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Which Site-Level and Landscape-Level Movement is Favored by Tiger (*Panthera Tigris*) in Nepal and with India?

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Abstract

Since the landscape conservation intervention has taken place Terai Arc Landscape (TAL) has been given much attention for mega fauna conservation by Nepal and Indian government. This review-based work was initiated with an aim to identify the movement of Tiger (Panthera tigris) in Nepal assumed as a site level movement and sharing of habitats with India as landscape movement. Restricted source of information about the landscape conservation related to tiger for e.g. tiger report of both countries along with some reports associated to tiger conservation and research articles were reviewed. Three sites levels movement was recorded for tiger population in Nepal namely Chitwan- Parsa complex, Banke- Bardia complex, and Shuklaphanta complex. Habitat fragmentation is still prevalent to connect this patch. However, Parsa and Banke National Park were considered as sink habitat for Chitwan and Bardia tiger populations. Landscape movement has been inspired by the contagious boundary of protected areas and with intact forest left, but restricted to the adjoining protected areas only. Three landscape movement Chitwan-Parsa-Valmiki Tiger conservation landscape, Bardia-Khata-Katerniaghat complex and Shuklaphanta-Laggabagga-Pilibhit were found. High permeability of tiger population between two countries protected areas in future will give the actual meaning of landscape conservation. For this habitat fragmentation and isolation of breeding populations should be discouraged with efforts of both governments.

Keywords: Corridor, India, Landscape-conservation, Movement, Nepal, Tiger, Terai-Arc Landscape.

Introduction

Being the umbrella species protection of top carnivores is believed to be reasonable for the protection of other species (Wikramanayake et al. 1998). In an Asia many protected are relatively small (Dinerstein & Wikramanayake 1993). So, it is necessary to foster the international co-corporation in addressing tiger (Panthera tigris) conservation efforts between Nepal and India and strengthen ecological security in the trans-boundary region (Karki et al. 2011). Nepal has also move ahead from Protected Areas (PAs) conservation to landscape conservation with an aim to connect between wildlife populations of Nepal's and India's PAs (Wikramanayake et al. 1989) especially tiger. The PAs of India and Nepal which have good prey density and could support approximately 800 tigers; therefore, it requires maintaining the vast landscape which are under the human-dominated matrices (Wikramanayake et al. 2011). These subpopulations with breeding tigers are from west to east: Rajaji, Corbett, Suklaphanta, Dudhwa, Bardia, Katerniaghat, and Chitwan/Parsa/Valmiki (Seidensticker et al. 2010).



This paper will highlight the tiger conservation intervention in Terai Arc Landscape (TAL) of both country in India and Nepal based on tiger movement only. Status of metapopulation approach around the PAs of Nepal and its connection to India PAs will be addressed. I expect for the sound dispersal of tiger population in India and Nepal via nine corridors identified by Nepal. Different research and reports with dispersal of tiger populations and gaps to link between these PAs are identified in other research articles. However, I have focused my concerned in Nepal PAs and corridors and forwarded few solutions and possibilities based on published paper.

Study area:

Five National Parks and Nine corridors of Nepal (Fig. 1) that lies in the Terai plains in the western belt was the concerned of the study linked to the Uttar Pradesh (UP) of India that connects Valmiki National Park (VNP), Sohagi Barwa Wildlife Sanctuary, Suhelwa Wildlife Sanctuary (SuWS), Katerniaghat Wildlife Sanctuary (KWS), Dudhwana National Park (DNP), Kishanpur Wildlife Sanctuary. UP is further connected to Corbat National park in the west of Suklaphanta National Park (SuNP) through Surai Range falls (Jhala et al. 2011).



Figure 1: Five National Parks and Nine corridors of Nepal

Methods:

The research paper related to the tiger conservation were searched in scholar.google.com. The research has depended on Scholar.google.com. Search was conducted with first name of target species (i.e. Tiger) followed by country (Nepal, India) and PAs that include Five NPs of Nepal and Seven Protected areas including Sonanadi Wildlife Sanctuary and Rajaji National Park of India. National Tiger report of both the country were reviewed. In each research articles and reports key words like tiger, corridors, biological corridors, PAs name, nine corridors names, landscape conservation, transboundary movement, were searched for easy identification.



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Results

1. Site level movement

Chitwan- Parsa Complex: High reproductive success rate and constant number of breeding females plays vital role in Chitwan National Park (CNP) for tiger population (Barlow et al. 2009). CNP is an important source of tiger population, and disperse to VNP in India, Parsa National Park (PNP) in east and Dumkibash adjoining forest (Karki et el. 2015). A new hope for tiger conservation was seen from PNP, where the habitat has now no more considered as sink only, it has its own population around 17 in 2016 (Lamichhane et al. 2018) and 18 individuals were recorded in the survey of national status of tiger and prey in 2018 from PNP and adjoining forest area (DNPWC & DFSC 2018). Finally, the researcher had suggested to manage it as a single ecological unit to preserve the tiger population because PNP boundary is contagious with CNP.

Banke- Bardia Complex: Banke-bardia Complex is regarded as a biodiversity hotspot for large mammalian assemblage in TAL region and considered as one of the levels-I high Tiger Conservation Unit (TCU). Banke National Park (BaNP) is located in the eastern part of Bardia National Park (BNP), which was earlier extended as a favorable tiger habitat. Recent National survey indicate the essence behind the establishment of BaNP has been fulfilled. As from the survey BaNP act as a sink habitat for increasing tiger population (DNPWC & DFSC 2018).

Suklaphanta National Park (ShNP): In Nepal, reserve protection effectively ceased between 2002 and 2006, because of civil conflict, allowing poachers greater access ShNP. Populations crashed in reserves, from 27 adults in 2005 to eight in 2008. Recently, 16 tiger populations were estimated in ShNP and adjoining forests (DNPWC & DFSC 2018).

2. Landscape-level movement

Chitwan-Parsa-Valmiki Tiger Conservation Landscape

The recent habitat including Chitwan, Parsa, Barandabhar, Someswor and Valmiki covers an area of c. 3,000 km2 and serves as priority tiger conservation landscape units. With increasing populations of tiger from CNP contribute in the maintenance of population to the surrounding PAs of Nepal and India (Karki et el. 2015). They are found to be fully connected to each other (Chanchani et al. 2014). This landscape forms a level I TCU and supports one of the largest tiger populations in South Asia (Wikramanayake et al. 1998). Sohagibarwa Wildlife Sanctuary is connected with the western part of VNP used to serve as a corridor for wildlife between PAs of Nepal and India (Chanchani et al. 2014).

Bardia-Khata-Katerniaghat Complex

Khata corridor connect BNP of Nepal and KWS of India. The park comprises two distinct units, namely Karnali floodplain and Babai valley. Within the BNP also between 1987 to 1997, tigers west of the Karnali river became increasingly isolated from the core population (Smith, et al. 1998). Babai river valley extends from Parewaodar to Chepang and is a wilderness zone comprised of alluvial grasslands and forests, covering more than 50% of the park. Khata corridor is considered as the most successful corridor for tigers which have been confirmed following restoration efforts like enhanced protection measures, effective implementation of buffer zone concept and support from communities along the corridor and habitat management interventions by park authorities (DNPWC & DFSC 2018) such sharing of habitat helps to foster the robust population of tigers (Thapa et al. 2018).

Shuklaphanta-Laggabagga-Pilibhit Complex

Shukla connected with two tiger reserves in India: Pilibhit and Dudhwa in the south via narrow links of Churia forests and the Laljhadi and Basanta corridors; and the eastern part of Indian TAL across Mahakali



River through the Boom-Brahmadev corridor. Lack of signs of tiger in Laljhadi forest corridor isolate the tiger populations between Suklaphanta and Dudwa with potential gap of 33 km because of Intensive agriculture (Smith et al. 2001).

Discussions

In Nepal tiger populations was found to extends 546 km from the western border of Nepal to 16 km west of the Bagmati River with isolated three tiger populations in Nepal (Smith et al. 2001). Transboundary protection of species expects to promote for the achievement of conservation objectives from the configuration of isolated protected areas for the survival of endangered species (Busch et al. 2008). Along with that protected area gains the highest profile in terms of conservation (Busch et al. 2008). For instance, with increase in tiger populations in BNP government of Nepal has declared the adjoining area as BaNP, which is considered as the potential recovery site of tiger populations and viewed it as Banke- Bardia Complex. This site level landscape has given more conservation emphasis and have promoted the importance of Bardia-Khata-Katerniaghat Complex or we may relate with Chitwan-Parsa-Valmiki Tiger Conservation Landscape. Such importance has not only promoted the conservation of tiger, rather transboundary conservation promotes the species richness and the persistence (Inskipp & Collar 1984; Busch et al. 2008). That is why the corridors should be continuous with variety of habitat patches, that foster the outbreeding depression when species are genetically differentiated across their range (Pearce & Moran 2013). Habitat patches influence the interaction between the species whether it is a tiger or its prey in the landscape conservation approach, which reduces its risk to extinction (Wikramanayake et al. 1998). Corridors are sharing the populations of tiger (DNPWC & DFSC, 2018). Such dispersal of population will even help to mitigate the human wildlife conflict. Some dispersal gaps were reported between the site level movements in Nepal. For instance, there is a 55 km gap in Chitwan and Bardia tiger (Smith et al. 2001). This gap is promoted by expansion of city, proliferation of agricultural lands, deforestation, narrow degraded stripes of forests (Smith et al. 2001)

Lastly, although the proposed sites for transboundary conservation are increasing (Hall-Martin & Modise 2002) internal cooperation and management rarely thought it common necessity (Fall 1999) which has hindered its objectives. So, with result of latest national tiger report of Nepal and India both countries are approaching towards the goal to double its tiger population. This might have association with importance given to landscape conservation in terms of tiger conservation.

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