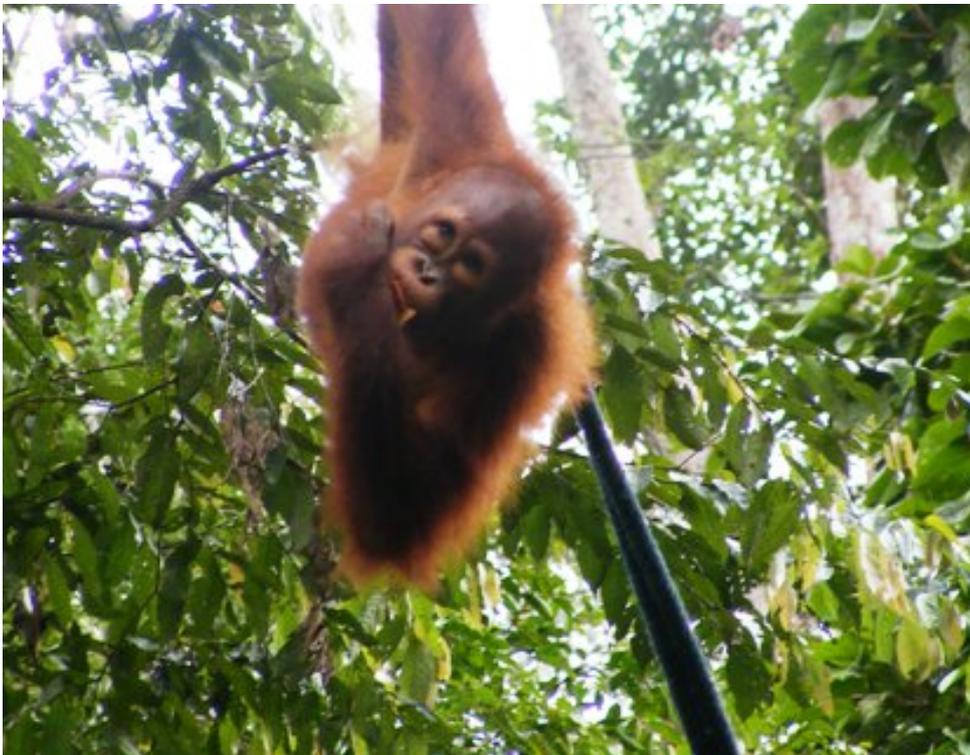




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## Save the orangutan (*Pongo Pygmaeus*)

- a comparative study of conservation work in  
Scandinavian zoos and Bornean rehabilitation  
centers



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## 1. Summary

The orangutan is a seriously threatened species, mostly due to habitat destruction but also as a consequence of trade and hunting. This report tries to understand what type of conservation work that could be the key in the struggle to save this close relative of ours. Two different conservation strategies were investigated and compared; zoos and rehabilitation centers. What advantages and disadvantages are there to these two very different methods? Through interviews and check boxes parameters such as organization, care, enclosures, reproduction, information and staff's attitudes were investigated. The results showed that both types have benefits. The zoos act to spread knowledge of the importance of conserving the orangutan and what you personally can do, whereas the rehabilitation centers actually reintroduce many individuals to the wild where they can increase the population. Forms handed out to visitors showed that a visit to these locations affected them and taught them about the orangutan and its environment. The attitudes of the staff in this study differed in some regards between rehabilitation centers and zoos. The staff of the rehabilitation centers was in general more positive to using the rainforest for economic gains and the importance of the orangutan as a tourist attraction. They also thought that people worry too much about the human progress on Borneo is harming the wildlife. The staff at the zoos agreed more to the statement that we should conserve all ecosystems even if they provide us with no direct benefits. The results from this study can be used as a basis of discussion when orangutan conservation work is planned. Further similar studies including more locations and more extensive methods could be very valuable for the field of orangutan conservation.

## 2. Introduction

The orangutan, or “the man of the forest” as it means in Malay, is one of our closest relatives. Historically, orangutans were spread out all over Southeast Asia but now exist only on the islands of Borneo and Sumatra. The orangutan is divided into two species, the Bornean orangutan (*Pongo pygmaeus*) and the Sumatran orangutan (*Pongo abelii*) (Rautner *et al.*, 2007).

Both species has declined dramatically in the past years; well over 50% during the last 60 years. The Bornean orangutan is currently less threatened than the Sumatran species. It is also the most abundant one and will therefore be the focus for this report. Because of an increasing deforestation, illegal hunting and trade, the Bornean orangutan is now classified as an endangered species by the International Union for Conservation of Nature, IUCN (Ancrenaz *et al.*, 2010). The present population size is uncertain but in 2005 the estimated population size ranged between 54,900 and 56,100 individuals (Rautner *et al.*, 2007) Another study by Wich *et al.* (2008) determined the bornean orangutan population size to at least 54,000 individuals, but at the same time say that these figures could be overestimated by 10%.

### 2.1 Conservation biology

Conservation can be divided into two types, *ex situ* and *in situ*. *Ex situ* being conservation performed outside natural habitat and *in situ* being conservation work in the natural environment. *Ex situ* conservation such as zoos or aquariums is controversial and has often been questioned. It has been argued that it is only focused on a minority of species, that it is expensive and has low success rate of reintroductions. But there are also many advantages with *ex situ* conservation. The most obvious one is the decreased risk of extinction, due to an increased number of individuals (Pullin, 2002). In fact there are many species that would not

even exist if not bred in captivity. Examples of this include the European bison (*Bison bonasus*), the Przewalski's horse (*Equus ferus przewalskii*) and the red wolf (*Canis rufus*) (Malcolm & Gibbs, 2007). Another not as obvious advantage is the opportunity to increase our knowledge of the species and perform research for example to develop anaesthetics that can be used on individuals in the wild. An additional advantage is the zoos and aquariums ability to educate visitors about conservation and endangered species (Pullin, 2002). One of these conservation types do not need to exclude the other, *ex situ* conservation could be very effective if combined with *in situ* conservation. This is the case for many of the most popular zoos. Malcolm *et al.* (2007) suggest that visitors of zoos should be charged for an extra "conservation ticket" at their arrival. The revenues from these tickets would be put into different conservation projects in the species natural environments. In this way, *in situ* conservation would be integrated as a natural part of *ex situ* conservation.

So which species are in need of these conservation efforts? To answer this you need to consider the species' vulnerability. This can be explained partly by how rare the species is. Species' rareness can be divided into three categories: rare habitat, small geographic range and low population density (Hunter & Gibbs, 2007). The orangutan fits into all three categories and is therefore very vulnerable. Their habitat is not only rare but also one of the world's few hotspots with high species richness and many endemic species (Mittermeier *et al.*, 2004). But species' vulnerability can not be explained by rareness alone. Some species' populations have been stable for decades despite the fact that they are naturally rare. A factor that also needs to be considered is the level of threat. The International Union for the Conservation of Nature (IUCN) has established categories for the level of threat at the species level. These categories from the lowest level of threat to the highest are as follows: insufficiently known, indeterminate, rare, vulnerable, endangered and extinct (Pullin, 2002).

## **2.1 Orangutan threats**

The single most important threat to the orangutan populations is habitat loss. During the years 2000 to 2002, 1.3 million hectares of forest disappeared every year as a consequence of logging. This corresponds to 2.5 hectares every minute (Rautner *et al.*, 2007). The rapid rate of deforestation is mostly due to the conversion of forest into palm oil plantations (Cambell-Smith *et al.*, 2011; Fitzherbert *et al.*, 2008). Malaysia is the largest exporter of palm oil in the world and today 1.6 million hectares in the regions of Sabah and Sarawak are covered by palm oil plantations (Rautner *et al.*, 2007). This in order to supply the world's large oil demand that is increasing steadily and currently is at a level where palm oil makes up 60% of all exported vegetable oil (Carter *et al.*, 2007). The forest is also logged for plantations of acacia, rice and cocoa and has been further reduced as a consequence of several big fires in the area (Ancrenaz *et al.*, 2010). This rapid destruction of the rain forest has been well documented and projections show that the 75% rainforest cover reported in 1985 will be less than 33% by year 2020 (Fig 1).

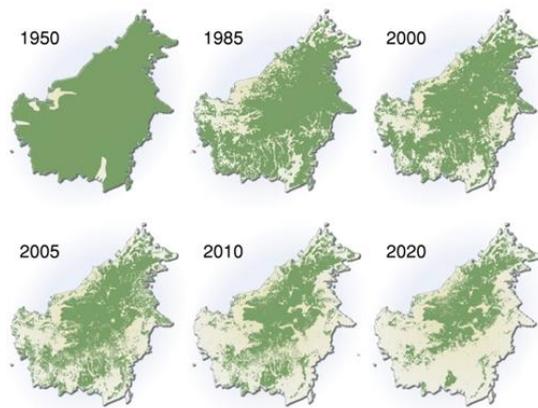


Figure 1. The deforestation on Borneo from 1950-2005 and a projection towards 2020 (UNEP, 2007).

Estimates predict that most of the suitable orangutan habitat will be lost by 2032 (UNEP, 2010). If the current rate of deforestation is not reduced the orangutan could be extinct within the next 50 years (Rautner *et al.*, 2007).

As mentioned previously, the orangutan population is decreasing due to illegal trade and hunting as well. Orangutans are hunted for trade of bush meat and orangutan body parts used for medical purposes or to chase them away from plantations. According to Marshall *et al.* (2006) hunting might even be a larger threat to the orangutans than logging. Trade of orangutans for use as pets or entertainment in zoos is not uncommon. In 2004, 100 orangutans were confiscated in Thailand and later returned to Malaysia and Indonesia for rehabilitation in rehabilitation centers (Ancrenaz *et al.*, 2010).

## 2.2 Conservation methods

Rehabilitation and reintroduction of orangutans started early in Borneo and Sumatra. The scientist Barbara Harrisson was concerned about the growing trade of orangutans and its strong decreasing effect on the population and therefore started to rehabilitate captive animals with the aim of returning them to the wild. Rehabilitation projects have been going on in several locations since the 1960's when Harrisson first started in Sarawak (Harrisson, 1961; Harrisson, 1962). There are currently six rehabilitation projects active on Borneo (Russon, 2008).

There are also other kinds of conservation work going on all over the world. Zoos play an important role as *ex situ* conservation by preserving threatened species and at the same time educating their visitors. Every year the world's zoos and aquariums are visited by around 600 million people (Sunquist, 1995). Clearly this gives them a great power to influence the public. In Scandinavia there are three zoos; Borås Zoo, Kristiansand Zoo and Aalborg Zoo that hold Bornean orangutans.

In the present study two very different methods of conservation work was compared; zoos in Scandinavia and rehabilitation centers on Borneo.

## 2.3 Background of the studied locations

Borås Zoo is a zoo located in the south west of Sweden. It was founded in 1962 by Sigvard Berggren together with the municipality of Borås. Since then the zoo has worked continuously with improving their efficiency by always keeping the motto "animals in nature"

that Sigvard first coined, in mind. The zoo prefers to use natural material in the environment the animals use and try to avoid materials like steel and concrete. By creating an environment as natural as possible the animals will be stimulated to natural behaviours. The zoo thinks that information and education is one of the most important things when it comes to conservation work. Therefore they provide information about conservation of endangered species, breeding work in small populations and global environment problems, for students from lower school to university level. They are currently part of 15 national and international breeding programs and support 26 different conservation projects. Borås Zoo is at the moment home to four orangutans (Borås Djurpark, 2010).

Kristiansand Zoo is a zoo that was established in 1964 by Willy Tjomsaas together with five business men. It is located near the town of Kristiansand in the south of Norway. The zoo is the most visited tourist attraction in Norway with wide open spaces for the animals. Today they hold three orangutans (Kristiansand Dyrepark, 2010).

Sepilok Rehabilitation Centre is situated in the Malaysian Sabah District in the north of Borneo. The centre was founded in 1964 by the Wildlife Department of Sabah to rehabilitate young orphan orangutans. The centre is supported by the English charity fund Orangutan Appeal UK. About 25 orangutans are being nursed at the centre at the moment and 60-80 orangutans live free in the 43 km<sup>2</sup> site at the edge of Kabili Sepilok Forest Reserve (Orangutan Appeal UK, 2010).

Semengoh Wildlife Rehabilitation Centre is situated within the 640 hectares Semengoh Nature Reserve near the town Kuching in the North West part of Malaysian Borneo. It was founded in 1975 with a focus on rehabilitation of confiscated and surrendered animals. Today it is a temporary home for both rehabilitated orangutans and hornbills (Sarawak Forestry, 2010), and currently they hold 25 orangutans at the centre. Its sister centre, Matang Wildlife Centre was created in 1998. It is located in the western corner of Kubah National Park. The centre's purpose is to act as a receiver of surrendered and confiscated orangutans from the whole region of Sarawak. When rehabilitated, some of the orangutans are replaced to the Semengoh Wildlife Rehabilitation Centre that today only serves as a release site (The Great Orangutan Project, 2010).

### **3. Aim**

The two zoos, Borås and Kristiansand, and the rehabilitation centers Semengoh and Sepilok, were the objects for this project. The aim of the study was to identify what differences there are between these two conservation methods. Few or perhaps no studies have been done where rehabilitation centers are compared with zoos. By studying these locations valuable information for future planning of orangutan conservation work will possibly be found. This study can also give some advice when making considerations of how to prioritize, if to support conservation work in natural habitat or support conservation work outside natural environment. What should we focus our efforts on when trying to save endangered species?

Through interviews and checkbox forms answers for the following question will be searched:

*What are the benefits and disadvantages with in-situ and ex-situ conservation when it comes to preserving the orangutan?*

## 4. Material & Method

The most important thing when it comes to conservation is to increase the size of the endangered population. Therefore parameters like reproduction and survival becomes very important when interview questions are designed. These parameters could in their turn depend on the orangutans overall welfare, what circumstances they live under, their enclosures, food, training and environmental enrichment. Another thing that both the zoos and the rehabilitation centers push for is the importance of getting information out to the general public. The staff and their background, education and experiences, are also important when it comes to with what level of engagement and ambitiousness they can practice their job. With these important parameters in mind, a form with several questions was constructed (Appendix 1). This was also translated into Malay. Four different interviews with the form as a basis were done with the staff of Kristiansand Zoo, Borås Zoo, Semengoh Rehabilitation Centre and Sepilok Rehabilitation Centre. With the staff at Kristiansand this was done by mail contact while the staff at the other places was interviewed orally. The interviews were conducted on the 13<sup>th</sup> and 19<sup>th</sup> of November, and on the 9<sup>th</sup> and 21<sup>th</sup> of December.

Since the importance of educating the general public is claimed to be an important factor, a form to the zoo's and rehabilitation centre's visitors was designed in both English and Malay to find out how their visit had affected them (Appendix 2). The forms were handed out in connection to the interviews at Semengoh (6 participants) and Sepilok (12 participants) and at a later occasion at Borås (9 participants). Kristiansand Zoo could not participate.

The staff's attitudes towards conservation could also be seen as important in this context, as they are truly relevant for their achievements. Therefore a form with several statements concerning orangutan conservation was designed in English and Malay (Appendix 3). These forms were handed out to the staff present during the time for the interviews. This meant 5 participants from Semengoh, 7 from Sepilok, 4 from Borås and 5 from Kristiansand.

A Z-test was done to question 2, 3 and 4a in the form to the visitors. The purpose of this was to see if the results of these forms are likely to be the same if it was a larger sample size. No test was done on question 1 since it was just a control question. A Mann-Whitney test was planned for questions 4b, 5a and 5b to see if the visitors answers from the two groups; zoos and rehabilitation centers, were separated from each other. But as a consequence of a low response to answering the form, the zoo sample size was only 9 and the rehabilitation centers 18. This is too few to perform the test since one condition is that it has to be an expected number of at least five of every answering alternative in each of the two groups.

Another Mann-Whitney test was planned for the staffs answers to see if it the two groups were separated in that regard. The zoos sample size was 8 and the rehabilitation centers was 10. For the rehabilitation centers 12 forms were available but 2 of them were removed because of suspicion of the participants not reading carefully and therefore just choosing all the left text boxes with the answer "strongly agree". One form from the zoos was also removed for the same reason. These samples sizes were also too few for the conditions of the test to be fulfilled.

## **5. Interview results**

### **5.1. Organization**

The interviews of the staff included questions regarding the organization such as how many visitors the zoo or the rehabilitation centre receive each year, how many days of the year they are open to the public, how their activity is financed, how many employees they have and what background they have and also what laws regulate the centre's or zoos activity (Appendix 1).

#### **5.1.1. Borås Zoo**

Borås Zoo has 270.000-290.000 visitors every year during the 170-180 days that they are open to the public. The zoo receives visitors from school classes or other groups during all year except during Christmas holidays. Their activity is founded by municipal grants, admission fees, through letting out cabins and camp sites, from items and souvenirs sold at the restaurant and shops and through educational activities for school classes of different levels. There are around 25 part- or full time employees that have different education levels, from no education to upper secondary school within the area of animal care or agriculture to curators with university degree in biology. On top of that they also have a consulted veterinarian working part time.

The laws regulating their activity are primarily laws preventing cruelty to animals, mainly the Animal Welfare Act (Djurskyddslagen) and the Animal Welfare Ordinance (Djurskyddsförordningen), but also several more detailed directives from the Swedish Board of Agriculture concerning keeping animals at zoos, such as L108 (Statens jordbruksverks föreskrifter om djurhållning i djurparker m.m). These directives are set by the Swedish Board of Agriculture. Threatened Animals species within the CITES (Convention on International Trade in Endangered Species) directive, are controlled by the Swedish Environmental Protection Agency, and imported, exported and hold according to regulations within the directive Artskyddsförordningen. All zoo business within the European Union is also controlled through the EU Zoo Directive. Borås Zoo is a member of EAZA as well as SAZA (Swedish Association of Zoos and Aquaria), which has strict ethical norms for how animals are displayed and kept in the zoo. The controller function, with the mission to check that laws and directives are followed in every zoo, is performed by the Swedish county authority (Länsstyrelsen) around every fifth year. (Daniel Roth, personal communication).

#### **5.1.2 Kristiansand Zoo**

Kristiansand Zoo is open to visitors all year and has around 700.000 visitors every year. It is financed by commercial yields since it is a limited company. There are around six persons working full or part time with the orangutans. Their background is varied with different experiences and education levels. Kristiansand Zoo is like Borås Zoo a member of EAZA and therefore also follows their regulations as well as the CITES directive. They also follow additional Norwegian laws such as the animal welfare law (Helene Axelsen, personal communication).

### ***5.1.3 Semengoh Rehabilitation Centre***

The centre at Semengoh is run by the Forest Department in Sarawak. They therefore follow the federal laws of the region such as the Wildlife Protection Ordinance 1998. Currently around 20 people are working at Semengoh Wildlife Centre. Every year Semengoh is visited by 8.000 people that get the opportunity to see orangutans in their natural environment. At Semengoh visitors can observe orangutans being fed at two feeding platforms all year-round. The activity of the centre is financed not only by entrance-fees but also through orangutan adoptions and volunteering activities. These services are provided by the organization Heart to Heart with Orangutan, the Orangutan Adoption Program and The Great Orangutan Project (Mr Murtadza, personal communication).

### ***5.1.4 Sepilok Rehabilitation Centre***

Sepilok Rehabilitation Centre is managed by the Wildlife Department of the region Sabah. This means that their activities are regulated by the Wildlife Protection Enactment 1997 federal law. The centre is opened to visitors every day and receives around 100,000 visitors during one year. The amount of staff working there is approximately 20 to 25 (Sylvia Alsisto, personal communication).

## **5.2 Enclosures**

The questions regarding the orangutan's enclosures consisted of what measures the indoor and outdoor enclosures have and how they look, how large part of these areas that can be viewed by visitors and if the orangutans have possibilities for both vertical and horizontal climbing (Appendix 1).

### ***5.2.1 Borås Zoo***

The orangutans at Borås Zoo have two different indoor enclosures with the measures of 13m (width)\*8m (depth)\*5m (height) = 624 m<sup>3</sup> and 11m\*5m\*5m=275m<sup>3</sup>. The outdoor enclosure is a 300m<sup>2</sup> island surrounded by a moat. The whole outdoor area can be viewed by visitors. The island is covered by grass and decorated with dead trees and climbing ropes. The orangutans have the opportunity to do both vertical and horizontal climbing and they have several resting places both elevated and on the ground (Daniel Roth, personal communication).

### ***5.2.2 Kristiansand Zoo***

The indoor enclosure at Kristiansand Zoo is 13m\*10m\*10m=1300m<sup>3</sup>. The orangutans share this area with the gibbons of the zoo. The outdoor enclosure is about 1500m<sup>2</sup> and consists of an island with trees, grass and other plants surrounded by a water moat, this whole area can be viewed by the visitors. There are opportunities for both vertical and horizontal climbing (Helene Axelsen, personal communication).

### ***5.2.3 Semengoh Rehabilitation Centre***

At Semengoh the orangutans are free ranging, so they don't have any enclosures there (Mr Murtadza, personal communication).

#### **5.2.4 Sepilok Rehabilitation Centre**

At the centre they have ten smaller enclosures with the measures  $3\text{m} \times 4\text{m} \times 5\text{m} = 60\text{m}^3$  that are used as night stalls. The interior in these enclosures are spare. They also have a bigger enclosure of  $20\text{m} \times 20\text{m} \times 5\text{m} = 2000\text{m}^3$  that is used for training which have boxes and ropes to stimulate the orangutans. There are two feeding platforms in the area, the closest of them is accessible for visitors but the other one is restricted to staff (Sylvia Alsisto, personal communication).

### **5.3 Care**

Questions to cover the care of the orangutans included how often they are fed, what type of food they are given, how it is served, if any environmental enrichments are done and what kind of training they get (Appendix 1).

#### **5.3.1 Borås Zoo**

The orangutans at Borås Zoo are fed four times a day in the winter and five times a day in the summer. The food consists of bananas, apples, carrots and sometimes bell pepper and sweet fruits like grapes, depending on what leftovers that are delivered from the store. The food is always served hidden in and behind the interior or on the resting places. In addition to this, at least one of the daily meals are served as environmental enrichments by being served as whole fruits, inside a poke box or together with a dip can filled with yoghurt. One more enrichment is also done every day, together with the food as mentioned before or just for stimulating purpose. For example egg-boxes can be filled with different spices and flavors, hay can be used for food, or bed or cover to hide behind. It can also be ropes, big boxes, mirrors, magazines, clothes or car tires used for play, barrels or tubes filled with some snack, jute sack used as bed or hiding cover or it can be extra stimulating snacks that are a bit hard to eat such as ostrich eggs or ice cream. All enrichments are prepared according to a weekly schedule.

At the moment only the big male, Bako, is trained since the others are too young. Bako is trained approximately three times a week in showing his teeth's, showing his feet's or just standing still while the keepers close the doors. This is done by using clickers.

The keepers try to have as little contact with the orangutans as possible. At feeding times, the food is placed in the enclosure that they are not using at the time, the tunnel between is opened and they change to the enclosure with food. This is a very good way to both prepare feedings and clean the used enclosures. When it comes to training, the keepers are never alone in order to prevent accidents (Pia Merxén and Hanna Ros, personal communication).

#### **5.3.2 Kristiansand Zoo**

The orangutans at Kristiansand Zoo are feed three times a day, once in the morning, once in the middle of the day and once in the evening. They are given different kind of fruits and vegetables depending on what wastage that is delivered from the store. In the middle of the day, the food is given as environmental enrichment. The food is often placed inside different objects so that the orangutans have to activate themselves in order to reach the food. It can be placed in a box were the orangutans have to use sticks to push out sweets. It can also be hidden both indoors and outdoors, inside balls for example. Sometimes honey is placed in a tube in order to stimulate the orangutans further.

The orangutans are trained five times a week by using clickers. The keepers teach them to show their teeth's, legs, arms, belly, back and other body parts. This is very useful as it make future veterinary controls easier (Helene Axelsen, personal communication).

### ***5.3.3 Semengoh Rehabilitation Centre***

At Semengoh, the orangutans at the centre are fed at the feeding platforms twice a day, in the morning and in the afternoon (Fig 2). The meals consist of fruit and vegetables, mostly bananas but also apples, coconuts and carrots. When the apprehended orangutans come to the sister center Matang, they will first go through 90 days quarantine before they can start kindergarden. During their younger years the orangutans will learn the skills needed to manage on their own in several steps. First they go to kindergarden, then to primary school and eventually to secondary school. Through training out in the rainforest every day they will learn how to find food and become familiar with a life in the forest. Eventually, when the staff believes that the orangutan can manage on their own, they are released. Some of them are released at Semengoh and some of them into the surrounding Kubah National Park. After being released, the orangutans are monitored and usually only go to the feeding platforms for an extra meal when food resources in the forest are scarce (Mr Murtadza, personal communication).



Figure 2. An orangutan is being fed at the feeding platform at Semengoh Rehabilitation Centre. Photo: Susanna Gustavsson.

### ***5.3.4 Sepilok Rehabilitation Centre***

When the orangutans first come to the centre they are put in quarantine for a maximum of 90 days depending on what condition they are in when they arrive. Their health is checked, a TBE (Tick Borne Encephalitis) test and regular blood test are taken. The staff tries to find out as much as possible about the animals background, age, physical and mental status.

A normal day for the orangutans at the centre looks almost the same as for any human child with activities like bathing, cleaning and feeding. All the orangutans are fed two times a day, in the morning and in the afternoon, except for the babies that are fed more often. The food, which consists of fruit, is once a while presented with different environmental enrichment methods like inside balls and bottles. Sometimes the fruits are unopened to even further stimulate the animals.

The orangutan's body temperatures are monitored every day for the babies and once a week for the older ones. Weightings' are also done once a week. To prevent human diseases spreading to the orangutans, there are clear rules for everyone going into the restricted areas to be medical checked first. This is a very important safety step since there are people from all over the world coming there for volunteering and research. The centre tries to minimize human contact with the orangutans as much as possible. When being interviewed the manager of the centre, Sylvia, states the importance of "the animals not being treated like play toys".

The orangutans are rehabilitated in a four-step program. First they are handled by "care" from one member of the staff acting like a mother and also having fun times at the jungle gym where they are encouraged to climb and swing. Then they pass on to the "infant school" where they learn more about climbing and swinging and establish bounds with their playmates. Every young orangutan is paired up with an older orangutan that will help them learn all about orangutan-life. From the "infant school" they go on to the "outward bound school" where the training gets more serious towards being capable of making it on their own in the forest where the orangutan now have started to sleep. The contact with humans is restricted as another action towards the goal of raising independent animals. This stage is usually reached at the age of five. From there they eventually go over to "monitoring". That means that the orangutans roam free, find food of their own and build nests. Hopefully they only return to the center rarely for a free meal. The whole process usually takes more than ten years (Sylvia Alsisto, personal communication).

#### **5.4 Reproduction, stereotypic behaviours and diseases**

This part of the interviews covered questions about how many orangutans that have been there during the last ten years, how many that have been born and how many that have died and also if there have been any stereotypic behaviours or diseases (Appendix 1).

##### ***5.4.1 Borås Zoo***

Borås Zoo has been home to six different orangutans since they received their first orangutan fifteen years ago. One baby orangutan has been born. The only stereotypic behaviour that has been registered is vomiting. But this is believed to be a consequence of the big male disturbing her while eating, which makes her eat too quickly and therefore vomit. Arrangements with changing the food routines have been done to stop this problem. No orangutan has ever died in the zoo and they have never had any serious diseases, only the common cold (Daniel Roth, personal communication).

##### ***5.4.2 Kristiansand Zoo***

The zoo has had four different individuals since the first orangutan came in 2004. No baby orangutan has been born at the zoo. The orangutans at Kristiansand Zoo have not showed any stereotypic behaviour and never had any severe diseases, only the common cold (Helene Axelsen, personal communication).

##### ***5.4.3 Semengoh Rehabilitation Centre***

At Semengoh there have been 25 different orangutans during the last ten years, of these 15 are born at the centre. The orangutans at Semengoh have no record of stereotypic behaviours or severe diseases. The cooperation centers Semengoh and Matang have a history of 47 % of the rehabilitated orangutans being released. This is today done from Matang to the surroundings of Semengoh Rehabilitation Centre or into Kubah National Park (Mr Murtadza, personal communication).

#### **5.4.4 Sepilok Rehabilitation Centre**

The centre has taken care of around 700 orangutans during the last ten years, and some of them have been able to reproduce which have resulted in 20 new babies. The centre has a success of 65% of their orangutans being released. This is done into the nearby reserves Sepilok Forest Reserve, Lower Kinabatang Wildlife Sanctuary or Tabin Wildlife Reserve.

Most of the orangutans that come to Sepilok are very young, between 0-3 years. Since all the orangutans come from different backgrounds they all have different needs and problems. Some are traumatized when they arrive at the centre, some of them get well again but some may never recover. Some behaviour like for example biting nails are probably a sign of mental problems. A part from different mental problems there has also been cases of malaria, diarrhea and TBE among the orangutans (Sylvia Alsisto, personal communication).

#### **5.5. Information to visitors**

This part of the interviews consisted of one single question: “what kind of information are the visitors given?” (Appendix 1).

##### **5.5.1. Borås Zoo**

The information given to the visitors consists of several signs inside the ape house with information about the orangutans over all, about the four individuals living in the zoo and about the environmental enrichment that are being done there. During high season they also have spoken information every day about what human activities affects the survival of the orangutans and what you yourself can do to increase the chance of keeping them. They talk about logging being the biggest threat, make people aware of that they are consuming products containing palm oil and give suggestions on how they can change their habits. More information about the orangutans will soon be given when the ape campaign starts. The ape campaign is organized by EAZA and many zoo members, like Borås Zoo, has signed up and will during 2011 together set up a fund to help different projects acting for ape and gibbon conservation by protecting their habitats, preventing trade and hunting and changing costumers behaviour. The goal is to raise 1 million dollars (EAZA Ape Campaign, 2010).

During an interview with Daniel Roth, zoologist at Borås Zoo, he claims that the most important role their orangutans can play to conserve the species is to function as flagships and opinion-makers. He argues that “the things you haven’t seen, smelled or felt, you will have a hard time relate to and be interested in a good way”. His hopes are that the orangutans at Borås Zoo will inspire and engage people to contribute in some way to preserve the wild orangutan and its habitat (Daniel Roth, personal communication).

##### **5.5.2. Kristiansand Zoo**

Kristiansand Zoo provides signs with species information to their visitors. During high season they twice a day also provide spoken information about the orangutans they have living in the zoo. Information about orangutans in general, about palm oil and biofuel is at the moment under development. This year the zoo has also given information to school classes with the approach “Life on earth” where they have talked about diversity in nature and endangered species. As a part of this setup the class has also visited the orangutans and talked about them being endangered and why (Helene Axelsen, personal communication).

### 5.5.3. Semengoh Rehabilitation Centre

Before the visitors are allowed to go to the feeding platform at Semengoh, they are informed of the regulations concerning safety and the aim to minimize the disturbance of the orangutans. The visitors are urged to speak low and avoid being closer than five meters to the animals. The fact that “this is not human habitat” is repeated over and over. There are also four big board’s giving the visitors information about the orangutans at the centre and their bloodline, general information about the centre and warnings with pictures of what can happen if you come to close to the orangutans.

### 5.5.4 Sepilok Rehabilitation Centre

At Sepilok they have several big boards with information about the centre in general and the rehabilitation process, about Sepilok Forest Reserve, some orangutan facts, information on how you can support the centre, a desk where you can sign up for adoption and a board with information about some of the individuals living at the centre. There is also a movie about the dangers for the species and how Sepilok work to help the orangutans.

## 5.6 Summary

The interviews with the zoos and the rehabilitation centers revealed some differences in their organization and care of the orangutans, the orangutan’s enclosures, the orangutan’s reproduction, diseases and stereotypic behaviours and also in their information to the visitors. This can be summarized as below (Table 1).

Table 1. A selection of the most important answers to the interview questionnaires.

Variables	Borås, Sweden	Kristiansand, Norway	Sepilok, Borneo	Semengoh, Borneo
Visitors	270-290.000	700.000	300.000	8.000
Days opened	170-180	365	365	365
Amount of staff	~25	~6	20-25	~20
Indoor enclosures	624 m <sup>3</sup> , 275 m <sup>3</sup>	1300m <sup>3</sup>	10 á 60m <sup>3</sup> , 2000m <sup>3</sup>	Natural habitat
Outdoor enclosure	300m <sup>2</sup>	1500m <sup>2</sup>	Natural habitat	Natural habitat
Food	Fruit, vegetables	Fruit, vegetables	Fruit	Fruit, vegetables
Feedings	4-5 times a day	3 times a day	2 times a day	2 times a day
Environmental enrichment	Twice a day	Daily	Sometimes	Sometimes
Training	3 times a week	5 times a week	According to “school” schedule	According to “school” schedule
Orangutans the last ten years	5	4 (arrived 2004)	700	25
Babies born	1	0	20	15
Individuals with stereotypic behaviours	1 (vomiting)	None	Some (biting nails)	None recorded
Diseases	Common cold	Common cold	TBE, malaria, diarrhea	No severe ones

## 6. Form results

### 6.1 Form to visitors

The answers to the first question in the form for the visitors is not shown graphically since it is a control question to which all participants have answered yes. All the participants' answers can be found in appendix 4. When the two groups: rehabilitation centers with 18 participants and zoos with 9 participants is compared, it is clear that question 2, 3 and 4a all follows the same pattern. A larger share of the people approached at the rehabilitation centers have answered "yes" compared to those approached at the zoo (Fig 3, 4, 5).

The Z-test of question 2, 3 and 4a shows that with a 95% confidence interval it is very likely that a larger sample size would give the same result in question 2 and 4a but less likely in question 3 ( $Z_2=2.5$ ,  $Z_3=0.19$ ,  $Z_{4a}=2.9$ ).

Of those answering "yes" to question 4a, and therefore answering question 4b, all thinks that it is either "much more important" or "a little more important". In comparison a larger share thinks that it is "much more important" at the rehabilitation centers than at the zoo. This difference is too small with this small sample size to indicate a true difference (Fig 6).

The answers to question 5a and 5b is not as similar between the rehabilitation centers and the zoo as the previous questions. In question 5a the answers vary from "unchanged" to "increased a little" and "increased much". At the zoos the great majority of the visitors questioned find the probability of them donating money or in other ways contribute to the protection of the orangutan "unchanged" and the rest says that it has "increased a little". At the rehabilitation centers the majority of the visitors in contrast believes that the probability has "increased a little", a small part believes that it is "unchanged" and a minor part believes that it has "increased much" (Fig 7).

The answers to question 5b differ even more. A great majority of the visitors from the zoo answers that the probability of them abstaining from buying products that has its origin from the rainforest is "unchanged" whereas the rest answers that it has "increased a little". This in contrast to the visitors at the rehabilitation centers where the most common answer was "increased a little", followed by "increased much", "decreased a little" and "unchanged" (Fig 8).

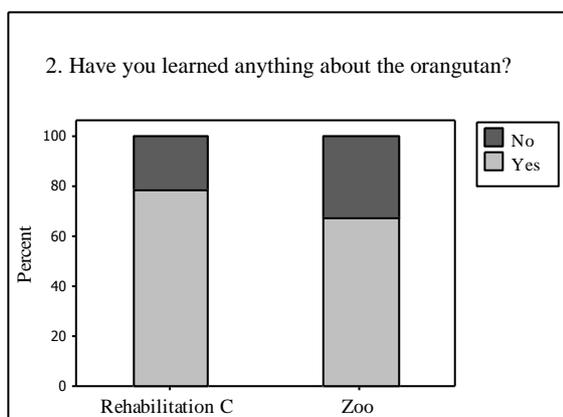


Figure 3. The visitors answer in percent to question 2.

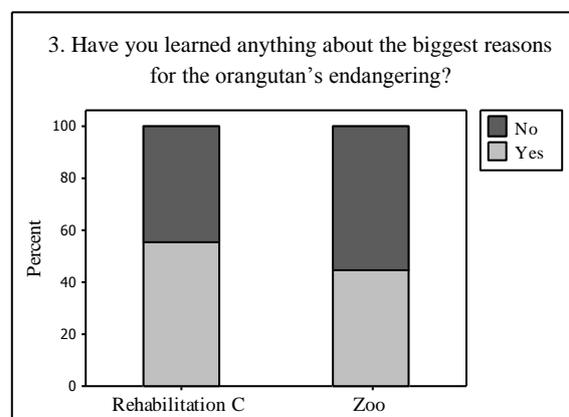


Figure 4. The visitors answer in percent to question 3.

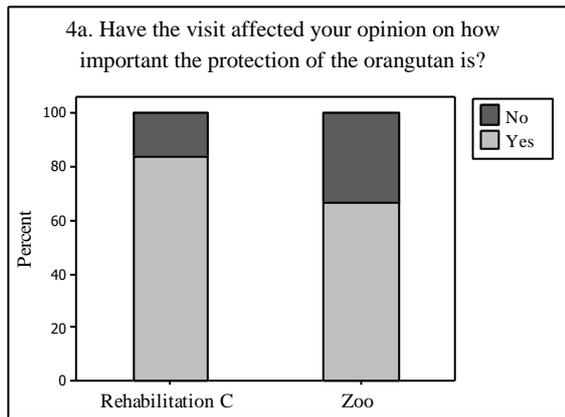


Figure 5. The visitors answer in percent to question 4a.

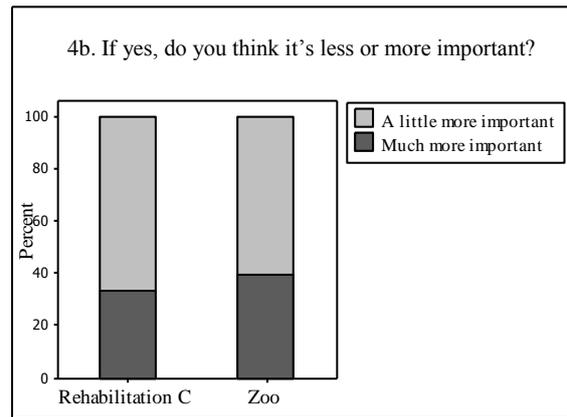


Figure 6. The visitors answer in percent to question 4b.

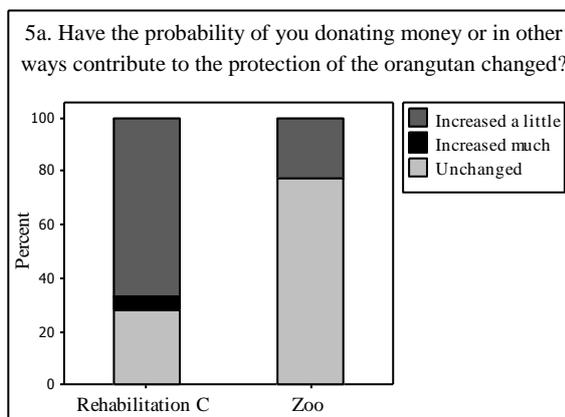


Figure 7. The visitors answer in percent to question 5a.

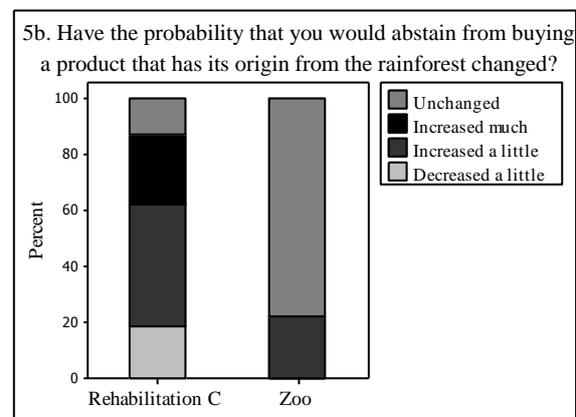


Figure 8. The visitors answer in percent to question 5b.

## 6.2 Form to the staff

The results from the forms with attitude statements that were handed out to the staff are compared between the two groups: rehabilitation centers with 10 participants and zoos with 8 participants. These results indicate that there are differences between how the staff in Scandinavia and the staff on Borneo think about the conservation of the orangutan and its habitat. Result from all statements can be viewed in Appendix 5. Below are the statements where the two groups', rehabilitation centers and zoos, answers differ the most, shown graphically.

Statement 3 is the first where a difference between the two groups is clearly showed. Here all staff from the zoos have answered "strongly agree" whereas from the rehabilitation centers most part have answered "strongly agree", almost as many have answered "agree" but quite a few have answered "disagree" (Fig 9).

The results of statement 5 vary even more. The majority of the staff from the zoos support "strongly disagree" the most whilst the rest support "disagree" and "strongly agree". At the rehabilitation centers, most part of the staff, in contrast, supports "agree", followed by "strongly agree" and last "neutral" and "disagree" (see figure 10).

To statement 9 the staff at the zoos has equally answered "strongly agree" and "disagree". In contrast to the staff at the rehabilitation centers that has answered "strongly agree" the most and then "agree" or "neutral" (Fig 11).

Statement 11 gets a positive reaction from staff at both the rehabilitation centers and the zoos. Although all questioned have responded “strongly agree” at the zoos whereas the largest share at the rehabilitation centers have responded “strongly agree”, a small share have responded “agree” and a minor share have responded “neutral” (Fig 12).

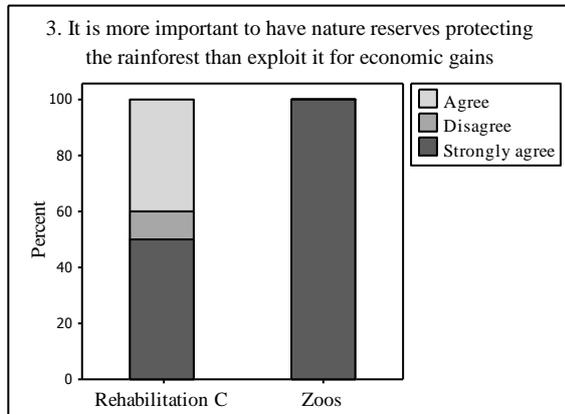


Figure 9. The staff's answer to attitude statement 3.

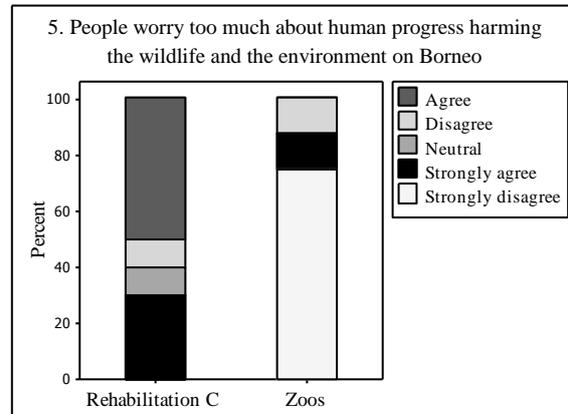


Figure 10. The staff's answer to attitude statement 5.

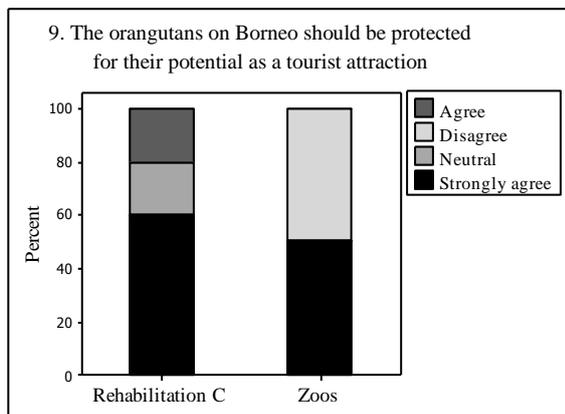


Figure 11. The staff's answer to attitude statement 9.

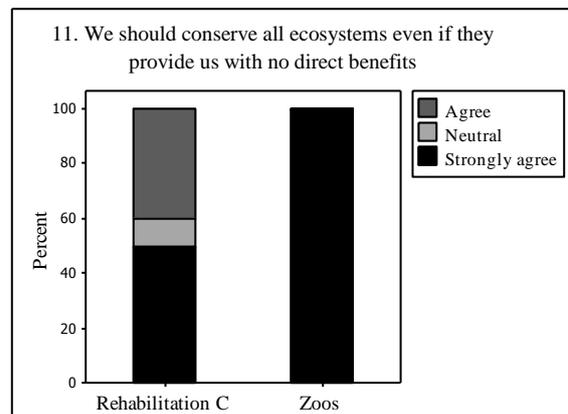


Figure 12. The staff's answer to attitude statement 11.

## 7. Discussion

This study can be compared with a study by Aveling & Mitchell (1982) in Bohorok, Indonesia, where over one hundred orangutans were studied during seven years to determine factors important for successful rehabilitation. Several parameters necessary to reach the goal of the orangutans being able to survive on their own and be socially integrated were defined. They concluded that it is necessary that the orangutans have passed infancy and that they should have spent their first years in the wild to rehabilitate successfully. The probability for success also increases when independence to humans is encouraged by a gradual but deterrent process. It is also important that young orangutans have the possibility to learn from a more independent individual by forming a close relationship with that individual. The strongest argument against rehabilitation centers is the possible problems of diseases and social stress being introduced into the wild through rehabilitated animals. This makes the careful quarantine, together with preventing contact with visitors and continuous health controls very important (Aveling & Mitchell, 1982).

When the arrangements mentioned above are compared with how the conservation work at the rehabilitation centers in this study is practiced, it can be concluded that some is fulfilled

while some is not. Most of the orangutans coming to the centers are very young, from 0-3 years, which means that they have not been living in the forest long enough to learn skills that are hard to catch up with. The independence to humans can also be questioned. Although both centers try to minimize human contact there are not only many tourists coming to the allowed area, but also volunteers and researchers coming to the restricted areas. The learning process for the rehabilitants is much like what is mentioned above. The younger orangutans are paired up together with an older and more independent orangutan to learn from. Both rehabilitation centers use quarantine for newly arrived animals and at Sepilok the other apes are carefully monitored and checked for diseases. Sepilok seems to have succeeded better than Semengoh in their rehabilitation work, with a figure of 65% of their orangutans being released compared to Semengoh's 47%. The reason for this is perhaps that Sepilok receives more visitors per year and therefore have larger budget that they can use to improve their organization and routines in order to a larger extent succeed with the rehabilitation.

The survival success of orangutans living in captivity is an interesting subject. In the past survival used to be lower for orangutans in captivity compared to orangutans in the wild. But between 1946 and 2005 the survival for both female and male orangutans living in captivity increased to a level where it is now almost the same as for those living in the wild. According to Wich *et al.* (2009) this is due to an improvement in management at the European Zoo's.

According to studies of free ranging female orangutans at Sepilok Rehabilitation Centre, interbirth intervals (IBA, i.e. the period between a female gives birth until she gives birth again), is shorter for the rehabilitated free ranging orangutans compared both to those in captivity and to those in the wild (Kuze *et al.*, 2008).

Reproduction as whole is hard to compare between the four study locations in the present study. The zoos have very few individuals, who can only mate when decided by the management, while the rehabilitation centers have more individuals that roam free and are therefore able to mate whenever they want. However, it is clear the zoos as well as the rehabilitation centers can achieve pregnancies and successful births to different extents. From the 700 orangutans that Sepilok have been rehabilitating the last ten years, 20 new orangutan babies has been reproduced. Semengoh's 25 individuals have been able to increase their population with 15 new babies. Borås Zoo has had one birth during the last ten years (Table 1). The difference between the two rehabilitation centers is striking. One explanation might be that Sepilok has received many orangutans but not all of them are rehabilitated successfully. Furthermore, not all of the rehabilitated orangutans are continuously coming back to the feeding platforms, which means that there are probably many births missing in the statistics. At Semengoh all orangutans are rehabilitated individuals at arrival and most of them come to the feeding platforms regularly, which make birth observations easier.

A good animal welfare is claimed by many to be necessary for reproduction in captivity, although it has not yet been proved (Carlstead & Shepherdson, 1994). Looking at the welfare for the orangutans at the four locations compared in this study it is clear that they all are given the same kind of food (Table 1). The zoos serve food four to five times a day and three times a day, respectively, while the rehabilitation centers only serve food twice a day. Fewer feedings at the rehabilitation centers is probably to encourage the orangutans to search for food themselves during trainings in the rainforest. The zoos have larger enclosures than the rehabilitation centers. But on the other hand, the orangutans at the rehabilitation centers are more often trained and therefore spend time outside in the forest, which can compensate for smaller enclosure sizes. The less frequent training in the zoos can be argued to be enough for these individuals who do not need as much training as the orangutans at the rehabilitation

centers that hopefully someday will have to manage on their own out in the forest. On the other hand they do not live in their natural environment, which could mean that they need to be stimulated more in order to express natural behaviours.

According to Carlstead & Shepherdson (2000) enrichments can reduce aggressive behaviours, increase the animals' health and reproductive ability. All of the included rehabilitation centers and zoos in this study understand the importance of environmental enrichments, although the zoos use enrichments more often and in more different kinds, than the rehabilitation centers. Obtaining the same degree of stimulation as the rainforest offers might however be impossible.

When it comes to spreading information, the zoos in this study have reached further than the rehabilitation centers in some ways. They are not only informing about the species in general, their individuals and their work but also about the threats acting on this endangered species. They have also taken the information one step further when informing about the habitat destruction being the most powerful threat and how each person can contribute, by for example not buying palm oil products.

The results from the forms handed out to the visitors showed that over all, the visitors experienced that they have learned about the orangutan and the threats against it. Their opinions of the orangutan and its habitat were affected by the visit. Similar results have been showed in a three year study conducted in twelve zoos and aquariums all over the USA. The zoos and aquariums in that study increased their visitor's awareness of their own role in environmental problems and conservation actions. They also affected the visitor's values and attitudes towards conservation. Approached visitors believed that zoos and aquariums play an important role in conservation (Falk *et al.*, 2007). Of the visitors in this study who thought that the visit had changed their opinion about how important it is to protect the orangutan, all experienced that it has changed to either "a little more important" or "much more important", which is a good achievement of the rehabilitation centers and the zoos. It seems that the zoos and the rehabilitation centers in this study contributed to an increased positive attitude towards orangutan conservation. The reason why visitors at the rehabilitation centers were slightly more positive than the visitors at the zoo, could possibly be due to that they have learned more compared to the visitors at the zoo. But it could also be variation in previous knowledge that creates this difference.

Visitors at the rehabilitation centers experience that the probability of them donating money or in other ways contribute to the protection of the orangutan have increased to a larger extent than the visitors from the zoos. This could be explained by the easy accessed possibility to donate money at the rehabilitation centers where they for example at Sepilok have boards about how to support the centre and an adoption desk. You also have to keep in mind that at the zoo, visitors do not only see orangutans but also many other animals. This could reduce their will to support specifically orangutans.

The probability that the visitors would abstain from buying products that have its origin from the rain forest, had to a larger extent increased for the visitors at the rehabilitation centers. The increased will to support the protection of the rainforest could be due to a strong impact when experiencing the rainforest in reality. But some also believed that it had decreased. This could maybe be because of a wish to get souvenirs from the place they have just visited.

Interesting results were revealed when the staffs' answers to the attitude statements was analyzed. To the statement, concerning the importance to have protected nature reserves rather than exploit the rainforest for economic gains, "disagree" was answered by some of the

staff at the rehabilitation centers. This could be expected when taking the economic profits that Malaysia as a country gain from exploiting the rainforest into account. Maybe the Malaysian's positive attitude towards the exploitation of the rainforest is not so strange considering how much it has contributed to the development of their country. The fact that the staff at the zoos exclusively answered "strongly agree" is not surprising. It is always hard to relate to problems that are not personally experienced. Maybe the staff in Scandinavia simplifies the problem, in their view we have everything to win on the rainforest being protected. The results from the statement "people worry too much about human progress harming the wildlife and the environment on Borneo", are in accordance with the above. The staff at Borneo was more positive than the Scandinavian staff to the statement that "the orangutans on Borneo should be protected for their potential as a tourist attraction". This could be a consequence of the orangutan being a tourist magnet on Borneo and therefore potentially important in the economic development. Furthermore the zoos are not as dependent on one specific species since they have the opportunity to show many exotic animals from all over the world to their visitors. When it comes to the statement "we should protect all ecosystems even if they provide us with no direct benefits", the Scandinavian staff was in general more positive. One explanation to this could be that in Scandinavia conservation efforts are encouraged and affordable whilst in Malaysia conservation efforts are more seen as "luxury" projects where the investments are preferably put into further development of the country instead.

One of the main differences between the two conservation methods is that the zoos work more with enrichments and information than the rehabilitation centers. The strength of the rehabilitation centers is that they have the opportunity to conserve orangutans in their natural environment, which is argued by many to be an important factor in order to increase the animal's welfare and natural behaviours (Mason *et al.*, 2007). The individuals at the zoos will never be released to their natural environment, which is a very strong advantage that the rehabilitation centers have in contrast. Many of their individuals will get back to their natural habitat and contribute further to the species conservation by reproducing themselves. The reproduction of the individuals at the zoos will always be limited by management, time and money.

Hence, it can be concluded that both zoos and rehabilitation centers are needed. The zoos are focusing their efforts on giving their few individuals a good welfare and also on educating the public regarding the importance of conserving the species and its habitat. By increasing the visitors' awareness and positive attitudes towards rainforest conservation they can contribute to a change in political and economical decisions concerning the rainforest. Influence and pressuring of decision makers and companies by the public, for example through their own consumption, could in the long term make a real difference for the orangutans. To make a difference it is important that people in the wealthy part of the world act for a change. The rehabilitation centers on the other hand, make a very important contribution to orangutan conservation by actually reintroducing them into their natural environment where they can contribute to an expansion of the orangutan population.

This study can be used as a basis for discussion when orangutan conservation work is planned. Depending on where the focus lies, it can give some clues about how to get there. It can also be regarded as a start to fill holes of missing information that promotes further research regarding practical conservation management. More research of study locations all over the world would generate data that would be possible to evaluate statistically. Finally, I hope that this report may affect the readers and maybe even encourage them to start thinking of what they can do themselves to help orangutan conservation.

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## **Appendix 1**

### **Organization**

1. How many visitors do you have during a year?
2. How is your activity founded?
3. How many days of the year is the centre open for visitors?
4. How many people work with the animals and what are their backgrounds?
5. What laws regulate your activities and what does the law say?

### **Enclosure**

1. How big is the orangutans indoor enclosure (width\*depth\*height)?
2. a) How big is the orangutans outdoor enclosure (width\*depth\*height)?  
b) How big part of this area is accessed to viewing by visitors?  
c) Is the outdoor environment created by living nature like grass and trees?  
d) If water moats are used, is there any security arrangement to prevent drowning?
3. Are there opportunities for both vertical and horizontal climbing?

### **Care**

1. What treatment do the new arriving orangutans get when they come to you?
2. What are your restrictions when it comes to handling the orangutans?
3. What food are the orangutans given?
4. How often do they feed?
5. How is the food presented?
6. What kind of environmental enrichment are you using?
7. What kind of training do the orangutans get?

### **Reproduction, diseases and stereotypic behaviours**

1. How many different orangutans have you had here during the last ten years?
2. How many orangutans have been born here during the last ten years?
3. How many orangutans have died here during the last ten years?
4. Have you had any diseases among the orangutans and in that case what diseases?
5. Have you seen any stereotypic behaviour by the orangutans and in that case what behaviour?

### **Information**

1. What information about orangutans is given to the visitors?

## Appendix 2

### Questions for the visitors

Year of birth: .....

Sex:     Male     Female

Nationality: .....

1. Have you seen the orangutans that are in rehabilitation centre today?

Yes     No     Don't want to answer

2. Have you learned anything about the orangutan?

Yes     No     Don't want to answer

3. Have you learned anything about the biggest reasons for the orangutan's endangering?

Yes     No     Don't want to answer

4. a) Has the visit at the rehabilitation centre affected your opinion on how important the protecting of the orangutan is?

Yes     No     Don't want to answer

b) If yes, do you think it's more or less important than earlier?

Much more important     A little more important     Less important     Much less important

5. How has the probability for you doing the following changed since before the visit?

a) donate money or in some other way contribute to projects that act to protect the orangutan

Increased much     Increased a little     Unchanged     Decreased a little     Decreased a lot

b) abstain from buying a product that fully or partly has its origin from the rainforest

Increased much     Increased a little     Unchanged     Decreased a little     Decreased a lot

Thank you for your participation!

## Appendix 3

Age: .....

Sex:     Male     Female

Level of education:     Elementary school     Upper secondary school     University

Please fill in what you feel about the following statements

**1. It is important to protect wild orangutans**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**2. It is important to protect the rainforest**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**3. It is more important to have nature reserves protecting the rainforest than exploit it for economic gains**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**4. The Malaysian government's prohibition of orangutan products is good**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**5. People worry too much about human progress harming the wildlife and the environment on Borneo**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**6. It is important to protect the rainforest of Borneo because it's the home to many species that only exist there**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**7. Conservation of the rainforest is incompatible with running an agricultural business**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**8. Man has a moral obligation to conserve the rainforest**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**9. The Orangutans in Borneo should be protected for their potential as a tourist attraction**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**10. It is important to prevent human disruption to the environment in order to preserve its inner beauty**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

**11. We should conserve all ecosystems even if they provide us with no direct benefits**

Strongly agree     Agree     Neutral     Disagree     Strongly disagree     Don't know

Thank you for your participation!

## Appendix 4

Table 2. The visitors at Sepilok's answer in percent.

Question	Yes	No			
1.	100	0			
2.	83	17			
3.	50	50			
4a.	75	25			
Question	Much more important	A little more important	Less important	Much less important	No answer
4b.	33	42	0	0	25
Question	Increased much	Increased a little	Unchanged	Decreased a little	Decreased a lot
5a.	8	67	25	0	0
5b.	33	42	17	8	0

Table 3. The visitors at Semengoh's answer in percent.

Question	Yes	No			
1.	100	0			
2.	67	33			
3.	67	33			
4a.	100	0			
Question	Much more important	A little more important	Less important	Much less important	No answer
4b.	14	86	0	0	0
Question	Increased much	Increased a little	Unchanged	Decreased a little	Decreased a lot
5a.	0	57	43	0	0
5b.	0	40	20	40	0

Table 4. The visitors of Borås' answer in percent.

Question	Yes	No			
1.	100	0			
2.	67	33			
3.	44	66			
4a.	67	33			
Question	Much more important	A little more important	Less important	Much less important	No answer
4b.	33	22	0	0	45
Question	Increased much	Increased a little	Unchanged	Decreased a little	Decreased a lot
5a.	0	12	88	0	0
5b.	0	22	78	0	0

## Appendix 5

Table 8. The staff of Sepilok's answer to the statements in percent.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	100	0	0	0	0
2.	86	14	0	0	0
3.	57	43	0	0	0
4.	86	14	0	0	0
5.	71	14	14	0	0
6.	71	29	0	0	0
7.	43	43	14	0	0
8.	100	0	0	0	0
9.	86	14	0	0	0
10.	86	14	0	0	0
11.	43	57	0	0	0

Table 9. The staff of Semengoh's answer to the statements in percent.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	100	0	0	0	0
2.	80	20	0	0	0
3.	60	20	20	0	0
4.	80	20	0	0	0
5.	0	80	20	0	0
6.	80	20	0	0	0
7.	0	60	40	0	0
8.	60	40	0	0	0
9.	40	20	40	0	0
10.	60	40	0	0	0
11.	80	0	20	0	0

Table 10. The staff of Kristiansand's answer to the statements in percent.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	100	0	0	0	0
2.	100	0	0	0	0
3.	100	0	0	0	0
4.	100	0	0	0	0
5.	40	0	0	0	60
6.	100	0	0	0	0
7.	40	0	0	20	20
8.	100	0	0	0	0
9.	40	20	0	40	0
10.	100	0	0	0	0
11.	100	0	0	0	0

Table 11. The staff of Borås' answer to the statements in percent.

Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	100	0	0	0	0
2.	86	14	0	0	0
3.	57	43	0	0	0
4.	86	14	0	0	0
5.	71	14	14	0	0
6.	71	29	0	0	0
7.	43	43	14	0	0
8.	100	0	0	0	0
9.	86	14	0	0	0
10.	86	14	0	0	0
11.	43	57	0	0	0