



Summary of Orangutan Surveys Conducted in Berau District, East Kalimantan

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ABSTRACT

Orangutan populations on both Sumatra and Borneo are in drastic decline. Despite their officially protected status in both Indonesia and Malaysia, it has been estimated that unless the joint threats of deforestation, fragmentation and poaching are seriously confronted in the immediate future, orangutans will be extinct in the wild by the year 2020 (Rijksen & Meijaard 1999). A key first step in seriously addressing these threats is to identify all potentially viable orangutan populations and estimate their size. The goal of this study was to assess the abundance of orangutans in an 140,000 hectare area (approximately 346,000 acres) of the Berau District, East Kalimantan. Estimates of orangutan density for this area are provided based on nest counts along line transects. A total survey effort of 71 km of transects was distributed within the area, and yielded an extrapolated total estimate of approximately between 1,000 and 2,500 orangutans in the 140,000 ha area. This number represents approximately 10% of the estimated total orangutan population in the world (27,000 in 1997 from Rijksen & Meijaard 1999). Preliminary ecological surveys indicate that the survey area is of high quality and relatively low disturbance, and suggest that the area could serve as a major stronghold for the world's rapidly diminishing orangutan population. It is therefore recommended that conservationists consider this location a high priority area in which focused efforts may make a substantial contribution to maintaining populations of wild orangutans. In addition, this result highlights the value of biological surveys of new areas as an important tool in identifying previously unknown but potentially important strongholds for highly threatened species.

Not only is the population in the survey area one of the largest populations left on Borneo, it is also one of the few remaining areas in which focused efforts to maintain a viable population of wild orangutans have a reasonable chance of success. The survey results and subsequent efforts to protect this prime orangutan habitat should therefore be widely publicized and strongly supported by conservationists as one of the last hopes for the protection of wild orangutans from extinction.

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SUMMARY

We assessed the density of orangutans in a 140,000 ha area (approximately 346,000 acres) of unlogged and lightly logged concession forest in the Berau District, East Kalimantan. Our estimates of orangutan density are based on the widely-accepted methodology of systematically counting orangutan nests along line transects. We divided the survey area into two different zones — a 50,000 ha zone which has been relatively unexposed to hunting in the recent past (Gunung Gajah) and a 90,000 ha zone in which orangutans have been subject to long-term, intensive hunting (Sungai Gie). A total of 71 km of systematic transects were distributed within the Gunung Gajah zone, and yielded an estimated orangutan density of 2.00 orangutans/km² (based on an estimated 6.93 nests/ha). An additional 22 km of preliminary transects and a two-week exploratory expedition were conducted in the Sungai Gie zone, indicating that orangutan densities in this portion of the survey area are very low. We conservatively estimate a total population size of between 1,000-2,500 orangutans in the survey area. We also conducted ecological surveys that indicated that the forest there is high quality habitat for orangutans, and that due to the impacts of hunting, the present orangutan population is probably well below the carrying capacity of the area. These results suggest that if this forest is effectively protected from hunting it could serve as a major stronghold for the world's rapidly diminishing orangutan population.

RATIONALE

The orangutan (*Pongo pygmaeus*) is Asia's only great ape, and is found only in Indonesia and Malaysia, on the islands of Sumatra and Borneo. Orangutan populations on both islands are in a dramatic state of decline, largely due to hunting, habitat loss and fragmentation. Despite their officially protected status, it has been estimated that unless the joint threats of deforestation, fragmentation, and poaching are seriously confronted in the immediate future, orangutans will be extinct in the wild within the next two decades. The long term protection of wild orangutans will only be achieved if a set of replicated, viable populations can be identified and adequately protected. Although nobody knows how big an orangutan population must be in order to be viable, the basic principles of conservation biology suggest that the most effective strategy is to focus conservation efforts on the few remaining large wild populations. Large populations are at relatively lower extinction risk than are small populations, and their protection is more cost efficient than protecting several smaller, fragmented populations.

The Berau district in East Kalimantan is one of the few remaining areas on either Sumatra or Borneo that still contains substantial expanses of relatively undisturbed lowland Dipterocarp forest. Recent ecological surveys indicated that the Berau District contained an orangutan population that has thus far received little attention from orangutan conservationists. However the size of this population was unknown. We therefore identified a 140,000 ha (approximately 346,000 acres) block of timber concession forest which was relatively undisturbed, in which local people had reported relatively high orangutan densities, and which was fairly remote from human settlements and therefore less susceptible to land-use conflicts. We conducted orangutan surveys in this area using established nest transect techniques to assess the size of the orangutan population in this area.

METHODOLOGY

In theory, orangutan populations could be censused by walking along line transects and recording direct sightings of animals. However, surveys that are based on direct sightings of animals as rare and cryptic as orangutans are inaccurate and take a prohibitively long time. A more feasible method is to use established transect techniques to assess the density of orangutan nests. Nests are visible much longer than the orangutans themselves, are more commonly encountered and their density fluctuates less dramatically over time. In addition to requiring less time, resulting in larger sample sizes, and being less subject to temporal variation, nest survey methodologies are well developed and have been validated at long-term research sites where orangutan densities are already known. Finally, the use of accepted techniques results in accurate density estimates that can be directly compared to those obtained at other sites.

We divided our survey area into two zones because the orangutan populations in the two areas have been subject to substantially different levels of pressure over the past century. The smaller of the two zones, Gunung Gajah (GG), is approximately 50,000 ha in size (approximately 124,000 acres) and has been relatively undisturbed by hunting. The larger zone, Sungai Gie (SG), is approximately 90,000 ha in size (223,000 acres). Although SG is currently uninhabited, until recently several villages were located there and reports suggest that orangutans were hunted intensively by villagers in this area. Punan men still frequently hunt along the Sungai Gie, and will kill and eat orangutans if they come across them. That this rarely happens today is more due to drastically reduced orangutan densities in the area than it is to any change in attitudes regarding the hunting of orangutans. The two zones are now portions of larger timber concessions (to PT Gunung Gajah Abadi and PT Karya Lestari), however only very limited logging has been conducted in either area to date.

We conducted nest surveys in the GG zone over four different field trips between 4 December 2001 and 26 February 2002. Two sets of preliminary nest surveys were conducted in the SG zone between 3 April and 2 May 2002. Field surveys were conducted by two teams working simultaneously. Each team was composed of trained local research assistants and headed by a team leader with substantial prior experience in nest transect methodology (Bhayu Pamungkas and Linda Engstrom). Data collection began with the random selection of a point in the forest. From each of these points we cut a one kilometer-long midline in a randomly selected direction, and then cut eight 500 meter transects perpendicular to each midline. The starting point and bearing of each transect were randomly selected, with the stipulation that all transects on the same side of the midline must be at least 100 meters apart. This design sought to optimize the tradeoff between having a large number of independent samples and having transects that were sufficiently long to avoid the biases due to the spatial heterogeneity associated with micro-habitat variation or the clumping of orangutan nests. The research teams walked 4 km of transect at each midline, yielding a total survey effort of 71 km of transect at GG and 22.5 km of transect at SG. The number of orangutan nests seen was recorded along each transect, as well as simple ecological indices of forest composition and habitat disturbance. In addition, I led a two-week expedition to the far western portion of the survey area to assess orangutan abundance and habitat quality there.

Data analysis followed accepted procedures, which accounts for the fact that not all nests are seen, that only a subset of an orangutan population are nest builders, that multiple nests can be made in one day and that nests decay over time. The values chosen for each of the parameters in the equation were based on the most relevant numbers available in the scientific literature. Where a range of values were available, we used the most conservative ones (i.e., those resulting in the lowest density estimate). Therefore, any errors in our projection are likely to have underestimated population size, rather than inflating it. All analyses were conducted using Distance 3.5, a program designed to accurately estimate the density of organisms based on line transect data.

RESULTS

A total of more than 1,600 nests were seen on the 71 km of transect that was walked in the GG zone. Analysis of these data produced an estimated density of 6.93 (95% CI 4.33-11.01) nests per hectare, which yielded an overall density estimate of 2.00 orangutans/km² (95% CI 1.60-2.52) in the GG zone. A total of 43 nests were seen in 22.5 km of transect that were walked in the SG zone. The sample size in the SG zone is too small to permit robust statistical analysis. However, the small number of nests seen on the transects conducted, as well as the reports from the most recent expedition to the far western portion of the SG zone, suggest that the density of orangutans in this area is very low (less than 0.5 orangutans/km²). This is undoubtedly due to the fact that orangutans have been hunted intensively in this area for decades. Our density estimates lead to an overall estimated population size of 1,000-2,500 orangutans in the survey area.

The results of our systematic ecological assessment of the GG zone suggest that the forest there is of high quality for orangutans. There was very little environmental disturbance; none of the forest had burned and logging was extremely light in the few places where any logging had occurred (< 2 stems/ha). There was a high density of large trees, lianas and figs, all signifying good quality habitat for orangutans. Three separate preliminary survey expeditions to various portions of the SG zone suggest that the habitat quality found there is also high. Based on the quality of the habitat, this area could hold probably hold 2,500-3,000 orangutans, if they were protected from hunting.

I presented these results at the International CBSG Orangutan Conservation and Rehabilitation Workshop in Palangkaraya, Central Kalimantan, in June 2002. The majority of the world's experts on orangutans were present, and I discussed our survey methodology and results with most of them. All agreed with our methodology and conclusions, and were excited about our reports of a sizeable orangutan population in East Kalimantan. Additional surveys of the SG zone are currently being conducted to more accurately assess orangutan density and habitat quality in that area. Details of all analyses conducted, the formulae utilized and the parameters selected are provided in the full technical report of our results (available at TNC's Samarinda office).

IMPLICATIONS

The density estimate in the survey area is comparable to that found at other major sites on Borneo. (Bornean orangutan density in lowland non-swamp forests varies from about 1 to 2.5 individuals/km².) In addition, the survey area is one of the largest relatively intact forest fragments remaining in Kalimantan in which orangutan densities are fairly high. This suggests that the survey area is one of a very limited number of areas left in the world that contains an orangutan population large enough to have the potential for long-term viability. In addition, contrary to the situations in most other areas that hold potentially viable orangutan populations, there are few social or political roadblocks to the protection of orangutan

habitat in this area. The survey area is fairly remote, there are few land-use conflicts with local people over the area, and the timber companies that hold the rights to the concessions which comprise the survey area are willing to cooperate with the Conservancy to maximize the conservation value of their concessions.

ADDITIONAL INFORMATION

For additional information, please consult the following reports:

1. Orangutan population survey of Gunung Gajah in Berau district, East Kalimantan. Andrew J. Marshall. 25 June 2002, Report to The Nature Conservancy.
2. Survey of the headwaters of the Sungai Gie and Sungai Lamcin: 2 September – 14 September 2002. Andrew J. Marshall. 20 September 2002, Report to The Nature Conservancy.
3. Field Work Report: Gunung Gajah: 4-13 December 2002. Bhayu Pamungkas & Linda Engstrom. 14 December 2001, Report to The Nature Conservancy.
4. Field Report: Gunung Gajah 2: 9-20 January 2002. Bhayu Pamungkas & Linda Engstrom. 23 January 2002. Report to The Nature Conservancy.
5. Field Report: Gunung Gajah 3: 25 January – 7 February 2002. Bhayu Pamungkas & Linda Engstrom. 9 February 2002. Report to The Nature Conservancy.
6. Field Report: Gunung Gajah 4: 14-26 February 2002. Bhayu Pamungkas & Linda Engstrom. 10 March 2002. Report to The Nature Conservancy.
7. Field Report: Hulu Sungai Gie: 3-18 April 2002. Bhayu Pamungkas & Linda Engstrom. 4 May 2002. Report to The Nature Conservancy.
8. Scouting Trip upstream Gie River, Berau District: 26 April -2 May 2002. Linda Engstrom & Bhayu Pamungkas. 4 May 2002. Report to The Nature Conservancy.