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How the fishing cat came to occur in Sumatra

There is widespread belief that the fishing cat occurs in Sumatra. I examined camera trap photographs, museum records, and conducted an extensive literature search to determine if the fishing cat *Prionailurus viverrinus* in fact occurs in Sumatra. All four camera trap photographs of fishing cats were determined to be leopard cats *P. bengalensis*. Not one of four well-known museums housing collections of fishing cats contained specimens from Sumatra. Literature searches revealed that before 1940 Sumatra was never included within the geographic range of the fishing cat. From 1940 to the present an increasing number of authors included Sumatra as having fishing cats. There is no physical evidence that the fishing cat occurs in Sumatra and therefore Sumatra should not be considered as part of the geographic range of the fishing cat. This is bad news for the endangered fishing cat, and places increasing importance on the presence of the fishing cat in Java that was last recorded in 1932.

The island of Sumatra, a collection of Indonesian provinces, was blessed with some of the world's most beautiful wild cats. The list of cats inhabiting Sumatra is found in the authoritative book titled *Wild Cats* compiled and edited by Kristin Nowell and Peter Jackson and published by the International Union for Conservation of Nature IUCN in 1996. Sumatra has seven species of wild cats. The largest wild cat and one of the most widespread in Sumatra is a subspecies of tiger *Panthera tigris sumatræ*. The other cats found in Sumatra are the Asiatic golden cat *Catopuma temmenckii*, marbled cat *Pardofelis marmorata*, clouded leopard

Neofelis diardi, leopard cat, flat-headed cat *Prionailurus planiceps*, and the fishing cat. The tiger, fishing cat, and flat-headed cat are listed as *Endangered* on the IUCN Red List for Endangered Species 2008 (Sanderson et al. 2008). Sumatra seems to have never been populated by one of the most wide-spread wild cats – the leopard *Panthera pardus*.

As information on the distribution of wildlife gleaned from camera traps at various places in Sumatra mounted, I noticed a curious relationship. The most photographed wild cat was the tiger, followed by the Asiatic golden cat, and closely followed by the leopard cat. Quite far down the list were clouded leopard,

and then very far down marbled cat, fishing cat and flat-headed cat photographs.

Specialists believe (ah, the pitfalls associated with belief) that the marbled cat is highly arboreal. Indeed, the marbled cat might be thought of as occupying the same niche as the New World margay *Leopardus wiedii*. Thus, since most camera traps are placed near the ground, it would not be terribly surprising that there would be few photographs of marbled cats. But what factors could explain the absence of photographs of the most aquatic of the wild cats: the fishing cat and the smaller flat-headed cat?

Methods

I used three methods to investigate the presence of fishing cats in Sumatra: (1) the wealth of photographs taken by camera traps, (2) the museum collections of the American Museum of Natural History, Field Museum, Smithsonian Natural History Museum, and the National Museum's of Singapore, and (3) historical literature searches.

Results

1) Camera trap photos

To understand the lack of photographs of the flat-headed cat and fishing cat I had to visit Sumatra, meet my colleagues, and do some camera trapping myself. In Batang Gadis, Sumatra the camera traps my colleagues and I placed recorded tiger, clouded leopard, Asiatic golden cat, leopard cat, and marbled cat. Not unexpectedly we did not get photographs of the most aquatic of the cats – the fishing cat and the flat-headed cat – because we were too high in the mountains.

My colleague Neil Franklin sent me camera trap pictures of a flat-headed cat taken in 1995 in Way Kambas National Park in the extreme southeast of Sumatra. I visited this site that is barely above sea level, very flat, and in the wet season a series of shallow lakes – perfect habitat for a flat-headed cat. But where might the fishing cat be found? I issued a call for camera trap pictures of fishing cats.

Colleagues working in Bukit Barasan Selatan National Park in southwest Sumatra responded with the following four camera trap photographs that were labeled fishing cats (Fig. 1.). One glance was all it took to conclude these four photographs were of the more common leopard cat. Confirmation of my diagnosis was provided by Mel Sunquist at the University of Florida, and by Andy Hearn and Jo Ross working in Sabah, Borneo.



Fig. 1. Four camera trap photographs from Bukit Barasan Selatan National Park Sumatra (Courtesy of Nick Brickle, Wildlife Conservation Society, Sumatra).

2) *Museum collections*

Next I searched the mammal collections of the American Museum of Natural History, Field Museum, Smithsonian Natural History Museum, and the National Museums of Singapore (Appendix I) for fishing cats. No fishing cats from Sumatra appeared in these collections.

3) *Literature searches*

The evidence for the presence of fishing cat in Sumatra was turning out to be very suspect indeed. To understand the geographic distribution of the fishing cat I had to begin at the beginning, and in the beginning the fishing cat was known as the Himalayan serval and described to science from a specimen collected in India.

a) *Characters of a New Species of Cat (Felis, Linn.) from the continent of India, presented by J. M. Heath, Esq.*

The fishing cat was made known to science in an oral presentation at a meeting of the Zoological Society of London. The first description was published in 1833 in the Proceedings of the Zoological Society of London, Part I. Here is an excerpt of the article:

Specimens were exhibited of various Mammalia, Birds, and Reptiles, from the continent of India, which had been recently presented to the Society by Thomas Heath, Esq. Mr. Bennett observed on the several objects, pointing out especially the more interesting among them. They included an individual apparently referrible [sic] to the *Semnopithecus cucullatus*, Isid. Geoff. St.-Hil., although darker in all its markings than is indicated in the description given by the original observer of the species. They also included a species of *Felis*, of a size intermediate between the larger and the smaller animals of that genus, and having in its grey colour and longitudinal striping a general external resemblance to some of the Viverræ. This Mr. Bennett regarded it as new to science, and proposed to designate it

FELIS VIVERRINUS. Fel. Fulvo-cinereus, subtus albescens; capite, nuchd, dorso, genis, gulâque nigro vittatis; lateribus, ventre, pedibusque nigro maculatis.

Long. corporis cum capite, 33 unc.; caudæ mutilæ, 7; auriculæ, 1½.

b) *Jardine W. 1833-1843. The Naturalist's Library*

The next solid reference for the fishing cat appears in Sir William Jardine's exquisitely



Fig. 2. The Himalayan serval, today's Fishing cat, from Jardine's *The Naturalist's Library*, Volume XVI.

illustrated encyclopedia of the fauna of the world: *The Naturalist's Library*, Volume XVI. published from 1833-1843. Fortunately, the wild cats appeared after the 1833 first description of the fishing cat. Between pages 230 and 231 is a fine hand-colored illustration of the Himalayan serval (Fig. 2).

Jardine did not include any new information on the habits of the Himalayan serval but listed the habitat as "Alpine India."

c) *Elliot D.G. 1878-1883. A Monograph of the Felidae, or Family of Cats.*

Daniel Giraud Elliot described the fishing cat in his imposing monograph published between 1878 and 1883. He lists the geographic distribution as

HAB. India (with Ceylon); Burma, common in the Tenasserim Provinces. Found only in the lower valleys of the Himalayas; Malacca, Camboja, South China (BLYTH). Open lower regions of Nepal and Tarai (HORSFIELD). Formosa (SWINHOE).

Note that neither Java nor Sumatra is mentioned. Following the illustration by Josef Wolf (Fig. 3) Elliot wrote:

THIS animal, by some called a Tiger-cat, is pretty well distributed in the Indian and Indo-Chinese subregions of the Oriental Region. In the first of these it is found throughout Burma, according to Jerdon and Blyth, common in Tennasserim, Travancore, and Ceylon, and extends up the Malabar coast as far as Mangalore. It is also found in the Terai and the marshy region of Southern China, Camboja, and the island of Formosa. Jerdon says that in Bengal this Cat inhabits low watery situations, and that he has often met with it

on the edge of swampy thickets. In the neighbourhood of Calcutta, according to Buchanan Hamilton, it is common, and frequents reeds near water, and besides fish and birds preys upon *Ampullariæ* and *Uniones*.

d) *St. George Mivart 1892. The Cat*

This wonderful book with just about everything you would ever need to know about cats. The description of the fishing cat (Fig. 4) begins on page 401 as follows:

(11) Fishing cat (*Felis viverrina*) This well-marked and very distinct species was originally described by Bennett in 1833, and the type of the species is preserved in the British Museum.

In the next paragraph the morphology of the fishing cat is described, and page 402 begins:



Fig. 3. Josef Wolf's illustration in Elliot's "A Monograph of the Felidae".



Fig. 176.—The Fishing Cat (*F. viverrina*)

Fig. 4. The illustration of the Fishing cat in Mivart's *The Cat*.

Mr. Jerdon says that the pupil is circular. He also tells us that *F. viverrina* is found throughout Bengal to the foot of the south-eastern Himalayas, extending into Burmah, China, and Malayana, and that it is common in Travancore and Ceylon, extending up the Malabar coast as far as Mangalore.

Mr. Buchanan says that besides fish it eats *Ampulluriae*, and *Unios*, and that it has a very disagreeable smell. It is exceedingly fierce, and has been known to carry off children.

e) Lydekker, R. 1896. *Lloyd's Natural History, A Hand-book to the Carnivora, Part I, Cats, Civets, and Mongooses*.

The above illustration from Jardine was reprinted and the distribution as given previously by Jardine was repeated. Lydekker wrote:

Distribution. India, Ceylon, Lower Burma, Tenasserim, Formosa, and Southern China.

f) Lydekker R. 1893-94. *The Royal Natural History in 1893-94*.

Volume I of the four volume set contained the mammals, and the carnivores were described in Chapter XIII beginning with the cats. The fishing cat was described on pages 409-411. The geographic distribution appeared on the last line of page 410 and continued on page 411: "The geographic range of the fishing-cat extends from India to Southern China; but its distribution in the countries it inhabits appears to be somewhat local. Thus, instead of occurring all over India, this cat, according to Mr. Blanford, is unknown in the peninsula, except along the Malabar coast. It occurs, however, in Ceylon, and is found long the flanks of the Himalaya as far westward as the independent state of Nepal. Thence it extends into Burma, the Malay Peninsula, and the south of China; but, somewhat curiously, it appears to be absent from the great Malayan Islands, such as Sumatra and Borneo.

The species is, however, said to reappear in the Island of Formosa; which, if confirmed, will show that its distribution will accord very closely with that of the clouded leopard."

Discussion

When and how did the fishing cat end up on Sumatra?

In 1932, Delsman published information and a photo of a fishing cat killed by a hunter in Java (Fig. 5). There is no doubt that the cat pictured was indeed a fishing cat. The photograph was of a specimen shot "at the mouth of the Tji Liman in Bantam (= Java)." Delsman added he has no proof of the species in Sumatra, but the same hunter (Mr. Pieters) told him that "also at the mouths of Toelangbawang, Masoedji, Sekamong and other rivers in South Sumatra the 'mangrove cat' was repeatedly seen by him and shot, while he was hunting for crocodiles".

Brongersma (1935) examined fishing cat specimens collected in Java but questioned the presence of the species in Sumatra. He wrote: Up to the present time definite records exist only for Java, where this species occurs not only along the north coast, but also on the west coast (Delsman 1932). Its presence in Sumatra has not yet been definitely proved, but Delsman (1932) mentions a statement by Mr. Pieters that this species is not uncommon along the river-mouths of Southern Sumatra. Several authors (Blanford 1888, Flower 1900) mention this species from the Malay Peninsula but no actual records seem to exist (Chasen & Kloss 1930). Our Museum [Leiden] possesses a specimen labelled "Singapore", but as the species has not been recorded from that island in recent times (it is not mentioned by Chasen 1924, 1925) this locality-record seems extremely doubtful to me. Distribution in the Archipelago: Java; Sumatra?

Reginald Innes Pocock (1939) gave the distribution of the fishing cat as: India, precise range unknown; Ceylon, and east of the Bay of Bengal to Cochin China and Java.

In 1940, Frederick Nutter Chasen, the Director of the Raffles Museum in Singapore, published *A handlist of Malaysian mammal*, an authoritative and systematic list of the mammals of the Malay Peninsula, Sumatra, Borneo and Java, including the adjacent small islands. Members of the great family of cats were described on pages 104 -108. The geographic distribution of the fishing cat was given on page 107: Java; Sumatra.

Without comments or remarks, Chasen included Sumatra within the geographic range

of the fishing cat. Could it be that contrary to Brongersma's (1935) doubts, Chasen (1940) believed without proof Delman's (1932) Mr. Pieters and hearsay put the fishing cat in Sumatra? Subsequently, Sumatra was accepted as being part of the fishing cat's geographic distribution.

The first edition of Wilson and Reeder's *Mammal Species of the World* appeared in 1982 and included Sumatra in the range of the fishing cat. Subsequent editions repeated this. While Kitchener (1991) was more cautious regarding the distribution of the fishing cat ("parts of Indonesia") by 1993, Alderton's *Wild Cats of the World* summed up what was accepted to be the geographic distribution of the fishing cat (page 110): Occurs in isolated pockets of suitable habitat across Asia, from south-western India and Sri Lanka via the southern Himalayas, Bangladesh, Burma, Thailand and Vietnam into China and south to the islands of Sumatra and Java.

In Nowell & Jackson (1996) the range of the fishing cat included Sumatra (Fig. 6). The distribution map has point locations where fishing cats were presumed to be present in Sumatra. Jackson et al. (1991, page 178) also included the fishing cat in Sumatra. In the Red List 2008 Sumatra is included in the fishing cat range as well (Sanderson et al. 2008). In their authoritative *Wild Cats of the World* Sunquist & Sunquist (2002) included Sumatra as part of the fishing cat's geographic distribution.



Fig. 5. Fishing cat killed by a hunter in Java (Delsman 1932).

Javan fishing cat

There is no doubt that the geographic distribution of the fishing cat includes Java. The Javan fishing cat *P. viverrinus rizophoreus* is a recognized subspecies.

In 1995, Melisch and his co-authors reported in *Cat News* 22, that the Javan fishing cat was in big trouble and should be considered *Critically Endangered*, the highest threat level in the IUCN Red list before a species is declared extinct in the wild. Melisch et al. (1995) believed the fishing cat could be found only on the far northwest tip of Java. Since that time no information has become available, and no camera trap photographs are known to exist. Anton Aria undertaking surveys with camera traps for the Javan leopard wrote: The Javan leopard lives in all of terrestrial national parks and nature reserves in Java. As for fishing cats there are no camera trap pictures or other evidence. My camera traps never found the fishing cat because both areas are mountain national parks. I've heard that there are fishing cats in Ujung Kulon National Park west Java, but again there are no photographs. We are not looking in the right places.

Though this news is unexpectedly good regarding the Javan leopard, I have grave doubts about the continued existence of the Javan fishing cat. Surveys targeting coastal areas for fishing cats must become a priority.

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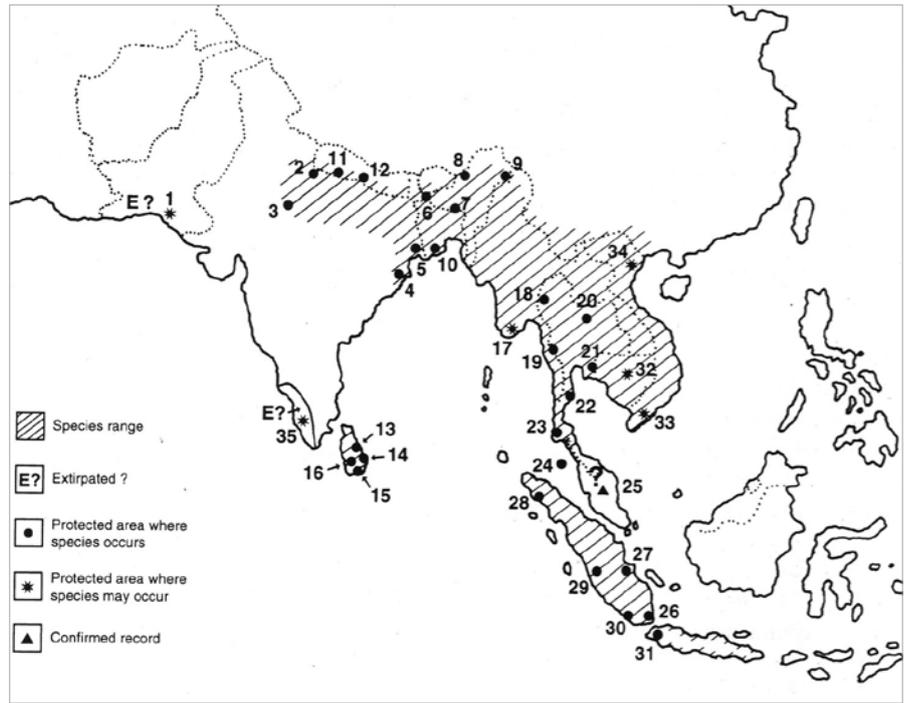


Fig. 6. The range of the Fishing cat given in *Wild cats - Status Survey and Conservation Action Plan* (Nowell & Jackson 1996).

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Appendix I. Museum Records for the fishing cat.

Museum	Number	Genus	Species	Place
American Museum of Natural History	70128	Prionailurus	viverrinus	India
	7	Prionailurus	viverrinus	India
	80018	Prionailurus	viverrinus	India
Chicago Field Museum		Felis	viverrina	Nepal
		Felis	viverrina	Nepal
		Felis	viverrina	Sri Lanka
		Felis	viverrina	Sri Lanka
		Felis	viverrina	India
Smithsonian Natural History Museum	535231	Prionailurus	viverrinus	Thailand
	253538	Prionailurus	viverrinus	Thailand
	172691	Prionailurus	viverrinus	Unknown
	381425	Prionailurus	viverrinus	Unknown
National Museums of Singapore	395757	Prionailurus	viverrinus	Unknown
	No records from Sumatra			