



Human Fatality by Escaped *Pan troglodytes* in Sierra Leone

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Abstract In April 2006, a group of chimpanzees escaped from the Tacugama Chimpanzee Sanctuary in Sierra Leone, resulting in the death of 1 local citizen and injury of another. The chimpanzees caused no further damage after the initial incident. Of the 31 escaped chimpanzees, 27 returned to the sanctuary by the end of 2006, 21 of them voluntarily. The sanctuary is in a forest reserve, a habitat of wild chimpanzees. Ironically, the tragic incident provided an opportunity to observe the behavior of the escaped chimpanzees and their adaptability in the forest. As a result of the incident, local communities could have come to fear the chimpanzees or develop negative feelings toward the sanctuary and its activities, which include keeping a colony of orphaned chimpanzees for rehabilitation and promoting the protection of wild populations. However, collaboration and understanding among the sanctuary, local communities, and government authorities resulted in peaceful handling of the situation and the humane retrieval of 27 of the escaped chimpanzees. As the number of chimpanzees in African sanctuaries increases, they are responsible more than ever for minimizing hazards to surrounding communities. It is important for sanctuaries to develop understanding and to raise support from local communities and government authorities to help them avoid crises and continue their activities.

Keywords behavior · chimpanzees · escape · rehabilitation · sanctuary · Sierra Leone

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Introduction

A sanctuary is a facility that provides “a safe and secure home for African apes and other primates in need. The welfare of the individual and the preservation of the species are of prime importance and are considered equally. The sanctuary operates in the context of an integrated approach to conservation, which can include rehabilitation and reintroduction” (Pan African Sanctuary Alliance 2007, p. 3). Despite efforts by local and international conservation bodies to protect wild populations, trafficking in young chimpanzees continues. The number of sanctuaries for chimpanzees in Africa has increased during the past decade (Cox *et al.* 2000; Farmer 2002; Teleki 2001); currently 14 facilities are in operation (Mills *et al.* 2005; Pan African Sanctuary Alliance 2007). Since 2000, there has been a 59% increase in the number of chimpanzees in African sanctuaries (Mills *et al.* 2005).

The reintroduction of rehabilitated chimpanzees into the wild seems to be a humane solution for dealing with the increasing number of chimpanzees; however, the underlying prerequisites are complex (Beck *et al.* 2007) and, in reality, difficult to fulfill. Conservationists have attempted reintroductions of chimpanzees into different areas of Africa, most of which have involved release of small groups of chimpanzees at a time (Borner 1985; Brewer 1978; Carter 2003; Hannah and McGrew 1991; Treves and Naughton-Treves 1997). The selection of suitable candidates (Hannah and McGrew 1991) and rehabilitation before reintroduction are critical to their success (Brewer 1977; Carter 1988; Hannah and McGrew 1991). The site for reintroduction should have few or no wild chimpanzee populations (Brewer 1977; Carter 2003) and should be located far from human settlements to avoid attacks on people by the chimpanzees (Borner 1985; Hannah and McGrew 1991). However, systematic data on reintroductions are sporadic and scarce. One exception is a project in the Congo that has accumulated records on release procedures both before and after release (Goossens *et al.* 2002, 2003, 2005; Tutin *et al.* 2001). Researchers involved in the project released 37 chimpanzees between 1996 and 2001; 23 individuals had survived as of February 2004. They closely monitored the chimpanzees after release and observed their interactions with wild populations. In addition, 5 births occurred among the 4 released females (Goossens *et al.* 2005).

Chimpanzees are physically strong and can be dangerous to humans; therefore, sanctuaries that keep them must minimize potential hazards to the local community. On April 23, 2006, 31 chimpanzees escaped from holding facilities at the Tacugama Chimpanzee Sanctuary in Sierra Leone. The escape resulted in the death of 1 local citizen and injury of another. Through the process of retrieving the escaped chimpanzees, we noticed some interesting behaviors. Though they did so unintentionally, the chimpanzees escaped into their natural habitat. Because there is no report of the escape or release of such a large group of chimpanzees into their natural habitat, the incident provided an opportunity to observe how they would behave. We describe the details of the unexpected and tragic incident, based on statements collected from the injured victim and sanctuary staff, and report on the crisis control by the sanctuary and the reaction of the public after the incident. We also describe the process of retrieving the chimpanzees and assess their behaviors to

determine whether rehabilitation at the sanctuary can prepare chimpanzees for reintroduction into the wild.

Tacugama Chimpanzee Sanctuary, Sierra Leone

In 1995, Bala Amarasekaran, the sanctuary director and an expatriate, established the Tacugama Chimpanzee Sanctuary in collaboration with the Ministry of Agriculture and Forestry and the Conservation Society of Sierra Leone, a local nongovernmental organization. The objectives of the sanctuary are to stop the illegal chimpanzee pet trade and to protect wild populations by providing a holding facility and rehabilitative care for confiscated chimpanzees. The government allocated land for the sanctuary in the Western Area Forest Reserve, which is adjacent to the capital city Freetown, and appointed 2 officials to work at the sanctuary. It is located *ca.* 10 km from Freetown and 3 km from the nearest human settlements of Regent, Bathurst, and Charlotte. From the main road, a narrow road *ca.* 3 m wide leads to the Congo Dam and the sanctuary. Normally only sanctuary vehicles and visitors to the sanctuary and to the dam use the road.

The Western Area Forest Reserve is *ca.* 4 km wide and 37 km long and covers 17,688 ha of the westernmost remnant of the Upper Guinean forest block. Motor roads encircle the reserve, and human settlements, including Freetown, surround the reserve. The human population of the peninsula *ca.* 950,000 in 2004 (Statistics Sierra Leone 2006).

Ausden and Wood (1990) reported the presence of wild chimpanzees in the Western Area Forest Reserve, but a survey conducted in 1993 revealed no evidence of chimpanzees (Alp *et al.* 1993). However, in 1997, 1 adult female chimpanzee, Ms. Congo, appeared near the sanctuary. We observed another female, Ms. Tacugama, in the sanctuary in February 2001. We often observed them interacting with the chimpanzees in the sanctuary through the grilles of the dens. Since 2001, we have heard an increasing number of vocalizations from several wild chimpanzees around the hills south of the sanctuary.

Holding Facilities at the Sanctuary

The chimpanzees at the sanctuary live in 5 social groups, each comprising 5–33 chimpanzees. The sanctuary's rehabilitative procedure aims to socialize them into mixed age and sex groups and to allow them to live in natural forest enclosures with necessary, but minimal, husbandry and medical support. The ultimate goal is their reintroduction into the wild, though there is no specific plan at present. The forest inside the enclosure contains edible plants (Barrie 1999), and chimpanzees feed on them, though sanctuary caretakers also feed them several times a day. Though the sanctuary is open to the public and accepts visitors, chimpanzees have no direct contact with any human other than sanctuary staff.

Currently, 7 solar-powered electric fence enclosures operate at the sanctuary. The fence used for the group of escapees was *ca.* 3 m high. Each electric-fenced

enclosure is connected to dens where the chimpanzees sleep at night. Chimpanzees use slides to move between the dens and the enclosures. The den walls are solid concrete block with grilles of iron bars. Each den has a metal service door for sanctuary staff.

Report of the Incident

We base the description on information collected via interviews with Melvin Mammah, the injured victim, who lost 3 fingers; a newsletter issued by the Tacugama Chimpanzee Sanctuary; and statements by sanctuary staff and volunteers and people from nearby communities.

The Incident (April 23, 2006)

There were 84 chimpanzees in the sanctuary on the day of the incident. At *ca.* 8 a.m. on April 23, 2006, 1 chimpanzee managed to open a chute connected to the dens from the inside of an enclosure that held 31 chimpanzees of mixed ages. We later confirmed experimentally that 1 adolescent male chimpanzee, Jido, *ca.* 9 yr old, was able to open the slide by using a stick and a stone to dismantle the lock, which was a combination of timbers fitted in the grooves of the slide to shut the chute. A padlock was normally in place when the slide was shut, but the staff were not able to locate it after the incident.

The staff-access door of the den was open for cleaning, and the chimpanzees exited through the door while the caregiver was away removing the waste. As soon as the caregiver realized that many chimpanzees, including some adult males, had escaped, several staff went to the village to warn the public and reported to the police that the chimpanzees had escaped. One staff member and a volunteer locked themselves in the clinic quarantine area when they saw the chimpanzees approaching.

According to the statement by Mr. Mammah, a Sierra Leonean national, he, 2 Americans, and 1 Canadian had hired a local taxi for the day and planned to visit the sanctuary that morning. They had not informed the sanctuary of their intended visit. When they reached the junction near the sanctuary and the dam, instead of turning onto the steep road to the sanctuary, they continued on to the dam (Fig. 1). At the dam, they saw 1 adult chimpanzee. The Americans and the Canadian started taking pictures of the chimpanzee, which began hitting the front of the car. The chimpanzee broke one of the windows, took hold of Mr. Mammah's arm, and bit him. The driver tried to hit the chimpanzee with the car, but the chimpanzee moved out of the way and the car crashed into the metal gates of the dam compound. Mr. Mammah exited the car, and the chimpanzee then bit his leg. Mr. Mammah picked up a rock and hit the chimpanzee with it. The chimpanzee ran away, but Mr. Mammah lost 3 fingers. Meanwhile, the local driver and expatriates had already fled the scene.

A volunteer telephoned the family of the director, and the director, who was in the United Kingdom along with the resident veterinarian, R. M. Garriga, subsequently heard about the escape from the family member. The director instructed the volunteer and staff not to leave the clinic. He contacted government officials in the

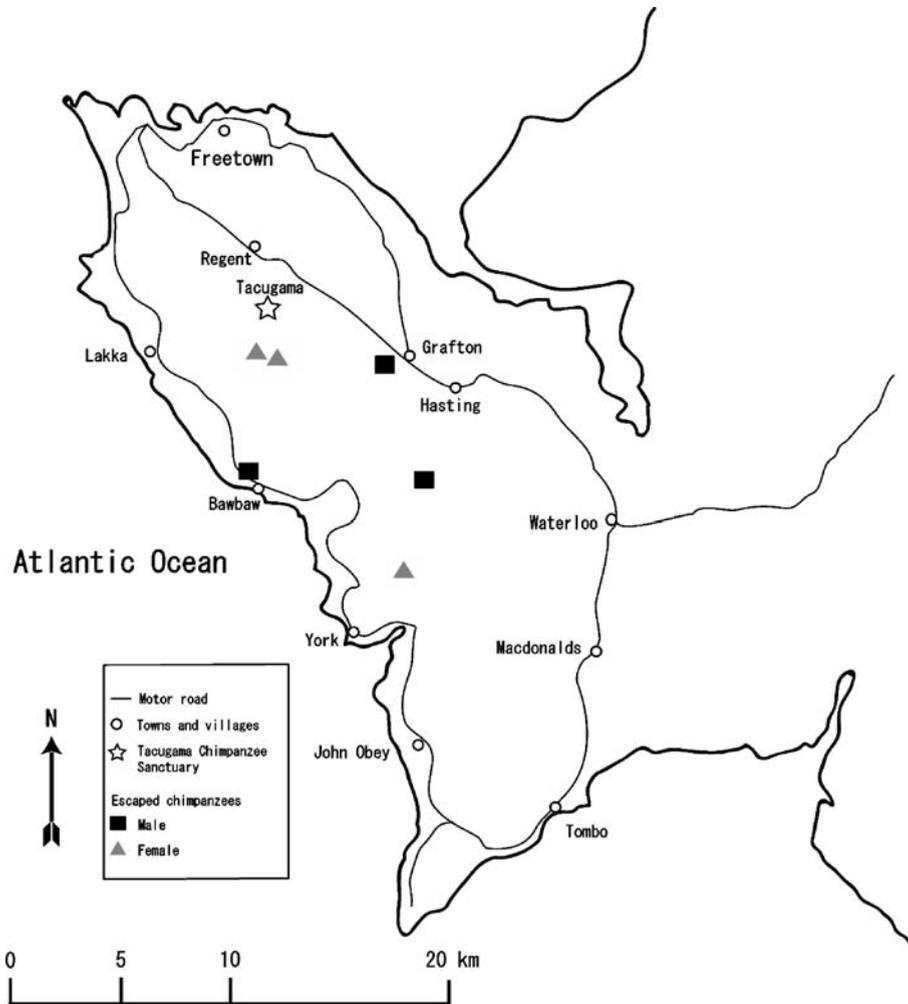


Fig. 1 Locations where 6 escaped chimpanzees were found or retrieved outside of the sanctuary.

president's office, ministries, police, and defense headquarters. Shortly afterward, police officers informed the sanctuary supervisor that staff had found the mutilated body of a local man by the sanctuary gate. Later, officials confirmed that the body was that of the taxi driver. We do not know exactly what happened to the driver or why he decided to walk up the road leading to the sanctuary. The volunteer and staff member hiding in the sanctuary confirmed that they had heard a man screaming from the direction of the gate. Dr. Owiz Koroma, senior pathologist at the government hospital in Freetown, conducted an autopsy. The autopsy report revealed that the driver had bled to death from multiple bites all over his body.

At around noon on the day of the incident, an armed police special task force from the Operational Support Division arrived at the sanctuary to investigate the incident and to bring the situation under control. Before approaching the sanctuary,

the police shot a gun into the air 3 times to frighten away chimpanzees that might have been loose on the premises. The officers rescued the volunteer and staff member from the clinic where they had been hiding since that morning. The government authorities studied the incident in detail and concluded that this was a rare incident and the danger had passed. The police high command sensibly ordered the officers not to open fire unless they experienced another attack. Everyone agreed that the police officers would follow the instructions of the sanctuary director in trying to locate the escaped chimpanzees and to retrieve them unharmed. By evening, most of the sanctuary staff had returned, and the authorities assigned 6 armed police officers to the sanctuary. The officers remained assigned to the sanctuary for 3 mo and escorted search parties formed by the sanctuary.

On the day of the incident, people living in the nearby communities were very frightened. They had heard only that chimpanzees had escaped and killed someone, and they thought that the chimpanzees might be approaching the human settlements. The government authorities communicated with villages around the sanctuary to reassure people immediately after the incident.

By noon that day, the population of the whole town was aware of the incident. The American embassy, the United Nations, and other nongovernmental organizations circulated notices to their staff to avoid the sanctuary. On April 25, local newspapers reported the incident on their front pages; they also published some follow-up stories. However, news of the escape included unreliable second-hand information. Most of the articles had exaggerated headlines, and some articles contained false information. To clarify the false information and misunderstandings about the incident, the sanctuary's June 2006 online newsletter, issued on June 21, 2006 (<http://www.tacugama.org>), included a statement by the director.

Mr. Mammah was the only source of information as to how he and his party had come across a chimpanzee that day. The rest of the party was not available to provide comments because the driver was dead and the Americans and Canadian left the country the next day without providing statements (M. Mammah, *pers. comm.*).

Days 1–16 after the Incident

The group involved in the incident comprised 31 chimpanzees, 16 males and 15 females, between *ca.* 2.5 and 20 yr of age. Except for 4 infants, all were >6 yr old. We based our estimations of the age of each chimpanzee on dental eruption and years spent at the sanctuary since acquisition (Table 1).

The director and the resident veterinarian returned to Sierra Leone on April 24, the morning after the incident. That morning, staff found 3 chimpanzees inside the holding facility. The escaped chimpanzees initially left the sanctuary, or at least hid and remained quiet, possibly because they were frightened after hearing the gunshots and commotion that the police officers made in the sanctuary. Sanctuary staff used various methods to locate the chimpanzees. Every morning and evening, caregivers made feeding calls just as they normally did at feeding time to gather chimpanzees, hoping they would bring the chimpanzees closer to the sanctuary. At times we heard chimpanzees vocalizing after we made the calls. Though there were wild chimpanzees in the reserve, well-trained sanctuary staff reported several times that they recognized the vocalizations of escapees. We kept some of the enclosures

Table 1 List of escaped chimpanzees

Name	Sex	Estimated age in April 2006	Year of acquisition	Years in the group	Retrieved?
Bruno	M	19	1988	6	No
Charlie	M	16	1992	6	No
Phillip	M	16	1993	6	Yes
Tito	M	16	1995	6	Yes
Christo	M	13	1998	6	Yes
Jojo	M	11	1997	6	Yes
Ole	M	10	1996	6	Yes
Perform	M	10	1999	6	Yes
Solo	M	9	2001	5	Yes
Jido	M	9	2001	5	Yes
Toko	M	8	2000	5	No
Kafoe	M	8	1998	6	Yes
Sabie	M	7	1999	5	No
Sulleh	M	7	2000	5	Yes
Suma	M	2.5	2003 ^a	3	Yes
Jumu	M	2.5	2003 ^b	3	Yes
Julie	F	20	1989	6	Yes
Babes	F	16	1997	6	Yes
Cheetah	F	15	1994	6	Yes
Gabie	F	14	1995	6	Yes
Suzie	F	11	1996	6	Yes
Sitta	F	11	1998	6	Yes
Musu	F	10	1998	6	Yes
Ezme	F	10	1996	6	Yes
Charlie Girl	F	9	2001	5	Yes
Omo	F	8	2001	5	Yes
Big Lucy	F	8	2001	5	Yes
Small Lucy	F	7	2001	5	Yes
Pieh	F	6	2000	5	Yes
Bimtu	F	2.5	2003 ^c	3	Yes
Gara	F	2.5	2003 ^d	3	Yes

The estimations of the age of each chimpanzee are based on dental eruption and years spent at the sanctuary since acquisition.

^a Born to Sitta. The year of birth.

^b Born to Julie. The year of birth.

^c Born to Babes. The year of birth.

^d Born to Gabie. The year of birth.

empty and the staff service gates open to trap any chimpanzee that returned to the enclosures.

Typically, an anesthetic is used to immobilize chimpanzees, allowing for their safe capture and translocation. The sanctuary commonly uses ketamine, medetomidine, and zolazepam with tiletamine alone or in combination. The anesthetics can be administered orally mixed in a soft drink or honey for sedation. However, if there is a need to anesthetize individuals completely for transportation, drugs are injected by hand or with a blowpipe dart. In cases of escape, the protocols for anesthetics vary. Because the resident veterinarian might not be present during a capture, the staff members in charge of retrieval were trained in the procedures and received mobile

phones to communicate with the veterinarian regarding the administration of drugs and subsequent monitoring.

Two days after the incident, a search party, consisting of senior staff from the sanctuary, police officers, and people from the community, combed through the forest around the sanctuary searching for nests, calls, tracks, or remains from feeding.

The sanctuary director and staff visited local communities to explain the situation. The staff told people what they should do if they encountered chimpanzees, i.e., stay calm, do not approach or attempt to catch them, do not run, and to report their sightings. We also used mass media such as radio and television to reach the public in Freetown and the areas surrounding the sanctuary. Local people were sympathetic to the sanctuary staff and were very understanding. They helped to locate missing chimpanzees by reporting sightings to the sanctuary; in many cases, people from the community also spent days with the staff looking for chimpanzees in the forest. They seemed to accept that the incident was a rare accident, because this was the first time in the 10 yr that the sanctuary had been in operation. Some people also thought that the chimpanzees had attacked the victims because they were strangers and were unexpected at that time of day.

By May 1, 8 d after the incident, 16 chimpanzees had returned to the sanctuary, and all, except 1 10-yr-old male, Performance, walked into the enclosure through the staff service gate. The male came to the enclosure fence, but because he was afraid to walk in, staff sedated him.

On the morning of May 3, the sanctuary received a report from a local trapper that an infant chimpanzee had been caught in his snare trap *ca.* 2.5 km from the sanctuary. The local trapper's relationship with the sanctuary had been rather negative because the sanctuary had been patrolling around the reserve to stop poaching and woodcutting; however, he volunteered to search for the escaped chimpanzees with the sanctuary staff. The infant chimpanzee was a 2.5-yr-old female named Bintu. Her mother, Babes, had come back to the sanctuary alone on April 28. Apparently, Bintu had survived without her mother for ≥ 6 d. Sanctuary staff sighted another chimpanzee, possibly a male adult called Christo, near the trap. We assumed that if the chimpanzee was actually Christo, he might have stayed with Bintu, who was caught in the trap. Unfortunately, the male fled into the bush and the staff could not locate him. Staff returned Bintu to her mother the next day.

On May 2, charcoal burners from the community of Grafton, *ca.* 5 km from the sanctuary, saw a chimpanzee. On May 4, the chimpanzee, a 9-yr-old male named Jido, appeared again when the people were working in the bush. The director sedated Jido to bring him back to the sanctuary by vehicle.

On May 6, the same trapper who had found Bintu reported sighting 2 more chimpanzees. He found a 10-yr-old female, Ezme, in a tree in the forest *ca.* 2.5 km from the sanctuary, not far from where we had found Bintu. It took some time to persuade Ezme to climb down from the tree, and it was not until May 9 that staff immobilized her and returned her to the sanctuary.

On May 7, a mother and her infant, Sita and Suma, respectively, returned to the sanctuary on their own. A sanctuary volunteer guided them into the enclosure.

After 2 wk of attempting to locate chimpanzees, the search team could find no further trace and they felt that their attempts to track the chimpanzees might actually

be chasing them further from the sanctuary. The staff decided to wait for reports from neighboring villages and towns.

One Month after the Incident

On May 30, at *ca.* 4 p.m., we unexpectedly saw Sulleh, a 7-yr-old male, in the enclosure with the other chimpanzees of his original group. On the following day, we discovered Tito, a 16-yr-old male, in the same enclosure. We suspected that they had jumped into the enclosure via the overhanging branches. On June 2, we found Christo, a 13-yr-old male, in the sanctuary near the main gates. After sedating him with orally administered drugs, the staff darted him for transfer to the holding facility.

At the end of May, the people of Baw Baw village, in the coastal area of Freetown Peninsula, reported that a woman in a nearby village had seen a chimpanzee inside her house eating rice, but when she returned with other people, the chimpanzee was gone. On June 3, we found Philip, a 16-yr-old male, in a small wood lot near Baw Baw. The sanctuary director and senior staff anesthetized Philip for transfer to the sanctuary.

On June 21, a report from Tokeh, a coastal village *ca.* 12 km from the sanctuary, indicated that someone had sighted a chimpanzee in the forest. The following day Pieh climbed down from a tree to the staff. She took an anesthetic drug in a drink and was subdued sufficiently for transfer to the sanctuary.

Six Months after the Incident

In October, we received several reports of sightings of chimpanzees in the forest 10 km away, southwest of Hasting. After waiting several days in the area where the chimpanzees were sighted and failing to bait them with a soft drink containing anesthetic drugs, staff hiding in a shack finally darted Ole with a blowpipe on November 9. Between November and December, the search team reported sighting 2 of the escaped young males on 5 occasions in the area where they retrieved Ole, *ca.* 10 km away from the sanctuary. Most of the retrieved chimpanzees recognized, approached, and were willing to take food or drink from staff members on being found outside of the sanctuary. However, Ole and other chimpanzees traveling together fled whenever they saw people, even including sanctuary staff who had known them for 5–10 yr. Four males remained at large as of the end of December 2007. All efforts to retrieve the remaining 4 individuals have been futile.

After the escape, the sanctuary closed to the public. It reopened in December 2006 and now accepts a limited number of visitors per day by appointment only. Staffers built 3 shelters with concrete walls and metal doors at various viewing stations along the visitors' trail so that staff and visitors can hide safely in case of emergency. The sanctuary also reinforced existing buildings, such as the clinic and office, by placing iron grilles on the windows. Though the escape in April was not due to the design of the enclosures or the fence, the staff added more wires to the fence to prevent chimpanzees from escaping. The sanctuary also purchased additional ultrahigh-frequency radio equipment to ensure wider and more effective network coverage among the staff.

After health examinations by the resident veterinarian confirmed that they had no physical problem, staff returned them to their original groups. Because the α -male and 3 other males are still missing, the social dynamics of the group have changed since the incident. Therefore, the resocialization of the retrieved individuals has occurred gradually, and we have carefully observed the group's intragroup dynamics.

Retrieval of the Chimpanzees

Of the 31 escaped chimpanzees, we had retrieved 27 as of December 2006. Of the 27 chimpanzees retrieved, 21 returned to the sanctuary voluntarily. Nineteen of them walked or jumped into the enclosures or dens on their own, and staff anesthetized the other 2 inside the sanctuary because they did not attempt to enter an enclosure or den on their own and staff did not want to let them escape.

Thirteen chimpanzees (41.9%) returned to the sanctuary ≤ 3 d of the incident. By May 9, 16 d after the incident, 21 chimpanzees (67.7%) had returned to the sanctuary. After May 9, staff retrieved no chimpanzee for 20 d. However, between May 31 and June 3, 3 males returned to the sanctuary, and we retrieved 1 male from a village on the other side of the hills of the Freetown Peninsula. Later, we retrieved 2 chimpanzees, 1 in June and the other in November, from different locations (Fig. 1).

All of the females, except for 1 retrieved in June, returned or were retrieved ≤ 16 d of the incident. In contrast, we retrieved some males 14–36 d after the incident, but 4 males —2 adults and 2 adolescents— were still missing as of December 2006. The difference in the return rates of the sexes is significant: ≤ 7 d of the incident, 15 chimpanzees, half of those that had escaped, had returned. Of the 15, 11 were female. The probability of >11 of 15 chimpanzees being female is 0.92%.

Discussion

Prevention of Further Incidents

This tragic incident is a reminder that chimpanzees can be dangerous and that sanctuaries are responsible for ensuring the safety of their staff and visitors, as well as that of people in neighboring communities. Improving sanctuary security, in terms of facility design and staff training in security and emergency protocols, is important to help prevent future escapes. All sanctuary personnel should recognize the importance of caution and awareness in dealing with a group of strong, intelligent animals. Having a resident veterinarian to train staff regularly on anesthetic procedures in case of emergency is imperative, as is keeping a good stock of anesthetics and equipment on hand at all times. Controlling visitors to the sanctuary is also important. Sanctuary staff should have the training to minimize damage when an accident occurs. In this case, measures taken by the sanctuary staff on learning of the escape were appropriate because no further damage occurred beyond the death and injury of the 2 locals whom the staff were not aware were in the vicinity.

Crisis Management and Collaboration with Local Sectors

Of the escaped chimpanzees, 27 returned unharmed, 6 of them because of collaboration with local communities in the retrieval process. We cannot sufficiently stress the importance of sanctuaries building good, solid relationships with local communities and authorities to ensure support from them in times of crisis.

Keeping in close contact with the Ministry of Agriculture and Forestry, e.g., having officials as part of sanctuary staff, and collaborating with local law-enforcement bodies such as the police and military helped to control the situation. Tacugama Sanctuary regularly invites police officers and military personnel to visit the facility as part of educational programs, and some of the personnel have been involved in the confiscation of pet chimpanzees. The professionalism of the authorities while dealing with this unusual situation reassured people in the surrounding communities and prevented unnecessary panic.

The Tacugama Chimpanzee Sanctuary has tried to use the incident to raise public awareness about the danger of keeping chimpanzees as pets. If not for sanctuaries, many chimpanzees would be kept as pets in crowded towns and villages without security measures.

Providing accurate information about the incident to the public via television and radio, and the sanctuary newsletter was important in clarifying the misunderstandings about chimpanzees and sanctuaries created by outrageous reports based on unreliable information. The information the sanctuary provided helped the local public to understand that the incident was an accident and that the sanctuary and local authorities were working together to control the situation. In addition, African sanctuaries depend largely on overseas donors (Farmer 2002), who base their evaluations of sanctuaries on information in the media because they often have no opportunity to visit.

Behavior of Escaped Chimpanzees

The rehabilitation of chimpanzees in sanctuaries involves not only resolving physical or psychological problems caused during capture and captivity but also recovering or rediscovering natural behavior. Ideally, successfully rehabilitated chimpanzees should be able “to find and process food and water, to detect and avoid predators and other hazards, to seek and make shelters, to practice healthy personal habits, and to produce and rear offspring” (Hannah and McGrew 1991, p. 168). The good health of the retrieved chimpanzees indicated that they were able to feed themselves in the forest. Though the body masses of the chimpanzees before escape are unknown, some male chimpanzees, especially Ole, had grown visibly after spending 6 mo in the forest.

Given that 31 chimpanzees escaped from a sanctuary so close to human settlements, including a capital city, the incident could have resulted in a large number of victims and much damage. Once they are habituated, chimpanzees can be aggressive and potentially dangerous to humans (Carter 2003). Though they had spent most of their lives with humans, they seemed to be aware that there was a boundary between their forest habitat and the human settlements and that they were safer in the former. The perception is similar to how wild chimpanzees that live near

human settlements show more signs of vigilance when they are in farm fields or villages than when they are in the forest (Hockings 2007; Hockings *et al.* 2007).

There were differences between the sexes in the rate and timing of their return to the sanctuary. All females except 1 returned to the sanctuary ≤ 16 d of the incident. Though some males returned at about the same time as the females, some returned only after 5 wk or 6 mo. Four male chimpanzees had still not returned after 1 yr, and we cannot confirm their survival. The differences between the sexes may reflect the range patterns of wild chimpanzees. Various ecological factors, e.g., predation, availability of food, determine the home range patterns of chimpanzees in the wild and the size and use of home ranges by the sexes differ from site to site (Chapman and Wrangham 1993; Hasegawa 1990; Herbinger *et al.* 2001; Lehmann and Boesch 2005; Williams *et al.* 2002). However, generally male range patterns are associated with the distribution and density of receptive females, and female range patterns are associated with the distribution and density of food (Wrangham 1979). For the escaped females, the sanctuary enclosure may have represented food and the safety of a familiar environment. In contrast, there was no receptive female at the sanctuary for the males; 4 females were nursing and the other females of reproductive age had contraceptive implants. The escaped males most likely had some contact with wild chimpanzees and there may have been receptive females outside the sanctuary.

Except for a few solitary chimpanzees, the majority of the chimpanzees seemed to travel in groups. They were from different backgrounds and some of them had not had contact with other chimpanzees for years while they were kept as pets. However, they were able to live in a social group after their careful introduction to other individuals at the sanctuary.

Considering that some of the chimpanzees survived in the forest for >6 mo, the behavior of those that returned indicates that even after years in captivity and in close contact with humans, chimpanzees can maintain or regain their ability to survive in the wild. The rehabilitation and husbandry procedures at the Tacugama Chimpanzee Sanctuary, e.g., keeping chimpanzees in a large social group in the forested enclosure, gave them the opportunity to create social bonds with conspecifics and to learn skills for surviving in the forest. Bintu's case points to the importance of protecting a site from hunting activities if a sanctuary plans to release rehabilitated chimpanzees (*cf.* Tutin *et al.* 2001), unless chimpanzees learn to avoid snare traps (Ohashi 2005).

Conclusion

Because there are no laws in Africa related to keeping chimpanzees in sanctuaries, the sanctuaries themselves are ethically responsible for handling safety issues. Each sanctuary has a different setting; one may be located in a crowded urban area and another in a remote area within a national park. However, an incident similar to the one described here could occur at any facility at any time. As long as the trade in live chimpanzees continues in Africa, which unfortunately may be for some time, the number of chimpanzees in sanctuaries will continue to increase. Organizations like the Pan African Sanctuary Alliance can provide opportunities for sanctuary

managers to exchange ideas on how to keep chimpanzees and other primates safely and how to handle crisis situations.

It is important that sanctuaries work with local authorities and communities. In the United States and in Europe, a few cases of chimpanzee escapes have resulted in killing the escapees. For example, officials killed 2 chimpanzees that escaped and attacked visitors at the Animal Haven Ranch in California in March 2005 (Anonymous 2005a,b), and officials shot 3 chimpanzees that escaped from the Nebraska Zoo in November 2005 (Kindschuh 2005). In August 2003, 4 adult male chimpanzees escaped from the outdoor enclosure of the Mona Foundation sanctuary in Spain. The police killed one of them and another died after anaesthesia. The others were sedated and brought back to the facility (Dotras, *pers. comm.*). In 2007, at the same sanctuary, 3 adult males escaped. Though the veterinarian darted 1 chimpanzee with anesthetic, police shot him instead of waiting for the drug to take effect. The 2 others returned to the facility (Mona Foundation 2007). In Tanzania, authorities shot 1, and possibly 2, male chimpanzees that were released on Rubondo Island because they continued to attack game scouts and their families who lived on the island (Borner 1985).

Authorities in Sierra Leone handled the escape humanely and calmly considering the number of chimpanzees that escaped and the limited work force, resources, and equipment available to them. Under different circumstances, the incident could have created panic among the local communities and might have resulted in killing the escapees. It might also have negatively affected the protection of wild chimpanzee populations in the country.

The human-chimpanzee relationship has been diverse ever since Europeans discovered chimpanzees and transported them out of Africa. Chimpanzees are no longer mysterious humanlike creatures that live deep in African forests. In industrial countries, they are kept in zoos, used in the entertainment business, and subjected to various medical and psychological experiments (Beck *et al.* 2001). In some cases, they are retired from laboratories or circuses to sanctuaries, and their welfare and freedoms are the subject of heated debate (Cavalieri and Singer 1993). In countries that have chimpanzee habitats, they are habituated for research and ecotourism, decried as crop raiders, traded as pets and food, rescued by sanctuaries, and some are even returned to the wild (Kormos *et al.* 2003). Though any facility that contains chimpanzees should take all necessary steps to prevent escape, it is important to make information accessible to further our understanding about life with chimpanzees and other animals, both in captivity and in the wild.

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References

- Alp, R., Brima, J., Amarasekaran, B., & Tucker, W. (1993). *Chimpanzee Rehabilitation in Sierra Leone, West Africa: Survey Results and Preliminary Proposals*. Freetown, Sierra Leone: The Ministry of Agriculture, Forestry and Fisheries.
- Anonymous (2005a). Chimps escape, attack visitors at animal sanctuary. *Laboratory Primate Newsletter*, 44, 21.
- Anonymous (2005b). Escaped chimps attack visitors in California. *IPPL News*, 32, 7–8.
- Ausden, M., & Wood, P. (1990). *The Wildlife of the Western Area Forest Reserve, Sierra Leone*. Forestry Division of the Government of Sierra Leone, Conservation Society of Sierra Leone, International Council for Bird Preservation, Royal Society for the Protection of Birds, Freetown, Sierra Leone.
- Barrie, A. (1999). The Structure and Floristic Composition of the Tacugama Forest Reserve: A Potential Habitat for the Release of Rehabilitated Chimpanzees in Sierra Leone. BSc dissertation, Njala University, Freetown, Sierra Leone.
- Beck, B., Stoinski, T. S., Hutchins, M., Maple, T. L., Norton, B., Rowan, A., Stevens, E. F., *et al.* (2001). *Great apes and humans: The ethics of coexistence*. Washington, DC: Smithsonian Institution Press.
- Beck, B., Walkup, K., Rodrigues, M., Unwin, S., Travis, D., & Stoinski, T. (2007). *Best practice guidelines for the reintroduction of great apes*. Gland, Switzerland: IUCN/SSC Primate Specialist Group.
- Borner, M. (1985). The rehabilitated chimpanzees of Rubondo Island. *Oryx*, 19, 151–154.
- Brewer, S. (1977). *Chimpanzee Rehabilitation*. The International Primate Protection League, South Carolina.
- Brewer, S. (1978). *The Chimps of Mt. Asserik*. New York: Alfred A. Knopf.
- Carter, J. (1988). Freed from keepers and cages, chimps come of age on Baboon Island. *Smithsonian*, 19, 36–49.
- Carter, J. (2003). Orphan chimpanzees in West Africa: Experiences and prospects for viability in chimpanzee rehabilitation. In *West African Chimpanzees: Status Survey and Conservation Action Plan*. IUCN—World Conservation Union, Gland, Switzerland, pp. 157–167.
- Cavaliere, P., & Singer, P. (1993). *The Great Ape Project: Equality Beyond Humanity*. London: Fourth Estate.
- Chapman, C. A., & Wrangham, R. W. (1993). Range use of the forest chimpanzees of Kibale: Implications for the understanding of chimpanzee social organization. *American Journal of Primatology*, 31, 263–273. doi:10.1002/ajp.1350310403.
- Cox, D., Rossen, N., Montgomery, C., & Seal, U. S. (2000). *Chimpanzee Sanctuaries: Guidelines and Management Workshop Report*. Entebbe, Uganda: Conservation Breeding Specialist Group (CBSG/IUCN).
- Farmer, K. H. (2002). Pan-African Sanctuary Alliance: Status and range of activities for great ape conservation. *American Journal of Primatology*, 58, 117–132. doi:10.1002/ajp.10054.
- Goossens, B., Funk, S. M., Vidal, C., Latour, S., Jamart, A., Ancrenaz, M., *et al.* (2002). Measuring genetic diversity in translocation programmes: Principles and application to a chimpanzee release project. *Animal Conservation*, 5, 225–236. doi:10.1017/S1367943002002275.
- Goossens, B., Setchell, J., Vidal, C., Dilambaka, E., & Jamart, A. (2003). Successful reproduction in wild-released orphan chimpanzees (*Pan troglodytes troglodytes*). *Primates*, 44, 67–69.
- Goossens, B., Setchell, J., Tchidongo, E., Dilambaka, E., Vidal, C., Ancrenaz, A., *et al.* (2005). Survival, interactions with conspecifics and reproduction in 37 chimpanzees released into the wild. *Biological Conservation*, 123, 461–475. doi:10.1016/j.biocon.2005.01.008.
- Hannah, A. C., & McGrew, W. C. (1991). Rehabilitation of captive chimpanzees. In H. O. Box (Ed.), *Primate responses to environmental change* (pp. 167–186). London: Chapman & Hall.
- Hasegawa, T. (1990). Sex differences in ranging patterns. In T. Nishida (Ed.), *The Chimpanzees of the Mahale Mountains: Sexual and Life History Strategies* (pp. 99–114). Tokyo: University of Tokyo Press.

- Herbinger, I., Boesch, C., & Rothe, H. (2001). Territory characteristics among three neighboring chimpanzee communities in the Taï National Park, Côte d'Ivoire. *International Journal of Primatology*, 22, 143–167. doi:10.1023/A:1005663212997.
- Hockings, K. J. (2007). *Human-Chimpanzee Coexistence at Bossou, the Republic of Guinea: A chimpanzee Perspective*. Ph.D. dissertation, University of Stirling.
- Hockings, K. J., Anderson, J. R., & Matsuzawa, T. (2007). Road crossing in chimpanzees: A risky business. *Current Biology*, 16, 668–670.
- Kindschuh, H. (2005). Three chimps shot after escape from Zoo Nebraska, *Lincoln Journal Star*, <http://www.journalstar.com/articles/2005/09/12/local/doc4324fa7f3601c238007438.txt> (Accessed January 16, 2007).
- Kormos, R., Boesch, C., Bakarr, M., & Butynski, T. M. (2003). *West African Chimpanzees: Status Survey and Conservation Action Plan*. Gland, Switzerland: IUCN—World Conservation Union.
- Lehmann, J., & Boesch, C. (2005). Bisexually bonded ranging in chimpanzees (*Pan troglodytes verus*). *Behavioral Ecology and Sociobiology*, 57, 525–535. doi:10.1007/s00265-004-0891-5.
- Mills, W., Cress, D., & Rosen, N. (2005). *Pan African Sanctuary Alliance (PASA) 2005 Workshop Report*. Conservation Breeding Specialist Group (SSC/IUCN), Mona Foundation. (2007). *A Very Sad Day for Mona*. Mona Foundation, Girona, Spain, http://www.fundacionmona.org/final/english/noticias_marco.php?id=50&pag=0 (Accessed January 16, 2008).
- Ohashi, G. (2005). Deactivation of snares by wild chimpanzees. *Primate Report*, 21, 68.
- Pan African Sanctuary Alliance. (2007). *PASA Handbook 2006–2007*, Pan African Sanctuary Alliance.
- Statistics Sierra Leone. (2006). *2004 Population and Housing Census*. Statistics Sierra Leone, the Government of Sierra Leone.
- Teleki, G. (2001). Sanctuaries for ape refugees. In B. B. Beck, T. S. Stoinski, M. Hutchins, T. L. Maple, B. Norton, A. Rowan, E. F. Stevens, & A. Arluke (Eds.), *Great Apes & Humans: The ethics of Coexistence* (pp. 133–149). Washington, DC: Smithsonian Institution Press.
- Treves, A., & Naughton-Treves, L. (1997). Case study of a chimpanzee recovered from poachers and temporarily released with wild conspecifics. *Primates*, 38, 315–324. doi:10.1007/BF02381618.
- Tutin, C., Ancrenaz, E. G., Paredes, M., Vacher-Vallas, J., Vidal, M., Goosens, C., et al. (2001). Conservation biology framework for the release of wild-born orphaned chimpanzees into the Conkouati reserve, Congo. *Conservation Biology*, 15, 1247–1257. doi:10.1046/j.1523-1739.2001.00046.x.
- Williams, J. M., Pusey, A. E., Carlis, J. V., Farm, B. P., & Goodall, J. (2002). Female competition and male territorial behaviour influence female chimpanzees' ranging patterns. *Animal Behaviour*, 63, 347–360. doi:10.1006/anbe.2001.1916.
- Wrangham, R. W. (1979). Sex differences in chimpanzee dispersion. In D. A. Hamburg, & E. R. McCown (Eds.), *Perspectives on human evolution, vol. 5: The great apes* (pp. 481–489). Menlo Park, CA: Benjamin/Cummings.