

# Interview and Observation Study Focused on Behaviour of the Swinhoei's Softshell Turtle (*Rafetus swinhoei*) in Hoan Kiem Lake, Hanoi, Vietnam

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## **Acknowledgements**

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## **Introduction**

Swinhoe's Softshell Turtle (*Rafetus swinhoei*) is a large soft-shell turtle species which can reach a size greater than 150kg. *Rafetus swinhoei* is among the 23 species of tortoise and freshwater turtle native to Vietnam, and is currently listed as critically endangered by the International Union for the Conservation of Nature (IUCN, 2005). Moreover, the species is considered by many turtle conservationists to be the most endangered chelonian in the world. With no known populations existing in the wild it is likely that a combination of habitat loss and hunting, primarily for local consumption, have resulted in a dramatic decline in this large soft-shell species throughout its range in recent decades. At present only six live specimens are known in existence in the world. Five of these in Chinese zoos and temple ponds, and a single individual survives in Hoan Kiem Lake located in the center of Hanoi, Vietnam.

The focus of this interview and observation study was to learn more about the seasonal and daily behaviour of the individual *Rafetus swinhoei* existing in Hoan Kiem Lake. This information will be used to assist our field team survey lakes in Yen Bai Province during the early part of 2006 where *Rafetus swinhoei* reportedly persists in the wild.

## **Duration:**

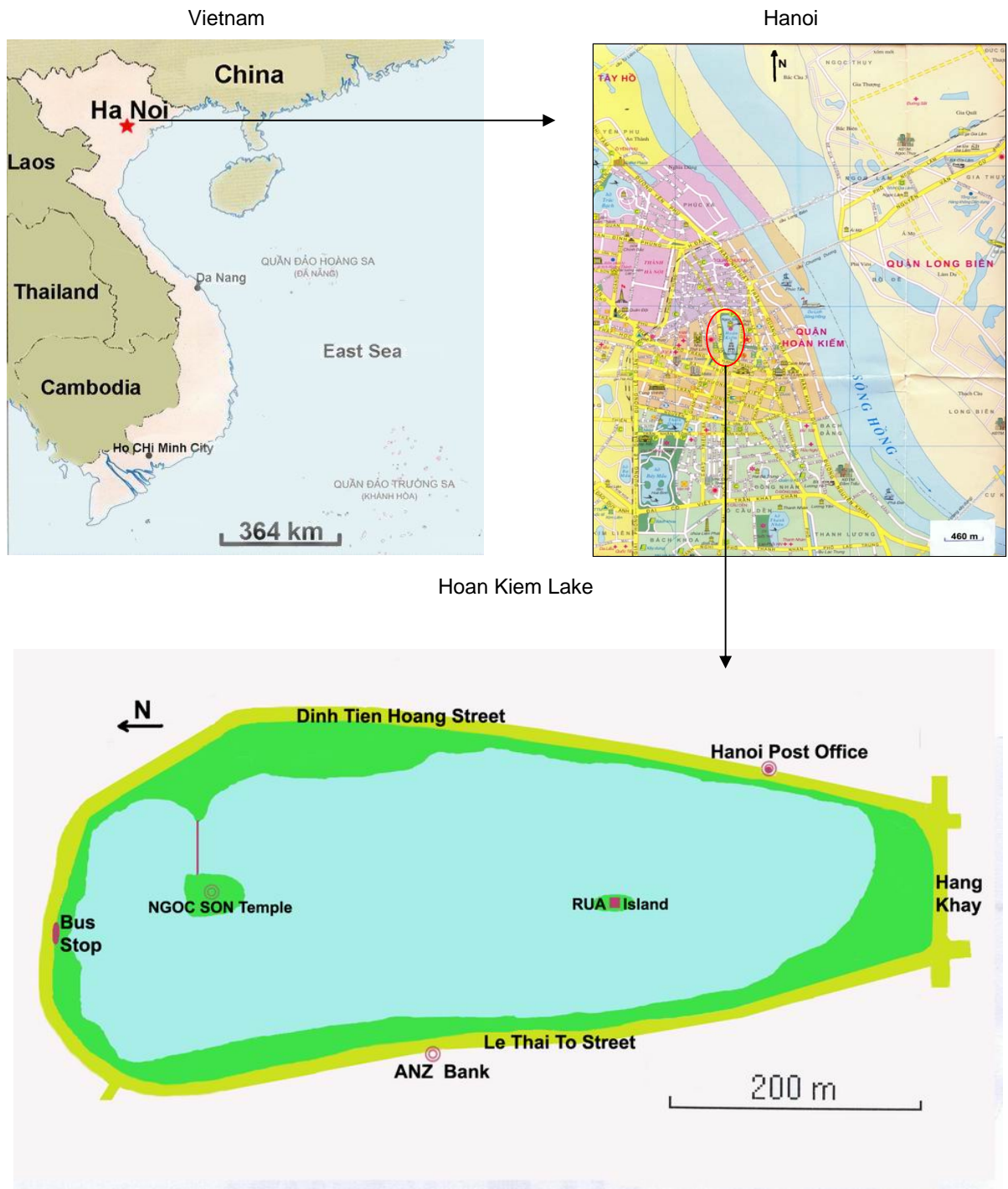
Nov. 1 – Nov. 5, 2005: interview study

Nov. 1 – Nov. 29, 2005: observation study

**Location:** Hoan Kiem Lake, Hanoi, Vietnam.

**Description of the site:** Hoan Kiem Lake is a small lake situated in the centre of Hanoi, surrounded on all sides by roads, the lake is approximately 11.6 hectares, 653 meters in length and 242 meters wide. The water level of the lake fluctuates depending on the season, ranging between 0.3m and 1.2m deep during the dry season (from November to April next year) and between 1m and 2m (?) during the rainy season (from May to October).

Figure 1. Location of the Hoan Kiem Lake, Hanoi, Vietnam



## Methodology

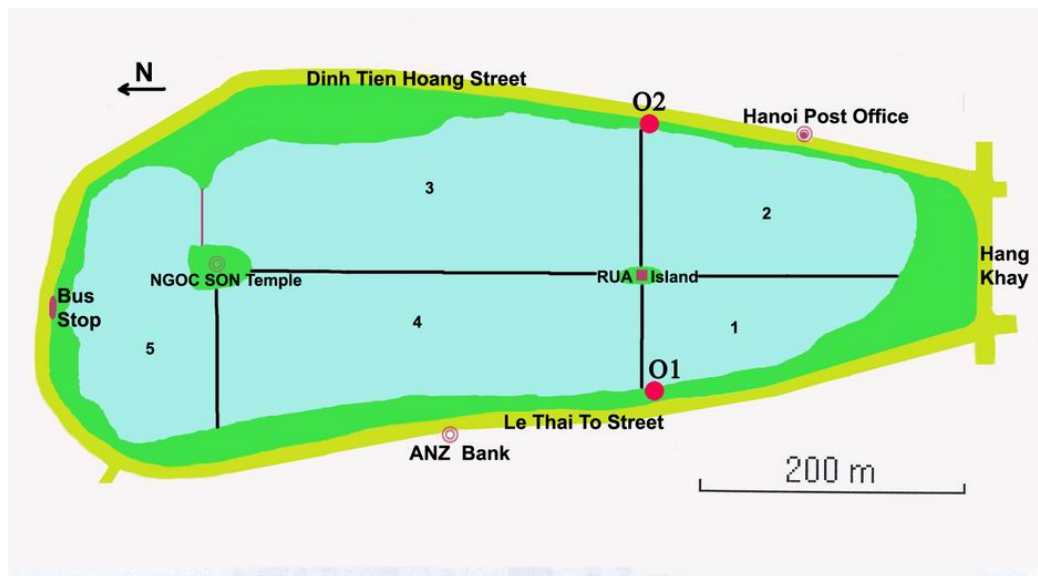
Interviews were conducted around Hoan Kiem Lake from the 1<sup>st</sup> to the 5<sup>th</sup> of November 2005. Interview subjects comprised of individuals who utilize the small park area that encircles the lake. Interview subjects were selected during different times of the day.

During interviews the subjects were asked to identifying the season that they most commonly observe *Rafetus*, the time of day that the turtle is seen, as well as the type of weather at the time of observation. Subjects are also asked to point out the specific area in the lake where the turtle is seen. The lake was divided into 5 sections (Fig. 2) in which observations of *Rafetus* from interviews were recorded.

Observations around Hoan Kiem Lake were also undertaken from the 1<sup>st</sup> to the 29<sup>th</sup> of November 2005. During observation periods, the surveyor walked around the lake using binoculars to scan the surface of the lake and determine if *Rafetus* was active. Activity was often indicated where bubbles could be seen on the surface in trails typical of movement along the bottom and occasional emergence of the turtle's head to breath.

If no evidence could be found indicating activity of *Rafetus*, the observer positioned himself at one of two locations (O<sub>1</sub> or O<sub>2</sub>, see Fig. 2) which provided a good vantage point of the lake. Observations around the lake were made between 0700hrs and 1730hrs (See Appendix 1).

Figure 2. Observation locations



## Results

### Interview results

A total of 52 subjects were interviewed. These included exercisers, food vendors, photographers, public WC attendants, cleaners and park security staff. The times during which the subjects utilized the area around the lake and their activities are shown in the table below:

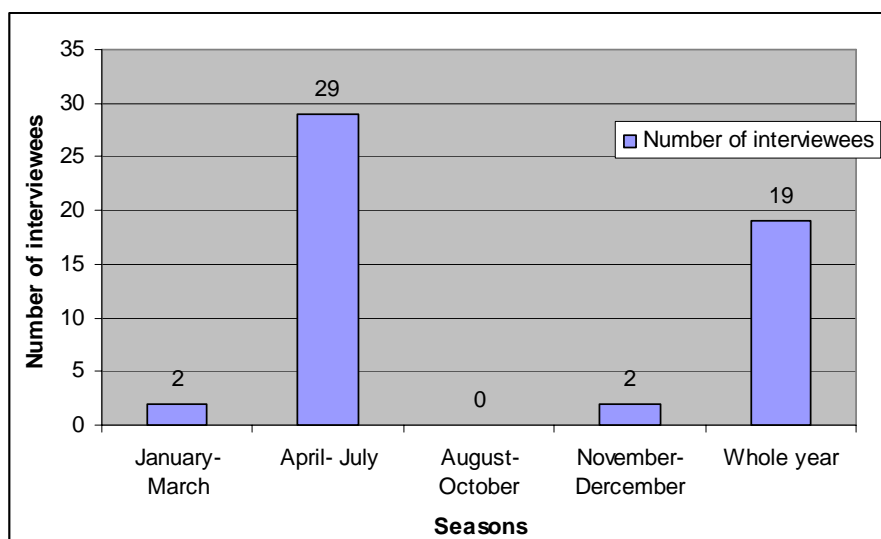
**Table 1. Interview subject profile**

Interviewees	Sex		Total	Time presented in the lake
	Male	Female		
Exercisers	13	11	24	0600hrs – 1000hrs 1500hrs – 1800hrs
Photographers	8	5	13	the whole day
Food vendors	0	6	6	the whole day
Public WC attendants	0	2	2	the whole day
Cleaners	0	3	3	0800hrs – 1100hrs 1400hrs – 1700hrs
Security staff	3	0	3	the whole day
Vehicle keeper	1	0	1	the whole day
<b>Total</b>	<b>25</b>	<b>27</b>	<b>52</b>	

### Seasonality

From the results of the interviews it was found that 36.5% of interviewees reported that *Rafetus* could be observed in the lake throughout the year, while 55.8% reported that April to August were the best time of the year to see the turtle. The remaining 7.7% of those interviewed thought that November –March was the best time to observe *Rafetus* on the lake. None of those interviewed indicated that September-October was a good season to observe the turtle. In Figure 3 below the season during which interviewees believe *Rafetus* is observed is shown.

**Figure 3. Seasonal activity of *Rafetus swinhoei* based on interview data collected from Hoan Kiem Lake.**

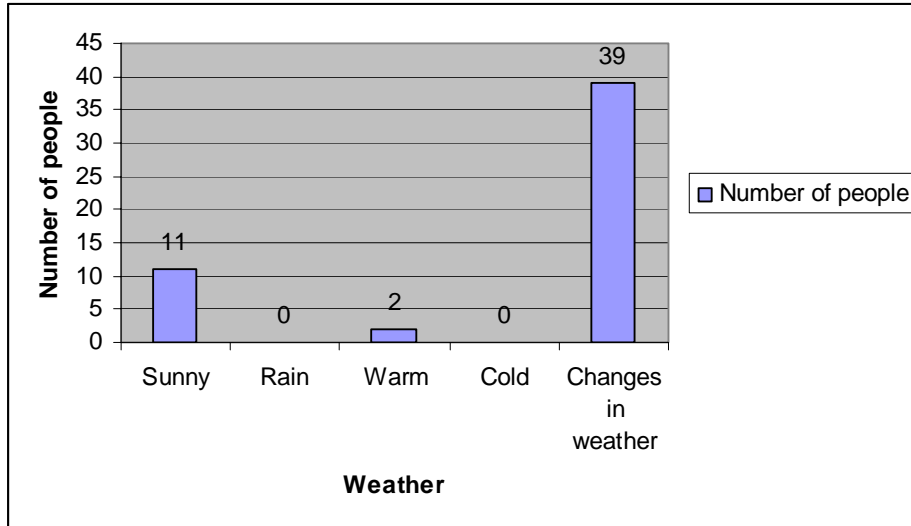


### Weather condition

Most of those interviewed (75%) said that *Rafetus* usually emerged after changes in the weather such as after a rain storm or cold spell when the sun returned, or during warm or

humid weather during the winter. Additionally, 34% of the subjects claimed that *Rafetus* was observed during sunny weather conditions and only rarely during rain or cold weather.

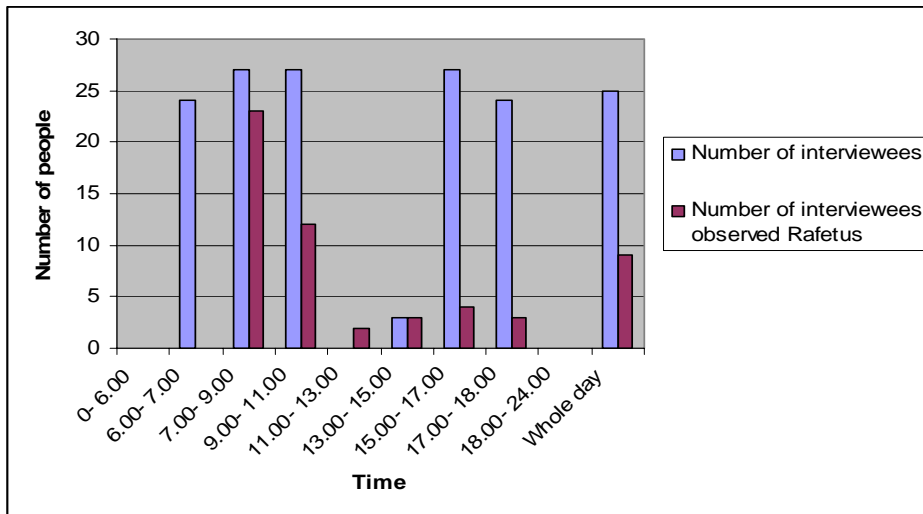
**Figure 4. Activity of *Rafetus swinhoei* during different weather conditions based on interviews.**



**Time of day**

According to the interview results *Rafetus* is active more often during the morning hours between 0700hrs and 1100hrs, and is rarely seen between 1100hrs to 1800hrs.

**Figure 5. Time of day during which *Rafetus swinhoei* is observed based on interviews.**

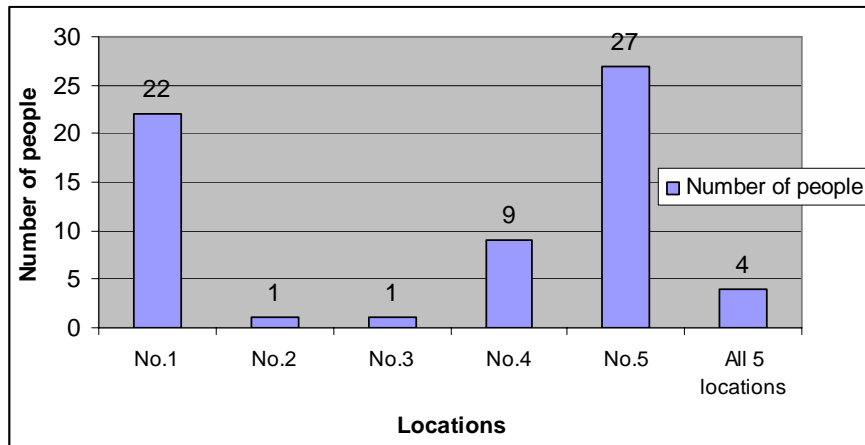


Note: Four people that were interviewed gave two time intervals describing when *Rafetus* usually emerged. Subsequently, the above table is based on 56 reported activity periods.

**Location**

*Rafetus swinhoei* was most often observed in section 5 of the lake (42.2%), near Dinh Tien Hoang Street bus stop, and in section 1 in front of the Intimex supermarket on Le Thai To Street (34.4%). See figure 6 on next page.

**Figure 6. The locations within Hoan Kiem Lake where *Rafetus swinhoei* is normally observed.**



Note: Twelve people gave two locations for where *Rafetus* normally emerges, resulting in 64 answers used in the above graph.

**Observation results**

From the 1<sup>st</sup> to the 29<sup>th</sup> of November, the reporting officer conducted observations of the lake for *Rafetus swinhoei*. Typical observations of *Rafetus* included stationary or trailing bubbles, observation of the turtle’s head at the surface, and a few rare cases where the turtle was observed basking on the Turtle Tower Island at the center of the lake. During the course of the observation period, the turtle was physically seen 20/21 observation days.

**Route of movement by *Rafetus***

During the observation study, *Rafetus* was seen moving between locations No. 1 and No. 5 (Fig. 7) on eight occasions. During these movements, *Rafetus* was observed following the same route from location No.5 to No.1 five times.

**Figure 7. The route of movement taken by *Rafetus* during observations**



**Daily active**

During the observation period it was noted that *Rafetus* was usually active/moving between 0700hrs and 1500hrs when it was sunny, despite temperatures being low between 17°C and 19°C. While on overcast and cool days when the temperature was below 17°C *Rafetus* was mostly inactive.

### Frequency of *Rafetus* respiration

The amount of elapsed time between surfacing during periods of observation can be seen in the table below (Table 2). The frequency is much higher during activity periods (when the turtle was moving in the water) than during inactive periods (when the turtle appeared to be remaining in one area).

**Table 2. Frequency of respiration when active and inactive as observed in Hoan Kiem Lake, based on observations**

Status	Maximum frequency	Minimum frequency	Average frequency	Number of observations
<b>Active</b>	26 minutes	7 seconds	3 minutes	714
<b>Inactive</b>	97 minutes	1 minutes	21 minutes	63

### Locations where *Rafetus* was observed

During the extent of the 21-day observation period, the turtle was observed to utilize areas No. 1, 2, 4 and 5 (see Fig. 7). Among these locations, *Rafetus* was most often observed in area No. 4 (85.7%), while activity in area No.5 appeared to be limited to the morning between 0700hrs and 1100hrs.

**Table 3. Number of the days during which activity by *Rafetus swinhoei* was observed in different sections of Hoan Kiem Lake**

Locations	No. 1	No. 2	No. 3	No. 4	No. 5	On Island
<b>Number of days that activity observed</b>	9	10	1	18	8	5
<b>Time of day during which activity was observed</b>	0700hrs-1000hrs	0700hrs-0900hrs and 1100hrs-1500hrs	1200hrs-1720hrs	0700hrs-1600hrs	0700hrs-1100hrs	0900hrs-1400hrs

During the observation survey, the turtle was observed to be inactive for extended periods of time at two locations S1 and S2 (Fig. 8).

**Table 4. Time at which *Rafetus* stayed at the positions S1 and S2**

Location (on figure 8)	Date	Time
<b>S1</b>	Nov. 25	1425hrs- 1730hrs
<b>S2</b>	Nov. 10	0757hrs- 0950hrs
	Nov. 11	0903hrs- 1438hrs
	Nov. 12	0901hrs- 1042hrs
	Nov. 15	0950hrs- 1057hrs
	Nov. 16	0749hrs- 1530hrs

Figure 8. Locations where *Rafetus* was observed inactive



#### Observations of *Rafetus swinhoei* basking

During the observation survey, *Rafetus swinhoei* was observed on five occasions basking on Turtle Tower Island at the southern end of the Hoan Kiem Lake. The days when *Rafetus* was observed basking on the island were sunny with temperatures between 15.5°C and 19°C. On these occasions, the air and water temperature were noted to be similar.

Table 5. Weather conditions and time of a day when *Rafetus* was observed basking on the island

Weather Condition	November 3, 2005	November 20, 2005	November 21, 2005	November 23, 2005	November 24, 2005
Weather	Cold, sunny, northern wind	Cold, sunny, northern wind	Cold, sunny, northern wind	Cold, sunny, northern wind	Cold, sunny, northern wind
Air Temperature	?	19°C	18°C	15.5°C	18°C
Water Temperature	?	19°C	17°C	16°C	18°C
Time of Day	0840hrs-0950hrs	1300hrs-1440hrs	0925hrs-1345hrs	0910hrs-1425hrs	1010hrs-1335hrs

#### Conclusion

Based on the results of the interviews and observation study, we may be able to determine the best season and conditions during which to conduct field studies to try and observe *Rafetus* that may still remain in the wild in Yen Bai and Thanh Hoa Provinces of Vietnam.

From the interviews it was indicated that the *Rafetus swinhoei* in Hoan Kiem Lake is normally more active during the summer months and is seen more frequently during the morning between 0700hrs and 1100hrs. It should however be considered that many of the people interviewed utilize the lake for exercises during the morning and this may have resulted in some bias relevant to the outcome of the interviews. During the observation study, *Rafetus* was seen to be active at all times between 0700hrs and 1800hrs. Additional observation periods at earlier and later times would be beneficial to determine if the turtle is also active later in the day or in the evening.

The findings also suggest that changes in environmental conditions effect the behaviour of *Rafetus*, with 75% of the subjects interviewed reporting that it is easier to see the turtle when there are changes in the weather. Fewer observations were reported during cold or adverse

(rain and windy) weather. However, fewer people are presumed to utilize the area around the lake during these times, reducing the number of reported sightings of the turtle. It is also likely that during wind and rain, the surface of the lake becomes more disturbed making observation of the turtle more difficult

From the observation study of *Rafetus* during November 2005, it would appear that the turtle is less active at cooler temperatures (below 17°C).

From the interviews as well as the observations it would appear that *Rafetus* is more active within the northwest area of Hoan Kiem Lake, moving between areas 1 and 5, travelling through section 4. Additional depth data from the lake would be beneficial to determine if these areas of the lake are any shallower, as it may be possible that the turtle is observed more in these areas because of reduced depth making the turtle's movement more apparent.

The observation of *Rafetus* basking on turtle island within Hoan Kiem Lake is also of great interest. Although this behaviour was observed on five occasions, few people seemed to notice until the turtle's presence was pointed out by the survey team. It is possible that *Rafetus* emerges more frequently on the island, but that this basking behavior is not readily noticed.

Observations of the respiration activity of *Rafetus* in Hoan Kiem Lake would suggest that the animal is more easily seen when it is moving, the emergence of the head being much more frequent, on average once every 3 minutes when active and only once every 21 minutes during apparent inactive periods.

The combined results of the interview and observation study clearly suggest that field teams should concentrate field survey periods in Yen Bai and Thanh Hoa on times of the year when weather patterns are changing, and that during warm days immediately following cold or adverse weather, the presence of *Rafetus* should be able to be confirmed through watching for surfacing or movement around the target site.

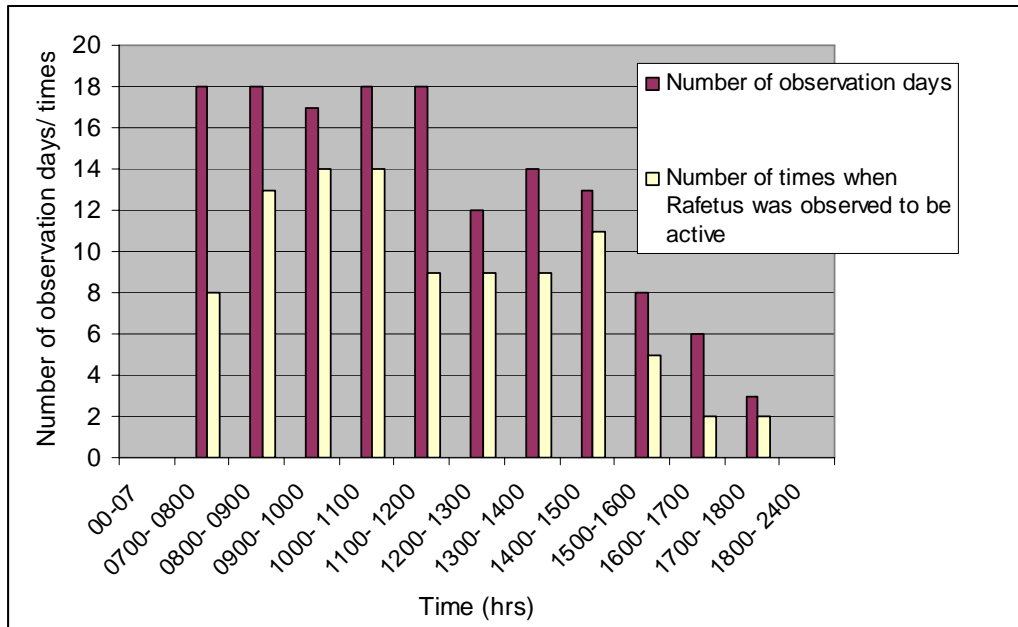
**Appendix 1. Daily observation schedule and times when *Rafetus* was observed**

Date	Daily observation schedule		Time when <i>Rafetus</i> was observed	
	Start time (hrs)	Stop time (hrs)	Start time (hrs)	Stop time (hrs)
1 Nov. 2005	1000	1600	1004	1006
			1521	1600
2 Nov. 2005	0730	1330	1000	1017
			1209	1239
3 Nov. 2005	0730	1130	0840	0950
4 Nov. 2005	0700	1730	0752	0906
			1229	1721
5 Nov. 2005	0700	1730	0853	1427
9 Nov. 2005	0700	1500	0817	0918
10 Nov. 2005	0700	0950	0757	0950
	1015	1600	1441	1546
11 Nov. 2005	0700	1603	0702	0732
			0903	1438
12 Nov. 2005	0700	1140	0720	1042
14 Nov. 2005	0700	0900	0725	0731
			0759	0834
15 Nov. 2005	0700	1120	0950	1057
	1334	1700		
16 Nov. 2005	0700	1130	0749	1108
	1300	1645	1300	1530
18 Nov. 2005	0700	1230	Found no <i>Rafetus</i>	
	1324	1630		
20 Nov. 2005	1315	1440	1315	1440
21 Nov. 2005	0700	1440	0838	0846
			0925	1345
			1428	1440
22 Nov. 2005	0700	1310	0807	1310
23 Nov. 2005	0700	1430	0910	1425
24 Nov. 2005	0700	1425	0714	0854
			1000	1410
25 Nov. 2005	0700	1300	1009	1300
	1400	1730	1420	1730
28 Nov. 2005	0700	1200	0700	1200
29 Nov. 2005	0700	1200	0840	1149

**Appendix 2. Number of observation days and number of times when *Rafetus* was observed to be active**

Time (hrs)	00-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-24
Number of observation days	0	18	18	17	18	18	12	14	13	8	6	3	0
Number of times when <i>Rafetus</i> was observed to be active	0	8	13	14	14	9	9	9	11	5	2	2	0

**Figure 12. Number of observation days and number of times when *Rafetus* was observed to be active**



**Note:**

During the 18 days of observation at Hoan Kiem Lake between 0700hrs and 0800hrs, *Rafetus* was observed active during 8 days at the times shown above.

### Appendix 3. Weather conditions of the days when the survey was carried out in Hoan Kiem Lake

Date	1 Nov	2 Nov	3 Nov.	4 Nov.	5 Nov.	9 Nov.	10 Nov.	11 Nov.	12 Nov.	14 Nov.	15 Nov.	16 Nov.	18 Nov.	20 Nov.	21 Nov.	22 Nov.	23 Nov.	24 Nov.	25 Nov.	28 Nov.	29 Nov.
Air temperature (°C)				24	24	23	27	25	23	25.5	25	18	14	19	18	21	15.5	18	20	20.5	22
Water temperature (°C)				22						17.5	25	23	18	19	17	18	16	18	19	22	22
Weather	dull, cool	dull, cool	sunny, cool	dull, cool	dull, cool	dull, cool	sunny, cool	dull, cool	dull, cool	sunny, cold	dull	dull, cold	dull, cold	sunny, cold	sunny, cold	sunny, cold	sunny, cold	sunny, cold	sunny, cold	sunny, cold	sunny, cold
<i>Rafetus</i> 's status	A	InA	A	InA	A	A	A	A	A	A	InA	InA	Found no <i>Rafetus</i>	InA	A	A	InA	A	A	A	A

Note: A= Active; InA= Inactive

#### Participants

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