

## ASSESSMENT OF SWAMP DEER HABITAT IN AND AROUND JHILMIL JHEEL CONSERVATION RESERVE, HARIDWAR, UTTARAKHAND, INDIA

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### Abstract

*Swamp deer (Rucervus duvaucelii duvaucelii) or Barasingha is categorized as vulnerable on the IUCN Red list. With a global population of less than 5,000 the species has a very limited distribution spanning over 2,000 km<sup>2</sup> in India and Nepal. A small population of swamp deer was recently rediscovered in Uttarakhand state at Jhilmil Jheel. This population warranted a conservation initiative because the habitat around this Conservation Reserve is heavily fragmented due to expansion of agriculture, habitation and various other land use practices. The reserve provides an area of only 0.009 km<sup>2</sup> per animal, which is insufficient in maintaining a viable population of swamp deer. It is therefore important to identify further potential habitat and to begin linkages between existing and potential habitats. A habitat conservation evaluation can play a key role in influencing conservation strategies by conducting detailed research including identification of potential habitat blocks and suggesting linkages between existing and adjacent potential habitat blocks. In this way the initiative can help to increase the number of swamp deer and to maintain a viable population of the species.*

**Keywords:** *Habitat evaluation; home range; linkage; potential habitat; swamp deer.*

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### Introduction

Swamp deer lives in the swampy grasslands and floodplains of Indian sub continent, and also utilizes surrounding riverine forests and woodlands. It is highly dependent on the availability of water. Swamp deer is mainly a grazer, eating grass and leafy aquatic vegetation. It feeds mainly in the morning and evenings, and in the midday heat it retreats to the shade or rest in the open. Where there is substantial human disturbance, the swamp deer is mainly nocturnal.

Swamp deer is listed by IUCN, with the few remaining populations declining or already affected by habitat fragmentation due to expansion of agriculture, habitation and various other land use practices [1, 2]. The total world population of swamp deer is estimated less than 5,000 animals, occupying an area of less than 2,000 km<sup>2</sup> in India and Nepal (Fig. 1). The species is extinct in Pakistan and Bangladesh [3]. A small population of swamp deer (320 in number) was recently rediscovered in Uttarakhand state (in 2005) at Jhilmil Jheel [4].

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At the time of rediscovery of swamp deer around Jhilmil Jheel in the year 2005 itself, it was realized that the habitat was too small in comparison to the need of swamp deer and other large herbivores. So a need was felt to assess the conservation reserve area as well as adjoining areas for identification of potential habitat blocks. Once these habitat blocks are demarcated, the next step will be to suggest the means of establishing linkage of the presently available habitat with neighbouring *Terai* habitat for future conservation in perpetuity.

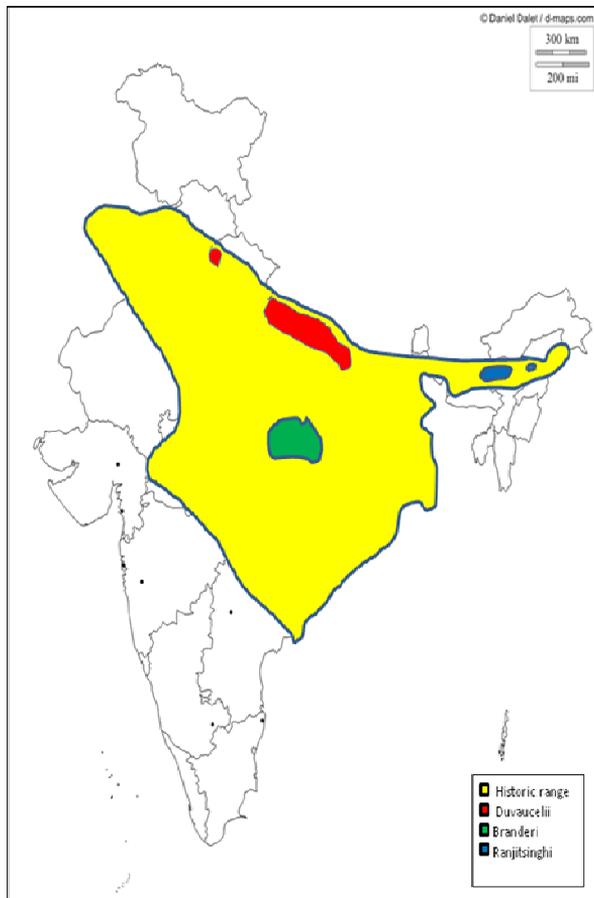


Fig. 1. Map showing past and present distribution range of swamp deer

### Study area

Jhilmil Jheel is a saucer shaped wetland located between Haridwar–Najimabad highway and the River Ganges, in Chidiyapur Range of Haridwar Division, Uttarakhand, covering an area of 37.83 km<sup>2</sup> of Reserve Forest and elevation ranging from 200 to 250 meters above MSL [5]. The spectacular *terai* landscape of the study area is a mosaic of short and tall grasslands, tropical mixed moist deciduous forests, and secondary scrub (Fig. 2). The area experiences sub-tropical climate. Annual rainfall averages about 1300 mm (recorded between 1997 and 2007) and is most prominent during June–September (monsoon). Temperature soars

up to 44°C in May and drops to 2°C in January. The texture of the soil varies from fine sand to clayey loam. The area is rich in faunal and floral diversity including spotted deer, elephant, blue bull, wild boar, monkey, langur, mongoose, hare, common leopard and occasionally tiger, jungle cat, otter, porcupine, sambar, barking deer and hog deer are also seen in the area. Avifauna includes a large number of resident and winter migratory birds.

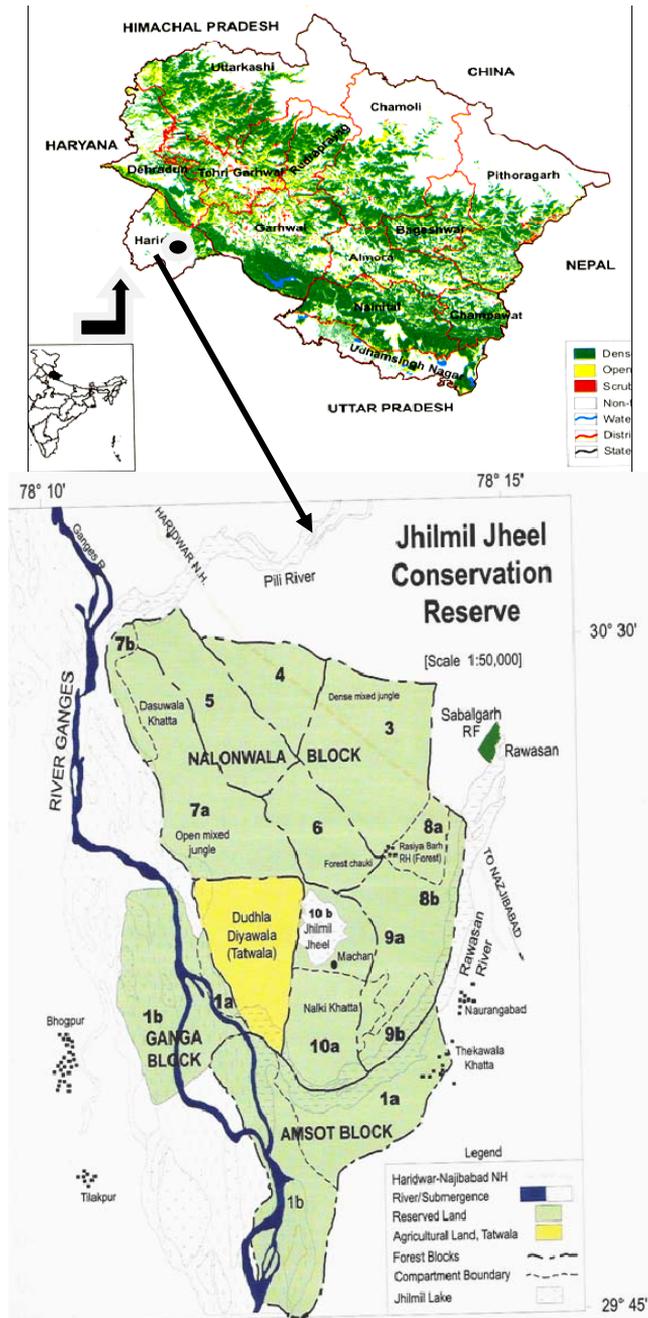


Fig. 2. Location map of Jhilmil Jheel Conservation Reserve

The dominant vegetation types include *Typha elephantina*, *Phragmites karka*, *Imperata cylindrica*, *Vetiveria zizanioides*, *Zizyphus mauritiana* and *Salix tetrasperma*. The local inhabitants of Tantwala village, adjacent to Jhilmil Jheel consist of 146 households. They are of different communities' viz., Punjabis, Sainis, Garhwalis, and Gujjars who settled here in early 1950's. Before the enforcement of Wildlife (Protection) Act of 1972, limited wildlife shooting was permitted here. The working plans in the initial 70-80 years of the management history aimed only at obtaining more revenue out of the forest wealth. Later in 1973's onward there was a shift; with inclusion of wildlife conservation initiatives in the working plans (B.K.P.Sinha plan of 1973-89). On August 05, 2005 the government of Uttarakhand declared the area as a Conservation Reserve. Before this declaration people (villagers and illegally settled nomads, 'gujjars') were freely grazing their livestock in the grasslands of Jhilmil Jheel area. Later, *gujjars* were rehabilitated outside of reserve area along the River Rawasan.

### Threats to swamp deer and its habitat in and around Jhilmil Jheel

Swamp deer is an 'exacting' species and needs its traditional wintering and feeding grounds to be restored to it [6]. It is surviving at Jhilmil Jheel in an island habitat surrounded by various land use/ land cover types. The most essential cover requirements (viz. forage, hiding etc.) of its crucial phase of life cycle are at risk in the existing situation. The annual composite home range of herds ranges from 10-30 km<sup>2</sup>. Swamp deer on an average move 2-3 km (straight line) daily and known to move distances of 5-7 km during seasonal shifts of habitat [7, 8, 9, 10, and 11]. Whereas, the area available to the swamp deer is 2.9 km<sup>2</sup> (which includes Jhilmil Jheel, 'the prime swamp deer habitat' of 0.5 km<sup>2</sup> area and the surrounding agricultural fields, scrub, grasslands and forest). Individually, Jhilmil Jheel is not large enough to support self sustaining populations for long; they may be dependent on adjoining patches [12]. There are some habitat blocks in the reserve area itself (viz. riverine forest, plantations and sandy river bed) which have been reported (riverine forest-Martin 1977 [7], plantations-Qureshi et al. 1995 [11], sandy river bed-Schaller 1967 [13]) as being used by swamp deer during various phases of their life cycle. These parts of the reserve cannot be used by the animal due to fragmentation (Fig. 3).

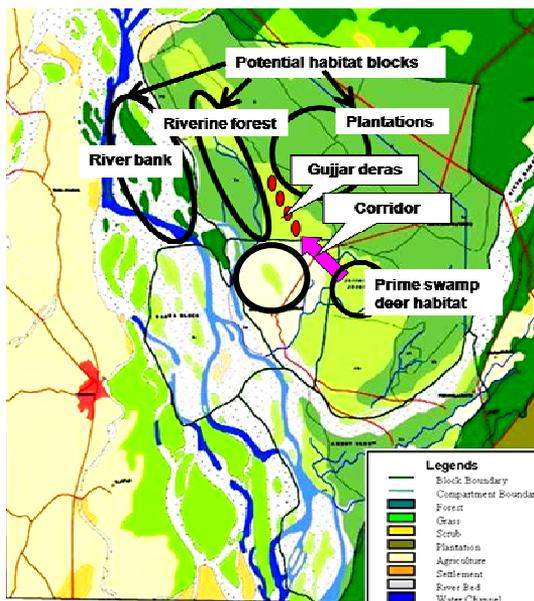


Fig. 3. Map of JJCR showing potential habitat blocks

On the western bank of the river Ganges, is located Banganga Wetland (Fig. 4) with a small population of swamp deer (approximately 100). Banganga wetland harbours *Typha* islands, *Phragmites* islands and several other aquatic plant species. Jhilmil and Banganga wetland are also not connected and the resident swamp deer populations are presumed isolated.

The grasslands and woodland of the Conservation Reserve also have large cattle and human population dependent on resources of these patches in terms of fodder, fuelwood, and timber requirements. High dependency of local people on resources of these natural tracts poses severe threats to ungulate community and their long term conservation.

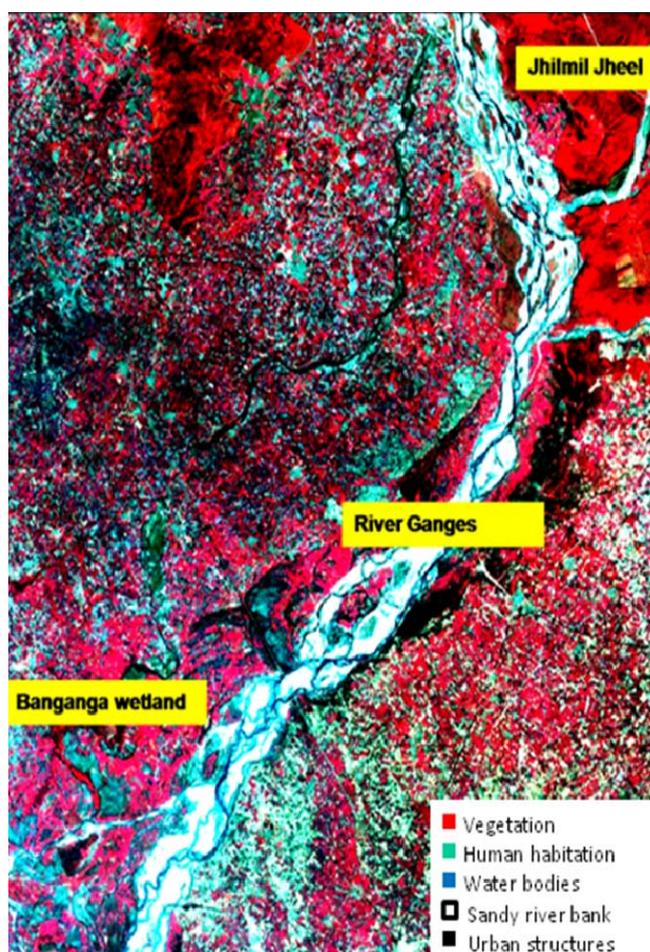


Fig. 4. Map showing location of Jhilmil Jheel and Banganga Wetland

### Recommended strategies

If we intend to conserve this threatened species in its western most range, improvement of the habitat conditions of this region is required. As a first step, the area in and around Conservation Reserve will be assessed for identification of potential habitat blocks. Next, means of establishing linkage of the presently available habitat with neighboring Terai habitat will be suggested. It is presumed that increasing the connectivity between the isolated patches may counteract the adverse effects of fragmentation on swamp deer.

Thus we recommend that connectivity can be achieved in two steps:

***Step 1: Providing connectivity between the potential habitat blocks and prime swamp deer habitat of Conservation Reserve by evacuating adjoining agricultural fields of 'Tantwala' village and the 'Gujjar deras':***

Relocation of selected agricultural fields of Tantwala village and 'gujjar deras' adjoining to the prime swamp deer habitat is crucial to the swamp deer conservation as it shall provide unhindered access to the swamp deer populations right up to the Ganges and will add an area of 18.5 km<sup>2</sup> to the available 2.9 km<sup>2</sup> habitat (Fig. 3). The evicted parts of village and agricultural fields would have to be cleaned of village and household debris etc so that the grassland habitat and water bodies are restored. Eventually an area of approximately 21.4 km<sup>2</sup> will be available for conservation purposes, free from all human encumbrances. It is going to be a contiguous habitat dedicated to conservation of terai ecosystem in Uttarakhand. As a matter of fact this relocation is voluntary as well as incentivised. Farmers have observed a lower agriculture yield here due to excessively high water table. So they readily want to move out from this village. On top of this, villagers are being relocated to a place next to national highway.

***Step 2: Developing corridor between Jhilmil Jheel and Banganga Wetland:***

The villages on the western bank of river Ganges between the river and Banganga wetland are required to be relocated on a similar pattern as of Jhilmil (Fig. 4).

## Conclusions

It has been recognized that this Conservation Reserve has high dependency of local people. So, the conservation of flagship species, swamp deer, is only possible if the interests of local communities are taken care of. Also cooperation of eco-development committee of the area is of immense help for spreading awareness regarding wildlife conservation. Thus swamp deer conservation requires long term monitoring, meticulous planning and intensive management action.

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