

# Forest Fire-A Case Study on the Four National Park of Uttarakhand

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**Abstract:-** Forest fire is not a new concept in present era but now a days the threat of forest fire looms large over the vast cover of green vegetation. As the global temperature is rising, increasing incidents of forest fires are increasing the temperature of earth. The forests are prone to the wildfire because of large spell of winter in which the precipitation is scanty. Every year India witnesses many incidents of forest fire in a vast geographical area. This is one of the biggest threat to our biodiversity and wild life. Every year many animals lost their life in wild fire. India has 104 national parks and more than 500 wild life sanctuary. These national parks and wild life sanctuary are under the great threat of wild fire. Uttarakhand is a Himalayan state which holds a large number of species of wild flora and fauna. Some of these wild animals and plants holds a great importance in our environment. Every year Uttarakhand witnesses a large number of wild fires. Being an ecologically sensitive zone, these wild fires damages a large geographical area of state. Uttarakhand has 45.32% of its geographical area under the forest cover. It is the only north Indian state to have more than 33% of area under forest cover. When we include permanently snowbound landscapes and alpine pastures as forests, the total area recorded as forests is as high as 71.05%.

The present study is about the forest fire analysis in the four national parks of Uttarakhand. These national parks are: Jim Corbett National Park, Govind wildlife sanctuary and national park, Nandadevi forest division, Rajaji Tiger reserve. From 2005 to 2015, in last ten years, total 601 incidents were reported in these four national parks and wild life sanctuaries. Among these the Rajaji National Park witnessed most of the fire incidents about 66.39% percent of the total reported fire incidents.

## 1 INTRODUCTION

Uttarakhand has witnessed a number of fire incidents in the past. Being a Himalayan state, the ecology of Uttarakhand is quite sensitive. Uttarakhand has a large area under its forest cover. It has highest number of forest cover in the northern states. Uttarakhand also an abode of many flora and fauna which are protected by national park, sanctuaries and bio-sphere reserve. Some of these flora and fauna are even listed in IUCN (International Union of Conservation and Nature) as critically endangered and endangered. Forest fire increases the rate of extinction of species. As per FSI Uttarakhand forest are divided in the following types:

- 1) Tropical Moist Deciduous Forest
- 2) Tropical Dry deciduous Forest
- 3) Subtropical Pine Forest
- 4) Himalayan Moist Temperate Forest
- 5) Tropical Moist Deciduous Forest
- 6) Plantation/Trees Outside Forest

These forests are prone to forest fires. The duration of forest fire in state is from February to June. The peak fire incidents are reported in the May and June. The forest fire in state is categorised in three types:

- 1) Ground fires
- 2) Surface fires
- 3) Crown fires

Ground fire spread on the top of organic matter. It mostly consume matter like duff, musk or peat present beneath the surface litter of the forest floor. Surface fire spread very rapidly and mostly survive upon the small vegetation and surface litter. The Crown fire burns the top trees and shrubs without having any close link with surface fire. These are the mainly three types of fire which occurs in forests and natural parks of forests. The study about four national park and occurrence of fire incidents are as follow:

## 2. CORBETT NATIONAL PARK:

The park is located between 29°25' to 29°39'N latitude and between 78°44' to 79°07'E longitude. Park is covered area 1318.54 km<sup>2</sup>. The altitude of the region ranges between 360 m to 1,040 m. The park has total of 488 different species of plants have been recorded in the park. Total tree basal cover is greater in Sal dominated areas of woody vegetation. The park has more than 586 species of resident and migratory birds crested serpent eagle, blossom headed parakeet and red jungle fowl. 33 species of reptiles, seven species of amphibians, seven species of fish and 36 species of dragonflies have also been recorded. Leopards, barking deer, sambar deer, hog deer, Himalayan black bear etc. are found. From 2005 to 2015, Corbett Tiger National park, witnessed 196 incidents, which are 32.61% of the total number of the forest fire witnessed in this duration. The map showing fire sensitive areas in the Corbett National Park is as follow:

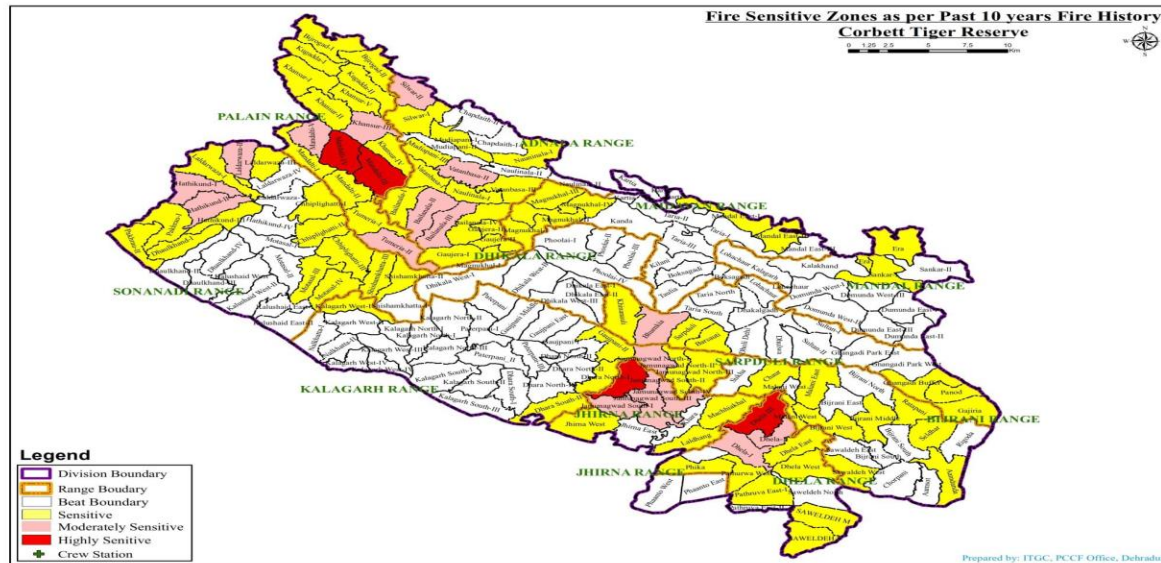


Figure 2.1: Map of sensitive areas in Corbett National Park

(Source: Forest Fire Mitigation Measure Report)

Table 2.1 Fire Sensitive Compartments in Corbett Tiger Reserve

Range	BEAT	Compartment	Number of Fire Incidences 2005-2015	Fire Sensitivity
DHELA RANGE	Dhela-III	4	8	Highly Sensitive
DHELA RANGE	Dhela-III	5	10	Highly Sensitive
JHIRNA RANGE	Jamunagwad South-II	5	11	Highly Sensitive
JHIRNA RANGE	Jamunagwad South-II	6	4	Highly Sensitive
DHELA RANGE	Dhela-I	1	7	Mod. Sensitive
DHELA RANGE	Dhela-I	2	6	Mod. Sensitive
DHELA RANGE	Dhela-II	3	4	Mod. Sensitive
JHIRNA RANGE	Jamunagwad South-I	4	2	Mod. Sensitive
DHELA RANGE	Dhela-II	7	8	Mod. Sensitive
JHIRNA RANGE	Jamunagwad South-I	7	6	Mod. Sensitive
JHIRNA RANGE	Jamunagwad South-III	9	2	Mod. Sensitive
JHIRNA RANGE	Jamunagwad South-III	10	12	Mod. Sensitive
JHIRNA RANGE	Jamunagwad South-IV	11	6	Mod. Sensitive
JHIRNA RANGE	Jamunagwad South-IV	12	2	Mod. Sensitive
KALAGARH RANGE	Jamunagwad North-I	14	2	Mod. Sensitive
KALAGARH RANGE	Jamunagwad North-I	15	6	Mod. Sensitive
SARPDULI RANGE	Bhumkia	17	3	Mod. Sensitive
SARPDULI RANGE	Bhumkia	18	5	Mod. Sensitive
SARPDULI RANGE	Bhumkia	19	1	Mod. Sensitive
SARPDULI RANGE	Bhumkia	20	5	Mod. Sensitive
JHIRNA RANGE	Jhirna West	3	2	Sensitive
BIJRANI RANGE	Chaur	4	2	Sensitive
JHIRNA RANGE	Laldhang	5	2	Sensitive
BIJRANI RANGE	Malani West	6	4	Sensitive
JHIRNA RANGE	Machhiakhhal	6	4	Sensitive
BIJRANI RANGE	Malani East	8	1	Sensitive
DHELA RANGE	Dhela East	8	2	Sensitive
BIJRANI RANGE	Bijrani West	9	2	Sensitive
DHELA RANGE	Dhela West	11	1	Sensitive
KALAGARH RANGE	Gaujpani-II	12	2	Sensitive
KALAGARH RANGE	Gaujpani-II	13	1	Sensitive
KALAGARH RANGE	Dhara South-II	14	2	Sensitive
KALAGARH RANGE	Dhara North-I	15	4	Sensitive
BIJRANI RANGE	Bijrani Middle	16	1	Sensitive
SARPDULI RANGE	Khinanauli	16	2	Sensitive
KALAGARH RANGE	Jamunagwad North-II	17	4	Sensitive
KALAGARH RANGE	Dhara North-I	18	5	Sensitive
KALAGARH RANGE	Jamunagwad North-III	18	4	Sensitive
SARPDULI RANGE	Sarpduli	21	4	Sensitive
SARPDULI RANGE	Barsauti	23	2	Sensitive
SARPDULI RANGE	Barsauti	24	2	Sensitive

DHIKALA RANGE	Dhikala East-I	10 Part	1	Sensitive
BIJRANI RANGE	Seldhar	1	2	Sensitive
KALAGARH RANGE	Nalkhatta-I	1	1	Sensitive
BIJRANI RANGE	Seldhar	2	1	Sensitive
BIJRANI RANGE	Sawaldeh West	4	2	Sensitive
DHELA RANGE	Pathruva East-I	5	2	Sensitive
BIJRANI RANGE	Aamdanda	6	1	Sensitive
DHELA RANGE	Pathruva East-II	6	1	Sensitive
SARPDULI RANGE	Dhangari Buffer	8	2	Sensitive
SARPDULI RANGE	Panod	10	2	Sensitive
SARPDULI RANGE	Gajiria	12	7	Sensitive
BIJRANI RANGE	Ratapani	19	2	Sensitive
DHELA RANGE	Phika	1b	3	Sensitive
DHELA RANGE	SAWELDEH M	SAWELDEH M	3	Sensitive
DHELA RANGE	SAWELDEH S	SAWELDEH S	4	Sensitive

### 3. GOVIND WILDLIFE SANCTUARY AND NATIONAL PARK

The park is located between 31.10°N latitude 78.29°E longitude. Park is covered area 958 km<sup>2</sup>. The altitude of the region ranges 1400m to 6323m. Trees present in the lower parts of the sanctuary include chir pine, deodar, oak etc. At altitudes over about 2,600 m common species include conifers such as blue pine, silver fir, yew and other species such as oak, maple, walnut, horse chestnut, hazel and rhododendron. In the park about fifteen species of large mammal and one hundred and fifty species of birds. The mammals found in the sanctuary include the Asian black bear, the brown bear, the common leopard, the musk deer, the Himalayan tahr and the serow, Indian

crested porcupine, European otter, goral, civet, hedgehog, Himalayan field rat. Birds found here include several endangered species such as the golden eagle, the steppe eagle and the black eagle, the bearded vulture, the Himalayan snowcock, the Himalayan monal pheasant. Govind wild life sanctuary and National park witnessed less number of the wild fire in duration between 2005 to 2015. Total 4 incidents were reported in this time period, which is 0.665% of total number of incidents. The main reason behind the less number of fire incidents is high altitude and less inhabited by villages. The ground holds sufficient amount of moisture because of this, it is not prone to wildfire as compared to other national parks.

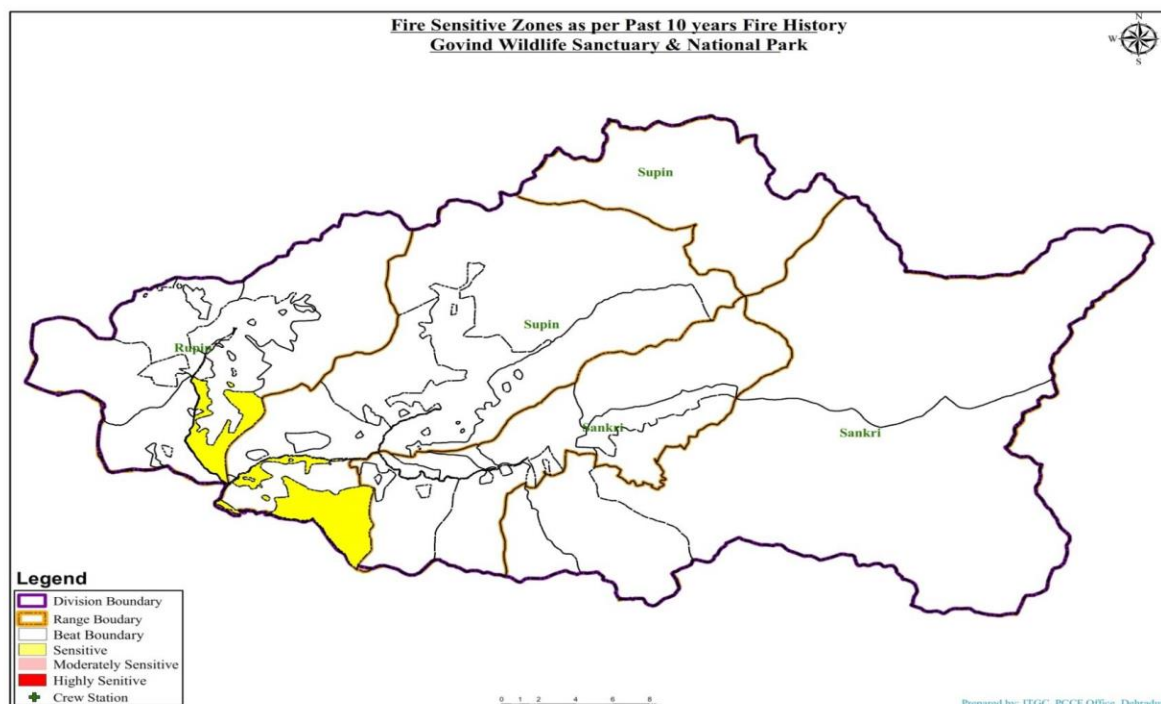


Figure 3.1 Map showing sensitive areas in Govind wildlife Sanctuary and National Park  
(Source: Forest Fire Mitigation Measure Report)

Table 3.1 Fire Sensitive Compartments in Govind Wildlife Sanctuary and National Park

Fire Sensitive Compartments in Range	BEAT	Compartment	Number of Fire Incidences 2005-2015	Fire Sensitivity
Supin	Saur	1	2	Sensitive
Rupin	Pujeli	4	2	Sensitive

#### 4. NANDA DEVI FOREST DIVISION:

The park is located between 30°25'7"N latitude 79°50'59"E longitude. Park is covered area 630.33 km<sup>2</sup>. The altitude of the region ranges 6000m to 7500m. This park is also part of UNESCO World Heritage Site. The park is home to a wide variety of flora. The park has 312 floral species that include 17 rare species have been found here. Fir, birch, rhododendron, and juniper are the main flora. Vegetation is scarce in the inner sanctuary due to the dryness of the conditions. One will not find vegetation near

Nanda Devi Glacier. Ramani, alpine, prone mosses and lichens are other notable floral species found here. Common larger mammals are Himalayan musk deer, mainland serow, Himalayan tahr, snow leopard, Himalayan black bear, brown bear, Langurs are found within the park and total no of 114 bird species were recognized. In between 2005 to 2015, Nanda Devi National park witnessed least number of fire incidents. High altitude and less moisture in ground through out the year is main reason because of this less number of forest fires are reported in region.

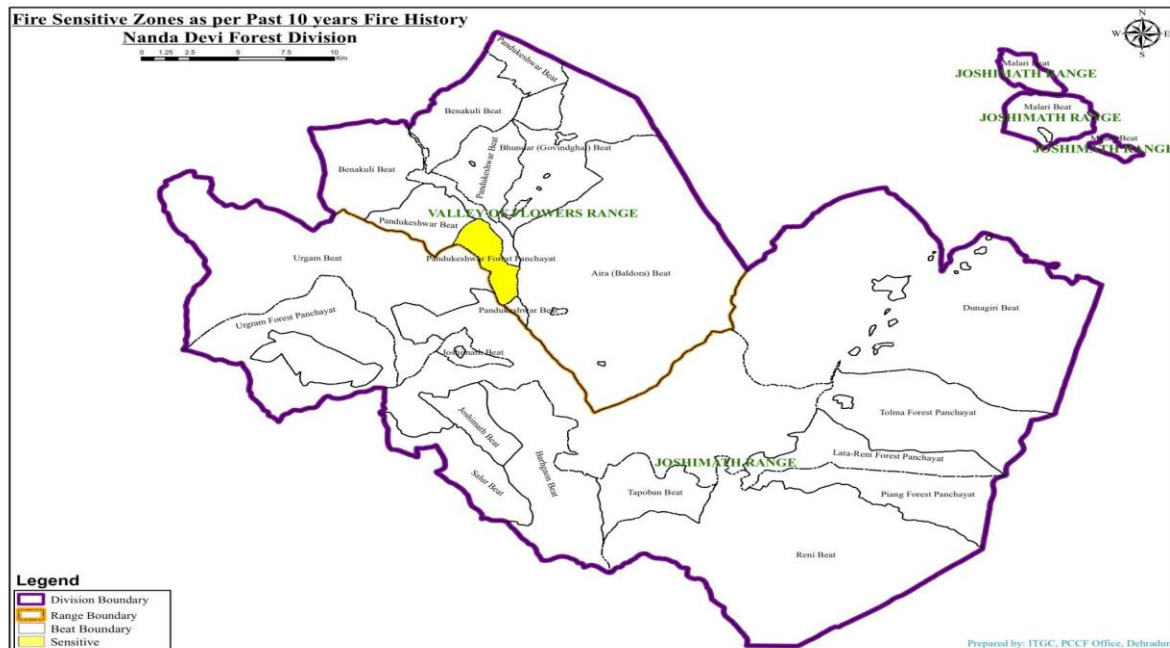


Figure 4.1 Map showing sensitive areas in Nanda Devi National Park

(Source: Forest Fire Mitigation Measure Report)

Table 4.1 Fire Sensitive Compartments in Nanda Devi Forest Division

Range	BEAT	Compartment	Number of Fire Incidences 2005-2015	Fire Sensitivity
VALLEY OF FLOWERS RANGE	Pandukeshwar Forest Panchayat	Forest Pan	2	Sensitive

#### 5.0 RAJAJI NATIONAL PARK:

The park is located between 29°52' to 30°15'N latitude and between 78°57' to 78°23'E longitude. Park is covered area 820.42 km<sup>2</sup>. The altitude of the region ranges 360m to 860m. The Park has deciduous forests, riverine vegetation, scrubland, grasslands and pine forests form the range of flora in this park. The under-wood is light and often absent, consisting of rohini, shisham, Sal, palash, arjun, khair etc. The Park is predominantly formed from dense green jungles, and this environment forms a habitat for a number of animals. Here we found sambar, barking deer, hog deer, nilgai, wild pigs, sloth bears, leopard cat, jungle cat,

civet etc. Over 315 species of birds are found in the park, whereas the wider region has over 500 species of birds, including both residents and migrants. The most prominent avian species include pea fowl, vultures, woodpeckers, pheasants, kingfishers etc. Rajaji National Park witnessed highest numbers of forest fires about 399. The main reason behind the highest number of fire incidents are :Deciduous nature of forest because of this biomass accumulated in large quantity. The villages which are in surrounding of national parks follow the practice of burning of agricultural residue, sometimes the fires escapes agricultural fields and reaches into national park.

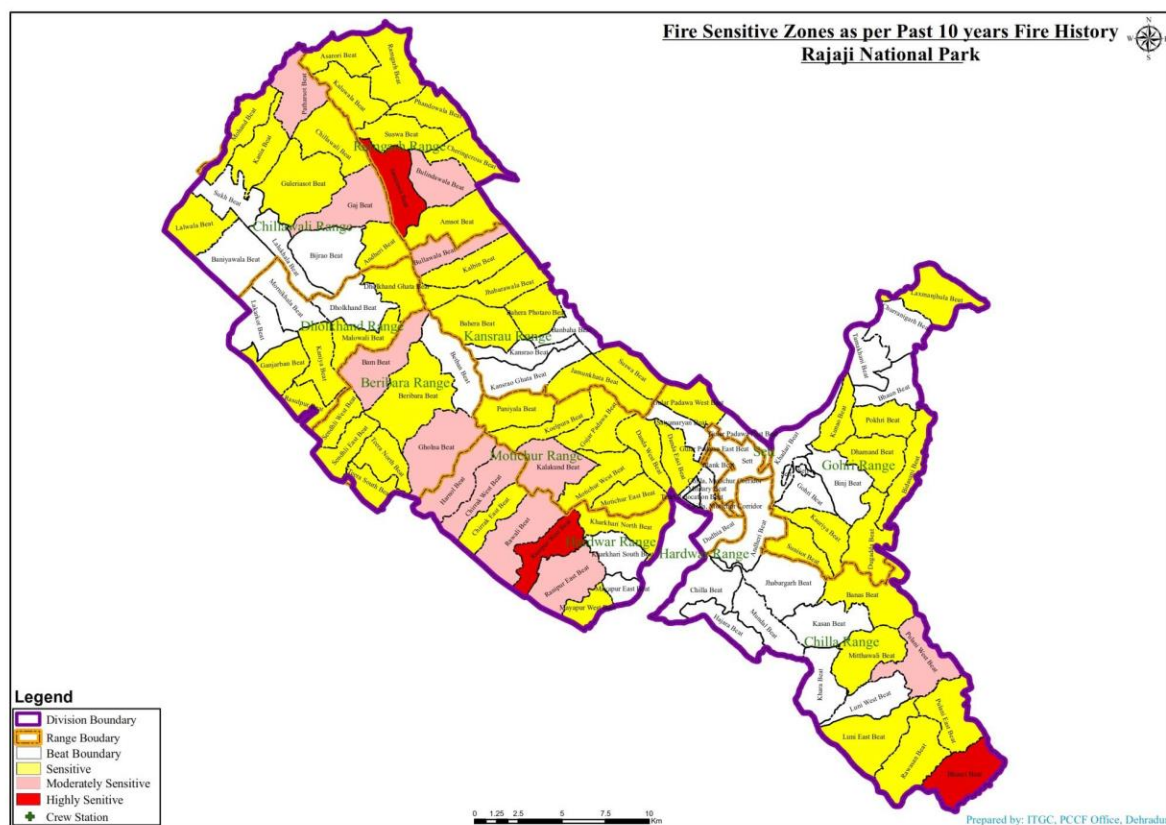


Figure 5.1 Map showing sensitive areas in Rajaji National Park

(Source: Forest Fire Mitigation Measure Report)

Table 5.1 Fire Sensitive Compartments in Rajaji National Park

Range	BEAT	Compartment	Number of Fire Incidences 2005-2015	Fire Sensitivity
Haridwar Range	Ranipur West Beat	2a (Part)	15	Highly Sensitive
Haridwar Range	Ranipur West Beat	2b (Part)	7	Highly Sensitive
Beribara Range	Bam Beat	1	1	Mod. Sensitive
Beribara Range	Gholna Beat	1	2	Mod. Sensitive
Chilla Range	Pulani Beat	1	3	Mod. Sensitive
Gohri Range	Gohri Beat	2	1	Mod. Sensitive
Gohri Range	Gohri Beat	3	2	Mod. Sensitive
Kans Rao Range	Bullawala Beat	3	1	Mod. Sensitive
Kans Rao Range	Bullawala Beat	4	2	Mod. Sensitive
Gohri Range	Gohri Beat	5	4	Mod. Sensitive
Gohri Range	Gohri Beat	8	4	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	8	6	Mod. Sensitive
Chilla Range	Pulani Beat	9	5	Mod. Sensitive
Chilla Range	Pulani Beat	11	3	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	14	1	Mod. Sensitive
Kans Rao Range	Bullawala Beat	10b	2	Mod. Sensitive
Kans Rao Range	Bullawala Beat	11a	2	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	11a	2	Mod. Sensitive
Kans Rao Range	Bullawala Beat	11b	1	Mod. Sensitive
Kans Rao Range	Bullawala Beat	11b	3	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	11b	2	Mod. Sensitive
Kans Rao Range	Bullawala Beat	12a	5	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	12a	1	Mod. Sensitive
Kans Rao Range	Bullawala Beat	12b	1	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	15a	2	Mod. Sensitive
Beribara Range	Gholna Beat	2a	4	Mod. Sensitive
Haridwar Range	Harnol Beat	2a	8	Mod. Sensitive
Haridwar Range	Rawali Beat	2a	11	Mod. Sensitive
Haridwar Range	Chirrak West Beat	2a (Part)	9	Mod. Sensitive
Haridwar Range	Ranipur East Beat	2a (Part)	4	Mod. Sensitive
Beribara Range	Gholna Beat	2b	7	Mod. Sensitive

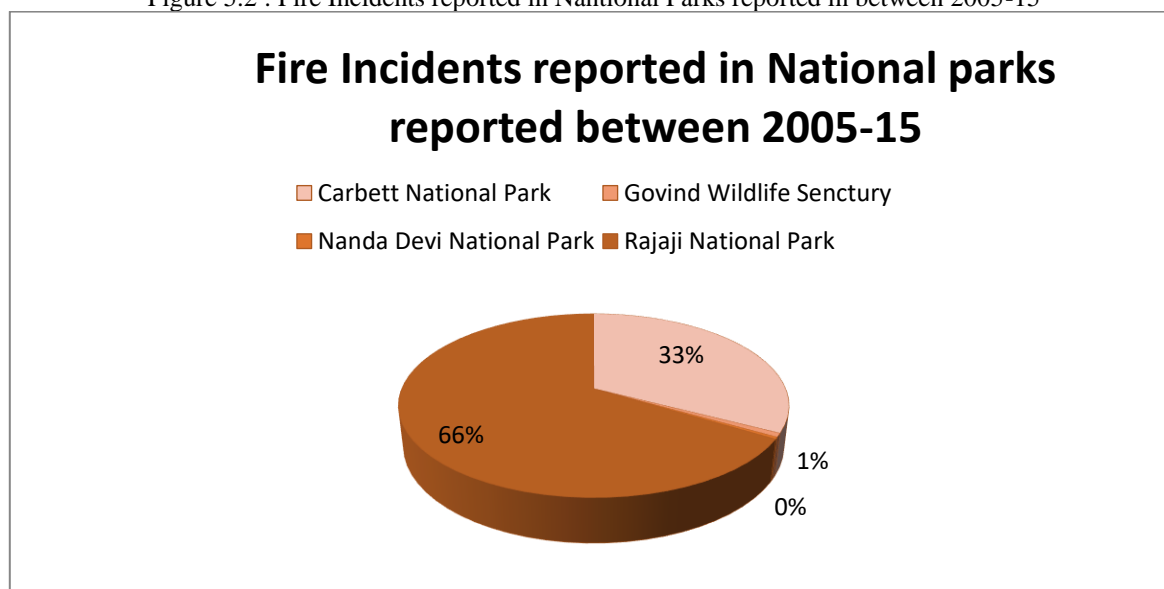
Haridwar Range	Harnol Beat	2b	3	Mod. Sensitive
Haridwar Range	Rawali Beat	2b	3	Mod. Sensitive
Haridwar Range	Chirrak West Beat	2b (Part)	4	Mod. Sensitive
Haridwar Range	Ranipur East Beat	2b (Part)	8	Mod. Sensitive
Beribara Range	Bam Beat	3a	1	Mod. Sensitive
Chillawali Range	Sukh Beat	3a	9	Mod. Sensitive
Beribara Range	Bam Beat	3b	8	Mod. Sensitive
Chillawali Range	Sukh Beat	3b	6	Mod. Sensitive
Chillawali Range	Gaj Beat	4a	10	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	4a	3	Mod. Sensitive
Chillawali Range	Gaj Beat	4b	2	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	4b	2	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	5a	3	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	5b	4	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	6b	2	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	7b	2	Mod. Sensitive
Ramgarh Range	Bulindawala Beat	9b	3	Mod. Sensitive
Beribara Range	Sendhli Beat	1	2	Sensitive
Chilla Range	Kasan Beat	1	1	Sensitive
Dholkhand Range	Rasulpur Beat	1	1	Sensitive
Gohri	Maral	1	2	Sensitive
Gohri Range	Laxmanjhula North Beat	1	4	Sensitive
Haridwar Range	Mayapur West Beat	1	1	Sensitive
Kans Rao Range	Jamunkhata Beat	1	1	Sensitive
Chilla Range	Khara Beat	2	6	Sensitive
Kans Rao Range	Jamunkhata Beat	2	4	Sensitive
Motichur Range	GularPadawa West Beat	3	2	Sensitive
Ramgarh Range	Amsot Beat	3	3	Sensitive
Dholkhand Range	Rasulpur Beat	4	1	Sensitive
Ramgarh Range	Phandowala Beat	4	1	Sensitive
Chilla Range	Rawasan Beat	5	4	Sensitive
Dholkhand Range	Rasulpur Beat	5	1	Sensitive
Ramgarh Range	Phandowala Beat	5	3	Sensitive
Chilla Range	Rawasan Beat	6	5	Sensitive
Dholkhand Range	Ganjarban Beat	6	1	Sensitive
Gohri	Palelgaon	6	3	Sensitive
Gohri Range	Kunao Beat	6	2	Sensitive
Chilla Range	Rawasan Beat	7	10	Sensitive
Dholkhand Range	Ganjarban Beat	7	4	Sensitive
Gohri Range	Bidasani Beat	7	1	Sensitive
Motichur Range	Danda Beat	7	4	Sensitive
Ramgarh Range	Ramgarh Beat	7	2	Sensitive
Motichur Range	Koelpura West Beat	8	2	Sensitive
Ramgarh Range	Asarori Beat	8	4	Sensitive
Ramgarh Range	Ramgarh Beat	8	4	Sensitive
Gohri Range	Bidasani Beat	9	1	Sensitive
Ramgarh Range	Asarori Beat	10	3	Sensitive
Gohri Range	Kunao Beat	12	2	Sensitive
Motichur Range	Motichur Beat	13	1	Sensitive
Gohri Range	Bidasani Beat	15	2	Sensitive
Chilla Range	Rawasan Beat	18	2	Sensitive
Chilla Range	Rawasan Beat	19	2	Sensitive
Chilla Range	Rawasan Beat	20	1	Sensitive
Motichur Range	Koelpura East Beat	10a	1	Sensitive
Motichur Range	Koelpura East Beat	10b	1	Sensitive
Ramgarh Range	Asarori Beat	11a	2	Sensitive
Chilla Range	Luni Beat	12b	3	Sensitive
Chilla Range	Luni Beat	16a	2	Sensitive
Chilla Range	Rawasan Beat	17a	2	Sensitive
Chillawali Range	Lalwala Beat	1a	2	Sensitive
Haridwar Range	Kharkhari North Beat	1a	1	Sensitive
Kans Rao Range	Jamunkhata Beat	1a	1	Sensitive
Motichur Range	Danda Beat	1a	1	Sensitive
Ramgarh Range	Asarori Beat	1a	3	Sensitive
Beribara Range	Teera Beat	1a(i)	2	Sensitive
Beribara Range	Teera Beat	1a(i)	7	Sensitive
Beribara Range	Teera Beat	1b	6	Sensitive
Ramgarh Range	Amsot Beat	1b	2	Sensitive
Ramgarh Range	Asarori Beat	1b	1	Sensitive
Haridwar Range	Chirrak East Beat	2a (Part)	2	Sensitive
Beribara Range	Betban Beat	2b	1	Sensitive

Beribara Range	Sendhli Beat	2b	3	Sensitive
Kans Rao Range	Bahera Beat	2b	1	Sensitive
Ramgarh Range	Asarori Beat	2b	1	Sensitive
Haridwar Range	Chirrak East Beat	2b (Part)	2	Sensitive
Beribara Range	Sendhli Beat	2c	1	Sensitive
Chilla Range	Rawasan Beat	3a	1	Sensitive
Dholkhand Range	Dholkhand Beat	3a	1	Sensitive
Dholkhand Range	Dholkhand Beat	3a	3	Sensitive
Beribara Range	Sendhli Beat	3a (Part)	2	Sensitive
Dholkhand Range	Dholkhand Beat	3b	3	Sensitive
Chillawali Range	Mohand East Beat	3b(Part)	3	Sensitive
Dholkhand Range	Ganjarban Beat	4a	1	Sensitive
Motichur Range	Koelpura East Beat	4a	2	Sensitive
Ramgarh Range	Amsot Beat	4a	2	Sensitive
Motichur Range	Koelpura East Beat	4b	3	Sensitive
Chillawali Range	Andheri Beat	5a	2	Sensitive
Chillawali Range	Chillawali Beat	5a	2	Sensitive
Kans Rao Range	Jhabarawala Beat	5a	1	Sensitive
Chillawali Range	Chillawali Beat	5b	8	Sensitive
Kans Rao Range	Jhabarawala Beat	5b	2	Sensitive
Motichur Range	Motichur Beat	6a	2	Sensitive
Ramgarh Range	Ramgarh Beat	6a	2	Sensitive
Motichur Range	Motichur Beat	6b	4	Sensitive
Kans Rao Range	Jhabarawala Beat	7b	1	Sensitive
Motichur Range	Motichur Beat	8a	2	Sensitive
Motichur Range	Koelpura East Beat	8b	2	Sensitive
Motichur Range	Motichur Beat	8b	1	Sensitive
Kans Rao Range	Jhabarawala Beat	9a	1	Sensitive
Motichur Range	Motichur Beat	9a	1	Sensitive
Kans Rao Range	Bahera Beat	9b	1	Sensitive
Kans Rao Range	Jhabarawala Beat	9c	2	Sensitive
Gohri Range	Kunao Beat	KunaoChaur Block	2	Sensitive

Table 5.2 Total Number of fire Incidents in Four National Park

Nationa Park and wild life sancturies	Fire Incidents	Percentage
Corbett National Park	196	32.61%
Govind Wildlife Santury and National Park	4	0.605%
Nanda Devi National Park	2	0.332%
Rajaji National Park	399	66.39%
Total	601	

Figure 5.2 : Fire Incidents reported in Nantional Parks reported in between 2005-15



#### 6 REASONS FOR FOREST FIRE:

1 Lack of Rain and moisture in the forests: Uttrakhand receives a good amount of precipitation but it is

concentrated in mostly in the monsoon months and leave a long spell of nine months without rain. In this long spell the deciduous forests become vulnerable to forest fire. The rain and snow is important to maintain the moisture in the

ground which helps in preventing the forest fire. If winter do not get sufficient amount of rain, it makes the forests floor and biomass too dry and extremely vulnerable to fire.

2. Uttarakhand is in the lap of Himalayas and villages in Uttarakhand are in the middle of forests of Himalayas. Uttarakhand have large expanse of chir pine forest. As a traditional practice the people are burning there near places to reduce the slippery chir pine needle and to ensure a fresh green grass for their live stocks. When the ground has sufficient moisture, the fire remain control but if there is no winter rain, it can go out of control.

3. Burning of agricultural biomass in agricultural fields is very common in entire north India. Sometime the fire escapes from the fields and reaches into forests and national parks

4. A large area of Uttarakhand is hilly terrain which makes it very difficult to control forest fire. To reach a site which is often away from road head is difficult. Many places in national parks and forests have no foot track and bridge path to reach site.

5. Technology has helped in the detection of fires in but there are still a lot of challenges like mobilisation of department of workforce on a particular site because of less number of vehicle and fire extinguishing equipment.

#### 7 FOREST FIRE MITIGATION MEASURES:

- 1: The national park authorities and forest department officials have to create awareness generation programs in the villages which are surroundings of the national parks and wild life sanctuaries.
- 2: The national park authorities must follow rotational burning/controlled burning of forest floor so that the litter and bio mass would not accumulate in an area.
- 3: During the peak season of the forest fire burning national park authorities can create master control room to monitor the situation.
- 4: The forest department and national park official must create watch towers in the surroundings of national parks.
- 5: The forest department can create a crew station for tackling the situation immediately so that the forest fire can be control easily in its initial phases.
- 6: All ground crew stations must be connected to the wireless communication network so that they can get proper information from master control room
- 7: The forest department official and other persons must be equipped with efficient firefighting tools.
- 8: The national park authorities must adopt a suitable techniques to reduce fuel load on forest floor.
- 9: The national park authorities must continue their awareness campaign about forest fire and its impact on wild life.

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