

# **RHINO PATROL AND MONITORING UNITS CAT TIEN NATIONAL PARK VIETNAM**

**TECHNICAL REPORT 1: AUGUST – DECEMBER 2001**

## **RESULTS OF RHINO SURVEY AUGUST - DECEMBER 2001**

**By Bui Huu Manh**

**WWF - ASIAN RHINO AND ELEPHANT ACTION STRATEGY  
in VIETNAM**



---

### **CAT TIEN NATIONAL PARK CONSERVATION PROJECT DECEMBER 2001**

This report describes the results of the Rhino Protection and Monitoring Units in Cat Tien National Park. This work is generously funded by WWF-US through the Asian Rhino and Elephant Action Strategy (AREAS) and the US Fish and Wildlife Service. It is executed under the auspices of the WWF – Cat Tien National Park Conservation Project and Cat Tien National Park. The Cat Tien National Park Conservation Project is a joint initiative of the Ministry of Agriculture and Rural Development (Hanoi) and the WWF-Indochina Programme, funded by the Governments of Vietnam and The Netherlands.

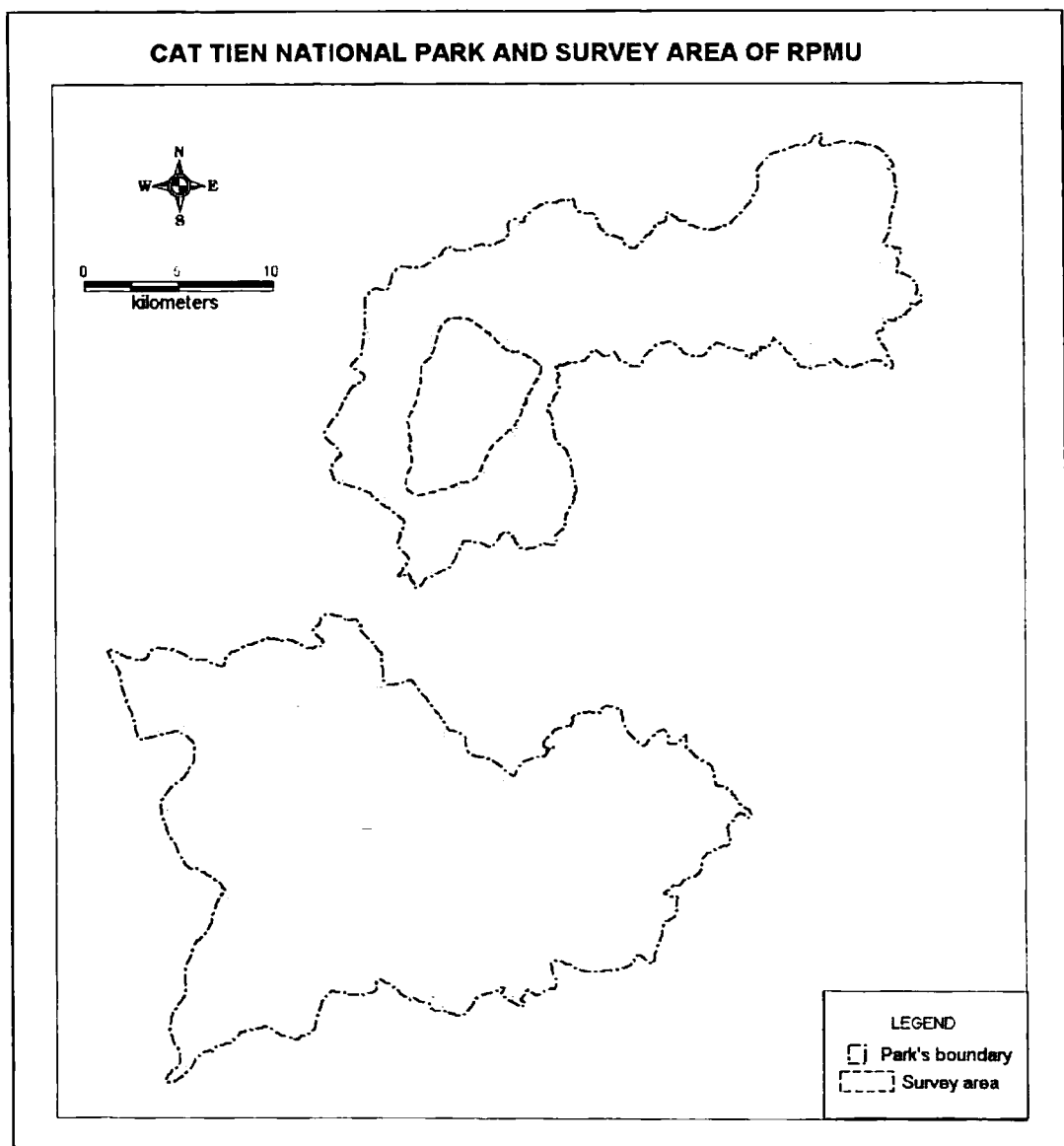
## GENERAL

From August to December, the RPMU has covered the length of survey as follow (January and February 2002 is the period of patrolling training held by Peter Hartley):

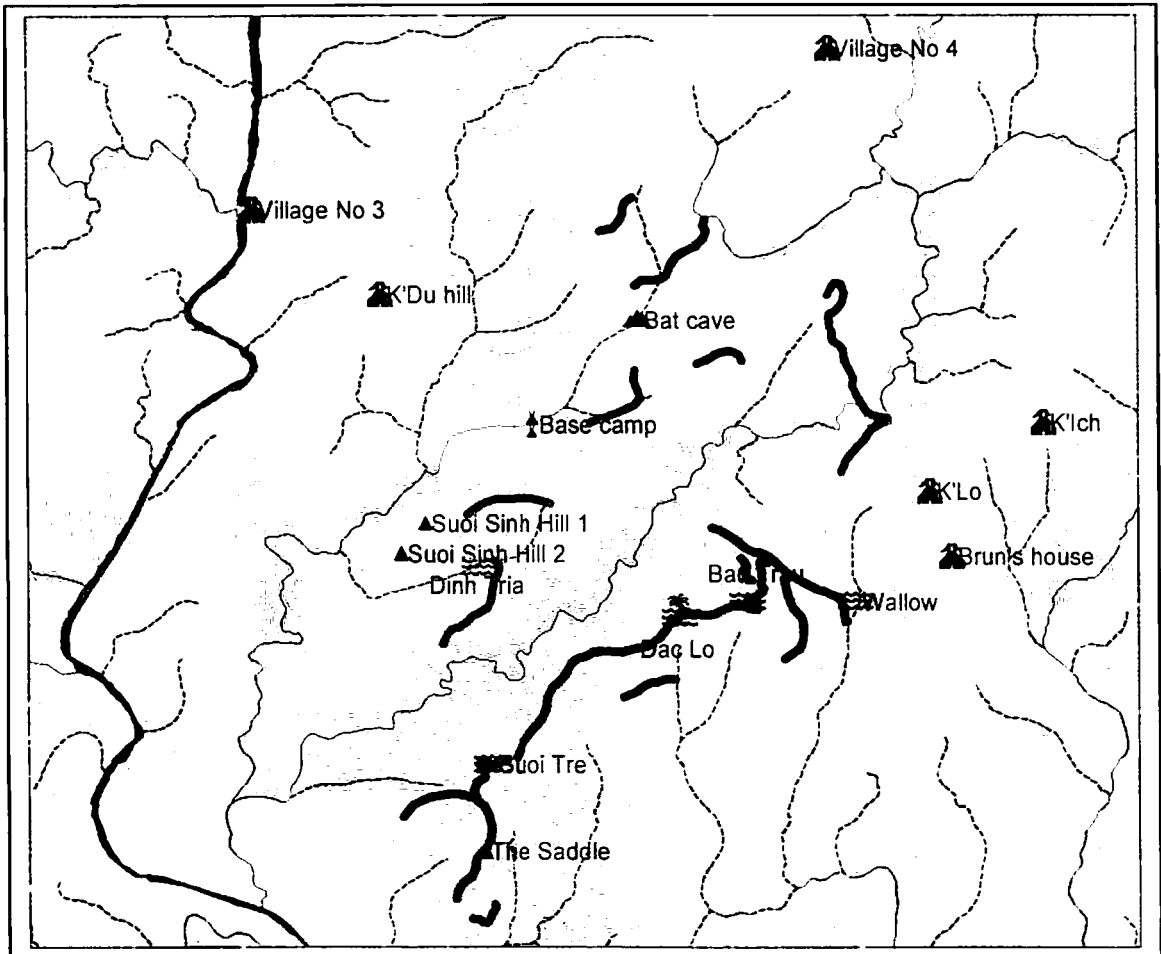
<u>August:</u>	Group I: 13,84 km; Group II: 36,39 km
<u>September:</u>	Group I: 25,13 km; Group II: 23,66 km
<u>October:</u>	Group I: 33,73 km; Group II: 10,86 km
<u>November:</u>	Group I: 20,90 km; Group II: 23,90 km
<u>December:</u>	Group I: 22,10 km; Group II: 13,20 km

(group I is based in Phuoc son station , group II is based in Gia vien station)

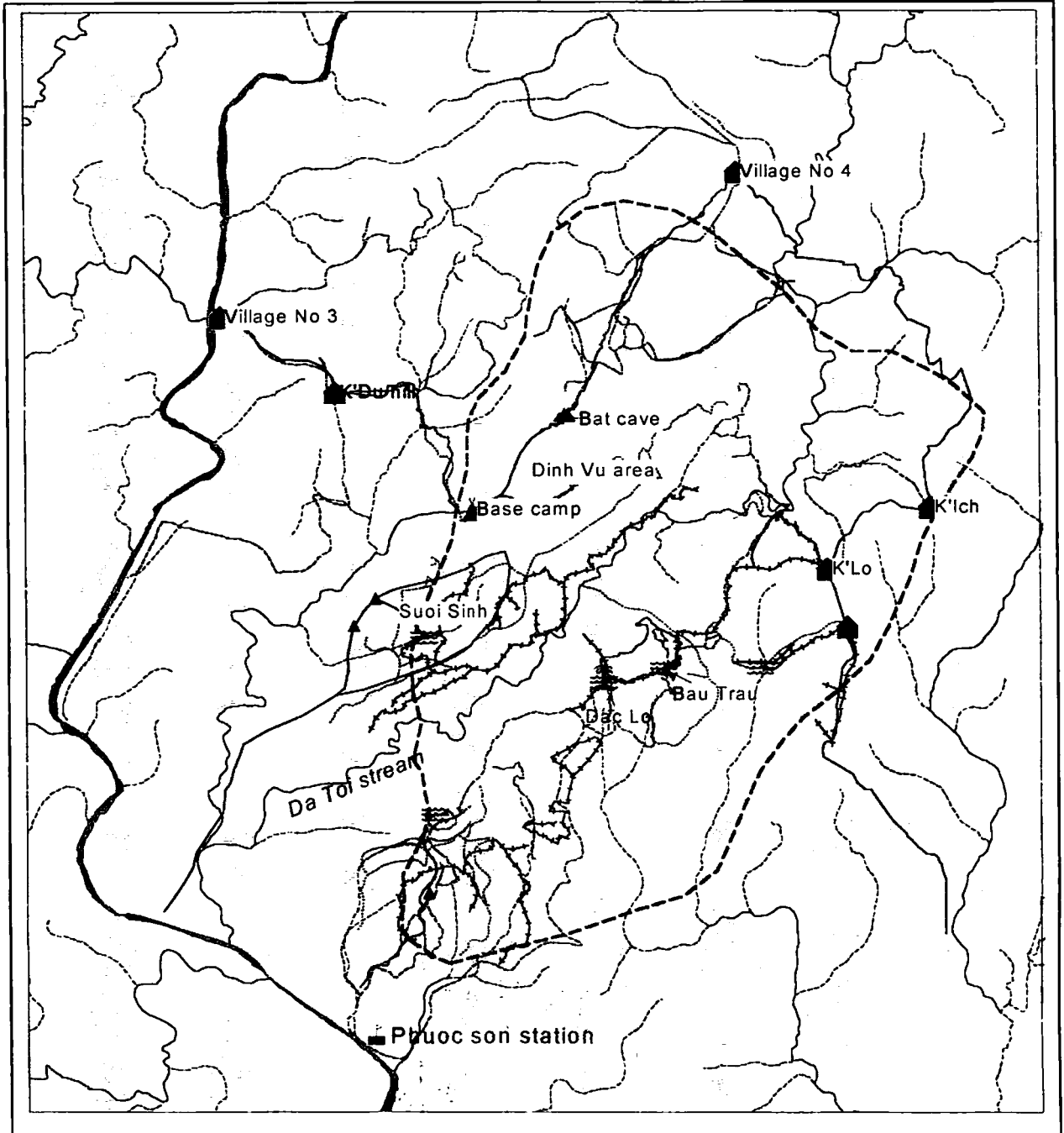
So the total distance has been covered by RPMU is 223.71 km (see Map No 2).



Map 1. Routes of rhino recorded from August 2001 till December 2001



Map 2. Patrolling routes covered by the RPMU from August 2001 to December 2001



# RESULTS AND DISCUSSIONS

## I. DISTRIBUTION:

### I.1. Routes used by the rhinos

The survey has discovered some permanent routes which the rhinos use within their range (see map No 1).

From the above map, it is clear that the rhinos mainly move on top of hills. These are relatively flat area, not very steep. This fits the special body characteristics of the species which is heavy and large size. The rhinos only move down to to low area and cross steep areas when absolutely necessary (going to saltlicks or moving from one foraging area to the other).

Route map of rhinos show that the range of this species is split into 2 regions: one is the area from Suoi Sinh Stream – Dinh Vu region – Dinh De up to some small hills in between Village No 3 and Village No 4, the second is the area from Bau Chim to Suoi Tre stream and up to Dac Lo – Bau Trau area near K'Lo. The two regions are separated by one big stream in the middle of the rhino range (Da Toi stream). This is a relatively big stream with steep slopes which are difficult for the rhinos to cross. So far the RPMUs found only two sites where the rhino crosses this stream, one is near Dac Lo – Bau Trau area and the other is near K'Lo.

The rhino routes have been recorded very accurately by following the footprints of rhino while keeping a GPS (Garmin 12XL and Garmin 12) on. Tracks which have been drawn in GPSs are downloaded directly to GIS maps in MapInfo (version 6.0). In some locations the footprints are recorded scatteredly because of the hard substrates or thick leaf-litter. However by comparing the already known routes, direction of footprints and the landscape we can predict some possible routes which the rhinos seem to use (See Map No 1).

Based on the routes which have been found so far, we can see that the range of movement of the species is not big. Hypothetically, the furthest distance which one rhino has to move is the route Bau Chim – Suoi Tre stream – Dac Lo – Bau Trau – Dac Lo stream – Dinh De – Suoi Sinh which is just about 16 km. Usually one rhino moves about 20 – 25 km per day because this is a moving-eating species. So this area is quite small for this big and wide-ranging moving species.

From the results found the rhino's range is about 3000 – 4000 hectares which is very small for this species (Mammals of Thailand). Moreover, as mentioned before, the rhino mainly walk in flat areas with gentle slopes so the estimate is actually larger than the real area used by the rhino in the region.

Considering all the above factors, we can tentatively divide the distribution of rhino species into 3 main active areas:

1. Bau Chim – Suoi Tre area
2. Dac Lo – Bau Trau – K'Lo area
3. Suoi Sinh – Dinh Vu – Bat cave area

## **1.2. Feeding sites**

Despite of the rhino is a moving-eating species, there are still some main feeding sites of the rhino because of the limited and un-even distribution of the foodplants within its range of the foodplants. The RPMU has found two locations which have been used intensively as feeding sites. One is a small hill at the beginning of Suoi Tre stream (E 107°19' 32", N 11° 39' 45"), the other is another hill at the beginning of Lua stream (next to Bau Trau) (E 107°20' 03", N 11° 40' 03").

## **1.3. Phototrap results**

Locations of phototrap are displayed on Map No 4. Every month there are 2 two units have been set up in the rhino range for two times (each unit is left in the site for 2 weeks). There is not photo of rhino recorded on those phototraps unit excepted for the two photos recorded by David Murphy before the activity of the RPMUs started in August of 2001 (location in the Saddle).

The reasons are possibly because of this species is an extremely sensitive species. After the first series of photos taken in April – May of 1999, the activity of this type of equipment on the species is very ineffective. The Javan rhino might recognise the phototrap units (which always releasing flash when photo is taken) and try to avoid to walk through the trails that they know there is phototraps. This effect is very important in a situation that the range of the rhino is too small and those units can not be set up far away from each other to reduce the cumulative effect of them.

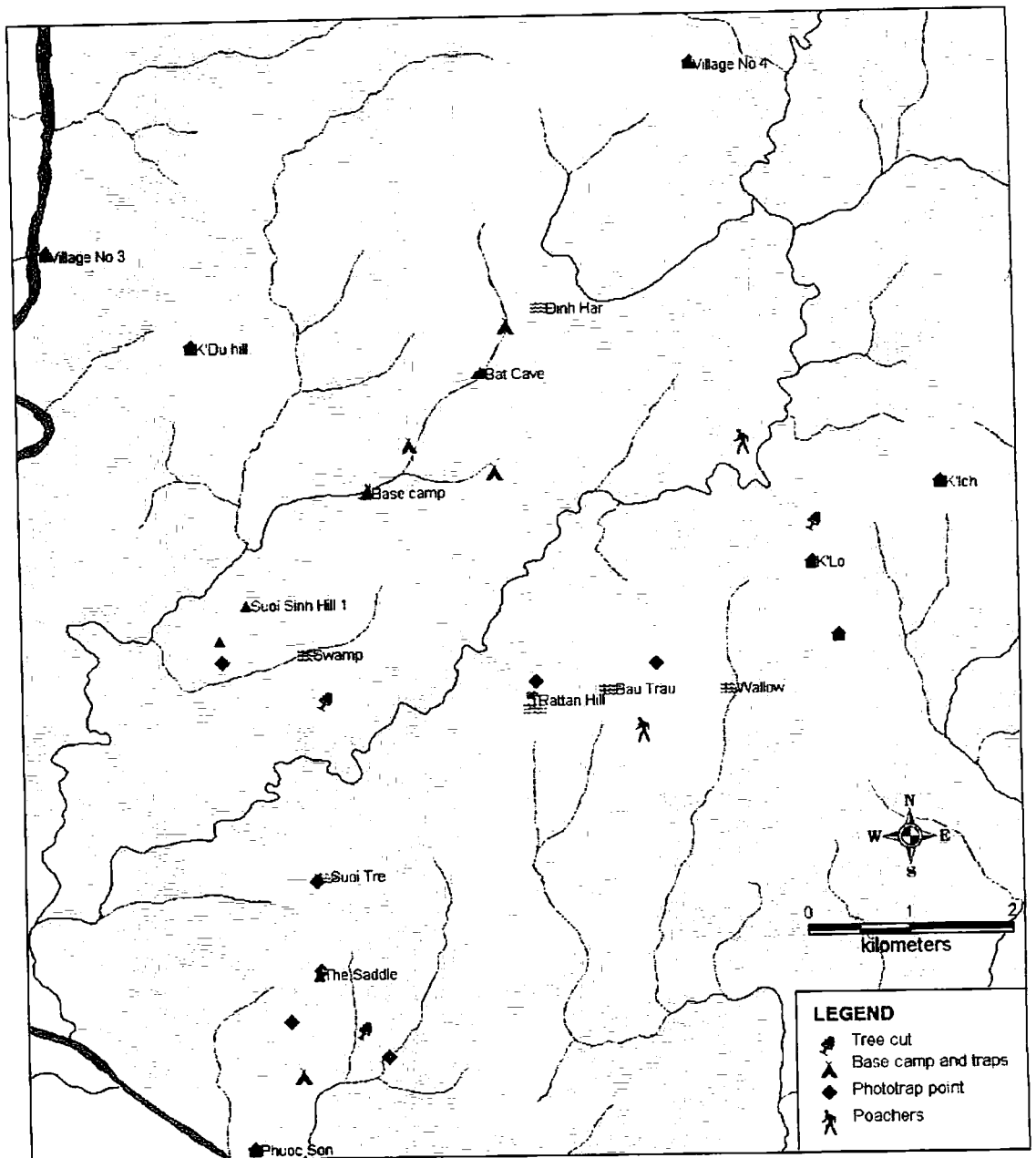
Another reason could make the phototrap activity in ineffective is the number of the rhino. As pointed out above, the rhino has known the units so they try to stay away from them or destroy them. Three units have been attacked during the 1999 phototrapping period. If there are many rhinos, theoretically each one should be shot by the unit before they know them. Javan rhino is a solitary animal so it is unlikely that one individual knows the phototrap and then informs to others. The situation here is not fallen in to this case despite of the continuous effort of phototrapping from April of 1999 until the end of that year. Among the photos of rhino taken so far (11 photos), they are all the same, excepted for the three photos taken in May of 1999 in Bau Trau. This 3 photos series show a little bit different from the photos of individual in Bau Chim. This fact is also agreed with footprint analysis see below).

## **1.4. Violations records**

During the survey, there are not many cases of violation recorded. Mainly violation cases are minor, mostly is the logging activities. Local people didn't cut down big trees because they know that it's not easy to hide this activity and also this can lead to a high penalty. They only cut small trees to make houses and some normal things to be used in the family. Trapping activities are recorded mostly on the trail from Village No.4 down to Bat Cave. These are monitor lizard traps.

There are two cases the RPMUs found the poachers in the forest. They went to the forest to collect forest products (honey bees, fruit plants,... and hunting when possible). When those people are arrested, they are treated in normal procedure of violation.

Map 3: Violation and phototrap point in August – December patrols



## II. NUMBER OF RHINOS

### II.1. Variation of footprint width

The widths of footprints recorded are very variable depending on the slope. When the animals move up-hill, the width of footprints tends to be smaller, the hoofs are contracted to "grasp" the substrate. When the animals move down-hill, the hoofs are spread out to stand for the heavy body. The measurements of footprint width have shown this very clearly as showing Table 1 to 6 which provide measurements of footprints of one animal each.

*Table 1. Footprint widths recorded from a hill near Bau Trau down to Da toi Stream. (20<sup>th</sup> Sept 2001)*

No	Footprint width (mm)	Note
1.	220	Down hill
2.	210	Down hill
3.	210	Down hill
4.	213	Down hill
5.	213	Down hill
6.	213	Down hill
7.	214	Down hill
8.	210	Down hill
9.	200	Down hill
10.	215	Down hill
11.	215	Down hill
12.	197	Down hill
13.	210	Down hill
14.	207	Down hill
15.	205	Down hill
16.	214	Down hill
17.	205	Down hill
18.	205	Down hill
19.	210	Down hill
20.	210	Down hill
21.	200	Down hill
22.	187	Down hill
23.	210	Down hill
24.	200	Down hill
25.	215	Down hill
26.	218	Down hill
27.	215	Down hill
	208,93	Average

*Table 2. Footprint widths from a hill near beginning of Da Lo stream down to Da Toi stream and from Da Toi stream up hill (18<sup>th</sup> Oct 2001)*

No	Footprint width (mm)	Note
1.	218	Down hill
2.	207	Down hill
3.	210	Down hill



4.	197	Down hill
5.	198	Down hill
6.	221	Down hill
7.	186	Down hill
8.	194	Down hill
9.	196	Down hill
10.	221	Down hill
11.	191	Down hill
12.	177	Up hill
13.	187	Up hill
14.	180	Up hill
15.	192	Up hill
16.	180	Up hill
17.	192	Up hill
18.	180	Up hill
19.	192	Up hill
20.	177	Up hill
21.	176	Up hill
22.	179	Up hill
23.	155	Up hill
24.	160	Up hill
25.	155	Up hill
26.	185	Up hill
27.	170	Up hill
28.	185	Up hill
29.	180	Up hill

Table 3. Footprint widths on the trail from hill down to Da Toi stream (11<sup>th</sup> Aug 2001)

No	Width (mm)
1.	218
2.	207
3.	210
4.	197
5.	198
6.	221
7.	186
8.	194
9.	196
10.	221
11.	191
<b>Average</b>	<b>203.54</b>

Table 4. Footprint widths from Dinh De stream up hill in Dinh Vu area (15<sup>th</sup> Aug 2001)

No	Width (mm)	
1.	184	Up-hill
2.	198	Up-hill
3.	202	Up-hill
4.	181	Up-hill

5.	189	Up-hill
6.	170	Up-hill
7.	184	Up-hill
8.	178	Up-hill
9.	178	Up-hill
10.	172	Up-hill
11.	182	Up-hill
12.	200	Up-hill
13.	164	Up-hill
<b>Average</b>	<b>183.23</b>	<b>Up-hill</b>

Table 5. Footprint widths from Suoi Tre stream up hill (17<sup>th</sup> Oct 2001)

No	Width (mm)	Note
1.	174	Up-hill
2.	183	Up-hill
3.	173	Up-hill
4.	179	Up-hill
5.	188	Up-hill
6.	193	Up-hill
7.	179	Up-hill
8.	171	Up-hill
9.	166	Up-hill
10.	179	Up-hill
11.	173	Up-hill
12.	185	Up-hill
13.	173	Up-hill
14.	161	Up-hill
15.	190	Up-hill
16.	218	Up-hill
17.	191	Up-hill
<b>Average</b>	<b>180.94</b>	<b>Up-hill</b>

Table 6. Footprint widths on the hill top next to Bau Chim (18<sup>th</sup> Oct 2001) (the trail is nearly horizontal and then slightly down)

No	Width (mm)	Note
1.	228	Down hill
2.	206	Down hill
3.	193	Down hill
4.	206	Down hill
5.	201	Down hill
6.	227	Down hill
7.	185	Down hill
8.	204	Down hill
9.	165	Down hill
10.	185	Down hill
11.	185	Down hill
12.	200	Down hill
13.	192	Down hill
14.	198	Down hill
15.	189	Down hill
Average	197.6	
16.	145	Up hill
17.	178	Up hill
18.	183	Up hill
19.	178	Up hill
Average	171.0	

Those above tables show clearly that the variation in footprint width is very high hence all footprints measurements made in 1998 and 1999 have to be re-interpreted. But at the same time, the front hoof width is quite stable (see section II.2.3. below).

Table 7. Footprint widths and front-hoof width on the trail from Bau Trau up hill (20<sup>th</sup> Oct 2001)

No	Footprint width (mm)	Front-hoof width (mm)	Note
1.	177	90	Up hill
2.	185	99	Up hill
3.	-	82	Up hill
4.	-	99	Up hill
5.	200	96	Up hill
6.	186	106	Up hill
7.	169	100	Up hill
8.	-	88	Up hill
9.	-	104	Up hill
10.	181	92	Up hill
11.	168	110	Up hill
12.	178	104	Going along contour horizontally
13.	206	110	Horizontal
14.	197	102	Horizontal

15.	180	104	Horizontal
16.	179	103	Horizontal
17.	-	95	Horizontal
18.	171	104	Horizontal
19.	-	97	Horizontal
20.	193	91	
21.	-	97	
22.	180	97	
23.	-	94	
24.	-	101	
25.	-	102	
26.	184	106	
27.	-	112	
28.	185	108	
29.	177	107	
30.	-	94	
31.	176	106	
32.	177	102	
33.	189	110	
34.	189	110	
35.	177	-	
36.	183	-	
37.	-	112	
38.	181	98	
39.	196	-	
40.	198	111	
41.	186	101	
42.	203	-	
43.	185	104	
44.	-	97	
45.	185	108	
46.	186	104	
47.	-	109	
48.	180	-	
49.	173	-	
50.	185	101	
51.	194	106	
52.	175	113	
53.	207	112	
54.	177	-	
55.	176	-	
56.	185	102	
57.	186	-	
58.	178	-	
59.	180	103	
60.	187	115	
61.	195	109	
62.	198	108	
63.	184	104	

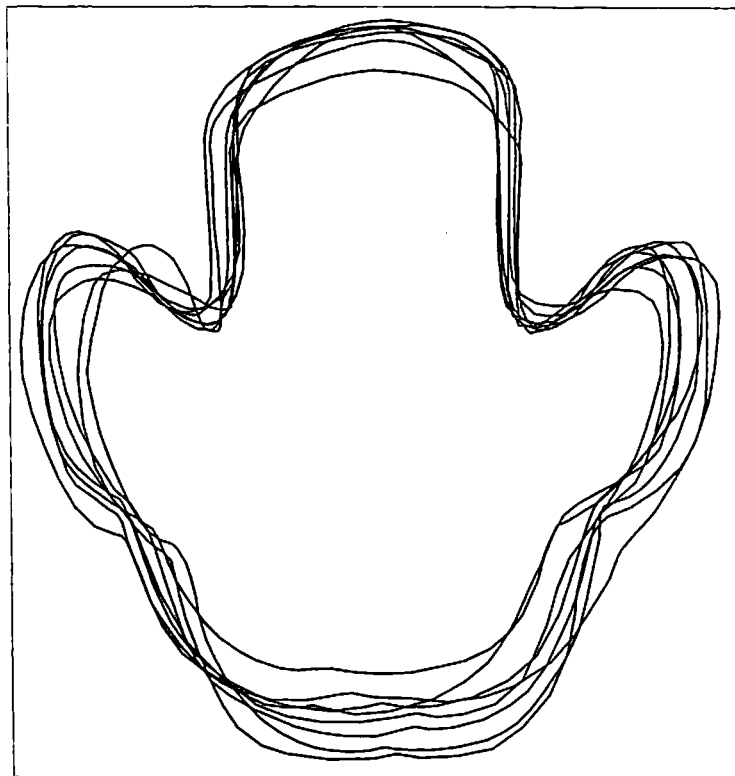
64.	190	98	
65.	183	101	
66.	183	-	
67.	194	-	
	184.94	102.51	

## II.2. Variations of footprint characteristics

Generally there is not much different in footprint characteristics found in all the range of rhino. The variations of footprint are mostly due to the substrate (hardness, leaf-litter,...).

### II.2.1. Footprint characteristics:

There are not many differences in footprint shape. Considering the footprints from all locations in the range of the species, we can see that they are nearly the same in size and shape. (See Figure No 1 and 2).



**Figure 1.**

*Left footprints recorded in 5 different locations: Bau Chim, Suoi Sinh, Dinh Har, Bau Trau, K'Lo*

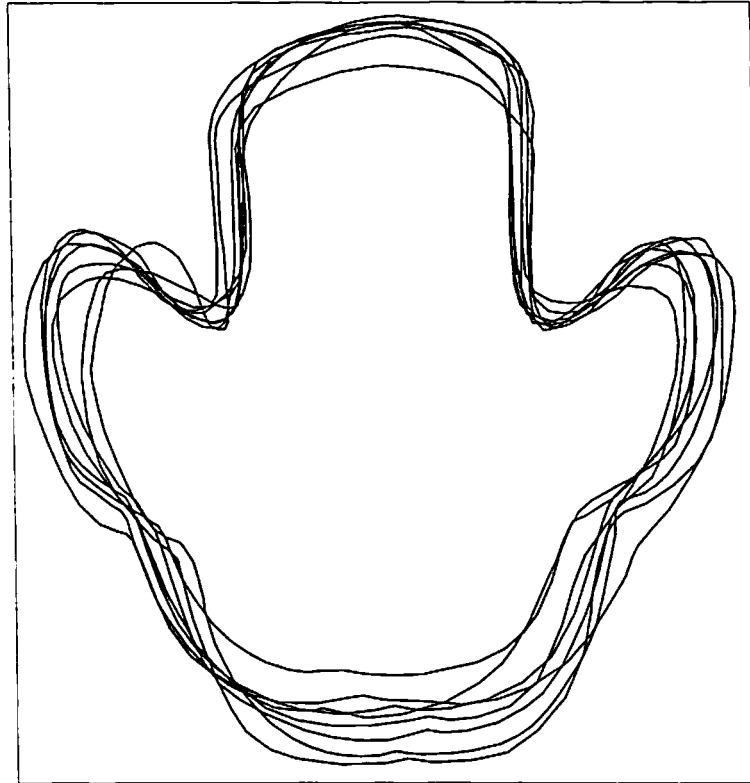


Figure 2. Right footprints in 7 locations: Bau Chim, Suoi Sinh, Bau Trau, Dac Lo, Dinh Giang, Dinh Har, K'Lo

### ***11.2.2. Side hoof.***

The side-hoof of footprints found all over the range are not much difference. Usually when the rhino walks up the side-hoofs are elongated and narrower and when the animal walks down, the side-hoofs are shorter and wider (see Figure No 3). And the changes happen to both side-hoofs.

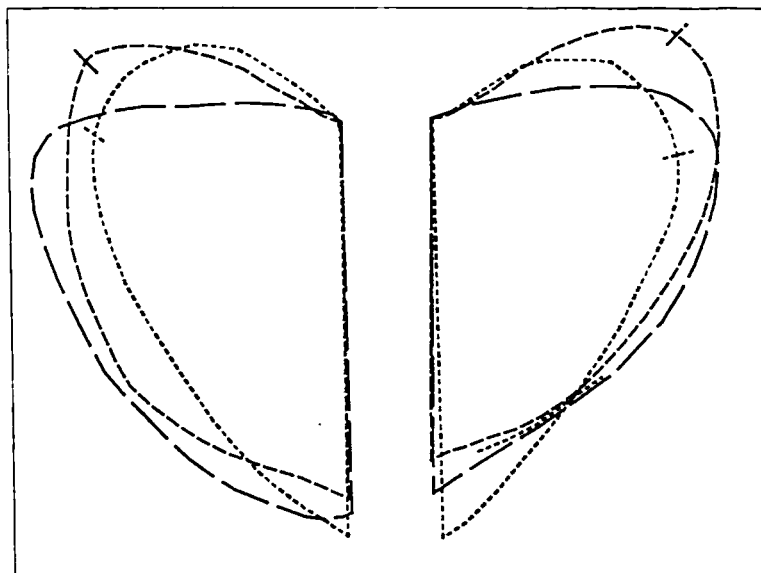
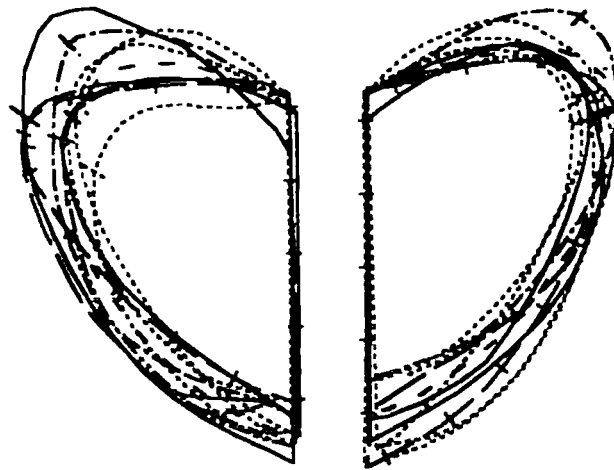
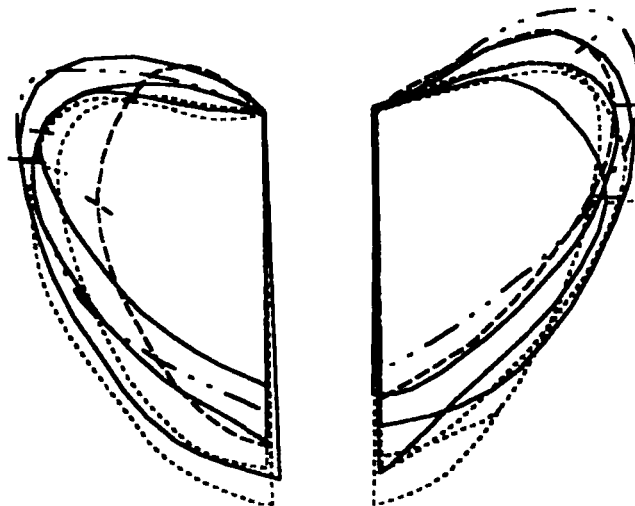


Figure 3: Variations of side hoofs against the slope (side-hoofs of one individual in Bau Chim)



**Figure 4:** Sidehoofs of left foot in Bau Trau, Bau Chim, Suoi Sinh, Dinh Har, K'Lo



**Figure 5:** Sidehoofs of right foot in Bau Trau, Dac Lo, suoi Tre, Suoi Sinh, Dinh Giang

As we can see, the side hoofs are not much different in shape. Most of them are quite similar. The varieties in the drawings are only due to the depths of the presses. The shallower the press, the smaller of the side hoofs. At least this can point out that the individuals of rhino in the region are quite close in sizes. The analysis of side hoofs is also quite difficult because of the variation of the hoofs. As discussed before, the sidehoof shapes are also very variable in shape because of the substrate.

### **II.2.3. Front hoof**

The differences in front hoof is more relevant than the differences in side hoofs. Two different groups of front hoofs are recognised. One is a rather small and round hoof, the other is bigger and squarish (Pictures No 6 and 9).

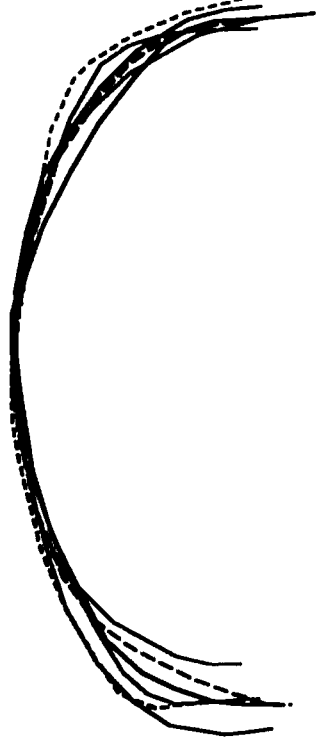


Figure 6: Left fronthoofs in 3 locations: Bau Chim, Suoi Sinh, Dinh Har

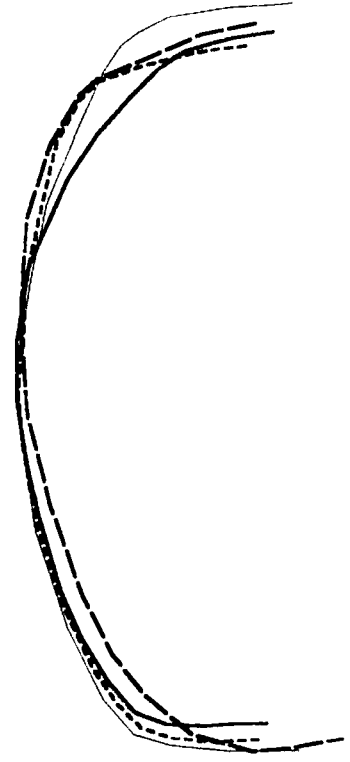


Figure 7: Left fronthoofs in 3 locations: K'Lo, Bau Trau, Dac Lo



Figure 8: Right fronthoofs in 4 locations: Suoi Tre, Bau Sinh, Dinh Har, Bau Chim

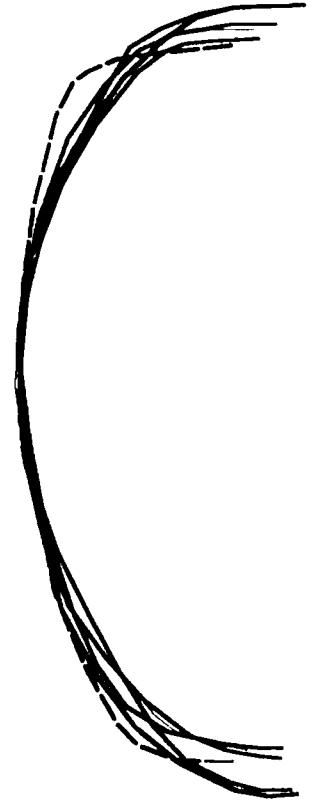


Figure 9: Right fronthoofs in 3 locations: Dac Lo, Bau Trau, K'Lo



Considering also the locations that the footprints are recorded, this could lead to the distinguishing of at least two different individuals. The squarish fronthoofs are mostly found in Bau Trau and Dac Lo area while the round fronthoofs are mostly found in Bau Chim, Suoi Tre and Suoi Sinh areas. Another characteristic that can help to identify them as the two groups of footprints is the width of the fronthoofs. The squarish group are wider the other group about 1cm (see table No 8). We can see from table No 8 that fronthoof width in Bau Chim – Suoi Tre – Suoi Sinh area is less than 95mm while the fronthoof width in Bau Trau – Dac Lo – K'Lo – Dinh Vu area is wider than 95 mm.

Moreover, as mentioned before, there are two feeding sites recognised. This fact also fits to the distribution of the two groups of footprints so possibly these two individuals use two different main feeding sites.

Based on those results, temporarily we can say that there are two individuals identified. One individual distributes in Bau Chim – Suoi Tre – Suoi Sinh area, the other ranges in Bau Trau – Dac Lo – K'Lo area. However it is still possible that there are some more individuals in the region but this number is not high if we consider the limited area of the rhino range. The information found in northern part of Bat Cave is still limited so it is still not confirmed that whether there is another individual in that region or not. This area is also both easy to access by the individual from Dac Lo or by the individual from Suoi Sinh. No clear footprints in the area have been found so the result is only limited by the routes recorded.

If we assume that there are more than two individuals, the others must have the overlapped distribution with the two identified ones. This is also possible because it is necessary to bear in mind that the rhinos living Cat Loc area, which is not a favorable terrain for the Javan rhino, because they have been pushed there due to the pressure of growing human population in 1980s.

Another fact needs to be considered while discussing about the number of rhinos is one plaster cast made by the rhino team in January 1999. This plaster cast has been collected from Dinh De – Dinh Vu area and is very small compared to the others. According to Dr. Nico van Strien, this is a footprint of a sub-adult individual that is about 1 year old. It is unfortunately that only 1 plaster collected so the existence of this individual is not fully proven. If this individual is still alive (which is quite possible because of good protection since 1998 and no record of rhino kill) it now may reach the adult size. This individual may use the area in northern part of Bat Cave but this needs to be proven.

Finally it is possible to say that there at least 3 three individuals of rhino in Cat Loc area. If there are more individuals, this must be proved by a very clear evidence. In this case phototrap will be an appropriate method to help.

**Table 8. Widths of frontroofs in different areas (in mm)**

Bau trau	From Da Toi stream uphill	From Da toi stream uphill	K'lo to Da Toi stream	From Dinh Vu stream to K'Lo	Walkway above Batcave	Walkway above batcave	Suoi Sinh	Walkway from the Saddle down to Bau Chim	Walkway from the Saddle down to Bau Chim (No 2)	Walkway on the eastern side of Bau Chim
90	96	95	95	103	95	90	95	98	94	128
99	101	100	103	102	105	100	89	85	93	106
82	97	95	100	106	105	100	88	83	93	108
99	100	95	95	105	110	100	95	98	91	120
96	95	107	97	100	100	95	95	98	86	95
106	92	101	108	100	102	104	86	92	95	96
100	110	92	95	104	102	104	75	91	91	103
88	105	85	95		100		85	88	89	102
104	95	105	100		105		86	90	86	100
92	95		90		105		81	86	90	109
110	95		103		105		87	90		107
104	100						78	88		102
110	97						85	86		107
102	100						75	87		98
104	100						86	89		
103	100						74	88		
95	95						84	94		
104	105						90	94		
97							94	90		
91							92			
97							84			
97							80			
94							105			
101							83			
102							90			
106							77			

