed by camera trapping and pugmark searches from 2011 to 2014. The reserve is a highly dynamic and unstable snow-fed braided river system with many anabranches and islands. Evidence of Fishing Cats was found throughout most of the reserve. They were probably more abundant on the eastern side, among the islands of the main river channel, and in the adjacent buffer zone where there was a chain of fishponds and marsh areas fed by seepage from the main river channel. Evidence of Fishing Cats was found up to 6km north of the reserve on the Koshi River but not beyond this. The population is probably small and may be isolated but given the endangered status of the species, is significant. According to locals who has frequently seen Fishing cat in their fish ponds said that it sometimes arrive in groups of 3 to 4 cats and take away the fish. The cats are highly routine and patrol the fish ponds for the opportunity of fishing. Due to their routine nature they are very much predictable cats and hence vulnerable for being hunted down. They did a series of camera trapping at the fish ponds of local villagers in the Prakashpur and recorded Fishing cat from two ponds nearly 300m apart. The live footage of Fishing cat was recorded on 3rd February 2016 at Prakashpur.The highest number of Fishing cat study in Nepal is concentrated in KoshiTappu Wildlife Reserve (KTWR). Pandey and Kaspal (2011) did the survey in KoshiTappu and its buffer zone and recorded that the Fishing cat are regular visitor to the local fish ponds. The work was followed by Taylor et al. (2015) and described the conservation status with perceived threats to the Fishing cat in KTWR.

Twelve cat species were recorded in Nepal including the Fishing Cat *Prionailurus viverrinus* in Parsa National Park in southern central Nepal during a camera trap survey targeted at the tiger between 2014 and 2016. There were only single detections of each species; this does not give enough information to establish distribution or conservation status of either of the species in Parsa National Park (Poudel et al., 2019).A total of 19 photographs of five individual cats were recorded at three locations in six independent events. Eleven camera-trap records obtained during surveys in 2010, 2012 and 2013 were used to map the species distribution inside Chitwan National Park and its buffer zone (Mishra et al.,2018)

The fishing cat is one of the least known felids found in India. It is a medium-sized felid characterized by a stocky, powerful build with short legs (because of which the species got its name *viverrinus*, i.e., civetlike) partially webbed paws, and a very short tail (Macdonald & Loveridge 2010). Its olive brown pelt is patterned with rows of parallel solid black spots which often form a line along the spine as well as in the neck portion. Although the animal inhabits wetlands its body is not much modified for catching fish (Nowell& Jackson 1996). At present the fishing cat is included in Schedule I of the Indian Wildlife (Protection) Act and is listed as vulnarable in the IUCN Red List (Mukherjee et al. 2016), and in Appendix 1 in CITES (Cutter 2009). Although fishing cats are widespread throughout their range their occurrence is patchy and not well documented (Macdonald & Loveridge 2010); there are very few studies on the distribution and status of this elusive species in its present range (Pocock 1939, Nowell& Jackson 1996, Kumara & Singh 2004, Kolipaka 2006, Mukherjee et al. 2012. Fishing Cat is widely but patchily distributed across Asia and strongly associated with wetlands. It is among the 15 felid species that inhabit India and like other smaller cat species it is very poorly understood. Apart from a few recent surveys in specific locations, no concerted effort has been made to assess its current distribution and threats to its persistence within India. In India, it has been known that fishing cats mainly occur in the mangrove forests of the Sundarbans, and sparsely in wetlands along the Ganga and the Brahmaputra River tributaries. They also occur around other well-known wetlands such as the Keoladeo National Park in northwestern India and the Chilika Lake in Orissa (Acharjyo&Misra 1974, Mukherjee et al. 2012, Aniruddha 2014, see also: www.fishing-cat.wild-cat.org/). The fishing cat is listed as a Schedule I species in the Indian Wildlife (Protection) Act, 1972. On the east coast of South India, only a few intact small populations of fishing cats are known to occur, supported by a few recent records (Kolipaka 2006, Mukherjee et al. 2012, Sankar 2014), and these populations are subject to severe threats due to habitat loss by aquaculture, persecution and poaching by humans for their meat (based on interviews with local communities by M. Kantimahanti, P. Sathiyaselvam, and A. Rao, pers. comm.). A recent survey effort presented a case for the potential extirpation of fishing cats on the west coast of South India (Janardhanan et al. 2014). In spite of its potential habitat being present in coastal Kerala, there are only a few, unsubstantiated records of the cat. Moreover, its occurrence in Sri Lanka strengthens the possibility of its presence (historical or current

population) in southern India, including Kerala. A survey was conducted to assess the occurrence of the Fishing Cat in coastal Kerala through personal informal interviews with local people and molecular analysis of scats. The study failed to find any evidence of the occurrence of Fishing Cat in the coastal areas of Kerala. two possibilities came across - one, of the species existing earlier but driven to extinction in recent decades, due to high levels of land conversion through anthropogenic activities in these areas and the other of the Fishing Cat having never occurred in coastal Kerala. A speculative reasoning for its absence from the region could be related to the difference in salinity levels between the eastern and western coasts of India which has already been documented. Moreover, fewer freshwater sources merge into the sea in coastal areas of Kerala as compared to the eastern coast of India. This could limit the distribution of the Fishing Cat. The argument was also supported by the lack of any authentic report till date or of local names for the Fishing Cat in the region .Within India, the Fishing Cat is primarily distributed in the eastern parts (West Bengal, Assam, Orissa, parts of Andhra Pradesh) and along the foothills of the Himalaya in the Terai tract (Pocock 1939; Sunquist&Sunquist 2002).and one recent camera trap record from Ranthambhore Tiger Reserve (Sadhu & Reddy 2013). Since the distribution of this cat continues into Sri Lanka, it is expected to occur in southern India. Despite the presence of wetlands and mangroves along the western coast, the occurrence of the Fishing Cat in this region is contentious (Prater 1971; Sunquist&Sunquist 2002; Menon 2003). Some authors have speculated a recent extirpation of the species from this region due to habitat loss (Karanth 1986; Nowell& Jackson 1996; Sunquist&Sunquist 2002; Kumara & Singh 2007). On the other hand, there are recent, though unsubstantiated, reports of the Fishing Cat from Kannur, Kumarakom Mangroves and Periyar Tiger Reserve in Kerala (http://wild-cat.org/viverrinus/ fishing-cat/index.htm?pv-distribution.htm, accessed on 20th August 2013; http://www.periyartigerreserve.org/ check_list/mammals.pdf, accessed on 14th March 2014). Pocock (1939) questions the validity of the Malabar Coast (which in the 1930s would include almost the entire western coast of India) as the locality of the type specimen of the species. He remarks that this could be an assumption since the donor submitted a specimen of a langur from the Western Ghats along with the Fishing Cat specimen, though notes on the specimen mention the locality as just 'India'. The record from Periyar Tiger Reserve too is not substantiated with photographic or genetic evidence and so remains speculative. One scenario suggests that the species was

present in this region historically and at present occurs in small populations, in danger of extinction, or has already been extirpated from this region. Alternatively, the possibility of the cat having never occurred here also cannot be rejected. Solving this is important, not just to enable conservation of this cat but also to trace its historical dispersal into Sri Lanka. The team surveyed potential habitats in coastal Kerala for Fishing Cat through scat collection and assignment of scats to species using molecular tools.In this study we collected scats from natural habitats, through six states including five protected areas throughout India and performed informal interviews with locals to get a better overview of the current distribution and threats for Fishing Cats in India. Of the 114 scats used for molecular analysis, 37% were assigned to felids, including 19 Fishing Cats. We confirmed that Fishing Cat populations persisted in all locations where they were recorded before, including Keoladeo Ghana, from where it was reported in recent years that fishing cats are possibly extinct. Most populations face imminent threats with the worst being in the Howrah District of West Bengal where 27 dead individuals were traced during the study period of only one year.(Adhya,2011) .During the Tiger monitoring camera trap evidences show that fishing cats are present in the terai region of india.(Shwetha Nair).It has possibly disappeared also from the southern Western Ghats (Nowell and Jackson 1996; Shomita Mukherjee and Jamal Khan pers. comms. 2007). However, there is also a new record from Umred, near Nagpur in central India, an area well outside of the fishing cat's known range, when a Fishing Cat that had been killed by a vehicle was found (Anon,2005).In coastal South India, the first published records of confirmed evidence-based observations of fishing cats were in 2006, and then again in 2012 and 2014, all from the Coringa Wildlife Sanctuary in the state of Andhra Pradesh. With the use of recent local news articles, interviews with local people, field tracking, and camera-trap surveys outside protected areas, we recorded fishing cats in several more locations along the coastline of Andhra Pradesh from November 2013 until August 2014. Based on the reports and our preliminary findings, we surmise that the Krishna and Coringa Wildlife Sanctuaries and proximal mangroves probably hold the southernmost, sizeable populations of fishing cats in India. We also provide details on needed community-based measures for the longterm conservation of fishing cats in this region (Naidu et al., 2015).During scat sampling of Fishing Cat,a survey team was formed for the collection of scats from various places if India 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. (Mukherjee et al. 2010). In the last decade, there have been many records of presence of fishing cat in India. On 18 February 2016 in the morning, a dead fishing cat was spotted on the National Highway 2 in Sur Sarovar Bird Sanctuary, Agra, India. This is the first record of the presence of fishing cat within this sanctuary.(Prerna et al.,2016). In Odisha fishing cat research was going from 2008 to 2018 and the team came across with the presence in 25 localities there.(Pal H.S. et al.,2018). A fishing cat was found dead on the National Highway 58 near the Upper Ganges canal in Ghaziabad town of Muradnagar on September 3rd, 2015 according to police.(The Pioneer). A recent study (Adhya 2015) in the Howrah district of West Bengal reveals that Fishing Cat diet is largely composed of small mammals, fish and birds with a negligible portion (less than 5%) comprising of livestock and surmises that the killings are based on a perception of conflict because of the presence of the cat.

In spite of all these studies, Fishing Cat faces a high risk of extinction throughout its range and is thought to be amongst the most vulnerable of the small and medium-sized cats in Southeast Asia, reflecting the very low overlap of occupied habitat with protected areas and other conservation interventions, rather than any particular inherent higher susceptibility than shown by the other small cats (e.g. Duckworth *et al.* 2014). The major threat across its South Asian range appears to be habitat loss and fragmentation by developmental activities such as urbanization, industrialization, agriculture and aquaculture (prawn and shrimp farms), whereas in Southeast Asia persecution is the major threat (Melisch *et al.* 1996, Cutter and Cutter 2009, Tantipisanuh *et al.* 2014, Willcox *et al.* 2014). Poaching and retribution killing were the major causes for a high Fishing Cat mortality of 84% in Thailand, where16 individuals have been monitored over a three-year radio-telemetry study (Cutter 2015). In Cambodia, the

Fishing Cat is killed by local people for consumption or in retaliation for damaging fishing nets (Thaung and Herranz Munoz 2016). Opportunistic trading of skins and potentially other parts is likely to occur in mainland Southeast Asia, where such trading is at very high levels and involves a wide diversity of species (e.g. Willcox *et al.* 2014), but there is no evidence of its being particularly sought after there. Similarly, in Java individuals are sometimes seen in the island's intensive live animal ('pet') trade (e.g. Duckworth *et al.*2009), but again there is no indication that it is (yet) a specific target. In Bangladesh, a compilation of reports from newspaper articles and web-based searches on the Fishing Cat (deaths, captures, rescues and releases) revealed 82records and 30 confirmed deaths over a three-year period from January 2010 to March 2013(Chowdhury *et al.* 2015). In both areas, almost all deaths could be traced to local people killing the cats (Mukherjee *et al.* 2012, Chowdhury *et al.* 2015). In South Asia, although relatively widespread, it occurs largely in human-dominated landscapes (often hugely so), which are under locally severe threat from urbanization (Sri Lanka and India) and industrialization (India). In addition, habitat loss along with the killing of Fishing Cats because of conflict with local people throughout the species' range has led to a global population decline suspected to be 30% or more in the past 15 years (three generations). Irreversible losses of around 10% of Fishing Cat habitat in Sri Lanka, 30% in the Ganges-Brahmaputra Delta and 10% in the Terai-Duarsavanna and grasslands ecoregion of India and Nepal are likely in the next 15 years (AshanThudugala,Anya Ratnayaka, Tiasa Adhya, Shomita Mukherjee, Murthy Kantimahanti, GiridharMalla, Rama Mishra,SagarDahal pers. comm. 2015). These rates being compounded by ongoing retaliatory killing, it is likely that in the next 15 years there will be a decrease of a further 30% in the global Fishing Cat population.

The current known global Fishing Cat strongholds are Sri Lanka, Bangladesh, West Bengal in India and theTerai-Duar belt of the Himalayan foothills in India and Nepal. Outside these strongholds, declines may be considerably steeper, but such populations are believed now to comprise such a small proportion of the global population that they will have negligible effect on the overall global population decline rate. Habitat destruction and retaliatory killings continue and the process of reducing this loss through several measures is likely to be very slow. Apart from being the State animal of West Bengal, Fishing cats play a major role in the ecosystem. Decline of population of fishing cat can damage the natural ecosystem of the

wetland habitat severely leading to a trophic cascade and extinction series of the local biodiversity.

In India, much of its habitat comprises freshwater marshlands which are categorized as 'wastelands 'under land use policies and are thus subject to conversion and degradation (Adhya 2015). Linked to this is conflict with humans, which is believed to be aggravated by habitat fragmentation and sharing of resources such as space (wetlands) and food (fish, goats, poultry) (Melisch *et al.* 1996, Kolipaka 2006,Cutter and Cutter 2009, Mukherjee *et al.* 2012, Chowdhury *et al.* 2015). Poisoning, trapping and clubbing seem to be common methods to kill Fishing Cats across the species' range. Annual Administrative report prepared by Department of Forest (Govt. of West Bengal) shows during the year 2012-13 ,10 number of Fishing Cats were rescued, in 2015-16 the number was 11 and in 2016-17 the number managed to be 16. In 2016-17 normal death of the state animal was recorded to be 6 .one by poaching and 2 carcass were also collected by the forest department. A survey in West Bengal recorded 27 deaths of Fishing Cats between April 2010 and May 2011 in Howrah district (1,600 km²) (Mukherjee *et al.* 2012). In Indian Sundarbans, local people from Sagar Island admitted to having exterminated the cat from their island (Mukherjee *et al.* 2012). In Sunderban Tiger reserve from 2003 to 2009, 11 fishing cats faced natural death and within the same period 20 fishing cats were rescued. In February 2019, an adult fishing cat was rescued by the local people and was handed over to forest department. The Fishing Cat is killed for consumption and a very recent report from Howrah district, India, reveals the rampant killing of the species outside protected areas in human-dominated landscapes for consumption as part of a cultural practice. Researches revealed a declining population facing an array of severe threats from habitat destruction to active persecution due to perceived conflict (Mukherjee *et al.* 2012, Cutter 2015, Adhya 2016). Such cases most often go unnoticed or are ignored unless some interested people and non-governmental organizations pursue the case until the perpetrators are convicted (Adhya 2015).

Justification of the Present Study:

In spite of being declared as the State Animal of West Bengal, various threats are looming large on the species and its habitat. However, very few studies have so far been carried out on this secretive nocturnal lesser cat. In this context, state wide survey to assess the distribution of Fishing Cats will be a big step towards the conservation of this species in this state. Assessment of village survey will also provide the clear picture of the level of exploitation of the species which is very important key factor for the decline of carnivore populations. Current views of the villagers will also be known towards the Fishing cast which will be an asset factor if a conservation management step is to be taken.

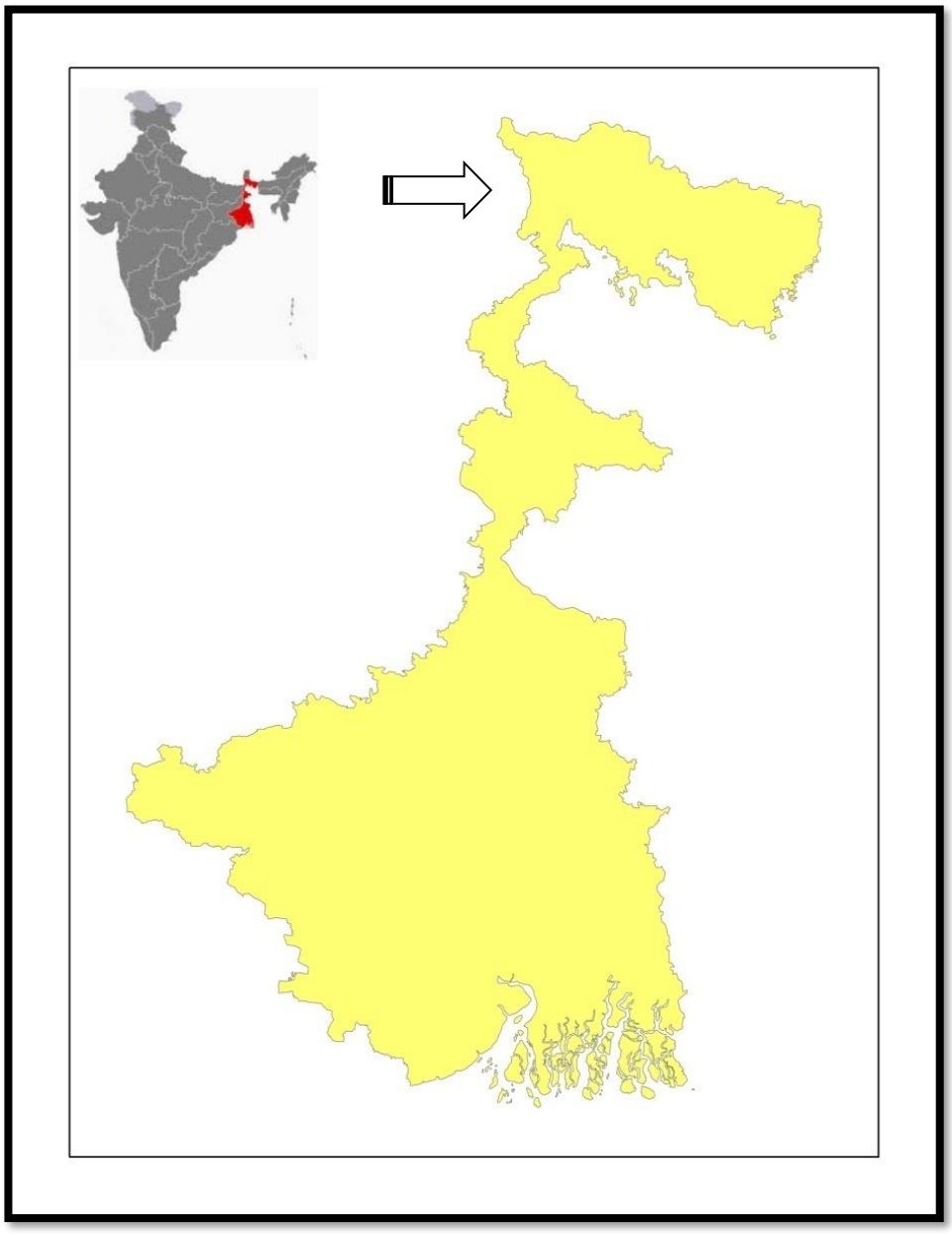
Objectives:

- To document and compile ecological history and mapping the historical records of distribution of the species in West Bengal.
- To prepare the present distribution map of the species in different wetland habitats of the state.
- To identify the possible habitat requirements of the species and their relative abundance in different wetland habitats of West Bengal.
- To identify the reasons and areas of human-fishing cat conflicts in West Bengal.
- To facilitate and promote conservation measures for the species in West Bengal in a participatory manner involving local communities, Govt. Departments, NGOs etc.

Methodology:

A) Study Area:

The study area is the wetland habitats outside the protected areas of the entire West Bengal from Himalayan foothills to the lower Gangetic plains. The west Bengal is consisting of 23 districts of which 15 districts are in southern Bengal and Northern Bengal consisting of 8 districts, River Ganges being the demarcating line.



Study Area (West Bengal)

B. Map Generation

a. Satellite image analysis:

Satellite images of December 2017 by Landsat OLI were acquired for this study, resulting good temporal and spectral resolution and 30 meters of spatial resolution.

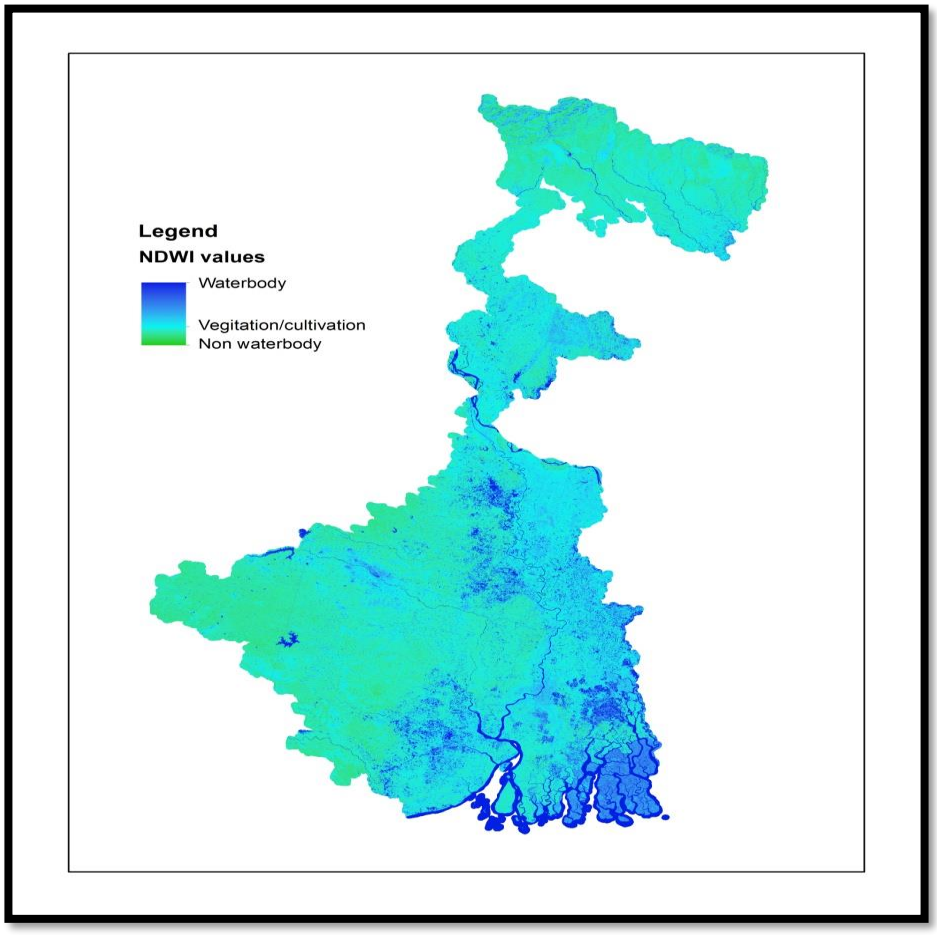
Images were downloaded from the USGS Earth Explorer and USGS Glovis. When downloading it, the season was chosen after monsoon, and thus it has been ensured that the images are completely cloud free.

A geo-referenced map of West Bengal (with blocks and districts, excluding protected areas and urban settlements) was drawn so that we can report the presence of the species in reference to an administrative boundary. Along with this we had generated the NDWI **(Normalized Difference Water Index)** of the each District to ensure the water body map of that particular area as the study is in reference to the wetland area of the West Bengal. A 2x2 sq km grid map was drawn on wetland habitats with 2 km buffers for surveys. Documentation of the critical habitats like reeds, mangroves etc through surveys and ground truthing by hand holding GPS (Garmin etrex 30) are also considered.

Water body maps with grids and buffer, was converted to KML or KMZ or GPX files and transferred to the GPS to get the reference of the particular wetlands while at the field.

Table 1: Softwares used in Map Generation

Software	Functions
ERDAS Imagine TM 14	Layer stack
Arc GIS 13	Preparation of thematic map, Analysis, NDWI, Image classification, Subset, Clipping image, Buffer map, Creating Fishnet, Conversion of KML files to shape files and Vice versa
Google Earth Imagery	Vector layer creation, creating KML files and verifying of GPS generated points



Water body Map of West Bengal

b. Gathering information from different Source:

With the use of local newspaper, information from different Forest Divisions **(Table 3)**, Peoples Biodiversity Register (PBR) **(Table 2)** and other print and electronic media sources the fishing cat habitat is plotted from all corners of West Bengal.

Table 1: Peoples Biodiversity Register data Obtained from West Bengal Biodiversity Board

District	PanchayetSamity/Block	Panchayet	Villages	Fishing cat reporting (YES/NO/May be)
Howrah	Panchla	Deulpur	Deulpur	YES
			Kusodanga	YES
			Jayrampur	YES
			Gaighata wet land	maybe
South 24 PGS	Patharpratima Block	Patharpratima	Dakhin Sibgunge	Yes
			Madhabnagar	Yes
			Kishorinagar	Yes
			DakhinLakhhinarayanpur	Yes
			Bhagabatpur	Yes
			Borodapur	Yes
			DakhinDwarakapur	Yes
	Bishnupur 2 Block		Bakhrahat	Yes
	Gosaba	Lahiripur		No
		Karanjali Gram Panchayet	Chakdulalpur	No
			Khakrakona	No
			Dhukrijhara	No
North 24 PGS	Gobordanga Municipality	Khatua	P.S- Habra	Maybe
	Madhyamgram			No
	Bidhannagar Municipality		Salt lake 11-25 ward	Yes
Hoogly	Gaighata		East Bishnupur	No
	Goghat 2		Kultala	Maybe
	Goghat 2		Paschim Para	Maybe
	Goghat 2		Bhagabanpur	Maybe

East Midnapur	Khejuri 1	BirbandarPanchayet		No
	Khejuri 2			No
	Potashpur 1	Bhogobanpur 2	Basudebberiya	No
	Khejuri 2	Khosba		No
	Tomluk			No
	Ramnagar 1	Talgachhari 1		No
		Talgachhari 2		No

Table 3: Acquired the rescue /conflict report from Forest Department and other sources of the districts where present surveys are being carried out

District	Date	Village/ Panchayet	Age, sex	Remarks
Howrah	23.12.2016	Malgachhi, Shyampur		Killed
Howrah	18.11.2017	Uluberia,Banibon	Adult,M	Rescued by Forest Dept
Howrah	25.11.2017	Sibgunge,Shyampur	Adult,M	Rescued by Forest Dept
East Medinipur	05.12.2017	Sutahata, Haldia Range	Adult, M	Rescued by Forest Dept
South 24 PGS	06.01.2018	Chandihat, Bhangor, Kashipur P.S	Adult, M	Rescued by Forest Dept
Howrah	16.02.2018		2 Cats	Rescued by Forest Dept
Nadia	2013	Khoiramari bill		Killing
Nadia	2016	Thanar Para, Tehotta Subdivision		Rescued by Forest Dept
Nadia	19.02.2018	Asharnagar, Krishnanagar Block	Male	Rescued by Forest Dept
East Midnapur	16.02.2017	Kapasberiya, Mahishadal	2 kittens	Rescued and sent to Jhargram zoo
East Midnapur	Dec-17	Nimtouri	Not Known	Spotted
East Midnapur	27.06.17, 29.06.17	Haldichawk, Nimtouri		Pugmark identified
East Midnapur	2017	Masishadal	Adult	Rescued by Forest Dept
East Midnapur	Nov-2016	Dholhora, Muthouri, Kashipur, Tamluk (Rupnarayan River Basin)	Adult	Killed

East Midnapur	15.11.2017	Jiyada, Panskura Range	Adult	Rescued by Forest Dept
East Midnapur		Chongsorpur		Spotted
Hoogli	October, 2018	Nilarpur, Jangipara	Adult	Rescued by Forest Dept
South 24 PGS	February 2019	Kachua, Bhangor, Kashipur P.S	Adult,	Rescued by Forest Dept
East Midnapur	24.11.2018	Bahichberiya, Nandakumar	Adult	Death by car accident
Howrah	09.02.2019	Bauriya	Adult	Death by car accident
Howrah	22.02.2019	Deulpur	Adult	Rescued by Forest Dept

c. Questionnaire based interview:

A questionnaire based interview is initiated with local people in different villages of West Bengal. On a basic template, with Name, Village, Panchayet, Blocks, Date, random surveys are being conducted with the photographic plate and documented to have a 'seen/not seen' data for Fishing Cat and especially in areas from where news reports and anecdotal evidence based on verbal communications were available on fishing cats

Glimpses of questionnaire survey during project period

d. Sign Survey:

On the basis of the above mentioned questionnaire survey and from reports and evidences of fishing cat signage survey methods are being conducted. Signs like pugmark, scat, or other evidences are considered as signage (**different signs are given in the photographs below)**

Sign Survey (Pugmarks, Remnents,Scats from different habitats from West Bengal)

e. Camera traps:

On the basis of the signs like pugmark, scat, leftover food and identified trails, camera traps are installed for a continuous 15 day period. Till Now camera traps have been installed in27 locations in 12 different district viz. Howrah, Hooghly, South 24 Parganas, North 24 Parganas, Nadia, Murshidabad, East Bardhhaman, Purulia& East Midnapur, Darjiling, birbhum, Coochbehar.

Both white flash and infrared camera is being used for the study. The local people have been involved to implement the camera to ensure the protection of the camera.

Camera Trap Installation associating local people

Documentation and compilation of ecological history and mapping the historical records of distribution of the species in West Bengal.

It is very important to have a baseline data for a proper way to carry forward any research work. In case of finding any wild individual from any area researchers go through various literature survey for getting the basic idea regarding the habitat of that particular organism. In case of Fishing Cat we also did a vivid review of literature from various sources that we could able to find. In this context scientific articles as well as newspaper reports, reports from Peoples' Biodiversity Register, different books were consulted. The team also talked with the forest officials for obtaining information about the cat. Now a days social media has become very much active in terms of any wild animals. Those sites also enabled us to gather good amount of knowledge about the State animal before we went for the ground trothing.

The oldest record on Fishing cat presence in West Bengal outside Protected Areas is by Sclater(1891) from Calcutta district. Inglis et al. (1919) has recorded Fishing cats from Howrah and Jalpaiguridictricts and O'Malley (1924) recorded them from North and South 24 Parganas. Pocock (1939), gives a description of the distribution of the species from reed beds near Calcutta and the area east of the Bay of Bengal. Fishing cats are common in the Sunderbans, South 24 Paraganas (Sanyal 1989) but rare in other parts of the state, due to destruction of their habitat. His latter papers go on to say that the Shyampur and Panchla block of Howrah district are rich habitats of Fishing cats (Sanyal& Roy 1986, Sanyal 1992). T. Bhattacharya (1988), reports killing of two cats on 3rd Jun 1988 in the Village Melo of Howrah under Panchla PS, Jalabiswanathapur Panchayat. More recently, H. Nandy (2007) has documented the killing of a pair of Fishing cats in Panchla block of Howrah district.In 2005, survey report of Zoological Survey of India shows that Fishing cat was present in Kathambaribeel (Dooars) and they also inhabit in wetlands of Buxa Tiger reserve.The swamp of Jaldapara Wildlife Sanctuary offers suitable living conditions to four wetland dependent mammals such as One-horned Rhinoceros, Wild Boar, Fishing Cat and Wild Buffalo (Nandi et al.,2005).Distribution of the cat was again documented in Buxa Tiger Reserve in 2016 through camera trapping (NEWS). According to a magazine,Hooghly district of West Bengal consist of large marshy lake that stretches from the edge of a cluster of villages for

a few square kilometres to the opposite bank, overgrown in this rainy season with a coarse grass called *hogla.* This indigenous plant once cove red the district, giving it its name. And the thickets it formed is the natural habitat of a wild feline, the 'fishing cat', now on the verge of extinction. Though not known to attack humans, this less celebrated cousin of the redoubtable Royal Bengal Tiger clearly inspired enough awe for locals to refer to it as a 'tiger'—from the commonest *maachbaagha*(literally, 'fishing tiger') to the rarer *baaghrol* (Outlook the fully loaded magazine).In 2011 T.Adhya worked in different parts of Howrah and Hooghly [Gorchumuk – Aima – Bargram - Goalberia (alongside river Damodar) Dankuni wetlands (extending from Northern Howrah into southern Hooghly), Kushberia – Tajpur – Sonamui – Sardah – Mahishamuri – Kachida (also along Damodar)]and successfully given information of our state animal from these areas.(Adhya 2011).To ensure the continued survival of fishing cats in the unprotected human-dominated Amta block, West Bengal , local conservation enthusiasts started the 'BhagrolBasa Fishing Cat Project' in 2016 and from March 2016 to January 2019 revealed 19 individual cats living with-in this 30 km² area. (Kolipaka et al.,2019).Fishing cats are scatteredly dispersed in different pockets of East midnapore as various rescue reports and release reports are available in the forest department documents of this district. In April 2018, villagers of Kolaghat reported to see Fishing Cat in their area. Sutahata, Kapasberia,Mahishadal,nimtouri, Dholhora, Muthouri, Kashipur, Tamluk (Rupnarayan River Basin) are also potential sites of Fishing Cats as recue and killing reports have been gatherd by the forest department from these areas. Khoiramari Bill, Thanar Para,Tehotto, Asharnagar,Krishnagar Block from Nadia are mentioned to be potential habitats of Fishing Cat. Sundarban Tiger Reserve (2,584.89 km2) in West Bengal is a part of the world's largest estuarine wetland and the only mangrove tiger land, spread over India and Bangladesh. Its plant associations exhibit a greatgeneric/species diversity and offers habitats of many rare and endangered mammals. The small carnivore community is composed of the leopard cat (*Prionailurus bengalensis*), fishing cat(*Prionailurus viverrinus*) and jungle cat (*Felis chaus*).The secondary predators are mainly the fishing cat and, to a small extent, the jungle cat and leopard cat. The fishing cats dwell amidst the dense vegetation associated with the marshes and mangroves (Mallick, 2010a). Fishing cat was locally rare in the year 2011 in Sunderban but continuous monitoring in the wild helps the felidae group to be encountered in different case studies in recent past. In 2017 camera trap study reveals presence of Fishing Cat in Lothian Island and 13 were identified (Cat News 66, Autumn 2017). A good number of the

cats are still harboring in this area as various photographic evidences are coming from different social media reports. In March 2019 Soumyajit Nandy reported that he had a fleeting glimpse of an individual in Feb 2017 basking in the early morning sun during a foggy winter morning. In Feb 2019, a few of them got to see a juvenile fishing cat soaked in the mist and enjoying the warmth of the rising sun. Their sighting went on for a long time, until it was hot enough for the cat to recede into the mangroves**.** (Conservation India (enabling conservation action), March 31, 2019)

From PBR we also obtained various important information regarding Fishing Cat. From East Midnapore Patashpur, ramnagar 1, Naiput, Amarshi, Khejuri are mentioned to be the sighting sites of the felid. Similarly from Hooghly (Haldia,Chaulkuri) Howra (Deulpur,Panchla) South 24 pgs (Patharpratima) Birbhum(Bishnupur), North 24 PGS (Gobardanga) Burdwan (Ketugram,Nabagram,Katwa) are the panchayets /Blocks where reports of the cat has been documented.

Sunderban,Buxa,Senchal,Mahananda,Jaldapara,Gorumara,Chapramari,Bethuadahari, Bhibhutibhushan wildlife Santuary,Lothian Island, Halliday Island, Sajnekhali, Ramnabagan are said to be the places where occurrence report of Fishing cat was mentioned in 'Fauna of West Bengal,1992, Part 1 by A.k Ghosh' published by Zoological Survey of India.

From Social media evidences (Facebook and Instagram) the cat has been reported from outskirts of Kolkata (Mr.Sujan Chatterjee), howrah (Mr.Dhritiman Mukherjee, Mr. Subhendu Rudra) Sunderban (Mr.Kushal Mukherjee) and East Midnapore Nilapur (Mr.Utsav Saha).

From the above literature a basic map was constructed about the presence of Fishing Cat and thereafter the work has been started by visiting the places directly. Methods applied for the work has been discussed in the previous chapter.

Preparation of the present distribution map of the species in different wetland habitats of the state.

As discussed in the methodology section a grid map was generated and with that map the preliminary work was started. Grid analysis is given below

District wise discussion of grids and general perception of local people about State Animal

In wildlife biology it is very essential to incorporate the local dwellers of a particular habitat of a target species. Gathering the local knowledge from them helps any scientific study to infiltrate deeper. These informal interviews with the local residents also help to build up a communication bridge which in future may be beneficial for any researcher. Similarly in Fishing Cat project the informal interviews were taken in almost every part of our state. These interviews were further modified in Questionnaire surveys. Talking with people helped the research team to establish resources which was used during camera trap surveys. Doing camera traps in any protected area is too some extent easy than doing it in any non-protected areas because of the loss of the traps by human interference. So while doing the interview session majority of the local people were very much keen to know about the procedure and they were very willing to protect the camera traps. But still some bad interventions were faced by the team in some areas of West Bengal.

Grid to grid questionnaire surveys were done as the first step of the method developed. The grids were laid by the software so sometimes the grids only contained grassland or agricultural land where surveys could not be possible. Considering the accessibility of the grids they were selected for further works.

Overall the surveys were mainly kept within the seniors of any particular area because the local knowledge of them would have been little vast than that of the little once. But very interestingly sometimes young once gave us some valuable information regarding the fishing cat. In fact sometimes they took the research team to a precise location of the cat. The questionnaire surveys contained some basic information about the cat. Firstly a photographic plate was shown to them which contained picture of Fishing Cat along with some other associated organisms. If someone pointed out the target cat then he/she was questioned further. During the interviews the perception about the felid was also reflected and if some conflict we could sense then he/she was motivated for not killing the wild animals.

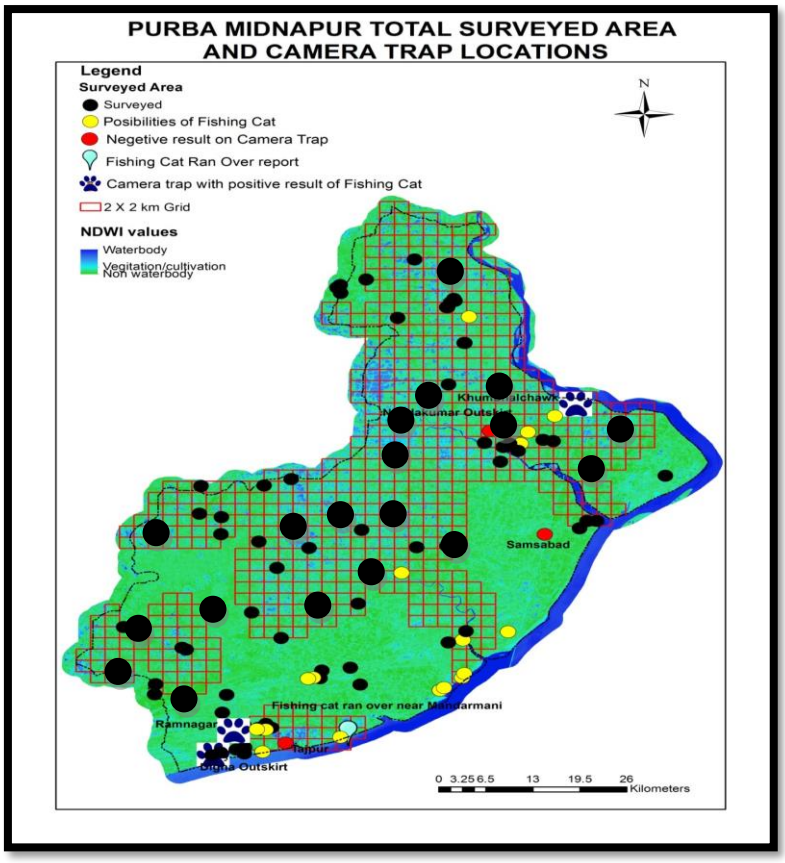
As we had a base line data of the cat from literature we didn't have to search haphazardly here and there and talk with any random person. Majority of the persons were unaware of the fact that our state animal is Fishing Cat. But after the survey they all know regarding the cat.

East Midnapore, Howrah, Hooghly ,South& North 24 Pgs are the areas where questionnaire survey shows positive relation with the camera trap evidence. But West Midnapore, Bankura, Purulia are very dry place where the habitat of Fishing Cat was not present and same was reflected in the surveys as majority of the persons interviewed gave negative response regarding the cat. But in Case of Golden jackal and Jungle Cat their answers were affirmative mostly as their number is higher in all over west Bengal.

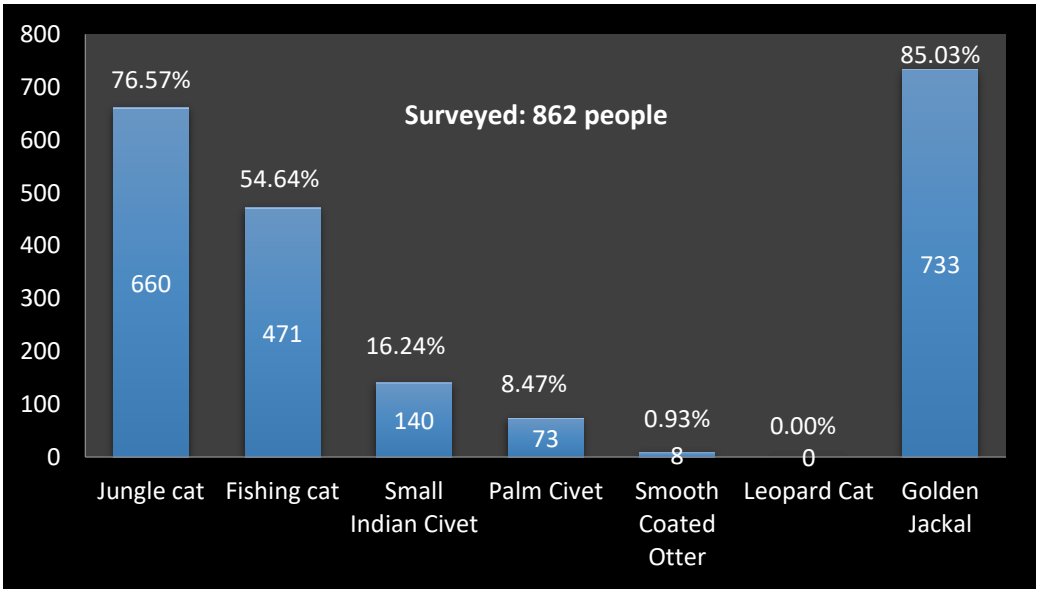
Very interestingly when the locals were questioned in Sagar Island and Henry's Island they gave exactly the same data that was reflected in our camera trap. In Sagardwip they were aware of the fact of Fishing Cat but retaliatory killing caused the population null in that place and so as in our camera traps could not get any picture of the target cat but Jungle Cat and Jackal. Same in Henry Island as majority of the people told regarding presence of Fishing Cat and it was trapped in our cameras as well.

Local Names may cause some difficulties in proper identification of the target organism. This happened in Baranti (Purulia). As we questioned many local villagers in Baranti they told us about the presence of the cat in local name which was equivalent to Fishing Cat in Howrah. But when camera trap was done, Stripped Hyena was spotted which was same as the local name given by the dwellers there.

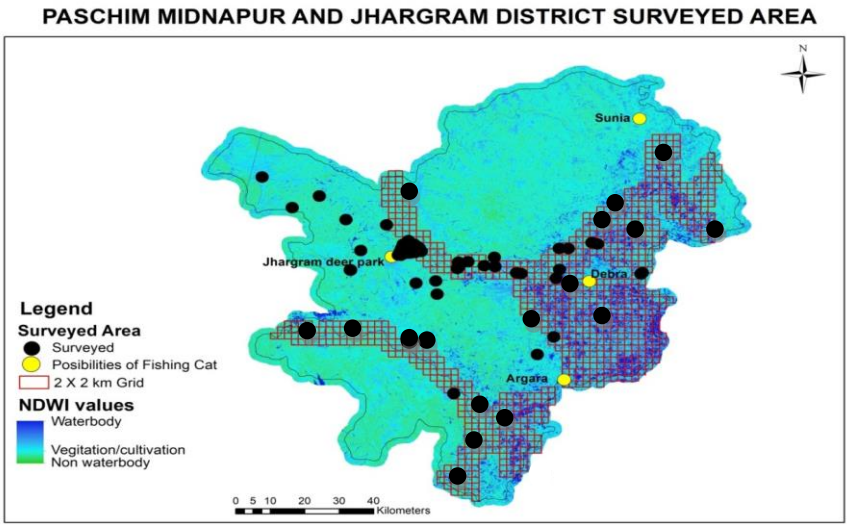
The survey was started from East Midnapore, West Midnapore and Jhargram. About 862, 445, and 132 local persons participated in the Questionnaire surveys respectively. In case of East midnapore people mainly told us about the presence of the cat but in other two districts mostly negative response came from them. For West midnapore and Jhargram the major compulsion of our work was the protected area issues as the project is restricted to the non-protected areas. But talking with the DFOs in those areas gave us the impression of the presence of wild lesser cats in those areas but no record of fishing cat. This is may be due to the presence of the suitable habitat of Fishing Cat is somehow missing in West Midnapore and jhargram. But literature reviews show a good amount of our state animal is located in different parts of East Midnapore. While doing camera traps in various places it was also supported scientifically. 72.36% and 80.60% of the total grids were surveyed in East and west Midnapore respectively.



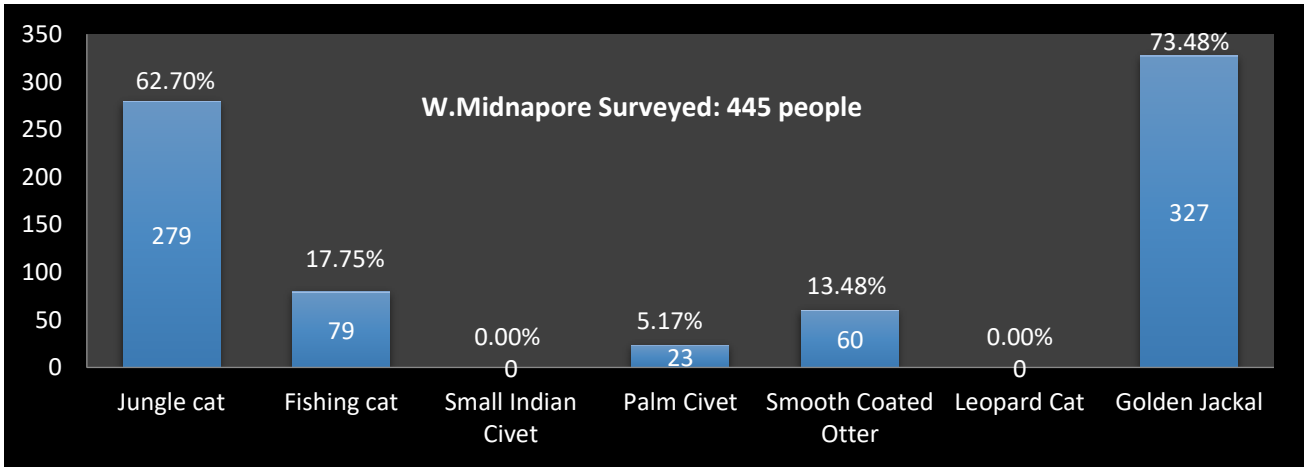
Purba Midnapore surveyed area

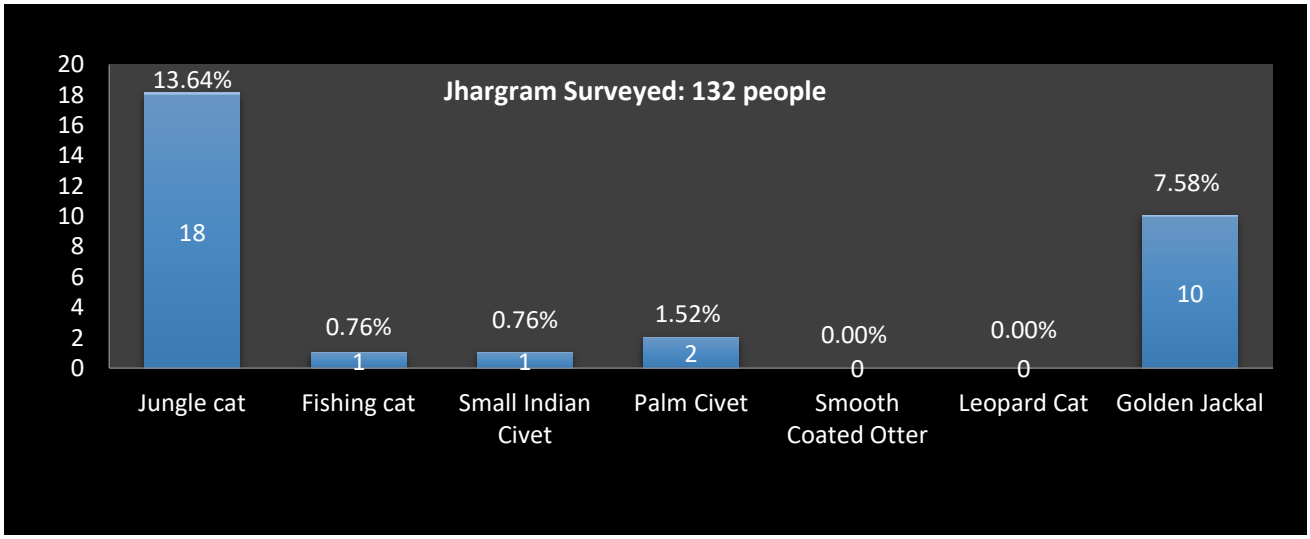


Total people surveyed in PurbaMidnapur

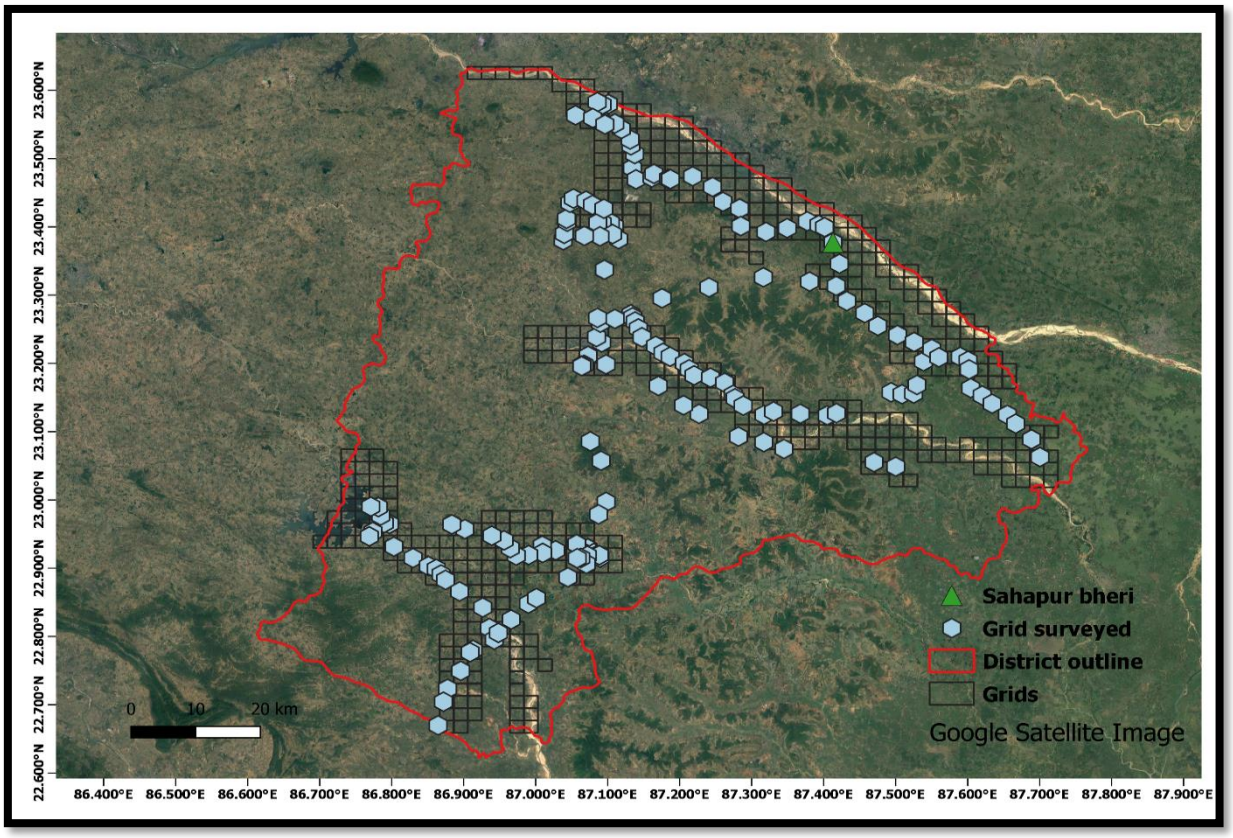


West Midnapore and Jhargram Surveyed

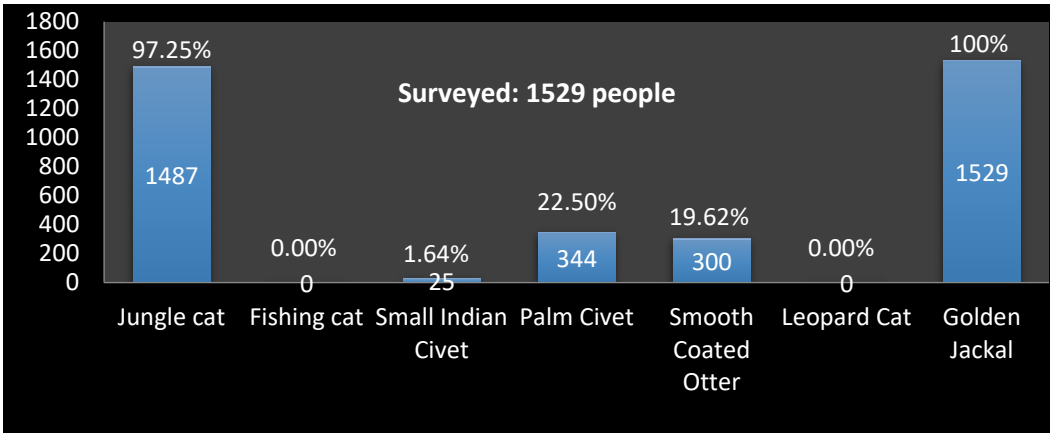




In Bankura 91.01% grids were surveyed and about 1529 persons were interviewed. But not a single person told us regarding the presence of Fishing Cat. Only in one place some people were confused between the cats but when we had a detailed talk we found that they were talking about smooth coated otter which also takes fish out of the pond. Majority grid portion in Bankura were inaccessible because of the presence of crop land. Being a dry area less amount of water bodies are present but the surrounding does not support the favourable habitat of Fishing Cats.

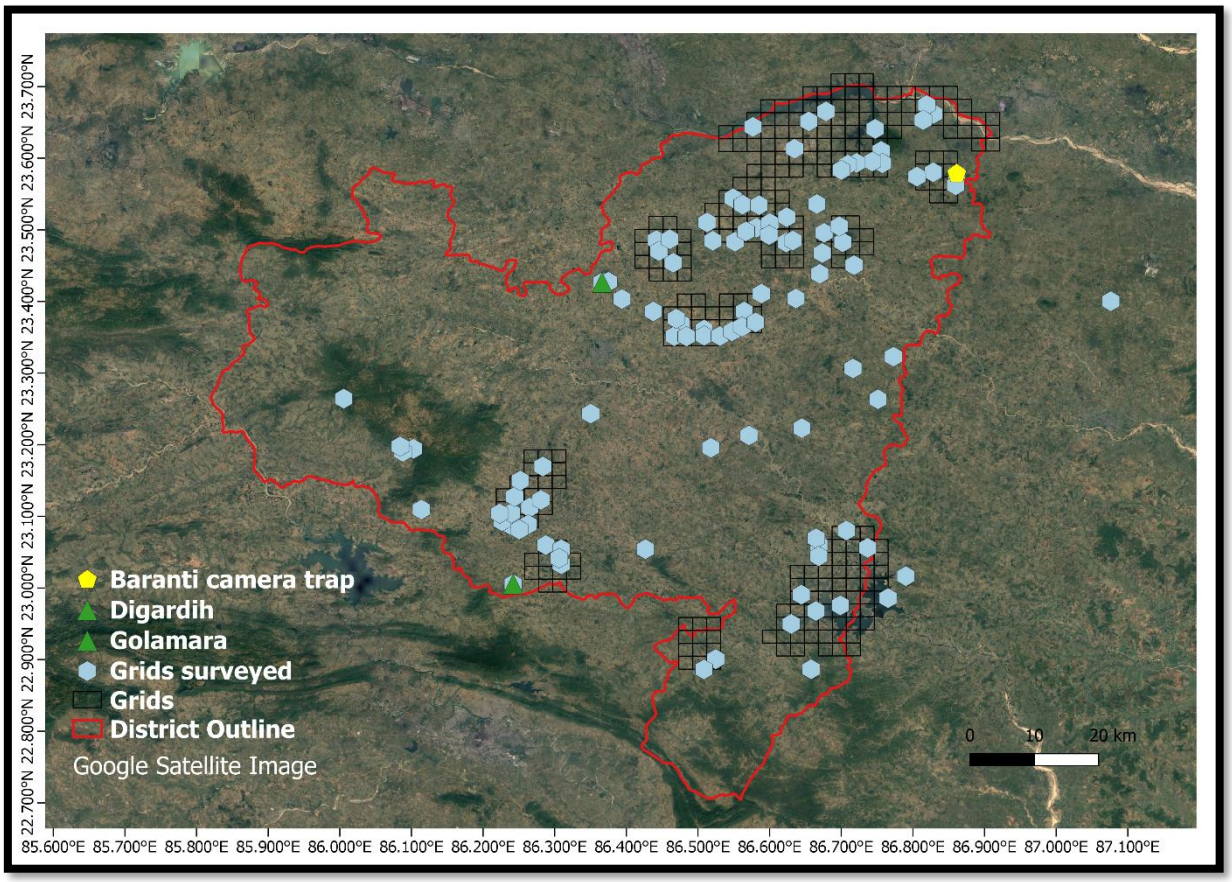


Bankura Surveyed (Map)

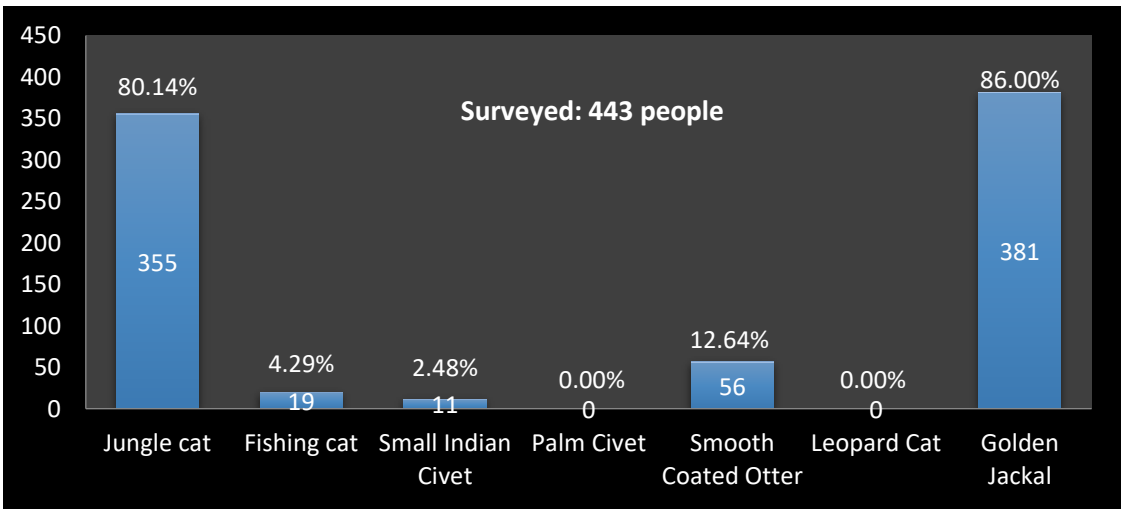


Total people Surveyed in Bankura

Moving to Purulia, about 92.59% grids were surveyed and during the surveys perception of 443 persons were kept in consideration. Some water bodies are present in Purulia but they were within the protected areas and some probable reports of the cat may be present from forest officials. As discussed earlier local name of the cat caused a little bit problems in finding the target felid.

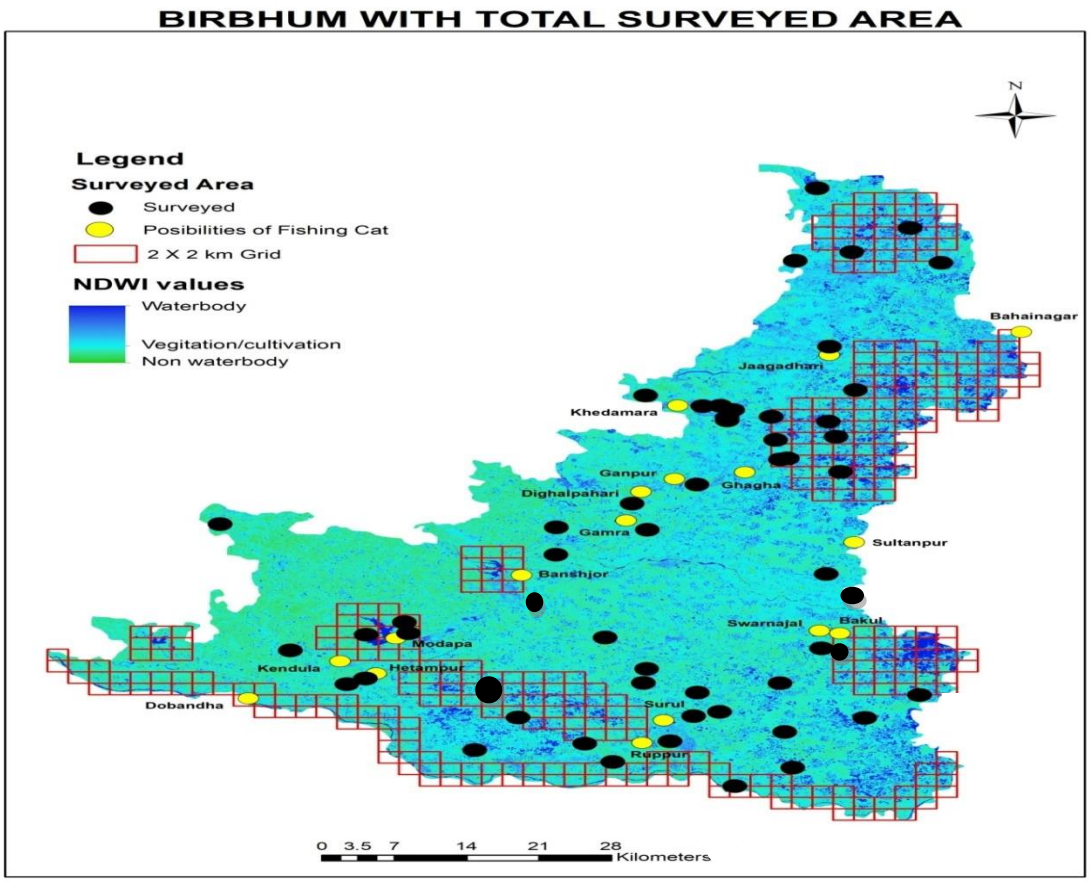


Purulia surveyed Area (map)

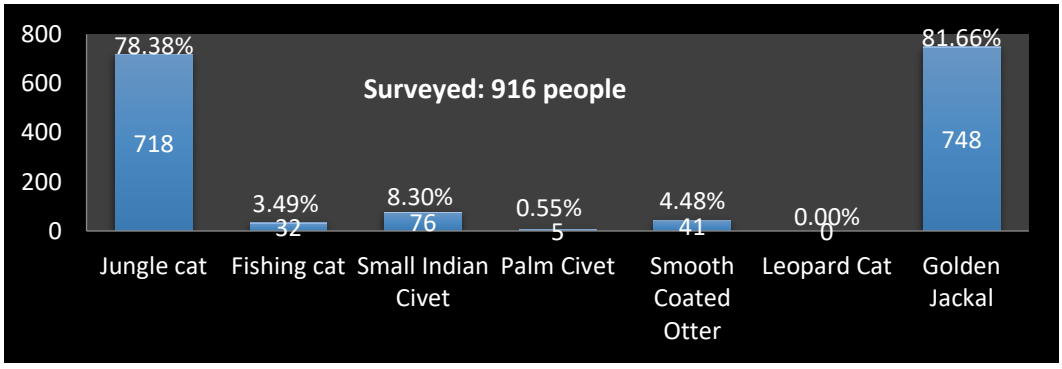


Total people Surveyed in Purulia

Birbhum is also regarded as a dry district. Due to the presence of lateritic soil water can not be persisted in the surface so less amount of water bodies are present here. The habitat is also not suitable for the Fishing cat. Though some places in the district gave us some positive report about the cat but due to the unwillingness of the local people for camera traps we were not able to do it. Yet those places are marked in map generated and in future if some local help is available then camera trap data can also show about the reality. About 90.21% grids were surveyed with 916 interviewed persons.

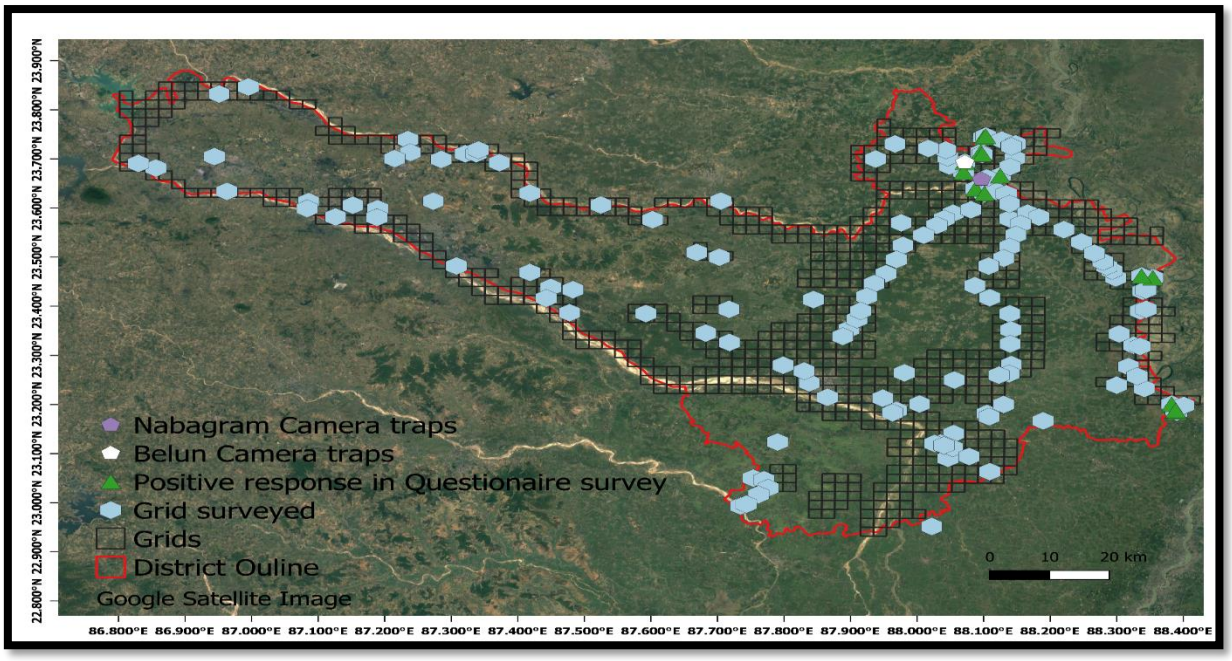


Birbhum Surveyed Area (map)

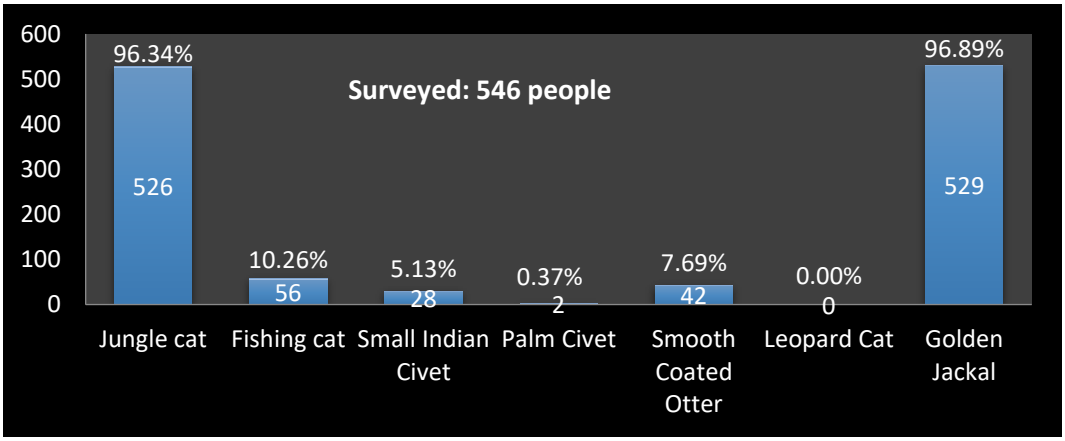


Total people Surveyed in Birbhum

Bardhaman is divided into two parts as east and west. For west is mainly noted as the industrial belt of West Bengal and numerous collieries are also present. Habitat is not at all suitable for our target organism and same was reflected in the local perception. About 286 persons told us about the presence of good number of Golden Jackal and Jungle cat but no Fishing cat. Contrastingly the eastern part of Bardhaman consist of great habitat features for the felid and the locals were said yes in many places of Eastern part. Based on the best possible way we did camera traps in 'Belun Gram' but unfortunately we could not get the picture of Fishing Cat. But people of that village told us regarding the sighting of the Cat very frequently. So this is also a place were further effort can be given. About 260 persons were interviewed here and almost 91.45% grids were surveyed

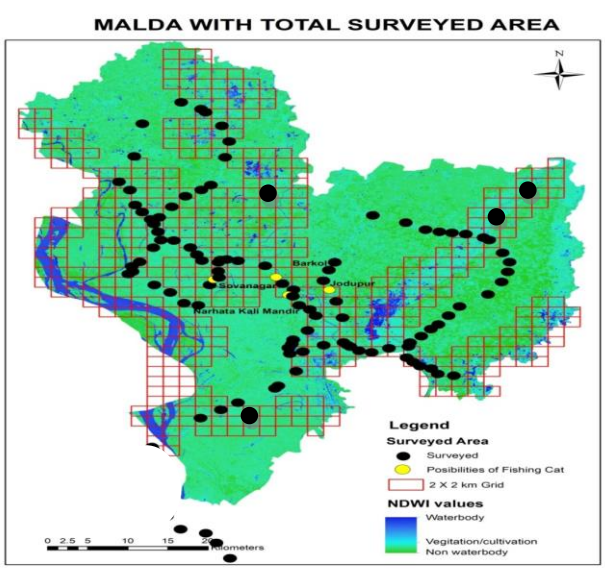


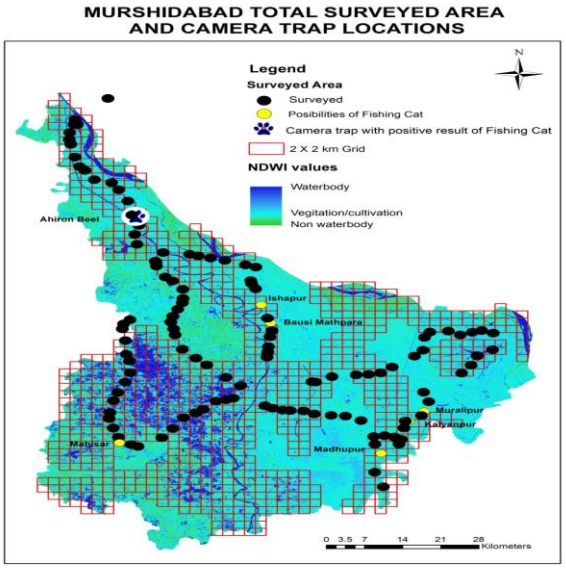
Bardhaman Surveyed Area (map)

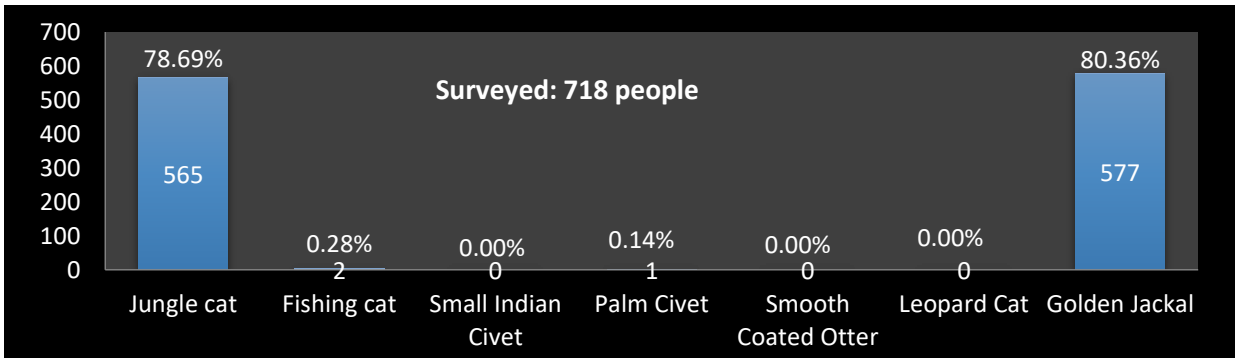


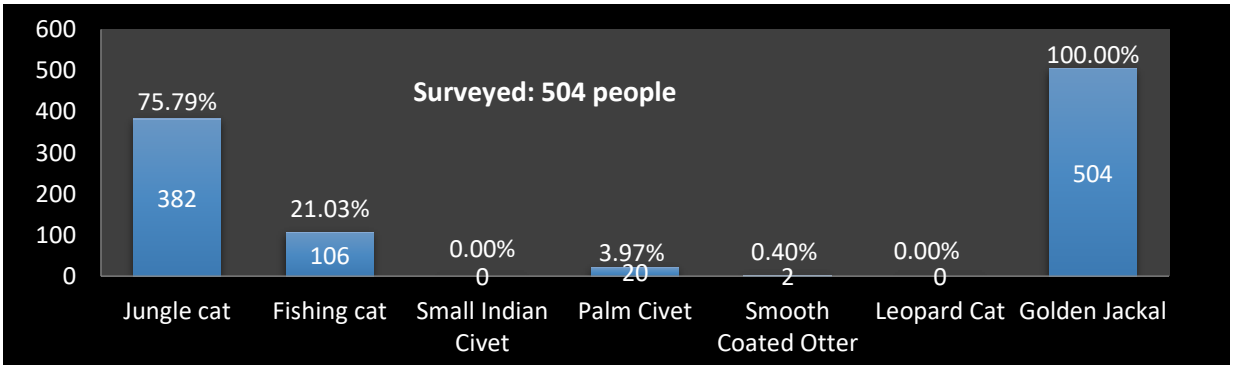
Total people Surveyed in Bardham

For Malda and Murshidabad 63.28 % grids were surveyed. Most grids were inaccessible and we could not go to each and every grids. But still 718 and 504 persons participated in questionnaire survey respectively. Here again some potential places were found but due the camera trap protection issue we could do it. In Murshidabad one of the largest wetland of West Bengal Ahiron lake is situated and we found the habitat was very suitable for Fishing Cat and while doing camera trap we have the first record of the State Animal from here.





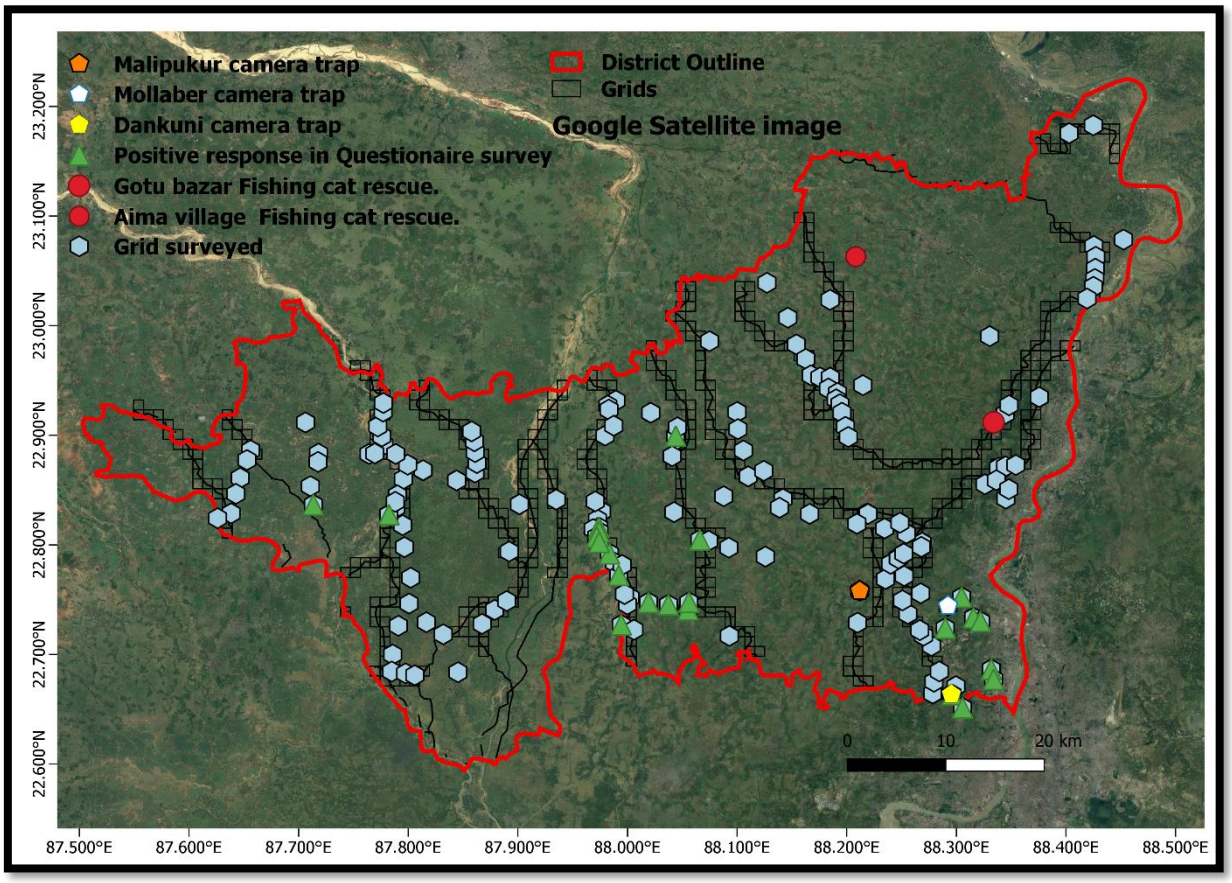


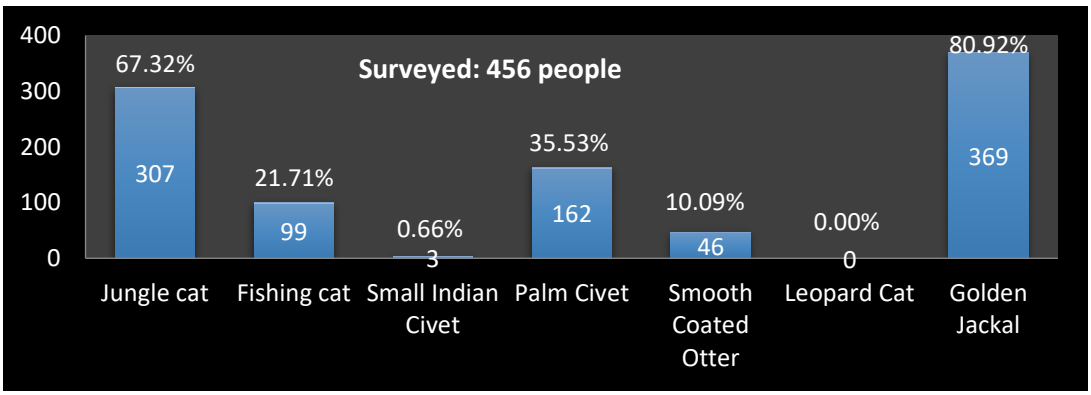


Maps showing the surveyed area in Murshidabad and Malda along with total number of people surveyed

Howrah is a well-known place for Fishing Cat and so vigorously the interviews were not taken here as locals are already aware of the cat. Many people are working on Fishing Cat in different parts of Howrah so we only concentrated in doing camera traps in this district.

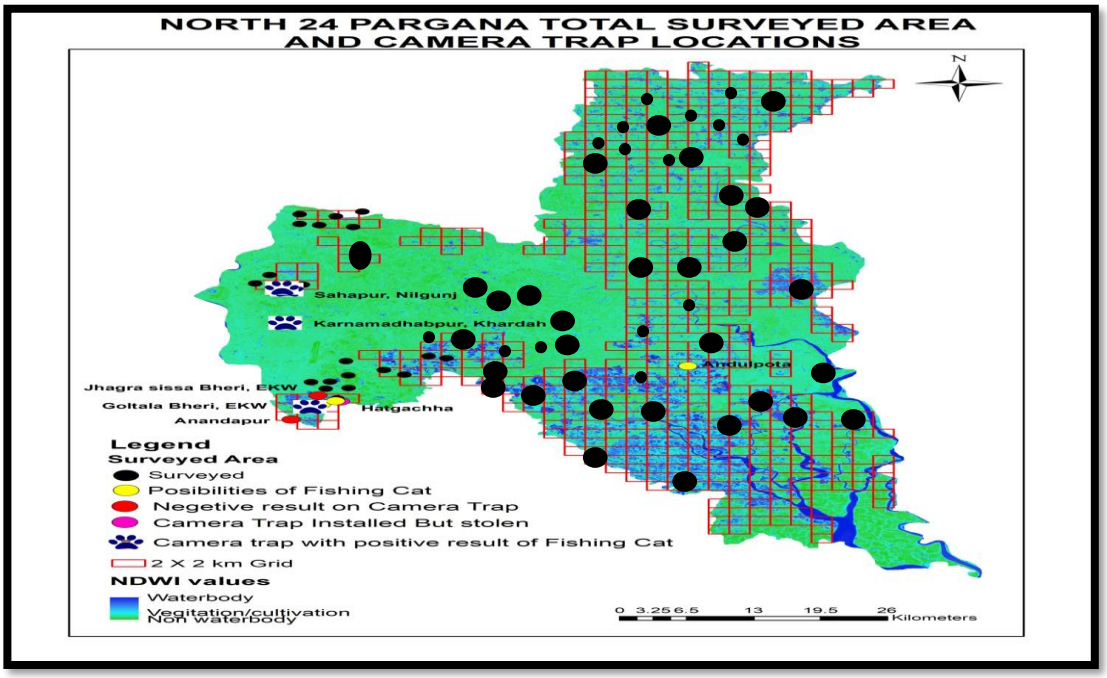
For Hooghly 82.85% grids were surveyed and 456 persons were interviewed. Hooghly is also a good place for fishing cat as the habitat helps the cat to harbour. Camera traps were done in some places along with positive report. Still many potential areas are present in this district. Just due to the absence of proper resource persons, camera traps could not be done in all places.



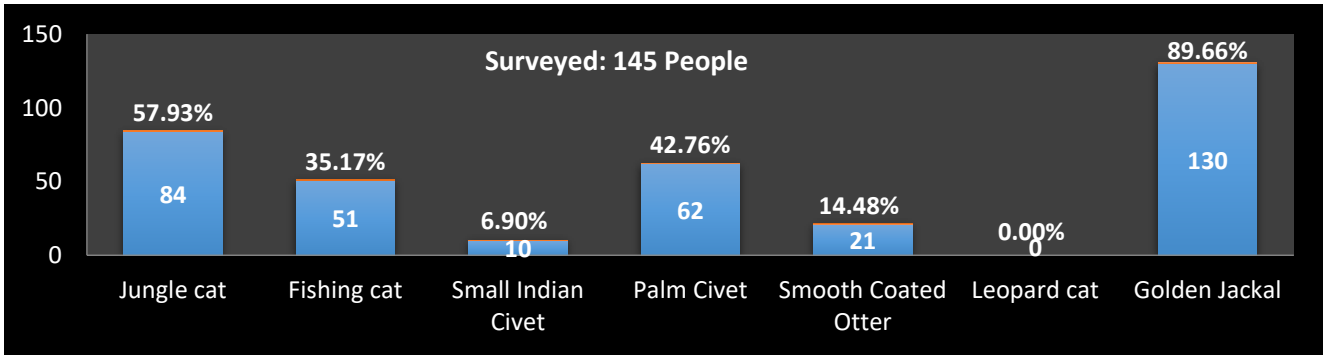


Map showing the surveyed area of Hooghly as well as the questionnaire surveys

For Kolkata, North and South 24 parganas 18% and 27% grids were surveyed respectively. With about 145 and 393 persons were questioned. Outskirts of Kolkata and North 24 pgs showed the presence of the cat with all the anthropogenic loads. For South 24 pgs many places also showed the presence. But again the protection issue of the cameras caused deep hindrance in this place.In North 24 Parganas out of 574 grids 109 grids has been surveyed (18.98%). Mainly the eastern part of the district has been surveyed so far. In the upcoming month the remaining grids will be surveyed especially the Basirhat, Hasnabad and the Bongaon area. There was a very interesting scenario observed in North 24 Parganas district. Out of the 4 locations 2 locations viz. Sahapur, Nilganj and Karnamadhabpur, Khardah does not have any reed bed habitat. Even in case of Karnamadhabpur, No ideal wetland was observed only small ponds and bamboo plants but still the camera trap result was positive there.

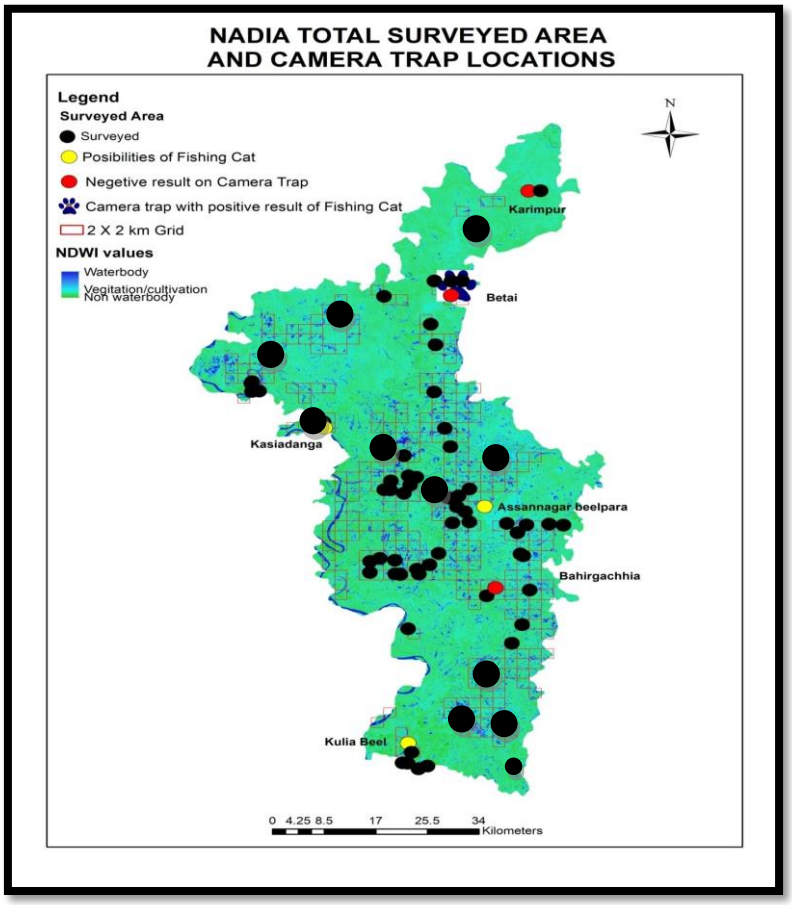


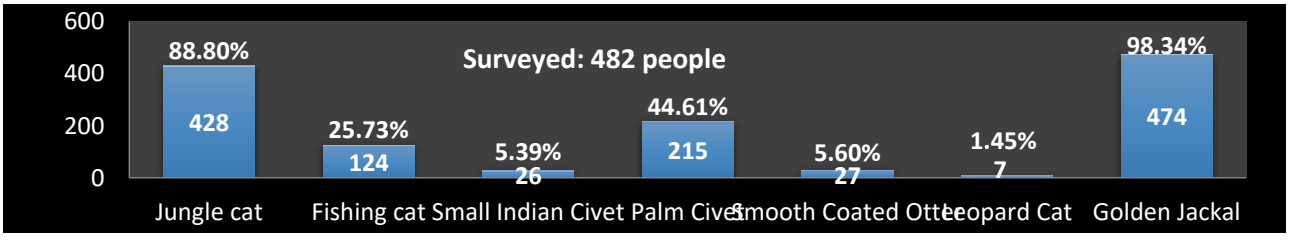
North 24 PGS District total surveyed area(map)



Surveyed area of North 24 pgs with questionnaire surveys

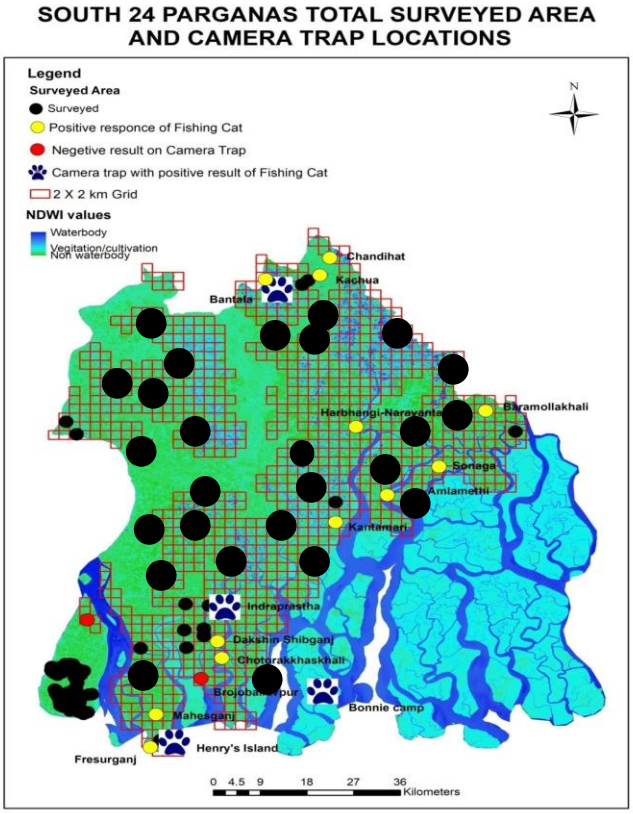
In case of Nadia total grid laid was around 299, in which 201 grids was covered. Total people surveyed were 653. Most of them have seen Golden Jackal (81.93%) followed by Jungle cat (74.89%) and 35.99% of people said they have seen fishing cat. In total 6 places camera were installed. In which 2 places have confirmed photographs of Fishing cat Assannagar and Betai. In one place camera was stolen in the next day but fortunately it was restored by dialog exchange with panchayet. And in rest of 3 places no fishing cat photograph was captured. In places like Kshiadanga and Kulia Beel where we could not place cameras due to non-protectively, where people have informed about Fishing cat. More than 67% grids were covered. Some grids which were laid in agricultural field or which had transportation problem (inaccessibility) were left. Beside the laid grids, locations informed by local people were also being covered.





Map of Nadia showing the surveyed areas with local perception of people

For south 24 pgs the baseline work was started from Ramganga and its surroundings. Camera trap was also installed in there but the result was negative in case of Fishing Cat. Bantala was a major finding in South 24 parganas were still Fishing Cats are harbouring. Coming to Sagardwip and Henry's Island almost entire girds were surveyed. In Sagardwip the people pointed out the presence of Fishing Cat in long Back but not now as because of hunting of the felid. Similarly in case of Henry's Island the local perception was absolutely correct regarding the presence of State Animal as we also encountered the majestic Felid in our camera Traps. Due to two major elections all the portions could not be covered but the work is still going on in various areas of South 24 pgs.



South 24 Parganas total surveyed area(map)

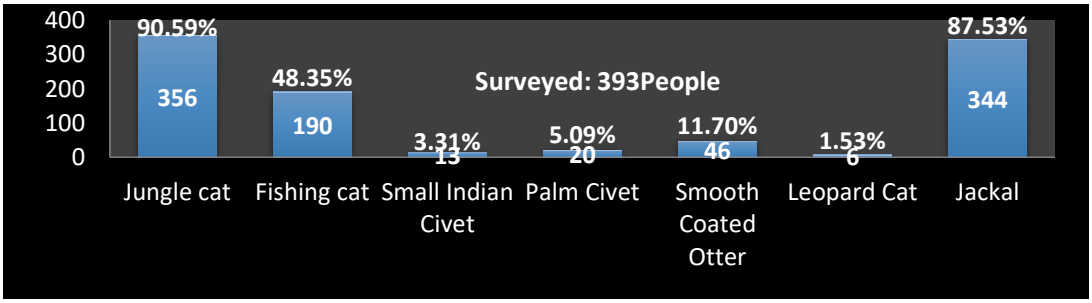


Figure 60: Total people surveyed in South 24 PGS

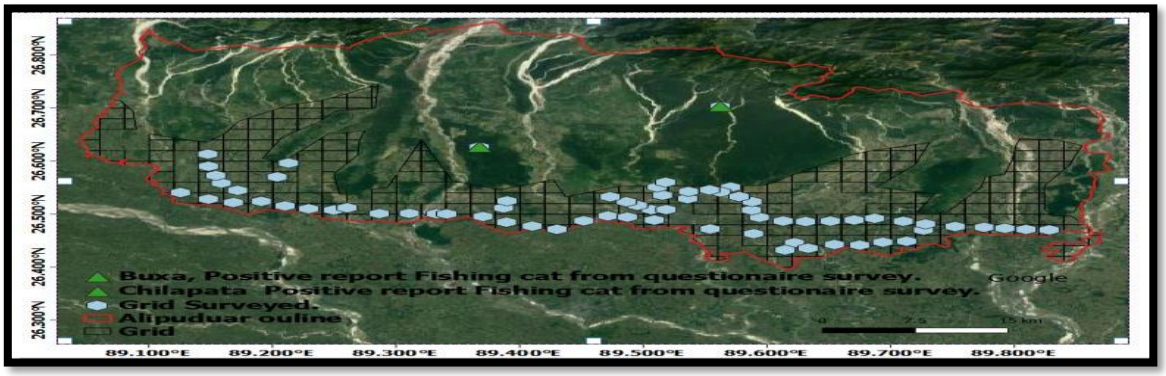
1

2

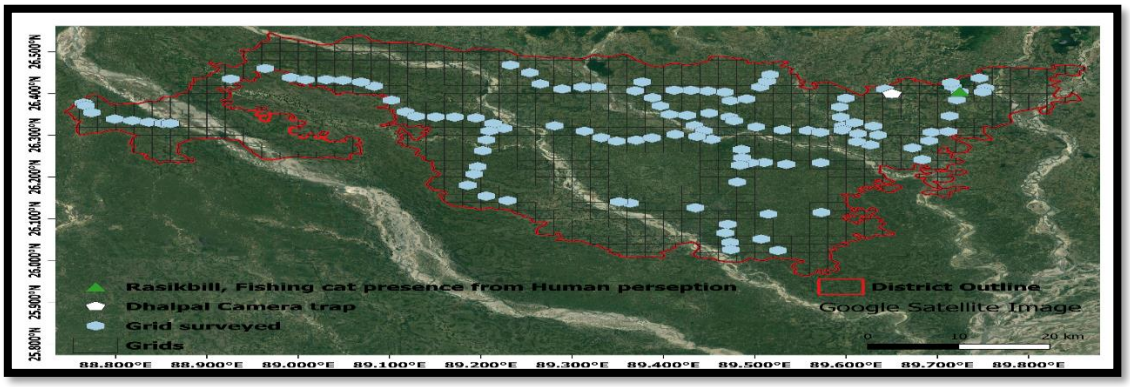
Fishing cat Kittens recued from Indraprastha (1) and Photographed at Bonnie camp (2) in South 24 Parganas

North Bengal Grid Surveys and Local perception:

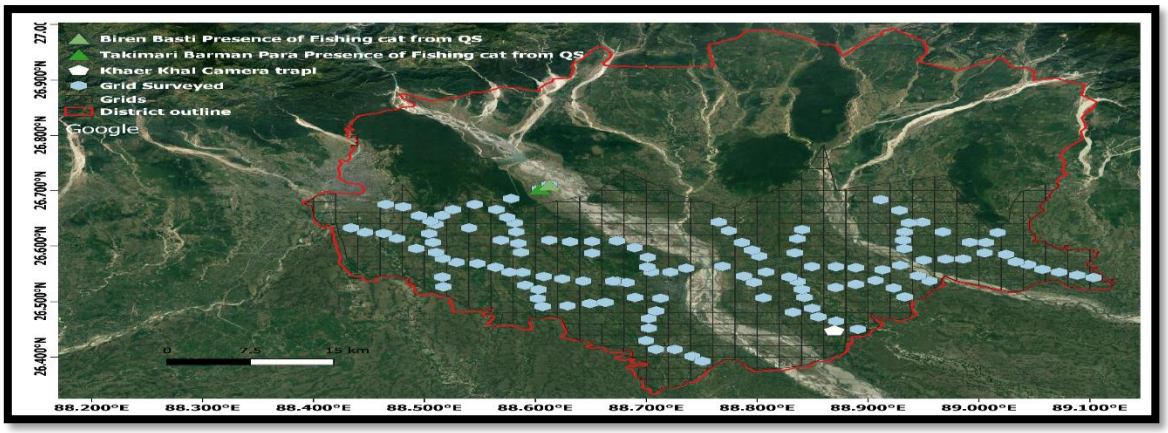
Northern Part of West Bengal consist of 5 districts i.e, Darjeeling, Cooch Behar, Alipurduar and Kalimgpong. Along with these many protected areas lies here such as Buxa National Park (NP), Gorumara NP, Neora Valley NP, Singalila NP, Buxa Wildlife sanctuaries (WLS) , Chapramari WLS, Jaldapara WLS, Jorepokhri Salamander WLS, Mahananda WLS, Senchal WLS. Due to the presence of large portion of protected areas survey was little bit hampered during the course of time. But somehow the team managed to give an overall view about the local perception of the people. Siliguri, Jalpaiguri, Coochbehar,and Alipurduar consist of 437,450,654 and 307 number of grids respectively. Majority of the grids laid on inaccessible areas and so the number of the surveyed grids will vary from that of southern Bengal. Still 26%,27%,41%, 22% grids were surveyed respectively in these districts. About 3000 people were interviewed during the project phase. While talking with local people though they were pointing out the picture of Fishing Cat during but their description was similar with that of the leopard and sometime leopard cat. According to a newspaper of North Bengal, Kittens of fishing cats were rescued from Jalasnijamtara, a small village near Siliguri. When the team went for detailed questionnaire survey along with camera trapping we did not find any evidences of the cat. In Jalpaiguri the people not very much aware of sighting of Fishing cat.the research team surveyed along the southern bank of Teesta river and have identified two potential locations near Gajaldoba and Tankimari char but due to the protection issues camera traps could not be installed there. But the team have identified these places to be potential place for the cat and if the protection of the cameras can be ensured then camera traps may provide the presence of the Fishing Cats from these areas. Still the team did the camera traps in Khayer Khal (Jalpaiguri) but the result was nil in this effort. Talking with local people in Alipurduar had given us some information of the cat. According to them the cats may inhabit in Chilapata and its outskirt areas. But we could not install camera traps there. In Coochbehar not too many people talked about Fishing cat. But according to some local information the team went for camera trapping in Dhalpal area. The area had many fisheries pond but somehow we did not get any positive presence of Fishing cat from there as well. People there also pointed out regarding Rasikbill might be a suitable place for Fishing cat.



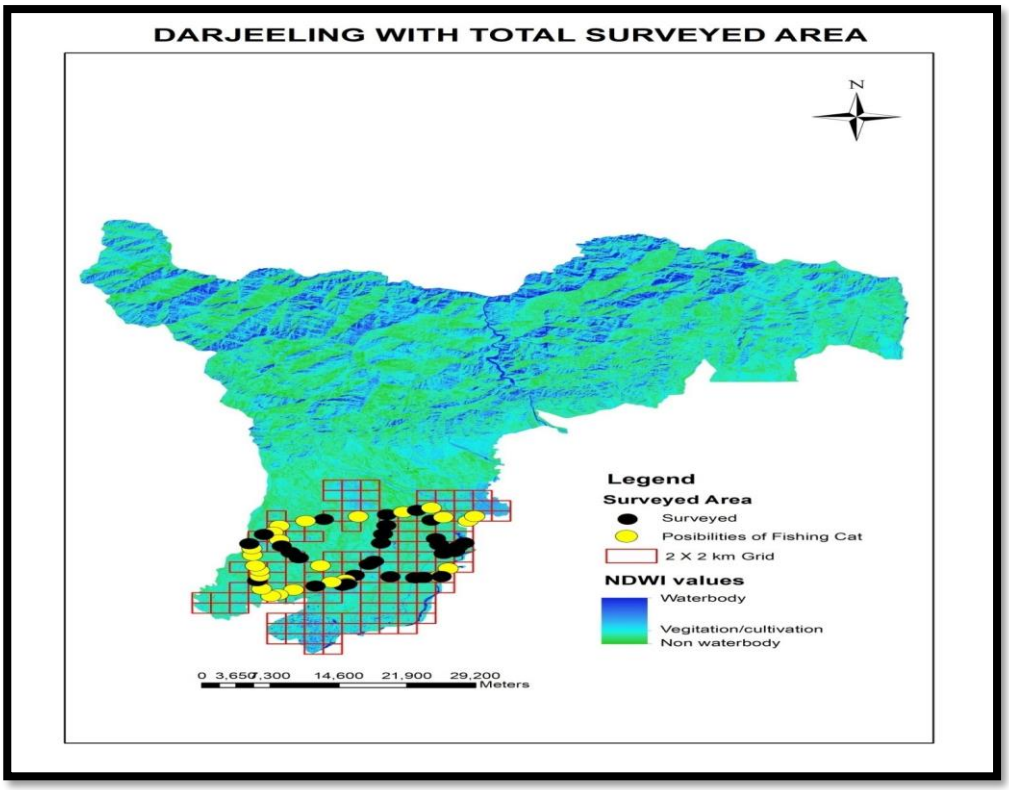
Alipurduar Surveyed Area

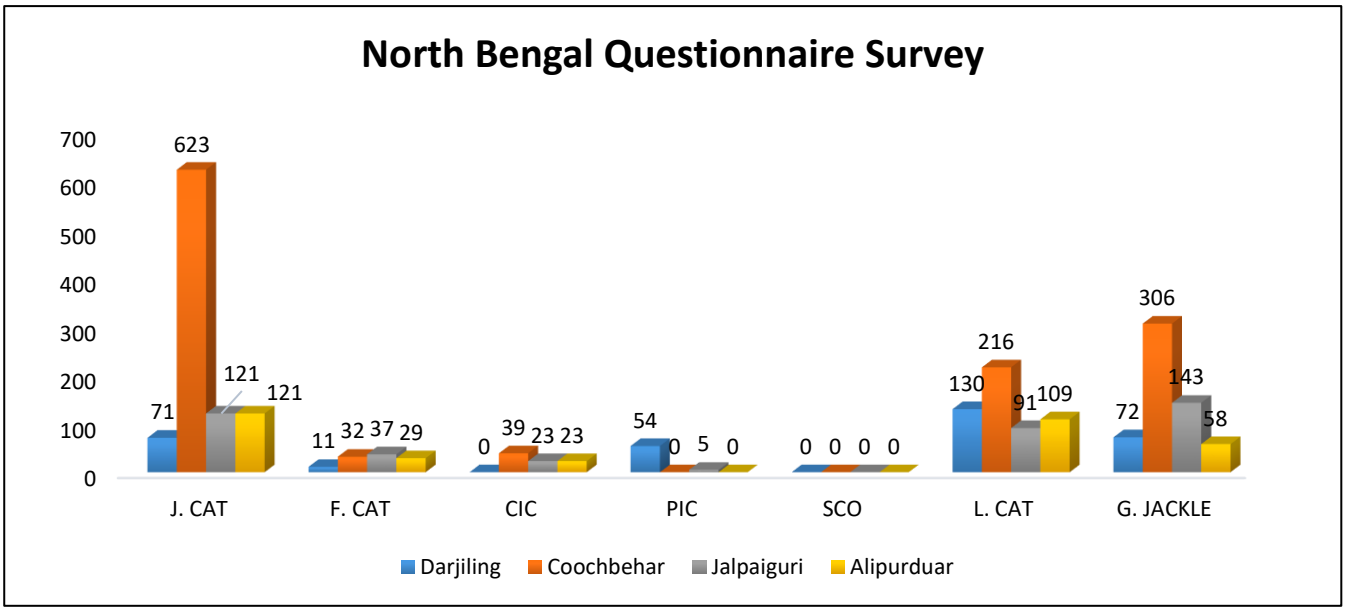


Coochbehar surveyed area



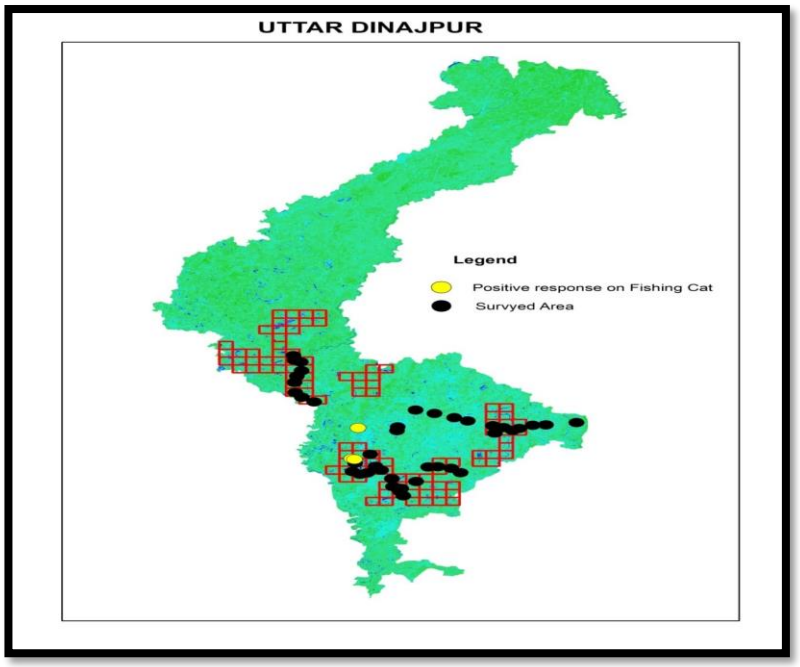
Jalpaiguri surveyed area



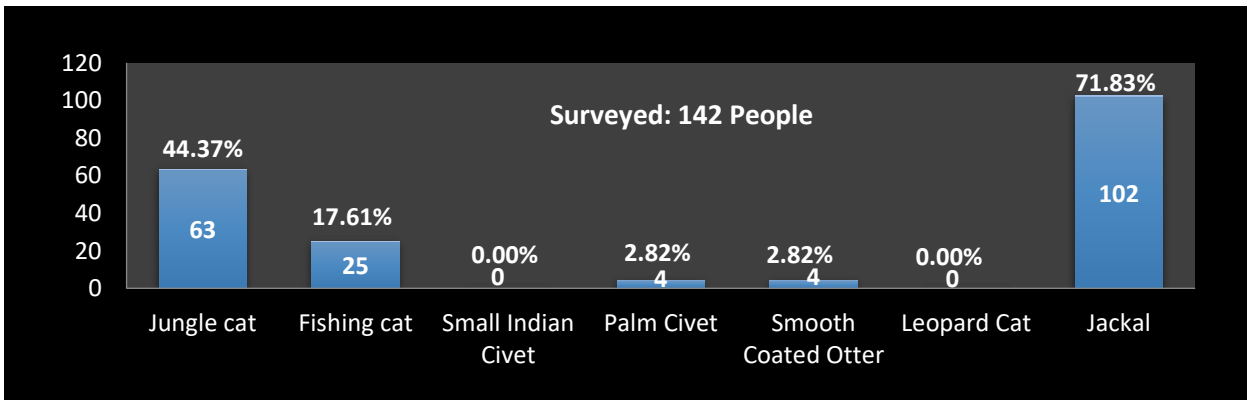


Graph shows the local perception of people about Fishing Cat and other associated fauna. Leopard siting are very often in various parts of North Bengal so there lies a confusion of identifying Fishing Cat or leopard or even leopard cat.

In Uttar Dinajpur out of 104 grids 72 (69.2%) has been covered so far. Many of the grids were inaccessible and some grids did not have a suitable habitat. So we continued our work to rest of the grids and came up with a conclusion that major parts of these areas were the places of Jungle Cat and Golden Jackal. Very few people had told us about Fishing cat. Here also the protection to the camera traps was a major issue for which we could not do camera traps in Uttar Dinajpur. Only in Nahali Beel, which is the biggest wetland of Uttar Dinajpur the response among the people was positive but almost all of them told that they have seen fishing cat before the 2017 flood. After the flood they have not seen the fishing cat till date.

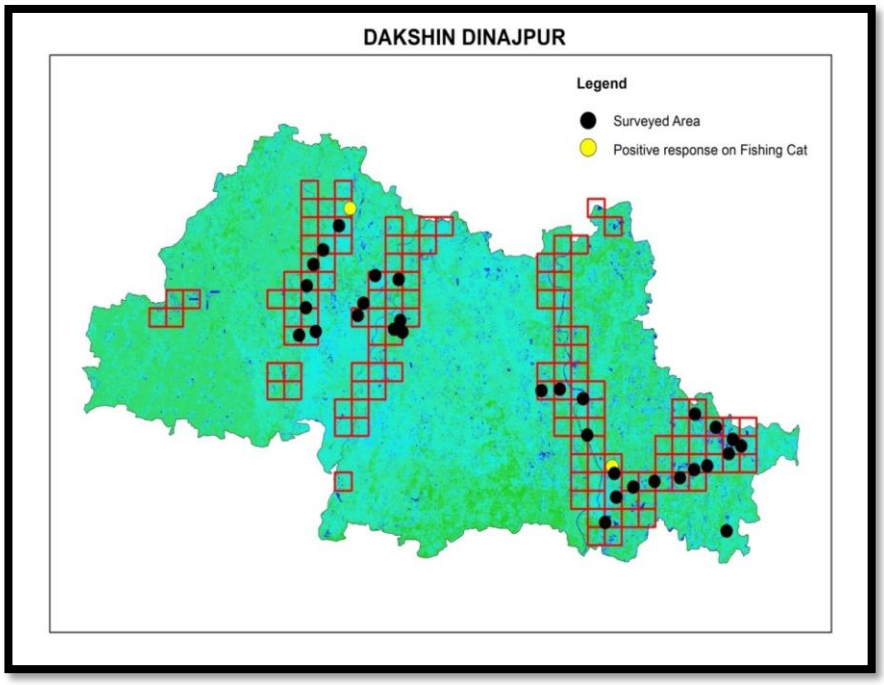


Uttar Dinajpur District total surveyed area (map)

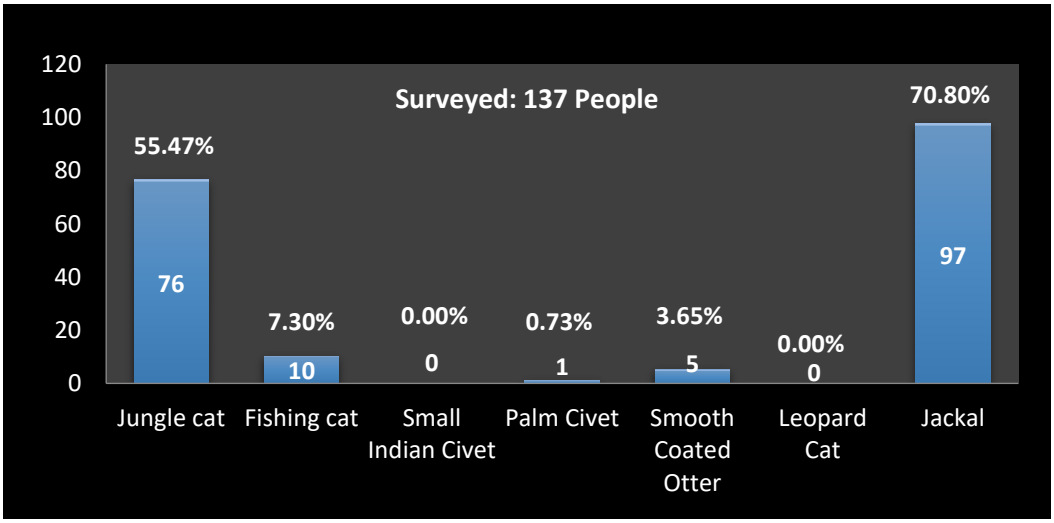


Total people surveyed in Uttar Dinajpur

In Dakhhin Dinajpur out of 131 grids 59 (45%) has been covered so far. Many of the grids were inaccessible and some grids did not have a suitable habitat. So we continued our work to rest of the grids and came up with a conclusion that major parts of these areas were the places of Jungle Cat and Golden Jackal. Almost no people had told us about Fishing cat. Forest Department also has no records of Fishing Cat in these areas.



Dakshin Dinajpur District total surveyed area (map)

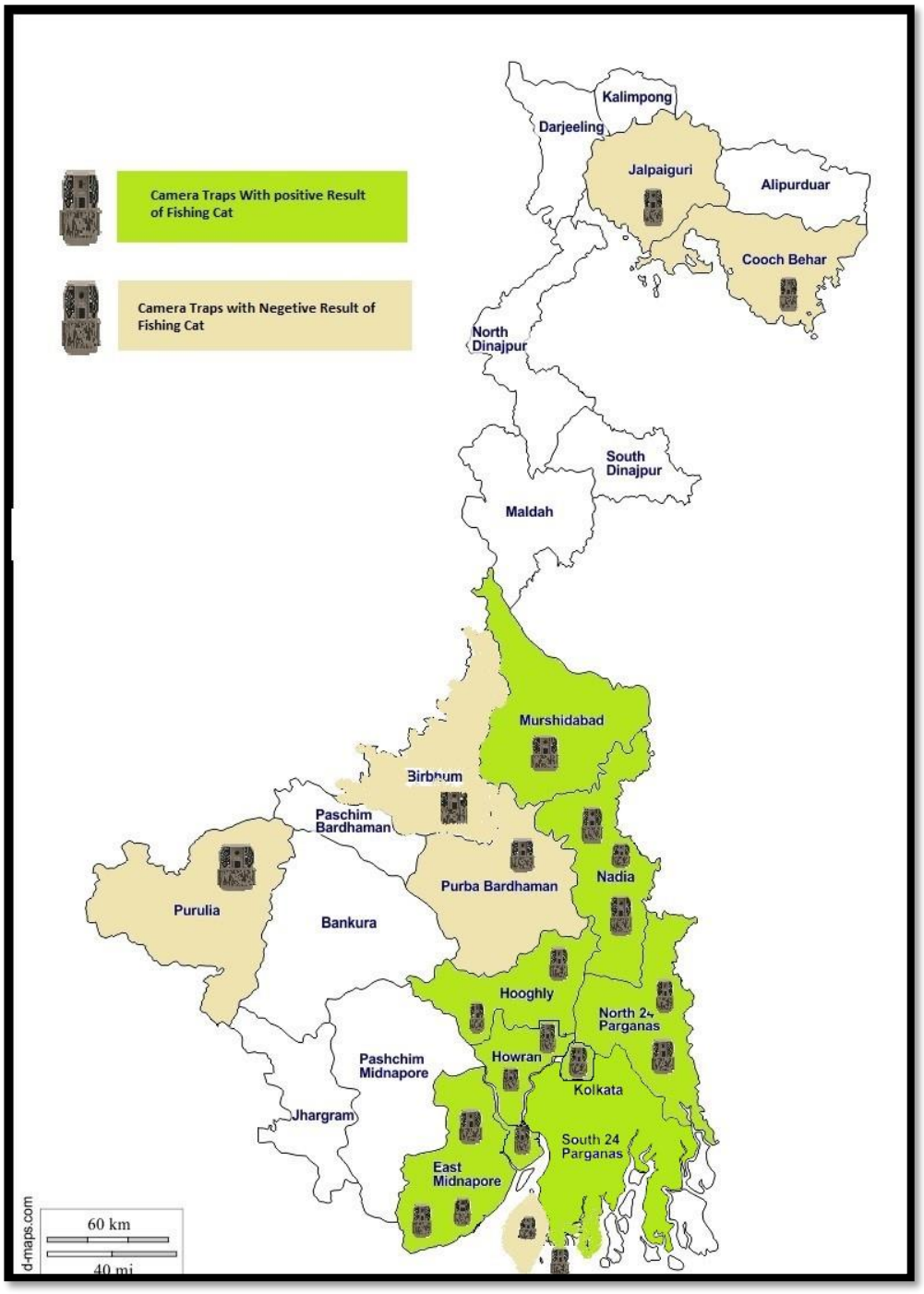


Total people surveyed in Dakshin Dinajpur

In Case of North Bengal most of the people were not very keen regarding this interview session. Majority of them did not participate in the survey. The demography along with the presence of many protected areas caused a hindrance in the survey phase. And lastly but fore mostly the protection issues of the cameras were a major problem in North Bengal. Removal of these difficulties will ensure the presence of the cat through camera trapping beyond protected areas.

About sixteen thousand people over West Bengal were interviewed during the project period. Their views were very much essential for the work we did in different districts. Without their help and support the work could not be done very smoothly. Taking us to the different habitats to protecting the camera traps were mainly done by them so they owe a deep gratitude from the entire research group.

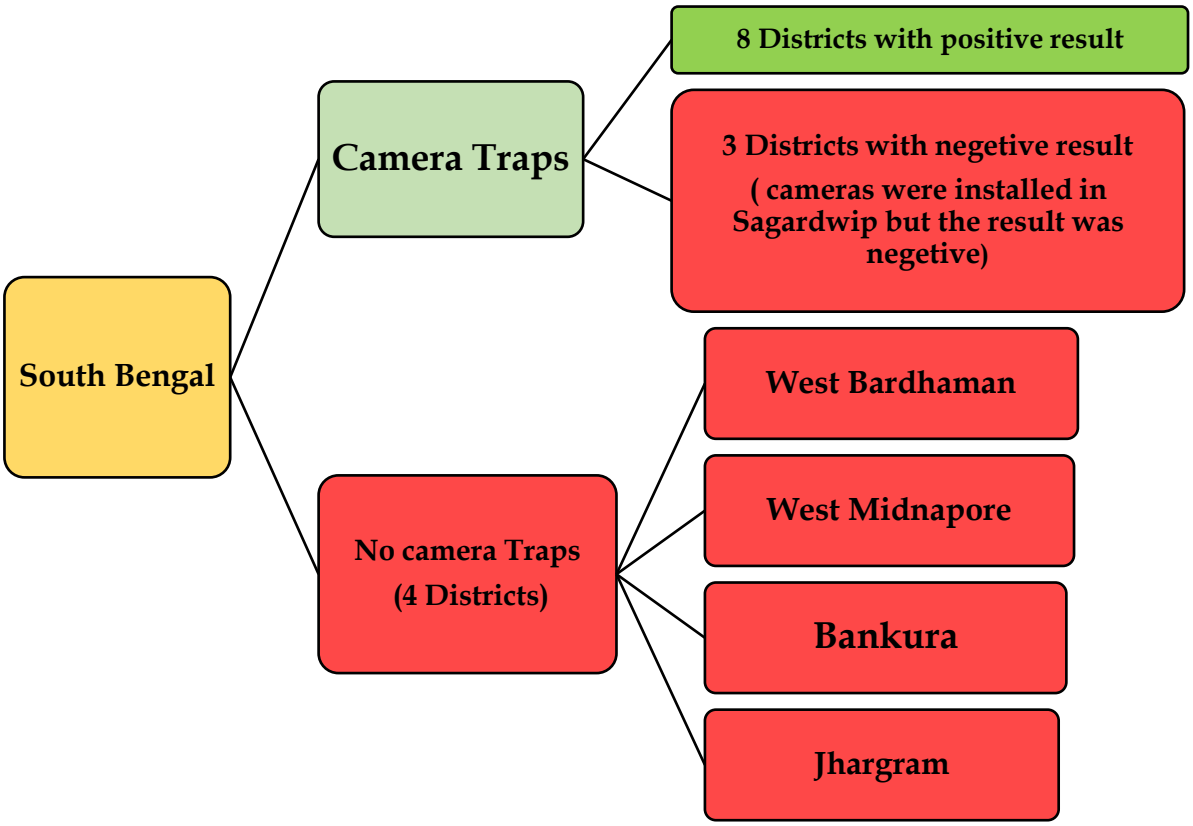
Camera Traps installed in different districts of West Bengal

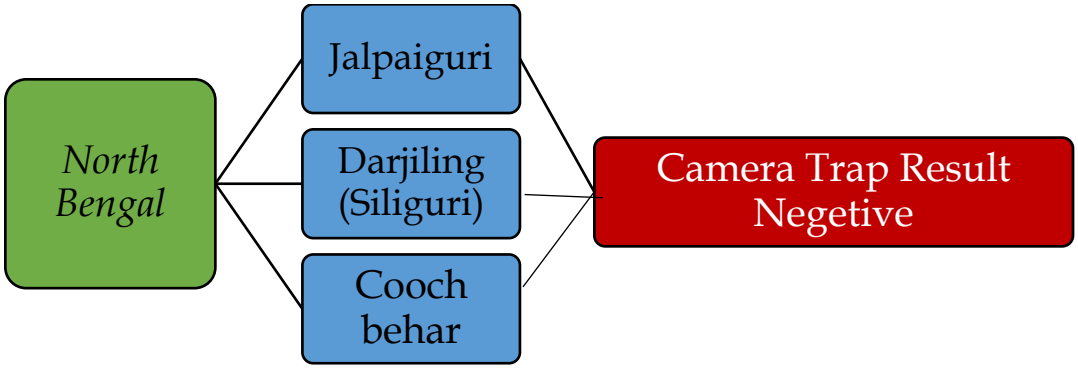


In the last two years camera traps have been done continuously in different districts of west Bengal. 13 districts have been covered in this scenario. Majority of the camera traps are from south Bengal. In South Bengal People willingly participated in the protection of the cameras. In case of North Bengal vandalism was a major issue for

less amount of installation of camera traps there. Camera Traps could only be successfully done in Jalpaiguri, Coochbehar and Siliguri. But in all cases negative result came.

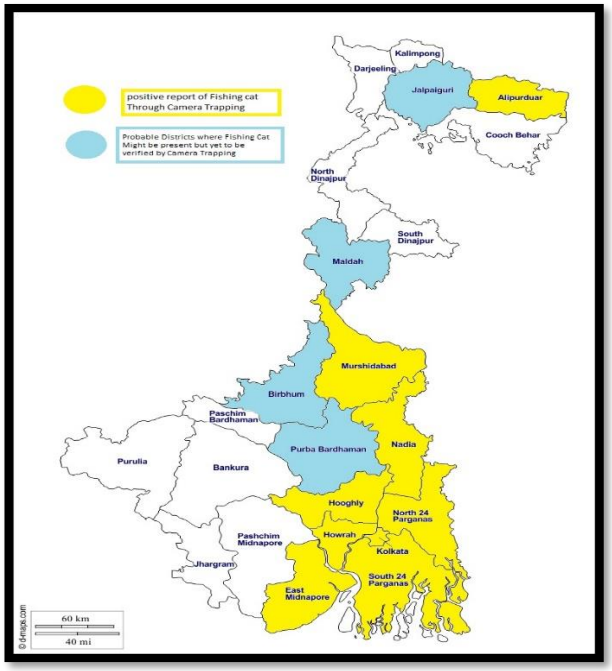
In case of South Bengal camera traps have been done in all districts except 4 (viz; Paschim Bardhaman, Jhargram, Bankura and West Midnapore) These 4 districts did not support the presence of Fishing Cat in questionnaire survey with the local people and also some consist of large forest ranges. In rest of 11 districts, apart from Purulia, Purba bardhaman and birbhum all other shows confirm presence of Fishing Cat. Baranti (Purulia), Bolpur (Birbhum), Belun gram (Purba Bardhaman) and Sagardwip (South 24 parganas) showed negative result in the camera traps.





In the upcoming days more emphasis will be given on North Bengal. We have successfully added some precise locations from South Bengal. Now the prime focus will be to find out some precise locations from there as well. Literature reviews and local perception of the people suggest that they are mainly restricted in the protected areas over there. Now the challenge is to have the presence of Fishing Cats in north Bengal outside the protected areas. Along with this part some precise locations of south Bengal will be pointed out for the intensive camera traps for abundance calculation.

Confirmed and Probable areas of Fishing Cats in West Bengal



In the above map of West Bengal, the yellow marked areas are such districts where confirmed presence of Fishing Cats have been found through camera trapping. The precise location is given in the previous discussion. The entire yellow mark does not support the presence of the cat in the entire district. It simply signifies the presence of Fishing Cats in districts at a glance. The blue coloured districts have potential habitats for fishing cats. But as we are working on an elusive nocturnal felid so in these areas when camera traps were done may be we didn't get a chance to encounter the animal but these are probable areas for the Fishing Cats. In depth study in these districts may come to some precise locations with confirmed presence of Fishing Cats like other districts. The districts which are marked with no colour are such areas where possibility of getting fishing cats are very low. Say for West Bardhaman, Bankura have completely different terrain which is unsuitable for the Fishing Cats. West Midnapore, Jhargram, Purulia consist of huge amount of forest patches. Our project is mainly focused on the areas beyond protected areas. So camera traps could not be done thoroughly in these areas. But overall interactions with forest officials came to a conclusion that Fishing Cats may not be present in these areas.

In Case of North Bengal more effort has to be given in all the districts in the upcoming days and after that any conclusion may be drawn. Overall questionnaire survey and camera traps in three places may be not be in the favour of the project but intensive study will be done in near future for a concrete statement.

Fishing Cat pictures obtained from different districts of West Bengal through camera trapping

Bagnan (Howrah)

Bantala (South 24 pgs)

Bantala (South 24 pgs)

Betai (Nadia)

Dankuni (Howrah)

Digha (East Midnapore)

Digha (East Midnapore)

Digha (East Midnapore)

East Kolkata Wetlands (Kolkata)

East Kolkata Wetlands (Kolkata)

Henry's Island (South 24 pgs)

Henry's Island (South 24 pgs)

Mollarber (Hooghly)

Mollarber (Hooghly)

Khorop (Howrah)

Khorop (Howrah)

Mahishadal (East Midnapore)

Mahishadal (East Midnapore)

Ahiron Lake (Murshidabad)

Ahiron lake (Murshidabad)

Sahapur (North 24 pgs)

Ramnagar (East Midnapore)

Ramnagar (East Midnapore)

Karnamadhavpore (North 24 pgs)

In 2017, when camera trap was done in Mahishadal we have identified two different individuals by observing the difference in their stripe pattern. The Difference is shown in the picture below

The Blue Circle shows the difference in stripe pattern in the individuals

During camera trapping we not only got pictures of Fishing cat but other allied organisms as well. Mostly Jungle cat, Golden Jackal have their presence almost everywhere in our state. The list also includes Common Indian civet, Indian palm civet, Grey Mongoose, Monitor Lizard and some waterbirds. The pictures are given below:

Common Grey Mongoose

Jungle Cat

Indian palm Civet

Common Indian Civet

Golden Jackal

Monitor Lizard

During camera trapping in Baranti (Purulia) we found picture of Stripped Hyena.

Pictures showing result of Camera Trapping In Baranti (Purulia)

Identifying the reasons and areas of human-fishing cat conflicts in West Bengal and to facilitate and promote conservation measures for the fishing cats in West Bengal.

Conflict is a well-known term in wildlife biology. Care for the wild and conflict with it are the two sides of the same coin. Conflict comes from the perception of one's particular view regarding the animal. Mostly when there is any loss caused by the wild all the anger of the people comes straight to it. Rational thinking in most of the cases are lagging and so throughout the globe huge loss of animals are going in the wild. Conflict with the wild doesn't solely dependent on the depletion of human life but it comes with unscientific urbanisation also, such as making roads through forest patch or construction of some industry or nude electrical fence.

Identifying reasons and areas of human-fishing cat conflicts in West Bengal

The journey of the project also came across with some conflict issues with Fishing cat. Diet of Fishing cat is mostly dependent on fishes. And majority of the locals while interviewing are pointing out this issue only. There is some misperceptions about the cat as many people think that they are taking huge amount of fishes which is causing financial crisis to them. And to save their ponds they are mainly in favour of sometimes killing the cat. But somehow we made them realise about the fact of fishing cat, hopefully in future those areas will harbour a good number of Fishing Cats.

In Ramnagar, a killing report came during the project period. When the team talked with the people they were very much dissatisfied with the loss of the animal. Electrocution was the cause of death of the felid. It was an adult Fishing Cat and just because of the irresponsibility of some concerned authority we lost one adult Fishing Cat. (Fig 1a). Another electrocuted Fishing Cat was found dead in Hatgacha (Fig 1b). It was also rescued by the local people of

that place. Talking with them came with the inference that a pair was spotted for some days. And they believe that the dead cat was an individual of that pair.

While surveying in Hooghly (mollarber), we found a very potential habitat for the cat and after the camera trap result we got the positive result about the presence of Fishing Cat over there. But on the same day we came to witness the loss of the habitat as well. It was mainly a grassland and in favour of the growth of grass land they are sometimes kept on fire for the destruction of the unwanted growth. But it should be done scientifically. In Mollarber the fire was completely unscientific and if it goes on for a practice then the habitat will soon be destroyed. The local people were also against this incident which gives hope for the thriving of Fishing cats. (Fig 2a, 2b, 2c)

In 2018 while the cameras were deployed in Mahishadal we found the confirmed presence of the cat as the habitat was suitable along with plenty food sources. On the rotation of the year when we again went there we found that the entire habitat was destroyed as because of a brick kiln site have stretched its wing. Camera trap data also showed no evidence of the cat along with any associated fauna. Taking with the locals came to meet up with the conclusion that after the formation of the brick industry they haven't seen the fishing cat as well and they tried to stop the entire thing but it was well connected so they failed.

Killing of wildlife sometimes comes for fun only. Many incidents took place in the last few years in Howrah. In some cases active participation of the local people helped the animal to thrive but in some cases newspaper flashes out some heinous incidents as well. According to many descriptions given by the local people we came to face some ugly perspective of humans that will never come in favour of wild animals. Again many Fishing Cats were rescued in between these time frame from Howrah and they were handed over to the Forest Department and later they were released in the wild again (Fig 3a,3b). In mannapara an adult Fishing Cat was captured in a trap set by the local people but at the end they all decided to release the cat again. This Incidents also give us some positive energy to motivate ground level people.

Serious problems may happen to local people as they are sharing the same habitat with the wild animals. Killing can never be an option to get rid of all the problems from the wild. Irrespective of all problems some negotiations can be fruitful for the ultimate goal to save wild animals. Various NGOs, Local Committees are working in this regard to make a society vulnerable for both wild and human interactions.

Plate 1 and Appendix 'A' showing the conflict and rescue reports of Fishing Cat and other wild associated fauna from different newspapers in West Bengal.

PLATE 1 (Pictorial Overview)

Conflict reports from different places of West Bengal

Fig: 1a (An adult Fishing Cat was electrocuted in Ramnagar, East Midnapore)

Fig: 1b (Adult Fishing Cat was found dead in Hatgacha due to electrocution)

Fig: 2a (Habitat at Mollaber where Fishing Cat was documented in Camera Trap)

Fig: 2b and 2c (Showing the unscientific human induced fire that in destroying the habitat)

Appendix- A

(Conflict Reports of Fishing cat and other associated wild fauna from Newspapers)

চিতাবাঘ ভেবে মার বাঘরোলকে

গৌতম চক্রবর্তী

গ্রামে চিতাবাঘ দেখা গেছে। পূর্ণ বয়স্ক বাঘরোলকে দেখে এমনটাই গুজব ছড়িয়ে পড়ে। আর তাতেই আতঙ্ক ছড়ায় ভাঙড়ের কচুয়া গ্রামে। চিতাবাঘের কথা শুনে অনেকেই ভয় পেয়ে যান। লাঠিসোটা নিয়ে গ্রামের মানুষ তেড়ে যায় অবলা জন্তুটার দিকে। বাঁশ দিয়ে মাথায় এক ঘা বসিয়ে দেয় এক যুবক। রক্তাক্ত হয়ে মাটিতে লুটিয়ে পড়ে সাদা-ধূসর রঙের বিলুপ্তপ্রায় ওই প্রাণীটি। দড়ি দিয়ে চার হাত-পা বেঁধে ফেলে গ্রামবাসীরা।

তাতে এ যাত্রায় প্রাণে বেঁচে গেছে বাঘরোলটি। মঙ্গলবার বিকেল ৩টে নাগাদ ঘটনাটি ঘটে।

খবর পেয়ে ঘটনাস্থলে পৌঁছয় কাশীপুর থানার পুলিশ। তার অনেক পরে পৌঁছন মাতলা রেঞ্জের বন দপ্তরের আধিকারিকেরা। বাঘরোলটিকে উদ্ধার করে রেসকিউ সেন্টারে নিয়ে যান তাঁরা। স্থানীয়রা জানান, মঙ্গলবার দুপুরে চিতাবাঘের খোঁজ করতে গিয়ে দেখা যায় উত্তর কচুয়ার একটি কোপের আড়ালে শুয়ে রোদ পোহাচ্ছে বাঘরোলটি। তাড়া করলে একজনের বাড়ির মাচায় উঠে পড়ে। ইটপাটকেল ছুঁড়ে মারে কয়েকজন

ভাঙড়ে আহত বাঘরোল। ছবি: প্রতিবেদক

আনন্দবাজার পত্রিকা

Login with

মৃত বাঘরোল। —নিজস্ব চিত্র।

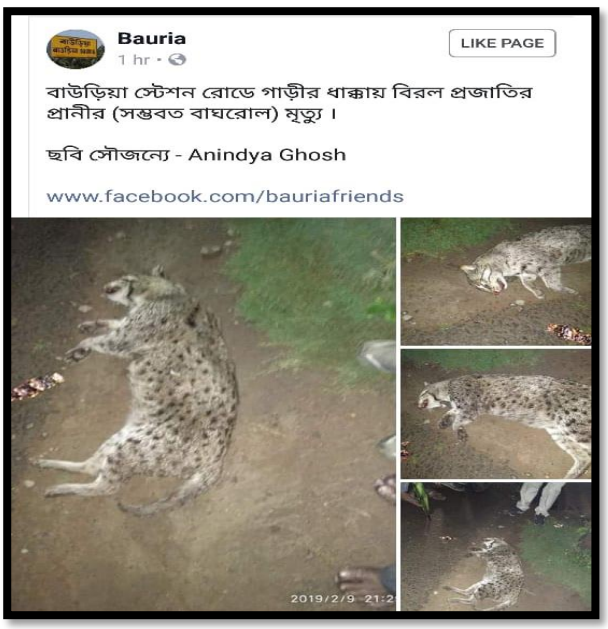
রাজ্য সড়কের উপরে উদ্ধার হল বাঘরোলের মৃতদেহ।

স্থানীয় সূত্রের খবর, নন্দকুমারের বহিচবেড়িয়া গ্রামে শনিবার সকালে তমলুক শহর থেকে ময়নাগামী রাজ্য সড়কের উপর ওই বাঘরোলের মৃতদেহ দেখতে পান স্থানীয়েরা। খবর

Shiba Sankar

Jan 8 at 11:33 AM

এখনো আমরা এই সব জীব দের মেরে ফেলছি।কবে বুঝবো?পাঁচলার থেকে একটু দুরে বলরামপোতার কাছে NH er পাশে।



Bauria

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বাউড়িয়া স্টেশন রোডে গাড়ীর ধাক্কায় বিরল প্রজাতির প্রানীর (সম্ভবত বাঘরোল) মৃত্যু ।

ছবি সৌজন্যে - Anindya Ghosh

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2019/2/9 21:2

In most of the cases the cats were killed because of the misconception of local people regarding the food habit of the cats. In order to give punishment they are actually killing the wild population of the cat which in turn may lead to the extinction of the majestic felid from west Bengal.

During 'Sikar-Utsav' huge number of wild fauna gets eliminated every year. In the above picture a villager is posing in front of the camera with good number of dead bodies of Jungle Cats and Common Indian Civets.

A very Familiar incident with the wild population where they have to face an extinction by the hands of so called civilized people in the name of 'justice'. The dead Fishing Cats pictures are given by Mr.Hindol Ahmed

Awareness and conservation initiatives for the fishing cats in West Bengal

For conservation and awareness component we mainly targeted academic intuitions of different districts of our State. Talking about the importance of Fishing Cat and associated wild fauna with the students will manage to make a future group of enthusiastic group who will be keen towards wildlife. Taking the students as model will also help to spread the awareness to local place they actually belong to. To initiate any conservation aspect the student class is the best suitable group whom you can moult accordingly that will help in conservation purpose for wild animals in future.

Awareness programme has been held on 8 Universities 37 colleges and 5 schools in total 18 districts viz. Bankura, East and West Burdwan, Birbhum, Purulia, Hoogly, Darjeeling, Alipurduar, Jalpaiguri, Coachbehar, Uttar and DakshinDinajpur, PurbaMidnapur, PaschimMidnapur and Jhargram, malda, Howrah, Nadia and South 24 Parganas.

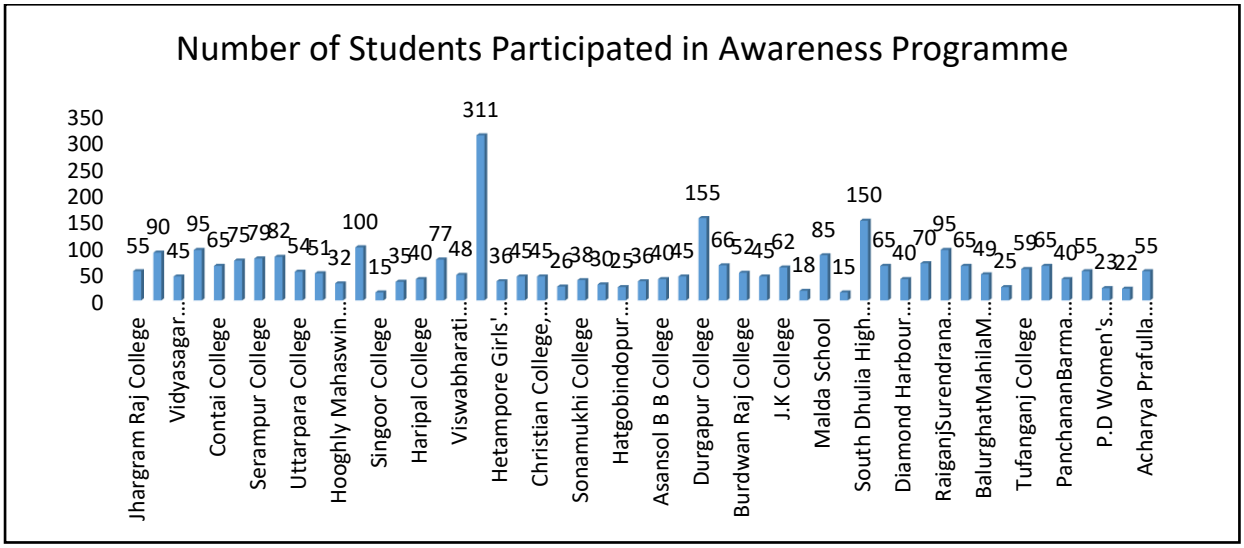
Name of the academic institutions are given below:

District	**College/ University/ School name**
Jhargram	Jhargram Raj College
PaschimMidnapur	Raja NarendraLal Khan Women's College
	Vidyasagar University
	Gorbeta College
PurbaMidnapur	Contai College
	Ramnanagr College
Hooghly	Serampur College
	Khalisani College
	Uttarpara College
	Hooghly Women's College
	Hooghly Mahaswin College
	CGR Govt. College
	Singoor College
	Itachuna College
	Haripal College

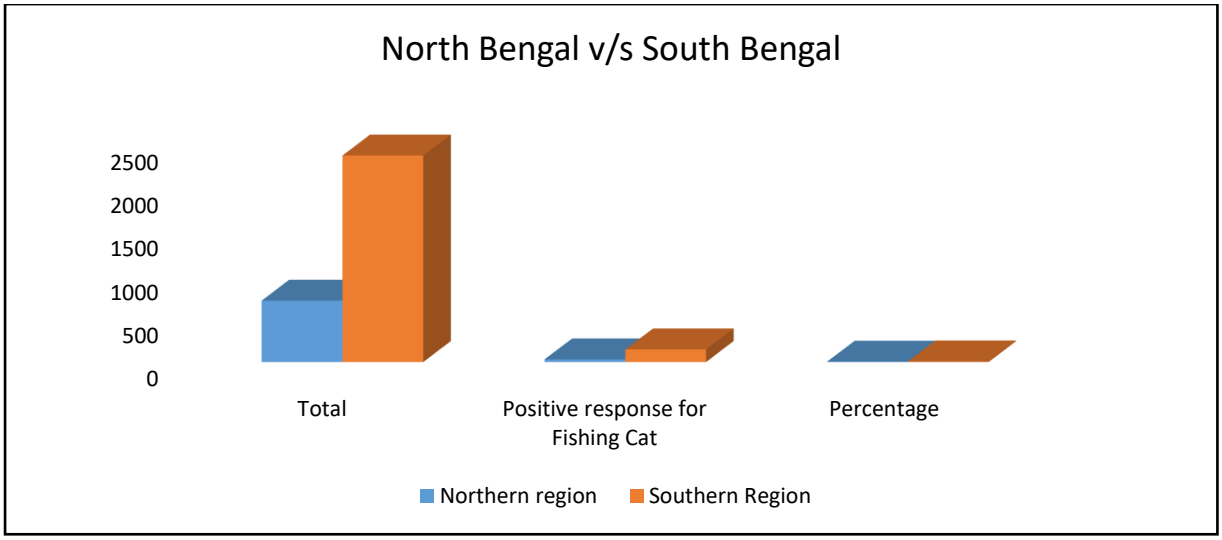
	Mogra College
Birbhum	Viswabharati university
	Tumboni High school
	Hetampore Girls' High School
	Hetampore Boys' High School
Bankura	Christian College, Bankura
	Saldiha College
	Sonamukhi College
Burdwan (East and West)	Syamsundar College
	Hatgobindopur College
	Kulti College
	Asansol B B College
	Raigunge College
	Durgapur College
	Burdwan University
	Burdwan Raj College
Purulia	S.K.B University
	J.K College
	RamanandaCentinary College
Malda	One school
Howrah	Uluberia College South Dhulia High School
Nadia	Kalyani University
South 24 Parganas	Diamond Harbour Women's University
Uttar Dinajpur	Raiganj University College
	RaiganjSurendranathMahavidyalaya
DakshinDinajpur	Balurghat College
	BalurghatMahilaMahavidyalaya
Alipurduar	Alipurduar College
Coach Behar	Tufanganj College
	ABN Seal College
	PanchananBarma University
Jalpaiguri	Jalpaiguri AC College
	P.D Women's College
Darjeeling	Siliguri College
	Acharya Prafulla Chandra Roy Govt. College

About 708 students From North Bengal and 2383 students from south Bengal have participated in the awareness programme. Many students have given valuable information about the cat from their locality. Some students have maintained a streamline connection with the research team which have proven to be beneficial in the field works. A student from Hooghly once gave us a call and told that a mother cat was taking her babies with her in their home. We went to the place but due to canny behaviour the cat left the place. But we somehow managed to have the pictures clicked by the student which helped us in pointing out another location of Fishing cat in Hooghly (Fig 4a, 4b).

Deep enthusiasm was noted during these campaigns from the students end. Now it is our prime duty to guide them in proper way so that the wild can thrive happily in wild with human association. Majority in these surveys show a handful of students knew about the State Animal but after the successful completion of the project the student now know about the State Animal and Bird.



Graph 1: Graphical representation of Total number of Students who took part in the awareness campaign throughout West Bengal. The number indicates the students in any particular academic institution.



Graph 2: Comparison between knowledge of Fishing Cat among students of southern and northern Bengal

Graph 2 represents the overall comparison on the knowledge about the State Animal of two portion of Bengals that is North and South part. In north Bengal out of 708 students only 30 students and in South Bengal out of 2383 students maximum 145 students have given positive response regarding Fishing Cat. The number looks higher in case of South Bengal but when it was converted into percentage both the numbers show almost equality.

During this campaigning some students who showed very much interest and gave us some valuable information were given a badge of fishing cat as a token of appreciation. These badges were widely spread among different Panchayets, Local Clubs and academic institutions for enhancing their willingness to work for Fishing Cat. Picture of The badge is given below:

Fig 3: The badge also have the take home message to save our State Animal 'Fishing Cat'

বিডিও মিলে শান্ত করেন

উদ্ধার ভাম ও বাঘরোল

এই সময়, উলুবেড়িয়া: অন্ধকারে চুপিসাড়ে দোকানে ঢুকেছিল সে। কিন্তু টের পেয়ে যান দোকানের মালিক। তিনি এবং অন্য কয়েকজন স্থানীয় বাসিন্দা যখন লাঠিসোঁটা নিয়ে 'অনুপ্রবেশকারী' গন্ধগোকুলকে (ভাম) মারতে জন্য উদ্যত, স্থানীয় আরেক ব্যবসায়ী তাঁদের নিবৃত্ত করলেন।

ঘটনাটি ঘটেছে সোমবার ভোররাতে, গ্রামীণ হাওড়ার কুলগাছিয়া স্টেশন মার্কেটে। সেখানে অনেক ব্যবসায়ী দোকানেই রাত্রিযাপন করেন। তেমনই একজন ইমারতি দ্রব্যের কারবারি বিজয় পোড়ে। ভোররাতে দোকান ভাম ঢুকেছে বুঝে চিৎকার শুরু করেন তিনি। আওয়াজ শুনে নিজের দোকান থেকে বেরিয়ে শুভঙ্কর মাইতি দেখেন ভাম নিধনের প্রস্তুতি চলছে। তিনি তখন বনপ্রাণীটিকে না-মেরে বনদপ্তরের খবর

খাঁচাবন্দি গন্ধগোকুল — রাকিব ইকবাল

পাঁচলা ব্লক কমিটির সদস্য ইন্দ্রজিৎ আদক এদিন জানান, এলাকার কৃষকেরা বেওয়ারিশ শুয়োরের হানাদারি থেকে ফসল রক্ষা করতে ফাঁদ পেতেছিলেন। তাতেই বাঘরোলটি আটকে পড়ে। তিনি বলেন, 'শীতকালে যাযাবর

বাঘরোল উদ্ধার, সচেতনতায় খুশি বন দফতর

নিজস্ব সংবাদদাতা

শ্যামপুর: পোলট্রি ফার্ম থেকে একটি পূর্ণ বয়স্ক বাঘরোল উদ্ধার করল বন দফতর। বুধবার বিকেলে শ্যামপুরের ভগবানপুরের একটি পোলট্রি ফার্মে একটি পূর্ণ বয়স্ক বাঘরোল দেখা যায়। স্থানীয় বাসিন্দারা তাকে পোলট্রি ফার্মের মধ্যে আটকে রেখেই বন দফতরকে খবর দেন। পরে বন দফতরের কর্মীরা গিয়ে বাঘরোলটিকে উদ্ধার করে গড়চুমুক প্রাণী স্বাস্থ্যকেন্দ্রে পাঠায়।

উলুবেড়িয়া বন দফতরের রেঞ্জার উৎপল সরকার বলেন, "বাঘরোলটি পুরুষ। বয়স ৭/৮ বছর। এ রাজ্যে তফশিলি ১-এর অন্তর্ভুক্ত প্রাণী এটি।" বাঘরোল সাধারনত হোগলা বন, বড়ি বনে থাকে। শিকারের ধরতে হানা দেয় গৃহস্থ বাড়িতে। ধরে নিয়ে যায় হাঁস মুরগি।

এ দিন যে বাঘরোলটিকে উদ্ধার করা গিয়েছে, তাতে খুশি বন দফতর। উৎপলবাবুর দাবি, বছর খানেক আগেও ছবিটা ছিল ভিন্ন। তখন শ্যামপুরে গ্রামে গ্রামে বাঘরোল ধরার জন্য খাঁচা পাতা হত। বিশেষ ভাবে তৈরি সেই খাঁচায় পায়রা রেখে টোপ দেওয়া হত। বাঘরোলের মাংসও খাওয়া হত।

উৎপলবাবু বলেন, "শুধু মাংস খাওয়ার জন্য নয়, অনেক সময় ভয় পেয়েও মানুষ বন্যপ্রাণী মারেন। আমার এলাকায় শিবির করে বিষয়টি বুঝিয়েছি। বন দফতরের ফোন নম্বর দিয়ে এসেছি গ্রামে গ্রামে। তাতে উপকার যে হয়েছে এ দিনের ঘটনাই তার প্রমাণ।"

এ দিন যাঁর পোলট্রি ফার্ম থেকে উদ্ধার হয়েছে বাঘরোলটি, সেই টিপু রহমান বলেন, "কয়েক সপ্তাহ আগে বন দফতরের শিবির হয়েছে আমাদের গ্রামেও। তার পর থেকে গ্রামের মানুষ ঠিক করে বাঘরোল দেখলেই বন দফতরে খবর দেওয়া হবে।"

এ দিনও অবশ্য অনেকে মেরে ফেলতে চেয়েছিলেন বাঘরোলটিকে। টিপুর জন্য, তাঁর পোলট্রির দু'টি মুরগি মেরেছে বাঘরোলটি। কিন্তু গ্রামের একাংশ বাসিন্দার পরামর্শে টিপুর পোলট্রির দরজা বন্ধ করে আটকে রাখেন প্রাণীটিকে। খবর দেন বন দফতরে।

বন দফতরে দাবি যে খুব ভুল নয়, তা প্রমাণ হয়েছে বৃহস্পতিবারই। এ দিন সকালে উলুবেড়িয়ার কুলগাছিয়া একটি কচ্ছপও উদ্ধার করতে পেরেছে থেকে বন দফতর।

বন দফতর থেকে জানানো হয়েছে, কচ্ছপটিকেও গড়চুমুক প্রাণী স্বাস্থ্যকেন্দ্রে পাঠানো হয়েছে। এ দিন সকালে কুলগাছিয়ার বাসিন্দা জয়ন্ত মণ্ডল তাঁর বাড়ির সামনে কচ্ছপটিকে দেখতে পান। তিনিই বন দফতরের ফোন নম্বরে যোগাযোগ করেন।

■ খাঁচায়: বন দফতর উদ্ধার করার পরে। ছবি: সুব্রত জানা

আনন্দবাজার পত্রিকা
বৃহস্পতিবার ১৬ ফেব্রুয়ারি ২০১৭

কাপাসএড়্যা থেকে উদ্ধার বাঘরোল ছানা

নিজস্ব সংবাদদাতা, তমলুক: ফের গ্রামবাসীদের কাছ থেকে খবর পেয়ে ঝোপ থেকে দুই বাঘরোল ছানা উদ্ধার হল পূর্ব মেদিনীপুরে।

মহিষাদলের কাপাসএড়্যা গ্রামে বুধবার দুপুরে ওই দুই বাঘরোল ছানাকে উদ্ধার করে বন দফতরের হলদিয়া রেঞ্জের আধিকারিক-কর্মীরা। জেলা বন আধিকারিক স্বাগতা দাস বলেন, "বাঘরোল ছানা দুটি এক থেকে দেড় মাস বয়সের। দুটি ছানাই সুস্থ রয়েছে। তাদের শুশ্রূষা করা হচ্ছে। ওই বাঘরোল ছানাদের মা এলাকায় থাকতে পারে। তাই স্থানীয় বাসিন্দারা যাতে বাঘরোল দেখতে পেলে আতঙ্কগ্রস্ত না হয়ে আমাদের খবর দেন সে জন্য মাইক দিয়ে এলাকায় প্রচার চালানো হয়েছে।"

মঙ্গলবারই পশ্চিম মেদিনীপুর জেলার দাসপুরের সোনাখালি গ্রামে স্থানীয় বাসিন্দারা এক বাঘরোলকে পিটিয়ে মেরে ফেলেছে। তবে এই ধরনের ঘটনা নতুন নয়। কয়েকমাস আগেই তমলুকের কাশীপুর ও ধলহরা গ্রামে কয়েক দিনের ব্যবধানে স্থানীয় বাসিন্দারা দুই বাঘরোলকে পিটিয়ে মেরেছিল। ঘটনার জেরে স্থানীয় বাসিন্দাদের অনেকেই বন দফতরের গাফিলতিকে দায়ী করেছিলেন। এরপরই নড়েচড়ে বসে জেলা বন দফতর।

বাঘরোল-সহ বিভিন্ন বিপন্ন প্রজাতির প্রাণী, পাখিকে আক্রমণের হাত থেকে রক্ষা করতে সচেতনতা অভিযান শুরু করে জেলা বন দফতর। এইসব প্রাণী-পাখির রঙিন ছবি ও তাদের রক্ষা করার প্রয়োজনীয়তা নিয়ে পুস্তিকা তৈরি করে স্কুলের ছাত্র-ছাত্রীদের হাতে তুলে দেওয়ার

উদ্ধার হওয়া দুই শাবক।

পাশাপাশি জেলার বিভিন্ন এলাকায় স্থানীয় বাসিন্দাদের সচেতন করায় উদ্যোগী হয়েছে বন দফতর। আর তারপরেই তমলুকের রাধাবল্লভপুর গ্রামের বাসিন্দাদের কাছ থেকে খবর পেয়ে দুই বাঘরোল ছানা উদ্ধার করে বন দফতর। পাঁশকুড়ার জিয়াদা গ্রামের বাসিন্দাদের কাছ থেকে খবর পেয়ে পাঁচটি বাঘরোল ছানা উদ্ধার করে বন দফতর।

নন্দকুমারের খঞ্চি গ্রামের রথের মেলায় বেআইনিভাবে পাহাড়ি টিয়াপাখি বিক্রির অভিযোগ পেয়ে ৪৫ টি টিয়াপাখি এবং কাঁথিনগর হাট থেকে ১৩ টি কচ্ছপ উদ্ধার করে বন দফতর। এরপর বুধবার মহিষাদল থানার কাপাসএড়িয়া গ্রামের ঝোপের মধ্যে থাকা দুই বাঘরোল ছানাকে দেখতে পেয়ে স্থানীয় বাসিন্দারা বন দফতরের কাছে জানান। বন দফতরের আধিকারিক-কর্মীরা গিয়ে দুই বাঘরোল ছানাকে উদ্ধার করে।

নিজস্ব চিত্র।

৮ সংবাদ প্রতিদিন, শুক্রবার ১৭ ফেব্রুয়ারি ২০১৭

হলদিয়ায় উদ্ধার ৩ বাঘরোল যাচ্ছে আলিপুর চিড়িয়াখানায়

নিজস্ব সংবাদদাতা, হলদিয়া : হলদিয়া থেকে ৩টি বাঘরোল পাঠানো হল কলকাতার আলিপুর চিড়িয়াখানায়। বৃহস্পতিবার পূর্ব মেদিনীপুর বন দফতর খাঁচাবন্দি করে পাঠায় এই তিন প্রাণীকে। উল্লেখ্য, সোমবার একটি বাঘরোল জখম অবস্থায় হলদিয়া টাউনশিপে ধরা পড়ে। পশু চিকিৎসকদের চেষ্টায় হলদিয়া বনবিভাগ অফিসে সুস্থ হয় প্রায় তিন ফুট লম্বা বাঘরোলটি। বুধবার মহিষাদলের কাপাসএড়িয়ায় আরও দুটি বাচ্চা বাঘরোল ধরা পড়ে বনকর্মীদের হাতে। বৃহস্পতিবার তিনটি বাঘরোল আলিপুর চিড়িয়াখানায় পাঠানো হয়েছে। পাঠানোর আগে হলদিয়ার বাড় বাজিতপুর যতীন্দ্র হাইস্কুলের পড়ুয়াদের সঙ্গে এই প্রাণীটির পরিচিতি ঘটানো হয়। বন্যপ্রাণ রক্ষার বিষয়ে সতর্ক করা হয় পড়ুয়াদের। জানান হলদিয়া বনবিভাগের আধিকারিক পার্থ দেবনাথ। এর আগেও জেলার নানা প্রান্ত থেকে উদ্ধার হওয়া বেশকিছু পাখি, কচ্ছপ-সহ ইত্যাদি প্রাণি বন কর্মীরা উদ্ধার করেছিলেন। সেগুলিও পাঠানো হয়েছে অলিপুর চিড়িয়াখানায়।

আনন্দবাজার পত্রিকা
কলকাতা শুক্রবার ১৭ ফেব্রুয়ারি ২০১৭

দিন দুয়েক আগে হলদিয়া টাউনশিপ থেকে উদ্ধার করা হয়েছিল আহত পূর্ণবয়স্ক বাঘরোলটিকে। তারপর থেকে সেটি ছিল হলদিয়া বালুঘাটা বনবিভাগে। সুস্থ হয়ে ওঠার পর বৃহস্পতিবার তাকে নিয়ে কলকাতার আলিপুরের দিকে রওনা দেন বনকর্মীরা। তার আগে বাঘরোলটিকে নিয়ে যাওয়া হয় স্থানীয় একটি হাইস্কুলের ছাত্রছাত্রীদের সামনে। নন্দকুমার বনবিভাগের রেঞ্জার পার্থ দেবনাথ বলেন, "বিপন্ন এই প্রাণীটিকে রক্ষা করা দরকার। তাই শিক্ষক শিক্ষিকাদের উপস্থিতিতে সচেতনতা মূলক প্রচার চালানো হল।" এ দিন আলিপুরে নিয়ে যাওয়া হয় কাপাসএড়্যা থেকে উদ্ধার হওয়া দু'টি শিশু বাঘরোলকেও। নিজস্ব চিত্র।

সংবাদ প্রতিদিন মঙ্গলবার ১৪ ফেব্রুয়ারি ২০১৭

হলদিয়ায় বাঘরোল উদ্ধারে উত্তেজনা

নিজস্ব সংবাদদাতা, হলদিয়া : প্রায় তিন ফুট লম্বা একটি বাঘরোল উদ্ধার হল হলদিয়ায়। সোমবার হলদিয়ার বন্দর প্রশাসনিক ভবন জওহর টাওয়ারের কাছে এক কালভার্টের তলা থেকে জখম বাঘরোলটি উদ্ধার করেছেন হলদিয়ার বনবিভাগ কর্মীরা। মাথায় এবং পিছনে বাঁ-পায়ে আঘাতের চিহ্ন রয়েছে। অন্য বাঘরোলের সঙ্গে মারামারি কিংবা মানুষের আঘাতে বাঘরোলটি জখম বলে বনকর্মীরা মনে করছেন। এখন হলদিয়া বন দফতরের অফিসে চিকিৎসাধীন প্রাণীটি। সুস্থ হলে আলিপুর চিড়িয়াখানায় পাঠানো হবে। জানান বন আধিকারিক পার্থ দেবনাথ।

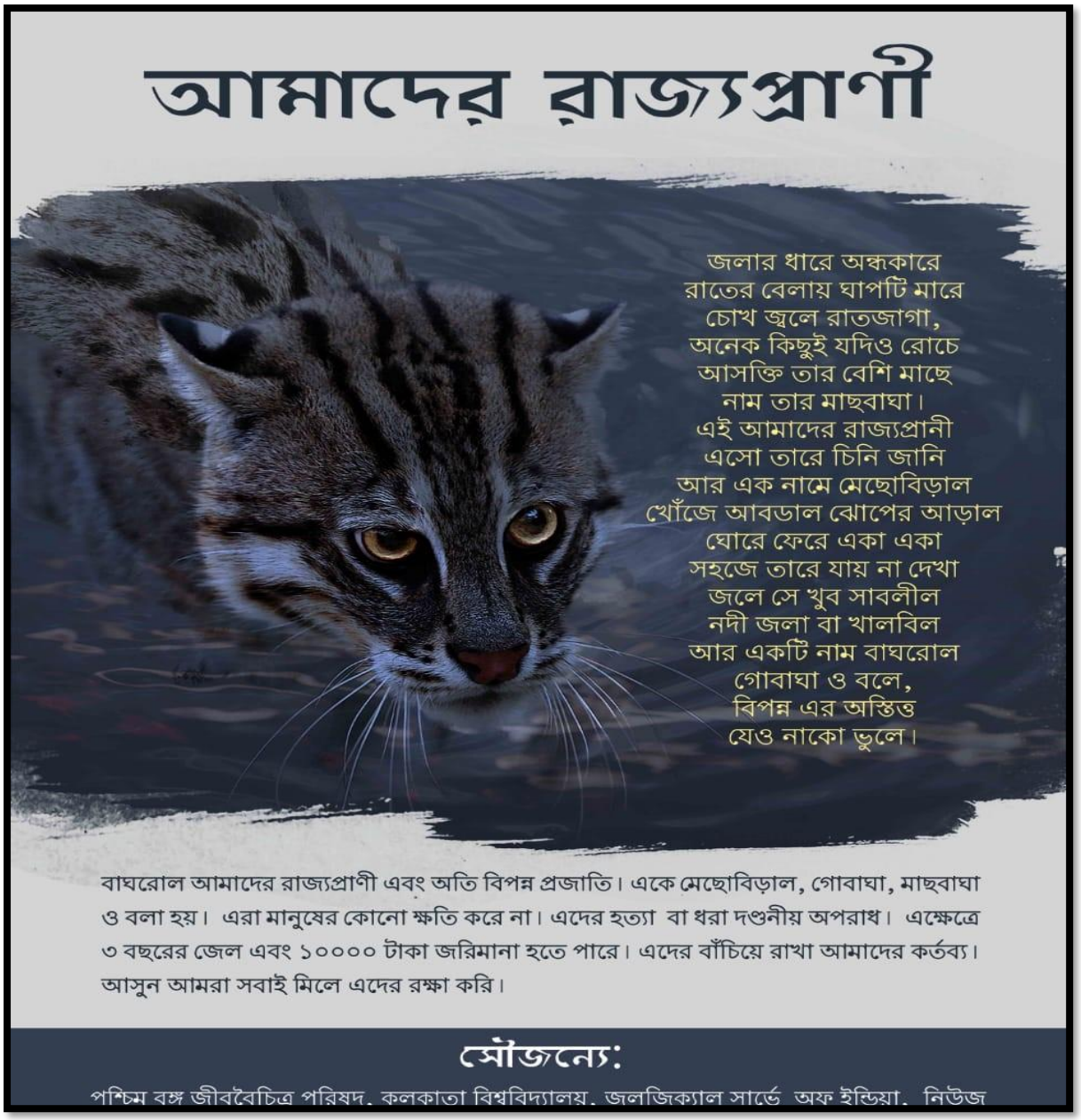
But on the same hand these news also keep the hope alive for us, for all the people who always stand against the killing of wild animals and believe in conserving them, protect them. For conservation of any wild fauna it is very essential to incorporate the local people, stakeholders as they will stand as the local shield for the wild. Awareness to these grassroot level people will always be beneficial in terms of conserving any endemic organism.

Fig: 3a and 3b showing the rescued Fishing Cat by the Forest Department From Howrah (Mannapara)

Fig: 4a and 4b shows the kitten of Fishing Cat in Haripur (Hooghly) clicked by one of the students who has participated in the awareness programme of 'Fishing Cat'

Leaflets and posters (given below) have been prepared which has been widely distributed among the identified Fishing Cat habitats across the state to disseminate the awareness among the local residents about the 'State Animal' thriving in their area. This will also be useful to spread awareness among the residents without any prior knowledge about this wetland associated organism.

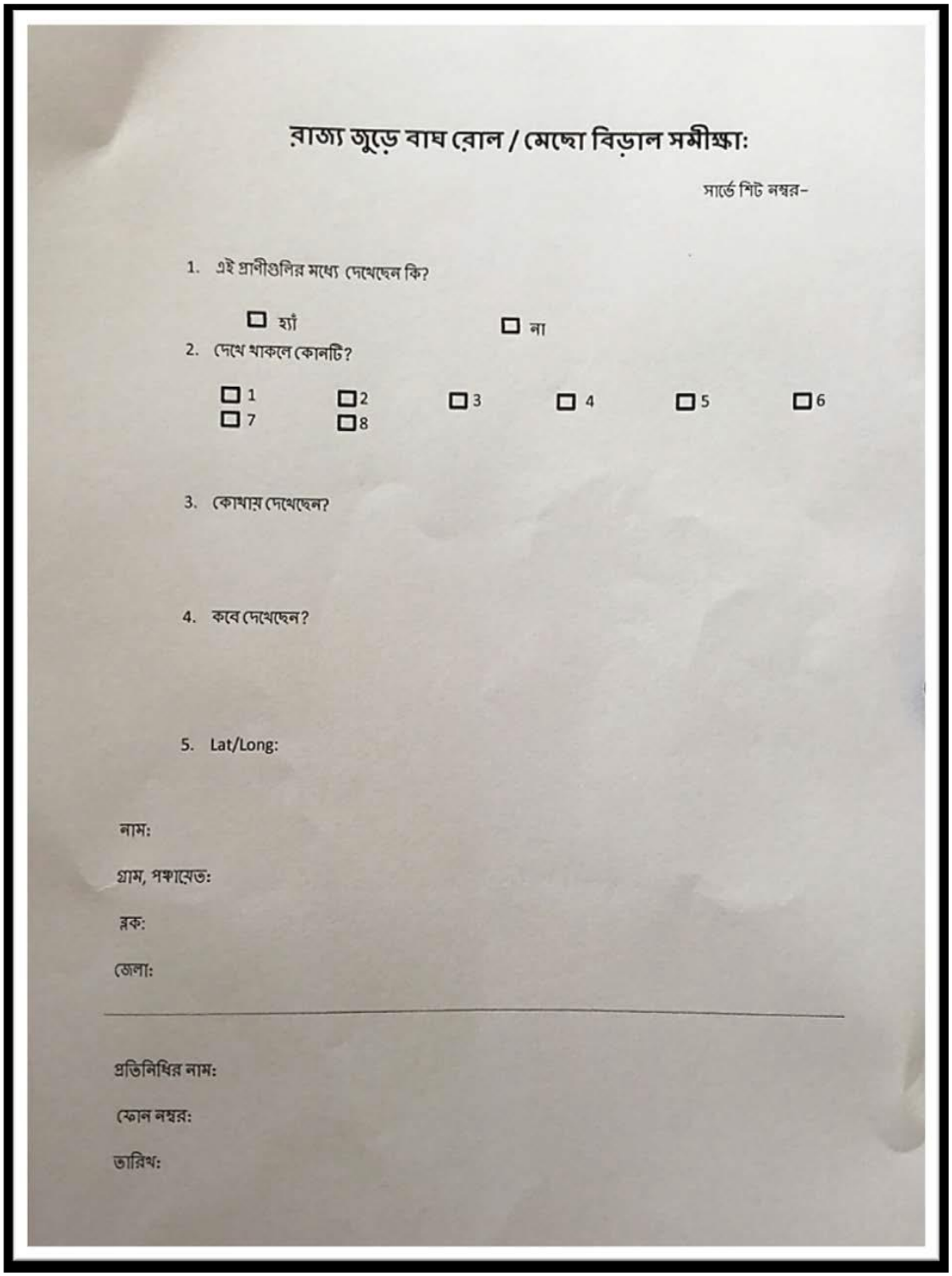
These leaflets were distributed in various academic institutions and local level to give the local dwellers a basic idea on our State animal



These posters have also been prepared and distributed in different areas of the state with a basic objective to aware as many people as possible for saving the vulnerable State Animal 'Fishing Cat'.

<u>Some glimpses of the awareness camps in different colleges of West Bengal.</u>

Questionnaire sheet used for survey



রাজ্য জুড়ে বাঘ রোল / মেছো বিড়াল সমীক্ষা:

সার্ভে শিট নম্বর-

1. এই প্রাণীগুলির মধ্যে দেখেছেন কি?

☐ হ্যাঁ ☐ না

2. দেখে থাকলে কোনটি?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6
☐ 7 ☐ 8

3. কোথায় দেখেছেন?

4. কবে দেখেছেন?

5. Lat/Long:

নাম:

গ্রাম, পঞ্চায়েত:

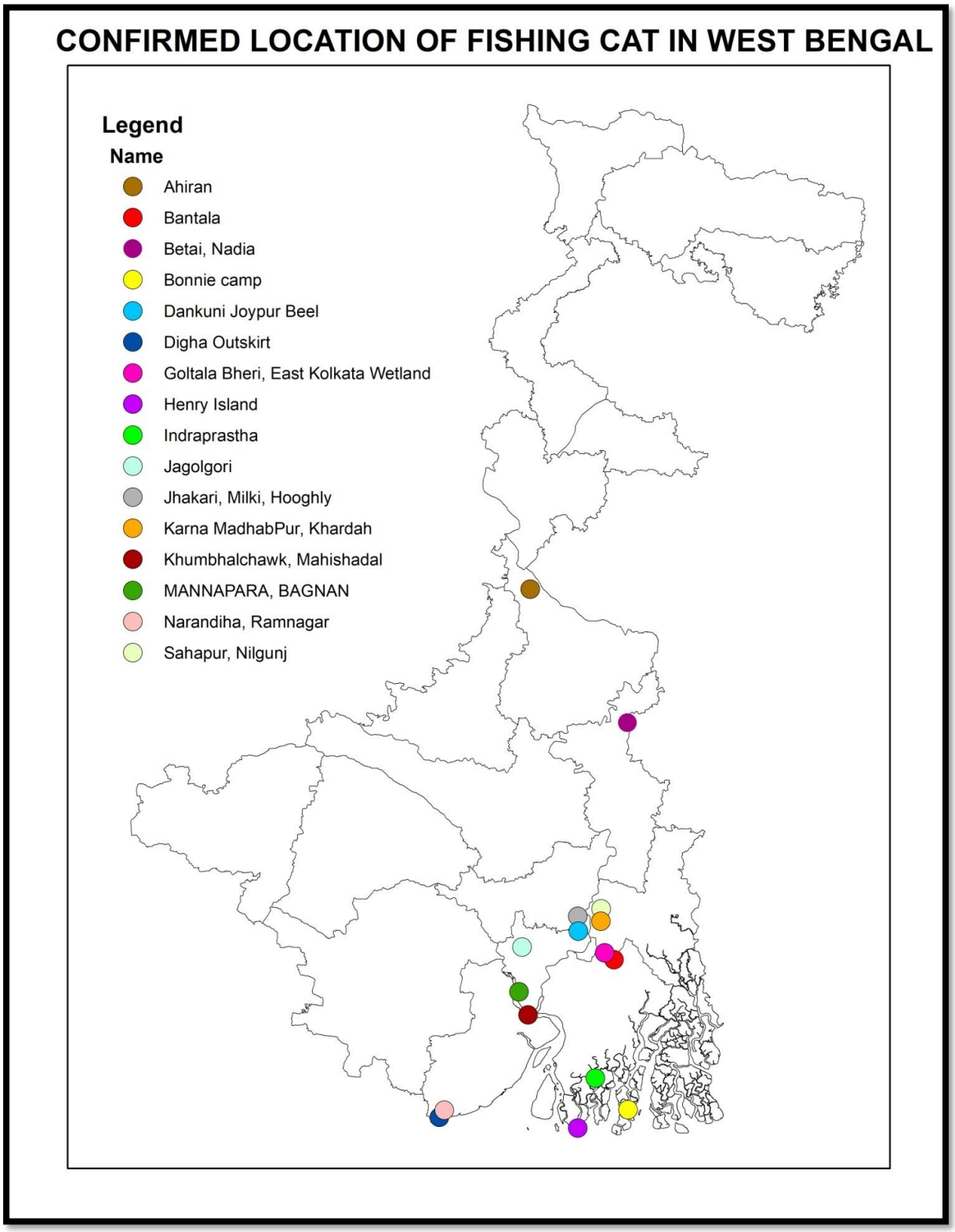
ব্লক:

জেলা:

প্রতিনিধির নাম:

ফোন নম্বর:

তারিখ:



Confirmed locations of Fishing Cats from West Bengal through Camera Trapping

Challenges Faced in the last two years:

In the last two years, the project in some cases faced some challenges. These challenges are discussed in this section.

The primary and most important challenge is to have some precise locations of Fishing Cat from North Bengal. In case of Northern Part, the demography was completely different from the Southern Part. While a huge number of grids could be covered in South Bengal, similarly in case of North Bengal the inaccessibility to the grids was a major hindrance. A good amount of protected areas is present over there. As our project was focused outside the protected areas so major portion was to be excluded. Local participation was very less in North Bengal. As given in the graphs below it is very clear that in case of Questionnaire survey 78% local people participated in south Bengal and only 22% from North Bengal.

Similarly, in Case of Awareness campaigning major portion in the graph is contributed by the South Bengal colleges and academic institutions.

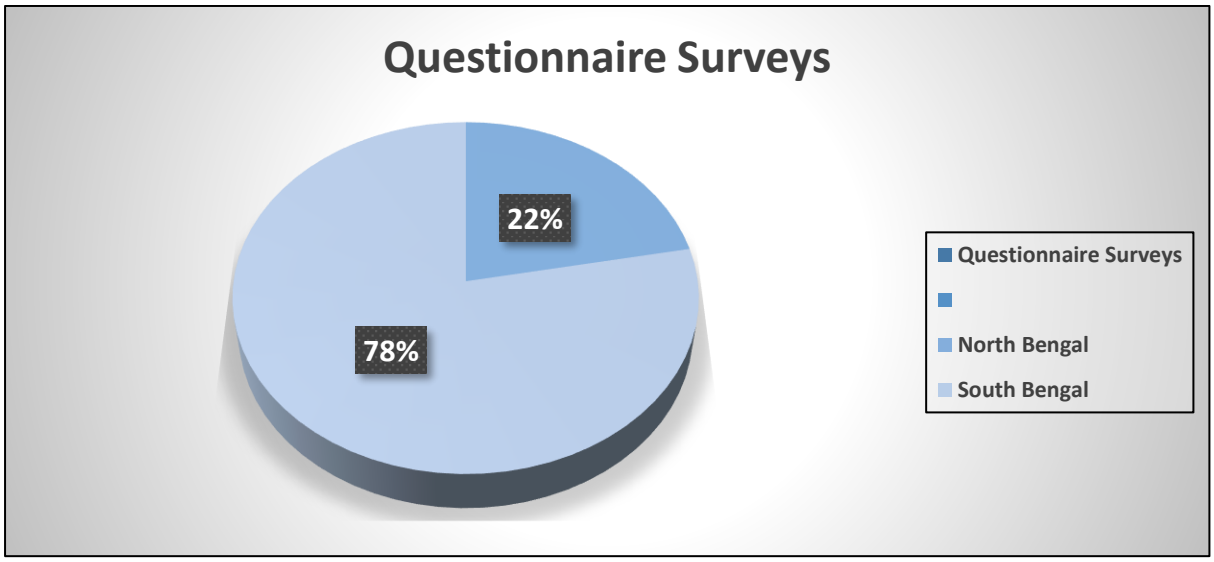
Protection for the cameras was a very important thing in the entire survey period. Most of the people in South Bengal willingly participated in the camera trap protection. So 10 districts could be cover from here. And the cameras were placed more or less 15 trap nights in most of the cases. But in case of North Bengal there were not that much of enthusiasm seen in the local dwellers regarding the protection of camera traps. Only 3 districts with a very less amount of camera trap emphasis could be given that too for a very short period. This resulted in, out of 10 districts of South Bengal eight districts have confirmed the presence of Fishing Cat through camera Trapping. We still don't have any precise location in North Bengal in this scenario. Though many literatures have pointed out some locations but yet they have to be verified by camera traps in recent times.

From the beginning of the project two major elections took place in West Bengal. In that period of time local support was very less and majority of the resource persons were engaged in election procedure. This caused some shortage of time and additional helps in both North and South Bengal.

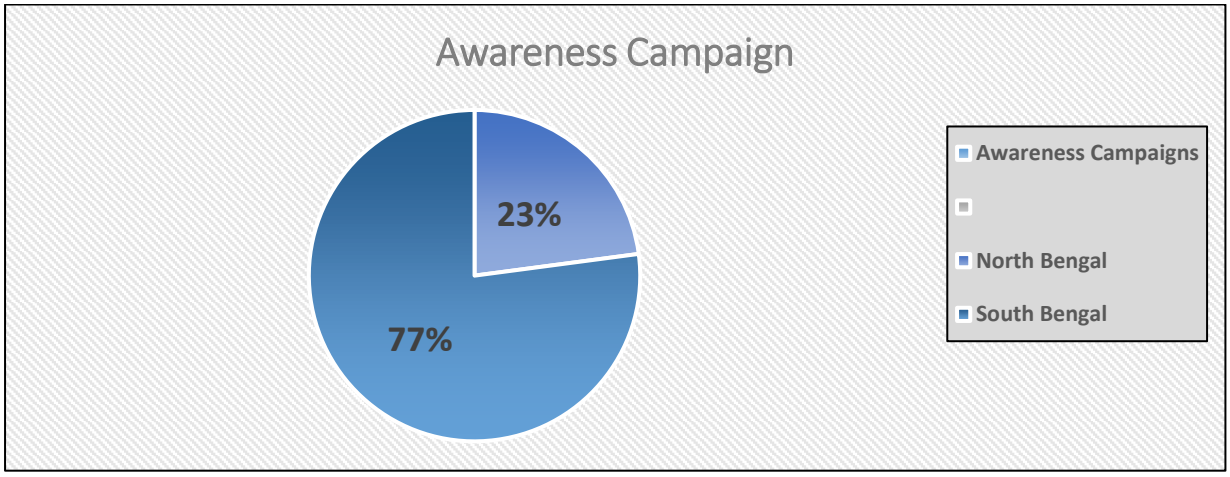
Some incidents of vandalism of camera traps also took place in the project tenure. Beyond everything the basic map of Fishing cat habitat with precise location could be generated. Now the basic objective is to give complete emphasis on North Bengal and add some potential places where fishing cats are still present outside the protected areas over there.

In South Bengal based on all local support and protection of Camera traps some places will be rigorously surveyed for having the abundance data and some other associated data for Fishing cat.

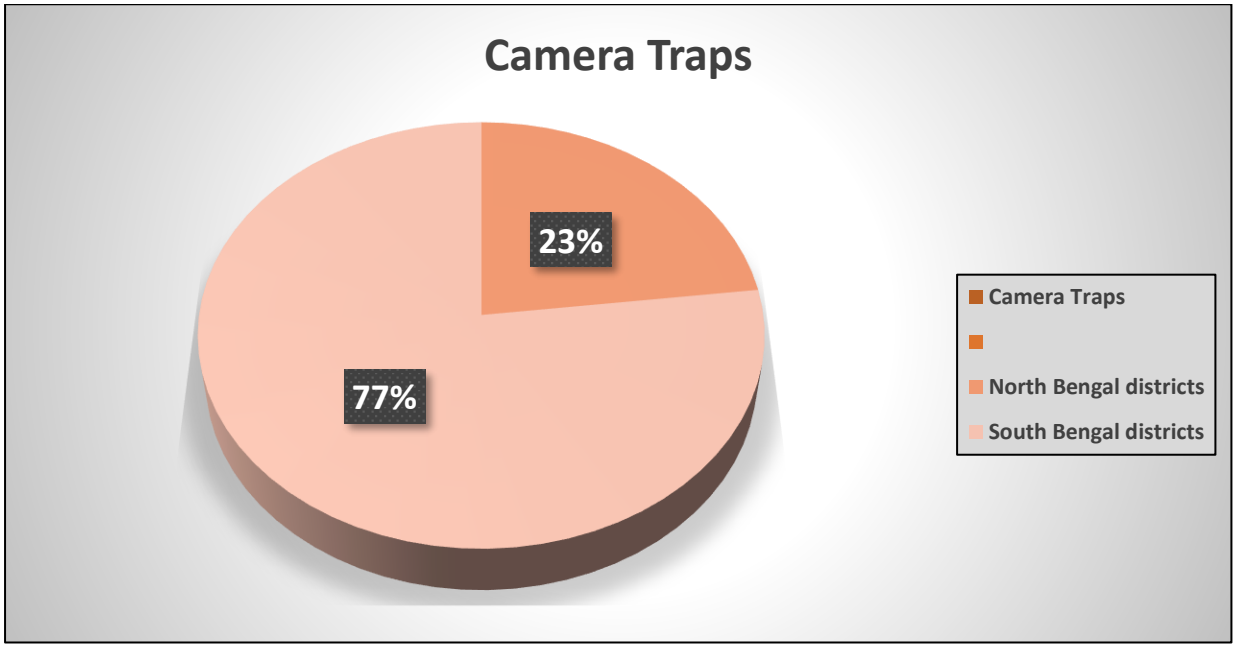
To overcome these hurdles more time is needed in which proper abundance estimation can be possible in some selected places along with some more awareness campaign and formation of some steward groups who will be engaged in local level to protect and monitor the present population of Fishing Cat in West Bengal.



This graph shows a greater number of willing people in the different grids participated in questionnaire surveys in South Bengal than North Bengal.



This graph also indicates a greater number of students participated in awareness campaign in South Bengal. From their knowledge research team got some interesting information about the State Animal



This graph also shows a greater number of camera traps installed in south Bengal that North Bengal

So, from the above discussion it very evident that the research group is now focusing on North Bengal exclusively for obtaining precise locations of Fishing cats through Camera Trapping.

Analysis of Data through Communication in journals

Paper 1

Journal: Proceedings of the Zoological Society

Springer

First camera trap record of Fishing cat *Prionailurus viverrinus* Bennett, 1833 (Carnivora: Felidae) from a rural wetland mid-West Bengal, India.

Samrat Chakraborty[1,*], Souvik Barik[1,2,*], Ranjana Saha[1,2], Ajanta Dey[2], Kaushik Deuti[3], C. Venkatraman[3], Subhendu Mazumdar[4,1,Ψ], Goutam Kumar Saha[1, Ψ]

[1] University of Calcutta, 35, Ballygunge Circular Road, Kolkata - 700019, West Bengal, India

[2] Nature Environment and Wildlife Society, 10, Chowringhee Terrace, Kolkata-700020, West Bengal, India

[3] Zoological Survey of India, *Prani Vigyan Bhawan*, M-Block, New Alipore Kolkata-700053, West Bengal, India

[4] Shibpur Dinobundhoo Institution (College), 412/1, G.T.Road (South), Shibpur, Howrah - 711102, West Bengal, India,

[*] Equal contribution

[Ψ] Corresponding authors: subhendumazumdar@gmail.com; gkszoo@gmail.com

Abstract:

Prionailurus viverrinus is wetland-dependent lesser cat with second smallest distribution range among the lesser cats and a declining global population. In India, they are reported to be present in dense emergent vegetation adjoining different wetlands along the east coast. However, surveys determining their distribution range were carried out long ago. In addition to the increasing destruction/conversion of wetlands for various anthropogenic use, fishing cats are mired with several other threats (like poaching, retaliatory killing etc.) and have been decimated from many areas where they used to thrive earlier. This demands for a reassessment of their present status across its reported distributed distribution range.

In this paper we report the presence of fishing cats (through camera trap evidence) for the first time from a human-dominated wetland habitat of Murshidabad district, West Bengal, India. Out of all camera-trap images in the present study, majority are of fishing cats *Prionailurus viverrinus* (25 pictures, 64.10%) followed by golden jackal *Canis aureus* (12 pictures, 30.76%), and jungle cat *Felis chaus* (two pictures, 5.12%). None of these wild fauna were recorded during day. Fishing cats, golden jackals were mostly recorded between 21:01-00:00 hrs, 00:01-3:00 hrs and 18:00 -21:00 hrs respectively, while two images of Jungle cats were captured one each during 21:01-00:00 hrs and 00:01-3:00 hrs. Similar studies in other wetlands within its distributional range will collectively validate their present distribution, which might be useful in the *in-situ* conservation of this illusive vulnerable species.

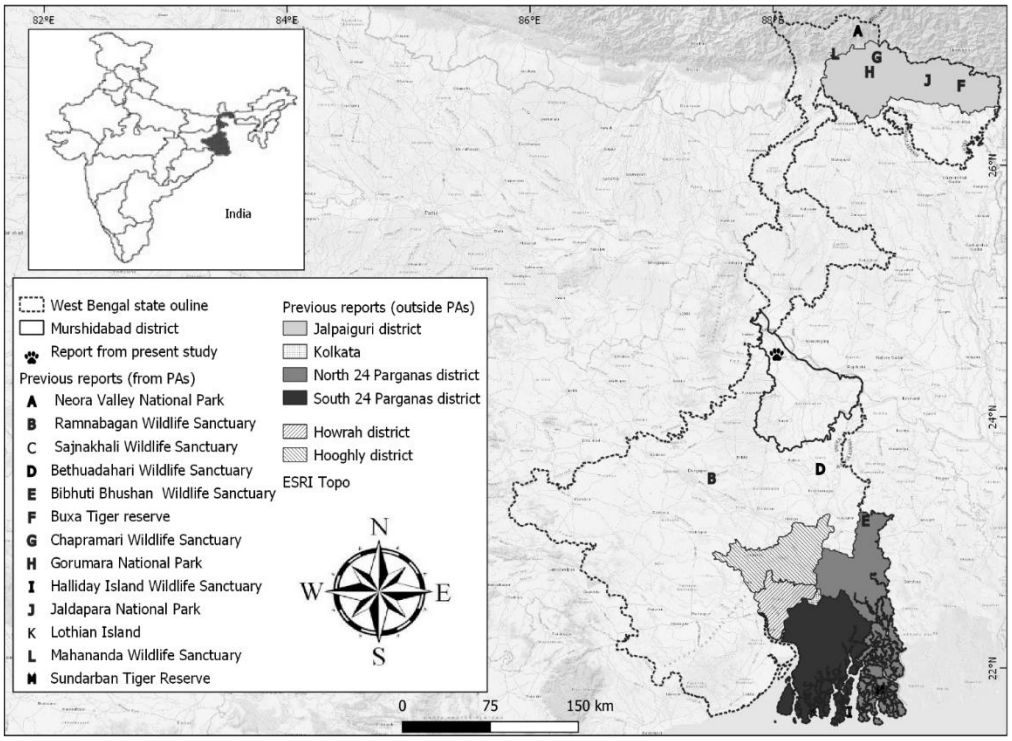


Fig. 1 Location of Fishing cat *Prionailurus viverrinus* records (including present study and previous records) from West Bengal, India.

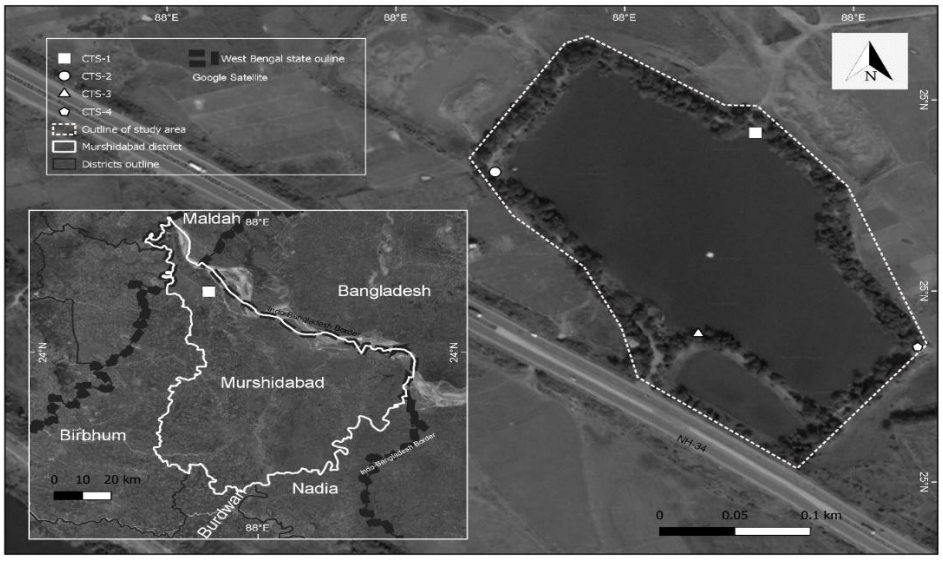


Fig. 2 Location of the Camera trap stations (CTS) in the study area.

Result:

Out of 39 images of wild mammals obtained from four camera trap stations, 25 pictures (64.10%) were of fishing cats (*Prionailurus viverrinus*), along with three associated wild species sharing the same habitat such as jungle cat (*Felis chaus*; two pictures, 5.12%), golden jackal (*Canis aureus*; 12 pictures, 30.76%), recorded from camera traps (Figure 3a-e). Images of fishing cat and Golden jackal were recorded in all camera trap stations (CTS 1-4), Jungle cats were photographed in only one camera trap station (i.e. CTS 1). Assessment of the time of the recorded images (Table 1) revealed that all wild mammals were recorded in night hours; particularly fishing cats golden jackals were mostly recorded during 21:01-00:00 hrs, 00:01-3:00 hrs and 18:00 -21:00 hrs respectively, while two images of Jungle cats were captured one each during 21:01-00:00 hrs and 00:01-3:00 hrs.

Captured species	Events	CTS 1		CTS 2		CTS 3		CTS 4	
		Trap night 1	Trap night 2	Trap night 1	Trap night 2	Trap night 1	Trap night 2	Trap night 1	Trap night 2
Fishing cat	06:01-09:00	0	0	0	0	0	0	0	0
	09:01-12:00	0	0	0	0	0	0	0	0
	12:01-15:00	0	0	0	0	0	0	0	0
	15:01-18:00	0	0	0	0	0	0	0	0
	18:01-21:00	1	0	0	0	1	0	2	0
	21:01-00:00	1	0	1	0	1	2	2	2
	00:01-03:00	2	0	1	1	0	0	1	4
	03:01-06:00	0	0	1	0	1	0	1	0
Jungle cat	06:01-09:00	0	0	0	0	0	0	0	0
	09:01-12:00	0	0	0	0	0	0	0	0
	12:01-15:00	0	0	0	0	0	0	0	0
	15:01-18:00	0	0	0	0	0	0	0	0
	18:01-21:00	0	0	0	0	0	0	0	0
	21:01-00:00	1	0	0	0	0	0	0	0
	00:01-03:00	1	0	0	0	0	0	0	0
	03:01-06:00	0	0	0	0	0	0	0	0
Golden Jackal	06:01-09:00	0	0	0	0	0	0	0	0
	09:01-12:00	0	0	0	0	0	0	0	0
	12:01-15:00	0	0	0	0	0	0	0	0
	15:01-18:00	0	0	0	0	0	0	0	0
	18:01-21:00	0	0	0	0	0	0	0	0
	21:01-00:00	0	0	0	1	0	0	0	0
	00:01-03:00	3	1	0	1	0	1	0	1
	03:01-06:00	0	1	0	1	0	2	0	0

Table 1 Species captured by camera traps (CTS 1-4) from the study area during two trap nights.

Destruction of wetland habitats and or even small scale changes might lead to catastrophic impact on the occurrence and survival of fishing cats (Mukherjee et al. 2012, 2016). Prasad et al. (2002) reported 70% of the wetland habitats to be presently under paddy cultivation. Vast stretches of lands surrounding the present study area are agricultural lands. Visual interpretation of the high resolution Google Earth V. 5.0—beta satellite images (see Zha et al. 2003; Horning et al. 2010, Clark and Aide 2011; Taylor and Lovel 2012; Hu et al. 2013) indicate that several water bodies and their adjacent vegetation has degraded and converted to crop fields (Figure 4a and 4b).

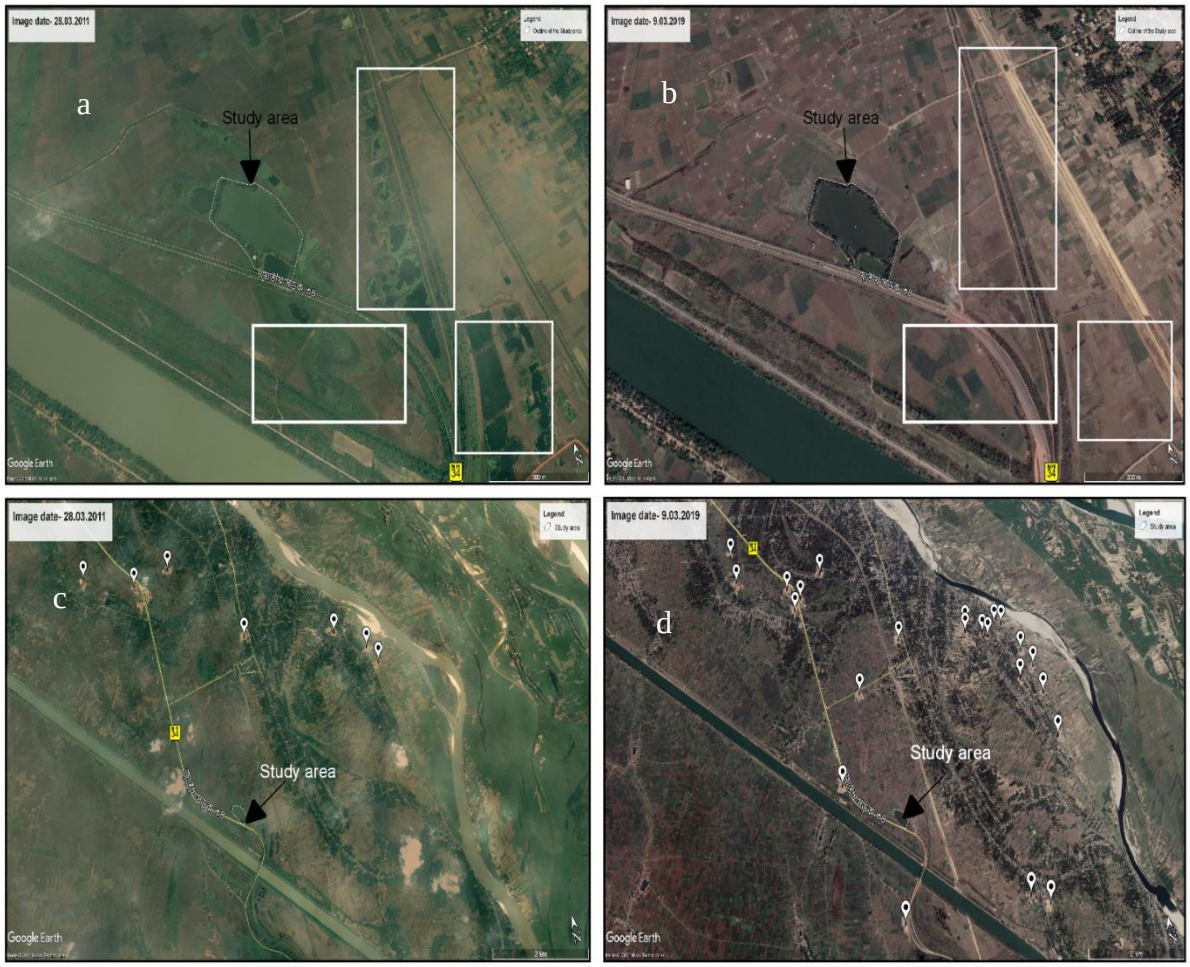


Fig. 4 Comparison of Google Earth Images to show the increase of agricultural land (a, b) and brick- industries (c, d) over time. [White boxes show the waterbody areas and white balloons showing brick industries. Image acquisition date-28 March 2011 (a, c) and 9 March 2019 (b, d)].

This is the first report along with photographic evidence of the existence of fishing cat in the study area. Further research is being carried out in the study area to get a deeper insight about the resource utilisation pattern and accordingly design suitable conservation plan to conserve the species and the wetland. It is also the onus of the conservationists to conduct similar studies in other wetlands situated in human dominated landscape within its distributional range, which collectively will validate their present distribution. This will also be useful to design extensive awareness programmes amongst the stakeholders, initiate compensation schemes and appropriate conservation strategies for fishing cats, along with other associated flora and fauna, where they are still thriving.

Paper 2

Journal: Écoscience

Impact of habitat features and influence of habitat alteration on the occurrence of vulnerable Fishing Cat *Prionailurus viverrinus* in rural area: A case study from East Medinipore, West Bengal, India.

Samrat Chakraborty[1,*], Souvik Barik[1,2,*], Ranjana Saha[1,2], Ajanta Dey[2], Kaushik Deuti[3], C. Venkatraman[3], Subhendu Mazumdar[1,4,Ψ], Goutam Kumar Saha[1, Ψ]

[1] University of Calcutta, 35, Ballygunge Circular Road, Kolkata – 700019, West Bengal, India

[2] Nature Environment and Wildlife Society, 10, Chowringhee Terrace, Kolkata-700020, West Bengal, India

[3] Zoological Survey of India, *Prani Vigyan Bhawan*, M-Block, New Alipore Kolkata-700053, West Bengal, India

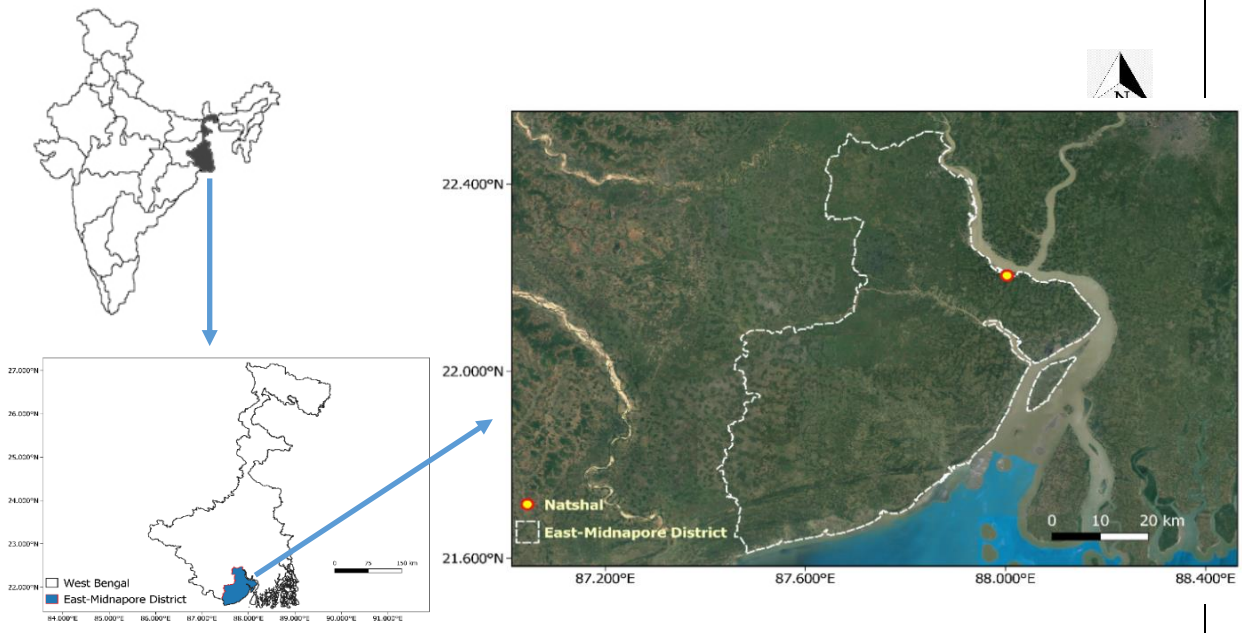
[4] Shibpur Dinobundhoo Institution (College), 412/1, G.T.Road (South), Shibpur, Howrah – 711102, West Bengal, India

[*] Equal contribution

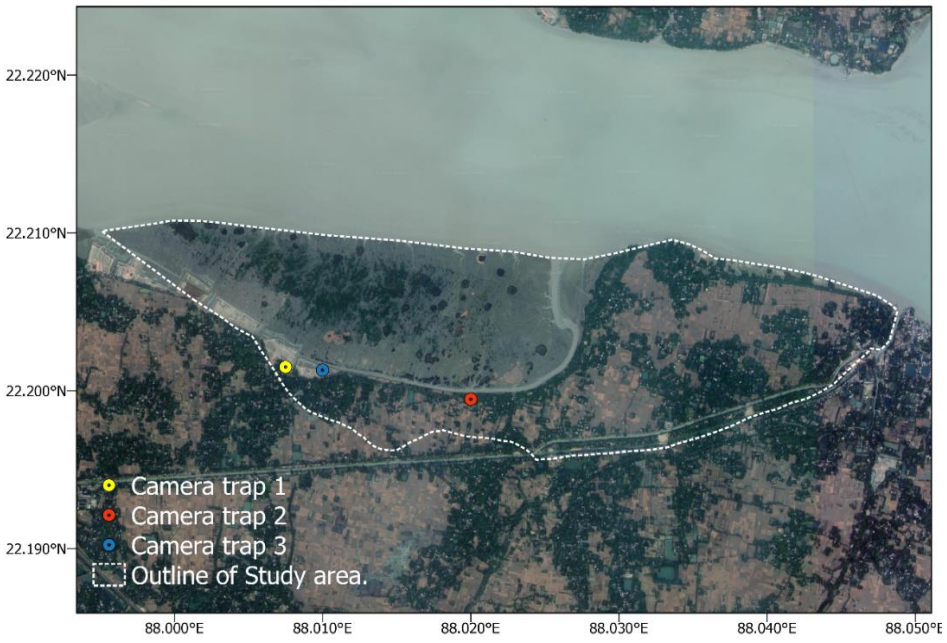
[Ψ] Corresponding authors: subhendumazumdar@gmail.com; gkszoo@gmail.com

Abstract

Fishing cat *Prionailurus viverrinus* is a wetland specialist, nocturnal and vulnerable lesser cat (Mammalia, Carnivora, Felidae). In spite of being mired with several threats, studies on this species outside protected area in India are scarce. In West Bengal, fishing cats have so far been scientifically documented only from Howrah and Hooghly. This is the first camera trap evidence of fishing cats from a human-dominated landscape of East Medinipur (West Bengal, India). We found that the detection rate of fishing cats was higher in places away from build-up areas (B= 0.01±0.0041, Wald χ^2 = 5.593, df=1, p= 0.018) and cropfields (B= 0.005±0.0025, Wald χ^2 = 4.486, df=1, p= 0.034), but was not influenced by emergent vegetation (Wald χ^2 = 3.699, df=1, p= 0.054). We also noticed that expansion of barren land (for construction of a brick clin) led to local disappearance of fishing cats and some associated fauna (like Jungle cat *Felis chaus*, Golden jackal *Canis aureus*, Asian palm civet *Paradoxurus hermaphroditus*) from the study area. Hence, reviewing of the existing anthropocentric land-use policies is essential to reduce destruction and anthropogenic disturbances in wetland habitats for continued existence of fishing cats in human dominated landscapes.



(a)



(b)

Figure 1. (a) Location of study area in West Bengal, India and (b) Camera trap locations within the study area.

Results: During camera trapping in 2018, we obtained 49 independent photographs of fishing cats *Prionailurus viverrinus* in the study area along with pictures of jungle cat *Felis chaus* (five photographs), golden jackal *Canis aureus* (seven photographs), Asian palm civet *Paradoxurus hermaphroditus* (2 photographs).

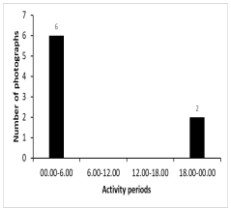
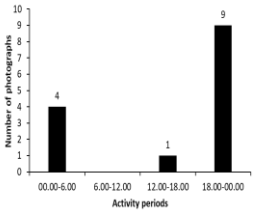
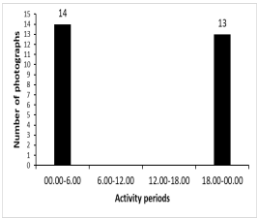
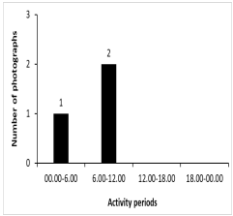
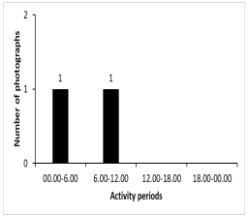
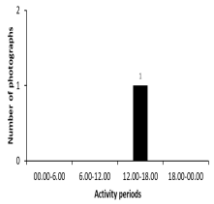
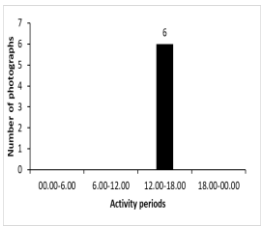
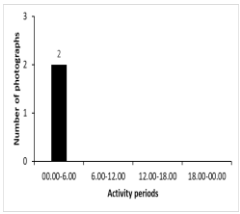
Common Name	Scientific Name	IUCN Status	Global Population Trend	Camera 1	Camera 2	Camera 3
Fishing Cat	*Prionailurus viverrinus*	Endangered	Decreasing			
Jungle Cat	*Felis chaus*	Least concern	Decreasing		No photographs	
Golden Jackal		Least concern	Increasing			No photographs
Asian palm civet	*Paradoxurus hermaphroditus*	Least concern	Decreasing	No photographs	No photographs	

Table 1 Species captured by three camera traps from the study area trap nights.

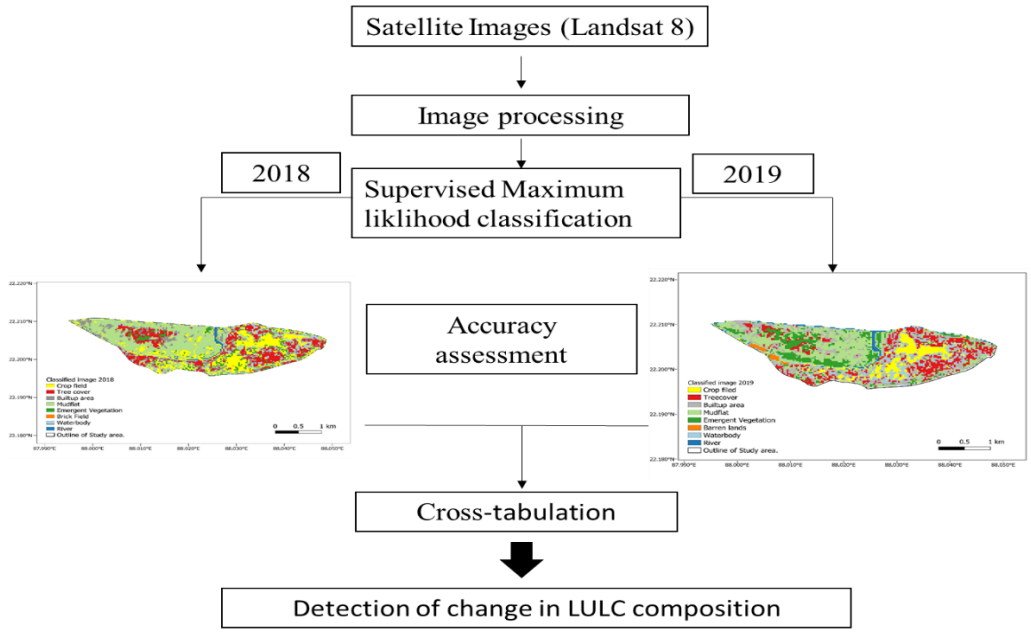
GLM with negative binomial distribution revealed that the detection rate of fishing cats significantly decreased with decreasing distance to build up areas (B= 0.01±0.0041, Wald χ^2 = 5.593, df=1, p= 0.018) and crop fields (B= 0.005±0.0025, Wald χ^2 = 4.486, df=1, p= 0.034) and vice-versa. Interestingly, the distance to emergent vegetation did not influence the detection rate (Wald χ^2 = 3.699, df=1, p= 0.054) of fishing cats in the study area. In 2019, after the brick-kiln had come up in the study area, no photographs of fishing cat as well as any other associated fauna was captured in any of the three camera traps set up in similar locations with similar trapping effort. Again, cross tabulation of 2018 and 2019 supervised classified image of the study area (Table 2) revealed that the build-up area increased (by 0.191 sq.km) as also the area of emergent vegetation (by 0.051 sq.km), but the area of crop field decreased (by 0.619 sq.km).

Class Name	**Description**
Crop Field	*Areas with standing crops.*
Tree cover	*Area of the tree crowns when viewed from above*
Build-up area	*Areas of human settlements.*
Mudflat	*Areas of wetlands composed of mud.*
Emergent Vegetation	*Areas beside rivers, canals, ponds where uncultivated shrubs and bushes were seen to grow.*
Barren land	*Areas without any vegetation cover mostly inside the boundary of the Brick kiln.*
Waterbodies	*Areas with standing water.*
River	*Areas of flowing water of river.*

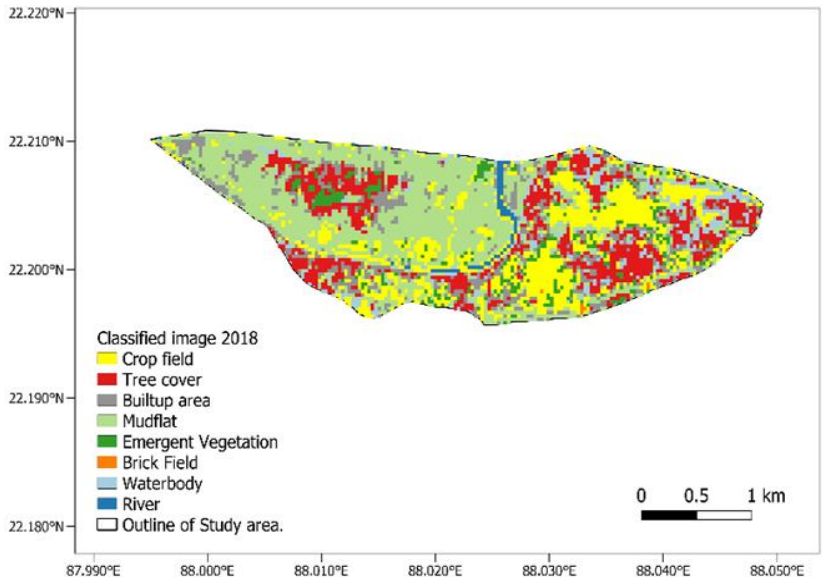
Table 1 : Description of different categories of LULC classes within our 'region of interest'

Cross- tabulation	***Crop Field***	***Tree cover***	***Build-up area***	***Mudflat***	***Emergent vegetation***	***Barren land***	***Waterbody***	***River***	**Total 2018**
Crop Field	**37.44**	12.78	8.73	16.56	15.66	0.72	21.24	4.05	**117.18**
Tree cover	0.27	**46.71**	15.48	14.31	14.85	0.09	5.31	0	**97.02**
Built-up area	2.7	9.54	**20.88**	30.15	7.11	1.08	8.73	0.09	**80.28**
Mudflat	6.03	15.48	47.61	**93.15**	22.41	3.87	16.29	1.53	**206.37**
Emergent vegetation	7.11	2.7	1.71	2.97	**10.98**	0	6.12	0	**31.59**
Barren land	0	0	0.36	0.09	0.18	**0.18**	0.09	0	**0.9**
Waterbody	1.08	13.05	4.59	3.87	1.08	0.09	**10.08**	0.9	**34.74**
River	0.63	0	0	0	0	0	0	**6.39**	**7.02**
Total 2019	**55.26**	**100.26**	**99.36**	**161.1**	**72.27**	**6.03**	**67.86**	**12.96**	**575.1**

Table 2: Cross tabulation analyses of the classified Land use/cover image of 2018 and 2019 to detect the change in LULC composition



(a)



(b)

Figure 2. (a) Pictorial representation of supervised classification and cross-tabulation procedure and (b) Supervised maximum likelihood classification of the Landsat8 image of the study area showing eight land-cover types

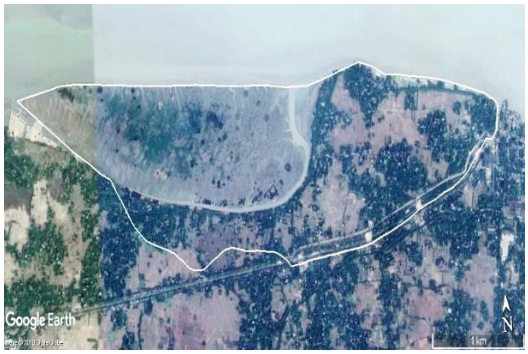
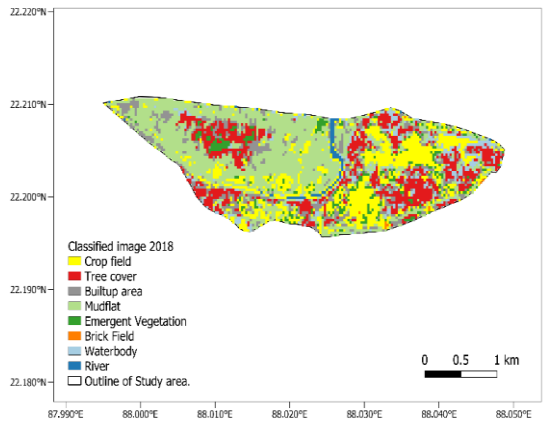
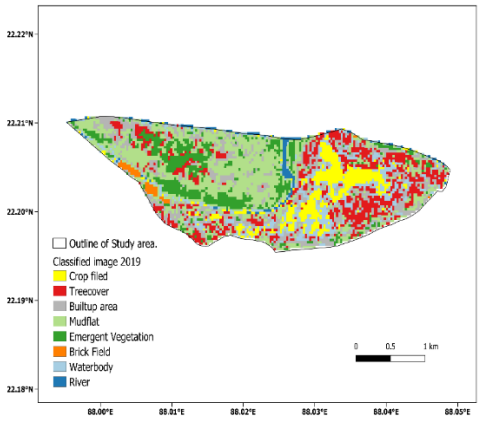
2018	2019
	
(a)	
	
(b)	

Figure 3: Change detection of the study area between 2018 and 2019 from (a) satellite images (Source: Google Earth) and (b) Supervised classification of the Landsat 8 images

Present research add to the existing knowledge of the influence of various land covers as well as the impact of habitat alteration and disturbances on the existence of fishing cats. Our findings indicate that the increase in build-up areas and expansion of the barren land (for construction of brick clin) through conversion of wetlands and other wilderness area have more harmful effects on the existence of fishing cat, than the benefits arising out of slight increase in the area of disconnected emergent vegetation and wetland patches. Mukherjee et al. (2016) also assessed that around 30% decline in the global population of fishing cat since 2000 and predicted further 30% decline by 2030, if the present threat persists. We, therefore, emphasize that in addition to protecting the emergent vegetation in and around wetland habitats, rapid expansion of build-up area and subsequent anthropogenic disturbances in and around the potential fishing cat habitats need to be urgently stopped. Undoubtedly, the conservation of fishing cats throughout its distribution range is going to be more challenging due to rapid expansion of build-up areas and crop fields by destructing the wetlands and other wilderness areas. Conservation initiative for fishing cats in human dominated landscapes, therefore, demands for reviewing of the existing anthropocentric land-use policies, as also mentioned by Mukherjee et al. (2012). More such studies are essential to assess their present situation in other human-dominated landscapes within their distribution range. All such studies, pooled together, will be useful to scientifically assess site-specific threats, reviewing the existing land-use policies in human-dominated landscapes and in designing a scientific conservation plan for the fishing cats.

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Fishing Cat Ecology: Food Habits, Home Ranges, Habitat Use and Mortality in a Human-Dominated Landscape around Khao Sam RoiYot Area, Peninsular Thailand (Passanan Cutter)

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