

A Preliminary Study on the Habitat Utilization by *Rhinoceros Unicornis* in Pobitora Wildlife Sanctuary, Morigaon, Assam

Abstract

The analysis reveals that irrespective of season, the highest number of rhinos was sighted in the wet alluvial grassland during 2018-2019. This indicates that Rhinos prefer wet alluvial grassland in all seasons of the year. The habitat utilization pattern changes in blocks according to the availability of the fodder in the wet alluvial grassland. This study also shows that the habitat utilization pattern of rhinos is dependent upon food, grass cover and water. Keeping in mind rhino preference for wet alluvial grassland, it is essential for management authorities to maintain the hydrology of the sanctuary that supports wet alluvial grassland. Siltation due to flooding needs to be checked, desiltation should also be carried out to maintain wetland dynamics in the park that in turn help in maintaining the wet alluvial grassland that rhinos prefer. There are potential opportunities to maintain preferred grassland habitat in the park with timely management interventions to ensure the long-term conservation future of rhinos. The results of this study resemble the study done by Hazarika (2007). The study reveals that the maximum use of grassland habitat by the Indian Rhino was 47.4% (n=148), 28.2% (n=90) in wetland, 20.8% (n=65) in woodland, 3.5% in human resident area.

Keywords: Rhinoceros, Habitat Utilization, Grassland, Sanctuary, Wetland Dynamics.

Introduction

Habitat management is key to supporting pre-historic wild animals like the *Rhinoceros unicornis*. Individuals or groups of wild animals never use the entire habitat homogeneously, but utilize selective zones of the habitat (Hazarika, 2007). Each species requires a particular habitat, food, shelter and other survival needs, to the extent that species are said to be a product of their habitat (Smith, 1974). This habitat selection could be determined by the availability of food resources, mate distribution as well as safety from predators (Fjellstad and Steinheim, 1996). There are species-specific variations of habitat use patterns owing to distinct food choices of individual species, which may or may not be available in each habitat patch and home range area (Bell, 1971). The differences in food choice lead to variations in habitat utilization patterns among different species; it is widely applicable among herbivorous animals. The seasonal variations among food availability, such as burning of grasslands and annual floods, affects the variation of habitat utilization pattern (Lahan, *et al.* 1971; Debroy, 1986; Hazarika, 2007).

The state of Assam in India has successfully set aside areas for conserving and protecting the great one-horned rhino, *Rhinoceros unicornis*, in its distribution range. The Indian rhino was a survivor, the product of at least 35 million years of evolution, but this species had undergone least morphological changes through the process of evolutionary changes (Dinerstein, 2003). This aspect itself makes the animal quite unique and an object of prime interest of science. Though in the wild, this species has hardly any natural predator or enemy yet the species got dislodged and ultimately disappeared from most of the former distribution range, mainly being anthropogenic causes.

Objectives of the Study

1. To study the present status of the *Rhinoceros unicornis* in Pobitora wildlife Sanctuary.

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- Monitoring of Habitat Selectivity of the *Rhinoceros unicornis* in different months.
- To find out Habitat Utilization by the *Rhinoceros unicornis* in its natural habitat.

Review of Literature

Kushwaha *et al.*(2000) had studied land area change and rhino habitat suitability analysis in Kaziranga National Park, Assam. Banerjee *et al.*(2001) had studied the habitat used by Indian and other sympatric species in Kaziranga National Park. Talukdar (2002) had studied tiger predation of Rhino Calves at Kaziranga National Park. Hazarika (2007) had worked on the eco-behavioral aspects of Indian rhino in Orang National Park, India.

Bairagee *et al.*(2002-2004) had done some short studies on grassland status, utilization of grassland by fringe villagers, population status of Indian Rhino and their conservation approach involving local community in Pobitora Wildlife Sanctuary, Assam. Deka and Baruah (2003) had compared forages/feed consumed by the Indian Rhino in free-ranging and in captivity. Talukdar (1999,2000) and Talukdar and Baruah (2006) documented the current status of the sanctuary.

Pobitora Wildlife Sanctuary is a very small area (38.81 km square) with crowded Rhino numbers and tremendous human pressure leading to quick degradation of habitat of Indian Rhino and also found repeated incidence of Rhino human conflict. Therefore to manage the population of Indian Rhino and protect the small isolated area, there is a need of comprehensive systematic study on ecology and conservation of the species. The present study is aimed to fulfill the said need. The seasonal variation of food availability, burning of grasslands and annual flooding affects the habitat utilization pattern of herbivore animals (Lahan *et al.*, 1973; Debroy, 1986). Rhino, a mega herbivore, changes its pattern of using its habitat according to availability of food, vegetation cover and water in different seasons of the year.

Habitat utilization pattern is dependent upon food, grass cover and water. Keeping in mind rhino preference for wet alluvial grassland, it is essential for management authorities to maintain the hydrology of the park that supports wet alluvial grassland. Siltation due to flooding needs to be checked; de-siltation should also be carried out to maintain wetland dynamics in the park that in turn help in maintaining the wet alluvial grassland that rhinos prefer. There are potential opportunities to maintain preferred grassland habitat in the park with timely management interventions to ensure the long-term conservation future of rhinos. The results of this study resemble the study done by Hazarika (2007).

Flora and Fauna

The vegetation type of sanctuary is broadly of two types-1. Tropical alluvial plain vegetation. 2. Tropical moist semi evergreen hilly forest (Bora and Kumar, 2003). The dominant top canopy trees are –*Albizia procera*, *Bombyx ceiba*, *Lagerstromia reginae*, *Trewia nudiflora*, *Lannea coromandelica*, *Streblus asper*, *Litsea monopetala*, *Baringtonia acutangula*, *Syzygium cumini* etc. The

middle canopy is not dense and continuous mainly composed of *Antidesma acidum*, *Ardisia solanacea*, *Catunaregam uliginosa*, *Leea indica*, *Litsea monopetala*, *Zizyphus mauritiana* etc. and tall *Rhizomatus* herbs like *Alpinia nigra* and *Costus speciosus*. The climbers like *Cissus repanda*, *Mikania micrantha* etc climb on shrubs and tree. The ground vegetation is mainly composed by the herbaceous families, terrestrial Pteridophytic ferns, terrestrial orchids and some weeds.

Materials & Methodology

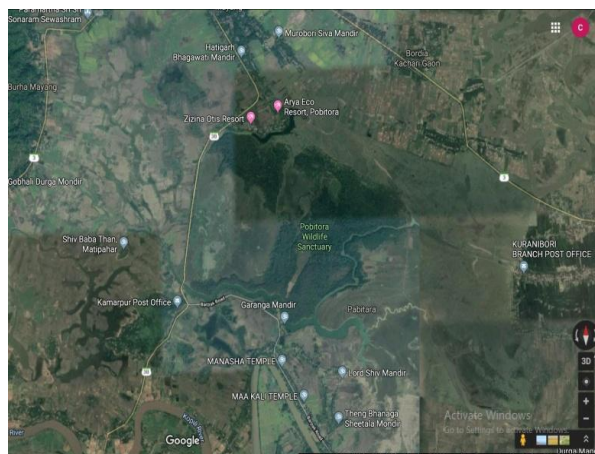
To understand the habitat utilization pattern of Indian Rhino the study area was searched for rhino in different seasons of the year covering all grids. All the sighting was recorded along with activities of Rhino and the habitat types (Hazarika and Saikia, 2007, 2009, 2010, 2011; Hazarika 2007; Laurie 1978, with certain modification). The location and time of each rhino sighting had taken with the nearest approachable distance, if the animal was in stationary activity, otherwise location was taken in the sight after movement of the animal. All the data was maintained in an MS EXCEL spread sheet for necessary calculations. Habitat selectivity of rhino in the area was calculated using following formula-
Habitat selectivity

$$= \frac{\text{Total number of Rhino sighted in a particular habitat}}{\text{Total number of sighting record of rhino in all habitats}} \times 100$$

The study was carried out from 2018 to 2019 in pre-monsoon (March to May), monsoon (September to November) and winter (December to February) seasons to get the seasonal variations of habitat use. A map was prepared before starting to collect primary data. A data sheet was maintained to note down the date of survey, habitat pattern, vegetation, species and number of rhinos counted. In this study, rhinos were monitored in different seasons.

Study Area

Pobitora Wildlife Sanctuary is a wildlife reserve in the Morigaon district of the state of Assam in India. Pobitora Wildlife Sanctuary is located about 30 km east of Guwahati. The Pobitora Wildlife Sanctuary is about 48 km by road from Guwahati. It covers an area of 38.8 km sq. Though the total notified area of the park is 38.81 sq km, only 16 square kilometers is the effective rhino habitat. It lies within the geographical limits of latitude 26°12'0"N to 26°16'48" N and 91°58'48" N to 92°05'24" E longitude. River Brahmaputra forms the northern boundary of the sanctuary.



- STUDY SITES:**
 Site-1:Amaramul
 N26°14'45"E92°2'56"
 Site-2:Sildubi
 N26°14'49"E92°5'5"
 Site-3:Kuchiani
 N26°14'2"E92°4'48"
 Site-4:Khulabhuyan
 N26°12'3"E92°3'18"

Results

Observation of Rhino Population in Different Habitats and its Habitat Utilization at Pobitora Wildlife Sanctuary during September'2018 to April'2019

Fig 1: Rhino sighting- September'2018

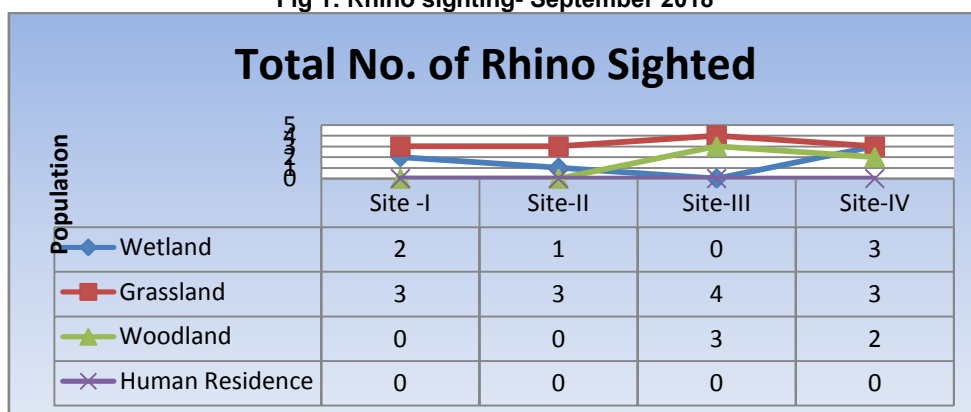


Fig 2: Habitat Utilization by Rhino in Pobitora W.S. September'2018

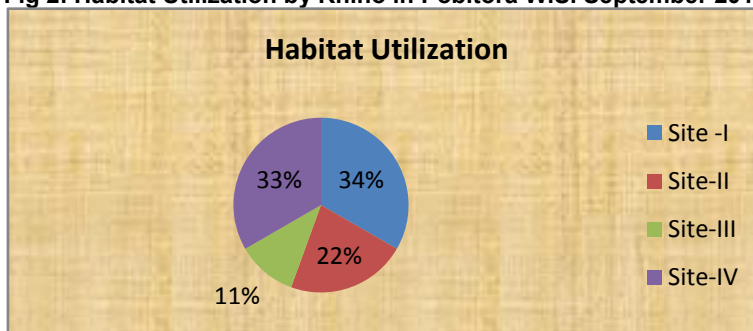


Fig 3: Rhino sighting- October'2018

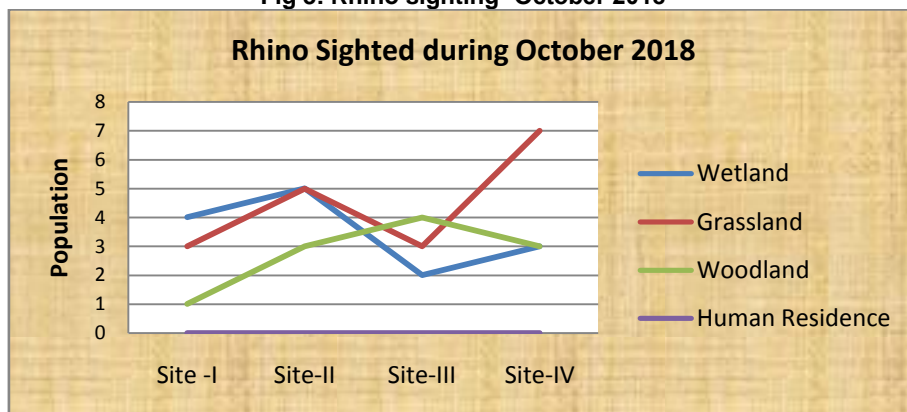


Fig 4: Habitat Utilization by Rhino in Pobitora W.S. October'2018

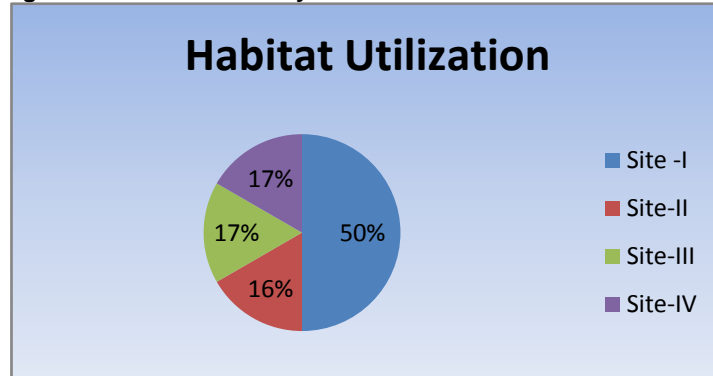


Fig 5: Rhino sighting- November'2018

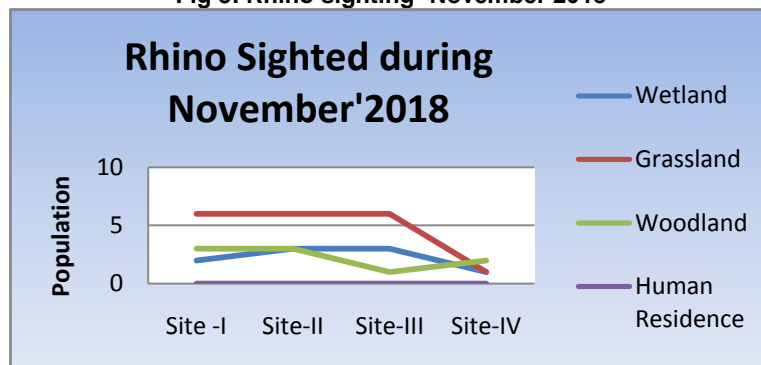


Fig 6: Habitat Utilization by Rhino in Pobitora W.S. November'2018

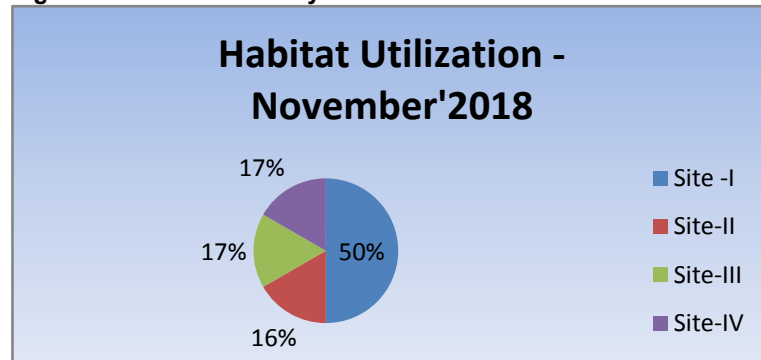


Fig 7: Rhino sighting- December'2018

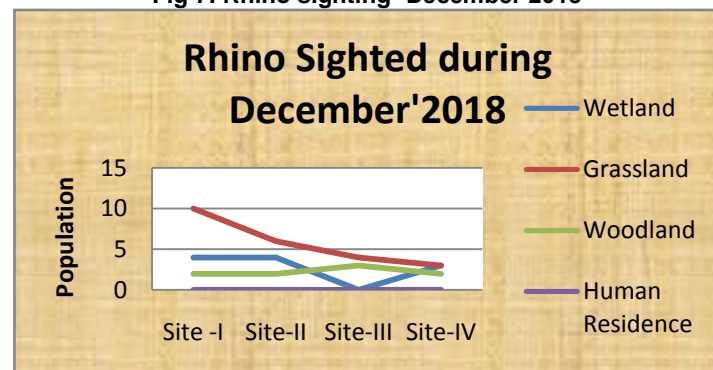


Fig 8: Habitat Utilization by Rhino in Pobitora W.S. December'2018

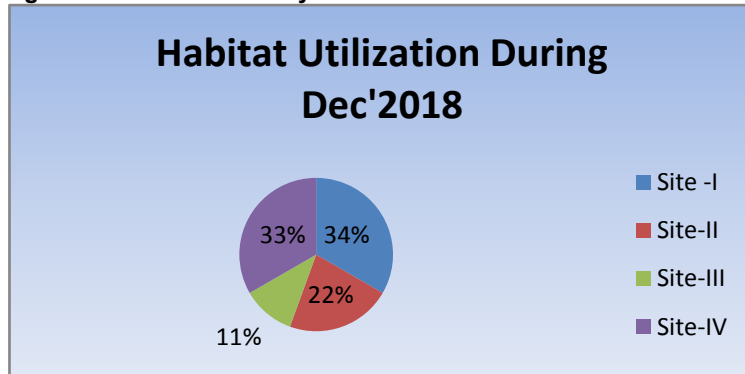


Fig 9: Rhino sighting- January'2019

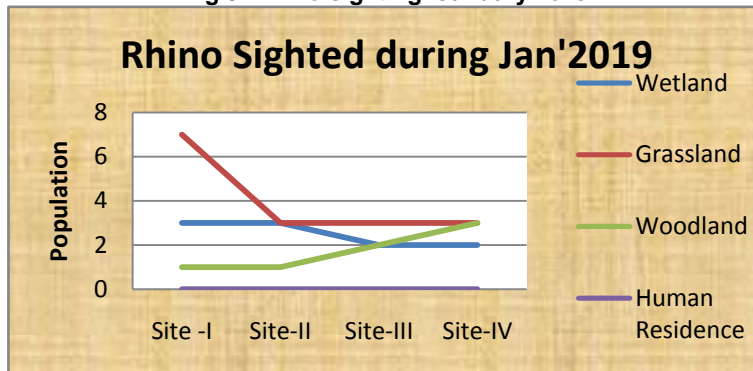


Fig 10: Habitat Utilization by Rhino in Pobitora W.S. January'2019

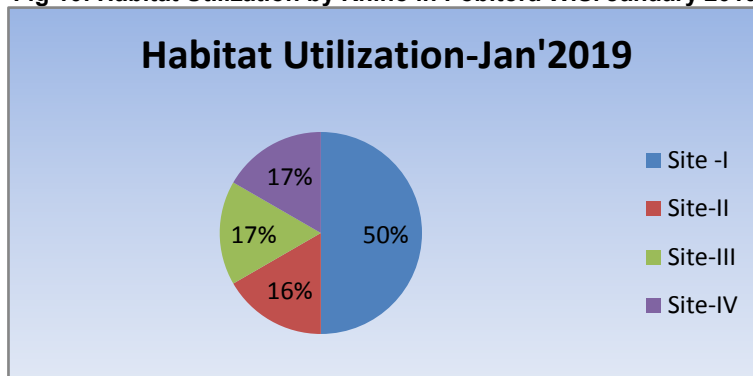


Fig 11: Rhino sighting- February'2019

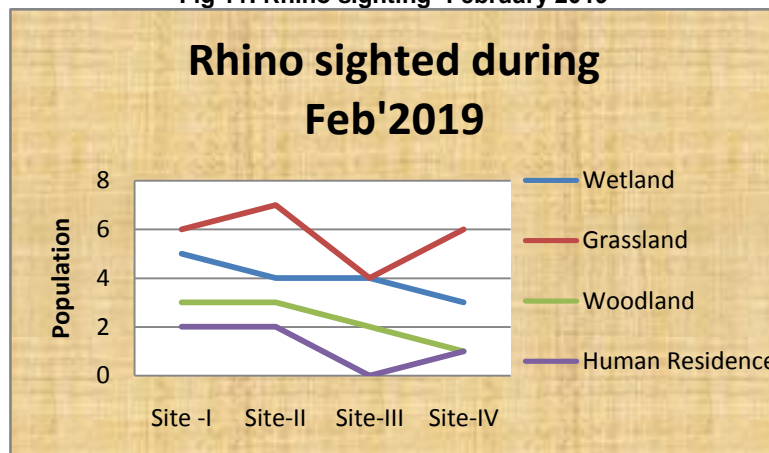


Fig 12: Habitat Utilization by Rhino in Pobitora W.S. February'2019

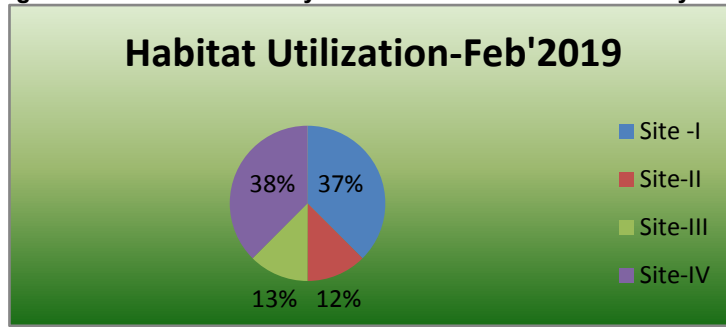


Fig 13: Rhino sighting- March'2019

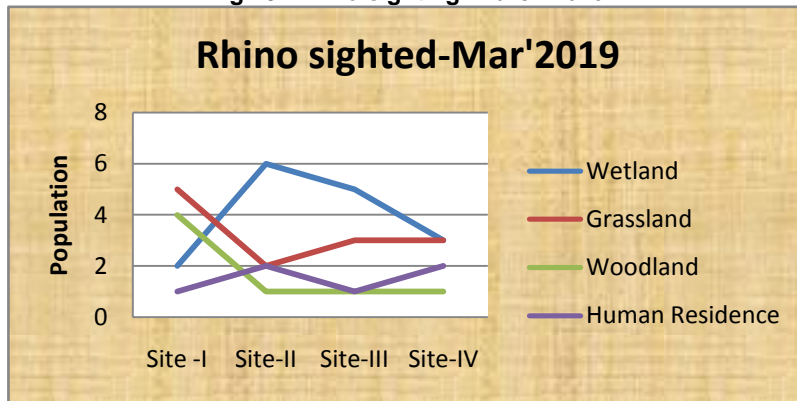


Fig 14: Habitat Utilization by Rhino in Pobitora W.S. March'2019

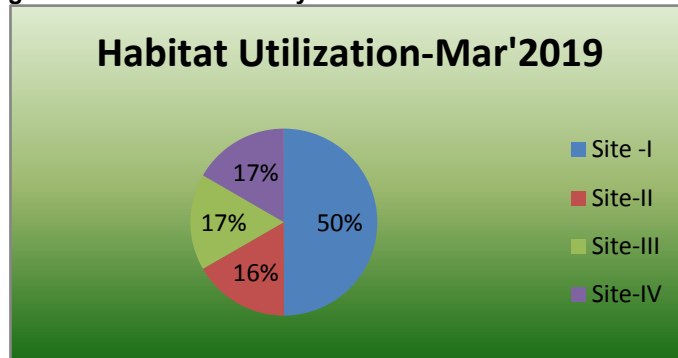


Fig 15: Rhino sighting- April'2019

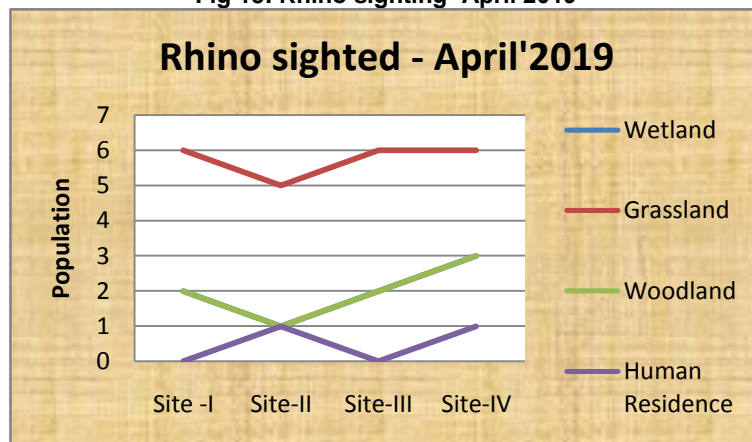
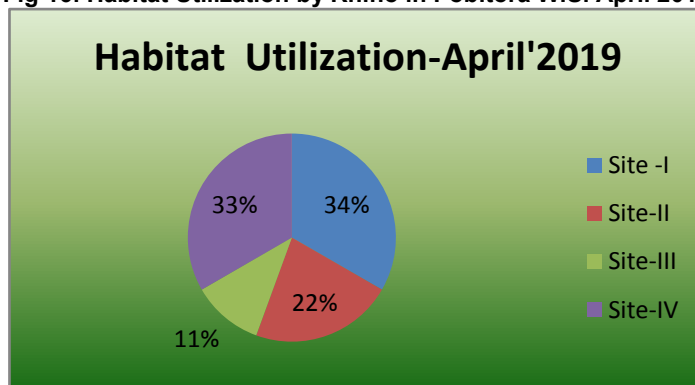
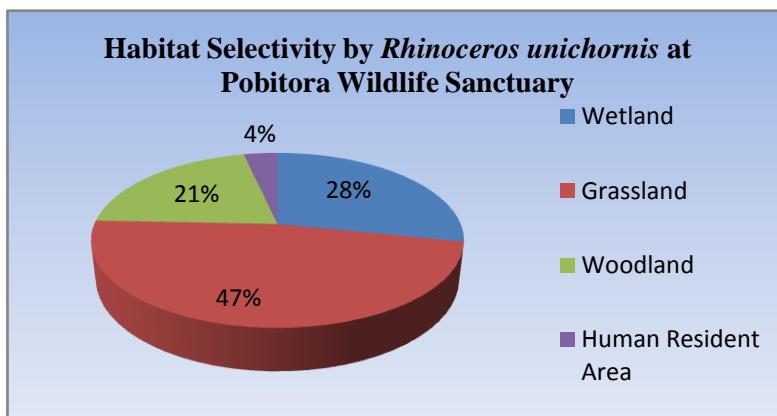


Fig 16: Habitat Utilization by Rhino in Pobitora W.S. April'2019



Habitat Selectivity Survey

Habitat Selectivity by <i>Rhinoceros unicornis</i>	
Habitat	%
Wetland	28.2
Grassland	47.4
Woodland	20.8
Human Resident Area	3.5



Discussion

During the study period between September 2018 and April 2019, rhinos were spotted ranging from lowest 22 in september to 48 in february in different habitats in Pobitora Wildlife Sanctuary. According to latest population count carried out at the Pobitora Wildlife Sanctuary, that spans only over 48 sq. km has recorded an increase in the pace of growth of the one-horned rhino recording a presence of 102 rhinos against the 2012 census.

In the month of september total number of rhinos sighted were 22, similarly in october 43 rhinos, November 37, December 43, January 33, February 48, March 36, April 39 were sighted.

The study reveals that the maximum use of grassland habitat by the Indian Rhino was 47.4%(n=148), 28.2%(n=90) in wetland, 20.8%(n=65) in woodland, 3.5% in human resident area.

Earlier studies carried out on habitat utilization patterns, ecology and behaviour of the greater one-horned rhino also show that the habitat the rhinos prefer most is wet alluvial grassland (Fjellstad, et al., 1996; Deka et al., 2003; Laurie, 1978).

Conclusions

The rhinoceros is an amazing creature, which has dominated many ecosystems on this planet for millennia. It has evolved from hundreds of sub-species and adapt to enumerable ecological changes. The Indian rhino currently holds its place as the second largest rhinoceros on planet earth. The first is the white rhinoceros. The story of the Rhino is long, has a very sad ending. Most species of rhino today are nearly extinct, largely due to irresponsible hunting or poaching operations and rapidly shrinking habitats. Only five distinct species of rhinoceros exist today and most of those exist only in wildlife reserves sectioned off and designed for them.

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