

- Thailand. Association for the Conservation of Wildlife, Bangkok.
- Pocock, R.I. 1932. The marbled cat (*Pardofelis marmorata*) and some other Oriental species, with the definition of a new genus of the Felidae. *Proceedings of the Zoological Society of London*, **132**, 741–766.
- US Fish and Wildlife Service. 1991. *Endangered and Threatened Wildlife and Plants*. US Government Printing Office, Washington, DC, 37 pp.
- Weigel, I. 1961. Das Fellmuster der wildlebenden Katzenarten und der Hauskatze in Vergleichender und Stammesgeschichtlicher Hinsicht. *Säugetierkundliche Mitteilungen*, **9**, 1–120.
- Wozencraft, W.C. 1993. Order Carnivora. In *Mammal Species of the World* (eds D. E. Wilson and D. M. Reeder), 2nd edn., pp. 279–348. Smithsonian Institution Press, Washington DC.

## The decline of the wild water buffalo in north-east India

*The Asiatic wild buffalo Bubalus bubalis was widely distributed in the river systems of south and South East Asia, but habitat destruction, hunting and interbreeding with domestic water buffalo have resulted in only relict wild populations remaining. Unless protection measures are intensified, the species could disappear in India within a few decades.*

### Introduction and methods

The bulk of the wild buffalo remaining in India are found in or near the Brahmaputra Valley in the provinces of Assam, Arunachal Pradesh and Meghalaya. The only other area having wild water buffalo is the Indravati National Park and locally elsewhere in the Indravati Valley west of the Madhya Pradesh–Orissa border. It was found over large areas in the Brahmaputra Valley, but it is now restricted to a few localities. Some information on the distribution of the species is given in Gee (1964), Sheshadri (1969) and Grewel *et al.* (1987, p. 98), but detailed information on distribution and status is lacking. From 1985 to 1993 I was able to carry out field surveys in various parts of north-east India to determine the current distribution and status of the wild buffalo, as part of broader surveys concentrating on primates. As well as travelling widely in Assam, I visited parts of Arunachal Pradesh, Nagaland, Manipur, Mizoram and Meghalaya. In most cases I was able to observe the animals directly, but in



A wild bull buffalo in Dibru-Saikhowa Sanctuary, Assam (A. Choudhury).

some cases I had to rely on interviews with local people and forest officials.

### Results

The current distribution and estimated populations are given in Table 1 and Figure 1. Comments on the data are given below.

Water buffalo favour low-lying wet areas with tall elephant grass, including *beels* (ox-bow lakes and other depressions left by changes in the course of a river), river banks, and *chaporis* (sandy islets situated between branches of a river in a braided river system). In some instances the populations extend into woodland. The buffalo were active in the daytime only in areas where they are well protect-

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ed; where there was substantial human disturbance they were active mainly at night.

Currently buffalo occupy only about 1500 sq km in Assam, 200 sq km in Arunachal Pradesh, and something under 200 sq km in Meghalaya. Forest Department estimates

suggest a total of 2300 in Kaziranga and Manas National Parks combined, and my estimates based on interviews with local people and Forest Department staff together with my own observations total about 700–900 in the remainder of Assam, 150 in Arunachal

**Table 1.** Distribution and population estimates of wild water buffalo in Assam, Arunachal Pradesh and Meghalaya

Area/locality	Location	Estimated population
Assam		
1 Manas NP	Barpeta, Bongaigaon Kokrajhar and Nalbari	1200
2a Kaziranga NP and adjoining areas including Kukurakata RF and Deochur	Golaghat, Nagaon and Sonitpur	1100
2b Panpur RF	Sonitpur	Visitors from Kaziranga
2c Khatonibari SCA	Sonitpur	
3a Laokhowa WLS	Nagaon	
3b Burhachapori RF	Sonitpur	
3c Rone Tapu (Baghe Tapu) chapori	Sonitpur	200
4 Patradisa RF	Karbi Anglong	3 (stray group)
5 Dhansiri RF	Karbi Anglong	Small
6a Kadam RF	Lakhimpur	100–150
6b Borchapori	Lakhimpur	
6c Kaopak chapori	Lakhimpur	
6d Dulung and Kakoi RFs	Lakhimpur	
7 Dhakuakhana (Borkalia)	Lakhimpur	Wanderers from Kadam during high flood
8a Jamjing RF	Dhemaji	5
8b Sengajan RF	Dhemaji	150–200
9a Dibru-Saikhowa WLS	Tinsukia, Dibrugarh and Dhemaji	250
9b Koplong chapori (now a part of Dibru-Saikhowa)	Dhemaji	
9c Poba RF	Dhemaji	
9d Kobo chapori	Dhemaji	
9e Amarpur (Dibang) chapori	Tinsukia	
10 Doom dooma RF	Tinsukia	8–9
11 Kollolua	Dibrugarh	13–15
Arunachal Pradesh		
12 D'Ering WLS	East Siang	100 (approx., habitat contiguous with 9d)
13 Dibang RF	Dibang Valley	Small and scattered
Meghalaya		
14 Balphakram NP	South Garo Hills	Small

NP, National Park; WLS, Wildlife Sanctuary; RF, Reserved Forest; SCA, Soil Conservation Area. Bracketing indicates reserves/areas are contiguous. The wild buffalo became extinct in Pabha RF (Lakhimpur district) and Gali RF (Dhemaji district) during the 1970s. There are no captive populations in any zoos.

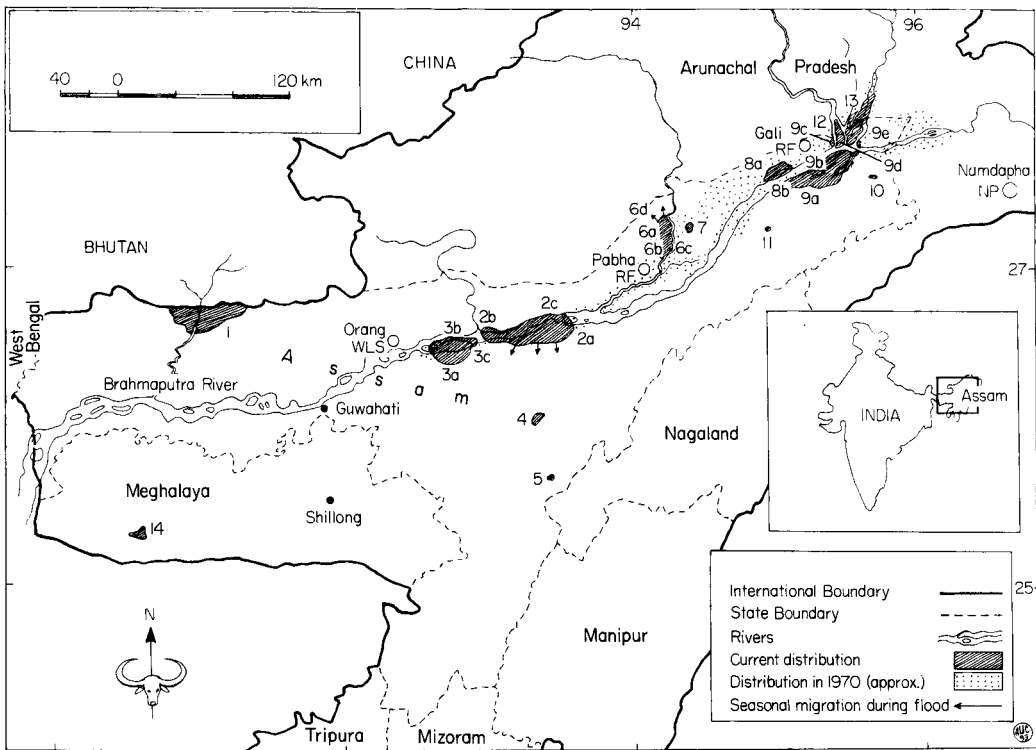


Figure 1. Map showing the distribution of the wild buffalo in Assam and adjacent states of India.

Pradesh and an unknown small number in Meghalaya: in all totalling perhaps 3300–3500 individuals.

**Causes of decline in numbers**

*1. Destruction of habitat*

Except in Kaziranga National Park, D’Ering Wildlife Sanctuary, Dibru-Saikhowa Wildlife Sanctuary, Balphakram National Park and the core area of Manas National Park, water buffalo habitat is vanishing. Hundreds of hectares of elephant-grass jungle are cleared every year for cultivation of crops, such as rice and mustard. Because the areas concerned have alluvial soils and are suitable for winter crops, it is impossible to prevent clearance except in closely protected reserves. In the 107-sq-km Gali Reserved Forest in Dhemaji district, for example, there is no buffalo habitat left.

*2. Hunting*

The wild water buffalo is listed as endangered in Schedule 1 of the Indian Wild Life (Protection) Act 1972, which prohibits both its killing and its capture. However, it is killed frequently for food with guns or spears in the Lakhimpur and Dhemaji districts by the Mising (plains Miri) tribal people, who live in the upper Brahmaputra Valley. This is mainly done when the rivers are in flood and the buffalo take refuge on small areas of raised ground. In the East Siang and Dibang Valley districts of Arunachal Pradesh, the Adi (Abor) tribal people, who are ethnically very close to Mising, kill wild buffalo for food. There is also limited hunting elsewhere.

*3. Disease transmission and grazing by domestic cattle and other livestock*

Rinderpest is a serious threat. It killed at least 150 buffaloes in 1981 in Kaziranga National

Park, and in the mid-1970s more than 100 in the Dhakuakhana area. This and other bovine diseases are readily transmitted by domestic livestock, which can also deplete the food supply by overgrazing. Domestic water buffalo offer a further threat to wild populations through the readiness with which the two interbreed and the fact that they can outnumber the wild herds in smaller areas. In and around the Kadam Reserved Forest some 300–400 domestic buffaloes graze throughout the year and their number can reach 6000 during times of flood. About 200 domestic buffaloes and 1600 cattle graze in the D'Ering Wildlife Sanctuary. There is a similar situation in the other reserves except Kaziranga and Manas National Parks, where the core areas are free of domestic livestock.

### Recommendations for conservation

1. Create more wildlife sanctuaries. I suggest the areas listed below should be declared sanctuaries without delay.

\* Burhachapori Reserved Forest together with Baghe (Rone) Tapu chapori and Kochmora chapori totalling 70 sq km.

\* Kadam Reserved Forest together with Borchapori and Kaopak chapori totalling 50 sq km.

\* Borkalia, near Dhakuakhana, about 5 sq km.

\* Jamjing and Sengajan Reserved Forests, totalling 100 sq km.

\* Kobo chapori together with Poba Reserved Forest, totalling about 200 sq km.

\* Part of Dibang Reserved Forest together with Sirkee Proposed Reserved Forest, totalling about 150 sq km.

2. Provide effective management of existing wildlife sanctuaries. Dibru-Saikhowa, Laokhowa and D'Ering Wildlife Sanctuaries should be protected and managed in the same way as

Kaziranga and Manas National Parks, including prevention of grazing of livestock in the core areas and minimizing grazing in the peripheral areas.

3. Identify core and peripheral zones in national parks and wildlife reserves. The Indian Wild Life (Protection) Act 1972 should be amended to provide for core areas and buffer zones to be demarcated in all national parks and wildlife sanctuaries, with ploughing and the grazing of livestock being prohibited in the former and allowed on a limited scale in the latter. It is impracticable to attempt to prevent grazing of livestock and arable cultivation throughout the area suitable as habitat for the buffalo.

Unless action on the lines suggested above is taken soon, wild buffalo may disappear within 20 years except in the national parks.

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### References

- Gee, E.P. 1964. *The Wildlife of India*. Collins, London.  
Grewel, B., Israel, S. and Sinclair, T. (eds). 1987. *Indian Wildlife*. APA Productions (HK) Ltd, Hong Kong.  
Sheshadri, B.K. 1969. *The Twilight of India's Wildlife*. John Baker, London.