*Journal of Tropical Ecology* (2000) 16:841–851.

# Mammal trap efficiency during the fragmentation by flooding of a neotropical rain forest in French Guiana

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*(Accepted 10th May 2000)*

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ABSTRACT. During the flooding of primary lowland rain forest by the filling of a hydroelectric reservoir in French Guiana, live-trapping was conducted on 175 subsequently formed islands. Different factors affecting the mammal trap efficiency were analysed. The main results show the real complexity of the sampling problem and the influence of the habitat disturbance due to the flooding. The location and/or the type of traps influenced captures of *Dasypus novemcinctus*, *Proechimys* spp., *Metachirus nudicaudatus* and *Philander opossum* in relation to their foraging and/or locomotion behaviour, and to their size. The conformation of the islands (height and size) had no influence on the number of captures, nor on the species richness. The number of captures increased with the number of trapnights during the first water inflow and the level stretch. The best trapping success was observed during the wet season, when the strong habitat modification and the forest fragmentation became more significant. It resulted from the reduction of available land area and trophic resources. One year after the beginning of the water inflow, the decrease of the number of captures with the increasing number of trapnights reflected a real decrease of the number of mammals on the islands. The species richness increased with the number of trapnights in all periods, and was also the highest during the wet season.

KEY WORDS: flooding, fragmentation, French Guiana, islands, live-trapping, mid-sized terrestrial mammals, rain forest, rescue, trapping success

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## INTRODUCTION

Between January 1994 and July 1995, *c*. 365 km$^2$ of primary lowland rain forest were flooded by the filling of the Petit Saut hydroelectric dam on the Sinnamary river in French Guiana. A wildlife rescue programme was organized by Electricité de France, the French company building the dam, with the following main objectives: (1) capturing and translocating threatened mid- and large-sized mammals (> 200 g), tortoises and snakes to a protected forest area, (2) building a biological bank and database on Guianan wildlife, (3) carrying out a post-release survey including ecological studies and assessment of translocation effects (Vié & Richard-Hansen 1997, Vié *et al.* 1997), and (4) raising public awareness on Guianan wildlife conservation (Vié 1999). Wildlife rescues have been organized on other occasions during the flooding of neotropical forest, starting in 1964 in Surinam (Walsh & Gannon 1967), and mainly in Brazil in the 1980s (Vié 1999). Nevertheless, these efforts were poorly documented.

The growing rate of human-induced habitat destruction stimulated research on ecosystem fragmentation, which has become a major concern within the framework of conservation biology. Numerous studies on the effects of habitat fragmentation have been conducted to identify the various responses to fragmentation (Adler 1994, Granjon *et al.* 1996; Laurance 1990, 1994, for tropical forests) and to evaluate conservation research requirements and lessons for management (Andrén 1994, 1996; Bascompte & Solé 1996, Laurance 1991, Saunders *et al.* 1991). The consequences of ecosystem fragmentation vary with time since isolation, distance from other remnants and presence of connections with other remnants (Saunders *et al.* 1991). In Petit Saut, water inflow seriously fragmented the forest within a short period, and the aquatic nature of the matrix represented a very unfavourable habitat and a significant barrier for many species.

During the rescue, various complementary methods for capturing terrestrial and arboreal mammals were used, including live trapping, captures with net pouches adjusted at den exits, den excavation, manual capture and vertical net captures. Forty-one per cent of the rescue effort (defined as the total number of boats operating per day) was dedicated to terrestrial live trapping. The objectives of this paper are to describe the live trapping method used during the rescue and to analyse the factors affecting its efficiency: (1) influence of trap locations and trap types, (2) influence of the conformation of the islands (height and size), and (3) influence of the period of trapping since the beginning of the water inflow.

## METHODS

### Study site

The Petit Saut hydroelectric dam (5°4′ N, 53°3′ W) is located on the Sinnamary river, *c.* 40 km from the Atlantic Ocean. It was built within a primary lowland evergreen rain forest. Mean annual rainfall is *c*. 3000 mm. There is a pronounced dry season from July to November and a long rainy season during the rest of the year, interrupted by a short, irregular dry season in February–March. The filling of the reservoir started in January 1994, ended in June 1995 (35 m depth by the dam), and flooded a total area of about *c*. 365 km$^2$. The hilly landscape resulted in habitat fragmentation by the creation of numerous islands and peninsulas of various shapes, sizes and degrees of isolation. Captures were made by terrestrial live trapping on islands situated 0.5 to 3 km from the main river-bed, spread along 70 km of the Sinnamary river and 15 km of the Tigre Creek tributary. Islands were selected according to their accessibility, their surface area, and particularly their height above the water. Available maps of the flooded area and the resulting islands at different water levels were erroneous because the altitude of the hills had been estimated too roughly. Prospecting the flooding forest was therefore constantly necessary while the water was rising in order to find new islands, to monitor the flooding of others and to assess the best capture opportunities. The location of the islands was recorded on a grid cell of 0.25 nautical mile (463-m × 463-m). Low and small islands were given priority as they were the first to disappear.

### *Sampling procedures*

One hundred and thirty-three collapsible live traps (Tomahawk Live Trap Company, Tomahawk, Wisconsin 54487, USA) were used. They included four types: small trap (81-cm × 23-cm × 23-cm) double door (model 206), small trap (81-cm × 25.5-cm × 31-cm) single door (model 207), large trap (107-cm × 38-cm × 38-cm) double door (model 208), and large trap (107-cm × 38-cm × 51-cm) single door (model 209.5). Traps were placed on the ground, *c*. 25 m apart along a trail on each island (circular line for round islands and straight line for long islands). They were hidden using palms in order to avoid exciting the captured animals, and the wire floor was covered with dead leaves. Traps were baited with apple. Preliminary bait tests, including various fruits, vegetables, meat and fish, showed that apple was one of the preferred baits and also had the advantage of deteriorating slowly. The location of each trap was noted as (1) along (double-door traps) or across (single-door traps) a well-defined pathway, (2) along a tree with buttresses or aerial roots, along or in a hollow fallen log, in tree-falls, and (3) no particular location. Traps were checked each morning and rebaited if necessary.

Trapping was conducted from mid-February to October 1994 (end of the first water inflow in July 1994) and from mid-January to March 1995, on 175 different islands, of which 94 were transient. Two trapping sessions were conducted at 1.5–6-mo intervals on 10 islands. Two to 35 traps were placed on the islands for two to 21 consecutive nights, depending on the size of the island, the rapidity of its flooding, the results obtained, and trap availability at the time (i.e. number of islands to trap at the same time). Nevertheless, the number of captured animals quickly decreased within a few days, and trapping was limited to 7 to 16 nights on 80% of the islands.

Once captured, animals were individually housed in plastic cages and transferred to the veterinary facility. They were anaesthetized for routine clinical procedures, including a clinical examination, collection of biological samples (blood, ectoparasites and skin biopsy), measurements, tattooing and colour tagging for the largest species. The animals were released the following day in a 150-km$^2$ protected forest area contiguous to the flooded area, 10 km east of the dam.

### *Data analysis*

A chi-squared goodness-of-fit test was used for each common species to determine whether there was a significant difference between the expected success of the trap locations (based upon their availability) and the observed frequency of their success. To determine the locations that were preferred or avoided, we used the Bonferroni 95% confidence intervals (Byers *et al.* 1984, Neu *et al.* 1974). Where the sample size was sufficient, a chi-squared goodness of fit test was used within a particular trap location to determine whether there was a significant difference between the expected success of the trap types (based upon their availability) and the observed frequency of their success. We used again the Bonferroni 95% confidence intervals to determine the trap models that were preferred or avoided. The mean body mass of the animals captured in small and large traps were compared using a *t*-test for unpaired data (Sokal & Rohlf 1981).

For each island, we calculated the number of trap-nights (number of nights of trapping × number of traps) and the number of individuals captured (i.e. number of captures). The composition of the captures was characterized by the species richness (number of species captured). In order to standardize the data between islands, these three variables were calculated for all islands for the seven first consecutive nights of trapping. Islands with less than seven nights of trapping ($n = 25$) were consequently excluded from the analysis. Second trapping sessions were also excluded from the analysis.

Elevation of the islands above the water line was estimated at the date of trapping. For flooded islands, it was confirmed retrospectively by the difference in water levels (recorded every day) at flooding and trapping times. The area was calculated by comparing the shape to a circle or an ellipse. Altitude and area data were available for 117 of the 154 islands in 1994 and 15 of the 21 islands in 1995. Four height classes (a) $\leq$ 2 m, (b) 2–5 m, (c) 5–10 m and (d) $\geq$ 10 m, and four size classes (A) $\leq$ 0.25 ha, (B) 0.25–1 ha, (C) 1–5 ha, and (D) $\geq$ 5 ha were defined.

To test the influence of the effects of island height class, island size class and period on the trapping success and on the species richness, we performed two three-way ANCOVAs by using successively the number of captures and the number of species as variables, the height class, the size class and the period as factors, and the number of trapnights as a covariate. This allowed us to account for possible complex relationships between the trapping effort (i.e. the number of trapnights) and the trapping success (i.e. the number of captures). To satisfy to normality criterion, variables were transformed using the log(X+1) transform (Sokal & Rohlf 1981). Four periods were defined: (1) February to April 1994 (first water inflow, 33 islands, 6461 trap-nights), (2) May to July 1994 (first water inflow, 81 islands, 8427 trap-nights), (3) August to October 1994 (level stretch, 50 islands, 7746 trap-nights), and (4) January to March 1995 (second water inflow, 21 islands, 2707 trap-nights). In all statistical analyses, a probability of $P \leqslant 0.05$ was considered significant.

## RESULTS

A total of 1221 mammals belonging to 15 different species (six rodent, four marsupial, three edentates, one artiodactyl and one carnivore) were trapped (Table 1). Young captured with their mother and marsupial pouch young were not included. The two sibling species of *Proechimys* (*P. cuvieri* and *P. guyannensis*), probably both present, could not be distinguished because the differentiation only based on classical external morphological characters is very difficult (Guillotin & Ponge 1984). Seven species were rarely live trapped (number of captures $< 10$). For the eight common species (Table 1), live trapping represented the main capture method, except for *Dasypus novemcinctus* and *Dasyprocta agouti*. On 56 occasions, traps were damaged, mostly by armadillos, which escaped out of the traps by prying the door open.

Table 1. Species, mean ± SD body mass, number of individuals, and percentage of the total number rescued of mammals captured with terrestrial live traps at Petit Saut, French Guiana, between February 1994 and March 1995. Nomenclature follows Emmons & Feer (1990).

| Species | Mean ± SD body mass (kg) | Number of individuals captured with terrestrial live-traps during each period and total number | | | | | Percentage of the total number rescued |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | Total | |
| *Agouti paca* | 4.18 ± 2.67 | 1 | 5 | 0 | 0 | 6 | 20.7 |
| *Dasyprocta agouti** | 3.66 ± 1.12 | 3 | 11 | 9 | 1 | 24 | 31.6 |
| *Myoprocta acouchy** | 0.90 ± 0.20 | 37 | 129 | 69 | 9 | 244 | 71.6 |
| *Proechimys* spp.* | 0.34 ± 0.08 | 114 | 215 | 73 | 9 | 411 | 92.1 |
| *Sciureus aestuans* | 0.17 ± 0.01 | 0 | 2 | 2 | 0 | 4 | 4/5 |
| *Sciurillus pusillus* | — | 0 | 1 | 0 | 0 | 1 | 1/2 |
| *Dasypus kappleri* | 9.35 ± 0.63 | 1 | 0 | 2 | 1 | 4 | 6.3 |
| *Dasypus novemcinctus** | 4.35 ± 1.60 | 25 | 22 | 7 | 5 | 59 | 31.4 |
| *Tamandua tetradactyla* | 4.48 | 1 | 0 | 0 | 0 | 1 | 2.2 |
| *Didelphis albiventris** | 0.77 ± 0.28 | 7 | 21 | 12 | 0 | 40 | 100.0 |
| *Didelphis marsupialis** | 0.96 ± 0.39 | 43 | 90 | 44 | 2 | 179 | 90.0 |
| *Metachirus nudicaudatus** | 0.42 ± 0.10 | 33 | 31 | 14 | 1 | 79 | 94.0 |
| *Philander opossum** | 0.51 ± 0.13 | 29 | 82 | 45 | 10 | 166 | 96.0 |
| *Tayassu tajacu* | 4.02 | 0 | 1 | 0 | 0 | 1 | 1/11 |
| *Nasua nasua* | 3.11 ± 0.98 | 0 | 2 | 0 | 0 | 2 | 2/5 |

[*] , commonly captured species.

*Influence of trap location and trap type*

*D. agouti*, *Didelphis albiventris* and *Didelphis marsupialis* were captured equally in each trap location ($\chi^2 = 1.83$, df = 2, $P < 0.399$; $\chi^2 = 0.15$, df = 2, $P < 0.924$; and $\chi^2 = 4.71$, df = 2, $P < 0.094$, respectively). *Myoprocta acouchy* seems to prefer traps on no particular location and to avoid traps placed across or along pathways ($\chi^2 = 6.57$, df = 2, $P < 0.037$), but the Bonferroni 95% confidence intervals were not significant. *Proechimys* spp. preferred traps on no particular location and avoided traps placed across or along pathways ($\chi^2 = 21.24$, df = 2, $P < 0.001$). *D. novemcinctus* preferred traps on no particular location ($\chi^2 = 12.81$, df = 2, $P < 0.002$). *Metachirus nudicaudatus* avoided traps placed near trees, fallen logs and tree-falls ($\chi^2 = 8.18$, df = 2, $P = 0.017$). Finally, *Philander opossum* preferred traps on no particular location and avoided traps placed across or along pathways ($\chi^2 = 15.20$, df = 2, $P < 0.001$) (Table 2).

Influence of trap-type could not be tested for *D. agouti* and could be tested only for the location 1 (across or along pathways) for the other species, except *Proechimys* spp., *M. acouchy*, *D. albiventris*, *D. marsupialis* and *P. opossum* were captured equally in each trap type ($\chi^2 = 0.81$, df = 3, $P < 0.847$; $\chi^2 = 0.76$, df = 3, $P < 0.857$; $\chi^2 = 6.08$, df = 3, $P < 0.107$; and $\chi^2 = 2.99$, df = 3, $P < 0.393$, respectively). *D. novemcinctus* preferred double-door large traps and avoided single- or double-door small traps ($\chi^2 = 53.48$, df = 3, $P < 0.01$). *M. nudicaudatus* preferred double-door small traps and avoided double-door large traps ($\chi^2 = 10.72$, df = 3, $P < 0.013$) (Table 3). *Proechimys* spp. avoided large traps on location 1 ($\chi^2 = 20.14$, df = 3, $P < 0.001$), avoided single-door small traps and preferred double-door traps on location 2 ($\chi^2 = 131.02$, df = 3, $P < 0.001$), and avoided single-door large traps on no particular location ($\chi^2 = 9.90$, df = 3, $P < 0.002$) (Table 4).

The mean body mass of *D. novemcinctus* captured in large traps was significantly higher than those captured in small traps (4.68 ± 1.18 kg, n = 42, and 3.18 ± 2.28 kg, n = 19, respectively; P = 0.03). No such difference was observed in other species.

Table 2. Percentage of the trap-nights, number of captures observed and number of captures expected by trap location for the commonly captured species at Petit Saut, French Guiana.

| Trap location | 1. Across or along well-defined pathways | | 2. Trees, fallen logs, tree-falls | | 3. No particular location | |
|---|---|---|---|---|---|---|
| Percentage of trap-nights | 80.0 | | 11.5 | | 8.5 | |
| Number of captures | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. |
| *Dasyprocta agouti* | 14 | 15.20 | 4 | 2.18 | 1 | 1.61 |
| *Myoprocta acouchy** | 158 | 170.40 | 27 | 24.49 | 28 | 18.10 |
| *Proechimys* spp.* | 278 | 305.60 | 47 | 43.93 | 57 | 32.47 |
| *Dasypus novemcinctus** | 43 | 42.40 | 0 | 6.09 | 10 | 4.50 |
| *Didelphis albiventris* | 33 | 32.00 | 4 | 4.60 | 3 | 3.40 |
| *Didelphis marsupialis* | 119 | 129.60 | 23 | 18.63 | 20 | 13.77 |
| *Metachirus nudicaudatus** | 64 | 59.20 | 1 | 8.51 | 9 | 6.29 |
| *Philander opossum** | 89 | 105.60 | 21 | 15.18 | 22 | 11.22 |

$^*$, chi-squared goodness-of-fit test significant.

Table 3. Percentage of the trap-nights, number of captures observed and number of captures expected by trap type in location 1 (across or along well-defined pathways) for the common captured species at Petit Saut, French Guiana.

| Trap type | Large trap single door | | Large trap double door | | Small trap single door | | Small trap double door | |
|---|---|---|---|---|---|---|---|---|
| Percentage of trap-nights | 12.36 | | 25.84 | | 21.85 | | 39.95 | |
| Number of captures | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. |
| *Myoprocta acouchy* | 16 | 19.53 | 42 | 40.83 | 34 | 34.52 | 66 | 63.12 |
| *Dasypus novemcinctus** | 3 | 5.31 | 32 | 11.11 | 4 | 9.39 | 4 | 17.18 |
| *Didelphis albiventris* | 3 | 4.07 | 8 | 8.53 | 9 | 7.21 | 13 | 13.18 |
| *Didelphis marsupialis* | 13 | 14.70 | 20 | 30.75 | 31 | 26.00 | 55 | 47.54 |
| *Metachirus nudicaudatus** | 7 | 7.91 | 9 | 16.54 | 10 | 13.98 | 38 | 25.57 |
| *Philander opossum* | 13 | 11.00 | 21 | 23.00 | 25 | 19.45 | 30 | 35.56 |

*, chi-squared goodness-of-fit test significant.

### *Variation in the number of captures*

When possible effects of period and number of trap-nights were accounted for, the height and the size of the islands did not influence the number of captures (F = 1.854, df = 3,123; P = 0.141, and F = 0.700, df = 3,123; P = 0.554, respectively). On the other hand, a significant interaction between the effects of the number of trap-nights and the period affected the number of captures (F = 3.174, df = 3,120; P = 0.0267). The number of captures increased slightly with the number of trap-nights during the first period (slope of 0.002142), steadily during the second and the third periods (slopes of 0.010273 and 0.009276, respectively), but decreased with increasing number of trap-nights during the last period (slope of –0.004565).

### *Variation in the species richness*

Likewise, height and size of island did not influence the species richness when the possible effects of period and number of trap-nights were accounted for (F = 0.143, df = 3,123; P = 0.934, and F = 1.000, df = 3,123; P = 0.395,

Table 4. Percentage of the trap-nights, number of captures observed and number of captures expected by trap type in the three trap locations for *Proechimys* spp. at Petit Saut, French Guiana. Location 1: across or along well-defined pathways; location 2: trees, fallen logs, tree-falls; location 3: no particular location.

| Trap type | Large trap single door | | Large trap double door | | Small trap single door | | Small trap double door | |
|---|---|---|---|---|---|---|---|---|
| Location 1 | | | | | | | | |
| Percentage of trap-nights | 12.36 | | 25.84 | | 21.85 | | 39.95 | |
| Number of captures | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. |
| *Proechimys* spp.* | 18 | 34.36 | 53 | 71.83 | 76 | 60.74 | 131 | 111.06 |
| Location 2 | | | | | | | | |
| Percentage of trap-nights | 16.38 | | 3.45 | | 61.21 | | 18.96 | |
| Number of captures | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. |
| *Proechimys* spp.* | 13 | 14.58 | 21 | 3.07 | 25 | 54.48 | 30 | 16.87 |
| Location 3 | | | | | | | | |
| Percentage of trap-nights | 30.59 | | 12.94 | | 40.00 | | 16.47 | |
| Number of captures | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. | Obs. | Exp. |
| *Proechimys* spp.* | 8 | 17.44 | 6 | 7.37 | 28 | 22.8 | 15 | 9.38 |

*, chi-squared goodness-of-fit test significant.

respectively). No interaction between the effects of the number of trap-nights and those of the period occurred on the species richness (F = 1.494, df = 3,123; P = 0.219). However, both the number of trap-nights and the period affected the species richness (F = 4.178, df = 1,126; P = 0.0430, and F = 6.845, df = 3,123; P < 0.0003, respectively). Therefore, a model with additive effects of number of trap-nights and period (with a richness increasing at a slope of 0.004879). For a given number of trap-nights, richness was highest in period 2 (0.7827), then in period 4 (0.7032), then in period 1 (0.6983) and lastly in period 3 (0.6398).

## DISCUSSION

The large trapping effort allowed a high number of live trap captures on the islands of a large variety of species of medium-sized mammals and the large part of the rescue effort dedicated to this capture method was justified. Trap-shyness of some species largely influenced the results. *D. agouti* and *Agouti paca* were difficult to capture with live traps, as previously reported by Smythe (1978). Individuals regularly observed on the islands did not enter into the traps (authors, *pers. obs.*). They appeared particularly wary, and the animals that entered traps were young or hungry. Smythe (1978) also found it impossible to regularly trap agoutis at any time of the year in Panama, except when falling ripe fruits were scarce. Even at that time, adults seldom entered into the traps. Smythe (1978) and Smythe *et al.* (1982) captured more agoutis and pacas than we did using the same traps (Tomahawk live trap model 206), probably because of habitat and density differences in addition to low wariness of these species on the protected Barro Colorado Island (Glanz 1982, McClearn *et al.* 1994). Although armadillos are known to be difficult to capture with commercially available traps (Voss & Emmons 1996), we captured a substantial number of *D. novemcinctus* in our disturbed environment. *Dasypus kappleri* also regularly entered traps, but these traps were not suitable for this species, which probably caused most of the damage to the traps. In the same way, though acouchies are nervous and wary (Emmons & Feer 1990), and usually known to be trap-shy, we captured a high number of individuals. The decrease in the number of potential resting places and shelters caused by the water inflow could partly explain these results. Strong disturbance of the environment may have increased the tendency of these species to enter traps to hide. For acouchies, spiny rats and marsupials, live-trapping was the main capture method. We developed more efficient methods for capturing agoutis, pacas and armadillos, particularly with net pouches adjusted at the den exits, den excavations and vertical net during battues (C. Fournier-Chambrillon, unpubl. data).

Factors affecting trap results have been noted by many authors (Adler & Lambert 1997, Laurance 1992, Malcolm 1991, McClearn *et al.* 1994, Smythe 1978, Smythe *et al.* 1982; Woodman *et al.* 1995, 1996), and Voss & Emmons (1996) stressed that all inventory methods are biased. Our main results show again the real complexity of the sampling problem and we describe new and original aspects. In this study, the location of the traps influenced capture of some species, and it appears that the main location selected to place the traps (80% of the traps were across or along a well-defined pathway) was avoided by some species. Concurrently, traps on no particular location represented only 8.5% in our study, but were regularly preferred. This represents an important information for any further trapping experience with the same material. These results can partly be explained by the locomotion and foraging habits of the animals, hence their probability of coming across the traps. *Proechimys* spp. have short movements, walking around in a small area (Emmons & Feer 1990), and probably do not often use pathways. *M. nudicaudatus* is strictly terrestrial (Emmons & Feer 1990) and morphologically typically a runner (Julien-Laferrière 1991), so avoided tree-falls and logs, whereas *P. opossum* uses the ground to middle vegetation levels, winding along fallen brush or logs, and is most common around tree-falls (Charles-Dominique *et al.* 1981, Emmons & Feer 1990), so avoided pathways. In opposition, armadillos often use well-worn pathways (Emmons & Feer 1990), and their preference for traps placed on no particular location could be more in relation to the search for a den. Species for which the trap location had some influence also showed preferences for the trap types. The results are generally related to the size of the species: armadillos were too large to enter in small traps; small species probably did not venture easily into large traps. Nevertheless, in location 2, the preference of *Proechimys* spp. for double-door traps is more in relation with its foraging habits.

Effects of water inflow and forest fragmentation on the trapping success were different according to the time since the beginning of the water inflow. The number of captures increased with the number of trap-nights during the three first periods. Nevertheless, the number of successful traps was never $> 50\%$, as observed by McClearn *et al.* (1994) in Panama. The best trapping success was obtained in period 2 (May to July 1994), after the water level had reached 25 m at the dam, when the strong habitat modification due to the water inflow and the subsequent forest fragmentation became more significant. During the wet season, trappability and trap success are generally reduced (Adler & Lambert 1997, McClearn *et al.* 1994) because of the maximum fruitfall during this season (Guillotin 1982). In our study, better success during this period resulted from several factors associated with habitat isolation and loss, including an increase in density due to animals moving in from flooded areas (i.e. concentration of animals in remaining dry habitat), reduced food availability, decrease in the number of potential resting places and shelters. Conversely, one year after the beginning of the water inflow (period 4 versus period 1), the number of captures decreased with the increasing number of trap-nights, reflecting a real decrease of the number of mammals on the islands, due to: animals fleeing the disturbed habitat, animals dying *in situ* because of starvation, interspecific competition, and predation, and probably also our removal trapping conducted on adjacent islands.

The number of trap-nights also positively influenced the species richness, even during the last period. Regarding trapping success, species richness was highest during the second period, when the strong disturbance of the environment became more significant. Concentration of animals, reduced food availability and decrease in the number of potential dens may have increased the tendency and the probability of all species to enter traps. On the other hand, one year after the beginning of the water inflow, we did not observe in the mid-sized terrestrial-mammal community, the decrease in species richness reflecting the short-term effects of habitat fragmentation previously reported by Granjon *et al.* (1996) in the same context on the small terrestrial-mammal community.

## ACKNOWLEDGEMENTS

The rescue was funded by Electricité de France/Centre National d'Equipement Hydraulique (EDF/CNEH). We would like to thank all the 'Faune Sauvage' team, composed of veterinarians, biologists, students and local helpers, and the members from the Office National de la Chasse for their participation in the captures. We also thank the SEPANGUY for its support. We are grateful to J.M. Duplantier, L. Granjon, and R. Voss for the critical review of an earlier version of this manuscript. This paper was funded by EDF/CNEH through GREGE-ARPEN (Commande GP 0866).

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