Ex-Mega Rice Project Gibbon Density and Comparison with Other Areas

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The Orangutan Tropical Peatland Project
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The Mega Rice Project in Central Kalimantan, Indonesia was initiated in 1996 with the goal of clear-felling one million hectares of unproductive and sparsely populated lowland peat-swamp forest into rice paddies in an attempt to alleviate Indonesia’s growing food shortage (Boehm and Siegert, 1999). The Indonesian government made a large investment in constructing an estimated 4,600 kilometres of drainage canals, the largest of them 30 metres wide irrigation canals and removing trees, but the project did not succeed because rice could not be cultivated in the acidic soil. It was eventually abandoned after causing extensive damage to the forest and peat (Aldhous, 2004).

The former Mega Rice Project is part of a stretch of forested peatland that covers a large extent of the lowland river plains of southern Borneo. Although the area was once connected, it is now highly fragmented. The study area for this work is Block C, one of the five blocks A-E that comprise the entire ex-Mega Rice Project. It is surrounded by the Kahayan River to the east, the Sabangau River to the west, the Java Sea to the south, and the main Palangka Raya-Sampit road to the north. Block C and the adjacent Sabangau Forest make up the Sabangau basin and are divided by the black water Sabangau River.
Methods

Gibbon density was estimated using fixed-point counts, as described by Brockelman and Ali (1987), at three distinct survey sites within the research area. This method has been recommended for the survey of gibbons for the following reasons: first, because the gibbons’ inconspicuous behavior and preference for high canopy makes the use of line transects for surveying unsuccessful [Brockelman and Ali 1987; Brockelman and Srikosamatara 1993; O’Brien et al. 2004; Nijman and Menken 2005; Cheyne et al. 2007; Hamard et al. 2010]. Secondly, because the territorial behaviour of gibbons allows efficient mapping of triangulated points (Sutherland, 2000). The animals’ loud calls, audible from a considerable distance, allow their detection from greater distances than by using sightings [Davies 2002]. Finally, fixed-point counts allow quick, time-efficient surveys, with more reliable results than a line transect survey conducted within the same time frame (Nijman and Menken, 2005).

The density estimates were obtained with the following formula, developed by Brockelman and Ali (1987): \(D = \frac{n}{p(m) \times E}\), where \(n\) is the number of groups heard in an area as determined by the mapping, \(p(m)\) is the estimated proportion of groups expected to sing during a sample period of \(m\) days, and \(E\) is the effective listening area [Brockelman and Ali 1987; Nijman and Menken 2005; Cheyne et al. 2007]. The correction factor \(p(m)\) was determined at each site with the formula \(p(m) = 1 - [1 - p(1)]m\), with \(p(1)\) being the singing probability for any given day, and \(m\) being the number of survey days. The effective listening area was calculated for each site using a fixed radius of 1km around each listening post, and was defined by the area in which at least two of the listening posts could hear gibbons singing.

Figure 1: Map of Sabangau catchment. Main field site in Sabangau (LAHG) = blue circle, Mega Rice field site = yellow circle. Dark green is remaining forest.
Figure 2: Google Earth image of Sabangau catchment. Main field site in Sabangau (LAHG) = blue circle, Mega Rice field site = yellow circle.

Results

Table 1: Basic data on survey carried out from 4-7 August 2011

<table>
<thead>
<tr>
<th>Days of survey</th>
<th>Width of buffer (km)</th>
<th>Calling probability (p(m))</th>
<th>Effective Listening Area (ELA) (km²)</th>
<th>Total study groups in ELA</th>
<th>Individuals in ELA based on groups heard (assume 3.5 gibbons/group based on sightings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1</td>
<td>0.6</td>
<td>6.44</td>
<td>9</td>
<td>31.5</td>
</tr>
</tbody>
</table>
Table 2: Results of density and population - Kalampangan

<table>
<thead>
<tr>
<th>Groups/km² (D=n/(p(m) x E))</th>
<th>Individuals/km²</th>
<th>Lone gibbons/km²</th>
<th>Total gibbons/km²</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.33</td>
<td>4.89</td>
<td>1</td>
<td>5.89</td>
</tr>
</tbody>
</table>

Total population estimate for 1254 km² [Cattau 2010]: 7385 individuals

Individuals/km² based on groups heard (assuming 3.5 gibbons/group from sightings [Cheyne et al. 2007])
Lone gibbons (5.5% of paired population [Cowlishaw 1996; Cheyne et al. 2007])

Discussion and conservation importance of MRP area

*H. albibarbis* is listed as Endangered on the IUCN Red List 2008 [IUCN 2008] based on an estimated population reduction of over 50% when considering the past 30 years and projected future habitat change due to draining of peat-swamps, logging and burning into the next 15 years (totalling 45 years which is approximately 3 generations). Where the species persists there is hunting and collection for the wildlife trade. A large part of the species range is in peat-swamp – an extremely threatened ecosystem. This species may qualify for Critically Endangered in the future if rates of habitat change increase, and thus should be carefully monitored as availability of suitable habitat and population are declining.

There is a severe lack of data on non-protected areas or small forest areas which may contain viable populations. In the absence of a full Population and Habitat Viability Analysis (PHVA) all survey data are vitally important to obtain accurate population estimates of this species. Based on these data, this area is home to 3% of the global population of this endangered species. Thus, this area is clearly capable of supporting a viable population but it is isolated from other potential corridors of genetic transfer from other forests and the area is highly fragmented.
Figure 3 showing average density for Sabangau of 2.6 groups/km$^2$ (green circle) and for MRP 2.33 groups/km$^2$ (red circle).

Based on these results the density of gibbons is less than that in Sabangau (2.6 groups/km$^2$) as is the number of gibbons/km$^2$ (5.89 compared to 10.7 for Sabangau). The estimate of ±7,000 gibbons indicates that this forest could support a viable population of gibbons, despite the highly fragmented and disturbed state of the forest and surrounding areas. These are preliminary data based on only 4 days of survey and based on these data it is clear that more survey work is needed. It is clear that without extensive attempts to connect the fragments, this population of gibbons does not have a long-term future.
References


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