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Abstract: The land that is now the state of Uttaranchal has a glorious history in tiger conservation; it was in the Corbett Tiger Reserve (TR)-one of the country's most priceless reserves-that one of the most credited conservation programs of the century, Project Tiger, was launched in 1973. While most tiger habitats in the country are experiencing severe anthropogenic pressures leading to degradation, the tiger habitat in Uttaranchal and the conservation efforts of the government continue to give a glimmer of hope for the long-term survival of tigers in this young state, which was established in late 2000. A field assessment carried out by the Wildlife Institute of India (WII) with the support of Save the Tiger Fund (USA) in the year 2002-2003, is the most recent and comprehensive empirical evidence on the status of the tiger in the state.

Status and Conservation of the Tiger in Uttarakhand, Northern India

The land that is now the state of Uttarakhand has a glorious history in tiger conservation; it was in the Corbett Tiger Reserve (TR)—one of the country's most priceless reserves—that one of the most credited conservation programs of the century, Project Tiger, was launched in 1973 (1). While most tiger habitats in the country are experiencing severe anthropogenic pressures leading to degradation, the tiger habitat in Uttarakhand and the conservation efforts of the government continue to give a glimmer of hope for the long-term survival of tigers in this young state, which was established in late 2000. A field assessment carried out by the Wildlife Institute of India (WII) with the support of Save the Tiger Fund (USA) in the year 2002–2003, is the most recent and comprehensive empirical evidence on the status of the tiger in the state (2). The strength of the tiger habitat here is largely from the hilly nature of the terrain, which arguably supports sufficient prey and offers safe hideouts for the sensitive tiger in the deep valleys and numerous *nallahs*. The relatively lower human density of the state (158 people in a km² area) versus the national density of 324 people in a km² area (3) and 45% forest cover versus the national forest cover of 20.5% (4) are the other factors that give hope for the survival of this magnificent species. A framework for prioritizing tiger conservation in the global perspective has included a considerable portion of the tiger habitats in Uttarakhand into 1 of the 11 level I tiger conservation units (top priority areas) identified in the Indian subcontinent. This underscores the significance attached to this state for the long-term conservation of the tiger (5). However, there is an urgent need to periodically assess the situation in the state, given the severe threats faced by the tiger throughout its range.

According to Johnsingh et al. (2), almost the entire stretch of tiger habitat in Uttarakhand is under the *bhabar* (hilly) tract and occurs in three disjunct units, identified as tiger habitat blocks (THB), with poor or no connectivity between the blocks. From west to east, these THBs include the areas between the Yamuna River and the west bank of the Ganga River (referred to as THB I), the east bank of the Ganga and the west bank of the Gola River (THB II), and the east bank of Gola River and the Tanakpur-Khatima Highway and Sharda River (THB III) (Fig. 1). In the entire area of tiger distribution along the foothills of the Himalayas, from the Simbalbara Wildlife Sanctuary (Himachal Pradesh) to the

Valmiki TR (Bihar), these THBs constitute the largest tiger habitat, approximately 6500 km². This area can support a minimum of 150 adult tigers, provided that corridors (connectivities) are established and strengthened, the habitat is managed, and the large wild ungulate species are well protected.

The forest divisions (FD) and the protected area (PA) that fall in THB I (approx. 1800 km²; Fig. 2) are Kalsi, Shivalik (Uttar Pradesh), Dehradun, Narendranagar (in part), and the western part of Rajaji National Park (Uttarakhand); in THB II (approx. 3000 km²; Fig. 2), the eastern part of Rajaji NP, Haridwar, Bijnor Plantation Division (Uttar Pradesh), Lansdowne, Corbett TR, Ramnagar, Nainital, Terai West, and Terai Central (Uttarakhand); and in THB III (approx. 1800 km²; Fig. 2), Terai East, Haldwani, and Champawat. Tigers also occasionally range into the lower reaches of the Nainital FD. During the 2002–2003 survey (except for the Kalsi, Dehradun, Narendranagar, and Haridwar FDs, and the Bijnor Plantation Division), evidence of tiger use was observed in all the FDs and the PA. Among these, the Corbett TR had the highest tiger use (approx. 41%; range, 19.2–63.2%) followed by the Ramnagar FD (20.7%; range, 2.7–38.7%). Overall, there was high variation in the frequency of occurrence of tigers in the state, indicating a patchy distribution. In other words, even within the FDs and PAs, while some areas had a higher concentration or frequency of use, most other areas were poorly used. For instance, although the Lansdowne FD, recognized as a corridor connecting the Rajaji (NP) with the Corbett TR, scored 16.8%, some areas, between Laldhang and Kotdwar, were devoid of tiger use (0%) and others had a value as high as 45% (around Koluchaur). Surprisingly, the Rajaji NP scored quite low (12.9%), with high variation, suggesting that tiger use is still low there, because tigers were reported only from the Dholkhand, Chilla, and Gauri Ranges. In contrast, the forests of the Terai West and the Ramnagar FDs, which are not part of any protected area, scored better. This, however, should not be interpreted to indicate that tigers are faring well in the reserved forests; it is their proximity to the Corbett TR that benefits these areas. Nevertheless, it should be clearly understood that for the conservation of the tiger, all areas are important, with some areas acting as a source (e.g. Corbett TR and Rajaji NP) and other areas providing connectivity (e.g., Lansdowne division), thereby, facilitating the

long-term survival of the tiger in Uttarakhand.

The study report (2) has several site specific, as well as overall recommendations. Given the deteriorating situations elsewhere and the strength of the habitat status in Uttarakhand, it is likely that this state has the potential to become the tiger state of north India, attracting conservation attention and enhanced tourism. But, for this to happen, the state has to initiate certain radical steps to counterbalance the increasing threats, otherwise the state will helplessly witness the diminishing status of tiger in its territory as well. We advise urgent action on the following issues:

Poaching of the tiger and its prey species is prevalent, but evidence may not be easily available. With the help of local informants and forest staff, it is important to locate the "poaching-prone" areas and enhance the patrolling and antipoaching measures. Johnsingh and Negi (6) found that nearly 20 gun and ammunition shops in this landscape between Sahranpur and Tanakpur sell about 100 000 cartridges annually, the bulk of which might be used for poaching. Already in the early 1930s, Champion (7) recommended sawing off the barrels of crop-protection guns to make them ineffective for poaching. All guns in Uttarakhand should be replaced with specially made guns with short barrels, which cannot be used for poaching. Gun owners could continue to keep their gun rights, which, however, should be kept in the safe custody of the government. International conservation agencies and the government of India should come up with sufficient funds for this gun-replacement program. This program, essentially needed to protect the tiger's prey, is likely to get enormous support and appreciation from those concerned about the future of the tiger.

Habitat fragmentation and degradation are on the rise, threatening the habitat contiguity and quality. Unless habitat connectivity is established and strengthened, the existing tiger habitat in Uttarakhand is bound to become habitat islands, increasing the extinction risk from inbreeding, disease, and poaching. In this regard, three corridors deserve mention:

- i) **Chilla-Motichur corridor.** This corridor is a must for the young tigers of the Chilla Range to colonize the forests (approx. 1800 km²) west of River Ganga. This immigration is necessary to safeguard the future of the tigers on the west bank, because

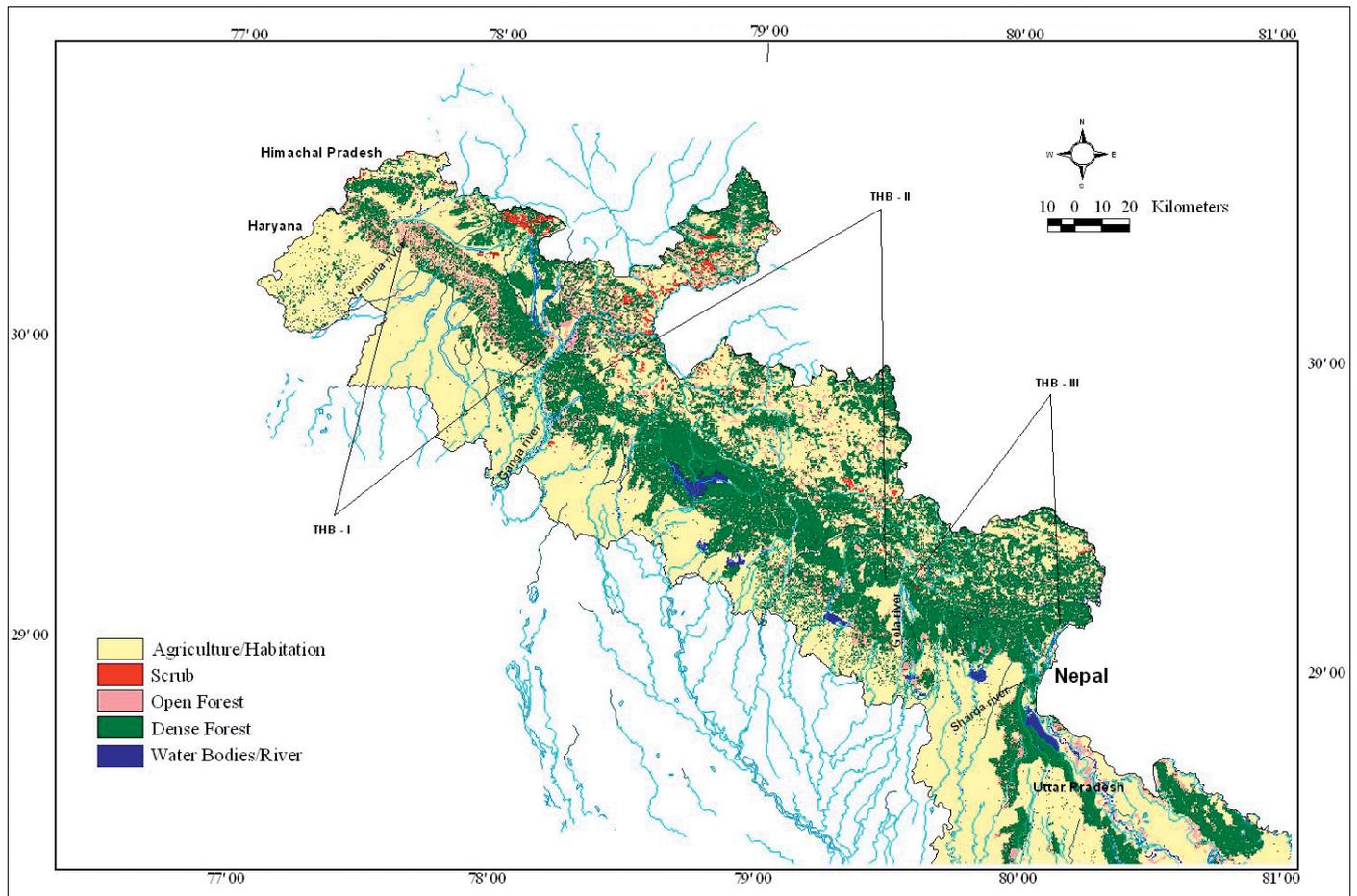


Figure 1. Tiger landscape in Uttaranchal showing major rivers and tiger habitat blocks.

the present status of tigers here is extremely precarious. Even in 2000, the estimated number on the west bank was only 5–10 animals. Ongoing research by the WII in the Chilla Range suggests that after the *gujan* relocation, which was completed in early 2004, the tiger population here is recovering, as evinced by the camera-trap photographs of two lactating tigresses taken in early 2005. As recommended nearly two decades ago (8), the relocation of *Khand Gaon* (settlement), complete protection to the islands on the Ganga, the building of the 1.0-km flyover for vehicular traffic between Raiwala and Haridwar, and shifting of the army ammunition dump should not be delayed any further. *Gangabhogpur Talla* (30 households), *Gangabhogpur Malla* (150 households), and *Kunaun Goth* (70 households), villages on the east bank of the Ganga within Rajaji NP, should be shifted. Sufficient land for the relocation of these villages is available in the Barkot Range, the Dehradun FD, which has almost lost its value for large mammal conservation as a result of extensive wood-cutting pressure from the Rishikesh township. If these villages are shifted, nearly 250 km² habitat on the east

bank of the Ganga within the Rajaji NP (Gauri and Chilla Ranges) would be secured for the tiger. This area would become an important breeding ground for the tiger, not only supporting the population in the Rajaji NP but also act as a source for dispersal to other forest areas west of the Ganga.

ii) **Kosi River corridor.** The forests between the Mohan and Kumaria villages should be made disturbance free by shifting the Indian Medicines Pharmaceutical Corporation Limited to a location closer to Ramnagar town, because most of the staff working in this firm come from Ramnagar, which is 15 km away. Another commercial unit, Garjia Chemicals, where very few people work now, should be closed. The connectivity between Infinity Resorts and Bijrani can be significantly improved if the two small villages Ringora and Amdanda are resettled. Similarly, shifting of the Tehda forest village from the left bank of Kosi River (Ramnagar FD) would go a long way in strengthening this corridor. These three villages originated as cattle camps and together have about 80 households. Enough land is available for this resettlement in the Gabua forest patch (13 km²) in the Terai West FD.

iii) **Gola River corridor.** The growth of Haldwani town and the Lal Kuan industrial complex, south of Haldwani, has caused a major break in the tiger range between Terai Central and Terai East FDs. Heavy traffic (day and night) along the Haldwani–Lal Kuan road and large-scale boulder mining along the Gola River, involving hundreds of laborers, have also contributed to this fragmentation. The firewood demands of these laborers, camping in the riverbed, are decimating the Terai Central FD and the Gola and Tanda Ranges of Terai Central FD. The continuity between the Terai East and Terai Central FDs should be restored by translocating the timber depot of the Uttaranchal government, which is north of Lal Kuan, to a location closer to Haldwani. It is crucial to ban sand and boulder mining in the entire stretch of the Gola River and to remove the encroachers between the Timber Depot and the river. Once the corridor is established, it may be necessary to build a 1-km flyover for vehicular traffic, to facilitate movement of animals. The loss of revenue to the state government incurred from the cessation of boulder mining could be made good by shifting this activity to areas of less consequence to tigers (e.g., the

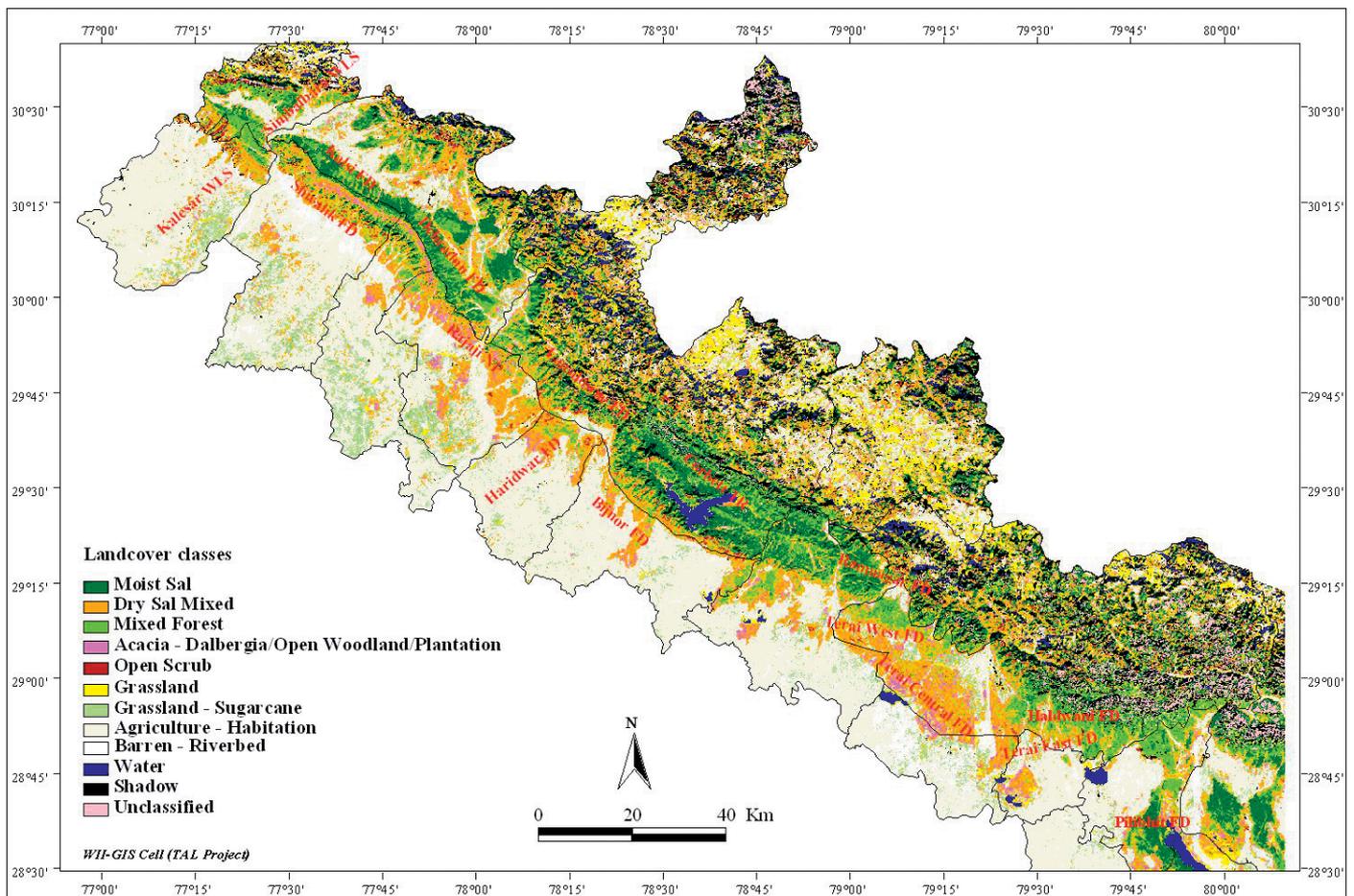


Figure 2. Tiger landscape in Uttarakhand showing protected areas and forest divisions

stretch of Song River north of Doiwala and the Dhapka River south of the Ramnagar–Kaladhungi highway), and by an adequate compensation from the government of India.

Relocation of Gujjars and Encroachers

Following the model of Gaindi Katha, all the *gujjars* from the entire tiger landscape in Uttarakhand and encroachers from the Ramnagar, the Terai West, and the Terai East FDs, should be settled in the southern fringe areas, which do not have much wildlife value. The Gabua forest patch could be used to resettle the encroachers from *Sunder khal*. There should be a joint venture between the governments of Uttarakhand and Uttar Pradesh to resettle the *gujjars* from Shivalik FD, which will immensely strengthen the tiger and elephant habitat west of the Ganga.

Establishment of Nandhour Valley National Park

Creation of this protected area of approximately 300 km² along the scenic Nandaur River in Haldwani FD is essential and would add one more tiger breeding habitat to the Uttarakhand tiger landscape. There are no villages along this 30-km-long river valley, and, therefore, the creation of this protected area should be possible. With the onset of rains, this beautiful valley habitat becomes totally cut off from the

outside world, and this is exploited by the *Rai Sikhs* from the southern fringes of the Terai East FD, who are known locally for the depleted status of wildlife here. It is possible to establish a 700 km² conservation reserve around the National Park.

Arresting Habitat Degradation

Extraction of forest resources, such as firewood for subsistence and commercial purposes, and livestock grazing, are widespread in Uttarakhand and are a major cause of habitat degradation. Following the existing models (e.g., joint forest management or ecodevelopment) or other innovative approaches, habitat degradation should be reduced. Recommendations given in this regard by Johnsingh et al. (2) including raising fuel wood plantations, distribution of fuel-efficient stoves, and conservation education.

This note presents the ground situation at the time of the project period (2002–2003), which is continuously deteriorating. The methods and data presented in the final report could be taken as the baseline, and using the same framework, the current status of tiger could be compared and checked in select localities of high and low tiger use. In addition, tiger monitoring could be followed along the lines of activities carried out in the central Indian forests as per the guidelines of Project Tiger Directorate (9).

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