

Ecosystem Restoration Concessions: A New Strategy for Conserving Elephant Habitat in Sumatra?

Arnold F. Sitompul^{1,2*}, Mathew Linkie³, Donny Gunaryadi^{2,4}, Elisabet Purastuti² and Arif Budiman^{2,5}

¹*Conservation Science Initiative & The Indonesian Biodiversity Foundation, Jakarta, Indonesia*

²*Indonesia Elephant Conservation Forum, Bogor, West Java, Indonesia*

³*Fauna & Flora International, Cambridge, United Kingdom*

⁴*Wildlife Conservation Society-Indonesia Program, Bogor, West Java, Indonesia*

⁵*Yayasan WWF Indonesia, Jakarta, Indonesia*

*Corresponding author's e-mail: asitompul@hotmail.com

Introduction

Despite being the recipient of intensive conservation intervention over the past decade, the Sumatran elephant population continues to decline and is now restricted to fragmented forest habitat (Soehartono *et al.* 2007; Uryu *et al.* 2008, 2010). Island-wide, the current Sumatran elephant population is estimated at 2400-2800 wild elephants (excluding elephants in camps) that occur in 25 fragmented populations. The survival of these populations is considered vulnerable because of the threats posed by habitat loss due to large-scale habitat conversion for monoculture plantation (especially oil palm), human settlement, illegal logging and forest fires (Soehartono *et al.* 2007; Uryu *et al.* 2008, 2010). In turn, this habitat degradation brings elephants and people into closer proximity and often leads to increased conflict (Sitompul *et al.* 2010).

The current direction of Sumatran elephant conservation strategies recommends conducting peer-reviewed surveys to estimate population size and monitoring to identify population trends, improve interagency cooperation and data sharing, protecting key elephant populations (Blake & Hedges 2004), reducing human-elephant conflict (e.g. through community based guarding; Hedges & Gunaryadi 2010) and developing elephant response units (see Riddle 2007). Despite the importance of these strategies, none have had an immediate impact in saving elephant habitat at a landscape scale. Yet, in the meantime, many empirical studies have shown that habitat loss and degradation remains the greatest threat to not

only Sumatran elephants, but all Asian elephants (Sukumar 1992; Leimgruber *et al.* 2003; Soehartono *et al.* 2007; Uryu *et al.* 2008). In Sumatra, habitat loss is continuing at an alarming rate (Laumonier *et al.* 2010) and human-elephant conflict is escalating (Sitompul 2004; Uryu *et al.* 2008; Sitompul *et al.* 2010). As elephant conservation biologists who work extensively in Sumatra, we believe that elephant conservation strategies should secure the remaining elephant habitat, or the elephant population in Sumatra will be extirpated. To achieve a significant result for elephant conservation in Sumatra, a revolutionary and innovative strategy is urgently needed. Elephant conservation strategy in Sumatra needs to be directed and to focus on securing habitats and managing those habitats in a sustainable way and with concrete direct benefit to local stakeholders.

The most comprehensive analysis of island-wide distribution shows that 85% of wild Sumatran elephants live outside of protected areas (Soehartono *et al.* 2007). These elephant habitats are fragile because they lack an official protection status, meaning that they can be converted into monoculture plantations, mined or encroached upon by human settlements at any time. To save these elephant habitats, conservationists need to develop new initiatives to sustainably manage these unprotected habitats. Undoubtedly, this will require providing economic incentives to the local stakeholders (e.g. government agencies and rural communities) who will bear lost opportunity costs as a result of not converting elephant habitat to other uses.

The aim of this paper is to provide an alternative conservation strategy based on habitat management and to provide future recommendations to prevent the species from extinction. The more specific aims are to: (i) update current Sumatran elephant distribution; (ii) assess how the ‘Ecosystem Restoration Concession’ concept could help save elephant habitat; and, (iii) identify how the REDD+ scheme can be used to support elephant conservation in Indonesia.

Current Sumatran elephant distribution

The first elephant population survey in Sumatra, conducted in early 1980s, estimated the elephant population at about 2800-4800 individuals occurring in 44 discrete populations (Blouch & Haryanto 1984; Blouch & Simbolon 1985). After this, there were no further systematic elephant population surveys until the beginning of 2000. The first population estimates that used standardized methods were conducted in two national parks in southern Sumatra (Hedges *et al.* 2005). The results of this study found that the elephant populations in Bukit Barisan Selatan National Park and Way Kambas National Park were the only two significant populations left in a province where 12 populations had previously been found in the early 1980s (Hedges *et al.* 2005).

In 2007, data compiled from government agencies and conservation NGOs suggested that the total Sumatran elephant population had declined by approximately 50% since the 1980s to 2400-2800 wild individuals and that they were reduced to only 25 fragmented populations (Fig. 1; Soehartono *et al.* 2007). Most of these populations were found to occur in lowland areas, with about 85% of their habitat being located outside of the protected area network (Fig. 1). Each of these populations is considered to be vulnerable to the present forest habitat loss on Sumatra (Soehartono *et al.* 2007; Uryu *et al.* 2008).

New challenge to secure elephant habitat

Although some scientists have suggested that conservation efforts towards Sumatran elephant should focus on increasing the effectiveness of

existing protected areas and identifying forest corridors for linking elephant populations (Leimgruber *et al.* 2003), there is a possibility that these recommendations might not be effective as most of the current elephant habitat occurs outside of the protected area boundaries (Soehartono *et al.* 2007). Developing new protected areas for conserving elephants in Indonesia may not always be effective because most of the protected areas in Indonesia are managed by the central government. Consequently, direct economic benefits to local government and local communities may be insufficient. Furthermore, creating new protected areas will need to follow complicated bureaucratic procedures and will require an enormous amount of funding. In this situation, most of the conservation agencies are reluctant to invest their conservation effort to continue working on this concept, mostly because of their short-term project time frames and limited financial resources.

Another option for conserving elephant habitat is through the “Managed Elephant Range (MER)” concept (Dublin *et al.* 2006). This suggests that limited resource extraction by humans will be allowed in elephant habitat as long as the activity

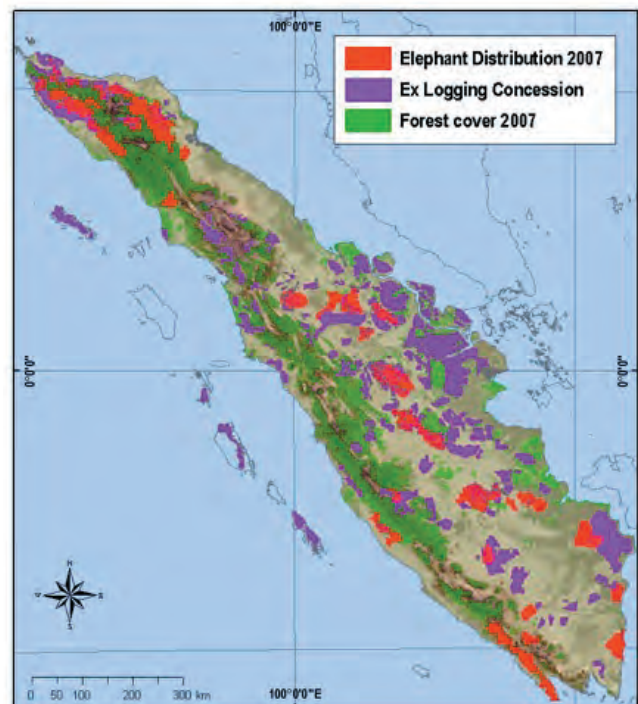


Figure 1. Sumatran elephant distribution and ex-logging concession areas in Sumatra (Soehartono *et al.* 2007).

is non-destructive, sustainable and compatible with elephant conservation goals. Despite being good in theory, the implementation of this concept is not well documented with only a limited number of examples in the South Asian region and therefore its applicability to Sumatra remains uncertain (Dublin *et al.* 2006).

In Sumatra, at least 1.6 million ha of elephant habitat falls within active or inactive logging concessions (Soehartono *et al.* 2007). Ex-logging concession areas also represent important habitat for elephants (Sitompul & Pratje 2009; Sitompul 2011). The most recent study on elephant foraging ecology in northern Bengkulu province, Sumatra, shows that the nutritional quality of most elephants' diet in regenerating ex-logging concessions is in the optimum level to support elephant growth (Sitompul 2011). Therefore, management of ex-logging concessions for elephants should focus on habitat restoration and rehabilitation, which can be implemented through the new Indonesian forest regulation of "Ecosystem Restoration Concessions (ERC)" (Dephut 2004a). This regulation gives an opportunity for conservation agencies to explicitly develop elephant habitat management practices inside concession areas.

Ecosystem restoration concession

The ERC concept was first introduced in 2004 through the Ministry of Forestry regulations No.159/2004 (SK.159/Menhut-II/2004; Dephut 2004a) and No 18/2004 (P.18/Menhut-II/2004; Dephut 2004b). This concept is similar to the conservation concession model that had been introduced as alternative strategy to protect biodiversity in Central America (*see* Hardner & Rice 2002). The ERC regulation was then revised through Government Regulation No 6/2007 (PP No.6/2007; Dephut 2007) and again through No 3/2008 (PP No. 3/2008; Dephut 2008a). Details of ERC implementation is in Regulation No 61/2008 (P.61/Menhut-II/2008; Dephut 2008b) and No 50/2010 (P.50/Menhut-II/2010; Dephut 2010). The ERC is defined by re-management and restoration efforts on former production forest, including biotic (flora and fauna) and abiotic (soil, hydrology, nutrition cycles and other natural process) components in order to re-establish

a biological balance (Dephut 2004a). Several strengths of this concept are: (i) management of concession is based on habitat restoration and rehabilitation; (ii) secure land tenure ownership, therefore concession management has a legitimate authority to fully manage the area; (iii) monitoring and safeguarding an area from illegal exploitation can be conducted more effectively; and, (iv) there is the potential for obtaining sustainable financing through a carbon credit (REDD) project.

The potential to implement the ERC concept into elephant habitat management is promising and therefore needs to be further explored. Currently, there are only two ERCs established in Indonesia and neither one of them were specifically designated to manage elephant habitat. The two areas are: *Restorasi Ekosistem Indonesia* (REKI) concession in Southern Sumatra (~50,000 ha approved and another ~50,000 ha in progress; Dephut 2008c) and *Rehabilitasi Habitat Orangutan Indonesia* (RHOI) Concessions (about ~86,000 ha in East Kalimantan; Dephut 2011). The two concessions are relatively new. Therefore, the impact of this concept in conserving biodiversity is too early to determine. However, several important issues emerged during the establishment phase and need to be addressed in order to benefit elephant habitat: (i) the cost to establish an ERC is still relatively high, including upfront payment of concession taxes for a 60 years tenure; (ii) in practice, establishing an ERC needs to follow a relatively long process (three to four years) and extensive bureaucratic procedure; and, (iii) sustainable financial schemes to support the management of ERCs remain unclear and need to be further explored.

Sustainable financing through REDD+

One of the most crucial issues for implementing a large scale conservation concession (such as an ERC) is to determine how the area can be sustainably financed and by what mechanism. Encouraging habitat preservation without direct sustainable economic incentives for the local economy may receive little support from local government and/or local communities. Furthermore, the value of economic incentives for preserving habitat

should, at least be comparable to that obtainable from alternative land use practices (e.g palm oil plantations) to avoid undermining the habitat preservation scheme. Carbon credit financing through *Reducing Emission from Deforestation and Forest Degradation* (REDD+) schemes was offered as an option for securing sustainable financing for habitat preservation (Campbell 2009). Despite its great potential however, the economic benefits derived from REDD+ alone might still be less, than those delivered by oil palm plantations (Butler *et al.* 2008). Therefore, REDD+ should tie in with other alternative payments for ecosystem services (e.g. clean water and flood control) to increase the economic value of preserving habitat (Redford & Adams 2009). Moreover, REDD+ must be accountable in a transparent way, provide direct benefits to local communities and not be administered solely by a national agency or proxy agents (Melick 2010).

For long-term habitat management, incorporating carbon credit financing through REDD+ offers a solution to overcome financial uncertainty in implementing ERCs. Despite the slow process in the development of REDD+ programs in Indonesia, due to the complex and complicated regulatory context, the emerging carbon credit markets present significant opportunities. In 2008, the total value of the global carbon market was estimated at US\$ ~120 billion and total voluntary market transacted was US\$ 705 million (Hamilton 2009). There are many complex issues that have not been resolved, e.g. a standard protocol to implement REDD+ projects nationwide. For example, issues on 'carbon rights' are not fully addressed in existing regulations, and therefore there is plenty of uncertainty to legally claiming carbon stocks in designated REDD+ areas. The Indonesian government needs to finalize standard protocols for the implementation of REDD+ soon in order to attract REDD proponents to invest in the forestry industry within the country.

Summary

In Sumatra, a substantial amount of elephant habitat occurs in ex-logging concessions and these areas are likely to be converted into large scale monoculture plantations or used for mining

in the future (Uryu *et al.* 2008; Sitompul & Pratje 2009; Uryu *et al.* 2010). As some economic development will need to take place, instead of converting forest habitat, we suggest that management of the remaining elephant habitat in Sumatra should focus on habitat restoration that ties into the REDD+ program (<http://www.un-redd.org/>). Indonesia was one of the nine pilot countries designated as pilot projects for the United Nations-REDD program in 2008 and is eligible for developing an alternative finance mechanism to maintain the integrity of remaining forested areas in Sumatra. Carbon financing, in combination with ERCs, may provide a viable option for maintaining elephant habitat integrity while concurrently improving rural livelihoods. The Indonesian government and other stakeholders (conservation NGOs and community groups) should take the opportunity to use the program for sustainably managing potential elephant habitat in Sumatra. If ERCs can be fully implemented and endorsed with comprehensive regulatory mechanisms, there might be a chance to save the Sumatran elephant in the future.

Acknowledgements

We would like to thank the Taiwan Government Bureau of Forestry for the support on elephant conservation project in Bengkulu Province. We also thank the Indonesian Ministry of Forestry's Directorate General Forest Protection and Nature Conservation for intensive collaboration with the Indonesian Elephant Conservation Forum.

References

- Blake S & Hedges S (2004) Sinking the flagship: The case of forest elephant in Asia and Africa. *Conservation Biology* **18**: 1191-1202.
- Blouch RA & Haryanto (1984) *Elephant in Southern Sumatra*. Unpublished report, IUCN/WWF Project 3033, Bogor, Indonesia.
- Blouch RA, Simbolon K (1985) *Elephants in Northern Sumatra*. Unpublished report, IUCN/WWF Project 3033, Bogor, Indonesia.

- Butler RA, Koh LP & Ghazoul J (2009) REDD in the red: palm oil could undermine carbon payment schemes. *Conserv. Letters* **2**: 67-73.
- Campbell BM (2009) Beyond Copenhagen: REDD+, agriculture, adaptation strategies and poverty. *Global Environmental Change* **19**: 397-399.
- Dephut (2004a) Peraturan Menteri Kehutanan tentang Restorasi Ekosistem di kawasan Hutan Produksi. <http://www.dephut.go.id/informasi/skep/skmenhut/159_04.htm> accessed 2011.
- Dephut (2004b) Peraturan Menteri Kehutanan tentang Kriteria Hutan Produksi yang dapat diberikan izin usaha pemanfaatan hasil hutan kayu pada hutan alam dengan kegiatan Restorasi Ekosistem. <<http://www.dephut.go.id/index.php?q=id/node/1603>> accessed March 2011.
- Dephut (2007) Peraturan Pemerintah Republik Indonesia tentang Tata hutan dan Penyusunan rencana pengelolaan hutan serta pemanfaatan hutan. <<http://www.dephut.go.id/index.php?q=id/node/2018>> accessed March 2011.
- Dephut (2008a) Perubahan atas Peraturan Pemerintah Nomor 6 Tahun 2007 tentang Tata Hutan dan Penyusunan Rencana Pengelolaan Hutan, serta Pemanfaatan Hutan. <<http://www.dephut.go.id/index.php?q=id/node/3340>> accessed March 2011.
- Dephut (2008b) Peraturan Menteri Kehutanan tentang Ketentuan dan Tata Cara Pemberian Izin Usaha Pemanfaatan Hasil Hutan Kayu Restorasi Ekosistem dalam Hutan Alam pada Hutan Produksi Melalui Permohonan. <<http://www.dephut.go.id/index.php?q=id/node/4921>> accessed March 2011.
- Dephut (2008c) Departemen kehutanan menyerahkan sk iuphkk restorasi ekosistem hutan alam kepada PT. REKI. <<http://www.dephut.go.id/index.php?q=id/node/3352>> accessed March 2011.
- Dephut (2010) Tata cara pemberian dan perluasan areal kerja ijin usaha pemanfaatan hasil hutan kayu (IUPHHK) dalam hutan alam, IUPHHK restorasi ekosistem, atau IUPHHK hutan tanaman industri pada hutan produksi. <<http://www.dephut.go.id/index.php?q=id/node/6985>> accessed May 2011.
- Dephut (2011) Kemenhut beri IUPHHK – RE kepada PT. RHOI. <<http://www.dephut.go.id/index.php?q=id/node/6979>> accessed March 2011.
- Dublin H, Desai AA, Hedges S, Vié JC, Bambaradeniya C & Lopez A (2006) *Elephant Range State Meeting*. Unpublished IUCN-SSC Technical Report. Kuala Lumpur. Malaysia.
- Hamilton K, Sjardin M, Shapiro A & Marcello T (2009) *Fortifying the Foundation: State of the Voluntary Carbon Markets 2009*. New Carbon Finance and Ecosystem Market Place Technical Report, New York and Washington D.C. USA.
- Hardner J & Rice R (2002) Rethinking green consumerism. *Scientific American* **286**: 89-95.
- Hedges S, Tyson MJ, Sitompul AF, Kinnaird MF, Gunaryadi D & Aslan B (2005) Distribution, status and conservation needs of Asian elephant (*Elephas maximus*) in Lampung Province, Sumatra, Indonesia. *Biological Conservation* **124**: 35-48.
- Hedges S & Gunaryadi D (2010) Reducing human-elephant conflict: Do chilies help deter elephants from entering crop fields. *Oryx* **44**: 139-146.
- Leimgruber P, Gagnon JB, Wemmer CM, Kelly DS, Songer MA, Sellig ER (2003) Fragmentation of Asia's remaining wild lands: Implications for Asian elephant conservation. *Animal Conservation* **6**: 347-359.
- Melick D (2010) Credibility of REDD and experience from Papua New Guinea. *Conservation Biology* **24**: 359-361.
- Redford KH & Adams WM (2009) Payment for ecosystem services and challenge of saving nature. *Conservation Biology* **23**: 785-787.

Riddle H (2007) *Elephant Response Unit (ERU)*. *Gajah* **26**: 47-53.

Sitompul AF & Pratje P (2009) *The Bukit Tigapuluh Ecosystem Conservation Implementation Plan*. Frankfurt Zool. Society, Frankfurt, Germany.

Sitompul AF, Tyson MJ, Carroll JP & O'Brien TG (2010) Crop raiding by elephants adjacent to two national parks in Lampung Province, Sumatra, Indonesia. *Gajah* **33**: 26-34.

Sitompul AF (2011) *Ecology and Conservation of Sumatran Elephant (Elephas maximus sumatranus) in Sumatra, Indonesia*. Ph.D. thesis, University of Massachusetts, Amherst, USA.

Soehartono T, Susilo HD, Sitompul AF, Gunaryadi D, Purastuti EM, Azmi W, Fadhli N & Stremme C (2007) *The Strategic and Action Plan for Sumatran and Kalimantan Elephant*. Departemen Kehutanan, Jakarta, Indonesia.

Sukumar R (1992) *The Asian Elephant: Ecology and Management. Second Edition*. Cambridge

University Press, Cambridge, UK.

Uryu Y, Mott C, Foad N, Yulianto K, Budiman A, Setiabudi, Takakai F, Nursamsu, Sunarto, Purastuti E, Fadhli N, Hutajulu C, Jaenicke J, Hatano R, Siegert F & Stüwe M (2008) *Deforestation, Forest Degradation, Biodiversity Loss and CO₂ Emissions in Riau Sumatra, Indonesia*. WWF Indonesia Technical Report, Jakarta, Indonesia.

Uryu Y, Purastuti E, Laumonier Y, Sunarto, Setiabudi, Budiman A, Yulianto K, Sudibyo A, Hadian O, Kosasih DA & Stüwe M (2010) *Sumatra's Forests, their Wildlife and the Climate. Windows in Time: 1985, 1990, 2000, and 2009*. WWF-Indonesia Technical Report, Jakarta, Indonesia.

Laumonier Y, Uryu Y, Stüwe M, Budiman A, Setiabudi B & Hadian O (2010) Eco-floristic sectors and deforestation threats in Sumatra: identifying new conservation area network priorities for ecosystem-based land use planning. *Biodiversity Conservation* **19**: 1153-1174.



Wild elephant in Sampoנית, Aceh Jaya, Sumatra
Photo by Mahdi Ismail