

HCV 2 (LANDSCAPE LEVEL FOREST)

Definition from Malaysia National Toolkit (2009): Large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

Any forest area that forms or is part of a linkage between larger forest complexes, and can thus provide connectivity between fragments or act as a wildlife corridor for the movement of animals from one complex to another, is considered HCV 2. This HCVF can serve as a buffer zone to protected areas. Its identification and management should be tailored towards the needs of umbrella species i.e. sensitive, wide ranging wildlife that are particularly susceptible to forest fragmentation and human population pressures

Attribute	USM SFMP area is a significant landscape for wildlife refuge. This project area has the largest home of orang-utans (the endemic subspecies <i>Pongo pygmaus morio</i>), and also contains the largest population of orang-utans in North-eastern Borneo. It is estimated that 2,600 individuals, which account for about half of the total orang-utan population Sabah. Large concentration of fragmented orang-utan is found at the degraded vegetation condition such as Bukit Piton FR with total areas about 11,612 ha.
Management Recommendations	<ul style="list-style-type: none"> • Enhance the forest quality to provide sufficient habitat and food source for orang-utan; and • To protect the area from deforestation issue
Monitoring Recommendations	<ul style="list-style-type: none"> • Continuous monitoring program for critical endangered species • Continuous monitoring for habitat rehabilitation program
Actions	<ul style="list-style-type: none"> • Aerial nest counting for orang-utan executed once in 5 years • Forest restoration at degraded area • Perimeter boundary patrol by ground and aerial surveillance executed by monthly basis

Measurable Effectiveness Indicators

Many plant species in USM are depleted (e.g. Merbau and *Diospyros* spp.) by past logging especially in Bukit Piton FR. Planting of pioneer species, dipterocarps, common species and 'fruit trees' are essential steps towards fulfilling to provide sufficient habitat and food source for orang-utan.

Figure 1: Identified area for HCV 2 within Ulu Segama-Malua SFM.

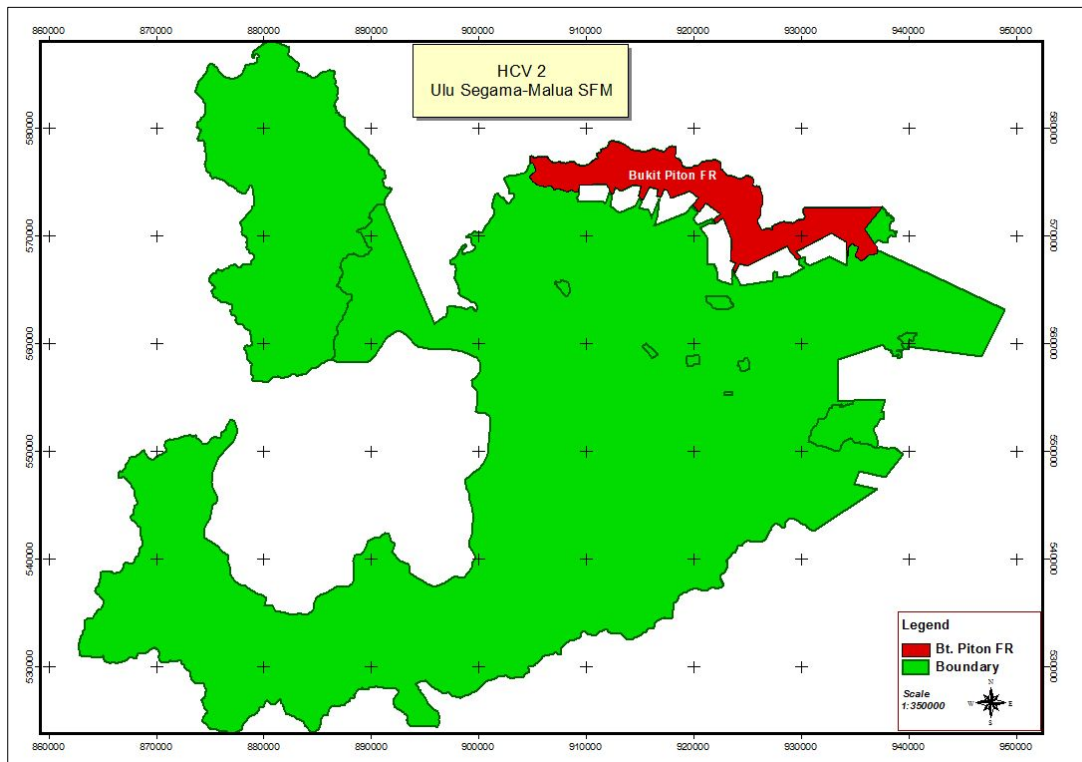
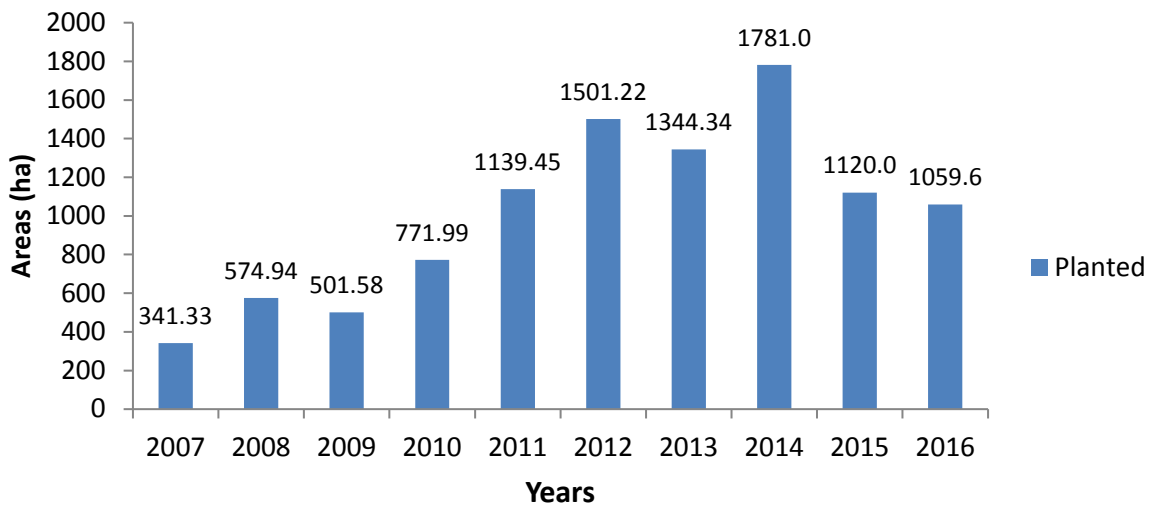


Figure 2: Restoration works in Bukit Piton FR since 2007



The restoration works which was initiated in 2007 had received full supports from various stakeholders in 2010 i.e. Yayasan Sabah, WWF-Malaysia, and Sime Darby which provide sufficient funds to restore habitat and enough food sources for orang-utan. A total of about 10,135 ha had been restored in Bukit Piton FR since the project inception in 2007. The total area was planted in 2016 has decreased from the previous years about 1,059.6 ha due to prolonged drought in first and second quarters.

Based on the continuous monitoring for the period of 2012 – 2014, it revealed that the mortality rate is ranging from 3% to 27% (one to three year after planting), as shown in Table 1. The mortality rate is contributed by seedlings quality, technique of planting, wildlife disturbance, weeds competition, wildlife disturbance and weather condition. Over the time, the mortality rate is reducing due to application of better planting technique, seedlings quality and consistent maintenance rounds.



Planting line in Bukit Piton Forest Reserve



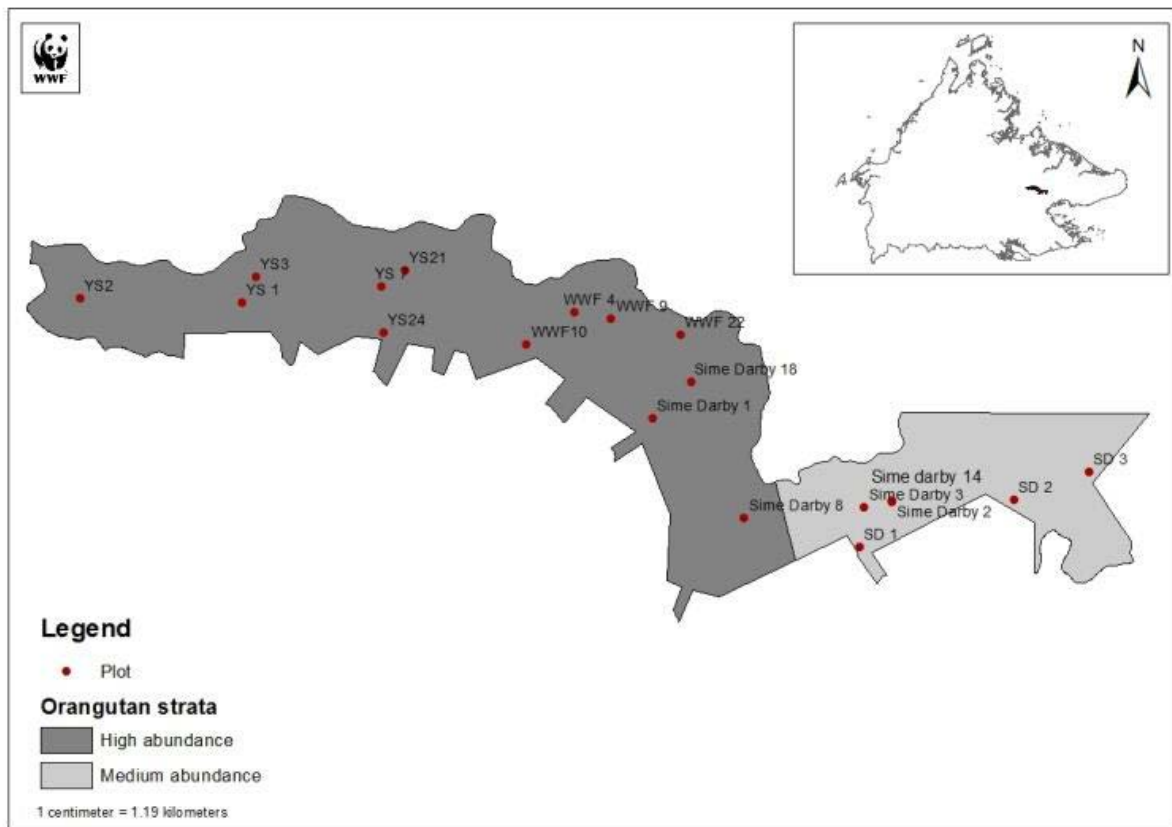
Planting tree by appointed contractor

Table 1: Mortality rate of planted seedlings since 2012

NO	CPT#	RESTORED AREA (HA)	MORTALITY RATE (%)		
			YEAR		
			2012	2013	2014
1	103	347.00	-	-	3
2	104	519.00	-	-	7
3	105	425.00	6	6	6
4	106	463.00	-	-	14
5	107	751.00	9	-	11
6	108	159.00	-	-	27
7	109	718.00	10	9	8
8	110	973.00	14	10	8
9	111	418.00	5	8	6
10	112	552.00	21	12	6
11	113	518.00	-	8	8
12	114	310.00	17	14	6
13	115	618.00	-	3	16
14	116	673.00	22	15	13
15	117	188.00	-	-	3
16	121	324.00	17	13	8
Total		7,956.00			
Mean Mortality (%)			13.4	9.8	9.4

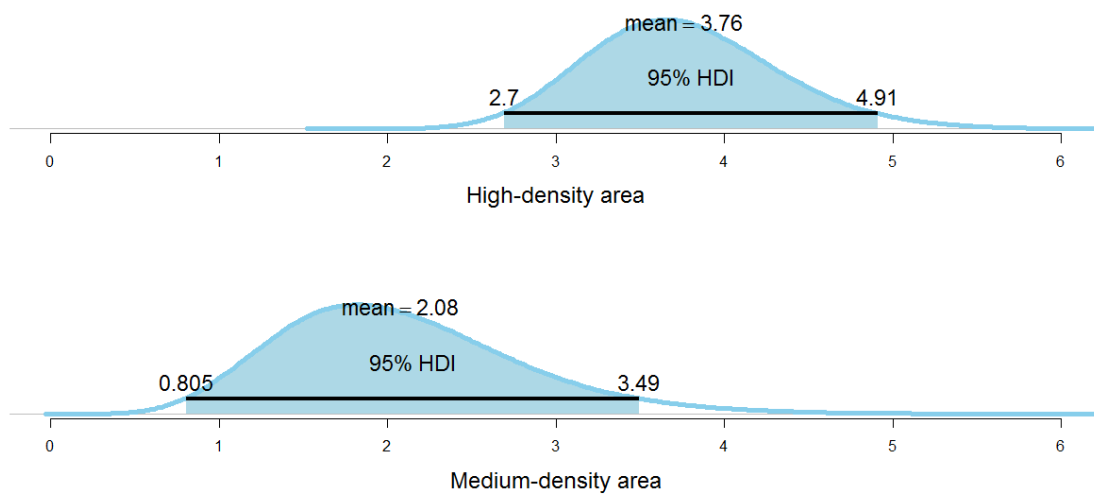
Aside from restoring the project area, a study on estimate of orang-utan population in Bukit Piton Forest Reserve was carried out in 2016 by WWF-Malaysia. The survey had established 16 plots in a random area of high and medium density stratum within Bukit Piton Forest Reserve. The result shows that the orang-utan density in high-density area is 4 individuals per km² which doubled the density of orang-utans in the medium-density area. The medium-density area, which is located on the half east of Bukit Piton Forest Reserve, was badly logged in the past, leaving a harsh environment for orang-utans with small trees and dense undergrowth vegetation. There was fewer orang-utans occupying medium-density area compared to the high-density area on the half west of BPFR where logging was not as intense as the half east. Through the forest restoration project since 2008, planted trees already mature enough to provide food and nesting trees for orang-utans. In general, orang-utan population in Bukit Piton Forest Reserve considered as a stable population as no major catastrophe such as forest fire, habitat conversion or killing have been reported. Instead, more sightings of mother and dependent young (<6 years of age) were seen roaming around the area in the recent years (2012-2016). Continued protection and establishment of canopy from fast growing trees through the current forest restoration project will likely continue to increase orang-utan populations.

Figure 3: The survey plots in Bukit Piton Forest Reserve are represented by red dots. Twelve plots were in the high-density stratum (85.85 km²) and six plots in the medium-density stratum (30.84 km²)



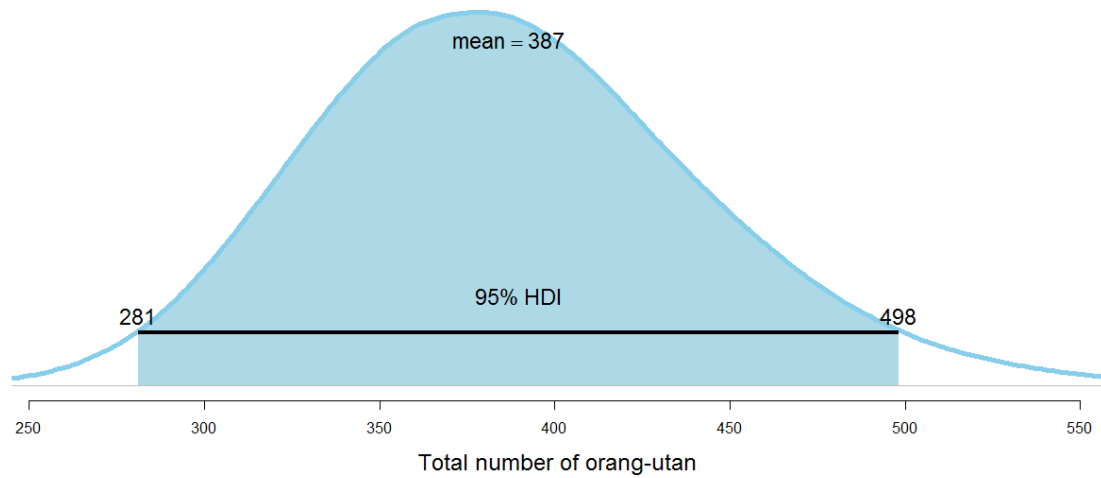
(Source: WWF-Malaysia)

Figure 4: The posterior distributions of orang-utan population density estimate for the high- and medium-density stratum in Bukit Piton Forest Reserve



(Source: WWF-Malaysia)

Figure 5: The posterior distribution of orang-utan population estimate in Bukit Piton Forest Reserve



(Source: WWF-Malaysia)

[Orang-Utan Population Estimates in Bukit Piton Forest Reserve by WWF-Malaysia](#)

Rope-bridges were also constructed across the Segama River to provide connectivity for orang-utans to the larger population and habitat in Ulu Segama Forest Reserve south of the river. Funding supports from WWF-UK and Oliver Hardiment legacy have been used for the construction of these rope-bridges. These rope-bridges are expected to provide an immediate means for orang-utans to move among forest patches to access food resources and mates, to find additional habitats for dispersal, and thereby also to facilitate genetic flow among orang-utans in Ulu Segama Forest Reserve.

However in 2015, due to tight financial for maintenance, rope-bridges have been severely damaged and snapped off by the high water level of river. No new rope-bridges yet to be installed.