

# PANNA TIGER RESERVE, PANNA, MP.

## NEWSLETTER

(24/05/2022)

### FIRE SEASON - 2022

#### **“MANAGING AND CONTROLLING FOREST FIRES *in* PANNA TIGER RESERVE”**

##### **1. INTRODUCTION:**

As per long term trend analysis performed by Forest Survey of India (FSI), Dehradun, nearly 10.66% area of forest cover in India is under extremely to very highly fire prone zone. Panna Tiger Reserve (PTR) being dry deciduous forest area, also falls under extremely to very highly fire prone zone. Severe fire happens in Dry Deciduous forest compare to other forest types. Persistent hot and drier weather from January till monsoon makes PTR very prone to fires. Forest fires have been recorded in PTR mainly from February to June, though occasional fire incidents have happened in January also in past. Majority of fires being caused due to man-made factor, anthropogenic origin.

Forest fires have long been an integral part of the forest environment and have played important role in shaping the forest ecosystem, their conservation and management. Although fire has benefits in terms of clearing the forest floor and paving way for regeneration of new grass, herbs, and sapling, yet these are marginal when compared to the huge losses linked to large and long duration forest fires.

Since 2004, Forest Department is using modern technology, latest remote sensing and communication technology to deal with forest fires. Since 2008, forest fire alerts through SMS, were provided to field staff by using MODIS (Moderate Resolution Imaging Spectroradiometer) sensor on-board Aqua and Terra Satellite of NASA. Currently, forest fires are detected by MODIS sensor (1 km \* 1 km resolution) and SNPP-VIIRS (Suomi National Polar-orbiting Partnership- Visible Infrared Imaging Radiometer Suite) sensor (375 m \* 375 m resolution), at least six times in 24 hours and SMS are sent in the shortest possible time to field staff.

##### **2. FOREST FIRES IN PTR- A Comparative Analysis for Year 2021 and 2022:**

Year 2022 is on the way to become one of the hottest years ever. The month of March, April and May were unusually dry with high temperature. Rainfall over Central India in April 2022 was 55% less than normal rainfall. Over the country as a whole during April 2022, the average maximum temperature was third highest with 35.3°C after the years 2010 (35.42°C), 2016 (35.32°C) since 1901 and mean temperature was second highest with 29.41°C after the year 2010 (29.48°C) since 1901. The average minimum temperature was also second highest 23.51°C after the year 2010 (23.54°C) since 1901.

Over Central India during April 2022, the average maximum temperature was highest with 38.04°C in last 122 years for the period 1901-2022 against the earliest record of 37.75°C in 1973. The average mean temperature in April 2022 was highest with 31.35°C for the period 1901-2022 and it broke the earlier highest record of 31.10°C in 2010. The average minimum

temperature was also highest in April 2022 with 24.66°C and it broke the earlier record of 24.52°C in 2010.

PTR, a Tiger Reserve in Central India having Dry Deciduous Forest, high dryness coupled with high temperature in year 2022 was a cause of concern as forest fire is common in Dry Deciduous Forests during summer season. Management of forest fire is a three pronged strategy which includes: (i) Pre-fire activities or Fire prevention works; (ii) During fire response or Fire suppression, and (iii) Post fire reconstruction works. Planning for managing forest fire for fire season 2022 started in the month of October 2021.

**a. Pre-Fire Activities or Fire Prevention:**

The plan was to substantially reduce the vulnerabilities of PTR forest against fire hazards, to improve and enhance capabilities of forest and other personnel in fighting forest fires and use of technology. Technology such as satellite-based forest fire detection and alerts dissemination in near real-time and related activities are of critical importance in timely prevention and control of forest fires. It was ensured that fire alerts were received up to the Beat Guard managing the Beat. Previous years forest fire data of PTR was collected and analyzed to have idea about fire susceptibility of forest area, kind of early warning information. Special emphasis was given in those areas which had potential to convert small forest fires in to large fires.

Fire lines were cut and cleared in November-December 2021. Last week of December 2021 and second week of January 2022 received some rains which delayed the burning of cut fire lines till February-March 2022. Dates of fire line burning was decided based on dryness of the cut material and it varied from one range to other. PTR has extensive wireless network covering the whole Tiger Reserve. Start and end of every fire line burning was reported to HQ through wireless. Last of fire-line burning was completed on 24<sup>th</sup> March 2022 in Hinouta Range.

Fire Camps with Fire Watchers were deployed in every Range along with one vehicle at their disposal for swift movement. Location of these Fire Camps were so decided so as to cover the pre-identified fire sensitive area quickly.

**b. During Fire Response or Fire Suppression:**

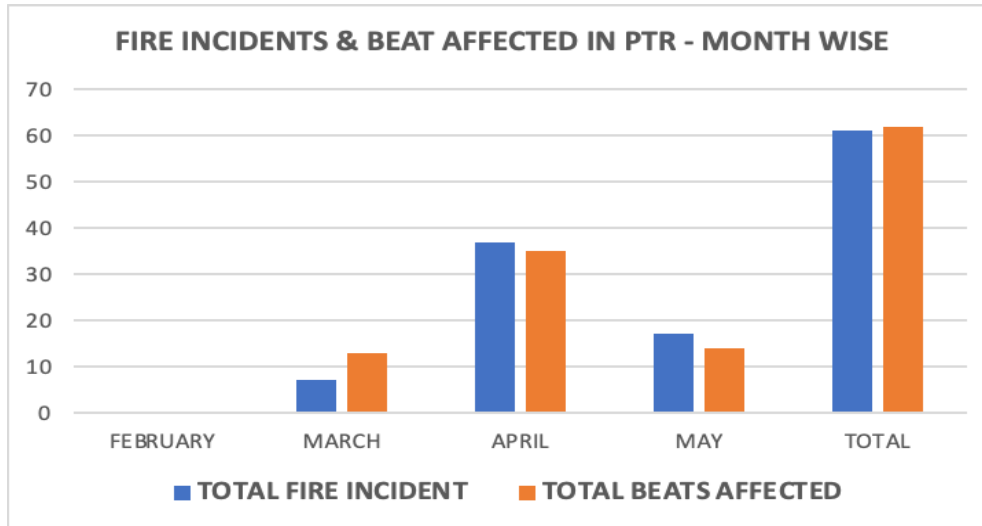
Following Table 1 and Chart 1 give detail of the Month-wise fire incidents and Beat affected in PTR for the year 2022:

**Table 1**

**Month-wise Fire Incidents and Beat affected in PTR in Year 2022**

MONTH	TOTAL FIRE INCIDENT	TOTAL BEATS AFFECTED BY FIRE*		
		NEW BEATS	BEATS ALREADY AFFECTED IN LAST MONTHS	TOTAL BEATS AFFECTED IN MONTH
FEBRUARY	-	-	-	
MARCH	7	13	-	13
APRIL	37	35	6	35 + 6 = 41
MAY	17	14	8	14 + 8 = 22
<b>TOTAL</b>	<b>61</b>	<b>62</b>	<b>14</b>	<b>62</b>

\* Total beats affected have been divided in two categories: (i) New Beats i.e., fire incident happening for the first time in a particular month; (ii) Beats already affected in last month's fire i.e., fire incident registered in Beats where fire incidence was registered in past months also. There were 14 Beats which have been affected more than once by fire during year 2022. (A Beat affected by fire doesn't mean that the whole area of the Beat is affected by fire. It only indicates that fire has taken place in some part of the Beat.)

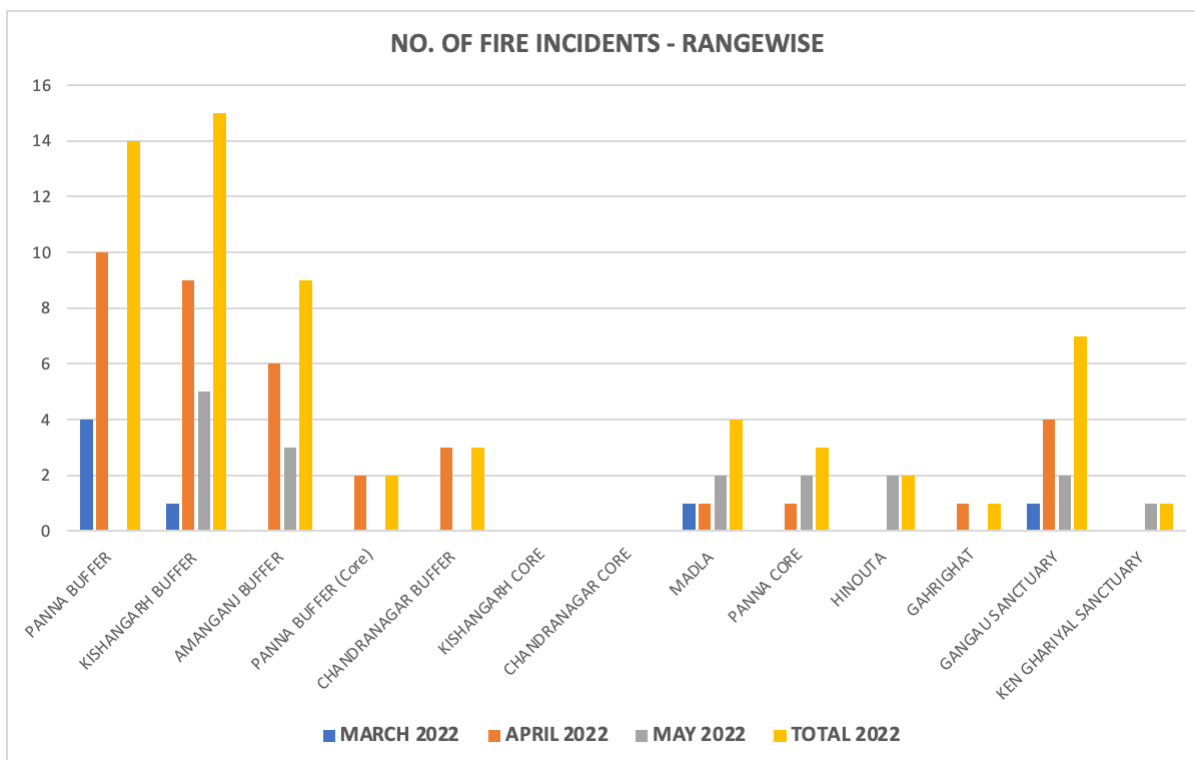


**CHART 1: Month-wise Fire Incidents in PTR in Year 2022**

Following Table 2 and Chart 2 gives detail of the monthly Range-wise fire incidents in PTR for the year 2022:

**Table 2**  
**Range-wise Number of Fire Incidents in PTR in Year 2022**

Sr No.	RANGE	NO. OF FIRE INCIDENTS				
		FEBRUARY	MARCH	APRIL	MAY	TOTAL
1	PANNA BUFFER	0	4	10	0	14
2	KISHANGARH BUFFER		1	9	5	15
3	AMANGANJ BUFFER		0	6	3	8
4	PANNA BUFFER (Core)		0	2	0	2
5	CHANDRANAGAR BUFFER		0	3	0	3
6	KISHANGARH CORE		0	0	0	0
7	CHANDRANAGAR CORE		0	0	0	0
8	MADLA		1	1	2	4
9	PANNA CORE		0	1	2	3
10	HINOUTA		0	0	2	1
11	GAHRIGHAT		0	1	0	1
12	GANGAU SANCTUARY		1	4	2	6
13	KEN GHARIYAL SANCTUARY		0	0	1	1
	<b>TOTAL</b>	<b>0</b>	<b>7</b>	<b>37</b>	<b>17</b>	<b>61</b>



**CHART 2: Month-wise Fire Incidents in PTR in Year 2022**

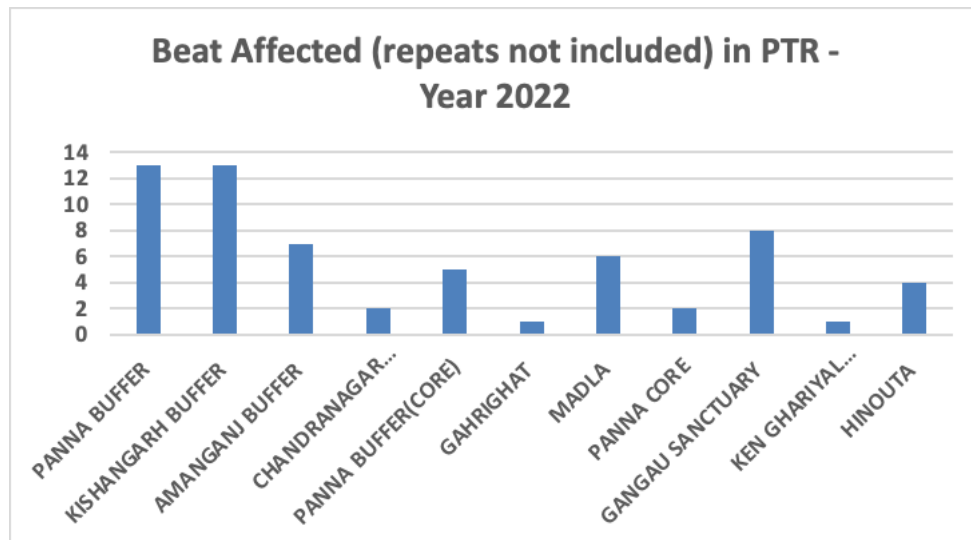
Fire incidents were attended as soon as fire occurred and at the same time, fires which had potential to convert in large fire, were attended with all the resources to control them at the beginning. The smooth exchange of field staff and fire watchers from one range to other, whenever situation demanded to control forest fire, was ensured and monitored from the highest level at PTR. This resulted in early control of fires.

Table 3 and Chart 3 gives details of Beats affected at least once by fire. 58 Beats out of total 143 Beats in PTR have been affected by fire in year 2022. Range-wise distribution of these Beats is as following:

**TABLE 3**  
**Beats Affected by Fire in PTR in year 2022**

RANGE	Beats Affected*
PANNA BUFFER	13
KISHANGARH BUFFER	13
AMANGANJ BUFFER	7
CHANDRANAGAR BUFFER	2
PANNA BUFFER(CORE)	5
GAHRIGHAT	1
MADLA	6
PANNA CORE	2
GANGAU SANCTUARY	8
KEN GHARIYAL SANCTUARY	1
HINOUTA	4
<b>TOTAL</b>	<b>62</b>

*\*A Beat affected by fire doesn't mean that the whole area of the Beat is affected by fire. It only indicates that fire has taken place in some part of the Beat.*



**CHART 3: Range-wise Beats affected at least once by fire in Year 2022**

**c. Comparing Forest Fire Incidents of Year 2021 and Year 2022:**

There are seasonal variation of dryness and temperature every year from January to June. Rains and temperature are two parameters which control the intensity and duration of fire season. While year 2022 received some rains in the second week of January and had lower average temperature till mid-March compare to year 2021, the year 2021 received rains in second week of May. January rains coupled with low average temperature till mid-March in 2022 delayed the forest fire season and no uncontrolled fire (as against controlled fires, fire lines etc., which are ignited in a controlled manner by Forest Department for management purposes) took place till 25<sup>th</sup> March 2022. But since mid-March 2022, PTR has seen one of the hottest and driest summer seasons which continued till it rained on 23<sup>rd</sup> May. Though Year 2021 did not receive any substantive winter rains, it received early rains in the second week of May, which closed the fire season in PTR as no fire took place after early May rains in year 2021.

The effects of rains and temperature not only affects onset of fire season, it also affects collection season of Minor Forest Produces (MFPs) during the summer months. Collection of Mahua flowers in forest is important livelihood activity which normally starts in the month of March. As lots of fire are started by collectors of Mahua to facilitate easy collection, date of start of Mahua collection become important for controlling fires in the forest. Almost all of the forest fires, specially, in Buffer areas of PTR, have their origin in Mahua collection. Any change in collection season due to seasonal climate variations shifts the fire season accordingly. Pruning works, for Tendu leaves collection, in the month of March is also one of the main causes of forest fire, which again varies according to dryness and temperatures. In Panna, Mahua collection and pruning works of Tendu leaves were slightly delayed in year 2022 compare to year 2021.

Hence, due to this seasonal variation in rain and temperature, managing forest fire is a dynamic process. Timing of fire line cutting and burning depends on humidity and

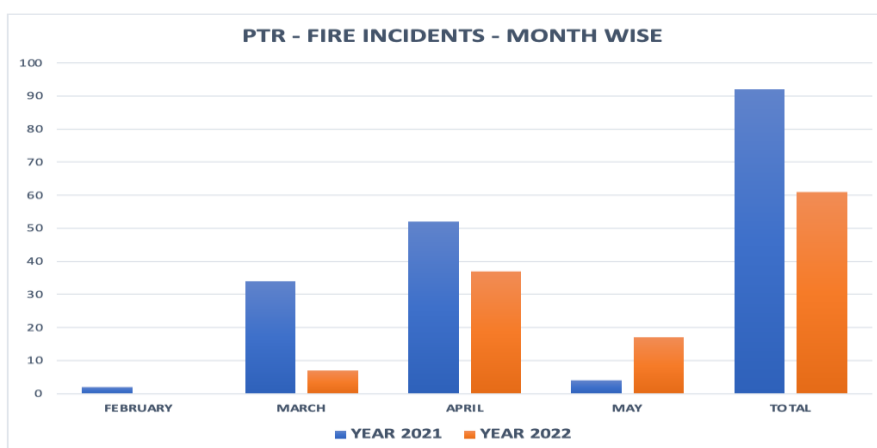
temperature. Similarly, varying collection dates of MFPs specially Mahua and Tendu leaves every year, affects the planning and management of forest fires. taking all these aspects in to consideration, planning for managing forest fires is done and executed in the field. Comparison of results of the forest fire management is done for year 2021 and year 2022 and is as following:

**A. Month-wise Comparison:** Forest fire data for the year 2022 and 2021 have been analyzed and compared month-wise. Following Table 4 and Chart 4, Chart 5, Chart 6, show the detail of month-wise fire incidents and Beats affected by fire in PTR:

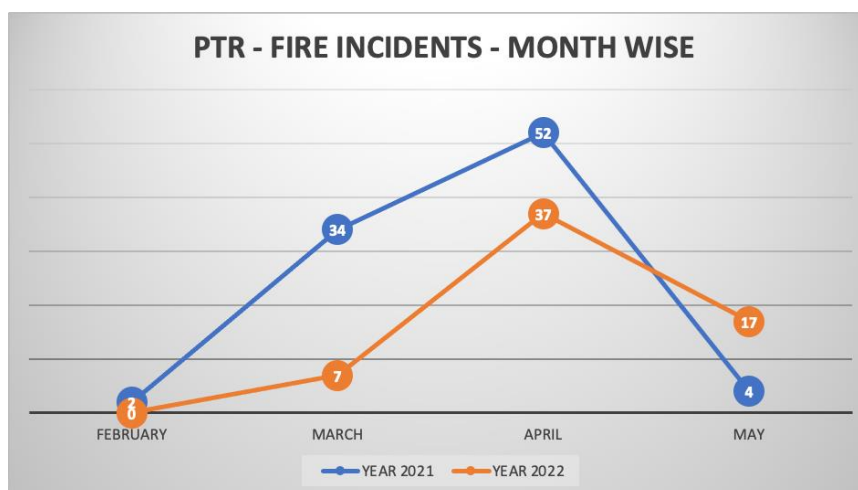
**TABLE 4**

**Month-wise Fire Incidents and Beats affected in PTR**

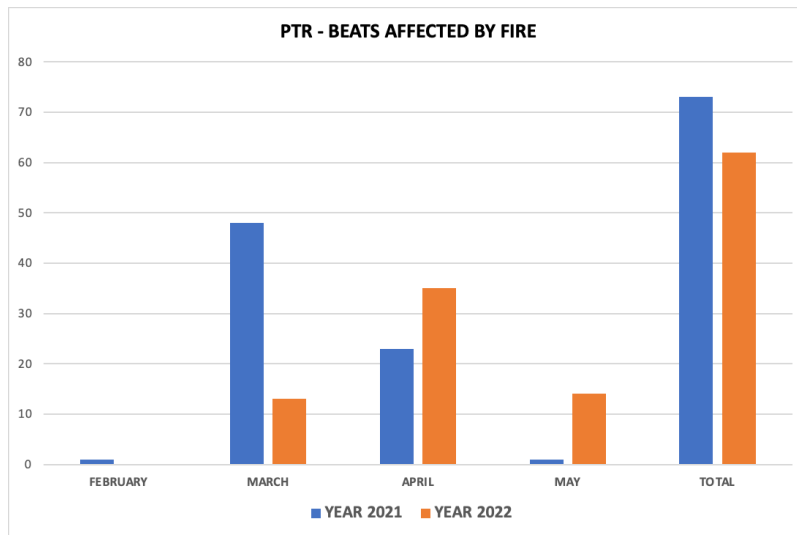
MONTH	TOTAL FIRE INCIDENT		BEATS AFFECTED	
	Year 2021	Year 2022	Year 2021	Year 2022
<b>FEBRUARY</b>	2	-	1	-
<b>MARCH</b>	36	7	48	13
<b>APRIL</b>	52	37	23	35
<b>MAY</b>	4	17	1	14
<b>TOTAL</b>	<b>92</b>	<b>58</b>	<b>73</b>	<b>62</b>
<b>CHANGE (%)</b>		<b>(-34 %)</b>		<b>(-15 %)</b>



**CHART 4: Month-wise Fire Incidents in PTR**



**CHART 5: Month-wise Fire Incidents in PTR**



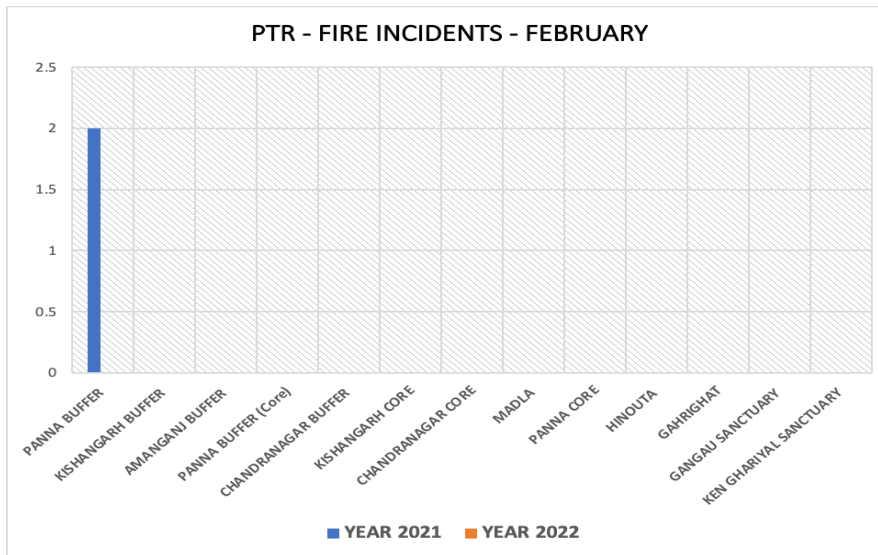
**CHART 6: Month-wise Beat Affected by Fire in PTR**

**B. Range-wise Comparison:** Range-wise forest fire data for the year 2022 and year 2021 have been analyzed and compared.

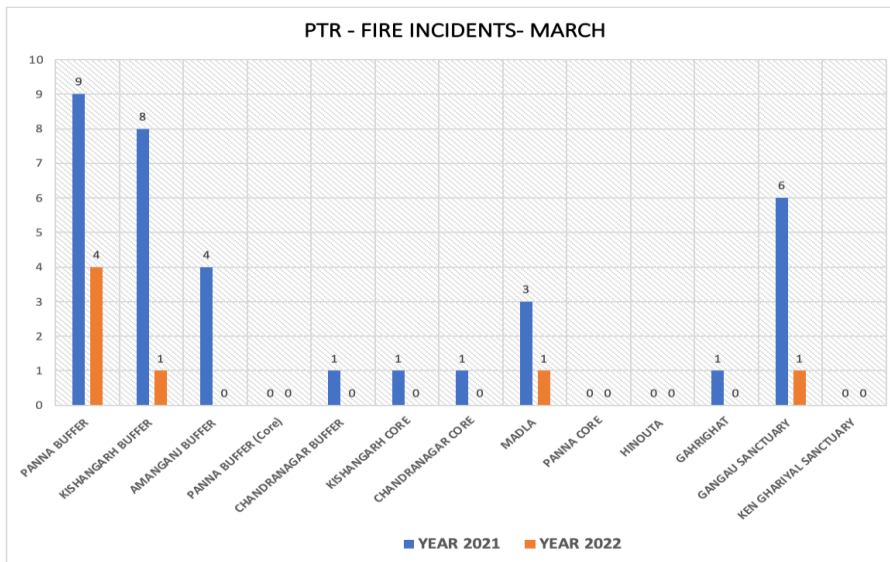
i. **Fire Incidents:** Following Table 5 and Chart 7, Chart 8, Chart 9, Chart 10, Chart 11 show the detail of fire incidents, month-wise and Range-wise, in PTR:

**TABLE 5  
RANGE-WISE NUMBER OF FIRE INCIDENTS**

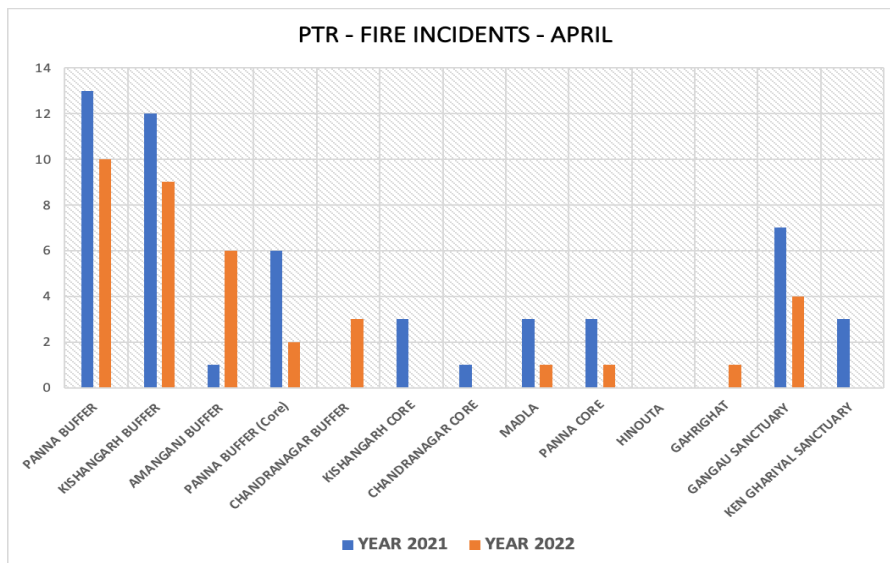
Sr N.	RANGE	NO. OF FIRE INCIDENTS									
		FEBRUARY		MARCH		APRIL		MAY		TOTAL	
		2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
1	PANNA BUFFER	2		9	4	13	10	2	0	26	14
2	KISHANGARH BUFFER			8	1	12	9	1	5	21	15
3	AMANGANJ BUFFER			4	0	1	6	0	1	5	7
4	PANNA BUFFER (Core)			0	0	6	2	0	0	6	2
5	CHANDRANAGAR BUFFER			1	0	0	3	0	0	1	3
6	KISHANGARH CORE			1	0	3	0	0	0	4	0
7	CHANDRANAGAR CORE	0	0	1	0	1	0	0	0	2	0
8	MADLA			3	1	3	1	1	2	7	4
9	PANNA CORE			0	0	3	1	0	2	3	3
10	HINOUTA			0	0	0	0	0	1	0	1
11	GAHRIGHAT			1	0	0	1	0	0	1	1
12	GANGAU SANCTUARY			6	1	7	4	0	1	13	6
13	KEN GHARIYAL SANCTUARY			0	0	3	0	0	1	3	1
	<b>TOTAL</b>	<b>2</b>	<b>0</b>	<b>34</b>	<b>7</b>	<b>52</b>	<b>37</b>	<b>4</b>	<b>13</b>	<b>92</b>	<b>57</b>



**CHART 7: Range-wise Fire Incidents in PTR- February**

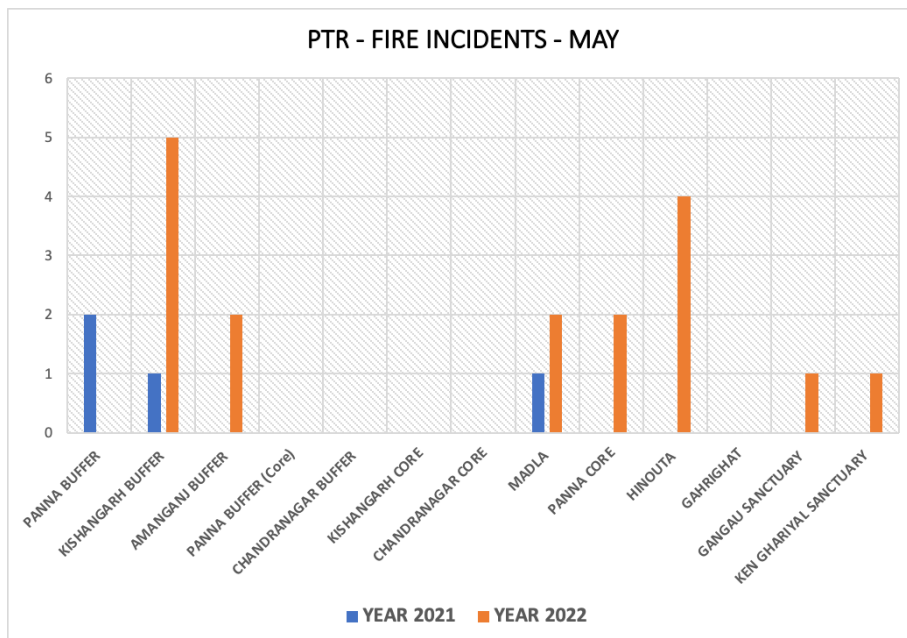


**CHART 8: Range-wise Fire Incidents in PTR- March**

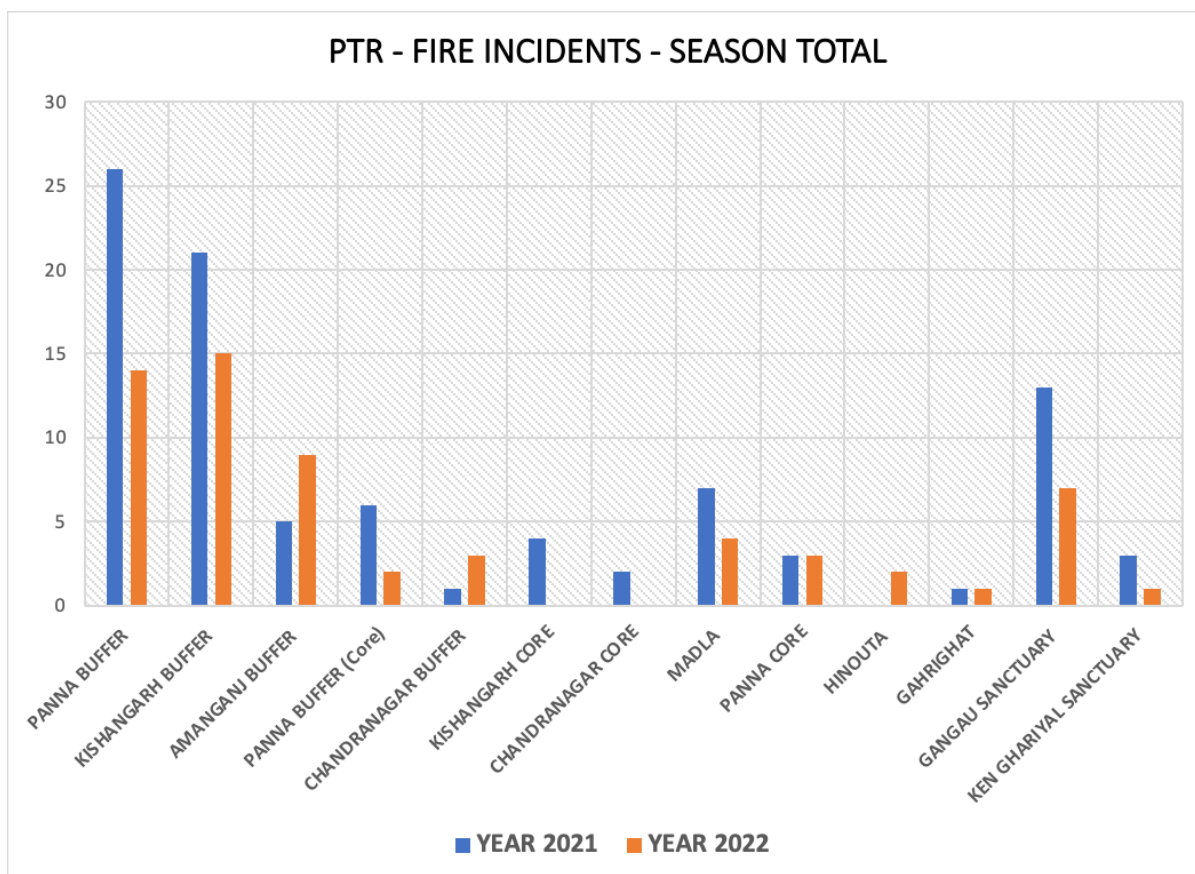


**CHART 9: Range-wise Fire Incidents in PTR- April**





**CHART 10: Range-wise Fire Incidents in PTR- May**



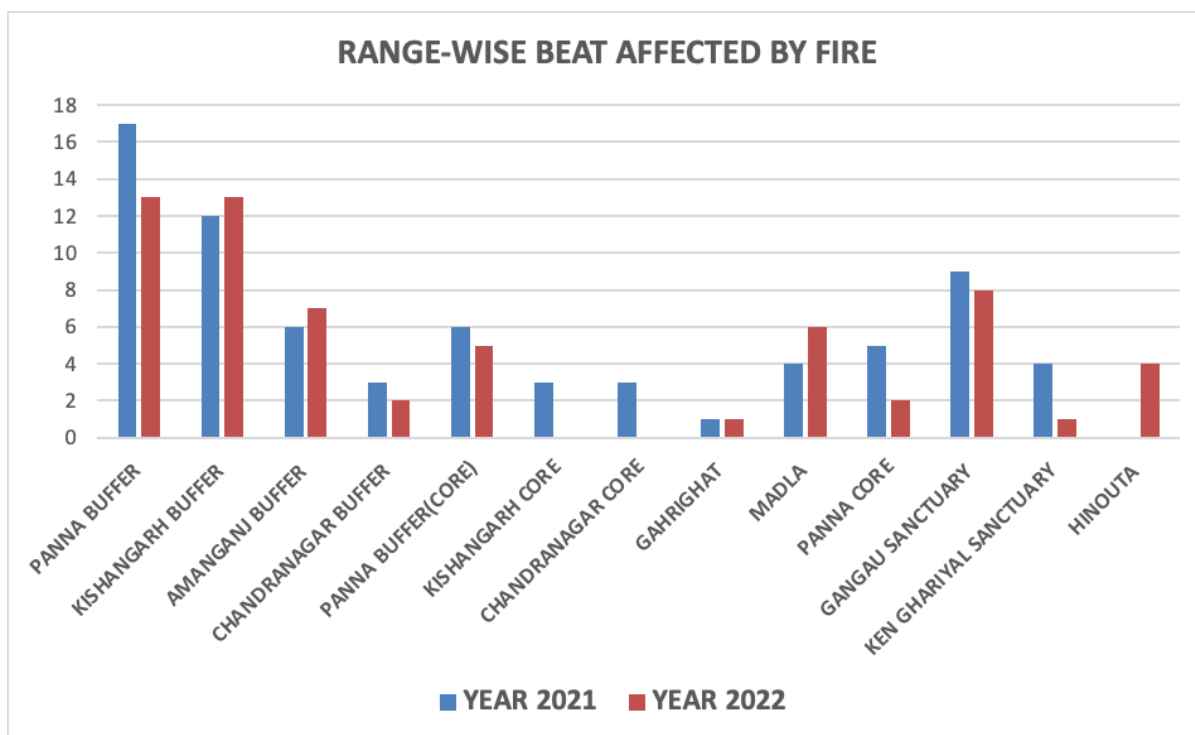
**CHART 11: Range-wise Fire Incidents in PTR- SEASON TOTAL**

- ii. **Beats Affected:** Following Table 6 and Chart 12 show the detail of Beats affected, Range-wise, in PTR:

**TABLE 6**  
**Beats Affected\* by Fire in PTR– Range wise**

SR NO.	RANGE	YEAR 2021	YEAR 2022
1	PANNA BUFFER	17	13
2	KISHANGARH BUFFER	12	13
3	AMANGANJ BUFFER	6	7
4	CHANDRANAGAR BUFFER	3	2
5	PANNA BUFFER(CORE)	6	5
6	KISHANGARH CORE	3	0
7	CHANDRANAGAR CORE	3	0
8	GAHRIGHAT	1	1
9	MADLA	4	6
10	PANNA CORE	5	2
11	HINOUTA	0	4
12	GANGAU SANCTUARY	9	8
13	KEN GHARIYAL SANCTUARY	4	1
<b>TOTAL</b>		<b>73</b>	<b>62</b>

*\*A Beat affected by fire doesn't mean that the whole area of the Beat is affected by fire. It only indicates that fire has taken place in some part of the Beat.*



**CHART 12: Range-wise Beat Affected by Fire in PTR**

Following Table 7 shows the number of Beats which registered fire more than once in year 2021 and year 2022:

**TABLE 7**  
**Yearly Details of Beats Affected More Than Once by Fires in PTR**

<b>MONTH</b>	<b>BEATS REGISTERED FIRE MORE THAN ONCE</b>	
	<i>YEAR 2021</i>	<i>YEAR 2022</i>
<b>FEBRUARY</b>	-	-
<b>MARCH</b>	1	-
<b>APRIL</b>	34	6
<b>MAY</b>	9	9
<b>TOTAL</b>	<b>44</b>	<b>15</b>

### 3. DISCUSSION:

It is clear from the above Tables and Charts that year 2022 saw a 34% drop in overall fire incidents in PTR. Month April which normally registers the greatest number of fire incidents, saw a drop of nearly 29% in fire incidents in year 2022 compare to year 2021. Similarly, month of March 2022 saw a drop of nearly 80% in fire incidents compare to previous year. Month of February 2022 had no fire incidents. The month of May 2022, saw a marginal increase in number of fire incidents as temperature and dryness remained too high and there were no early rains in May 2022 unlike year 2021 when it rained in second week of May. While first/last fire started/ended on 23<sup>rd</sup> February/8<sup>th</sup> May in year 2021; in year 2022, first/last fire started/ended on 26<sup>th</sup> March/18<sup>th</sup> May 2022. Kishangarh Buffer Range registered maximum fire incidents (15 fire incidents) in year 2022, while in year 2021 Panna Buffer Range registered maximum number of fire incidents (26 fire incidents). No fire incidents were recorded in Chandranagar Core and Kishangarh Core Range in year 2022, while in year 2021 only one Range Hinouta did not register any fire incident.

Fire incidents in Core Ranges are much lower compare to Buffer Ranges. In Year 2022, while 41 fire incidents out of total 57 fire incidents (72%) were registered in Buffer Ranges, 9 fire incidents (16%) were registered in Core Ranges and 7 fire incidents (12%) were registered in two Sanctuaries. In Year 2021, while 59 fire incidents out of total 92 fire incidents (64%) were registered in Buffer Ranges, 17 fire incidents (18%) were registered in Core Ranges and 16 fire incidents (18%) were registered in two Sanctuaries.

Month of April registered maximum number of fire incidents in both the year, 52 and 37 respectively for year 2021 and 2022.

Similarly, Beat affected by fire saw an overall decrease of nearly 15% in year 2022 compare to year 2021. For both the years, maximum number of Beats are affected in Panna Buffer and Kishangarh Buffer Ranges. No Beat of Chandranagar Core and Kishangarh Core Range was affected by fire in year 2022, while in year 2021, only one Range Hinouta was not affected by fire. Beats affected by fire in Core Ranges are much lower compare to Buffer Ranges. In Year 2022, while 40 Beats out of total 62 fire affected Beats (65%) were

in Buffer Ranges, 13 Beats (20%) were affected in Core Ranges and 9 Beats (15%) were affected by fire in two Sanctuaries. In Year 2021, while 44 Beats out of total 73 fire affected Beats (60%) were in Buffer Ranges, 16 Beats (22%) were affected in Core Ranges and 13 Beats (18%) were affected by fire in two Sanctuaries.

Beat which were repeatedly affected by fire (fire incident registered more than once) also saw a considerable drop. While 44 Beats were affected more than once by fire in year 2021, only 15 Beats were affected by fire more than once, a drop of nearly 66%, in year 2022.

#### **4. CONCLUSION:**

It can be fairly concluded that in PTR, number of fire incidents and Beats affected by fire, both have seen a major dip in year 2022 compared to year 2021 in spite of the fact that year 2022 is going down in the history as one of the driest and hottest year in Panna and surrounding districts. Striving for better management practices in controlling forest fires by Forest Department is in the base of it. There is no denying of the fact that almost all of forest fires are man-made in Panna. Unsustainable practices like use of fire for collection of MFPs by locals is the main cause of forest fire in Panna district. Changing climate and other human factor such as uncontrolled burning of crop residue in the agriculture field, land conversion for agriculture, add to the distribution and severity of forest fires. It is not a case of innocent unawareness of the consequences of these unsustainable and uncontrolled practices. People living in and around the forest know the best about forest fires including how forest fires are started and how difficult it is to control them once started. Still, human practices are continuing which are leading to uncontrolled forest fires.

It is also true that forest fires have long been an integral part of the forest environment and have played important role in shaping the forest ecosystem, their conservation and management specially in Dry Deciduous Forests. Dry Deciduous Forest like forest of Panna and adjoining district of Chhatarpur, have evolved facing forest fires. But in these days of intensive management, large and long duration forest fires need to be avoided and controlled with full might at the disposal. Not every forest fire is of serious concern from the point of view of damages done, but it needs to be controlled so as not to spread and becomes a large and long duration fire.

PTR will still strive hard to achieve minimum forest fire incidents in future and in this endeavor, will work hard, 1) to inculcate more responsibility in locals so as to discontinue unsustainable MFP harvesting practices, and 2) to manage forest fires with prior planning, clear objectives and still better execution. Future challenges will be more as along with current pressures and causes, climate change is also fast becoming a reality.

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*(The above analysis is based on the data received by Panna Tiger Reserve through SMS and e-mail alerts as sent by Forest Survey of India, Dehradun in the year 2021 and year 2022.)*